EXPLANATION

Rules and Regulations of the Federal Communications Commission governing broadcasting services, are published herewith in full, with certain exceptions. These have been corrected by the FCC Legal and Engineering Staffs, to Jan. 10, 1946, and are published in cooperation with the FCC, whose valuable service is gratefully acknowledged. Standards of Good Engineering Practice Governing Standard Broadcast Stations and other portions of the Rules and Regulations not published herewith, are available through the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

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

Part

2. General Rules and Regulations.
4. Broadcast Services Other Than Standard Broadcast.
5. Experimental Services.
7. Coastal and Marine Relay Service.
8. Ship Service.
15. All Radio Stations in the War Emergency Radio Service.
31-32. Uniform System of Accounts, Class A and Class B Telephone Companies, and Units of Property, Class A and Class B Telephone Companies.
65. Communications Fellowships for Students from Other American Republics.

* Rules of Interstate Commerce Commission dated July 1, 1917, are still in effect—not reprinted by Federal Communications Commission.

Part I—RULES OF PRACTICE AND PROCEDURE

TABLE OF CONTENTS

ADMINISTRATIVE PROVISIONS

Sec. 1. Office; hours.
Sec. 2. Meetings.
Sec. 3. Miscellaneous.
Sec. 4. Authentication of documents.
Sec. 5. Notices; requests for; contents; official record; use of.
Sec. 6. Person, defined.

PERSONAL APPEARANCES: PRACTITIONERS

Sec. 1. Appearances.
Sec. 2. Authority for representation.
Sec. 3. Persons who may be admitted to practice.
Sec. 4. Applications for admission.

APPLICATIONS AND AMENDMENTS—GENERAL

Sec. 1. Applications made on prescribed forms; exceptions.
Sec. 2. Detracting applications.
Sec. 3. Amendments and dismissals; when allowed.

AMENDMENTS OF RULES

Sec. 1. Requests for amendment of rules.

AMENDMENTS TO PLEADINGS

Sec. 1. Time for filing; disposition.

PETITIONS AND COMPLAINTS

Sec. 1. General.
Sec. 2. Intervention.

SUBSCRIPTION AND VERIFICATION

Sec. 1.121 Applications; amendment.
Sec. 1.122 Petitions.

SPECIFICATIONS AS TO DOCUMENTS AND PLEADINGS

Sec. 1.131 Papers, general.
Sec. 1.132 Petitions.

SERVICE OF DOCUMENTS; COPIES

Sec. 1.141 Service, proof of service.

PROOF OF OFFICIAL RECORD

Sec. 1.151 Authentication of copy.
Sec. 1.152 Proof of lack of record.

SUBPOENAS

Sec. 1.171 Who may issue;
Sec. 1.172 Requests, verification and content.

HEARINGS

Sec. 1.191 Clauses.

INFORMAL HEARINGS

Sec. 1.292 Informal.

FORMAL HEARINGS

Sec. 1.193 Hearing date on related matters.
Sec. 1.194 Consolidation of cases.
Sec. 1.195 Continuance; extensions.
Sec. 1.196 Motion involving delay.
Sec. 1.197 Postponement of changes of place.

ODER OF PROCEEDURE

Sec. 1.201 Order of pleading.

EVIDENCE

Sec. 1.211 Evidence.
Sec. 1.212 Cumulative evidence.
Sec. 1.213 Further evidence during hearing.
Sec. 1.214 Documents containing matter not material.

DEPOSITIONS

Sec. 1.221 Request for order to take, time of filing.
Sec. 1.222 Certificate.
Sec. 1.223 Record of examination.
Sec. 1.224 Submission to witness; changes; signature.

CONDUCT OF HEARINGS

Sec. 1.231 Conduct of hearings.
Sec. 1.232 Transcripts.
Sec. 1.233 Witness examiner.
Sec. 1.234 Witness examiner.

MOTIONS DOCKET

Sec. 1.251 Motions.
Sec. 1.252 Proposed order.
Sec. 1.253 Time of calling; continuance.

RENEWALS

Sec. 1.271 Renewals.
Sec. 1.272 Renewals.
Sec. 1.273 Renewals.
Sec. 1.274 Renewals.

FINANCIAL OWNERSHIP AND OTHER REPORTS OF BROADCAST LICENSEES

Sec. 1.301 Financial reports.
Sec. 1.302 Pleadings.
Sec. 1.303 Owner.
Sec. 1.304 Owner.
Sec. 1.305 Owner.
Sec. 1.306 Owner.

(Continued on page 549)
SPECIAL PROVISIONS RELATING TO RADIO (Applications under part I of Title III of the act)

Sec. 1.381 Place of filing; number of copies.
1.382 Full disclosures.
1.384 Additional statements.
1.385 Installation or removal of apparatus.
1.386 Extension or renewal of construction permits; applications.
1.387 License following construction permis.
1.388 Where construction permit not re-
1.389 Type of license.
1.386 Renewal of license.
1.381 Financial statements.
1.386 Filing directed by Commission.

ACTION ON APPLICATIONS

Sec. 1.381 Partial grants.
1.382 Denial for bearing.

ANSWERS TO NOTICES OF VIOLATION

Sec. 1.391 Under title III of the act.

REVOCATION AND MODIFICATION OF STATION LICENSES

Sec. 1.401 Revocation.
1.402 Modification.
1.403 Revocation or modification, how cause.
1.404 Contents of order to show cause.
1.405 Failure to appear.

SUSPENSION OF OPERATOR LICENSES

Sec. 1.411 Order of suspension.
1.412 Proceedings.

SPECIAL PROVISIONS RELATING TO COMMON CARRIERS

(Complaints under title II of the act)

Sec. 1.421 Formal or informal.
1.422 Informal complaints; substance.
1.423 Action on informal complaints.
1.424 Reexamination; 6 months' rule.
1.425 Formal complaints; requirements.
1.426 Statement of issues; joinder of causes of complaint.
1.427 Notice of complaints.
1.428 Charges, etc.; specific references.
1.429 Separate statement of each provision violated.
1.430 Allegations; certainty.

EXTENSIONS OF CARRIER FACILITIES

Sec. 1.431 Applications under section 231 (a)
1.432 Supporting data required with ap-
1.433 Corrected applications.
1.434 Additional information.
1.435 Discrimination specified.
1.436 Preference or prejudice.
1.437 Separation; prayer for.
1.439 Supplemental complaint.
1.440 General.
1.441 Cross complaints.
1.442 Answers to complaints and petitions.
1.443 Answers to petitions of amended complaints.

ORDERS TO SHOW CAUSE

Sec. 1.441 Orders instituting action under title II of the act.
1.442 Answer to order to show cause.

PROTESTS OF VALUATIONS

Sec. 1.471 Tentative valuations.

SUSPENSION OF TARIFF SCHEDULES

Sec. 1.481 Under section 204 if the act.
1.482 Rate increases—furnishing to Commission of data furnished to Office of Price Administration.

SERVICE AND NUMBER OF COPIES

Sec. 1.491 Service by the Commission.

ADMINISTRATIVE PROVISIONS

1.51 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 9:30 a.m. to 5:30 p.m., Monday through Friday, on legal holidays.

1.52 Minutes.—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.

1.53 Minutes.—The minutes of a meeting of the Commission shall be kept by the Secretary, Washington, D.C., unless otherwise specifically provided by order of the Commission, and shall be kept by, and in the office of, the Secretary, Washington, D.C.

1.54 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, Washington, D.C., and authenticated by the seal of the Commission.

1.55 Inspection of records.—Subject to the provisions of section 4(1), 2, 3, 4, and 4 of the act, the files of the Commission shall be open to public inspection as follows:

(a) Tariff schedules required to be filed under section 203 of the act; valuation reports, including exhibits filed in connection therewith, unless otherwise provided by the Commission; and annual and monthly reports required to be filed under Section 219 of the act.

(b) Contracts or agreements or arrangements between carriers, filed pursuant to section 211 (a) of the act, except such contracts relating to foreign wire or radio communication which are made in the public interest by the Commission; provided, however, the Commission will give appropriate consideration to a petition filed by any party showing that any such contract, agreement, or arrangement will or might jeopardize the interest of the United States, to the extent that its publication would place American communication companies at a disadvantage in meeting the competition of foreign communication companies; and that such publication would be detrimental to the public interest.

(c) 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 of the act, and all communications protecting or endorsing any such applications; and all pleadings, depositions, exhibits, transcripts of testimony, reports of examiners or presiding officers, exceptions, briefs, proposed orders, or findings of fact and conclusions; all minutes and orders of the Commission. The information filed under § 1301 and network and transcription contracts filed pursuant to § 1302 shall not be open to public inspection.

(d) In the discretion of the Commission, other files, including those excepted in paragraphs (a), (b), and (c) hereof, upon written request describing in detail the documents to be inspected and the reasons therefor.

1.56 Certified copies; requests for; costs.—Copies of any documents subject to inspection under section 211 of the act may be obtained from the Commission upon request to 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.

1.57 Official reporter; transcript.—The Commission will designate from time to time an official reporter for the taking down and for the description of the 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 211 of the act. Such transcripts, if obtained from the Commission, shall be furnished by the official reporter upon payment of the charges therefor.

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

1.59 General period 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 included but the day on which the act, event, or default is completed, or on which the period begins, is included. When a period is to end on a Sunday or a holiday, the period is extended to the next working day, whether on a Sunday or a holiday. When the period of time prescribed or allowed is less than 7 days, intermediate Saturdays and Sundays shall be excluded in the computation. A half holiday shall be considered in other days and not as a holiday.

1.60 Additional time to parties in certain cases.—Where, under these rules, a person is otherwise entitled thereby, 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 residing outside, or are citizens of, the United States, except for citizens of 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 State or Territory other than the State in which the Commission is located may be admitted to practice before the Commission or the official presiding at any hearing, be admitted for a particular proceeding or case as an agent of the party.
meant himself as a practitioner before the Commission, in good standing before it for a period of five years, that such person has not violated his oath upon admission; or has, in obtaining admission, committed any material falsehood with reference to his legal qualifications, professional standing, character, or integrity, or has failed to comply with any of the requirements prescribed by the Commission. 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 shall be revoked, said member shall be afforded the opportunity to be heard thereon.

§ 176. Notice of Change of Address—Every member of the Commission in which will be entered the names of all persons entitled to practice before the Commission. Only individuals will be admitted or reelected. 

§ 177. Process—No member, officer, or employee of the Commission shall, within 2 years after his service with the Commission is terminated, appear as an attorney before the Commission in any case or application on which he has acted or leaned shall apply with the Commission's consent.

§ 178. Appearance of Attorney—Any attorney representing a party in any proceeding shall enter his appearance, in duplicate, on the form prescribed for the purpose and signed by the party or his proper agent or attorney, in the place of business of the party which appearance shall be made a part of the record. (See Appendix No. 3.)

PARTIES

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

§ 180. 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 or issue. The term is required.

§ 181. Complainant—The term "complainant" means a party who complies 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.

§ 182. Investigation—The term "investigating" means a party whose complaint has been enforced or upon petition, has been permitted to become a party to any proceeding before the Commission. The term "petitioning" means a party whose petition shall be made a party to any proceeding in which such carrier is a party.

§ 183. Respondent—The term "respondent" means a party against whom a complaint has been filed of anything done or omitted to be done in violation of any provision of the act. The term "responding" means a party against whom a complaint has been filed of anything done or omitted to be done in violation of any provision of the act. In cases arising in services other than broadcast where a single licensee holds a number of licenses which are subject in the discretion of the Commission, a single application may be filed for renewal or modification of such license, in the discretion of the Commission, a single application may be filed for renewal or modification of such license, in the discretion of the Commission. A single application may be filed for renewal or modification of such license, in the discretion of the Commission.

§ 184. Substitution of parties—The Commission in a proper case may order a substitution of parties. The Commission in a proper case may order a substitution of parties. The substitution of parties shall be made in favor of the party or his proper agent or attorney, in the place of business of the party. The substitution of parties shall be made in favor of the party or his proper agent or attorney, in the place of business of the party.

APPLICATIONS AND AMPENDMENTS—GENERAL

§ 185. Applications made on prescribed forms; exceptions—Applications for the making and rules and regulations shall be made in writing, subscribed and verified as provided in section 1.321 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 application for permission to place in operation new lines or new facilities or new source of power by rail carriers, except in the exception of station locality, and in other cases in the discretion of the Commissioner, a single application may be filed for renewal or modification of such license, in the discretion of the Commissioner. A single application may be filed for renewal or modification of such license, in the discretion of the Commissioner. A single application may be filed for renewal or modification of such license, in the discretion of the Commissioner. A single application may be filed for renewal or modification of such license, in the discretion of the Commissioner.

§ 186. Applications to be filed by officers of the Commission—Applications by officers of the Commission shall be made on the form prescribed by the Commission, and shall be filed with the Commission in the manner prescribed by the Commission.

§ 187. Applications not in accordance with the Commission's rules, regulations or other requirements will be considered defective unless accompanied by (i) a petition in accordance with section 1.361 to amend any rule or regulation with which the application is in conflict, or (ii) 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 facts on which the waiver or exception desired and set forth the reasons in support thereof.

§ 188. Defective applications will not be considered by the Commission.

§ 189. Amendment of applications—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.

§ 190. 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 files, and no document once officially filed shall be returned unless the Commission shall, for good cause shown, order such return.

§ 191. 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 Commission to dismiss it within 30 days after the date of the last hearing or return of an application which has been officially filed shall be considered as a request to dismiss the application without prejudice. An application which has been designated for hearing and wholly or partly 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

§ 192. 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 PLEADING

§ 193. Time for filing; disposition—Any pleading may be amended by the court as a matter of course within 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 amended motions shall 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.

PETITIONS AND COMPLAINTS

§ 194. General—Petitions for relief under the jurisdiction of the Commission shall be in writing, subscribed and verified as provided in section 1.321, addressed to the Commission, and verified as required by law. Any petition filed with the Commission shall be in writing, subscribed and verified as provided in section 1.321, addressed to the Commission, and verified as required by law.

§ 195. Intervention—Intervention must be set forth the grounds of the proposed intervention, the position and interest of the petitioner in the proceeding, the time when the same will be filed, and the effect of the petitioner's intervention will be in the public interest, and must be subscribed or verified in ac- cordance with the laws of the State in which the proceeding shall be held. The Commission shall not approve the effect of permitting intervention before the Commission but shall not be considered as an exception of any law or equitable right or interest in the proceeding. An intervening application 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.

§ 196. Complaints—Complaints to the Commission complaining of anything done, or omitted to be done, in contravention of the provisions of the law, except formal and informal complaints filed under "Special provisio

SUBSCRIPTION AND VERIFICATION

§ 197. 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 the party of the party filing the application or amendment if the party be a corporation: Provided, however, That subscription and verification may be made by any person or party who may be authorized or required by law or the Commission to verify such application or amendment; and (3) by the party of the party filing the application or amendment if the party be a corporation.
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 acknowledged or acknowledged. An affidavit in support of a motion, motion for a preliminary injunction, or motion for a temporary restraining order must be subscribed and verified in accordance with section 1.122 and must specify the affidavits, depositions, answers to interrogatories, admissions, and documents desired, and the facts expected to be proved thereby.

1.113 Witness fees.—Witnesses who are subpoenaed and respond thereto are entitled to full compensation for their attendance, including travel therefor, at a rate of not less than $10 per day and not less than 15 cents per mile for each mile necessarily traveled in the course of the United States, under such regulations as may be prescribed by the Attorney General. Witness fees shall be paid by the party at whose instance the witnesses are summoned at the time and place 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 more than one witness is summoned, the witness fees and mileage of each shall be paid by the party at whose instance the witnesses are summoned.

1.114 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 who is not less than 18 years of age and is therefore not a person named in the subpena. 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 more than one person is summoned, the fees and mileage of each shall be paid by the party at whose instance the persons are summoned. (b) If made by any other person, the subpena 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 therein. 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 party to whom it is to be served, and copies shall be left with him. The party to whom the subpena or service shall be made shall sign his name to the receipt in the presence of the officer to whom such return shall be made, and the officer shall endorse the name and title of the person named in the subpena at the time of return. (c) The return of the subpena or any service made shall be made to the officer to whom the subpena or service was directed on or before the day named in the subpena, or, if no day is named therein, on or before the expires of the time limited for return of the subpena or service.

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 to whom it may appear 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, require the surrender of the books, papers, or other evidences of the generation out of its duties, or for the formulation or amendment of its Rules and Regulations. For such purpose, the Commission may require the production of testimony and formal hearings by the procedure to be followed shall be irregular but shall be informal and such as in the opinion of the Commission will best serve the purpose 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 in all related matters which are connected in substance 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 subpena witnesses and require the production of testimony by formal hearings but the procedure to be followed shall be informal and such as in the opinion of the Commission will best serve the purpose of such hearing.

1.104 Consolidation of cases.—The Commission, upon motion, or upon its own motion, will, where such action will best conducive to the proper disposition of business and to the ends of justice, consolidate for hearing (a) any cases which are pending and arise out of the same complaint or cause, or (b) any applications which by reason of the nature of the case, 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. The secretary will notify all persons shown by the records to have communicated with the Commission, other than officers and employees, of the date of hearing to be had on the application, or of the time on which the record shall be kept, and authorized by any applicable statute or by the rules of evidence at common law.

SUBPENAS

1.171 Who may sign and issue.—Subpens require the attendance and testimony of witnesses, and subpens require the production of any books, papers, schedules, records, or other documents, which any party may lawfully inspect, as to any matter under investigation or hearing or may be signed and issued as follows: (a) Hearings before the Commission en banc; by any Commissioner; (b) hearings before a Commission of more than three members; by any such officer designated to hear a case may sign and issue subpens in that case; (c) in other cases: By any Commissioner.
CONTINUANCES: EXTENSIONS

$1.201 Continuances and extensions.—Continuance in respect to any proceeding or hearing, or a part thereof, may be granted before or after making any filing or performing any act required or allowed to be done within a specified time, in the discretion of the Commission, 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 may at a hearing or any proceeding requiring an oral hearing, postpone or change the time or place at which it is to be held, or adjourn the same for such time as may be necessary, or change the place thereof to another place nearer or more convenient to the parties to the proceeding. Such motions shall allow service upon all parties as provided in section 1.141.

ORDER OF PROCEEDURE

$1.304 Order of procedure.—At hearings on complaints, petitions, applications, or other proceedings for instruments of authorisation which the Commission is empowered to issue, the complainant, petitioner, or applicant as the case may be, may file such copies of such material and relevant matter therefrom, as he, in any meetings 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 is directed shall open and close. At hearings under title I or I of the act on revocations and suspensions of operating licenses or modifications of orders under section 312 (b) of the act, or other like proceedings instituted by the Commission, the Commission shall open and close. In hearings on a consolidated record, the Commission or presiding officer shall designate the order of documents and exhibits which shall be in the order of the proceedings. If the party 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 intervenors 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.—Unless expressly provided otherwise, any evidence introduced at a hearing shall not be excluded for the reason that it is cumulative evidence which may be received in evidence, and become a part of the record. 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, where exhibits are to be used in evidence, notice must be furnished by opposing counsel unless the presiding officer otherwise directs. Wherever practicable, the original and a duplicate or copies of exhibits on file or before commencement of the hearing.

$1.216 Mechanical reproductions as evidence.—Unless offered for the sole purpose of showing the effect of the reproduced sound and no other, mechanical reproductions of sound waves shall not be admitted in evidence. Any party desiring to offer any matter alleged to be contained therein or hereupon 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 read 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 shall be evidence by reference subject to check with the original tariff schedule on file.

DEPOSITIONS

$1.221 Request for orders to take; time of filing; content.—The Commission, either on its own motion, or on formal notice of a party to a proceeding, shall issue an order to take depositions. Motions to take depositions shall be filed with the Commission; and the order shall set forth the names and addresses of the persons whose depositions are to be taken, the time and place thereof, the manner in which it is expected such witness will testify, the place where, the time when, the 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 through his clerk or designee, read to the witness, under his hand, a copy of the position or oath. The deposition of the witness shall be taken stenographically and transcribed, unless the parties agree otherwise. All objections made at the time of the examination shall be made in writing and served on the opposite party and the officer, which shall be considered objections thereto. If objections are made after 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 record of the deposition. In lieu of participating in the oral examination, parties served with notice of taking depositions may attend in writing and object to the taking of the deposition by the officer with a statement of the reasons given for the witness for making them. The deposition shall then be signed, by the witness, unless by stipulation waive the signing or if it is held necessary by the officer, and shall be read to by or him. Any changes in form or substance which shall be deemed material, and to which the party objects, shall be set out in the deposition. Such matters shall be signed by the witness and be served upon the opposing party in writing, and a copy thereof together with the original and one copy of all exhibits registered mail to the secretary of the Commission.

$1.225 Certification and filing by officer; copies.—The officer shall certify on the original of the deposition that the witness was duly sworn or deemed by the officer to be a true record of the testimony given by the witness, and that said officer is not a party to the proceeding before the Commission. The officer shall sign the deposition in an envelope endorsed with the title of the action and marked "Deposition of [insert name of witness] with the date of original deposition." The officer shall then file one copy thereof with the original and one copy of all exhibits registered mail to the secretary of the Commission.

$1.227 Time of filing.—All depositions shall be filed with the Commission not later than 10 days before the date of the hearing and by which they are to be offered as evidence, or in the event of an extension of time, not later than 20 days before the date of the hearing. If any officer, party, or attorney desires an extension of time, he shall file a written request therefor with the Commission at least 10 days before the date of the hearing.

$1.228 Inclusion in record.—No deposition shall constitute a part of the record in any proceeding unless filed 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 on sub judice matters, the Commission will provide for the conduct of each such hearing by a specific order of reference and otherwise provided 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 would be controlled by the court in the course of the proceeding. Any motion to dismiss the proceeding or other motion which involves final determination may be made at any time during the hearing.

(b) Transcript filed with Secretary.—After the closing of the hearing complete transcript of testimony taken, together with any exhibits and any blank pages of law or code, shall be filed in the office of the secretary of the Commission.

(c) Transcripts to transcripts of records to be signed.—Transcripts to transcripts of records shall be signed only if offered within 10 days after the date the transcripts are filed with the Commission. Suggested corrections shall be served upon all parties participating in the hearing in the manner 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 any proposed findings that 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, shall preclude such party, of any right of further participation in the proceeding, including oral argument.

(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 all conclusions of law or law and fact. The proposed findings of fact shall be accompanied by briefs or memoranda of law.

The proposed decision of the Commission. The Commission will thereafter enter its proposed report or findings of fact, conclusions: Provided, however, that if the proposed findings of fact and conclusions filed by the parties present no new issues of law, and if the Commission, after considering the parties' comments, determines to accept the proposed findings and conclusions, the Commission may be accompanied by briefs or memoranda of law. The proposed decision of the Commission. The Commission will thereafter enter its proposed report or findings of fact, conclusions: Provided, however, that if the proposed findings of fact and conclusions filed by the parties present no new issues of law, and if the Commission, after considering the parties' comments, determines to accept the proposed findings and conclusions, the Commission may be accompanied by briefs or memoranda of law.
(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 or briefs in support of their views, and in 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 of record relied upon to support the objections presented. Each such paper shall be accompanied by the opposition thereto, submitted by any other party to the proceeding, within 30 days of receipt of such objections, and 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, or in 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 of record relied upon to support the objections presented. Each such paper shall be accompanied by the opposition thereto, submitted by any other party to the proceeding, within 30 days of receipt of such objections, and shall be accompanied by a memorandum brief in support thereof, and may request oral argument.

(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 exceptions or brief shall serve a true and correct copy thereof 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 that the requirements of this rule have been complied with.

(j) Request for oral argument; waiver.—Within 5 days of the filing of the Commission’s request for a oral argument, any party may file a written request for hearing, and upon the receipt of such a request, the Commission shall promulgate rules for the conduct of the hearing. Such rules shall be served 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 the issues in part or in toto, or preliminary motions, those having the nature of an appeal to the Commission, and those requesting change or modification of a final order made by the Commission, shall be entered upon the docket of the Commission, and questions 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 docket of the Commission, as to change or modification, petition for order of reconsideration, and in the docket of the questions docket, and in the hearing if that is requested.

§1.253 Time for filing motions.—No such motion, petition, or other matter presented shall be called, considered, 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 other 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 section 1:10 or residing beyond the continental limits of the United States, shall be served, considered, and determined in the absence of consent of all parties until the expiration of 7 days.

§1.255 Objection to motion; right to be heard.—During the time specified in section 1:254, any party in interest shall have the right to file an objection to any motion presented for order of reconsideration, petition for order of reconsideration, and in the docket of the questions docket, and in the hearing, if that is requested. Such opposition shall show service on the petitioner or moving party. Parties filing oppositions to motions shall be served with a copy of the motion or petition, or other matter against which the objection is directed. Any party desiring to waive oral argument on any motion, or opposition thereto, may indicate such desire in written notification or by a statement directed to that effect upon the call of the docket. In case oral argument is waived by any party, copies of the order embodying the decision of the Commission, or memoranda or briefs which may be filed in support thereof; and the waiving of oral argument 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 for hearing, 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.

§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 any action, decision, order, or requirement of the Commission 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 application for hearing, (2) further argument in the cases decided; (3) rehearing 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 shall state in detail the material facts upon which the petition is based. Each such petition shall state the particularity in what respect the decision, order, or requirement of the Commission is alleged to be unwarranted, as prerequisite, or erroneous, and with respect any finding to fact must specify the pages of record relied on. Where the existence of newly discovered evidence is claimed, it shall 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 proceeding and all parties having an interest, as determined by the Commission, in the reconsideration of a decision, order, or requirement made without a hearing, the filing the petition shall serve the same in the manner provided in section 1:141 upon all parties to the proceeding or the party requiring service upon such parties, as the case may be. Each such petition for rehearing shall be directed to the Federal Communications Commission.

§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.

FINANCIAL OWNERSHIP AND OTHER REPORTS OF BROADCAST LICENSEES

§1.301 Financial report.—Each licensee of a broadcast station (standard, FM, television, and international) shall file with the Commission on or before April 1 of each year (Form 321 or such other form as the Commission may prescribe, together with supporting schedules) a balance sheet as of December 31 of the preceding calendar year and an income statement for said calendar year. Each such form shall be subscribed as provided in §1.241 of the Commission’s regulations. Other than the “Construction contracts” (standard, FM, television, and international) shall file with the Commission within 30 days of execution thereof verified copies of all documents, information, contracts (including any and all underlying contracts), or agreements relating to the ownership or control of a broadcasting station, or affecting ownership of licensees, rights or interests therein; the use, management, or operation of licensed facilities; and agreements relating to networks, transmission service or bulk time sales (amounting to two hours or more per day); including but not limited to (a) Articles of partnership, association, or incorporation; (b) an agreement binding the seller or his heirs, executors, administrators, or legal representatives, or the corporation, control number or number of its officers or directors, the classification or voting rights or interests therein; (c) any agreement or contract relating to or affecting ownership of licensees, rights or interests therein, its stock, or voting rights thereto; (d) management contracts, network contracts, transmission contracts, or other agreements or contracts, having any interest, director or indirect, in the licensee or any of its stock;

§1.303 Ownership reports.—(a) Annual ownership reports. The licensee of each broadcast station (standard, FM, television, and international) shall file on or before April 1 of each year (Form 321A or such other form as the Commission approves) an annual ownership report and shall show the following information as of December 31 of the preceding calendar year:

(1) In the case of an individual, the name of such individual.

(2) In the case of a partnership; the names of the partners and the interest of each partner in the station.

(3) In the case of a corporation or association; (i) Capitalization, with a description of the classes and voting power of stock authorized and the shares thereof outstanding, the names, residences, and occupations of the stockholders of officers and directors, and stockholders; (ii) full information with respect to the interest and identity of any person whether or not a stockholder, having any interest, director or indirect, in the licensee or any of its stock;

§1.306 Capitalization and authorized stock.—(a) Where A is the beneficial owner or votes stock held by B, the same information shall be furnished for A as is required for B. Where A holds 25% or more of the stock of the licensee, the same information shall be furnished with respect to X corporation (its capitalization, officers, directors, and stockholders and the amount of stock in X held by each) as is required in the case of the licensee, together with full information as to the identity and citizenship of the person authorized to vote licensee’s stock.

(b) Where A holds 25% or more of the stock of the licensee, the same information shall be furnished with respect to Y corporation if it controls X corporation or holds 25% or more of the stock of X, and as to any other corporation if it controls Y corporation or holds 25% or more of the stock of Y and so on back to natural persons.

(c) Full information as to family relationship or business association between two or more officials and/or stockholders.

(d) In the case of all stations, the station’s name, residence, position and date of appointment of operating personnel determining program policy (such as general manager, program director, etc.); (ii) a list of all contracts still in effect bearing the signature of any station manager or other person with authority to bind the station, showing the periods of execution and expiration of each contract; (iii) any interest which the licensee may have in any other broadcast station.

§1.307 Interests or Interlocks. An ownership interest or interlock report shall be filed by each licensee on FCC Form 321A describing any change in information required in the annual ownership report from that previously reported within 30 days from the date of such change.

(1) Any change in capitalization or organization.

(2) Any change in management or control of officers or directors and in operating personnel determining program policy.

(3) Any transaction affecting the ownership, direct or indirect, or voting rights of licensee’s stock, such as (i) a transfer of stock, (ii) issuance of

For the year 1945, an Annual Ownership Report shall be filed with the Commission on or before September 1 of each year. For the year 1946, an Annual Ownership Report shall be filed with the Commission not later than as of June 30, 1945.

Any change in the name, residence, position and date of appointment of operating personnel determining program policy shall be reported on FCC Form 321A.

For the year 1945, an Annual Ownership Report shall be filed with the Commission not later than as of June 30, 1945.

Any change in the name, position and date of appointment of operating personnel determining program policy shall be reported on Form 321A.
(Continued from page 480)

new stock or disposition of treasury stock, (iii) acquisition of licensee's stock by the corporation.

(4) Any change in the officers, directors or stockholders of a corporation other than the licensee such as X, Y or Z Corporation described in the example above, shall be filed with the Commission as soon as practicable, but no later than 30 days after the change takes place. Provided, however, That in the case of a change in the officers, directors or stockholders of a corporation described in the example above, such change need not be reported to the Commission if the corporation described in the example above meets the requirements as set forth in Section 1301, but no later than 30 days after the change. Such application may be treated as an initial application for modification of license, and as such, shall be subject to provisions applicable to such applications, including examination for license.

(b) Any application for extension of time for which a non-commercial license is pending before the Commission, and for which the Commission has not made a finding of probable cause, shall be treated as an application for temporary extension of license. Provided, however, That no such temporary extension of license shall be granted where the Commission has found probable cause for denial of such temporary extension of license. Provision for temporary extension of license shall be made at the discretion of the Commission.

(s) "Stock" shall include any interest, legal or beneficial in, or right or privilege in connection with stock.

(f) "Order" shall include any order, including, without limitation, an option, trust, or pledgee or any modification thereof, express or implied, oral or written.

SPECIAL PROVISIONS RELATING TO RADIO

(Application 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 the exception of the number of copies and place of filing, shall be submitted as follows:

Class of station

A. All classes of Alamak station, except those having an equal or greater number of full-time employees than the number of full-time employees of any other station.

B. Aircraft.

C. Geophysical.

D. Class A stations having more than one geographical area.

E. Class B stations.

F. Standard broadcast.

G. Amateur stations.

Number of applications forms required and method of filing

3 copies via Inspector in charges, radio district No. 14, Seattle, Wash.

1 copy direct to Washington, D. C.

1 copy direct to Washington, D. C.

2 copies direct to Washington, D. C.

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., if all other cases, including examination 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 construction facilities in the band 350 kilocycles to 1600 kilocycles shall include an extension, limited to one specific frequency. An application for radio station construction permit or license requesting alternate facilities will not be accepted.

$1.355 Full disclosure — In no event shall an applicant be required to make full and complete disclosures with regard to the real party or parties in interest, and their legal, technical, financial, and other interests, and 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 make additional statements 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 the installation or removal of apparatus or station equipment, shall be filed at least 60 days prior to the contemplated removal 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 notification 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 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 thereafter. 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 failure to complete. 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 such license shall be modified or granted thereof, if for station other than broadcast) shall be filed by permittee prior to the expiration of the construction permit.

$1.358 Where construction permit not required.—Each application for a new license, except amateur, where a construction permit is not a prerequisite

1 Before any change in the organization, capitalization, officers, directors or stockholders of any other corporation other than licenses, which results in a change in the control of the license, prior Commission consent must be received under section 319 (b) of the Communications Act.

1 F. C. C. Form No. 701.

Page 462 • 1946 Yearbook Number

(Continued on page 484)

BROADCASTING • Telecasting

1 Informal applications.
(5) If the request is made by time-sharing station, the showing required 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 or frequency of any other station on the same or adjacent channels when any such station is located within the interference area of the station for which the request is made. "Interference area" is defined by the Standards of Good Engineering Practice Concerning Standard Broadcast Services of the National Association of Broadcasters.

(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 the Commission shall then send a copy of the objection to the station for which the request is made. Should the Commission, after a reasonable time, without a reply having been received, consider that such stations have waived any objections to the application, and no reply has been received, it will be considered that such stations have waived any objections to the application.

§1.306 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 than or in addition to 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 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 provisions of this section.

(b) That the 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.

Interference 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, is considered.

§1.308 Multiple applications; broadcast service.—In the broadcast service, when there are competing applications for additional facilities pending for a standard, international, television, facsimile, high frequency, or developmental broadcast station, the Commission will not consider another application for 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, two such applications being treated as inconsistent.

§1.309 Repetitive applications.—(a) Broadcast services.—In the broadcast service, when an application has been filed and denied, the same applicant, his successor or assignee, or on behalf of or for the benefit of the original parties in interest, and is not subject to reissue or application for a new station or for an extension or renewal of any existing license or outstanding construction permit; (b) grant of the application will cause undue interference to an existing station or station for which a construction permit is outstanding; (c) a grant of the application will not serve the public interest; (d) interference to any other application in part, or with any privileges, terms, or conditions other than those requested, the action of the Commission shall be considered as a granting of such application as to such privileges, terms, or conditions, other than those requested, the action of the Commission shall be considered as a granting of such application as to such privileges, terms, or conditions, other than those requested, the action of the Commission shall be considered as a granting of such application as to such privileges, terms, or conditions, or (e) the application has been filed on the same motion as parties to the hearing.

§1.310 Procedure when case is designated for hearing.—(a) When an application has been designated for hearing, the Secretary of the Commission shall send notice of such designation to the applicant, and any parties to the application, and the applicant shall file a written appearance stating that he will appear and present evidence on the hearing, or that he is unable to do so. If the Commission, on any 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 Commission will issue an order granting an application, copy of his application and supporting documents.

(b) The Commission will on its own motion if any party to the hearing requires 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 has not been modified or revoked, or whose application for renewal of license would have been denied, in its present form, on any previous occasion.

(iii) Any person, whether the time in question was designated for hearing, had filed with the Commission a mutually exclusive application, for construction permit.

The Commission in question has been designated for hearing will be named as parties only if the Commission in its discretion deems such action advisable.

§1.311 What constitutes a petition to intervene.—A petition to intervene shall be filed on its own motion as name to parties to a hearing any person specified in Section 1.310(b), supra, or by filing with the Secretary of the Commission a written petition to intervene showing that he comes within the provisions of Section 1.310(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 by 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 its 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 making a decision in the matter. Some discretion in this regard rests 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 proceedings.

(c) The granting of any petition to intervene shall not have the effect of charging the hearing fees. Any person desiring to be heard shall notify the Commission in its notice of hearing unless the Commission shall on motion of any party to the hearing.

(d) Petitions to intervene under this section must be filed with the Commission before the expiration of the 15 days after the filing of the notice of hearing. Any person desiring to file a petition to intervene shall file with the Commission within the 15 days after the expiration of such 15 days must set forth the reason why it was not possible to file the petition to intervene within the 15 days. The filing of the good cause shown is delayed for filing in, the petition will not be granted.

§1.336 Motions to enlarge or change the issues.—Motions to enlarge or change the issues shall be in writing shall be moved either during the course of the proceedings or within 30 days of the mailing of the notice of hearing. The party filing the motion shall file with the Commission, at least 5 days before the hearing, a written notice of the contents of the motion, which shall be 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 to intervene within the 15 days. The filing of the good cause shown is delayed for filing in, the petition will not be granted.

§1.338 Designation for hearing.—Applications will be designated for hearing in the same manner as other applications for construction permits.
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 and be accompanied by a deposit of the filing fee. After filing, the motion will not be granted.

**§ 1.837 Petitions for reconsideration or for rehearing.—(a) Where an application has been granted without a hearing, any person aggrieved by such action, or by the decision in which his interests would be adversely affected thereby may file a petition for reconsideration or rehearing. Such petitions are classified according to the following:

1. Type a, in which the decision is being sought in the light of the facts and circumstances which were not known when the original decision was made.
2. Type b, in which the decision is being sought in order to establish a record for a rehearing.

(b) 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:

1. The decision is being sought in the light of the facts and circumstances which were not known when the original decision was made.

(c) Where an application has been granted or denied after hearing, petitions for reconsideration or rehearing may be filed within 20 days after public notice is given of the Commission's action. Such petitions are classified according to the following:

1. Type a, in which the decision is being sought in the light of the facts and circumstances which were not known when the original decision was made.
2. Type b, in which the decision is being sought in order to establish a record for a rehearing.

(d) Where a petition for reconsideration is being sought in the light of the facts and circumstances which were not known when the original decision was made, such petition must be accompanied by an affidavit of a qualified radio engineer which may be attached by reference to the Commission's Standards and Practices for the Design and Operation of any application filed on behalf of the applicant by a party filing the petition shall be heard 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) A petition 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) reassignment; (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 of any matter determined therein is claimed to be unjust, unwarranted, or unreliable. In this respect any finding of fact must specify the facts relied upon. Where the decision is based upon a claim of newly discovered evidence, it may be certified by a verified statement of the facts relied upon, together with the facts relied upon to show that the petitioner, with due diligence, could not have known or discovered such facts at the time of the hearing.

**[Proposed Rule] § 1.838 Special rules relating to action on applications for assignment and transfer of control.—(a) Applications for consent to assignment or transfer of control or both shall be accompanied by a copy of the license or authority which it is desired to transfer.

**§ 1.838 Special rules relating to action on applications for assignment and transfer of control.—(a) Applications for assignment or transfer of control or both shall be accompanied by a copy of the license or authority which it is desired to transfer.

(b) Any application on which no decision has been reached after 30 days from the date of filing, during which time any person desiring to have the application disposed of shall file a similar notice stating the terms and conditions of the proposed assignment or transfer, may request a hearing thereon. Such hearing shall be granted to the extent necessary to determine whether the assignment or transfer is in the public interest.

(c) Any application for assignment or transfer of control shall be considered as the original application upon its merits and will be acted upon after the expiration of 30 days from the date of filing, during which time any person desiring to have the assignment or transfer disposed of shall file a similar notice stating the terms and conditions of the proposed assignment or transfer, may request a hearing thereon. Such hearing shall be granted to the extent necessary to determine whether the assignment or transfer is in the public interest.

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(g) Any application for assignment or transfer of control shall be considered as the original application upon its merits and will be acted upon after the expiration of 30 days from the date of filing, during which time any person desiring to have the assignment or transfer disposed of shall file a similar notice stating the terms and conditions of the proposed assignment or transfer, may request a hearing thereon. Such hearing shall be granted to the extent necessary to determine whether the assignment or transfer is in the public interest.
number of frequencies or wave-lengths which may be used for the transmission of energy, communications, or signals by radio.  

§ 2.20 Modulation. — "Modulation" is a method of communicating information in which transient visual images of moving or fixed objects are transmitted for reception by visual observation.

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

§ 2.25 Type A facsimile. — "Type A facsimile" is a system of facsimile communication embracing or utilizing a combination of lines or dots of constant intensity.

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

§ 2.30 Cycles, kilocycles, megacycles. — In these regulations and in any instrument of authorization issued pursuant thereto the term "cycles" shall be considered to mean frequencies measured in cycles per second; "kilocycles" to mean cycles per thousand; and "megacycles" to mean cycles per million.

§ 2.35 Special provisions for apparatus employing alternating plate supply and self-reacting plate supply. — The provisions 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 mean or refer to voltages and voltages, 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.

§ 2.41 Period of construction. — (a) Each construction permit for a radio station engaged in commercial broadcast service will specify a maximum of 90 days from the date of granting thereof in which the station shall begin, and a maximum of six months thereafter as the time within which construction must be completed and the station ready for operation, unless otherwise determined by the Commission upon proper showing in any particular case.

§ 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 permit.  

The following table shows how the rule is classified into bands with designations and abbreviations as follows:

<table>
<thead>
<tr>
<th>Frequency in Kilocycles</th>
<th>Designations</th>
<th>Abbreviations</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 to 20 inclusive</td>
<td>Very Low</td>
<td>VLF</td>
</tr>
<tr>
<td>200 to 3000</td>
<td>Low</td>
<td>LO</td>
</tr>
<tr>
<td>3000 to 30000</td>
<td>Medium</td>
<td>MP</td>
</tr>
<tr>
<td>30000 to 300000</td>
<td>High</td>
<td>HP</td>
</tr>
<tr>
<td>300000 to 3000000</td>
<td>Very High</td>
<td>VHP</td>
</tr>
<tr>
<td>3000000 to 30000000</td>
<td>Ultra High</td>
<td>UHP</td>
</tr>
<tr>
<td>30000000 to 300000000</td>
<td>Super High</td>
<td>SHF</td>
</tr>
</tbody>
</table>

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

In linear modulation the average amplitude of the envelope is equal to the amplitude of modulating wave, and the frequency content of the modulating wave is transformed into a 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 ratio of the maximum departures (positive and negative) of the envelope from its average value, to its average value.

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

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

§ 2.31 High-level modulation. — "High-level modulation" is modulation produced in the last radio stage.  

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

§ 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 the plate circuit or grid circuit of any tube in which the carrier frequency wave is present.

§ 2.35 Special provisions for apparatus employing alternating plate supply and self-reacting plate supply. — The provisions 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 mean or refer to voltages and voltages, 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.

§ 2.41 Period of construction. — (a) Each construction permit for a radio station engaged in commercial broadcast service will specify a maximum of 90 days from the date of granting thereof in which the station shall begin, and a maximum of six months thereafter as the time within which construction must be completed and the station ready for operation, unless otherwise determined by the Commission upon proper showing in any particular case.

§ 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 permit.  

§ 2.45 License, simultaneous modification and renewal. — When an application is made for a construction permit for a station license with a frequency 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 subject to the conditions that the license (and for the renewal license) the modified license as well as the renewal license shall be issued to the combined action of the Commission.

1See section 1.356 Rules of Practice and Procedure (Continued on page 472)
FCC RULES & REGULATIONS FOR BROADCAST SERVICES

(Continued from page 468)

§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 station equipment. These tests shall be so conducted as not to cause interference with the service of other stations.

§2.50 Deletion of call letters.—The call letters of a radio station shall be deleted as follows: (a) Where an existing station or authorization has expired and no application for renewal or extension thereof has been filed; (b) When the call letters shall have been deleted because of the authorization having been suspended, surrendered or canceled.

§2.51 Station license, posting of.—The original of each station license shall be posted in the transmitter room or kept in a place specified in the regulations governing the station.

§2.51 Operator license, posting of.—The original of each station license shall be displayed in a manner specified in the regulations governing the station.

§2.54 Operators, place of duty.—(a) Except as may be provided in the rules governing a particular class of station, one or more licensed operators of the grade specified by these rules and regulations shall be on duty at all times when transmitting for a period of at least 1 hour in each 24-hour period.

§2.56 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 equal to that required for the station by the rules governing the particular service or class of station concerned; Provided, however, that when the retention of such logs will result in inconvenience of the licensee, or when the information contained in such logs will not be of assistance in preventing or correcting any violation of the rules or regulations, the station licensee may inform the Bureau of such difficulty and be relieved of the obligation of retaining such logs.

§2.60 Log book.—(a) Each station shall maintain a log book, available at all times, showing the operation of the station and the personnel on duty. (b) No station shall be owned or operated by a limited company, corporation, partnership, or other association unless the person having charge of the station maintains a log book.

§2.62 Log book, form.—The log book shall be kept in an orderly manner, in suitable form, and in such detail that the data required for the particular class of sta-
to the purpose for which they are used, assuming their modulation or their possible keying to be only in amplitude as follows:1
1. Continuous waves:
Type A—Telegraphy on pure continuous waves. A continuous wave which is keyed according to a telegraph code.
Type B—Modulated telegraphy. A carrier wave modulated at one or more audible frequencies; the audible frequency or frequencies and their combination with the carrier wave being keyed according to a telegraph code. A sounds wave resulting from the modulation of a carrier 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 C—Teletypewriting: Waves resulting from the modulation of a carrier wave by frequencies produced at the time of the scanning of fixed or moving objects.
2. Damped waves:
Type A—Facsimile: Waves composed of successive series of oscillations the amplitude of which, after attaining a maximum, decreases gradually, the wave trains being keyed according to a telegraph code.

Communication band widths. The frequency bands authorized to be occupied by the above types of emission are as shown in the following table:

<table>
<thead>
<tr>
<th>Type of transmission</th>
<th>Total width of the band in cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-0 Continuous waves, no signaling.</td>
<td>For transmission with 2 sidesbands</td>
</tr>
<tr>
<td>A-1 Telegraphy, pure continuous wave. Morse code. Stop-coast printer.</td>
<td>Numerically equal to the telegraph speed in bands for the fundamental frequency, 3 times this band for the 2nd harmonic. (For a code of 8 time elements (dots or blanks) per letter and 20 letters per minutes, the stop-coast printer band shall be equal to 0.8 times the speed in words per minute.)</td>
</tr>
<tr>
<td>A-2 Telegraph modulated to radio frequencies. Commercial telegraphy.</td>
<td>Figures appearing under A-1, plus twice the highest number of harmonics included. Twice the number indicated by the COIF Opinions (about 4000 to 6000), 13000 to 20000.</td>
</tr>
<tr>
<td>A-3 Commercial telephony.</td>
<td>B-77 Frequency measurement. The license of each station shall provide means for the measurement of the station frequency. The measurement of the station frequency shall be made by a means independent of the frequency control of the transmitter and shall be conducted in accord with the regulations governing the class of station concerned.</td>
</tr>
<tr>
<td>A-4 Facsimile</td>
<td>Approximately the ratio between the number of picture components multiplied by the number of picture elements transmitted per second.</td>
</tr>
<tr>
<td>A-5 Television</td>
<td>Digital to analog conversion and transmission.</td>
</tr>
</tbody>
</table>

### 12.78 Special emissions. Authorization for other types of emission may be issued and will be termed “special” in the instrument of authorization. When special emissions are authorized they will be described and limited as to band width by the instrument of authorization. |

### 12.79 Operating power, computation of. The operating power shall be computed by one of the following methods:
1. By indirect measurement from the plate input power of the last radio stage by multiplying the plate voltage by the current of the last radio stage, and by a factor which is specified in the regulations governing the class of station concerned.
2. By direct measurement of the antenna input power. |

### 12.80 Change in height or location of antenna. The license 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 300 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 controlled by the Civil Aeronautics Administration or within five miles of the center line of an established Federal Airport.

### 12.82 Inspection of tower lights and associated control equipment. The licensee of any radio station which has an antenna or antenna supporting structures shall be subject to the provisions of 306 of the Communications Act of 1934, as amended:
1. 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.
2. Shall report immediately by telephone or telegraph to the nearest Airway 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.
3. Shall inspect at intervals of at least once each three months, all flashing or rotating lights and associated control devices to insure that such apparatus is functioning properly as required.

### NATIONAL DEFENSE

#### 12.91 National defense—free service. Any common carrier subject to the Communications Act may render to any agency of the United States Government, the nearest Airway 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.

#### 12.93 National defense—emergency authorization. The Federal Communications Commission may authorize the licensee of any radio station during a period of national emergency, such emergency being declared by the President or his designee, to transmit to the United States military forces, or to such other agencies as the President or his designee may designate, frequencies not in use, which are not restricted in this part, and which are not in use, to whom such operation is authorized by the President or his designee, to the exclusion of other users of the frequency band in which such frequencies are authorized.

Part 2—RULES GOVERNING STANDARD AND HIGH-FREQUENCY BROADCAST STATIONS

### TABLE OF CONTENTS

#### SUBPART A—RULES GOVERNING STANDARD BROADCAST STATIONS

<table>
<thead>
<tr>
<th>Definitions</th>
<th>See</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Standard broadcast station.</td>
<td>See 3.2</td>
</tr>
<tr>
<td>3.2 Standard broadcast band.</td>
<td>3.9 Broadcast day.</td>
</tr>
<tr>
<td>3.3 Standard broadcast channel.</td>
<td>3.10 Experimental period.</td>
</tr>
<tr>
<td>3.4 Nominal station.</td>
<td>3.11 Service areas.</td>
</tr>
<tr>
<td>3.5 Secondary station.</td>
<td>3.12 Portable transmitter.</td>
</tr>
<tr>
<td>3.6 Daytime station.</td>
<td>3.13 Portable receiver.</td>
</tr>
<tr>
<td>3.7 Nighttime.</td>
<td>3.14 Combined audio harmonics.</td>
</tr>
<tr>
<td>3.8 Sunrise and sunset.</td>
<td>3.15 Effective field.</td>
</tr>
</tbody>
</table>

(Continued on page 179)
ALLOCATION OF FACILITIES

Sec. 3.201 Three classes of standard broadcast channels.
Sec. 3.202 Clear channel.
Sec. 3.203 Regional channel.
Sec. 3.204 Local channel.
Sec. 3.205 Channels and power of standard broadcast channels.
Sec. 3.206 Broadcast facilities; showing required.

FREQUENCY ALLOCATIONS BY CLASSES OF STATIONS

Sec. 3.207 Clear channels: classes I and II stations.
Sec. 3.208 Regional channels: classes III-A and I-B stations.
Sec. 3.209 Local channels: classes IV stations.
Sec. 3.210 Assignment of stations to classes.
Sec. 3.211 Antennas: class IV stations to regional channels.

EQUIPMENT

Sec. 3.212 Maximum rated power; tolerances.
Sec. 3.213 Maximum rated power; how determined.

TECHNICAL OPERATION

Sec. 3.51 Operating power; how determined.
Sec. 3.52 Operating power; indirect measurement.
Sec. 3.53 Application of efficiency factors.
Sec. 3.54 Modulation.
Sec. 3.55 Modulation; data required.
Sec. 3.56 Operating power; maintenance of.

OPERATION

Sec. 3.71 Minimum operating schedule.
Sec. 3.72 Operating schedule during experimental period.
Sec. 3.73 Scheduling hours.
Sec. 3.74 Sharing time.
Sec. 3.75 Sharing time; equivalency of day and night hours.
Sec. 3.76 Sharing time; experimental period.
Sec. 3.77 Sharing time; departure from regular schedule.
Sec. 3.78 Shifting time stations; notification to Commission.
Sec. 3.79 License to specify sunrise and sunset hours.

RULES APPLICABLE TO STATIONS ENGAGED IN CHAIN BROADCASTING

Sec. 3.101 Exclusion of affiliation.
Sec. 3.102 Territorial exclusivity.
Sec. 3.103 Term of affiliation.
Sec. 3.104 Option time.

Subpart B—RULES GOVERNING FM BROADCAST STATIONS

CLASSIFICATION OF FM STATIONS AND ALLOCATION OF FREQUENCIES

Sec. 3.201 Numerical designation of FM channels.
Sec. 3.202 Areas of the United States.

RULES GOVERNING ADMINISTRATIVE PROCEDURE

Sec. 3.311 Application for FM stations.
Sec. 3.312 Authorization to operate.
Sec. 3.313 Installation or removal of apparatus.
Sec. 3.314 Period of construction.
Sec. 3.315 Enforcement of construction permits.
Sec. 3.316 Equipment tests.
Sec. 3.317 Program tests.
Sec. 3.318 Normal license period.
Sec. 3.319 License; simultaneous modification, and renewal.
Sec. 3.320 Renewal of license.
Sec. 3.321 Temporary extension of license.

RULES RELATING TO EQUIPMENT

Sec. 3.351 Transmitter power.
Sec. 3.352 Frequency monitor.
Sec. 3.353 Modulation monitor.
Sec. 3.354 Required transmitter performance.

RULES RELATING TO TECHNICAL OPERATION

Sec. 3.261 Time of operation.
Sec. 3.262 Experimental operation.
Sec. 3.263 Station inspection.
Sec. 3.264 Station operation; using of.
Sec. 3.265 Operational requirements.
Sec. 3.266 Facsimile broadcasting and multiple transmission.

OTHER RULES RELATING TO OPERATION

Sec. 3.301 Logs.
Sec. 3.302 Logs, retention of.
Sec. 3.303 Logs, by whom kept.
Sec. 3.304 Log form.
Sec. 3.305 Correction of logs.
Sec. 3.306 Rough logs.
Sec. 3.307 Station identification.
Sec. 3.308 Mechanical records.
Sec. 3.309 Sponsored programs, announcement of.

Subpart C—GENERAL RULES APPLICABLE TO STANDARD BROADCAST STATIONS

Sec. 3.401 Station license; posting of.
Sec. 3.402 Licensed operator required.
Sec. 3.403 Licensed operator; other duties.
Sec. 3.404 Logs;
Sec. 3.405 Logs; retention of.

Subpart D—RULES GOVERNING TELEVISION BROADCAST STATIONS

CLASSIFICATION OF TELEVISION STATIONS AND ALLOCATION OF FREQUENCIES

Sec. 3.501 Numerical Designation of Television.
Sec. 3.502 Shifting or Television Channels.
Sec. 3.503 Community Stations.
Sec. 3.504 Metropolitan Stations.

RULES GOVERNING ADMINISTRATIVE PROCEDURE

Sec. 3.511 Application for Television Stations.
Sec. 3.512 Full Disclosure.
Sec. 3.513 Installation or Removal of Apparatus.
Sec. 3.514 Period of Construction.
Sec. 3.515 Contract of Construction Formulas.
Sec. 3.516 Extension of Time.
Sec. 3.517 Program Tests and Proof of Performance.
Sec. 3.518 Program Tests.
Sec. 3.519 Normal License Period.

RULES RELATING TO EQUIPMENT

Sec. 3.601 Transmitter Power.
Sec. 3.603 Frequency Monitors.
Sec. 3.605 Modulation Monitors.
Sec. 3.606 Required Transmitter Performance.

RULES RELATING TO TECHNICAL OPERATION

Sec. 3.601 Time of Operation.
Sec. 3.602 Experimental Operation.
Sec. 3.603 Station Inspection.
Sec. 3.604 Inspection of Tower Lights and Associated Control Equipment.

OTHER RULES RELATING TO OPERATION

Sec. 3.601 Logs.
Sec. 3.602 Logs, retention of.
Sec. 3.603 Logs, by whom kept.
Sec. 3.604 Log form.
Sec. 3.605 Correction of Logs.
Sec. 3.606 Rough Logs.
Sec. 3.607 Station Identification.
Sec. 3.608 Mechanical Records.
Sec. 3.609 Inspection of records.
Sec. 3.610 Inspection of towers.

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

Sec. 3.701 Station license; posting of.
Sec. 3.702 Licensed operator required.
Sec. 3.703 Licensed operator; other duties.
Sec. 3.704 Logs.

EQUIPMENT

Sec. 3.801 Transmitter power.
Sec. 3.802 Frequency monitor.
Sec. 3.803 Modulation monitor.
Sec. 3.804 Required transmitter performance.

TECHNICAL OPERATION

Sec. 3.901 Time of operation.
Sec. 3.902 Experimental operation.
Sec. 3.903 Station inspection.
Sec. 3.904 Station operation; using of.
Sec. 3.905 Operational requirements.

RADIO BROADCASTING • TELECASTING

Page 476 • 1946 Yearbook Number

(Continued on page 130)
§32.2 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 unusual 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 channels. No station from the same area will be licensed with a clear channel designation in section 3.25 or in accordance with the Engineering Standards of Allocation. The operating power shall be 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 designated in section 3.25 and designed to render primary service which is limited by and subject to such interference as may exist from another class I station. The operating power shall not be 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. No other class II stations will be licensed on the same channel for classes III, IV and V 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 primarily 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 power not less than 0.25 kilowatts nor more than 0.5 kilowatt, and its service area is subject to interference in accordance with the Engineering Standards of Allocation.

§32.3 Time of operation of the several classes of stations. — 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 the hours of 6 a.m. to 6 p.m., in addition to the hours of 6 a.m. to 6 p.m. of the day, between the hours of 6 p.m. and 6 a.m., including the subject of 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 of 6 a.m. to 6 p.m., with the exception of the hours of 12 a.m. to 6 a.m., and from 6 a.m. to 6 p.m., including the hours of 12 a.m. to 6 a.m., including the hours of 12 a.m. to 6 p.m.

(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 3.11.)

§32.4 Broadcast facilities; showing required. — An authorization for a new standard broadcast station or increase in facilities of an existing station will be issued only after a satisfactory showing has been made in regard to the following:

(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 section 3.25.)

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

(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 assignment or relocation of new stations and requirements of the FCC. (See technical regulations herein and Locations of Transmitters of Standard Broadcast Stations.)

(f) That the facilities sought are subject to assignment as requested under the regulation cited in the license.

(1) For definitions of terms employed in section 3.25 and the Communications Act of 1934, as amended, see section 3.25(a) for further power limitation.

(2) The term “metropolitan district” as used in this paragraph is not limited in accordance with the classification system of the Bureau of the Census but includes any principal center of population in any area.

(3) The Radio Station Propagation Handbook and the Communications Act of 1934, as amended, shall be accepted under conditions prescribed by the Commission.

(4) Effective field, effective field intensity, effective field strength, field at a distance of 1 mile from the antenna in all directions, and horizontal plane.

(5) The term “terminal area” as used in this paragraph is not limited in accordance with the classification system of the Bureau of the Census but includes any principal center of population in any area.
existing international agreements and the Rules and Regulations of the Commission.

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

§32.23 Clear channel: class I and II stations.—The frequencies in the following table are reserved as clear channels and assigned use by the classes of stations are 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: 690, 650, 660, 670, 700, 720, 750, 760, 770, 780, 820, 830, 840, 850, 860, 870, 880, 890, 900, 910, 920, 930, 940, 950, 960 and 970 kilocycles.

(b) The power of the class I stations on these channels shall not be less than 50 watts.

(c) To each of the channels below there may be assigned class I and class II stations: 680, 710, 810, 850, 940, 1000, 1080, 1090, 1280, 1290, 1410, 1420, 1430, 1550, 1600, 1610, and 1650 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, 25 milliwatts per meter vertical effective radiated power may be used at any point on said border, 690, 740, 800, 900, 1010, and 1580 kilocycles.

§32.25 Regional channels: class I-A and class I-B stations.—The following frequencies are assigned to regional channels and are assigned use for class I-A and class I-B stations: 550, 550, 550, 550, 550, 600, 610, 620, 630, 640, 650, 660, 670, 680, 690, 700, 710, 720, 730, 740, 750, 770, 780, 800, 810, 820, 830, 840, 850, 860, 870, 880, 890, 900, 910, 920, 930, 940, 950, 960, 970, 980, 990, 1000, 1000, 1010, 1020, 1030, 1040, 1050, 1060, 1070, 1080, 1090, 1100, 1110, 1120, 1130, 1140, 1150, 1160, 1170, 1180, 1190, 1200, 1210, 1220, 1230, 1240, 1250, 1260, 1270, 1280, 1290, 1300, 1310, 1320, 1330, 1340, 1350, 1360, 1370, 1380, 1390, 1400, 1410, 1420, 1430, 1440, 1450, 1460, 1470, 1480, 1490, 1500, 1510, 1520, 1530, 1540, 1550, 1560, 1570, 1580, 1590, and 1600 kilocycles.

§32.27 Local channels: IV stations.—The following frequencies are designated as local channels and are assigned use for class IV stations: 1290, 1340, 1350, 1360, and 1370 kilocycles.

§32.30 Assignment of stations to channels.—(a) The individual assignments of stations to channels which may cause interference to other United States stations will be made in accordance with the standards of good engineering practice prescribed and published from time to time by the Commission for the respective classes of stations involved. (For determining objectionable interference see "Engineering Standards for Broadcast Stations—Field Intensity Measurements in An Aerosion", Section C.)

(b) Frequency assignments will be made in accordance with the "Field Intensity Measurements in An Aerosion", Section C.)

(c) In all cases where the individual assignment may cause interference with or may involve a channel assigned for priority of use by a station in another North American country, the classification, allocation requirements and engineering standards for the channel in the North American Regional Broadcasting Agreement shall be observed.

§32.35 Assignment of class IV stations to regional channels.—On condition that interference will not be caused to any class III station and that the channel is used only for class III stations and subject to interference as may be received from class III stations, class IV stations may be assigned to regional channels.

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

(b) The physical location of a standard broadcast station, duly located to service the public interest, convenience, and necessity will be served by the authorization requested.

(c) In case a special experimental authorization permits additional hours of operation, the station may remain in operation during such time and as the operation may be necessary to serve the public convenience, interest, or necessity.

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

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

(f) That the proposed experimental authorization 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.

(g) 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:

(1) Comprehensive summary of all research and experimental conducted

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

§33.30 Directional antenna: showing required.—(a) No application for authority to install a directional antenna will be accepted unless a definite picture has been filed of the time of day and time of year when the broadcast station will hold such experimental authorization to conduct experiments that are deemed desirable and reasonable.

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

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(1) Comprehensive summary of all research and experimental conducted

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

§33.30 Directional antenna: showing required.—(a) No application for authority to install a directional antenna will be accepted unless a definite picture has been filed of the time of day and time of year when the broadcast station will hold such experimental authorization to conduct experiments that are deemed desirable and reasonable.

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

(1) Comprehensive summary of all research and experimental conducted

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

§33.30 Directional antenna: showing required.—(a) No application for authority to install a directional antenna will be accepted unless a definite picture has been filed of the time of day and time of year when the broadcast station will hold such experimental authorization to conduct experiments that are deemed desirable and reasonable.

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

(1) Comprehensive summary of all research and experimental conducted

(2) Conclusions and outline of proposed program for further research and development.
FCC RULES & REGULATIONS FOR BROADCAST SERVICES

(Continued from page 482)

TECHNICAL OPERATION

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

(1) Direct measurement of the antenna power in accordance with section 3.04.14;

(2) Each new standard broadcast station.

§3.32 Operating power; indirect measurement.—The operating power determined by indirect measurement from the plate input power of the last radio stage is the product of the plate rating (Ip), the total plate current of the last radio stage (Ip), and the proper factor (Fp) given in the following table:

A. Factor to be used for stations employing plate modulation in the last radio stage:

<table>
<thead>
<tr>
<th>Class</th>
<th>Power rating in watts</th>
<th>Factor (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A25</td>
<td>120-250, 500-1,000</td>
<td>20</td>
</tr>
<tr>
<td>A50</td>
<td>120-250, 500-1,000</td>
<td>20</td>
</tr>
<tr>
<td>A100</td>
<td>120-250, 500-1,000</td>
<td>20</td>
</tr>
<tr>
<td>A200</td>
<td>120-250, 500-1,000</td>
<td>20</td>
</tr>
<tr>
<td>A500</td>
<td>120-250, 500-1,000</td>
<td>20</td>
</tr>
</tbody>
</table>

B. Factor to be used for stations using grid modulation in the last radio stage:

<table>
<thead>
<tr>
<th>Class</th>
<th>Factor (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A25</td>
<td>30</td>
</tr>
<tr>
<td>A50</td>
<td>30</td>
</tr>
<tr>
<td>A100</td>
<td>30</td>
</tr>
<tr>
<td>A200</td>
<td>30</td>
</tr>
<tr>
<td>A500</td>
<td>30</td>
</tr>
</tbody>
</table>

C. Factor to be used for stations using grid modulation in the last radio stage:

<table>
<thead>
<tr>
<th>Class</th>
<th>Factor (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A25</td>
<td>30</td>
</tr>
<tr>
<td>A50</td>
<td>30</td>
</tr>
<tr>
<td>A100</td>
<td>30</td>
</tr>
<tr>
<td>A200</td>
<td>30</td>
</tr>
<tr>
<td>A500</td>
<td>30</td>
</tr>
</tbody>
</table>

§3.33 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 of the transmitter. The peak plate current at any time during the course of an 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 included all immediately made and description of the method used and the data taken. The antenna current shall be measured by no ammeter of accepted accuracy. These data must be submitted to and approved by the Commission before any license will be authorized to operate by this method of power determination. The antenna measure shall not be changed and the same value, maximum reading, or accuracy without the authority of the Commission. 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 reviewed by the Commission. (See Further Requirements for the Operating Power of Broadcast Stations.)

§3.34 Operating power; direct measurement.—The antenna input power determined by direct measurement is the square of the antenna current times the antenna resistance at any time during the course of an 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 included immediately made and description of the method used and the data taken. The antenna current shall be measured by no ammeter of accepted accuracy. These data must be submitted to and approved by the Commission before any license will be authorized to operate by this method of power determination. The antenna measure shall not be changed and the same value, maximum reading, or accuracy without the authority of the Commission. 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 reviewed by the Commission. (See Further Requirements for the Operating Power of Broadcast Stations.)

§3.35 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 55 percent. When the transmitter is operated with 85 percent modulation, not over 10 percent emitted audio frequency harmonics shall be generated by the transmitter.

§3.36 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.

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

(c) The antenna equipment shall be operated tuned and adjusted that emissions are not radiated outside the authorized band 13 which cause or which, in accordance with the Standards of Good Engineering Practice, are considered as being equivalent to 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 noise, modulating noise, and other essential phases of the operation which control the efficiency of the transmitter shall at all times conformed to the requirements of good engineering practice.

(d) Whichever, in this section, the term "good engineering practice" is used, the specific regulations and standards thereof, as may be published from time to time. (See Construction, General Operation and Safety of Life Requirements.)

14 See Construction, General Operation and Safety of Life Requirements.

13 Formal application required. See Standards of Good Engineering Practice for form number.

12 Informal application may be made, except in controversial cases or directional antenna; then formal application shall be necessary.

11 See Construction, General Operation and Safety of Life Requirements.
(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 practicable by technical means in order to improve broadcast practice and in no case less than 85 percent on peaks of frequent occurrence during any selected period which normally is transmitted at the highest level of the station.

(d) The Commission will, from time to time, publish the specifications, requirements for approval, and a list of approved modulation monitors. (See Field Offices of the Commission for form numbers.)

§3.39 Modulation: data required.—A licensee of a broadcast station claiming the greatest degree of modulation shall, if fundamental data is indicated, be procured shall submit full data showing the actual input power by different means to the extent that the operations of the station are substantially the same as to frequency stability, reliability of operation, radio harmonics and other emissions, audio frequency range and audio harmonic generation in the transmitter.

§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 director in charge of the station shall be notified in writing immediately after the emergency develops. (See Field Offices of the Commission for form numbers.)

§3.58 Indicating instruments.—Each broadcast station shall be equipped with suitable indicating instruments of accepted accuracy to measure the antenna current, current in each arm of the antenna, and the voltage, current, and power of the last radio stage. These indicating instruments shall not be changed or replaced, without the authority of the Commission, except by instruments of the same type, having the same 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 0.0005 cycles of the assigned frequency until January 1, 1948, 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. After January 1, 1948, the frequency of all stations shall be maintained within 20 cycles of the assigned frequency.

§3.60 Frequency monitor.—The licensee of each broadcast station shall be equipped with a frequency monitor to control the frequency of the frequency control of the transmitter. The frequency monitor shall be approved by the Commission and the signal to be transmitted shall be monitored at least once per day. (See Approved Frequency Monitors and Requirements for Approval of Frequency Monitors.)

§3.61 New or Second Hand Broadcast Transmitter.—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 considered that there is reasonable assurance that the transmitter is capable of maintaining automatically the assigned frequency within the limits specified in section 3.60.

§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 or the operating frequency of the station shall require authorization from the Commission. (See Approved Equipment.)

§3.63 Auxiliary transmitter.—Upon showing that a need exists for the use of an auxiliary transmitter in a broadcast station, a license therefor may be issued provided that:

(a) An auxiliary transmitter may be installed at the same location as the main broadcast station and the transmission and the station licensed shall be considered to be an auxiliary transmitter.

(b) A licensed operator shall be in control whenever an auxiliary transmitter is 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:

(1) The transmission of the regular programs upon the failure of the main transmitter

(2) The transmission of regular programs during maintenance or modification 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 good operating condition and that it is adjusted to the proper frequency, except that in case of operation in accordance with paragraph (e) of this section during any week, the test in that week may be omitted provided the operation under paragraph (e) of this section is satisfactory. A record shall be kept of the time and result of each test operating under paragraph (e). Tests shall be conducted every 8 hours at midnight and 8 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 without any manual adjustment during operation or when it is being put into operation.

§3.64 Alternate main transmitters.—The licensee of a standard broadcast station shall, for a period of not to exceed 6 months, have in operation a technique or equipment provisioned for use in the event of failure of the main transmitter. Such alternate transmitters shall provide satisfactory operation with the same authorized frequency, class, power and audience day and night, and the stations shall be permitted to maintain the same authorized frequency, class, power and audience day and night, as the main transmitter. (See FCC rules and regulations as to safety requirements and spurious emissions applying to broadcast transmitting equipment shall apply also to an auxiliary transmitter. (Use of Frequency Monitor Pursuant to section 3.60.)

§3.65 Minimum authorized power.—The minimum authorized power for a standard broadcast station shall be 200 watts, 100 watts power, or 100 watts effective radiated power, as determined by the Commission. Such alternate transmitters are substantially the same as to frequency stability, reliability of operation, radio harmonics and other emissions, audio frequency range and audio harmonic generation in the transmitter.

§3.71 Minimum operating schedule.—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 that 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 5 days. (Provided that the Commission and the inspector in charge shall be notified in writing immediately after the emergency develops. (See Field Offices of the Commission for form numbers.)

§3.72 Operation during experimental period.—The licensees of each standard broadcast station shall be authorized to operate, at any time, during an experimental period as directed by the Commission in order to facilitate frequency measurement or for the determination of the interference. (Stations operated free, with no compensation for time.) Such licensees shall be charged for the time during which they are operating free, with no compensation for time, and shall be required to operate on their experimental frequency in the regular time checking and silent schedule.

§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 agreements, 1 hour day shall be considered the equivalent of 2 day hours. (See Average Ratings.)

§3.76 Sharing time; experimental period.—If the license of a station authorized to operate during an experimental period is signed by the licensee of the station thereby and filed with the Commission prior to the time of the proposed change, the operating schedule provided for shall be considered as in effect during the experimental period.

§3.77 Time-sharing agreements; notice to Commission.—If the licensees of authorized stations agree to share time, the Commission shall be notified by statement to that effect filed with the applications for renewals of licenses. Upon receipt of such statement the Commission shall provide the application for such station with the usual schedule of such hearing. The operating schedule previously provided shall be considered in full effect and effect.

§3.78 License to specify summer and winter hours.—If the license of a broadcast station is signed by the licensees of the stations thereby and filed with the Commission prior to the time of the proposed change, the license shall contain the time during the summer and winter, the license shall specify the hour of the day during which the license period when operation of such station will commence or cease. (See Average Ratings.)

§3.80 Secondary stations; filing of operating schedule.—The licensee of a secondary station authorized to operate limited time and which may operate with a low power broadcasting service shall be required to file with the Commission, in triplicate, a copy of its regular operating schedule, bearing a signed notation by the

(Continued from page 484)

BROADCASTING • Telecasting

Page 486 • 1946 Yearbook Number
licensure of the dominant station of its objection or lack of objection thereto. U.S. approval of the application for the permit shall not be effective until the application has been approved by the Federal Communications Commission and returned one copy to the licensee authorized to operate limited time, which shall be posted in the station license and considered as a part thereof. Departure from said operating conditions is hereby permitted in accordance with the procedure set forth in section 3.77. 

§ 1.57 Question: failure to reach agreement.—If the licensee of a secondary station authorized to operate limited time and a dominant station of a channel are unable to agree upon a definite time for resumption of operation by the station authorized to operate limited time, the Commission may order the licensee of the station authorized limited time. After receipt of such statement the Commission will designate for hearing the applications of both parties for hearing and will not hear the scheduling previously adhered to shall remain in full force and effect.

§ 1.58 Departure from schedule; material violation.—In all cases where a station license is suspended or revoked, and in any other instance of violation or departure from such schedule, except as herein authorized, shall be considered as a violation of a material term of the license.

§ 1.59 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.

§ 1.60 Daylight saving time.—I1 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.

§ 1.61 Changes in time; agreement between licensees.—When 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 during the period of daylight saving time observed at any of the locations of some of the stations.

§ 1.62 Limited-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 modifications of such license with respect to hours of operation is authorized by the Commission.

§ 1.63 Program transmissions prior to local sunrise. (a) The provisions of sections 1.59, 1.63, 3.11 and 3.15 shall not prevent the transmission of programs between four o'clock, local standard time, and local sunrise, of standard broadcast stations with their authorized daytime facilities.

(b) Provided: That the provisions of this rule shall not extend to:

(1) Stations regularly sharing time during daylight hours either under licenses pursuant to which time-sharing agreements have been entered into, or licenses specifying hours of operation, unless time-sharing agreements have been reached covering such operation prior to local sunrise. Sections 3.74, 3.77, and 3.78 of these rules shall apply.

(2) Any class II station causing interference, by use of its daytime facilities within the 0.5-microsecond 50% mark, to any class I station within the United States or of any country party to the North American Regional Broadcasting Agreement, except (a) where the class I station is located east of the 84th meridian; and (b) where an agreement has been reached with the class I station.

(3) Operation by use of its daytime facilities of any class II station on any class I channel not assigned to the United States under the North American Regional Broadcasting Agreement.

(4) Any station operating during such hours receiving notice from the Commission that the station's interference frequency shall be shut off from such operation during such hours pending further notice from the Commission.

(c) Nothing contained in this section shall have authorization for such stations shall prohibit such operation except as herein provided.

(d) The period 4 a.m. to 6 a.m., local standard time, shall not be included in determining compliance with section 3.71 of these rules.

§ 1.101 Exclusion 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 under which the station is primarily engaged in the operation of such station shall be considered as one with any other network organization.

§ 1.102 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 prevents or hinders the station from scheduling programs not taken by the former station, or which prevents or hinders another station from scheduling a program in a subject matter different area from broadcasting any program of a network organization. This restriction shall extend to any contract, arrangement, or understanding between a station and a network organization to the extent that the station may not use its facilities to broadcast in its primary service area upon the programs of the network organization.

Subpart B—Rules Governing FM Broadcast Stations

CLASSIFICATION OF FM STATIONS AND ALLOCATION OF FREQUENCIES

§ 3.201 Numerical designation of FM channels. —For convenience, the frequency available for FM broadcasting (including those assigned to non-commercial and educational) are given numerical designations which are shown in the table below:

[Table]

[Editor's Note: FM Allocations by me on page 190; by cities on page 143.1]

§ 3.202 Terms. —The term "network organization", as used herein includes national and regional network organizations.

[Subparagraphs]

§ 3.203 Rules applicable to stations engaged in chain broadcasting

LICENSING REQUIREMENTS

§ 3.101 Exclusion 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 under which the station is primarily engaged in the operation of such station shall be considered as one with any other network organization.

§ 3.102 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 prevents or hinders the station from scheduling programs not taken by the former station, or which prevents or hinders another station from scheduling a program in a subject matter different area from broadcasting any program of a network organization. This restriction shall extend to any contract, arrangement, or understanding between a station and a network organization to the extent that the station may not use its facilities to broadcast in its primary service area upon the programs of the network organization.

[Subparagaphs]
§ 3.203 Community Stations.—(a) Community stations are limited to a maximum effective radiated power of 250 watts and a maximum antenna height of 200 feet over average terrain. The Commission may authorize the use of lower antenna heights in such cities as will assure protection to other users of the airwaves.

Upon proper showing that an antenna height in excess of 250 feet is necessary, authorization may be granted to continue the use of such height, but in no case shall the permitted radiated power be increased in such cases require a reduction in radiated power. A minimum separation of 50 miles will be provided in the case of Community stations on the same channel, or 100 miles in the case of Community stations in a metropolitan district. Ten of these channels are also available for ground service in all the non-metropolitan areas of the United States.

(b) In Area I, 20 channels beginning with 104.1 mc and ending with 105.9 mc (Channels 251 through 300) are allocated for Community stations. All of these 20 channels are available for Community stations in the primary service of a city of a metropolitan district. Ten of these channels are also available for ground service in all the non-metropolitan areas of the United States.

(c) In Area II, 10 channels beginning with 104.1 mc and ending with 105.9 mc (Channels 221 through 230) are available for Community stations and may be used in any community which is not a part of a metropolitan district.

(d) The main studio of a Community station shall be located in the city served and the transmitter shall be located as near the center of the city as practicable.

§ 3.204 Metropolitan stations.—(a) In Area I, Metropolitan stations are limited to a maximum of 20 kw effective radiated power with a non-directional antenna having a height of 500 feet, as determined by the methods prescribed in the standards of Good Engineering Practice Concerning FM broadcast stations. Where higher antenna heights are available, they should be used but in such cases the Commission will authorize less than 20 kw effective radiated power so that the coverage (within the 1000 mc/m contour) shall be substantially similar to that to which would be provided by 20 kw effective radiated power and a 500 foot antenna. Where the only antenna height available is less than 500 feet, the Commission may authorize its use but will not permit an increase in radiated power in excess of 2 kw. In Area I, the service area of Metropolitan stations will generally be limited to the city served, but the Commission may authorize a service area extending beyond the city of a metropolitan district.

(b) Metropolitan stations in Area II are designed primarily to render service to a single metropolitan district or a principal city, and to rural areas surrounding such metropolitan district. Metropolitan stations in Area II will be authorized similar service areas to those shown for Metropolitan stations in Area I. The Commission may designate service areas for Metropolitan stations in Area II and will authorize appropriate power and antenna heights to cover the designated area in accordance with the standards of Good Engineering Practice Concerning FM broadcast stations. Upon proper showing changes will be made in these service areas.

(c) Metropolitan stations will be authorized service areas similar to those shown for Metropolitan stations in Area I and II. The Commission but no application will be granted for a Metropolitan station unless it is proposed to serve an area substantially greater than could be served by a Community station.

(d) Sixty frequencies are available for Metropolitan stations in Areas I and II. These frequencies begin at 92.1 mc and end at 105.9 mc (Channels 221 through 280).

(e) The main studio of a Metropolitan station shall be located within its 1500 mc/m contour. However, upon a special showing of need, the Commission may authorize the main studio to be located beyond the 1500 mc/m contour but not beyond the 1000 mc/m contour. The transmitter shall be so located as to provide maximum service both to the city where the main studio is located and to the surrounding rural area.

§ 3.205 Rural stations.—(a) Rural stations are designed primarily to furnish service to rural areas, and are limited to 10 kw effective radiated power, and are limited to service areas designated by the Commission for Metropolitan stations upon a showing to the Commission that the additional area which the Rural station will serve is not being adequately served by other stations. The Commission may authorize a Rural station to serve an area of up to 100 square miles for which it is shown that at least 50 percent of the population proposed to be added within the 50 mc/m contour live in rural areas or in communities smaller than 10,000. The standards of Good Engineering Practice Concerning FM broadcast stations contain technical provisions for the application of the rules and regulations governing FM broadcast stations to rural areas. The Commission may grant an application for a Rural station license after it is shown, upon a special showing of need, that: the area in question is adequately served, the new station will be a substitute for an existing station, or that the additional service will be of material benefit to the area.

(b) Rural stations will not be licensed in Area I as presently defined. If, in the future it becomes necessary to extend Area I by including part or all of the region set forth in footnote 1 of Section 2.292, consideration will be given at that time to the question whether Rural stations should be licensed in this region.

(c) The 60 channels available for Metropolitan stations are also available for Rural stations.

(d) The main studio of a Rural station shall be located within its 1000 mc/m contour. However, upon a special showing of need, the Commission may authorize the main studio to be located beyond the 1000 mc/m contour but not beyond the 5000 mc/m contour.

1 For the time being, until more FM stations are authorized, the Commission will not authorize Community stations in principal cities of metropolitan districts in Area I having 4 or more AM stations.

2 The 10 frequencies from 104.1 mc to 105.9 mc which are available for Community stations shall be used to provide service to the communities to which they are assigned in accordance with the needs of the area as shown by future developments. In the meantime they will be available for use in rural areas.

3 In determining service areas for principal communities, the Commission will give consideration to population distribution, terrain, trade areas, and other pertinent factors. As long as each station is limited to a maximum of 20 kw, such stations may be licensed to serve other communities with the needs of the area as shown by future developments. In the meantime they will be available for service to other communities.

1 Form FCC No. 701.
FCC RULES & REGULATIONS FOR BROADCAST SERVICES

(Continued from page 490)

§ 3.230 Renewal of license.—(a) Unless otherwise directed by the Commission, each application for renewal of an FM license shall be filed at least 60 days prior to the expiration date of the license sought to be renewed (Form FCC 303B). For Renewal of a license, the application will be considered unless there is on file with the Commission, the information required by Section 3 of this part, a request for 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 time specified for the hearing or investigation shall proceed as if such renewal application had been received.

(b) Whenever the Commission regards an application for a renewal of an FM license to be wholly or partially inadequate, or if the application does not comply with the provisions of this section, or if it is otherwise deemed advisable by the Commission to require a hearing or investigation, such application shall be dismissed without prejudice and without an application for hearing or investigation being filed by the licensee within the time thus specified. That such temporary extension shall be construed as a finding by the Commission that the station is serving the public, the public interest, convenience, and necessity, or that the public the express terms of such temporary extension of license; And provided further, That such temporary extension of license shall be in no wise affect or limit the action of the Commission with respect to any pending application or proceeding.

§ 3.232 Repeal of regulations.—(a) Where an applicant has been afforded an opportunity to be heard with respect to a particular application for a new FM 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, at the same place, or by one or more of the original parties in interest, until after the lapse of 12 months from the date of the action of the Commission.

(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 service, at the same place, or by one or more of the original parties in interest, will not be considered until the final disposition of such appeal.

§ 3.233 Assignment or transfer of control.—(a) Voluntary: Application for consent to voluntary assignment of an FM construction permit or license, or for consent to voluntary transfer of control of a corporation holding an FM construction permit or license shall be filed with the Commission on Form FCC 303A. The application must be submitted prior to the effective date of the assignment or transfer of control (as defined in §3.234). Consent to assignment or 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 entity involved.

§ 3.234 Exclusivity of assignment.—No license shall be granted to an FM broadcast station having any contract, arrangement, or understanding, express or implied, with a network organization, under which the station is to be programmed or controlled, or to be operated in such a manner as to receive, distribute, or rebroadcast network programming.

§ 3.235 Territorial exclusivity.—No license shall be granted to an FM broadcast station having any contract, arrangement, or understanding, express or implied, with a network organization which prevents or hinders another broadcast station in the same area from receiving, distributing, or rebroadcasting network programs not taken by the former station, or which prevents or hinders another broadcast station serving a substantially different area from broadcasting any network programs.

§ 3.236 Term of affiliation.—No license shall be granted to an FM broadcast station having any contract, arrangement, or understanding, express or implied, with a network organization which provides, by original terms, provisions for renewal, or affords a station the option to renew an affiliation contract 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 expiration of the license term.

§ 3.237 Option time.—No license shall be granted to an FM broadcast station which opts to receive programs of a network to which any or all networks during any one of three segments of the broadcast day, as herein described. The broadcast day is divided into four segments, as follows:

(a) 8:00 a.m. to 1:00 p.m.; (b) 1:00 p.m. to 6:00 p.m.; (c) 6:00 p.m. to 11:00 p.m.; (d) 11:00 p.m. to 6:00 a.m. Each network affiliation which is the subject of this part shall be considered to cover the time covered by the option, or time, to other network organizations.

§ 3.239 Right to reject programs.—No license shall be granted to an FM broadcast station the application for which is conditioned upon the station offering a program prescribed by another network organization and may not prevent the station from offering a program which the station reasonably believes to be unsatisfactory or unsuitable; or which (b), with respect to network programs, whether or not already contracted to the station, it is not in the public interest, or refusing any program for such opinion, is contrary to the public interest, or from substituting a program of local or national importance.

§ 3.240 Assignment or transfer of control—a network organization, or to any person directly or indirectly controlled by or under common control3 of a network organization, for a—FM broadcast station having any contract, arrangement, or understanding, express or implied, with a network organization which includes the right of the owner or controlling person of the network organization, or to any person directly or indirectly controlled by or under common control of a network organization, for a FM broadcast station to be affiliated with a network organization which maintains more than one network of FM broadcast stations: Provided, That this regulation shall in no way affect or limit the action of the Commission with respect to any pending application or proceeding.

§ 3.242 Control by networks of station rates.—No license shall be granted to an FM broadcast station having any contract, arrangement, or understanding, express or implied, with a network organization which includes the right of the owner or controlling person of the network organization, or to any person directly or indirectly controlled by or under common control of a network organization, for a FM broadcast station to be affiliated with a network organization which maintains more than one network of FM broadcast stations: Provided, That this regulation shall in no way affect or limit the action of the Commission with respect to any pending application or proceeding.

§ 3.243 Frequency monitor.—The licensee of each FM broadcast station shall in operation at the transmitter an approved frequency monitor adequate to perform the functions required by this section. For detailed requirements thereof see Standards of Good Engineering Practice concerning FM Broadcast Stations.

§ 3.244 Modulation monitor.—The licensee of each FM broadcast station shall in operation at the transmitter an approved modulation monitor. For detailed requirements thereof see Standards of Good Engineering Practice concerning FM Broadcast Stations.

§ 3.245 Required transmitter performance.—The construction, installation, operation, and maintenance of the FM broadcast transmitter system shall be in accordance with the Standards of Good Engineering Practice concerning FM Broadcast Stations.

§ 3.246 Transmitter.—Upon showing that a need exists for the use of an auxiliary transmitter in addition to the regular transmitter of a broadcast station, a license therefor may be issued provided that:

(a) The auxiliary transmitter shall be under control of the owner of the regular transmitter, and either at the same location as the regular or auxiliary transmitter in the same building.

(b) The auxiliary transmitter shall be maintained so that it may be put into immediate operation at any time as may be necessary for the following purposes:

(1) The transmission of regular programs upon the failure of the main transmitter.

(2) The transmission of emergency programs.

(3) The transmission of programs necessary to keep the station on the air.

3The term "network organization" as used herein includes national and regional network organizations as defined in §3.3 of this part, including the Chain Broadcast League and others.

4As used in this section, an option is any contract, arrangement, or understanding, express or implied, between a station and a network organization which provides, or obligates, the station to receive programming provided by the network organization and which limits the station's right or obligation to receive programming provided by other network organizations. Shifts from daylight saving time to standard time or vice versa may or may not shift the specified hours correspondingly as agreed by the station and network organization.

5The word "controlled" as used herein, is not limited to full control but includes such a relationship as that in which the controlling person or entity has over 50 per cent of the stock ownership of the station to other networks.

(Continued on page 494)
FM station for the multiplex transmission of facsimile or other signals and
other broadcast programs, provided that the transmission of facsimile
or other broadcast signals is incidental to the radio broadcast, does not
reduce the authorized power of the station, and that the equipment
is not required for receivers not equipped to receive facsimile or other
signals.

§ 3206 Provisional license for experimental broadcast operation.
(a) A license to operate a radio broadcast station, which requires
for its operation an experimental specification, or for which an
experimental license is required, shall be granted 

§ 3206 Station monitoring. — The owner or operator of each
station must monitor the performance of the station and
make a written record of any violation detected. The
violation shall be reported immediately to the
Commission.

§ 3206.3 Inspection of facilities and associated control equipment.
(b) Each "special facility license" or "special control license"
shall be canceled if the person operating the station
fails to maintain the records required by the
provisions of § 3206.3.

§ 3208 Receipt of signals.
(a) Each "special facility license" or "special control license"
shall be canceled if the person operating the station
fails to maintain the records required by the
provisions of § 3206.3.

§ 3209 Frequency changes without license.
(a) Each "special facility license" or "special control license"
shall be canceled if the person operating the station
fails to maintain the records required by the
provisions of § 3206.3.

§ 3211.3 Operation of radio broadcast station.
(a) Each "special facility license" or "special control license"
shall be canceled if the person operating the station
fails to maintain the records required by the
provisions of § 3206.3.

§ 3215.3 Operation of radio broadcast station.
(a) Each "special facility license" or "special control license"
shall be canceled if the person operating the station
fails to maintain the records required by the
provisions of § 3206.3.

§ 3219.3 Operation of radio broadcast station.
(a) Each "special facility license" or "special control license"
shall be canceled if the person operating the station
fails to maintain the records required by the
provisions of § 3206.3.

§ 3221.3 Operation of radio broadcast station.
(a) Each "special facility license" or "special control license"
shall be canceled if the person operating the station
fails to maintain the records required by the
provisions of § 3206.3.

§ 3223.3 Operation of radio broadcast station.
(a) Each "special facility license" or "special control license"
shall be canceled if the person operating the station
fails to maintain the records required by the
provisions of § 3206.3.

§ 3225.3 Operation of radio broadcast station.
(a) Each "special facility license" or "special control license"
shall be canceled if the person operating the station
fails to maintain the records required by the
provisions of § 3206.3.

§ 3227.3 Operation of radio broadcast station.
(a) Each "special facility license" or "special control license"
shall be canceled if the person operating the station
fails to maintain the records required by the
provisions of § 3206.3.

§ 3229.3 Operation of radio broadcast station.
(a) Each "special facility license" or "special control license"
shall be canceled if the person operating the station
fails to maintain the records required by the
provisions of § 3206.3.

§ 3231.3 Operation of radio broadcast station.
(a) Each "special facility license" or "special control license"
shall be canceled if the person operating the station
fails to maintain the records required by the
provisions of § 3206.3.

§ 3233.3 Operation of radio broadcast station.
(a) Each "special facility license" or "special control license"
shall be canceled if the person operating the station
fails to maintain the records required by the
provisions of § 3206.3.

§ 3235.3 Operation of radio broadcast station.
(a) Each "special facility license" or "special control license"
shall be canceled if the person operating the station
fails to maintain the records required by the
provisions of § 3206.3.

§ 3237.3 Operation of radio broadcast station.
(a) Each "special facility license" or "special control license"
shall be canceled if the person operating the station
fails to maintain the records required by the
provisions of § 3206.3.

§ 3239.3 Operation of radio broadcast station.
(a) Each "special facility license" or "special control license"
shall be canceled if the person operating the station
fails to maintain the records required by the
provisions of § 3206.3.

§ 3241.3 Operation of radio broadcast station.
(a) Each "special facility license" or "special control license"
shall be canceled if the person operating the station
fails to maintain the records required by the
provisions of § 3206.3.
§ 3256 Correction of log.—No log or portion thereof shall be erased, obliterated, altered, or destroyed in whole or in part, except in accordance with the rules. Any necessary correction may be made only by the person originating the entry, and in a manner approved for that purpose. The correction shall be made in the log immediately after the correction is made, and the person making the correction shall sign his name in the log immediately after the correction is made and indicate the time of the correction.

§ 3266 Rough logs.—Rough logs may be transcribed into condensed form, but in such case the original log or memorandum and all portions thereof shall be preserved. Any correction made in the condensed form shall be made in the log, and the person making the correction shall sign his name in the log and indicate the time of the correction.

§ 3257 Station identification.—(a) A licensee of an FM broadcast station shall make station identification announcements (call letters and location) at the beginning of the program and during the program, at intervals not exceeding 30 minutes, on the hour and (2) either on the half hour or at the quarter hour following the hour and a quarter past the hour, as determined by the schedule of the program.

(b) Such identification announcement need not be made on the hour when to make such announcement would interrupt a single consecutive speech, play, recorded program, 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 first interruption of the entertainment continuity, and at the conclusion of the program or extension of the program.

(c) Such identification announcement need not be made on the half hour or at the quarter hour following the hour when to make such announcement would interrupt a single consecutive speech, play, recorded program, symphony concert, or operatic production of longer duration than 30 minutes. In such cases the identification announcement shall be made at the beginning and at the conclusion of the program or extension of the program.

(d) In the case of any political program or any program involving the discussion of public controversial issues for which any records, transcripts, talent, scripts, or other material or services of any kind are furnished, either directly or indirectly, to a station as an inducement to the broadcast of such program, an identification announcement shall be made at the beginning of such program of which such material or services are used that such records, transcripts, talent, scripts, or other material or services were furnished to such station in connection with the broadcasting of such program or programs received by, any radio broadcast station, the station broadcasting such program or programs received by, any radio broadcast station, the station broadcasting such program or programs, and in such case the identification announcement shall be made immediately following the program or programs and in such case the identification announcement shall be made immediately following the program or programs.

§ 3299 Rebroadcast.—(a) The term "rebroadcast" means receipt of program material by radio retransmission of any program material by any other radio station. The term "station" means any radio station or any combination of radio stations controlled by or under common ownership or otherwise made available to the public.

(b) The licensees of any FM broadcast station may, without further authority of the Commission, rebroadcast the program of a United States standard, FM or non-commercial FM station, without the further authority of the Commission, if notified of the call letters of each station rebroadcast and the licensees certifies that express authority has been received from the licensees of the station originating the program.

(c) (1) The license of an FM broadcast station located within a state or the District of Columbia may, without further authority of the Commission, rebroadcast any program of a United States standard, FM or non-commercial FM station, without the further authority of the Commission, if notified of the call letters of each station rebroadcast and the licensees certifies that express authority has been received from the licensees of the station originating the program.

§ 3269 Sponsored programs, announcement of.—(a) In the case of each program for the broadcasting of which money, services, or other valuable consideration is paid to the station, the person or persons who furnished such consideration shall be identified by appropriate announcement immediately following the program.

(b) In the case of any political program or any program involving the discussion of any public issues for which any records, transcripts, talent, scripts, or other material or services of any kind are furnished, either directly or indirectly, to a station as an inducement to the broadcast of such program, an identification announcement shall be made at the beginning of such program of which such material or services are used that such records, transcripts, talent, scripts, or other material or services were furnished to such station in connection with the broadcasting of such program or programs received by, any radio broadcast station, the station broadcasting such program or programs, and in such case the identification announcement shall be made immediately following the program or programs.

Subpart C—General Rules Applicable to Standard Broadcast Stations

§ 3001 Station license; posting of.—The station license and any other information required by this part shall be displayed in a conspicuous location in a manner that will permit the public to see and read the information without hindrance. Each station shall maintain a list of all individuals who are authorized to operate the station and shall maintain a list of all programs broadcast by the station. Each station shall maintain a list of all programs broadcast by the station.

§ 3002 Licensed operator required.—The license of each station shall have a licensed operator or operators of the grade specified by the Commission on the premises at all times the station is on the air.

1As used in this section, programs includes any complete program or part thereof.

2Transmission of such program requiring a broadcast station.
§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 commission, be required to perform any duty concerning the broadcast service of another radio station or stations in accordance with the laws of operator’s license which he holds and by the rules and regulations governing such other stations: Provided, however, That the operator shall not be required to perform any mechanical or mechanical record of a continuous uninterrupted speech, play, religious services, symphony concert, or other public entertainment, or to interfere with the proper operation of the standard broadcast transmitter.

§404 Logs.—The licensee of each broadcast station shall maintain programs and operating logs which shall require entries to be made as follows:

(a) In the program log:
(1) An entry of the time the station identification announcement (call letters and name) is made and the time the station is on the air.
(2) An entry briefly describing each program broadcast, such as "music," "science," or "religious," together with the name of the program, the name or title thereof, and the program'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, and the name of the person making the record. If a speech is made by a political candidate, the name and political affiliations of such speaker shall be entered.
(b) An entry showing that each sponsored program broadcast has been announced as sponsored, paid for, or furnished by the sponsor.
(c) An entry showing for each program of network origin, the name of the network originating the program.
(d) An entry in the operating log showing that the station begins to supply power to the antenna, and the time it stops.
(e) An entry of the time the program begins and ends.
(f) An entry of each interruption to the carrier wave, its cause, and duration.

§405 Logs.—An entry of the following each 30 minutes:

(i) Operating constants of last radio surge (total plate current and plate voltage).
(ii) Antenna current.
(iii) Frequency meter reading.
(iv) Temperature of crystal control chamber if thermometers is used.
(v) Log of experimental operation during experimental period. (If regular operation is maintained during this period, the above logs shall be kept.)
(vi) 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.

§406 Logs.—If the requirement for an identifying structure or structure(s) is required to be illuminated the licensee shall make entries in the radio station log appropriate to the requirements of section 2820 (k) (1), (b), and (c) as follows:
(a) The time the tower lights are turned on and off if manually controlled.
(b) The time the visual observation of the tower lights was made.
(c) In the event of the observed failure of a tower light.
(d) Nature of such failure.
(e) Time the failure was observed.
(f) Time and manner of the repairs or replacement made.

§407 Night and day time identification and the time of the station identification announcement, the call letters and name, were broadcast, shall be 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 2802.

§408 Station identification.—(a) A licensee of a standard or high-frequency broadcast station shall make station identification announcement (call letters and name) at the beginning and the 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, however, That the identification announcement need not be made on the hour when to make such announcement would interrupt a single consecutive speech, play, religious services, 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 intermission, at the intermission of the entertainment continuity, and at the conclusion of the program.
(b) Such identification announcement need not be made on the half hour or quarter hour when to make such announcement would interrupt a single consecutive speech, play, religious services, 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 intermission, at the intermission 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 hour when to make such announcement would interrupt a single consecutive speech, play, religious services, symphony concert, or operatic production, if the same is permitted by the rules and regulations of the commission. Provided, however, That an announcement within 5 minutes of the time specified in the above proviso (c) of this section will satisfy the requirements of identification announcements.
(d) In the case of variety show programs, baseball game broadcasts, or similar programs in which it is necessary to reduce the number of identifications, the identification announcement shall be made within 5 minutes of the hour and of the times specified in subdivision (2) of this paragraph of this section.
(e) In the case of all other programs, the identification announcement shall be made within 5 minutes of the hour and of the times specified in subdivision (2) of this paragraph of this section.
(f) In making the identification announcement the call letters shall be given only on the channel of the station identified thereof.

§409 Breaks.—Each program shall be 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.

(Continued from page 496)
er. That only one such announcement need be made in the case of any such announcement of the discontinuance of a program or removal may be made either at the beginning or the conclusion of the program.

(c) The announcement required by this section shall be fully and fairly disclose the existence of the program or programs or carrier identification and the time and place of broadcast, the program or programs of the network to which the station is affiliated; that the program or programs of the network is a new or reedited material, or that such program or programs is not comprised of material furnished, by a network or by other person contracts or otherwise makes arrangements with a station on behalf of another; and any information which the corporation, committee, association or other unincorporated group, the station, or owners of the station are furnished, the name and address of the person or entity that 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 a program, other than a program advertising commercial products or services, which is sponsored, paid for or furnished, either in whole or in part, by any entity, or sponsor, such 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 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 such candidate shall make arrangements which provide equal opportunities to all other such candidates for that office to use such facilities for the public's benefit, the station shall not have the power of censorship over the material broadcast. Any such candidate shall have the understanding with the station that he shall have the right to be heard, and such candidate's subjective qualifications shall be the determining factor in his selection for public office, as the licensee shall determine

§3.422 Definitions.—A "legally qualified candidate" means any person who has complied with all the necessary procedures for the public election of any candidate for any office, as the licensee shall determine, and has 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 stated in such proceedings but shall be limited to the application of the rules on any such candidate and shall be deemed the candidate so that he may be voted for by the electorate directly or by means of delegates or otherwise.

(a) has a place for a ballot on the slate or
(b) is eligible under the applicable law to be voted for by the electorate by writing his name on the ballot or otherwise; or
(c) makes a substantial showing that he is a bona fide candidate for nomination or office, as the licensee shall determine.

§3.423 Rates and practices.—The rates, if any, charged all such candidates for the same office shall be uniform and shall not be reduced by any means, if the rates for any candidate are reduced, any discrimination among candidates, practices, regulations, facilities, or services for or in connection with the service rendered pursuant to these rules, or any other practices, shall not be imposed, and any preference or disfavor, nor shall any license issue any special offer, any preference or disfavor, nor shall any license offer any special service nor shall any license 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 Public 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 request by the licensee of such requests, and the charges made, if any, if request is granted.

Subpart D—Rules Governing Television Broadcast Station

§3.601 Numerical designation of television channels.—The channels or frequency bands set forth below are available for television broadcast stations.

<table>
<thead>
<tr>
<th>Channel N°</th>
<th>Megacycles</th>
<th>Channel N°</th>
<th>Megacycles</th>
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</thead>
<tbody>
<tr>
<td>1-13</td>
<td>54-69</td>
<td>44-69</td>
<td>180-216</td>
</tr>
<tr>
<td>14-27</td>
<td>70-105</td>
<td>70-105</td>
<td>180-216</td>
</tr>
<tr>
<td>28-41</td>
<td>106-141</td>
<td>106-141</td>
<td>180-216</td>
</tr>
<tr>
<td>42-65</td>
<td>142-177</td>
<td>115-180</td>
<td>216-251</td>
</tr>
<tr>
<td>66-89</td>
<td>178-213</td>
<td>88-125</td>
<td>251-300</td>
</tr>
</tbody>
</table>

§3.602 Sharing of Television Channels.—Channels 1 through 6 and 7 through 13 are available for assignment to radio services other than television upon a showing no mutual interference will result.

§3.603 Community stations.—(a) A Community station is designed primarily for rendering a service in a limited area, either to a single local television district or to the principal, television channel No. 1 is assigned exclusively for Community stations. Channel 2 to 13 may 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 power of 500 watts. The antenna of such a Community station may not be placed more than 500 feet above the average terrain as determined by methods prescribed in Standards of Good Engineering Practice concerning Television Broadcast Engineer.

(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.—(a) Metropolitan stations may be assigned to television channels 2 through 6 and 7 through 13. The effective radiated power of such a station shall not exceed 500,000 watts. The power and antenna shall be so located as 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 50,000 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 Engineer. If additional power and heights are available, they should be used but in such cases the Commission may allow less than 50 kilowatts effective radiated peak power so that the coverage would be limited to the area within which 50 kilowatts would provide broadcast of effective radiated peak power of 500 feet above the antenna. Where it is shown that an antenna height of 500 feet is not available, the Commission may authorize the use of lower height antenna, but will not permit an increase in radiated power in excess of 50 kilowatts. The service area of such stations shall be limited to the area within which the broadcast can be received. The Commission shall be notified in advance by the licensee of the location of such stations in such a manner as to ensure, insofar as possible, a maximum of television service to all listeners, whether urban or rural.

(d) In the case of Metropolitan stations located within the city or metropolitan districts with which the station is associated and the transmitter shall be located to provide the maximum service to the city or metropolitan district served.

§3.605 Rural stations.—(a) Licenses of Metropolitan stations or applicants who desire to qualify as Metropolitan stations, shall 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 predominately 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 such a requirement would evidence a reasonable probability of satisfactory service in the future.

(b) The channels 1 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 miles from the Commission.
(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 notice is found necessary.

(c) Within the 90-day period prescribed by this section for equipment tests, field measurements, or other tests required by the standards, the Commission may extend the time of such tests, where necessary.

3.617 Program tests.—(a) When construction and equipment tests are completed, and the necessary supporting data is furnished, the license or certificate, or both, shall be issued. If upon the request of the applicant the license is not issued or if an application for a license is disapproved, this section does not apply.

(b) The applicant must file with the Commission a statement of the date and time and the place of the test, and of the time and place for the inspection of the equipment, if any, to which paragraph (a) applies. The Commission may require the test to be conducted at any time after expiration of the 90-day period prescribed by this section.

(c) A license or certificate for a television station shall be issued by the Commission only if the applicant has satisfactorily satisfied all legal requirements necessary to issuance of the license or certificate. The license or certificate shall be issued without delay.

(d) The Commission may, at its discretion, grant a temporary license for a period not exceeding 30 days to any applicant who is engaged in the construction of a television station and who is not the holder of a valid license or certificate for such station. The temporary license shall be filed with the Commission and a copy thereof shall be sent to the applicant. The temporary license shall be subject to the same conditions as a permanent license.

3.620 Renewal of license.—(a) Unless otherwise directed by the Commission, each application for renewal of a radio or television station license shall be filed at least 60 days before the expiration of the license term. The license applicant shall send to the Commission and the Commission shall send a notice of the expiration of the license term to the holder of the license at least 30 days before the expiration date. The license term expires on the date specified by the notice. The license term shall be extended for an additional period of time when the renewal application is filed with the Commission.

(b) A renewal of license application shall be filed with the Commission at least 90 days before the expiration date of the license term. The renewal application shall be accompanied by a description of the proposed station operating characteristics, including the frequency of operation, power output, and the technical and engineering facilities to be used.

(c) A renewal of license application shall be accompanied by a statement of the reasons for renewal, including the impact of the license on the public, and the public interest, convenience, and necessity.

(d) A renewal of license application shall be accompanied by the filing of the required fees, and shall be accompanied by a statement of the number of new employees, including the number of those who are newly employed, and a statement of the number of those who are terminated.

(e) A renewal of license application shall be accompanied by a statement of the number of new employees, including the number of those who are newly employed, and a statement of the number of those who are terminated.

3.622 Assignment or transfer of control.—(a) Assignment or transfer of control of a license or certificate shall be subject to the approval of the Commission, except when the assignment or transfer of control is made in accordance with the terms of the license or certificate.

(b) Assignment or transfer of control of a license or certificate shall be subject to the approval of the Commission, except when the assignment or transfer of control is made in accordance with the terms of the license or certificate.

(c) Assignment or transfer of control of a license or certificate shall be subject to the approval of the Commission, except when the assignment or transfer of control is made in accordance with the terms of the license or certificate.

(Continued from page 500)
broadcasting service distinct and separate from existing services, and that (2) such service is necessary to provide adequate and uniform coverage of control of television broadcasting facilities in a manner inconsistent with public interest, convenience, or necessity; provided, however, that the Commission may not approve or authorize the construction or operation of a television broadcasting station to constitute the concentration of control of television broadcasting facilities in a manner inconsistent with public interest, convenience, or necessity.

RULES RELATING TO EQUIPMENT

§3.653 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.

§3.653 — Modulation monitors.—The licensee of each television broadcast station shall have in operation at the transmitter a modulation monitor for the accurate determination of the output modulation. The modulation monitor shall be in accordance 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 transmitters.—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:

(a) An auxiliary transmitter shall be installed either at the same location as the main transmitter or at another location.

(b) A licensed operator shall be in control whenever auxiliary transmitters are in operation.

(c) The auxiliary transmitters shall be maintained so that they may be put in immediate operation in the event of any emergency in the main transmitter.

(1) The transmission of regular programs during maintenance or modification work on the main transmitters necessitating discontinuance of its operation for a period not exceeding 24 hours, shall be permitted at the discretion of the Commission.

(2) The auxiliary transmitter shall, subject to approval of the Commission, be installed and operated in such a manner as to minimize the interference with regular programs.

(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 paragraphs (c) (i) and (c) (ii) of this section, the test in that week may be omitted provided a written operation paragraph (c) is satisfactory. A record shall be kept of the time and result of each test operating under paragraph (c).

(e) The auxiliary transmitter shall be in accordance with the Standards of Good Engineering Practice concerning Television Broadcast Stations.

§3.656 Alternate main transmitters.—The license of a television broadcast station may be held for alternate main transmitters provided that a technical necessity for such alternate transmitters is shown and that the following conditions are met:

(a) Both transmitters are located at the same place.

(b) Transmitters are adjacent to each other.

(c) Both transmitters shall meet the construction, installation, operation, and performance performance of the Standards of Good Engineering Practice concerning Television Broadcast Stations.

§3.657 Changes in equipment and antenna systems.—Licensees of television broadcast stations shall, when changes with regards to changes in equipment and antenna systems are made:

(a) A written report 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 concerning Television Broadcast Stations.

(b) Specific authority, upon filing formal application, (Form FCC No. 338) therefore, 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 transmitter.

(2) A replacement of the transmitters as a whole.

(3) Change in the location of the transmitting antenna.

(4) 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.

(5) Change in the number of transmitters.

(6) Change in frequency control and/or modulation system.

(7) Change in frequency control and/or modulation system.

(8) Changes in the power feeders, and such changes shall be shown in the next application for renewal of license.

RULES RELATING TO ENGINEERING PRACTICE

§3.658 Time of operation.—(a) All television broadcast stations shall 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 24-hour period, and shall operate for not less than 30 minutes per hour on the air during the time it is licensed. The time of operation shall begin and end immediately after the emergency as to any emergency as to the issuance and renewal of license. In an emergency, however, when due to causes beyond the control of a licensee, it becomes impossible to continue operation, the station may cease broadcasting for such period as is necessary to prevent any danger to life or property. The Commission shall have control of the operation of the station, and the Inspector in Charge of the district in which the station is located shall immediately report such occurrence to the Commission and to the operator of the visual transmitter.

(b) Persons desiring to enter into a voluntary sharing arrangement of a television channel may file application therefore with the Commission. Copies of the time-sharing agreement shall be filed with the application.

§3.652 Special operating permits.—In special cases where technical experimentation directed to the improvement of technical phases of operation or for such purposes may utilize a signal other than the standard television signals, the Commission may grant experimental permits to television broadcast stations for the production or transmission of programs when conducting technical experimentation.

§3.654 Station identification.—The license of any television broadcast station shall make the station available for inspection by representatives of the Commission at any reasonable time.

§3.664 Station license, posting of.—The original of each station license shall be posted in the transmitter room.

§3.665 Operating power.—One or more licensed radio-telephone 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. Persons holding regular licenses or temporary operating permits are licensed to operate the station shall be posted at the place where he is on duty. The licensed operator on duty at the station shall be in actual charge of the operation of the transmitter, or, 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 no wise interfere with the operation of the broadcast transmitter.

§3.666 Operating power: In case of authorized.—The operating power, and the requirement of maintenance thereof, of this 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. The percentage of modulation shall not be less than 50 nor more than 100 per cent on peaks of frequent occurrence, but shall normally be 85 per cent.

§3.668 Frequency tolerance.—The frequency of the aural and visual transmissions of a television broadcast station shall be maintained within 50 parts per million of the assigned frequencies.

§3.669 Noise control.—The licensee or operators of any television station shall have an antenna or antenna supporting structure(s) required to be illuminated pursuant to the provisions of section 201 of the Communications Act of 1934 as amended:

(a) Shall make a visual observation of the lower lights at least once each 24 hours to assure that all such lights are functioning properly as required, and that the lights are not illuminated unnecessarily, but not less than once each 2 hours. The lights shall be so arranged that the Commission, the Federal Communications Commission and Federal Airway Communication Stations or office of the Civil Aeronautics Administration or Federal Airways Flight Record Office, and all other radio stations operating in the vicinity, may at any time within 24 hours of notice of such failure, further notification by telephone or telegram shall be given immediately upon resumption of the required illumination.

(b) Shall have such lights in operation at intervals of not more than 30 minutes. Such lights shall be flashing rotating beacons and automatic lighting control devices to insure that such apparatus is functioning properly as required.

OTHER RULES RELATING TO OPERATION

§3.681 License.—The license of each television station shall maintain program and operating logs and shall require entries to be made as follows:

(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 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 affiliation of such speaker shall be entered.

(3) An entertainment 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 to which the program is sent.

(5) In the operating log:

(1) An entry of the time the station begins to supply power to the antenna system.

(2) An entry of the time the program begins and ends.

(3) An entry each time the program is of unusual cause, its cause, and duration.

(4) An entry of the following each 30 minutes:

(a) Operating constants of last radio stage of the aural transmitter (total power, current and plate voltage of both transmitters).

(c) Frequency monitor reading.

(Continued on page 506)
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 described in this section, such corporation, committee, association or other unincorporated group shall be deemed to be the sponsor of such announcement, whether or not the name of such corporation, committee, association or other unincorporated group is named as such by the station.

(e) In the case of programs advertising commercial products or services, an announcement that the name of the sponsor of the product, shall be deemed sufficient for the purposes of this section and any one such announcement need be made at any time during the course of the announcement.

§5.990 Broadcasts by candidates for public office.—(a) Legally qualified candidates.—A licensee who has received a certificate of election to any public office shall be deemed to have qualified as a candidate for public office and shall be governed by the provisions of this section.

§5.991 Candidate for public office, use of facilities by.—(a) Use of facilities by candidates for public office.—Any candidate for public office shall be entitled, upon request, to the use of the facilities of the station for the purpose of broadcasting, at times, and on such conditions as the Commission, or its designee, may prescribe.

§5.992 Use of facilities by candidates for public office.—(a) Use of facilities by candidates for public office.—Any candidate for public office shall be entitled, upon request, to the use of the facilities of the station for the purpose of broadcasting, at times, and on such conditions as the Commission, or its designee, may prescribe.

§5.993 Rules governing broadcast services other than standard broadcast table of contents.

§5.994 Rules governing broadcast services other than standard broadcast.

§5.995 Rules governing broadcast services other than standard broadcast.

§5.996 Rules governing broadcast services other than standard broadcast.

§5.997 Rules governing broadcast services other than standard broadcast.

§5.998 Rules governing broadcast services other than standard broadcast.

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§5.9999 Rules governing broadcast services other than standard broadcast.

(Continued from page 504)
RULES GOVERNING ST BROADCAST STATIONS
4.31 Defined. 4.32 Licensing requirements. 4.33 Service. 4.34 Frequency assignment and operation. 4.35 Power. 4.36 Required equipment. 4.37 Supplemental report with renewal application. 4.38 Station identification.

INTERNATIONAL BROADCAST STATIONS
Sec. 4.41 Defined. 4.42 Licensing requirements; necessary showing. 4.43 Service; commercial or sponsored programs. 4.44 Frequency control.

VISUAL BROADCAST SERVICE
Sec. 4.61 Defined.

EXPERIMENTAL TELEVISION BROADCAST STATIONS
Sec. 4.61 Defined. 4.62 Purpose. 4.63 Licensing requirements; necessary showing. 4.64 Charges. 4.65 Frequency assignment. 4.66 Power. 4.67 Operating requirements. 4.68 Supplemental report with renewal application.

FACSIMILE BROADCAST STATIONS
Sec. 4.61 Defined. 4.62 Power. 4.63 Frequency assignment. 4.64 Charges prohibited; restrictions.

HIGH FREQUENCY BROADCAST STATIONS
Sec. 4.111 Defined. 4.112 Power. 4.113 Frequency assignment. 4.114 Frequency control. 4.115 Frequency requirements.

NONCOMMERCIAL EDUCATIONAL BROADCAST STATIONS
Sec. 4.111 Defined. 4.112 Operating schedules. 4.113 Frequency requirements. 4.114 Frequency. 4.115 Frequency control.

DEVELOPMENTAL BROADCAST STATIONS
Sec. 4.111 Defined. 4.112 Frequency assignment. 4.113 Frequency tolerance. 4.114 Supplemental report with renewal application. 4.115 Frequency restrictions.

IN GENERAL
§ 4.1 Frequency tolerance.—The operating frequency of the broadcast station as listed below shall be maintained within plus or minus the percentage of the assigned frequency as shown in table I.

### TABLE I

<table>
<thead>
<tr>
<th>Class of station</th>
<th>Frequency tolerance</th>
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<tbody>
<tr>
<td>Relay broadcast station:</td>
<td>0.04 percent</td>
</tr>
<tr>
<td>(a) 625 to 3260 kc</td>
<td></td>
</tr>
<tr>
<td>(b) 3000 to 40000 kc and above</td>
<td>19 watts or less, 0.1 percent.</td>
</tr>
<tr>
<td>ST broadcast station</td>
<td>0.01 percent</td>
</tr>
<tr>
<td>International broadcast station</td>
<td>0.01 percent</td>
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<tr>
<td>Television broadcast station</td>
<td>0.01 percent</td>
</tr>
<tr>
<td>Facsimile broadcast station</td>
<td>0.05 percent or less as required.</td>
</tr>
<tr>
<td>High frequency broadcast station</td>
<td>0.01 percent</td>
</tr>
<tr>
<td>Noncommercial educational broadcast station</td>
<td>0.05 percent or less as required.</td>
</tr>
<tr>
<td>Developmental broadcast station</td>
<td>0.05 percent or less as required.</td>
</tr>
</tbody>
</table>

§ 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 (1/2) 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—(a) Licenses for the following classes of broadcast stations normally will be issued for a period of 1 year expiring as follows:

- 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.
- Each licensee shall submit the application for renewal of license at least 60 days prior to the expiration date (Section 1.300).
- A supplemental report shall be submitted with each application for renewal of license of a station licensed experimentally 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 licenses may be granted by the Commission, a station shall be assigned a specified frequency, but the frequency may be adjusted after the grant of the license, and the assignment of frequency may be changed in accordance with the requirements of said section 4.52.

(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 an application for a license shall be subject to the approval of the Commission, and each experimental station shall be adhered to in the main, unless the license is authorized to do otherwise by the Commission.

(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, Licenses of developmental broadcast stations which are licensed to conduct special experimental experiments, such as to develop and test commercial broadcast equipment, are required to be operated only when there is a need for such operation.

(e) A supplemental statement shall be filed with and made a part of each application for the construction permit for any broadcast station on an experimental basis which specifies the frequencies to be used in the band 162,000 to 168,000, 210,000 to 210,000, and 240,000 to 270,000 kilocycles exclusive of 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.

(3) That the frequency may not be allocated for the service that may be developed experimentally.

§ 4.5 Station rules—(a) The licensee of each class of broadcast station listed in section 4.1 shall maintain adequate records of the operation, including:

- Hours of operation.
- Program transmission.
- Frequency check.
- Pertinent remarks concerning transmission.
- Time of station for program origination and receiver location shall be included.

(b) Research and experimental conducted in case of an experimental station.

(c) Any additional information specified in the regulations governing each class of station or for completing the supplemental report as required.

§ 4.6 Program transmitting support structure (s) is required to be illuminated the licensee shall make entries in the ratio station log appropriate to the requirements of section 5.25, (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) The time of any observed failure of a tower light.
- (4) Time of the failure was observed.
- (5) Time and nature of the adjustments, repairs or replacements made.

§ 4.7 Any additional information specified in the regulations governing each class of station.

§ 4.8 License renewal—(a) Licenses for the following classes of broadcast stations normally will be issued for a period of 1 year expiring as follows:

<table>
<thead>
<tr>
<th>Class of station</th>
<th>Date of expiration</th>
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<tbody>
<tr>
<td>ST broadcast station</td>
<td>Apr. 1</td>
</tr>
<tr>
<td>Television broadcast station</td>
<td>Jan. 1</td>
</tr>
<tr>
<td>International broadcast station</td>
<td>Mar. 1</td>
</tr>
<tr>
<td>Television broadcast station</td>
<td>Jun. 1</td>
</tr>
<tr>
<td>Noncommercial educational broadcast station</td>
<td>May 1</td>
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</tbody>
</table>

§ 4.9 The phrases “station licensed experimentally” and “experimental station” are used interchangeably and refer to stations listed in section 4.2 when so specified in the instrument of authorization.

(Continued on page 510)
FCC RULES & REGULATIONS FOR BROADCAST SERVICES

(Continued from page 508)

4.7 Emission authorized.—All classes of broadcast licenses authorize A3 emission as specified in the license. In case A1, A2, A5, A6, or special emission are necessary or helpful in carrying on any phases of experimental operation, an application setting out fully the needs shall be made to, and authority therefore rendered to the Commission.

4.8 Additional orders, as needed.—In case all the general rules and regulations of the special rules governing each class of broadcast station do not cover all phases of operation of the Commission 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 necessity.

4.9 Operation.—A licensed station shall be on duty and in charge of the commissioning transmitter 24 hours a day. Scientific and engineering control operation shall be authorized. A transmitter is not considered as being operated by remote control when the following conditions prevail:

(a) The transmitter is in use at all times.
(b) Controlling instruments are before the operator as follows:
   (1) Frequency deviation meter.
   (2) Percentage modulation indicator.
   (3) Spurious emission check (receiver).
   (4) Output or antenna current.
   (5) Loss in radio stage plate voltage.
   (6) Last radio stage plate current.
   (7) Output or antenna current.
   (8) The operator has on-and-off control of the power to the last radio stage.
   (9) 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.—(a) The license 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 the station rebroadcast and the license certifies that express authority has been received from the licensees of the station originating the program.4 See section 4.45 and 4.132 of the commission regulations concerning the rebroadcast of program material.5
   (b) A licensed operator may rebroadcast the program of any other class of United States radio station without written authority by simply notifying the Commission of the fact of such rebroadcast.
   (c) An educational broadcast station may, without further authority of the Commission, rebroadcast the programs of any other station of the same or of a lower class of educational broadcast station, provided the Commission is notified of the call letters of the station rebroadcast and the license certifies that express authority has been received from the licensees of the station originating the program.
   (d) A noncommercial educational broadcast station may rebroadcast the program of any other station of the same or of a lower class of educational broadcast station, provided the Commission is notified of the call letters of the station rebroadcast and the license certifies that express authority has been received from the licensees of the station originating the program.

4.11 A station of educational broadcast may rebroadcast the program of any radio station within the limits of the North American Continent without permission from the Commission; Provided, That the station rebroadcasting the program shall be rebroadcast in the United States.

4.12 An application for authority to rebroadcast the program of any radio station shall be accompanied by written consent or certification of consent of the licensees of the station originating the program.

4.13 Equipment and program tests.—(a) A licensee of a broadcast station may conduct program tests and equipment tests in accordance with the rules and regulations contained in section 4.22 and program tests in accordance with section 4.23.3
   (b) A station licensed on the basis of a standard broadcast station proposal, or a station licensed on the basis of a standard broadcast station proposal, shall not be subject to the rules of section 4.22 and program tests in accordance with section 4.23.3
   (c) A station licensed on the basis of a standard broadcast station proposal, or a station licensed on the basis of a standard broadcast station proposal, shall not be subject to the rules of section 4.22 and program tests in accordance with section 4.23.

4.14 Station and operator licenses; posting of.—(a) The station license and any operator licenses shall be displayed on a panel visible to the general public and to the Commission if the operator desires to do so. The construction or the manner of operation of the station shall be posted so that all terms thereof are visible in a conspicuous place in the room in which the station is located.

4.15 The station operator license shall be posted in the above-described manner at the operational position.

4.16 If the station is licensed for portable-mobile operation, the license or a copy thereof shall be afforded to the equipment or the operator of the station upon request.

4.17 The station license shall be posted in the above-described manner at the operating position.

4.18 The station license shall be conspicuously posted at the operation of the station.

4.19 The station license shall be conspicuously posted in the personal possession of the operator.

RELAY BROADCAST STATIONS

4.21 Defined.—The term "relayed broadcast station" means a station licensed to transmit from points where 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 shall be issued under the rules for standard broadcast stations? Provided, however, in cases where it is impractical, impossible, or prohibited by law or regulations for the license of a standard broadcast station to install, operate, or maintain a relay broadcast service, or if the Commission deems it necessary to do so, the Commission may grant special temporary authority for any event to another person to operate a relay broadcast service, or equipment which may be installed under section 319 (h) of the Communications Act of 1934 without a construction permit; And provided further, that the license of the licensee of another class of broadcast station provided a need therefor is shown, a relay broadcast station shall be used only for relaying of programs by broadcast stations.

(b) A license for a relay broadcast station shall be issued under the rules for standard broadcast stations and other broadcast stations transmitting the same programs simultaneously or by a chain of broadcast stations, either directly or through any other 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 affiliated.

(c) In case a licensee has two or more standard broadcast stations located in different cities, it shall, in applying for a 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, shall be used to reproduce the programs of these stations.

4.23 Frequency assignment and sharing.4 Any group of frequencies assigned to a relay broadcast station for transmission of programs to be broadcast by its standard broadcast station and other broadcast stations transmitting the same programs simultaneously or by a chain of broadcast stations, shall be used only for relay broadcasts by the network with which the license is regularly affiliated. The license of a relay station does not authorize transmission of programs to be broadcast solely by other broadcast stations not affiliated.

4.24 Frequency selection to avoid interference.—In case two or more standard broadcast stations or other broadcast stations transmit programs simultaneously, the licensee shall select frequencies to avoid interference. If a mutual agreement to this effect

4.25 See "Number of Relay Broadcast Stations That Will Be Licensed to Each Holder of Standard Broadcast Stations License," this section of the Administrative Procedure Act, and the rules which were adopted by the Commission in connection with the allocation of frequencies for the new services.

4.26 Subject to the conditions that interference is caused to Government services on adjacent channels.

(Continued on page 512)
cannot be reached the Commission shall be notified and it will specify the frequencies on which each station is to be operated.

§ 253 Power limitations.—(a) A relay broadcast station assigned frequencies in groups A, B, C, D, E, F, and G will be licensed to operate with an aggregate 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.

(b) A relay broadcast station assigned frequencies in groups D, E, F, and G will not be licensed to transmit programs in excess of 100 watts; Provided, That before using any frequency in these groups with a power in excess of 10 watts, tests shall be made by the licensee to insure that no objectionable interference will result to the service of any other station, And provided further, That if the use of any frequency may cause interfering the power shall be reduced to 25 watts or another frequency in the licensed group selected which will not cause objectionable interference.

(c) 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 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 and no satisfactory arrangement cannot be agreed upon the Commission will determine and specify the maximum power or conditions of operation of each such station.

§ 26 Supplemental report with renewal application.—The licensee of a standard broadcast station assigned frequencies under group J shall file a supplemental report with and make a part of each application for renewal of license as follows:

(a) Number of hours operated for experimental purposes.
(b) Development 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.

§ 277 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, unless specifically licensed for operation more than once every hour. Calls shall be announced as call letters or shall make an announcement which will permit it to be identified.

RULES GOVERNING ST BROADCAST STATIONS

§ 211 Defined.—The term "ST" 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.

§ 221 Service.—Any ST broadcast station will be licensed only to the licensee of the 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.

§ 231 Service.—The license of an ST broadcast station authorizes the transmission of sound incidental to the main studio to the transmitter of the high frequency broadcast station or international broadcast station with which it is connected.

§ 241 Frequency assignment and operation.—The following frequencies are allocated for assignment to ST broadcast stations upon an experimental basis:

<table>
<thead>
<tr>
<th>Kilocycles</th>
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<th>Kilocycles</th>
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<tr>
<td>313600</td>
<td>325300</td>
<td>336600</td>
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<td>325300</td>
<td>336600</td>
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<td>336601</td>
<td>350000</td>
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<td>340000</td>
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</tr>
<tr>
<td>344000</td>
<td>360000</td>
<td>375000</td>
<td>380000</td>
<td>390000</td>
</tr>
</tbody>
</table>

(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 license of each ST broadcast station shall include a directional antenna designed so that the gain in power toward the receiver shall be 10 (field gain 510) times the power field from a another (127.6 m or 1 kw for 1 km 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 dipole.

§ 35 Power.—ST broadcast station will be licensed with a power output not in excess of that necessary to render a satisfactory service.

§ 36 Required equipment.—Each ST broadcast station is required to conduct experiments with regard to the following:

(1) Design of equipment and power required to render a satisfactory service.
(2) Design of directional transmitting antenna.
(3) Design and location of receiving antennas.

§ 37 Supplemental report with renewal application.—A supplemental report shall be filed with the Commission at the time of renewal of application and shall include statements as to the following items:

(a) Total hours of operation.
(b) Cost of operation.
(c) Duration and frequency of any interruptions.
(d) Power required to deliver satisfactory signal at receiver.

(e) Data on design, adjustments, and operation of directional receiving and transmitting systems and the service resulting from it.

(f) Interference to service resulting from other stations or other sources.
(g) Cost of transmitter and receiver installation and expense of operation.
(h) Over-all fidelity of equipment, frequency and amplitude.

§ 43 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 when it shall either announce its call letters or shall make an announcement which will permit it to be identified.

INTERNATIONAL BROADCAST STATIONS

§ 431 Defined.—The term "international broadcast station" means a station licensed for the transmission of broadcast programs for international public consumption. These stations are assigned frequencies between 6000 and 28000 kilocycles for broadcasting by international agreement.

§ 432 Licensing requirements; necessary showing.—A licensee for an international broadcast station shall 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.
(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 licensed.
(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 requirement of the Department of Commerce of non-identified and possessing 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.

§ 433 Service; commercial or sponsored programs.—(a) A licensee of an international broadcast station shall render only an international broadcast service which will reflect the culture of the country and which will promote international goodwill, understanding, cooperation and cooperation. Any program solely intended for, and directed to an audience in the continental United States does not fall the requirements of this section.

(b) Such international broadcast service may include commercial or sponsored programs; Provided, That—

(1) Commercial program content gives no more than the name of the station over the program and the name and general character of the commodity, utility, 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 part of the program and is of such a nature that it is not carried simultaneously by another international station (except another station owned by the same company) or is not carried simultaneously on a frequency in a different group to obtain continuity of signal service.

(4) The means 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 of such design and operated that the signals (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 310).".

(5) An international broadcast station may transmit the program of a standard broadcast station or network system; Provided, The conditions in paragraph (c) of this section in regard to any commercial continuity 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, The license of such chain of stations may be granted simulaneously by another international station (except another station owned by the same company) or on a frequency in a different group to obtain continuity of signal service.

(6) Station identification, program announcements, and ordinal continuity shall be broadcast over the program of the international station which is assigned for the foreign country or countries for which the service is primarily intended.

See General Radio Regulations annexed to the International Telecommunications Congress at Washington D.C., September 1, 1938, articles 7, 8, and 9, and thereafter see Commission General Radio Regulations, art. 2, amended to the International Telecommunications Congress at Washington D.C., September 1, 1938, article 7. In accordance with these regulations provisions are made by the Bureau of the International Telecommunications Union, Berne, Switzerland, through the Commission in Philadelphia, Pennsylvania, under the authority of Section 404 of the Communications Act of 1934, at further order of the Commission.

See sec. 3 (c) of the Communications Act of 1934 for the definition of "chain broadcasting."

(Continued on page 514)
FCC RULES & REGULATIONS FOR BROADCAST SERVICES

(Continued from page 512)

(4) Each licensee of an international broadcast station shall make verbatim mechanical records of all international programs transmitted.

(b) Under these rules for experimental television broadcast stations, the Commission will authorize experimental television relay broadcast 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 licensees of a television broadcast station.

(c) Licensees of an experimental television broadcast station shall be issued for the purpose of carrying on research and experimentation for the advancement of television, and for the development of equipment for the transmission of signals by radio, by the representatives of the Commission upon request.

(d) 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:

<table>
<thead>
<tr>
<th>Group A</th>
<th>Group B</th>
<th>Group C</th>
<th>Group D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kilocycles</td>
<td>Kilocycles</td>
<td>Kilocycles</td>
<td>Kilocycles</td>
</tr>
<tr>
<td>6094</td>
<td>6090</td>
<td>6084</td>
<td>6078</td>
</tr>
</tbody>
</table>

(b) Under these rules for experimental television broadcast stations, the Commission will authorize experimental television relay broadcast 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 licensees of a television broadcast station.

(c) Licensees of an experimental television broadcast station shall be issued for the purpose of carrying on research and experimentation for the advancement of television, and for the development of equipment for the transmission of signals by radio, by the representatives of the Commission upon request.

4.45 License 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 research and experimentation in the technical phase of television broadcasting, which indicates reasonable likelihood of the accomplishment of 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.

4.46 That the program of research and experimentation will be conducted by qualified personnel.

4.47 That the applicant is legally, financially, technically, and otherwise qualified to carry forward the proposed plan of operation.

4.48 That public interest, convenience or necessity will be served through the operation of the proposed station.

4.49 Charges. — No charges, either direct or indirect, shall be made by the licensee of an experimental television station for the production or transmission of any signals, however, such signals may be made available for transmission by such 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.

4.50 Announcements. — (a) Station identification. — A licensee of a television broadcast station shall make available announcements audio and visually (call letters and location) at the beginning and ending of each time period of operation and duplicate announcements on the hour.

(b) At the time 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.""
FCC RULES & REGULATIONS FOR BROADCAST SERVICES

(Continued from page 514)

(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 the performance of the station which should be included in the report.
(4) Power employed, field intensity measurements and visual and aural observations and the type of instruments and receivers utilized to determine the service area of stations and the efficiency of the different types of transmission.
(5) Estimated degree of public reception in the results of observations as to the effectiveness of types of transmission.
(6) Conclusions, tentative and final.
(7) Plans for further developments in television broadcasting.
(8) All development and technical documents.
(9) Any other pertinent developments.

FACSIMILE BROADCAST STATIONS

§4.93 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 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 personnel.
(d) That the program and/or necessity will be served through the operation of the proposed station.

§4.93 Charges prohibited; restrictions and announcements.—(a) A licensee of a facsimile broadcast station shall not make any charge, directly or indirectly, for the transmission of programs.
(b) A licensee of any standard broadcast station or network shall make any additional charge, directly or indirectly, for the transmission of some or all phase of the program by a facsimile broadcast station, nor shall any transmission 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:

<table>
<thead>
<tr>
<th>Group A</th>
<th>Group B</th>
<th>Group C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kilocycles</td>
<td>Kilocycles</td>
<td>Kilocycles</td>
</tr>
<tr>
<td>25025</td>
<td>Any frequency above 30000 kc, excluding band 600000 to 601000 kc.</td>
<td></td>
</tr>
<tr>
<td>25075</td>
<td>43250</td>
<td></td>
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<tr>
<td>25075</td>
<td>43280</td>
<td></td>
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<tr>
<td>25125</td>
<td>43300</td>
<td></td>
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<tr>
<td>25125</td>
<td>43350</td>
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<td>25175</td>
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<td>25225</td>
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<tr>
<td>25225</td>
<td>43500</td>
<td></td>
</tr>
<tr>
<td>25250</td>
<td>43550</td>
<td></td>
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</tbody>
</table>

(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.

§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, that no transmitter having an output of 1.000 Watts will be licensed 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 submitted with the 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 in 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 250000 kilocycles for transmission of aural programs for general public reception.

§4.112 License and 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 the program of research and experimentation will be conducted by qualified personnel.
(c) That the program and/or necessity will be served through the operation of the proposed station.
(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 program 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 that 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 an announcement of the call letter designation of a standard broadcast station, the program from which is being broadcast over a high frequency broadcast station shall be given in the case of the rebroadcast of the program of any broadcast station, section 4.10 applies.
(b) No license 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 others acting in their behalf upon representation that the commercial program will also be transmitted by the high frequency broadcast station.

§4.114 Frequency assignment.—(a) The following groups of frequencies are allocated for assignment to high frequency broadcast stations:

<table>
<thead>
<tr>
<th>Group A</th>
<th>Group B</th>
<th>Group C</th>
<th>Group D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kilocycles</td>
<td>Kilocycles</td>
<td>Kilocycles</td>
<td>Kilocycles</td>
</tr>
<tr>
<td>250000</td>
<td>Any frequency above 300000 kc, excluding band 400000 to 401000 kc.</td>
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<tr>
<td>25075</td>
<td>43250</td>
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<td>25175</td>
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<td>25225</td>
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<tr>
<td>25250</td>
<td>43550</td>
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</tbody>
</table>

(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) Frequencies 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 E, and in group F, 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 observations to determine that interference does not exist 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 caused to such services the license 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 to operate at a power rating greater than 1000 watts unless the applicant can prove, before the hearing, that an operating station with an antenna height greater than 1000 watts be authorized to a station assigned a frequency in group A or one of the last two frequencies in group A. (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. The station shall be responsible for the maintenance of the frequency control equipment and 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 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) The frequency assigned and the operating characteristics 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.

4.118 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 educational work and for 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 operated 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 constructed and 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 or 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: 41200, 42500, 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 broadcasting stations on 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 program of research and development which cannot be satisfactorily carried on by any of the classes of broadcast stations already allocated, is not competitive 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 possesses 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 extend several independent developmental programs, 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 broadcast in connection with the developmental work. In case of the rebroadcast of the program of any broadcast station, section 4.10 applies.

4.154 Frequency assignment.—(a) The following frequencies are allocated for assignment to developmental broadcast stations:* 1614 1285 1286.5 2295 1288 1297 2400 1700 1730 3490 3492.5 3720 3495 3497.5 3730 4795 4797.5 5100 4890 5110 5118 5140 15697.5 6420 6425 6540 6545 6920 6925 7010 7015 7140 7145 7540 7545 16132.5 7760 7765 7770 7775 8010 8015 8540 8545 8550 8555 9010 9015 9020 9025 9030 9035 9040 9045 9050 9055 10000 and above

4.155 Frequency tolerance.—(a) The operating frequency of a developmental broadcast station shall be maintained in accordance with the frequency tolerance given in section 4.1: Provided, however, Where lesser tolerance is necessary to prevent interference, the Commission will specify the tolerance. (b) The operating power of a developmental broadcast station shall not be in excess of that necessary to carry on the program of research. The operating power may be maintained at the maximum rating or less, as the conditions of operation may require.

4.156 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 among others: (a) The number of hours operated. (b) Comprehensive report on research and experiments conducted. (c) Conclusions and program for further development of the broadcast service. (d) All developments and major changes in equipment. (e) Any other pertinent developments.

4.157 Frequency restrictions.—A developmental broadcast station authorized to operate on frequencies regularly allocated to other stations or services, shall be subject to the same rules governing the stations using regularly those which are applicable to developmental broadcast stations and are not in conflict with section 4.1 to 4.11, inclusive, and sections 4.151 to 4.156, inclusive, of these rules.

* Also available for assignment to all other stations in the experimental service.
FCC Standards of Good Engineering Practice Governing Television Broadcast Stations

1. Definitions

A. General

1. Television broadcast station.—The term “television broadcast station” means a station in the television broadcast band transmitting simultaneous visual and aural signals intended to be received by the general public.

2. Television broadcast band.—The term “television broadcast band” means those frequencies in the band extending from 440 to 876 megacycles which are allocable to television broadcast stations. These frequencies are 440 to 59 megacycles (Channel No. 1), 54 to 72 megacycles (Channels 2 through 4), 76 to 88 megacycles (Channels 5 and 6), and 174 to 216 megacycles (Channels 7 through 13).

3. Television channel.—The term “television channel” means a band of frequencies 6 megacycles wide in the television broadcast band and designated either by number or by the extreme lower and upper frequencies.

4. Television transmission standards.—The term “television transmission standards” means the standards which determine the characteristics of the television signal as radiated by a television broadcast station. (See Section 2.A.)

5. Standard television signal.—The term “standard television signal” means a signal which conforms with the television transmission standards.

6. Television transmitter.—The term “television transmitter” means the radio transmitter or transmitters for the transmission of both visual and aural signals.

7. Antenna field gain.—The term “antenna field gain” of a television 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 1576 mw/m.

8. 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.

9. Polarization.—The term “polarization” means the direction of the electric vector as radiated from the transmitting antenna.

10. Effective radiated power.—The term “effective radiated power” means the product of the antenna power (transmitter output power less transmission line loss) times (1) the antenna gain, or (2) the antenna field gain squared.

11. Service area.—The term “service area” as applied to television broadcasting means the service resulting from an assigned effective radiated power and antenna height above average terrain.

12. Antenna height above average terrain.—The term “antenna height above average terrain” means the average of the antenna heights above the terrain from two to ten tenths the antenna. (In general a different antenna height will be determined by each direction from the antenna. The average of these various heights is considered as the antenna height above average terrain.)

B. Visual transmitter

1. Visual transmitter.—The term “visual transmitter” means the radio equipment for the transmission of the visual signal only.

2. Amplitude modulation.—The term “amplitude modulation” (AM) means a system of modulation in which the envelope of the transmitted wave contains a component similar to the wave form of the signal to be transmitted.

3. Aspect ratio.—The term “aspect ratio” means the numerical ratio of the frame width to frame height, as transmitted.

4. Black level.—The term “black level” means the amplitude of the modulating signal corresponding to the scanning of a black area in the transmitted picture.

5. Color transmission.—The term “color transmission” means the transmission of television signals which can be reproduced with different color values.

6. Field frequency.—The term “field frequency” means the number of times per second the frame area is fractionally scanned in the interlaced scanning.

7. Frame.—The term “frame” means one complete picture.

8. Frame frequency.—The term “frame frequency” means the number of times per second the picture area is completely scanned.

9. Interlaced scanning.—The term “interlaced scanning” means a scanning process in which successive scanned lines are spaced an integral number of line widths, and in which the adjacent lines are scanned during successive cycles of the field frequency scanning.

10. Monochrome transmission.—The term “monochrome transmission” means the transmission of television signals which can be reproduced in gradations of a single color only.

11. Negative transmission.—The term “negative transmission” means that a decrease in initial light intensity causes an increase in the transmitted power.

12. Positive transmission.—The term “positive transmission” means that an increase in initial light intensity causes an increase in the transmitted power.

13. Progressive scanning.—The term “progressive scanning” means a scanning process in which scanning lines trace one dimension substantially parallel to a side of the frame and in which successively scanned lines are adjacent.

14. Scanning.—The term “scanning” means the process of analyzing progressively, according to a predetermined method, the light values of picture elements constituting the total picture area.

15. Scanning line.—The term “scanning line” means a single continuous narrow strip containing highlights, shadows, and half tones which is determined by the process of scanning.

16. Synchronization.—The term “synchronization” means the maintaining of one operation in step with another.

17. Vestigial side band transmission.—The term “vestigial side band transmission” means a system of transmission wherein one of the generated side bands is partially attenuated at the transmitter and radiated only in part. (See Appendix II).

18. Visual frequency.—The term “visual frequency” means the frequency of the signal resulting from television scanning.

19. Visual transmitter power.—The term “visual transmitter power” means the peak power output when transmitting a standard television signal.

20. Peak power.—The term “peak power” means the power over a radio frequency cycle corresponding in amplitude to synchronizing peaks.

C. Aural Transmitter

1. Aural transmitter.—The term “aural transmitter” means the radio equipment for the transmission of the aural signal only.

2. Center frequency.—The term “center frequency” means:
   (1) The average frequency of the emitted wave when modulated by a sinusoidal signal.
   (2) The frequency of the emitted wave without modulation.

3. Frequency modulation.—The term “frequency modulation” means (Continued on page 523)
a system of modulation where the instantaneous radio frequency varies in proportion to the instantaneous amplitude of the modulating signals (amplitude of modulating signal to be measured after phase inversion if phase is used) and the instantaneous radio frequency is independent of the frequency of the modulating signal.

4. **Frequency swinging**—The term “frequency swinging” means the instantaneous departure of the frequency of the emitted wave from the center frequency resulting from modulation.

5. **Percentage modulation**—The term “percentage modulation” as applied to frequency modulation means the ratio of the actual frequency swing to frequency swing defined by 100 percent modulation, expressed in percentage. For the aural transmitter of television broadcast stations, a frequency swing of ± 25 kilocycles is defined as 100 percent modulation.

2. **Transmission Standards and Changes or Modifications Thereof**

**A. Transmission Standards**

1. The width of the television broadcast channel shall be six megacycles.
2. The visual carrier shall be located 4.5 megacycles lower in frequency than the aural center frequency.
3. The aural center frequency shall be located 0.25 megacycles lower than the upper frequency limit of the channel.
4. The visual transmission amplitude characteristic shall be as shown in Appendix II.
5. The number of scanning lines per frame period shall be 525, interlaced two to one.
6. The frame frequency shall be 30 per second and the field frequency shall be 60 per second.
7. The aspect ratio of the transmitted television picture shall be 4 units horizontally to 3 units vertically.
8. During the scanning intervals of each scene, the picture shall be scanned from left to right horizontally and from top to bottom vertically, at uniform velocities.
9. A carrier shall be modulated within a single television channel for both the visual and aural carrier signals, the two signals comprising different modulation ranges in amplitude (see Appendices I and II).
10. A decrease in initial light intensity shall cause an increase in the radiated power (negative transmission).
11. The black level shall be represented by a definite carrier level, independent of light intensity in the picture.
12. The pedestal level (normal black level) shall be transmitted at 75 percent (with a tolerance of plus or minus 2.5 percent) of the peak carrier amplitude.
13. The maximum white level shall be 15 percent or less of the peak carrier amplitude.
14. Variation of field output:—The peak-to-peak variation of the transmitter output within the same frame of video signal due to all causes, including hum, noise, and low-frequency response, measured at both normal signal and pedestal level, shall not exceed 5 percent of the average synchronizing peak signal amplitude.
15. **Black Level**—The black level shall be made as nearly equal to the pedestal level as the state of the art will permit. If they are made essentially equal, satisfactory operation will result and improved techniques will later lead to the establishment of the tolerance if necessary.
16. **Brightness Characteristic**—The transmitter output shall vary in substantially inverse logarithmic relation to the brightness of the subject. No tolerances are set at this time.

**B. Change or Modification of Transmission Standards**

The Commission will consider the question whether a proposed change or modification of transmission standards adopted for television broadcasting would be in the public interest, convenience, and necessity, upon petition being filed by the person proposing such change, or modification, setting forth the following:

1. The exact character of the change or modification proposed;
2. The reasons for the proposed change or modification upon all other transmission standards that have been adopted by the Commission for television broadcast stations;
3. The evidence, if any, that has been made to show that the proposed change or modification accomplishes an improvement and is technically feasible;
4. The effect, if any, of the proposed change or modification in the adopted standards upon operation and obsolescence of receivers;
5. The change in equipment required in existing television broadcast stations for incorporating the proposed change or modification in the adopted standards, and
6. The facts and reasons upon which the petitioner bases his conclusions that the proposed change or modification would be in the public interest, convenience and necessity. Should a change or modification in the transmission standards be approved, the effective date of the change shall be determined in the light of the considerations mentioned in sub-paragraph (4) above.

3. **Engineering Standards of Allocation**

**A. Sections 3.603 through 3.608 of the Commission’s Rules prescribes the basis of assignment of television broadcast facilities. Section 3.601 indicates the groups of channels that are available for assignment to television broadcast stations. As indicated by these rules, the number of channels are limited and therefore have been allocated in advance to specific areas. This listing has been carefully planned with a view to providing the greatest number of stations in the areas of greatest population, and in additional to the above, every attempt has been made to ensure that the stations are not too large in number to the areas they serve.**

**B. Extent of service is determined by the point at which the ground wave is no longer of sufficient intensity to provide satisfactory broadcast service. The field intensity considered necessary for service is as follows:**

<table>
<thead>
<tr>
<th>Area</th>
<th>Medical Field Intensity (MED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial or factory areas</td>
<td>500 µW/m²</td>
</tr>
<tr>
<td>Residential and rural areas</td>
<td>500 µW/m²</td>
</tr>
</tbody>
</table>

These figures are based upon the usual noise levels encountered in the two areas and upon the absence of interference from other television broadcast stations. The Commission will require that the transmitting antenna be so located as to provide a coverage area which is contiguous with the city. The intensity of the service is to be determined, particularly in cases of rugged terrain, even though the city may be more than 10 miles from the antenna site. The profile graph for each radial should be plotted by contour intervals of 40 to 100 feet and, where the data permit, at least 50 points of elevation (generally uniformly spaced) should be used for each radial. In instances of very rugged terrain where the urban pattern is not to be used, particularly in several points in a short distance, 200 or 400 foot contour intervals may be used for such distances. On the other hand, where the terrain is uniform or gently sloping the smallest contour interval indicated on the topographic map, (see below) should be used, although only a relatively few points may be available. The profile graph should accurately indicate the topography for each radial, and the graph should be plotted with the distance in miles as the abscissa and the elevation in feet above mean sea level as the ordinate. The profile graphs should indicate the source of the topographical data employed.

The graph should also show the elevation of the center of the radiating system. The graph may be plotted either on rectangular coordinate paper or on special paper which shows the curvature of the earth. It is not necessary to take the curvature of the earth into consideration in this procedure, as this factor is taken care of in the charts showing signal intensities.

**Appendix IV**

The average elevation of the rise in distance between two and ten miles from the antenna site should then be determined from the profile graph for each radial. This may be obtained by averaging a number of points of the profile graph, or by obtaining the median elevation (that exceeded for 50% of the distance) in sectors and averaging those values.

To determine the distance to a particular contour concerning the range of television broadcast stations, Appendix IV should be used. These charts have been prepared for frequencies in the center of the wavebands of channels and are to be used as follows: Figure 1 for Channel 1; Figure 2 for Channels 2 through 4; Figure 3 for Channels 5 and 6; and Figure 4 for Channels 7 through 13. The distance to a contour is determined by the effective radiated

(Continued from page 532)
power and the antenna height. The height of the antenna used in con-
nection with Appendix IV should be the height of the center of the
propagating wave at the level of the antenna. In such cases the
height of a wave may be derived from the preceding method. The
distances shown by Appendix IV are based upon an effective radiated
power of one kilowatt; to use the charts for other powers, the wave
height is to be multiplied by the square of the ratio of the power used
and one kilowatt. The height of the antenna peak or its equivalent
should be utilized and used as the ordinate scale. This slide rule is
placed on the charts with the appropriate gradation for power in line
with the lower line of the top edge of the charts. The right edge of
the scale is placed in line with the appropriate antenna height gradu-
ations and the charts then become directly reading for this power and
antenna height. Where the antenna height is not one of those for
Which a scale is provided, approximate values may be found by
interpolation between the curves connecting the equidistant points.

The foregoing process of determining the extent of the required con-
tours shall be followed in determining the boundary of the proposed
service area. The areas within the 5000 uM and 500 uM contours
should be treated in the same manner. Each application shall include
a map showing these contours, and for this purpose Sectional Aeronautical
charts or other maps having a convenient scale may be used. The map
shall show the radials along which the profile charts and expected field
strength have been determined. The area within each contour should
therefore include all areas lying along such a radial between the
points determined by the number of square miles therein. In computing the area
within the contours, exclude (1) areas beyond the borders of the
United States, (2) large bodies of freshwater such as ocean bays,
 gulfs, soundings, lakes, etc., but not rivers. Where inter-
ference is involved such areas shall be determined as indicated by
Section 7a.

In cases where the terrain in one or more directions from the antenna
site departs widely from the average elevation of the two to ten
mile sector, the application of this prediction method may indicate
contour distances that are different from those which may be expected
in practice. In such cases the prediction method should be followed, but
a showing may be made if desired concerning the distance to the
contour as determined by other means. Such showing shall include
data concerning the procedure employed and sample calculations. For
example, a mountain ridge may indicate the practical limit of service
although the prediction method may indicate the contrary otherwise.

In cases of such limitation, the map of predicted coverage should
show both the regular predicted area and the areas as limited or
extended by terrain. Both areas should be measured, as previously
described; the area obtained by the regular prediction method should
be given in the application form, with a supplementary note giving the
limited or extended region. In special cases the Commission may
require additional information as to the terrain in the proposed service
area.

In determining the population served by television broadcast stations, it
is considered that the built-up city areas and business districts in
cities having over 10,000 population and located beyond the 5000
uM contour are not providing service. Service Minor Census Divi-
sion maps (1940 Census) should be used in making population counts,
excluding cities not receiving adequate service. Where a contour
divides a minor division, uniform distribution of population within
the division is to be assumed, if the population is not included within the contour, unless a more
accurate count is available.

4. Topographical Data

In the preparation of the profile graphs previously described, the elevations or contour intervals shall be taken from the U.S. Geological
Topographical Quadrangle Sheets for all areas for which such maps are
available. If such maps are not available for the area in question, the
next best topographic information should be used. Topographic data
may sometimes be obtained from state and municipal agencies. The data
from the Standard quad sheets includes all high points, such as railroad
depot elevations and highway elevations from road maps, may be
used where no other information is available. In cases where lim-
ited topographic data can be obtained, an attempt may be made to
plot the contours directly from the map in a car driven along roads extending generally radially from the
transmitter site.

The Commission will not ordinarily require the submission of topo-
 graphical maps for areas beyond 15 miles from the antenna sites, but
the maps must include the principal city or cities to be served. If it ap-
pears necessary, additional data may be requested.

The U.S. Geological Survey Topographical Quadrangle Sheets may be
obtained from the U.S. Geological Survey, Department of the Interior,
Washington, D. C., for ten cents each. The Sectional Aeronautical
Charts and Available Maps, published by the U.S. Department of
Commerce, Washington, D. C., for twenty-five cents each. Other sources of topographical maps or data will be furnished at a later date.

5. Interference Standards

Field intensity measurements are preferable in predicting interference
time between television broadcast stations and should be used, when available,
in determining the extent of the required contours. If field intensity
measurements are not available, interference should be predicted in accordance with the method described herein.

Objectionable visual interference is considered to exist when the in-
terfering signal exceeds that given by the ratio of Table II. In Table
II, the desired signal is median field strength of the desired signal and the interfering signal is the tropo-
spheric signal intensity exceeded for 10% of the time.

<table>
<thead>
<tr>
<th>Channel Separation</th>
<th>Ratio of Desired to Undesired Signals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same channel</td>
<td>100:1</td>
</tr>
<tr>
<td>Adjacent channel</td>
<td>2:1</td>
</tr>
</tbody>
</table>

It is considered that stations on alternate channels or on channels sep-
ated by a distance less than or equal to the value obtained from Table II, are subject to objectionable interference, i.e., on this basis, channels 1 and 2 or 4 and 5
could be used in the same city or area.

As shown in Table II, objectionable interference from a co-channel station is considered to exist at the 500 uM contour of a station if a tropospheric signal from the co-channel station equals or exceeds 5 uM or for at least ten percent of the time. The ten per cent values for one kilowatt of power and various antenna heights
are given in Appendix V, and values for other powers may be obtained
by using the sliding scale and Appendix IV. The values indicated by
Appendix V are based upon available data, and are subject to change as additional information concerning tropospheric wave propagation is obtained.

At the present time it is considered sufficient to consider only the
ground wave field intensities in determining the extent of adjacent channel interference.

6. Field Intensity Measurements in Allocation

When field intensity measurements are required by the Commission's
rules or when employed in determining the extent of service or interfere-
ence of existing stations, such measurements should be made in accord-
ance with the procedures in Appendix IV.

Measurements made to determine the service and interference areas of
television broadcast stations should be made with mobile equipment and
with such close proximity to the existing station as is possible. The
measured field intensity versus distance curves should be plotted (e.g.,
cross-curves on graph paper) in order to determine the points or this path
where the interference ratios exist. The points established by this method,
together with the points along the contours where the same ratios are
determined, are considered to be generally sufficient to predict the area
of interference. Additional points may be required in cases of irregular
terrain or directional antenna systems.

The area of interference, if any, shall be shown in connection with the
map of predicted coverage required by the application form, together with
the basic data employed in computing such interference. The map shall
show the interference within the 500 uM contour.

Payment of the filing fees required by the Commission in connection with
the application should be made to the Commission at the time the
application is filed.
the station. The field intensity in each section of the chart shall be ana-
lized to determine the field intensity received 50 perceot of the distance
(median field) throughout the section, and this median field intensity
assumed that the receiving point is responsible for the absorbed
figures must be corrected for a receiving antenna elevation of
feet and for any directional effects of the automobile not otherwise com-
pensated for. The direction of the line shall be plotted on the
ordinate paper with distance as the abscissa and field intensity as the
ordinate. A smooth curve should be drawn through these points (of
median field intensity) for each of the sections to determine the dis-
tance to the desired contour. The distances obtained for each radial may
then be plotted on the map of predicted coverage or on polar coordinate
paper (excluding water areas, etc.) to determine the service and inter-
ference areas of a station.

In making measurements to establish the field intensity contours of a
station mobile recordings should be made along each of the radials drawn
in section 2C above. Measurements should extend from the vicinity of the
station out to the 500 uv/m measured contour and somewhat beyond.
These measurements would be made for the purpose of determining the
variation of the measured contours from those predicted. Adjustment of
power or antenna may be required to fit the actual contours to that
predicted.

In predicting tropospheric interference on the basis of the above meas-
urements, such measurements shall be carried out in the manner
cated above to determine the 500 uv/m contour. Using the appropriate
figure in Appendix IV for the channel involved and the sliding scale, the
equivalent power for that figure shall be determined. The
scale on the chart (using the appropriate antenna height) and moving
the scale until the distance to the 500 uv/m contour (as determined above)
and the 500 uv/m at the point of interest are agreed on, then read from the
sliding scale where it crosses the lower line of the top
edge of the chart. Changing to the corresponding figure in Appendix
V is using the equivalent radiated power just determined, the distance
to the interfering contour under investigation is read in the usual
manner.

In certain cases the Commission may desire more information or record-
ings, and in these instances, such additional tests will be issued. This
may include fixed location measurements to determine tropospheric propa-
gation and fading ratios.

Complete data taken in conjunction with field intensity measurements
shall be submitted to the Commission in ARFAd form, including the
following:
A. Map or maps showing the roads or points where measurements were
made, showing the area and/or interference areas determined by the pro-
duction method and by the measurements, and any unusual terrain
characteristics existing in these areas. (This map may preferably be
of a type showing topography in the area.) The 5000 and 5000 uv/m
contours shall be shown.
B. If a directional transmitting antenna is employed, a diagram or polar
coordinate paper showing the predicted free space field intensity in
millivolts along the interfering contours. (See Appendix V.)
C. A full description of the procedures and methods employed including
the type of equipment, the method of installation and operation, and
calibration procedures.
D. Complete data obtained during the survey, including calibration.
E. Antenna system and power employed during the survey.
F. Name, address, and qualifications of the engineer or engineers making
the measurements.

All data shall be submitted to the Commission in triplicate, except that
only the original or one photostatic copy need be submitted of the actual
recording tapes.

7. Transmitter Location
A. The transmitter location shall be as near the center of the proposed
service area as possible and shall be located on a site with sufficient elevation
to provide service throughout the area. Location of the
antenna at a point of high elevation is necessary to
reduce to a minimum the shadow effect on propagation due to hills
and buildings which may reduce materially the intensity of the station's
signals in a particular direction. The transmitting site should be selected consistent with the purpose of the station, i.e., whether it is
intended to provide service to a metropolitan area or a
region. Inasmuch as service may be provided by signals of 5000 uv/m or
greater field intensities in metropolitan areas, and inasmuch as signals
below 5000 uv/m are undesirable, the elevation of the transmitting site
should be located at the most central point at the highest elevation
available. In providing the best degree of service to an area, it is
usual practice to place a high antenna rather than a lower antenna
with increased transmitter power. The location should be so chosen
that line-of-sight can be obtained from the antenna over the principal
city or cities to be served; in no event should there be a major ob-
struction in this path.
B. The transmitting location shall be selected so that the 5000 uv/m
contour encompasses the urban population within the area to be served
and the 500 uv/m or the interference free contour coincides generally
with the limits of the area to be served. It is recognized that topog-
raphy and the requirements of the desired service area, and population distribution
may make the choice of a transmitter location difficult. In such cases
consideration may be given to the use of a directional antenna system,
although the Commission should condition such a choice to a site where a non-
directional antenna may be employed.
C. In cases of questionable antenna locations it is desirable to conduct
propagation tests to determine the intensity expected in the prin-
cipal city or cities to be served and in other areas, particularly where
severe shadowing may be expected. Ir considering applications
proposing the use of such locations, the Commission may require site
surveys to be made in accordance with the
measurement procedure previously described, and full data therefore
must be supplied to the Commission. Test transmitters should employ
an antenna having a height as close as possible to the proposed
antenna height, using a balloon or other support if necessary and
feasible. Information concerning the authorization of such tests may
be obtained from the Commission upon request.
D. Present information is not sufficiently complete to establish "blanket
areas" of television broadcast stations. A "blanket area" is that area
adjacent to a transmitter in which the reception of other stations is
subject to interference due to the strong signal from this station.
Where it is found necessary to locate the transmitter in a residential
area where blanketing problems may appear to be excessive the appli-
cant should provide evidence of the effect of shadowing by blanketing
sites. The authorization of station construction in areas where blanketing
problems appear to be excessive will be on the basis that the applicant provides evidence of reasonable complaints arising from excessively strong signals of
the applicant's station.

Cognizance must of course be taken regarding the possible hazard of
the proposed site to airports and airways. In passing on proposed
construction, the Commission refers each case to the Civil Aeronautics
Administration to obtain suggestions and recommendations. Antenna painting and/or
lighting may be required at the time of construction or at a later
date.

8. Antenna Systems
A. An antenna which is high in respect to the average level of the terri-
tory served is desired for service, as this is likely to reduce shadowing.
The antenna must be constructed so that it is as clear as possible
of surrounding buildings or objects that would cause shadow problems.
B. Applications proposing the use of directional antenna systems must
be accompanied by the following:
(1) Complete description of the proposed antenna system.
(2) Orientation of array with respect to true north; time phasing of
fields from elements (degrees leading or lagging); space phasing of
fields (in feet and degrees); and ratio of fields from
elements.
(3) Calculated field intensity pattern (on letter-size polar coordinate
paper) giving the free space field intensity in millivolts per meter
at one mile in the horizontal plane, together with the formula
terms used, constants employed, sample calculations, and tabulations
of calculation data.
(4) Name, address, and qualifications of the engineer making the calculations.
C. Applications proposing (1) the use of television broadcast antennas in
the immediate vicinity (i.e., 200 feet or less) of television broadcast antennas operating on a channel within 20% in frequency of the pro-
posed channel, or (2) the use of television antennas on channels 5 or 6 in the immediate vicinity of FM broadcast antennas, must include a
showing as to the expected effect if any, of such proximity operation.
D. In cases where it is proposed to use a tower of a standard broadcast
station as a supporting structure for a television broadcast antenna, an
application for construction permit (or modification of construction
permit) for such station must be filed for consideration with the
applying station. An application may be required for other
channels or stations when the tower is to be used in connection
with a television station.

When a television antenna is mounted on a non-directional standard
broadcast tower, the tower shall be made of standard broadcast antenna after installation and testing of the
television antenna. During the installation and until the new re-
stance determination is approved, the standard broadcast station
license should apply for authority (informal application) to operate
by the indirect method of power determination. The television license
application will not be considered until the application form concern-
ing the standard broadcast antenna is approved by the

When a television antenna is mounted on an element of a standard
broadcast directional antenna. A full engineering study concerning the
effect of the television antenna on the directional pattern must be filed
with the application concerning the standard broadcast station.
pending upon the individual case, the Commission may require readjustment and certain field intensity measurements of the standard broadcast station following the completion of the television antenna system.

When the proposed television antenna is to be mounted on a tower in the vicinity of a standard broadcast directional array and it appears that the operation of the directional antenna system may be affected, an engineering study must be filed with the television application concerning the effect of the television antenna on the directional pattern. Readjustment and field intensity measurements of the standard broadcast station may be required following construction of the television antenna.

Information regarding data required in connection with standard broadcast directional antenna systems may be found in the Standards of Good Engineering Practice Concerning Standard Broadcast Stations.

E. In the event a common tower is used by two or more licensees for antenna and/or antenna supporting purposes, the licensee who is owner of the tower shall assume full responsibility for the installation and maintenance of any painting and/or lighting requirements.

In the event of shared ownership, one licensee shall assume such responsibility and advise the Commission accordingly.

F. Standard Lamps and Paints.

When necessary for the protection of air navigation, the antenna and supporting structure shall be painted and illuminated in accordance with the specifications supplied by the Commission pursuant to Section 328 (a) of the Communications Act of 1934, as amended. These individual specifications are issued for and attached to each authorization for an installation. The details of the specifications depend on the degree of hazard presented by the particular installation. The tower paint shall be kept in good condition and repainted as often as necessary to maintain this condition.

General information regarding painting and lighting requirements is contained in the Obstruction Marking Manual available from the Civil Aeronautics Administration, Washington 25, D. C.

9. Transmitters and Associated Equipment

A. Visual transmitter design

The general design of television broadcast visual transmitting equipment shall be in accordance with the following principles and specifications:

1. The overall attenuation characteristics of the transmitter measured in the antenna transmission line after the vestigial sideband filters shall not be greater than

   - 2 db at 0.5 Mc
   - 2 db at 1.25 Mc
   - 3 db at 2.0 Mc
   - 6 db at 3.0 Mc
   - 12 db at 5.0 Mc

   below the ideal demodulated curve (See Appendix II). The curve shall be substantially smooth between these specified points exclusive of the region from 0.75 Mc to 1.25 Mc.

2. The field strength or voltage of the lower side band as radiated or dissipated and measured as described in (3) below shall not be greater than —20 db for a modulating frequency of 1.25 Mc or greater.

3. The attenuation characteristics of a visual transmitter shall be measured by application of a modulating signal to the transmitter input terminals in place of the normal composite television video signal. The signal applied shall be a composite signal composed of a synchronizing signal to establish peak output voltage plus a variable frequency sine wave voltage occupying the interval between synchronizing pulses. The axis of the sine wave in the composite signal observed in the output monitor shall be maintained at an amplitude 0.5 of the voltage at synchronizing peaks.

   The amplitude of the sine wave input shall be held at a constant value. This constant value should be such that at no modulating frequency does the maximum excursion of the sine wave, observed in the composite output signal monitor, exceed the value 0.75 of peak output voltage. The amplitude of the 100 kilocycle sideband shall be measured and designated zero db as a basis for comparison. The modulation signal frequency shall then be varied over the desired range and the field strength or signal voltage of the corresponding sidebands measured.

As an alternate method of measuring, in those cases in which the automatic d-c insertion can be replaced by manual control, the above characteristic may be taken by the use of a video sweep

(Continued on page 538)
generator and without the use of pedestal synchronizing pulses. The d-c level shall be set for mid-characteristic operation.

(4) The radio frequency signal, as radiated, shall have an envelope as would be produced by a modulating signal in conformity with Appendix I, as modified by vestigial operation specified by Appendix II.

(5) The time interval between the leading edges of successive horizontal synchronizing pulses shall vary less than one half of one per cent of the average time interval.

(6) The rate of change of the frequency of recurrence of the leading edges of the horizontal synchronizing signals shall not be greater than 20 per cent of the average frequency to the degree that the frequency of the average process carried out over a period of not less than 20, nor more than 100 lines such lines not to include any portion of the vertical blanking signal.

B. Aural transmitter design

The general design of the aural transmitting equipment associated with a television station shall be in accordance with the following principles and specifications:

(1) The transmitter shall operate satisfactorily with a frequency swing of ±25 kilocycles, which is considered 100% modulation. It is recommended, however, that the transmitter be designed to operate satisfactorily with a frequency swing of at least ±40 kilocycles.

(2) The transmitting system, from input terminals of microphone pre-amplifier, through audio facilities in the studio, through telephone lines or other circuits between studio and transmitter, through audio facilities at the transmitter, and through the transmission line, but excluding the characteristics of the microphones in microphones) and shall be capable of transmitting a band of frequencies from 60 to 15,000 cycles. Pre-emphasis shall be employed in accordance with the impedance-frequency characteristic of a series inductance-capacitance network having a time constant of 75 microseconds (See Appendix VI). The deviation of the system response from the standard pre-emphasis curve shall lie between two limits as shown by Appendix VI.

(3) At any modulating frequency between 50 and 15,000 cycles and at modulation percentage of 25%, 50% and 100%, the combined audio frequency harmonics measured in the output of the system shall not exceed the root-mean-square values given in the following table:

<table>
<thead>
<tr>
<th>Modulating frequency</th>
<th>Distortion</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 to 150 cycles</td>
<td>3.5%</td>
</tr>
<tr>
<td>150 to 750 cycles</td>
<td>2.5%</td>
</tr>
<tr>
<td>750 to 1500 cycles</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

Measurements shall be made employing 75 microsecond de-emphasis in the measuring equipment and 75 microsecond pre-emphasis in the transmitting equipment. The 75 microsecond de-emphasis shall be employed on all measurements unless otherwise specified. If a compression amplifier is employed, harmonics shall be included to 30 kc.

It is recommended that none of the three main divisions of the system (transmitter, studio to transmitter circuit, and audio facilities) contribute over one-half of the percentages, since at some frequencies the total distortion may become the arithmetic sum of the distortions of the divisions.

(4) The transmitting system output noise level (frequency modulation) in the band of 59 to 15,000 cycles shall be at least 55 db below the frequency modulation level representing a frequency swing of ±25 kc.

(5) The transmitting system output noise level (amplitude modulation) in the band of 50 to 15,000 cycles shall be at least 50 db below the level representing 100% amplitude modulation.

C. Design applicable to both visual and aural transmitters

In addition to design features applicable to the individual transmitters, the general design of television broadcast (visual and aural) transmission equipment shall be in accordance with the following principles and specifications:

(1) Automatic means shall be provided in the transmitters to maintain the authorized carrier frequencies within the allowable limits.

(2) The transmitters shall be equipped with suitable indicating instruments for the determination of operating power and with other equipment as necessary for proper adjustment, operation, and maintenance of the equipment.

(3) Adequate provision shall be made for varying the output power of the transmitters to compensate for excessive variations in line voltage or for other factors. Transmitters shall be provided in component parts to avoid overheating at the rated maximum output powers.

(4) Adequate provisions shall be provided in all component parts to avoid overheating at the rated maximum output powers.

(5) Means shall be provided for connection and continuous operation of approved frequency and modulation monitors.

D. Construction

In general, the transmitters shall be constructed either on racks and panels or in totally enclosed frame as protected by required by article 818 of the National Electrical Code. The requirements for these include:

(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) Power supply rectifiers and associated equipment shall be installed across all the capacitor banks to lower any voltage which may remain accessible with access door open to less than 350 volts between two sources after the access door is opened.

(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) Guard grids shall be provided on all highly rotating machinery. Coupling guards should be provided on motor generators.

(b) Power equipment and control panels of the transmitters shall meet the above requirements (exposed 220 volt AC switching equipment on the front of the power control panels not recommended but is not prohibited).

(c) Power equipment located at a television broadcast station not directly associated with the transmitters (not purchased as part of same), such as power distribution panels, are not under the jurisdiction of the Commission; therefore Section 3.654 does not apply.

(4) Metering equipment

(a) All instruments having more than 1,000 volts potential to ground on the movement shall be protected by a cage or cover as well as by additional protective device. Instruments are designed by the manufacturers to operate safely within their designed terminal of the instruments at or less than 1,000 volts above ground, no protective case is required. However, it is good practice to protect voltimeters of devices of safety voltages.

(b) In case the plate voltmeters are located on the low potential side of the multipliers resistors with the potential of the high terminal of the instruments, it is recommended that protective case is required. However, it is good practice to protect voltimeters subject to more than 5,000 volts with suitable over-voltage protective devices across the instrument terminals in case the winding opens.

(c) Transmission, line meters and any other radio frequency instrument which may be 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.

(d) It is recommended that component parts comply as much as possible with the level of design specified by the Army-Navy Electronics Standards Agency.

E. Wiring and Shielding

(1) The transmitter panels or units shall be wired in accordance with article 818 and all terminals of the equipment designated by the Army-Navy Electronics Standards Agency.
with standard practice, such as insulated leads properly cabled and supported, concentric lines or rigid bus bar properly insulated and protected.

(2) Wiring between units of the transmitters, with the exception of circuits carrying radio frequency energy or video energy, shall be installed in conduits or approved fiber or metal raceways to protect it from mechanical injury.

(3) Circuits carrying radio frequency or video energy between units shall be either coaxial, two wire balanced lines, or properly shielded.

(4) All stages or units shall be adequately shielded and filtered to prevent interaction and radiation.

(5) The frequency and modulation monitors and associated radio frequency lines to the transmitter shall be thoroughly shielded.

F. 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.

G. Spare tubes

A spare tube of every type employed in the transmitters and frequency modulation monitors shall be kept at the equipment location. When more than one tube of any type are employed, the following table determines the number of spares of that type required:

<table>
<thead>
<tr>
<th>Number of each type employed</th>
<th>Spares required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 or 2</td>
<td>1</td>
</tr>
<tr>
<td>3 to 5</td>
<td>2</td>
</tr>
<tr>
<td>6 to 8</td>
<td>3</td>
</tr>
<tr>
<td>9 or more</td>
<td>4</td>
</tr>
</tbody>
</table>

An accurate circuit diagram and list of required spare tubes, as furnished by the manufacturer of the equipment, shall be supplied to and retained at the transmitter location.

H. Operation

In addition to specific requirements of the rules governing television broadcast stations, the following requirements are specified:

(1) Spurious emissions, including radio frequency harmonics, shall be maintained at not more than the level at which the art permits.

(2) If a limiting or correction amplifier is used in conjunction with the aural transmitter, the operating precautions should be maintained by the use of pre-emphasis in the transmitting system.

I. Studio Equipment

Studio equipment shall be subject to all the above requirements and specifications, including but not limited to:

(1) If properly covered by an underwriters' certificate, it will be considered as satisfying safety requirements.

(2) Section 851 of Article 8 of the National Electrical Code shall apply for voltages only in excess of 50 volts. No specific requirements are made relative to the design and acoustical treatment of studios. However, the design of studios, particularly the main studio, shall be compatible with the required performance characteristics of television broadcast stations.

10. Indicating Instruments

A. A television broadcast station shall be equipped with suitable indicating instruments of accepted accuracy to measure the direct plate voltage and current of the last radio stage of the visual and audio stages and transmitter and an instrument for reading the transmission line of both transmitters.

The following requirements and specifications shall apply to indicating instruments used by television broadcast stations in compliance with these rules:

(1) Length of scale shall be not less than 2 3/10 inches.

(2) Accuracy shall be not more than 3 per cent of the full scale reading.

(3) Scale shall have at least 40 divisions.

(4) Full scale reading shall not be greater than five times the minimum normal indication.

No specifications are prescribed at this time regarding the peak indicating device required by Section 11B(1) of these standards.

B. No instruments indicating the plate current or plate voltage of the last radio stage shall be changed or replaced without written authority of the Commission, except by instruments of the same maximum scale readings and accuracy. Requests for authority to use an instrument of different maximum scale reading and/or accuracy shall be made by letter or telegram, giving the manufacturer's name, type, number, and full scale reading of the proposed instrument and the values of current or voltage at which accuracy will be maintained. Requests for temporary authority without an instrument or with a substitute instrument may be made by letter or telegram stating the necessity therefor and the period involved.

C. No required instrument the accuracy of which is questionable shall be employed. Repairs and calibration of instruments shall be made by the manufacturer, or authorized, or repair service of the manufacturer, or by some other properly qualified or equipped instrument repair service, in any case, the repaired instrument must be supplied with a certificate of calibration.

D. Recording instruments may be employed in addition to the indicating instruments to record the direct plate current and/or voltage to the last radio stage provided that they do not affect the operation of the circuits or accuracy of indicating instruments. If the records are to be used in any proceeding before the Commission, as representative of operation, 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 such accuracy.

E. The function of each instrument used in the equipment shall be clearly and permanently marked on the instrument itself or on the panel immediately adjacent thereto.

11. Operating Power—

Determination and Maintenance

A. Determination

(1) Visual transmitter

The average power shall be measured while operating into a dummy load of substantially zero reactance and a resistance equal to the transmission line surge impedance, while transmitting a standard black-and-white television picture. The peak power shall be the value obtained by this method, multiplied by the factor 1.65. During this measurement the direct plate voltage and current shall not exceed the last radio stage and the peak output voltage or current shall be read for use below.

(2) Aural transmitter

The operating power of the aural transmitter shall be determined by the indirect method. This is the product of the plate voltage (E) and the plate current (I) of the last radio stage, and an efficiency factor F; that is:

\[ \text{Operating power} = E \times I \times F \]

The efficiency factor F shall be established by the transmitter manufacturer for each type of transmitter for which he requests FCC approval, and shall be shown in the instruction books supplied to the customer with each transmitter. In the case of composite equipment the factor F shall be furnished to the Commission by the applicant along with a statement of the basis used in determining such factor.

B. Maintenance

(1) Visual Transmitter

The peak power shall be monitored by a peak reading device which reads proportionally to other voltage or current on the transmission line operating into the antenna, the output of the antenna and the input to the receiver. The (Continued on page 530)
GROUND WAVE SIGNAL RANGE FOR TELEVISION

46 mc, \( \sigma = 5 \times 10^{-4} \) s.m.v., \( \epsilon = 15 \), RECEIVING ANTENNA HEIGHT 30 FEET
FOR HORIZONTAL (AND APPROX. FOR VERTICAL) POLARIZATION

(Gauge on page 539 to be used in conjunction with this chart)

maintained as near as practicable to the authorized operating power, and shall not exceed the limits of 10 percent above and 20 percent below the authorized power except in emergencies.

(3) In the event it becomes impossible to operate with the authorized power, the station may be operated with reduced power for a period of 10 days or less provided the Commission and the Inspector in Charge of the district in which the station is located shall be notified in writing immediately thereafter and also upon the resumption of the normal operating power.

12. Auxiliary Transmitters
Auxiliary transmitters may not exceed the power rating of the main transmitters. As a general guide specifications for auxiliary transmitters should conform as much as possible to those of the main transmitters. No requirements are set forth at this time.

Page 530 • 1946 Yearbook Number
GROUND WAVE SIGNAL RANGE FOR TELEVISION
63 mc, $\sigma = 5 \times 10^{-6}$ e.m.u., $\epsilon = 15$, RECEIVING ANTENNA HEIGHT 30 FEET
FOR HORIZONTAL (AND APPROX. FOR VERTICAL) POLARIZATION

(Note: Gauge on page 529 used in conjunction with this chart.)
GROUND WAVE SIGNAL RANGE FOR TELEVISION

82 mc. σ=5×10⁻¹⁷ e.m.u., ε=15, RECEIVING ANTENNA HEIGHT 30 FEET
FOR HORIZONTAL (AND APPROX. FOR VERTICAL) POLARIZATION

(Note: Gauge on page 529 used in conjunction with this chart.)
GROUND WAVE SIGNAL RANGE FOR TELEVISION

195 mc, $\sigma=5 \times 10^{-4}$ e.m.u., $\varepsilon=15$, RECEIVING ANTENNA HEIGHT 30 FEET FOR HORIZONTAL (AND APPROX. FOR VERTICAL) POLARIZATION

(Note: Gauge on page 529 used in conjunction with this chart.)
STANDARDS OF GOOD ENGINEERING PRACTICE FOR FM STATIONS

INTRODUCTION

There are presented herein the Commission's engineering standards relating to the allocation and operation of FM broadcast stations. These standards also apply to noncommercial educational (FM) broadcast stations, except as noted herein. The Commission's Rules and Regulations contain references to these standards, which have been approved by the Commission and thus are considered as reflecting its opinion in all matters involved.

The standards set forth herein are those deemed necessary for the construction and operation of FM broadcast stations to meet the requirements of technical regulations and for operation in the public interest along technical lines not otherwise enumerated. These standards are based upon the best engineering data available, including evidence at hearings conferences with radio engineers and data supplied by manufacturers of radio equipment and by licensees of FM broadcast stations. These standards are complete in themselves and supersede previous engineering standards or policies of the Commission concerning FM broadcast stations. While these standards provide for flexibility and indicate the conditions under which they are applicable it is not expected that material deviation from the fundamental principles will be recognized unless full information is submitted as to the need and reasons therefor.

These standards will necessarily be revised from time to time as progress is made in the art. The Commission will accumulate and analyze engineering data available as to the progress of the art so that these standards may be kept current with technical developments.

TABLE OF CONTENTS

1. Definitions
2. Engineering Standards of Allocation
3. Topographical Data
4. Interference Standards
5. Field Intensity Measurements in Allocation
6. Transmitter Location
7. Antenna Systems
8. Transmitters and Associated Equipment
9. Indicating Instruments
10. Auxiliary Transmitters
11. Operating Power: Determination & Maintenance
12. Frequency & Modulation Monitors at Auxiliary Transmitters
13. Requirements for Type Approval of Transmitters
14. Requirements for Type Approval of Frequency Monitors
15. Requirements for Type Approval of Modulation Monitors
16. Approved Transmitters
17. Approved Frequency Monitors
18. Approved Modulation Monitors
19. FM Broadcast Application Forms

1. DEFINITIONS

A. FM Broadcast station. The term "FM broadcast station" means a station employing frequency modulation in the FM broadcast band and licensed primarily for the transmission of radiotelephone emissions intended to be received by the general public.

B. Frequency modulation. The term "frequency modulation" means a system of modulation where the instantaneous radio frequency varies in proportion to the amplitude of the modulating signal (amplitude of modulating signal to be measured after pre-emphasis, if used) and the instantaneous frequency is independent of the frequency of the modulating signal.

C. FM broadcast band. The term "FM broadcast band" means the band of frequencies extending from 88 to 108 megacycles, which includes those assigned to noncommercial educational broadcasting.

D. Center frequency. The term "center frequency" means:

(1) The average frequency of the emitted wave when modulated by a sinusoidal signal.

(2) The frequency of the emitted wave without modulation.

E. Frequency swing. The term "frequency swing" means the instantaneous departure of the frequency of the emitted wave from the center frequency resulting from modulation.

F. FM broadcast channel. The term "FM broadcast channel" means a band of frequencies 200 kilocycles wide and is designated by its center frequency. Channels for FM broadcast stations begin at 88.1 megacycles and continue in successive steps of 200 kilocycles to and including 107.9 megacycles.

G. Antenna field gain. The term "antenna field gain" of an FM 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 microvolts.

H. 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.

I. Multiples transmission. The term "multiples transmission" means the simultaneous transmission of two or more signals within a single channel. Multiplex transmission as applied to FM broadcast stations means the transmission of facsimile or other signals in addition to the regular broadcast signals.

J. Percentage modulation. The term "percentage modulation" as applied to frequency modulation means the ratio of the actual frequency swing to the frequency swing defined as 100 percent modulation, expressed in percentage. For FM broadcast stations, a frequency swing of ± 75 kilocycles is defined as 100 percent modulation.

K. Effective Radiated Power. The term "effective radiated power" means the product of the antenna power (transmitter output power less transmission line losses) times (1) the antenna power gain, or (2) the antenna field gain squared.

L. Service area. The term "service area" as applied to FM broadcasting means the service area resulting from an assigned effective radiated power and antenna height above average terrain.

M. Antenna height above average terrain. The term "antenna height above average terrain" means the average of the antenna heights above the terrain from two to ten miles from the antenna. (In general a different antenna height will be determined by each direction from the antenna. The average of these various heights is considered as the antenna height above average terrain.)

2. ENGINEERING STANDARDS OF ALLOCATION

A. Sections 3.202 to 3.205 inclusive of the Rules and Regulations describe the basis for allocation of FM Broadcast Stations, including the division of the United States into Areas I and II. Whereas the Rules to assign heights of Community Stations, Section 2 E (1) of these Standards should be consulted; for other classes of FM Broadcast Stations, Section 2 E (2) should be consulted.

As noted in Section 3.204 (b) of the Rules, the Commission will designate service areas for Metropolitan Stations in Area II. In addition to the showing required by this Rule a special showing must be included in the application concerning the area proposed to be served, in the event that (1) such area is smaller than the service area designated by the Commission, or (2) such area is smaller than that which would appear to be the appropriate service area, in cases where it has not been designated by the Commission. The proposed area to be served must be substantially greater than that which could be served by a Community station.

B. In determining the predicted and measured field intensity contours of FM broadcast stations the following shall govern:

(1) Community stations will normally be not required to determine their contours.

(2) Metropolitan Stations shall determine the extent of their 1000 uv/m and 50 uv/m contours.

(3) Rural stations shall determine their 1000 uv/m, 50 uv/m and 20 uv/m contours.*

The above contours shall be determined in accordance with the methods prescribed in these Standards.

C. Although some service is provided by tropospheric waves, the service area is considered to be only that served by the ground wave. The extent of the service, however, is limited by the ground wave to such an extent that the service area is not of sufficient intensity to provide satisfactory broadcast service. The field intensity considered necessary for service is as follows:

* The 50 uv/m contour is desired in this case for use by the Commission in determining the usability of a signal at such low intensity.

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Page 534 • 1946 Yearbook Number

BROADCASTING • Telecasting
TABLE I

<table>
<thead>
<tr>
<th>Area</th>
<th>Median Field Intensity</th>
<th>Median Field Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>City business or factory areas</td>
<td>1000 µV/m</td>
<td>50 µV/m</td>
</tr>
<tr>
<td>Rural areas</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A median field intensity of 3000 to 5000 µV/m should be placed over the principal city to be served, and a median field intensity of 1000 µV/m should be placed over all other cities of the same metropolitan district served. The field intensity to be provided over the main service area is specified in paragraphs 2.2.11, 2.2.12, and 2.2.13. These figures are based upon the usual noise levels encountered in the several areas and upon the absence of interference from other FM stations.

D. A basis for allocation of satellite stations has not yet been determined.

For the present applications will be based on their individual merits.

E. The service area is predicted as follows:

1. Community stations

A map, topographical where obtainable, shall be submitted for the area within 15 miles of the proposed antenna site. On this map shall be indicated the antenna location, the contours of the terrain, and the center. Representative points shall be picked on this circle 15 degrees apart and the elevation of these points determined. The average elevation of these points shall then be subtracted from the field elevation of the center. The difference between the elevation of the center of the radiating system and the average elevation of these points shall determine the distance of the location on the terrain 10 miles from the transmitter. In cases where the applicant believes this method to be grossly in error due to peculiarities of the terrain, this method shall be used for determining the antenna height but a showing may be made, if desired, determining the height by other means and describing the method used. Calculations of the service contours of Community stations are not required.

2. Metropolitan and Rural stations

Profile graphs must be drawn for at least eight radials from the proposed antenna site. These profiles should be prepared for each radial beginning at the antenna site and measured to a point 100 feet higher than the antenna and then drawn for each 45° of azimuth; however, where feasible the radials should be drawn in such a way as to avoid large changes in the slope of the terrain. The method for determining the service area for the antenna site may be more than 10 miles from the antenna site. The profile graph for each radial should be plotted by contour intervals of from 40 to 100 feet and where the data permits at least 50 points of elevation (equally uniformly spaced) should be used for each radial. In instances of very rugged terrain where the use of contour intervals of 100 feet would result in several points in a short distance, 200 or 400 foot contour intervals may be used for such distances. On the other hand, where the terrain is uniform or gently sloping the smallest contour interval that could be used might be one foot, although only a relatively few points may be available. The profile graph should accurately depict the topography for each radial, and the graphs should be plotted with the distance in miles as the abscissa and the elevation in feet above mean sea level as the ordinate. The profile graphs should indicate the source of the topographical data employed. The graph should also show the elevation of the center of the radiating system. The graph may be plotted either on rectangular graph paper or on a drawing scale which shows the curvature of the earth. It is not necessary to take the curvature of the earth into consideration in this procedure, as this factor is taken care of in the chart showing signal intensity (Fig. 1).

The average elevation of the eight mile distance between two and ten miles from the antenna site should then be determined from the profile graph for each radial and may be obtained by averaging a large number of equally spaced points, by using a planimeter, or by obtaining the median elevation (that exceeded for 50% of the distance) in sections and averaging these values.

To determine the distance to a first-order contour for the field intensity of 1000 µV/m is used. The chart has been prepared for a frequency in the center of the band and is to be used for all FM broadcast channels. Since the change results from the change in frequency range, a to a contour is determined by the effective radiated power and the antenna height. The height of the antenna used in connection with Figure 1 should be the height of the center of the radiating system. The distance above the contour obtained by the preceding method. The distances shown by Figure 1 are based upon the effective radiated power that would result from other power, the sliding scale associated with the chart should be trimmed and used as the ordinate scale. This sliding scale is placed on the chart with the appropriate graduation for power in line with the lower line of the top edge of the chart. The right edge of the chart is placed as line with the appropriate antenna height gradient, and the chart then becomes direct reading for this power and antenna height. Where the antenna height is not one of those for which the signal strength distance characteristics are given, the contours, excluding (1) areas beyond the borders of the United States, and (2) large bodies of water, such as ocean areas, gulfs, sounds, bays, lakes, etc., but not rivers.

In cases where the terrain in one or more directions from the antenna site departs widely from the average elevation of the two to ten mile sector, the application assuming that the methods used above are not applicable to the several directions different from those which may be expected in practice. In such cases the prediction method should be followed, but a showing may be made if desired concerning the variation of the terrain and the justification for the showing should include data concerning the procedure employed and sample calculations. For example, a mountain ridge may indicate the practical limit of service and although the prediction method may indicate the contrary. In cases of such limitation, the map of predicted coverage should show both

BROADCASTING • Teletasking

1946 Yearbook Number • Page 535

3. TOPOGRAPHICAL DATA

In the preparation of the profile graphs previously described, the elevations or contour intervals shall be taken from the U.S. Geological Topographical Quadrangle Sheets for all areas for which such maps are available. If such maps are not published for the area in question, the next best topographic information should be used. Topographic data may sometimes be obtained from state and municipal agencies, the data from the Sectional Aeronautical Charts (including bench marks), or railroad depot elevations and highway elevations from roads may be used where no better information is available. In cases where limited topographic data can be obtained, use may be made of an altimeter in a car driven along roads extending generally radially from the transmitter site.

The Commission will not ordinarily require the submission of topographical maps for areas beyond 15 miles from the antenna site, but the maps must indicate the principal city or cities to be served. If it appears necessary, additional topographic data may be required.

The U.S. Geological Survey Topography Quadrangle Sheets may be obtained from the U.S. Geological Survey, Department of the Interior, Washington, D.C., for ten cents each. The Sectional Aeronautical Charts are available from the U.S. Coast and Geodetic Survey, Department of Commerce, Washington, for twenty-five cents each. Other sources of topographical maps or data will be furnished at a later date.

4. INTERFERENCE STANDARDS

Field intensity measurements are preferable in predicting interference between FM broadcast stations and should be used, when available, in determining the extent of interference. (For methods and procedure, see Section 2). In lieu of measurements, the interference should be predicted in accordance with the methods described.

Objectionable interference is considered to exist when the interfering signal exceeds that given by the ratio of Table II. In Table II the desired signal is median field and the undesired signal is the tropospheric signal intensity exceeding for 1% of the time.

(Continued on page 536)
TABLE II

<table>
<thead>
<tr>
<th>Channel Separation</th>
<th>Ration of Desired to Undesired Signals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same channel</td>
<td>10:1</td>
</tr>
<tr>
<td>Adjacent channel</td>
<td>2:1</td>
</tr>
</tbody>
</table>

In predicting tropospheric interference on the basis of the above measurements, the above method would be used to determine the 1000 uv/m contour. Using Figure 1 and its associated scaling scale, the equivalent radiated power shall be determined by placing the scaling scale along the axis of the transmitter. The distance to the 1000 uv/m contour is varied until the distance to the 1000 uv/m contour (as determined above), and the 1000 uv/m contour are found. The distance to the 1000 uv/m contour is then given opposite the 50 uv/m mark on the scaling scale where it crosses the lower line of the top edge of the chart. Changing to Figure 2 and using the equivalent radiated power just determined, the tropospheric interference is computed in the manner described in Section 2.

In certain cases, the Commission may desire more information or recordings, and in these instances special instructions will be issued. This may include fixed location measurements to determine tropospheric propagation and fading ratios.

All data shall be submitted to the Commission in digital form, including the following:

A. Map or maps showing the roads or points where measurements were made.
B. The service or interference areas determined by the method, including the boundaries.
C. All full description of the procedures and methods employed using the type of equipment, the method of installation and operation, and calibration procedures.
D. Complete data obtained during the survey, including calibration.
E. Antenna system and power employed during the survey.
F. Same, address, and qualifications of the engineer or engineers making the measurements.

In all cases, the data shall be submitted to the Commission in triplicate, except that only the original or one photostatic copy need be submitted of the actual recording tapes.

5. FIELD INTENSITY MEASUREMENTS IN ALLOCATION

When field intensity measurements are required by the Commission’s rules or when employed in determining the extent of service or interference of existing stations, the method of making field intensity measurements, as published in the Federal Communications Commission’s Radio Frequency Engineering Manual, may be employed, or a method similar to that in this section may be adapted for the purpose.

Measurement of the service and interference areas of FM broadcast stations should be made with mobile equipment along roads which are as close and similar as possible to the roads showing topography which was used in the prediction of the interference area. The mobile equipment and a continuous recording device must be placed in the chart, on the basis of which it is known that the signal is driven from the speedometer of the automobile, while the equipment is mounted on the bed so that it can be moved in any direction required in the case of irregular terrain or the use of directional antenna systems.

The area of interference, if any, shall be shown in connection with the map of predicted coverage. The use of昭on by昭on, scenario, and similar methods is not recommended.

6. TRANSMITTER LOCATION

A. The transmitter location shall be on or near the center of the proposed service area, and the station antenna shall be designed to the extent possible to provide service throughout the entire area. It is desirable to locate the transmitter at a point where there is an adequate view of the area to be served, and the terrain is such that the horizontal and vertical patterns of the antenna may be used to provide the desired service area.

B. The station shall be located at a point where the terrain is such that the antenna may be used to provide the desired service area.

C. The Commission may require that the station be located at a point where the terrain is such that the antenna may be used to provide the desired service area.

D. The station shall be located at a point where the terrain is such that the antenna may be used to provide the desired service area.

E. The station shall be located at a point where the terrain is such that the antenna may be used to provide the desired service area.

F. The station shall be located at a point where the terrain is such that the antenna may be used to provide the desired service area.

G. The station shall be located at a point where the terrain is such that the antenna may be used to provide the desired service area.

H. The station shall be located at a point where the terrain is such that the antenna may be used to provide the desired service area.

7. ANTENNA SYSTEMS

A. The system shall be designed to provide the desired service area. The system shall be designed to provide the desired service area.

B. The system shall be designed to provide the desired service area.

C. The system shall be designed to provide the desired service area.

D. The system shall be designed to provide the desired service area.

E. The system shall be designed to provide the desired service area.

F. The system shall be designed to provide the desired service area.

G. The system shall be designed to provide the desired service area.

H. The system shall be designed to provide the desired service area.
B. The antenna must be constructed so that it is as clear as possible of surrounding buildings or objects that would cause shadow problems.
C. Applications proposing the use of directional antennas systems must be accompanied by the following:
   (1) Complete description of the proposed antenna system.
   (2) Orientation of array with respect to true north; time spacing of fields from elements (degrees leading or lagging); space spacing of elements (in feet); degrees; ratio of fields from elements.
   (3) Calculated field intensity pattern (on letter-size polar coordinate paper) giving the free space field intensity in millivolts per meter at one mile in the horizontal plane, together with the formula used, constants employed, sample calculations and tabulation of calculation data.
   (4) Name, address, and qualifications of the engineer making the calculation.
D. Applications proposing the use of FM broadcast antennas in the immediate vicinity (i.e., 300 feet or less) of (1) other FM broadcast antennas, or (2) television broadcast antennas for frequencies adjacent to the FM broadcast band, must include a showing to the expected effect, if any, of such proximity operation.

In cases where it is proposed to use a tower of a standard broadcast station as a supporting structure for an FM broadcast antenna, an application for construction permit (or modification of construction permit) for such station must be filed for consideration with the FCC. Applications may be required for other classes of stations when their towers are to be used in connection with FM broadcast stations.

When an FM broadcast antenna is mounted on a non-directional standard broadcast antenna, new resistance measurements must be made of the standard broadcast antenna after installation and testing of the FM broadcast antenna. During the installation and until the new resistance determination is approved, the standard broadcast station licensee should apply for authority (informal application) to operate by the indirect method of power determination. The FM broadcast license application will not be considered until the application form concerning resistance measurements is filed for the standard broadcast station.

When an FM broadcast antenna is mounted on an element of a standard broadcast antenna, the effect of the FM broadcast antenna on the directional pattern must be filed and tested with the standard broadcast license application concerning the effect of the FM broadcast antenna on the directional pattern. Depending upon the individual case, the Commission may require readjustment and certain field intensity measurements of the standard broadcast station following the completion of the FM broadcast antenna system construction.

When the proposed FM broadcast antenna is to be mounted on a tower in the vicinity of a standard broadcast directional array and it appears that the operation of the directional antenna system may be affected, an engineering study must be filed with the FM broadcast application concerning the effect of the FM broadcast antenna on the directional pattern. Readjustment and field intensity measurements of the standard broadcast station may be required following construction of the FM broadcast antenna.

Information regarding data required in connection with standard broadcast directional antenna systems may be found in the Standards of Good Engineering Practice Concerning Standard Broadcast Stations.

In the event a construction permit is made for an auxiliary licensee to construct a new antenna or antennas for its own use, information concerning the effect on the standard broadcast station may be required following construction of the FM broadcast antenna.

Information regarding performance requirements in connection with these standards may be found in the Standards of Good Engineering Practice Concerning Standard Broadcast Stations.

8. TRANSMITTERS AND ASSOCIATED EQUIPMENT

A. Electrical Performance Standards—The general design of the FM broadcast transmitting system (from input terminals of microphone pre-amplifier, through audio facilities at the studio, through lines or other circuits between studio and transmitter, through audio facilities at the transmitter, and through the transmitter, both electrical equalizers for the correction of deficiencies in microphone response) shall be in accordance with the following principles and specifications:

   (1) Standard power ratings and operating power range of FM broadcast transmitters shall be in accordance with the following table:

<table>
<thead>
<tr>
<th>Standard Power Rating</th>
<th>Operating Power Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 watts</td>
<td>250 watts — 1 kw</td>
</tr>
<tr>
<td>1 kw</td>
<td>1 kw</td>
</tr>
<tr>
<td>3 kw</td>
<td>3 kw</td>
</tr>
<tr>
<td>10 kw</td>
<td>10 — 10 kw</td>
</tr>
<tr>
<td>25 kw</td>
<td>25 — 25 kw</td>
</tr>
<tr>
<td>50 kw</td>
<td>50 — 50 kw</td>
</tr>
<tr>
<td>100 kw</td>
<td>100 — 100 kw</td>
</tr>
</tbody>
</table>

   Composite transmitters may be authorized with a power rating different from the above table, provided full data is supplied in the application concerning the impedance-frequency characteristic of the series inductance-resistance networks having a time constant of 75 microseconds. (See Figure 3.) The deviation of the system response from the standard pre-emphasis curve shall lie between two limits as shown in Figure 3. The upper of these limits shall be uniform (no deviation) from 20 to 15,000 cycles. The lower limit shall be uniform from 100 to 7,500 cycles, and three db below the upper limit; from 7,500 to 15,000 cycles the lower limit shall fall from the three db limit at an uniform rate of one db per octave (four db at 50 cycles); from 7,500 to 15,000 cycles the lower limit shall fall from the three db limit at a uniform rate of two db per octave (five db at 15,000 cycles).

   (2) At any modulation frequency between 50 and 15,000 cycles and at modulation percentages of 25%, 50%, and 100%, the combined audio frequency harmonics measured in the output of the system shall not exceed the root-mean-square values given in the following table:

<table>
<thead>
<tr>
<th>Modulating frequency</th>
<th>Distortion</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 to 100 cycles</td>
<td>3.5%</td>
</tr>
<tr>
<td>100 to 7500 cycles</td>
<td>2.5%</td>
</tr>
<tr>
<td>7500 to 15000 cycles</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

   Measurements shall be made employing 75 microsecond de-emphasis in the measuring equipment and 75 microsecond pre-emphasis in the transmitting equipment, and without compression if a compression amplifier is employed. Equipment shall be included in the test.

   (3) It is recommended that none of the three main divisions of the system (transmitter, studio to transmitter circuit, and audio facilities) contribute over one of these percentages since at some frequencies the total distortion may become the arithmetic sum of the distortions of the divisions.

   (4) The transmitting system output noise level (frequency modulation) in the band of 50 to 15,000 cycles shall be at least 60 decibels below the audio frequency level representing a frequency swing of ±75 kilocycles. The noise-measuring equipment shall be provided with standard 75-microsecond de-emphasis; the ballistic characteristics of the instrument shall be similar to those of the Standard VU Meter.

   (5) The transmitting system output noise level (amplitude modulation) in the band of 50 to 15,000 cycles shall be at least 60 decibels below the noise level representing 100% amplitude modulation. The noise-measuring equipment shall be provided with standard 75-microsecond de-emphasis; the ballistic characteristics of the instrument shall be similar to those of the Standard VU Meter.

   (6) Automatic means shall be provided in the transmitter to maintain the audio frequency noise (frequency within ±2000 cycles).

   (7) The transmitter shall be equipped with suitable indicating instruments.

*See Section 13 for measurement frequencies and other information. (Continued on page 539)
STANDARDS OF GOOD ENGINEERING PRACTICE FOR FM STATIONS

(Continued from page 537)

for the determination of operating power and with other instruments as are necessary for proper adjustment, operation, and maintenance of the equipment (See Section 9).

(8) Adequate provision shall be made for varying the transmitter output power to compensate for excessive variations in line voltage or for other factors affecting the output power.

(9) Adequate provision shall be provided in all component parts to avoid overloading and damage due to maximum output power.

(10) Means should be provided for connection and continuous operation of approved frequency and modulation monitors.

(11) If the transmission system is employed, precaution shall be taken to maintain it in its connection in the circuit due to the use of pre-emphasis in the transmitting system.

2. Construction. The transmitter shall be constructed either on racks and panels or in totally enclosed frames protected as required by article 810 of the National Electrical Code and set forth below:

(a) All space between the transmitting equipment and the cabinets shall be filled with a Type K1 structural material.

(b) Power equipment and control panels shall be mounted in a manner to prevent access to live parts.

(c) All power connections to the transmitter shall be made in accordance with the National Electrical Code and the British Standards Institution requirements.

3. General. The transmitter shall be designed to meet the following minimum requirements, requiring voltages in excess of 350 volts to be applied to the circuit, from the front of the panels with all access doors closed.

(1) Proper bleeders or automatic mains shall be installed across all capacitor banks to lower any voltage which may remain accessible with access door open to less than 350 volts within two weeks after the access door is opened.

(2) All plate and source equipment shall not be accessible to the public.

(4) All space between the transmitting equipment and the cabinets shall be filled with a Type K1 structural material.

(a) All transmission lines shall be of 1.000 volts potential to ground on the movement shall be protected by a gap 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 movement. If not shown in the manufacturer’s rating the use instrument will operate safely at the applied potential, as the instrument is not necessary.)

(1) In case the plate voltmeter is located on the low potential side of the multiplier resistor with the potential of the high potential terminal of the instrument, the instrument shall be of the 5,000 volt type sufficient to operate the protective devices across the instrument terminals in case the winding opens.

(c) Transmission line meters and any other radio frequency instrument which may be necessary for the operator to read shall be so installed as to be easily accessible to the operator and to the risk contact with circuits carrying high potential radio frequency energy.

(3) The frequency and modulation monitors and associated radio frequency lines to the transmitter shall be thoroughly shielded.

D. Installation

(1) The installation shall be made in suitable quarters.

(2) The operator must be on duty during operation, suitable facilities for his welfare and comfort shall be provided.

E. Spares. A spare tube of every type used in the transmitter and frequency and modulation monitors shall be on hand at the equipment location. When more than one type are employed, the following table determines the number of spares of each type required.

<table>
<thead>
<tr>
<th>Number of each type employed</th>
<th>Spares required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3 to 5</td>
<td>8</td>
</tr>
<tr>
<td>6 to 10</td>
<td>8</td>
</tr>
<tr>
<td>11 to 15</td>
<td>4</td>
</tr>
</tbody>
</table>

F. Operation. In addition to specific requirements of the rules governing FM broadcast stations, the following operating requirements are specified:

(1) The maximum percentage of modulation shall be maintained in accordance with Section 3.205. However, precautions shall be taken to not to exceed 100% of the maximum permissible value.

(2) Spurious emissions, including radio frequency harmonics, shall be maintained at a level as low as practical at all times in accordance with good engineering practices.

(3) If a limiting or compression amplifier is employed, care shall be taken in its use due to pre-emphasis in the transmitting system.

G. Data. All data shall be subject to the above requirements where applicable except as follows:

(1) If properly covered by an underwriter’s certificate, it will be considered as satisfying safety requirements.

(2) Section 8191 of Article 810 of the National Electrical Code shall apply for voltages only in excess of 500 volts.

(3) No specific requirements are made with regards to the microphones to be employed. However, microphone performance (including compensating networks, if employed) shall be compatible with the required performance of the transmitting system.

9. INDICATING INSTRUMENTS

An FM broadcast transmitter shall be equipped with suitable indicating instruments of acceptable accuracy to measure (1) the direct plate voltage and voltage, (2) the main transmission line radio frequency current or voltage. The following requirements and specifications shall apply to indicating instruments used by the broadcasting station.

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 at least 12 linear scale inches.

(2) Accuracy shall be at least 2 percent of the full scale reading.

(3) Scale shall have at least 40 divisons.

(4) Full scale reading shall not be greater than five times the minimum normal indication.

B. Instruments indicating transmission line current or voltage shall meet the following specifications:

(1) Instruments having linear scales shall meet the requirements of A

(2) Instruments having logarithmic or square law scales.

(a) shall meet requirements A(1) and (2) for linear scale instruments.

(b) Full scale reading shall not be greater than three times the normal minimum indication.

(c) No scale division above one-third full scale reading (in amperes) shall be greater than one-thirtieth of the full scale reading.

C. Radio frequency instruments having expanded scales.

(1) Shall meet requirements A(1), (2), and (4) for linear scale instruments.

(2) No scale division above one-third full scale reading (in amperes) shall be greater than one-fifteenth of the full scale reading.

(3) The meter face shall be marked with the words ‘Expanded Scale’ of the appropriate gain factor.

D. No indicating instrument shall be used which is not capable of determining the plate current or plate voltage of the last radio stage or the transmission line current or voltage or the direct plate current and/or direct plate voltage of the last radio stage, provided that the resolution of the instrument and the circuitry of the circuits or accuracy of the indicating instruments. If the records are to be used in any proceeding before the Commission as representative of the accuracy, the accuracy shall be predetermined and the indicating instrument shall be checked at such intervals as to insure the retention of the accuracy.

E. No required instrument, the accuracy of which is questionable, shall be employed. Repairs and recalibration of instruments shall be made by the manufacturer, or by an authorized instrument repair service of the manufacturer, or by some other properly qualified and equipped instrument repair service. In any case the required instrument must be supplied with a certificate of calibration.

F. Recording instruments may be employed in addition to the indicating instruments to record the transmission line current or voltage and the direct plate current and/or direct plate voltage of the last radio stage, provided that the indication shall be recorded by the addition of the circuitry or accuracy of the indicating instruments. If the records are to be used in any proceeding before the Commission as representative of the accuracy, the accuracy shall be predetermined and the indicating instrument shall be checked at such intervals as to insure the retention of the accuracy.

G. The function of each instrument used in the equipment shall be clearly and distinctly shown on the instrument itself or on the panel immediately adjacent thereto.

10. AUXILIARY TRANSMITTERS

Auxiliary transmitters may not exceed the power rating or operating power range of the main transmitter, but need not conform to the performance characteristics specified by Section 5A:2.10A (5) inclusive. The subsequent portions of Section 5A shall apply to auxiliary transmitters.
11. OPERATING POWER: DETERMINATION AND MAINTENANCE

A. The operating power of FM broadcast stations shall be determined by
the indirect method. This is the product of the plate voltage, plate current
(1p), plate current rating, and an efficiency factor, ƞ; that is:

\[ \text{Operating power} = \text{Ep} \times 1p \times ƞ \]

The efficiency factor, ƞ, shall be established by the transmitter manufacturer
and shall be posted on each unit of each transmitter manufactured by
such manufacturer. It shall be shown in the instruction books supplied to the
customer with each transmitter. In the case of the operating power of the
transmitter the operating power in watts substantially as transmitted to
the Commission by the applicant along with a statement of the basis used in
determining such factor.

The operating power shall be maintained as near as practicable to the
authorized operating power, and shall not exceed the limits of 5 percent above
and 10 percent below the authorized power except in emergencies. In the
event it becomes necessary to reduce the operating power, the station may
be operated with reduced power for a period of 10 days or less provided the
Commission is notified that the device by which the reducing power
of the station is to be operated shall be notified in writing immediately thereafter
and also upon the resumption of normal operating power.

12. FREQUENCY AND MODULATION MONITORS AT AUXILIARY TRANSMITTERS

Sections 3.566 and 3.567 require that each FM broadcast station have
approved frequency and modulation monitors in operation at the transmitter.
The following shall govern the installation of approved frequency and modula
tion monitors at auxiliary transmitters of FM 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 installed at the
auxiliary transmitter except when the frequency of the auxiliary transmitter
may be monitored by means of the frequency monitor at the main transmitter.
When the auxiliary transmitter is operated without a frequency monitor under
this exception, it shall be monitored by means of the frequency monitor at
the main transmitter.

The licensees will be held strictly responsible for any center frequency devi
tion of the main transmitter in the times 1000 cycles or time frequency, even though
exempted from the above from installing an approved frequency
monitor.

Installation of an approved modulation monitor at the location of the auxiliary
transmitter, when different from that of the main transmitter, is optional
for the station in compliance with this rule. If the auxiliary transmitter is
operated 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 used for the entire period of operation of the
auxiliary transmitter, it being understood that it will not be removed without
the approval of the Commission.
The idea of introducing the minimum frequency monitor at the auxiliary
transmitter with the same location, the same frequency and modulation monitors may be
used for monitoring both transmitters, provided they are so arranged as to be readyly
switched from one to the other.

12. * REQUIREMENTS FOR TYPE APPROVAL OF TRANSMITTERS

Section 3.254 of the Rules and Sections 8 of these Standards concern the
design, construction and technical operation of FM broadcast station equipment.
In order to facilitate the filing of and action on applications for construction
permit specifications, equipment, etc., manufacturers will be required to
approve, as complying with the technical requirements, such equipment by
their own manufacturer, subject to the following conditions and in accordance 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 current technical
Rules and Regulations of the Commission. The approval may be withdrawn
under circumstances when it is subsequently found that the equipment does not
comply with these requirements or is not being represented or does not comply with the
technical Rules and Regulations of the Commission on which the type approval
was based.

B. Such approval shall not be construed to mean that the equipment shall be
satisfactory as the art progresses and or as the Rules and Regulations
of the Commission change requiring retesting of the equipment.

C. Applicants specifying equipment of approved manufacture need not sub
mit detailed descriptions and diagrams where the correct type number is specified
and where the correct type number is shown in the specifications.

D. In passing on equipment, no consideration is given by the Commission
to patent rights.

For the approval of FM broadcast transmitters, manufacturers shall submit
PCC Form 9 of 100 percent completion with respect to all pertinent sections (two sworn
copies). In every case the data set forth below, all of which shall be verified before a notary public.*

(1) Photographs or drawings, or any other evidence that construction is
consistent with the requirements for good engineering practices.

(2) Data and curves showing overall audio frequency response from
50 to 15,000 cycles for approximately 25, 50 and 100 percent modulation. Measure
tments shall be made at 100, 400, 1000, 5000, 10,000 and 15,000 cycles. These shall be plotted below a standard
dB graph, and shall also contain error margins.

(3) Data on audio frequency harmonics for 25, 50 and 100 percent modulation
for the fundamentals frequencies of 50, 100, 400, 1000 and 5000 cycles. The data shall be on an absolute scale. Measurements
shall be made at 10,000, 15,000, 20,000 and 25,000 cycles. More than 1 percent modulation shall not be measured at 12
megacycles or less as the fundamental frequency is below 1000 cycles.

(4) Data on audio frequency harmonics and the modulation characteristics for
the fundamentals frequencies of 50, 100, 400, 1000 and 5000 cycles. Measurements shall be made at 10,000, 15,000, 20,000
and 25,000 cycles, and shall be measured as the level below 100 percent modulation.

(5) Data and curves comparing output power to compensate for power supply
voltage variations.

(6) Data and curves on frequency sensitivity for variations in ambient temperature
and humidity, and electrical and magnetic fields.

(7) Data and curves on frequency stability for variations in power supply voltage
from 85 to 110 percent normal.

(8) Data and curves on frequency sensitivity for variations in power supply voltage
from 85 to 110 percent normal.

F. In case any manufacturer decide to produce a 100 kw transmitter and submit
data for it on approval, or any power ratio not listed as standard, the
manufacturer shall provide the Commission with a complete list of the
manufacturers name and the standard power rating of the transmitter to
be produced at least six months prior to the delivery date or completion
of such transmitter.

14. * REQUIREMENTS FOR TYPE APPROVAL OF FREQUENCY MONITORS

Section 3.252 of the Rules requires each FM broadcast station to have in
operation a facility that will maintain the independent measurement of the
frequency control of the transmitter. The frequency monitor shall be
approved by the Commission and shall have a stability and accuracy of at least
20 cycles per second (20 cycles per second). The operation of the frequency
monitor shall be considered on the basis of data submitted by the manufacturer. Any manufacturer
wishing to sell a frequency monitor shall submit the Commission with full
details (two sworn copies).

In approving a frequency monitor based on these tests and specifications, the
Commission merely recognizes that the design of such equipment, as approved
with Section 3.252, if properly constructed, maintained and operated, The Commission accepts no responsibility whatever for further re
 manufactures, which may affect its performance. The Commission reserves
the right to determine whether or not the frequency monitor fulfills the
standards set forth here and the Commission will notify the manufacturer
of its determination.

B. General Specifications

The general specifications that frequency monitors shall meet before
they will be approved are as follows:

(1) The unit shall have an accuracy of 100 cycles per second (100 cycles
per second) and shall be tested at the time of installation on
the frequency monitor and thereafter on a frequency monitor,
which may affect its accuracy, in an FM broadcast station through
out the United States for any channel within the FM broadcast
band.

(2) The scale of the frequency monitor shall be so calibrated as to be
accurately read within ±100 cycles.

(3) Means shall be provided for adjustment of the frequency monitor
which may be provided to the manufacturer in the event
of change in design or construction or that the material or workmanship is defective.

C. Tests to be made for approval of FM broadcast frequency monitors.

The manufacturer of a monitor shall submit data on the following at the
time of requesting approval:

(1) Constancy of oscillator frequency, as measured several times in one
month.

(2) Constancy of oscillator frequency when subjected to vibration tests
which would correspond to the treatment received in shipping, handling and
installing the instrument.

(3) Accuracy of readings of the frequency deviation instrument.

(4) Functioning of frequency adjustment device.

(5) Effects on frequency and readings, of the changing of tubes, of\nvarious atmospheres, and of variations of room temperature through a range not to exceed
10°C to 40°C.

(6) Response of indicating instrument to small changes of frequency.

(7) Ability of the monitor, after being subjected to the various tests
including operating tests, to determine ability of equipment to withstand
shock and vibration.

(8) Other tests may be required, such as effects of variation of input
level, etc. The tests to be made shall be agreed on by the
Commission and the manufacturer.

Tests shall be conducted in such a manner as to approximate actual operating
conditions as nearly possible. The equipment under test shall be operated on
any channel in the FM broadcast band.

15. REQUIREMENTS FOR TYPE APPROVAL OF MODULATION MONITORS

Section 3.255 requires each FM broadcast station to have an approved
modulation monitor in operation in cases where the modulation may be
required by the Commission to be measured or is not a part of the FM broadcast
frequency monitor. Approval of a modulation
monitor for FM broadcast stations will be considered on the basis of data supplied
by the manufacturer, and the following specifications must be met in
order for approval to be granted. Allocation of the Commission with full
details (two sworn copies).

A. A means for insuring that the transmitter input to the modulation
monitor is of the same frequency as the station.

B. A modulation peak indicating device that can be set at any pre-determined
value from 50 to 100 percent modulation (plus-minus 10% swing) and
for either positive or negative swings (i.e., either into or out of the
modulation)

C. 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 100 micro-seconds and 100 milliseconds are indicated to within 10 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 the meter will read zero on the discharge cycle.

The characteristics of the indicating meter are as follows:

1. Speed of the meter for discharge of a 10 micro-micro-seconds pulse shall be
250 to 350 milliseconds.

2. The damping factor shall be between 0.7 to 0.9

* In connection with this type approval of FM equipment, the Commission may send to
the manufacturer a representative to observe tests made of such equipment by the manufacturer.

1946 Yearbook Number • Page 539