T20-2-1

HOW TO READ DIRECTIONAL PATTERNS

This is probably as good a place as any to mention that a DA pattern and a coverage map are not the same thing. The purpose of the former is to provide a proof of the directionality of a station's transmitting array, while that of the latter is to show the effect of this radiation, i.e. to portray the geographical area which would enjoy a usable signal. Although in pure theory a station's pattern and CM would look identical, they never do in practice due to variations in terrain, QRM, etc.

The FCC requires that all DA patterns be filed as a polar graph of the variations in the station's field intensity (measured in millivolts per meter -- mv/m) as a monitoring instrument is brought around the array in a circle whose radius is fixed at ONE MILE. Of course, it's impossible to measure this intensity at <u>all</u> points which are one mile away; in reality only a few points are selected, the remainder being filled in by interpolation. No pattern is ever graphed in terms of Effective Radiated Power (ERP) in watts as DXers would probably prefer.

An obvious question might be: 'Wouldn't such-and-such a field intensity induced at one mile be the result of a specific ERP in watts being radiated in that direction?" Generally speaking (there are some minor complications!), the answer is "yes", and this is the key to interpreting patterns as far as DXers are concerned. The table below can be used to convert from mv/m/one mile to ERP in watts. It should be cautioned that the figures have been rounded off slightly from the true values.

MV/M @ 1 mile	ERP (watts)	MV/M @ 1 mile	ERP (watts)
4500	500,000	200	1000
3450	300,000	140	500
2800	200,000	100	250
2000	100,000	63	100
1400	50,000	45	50
900	20,000	20	10
630	10,000	14	5
450	5,000	6.3	1

You may notice that the inverse-square law is in force here.

Turning to the KRDS (formerly KZON) pattern which follows this article, it becomes apparent that -- with some modifications -- it is the "figure 8" described earlier. In order to check yourself out on the table above, find the pattern's maximum and minimum values of 180 and 6.0 mv/m respectively -- they represent an ERP variation of about 900 watts to 1 watt! In addition to the pattern graph itself, this particular sheet includes a tower layout plan at the upper left, showing tower separation and orientation, as well as tower height ("G" = ht.). The field ratio between towers (ratio of antenna currents in amps) is 0.915 : 1. The power phase relationship is given as "0 deg. - 0 deg." (i.e. radiators are "in phase"). On all DA patterns, one tower will be assigned a field value of unity and a phase angle of zero degrees, to serve as a reference tower. Most of the other markings on this pattern should be self-explanatory.

Although the FCC has on file every current or proposed pattern in existence, they do not have the facilities for making copies of their patterns. Instead, they've contracted Cooper-Trent, Inc., a Washington, D.C. blueprinting firm, to make copies of the FCC patterns for interested individuals. This company is the only dependable source of patterns that I know of; patterns are generally not available from radio stations. Anyone interested in placing orders with this company is invited to write me (or Cooper-Trent) for their fees and other ordering details. Any other queries pertaining to this article are likewise invited.

--Jim Korn

120-2-2

MEASURED DAY & NIGHT
(1-17-61g)

Station KZON
Tolleson, Arizona

250w, DA-1, U
1190 KC

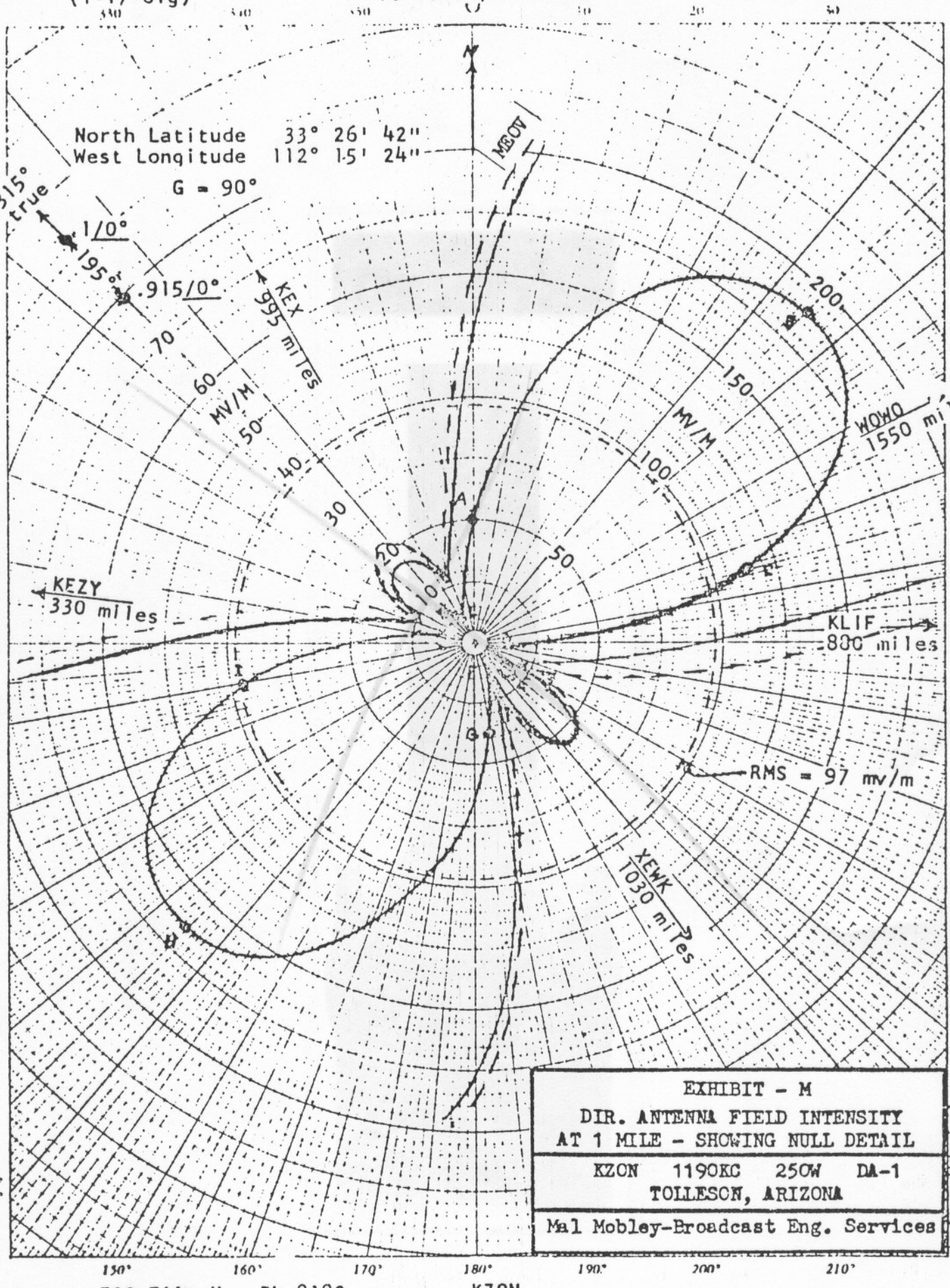

EXHIBIT - M
DIR. ANTENNA FIELD INTENSITY AT 1 MILE - SHOWING NULL DETAIL
KZON 1190KC 250W DA-1 TOLLESON, ARIZONA
Mal Mobley-Broadcast Eng. Services

FCC File No. BL-8182
Accepted 12-21-60

KZON
Tolleson, Arizona

1190 KC