
FM DIRECTIONAL BROADCAST ANTENNA
PROOF-OF-PERFORMANCE

MODEL JHPC-4 DA

SERIAL NUMBER 15760

WZLV

Cape Charles, VA



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DATE: February 1, 2012

ANTENNA GAIN	<u>H-pol</u>	<u>V-pol</u>
relative	7.32	7.32
(dBd)	(8.65)	(8.65)

FM ANTENNA FOR:

STATION: WZLV

LOCATION: Cape Charles, VA

MODEL NUMBER: JHPC-4 DA

FREQUENCY & ERP: 90.7 MHz, 47.00 kW

ANTENNA INPUT POWER: 6.420 kW

ANTENNA BOOM HEADING: 220° T.

**RMS OF THE
AZIMUTH PATTERNS:**

Composite	H-pol	V-pol
0.563	0.533	0.538

CERTIFICATION

This certification, along with the accompanying antenna specification sheet, antenna mounting sketches, and azimuth and elevation patterns, certifies the construction and measurement of the JAMPRO FM CP antenna to the station's requirements, as measured at the JAMPRO antenna site in Sacramento, California. The following is an outline of construction methods, pattern measurements, installation requirements, recommended maintenance and equipment used.

CONSTRUCTION

A standard CP FM antenna model was used and parasitic reflectors were added to create the required directional patterns. From experience and by repeated measurements, these elements were adjusted as to position until the final configuration was determined and the pattern requirements were met. These additional elements are steel, hot dipped galvanized and either bolted or welded in place. Measurements to establish their exact location are shown on the antenna mounting sketches.

MEASUREMENT

The full scale antenna was mounted on an exact duplicate of its final support at the station. We were careful to duplicate conduits, cables and anything peculiar to this mounting. This was then placed on a turntable at the JAMPRO antenna range. This directional antenna was used for receiving the radiation from a transmitting antenna that is elevated 25 feet above ground and located at a distance of 4,500 feet. This transmitting antenna is capable of transmitting either horizontal or vertical polarization. The frequency of the signal generator was accurately set to station frequency by use of a frequency counter. A spectrum analyzer was used to continuously measure field strength as the antenna under test was rotated. Field strength at each azimuth was then plotted.



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Station: WZLV

Model: JHPC-4 DA

INSTALLATION

The antenna must be installed in exactly the manner in which it was measured at the factory. This is shown in detail on the antenna mounting sketch, including the azimuth bearing of the elements. This boom must be verified by a surveyor at the site when installation is being completed. *Note: Non-metallic guy wires must be used within the aperture of the array.* Good engineering practices should be followed in any details not covered by specific instructions.

MAINTENANCE

Annual or regular inspection should be made on the antenna system. At this time, tightness of U-bolts, or other fastenings, should be routinely checked. Any deterioration of the antenna due to lightning, or other causes should be promptly repaired.

EQUIPMENT

MODEL: -3000 Wavetek Signal Generator, Serial #66479
-1580 Scientific Atlanta pattern Recorder, Serial # 471, Cal'd 11/01/07
-8591E H.P. Spectrum Analyzer, Serial #3308A01312, Cal'd 12/18/07
-TUNED CAVITY DIPOLE

CONCLUSION

In the development of this pattern, JAMPRO antennas, Inc. observed known requirements of the FCC, as stated on the station construction permit.

Gain figures and required input power to achieve station ERP, as well as other details, are found on the first page.

This certification, with its calculations were performed by J. Dane Jubera, B.S.E.E., Electrical Engineer, JAMPRO Antennas, Inc.

EXECUTED THIS 1st DAY OF February, 2012

BY:

J. Dane Jubera, B.S.E.E. JAMPRO Antennas, Inc.

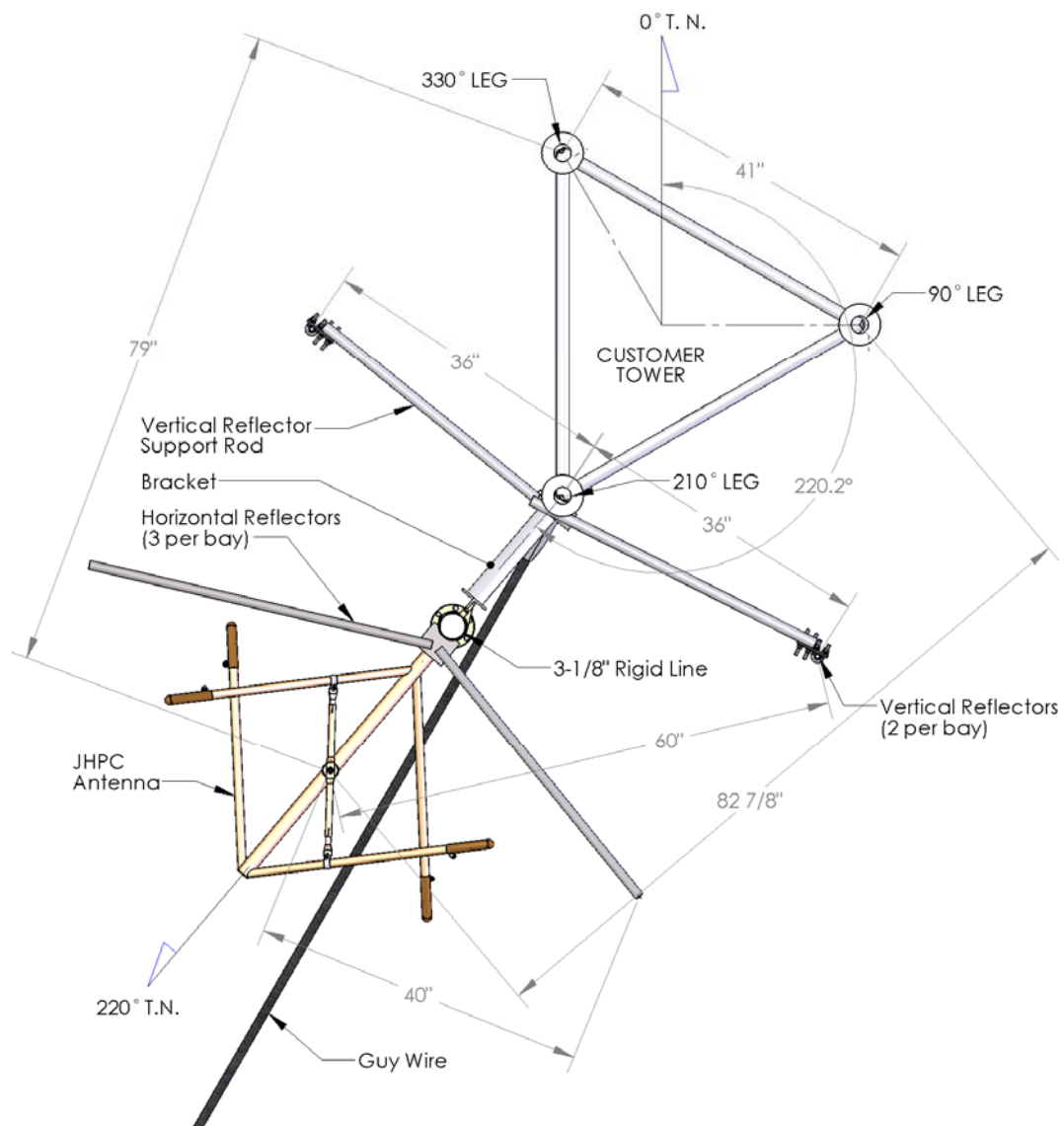


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MECHANICAL DRAWING

TOP VIEW



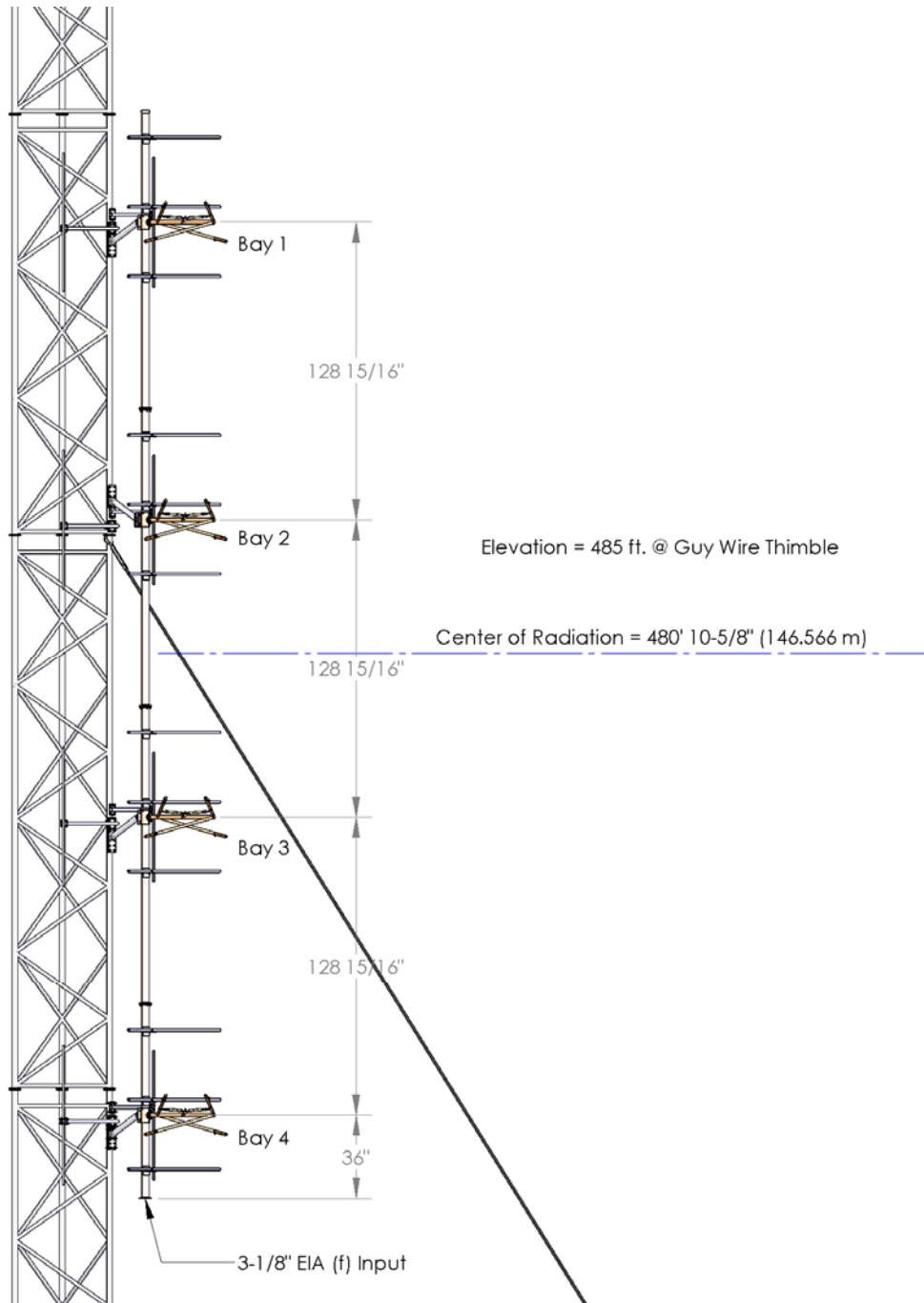


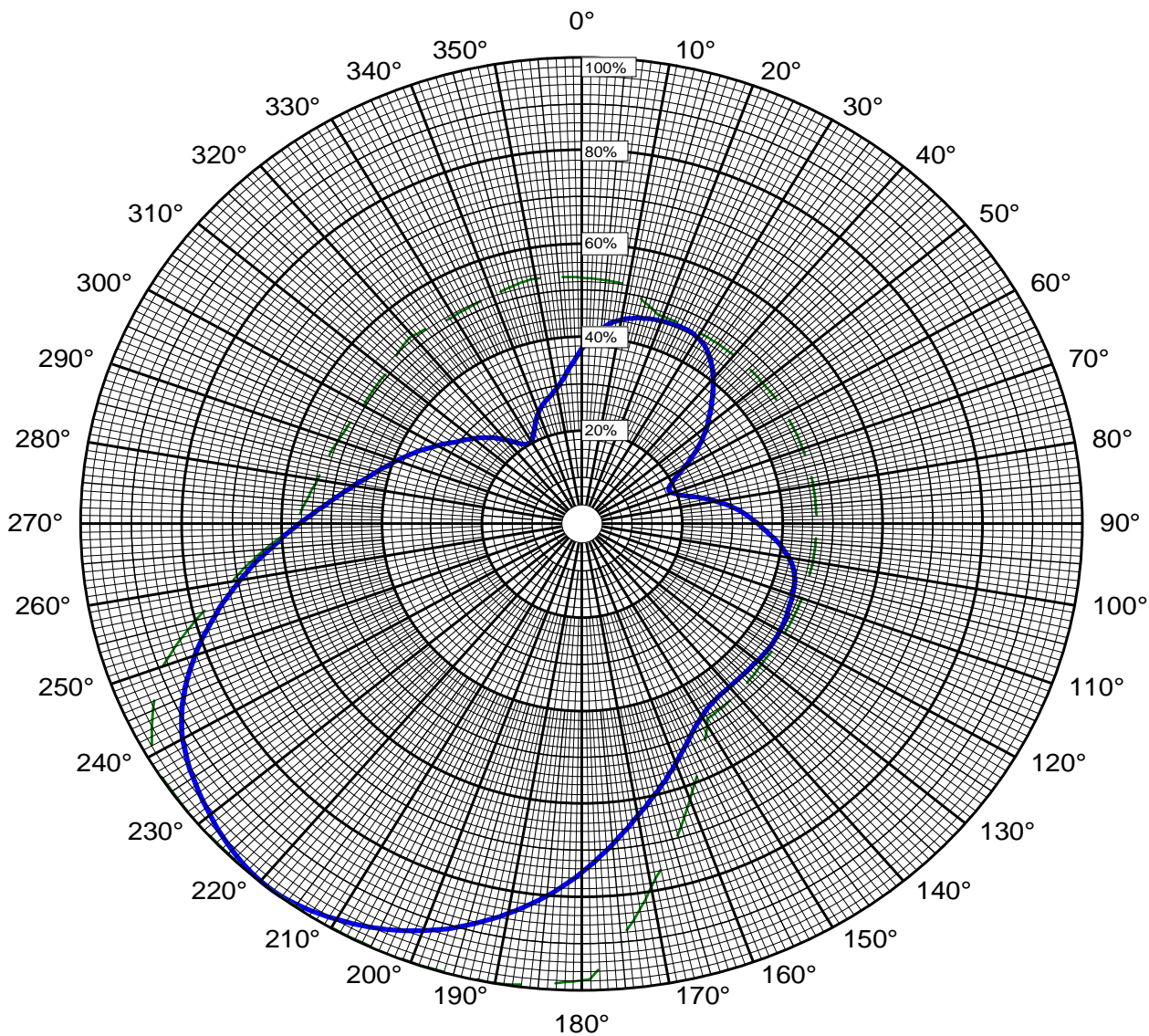
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MECHANICAL DRAWING

SIDE VIEW





Azimuth Pattern

Customer: WZLV

Date: March 31, 2011

Frequency: 90.7 MHz

Type Number: JHPC-4 DA

Notes:

COMPOSITE PATTERN ENVELOPE (H & V)



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WZLV

ERP = 47.00 kW

March 31, 2011

JHPC-4 DA

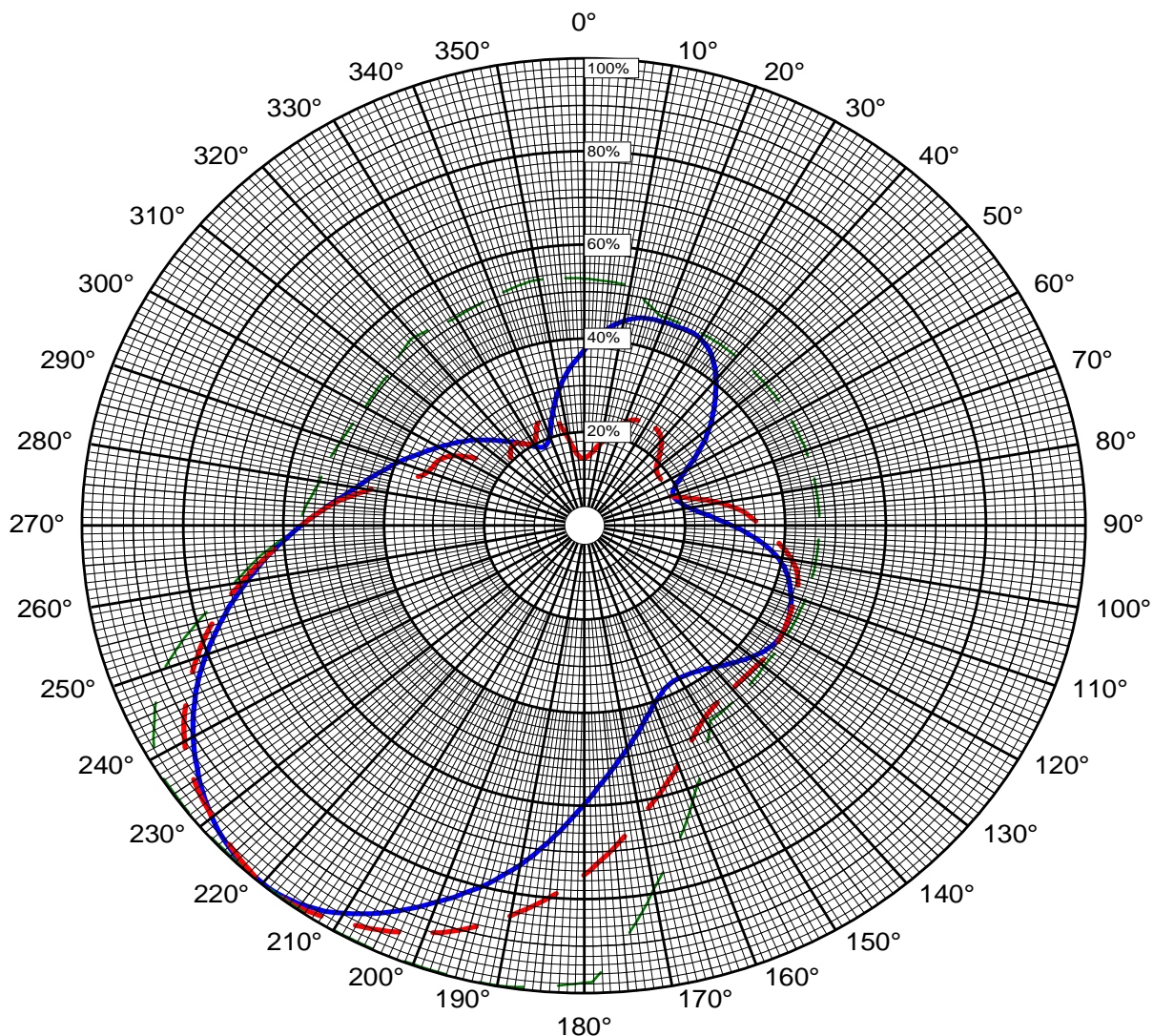
TABULATION OF RELATIVE FIELD

COMPOSITE MEASURED PATTERN (H & V)

<u>BEARING</u>	<u>FIELD</u>	<u>ERP</u> <u>(kW)</u>	<u>dBk</u>
0	0.370	6.43	8.09
10	0.440	9.10	9.59
20	0.460	9.95	9.98
30	0.460	9.95	9.98
40	0.410	7.90	8.98
50	0.330	5.12	7.09
60	0.240	2.71	4.33
70	0.190	1.70	2.30
80	0.270	3.43	5.35
90	0.350	5.76	7.60
100	0.420	8.29	9.19
110	0.450	9.52	9.79
120	0.460	9.95	9.98
130	0.460	9.95	9.98
140	0.460	9.95	9.98
150	0.480	10.83	10.35
160	0.550	14.22	11.53
170	0.640	19.25	12.84
180	0.750	26.44	14.22
190	0.850	33.96	15.31
200	0.930	40.65	16.09
210	0.980	45.14	16.55
220	1.000	47.00	16.72
230	0.970	44.22	16.46
240	0.920	39.78	16.00
250	0.820	31.60	15.00
260	0.690	22.38	13.50
270	0.560	14.74	11.68
280	0.460	9.95	9.98
290	0.390	7.15	8.54
300	0.330	5.12	7.09
310	0.280	3.68	5.66
320	0.230	2.49	3.96
330	0.200	1.88	2.74
340	0.250	2.94	4.68
350	0.290	3.95	5.97

Relative fields at other azimuths:

45	0.370	225	0.989
135	0.459	315	0.258



Azimuth Pattern

Customer: WZLV

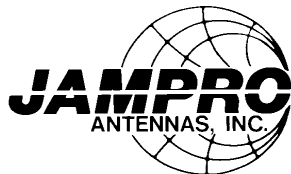
Date: March 31, 2011

Frequency: 90.7 MHz

Type Number: JHPC-4 DA

Notes: MEASURED PATTERN IN FULL SCALE

———— HPOL VPOL - - - LIMITS



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WZLV

ERP = 47.00 kW

March 31, 2011

JHPC-4 DA

TABULATION OF MEASURED FIELDS

<u>BEARING</u>	<u>HORIZONTAL POLARIZATION</u>		<u>VERTICAL POLARIZATION</u>	
	<u>FIELD</u>	<u>ERP(kW)</u>	<u>FIELD</u>	<u>ERP(kW)</u>
0	0.370	6.43	0.140	0.92
10	0.440	9.10	0.170	1.36
20	0.460	9.95	0.230	2.49
30	0.460	9.95	0.250	2.94
40	0.410	7.90	0.240	2.71
50	0.330	5.12	0.190	1.70
60	0.240	2.71	0.180	1.52
70	0.190	1.70	0.180	1.52
80	0.210	2.07	0.270	3.43
90	0.290	3.95	0.350	5.76
100	0.390	7.15	0.420	8.29
110	0.440	9.10	0.450	9.52
120	0.460	9.95	0.460	9.95
130	0.440	9.10	0.460	9.95
140	0.400	7.52	0.460	9.95
150	0.380	6.79	0.480	10.83
160	0.410	7.90	0.550	14.22
170	0.490	11.28	0.640	19.25
180	0.600	16.92	0.750	26.44
190	0.740	25.74	0.850	33.96
200	0.860	34.76	0.930	40.65
210	0.960	43.32	0.980	45.14
220	1.000	47.00	1.000	47.00
230	0.970	44.22	0.970	44.22
240	0.900	38.07	0.920	39.78
250	0.800	30.08	0.820	31.60
260	0.680	21.73	0.690	22.38
270	0.560	14.74	0.560	14.74
280	0.460	9.95	0.430	8.69
290	0.390	7.15	0.330	5.12
300	0.330	5.12	0.290	3.95
310	0.280	3.68	0.200	1.88
320	0.230	2.49	0.220	2.27
330	0.190	1.70	0.200	1.88
340	0.200	1.88	0.250	2.94
350	0.290	3.95	0.190	1.70
MAXIMUM FIELDS:				
220	1.000	47.00		
220			1.000	47.00
MINIMUM FIELDS:				
335	0.183	1.57		
0			0.140	0.92

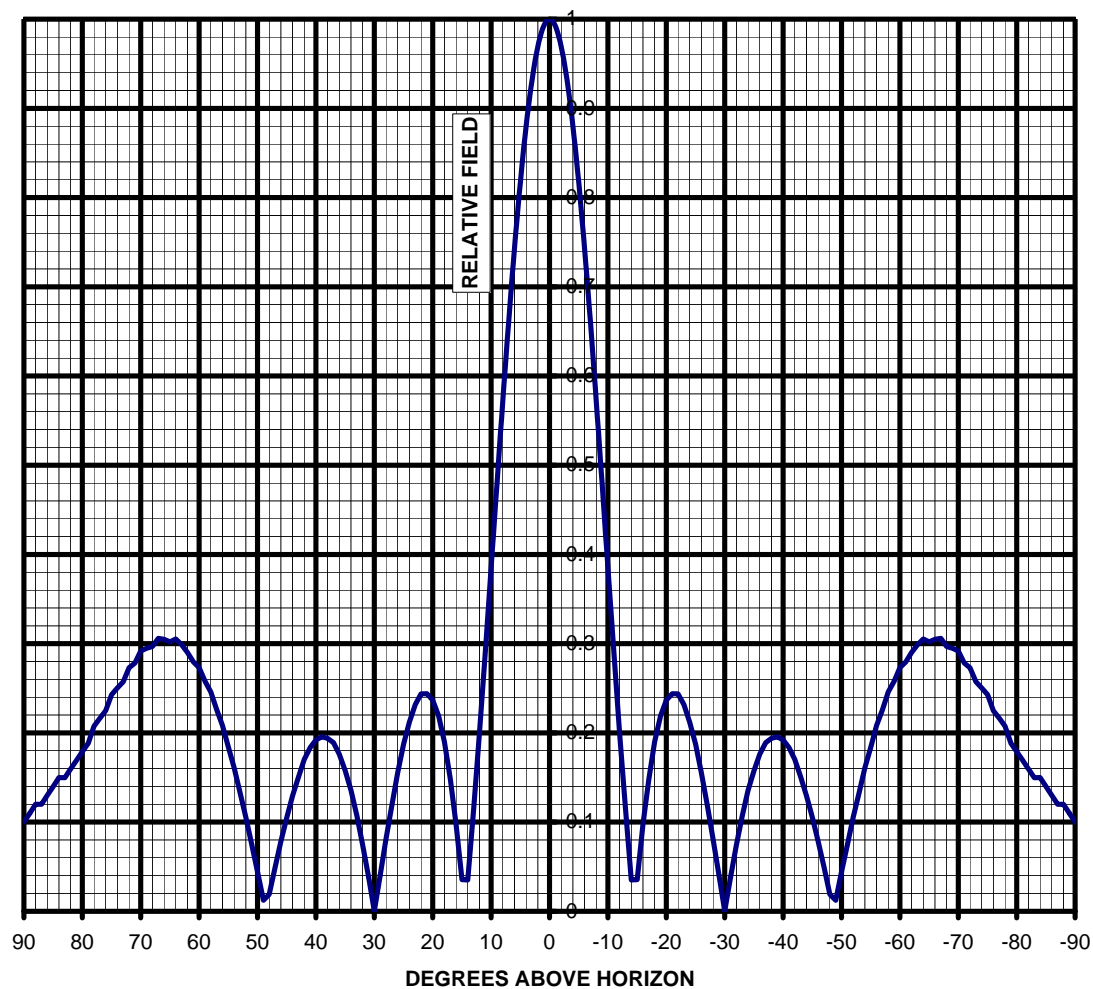


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PLOT OF ELEVATION PLANE PATTERN

STATION: WZLV 90.7 MHz JHPC-4 DA 1.00 lambda spacing





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TABULATION OF ELEVATION PLANE PATTERN

STATION: WZLV 90.7 MHz JHPC-4 DA 1.00 lambda spacing

ELEVATION RELATIVE		ELEVATION RELATIVE		ELEVATION RELATIVE	
<u>ANGLE</u>	<u>FIELD</u>	<u>ANGLE</u>	<u>FIELD</u>	<u>ANGLE</u>	<u>FIELD</u>
10	0.385	-25	0.187	-60	0.273
9	0.479	-26	0.155	-61	0.280
8	0.572	-27	0.119	-62	0.290
7	0.661	-28	0.081	-63	0.299
6	0.743	-29	0.041	-64	0.305
5	0.817	-30	0.000	-65	0.302
4	0.880	-31	0.039	-66	0.305
3	0.932	-32	0.074	-67	0.306
2	0.969	-33	0.107	-68	0.297
1	0.992	-34	0.136	-69	0.295
0	1.000	-35	0.158	-70	0.292
-1	0.992	-36	0.176	-71	0.278
-2	0.969	-37	0.189	-72	0.273
-3	0.932	-38	0.194	-73	0.257
-4	0.880	-39	0.196	-74	0.250
-5	0.817	-40	0.192	-75	0.243
-6	0.743	-41	0.184	-76	0.225
-7	0.661	-42	0.170	-77	0.216
-8	0.572	-43	0.150	-78	0.207
-9	0.479	-44	0.129	-79	0.188
-10	0.385	-45	0.105	-80	0.179
-11	0.291	-46	0.078	-81	0.169
-12	0.200	-47	0.049	-82	0.160
-13	0.115	-48	0.019	-83	0.150
-14	0.035	-49	0.012	-84	0.150
-15	0.036	-50	0.044	-85	0.140
-16	0.097	-51	0.075	-86	0.130
-17	0.148	-52	0.105	-87	0.120
-18	0.190	-53	0.133	-88	0.120
-19	0.219	-54	0.161	-89	0.110
-20	0.237	-55	0.184	-90	0.100
-21	0.244	-56	0.208		
-22	0.244	-57	0.226		
-23	0.232	-58	0.246		
-24	0.212	-59	0.258		