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S.O. 22660

Report of Test 6810-3R-H/V-DA

for

VSS CATHOLIC COMMUNICATIONS, INC.

KVSS 88.9 MHZ OMAHA, NE

OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a 6810-3R-H/V-DA to meet the needs of KVSS and to comply with the requirements of the FCC construction permit, file number BPED-20020425AAM.

RESULTS:

The measured azimuth pattern for the 6810-3R-H/V-DA is shown in Figure 1. Figure 1A shows the Tabulation of the Vertical Polarization. The horizontal azimuth pattern of this antenna is omni-directional and therefore is not shown. The calculated elevation pattern of the antenna is shown in Figure 3. Construction permit file number BPED-20020425AAM indicates that the Vertical radiation component shall not exceed 1.5 kW at any azimuth and is restricted to the following values at the azimuths specified:

210 to 220 Degrees T: 0.125 kW

From Figure 1, the maximum radiation of the Vertical component occurs at 088 Degrees T to 105 Degrees T and 308 Degrees T to 319 Degrees T. At the restricted azimuth of 210 to 220 Degrees T the Vertical component is 11.70 dB down from the maximum of 1.5 kW, or 0.102 kW.

The R.M.S. of the Vertical component is 0.770. The total Vertical power gain is 4.774. See Figure Four for calculations. The R.M.S. of the FCC composite pattern is 0.850. Therefore this Pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

METHOD OF DIRECTIONALIZATION:

One bay of the 6810-3R-H/V-DA was mounted on a tower of exact scale to an Advanced 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 BPED-20020425AAM, a single level of the 6810-3R-H/V-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.

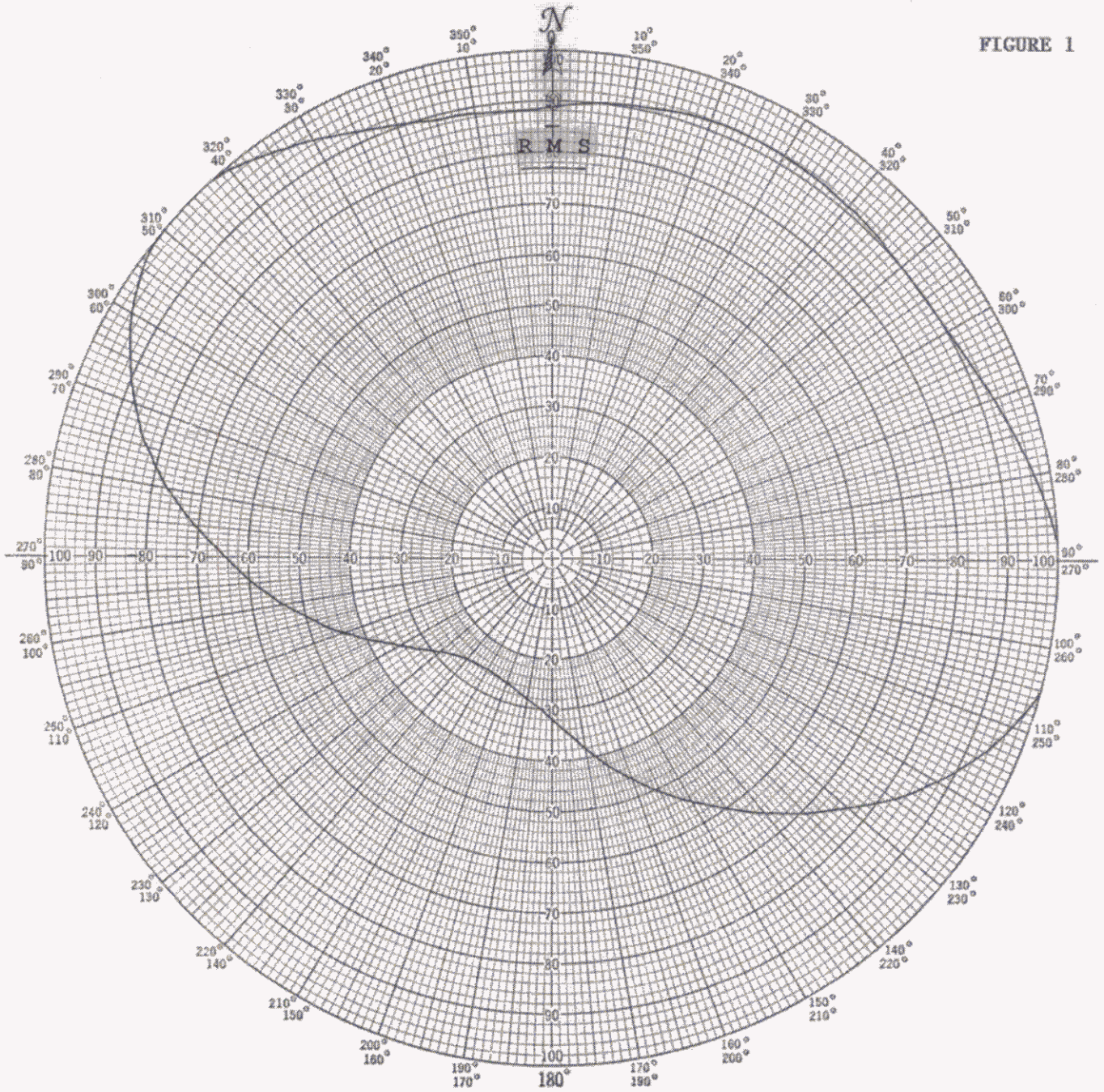
TEST PROCEDURES:

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 400.05 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 22660
November 13, 2002

FIGURE 1



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PROJECT NAME KVSS OMAHA, NE

PROJECT NUMBER 22660 DATE 11/5/02

MODEL (X) FULL SCALE ( ) FREQUENCY 400.05/88.9 MHz

POLARIZATION VERTICAL

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

OBSERVER RAS

ANTENNA TYPE 6810-3R-H/V-DA

PATTERN TYPE DIRECTIONAL AZIMUTH

REMARKS: SEE FIGURE 2 FOR MECHANICAL DETAILS

Figure 1A

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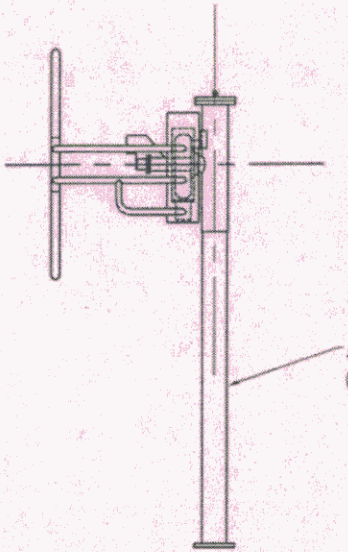
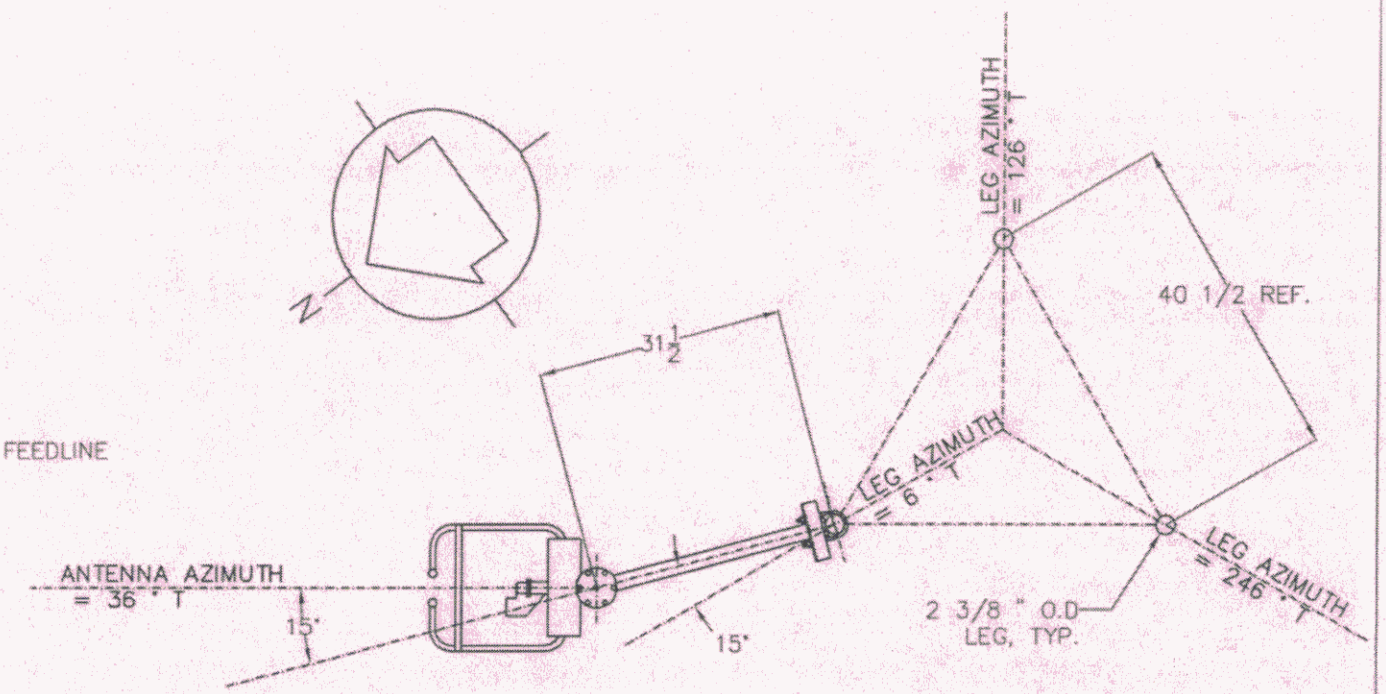
TABULATION OF VERTICAL POLARIZATION
KVSS OMAHA, NE

DEGREE	RELATIVE FIELD	DEGREE	RELATIVE FIELD
0	0.885	180	0.320
10	0.905	190	0.285
20	0.920	200	0.260
30	0.920	210	0.255
40	0.910	220	0.260
45	0.905	225	0.270
50	0.900	230	0.290
60	0.900	240	0.350
70	0.930	250	0.440
80	0.970	260	0.540
90	1.000	270	0.645
100	1.000	280	0.770
110	0.970	290	0.875
120	0.875	300	0.960
130	0.760	310	1.000
135	0.710	315	1.000
140	0.650	320	0.995
150	0.550	330	0.950
160	0.465	340	0.905
170	0.385	350	0.885



SIDE VIEW



TOP VIEW
TOWER: ADVANCED

SHIVELY LABS A DIVISION OF HOWELL LABORATORIES INC., BRIDGTON, MAINE			
SHOP ORDER: 22,660	FREQUENCY: 88.9 Mhz	SCALE: N.T.S.	DRAWN BY: NOH APPROVED BY:
TITLE: MODEL-6810-3R-H/V-DIRECTIONAL ANTENNA			
DATE: 10-15-02	FIGURE 2		

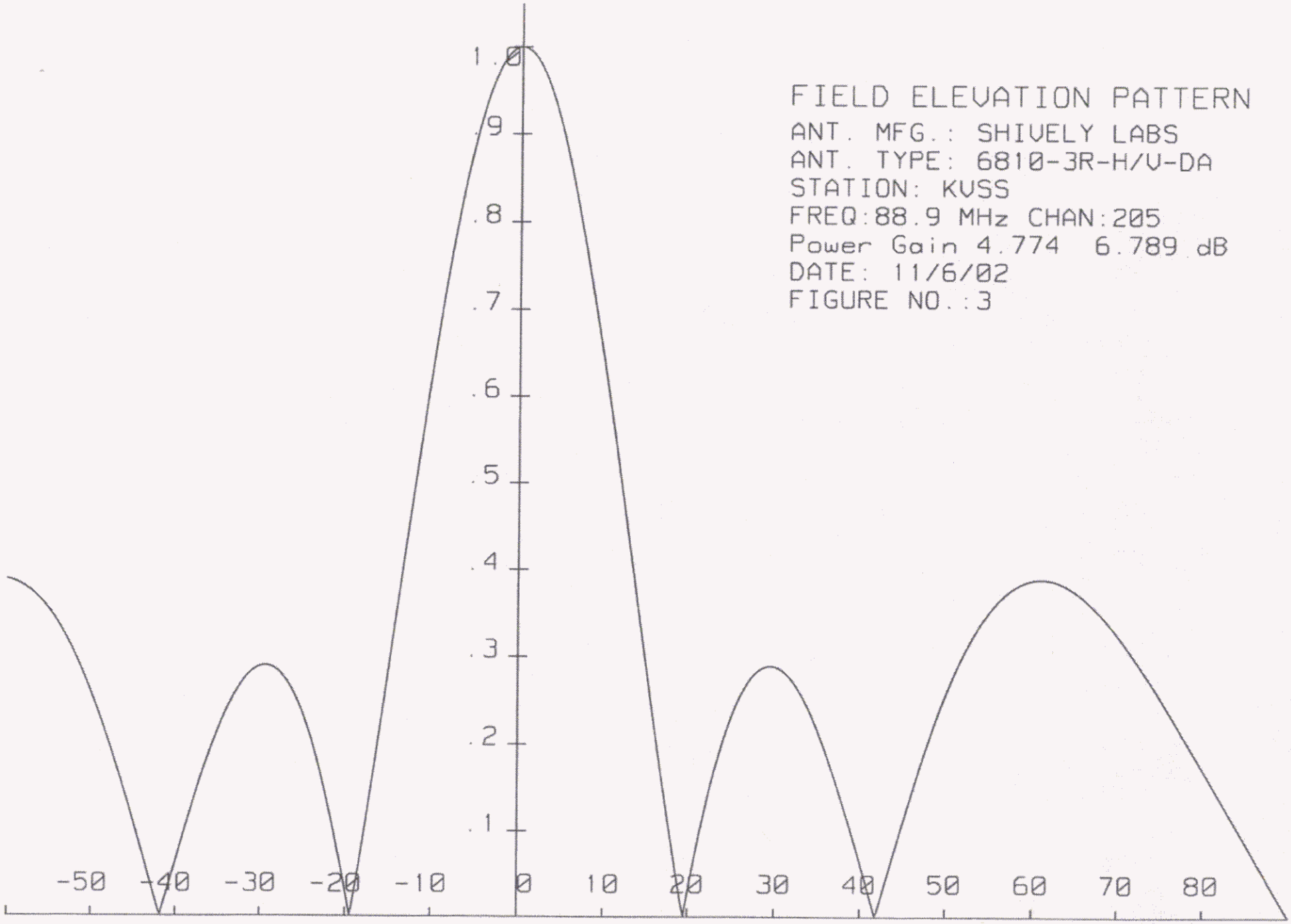

FIELD ELEVATION PATTERN
ANT. MFG.: SHIVELY LABS
ANT. TYPE: 6810-3R-H/V-DA
STATION: KVSS
FREQ:88.9 MHz CHAN:205
Power Gain 4.774 6.789 dB
DATE: 11/6/02
FIGURE NO.:3
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
-50
-40
-30
-20
-10
0
10
20
30
40
50
60
70
80

FIGURE 4

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VALIDATION OF GAIN CALCULATION

KVSS OMAHA, NE

MODEL 6810-3R-H/V-DA

Vertical Elevation Gain of a 6810-3R-H/V-DA equals 2.83

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

Elevation Gain of Horizontal Component equals 0.27

Elevation Gain of Vertical Component equals 2.83

Vertical Azimuth Gain equals $1/(RMS)^2$
$1/(0.77)^2 = 1.687$

*** Total Horizontal Gain is Elevation Gain times Azimuth Gain equals 0.27**

*** Total Vertical Gain is Elevation Gain times Azimuth Gain 2.83 x 1.687 = 4.774**

ERP divided by Vertical Gain equals Antenna Input Power
1.50 kW ÷ 4.774 = 0.314 kW

Antenna Input Power times Horizontal Gain equals Horizontal ERP
0.314 x 0.27 = 0.085 kW