

S.O. 23148

Report of Test 6015-1/2-DA

for

ENTRAVISION HOLDINGS, LLC.

KDLE 103.1 MHz NEWPORT BEACH, CA

OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a 6015-1/2-DA to meet the needs of KDLE and to comply with the requirements of the FCC construction permit, file number BPH-20030617AAA.

RESULTS:

The measured azimuth pattern for the 6015-1/2-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-20030617AAA indicates that the Horizontal radiation component shall not exceed 0.3 kW at any azimuth and is restricted to the following values at the azimuths specified:

130 - 150 Degrees T: 0.038 kW

330 - 355 Degrees T: 0.038 kW

From Figure 1, the maximum radiation of the Horizontal component occurs at 062 Degrees T to 071 Degrees T and at 218 Degrees T to 239 Degrees T. At the restricted azimuth of 130 - 150 Degrees T the Horizontal component is 9.897 dB down from the maximum of 0.3 kW, or 0.031 kW. At the restricted azimuth of 330 - 355 Degrees T the Vertical component is 10.75 dB down from the maximum of 0.3 kW, or 0.025 kW.

The R.M.S. of the Horizontal component is 0.660. The total Horizontal power gain is 1.065. The R.M.S. of the Vertical component is 0.655. The total Vertical power gain is 1.042. See Figure 4 for calculations. The R.M.S. of the FCC composite pattern is 0.770. Therefore this Pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

METHOD OF DIRECTIONALIZATION:

One bay of the 6015-1/2-DA was mounted on a tower of exact scale to a the self-supported tower at the KDLE site. The spacing of the antenna to the tower was varied to achieve the vertical pattern shown in Figure 1. A horizontal parasitic element was placed directly under the bay. The position of this horizontal parasitic element was changed until the horizontal pattern shown in Figure 1 was achieved. See Figure 2 for mechanical details.

METHOD OF MEASUREMENT:

As allowed by the construction permit, file number BPH-20030617AAA, a single level of the 6015-1/2-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:

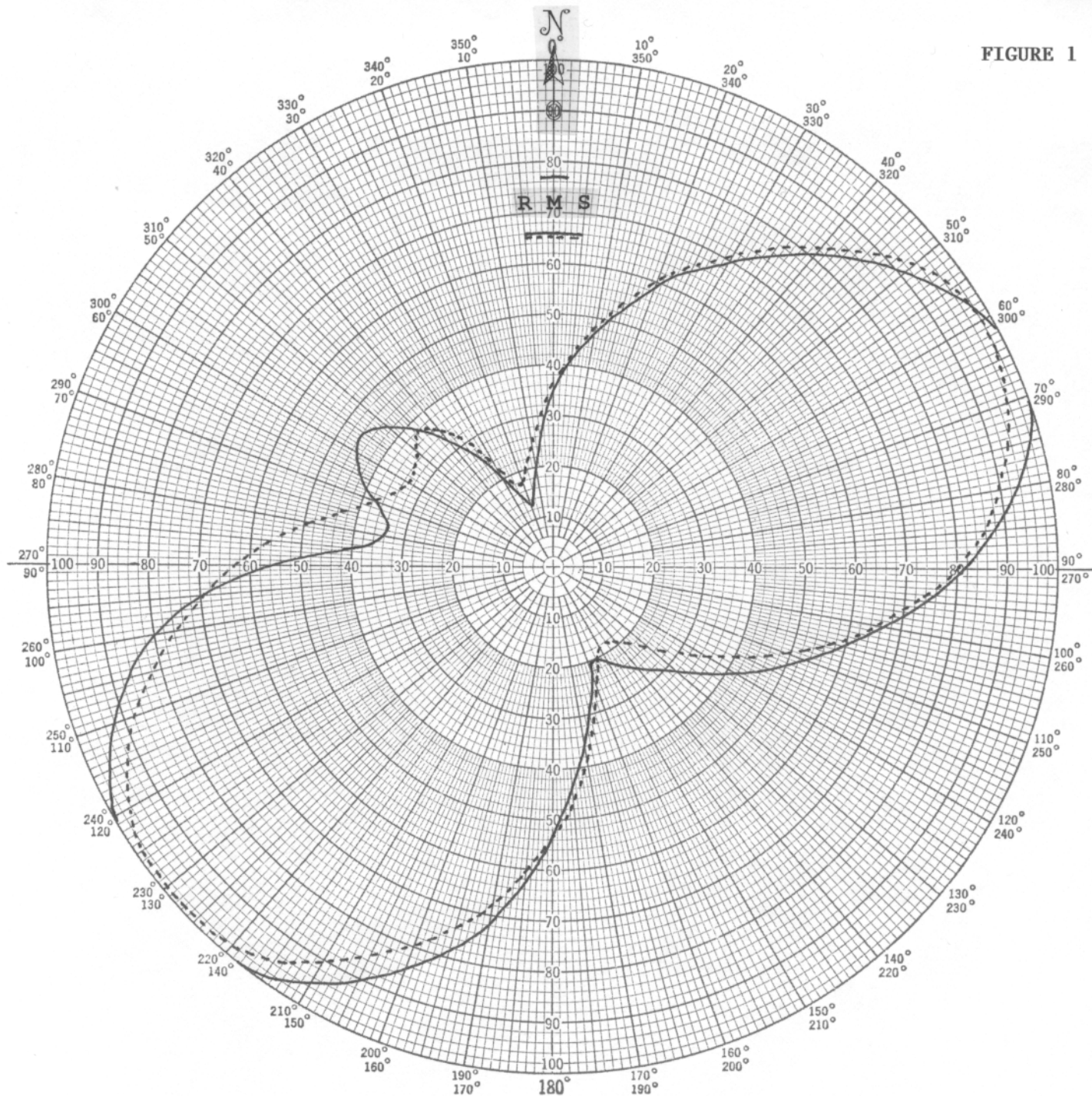
The corner reflector is mounted so that the horizontal and vertical azimuth patterns are measured independently by rotating the corner reflector by 90 degrees. The network analyzer was set to 463.95 MHz. Calibrated pads are used to check the linearity of the measuring system. For example, 6 dB padding yields a scale reading of 50 from an unpadding 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 23148
November 5, 2004

FIGURE 1



Shively Labs

PROJECT NAME KDLE NEWPORT BEACH, CA

PROJECT NUMBER 23148 DATE 11/6/03

MODEL (☒) FULL SCALE (☐) FREQUENCY 463.95/103.1 MHz

POLARIZATION HORIZ (—); VERT (----)

CURVE PLOTTED IN: VOLTAGE (☒) POWER (☐) DB (☐)

OBSERVER RAS

ANTENNA TYPE 6015-1/2-DA

PATTERN TYPE DIRECTIONAL AZIMUTH

REMARKS: SEE FIGURE 2 FOR MECHANICAL

DETAILS

Figure 1A

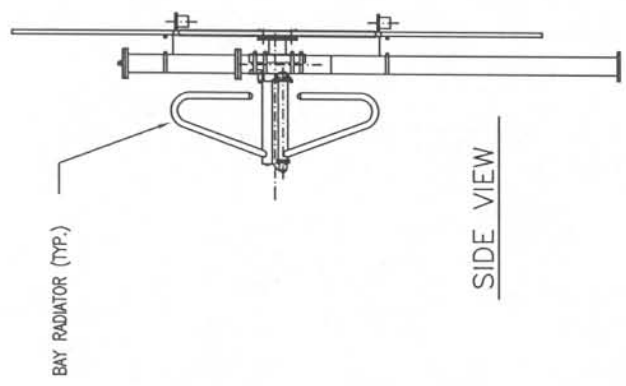
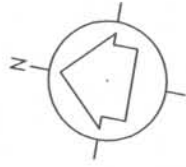
S/O 23148
TABULATION OF HORIZONTAL POLARIZATION
KDLE NEWPORT BEACH, CA

DEGREE	RELATIVE FIELD	DEGREE	RELATIVE FIELD
0	0.350	180	0.530
10	0.470	190	0.720
20	0.590	200	0.845
30	0.690	210	0.950
40	0.810	220	1.000
45	0.860	225	1.000
50	0.910	230	1.000
60	0.990	240	0.995
70	1.000	250	0.920
80	0.935	260	0.800
90	0.810	270	0.560
100	0.670	280	0.340
110	0.535	290	0.375
120	0.420	300	0.450
130	0.320	310	0.430
135	0.290	315	0.380
140	0.260	320	0.320
150	0.220	330	0.200
160	0.220	340	0.130
170	0.360	350	0.200

Figure 1B

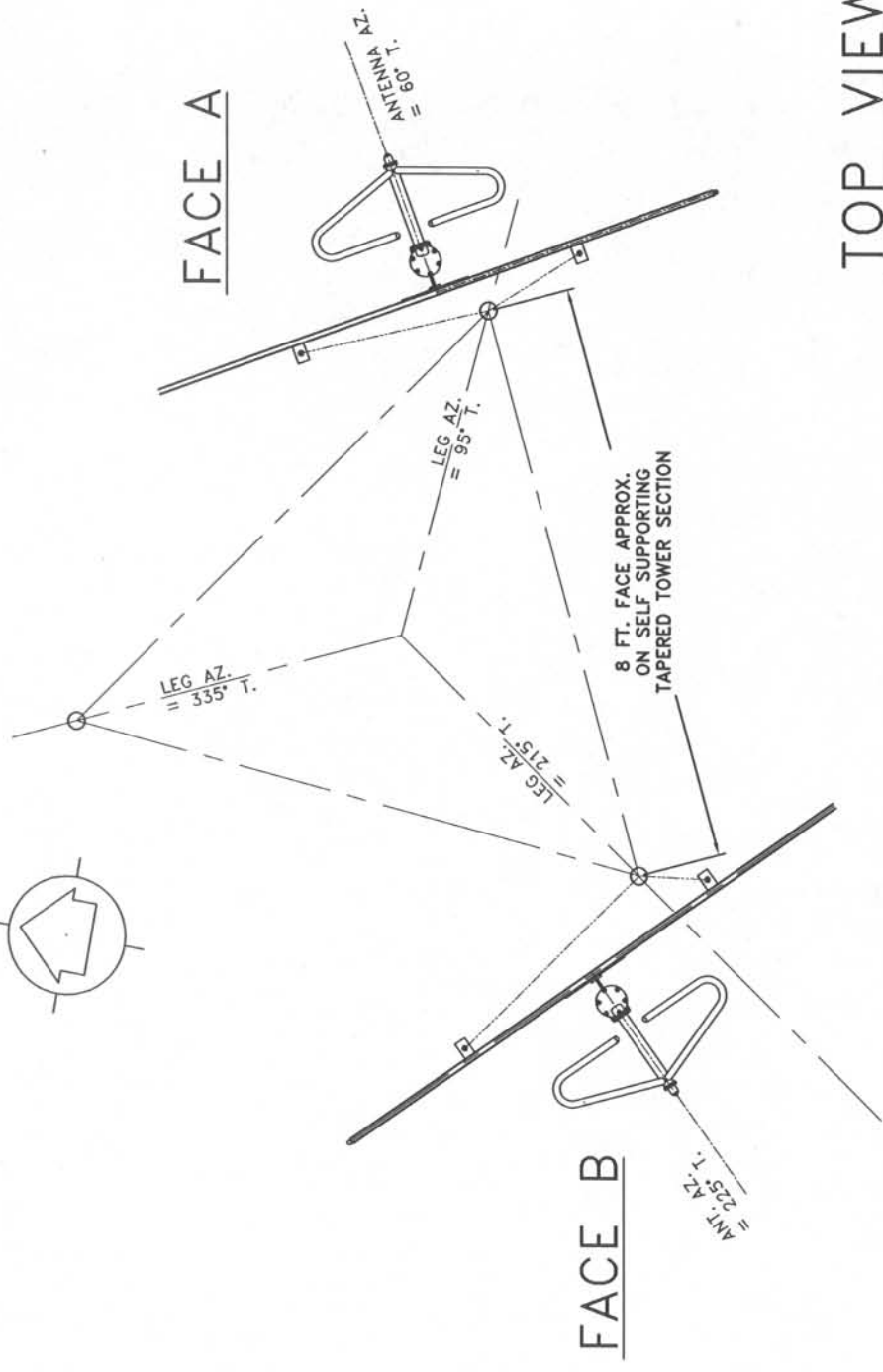
S/O 23148
TABULATION OF VERTICAL POLARIZATION
KDLE NEWPORT BEACH, CA

DEGREE	RELATIVE FIELD	DEGREE	RELATIVE FIELD
0	0.360	180	0.530
10	0.480	190	0.675
20	0.600	200	0.795
30	0.710	210	0.905
40	0.825	220	0.980
45	0.880	225	0.990
50	0.935	230	0.990
60	0.980	240	0.960
70	0.960	250	0.880
80	0.895	260	0.755
90	0.800	270	0.630
100	0.650	280	0.490
110	0.490	290	0.375
120	0.350	300	0.330
130	0.250	310	0.350
135	0.210	315	0.380
140	0.195	320	0.350
150	0.185	330	0.220
160	0.240	340	0.180
170	0.390	350	0.240



BAY RADIATOR (TYP.)

SIDE VIEW



FACE A

FACE B

8 FT. FACE APPROX.
ON SELF SUPPORTING
TAPERED TOWER SECTION

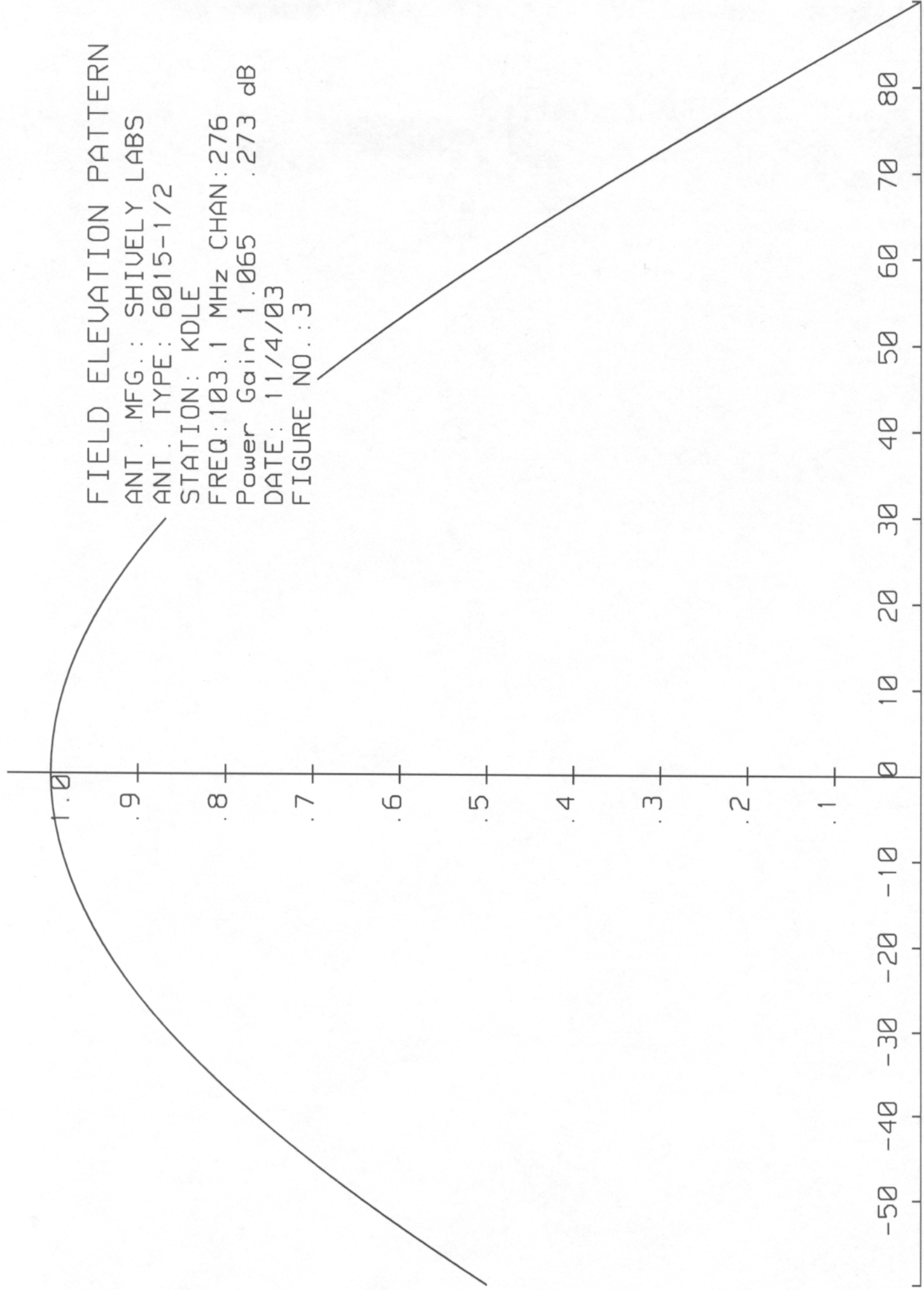
TOP VIEW

TOWER: SELF SUPPORTING

SHIVELY LABS			
A DIVISION OF HOWELL LABORATORIES INC., BRIDGTON, MAINE			
SHOP ORDER:	FREQUENCY:	SCALE:	DRAWN BY:
23148	103.1 MHz.	N.T.S.	ASP
NEWPORT BEACH CA.			APPROVED BY:
TITLE: MODEL-6015-1/2-DIRECTIONAL ANTENNA			
DATE:	DATE:		
11/5/04	FIGURE 2		

FIELD ELEVATION PATTERN

ANT. MFG.: SHIVELY LABS
ANT. TYPE: 6015-1/2
STATION: KDLE
FREQ: 103.1 MHz CHAN: 276
Power Gain 1.065 .273 dB
DATE: 11/4/03
FIGURE NO.: 3



S.O. 23148

VALIDATION OF GAIN CALCULATION

KDLE NEWPORT BEACH, CA

MODEL 6015-1/2-DA

Elevation Gain of 6015-1/2-DA equals 0.46

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

Horizontal RMS divided by Vertical RMS equals

$$0.660 \div 0.655 = 1.008$$

Elevation Gain of Horizontal Component equals

$$0.46 \times 1.008 = 0.464$$

Elevation Gain of Vertical Component equals

$$0.46 \times 0.992 = 0.456$$

Horizontal Azimuth Gain equals $1/(\text{RMS})^2$

$$1/(0.660)^2 = 2.296$$

Vertical Azimuth Gain equals $1/(\text{RMS} \div \text{Max Vert})^2$

$$1/(0.655 \div 0.990)^2 = 2.284$$

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

$$0.464 \times 2.296 = 1.065$$

*** Total Vertical Gain is Elevation Gain times Azimuth Gain**

$$0.456 \times 2.284 = 1.042$$

ERP divided by Horizontal Gain equals Antenna Input Power

$$0.300 \text{ kW} \div 1.065 = 0.282 \text{ kW}$$

Antenna Input Power times Vertical Gain equals Vertical ERP

$$0.282 \times 1.042 = 0.294 \text{ kW}$$

Maximum Value of the Vertical Component squared times the Maximum ERP equals the Vertical ERP

$$(0.990)^2 \times 0.300 \text{ kW} = 0.294 \text{ kW}$$

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