FEDERAL COMMUNICATIONS COMMISSION

RULES AND REGULATIONS

(TITLE 47—TELECOMMUNICATION—CHAPTER I)

PART 1

RULES OF PRACTICE AND PROCEDURE

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PREFACE TO THE RULES AND REGULATIONS OF THE FEDERAL COMMUNICATIONS COMMISSION

The "Rules and Regulations of the Federal Communications Commission" incorporate all the rules and regulations of a general or permanent nature in force as of the effective date appearing at the beginning of each part. The title, "Title 47—Telecommunication," has been adopted for all the rules to correspond with the codification thereof under the provisions of the Federal Register Act, and also to correspond with the title under whieh the Communications Act is printed in the United States Code.

In preparing this compilation, the Commission has had in mind the necessity for an arrangement which would make the rules conveniently accessible and one which would also make provision for future amendments. To this end all the existing rules have been logically arranged under 26 parts, which have been suitably subdivided, employing nonconsecutive part numbers from 1 to 71, making provision for substitutions and additions.

The various parts are independently numbered, each part beginning with the principal section number allocated for the purpose and in keeping with the system of numbering which has been used, and these section numbers run consecutively only within the part. The first section of each part begins with ".1." Gaps are left in the numbering throughout so that new and amendatory provisions may be inserted with due regard to their relation to the compilation as a whole.

Each part has been printed and bound in separate pamphlet form, and each contains a title page listing the part numbers and titles of all the Rules and Regulations. In addition, explanatory footnotes have been included referring to statutes or treaties applicable to particular services and, so far as practicable, to other applicable parts.

It is intended that future amendments will be made available in such form that the substitute or added pages may be readily inserted within the part.

Provisions of the rules may be cited thus: "Section or § 1.1 Federal Communications Commission Rules."

Copies of these rules may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C.

THE RULES AND REGULATIONS OF THE FEDERAL COMMUNICATIONS COMMISSION ARE PUBLISHED IN SEPARATE PAMPHLETS, NUMBERED AND TITLED AS FOLLOWS

Part

1. Rules of Practice and Procedure.
2. General Rules and Regulations.
3. Standard Broadcast Stations.
4. Broadcast Services Other Than Standard Broadcast.
5. Experimental Radio Services.
6. Fixed Public Radio Services.
7. Coastal Radio Services.
8. Ship Radio Services.
9. Aviation Radio Services.
10. Emergency Radio Services.
11. Miscellaneous Radio Services.
12. Amateur Radio: Stations and Operators.
13. Commercial Radio Operators.
14. Radio Stations in Alaska.
31. Uniform System of Accounts, Class A and B Telephone Companies.
32. Units of Property: Telephone Companies.

Part

33. Accounting by Class C Telephone Companies.
34. Uniform System of Accounts, Radio Telegraph Carriers.
35. Uniform System of Accounts for Telegraph and Cable Companies.
41. Franks and Passes.
42. Destruction of Records.
43. Filing of Contracts, Periodic Reports, etc.
51. Classification of Telephone Employees.
61. Tariffs.
62. Applications for Interlocking Directorates.
71. Miscellaneous Rules and Regulations (Temporary Rules).

TABLE OF CONTENTS

Administrative Provisions

Personal Appearances; Practitioners

Parties

Applications and Amendments—General

Amendments to Pleadings

Petitions and Complaints

Subscription and Verification

SPECIFICATIONS AS TO DOCUMENTS AND PLEADINGS

SERVICE OF DOCUMENTS; COPIES

PROOF OF OFFICIAL RECORD

SUBPENAS

HEARINGS

INFORMAL HEARINGS

FORMAL HEARINGS

CONTINUANCES; EXTENSIONS

ORDER OF PROCEDURE

EVIDENCE

DEPOSITIONS

CONDUCT OF HEARINGS

MOTIONS DOCKET

REHEARINGS

SPECIAL PROVISIONS RELATING TO RADIO

(Applications under part I of title III of the act)

ACTION ON APPLICATIONS

ANSWERS TO NOTICES OF VIOLATION

REVOCATION AND MODIFICATION OF STATION LICENSES

SUSPENSION OF OPERATOR LICENSES

SPECIAL PROVISIONS RELATING TO COMMON CARRIERS

(Complaints under title II of the act)

EXTENSIONS OF CARRIER FACILITIES

ORDERS TO SHOW CAUSE

PROTESTS OF VALUATIONS

SUSPENSION OF TARIFF SCHEDULES

SERVICE AND NUMBER OF COPIES

Amendment No. 148 (Amending Sec. 1.1), effective December 26, 1942
To be substituted for pp. 1-2, Part 1, Rules of Practice and Procedure
The last previous amendment affecting Part 1 was amendment No. 119, pp. 15-16, effective February 24, 1942.

PART 1.--RULES OF PRACTICE AND PROCEDURE

ADMINISTRATIVE PROVISIONS

§1.1 Offices; hours.—The principal office of the Commission shall be located at Washington, D. C., and all communications to it shall be addressed to the Secretary, Washington, D. C., unless otherwise specifically directed. The hours of the Commission are from 9:15 a.m. to 5:45 p.m., Monday to Saturday, inclusive, except on legal holidays.

§1.2 Meetings.—All meetings of the Commission, unless otherwise determined by a majority of the members thereof, shall be held at the principal office of the Commission.

§1.3 Minutes.—The minutes of a meeting of the Commission shall be the official record of any action taken therein, and shall be kept by, and in the office of, the secretary.

§1.4 Authentication of documents.—All orders, permits, licenses, or other instruments of authorization made, issued, or granted by the Commission, shall, unless otherwise specifically provided by order of the Commission, be signed by the secretary in the name of the Commission and authenticated by the seal of the Commission.

§1.5 Inspection of records.—Subject to the provisions of sections 4 (j), 412, and 606 of the Act, the files of the Commission shall be open to inspection as follows:

(a) Tariff schedules required to be filed under section 203 of the Act and annual and monthly reports required to be filed under section 219 of the Act.

(b) All applications and amendments thereto filed under title II and title III of the Act, including all documents and exhibits filed with and made a part thereof; authorizations and certifications issued upon such applications; all pleadings, depositions, exhibits, transcripts of testimony, examiners' reports, exceptions, briefs, proposed reports or findings of fact and conclusions, minutes, and orders of the Commission.

(c) Other files in the discretion of the Commission upon written request describing in detail the documents to be inspected and the reasons therefor.

§1.6 Certified copies; requests for; costs.—Copies of any documents subject to inspection under the provisions of section 1.5 will be prepared and certified by the secretary,

under seal, on written request, specifying the exact documents, the number of copies desired, and the date on which the same will be required: *Provided, however,* That such request must be made so as to permit a reasonable time for the preparation of such copies: *And provided further*, That any cost incurred in the preparation of such copies shall be prepaid by the person making application therefor.

§1.7 Official reporter; transcript.—The Commission will designate from time to time an official reporter for the taking down and transcribing of its proceedings. No transcript of the testimony taken, or argument had, at any hearing will be furnished by the Commission, but will be open to inspection under section 1.5. Such transcript, if desired, must be obtained from the official reporter upon payment of the charges therefor.

§1.8 Person, defined.—Wherever in these rules the term "person" is used, it shall include an individual, partnership, association, joint-stock company, trust, or corporation.

§1.9 Computation of time.—In computing any period of time prescribed or allowed by these rules, by order of the Commission, or by any applicable statute, the day of the act, event, or default, after which the designated period of time begins to run is not to be included. The last day of the period so computed is to be included, unless it is a Sunday or a legal holiday, in which event the period runs until the end of the next day which is neither a Sunday nor a holiday. When the period of time prescribed or allowed is less than 7 days, intermediate Sundays and holidays shall be excluded in the computation. A half holiday shall be considered as other days and not as a holiday.

§1.10 Additional time to parties in certain cases.—Where, under these rules, unless otherwise expressly provided, any limitation is made as to the time within which any document is required to be filed, or any procedural step is required to be taken in connection with any hearing, parties who are residents of Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, and California shall have an additional period of 5 days; and parties who reside beyond the confines of the continental United States shall have an additional period of 20 days within which to file such document or take such other procedural step: *Provided, however,* That this rule shall not apply to any limitation as to time fixed by statute.

§1.11 Documents in foreign languages.—Every document, exhibit, or other paper written in a language other than English, which shall be filed in any proceeding before the Commission or in response to any order of the Commission unless expressly waived therein, shall be filed in the language in which it is written together with an

English translation thereof duly verified under oath to be a true translation. Each copy of every such document, exhibit, or other paper filed, shall be accompanied by a separate copy of the translation.

§ 1.21 **Suspension, amendment, etc., of rules.**—The rules and regulations of the Commission may be suspended, revoked, modified, amended, or supplemented, in whole or in part, at any time by the Commission.

§ 1.31 **Appearances.**—Any individual, receiver, or trustee may appear and be heard in person or by attorney. A partnership may appear and be represented by any member thereof or by attorney. A corporation, association, joint-stock company, or trust, may appear only by attorney.

§ 1.32 **Authority for representation.**—Any person, in a representative capacity, transacting business with the Commission, may be required to show his authority to act in such capacity.

§ 1.33 **Persons who may be admitted to practice.**—Attorneys at law admitted to practice before any court of the United States, the District of Columbia, or the highest court of any State or Territory, upon application may be admitted to practice before the Commission. An attorney at law from any place other than the District of Columbia may, in the discretion of the Commission or the official presiding at any hearing, be admitted for a particular case in which he may be employed.

§ 1.34 **Applications for admission.**—Applications for admission to practice shall be on a form prescribed and provided by the Commission. (See appendix No. 1.)

§ 1.35 **Oath.**—No person shall be admitted to practice before the Commission until he shall have subscribed to an oath or affirmation that he will demean himself as a practitioner before the Commission, uprightly and according to law; and that he will support the Constitution and laws of the United States and will conform to the Rules and Regulations of the Commission.

§ 1.36 **Suspension; disbarment.**—The Commission may censure, suspend, disbar, or revoke the right of any person who has been admitted to practice before it if it finds that such person has violated his oath taken upon admission; or has, in obtaining admission, concealed any material facts with reference to his legal qualifications, professional standing, character, or integrity, or has failed to conform to recognized standards of professional conduct: *Provided, however*, That before any member of the bar of this Commission shall be censured, suspended, disbarred, or his right to practice before the Commission revoked, charges shall be preferred by the Commission against such practitioner and he shall be afforded an opportunity to be heard thereon.

Amendment No. 28 (Amending Sec. 1.38) effective August 19, 1940

To be substituted for p. 5-6, Part 1, Rules of Practice and Procedure.

1.37 Register of practitioners.—A register will be maintained by the Commission in which will be entered the names of all persons entitled to practice before the Commission. Only individuals will be admitted or recognized.

1.38 Former employees.—*(a)* No member, officer, or employee of the Commission shall, within 2 years after his service with the Commission is terminated, appear as attorney before the Commission in any cause or application which he has handled or passed upon while in the service of the Commission.

(b) No member, officer or employee of the Commission (1) whose active service with the Commission has terminated but who is receiving pay while on annual leave not taken prior to separation from such active service, or (2) who is in any other leave status, shall appear as attorney or participate in the preparation or handling of any matter before, or to be submitted to, the Commission.

1.39 Appearance blanks.—Each attorney representing a party to any proceeding shall enter his appearance, in duplicate, on the form prescribed for the purpose by the Commission prior to participating in such proceeding, which appearance shall be made a part of the record. (See appendix No. 2.)

§ 1.51 **Parties, defined.**—The term "party" shall include any person, body politic, municipal organization, or State Commission. Parties to proceedings will be designated as applicants, complainants, defendants, petitioners, interveners, protestants, or respondents.

§ 1.52 **Applicant.**—The term "applicant" means a party applying for a certificate, certification, permit, license, or such other instrument of authorization as the Commission is empowered to grant, and for which an application is required.

§ 1.53 **Complainant.**—The term "complainant" means a party who complains to the Commission of anything done or omitted to be done by any common carrier subject to the act in violation of the provisions thereof.

§ 1.54 **Intervener.**—The term "intervener" means a party who, upon petition, has been permitted to become a party to any proceeding before the Commission.

§ 1.55 **Protestant.**—The term "protestant" means a party opposing the schedules under suspension in investigation and suspension proceedings, or a party who files a protest to a tentative valuation in valuation proceedings.

§ 1.56 **Petitioner.**—The term "petitioner" means a party other than as defined above seeking relief within the jurisdiction of the Commission.

§ 1.57 **Defendant.**—The term "defendant" means a common carrier subject to the act against whom a complaint has been filed of anything done or omitted to be done in violation of the provisions of the act.

§ 1.58 **Respondent.**—The term "respondent" means a party against whom the Commission has, on its own motion, instituted an inquiry, investigation, revocation, suspension, modification, cancelation, or other proceeding.

§ 1.59 **Receiver or trustee of carrier.**—The receiver or trustee of any common carrier subject to the act shall be made a party to any proceeding in which such carrier is a party.

§ 1.60 **Substitution of parties.**—The Commission in a proper case may order a substitution of parties; in case of death of a party, upon suggestion thereof; and in other circumstances, for good cause shown, upon petition.

FEDERAL COMMUNICATIONS COMMISSION
RULES AND REGULATIONS

Amendment No. 67 (Amending sections 1.71. 1.72 and adopting section 1.81) effective May 29, 1941
To be substituted for p. 7-8, Part 1, Rules of Practice and Procedure

APPLICATIONS AND AMENDMENTS---GENERAL

§ 1.71 Applications made on prescribing forms; exceptions.--Each application for an instrument of authorization shall comply With the Commission's Rules and Regulations and shall be made in writing, subscribed and verified as provided in section 1.121 on a form furnished by or in the manner prescribed by the Commission: *Provided, however*, That in emergency cases the Commission may waive the requirements of formal application with respect to applications for other than radio licenses and for licenses, renewals, or modification thereof for stations on vessels or aircraft of the United States, pursuant to section 308 *(a)* of the act. Separate application shall be filed for each instrument of authorization requested: *Provided, however*, That in cases arising in services other than broadcast where a single licensee holds a number of licenses which are identical in their terms or which are identical in their terms with the exception of station locality, and in other cases in the descretion of the Commission, a single application may be filed for renewal or modification of such licenses, where such single application sets forth in detail and in unmistakable language, an accurate description of the individual licenses sought to be renewed or modified. The required forms may be obtained from the Commission or from any of its field offices. (For a list of such offices and related geographical districts, see appendix No. 3.)

§ 1.72 Defective applications.--*(a)* Applications which are defective with respect to completeness of answers to required questions, execution, or other matters of a purely formal character will not be received for filing by the Commission unless the Commission shall otherwise direct.

(b) If an applicant is requested by the Commission to file any documents or information not included in the prescribed application form, a failure to comply with such request will constitute a defect in the application.

(c) Applications which are not in accordance with the Commission's rules, regulations or other requirements will be considered defective unless accompanied either (1) by a petition in accordance with Section 1.81 to amend any rule or regulation with which the appli-

cation is in conflict, or (2) by a request of the applicant for waiver of, or an exception to, any rule, regulation or requirement with which the application is in conflict. Such request shall show the nature of the waiver or exception desired and set forth the reasons in support thereof.

(d) Defective applications will not be considered by the Commission.

§ 1.73 Amendments and dismissals; when allowed.--Any application may be amended or dismissed without prejudice as a matter of right prior to the designation of such application for hearing. Thereafter, requests to amend or dismiss without prejudice will be considered only upon written motion served upon all parties of record as provided in section 1.141.

When leave to amend has been granted after an application has been designated for hearing, the application will not be removed from the hearing docket unless the Motions Commissioner shall determine that the proposed amendment substantially affects the issues upon which the application has been designated for hearing and orders that the application shall be removed from the hearing docket. An amended application which has been removed from the hearing docket will be reexamined by the Commission and when necessary will be redesignated for hearing at a subsequent time.

§ 1.74 Form of amendments.--Any amendment to an application shall be subscribed, verified, and submitted in the same manner, and with the same number of copies, as was the original application.

§ 1.75 Amendments ordered.--The Commission may, upon its own motion or upon motion of any party to the proceeding, order the applicant to amend his application so as to make the same more definite and certain.

§ 1.76 Withdrawal of papers.--The granting of a request to dismiss or withdraw an application or a pleading does not authorize the removal of such application or pleading from the Commission's records. No application or other document once officially filed shall be returned unless the Commission shall, for good cause shown, order such return.

§ 1.77 Failure to prosecute applications not designated for hearing.--The following provisions shall apply to applications which have not been designated for hearing. An applicant not desiring to prosecute his application may request the dismissal of same without prejudice. A request of an applicant for the return of an application which has been officially filed will be considered as a request to dismiss the same without prejudice. Any application which has not been designated for hearing and which by reason of failure to respond to official correspondence or otherwise is subject to dismissal for non-prosecution will be dismissed without prejudice.

AMENDMENTS OF RULES

§ 1.81 Requests for amendment of rules.—Any person may petition for amendment of any rule or regulation. Such petition shall show the desired change in the rules and regulations and set forth the reasons in support thereof.

AMENDMENTS TO PLEADINGS

§ 1.91 Time for filing; disposition.--Any pleading may be amended as a matter of right if filed with the Commission not less than 30 days prior to the date set for hearing in the proceeding in which the pleading is filed. Thereafter, requests for leave to amend will be considered only upon written motion. Amendments, amended pleadings, or requests for leave to amend must be served upon all parties of record as provided in section 1.141 prior to filing. Amendments to applications may be determined only as provided in section 1.73.

Amendment No. 292 (Adopting footnotes to Sections 1.102 and 1.271; repealing Sections 1.381 and 1.382; and adopting new Sections 1.381 through 1.387) effective January 16, 1946, pp. 9-10, 25-26, 33-34, 34a-34b, 34c-34d.

To be substituted for pp. 9-10, 25-26, and 33-34, Part 1, Rules of Practice and Procedure.

The last previous amendment affecting Part 1 was Amendment No. 261, pp. 1-2, 2a, 26a-26b, 26c, 29-30.

PETITIONS AND COMPLAINTS

§ 1.101 General.—Petitions for relief under the jurisdiction of the Commission shall set forth clearly and concisely the petitioner's interest and the facts supporting the relief sought. (See also section 1.81 and 1.72(c).)

§ 1.102 Intervention.*— Petitions for intervention must set forth the grounds of the proposed intervention, the position and interest of the petitioner in the proceeding, the facts on which the petitioner bases his claim that his intervention will be in the public interest, and must be subscribed or verified in accordance with section 1.122. The granting of a petition to intervene shall have the effect of permitting intervention before the Commission but shall not be considered as any recognition of any legal or equitable right or interest in the proceeding. The granting of such petition shall not have the effect of changing or enlarging the issues which shall be those specified in the Commission's notice of hearing unless on motion the Commission shall amend the same.

§ 1.103 Complaints.—Communications to the Commission complaining of anything done, or omitted to be done, in contravention of the provisions of the act, except formal and informal complaints filed under 'Special provisions relating to common carriers" hereof, may, in the discretion of the Commission, be investigated or otherwise acted upon in any manner the Commission may deem expedient; but such communications shall not be deemed to be either formal or informal complaints within the meaning of these rules, irrespective of any action taken thereon by the Commission.

*For specific rules regarding petitions to intervene in connection with applications under Title III, see section 1.385.

SUBSCRIPTION AND VERIFICATION

§ 1.121 **Applications; amendments.**—Each application or amendment thereto shall be personally subscribed and verified: (1) By the party filing such application or amendment, or by one of the parties, if there be more than one; (2) by an officer of the party filing the application or amendment if the party be a corporation: *Provided, however,* That subscription and verification may be made by the attorney for the party (1) in case of physical disability of the party, or (2) his absence from the continental United States. If it be made by a person other than the party, he must set forth in the verification the grounds of his belief as to all matters not stated upon his knowledge and the reason why it is not made by the party.

§ 1.122 **Pleadings.**—All pleadings (not including applications or amendments thereto) filed by any party represented by an attorney, shall be signed by at least one attorney of record in his individual name, whose address shall be stated. A party who is not represented by an attorney shall sign and verify his pleading and state his address. Except when otherwise specifically provided by rule or statute, pleadings signed by the attorney for a party need not be verified or accompanied by affidavit. The signature of an attorney constitutes a certificate by him that he has read the pleading; that to the best of his knowledge, information, and belief there is good ground to support it; and that it is not interposed for delay. If a pleading is not signed or is signed with intent to defeat the purpose of this section, it may be stricken as sham and false and the matter may proceed as though the pleading had not been served. For a willful violation of this rule an attorney may be subjected to appropriate disciplinary action. Similar action may be taken if scandalous or indecent matter is inserted.

PROOF OF OFFICIAL RECORD

§ 1.151 **Authentication of copy.**—An official record, or entries therein when admissible for any purpose, may be evidenced by an official publication thereof or by a copy attested by the officer having legal custody of the record, or by his deputy, and accompanied with a certificate that such officer has the custody. If the office in which the record is kept is within the United States or within a territory or insular possession subject to the dominion of the United States, the certificate may be made by the judge of a court of record of the district or political subdivision in which the record is kept, authenticated by the seal of the court, or may be made by any public officer having a seal of office having official duties in the district or political subdivision in which the record is kept, authenticated by the seal of his office. If the office in which the record is kept is in a foreign state or country, the certificate may be made by a secretary of embassy or legation, consul general, consul, vice consul, or consular agent or by any officer in the foreign service of the United States stationed in the foreign state or country in which the record is kept, and authenticated by the seal of his office.

§ 1.152 **Proof of lack of record.**—A written statement signed by an officer having the custody of an official record or by his deputy that after diligent search no record or entry of a specified tenor is found to exist in the records of his office accompanied by a certificate as above provided, is admissible as evidence that the records of his office contain no such record or entry.

§ 1.153 **Other proof.**—This rule does not prevent the proof of official records or of entry or lack of entry therein by any method authorized by any applicable statute or by the rules of evidence at common law.

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§ 1.171 **Who may sign and issue.**—Subpenas requiring the attendance and testimony of witnesses, and subpenas requiring the production of any books, papers, schedules of charges, contracts, agreements, and documents relating to any matter under investigation or hearing may be signed and issued as follows: (*a*) Hearings before the Commission en banc; by any Commissioner; (*b*) hearings before any designated officer; (1) by any Commissioner; (2) the officer designated to hear a case may sign and issue subpenas in that case; (*c*) in other cases: By any Commissioner.

§ 1.172 **Requests; verification and content.**—Unless directed by the Commission upon its own motion, subpenas will be issued only upon request in writing. Requests for subpenas to compel witnesses to produce documentary evidence must be subscribed and verified in accordance with section 1.122 and must specify with particularity the books, papers, or documents desired, and the facts expected to be proved thereby.

§ 1.173 **Witness fees.**—Witnesses who are subpenaed and respond thereto are entitled to the same fees including mileage as are paid for like service in the courts of the United States, such fees to be paid by the party at whose instance the testimony is taken at the time the subpena is served.

§ 1.174 **Service of subpenas; return.**—(*a*) A subpena may be served by a United States marshal or his deputy or by any other person who is not a party and is not less than 18 years of age. Service of a subpena upon a person named therein shall be made by delivering a copy thereof to such person and by tendering to him the fees for 1 day's attendance and the mileage allowed by law. When the subpena is issued on behalf of the United States or an officer or agency thereof, fees and mileage need not be tendered.

(*b*) If made by any other person, such person shall make affidavit thereof, stating the date, time, and manner of service; and return such affidavit on, or with, the original subpena in accordance with the form thereon. In case of failure to make service the reasons for the failure shall be stated on the original subpena. In making service, the original subpena shall be exhibited to the person served, shall be read to him if he is unable to read, and a copy thereof shall be left with him. The original subpena, bearing or accompanied by the required return, affidavit, or statement, shall be returned forthwith to the secretary of the Commission, or, if so directed on the subpena, to the presiding officer before whom the person named in the subpena is required to appear.

HEARINGS

§ 1.191 Classes.—Hearings before the Commission may be formal or informal.

INFORMAL HEARINGS

§ 1.192 **Informal; procedure.**—The Commission may upon petition by any person or upon its own motion hold such informal hearings as it may deem necessary from time to time in connection with the investigation of any matter which it has power to investigate under the law, or for the purpose of obtaining information necessary or helpful in the determination of its policies, the carrying out of its duties, or the formulation or amendment of its Rules and Regulations. For such purposes it may subpena witnesses and require the production of testimony as in formal hearings but the procedure to be followed shall be informal and such as in the opinion of the Commission will best serve the purposes of such hearing.

FORMAL HEARINGS

§ 1.193 **Hearing date on related matters.**—In fixing dates for hearings the Commission will, so far as practicable, endeavor to fix the same date for separate hearings (*a*) on all related matters which involve the same applicant, or arise out of the same complaint or cause; and (*b*) for separate hearings on all applications which by reason of the privileges, terms, or conditions requested present conflicting claims of the same nature.

§ 1.194 **Consolidation of cases.**—The Commission, upon motion, or upon its own motion, will, where such action will best conduce to the proper dispatch of business and to the ends of justice, consolidate for hearing (*a*) any cases which involve the same applicant or arise from the same complaint or cause, or (*b*) any applications which by reason of the privileges, terms, or conditions requested present conflicting claims of the same nature.

§ 1.195 **Communications relating to applications.**—There will be maintained in the office of the secretary of the Commission a record of all communications received by the Commission relating to the merits of any application pending before the Commission requesting the granting, renewal, modification, or revocation of any license or construction permit, certificate of convenience and necessity, or rate schedule. Such record shall show the name and address of the person making the statement and the substance of such statement. When the date of hearing has been set, if the matter is designated for hearing, the secretary shall notify all persons shown by the

records to have communicated with the Commission regarding the merits of such matter in order that such persons will have an opportunity to appear and give evidence at such hearing: *Provided*, That in the case of communications bearing more than one signature, notice shall be given to the person first signing unless the communication clearly indicates that such notice should be sent to some one other than such person.

No such person shall be precluded from giving any relevant material and competent testimony at such hearing because he lacks a sufficient interest to justify his intervention as a party in the matter.

No such communication will be considered by the Commission in determining the merits of any such matter nor shall any such communication be considered by any examiner unless it has been introduced into evidence at the hearing and appears as a part of the record. The admissibility of any such communication or the secretary's record of any such communication shall be governed by the applicable rules of evidence, and no such communication shall be admissible on the basis of a stipulation unless Commission's counsel as well as counsel for all of the parties shall join in such stipulation.

Such communications, however, may be considered by the Commission if circumstances warrant in deciding whether or not a matter shall be set down for hearing in cases where in the absence of such communication no hearing would be required by the Commission.

§ 1.196 **Notice of hearing under part I of title III.**—In cases arising under part I of title III of the act notice of applications received and action thereon shall be given in the following manner:

(*a*) By publishing the notice of hearing in the Federal Register not less than 30 days in advance of the hearing date;

(*b*) Notice of the filing of all applications under part I of title III of the act and of the date fixed for hearing on such applications shall be published weekly in the office of the Commission and posted in the office of the secretary and such lists shall be mailed to all persons who, in writing, request this service.

§ 1.197 **Notice of hearing under title II or part II of title III.**—In cases arising under title II or part II of title III of the act, except if specific provision is made by statute or by these rules for actual or constructive notice, the Commission shall give or require reasonable notice.

CONTINUANCES: EXTENSIONS

§ 1.201 **Continuances and extensions.**—Continuance in respect to any proceeding or hearing pending before the Commission and extensions of time for making any filing or performing any act required or allowed to be done within a specified time may be granted upon motion for good cause shown, except where the time for performance or filing is limited by statute.

§ 1.202 **Postponement or change of place.**—The Commission or the presiding officer at a hearing may, after opening any hearing pursuant to notice, recess or adjourn the same for such time as may be necessary, or change the place thereof.

§ 1.203 **Motions involving delay.**—Requests for continuance shall show diligence by the moving party and shall be made at such time and in such manner as to avoid unnecessary hardship or expense to the parties to the proceeding. Such motions shall show service upon all parties as provided in section 1.141.

ORDER OF PROCEDURE

§ 1.204 **Order of procedure.**—At hearings on complaints, petitions, applications, or other proceedings for instruments of authorization which the Commission is empowered to issue, the complainant, petitioner, or applicant as the case may be, shall open and close. At hearings on investigation and suspension proceedings under title II of the act, the respondent whose tariffs are under suspension shall open and close. At hearings in all other investigations, the party to whom the order to show cause was issued shall open and close. At hearings under title III of the act on revocations and suspension of operator licenses or modifications of licenses under section 312 (b) of the act, or other like proceedings instituted by the Commission, the Commission shall open and close. In hearings upon a consolidated record, the Commission or presiding officer shall designate the order of presentation. Interveners shall follow the party in whose behalf intervention is made, and in all cases where the intervention is not in support of an original party, the Commission, or presiding officer, shall designate at what stage such interveners shall be heard.

EVIDENCE

§ 1.211 **Rules of evidence.**—Except as otherwise provided herein, the rules of evidence governing civil proceedings in matters not involving trial by jury in the courts of the United States shall

govern formal hearings before the Commission: *Provided, however,* That such rules may be relaxed in any case where the ends of justice will be better served by so doing.

§ 1.212 **Cumulative evidence.**—The introduction of merely cumulative evidence shall be avoided, and the number of witnesses that may be heard in behalf of a party on any issue may be limited.

§ 1.213 **Further evidence during hearing.**—At any stage of a hearing, the presiding officer may call for further evidence upon any issue and may require such evidence to be presented by any party to the proceeding.

§ 1.214 **Documents containing matter not material.**—Where material and relevant matter offered in evidence is embraced in a document containing other matter not material or relevant, and not intended to be put in evidence, such document will not be received, but the party offering the same shall present to opposing counsel, and to the Commission, the original document, together with true copies of such material and relevant matter taken therefrom, as it is desired to introduce. Upon presentation of such matter in proper form, it may be received in evidence, and become a part of the record: *Provided, however,* That opposing counsel shall be afforded an opportunity to introduce in evidence, in like manner, other portions of such document if found to be material and relevant.

§ 1.215 **Copies of exhibits.**—No document or exhibit, or part thereof shall be received as, or admitted in, evidence unless offered in duplicate. In addition, when exhibits of a documentary character are to be offered in evidence, copies must be furnished to opposing counsel unless the presiding officer otherwise directs. Whenever practicable the parties should interchange copies of exhibits before or after commencement of the hearing.

§ 1.216 **Mechanical reproductions as evidence.**—Unless offered for the sole purpose of attempting to prove or demonstrate sound effect, mechanical or physical reproductions of sound waves shall not be admitted in evidence. Any party desiring to offer any matter alleged to be contained therein or thereupon shall have such matter typewritten on paper of the size prescribed by the rules of the Commission, and the same shall be identified and offered in duplicate in the same manner as other exhibits.

§ 1.217 **Tariffs as evidence.**—In case any matter contained in a tariff schedule on file with the Commission is offered in evidence, such tariff schedule need not be produced or marked for identification, but the matter so offered shall be specified with particularity (tariff and page number) in such manner as to be readily identified, and may be received in evidence by reference subject to check with the original tariff schedules so on file.

§ 1.221 **Request for orders to take; time of filing; contents.**—The Commission, either on its own motion, or on formal notice of a party to a proceeding, will issue an order to take a deposition. Motions to take depositions shall be filed with the Commission not less than 25 days before the proposed date for taking of the depositions, and shall set forth the names and addresses of the witnesses, a specific statement as to each witness of the matters and facts concerning which it is expected such witness will testify, the place where, the time when, the officer before whom, and the cause or reason why such deposition should be taken. Such motion shall be subscribed and verified as provided in section 1.122, and shall be accompanied by proof of service and by the proposed order in a sufficient number of copies to be served on all parties. If said order is allowed, the secretary shall mail a copy thereof to all parties to the proceeding at least 15 days prior to the date fixed for the taking of testimony.

§ 1.222 **Contents of order.**—The order issued authorizing the taking of a deposition shall state the name and address of each witness, the matters and facts concerning which it is expected such witness will testify, the place where, the time when, and the designated officer before whom the witness is to testify as provided in section 409 (e) of the act.

§ 1.223 **Record of examination; oath; objections.**—The officer before whom the deposition is to be taken shall put the witness on oath and shall personally, or by some one acting under his direction and in his presence, record the testimony of the witness. The testimony shall be taken stenographically and transcribed, unless the parties agree otherwise. All objections made at the time of the examination to the qualifications of the officer taking the deposition, or to the manner of taking it, or to the evidence presented, or to the conduct of any party, and any other objection to the proceedings, shall be noted by the officer upon the deposition. Evidence objected to shall be taken subject to the objections. In lieu of participating in the oral examination, parties served with notice of taking a deposition may transmit written interrogatories to the officer, who shall propound them to the witness and record the answers verbatim.

§ 1.224 **Submission to witness; changes; signing.**—When the testimony is fully transcribed the deposition of each witness shall be submitted to him for examination and shall be read to or by him.

Any changes in form or substance which the witness desires to make shall be entered upon the deposition by the officer with a statement of the reasons given by the witness for making them. The deposition shall then be signed by the witness, unless the parties by stipulation waive the signing or the witness is ill or cannot be found or refuses to sign. If the deposition is not signed by the witness, the officer shall sign it and state on the record the fact of the waiver or of the illness or absence of the witness or the fact of the refusal to sign together with the reason, if any, given therefor; and the deposition may then be used as fully as though signed, unless on a motion to suppress the Commission holds that the reasons given for the refusal to sign require rejection of the deposition in whole or in part.

§ 1.225 **Certification and filing by officer; copies.**—The officer shall certify on the deposition that the witness was duly sworn by him and that the deposition is a true record of the testimony given by the witness, and that said officer is not of counsel or attorney to either of the parties, nor interested in the event of the proceeding or investigation. He shall then securely seal the deposition in an envelope endorsed with the title of the action and marked "Deposition of (here insert name of witness)" and shall promptly send the original and one copy thereof together with the original and one copy of all exhibits by registered mail to the secretary of the Commission.

§ 1.226 **Waiver of objections.**—Objections to the form of question and answer shall be made before the officer taking the depositions, and if not so made, shall be deemed waived: *Provided, however*, That if no representative of the Commission is present at the taking of the deposition of any witness, such deposition shall be received in evidence at the hearing when offered subject to such legal objection by the Commission as may be proper.

§ 1.227 **Time of filing.**—All depositions shall be filed with the Commission not later than 5 days before the date of the hearing in which they are to be offered as evidence, and section 1.10 shall not apply or in any wise serve to extend this time: *Provided, however*, That the presiding officer at any hearing may, on motion which shall show diligence on the part of the moving party, waive the requirements of this section.

§ 1.228 **Inclusion in record.**—No deposition shall constitute a part of the record in any proceeding until received in evidence at a hearing, unless otherwise ordered by the Commission.

CONDUCT OF HEARINGS

§ 1.231 **Conduct of hearings.**—Except for hearings before the Commission en banc the Commission will provide for the conduct of each hearing by a specific order of reference and unless otherwise specified in such order:

(*a*) *Authority of presiding officer.*—The presiding officer at the hearing shall have authority to administer oaths, examine witnesses, and receive evidence at any place in the United States designated by the Commission, and to rule upon the admissibility of evidence and other matters that normally and properly arise in the course of the hearing, but shall have no power to decide any motion to dismiss the proceeding or other motion which involves final determination of the merits of the proceeding.

(*b*) *Transcript filed with Secretary.*—After the close of the hearing the complete transcript of testimony taken, together with any exhibits and any briefs or memoranda of law filed theretofore on behalf of any party, shall be filed in the office of the secretary of the Commission.

(*c*) *Corrections to transcripts.*—Suggested corrections to transcripts of records shall be considered only if offered within 10 days after the date the transcript is filed with the Commission. Suggested corrections shall be served upon all other parties participating in the proceeding as provided in section 1.141 prior to the filing with the Commission. The presiding officer at the hearing shall have authority to act upon motions to correct the record.

(*d*) *Findings proposed by parties.*—Within 20 days from the filing of the transcript of record of the hearing, each party to the proceeding shall file with the Commission proposed findings of fact and conclusions which shall be served upon all parties participating in the hearing in the manner provided in section 1.141. Failure to file proposed findings of fact and conclusions by any such party within the time so required, shall be deemed a waiver by such party of any right of further participation in the proceeding, including oral argument if any is held.

(*e*) *Contents of findings proposed by parties.*—Such proposed findings of fact shall be set forth in serially numbered paragraphs and shall set out in detail and with particularity all basic evidentiary facts developed by the evidence (with appropriate citations to the transcript of record or exhibits relied on) supporting the conclusions

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proposed by the party filing same. Proposed conclusions shall be separately stated. Proposed findings of fact and conclusions submitted by a person other than an applicant may be limited to those issues in connection with the hearing which affect the interests of such person. Such proposed findings and conclusions may be accompanied by briefs or memoranda of law.

(*f*) *Proposed decisions of Commission.*—The Commission will thereafter enter its proposed report or findings of fact and conclusions: *Provided, however*, That if the proposed findings of fact and conclusions filed by the parties present no substantial conflict, and the Commission is in accord with the ultimate conclusions proposed, it will, if it deems such action will best conduce to the proper dispatch of business and to the ends of justice, issue a final order with or without findings of fact and conclusions in lieu of issuing its proposed findings of fact and conclusions in accordance with this paragraph.

(*g*) *Exceptions; oral argument.*—Within 20 days from the filing of the Commission's proposed report or findings of fact and conclusions the parties to the proceeding may file exceptions to the same which shall point out with particularity alleged errors in said report or findings of fact and conclusions and shall contain specific reference to the page of the transcript of hearing or exhibit on which the exception is based, such exceptions shall be accompanied by a memorandum brief in support thereof, and may request oral argument.

(*h*) *Reply briefs.*—Reply memorandum briefs may be filed by any party to the proceeding within 30 days from the filing of the Commission's proposed report or findings of fact and conclusions. If no request for oral argument is made within said 30-day period all parties shall be considered as waiving any right thereto.

(*i*) *Service of exceptions or briefs.*—At or prior to the date fixed for the filing of any exceptions, memorandum brief, or request for oral argument, the party filing the same shall serve at least one copy thereof, as provided in section 1.141, upon all other parties to the proceeding, and no exceptions or memorandum brief will be accepted or considered by the Commission unless accompanied by an affidavit showing this requirement has been met.

(*j*) *Request for oral argument; waiver.*—Within 5 days of the filing with the Commission of a request for oral argument by any party to a proceeding all parties to such proceeding shall file written notice of desire to appear and participate in such oral argument. In the absence of the filing of such written notice by any party his right to oral argument will be considered as waived.

(k) *Number of copies.*—Fifteen copies of any proposed findings of fact and conclusions, exceptions, or memorandum briefs filed in connection with any hearing shall be filed with the Commission.

§ 1.232 **Hearings before more than one person.**—The authority to perform any act in connection with a hearing vested in a "presiding officer" under these rules shall be vested in a majority of the persons conducting the hearing if the hearing is conducted by more than one person.

MOTIONS DOCKET

§ 1.251 **Matters to be heard.**—All motions, petitions, or matters in cases designated for formal hearing, excepting motions and petitions requesting final disposition of a ease on its merits, those having the nature of an appeal to the Commission, and those requesting ehange or modification of a final order made by the Commission, shall be placed upon the motions docket for hearing.

§ 1.252 **Proposed orders.**—All motions or petitions shall be accompanied by a proposed order or orders which, if the relief requested is granted, may be entered in the doeket of the proceeding so as to evidence all aetion taken on the motion or petition.

§ 1.253 **Time of calling; continuances.**—The motions docket will be called at the offiees of the Commission at such times as the Commission may designate, and the presiding officer shall have the authority to continue any motion, petition, or other matter presented to a future date, and may, proper notiee having been given, hear any motion at any time.

§ 1.254 **Time for filing motions.**—No such motion, petition, or other matter presented shall be ealled, eonsidered, or determined in the absence of consent by all parties unless the same shall have been on file, accompanied by proof of service upon all interested parties, with the Commission for a period of 5 days: *Provided, however*, That all petitions, motions, or other matters involving parties residing in the States set out in seetion 1.10 or residing beyond the continental limits of the United States shall not be called, considered, or determined in the absence of consent of all parties until the expiration of 7 days.

§ 1.255 **Oppositions; right to be heard.**—During the time specified in section 1.254, any party in interest shall have the right to file an opposition thereto. Such opposition shall show service on the petitioner or moving party. Parties filing oppositions shall have the right to be heard on the day designated for hearing of the motion, petition, or other matter against which the opposition is directed. Any party desiring to waive oral argument on any motion, or opposition thereto, may indicate such desire by an appropriate notation or by a statement to that effect upon the eall of the docket. In ease oral argument is waived by any party, such motion or opposition shall be considered together with any memoranda or briefs which may be filed in support thereof; and the waiving of oral argu-

ment by any party shall not preclude the holding of oral argument by any other party desiring same.

§ 1.256 Adverse ruling; exceptions.—Where a ruling on any petition, motion, or other matter is adverse to an interested party said interested party may except thereto, and when the matter comes on for the hearing of the evidence, he shall state into the record at such hearing that he reserves an exception to the ruling made by the presiding officer of the motions docket and request that such exception be noted and carried forward in the record. In the event such interested party fails to note his exception taken at the time ruling was made by the presiding officer of the motions docket, such exception shall be considered waived. Within 2 days from the date of any ruling on any petition, motion or other matter by the presiding officer of the motions docket, any interested party may petition for a review of such ruling by a quorum of the Commission, such petition for review shall not be essential for the preservation of any exception taken.

REHEARINGS

§ 1.271 **Petitions; contents.***—Any party whose interests are aggrieved or adversely affected by any decision, order, or requirement of the Commission may file a petition for rehearing of the same or any matter determined therein as provided in section 405 of the act. Such petition for rehearing may request (1) reconsideration, either in cases decided after hearing or in cases of applications granted without hearing under title III of the act; (2) reargument; (3) reopening of the proceeding; (4) amendment of any finding, or (5) other relief. Such petition shall be specific as to the form of relief sought and, subject to this requirement, may contain alternative requests. Each such petition shall state with particularity in what respect the decision, order, or requirement or any matter determined therein is claimed to be unjust, unwarranted, or erroneous, and with respect to any finding of fact must specify the pages of record relied on. Where the existence of newly discovered evidence is claimed, the petition must be accompanied by a verified statement of the facts, together with the facts relied on to show that the petitioner, with due diligence, could not have known or discovered such facts at the time of the hearing.

§ 1.272 **Subscription and service.**—Each petition for rehearing shall be subscribed as provided in section 1.122 and served upon all parties participating in the hearing in the manner provided in section 1.141. In case the petition seeks reconsideration of a decision, order, or requirement made without a hearing, the party filing the petition shall serve the same in the manner provided in section 1.141 upon the party or parties to whom such decision, order, or requirement was directed.

§ 1.273 **Opposition.**—An opposition to any petition for rehearing may be filed within 10 days after the filing of such petition, and shall be subscribed or verified as provided in section 1.122 and served upon all parties participating in the hearing in the manner provided in section 1.141.

§ 1.274 **Special calendar when granted.**—In case any petition for rehearing is granted, whether the taking of additional testimony is ordered or otherwise, the case shall be placed upon a special calendar and consideration of the same shall be expedited.

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*For specific rules regarding petitions for rehearing in connection with applications under Title III, see section 1.387.

Amendment No. 59 (Amending Sec. 1.351) effective May 1, 1941
To be substituted for p. 27-28, Part 1, Rules of Practice and Procedure

SPECIAL PROVISIONS RELATING TO RADIO

(Applications under part I of title III of the act)

§ 1.351 Place of filing; number of copies.—Each application for construction permit or station license, and all papers incorporated therein and made a part thereof, with respect to the number of copies and place of filing, shall be submitted as follows:

Class of station	Number of application forms required and method of filing
a. All classes of Alaskan stations, except broadcast and amateur.	3 copies via inspector in charge, radio district No. 14, Seattle, Wash.
b. Aircraft	1 copy direct to Washington, D. C.
c. Geophysical	Do.
d. All classes including portable, except standard broadcast, high frequency broadcast, international broadcast, television and amateur.	2 copies direct to Washington, D. C.
e. Ship	1 copy direct to Washington, D. C.
f. Standard broadcast, high frequency broadcast, international broadcast and television.	3 copies direct to Washington, D. C.
g. Amateur	1 copy to be sent as follows: (a) To proper district office if it requires personal appearance for operator examination under direct supervision from that office; (b) direct to Washington, D. C. in all other cases, including examinations for class C privileges.

§ 1.352 Contents.--Each application shall be specific with regard to frequency or frequencies, power, hours of operation, equipment, location of the station, and other information required by the application forms. An application for broadcast facilities in the band 550 kilocycles to 1600 kilocycles shall be limited to one specific frequency. An application for radio station construction permit or license requesting alternate facilities will not be accepted.

§ 1.353 Full disclosures.—Each application shall contain full and complete disclosures with regard to the real party or parties in interest, and their legal, technical, financial, and other qualifications, and as to all matters and things required to be disclosed by the application forms.

§ 1.354 Additional statements.—In addition the Commission may require an applicant to submit such documents and written statements of fact, under oath, as in its judgment may be necessary.

§ 1.355 Installation or removal of apparatus.—Applications for construction permit or modification thereof, involving removal of existing transmitting apparatus and/or installation of new transmitting apparatus, shall be filed at least 60 days prior to the contemplated removal and/or installation.

§ 1.356 Forfeiture of construction permits: extensions of time.—*(a)* A construction permit shall be automatically forfeited if the station is not ready for operation within the time specified therein or within such further time as the Commission may have allowed for completion, and a notation of the forfeiture of any construction permit under this provision will be placed in the records of the Commission as of the expiration date.

(b) Any application[1] for extension of time within which to construct a station shall be filed at least thirty days prior to the expiration date of such permit if the facts supporting such application for extension are known to the applicant in time to permit such filing. In other cases such applications will be accepted upon a showing satisfactory to the Commission of sufficient reasons for filing within less than thirty days prior to the expiration date. Such applications will be granted upon a specific and detailed showing that the failure to complete was due to causes not under the control of the grantee, or upon a specific and detailed showing of other matters sufficient to justify the extension.

§ 1.357 License following construction permit.—In all cases where a construction permit is required by section 319 of the act for the construction of a station, the application for station license (or for station license or modification thereof, if for station other than broadcast) shall be filed by permittee prior to service or program tests.

§ 1.358 Where construction permit not required.—Each application for a new license, except amateur, where a construction permit is not a prerequisite thereto, shall be filed at least 60 days prior to the contemplated operation of the station: *Provided, however,* That in emergency and for good cause shown, the Commission may waive the requirements of this rule.

§ 1.359 Modification of license.—An application for modification of license, except amateur, and except as otherwise provided by these rules, may be filed for change in frequency, change in operating power where no construction is necessary, change in hours of operation, and for change in name of licensee where no change in ownership or control is involved. In case of a broadcast station,

[1] F.C.C. Form No. 701.

an application for modification of license may be filed for change in location of main studio. In case of all stations under than broadcast, an application for modification of license may be filed for change in points of communication, change in nature of authorized service, and to cover an outstanding construction permit where the station is already licensed. Except when filed to cover construction permit, each application for modification of license shall be filed at least 60 days prior to the contemplated modification of license: *Provided, however*, That in emergencies and for good cause shown, the requirements hereof may be waived insofar as time for filing is concerned.

§ 1.360 Renewal of license.—Unless otherwise directed by the

Amendment No. 210 (Amending Sec. 1.361 effective August 24, 1943, and Sec. 1.364 effective January 11, 1944).

To be substituted for pp. 29-30, Part 1, Rules of Practice and Procedure.

The last previous amendment affecting Part 1 was amendment No. 190, pp. 47-48.

Commission, each application for renewal of license shall be filed at least 60 days prior to the expiration date of the license sought to be renewed. No application for renewal of license of a standard broadcast station will be considered unless there is on file with the Commission, the balance sheet and income statement currently required by section 1.361, reference to which by date and file number shall be included in the application.

§ 1.361 **Financial statements.***—Each licensee of a standard broadcast station shall file with the Commission on or before March 1 of each year on such forms as may be prescribed by the Commission, a balance sheet showing the financial condition of the licensee as of December 31 of the preceding year and an income statement for the preceding calendar year. Each such form shall be subscribed as provided in section 1.121.

§ 1.362 **Filing directed by Commission.**—Whenever the Commission regards an application for a renewal of license as essential to the proper conduct of a hearing or investigation, and specifically directs that it be filed by a date certain, such application shall be filed within the time thus specified. If the licensee fails to file such application within the prescribed time, the hearing or investigation shall proceed as if such renewal application had been received.

§ 1.363 **Temporary extension of station licenses.**—Where there is pending before the Commission any application, investigation, or proceeding which, after hearing, might lead to or make necessary the modification of, revocation of, or the refusal to renew an existing license, the Commission may, in its discretion, grant a temporary extension of such license: *Provided, however,* That no such temporary extension shall be construed as a finding by the Commission that the operation of any radio station thereunder will serve public interest, convenience, and necessity beyond the express terms of such temporary extension of license: *And pro-*

* See also section 43.1 of the Rules and Regulations which requires the filing by licensees and permittees of all classes of broadcast stations of reports as to ownership, operation, interests therein, contracts, etc.

567342—44

vided further, That such temporary extension of license will in no wise affect or limit the action of the Commission with respect to any pending application or proceeding.

§ 1.364 **Assignment or transfer of control.**—(*a*) *General.* (1) *Voluntary*: Application for consent to voluntary assignment of a construction permit or license or for consent to voluntary transfer of control of a corporation holding a construction permit or license shall be filed with the Commission at least 60 days prior to the contemplated effective date of assignment or transfer of control.

(2) *Involuntary*: In the event of the death or legal disability of a permittee or licensee, or a member of a partnership, or a person directly or indirectly in control of a corporation, which is a permittee or licensee

(i) the Commission shall be notified in writing promptly of the occurrence of such death or legal disability, and

(ii) within thirty days after the occurrence of such death or legal disability (except in the case of a ship or amateur station), application shall be filed for consent to involuntary assignment of such permit or license or for involuntary transfer of control of such corporation to a person or entity legally qualified to succeed to the foregoing interests under the laws of the place having jurisdiction over the estate involved. In the case of ship and amateur stations, involuntary assignment of licenses will not be made; such licenses shall be surrendered for cancellation upon the death or legal disability of the licensee.

(*b*) *Broadcast.*—With each such application, involving any standard broadcast station construction permit or license, there shall be submitted under oath or affirmation all information required to be disclosed by the application forms prescribed by the Commission, together with such other information under oath or affirmation as the Commission may require.

(c) *Other than broadcast.*—In all classes of applications for consent to assignment of construction permit or license or for consent to transfer of control of a corporation holding a construction permit or license, other than those prescribed in paragraph (*b*), the Commission may require the furnishing of such information as in its discretion is deemed necessary.

§ 1.365 **Special temporary authorizations.**—(*a*) Special temporary authority may be granted for the operation of a station for a limited time, or in a manner and to an extent or for service other

Amendment No. 210 continued from p. 30.

or beyond that authorized in an existing license upon proper application therefor: [1] *Provided, however,* That no such request will be considered unless:

(1) It is received by the Commission at least 10 days previous to the date of proposed operation: *Provided, however,* That any such request received within less than 10 days may be accepted upon due showing of sufficient reasons for the delay in submitting such request;

(2) Full particulars as to the purpose for which the request is made are stated.

(*b*) If the request is for operation of a standard broadcast station, the following additional requirements shall apply:

(1) No such authority may be granted to a person other than the licensee of an existing standard broadcast station.

(2) The request shall be limited to a definite or temporary period or periods for the transmission of programs or events which are not recurrent, and approval thereof will not be granted for a period in excess of 30 days.

(3) The request shall show that it has been seasonably submitted to other stations whose operations may be affected (to be determined as indicated below), and the date on which such request was so submitted, which such stations shall submit direct to the Commission waiver of objection to the granting thereof or a statement of the nature of any objections that such stations may desire to interpose.

(4) If the request is for operation upon a clear channel, showing required above shall be made with respect to the class I station or stations on the channel.

(5) If the request is made by time-sharing station, the showing required above shall be made with respect to the station or stations with which time is shared.

(6) In any case, the showing required above must be made with respect to any station on the same or adjacent channels when any

[1] Informal applications.

Amendment No. 155 (Amending § 1.366), effective February 18, 1943
To be substituted for pp. 31-32, Part 1, Rules of Practice and Procedure
The last previous amendment affecting Part 1 was amendment No. 152, pp. 47-48, effective January 14, 1943

such station is located within the interference range of the station making the request to be determined by the "Standards of Good Engineering Practice Concerning Standard Broadcast Stations."

(7) Waiver of objections, or statement of objections, when furnished under this rule, shall be forwarded direct to the Commission by the responding station, and in the case of waiver shall show whether the waiver covers simultaneous operation or whether the station is giving up the time sought by the applicant. Where it appears that the proposed operation has been seasonably submitted to the station or stations referred to in subparagraphs (4), (5), and (6), above, and no reply has been received, it will be considered that such stations have waived any objections to the granting of the request.

§ 1.366 Special service authorizations.—Special service authority may be issued to the licensee of a standard broadcast station or, in connection with the furnishing of facilities for service to the United States Government, to the licensee of an international broadcast station or an international point-to-point station, for a service other or beyond that authorized in its existing license for a period not exceeding that of its existing license.

Application for special service authorization for standard broadcast stations must be made by formal application[2] and a satisfactory showing must be made in regard to the following, among others:

(a) That the requested operation may not be granted on a regular basis under the existing rules governing the operation of standard broadcast stations;

(b) That experimental operation is not involved as provided for by Section 3.32 of the Rules and Regulations;

(c) That public interest, convenience, and necessity will be served by the authorization requested.

§ 1.367 Inconsistent or conflicting applications.—When an applicant has an application pending and undecided, no other inconsistent or conflicting application filed by the same applicant, his successor or assignee, or on behalf or for the benefit of said applicant, will be accepted for consideration.

§ 1.368 Multiple applications; broadcast service.—In the broadcast service, while there is one application for new or additional

[2]Form 317.

facilities pending for a standard, international, television, facsimile, high frequency, or experimental broadcast station, the Commission will not consider another application for new or additional facilities for a station of the same class (as given above) to serve in whole or in part the same area, by the same applicant or by his successor or assignee, or on behalf or for the benefit of the original parties in interest. Two such applications may not be filed simultaneously.

§ 1.369 Repetitious applications.—*(a) Broadcast services.*—In the broadcast service, where an applicant has been afforded an opportunity to be heard with respect to a particular application for a new standard, international, television, facsimile, high frequency, or developmental broadcast station, or for an extension or enlargement of existing service or facilities, and the Commission has, after hearing or default, denied the application or dismissed it with prejudice, the Commission will not consider another application for a station of the same class (as given above) to serve in whole or in part the same area, by the same applicant or by his successor or assignee, or on behalf of or for the benefit of the original parties in interest, until after the lapse of 12 months from the effective date of the Commission's order.

(b) Other radio services.—In any other radio service, where an applicant has been afforded an opportunity to be heard with respect to a particular application for new station, or for an extension or enlargement of service or facilities, and the Commission has, after hearing or default, denied the application or dismissed it with prejudice, the Commission will not consider a like application involving service of the same kind to the same area by the same applicant, or by his successor or assignee, or on behalf of or for the benefit of the original parties in interest, until after the lapse of 12 months from the effective date of the Commission's order: *Provided, however*, That the Commission may waive the requirements of this rule in situations affecting safety of life or property.

§ 1.370 Pending appeal.—Where an appeal has been taken from the action of the Commission in denying a particular application, another application for the same class of broadcast station and for the same area, in whole or in part, filed by the same applicant or by his successor or assignee, or on behalf or for the benefit of the original parties in interest, will not be considered until the final disposition of such appeal.

ACTION ON APPLICATIONS UNDER TITLE III

§ 1.381 Grants without a hearing.—Where an application for radio facilities is proper upon its face and where it appears from an examination of the application and supporting data that (1) the applicant is legally, technically and financially qualified; (2) a grant of the application would not involve modification, revocation, or non-renewal of any existing license or outstanding construction permit; (3) a grant of the application would not cause electrical interference to an existing station or station for which a construction permit is outstanding within its normally protected contour as prescribed by the applicable Rules and Regulations; (4) a grant of the application would not preclude the grant of any mutually exclusive application; and (5) a grant of the application would be in the public interest, the Commission will grant the application without a hearing.

§ 1.382 Partial grants.—Where the Commission without a hearing grants any application in part, or with any privileges, terms, or conditions other than those requested, the action of the Commission shall be considered as a grant of such application unless the applicant shall, within 20 days from the date on which public announcement of such grant is made, or from its effective date if a later date is specified, file with the Commission a written request for a hearing with respect to the part, or with respect to the privileges, terms, or conditions, not granted. Upon receipt of such request, the Commission will vacate its original action upon the application and set the application for hearing in the same manner as other applications are set for hearing.

§ 1.383 Designation for hearing.—Applications will be designated for hearing in the following cases:

(a) Where it does not appear from an examination of the application that the applicant is legally, technically or financially qualified; or

(b) Where a grant of the application would require the modification, revocation, or non-renewal of license of an existing station or of any outstanding construction permit; or

(c) Where a grant of the application would cause electrical interference to an existing station or station for which a construction permit is outstanding within its normally protected contour as as prescribed by the applicable Rules and Regulations; or

(d) Where it does not appear from an examination of the application that a grant of the application will be in the public interest;

(e) Where a grant of the application would preclude the grant of an application or applications mutually exclusive with it. However, the Commission may, if public interest will be served thereby, make a conditional grant of one of the applications and designate all of the mutually exclusive applications for hearing. Such conditional grant will be made upon the express condition that such grant is subject to being withdrawn if at the hearing it is shown that public interest will be better served by a grant of one of the other applications. Such conditional grants will be issued only where it appears:

(i) That some or all of the applications were not filed in good faith but were filed for the purpose of delaying or hindering the grant of another application; or

(ii) That public interest requires the prompt establishment of radio service in a particular community or area; or

(iii) That a grant of one or more applications would be in the public interest and that a delay in making a grant to any applicant until after the conclusion of a hearing on all applications might jeopardize the rights of the United States under the provisions of international agreement to the use of the frequency in question; or

(iv) That a grant of one application would be in the public interest and that it appears from an examination of the remaining applications that they cannot be granted because they are in violation of provisions of the Communications Act, or of other statutes, or of the Commission's rules and regulations.

§ 1.384 Procedure when case is designated for hearing.—*(a)* When an application has been designated for hearing, the Secretary of the Commission will mail a written notice to the applicant setting forth the action of the Commission designating the application for hearing, together with such statement of the Commission's reasons therefor as shall be appropriate to the nature of the application. In order to avail himself of the opportunity to be heard, the applicant, in person or by his attorney, shall, within 15 days of the mailing of the notice of designation for hearing by the Secretary, file with the Commission a written appearance stating that he will appear and present evidence on the issues specified in the statement of reasons furnished by the Commission on such date as may be fixed for the hearing. In cases involving applications for facilities other than AM broadcast, FM broadcast, international broadcast, or television, the applicant shall submit with his appearance an additional copy of his application and supporting documents.

(b) The Commission will on its own motion name as parties to the hearing:

(i) Any existing licensee or holder of an outstanding construction permit who, if the application were granted, would suffer electrical interference within his normally protected contour as prescribed by the Commission's Rules and Regulations.

(ii) Any existing licensee or holder of an outstanding construction permit whose license or construction permit would have to be modified or revoked, or whose application for renewal of license would have to be denied, if the application in question were granted.

(iii) Any person who, prior to the time the application in question was designated for hearing, had filed with the Commission a mutually exclusive application. Persons filing mutually exclusive applications after the application in question has been designated for hearing will be named as parties only if the Commission in its discretion deems such action advisable.

§ 1.385 Petitions to intervene.—*(a)* Where the Commission has failed on its own motion to name as parties to a hearing any person specified in Section 1.384*(b)*, such person will be permitted to participate in the proceeding by filing a petition to intervene showing that he comes within the provisions of Section 1.384*(b)*. Where the petition to intervene is based upon a claim that a grant

of the application would cause electrical interference to an existing station or a station for which a construction permit is outstanding within its normally protected contour as prescribed by the applicable Rules and Regulations, the petition must be accompanied by an affidavit of a qualified radio engineer which shall show either by reference to the Commission's Standards of Good Engineering Practice or to actual measurements made in accordance with the methods prescribed by the Commission's Standards of Good Engineering Practice that electrical interference will be caused to the existing station or station for which a construction permit is outstanding within the normally protected contour of the station.

(b) Any other person desiring to participate in the hearing may file a petition to intervene. The petition must set forth the interest of the petitioner in the proceedings and must show how such person's participation will assist the Commission in the determination of the issues in question. The Commission in its discretion may grant or deny such petition or may permit intervention by such persons limited to particular issues or to a particular stage of the proceeding.

(c) The granting of any petition to intervene shall not have the effect of changing or enlarging the issues specified in the Commission's notice of hearing unless the Commission shall on motion amend the same.

(d) Petitions to intervene under this section must be filed with the Commission not later than 15 days after the issues in the hearing have first been published in the Federal Register. Any person desiring to file a petition to intervene after the expiration of such 15 days must set forth the reason why it was not possible to file the petition within the prescribed 15 days. Unless good cause is shown for delay in filing, the petition will not be granted.

§ 1.386 Motions to enlarge or change the issues.—Motions to enlarge or change the issues may be filed by any party to a hearing. Such motions must be filed with the Commission not later than 15 days after the issues in the hearing have first been published in the Federal Register. Any person desiring to file a motion to enlarge or change the issues after the expiration of such 15 days must set forth the reason why it was not possible to file the petition within the prescribed 15 days. Unless good cause is shown for delay in filing, the motion will not be granted.

§ 1.387 Petitions for reconsideration or for rehearing.—*(a)* Where an application has been granted without a hearing, any person aggrieved or whose interests would be adversely affected thereby may file a petition for reconsideration of such action. Such petition must be filed with the Commission within 20 days after public notice

is given of the Commission's action in granting the application. Such petition will be granted if the petitioner shows that:

(i) Petitioner is an existing licensee or permittee and a grant of the application would require the modification, revocation, or non-renewal of his license or construction permit; or

(ii) That petitioner is an existing licensee or permittee and a grant of the application would cause interference to his station within the normally protected contour as prescribed by applicable Rules and Regulations; or

(iii) At the time the application was granted, petitioner had a mutually exclusive application pending before the Commission; or

(iv) A grant of the application is not in the public interest.

(b) Where an application has been granted or denied after hearing, petitions for rehearing may be filed within 20 days after public notice is given of the Commission's action in granting or denying the application. Petitions for rehearing by persons not parties to the Commission's hearing will not be granted unless good cause is shown as to why it was not possible for such person to participate earlier in the Commission's proceeding.

(c) Where a petition for reconsideration or for rehearing is based upon a claim of electrical interference within the normally protected contour of an existing station or a station for which a construction permit is outstanding, such petition must be accompanied by an affidavit of a qualified radio engineer which shall show either by reference to the Commission's Standards of Good Engineering Practice or to actual measurements made in accordance with the methods prescribed by the Commission's Standards of Good Engineering Practice that electrical interference will be caused to the station within its normally protected contour. If the claim of interference is not based upon actual measurements made in accordance with the Standards of Good Engineering Practice, it may be controverted by affidavit containing results of actual measurements made in accordance with the Standards of Good Engineering Practice.

(d) Each petition for reconsideration or rehearing, shall be subscribed as provided in Section 1.122 and served upon all parties participating in the hearing in the manner provided in Section 1.141. In the case of a petition for reconsideration of a decision, order, or requirement made without a hearing, the party filing the petition shall serve the same in the manner provided in Section 1.141 upon the party or parties to whom such decision, order or requirement was directed.

(e) Any opposition to a petition for reconsideration or rehearing may be filed within 10 days after the filing of such petition.

(f) Petitions for reconsideration or rehearing filed under this section may request (1) reconsideration, either in cases decided after hearing or in cases of applications granted without hearing; (2) reargument; (3) reopening of the proceeding; (4) amendment of any finding; or (5) such other relief as may be appropriate. Such petition shall state specifically the form of relief sought and, subject to this requirement, may contain alternative requests. Each such petition shall state with particularity in what respect the decision, order, or requirement or any matter determined therein is claimed to be unjust, unwarranted, or erroneous, and with respect to any finding of fact must specify the pages of record relied on. Where the petition is based upon a claim of newly discovered evidence, it must be accompanied by a verified statement of the facts relied upon, together with the facts relied on to show that the petitioner, with due diligence, could not have known or discovered such facts at the time of the hearing.

ANSWERS TO NOTICES OF VIOLATION

§ 1.391 Under title III of the act.—Any licensee receiving official notice of a violation of the terms of the Communications Act of 1934, any legislative act, Executive order, treaty to which the United States is a party, or the Rules and Regulations of the Federal Communications Commission, shall, within 3 days from such receipt, send a written answer direct to the Federal Communications Commission at Washington, D. C., and a copy thereof to the office of the Commission originating the official notice when the originating office is other than the office of the Commission in Washington, D. C.: *Provided, however,* That if an answer cannot be sent nor an acknowledgment made within such 3-day period by reason of illness or other unavoidable circumstances, acknowledgment and answer shall be made at the earliest practicable date with a satisfactory explanation of the delay. The answer to each notice shall be complete in itself and shall not be abbreviated by reference to other communications or answers to other notices. If the notice relates to some violation that may be due to the physical or electrical characteristics of transmitting apparatus, the answer shall state fully what steps, if any, are taken to prevent future violations, and if any new apparatus is to be installed, the date such apparatus was ordered, the name of the manufacturer, and promised date of delivery. If the installation of such apparatus requires a construction permit, the file number of the application shall be given, or if a file number has not been assigned by the Commission such identification as will permit of ready reference. If the notice of violation relates to some lack of attention or improper operation of the transmitter, the name and license number of the operator in charge shall be given.

REVOCATION AND MODIFICATION OF STATION LICENSES

§ 1.401 **Revocation.**—Whenever the Commission shall institute a revocation proceeding against the holder of any radio station construction permit or license under section 312 (a), it shall initiate said proceeding by serving upon said licensee an order of revocation effective not less than 15 days after written notice thereof is given the licensee. The order of revocation shall contain a statement of the grounds and reasons for such proposed revocation and a notice of the licensee's right to be heard by filing with the Commission a written request for hearing within 15 days after receipt of said order. Upon the filing of such written request for hearing by said licensee the order of revocation shall stand suspended and the Commission will set a time and place for hearing and shall give the licensee and other interested parties notice thereof. If no request for hearing on any order of revocation is made by the licensee against whom such an order is directed within the time hereinabove set forth, the order of revocation shall become final and effective, without further action of the Commission. When any order of revocation has become final, the person whose license has been revoked shall forthwith deliver the station license in question to the inspector in charge of the district in which the licensee resides.

§ 1.402 **Modification.**—(*a*) *Order to show cause.*—Whenever the Commission shall determine that public interest, convenience, and necessity would be served, or any treaty ratified by the United States will be more fully complied with, by the modification of any radio station construction permit or license either for a limited time, or for the duration of the term thereof, it shall issue an order for such licensee to show cause why such construction permit or license should not be modified.

(*b*) *Contents of order to show cause.*—Such order to show cause shall contain a statement of the grounds and reasons for such proposed modification, and shall specify wherein the said construction permit or license is required to be modified. It shall require the licensee against whom it is directed, to be and appear at a place and time therein named, in no event to be less than 30 days from the date of receipt of the order to show cause why the proposed modification should not be made and the order of modification issued.

(*c*) *Failure to appear.*—If the licensee against whom the order to show cause is directed does not appear at the time and place provided in said order, a final order of modification shall issue forthwith.

SUSPENSION OF OPERATOR LICENSES

§ 1.411 **Order of suspension.**—No order of suspension of any operator's license shall take effect until 15 days' notice in writing thereof, stating the cause for the proposed suspension, has been given to the operator licensee who may make written application to the Commission at any time within said 15 days for a hearing upon such order. The notice to the operator licensee shall not be effective until actually received by him, and from that time he shall have 15 days in which to mail the said application. In the event that physical conditions prevent mailing of the application at the expiration of the 15-day period, the application shall then be mailed as soon as possible thereafter, accompanied by a satisfactory explanation of the delay. Upon receipt by the Commission of such application for hearing, said order of suspension shall be held in abeyance until the conclusion of the hearing which shall be conducted under such rules as the Commission shall deem appropriate. Upon the conclusion of said hearing the Commission may affirm, modify, or revoke said order of suspension.

§ 1.412 **Proceedings.**—Proceedings for the suspension of an operator's license shall in all cases be initiated by the entry of an order of suspension. Respondent will be given notice thereof together with notice of his right to be heard and to contest the proceeding. The effective date of the suspension will not be specified in the original order but will be fixed by subsequent motion of the Commission in accordance with the conditions specified above. Notice of the effective date of suspension will be given respondent, who shall send his operator license to the office of the Commission in Washington, D. C., on or before the said effective date, or, if the effective date has passed at the time notice is received, the license shall be sent to the Commission forthwith.

SPECIAL PROVISIONS RELATING TO COMMON CARRIERS

(Complaints under title II of the act)

§ 1.421 **Formal or informal.**—Complaints filed under title II of the act may be either formal or informal.

§ 1.422 **Informal complaints; substance.**—No form of informal complaint is prescribed, but it must be in writing, subscribed, and verified by the complainant. The complaint shall state the name and address of the complainant, the name of the carrier against whom the complaint is made, and shall state as definitely as possible the basis or reason for the complaint.

§ 1.423 **Action on informal complaints.**—Upon receipt of an informal complaint properly drawn and executed, the Commission will, if its nature warrants, take the question up by correspondence with the carrier complained of in an endeavor to bring about satisfaction. Such correspondence with the carrier shall call upon it either to satisfy the complainant or advise the Commission of its refusal or inability to do so within such time as may be prescribed. If the carrier satisfies the complainant, it shall immediately notify the Commission and file with it proof of satisfaction; whereupon the complaint will be dismissed. If the carrier refuses or is unable to satisfy the complainant within the time prescribed, it shall so notify the Commission, which decision the Commission will forthwith give notice of to the complainant.

§ 1.424 **Resubmission; 6 months' rule.**—When an informal complaint has not been satisfied pursuant to the foregoing rule, the complainant may either file a formal complaint or resubmit his informal complaint within 6 months from the date of the Commission's notice: *Provided, however*, That such resubmitted informal complaint must contain new material matter upon the same cause of action. The procedure prescribed herein for handling of informal complaints will be followed in case of resubmitted informal complaints. If such resubmitted informal complaint or a formal complaint is filed with the Commission within the 6-month period, such resubmission or filing will be deemed to relate back to the date of the filing of the original informal complaint. But reference to the original date of the informal complaint must be made in such resubmission or in the formal complaint filed.

§ 1.425 **Formal complaints; requirements.**—Formal complaints shall contain the names of all parties complainant and defendant in

full, without abbreviations, the address of each complainant, and the name and address of his attorney, if represented by attorney, and shall be subscribed and verified by the complainant as provided in section 1.122. (See appendix No. 4 for form of formal complaint.)

§ 1.426 **Statement of issues; joinder of causes of complaint.**—Formal complaints shall be so drawn as to advise the Commission and the defendant fully wherein the provisions of the act, or an order, rule, or regulation of the Commission, have been violated, the facts claimed to constitute such violation, and the relief sought. Two or more grounds of complaint involving the same principle, subject, or state of facts may be included in one complaint, but should be separately stated and numbered.

§ 1.427 **Notice of complaints.**—Upon receipt of any formal complaint against any common carrier subject to the act, the Commission will forward a copy of the same to such carrier together with a notice of the filing thereof, which notice shall contain an order of the Commission calling upon the carrier to satisfy the complaint or answer the same in writing within the time specified in said notice, which in no event shall be less than 30 days.

§ 1.428 **Charges, etc.; specific references.**—The several charges, classifications, regulations, or practices complained of shall be set out by specific references to schedules of charges and classifications, and also the particular regulations or practices whenever that is possible.

§ 1.429 **Separate statement of each provision violated.**—When a violation of more than one provision of a section of the act is alleged, such violation shall be separately stated with respect to each provision of the act claimed to be violated.

§ 1.430 **Allegations; certainty.**—In case recovery of damage is sought, the complaint should contain appropriate allegations showing such data as will serve to identify, with reasonable certainty, the communications or transmissions, or other services, in respect of which recovery is sought, and shall state (1) that the complainant makes claim for reparation; (2) the name and address of each individual claimant asking reparation; (3) the name and address of defendants against which claim is made; (4) the communications, transmissions, or other services rendered, the charge applied thereto, the date when charges were paid, by whom paid, and by whom borne; (5) the period of time within which, or the specific dates when such communications, transmissions, or other services were rendered; (6) points of origin and reception of such communications or transmissions, and if the damages sought to be recovered are for services other than communications or transmissions, then the allegations of the complaint shall state the nature and extent of such services, the date or dates when rendered, when paid for, and by

whom borne; (7) nature and amount of injury sustained by each claimant; (8) if reparation is sought on behalf of others than the complainant, in what capacity or by what authority complaint is made in their behalf; and (9) that claimant has not filed suit in any court on the basis of the same claim.

§ 1.431 **Challenge of general rate adjustments; reparation.**—If a general rate adjustment is challenged in the complaint, or many communications and transmissions or points of origin and reception are involved, the Commission will find and determine in its report the issues as to violation of the act, injury thereby to complainant, and right to reparation. The Commission will afford the parties opportunity to agree or make proof respecting the communications, transmissions, or other services, and amount of reparation due under its findings, before entering its order awarding reparation. In such cases, authenticated schedule of charges, receipts, statements, and other exhibits bearing on details of such communications, transmissions, or other services, for which reparation is claimed, and the amount claimed (separately stated with respect to each communication, transmission, or other service rendered), need not be produced at the hearing unless called for or needed to develop other pertinent facts.

§ 1.432 **Discrimination specified.**—In case unjust or unreasonable discrimination is alleged, the charge, practice, classification, regulation, facility, or service complained of must be clearly specified.

§ 1.433 **Preference or prejudice.**—In case undue or unreasonable preference, advantage, or prejudice is alleged, the particular person, company, firm, corporation, locality, or description of traffic affected thereby, and the particular preference or prejudice or disadvantage, relied upon as constituting a violation, shall be clearly specified.

§ 1.434 **Reparation; prayer for.**—Reparation will not be awarded upon a complaint unless specifically prayed for, except under unusual circumstances and for good cause shown. Reparation may be awarded, however, upon a supplemental complaint based upon the finding of the Commission in the original proceeding.

§ 1.435 **Limitations; damages pendente lite.**—The Commission will consider as in substantial avoidance of the statute of limitations, a complaint in which the complainant alleges that the matters complained of, if continued in the future, will constitute violations of the act in the particulars and to the extent indicated, and prays reparation accordingly as to charges which shall be paid and borne by complainant on all communications, transmissions, or other services affected thereby occurring during the pendency of the proceeding.

§ 1.436 **Supplemental complaints.**—(*a*) *General.*—Supplemental complaints may be tendered for filing by the parties complainant,

against the parties defendant, setting forth any causes of action under the act alleged to have accrued in favor of the complainants and against the defendants since the filing of the original complaint.

(*b*) *Seeking damages.*—If recovery of damages is sought by supplemental complaint, it must be filed with the Commission within the statutory periods stated in section 415 of the act.

§ 1.437 **Cross complaints.**—Cross complaints alleging violations of the act by other carriers, parties to the proceeding, or seeking relief against them under the act, may be tendered for filing by defendants with their answers and, upon leave granted, will be filed and served by the Commission in the manner provided for serving complaints.

§ 1.438 **Answers to complaints and petitions.**—Any party upon whom a copy of a complaint, petition, or cross complaint is filed under title II of the act, shall file answer within 30 days after service of the complaint. Such answer shall be subscribed by the party answering as provided in section 1.122, and shall be so drawn as to advise the parties and the Commission fully and completely of the nature of the defense, and shall admit or deny specifically and in detail all material allegations of the complaint. Collateral or immaterial issues shall be avoided in answers and every effort shall be made to narrow the issues. Matters alleged as affirmative defenses shall be separately stated and numbered. Any defendant failing to file and serve answer within the time and in the manner prescribed will be deemed in default, and the Commission will issue an appropriate order. (Counterclaims and set-offs against users of service supplied by carriers are not within the jurisdiction of the Commission.) This section does not apply to protests or applications seeking suspensions of proposed tariff schedules.

§ 1.439 **Answers to petitions or amended complaints.**—In proceedings under title II, answers to petitions for intervention, or to amended complaints filed and served upon leave granted, need not be separately made unless the defendant so elects, and defendant's answer to the complaint will be deemed its answer to the petition in intervention.

§ 1.451 **Applications under section 214.**—Application for an authorization under Section 214 of the Act shall be submitted as follows:

(*a*) *Contents of application.*—Each application shall contain in narrative form the following information: (1) The exact name and address of each applicant; (2) a statement as to whether the applicant is a carrier subject to the act, or a corporation organized to construct, acquire, or operate interstate wire communication properties, but not as yet an operating company; (3) a statement as to whether the application is for an extension (by construction, purchase, lease, or otherwise) of service into territory not currently served by the applicant, or is for the supplementing of existing facilities of the applicant, or for temporary or emergency service (giving the estimated period of time for which the application is made); (4) the reasons, briefly stated, why the present or future public convenience and necessity require, or will require, the proposed construction, acquisition (by purchase, lease, or otherwise), or operation; (5) the name, title, and post office address of the officer to whom correspondence concerning the application is to be addressed; (6) the Government, State or Territory, under the laws of which each corporate applicant was organized; (7) description of the facilities for the construction, acquisition, or operation of which authorization is requested, including details of construction or acquisition with allocation of ownership, economic justification, traffic data (including data as to message loads and toll circuit requirements for past periods and estimates for the future), summary of construction estimate (including outside plant, repeaters, carrier equipment, and associated equipment, and the cost to each participant), quantities and cost of major materials, amount of labor and cost of same, and a description of existing facilities; (8) a description of the manner and means by which services of a similar character are now being rendered by the applicant and others in the area proposed to be served; (9) statement of the accounting to be performed in connection with the proposed project.

(*b*) *Exhibits required.*—Each copy of such application shall be accompanied by a map or sketch showing: (1) Route of proposed extension, including all proposed branches; (2) type and ownership of wire structures (open wire, aerial cable, underground cable, etc.); (3) existing facilities in vicinity, indicating type and ownership of same; (4) facilities to be removed; (5) cities, towns, and villages along

routes indicated on map or sketch and approximate population of each and route mileage between them; (6) location of present and proposed telephone central offices and other related telephone toll center locations; (7) existing and proposed repeater points; (8) other geographic facts pertinent to a consideration of the application, including State and county boundary lines through which the proposed facilities will extend; (9) topographical features which may require special consideration or added cost.

(*c*) *Additional information.*—The applicant shall furnish any additional information which the Commission may require after a preliminary examination of the application.

(*d*) *Copies required.*—The Commission shall be furnished with the number of copies required by section 1.491 of the rules.

(*e*) *Exceptions.*—Requests for authorization for emergency service, temporary service, or for the supplementing of existing facilities through construction involving an expenditure of $7,500 or less, may be made as hereinafter provided without regard to the other provisions of this rule.

(1) *Emergency service.*—Emergency service may be authorized on request made by letter or telegram describing the service and facilities involved and stating the nature and extent of the emergency.

(2) *Temporary service.*—Temporary service, to be rendered by means of leased facilities for a period not exceeding 4 months, to points already directly served by the applicant with the same type of service, may be authorized, upon informal request to the Commission made not less than 30 days prior to establishment of the proposed service, setting forth the type of facilities to be leased, the route mileage thereof, the termini of the facilities proposed to be leased, the points to be served, how these points are now being served by the applicant, the dates on which service is to begin and terminate, the need for the proposed service, and the rentals and other consideration involved. The authority so requested shall be deemed to be granted unless, during the 30-day period, the Commission shall call upon the carrier for a formal application in accordance with paragraphs (*a*), (*b*), (*c*), and (*d*) of this section.

(3) *Small construction projects.*—Applications for authority to supplement existing facilities by construction, between points already directly served by the applicant with the same type of service, where the estimated cost of the proposed construction is not more than $7,500, may be authorized upon informal request to the Commission made not less than 30 days prior to the commencement of the proposed construction, and the authority shall be deemed to be granted unless during said 30-day period the Commission shall call upon the

ORDERS TO SHOW CAUSE

§ 1.461 **Orders instituting action under title II of the act.**—Whenever the Commission shall institute a proceeding within its jurisdiction under title II of the act against any common carrier, it may commence such action by serving upon the carrier an order to show cause. Said order shall contain a statement of the particulars and matters upon which the Commission is inquiring, and the reasons for such action, and shall call upon the carrier to be and appear before the Commission at a place and time therein stated, and then and there answer and give evidence upon the matters specified in said order. The Commission may, however, require in said order, that the carrier file with the Commission its verified answer to the order to show cause, on or before a day certain, prior to the hearing date therein fixed, in no event less than 30 days after service of the order: *Provided, however*, That the Commission may include in an order to show cause any further provisions which it may deem necessary and which are within its jurisdiction under the act. Nothing in this section shall be construed to limit the authority of the Commission to institute or conduct any investigation or inquiry within its jurisdiction in any other manner or according to any other procedure which it may deem necessary or proper.

§ 1.462 **Answer to order to show cause.**—Any carrier, upon whom an order to show cause has been served under section 1.461 shall respond to the same by filing its answer within the time specified in said order. Such answer shall be subscribed in the manner provided in section 1.122, shall be drawn so as specifically to admit or deny the charges or allegations which may be made in said order, and so as to advise the Commission fully and completely upon the matters and things inquired of.

PROTESTS OF VALUATIONS

§ 1.471 **Tentative valuations.**—Protests in opposition to a tentative valuation, under the provisions of title II of the act, shall be subscribed and verified by the protestant and shall contain a concise statement of the essential elements of the protest with particularity to the matters concerning which protest is made. Each object of protest shall be set up as a separate item in a separately numbered paragraph and the protest shall also include a statement of the protestant's interest in the matter in controversy.

RULES AND REGULATIONS

Amendment No. 190 (Amending Sec. 1.482) effective September 7, 1943.
To be substituted for pp. 47-48, Part 1, Rules of Practice and Procedure.
The last previous amendment affecting Part 1 was amendment No. 186.

SUSPENSION OF TARIFF SCHEDULES

§ 1.481 **Under section 204 of the Act.**—Suspensions of tariff schedules under section 204 of the Act will not ordinarily be considered unless protest and application therefor is made in writing or by telegram at least 10 days before the effective date named in the schedule. Applications for suspensions must indicate the schedule affected by its Federal Communications Commission number and give specific reference to the items against which protest is made, together with a statement of the grounds thereof. If such application is made by telegram, the telegram must be followed and confirmed by application in writing and the telegram should succinctly state the substance of the matters to be set forth in the written application. Sixteen copies of each written application must be furnished to the Commission.

§ 1.482 **Rate increases—furnishing to Commission of data furnished to Office of Price Administration.**—Any common carrier subject to the Communications Act of 1934, as amended, which furnishes any notice or other data to the Office of Price Administration in connection with an increase in rates or charges subject to the Communications Act of 1934, as amended, shall concurrently furnish to this Commission two copies of such notice and other data.

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SERVICE AND NUMBER OF COPIES

§ 1.491 **Service by the Commission.**—Applications under title II of the Act, formal complaints, supplemental complaints, cross complaints, and amended complaints, will be served by the Commission and copies of each shall be furnished in sufficient number so as to provide the Commission with 15 copies for its use, and a copy for each party to the proceeding.

Service by the Commission upon common carriers shall be by leaving a copy of any document requiring service with the designated agent of such carrier at his office or usual place of residence in the District of Columbia, and if no such agent is designated, then service may be made by posting such notice, process, order, decision, or pleading in the office of the Secretary of the Commission.

APPENDIX NO. 1

APPLICATION FOR ADMISSION TO PRACTICE BEFORE THE COMMISSION UNDER SECTION 1.34

I, _____ hereby apply for admission to practice before the Federal Communications Commission under section 1.34 of the rules of practice of the Commission, and submit the following:

1. I reside at _____, _____, _____, County, State of _____. My office address is _____, _____ County, *State of* _____.
(Street number) (City) (Street number)

2. I was admitted to practice as an attorney at law by the _____ _____ Court of _____ on the _____ day of _____, 19____, and am now a member of the bar of that court; I have never been suspended or disbarred from practice before any court (state here any exception) _____.

_____.
(Signature of applicant)

STATE OF _____

County of _____ *ss:*

_____ being first duly sworn, on his oath deposes and says: I am the person named in the foregoing application for admission to practice before the Federal Communications Commission, and that the statements of facts therein contained are true.

_____.
(Signature of applicant)

Subscribed in my presence, and sworn to before me, this _____ day of _____, 19____.

[SEAL] _____.

_____.
(Title)

Commission expires _____.

CLERK'S CERTIFICATE

I, _____, clerk of the _____ court of _____, hereby certify that _____, the above-named applicant for admission to practice before the Federal Communications Commission, is duly admitted to practice as an attorney at law by the said court, and is now in good standing as a member of the bar of said court.

Dated this _____ day of _____, 19____.

[SEAL] _____
(Clerk of said court)

Please note carefully:

§ 1.33 **Persons who may be admitted to practice.**—Attorneys at law admitted to practice before any court of the United States, the District of Columbia, or the highest court of any State or Territory, upon application may be admitted to practice before the Commission. An attorney at law from any place other than the District of Columbia may, in the discretion of the Commission or the official presiding at any hearing, be admitted for a particular case in which he may be employed.

If this certificate is not from a court of the United States or the District of Columbia, then it must be from the highest court of the State or Territory, or the applicant must furnish evidence that his admission entitles him to practice before the highest court of such State or Territory.

FEDERAL COMMUNICATIONS COMMISSION
RULES AND REGULATIONS

Amendment No. 156 (Amending Appendix 3, Part 1), revised to March 1, 1943

To be substituted for pp. 51-52, 53-54, Part 1, Rules of Practice and Procedure

The last previous amendment affecting Part 1 was amendment No. 155, pp. 31-32, effective February 18, 1943

A P P E N D I X No. 2

APPEARANCE BLANK

FEDERAL COMMUNICATIONS COMMISSION

In the matter of

--- Docket No.----------

For----------

APPEARANCE

The record will show the entry of my appearance as counsel for

Respondent

Applicant

---------- ---------- in the above-entitled matter.
(Other) (Name of Party)

(Attorney)

Address:

(See sections 1.37 and 1.39 of F.C.C. regulations)

APPENDIX No. 3

RADIO DISTRICTS

Radio district	Address of the inspector in charge	Territory within district	
		States, etc.	Counties
1	Customhouse, 7th Floor, Boston, Mass.	Connecticut--	All counties.
		Maine----------	Do.
		Massachusetts-	Do.
		New Hampshire-	Do.
		Rhode Island--	Do.
		Vermont--------	Do.
2	748 Federal Building 641 Washington Street New York, N.Y.	New Jersey-----	Bergen, Essex, Hudson, Hunterdon, Mercer, Middlesex, Monmouth, Morris, Passaic, Somerset, Sussex, Union, and Warren.
		New York-------	Albany, Bronx, Columbia, Delaware, Dutchess, Greeno, Kings, Nassau, New York, Orange, Putnam, Queens, Rensselaer, Richmond, Rockland, Schenectady, Suffolk, Sullivan, Ulster, and Westchester.
3	Room 1200, New U.S. Customhouse, 2nd & Chestnut Streets, Philadelphia, Pa.	Delaware-------	Newcastle.
		New Jersey-----	Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Ocean, and Salem.
		Pennsylvania--	Adams, Berks, Bucks, Carbon, Chester, Cumberland, Dauphin, Delaware, Lancaster, Lebanon, Lehigh, Monroe, Montgomery, Northampton, Perry, Philadelphia, Schuylkill and York.
4	508 Old Town Bank Bldg., Gay Street & Fals way, Baltimore, Md.	Delaware-------	Kent and Sussex.
		District of Columbia-----	
		Maryland-------	All counties.
		Virginia-------	Arlington, Clark, Fairfax, Fauquier, Frederick, Loudon, Page, Prince William, Rappahannock, Shenandoah, and Warren.
5	Room 402, New Post Office Bldg., Norfolk, Va.	North Carolina	All except district 6.
		Virginia-------	All except district 4.
6	411 Federal Annex, Atlanta, Georgia.	Alabama--------	All except district 8.
		Georgia--------	All counties.
		North Carolina	Ashe, Avery, Buncombe, Burke, Caldwell, Cherokee, Clay, Cleveland, Graham, Haywood, Henderson, Jackson, McDowell, Macon, Madison, Mitchell, Polk, Rutherford, Swain, Transylvania, Watauga, and Yancey.
		South Carolina	All counties.
		Tennessee-------	Do.
Sub-Office	P.O. Box 77, (214-218 Post Office Bldg.), Savannah, Georgia.		
7	P.O. Box 150, (312 Federal Bldg.), Miami, Florida.	Florida--------	All except district 8.
Sub-Office	203 Post Office Bldg., Tampa, Florida.		

Continued from p. 52

Radio Districts—Continued.

Radio district	Address of the inspector in charge	Territory within district	
		States, etc.	Counties
8	400 Audubon Building, New Orleans, La.	Alabama	Mobile, Baldwin.
		Arkansas	All counties.
		Florida	Escambia.
		Louisiana	All counties.
		Mississippi	Do.
		Texas	City of Texarkana only.
9	Room 404 Federal Bldg., Galveston, Tex.	Texas	Aransas, Brazoria, Brooks, Calhoun, Cameron, Chanbers, Fort Bend, Galveston, Goliad, Harris, Hidalgo, Jackson, Jefferson, Jim Wells, Kenedy, Kleberg, Matagorda, Nueces, Refugio, San Patricio, Victoria, Wharton, and Willacy.
Sub-Office	P.O. Box 1527 (329 Post Office Bldg.), Beaumont, Tex.		
10	P.O. Box 5238 (500 U.S. Terminal Annex Bld g.), Dallas, Tex.	New Mexico	All counties.
		Oklahoma	Do.
		Texas	All except district 9 and the city of Texarkana.
11	539 U.S. Post Office & Courthouse Bldg., Temple & Spring Streets, Los Angeles, California	Arizona	All counties.
		California	Imperial, Inyo, Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, and Ventura.
		Nevada	Clarke.
Sub-Office	307 U.S. Customhouse & Courthouse Bldg., Union & F Streets, San Diego, Calif.		
12	328 Customhouse, San Francisco, Calif.	California	All except district 11.
		Nevada	All except Clarke.
		Guam	
		Midway	
		Wake	
		American Samoa	
13	805 Terminal Sales Bldg., Portland, Oregon	Idaho	All except district 14.
		Oregon	All counties.
		Washington	Wahkiakum, Cowlitz, Clarke, Skamania, and Kilicitat.
14	808 Federal Office Bldg. Seattle, Washington	Idaho	Benewah, Bonner, Boundary, Clearwater, Idaho, Kootenai, Latab, Lewis, Nez Perce, and Shoshone.
		Montana	All counties.
		Washington	All except district 13.
15	504 Customhouse, Denver, Colorado	Colorado	All counties.
		Utah	Do.
		Wyoming	Do.
16	208 Uptown Post Office & Fed. Cts. Bldg., 5th & Washington Streets, St. Paul, Minn.	Minnesota	Do.
		Michigan	Alger, Baraga, Chippewa, Delta, Dickinson, Gogebic, Houghton, Iron, Keweenaw, Luce, Mackinac, Marquette, Menominee, Ontonagon, and Schoolcraft.
		North Dakota	All counties.
		South Dakota	Do.
		Wisconsin	All except district 18.

Radio district	Address of the inspector in charge	Territory within district	
		States, etc.	Counties
17	809 U.S. Court House, Kansas City, Mo.	Iowa--------	All except district 18.
		Kansas-------	All counties.
		Missouri-----	Do.
		Nebraska-----	Do.
18	248 U.S. Courthouse Bldg., Chicago, Illinois	Illinois-----	All counties.
		Indiana------	Do.
		Iowa---------	Allamakoe, Buchanan, Cedar, Clayton, Clinton, Delaware, Des Moines, Dubuque, Fayette, Henry, Jackson, Johnson, Jones, Lee, Linn, Louisa, Muscatine, Scott, Washington, and Winneshiek.
		Wisconsin------	Columbia, Crawford, Dane, Dodge, Grant, Green, Iowa, Jefferson, Kenosha, Lafayette, Milwaukee, Ozaukee, Racine, Richland, Rock, Sauk, Walwerth, Washington, and Waukesha.
19	414 New Federal Bldg., Detroit, Mich.	Kentucky------	All counties.
		Michigan------	All except district 18.
		Ohio----------	All counties.
		West Virginia	Do.
Sub-Office	541 Old Post Office Bldg., Cleveland, Ohio		
20	328 Federal Bldg., Buffalo, New York	New York------	All except district 2.
		Pennsylvania	All except district 3.
21	609 Stangenwald Bldg., Honolulu, T. H.	Territory of Hawaii------	
22	P.O. Box 2987 (322-323 Federal Bldg.), San Juan, Puerto Rico.	Puorto Rico-Virgin Islands	
23	P.O. Box 1421, (7-8 Ghattuck Bldg.), Junoau, Alaska.	Alaska----------	
Monitoring Stn.	Allegan Monitoring Station, P.O. Box 89, Allegan, Michigan.		
Monitoring Stn.	Central Frequency Monitoring Station P.O. Box 788, Grand Island, Nebraska.		
Monitoring Stn.	Kingsville Monitoring Station, P.O. Box 632, Kingsville, Texas.		

FEDERAL COMMUNICATIONS COMMISSION

RULES AND REGULATIONS

(TITLE 47—TELECOMMUNICATION—CHAPTER I)

PART 2

GENERAL RULES AND REGULATIONS

EFFECTIVE JUNE 15

1939

UNITED STATES GOVERNMENT PRINTING OFFICE

WASHINGTON : 1939

For sale by the Superintendent of Documents, Washington, D. C. - - - - - - - - - Price 10 cents

PREFACE TO THE RULES AND REGULATIONS OF THE FEDERAL COMMUNICATIONS COMMISSION

The "Rules and Regulations of the Federal Communications Commission" incorporate all the rules and regulations of a general or permanent nature in force as of the effective date appearing at the beginning of each part. The title, "Title 47—Telecommunication," has been adopted for all the rules to correspond with the codification thereof under the provisions of the Federal Register Act, and also to correspond with the title under which the Communications Act is printed in the United States Code.

In preparing this compilation, the Commission has had in mind the necessity for an arrangement which would make the rules conveniently accessible and one which would also make provision for future amendments. To this end all the existing rules have been logically arranged under 26 parts, which have been suitably subdivided, employing nonconsecutive part numbers from 1 to 71, making provision for substitutions and additions.

The various parts are independently numbered, each part beginning with the principal section number allocated for the purpose and in keeping with the decimal system of numbering which has been used, and these section numbers run consecutively only within the part. The first section of each part begins with ".1." Gaps are left in the numbering throughout so that new and amendatory provisions may be inserted with due regard to their relation to the compilation as a whole.

Each part has been printed and bound in separate pamphlet form, and each contains a title page listing the part numbers and titles of all the Rules and Regulations. In addition, explanatory footnotes have been included referring to statutes or treaties applicable to particular services and, so far as practicable, to other applicable parts.

It is intended that future amendments will be made available in such form that the substitute or added pages may be readily inserted within the part.

Provisions of the rules may be cited thus: "Section or §2.1 Federal Communications Commission Rules."

Copies of these rules may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C.

THE RULES AND REGULATIONS OF THE FEDERAL COMMUNICATIONS COMMISSION ARE PUBLISHED IN SEPARATE PAMPHLETS NUMBERED AND TITLED AS FOLLOWS

Part

1. Rules of Practice and Procedure.
2. General Rules and Regulations.
3. Standard Broadcast Stations.
4. Broadcast Services Other Than Standard Broadcast.
5. Experimental Radio Services.
6. Fixed Public Radio Services.
7. Coastal Radio Services.
8. Ship Radio Services.
9. Aviation Radio Services.
10. Emergency Radio Services.
11. Miscellaneous Radio Services.
12. Amateur Radio: Stations and Operators.
13. Commercial Radio Operators.
14. Radio Stations in Alaska.
31. Uniform System of Accounts, Class A and B Telephone Companies.

Part

32. Units of Property: Telephone Companies.
33. Accounting by Class C Telephone Companies.
34. Uniform System of Accounts, Radio Telegraph Carriers.
35. Uniform System of Accounts for Telegraph and Cable Companies.
41. Franks and Passes.
42. Destruction of Records.
43. Filing of Contracts, Periodic Reports, etc.
51. Classification of Telephone Employees.
61. Tariffs.
62. Applications for Interlocking Directorates.
71. Miscellaneous Rules and Regulations (Temporary Rules).

TABLE OF CONTENTS

Definitions

Administrative Regulations

TECHNICAL REGULATIONS

NATIONAL DEFENSE

PROVISIONS GOVERNING THE OPERATION OF CERTAIN LOW POWER RADIO FREQUENCY DEVICES

FEDERAL COMMUNICATIONS COMMISSION

RULES AND REGULATIONS

Amendment No. 158 (Amending Section 2.5), effective March 4, 1943
To be substituted for pp. 1-2, Part 2, General Rules and Regulations
The last previous amendment affecting Part 2 was amendment No. 150, pp. 9-10, effective January 8, 1943

Part 2.—GENERAL RULES AND REGULATIONS

DEFINITIONS[1]

§2.1 Permittee.— "Permittee" means the holder of a radio station construction permit.

§2.2 Station licensee.— "Station licensee"[2] means the holder of a radio station license.

§2.3 Operator licensee.— "Operator licensee" means the holder of a license or permit for the technical operation (manipulate the controls) of a licensed radio station.

§2.4 Radio station.— "Radio station" or "Station" means a station equipped to engage in radio communication or radio transmission of energy. A station includes all apparatus used at a particular location for one class of service and operated under a single instrument of authorization. Radio stations are classified according to the nature of the service they furnish and in each service there may be several classes of radio stations as hereinafter provided.

§2.5 Useful radio spectrum.— "Useful radio spectrum" means the total number of frequencies or wavelengths which may be used for the transmission of energy, communications, or signals by radio.[3]

§2.6 Television.— "Television" is a system of communication in which transient visual images of moving or fixed objects are transmitted for reception by visual observation.

§2.7 Facsimile.— "Facsimile" is a system of communication in which images are transmitted for record reception.

[1]For additional definitions see Appendix A, page 1.

[2]A licensee may hold more than one license. The provisions of any rules of the Commission imposing requirements on licensees shall be considered to apply only with respect to the particular class of station to which the rule relates unless the context otherwise clearly requires.

[3]At the present development of the art the useful radio spectrum is considered to extend from 10 kilocycles to 30000000 kilocycles or 30000 meters to 0.01 meters. These frequencies are classified into bands with designations and abbreviations as follows:

Frequency in Kilocycles				Designations	Abbreviations
	10 to	30	inclusive	Very Low	VLF
Above	30 to	300	"	Low	LF
"	300 to	3000	"	Medium	MF
"	3000 to	30000	"	High	HF
"	30000 to	300000	"	Very High	VHF
"	300000 to	3000000	"	Ultra High	UHF
"	3000000 to	30000000	"	Super High	SHF

This range may be extended as progress of the art warrants.

§2.8 Type A facsimile.— "Type A facsimile" is a system of facsimile communication in which images are built up of lines or dots of constant intensity.

§2.9 Type B facsimile.— "Type B facsimile" (telephotography, photoradio, etc.) is a system of facsimile communication in which images are built up of lines or dots of varying intensity.

§2.10 Cycles, kilocycles, megacycles.—In these regulations and in any instrument of authorization issued pursuant thereto the term "cycles" shall be construed to mean cycles per second; "kilocycles" to mean kilocycles per second; and "megacycles" to mean megacycles per second.

§2.11 Carrier wave.—A "carrier wave" is:

(a) In a frequency stabilized system, the sinusoidal component of a modulated wave whose frequency is independent of the modulating wave; or

(b) The output of a transmitter when the modulating wave is made zero; or

(c) A wave generated at a point in the transmitting system and subsequently modulated by the signal; or

(d) A wave generated locally at the receiving terminal which when combined with the sidebands in a suitable detector produces the modulating wave.

§2.12 Carrier frequency.—A "carrier frequency" is the frequency of the carrier wave.

§2.13 Authorized, licensed, assigned frequency.— "Authorized frequency", "licensed frequency", or "assigned frequency" means the carrier frequency assigned to a station by the Commission and specified in the instrument of authorization.

§2.14 Operating frequency.— "Operating frequency" means the carrier frequency that is actually generated by a station.

§2.15 Communication band.— "Communication band" means the frequency band or width of the frequency band required for the type of emission authorized.

§2.16 Authorized band.— "Authorized band" means the frequency band or width of the frequency band within which the emissions of a station shall be confined. Its width comprises the "communication band" and twice the "frequency tolerance."

§2.17 Authorized or licensed power.— "Authorized power" or "licensed power" means the power assigned to a radio station by the Commission and specified in the instrument of authorization.

§2.18 Operating power.— "Operating power" means the power that is actually supplied to the radio station antenna. This power is computed by one of the several methods hereinafter described in these regulations.

§2.19 Maximum rated carrier power.— "Maximum rated carrier power" is the maximum power at which the transmitter can be operated satisfactorily and is determined by the design of the transmitter and the type and number of vacumm tubes used in the last radio stage.

§2.20 Plate input power.— "Plate input power" means the product of the direct plate voltage applied to the tubes in the last radio stage and the total direct current flowing to the plates of these tubes, measured without modulation.

§2.21 Antenna power.— "Antenna input power" or "antenna power" means the product of the square of the antenna current and the antenna resistance at the point where the current is measured.

Amendment No. 264 (Amending Section 2.41) effective April 3, 1945; (Repealing Section 2.36) effective September 30, 1945.

To be substituted for pp. 3-4, Part 2, General Rules and Regulations.

Part 2, revised to December 19, 1944, has not been amended previously.

mitter and the type and number of vacuum tubes used in the last radio stage.

§ 2.20 **Plate input power.**—"Plate input power" means the product of the direct plate voltage applied to the tubes in the last radio stage and the total direct current flowing to the plates of these tubes, measured without modulation.

§ 2.21 **Antenna power.**—"Antenna input power" or "antenna power" means the product of the square of the antenna current and the antenna resistance at the point where the current is measured.

§ 2.22 **Antenna current.**—"Antenna current" means the radio-frequency current in the antenna with no modulation.

§ 2.23 **Antenna resistance.**—"Antenna resistance" means the total resistance of the transmitting antenna system at the operating frequency and at the point at which the antenna current is measured.

§ 2.24 **Modulation.**—"Modulation" is the process of producing a wave, some characteristic of which varies as a function of the instantaneous value of another wave, called the modulating wave.

§ 2.25 **Modulator stage.**—"Modulator stage" means the last amplifier stage of the modulating wave which modulates a radio-frequency stage.

§ 2.26 **Modulated stage.**—"Modulated stage" means the radio-frequency stage to which the modulator is coupled and in which the continuous wave (carrier wave) is modulated in accordance with the system of modulation and the characteristics of the modulating wave.

§ 2.27 **Last radio stage.**—"Last radio stage" means the oscillator or radio-frequency-power amplifier stage which supplies power to the antenna.

§ 2.28 **Percentage modulation (amplitude).**—"Percentage modulation" with respect to an amplitude modulated wave means the ratio of half the difference between the maximum and minimum amplitudes of the amplitude modulated wave to the average amplitude, expressed in percentage.[4]

§ 2.29 **Percentage modulation (frequency).**—"Percentage modulation" with respect to a frequency modulated radio wave, is the ratio of the frequency difference between the fixed carrier frequency and the resultant modulated frequency and the frequency difference required for 100-percent modulation, expressed in percentage.

[4] In linear modulation the average amplitude of the envelope is equal to the amplitude of the unmodulated wave, provided there is no zero-frequency component in the modulating signal wave (as in telephony). For modulating signal waves having unequal positive and negative peaks, positive and negative modulation factors may be defined as the ratios of the maximum departures (positive and negative) of the envelope from its average value, to its average value.

§ 2.30 **Maximum percentage modulation.**—"Maximum percentage of modulation" means the greatest percentage of modulation that may be obtained by a transmitter without producing in its output harmonics of the modulating frequency in excess of those permitted by these regulations.

§ 2.31 **High level modulation.**—"High level modulation" is modulation produced in the last radio stage of the system.

§ 2.32 **Low level modulation.**—"Low level modulation" is modulation produced in an earlier stage than the final.

§ 2.33 **Plate modulation.**—"Plate modulation" is modulation produced by introduction of the modulating wave into the plate circuit of any tube in which the carrier frequency wave is present.

§ 2.34 **Grid modulation.**—"Grid modulation" is modulation produced by introduction of the modulating wave into any of the grid circuits of any tube in which the carrier frequency wave is present.

§ 2.35 **Special provisions for apparatus employing alternating plate supply (self-rectifying plate supply).**—In the application of these rules to equipment authorized and designed for the use of alternating current or voltage, as plate supply for the last radio stage, the terms "direct current" and "direct voltage" shall be considered as referring to the equivalent effective alternating current and voltage, and terms having possible application only to equipment designed for the use of direct current shall not apply whenever these terms are used in these rules.

ADMINISTRATIVE REGULATIONS

§ 2.41 **Period of construction.**[5]—*(a)* Each construction permit for a radio station in the broadcast service will specify a maximum of 60 days from the date of granting thereof as the time within which construction of the station shall begin, and a maximum of six months thereafter as the time within which construction shall be completed and the station ready for operation, unless otherwise determined by the Commission upon proper showing in any particular case.

(b) Each construction permit for a radio station other than broadcast will specify the date of grant as the earliest date of commencement of construction and a maximum of eight months thereafter as the time within which construction shall be completed and the station ready for operation, unless otherwise determined by the Commission upon proper showing in any particular case.

§ 2.42 **Equipment test.**—Upon completion of construction of a radio station in exact accordance with the terms of the construction permit, the technical provisions of the application therefor and the rules and regulations governing the class of station concerned and prior to filing of application for license, the permittee is authorized

[5] See section 1.356 Rules of Practice and Procedure.

§ 2.41 **Period of construction.**—Each construction permit will specify a maximum of 60 days from the date of granting thereof as the time within which construction of the station shall begin, and a maximum of six months thereafter as the time within which construction shall be completed and the station ready for operation, unless otherwise determined by the Commission upon proper showing in any particular case.[5]

§ 2.42 **Equipment test.**—Upon completion of construction of a radio station in exact accordance with the terms of the construction permit, the technical provisions of the application therefor and the rules and regulations governing the class of station concerned and prior to filing of application for license, the permittee is authorized to test the equipment for a period not to exceed 10 days: *Provided,* That:

(*a*) The inspector in charge of the district in which the station is located, is notified 2 days in advance of the beginning of tests.

(*b*) In the case of all broadcast stations the Commission also shall be notified 2 days in advance of the beginning of tests, which shall be conducted in the case of standard broadcast stations, only between 1 a. m., and 6 a. m., local standard time unless otherwise specifically authorized. Equipment tests shall not be conducted during the frequency monitoring period when the station is required to remain silent.

(*c*) The Commission may notify the permittee to conduct no tests or may cancel, suspend, or change the date of beginning for the period of such tests as and when such action may appear to be in the public interest, convenience, and necessity.

§ 2.43 **Service or program test.**

(*a*) When construction and equipment tests are completed in exact accordance with the terms of the construction permit, the technical provisions of the application therefor, and the rules and regulations governing the class of station concerned, and after an application for station license has been filed with the Commission showing the transmitter to be in satisfactory operating condition, the permittee is authorized to conduct service or program tests in exact accordance

[5] See section 1.356 Rules of Practice and Procedure.

with the terms of the construction permit for a period not to exceed 30 days: *Provided,* That:

(1) The inspector in charge of the district in which the station is located, is notified 2 days in advance of the beginning of such tests.

(2) In the case of all broadcast stations the Commission also shall be notified 2 days in advance of the beginning of tests.

(*b*) The Commission reserves the right to cancel such tests or suspend, or change the date of beginning for the period of such tests as and when such action may appear to be in the public interest, convenience and necessity by notifying the permittee.

(*c*) Service or program tests will not be authorized after expiration date of the construction permit.

§ 2.44 **Authorization for tests not to be construed as license.**—The authorization for tests embodied in sections 2.42 and 2.43 shall not be construed as constituting a license to operate but as a necessary part of the construction.

§ 2.45 **License expiration time and periods.**—Each station license will be issued so as to expire at the hour 3 a. m., eastern standard time. The normal license periods and expiration dates are specified under the rules governing the class of station concerned. Unless otherwise ordered, when an application for a new station license is granted within three months of the expiration date for licenses of the particular class of station involved, the license shall be issued for the unexpired period of the current license term and for the full succeeding term. If granted more than three months from the normal expiration date, the license will be issued for the unexpired period of the current license term only.

§ 2.46 **License, simultaneous modification and renewal.**—When an application is granted by the Commission necessitating the issuance of a modified license less than 60 days prior to the expiration date of the license sought to be modified, and an application for renewal of said license is granted subsequent or prior thereto (but within 30 days of expiration of the present license) the modified license as well as the renewal license shall be issued to conform to the combined action of the Commission.

§ 2.47 **Maintenance tests of licensed stations.**—Station licensees are authorized to carry on such routine tests as may be required for the proper maintenance of the stations under the rules governing the class of station concerned, provided that the tests shall be so conducted as not to cause interference with the service of other stations.

§ 2.48 **Station inspection.**—The licensee of any radio station shall make the station available for inspection by representatives of

(*b*) Authority to employ an operator at the control point in accordance with paragraph (*a*) (1) of this section shall be subject to the following conditions:

(1) The transmitter shall be so installed and protected that it is not accessible to other than duly authorized persons.

(2) The emissions of the transmitter shall be continuously monitored at the control point by a licensed operator of the grade specified for the class of station involved.

(3) Provision shall be made so that the transmitter can quickly and without delay be placed in an inoperative condition in the event there is a deviation from the terms of the station license.

(4) The radiation of the transmitter shall be suspended immediately when there is a deviation from the terms of the station license.

§ 2.54 **Retention of radio station logs.**—Logs of a radio station, when required elsewhere in these rules and regulations to be made or kept, shall be retained by the licensee for a period of 1 year unless otherwise provided by the rules governing the particular service or class of station concerned: *Provided, however,* That logs involving communications incident to a disaster or which include communications incident to or involved in an investigation by the Commission and concerning which the licensee has been notified, shall be retained by the licensee until specifically authorized in writing by the Commission to destroy them: *Provided, further,* That logs incident to or involved in any claim or complaint of which the licensee has notice shall be retained by the licensee until such claim or complaint has been fully satisfied or until the same has been barred by statute limiting the time for the filing of suits upon such claims.

§ 2.55 **Logs, by whom kept.**—Each log shall be kept by the person or persons competent to do so, having actual knowledge of the facts required, who shall sign the log when starting duty and again when going off duty. The logs shall be made available upon request by an authorized representative of the Commission.

§ 2.56 **Log form.**—The log shall be kept in an orderly manner, in suitable form, and in such detail that the data required for the particular class of station concerned, are readily available. Key letters or abbreviations may be used if proper meaning or explanation is contained elsewhere in the log.

§ 2.57 **Correction of logs.**—No log or portion thereof shall be erased, obliterated, or willfully destroyed within the period of retention provided by the rules. Any necessary correction may be made only by the person originating the entry who shall strike out the erroneous portion, initial the correction made, and indicate the date of correction.

§ 2.58 **Rough logs.**—Rough logs may be transcribed into con-

Amendment No. 185 (Adopting Sec. 2.66) effective August 24, 1943.
To be substituted for pp. 9-10, Part 2, General Rules and Regulations.
The last previous amendment affecting Part 2 was amendment No. 183, pp. 15-16.

densed form, but in such case the original log or memoranda and all portions thereof shall be preserved and made a part of the complete log.

§ 2.59 **Distress messages.**—Each station licensee shall give absolute priority to radio communications or signals relating to ships or aircraft in distress; shall cease all sending on frequencies which will interfere with hearing a radio communication or signal of distress and except when engaged in answering or aiding the ship or aircraft in distress, shall refrain from sending any radio communications or signals until there is assurance that no interference will be caused with the radio communications or signals relating thereto; and shall assist the vessel in distress, so far as possible, by complying with its instructions.

§ 2.60 **Control of distress traffic.**—The control of distress traffic shall devolve upon the mobile station in distress or upon the station which by application of the provisions of section 2.61 has sent the distress call. These stations may delegate the control of the distress traffic to another station.

§ 2.61 **Retransmission of distress message.**—Any station which becomes aware that a mobile station is in distress may transmit the distress message in the following cases:

(*a*) When the station in distress is not itself in a position to transmit the message.

(*b*) In the case of mobile stations, when the master or the person in charge of the ship, aircraft, or other vehicle carrying the station which intervenes believes that further help is necessary.

(*c*) In the case of other stations, when directed to do so by the station in control of distress traffic or when it has reason to believe that a distress call which it has intercepted has not been received by any station in a position to render aid.

§ 2.62 **Resumption of operation after distress.**—No station having been notified to cease operation shall resume operation on frequency or frequencies which may cause interference until notified by the station issuing the original notice that the station involved will not interfere with distress traffic as it is then

being routed or until the receipt of a general notice that the need for handling distress traffic no longer exists.

§ 2.63 **Operation during emergency.**—The licensee of any station, except amateurs, may, during a period of emergency in which the normal communication facilities are disrupted as a result of hurricane, flood, earthquake, or similar disaster, utilize such station for emergency communication service in communicating in a manner other than that specified in the station license, provided (1) that as soon as possible after the beginning of such emergency use notice be sent to the Commission in Washington, D. C., and to the inspector in charge of the district in which the station is located stating the nature of the emergency and the use to which the station is being put, and (2) that the emergency use of the station shall be discontinued as soon as substantially normal communication facilities are again available and the Commission in Washington, D. C., and the inspector in charge be notified immediately when such special use of the station is terminated. The Commission may at any time order the discontinuance of such service.

§ 2.64 **Portable-mobile station.**—"Portable-mobile station" means a radio station which is normally used while in motion and which is capable of being moved conveniently from one mobile unit to another, and is in fact so moved from time to time.

§ 2.65 **Station identification.**—When not required to identify itself by some other provision or provisions of the Rules and Regulations, every radio station shall identify itself by its regularly designated call letters as follows:

1. Every station operating in the broadcast service shall transmit its call letters at the beginning and end of each period of operation, and, during operation, at least once every hour.

2. Every station used for other than broadcast service shall transmit its call letters at the end of each transmission, and at least once every fifteen minutes during an exchange of communications.

§ 2.66 **Discontinuance of operation.**—Unless otherwise required by the rules governing the particular service in which a radio station operates, the licensee of each fixed or land radio station, except stations operating in Alaska, shall notify the inspector in charge of the district where such station is located of any of the following changes in the status of such station at least two days before such change:

(*a*) Temporary discontinuance of operation for a period of ten days or more;

Amendment No. 185 continued from p. 10.

(*b*) The date of resumption of operation after temporary discontinuance of operation for a period of ten days or more;

(*c*) Permanent discontinuance of operation.

Provided, however, Where any such discontinuance of operation is not voluntary and results from causes beyond the control of the licensee, notice thereof shall be given not later than two days after such discontinuance of operation.

In all cases of permanent discontinuance of operation the licensee shall, in addition to notifying the inspector of intention to discontinue operation, immediately forward the station license to the Washington, D. C., office of the Commission for cancellation.

§ 2.71 **Allocation of frequencies.**—The center frequencies of each communication band and the allocation of frequencies to the various services will be in accordance with appendix B hereof.

§ 2.72 **Classification of emissions.**—Emissions shall be classified according to the purpose for which they are used, assuming their modulation or their possible keying to be only in amplitude as follows: [6]

1. Continuous waves:

Type A0.—Waves the suecessive oseillations of whieh are identieal under fixed eonditions.[7]

Type A1.—Telegraphy on pure eontinuous waves. A continuous wave whieh is keyed aceording to a telegraph code.

Type A2.—Modulated telegraphy. A carrier wave modulated at one or more audible frequencies; the audible frequeney or frequeneies or their combination with the carrier wave being keyed according to a telegraph code.

Type A3.—Telephony: Waves resulting from the modulation of a earrier wave by frequencies eorresponding to the voice, to music or to other sounds.

Type A4.—Facsimile: Waves resulting from the modulation of a earrier wave by frequencies produced at the time of the scanning of a fixed image with a view to its reproduction in a permanent form.

Type A5.—Television: Waves resulting from the modulation of a carrier wave by frequencies produced at the time of the scanning of fixed or moving objeets.[8]

2. Damped waves:

Type B.—Waves composed of successive series of oseillations the amplitude of which, after attaining a maximum, decreases gradually, the wave trains being keyed according to a telegraph eode.

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[6] Section 2.72 shall remain in effect until such time as the General Radio Regulations annexed to the International Telecommunication Convention, Madrid 1932, Revision of Cairo, 1938, shall have been ratified by the United States, from and after which date section 2.72 shall have no force or effect. **[The Cairo Revision of the General Radio Regulations was ratified by the United States effective August 25, 1939.]**

[7] These waves shall be used only in special cases, such as standard frequency emissions.

[8] "Objects" is used here in the optical sense of the word.

Communication band width.—The frequeney bands authorized to be oeeupied by the above types of emission are as shown in the following table:

Type of transmission	Total width of the band in cycles For transmission with 2 sidebands
A–0 Continuous waves, no signaling.	
A–1 Telegraphy, pure, continuous wave: Morse code. Baudot code. Stop-start printer	Numerically equal to the telegraph speed in bauds for the fundamental frequency, 3 times this width for the 3d harmonic, etc. (For a code of 8 time elements (dots or blanks) per letter and 48 time elements per word, the speed in bauds shall be equal to 0.8 times the speed in words per minute.)
Scanning-type printer	300–1000, for speeds of 50 words per minute, according to the conditions of operation and the number of lines scanned (for example, 7 or 12). Harmonics are not considered in the above values.
A–2 Telegraph modulated to musical frequency.	Figures appearing under A–1, plus twice the highest modulation frequency.
A–3 Commercial telephony	Twice the number indicated by the CCIF Opinions (about 6000 to 8000).[1]
Broadcasting	15000 to 20000.
A–4 Facsimile	Approximately the ratio between the number of picture components [2] to be transmitted and the number of seconds necessary for the transmission.
A–5 Television	Approximately the product of the number of picture components [2] multiplied by the number of pictures transmitted per second.

[1] It is recognized that the band-width may be wider for multiple-channel radiotelephony and secret radiotelephony.
[2] Two picture components, one black and one white, constitute a cycle; thus, the modulation frequency equals one-half the number of components transmitted per second.

§ 2.73 **Special emissions.**—Authorization for other types of emission may be issued and will be termed "speeial" in the instrument of authorization. When speeial emissions are authorized they will be deseribed and limited as to band width by the instrument of authorization.

§ 2.74 **Permissible band width of emission.**—The band width deseribed herein is the maximum permissible for the type of emission indieated. Unless otherwise speeifieally provided by the rules governing the elass of station eoneerned, the band width emitted shall not exeeed the frequeney separation band width as shown in the table of frequeney alloeations (appendix B).

§ 2.75 **Frequency measurement.**—The lieensee of eaeh station shall provide means for the measurement of the station frequeney. The measurement of the station frequeney shall be made by a means independent of the frequeney eontrol of the transmitter and shall be

Amendment No. 192 (Adopting Sec. 2.82), effective October 28, 1943
To be substituted for pp. 13-14, Part 2, General Rules and Regulations
The last previous amendment affecting Part 2 was amendment No. 185, pp. 9-10, 10a

conducted in accord with the regulations governing the class of station concerned.

§ 2.76 Primary standard of frequency.—The primary standard of frequency for radio frequency measurements shall be the national standard of frequency maintained by the National Bureau of Standards, Department of Commerce, Washington, D. C. The operating frequency of all radio stations will be determined by comparison with this standard or the standard signals of Station WWV of the National Bureau of Standards.

§ 2.77 Type B emission prohibited.—No license shall be issued for the operation of any station using, or proposing to use, transmitting apparatus employing damped wave (type B) emission, except for the operation of portable lifeboat apparatus for routine tests, and emergency communication in the open sea.

§ 2.78 Frequency tolerance.—The frequency tolerance for various classes of stations will be as specified in the regulations governing the class of station concerned.

§ 2.79 Operating power, computation of.—The operating power shall be computed by one of the following methods:

(a) By indirect measurement from the plate input power of the last radio stage, by multiplying the plate voltage by the total plate current of the last radio stage, and by a factor which is specified in the regulations governing the class of station concerned.

(b) By direct measurement of the antenna input power.

(c) By measurements of field intensity as specified by the regulations governing the class of station concerned.

§ 2.80 Operating power tolerance.—The operating power of all radio stations shall be maintained within the following tolerance of the authorized or licensed power:

(a) When the maximum power only is specified, the operating power shall not be greater than necessary to carry on the service and in no event more than 5 percent above the maximum power specified.

(b) When an exact power is specified, the operating power shall at all times be within the limits of 105 percent and 90 percent of the maximum power specified.

§ 2.81 Changes in height or location of antenna.—The licensee of a radio station, the transmitter of which is authorized at a fixed location, shall not make any changes, without the express authority of the Commission, either in the height or the location of the antenna or its supporting structures, except, in case of other than broadcast station when the existing or proposed antenna or structure has a maximum height not in excess of 100 feet above the ground, changes in height or local changes in location may be made without specific authorization. In no case shall any change in the height or the location of the antenna or its supporting structures be made without authority when located or proposed to be located within five miles of an airport recognized by the Civil Aeronautics Administration or within five miles of the center line of an established Federal airway.

§ 2.82 Inspection of tower lights and associated control equipment.—The licensee of any radio station which has an antenna or antenna supporting structure(s) required to be illuminated pursuant to the provisions of Section 303(q) of the Communications Act of 1934, as amended:

(a) Shall make a visual observation of the tower lights at least once each twenty-four hours to insure that all such lights are functioning properly as required.

(b) Shall report immediately by telephone or telegraph to the nearest Airways Communication Station or office of the Civil Aeronautics Administration any observed failure of the tower lights, not corrected within thirty minutes, regardless of the cause of such failure. Further notification by telephone or telegraph shall be given immediately upon resumption of the required illumination.

(c) Shall inspect at intervals of at least once each three months, all flashing or rotating beacons and automatic lighting control devices to insure that such apparatus is functioning properly as required.

Amendment No. 183 (Amending sec. 2.91), effective July 20, 1943
To be substituted for pp. 15-16, Part 2, General Rules and Regulations
The last previous amendment affecting Part 2 was amendment No. 158, pp. 1-2, 2a, effective March 4, 1943

NATIONAL DEFENSE

§2.91 National defense—free service.—Any common carrier subject to the Communications Act may render to any agency of the United States Government free service in connection with the preparation for the national defense. Every such carrier rendering any such free service shall make and file, in duplicate, with the Commission, on or before the 31st day of July and on or before the 31st day of January in each year, reports covering the periods of six months ending on the 30th day of June and the 31st day of December, respectively, next prior to said dates. These reports shall show the names of the agencies to which free service was rendered pursuant to this rule, the general character of the communications handled for each agency, and the charges in dollars which would have accrued to the carrier for such service rendered to each agency if charges for all such communications had been collected at the published tariff rates.

§2.92 National defense—emergency authorization.—The Federal Communications Commission may authorize the licensee of any radio station during a period of national emergency to operate its facilities upon such frequencies, with such power and points of communication, and in such a manner beyond that specified in the station license as may be requested by the Army or Navy.

§2.93 National defense—naval instructions regarding ship radio service.—No provision of the Commission's rules and regulations shall, in time of war, prevent the master of any vessel of the United States from taking any action whatsoever in regard to the radio installation, the operators, the transmission and receipt of messages, and the radio service of the ship whenever in his discretion such action is necessary to carry out the instructions of United States naval control officers and other instructions issued by the Navy Department.

PROVISIONS GOVERNING THE OPERATION OF CERTAIN LOW POWER RADIO FREQUENCY DEVICES

§ 2.101 **General.**—Pending the acquiring of more complete information regarding the character and effects of the radiation involved, the following provisions shall govern the operation of the low power radio frequency electrical devices hereinafter described.

§ 2.102 **Apparatus excepted from requirements of other rules.**—With respect to any apparatus which generates a radio frequency electromagnetic field functionally utilizing a small part of such field in the operation of associated apparatus not physically connected thereto and at a distance not greater than $\frac{157,000}{\text{f. (kc.)}}$ ft. $\left[\frac{\lambda}{2\pi}\right]$ the existing rules and regulations of the Commission shall not be applicable, provided:

(*a*) That such apparatus shall be operated with the minimum power possible to accomplish the desired purpose.

(*b*) That the best engineering principles shall be utilized in the generation of radio frequency currents so as to guard against interference to established radio services, particularly on the fundamental and harmonic frequencies.

(*c*) That in any event the total electromagnetic field produced at any point a distance of $\frac{157,000}{\text{f. (kc.)}}$ ft. $\left[\frac{\lambda}{2\pi}\right]$ from the apparatus shall not exceed 15 microvolts per meter.

(*d*) That the apparatus shall conform to such engineering standards as may from time to time be promulgated by the Commission.

§ 2.103 **Exceptions; interference to radio reception.**—The provisions of sections 2.101 and 2.102 shall not be construed to apply to any apparatus which causes interference to radio reception.

§ 2.104 **Inspection and test; certificates.**—Upon request, the Commission will inspect and test any apparatus described in sections 2.101 and 2.102, and on the basis of such inspection and test, formulate and publish findings as to whether such apparatus does or does not comply with the above conditions, and issue a certificate specifying conditions of operation to the party making such request.

APPENDIX A

THE FOLLOWING DEFINITIONS ARE QUOTED HEREIN FROM THE COMMUNICATIONS ACT OF 1934, AS AMENDED, FOR CONVENIENCE ONLY

DEFINITIONS

SEC. 3. For the purposes of this Act, unless the context otherwise requires—

(*a*) "Wire communication" or "communication by wire" means the transmission of writing, signs, signals, pictures, and sounds of all kinds by aid of wire, cable, or other like connection between the points of origin and reception of such transmission, including all instrumentalities, facilities, apparatus, and services (among other things, the receipt, forwarding, and delivery of communications) incidental to such transmission.

(*b*) "Radio communication" or "communication by radio" means the transmission by radio of writing, signs, signals, pictures, and sounds of all kinds, including all instrumentalities, facilities, apparatus, and services (among other things, the receipt, forwarding, and delivery of communications) incidental to such transmission.

(*c*) "Licensee" means the holder of a radio station license granted or continued in force under authority of this act.

(*d*) "Transmission of energy by radio" or "radio transmission of energy" includes both such transmission and all instrumentalities facilities, and services incidental to such transmission.

(*e*) "Interstate communication" or "interstate transmission" means communication or transmission (1) from any State, Territory, or possession of the United States (other than the Philippine Islands and the Canal Zone), or the District of Columbia, to any other State, Territory, or possession of the United States (other than the Philippine Islands and the Canal Zone), or the District of Columbia, (2) from or to the United States to or from the Philippine Islands or the Canal Zone, insofar as such communication or transmission takes place within the United States, or (3) between points within the United States but through a foreign country; but shall not include wire communication between points within the same State, Territory, or possession of the United States, or the District of Columbia, through any place outside thereof, if such communication is regulated by a State commission.

(*f*) "Foreign communication" or "foreign transmission" means communication or transmission from or to any place in the United States to or from a foreign country, or between a station in the United States and a mobile station located outside the United States.

(*g*) "United States" means the several States and Territories, the District of Columbia, and the possessions of the United States but does not include the Philippine Islands or the Canal Zone.

(*h*) "Common carrier" or "carrier" means any person engaged as a common carrier for hire, in interstate or foreign communication by wire or radio or in interstate or foreign radio transmission of energy, except where reference is made to common carriers not subject to this act; but a person engaged in radio broadcasting shall not insofar as such person is so engaged, be deemed a common carrier.

(*i*) "Person" includes an individual, partnership, association, joint-stock company, trust, or corporation.

(*j*) "Corporation" includes any corporation, joint-stock company, or association.

(*k*) "Radio station" or "station" means a station equipped to engage in radio communication or radio transmission of energy.

(*l*) "Mobile station" means a radio-communication station capable of being moved and which ordinarily does move.

(*m*) "Land station" means a station, other than a mobile station, used for radio communication with mobile stations.

(*n*) "Mobile service" means the radio-communication service carried on between mobile stations and land stations, and by mobile stations communicating among themselves.

(*o*) "Broadcasting" means the dissemination of radio communications intended to be received by the public, directly or by the intermediary of relay stations.

(*p*) "Chain broadcasting" means simultaneous broadcasting of an identical program by two or more connected stations.

(*q*) "Amateur station" means a radio station operated by a duly authorized person interested in radio technique solely with a personal aim and without pecuniary interest.

(*r*) "Telephone exchange service" means service within a telephone exchange, or within a connected system of telephone exchanges within the same exchange area operated to furnish to subscribers intercommunicating service of the character ordinarily furnished by a single exchange, and which is covered by the exchange service charge.

(*s*) "Telephone toll service" means telephone service between stations in different exchange areas for which there is made a separate charge not included in contracts with subscribers for exchange service.

(*t*) "State commission" means the commission, board, or official (by whatever name designated) which under the laws of any State

has regulatory jurisdiction with respect to intrastate operations of carriers.

(*u*) "Connecting carrier" means a carrier described in clause (2) of section 2 (b).

(*v*) "State" includes the District of Columbia and the Territories and possessions.

(*w*) (1) "Ship" or "vessel" includes every description of watercraft or other artificial contrivance, except aircraft, used or capable of being used as a means of transportation on water, whether or not it is actually afloat.

(2) A ship shall be considered a passenger ship if it carries or is licensed or certificated to carry more than twelve passengers.

(3) A cargo ship means any ship not a passenger ship.

(4) A passenger is any person carried on board a ship or vessel except (1) the officers and crew actually employed to man and operate the ship, (2) persons employed to carry on the business of the ship, and (3) persons on board a ship when they are carried, either because of the obligation laid upon the master to carry shipwrecked, distressed, or other persons in like or similar situations or by reason of any circumstance over which neither the master, the owner, nor the charterer (if any) has control.

(*x*) "Auto-alarm" on a foreign ship means an automatic alarm receiver which has been approved by the country to which the ship belongs, provided the United States and the country to which the ship belongs are both parties to the same treaty, convention, or agreement prescribing the requirements for such apparatus. "Auto-alarm" on a ship of the United States subject to the provisions of part II of title III of this Act means an automatic alarm receiver complying with law and approved by the Commission. Nothing in this act or in any other provision of law shall be construed to require the recognition of an auto-alarm as complying with part II of title III of this act, on a foreign ship subject to such part, whose country of origin is not a party to a treaty, convention, or agreement with the United States in regard to such apparatus.

(*y*) (1) For the purpose of part II of title III, a "qualified operator" or "operator" on a foreign ship means a person holding a certificate as such complying with the provisions of the General Radio Regulations annexed to the International Telecommunication Convention in force, or complying with an agreement or treaty between the United States and the country to which the ship belongs.

(2) For the purpose of part II of title III, a "qualified operator" or "operator" on a ship of the United States means a person holding a radio operator's license of the proper class, as prescribed and issued by the Commission.

(*z*) "Harbor" or "port" means any place to which ships may resort for shelter or to load or unload passengers or goods, or to obtain fuel, water, or supplies. This term shall apply to such places whether proclaimed public or not and whether natural or artificial.

(*aa*) "Safety convention" means the International Convention for the Safety of Life at Sea in force and the regulations referred to therein.

THE FOLLOWING DEFINITIONS ARE QUOTED HEREIN FROM THE INTERNATIONAL TELECOMMUNICATION CONVENTION, MADRID, 1932, FOR CONVENIENCE ONLY AND WITHOUT INDICATION AS TO THEIR APPLICATION OR CONSTRUCTION IN ANY PARTICULAR INSTANCE

ANNEX (SEE ARTICLE 1, SECTION 2)

DEFINITION OF TERMS USED IN THE INTERNATIONAL TELECOMMUNICATION CONVENTION

Telecommunication.—Any telegraph or telephone communication of signs, signals, writings, images, and sounds of any nature, by wire, radio, or other systems or processes of electric or visual (semaphore) signaling.

Radio communication.—Any telecommunication by means of Hertzian waves.

Radiotelegram.—Telegram originating in or intended for a mobile station, transmitted on all or part of its route over the radio-communication channels of the mobile service.

Service telegrams and radiotelegrams.—Those emanating from the telecommunication administrations of the contracting governments, or from any private operating agency recognized by one of these governments, and which refer to international telecommunications, or to matters of public interest determined by agreement among the said administrations.

Private telegrams and radiotelegrams.—Those other than a service or government telegram and radiotelegram.

Public correspondence.—Any telecommunication which the offices and stations, by reason of their being at the disposal of the public, must accept for transmission.

Private operating agency.—Any individual, company, or corporation, other than a governmental institution or agency, which is recognized by the government concerned and operates telecommunication installations for the purpose of exchanging public correspondence.

Administration.—A government administration.

Public service.—A service for the use of the public in general.

International service.—A telecommunication service between offices or stations subject to different countries, or between stations of the mobile service except when the latter are of the same nationality

and are within the limits of the country to which they belong. An internal or national telccommunicaton service which is likely to cause interference with other services beyond the limits of the country in which it operates, shall be considered as an international service from the standpoint of interference.

Limited servicc.—A service which can be uscd only by spccificd persons or for special purposes.

Mobile scrvicc.—A radio-communication service carricd on between mobile and land stations and by mobile stations communicating among themselves, special scrvices being cxcludcd.

THE FOLLOWING DEFINITIONS ARE QUOTED HEREIN FROM THE GENERAL RADIO REGULATIONS (CAIRO REVISION, 1938) ANNEXED TO THE INTERNATIONAL TELECOMMUNICATION CONVENTION FOR CONVENIENCE ONLY AND WITHOUT INDICATION AS TO THEIR APPLICATION OR CONSTRUCTION IN ANY PARTICULAR INSTANCE

ARTICLE 1.—DEFINITIONS

SECTION 1

Telecommunication.—Any telegraph or telephonc communication of signs, signals, writings, images, and sounds of any nature, by wire, radio, or other systems or processes of electric or visual (semaphore) signaling.

General nctwork of telecommunication channcls.—The whole of the existing tclecommunication channels open to public service, with the exception of thc radio channels of the mobile service.

Radio communication.—Any telecommunication by mcans of Hertzian waves.

Radiotclcgram.—Telegram originating in or intcndcd for a mobile station, transmitted on all or part of its routc over the radio channels of the mobile servicc.

Tclegraphy.—Telecommunication by any system of telegraph signaling. The word "telegram" also covers "radiotelegram," except when the text expressly precludes such a meaning.

Telephony.—Telecommunication by any system of tclephone signaling.

Frequency assignod to a station.—The frequency assigned to a station is the frequency occupying the center of the frequency band in which the station is authorized to work. In general, this frequency is that of a carrier wave.

Frequency band of an cmission.—The frequency band of an emission is the frequency band actually occupied by this emission for the type of transmission and for thc signaling-speed used.

Frcqucncy tolerance.—The frcquency tolerance is the maximum permissible separation between the actual frequency of an emission

and the frequency which this emission should have (frequency notified or frequency chosen by the operator).

Power of a radio transmitter.—The power of a radio transmitter is the power supplied to the antenna. For the types of transmitters indicated hereinafter, the following data are applicable:

Continuous wave radiotelegraphy.—In the case of a transmitter employing type-A1 or -A2 emissions the power is that delivered to the antenna during the marking (key-closed) condition.

Conventional double-sideband type.—In the case of an amplitude-modulated wave transmitter of the conventional double-sideband type the power in the antenna is represented by two numbers, one indicating the value of the carrier-wave power supplied to the antenna and the other indicating the actual maximum percentage of modulation used.[1]

Other types.—In the case of amplitude-modulated wave transmitters of other than the conventional double-sideband type, the maximum power delivered to the antenna shall be given as the power of the transmitter.

SECTION 2

Fixed service.—A service carrying on radio communication of any kind between fixed points, with the exception of the broadcasting services and special services.

Mobile service.—A radio service carried on between mobile and land stations and by mobile stations communicating among themselves, excluding special services.

Aeronautical service.—A radio service carried on between aircraft stations and land stations and by aircraft stations among themselves. This term shall also apply to fixed and special radio services intended to insure the safety of aerial navigation.

Broadcasting service.—A service carrying on the broadcasting of transmissions intended to be received by the general public; this service shall include exclusively: [2]

(*a*) *Radiotelephone service.*—Service carrying on the broadcasting of transmissions for reception at a distance of voice and music;

(*b*) *Television service.*—Service carrying on the broadcasting of transmissions for the visual reception at a distance of fixed or moving objects.[3]

Facsimile service.—A service making transmissions for the reproduction at a distance of fixed images in a permanent form.[4]

Special service.—A telecommunication service carried on especially for the needs of a specific service of general interest and not open to

[1] This percentage shall be expressed in x percent.

[2] See the exception under facsimile service and corresponding footnote (4).

[3] "Objects" is used here in the optical sense of the word.

[4] This facsimile service may be carried on by broadcasting stations, fixed stations, or mobile service stations.

public correspondence, such as: a service of radiobeacons, radio direction-finding, time signals, regular meteorological bulletins, notices to navigators, press messages addressed to all, medical notices (medical consultation by radio), standard frequencies, emissions for scientific purposes, et cetera.

SECTION 3

Fixed station.—A station not capable of being moved and communicating by radio with one or more stations established in the same manner.

Land station.—A station not capable of being moved, carrying on a mobile service.

Coast station.—A land station carrying on a service with ship stations. This may be a fixed station assigned also to communication with ship stations; in this case, it shall be considered as a coast station only for the duration of its service with ship stations.

Aeronautical station.—A land station carrying on a service with aircraft stations. This may be a fixed station assigned also to communication with aircraft stations; in this case, it shall be considered as an aeronautical station only for the duration of its service with aircraft stations.

Mobile station.—A station capable of being moved and which ordinarily does move.

On-board station.—A station on board either a ship which is not permanently moored, or an aircraft.

Ship station.—A station on board a ship which is not permanently moored.

Aircraft station.—A station on board any aircraft.[5]

Portable station.—A station intended to be moved easily but which is not ordinarily used while in motion.

Radiobeacon station.—A special station the emissions of which are intended to enable an on-board station to determine its bearing or a direction with reference to the radiobeacon station, and in some cases also the distance which separates it from the latter.

Radio direction-finding station.—A station equipped with special apparatus for determining the direction of the emissions of other stations.

Amateur station.—A station used by an "amateur," that is, by a duly authorized person interested in radio technique solely with a personal aim and without pecuniary interest.

Private experimental station.—A private station intended for experiments looking to the development of radio technique or science.

Private radio station.—A private station, not open to public correspondence, which is authorized solely to exchange with other

[5] "Aircraft" is a general term including airplanes, dirigibles, free or captive balloons, et cetera.

"private radio stations" communications concerning the private business of the license holder or holders.

APPENDIX 1 (CAIRO REVISION, 1938)

TABLE OF FREQUENCY TOLERANCES

The frequency tolerance is the maximum permissible separation between the actual frequency of an emission and the frequency which this emission should have (frequency notified or frequency chosen by the operator).

Frequency bands (wave lengths)	Tolerances	
	Transmitters in service now and until Jan. 1, 1944 after which date they will conform to the tolerances indicated in column 2	New transmitters installed beginning Jan. 1, 1940
	Column 1	Column 2
A. From 10 to 550 kc. (30000 to 545 m.):		
(a) Fixed stations	0.1%	0.1%
(b) Land stations	0.1%	0.1%
(c) Mobile stations using frequencies other than those of bands indicated under (d)	0.5%	0.1%
(d) Mobile stations using frequencies of the bands 110–160 kc. (2727 to 1,875 m.), 365–515 kc. (822 to 583 m.)[1]	[2] 0.5%	[2] 0.3%
(e) Aircraft stations	0.5%	0.3%
(f) Broadcasting	50 cycles	20 cycles
B. From 550 to 1500 kc. (545 to 200 m.):		
(a) Broadcasting stations	50 cycles	20 cycles
(b) Land stations	0.1%	0.05%
(c) Mobile stations using the frequency of 1364 kc. (220 m.)	0.5%	0.1%
C. From 1500 to 6000 kc. (200 to 50 m.):		
(a) Fixed stations	0.03%	0.01%
(b) Land stations	0.04%	0.02%
(c) Mobile stations using frequencies other than those of bands indicated in (d):		
1560 to 4000 kc. (192.3 to 75 m.)	[2] 0.1%	[2] 0.05%
4000 to 6000 kc. (75 to 50 m.)	0.04%	0.02%
(d) Mobile stations using frequencies within the bands:		
4115 to 4165 kc. (72.90 to 72.03 m.)	[2] 0.1%	[2] 0.05%
5500 to 5550 kc. (54.55 to 54.05 m.)		
(e) Aircraft stations	0.05%	0.025%
(f) Broadcasting:		
between 1500 and 1600 kc. (200 and 187.5 m.)	50 cycles	20 cycles
between 1600 and 6000 kc. (187.5 and 50 m.)	0.01%	0.005%
D. From 6000 to 30000 kc. (50 to 10 m.):		
(a) Fixed stations	0.02%	0.01%
(b) Land stations	0.04%	0.02%
(c) Mobile stations using frequencies other than those of bands indicated under (d)	0.04%	0.02%
(d) Mobile stations using frequencies within the bands:		
6200 to 6250 kc. (48.39 to 48 m.)	[2] 0.1%	[2] 0.05%
8230 to 8330 kc. (36.45 to 36.01 m.)		
11000 to 11100 kc. (27.27 to 27.03 m.)		
12340 to 12500 kc. (24.31 to 24 m.)		
16460 to 16660 kc. (18.23 to 18.01 m.)		
22000 to 22200 kc. (13.64 to 13.51 m.)		
(e) Aircraft stations	0.05%	0.025%
(f) Broadcasting stations	0.01%	0.005%

[1] It is recognized that a great number of spark transmitters and simple self-oscillator transmitters exist in this service which are not able to meet these requirements.

[2] See preamble above.

NOTE 1.—The administrations shall endeavor to profit by the progress of the art in order to reduce frequency tolerances progressively.

NOTE 2.—It shall be understood that ship stations working in shared bands must observe the tolerances applicable to land stations and other stations mentioned in the General Radio Regulations, Cairo revision, 1938.

NOTE 3.—Radiotelephone stations with less than 25 watts' power, employed by maritime beacons for communications with beacons isolated at sea, shall be comparable, with reference to frequency stability, to mobile stations indicated in C above.

NOTE 4.—Ships equipped with a transmitter, the power of which is under 100 watts, working in the band of 1560–4000 kc. (192.3–75 m.), shall not be subject to the stipulations of column 1.

This separation results from the following errors:

(*a*) Error made when the station was calibrated; this error presents a semipermanent character.

(*b*) Error made during use of the station (error variable from one transmission to another and resulting from actual operating conditions: ambient temperature, voltage of supply, antenna, skill of the operator, et cetera). This error, which is usually small in other services, is particularly important in the case of mobile stations.

(*c*) Error due to slow variations of the frequency of the transmitter during a transmission.

NOTE.—In the case of transmissions without a carrier wave, the preceding definition applies to the frequency of the carrier wave before its suppression.

In the case of ship stations, the reference frequency is the frequency on which the transmission begins, and the figures appearing in the present table, marked by an asterisk, refer only to frequency separations observed during a 10-minute period of transmission.

In the frequency tolerance, modulation is not considered.

APPENDIX 3 (CAIRO REVISION, 1938)

TABLE OF FREQUENCY-BAND WIDTHS OCCUPIED BY THE EMISSIONS

The frequency bands necessary for the various types of transmission, at the present state of technical development, are indicated below. This table is based solely upon *amplitude* modulation. For frequency or phase modulation, the band widths necessary for the various transmissions are many times greater.

Type of transmission	Total width of the band in cycles For transmission with two sidebands
A0 Continuous waves, no signaling	
A1 Telegraphy, pure, continuous wave: Morse code. Baudot code. Stop-start printer	Numerically equal to the telegraph speed in bauds for the fundamental frequency, 3 times this width for the 3d harmonic, etc. (For a code of 8 time elements (dots or blanks) per letter and 48 time elements per word, the speed in bauds shall be equal to 0.8 times the speed in words per minute.)
Scanning-type printer	300–1000, for speeds of 50 words per minute, according to the conditions of operation and the number of lines scanned (for example, 7 or 12). (Harmonics are not considered in the above values.)
A2 Telegraphy modulated to musical frequency.	Figures appearing under A1, plus twice the highest modulation frequency.
A3 Commercial radiotelephony	Twice the number indicated by the C. C. I. F. Opinions (about 6000 to 8000).[1]
Broadcasting	15,000 to 20,000.
A4 Facsimile	Approximately the ratio between the number of picture components [2] to be transmitted and the number of seconds necessary for the transmission.
A5 Television	Approximately the product of the number of picture components [2] multiplied by the number of pictures transmitted per second.

[1] It is recognized that the band width may be wider for multiple-channel radiotelephony and secret radiotelephony.

[2] Two picture components, 1 black and 1 white, constitute a cycle; thus, the modulation frequency equals one-half the number of components transmitted per second.

THE FOLLOWING DEFINITIONS ARE QUOTED HEREIN FROM THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, LONDON, 1929, FOR CONVENIENCE ONLY AND WITHOUT INDICATION AS TO THEIR APPLICATION OR CONSTRUCTION IN ANY PARTICULAR INSTANCE

ARTICLE 2.—APPLICATIONS AND DEFINITIONS

* * * * * * *

3. In the present convention, unless expressly provided otherwise—

(*a*) a ship is regarded as belonging to a country if it is registered at a port of that country;

(*b*) the expression "Administration" means the Government of the country in which the ship is registered;

(*c*) an international voyage is a voyage from a country to which the present Convention applies to a port outside such country, or conversely; and for this purpose every colony, overseas territory, protectorate or territory under suzerainty or mandate is regarded as a separate country;

(*d*) a ship is a passenger ship if it carries more than 12 passengers;

* * * * * * *

ARTICLE 26—APPLICATION AND DEFINITION

1. This chapter [6] applies to all ships engaged on international voyages exccpt cargo ships of less than 1,600 tons gross tonnage.

2. For the purposes of this chapter [6] a cargo ship means any ship not being a passenger ship.

[6] Ch. 4. Radiotelegraphy.

FEDERAL COMMUNICATIONS COMMISSION

RULES AND REGULATIONS

Amendment No. 142, (Revising Appendix B, Part 2), effective November 26, 1942

To be substituted for pp. 27-52, Part 2, General Rules and Regulations

The last previous amendment affecting Part 2 was amendment No. 137, p. 16a

APPENDIX B — FREQUENCY ALLOCATIONS

The center frequencies of communication bands that will be designated are as follows: [1]

Frequency (kilocycles)	Allocation	Frequency (kilocycles)	Allocation
10.05	Fixed	13.95	Fixed
10.20	do.	14.10	do.
10.35	do.	14.25	do.
10.50	do.	14.40	do.
10.65	do.	14.55	do.
10.80	do.	14.70	do.
10.95	do.	14.85	do.
11.10	do.	15.00	do.
11.25	do.	15.20	do.
11.40	do.	15.40	do.
11.55	do.	15.60	do.
11.70	do.	15.80	do.
11.85	do.	16.00	do.
12.00	do.	16.20	do.
12.15	do.	16.40	do.
12.30	do.	16.60	do.
12.45	do.	16.80	do.
12.60	do.	17.00	do.
12.75	do.	17.20	do.
12.90	do.	17.40	do.
13.05	do.	17.60	do.
13.20	do.	17.80	Government
13.35	do.	18.00	do.
13.50	do.	18.20	Fixed
13.65	do.	18.40	do.
13.80	do.	18.60	Government

[1] Frequencies are listed for information purposes only. Indented frequencies indicate assigned center frequencies of communication bands not in accordance with the approximate 0.1% frequency separation scale, while bracketed frequencies show the allocated center frequencies of communication bands covering more frequency space than the approximate 0.1% frequency separation plan provides. The term "General Communication" is used only as a designation for non-Government frequencies which have not been assigned to any specific service. Section 305 (a) of the Communications Act of 1934, as amended, states as follows:

"Radio stations belonging to and operated by the United States shall not be subject to the provisions of Sections 301 and 303 of this Act. All such Government stations shall use such frequencies as shall be assigned to each or to each class by the President. All such stations, except stations on board naval and other Government vessels while at sea or beyond the limits of the continental United States, when transmitting any radio communication or signal other than a communication or signal relating to Government business, shall conform to such rules and regulations designed to prevent interference with other radio stations and the rights of others as the Commission may prescribe."

For more detailed information regarding restrictions on the use of non-Government frequencies consult the chapter of the Rules and Regulations of this Commission covering the service or class of station to which the frequency is allocated.

Frequency (kilocycles)	Allocation
18.80	Fixed
19.00	do.
19.20	do.
19.40	do.
19.60	do.
19.80	Government
20.00	Fixed
20.25	do.
20.50	do.
20.75	do.
21.00	do.
21.25	do.
21.50	do.
21.75	do.
21.80	do.
22.00	do.
22.10	do.
22.25	do.
22.50	do.
22.60	do.
22.75	do.
22.90	Government
23.00	do.
23.25	Fixed
23.50	do.
23.75	do.
24.00	Government
24.25	Fixed
24.50	do.
24.75	do.
25.00	do.
25.30	do.
25.60	do.
25.82	do.
25.90	do.
26.10	Government
26.20	do.
26.50	Fixed
26.80	do.
27.10	do.
27.40	do.
27.70	do.
28.00	do.
28.30	do.
28.50	Government
28.60	do.
28.90	Fixed
29.20	do.
29.50	do.
29.80	do.
30.20	do.
30.60	Government
31.00	Fixed
31.40	do.
31.80	do.
32.20	do.
32.60	do.
33.00	do.
33.40	do.
33.80	do.
34.20	do.
34.60	do.
35.00	do.
35.40	do.
35.80	do.

Frequency (kilocycles)	Allocation
36.20	Fixed
36.60	do.
37.00	do.
37.40	do.
37.80	do.
38.20	do.
38.60	do.
39.00	do.
39.40	do.
39.80	do.
40.20	do.
40.70	do.
41.20	do.
41.70	do.
42.20	do.
42.70	Government
42.80	do.
43.20	Fixed
43.70	do.
44.20	do.
44.70	do.
45.20	do.
45.70	do.
46.20	do.
46.70	do.
47.20	do.
47.70	do.
48.20	do.
48.70	do.
49.20	do.
49.70	do.
50.20	do.
50.80	do.
51.00	Government
51.40	Fixed
51.68	do.
52.00	do.
52.60	do.
53.20	do.
53.80	do.
54.00	Government
54.40	Fixed
55.00	do.
55.60	do.
56.00	Government
56.20	do.
56.80	Fixed
57.40	do.
58.00	Government
58.50 – 60.00	Fixed
61.50	Government
62.00	do.
62.80	do.
63.60	do.
64.00	Government
64.40	do.
65.20	Fixed
66.00	Government
66.50 – 68.00	Fixed
69.50	Government
70.00	do.
70.80	do.
71.60	do.

Frequency (kilocycles)	Allocation
72.40	Fixed
73.20	do.
74.00	do.
74.80	Government
75.00	do.
75.60	Fixed
76.40	do.
77.20	do.
78.00	do.
78.80	do.
79.32	do.
79.60	do.
80.40	do.
81.20	do.
82.00	Government
82.80	do.
83.00	do.
83.60	Fixed
83.86	do.
84.40	do.
85.20	do
86.00	do.
86.80	do.
87.60	do.
88.40	do.
88.50	Government
89.20	Fixed
90.00	do.
90.80	do.
91.00	Government
91.60	Fixed
92.40	do.
92.76	do.
93.20	do.
94.00	Government
94.80	Fixed
95.50	Government
95.60	Fixed
96.40	do.
97.20	do.
97.50	do.
98.00	Government
98.80	Fixed
100	Government
101	Fixed
102	Government
103	Fixed
104	Government
105	Coastal Teleg.
106	Government
107	Coastal Teleg.
108	Government
109	Coastal Teleg. & Fixed
110	Government
111	Coastal Teleg.
112	Government
113	do.
114	Coastal Teleg. & Govt.
115	Government
116	Coastal Teleg.
117	Coastal Teleg.
118	do.
119	do.
j120	Coastal Teleg. & Govt.
121	Coastal Teleg.
122	Government
123	Coastal Teleg.
124	do.
125	do.
126	do.
127	Government
128	do.
129	Coastal Teleg.
130	Coastal Teleg. & Govt.
131	Coastal Teleg.
132	Government
j133	Coastal Teleg. & Govt.
134	Coastal Teleg.
135	do.
136	do.
137	do.
138	Government
139	Coastal Teleg. & Govt.
140	Government
141	Coastal Teleg.
142	Guard Band
143	Maritime Calling
144	Guard Band
145	Government
j146	Coastal Teleg. & Govt.
147	Coastal Teleg.
148	Government
149	Coastal Teleg.
150	Government
151	Ship Teleg.
152	do.
153	do.
154	do.
j155	Ship Teleg. & Govt.
156	Ship Teleg.
157	do.
158	do.
159	Government
160	Ship Teleg.
161	Fixed & Coastal Teleg.
162	Government
163	Fixed & Coastal Teleg.
164	Fixed, Coastal Teleg. & Govt.
165	Fixed & Coastal Teleg.
166	Government
167	Fixed & Coastal Teleg.

Frequency (kilocycles)	Allocation
168	Government
169	Fixed & Coastal Teleg.
170	do.
171	do.
172	Government
173	Fixed & Coastal Teleg.
174	do.
175	Government
176	Fixed & Coastal Teleg.
177	do.
178	Government
179	Fixed & Coastal Teleg.
180	Government
181	Fixed & Coastal Teleg.
a182	do.
aj183	Fixed, Coastal Teleg. & Govt.
184	Fixed & Coastal Teleg.
185	Government
186	do.
a187	Fixed & Coastal Teleg.
188	Government
a189	Fixed, Coastal Teleg. & Govt.
j190	State Police & Govt.
191	Fixed & Coastal Teleg.
192	Government
193	do.
194	do.
195	do.
196	do.
197	do.
198	Government
199	
200	Government
s201	Government
202	
s203	do.
204	
205	do.
s206	do.
207	
208	
as209	Government
a210	Fixed
211	
as212	Government
213	
a214	Fixed
215	Government
216	do.
217	
218	do.
s219	Government
220	do.
s221	do.
222	

Frequency (kilocycles)	Allocation
223	
s224	Government
225	do.
226	
as227	Government
228	
229	
s230	Government
231	
232	
s233	Government
234	
235	
s236	Government
237	
238	
s239	Government
240	
241	
s242	Government
243	
244	
s245	Government
a246	Fixed
247	
s248	Government
249	
250	
s251	Government
a252	Fixed
253	
s254	Government
255	
a256	Fixed
s257	Government
258	
259	
s260	Government
261	
a262	Fixed
s263	Government
264	
265	
s266	Government
267	
a268	Fixed
s269	Government
270	
271	
s272	Government
273	
a274	Fixed
275	Government
276	
277	
cs278	Airport & Govt.
279	
280	
s281	Government
282	
283	
s284	Government
285	
s286	Government
287	

Frequency (kilocycles)	Allocation
287	
s288	Government
289	
s290	Government
291	
s292	Government
s293	do.
s294	do.
295	
s296	do.
297	
s298	do.
299	
s300	do.
301	
s302	do.
303	
s304	do.
s305	do.
s306	do.
307	
s308	do.
309	
s310	do.
s311	do.
s312	do.
313	
s314	do.
315	
316	do.
s317	do.
318	
319	
s320	Government
321	
322	
s323	Government
324	
325	
s326	Government
327	
328	
s329	Government
330	
331	
s332	Government
j333	Aircraft & Govt.
334	
s335	Government
336	
337	
s338	Government
339	
340	
s341	Government
342	
343	Government
s344	Government
345	
346	
s347	Government
348	
349	
s350	Government
351	
352	
s353	Government
354	
355[3]	Government
s356	do.
357	
358	
s359	Government
360	do.
361	
s362	do.
363	
364	do.
s365	Guard Band & Govt.
366	Guard Band
367	do.
s368	Guard Band & Govt.
369	do.
370	Guard Band
s371	Guard Band & Govt.
372	Guard Band
373	do.
374	do.
j375	Direction Finding
376	Guard Band
377	do.
378	do.
s379	Guard Band & Govt.
380	do.
381	Guard Band
s382	Guard Band & Govt.
383	Guard Band
384	do.
s385	Guard Band & Govt.
386	Government
387	
s388	do.
389	
390	
s 391	do.
392	Coastal Teleg.
393	Government
394	Coastal Teleg. & Ship-Teleg.
396	Government
398	Guard Band
ns400	Ship Teleg. & Govt.
402	Guard Band
404	Government
406	Coastal Teleg.
407	Government
408	Coastal Teleg.
j410	Coastal & Ship Teleg. & Govt.
412	Coastal Teleg.
414	Government
416	Coastal Teleg.
418	do.
420	do.
422	Government
424	Guard Band
aj 425	Coastal & Ship Teleg., Intership Phone & Govt.
426	Guard Band
428	Government

[3] Available for non-Government ship stations for communication with Government stations.

Frequency (kilocycles)	Allocation
j430	Coastal Teleg. & Govt.
432	do.
434	Government
436	Coastal Teleg.
438	do.
440	Government
442	Coastal Teleg.
444	Government
446	do.
448	Coastal Teleg.
450	Government
452	do.
j454	Coastal & Ship Teleg. & Govt.
456	Guard Band
n 457	Aircraft & Govt.
458	Guard Band
aj460	Coastal Teleg. & Govt.
462	Coastal Teleg.
464	Government
466	Coastal Teleg. & Govt.
468	Ship Teleg.
470	Government
472	do.
474	Coastal Teleg.
j476	Coastal Teleg. & Govt.
478	Coastal Teleg.
480	Government
482	Coastal Teleg.
484	do.
486	Guard Band
488	do.
490	do.
492	do.
494	do.
496	do.
498	do.
ac500	Maritime Calling & Govt.
502	Guard Band
504	do.
506	do.
508	do.
510	do.
512	do.
514	do.
516	Government
518	do.
520	do.
522	do.
524	do.
526	do.
528	do.
530	do.
532	do.
534	do.
536	do.
538	do.
540	do.
542	do.
544	do.
546	Guard Band

Frequency (kilocycles)	Allocation
548	Guard Band
550 to 1600	Government
550	Broadcast
560	do.
570	do.
580	do.
590	do.
600	do.
610	do.
620	do.
630	do.
640	do.
650	do.
660	do.
670	do.
680	do.
c690	Broadcast & Govt.
700	Broadcast
710	do.
720	do.
730	do.
740	do.
750	do.
760	do.
770	do.
780	do.
790	do.
800	do.
810	do.
820	do.
830	do.
840	do.
850	do.
860	do.
870	do.
880	do.
890	do.
900	do.
910	do.
920	do.
930	do.
940	do.
950	do.
960	do.
970	do.
980	do.
990	do.
1,000	do.
1,010	do.
1,020	do.
1,030	do.
1,040	do.
1,050	do.
1,060	do.
1,070	do.
1,080	do.
1,090	do.
1,100	do.
1,110	do.
1,120	do.
1,130	do.
1,140	do.
1,150	do.
1,160	do.
1,170	do.

Frequency (kilocycles)	Allocation
1,180	Broadcast
1,190	do.
1,200	do.
1,210	do.
1,220	do.
1,230	do.
1,240	do.
1,250	do.
1,260	do.
1,270	do.
1,280	do.
1,290	do.
1,300	do.
1,310	do.
1,320	do.
1,330	do.
1,340	do.
1,350	do.
1,360	do.
1,370	do.
1,380	do.
1,390	do.
1,400	do.
1,410	do.
1,420	do.
1,430	do.
1,440	do.
1,450	do.
1,460	do.
1,470	do.
1,480	do.
1,490	do.
1,500	do.
1,510	do.
1,520	do.
1,530	do.
1,540	do.
1,550	do.
1,560	do.
1,570	do.
1,580	do.
1,590	do.
1,600	do.
)1,602	Geophysical
1,604	
a)1,606	Relay Broadcast
1,608	
n)1,610	Police & Govt.
1,612	
n)1,614	Exp. & Govt.
1,616	
n)1,618	Police & Govt.
1,620	
a)1,622	Relay Bc.
1,624	
n)1,626	Police & Govt.
1,628	Geophysical
)1,630	Marine Fire
1,632	
n)1,634	Police & Govt.
1,636	
ac)1,638	Aviation & Govt.
1,640	
1,640	
n)1,642	Police & Govt.
1,644	
a)1,646	Relay Bc.
1,648	
)1,650	Police
1,652	Motion Picture, Geophysical & Govt.
1,656	Government
n)1,658	Police & Govt.
a1,660	
1,664	
n)1,666	Police & Govt.
1,668	
1,672	
n)1,674	Aviation, Police and Govt.
)	
1,676	Geophysical
1,680	
n)1,682	Police & Govt.
1,684	
1,688	
n)1,690	Police & Govt.
1,692	
1,696	
n)1,698	Police & Govt.
1,700	Geophysical
1,704	
1,705	Government
n)1,706	Police & Govt.
a1,708	Government
1,712	Government
n)1,714	Police & Govt.
1,716	
1,720	Government
)1,722	Aviation, Police
1,724	
1,728	
)1,730	Police
1,732	
1,736	
)1,738	Government
1,740	
)1,742	do.
1,744	
)1,746	do.
1,748	
1,750	
n to	Amateur & Govt.
2,050	
2,052	Government
2,056	
n)2,058	Relay Bc. & Govt.
2,060	
2,064	
)2,066	Government
2,068	
2,072	do.
)2,074	Relay Bc.
2,076	Government
2,080	
)2,082	do.
2,084	do.

Frequency (kilocycles)	Allocation
2,088	
n)2,090	Relay Bc. & Govt.
2,092	
2,096	Government
2,100	
n)2,102	Relay Bc. & Govt.
2,104	
2,108	
j)2,110	Ship Phone & Govt.
2,112	
2,114	Government
2,116	
n)2,118	Ship Phone & Govt.
2,120	
2,122	Government
2,124	
j)2,126	Ship Phone & Govt.
2,128	
2,130	Government
2,132	
j)2,134	Ship Phone & Govt.
2,136	
2,138	Government
2,140	
j)2,142	Ship Phone & Govt.
2,144	
2,148	
g)2,150	Relay Bc. & Govt.
2,152	
2,156	
)2,158	Ship Phone & Govt.
2,160	
2,164	
j)2,166	Ship Phone & Govt.
2,168	
)2,170	Government
2,172	
j)2,174	Ship Phone & Govt.
2,176	
2,180	
c)2,182	Ship Phone, Coastal Hrbr. & Govt.
2,184	
2,188	Government
)2,190	Relay Bc.
2,192	Government
2,196	do.
j)2,198	Ship Phone & Govt.
2,200	
2,204	
)2,206	Ship Phone & Govt.
2,208	
2,210	Government
2,212	Forestry
2,216	Government
2,220	do.
)2,222	do.
2,224	
j)2,226	Govt. & Forestry
2,228	
2,232	Government
2,236	Forestry
2,240	Government
2,244	Forestry
2,248	Government

Frequency (kilocycles)	Allocation
g2,252	Fixed & Govt.
2,256	
)2,258	Government
2,260	
n2,264	Fixed & Govt.
2,268	Government
2,272	do.
)2,274	Ship & Coastal Teleg.
2,276	Government
2,280	do.
2,284	do.
2,288	do.
c2,292	Spl. Emerg. & Govt.
2,296	Government
2,300	do.
2,304	do.
2,308	
)2,310	do.
2,312	
2,315	do.
2,316	
)2,318	Police
2,320	Government
2,324	
j)2,326	Police & Govt.
2,328	
2,332	Government
)2,334	Police
2,336	Government
2,340	do.
)2,342	Police
2,344	
2,345	Government
2,348	
)2,350	Government
2,352	
2,356	Government
2,360	do.
2,364	
n)2,366	Police & Govt.
2,368	
2,370	Government
2,372	
)2,374	Government
2,376	
2,380	
an)2,382	Police & Govt.
2,384	Government
2,388	
n)2,390	Police & Govt.
2,392	
2,396	
)2,398	Experimental
2,400	Government
2,404	do.
n)2,406	Police & Govt.
2,408	
2,410	Government
2,412	
n)2,414	Police & Govt.
2,416	
2,418	Government
2,420	
an)2,422	Police & Govt.
2,424	
2,426	Government

Frequency (kilocycles)	Allocation
2,428	
an)2,430	Police & Govt.
2,432	
2,436	Government
2,440	
n)2,442	Police & Govt.
2,444	
)2,446	Government
2,448	
an)2,450	Police & Govt.
2,452	
2,454	Government
2,456	
n)2,458	Police & Govt.
2,460	
2,462	Government
2,464	
an)2,466	Police & Govt.
2,468	
2,470	Government
2,472	
an)2,474	Police & Govt.
2,476	
)2,478	Government
2,480	
an)2,482	Police & Govt.
2,484	Government
2,488	
n)2,490	Police & Govt.
2,492	Government
2,496	do.
2,500	do.
2,504	
j)2,506	Coastal Harbor
)	& Govt.
2,508	
a2,512	
)2,514	Coastal Harbor
)	& Govt.
2,516	Government
2,520	do.
)2,522	Coastal Harbor
)	& Govt.
2,524	
2,528	
n)2,530	Coastal Harbor
)	& Govt.
2,532	
2,534	Government
2,536	
an)2,538	Coastal Harbor
)	& Govt.
2,540	Government
2,544	do.
2,548	
n)2,550	Coastal Harbor
)	& Govt.
2,552	
2,554	Government
2,556	
n)2,558	Coastal Harbor
)	& Govt.
2,560	
2,562	Government
2,564	
a)2,566	Coastal Harbor &
)	Govt.
2,568	
2,572	Coastal Harbor & Govt.
2,576	Government
2,580	
)2,582	Coastal Harbor &
)	Govt.
2,584	
2,586	Government
2,588	
n)2,590	Coastal Harbor &
)	Govt.
2,592	
2,594	Government
2,596	
j)2,598	Coastal Harbor &
)	Govt.
2,600	
2,604	Government
a2,608	Aviation
2,612	do.
2,616	Government
)2,618	do.
2,620	
2,621	Government
2,624	do.
2,628	
)2,630	Government
a2,632	
2,636	Aviation
)2,638	Intership
2,640	Aviation
2,644	do.
aj2,648	Aviation & Govt.
2,652	Government
2,656	do.
2,660	do.
)2,662	do.
2,664	do.
2,668	
)2,670	do.
2,672	
2,676	do.
2,680	do.
2,684	do.
2,688	do.
2,692	do.
2,696	
)2,698	do.
2,700	
2,704	Government
2,708	
)2,710	Government
2,712	
2,716	Government
a2,720	Aviation & Govt.
2,724	
c)2,726	Spec. Emerg.
2,728	
2,732	Aviation

Frequency (kilocycles)	Allocation
2,736	
j)2,738	Coastal Harbor, Ship Phone, Intership & Govt.
2,740	
2,744	Government
a2,748	Aviation
2,750	Government
2,752	
)2,754	Government
2,756	
n)2,758	Relay Bc. & Govt.
2,760	
2,764	Government
2,768	
)2,770	Government
2,772	do.
2,776	Fixed
n2,780	Fixed & Govt.
)2,782	Ship Phone & Coastal Harbor
2,784	Fixed
2,788	Government
)2,790	Relay Broadcast
2,792	Government
2,796	do.
)2,798	do.
2,800	do.
2,804	Police
2,808	do.
2,812	do.
2,816	Government
2,820	do.
)2,822	do.
2,824	
2,828	
n)2,830	Relay Bc. & Govt.
2,832	
n 2,834	Government
2,836	do.
)2,838	do.
2,840	do.
2,844	do.
n2,848	Fixed & Govt.
2,852	Government
)2,854	do.
2,856	
2,860	
)2,862	Government
2,864	
2,868	
c)2,870	Aviation & Govt.
2,872	
2,876	
)2,878	Government
2,880	
2,884	Government
2,888	
)2,890	Government
2,892	
)2,894	Government
2,896	
n)2,898	Aviation & Govt.
2,900	

Frequency (kilocycles)	Allocation
2,900	
)2,902	Government
2,904	
)2,906	Aviation
2,908	
c2,912	Aviation & Govt.
2,916	Government
2,920	
a)2,922	Aviation
2,924	
n)2,926	Government
2,928	
)2,930	Aviation
2,932	
2,936	Government
)2,938	Aviation
2,940	Government
2,944	
a)2,946	Aviation
2,948	
2,952	Government
2,956	do.
2,960	do.
2,964	Aviation & Govt.
2,968	Government
)2,970	do.
2,972	do.
c2,976	Aviation & Govt.
c2,980	do.
2,984	
an)2,986	Aviation & Govt.
2,988	
)2,990	Government
2,992	
a)2,994	Aviation & Govt.
2,996	
2,998	Aviation
3,000	
)3,002.5	Aviation
g3,005	Aviation & Govt.
3,010	Government
3,015	
)3,017.5	Government
3,020	
n3,025	Fixed & Govt.
n)3,027.5	Government
j3,030	Ship Teleg., Coastal Teleg. & Govt.
g3,035	Government
)3,037.5	do.
3,040	
n3,045	Fixed & Govt.
3,050	Aviation
)3,052.5	Government
3,055	
3,060	
)3,062.5	Aviation
3,065	Government
3,070	do.
)3,072.5	Aviation
3,075	
3,080	
a)3,082.5	Aviation & Govt.
3,085	Government
3,088	Aviation

Frequency (kilocycles)	Allocation
3,090	
a)3,092.5	Aviation
3,095	Government
3,100	Guard Band
ac3,105	Aircraft & Govt.
3,110	Guard Band
3,115	Ship Teleg.
)3,117.5	Aircraft
n3,120	Ship Teleg. & Govt.
3,125	
)3,127.5	Aviation
3,130	Government
3,135	do.
n)3,137.5	Aviation & Govt.
3,140	
3,145	
)3,147.5	Aviation
3,150	
3,155	Government
3,160	
a)3,162.5	Aviation
3,165	
3,170	
)3,172.5	Aviation
3,175	
3,180	
)3,182.5	Aviation
3,185	
ac3,190	Special Emerg. & Govt.
3,195	Government
3,200	
)3,202.5	Government
3,205	
n)3,207.5	Government
3,210	Government
n)3,212.5	Aviation & Govt.
3,215	Government
3,220	
n)3,222.5	Aviation & Govt.
3,225	Fixed[2]
3,230	
)3,232.5	Aviation
3,235	Government
3,240	
)3,242.5	Aviation
3,245	
j3,250	Government
3,255	
)3,257.5	Aviation
3,260	
a3,265	Government
3,270	Fixed
n3,275	Fixed & Govt.
3,280	Fixed
c3,285	Aviation & Govt.
3,290	Aviation
3,295	Government
3,300	do.
3,305	
)3,307.5	Government
3,310	
)3,312.5	Government
3,315	
)3,317.5	Government
3,320	
)3,322.5	Aviation
3,325	
3,330	Government
)3,332.5	do.
3,335	
3,340	Government
3,345	do.
3,350	do.
)3,352.5	do.
3,355	do.
)3,357.5	Government
3,360	do.
3,365	do.
3,370	
)3,372.5	Aviation
3,375	
3,380	Government
3,385	do.
3,390	do.
)3392.5	do.
3,395	do.
)3,397.5	do.
3,400	do.
)3,402.5	do.
3,405	do.
)3,407.5	do.
3,410	do.
3,415	do.
3,420	
)3,422.5	Government
3,425	do.
)3,427.5	do.
3,430	
)3,432.5	Aviation
3,435	
)3,437.5	Government
3,440	do.
3,445	do.
)3,447.5	Aviation
3,450	
)3,452.5	Government
3,455	
j)3,457.5	Aviation & Govt.
3,460	
3,465	
)3,467.5	Aviation
3,470	
3,475	Government
3,480	Aviation
n3,485	Aviation & Govt.
3,490	
)3,492.5	Experimental
3,495	

[2] Assigned for low power fixed service in the Territory of Hawaii only.

Frequency (kilocycles)	Allocation
3,497.5	Government
3,500 to 4,000	Amateur & Govt.
4,005	Government
4,010	do.
4,015	do.
4,020	do.
4,025	do.
4,030	do.
4,035	do.
4,040	do.
4,045	do.
4,050	do.
4,055	Aviation & Govt.
4,060	do.
4,062.5	Government
4,065	do.
4,070	do.
4,075	do.
4,080	do.
4,085	do.
4,090	do.
4,095	
)4,097.5	Fixed
4,100	
4,105	Government
4,110	Aviation
a4,115	Aviation & Govt.
j4,120	Government
)4,122.5	Aviation
an4,125	Aviation & Govt.
4,130	Government
4,135	do.
j4,140	Maritime Calling and Govt.
4,145	Government
j4,150	Ship Teleg. & Govt.
4,155	Government
n4,160	Ship Teleg. & Govt.
)4,162.5	Ship Phone
)	& Coastal Harbor
j4,165	Ship Teleg. & Govt.
j4,170	do.
4,175	
)4,177.5	Coastal Phone
4,180	
4,185	Government
n4,190	Fixed & Govt.
n4,195	do.
4,200	Government
4,205	do.
4,210	do.
4,215	do.
4,220	do.
4,225	do.
4,230	do.
4,235	do.
4,240	do.
n4,245	Agri. & Govt.
4,250	Government
4,255	do.
4,260	Fixed
4,265	Government

Frequency (kilocycles)	Allocation
4,270	
)4,272.5	Coastal Phone
j4,275	Government
n4,280	Coastal Phone
)	& Govt.
n)4,282.5	Coastal Phone,
)	Coastal Harbor
)	& Govt.
4,285	
n)4,287.5	Coastal Phone
)	& Govt.
4,290	Government
4,295	do.
4,300	do.
4,305	do.
4,310	do.
4,315	
)4,317.5	do.
4,320	do.
4,325	
)4,327.5	Government
4,330	do.
4,335	Aviation
4,340	
)4,342.5	Government
4,345	
4,350	Government
4,355	
)4,357.5	Government
4,360	do.
4,365	do.
4,370	do.
4,375	do.
4,380	do.
4,385	do.
4,390	do.
4,395	
)4,397.5	Government
j4,400	do.
)4,402.5	Ship Phone
n4,405	Government
)4,407.5	Government
j4,410	do.
)4,412.5	Ship Phone
j4,415	Government
)4,417.5	do.
j4,420	do.
)4,422.5	Ship Phone
4,425	
)4,427.5	Government
4,430	do.
4,435	do.
4,440	do.
4,445	do.
4,450	do.
4,455	
j)4,457.5	Ship Phone
)	& Govt.
4,460	
4,465	
)4,467.5	Government
4,470	do.
4,475	do.
)4,477.5	do.
4,480	do.

Frequency (kilocycles)	Allocation
4,485	
)4,487.5	Government
4,490	do.
4,495	do.
4,500	do.
4,505	
)4,507.5	do.
4,510	
4,515	do.
4,520	do.
4,525	do.
n4,530	Fixed & Govt.
4,535	Fixed
4,540	do.
n4,545	Fixed & Govt.
n4,550	do.
4,555	Fixed
4,560	Government
4,565	do.
n4,570	Fixed & Govt.
n4,575	do.
4,580	Government
4,585	
)4,587.5	Government
4,590	do.
4,595	do.
4,600	do.
)4,602.5	do.
4,605	
4,610	do.
4,615	
)4,617.5	Government
4,620	
4,625	Government
4,630	do.
4,635	do.
c)4,637.5	Spec. Emerg.
4,640	Government
n4,645	Fixed & Govt.
a4,650	Aviation
n4,655	Fixed & Govt.
n4,660	do.
n4,665	do.
4,670	Fixed
4,675	do.
n4,680	Fixed & Govt.
n4,685	do.
a4,690	Aviation
4,695	
)4,697.5	Government
4,700	
n4,705	Mobile Press & Govt.
4,710	Fixed
4,715	do.
n4,720	Fixed & Govt.
n4,725	do.
4,730	Aviation
)4,732.5	do.
4,735	do.
4,740	do.
a)4,742.5	do.
4,745	do.
4,750	
)4,752.5	Coastal Phone
4,755	
4,760	Government
4,765	do.
4,770	
)4,772.5	do.
4,775	
4,780	Coastal Teleg.
n4,785	Coastal Teleg. & Govt.
n4,790	Coastal Teleg. & Govt.
4,795	
n)4,797.5	Exper. & Govt.
4,800	
n4,805	Fixed & Govt.
4,810	Gen. Communication
4,815	Government
4,820	Gen. Communication
4,825	Government
4,830	do.
4,835	do.
4,840	do.
4,845	do.
4,850	do.
4,855	do.
4,860	Gen. Communication
4,865	Government
4,870	do.
4,875	do.
4,880	do.
4,885	do.
4,890	do.
4,895	
)4,897.5	Government
4,900	
4,905	
)4,907.5	Government
4,910	do.
4,915	
)4,917.5	Aviation
4,920	
4,925	
)4,927.5	Government
4,930	do.
4,935	
)4,937.5	Aviation
4,940	
4,945	
a)4,947.5	Aviation
4,950	
a)4,952.5	Aviation
4,955	
4,960	Government
4,965	
a)4,967.5	Aviation
4,970	
4,975	Government
n4,980	Fixed & Govt.
4,985	Fixed
n4,990	Fixed & Govt.
4,995	Fixed

Frequency (kilocycles)	Allocation
5,000	Government
5,005	do.
n5,010	Fixed & Govt.
5,015	Government
5,020	do.
5,025	Gen. Communication
5,030	Government
a)5,032.5	Aviation
5,035	
a)5,037.5	Aviation
5,040	
a)5,042.5	Aviation
5,045	
5,050	
n)5,052.5	Fixed & Govt.
5,055	
5,060	Government
5,065	do.
)5,067.5	Fixed
5,070	
)5,072.5	Government
5,075	
)5,077.5	Fixed
5,080	Government
5,085	Fixed
5,090	Government
5,095	Fixed
n5,100	Fixed & Govt.
n5,105	do.
n5,110	do.
5,115	Government
5,120	
a)5,122.5	Aviation
5,125	
5,127.5	Government
5,130	Gen. Communication
n5,135	Police & Govt.
a)5,137.5	Alaska Service
n5,140	Police & Govt.
5,145	Gen. Communication
5,150	Government
5,155	do.
5,160	
)5,162.5	Aviation
c5,165	Aviation & Govt.
a)5,167.5	Alaska Service
5,170	
)5,172.5	Aviation
5,175	
n5,180	Fixed & Govt.
5,185	Fixed
5,190	do.
n5,195	Police & Govt.
5,200	Government
5,205	do.
an)5,207.5	Alaska Services & Govt.
5,210	Government
j5,215	Aviation & Govt.
5,220	Aviation
n5,225	Fixed & Govt.
n5,230	do.
n5,235	do.
5,240	Fixed
5,245	do.
5,250	Fixed
)5,252.5	Aviation
5,255	Aviation & Govt.
5,260	Fixed
n5,265	Fixed & Govt.
5,270	Fixed
5,275	Aviation
5,280	Government
5,285	
)5,287.5	Government
5,290	
5,295	Government
5,300	do.
5,305	do.
a5,310	Aviation
5,315	Fixed
5,320	Government
5,325	
)5,327.5	Government
5,330	
5,335	Government
5,340	do.
5,345	do.
5,350	Fixed
5,355	do.
n5,360	Fixed & Govt.
5,365	Agri. & Aviation
5,370	Aviation
c5,375	Aviation & Govt.
)5,377.5	Aviation
5,380	
5,385	Government
5,390	Aviation
5,395	
)5,397.5	Government
5,400	
5,405	Aviation
5,410	
)5,412.5	Government
5,415	
)5,417.5	Government
5,420	
)5,422.5	Government
5,425	Aviation
)5,427.5	Government
5,430	
5,435	
)5,437.5	Government
5,440	
)5,442.5	Government
5,445	
5,450	
)5,452.5	Government
5,455	
)5,457.5	Government
5,460	
)5,462.5	Government
5,465	
)5,467.5	Government
5,470	
)5,472.5	Government
5,475	do.
5,480	Aviation
)5,482.5	Government
5,485	

Frequency (kilocycles)	Allocation
5,490	
)5,492.5	Government
5,495	
5,500	Government
j5,505	Ship Teleg. & Govt.
j5,510	do.
5,512.5	Ship Teleg.
j5,515	Ship Teleg. & Govt.
j5,520	Maritime Calling & Govt.
j5,525	Ship Teleg. & Govt.
5,527.5	Ship Teleg.
j5,530	Government
j5,535	Ship Teleg. & Govt.
5,540	Government
n5,545	Coastal Teleg. & Govt.
n5,550	do.
n5,555	do.
5,560	Coastal Teleg.
n5,565	Coastal Teleg. & Govt.
5,570	
a)5,572.5	Aviation
5,575	
5,577.5	Government
5,580	
a)5,582.5	Aviation
5,585	
5,587.5	Government
5,590	
)5,592.5	Aviation
5,595	
5,600	
a)5,602.5	Aviation
5,605	
5,607.5	Government
5,610	
)5,612.5	Aviation
5,615	
5,620	
a)5,622.5	Aviation
5,625	Government
5,630	
a)5,632.5	Aviation
5,635	
5,640	Government
)5,642.5	Aviation
5,645	
5,650	
a)5,652.5	Aviation
5,655	
5,660	
a)5,662.5	Aviation
5,665	
5,670	
ac)5,672.5	Aviation & Govt.
5,675	
5,680	
a)5,682.5	Aviation
5,685	
5,687.5	Government
5,690	
a)5,692.5	Aviation
5,695	
)5,697.5	Aviation
5,700	
5,705	
)5,707.5	Aviation
5,710	
5,715	Government
5,720	Fixed
5,725	Government
5,730	Gen. Communication
5,735	Government
)5,737.5	do.
5,740	
)5,742.5	Government
5,745	
5,750	Fixed
)5,752.5	Government
5,755	
5,760	Gen. Communication
5,765	
)5,767.5	Government
5,770	
5,775	Government
5,780	do.
5,785	do.
5,790	Gen. Communication
5,795	Government
5,800	do.
5,805	do.
5,810	Gen. Communication
5,815	Government
5,820	do.
5,825	Aviation
5,830	Gen. Communication
5,835	Government
5,840	do.
5,845	Fixed
5,850	
)5,852.5	Fixed
5,855	Government
5,860	do.
5,865	do.
5,870	do.
5,875	do.
5,880	do.
5,885	
a)5,887.5	Aviation
5,890	
)5,892.5	Aviation
5,895	
)5,897.5	Government
5,900	Government
)5,902.5	Government
5,905	do.
5,910	
)5,912.5	Government
5,915	

Frequency (kilocycles)	Allocation
5,920	Aviation & Govt.
5,925	do.
5,930	Government
5,935	do.
5,940	do.
5,945	do.
5,950	Government
5,955	do.
5,960	do.
5,965	do.
5,970	do.
n5,975	Fixed & Govt.
5,980	Fixed
5,985	do.
5,990	do.
5,995	Government
6,000	Guard Band
6,020	International Bc.
6,040	do.
6,060	do.
6,080	do.
6,100	do.
6,120[4]	Government
6,140	International Bc.
n 6,155	Government
6,170	International Bc.
6,190	do.
6,200	Guard Band
ac6,210	Maritime Calling, Aircraft & Govt.
n6,220	Ship Teleg. & Govt.
6,225	Government
n6,230	Ship Teleg. & Govt.
n6,240	Ship Teleg., Ship Phone, Coastal Harbor & Govt.
j6,250	Coastal Teleg. & Govt.
n6,260	do.
6,265	Government
6,270	Coastal Teleg. & Govt.
6,280	Government
6,290	do.
6,300	Coastal Teleg.
6,305	Government
n6,310	Coastal Teleg. & Govt.
6,315	Government
6,320	Coastal Teleg.
6,325	Government
n6,330	Coastal Teleg. & Govt.
6,335	Government
6,340	Coastal Teleg.
6,345	Government
6,350	Coastal Teleg.
6,355	Government
6,360	Coastal Teleg.
6,370	do.
6,380	do.
6,385	Government
n6,390	Coastal Teleg. & Govt.
n6,400	do.
6,405	Government
n6,410	Coastal Teleg. & Govt.
6,420	Government
n)6,425	Exper. & Govt.
6,430	Government
n6,440	Mobile Press & Govt.
6,445	Government
6,450	Mobile Press
6,455	Ship Phone & Coastal Harbor
n6,460	Coastal Phone & Govt.
6,465	Government
n6,470	Coastal Phone, Coastal Hrbr. & Govt.
6,475	Government
n6,480	Coastal Phone & Govt.
6,490	Aviation
6,500	Government
6,510	Aviation
6,520	do.
c 6,523	Aviation & Govt.
c6,530	do.
c 6,537	do.
n6,540	do.
c 6,543	do.
c6,550	do.
c 6,557	do.
6,560	Aviation
c 6,563	Aviation & Govt.
ac6,570	do.
c 6,577	do.
6,580	Aviation
c 6,583	Aviation & Govt.
ac6,590	do.
c 6,597	do.
j6,600	do.
6,610	do.
n)6,615	do.
6,620	Government
6,625	do.
6,630	do.
6,635	do.
6,640	do.
6,645	do.
n6,650	Ship Phone & Govt.
6,655	Government
n6,660	Ship Phone & Govt.
6,665	Government
n6,670	Ship Phone & Govt.
6,680	Fixed
6,685	Government
6,690	do.
6,700	do.
6,705	do.
n6,710	Fixed & Govt.
n 6,717.5	do.
6,720	Fixed
6,725	do.

[4]Available for temporary assignment to non-Government international broadcast stations.

Frequency (kilocycles)	Allocation
6,730	Fixed
n 6,732.5	Fixed & Govt.
6,740	Fixed
6,745	do.
6,747	Government
6,750	Fixed
6,755	do.
6,760	Government
6,765	do.
6,770	Fixed
6,777.5	do.
6,780	do.
6,785	do.
6,790	do.
6,795	Aviation
6,800	Fixed
6,805	Aviation
6,810	Fixed
6,815	do.
6,820	Aviation
6,830	Fixed
6,835	Government
6,840	Fixed
6,845	do.
6,850	do.
6,852.5	do.
6,860	do.
6,870	do.
6,875	do.
6,880	Government
6,890	Fixed
6,895	Government
6,900	do.
6,910	do.
6,920	Fixed
6,927.5	do.
6,930	do.
6,935	do.
6,940	Government
6,942.5	Fixed
6,950	do.
n 6,957.5	Fixed & Govt.
6,960	Fixed
6,965	do.
6,970	Government
6,980	Fixed
6,990	Government
7,000 n to 7,300	Amateur & Govt.
7,305	Government
7,310	Fixed
7,315	do.
7,320	Government
7,325	do.
7,330	do.
7,335	do.
7,340	Fixed
7,350	do.
7,355	do.
7,360	do.
7,362.5	Government
7,370	Fixed
7,375	Government
7,380	Fixed
7,385	Government
7,390	Fixed
7,395	do.
7,400	do.
7,407.5	do.
7,410	do.
7,415	do.
7,420	do.
7,422.5	do.
7,430	do.
7,437.5	do.
7,440	do.
n 7,445	Fixed & Govt.
7,450	Fixed
7,455	Government
7,460	do.
7,470	Fixed
7,475	Government
7,480	Police
7,485	Fixed
7,490	do.
7,500	Government
7,510	Fixed
7,520	do.
7,530	Government
7,535	do.
7,540	do.
7,550	Fixed
7,555	do.
7,560	do.
7,565	do.
7,570	do.
7,575	do.
7,580	do.
7,585	Government
7,590	Fixed
7,595	Government
7,600	Fixed
7,610	do.
n 7,615	Fixed & Govt.
7,620	Fixed
7,625	do.
7,630	do.
7,635	Government
7,640	Fixed
7,645	Government
7,650	Fixed
7,655	do.
7,660	do.
n 7,662.5	Fixed & Govt.
7,670	Fixed
7,680	Government
7,690	do.
7,700	Aviation
7,705	Government
7,710	Fixed
n 7,715	Fixed & Govt.
7,720	Government
7,730	Fixed
7,737.5	do.
7,740	do.
7,745	do.

Frequency (kilocycles)	Allocation
7,750	Fixed
7,752.5	do.
n7,760	Fixed & Govt.
7,770	Aviation
7,775	Fixed
7,780	do.
7,785	Government
7,790	do.
7,795	Aviation
7,800	Fixed
7,805	Police
7,810	Fixed
7,820	do.
a7,830	Aviation
7,840	Fixed
7,845	Government
7,850	Fixed
7,860	Government
7,870	do.
7,880	Fixed
7,885	Government
7,890	Fixed
7,895	Government
7,900	Fixed
7,905	Government
7,910	Fixed
7,920	Government
7,925	do.
7,930	Fixed
7,935	Police
7,940	Fixed
7,945	Government
7,950	do.
7,955	Fixed
7,960	do.
7,965	Government
7,970	Fixed
7,977.5	do.
7,980	do.
7,985	Government
7,990	Fixed
7,995	Government
8,000	Fixed
8,010	Government
a)8,015	Aviation & Govt.
8,020	Government
8,030	do.
8,040	do.
8,050	do.
8,060	do.
a8,070	Fixed & Aviation
n 8,075	Fixed & Govt.
8,080	Government
8,090	do.
8,100	do.
8,110	do.
8,120	Aviation & Govt.
8,130	Government
8,140	do.
8,150	do.
8,160	do.
8,165	do.
8,170	do.
8,175	do.
8,180	do.
8,190	do.
8,200	Government
8,210	do.
c 8,217	Aviation & Govt.
a8,220	Aviation
c 8,225	Aviation & Govt.
n8,230	do.
c 8,233	do.
j8,240	Ship Teleg., Govt. & Aviation
j8,250	Ship Teleg. & Govt.
8,260	do.
8,270	Government
j8,280	Govt. & Maritime Calling
8,290	Government
j8,300	Ship Teleg. & Govt.
8,310	Government
n8,320	Ship Teleg. & Govt.
n8,330	do.
8,340	Government
n8,350	Mobile Press & Govt.
8,355	Government
8,360	Mobile Press
8,370	Coastal Teleg.
8,380	do.
8,390	Coastal Teleg.
8,400	Government
8,410	do.
n8,420	Coastal Teleg., & Govt.
8,430	Coastal Teleg.
8,440	do.
8,450	do.
8,460	Government
8,470	do.
8,480	Coastal Teleg.
c 8,485	Aviation & Govt.
8,490	Coastal Teleg.
8,500	Government
8,510	do.
8,520	do.
8,530	do.
c 8,538	Aviation & Govt.
8,540	Coastal Phone
c 8,546	Aviation & Govt.
8,550	Coastal Phone
c 8,554	Aviation & Govt.
8,560	Government
c 8,561	Aviation & Govt.
8,565	Aviation
c 8,569	Aviation & Govt.
8,570	Coastal Teleg.
c 8,577	Aviation & Govt.
8,580	Coastal Teleg.
8,585	Coastal Hrbr.
8,590	Government
8,600	do.
8,605	do.
8,610	do.
8,615	do.
8,620	do.
8,630	Coastal Teleg. & Coastal Phone
8,640	Coastal Teleg.
8,650	Government

Frequency (kilocycles)	Allocation	Frequency (kilocycles)	Allocation
8,660	Coastal Phone	9,160	Fixed
8,670	Coastal Teleg.	9,170	do.
n8,680	Coastal Teleg. & Govt.	9,180	Government
		9,190	do.
n8,690	do.	9,200	Fixed & Aviation
8,700	Fixed & Aviation	9,210	Fixed
n8,710	Fixed & Govt.	9,215	Government
8,720	Aviation & Govt.	9,220	Fixed
8,730	Government	n9,230	Fixed & Govt.
8,735	do.	9,240	Government
8,740	do.	9,250	Government
8,750	do.	9,260	Fixed
8,760	do.	9,270	Government
8,770	do.	9,280	Fixed
8,780	do.	9,285	Government
8,790	do.	9,290	Fixed
8,800	do.	9,300	Government
8,810	Ship Phone & Fixed	c9,310	Aviation & Govt.
j8,820	Ship Phone & Govt.	9,320	Government
8,824	Government	9,325	do.
j8,830	Ship Phone & Govt.	9,330	do.
j8,840	Coastal Hrbr., Ship Phone & Govt.	9,340	Fixed
		9,345	Government
n8,850	Ship Phone, Fixed & Govt.	9,350	Fixed
		9,355	do.
8,860	Government	9,360	do.
8,870	do.	9,365	do.
8,880	do.	9,370	do.
8,885	do.	9,380	Government
8,890	do.	9,390	Fixed
8,900	Fixed	9,400	do.
8,905	do.	9,410	do.
8,910	do.	9,420	do.
8,920	Government	9,425	Government
8,930	Fixed	9,430	Fixed
8,940	do.	9,440	Government
8,945	Government	9,450	Fixed
8,950	Fixed	9,455	Government
8,955	Government	9,460	Fixed
n8,960	Fixed & Govt.	9,470	do.
8,970	Fixed	9,480	do.
8,980	do.	9,490	do.
8,990	do.	9,510	International Bc.
9,000	Government	9,530	do.
9,010	Fixed	9,550[4]	Government
9,015	Government	9,570	International Bc.
9,020	Fixed	9,590	do.
9,030	Government	9,610	do.
9,040	do.	9,630	do.
9,050	do.	9,650	do.
9,060	Fixed	9,670	do.
9,065	Government	9,690	do.
n9,070	Fixed & Govt.	9,700	International Bc.
9,080	Fixed	9,710	Government
9,090	Government	9,720	Fixed
9,100	do.	9,730	Government
9,110	Fixed	9,740	do.
9,120	Government	9,750	Fixed
9,125	do.	9,760	do.
9,130 to 9,135	Experimental	9,765	Government
		9,770	do.
9,140		9,780	Fixed
9,150	Government	a 9,785	Aviation

[4] Available for temporary assignment to non-Government international broadcast stations.

Frequency (kilocycles)	Allocation
9,790	Fixed
9,800	do.
9,805	Government
9,810	Fixed
9,815	Government
9,820	Fixed
9,825	Government
9,830	Fixed
9,835	Government
9,840	Fixed
9,850	do.
9,860	Fixed
9,870	do.
9,880	Government
9,890	Fixed
9,900	do.
9,905	do.
9,910	do.
9,920	Government
9,930	Fixed
9,940	do.
9,950	do.
9,960	Government
9,970	Fixed
a9,980	Aviation
9,990	Government
10,000	Government
10,010	Fixed
10,020	do.
10,030	do.
10,035	Government
10,040	Fixed
10,047.5	Government
10,050	Fixed
10,060	do.
10,065	Government
10,070	Fixed
10,080	Fixed & Aviation
10,090	Fixed
10,100	do.
10,110	do.
10,120	Aviation
10,125	do.
10,130	do.
10,140	Government
10,150	do.
10,160	do.
10,170	Fixed
10,180	do.
10,190	Aviation
10,197.5	Fixed
10,200	do.
10,205	Government
10,210	Fixed
10,215	Government
10,220	Fixed
10,225	Government
10,230	Fixed
10,235	Government
n10,240	Fixed & Govt.
10,250	Fixed
10,255	Government
10,260	Fixed
10,265	do.
10,270	do.
10,280	Government
10,290	Fixed
10,295	do.
10,300	do.
10,305	Government
10,310	Fixed
10,315	Government
10,320	Fixed
10,325	Government
10,330	do.
n10,340	Fixed & Govt.
10,350	Fixed
10,355	Government
10,360	Fixed
10,370	do.
10,380	do.
10,390	do.
10,400	do.
n10,410	Fixed & Govt.
10,420	Fixed
10,430	do.
10,440	do.
10,450	do.
n10,460	Fixed & Govt.
10,465	Fixed
10,470	do.
10,480	do.
10,490	do.
10,500	Government
10,510	Fixed
10,515	do.
10,520	do.
10,530	do.
c 10,535	Aviation & Govt.
10,540	Fixed
10,550	do.
10,560	do.
10,570	do.
10,580	do.
10,590	do.
10,600	do.
10,610	do.
10,620	do.
n10,630	Fixed & Govt.
10,640	Fixed
10,650	do.
10,660	do.
10,670	do.
10,675	do.
10,680	do.
10,690	Government
10,700	Fixed
10,710	do.
10,720	Government
10,730	Fixed
10,740	do.
10,750	do.
10,760	do.
10,770	do.
10,780	do.
10,790	do.
10,800	do.
10,810	do.
10,820	do.
10,830	do.
10,840	do.

Frequency (kilocycles)	Allocation
10,850	Fixed
10,855	Aviation
10,860	Fixed
10,870	do.
10,880	do.
10,890	do.
10,900	do.
10,905	Government
10,910	Fixed
10,915	Government
10,920	Fixed
n10,930	Fixed & Govt.
10,940	Fixed
10,950	Aviation
j 10,955	Aviation & Govt.
10,960	Aviation
10,965	do.
10,970	Fixed
10,980	do.
10,985	Government
a10,990	Aviation
11,000	Government
j11,010	Ship Teleg. & Govt.
j 11,020	do.
11,025	Ship Telegraph
j 11,030	Ship Teleg. & Govt.
j11,040	Maritime Calling & Govt.
j 11,050	Ship Teleg. & Govt.
11,055	Ship Teleg.
j 11,060	Ship Teleg. & Govt.
j11,070	do.
11,080	Government
11,085	Ship Teleg.
j 11,090	Ship Phone, Coastal Harbor & Govt.
11,100	Ship Teleg.
11,105	Government
n11,115	Coastal Teleg. & Govt.
11,130	Coastal Teleg.
11,145	do.
11,160	do.
11,175	do.
n11,190	Coastal Teleg. & Govt.
11,205	Coastal Teleg.
11,210	Government
11,220	Coastal Teleg.
11,235	do.
11,240	Government
11,250	Coastal Teleg.
n11,265	Coastal Teleg. & Govt.
n11,280	do.
11,290	Government
n11,295	Coastal Teleg. & Govt.
c 11,306	Aviation & Govt.
11,310	Coastal Teleg.
c 11,319	Aviation & Govt.
11,325	Coastal Teleg.
11,330	Government
c 11,331	Aviation & Govt.
11,340	Mobile Press
c 11,344	Aviation & Govt.
n11,355	Mobile Press & Govt.
c 11,356	Aviation & Govt.
c 11,369	do.
11,370	Coastal Phone
c 11,381	Aviation & Govt.
11,385	Aviation
11,390	Government
c 11,394	Aviation & Govt.
11,400	Aviation
11,410	Government
11,415	Fixed
11,430	Government
11,445	do.
11,460	Fixed
j 11,470	Aviation & Govt.
11,475	Government
11,490	do.
11,500	do.
11,505	Fixed
n 11,510	Fixed & Govt.
11,520	Fixed
n 11,525	Fixed & Govt.
11,535	Fixed
11,545	Government
11,550	do.
11,565	Fixed
11,570	Government
11,580	do.
11,595	Fixed
11,610	Government
11,625	Fixed
11,630	Government
11,640	Fixed
11,655	Government
11,670	Fixed
11,680	do.
11,685	do.
n11,710	Int. Bc. & Govt.
11,730[4]	Government
11,750	International Bc.
11,770	do.
11,790	do.
11,810	do.
11,820	do.
11,830	do.
11,847.5	do.
n11,850	Int. Bc. & Govt.
11,870	International Bc.
11,890	do.
j11,910	Aviation & Govt.
11,925	Fixed
11,940	Government
11,950	Fixed
11,955	do.
11,960	Aviation
11,970	Fixed
11,975	Government
11,985	do.
12,000	Fixed

[4]Available for temporary assignment to non-Government international broadcast stations.

Frequency (kilocycles)	Allocation
12,015	Government
12,030	do.
12,045	do.
12,060	do.
12,075	do.
12,090	do.
12,105	do.
12,120	do.
12,135	do.
12,150	do.
12,165	Aviation & Govt.
12,180	do.
12,195	Government
12,210	do.
12,225	do.
12,240	do.
12,247.5	do.
12,255	do.
12,265	do.
12,270	do.
12,285	Fixed
a12,290	Aviation
12,300	Fixed
12,315	Government
12,330	Aviation & Govt.
j12,345	Ship Teleg. & Govt.
j12,360	do.
j12,375	do.
j 12,385	do.
12,390	Ship Teleg.
12,395	Government
12,405	do.
j12,420	Maritime Calling & Govt.
12,435	Government
j 12,440	Ship Teleg. & Govt.
j12,450	do.
12,460	Ship Teleg.
12,465	Government
n12,480	Ship Teleg. & Govt.
j12,495	Coastal Teleg. & Govt.
j12,510	do.
12,525	Coastal Teleg.
12,540	Government
12,550	Coastal Teleg.
12,555	do.
12,560	Government
12,570	Coastal Teleg.
12,575	Government
12,585	Coastal Teleg.
12,600	Government
12,615	do.
12,630	do.
12,645	Coastal Teleg.
12,660	do.
12,675	do.
12,690	Government
12,705	do.
12,720	do.
12,735	Coastal Teleg.
12,750	do.
12,755	Government
12,765	do.
c 12,776	Aviation & Govt.
12,780	Government
c 12,788	Aviation & Govt.
12,795	Government
12,810	Coastal Phone
c 12,824	Aviation & Govt.
12,825	Aviation
12,840	Coastal Phone
12,850	Government
12,855	
12,860	Government
)12,862.5	Experimental
12,870	
12,875	Government
12,885	do.
12,900	do.
12,915	do.
12,922.5	do.
12,925	do.
12,930	Fixed
12,940	do.
12,945	do.
12,947.5	do.
12,955	do.
12,960	do.
12,970	do.
12,975	Government
n 12,980	Fixed & Govt.
12,990	Government
13,000	Fixed
13,005	do.
13,007.5	Government
13,015	Fixed
13,020	do.
13,030	do.
13,035	do.
13,040	Government
13,050	Coastal Teleg.
13,065	Government
n13,080	Coastal Teleg. & Govt.
13,095	Government
13,110	do.
13,125	do.
13,132.5	do.
13,140	do.
13,155	do.
13,170	Coastal Teleg.
13,185	Fixed
j13,200	Ship Phone & Govt.
13,210	Ship Phone
j13,215	Ship Phone & Govt.
13,220	Ship Phone
j13,230	Ship Phone & Govt.
j13,245	do.
j13,260	do.
n 13,270	Government
j13,275	Ship Phone & Govt.
13,280	Government
13,290	do.
13,305	do.
13,320	do.
13,335	do.
13,350	Fixed
13,355	Government
13,360	Fixed

Frequency (kilocycles)	Allocation
13,370	Fixed
13,375	do.
13,380	Government
13,390	Fixed
13,400	do.
13,405	do.
13,410	do.
n13,420	Fixed & Govt.
13,435	Fixed
13,450	do.
n13,465	Fixed & Govt.
13,480	Fixed
13,495	do.
13,510	Government
13,525	Fixed
13,540	do.
13,545	Government
13,555	Fixed
13,570	do.
13,575	Government
13,585	Fixed
13,600	Government
13,605	do.
13,615	Fixed
13,625	Government
13,630	Fixed
n13,645	Fixed & Govt.
13,660	Fixed
13,675	do.
n13,690	Fixed & Govt.
13,705	Fixed
13,720	do.
13,735	Government
13,750	Fixed
13,765	Government
13,780	Fixed
13,790	do.
13,795	do.
13,810	do.
13,825	do.
13,830	Government
13,840	Fixed
13,855	do.
13,870	do.
n13,885	Fixed & Govt.
13,900	Fixed
13,915	do.
13,930	do.
13,945	do.
n13,960	Fixed & Govt.
13,975	Fixed
13,990	Government
n 14,000 to 14,400	Amateur & Govt.
14,410	Fixed
14,425	do.
n 14,430	Fixed & Govt.
14,440	Fixed
14,455	do.
14,460	Government
14,470	Fixed
14,485	do.
14,495	Government
14,500	Fixed
14,510	do.
14,515	do.
14,530	do.
14,545	do.
14,560	do.
14,575	do.
14,590	do.
14,600	do.
14,605	do.
14,615	do.
14,620	do.
14,635	do.
14,650	Government
14,660	do.
14,665	do.
n14,680	Fixed & Govt.
14,695	Fixed
14,710	do.
14,725	do.
14,740	do.
14,755	do.
n14,770	Fixed & Govt.
n14,785	do.
14,800	Fixed
14,807.5	do.
14,815	do.
14,830	do.
14,845	do.
n14,860	Fixed & Govt.
14,875	Fixed
n14,890	Fixed & Govt.
14,905	Government
n14,920	Fixed & Govt.
14,935	Fixed
14,945	Government
14,950	Fixed
14,960	Government
14,965	Fixed
14,975	Government
14,980	Fixed
14,995	do.
15,000	Government
15,010	Fixed
15,020	Government
15,025	Fixed
15,032.5	do.
15,040	do.
15,055	do.
n15,070	Fixed & Govt.
15,080	Fixed
15,085	do.
15,090	Government
15,110[4]	International Bc.
15,130[4]	Government
15,150	International Bc.
15,170	do.
15,190	do.
15,210	do.
15,230	do.
15,250	do.
15,270	do.

[4] Available for temporary assignment to non-Government international broadcast stations.

Frequency (kilocycles)	Allocation
15,290	International Bc.
15,310	do.
15,330	do.
15,350	do.
15,355	Fixed
15,370	do.
15,375	Government
15,385	Fixed
15,395	do.
15,400	do.
15,415	do.
15,425	Government
15,430	Fixed
15,445	do.
15,460	do.
15,475	do.
15,490	do.
15,505	do.
15,515	Government
15,520	Fixed
15,525	Government
15,535	Fixed
15,545	Government
15,550	Fixed
15,565	do.
n15,580	Fixed & Govt.
15,595	Fixed
15,610	do.
15,625	do.
15,630	Government
15,640	Fixed
15,655	do.
15,670	do.
15,675	do.
15,685	do.
15,690	do.
15,700	do.
15,715	Government
15,730	Fixed
15,745	Government
15,760	Fixed
15,775	do.
15,790	do.
15,805	Government
15,820	Fixed
15,825	do.
15,835	do.
15,850	do.
15,865	do.
15,870	Government
n15,880	Fixed & Govt.
15,895	Government
15,910	Fixed
15,925	do.
15,935	Government
15,940	Fixed
15,955	Government
15,970	Fixed
15,985	do.
16,000	do.
16,015	do.
16,020	Government
16,030	Fixed
16,045	Government
16,060	do.
16,075	Fixed
16,080	Government
16,090	do.
16,100	do.
16,105	Fixed
16,120	Government
16,135	Fixed
16,140	Government
16,150	do.
16,160	do.
16,165	Fixed
16,180	Government
16,195	Fixed
16,200	Government
n16,210	Fixed & Govt.
16,217.5	Fixed
16,220	Government
16,225	do.
16,232.5	do.
16,235	do.
c16,240	Aviation & Govt.
16,247.5	Government
16,250	Aviation & Govt.
16,255	Government
16,260	do.
16,265	do.
16,270	Fixed
16,280	Aviation & Govt.
16,285	Fixed
16,290	Aviation
16,300	Government
16,315	Fixed
16,320	Government
16,330	do.
16,340	do.
16,345	Fixed
16,360	Government
16,370	Fixed
16,375	do.
16,385	Government
16,390	Fixed
16,400	Government
16,405	Ship Teleg.
16,420	Government
c16,440	Aviation & Govt.
j16,460	Ship Teleg. & Govt.
16,470	Government
j16,480	Ship Teleg. & Govt.
j16,500	do.
j 16,515	do.
16,520	Ship Teleg.
j 16,530	Ship Teleg. & Govt.
16,540	Government
j16,560	Maritime Calling & Govt.
16,575	Ship Teleg.
16,580	Government
j 16,590	Ship Teleg. & Govt.
16,600	Ship Teleg.
j 16,605	Ship Teleg. & Govt.

Frequency (kilocycles)	Allocation
16,620	Government
n16,640	Ship Teleg. & Govt.
j16,660	do.
j16,680	do.
16,700	Mobile Press
16,720	do.
n16,740	Coastal Teleg. & Govt.
16,760	Coastal Teleg.
16,780	do.
16,790	do.
16,800	do.
16,820	Government
16,840	do.
16,860	Coastal Teleg.
16,880	do.
16,890	Government
16,900	Coastal Teleg.
16,920	Coastal Teleg. & Govt.
16,940	Government
16,960	do.
16,980	Coastal Teleg.
17,000	Coastal Teleg. & Aviation
17,020	Government
17,040	do.
17,060	do.
17,075	do.
17,080	Coastal Phone
17,090	do.
17,100	do.
17,110	Government
17,120	Coastal Phone
17,140	Fixed
17,155	Government
17,160	Fixed
17,170	do.
17,180	Government
17,200	do.
17,210	do.
17,220	Fixed
17,230	Government
17,240	do.
c 17,257	Aviation & Govt.
17,260	Aviation
c 17,274	Aviation & Govt.
17,280	Aviation
c 17,288	Aviation & Govt.
17,295	Government
17,300	
)17,310	Experimental
17,320	
c 17,319	Aviation & Govt.
c 17,336	do.
17,340	Aviation
c 17,350	Aviation & Govt.
17,355	Government
17,360	Aviation
c 17,367	Aviation & Govt.
17,370	Government
17,380	Fixed
a17,385	Aviation
17,400	Fixed
17,405	Government
n17,420	Fixed & Govt.
n17,440	do.
17,460	Government
17,470	do.
17,480	do.
17,490	do.
17,500	do.
17,510	do.
17,520	Fixed
17,540	Government
17,560	do.
17,580	Fixed
j17,600	Ship Phone & Govt.
17,610	Ship Phone
j17,620	Ship Phone & Govt.
j17,640	do.
j17,660	do.
j17,680	do.
17,690	Government
17,700	do.
17,720	do.
17,740	do.
17,750	International Bc.
17,760	do.
17,780	do.
17,800	do.
17,820	do.
17,830	do.
17,840	do.
17,860	Fixed
17,880	do.
17,900	do.
17,910	do.
17,920	do.
17,940	do.
17,960	do.
17,980	do.
18,000	do.
18,020	do.
18,040	do.
18,050	Government
18,060	do.
18,080	Fixed
18,100	Government
18,120	Fixed
n18,140	Fixed & Govt.
18,160	Fixed
18,180	do.
18,200	do.
n18,220	Fixed & Govt.
18,240	Fixed
18,260	do.
18,280	do.
18,285	do.
18,300	do.
18,320	do.
18,340	do.
18,360	Aviation
18,370	Fixed
18,380	do.
18,400	do.

Frequency (kilocycles)	Allocation
18,420	Fixed
18,425	do.
18,440	do.
18,450	do.
n18,460	Fixed & Govt.
18,480	Fixed
18,500	do.
18,510	do.
18,520	do.
18,540	do.
18,550	Government
18,560	Fixed
18,580	do.
18,600	do.
18,620	do.
18,640	do.
18,660	do.
18,680	do.
18,700	do.
18,720	do.
n 18,730	Fixed & Govt.
18,740	Fixed
18,755	do.
18,760	do.
18,780	do.
18,800	do.
n18,820	Fixed & Govt.
18,840	Fixed
18,860	do.
n18,880	Fixed & Govt.
18,900	Fixed
18,920	Fixed
18,930	do.
n18,940	Fixed & Govt.
18,960	Fixed
n18,980	Fixed & Govt.
19,000	Fixed
19,020	do.
19,040	do.
19,060	do.
19,080	do.
19,100	do.
19,120	do.
19,140	do.
19,160	do.
19,180	do.
19,190	do.
19,200	do.
19,220	do.
19,240	do.
19,260	do.
19,280	do.
19,300	do.
19,320	do.
19,340	do.
n19,360	Fixed & Govt.
19,380	Fixed
19,400	do.
19,420	do.
19,440	do.
19,460	do.
19,470	do.
19,480	do.
19,500	do.
19,520	do.

Frequency (kilocycles)	Allocation
n19,540	Fixed & Govt.
n19,560	do.
19,580	Fixed
19,600	do.
19,620	do.
19,640	do.
19,660	do.
19,680	do.
19,700	do.
19,720	do.
n19,740	Fixed & Govt.
19,760	Fixed
19,780	do.
19,800	do.
19,820	do.
19,840	do.
19,850	do.
19,860	do.
19,880	do.
19,900	do.
19,920	do.
19,940	do.
19,960	do.
n19,980	Fixed & Govt.
20,000	Government
20,020	Fixed
20,025	Government
20,040	Fixed
20,060	do.
20,075	Government
20,080	Fixed
n20,100	Fixed & Govt.
20,120	Fixed
20,125	Government
20,140	Fixed
20,150	Government
20,160	Fixed
20,175	Government
20,180	Fixed
20,200	Government
20,220	Fixed
20,225	Government
20,240	Fixed
n20,260	Fixed & Govt.
20,275	Government
20,280	Fixed
n20,300	Fixed & Govt.
20,320	Fixed
20,325	Government
20,340	Fixed
20,360	do.
20,375	Government
20,380	Fixed
20,400	Government
20,420	Fixed
20,425	Government
20,440	Fixed
20,460	do.
20,475	Government
20,480	Fixed
20,500	Government
20,520	Fixed
20,525	Government
20,540	Fixed
20,560	do.

Frequency (kilocycles)	Allocation
20,575	Government
n20,580	Fixed & Govt.
20,600	Government
20,620	Fixed
20,625	Government
20,640	Fixed
20,660	do.
20,675	Government
20,680	Fixed
20,700	Government
20,720	Fixed
20,725	Government
20,740	Fixed
20,760	do.
20,775	Government
20,780	Fixed
n20,800	Fixed & Govt.
n20,820	do.
20,825	Government
20,840	Fixed
20,850	Government
20,860	Fixed
20,875	Government
20,880	Fixed
20,900	Government
20,920	Fixed
20,925	Government
20,940	Fixed
20,960	do.
20,975	Government
20,980	Fixed
21,000	Government
21,020	Fixed
21,025	Government
21,040	Fixed
21,060	do.
21,075	Government
21,080	Fixed
21,100	Government
21,120	Fixed
21,125	Government
n21,140	Fixed & Govt.
21,160	Fixed
21,175	Government
21,180	Fixed
21,200	Government
21,220	Fixed
21,225	Government
21,240	Fixed
n21,260	Fixed & Govt.
21,275	Government
21,280	Fixed
21,300	Government
21,310	Fixed
21,320	do.
21,325	Government
21,340	Fixed
21,360	do.
21,375	Government
21,380	Fixed
21,400	Government
21,420	Fixed
21,425	Government
21,440	Fixed
21,460	International Bc.
n 21,475	Government
21,480	International Bc.
21,500[4]	Government
21,520	International Bc.
n 21,525	Government
21,540	International Bc.
21,570	do.
n 21,575	Government
21,590	International Bc.
n 21,600	Government
21,610	International Bc.
n 21,625	Government
21,630	International Bc.
21,650	Coastal Teleg. & International Bc.
n21,675	Coastal Teleg. & Govt.
n21,700	do.
n21,725	Coastal Teleg. & Govt.
21,750	Coastal Teleg.
n21,775	Coastal Teleg. & Govt.
n21,800	do.
n21,825	do.
21,850	Coastal Teleg.
n21,875	Coastal Teleg. & Govt.
n21,900	do.
21,925	Government
21,950	Coastal Teleg.
n21,975	Coastal Teleg. & Govt.
n22,000	Ship Teleg. & Govt.
n22,025	do.
22,040	Ship Teleg.
22,050	do.
22,060	do.
n22,075	Ship Teleg. & Govt.
22,080	Maritime Calling
n22,100	Ship Teleg. & Govt.
22,110	Ship Teleg.
22,120	do.
n22,125	Ship Teleg. & Govt.
22,140	Ship Teleg.
22,150	do.
22,175	Government
n22,200	Ship Teleg. & Govt.
n22,225	Mobile Press & Govt.
22,250	Mobile Press
n22,275	Coastal Teleg. & Govt.
n22,300	do.
n22,325	do.
22,350	Coastal Teleg.
22,375	Government
n22,400	Coastal Teleg. & Govt.
n22,425	Coastal Teleg. & Govt.
22,450	Coastal Teleg.
n22,475	Coastal Teleg. & Govt.

[4] Available for temporary assignment to non-Government international broadcast stations.

Frequency (kilocycles)	Allocation
n22,500	Coastal Teleg. & Govt.
22,525	Government
22,535	do.
22,550	Coastal Teleg.
22,575	Government
22,600	do.
22,625	do.
22,650	Coastal Teleg.
22,660	Fixed
n22,675	Coastal Phone & Govt.
n22,700	Coastal Phone, Fixed & Govt.
22,725	Government
22,750	do.
22,775	do.
22,780	Fixed
22,800	Government
22,825	do.
22,830	do.
22,850	do.
22,875	do.
22,900	do.
22,925	do.
22,950	do.
22,975	do.
n23,000	Ship Phone & Govt.
c23,025	Aviation & Govt.
23,050	Government
23,075	do.
n23,100	Experimental & Govt.
23,125	Government
23,150	Gen. Communication
23,175	Government
23,200	do.
c 23,211	Aviation & Govt.
n23,225	do.
c 23,234	do.
23,250	Aviation
c 23,256	Aviation & Govt.
n23,275	Aviation & Govt.
c 23,279	do.
23,300	Government
c 23,301	Aviation & Govt.
c 23,324	do.
n23,325	do.
c 23,346	do.
23,350	Aviation
c 23,369	Aviation & Govt.
n23,375	do.
23,400	Government
23,425	do.
23,450	Fixed
23,475	Government
23,500	do.
23,525	do.
23,550	do.
23,575	do.
23,600	do.
23,625	do.
23,650	do.
23,675	do.
23,700	do.
23,725	do.
23,750	Government
23,775	do.
23,800	do.
23,825	do.
23,850	do.
23,875	do.
23,900	do.
23,925	do.
23,950	do.
23,975	do.
24,000	do.
24,025	do.
24,030	do.
24,050	Gen. Communication
24,075	Government
24,090	do.
24,100	do.
24,120	do.
24,125	do.
24,150	do.
24,175	do.
24,180	do.
24,200	do.
24,225	do.
24,250	Gen. Communication
24,270	Government
24,275	do.
24,300	do.
24,325	do.
24,350	do.
24,375	do.
24,400	do.
24,425	do.
24,450	do.
24,475	do.
24,480	do.
24,500	do.
24,510	do.
24,525	do.
24,540	do.
24,550	Gen. Communication
24,575	Government
24,600	do.
24,625	do.
24,630	do.
24,650	Gen. Communication
24,675	Government
24,700	do.
24,725	do.
24,750	do.
24,775	do.
24,800	do.
24,810	do.
24,825	do.
24,850	do.
24,875	do.
24,900	do.
24,925	do.
24,930	do.
24,950	Gen. Communication
24,975	Government
25,000	do.
n25,025	Broadcast & Govt.
n25,050	do.
n25,075	do.

Frequency (kilocycles)	Allocation
n25,100	Broadcast & Govt.
n25,125	do.
n25,150	do.
n25,175	do.
n25,200	do.
n25,225	do.
n 25,230	do.
n25,250	do.
n25,275	do.
n25,300	do.
n25,325	do.
n25,350	do.
n25,375	do.
n25,400	do.
n 25,410	do.
n25,425	do.
n25,450	do.
n25,475	do.
n25,500	do.
n25,525	do.
n25,550	do.
n25,575	do.
n 25,590	do.
n25,600	do.
n25,625	do.
n25,650	do.
n25,675	do.
n25,700	do.
n25,725	do.
n25,750	do.
n 25,770	do.
n25,775	do.
n25,800	do.
n25,825	do.
n25,850	do.
n25,875	do.
n25,900	do.
n25,925	do.
n25,950	do.
n25,975	do.
n26,000	do.
n26,025	do.
n26,050	do.
n26,075	do.
n26,100	do.
n26,125	do.
n26,150	do.
n26,175	do.
n26,200	do.
n26,225	do.
n26,250	do.
n26,275	do.
n26,300	do.
n 26,310	do.
n26,325	do.
n26,350	do.
n26,375	do.
n26,400	do.
n26,425	do.
n26,450	do.
n26,475	do.
n26,500	do.
n26,525	do.
n26,550	do.

Frequency (kilocycles)	Allocation
n26,575	Broadcast & Govt.
n26,600	do.
n 26,610	do.
n26,625	do.
26,650	Government
n26,675	Broadcast & Govt.
n26,700	do.
n26,725	do.
n26,750	do.
n26,775	do.
26,800	Government
n26,825	Broadcast & Govt.
n26,850	do.
n26,875	do.
n26,900	do.
n26,925	do.
n26,950	do.
n26,975	do.
g27,000	Gen. Communication & Govt.
g27,025	do.
g27,050	do.
g27,075	do.
g27,100	do.
g27,125	do.
g27,150	do.
g27,175	do.
g27,200	do.
g27,225	do.
g27,250	do.
g27,275	do.
g27,300	do.
g27,325	do.
g27,350	do.
g27,375	do.
g27,400	do.
g27,425	do.
g27,450	do.
g27,475	do.
g27,500	do.
g27,525	do.
g27,550	do.
g27,575	do.
g27,600	do.
g27,625	do.
g27,650	do.
g27,675	do.
g27,700	do.
g27,725	do.
g27,750	do.
g27,775	do.
g27,800	do.
g27,825	do.
g27,850	do.
g27,875	do.
g27,900	do.
g27,925	do.
g27,950	do.
g27,975	do.
28,000 to 30,000	Amateur & Govt.
g30,020	Govt. & Exper.

Frequency (kilocycles)	Allocation
30,000 to 30,500	Government
30,540	Coastal Harbor & Ship Phone
30,580	Police
30,620	Geophysical & Motion Picture
30,660	Experimental
30,700	Police
30,740	Fixed
30,780	do.
n30,820	Relay Bc. & Govt.
30,860	Relay Press
30,900	Government
30,940	Forestry
30,980	Police
31,020	Spec. Services & Experimental
31,060	Geophysical & Motion Picture
31,100	Police
31,140	Experimental
31,180	Spec. Services & Experimental
31,220	Relay Bc.
31,260	Coastal Hrbr. & Ship Phone
31,300	Government
31,340	Forestry
31,380	Fixed
31,420	do.
31,460	Spec. Emergency
31,500	Police
31,540	Spec. Services & Experimental
31,580	Forestry
n31,620	Relay Bc. & Govt.
31,660	Coastal Harbor & Ship Phone
31,700	Government
31,740	Spec. Emergency
31,780	Police
31,820	Fixed
31,860	do.
31,900	Police
31,940	Forestry
31,980	Relay Press
32,000 to 33,000	Government
33,020	Relay Press
33,060	Spec. Emergency
33,100	Police
33,140	Fixed
33,180	do.
33,220	Police
33,260	Relay Press
33,300[5]	Government
33,340	Experimental
33,380	Relay Broadcast
33,420	Aviation
33,460	Spec. Services & Experimental
33,500	Police
33,540	Geophysical & Motion Picture
33,580	Relay Press
33,600	Fixed[2]
33,620	Spec. Services & Experimental
33,660	Aviation
33,700	Government
33,740	Relay Bc.
33,780	Police
33,820	Spec. Emergency
33,860	Fixed
33,900	do.
33,940	Police
33,980	Relay Press
34,000 to 35,000	Government
35,020	Relay Bc.
35,060	Experimental
35,100	Police
35,140	Spec. Emergency
35,180	Relay Press
35,200	Fixed[2]
35,220	Police
35,260	Relay Bc.
35,300	Government
35,340	Coastal Harbor & Ship Phone
35,380	Fixed
35,420	do.
35,460	Spec. Services & Experimental
35,500	Police
35,540	Geophysical & Motion Picture
35,580	Marine Fire
35,620	Relay Bc.
35,660	Coastal Harbor & Ship Phone
35,700	Government
35,740	Forestry
35,780	Police
35,820	Relay Bc.
35,860	Intership
35,900	Police
35,940	Forestry
35,980	Relay Press
36,000	Fixed[2]
36,000 to 37,000	Government
37,020	Relay Bc.
37,060	Spec. Services & Experimental
37,100	Police
37,140	Spec. Services & Experimental
37,180	Spec. Emergency
37,220	Police
37,260	Coastal Harbor & Ship Phone
37,300	Government

[2] Assigned for low power fixed service in the Territory of Hawaii only.

[5] See Article 7, General Radio Regulations (Cairo Revision, 1938) annexed to the International Telecommunication Convention, Madrid, 1932.

Frequency (kilocycles)	Allocation
37,340	Relay Bc.
37,380	Police
37,400	Fixed[2]
37,420	Relay Press
37,460	Forestry
37,500	Police
37,540	Experimental
37,580	Coastal Harbor & Ship Phone
37,620	Relay Bc.
37,660	Intership & Forestry
37,700	Government
37,740	Marine Fire
37,780	Police
37,820	Spec. Emergency
37,860	Aviation
37,900	Police
37,940	Coastal Harbor & Ship Phone
37,980	Relay Bc.
38,000[5]	Fixed[2] & Govt.
38,000 to 39,000	Government
39,020	Relay Press
39,060	Aviation
39,100	Police
39,140	Spec. Services & Experimental
39,180	Police
39,220	Coastal Harbor & Ship Phone
39,260	Relay Bc.
39,300	Government
39,340	Spec. Emergency
39,380	Police
39,420	Forestry
39,460	Experimental
39,500	Police
39,540	Spec. Services & Experimental
39,580	Coastal Harbor & Ship Phone
39,600	Fixed[2]
n39,620	Relay Bc. & Govt.
39,660	Spec. Emergency
39,700	Government
39,740	Forestry
39,780	Police
39,820	Relay Bc.
39,860	Spec. Emergency
39,900	Police
39,940	Forestry
39,980	Relay Press
40,000 to 42,000	Government
41,000	Fixed[2]
41,800	Fixed[2]
42,100	Broadcast
42,300	do.
42,500	do.
42,700	do.
42,900	do.
43,100	do.
43,300	do.
43,500	do.
43,700	do.
43,900	do.
44,100	do.
44,300	do.
44,500	do.
44,700	do.
44,900	do.
45,100	do.
45,300	do.
45,500	do.
45,700	do.
45,900	do.
46,100	do.
46,200	Fixed[2]
46,300	Broadcast
46,500	do.
46,700	do.
46,900	do.
47,100	do.
47,300	Broadcast[2] & Fixed
47,500	Broadcast
47,700	do.
47,900	do.
48,100	do.
48,300	do.
48,400	Fixed[2]
48,500	Broadcast
48,700	do.
48,900	do.
49,100	do.
49,300	do.
49,500	Broadcast[2] & Fixed
49,700	Broadcast
49,900	do.
50,000 n to 56,000	Television Bc.
56,000 to 60,000	Amateur
60,000 n to 66,000	Television Bc.
66,000 n to 72,000	Television Bc.
72,000 to 78,000	Government
75,000[5]	Govt. (Avia. marker)

[2] Assigned for low power fixed service in the Territory of Hawaii only.

[5] See Article 7, General Radio Regulations (Cairo Revision, 1938) annexed to the International Telecommunication Convention, Madrid, 1932.

Frequency (kilocycles)	Allocation
78,000 to 84,000	Television Bc.
84,000 to 90,000	Television Bc.
90,000 to 96,000	Government
94,300[5]	Government
96,000 to 102,000	Television Bc.
n to 108,000	do.
108,000 to 112,000	Government
110,300[5]	Government
112,000 to 116,000	Amateur
116,050[6]	Spec. Services & Experimental
n 116,100	Government
116,150	Police
116,250	Experimental
116,350	Coastal Harbor & Ship Phone
116,450	Spec. Services & Experimental
116,550	Police
116,650	Spec. Emergency
116,750	Relay Press
116,850	Spec. Services & Experimental
116,950	Police
117,050	Experimental
n117,150	Relay Press & Govt.
117,250	Spec. Services & Experimental
117,350	Police
117,450	Forestry
117,550	Marine Fire
117,650	Spec. Services & Experimental
117,750	Police
117,850	Spec. Emergency
117,950	Relay Press
118,050	Government
118,150	Police
118,250	Experimental
118,350	Coastal Harbor & Ship Phone
118,450	Spec. Services & Experimental
118,550	Police
118,650	Experimental
118,750	Relay Press
118,850	Government
n118,950	Forestry & Govt.

Frequency (kilocycles)	Allocation
119,000 s to 129,000	Government
c129,000	Aviation & Govt.
c129,200	do.
c129,400	do.
c129,600	do.
c129,800	do.
c130,000	do.
c130,200	do.
c130,400	do.
c130,600	do.
c130,800	do.
c131,000	do.
c131,200	do.
c131,400	do.
c131,600	do.
c131,800	do.
j132,000	do.
132,000 to 140,000	Government
c140,100	Aircraft
140,240	Aviation
140,380	do.
140,520	do.
140,660	do.
140,800	do.
140,940	do.
141,080	do.
141,220	do.
141,360	do.
141,500	do.
141,640	do.
141,780	do.
141,920	do.
142,060	do.
142,200	do.
142,340	do.
142,480	do.
142,620	do.
142,760	do.
142,900	do.
143,040	do.
143,180	do.
143,320	do.
143,460	do.
143,600	do.
143,740	do.
143,880	do.
144,000 to 156,000	Government
156,075	Broadcast
156,225	Fixed
156,375	do.
156,525	Special Services & Experimental
156,675 to 156,750	Broadcast
156,825	
156,975	Experimental
157,125	Fixed

[5] See Article 7, General Radio Regulations (Cairo Revision, 1938) annexed to the International Telecommunication Convention, Madrid, 1932.

[6] Frequencies allocated between 116,000 and 119,000 kc are available for assignment to stations in the services shown on an experimental basis only.

Frequency (kilocycles)	Allocation
157,275	Fixed
157,425	Spec. Services & Experimental
157,575	Broadcast
157,725	Experimental
157,875	Fixed
158,025	do.
158,175	Spec. Services & Experimental
158,325 to 158,400	Broadcast
158,475	
158,625	Police
158,775	Fixed
158,925	do.
159,075	Spec. Services & Experimental
159,225 to 159,300	Broadcast
159,375	
159,525	Fixed
159,675	do.
159,825	Spec. Emergency
159,975	Broadcast
160,125	Fixed
160,275	do.
160,425	Spec. Services & Experimental
160,575	Fixed
160,725	do.
160,875	Forestry
161,025 to 161,100	Broadcast
161,175	
161,325	Spec. Services & Experimental
161,475	Fixed
161,625	do.
161,775	Experimental
161,925	Broadcast
162,000 to 168,000	Television Bc. & Experimental[7]
168,000 to 180,000	Government
180,000 to 186,000	Television Bc.
186,000 to 192,000	Television Bc.
192,000 to 204,000	Government
204,000 to 210,000	Television Bc.
210,000	Fixed[2]
210,000 to 216,000	Television Bc. & Experimental[7]
215,000	Fixed[2]
216,000 to 224,000	Government
224,000 to 230,000	Amateur
230,000 to 236,000	Television Bc.
236,000 to 242,000	Television Bc.
242,000 to 258,000	Government
258,000 to 264,000	Television Bc.
264,000 to 270,000	Television Bc. & Experimental[7]
270,000 to 282,000	Government
282,000 to 288,000	Television Bc.
288,000 to 294,000	Television Bc.
294,000 to 300,000	Government
300,000 to 400,000	Experimental
400,000 to 401,000	Amateur
401,000 and above	Experimental

[2]Assigned for low power fixed service in the Territory of Hawaii only.

[7]This band is available, for assignment on a temporary basis only, for use by stations in the experimental service not authorized to operate in a proposed or established radio service. The holder of any related instrument of authorization will be required to discontinue operation on frequencies within this band if operation thereon causes interference to any television station authorized to use this band.

NOTES

a. Available for assignment in Alaska under the rules governing non-Government radio stations in Alaska.

c. May be authorized for Government assignments for use in common with non-Government operations in the same service.

g. May be authorized for non-Government assignments provided no interference is caused to Government assignments present or future.

j. May be authorized for both Government and non-Government assignments.

n. May be authorized for Government assignments provided no interference is caused to non-Government assignments, present or future.

s. Used continually for Government navigational aids for the protection of life and property.

ABBREVIATIONS

Agri.	Agriculture	Govt.	Government
Bc.	Broadcast	Hrbr.	Harbor
Emerg.	Emergency	Relay Bc.	Relay Broadcast
Gen.	General	Teleg.	Telegraph
	Spec. Special		

FEDERAL COMMUNICATIONS COMMISSION

RULES AND REGULATIONS

(TITLE 47—TELECOMMUNICATION—CHAPTER I)

PART 3

RULES GOVERNING STANDARD AND HIGH-FREQUENCY BROADCAST STATIONS

EFFECTIVE JUNE 25

1940

(Revised to October 5, 1940)

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PREFACE TO THE RULES AND REGULATIONS OF THE FEDERAL COMMUNICATIONS COMMISSION

The "Rules and Regulations of the Federal Communications Commission" incorporate all the rules and regulations of a general or permanent nature in force as of the effective date appearing at the beginning of each part. The title, "Title 47—Telecommunication," has been adopted for all the rules to correspond with the codification thereof under the provisions of the Federal Register Act, and also to correspond with the title under which the Communications Act is printed in the United States Code.

In preparing this compilation, the Commission has had in mind the necessity for an arrangement which would make the rules conveniently accessible and one which would also make provision for future amendments. To this end all the existing rules have been logically arranged under 26 parts, which have been suitably subdivided, employing non-consecutive part numbers from 1 to 71, making provision for substitutions and additions.

The various parts are independently numbered, each part beginning with the principal section number allocated for the purpose and in keeping with the system of numbering which has been used, and these section numbers run consecutively only within the part. The first section of each part begins with ".1." Gaps are left in the numbering throughout so that new and amendatory provisions may be inserted with due regard to their relation to the compilation as a whole.

Each part has been printed and bound in separated pamphlet form, and each contains a title page listing the part numbers and titles of all the Rules and Regulations. In addition, explanatory footnotes have been included referring to statutes or treaties applicable to particular services and, so far as practicable, to other applicable parts.

It is intended that future amendments will be made available in such form that the substitute or added pages may be readily inserted within the part.

Provision of the rules may be cited thus: "Section (or §) 3.1 Federal Communications Commission Rules."

Copies of these rules may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C.

THE RULES AND REGULATIONS OF THE FEDERAL COMMUNICATIONS COMMISSION ARE PUBLISHED IN SEPARATE PAMPHLETS, NUMBERED AND TITLED AS FOLLOWS:

Part

1. Rules of Practice and Procedure.
2. General Rules and Regulations.
3. Standard and High-Frequency Broadcast Stations.
4. Broadcast Services Other Than Standard Broadcast.
5. Experimental Radio Services.
6. Fixed Public Radio Services.
7. Coastal Radio Services.
8. Ship Radio Services.
9. Aviation Radio Services.
10. Emergency Radio Services.
11. Miscellaneous Radio Services.
12. Amateur Radio: Stations and Operators.
13. Commercial Radio Operators.
14. Radio Stations in Alaska.
31. Uniform System of Accounts, Class A and B Telephone Companies.

Part

32. Units of Property: Telephone Companies.
33. Accounting by Class C Telephone Companies.
34. Uniform System of Accounts, Radio Telegraph Carriers.
35. Uniform System of Accounts for Telegraph and Cable Companies.
41. Franks and Passes.
42. Destruction of Records.
43. Filing of Contracts, Periodic Reports, etc.
51. Classification of Telephone Employees.
61. Tariffs.
62. Applications for Interlocking Directorates.

TABLE OF CONTENTS

PART 3—RULES GOVERNING STANDARD AND HIGH-FREQUENCY BROADCAST STATIONS

SUBPART A—RULES GOVERNING STANDARD BROADCAST STATIONS

TECHNICAL OPERATION

OPERATION

SUBPART B—RULES GOVERNING HIGH-FREQUENCY BROADCAST STATIONS

DEFINITIONS

ALLOCATION OF FACILITIES

EQUIPMENT

TECHNICAL OPERATION

OPERATION

SUBPART C—GENERAL RULES APPLICABLE TO BOTH STANDARD AND HIGH-FREQUENCY BROADCAST STATIONS

BROADCASTS BY CANDIDATES FOR PUBLIC OFFICE

PART 3—RULES GOVERNING STANDARD AND HIGH-FREQUENCY BROADCAST STATIONS

Subpart A—Rules Governing Standard Broadcast Stations

DEFINITIONS[1]

§ 3.1 **Standard broadcast station.**—The term "standard broadcast station" means a station licensed for the transmission of radiotelephone emissions primarily intended to be received by the general public and operated on a channel in the band 550–1600 kilocycles, inclusive.

§ 3.2 **Standard broadcast band.**—The term "standard broadcast band" means the band of frequencies extending from 550–1600 kilocycles, inclusive, both 550 kilocycles and 1600 kilocycles being the carrier frequencies of broadcast channels.

§ 3.3 **Standard broadcast channel.**—The term "standard broadcast channel" means the band of frequencies occupied by the carrier and two side bands of a broadcast signal with the carrier frequency at the center. Channels shall be designated by their assigned carrier frequencies. Carrier frequencies assigned to standard broadcast stations shall begin at 550 kilocycles and be in successive steps of 10 kilocycles.

§ 3.4 **Dominant station.**—The term "dominant station" means a class I station, as hereinafter defined, operating on a clear channel.

§ 3.5 **Secondary station.**—The term "secondary station" means any station except a class I station operating on a clear channel.

§ 3.6 **Daytime.**—The term "daytime" means that period of time between local sunrise and local sunset.

§ 3.7 **Nighttime.**—The term "nighttime" means that period of time between local sunset and 12 midnight local standard time.

§ 3.8 **Sunrise and sunset.**—The terms "sunrise and sunset" mean, for each particular location and during any particular month, the average time of sunrise and sunset as specified in the license of a broadcast station. (For tabulation of average sunrise and sunset times for each month at various points in the United States, see "Average Sunrise and Sunset Times.")

§ 3.9 **Broadcast day.**—The term "broadcast day" means that period of time between local sunrise and 12 midnight local standard time.

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[1] Other definitions which may pertain to standard broadcast stations are included in sections 2.1 to 2.35 and the Communications Act of 1934, as amended.

§ 3.10 **Experimental period.**—The term "experimental period" means that time between 12 midnight and local sunrise. This period may be used for experimental purposes in testing and maintaining apparatus by the licensee of any standard broadcast station on its assigned frequency and with its authorized power, provided no interference is caused to other stations maintaining a regular operating schedule within such period. No station licensed for "daytime" or "specified hours" of operation may broadcast any regular or scheduled program during this period.

§ 3.11 **Service areas.**—(*a*) The term "primary service area" of a broadcast station means the area in which the ground wave is not subject to objectionable interference or objectionable fading.

(*b*) The term "secondary service area" of a broadcast station means the area served by the sky wave and not subject to objectionable interference. The signal is subject to intermittent variations in intensity.

(*c*) The term "intermittent service area" of a broadcast station means the area receiving service from the ground wave but beyond the primary service area and subject to some interference and fading.

§ 3.12 **Main studio.**—The term "main studio" means, as to any station, the studio from which the majority of its local programs originate, and/or from which a majority of its station announcements are made of programs originating at remote points.

§ 3.13 **Portable transmitter.**—The term "portable transmitter" means a transmitter so constructed that it may be moved about conveniently from place to place, and is in fact so moved about from time to time, but not ordinarily used while in motion. In the standard broadcast band, such a transmitter is used in making field intensity measurements for locating a transmitter site for a standard broadcast station. A portable broadcast station will not be licensed in the standard broadcast band for regular transmission of programs intended to be received by the public.

§ 3.14 **Auxiliary transmitter.**—The term "auxiliary transmitter" means a transmitter maintained only for transmitting the regular programs of a station in case of failure of the main transmitter.

§ 3.15 **Combined audio harmonics.**—The term "combined audio harmonics" means the arithmetical sum of the amplitudes of all the separate harmonic components. Root sum square harmonic readings may be accepted under conditions prescribed by the Commission.

§ 3.16 **Effective field.**—The term "effective field" or "effective field intensity" is the root-mean-square (RMS) value of the inverse distance fields at a distance of 1 mile from the antenna in all directions in the horizontal plane.

ALLOCATION OF FACILITIES

§ 3.21 **Three classes of standard broadcast channels.**—(*a*) *Clear channel.*—A "clear channel" is one on which the dominant station or stations render service over wide areas and which are cleared of objectionable interference within their primary service areas and over all or a substantial portion of their secondary service areas.

(*b*) *Regional channel.*—A "regional channel" is one on which several stations may operate with powers not in excess of 5 kilowatts. The primary service area of a station operating on any such channel may be limited, as a consequence of interference, to a given field intensity contour.

(*c*) *Local channel.*—A "local channel" is one on which several stations may operate with powers not in excess of 250 watts. The primary service area of a station operating on any such channel may be limited, as a consequence of interference, to a given field intensity contour.

§ 3.22 **Classes and power of standard broadcast stations.**—(*a*) *Class I station.*—A "class I station" is a dominant station operating on a clear channel and designed to render primary and secondary service over an extended area and at relatively long distances. Its primary service area is free from objectionable interference from other stations on the same and adjacent channels, and its secondary service area free from interference, except from stations on the adjacent channel, and from stations on the same channel in accordance with the channel designation in section 3.25 or in accordance with the "Engineering Standards of Allocation." The operating power shall be not less than 10 kilowatts nor more than 50 kilowatts. (Also see section 3.25 (*a*) for further power limitation.)

(*b*) *Class II station.*—A "class II station" is a secondary station which operates on a clear channel (see section 3.25) and is designed to render service over a primary service area which is limited by and subject to such interference as may be received from class I stations. A station of this class shall operate with power not less than 0.25 kilowatts nor more than 50 kilowatts. Whenever necessary, a class II station shall use a directional antenna or other means to avoid interference with class I stations and with other class II stations, in accordance with the Engineering Standards of Allocation.

(*c*) *Class III station.*—A "class III station"is a station which operates on a regional channel and is designed to render service pri-

marily to a metropolitan district and the rural area contiguous thereto. Class III stations are subdivided into two classes:

(1) *Class III–A station.*—A "class III–A station" is a class III station which operates with power not less than 1 kilowatt nor more than 5 kilowatts, and the service area of which is subject to interference in accordance with the Engineering Standards of Allocation.

(2) *Class III–B station.*—A "class III–B station" is a class III station which operates with a power not less than 0.5 kilowatt nor more than 1 kilowatt night and 5 kilowatts daytime, and the service area of which is subject to interference in accordance with the Engineering Standards of Allocation.

(*d*) *Class IV station.*—A "class IV station" is a station operating on a local channel and designed to render service primarily to a city or town and the suburban and rural areas contiguous thereto. The power of a station of this class shall not be less than 0.1 kilowatt nor more than 0.25 kilowatt, and its service area is subject to interference in accordance with the Engineering Standards of Allocation.

§ 3.23 **Time of operation of the several classes of stations.**[2]—The several classes of standard broadcast stations may be licensed to operate in accordance with the following:

(*a*) "Unlimited time" permits operation without a maximum limit as to time.

(*b*) "Limited time" is applicable to class II (secondary stations) operating on a clear channel only. It permits operation of the secondary station during daytime, and until local sunset if located west of the dominant station on the channel, or if located east thereof, until sunset at the dominant station, and in addition during night hours, if any, not used by the dominant station or stations on the channel.

(*c*) "Daytime" permits operation during the hours between average monthly local sunrise and average monthly local sunset. (For exact time of sunset at any location, see "Average Sunrise and Sunset Times.")

(*d*) "Sharing time" permits operation during hours which are so restricted by the station license as to require a division of time with one or more other stations using the same channel.

(*e*) "Specified hours" means that the exact operating hours are specified in the license. (The minimum hours that any station shall operate are specified in section 3.71.)

§ 3.24 **Broadcast facilities; showing required.**—An authorization for a new standard broadcast station or increase in facilities of

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[2] Formal application required for change in time of operation of existing broadcast station.
See Standards of Good Engineering Practice for form number.

Amendment No. 61 (Amending Sec. 3.25) effective April 22, 1941
To be substituted for p. 5-6, Part 3, Rules Governing Standard and High-Frequency Broadcast Stations

an existing station[3] will be issued only after a satisfactory showing has been made in regard to the following, among others:

(a) That the proposed assignment will tend to effect a fair, efficient, and equitable distribution of radio service among the several states and communities.

(b) That objectionable interference will not be caused to existing stations or that if interference will be caused the need for the proposed service outweighs the need for the service which will be lost by reason of such interference. That the proposed station will not suffer interference to such an extent that its service would be reduced to an unsatisfactory degree. (For determining objectionable interference, see Engineering Standards of Allocation and Field Intensity Measurements in Allocation.)

(c) That the applicant is financially qualified to construct and operate the proposed station.[4]

(d) That the applicant is legally qualified. That the applicant (or the person or persons in control of an applicant corporation or other organization) is of good character and possesses other qualifications sufficient to provide a satisfactory public service.

(e) That the technical equipment proposed, the location of the transmitter, and other technical phases of operation comply with the regulations governing the same, and the requirements of good engineering practice. (See technical regulations herein and Locations of Transmitters of Standard Broadcast Stations.)

(f) That the facilities sought are subject to assignment as requested under existing international agreements and the Rules and Regulations of the Commission.

(g) That the public interest, convenience, and necessity will be served through the operation under the proposed assignment.

[3] Formal application required. See Standards of Good Engineering Practice for form number.

[4] See Money Required to Construct and Complete Electrical Tests of Stations of Different Classes and Powers.

§ 3.25 Clear channels; class I and II stations.—The frequencies in the following tabulation are designated as clear channels and assigned for use by the classes of stations as given:

(a) To each of the channels below there will be assigned one class I station and there may be assigned one or more class II stations operating limited time or daytime only: 640, 650, 660, 670, 700, 720, 750, 760, 770, 780, 820, 830, 840, [850]*, 870, 880, 890, 1020, 1040, 1100, 1120, 1160, 1180, 1200, and 1210 kilocycles. The power of the class I stations on these channels shall not be less than 50 kilowatts.

(b) To each of the channels below there may be assigned class I and class II stations: 680, 710, 810, [850]*, 940, 1000, 1030, 1060, 1070, 1080, 1090, 1110, 1130, 1140, 1170, 1190, 1500, 1510, 1520, 1530, 1550, and 1560 kilocycles.

(c) For class II stations located not less than 650 miles from the nearest Canadian Border and which will not deliver over 5 microvolts per meter ground wave or 25 microvolts per meter 10 per cent time sky wave at any point on said border, 690, 740, 860, 990, 1010[4a], and 1580 kilocycles.

(d) For class II stations which operate daytime only with power not in excess of 1 kilowatt and which will not deliver over 5 microvolts per meter ground wave at any point on the nearest Mexican Border, 730, 800, 900, 1050[4b], 1220[4c], and 1570 kilocycles.

(e) For class II stations located not less than 650 miles from the nearest Cuban Border and which will not deliver over 5 microvolts per meter ground wave or 25 microvolts per meter 10 per cent time sky wave at any point on said border, 1540 kilocycles.

§ 3.26 Regional channels; classes III-A and III-B stations.—The following frequencies are designated as regional channels and are assigned for use by class III-A and III-B stations[4d]: 550, 560[5], 570[5], 580, 590[5], 600, 610, 620, 630[5], 790, 910, 920, 930, 950, 960, 970, 980, 1150, 1250, 1260, 1270[5], 1280, 1290, 1300, 1310, 1320, 1330, 1350, 1360, 1370, 1380, 1390, 1410, 1420, 1430, 1440, 1460, 1470, 1480, 1590, and 1600 kilocycles.

§ 3.27 Local channels: class IV stations.—The following frequencies are designated as local channels and are assigned for use by class IV stations: 1230, 1240, 1340, 1400, 1450, and 1490 kilocycles.

4a A station on 1010 kilocycles shall also protect a class I-B station at Havana, Cuba.

4b See North American Regional Broadcasting Agreement for use of this channel by a station in New York (Appendix I, Table IV).

4c See Agreement with Mexico for further use of this channel.

4d See section 3.29 in regard to assigning class IV stations to regional channels.

5 See North American Regional Broadcasting Agreement for special provisions concerning the assigning of class II stations in other countries of North America to these regional channels. Such stations shall be protected from interference in accordance with Appendix II, Table I, of said Agreement.

* The Commission on April 22, 1941, effective immediately, suspended its action of April 7, 1941, striking the reference to the frequency 850 kc in sec. 3.25(a) and adding the same in sec. 3.25(b).

§ 3.30 **Station location.**—(*a*) Each standard broadcast station shall be considered located in the State and city where the main studio is located.

(*b*) The transmitter of each standard broadcast station shall be so located that primary service is delivered to the city in which the main studio is located, in accordance with the Standards of Good Engineering Practice, prescribed by the Commission.

§ 3.31 **Authority to move main studio.**—The licensee of a standard broadcast station shall not move its main studio outside the borders of the city, State, district, Territory, or possession in which it is located without first making written application [6] to the Commission for authority to so move, and securing written permission for such removal. A licensee need not obtain permission to move the main studio from one location to another within a city or town, but shall promptly notify the Commission of any such change in location.

§ 3.32 **Special experimental authorizations.**—(*a*) Special experimental authorizations [7] may be issued to the licensee of a standard broadcast station in addition to the regular license upon proper application therefor [6] and satisfactory showing in regard to the following, among others:

(1) That the applicant has a program of research and experimentation which indicates reasonable promise of contribution to the development and practical application of broadcasting, and will be in addition to and advancement of the work that can be accomplished under its regular license.

(2) That the experimental operation and experimentation will be under the direct supervision of a qualified engineer with an adequate staff of engineers qualified to carry on the program of research and experimentation.

(3) That the public interest, convenience, and necessity will be served by granting the authorization requested.

(*b*) [8] In case a special experimental authorization permits additional hours of operation, no licensee shall transmit any commercial or sponsored program or make any commercial announcement during such time of operation. In case of other additional facilities, no additional charge shall be made by reason of transmission with such facilities.

(*c*) A special experimental authorization will not be extended after the actual experimentation is concluded.

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[6] Formal application required. See standards of Good Engineering Practice for form number.

[7] Special authorizations which do not involve experimental operation may be granted pursuant to section 1.365.

[8] The Commission on September 24, 1940, advanced the effective date of section 3.32 (b) to March 29, 1941.

(*d*) The program of research and experimentation as outlined in the application for a special experimental authorization shall be adhered to in the main unless the licensee is authorized to do otherwise by the Commission.

(*e*) The Commission may require from time to time a broadcast station holding such experimental authorization to conduct experiments that are deemed desirable and reasonable.

(*f*) A supplemental report shall be filed with and made a part of each application for an extension of a special experimental authorization and shall include statements of the following:

(1) Comprehensive summary of all research and experimentation conducted.

(2) Conclusions and outline of proposed program for further research and development.

(3) Comprehensive summary and conclusions as to the social and economic effects of its use.

§ 3.33 **Directional antenna; Showing required.**—(*a*) No application for authority to install a directional antenna [9] will be accepted unless a definite site and full details of the design of the directional antenna are given with the application. (See Data Required with Applications Involving Directional Antenna Systems.)

(*b*) No application for an authorization to operate a directional antenna during the broadcast day will be accepted unless proof of performance of the directional antenna taken during equipment test period is submitted with the application. (See Field Intensity Measurements in Allocation, sec. B.)

§ 3.34 **Normal license period.**—All standard broadcast station licenses will be issued so as to expire at the hour of 3 a. m., Eastern Standard Time, and will be issued for a normal license period of 1 year, expiring as follows:

(*a*) For stations operating on the frequencies 640, 650, 660, 670, 680, 700, 710, 720, 740, 750, 760, 770, 790, 800, 810, 820, 830, 850, 860, 870, 970, 980, 990, 1000, 1020, 1040, 1050, 1060, 1070, 1080, 1090, 1100, 1110, 1130, 1140, 1150, 1160, 1170, 1180, 1190, 1460, 1470, 1480, and 1490 kilocycles, February 1.

(*b*) For stations operating on the frequencies 550, 560, 570, 580, 590, 600, 610, 620, 630, 780, 880, 890, 900, and 920 kilocycles, April 1.

(*c*) For stations operating on the frequencies 930, 940, 950, 1010, 1120, 1220, 1230, 1240, 1250, 1260, 1270, 1280, and 1290 kilocycles, June 1.

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[9] Formal application required. See Standards of Good Engineering Practice for form number.

Amendment No. 206 (Adopting Sec. 3.35 effective November 23, 1943, and amending Sec. 3.34 effective December 15, 1943)

To be substituted for pp. 8a, 9-10, Part 3, Rules Governing Standard and High Frequency Broadcast Stations

The last previous amendment affecting Part 3 was amendment No. 202, pp. 22a-22b 22c

§ 3.33 Directional antenna; showing required.—*(a)* No application for authority to install a directional antenna[9] will be accepted unless a definite site and full details of the design of the directional antenna are given with the application. (See Data Required with Applications Involving Directional Antenna Systems.)

(b) No application for an authorization to operate a directional antenna during the broadcast day will be accepted unless proof of performance of the directional antenna taken during equipment test period is submitted with the application. (See Field Intensity Measurements in Allocation section B.)

§ 3.34 Normal license period.—All standard broadcast station licenses will be issued for a normal license period of 3 years. Licenses will be issued to expire at the hour of 3 a.m., Eastern Standard Time, in accordance with the following schedule, and at three-year intervals thereafter:

(a) For stations operating on the frequencies 640, 650, 660, 670, 680, 690, 700, 710, 720, 730, 740, 750, 760, 770, 780, 800, 810, 820, 830, 840, 850, 860, 870, 880, 890, 900, 940 kilocycles, November 1, 1946.

(b) For stations operating on the frequencies [illegible], 1000, 1010, 1020, 1030, 1040, 1050, 1060, 1070, 1080, 1090, 1100, 1110, 1120, 1130, 1140, 1160, 1170, 1180, 1190, 1200, 1210, 1220, 1500, 1510, 1520, 1530, 1540, 1550, 1560, 1570, 1580 kilocycles, May 1, 1945.

(c) For stations operating on the frequencies 550, 560, 570, 580, 590, 600, 610, 620, 630, 790 kilocycles, May 1, 1946.

(d) For stations operating on the frequencies 910, 920, 930, 950, 960, 970, 980, 1150, 1250 kilocycles, May 1, 1947.

(e) For stations operating on the frequencies 1260, 1270, 1280, 1290, 1300, 1310, 1320, 1330, 1350, 1360 kilocycles, November 1, 1945.

(f) For stations operating on the frequencies 1370, 1380, 1390, 1410, 1420, 1430, 1440, 1460, 1470, 1480, 1590, 1600 kilocycles, November 1, 1947.

(g) For stations operating on the frequency 1230 kilocycles, February 1, 1946.

(h) For stations operating on the frequency 1240 kilocycles, August 1, 1946.

[9]Formal application required. See Standards of Good Engineering Practice for form number.

Amendment No. 206, continued from p. 8a.

(i) For stations operating on the frequency 1340 kilocycles, February 1, 1947.

(j) For stations operating on the frequency 1400 kilocycles, August 1, 1947.

(k) For stations operating on the frequency 1450 kilocycles, February 1, 1948.

(l) For stations operating on the frequency 1490 kilocycles, August 1, 1948

§ 3.35 Multiple ownership.[9a]—No license shall be granted for a standard broadcast station, directly or indirectly owned, operated or controlled[9b] by any person[9c] where such station renders or will render primary service to a substantial portion of the primary service area of another standard broadcast station, directly or indirectly owned, operated or controlled by such person, except upon a showing that public interest, convenience and necessity will be served through such multiple ownership situation.

[9a]See Order 84-A, dated November 23, 1943: "This regulation is to take effect immediately, PROVIDED, HOWEVER, That with respect to persons who now directly or indirectly own, operate or control a standard broadcast station which renders primary service to a substantial portion of the primary service area of another standard broadcast station, directly or indirectly owned, operated or controlled by such person, the effective date of this regulation shall be midnight May 31, 1944; PROVIDED FURTHER, That with respect to such persons the Commission may, upon proper showing, extend the licenses of the stations involved in order, in any particular case, to determine the applicability of this regulation or to permit the orderly disposition of properties."

[9b]The word "control", as used herein, is not limited to majority stock ownership but includes actual working control in whatever manner exercised.

[9c]The word "person", as used herein, includes all persons under common control.

§ 3.41 Maximum rated carrier power; tolerances.—The maximum rated carrier power of a standard broadcast transmitter shall not be less than the authorized power nor shall it be greater than the value specified in the following table:

Class of station	Maximum power authorized to station	Maximum rated carrier power permitted to be installed [1]
		Watts
Class IV--------	100 or 250 watts----------	250
Class III-------	500 or 1,000 watts----------	1,000
	5,000 watts----------	5,000
Class II--------	250, 500, or 1,000 watts----------	1,000
	5,000 or 10,000 watts----------	10,000
	25,000 or 50,000 watts----------	50,000
Class I---------	10,000 watts----------	10,000
	25,000 or 50,000 watts----------	50,000

[1] The maximum rated carrier power must be distinguished from the operating power. (See sections 2.18 and 2.19.)

§ 3.42 Maximum rated carrier power; how determined.—The maximum rated carrier power of a standard broadcast transmitter shall be determined as the sum of the applicable power ratings of the vacuum tubes employed in the last radio stage.

(a) The power rating of vacuum tubes shall apply to transmitters employing the different classes of operation or systems of modulation as specified in Power Rating of Vacuum Tubes prescribed by the Commission.

(b) If the maximum rated carrier power of any broadcast transmitter, as determined by paragraph *(a)* of this section, does not give an exact rating as recognized in the Commission's plan of allocation, the nearest rating thereto shall apply to such transmitter.

(c) Authority will not be granted to employ, in the last radio stage of a standard broadcast transmitter, vacuum tubes from a manufacturer or of a type number not listed until the manufacturer's rating for the class of operation or system of modulation is submitted to and approved by the Commission. These data must be supplied by the manufacturer in accordance with Requirements for the Approval of the Power Rating of Vacuum Tubes, prescribed by the Commission.

§ 3.43 Changes in equipment; authority for.—No licensee shall change, in the last radio stage, the number of vacuum tubes to vacuum tubes of different power rating or class of operation, nor shall it

change system of modulation without the authority of the Commission.[10]

§ 3.44 **Other changes in equipment.**—Other changes except as provided for in these rules or Standards of Good Engineering Practice, prescribed by the Commission, which do not affect the maximum power rating or operating power of the transmitter or the operation or precision of the frequency control equipment may be made at any time without authority of the Commission, but in the next succeeding application for renewal of license such changes which affect the information already on file shall be shown in full.

§ 3.45 **Radiating system.**—(*a*) All applicants for new, additional, or different broadcast facilities and all licensees requesting authority to move the transmitter of an existing station shall specify a radiating system the efficiency of which complies with the requirements of good engineering practice for the class and power of the station. (Also see Use of Common Antenna by Standard Broadcast Stations or Another Radio Station.)

(*b*) The Commission will publish from time to time specifications deemed necessary to meet the requirements of good engineering practice. (See Minimum Antenna Heights or Field Intensity Requirements and Field Intensity Measurements in Allocation, sec. A.)

(*c*) No broadcast station licensee shall change the physical height of the transmitting antenna, or supporting structures, or make any changes in the radiating system which will measurably alter the radiation patterns, except upon written application to and authority from the Commission.[11]

(*d*) The antenna and/or supporting structure shall be painted and illuminated in accordance with the specifications supplied by the Commission pursuant to section 303 (q) of the Communications Act of 1934, as amended. (See Standard Lamps and Paints.)

(*e*) The simultaneous use of a common antenna or antenna structure by two standard broadcast stations or by a standard broadcast station and a station of any other class or service will not be authorized unless both stations are licensed to the same licensee. (See Use of Common Antenna by Standard Broadcast Stations or Another Radio Station.)

§ 3.46 **Transmitter.**—(*a*) The transmitter proper and associated transmitting equipment of each broadcast station shall be designed, constructed, and operated in accordance with the standards of good engineering practice in all phases not otherwise specifically included in these regulations.

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[10] Formal application required. See Standards of Good Engineering Practice for form number.

[11] Informal application may be made, except in controversial cases or directional antenna; then formal application shall be made.

(*b*) The transmitter shall be wired and shielded in accordance with good engineering practice and shall be provided with safety features in accordance with the specifications of article 810 of the current National Electrical Code as approved by the American Standards Association.

(*c*) The station equipment shall be so operated, tuned, and adjusted that emissions are not radiated outside the authorized band [12] which cause or which, in accordance with the Standards of Good Engineering Practice, are considered as being capable of causing interference to the communications of other stations. The spurious emissions, including radio frequency harmonics and audio frequency harmonics, shall be maintained at as low level as required by good engineering practice. The audio distortion, audio frequency range, carrier hum, noise level, and other essential phases of the operation which control the external effects shall at all times conform to the requirements of good engineering practice.

(*d*) Whenever, in this section, the term "good engineering practice" is used, the specifications deemed necessary to meet the requirements thereof will be published from time to time. (See Construction, General Operation and Safety of Life Requirements.)

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[12] See Construction, General Operation and Safety of Life Requirements.

Amendment No. 274 (Amending Footnote 14a to Sec. 3.52) effective September 1, 1945 and October 1, 1945

To be substituted for pp. 13-14, Part 3, Rules Governing Standard and High-Frequency Broadcast Stations

The last previous amendment affecting Part 3 was amendment No. 272, pp. 37-38

TECHNICAL OPERATION

§3.51 Operating power; how determined.—The operating power of each standard broadcast station shall be determined by:

(a) Direct measurement of the antenna power in accordance with section 3.54.[13]

(1) Each new standard broadcast station.

(2) Each existing standard broadcast station after June 1, 1941.

(b) Indirect measurement by means of the plate input power to the last radio stage on a temporary basis in accordance with sections 3.52 and 3.53.

(1) In the case of existing standard broadcast stations and pending compliance with paragraph *(a)* (2) of this section.

(2) In case of an emergency where the licensed antenna has been damaged or destroyed by storm or other cause beyond the control of the licensee or pending completion of authorized changes[14] in the antenna system.

(c) Upon making any change[13] in the antenna system, or in the antenna current measuring instruments, or any other change which may change the characteristics of the antenna, the licensee shall immediately make a new determination of the antenna resistance (see section 3.54) and shall submit application for authority to determine power by the direct method on the basis of the new measurements.

§3.52 Operating power; indirect measurement[14a].—The operating power determined by indirect measurement from the plate input power of the last radio stage is the product of the plate voltage (E_p), the total plate current of the last radio stage (I_p), and the proper factor (F) given in the following tables: that is

[13] Program tests on equipment, including a new or different antenna system, will not be authorized unless application for authority to determine power by the direct method has been granted, or is submitted simultaneously with the application for license to cover the construction permit and the application for license will not be granted until such time as the application for direct measurement is approved.

[14] Changes shall not be made except upon making proper request and obtaining approval thereof in accordance with sections 3.45 and 3.58.

[14a] See Order No. 107, dated November 6, 1942, effective December 1, 1942, which makes certain changes in the method of determining operating constants of standard broadcast stations; and Order No. 107A, dated July 10, 1945, effective September 1, 1945, and October 1, 1945, which revokes Order No. 107 and reinstates the provisions of section 3.52.

Operating power $E_p \times I_p \times F$

A. Factor to be used for stations employing plate modulation in the last radio stage[1]

Maximum rated carrier power of transmitter:[2]	*Factor (F) to be used in determining the operating power from the plate input power*
100-1,000 watts	0.70
5,000 and over watts	.80

B. Factor to be used for stations of all powers using low level modulation[1]

Class of power amplifier in the last radio stage:	*Factor (F) to be used in determining the operating power from the plate input power*
Class B	0.35
Class BC[3]	.65

C. Factors to be used for stations of all powers employing grid modulation in the last radio stage[1]

Type of tube in the last radio stage:	*Factor (F) to be used in determining the operating power from the plate input power*
Table C[1]	0.25
Table D[1]	.35

[1] See Power Rating of Vacuum Tubes.

[2] The maximum rated carrier power must be distinguished from the operating power. (See sections 2.10 and 3.19.

[3] All linear amplifier operation where efficiency approaches that of class C operation.

§3.53 **Application of efficiency factors.**—In computing operating power by indirect measurement the above factors shall apply in all cases, and no distinction will be recognized due to the operating power being less than the maximum rated carrier power. (See Plate Efficiency of Last Radio Stage.)

§3.54 **Operating power; direct measurement.**—The antenna input power determined by direct measurement is the square of the antenna current times the antenna resistance at the point where the current is measured and at the operating frequency. Direct measurement of the antenna input power will be accepted as the operating power of the station, provided the data on the antenna resistance measurements are submitted under oath giving detailed description of the method used and the data taken. The antenna current shall be measured by an ammeter of accepted accuracy.[15] These data must be submitted to and approved by the Commission before any licensee will be authorized to operate by this method of power determination.[16] The antenna ammeter shall not be changed to one of different type, maximum reading, or accuracy without the authority of the Commission. If any change is made in the antenna system or any change

[15] See Indicating Instruments pursuant to section 3.50.

[16] Formal application required. See Standards of Good Engineering Practice for form number.

made which may affect the antenna system, the method of determining operating power shall be changed immediately to the indirect method. (See Further Requirements for Direct Measurements of Power.)

§ 3.55 **Modulation.**—(*a*) A licensee of a broadcast station will not be authorized to operate a transmitter unless it is capable of delivering satisfactorily the authorized power with a modulation of at least 85 percent. When the transmitter is operated with 85 percent modulation, not over 10 percent combined audio frequency harmonics shall be generated by the transmitter.

(*b*) All broadcast stations shall have in operation a modulation monitor approved by the Commission.

(*c*) The operating percentage of modulation of all stations shall be maintained as high as possible consistent with good quality of transmission and good broadcast practice and in no case less than 85 percent on peaks of frequent recurrence during any selection which normally is transmitted at the highest level of the program under consideration.

(*d*) The Commission will, from time to time, publish the specifications, requirements for approval, and a list of approved modulation monitors. (See Approved Modulation Monitors and also Requirements for Approval of Modulation Monitors.)

§ 3.56 **Modulation; data required.**—A licensee of a broadcast station claiming a greater percentage of modulation than the fundamental design indicates can be procured shall submit full data showing the antenna input power by direct measurement and complete information, either oscillograms or other acceptable data, to show that a modulation of 85 percent or more, with not over 10 percent combined audio harmonies, can be obtained with the transmitter operated at the maximum authorized power.

§ 3.57 **Operating power; maintenance of.**—The licensee of a broadcast station shall maintain the operating power of the station within the prescribed limits of the licensed power at all times except that in an emergency when, due to causes beyond the control of the licensee, it becomes impossible to operate with the full licensed power, the station may be operated at reduced power for a period of not to exceed 10 days, provided that the Commission and the Inspector in Charge [17] shall be notified in writing immediately after the emergency develops. (See Operating Power Tolerance.)

§ 3.58 **Indicating instruments.**—Each broadcast station shall be equipped with suitable indicating instruments of accepted accuracy to measure the antenna current, direct plate circuit voltage, and the direct plate circuit current of the last radio stage. These indicating instruments shall not be changed or replaced, without authority of

[17] See Field Offices of the Commission.

the Commission, except by instruments of the same type, maximum scale reading, and accuracy. (See Indicating Instruments Pursuant to section 3.58.)

§ 3.59 **Frequency tolerance.**—The operating frequency of each broadcast station shall be maintained within 50 cycles of the assigned frequency until January 1, 1940, and thereafter the frequency of each new station or each station where a new transmitter is installed shall be maintained within 20 cycles of the assigned frequency, and after January 1, 1942, the frequency of all stations shall be maintained within 20 cycles of the assigned frequency.

§ 3.60 **Frequency monitor.**—The licensee of each standard broadcast station shall have in operation at the transmitter a frequency monitor independent of the frequency control of the transmitter. The frequency monitor shall be approved by the Commission. It shall have a stability and accuracy of at least 5 parts per million. (See Approved Frequency Monitors and also Requirements for Approval of Frequency Monitors.)

§ 3.61 **New equipment; restrictions.**—The Commission will authorize the installation of new transmitting equipment in a broadcast station or changes in the frequency control of an existing transmitter only if such equipment is so designed that there is reasonable assurance that the transmitter is capable of maintaining automatically the assigned frequency within the limits specified in section 3.59.

§ 3.62 **Automatic frequency control equipment; authorization required.**—New automatic frequency control equipment and changes in existing automatic frequency control equipment that may affect the precision of frequency control or the operation of the transmitter shall be installed only upon authorization [18] from the Commission. (See Approved Equipment.)

§ 3.63 **Auxiliary transmitter.**—Upon showing that a need exists for the use of an auxiliary transmitter [19] in addition to the regular transmitter of a broadcast station, a license therefor may be issued provided that:

(*a*) An auxiliary transmitter may be installed either at the same location as the main transmitter or at another location.

(*b*) A licensed operator shall be in control whenever an auxiliary transmitter is placed in operation.

(*c*) The auxiliary transmitter shall be maintained so that it may be put into immediate operation at any time for the following purposes:

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[18] Formal application required. See Standards of Good Engineering Practice for form number.

[19] All regulations as to safety requirements and spurious emissions applying to broadcast transmitting equipment shall apply also to an auxiliary transmitter. (See Use of Frequency and Modulation Monitors at Auxiliary Transmitter.)

Amendment No. 246 (Amending Sec. 3.64) effective August 22, 1944
To be substituted for pp. 17-18, 18a, Part 3, Rules Governing Standard and High Frequency Broadcast Stations
The last previous amendment affecting Part 3 was amendment No. 245, pp. 37-38.

(1) The transmission of the regular programs upon the failure of the main transmitter.

(2) The transmission of regular programs during maintenance or modification[20] work on the main transmitter, necessitating discontinuance of its operation for a period not to exceed five days.

(3) Upon request by a duly authorized representative of the Commission.

(d) The auxiliary transmitter shall be tested at least once each week to determine that it is in proper operating condition and that it is adjusted to the proper frequency, except that in case of operation in accordance with paragraph *(c)* of this section during any week, the test in that week may be omitted provided the operation under paragraph *(c)* is satisfactory. A record shall be kept of the time and result of each test operating under paragraph *(c)*. Tests shall be conducted only between midnight and 9 a.m., local standard time.

(e) The auxiliary transmitter shall be equipped with satisfactory control equipment which will enable the maintenance of the frequency emitted by the station within the limits prescribed by these regulations.

(f) An auxiliary transmitter which is licensed at a geographical location different from that of the main transmitter shall be equipped with a frequency control which will automatically hold the frequency within the limits prescribed by these regulations without any manual adjustment during operation or when it is being put into operation.

(g) The operating power of an auxiliary transmitter may be less than the authorized power, but in no event shall it be greater than such power.

[20] This includes the equipment changes which may be made without authority as set forth elsewhere in the Rules and Regulations and the Standards of Good Engineering Practice or as authorized by the Commission by letter or by construction permit. Where such operation is required for periods in excess of 5 days, request therefor shall be made in accordance with section 1.365.

§ 3.64 **Alternate main transmitters.**— The licensee of a standard broadcast station may be licensed for alternate main transmitters provided that a technical need[21] for such alternate transmitters is shown and that the following conditions are met:

(a) Both transmitters are located at the same place.

(b) The transmitters have the same power rating except at stations operating with different daytime and nighttime power when it shall be permissible to employ transmitters of power ratings appropriate to either the licensed daytime or nighttime power.

(c) The external effects from both transmitters are substantially the same as to frequency stability, reliability of operation, radio harmonics and other spurious emissions, audio frequency range and audio harmonic generation in the transmitter.

OPERATION

§ 3.71 **Minimum operating schedule**[21a].— Except Sundays, the licensee of each standard broadcast station shall maintain a minimum operating schedule of two-thirds of the total hours that it is authorized to operate between 6 a.m. and 6 p.m., local standard time and two-thirds of the total hours it is authorized to operate between 6 p.m. and midnight, local standard time, except that in an emergency when, due to causes beyond the control of the licensee, it becomes impossible to continue operating, the station may cease operation for a period of not to exceed 10 days, provided that the Commission and the inspector in charge[22] shall be notified in writing immediately after the emergency develops.

§ 3.72 **Operation during experimental period.**— The licensee of each standard broadcast station shall operate or refrain from operating its station during the experimental period as directed by the Commission in order to facilitate frequency measurement or for the determination of interference. (Stations involved in the after-midnight frequency monitoring programs are notified of their operating and silent schedule.)

[21] Such as licensees maintaining 24-hour schedule and needing alternate operation for maintenance, or where developmental work requires alternate operation.

[21a] By Order No. 94-A, dated and effective November 6, 1942, until further order of the Commission, section 3.71 is suspended; "and in lieu thereof, except Sundays, the minimum operating schedule for standard broadcast stations shall be one-third of the total hours it is authorized to operate between 6 a.m. and midnight, local standard time, except that in an emergency, due to causes beyond the control of the licensee, it becomes impossible to continue operating, the station may cease operation for a period of not to exceed 10 days, provided that the Commission and Inspector in charge shall be notified in writing immediately after the emergency develops."

[22] See Field Offices of the Commission.

Amendment No. 246 effective August 22, 1944
Continued from p. 18

§ 3.73 Specified hours.—If the license of a station specifies the hours of operation, the schedule so specified shall be adhered to except as provided in sections 3.71 and 3.72.

§ 3.74 Sharing time.—If the licenses of stations authorized to share time do not specify hours of operation, the licensees shall endeavor to reach an agreement for a definite schedule of periods of time to be used by each. Such agreement shall be in writing and each licensee shall file the same in triplicate original with each application to the Commission for renewal of license. If and when such written agreements are properly filed in conformity with this section the file mark of the Commission will be affixed thereto, one copy will be retained by the Commission, one copy forwarded to the inspector in charge, and one copy returned to the licensee to be posted with the station license and considered as a part thereof. If the license specifies a proportionate time division, the agreement shall maintain this proportion. If no proportionate time division is specified in the license, the licensees shall agree upon a division of time. Such divi-

sion of time shall not include simultaneous operation of the stations unless specifically authorized by the terms of the license.

§ 3.75 **Sharing time; equivalence of day and night hours.**—For the purpose of determining the proportionate division of time of the broadcast day for sharing time stations 1 night hour shall be considered the equivalent of 2 day hours.

§ 3.76 **Sharing time; experimental period.**—If the license of a station authorized to share time does not specify the hours of operation, the station may be operated for the transmission of regular programs during the experimental period provided an agreement thereto is reached with the other stations with which the broadcast day is shared and further provided such operation is not in conflict with section 3.72. Time-sharing agreements for operation during the experimental period need not be submitted to the Commission.

§ 3.77 **Sharing time; departure from regular schedule.**—A departure from the regular operating schedule set forth in a time-sharing agreement will be permitted only in cases where an agreement to that effect is reduced to writing, is signed by the licensees of the stations affected thereby and filed in triplicate by each licensee with the Commission prior to the time of the proposed change. If time is of the essence, the actual departure in operating schedule may precede the actual filing of written agreement, provided appropriate notice is sent to the Commission and the Inspector in Charge.[23]

§ 3.78 **Sharing time stations; notification to Commission.**—If the licensees of stations authorized to share time are unable to agree on a division of time, the Commission shall be so notified by statement to that effect filed with the applications for renewals of licenses. Upon receipt of such statement the Commission will designate the applications for a hearing and, pending such hearing, the operating schedule previously adhered to shall remain in full force and effect.

§ 3.79 **License to specify sunrise and sunset hours.**—If the licensee of a broadcast station is required to commence or cease operation of the station at the time of sunrise or sunset, the license will specify the hour of the day during each month of the license period when operation of such station will commence or cease. (See Average Sunrise and Sunset Time.)

§ 3.80 **Secondary station; filing of operating schedule.**—The licensee of a secondary station authorized to operate limited time and which may resume operation at the time the dominant station (or stations) on the same channel ceases operation shall, with each application for renewal of license, file in triplicate a copy of its reg-

[23] See Field Offices of the Commission.

ular operating schedule, bearing a signed notation by the licensee of the dominant station of its objection or lack of objection thereto. Upon approval of such operating schedule, the Commission will affix its file mark and return one copy to the licensee authorized to operate limited time, which shall be posted with the station license and considered as a part thereof. Departure from said operating schedule will be permitted only in accordance with the procedure set forth in section 3.77.

§ 3.81 **Secondary station; failure to reach agreement.**—If the licensee of a secondary station authorized to operate limited time and a dominant station on a channel are unable to agree upon a definite time for resumption of operation by the station authorized limited time, the Commission shall be so notified by the licensee of the station authorized limited time. After receipt of such statement the Commission will designate for hearing the applications of both stations for renewal of license, and pending the hearing the schedule previously adhered to shall remain in full force and effect.

§ 3.82 **Departure from schedule; material violation.**—In all cases where a station licensee is required to prepare and file an operating schedule, any deviation or departure from such schedule, except as herein authorized, shall be considered as a violation of a material term of the license.

§ 3.83 **Local standard time.**—All references herein to standard time or local standard time refer to local standard time as determined and fixed by the Interstate Commerce Commission.

§ 3.84 **Daylight saving time.**—If local time is changed from standard time to daylight saving time at the location of all stations sharing time on the same channel, the hours of operation of all such stations on that channel shall be understood to refer to daylight saving time, and not standard time, as long as daylight saving time is observed at such locations. This provision shall govern when the time is changed by provision of law or general observance of daylight saving time by the various communities, and when the time of operation of such stations is specified in the license or is mutually agreed upon by the licensees: *Provided, however*, That when the license specifies average time of sunrise and sunset, local standard time shall be observed. In no event shall a station licensed for daytime only operate on regular schedule prior to local sunrise, or shall a station licensed for greater daytime power than nighttime power or for a different radiation pattern for daytime operation than for nighttime operation operate with the daytime power or radiation pattern prior to local sunrise.

§ 3.85 **Changes in time; agreement between licensees.**—Where the local time is not changed from standard time to daylight saving time at the location of all stations sharing time on the same channel, the hours of operation of such stations shall be understood to have reference to standard time, and not daylight saving time, unless said licensees mutually agree upon a new schedule which shall be effective only while daylight saving time is observed at the location of some of these stations.

§ 3.86 **Local standard time; license provisions.**—The time of operation of any broadcast station which does not share time with other stations on the same channel shall be understood to have reference to local standard time unless modification of such license with respect to hours of operation is authorized by the Commission.

Amendment No. 202 (Footnote 32 to Sec. 3.107) effective April 12, 1944

To be substituted for pp. 22a-22b, 22c, Part 3, Rules Governing Standard and High Frequency Broadcast Stations

The last previous amendment affecting Part 3 is amendment No. 193, pp. 35-36, 36a

RULES APPLICABLE TO STATIONS ENGAGED IN CHAIN BROADCASTING

LICENSING REQUIREMENTS

§ 3.101 **Exclusive affiliation of station.**—No license shall be granted to a standard broadcast station having any contract, arrangement, or understanding, express or implied, with a network organization[24] under which the station is prevented or hindered from, or penalized for, broadcasting the programs of any other network organization.[25]

§ 3.102 **Territorial exclusivity.**—No license shall be granted to a standard broadcast station having any contract, arrangement, or understanding, express or implied, with a network organization which prevents or hinders another station serving substantially the same area from broadcasting the network's programs not taken by the former station, or which prevents or hinders another station serving a substantially different area from broadcasting any program of the network organization. This regulation shall not be construed to prohibit any contract, arrangement, or understanding between a station and a network organization pursuant to which the station is granted the first call in its primary service area upon the programs of the network organization.[25]

§ 3.103 **Term of affiliation.**—No license shall be granted to a standard broadcast station having any contract, arrangement, or understanding, express or implied, with a network organization which provides, by original term, provisions for renewal, or otherwise for the affiliation of the station with the network organization for a period longer than two years: *Provided*, That a contract, arrangement, or understanding for a period up to two years, may be entered into within six months prior to the commencement of such period.[25]

§ 3.104 **Option time.**—No license shall be granted to a standard broadcast station which options[26] for network programs any time subject to call on less than 56 days' notice, or more time than a total

[24] The term "network organization" as used herein includes national and regional network organizations. See Chapter VII, J, of Report on Chain Broadcasting.

[25] These regulations shall become effective 12:01 a.m., Eastern War Time, June 15, 1943, unless otherwise required by court order.

[26] As used in this section, an option is any contract, arrangement, or understanding, express or implied, between a station and a network organization which prevents or hinders the station from scheduling programs before the network agrees to utilize the time during which such programs are scheduled, or which requires the station to clear time already scheduled when the network organization seeks to utilize the time.

of three hours[27] within each of four segments of the broadcast day, as herein described. The broadcast day is divided into 4 segments, as follows: 8:00 a.m. to 1:00 p.m.; 1:00 p.m. to 6:00 p.m.; 6:00 p.m. to 11:00 p.m.; 11:00 p.m. to 8:00 a.m.[28] Such options may not be exclusive as against other network organizations and may not prevent or hinder the station from optioning or selling any or all of the time covered by the option, or other time, to other network organizations.[29]

§ 3.105 Right to reject programs.—No license shall be granted to a standard broadcast station having any contract, arrangement, or understanding, express or implied, with a network organization which *(a)*, with respect to programs offered pursuant to an affiliation contract, prevents or hinders the station from rejecting or refusing network programs which the station reasonably believes to be unsatisfactory or unsuitable; or which *(b)*, with respect to network programs so offered or already contracted for, prevents the station from rejecting or refusing any program which, in its opinion, is contrary to the public interest, or from substituting a program of outstanding local or national importance.[29]

§ 3.106 Network ownership of stations[30].—No license shall be granted to a network organization, or to any person directly or indirectly controlled by or under common control[31] with a network organization, for more than one standard broadcast station where one of the stations covers substantially the service area of the other station, or for any standard broadcast station in any locality where the existing standard broadcast stations are so few or of such unequal desirability (in terms of coverage, power, frequency, or other related matters) that competition would be substantially restrained by such licensing.[29]

§ 3.107 Dual network operation[32].—No license shall be issued to a standard broadcast station affiliated with a network organization

[27] All time options permitted under this section must be for specified clock hours, expressed in terms of any time system set forth in the contract agreed upon by the station and network organization. Shifts from daylight saving to standard time or vice versa may or may not shift the specified hours correspondingly as agreed by the station and network organization.

[28] These segments are to be determined for each station in terms of local time at the location of the station but may remain constant throughout the year regardless of shifts from standard to daylight saving time or vice versa.

[29] These regulations shall become effective 12:01 a.m., Eastern War Time, June 15, 1943, unless otherwise required by court order.

[30] Effective date of this section with respect to any station may be extended from time to time in order to permit the orderly disposition of properties; and it shall be suspended indefinitely with respect to regional network organizations.

[31] The word "control" as used herein, is not limited to full control but includes such a measure of control as would substantially affect the availability of the station to other networks.

[32] This section shall become effective April 12, 1944.

which maintains more than one network: *Provided*, That this regulation shall not be applicable if such networks are not operated simultaneously, or if there is no substantial overlap in the territory served by the group of stations comprising each such network.

§ 3.108 Control by networks of station rates.—No license shall be granted to a standard broadcast station having any contract, arrangement, or understanding, express or implied, with a network organization under which the station is prevented or hindered from, or penalized for, fixing or altering its rates for the sale of broadcast time for other than the network's programs.[33]

[33] These regulations shall become effective 12:01 a.m., Eastern War Time, June 15, 1943, unless otherwise required by court order.

Subpart B—Rules Governing High-Frequency Broadcast Stations

DEFINITIONS[1]

§ 3.201 **High-frequency broadcast station.**—The term "high-frequency broadcast station" means a station licensed primarily for the transmission of radiotelephone emissions intended to be received by the general public and operated on a channel in the high frequency broadcast[2][3] band.

§ 3.202 **High-frequency broadcast band.**—The term "high-frequency broadcast band" means the band of frequencies extending from 43,000 to 50,000 kilocycles, both inclusive.

§ 3.203 **Frequency modulation.**—The term "frequency modulation" means a system of modulation of a radio signal in which the frequency of the carrier wave is varied in accordance with the signal to be transmitted while the amplitude of the carrier remains constant.

§ 3.204 **Center frequency.**—The term "center frequency" means the frequency of the carrier wave with no modulation (With modulation the instantaneous operating frequency swings above and below the center frequency. The operating frequency with no modulation shall be the center frequency within the frequency tolerance.)

§ 3.205 **High-frequency broadcast channel.**—The term "high-frequency broadcast channel" means a band of frequencies 200 kilocycles wide and is designated by its center frequency. Channels for high-frequency broadcast stations begin at 43,100 kilocycles and continue in successive steps of 200 kilocycles to and including the frequency 49,900 kilocycles.

§ 3.206 **Service area.**—The term "service area" of a high-frequency broadcast station means the area in which the signal is not subject to objectionable interference or objectionable fading. (High-frequency broadcast stations are considered to have only one service area; for determination of such area see Standards of Good Engineering Practice for High-Frequency Broadcast Stations.)

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[1] Other definitions which may pertain to high-frequency broadcast stations are included in sections 2.1 to 2.35 and sections 3.1 to 3.16, and the Communications Act of 1934, as amended.

[2] See Section 3.228 concerning multiplexing, aural and facsimile programs.

[3] High-frequency broadcast stations must use frequency modulation exclusively in accordance with section 3.227 (b).

§ 3.207 **Antenna field gain.**—The term "antenna field gain" of a high-frequency broadcast antenna means the ratio of the effective free space field intensity produced at one mile in the horizontal plane expressed in millivolts per meter for 1 kilowatt antenna input power to 137.6

§ 3.208 **Free space field intensity.**—The term "free space field intensity" means the field intensity that would exist at a point in the absence of waves reflected from the earth or other reflecting objects.

§ 3.209 **Frequency swing.**—The term "frequency swing" is used only with respect to frequency modulation and means the instantaneous departure of the carrier frequency from the center frequency resulting from modulation.

§ 3.210 **Multiplex transmission.**—The term "multiplex transmission" means the simultaneous transmission of two or more signals by means of a common carrier wave. (Multiplex transmission as applied to high-frequency broadcast stations means the transmission of facsimile or other aural signals in addition to the regular broadcast signals.)

§ 3.211 **Percentage modulation.**—The term "percentage modulation" with respect to frequency modulation means the ratio of the actual frequency swing to the frequency swing required for 100 percent modulation expressed in percentage. (For high-frequency broadcast stations, a frequency swing of 75 kilocycles is standard for 100 percent modulation.)

§ 3.212 **Experimental period.**—The term "experimental period" means that period of time between 12 midnight and sunrise. This period may be used for experimental purposes in testing and maintaining apparatus by the licensee of any high-frequency broadcast station, on its assigned frequency and with its authorized power, provided no interference is caused to other stations maintaining a regular operating schedule within such period.

§ 3.213 **Main studio.**—The term "main studio" means, as to any station, the studio from which the majority of its local programs originate, and/or from which a majority of its station announcements are made of programs originating at remote points.

ALLOCATION OF FACILITIES[4]

§ 3.221 **Basis of licensing high-frequency broadcast stations.**—High-frequency broadcast stations shall be licensed to serve a specified area in square miles. The contour bounding the service area and the radii of the contour shall be determined in accordance with the Standards of Good Engineering Practice for High-Frequency Broadcast Stations.

§ 3.222 **Service areas; definitions.**—For the purpose of determining the areas to be served by high-frequency broadcast stations, the following definitions apply:

(*a*) "Basic trade areas" and "limited trade areas" consist of areas the boundaries of which are determined by the Commission on the basis of showings made in applications as to retail trading areas or consumer trading areas and from Government data.[5] Each basic trade area includes one "principal city." The boundaries of the basic trade areas are adjoining and the aggregate of all such areas is the total area of the United States. Each "limited trade area" includes one city. The boundaries of limited trade areas are not necessarily adjoining. Such areas may include portions of other limited trade areas and may extend into more than one basic trade area.

(*b*) "Principal city" means the largest city or the city or cities designated as "principal city" by the Commission, within a basic trade area. "City" means any city, town, or borough in a basic trade area except the principal city. Each "city" has a limited trade area.

(*c*) "Rural area" means all land area outside incorporated towns or cities with population greater than 2,500 and where the density of population is less than 150 per square mile. Incorporated towns or cities with population from 2,500 to 5,000 without a high-frequency broadcast station and not adjacent to larger cities may be considered rural area.

§ 3.223 **Service areas; established.**—The Commission in considering applications for high-frequency broadcast stations will estab-

[4] The rules relating to allocation of facilities are intended primarily for the information of applicants. Nothing contained in said rules shall be regarded as any recognition of any legal right on behalf of any person to a grant or denial of any application.

[5] There are several current and recognized authorities on retail trading areas or consumer trading areas from which the applicant may prepare its showing and to which the Commission will give consideration in making its determination. Among these recognized authorities are the following: J. Walter Thompson (Retail Shopping Areas), Hearst Magazines, Inc. (Consumer Trading Areas), Rand McNally Map Co. (Trading Areas), and Hagstrom Map Co.'s Four Color Retail Trading Area Map. Although the foregoing sources of data are expressly recognized, the Commission will also give consideration to data furnished from other sources which may have probative value on which the applicant may desire to prepare its showing. See separate release of the Commission "Concerning Applications For High-Frequency Broadcast Stations."

lish service areas. Such stations will be licensed to serve areas having the following characteristics:

(*a*) An area comprising a limited trade area and a city. The station shall render good service to the city and its service area shall conform generally with the limited trade area.

(*b*) An area comprising a basic trade area and a principal city. The station shall render good service to the principal city and its service area shall conform generally with the basic trade area.

(*c*) An area of at least 15,000 square miles comprising primarily a large rural area, and particularly that part of basic trade areas which cannot be served by stations assigned basic trade areas due to economic and technical limitations. The service area may include one or more principal city or cities, provided that in rendering service to such cities the service to rural areas which the station is designated to serve is not impaired. The transmitter of such a station shall be located in such a manner that the service area, (1) shall extend into two or more basic trade areas, (2) shall not conform generally with a basic trade area, and (3) shall not merely extend beyond a basic trade area.

(*d*) An area having substantially different characteristics (social, cultural, or economic) from those areas specified in subsections (*a*), (*b*), and (*c*) of this section where, by reason of special conditions, it is shown that a need (which cannot be supplied by a station serving areas under subsections (*a*), (*b*), or (*c*) of this section) for the proposed service both program and technical exists which makes the establishment of the service area in the public interest, convenience, or necessity. The Commission will give particular consideration in this connection to competitive advantages which such stations would have over other stations established under other provisions.

(*e*) In case it is not economically and technically feasible for a station assigned a basic or limited trade area to serve substantially all such area, the Commission will establish the service area on the basis of conditions which obtain in the trade area.

(*f*) In case an applicant proposes a change in an established service area, the applicant shall make a full showing as to need for such change and the effect on other stations serving the area.

§ 3.224 **Time of operation.**—All high-frequency broadcast stations shall be licensed for unlimited time operation.

§ 3.225 **Showing required.**—Authorization for a new high-frequency broadcast station or increase in facilities of an existing station [5a] will be issued only after a satisfactory showing has been made in regard to the following matters:

(*a*) That the area which the applicant proposes to serve has the characteristics of an area described in section 3.223 hereof.

[5a] Special authorizations which do not involve experimental authorization may be granted pursuant to section 1.365.

(*b*) Where a service area has been established in which one or more existing high-frequency broadcast stations are in operation, that the contours of any new station proposed to serve such area will compare with those of the existing station or stations as nearly as possible, or that the service area already established should be modified.

(*c*) That objectionable interferenee will not be caused to existing stations or that if interference will be caused the need for the proposed service outweigh the need for the serviee which will be lost by reason of such interference.

(*d*) That the proposed station will not suffer interference to such an extent that its serviee would be reduced to an unsatisfactory degree. (For determining objectionable interference, see Standards of Good Engineering Practiee for High-Frequency Broadcast Stations.)

(*e*) That the technieal equipment proposed, the location of the transmitter, and other technieal phases of operation comply with the regulations governing the same, and the requirements of good engineering practiee. (See technical regulations herein and Standards of Good Engineering Practice for High-Frequency Broadcast Stations.)

(*f*) That the applicant is financially qualified to construct and operate the proposed station; and, if the proposed station is to serve substantially the same area as an existing station, that applicant will be able to compete effectively with the existing station or stations.

(*g*) That the program service will include a portion of programs particularly adapted to a service utilizing the full fidelity capability of the system, as set forth in the Standards of Good Engineering Practice for High-Frequency Broadcast Stations.

(*h*) That the proposed assignment will tend to effect a fair, efficient, and equitable distribution of radio service among the several states and communities.

(*i*) That the applicant is legally qualified, is of good character, and possesses other qualifieations sufficient to provide a satisfactory public service.

(*j*) That the facilities sought are subject to assignment as requested under existing international agreements and the Rules and Regulations of the Commission.

(*k*) That the public interest, convenienee, and neeessity will be served through the operation under the proposed assignment.

§3.226 **Channel assignments.**—The channels set forth below with the indicated center frequencies are available for assignment to high-frequency broadcast stations to serve the areas provided in section 3.223:

(*a*) An applicant for a station to serve an area specified in section 3.223 (*a*) or (*b*), to be located in a principal city or city which has a

population less than 25,000 (city only) shall apply for one of the following channels:

48900	49500
49100	49700
49300	49900

(*b*) An applicant for a station to serve an area specified in section 3.223 (*a*) or (*b*), to be located in a principal city or city which has a population greater than 25,000 (city only) shall apply for one of the following channels·

44500	46700
44700	46900
44900	47100
45100	47300
45300	47500
45500	47700
45700	47900
45900	48100
46100	48300
46300	48500
46500	48700

(*c*) An applicant for a station to serve primarily a large rural area, specified in section 3.223 (*c*) or an area specified in section 3.223 (*d*) shall apply for one of the following channels:

43100	43900
43300	44100
43500	44300
43700	

§ 3.227 **Special provisions concerning assignments.**—(*a*) Stations located in the same city shall have substantially the same service area.

(*b*) High-frequency broadcast stations shall use frequency modulation exclusively.

(*c*) Stations serving a substantial part of the same area shall not be assigned adjacent channels.

(*d*) One channel only will be assigned to a station.

§ 3.228 **Facsimile broadcasting and multiplex transmission.**—The Commission may grant authority to a high-frequency broadcast station for the multiplex transmission of facsimile and aural broadcast programs provided the facsimile transmission is incidental to the aural broadcast and does not either reduce the quality of or the frequency swing required for the transmission of the aural program. The frequency swing for the modulation of the aural program should be maintained at 75 kc. and the facsimile signal added thereto. No trans-

Amendment No. 160 (amending Sec. 3.229), effective April 1, 1943
To be substituted for pp. 29-30, Part 3, Rules Governing Standard and High-Frequency Broadcast Stations
The last previous amendment affecting Part 3 was amendment No. 159, pp. 33-34, effective April 1, 1943

mission outside the authorized band of 200 kc. shall result from such multiplex operation nor shall interference be caused to other stations operating on adjacent channels. The transmission of multiplex signals may also be authorized on an experimental basis in accordance with section 3.32, subpart A.

§3.229 **Proof of performance required.**[5b]— Within 1 year of the date of first regular operation of high-frequency broadcast station, continuous field intensity records along several radials shall be submitted to the Commission which will establish the actual field contours, and from which operating constants required to deliver service to the area specified in the license are determined. The Commission may grant extensions of time upon showing of reasonable need therefor.

§3.230 **Multiple ownership.**—*(a)* No person (including all persons under common control[6]) shall, directly or indirectly, own, operate, or control more than one high-frequency broadcast station that would serve substantially the same service area as another high-frequency broadcast station owned, operated, or controlled by such person.

(b) No person (including all persons under common control) shall, directly or indirectly, own, operate, or control more than one high-frequency broadcast station, except upon a showing (1) that such ownership, operation, or control would foster competition among high-frequency broadcast stations or provide a high-frequency broadcasting service distinct and separate from existing services, and (2) that such ownership, operation, or control would not result in the concentration of control of high-frequency broadcasting facilities in a manner inconsistent with public interest, convenience, or necessity; *provided, however,* That the Commission will consider the ownership, operation, or control of more than six high-frequency broadcast stations to constitute the concentration of control of high-frequency broadcasting facilities in a manner inconsistent with public interest, convenience, or necessity.

§3.231 **Normal license period.**—All high-frequency broadcast station licenses will be issued so as to expire at the hour of 3 a. m., eastern standard time, and will be issued for a normal license period of 1 year, expiring as follows:

[5b] See Order 112, March 30, 1943, which suspends until further order of the Commission Section 3.229, requiring that field intensity measurements shall be made and submitted to the Commission within one year of the first date of regular operation of a high frequency (FM) broadcast station.

[6] The word "control" as used herein is not limited to majority stock ownership, but includes actual working control in whatever manner exercised.

(a) For stations operating on the frequencies 48900, 49100, 49300, 49500, 49700, and 49900, April 1.

(b) For stations operating on the frequencies 44500, 44700, 44900, 45100, 45300, 45500, 45700, 45900, 46100, 46300 and 46500, May 1.

(c) For stations operating on the frequencies 46700, 46900, 47100, 47300, 47500, 47700, 47900, 48100, 48300, 48500, and 48700, June 1.

(d) For stations operating on the frequencies 43100, 43300, 43500, 43700, 43900, 44100, and 44300, July 1.

EQUIPMENT

§3.241 **Maximum power rating.**—The Commission will not authorize the installation of a transmitter having a maximum rated power more than twice the operating power of the station.

§3.242 **Maximum rated carrier power; how determined.**—*(a)* The maximum rated carrier power of a standard transmitter shall be determined by the manufacturer's rating of the equipment.

(b) The maximum rated carrier power of a composite transmitter shall be determined by the sum of the applicable commercial ratings of the vacuum tubes employed in the last radio stage.

§3.243 **Frequency monitor.**—The licensee of each high-frequency broadcast station shall have in operation at the transmitter a frequency monitor independent of the frequency control of the transmitter. It shall have a stability of 20 parts per million. For detailed requirements thereof see Standards of Good Engineering Practice for High-Frequency Broadcast Stations.

§3.244 **Modulation monitor.**—The licensee of each high-frequency broadcast station shall have in operation at the transmitter an approved modulation monitor. For detailed requirements thereof see Standards of Good Engineering Practice for High-Frequency Broadcast Stations.

§3.245 **Required transmitter performance.**—*(a)* The external performance of high-frequency broadcast transmitters shall be within the minimum requirements prescribed by the Commission contained in the Standards of Good Engineering Practice for High-Frequency Broadcast Stations.

(b) The transmitter center frequency shall be controlled directly by automatic means which do not depend on inductances and capacities for inherent stability.

(c) The transmitter shall be wired and shielded in accordance with good engineering practice and shall be provided with safety features in accordance with the specifications of article 810 of the current National Electric Code as approved by the American Standards Association.

§3.246 **Indicating instruments.**—The direct-plate-circuit current and voltage shall be measured by instruments having an acceptable accuracy. (See Standards of Good Engineering Practice for High-Frequency Broadcast Stations.)

§ 3.247 **Auxiliary and duplicate transmitters.**—See sections 3.63 and 3.64 for provisions governing the use of auxiliary and duplicate transmitters at high-frequency broadcast staitons.

§ 3.248 **Changes in equipment and antenna system.**—Licensees of high-frequency broadcast stations shall observe the following provisions with regard to changes in equipment and antenna system:

(*a*) No changes in equipment shall be made:

(1) That would result in the emission of signals outside of the authorized channel.

(2) That would result in the external performance of the transmitter being in disagreement with that prescribed in the Standards of Good Engineering Practice for High-Frequency Broadcast Stations.

(*b*) Specific authority, upon filing formal application[7] therefor, is required for a change in service area or for any of the following changes:

(1) Changes involving an increase in the maximum power rating of the transmitter.

(2) A replacement of the transmitter as a whole.

(3) Change in the location of the transmitter antenna.

(4) Change in antenna system, including transmission line, which would result in a measurable change in service or which would affect the determination of the operating power by the direct method. If any change is made in the antenna system or any change made which may affect the antenna system, the method of determining operating power shall be changed immediately to the indirect method.

(5) Change in location of main studio to outside of the borders of the city, state, district, territory, or possession.

(6) Change in the power delivered to the antenna.

(*c*) Specific authority, upon filing *informal* request therefor, is required for the following change in equipment and antenna:

(1) Change in the indicating instruments installed to measure the antenna current or transmission line, direct plate circuit voltage, and the direct current of the last radio stage, except by instruments of the same type, maximum scale reading and accuracy.

(2) Minor changes in the antenna system and/or transmission line which would not result in an increase of service area.

(3) Changes in the location of the main studio except as provided for in subparagraph (*b*) (5).

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[7] See Standards of Good Engineering Practice for High-Frequency Broadcast Stations for specific application form required.

(*d*) Other changes, except as above provided for in this section or in Standards of Good Engineering Practice for High-Frequency Broadcast Stations prescribed by the Commission may be made at any time without the authority of the Commission, provided that the Commission shall be promptly notified thereof, and such changes shall be shown in the next application for renewal of license.

FEDERAL COMMUNICATIONS COMMISSION
RULES AND REGULATIONS

Amendment No. 182 (Amending Sec. 3.261 *(a)* and *(b)*), effective July 6, 1943

To be substituted for pp. 33-34, Part 3, Rules Governing Standard and High Frequency Broadcast Stations

The last previous amendment affecting Part 3 was Amendment No. 169, pp. 13-14

TECHNICAL OPERATION

§3.251 Operating power; how determined.—The operating power, and the requirements for maintenance thereof, of each high frequency broadcast station shall be determined by the Standards of Good Engineering Practice for High Frequency Broadcast Stations.

§3.252 Modulation.—The percentage of modulation of all stations shall be maintained as high as possible consistent with good quality of transmission and good broadcast practice and in no case less than 85 percent on peaks of frequent recurrence during any selection which normally is transmitted at the highest level of the program under consideration.

§3.253 Frequency tolerance.—The operating frequency without modulation of each broadcast station shall be maintained within 2000 cycles of the assigned center frequency.

OPERATION

§3.261 Minimum operating schedule; service.—*(a)* Except Sundays, the licensee of each high frequency broadcast station shall maintain a regular daily operating schedule which shall consist of at least 3 hours of operation during the period 6 a. m. to 6 p. m., local standard time and 3 hours of operation during the period 6 p. m. to midnight, local standard time. In an emergency, however, when due to causes beyond the control of the licensee, it becomes impossible to continue operating, the station may cease operation for a period not to exceed 10 days, provided that the Commission and the inspector in charge of the radio district in which the station is located[8] shall be notified in writing immediately after the emergency develops.[8a]

(b) Such stations shall devote a minimum of 1 hour each day during the period 6 a. m. to 6 p. m., and 1 hour each day during the

[8] See Appendix No. 3, Part 1.

[8a] Suspended by Order No. 111-A, dated and effective July 6, 1943*** and in lieu thereof, except Sundays, the minimum operating schedule of high frequency (FM) broadcast stations shall be six hours during the period from 6 a. m. to midnight, local standard time; except that if in any emergency, due to causes beyond the control of the licensee, it becomes impossible to continue operating, the station may cease operation for a period not to exceed 10 days, provided that the Commission and the inspector in charge shall be notified in writing immediately after the emergency develops".

period 6 p. m. to midnight, to programs not duplicated simultaneously as primary service in the same area by any standard broadcast station or by any high frequency broadcast station. During said 1 hour periods, a service utilizing the full fidelity capability of the system, as set forth in the Standards of Good Engineering Practice for High Frequency Broadcast Stations, shall be rendered. However, the Commission may, upon request accompanied by a showing of reasons therefor, grant exemption of the foregoing requirements, in whole or in part, for periods not in excess of 3 months.[8a]

(c) In addition to the foregoing minimum requirements, the Commission will consider, in determining whether public interest, convenience, and necessity has been or will be served by the operation of the station, the extent to which the station has made or will make use of the facility to develop a distinct and separate service from that otherwise available in the service area.

[8a] Suspended by Order No. 111-A, dated and effective July 6, 1945*** and in lieu thereof, except Sundays, the minimum operating schedule of high frequency (FM) broadcast stations shall be six hours during the period from 6 a. m. to midnight, local standard time; except that if in any emergency, due to causes beyond the control of the licensee, it becomes impossible to continue operating, the station may cease operation for a period not to exceed 10 days, provided that the Commission and the inspector in charge shall be notified in writing immediately after the emergency develops.

FEDERAL COMMUNICATIONS COMMISSION
RULES AND REGULATIONS

Amendment No. 193 (Adopting Sec. 3.404(c)), effective October 28, 1943
To be substituted for pp. 35-36, Part 3, Rules Governing Standard and High Frequency Broadcast Stations
The last previous amendment affecting Part 3 was amendment No. 182, pp. 33-34

Subpart C--General Rules Applicable to Both Standard and High-Frequency Broadcast Stations

§ 3.401 Station license; posting of.—The station license and any other instrument of authorization or individual order concerning construction of the equipment or the manner of operation of the station shall be posted in a conspicuous place in the room in which the transmitter is located in such manner that all terms thereof are visible and the license of the station operator shall be posted in the same manner. (See secs. 2.51 and 2.52.)

§ 3.402 Licensed operator required.—The licensee of each station shall have a licensed operator or operators of the grade specified by the Commission on duty during all periods of actual operation of the transmitter at the place where the transmitting equipment is located. (See sec. 2.53.)

§ 3.403 Licensed operator; other duties.—The licensed operator on duty and in charge of a standard or high-frequency broadcast transmitter may, at the discretion of the licensee, be employed for other duties or for the operation of another radio station or stations in accordance with the class of operator's license which he holds and by the rules and regulations governing such other stations: *Provided, however,* That such duties shall in nowise interfere with the proper operation of the standard broadcast transmitter.

§ 3.404 Logs.—The licensee of each broadcast station shall maintain program and operating logs and shall require entries to be made as follows:

(a) In the program log:

(1) An entry of the time each station identification announcement (call letters and location) is made.

(2) An entry briefly describing each program broadcast, such as "music," "drama," "speech," etc., together with the name or title thereof, and the sponsor's name, with the time of the beginning and ending of the complete program. If a mechanical record is used, the entry shall show the exact nature thereof, such as "record," "transcription," etc., and the time it is announced as a mechanical record. If a speech is made by a political candidate, the name and political affiliations of such speaker shall be entered.

(3) An entry showing that each sponsored program broadcast has been announced as sponsored, paid for, or furnished by the sponsor.

(b) In the operating log:

(1) An entry of the time the station begins to supply power to the antenna, and the time it stops.

(2) An entry of the time the program begins and ends.

(3) An entry of each interruption to the carrier wave, its cause, and duration.

(4) An entry of the following each 30 minutes:

(i) Operating constants of last radio stage (total plate current and plate voltage).

(ii) Antenna current.

(iii) Frequency monitor reading.

(iv) Temperature of crystal control chamber if thermometer is used.

(5) Log of experimental operation during experimental period. (If regular operation is maintained during this period, the above logs shall be kept.)

(i) A log must be kept of all operation during the experimental period. If the entries required above are not applicable thereto, then the entries shall be made so as to fully describe the operation.

(c) Where an antenna or antenna supporting structure(s) is required to be illuminated the licensee shall make entries in the radio station log appropriate to the requirements of section 2.82 *(a)*, *(b)*, and *(c)* as follows:

(1) The time the tower lights are turned on and off if manually controlled.

(2) The time the daily visual observation of the tower lights was made.

(3) In the event of any observed failure of a tower light,

(i) Nature of such failure.

(ii) Time the failure was observed.

(iii) Time and nature of the adjustments, repairs or replacements made.

(iv) Airways Communication Station (C.A.A.) notified of the failure of any tower light not corrected within thirty minutes and the time such notice was given.

(v) Time notice was given to the Airways Communication Station (C.A.A.) that the required illumination was resumed.

(4) Upon completion of the periodic inspection required at least once each three months,

(i) The date of the inspection and the condition of all tower lights and associated tower lighting control devices.

(ii) Any adjustments, replacements or repairs made to insure compliance with the lighting requirements.

§ 3.405 Logs, retention of.—Logs of standard or high-frequency broadcast stations shall be retained by the licensee for a period of 2 years, except when required to be retained for a longer period in accordance with the provisions of section 2.54.

§ 3.406 Station identification.—*(a)* A licensee of a standard or high-frequency broadcast station shall make station identification announcement (call letters and location) at the beginning and ending of each time of operation and during operation (1) on the hour and (2) either on the half hour or at the quarter hour following the hour and at the quarter hour preceding the next hour: *Provided,*

(b) Such identification announcement need not be made on the hour when to make such announcement would interrupt a single consecutive speech, play, religious service, symphony concert, or operatic production of longer duration than 30 minutes. In such cases the identification announcement shall be made at the beginning of the program, at the first interruption of the entertainment continuity, and at the conclusion of the program.

(c) Such identification announcement need not be made on the half hour or quarter hours when to make such announcement would interrupt a single consecutive speech, play, religious service, symphony concert, or operatic production. In such cases an identification announcement shall be made at the first interruption of the entertainment continuity and at the conclusion of the program, *Provided,* That an announcement within 5 minutes of the times specified in subdivision (2) of paragraph *(a)* of this section will satisfy the requirements of identification announcements.

Amendment No. 272 (Amending Sec. 3.407) effective July 3, 1945
To be substituted for pp. 37-38, Part 3, Rules Governing Standard and High-Frequency Broadcast Stations
The last previous amendment affecting Part 3 was Amendment No. 253, pp. 38a-38b

(d) In the case of variety show programs, baseball game broadcasts, or similar programs of longer duration than 30 minutes, the identification announcement shall be made within 5 minutes of the hour and of the times specified in subdivision (2) of paragraph *(a)* of this section.

(e) In the case of all other programs the identification announcement shall be made within 2 minutes of the hour and of the times specified in subdivision (2) of paragraph *(a)* of this section.

(f) In making the identification announcement the call letters shall be given only on the channel of the station identified thereby.

§ 3.407 Mechanical records.—Each program broadcast which consists in whole or in part of one or more mechanical reproductions shall be announced in the manner and to the extent set out below.

(a) Each such program of longer duration than 30 minutes, consisting in whole or in part of one or more mechanical reproductions, shall be identified by appropriate announcement at the beginning of the program, at each 30-minute interval and at the conclusion of the program; *provided, however,* that the identifying announcement at each 30-minute interval is not required in case of a mechanical record consisting of a continuous uninterrupted speech, play, religious service, symphony concert or operatic production of longer than 30 minutes.

(b) Each such program of a longer duration than 5 minutes and not in excess of 30 minutes, consisting in whole or in part of one or more mechanical reproductions, shall be identified by an appropriate announcement at the beginning and end of the program.

(c) Each such program of five minutes or less, consisting in whole or in part of mechanical reproductions, shall be identified by appropriate announcement immediately preceding the use thereof.

(d) In case a mechanical record is used for background music, sound effects, station identification, program identification (theme music of short duration) or identification of the sponsorship of the program proper, no announcement of the mechanical record is required.

(e) The exact form of identifying announcement is not prescribed, but the language shall be clear and in terms commonly used and understood. A licensee shall not attempt affirmatively to create the impression that any program being broadcast by mechanical reproduction consists of live talent.

§3.408 Rebroadcast.—*(a)* The term "rebroadcast" means reception by radio of the program[1] of a radio station, and the simultaneous or subsequent retransmission of such program by a broadcast station.[2]

(b) The licensee of a standard or high frequency broadcast station may, without further authority of the Commission, rebroadcast the program of a United States standard or high frequency broadcast station, provided the Commission is notified of the call letters of each station rebroadcast and the licensee certifies that express authority has been received from the licensee of the station originating the program.[3]

(c) (1) The licensee of a standard or high frequency broadcast station located within a state or the District of Columbia may, without further authority of the Commission, rebroadcast on a noncommercial basis a noncommercial program of a United States international broadcast station.

(2) The licensee of a standard or high frequency broadcast station located in any territory or insular possession of the United States may, without further authority of the Commission, rebroadcast any program of a United States international broadcast station.

(3) In the case of any rebroadcast under the provisions of this paragraph *(c)*, the Commission shall be notified of the call letters of each station whose programs are rebroadcast and the licensee shall certify that express authority has been received from the licensee of the station originating the program.

(d) No licensee of a standard or high frequency broadcast station shall rebroadcast the program of any other class of United States radio station without written authority having first been obtained from the Commission upon application accompanied by written consent or certification of consent of the licensee of the station originating the program.[4] [5] [5a]

[1] As used in sec. 3.408, program includes any complete program or part thereof, or any signals if other than A-3 emission.

[2] In case a program is transmitted from its point of origin to a broadcast station entirely by telephone facilities in which a section of such transmission is by radio, the broadcasting of this program is not considered a rebroadcast.

[3] The notice and certification of consent shall be given within three (3) days of any single rebroadcast, but in case of the regular practice of rebroadcasting certain programs of a standard or high frequency broadcast station several times during a license period, notice and certification of consent shall be given for the ensuing license period with the application for renewal of license, or at the beginning of such rebroadcast practice if begun during a license period.

[4] The broadcasting of a program relayed by a relay broadcast station (sec. 4.21) is not considered a rebroadcast.

[5] Informal application may be employed.

[5a] By Order No. 82, dated and effective June 24, 1941, until further order of the Commission, section 3.408(d) is suspended only insofar as it requires prior written authority of the Commission for the rebroadcasting of programs originated for that express purpose by United States Government radio stations.

Amendment No. 253 (Adopting Sec. 3.409) effective December 12, 1944, pp. 38a-38b

To be substituted for p. 38a, Part 3, Rules Governing Standard and High-Frequency Broadcast Stations

The last previous amendment affecting Part 3 was amendment No. 246, pp. 17-18, 18a

(e) In case of a program rebroadcast by several standard broadcast stations, such as a chain rebroadcast, the person legally responsible for distributing the program or the network facilities may obtain the necessary authorization for the entire rebroadcast both from the Commission and from the person or licensee of the station originating the program.

Attention is directed to section 325*(b)* of the Communications Act of 1934, which reads as follows:

> No person shall be permitted to locate, use, or maintain a radio broadcast studio or other place or apparatus from which or whereby sound waves are converted into electrical energy, or mechanical or physical reproduction of sound waves produced, and caused to be transmitted or delivered to a radio station in a foreign country for the purpose of being broadcast from any radio station there, having a power output of sufficient intensity, and/or being so located geographically that its emissions may be received consistently in the United States, without first obtaining a permit from the Commission upon proper application therefor.[6]

§3.409 Sponsored programs, announcement of.—*(a)* In the case of each program for the broadcasting of which money, services, or other valuable consideration is either directly or indirectly paid or promised to, or charged or received by, any radio broadcast station, the station broadcasting such program shall make, or cause to be made, an appropriate announcement that the program is sponsored, paid for, or furnished, either in whole or in part.

(b) In the case of any political program or any program involving the discussion of public controversial issues for which any records, transcriptions, talent, scripts, or other material or services of any kind are furnished, either directly or indirectly, to a station as an inducement to the broadcasting of such program, an announcement shall be made both at the beginning and conclusion of such program on which such material or services are used that such

[6] Formal application required. See Standards of Good Engineering Practice for form number.

records, transcriptions, talent, scripts, or other material or services have been furnished to such station in connection with the broadcasting of such program: *Provided, however*, That only one such announcement need be made in the case of any such program of five minutes' duration or less, which announcement may be made either at the beginning or the conclusion of the program.

(c) The announcement required by this section shall fully and fairly disclose the true identity of the person or persons by whom or in whose behalf such payment is made or promised, or from whom or in whose behalf such services or other valuable consideration is received, or by whom the material or services referred to in subsection *(b)* hereof are furnished. Where an agent or other person contracts or otherwise makes arrangements with a station on behalf of another, and such fact is known to the station, the announcement shall disclose the identity of the person or persons in whose behalf such agent is acting instead of the name of such agent.

(d) In the case of any program, other than a program advertising commerical products or services, which is sponsored, paid for or furnished, either in whole or in part, or for which material or services referred to in subsection *(b)* hereof are furnished, by a corporation, committee, association or other unincorporated group, the announcement required by this section, shall disclose the name of such corporation, committee, association or other unincorporated group. In each such case the station shall require that a list of the chief executive officers or members of the executive committee or of the board of directors of the corporation, committee, association or other unincorporated group shall be made available for public inspection at one of the radio stations carrying the program.

(e) In the case of programs advertising commercial products or services, an announcement stating the sponsor's corporate or trade name or the name of the sponsor's product, shall be deemed sufficient for the purposes of this section and only one such announcement need be made at any time during the course of the program..

BROADCASTS BY CANDIDATES FOR PUBLIC OFFICE

§ 3.421 **General requirements.**—No station licensee is required to permit the use of its facilities by any legally qualified candidate for public office, but if any licensee shall permit any such candidate to use its facilities, it shall afford equal opportunities to all other such candidates for that office to use such facilities, provided that such licensee shall have no power of censorship over the material broadcast by any such candidate.

§ 3.422 **Definitions.**—The following definitions shall apply for the purposes of section 3.421:

(*a*) "A legally qualified candidate" means any person who has met all the requirements prescribed by local, state, or federal authority as a candidate for the office which he seeks, whether it be municipal, county, state, or national, to be determined according to the applicable local laws.

(*b*) "Other candidates for that office" means all other legally qualified candidates for the same public office.

§ 3.423 **Rates and practices.**—The rates, if any, charged all such candidates for the same office shall be uniform and shall not be rebated by any means, directly or indirectly; no licensee shall make any discrimination in charges, practices, regulations, facilities, or services for or in connection with the service rendered pursuant to these rules, or make or give any preference to any candidate for public office or subject any such candidate to any prejudice or disadvantage; nor shall any licensee make any contract or other agreement which shall have the effect of permitting any legally qualified candidate for any public office to broadcast to the exclusion of other legally qualified candidates for the same public office.

§ 3.424 **Records; inspection.**—Every licensee shall keep and permit public inspection of a complete record of all requests for broadcast time made by or on behalf of candidates for public office, together with an appropriate notation showing the disposition made by the licensee of such requests, and the charges made, if any, if request is granted.

FEDERAL COMMUNICATIONS COMMISSION
RULES AND REGULATIONS

Amendment No. 188 (Amending Sec. 43.1) effective August 24, 1943.
To be substituted for page 41, Part 3, Rules Governing Standard and High Frequency Broadcast Stations.
The last previous amendment affecting Part 3 was amendment No. 182, pp. 33-34.

The Following Rule Is Quoted for the Information of Licensees and Permittees of All Classes of Broadcast Stations:

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§ 43.1 * **Information as to ownership, operation, interests therein, contracts, etc.**—Licensees and permittees of all classes of broadcast stations shall file reports as follows:

(*a*) Within 30 days after becoming licensees or permittees all such licensees or permittees shall file with the Commission original reports containing the information required in accordance with the forms adopted and furnished by the Commission and the instructions in such forms.

(*b*) Thereafter, and within 30 days of the occurrence of any event which necessitates a change in information already reported, all such licensees or permittees shall file supplemental reports containing the information required in accordance with the forms adopted and furnished by the Commission and the instructions in such forms.

(*c*) All reports required hereby must be dated and executed under oath (or affirmed according to law) in accordance with the provisions of the form and show the date upon which each reporting event occurred. One report (original or supplemental) may be rendered by a licensee or permittee covering more than one station, provided the reported information relates equally to all stations. Otherwise, separate reports for each station must be filed.

(*d*) A licensee or permittee corporation which has of record on the date of submission of any report 1,000 stockholders or more, may file the information required herein as to the stockholders who own 1,000 or more shares of the stock of said corporation.

(*e*) The term "contract" as it appears on the forms provided by this section shall be construed to include every contract, understanding, or agreement, verbal or written. Verbal contracts shall be reduced to writing and certified copies thereof submitted.

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* See also section 1.361 of the Rules of Practice and Procedure which requires the filing by each licensee of a standard broadcast station of financial statements.

The Following Rule Is Quoted for the Information of Licensees and Permittees of All Classes of Broadcast Stations:

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§ 43.1 **Information as to ownership, operation, interests therein, contracts, etc.**—Licensees and permittees of all classes of broadcast stations shall file reports as follows:

(*a*) Within 30 days after becoming licensees or permittees all such licensees or permittees shall file with the Commission original reports containing the information required in accordance with the forms adopted and furnished by the Commission and the instructions in such forms.

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(*c*) All reports required hereby must be dated and executed under oath (or affirmed according to law) in accordance with the provisions of the form and show the date upon which each reporting event occurred. One report (original or supplemental) may be rendered by a licensee or permittee covering more than one station, provided the reported information relates equally to all stations. Otherwise, separate reports for each station must be filed.

(*d*) A licensee or permittee corporation which has of record on the date of submission of any report 1,000 stockholders or more, may file the information required herein as to the stockholders who own 1,000 or more shares of the stock of said corporation.

(*e*) The term "contract" as it appears on the forms provided by this section shall be construed to include every contract, understanding, or agreement, verbal or written. Verbal contracts shall be reduced to writing and certified copies thereof submitted.

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Amendment No. 26 (Adopting Secs. 13.64-13.70) effective July 8, 1940

To be substituted for p. 9-10, Part 13, Rules Governing Commercial Radio Operators

(3) The license is not valid for the operation of a radiotelegraph station on board a vessel required by treaty or statute to be equipped with a radio installation.

(4) The license is not valid for the operation of any ship telegraph, coastal telegraph, or marine-relay station open to public correspondence.

§ 13.62 **Special privileges.**—(*a*) Any operator may operate any station in the experimental service, while using frequencies above 300000 kilocycles.

(*b*) Subject to the limitations set forth herein,[11] the holder of any class radiotelephone operator license may operate a radiotelephone point-to-point station, a coastal harbor, or coastal telephone station while using A–1 or A–2 emission, for testing or other transmission entirely secondary and incidental to the service of such station.

§ 13.63 **Operator's responsibility.**—The licensed operator responsible for the maintenance of a transmitter may permit other persons to adjust a transmitter in his presence for the purpose of carrying out tests or making adjustments requiring specialized knowledge or skill, provided that he shall not be relieved thereby from responsibility for the proper operation of the equipment.

13.64 Obedience to lawful orders.—All licensed radio operators shall obey and carry out the lawful orders of the master or person lawfully in charge of the ship or aircraft on which they are employed.

13.65 Damage to apparatus.—No licensed radio operator shall willfully damage, or cause or permit to be damaged, any radio apparatus or installation in any licensed radio station.

13.66 Unnecessary, unidentified, or superfluous communications.—No licensed radio operator shall transmit unnecessary, unidentified, or superfluous radio communications or signals.

13.67 Obscenity, indecency, profanity.—No licensed radio operator or other person shall transmit communications containing obscene, indecent, or profane words, language, or meaning.

13.68 False signals.—No licensed radio operator shall transmit false or deceptive signals or communications by radio, or any call letter or signal which has not been assigned by proper authority to the radio station he is operating.

[11] Section 13.61.

13.69 Interference.—No licensed radio operator shall willfully or maliciously interfere with or cause interference to any radio communication or signal.

13.70 Fraudulent licenses.—No licensed radio operator or other person shall obtain or attempt to obtain, or assist another to obtain, an operator's license by fraudulent means.

MISCELLANEOUS

§ 13.71 **Issue of duplicate license.**—An operator whose license or permit has been lost, mutilated, or destroyed, shall immediately notify the Commission. A sworn application for duplicate should be submitted to the office of issue embodying a statement attesting to the facts thereof. If a license has been lost, the applicant must state that reasonable search has been made for it, and further, that in the event it be found either the original or the duplicate will be returned for cancelation. The applicant must also give a statement of the service that has been obtained under the lost license.

§ 13.72 **Exhibiting signed copy of application.**—When a duplicate operator license or permit has been requested, or request for renewal upon service has been made, the operator shall exhibit in lieu thereof a signed copy of the application for duplicate, or renewal, which has been submitted by him.

§ 13.73 **Supervision of examinations for permit.**—Persons other than employees of the Commission may be authorized to supervise examinations for Restricted Radiotelephone Operator Permits for one or more employees of a division of local or State Government: *Provided*—

(*a*) That the absence of such employees for the purpose of taking an examination at a field office or designated examining city would interfere with the proper functioning of the division, and

(*b*) That the chief of police, director of public safety, or other official of equal responsibility furnish the names of the persons to be examined and designate an official by name and title to supervise the examination. The application for supervisory examination shall be made to the inspector in charge of the district in which the applicants are located.

§ 13.74 **Verification card.**—The holder of an operator license who operates any station in which the posting of an operator license is not required, may, upon filing application[12] in duplicate, accompanied by his license, obtain a Verification Card.[13] Ths card may be carried on the person of the operator in lieu of the original operator license: *Provided*, The license is readily accessible within a reasonable time for inspection upon demand by an authorized Government representative.

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[12] Form 756.
[13] Form 758–F.

FEDERAL COMMUNICATIONS COMMISSION

RULES AND REGULATIONS

(TITLE 47—TELECOMMUNICATION—CHAPTER I)

PART 12

RULES GOVERNING AMATEUR RADIO: STATIONS AND OPERATORS

EFFECTIVE DECEMBER 1

1938

(Revised to April 18, 1940)

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PREFACE TO THE RULES AND REGULATIONS OF THE FEDERAL COMMUNICATIONS COMMISSION

The "Rules and Regulations of the Federal Communications Commission" incorporate all the rules and regulations of a general or permanent nature in force as of the effective date appearing at the beginning of each part. The title, "Title 47—Telecommunication," has been adopted for all the rules to correspond with the codification thereof under the provisions of the Federal Register Act, and also to correspond with the title under which the Communications Act is printed in the United States Code.

In preparing this compilation, the Commission has had in mind the necessity for an arrangement which would make the rules conveniently accessible and one which would also make provision for future amendments. To this end all the existing rules have been logically arranged under 26 parts, which have been suitably subdivided, employing nonconsecutive part numbers from 1 to 71, making provision for substitutions and additions.

The various parts are independently numbered, each part beginning with the principal section number allocated for the purpose and in keeping with the system of numbering which has been used, and these section numbers run consecutively only within the part. The first section of each part begins with ".1." Gaps are left in the numbering throughout so that new and amendatory provisions may be inserted with due regard to their relation to the compilation as a whole.

Each part has been printed and bound in separate pamphlet form, and each contains a title page listing the part numbers and titles of all the Rules and Regulations. In addition, explanatory footnotes have been included referring to statutes or treaties applicable to particular services and, so far as practicable, to other applicable parts.

It is intended that future amendments will be made available in such form that the substitute or added pages may be readily inserted within the part.

Provisions of the rules may be cited thus: "Section or § 12.1, Federal Communications Commission Rules."

Copies of these rules may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C.

THE RULES AND REGULATIONS OF THE FEDERAL COMMUNICATIONS COMMISSION ARE PUBLISHED IN SEPARATE PAMPHLETS NUMBERED AND TITLED AS FOLLOWS

Part

1. Rules of Practice and Procedure.
2. General Rules and Regulations.
3. Standard Broadcast Stations.
4. Broadcast Services Other Than Standard Broadcast.
5. Experimental Radio Services.
6. Fixed Public Radio Services.
7. Coastal Radio Services.
8. Ship Radio Services.
9. Aviation Radio Services.
10. Emergency Radio Services.
11. Miscellaneous Radio Services.
12. Amateur Radio: Stations and Operators.
13. Commercial Radio Operators.
14. Radio Stations in Alaska.
31. Uniform System of Accounts Class A and B Telephone Companies.

Part

32. Units of Property: Telephone Companies.
33. Accounting by Class C Telephone Companies.
34. Uniform System of Accounts, Radio Telegraph Carriers.
35. Uniform System of Accounts for Telegraph and Cable Companies.
41. Franks and Passes.
42. Destruction of Records.
43. Filing of Contracts, Periodic Reports, etc.
51. Classification of Telephone Employees.
61. Tariffs.
62. Applications for Interlocking Directorates.
71. Miscellaneous Rules and Regulations (Temporary Rules).

TABLE OF CONTENTS

PART 12.—RULES GOVERNING AMATEUR RADIO: STATIONS AND OPERATORS

PORTABLE AND PORTABLE-MOBILE STATIONS

USE OF AMATEUR STATIONS

ALLOCATION OF FREQUENCIES

EQUIPMENT AND OPERATION

SPECIAL CONDITIONS

PART 12.—RULES GOVERNING AMATEUR RADIO: STATIONS AND OPERATORS

DEFINITIONS

§ 12.1. **Amateur service.**—The term "amateur service" means a radio service carried on by amateur stations.

§ 12.2. **Amateur station.**—The term "amateur station" means a station used by an "amateur," that is, a duly authorized person interested in radio technique solely with a personal aim and without pecuniary interest. It embraces all radio transmitting apparatus at a particular location used for amateur service and operated under a single instrument of authorization.

§ 12.3. **Amateur portable station.**—The term "amateur portable station" means an amateur station that is portable in fact, that is so constructed that it may conveniently be moved about from place to place for communication, and that is in fact so moved from time to time, but which is not operated while in motion.

§ 12.4. **Amateur portable-mobile station.**—The term "amateur portable-mobile station" means an amateur station that is portable in fact, that is so constructed that it may conveniently be transferred to or from a mobile unit or from one such unit to another, and that is in fact so transferred from time to time and is ordinarily used while such mobile unit is in motion.

§ 12.5. **Amateur radio communication.**—The term "amateur radio communication" means radio communication between amateur stations solely with a personal aim and without pecuniary interest.

§ 12.6. **Amateur operator.**—The term "amateur operator" means a person holding a valid license issued by the Federal Communications Commission authorizing him to operate licensed amateur stations.

AMATEUR OPERATORS

LICENSES—PRIVILEGES

§ 12.21. **Eligibility for license.**—The following are eligible to apply for amateur operator license and privileges:

Class A—A United States citizen who has within 5 years of receipt of application held license as an amateur operator for a year or who in lieu thereof qualified under section 12.46.

Class B—Any United States citizen.

Class C—A United States citizen whose actual residence, address, and station are more than 125 miles airline from the nearest point where examination is given at least quarterly for class B; or is shown by physician's certificate to be unable to appear for examination due to protracted disability; or is shown by certificate of the commanding officer to be in a camp of the Civilian Conservation Corps or in the regular military or naval service of the United States at a military post or naval station and unable to appear for class B examination.

§ 12.22. **Classification of operating privileges.**—Amateur operating privileges are as follows:

Class A—All amateur privileges.

Class B—Same as class A except specially limited as in section 12.116.

Class C—Same as class B.

§ 12.23. **Scope of operator authority.**—Amateur operators' licenses are valid only for the operation of licensed amateur stations: *Provided, however*, Any person holding a valid radio operator's license of any class may operate stations in the experimental service licensed for, and operating on, frequencies above 300000 kilocycles.

§ 12.24. **Posting of license.**—The original operator's license shall be posted in a conspicuous place in the room occupied by such operator while on duty or kept in his personal possession and available for inspection at all times while the operator is on duty, except when such license has been filed with application for modification or renewal, or has been mutilated, lost, or destroyed, and application has been made for a duplicate.

§ 12.25. **Duplicate license.**—Any licensee applying for a duplicate license to replace an original which has been lost, mutilated, or destroyed, shall submit to the Commission such mutilated license or affidavit attesting to the facts regarding the manner in which the

Amendment No. 256 (Amending Footnote 1 to Sec. 12.26, and Footnote 1b to Sec. 12.66) effective January 1, 1945.

To be substituted for pp. 3-4, 5-6, Part 12, Rules Governing Amateur Radio: Stations and Operators

The last previous amendment affecting Part 12 was Amendment No. 251, pp. 3-4, 5-6

original was lost or destroyed. If the original is later found, it or the duplicate shall be returned to the Commission.

§ 12.26 Renewal of amateur operator license.[1] [1a]—An amateur operator license may be renewed upon proper application and a showing that within 3 months of receipt of the application by the Commission the licensee has lawfully operated an amateur station licensed by the Commission, and that he has communicated by radio with at least three other such amateur stations. Failure to meet the requirements of this section will make it necessary for the applicant to again qualify by examination.

§ 12.27 Who may operate an amateur station.—An amateur station may be operated only by a person holding a valid amateur operator's license, and then only to the extent provided for by the class of privileges for which the operator's license is endorsed. When an amateur station uses radiotelephony (type A-3 emission) the licensee may permit any person to transmit by voice, provided a duly licensed amateur operator maintains control over the emissions by turning the carrier on and off when required and signs the station off after the transmission has been completed.

[1] By Order No. 77, dated and effective December 4, 1940, this section is suspended, until further order of the Commission, insofar as the required showing of service or use of license is concerned. The suspension has been continued by Orders Nos. 77-A, 77-B, 77-C, and 77-D. Suspension date extended in no event beyond January 1, 1946 by Order No. 7 -D, effective as of January 1, 1945.

[1a] Until further order of the Commission, Order No. 116, dated and effective May 20, 1943, suspends the provisions of this section to the extent that they are inconsistent with the following:

"1. Every amateur radio operator license which by its terms expired during the period December 7, 1941 to May 20, 1943 inclusive, and has not been renewed, be, and the same is hereby reinstated, and the license term thereof is hereby extended for a period of three years from the date of expiration provided therein.

2. The license term of every amateur radio operator license which by its terms expires during the period May 20, 1943 to December 7, 1944, inclusive, be and the same is hereby extended, for a period of three years from the date of expiration provided therein.

Provided however, That the provisions of this Order shall not apply to any amateur radio operator license which has been, or may hereafter be, finally suspended by Commission Order, or has been voluntarily surrendered by the licensee, or to any amateur radio operator licensee who has failed to comply with Commission Order No. 78, as amended."

By Order 115-A, effective November 28, 1944, amateur radio operator licenses issued or extended to expire during the period December 7, 1944 to December 7, 1945 were extended for a period of one year.

§ 12.41 When required.—Examination is required for a new license as an amateur operator or for change of class of privileges.

§ 12.42 Elements of examination.—The examination for amateur operator privileges will comprise the following elements:

1. Code test—ability to send and receive, in plain language, messages in the International Morse Code at a speed of not less than 13 words per minute, counting 5 characters to the word, each numeral or punctuation mark counting as 2 characters.
2. Amateur radio operation and apparatus, both telephone and telegraph.
3. Provisions of treaty, statute, and regulations affecting amateurs.
4. Advanced amateur radiotelephony.

§ 12.43 Elements required for various privileges.—Examinations for class A privileges will include all four examination elements as specified in section 12.42.

Examinations for classes B and C privileges will include elements 1, 2, and 3 as set forth in section 12.42.

§ 12.44 Manner of conducting examination.—Examinations for class A and class B privileges will be conducted by an authorized Commission employee or representative at points specified by the Commission.

Examinations for class C privileges will be given by volunteer examiner(s), whom the Commission may designate or permit the applicant to select; in the latter event the examiner giving the code test shall be a holder of an amateur license with class A or B privileges, or have held within 5 years a license as a professional radiotelegraph operator or have within that time been employed as a radiotelegraph operator in the service of the United States; and the examiner for the written test, if not the same individual, shall be a person of legal age.

§ 12.45 Additional examination for holders of class C privileges.—The Commission may require a licensee holding class C privileges to appear at an examining point for a class B examination. If such licensee fails to appear for examination when directed to do so, or fails to pass the supervisory examination, the license held will be canceled and the holder thereof will not be issued another license for the class C privileges.

Whenever the holder of class C amateur operator privileges changes his actual residence or station location to a point where he would not be eligible to apply for class C privileges in the first instance, or whenever a new examining point is established in a region from which applicants were previously eligible for class C privileges, such holders of class C privileges shall within 4 months thereafter appear at an examining point and be examined for class B privileges. The license will be canceled if such licensee fails to appear, or fails to pass the examination.

§ 12.46 Examination abridgment.—An applicant for class A privileges, who holds a license with class B privileges, will be required to pass only the added examination element No. 4. (See section 12.42.)

A holder of class C privileges will not be accorded an abridged examination for either class B or class A privileges.

An applicant who has held a license for the class of privileges specified below, within 5 years prior to receipt of application, will be credited with examination elements as follows:

Class of license or privileges:	Credits
Commercial extra first	Elements 1, 2, and 4.
Radiotelegraph first, second, or third	Elements 1 and 2.
Radiotelephone first or second	Elements 2 and 4.
Class A	Elements 2 and 4.

No examination credit is given on account of license of radiotelephone third class, nor for other class of license or privileges not above listed.

§ 12.47 Examination procedure.—Applicants shall write examinations in longhand—code tests and diagrams in ink or pencil. written tests in ink—except that applicants unable to do so because of physical disability may typewrite or dictate their examinations and, if unable to draw required diagrams, may make instead a detailed description essentially equivalent. The examiner shall certify the nature of the applicant's disability and, if the examination is dictated, the name and address of the person(s) taking and transcribing the applicant's dictation.

§ 12.48 Grading.—Code tests are graded as passed or failed, separately for sending and receiving tests. A code test is failed unless free of omission or other error for a continuous period of at least 1 minute at required speed. Failure to pass the required code test will terminate the examination. (See section 12.49.)

A passing grade of 75 percent is required separately for class B and class A written examinations.

§ 12.49 Eligibility for reexamination.—An applicant who fails examination for amateur privileges may not take another examination for such privileges within 2 months, except that this rule shall not apply to an examination for class B following one for class C.

LICENSES

§ 12.61 **Eligibility for amateur station license.**—License for an amateur station will be issued only to a licensed amateur operator who has made a satisfactory showing of control of proper transmitting apparatus and control of the premises upon which such apparatus is to be located: *Provided, however*, That in the case of an amateur station of the military or naval reserve of the United States located in approved public quarters and established for training purposes, but not operated by the United States Government, a station license may be issued to a person in charge of such a station although not a licensed amateur operator.

§ 12.62 **Eligibility of corporations or organizations to hold license.**—An amateur station license will not be issued to a school, company, corporation, association, or other organization; nor for their use: *Provided, however*, That in the case of a bona fide amateur radio society a station license may be issued in accordance with section 12.61 to a licensed amateur operator as trustee for such society.

§ 12.63 **Location of station.**—An amateur radio station, and the control point thereof, when remote control is authorized, shall not be located on premises controlled by an alien. Authority to operate by remote control will be granted only upon the filing of a proper application, and supported by a showing of the applicant's legal control of the control point, the means employed to control emissions, the equipment and method for monitoring, and the precautions adopted to prevent access to the premises by unauthorized persons.

§ 12.64 **License period.**—License for an amateur station will normally be for a period of 3 years from the date of issuance of a new, renewed, or modified license.

§ 12.65 **Authorized operation.**—An amateur station license authorizes the operation of all transmitting apparatus used by the licensee at the location specified in the station license and in addition the operation of portable and portable-mobile stations at other locations under the same instrument of authorization.

§ 12.66 **Renewal of amateur station license.**[1b]—An amateur station license may be renewed upon proper application and a showing that, within 3 months of receipt of the application by the Commission, the licensee thereof has lawfully operated such station in communication by radio with at least three other amateur stations licensed by the

[1b] By Order No. 77, dated and effective December 4, 1940, this section is suspended, until further order of the Commission, insofar as the required showing of service or use of license is concerned. The suspension has been continued by Orders Nos. 77-A, 77-B, 77-C, and 77-D. Suspension date extended in no event beyond January 1, 1946 by Order No. 77-D, effective as of January 1. 1945.

Amendment No. 25 (Amending Secs. 12.82, 12.111, 12.115) revised to November 1, 1940

To be substituted for pp. 7-8, 9-10, Part 12, Rules Governing Amateur Radio: Stations and Operators

failure to comply with the above requirements, a successor license will not be granted until 2 months after expiration of the old license.

§ 12.67. **Posting of station license.**—The original of each station license or a facsimile thereof shall be posted by the licensee in a conspicuous place in the room in which the transmitter is located or kept in the personal possession of the operator on duty, except when such license has been filed with application for modification or renewal, or has been mutilated, lost, or destroyed, and application has been made for a duplicate.

CALL SIGNALS

§ 12.81. **Assignment of call letters.**—Amateur station calls will be assigned in regular order and special requests will not be considered except that a call may be reassigned to the latest holder, or if not under license during the past 5 years to any previous holder, or to an amateur organization in memoriam to a deceased member and former holder, and particular calls may be temporarily assigned to stations connected with events of general public interest.

§ 12.82. **Call signals for member of U. S. N. R.**—In the case of an amateur licensee whose station is licensed to a regularly commissioned or enlisted member of the United States Naval Reserve, the Commandant of the naval district in which such station is located may authorize, in his discretion, the use of the call-letter prefix N in lieu of the prefix W or K, assigned in the license issued by the Commission, provided that such N prefix shall be used only when operating in the frequency bands **1750–2050** kilocycles, 3500–4000 kilocycles, 56000–60000 kilocycles, and 400000–401000 kilocycles in accordance with instructions to be issued by the Navy Department.

§ 12.83. **Transmission of call signals.**—An operator of an amateur station shall transmit its assigned call at the end of each transmission and at least once every 10 minutes during transmission of more than 10 minutes' duration; *Provided, however*, That transmission of less than 1 minute duration from stations employing break-in operation need be identified only once every 10 minutes of operation and at the termination of the correspondence. In addition, an operator of an amateur portable or portable-mobile radiotelegraph station shall transmit immediately after the call of the station the fraction-bar character ($\overline{DN}$) followed by the number of the amateur call area in which the portable or portable-mobile amateur station is then operating, as for example:

Example 1.—Portable or portable-mobile amateur station operating in the third amateur call area calls a fixed amateur station: W1ABC W1ABC W1ABC DE W2DEF $\overline{DN}$ 3 W2DEF $\overline{DN}$ 3 W2DEF $\overline{DN}$ 3 AR.

Example 2.—Fixed amateur station answers the portable or portable-mobile amateur station: W2DEF W2DEF W2DEF DE W1ABC W1ABC W1ABC $\overline{K}$.

Example 3.—Portable or portable-mobile amateur station calls a portable or portable-mobile amateur station: W3GHI W3GHI W3GHI DE W4JKL $\overline{DN}$ 4 W4JKL $\overline{DN}$ 4 W4JKL $\overline{DN}$ 4 AR.

If telephony is used, the called sign of the station shall be followed by an announcement of the amateur call area in which the portable or portable-mobile station is operating.

PORTABLE AND PORTABLE-MOBILE STATIONS

§ 12.91. **Requirements for portable and portable-mobile operation.**—A licensee of an amateur station may operate portable amateur stations (section 12.3) in accordance with the provisions of sections 12.82, 1283, 12.92, and 12.136. Such licensee may operate portable and portable-mobile amateur stations without regard to section 12.92, but in compliance with sections 12.82, 12.83, and 12.136, when such operation takes place on authorized amateur frequencies above 28000 kilocycles.

§ 12.92. **Special provisions for portable stations.**—Advance notice in writing shall be given by the licensee to the inspector in charge of the district in which such portable station is to be operated. Such notices shall be given prior to any operation contemplated, and shall state the station call, name of licensee, the date of proposed operation, and the locations as specifically as possible. An amateur station operating under this section shall not be operated during any period exceeding 1 month without giving further notice to the inspector in charge of the radio-inspection district in which the station will be operated, nor more than four consecutive periods of 1 month at the same location. This section does not apply to the operation of portable or portable-mobile amateur stations on frequencies above 28000 kilocycles. (See section 12.91.)

§ 12.93. **Special provisions for nonportable stations.**—The provisions for portable stations shall not be applied to any nonportable station except that—

(*a*)[1] An amateur station that has been moved from one permanent location to another permanent location may be operated at the latter location in accordance with the provisions governing portable stations for a period not exceeding 60 days, but in no event beyond the expiration date of the license, provided an application for modification of license to change the permanent location has been made to the Commission.

(*b*) The licensee of an amateur station who is temporarily residing at a location other than the licensed location for a period not exceeding 4 months may for such period operate his amateur station

[1] The Commission, on October 22, 1940, modified for a temporary period so as to permit an amateur station which is moved from one permanent location to another permanent location prior to May 1, 1941, to be operated at the latter location (in accordance with the provisions governing portable stations) for a period not exceeding four months, but in no event beyond the expiration date of the license; provided a proper application for modification of license is duly filed in accordance with the Rules and Regulations of the Commission.

at his temporary address in accordance with the provision governing portable stations.

USE OF AMATEUR STATIONS

§ 12.101. **Points of communication.**—An amateur station shall communicate only with other amateur stations, except that in emergencies or for testing purposes it may be used also for communication with commercial or Government radio stations. In addition, amateur stations may communicate with any mobile radio station which is licensed by the Commission to communicate with amateur stations, and with stations of expeditions which may also be authorized to communicate with amateur stations. They may also make transmissions to points equipped only with receiving apparatus for the measurement of emissions, observation of transmission phenomena, radio control of remote objects, and similar purely experimental purposes.

§ 12.102. **No remuneration for use of station.**—An amateur station shall not be used to transmit or receive messages for hire, nor for communication for material compensation, direct or indirect, paid or promised.

§ 12.103. **Broadcasting prohibited.**—An amateur station shall not be used for broadcasting any form of entertainment, nor for the simultaneous retransmission by automatic means of programs or signals emanating from any class of station other than amateur.

§ 12.104. **Radiotelephone tests.**—The transmission of music by an amateur station is forbidden. However, single audio-frequency tones may be transmitted by radiotelephony for test purposes of short duration in connection with the development of experimental radiotelephone equipment.

ALLOCATION OF FREQUENCIES

§ 12.111. **Frequencies for exclusive use of amateur stations.**—The following bands of frequencies are allocated exclusively for use by amateur stations:

1750 to 2050 kilocycles.
3500 to 4000 kilocycles.
7000 to 7300 kilocycles.
14000 to 14400 kilocycles.
28000 to 30000 kilocycles.
56000 to 60000 kilocycles.
112000 to 116000 kilocycles.
224000 to 230000 kilocycles.
400000 to 401000 kilocycles.

§ 12.112. **Use of frequencies above 300000 kilocycles.**—The licensee of an amateur station may, subject to change upon further order, operate amateur stations, with any type of emission authorized for amateur stations, on any frequency above 300000 kilocycles without separate licenses therefor.

§ 12.113. **Individual frequency not specified.**—Transmissions by an amateur station may be on any frequency within the bands assigned. Sideband frequencies resulting from keying or modulating a transmitter shall be confined within the frequency band used.

§ 12.114. **Types of emission.**—All bands of frequencies allocated to the amateur service may be used without modulation (type A–1 emission).

§ 12.115. **Additional bands for types of emission using amplitude modulation.**—The following bands of frequencies are allocated for use by amateur stations using additional types of emission as shown:

1750 to 2050 kilocycles	—	—	A–4	—
1800 to 2050 kilocycles	—	A–3	—	—
28500 to 30000 kilocycles	—	A–3	—	—
56000 to 60000 kilocycles	A–2	A–3	A–4	—
112000 to 116000 kilocycles	A–2	A–3	A–4	A–5
224000 to 230000 kilocycles	A–2	A–3	A–4	A–5
400000 to 401000 kilocycles	A–2	A–3	A–4	A–5

§ 12.116. **Additional bands for radiotelephony.**—Amateur stations may use radiotelephony with amplitude modulation (type A–3 emission) in the frequency bands 3900 to 4000 kilocycles and 14150 to 14250 kilocycles, provided the station is licensed to a person who holds an amateur operator license endorsed with class A privileges, and actually is operated by an amateur operator holding class A privileges.

§ 12.117. **Frequency modulation.**—The following bands of frequencies are allocated for use by amateur stations for radiotelephone frequency modulation transmissions:[2]

58500 to 60000 kilocycles
112000 to 116000 kilocycles
224000 to 230000 kilocycles
400000 to 401000 kilocycles

[2] When using frequency modulation no simultaneous amplitude modulation is permitted.

§ 12.131. **Maximum power input.**—The licensee of an amateur station is authorized to use a maximum power input of 1 kilowatt to the plate circuit of the final amplifier stage of an oscillator-amplifier transmitter or to the plate circuit of an oscillator transmitter. An amateur transmitter operating with a power input exceeding 900 watts to the plate circuit shall provide means for accurately measuring the plate power input to the vacuum tube, or tubes, supplying power to the antenna.

§ 12.132. **Power supply to transmitter.**—The licensee of an amateur station using frequencies below 60000 kilocycles shall use adequately filtered direct-current plate power supply for the transmitting equipment to minimize frequency modulation and to prevent the emission of broad signals.

§ 12.133. **Requirements for prevention of interference.**—Spurious radiations from an amateur transmitter operating on a frequency below 60000 kilocycles shall be reduced or eliminated in accordance with good engineering practice and shall not be of sufficient intensity to cause interference on receiving sets of modern design which are tuned outside the frequency band of emission normally required for the type of emission employed. In the case of A–3 emission, the transmitter shall not be modulated in excess of its modulation capability to the extent that interfering spurious radiations occur, and in no case shall the emitted carrier be amplitude-modulated in excess of 100 percent. Means shall be employed to insure that the transmitter is not modulated in excess of its modulation capability. A spurious radiation is any radiation from a transmitter which is outside the frequency band of emission normal for the type of transmission employed, including any component whose frequency is an integral multiple or submultiple of the carrier frequency (harmonics and subharmonics), spurious modulation products, key clicks, and other transient effects, and parasitic oscillations. The frequency of emission shall be as constant as the state of the art permits.

§ 12.134. **Modulation of carrier wave.**—Except for brief tests or adjustments, an amateur radiotelephone station shall not emit a carrier wave on frequencies below 112000 kilocycles unless modulated for the purpose of communication.

§ 12.135. **Frequency measurement and regular check.**—The licensee of an amateur station shall provide for measurement of the transmitter frequency and establish procedure for checking it

regularly. The measurement of the transmitter frequency shall be made by means independent of the frequency control of the transmitter and shall be of sufficient accuracy to assure operation within the frequency band used.

§ 12.136. **Logs.**—Each licensee of an amateur station shall keep an accurate log of station operation, including the following data:

(*a*) The date and time of each transmission. (The date need only be entered once for each day's operation. The expression "time of each transmission" means the time of making a call and need not be repeated during the sequence of communication which immediately follows; however, an entry shall be made in the log when "signing off" so as to show the period during which communication was carried on.)

(*b*) The signature of the person manipulating the transmitting key of the radiotelegraph transmitter or the signature of the person operating a transmitter of any other type (type A–3 or A–4 emission) with statement as to type of emission, and the signature of any other person who transmits by voice over a radiotelephone transmitter (type A–3 emission). (The signature need only be entered once in the log, provided the log contains a statement to the effect that all transmissions were made by the person named except where otherwise stated. The signature of any other person who operates the station shall be entered in the proper space for his transmissions.)

(*c*) Call letters of the station called. (This entry need not be repeated for calls made to the same station during any sequence of communication, provided the time of "signing off" is given.)

(*d*) The input power to the oscillator, or to the final amplifier stage where an oscillator-amplifier transmitter is employed. (This need be entered only once, provided the input power is not changed.)

(*e*) The frequency band used. (This information need be entered only once in the log for all transmissions until there is a change in frequency to another amateur band.)

(*f*) The location of a portable or portable-mobile station at the time of each transmission. (This need be entered only once provided the location of the station is not changed. However, suitable entry shall be made in the log upon changing location, showing the type of vehicle or mobile unit in which the station is operated and the approximate geographical location of the station at the time of operation.)

(*g*) The message traffic handled. (If record communications are handled in regular message form, a copy of each message sent and received shall be entered in the log or retained on file for at least 1 year.)

Amendment No. 25 (continued) (Amending Sec. 12.155 and adopting Secs. 12.156-12.161) revised to November 1, 1940

To be substituted for pp. 13-14, 15, Part 12, Rules Governing Amateur Radio: Stations and Operators

The log shall be preserved for a period of at least 1 year following the last date of entry. The copies of record communications and station log, as required under this section, shall be available for inspection upon request by an authorized Government representative.

SPECIAL CONDITIONS

§ 12.151. **Additional conditions to be observed by licensee.**—An amateur station license is granted subject to the conditions imposed in sections 12.152 to 12.155, inclusive, in addition to any others that may be imposed during the term of the license. Any licensee receiving due notice requiring the station licensee to observe such conditions shall immediately act in conformity therewith.

§ 12.152. **Quiet hours.**—In the event that the operation of an amateur station causes general interference to the reception of broadcast programs with receivers of modern design, such amateur station shall not operate during the hours from 8 o'clock p. m. to 10:30 p. m., local time, and on Sunday for the additional period from 10:30 a. m. until 1 p. m., local time, upon such frequency or frequencies as cause such interference.

§ 12.153. **Second notice of same violation.**—In every case where an amateur station licensee is cited a second time within a year for the same violation under section 12.111, 12.113, 12.116, 12.117, 12.132, or 12.133, the Commission will direct that the station remain silent from 6 p. m. to 10:30 p. m., local time, until written notice has been received authorizing full-time operation. The licensee shall arrange for tests at other hours with at least two amateur stations within 15 days of the date of notice, such tests to be made for the specific purpose of aiding the licensee in determining whether the emissions of his station are in accordance with the Commission's regulations. The licensee shall report under oath to the Commission at the conclusion of the tests as to the observations reported by amateur licensees in relation to the reported violation. Such reports shall include a statement as to the corrective measures taken to insure compliance with the regulations.

§ 12.154. **Third notice of same violation.**—In every case where an amateur station licensee is cited the third time within a year for the same violation as indicated in section 12.153, the Commission will direct that the station remain silent from 8 a. m. to 12 midnight, local time, except for the purpose of transmitting a prearranged test to be observed by a monitoring station of the Commission to be designated in each particular case. Upon completion of the test the station shall again remain silent during these hours until authorized by the Commission to resume full-time operation. The Commission will con-

sider the results of the tests and the licensee's past record in determining the advisability of suspending the operator license and/or revoking the station license.

§ 12.155. **Operation in emergencies.**—In the event of widespread emergency conditions affecting domestic communication facilities, the Commission may confer with representatives of the amateur service and others and, if deemed advisable, will declare that a state of general communications emergency exists, designating the licensing area or areas concerned (in general not exceeding 1,000 miles from center of the affected area), whereupon it shall be incumbent upon each amateur station in such area or areas to observe the following restrictions for the duration of such emergency:

(*a*) No transmissions except those relating to relief work or other emergency service such as amateur nets can afford, shall be made within the 1750–2050 kilocycle or 3500–4000 kilocycle amateur bands. Incidental calling, testing, or working, including casual conversation or remarks not pertinent or necessary to constructive handling of the general situation shall be prohibited.

(*b*) The frequencies 2025–2050, 3500–3525, and 3975–4000 kilocycles shall be reserved for emergency calling channels, for initial calls from isolated stations or first calls concerning very important emergency relief matters or arrangements. All stations having occasion to use such channels shall, as quickly as possible, shift to other frequencies for carrying on their communications.

(*c*) A 5-minute listening period for the first 5 minutes of each hour shall be observed for initial calls of major importance, both in the designated emergency calling channels and throughout the 1750–2050 and 3500–4000 kilocycle bands. Only stations isolated or engaged in handling official traffic of the highest priority may continue with transmissions in these listening periods, which must be accurately observed. No replies to calls or resumption of routine traffic shall be made in the 5-minute listening period.

(*d*) The Commission may designate certain amateur stations to assist in promulgation of its emergency announcement, and for policing the 1750–2050 and 3500–4000 kilocycle bands and warning noncomplying stations noted operating therein. The operators of these observing stations shall report fully the identity of any stations failing, after due notice, to comply with any section of this regulation. Such designated stations will act in an advisory capacity when able to provide information on emergency circuits. Their policing authority is limited to the transmission of information from responsible

official sources, and full reports of noncompliance which may serve as a basis for investigation and action under section 502 of the Communications Act. Policing authority extends only to 1750–2050 and 3500–4000 kilocycle bands. Individual policing transmissions shall refer to this section by number, shall specify the date of the Commission's declaration, the area and nature of the emergency, all briefly and concisely. Policing-observer stations shall not enter into discussions beyond essentials with the stations notified, or other stations.

(*e*) These special conditions imposed under this section will cease to apply only after the Commission shall have declared such emergency to be terminated.

12.156 **Obscenity, indecency, profanity.**—No licensed radio operator or other person shall transmit communications containing obscene, indecent, or profane words, language, or meaning.

12.157 **False signals.**—No licensed radio operator shall transmit false or deceptive signals or communications by radio, or any call letter or signal which has not been assigned by proper authority to the radio station he is operating.

12.158 **Unidentified communications.**—No licensed radio operator shall transmit unidentified radio communications or signals.

12.159 **Interference.**—No licensed radio operator shall willfully or maliciously interfere with or cause interference to any radio communication or signal.

12.160 **Damage to apparatus.**—No licensed radio operator shall willfully damage, or cause or permit to be damaged, any radio apparatus or installation in any licensed radio station.

12.161 **Fraudulent licenses.**—No licensed radio operator or other person shall obtain or attempt to obtain, or assist another to obtain or attempt to obtain, an operator license by fraudulent means.

FEDERAL COMMUNICATIONS COMMISSION

RULES AND REGULATIONS

(TITLE 47—TELECOMMUNICATION—CHAPTER I)

PART 4

RULES GOVERNING BROADCAST SERVICES

OTHER THAN STANDARD BROADCAST

EFFECTIVE MAY 23

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RULES AND REGULATIONS

Amendment No. 276 (Amending Footnote 1a of Section 4.3) effective September 11, 1945.

To be substituted for pp. 1-2, Part 4, Rules Governing Broadcast Services Other Than Standard Broadcast.

The last previous amendment affecting Part 4 was Amendment No. 228, pp. 1-2.

Part 4.—RULES GOVERNING BROADCAST SERVICES OTHER THAN STANDARD BROADCAST

IN GENERAL

§4.1 Frequency tolerance.—The operating frequency of the broadcast stations as listed below shall be maintained within plus or minus the percentage of the assigned frequency as given in table I

TABLE I

Class of station	Frequency tolerance
Relay broadcast station:	
(a) 1622 to 2830 kc	0.04 percent.
(b) 30000 to 40000 kc and above	10 watts or less, 0.1 percent. Above 10 watts, 0.05 percent.
ST broadcast station	0.01 percent.
International broadcast station	0.005 percent.[1]
Television broadcast station	0.01 percent.
Facsimile broadcast station	0.05 percent or less as required.
High frequency broadcast station	0.01 percent.
Noncommercial educational broadcast station.	Do.
Developmental broadcast station	0.05 percent or less as required.

[1] Tolerance may be 0.01 percent on equipment installed prior to January 1, 1940, and until January 1, 1941, when all international stations shall maintain frequency within 0.005 percent of the assigned frequency.

§4.2 Frequency monitors.—(a) The licensee of each broadcast station listed in section 4.1 except relay broadcast stations, shall operate at the transmitter a frequency monitor independent of the frequency control of the transmitter.

(b) The frequency monitor shall be designed and constructed in accordance with good engineering practice and shall have an accuracy sufficient to determine that the operating frequency is within one-half (½) of the allowed tolerance.

(c) The licensee of each relay broadcast station shall provide the necessary means for determining that the frequency of the station is within the allowed tolerance.

(d) The frequency of all stations listed in section 4.1 shall be checked at each time of beginning operation and as often thereafter as necessary to maintain the frequency within the allowed tolerance.

§4.3 License period; renewal[1a].—*(a)* Licenses for the following classes of broadcast stations normally will be issued for a period of 1 year expiring as follows:[2]

Class of station	Date of expiration
ST broadcast station	Apr. 1
International broadcast station	Nov. 1
Television broadcast station	Feb. 1
Facsimile broadcast station	Mar. 1
High frequency broadcast station	Apr. 1
Noncommercial educational broadcast station	May 1
Developmental broadcast station	May 1

(b) Licenses for relay broadcast and special relay broadcast stations authorized under section 4.22 of the Rules and Regulations will be issued for a period running concurrently with the license of the broadcast station with which it is to be used.

(c) Each licensee shall submit the application for renewal of license at least 60 days prior to the expiration date (section 1.360).

(d) A supplemental report shall be submitted with each application for renewal of license of a station licensed experimentally[3] in accordance with the regulations governing each class of station.

§4.4 Requirements, limitations, and restrictions.—*(a)* No station licensed experimentally will be assigned for exclusive use of any frequency. In case interference would be caused by simultaneous operation of stations licensed experimentally, such licensees shall endeavor to arrange satisfactory time division. If such agreement cannot be reached, the Commission will determine and specify the time division.

(b) The Commission may from time to time require that a station licensed experimentally conduct such experiments that are deemed desirable and reasonable for the development of the service.

(c) The program of research and experimentation as offered by an applicant in compliance with the requirements for obtaining a license for an experimental station[3] shall be adhered to in the main, unless the licensee is authorized to do otherwise by the Commission.

[1a] Order No. 110-A, dated and effective September 11, 1945, suspends, until further order of the Commission, that portion of this section which established for international broadcast stations a normal license term of one year and ordered: "The license term for every international broadcast station presently licensed shall end at the earlier of the following dates: (a) April 1, 1946, or (b) the first day on which its operations are not controlled, by agreement or otherwise, by the office of War Information, the Coordinator of Inter-American Affairs, or other governmental agency supervising the operation of international broadcasting."

[2] Licenses will be renewed according to the schedules set out in these rules upon the expiration of existing licenses.

[3] The phrases "station licensed experimentally" and "experimental station" are used interchangeably and refer to stations listed in section 4.3 when so specified in the instrument of authorization.

Amendment No. 194 (Amending Sec. 4.5(b)) effective October 28, 1943
To be substituted for pp. 3-4, Part 4, Rules Governing Broadcast Services Other Than Standard Broadcast
The last previous amendment affecting Part 4 was amendment No. 173 pp. 1-2

(d) A licensee of an experimental station is not required to adhere to a regular schedule of operation but shall actively conduct a program of research and experimentation or transmission of programs: *Provided, however,* Licensees of developmental broadcast stations which are licensed to conduct special intermittent experiments, such as to develop and test commercial broadcast equipment, are required to operate only when there is a need therefor.

(e) A supplementary statement shall be filed with and made a part of each application for construction permit for any broadcast station on an experimental basis which specifies any frequency above 300000 kilocycles or in the bands 162000 to 168000, 210000 to 216000, and 264000 to 270000 kilocycles except television, confirming the applicant's understanding:

(1) That all operation upon the frequency is experimental only,

(2) That the frequency may not be the best suited to the particular experimental work to be carried on, and

(3) That the frequency may not be allocated for the service that may be developed experimentally.

§ 4.5 Station records.—*(a)* The licensee of each class of broadcast station listed in section 4.1 shall maintain adequate records of the operation, including:

(1) Hours of operation.

(2) Program transmitted.

(3) Frequency check.

(4) Pertinent remarks concerning transmission.

(5) In case of relay station, an entry giving point of program origination and receiver location shall be included.

(6) Research and experimentation conducted in case of an experimental station.

(7) And any additional information specified in the regulations governing each class of station or for completing the supplemental report as required.

(b) Where an antenna or antenna supporting structure(s) is required to be illuminated the licensee shall make entries in the radio station log appropriate to the requirements of section 2.82*(a)*, *(b)*, and *(c)* as follows:

(1) The time the tower lights are turned on and off if manually controlled.

(2) The time the daily visual observation of the tower lights was made.

(3) In the event of any observed failure of a tower light,

(i) Nature of such failure.

(ii) Time the failure was observed.

(iii) Time and nature of the adjustments, repairs or replacements made.

(iv) Airways Communication Station (C.A.A.) notified of the failure of any tower light not corrected within thirty minutes and the time such notice was given.

(v) Time notice was given to the Airways Communication Station (C.A.A.) that the required illumination was resumed.

(4) Upon completion of the periodic inspection required at least once each three months,

(i) The date of the inspection and the condition of all tower lights and associated tower lighting control devices.

(ii) Any adjustments, replacements or repairs made to insure compliance with the lighting requirements.

§ 4.6 Equipment changes.—The licensee of each class of broadcast station listed in section 4.1 may make any changes in the equipment that are deemed desirable or necessary, *Provided:*

(a) That the operating frequency is not permitted to deviate more than the allowed tolerance;

(b) That the emissions are not permitted outside the authorized band;

(c) That the power output complies with the license and the regulations governing the same; and

(d) That the transmitter as a whole or output power rating of the transmitter is not changed.

§ 4.7 Emission authorized.—All classes of broadcast licenses authorize A3 emission only unless otherwise specified in the license. In case A1, A2, A4, A5, or special emission are necessary or helpful in carrying on any phases of experimentation, application setting out fully the needs shall be made to, and authority therefor received from, the Commission.

§ 4.8 Additional orders, as needed.—In case all the general rules and regulations and the specific rules governing each class of broadcast station do not cover all phases of operation or experimentation with respect to external effects, the Commission may make supplemental or additional orders in each case as deemed necessary for operation in the public interest, convenience, and/or necessity.

§ 4.9 Operation.—A licensed operator shall be on duty and in charge of the transmitter of each broadcast station listed in section 4.1. In no case will remote-control operation be authorized. A transmitter is not considered as being operated by remote control when the following conditions prevail:

(a) Continuous reading indicating instruments are before the operator as follows:

(1) Frequency deviation meter.

(2) Percentage modulation indicator.

(3) Spurious emission check (receiver).

(4) Last radio stage plate voltage.

(5) Last radio stage total plate current.

(6) Output or antenna current.

(b) The operator has off-and-on control of the power to the last radio stage.

(c) The operator can reach the transmitter proper in not more than 5 minutes to make any changes or adjustments necessary to maintain proper operation.

§ 4.10 **Rebroadcasts.**[4]—*(a)* The licensee of an international or noncommercial educational broadcast station may, without further authority of the Commission, rebroadcast the program of a United States standard broadcast station, provided the Commission is notified of the call letters of each station rebroadcast and the licensee certified that express authority has been received from the licensee of the station originating the program.[5] (See section 4.43 and 4.132(c) concerning commercial announcements.)

[4]For definition of "rebroadcast" see 3.94(a).

[5]The notice and certification of consent must be given within three (3) days of any single rebroadcast, but in case of the regular practice of rebroadcasting certain programs of a standard broadcast station several times during a license period, notice and certification of consent must be given for the ensuing license period with the application for renewal of license, or at the beginning of such rebroadcast practice if begun during a license period.

Amendment No. 171 (Footnote 8a to Sec. 4.21, effective June 24, 1941)

To be substituted for pp. 5-6, Part 4, Rules Governing Broadcast Services Other Than Standard Broadcast

The last previous amendment affecting Part 4 was amendment No. 151, pp. 9-10, 11-12, 12a

(b) No licensee of an international broadcast station shall rebroadcast the programs of any other class of United States radio station without written authority having first been obtained from the Commission.[6] [7]

(c) The licensee of a noncommercial educational broadcast station may, without further authority of the Commission, rebroadcast the noncommercial programs of a standard broadcast station or an international broadcast station, provided the Commission is notified of the call letters of each station rebroadcast and the licensee certifies that express authority has been received from the licensee of the station originating the program.

(d) No licensee of any other class of broadcast station listed in section 4.1 (television, facsimile, high frequency or developmental) shall rebroadcast the program of any radio station without written authority first having been obtained from the Commission.[7]

(e) A licensee of an international broadcast station may authorize the rebroadcast of its programs by any station outside the limits of the North American Continent without permission from the Commission: *Provided,* That the station rebroadcasting the programs cannot be received consistently in the United States.

(f) An application for authority to rebroadcast the program of any radio station shall be accompanied by written consent or certification of consent of the licensee of the station originating the program.

§4.11 Equipment and program tests.—*(a)* A licensee of a broadcast station listed in section 4.1 shall conduct equipment tests in accordance with section 2.42 and program tests in accordance with section 2.43.

(b) In case the transmitter and associated equipment are on hand in complete form and an application for license was filed and granted with the application for construction permit, then the notification of equipment tests and program tests as required by paragraph *(a)* of this section need not be made.

§4.12 Station and operator licenses; posting of.—*(a)* The station license and any other instrument of authorization or individual order concerning the construction of the equipment or manner of operation of the station shall be posted so that all terms thereof

[6] The broadcasting of a program relayed by a relay broadcast station (section 4.21) is not considered a rebroadcast.

[7] Informal application may be employed

are visible in a conspicuous place in the room in which the transmitter is located: *Provided:*

(1) If the transmitter operator is located at a distance from the transmitter pursuant to section 4.9, the station license shall be posted in the above-described manner at the operating position.

(2) If the station is licensed for portable-mobile operation, the station license or a photo copy thereof shall be affixed to the equipment or kept in the possession of the operator on duty at the transmitter. If a photo copy is used the original license shall be available for inspection by an authorized government representative.

(b) The license of each station operator(s) shall be conspicuously posted at the operating position, *Provided:*

(1) If the station at which the operator is on duty is licensed for portable-mobile operation, the operator's license may be kept in his personal possession.

RELAY BROADCAST STATIONS

§4.21 **Defined.**[8] [8a]—The term "relay broadcast station" means a station licensed to transmit from points where wire facilities are not available, programs for broadcast by one or more broadcast stations, or orders concerning such programs.

§4.22 **Licensing and authorizations.**—*(a)* A license for a relay broadcast station will be issued only to the licensee of a standard broadcast station:[9] *Provided, however,* In cases where it is impractical, impossible, or prohibited by laws or regulations for the licensee of a standard broadcast station to install, operate, or maintain the necessary equipment under its legal control, the Commission may grant special temporary authority for each event to another person to operate as a relay broadcast station equipment already licensed for another service, or equipment which may be installed under section 319 (b) of the Communications Act of 1934 without a construction permit: *And provided further:*

(b) The Commission may license a special relay broadcast station to the licensee of another class of broadcast station provided a need therefor is shown and the relay station will be used only for relaying of programs for broadcast by such broadcast station.

(c) The license of a relay broadcast station authorized the transmission of commercial or sustaining programs, or orders con-

[8] See section 4.5 (a) (6) for special log entry requirements.

[8a] By Order No. 82, dated and effective June 24, 1941, until further order of the Commission, this section is suspended "only insofar as it precludes by definition the use of a relay broadcast station where wire facilities are available for the transmission of programs from points under the jurisdiction of the military or naval establishments of the United States, where the broadcasting of such programs has been requested by the appropriate establishment."

[9] See "Number of Relay Broadcast Stations That Will Be Licensed to Each Holder of Standard Broadcast Station License" as announced by the Commission.

cerning such programs, to be broadcast by its standard broadcast station and other broadcast stations transmitting the same programs simultaneously or a chain program to the network with which the licensee is regularly affiliated. The license of a relay station does not authorize transmission of programs to be broadcast solely by other broadcast stations not aforementioned.

(d) In case a licensee has two or more standard broadcast stations located in different cities, it shall, in applying for a new relay station

or for renewal of license of an existing relay station, designate the standard broadcast station or stations in conjunction with which the relay station is to be operated principally, and it shall not thereafter operate the relay station in conjunction with another of its standard broadcast stations located in a different city for more than a total of 10 days in any 30-day period.

(*e*) Each application for temporary authority to operate a relay broadcast station from a person other than a licensee of a standard broadcast station shall be accompanied by an application for authority to broadcast the program from the licensee of the standard broadcast station proposing the broadcast.

(*f*) An application for special temporary authority to operate another class of station as a relay broadcast station shall specify a group of frequencies allocated in section 4.23: *Provided, however*, In case of events of national interest and importance which cannot be transmitted successfully to the nearest available wire facilities on these frequencies, other frequencies under the jurisdiction of the Commission may be requested, if it is shown that the operation thereon will not cause interference to established stations.

(*g*) An application for special temporary authority to operate on frequencies not allocated by section 4.23, or to operate another class of station as a relay broadcast station, must be received by the Commission not less than 10 days prior to the actual event to be broadcast, and shall contain complete information concerning the frequencies requested, and the license of the station to be used. In case of emergencies, which shall be fully explained in the application, the Commission may waive the 10-day requirement specified herein.

§ 4.23 **Frequency assignment and operation.**—(*a*) The following groups of frequencies are allocated for assignment to relay broadcast stations:

Group A	Group B	Group C	Group D	Group E
Kilocycles	*Kilocycles*	*Kilocycles*	*Kilocycles*	*Kilocycles*
1622	1606	1646	30820	31220
2058	[10] 2074	2090	33740	35620
2150	2102	2190	35820	37020
2790	2758	2830	37980	39260

Group F	Group G	Group H	Group I	Group J
Kilocycles	*Kilocycles*	*Kilocycles*	*Kilocycles*	
31620	33380	156075	156750	Any 4 frequencies above 300000 kc, excluding band 400000 to 401000 kc.
35260	35020	157575	158400	
37340	37620	159975	159300	
39620	39820	161925	161100	

[10] Subject to the condition that no interference is caused to Government stations on adjacent channels.

(*b*) One of the above groups only, including all four frequencies, will be assigned each station. The first application from any metropolitan area for the frequencies in groups A, B, or C shall specify group A; the second group B, and the third group C, the fourth group A again, etc., and likewise for frequencies in groups D, E, F, or G, first application group D, second E, third F, etc. Outstanding assignments not following this order will not be changed unless a need therefor develops. Additional applicants shall specify the next unassigned group in sequence or any other group if it appears interference will be avoided thereby.

(*c*) A station may be licensed for group H when a need for frequencies of this order may be shown.

(*d*) Group I will be licensed to stations to operate with frequency modulation only when need for such operation and frequencies of this order may be shown.

(*e*) Any four specific frequencies under group J will be assigned on experimental operation only and an applicant may apply for the four frequencies which appear most suitable for the experimental work to be conducted.

(*f*) The licensee of a station on group J shall carry on research and experimentation for the advancement of the relay broadcast art and development of these ultra high frequencies for relay broadcast services. An application for authority to operate a station on frequencies in group J shall include a statement concerning the research and experiments to be conducted. The research and experiments shall indicate reasonable promise of substantial contribution to the development of the program relay services.

(*g*) A license authorizes operation on only one of the four assigned frequencies at any one time. In case it is desired to transmit programs and spoken orders concerning such programs simultaneously, two licenses are required though each may specify the same group of frequencies.

§ 4.24 **Frequency selection to avoid interference.**—In case two or more stations are licensed for the same group of frequencies in the same area and in case simultaneous operation is contemplated, the licensees shall endeavor to select frequencies to avoid interference. If a mutual agreement to this effect cannot be reached the Commission shall be notified and it will specify the frequencies on which each station is to be operated.

§ 4.25 **Power limitations.**—(*a*) A relay broadcast station assigned frequencies in groups A, B, C, and J will be licensed to operate with a power output not in excess of that necessary to transmit the program and orders satisfactorily to the receivers and shall not be operated with a power greater than licensed.

Amendment No. 151 (Adopting Secs. 4.27 and 4.38), effective January 8, 1943

To be substituted for pp. 9-10, 11-12, Part 4, Rules Governing Broadcast Services Other Than Standard Broadcast

Part 4 has not been amended previously since its publication in revised form

(b)[11] A relay broadcast station assigned frequencies in groups D, E, F, and G will not be authorized to install equipment or licensed for an output power in excess of 100 watts; *Provided,* That before using any frequency in these groups with a power in excess of 25 watts, tests shall be made by the licensee to insure that no objectionable interference will result to the service of any government station, *And provided further,* That if the use of any frequency may cause interference then the power shall be reduced to 25 watts or another frequency in the licensed group selected which will not cause objectionable interference.

(c)[12] A relay broadcast station assigned frequencies in groups H and I will be licensed to operate with a power output not in excess of that necessary to transmit the program and orders satisfactorily to the receivers and shall not be operated with a power greater than that licensed. In event interference may be caused to stations on adjacent channels, licensees shall endeavor to make arrangements to reduce power to a point where interference will not be objectionable. If a satisfactory arrangement cannot be agreed upon the Commission will determine and specify the maximum power or conditions of operation of each such station.

§4.26 Supplemental report with renewal application.—The licensee of a relay broadcast station assigned frequencies under group J shall submit a supplemental report with and made a part of each application for renewal of license as follows:

(a) Number of hours operated for experimental purposes.

(b) Developments carried on in the relay broadcast service.

(c) Propagation characteristics of the frequencies assigned with regard to relay broadcast service.

(d) All developments or major changes in equipment.

(e) Any other pertinent developments.

§4.27 Station identification.—Each relay broadcast station shall announce its call letters at the beginning and end of each period of operation, and during operation, at least once every hour it either shall announce its call letters or shall make an announcement which will permit it to be identified.

[11] As amended by the Commission, effective November 7, 1939.

[12] As amended by the Commission, effective July 12, 1939.

RULES GOVERNING ST BROADCAST STATIONS

§4.31 Defined.—The term "ST[13] broadcast station" means a station used to transmit programs from the main studio to the transmitter of a high frequency broadcast station, or an international broadcast station.

§4.32 Licensing requirements.—An ST broadcast station will be licensed only to the licensee of a high frequency broadcast station or of an international broadcast station. Only one ST broadcast station will be authorized in connection with the license for any high frequency broadcast station. Not more than two ST broadcast stations will be authorized in connection with the license for any international broadcast station. Each such ST station shall be at a fixed location

§4.33 Service.—The license of an ST broadcast station authorizes the transmission of program material, including commercial programs, from the main studio to the transmitter of the high frequency broadcast station or international broadcast station in connection with which it is authorized.

§4.34 Frequency assignment and operation.—*(a)* The following frequencies are allocated for assignment to ST broadcast stations upon an experimental basis:

Kilocycles	*Kilocycles*	*Kilocycles*	*Kilocycles*	*Kilocycles*
330400	333400	336400	339400	342400
331000	334000	337000	340000	343000
331600	334600	337600	340600	343600
332200	335200	338200	341200	
332800	335800	338800	341800	

(b) ST broadcast stations will be authorized to employ frequency modulation only.

(c) The maximum frequency swing employed by ST broadcast stations shall not be in excess of 200 kilocycles.

(d) The licensee of each ST broadcast station shall install and operate a directional antenna designed so that the gain in power toward the receiver shall be 10 (field gain 3.16) times the free space field from a doublet (137.6 mv/m for 1 kw at 1 mile). In all other directions 30° or more off the line to receiver, the power gain shall not exceed one-fourth the free space field gain from a doublet.

§4.35 Power.—ST broadcast station will be licensed with a power output not in excess of that necessary to render a satisfactory service.

§4.36 Required experimentation.—The licensee of each ST broadcast station is required to conduct experimentation with regard to the following:

[13]The abbreviation "ST" is derived from "studio-transmitter."

(a) Design of equipment and power required to render a satisfactory service.

(b) Design and adjustment of directional transmitting antenna.

(c) Design and location of receiving antennas.

§4.37 Supplemental report with renewal application.—A supplemental report shall be filed with and made a part of each application for renewal of application and shall include statements as to the following items:

(a) Total hours of operation.

(b) Continuity of service, causes and duration of any interruptions.

(c) Power required to deliver satisfactory signal at receiver.

(d) Data on design, adjustments, and operation of directional receiving and transmitting antennas.

(e) Interference to service resulting from other stations or other sources.

(f) Cost of transmitter and receiver installation and expense of operation.

(g) Over-all fidelity of equipment, frequency and amplitude.

§4.38 Station identification.—Each ST broadcast station shall announce its call letters at the beginning and end of each period of operation, and during operation, at least once every hour it either shall announce its call letters or shall make an announcement which will permit it to be identified.

INTERNATIONAL BROADCAST STATIONS

§4.41 Defined.—The term "international broadcast station" means a station licensed for the transmission of broadcast programs for international public reception. (Frequencies for these stations are allocated from bands assigned [between 6000 and 26600 kilocycles] for broadcasting by international agreement.)

§4.42 Licensing requirements; necessary showing.—A license for an international broadcast station will be issued only after a satisfactory showing has been made in regard to the following, among others:

(a) That there is a need for the international broadcast service proposed to be rendered.

(b) That the necessary program sources are available to the applicant to render an effective international service.

(c) That the technical facilities are available on which the proposed service can be rendered without causing interference to established international stations having prior registration and occupancy

in conformity with existing international conventions or regulations on the frequency requested.[14]

(d) That directive antennas and other technical facilities will be employed to deliver maximum signals to the country or countries for which the service is designed.

(e) That the production of the program service and the technical operation of the proposed station will be conducted by qualified persons.

(f) That the applicant is technically and financially qualified and possesses adequate technical facilities to carry forward the service proposed.

(g) That the public interest, convenience and necessity will be served through the operation of the proposed station.

§4.43 Service; commercial or sponsored programs.—*(a)*[15] A licensee of an international broadcast station shall render only an international broadcast service which will reflect the culture of this country and which will promote international goodwill, understanding, and cooperation. Any program solely intended for, and directed to an audience in the continental United States does not meet the requirements for this service.

(b) Such international broadcast service may include commercial or sponsored programs: *Provided,* That--

(1) Commercial program continuities give no more than the name of the sponsor of the program and the name and general character of the commodity, utility or service, or attraction advertised.

(2) In case of advertising a commodity, the commodity is regularly sold or is being promoted for sale on the open market in the foreign country or countries to which the program is directed in accordance with paragraph (c) of this section.

(3) In case of advertising an American utility or service to prospective tourists or visitors to the United States, the advertisement continuity is particularly directed to such persons in the foreign country or countries where they reside and to which the program is directed in accordance with paragraph (c) of this section.

(4) In case of advertising an international attraction (such as a world fair, resort, spa, etc.) to prospective tourists or visitors to the United States, the oral continuity concerning such attraction is consistent with the purpose and intent of this section.

(5) In case of any other type of advertising, such advertising is directed to the foreign country or countries and to which the program is directed in accordance with paragraph (c) of this section and is consistent with the purpose and intent of this section.

[14] See General Radio Regulations annexed to the International Telecommunications Convention, Madrid, 1932, art. 7. Prior to September 1, 1939, and thereafter see Cairo General Radio Regulations, art. 7, annexed to the International Telecommunications Conferenees, Cairo, Egypt, 1938. Also, see list of assignments to international channels prepared by the Bureau of the International Telecommunications Union, Berne, Switzerland.

[15] The Commission on July 14, 1939, suspended the operation of seetion 4.43 (a) until further order of the Commission.

(c) The areas or zones established to be served by international broadcast stations are the foreign countries of the world, and directive antennas shall be employed to direct the signals to specific countries. The antenna shall be so designed and operated that the signal (field intensity) toward the specific foreign country or countries served shall be at least 3.16 times the average effective signal from the station (power gain of 10).

(d) An international broadcast station may transmit the program of a standard broadcast station or network system: *Provided*, The conditions in paragraph (b) of this section in regard to any commercial continuities are observed and when station identifications are made, only the call letter designation of the international station is given on its assigned frequency: *And provided further*, That in the case of chain broadcasting[16] the program is not carried simultaneously by another international station (except another station

[16]See sec. 3 (p) of the Communications Act of 1934 for the definition of "chain broadcasting."

owned by the same licensee operated on a frequency in a different group to obtain continuity of signal service), the signals from which are directed to the same foreign country or countries.

(*e*) Station identification, program announcements, and oral continuity shall be made with international significance (language particularly) which is designed for the foreign country or countries for which the service is primarily intended.

(*f*) (1) Each licensee of an international broadcast station shall make verbatim mechanical records of all international programs transmitted.

(2) The mechanical records, and such manuscripts, transcripts, and translations of international broadcast programs as are made shall be kept by the licensee for a period of two years after the date of broadcast and shall be furnished the Commission or be available for inspection by representatives of the Commission upon request.

(3) If the broadcast is in a language other than English the licensee shall furnish to the Commission upon request such record and scripts together with complete translations in English.

§ 4.44 **Frequency assignment.**—(*a*) The following groups of frequencies are allocated for assignment to international broadcast stations:

Group A	Group B	Group C	Group D
Kilocycles	*Kilocycles*	*Kilocycles*	*Kilocycles*
6040	9530	11710	[17] 15130
6060	[17] [18] 9550	[17] [18] 11730	15150
6080	9570	11790	15210
6100	9590	11820	15250
[17] 6120	9650	11830	15270
6140	9670	11870	15330
6170		11890	15350
6190			

Group E	Group F	Group G
Kilocycles	*Kilocycles*	*Kilocycles*
17750	21460	25600
17760	[17] [18] 21500	25625
17780	21520	25650
17800	21540	25675
17830	21570	25700
	21590	25725
	21610	25750
	21630	25775
	21650	25800
		25825
		25850

[17] Authorizations for international broadcast stations which permit operation on these frequencies shall be subject to the condition that the authorizations for these frequencies may be modified by the Commission to delete these frequencies without advance notice or hearing.

[18] Authorizations for international broadcast stations which permit operation on these frequencies shall be subject to the condition that there shall be no commercial or advertising announcements of any kind in the programs broadcast through the medium of these frequencies, and that the names of program sponsors shall not be broadcast.

(*b*) Additional frequencies allocated by international agreement may be assigned to international broadeast stations subjeet to the eonditions that no objectionable interference results to the service of foreign international broadcast stations whieh, in the opinion of the Commission, have priority of assignment.

(*c*) Any frequeney lieensed to an international broadcast station shall also be available for assignment to other international broadcast stations, provided no objeetionable interference is eaused to the service of any United States international broadeast station.

(*d*) An international broadcast station will not be authorized to use more than one frequency listed in any group listed in paragraph (*a*) without a showing of technical neeessity.

(*e*) Not more than one frequency shall be used simultaneously under the same authorization and call letter designation.

§ 4.45 **Power requirement.**—No international broadcast station will be authorized to install equipment or lieensed for operation with a power less than 50 kilowatts.[19]

§ 4.46 **Supplemental report with renewal application.**—A supplemental report shall be filed with and made a part of each application for renewal of lieense and shall include statements of the following:

(*a*) The number of hours operated on eaeh frequency.

(*b*) A list of programs transmitted of special international interest.

(*c*) Outline of reports of reception and interferenee and eonelusions with regard to propagation charaeteristies of the frequeney assigned.

§ 4.47 **Frequency control.**—The transmitter of eaeh international broadcast station shall be equipped with automatie frequency eontrol apparatus so designed and eonstrueted that it is capable of maintaining the operating frequency within plus or mius 0.005 percent of the assigned frequency.[20]

VISUAL BROADCAST SERVICE

§ 4.61 **Defined.**—The term "visual broadeast serviee" means a serviee rendered by stations broadeasting images for general public reeeption. There are two elasses of stations reeognized in the visual broadeast serviee, namely: Television broadeast stations and faesimile broadcast stations.

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[19] This provision shall become effective as applying to existing stations July 1, 1941.

[20] See section 4.1 This provision shall become effective as applying to existing stations January 1, 1941.

EXPERIMENTAL TELEVISION BROADCAST STATIONS

§ 4.71 **Defined.**—(*a*) The term "experimental television broadeast station" means a station licensed for experimental transmission of transient visual images of moving or fixed objects for simultaneous reception and reproduction by the general public.[21]

(*b*) Under these rules for experimental television broadcast stations. the Commission will authorize experimental television relay broadeast stations for transmitting from points where suitable wire facilities are not available, programs for broadcast by one or more television broadcast stations. Such authorization will be granted only to the licensee of a television broadcast station.

§ 4.72 **Purpose.**—A license for an experimental television broadcast station will be issued for the purpose of carrying on research and experimentation for the advancement of television broadcasting which may include tests of equipment, training of personnel, and experimental programs as are necessary for the experimentation.

§ 4.73 **Licensing requirements, necessary showing.**—A license for a television broadcast station will be issued only after a satisfactory showing has been made in regard to the following:

(1) That the applicant has a definite program of researeh and experimentation in the technical phases of television broadcasting, which indicates reasonable promise of substantial contribution to the developments of the television art.

(2) That upon the authorization of the proposed station the applicant can and will proceed immediately with its program of research and experimentation.

(3) That the transmission of signals by radio is essential to the proposed program of research and experimentation.

(4) That the program of research and experimentation will be eonducted by qualified personnel.

(5) That the applicant is legally, financially, technically, and otherwise qualified to carry forward the program.

(6) That public interest, convenience or necessity will be served through the operation of the proposed station.

§ 4.74 **Charges.**—No charges, either direct or indireet, shall be made by the licensee of an experimental television station for the production or transmission of either aural or visual programs transmitted by sueh station except that this section shall not apply to the transmission of commercial programs by an experimental television relay broadcast station for retransmission by a television broadcast station.

[21] The transmission of synchronized sound (aural broadcast) is considered an essential phase of television broadcast and one license will authorize both visual and aural broadcast.

§ 4.75 **Announcements.**—(*a*) *Station identification.*—A licensee of a television broadcast station shall make station identification announcement aurally and visually (call letters and location) at the beginning and ending of each time of operation and during operation on the hour.

(*b*) At the time station identification announcements are made there shall be added the following:

> *This is a special television broadcast made by authority of the Federal Communications Commission for experimental purposes.*

§ 4.76 **Operating requirements.**—(*a*) Each licensee of a television broadcast station shall diligently prosecute its program of research from the time its station is authorized.

(*b*) Each licensee of a television station will, from time to time, make such changes in its operations as may be directed by the Commission for the purpose of promoting worthwhile experimentation and improvement in the art of television broadcasting.

§ 4.77 **Frequency assignment.**—(*a*) The following groups of channels are available for assignment to television broadcast stations licensed experimentally:

Group A		Group B		Group O
Channel No.	Kilocycles	Channel No.	Kilocycles	
1	50000– 56000	8	162000–168000	Any 6000 kc. band above 300000 kc., excluding band 400000 to 401000 kc.
2	60000– 66000	9	180000–186000	
3	66000– 72000	10	186000–192000	
4	78000– 84000	11	204000–210000	
5	84000– 90000	12	210000–216000	
6	96000–102000	13	230000–236000	
7	102000–108000	14	236000–242000	
		15	258000–264000	
		16	264000–270000	
		17	282000–288000	
		18	288000–294000	

(*b*) No experimental television broadcast station will be authorized to use more than one channel in group A except for good cause shown. Both aural and visual carriers with side bands for modulation are authorized but no emission shall result outside the authorized channel.

(*c*) No persons (including all persons under common control) shall control directly or indirectly, two or more experimental television broadcast stations (other than television relay broadcast stations)

unless a showing is made that the character of the programs of research require a licensing of two or more separate stations.

(*d*) A license for an experimental television broadcast station will be issued only on the condition that no objectionable interference will result from the transmissions of the station to the regular program transmissions of television broadcast stations. It shall at all times be the duty of the licensee of an experimental television broadcast station to ascertain that no interference will result from the transmissions of its station. With regard to interference with the transmissions of an experimental television broadcast station or the experimental or test transmissions of a television broadcast station, the licensees shall make arrangements for operations to avoid interference.

(*e*) Channels in groups B and C may be assigned to experimental television stations to serve auxiliary purposes such as television relay stations. No mobile or portable station will be licensed for the purpose of transmitting television programs to the public directly.

§ 4.78 **Power.**—The operating power of a television station shall be adequate for but not in excess of that necessary to carry forward the program of research and in no case in excess of the power specified in its license.

§ 4.79 **Reports.**—(*a*) A report shall be filed with each application for renewal of station license which shall include a statement of each of the following:

(1) Number of hours operated.

(2) Full data on research and experimentation conducted including the type of transmitting and studio equipment used and their mode of operation.

(3) Data on expense of research and operation during the period covered.

(4) Power employed, field intensity measurements and visual and aural observations and the types of instruments and receivers utilized to determine the service area of station and the efficiency of respective types of transmissions.

(5) Estimated degree of public participation in reception and the results of observations as to the effectiveness of types of transmission.

(6) Conclusions, tentative and final.

(7) Program for further developments in television broadcasting.

(8) All developments and major changes in equipment.

(9) Any other pertinent developments.

(*b*) Special or progress reports shall be submitted from time to time as the Commission shall direct.

FACSIMILE BROADCAST STATIONS

§ 4.91 **Defined.**—The term "facsimile broadcast station" means a station licensed to transmit images of still objects for record reception by the general public.

§ 4.92 **Licensing requirements.**—A license for a facsimile broadcast station will be issued only after a satisfactory showing has been made in regard to the following among others:

(*a*) That the applicant has a program of research and experimentation which indicates reasonable promise of substantial contribution to the development of the facsimile broadcast service.

(*b*) That sufficient facsimile recorders will be distributed to accomplish the experimental program proposed.

(*c*) That the program of research and experimentation will be conducted by qualified engineers.

(*d*) That the applicant is legally and financially qualified and possesses adequate technical facilities to carry forward the program.

(*e*) That the public interest, convenience, and/or necessity will be served through the operation of the proposed station.

§ 4.93 **Charges prohibited; restrictions.**—(*a*) A licensee of a facsimile broadcast station shall not make any charge, directly or indirectly, for the transmission of programs.

(*b*) No licensee of any standard broadcast station or network shall make any additional charge, directly or indirectly, for the transmission of some phase of the programs by a facsimile broadcast station, nor shall commercial accounts be solicited by any licensee of a standard broadcast station or network, or others acting in their behalf, upon representation that images concerning that commercial program will be transmitted by a facsimile station.

§ 4.94 **Frequency assignment.**—(*a*) The following groups of frequencies are allocated for assignment to facsimile broadcast stations which will be licensed experimentally only:

Group A	Group B	Group C
Kilocycles	*Kilocycles*	
25025	43540	Any frequency above 300000 kc. excluding band 400000 to 401000 kc.
25050	43580	
25075	43620	
25100	43660	
25125	43700	
25150	43740	
25175	43780	
25200	43820	
25225	43860	
25250	43900	
	43940	

(*b*) Other broadcast or experimental frequencies may be assigned for the operation of facsimile broadcast stations on an experimental basis provided a sufficient need therefor is shown and no interference will be caused to established radio stations.

(*c*) One frequency only will be assigned to a facsimile station from the groups in paragraph (*a*) of this section. More than one frequency may be assigned under provisions of paragraph (*b*) of this section if a need therefor is shown.

(*d*) Each applicant shall specify the maximum modulating frequencies proposed to be employed.

(*e*) The operating frequency of a facsimile broadcast station shall be maintained in accordance with the frequency tolerance given in section 4.1: *Provided, however*, Where a lesser tolerance is necessary to prevent interference, the Commission will specify the tolerance.

(*f*) A facsimile broadcast station authorized to operate on frequencies regularly allocated to other stations or services shall be required to abide by all rules governing the stations regularly operating thereon, which are applicable to facsimile broadcast stations and are not in conflict with sections 4.1 to 4.11, inclusive, of these rules.

§ 4.95 **Power.**—The operating power of a facsimile broadcast station shall not be in excess of that necessary to carry forward the program of research: *Provided, however*, Not more than 1,000 watts will be authorized on a frequency in group A. The operating power may be maintained at the maximum rating or less, as the conditions of operation may require.

§ 4.96 **Supplemental report with renewal application.**—A supplemental report shall be filed with and made a part of each application for renewal of license and shall include statements of the following:

(*a*) Number of hours operated for transmission of facsimile programs.

(*b*) Comprehensive report of research and experimentation conducted.

(*c*) Conclusions and program for further developments of the facsimile broadcast service.

(*d*) All developments and major changes in equipment.

(*e*) Any other pertinent developments.

HIGH FREQUENCY BROADCAST STATIONS

§ 4.111 **Defined.**—The term "high frequency broadcast station" means a station licensed on frequencies above 25000 kilocycles for transmission of aural programs for general public reception.

§ 4.112 **Licensing requirements; necessary showing.**—A license for a high frequency broadcast station will be issued only after a satisfactory showing has been made in regard to the following, among others:

(*a*) That the applicant has a program of research and experimentation which indicates reasonable promise of substantial contribution to the development of high frequency broadcasting.

(*b*) That substantial data will be taken on the propagation characteristics of these frequencies; on the noise level in different parts of the city; on the field intensity necessary to render good broadcast service; on antenna design and characteristics with respect to propagation; and on other allied phases of broadcast coverage.

(*c*) That the research and experimentation will be conducted by qualified engineers.

(*d*) That the applicant is legally and financially qualified and possesses adequate technical facilities to carry forward the program.

(*e*) That the public interest, convenience, and necessity will be served through the operation of the proposed station.

§ 4.113 **Charges prohibited; restrictions and announcements.**—(*a*) A licensee of a high frequency broadcast station shall not make any charge, directly or indirectly, for the transmission of programs, but may transmit the programs of a standard broadcast station or network including commercial programs, if the call letter designation when identifying the high frequency broadcast station is given on its assigned frequencies only and the statement is made over the high frequency broadcast station that the program of a standard broadcast station or network (identify by call letters or name of network) is being broadcast. Immediately following any announcement of the call letter designation of a standard broadcast station, the program from which is being broadcast over a high frequency broadcast station, the call letter designation of the high frequency broadcast station shall be given. In case of the rebroadcast of the program of any broadcast station, section 4.10 applies.

(*b*) No licensee of any standard broadcast station or network shall make any additional charge, directly or indirectly, for the simultaneous transmissions of programs by the high frequency broadcast station, nor shall commercial accounts be solicited by a licensee of a standard broadcast station or network, or by others acting in their behalf upon representation that the commercial program will also be transmitted by a high frequency broadcast station.

§ 4.114 **Frequency assignment.**—(*a*) The following groups of frequencies are allocated for assignment to high frequency broadcast stations:

Group A	Group B	Group C	Group D
Kilocycles	*Kilocycles*	*Kilocycles*	*Kilocycles*
25300	25900	26300	42060
25325	25925	26500	42100
25350	25950	26700	42140
25375	25975	26900	42180
25400	26000		42220
25425	26025		42260
25450	26050		42300
25475	26075		42340
25500	26100		42380
25525	26125		42420
25550	26150		42460

Group E	Group F	Group G	Group H
Kilocycles	*Kilocycles*	*Kilocycles*	
42600	116590	117190	Any frequency above 300000 kc., excluding band 400000 to 401000 kc.
42800	116710	117430	
43000	116830	117670	
43200	116950	117910	
43400	117070		

(*b*) A station assigned a frequency in group A, B, D, or F is authorized to operate exclusively with amplitude modulation (maximum band width of emission 30 kc). A station assigned a frequency in group C, E, or G is authorized to operate exclusively with frequency modulation (maximum band width of emission 200 kc). A station assigned a frequency in group H is authorized to operate with either amplitude or frequency modulation with the above band widths of emission as applicable.

(*c*) Stations serving the same area will not be assigned frequencies separated less than the following:

Group A or B—100 kc.

Group D—160 kc.

Groups C, E, F, G, or H—To be determined.

(*d*) One frequency only in a group will be assigned to a station. A station assigned a frequency in group A, B, or C will not be assigned another frequency. A station assigned a frequency in group D may also be assigned a frequency in group F, and in group E, also in group G. In case more than one frequency is assigned to a station, the license authorizes operation on only one of the frequencies at one time.

(*e*) A licensee of a station assigned a frequency in group A or one of the last two frequencies in group C shall make the necessary ob-

servations to determine that no interference is caused to international mobile service and international fixed service respectively; and that the operation is in accordance with international agreements on the assignments of stations to this band. If interference is caused to such services the licensee may be required to reduce the operating power of the station or cease operation until the Commission deems no further interference will result.

§ 4.115 **Power.**—(*a*) No high frequency broadcast station will be licensed for an output power rating greater than 1000 watts unless the applicant can show that greater power is needed to carry on a special program of research: *Provided, however*, In no case will an operating power greater than 1000 watts be authorized to a station assigned a frequency in group A or one of the last two frequencies in group C.

(*b*) While conducting apparatus experiments and in case adequate signal for reliable service can be delivered with less power, the operating output may be reduced accordingly.

§ 4.116 **Frequency control.**—Each high frequency broadcast station transmitter shall be equipped with automatic frequency control apparatus so designed and constructed that it is capable of maintaining the operating frequency within plus or minus 0.01 percent of the assigned frequency.

§ 4.117 **Supplemental report with renewal application.**—A supplemental report shall be filed with each and made a part of the application for renewal of license and shall include statements of the following, among others:

(*a*) The number of hours operated.

(*b*) Data taken in compliance with section 4.112 (*b*).

(*c*) Outline of reports of reception and interference and conclusions with regard to propagation characteristics of the frequency assigned.

(*d*) Research and experiments being carried on to improve transmission and to develop broadcasting on the very high frequencies.

(*e*) All developments or major changes in equipment.

(*f*) Any other pertinent developments.

(*g*) Comprehensive summary of all reports received. See section 4.114 (*e*).

NONCOMMERCIAL EDUCATIONAL BROADCAST STATIONS

§ 4.131 **Defined.**—The term "noncommercial educational broadcast station" means a station licensed to an organized nonprofit educational agency for the advancement of its educational work and for

Correction Sheet No. 11 (Correcting Sec. 4.153(b)).
To be substituted for pp. 23-24, Part 4, Rules Governing Broadcast Services Other Than Standard Broadcast
Part 4 as revised to May 14, 1942 has not been corrected previously.

the transmission of educational and entertainment programs to the general public.

§ 4.132 Operation and service.—The operation of, and the service furnished by, noncommercial educational broadcast stations shall be governed by the following regulations:

(a) A noncommercial educational broadcast station will be licensed only to an organized nonprofit educational agency and upon a showing that the station will be used for the advancement of the agency's educational program particularly with regard to use in an educational system consisting of several units.

(b) Each station may transmit programs directed to specific schools in the system for use in connection with the regular courses as well as routine and administrative material pertaining to the school system and may transmit educational and entertainment programs to the general public.

(c) Each station shall furnish a nonprofit and noncommercial broadcast service. No sponsored or commercial program shall be transmitted nor shall commercial announcements of any character be made. A station shall not transmit the programs of other classes of broadcast stations unless all commercial announcements and commercial references in the continuity are eliminated.

§ 4.133 Power.—The operating power of noncommercial educational broadcast stations shall be not less than 100 watts or greater than 1000 watts unless a definite need for greater power is shown.

§ 4.134 Frequency control.—The transmitter of each noncommercial educational broadcast station shall be equipped with automatic frequency control apparatus so designed and constructed that it is capable of maintaining the operating frequency within plus or minus 0.01 percent of the assigned frequency.

§ 4.135 Operating Schedule.—Noncommercial educational broadcast stations are not required to operate on any definite schedule or minimum hours.

§ 4.136 Equipment requirements.—The transmitting equipment, installation, and operation as well as the location of the transmitter shall be in conformity with the requirements of good engineering practice as released from time to time by the Commission.

§ 4.137 Frequencies.—(a) The following frequencies are allocated for assignment to noncommercial educational broadcast stations:

Kilocycles—42100, 42300, 42500, 42700, and 42900.

(b) Stations serving the same area will not be assigned adjacent frequencies.

(c) Frequency modulation shall be employed exclusively unless it is shown that there is a special need for the use of amplitude modulation.

(d) Only one frequency will be assigned to a station.

DEVELOPMENTAL BROADCAST STATIONS

§ 4.151 **Defined.**—The term "developmental broadcast station" means a station licensed to carry on development and research for the advancement of broadcast services along lines other than those prescribed by other broadcast rules or a combination of closely related developments that can be better carried on under one license.

§ 4.152 **Licensing requirements; necessary showing.**—*(a)* Licenses for developmental broadcast stations will be issued only after a satisfactory showing has been made in regard to the following, among others:

(1) That the applicant has a program of research and development which cannot be successfully carried on under any of the classes of broadcast stations already allocated, or is distinctive from those classes, or combination of closely related developments that involve different phases of broadcasting which can be pursued better under one license.

(2) That the program of research has reasonable promise of substantial contribution to the development of broadcasting, or is along lines not already thoroughly investigated.

(3) That the program of research and experimentation will be conducted by qualified persons.

(4) That the applicant is legally and financially qualified and posesses adequate technical facilities to carry forward the program.

(5) That the public interest, convenience, and necessity will be served through the operation of the proposed station.

(b) A separate developmental broadcast station license will be issued for each major development proposed to be carried forward. When it is desired to carry on several independent developments, it will be necessary to make satisfactory showing and obtain a license for each.

§ 4.153 **Program service; charges prohibited; announcements.**—*(a)* A license of developmental broadcast stations shall broadcast programs when they are necessary to the experiments being conducted. No regular program service shall be broadcast unless specifically authorized by the license.

(b) A licensee of a developmental broadcast station shall not make any charge, directly or indirectly, for the transmission of programs, but may transmit the programs of a standard broadcast station or network including commercial programs, if the call letter designation when identifying the developmental broadcast station is given on its assigned frequency only and the statement is made over the developmental broadcast station that the program of a broadcast station or network (identify by call letters or name of network) is being

Amendment No. 195 (Adopting Sec. 4.264(*d*)) effective October 28, 1943
To be substituted for pp. 33-34, Part 4, Rules Governing Broadcast Services Other Than Standard Broadcast
The last previous amendment affecting Part 4 was amendment No. 194, pp. 3-4, 4a

(ii) Frequency monitor readings.

(c) Log of experimental operation when transmitting other than a standard television signal.

(1) Entry of the time the station begins to supply power to the antenna and the time it stops.

(2) Short description of the broadcast made and its technical purpose.

(d) Where an antenna or antenna supporting structure(s) is required to be illuminated the licensee shall make entries in the radio station log appropriate to the requirements of section 2.82(*a*), *(b)*, and *(c)* as follows:

(1) The time the tower lights are turned on and off if manually controlled.

(2) The time the daily visual observation of the tower lights was made.

(3) In the event of any observed failure of a tower light,

(i) Nature of such failure.

(ii) Time the failure was observed.

(iii) Time and nature of the adjustments, repairs or replacements made.

(iv) Airways Communication Station (C.A.A.) notified of the failure of any tower light not corrected within thirty minutes and the time such notice was given.

(v) Time notice was given to the Airways Communication Station (C A.A.) that the required illumination was resumed.

(4) Upon completion of the periodic inspection required at least once each three months,

(i) The date of the inspection and the condition of all tower lights and associated tower lighting control devices.

(ii) Any adjustments, replacements or repairs made to insure compliance with the lighting requirements.

§ 4.265 Logs; retention of.—Logs of a television broadcast station shall be retained by the licensee for a period of 2 years, except when required to be retained for a longer period in accordance with the provisions of section 2.54.

BROADCASTS BY CANDIDATES FOR PUBLIC OFFICE

§ 4.281 The provisions of sections 3.421 to 3.424, both inclusive, of the Rules and Regulations Governing Standard and High Frequency Broadcast Stations shall also govern television broadcast stations.

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STANDARDS OF GOOD ENGINEERING PRACTICE APPLICABLE TO NONCOMMERCIAL EDUCATIONAL BROADCAST STATIONS

Section 4.136 specifies that the transmitting equipment of all noncommercial educational broadcast stations shall be designed, constructed, installed, and operated in conformity with the requirements of good engineering practice as specified from time to time by the Commission. Also the location of the transmitter shall conform with the same requirements. The general principles of these requirements to insure satisfactory service from the station are enunciated below for the guidance of applicants and licensees. These principles are based on the best information available at this time but since the development of transmission and reception on the very high frequencies is only in the early stages, these standards may be departed from in case experience warrants the same. Each case will be treated on its individual merits as to details. The general principles are as follows:

1. TRANSMITTER AND ANTENNA LOCATION

To accomplish satisfactory coverage of any area, it is necessary that the transmitter and antenna be located at or near the highest point in such an area and as near the center thereof as obtainable, and yet meet the height requirements. The area that it is desired to serve may be only a section of the city, and the site should permit placing the antenna higher than the surrounding buildings or obstructions so as to include as large an area as possible within the line of sight from the antenna. In compromising between height and central location it is generally considered the height is of more importance. Any area behind a large hill or in a valley out of the line of sight from the antenna may receive materially reduced signal depending upon several factors as to the formation of the hill, distance, receiving conditions, etc.

2. ANTENNA SYSTEM

Since at the frequencies allocated for this service, one-half wave length is only approximately 12 feet, the antenna system design may vary within wide limits without unreasonable expense even for a very elaborate installation. It has not been definitely determined whether

horizontal or vertical polarization is superior. However, it is considered that at the frequencies of these stations horizontal polarization (radiating element horizontal) is superior for general broadcast purposes.

In addition to meeting the above requirement relative to location, the antenna itself should be above the immediate surrounding obstructions as explained above. Where a central location is not obtainable, a directional antenna for increasing the service in the farther areas should be considered. In cases where the radiating elements are horizontal, consideration should be given to concentrating the radiation in a small angle with the horizontal by means of several elements in vertical planes at right angles.

3. Transmitter Design and Construction

The transmitter shall be capable of delivering satisfactorily the authorized power with modulation of at least 85 percent with combined audio frequency harmonics generated by the transmitter not in excess of 10 percent. The system of modulation is not prescribed, but must be a system that has been tested and proven satisfactory in operation. The carrier hum and extraneous noise level shall be kept at a minimum and shall be at least 50 decibels below 100 percent modulation. Automatic frequency control shall be provided for automatically maintaining the operating frequency within 0.01 percent of the assigned frequency. Adequate margin shall be provided in all component parts to avoid overheating at the maximum rated power output. The maximum output power rating will be accepted as that given by the manufacturer unless it appears unsatisfactory. The transmitter shall be constructed in keeping with modern practice as to frame, panels and mounting, complete shielding, safety of life provisions, proper wiring, adequate meters (plate voltage, total plate current, output RF current, and others, as required) and control facilities.

4. Installation of Equipment

The installation must be made in a room suitable for the purpose. Exposed high voltage leads or connections should not be permitted. The output connection shall be made through suitable bushings with protection from contact. A transmission line to antenna is recommended in all except very special cases. As an operator is required on duty during all operation, suitable facilities for his welfare and comfort shall be provided.

5. Operation of Station

The transmitter shall be so tuned and operated that the radio frequency harmonics and spurious radiations are reduced to a minimum in keeping with current practice. Percentage of modulation should be maintained as high as practical without over-modulation, which results in excessive distortion or spurious emissions. Adequate facilities for checking the modulation and general operation are required. A frequency monitor is required by section 4.2.

Any phase of construction, operation, etc., which is not clear from these specifications, shall be further determined from the standards of good engineering practice applicable to standard broadcast stations in so far as not in disagreement with these standards.

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SUBPART D—RULES GOVERNING TELEVISION BROADCAST STATIONS

CLASSIFICATION OF TELEVISION STATIONS AND ALLOCATION OF FREQUENCIES

§ 3.601 Numerical designation of television channels.—The channels or frequency bands set forth below are available for television broadcast stations.

Channel No.	Megacycles	Channel No.	Megacycles
1	44 - 50	7	174 - 180
2	54 - 60	8	180 - 186
3	60 - 66	9	186 - 192
4	66 - 72	10	192 - 198
5	76 - 82	11	198 - 204
6	82 - 88	12	204 - 210
		13	210 - 216

§ 3.602 Sharing of television channels.—Channels 1 through 5 and 7 through 13 are available for assignment to radio services other than television upon a showing that no mutual interference will result.

§ 3.603 Community stations.—*(a)* A Community station is designed primarily for rendering service to the smaller metropolitan districts or principal cities. Television channel No. 1 is assigned exclusively for Community stations. Channels 2 to 13, inclusive, can also be used for Community stations provided such use complies with Section 3.606.

(b) The power of a Community station may not exceed an effective radiated peak power of 1 kilowatt. The maximum antenna height for such stations shall be 500 feet above the average terrain as determined by methods prescribed in the Standards of Good Engineering Practice concerning Television Broadcast Stations.

(c) The main studio of a Community station shall be located in the city or town served and the transmitter shall be located as near the center of the city as practicable.

§ 3.604 Metropolitan stations.—Metropolitan stations may be assigned to television channels 2 through 13, both inclusive. They are designed primarily to render service to a single metropolitan district or a principal city and to the rural area surrounding such metropolitan district or principal city.

(b) Metropolitan stations are limited to a maximum of 50 kilowatts effective radiated peak power with antenna having a height of 500 feet above the average terrain, as determined by the methods prescribed in Standards of Good Engineering Practice concerning Television Broadcast Stations. Where higher antenna heights are available, they should be used but in such cases the Commission may authorize less than 50 kilowatts effective radiated peak power so that the coverage (within the 5000 uv/m contour) shall be substantially similar to that which would be provided by 50 kilowatts effective radiated peak power and a 500 foot antenna. Where it is shown that an antenna

height of 500 feet is not available, the Commission may authorize the use of a lower height antenna but will not permit an increase in radiated power in excess of 50 kilowatts. The service area of Metropolitan stations will not be protected beyond the 5000 uv/m contour and such stations will be located in such a manner as to insure, insofar as possible, a maximum of television service to all listeners, whether urban or rural.

(c) The main studio for Metropolitan stations shall be located in the city or metropolitan district with which the station is associated and the transmitter should be located so as to provide the maximum service to the city or metropolitan district served.

§ 3.605 **Rural stations.**--*(a)* Licensees of Metropolitan stations or applicants who desire to qualify as licensees of Rural stations must make a special showing to the Commission that they propose to serve an area more extensive than that served by a Metropolitan station and that the additional area proposed to be served is predominantly rural in character. In addition, a showing must be made that such use of the channel will not cause objectionable interference to other television stations or prevent the assignment of other television stations where there is reasonable evidence of the probability of such station being located in the future.

(b) Channels 2 through 13 are available for assignment to Rural stations. The service area of Rural stations will be determined by the Commission.

(c) The main studio of Rural stations shall be located within the 500 uv/m contour.

§ 3.606 **Table showing allocation of television channels to metropolitan districts in the United States.**—(a) The table below sets forth the channels which are available for the areas indicated. The table below will be revised from time to time depending upon the demand for television stations which may exist in the various cities. Where it is desired to use a different channel in any such area, or to use one of the channels in another area conflicting therewith, it must be shown that public interest, convenience, or necessity will be better served thereby than by the allocation set forth in the table.

(b) Only the first 140 metropolitan districts are listed in the table below. Stations in other metropolitan or city areas not listed in the table will not be assigned closer than 150 miles on the same channel or 75 miles on adjacent channels, except upon an adequate showing that public interest, convenience, or necessity would be better served thereby or that by using lower power or by other means equivalent protection is provided.

(c) Persons desiring to enter into a voluntary sharing arrangement of a television channel may file application therefor with the Commission pursuant to the provisions of Section 3.661(c).

Metropolitan District (U.S. Census 1940)	Sales Rank	Population	Channel Nos.		Total Stations	
			Metro-politan	Community	Metro-politan	Community
Akron	35	349,705	11		1	
(Albany (Schenectady (Troy	23	431,575	2,4,7,9,11		5	
(Allentown (Bethlehem (Easton	43	325,142		8		1
Altoona	111	114,094	9		1	
Amarillo	136	53,463	2,4,5,7		4	
Asheville	132	76,324	5,7,12		3	
Atlanta	25	442,294	2,5,8,11		4	
Atlantic City	83	100,096		8		1
Augusta, Ga.	135	87,809	6,12		2	
Austin	106	106,193	8,10,12		3	
Baltimore	13	1,046,692	2,11,13		3	
(Beaumont (Port Arthur	90	138,608	3,6,8,10		4	
Binghamton	75	145,156	12		1	
Birmingham	42	407,851	4,9,13		3	
Boston	5	2,350,514	2,4,7,9,13		5	
Bridgeport, Conn.	53	216,621		1		1
(Buffalo (Niagara	14	857,719	4,7,9,13		4	
Canton, Ohio	63	200,352		1		1
Cedar Rapids	115	73,219	7,11		2	
Charleston, S. C.	127	98,711	7,10,13		3	
Charleston, W. Va.	88	136,332	7,11,13		3	
Charlotte	99	112,986	3,9,11		3	
Chattanooga	76	193,215	3,6,10,12		4	
Chicago	2	4,499,126	2,4,5,7,9,11,13		7	
Cincinnati	16	789,309	2,4,7,11		4	
Cleveland	9	1,214,943	2,4,5,7,9		5	
Columbia	117	89,555	2,4,8		3	
Columbus, Ga.	133	92,478	3,12		2	
Columbus, Ohio	29	365,796	3,6,8,10		4	
Corpus Christi	121	70,677	3,6,8,10		4	
Dallas	27	376,548	4,8,12		3	
(Davenport (Rock Island (Moline	67	174,995	2,4,5,9		4	

Metropolitan District (U.S. Census 1940)	Sales Rank	Population	Channel Nos. Metropolitan	Channel Nos. Community	Total Stations Metropolitan	Total Stations Community
Dayton	44	271,513	5,13		2	
Decatur	122	65,764	2		1	
Denver	26	384,372	2,4,5,7,9		5	
Des Moines	59	183,973	2,4,5,9		4	
Detroit	6	2,295,867	2,4,5,7,9		5	
(Duluth (Superior	72	157,098	3,6,8,10		4	
Durham	139	69,683	4,7		2	
El Paso	105	115,801	2,4,5,7		4	
Erie	95	134,039	12		1	
Evansville, Ind.	93	141,614	2,11		2	
(Fall River (New Bedford	55	272,648		1		1
Flint	64	188,554	11		1	
Fort Wayne	81	134,385	2,4,7,9		4	
Fort Worth	51	207,677	2,5,10		3	
Fresno	79	97,504	2,4,5,7		4	
Galveston	131	71,677	9,11,13		3	
Grand Rapids	57	209,873	7,9		2	
Greensboro	130	73,055	2,10		2	
(Hamilton (Middletown	110	112,686	9		1	
Harrisburg	70	173,367	8		1	
(Hartford (New Britain	20	502,193	8,10		2	
Houston	21	510,397	2,4,5,7		4	
(Huntington, W.Va. (Ashland, Ky.	92	170,979	5		1	
Indianapolis	24	455,357	3,6,8,10,12		5	
Jackson	128	88,003	2,4,5,7		4	
Jacksonville	66	195,619	2,4,6,8		4	
Johnstown, Pa.	100	151,781	13		1	
Kalamazoo	112	77,213	3		1	
(Kansas City, Mo. (Kansas City, Kans.	17	634,093	2,4,5,9		4	
Knoxville	87	151,829	2,4,8,11		4	
Lancaster	91	132,027		4		1
Lansing	94	110,356	6		1	
Lincoln	109	88,191	10,12		2	
Little Rock	98	126,724	3,6,8,10		4	
Los Angeles	3	2,904,596	2,4,5,7 9,11,13		7	

Metropolitan District (U.S. Census 1940)	Sales Rank	Population	Channel Nos. Metro-politan	Channel Nos. Community	Total Stations Metro-politan	Total Stations Community
Louisville	33	434,408	5,9		2	
(Lowell	45	334,969	6		1	
(Lawrence						
(Haverhill						
Macon	137	74,830	4,7,10		3	
Madison	101	78,349	9		1	
Manchester	118	81,932		1		
Memphis	37	332,477	2,4,5,7,9		5	
Miami	38	250,537	2,4,5,7		4	
Milwaukee	15	790,336	3,6,8,10		4	
(Minneapolis	11	911,077	2,4,5,7,9		5	
(St. Paul						
Mobile	119	144,906	3,5,9,11		4	
Montgomery	126	93,697	6,10		2	
Nashville	56	241,769	4,5,7,9		4	
New Haven	39	308,228		6		
New Orleans	31	540,030	2,4,6,7,10		5	
(New York	1	11,690,520	2,4,5,7,9,11,13		7	
(Northeastern						
(New Jersey						
(Norfolk	47	330,396	4,7,11,13		4	
(Portsmouth						
(Newport News						
Oklahoma City	52	221,229	2,4,5,9		4	
(Omaha	40	287,269	3,6,7		3	
(Council Bluffs						
Peoria	69	162,566	3,6,12		3	
Philadelphia	4	2,898,644	3,6,10,12		4	
Phoenix	84	121,828	2,4,5,7		4	
Pittsburgh	8	1,994,060	3,6,8,10		4	
Portland, Maine	89	106,566	3,8		2	
Portland, Oreg.	22	406,406	3,6,8,10,12		5	
Providence, R. I.	18	711,500	11		1	
Pueblo	140	62,039	3,6,8,10		4	
(Racine	97	135,075		1		
(Kenosha						
Reading	73	175,355		5		
Richmond	48	245,674	3,6,8,10		4	
Roanoke	104	110,593	5,9,12		3	
Rochester	28	411,970	2,6,11		3	
Rockford	102	105,259	12		1	

Metropolitan District (U.S Census 1940)	Sales Rank	Population	Channel Nos. Metro-politan	Channel Nos. Community	Total Stations Metro-politan	Total Stations Community
Sacramento	54	158,999	3,6,10		3	
(Saginaw	77	153,388	3,8,13		3	
(Bay City						
St. Joseph	129	86,991	13		1	
St. Louis	10	1,367,977	4,5,7,9,13		5	
Salt Lake City	58	204,488	2,4,5,7,9		5	
San Antonio	50	319,010	2,4,5,7,9		5	
San Diego	49	256,268	3,6,8,10		4	
(San Francisco	7	1,428,525	2,4,5,7,9,11		6	
(Oakland						
San Jose	78	129,367	13		1	
Savannah	114	117,970	3,5,9,11		4	
(Scranton	30	629,581	11	1	1	1
(Wilkes-Barre						
Seattle	19	452,639	2,5,7,11		4	
Shreveport	96	112,225	2,4,6,8		4	
Sioux City	107	87,791	4,9,11,13		4	
South Bend	80	147,022		1		1
Spokane	71	141,370	2,4,5,7,9		5	
Springfield, Ill.	103	89,484	8,10		2	
(Springfield, Mass.	32	394,623	3	1	1	1
(Holyoke						
Springfield, Mo.	134	70,514	2,4,5,9		4	
Springfield, Ohio	125	77,406		1		1
Stockton	108	79,337	8		1	
Syracuse	46	258,352	5,8,10		3	
Tacoma	74	156,018	4,9,13		3	
(Tampa	61	209,693	2,4,5,7		4	
(St. Petersburg						
Terre Haute	116	83,370	4		1	
Toledo	34	341,663	13		1	
Topeka	123	77,749	7,11		2	
Trenton	60	200,128		1		1
Tulsa	65	188,562	3,6,8,10		4	
(Utica	68	197,128	3,13		2	
(Rome						
Waco	138	71,114	3,6,9,11		4	
Washington	12	907,816	4,5,7,9		4	
Waterbury	85	144,822	12		1	
Waterloo	120	67,050	3,6,13		3	
Wheeling	82	196,340	12		1	
Wichita	86	127,303	2,4,5,9		4	
Wilmington	62	188,974		7		1
Winston-Salem	134	109,833	6,8		2	
Worcester	41	306,194	5		1	
York	113	92,627		1		1
Youngstown	36	372,428	13		1	

RULES GOVERNING ADMINISTRATIVE PROCEDURE

§ 3.611 **Application for television stations.**—Each applicant for a construction permit for a new television broadcast station, change in facilities of any existing television broadcast station, or television station license or modification of license shall file with the Commission in Washington, D. C., three copies of applications on the appropriate form designated by the Commission and a like number of exhibits and other papers incorporated therein and made a part thereof. Only the original copy need be sworn to. If the application is for a construction permit for a new television station, Form FCC No. 330 should be filed; for a television station license, Form FCC No. 331 should be filed; and for modification of a television station license or for change in facilities of an existing television station, Form FCC No. 333 should be filed.

§ 3.612 **Full disclosures.**—Each application shall contain full and complete disclosures with regard to the real party or parties in interest, and their legal, technical, financial, and other qualifications, and as to all matters and things required to be disclosed by the application forms.

§ 3.613 **Installation or removal of apparatus.**—Applications for construction permit or modification thereof, involving removal of existing transmitting apparatus and/or installation of new transmitting apparatus, shall be filed at least 60 days prior to the contemplated removal and/or installation.

§ 3.614 **Period of construction.**—Each construction permit will specify a maximum of 60 days from the date of granting thereof as the time within which construction of the station shall begin, and a maximum of six months thereafter as the time within which construction shall be completed and the station ready for operation, unless otherwise determined by the Commission upon proper showing in any particular case.

§ 3.615 **Forfeiture of construction permits: extension of time.** --*(a)* A construction permit shall be automatically forfeited if the station is not ready for operation within the time specified therein or within such further time as the Commission may have allowed for completion, and a notation of the forfeiture of any construction permit under this provision will be placed in the records of the Commission as of the expiration date.

(b) An application (Form FCC No. 701) for extension of time within which to construct a station shall be filed at least thirty days prior to the expiration date of such permit if the facts supporting such application for extension are known to the applicant

in time to permit such filing. In other cases such applications will be accepted upon a showing satisfactory to the Commission of sufficient reasons for filing within less than thirty days prior to the expiration date. Such applications will be granted upon a specific and detailed showing that the failure to complete was due to causes not under the control of the grantee, or upon a specific and detailed showing of other matters sufficient to justify the extension.

§ 3.616 Equipment tests and proof of performance. --*(a)* Upon completion of construction of a television station in exact accordance with the terms of the construction permit, the technical provisions of the application therefor and the rules and regulations and standards of good engineering practice governing television stations and prior to filing of application for license, the permittee is authorized to test the equipment for a period not to exceed 90 days: *Provided,* that the inspector in charge of the district in which the station is located and the Commission are notified 2 days in advance of the beginning of tests.

(b) The Commission may notify the permittee to conduct no tests or may cancel, suspend, or change the date of beginning for the period of such tests as and when such action may appear to be in the public interest, convenience, and necessity.

(c) Within the 90-day period prescribed by this section for equipment tests, field intensity measurements in accordance with the methods prescribed in the Standards of Good Engineering Practice Concerning Television Broadcast Stations shall be submitted to the Commission. The Commission may grant extensions of time upon showing of reasonable need therefor.

§ 3.617 Program tests.--*(a)* When construction and equipment tests are completed in exact accordance with the terms of the construction permit, the technical provisions of the application therefor, and the rules and regulations and standards of good engineering practice governing television stations, and after an application for station license has been filed with the Commission showing the equipment to be in satisfactory operating condition, the permittee is authorized to conduct program tests in exact accordance with the terms of the construction permit for a period not to exceed 30 days: *Provided,* That the inspector in charge of the district in which the station is located and the Commission are notified 2 days in advance of the beginning of such tests.

(b) The Commission reserves the right to cancel such tests or suspend, or change the date of beginning for the period of such tests as and when such action may appear to be in the public interest,

convenience, and necessity by notifying the permittee.

(c) The authorization for tests embodied in this section or Section 3.616 shall not be construed as constituting a license to operate but as a necessary part of the construction.

§ 3.618 **Normal license period.**—All television broadcast station licenses will be issued so as to expire at the hour of 3 a. m., E. S. T., and will be issued for a normal license period of 1 year.

§ 3.619 **License, simultaneous modification and renewal.**—When an application is granted by the Commission necessitating the issuance of a modified license less than 60 days prior to the expiration date of the license sought to be modified, and an application for renewal of said license is granted subsequent or prior thereto (but within 30 days of expiration of the present license) the modified license as well as the renewal license shall be issued to conform to the combined action of the Commission.

§ 3.620 **Renewal of license.**--*(a)* Unless otherwise directed by the Commission, each application for renewal of a television station license shall be filed at least 60 days prior to the expiration date of the license sought to be renewed (Form FCC No. 311). No application for renewal of license of a television broadcast station will be considered unless there is on file with the Commission, the information currently required by Sections 1.301-1.304, reference to which by date and file number shall be included in the application.

(b) Whenever the Commission regards an application for a renewal of a television station license as essential to the proper conduct of a hearing or investigation, and specifically directs that it be filed by a certain date, such application shall be filed within the time thus specified. If the licensee fails to file such application within the prescribed time, the hearing or investigation shall proceed as if such renewal application had been received.

§ 3.621 **Temporary extension of station licenses.**--Where there is pending before the Commission any application, investigation, or proceeding which, after hearing, might lead to or make necessary the modification of, revocation of, or the refusal to renew an existing television license, the Commission may, in its discretion, grant a temporary extension of such license: *Provided, however,* That no such temporary extension shall be construed as a finding by the Commission that the operation of any radio station thereunder will serve public interest, convenience, and necessity beyond the express terms of such temporary extension of license: *And provided further,* That such temporary extension of license will in no wise affect or limit the action of the Commission with respect to any pending application or proceeding.

§ 3.622 **Repetitious applications.**--*(a)* Where an applicant has been afforded an opportunity to be heard with respect to a particular application for a new television broadcast station, or for change of existing service or facilities, and the Commission has, after hearing or default, denied the application or dismissed it with prejudice, the Commission will not consider another application for a station of the same class to serve in whole or in part the same area, by the same applicant or by his successor or assignee, or on behalf of or for the benefit of the original parties in interest, until after the lapse of 12 months from the effective date of the Commission's order.

(b) Where an appeal has been taken from the action of the Commission in denying a particular application, another application for the same class of broadcast station and for the same area, in whole or in part, filed by the same applicant or by his successor or assignee, or on behalf or for the benefit of the original parties in interest, will not be considered until the final disposition of such appeal.

§ 3.623 **Assignment or transfer of control.**—*(a) Voluntary:* Application for consent to voluntary assignment of a television station construction permit or license or for consent to voluntary transfer of control of a corporation holding a television station construction permit or license shall be filed with the Commission on Form FCC No. 314 (assignment of license) or Form FCC No. 315 (transfer of control) at least 60 days prior to the contemplated effective date of assignment or transfer of control.

(b) Involuntary: In the event of the death or legal disability of a permittee or licensee, or a member of a partnership, or a person directly or indirectly in control of a corporation, which is a permittee or licensee:

(1) the Commission shall be notified in writing promptly of the occurrence of such death or legal disability, and

(2) within thirty days after the occurrence of such death or legal disability, application on Form FCC No. 314 or 315 shall be filed for consent to involuntary assignment of such television station permit or license or for involuntary transfer of control of such corporation to a person or entity legally qualified to succeed to the foregoing interests under the laws of the place having jurisdiction over the estate involved.

RULES RELATING TO LICENSING POLICIES

§ 3.631 **Exclusive affiliation of station.**—No license shall be granted to a television broadcast station having any contract, arrangement, or understanding, express or implied with a network organization [1] under which the station is prevented or hindered from, or penalized for, broadcasting the programs of any other network organization.

1/ The term "network organization" as used herein includes national and regional network organizations. See Chapter VII, J, of Report on Chain Broadcasting.

§ 3.632 Territorial exclusivity.—No license shall be granted to a television broadcast station having any contract, arrangement, or understanding, express or implied, with a network organization which prevents or hinders another broadcast station serving substantially the same area from broadcasting the network's programs not taken by the former station, or which prevents or hinders another broadcast station serving a substantially different area from broadcasting any program of the network organization. This regulation shall not be construed to prohibit any contract, arrangement, or understanding between a station and a network organization pursuant to which the station is granted the first call in its primary service area upon the programs of the network organization.

§ 3.633 Term of affiliation.—No license shall be granted to a television broadcast station having any contract, arrangement, or understanding, express or implied, with a network organization which provides, by original terms, provisions for renewal, or otherwise for the affiliation of the station with the network organization for a period longer than two years: *Provided*, that a contract, arrangement, or understanding for a period up to two years, may be entered into within six months prior to the commencement of such period.

§ 3.634 Option time.—No license shall be granted to a television broadcast station which options [1/] for network programs any time subject to call on less than 56 days' notice, or more time than a total of three hours [2/] within each of four segments of the broadcast day, as herein described. The broadcast day is divided into 4 segments, as follows: 8:00 a. m. to 1:00 p. m.; 1:00 p. m. to 6:00 p. m.; 6:00 p. m. to 11:00 p. m.; 11:00 p. m. to 8:00 a. m. [3/] Such options may not be exclusive as against other network organizations and may not prevent or hinder the station from optioning or selling any or all of the time covered by the option, or other time, to other network organizations.

1/ As used in this section, an option is any contrac arrangement, or understanding, express or implied, between a station and a network organization which prevents or hinders the station from scheduling programs before the network agrees to utilize the time during which such programs are scheduled, or which requires the station to clear time already scheduled when the network organization seeks to utilize the time.

2/ All time options permitted under this section must be specified clock hours, expressed in terms of any time system set forth in the contract agreed upon by the station and network organization. Shifts from daylight saving to standard time or vice versa may or may not shift the specified hours correspondingly as agreed by the station and network organization.

3/ These segments are to be determined for each station in terms of local time at the location of the station but may remain constant throughout the year regardless of shifts from standard to daylight saving time or vice versa.

§ 3.635 Right to reject programs.—No license shall be granted to a television broadcast station having any contract, arrangement, or understanding, express or implied, with a network organization which *(a)*, with respect to programs offered pursuant to an affiliation contract, prevents or hinders the station from rejecting or refusing network programs which the station reasonably believes to be unsatisfactory or unsuitable; or which *(b)*, with respect to network programs so offered or already contracted for, prevents the station from rejecting or refusing any program which, in its opinion, is contrary to the public interest, or from substituting a program of outstanding local or national importance.

§ 3.636 Network ownership of stations.—No license shall be granted to a network organization, or to any person directly or indirectly controlled by or under common control [1] of a network organization, for a television broadcast station in any locality where the existing television broadcast stations are so few or of such unequal desirability (in terms of coverage, power, frequency, or other related matters) that competition would be substantially restrained by such licensing.

§ 3.637 Dual network operation.—No license shall be issued to a television broadcast station affiliated with a network organization which maintains more than one network of television broadcast stations: *Provided*, that this regulation shall not be applicable if such networks are not operated simultaneously, or if there is no substantial overlap in the territory served by the group of stations comprising each such network.

§ 3.638 Control by networks of station rates.—No license shall be granted to a television broadcast station having any contract, arrangement, or understanding, express or implied with a network organization under which the station is prevented or hindered from, or penalized for, fixing or altering its rates for the sale of broadcast time for other than the network's programs.

§ 3.639 Use of common antenna site.—No television license or renewal of a television license will be granted to any person who owns, leases, or controls a particular site which is peculiarly suitable for television broadcasting in a particular area and *(a)* which is not available for use by other television licensees; and *(b)* no other comparable site is available in the area; and (c) where the exclusive use of such site by the applicant or licensee would unduly limit the number of television stations that can be authorized in a particular area or would unduly restrict competition among television stations.

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[1] The word "control" as used herein, is not limited to full control but includes such a measure of control as would substantially affect the availability of the station to other networks.

§ 3.640 Multiple ownership.—*(a)* No person (including all persons under common control) [1/] shall, directly or indirectly, own, operate, or control more than one television broadcast station that would serve substantially the same service area as another television broadcast station owned, operated, or controlled by such person.

(b) No person (including all persons under common control) shall, directly or indirectly, own, operate, or control more than one television broadcast station, except upon a showing (1) that such ownership, operation, or control would foster competition among television broadcast stations or provide a television broadcasting service distinct and separate from existing services, and (2) that such ownership, operation, or control would not result in the concentration of control of television broadcasting facilities in a manner inconsistent with public interest, convenience, or necessity; provided, however, that the Commission will consider the ownership, operation, or control of more than five television broadcast stations to constitute the concentration of control of television broadcasting facilities in a manner inconsistent with public interest, convenience, or necessity.

RULES RELATING TO EQUIPMENT

§ 3.651 Transmitter power.—The rated power and operating power range of transmitters shall be in accordance with the Standards of Good Engineering Practice concerning Television Broadcast Stations.

§ 3.652 Frequency monitors.—The licensee of each television broadcast station shall have in operation at the transmitters frequency monitors independent of the frequency control of the transmitters.

§ 3.653 Modulation monitors.—The licensee of each television broadcast station shall have in operation at the transmitter a modulation monitor for the aural transmitter. There shall also be sufficient monitoring equipment for the visual signal to determine that the signal complies with the Standards of Good Engineering Practice concerning Television Broadcast Stations.

§ 3.654 Required transmitter performance.—The construction, installation, operation, and performance of the television broadcast transmitter system shall be in accordance with the Standards of Good Engineering Practice concerning Television Broadcast Stations.

§ 3.655 Auxiliary transmitter.—Upon showing that a need exists for the use of auxiliary transmitters in addition to the regular transmitters of a television station, a license therefor may be issued provided that:

[1/] The word "control" as used herein is not limited to majority stock ownership, but includes actual working control in whatever manner exercised.

(a) Auxiliary transmitters may be installed either at the same location as the main transmitters or at another location.

(b) A licensed operator shall be in control whenever auxiliary transmitters are placed in operation.

(c) The auxiliary transmitters shall be maintained so that they may be put into immediate operation at any time for the following purposes:

(1) The transmission of the regular programs upon the failure of the main transmitters.

(2) The transmission of regular programs during maintenance or modification [1/] work on the main transmitters necessitating discontinuance of its operation for a period not to exceed five days.

(3) Upon request by a duly authorized representative of the Commission.

(d) The auxiliary transmitters shall be tested at least once each week to determine that it is in proper operating condition and that it is adjusted to the proper frequency, except that in case of operation in accordance with paragraph (c) of this section during any week, the test in that week may be omitted provided the operation under paragraph (c) is satisfactory. A record shall be kept of the time and result of each test operating under paragraph (c).

(e) The auxiliary transmitters shall be equipped with satisfactory control equipment which will enable the maintenance of the frequency emitted by the station within the limits prescribed by these regulations.

(f) The operating power of an auxiliary transmitter may be less than the authorized power of the main transmitters, but in no event shall it be greater than such power.

§3.656 **Alternate main transmitters.**—The licensee of a television broadcast station may be licensed for alternate main transmitters provided that a technical need for such alternate transmitters is shown and that the following conditions are met:

(a) Both transmitters are located at the same place.

(b) Both transmitters shall have the same power rating.

(c) Both transmitters shall meet the construction, installation, operation, and performance requirements of the Standards of Good Engineering Practice concerning Television Broadcast Stations.

§ 3.657 **Change in equipment and antenna system.**—Licensees of television broadcast stations shall observe the following provisions with regard to change in equipment and antenna system:

(a) No changes in equipment shall be made:

(1) That would result in the emission of signals outside of the authorized channel.

1/ This includes the equipment changes which may be made without authority as set forth elsewhere in the Rules and Regulations and the Standards of Good Engineering Practice or as authorized by the Commission by letter or by construction permit. Where such operation is required for periods in excess of 5 days, request therefor shall be in accordance with section 1.365.

(2) That would result in the external performance of the transmitter being in disagreement with that prescribed in the Standards of Good Engineering Practice concerning Television Broadcast Stations.

(b) Specific authority, upon filing formal application (Form FCC No. 333) therefor, is required for a change in service area or for any of the following changes:

(1) Changes involving an increase or decrease in the power rating of the transmitters.

(2) A replacement of the transmitters as a whole.

(3) Change in the location of the transmitting antenna.

(4) Change in antenna system, including transmission line.

(5) Change in location of main studio, if it is proposed to move the main studio to a different city from that specified in the license.

(6) Change in the power delivered to the antenna.

(7) Change in frequency control and/or modulation system.

(c) Specific authority, upon filing *informal* request therefor, is required for a change in the indicating instruments installed to measure transmitter power output, except by instruments of the same maximum scale reading and accuracy.

(d) Other changes, except as above provided for in this section or in Standards of Good Engineering Practice concerning Television Broadcast Stations prescribed by the Commission may be made at any time without the authority of the Commission, provided that the Commission shall be promptly notified thereof and such changes shall be shown in the next application for renewal of license.

RULES RELATING TO TECHNICAL OPERATION

§ 3.661 Time of operation.--*(a)* All television broadcast stations will be licensed for unlimited time operation. Each licensed television station shall maintain a regular program operating schedule of not less than 2 hours in any given broadcast day, and it shall render not less than 28 hours program service per week. In an emergency, however, when due to causes beyond the control of a licensee, it becomes impossible to continue operation, the station may cease operation for a period not to exceed 10 days, provided that the Commission and the Inspector in Charge of the radio district in which the station is located shall be notified in writing immediately after the emergency develops.

(b) The aural transmitter of a television broadcast station shall not be operated separately from the visual transmitter except for experimental or test purposes, and for purposes incidental to or connected with the operation of the visual transmitter.

(c) Persons desiring to enter into a voluntary sharing arrangement of a television channel may file application therefor with the Commission. Copies of the time-sharing agreement should be filed with the application.

§ 3.662 Experimental operation.—Television broadcast stations may conduct technical experimentation directed to the improvement of technical phases of operation and for such purposes may utilize a signal other than the standard television signal subject to the following conditions:

(a) That the licensee complies with the provisions of section 3.661 with regard to the minimum number of hours of transmission with a standard television signal.

(b) That no transmissions are radiated outside of the authorized channel and subject to the condition that no interference is caused to the transmissions of a standard television signal by other television broadcast stations.

(c) No charges either direct or indirect shall be made by the licensee of a television broadcast station for the production or transmission of programs when conducting technical experimentation.

§ 3.663 Station inspection.—The licensee of any television broadcast station shall make the station available for inspection by representatives of the Commission at any reasonable hour.

§ 3.664 Station license, posting of.—The original of each station license shall be posted in the transmitter room.

§ 3.665 Operator requirements.—One or more licensed radiotelephone first class operators shall be on duty at the place where the transmitting apparatus of each station is located and in actual charge thereof whenever it is being operated. The original license (Form FCC No. 759) of each station operator shall be posted at the place where he is on duty. The licensed operator on duty and in charge of a television broadcast transmitter may, at the discretion of the licensee, be employed for other duties or for the operation of another station or stations in accordance with the class of operator's license which he holds and by the rules and regulations governing such stations. However, such duties shall in nowise interfere with the operation of the broadcast transmitter.

§ 3.666 Operating power: how determined.—The operating power, and the requirements for maintenance thereof, of each television broadcast station shall be determined by the methods prescribed in the Standards of Good Engineering Practice concerning Television Broadcast Stations.

§ 3.667 Modulation.—The percentage of modulation of the aural transmissions shall be maintained as high as possible consistent with good quality of transmission and good broadcast practice and in no case less than 85 percent nor more than 100 percent on peaks of frequent recurrence during any selection which normally is transmitted at the highest level of the program under consideration.

§ 3.668 Frequency Tolerance.—The operating frequencies of the aural and visual transmitters of a television broadcast station shall be maintained within .002% of the assigned frequencies.

§ 3.669 Inspection of tower lights and associated control equipment.—The licensee of any television station which has an antenna or antenna supporting structure(s) required to be illuminated pursuant to the provisions of section 303(q) of the Communications Act of 1934, as amended:

(a) Shall make a visual observation of the tower lights at least once each 24 hours to insure that all such lights are functioning properly as required.

(b) Shall report immediately by telephone or telegraph to the nearest Airways Communication Station or office of the Civil Aeronautics Administration any observed failure of the tower lights, not corrected within 30 minutes, regardless of the cause of such failure. Further notification by telephone or telegraph shall be given immediately upon resumption of the required illumination.

(c) Shall inspect at intervals of at least once each 3 months all flashing or rotating beacons and automatic lighting control devices to insure that such apparatus is functioning properly as required.

OTHER RULES RELATING TO OPERATION

§ 3.681 Logs.—The licensee of each television station shall maintain program and operating logs and shall require entries to be made as follows:

(a) In the program log:

(1) An entry of the time each station identification announcement (call letters and location) is made.

(2) An entry briefly describing each program broadcast, such as "music," "drama," "speech," etc., together with the name or title thereof and the sponsor's name, with the time of the beginning and ending of the complete program. If a mechanical reproduction, either visual or aural, is used, the entry shall show the exact nature thereof, and the time it is announced as a mechanical reproduction. If a speech is made by a political candidate, the name and political affiliations of such speaker shall be entered.

(3) An entry showing that each sponsored program broadcast has been announced as sponsored, paid for, or furnished by the sponsor.

(4) An entry showing, for each program of network origin, the name of the network originating the program.

(b) In the operating log:

(1) An entry of the time the station begins to supply power to the antenna, and the time it stops.

(2) An entry of the time the program begins and ends.

(3) An entry of each interruption to the carrier wave, its cause, and duration.

(4) An entry of the following each 30 minutes:

(i) Operating constants of last radio stage of the aural transmitter (total plate current and plate voltage).

(ii) Transmission line current or voltage of both transmitters.

(iii) Frequency monitor reading.

(5) Log of experimental operation during experimental period (if regular operation is maintained during this period, the above logs shall be kept).

(i) A log must be kept of all operation during the experimental period. If the entries required above are not applicable thereto, then the entries shall be made so as to fully describe the operation.

(c) Where an antenna or antenna supporting structure(s) is required to be illuminated, the licensee shall make entries in the radio station log appropriate to the requirements of section 3.669 as follows:

(1) The time the tower lights are turned on and off if manually controlled.

(2) The time the daily visual observation of the tower lights was made.

(3) In the event of any observed failure of a tower light.

(i) Nature of such failure.

(ii) Time the failure was observed.

(iii) Time and nature of the adjustments, repairs or replacements made.

(iv) Airways Communications Station (C.A.A.) notified of the failure of any tower light not corrected within thirty minutes and the time such notice was given.

(v) Time notice was given to the Airways Communication Station (C.A.A.) that the required illumination was resumed.

(4) Upon completion of the periodic inspection required atleast once each three months.

(i) The date of the inspection and the condition of all tower lights and associated tower lighting control devices.

(ii) Any adjustments, replacements or repairs made to insure compliance with the lighting requirements.

§ 3.682 Logs, retention of .--Logs of television broadcast stations shall be retained by the licensee for a period of 2 years. However, logs incident to or involved in any claim or complaint of which the licensee has notice shall be retained by the licensee until such claim or complaint has been fully satisfied or until the same has been barred by statute limiting the time for the filing of suits upon such claims.

§ 3.683 Logs, by whom kept.—Each log shall be kept by the person or persons competent to do so, having actual knowledge of the facts required, who shall sign the log when starting duty and again when going off duty. The logs shall be made available upon request by an authorized representative of the Commission

§ 3.684 Log form.—The log shall be kept in an orderly manner, in suitable form, and in such detail that the data required for the particular class of station concerned are readily available. Key letters or abbreviations may be used if proper meaning or explanation is contained elsewhere in the log.

§ 3.685 Correction of logs.—No log or portion thereof shall be erased, obliterated, or wilfully destroyed within the period of retention provided by the rules. Any necessary correction may be made only by the person originating the entry who shall strike out the erroneous portion, initial the correction made, and indicate the date of correction.

§ 3.686 Rough logs. —Rough logs may be transcribed into condensed form, but in such case, the original log or memoranda and all portions thereof shall be preserved and made a part of the complete log.

§ 3.687 Station identification.--*(a)* A licensee of a television broadcast station shall make station identification announcement (call letters and location), at the beginning and ending of each time of operation and during the operation on the hour. The announcement at the beginning and ending of each time of operation shall be by both aural and visual means. Other announcements may be by either aural or visual means.

(b) Identification announcements during operation need not be made when to make such announcement would interrupt a single consecutive speech, play, religious service, symphony concert, or any type of production. In such cases the identification announcement shall be made at the first interruption of the entertainment continuity and at the conclusion thereof.

§ 3.688 Mechanical reproductions.—*(a)* Each program which consists in whole or in part of one or more mechanical reproductions, either visual or aural, shall be accompanied by an appropriate announcement to that effect either at the beginning or end of such reproduction or at the beginning or end of the program in which such reproduction is used. No such announcement shall be required where a mechanical reproduction is used for background music, sound effects, station identification, program identification (theme music of short duration) or identification of sponsorship of the program proper.

(b) The exact form of identifying announcement is not prescribed but the language shall be clear and in terms commonly used and understood. The licensee shall not attempt affirmatively to create the impression that any program being broadcast by mechanical reproduction consists of live talent.

§ 3.689 Sponsored programs, announcement.—*(a)* In the case of each program for the broadcasting of which money, services, or other valuable consideration is either directly or indirectly paid or promised to, or charged or received by, any radio broadcast station, the station broadcasting such program shall make, or cause to be made, an appropriate announcement that the program is sponsored, paid for, or furnished, either in whole or in part.

(b) In the case of any political program or any program involving the discussion of public controversial issues for which any films, records, transcriptions, talent, scripts, or other material or services of any kind are furnished, either directly or indirectly, to a station as an inducement to the broadcasting of such program, an announcement shall be made both at the beginning and conclusion of such program on which such material or services are used that such films, records, transcriptions, talent, scripts, or other material or services have been furnished to such station in connection with the broadcasting of such program; *provided, however,* that only one such announcement need be made in the case of any such program of five minutes' duration or less, which announcement may be made either at the beginning or conclusion of the program.

(c) The announcement required by this section shall fully and fairly disclose the true identity of the person or persons by whom or in whose behalf such payment is made or promised, or from whom or in whose behalf such services or other valuable consideration is received, or by whom the material or services referred to in subsection (b) hereof are furnished. Where an agent or other person contracts or otherwise makes arrangements with a station on behalf of another, and such fact is known to the station, the announcement shall disclose the identity of the person or persons in whose behalf such agent is acting instead of the name of such agent

(d) In the case of any program, other than a program advertising commercial products or services, which is sponsored, paid for or furnished, either in whole or in part, or for which material or services referred to in subsection (b) hereof are furnished, by a corporation, committee, association or other unincorporated group, the announcement required by this section, shall disclose the name of such corporation, committee, association or other unincorporated group. In each such case the station shall require that a list of the chief executive officers or members of the executive committee or of the board of directors of the corporation, committee, association or other unincorporated group shall be made available for public inspection at one of the television broadcast stations carrying the program.

(e) In the case of programs advertising commercial products or services, an announcement stating the sponsor's corporate or trade name or the name of the sponsor's product, shall be deemed sufficient for the purposes of this section and only one such announcement need be made at any time during the course of the program.

§ 3.690 Broadcasts by candidates for public office.—(a) Legally qualified candidate. -- A "legally qualified candidate" means any person who has publicly announced that he is a candidate for nomination by a convention of a political party or for nomination or election in a primary, special, or general election, municipal, county, state or national, and who meets the qualifications prescribed by the applicable laws to hold the office for which he is a candidate, so that he may be voted for by the electorate directly or by means of delegates or electors, and who:

(1) has qualified for a place on the ballot, or

(2) is eligible under the applicable law to be voted for by sticker, by writing in his name on the ballot, or other method, and (i) has been duly nominated by a political party which is commonly known and regarded as such, or (ii) makes a substantial showing that

he is a *bona fide* candidate for nomination or office, as the case may be.

(b) General requirements.—No station licensee is required to permit the use of its facilities by any legally qualified candidate for public office, but if any licensee shall permit any such candidate to use its facilities, it shall afford equal opportunities to all other such candidates for that office to use such facilities, *provided,* That such licensee shall have no power of censorship over the material broadcast by any such candidate.

(c) Rates and practices.—The rates, if any, charged all such candidates for the same office shall be uniform and shall not be rebated by any means, directly or indirectly; no licensee shall make any discrimination in charges, practices, regulations, facilities, or services for or in connection with the service rendered pursuant to these rules, or make or give any preference to any candidate for public office or subject any such candidate to any prejudice or disadvantage; nor shall any licensee make any contract or other agreement which shall have the effect of permitting any legally qualified candidate for any public office to broadcast to the exclusion of other legally qualified candidates for the same public office.

(d) Inspection of records.—Every licensee shall keep and permit public inspection of a complete record of all requests for broadcast time made by or on behalf of candidates for public office, together with an appropriate notation showing the disposition made by the licensee of such requests, and the charges made, if any, if request is granted.

§ 3.691 Rebroadcast.—*(a)* The term "rebroadcast" means reception by radio of the program [1/] of a radio station, and the simultaneous or subsequent retransmission of such program by a broadcast station. The broadcasting of a program relayed by a relay broadcast station or studio transmitter link is not considered a rebroadcast.

1/ As used in this section, program includes any complete program or part thereof.

(b) The licensee of a television broadcast station may, without further authority of the Commission, rebroadcast the program of a United States television broadcast station, provided the Commission is notified of the call letters of each station rebroadcast and the licensee certifies that express authority has been received from the licensee of the station originating the program. 1/

(c) No licensee of a television broadcast station shall rebroadcast the program of any United States radio station not designated in *(b)* above without written authority having first been obtained from the Commission upon application (informal) accompanied by written consent or certification of consent of the licensee of the station originating the program. 2/

1/ The notice and certification of consent shall be given within three (3) days of any single rebroadcast, but in case of the regular practice of rebroadcasting certain programs of a television broadcast station several times during a license period, notice and certification of consent shall be given for the ensuing license period with the application for renewal of license, or at the beginning of such rebroadcast practice if begun during a license period.

2/ By Order No. 82, dated and effective June 24, 1941, until further order of the Commission, section 3.691*(c)* is suspended only insofar as it requires prior written authority of the Commission for the rebroadcasting of programs originated for that express purpose by United States Government radio stations.

installed at the auxiliary transmitter except when the frequency of the auxiliary transmitter can be monitored by means of the frequency monitor at the main transmitter.

The licensee will be held strictly responsible for any frequency deviation of the auxiliary transmitter in excess of fifty cycles from the assigned frequency, even though exempted by the above from installing an approved frequency monitor. Furthermore, whenever the auxiliary transmitter is operated without a frequency monitor under this exemption, it shall be monitored by means of the frequency monitor at the main transmitter.

Installation of an approved *modulation* monitor at the location of the auxiliary transmitter, when different from that of the main transmitter, is optional with the licensee. However, when it is necessary to operate the auxiliary transmitter beyond two calendar days, a modulation monitor shall be installed and operated at the auxiliary transmitter. The monitor (if taken from the main transmitter) shall be reinstalled at the main transmitter immediately upon resumption of operation of the *main transmitter.*

In all cases where the auxiliary transmitter and the main transmitter have the same location, the same frequency and modulation monitors may be used for monitoring both transmitters, provided they are so arranged as to be readily switched from one transmitter to the other.

Standard broadcast stations not complying with these requirements cannot be considered as operating in compliance with the rules governing such operation.

21. APPROVED FREQUENCY MONITORS

Section 3.60 requires that each standard broadcast station shall have in operation at the transmitter an approved frequency monitor [39] independent of the frequency control of the transmitter.

The following frequency monitors have been approved as in compliance with the specifications issued pursuant to section 3.60:

Manufacturer's name	Type	Approval No.
General Radio Co	25-A	1461
RCA Victor Co	311-A	1462
General Radio Co	25-AB	1463
Western Electric Co	1-C	1464

[39] These monitors have a limited range over which the visual indicator will operate and accordingly it is uecessary that auxiliary aural means be provided in conjunction with the monitor to indicate deviations beyond the range of the visual indicator such as may occur because of defective transmitting apparatus or other causes. In approving the monitors the Commission expects that this auxiliary equipment will be used by all broadcast licensees and will not accept as satisfactory explanations of any frequency deviation which may occur simply on the basis that it was not indicated by the monitor.

22. APPROVED MODULATION MONITORS

Section 3.55 (*b*) requires that each standard broadcast station shall have an approved modulation monitor in operation at the transmitter.

The following modulation monitors have been approved as in compliance with the specifications issued pursuant to section 3.55 (*d*):

Manufacturer's name	Type No.	Approval No.
General Radio Co	731–A or B	1551
RCA Manufacturing Co	66–A	1552
Do	66–B	1553

23. APPROVED EQUIPMENT

Sections 3.41 to 3.64 govern the design, construction, and technical operation of standard broadcast equipment. There are listed below the currently available equipments which have been approved as in compliance with these rules in accordance with the provisions of "Requirements for Type Approval of Broadcast Transmitters and Automatic Frequency Control Equipment."

American Piezo Supply Co., P. O. Box 8112, Plaza Station, Kansas City, Mo.

Type No. C–X–7–C, automatic frequency control unit.

Bliley Electric Co., 203 Union Station Building, Erie, Pa.:

Type No. BC 46T, automatic temperature control unit.

Collins Radio Co., Cedar Rapids, Iowa:

Type No. 10S–2, automatic frequency control unit.
Type No. 20H 1,000-watt broadcast transmitter.
Type No. 20HA, 1,000-watt broadcast transmitter.
Type No. 20J, 1,000-watt broadcast transmitter.
Type No. 20K, 1,000-watt broadcast transmitter.
Type No. 21A, 5,000-watt broadcast transmitter.
Type No. 21D, 5,000-watt broadcast transmitter.
Type No. 21DA, 5,000-watt broadcast transmitter.
Type No. 21DX, 5,000-watt broadcast transmitter.
Type No. 40D, automatic frequency control unit.
Type No. 40E, automatic frequency control unit.
Type No. 300C, 250-watt broadcast transmitter.
Type No. 300C–1, 250-watt broadcast transmitter.
Type No. 300E, 100-watt broadcast transmitter.
Type No. 300F, 250-watt broadcast transmitter.
Type No. 300FA, 250-watt broadcast transmitter.

Doolittle & Falknor Inc., 7421 S. Loomis Blvd., Chicago, Ill.:

Type No. OB–5, automatic frequency control unit (includes Type TC–1 ATCU).
Type No. OB–6, automatic frequency control unit.
Type No. TC–1, automatic temperature control unit (includes Type 2–A ATCC).
Type No. 100–B, 100-watt broadcast transmitter (includes Type OB–2 or OB–5 AFCU).

Type No. 250–B, 250-watt broadcast transmitter (includes Type OB–2 or OB–5 AFCU).

Type No. 1000–B, 1,000-watt broadcast transmitter.

Gates American Corporation, Quincy, Ill.:

Type No. 25–A, automatic frequency control unit.
Type No. 100–A, 100-watt broadcast transmitter.
Type No. S–101, 100-watt broadcast transmitter.
Type No. 250–A, 250-watt broadcast transmitter.
Type No. S–251, 250-watt broadcast transmitter.

General Electric Co., Schenectady, N. Y.:

Type No. 32 C 401–G 30, automatic temperature control unit.

Piezoelectric Laboratories, 612 Rockland Avenue, New Dorp, N. Y.:

Type No. TC–210, automatic temperature control oven and relay unit.
Type No. TC–350, automatic temperature control oven and relay unit.
Type No. OB–10, oscillator and amplifier unit (oscillator and first buffer, no ATCU or crystal).

Precision Piezo Service, 427 Asia Street, Baton Rouge, La.:

Type No. 50–M, automatic temperature control unit.

Premier Crystal Laboratories, Inc., 53–63 Park Row, New York, N. Y.:

Type No. 350–A, automatic frequency control unit.

RCA Victor, Inc., Camden, N. J.:

Type No. UL–4292, automatic frequency control unit.
Type No. 100–E, 100-watt broadcast transmitter.
Type No. 100–G, 100-watt broadcast transmitter.
Type No. 100–H, 100-watt broadcast transmitter.
Type No. 250–D, 250-watt broadcast transmitter.
Type No. 250–E, 250-watt broadcast transmitter.
Type No. 250–F, 250-watt broadcast exciter unit.
Type No. 250–G, 250-watt broadcast transmitter.
Type No. 250–K, 250-watt broadcast transmitter.
Type No. 1–E, 1000-watt broadcast transmitter.
Type No. 1–E–A, 1,000-watt broadcast transmitter.
Type No. 1–G, 1,000-watt broadcast transmitter.
Type No. 1–K, 1,000-watt broadcast transmitter.
Type No. ET–4300, 1,000-watt broadcast transmitter.
Type No. 5–D, 5-kw. broadcast transmitter.
Type No. 5–D–1, 5-kw. broadcast transmitter.
Type No. 5–D–2, 5-kw. broadcast transmitter.
Type No. 5–DX, 5-kw. broadcast transmitter.
Type No. 10–C–A, 10-kw. broadcast transmitter.
Type No. 10–C–B, 10-kw. broadcast transmitter.
Type No. 10–D, 10-kw. broadcast transmitter.
Type No. 10–DX, 10-kw. broadcast transmitter.
Type No. 50–D, 50-kw. broadcast transmitter.
Type No. 50–D, 50-kw. power amplifier.
Type No. 50–E, 50-kw., power amplifier.

Western Electric Co., 195 Broadway, New York City:

Type No. 700–B, automatic frequency control unit.

Type No. 702–A, automatic frequency control unit.
Type No. 310–A, 100-watt broadcast transmitter.
Type No. 310–B, 250-watt broadcast transmitter.
Type No. 310–C, 500-watt broadcast transmitter.
Type No. 310–D, 1,000-watt broadcast transmitter.
Type No. 350C–1, 100-watt broadcast transmitter.
Type No. 351E–1, 250-watt broadcast transmitter.
Type No. 352E–1, 500-watt broadcast transmitter.
Type No. 353E–1, 1-kw. broadcast transmitter.
Type No. 403A–1, 1-kw. broadcast transmitter.
Type No. 405A–1, 5-kw. broadcast transmitter.
Type No. 405B–1, 5-kw. broadcast transmitter.
Type No. 406A–1, 10-kw. broadcast transmitter.
Type No. 406A–2, 10-kw. broadcast transmitter.
Type No. 406A–3, 10-kw. broadcast transmitter.
Type No. 407–A–1, 50-kw. broadcast transmitter.
Type No. 407–A–2, 50-kw. broadcast transmitter.
Type No. 407–A–3, 50-kw. broadcast transmitter.
Type No. 407–A–4, 50-kw. broadcast transmitter.
Type No. 442–A–1, 500-watt broadcast transmitter.
Type No. 443–A–1, 1,000-watt broadcast transmitter.

Westinghouse Electric and Manufacturing Co., 2519 Wilkins Avenue, Baltimore, Md.

Type No. HG, 50-kw. broadcast transmitter.

24. STANDARD BROADCAST APPLICATION FORMS

The Communications Act of 1934, as amended, and the Rules and Regulations of the Commission require that application be made to the Commission for various authorizations. In order to be of aid to applicants, there is set out below the correct forms to be submitted in making application for various authorizations applicable to standard broadcast stations.

In general, these forms shall be completed in full, answering each specific section. The only exception is in the technical sections when in the case of standard equipment, which has been approved by type number by the Commission, or when no change in such equipment is involved, in which cases, the manufacturer's name and type number of the approved equipment may be stated, or should be answered "no change" in each section applicable. All applications involving actual operation, such as license to cover construction permit, renewal of license, etc., shall be completed in full, regardless of whether such information has been previously filed with the Commission.

F. C. C. Form 301, Application for Standard Broadcast Station, Construction Permit or Modification Thereof, shall be used for all applications for authority:

(1) To erect a new standard broadcast station.

(2) For any change in assignment involving construction as listed in (3) to (9) below:

(3) To install new transmitter.

(4) To make changes in existing equipment with respect to system of modulation.

(5) To change type of vacuum tubes in the last radio stage except to tubes of the same rating in accordance with release "Power Rating of Vacuum Tubes."

(6) To change number of vacuum tubes in the last radio stage.

(7) To make any other change affecting the maximum-rated carrier power or type number of equipment.

(8) To change location of an existing transmitter or for approval of location previously authorized to be determined subject to Commission approval.

(9) To install directional antenna system.

(10) For modification of any outstanding construction permit which has not been covered by license.

F. C. C. Form 302, Application for Standard Broadcast Station License, shall be used for all applications for license:

(1) To cover construction permit.

(2) To use the former main transmitter as the auxiliary transmitter when no new construction is involved.

(3) For regular authorization covering special experimental authorization.

F. C. C. Form 303, Application for Renewal of Standard Broadcast Station License shall be used for all applications for renewal of regular licenses of all standard broadcast stations.

F. C. C. Form 304, Application for Modification of Standard Broadcast Station License, shall be used for all applications for modification of any term of an existing regular license of a standard broadcast station where a construction permit is not required:

(1) Change of frequency.

(2) Change of power where the equipment at present installed is capable of satisfactory operation at the proposed power.

(3) Change of time of operation.

(4) Change of location of main studio. (See Section 3.31.)

(5) Change name of licensee where no change of ownership is involved.

F. C. C. Form 305, Application for Authorization to Install Automatic Frequency Control, shall be used in making application for authority:

(1) To install new automatic frequency control equipment.

(2) To install new automatic temperature control chamber.

(3) Any other change affecting the accuracy or stability of the operating frequency of a standard broadcast station where an application for construction permit as above listed is not required.

F. C. C. Form 306, Application to Determine Operating Power of Broadcast Station by Direct Measurement of Antenna Power, shall be used in making all applications for authority to determine power by the direct method.

F. C. C. Form 307, Application for Standard Broadcast Station Experimental Authorization or Extension Thereof, shall be used in making application for—

(1) Any special experimental authorization under Section 3.32.

(2) Any extension thereof.

NOTE.—Attention is invited to note 2 of F. C. C. Form 307, which reads: "Give detailed description by completing F. C. C. Forms 301, sections 17, 18, 19, and 20, or 305, sections 6 and 7, and any other form if more complete engineering description of proposed equipment can be given thereby."

F. C. C. Form 308, Application for Permit to Locate, Maintain or use Studio Apparatus for Production of Programs to be Transmitted or Delivered to Foreign Radio Stations, shall be used in making application for all authorizations under section 325 (*b*) of the Communications Act of 1934.

F. C. C. Form 327, Supplemental Statement of Facts Required under section 308 of the Communications Act of 1934 Regarding Station Equipment, shall be submitted:

(1) Upon change of frequency authorized by modification of license or special experimental authorization.

(2) With all applications for license to cover construction permits made on F. C. C. Form 302 of issue prior to August 25, 1936.

NOTE.—The information required under sections (*e*), (*f*), (*g*), and (*h*) shall be obtained from operation during the experimental period and no operation shall occur during the regular broadcast day until the Commission has approved this information, which may be submitted by telegram, provided, F. C. C. Form 327, properly completed and executed, has been deposited in the United States mail and the telegram so states.

F. C. C. Form 701, Application for Additional Time to Construct a Radio Station, shall be submitted for all extensions of commencement and/or completion dates of construction permits.

F. C. C. Form 314, Application for Consent to Assignment of Radio Station Construction Permit or License, shall be used in all such cases in accordance with section 3.64.

F. C. C. Form 315, Application for Consent to Transfer of Control of Corporation Holding Construction Permit or Station License, shall be used in all such cases in accordance with section 1.364.

F. C. C. Form 316, Inventory of Station Property, shall be submitted with and as part of F. C. C. Forms 314 and 315 in accordance with the requirements of section 1.364.

F. C. C. Form 705, Profit and Loss Statement, shall be submitted with F. C. C. Forms 314 and 315 in accordance with the requirements of section 1.364.

F. C. C. Form 706, Balance Sheet, shall be submitted with applications:

(1) For construction permit for a new broadcast station.

(2) For substantial changes for existing station.

(3) For consent to assignment of radio station construction permit or license by (*a*) the assignor and (*b*) the assignee.

(4) For consent to transfer of control of a licensed corporation by (*a*) the licensed corporation and (*b*) the transferee.

F. C. C. Form 317 Application for Standard Broadcast Station Special Service Authorization or Extension Thereof shall be submitted for all such authorizations in accordance with section 1.366.

Informal requests (letters or telegrams) may be filed for requests:

(*a*) To operate additional time.

(*b*) To discontinue operation or services not covered by section 3.71.

(*c*) To operate with additional power.

(*d*) To operate with reduced power not covered by section 3.57.

(*e*) To operate for test purposes (to determine site, etc.).

(*f*) To rebroadcast programs of stations of other classes.

(*g*) Other special temporary operation beyond terms of existing license.

(*h*) Temporary operation without specified items of equipment, or with temporary, substitute, or auxiliary equipment.

(1) Operation without an approved frequency monitor.

(2) Operation without an approved modulation monitor.

(3) Operation without thermometer in automatic temperature control chamber.

(4) Operation without antenna ammeter, plate voltmeter, or plate ammeter.

(5) Operation with substitute ammeter, plate voltmeter, or plate ammeter.

(6) Operation with temporary antenna system.

(7) Operation with auxiliary transmitter as main transmitter.

(*i*) Operation with new or modified equipment pending repair of existing equipment, or pending receipt and action upon a formal application.

(*j*) Where formal application is not required, application for new or modified equipment or antenna system.

(*k*) Change of specifications for painting and lighting antenna towers where formal application is not required.

(*l*) Operation to determine power by direct method during program test period.

(*m*) Relocation of transmitter in same building.

182092°—40——6

(*n*) Operation with reduced power or time under sections 3.57 and 3.71.

(*o*) Approval of types of equipment as to compliance with outstanding rules or standards.

(*p*) All authorizations for equipment and program tests, or extensions thereof, where it appears that compliance has been had with the terms of the construction permit.

(*q*) Denial of requests for equipment and program tests where specifications of construction permit have not been met.

(*r*) Withdrawal of authorizations for equipment and program tests where subsequent to the issuance of the original authorizations it appears that the terms of the construction permit have not been met.

(*s*) Extensions of time within which to comply with technical requirements specified in authorizations, orders, and rules or releases of the Commission.

(*t*) Representations of compliance with technical requirements specified in authorizations, orders, rules, or releases (except formal applications).

(*u*) Operation with licensed, new or modified equipment at a temporary location with a temporary antenna system in case of an emergency when, due to causes beyond the control of the licensee, it becomes impossible to continue operating at the licensed location.

25. FIELD OFFICES OF THE COMMISSION

Section 3.57 and other rules of the Commission require that in certain instances, the inspector in charge of the district in which the station is located be advised of the conditions existing at the station. The following is a list of the radio districts, giving the address of each field office of the Commission and the territory embraced in each district:

Radio district	Address of the inspector in charge	Territory within district	
		States	Counties
1	Customhouse, 7th floor, Boston, Mass.	Connecticut	All counties.
		Maine	Do.
		Massachusetts	Do.
		New Hampshire	Do.
		Rhode Island	Do.
		Vermont	Do.
2	748 Federal Bldg., 641 Washington St., New York, N. Y.	New Jersey	Bergen, Essex, Hudson, Hunterdon, Mercer, Middlesex, Monmouth, Morris, Passaic, Somerset, Sussex, Union, and Warren.
		New York	Albany, Bronx, Columbia, Delaware, Dutchess, Greene, Kings, Nassau, New York, Orange, Putnam, Queens, Rensselaer, Richmond, Rockland, Schenectady, Suffolk, Sullivan, Ulster, and Westchester.

Amendment No. 157 (Amending 25. Field Offices of the Commission), revised March 1, 1943

To be substituted for pp. 77, 78, 78a, Standards of Good Engineering Practice Concerning Standard Broadcast Stations (550-1600 kc)

The last previous amendment affecting Standards of Good Engineering Practice was amendment No. 141, effective December 1, 1942

Radio district	Address of the inspector in charge	Territory within district	
		States	Counties
3	Room 1200, New U.S. Customhouse, 2nd & Chestnut Streets, Philadelphia, Pa.	Delaware----	Newcastle.
		New Jersey--	Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Ocean, and Salem.
		Pennsylvania	Adams, Berks, Bucks, Carbon, Chester, Cumberland, Dauphin, Delaware, Lancaster, Lebanon, Lehigh, Monroe, Montgomery, Northampton, Perry, Philadelphia, Schuylkill, and York.
	508 Old Town Bank Bldg., Gay Street & Falsway, Baltimore, Md.	Delaware----	Kent and Sussex.
4		District of Columbia---	
		Maryland----	All counties.
		Virginia----	Arlington, Clark, Fairfax, Fauquier, Frederick, Loudon, Page, Prince William, Rappahannock, Shenandoah, and Warren.
5	Room 402, New Post Office Bldg. Norfolk, Va.	N. Carolina-	All except district 6.
		Virginia	All except district 4.
6	411 Federal Annex, Atlanta, Georgia.	Alabama-----	All except district 8.
		Georgia-----	All counties.
		N. Carolina-	Ashe, Avery, Buncombe, Burke, Caldwell, Cherokee, Clay, Cleveland, Graham, Haywood, Henderson, Jackson, McDowell, Macon, Madison, Mitchell, Polk, Rutherford, Swain, Transylvania, Watauga, and Yancey.
		S. Carolina-	All counties.
		Tennessee---	Do.
Sub-Office	P.O. Box 77, (214-218 Post Office Bldg.), Savannah, Georgia.		
7	P.O. Box 150, (312 Federal Bldg.), Miami, Florida.	Florida-----	All except district 8.
Sub-Office	203 Post Office Bldg., Tampa, Florida.		
8	400 Audubon Building, New Orleans, La.	Alabama-----	Mobile, Baldwin.
		Arkansas----	All counties.
		Florida-----	Escambia.
		Louisiana---	All counties.
		Mississippi-	Do.
		Texas-------	City of Texarkana only.
9	Room 404, Federal Bldg., Galveston, Tex.	Texas-------	Aransas, Brazoria, Brooks, Calhoun, Cameron, Chambers, Fort Bend, Galveston, Goliad, Harris, Hidalgo, Jackson, Jefferson, Jim Wells, Kenedy, Kleberg, Matagorda, Nueces, Refugio, San Patricio, Victoria, Wharton, and Willacy.
Sub-Office	P.O. Box 1527 (329 Post Office Bldg.), Beaumont, Tex.		

Radio district	Address of the inspector in charge	Territory within district.	
		Statee	Counties
10	P.O. Box 5238 (500 U.S. Terminal Annex Bldg.), Dallas, Tex.	New Mexico----	All counties.
		Oklahoma------	Do.
		Texas---------	All except district 9 and the city of Texarkana.
11	539 U.S. Post Office & Courthouse Bldg., Temple & Spring Streets, Los Angeles, Calif.	Arizona--------	All counties.
		California-----	Imperial, Inyo, Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, and Ventura.
		Nevada --------	Clarke.
Sub-Office	307 U.S. Customhouse & Courthouse Bldg., Union & F Streets, San Diego, Calif.		
12	328 Customhouse, San Francisco, Calif.	California----	All except district 11.
		Nevada--------	All except Clarke.
		Guam----------	
		Midway--------	
		Wake----------	
		American Samoa	
13	805 Terminal Sales Bldg., Portland, Oregon.	Idaho----------	All except district 14.
		Oregon---------	All counties.
		Washington-----	Wahkiakum, Cowlitz, Clark, Skamania, and Klickitat.
14	808 Federal Office Bldg., Seattle, Washington.	Idaho----------	Benewah, Bonner, Boundary, Clearwater, Idaho, Kootenai, Latah, Lewis, Nez Perce, and Shoehone.
		Montana--------	All counties.
		Washington-----	All except district 13.
15	504 Customhouse, Denver, Colo.	Colorado-------	All counties.
		Utah-----------	Do.
		Wyoming--------	Do.
16	296 Uptown Post Office & Fed. Cts. Bldg., 5th & Washington Sts., St. Paul, Minn.	Minnesota------	Do.
		Mich ------	Alger, Baraga, Chippewa, Delta, Dickinson, Gogebic, Houghton, Iron, Keweenaw, Luce, Mackinac, Marquette, Menominee, Ontonagon, and Schoolcraft.
		North Dakota---	All counties.
		South Dakota---	Do.
		Wisconsin------	All except district 18.
17	809 U.S. Court House, Kansas City, Mo.	Iowa-----------	All except district 18.
		Kaneas---------	All counties.
		Miesouri-------	Do.
		Nebraska-------	Do.
18	246 U.S. Courthouse Bldg., Chicago, Illinois.	Illinois-------	All counties.
		Indiana--------	Do.
		Iowa-----------	Allamakee, Buchanan, Cedar, Clayton, Clinton, Delaware, Des Moines, Dubuque, Fayette, Henry, Jackson, Johnson, Jones, Lee, Linn, Louisa, Muscatine, Scott, Washington, and Winneshiek.
		Wisconsin------	Columbia, Crawford, Dane, Dodge, Grant, Green, Iowa, Jefferson, Kenosha, Lafayette, Milwaukee, Ozaukee, Racine, Richland, Rock, Sauk, Walworth, Washington, and Waukesha.
19	414 New Federal Bldg., Detroit, Michigan	Kentucky-------	All counties.
		Michigan-------	All except district 16.
		Ohio-----------	All counties.
		West Virginia-	Do.

Radio district	Address of the inspector in charge	Territory within district	
		States	Counties
Sub-Office	541 Old Post Office Bldg., Cleveland, Ohio.		
20	328 Federal Bldg., Buffalo, New York.	New York-----	All except district 2.
		Pennsylvania-	All except district 3.
21	609 Stangenwald Bldg., Honolulu, T.H.	Territory of Hawaii------	
22	P.O. Box 2987 (322-323 Federal Bldg.), San Juan, Puerto Rico.	Puerto Rico__ Virgin Islands	
23	P.O. Box 1421, (7-8 Shattuck Bldg.), Juneau, Alaska.	Alaska-------	
Monitoring Stn.	Allegan Monitoring Station, P.O. Box 89, Allegan, Michigan.		
Monitoring Stn.	Central Frequency Monitoring Station P.O. Box 788, Grand Island, Nebraska.		
Monitoring Stn.	Kingsville Monitoring Station, P.O. Box 632, Kingsville, Texas.		

26. AVERAGE SUNRISE AND SUNSET TIMES

Section 3.8 states that the terms "sunrise" and "sunset" mean for each particular station during any particular month, the average times of sunrise and sunset as specified in the license of a broadcast station. The following is a tabulation of the average times of sunrise and sunset for each month at various points:

Average Sunrise Time (SR)
Average Sunset Time (SS)

(A) Atlantic, (E) Eastern, (C) Central, (M) Mountain, (P) Pacific, standard times.

	Month											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Aberdeen, S. Dak. (C):												
SR	8:15	7:45	6:45	5:45	5:00	4:45	5:00	5:30	6:15	6:45	7:30	8:00
SS	5:15	6:00	6:45	7:15	8:00	8:30	8:15	7:45	6:45	5:45	5:00	4:45
*Akron, Ohio (E):												
SR	7:45	7:15	6:45	5:45	5:15	5:00	5:00	5:30	6:00	6:30	7:15	7:45
SS	5:15	6:00	6:30	7:00	7:30	8:00	8:00	7:30	6:30	5:45	5:15	5:00
*Albany, N. Y. (E):												
SR	7:30	7:00	6:15	5:15	4:30	4:15	4:30	5:00	5:30	6:15	6:45	7:15
SS	4:45	5:30	6:00	6:30	7:15	7:30	7:30	7:00	6:15	5:15	4:30	4:15
Albuquerque, N. Mex. (M):												
SR	7:15	7:00	6:15	5:30	5:00	4:45	5:00	5:30	5:45	6:15	6:45	7:15
SS	5:15	5:45	6:15	6:45	7:00	7:15	7:15	7:00	6:15	5:30	5:00	5:00
*Altoona, Pa. (E):												
SR	7:30	7:15	6:30	5:30	5:00	4:45	5:00	5:30	6:00	6:30	7:00	7:30
SS	5:15	5:45	6:15	6:45	7:15	7:45	7:45	7:15	6:30	5:30	5:00	4:45
Amarillo, Tex. (C):												
SR	8:00	7:30	7:00	6:15	5:45	5:30	5:45	6:00	6:30	7:00	7:15	7:45
SS	6:00	6:30	7:00	7:15	7:45	8:00	8:00	7:30	7:00	6:15	5:45	5:30
Ames, Iowa (C):												
SR	7:45	7:15	6:30	5:30	5:00	4:30	4:45	5:15	6:00	6:30	7:00	7:30
SS	5:00	5:45	6:15	7:00	7:30	7:45	7:45	7:15	6:30	5:30	5:00	4:45
Anderson, Ind. (C):												
SR	7:00	6:45	6:00	5:00	4:30	4:15	4:30	5:00	5:30	5:45	6:30	7:00
SS	4:45	5:15	5:45	6:15	6:45	7:15	7:15	6:45	6:00	5:00	4:30	4:15
Ardmore, Okla. (C):												
SR	7:30	7:15	6:45	6:00	5:30	5:15	5:30	5:45	6:15	6:30	7:00	7:30
SS	5:45	6:15	6:30	7:00	7:30	7:45	7:45	7:15	6:30	6:00	5:30	5:15
Ashtabula, Ohio (E):												
SR	7:45	7:15	6:45	5:45	5:00	4:45	5:00	5:30	6:00	6:30	7:15	7:45
SS	5:15	6:00	6:30	7:00	7:30	8:00	8:00	7:30	6:30	5:45	5:00	5:00
*Atlanta, Ga. (C):												
SR	6:45	6:30	5:45	5:15	4:30	4:30	4:30	5:00	5:15	5:45	6:15	6:30
SS	4:45	5:15	5:45	6:15	6:30	6:45	6:45	6:30	5:45	5:00	4:30	4:30
*Atlantic City, N. J. (E):												
SR	7:15	6:45	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:00	6:45	7:15
SS	5:00	5:30	6:00	6:30	7:00	7:30	7:30	7:00	6:15	5:15	4:45	4:30
Aurora, Ill. (C):												
SR	7:15	6:45	6:15	5:15	4:30	4:15	4:30	5:00	5:30	6:00	6:45	7:15
SS	4:45	5:30	6:00	6:30	7:00	7:30	7:30	7:00	6:00	5:15	4:30	4:30
Austin, Tex. (C):												
SR	7:30	7:15	6:45	6:00	5:30	5:30	5:45	6:00	6:15	6:30	7:00	7:15
SS	5:45	6:15	6:45	7:00	7:15	7:30	7:30	7:15	6:45	6:00	5:30	5:30
Baker, Oreg. (P):												
SR	7:30	7:00	6:00	5:15	4:30	4:00	4:15	4:45	5:30	6:00	6:15	7:15
SS	4:30	5:15	6:00	6:30	7:15	7:45	7:30	7:00	6:00	5:15	4:30	4:15
*Baltimore, Md. (E):												
SR	7:30	7:00	6:15	5:30	5:00	4:45	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:45	6:15	6:45	7:15	7:30	7:30	7:00	6:15	5:30	5:00	4:45
Bangor, Maine (E):												
SR	7:15	6:45	5:45	5:00	4:15	3:45	4:00	4:30	5:15	5:45	6:30	7:00
SS	4:15	5:00	5:45	6:15	7:00	7:15	7:15	6:45	5:45	4:45	4:15	4:00
Baton Rouge, La. (C):												
SR	7:00	6:45	6:15	5:45	5:15	5:00	5:15	5:30	5:45	6:00	6:30	7:00
SS	5:30	5:45	6:15	6:30	6:45	7:15	7:15	6:45	6:15	5:30	5:15	5:00
Bay City, Mich. (E):												
SR	8:15	7:30	6:45	6:00	5:15	5:00	5:00	5:45	6:15	6:45	7:30	8:00
SS	5:30	6:00	6:45	7:15	8:00	8:15	8:15	7:45	6:45	6:00	5:15	5:30
Beaumont, Tex. (C):												
SR	7:15	7:00	6:30	5:45	5:30	5:15	5:30	5:45	6:00	6:15	6:45	7:00
SS	5:45	6:00	6:30	6:45	7:00	7:15	7:15	7:00	6:30	5:45	5:15	5:15
*Beverly Hills, Calif. (P):												
SR	7:00	6:45	6:00	5:30	4:45	4:45	4:45	5:15	5:30	6:00	6:30	6:45
SS	5:00	5:30	6:00	6:30	6:45	7:00	7:00	6:45	6:00	5:15	4:45	4:45
Billings, Mont. (M):												
SR	8:00	7:15	6:30	5:30	4:45	4:30	4:30	5:15	5:45	6:30	7:15	7:45
SS	5:00	5:45	6:15	7:00	7:30	8:00	8:00	7:30	6:30	5:30	4:45	4:30
*Birmingham, Ala. (C):												
SR	7:00	6:30	6:00	5:15	4:45	4:30	4:45	5:15	5:30	5:45	6:15	6:45
SS	5:00	5:30	6:00	6:15	6:45	7:00	7:00	6:30	6:00	5:15	4:45	4:45
Bismarck, N. Dak. (C):												
SR	8:30	7:45	7:00	6:00	5:15	4:45	5:00	5:45	6:15	7:00	7:45	8:15
SS	5:15	6:00	6:45	7:30	8:15	8:45	8:30	8:00	7:00	6:00	5:15	5:00
Bluefield, W. Va. (E):												
SR	7:45	7:15	6:45	5:45	5:15	5:00	5:15	5:45	6:00	6:30	7:00	7:30
SS	5:30	6:00	6:30	7:00	7:30	7:45	7:45	7:15	6:30	5:45	5:15	5:15
Blytheville, Ark. (C):												
SR	7:15	6:45	6:15	5:30	5:00	4:45	5:00	5:15	5:45	6:00	6:30	7:00
SS	5:15	5:45	6:00	6:30	7:00	7:15	7:15	6:45	6:15	5:30	5:00	4:45

*Metropolitan district.

	Month											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Boise, Idaho: (M)												
SR	8:15	7:45	7:00	6:00	5:15	5:00	5:15	5:45	6:30	7:00	7:15	8:15
SS	5:30	6:15	6:45	7:30	8:00	8:30	8:30	7:45	7:00	6:00	5:15	5:15
Boone, Iowa (C):												
SR	7:45	7:15	6:30	5:30	5:00	4:45	4:45	5:15	6:00	6:30	7:00	7:30
SS	5:15	5:45	6:15	7:00	7:30	8:00	7:45	7:15	6:30	5:30	5:00	4:45
*Boston, Mass. (E):												
SR	7:15	6:45	6:00	5:00	4:30	4:00	4:15	4:45	5:30	6:00	6:30	7:00
SS	4:30	5:15	5:45	6:30	7:00	7:15	7:15	6:45	6:00	5:00	4:30	4:15
Brady, Tex. (C):												
SR	7:30	7:15	6:45	6:15	5:45	5:30	5:45	6:00	6:15	6:45	7:00	7:30
SS	6:00	6:30	6:45	7:00	7:30	7:45	7:45	7:15	6:45	6:00	5:45	5:30
*Bridgeport, Conn. (E):												
SR	7:15	6:45	6:15	5:15	4:30	4:15	4:30	5:00	5:30	6:00	6:45	7:15
SS	4:45	5:30	6:00	6:30	7:00	7:30	7:30	7:00	6:00	5:15	4:30	4:30
Brookings, S. Dak. (C):												
SR	8:00	7:30	6:45	5:45	5:00	4:45	5:00	5:30	6:00	6:45	7:15	8:00
SS	5:15	6:00	6:30	7:15	7:45	8:15	8:15	7:30	6:45	5:45	5:00	4:45
*Brooklyn, N. Y. (E):												
SR	7:15	6:45	6:15	5:15	4:45	4:30	4:30	5:00	5:30	6:00	6:45	7:15
SS	4:45	5:30	6:00	6:30	7:00	7:30	7:30	7:00	6:00	5:15	4:45	4:30
Brownsville, Tex. (C):												
SR	7:15	7:00	6:45	6:15	5:45	5:30	5:45	6:00	6:15	6:30	6:45	7:15
SS	6:00	6:30	6:45	7:00	7:15	7:30	7:30	7:00	6:30	6:00	5:45	5:45
Brunswick, Ga. (E):												
SR	7:30	7:15	6:45	6:00	5:30	5:15	5:30	5:45	6:15	6:30	7:00	7:15
SS	5:45	6:15	6:30	7:00	7:15	7:30	7:30	7:15	6:30	6:00	5:30	5:30
*Buffalo, N. Y. (E):												
SR	7:45	7:15	6:30	5:30	5:00	4:30	4:45	5:15	6:00	6:30	7:00	7:45
SS	5:00	5:45	6:15	7:00	7:30	8:00	8:00	7:15	6:30	5:30	5:00	4:45
Butte, Mont. (M):												
SR	8:15	7:30	6:45	5:45	5:00	4:45	5:00	5:30	6:00	6:45	7:30	8:00
SS	5:15	6:00	6:30	7:15	8:00	8:15	8:15	7:45	6:45	5:45	5:00	4:45
*Camden, N. J. (E):												
SR	7:15	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:30	6:00	6:45	7:15	7:30	7:30	7:00	6:15	5:30	4:45	4:30
Canton, N. Y. (E):												
SR	7:30	7:00	6:15	5:15	4:30	4:15	4:30	5:00	5:45	6:15	7:00	7:30
SS	4:45	5:30	6:00	6:45	7:15	7:45	7:45	7:00	6:15	5:15	4:30	4:15
*Canton, Ohio (E):												
SR	7:45	7:15	6:45	5:45	5:15	5:00	5:00	5:30	6:00	6:30	7:15	7:45
SS	5:15	6:00	6:30	7:00	7:30	8:00	8:00	7:30	6:30	5:45	5:15	5:00
Carthage, Ill. (C):												
SR	7:30	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:45	6:15	6:45	7:15	7:30	7:30	7:00	6:15	5:30	4:45	4:45
Cedar Rapids, Iowa (C):												
SR	7:30	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	7:00	7:30
SS	5:00	5:45	6:15	6:45	7:15	7:45	7:45	7:15	6:15	5:30	4:45	4:30
Charleston, S. C. (E):												
SR	7:30	7:00	6:30	5:45	5:15	5:15	5:15	5:45	6:00	6:30	6:45	7:15
SS	5:30	6:00	6:30	6:45	7:15	7:30	7:30	7:00	6:30	5:45	5:15	5:15
*Charleston, W. Va. (E):												
SR	7:45	7:15	6:45	6:00	5:15	5:00	5:15	5:45	6:15	6:30	7:15	7:30
SS	5:30	6:00	6:30	7:00	7:30	7:45	7:45	7:15	6:30	5:45	5:15	5:15
Charlotte, N. C. (E):												
SR	7:30	7:15	6:30	6:00	5:15	5:15	5:15	5:45	6:00	6:30	7:00	7:30
SS	5:30	6:00	6:30	7:00	7:15	7:45	7:45	7:15	6:30	5:45	5:15	5:15
*Chattanooga, Tenn. (C):												
SR	6:45	6:30	6:00	5:15	4:45	4:30	4:30	5:00	5:30	5:45	6:15	6:45
SS	4:45	5:30	5:45	6:15	6:30	7:00	7:00	6:30	5:45	5:15	4:30	4:30
*Chicago, Ill. (C):												
SR	7:15	6:45	6:00	5:15	4:30	4:15	4:30	5:00	5:30	6:00	6:45	7:15
SS	4:45	5:30	6:00	6:30	7:00	7:30	7:30	7:00	6:00	5:15	4:30	4:15
Chico, Calif. (P):												
SR	7:30	7:00	6:15	5:30	5:00	4:45	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:45	6:15	6:45	7:15	7:30	7:30	7:00	6:15	5:30	5:00	4:45
*Cincinnati, Ohio (E):												
SR	8:00	7:30	6:45	6:00	5:30	5:15	5:30	5:45	6:15	6:45	7:15	7:45
SS	5:45	6:15	6:45	7:15	7:45	8:00	8:00	7:30	6:45	6:00	5:30	5:15
*Clayton, Mo. (C):												
SR	7:15	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:45	6:00	6:30	7:00	7:30	7:30	7:00	6:15	5:30	4:45	4:45
*Cleveland, Ohio (E):												
SR	8:00	7:30	6:45	5:45	5:15	4:45	5:00	5:30	6:00	6:45	7:15	7:45
SS	5:15	6:00	6:30	7:00	7:45	8:00	8:00	7:30	6:45	5:45	5:15	5:00
Coffeyville, Kans. (C):												
SR	7:30	7:15	6:30	5:45	5:15	5:00	5:15	5:45	6:00	6:30	7:00	7:30
SS	5:30	6:00	6:30	7:00	7:30	7:45	7:45	7:15	6:30	5:45	5:15	5:00
College Station, Tex. (C):												
SR	7:30	7:15	6:30	6:00	5:30	5:15	5:30	5:45	6:15	6:30	6:45	7:15
SS	5:45	6:15	6:30	6:45	7:15	7:30	7:30	7:15	6:30	6:00	5:30	5:30

* Metropolitan district.

	Month											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Columbia, Mo. (C):												
SR	7:30	7:00	6:30	5:30	5:00	4:45	5:00	5:15	5:45	6:15	6:45	7:15
SS	5:15	5:45	6:15	6:45	7:15	7:30	7:30	7:00	6:15	5:30	5:00	4:45
Columbia, S. C. (E):												
SR	7:30	7:15	6:30	6:00	5:30	5:15	5:30	5:45	6:00	6:30	7:00	7:30
SS	5:30	6:00	6:30	7:00	7:15	7:30	7:30	7:15	6:30	5:45	5:15	5:15
*Columbus, Ohio (E):												
SR	8:00	7:30	6:45	6:00	5:15	5:00	5:15	5:45	6:15	6:45	7:15	7:45
SS	5:30	6:00	6:45	7:15	7:45	8:00	8:00	7:30	6:45	6:00	5:15	5:15
Cordele, Ga. (E):												
SR	7:30	7:15	6:45	6:15	5:45	5:30	5:45	6:00	6:15	6:45	7:00	7:30
SS	6:00	6:15	6:45	7:00	7:30	7:45	7:45	7:15	6:45	6:00	5:30	5:30
Corpus Christi, Tex. (C):												
SR	7:30	7:15	6:45	6:00	5:45	5:30	5:45	6:00	6:15	6:30	6:45	7:15
SS	6:00	6:15	6:45	7:00	7:15	7:30	7:30	7:15	6:30	6:00	5:45	5:30
Cumberland, Md. (E):												
SR	7:30	7:15	6:30	5:45	5:00	4:45	5:00	5:30	6:00	6:30	7:00	7:30
SS	5:15	5:45	6:15	6:45	7:15	7:45	7:45	7:15	6:30	5:30	5:00	4:45
*Dallas, Tex. (C):												
SR	7:30	7:15	6:45	6:00	5:30	5:15	5:30	5:45	6:15	6:30	7:00	7:30
SS	5:45	6:15	6:30	7:00	7:15	7:30	7:30	7:15	6:30	6:00	5:30	5:15
Danville, Va. (E):												
SR	7:30	7:15	6:30	5:45	5:15	5:00	5:15	5:30	6:00	6:30	7:00	7:30
SS	5:30	6:00	6:30	6:45	7:15	7:30	7:30	7:15	6:30	5:45	5:15	5:00
*Davenport, Iowa (C):												
SR	7:30	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:30	6:15	6:45	7:15	7:45	7:30	7:00	6:15	5:15	4:45	4:30
*Dayton, Ohio (E):												
SR	8:00	7:30	6:45	6:00	5:30	5:15	5:15	5:45	6:15	6:45	7:15	7:45
SS	5:30	6:15	6:45	7:15	7:45	8:00	8:00	7:30	6:45	6:00	5:15	5:15
Decorah, Iowa (C):												
SR	7:45	7:15	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	7:00	7:30
SS	5:00	5:30	6:15	6:45	7:30	7:45	7:45	7:15	6:15	5:30	4:45	4:30
*Denver, Colo. (M):												
SR	7:15	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:30	6:00	6:30	7:00	7:30	7:30	7:00	6:15	5:15	4:45	4:30
*Des Moines, Iowa (C):												
SR	7:45	7:15	6:30	5:30	5:00	4:45	4:45	5:15	6:00	6:30	7:00	7:30
SS	5:00	5:45	6:15	7:00	7:30	7:45	7:45	7:15	6:30	5:30	5:00	4:45
*Detroit, Mich. (E):												
SR	8:00	7:30	6:45	6:00	5:15	5:00	5:00	5:45	6:15	6:45	7:15	8:00
SS	5:30	6:00	6:45	7:15	7:45	8:15	8:15	7:30	6:45	5:45	5:15	5:00
Dodge City, Kans. (C):												
SR	8:00	7:30	7:00	6:00	5:30	5:15	5:30	6:00	6:15	6:45	7:15	7:45
SS	5:45	6:15	6:45	7:15	7:45	8:00	8:00	7:30	6:45	6:00	5:30	5:30
Dothan, Ala. (C):												
SR	6:45	6:30	6:00	5:15	4:45	4:30	4:45	5:00	5:30	5:45	6:15	6:30
SS	5:00	5:30	5:45	6:15	6:30	6:45	6:45	6:30	5:45	5:15	4:45	4:45
Dublin, Tex. (C):												
SR	7:30	7:15	6:45	6:00	5:30	5:30	5:30	6:00	6:15	6:30	7:00	7:30
SS	5:45	6:15	6:45	7:00	7:30	7:45	7:45	7:15	6:45	6:00	5:30	5:30
Dubuque, Iowa (C):												
SR	7:30	7:00	6:15	5:30	4:45	4:30	4:30	5:15	5:45	6:15	7:00	7:30
SS	5:00	5:30	6:15	6:45	7:15	7:45	7:45	7:00	6:15	5:30	4:45	4:30
*Duluth, Minn. (C):												
SR	7:45	7:15	6:30	5:30	4:30	4:15	4:30	5:00	5:45	6:30	7:15	7:45
SS	4:45	5:30	6:15	7:00	7:30	8:00	8:00	7:15	6:15	5:30	4:30	4:15
East Lansing, Mich. (E):												
SR	8:00	7:30	7:00	6:00	5:15	5:00	5:15	5:45	6:15	6:45	7:30	8:00
SS	5:30	6:15	6:45	7:15	8:00	8:15	8:15	7:45	6:45	6:00	5:15	5:00
Eau Claire, Wis. (C):												
SR	7:45	7:15	6:15	5:30	4:45	4:15	4:30	5:00	5:45	6:15	7:00	7:30
SS	4:45	5:30	6:15	6:45	7:30	8:00	7:45	7:15	6:15	5:30	4:45	4:30
Elmira, N. Y. (E):												
SR	7:30	7:00	6:30	5:30	4:45	4:30	4:45	5:15	5:45	6:15	7:00	7:30
SS	5:00	5:45	6:15	6:45	7:15	7:45	7:45	7:15	6:15	5:30	4:45	4:30
*El Paso, Tex. (C):												
SR	8:00	7:45	7:15	6:45	6:15	6:00	6:15	6:30	6:45	7:15	7:30	8:00
SS	6:30	6:45	7:15	7:30	8:00	8:15	8:15	7:45	7:15	6:30	6:00	6:00
*Erie, Pa. (E):												
SR	7:45	7:15	6:30	5:45	5:00	4:45	5:00	5:30	6:00	6:30	7:15	7:45
SS	5:15	5:45	6:30	7:00	7:30	8:00	8:00	7:15	6:30	5:45	5:00	4:45
Eureka, Calif. (P):												
SR	7:45	7:15	6:30	5:45	5:00	4:45	5:00	5:30	6:00	6:30	7:00	7:30
SS	5:15	5:45	6:15	7:00	7:30	7:45	7:45	7:15	6:30	5:45	5:00	4:45
*Evansville, Ind. (C):												
SR	7:00	6:45	6:00	5:15	4:45	4:30	4:45	5:00	5:30	6:00	6:30	7:00
SS	5:00	5:30	6:00	6:30	7:00	7:15	7:15	6:45	6:00	5:15	4:45	4:30
Fairmont, W. Va. (E):												
SR	7:45	7:15	6:30	5:45	5:15	4:45	5:00	5:30	6:00	6:30	7:00	7:30
SS	5:15	6:00	6:30	7:00	7:30	7:45	7:45	7:15	6:30	5:45	5:00	5:00

*Metropolitan district.

	Month											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
*Fall River, Mass. (E):												
SR	7:15	6:45	6:00	5:00	4:30	4:15	4:15	4:45	5:30	6:00	6:30	7:00
SS	4:45	5:15	5:45	6:30	7:00	7:30	7:15	6:45	6:00	5:00	4:30	4:15
Fargo, N. Dak. (C):												
SR	8:15	7:30	6:45	5:45	5:00	4:30	4:45	5:30	6:00	6:45	7:30	8:00
SS	5:00	5:45	6:30	7:15	8:00	8:15	8:15	7:45	6:45	5:45	5:00	4:45
Fayetteville, N. C. (E):												
SR	7:30	7:00	6:30	5:45	5:15	5:00	5:15	5:30	6:00	6:15	6:45	7:15
SS	5:30	6:00	6:15	6:45	7:15	7:30	7:30	7:00	6:30	5:45	5:15	5:00
Fergus Falls, Minn. (C):												
SR	8:00	7:30	6:45	5:45	4:45	4:30	4:45	5:15	6:00	6:45	7:30	8:00
SS	5:00	5:45	6:30	7:15	7:45	8:15	8:15	7:30	6:45	5:45	4:45	4:45
*Flint, Mich. (E):												
SR	8:00	7:30	6:45	6:00	5:15	5:00	5:15	5:45	6:15	6:45	7:30	8:00
SS	5:30	6:00	6:45	7:15	7:45	8:15	8:15	7:45	6:45	6:00	5:15	5:00
*Fort Wayne, Ind. (C):												
SR	7:00	6:30	6:00	5:00	4:30	4:00	4:15	4:45	5:15	5:45	6:30	7:00
SS	4:30	5:15	5:45	6:15	6:45	7:15	7:15	6:45	5:45	5:00	4:30	4:15
*Fort Worth, Tex. (C):												
SR	7:30	7:15	6:45	6:00	5:30	5:15	5:30	5:45	6:15	6:30	7:00	7:30
SS	5:45	6:15	6:30	7:00	7:15	7:45	7:45	7:15	6:30	6:00	5:30	5:30
Frederick, Md. (E):												
SR	7:30	7:00	6:30	5:30	5:00	4:45	5:00	5:15	5:45	6:15	7:00	7:30
SS	5:15	5:45	6:15	6:45	7:15	7:45	7:30	7:00	6:15	5:30	5:00	4:45
Fredericksburg, Va. (E):												
SR	7:30	7:00	6:30	5:30	5:00	4:45	5:00	5:30	5:45	6:15	6:45	7:15
SS	5:15	5:45	6:15	6:45	7:15	7:30	7:30	7:00	6:15	5:30	5:00	4:45
Fremont, Nebr. (C):												
SR	7:45	7:30	6:45	5:45	5:15	4:45	5:00	5:30	6:00	6:30	7:15	7:45
SS	5:15	6:00	6:30	7:00	7:30	8:00	8:00	7:30	6:45	5:45	5:15	5:00
Fresno, Calif. (P):												
SR	7:15	6:45	6:15	5:30	5:00	4:45	4:45	5:15	5:45	6:00	6:30	7:00
SS	5:00	5:45	6:00	6:30	7:00	7:15	7:15	6:45	6:15	5:30	4:45	4:45
Gainesville, Fla. (E):												
SR	7:30	7:15	6:45	6:00	5:30	5:30	5:45	6:00	6:15	6:30	7:00	7:15
SS	5:45	6:15	6:30	7:00	7:15	7:30	7:30	7:15	6:30	6:00	5:30	5:30
Gallup, N. Mex. (M):												
SR	7:30	7:00	6:30	5:45	5:15	5:00	5:15	5:30	6:00	6:15	6:45	7:15
SS	5:30	6:00	6:15	6:45	7:15	7:30	7:30	7:00	6:30	5:45	5:15	5:00
*Gary, Ind. (C):												
SR	7:15	6:45	6:00	5:15	4:30	4:15	4:30	5:00	5:30	6:00	6:45	7:15
SS	4:45	5:30	6:00	6:30	7:00	7:30	7:30	7:00	6:00	5:15	4:30	4:15
*Glendale, Calif. (P):												
SR	7:00	6:45	6:00	5:30	4:45	4:45	4:45	5:15	5:30	6:00	6:30	6:45
SS	5:00	5:30	6:00	6:30	6:45	7:00	7:00	6:45	6:00	5:15	4:45	4:45
*Glenside, Pa. (E):												
SR	7:15	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:30	6:00	6:45	7:15	7:30	7:30	7:00	6:15	5:30	4:45	4:30
Grand Forks, N. Dak. (C):												
SR	8:15	7:45	6:45	5:45	4:45	4:30	4:45	5:15	6:00	6:45	7:30	8:15
SS	5:00	5:45	6:30	7:15	8:00	8:30	8:30	7:45	6:45	5:45	4:45	4:30
Grand Island, Nebr. (C):												
SR	8:00	7:30	6:45	6:00	5:15	5:00	5:15	5:45	6:15	6:45	7:15	7:45
SS	5:30	6:15	6:45	7:15	7:45	8:00	8:00	7:30	6:45	6:00	5:15	5:00
*Grand Rapids, Mich. (E):												
SR	8:15	7:45	7:00	6:00	5:15	5:00	5:15	5:45	6:15	7:00	7:30	8:15
SS	5:30	6:15	6:45	7:30	8:00	8:30	8:15	7:45	7:00	6:00	5:15	5:15
Great Falls, Mont. (M):												
SR	8:15	7:30	6:45	5:45	4:45	4:30	4:45	5:15	6:00	6:45	7:30	8:00
SS	5:00	5:45	6:30	7:15	8:00	8:30	8:15	7:45	6:45	5:45	4:45	4:30
Greeley, Colo. (M):												
SR	7:15	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:30	6:00	6:30	7:00	7:30	7:30	7:00	6:15	5:15	4:45	4:30
Green Bay, Wis. (C):												
SR	7:30	7:00	6:15	5:15	4:30	4:00	4:15	5:00	5:30	6:00	6:45	7:15
SS	4:30	5:15	6:00	6:30	7:15	7:45	7:30	7:00	6:00	5:15	4:30	4:15
Greensburg, Pa. (E):												
SR	7:45	7:15	6:30	5:45	5:00	4:45	5:00	5:30	6:00	6:30	7:00	7:30
SS	5:15	6:00	6:30	7:00	7:30	7:45	7:45	7:15	6:30	5:45	5:00	5:00
Greensboro, N. C. (E):												
SR	7:30	7:15	6:30	5:45	5:15	5:00	5:15	5:30	6:00	6:30	7:00	7:30
SS	5:30	6:00	6:30	6:45	7:15	7:30	7:30	7:15	6:30	5:45	5:15	5:00
Greenville, N. C. (E):												
SR	7:15	7:00	6:15	5:45	5:00	5:00	5:00	5:30	5:45	6:15	6:45	7:15
SS	5:15	5:45	6:15	6:45	7:00	7:30	7:30	7:00	6:15	5:30	5:00	5:00
Greenville, S. C. (E):												
SR	7:45	7:15	6:45	6:00	5:30	5:15	5:30	5:45	6:15	6:30	7:00	7:30
SS	5:45	6:15	6:30	7:00	7:30	7:45	7:45	7:15	6:45	6:00	5:30	5:15
Gulfport, Miss. (C):												
SR	7:00	6:45	6:15	5:30	5:00	5:00	5:00	5:30	5:45	6:00	6:15	6:45
SS	5:15	5:45	6:00	6:15	6:45	7:00	7:00	6:45	6:00	5:30	5:00	5:00

*Metropolitan district.

	Month											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
*Hammond, Ind. (C):												
SR	7:15	6:45	6:00	5:15	4:30	4:15	4:30	5:00	5:30	6:00	6:45	7:15
SS	4:45	5:30	6:00	6:30	7:00	7:30	7:30	7:00	6:00	5:15	4:30	4:15
*Harrisburg, Pa. (E):												
SR	7:30	7:00	6:15	5:30	5:00	4:30	4:45	5:15	5:45	6:15	7:00	7:30
SS	5:00	5:45	6:15	6:45	7:15	7:45	7:30	7:00	6:15	5:30	4:45	4:45
Harrisonburg, Va. (E):												
SR	7:30	7:15	6:30	5:45	5:00	4:45	5:00	5:30	6:00	6:30	7:00	7:30
SS	5:15	6:30	6:15	6:45	7:15	7:45	7:45	7:15	6:30	5:45	5:00	5:00
*Hartford, Conn. (E):												
SR	7:15	6:45	6:00	5:15	4:30	4:15	4:30	5:00	5:30	6:00	6:45	7:15
SS	4:45	5:30	6:00	6:30	7:00	7:30	7:30	7:00	6:00	5:15	4:30	4:15
Hattiesburg, Miss. (C):												
SR	7:00	6:45	6:15	5:30	5:00	4:45	5:00	5:15	5:45	6:00	6:30	6:45
SS	5:15	5:45	6:00	6:30	6:45	7:00	7:00	6:45	6:00	5:30	5:00	5:00
Honolulu, Hawaii (local):												
SR	6:45	6:30	6:15	5:45	5:30	5:15	5:30	5:45	5:45	6:00	6:15	6:30
SS	5:45	6:00	6:15	6:15	6:30	6:45	6:45	6:30	6:00	5:30	5:15	5:15
Hot Springs, Ark. (C):												
SR	7:15	7:00	6:30	5:45	5:15	5:00	5:15	5:30	6:00	6:15	6:45	7:15
SS	5:30	6:00	6:15	6:45	7:00	7:30	7:30	7:00	6:15	5:45	5:15	5:00
*Houston, Tex. (C):												
SR	7:15	7:00	6:30	6:00	5:30	5:15	5:30	5:45	6:00	6:30	6:45	7:15
SS	5:45	6:15	6:30	6:45	7:15	7:30	7:30	7:00	6:30	5:45	5:30	5:30
*Huntington, W. Va. (E):												
SR	7:45	7:15	6:45	6:00	5:15	5:00	5:15	5:45	6:15	6:45	7:15	7:45
SS	5:30	6:00	6:30	7:00	7:30	8:00	8:00	7:30	6:45	6:00	5:15	5:15
Huntsville, Tex. (C):												
SR	7:15	7:00	6:30	6:00	5:30	5:15	5:30	5:45	6:00	6:30	6:45	7:15
SS	5:45	6:15	6:30	6:45	7:15	7:30	7:30	7:00	6:30	5:45	5:30	5:30
Idaho Falls, Idaho (M):												
SR	8:00	7:30	6:45	5:45	5:00	4:45	5:00	5:30	6:00	6:45	7:15	8:00
SS	5:15	6:00	6:30	7:15	7:45	8:15	8:15	7:30	6:45	5:45	5:00	4:45
*Indianapolis, Ind. (C):												
SR	7:00	6:45	6:00	5:15	4:30	4:15	4:30	5:00	5:30	6:00	6:30	7:00
SS	4:45	5:15	5:45	6:15	6:45	7:15	7:15	6:45	6:00	5:00	4:30	4:15
Iowa City, Iowa (C):												
SR	7:30	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	7:00	7:30
SS	5:00	5:45	6:15	6:45	7:15	7:45	7:45	7:00	6:15	5:30	4:45	4:30
Ithaca, N. Y. (E):												
SR	7:30	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	7:00	7:30
SS	5:00	5:30	6:15	6:45	7:15	7:45	7:45	7:15	6:15	5:30	4:45	4:30
Jackson, Miss. (C):												
SR	7:00	6:45	6:15	5:30	5:00	5:00	5:00	5:30	5:45	6:00	6:30	7:00
SS	5:30	6:00	6:15	6:30	7:00	7:15	7:15	6:45	6:15	5:30	5:15	5:00
*Jacksonville, Fla. (E):												
SR	7:30	7:15	6:45	6:00	5:30	5:30	5:30	6:00	6:15	6:30	6:45	7:15
SS	5:45	6:15	6:30	7:00	7:15	7:30	7:30	7:15	6:30	6:00	5:30	5:30
*Jersey City, N. J. (E):												
SR	7:15	6:45	6:15	5:15	4:45	4:30	4:30	5:00	5:30	6:00	6:45	7:15
SS	4:45	5:30	6:00	6:30	7:00	7:30	7:30	7:00	6:00	5:15	4:45	4:30
*Johnstown, Pa. (E):												
SR	7:45	7:15	6:30	5:45	5:00	4:45	5:00	5:30	6:00	6:30	7:00	7:30
SS	5:15	5:45	6:15	7:15	7:30	7:45	7:45	7:15	6:30	5:30	5:00	4:45
Joliet, Ill. (C):												
SR	7:15	6:45	6:00	5:15	4:30	4:15	4:30	5:00	5:30	7:00	6:45	7:15
SS	4:45	5:30	6:00	6:30	7:00	7:30	7:30	7:00	6:00	6:00	4:30	4:30
Jonesboro, Ark. (C):												
SR	7:15	6:45	6:15	5:30	5:00	4:45	5:00	5:15	5:45	6:15	6:45	7:00
SS	5:15	5:45	6:15	6:30	7:00	7:15	7:15	7:00	6:15	5:30	5:00	4:45
Kalamazoo, Mich. (E):												
SR	8:15	7:45	7:00	6:00	5:15	5:00	5:15	5:45	6:15	6:00	7:30	8:00
SS	5:30	6:15	6:45	7:15	8:00	8:15	8:15	7:45	7:00	5:15	5:15	5:15
*Kansas City, Mo. (C):												
SR	7:15	7:15	6:30	5:45	5:00	4:45	5:00	5:30	6:00	6:30	7:00	7:30
SS	5:15	6:00	6:30	7:00	7:30	7:45	7:45	7:15	6:30	5:45	5:00	5:00
*Knoxville, Tenn. (C):												
SR	6:45	6:30	5:45	5:00	4:30	4:15	4:30	5:00	5:15	5:45	6:15	6:45
SS	4:45	5:15	5:45	6:15	6:30	7:00	7:00	6:30	5:45	5:00	4:30	4:30
La Crosse, Wis. (C):												
SR	7:45	7:00	6:15	5:30	4:45	4:15	4:30	5:15	5:45	6:15	7:00	7:30
SS	4:45	5:30	6:15	6:45	7:30	7:45	7:45	7:15	6:15	5:30	4:45	4:30
Lawrence, Kans. (C):												
SR	7:45	7:15	6:30	5:45	5:15	5:00	5:00	5:30	6:00	6:30	7:00	7:30
SS	5:15	6:00	6:30	7:00	7:30	7:45	7:45	7:15	6:30	5:45	5:15	5:00
*Lawrence, Mass. (E):												
SR	7:15	6:45	6:00	5:00	4:30	4:00	4:15	4:45	5:30	6:00	6:30	7:15
SS	4:30	5:15	5:45	6:30	7:00	7:30	7:15	6:45	6:00	5:00	4:30	4:15
Lexington, Ky. (C):												
SR	7:00	6:30	5:15	5:00	4:30	4:15	4:30	4:45	5:15	5:45	6:15	6:45
SS	4:45	5:15	5:45	6:15	6:45	7:00	7:00	6:30	5:45	5:00	4:30	4:15

*Metropolitan district.

	Month											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
*Little Rock, Ark. (C):												
SR	7:15	7:00	6:15	5:45	5:00	5:00	5:00	5:30	5:45	6:15	6:45	7:15
SS	5:15	5:45	6:15	6:45	7:00	7:30	7:30	7:00	6:15	5:30	5:00	5:00
Lincoln, Nebr. (C):												
SR	7:45	7:30	6:45	5:45	5:15	5:00	5:00	5:30	6:00	6:30	7:15	7:45
SS	5:30	6:00	6:30	7:00	7:30	8:00	8:00	7:30	6:45	5:45	5:15	5:00
Logan, W. Va. (E):												
SR	7:45	7:15	6:45	6:00	5:15	5:00	5:15	5:45	6:15	6:30	7:15	7:30
SS	5:30	6:00	6:30	7:00	7:30	7:45	7:45	7:30	6:45	6:00	5:15	5:15
Longview, Tex. (C):												
SR	7:15	7:00	6:30	5:45	5:15	5:15	5:15	5:45	6:00	6:30	6:45	7:15
SS	5:30	6:00	6:30	6:45	7:15	7:30	7:30	7:00	6:30	5:45	5:15	5:15
*Los Angeles, Calif. (P):												
SR	7:00	6:45	6:00	5:30	4:45	4:45	4:45	5:15	5:30	6:00	6:30	6:45
SS	5:00	5:30	6:00	6:30	6:45	7:00	7:00	6:45	6:00	5:15	4:45	4:45
*Louisville, Ky. (C):												
SR	7:00	6:30	6:00	5:15	4:30	4:15	4:30	5:00	5:30	5:45	6:30	7:00
SS	4:45	5:15	5:45	6:15	6:45	7:15	7:00	6:45	6:00	5:00	4:30	4:30
Lubbock, Tex. (C):												
SR	8:00	7:30	7:00	6:15	5:45	5:30	5:45	6:15	6:30	6:45	7:15	7:45
SS	6:00	6:30	7:00	7:15	7:45	8:00	8:00	7:30	7:00	6:15	5:45	5:45
Lufkin, Tex. (C):												
SR	7:15	7:00	6:30	6:00	5:30	5:15	5:30	5:45	6:00	6:15	6:45	7:15
SS	5:45	6:00	6:30	6:45	7:15	7:30	7:30	7:00	6:30	5:45	5:15	5:15
Macon, Ga. (E):												
SR	7:45	7:15	6:45	6:00	5:30	5:30	5:30	6:00	6:15	6:45	7:00	7:30
SS	5:45	6:15	6:45	7:00	7:30	7:45	7:45	7:15	6:45	6:00	5:30	5:30
Madison, Wis. (C):												
SR	7:30	7:00	6:15	5:15	4:30	4:15	4:30	5:00	5:30	6:15	6:45	7:30
SS	4:45	5:30	6:00	6:45	7:15	7:45	7:30	7:00	6:15	5:15	4:30	4:30
Manchester, N. H., (E):												
SR	7:15	6:45	6:00	5:00	4:30	4:00	4:15	4:45	5:30	6:00	6:45	7:15
SS	4:30	5:15	5:45	6:30	7:00	7:30	7:30	6:45	6:00	5:00	4:30	4:15
Manhattan, Kans. (C):												
SR	7:45	7:15	6:45	5:45	5:15	5:00	5:15	5:45	6:00	6:30	7:15	7:45
SS	5:30	6:00	6:30	7:00	7:30	8:00	7:45	7:30	6:30	5:45	5:15	5:00
Mansfield, Ohio (E):												
SR	8:00	7:30	6:45	6:00	5:15	5:00	5:15	5:45	6:15	6:45	7:15	7:45
SS	5:30	6:00	6:30	7:15	7:45	8:00	8:00	7:30	6:45	5:45	5:15	5:00
Marinette, Wis. (C):												
SR	7:30	7:00	6:00	5:15	4:15	4:00	4:15	4:45	5:30	6:00	6:45	7:30
SS	4:30	5:15	6:00	6:30	7:15	7:45	7:30	7:00	6:00	5:15	4:30	4:15
Martinsville, Va. (E):												
SR	7:30	7:15	6:30	5:45	5:15	5:00	5:15	5:30	6:00	6:30	7:00	7:30
SS	5:30	6:00	6:30	7:00	7:15	7:45	7:45	7:15	6:30	5:45	5:15	5:00
Mayaguez, P. R. (A):												
SR	7:00	7:00	6:30	6:15	6:00	5:45	6:00	6:15	6:15	6:15	6:30	6:45
SS	6:15	6:30	6:45	6:45	7:00	7:00	7:15	7:00	6:30	6:00	5:45	6:00
Medford, Oreg. (P):												
SR	7:45	7:15	6:30	5:30	4:45	4:30	4:45	5:15	5:45	6:30	7:00	7:30
SS	5:00	5:45	6:15	6:45	7:30	7:45	7:45	7:15	6:30	5:30	4:45	4:45
*Memphis, Tenn. (C):												
SR	7:15	6:45	6:15	5:30	5:00	4:45	5:00	5:15	5:45	6:00	6:30	7:00
SS	5:15	5:45	6:00	6:30	7:00	7:15	7:15	6:45	6:15	5:30	5:00	4:45
Merced, Calif. (P):												
SR	7:15	7:00	6:15	5:30	5:00	4:45	5:00	5:15	5:45	6:15	6:45	7:15
SS	5:15	5:45	6:15	6:30	7:00	7:30	7:30	7:00	6:15	5:30	5:00	4:45
Meridian, Miss. (C):												
SR	7:00	6:45	6:00	5:30	5:00	4:45	5:00	5:15	5:45	6:00	6:30	6:45
SS	5:15	5:45	6:00	6:30	6:45	7:00	7:00	6:45	6:00	5:30	5:00	4:45
*Miami, Fla. (E):												
SR	7:15	7:00	6:30	6:00	5:30	5:30	5:30	6:00	6:00	6:15	6:45	7:00
SS	5:45	6:15	6:30	6:45	7:00	7:15	7:15	7:00	6:30	6:00	5:30	5:30
*Milwaukee, Wis. (C):												
SR	7:30	6:45	6:00	5:15	4:30	4:15	4:30	5:00	5:30	6:00	6:45	7:15
SS	4:45	5:15	6:00	6:30	7:15	7:30	7:30	7:00	6:00	5:15	4:30	4:15
*Minneapolis, Minn. (C):												
SR	7:45	7:15	6:30	5:30	4:45	4:30	4:45	5:15	5:45	6:30	7:15	7:45
SS	5:00	5:45	6:15	7:00	7:30	8:00	8:00	7:15	6:30	5:30	4:45	4:30
Minot, N. Dak. (C):												
SR	8:30	8:00	7:00	6:00	5:00	4:45	5:00	5:45	6:15	7:00	7:45	8:30
SS	5:15	6:00	6:45	7:30	8:15	8:45	8:45	8:00	7:00	6:00	5:15	4:45
Missoula, Mont. (M):												
SR	8:15	7:45	6:45	5:45	5:00	4:45	5:00	5:30	6:15	7:00	7:45	8:15
SS	5:15	6:00	6:45	7:30	8:00	8:30	8:30	7:45	6:45	5:45	5:00	4:45
Mobile, Ala. (C):												
SR	6:45	6:30	6:00	5:30	5:00	4:45	5:00	5:15	5:30	6:00	6:15	6:45
SS	5:15	5:45	6:00	6:15	6:45	7:00	7:00	6:30	6:00	5:15	5:00	5:00
Modesto, Calif. (P):												
SR	7:15	7:00	6:15	5:30	5:00	4:45	5:00	5:15	5:45	6:15	6:45	7:15
SS	5:15	5:45	6:15	6:45	7:00	7:30	7:30	7:00	6:15	5:30	5:00	4:45

*Metropolitan district.

	Month											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Montgomery, Ala. (C):												
SR	6:45	6:30	6:00	5:15	4:45	4:30	4:45	5:15	5:30	5:45	6:15	6:45
SS	5:00	5:30	6:00	6:15	6:30	7:00	7:00	6:30	6:09	5:15	4:45	4:45
*Nashville, Tenn. (C):												
SR	7:00	6:30	6:00	5:15	4:45	4:30	4:45	5:00	5:30	6:00	6:30	6:45
SS	5:00	5:30	6:00	6:15	6:45	7:00	7:00	6:45	6:00	5:15	4:45	4:30
*Newark, N. J. (E):												
SR	7:15	6:45	6:15	5:15	4:45	4:30	4:30	5:00	5:30	6:00	6:45	7:15
SS	4:45	5:30	6:00	6:30	7:00	7:30	7:30	7:00	6:00	5:15	4:45	4:30
Newburgh, N. Y. (E):												
SR	7:15	7:00	6:15	5:15	4:45	4:15	4:30	5:00	5:30	6:00	6:45	7:15
SS	4:45	5:30	6:00	6:30	7:15	7:30	7:30	7:00	6:15	5:15	4:45	4:30
New Castle, Pa. (E):												
SR	7:45	7:15	6:30	5:45	5:00	4:45	5:00	5:30	6:00	6:30	7:15	7:45
SS	5:15	6:00	6:30	7:00	7:30	8:00	8:00	7:15	6:30	5:45	5:00	5:00
*New Haven, Conn. (E):												
SR	7:15	6:45	6:00	5:15	4:30	4:15	4:30	5:00	5:30	6:00	6:45	7:15
SS	4:45	5:30	6:00	6:30	7:00	7:30	7:30	7:00	6:00	5:15	4:30	4:30
*New Orleans, La. (C):												
SR	7:00	6:45	6:15	5:30	5:15	5:00	5:15	5:30	5:45	6:00	6:30	6:45
SS	5:15	5:45	6:15	6:30	6:45	7:00	7:00	6:45	6:00	5:30	5:00	5:00
*New York, N. Y. (E):												
SR	7:15	6:45	6:15	5:15	4:45	4:30	4:30	5:00	5:30	6:00	6:45	7:15
SS	4:45	5:30	6:00	6:30	7:00	7:30	7:30	7:00	6:00	5:15	4:45	4:30
*Niagara Falls, N. Y. (E):												
SR	7:45	7:15	6:30	5:30	5:00	4:30	4:45	5:15	6:00	6:30	7:00	7:45
SS	5:00	5:45	6:15	7:00	7:30	8:00	8:00	7:15	6:30	5:30	5:00	4:45
Norfolk, Nebr. (C):												
SR	8:00	7:30	6:45	5:45	5:15	4:45	5:00	5:30	6:15	6:45	7:15	7:45
SS	5:15	6:00	6:30	7:15	7:45	8:00	8:00	7:30	6:45	5:45	5:15	5:00
*Norfolk, Va. (E):												
SR	7:15	7:00	6:15	5:30	5:00	4:45	5:00	5:15	5:45	6:15	6:45	7:51
SS	5:15	5:45	6:15	6:45	7:00	7:30	7:30	7:00	6:15	5:30	5:00	4:45
Norman, Okla. (C):												
SR	7:45	7:15	6:45	6:00	5:30	5:15	5:30	5:45	6:15	6:30	7:00	7:30
SS	5:45	6:15	6:30	7:00	7:30	7:45	7:45	7:15	6:45	6:00	5:30	5:15
Northfield, Minn. (C):												
SR	7:45	7:15	6:30	5:30	4:45	4:30	4:45	5:15	5:45	6:30	7:15	7:45
SS	5:00	5:45	6:15	7:00	7:30	8:00	8:00	7:15	6:30	5:30	4:45	4:30
North Platte, Nebr. (C):												
SR	8:15	7:45	7:00	6:00	5:30	5:15	5:30	5:45	6:30	7:00	7:30	8:00
SS	5:45	6:15	6:45	7:15	8:00	8:15	8:15	7:45	7:00	6:00	5:30	5:15
*Oakland, Calif. (P):												
SR	7:30	7:00	6:30	5:30	5:00	4:45	5:00	5:30	5:45	6:15	6:45	7:15
SS	5:15	5:45	6:15	6:45	7:15	7:30	7:30	7:00	6:15	5:30	5:00	4:45
Ogden, Utah (M):												
SR	8:00	7:30	6:45	5:45	5:15	5:00	5:00	5:30	6:15	6:45	7:15	7:45
SS	5:30	6:00	6:30	7:00	7:45	8:00	8:00	7:30	6:45	5:45	5:15	5:00
*Oklahoma City, Okla. (C):												
SR	7:45	7:15	6:45	6:00	5:30	5:15	5:30	5:45	6:15	6:30	7:00	7:30
SS	5:45	6:15	6:30	7:00	7:30	7:45	7:45	7:15	6:45	6:00	5:30	5:15
Olean, N. Y. (E):												
SR	7:45	6:15	6:30	5:30	5:00	4:30	4:45	5:15	6:00	6:30	7:00	7:30
SS	5:00	5:45	6:15	7:00	7:30	7:45	7:45	7:15	6:30	5:30	5:00	4:45
Olympia, Wash. (P):												
SR	8:00	7:15	6:30	5:30	4:30	4:15	4:30	5:00	5:45	6:30	7:15	7:45
SS	4:45	5:30	6:15	7:00	7:45	8:15	8:00	7:30	6:30	5:30	4:45	4:15
*Omaha, Nebr. (C):												
SR	7:45	7:15	6:45	5:45	5:00	4:45	5:00	5:30	6:00	6:30	7:15	7:45
SS	5:15	6:00	6:30	7:00	7:30	8:00	8:00	7:30	6:30	5:45	5:00	5:00
Opelika, Ala. (C):												
SR	6:45	6:30	6:00	5:15	4:45	4:30	4:45	5:00	5:30	5:45	6:15	6:30
SS	5:00	5:30	5:45	6:15	6:30	6:45	6:45	6:30	5:45	5:15	4:45	4:30
Orlando, Fla. (E):												
SR	7:15	7:00	6:30	6:00	5:30	5:30	5:30	6:00	6:15	6:30	6:45	7:15
SS	5:45	6:15	6:30	6:45	7:15	7:30	7:30	7:00	6:30	6:00	5:30	5:30
Palestine, Tex. (C):												
SR	7:30	7:00	6:30	6:00	5:30	5:15	5:30	5:45	6:00	6:30	6:45	7:15
SS	5:45	6:15	6:30	6:45	7:15	7:30	7:30	7:00	6:30	5:45	5:30	5:15
Panama City, Fla. (E):												
SR	7:45	7:30	7:00	6:15	5:45	5:45	5:45	6:15	6:30	6:45	7:15	7:30
SS	6:00	6:30	6:45	7:15	7:30	7:45	7:45	7:30	6:45	6:15	5:45	5:45
Pensacola, Fla. (C):												
SR	6:45	6:30	6:00	5:30	5:00	4:45	5:00	5:15	5:30	5:45	6:15	6:45
SS	5:15	5:30	6:00	6:15	6:30	6:45	7:00	6:30	6:00	5:15	4:45	4:45
*Peoria, Ill. (C):												
SR	7:15	7:00	6:15	5:15	4:45	4:30	4:45	5:00	5:45	6:15	6:45	7:15
SS	5:00	5:30	6:00	6:30	7:15	7:30	7:30	7:00	6:15	5:15	4:45	4:30
Petersburg, Va. (E):												
SR	7:30	7:00	6:30	5:45	5:00	4:45	5:00	5:30	5:45	6:15	6:45	7:15
SS	5:15	5:45	6:15	6:45	7:15	7:30	7:30	7:00	6:15	5:30	5:00	5:00

*Metropolitan district.

	Month											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
*Philadelphia, Pa. (E):												
SR	7:15	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:30	6:00	6:45	7:15	7:30	7:30	7:00	6:15	5:30	4:45	4:30
Phoenix, Ariz. (M):												
SR	7:30	7:15	6:45	6:00	5:30	5:15	5:30	5:45	6:15	6:30	7:00	7:30
SS	5:45	6:15	6:30	7:00	7:15	7:45	7:45	7:15	6:30	6:00	5:30	5:15
Pierre, S. Dak. (C):												
SR	8:15	7:45	7:00	6:00	5:15	5:00	5:15	5:45	6:15	7:00	7:30	8:15
SS	5:30	6:15	6:45	7:30	8:00	8:30	8:30	7:45	7:00	6:00	5:15	5:00
Pittsburg, Kans. (C):												
SR	7:30	7:15	6:30	5:45	5:15	5:00	5:15	5:30	6:00	6:30	7:00	7:30
SS	5:30	6:00	6:30	7:00	7:15	7:45	7:45	7:15	6:30	5:45	5:15	5:00
*Pittsburgh, Pa. (E):												
SR	7:45	7:15	6:30	5:45	5:00	4:45	5:00	5:30	6:00	6:30	7:00	7:30
SS	5:15	6:00	6:30	7:00	7:30	7:45	7:45	7:15	6:30	5:45	5:00	5:00
Plainview, Tex. (C):												
SR	8:00	7:30	7:00	6:15	5:45	5:00	5:45	6:00	6:30	6:45	7:15	7:45
SS	6:00	6:30	7:00	7:15	7:45	8:00	8:00	7:30	7:00	6:15	5:15	5:15
Pocatello, Idaho (M):												
SR	8:00	7:30	6:45	5:45	5:15	4:45	5:00	5:30	6:15	6:45	7:15	8:00
SS	5:15	6:00	6:30	7:15	7:45	8:15	8:00	7:30	6:45	5:45	5:15	5:00
Ponce, P. R. (A):												
SR	7:00	7:00	6:30	6:15	6:00	5:45	6:00	6:15	6:15	6:15	6:30	6:45
SS	6:15	6:30	6:30	6:45	6:45	7:00	7:00	7:00	6:30	6:00	5:45	6:00
*Pontiac, Mich. (E):												
SR	8:00	7:30	6:45	6:00	5:15	5:00	5:00	5:45	6:15	6:45	7:15	8:00
SS	5:30	6:00	6:45	7:15	7:45	8:15	8:15	7:30	6:45	5:45	5:15	5:00
Port Arthur, Tex. (C):												
SR	7:15	7:00	6:30	5:45	5:15	5:15	5:15	5:45	6:00	6:15	6:30	7:00
SS	5:30	6:00	6:15	6:30	7:00	7:15	7:15	7:00	6:15	5:45	5:15	5:15
Portland, Maine (E):												
SR	7:15	6:45	6:00	5:00	4:15	4:00	4:15	4:45	5:15	6:00	6:30	7:15
SS	4:30	5:15	5:45	6:30	7:00	7:30	7:15	6:45	6:00	5:00	4:15	4:00
*Portland, Oreg. (P):												
SR	7:45	7:15	6:30	5:30	4:45	4:15	4:30	5:15	5:45	6:30	7:15	7:45
SS	4:45	5:30	6:15	7:00	7:30	8:00	8:00	7:15	6:30	5:30	4:45	4:30
Portsmouth, N. H. (E):												
SR	7:15	6:45	6:00	5:00	4:15	4:00	4:15	4:45	5:15	6:00	6:30	7:15
SS	4:30	5:15	5:45	6:30	7:00	7:30	7:15	6:45	6:00	5:00	4:15	4:15
*Providence, R. I. (E):												
SR	7:15	6:45	6:00	5:00	4:30	4:15	4:15	4:45	5:30	6:00	6:30	7:00
SS	4:45	5:15	5:45	6:30	7:00	7:30	7:15	6:45	6:00	5:00	4:30	4:15
Pueblo, Colo. (M):												
SR	7:15	6:45	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:00	6:45	7:15
SS	5:00	5:30	6:00	6:30	7:00	7:30	7:15	7:00	6:15	5:15	4:45	4:45
Pullman, Wash. (P):												
SR	7:30	7:00	6:00	5:00	4:15	4:00	4:15	4:45	5:30	6:00	6:45	7:30
SS	4:30	5:15	6:00	6:30	7:15	7:45	7:45	7:00	6:00	5:00	4:15	4:00
Quincy, Ill. (C):												
SR	7:30	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:45	6:15	6:45	7:15	7:30	7:30	7:00	6:15	5:30	4:45	4:45
*Racine, Wis. (C):												
SR	7:15	6:45	6:00	5:15	4:30	4:15	4:30	5:00	5:30	6:00	6:45	7:15
SS	4:45	5:15	6:00	6:30	7:00	7:30	7:30	7:00	6:00	5:15	4:30	4:15
Raleigh, N. C. (E):												
SR	7:30	7:00	6:30	5:45	5:15	5:00	5:15	5:30	6:00	6:15	6:45	7:15
SS	5:30	6:00	6:15	6:45	7:15	7:30	7:30	7:00	6:30	5:45	5:15	5:00
Rapid City, S. Dak. (M):												
SR	7:30	7:00	6:15	5:15	4:30	4:15	4:30	5:00	5:30	6:00	6:45	7:15
SS	4:45	5:15	6:00	6:30	7:15	7:45	7:30	7:00	6:00	5:15	4:30	4:15
*Reading, Pa. (E):												
SR	7:30	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:45	6:15	6:45	7:15	7:30	7:30	7:00	6:15	5:30	4:45	4:45
Reno, Nev. (P):												
SR	7:15	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:30	6:00	6:30	7:00	7:30	7:30	7:00	6:15	5:15	4:45	4:30
Rice Lake, Wis. (C):												
SR	7:45	7:15	6:30	5:30	4:45	4:15	4:30	5:00	5:45	6:15	7:00	7:45
SS	4:45	5:30	6:15	6:45	7:30	8:00	8:00	7:15	6:15	5:30	4:45	4:30
*Richmond, Va. (E):												
SR	7:30	7:00	6:30	5:30	5:00	4:45	5:00	5:30	5:45	6:15	6:45	7:15
SS	5:15	5:45	6:15	6:45	7:15	7:30	7:30	7:00	6:15	5:30	5:00	5:00
*Roanoke, Va. (E):												
SR	7:30	7:15	6:30	5:45	5:15	5:00	5:15	5:30	6:00	6:30	7:00	7:30
SS	5:30	6:00	6:30	7:00	7:15	7:45	7:45	7:15	6:30	5:45	5:15	5:00
*Rochester, N. Y. (E):												
SR	7:45	7:15	6:30	5:30	4:45	4:30	4:45	5:15	5:45	6:30	7:00	7:30
SS	5:00	5:45	6:15	6:45	7:30	7:45	7:45	7:15	6:15	5:30	4:45	4:30
*Rockford, Ill. (C):												
SR	7:30	7:00	6:15	5:15	4:30	4:15	4:30	5:00	5:30	6:15	6:45	7:15
SS	4:45	5:30	6:00	6:30	7:15	7:30	7:30	7:00	6:15	5:15	4:30	4:30

*Metropolitan district.

	Month											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Rock Island, Ill. (C):												
SR	7:30	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:30	6:15	6:45	7:15	7:45	7:30	7:00	6:15	5:15	4:45	4:30
Roseburg, Oreg. (P):												
SR	7:45	7:15	6:30	5:30	4:45	4:30	4:45	5:15	5:45	6:30	7:00	7:45
SS	5:00	5:45	6:15	7:00	7:30	8:00	7:45	7:15	6:30	5:30	4:45	4:45
*Sacramento, Calif. (P):												
SR	7:30	7:00	6:15	5:30	5:00	4:45	5:00	5:15	5:45	6:15	6:45	7:15
SS	5:15	5:45	6:15	6:45	7:15	7:30	7:30	7:00	6:15	5:30	5:00	4:45
Saginaw, Mich. (E):												
SR	8:15	7:30	6:45	6:00	5:15	5:00	5:15	5:45	6:15	6:45	7:30	8:00
SS	5:30	6:00	6:45	7:15	8:00	8:15	8:15	7:45	6:45	6:00	5:15	5:00
*St. Paul, Minn. (C):												
SR	7:45	7:15	6:30	5:30	4:45	4:30	4:45	5:15	5:45	6:30	7:15	7:45
SS	5:00	5:45	6:15	7:00	7:30	8:00	8:00	7:15	6:30	5:30	4:45	4:30
*St. Petersburg, Fla. (E):												
SR	7:30	7:15	6:45	6:00	5:45	5:30	5:45	6:00	6:15	6:30	6:45	7:15
SS	6:00	6:15	6:45	7:00	7:15	7:30	7:30	7:15	6:30	6:00	5:30	5:30
Salem, Oreg. (P):												
SR	7:45	7:15	6:30	5:30	4:45	4:30	4:45	5:15	5:45	6:30	7:15	7:45
SS	5:00	5:45	6:15	7:00	7:30	8:00	8:00	7:15	6:30	5:30	4:45	4:30
Salina, Kans. (C):												
SR	7:45	7:30	6:45	6:00	5:15	5:00	5:15	5:45	6:15	6:45	7:15	7:45
SS	5:30	6:00	6:30	7:00	7:30	8:00	8:00	7:30	6:45	6:00	5:15	5:15
*Salt Lake City, Utah (M):												
SR	7:45	7:30	6:45	5:45	5:15	5:00	5:15	5:30	6:15	6:45	7:15	7:45
SS	5:30	6:00	6:30	7:00	7:30	8:00	8:00	7:30	6:45	5:45	5:15	5:00
*San Antonio, Tex. (C):												
SR	7:30	7:15	6:45	6:15	5:45	5:30	5:45	6:00	6:15	6:30	7:00	7:15
SS	6:00	6:30	6:45	7:00	7:15	7:30	7:30	7:15	6:45	6:00	5:45	5:30
*San Diego, Calif. (P):												
SR	6:45	6:30	6:00	5:15	4:45	4:45	4:45	5:15	5:30	6:00	6:15	6:45
SS	5:00	5:30	6:00	6:15	6:45	7:00	7:00	6:30	6:00	5:15	4:45	4:45
*San Francisco, Calif. (P):												
SR	7:30	7:00	6:30	5:30	5:00	4:45	5:00	5:30	5:45	6:15	6:45	7:15
SS	5:15	5:45	6:15	6:45	7:15	7:30	7:30	7:00	6:15	5:30	5:00	4:45
*San Jose, Calif. (P):												
SR	7:30	7:00	6:15	5:30	5:00	4:45	5:00	5:30	5:45	6:15	6:45	7:15
SS	5:15	5:45	6:15	6:45	7:15	7:30	7:30	7:00	6:15	5:30	5:00	4:45
San Juan, P. R. (A):												
SR	7:00	7:00	6:30	6:15	5:45	5:45	6:00	6:00	6:15	6:15	6:30	6:45
SS	6:15	6:30	6:30	6:45	6:45	7:00	7:00	6:45	6:30	6:00	5:45	5:45
Santa Barbara, Calif. (P):												
SR	7:00	6:45	6:15	5:30	5:00	4:45	5:00	5:15	5:45	6:00	6:30	7:00
SS	5:15	5:45	6:00	6:30	7:00	7:15	7:15	6:45	6:15	5:30	5:00	4:45
Saranac Lake, N. Y. (E):												
SR	7:30	7:00	6:15	5:15	4:30	4:15	4:30	5:00	5:30	6:15	6:45	7:30
SS	4:45	5:30	6:00	6:45	7:15	7:45	7:45	7:00	6:15	5:15	4:30	4:15
Sarasota, Fla. (E):												
SR	7:30	7:15	6:45	6:00	5:45	5:30	5:45	6:00	6:15	6:30	6:45	7:15
SS	6:00	6:15	6:45	7:00	7:15	7:30	7:30	7:15	6:30	6:00	5:45	5:45
Sault Ste. Marie, Mich. (C):												
SR	7:15	6:45	6:00	5:00	4:00	3:45	4:00	4:30	5:15	6:00	6:45	7:15
SS	4:15	5:00	5:45	6:30	7:00	7:30	7:30	6:45	5:45	5:00	4:00	3:45
*Savannah, Ga. (E):												
SR	7:30	7:15	6:30	6:00	5:30	5:15	5:30	5:45	6:15	6:30	7:00	7:15
SS	5:45	6:15	6:30	7:00	7:15	7:30	7:30	7:15	6:30	6:00	5:30	5:15
*Schenectady, N. Y. (E):												
SR	7:30	7:00	6:15	5:15	4:30	4:15	4:30	5:00	5:30	6:15	6:45	7:15
SS	4:45	5:30	6:00	6:30	7:15	7:30	7:30	7:00	6:15	5:15	4:30	4:15
*Scranton, Pa. (E):												
SR	7:30	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:30	6:15	6:45	7:15	7:45	7:30	7:00	6:15	5:30	4:45	4:30
*Seattle, Wash. (P):												
SR	8:00	7:15	6:30	5:30	4:30	4:15	4:30	5:00	5:45	6:30	7:15	7:45
SS	4:45	5:30	6:15	7:00	7:45	8:15	8:00	7:30	6:30	5:30	4:30	4:15
*Sharon, Pa. (E)												
SR	7:45	7:15	6:30	5:45	5:00	4:45	5:00	5:30	6:00	6:30	7:15	7:45
SS	5:15	6:00	6:30	7:00	7:30	8:00	8:00	7:15	6:30	5:45	5:00	5:00
Sheboygan, Wis. (C):												
SR	7:30	6:45	6:00	5:15	4:30	4:15	4:15	5:00	5:30	6:00	6:45	7:15
SS	4:45	5:15	6:00	6:30	7:15	7:30	7:30	7:00	6:00	5:15	4:30	4:15
Shenandoah, Iowa (C):												
SR	7:45	7:15	6:30	5:45	5:00	4:45	5:00	5:30	6:00	6:30	7:15	7:45
SS	5:15	6:00	6:30	7:00	7:30	8:00	7:45	7:15	6:30	5:45	5:00	5:00
Sherman, Tex. (C):												
SR	7:30	7:15	6:45	6:00	5:30	5:15	5:30	5:45	6:15	6:30	7:00	7:30
SS	5:45	6:15	6:30	7:00	7:15	7:45	7:45	7:15	6:30	6:00	5:30	5:15
Shreveport, La. (C):												
SR	7:15	7:00	6:30	5:45	5:15	5:00	5:15	5:45	6:00	6:15	6:45	7:15
SS	5:30	6:00	6:15	6:45	7:00	7:30	7:30	7:00	6:30	5:45	5:15	5:15

*Metropolitan district.

	Month											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Siloam Springs, (C) Ark.:												
SR	7:30	7:15	6:30	5:45	5:15	5:00	5:15	5:30	6:00	6:30	7:00	7:15
SS	5:30	6:00	6:30	6:45	7:15	7:30	7:30	7:15	6:30	5:45	5:15	5:00
Sioux City, Iowa (C)												
SR	8:00	7:30	6:45	5:45	5:00	4:45	5:00	5:30	6:00	6:45	7:15	7:45
SS	5:15	6:00	6:30	7:00	7:45	8:00	8:00	7:30	6:45	5:45	5:00	5:00
Sioux Falls, S. Dak. (C):												
SR	8:00	7:30	6:45	5:45	5:00	4:45	5:00	5:30	6:00	6:45	7:15	8:00
SS	5:15	6:00	6:30	7:15	7:45	8:15	8:00	7:30	6:45	5:45	5:00	4:45
*South Bend, Ind. (C):												
SR	7:15	6:45	6:00	5:00	4:30	4:15	4:15	4:45	5:30	6:00	6:30	7:00
SS	4:45	5:15	5:45	6:30	7:00	7:15	7:15	6:45	6:00	5:00	4:30	4:15
Spartanburg, S. C. (E):												
SR	7:30	7:15	6:45	6:00	5:30	5:15	5:30	5:45	6:15	6:30	7:00	7:30
SS	5:45	6:15	6:30	7:00	7:30	7:45	7:45	7:15	6:30	6:00	5:30	5:15
*Spokane, Wash. (P):												
SR	7:30	7:00	6:00	5:00	4:15	3:45	4:00	4:45	5:30	6:15	7:00	7:30
SS	4:30	5:15	6:00	6:45	7:15	7:45	7:45	7:00	6:00	5:00	4:15	4:00
*Springfield, Mass. (E):												
SR	7:15	6:45	6:00	5:15	4:30	4:15	4:30	5:00	5:30	6:00	6:45	7:15
SS	4:45	5:15	6:00	6:30	7:00	7:30	7:30	6:45	6:00	5:15	4:30	4:15
Springfield, Mo. (C):												
SR	7:30	7:00	6:30	5:45	5:00	4:45	5:00	5:30	6:00	6:15	6:45	7:15
SS	5:15	5:45	6:15	6:45	7:15	7:30	7:30	7:00	6:30	5:45	5:00	5:00
St. Albans, Vt. (E):												
SR	7:30	7:00	6:15	5:15	4:30	4:00	4:15	5:00	5:30	6:00	6:45	7:30
SS	4:30	5:15	6:00	6:30	7:15	7:45	7:30	7:00	6:00	5:15	4:30	4:15
St. Joseph, Mo. (C):												
SR	7:45	7:15	6:30	5:45	5:00	4:45	5:00	5:30	6:00	6:30	7:00	7:30
SS	5:15	6:00	6:30	7:00	7:30	7:45	7:45	7:15	6:30	5:45	5:00	5:00
*St. Louis, Mo. (C):												
SR	7:15	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:45	6:00	6:30	7:00	7:30	7:30	7:00	6:15	5:30	4:45	4:45
Stevens Point, Wis. (C):												
SR	7:30	7:00	6:15	5:15	4:30	4:15	4:30	5:00	5:30	6:15	7:00	7:30
SS	4:45	5:30	6:00	6:45	7:15	7:45	7:45	7:00	6:15	5:15	4:30	4:15
Stockton, Calif. (P):												
SR	7:15	7:00	6:15	5:30	5:00	4:45	5:00	5:15	5:45	6:15	6:45	7:15
SS	5:15	5:45	6:15	6:45	7:00	7:30	7:30	7:00	6:15	5:30	5:00	4:45
Suffolk, Va. (E):												
SR	7:15	7:00	6:15	5:30	5:00	4:45	5:00	5:30	5:45	6:15	6:45	7:15
SS	5:15	5:45	6:15	6:45	7:00	7:30	7:30	7:00	6:15	5:30	5:00	4:45
Sumter, S. C. (E):												
SR	7:30	7:15	6:30	6:00	5:15	5:15	5:15	5:45	6:00	6:30	7:00	7:15
SS	5:30	6:00	6:30	6:45	7:15	7:30	7:30	7:15	6:30	5:45	5:15	5:15
*Syracuse, N. Y. (E):												
SR	7:30	7:00	6:15	5:30	4:45	4:30	4:30	5:15	5:45	6:15	7:00	7:30
SS	5:00	5:30	6:15	6:45	7:15	7:45	7:45	7:15	6:15	5:30	4:45	4:30
*Tacoma, Wash. (P):												
SR	8:00	7:15	6:30	5:30	4:30	4:15	4:30	5:00	5:45	6:30	7:15	7:45
SS	4:45	5:30	6:15	7:00	7:45	8:15	8:00	7:30	6:30	5:30	4:30	4:15
Tallahassee, Fla. (E):												
SR	7:30	7:15	6:45	6:15	5:45	5:30	5:45	6:00	6:15	6:45	7:00	7:30
SS	6:00	6:30	6:45	7:00	7:30	7:45	7:45	7:15	6:45	6:00	5:45	5:45
*Tampa, Fla. (E):												
SR	7:30	7:15	6:45	6:00	5:45	5:30	5:45	6:00	6:15	6:30	6:45	7:15
SS	6:00	6:15	6:45	7:00	7:15	7:30	7:30	7:15	6:30	6:00	5:30	5:30
*Toledo, Ohio. (E):												
SR	8:00	7:30	6:45	6:00	5:15	5:00	5:15	5:45	6:15	6:45	7:30	8:00
SS	5:30	6:00	6:45	7:15	7:45	8:15	8:15	7:30	6:45	6:00	5:15	5:00
Topeka, Kans. (C):												
SR	7:45	7:15	6:30	5:45	5:15	5:00	5:15	5:30	6:00	6:30	7:00	7:30
SS	5:30	6:00	6:30	7:00	7:30	7:45	7:45	7:15	6:30	5:45	5:15	5:00
*Trenton, N. J. (E):												
SR	7:15	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:30	6:00	6:30	7:00	7:30	7:30	7:00	6:15	5:15	4:45	4:30
*Troy, N. Y. (E):												
SR	7:30	7:00	6:15	5:15	4:30	4:15	4:30	5:00	5:30	6:15	6:45	7:15
SS	4:45	5:30	6:00	6:30	7:15	7:30	7:30	7:00	6:15	5:15	4:30	4:15
Tucson, Ariz. (M):												
SR	7:30	7:15	6:30	6:00	5:30	5:15	5:30	5:45	6:15	6:30	7:00	7:15
SS	5:45	6:15	6:30	7:00	7:15	7:30	7:30	7:15	6:30	6:00	5:30	5:15
*Tulsa, Okla. (C):												
SR	7:30	7:15	6:30	6:00	5:15	5:00	5:15	5:45	6:00	6:30	7:00	7:30
SS	5:30	6:00	6:30	7:00	7:30	7:45	7:45	7:15	6:30	5:45	5:15	5:15
Tuscaloosa, Ala. (C):												
SR	7:00	6:30	6:00	5:15	4:45	4:45	4:45	5:15	5:30	6:00	6:15	6:45
SS	5:00	5:30	6:00	6:15	6:45	7:00	7:00	6:45	6:00	5:15	4:45	4:45
Tuscola, Ill. (C):												
SR	7:15	6:45	6:00	5:15	4:45	4:30	4:30	5:00	5:30	6:00	6:30	7:00
SS	4:45	5:30	6:00	6:30	7:00	7:15	7:15	6:45	6:00	5:15	4:45	4:30
Twin Falls, Idaho (M):												
SR	8:00	7:30	7:00	6:00	5:15	5:00	5:15	5:45	6:15	6:45	7:30	8:00
SS	5:30	6:15	6:45	7:15	7:45	8:15	8:15	7:45	6:45	6:00	5:15	5:00

*Metropolitan district.

	Month											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Urbana, Ill. (C):												
SR	7:15	6:45	6:15	5:15	4:45	4:30	4:30	5:00	5:30	6:00	6:45	7:15
SS	4:45	5:30	6:00	6:30	7:00	7:30	7:15	6:45	6:00	5:15	4:45	4:30
Valdosta, Ga. (E):												
SR	7:30	7:15	6:45	6:00	5:45	5:30	5:45	6:00	6:15	6:30	7:00	7:30
SS	6:00	6:15	6:45	7:00	7:15	7:30	7:45	7:15	6:45	6:00	5:30	5:30
*Vancouver, Wash. (P):												
SR	7:45	7:15	6:30	5:30	4:45	4:15	4:30	5:15	5:45	6:30	7:15	7:45
SS	4:45	5:30	6:15	7:00	7:30	8:00	8:00	7:15	6:30	5:30	4:45	4:30
Vermillion, S. Dak. (C):												
SR	8:00	7:30	6:45	5:45	5:00	4:45	5:00	5:30	6:00	6:45	7:15	7:45
SS	5:15	6:00	6:30	7:15	7:45	8:15	8:00	7:30	6:45	5:45	5:00	5:00
Vicksburg, Miss. (C):												
SR	7:00	6:45	6:15	5:30	5:00	5:00	5:00	5:30	5:45	6:00	6:30	7:00
SS	5:15	5:45	6:15	6:30	7:00	7:15	7:15	6:45	6:15	5:30	5:00	5:00
Victoria, Tex. (C):												
SR	7:30	7:15	6:45	6:00	5:30	5:30	5:45	6:00	6:15	6:30	6:45	7:15
SS	6:00	6:15	6:30	7:00	7:15	7:30	7:30	7:15	6:30	6:00	5:30	5:30
Visalia, Calif (P):												
SR	7:15	6:45	6:15	5:30	4:45	4:45	4:45	5:15	5:45	6:00	6:30	7:00
SS	5:00	5:45	6:00	6:30	7:00	7:15	7:15	6:45	6:00	5:30	4:45	4:45
Wallace, Idaho (P):												
SR	7:30	6:45	6:00	5:00	4:15	3:45	4:00	4:45	5:15	6:00	6:45	7:30
SS	4:15	5:00	5:45	6:30	7:15	7:45	7:45	7:00	6:00	5:00	4:15	4:00
*Washington, D. C. (E):												
SR	7:30	7:00	6:15	5 30	5:00	4:45	5:00	5: 5	5:45	6:15	6:45	7:15
SS	5:15	5:45	6:15	6:45	7:15	7:30	7:30	7:00	6:15	5:30	5:00	4:45
Waterbury, Vt. (E):												
SR	7:30	7:00	6:00	5:15	4:30	4:00	4:15	4:45	5:30	6:00	6:45	7:15
SS	4:30	5:15	6:00	6:30	7:15	7:30	7:30	7:00	6:00	5:15	4:30	4:15
Watertown, N. Y. (E):												
SR	7:30	7:00	6:15	5:30	4:45	4:15	4:30	5:00	5:45	6:15	7:00	7:30
SS	4:45	5:30	6:15	6:45	7:15	7:45	7:45	7:15	6:15	5:15	4:45	4:30
West Lafayette, Ind. (C):												
SR	7:15	6:45	6:00	5:15	4:30	4:15	4:30	5:00	5:30	6:00	6:30	7:00
SS	4:45	5:15	6:00	6:30	7:00	7:15	7:15	6:45	6:00	5:15	4:30	4:30
*Wheeling, W. Va. (E):												
SR	7:45	7:15	6:30	5:45	5:15	5:00	5:00	5:30	6:00	6:30	7:15	7:45
SS	5:15	6:00	6:30	7:00	7:30	8:00	7:45	7:15	6:30	5:45	5:15	5:00
*Wichita, Kans. (C):												
SR	7:45	7:15	6:45	6:00	5:15	5:00	5:15	5:45	6:15	6:30	7:15	7:45
SS	5:30	6:00	6:30	7:00	7:30	7:45	7:45	7:30	6:45	6:00	5:15	5:15
Wichita Falls, Tex. (C).												
SR	7:45	7:15	6:45	6:00	5:30	5:15	5:30	6:00	6:15	6:45	7:00	7:30
SS	5:45	6:15	6:45	7:00	7:30	7:45	7:45	7:15	6:45	6:00	5:30	5:30
*Wilmington, Del. (E):												
SR	7:30	7:00	6:15	5:30	4:45	4:30	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:30	6:15	6:45	7:15	7:30	7:30	7:00	6:15	5:30	4:45	4:45
Wilmington, N. C. (E):												
SR	7:15	7:00	6:30	5:45	5:15	5:00	5:15	5:30	6:00	6:15	6:45	7:15
SS	5:30	6:00	6:15	6:45	7:00	7:30	7:30	7:00	6:15	5:45	5:15	5:00
Winston-Salem, N. C. (E):												
SR	7:30	7:15	6:30	5:45	5:15	5:00	5:15	5:45	6:00	6:30	7:00	7:30
SS	5:30	6:00	6:30	7:00	7:15	7:45	7:45	7:15	6:30	5:45	5:15	5:15
Wisconsin Rapids, Wis. (C):												
SR	7:30	7:00	6:15	5:15	4:30	4:15	4:30	5:00	5:30	6:15	7:00	7:30
SS	4:45	5:30	6:00	6:45	7:15	7:45	7:45	7:00	6:15	5:15	4:30	4:15
Wolf Point, Mont. (M):												
SR	7:45	7:15	6:15	5:15	4:30	4:00	4:15	5:00	5:45	6:15	7:15	7:45
SS	4:30	5:30	6:00	6:45	7:30	8:00	8:00	7:15	6:15	5:15	4:30	4:15
*Worcester, Mass. (E):												
SR	7:45	6:45	6:00	5:15	4:30	4:15	4:30	5:00	5:30	6:00	6:30	7:15
SS	4:45	5:15	6:00	6:30	7:00	7:30	7:30	6:45	6:00	5:00	4:30	4:15
Yakima, Wash. (P):												
SR	7:45	7:15	6:15	5:15	4:30	4:00	4:15	5:00	5:45	6:15	7:00	7:45
SS	4:45	5:30	6:00	6:45	7:30	8:00	8:00	7:15	6:15	5:15	4:30	4:15
Yankton, S. Dak. (C):												
SR	8:00	7:30	6:45	5:45	5:15	4:45	5:00	5:30	6:15	6:45	7:15	8:00
SS	5:15	6:00	6:30	7:15	7:45	8:15	8:00	7:30	6:45	5:45	5:15	5:00
York, Pa. (E):												
SR	7:30	7:00	6:15	5:30	5:00	4:30	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:45	6:15	6:45	7:15	7:30	7:30	7:00	6:15	5:30	4:45	4:45
*Youngstown, Ohio (E):												
SR	7:45	7:15	6:30	5:45	5:00	4:45	5:00	5:30	6:00	6:30	7:15	7:45
SS	5:15	6:00	6:30	7:00	7:30	8:00	8:00	7:15	6:30	5:45	5:00	5:00
Yuma, Ariz. (M):												
SR	7:45	7:30	6:45	6:15	5:45	5:30	5:45	6:00	6:15	6:45	7:15	7:30
SS	6:00	6:30	6:45	7:15	7:30	7:45	7:45	7:30	6:45	6:00	5:45	5:30
Zarephath, N. J. (E):												
SR	7:15	7:00	6:15	5:15	4:45	4:30	4:45	5:15	5:45	6:15	6:45	7:15
SS	5:00	5:30	6:00	6:30	7:00	7:30	7:30	7:00	6:15	5:15	4:45	4:30

*Metropolitan district.

APPENDIX I

GROUND WAVE FIELD INTENSITY CHARTS

Graphs 1–20 show the computed values of ground wave field intensity as a function of the distance from the transmitting antenna. The ground wave field intensity is here considered to be that part of the vertical component of the electric field received on the ground which has not been reflected from the ionosphere nor the troposphere. These 20 charts were computed for 20 different frequencies, a dielectric constant of the ground equal to 15 for land and 80 for sea water (referred to air as unity) and for the ground conductivities (expressed in electromagnetic units $\times 10^{14}$ or expressed in mhos per meter $\times 10^{3}$) given on the curves. The curves show the variation of the ground wave field intensity with distance to be expected for transmission from a short vertical antenna at the surface of a uniformly conducting spherical earth with the ground constants shown on the curves; the curves are for an antenna power and efficiency such that the inverse distance field is 100 mv/m at 1 mile. The curves are valid at distances large compared to the dimensions of the antenna for other than short vertical antennas.

The inverse distance field (100 mv/m divided by the distance in miles) corresponds to the ground wave field intensity to be expected from an antenna with the same radiation efficiency when it is located over a perfectly conducting earth. To determine the value of the ground wave field intensity corresponding to a value of inverse distance field other than 100 mv/m at 1 mile, simply multiply the field intensity as given on these charts by the desired value of inverse distance field at 1 mile divided by 100; for example, to determine the ground wave field intensity for a station with an inverse distance field of 1700 mv/m at 1 mile, simply multiply the values given on the charts by 17. The value of the inverse distance field to be used for a particular antenna depends upon the power input to the antenna, the nature of the ground in the neighborhood of the antenna, and the geometry of the antenna. For methods of calculating the interrelations between these variables and the inverse distance field, see "The Propagation of Radio Waves Over the Surface of the Earth and in the Upper Atmosphere," Part II, by Mr. K. A. Norton, Proc. I. R. E., Vol. 25, September 1937, pp. 1203–1236.

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At sufficiently short distances (say less than 35 miles), such that the curvature of the earth does not introduce an additional attenuation of the waves, the graphs were computed by means of the plane earth formulas given in the paper, "The Propagation of Radio Waves Over the Surface of the Earth and in the Upper Atmosphere," Part I, by Mr. K. A. Norton, Proc. I. R. E., Vol. 24, October 1936, pp. 1367–1387. At larger distances the additional attenuation of the waves which is introduced by the effect of the curvature of the earth was introduced by the methods outlined in the papers, "The Diffraction of Electromagnetic Waves from an Electrical Point Source round a Finitely Conducting Sphere, with Applications to Radiotelegraphy and the Theory of the Rainbow," by Balth van der Pol and H. Bremmer, Part I, Phil. Mag., Vol. 24, p. 141, July 1937, Part II, Phil. Mag., Vol. 24, p. 825, Suppl., November 1937, "Ergebrisse einer Theorie uber die Fortpflanzung elektromagnetischer Wellen uber eine Kugel endlicher Leitfahigkeit," by Balth van der Pol and H. Bremmer, Hochfrequenztechnik und Elektroakustik, Band 51, Heft 6, June 1938, "Further Note on the Propagation of Radio Waves over a Finitely Conducting Spherical Earth," by Balth van der Pol and H. Bremmer, Phil. Mag., Vol. 27, p. 261, March 1939. In order to allow for the refraction of the radio waves in the lower atmosphere due to the variation of the dielectric constant of the air with height above the earth, a radius of the earth equal to 4/3 the actual radius was used in the computations for the effect of the earth's curvature in the manner suggested by C. R. Burrows, "Radio Propagation over Spherical Earth," Proc. I. R. E., May 1935; i. e., the distance corresponding to a given value of attenuation due to the curvature of the earth in the absence of air refraction was multiplied by the factor $(4/3)^{\frac{1}{3}}=1.21$. The amount of this refraction varies from day to day and from season to season, depending on the air mass conditions in the lower atmosphere. If k denotes the ratio between the equivalent radius of the earth and the true radius, the following tables gives the values of k for several typical air masses encountered in the United States.

Air mass type	k	
	Summer	Winter
Tropical Gulf—T_g	1.53	1.43
Polar Continental—P_c	1.31	1.25
Superior—S	1.25	1.25
Average	1.33	

It is clear from this table that the use of the average value of $k=4/3$ is justified in obtaining a single correction for the systematic effects of atmospheric refraction.

Provided the value of the dielectric constant is near 15, the curves of Graphs 1–20 may be compared with experimental data to determine the appropriate values of the ground conductivity and of the inverse distance field intensity at 1 mile. This is accomplished simply by plotting the measured fields on transparent log-log-graph paper similar to that used for Graphs 1–20 and superimposing this chart over the Graph corresponding to the frequency involved. The log-log-graph sheet is then shifted vertically until the best fit is obtained with one of the curves on the Graph; the intersection of the inverse distance line on the graph with the 1-mile abscissa on the chart determines the inverse distance field intensity at 1 mile. For other values of dielectric constant, the following procedure may be used for a determination of the dielectric constant of the ground, conductivity of the ground and the inverse distance field intensity at 1 mile. Graph 21 gives the relative values of ground wave field intensity *over a plane earth* as a function of the numerical distance p and phase angle b. On graph paper with coordinates similar to those of Graph 21, plot the measured values of field intensity as ordinates versus the corresponding distances from the antenna expressed in miles as abscissae. The data should be plotted only for distances greater than one wavelength (or, when this is greater, five times the vertical height of the antenna in the case of a single element, i. e., nondirectional antenna or 10 times the spacing between the elements of a directional antenna) and for distances less than $50/f_{mc}^{1/3}$ miles (i. e., 50 miles at ·1 mc). Then, using a light box, place the sheet with the data plotted on it over the sheet with the curves of Graph 21 and shift the data sheet vertically and horizontally (making sure that the vertical lines on both sheets are parallel) until the best fit with the data is obtained with one of the curves on Graph 21. When the two sheets are properly lined up, the value of the field intensity corresponding to the intersection of the inverse distance line of Graph 21 with the 1 mile abscissa on the data sheet is the inverse distance field intensity at 1 mile, and the values of the numerical distance at 1 mile, p_1, and of b are also determined. Knowing the values of b and p_1 (the numerical distance at 1 mile), we may substitute in the following

approximate formulas to determine the appropriate values of the ground conductivity and dielectric constant.

$$x \cong \frac{\pi}{p_1} \cdot (R/\lambda)_1 \cdot \cos b \qquad (1)$$

$(R/\lambda)_1$ = Number of wavelengths in 1 mile.

$$\sigma_{e.m.u.} = \frac{x f_{mc}}{17.9731} \cdot 10^{-14} \qquad (2)$$

$\sigma_{e.m.u.}$ = Conductivity of the ground expressed in electromagnetic units.

f_{mc} = frequency expressed in megacycles.

$$\epsilon \cong x \tan b - 1 \qquad (3)$$

ϵ = diclectric constant of the ground referred to air as unity.

First solve for x by substituting the known values of p_1, $(R/\lambda)_1$, and cos b in equation (1). Equation (2) may then be solved for σ and equation (3) for ϵ. At distances greater than 50/f miles the curves of Graph 21 do not give the correct rclative values of field intensity since the curvature of the earth weakens thc field more rapidly than these plane earth curves would indicate. Thus, no attempt should be made to fit experimental data to these curves at the larger distances.

At sufficiently short distances (say less than 35 miles at broadcast frcquencies), such that the curvature of the earth docs not introduce an additional attenuation of thc waves, thc curves of Graph 21 may be used for determining the ground wave field intensity for transmitting and receiving antennas at the surface of the carth for any radiated power, frequency, or set of ground constants in the following manner: First, lay off the straight inverse distance linc corresponding to the power radiated on transparent log-log graph paper similar to that of Graph 21, labelling the ordinates of the chart in terms of field intensity and the abscissae in terms of distance. Next, by means of the formulas given on Graph 21, calculate the value of the numerical distance, p, at 1 milc and the valuc of b. Then superimpose the log-log chart ovcr Graph 21, shifting it vertically until the inverse distance lines on both charts coincide and shifting it horizontally until the numerical distance at 1 mile on Graph 21 coincides with 1 mile on the log-log graph paper. The curvc of Graph 21 corresponding to the calculated value of b is then traced on the log-log graph paper giving the field intensity vcrsus distance in miles.

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FEDERAL COMMUNICATIONS COMMISSION

STANDARDS OF GOOD ENGINEERING PRACTICE CONCERNING STANDARD BROADCAST STATIONS

(550–1600 kc.)

EFFECTIVE AUGUST 1

1939

(Revised to July 20, 1940)

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INTRODUCTION

There are presented herein the Standards of Good Engineering Practice giving interpretations and further considerations concerning the Rules and Regulations of the Communications Commission governing standard broadcast stations. While the Rules and Regulations form the basis of good engineering practice, these standards may go beyond the Rules and Regulations and set up engineering principles for consideration of various allocation problems. These standards have been approved by the Commission and thus are considered as reflecting the opinion of the Commission in all matters involved.

The Rules and Regulations contain references to these standards; however, as further standards may be issued after the Rules and Regulations are published, the absence of such references does not relieve the responsibility of meeting the requirements specified herein. The Standards of Good Engineering Practice are collected in this publication for the convenience of all considering broadcast station operation and problems.

The Standards of Good Engineering Practice set forth herein are those deemed necessary for the construction and operation of standard broadcast stations to meet the requirements of technical regulations and for operation in public interest along technical lines not specifically enunciated in the regulations. These standards are based on the best engineering data available from evidence supplied in formal and informal hearings and extensive surveys conducted in the field by the Commission's personnel. Numerous informal conferences have been held with radio engineers, manufacturers of radio equipment and others for the guidance of the Commission in the formulation of these standards.

These standards are complete in themselves and supersede any previous announcements or policies which may have been enunciated by the Commission on engineering matters concerning standard broadcast stations.

While these standards provide for flexibility and set forth the conditions under which they are applicable, it is not expected that material deviation therefrom as to fundamental principles will be recognized unless full information is submitted as to the reasonableness of such departure and the need therefor.

These Standards of Good Engineering Practice will necessarily change as progress is made in the art, and accordingly it will be necessary to make revisions from time to time. The Commission will accumulate and analyze engineering data available as to the progress of the art so that its standards may be kept current with the developments.

TABLE OF CONTENTS

STANDARDS OF GOOD ENGINEERING PRACTICE CONCERNING STANDARD BROADCAST STATIONS

(550–1600 kc.)

1. ENGINEERING STANDARDS OF ALLOCATION

Section 3.28 requires that individual broadcast station assignments shall be made in accordance with the standards of good engineering practice prescribed and published from time to time by the Commission. These standards for each class of station are set out below.

Sections 3.21 to 3.34, inclusive, govern the allocation of facilities in the standard broadcast band of 550 to 1600 kc., inclusive. Section 3.21 establishes three classes of channels in this band, namely, clear channels for the use of high-powered stations, regional channels for the use of medium-powered stations, and local channels for the use of low-powered stations. The classes and power of standard broadcast stations which will be assigned to the various channels are set forth in section 3.22. The classification of the standard broadcast stations are as follows:

Class I stations are dominant stations operating on clear channels as follows:

(1) Class I stations operate with powers of not less than 10 or more than 50 kw. These stations are designed to render primary and secondary service over an extended area and at relatively long distances, hence have their primary service areas[1] free from objectionable interference from other stations on the same and adjacent channels and secondary service areas free from objectionable interference from stations on the same channels.[2] [3]

(2) From an engineering point of view, Class I stations may be divided into two groups:

(*a*) The Class I stations in Group 1 are those assigned to the channels allocated by section 3.25, paragraph (a), on which duplicate night-

[1] See section 3.31 for the definitions of primary and secondary service areas.

[2] See tables IV and V.

[3] The secondary service area of a Class I station is not protected from adjacent channel interference. However, in case of placing a station on an adjacent channel (10 kc. removed) to a Class I station which would substitute a primary service for the secondary service, the matter of the program service as well as the signal service of the two stations should be given consideration. That is, at the 0.5 mv/m 50 percent sky wave contour of a Class I station purely for the determination of comparative service, the area bound by 1 mv/m contour of a Class II, Class III or Class IV station 10 kc. removed may be taken as the area within which the secondary service of the Class I station is precluded. For higher values of 50 percent sky wave signal from a Class I station the ratio of the ground wave to sky wave shall be 2 to 1 and considered only within the 0.5 mv/m 50 percent sky wave contour of the Class I station.

time operation is not permitted, that is, no other station is permitted to operate on a channel with a Class I station of this group within the limits of the United States (the Class II stations assigned the channels operate limited time or daytime only), and during daytime the Class I station is protected to the 100 uv/m ground wave contour. Protection is given this class of station to the 500 uv/m ground wave contour from adjacent channel stations for both day and nighttime operations.[2] The power of each Class I station shall not be less than 50 kw.

(*b*) The Class I stations in group 2 are those assigned to the channels allocated by section 3.25, paragraph (b), on which duplicate operation is permitted, that is, other Class I or Class II stations operating unlimited time may be assigned to such channels. During nighttime hours of operation a Class I station of this group is protected to the 500 uv/m 50 percent sky wave contour and during daytime hours of operation to the 100 uv/m ground wave contour from stations on the same channel. Protection is given to the 500 uv/m ground wave contour from stations on adjacent channels for both day and nighttime operation.[2] The operating powers of Class I stations on these frequencies shall be not less than 10 kw. nor more than 50 kw.

Hereafter, for the purpose of convenience, the two groups of Class I stations will be termed Class Ia or Ib in accordance with the assignment to channels allocated by section 3.25 (*a*) or 3.25 (*b*).

Class II stations are secondary stations which operate on clear channels with powers not less than 0.25 kw. or more than 50 kw. These stations are required to use a directional antenna or other means to avoid causing interference within the normally protected service areas of Class I stations or other Class II stations. These stations normally render primary service only, the area of which depends on the geographical location, power, and frequency. This may be relatively large but is limited by and subject to such interference as may be received from Class I stations. However, it is recommended that Class II stations be so located that the interference received from Class I stations will not limit the service area to greater than the 2500 uv/m ground wave contour, which is the value for the mutual protection of this class of station with other stations of the same class.[2]

Class III stations operate on regional channels and normally render primary service to the metropolitan district and the rural area contained therein and contiguous thereto, and are subdivided into two classes:

(*a*) Class III–A stations which operate with powers not less than 1 kw. or more than 5 kw. are normally protected to the 2500

[2] See tables IV and V.

uv/m ground wave contour nighttime and the 500 uv/m ground wave contour daytime.[2]

(*b*) Class III–B stations which operate with powers not less than 0.5 kw. or more than 1 kw. nighttime and 5 kw. daytime are normally protected to the 4000 uv/m ground wave contour nighttime and 500 uv/m ground wave contour daytime.[2]

Class IV stations operate on local channels normally rendering primary service only to a city or town and the suburban and rural areas contiguous thereto with powers not less than 0.1 kw. or more than 0.25 kw. These stations are normally protected to the 4000 uv/m ground wave contour nighttime and 500 uv/m ground wave contour daytime. On local channels the separation required for the daytime protection shall also determine the nighttime separation. Class IV stations may be assigned to regional channels on condition that interference will not be caused to any Class III station in accordance with the above, that the channel is used adequately and properly for Class III stations,[4] and that the Class IV station will be subject to such interference as may be received from the Class III stations. That is, the Class IV station assigned to a regional channel shall protect the Class III station to the required contour, but the Class III station is under no obligation to protect the Class IV station so assigned. However, it is recommended that the Class IV stations be so located that the interference received will not be greater than to the 4000 uv/m ground wave contour nighttime and 500 uv/m daytime.

The class of any station is determined by the channel assignment, the power, and the field intensity contour to which it renders service free of interference from other stations as determined by these standards. No station will be permitted to change to a class normally protected to a contour of less intensity than the contour to which the station actually renders interference-free service. Any station of a class normally protected to a contour of less intensity than that to which the station actually renders interference-free service, will be automatically reclassified according to the class normally protected, the minimum consistent with its power and channel assignment. Likewise, any station to which the interference is reduced so

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[2] See tables IV and V.

[4] The assignment of a Class IV station to a regional channel normally is not considered as making the best usage of the assignment and will be made only when it is shown among other things that—

(1) There is no other transmission facilities in the town or towns in the proposed service area.

(2) There is no local channel assignment available for that area.

(3) Adequate economic support is not available for a Class III station.

(4) It is not practical from an engineering point of view to establish a Class III station and it would not prevent the establishment of any Class III station on that channel or an adjacent channel.

that service is rendered to a contour normally protected for a higher class will be automatically changed to that class if consistent with its power and channel assignment.

When it is shown that primary service is rendered by any of the above classes of stations, beyond the normally protected contour, and when primary service to approximately 90 percent of the population (population served with adequate signal) of the area between the normally protected contour and the contour to which such station acutally serves, is not supplied by any other station or stations carrying the same general program service, the contour to which protection may be afforded in such cases will be determined from the individual merits of the case under consideration.

A Class II, III–B or IV station may be assigned to a channel available for such class, when a need therefor is shown, even though objectionable interference will be received to a field intensity contour greater than that specified as the normally protected contour for its class, provided that no objectionable interference will be caused by it to existing stations, and provided further, that the population residing in the area between the normally protected contour for its class and the contour to which objectionable interference will be received, does not exceed approximately 10 percent of the population in its actual primary service area. In case the station is located in a metropolitan area, the interference free contour shall include 90 percent of the population of the metropolitan area.

When a station is already limited by interference from other stations to a contour of higher value than that normally protected for its class, this contour shall be the established standard for such station with respect to interference from all other stations.

Tables IV and V give a complete summary of the protected service contours and permissible interference signals for broadcast stations on the same and adjacent channels, respectively.

The several classes of broadcast stations have in general three service areas;[1] namely, primary, secondary, and intermittent service areas. Class I stations render service to all three service areas. Class II stations render service to a primary area but the secondary and intermittent service areas may be materially limited or destroyed due to interference from other stations depending on the station assignments involved. Class III and IV stations usually have only primary service areas as interference from other stations generally prevents any secondary service and may limit the intermit-

[1] See section 3.31 for the definitions of primary and secondary service areas.

tent service area. However, complete intermittent service may be obtained in many cases depending on the station assignments involved.

The signals necessary to render the different types of service are listed below.

TABLE I.—*Primary service*

Area:	*Field intensity ground-wave* [1]
City business or factory areas	10 to 50 mv/m
City residential areas	2 to 10 mv/m
Rural—all areas during winter or northern areas during summer	0.1 to 0.5 mv/m
Rural—southern areas during summer	0.25 to 1.0 mv/m

[1] See Appendix I for curves showing distance to various ground wave field intensity contours for different frequency and ground conductivities and Annex I.

All these values are based on an absence of objectionable fading, either in changing intensity or selective fading, the usual noise level in the areas [5] and an absence of limiting interference from other broadcast stations. The values apply both day and night but generally fading or interference from other stations limits the primary service at night in all rural areas to higher values of field intensity than the values given.

In determining the population of the primary service area, it may be considered that the following signals are satisfactory to overcome man-made noise in towns of the population given.

TABLE II

Population:	*Field intensity ground wave*
Up to 2,500	0.5 mv/m
2,500 to 10,000	2.0 mv/m
10,000 and up	Values given in Table I.

These values are subject to wide variations in individual areas and especial attention must be given to interference from other stations. The values are not considered satisfactory in any case for service to the city in which the main studio of the station is located. The values in Table I shall apply except as individual consideration may determine.

[5] Standards have not been established for interference from atmospherics or man-made electric noise as no uniform method of measuring noise or static has been established. In any individual case objectionable interference from any source, except other broadcast signals, may be determined by comparing the actual noise interference reproduced during reception of a desired broadcast signal to the degree of interference that would be caused by another broadcast signal within 20 cycles of the desired signal and having a carrier ratio of 20 to 1 with both signals modulated 100 percent on peaks of usual programs. Standards of noise measurements and interference ratio for noise are now being studied.

All classes of broadcast stations have primary service areas subject to limitation by fading and noise, and interference from other stations to the contours set out for each class of station.

Secondary Service

Secondary service is delivered in the areas where the sky wave for 50 percent or more of the time has a field intensity of 500 uv/m or greater.[6] It is not considered that satisfactory secondary service can be rendered to cities unless the sky wave approaches in value the ground wave required for primary service. The secondary service is necessarily subject to some interference and extensive fading whereas the primary service area of a station is subject to no objectionable interference or fading.[7] Class I stations only are assigned on the basis of rendering secondary service.

Intermittent Service

The intermittent service is rendered by the ground wave and begins at the outer boundary of the primary service area and extends to the value of signal where it may be considered as having no further service value. This may be down to only a few microvolts in certain areas and up to several millivolts in other areas of high noise level, interference from other stations, or objectionable fading at night. The intermittent service area may vary widely from day to night and generally varies from time to time as the name applies. Only class I stations are assigned for protection from interference from other stations into the intermittent service area.

Section 3.23 provides that the several classes of broadcast stations may be licensed to operate unlimited time, limited time, daytime, sharing time, and specified hours, with full explanation given in the section.

Section 3.24 sets out the general requirements for obtaining an increase in facilities of a licensed station and for a new station. Paragraph 2 concerns the matter of interference that may be caused by a new assignment or increase in facilities of an existing assignment.

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[6] The secondary service area of a Class Ia station should be considered as having this limit only for determination of service in comparison with other stations.

[7] Standards have not been established for objectionable fading as such standards would necessarily depend on the receiver characteristics which have been changed considerably in this regard during the last several years. Selective fading causing audio distortion and the signal fading below the noise level are the objectionable characteristics of fading on modern design receivers. The AVC circuits in the better designed modern receivers in general maintain the audio output sufficiently constant to be satisfactory during most fading.

Objectionable interference from another broadcast station [8] is the degree of interference produced when, at a specified field intensity contour with respect to the desired station, the field intensity of an undesired station (or the root-sum-square value of field intensities of two or more stations on the same frequency) exceeds for ten (10) percent or more of the time the values set forth in these standards.

With respect to the root-sum-square values of interfering field intensities referred to herein, it shall be understood to apply in determining the interference between existing stations.[9] It is not considered that increased objectionable interference is caused when (in the case where interference is predominantly from a single station) a signal from another station is added which does not have an intensity greater than 70 percent of the value of the highest signal already causing interference. In case such highest value of signal cannot be determined separately then the maximum value of any signal that can be added without considering that an increase in objectionable interference results, should be determined as follows: For two interfering signals of approximately the same value the signal added should not exceed 85 percent of the computed value of a single signal from the estimated or measured RSS value. For more than two interfering signals of approximately the same value, the added signal should not exceed the value of a single signal computed from the RSS value. This formula should be used to compute the value of the single signal,

$$E=\sqrt{\frac{F^2}{N}}$$

where E is the value of a single signal.

F is RSS field intensity as measured by the usual field intensity meter.

N is the number of interfering signals of approximately the same value.

Objectionable interference from a station on the same channel shall be considered to exist to a station when, at the field intensity contour specified in Table IV with respect to the class to which the station belongs, the field intensity of an interfering station (or the root-sum-square value of the field intensities of two or more interfering stations) operating on the same channel, exceeds for ten (10) percent or more of the time the value of the permissible interfering signal set forth opposite such class in Table IV.

---

[8] See footnote 6.

[9] In computing interference to any station only the RSS value of all signals which are greater than 70 percent of the highest signal shall be considered.

Objectionable interference from a station on an adjacent channel shall be considered to exist to a station when, at the normally protected contour of a desired station, the field intensity of the ground wave of an undesired station operating on an adjacent channel (or the root-sum-square value of the field intensities of two or more such undesired stations operating on the same adjacent channel) exceeds a value specified in Table V.

For the purpose of calculating the presence and the degree of objectionable interference, stations of the several classes shall be assumed, in the absence of actual measurements or data on the design of the antenna system, to produce effective fields, for 1 kilowatt of input power to the antenna, as follows:

TABLE III

Class of station:	*Effective field*
I	225 mv/m
II and III	175 mv/m
IV	150 mv/m

In case a directional antenna is employed, the interfering signal of a broadcasting station will vary in different directions, being greater than the above values in certain directions and less in others, depending upon the design and adjustment of the directional antenna system. To determine the interference in any direction, in the absence of actual interference measurements, the horizontal and vertical field intensity patterns of the directional antenna must be calculated and compared with the appropriate vectors in the horizontal or vertical patterns of a nondirectional antenna having the same effective field. Thus the interfering signal toward any other station can be expressed in terms of kilowatts. This rating in kilowatts shall be applied in the use of mileage separation tables or in computing interference from the propagation curves.[10]

The existence or absence of objectionable interference from stations on the same or adjacent channels shall be determined by one of the following methods:

(*a*) By actual measurements made according to the method hereafter described;

or, in the absence of such measurements:

(*b*) By reference to the propagation curves in Figure 1 and Appendix I, or

(*c*) By reference to the distance tables set forth in Tables VI, VII, and VIII.

[10] See Annex II for further discussion and solution of a typical directional antenna case.

The existence or absence of objectionable interference may be proved by field intensity measurements or recordings made with suitable apparatus, duly calibrated. Such field intensity measurements of sky wave shall be made for a period of time not less than 10 days and an adequate check shall be made on the sky wave signal of other stations to determine the general conditions of propagation while such measurements are taken.[11]

In computing the distance to the 50 percent sky wave field intensity contour of a Class I station of a given power, and also in computing the 10 percent sky wave field intensity of an alleged interfering station, of any class and given power, at a specified distance, use shall be made of the appropriate graphs set forth in Figure 1 entitled "Average sky wave field intensity" (corresponding to the second hour after sunset at the recording station). The curves are drawn for an effective field of 100 millivolts per meter at 1 mile.

The distance to any specified ground wave field intensity contour may be determined from appropriate ground wave curves plotted for the frequency under consideration and the conductivity and dielectric constant of the earth between the station and desired contour. The frequency and the conductivity of the earth must be considered in every case and where the distance is great, due allowance must be made for loss due to curvature of the earth. Figure 2 entitled "Ground wave field intensity," drawn for a frequency of 1000 kc., conductivity of 10^{-13}, dielectric constant 15, and an effective field of 100 millivolts per meter at 1 mile, may be employed when applicable.

Table VI gives the required day separation in miles between broadcast stations on the same channel. Table VII gives the required separation in miles between broadcast stations on adjacent channels during both daytime and nighttime. Table VIII gives the required night separation in miles between broadcast stations operating on the same channel. The assumed conditions of operation are given on the first page of the tables.

The tables are based upon the use of nondirective antennas but, in case a directive antenna is employed at a particular station, it will be necessary to consider the radiation distribution of the directional antenna involved and to modify the mileage separation accordingly.[12] [13]

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[11] See Annex III for detailed requirements and also section on "Field Intensity Measurements in Allocation."

[12] See Annex II for method of modification.

[13] The Commission will not authorize a directive antenna for a Class IV station assigned a local channel.

TABLE IV.—*Protected service contours and permissible interference signals for broadcast stations*

Class of station	Class of channel used	Permissible power	Signal intensity contour of area protected from objectionable interference [1]		Permissible interfering signal on same channel [2]	
			Day [3]	Night	Day [3]	Night [4]
Ia	Clear	50 kw	SC 100 uv/m AC 500 uv/m	Not duplicated	5 uv/m	Not duplicated.
Ib	Clear	10 kw. to 50 kw	SC 100 uv/m AC 500 uv/m	500 uv/m (50% sky wave).	5 uv/m	25 uv/m
II	Clear	0.25 kw. to 50 kw	500 uv/m	2500 uv/m [5] (ground wave).	25 uv/m	125 uv/m [5]
III-A	Regional	1 kw. to 5 kw	500 uv/m	2500 uv/m (ground wave).	25 uv/m	125 uv/m
III-B	Regional	0.5 to 1 kw. night and 5 kw. day.	500 uv/m	4000 uv/m (ground wave).	25 uv/m	200 uv/m
IV	Local [6]	0.1 kw. to 0.25 kw	500 uv/m	4000 uv/m (ground wave).	25 uv/m	200 uv/m

[1] When it is shown that primary service is rendered by any of the above classes of stations, beyond the normally protected contour, and when primary service to approximately 90 percent of the population (population served with adequate signal) of the area between the normally protected contour and the contour to which such station actually serves, is not supplied by any other station or stations, the contour to which protection may be afforded in such cases will be determined from the individual merits of the case under consideration. When a station is already limited by interference from other stations to a contour of higher value than that normally protected for its class, this contour shall be the established standard for such station with respect to interference from all other stations.

[2] For adjacent channels see Table V.

[3] Ground wave.

[4] Sky wave field intensity for 10 percent or more of the time.

[5] These values are with respect to interference from all stations except Class Ib, which stations may cause interference to a field intensity contour of higher value. However, it is recommended that Class II stations be so located that the interference received from Class Ib stations will not exceed these values. If the Class II stations are limited by Class Ib stations to higher values, then such values shall be the established standard with respect to protection from all other stations.

[6] Class IV stations may also be assigned to regional channels according to section 3.29

SC=Same channel.
AC=Adjacent channel.

The night separation tables for stations on the same frequency are computed from the sky wave curve given in Figure 1. These curves are based on extensive measurements of the sky wave produced by broadcasting stations and shall be considered as accurate in all cases unless proof to the contrary is supplied. Such proof must be based on field intensity measurements taken in accordance with requirements set out in Annex III and must show what condition prevails that causes the signal to depart from the average.

The mileage separation tables for the same channel during daytime and for adjacent channels day and night are computed from the ground wave curves in Figure 2. These tables apply only in case the frequency is 1000 kc. and the assumed soil conductivity and dielectric constant prevail. Since these values vary in every case, the tables for daytime and adjacent channel separation cannot be used except as a general guide. In any case under consideration an estimate of the mileage separation required may be made from the operating frequency and known or assumed soil conditions.[14]

[14] See Annex I for a determination of interference from ground waves when actual measurements are not available.

TABLE V.—*Adjacent channel interference*

Channel separation between desired and undesired stations:	*Maximum ground wave field intensity of undesired station*
10 kc	0.25 mv/m
20 kc	5.0 mv/m
30 kc	25.0 mv/m

The undesired ground wave signal shall be determined at or within the 0.5 mv/m ground wave contour of the desired station. These values apply to all classes of stations both day and night and are based on ground waves which hold for an effective power up to 50 kw. Above this effective power, when an interfering sky wave signal for 10 percent or more of the time exceeds 5 times the desired signal 10 kc. removed in frequency (or undesired exceeds 25 times the desired signal 20 kc. removed in frequency), interference will be produced. This may result from the use of a directional antenna and in such cases the interference shall be determined from the 10 percent sky wave of an interfering station to the normally protected ground wave or to a sky wave of a desired station, on the basis of a ratio of 1 to 5 (or 1 to 25 for 20 kc.) for desired signal to the undesired sky wave signal for 10 percent or more of the time.

The mileages given in Table VII are based on ground waves only and do not apply for night operation where the 10 percent sky wave of an undesired station exceeds 5 times (or 25 times for 20 kc.) the normally protected field intensity of a desired station.

MILEAGE-SEPARATION TABLES

The required mileage separations between broadcasting stations as tabulated below are based upon the following conditions:

(1) The use of nondirectional antennas in the horizontal plane and the vertical pattern of a 0.311 wave-length antenna.

(2) Effective field in mv/m at 1 mile for 1 kilowatt.

Class I—225 mv/m
Class II and III—175 mv/m
Class IV—150 mv/m

(3) Frequency, 1000 kc.
(4) Soil conductivity, $s=10^{-13}$.
(5) Soil dielectric constant, $e=15$.
(6) Ground-wave transmission as shown on chart in Figure 2.
(7) Sky-wave transmission as shown on chart in Figure 1.
(8) Protection to service areas as shown in Table IV.

(9) Ratio of desired to undesired signal:

Channel separation:	*Ratio of desired to undesired*
Same frequency	20:1 ground wave or 10% sky wave.
Synchronized carriers	4:1.[1]
10 kc	2:1 ground wave.[2]
	1:5 sky wave.
20 kc	1:10 ground wave.
	1:25 sky wave.
30 kc	1:50.
40 kc. and above	No restriction.[3]

[1] Two stations are considered to be operated synchronously when the carriers are maintained within one-fifth of a cycle per second of each other, either automatically or manually and they transmit the identical program. While observations have been made on several synchronized stations, no definite standards as to ratio of desired carrier to undesired carriers have been established, inasmuch as the methods of operations have not been standardized and results vary appreciably. From the observations it would appear that for most types of synchronous operation a ratio of about 4 to 1 between desired and undesired carriers is necessary to avoid distortion. This ratio holds only when the audio modulation is in sufficiently close time phase to avoid echo effects. In computing the interference in the primary service areas between the ground waves of two synchronously operated stations the ratio of 4 to 1 should be used. No complete information is available as to the required ratio between sky waves; however, it would appear that a ratio less than 4 to 1 can be tolerated without objectionable interference, first because the standard of acceptance of a signal as satisfactory is lower for secondary service, and second, because several waves with random relative phases usually make up each sky wave and the combination of two such synchronized waves generally causes less distortion. Synchronous operation of two or more stations may enable an extension of the coverage and service on a channel without any materially increased interference range beyond that one station would produce.

[2] This ratio of desired to undesired signal is not based on the characteristics of the average receiver but upon what the characteristics of an ideal receiver would be which would permit high-fidelity reception of a station in the high-fidelity primary service area (primary area where no interference would be caused to a receiver responding faithfully to a band 15 kc. wide or 7.5 kc. audio response). The ratio of desired to undesired (1 to 5 and 1 to 25) for interference from a sky wave 10 and 20 kc. removed in frequency respectively is based on the characteristics of most good receivers placed in operation since 1936 and operated as most listeners adjust variable selectivity receivers where the signal is one millivolt or less.

[3] Two stations, one with a frequency twice that of the other, should not be assigned in the same primary service area unless special precautions are taken to avoid interference from the second harmonic of the lower frequency.

(10) Service and interference radii—night:

Class—Power and field at mile	Service radii			Interference radii		
	2.5 mv/m G. W.	4.0 mv/m G. W.	500 uv/m 50% S. W.	200 uv/m 10% S. W.	125 uv/m 10% S. W.	25 uv/m 10% S. W.
Class IV						
100 w.: 47.5 mv/m	----------	8.5	----------	G. W.	190	----------
250 w.: 75 mv/m	----------	11.5	----------	G. W.	370	----------
Class III						
500 w.: 124 mv/m	----------	15	----------	380	590	----------
1000 w.: 175 mv/m	25	20	----------	535	710	----------
5 kw.: 392 mv/m	39	----------	----------	840	1000	----------
Class II						
250 w.: 87.5 mv/m	17	----------	----------	210	440	1040
500 w.: 124 mv/m	21	----------	----------	380	590	1170
1000 w.: 175 mv/m	25	----------	----------	535	710	1325
5 kw.: 392 mv/m	39	----------	----------	840	1000	1840
10 kw.: 554 mv/m	42	----------	----------	960	1125	2120
25 kw.: 875 mv/m	56	----------	----------	1120	1320	2570
50 kw.: 1238 mv/m	65	----------	----------	1265	1510	----------
Class I						
10 kw.: 712 mv/m	----------	----------	345	1045	1225	2345
25 kw.: 1125 mv/m	----------	----------	575	1225	1460	----------
50 kw.: 1592 mv/m	----------	----------	715	1395	1685	----------

G. W.=Ground wave. S. W.=Sky wave.

TABLE VI.—*Required day separation in miles between broadcast stations on the same channel* [1]

Class and power	Class IV		Classes II and III							Class I		
	100 w.	250 w.	0.25 kw.	0.5 kw.	1 kw.	5 kw.	10 kw.	25 kw.	50 kw.	10 kw.	25 kw.	50 kw.
Class IV												
100 w	143	165	172	192	213	265	285	310	335	390	417	437
250 w	165	173	180	200	221	273	293	318	343	415	442	462
Classes II and III												
0.25 kw	172	180	183	203	224	276	296	321	346	418	446	465
0.5 kw	192	200	203	210	231	283	303	328	353	446	473	493
1 kw	213	221	224	231	239	291	311	336	361	467	494	514
5 kw	265	273	276	283	291	313	333	358	383	520	547	567
10 kw	285	293	296	303	311	333	345	370	395	540	567	587
25 kw	310	318	321	328	336	358	370	389	414	565	592	612
50 kw	335	343	346	353	361	383	395	414	430	587	614	634
Class I												
10 kw	390	415	418	446	467	520	540	565	587	556	585	605
25 kw	417	442	446	473	494	547	567	592	614	585	612	632
50 kw	437	462	465	493	514	567	587	612	634	605	632	652

[1] See discussion above before using in any specific case.

TABLE VII.—*Required day and night separation in miles between broadcast stations on adjacent channels* [1]

Class and power	Class IV						Classes II and III														
	0.1 kw.			0.25 kw.			0.25 kw.			0.5 kw.			1 kw.			5 kw.			10 kw.		
	10 kc.	20 kc.	30 kc.	10 kc.	20 kc.	30 kc.	10 kc.	20 kc.	30 kc.	10 kc.	20 kc.	30 kc.	10 kc.	20 kc.	30 kc.	10 kc.	20 kc.	30 kc.	10 kc.	20 kc.	30 kc.
Class IV																					
0.1 kw	73	37	32	82	45	40	86	47	42	94	55	50	105	63	58	133	84	79	149	98	93
0.25 kw	82	45	40	90	48	41	94	50	43	102	58	51	113	66	59	141	87	80	157	101	94
Classes II and III																					
0.25 kw	86	47	42	94	50	43	96	51	43	104	59	51	115	67	59	143	88	80	159	102	94
0.5 kw	94	55	50	102	58	51	104	59	51	112	62	52	123	70	60	151	91	81	167	105	95
1 kw	105	63	58	113	66	59	115	67	59	123	70	60	131	73	62	159	94	83	175	108	97
5 kw	133	84	79	141	87	80	143	88	80	151	91	81	159	94	83	180	104	87	196	118	101
10 kw	149	98	93	157	101	94	159	102	94	167	105	95	175	108	97	196	118	101	210	123	104
25 kw	172	115	110	180	118	111	182	119	111	190	122	112	198	125	114	219	135	118	233	140	121
50 kw	190	131	126	198	134	127	200	135	127	208	138	128	216	141	130	237	151	134	251	156	137
Class I																					
10 kw	162	107	102	170	110	103	172	111	103	180	114	104	188	117	106	209	127	110	223	132	113
25 kw	183	126	121	191	129	122	193	130	122	201	133	123	209	136	125	230	146	129	244	151	132
50 kw	203	144	139	211	147	140	213	148	140	221	151	141	229	154	143	250	164	147	264	169	150

[1] See discussion above before using in any specific case.

Class and power	Class II						Class I								
	25 kw.			50 kw.			10 kw.			25 kw.			50 kw.		
	10 kc.	20 kc.	30 kc.	10 kc.	20 kc.	30 kc.	10 kc.	20 kc.	30 kc.	10 kc.	20 kc.	30 kc.	10 kc.	20 kc.	30 kc.
Class IV															
0.1 kw	172	115	110	190	131	126	162	107	102	183	126	121	203	144	139
0.25 kw	180	118	111	198	134	127	170	110	103	191	129	122	211	147	140
Classes II and III															
0.25 kw	182	119	111	200	135	127	172	111	103	193	130	122	213	148	140
0.5 kw	190	122	112	208	138	128	180	114	104	201	133	123	221	151	141
1 kw	198	125	114	216	141	130	188	117	105	209	136	125	229	154	143
5 kw	219	135	118	237	151	134	209	127	110	230	146	129	250	164	147
10 kw	233	140	121	251	156	137	223	132	113	244	151	132	264	169	150
25 kw	250	149	125	268	165	141	242	145	123	261	160	136	281	178	154
50 kw	268	165	141	284	172	145	260	161	139	279	163	144	297	185	158
Class I															
10 kw	242	145	123	260	161	139	232	137	115	253	156	134	273	174	152
25 kw	261	160	136	279	168	144	253	156	134	272	163	139	292	181	157
50 kw	281	178	154	297	185	158	273	174	152	292	181	157	310	190	161

TABLE VIII.—*Required night separation in miles between broadcast stations on the same channels*

The following tables indicate the mileage protection each class must give all other classes:

TABLE VIII–A

Class Ia should protect Class II stations as shown:

	Class II—All powers
Class Ia: 50 kw	Not duplicated at night.

TABLE VIII–B

Class Ib should protect other Class Ib stations as shown below:

Class Ib	Class Ib		
	10 kw.	25 kw.	50 kw.
10 kw	2665	3010	
25 kw	3010	(1)	(1)
50 kw		(1)	(1)

[1] Cannot be duplicated without directional antenna and then this table does not apply.

TABLE VIII–C

Class II should protect other classes as shown below—nondirectional antenna.

Class II	Class II							Class Ib		
	0.25 kw.	0.5 kw.	1 kw.	5 kw.	10 kw.	25 kw.	50 kw.	10 kw.	25 kw.	50 kw.
0.25 kw	455	[1] 460	465	480	485	495	505	1,385	1,615	1,755
0.5 kw	605	610	615	630	635	645	655	1,515	1,745	1,885
1 kw	725	730	735	750	755	765	775	1,670	1,900	2,040
5 kw	1,015	1,020	1,025	1,040	1,045	1,055	1,065	2,185	2,415	2,555
10 kw	1,140	1,145	1,150	1,165	1,170	1,180	1,190	2,465	2,695	2,835
25 kw	1,335	1,340	1,345	1,360	1,365	1,375	1,385	2,915	3,145	
50 kw	1,525	1,530	1,535	1,550	1,555	1,565	1,575			

[1] The mileages in the upper right-hand half of this section of this table do not provide for protection to the lower power Class II station. Thus, if a 0.25 kw Class II station operated 460 miles from a 0.5 kw. Class II station, it would receive interference to greater than the 2.5 mv/m ground wave contour unless the 0.5 kw. Class II station used an appropriate directional antenna.

TABLE VIII–D

Class III–A should protect other classes as shown below:

Class III–A	Class III–A		Class III–B	
	1 kw.	5 kw.	0.5 kw.	1 kw.
1 kw	735	750	550	555
5 kw	1, 025	[1] 1, 025 1, 040	855	735 860

[1] Where double figures are given, the lower and larger figure is the mileage required to protect the station in the left-hand column to its normally protected contour.

TABLE VIII–E

Class III–B should protect other classes as shown below:

Class III–B	Class III–A		Class III–B	
	1 kw.	5 kw.	0.5 kw.	1 kw.
0.5 kw	615	630 [1] 855	395	400 550
1 kw	735	750 860	550	555

[1] Where double figures are given, the lower and larger figure is the mileage required to protect the station in the left-hand column to its normally protected contour.

TABLE VIII–F

Class IV should protect other classes as shown below:

Class IV	Class III–A		Class III–B		Class IV	
	1 kw.	5 kw.[1]	0.5 kw.	1 kw.	0.1 kw.	0.25 kw.
0.1 kw	[2] 300	[2] 300	[3]	[3]	[3]	[3]
0.25 kw	395	410	[3]	[3]	[3]	[3]

[1] Where double figures are given, the lower and larger figure is the mileage required to protect the station in the left-hand column to its normally protected contour.
[2] The distance based on the minimum practical values.
[3] Daytime separation determines.

TABLE VIII–G

Distance Class II stations should be from Class Ib stations to obtain recommended protection to Class II station (2.5 mv/m ground wave contour):

Class II [1]	Class Ib		
	10 kw.	25 kw.	50 kw.
0.25 kw	1240	1475	1700
0.5 kw	1245	1480	1705
1 kw	1250	1485	1710
5 kw	1265	1500	1725
10 kw	1265	1505	1730
25 kw	1280	1515	1740
50 kw	1290	1525	1750

[1] The class II station should use a directional antenna to protect dominant station or stations with these separations.

TABLE VIII–H

Distance Class IV stations should be from Class III–A and III–B stations to obtain recommended protection to Class IV stations (4.0 mv/m ground wave contour):

Class IV	Class III–A or III–B		
	0.5 kw.	1.0 kw.	5.0 kw.
0.1 kw	388	543	850
0.25 kw	391	546	852

ANNEX I

INTERFERENCE FROM GROUND WAVE SIGNALS

Interference that may be caused by a proposed assignment or an existing assignment during daytime should always be determined, when possible, by measurements on the frequency involved or on another frequency over the same terrain and by means of the curves in Figure 4, interpolate for the desired frequency.

In determining the interference from field intensity measurements, two general steps are necessary: First, establish the outer boundary of the protected service area of the desired station in the direction of the station that may cause interference with it. Second, at this boundary, measure the interfering signal from the undesired station. The ratio of the desired to the undesired signal given on the first page of the separation should be applied to the measured signals and if the required ratio is observed, then no interference is contemplated. The effective field of the antenna in the pertinent directions of the stations must be established and all measurements must be made in accordance with the section on "Field Intensity Measurements in Allocation."

In all cases where measurements taken in accordance with the requirements are not available,[15] the ground wave intensity must be determined by means of the conductivity of the terrain and the ground wave curves of field intensity versus distance. The conductivity of a given terrain may be determined by measurements of any broadcast signal traversing the terrain involved, or in case such measurements are not available, then conductivity must be taken from the map of ground conductivity in the United States, Figure 3. This map shows the conductivity throughout the entire United States by general areas of reasonably uniform conductivity. In areas of limited size, or over a particular path, the conductivity may vary

[15] The Commission will *not* authorize operation on a proposed assignment for the purpose of making measurements.

widely from the values given. This map is to be used only when accurate and acceptable measurements have not been made.

If an interfering signal traverses areas for which more than one conductivity is given by the map, then conductivity for two-thirds the distance should be taken and in case this involves more than one value, then the highest predominating value should be assumed to prevail. Where the conductivity along a given path varies over wide limits, the previous method may give erroneous results, in which case the signal at any given point, for a given value of field intensity at 1 mile from the antenna in the direction concerned may be determined by determining and adding the attenuation in decibels of each section of the intervening path.[16]

Figure 4 gives the ground wave field intensity curves with field intensity plotted against distance for various values of conductivity and by blocks of frequencies. To cover the standard broadcast band some 20 graphs in all are required and are attached as Appendix I. In all cases the curves are plotted on the basis of 100 mv/m effective field at a mile. An example of determining the interference by this method follows:

It is desired to find the interference that a 5 kw. Class III station on 990 kc. may cause to a 1 kw. Class III station on 1000 kc. The stations are separated by 130 miles. It is assumed that both stations use nondirectional antennas[17] having such height as to produce an effective field for 1 kw. of 175 mv/m.[18] From Figure 3, the conductivity at each station and intervening terrain is determined as 6×10^{-14}. The protection to Class III during daytime is to the 500 uv/m contour. The distance to the 500 uv/m ground wave contour of the 1 kw. station is determined by the use of the curves in Figure 4 as being 39.5 miles. Since these curves are plotted for 100 mv/m at a mile, to find the distance to the 500 uv/m contour of the 1 kw. station, it is necessary to determine the distance on the appropriate curve to the

$$\left(\frac{100\times500}{175}=285\right)$$

[16] For example, assuming three values of conductivity prevail such that for the frequency and distances concerned the signal is attenuated over the given conductivities 6, 8, and 14 db. respectively or a total of 28 db. over the entire path, then the signal at the point concerned for 100 mv/m at 1 mile would be $\frac{100}{25.119}$ (voltage ratio for 28 db.) or 3.98 mv/m.

[17] See Annex II in case of use of directional antennas.

[18] In all cases the effective field should be established from the dimensions of the radiating system. The value assumed here is in accordance with section 3.45 and the Standards of Good Engineering Practice promulgated pursuant thereto.

285 uv/m contour. Thus, the estimated radius of the service area for the desired station is established as 39.5 miles. Subtract this distance from the distance between the two stations, leaving 90.5 miles for the interfering signal to travel. Again from the appropriate curve in Figure 4 it is found that the signal from the 5 kw. station at this distance would be 158 uv/m. Since the stations are separated by 10 kc., the undesired signal at that point can have a value up to 250 uv/m without interference, but if the interference signal had been found to be greater than this value, then interference would have been determined. For other channel separations the appropriate ratio of desired to undesired signal would have been used. This principle holds for all cases except where a sky wave signal 10 percent or more of the time from the undesired station is in excess of 5 times the desired signal when the frequency separation is 10 kc. or 25 times when the frequency separation is 20 kc. In this case the interference must be estimated on the basis of the sky wave interference and the propagation curve in Figure 1 used to determine the interfering signals rather than Figure 4 for the ground wave signals.

Annex II

Computation on interfering signal from a directional antenna

In case of an antenna directional in the horizontal plane, the ground wave interference can be readily computed from the calculated horizontal pattern by determining the vectors toward the service area of the station to be protected and apply these values to the ground wave curves set out in Annex I.

In case of determining sky wave interference from an antenna with a vertical pattern different from that on which Figure 1 is predicated (the basis of the night mileage separation tables), it is necessary to compare the appropriate vectors in the vertical plane.

The sky wave courses entitled "Average Sky Wave Field Intensity" (corresponding to the second hour after sunset at the recording station) as shown in Figure 1 are based on antenna systems having height of 0.311 wave length (112°) and producing a vertical pattern as shown at Figure 5. A nondirectional antenna system, as well as a directional antenna system having vertical patterns other than essentially the same as shown, must be converted to the pattern of a 0.311 wave length antenna having the same field intensity at the critical angle as does the pattern of the antenna involved. Example:

Figure 6 is a graph entitled "Variation with Distance of Two Important Parameters in the Theory of Sky Wave Propagation." The curve for θ showing the angle above the horizon at which radiation occurs plotted against distance, must be used for this purpose. For

instance, assuming the station with which interference may be expected is located at a distance of 450 miles from a proposed station, the critical angle of radiation as determined from this curve is approximately 15°. Therefore, if the vertical pattern of the proposed station in the direction of the other station is such that at 15° above the horizon the radiation is 1.3 times that from an antenna having a vertical pattern as shown at Figure 5 and producing the same field intensity at 1 mile in the horizontal plane, the interfering signal would be 1.3 times that determined from Figure 1 for an antenna having the same field intensity in the horizontal plane. That is, if the field intensity in the horizontal plane of the proposed station is 124 mv/m the interfering field intensity exceeded 10 percent of the time at the other station would be

$$140 \times 1.30 \times \frac{124}{100} \text{ or } 225 \text{ uv/m}$$

and would cause interference to the 4.5 mv/m ground wave contour of the existing station.

When the distance is large, more than one reflection may be involved and due consideration must be given each appropriate vector in the vertical pattern, as well as the constants of the earth where reflection takes place between the transmitting station and the service area to which interference may be caused.

Annex III

Interference from sky wave signals

Set out below is the detailed method of making measurements of the sky wave signals to determine an interfering signal for 10 percent of the time.

The signal must be received on an approved field intensity meter duly calibrated and recorded on a continuous recording meter of suitable accuracy and sensitivity. Measurements at distances less than 350 miles from the station should be made with a vertical antenna only. At greater distances either a vertical antenna, loop, or other suitable antenna may be used. Two complete recording units are required so that two signals can be recorded simultaneously.

A monitor station on which interference free measurements can be made must be selected for simultaneous recordings. This station should be in the general direction of the principal station to be recorded. Preferably, such monitor station should have known antenna characteristics and the conductivity of the surrounding terrain should be known. The transmitters should be located in the same general area and the frequencies of the stations as close as possible. The

reeeption of the two stations should be on the same antenna or on antennas in the same area so that both are influeneed by the same surrounding objeets.

Recordings may be made on both stations from sundown over the entire path until midnight at the reeording station. These reeords should be analyzed for eaeh night and for the entire period of reeording and graphs drawn whieh show field intensity versus percent time. The 10-pereent signal determined for the principal station for the entire period must be modified by a correction faetor determined from a eomparison of the 10-pereent signal from the monitor station to the value determined from the 10-percent curve of Figure 1 for the same distanee, power, and pertinent antenna charaeteristic. Thus, if the 10-percent signal from the Figure 1 10-pereent eurve is 500 uv/m and the measured 10-pereent signal on the monitor station 350 uv/m, then the 10-percent signal from the prineipal station should be multiplied by the faetor of 500/350 or 1.43 to determine the interfering signal. Reeordings for at least 10 nights are required. If it is not praetieal to follow this proeedure, due to interferenee to the reeeption of the prineipal station reeorded, the following proeedure is required:

Reeord the monitor station and the principal station during the earliest hour that the principal station ean be reeorded. The measurements must be for at least 1 eontinuous hour eaeh night and preferably not less than 2 hours each night. In all eases the monitor station must be reeorded simultaneously. These measurements must be taken for at least 10 nights. Establish the 10 percent value of the fields during the period when both are measured. The 10 pereent value of the field for the principal station must be eorreeted in the following manner:

Compare the 10 pereent value of the signal for the monitor station with the 10 pereent value determined from Figure 1 for the same distance reduced to the same power for eomparable radiation at the appropriate angle. Thus, if the 10-percent signal from the Figure 1 10-pereent curve is 500 uv/m and the measured 10-pereent signal on the monitor station is 400 uv/m then the 10-pereent signal from the prineipal station should be multiplied by the eorrection faetor of 500/400 or 1.25. The value obtained in this way is to be considered the interferenee value of signals for use in all alloeation problems.

When it is elaimed that the propagation over the path involved is normally less than the average, measurements must be made on two or more other stations of different paths for at least 30 days and the signals of all stations involved reeorded in the above manner to establish that propagation conditions in general were normal and that the path under eonsideration was low as claimed due to some

natural conditions. A full explanation of the theory or practical findings must be made.

In all other cases where the signal is substantially greater or less than the average determined from Figure 1, complete information must be supplied as to why the signal measured has departed from the average. If the reason this condition is based on the location of the antenna, its characteristics, the conductivity of the surrounding area or other natural limitations, a full explanation of the nature and character of such conditions must be supplied and also information as to whether the licensee could, by moving its station or by making other changes within its control, alter the situation so that the abnormal condition of propagation would no longer exist.

The interference signal determined by the above methods should be used to determine interference to a station in the same manner as the ground wave signals were employed, as set out in Annex I. These methods of measurement should be used to determine skyway service signal for 50 percent of the time.

2. FIELD INTENSITY MEASUREMENTS IN ALLOCATION

A. Field Intensity Measurements to Establish Effective Field Intensity at 1 Mile

Section 3.45 provides that certain minimum field intensities are acceptable in lieu of the required minimum physical vertical heights of the antennas proper. Also in other allocation problems, it is necessary to determine the effective field at 1 mile. The following requirements shall govern the taking and submission of data on the field intensity produced:

Beginning as near to the antenna as possible without including the induction field and to provide for the fact that a broadcast antenna not being a point source of radiation (not less than one wave length or 5 times the vertical height in the case of a single element, i. e., nondirectional antenna or 10 times the spacing between the elements of a directional antenna), measurements shall be made on eight or more radials, at intervals of approximately one-tenth mile up to 2 miles from the antenna, at intervals of approximately one-half mile from 2 miles to 6 miles from the antenna, at intervals of approximately 2 miles from 6 miles to 15 or 20 miles from the antenna, and a few additional measurements if needed at greater distances from the antenna. Where the antenna is rurally located and unobstructed measurements can be made, there shall be as many as 18 or 20 measurements on each radial. However, where the antenna is located in a city where unobstructed measurements are difficult to make, measurements shall be made on each radial at as many unobstructed locations

as possible, even though the intervals are considerably less than stated above, particularly within 2 miles of the antenna. In cases where it is not possible to obtain accurate measurements at the closer distances (even out to 5 or 6 miles due to the character of the intervening terrain), the measurements at greater distances should be made at closer intervals.[19]

These data should be plotted for each radial in accordance with either of the two methods set forth below:

(1) Using log-log coordinate paper, plot field intensities as ordinate and distance as abscissa.

(2) Using semi-log coordinate paper, plot field intensity times distance as ordinate on the log scale and distance as abscissa on the linear scale.

However, regardless of which of these methods is employed, the proper curve to be drawn through the points plotted shall be determined by comparison with theoretical curves as follows: Plot theoretical curves (see paper by Mr. K. A. Norton, October 1936, Proc. I. R. E.) for several values of conductivities and dielectric constants, approximating the conductivity and dielectric constants indicated by the measurements on another sheet of the same coordinate paper. Place this sheet over the sheet on which the actual points have been plotted, hold to the light if necessary and adjust until the curve most closely matching the points is found. This curve should then be drawn on the sheet on which the points were plotted, together with the inverse distance curve corresponding to that curve. The field at 1 mile for the radial concerned shall be the ordinate on the inverse distance curve at 1 mile.

When all radials have been analyzed in this manner, a curve shall be plotted on polar coordinate paper from the fields obtained, which gives the inverse distance field pattern at 1 mile. The radius of a circle, the area of which is equal to the area bounded by this pattern, is the effective field. (See section 3.16.)

While making the field intensity survey, the output power of the station shall be maintained at the licensed power as determined by the direct method. To do this it is necessary to determine accurately the total antenna resistance (the resistance variation method, the substitution method or bridge method is acceptable) and to measure the antenna current by means of an ammeter of acceptable accuracy.[20]

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[19] It is suggested that "wave tilt" measurements may be made to determine and compare locations for taking field intensity measurements, particularly to determine that there are no abrupt changes in ground conductivity or that reflected waves are not causing abnormal intensities.

[20] See section 3.54 and "Further Requirements for Direct Measurement of Power" and "Indicating Instruments Pursuant to Section 3.58."

Complete data taken in conjunction with the field intensity measurements shall be submitted to the Commission in affidavit form including the following:

(1) Tabulation by number of each point of measurement to agree with the map required in (2) below and the field intensity meter reading, the attenuation constant, the field intensity (E), the distance from the antenna (D) and the product of the field intensity and distance (ED) (if data for each radial are plotted on semi-logarithmic paper, see above) for each point of measurement.

(2) Map showing each point of measurement numbered to agree with tabulation required above.

(3) Description of method used to take field intensity measurements.

(4) The family of theoretical curves used in determining the curve for each radial properly identified by conductivity and dielectric constants.

(5) The curves drawn for each radial and the field intensity pattern (see subsection B 5 *a*, *b*, and *c*).

(6) Antenna resistance measurement:

a. Antenna resistance at operating frequency.

b. Description of method employed.

c. Tabulation of complete data.

d. Curve showing antenna resistance versus frequency.

(7) Antenna current or currents maintained during field intensity measurements.

(8) Description, accuracy, date, and by whom each instrument was last calibrated.

(9) Name, address, and qualifications of the engineer making the measurements.

(10) Any other pertinent information.

B. Field Intensity Measurements to Establish Performance of Directional Antennas

Section 3.33 (*b*) requires that proof of performance of directional antenna systems be submitted before any operation during the regular broadcast day may be permitted. These data shall be taken upon proper request and authorization therefor during the experimental period, and shall show that the pattern obtained is essentially the same as that predicted by the application and required by terms of the authorization, and that any specific requirements set out are fully met.

To establish this performance, measurements shall be made in accordance with the preceding section A along sufficient number of radials to establish the effective field from the antenna system. In

the case of a relatively simple directional antenna pattern, approximately eight radials in addition to the radials in the directions the field intensity values are specified by the authorization are sufficient. However, when more complicated patterns are involved, that is, patterns having several or sharp lobes or nulls, measurements shall be taken along as many additional radials as necessary to definitely establish the pattern.

In cases where the authorization requires a showing that actual field intensities of specified values be obtained in the various portions of the service area, sufficient measurements throughout these areas shall be made to show that at least the values specified are obtained. (See paragraph 2d of this section.)

In either of the above cases the following information shall be submitted in triplicate, even though such information was submitted with the original application:

(1) Complete description of antenna array.

a. Number of elements.

b. Manufacturer's name and type of each element (i. e., guyed or self-supporting, triangular or square, uniform cross-section or tapered, etc.).

c. If top loaded, give details.

d. Height of vertical lead of each element in feet (height above base insulator or base, if grounded).

e. Over-all height in feet of each element above ground level.

f. Over-all height in feet of each element above mean sea level.

g. Orientation of array with respect to true north and time (specify degrees leading or lagging) and space phasing of elements. (Space phasing should be given in feet as well as in degrees.)

h. Details of ground system for each element (length and number of radials, dimensions of ground screen, if used, and depth buried).

i. Current in each element (at point where antenna ammeter is located) and current and resistance at point of common input to the antenna system.[21]

j. Schematic sketch and description of method of feeding power to elements, including phasing and coupling equipment and locations of antenna ammeters (both regular, point of common input, and remote) in the circuits.

k. If not fully described above, give complete details and sketches if needed.

l. Full description of painting and lighting installed on each element.

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[21] See "Further Requirements for Direct Measurement of Power" and "Construction, General Operation, and Safety of Life Requirements."

m. If phase monitor is employed, state phase readings (specifying whether leading or lagging) and ratio of current indications for each element.[22]

(2) Horizontal field intensity patterns for each power involved showing:

a. Directional field intensity at 1 mile and effective field intensity from the antenna determined from the field intensity measurements as set forth above.

b. Direction true north shall be shown at zero ažimuth.

c. Direction of each station or city specified in the instrument of authorization in which direction a limiting field was specified and the actual field intensity obtained in each of such directions (all directions shall be determined by accurate calculation or from Lambert Conformal Conic Projection Map such as United States Coast and Geodetic Survey Map No. 3060a, or map of equal accuracy, and all distances shall be determined by accurate calculation or from United States Albers Equal Area Projection Map, Scale $\frac{1}{2{,}500{,}000}$ or map of equal accuracy. These may be obtained from the United States Coast and Geodetic Survey and from the United States Department of Interior, Geological Survey, for the sums of 40 cents and $1, respectively).

d. Actual field intensity contours for 25, 10, and 5 mv/m and any other contours specified by the instrument of authorization on a map having the largest practical scale. These contours need not be shown for distances over 15 miles from the antenna except that the field intensity contours on the far sides of the business and residential areas of the city in which the main studio is located shall be shown. This does not waive the requirement for measurements at greater distance under A above.

(3) Complete tabulation of all data used in plotting the above patterns.

(4) Any other pertinent information.

(5) Plotting of field intensity patterns:

a. All patterns shall be plotted on standard-letter-size polar coordinate paper (main engraving approximately 7″ x 10″).

b. All patterns shall be plotted to the largest scale possible on the paper specified in (*a*) above, using divisions and subdivisions having values of 1, 2, 2.5, or 5 times 10^x. (No other values shall be used.)

c. All values of field intensity less than 10 percent of the r. m. s. field intensity of the pattern shall be shown on an enlarged scale in accordance with (*a* and *b*) above.

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[22] See "Indicating Instruments Pursuant to Section 3.58."

As a check on the shape of the field intensity pattern obtained in accordance with the above, it is suggested that measurements be taken on each of the radials at approximately 1 mile from the antenna system for operation, both directional and nondirectional, and the ratios of these values plotted on polar coordinate paper in accordance with the above specifications.

C. Measurement of the Field Intensity of Broadcast Stations for Presentation in Support of Applications or Evidence at Hearings Before the Commission

Section 3.24 requires that among other things an application for a new standard broadcast station or increase in facilities of an existing station make a satisfactory showing that objectionable interference will not be caused to an existing station or stations.

In the determination of such interference in accordance with section 3.28, actual measurements will take precedence over theoretical values provided such measurements are properly taken and presented.

When measurements of either ground wave signal intensity or sky wave signal intensity are presented in evidence, they shall be supported by a field intensity survey of the station observed, which survey should be sufficiently complete in accordance with sections A and B above to determine the field at 1 mile in the pertinent directions for that station.

When measurements are made on sky wave signal intensity (either service or interference) they shall be graphic recordings as follows:

(1) Recordings shall be made on 10 or more nights for sufficient periods each night to obtain reasonable average values.[23]

(2) Observations shall be made on other stations to determine whether sky wave transmission conditions are normal or not.

(3) Scales on the graphic paper shall be such as to permit easy reading of both time and field intensity, and calibration shall be clearly indicated.

(4) Pertinent notes, such as predominance of signal of a certain station, when recording composite signals shall be made on the recording.

(5) Full description shall be given the point where recordings were made (geographically as well as field intensity of the station to which interference is being determined).

(6) Full explanation of to what extent signals from other stations on the same channel affected the accuracy of the recordings and what steps, if any, were taken to eliminate or compensate for such signals.

[23] See Annex III in section "Engineering Standards of Allocation" for detailed requirements.

If the observed station is owned or controlled by the party on whose behalf the measurements are made, then, in addition to the above, detail reports on the measurement of the antenna resistance and on the amount of power actually radiated (as determined by the direct method) during the course of the field intensity measurements shall be presented. The applicant (or participant) shall also furnish a complete description of the antenna and ground system in use at the transmitting station during the period of observations and a statement as to whether or not this is the identical equipment regularly used by the station.

When measurements of both the "desired" and "undesired" station are made in one area to determine the point where objectionable interference from ground wave signals occurs, several measurements of each station shall be made within a few miles of the point where the ratio of signals is that selected as the appropriate ratio for the determination of objectionable interference.

All information on the above, including description and accuracy of equipment used, when and by whom last calibrated, and the name and qualifications of the engineer making the measurements, when filed with an application, shall be in affidavit form. At the time of the hearing on applications involving such observations, the applicant should be prepared to present, as sworn testimony, complete data on the above.

3. DATA REQUIRED WITH APPLICATIONS INVOLVING DIRECTIONAL ANTENNA SYSTEMS

Section 3.33 (a) requires that an application for authority to install a directional antenna specify a definite site and that full details of the directional antenna are given with the application. Any application not complete in these details will be returned to the applicant as "defective" under section 1.72.

In order to comply with the above and to permit proper consideration of any application involving a directional antenna, the following shall be submitted in triplicate, properly verified by the engineer designing the antenna, with each such application:

(1) Name, address, and qualifications of the engineer.

(2) Complete description of the proposed antenna system.

a. Number of elements.

b. Type of each element [i. e., guyed or self-supporting, uniform cross section or tapered (specify base width), grounded or insulated, etc.].

c. If top loaded, give details.

d. Height of vertical lead of each element in feet (height above base insulator or base, if grounded).

e. Over-all height in feet of each element above ground level.

f. Over-all height in feet of each element above mean sea level.

g. Orientation of array with respect to true north and time phasing of fields from elements (specify degrees leading or lagging) and space phasing of elements (identifying elements). (Space phasing should be given in feet, as well as in degrees.)

h. Details of ground system for each element (length and number of radials, dimensions of ground screen, if used, and depth buried).

i. Ratio of fields from elements (identifying elements).

j. If not fully described above, give complete details and sketches if needed.

(3) Calculated horizontal field intensity patterns for each power involved showing:

a. Directional field intensity at 1 mile and effective field.

b. Direction true north shall be shown at zero azimuth.

c. Direction and distance to each existing station with which interference may be involved, operating either directional or nondirectional (all directions shall be determined by accurate calculation or from Lambert Conformal Conic Projection Map such as United States Coast and Geodetic Survey Map No. 3060a, or map of equal accuracy, and all distances shall be determined by accurate calculation or from United States Albers Equal Area Projection Map, scale $\frac{1}{2{,}500{,}000}$ or map of equal accuracy. These may be obtained from the United States Coast and Geodetic Survey and the United States Department of Interior, Geological Survey, for the sums of 40 cents and $1, respectively).

d. Calculated field intensity contours for 250, 25, and 5 mv/m and the population residing within each of such contours in addition to the information required by section 29 (*d*) of F. C. C. Form 301, on a map having the largest practical scale.

(4) Calculated vertical field intensity patterns (for nighttime power) in the direction of each minimum and the maximum and in the direction of each station with which nighttime interference may be involved, operating either directional or nondirectional for angles from 0° to 90° above the ground plane, based on the ground wave field intensity at 1 mile from the antenna for the direction involved.

(5) Data used in computing the above patterns including:

a. Formula used for calculating both horizontal and vertical patterns, and sample calculations. (Derivation of formula if other than standard is used.)

b. All assumptions made and basis therefor, including electrical height, current distribution and efficiency of each element, and ground conductivities.

c. Complete tabulation of calculation data used in plotting patterns, including data for determination of r. m. s. value of horizontal and directional patterns.

(6) Any other pertinent information.

(7) Plotting of field intensity patterns:

a. All patterns shall be plotted on standard letter-size polar coordinate paper (main engraving approximately 7″ x 10″).

b. All patterns shall be plotted to the largest scale possible on the paper specified in section (*a*) above using scale divisions and subdivisions having values of 1, 2, 2.5, or 5 times 10^x. (No other values shall be used.)

c. All values of field intensity less than 10 percent of the effective field intensity of the pattern shall be shown on an enlarged scale in accordance with (*a* and *b*) above.

d. In the event actual inverse distance field intensities expected to be determined in practice (that is, the values determined from actual measurements particularly in sharp nulls) are different from the above calculated values, the expected values as well as the calculated values shall be shown on both the full patterns and the enlarged sections.

4. LOCATIONS OF TRANSMITTERS OF STANDARD BROADCAST STATIONS

Section 3.24 (*e*) requires that the location of the transmitter shall comply with the requirements of good engineering practice. There are set out below the general requirements considered appropriate at this time. These standards will change as the art progresses and changes will be made in accordance with the best information available.

All applications for approval of transmitter sites for regular broadcast stations must be submitted on F. C. C. Form 301. In some cases the applicant may be required to submit additional information, including the results of a field intensity survey, particularly where there is any question as to whether the area can be served properly from the proposed location or where the population of the blanket area is too large.

F. C. C. Form 301 requires among other things that triplicate copies of the following be submitted:

(*a*) Map or maps having reasonable scales (not less than one-half inch per mile) clearly showing:

(1) Proposed location and present location if existing station;

(2) The character of the surrounding areas, particularly the retail business, wholesale business, manufacturing, residential, and unpopulated areas (by symbols, cross-hatching, colored crayons, or other means);

(3) The density and distribution of population;

(4) The heights of all tall buildings or other structures in the vicinity of the antenna, indicating their location and how marked for air navigation;

(5) The location of airports, airways, and other radio stations, including receiving stations, except broadcast or amateur;

(6) The terrain and types of soil.

(*b*) Aerial photograph or photographs taken of the proposed location of the antenna showing clearly the character of the area within the 250 mv/m contour. (Ordinary photographs will be accepted if they clearly show the terrain to the 250 mv/m contour and are taken in at least eight directions from the site: North, northeast, east, etc.

Where available, United States Geological Survey topography quadrangle sheets should be submitted. In the event the map submitted does not give the topography, the height above sea level of the proposed location, hills, ridges, and other obstructions should be shown. A statement as to whether or not other obstructions in the vicinity are painted and lighted or otherwise marked should always be made. In some cases additional maps, sketches, or descriptions may be necessary to clearly show the conditions. Attention is invited to the fact that the submission of complete and accurate information will materially expedite action on a proposed location, as well as enable the Commission to reach a correct decision thereon.

Aerial photographs of adequate scale are normally considerably superior to photographs taken from the proposed site. However, if the latter clearly show the character of the surrounding area, they are acceptable. Photographs taken from a location lower than the surrounding terrain or where the view is obstructed by immediately surrounding objects are of little value. Taking the photographs from a step ladder or other support will aid materially.

As a guide, the Engineering Department has established certain engineering principles based on the extensive experience of the Engineering Department and all data available along this line, including that presented at the informal engineering hearings of October 5, 1936, Jannary 18, 1937, and June 6, 1938.

The four primary objectives to be obtained in the selection of a site for a transmitter of a broadcast station are as follows:

(1) To serve adequately the center of population in which the studio is located and to give maximum coverage to adjacent areas.

(2) To cause and experience minimum interference to and from other stations.

(3) To present a minimum hazard to air navigation consistent with objectives 1 and 2.

(4) To fulfill certain other requirements given below.

The following table is offered as a general guide to be used in determining the approximate site of broadcast transmitters:

TABLE A

Power of station	Population of city or metropolitan area[1]	Approximate radius of blanket area 250 mv/m[2]	Site—distance from center of city (business or geographical)	Maximum percentage of total population in blanket area[1]
		Miles	*Miles*	*Percent*
100 watts	5,000–50,000	0. 15	½–1	1
100 watts	50,000 or more	0. 15	(3)	
250–500 watts	5,000–150,000	0. 3–0. 5	1–3	1
250–500 watts	150,000 or more	0. 3–0. 5	(3)	
1 kilowatt	5,000 to 200,000	0. 6–0. 9	2–5	1
1 kilowatt	200,000 or more	0. 6–0. 9	(3)	
5–10 kilowatts	All	1. 5–2. 5	5–10	1
25–50 kilowatts	All	3. 0–4. 5	10–15	1

[1] The total population is the population of the city sought to be served except in those instances when the station is to be located in an area classified by the Department of Commerce, Bureau of Census, as a metropolitan area, in which case the population of the metropolitan area shall apply: *Provided, however,* That when the power of the station is such that all the metropolitan area cannot be served, the population that will actually be served shall determine. The population figures are those determined by the latest official census and where greater population is claimed, the burden of proof is on the applicant.

[2] These radii are only approximate and the actual blanket area (area within the 250 mv/m contour) may be materially different depending on the antenna employed and other factors.

[3] In these instances it is usually necessary to locate the station within the city in order to render satisfactory service throughout the city. Such sites shall be in or near the center of the business district and under no circumstances will a site in the residential area be approved.

In case the power and the population of the city are such that it should be located at some distance from the center of the city, the approximate distance is given as well as the population of the so-called "blanket area." The "blanket area" of a broadcast station is defined as that area adjacent to the transmitter in which the usual broadcast receiver would be subject to some type of interference to the reception of other stations due to the strong signal from the station. The normal blanket area of a broadcast station is that area lying within the 250 millivolt per meter contour line. The average radii of the blanket areas for broadcast stations of the various powers are given in the above table.

In those cases where it is impossible or impractical to locate a station in accordance with the above specifications, the Commission will give consideration to approving locations where not more than 1 percent of the population (as above specified) is included within the 500 millivolt per meter contour, provided the applicant submits an affidavit setting forth the reasons why the normal specifications cannot be complied with, and further that the applicant will assume full

responsibility for adjustment of any reasonable complaints arising from the excessively strong signals of the applicant's station. Particular attention must be given to avoiding cross modulation.

In this connection, attention is invited to the fact that it has been found very unsatisfactory to locate broadcast stations so that high signal intensities occur in areas with overhead electric power or telephone distribution systems and sections where the wiring and plumbing are old or improperly installed. These areas are usually found in the older or poorer sections of a city. These conditions give rise to cross-modulation interference due to the nonlinear conductivity characteristics of contacts between wiring, plumbing, or other conductors. This type of interference is independent of the selectivity characteristics of the receiver and normally can be eliminated only by correction of the condition causing the interference. Cross modulation tends to increase with frequency and in some areas it has been found impossible to eliminate all sources of cross modulation, resulting in an unsatisfactory condition for both licensee and listeners.

Broadcast station transmitters will not be permitted to be located in these areas even though the population is within the requirements of Table A, unless the licensee assumes full responsibility for and it appears it can adjust all complaints satisfactorily.

If the city under consideration is of irregular shape, the station is of high power, a directional antenna system is employed, or if other unusual conditions obtain, the table may not apply and special consideration must be given. However, the general principles set out will still apply.

In selecting a site in the center of a city it is usually necessary to place the radiating system on the top of a building. This building should be large enough to permit the installation of a satisfactory ground and/or counterpoise system. Great care must be taken to avoid selecting a building surrounded by taller buildings or where any nearby building higher than the antenna is located in the direction which it is desired to serve. Such a building will tend to cast "radio shadows" which may materially reduce the coverage of the station in that direction. Irrespective of the height of surrounding buildings, the building on which the antenna is located should not have height of approximately one-quarter wavelength. A study of antenna systems located on buildings tends to indicate that where the building is approximately a quarter wavelength in height, the efficiency of radiation may be materially reduced.

If from Table A it is determined that a site should be selected removed from the city, there are several general conditions to be followed in determining the exact site. The table gives the approximate

distance from the center of the city. Three maps should be given consideration if available:

(1) Map of the density of population and number of people by sections in the area.

(2) Geographical contour map with contour intervals of 20 to 50 feet.

(3) Map showing the type, nature and depth of the soil in the area with special reference to the condition of the moisture throughout the year. (See Table B.)

From these maps a site should be selected that is approximately the required distance from the city, with a minimum population in the "blanket area" and with a minimum number of intervening hills between it and the center of the city. In general, because of ground conditions, it is better to select a site in a low area rather than on top of a hill, and the only condition under which a site on top of a hill should be selected is that it is only possible by this means to avoid a substantial number of hills, between the site and the center of a city with the resulting radio shadows. If a site is to be selected to serve a city which is on a general sloping area, it is generally better to select a site below the city than above the city.

If a compromise must be made between probable radio shadows from intervening hills and locating the transmitter on top of a hill, it is generally better to compromise in favor of the low area, where an efficient radiating system may be installed which will more than compensate for losses due to shadows being caused by the hills, if not too numerous or too high. Several transmitters have been located on top of hills, but so far as data has been supplied not a single installation has given superior efficiency of propagation and coverage.

The ideal location of a broadcast transmitter is in a low area of marshy or "crawfishy" soil or area, which is damp the maximum percentage of time and from which a clear view over the entire center of population may be had, and the tall buildings in the business section of the city would cast a shadow across the minimum residential area.

The type and condition of the soil or earth immediately around a site is very important. Important, to an equal extent, is the soil or earth between the site and the principal area to be served. Sandy soil is considered the worst type, with glacial deposits and mineral-ore areas next. Alluvial, marshy areas and salt-water bogs have been found to have the least absorption of the signal. One is fortunate to have available such an area and, if not available, the next best condition must be selected.

Table B indicates the values of inductivity and conductivity which it is recommended be used for various types of country in the absence of surveys over the particular area involved. Naturally, values

obtained from the use of these figures will be only approximate and should, if possible, be replaced by actual measurements in the area under consideration.

TABLE B

Type of terrain	Inductivity	Conductivity	Absorption factor at 50 miles, 1000 kc.[1]
Sea water, minimum attenuation	81	4.64×10^{-11}	1.0
Pastoral, low hills, rich soil, typical of Dallas, Tex., Lincoln, Nebr., and Wolf Point, Mont., areas.	20	3×10^{-13}	0.50
Pastoral, low hills, rich soil, typical of Ohio and Illinois	14	10^{-13}	0.17
Flat country, marshy, densely wooded, typical of Louisiana near Mississippi River.	12	7.5×10^{-14}	0.13
Pastoral, medium hills, and forestation, typical of Maryland, Pennsylvania, New York, exclusive of mountainous territory and sea coasts.	13	6×10^{-14}	0.09
Pastoral, medium hills, and forestation, heavy clay soil, typical of central Virginia.	13	4×10^{-14}	0.05
Rocky soil, steep hills, typical of New England	14	2×10^{-14}	0.025
Sandy, dry, flat, typical of coastal country	10	2×10^{-14}	0.024
City, industrial areas, average attenuation	5	10^{-14}	0.011
City, industrial areas, maximum attenuation	3	10^{-15}	0.003

[1] This figure is stated for comparison purposes in order to indicate at a glance which values of conductivity and inductivity represent the higher absorption. This figure is the ratio between field intensity obtained with the soil constants given and with no absorption.

Careful consideration must be given to selecting a site so that the number of people in the blanket area is a minimum. The last column of Table A gives the percentage of the total population of the city or metropolitan area that may be permitted in the blanket area. In general, broadcast transmitters operating with approximately the same power can be grouped in the same approximate area and thereby reduce the interference between them.

If the city is of irregular shape, it is often possible to take advantage of this in selecting a suitable location that will give a maximum coverage and at the same time maintain a minimum of people within the blanket area. The maps giving the density of population will be a key to this. The map giving the elevation by contours will be a key to the obstructing hills between the site and city. The map of the soil conditions will assist in determining the efficiency of the radiating system that may be erected and the absorption of the signal encountered in the surrounding area.

Another factor to be considered is the relation of the site to airports and airways. There are no regulations or laws with respect to distance from airports and airways, but a distance of 3 miles from each is used as a guide. In case a suitable location is found at less distance than this, it may be satisfactory if the towers are suitably painted and lighted in conformity with the requirements of the Civil Aeronautics Authority, or if the towers are not higher than the surrounding objects. The latter is normally considered poor engineering practice; however, in selecting a site the local aeronautical authorities

should always be consulted if there is any question concerning erecting a hazard to aviation, and in case of towers over 200 feet high this should always be done. In passing on a location and antenna installation, the Engineering Department refers each ease to the Civil Aeronauties Authority for its recommendation. The action of the Authority will be materially expedited by the district airline inspector and local representatives of the airports and airlines forwarding their approval or comments to the Civil Aeronautics Authority, Washington, D. C.

In finally selecting the site, consideration must be given to the required spaee for erecting an efficient radiating system, including the ground or counterpoise (see section 3.45). It is the general practice to use direct grounds consisting of a radial buried wire system. If the area is sueh that it is not possible to get such a ground system in soil that remains moist throughout the year, it probably will be found better to erect a counterpoise. (Such a site should be selected only as a last resort.) It, like the antenna itself, must of course be designed properly for the operating frequency and other local eonditions.

While an experienced engineer can sometimes select a satisfactory site for a 100-watt station by inspection, it is neeessary for a higher power station to make a field-intensity survey to determine that the site selected will be entirely satisfactory. There are several facts that cannot be determined by inspection that make a survey very desirable for all locations removed from the city. Often two or more sites may be selected that appear to be of equal promise. It is only by means of field-intensity surveys taken with a transmitter at the different sites or from measurements on the signal of nearby stations traversing the terrain involved that the most desirable site can be determined. There are many factors regarding site efficiency that cannot be determined by any other method.

The site selected should meet the following conditions:

(1) A minimum field intensity of 25 to 50 millivolts per meter will be obtained over the business or factory areas of the city.

(2) A minimum field intensity of 5 to 10 millivolts per meter will be obtained over the most distant residential section.

(3) The absorption of the signal is the minimum for any obtainable sites in the area. As a guide in this respect the absorption of the signals from other stations in that area should be followed, as well as the results of tests on other sites.

(4) The population within the blanket radius (250 mv/m) does not exceed that speeified by Table A.

When making the final selection of a site, the need for a field-intensity survey to establish the exact eonditions cannot be stressed

too strongly. The selection of a proper site for a broadcast station is an important engineering problem and can only be done properly by experienced radio engineers.

5. MINIMUM ANTENNA HEIGHTS OR FIELD INTENSITY REQUIREMENTS

Section 3.45 requires that all applicants for new, additional, or different broadcast facilities and all licensees requesting authority to move the transmitter of an existing station, shall specify a radiating system, the efficiency of which complies with the requirements of good engineering practice for the class and power of the station.

The specifications deemed necessary to meet the requirements of good engineering practice at the present state of the art are set out in detail below.

The licensee of a standard broadcast station requesting a change in power, time of operation, frequency, or transmitter location must also request authority to install a new antenna system or to make changes in the existing antenna system which will meet the minimum height requirements, or submit evidence[24] that the present antenna system meets the minimum requirements with respect to field intensity, before favorable consideration will be given thereto. In the event it is proposed to make substantial changes in an existing antenna system, the changes shall be such as to meet the minimum height requirements or will be permitted subject to the submission of field intensity measurements showing that it meets the minimum requirements with respect to effective field intensity.

These minimum actual physical vertical heights of antennas permitted to be installed are shown by curves A, B, and C of Figure 7 as follows:

A. Class IV stations, 150 feet[25] or a minimum effective field intensity of 150 mv/m for 1 kilowatt (100 watts 47.5 mv/m and 250 watts, 75 mv/m).

B. Class II and III stations, or a minimum effective field intensity of 175 mv/m for 1 kilowatt.

C. Class I stations, or a minimum effective field intensity of 225 mv/m for 1 kilowatt.

The heights given on the graph for the antenna apply regardless of whether the antenna is located on the ground or on a building. Except for the reduction of shadows, locating the antenna on a building does not necessarily increase the efficiency and where the

[24] See Field Intensity Measurements in Broadcast Allocation, section A.

[25] This height applies to a Class IV station on a local channel only. In case a Class IV station is assigned a regional channel Curve A shall apply.

height of the building is in the order of a quarter wave the efficiency may be materially reduced.

To obtain the maximum efficiency of which any antenna is capable a good ground system must be employed (a counterpoise may be substituted under certain conditions).

At the present development of the art, it is considered that where a vertical radiator is employed with its base on the ground, the ground system should consist of buried radial wires at least one-fourth wave length long. There should be as many of these radials evenly spaced as practicable and in no event less than 90. (120 radials of 0.35 to 0.4 of a wave length in length and spaced 3° is considered an excellent ground system and in case of high base voltage, a base screen of suitable dimensions should be employed.)

It should be borne in mind that the above specifications are the minimum and where possible better antenna and ground systems should be installed.

In case it is contended that the required antenna efficiency can be obtained with an antenna of height or ground system less than the minimum specified, a complete field intensity survey [26] must be supplied to the Commission showing that the field intensity at a mile without absorption fulfills the minimum requirements. This field survey must be made by a qualified engineer using equipment of acceptable accuracy.

The main element or elements of a directional antenna system shall meet the above minimum requirements with respect to height or effective field intensity. No directional antenna system will be approved which is so designed that the effective field of the array is less than the minimum prescribed for the class of station concerned, or in case of a Class I station less than 90 percent of the ground wave field which would be obtained from a perfect antenna of the height specified by Figure 7 for operation on frequencies below 1000 kilocycles, and in the case of a Class II or III station less than 90 percent of the ground wave field which would be obtained from a perfect antenna of the height specified by Figure 7 for operation on frequencies below 750 kilocycles.

In all cases of new construction where concentric transmission line is used between the transmitter and antenna, such line shall be installed in duplicate with adequate switching facilities for immediate connection of the second line in case of failure of the first line, or permanently installed auxiliary facilities such as an auxiliary transmitter and antenna system, auxiliary antenna system or other means whereby operation may be continued in the event of failure of the transmission line.

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[26] See Field Intensity Measurements in Broadcast Allocation, section A.

Before any changes are made in the antenna system, it is necessary to submit full details to the Commission for approval. These data may be submitted by letter.

6. STANDARD LAMPS AND PAINTS

Section 3.45 (*d*) requires that the antenna and supporting structure shall be painted and illuminated in accordance with the specifications supplied by the Commission pursuant to section 303 (*q*) of the Communications Act of 1934.

These individual specifications are issued for and attached to each authorization for an installation.[27] The details of the specifications depend on the degree of hazard presented by the particular installation. The following standard lamps and paints shall be used for the type of marking specified:

(*a*) *Painting.*—Each tower shall be painted throughout its height with alternate horizontal bands of international orange and white, terminating with orange bands at both top and bottom. (Orange yellow No. 5 color card, supplement to U. S. Army Quartermaster Corps Specifications No. 3–1, color chip below.) The width of the orange bands shall be approximately one-seventh of the height of any structure less than 250 feet in height, and between 30 and 40 feet for structures over 250 feet in height. The width of the white bands shall be one-half that of the orange bands.

(*b*) *Lighting.*—(1) Towers, the over-all heights of which do not exceed 200 feet, shall be lighted as follows:

SPECIFICATION "A"

At the top of each tower there shall be installed two 100-watt lamps, enclosed in aviation red prismatic obstruction light globes. At least one of these lamps shall burn continuously from sunset to sunrise. When only one lamp is operated, the circuit shall be equipped with a relay for instant automatic switchover to the other lamp in case of lamp failure.

At both the one-third and two-thirds levels of each tower there shall be installed two 100-watt lamps enclosed in aviation red prismatic obstruction light globes, at each level, one each on diagonally opposite corners of the structure.

All 100-watt lamps shall be type A–21 clear bulb traffic signal lamps (2,000 hours or equal).

All lamps shall be enclosed in aviation red prismatic obstruction light globes, and all lighting shall be exhibited from sunset to sunrise.

* * * * * * *

Special conditions of terrain and location with respect to airports or airways may require additional lighting of the character hereinafter specified for towers the over-all height of which exceeds 200 feet.

* * * * * * *

(2) Towers, the over-all heights of which exceed 200 feet but do not exceed 300 feet, shall be lighted as follows:

SPECIFICATION "B"

At the top of each tower there shall be installed a hazard beacon similar and equal in effectiveness to the standard 300 m./m. airways electric lantern. This beacon shall flash and shall be equipped with two 500-watt lamps (both lamps to burn simultaneously) and aviation red color shades. The 300 m./m. electric code beacon shall be equipped with a flashing mechanism producing 40 flashes per minute, having a luminous period of 1 second, and a period of darkness of one-half second.

The one-third and two-thirds levels of the tower shall be marked by 100-watt obstruction lights the same as specified for towers not exceeding 200 feet in height.

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Towers over 300 feet in height (and less than 300 feet in height where special conditions obtain) may be required to install additional marking as indicated below.

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[27] Specifications normally attached to authorization.

FEDERAL COMMUNICATIONS COMMISSION
RULES AND REGULATIONS

Amendment No. 170 (Footnote 27a to § 7, Standards of Good Engineering Practice, effective December 1, 1942)

To be substituted for pp. 39-40, Standards of Good Engineering Practice

The last previous amendment affecting the Standards was amendment No. 141, pp. 39-40.

GENERAL

Under particularly hazardous conditions and in areas of heavy air traffic, it may be necessary to add a 24-inch 500 or 1,000-watt red rotating beacon equipped with an automatic lamp changer, to mark the installation. The beacon may be installed on the roof of the transmitter building, provided the point will afford proper visibility, otherwise it may be necessary to install the beacon on a separate tower of proper height or on the radio tower itself. The recommended setting of this rotating beacon is such that the center line of the light beam shall be approximately 3° above horizontal.

Adequate red warning lights shall be placed on the structure or structures during the period of construction and until the specified obstruction lights are installed and in operation.

Under certain conditions it may be required to have the lighting controlled by a light sensitive control device, the adjustment being such that lights will be turned on at a north sky light intensity level of 20-foot candles and turned off at a north sky light intensity level of 40-foot candles.

Under certain conditions it may be required to install and operate a radio obstruction marker of a type to be specified.

Specifications A and B require that at both the one-third and two-thirds levels of the structure there shall be installed two 100-watt lamps enclosed in aviation red prismatic obstruction light globes, at each level, one each on diagonally opposite corners of the structure.

Under certain conditions and in the case of triangular and other towers of unusual design, it may be required to install 100-watt lamps enclosed in aviation red prismatic obstruction light globes at various corners and levels throughout the height of the structure in such a manner so that adequate visibility and definition would be obtained from all angles of approach.

Towers of excessive height or peculiar (unusual) design will be made the subject of special investigation and analysis to determine proper marking and lighting.

In addition to the standard marking and lighting of the main structure, towers using guy wires will be made the subject of special study to determine proper marking and lighting of the guy wires.

The specifications relative to obstruction marking and lighting of radio towers of a certain height are general, and in locations of extreme hazard to air navigation, it may be required to install additional equipment on any height tower, in order to obtain suitable protection.

(a) Type A-21, 100-watt traffic signal, clear, medium screw base lamps enclosed in aviation red prismatic obstruction light globes shall be employed in all cases where 100-watt lamps are specified.

(b) Type PS-30, 200-watt general lighting service, clear, mogul prefocus base lamps shall be employed in all cases where code beacons with 200-watt lamps are specified.

(c) Type PS-40, 500-watt general lighting service, clear, mogul prefocus base lamps shall be employed in all cases where code beacons with 500-watt lamps are specified.

(d) Type T-24, 500-watt aviation lighting service, clear, mogul bi-post base lamps shall be employed in all cases where rotating beacons with 500-watt lamps are specified.

(e) Type T-20, 1,000-watt aviation lighting service, clear, mogul bi-post base lamps shall be employed in all cases where rotating beacons with 1,000-watt lamps are specified.

(f) The tower paint shall be kept in good condition and repainted as often as necessary to maintain this condition. Towers now painted black and yellow shall, when repainting is necessary, be painted in accordance with the present standards.[27]

[27] Specifications normally attached to authorization.

7. FURTHER REQUIREMENTS FOR DIRECT MEASUREMENT OF POWER

Section 3.54 states that the antenna input power determined by direct measurement is the square of the antenna current times the antenna resistance at the point where the current is measured and at the operating frequency, and sets forth certain requirements relative to the determination of the resistance and measurement of the antenna current.

The Commission does not specify any particular method of making antenna resistance measurements. Measurements made by any standard method will be accepted provided satisfactory evidence is submitted in accordance with the following as to the procedure used, accuracy of the instruments and qualifications of the engineer conducting the measurements.

The resistance variation method, substitution method and bridge method are acceptable methods for measuring the total antenna resistance and the following general instructions are given as a guide.

The apparatus required is as follows:

(a) Radio frequency generator to cover the frequency range necessary, power 50 watts or required power when using bridge method.

(b) Wavemeter for broadcasting frequency, accuracy 0.25 percent.

(c) Decade resistor having steps of units, tens and hundreds ohms resistance, or equivalent, accuracy, 1.0 percent.

(d) Radio frequency galvanometer or millimeter of approved type, accuracy 2.0 percent.

(e) Approved tuning condenser of approximately 0.001 MFD capacity and tuning inductance of approximately 60 MH.

(f) Or suitable bridge if this method is used.

The broadcast transmitter is not usually satisfactory for use as the source of radio frequencies. The maximum power dissipated in the antenna while making measurements should not be over 10 percent of the power available from the radio-frequency generator.

[27a]An accurate determination of the antenna resistance can only be made by taking a series of measurements each for a different frequency. From 10 to 12 resistance measurements covering a band 50 to 60 kc. wide with the operating frequency near the middle of the band must be made to give data from which accurate results may be obtained. The values measured should be plotted with frequency as abscissa and resistance in ohms as ordinate and a smooth curve drawn. The point on the ordinate where this curve intersects the operating frequency gives the value of the antenna resistance.

In order to comply with the provisions of section 3.54 the following data should be submitted in duplicate to the Commission in affi-

[27a]By Order No. 107, dated November 6, 1942, effective December 1, 1942, the provisions of this paragraph are suspended and there are substituted in lieu thereof: "An accurate determination of the antenna resistance can only be made by taking a series of measurements each for a different frequency. From 10 to 12 resistance measurements covering a band 50 to 60 kc. wide with the operating frequency near the middle of the band must be made to give data from which accurate results may be obtained. The values measured should be plotted with frequency as abscissa and resistance in ohms as ordinate and a smooth curve drawn. The value of the point on the ordinate where this curve intersects the operating frequency multiplied by the factor 1.36, gives the value of the antenna resistance."

davit form, accompanied by duplicate copies of F. C. C. Form 306 properly executed:

(1) Complete data taken.

(2) The graph drawn.

(3) Description of method used to take readings (include schematic circuit diagrams of the measurement circuit and of the antenna system showing point of measurement and location in circuit of both regular and remote antenna ammeters).

(4) Manufacturer's name of each calibrated instrument used and manufacturer's rated accuracy.

(5) Accuracy, date and by whom each instrument was last calibrated.

(6) Qualifications of engineer making measurements.

Licensees of broadcast stations authorized to employ directional antenna systems desiring to determine the operating power by direct measurement of the antenna power shall determine the resistance by the following method:

Measure the resistance at the point of common radio frequency input to the directional antenna system. The following conditions and procedure shall obtain:

(*a*) The antenna shall be finally adjusted for the required pattern.

(*b*) The reactance at the operating frequency and at the point of measurement shall be adjusted to zero or as near thereto as practical.

(*c*) Suitable radio-frequency bridge or other method shall be employed to determine the resistance and reactance at the point of common radio frequency input in the same manner as set forth above for a single antenna.

(*d*) Resistance and reactance measurements at approximately 5, 10, 15, and 20 kc. on each side of the operating frequency shall be made. The values measured shall be plotted and the resistance at the operating frequency determined in the same manner as for a single-element antenna.

(*e*) A permanently installed antenna ammeter shall be placed in each element of the system as well as at the point of measurement of resistance, with the remote reading ammeters [28] located in the transmitter room. The application for authority to determine power by the direct method shall specify not only the current at the point of resistance measurement for the authorized input power (I^2R in accordance with section 3.54 and (*f*) below), but also the current of each element of the system when adjusted for the required pattern and for the authorized operating power.

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[28] In all cases regular antenna ammeters and remote antenna ammeters shall comply with the requirements of section 3.58 and "Indicating Instruments Pursuant to Section 3.58."

(*f*) The license for a station of power of 5 kw. or under, which employs a directional antenna and determines the power by the direct method, will specify the antenna resistance as 92.5 percent of that determined at the point of common input in accordance with the above. The resistance specified for stations of a power over 5 kw. will be 95 percent of that determined at the point of common input.

8. POWER RATING OF VACCUM TUBES

Section 3.42 requires that the maximum rated carrier power of a standard broadcast transmitter shall be determined as the sum of the applicable power ratings of the vacuum tubes employed in the last radio stage. The approved power ratings of vacuum tubes for operation in the last radio stages of broadcast transmitters are fixed as set out in the following tables:

TABLE A.[1]—*Power rating of vacuum tubes for high-level modulation or plate modulation in the last radio stage*

Power rating (watts)	Amperex	Collins	De Forest	Eitel McCullough	Federal Telegraph	General Electric Co.	Heintz & Kaufman	Hygrade Sylvania	RCA Mfg. Co.	Raytheon Production Corp.	Sheldon Electric Co.	United Electronics	Western Electric	Westinghouse Electric & Manufacturing Co.	Taylor Tubes, Inc.
50				35T 50T		GL-276-A	HK-54		808	RK-32 RK-35 RK-37 RK-47 RK-51 RK-52	35T		211D 211E 248A 276A		T55 841A
75	HF-100 203-A 211 838 852 860	C-203A C-211	503-A 511 552 560		F-303-A F-311-A F-352-A	GL-203-A GL-211 GL-242-C GL-835 GL-838 GL-860	154	203-A 211 852 860	203-A 211 838 850 852 860	RK-58		303-A 311 361-A 938 952	242A 242B 242C 250A 261A 284A 295A	WL-195 WL-196 WL-203-A WL-211 WL-469 WL-838 WL-850 WL-860	203A 211 211C
100				100TH 100TL 75T	F-102-A F-108-A		254			RK-36 RK-38 RK-48	100TH			WL-460 WL-468	
125	HF-200 203-H 211-C 211-D 211-H 805	C-200 C-201 C-211-D		150-T	F-123-A	GL-803 GL-805 GL-810			803 805 810	RK-57 RK-28A		905		WL-463 WL-803 WL-805 WL-810	T-155 HD-203A
250	204-A HF-300 212-E	C-204-A C-300	504-A 561 571		F-204-A F-212-E F-331-A	GL-204-A GL-806 GL-861	354 HK354A HK354C HK354D HK354E HK354F	204-A 212-D 831 861	204A 806 831 861	RK-63		304-A 312-E	212-D 212-E	WL-204-A WL-806 WL-861	T200 204A 814 822
350	270-A 849		549	250TH 250TL 300T	F-100-A F-849	GL-849		849	849		250TH	949	270-A	WL-849	
500	251-A			450TL 450TH		GL-833	255 654		833		450TH		251-A 357-A	WL-833	

[1] See footnote on p. 48.

TABLE A.—*Power rating of vacuum tubes for high-level modulation or plate modulation in the last radio stage*—Continued

Power rating (watts)	Amperex	Collins	De Forest	Eitel Mc-Cullough	Federal Telegraph	General Electric Co.	Heintz & Kaufman	Hygrade Sylvania	RCA Mfg. Co.	Raytheon Production Corp.	Sheldon Electric Co.	United Electronics	Western Electric	Westinghouse Electric & Manufacturing Co.	Taylor Tubes, Inc.
750	279-A 849-A 849-H 851	C-849-A C-849-H	551	500T	F-121-A F-351-A	GL-851	2054-A	851	851			951	279A	WL-851	
1,000	846			750TL 750TH	F-128-A F-346-A	GL-846	1554	846	846					WL-846	
2,500	228A 1652 HF3000		520-B 520-M	1500T	F-328-A F-328-B F-348 F-3652-A	GL-207 GL-889	3054	820-B	520B 1652				228A		
5,000	207 220-C 848 343A 863 891 892 892R		507 548 563	2000T	F-126-A F-307-A F-320-A F-320-B F-343-A F-348-A F-363-A F-892 F-892-R	GL-891 GL-892 GL-892-R		207 848 863	207 848 863 891 892 892R				220B 220C 343-A 220CA 343-AA	WL-207 WL-891 WL-892 WL-892-R	
10,000	232-B 342A				F-101-B F-110-A F-110-X F-116-A F-131-A F-332-A F-332-B F-332-C F-342-A F-358-A	GL-880 GL-893			858 893-R				232A 232B 342A	WL-858 WL-893 WL-893-R	
25,000					F-117-B F-124-A F-124-R										
40,000					F-862 F-898	GL-862 GL-898			862 898				298-A	WL-862 WL-898	
100,000													320-A		

Amendment 2[illegible] (Repealing Sections 4.201 through 4.281 of Part 4, Rules Governing Broadcast Services Other Than Standard Broadcast; adopting new Subpart D--Rules Governing Television Broadcast Stations, Sections 3.601-3.606, 3.611-3.623, 3.631-3.640, 3.651-3.657, 3.661-3.669, 3.681-3.691; revising Table of Contents of Part 3 to include new Subpart D) effective November 28, 1945.

To be inserted as pp. XI-XII, XIII, 41-42, 43-44, 45-46, 47-48, 49-50, 51-52, 53-54, 55-56, 57-58, 59-60, 61-62, 63, Part 3, Rules Governing Standard and High-Frequency Broadcast Stations.

The last previous amendment affecting Part 3 was Amendment No. 282, pp. VII-XI and 23-36.

RULES RELATING TO TECHNICAL OPERATION

OTHER RULES RELATING TO OPERATION

SUBPART C—GENERAL RULES APPLICABLE TO STANDARD BROADCAST STATIONS

BROADCASTS BY CANDIDATES FOR PUBLIC OFFICE

SUBPART D—RULES GOVERNING TELEVISION BROADCAST STATIONS

CLASSIFICATION OF TELEVISION STATIONS AND ALLOCATION OF FREQUENCIES

RULES GOVERNING ADMINISTRATIVE PROCEDURE

RULES RELATING TO LICENSING POLICIES

TABLE B [1]—*Power rating of vacuum. tubes for low-level modulation or last radio stage operating as linear power amplifier*

Power rating (watts)	Amperex	Collins	De-Forest	Eitel McCullough	Federal Telegraph	General Electric Co.	Heintz & Kaufman	Hygrade Sylvania	RCA Mfg. Co.	Raytheon Production Corp.	Sheldon Electric Co.	United Electronics	Western Electric	Westinghouse Electric & Manufacturing Co.	Taylor Tubes, Inc.
25				75T		GL-203-A	154		203A	RK-32 RK-35 RK-37 RK-47 RK-51				WL-203-A	203A 211 211C 841A
50	HF-200 203-H 211-H 242-C			100TH 100TL 150-T	F-123-A	GL-242-C GL-803 GL-810	HK354 HK354A HK354C HK354D HK354E HK354F		803 806 810	RK-36 RK-38 RK-57 RK-58 RK-28A RK-48	100TH		242B 242C	WL-803 WL-810	HD203-A
75	HF300 212-E 204-A		504-A		F-204-A F-212-E	GL-204-A		204-A 212-D	204A	RK-63		304-A 312-E	212D 212E	WL-204-A	T200 204A 814 822
125	270-A 849		549	250TH 250TL 300T 450TL 450TH	F-100-A F-849	GL-833 GL-849	654	849	833 833-A 849		250TH 450TH	949	270A	WL-833 WL-849	
250	251-A 849-A 849-H 851	C-849-A C-849-H	551	500-T	F-121-A F-128-A F-351-A	GL-851	255 1554	851	851			951	251A	WL-851	
350				750TL 750TH											
500	279-A 846			1000UHF 1500T	F-346-A	GL-846	2054-A 3054	846	846				279A	WL-846	
1,000	228-A 1652 ZB3200		520-B 520-M	2000T	F-328-A F-328-B F-3652-A			820-B	520B 1652				228A		
1,250						GL-889									

[1] See footnote on p. 48.

TABLE B.—*Power rating of vacuum tubes for low-level modulation or last radio stage operating as linear power amplifier*—Continued

Power rating (watts)	Amperex	Collins	De-Forest	Eitel Mc-Cullough	Federal Telegraph	General Electric Co.	Heintz & Kaufman	Hygrade Sylvania	RCA Mfg. Co.	Raytheon Production Corp.	Sheldon Electric Co.	United Electronics	Western Electric	Westinghouse Electric & Manufacturing Co.	Taylor Tubes, Inc.
2,500	207 220-C 343-A 863 892 892-R		507 569		F-126-A F-131-A F 307-A F-320-A F-320-B F-343-A F-363-A F-892 F-892-R	GL-207 GL-892 GL-892-R		207 863	207 863 892				220-B 220-C 220CA 343-A 343-AA	WL-207 WL-892	
5,000					F-358-A	GL-858			858					WL-858	
8,500	232-B 342-A				F-101-B F-110-A F-110-X F-116-A F-131-A F-332-A F-332-B F-332-C F-342-A								232-A 232-B 342-A		
10,000						GL-880 GL-893								WL-893 WL-893-R	
12,500					F-117-B F-124-A										
25,000					F-862 F-898	GL-862 GL-898			862 898				298-A	WL-862 WL-898	
75,000													320-A		

TABLE BC.[1]—*Power rating of vacuum tubes for low-level modulation in the last radio stage operating as linear power amplifier where efficiency approaches that of Class C operation*

Power rating (watts)	Amperex	Collins	De-Forest	Eitel McCullough	Federal Telegraph	General Electric Co.	Heintz & Kaufman	Hygrade Sylvania	RCA Mfg. Co.	Raytheon Production Corp.	Sheldon Electric Co.	United Electronics	Western Electric	Westinghouse Electric & Manufacturing Co.	Taylor Tubes, Inc.
250													357-A		
2,500													220-CA		

TABLE C.[1]—*Power rating of vacuum tubes for grid modulation in the last radio stage (operating efficiency 25 percent)*

Power rating (watts)	Amperex	Collins	De-Forest	Eitel McCullough	Federal Telegraph	General Electric Co.	Heintz & Kaufman	Hygrade Sylvania	RCA Mfg. Co.	Raytheon Production Corp.	Sheldon Electric Co.	United Electronics	Western Electric	Westinghouse Electric & Manufacturing Co.	Taylor Tubes, Inc.
25				75T											
50	212-E 241-B 270-A			250TH 250TL	F-212-E		354 HK354 A&C			RK-63	250TH		212-E 270-A		
100				300T			654								
125				450TL 500T 750TL			255				450TH				
250				1000UHF			1554								
350				1500T											
500				2000T			3054								

See footnote on p. 48.

TABLE D.[1]—*Power rating of vacuum tubes for grid modulation in the last radio stage (operating efficiency 35 percent)*

Power rating (watts)	Amperex	Collins	De Forest	Eitel Mc-Cullough	Federal Telegraph	General Electric Co.	Heintz & Kaufman	Hygrade Sylvania	RCA Mfg. Co.	Raytheon Production Corp.	Sheldon Electric Co.	United Electronics	Western Electric	Westinghouse Electric & Manufacturing Co.	Taylor Tubes, Inc.
250	849-A 849-H														
1,000					F-328-A								228-A		
2,500	343-R 892 892-R	C-892			F-307-A F-892 F-892R				892						

[1] These tables apply only to tube ratings for use in the last radio stage of broadcast transmitters and may not be applicable to any other service.

If in an application to the Commission a vacuum tube of a type number and power rating not given in the foregoing tables is specified for operation in the last radio stage, it may be accepted provided there is also submitted to and approved by the Commission the manufacturer's rating of the vacuum tube for the system of modulation or class of service contemplated. These data must be supplied by the manufacturer. (See section 3.42 and "Requirements for Approval of Power Rating of Vacuum Tubes.")

9. REQUIREMENTS FOR APPROVAL OF POWER RATING OF VACUUM TUBES

Section 3.42 (*c*) requires that only vacuum tubes of approved rating be employed in the last radio stages of standard broadcast transmitters and that such approved ratings will be given only upon submission of the ratings by the manufacturer.

These ratings shall be supplied under oath in the following table form:

TABLE (A, B, C, or D)—*Class of operation*

[State whether for plate modulation in the last radio stage, low level modulation, or grid modulation in the last radio stage. See section 3.52]

Type of tube	Epn	Epmn	Ipn	Ipmn	R_L	Ec	Power rating

The value of Epn and Ipn are those values that are recommended by the manufacturers for operation at the power rating specified. The values of Epmn and Ipmn are the maximum continuous operating values that the manufacturers will stand by their guarantee on the tube specified when used in the class of service above set out.

The power ratings given above are to apply when the following conditions and limitations as to operation prevail:

(1) The vacuum tubes are to be used in the last radio stage of standard broadcast transmitters.

(2) On the broadcast frequencies of 550 to 1,600 kilocycles, inclusive.

(3) The percentage of amplitude distortion or harmonic generation by the entire transmitter (from microphone terminals to antenna outputs) is not to be over 10 percent at 100 percent modulation. The radio harmonics are not to exceed the amount considered in accordance with good engineering practice. (See section 3.46 and "Construction, General Operation and Safety of Life Requirements" to comply with section 3.46.)

(4) The ventilation, cooling, general condition of circuits with respect to tuning, impedance match, and maintenance are to be those encountered in the average broadcast station and in accordance with good engineering practice. The operation, general maintenance, and adjustments are to be those ordinarily encountered in a broadcast station.

(5) The regulation of the power supply is to be that which has been found to exist throughout the United States where broadcast stations are located or may be located.

(6) Table A should give the power rating for use in transmitter employing plate modulation in last radio stage under the above specified conditions. (See section 3.52, Table A.)

(7) Table B should give the rating for use in transmitter employing low level modulation under the above specified conditions. (See section 3.52, Table B.)

(8) Tables C and D should give the power rating for use in transmitter employing grid modulation in the last radio stage under the above specified conditions and plate efficiencies of 25 and 35 percent, respectively. (Request for approval of ratings for grid modulation in the last radio stage should specify whether the operating efficiency is to be 25 percent or 35 percent. No tube will be approved for both efficiencies. See section 3.52, Table C.)

(9) The operating power of the transmitter is to be determined by sections 3.51, 3.52, 3.53, and 3.54.

(10) Due consideration will be given to the general standard of rating so that tubes manufactured by different firms but having practically the same absolute characteristics will have approximately the same power rating.

(11) The power rating should be an even power step as recognized by the Commission's plan of allocation (100 watts, 250 watts, 500 watts, 1,000 watts, 5 kw, 10 kw, 25 kw, 50 kw), or other ratings established in "Power Rating of Vacuum Tubes." If any other rating is desired, it will be necessary to support the request with satisfactory reasons therefor.

10. PLATE EFFICIENCY OF LAST RADIO STAGE

Section 3.53 requires that in computing the operating power of standard broadcast stations by the indirect method the efficiency factors specified in section 3.52 shall apply in all cases and no distinction will be recognized due to the operating power being less than the maximum rated carrier power.[29]

In compliance with this rule, standard broadcast stations permitted to determine the operating power by the indirect method in accordance with section 3.51 (*b*) and to employ greater daytime power than nighttime power shall maintain the same operating efficiency for both daytime and nighttime operation.[30]

To determine whether this condition obtains, the following procedure should be used:

The apparent antenna resistance should be computed from the daytime (highest power) operating constants and then the nighttime

[29] See section 3.52, Table A.

[30] When different last radio stages with different systems of modulation are employed for the two powers, the same principle shall apply, that is, the power shall be determined by the plate input times the proper efficiency factor and the antenna current shall change in proportion to the square root of the change in power within 5 percent.

power in the antenna determined from the I^2R, using the apparent resistance previously determined. If this computed antenna power agrees with the nighttime operating power determined by the indirect method within plus or minus 5 percent, the station is considered as complying with the requirement of maintaining the same operating efficiency. In case the antenna current is subject to variation due to weather or other conditions, an attempt should be made to arrive at an average value for the purpose of the computations referred to herein.

11. OPERATING POWER TOLERANCE

Section 3.57 requires that except in case of emergency beyond the control of the licensee, the operating power of each standard broadcast station shall be maintained within the prescribed limits of the licensed power.

Each station shall be operated at all times as near to the authorized power as practicable. However, in order to provide for variations in the power supply or other factors affecting the operating power which would necessitate continual adjustment to keep the operating power exactly the same as the authorized power, the operating power may be permitted to vary from 5 percent above to 10 percent below the authorized power for periods of short duration.

In addition to maintaining the operating power within the above limitations, broadcast stations employing directional antenna systems shall maintain the ratio of the antenna currents in the elements of the system within 5 percent of that specified by the terms of the license or other instrument of authorization.

12. CONSTRUCTION, GENERAL OPERATION AND SAFETY OF LIFE REQUIREMENTS

Section 3.46 requires that the transmitter proper and associated transmitting equipment of each broadcast station shall be designed, constructed, and operated in accordance with the standards of good engineering practice in addition to the specific requirements of the Rules and Regulations of the Commission.

The specifications deemed necessary to meet the requirements of the Rules and Regulations and good engineering practice with respect to design, construction, and operation of standard broadcast stations are set forth below. These specifications will be changed from time to time as the state of the art and the need arises for modified or additional specifications.

A. *Design.*—The general design of standard broadcast transmitting equipment [main studio microphone (including telephone lines, if

used, as to performance only [31]) to antenna output] shall be in accordance with the following specifications. For the points not specifically covered below, the principles set out shall be followed:

The equipment shall be so designed that:

(1) The maximum rated carrier power (determined by section 3.42) is in accordance with the requirements of section 3.41.

(2) The equipment is capable of satisfactory operation at the authorized operating power or the proposed operating power with modulation of at least 85 to 95 percent with no more distortion than given in (3) below.

(3) The total audio frequency distortion from microphone terminals, including microphone amplifier, to antenna output does not exceed 5 percent harmonics (voltage measurements of arithmetical sum or r. s. s.) when modulated from 0 to 84 percent, and not over 7.5 percent harmonics (voltage measurements of arithmetical sum or r. s. s.) when modulating 85 percent to 95 percent (distortion shall be measured with modulating frequencies of 50, 100, 400, 1000, 5000 and 7500 cycles up to tenth harmonic or 16000 cycles, or any intermediate frequency that readings on these frequencies indicate is desirable).

(4) The audio frequency transmitting characteristics of the equipment from the microphone terminals (including microphone amplifier unless microphone frequency correction is included in which event proper allowance shall be made accordingly) to the antenna output does not depart more than 2 decibels from that at 1000 cycles between 100 and 5000 cycles.

(5) The carrier shift (current) at any percentage of modulation does not exceed 5 percent.

(6) The carrier hum and extraneous noise (exclusive of microphone and studio noises) level (unweighted r. s. s.) is at least 50 decibels below 100 percent modulation for the frequency band of 150 to 5000 cycles and at least 40 decibels down outside this range.

(7) The transmitter shall be equipped with suitable indicating instruments in accordance with the requirements of section 3.58 and any other instruments necessary for the proper adjustment and operation of the equipment.

(8) Adequate provision is made for varying the transmitter power output between sufficient limits to compensate for excessive variations in line voltage, or other factors which may affect the power output.

(9) The transmitter is equipped with automatic frequency control equipment capable of maintaining the operating frequency within the limit specified by section 3.59.

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[31] In cases where telephone lines are not available to give the performance as required in these specifications a relay transmitter may be authorized to supersede the lines.

a. The maximum temperature variation [32] at the crystal from the normal operating temperature shall not be greater than:

1. Plus or minus 0.1° C. when an X or Y cut crystal is employed, or

2. Plus or minus 1.0° C. when low temperature coefficient crystal [33] is employed.

b. Unless otherwise authorized, a thermometer shall be installed in such manner that the temperature at the crystal can be accurately measured within 0.05° C. for *X* or *Y* cut crystal or 0.5° for low temperature coefficient crystal.

c. It is preferable that the tank circuit of the oscillator tube be installed in the temperature controlled chamber.

(10) Means are provided for connection and continuous operation of approved modulation monitor and approved frequency monitor.

a. The radio frequency energy for operation of the approved frequency monitor shall be obtained from a radio-frequency stage prior to the modulated stage unless the monitor is of such design as to permit satisfactory operation when otherwise connected and the monitor circuits shall be such that the carrier is not heterodyned thereby.

(11) Adequate margin is provided in all component parts to avoid overheating at the maximum rated power output.

B. *Construction.*—In general, the transmitter shall be constructed either on racks and panels or in totally enclosed frames [34] protected as required by article 810 of the National Electrical Code [35] and as set forth below:

(1) Means shall be provided for making all tuning adjustments, requiring voltages in excess of 350 volts to be applied to the circuit, from the front of the panels with all access doors closed.

(2) Proper bleeder resistors or other automatic means shall be installed across all the condenser banks to remove any charge which may remain after the high voltage circuit is opened (in certain instances the plate circuit of the tubes may provide such protection;

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[32] Explanations of excessive frequency deviations will not be accepted when temperature variations are in excess of the values specified below.

[33] See "Use of Low Temperature Coefficient Crystals by Broadcast Stations."

[34] The final stages of high power transmitters may be assembled in open frames provided the equipment is enclosed by a protective fence.

[35] The pertinent sections of article 810 of the National Electrical Code read as follows:

"8191. *General.*—Transmitters shall comply with the following:

"*a. Enclosing.*—The transmitter shall be enclosed in a metal frame or grille, or separated from the operating space by a barrier or other equivalent means, all metallic parts of which are effectually connected to ground.

"*b. Grounding of controls.*—All external metallic handles and controls accessible to the operating personnel shall be effectually grounded. No circuit in excess of 150 volts shall have any parts exposed to direct contact. A complete dead-front type of switchboard is preferred.

"*c. Interlocks on doors.*—All access doors shall be provided with interlocks which will disconnect all voltages in excess of 350 volts when any access door is opened."

however, individual approval of such shall be obtained by the manufacturer in case of standard equipment, and the licensee in case of composite equipment).

(3) All plate supply and other high voltage equipment, including transformers, filters, rectifiers and motor generators, shall be protected so as to prevent injury to operating personnel.

a. Commutator guards shall be provided on all high voltage rotating machinery (coupling guards on motor generators, although desirable, are not required).

b. Power equipment and control panels of the transmitter shall meet the above requirements (exposed 220 volt AC switching equipment on the front of the power control panels is not recommended, however, is not prohibited).

c. Power equipment located at a broadcast station but not directly associated with the transmitter (not purchased as part of same), such as power distribution panels, control equipment on indoor or outdoor stations and the substations associated therewith, are not under the jurisdiction of the Commission; therefore, section 3.46 does not apply.

d. It is not necessary to protect the equipment in the antenna tuning house and the base of the antenna with screens and interlocks, provided the doors to the tuning house and antenna base are fenced and locked at all times, with the keys in the possession of the operator on duty at the transmitter. Ungrounded fencing or wires should be effectively grounded, either directly or through proper static leaks. Lighting protection for the antenna system is not specifically required but should be installed.

e. The antenna, antenna lead-in, counterpoise (if used), etc., shall be installed so as not to present a hazard. The antenna may be located close by or at a distance from the transmitter building. A properly designed and terminated transmission line should be used between the transmitter and the antenna when located at a distance.[36]

(4) Metering Equipment.[37]

a. All instruments having more than 1,000 volts potential to ground on the movement shall be protected by a cage or cover in addition to the regular case. (Some instruments are designed by the manufacturer to operate safely with voltages in excess of 1,000 volts on the

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[36] In all cases of new construction where a concentric transmission line is used between the transmitter and antenna, such line shall be installed in duplicate with adequate switching facilities for immediate connection of the second line in case of failure of the first line, or permanently installed auxiliary facilities such as an auxiliary transmitter and antenna system, auxiliary antenna system or other means whereby operation may be continued in the event of failure of the transmission line. It is also recommended that spare antenna and transmission line ammeters identical with those installed be kept on hand.

[37] In addition to the following requirements, instruments shall meet the requirements of section 3.58 and "Indicating Instruments Pursuant to Section 3.58."

movement. If it can be shown by the manufacturer's rating that the instrument will operate safely at the applied potential, additional protection is not necessary.)

b. In case the plate voltmeter is located on the low potential side of the multiplier resistor with one terminal of the instrument at or less than 1,000 volts above ground, no protective case is required. However, it is good practice to protect voltmeters subject to more than 5,000 volts with suitable over-voltage protective devices across the instrument terminals in case the winding opens.

c. The antenna ammeters (both regular and remote and any other radio frequency instrument which it is necessary for the operator to read) shall be so installed as to be easily and accurately read without the operator having to risk contact with circuits carrying high potential radio frequency energy.

C. *Wiring and shielding.*—(1) The transmitter panels or units shall be wired in accordance with standard switchboard practice, either with insulated leads properly cabled and supported or with rigid bus bar properly insulated and protected.

(2) Wiring between units of the transmitter, with the exception of circuits carrying radio frequency energy, shall be installed in conduits or approved fiber or metal raceways to protect it from mechanical injury.

(3) Circuits carrying low level radio frequency energy between units shall be either concentric tube, two wire balanced lines, or properly shielded to prevent the pickup of modulated radio frequency energy from the output circuits.

(4) Each stage (including the oscillator) preceding the modulated stage shall be properly shielded and filtered to prevent unintentional feedback from any circuit following the modulated stage (an exception to this requirement may be made in the case of high level modulated transmitters of approved manufacture which have been properly engineered to prevent reaction).

(5) The crystal chamber, together with the conductor or conductors to the oscillator circuit shall be totally shielded.

(6) The monitors and the radio frequency lines to the transmitter shall be thoroughly shielded.

D. *Installation.*—(1) The installation shall be made in suitable quarters.

(2) Since an operator must be on duty during operation, suitable facilities for his welfare and comfort shall be provided.

E. *Spare tubes.*—A spare tube of every type employed in the transmitter and frequency and modulation monitors shall be kept on hand. When more than one tube of any type are employed, the

following table determines the number of spares of that type required:

Number of each type employed:	*Spares required*
1 or 2	1
3 to 5	2
6 to 8	3
9 or more	4

F. *Operation.*—In addition to the specific requirements of the rules governing standard broadcast stations, the following operating requirements shall be observed:

(1) The maximum percentage of modulation shall be maintained at as high level as practicable without causing undue audio frequency harmonics, which shall not be in excess of 10 percent when operating with 85 percent modulation.

(2) Spurious emissions, including radio frequency harmonics and audio frequency harmonics, shall be maintained at as low a level as practicable at all times in accordance with good engineering practice.

(3) In the event interference is caused to other stations by modulating frequencies in excess of 7,500 cycles or spurious emissions, including radio frequency harmonics and audio frequency harmonics outside the band plus or minus 7,500 cycles of the authorized carrier frequency, the licensee shall install equipment or make adjustments which limit the emissions to within this band or to such an extent above 7,500 cycles as to reduce the interference to where it is no longer objectionable.

(4) The operating power shall be maintained within the limits of 5 percent above and 10 percent below the authorized operating power and shall be maintained as near as practicable to the authorized operating power.

(5) Licensees of broadcast stations employing directional antenna systems shall maintain the ratio of the currents in the elements of the array within 5 percent of that specified by the terms of the license or other instrument of authorization.

(6) In case of excessive shift in operating frequency during warm-up periods, the crystal oscillator shall be operated continuously. The automatic temperature control circuits should be operated continuously under all circumstances.

G. *Studio equipment.*—The studio equipment shall be subject to all the above requirements where applicable except as follows:

(1) If it is properly covered by an underwriter's certificate, it will be considered as satisfying the safety requirements.

(2) Section 8191 of article 810 of the National Electrical Code shall apply for voltages only when in excess of 500 volts.

No specific requirements are made relative to the design and acoustical treatment. However, the studios and particularly the main studio should be in accordance with the standard practice for the class of station concerned, keeping the noise level as low as reasonably possible.

13. INDICATING INSTRUMENTS PURSUANT TO SECTION 3.58

Section 3.58 requires that each standard broadcast station shall be equipped with suitable indicating instruments of accepted accuracy to measure the antenna current, direct plate circuit voltage, and the direct plate circuit current of the last radio stage.

The following requirements and specifications shall apply to indicating instruments used by standard broadcast stations in compliance with this rule:

A. Instruments indicating the plate current or plate voltage of the last radio stage (linear scale instruments), shall meet the following specifications:

(1) Length of scale shall be not less than $2\frac{3}{10}$ inches.

(2) Accuracy shall be at least 2 percent of the full scale reading.

(3) The maximum rating of the meter shall be such that it does not read off scale during modulation.

(4) Scale shall have at least 40 divisions.

(5) Full scale reading shall not be greater than five times the minimum normal indication.

B. Instruments indicating the antenna current shall meet the following specifications:

(1) Instruments having logarithmic or square law scales.

(*a*) Shall meet same requirements as 1, 2, and 3 above for linear scale instruments.

(*b*) Full scale reading shall not be greater than three times the minimum normal indication.

(*c*) No scale division above one-third full scale reading (in amperes) shall be greater than one-thirtieth of the full scale reading. (Example: An ammeter meeting requirement (*a*) above having full scale reading of 6 amperes is acceptable for reading currents from 2 to 6 amperes, provided no scale division between 2 and 6 amperes is greater than one-thirtieth of 6 amperes, 0.2 ampere.)

(2) Radio frequency instruments having expanded scales.

(*a*) Shall meet same requirements as 1, 2, and 3 for linear scale instruments.

(*b*) Full scale reading shall not be greater than five times the minimum normal indication.

(*c*) No scale division above one-fifth full scale reading (in amperes) shall be greater than one-fiftieth of the full scale reading.

(Example: An ammeter meeting the requirement (*a*) above is acceptable for indicating currents from 1 to 5 amperes, provided no division between 1 and 5 amperes is greater than one-fiftieth of 5 amperes, 0.1 ampere.)

(*d*) Manufacturers of instruments of the expanded scale type must submit data to the Commission showing that these instruments have acceptable expanded scales, and the type number of these instruments must include suitable designation.

(3) Remote reading antenna ammeters may be employed and the indications logged as the antenna current in accordance with the following:

(*a*) Remote reading antenna ammeters may be provided by:

1. Inserting second thermocouple directly in the antenna circuit with remote leads to the indicating instrument.

2. Inductive coupling to thermocouple or other device for providing direct current to indicating instrument.

3. Capacity coupling to thermocouple or other device for providing direct current to indicating instrument.

4. Current transformer connected to second thermocouple or other device for providing direct current to indicating instrument.

5. Using transmission line current meter at transmitter as remote reading ammeter. See paragraph (*h*) below.

6. Using indications of phase monitor for determining the ratio of antenna currents in the case of directional antennas, provided the indicating instruments in the unit are connected directly in the current sampling circuits with no other shunt circuits of any nature.

(*b*) A thermocouple type ammeter meeting the above requirements shall be permanently installed in the antenna circuit. (This thermocouple ammeter may be so connected that it is short circuited or open circuited when not actually being read. If open circuited, a make-before-break switch must be employed.)

(*c*) The remote ammeter shall be connected at the same point in the antenna circuit as the thermocouple ammeter or shall be so connected and calibrated as to read in amperes within 2 percent of this meter over the entire range above one-third or one-fifth full scale. See sections B 1 (*c*) and B 2 (*c*) above respectively.

(*d*) The regular antenna ammeter shall be above the coupling to the remote meter in the antenna circuit so it does not read the current to ground through the remote meter.

(*e*) All remote meters shall meet the same requirements as the regular antenna ammeter with respect to scale accuracy, etc.

(*f*) Calibration shall be checked against the regular meter at least once a week.

(*g*) All remote meters shall be provided with shielding or filters as necessary to prevent any feed-back from the antenna to the transmitter.

(*h*) In the case of shunt excited antennas, the transmission line current meter at the transmitter may be considered as the remote antenna ammeter provided the transmission line is terminated directly into the excitation circuit feed line, which shall employ series tuning only (no shunt circuits of any type shall be employed), and insofar as qualified and equipped instrument repair service. In either case the instrument must be resealed with the symbol or trade-mark of the repair service and a certificate of calibration supplied therewith.

(*i*) Remote reading antenna ammeters employing vacuum tube rectifiers are acceptable provided:

1. The indicating instruments shall meet all the above requirements for linear scale instruments.

2. Data are submitted under oath showing the unit has an over-all accuracy of at least 2 percent of the full scale reading.

3. The installation, calibration, and checking are in accordance with the above requirements.

(*j*) In the event there is any question as to the method of providing or the accuracy of the remote meter, the burden of proof of satisfactory performance shall be upon the licensee and the manufacturer of the equipment.

C. Stations determining power by the indirect method may log the transmission line current in lieu of the antenna current provided the instrument meets the above requirements for antenna ammeters, and further provided that the ratio between the transmission line current and the antenna current is entered each time in the log. In case the station is authorized for the same operating power for both day and nighttime operation, this ratio shall be checked at least once daily. Stations which are authorized to operate with nighttime power different from the daytime power shall check the ratio for each power at least once daily.

D. No instruments indicating the plate current or plate voltage of the last radio stage, the antenna current or the transmission line current when logged, in lieu of the antenna current, shall be changed or replaced without written authority of the Commission, except by instruments of the same make, type, maximum scale readings, and accuracy. Requests for authority to change an instrument may be made by letter or telegram giving the manufacturer's name, type number, serial number and full scale reading of the proposed instrument and the values of current or voltage the instrument will be employed to indicate. Requests for temporary authority to operate without an instru-

ment or with a substitute instrument may be made by letter or telegram stating the necessity therefor and the period involved.

E. No instrument, the seal of which has been broken, on the accuracy of which is questionable, shall be employed. Any instrument which was not originally sealed by the manufacturer that has been opened shall not be used until it has been recalibrated and sealed in accordance with the following: Repairs and recalibration of instruments shall be made by the manufacturer, by an authorized instrument repair service of the manufacturer or by some other properly qualified and equipped instrument repair service. In either case the instrument must be resealed with the symbol or trade mark of the repair service and a certificate of calibration supplied therewith.

F. Since it is usually impractical to measure the actual antenna current of a shunt excited antenna system, the current measured at the input of the excitation circuit feed line is accepted as the antenna current.

G. Recording instruments may be employed in addition to the indicating instruments to record the antenna current and the direct plate current and direct plate voltage of the last radio stage provided that they do not affect the operation of the circuits or accuracy of the indicating instruments. If the records are to be used in any proceedings before the Commission as representation of operation with respect to plate or antenna current and plate voltage only, the accuracy must be the equivalent of the indicating instruments and the calibration shall be checked at such intervals as to insure the retention of the accuracy.

H. The function of each instrument shall be clearly and permanently shown on the instrument itself or on the panel immediately adjacent thereto.

14. REQUIREMENTS FOR TYPE APPROVAL OF BROADCAST TRANSMITTERS AND AUTOMATIC FREQUENCY CONTROL EQUIPMENTS

Sections 3.41 to 3.64 govern the design, construction, and technical operation of standard broadcast equipment. In order to facilitate filing of and action on applications for construction permits specifying equipment of standard manufacture, the Commission will approve, as complying with the technical requirements, such equipment by type, subject to the following conditions and in acordance with the following procedure:

(*a*) Approval of equipment by the Commission is only to the effect that insofar as can be determined from the data supplied the equipment complies with the current requirements of good engineering practice and the technical Rules and Regulations of the Commission. The approval may be withdrawn upon subsequent inspection or operation showing the equipment is not as represented or does not comply

with the technical Rules and Regulations of the Commission and the requirements of good engineering practice.

(*b*) Such approval shall not be construed to mean that the equipment will be satisfactory as the state of the art progresses and/or as the Rules and Regulations of the Commission may be changed as deemed advisable.

(*c*) Applicants specifying equipment of approved manufacture need not submit detailed descriptions and diagrams where the correct type number is specified, provided the equipment, including the antenna tuning unit, is identical with that approved.

(*d*) In passing on equipment, no consideration is given by the Commission to patent rights.

(*e*) For approval of standard broadcast transmitters, manufacturers shall submit F. C. C. Form 301, completed with respect to all pertinent sections and the data set forth below, both of which shall be verified before a notary public.

1. Photograph or drawings or any other evidence that construction is in accordance with the requirements of good engineering practice.

2. Data and curves showing over-all audio frequency response from 30 to 7500 cycles for approximately 25-, 50-, 85-, and 100- (if obtainable) percent modulation (reference frequency, 1000 cycles).

3. Data on audio frequency harmonics for 25-, 50-, 85-, and 100-percent modulation for the fundamental frequencies of 50, 100, 400, 1000, 5000, and 7500 cycles (either arithmetical sum or root-sum-square values up to tenth harmonic or 16000 cycles).

4. Percentage carrier shift (current) for 25-, 50-, 85-, and 100-percent modulation.

5. Carrier hum and extraneous noise generated within the equipment and measured as the level below 100-percent modulation throughout audio spectrum or by bands.

6. Percentage of each measurable radio frequency harmonic generated under expected normal operating conditions or in the first installation.

7. How output power is varied to compensate for power supply voltage variations.

8. Data and curves on frequency stability for variations in ambient temperatures over the range encountered in practice.

9. Data and curves on frequency stability for variations in power supply voltage from 85 to 115 percent normal values.

10 Net sale price.

(*f*) For approval of automatic frequency control equipment or automatic temperature control chambers, manufacturers shall complete F. C. C. Form 305 with respect to all pertinent sections and

the data set forth below, both of which shall be verified before a notary public.

1. Photograph or drawings or any other evidence.
2. Data and curves on frequency stability for variations in ambient temperatures over maximum range encountered in practice.
3. Data and curves on frequency stability for variations in power supply voltage from 85 to 115 percent normal values.
4. Net sale price.

15. REQUIREMENTS FOR APPROVAL OF FREQUENCY MONITORS

Section 3.60 requires that the licensee of each standard broadcast station have in operation at the transmitter a frequency monitor independent of the frequency control of the transmitter. The frequency monitor shall be approved by the Commission and shall have a stability and accuracy at least five parts per million.

A. General Requirements and Approval

There are several ways or means by which it can be determined whether the frequency of the omitted carrier wave is within the required limits of the assigned frequency. However, one of the commonest ways is by means of a local piezo oscillator of known frequency producing a beat with the omitted wave used in conjunction with an instrument to indicate the resultant beat frequency. The visual indicator [38] is the only method now in common use by which it is considered that the frequency of the beat may be determined with the required degree of accuracy. Approval of a frequency monitor will be given based upon data taken at the Bureau of Standards. However, the Bureau of Standards does not approve or disapprove the monitor as this is entirely in the hands of the Commission. Any manufacturer desiring to submit a monitor for approval shall supply the Commission with full details. If the specifications appear to meet the requirements, the Commission will request the Bureau of Standards to issue shipping instructions. The cost of tests as well as the shipping charges shall be paid by the manufacturer.

In approving a frequency monitor, based upon the tests at the Bureau of Standards, the Commission merely recognizes that the type of monitor has the inherent capability of functioning in compliance with section 3.60, if properly constructed, maintained, and

[38] In addition to the visual indicator, the range of which is necessarily limited in order to obtain the required accuracy, an aural indicator should also be employed to indicate frequency deviations beyond the range of the visual indicator, particularly where the visual indicator is so designed that the indication becomes zero when the deviations become considerably greater than the range of the instrument. When it is desired to make any change, either mechanical or electrical, the details shall be submitted to the Commission for its consideration.

operated. The Commission accepts no responsibility beyond this and further realizes that these monitors may have a limited range over which the visual indicator will determine deviations. Accordingly, it is necessary that adjunct equipment be used to determine major deviations.[38]

No change whatsoever will be permitted in the monitors sold under approval number issued by the Commission except when the licensee or the manufacturer is specifically authorized to make such changes.

When it is desired to make any change, either mechanical or electrical, the details shall be submitted to the Commission for its consideration.

Approval is given subject to withdrawal if the unit proves defective in service and cannot be relied upon under usual conditions of maintenance and operation encountered in the average standard broadcast station. Withdrawal of approval means that no further units may be installed by standard broadcast stations for the purpose of complying with section 3.60, but will not affect units already sold, unless it is found that there has been an unauthorized change in design or construction, or the material or workmanship is defective. All manufacturers of approved frequency monitors shall keep a list of sale numbers of the monitors sold to licensees of standard broadcast stations under the assigned approval number, and shall advise the Commission upon shipment of the monitor to the standard broadcast station.

B. General Specifications

The general specifications that frequency monitors shall meet before they will be approved by the Commission are as follows:

(1) The unit shall have an accuracy of at least five parts per million under ordinary conditions (temperature, humidity, power supply, and other conditions which may affect its accuracy) encountered in standard broadcast stations throughout the United States.

(2) The range of the indicating device shall be at least from 50 cycles below to 50 cycles above the assigned frequency. (When used by stations required by section 3.59 to maintain an operating frequency within 20 cycles of the assigned frequency, the range may be less than from 50 cycles above to 50 cycles below zero deviation but in no event shall the scale be less than from 20 cycles above to 20 cycles below zero deviation.)

(3) The scale of the indicating device shall be so calibrated as to be accurately read within at least 1 cycle.

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[38] See footnote on p. 62.

(4) The unit shall be equipped with an automatic temperature control chamber (preferably enclosing the tank circuits of the oscillator) such that the maximum temperature variation at the crystal from the normal operating temperature shall not be greater than,

(a) Plus or minus 0.05° C. when *X* or *Y* cut crystal is employed, or

(b) Plus or minus 0.5° C. when low temperature coefficient crystal is employed.

(5) Unless otherwise specifically authorized, the instrument shall be equipped with a thermometer such that the temperature can be accurately measured within 0.025° C. for *X* or *Y* cut crystal or 0.25° C. for low temperature coefficient crystal.

(6) The monitor circuit shall be such that it may be continuously operated and the omitted carrier of the station is not heterodyned thereby.

(7) Means shall be provided for adjustment of the temperature or other means for correction of the indications of the monitor to agree with the external standard.

C. Tests To Be Made by the Bureau of Standards

The tests to be made at the Bureau of Standards will include the determination of the following:

(1) *Accuracy.*—(*a*) Oscillator frequency, as received.

(*b*) Constancy of oscillator frequency, as measured several times in 1 month.

(*c*) Accuracy of readings of frequency-difference instrument.

(*d*) Functioning of frequency adjustment device.

(*e*) Effects on frequency of changing tubes and of voltage variations.

(2) *Temperature control stability.*—(*a*) Effect on frequency of variation of room temperature through a range not to exceed 10° to 35° C.

(3) *Sensitivity.*—(*a*) Response of indicating instrument to small changes of frequency.

(4) *General construction.*—(*a*) Inspection to determine ability to stand shipment and service.

(*b*) Special tests to determine quality of construction, such as effect of tilting or tipping on frequency.

(5) *Miscellaneous performance.*—(*a*) Various, depending on character of apparatus (e. g., changes after stopping and starting, effect of varying coupling with transmitter, etc.)

The equipment will be operated in a test in the same way and the same conditions under which it will be used in service as specified by the manufacturer. The manufacturer shall supply to the Bureau

of Standards all instructions or services which will be supplied to the purchaser of the equipment. The equipment, as submitted, shall be adjusted for operation in connection with broadcast stations operating on 1600 kilocycles.

16. REQUIREMENTS FOR APPROVAL OF MODULATION MONITORS

Section 3.55 (*b*) requires all broadcast stations to have in operation a modulation monitor approved by the Commission and section 3.55 (*d*) states that the Commission will from time to time publish the specifications, requirements, and list of approved modulation monitors. The specifications and requirements for approval are set out below. For a list of approved modulation monitors, attention is invited to Commission release "List of Approved Modulation Monitors."

Approval will be given based on the test data taken at the Bureau of Standards. However, the Bureau of Standards does not approve or disapprove the monitor as this is entirely in the hands of the Commission. Any manufacturer desiring to submit a monitor for approval shall supply the Commission with full details and if the specifications appear to meet the requirements, the Commission will request the Bureau of Standards to issue shipping instructions. The cost of tests, as well as the shipping charge, shall be paid by the manufacturer.

The specifications that the modulation monitor shall meet before it will be approved by the Commission are as follows:

(1) A DC meter for setting the average rectified carrier at a specific value and to indicate changes in carrier intensity during modulation.

(2) A peak indicating light or similar device that can be set at any predetermined value from 50 to 120 percent modulation to indicate on positive peaks, and/or from 50 to 100 percent negative modulation.

(3) A semi-peak indicator with a meter having the characteristics given below shall be used with a circuit such that peaks of modulation of duration between 40 and 90 milliseconds are indicated to 90 percent of full value and the discharge rate adjusted so that the pointer returns from full reading to 10 percent of zero within 500 to 800 milliseconds. A switch shall be provided so that this meter will read either positive or negative modulation and, if desired, in the center position it may read both in a full-wave circuit.

The characteristics of the indicating meter are as follows:

Speed.—The time for one complete oscillation of the pointer shall be 290 to 350 milliseconds. The damping factor shall be between 16 and 200. The useful scale length shall be at least 2.3 inches.

The meter shall be calibrated for modulation from 0 to 110 percent and in decibels below 100 percent with 100 percent being 0 DB.

The accuracy of the reading on percentage of modulation shall be ±2 percent for 100 percent modulation, and ±4 percent of full scale reading at any other percentage of modulation.

(4) The frequency characteristics curve shall not depart from a straight line more than ±½ DB from 30 to 10000 cycles. The amplitude distortion or generation of audio harmonics shall be kept to a minimum.

(5) The modulation meter shall be equipped with appropriate terminals so that an external peak counter can be readily connected.

(6) Modulation will be tested at 115 volts ±5 percent and 60 cycles, and the above accuracies shall be applicable under these conditions.

(7) All specifications not already covered above, and the general design, construction, and operation of these units must be in accordance with good engineering practice.

17. USE OF LOW TEMPERATURE COEFFICIENT CRYSTALS BY BROADCAST STATIONS

Section 3.62 requires that authority from the Commission shall be obtained before installing new automatic frequency control equipment or making changes in existing automatic frequency control equipment that may affect the precision of the frequency control. Therefore, licensees of standard broadcast stations desiring to install crystals of the low temperature coefficient type must obtain authorization therefor from the Commission. Requests for such authority may be made by letter specifying the manufacturer's name (see list of manufacturers of approved crystals below) and the guaranteed temperature coefficient and accuracy of calibration.

Use of a properly ground low temperature coefficient crystal normally materially increases the frequency stability, particularly where the equipment is subject to wide variations in ambient temperature. Where a crystal of this type is installed in the automatic frequency control unit but not in the approved frequency monitor, the stability of the control unit becomes considerably better than that of the monitor and unless care is exercised in making frequency adjustments, off frequency operation may occur. Therefore, it is recommended that when the crystal in the frequency control unit is changed to one of the low temperature coefficient type, a crystal of equal or better temperature coefficient and accuracy be installed in the monitor, authority for which may be requested by letter in

the same manner as for installation in the automatic frequency control unit.

Manufacturers desiring approval of crystals of the low temperature coefficient type must submit under oath data on several such typical crystals manufactured by them showing that the temperature coefficient is not in excess of three parts per million per degree Centigrade, and further affirming that no crystal of this type having a temperature coefficient in excess of this value will be supplied to any broadcast station and that all crystals so supplied will be ground to within five parts per million of the assigned frequency of the station for the normal operating temperature specified.

MANUFACTURERS OF LOW TEMPERATURE COEFFICIENT CRYSTALS WHICH HAVE BEEN ACCEPTED BY THE COMMISSION

Bellefonte Eng. Labs., Bellefonte, Pa.
Premier Crystal Labs, Inc., 53–63 Park Row, New York City.
RCA Mfg. Co., Camden, N. J.
Precision Piezo Service, Baton Rouge, La.
Scientific Research Laboratories, Hyattsville, Md.
Commercial Radio Equiment Co., 216 East Seventy-fourth Street, Kansas City, Mo.
Hollister Crystal Co., Merriam, Kans.
Piezo Electric Laboratories, New Dorp, N. Y.
Collins Radio Co., Cedar Rapids, Iowa.
Western Electric Co., New York, N. Y.
William W. L. Burnett, San Diego, Calif.
American Piezo Supply Co., Kansas City, Mo.
Bliley Electric Co., Union Station Building, Erie, Pa.
Hipower Crystal Co., 2035 West Charleston Street, Chicago, Ill.
Precision Crystal Laboratories, P. O. Box 326, Springfield, Mass.
Theodore S. Valpey, Holliston, Mass.

18. MONEY REQUIRED TO CONSTRUCT AND COMPLETE ELECTRICAL TESTS OF STATIONS OF DIFFERENT CLASSES AND POWERS

Section 3.24 (*c*) requires that an applicant for standard broadcast station show that it is financially qualified to construct and operate the proposed station.

It is considered that the money specified below is required to construct and complete electrical tests of a new standard broadcast station of the class and power indicated, in accordance with the requirements of the Rules and Regulations of the Commission and good engineering practice.

Power and class of station:	*Money required*
100 watts, Class IV	$6,500
250 watts, Class IV	8,500
250 watts, Class II	10,000
500 watts, Class II and III	22,500
1,000 watts, Class II and III	25,000
5 kw, Class II or III	40,000
10 kw, Class I or II	65,000
25 kw, Class I or II	175,000
50 kw, Class I or II	200,000

Attention is invited to the fact that the above figures are considered the minimum required for satisfactory installation, including the transmitter, antenna system, monitoring equipment and equipment for one large and one small studio of average dimensions, and equipment including microphones, speech input equipment, and usual acoustical treatment, but exclusive of the cost of land and buildings and organization and development costs in more elaborate installations including directional antenna would increase the cost accordingly.

19. USE OF COMMON ANTENNA BY STANDARD BROADCAST STATIONS OR ANOTHER RADIO STATION

Section 3.45 (*c*) permits the simultaneous use of the same antenna or antenna structure by two standard broadcast stations or a standard broadcast station and a station of another service or class only when both are licensed to the same licensee.

Such simultaneous use may be authorized to the same licensee provided:

(1) Complete verified engineering data are submitted showing that satisfactory operation of each station will be obtained without adversely affecting the operation of the other station.

(2) The requirements of section 3.45 (*a*) and (*b*) are met with respect to the minimum antenna height or field intensity for each standard broadcast station concerned.

20. USE OF FREQUENCY AND MODULATION MONITORS AT AUXILIARY BROADCAST TRANSMITTERS

Sections 3.60 and 3.55 (*b*) require that each standard broadcast station have approved frequency and modulation monitors in operation at the transmitter.

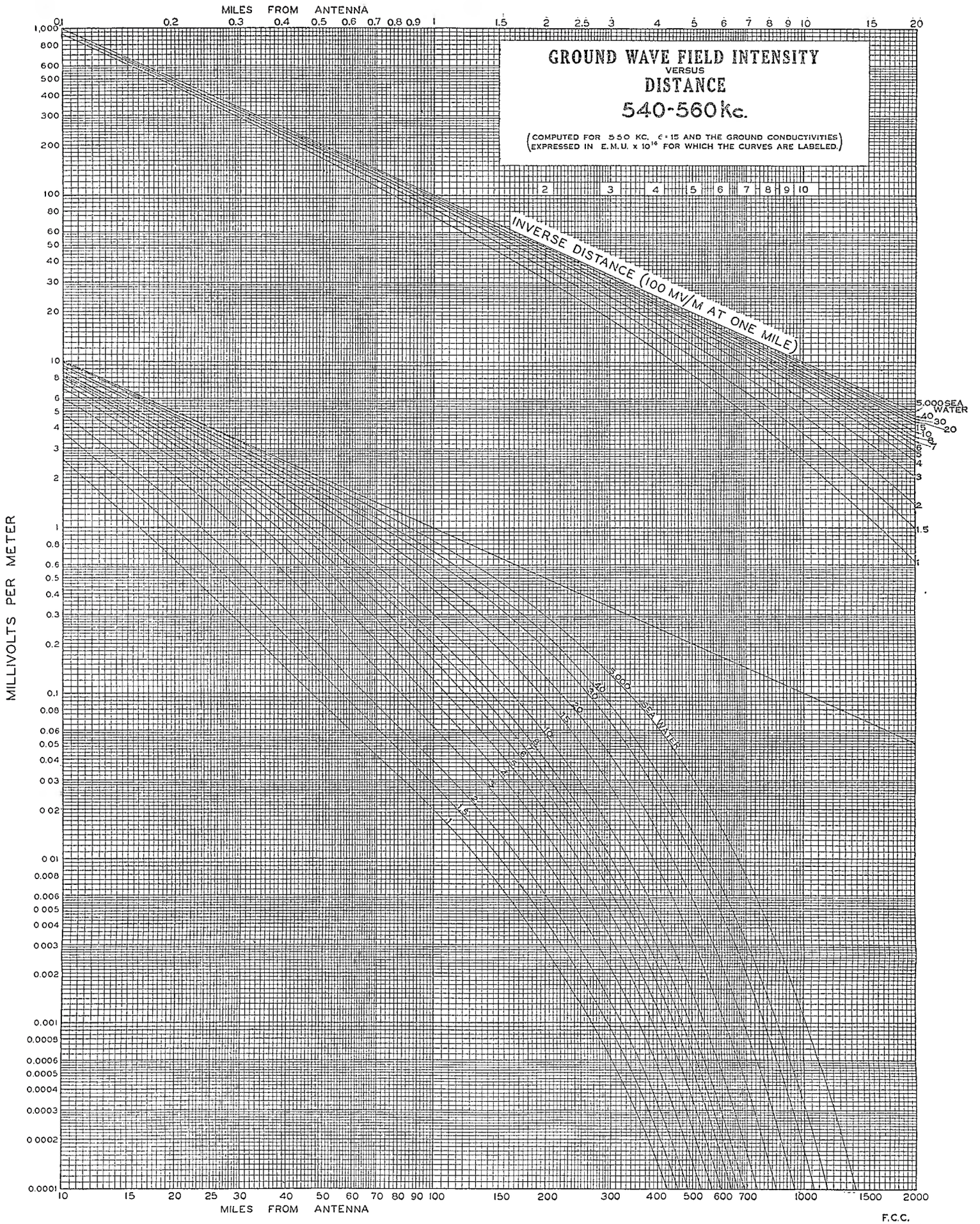
The following shall govern the installation of approved *frequency* and *modulation* monitors at auxiliary transmitters of standard broadcast stations in compliance with these rules:

In case the auxiliary transmitter location is at a site different from that of the main transmitter, an approved *frequency* monitor shall be

RULES RELATING TO EQUIPMENT

RULES RELATING TO TECHNICAL OPERATION

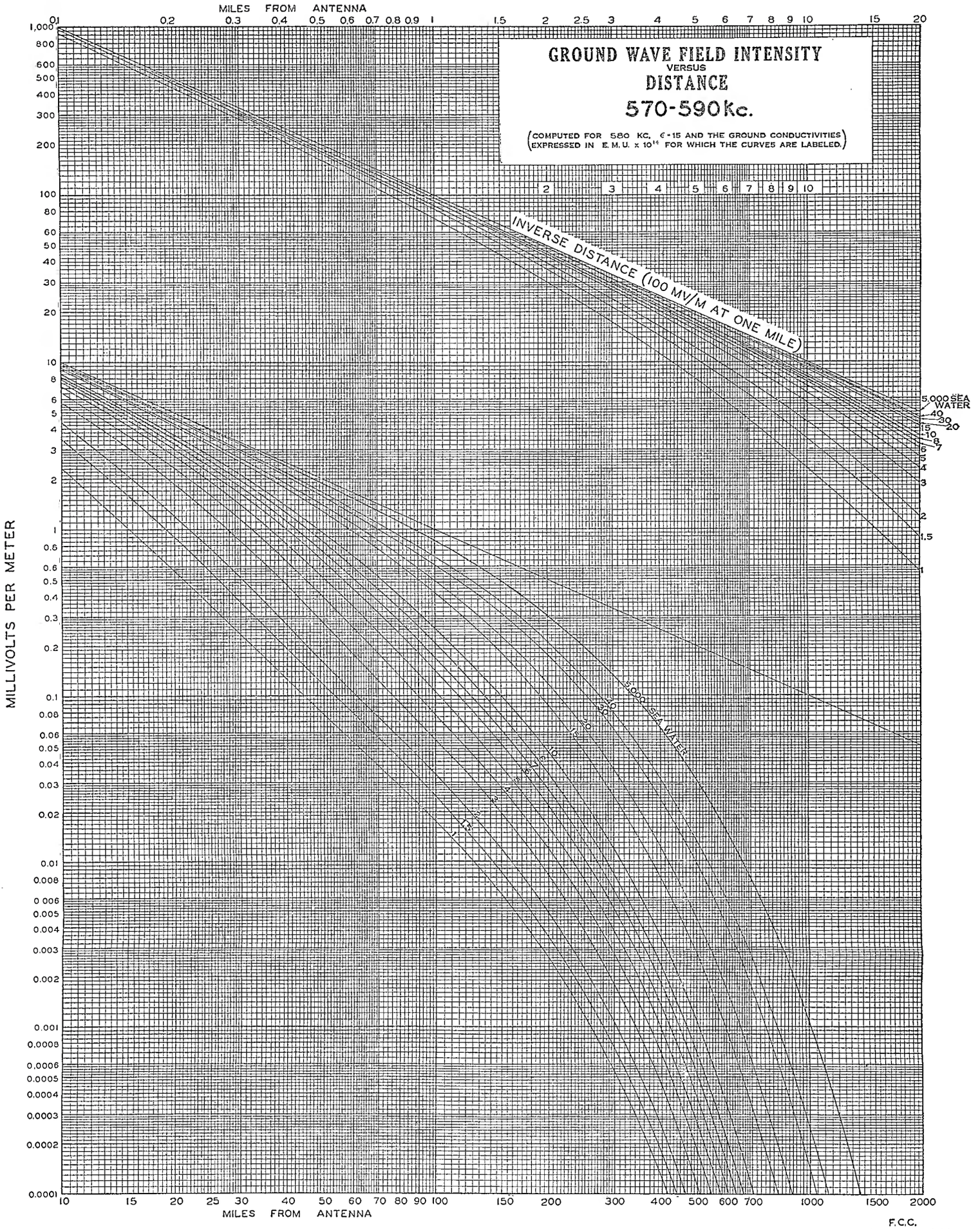
OTHER RULES RELATING TO OPERATION



F.C.C.
JANUARY - 1940

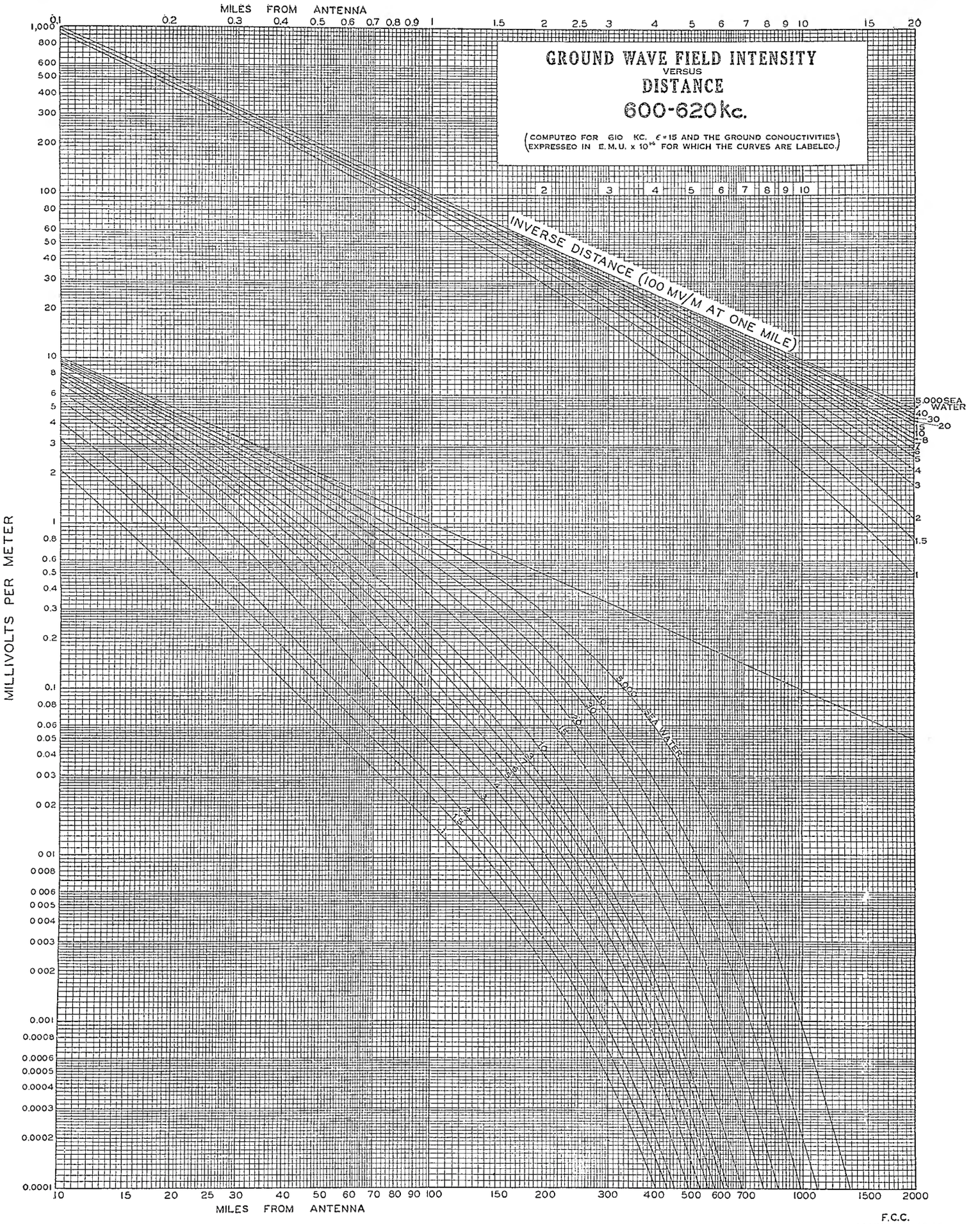
APPENDIX I - GRAPH 1

182092°—42



APPENDIX I - GRAPH 2

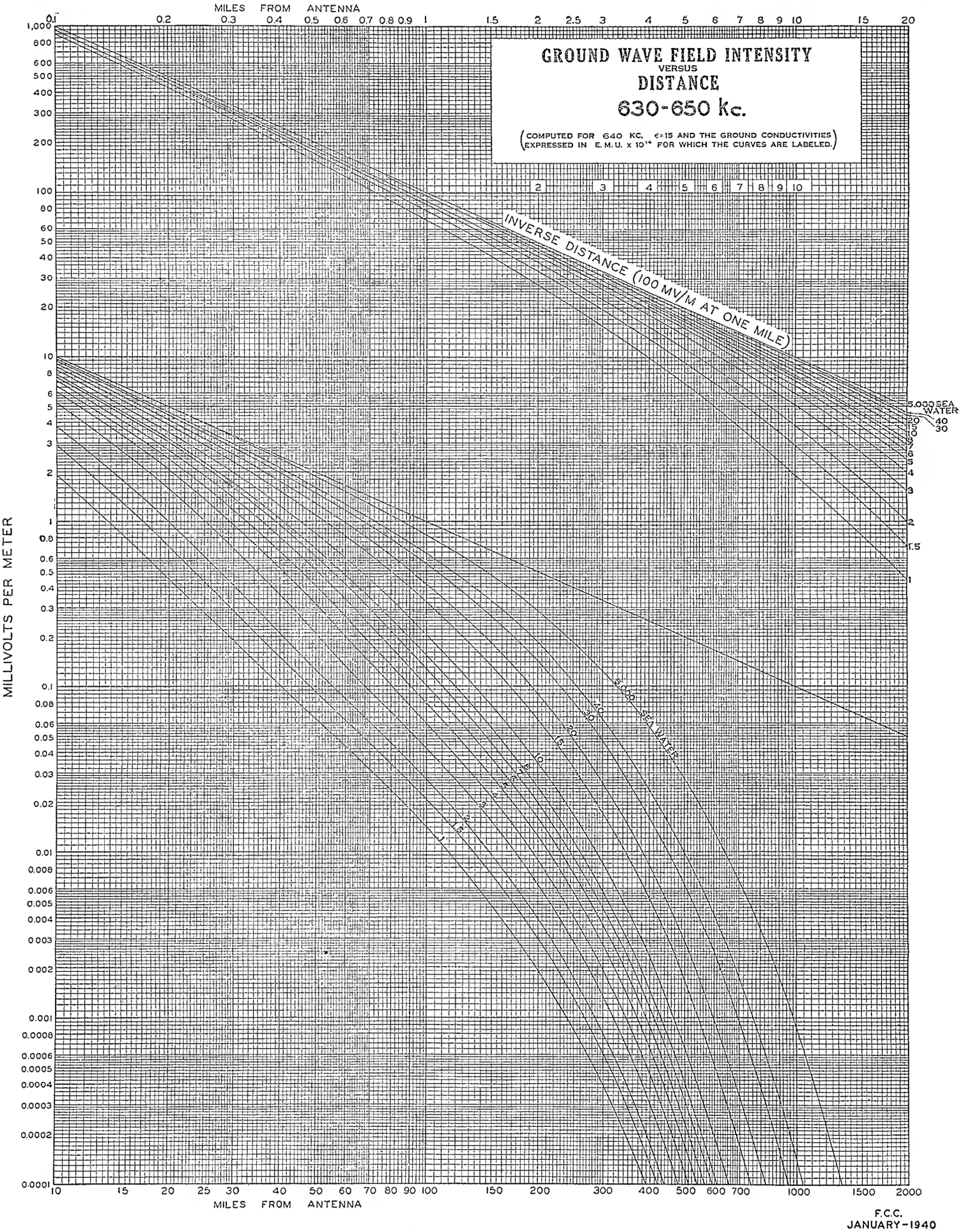
182092°—40



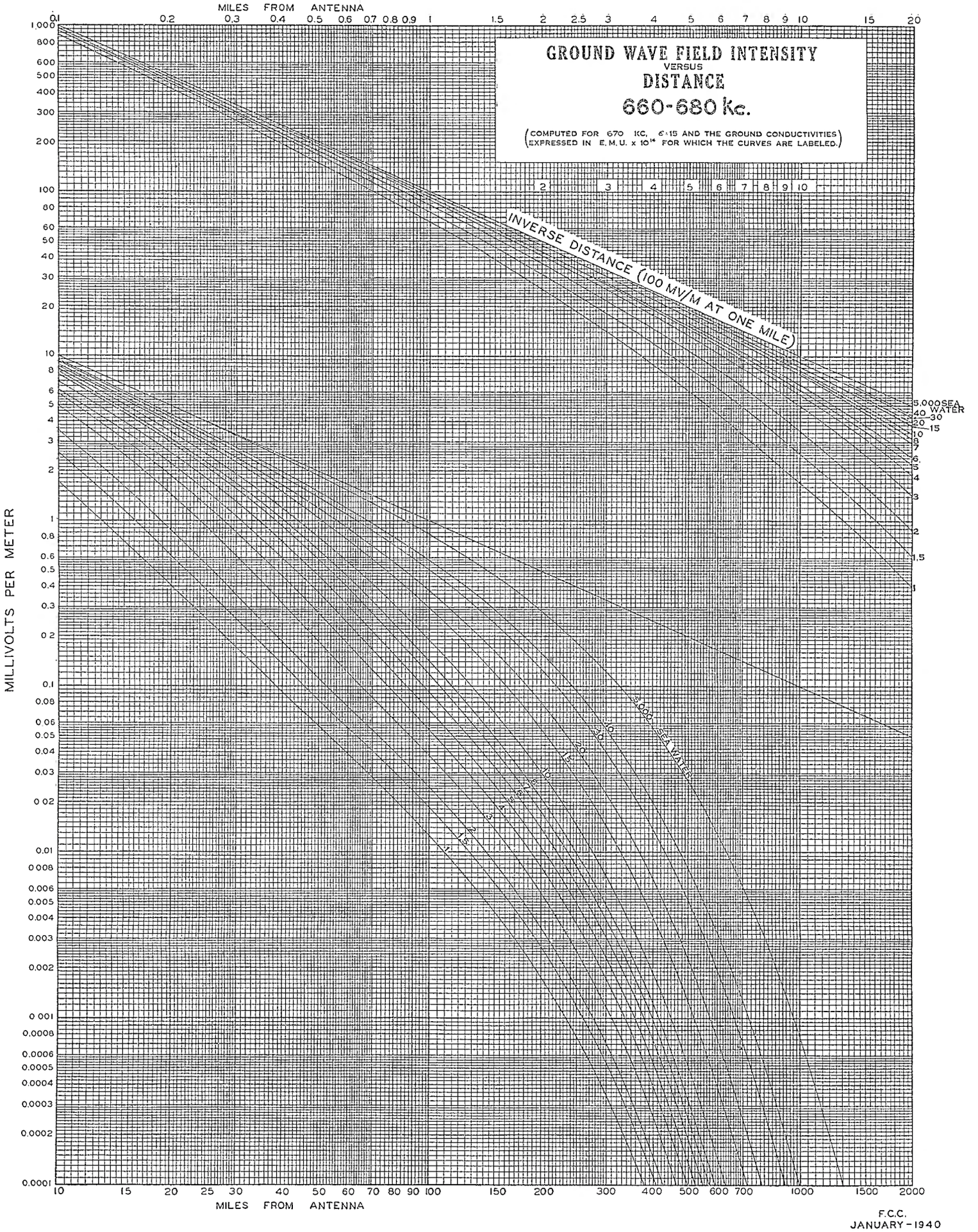
F.C.C.
JANUARY - 1940

APPENDIX I - GRAPH 3

182092°—40

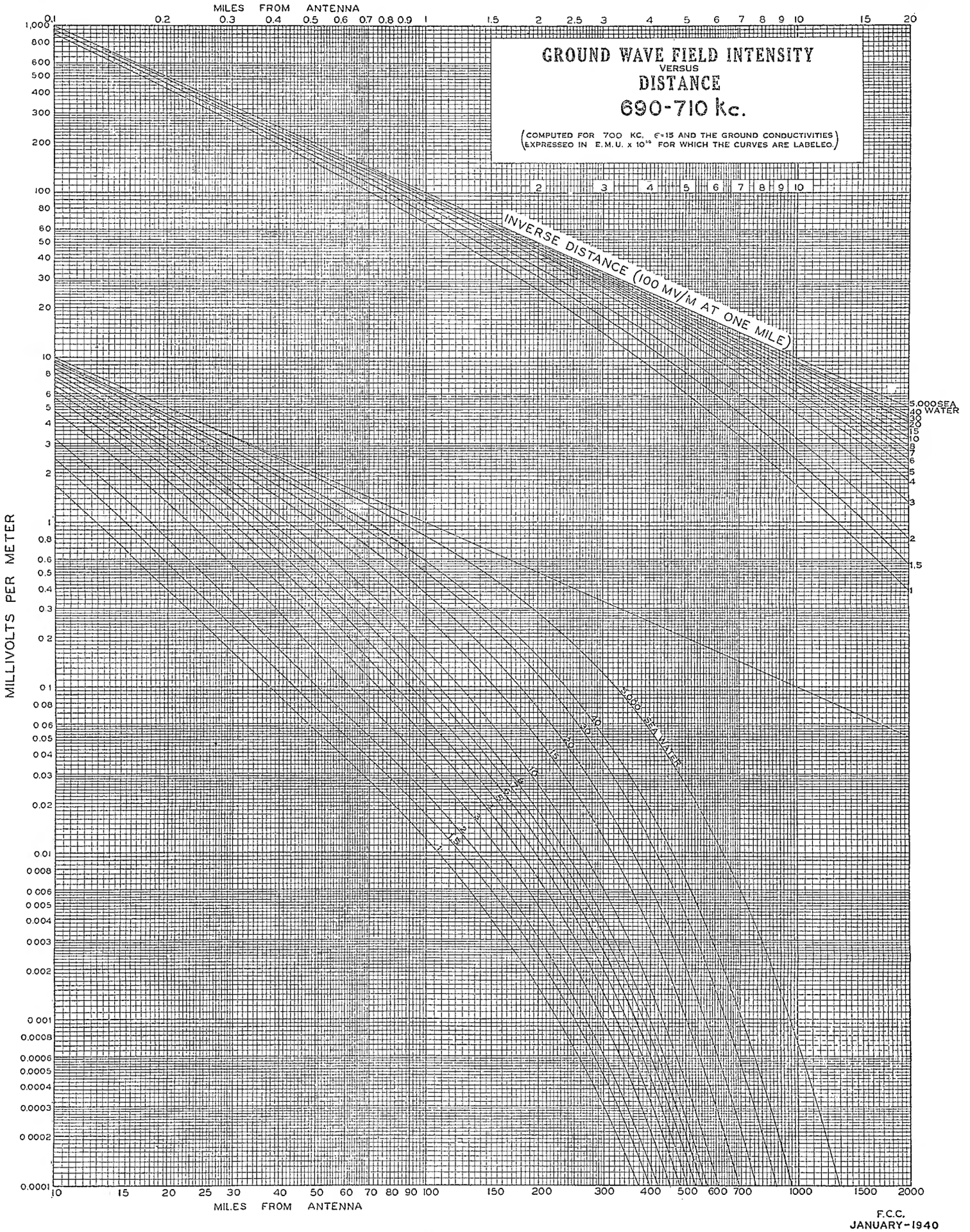


APPENDIX I - GRAPH 4

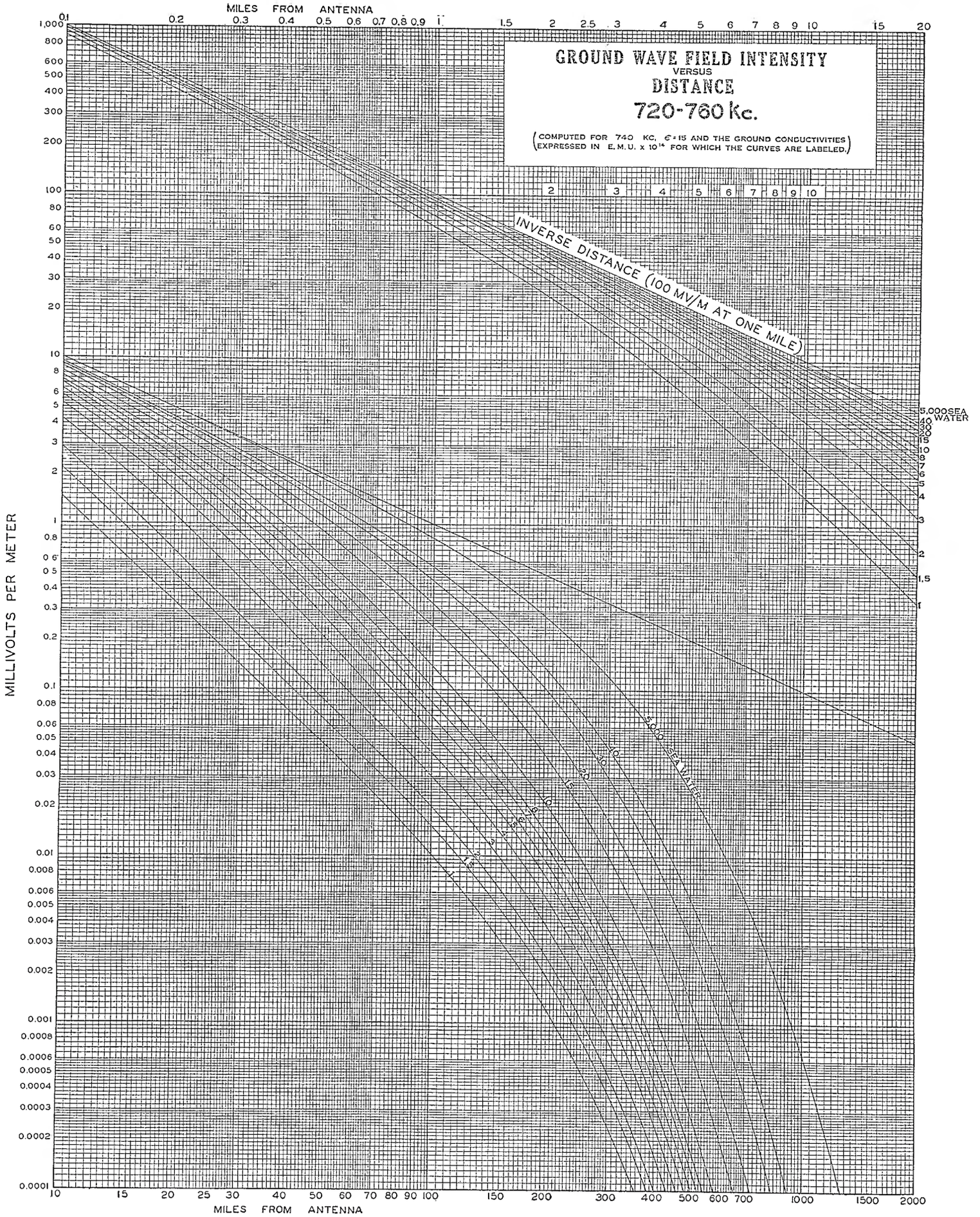


APPENDIX I - GRAPH 5

182092°—40



APPENDIX I - GRAPH 6



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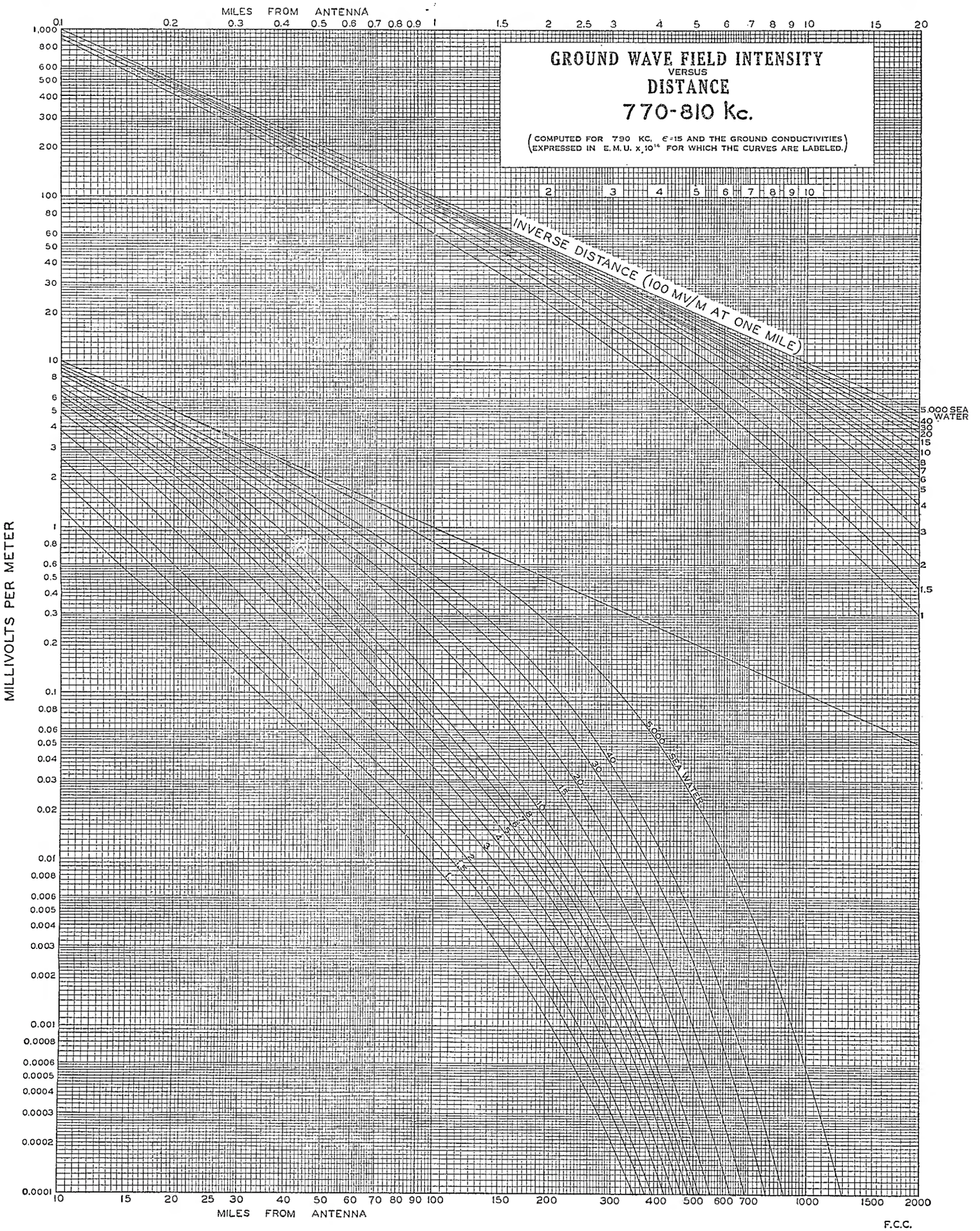
JANUARY - 1940

APPENDIX I - GRAPH 7

182092°—40



APPENDIX I - GRAPH 8

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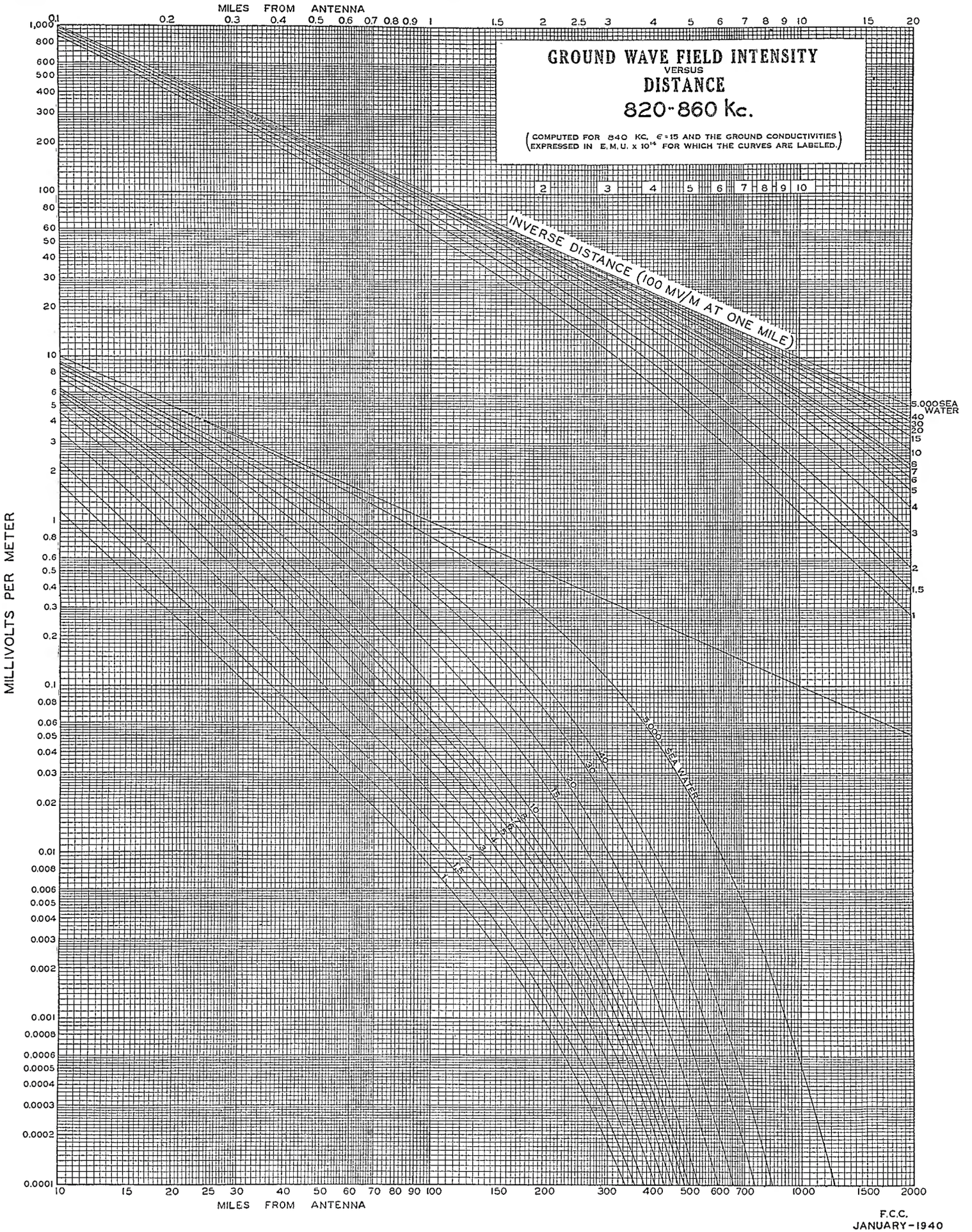
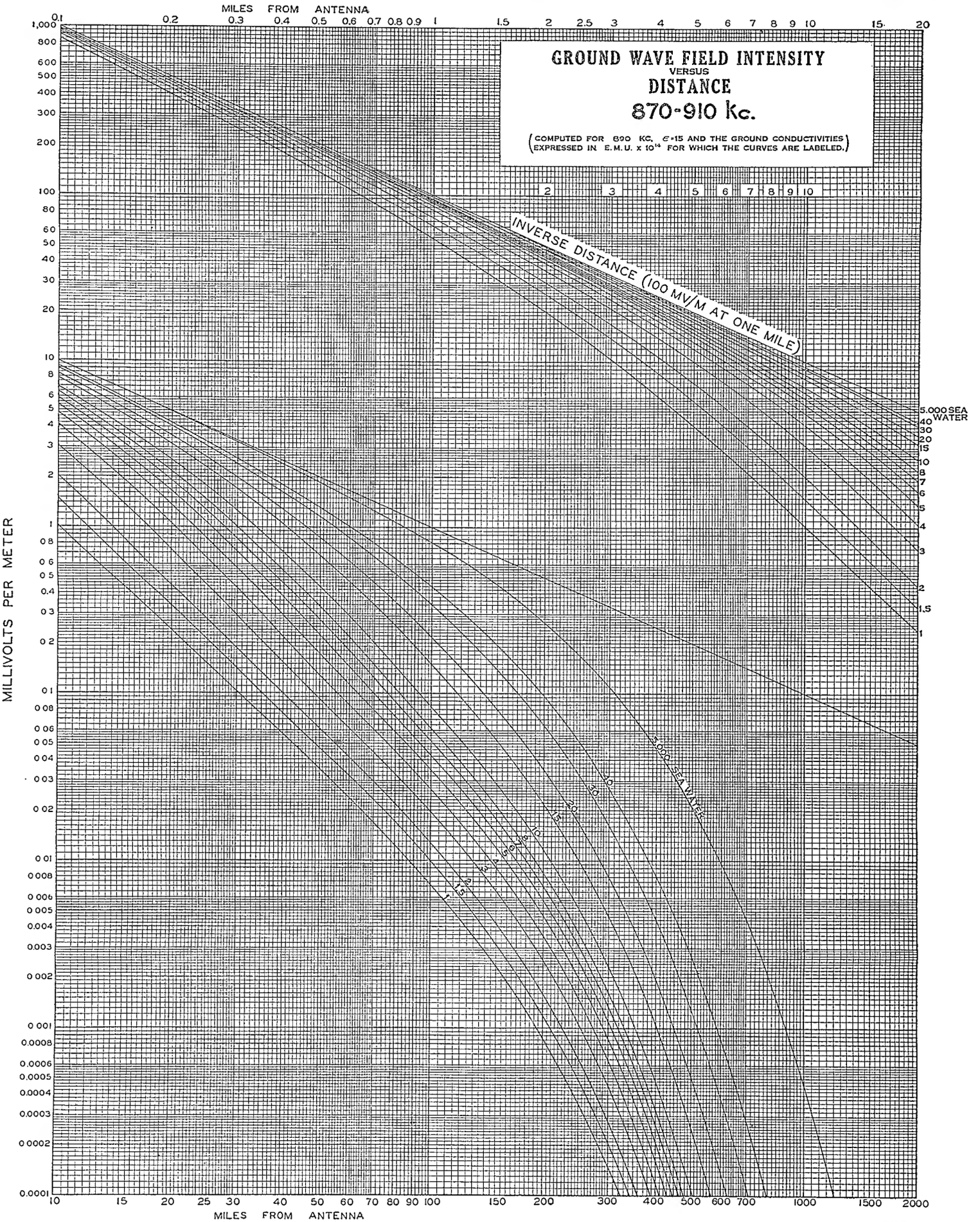
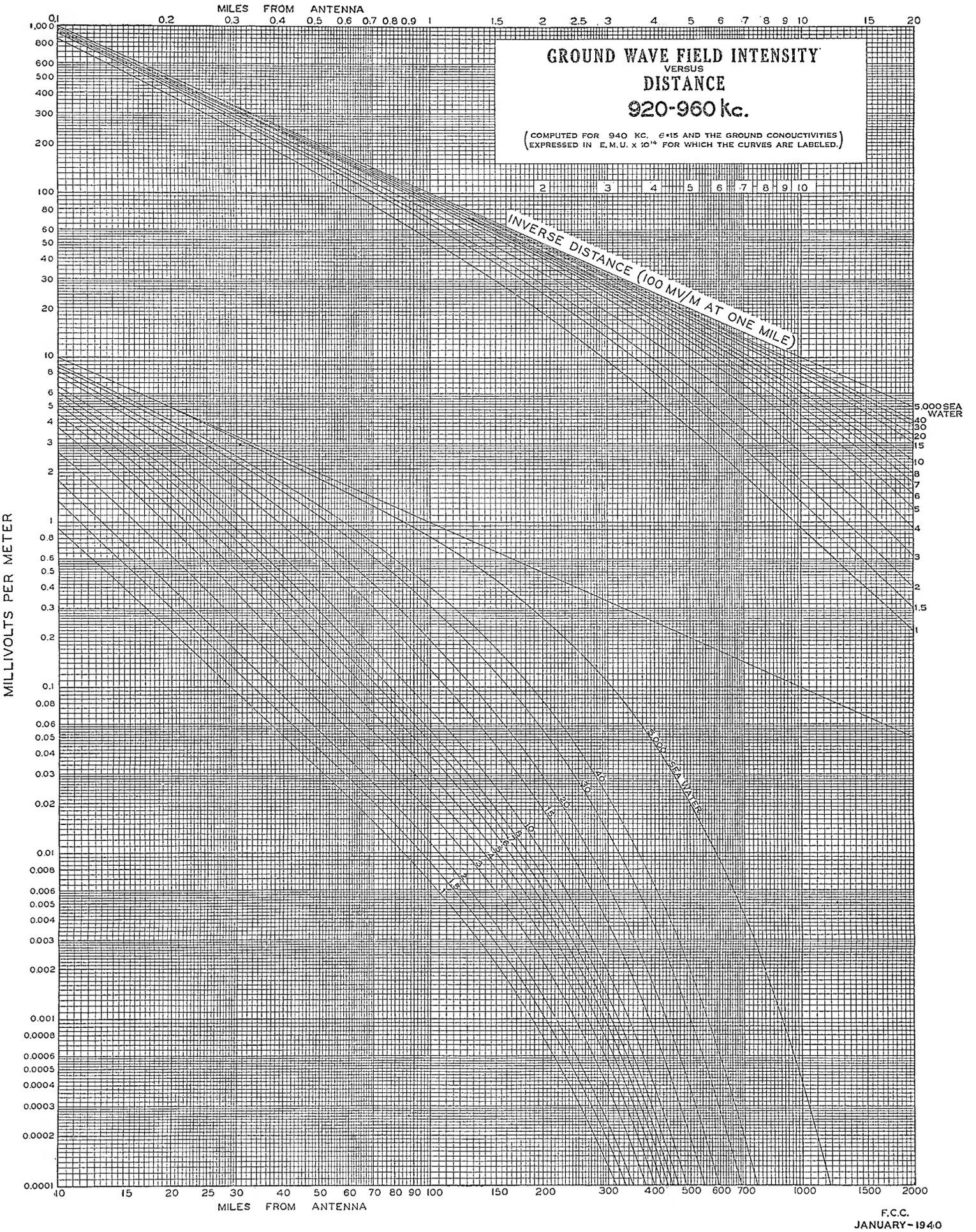


APPENDIX I - GRAPH 9



F.C.C.
JANUARY-1940

APPENDIX I - GRAPH 10



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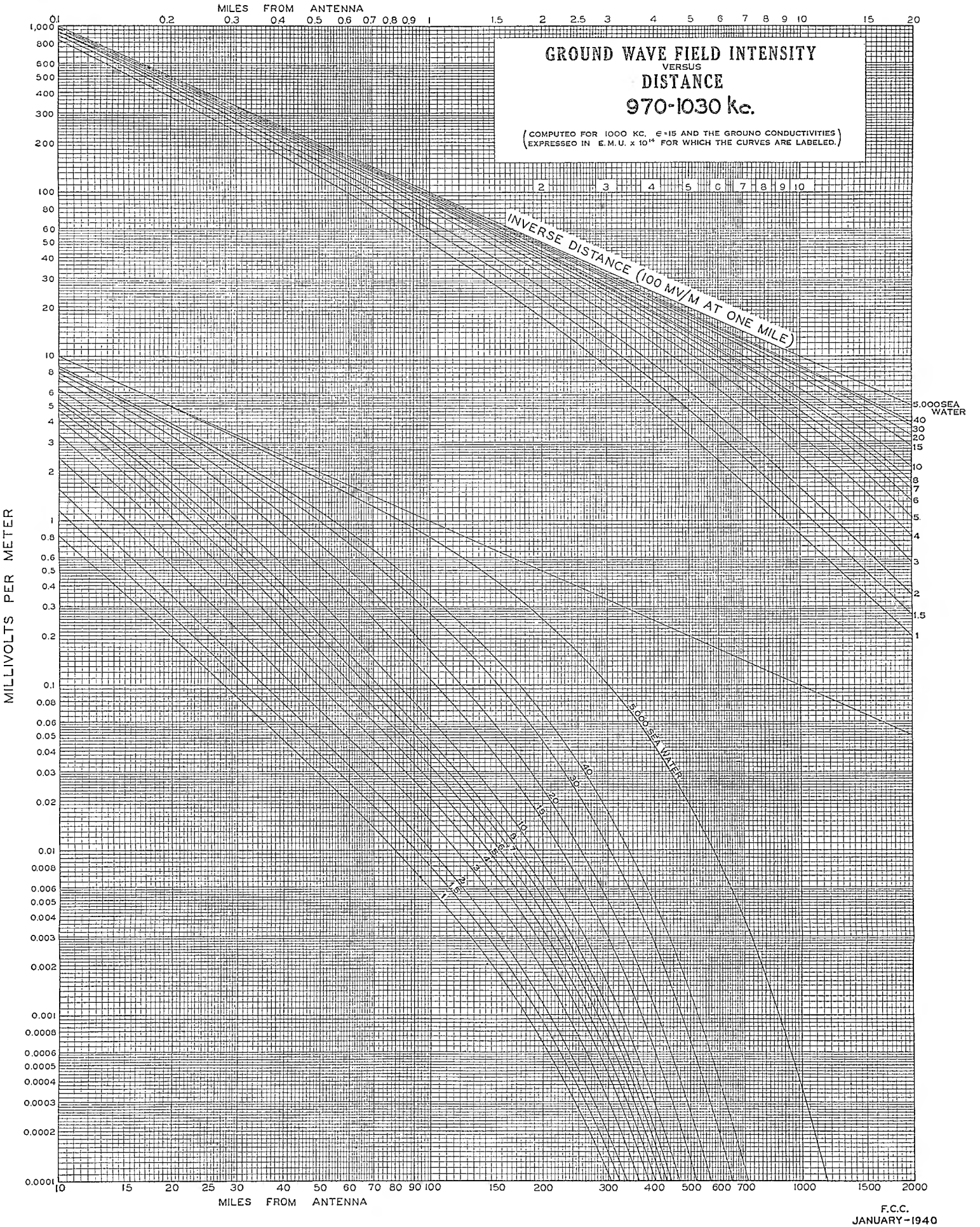
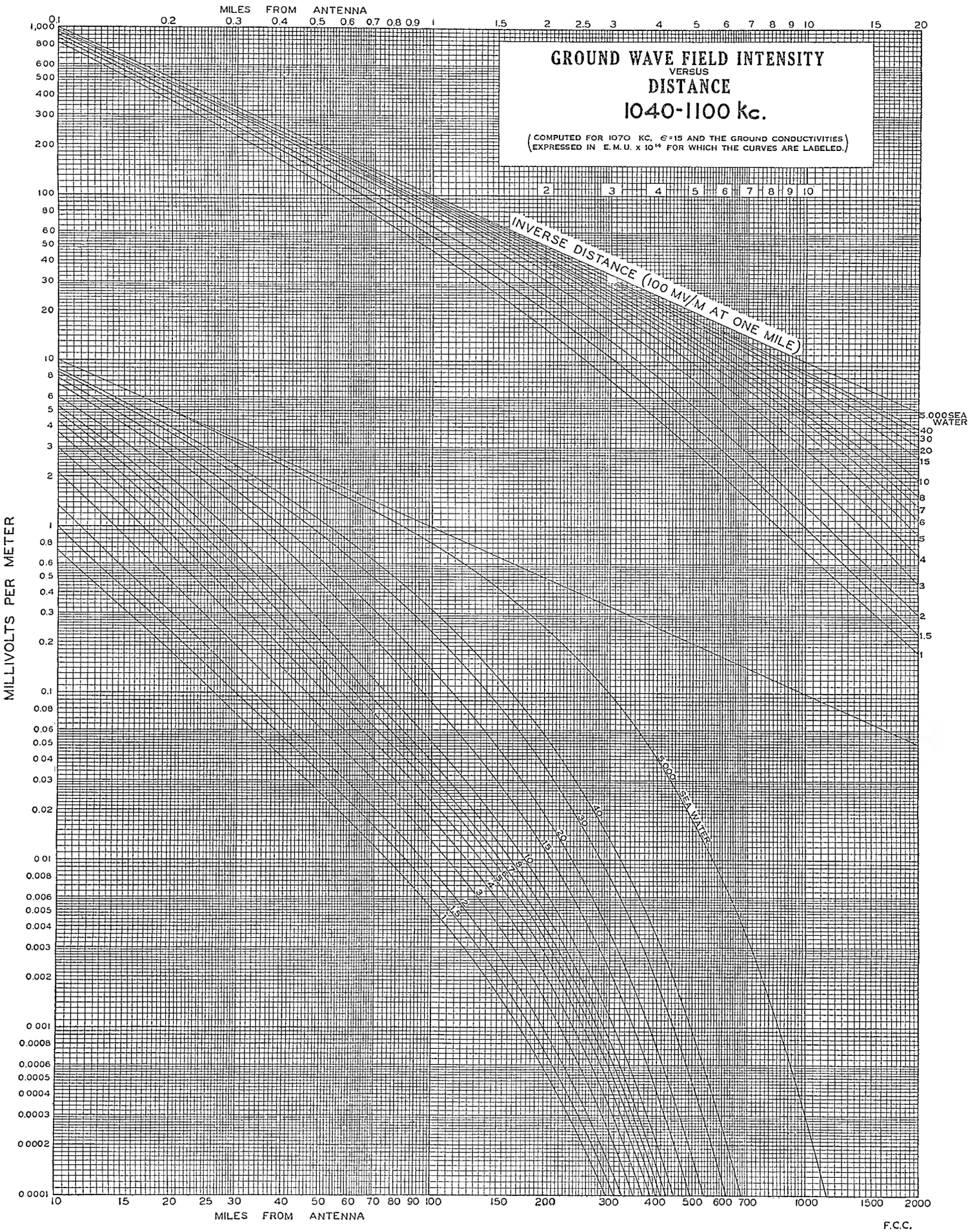
JANUARY-1940

APPENDIX I - GRAPH 11



APPENDIX I - GRAPH 12



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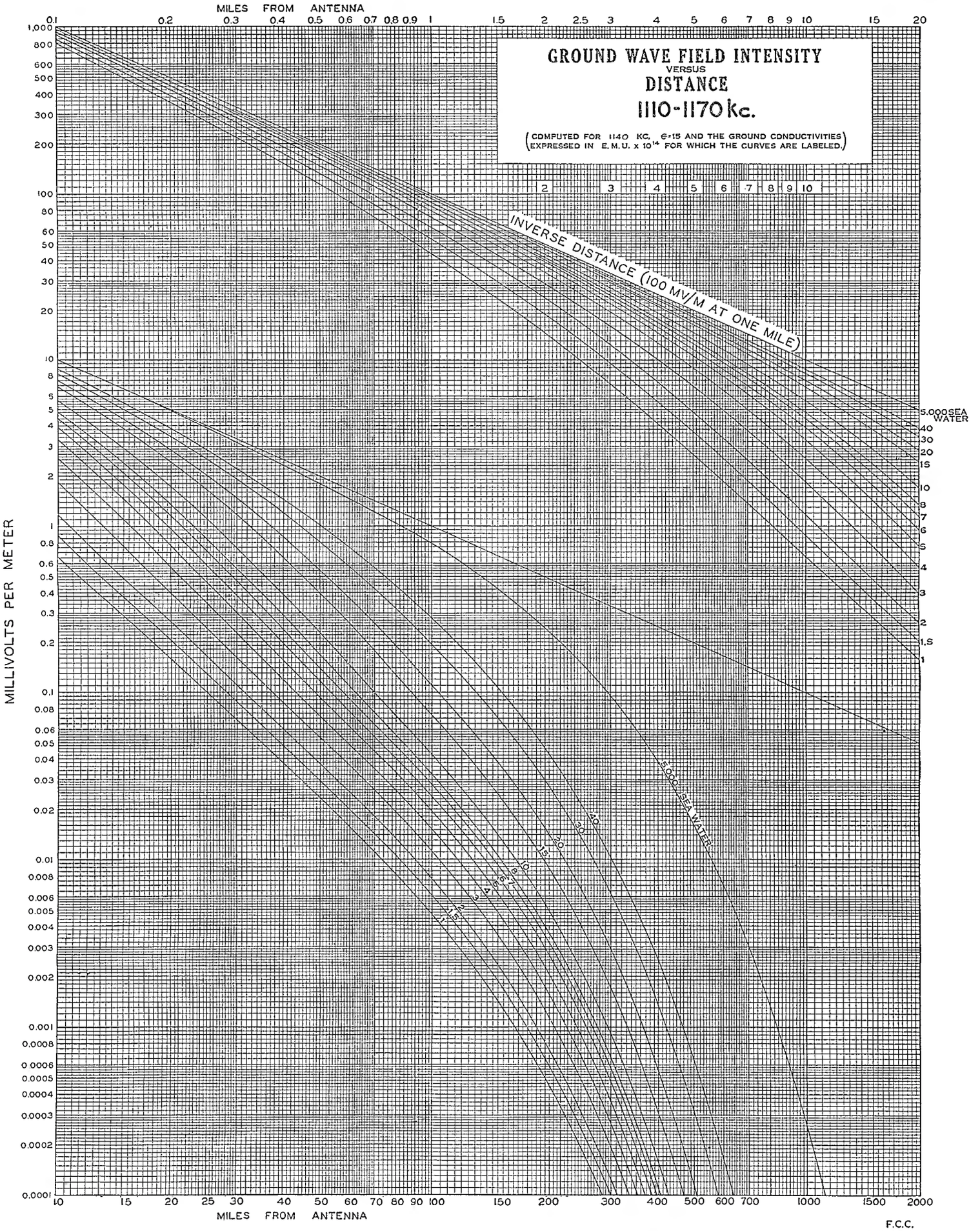
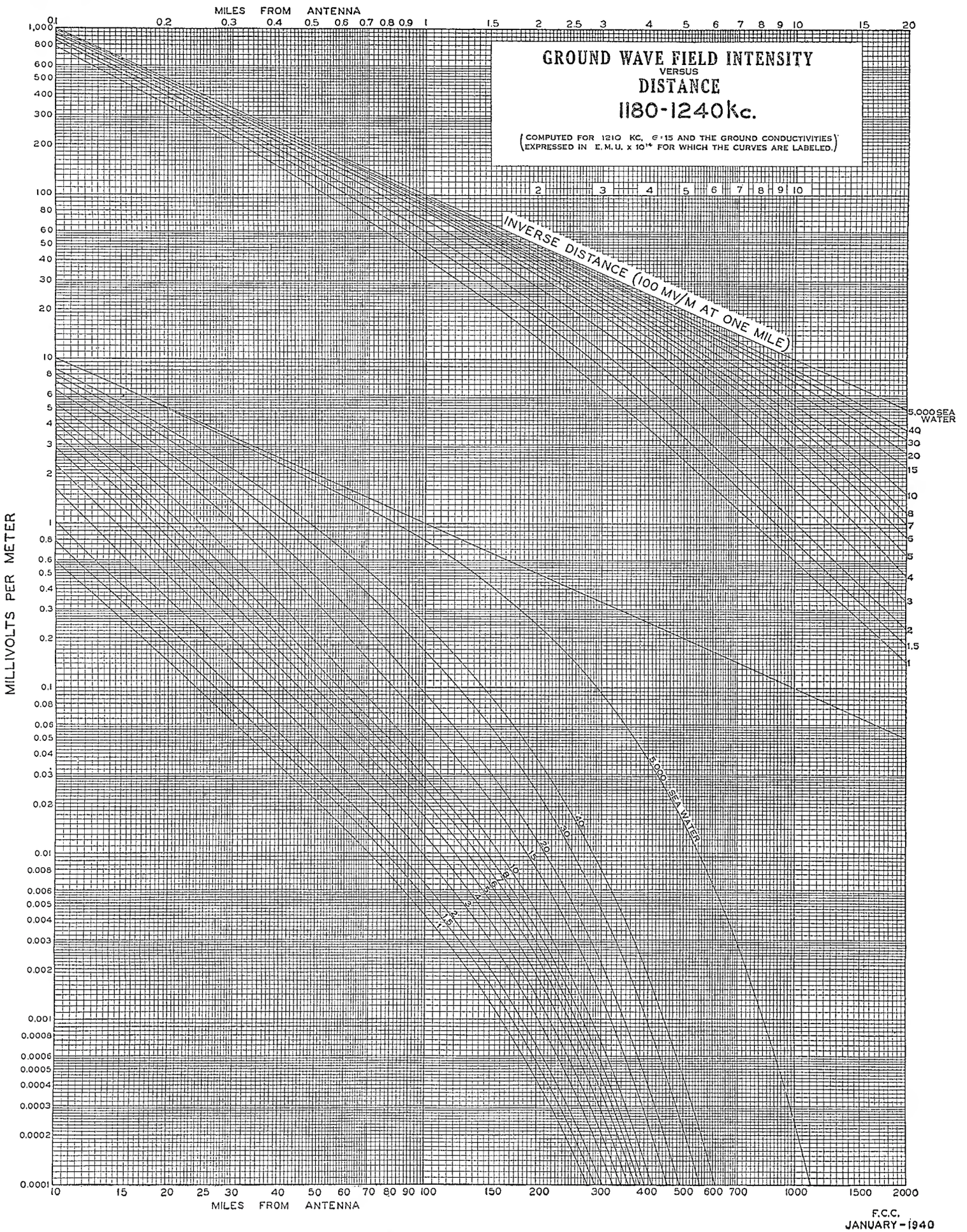
JANUARY-1940

APPENDIX I - GRAPH 13

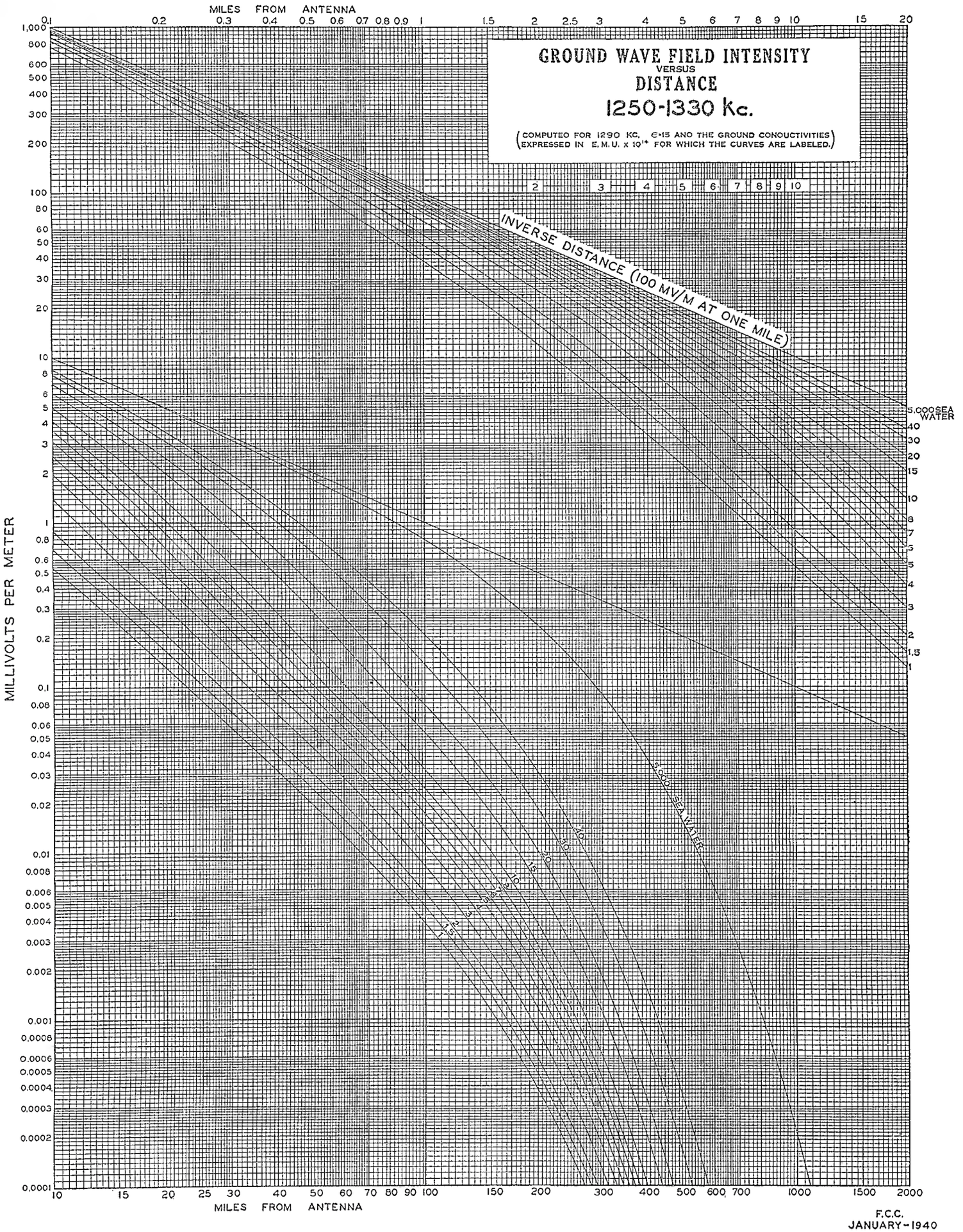
182092°—40



APPENDIX I - GRAPH 14



APPENDIX I - GRAPH 15



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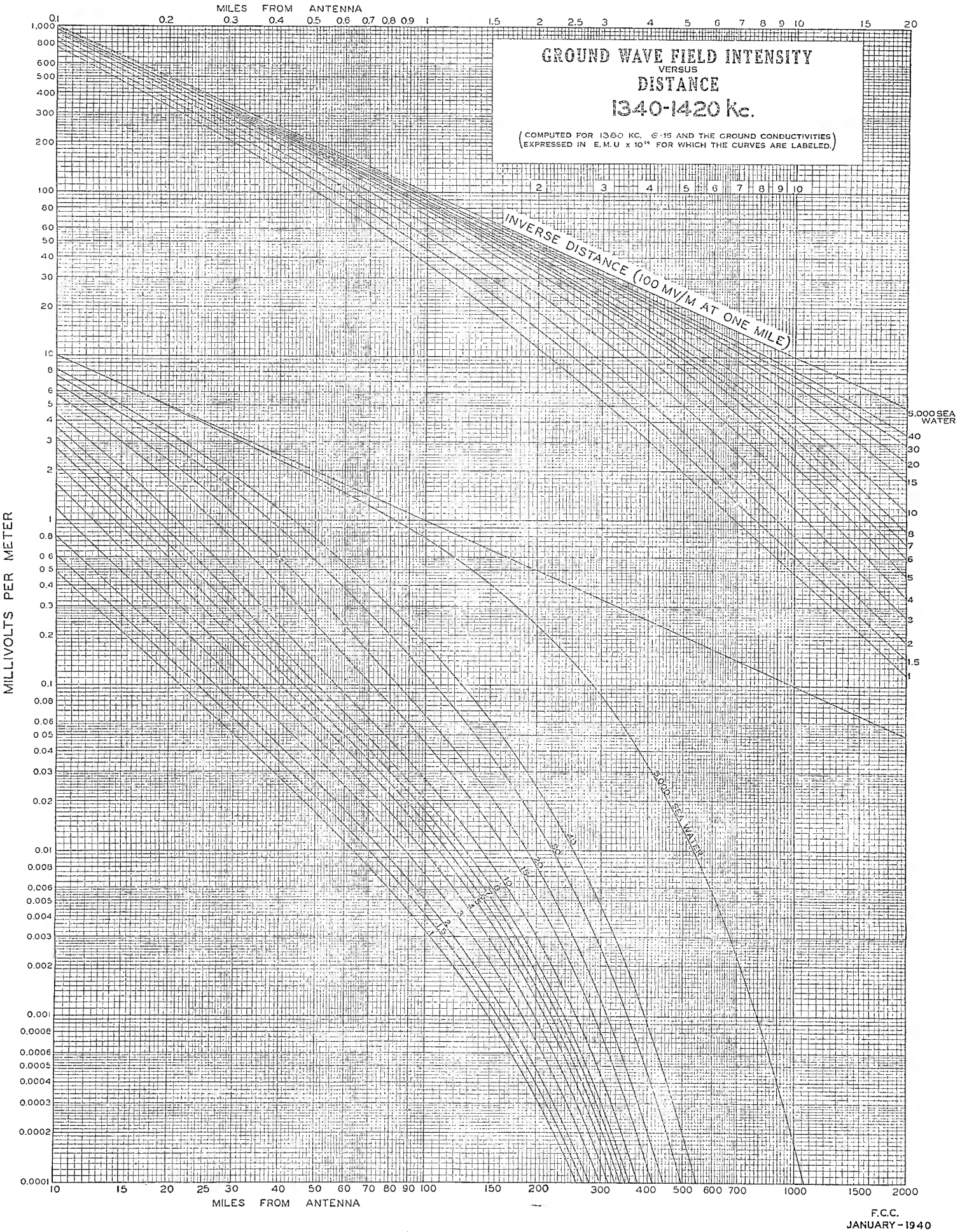
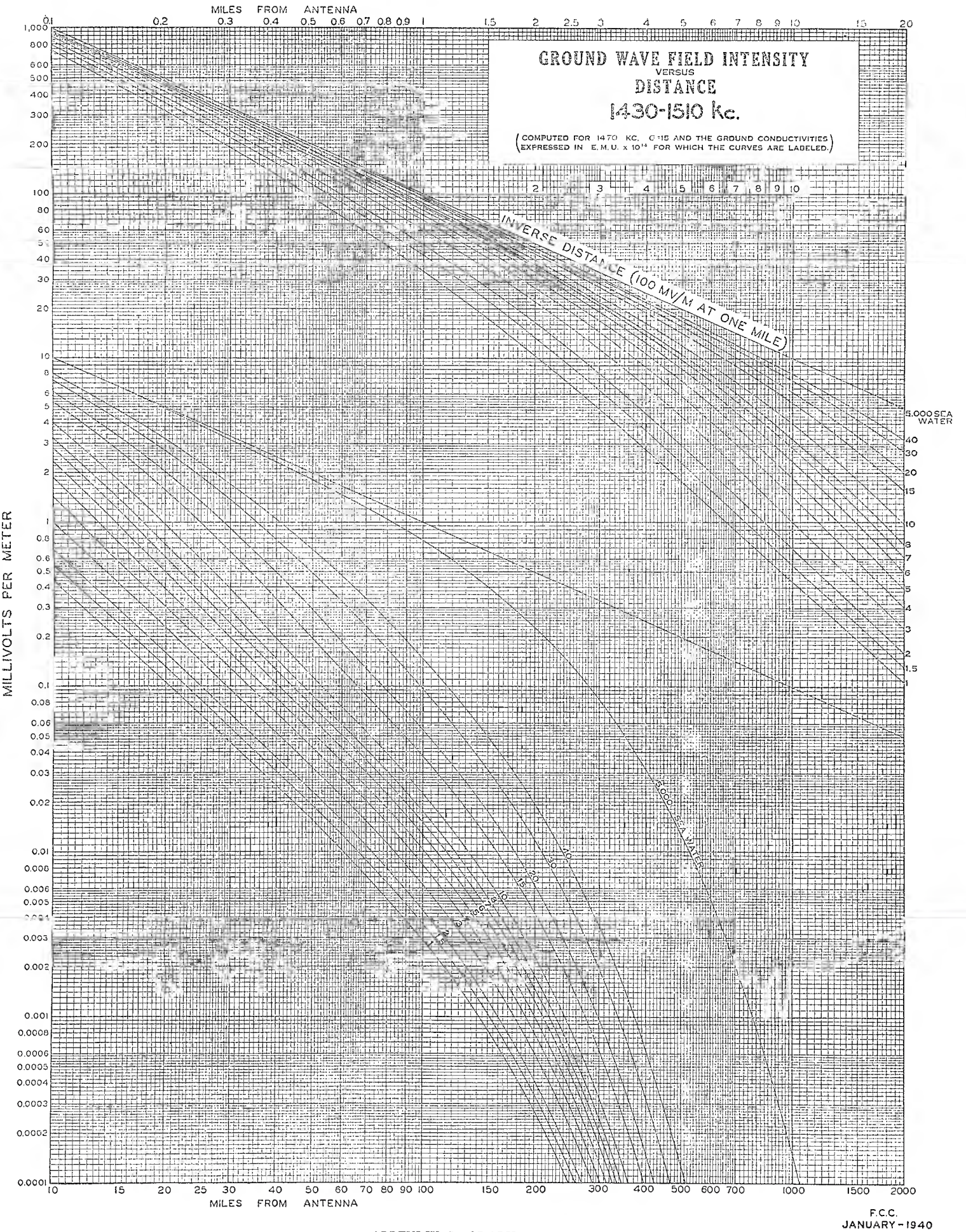
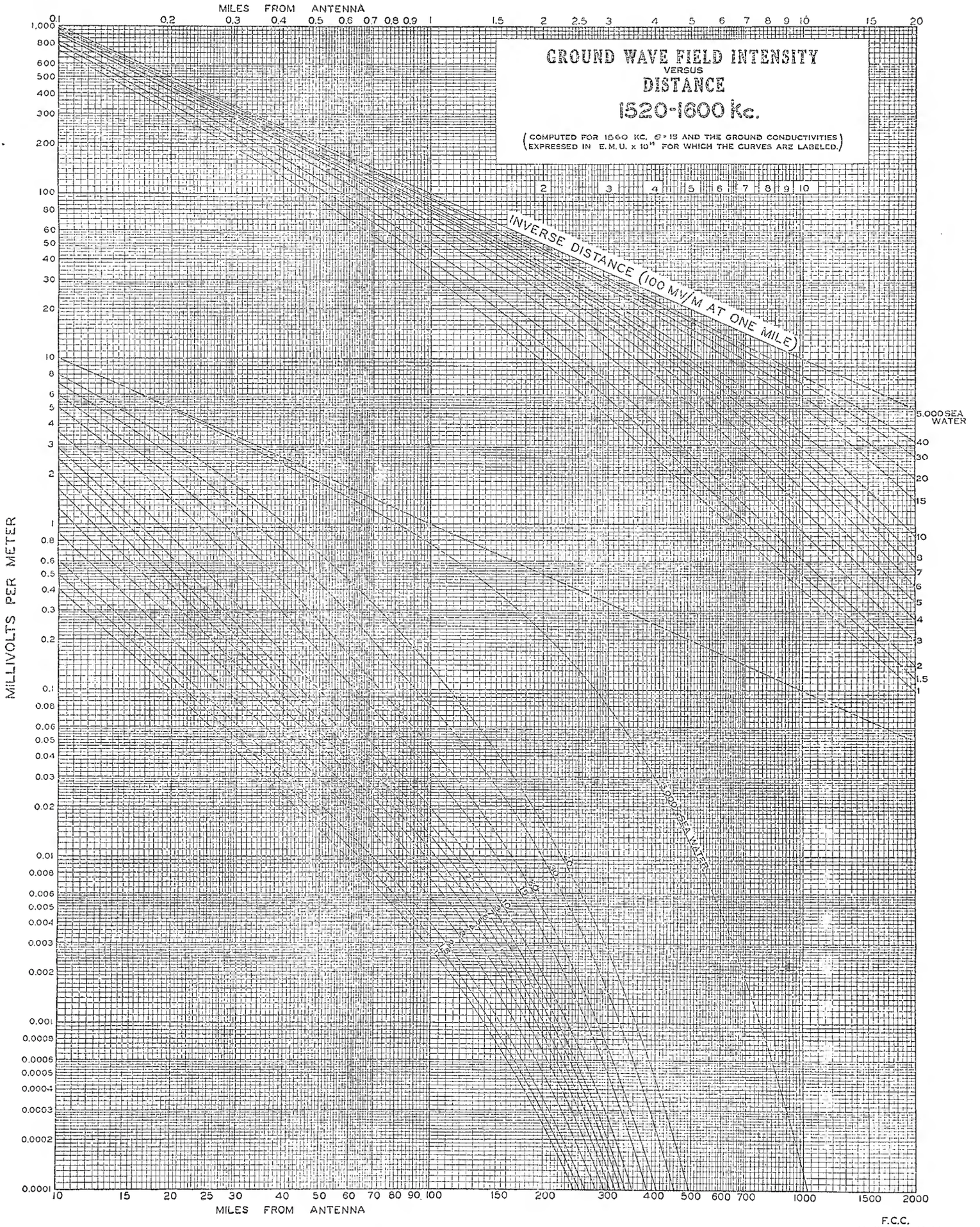


APPENDIX I - GRAPH 17



APPENDIX I - GRAPH 18



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JANUARY-1940

APPENDIX I - GRAPH 19

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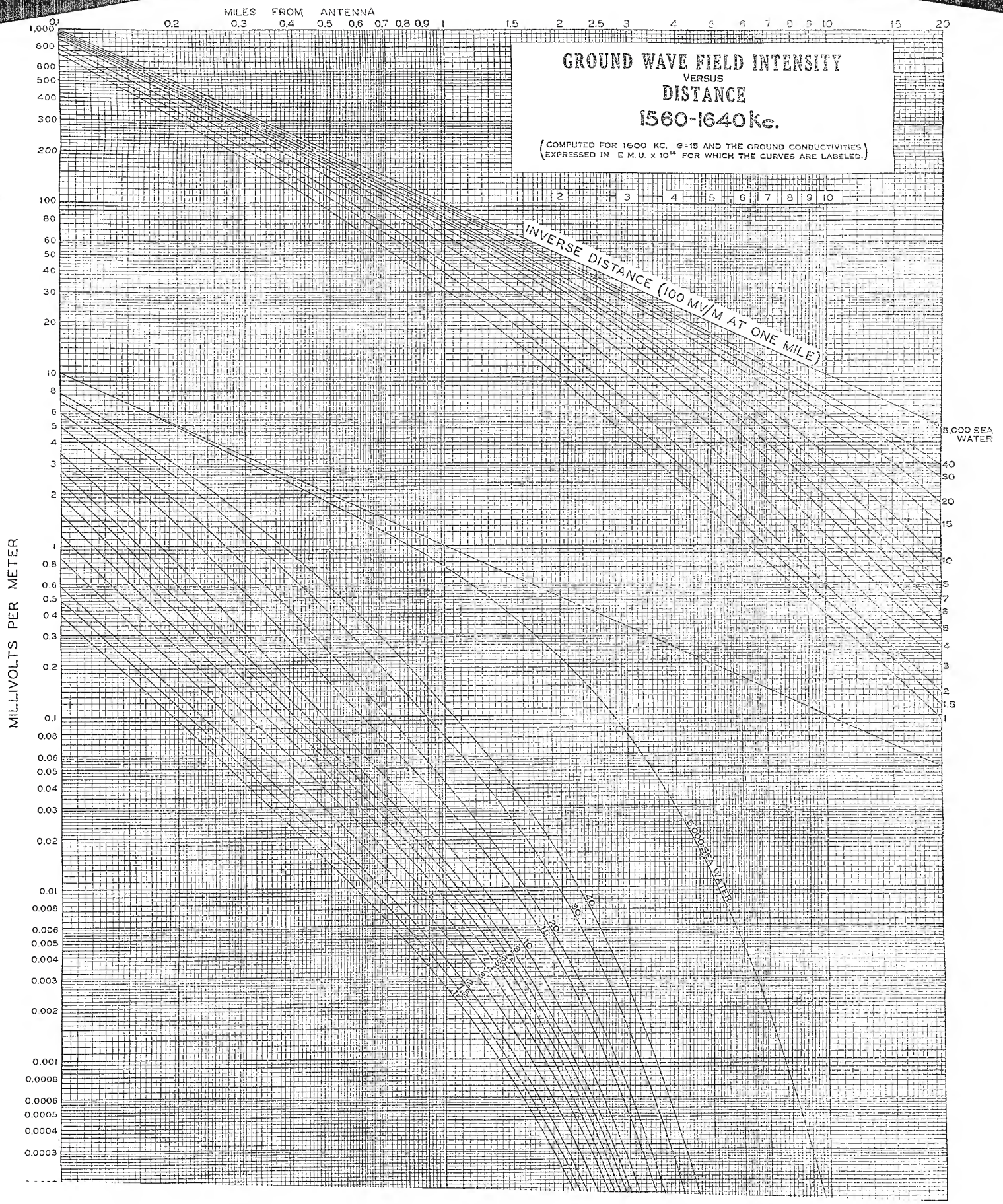
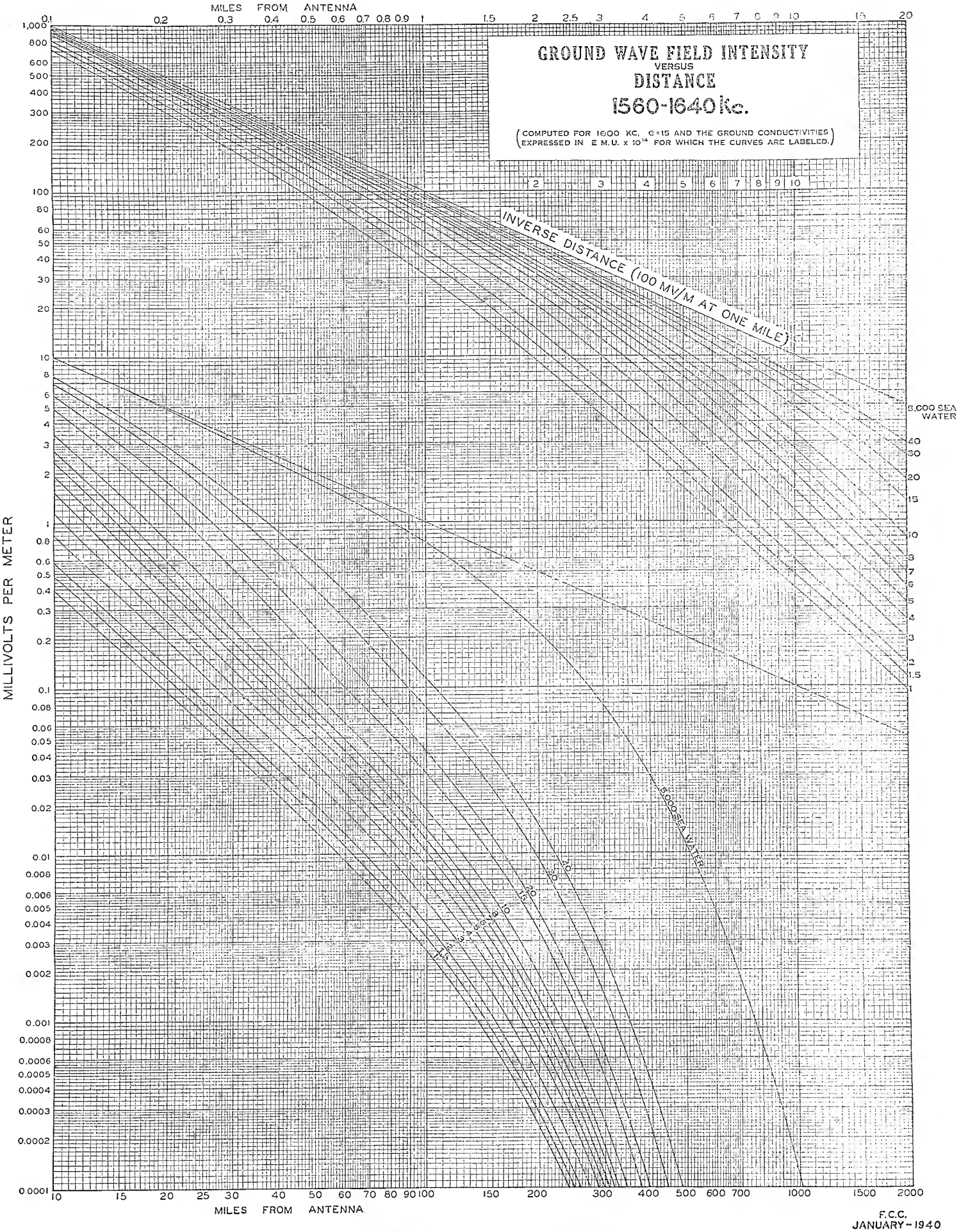

GROUND WAVE FIELD INTENSITY
VERSUS
DISTANCE
1560-1640 Kc.
(COMPUTED FOR 1600 KC. G=15 AND THE GROUND CONDUCTIVITIES EXPRESSED IN E M.U. x 10^14 FOR WHICH THE CURVES ARE LABELED.)
MILES FROM ANTENNA
MILLIVOLTS PER METER
INVERSE DISTANCE (100 MV/M AT ONE MILE)
5,000 SEA WATER
5000 SEA WATER
40
30
20
15
10
7
6
5
4
3
2
1.5
1



APPENDIX I - GRAPH 20

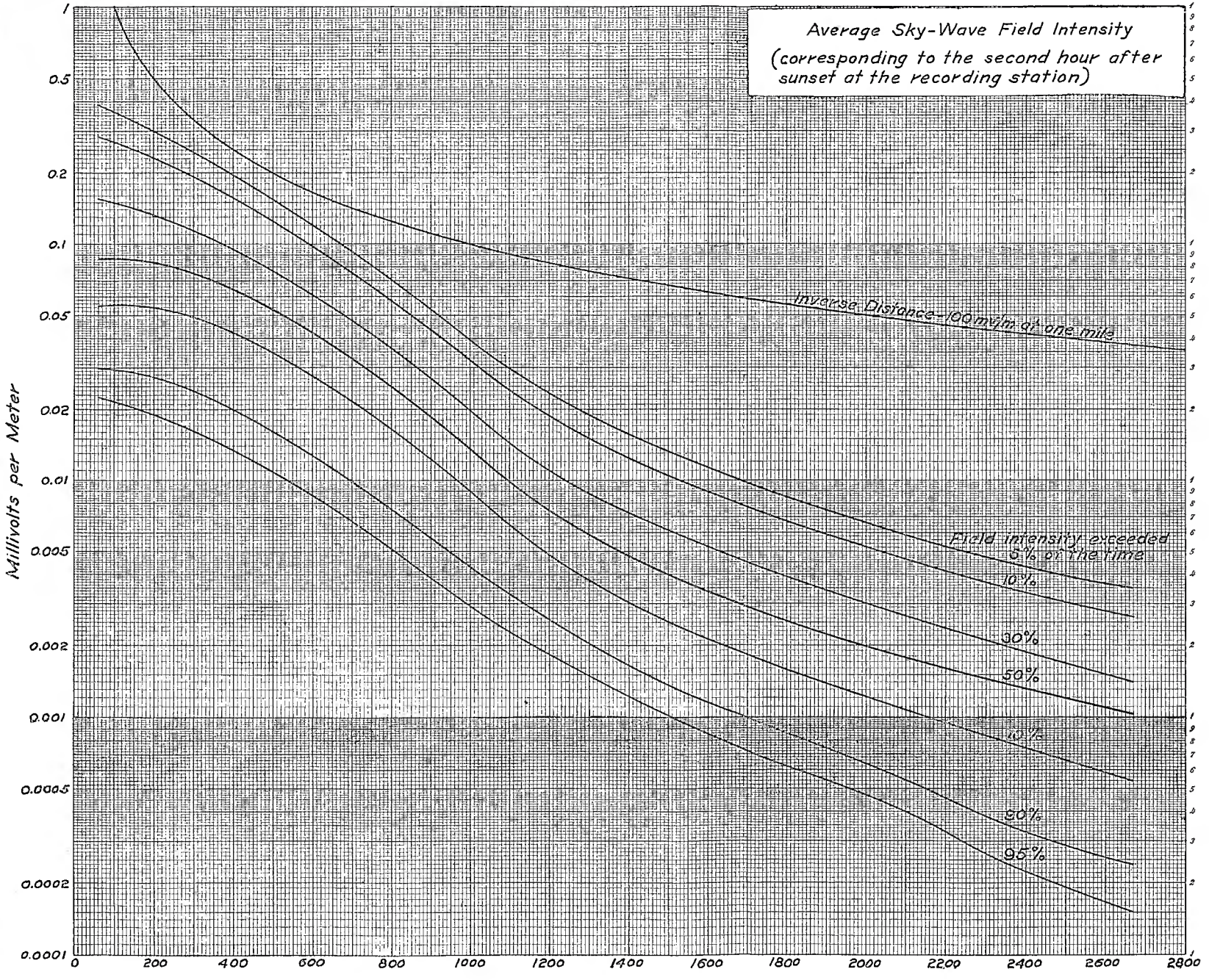


Figure 1

These curves are not considered to be sufficiently accurate for practical use for distances less than approximately 250 miles.

(Follows p. 89)

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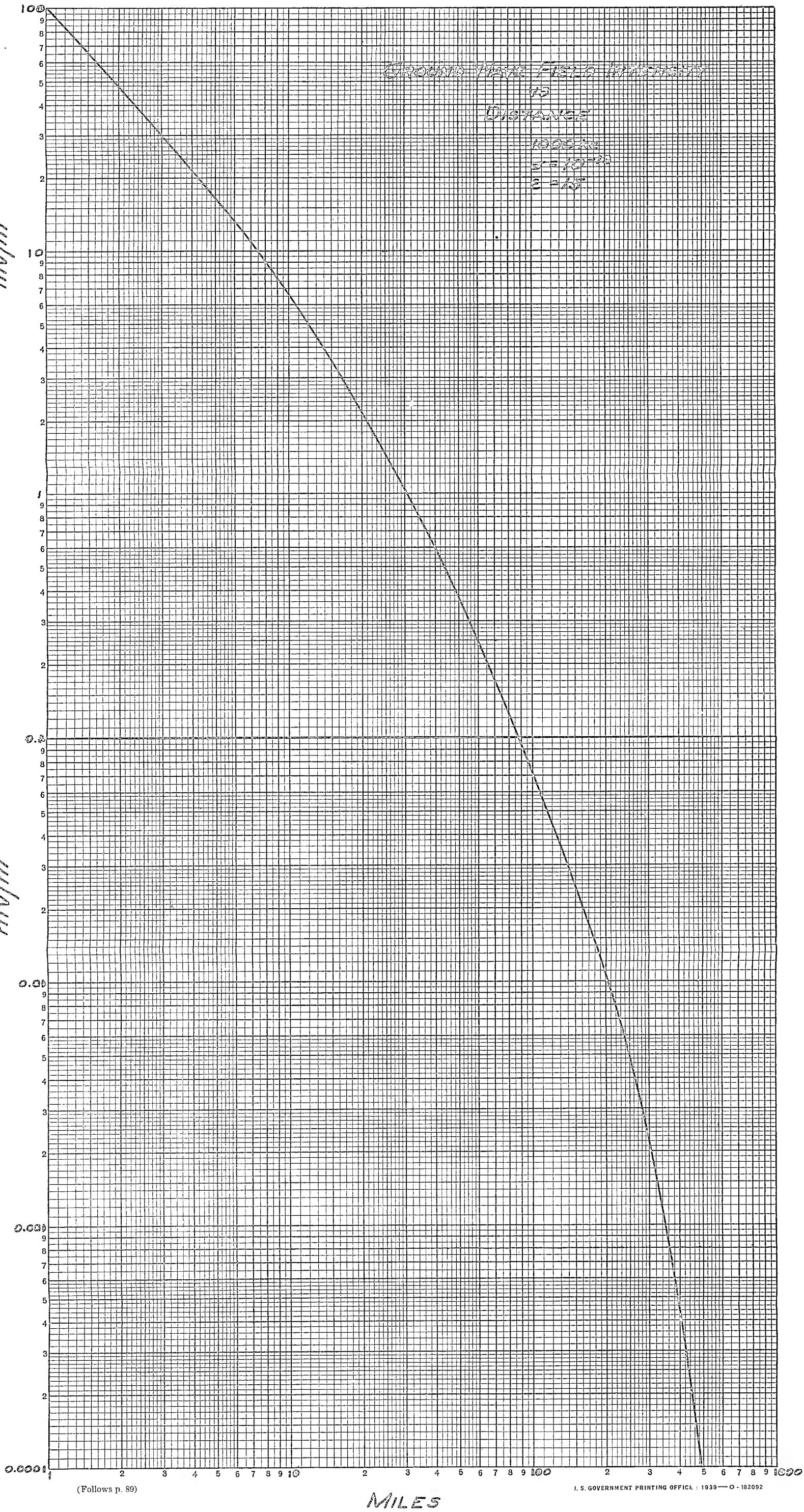

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Fig. 2

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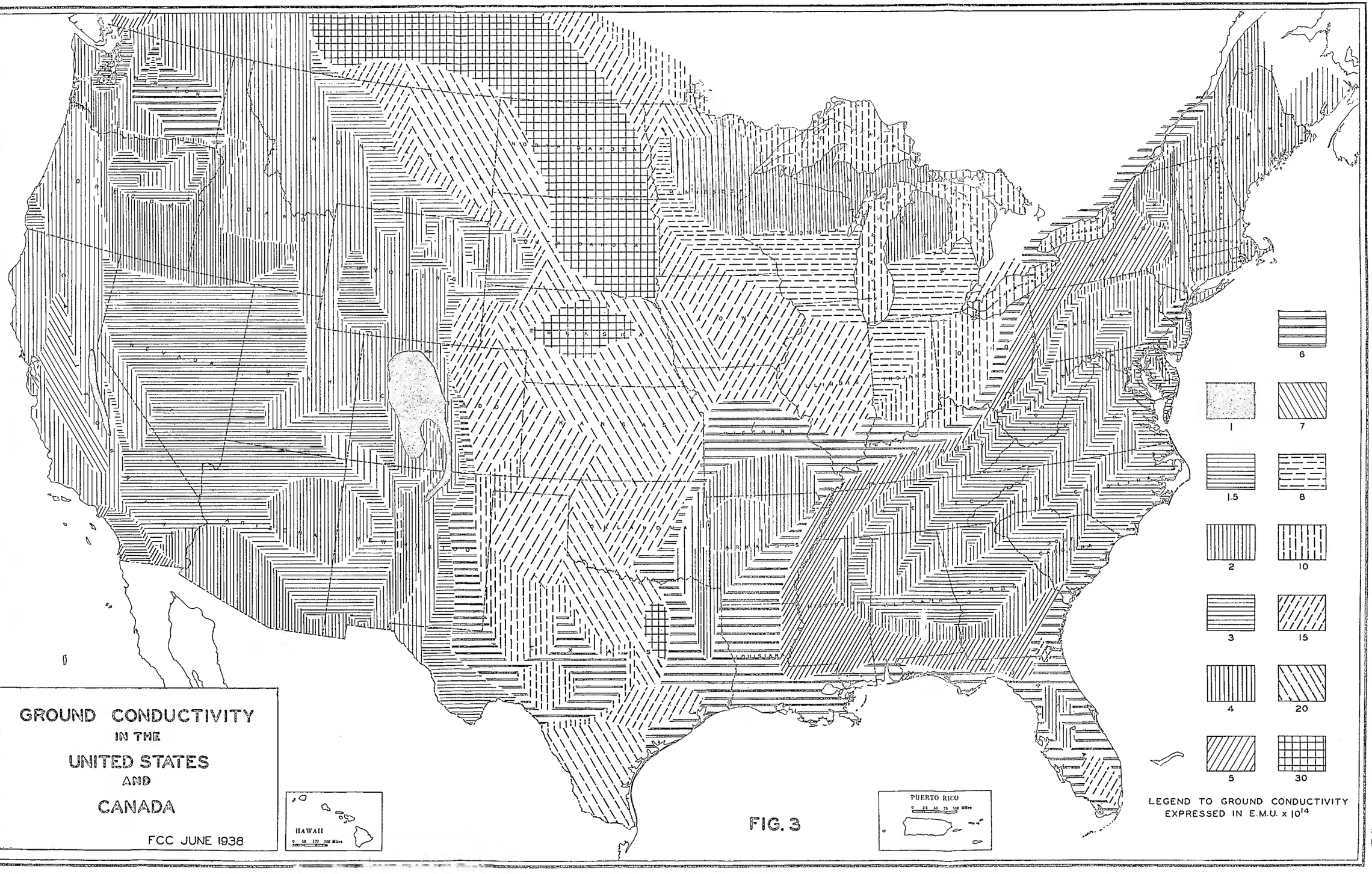

FIG. 3

(Follows p. 89)

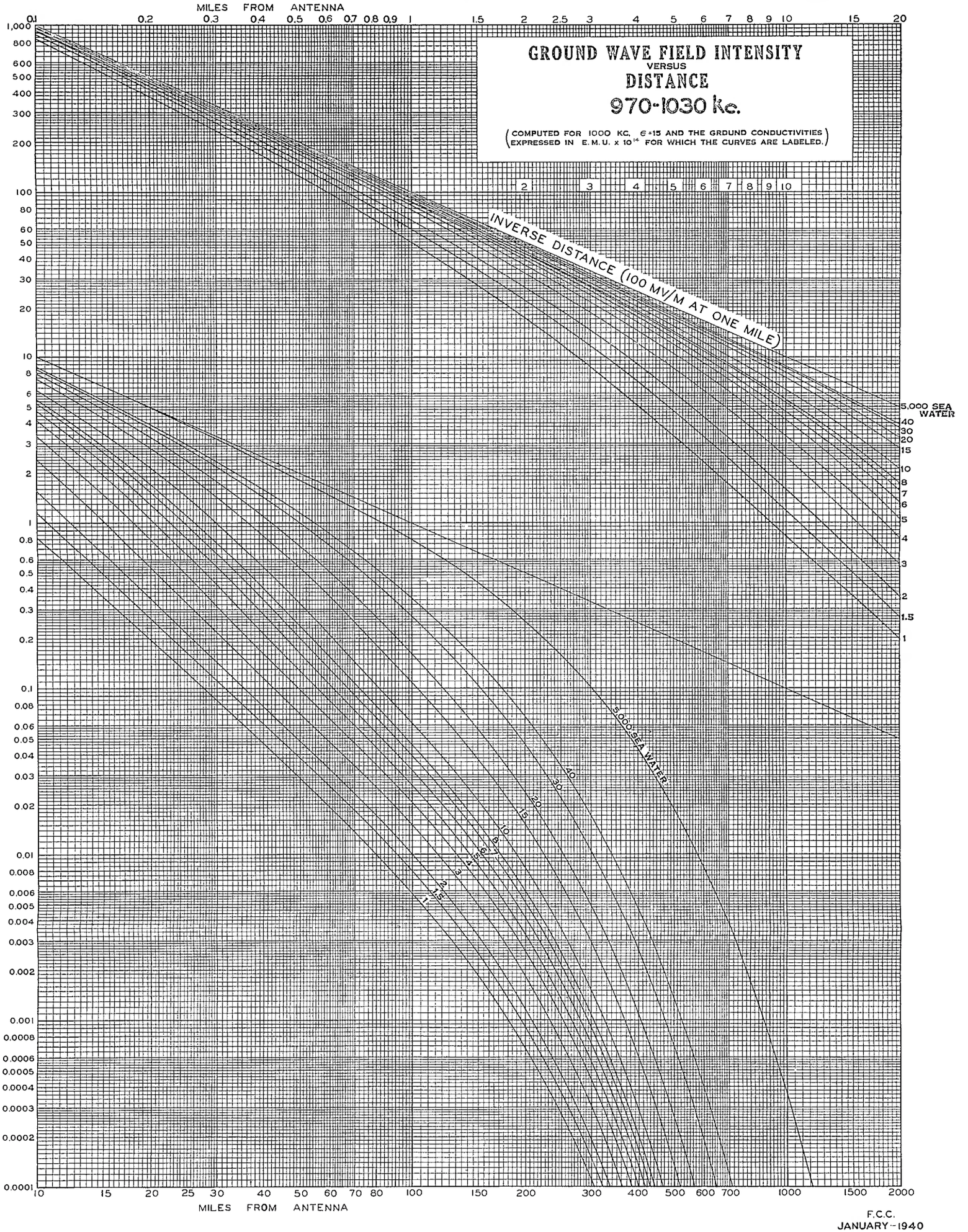

FIGURE 4

(Follows p. 89)

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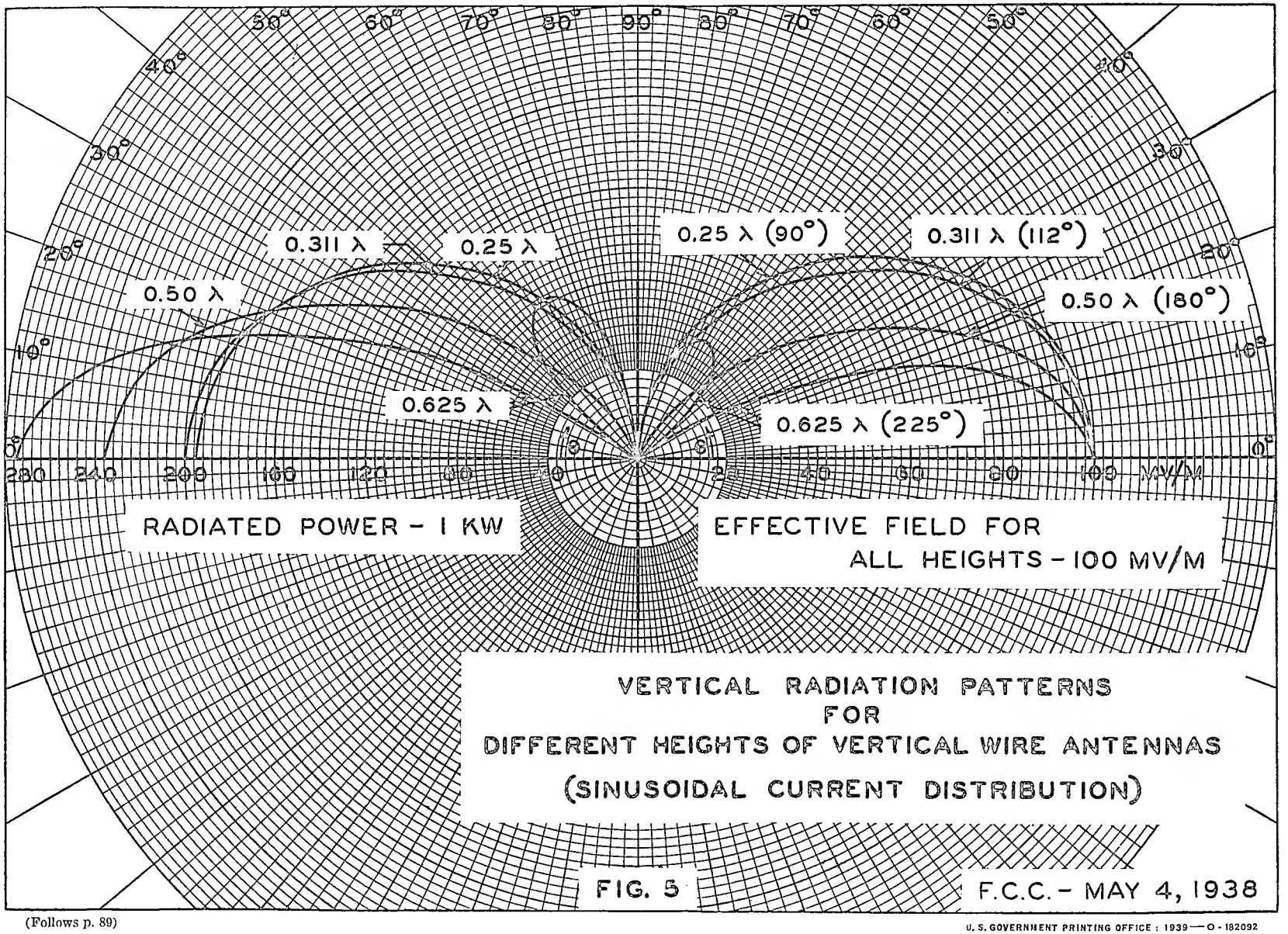

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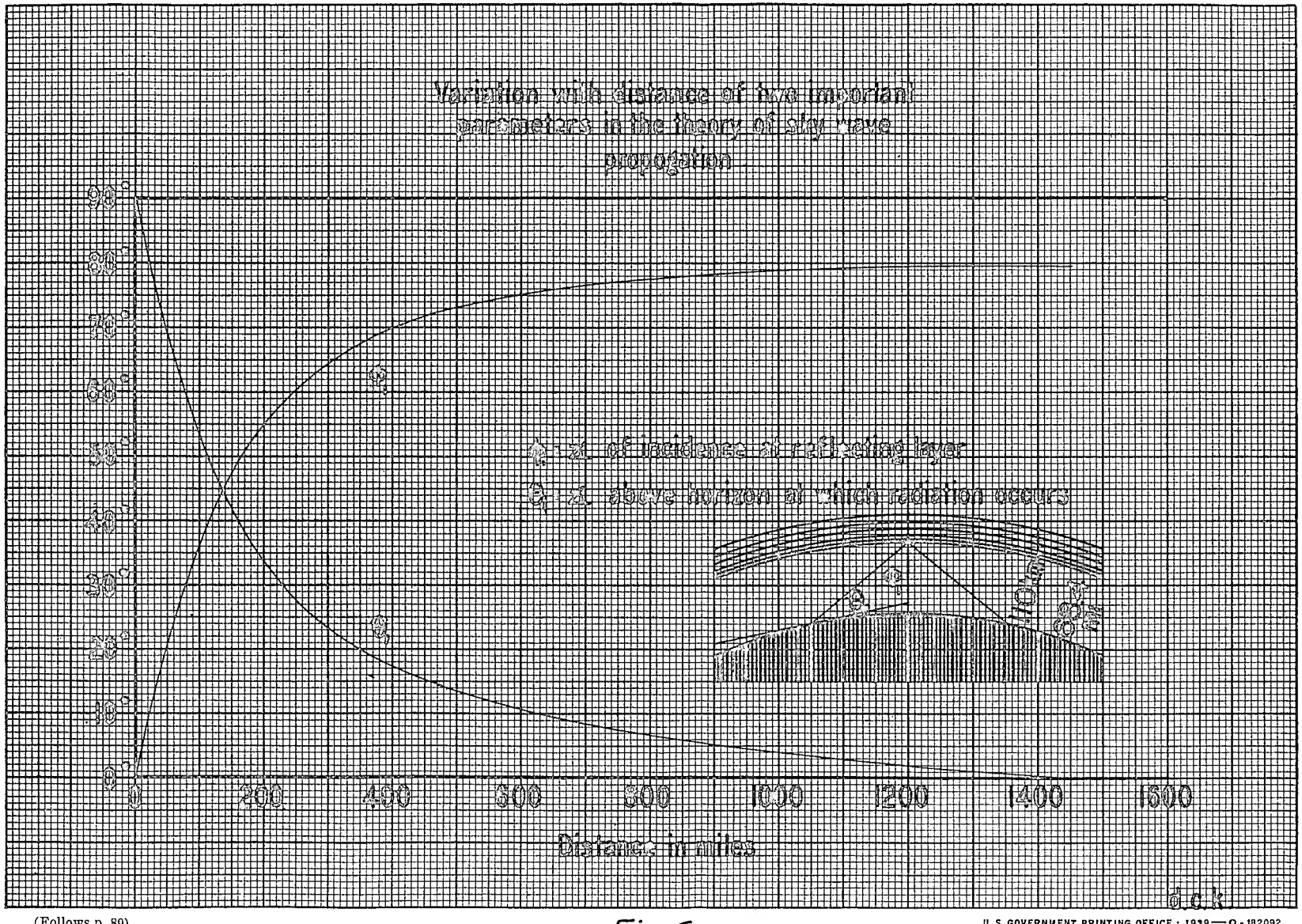

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Fig. 6

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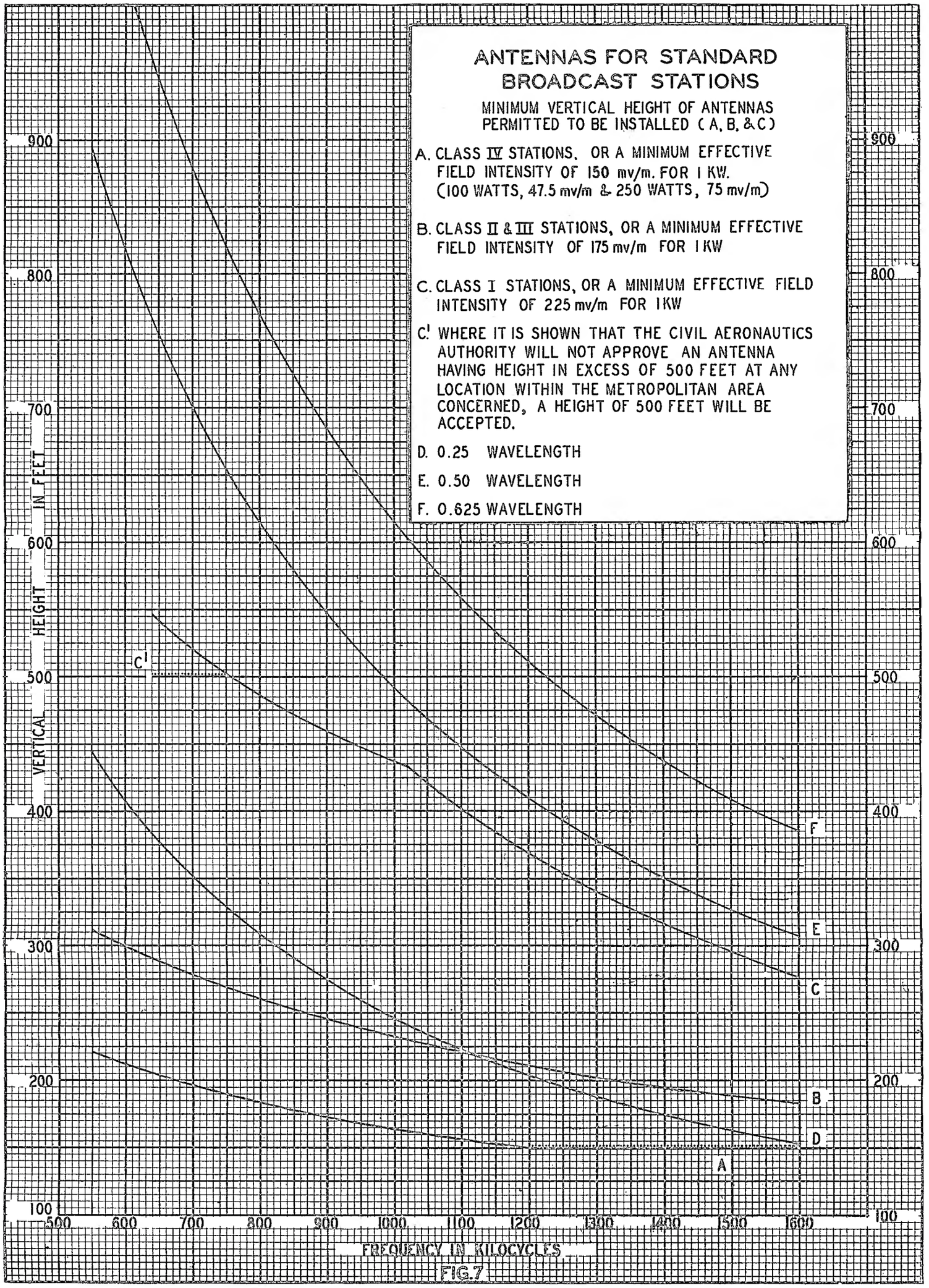

FIG. 7

(Follows p. 89)

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GROUND WAVE FIELD INTENSITY VERSUS NUMERICAL DISTANCE OVER A PLANE EARTH

$$p = \frac{\pi}{x}\frac{R}{\lambda}\frac{\cos^2 b''}{\cos b'} \cong \frac{\pi}{x}\frac{R}{\lambda}\cos b$$

$$b = 2b'' - b' \cong \tan^{-1}\frac{\epsilon + 1}{x}$$

} Vertical Polarization.

$$p = \pi\frac{R}{\lambda}\frac{x}{\cos b'}$$

$$b = 180° - b'$$

} Horizontal Polarization.

$$x = \frac{1.79731 \cdot 10^{15}\,\sigma\ \text{e.m.u.}}{f_{mc}}$$

$\frac{R}{\lambda}$ = distance expressed in wavelengths.

σ = ground conductivity expressed in e.m.u.

f = frequency expressed in megacycles.

ϵ = dielectric constant of the ground referred to air as unity.

$$\tan b'' = \frac{\epsilon}{x}$$

$$\tan b' = \frac{\epsilon - 1}{x}$$

INVERSE DISTANCE $(1/p)$

$b = 0°$, 15°, 30°, 45°, 60°, 75°, 90°, 180°

RELATIVE FIELD INTENSITY $\frac{|f(p)|}{p}$

100, 50, 20, 10, 5, 2, 1, 0.5, 0.2, 0.1, 0.05, 0.02, 0.01, 0.005, 0.002, 0.001, 0.0005, 0.0002, 0.0001, 0.00005, 0.00002, 0.00001

0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50, 100, 200

p

NUMERICAL DISTANCE

APPENDIX I - GRAPH 21