

**S.O. 38338**

**Report of Test SLV-2-.75SS-1/4 OFFSET-DA**

**for**

**CALL COMMUNICATIONS GROUP, INC**

**WMYE 91.9 MHz FORT MYERS, FL**

**OBJECTIVE:**

The objective of this test was to demonstrate the directional characteristics of a SLV-2-.75SS-1/4 OFFSET-DA to meet the needs of WMYE and to comply with the requirements of the FCC construction permit, file number 0000187128. This test characterizes only the radiation characteristics of the antenna when mounted on the tower as described. It does not represent or imply any guarantee of specific coverage which can be influenced by factors beyond the scope of this test.

**RESULTS:**

The following Figures are the results of the measurements from our pattern range:

- Figure 1A - Measured Azimuth Pattern with the FCC Composite
- Figure 1B - Measured Composite Azimuth Pattern with the FCC Composite
- Figure 1C - Tabulation of the Horizontal Polarization for the Measured Azimuth Pattern
- Figure 1D - Tabulation of the Vertical Polarization for the Measured Azimuth Pattern
- Figure 1E - Tabulation of the Measured Composite Azimuth Pattern
- Figure 1F - Tabulation of the FCC Composite

The calculated elevation pattern of the antenna is shown in Figure 3.

Construction permit file number 0000187128 indicates that the Horizontal radiation component shall not exceed 1.05 kW at any azimuth and is restricted to the following values at the azimuths specified:

80 Degrees True: 0.041 kilowatts

From Figure 1A, the maximum radiation of the Horizontal component occurs at 190 Degrees True to 200 Degrees True. At the restricted azimuth of 80 Degrees True the Horizontal component is 16.082 dB down from the maximum of 1.05 kW, or 0.026 kW.

The R.M.S. of the Horizontal component is 0.558. The total Horizontal power gain is 3.131. The R.M.S. of the Vertical component is 0.484. The total Vertical power gain is 1.905. See Figure 4 for calculations. The R.M.S. of the FCC composite pattern is 0.622. The R.M.S. of the measured composite pattern is 0.567. Eighty-five percent (85%) of the original authorized FCC composite pattern is 0.529. Therefore this pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

#### **METHOD OF DIRECTIONALIZATION:**

The array of the SLV-2-.75SS-1/4 OFFSET-DA was mounted on a tower of precise scale to the 10' X-braced tower at the WMYE site. The spacing of the antenna to the tower was varied to achieve the vertical pattern shown in Figure 1A. Horizontal parasitic elements were placed directly under and above the bay. The position of this horizontal parasitic element was changed until the horizontal pattern shown in Figure 1A was achieved. See Figure 2 for mechanical details.

#### **METHOD OF MEASUREMENT:**

As allowed by the construction permit, file number 0000187128, a single level of the SLV-2-.75SS-1/4 OFFSET-DA was set up on the Shively Labs scale model antenna pattern measuring range. A scale of 4.5:1 was used.

#### **EQUIPMENT:**

The 4.5:1 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 parabolic dish 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 Hypercell Superflex and Cellflex ICF cabling respectively.

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WMYE

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The control building is equipped with:

Hewlett Packard Model 4395-A Network Analyzer

PC Based Controller

Output Standard Printer or 'pdf'

All testing is carried out in strict accordance with approved procedures under our ISO9001.

**TEST PROCEDURES:**

The receiving antenna system is mounted so that the horizontal and vertical azimuth patterns are measured independently. The network analyzer was set to 413.55 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 1A.

Respectfully submitted by:

A handwritten signature in cursive script that reads "Sean C. Edwards".

Sean C. Edwards  
Director RF Engineering, Shively Labs

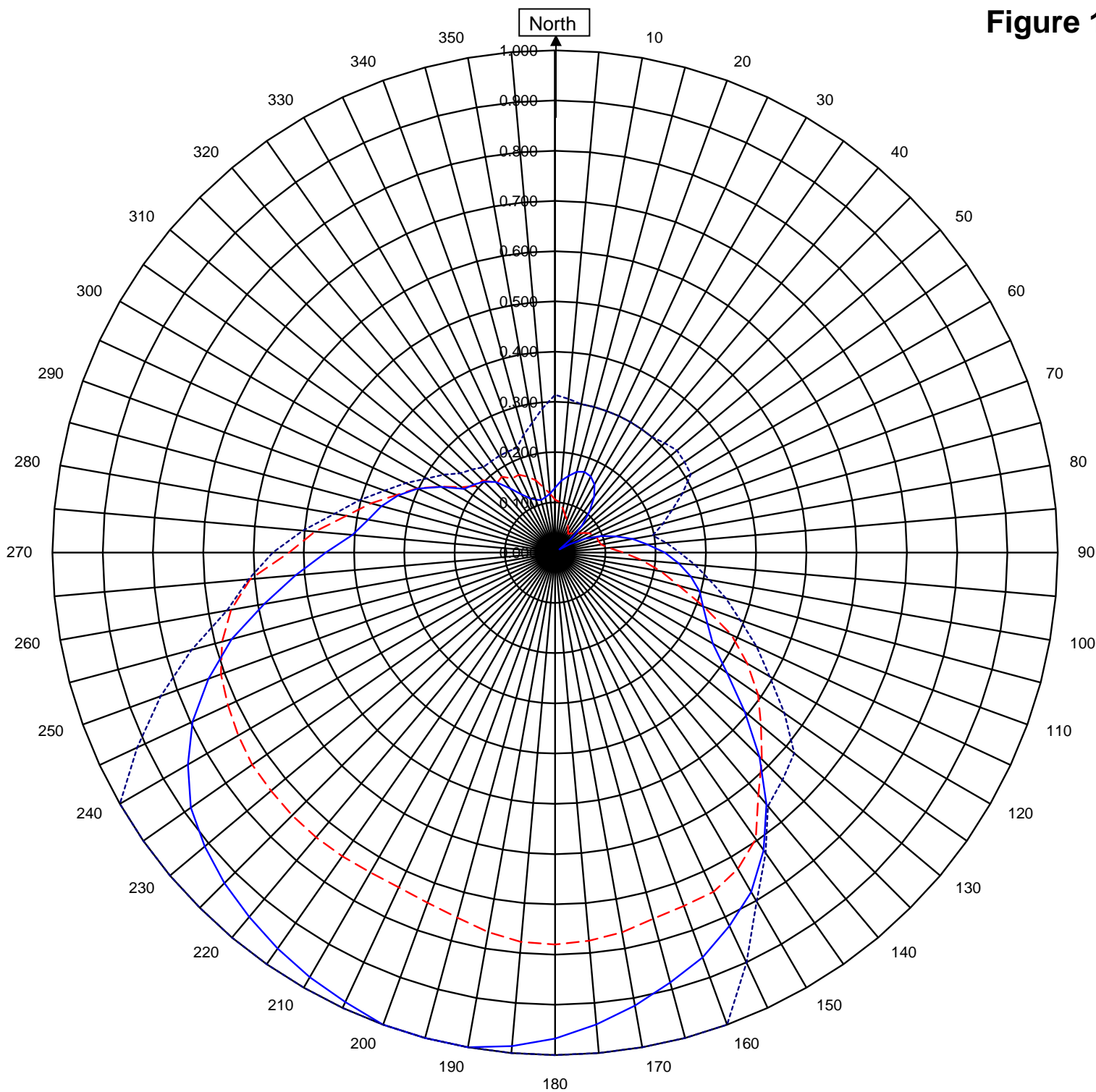
S/O: 38338

Date: May 9, 2022

# Shively Labs

Shively Labs, a division of Howell Laboratories, Inc.    Bridgton, ME    (207)647-3327

Figure 1A



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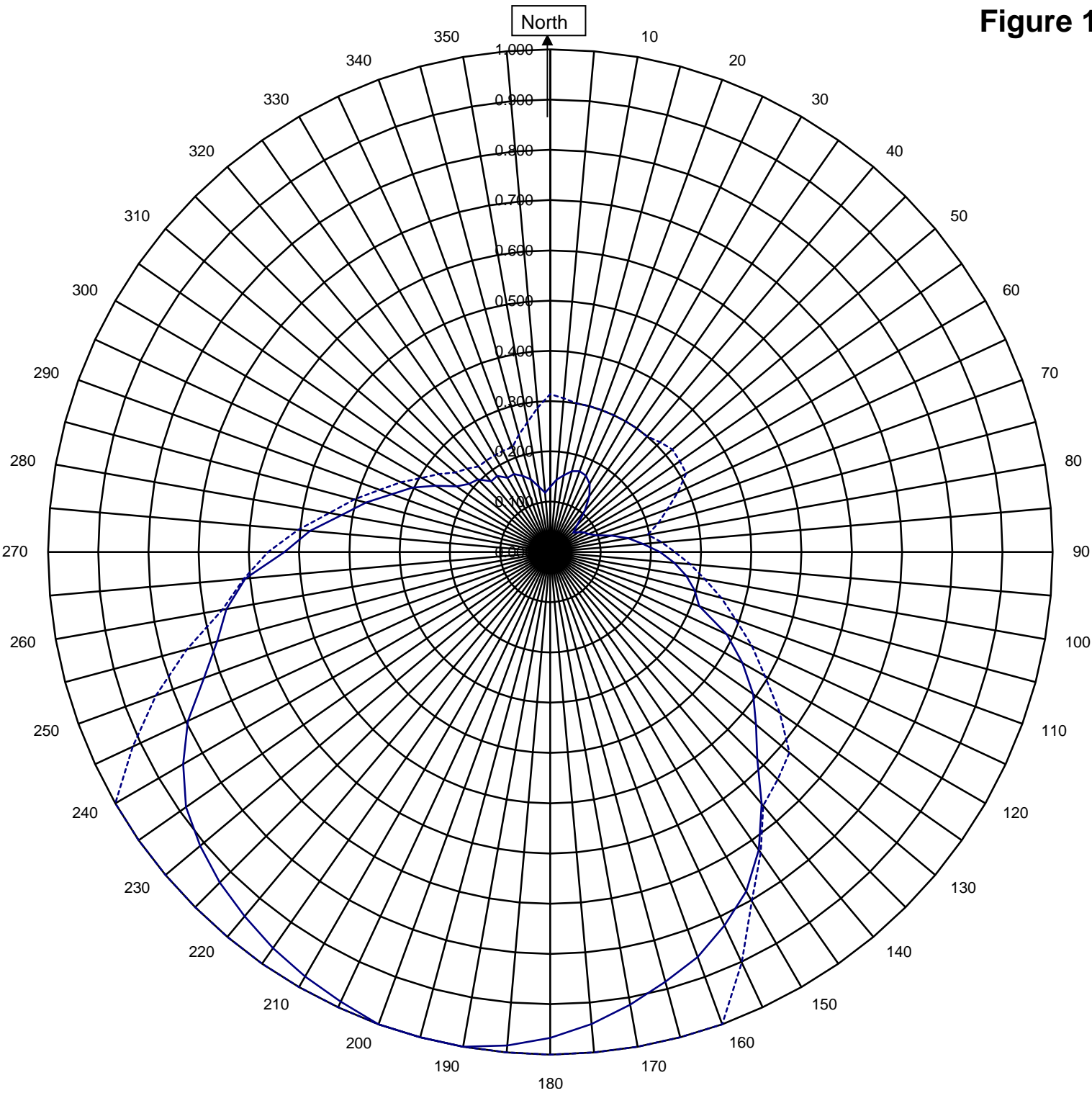
<div>Horizontal RMS</div>	0.558	Frequency	91.9 / 413.55 mHz
<div>Vertical RMS</div>	0.484	Plot	Relative Field
H/V Composite RMS	0.567	Scale	4.5 : 1
FCC Composite RMS	0.622	See Figure 2 for Mechanical Details	

Antenna Model	SLV-2-.75SS-1/4 OFFSET-DA
Pattern Type	Directional Azimuth

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Figure 1B



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 H/V Composite RMS	0.567
 FCC Composite RMS	0.622

Frequency	91.9    /    413.55    mHz
Plot	Relative Field
Scale	4.5 : 1
See Figure 2 for Mechanical Details	

Antenna Model	SLV-2-.75SS-1/4 OFFSET-DA
Pattern Type	Directional H/V Composite

Figure 1C

Tabulation of Horizontal Azimuth Pattern  
WME FORT MYERS

Azimuth	Rel Field	Azimuth	Rel Field
0	0.129	180	0.967
10	0.155	190	1.000
20	0.171	200	1.000
30	0.157	210	0.976
40	0.106	220	0.947
45	0.075	225	0.931
50	0.041	230	0.910
60	0.034	240	0.844
70	0.097	250	0.734
80	0.157	260	0.588
90	0.218	270	0.456
100	0.274	280	0.378
110	0.314	290	0.333
120	0.363	300	0.261
130	0.493	310	0.211
135	0.575	315	0.200
140	0.654	320	0.183
150	0.780	330	0.134
160	0.858	340	0.112
170	0.915	350	0.112

Figure 1D

Tabulation of Vertical Azimuth Pattern  
WMYE FORT MYERS

Azimuth	Rel Field	Azimuth	Rel Field
0	0.105	180	0.780
10	0.089	190	0.767
20	0.069	200	0.742
30	0.052	210	0.735
40	0.050	220	0.740
45	0.055	225	0.740
50	0.059	230	0.738
60	0.077	240	0.728
70	0.088	250	0.708
80	0.093	260	0.655
90	0.136	270	0.529
100	0.214	280	0.422
110	0.315	290	0.336
120	0.442	300	0.263
130	0.534	310	0.206
135	0.582	315	0.204
140	0.629	320	0.180
150	0.727	330	0.170
160	0.748	340	0.161
170	0.768	350	0.132

Figure 1E

Tabulation of Composite Azimuth Pattern  
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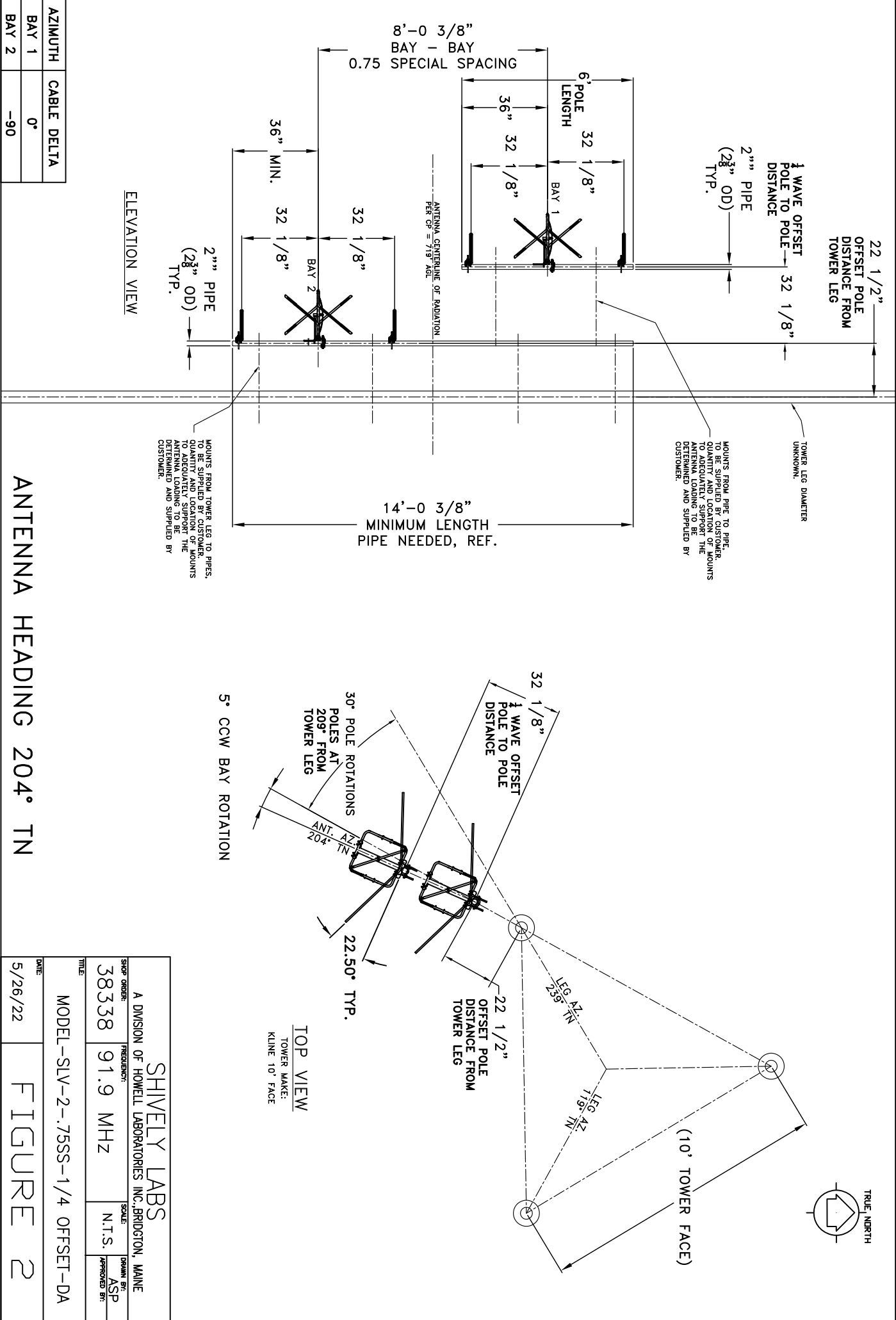
Azimuth	Rel Field	Azimuth	Rel Field
0	0.129	180	0.967
10	0.155	190	1.000
20	0.171	200	1.000
30	0.157	210	0.976
40	0.106	220	0.947
45	0.075	225	0.931
50	0.059	230	0.910
60	0.077	240	0.844
70	0.097	250	0.734
80	0.157	260	0.655
90	0.218	270	0.529
100	0.274	280	0.422
110	0.315	290	0.336
120	0.442	300	0.263
130	0.534	310	0.211
135	0.582	315	0.204
140	0.654	320	0.183
150	0.780	330	0.170
160	0.858	340	0.161
170	0.915	350	0.132



Figure 1F

Tabulation of FCC Directional Composite  
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Azimuth	Rel Field	Azimuth	Rel Field
0	0.314	180	1.000
10	0.300	190	1.000
20	0.300	200	1.000
30	0.300	210	1.000
40	0.300	220	1.000
50	0.317	230	1.000
60	0.312	240	1.000
70	0.248	250	0.835
80	0.197	260	0.663
90	0.248	270	0.562
100	0.312	280	0.446
110	0.392	290	0.361
120	0.493	300	0.295
130	0.621	310	0.246
140	0.659	320	0.222
150	0.802	330	0.222
160	1.000	340	0.222
170	1.000	350	0.262



Antenna Mfg.: Shively Labs  
Antenna Type: SLV-2-.75SS-1/4 OFFSET-DA

Date: 5/26/2022

Station: WMYE

Beam Tilt 0

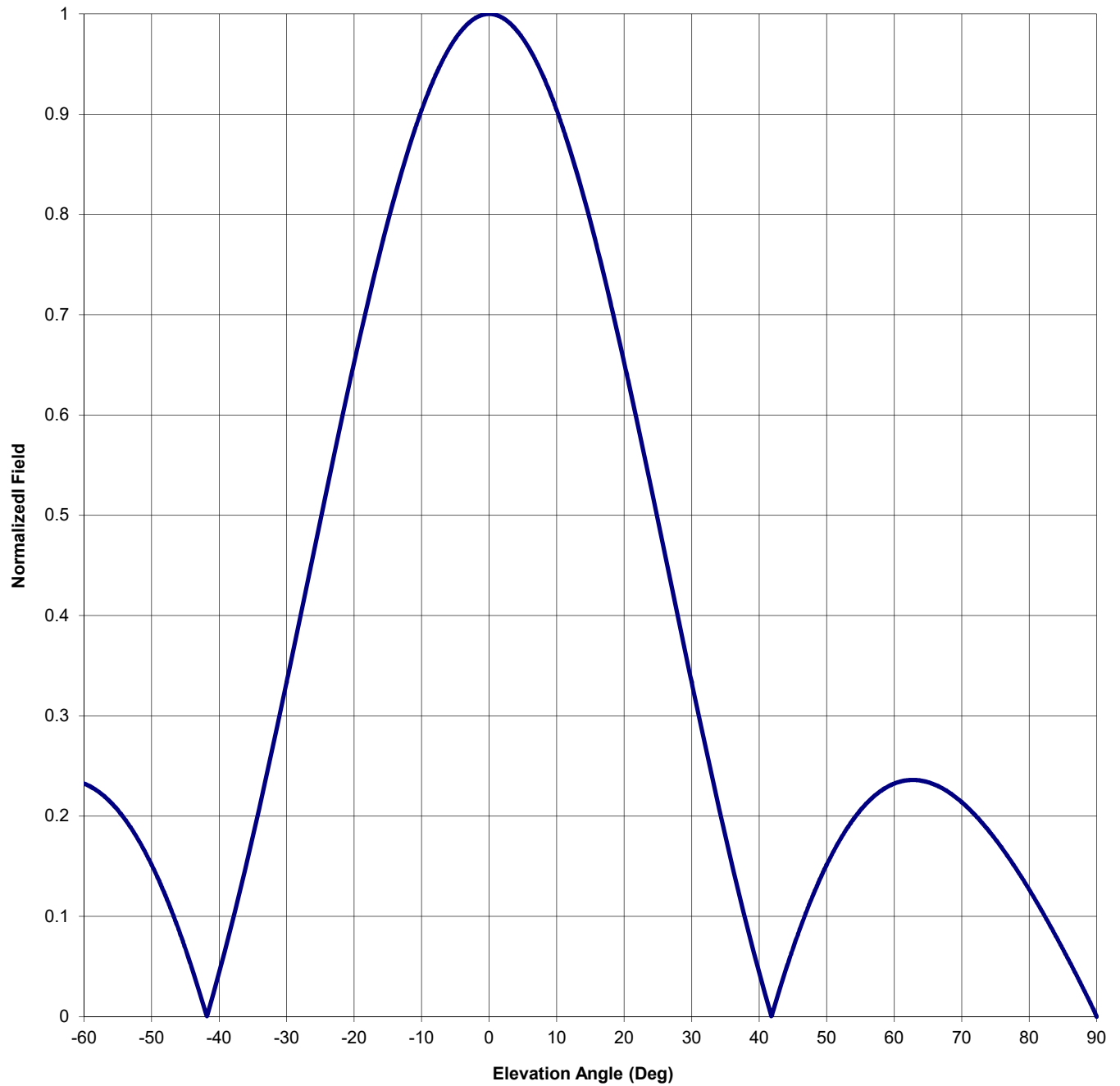
Frequency: 91.9

Gain (Max) 3.131 4.956 dB

Channel #: 220

Gain (Horizon) 3.131 4.956 dB

Figure: Figure 3



Antenna Mfg.: Shively Labs

Date: 5/26/2022

Antenna Type: SLV-2-.75SS-1/4 OFFSET-DA

Station: WMYE

Beam Tilt 0

Frequency: 91.9

Gain (Max) 3.131

4.956 dB

Channel #: 220

Gain (Horizon) 3.131

4.956 dB

Figure: Figure 3

Angle of Depression (Deg)	Relative Field	Angle of Depression (Deg)	Relative Field	Angle of Depression (Deg)	Relative Field	Angle of Depression (Deg)	Relative Field
-90	0.000	-44	0.048	0	1.000	46	0.087
-89	0.014	-43	0.026	1	0.999	47	0.105
-88	0.028	-42	0.004	2	0.996	48	0.122
-87	0.041	-41	0.019	3	0.991	49	0.137
-86	0.055	-40	0.044	4	0.984	50	0.152
-85	0.067	-39	0.069	5	0.975	51	0.165
-84	0.080	-38	0.096	6	0.965	52	0.177
-83	0.092	-37	0.123	7	0.952	53	0.188
-82	0.104	-36	0.151	8	0.938	54	0.197
-81	0.116	-35	0.180	9	0.922	55	0.206
-80	0.127	-34	0.210	10	0.904	56	0.213
-79	0.138	-33	0.240	11	0.885	57	0.220
-78	0.148	-32	0.271	12	0.864	58	0.225
-77	0.158	-31	0.302	13	0.842	59	0.229
-76	0.168	-30	0.334	14	0.818	60	0.232
-75	0.177	-29	0.366	15	0.793	61	0.235
-74	0.186	-28	0.398	16	0.767	62	0.236
-73	0.194	-27	0.430	17	0.740	63	0.236
-72	0.201	-26	0.463	18	0.711	64	0.235
-71	0.208	-25	0.495	19	0.682	65	0.234
-70	0.214	-24	0.527	20	0.652	66	0.231
-69	0.219	-23	0.559	21	0.622	67	0.228
-68	0.224	-22	0.591	22	0.591	68	0.224
-67	0.228	-21	0.622	23	0.559	69	0.219
-66	0.231	-20	0.652	24	0.527	70	0.214
-65	0.234	-19	0.682	25	0.495	71	0.208
-64	0.235	-18	0.711	26	0.463	72	0.201
-63	0.236	-17	0.740	27	0.430	73	0.194
-62	0.236	-16	0.767	28	0.398	74	0.186
-61	0.235	-15	0.793	29	0.366	75	0.177
-60	0.232	-14	0.818	30	0.334	76	0.168
-59	0.229	-13	0.842	31	0.302	77	0.158
-58	0.225	-12	0.864	32	0.271	78	0.148
-57	0.220	-11	0.885	33	0.240	79	0.138
-56	0.213	-10	0.904	34	0.210	80	0.127
-55	0.206	-9	0.922	35	0.180	81	0.116
-54	0.197	-8	0.938	36	0.151	82	0.104
-53	0.188	-7	0.952	37	0.123	83	0.092
-52	0.177	-6	0.965	38	0.096	84	0.080
-51	0.165	-5	0.975	39	0.069	85	0.067
-50	0.152	-4	0.984	40	0.044	86	0.055
-49	0.137	-3	0.991	41	0.019	87	0.041
-48	0.122	-2	0.996	42	0.004	88	0.028
-47	0.105	-1	0.999	43	0.026	89	0.014
-46	0.087	0	1.000	44	0.048	90	0.000
-45	0.068			45	0.068		

## VALIDATION OF TOTAL POWER GAIN CALCULATION

WMYE FORT MYERS

MODEL SLV-2-.75SS-1/4 OFFSET-DA

Elevation Gain of Antenna 0.845

Horizontal RMS value divided by the Vertical RMS value equals the Horiz. - Vert. Ratio

H RMS 0.557789 V RMS 0.483815 H/V Ratio 1.153

Elevation Gain of Horizontal Component 0.974

Elevation Gain of Vertical Component 0.733

Horizontal Azimuth Gain equals  $1/(\text{RMS})^2$ . 3.214Vertical Azimuth Gain equals  $1/(\text{RMS}/\text{Max Vert})^2$ . 2.599

Max. Vertical 0.78

**\*Total Horizontal Power Gain is the Elevation Gain Times the Azimuth Gain**

Total Horizontal Power Gain = 3.131

**\*Total Vertical Power Gain is the Elevation Gain Times the Azimuth Gain**

Total Vertical Power Gain = 1.905

=====

ERP divided by Horizontal Power Gain equals Antenna Input Power

1.05 kW ERP Divided by H Gain 3.131 equals 0.335 kW H Antenna Input Power

Antenna Input Power times Vertical Power Gain equals Vertical ERP

0.335 kW Times V Gain 1.905 equals 0.639 kW V ERP

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

(0.78)^2 Times 1.05 Equals 0.639 kW Vertical ERP

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