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**FM DIRECTIONAL BROADCAST ANTENNA**  
**PROOF-OF-PERFORMANCE**

**MODEL JADP-1/2(2) DA**

**SERIAL NUMBER 13274**

**WYPR**

**Baltimore, MD**



6340 Sky Creek Drive • Sacramento, California USA 95828  
(916) 383-1177 phone • (916) 383-1182 fax



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**DATE:** August 14, 2007

<b>ANTENNA GAIN</b>	<u>H-pol</u>	<u>V-pol</u>
relative	<b>1.34</b>	<b>1.34</b>
(dBd)	<b>(1.27)</b>	<b>(1.27)</b>

RMS OF THE  
AZIMUTH PATTERNS:

**FM ANTENNA FOR:**

STATION: **WYPR**

LOCATION: **Baltimore, MD**

MODEL NUMBER: **JADP-1/2(2) DA**

FREQUENCY & ERP: **88.1 MHz, 15.50 kW**

ANTENNA INPUT POWER: **11.57 kW**

ANTENNA BOOM HEADING: **See Dwgs**

Composite	H-pol	V-pol
<b>0.597</b>	<b>0.547</b>	<b>0.582</b>

**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**

Standard CP FM panel antenna models were used to create the required directional patterns. From experience and by repeated measurements, these panels were adjusted as to position until the final configuration was determined and the pattern requirements were met. Measurements to establish their exact location are shown on the antenna mounting sketches. One of these panel antennas uses a 10-foot diameter cavity. The other uses a 6-foot diameter cavity.

**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: **WYPR**

Model: **JADP-1/2(2) 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. These bearings must be verified by a surveyor at the site when installation is being completed. Good engineering practices should be followed in any details not covered by specific instructions.

A clear vertical aperture of 24 feet must be maintained about the centerline of the array in which no other antennas may be mounted. This is to insure the integrity of the measured directional pattern as certified.

### **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  
-8591E H.P. SPECTRUM ANALYZER, SERIAL #3308A01312, CAL'd 1/16/03  
-TUNED CAVITY DIPOLE

### **CONCLUSION**

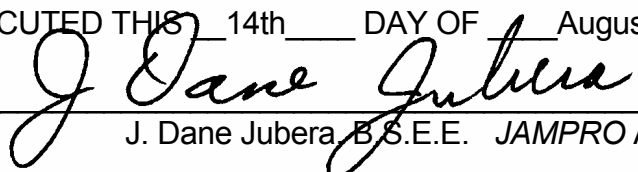
In the development of this pattern, JAMPRO antennas, Inc. observed known requirements of the FCC, as stated on the station construction permit. ***IMPORTANT NOTE: this pattern does not meet the 85% rms criterium required for licensing by FCC. A change to the authorized radiation pattern must be requested from FCC in order to allow this antenna to be licensed.***

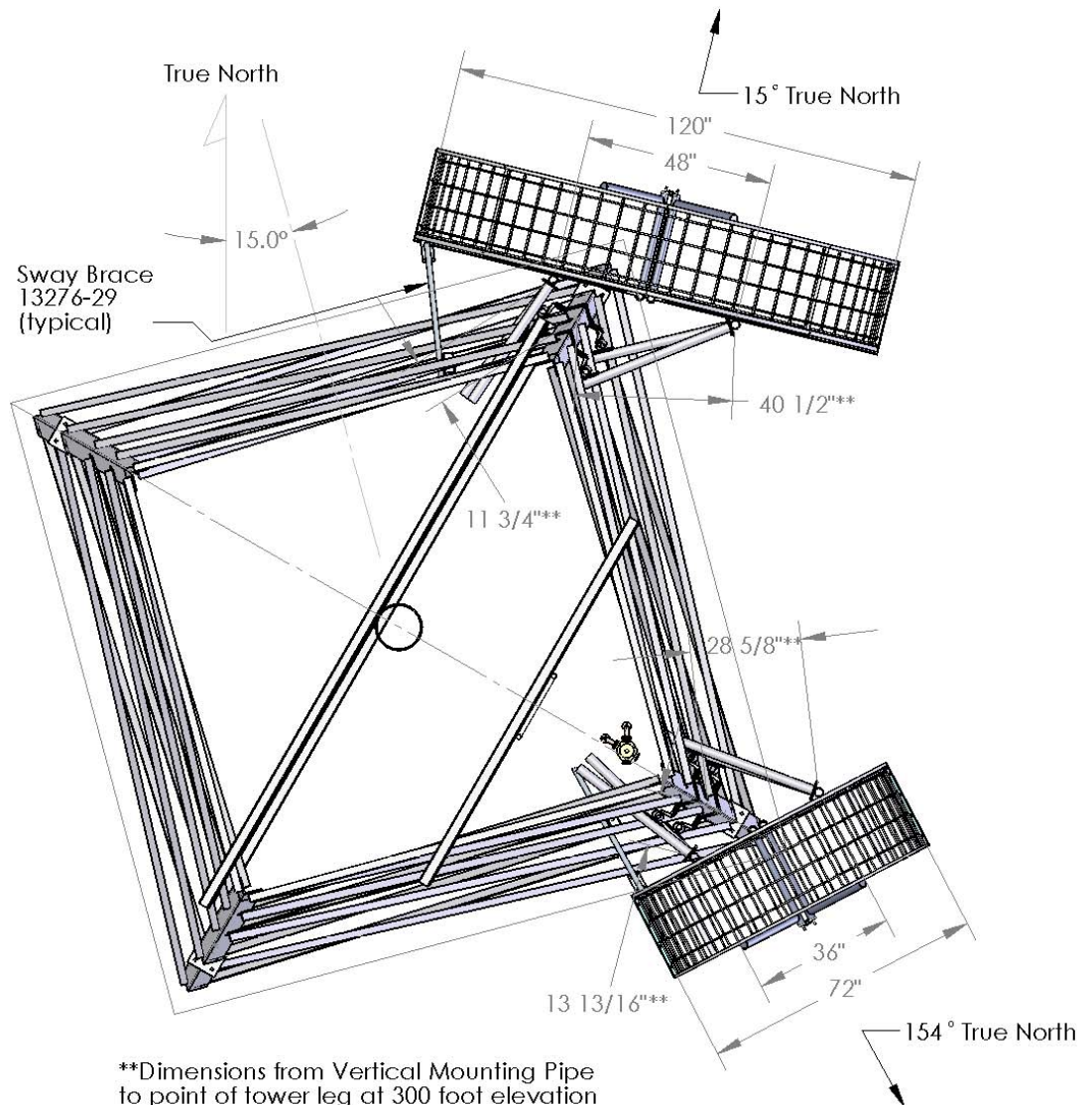
Gain figures and required input power to achieve station ERP, as well as other details, are found on the first page.

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

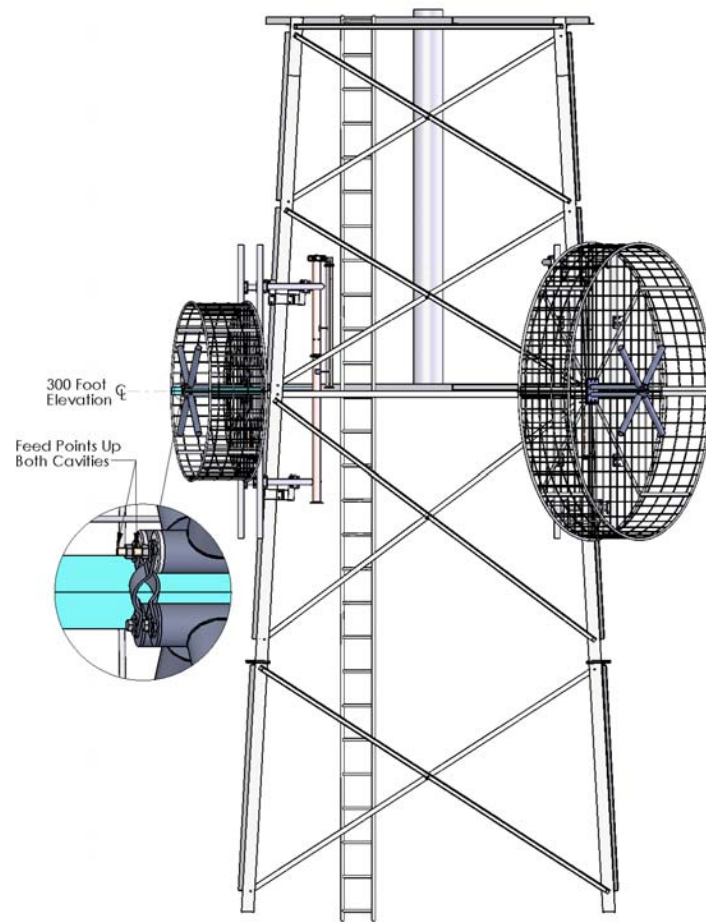
EXECUTED THIS 14th DAY OF August, 2007

BY:

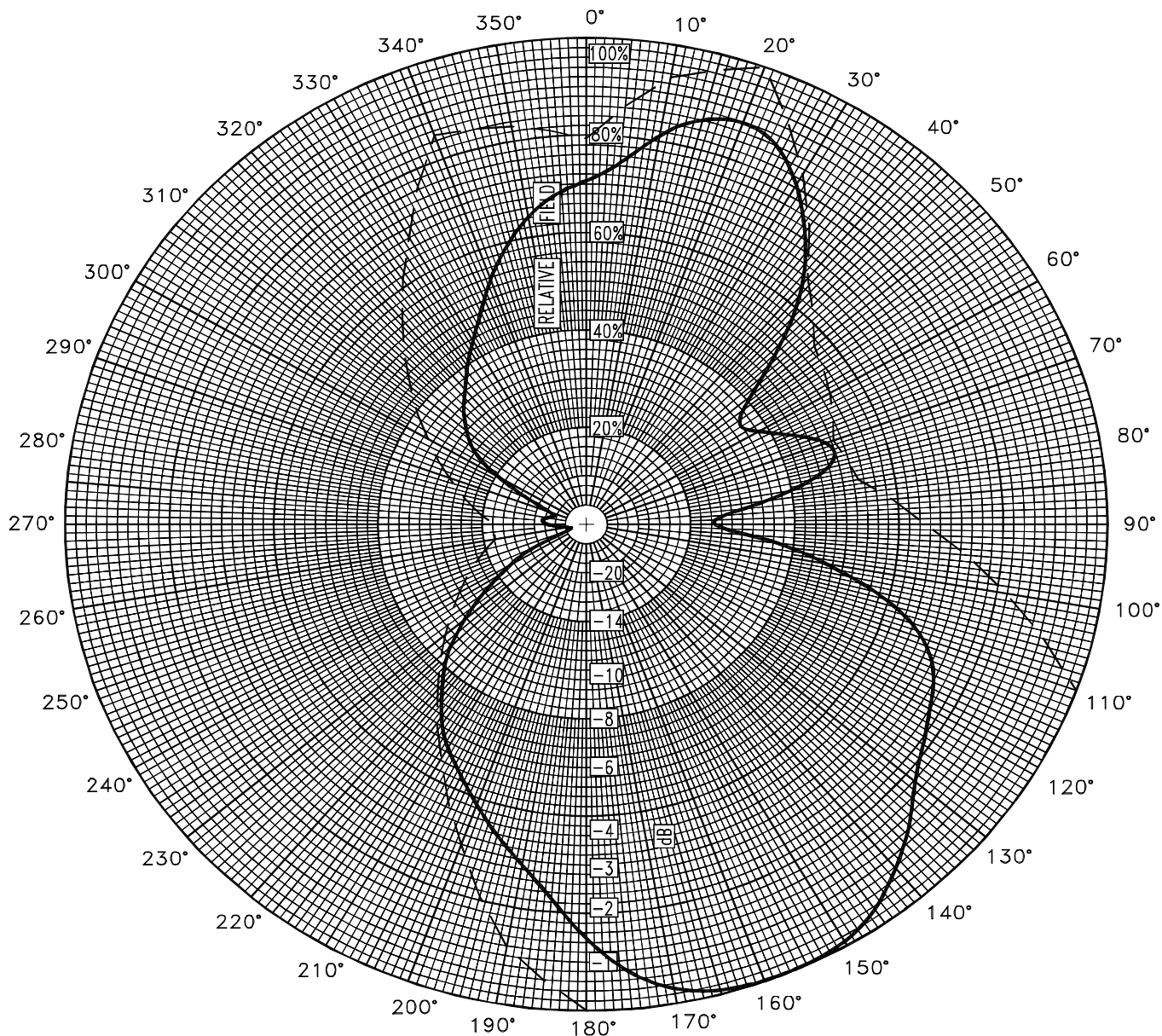
  
J. Dane Jubera, B.S.E.E. JAMPRO Antennas, Inc.



<b>PROPRIETARY AND CONFIDENTIAL</b> THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF JAMPRO ANTENNAS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF JAMPRO ANTENNAS IS PROHIBITED.		DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED  TOLERANCES: FRACTIONAL $\pm 1/32"$ ANGULAR: MACH $\pm .5^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01"$ THREE PLACE DECIMAL $\pm .005"$		COMMENTS:		NAME      DATE		<b>Jampro Antennas</b>	
WEIGHT	5231.356 lbs.	FINISH				DRAWN			
MATERIAL		DESCRIPTION				LAST REVISED			
						CHECKED			
						ENG APPR.			
						MFG APPR.			
DO NOT SCALE DRAWING						SIZE	DWG. NO.	REV.	
						A	13274-00		SHEET 5 OF 6







## Azimuth Pattern

Customer: WYPR

Date: June 4, 2007

Frequency: 88.1 MHz

Type Number: JADP-1/2(2) DA

Notes:

COMPOSITE PATTERN ENVELOPE (H & V )



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WYPR

ERP = 15.50 kW

June 4, 2007

JADP-1/2(2) DA

TABULATION OF RELATIVE FIELD

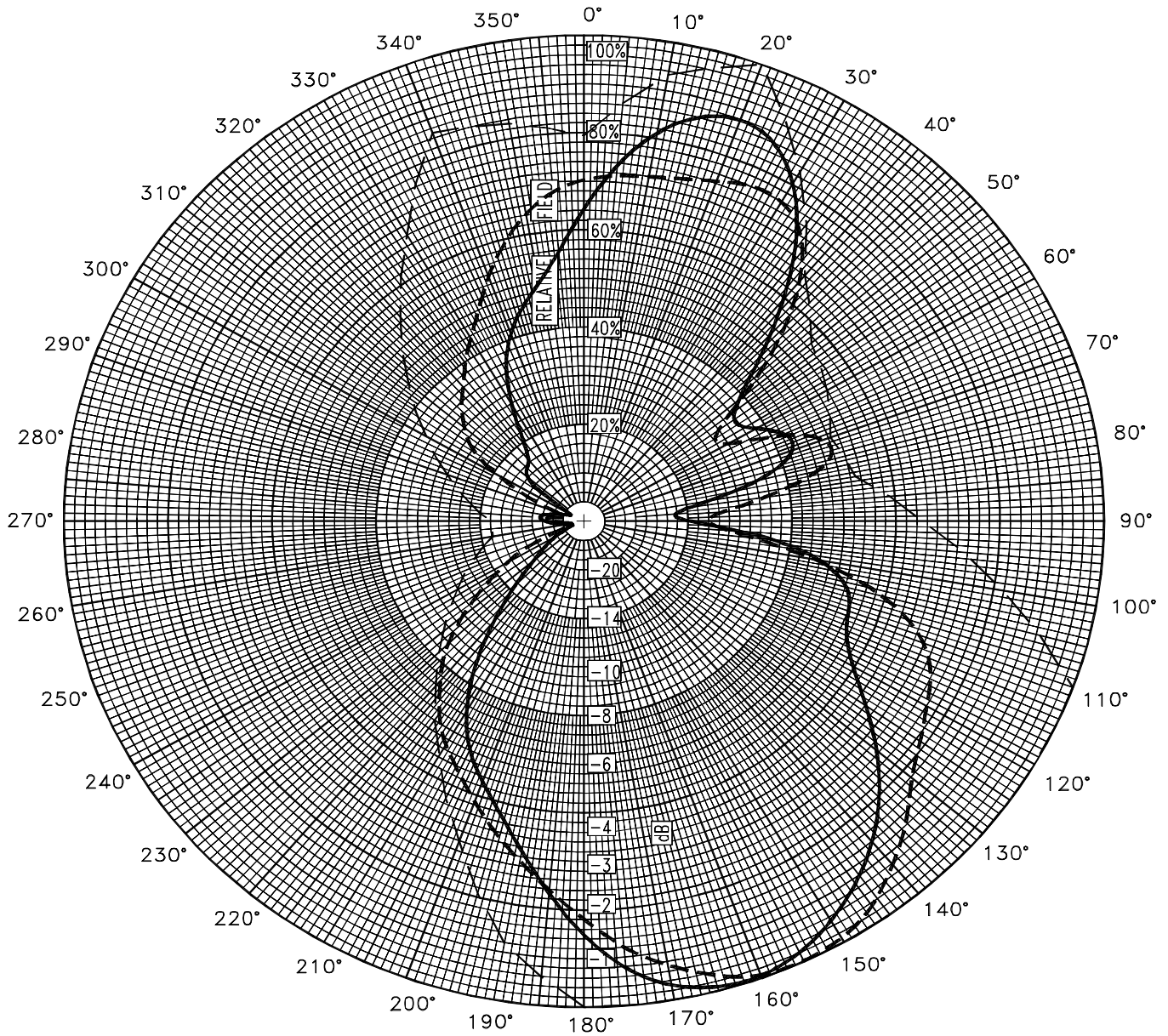
COMPOSITE MEASURED PATTERN (H & V)

<u>BEARING</u>	<u>FIELD</u>	<u>ERP</u> <u>(kW)</u>	<u>dBk</u>
0	0.705	7.70	8.87
10	0.819	10.39	10.17
20	0.885	12.14	10.84
30	0.811	10.20	10.09
40	0.655	6.65	8.23
50	0.410	2.61	4.16
60	0.382	2.26	3.54
70	0.500	3.88	5.88
80	0.415	2.67	4.26
90	0.210	0.68	-1.65
100	0.473	3.47	5.41
110	0.695	7.49	8.74
120	0.760	8.95	9.52
130	0.820	10.42	10.18
140	0.925	13.26	11.23
150	0.995	15.35	11.86
160	1.000	15.50	11.90
170	0.974	14.71	11.68
180	0.856	11.37	10.56
190	0.710	7.81	8.93
200	0.615	5.86	7.68
210	0.535	4.44	6.47
220	0.430	2.87	4.57
230	0.310	1.49	1.73
240	0.175	0.47	-3.24
250	0.040	0.02	-16.06
260	0.035	0.02	-17.21
270	0.077	0.09	-10.35
280	0.081	0.10	-9.88
290	0.075	0.09	-10.60
300	0.210	0.68	-1.65
310	0.300	1.40	1.45
320	0.360	2.01	3.03
330	0.435	2.93	4.67
340	0.540	4.52	6.55
350	0.645	6.45	8.09

Relative fields at other azimuths:

45	0.545	225	0.385
135	0.880	315	0.335





# Azimuth Pattern

Customer:	WYPR	Date:	June 4, 2007
Frequency:	88.1 MHz	Type Number:	JADP-1/2(2) DA
Notes: MEASURED PATTERN IN FULL SCALE			
<div style="display: flex; justify-content: space-around; align-items: center;"> <span>———— HPOL</span> <span>..... VPOL</span> <span>---- LIMITS</span> </div>			



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WYPR

ERP = 15.50 kW

June 4, 2007

JADP-1/2(2) 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	0.648	6.51	0.705	7.70
10	0.819	10.39	0.720	8.04
20	0.885	12.14	0.745	8.60
30	0.811	10.20	0.765	9.07
40	0.606	5.70	0.655	6.65
50	0.384	2.28	0.410	2.61
60	0.382	2.26	0.305	1.44
70	0.436	2.95	0.500	3.88
80	0.261	1.06	0.415	2.67
90	0.201	0.63	0.210	0.68
100	0.473	3.47	0.470	3.42
110	0.542	4.56	0.695	7.49
120	0.596	5.51	0.760	8.95
130	0.738	8.44	0.820	10.42
140	0.864	11.58	0.925	13.26
150	0.952	14.05	0.995	15.35
160	1.000	15.50	1.000	15.50
170	0.974	14.71	0.930	13.41
180	0.856	11.37	0.820	10.42
190	0.689	7.37	0.710	7.81
200	0.571	5.06	0.615	5.86
210	0.458	3.25	0.535	4.44
220	0.279	1.21	0.430	2.87
230	0.128	0.25	0.310	1.49
240	0.073	0.08	0.175	0.47
250	0.019	0.01	0.040	0.02
260	0.035	0.02	0.025	0.01
270	0.077	0.09	0.065	0.07
280	0.081	0.10	0.050	0.04
290	0.043	0.03	0.075	0.09
300	0.023	0.01	0.210	0.68
310	0.147	0.33	0.300	1.40
320	0.161	0.40	0.360	2.01
330	0.286	1.27	0.435	2.93
340	0.415	2.66	0.540	4.52
350	0.497	3.83	0.645	6.45

**MAXIMUM FIELDS:**

160 1.000 15.50

160 1 15.50

**MINIMUM FIELDS:**

250 0.019 0.01

255 0.02 0.01

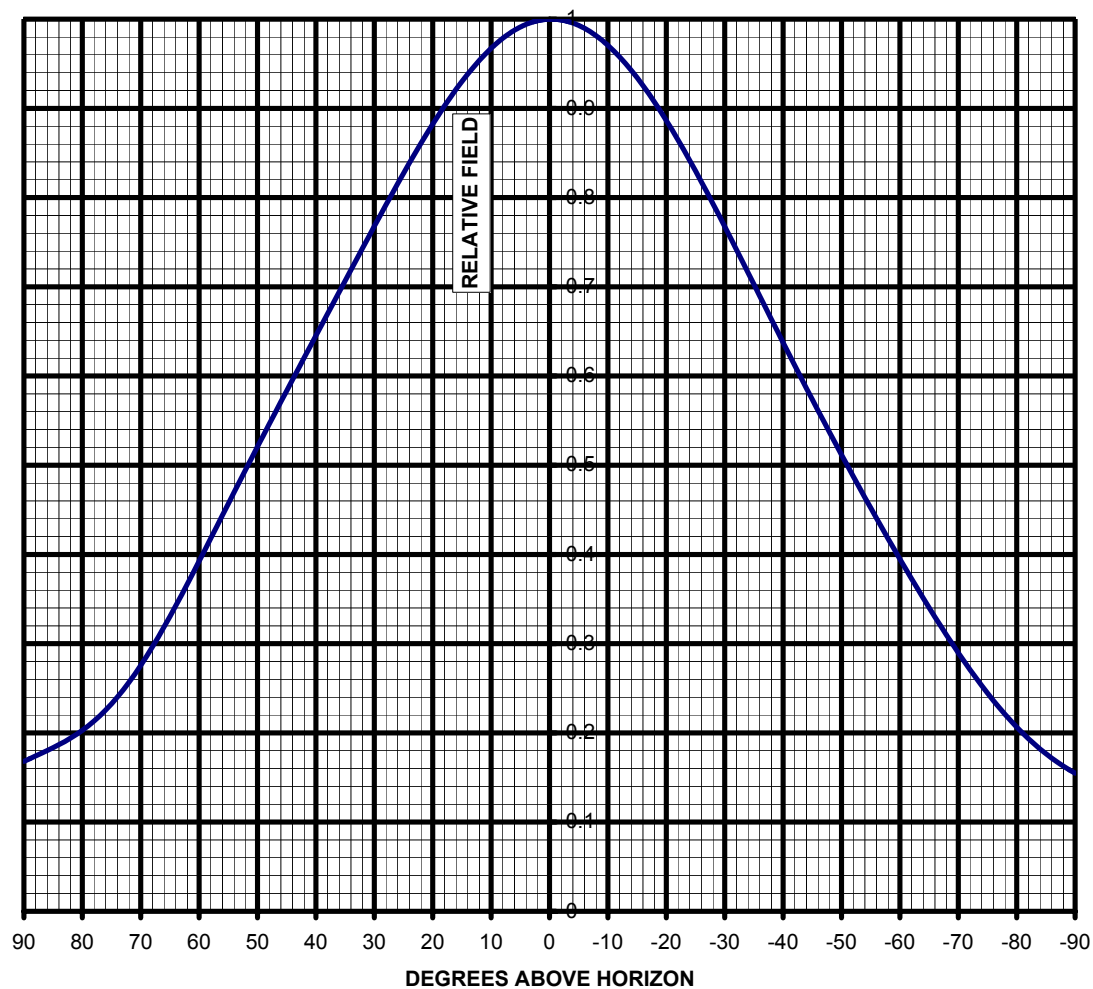


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## PLOT OF ELEVATION PLANE PATTERN

**STATION:** WYPR      Azimuth = 15 Degrees True North  
88.1 MHz    JADP-1/2(2) DA





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# TABULATION OF ELEVATION PLANE PATTERN

Azimuth = 15 Degrees True North

**STATION:** WYPR 88.1 MHz JADP-1/2(2) DA

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	0.967	-25	0.830	-60	0.395
9	0.973	-26	0.818	-61	0.384
8	0.979	-27	0.805	-62	0.373
7	0.983	-28	0.793	-63	0.362
6	0.988	-29	0.780	-64	0.351
5	0.991	-30	0.768	-65	0.340
4	0.994	-31	0.755	-66	0.330
3	0.997	-32	0.742	-67	0.320
2	0.998	-33	0.729	-68	0.309
1	0.999	-34	0.716	-69	0.299
0	1.000	-35	0.703	-70	0.290
-1	1.000	-36	0.690	-71	0.280
-2	0.999	-37	0.676	-72	0.271
-3	0.998	-38	0.663	-73	0.262
-4	0.996	-39	0.650	-74	0.253
-5	0.993	-40	0.637	-75	0.244
-6	0.990	-41	0.625	-76	0.236
-7	0.986	-42	0.612	-77	0.228
-8	0.981	-43	0.599	-78	0.221
-9	0.976	-44	0.586	-79	0.213
-10	0.971	-45	0.574	-80	0.206
-11	0.964	-46	0.561	-81	0.200
-12	0.958	-47	0.549	-82	0.194
-13	0.950	-48	0.536	-83	0.188
-14	0.943	-49	0.524	-84	0.182
-15	0.934	-50	0.512	-85	0.177
-16	0.926	-51	0.500	-86	0.172
-17	0.916	-52	0.488	-87	0.167
-18	0.907	-53	0.476	-88	0.163
-19	0.897	-54	0.464	-89	0.159
-20	0.886	-55	0.452	-90	0.155
-21	0.876	-56	0.440		
-22	0.865	-57	0.429		
-23	0.853	-58	0.417		
-24	0.842	-59	0.406		

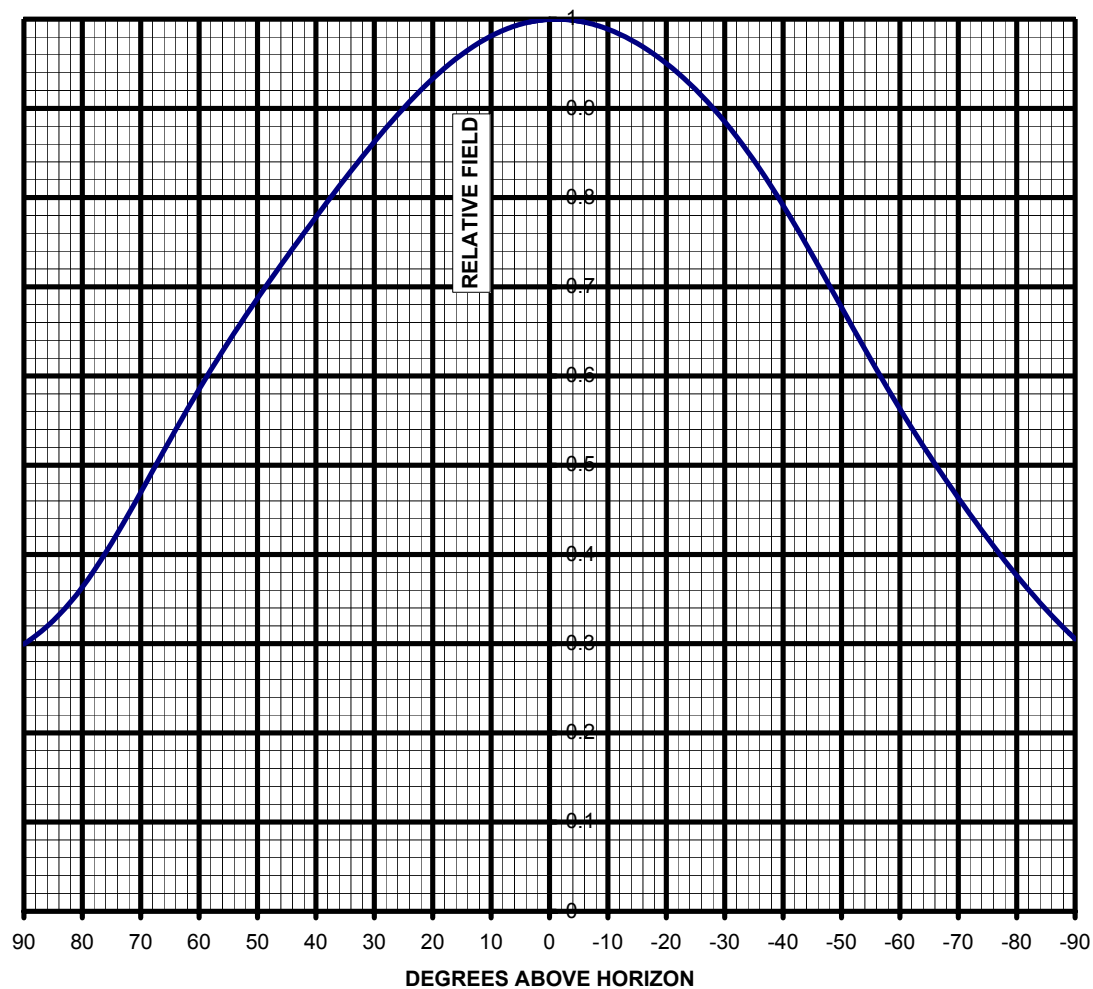


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## PLOT OF ELEVATION PLANE PATTERN

**STATION:** WYPR      Azimuth = 154 Degrees True North  
88.1 MHz    JADP-1/2(2) DA





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# TABULATION OF ELEVATION PLANE PATTERN

Azimuth = 154 Degrees True North

**STATION:** WYPR 88.1 MHz JADP-1/2(2) DA

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	0.981	-25	0.921	-60	0.563
9	0.984	-26	0.915	-61	0.552
8	0.987	-27	0.908	-62	0.542
7	0.990	-28	0.900	-63	0.532
6	0.992	-29	0.893	-64	0.521
5	0.994	-30	0.885	-65	0.511
4	0.996	-31	0.877	-66	0.502
3	0.997	-32	0.869	-67	0.492
2	0.998	-33	0.860	-68	0.482
1	0.999	-34	0.851	-69	0.473
0	1.000	-35	0.842	-70	0.463
-1	1.000	-36	0.832	-71	0.454
-2	1.000	-37	0.822	-72	0.445
-3	1.000	-38	0.812	-73	0.436
-4	0.999	-39	0.802	-74	0.427
-5	0.998	-40	0.791	-75	0.418
-6	0.997	-41	0.781	-76	0.410
-7	0.995	-42	0.770	-77	0.401
-8	0.993	-43	0.758	-78	0.393
-9	0.991	-44	0.747	-79	0.384
-10	0.989	-45	0.736	-80	0.376
-11	0.986	-46	0.724	-81	0.368
-12	0.983	-47	0.712	-82	0.361
-13	0.980	-48	0.701	-83	0.353
-14	0.977	-49	0.689	-84	0.346
-15	0.973	-50	0.677	-85	0.338
-16	0.969	-51	0.665	-86	0.331
-17	0.965	-52	0.653	-87	0.325
-18	0.960	-53	0.642	-88	0.318
-19	0.955	-54	0.630	-89	0.312
-20	0.950	-55	0.619	-90	0.305
-21	0.945	-56	0.607		
-22	0.940	-57	0.596		
-23	0.934	-58	0.585		
-24	0.928	-59	0.574		