Shively Labs
a division of Howell Laboratories,Inc.
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P. O. Box 389 Harrison Rd.,
Bridgton, Maine 04009 USA
(207) 647-3327
888-SHIVELY
Fax: (207) 647-8273
E-mail: sales@shively.com
Web site: www.shively.com

S.O. 20811

Report of Test 6014-6/2-DA

for

CLASSIC RADIO, INC.

KING-FM Seattle, WA

OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a 6014-6/2-DA to meet the needs of KING-FM and to comply with the requirements of the FCC construction permit, file number BPH-19990812IA.

RESULTS:

The measured azimuth pattern for the 6014-6/2-DA is shown in Figure 1. Figure 1A shows the Tabulation of the Horizontal Polarization. Figure 1B shows the Tabulation of the Vertical Polarization. The calculated elevation pattern of the antenna is shown in Figure 3. Construction permit file number BPH-19990812IA indicates that the Horizontal radiation component shall not exceed 50 kW at any azimuth and is restricted to the following values at the azimuths specified:

90 through 110 Degrees T: 2.0 kW

260 through 300 Degrees T: 39.694 kW

From Figure 1, the maximum radiation of the Horizontal component occurs at 203 Degrees T to 224 Degrees T and at 335 Degrees T to 0 Degrees T. At the restricted azimuth of 90 through 110 Degrees T the Vertical component is 14.42 dB down from the maximum of 50 kW, or 1.8 kW.

At the restricted azimuth of 260 through 300 Degrees T, the Vertical component is 1.21 dB down from the maximum of 50 kW, or 37.845 kW.

The R.M.S. of the Horizontal component is 0.725. The total Horizontal power gain is 6.461. The R.M.S. of the Vertical component is 0.700. The total Vertical power gain is 6.334. See Figure Four for calculations. The R.M.S. of the FCC composite pattern is 0.760. Therefore this Pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

METHOD OF DIRECTIONALIZATION:

The 6014-6/2-DA was mounted on a tower of exact scale to a Valmont-Microflect 300 ft. self-supporting tower. The spacing of the antenna to the tower was varied to achieve the vertical pattern shown in Figure 1. See Figure 2 for mechanical details.

METHOD OF MEASUREMENT:

As allowed by the construction permit, file number BPH-19990812IA, a single level of the 6014-6/2-DA was set up on the Howell Laboratories scale model antenna pattern measuring range. A scale of 4.5:1 was used.

SUPERVISION:

Mr. Surette was graduated from Lowell Technological Institute, Lowell, Massachusetts in 1973 with the degree of Bachelor of Science in Electrical Engineering. He has been directly involved with design and development of broadcast antennas, filter systems and RF transmission components since 1974, as an RF Engineer for six years with the original Shively Labs in Raymond, ME and for a short period of time with Dielectric Communications. He is currently an Associate Member of the AFCCE and a Senior Member of IEEE. He has authored a chapter on filters and combining systems for the latest edition of the CRC Electronics Handbook and for the 9th Edition of the NAB Handbook.

EQUIPMENT:

The scale model pattern range consists of a wooden rotating pedestal equipped with a position indicator. The scale model bay is placed on the top of this pedestal and is used in the transmission mode at approximately 20 feet above ground level. The receiving corner reflector is spaced 50 feet away from the rotating pedestal at the same level above ground as the transmitting model. The transmitting and receiving signals are carried to a control building by means of RG-9/U double shielded coax cable.

The control building is equipped with:

Hewlett Packard Model 8753 Network Analyzer
PC Based Controller
Hewlett Packard 7550A Graphics Plotter

The test equipment is calibrated to ANSI/NCSL Z540-1-1994.

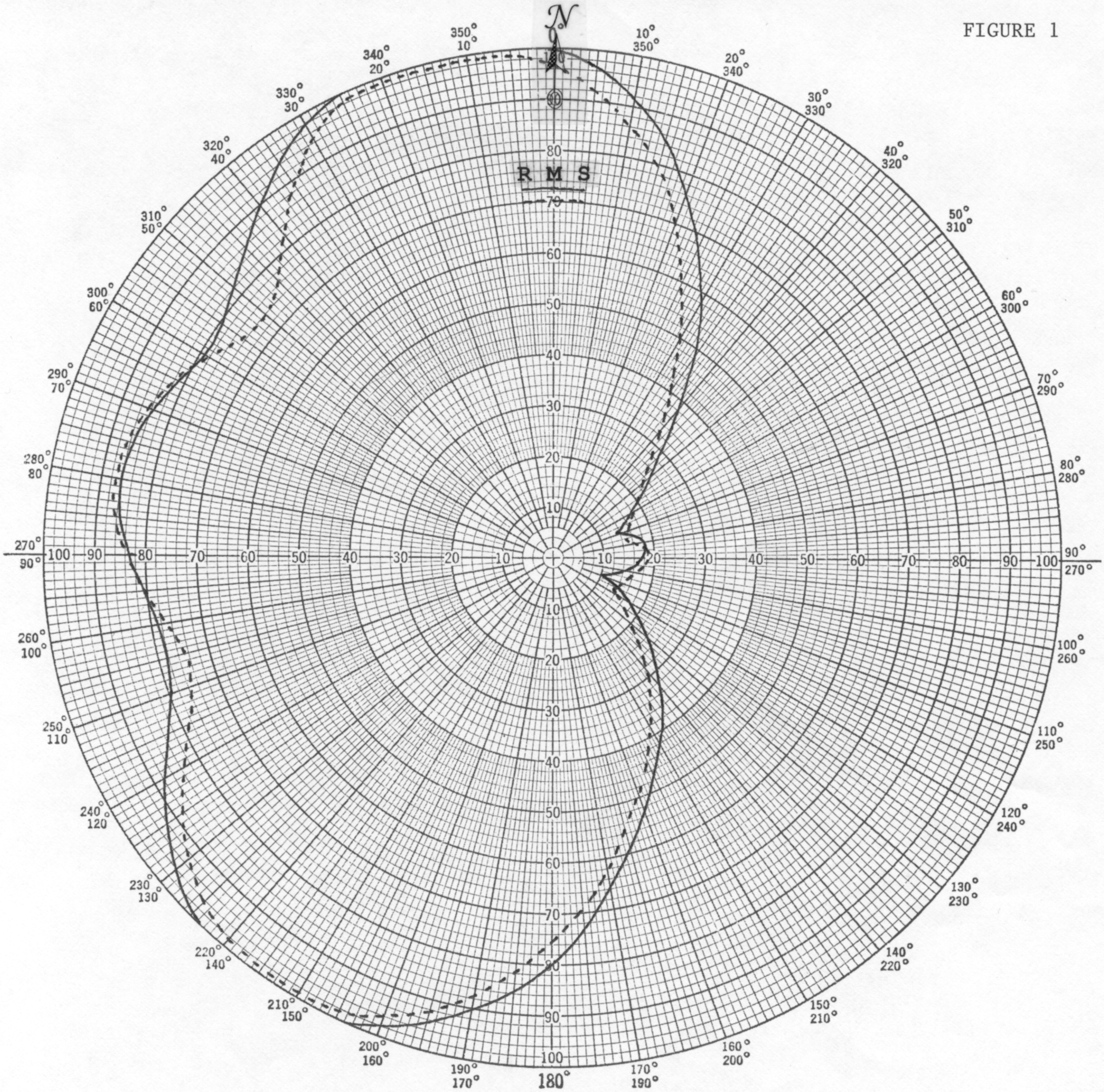
TEST PROCEDURES:

The corner reflector is mounted so that the horizontal and vertical azimuth patterns are measured independently by rotating the corner reflector by 90 degrees. The network analyzer was set to 441.45 MHz. Calibrated pads are used to check the linearity of the measuring system. For example, 6 dB padding yields a scale reading of 50 from an unpadded reading of 100 in voltage. From the recorded patterns, the R.M.S. values are calculated and recorded as shown in Figure 1.

Respectfully submitted by:

Robert A. Surette
Manager of RF Engineering
S/O 20811
April 2, 2002

FIGURE 1



Shively Labs

PROJECT NAME KING-FM SEATTLE, WA

PROJECT NUMBER 20811 DATE 12/04/01

MODEL (X) FULL SCALE ( ) FREQUENCY 441.45/98.1 MHz

POLARIZATION HORIZ (———); VERT (----)

CURVE PLOTTED IN: VOLTAGE (X) POWER( ) DB( )

OBSERVER RAS

ANTENNA TYPE 6014-6/2-DA

PATTERN TYPE DIRECTIONAL AZIMUTH

REMARKS: SEE FIGURE 2 FOR MECHANICAL DETAILS

Figure 1A

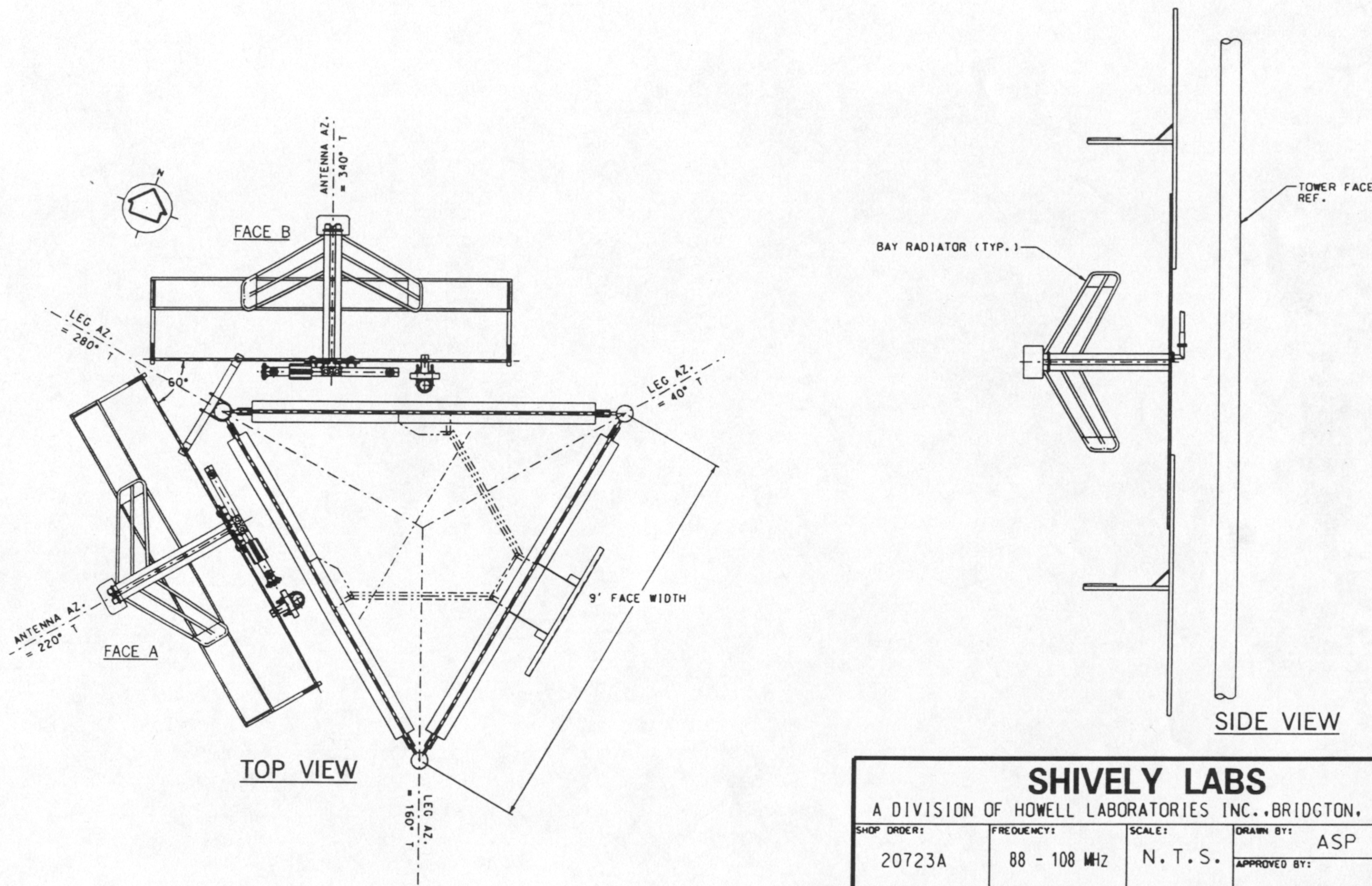
S/O 20811
TABULATION OF HORIZONTAL POLARIZATION
KING-FM Seattle, WA

DEGREE	RELATIVE FIELD	DEGREE	RELATIVE FIELD
0	1.000	180	0.800
10	0.910	190	0.900
20	0.760	200	0.980
30	0.590	210	1.000
40	0.390	220	1.000
45	0.300	225	0.990
50	0.250	230	0.960
60	0.180	240	0.880
70	0.140	250	0.795
80	0.180	260	0.790
90	0.175	270	0.830
100	0.150	280	0.860
110	0.110	290	0.835
120	0.180	300	0.790
130	0.250	310	0.820
135	0.290	315	0.855
140	0.330	320	0.900
150	0.425	330	0.980
160	0.530	340	1.000
170	0.660	350	1.000

Figure 1B

S/O 20811
TABULATION OF VERTICAL POLARIZATION
KING-FM   Seattle, WA

DEGREE	RELATIVE FIELD	DEGREE	RELATIVE FIELD
0	0.965	180	0.755
10	0.860	190	0.875
20	0.700	200	0.960
30	0.500	210	0.990
40	0.320	220	0.985
45	0.260	225	0.965
50	0.230	230	0.930
60	0.180	240	0.830
70	0.160	250	0.755
80	0.160	260	0.770
90	0.190	270	0.835
100	0.170	280	0.870
110	0.145	290	0.845
120	0.150	300	0.780
130	0.200	310	0.740
135	0.240	315	0.765
140	0.290	320	0.820
150	0.385	330	0.945
160	0.490	340	0.990
170	0.620	350	0.990



TOWER BY: VALMONT-MICROFLECT
MODEL: 300 FT. SELF-SUPPORTING

SHIVELY LABS A DIVISION OF HOWELL LABORATORIES INC., BRIDGTON, MAINE			
SHOP ORDER: 20723A	FREQUENCY: 88 - 108 MHz	SCALE: N.T.S.	DRAWN BY: ASP APPROVED BY:
TITLE: MODEL-6014-6/2-DIRECTIONAL ANTENNA			
DATE: 9-29-99	FIGURE 2		

FIELD ELEVATION PATTERN

ANT. MFG.: SHIVELY LABS
ANT. TYPE: 6014-6/2-DA
STATION: KING-FM
FREQ: 98.1 MHz CHAN: 251
Power Gain 6.461 8.103 dB
DATE: 12/04/01
FIGURE NO.: 3

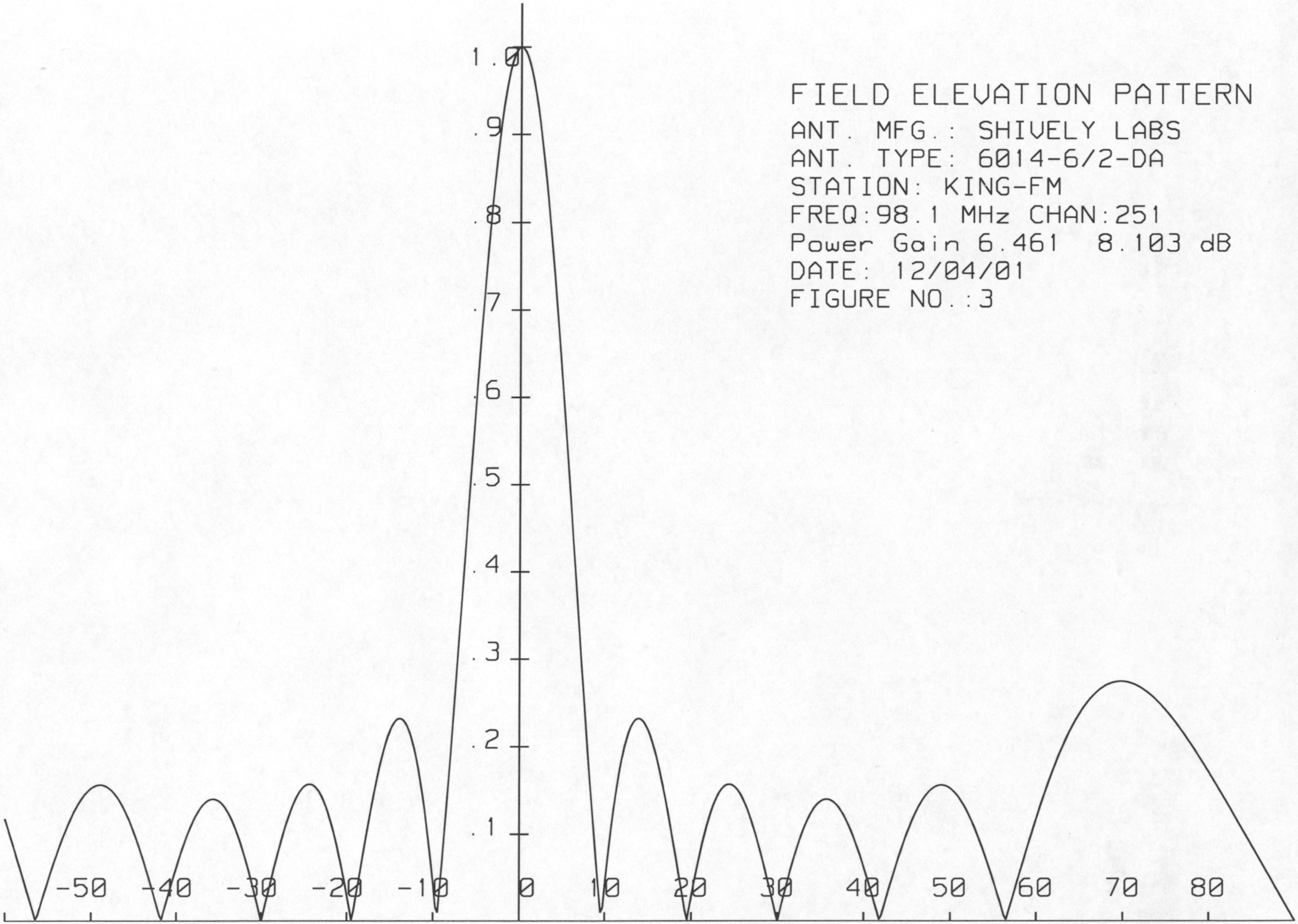


FIGURE 4

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VALIDATION OF GAIN CALCULATION

KING-FM SEATTLE, WA

MODEL 6014-6/2-DA

Elevation Gain of 6014-6/2-DA equals 3.280

The RMS values are calculated utilizing the data of a planimeter.

Horizontal RMS divided by Vertical RMS equals
0.725 ÷ 0.700 = 1.0357

Elevation Gain of Horizontal Component equals
3.280 x 1.0357 = 3.397

Elevation Gain of Vertical Component equals
3.280 x 0.9655 = 3.167

Horizontal Azimuth Gain equals $1/(RMS)^2$
$1/(0.725)^2 = 1.902$

Vertical Azimuth Gain equals $1/(RMS \div Max\ Vert)^2$
$1/(0.700 \div 0.990)^2 = 2.000$

* **Total Horizontal Gain is Elevation Gain times Azimuth Gain**
  3.397 x 1.902 = 6.461

* **Total Vertical Gain is Elevation Gain times Azimuth Gain**
  3.167 x 2.000 = 6.334

ERP divided by Horizontal Gain equals Antenna Input Power
50.0 kW ÷ 6.461 = 7.739 kW

Antenna Input Power times Vertical Gain equals Vertical ERP
7.739 x 6.334 = 49.02

Maximum Value of the Vertical Component squared times the Maximum ERP equals the Vertical ERP
$(0.99)^2$ x 50.0 kW = 49.01

NOTE: Calculating the ERP of the Vertical Component by two methods validates the total antenna gain calculations

COUGAR MOUNTAIN
SYSTEM LOSSES
S/O 20,723

FREQ.	COMBINER INSERTION LOSS	POWER SPLITTER LOSS	TRANSMISSION LINE LOSS	TOTAL SYSTEM LOSS
88.5	-.283	-.038	-.302	-.623
97.3	-.341	-.038	-.316	-.695
98.1	-.414	-.038	-.319	-.771
99.9	-.307	-.038	-.322	-.667
100.7	-.429	-.038	-.323	-.790
103.7	-.431	-.038	-.328	-.797
107.7	-.390	-.038	-.335	-.763

2/24/00