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

**MODEL JADP-2-2(4)**

**SERIAL NUMBER 13082**

**KBJS**

**Jacksonville, TX**



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**DATE:** November 14, 2006

<b>ANTENNA GAIN</b>	<u>H-pol</u>	<u>V-pol</u>
relative	<b>3.38</b>	<b>2.36</b>
(dBd)	<b>(5.29)</b>	<b>(3.73)</b>

**FM ANTENNA FOR:**

**STATION: KBJs**  
**LOCATION: Jacksonville, TX**  
**MODEL NUMBER: JADP-2-2(4)**  
**FREQUENCY & ERP: 90.3 MHz, 16.00 kW**  
**ANTENNA INPUT POWER: 4.73 kW**  
**ANTENNA BOOM HEADING: See Dwgs**

<b>RMS OF THE</b>	<b>Composite</b>	<b>H-pol</b>	<b>V-pol</b>
<b>AZIMUTH PATTERNS:</b>	<b>0.605</b>	<b>0.592</b>	<b>0.518</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**

A standard CP FM panel antenna model was used. This panel antenna uses a circular cavity as a reflector. An array was constructed using two different sizes of cavity in order to create the required directional pattern. From experience and by repeated measurements, the position of the cavities as well as the excitations of their radiating elements was adjusted until the final configuration was determined and the pattern requirements were met. Measurements to establish their exact location of the cavities 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: **KBJS** Model: **JADP-2-2(4)**

### 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. 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  
-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.

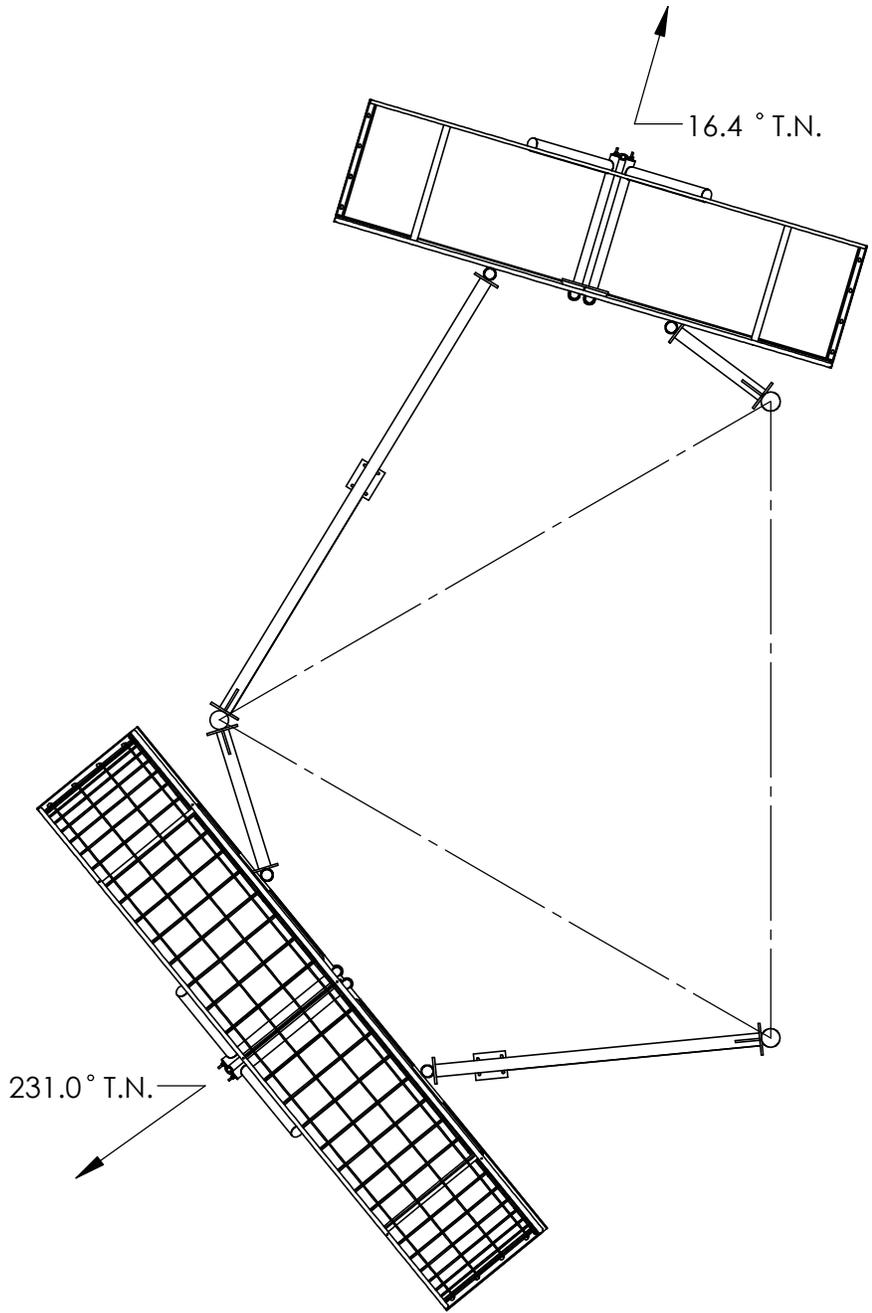
Gain figures and required input power to achieve station ERP, as well as other details, are found on the first page.

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 November, 2006

BY:

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



TOP VIEW

**PROPRIETARY AND CONFIDENTIAL**  
 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
DRAWN	SM	14Nov2006
CHECKED		
ENG APPR.		
MFG APPR.		

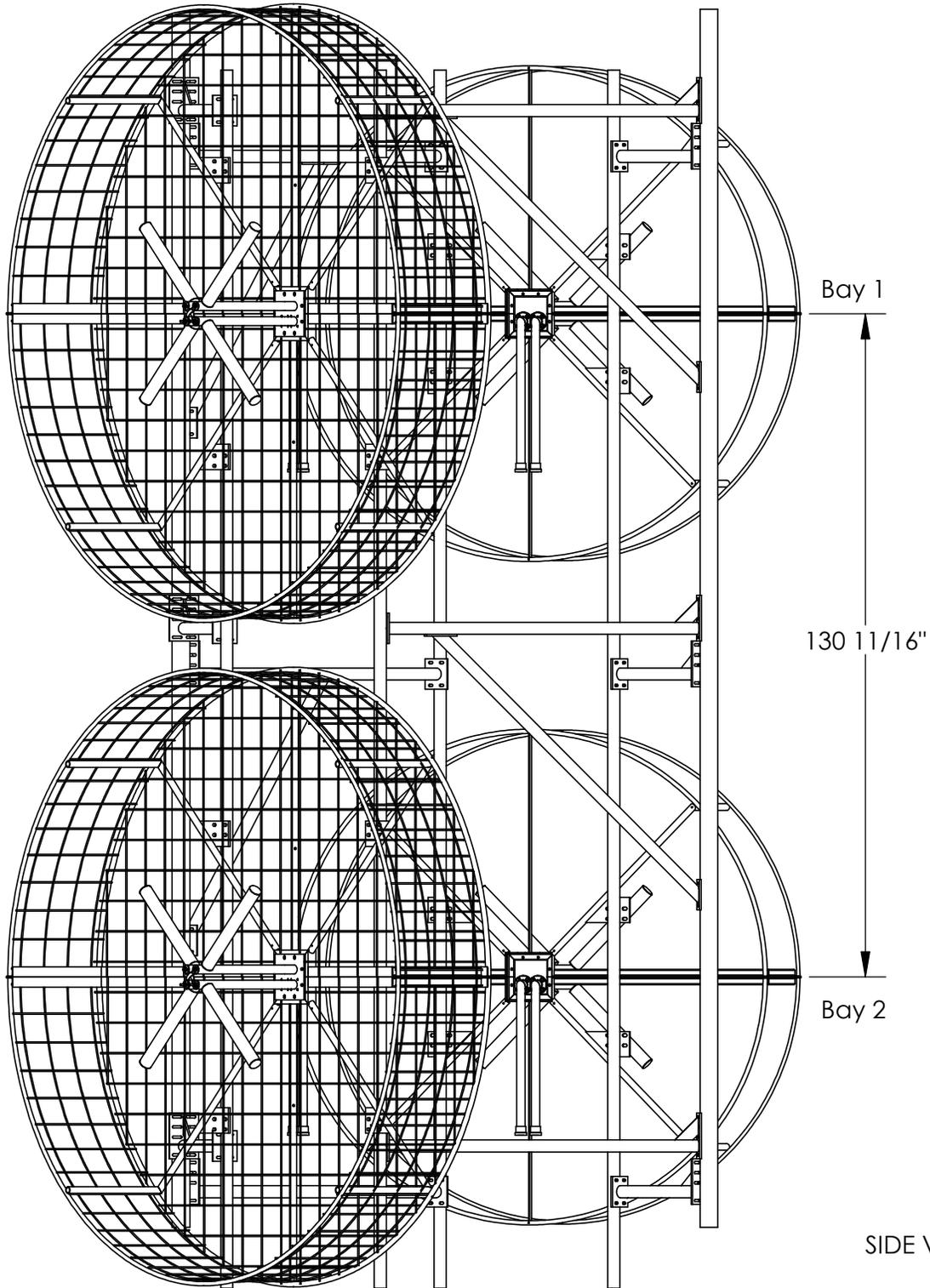
*Jampro Antennas*

KBJS

WEIGHT	FINISH
MATERIAL	DESCRIPTION

DO NOT SCALE DRAWING

SIZE DWG. NO. **A** 13084, IB Assy SHEET 6 OF 7 REV.



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 TWO PLACE DECIMAL  $\pm .01"$   
 THREE PLACE DECIMAL  $\pm .005"$

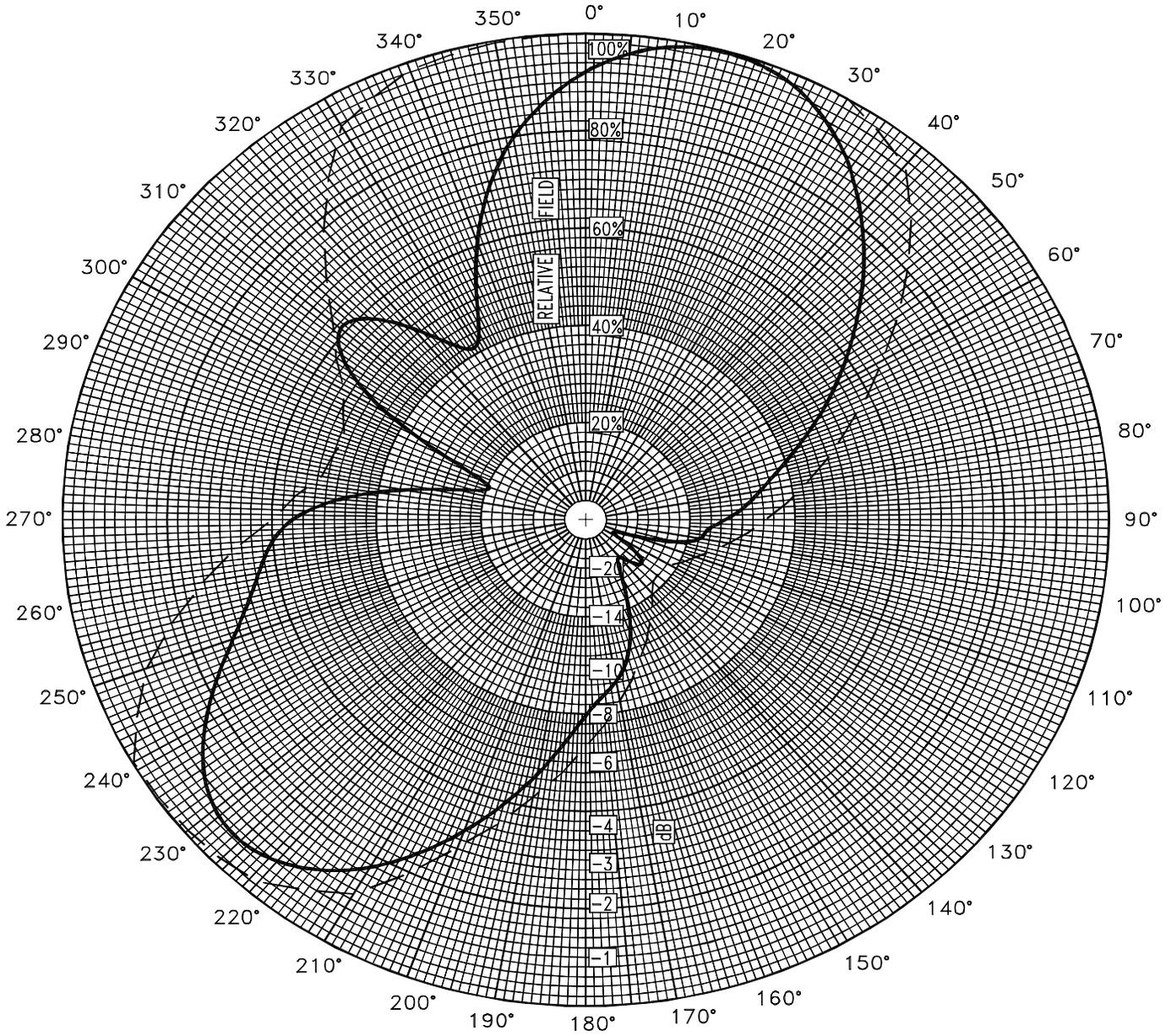
COMMENTS:

	NAME	DATE
DRAWN	SM	14Nov2006
CHECKED		
ENG APPR.		
MFG APPR.		

**Jampro Antennas**  
 KBJs

WEIGHT	FINISH
MATERIAL	DESCRIPTION

DO NOT SCALE DRAWING



**Azimuth Pattern**

Customer: KBJs

Date: August 28, 2006

Frequency: 90.3 MHz

Type Number: JADP-2-2(4)

Notes:

COMPOSITE PATTERN ENVELOPE (H & V)



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KBJS

ERP = 16.00 kW

August 28, 2006

JADP-2-2(4)

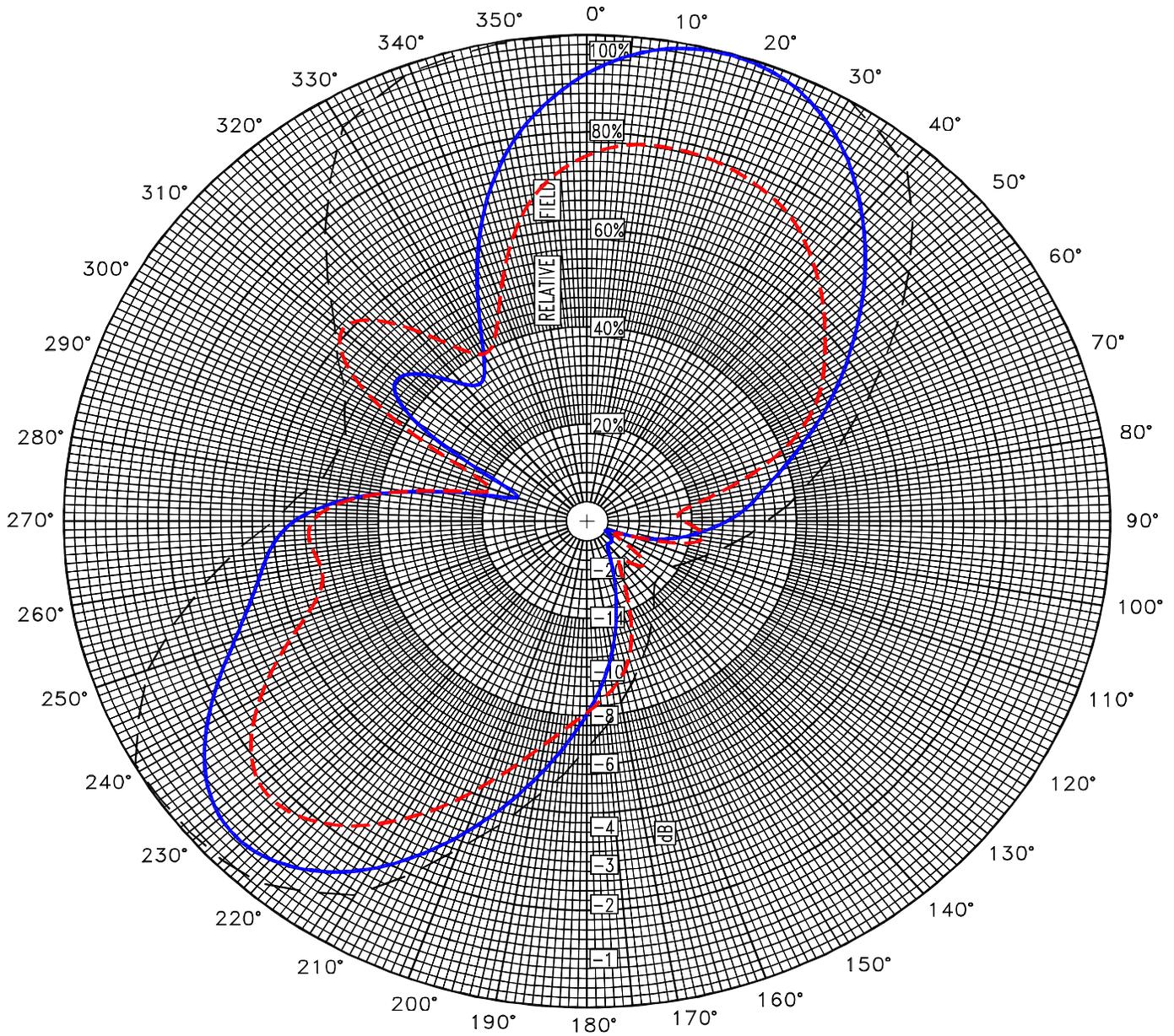
TABULATION OF RELATIVE FIELD

COMPOSITE MEASURED PATTERN (H & V)

<u>BEARING</u>	<u>FIELD</u>	<u>ERP</u> <u>(kW)</u>	<u>dBk</u>
0	0.926	13.72	11.37
10	0.992	15.74	11.97
20	0.996	15.87	12.01
30	0.937	14.04	11.47
40	0.821	10.80	10.33
50	0.687	7.56	8.78
60	0.553	4.90	6.90
70	0.429	2.95	4.69
80	0.338	1.83	2.61
90	0.271	1.18	0.71
100	0.230	0.85	-0.72
110	0.105	0.18	-7.53
120	0.075	0.09	-10.46
130	0.145	0.34	-4.73
140	0.095	0.14	-8.40
150	0.140	0.31	-5.04
160	0.255	1.04	0.17
170	0.340	1.85	2.67
180	0.401	2.57	4.11
190	0.534	4.57	6.60
200	0.686	7.52	8.76
210	0.831	11.05	10.43
220	0.921	13.58	11.33
230	0.930	13.85	11.41
240	0.842	11.35	10.55
250	0.718	8.24	9.16
260	0.635	6.44	8.09
270	0.570	5.20	7.16
280	0.370	2.20	3.42
290	0.165	0.44	-3.61
300	0.465	3.46	5.39
310	0.625	6.25	7.96
320	0.520	4.33	6.36
330	0.392	2.46	3.91
340	0.615	6.05	7.82
350	0.805	10.36	10.15

Relative fields at other azimuths:

45	0.757	225	0.939
135	0.130	315	0.595



**Azimuth Pattern**

Customer: KBJs

Date: August 28, 2006

Frequency: 90.3 MHz

Type Number: JADP-2-2(4)

Notes: MEASURED PATTERN IN FULL SCALE

———— HPOL ..... VPOL ---- LIMITS



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KBJS ERP = 16.00 kW August 28, 2006

JADP-2-2(4)

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	0.926	13.72	0.755	9.12
10	0.992	15.74	0.785	9.86
20	0.996	15.87	0.780	9.73
30	0.937	14.04	0.750	9.00
40	0.821	10.80	0.680	7.40
50	0.687	7.56	0.595	5.66
60	0.553	4.90	0.515	4.24
70	0.429	2.95	0.390	2.43
80	0.338	1.83	0.215	0.74
90	0.271	1.18	0.185	0.55
100	0.190	0.58	0.230	0.85
110	0.105	0.18	0.100	0.16
120	0.041	0.03	0.075	0.09
130	0.062	0.06	0.145	0.34
140	0.059	0.06	0.095	0.14
150	0.088	0.12	0.140	0.31
160	0.165	0.44	0.255	1.04
170	0.278	1.23	0.340	1.85
180	0.401	2.57	0.395	2.50
190	0.534	4.57	0.465	3.46
200	0.686	7.52	0.580	5.38
210	0.831	11.05	0.710	8.07
220	0.921	13.58	0.810	10.50
230	0.930	13.85	0.830	11.02
240	0.842	11.35	0.725	8.41
250	0.718	8.24	0.570	5.20
260	0.635	6.44	0.515	4.24
270	0.570	5.20	0.535	4.58
280	0.370	2.20	0.370	2.19
290	0.114	0.21	0.165	0.44
300	0.361	2.09	0.465	3.46
310	0.474	3.59	0.625	6.25
320	0.364	2.12	0.520	4.33
330	0.392	2.46	0.385	2.37
340	0.615	6.05	0.490	3.84
350	0.805	10.36	0.665	7.08
<b>MAXIMUM FIELDS:</b>				
15	1.000	16.00		
225			0.835	11.16
<b>MINIMUM FIELDS:</b>				
115	0.036	0.02		
115			0.045	0.03

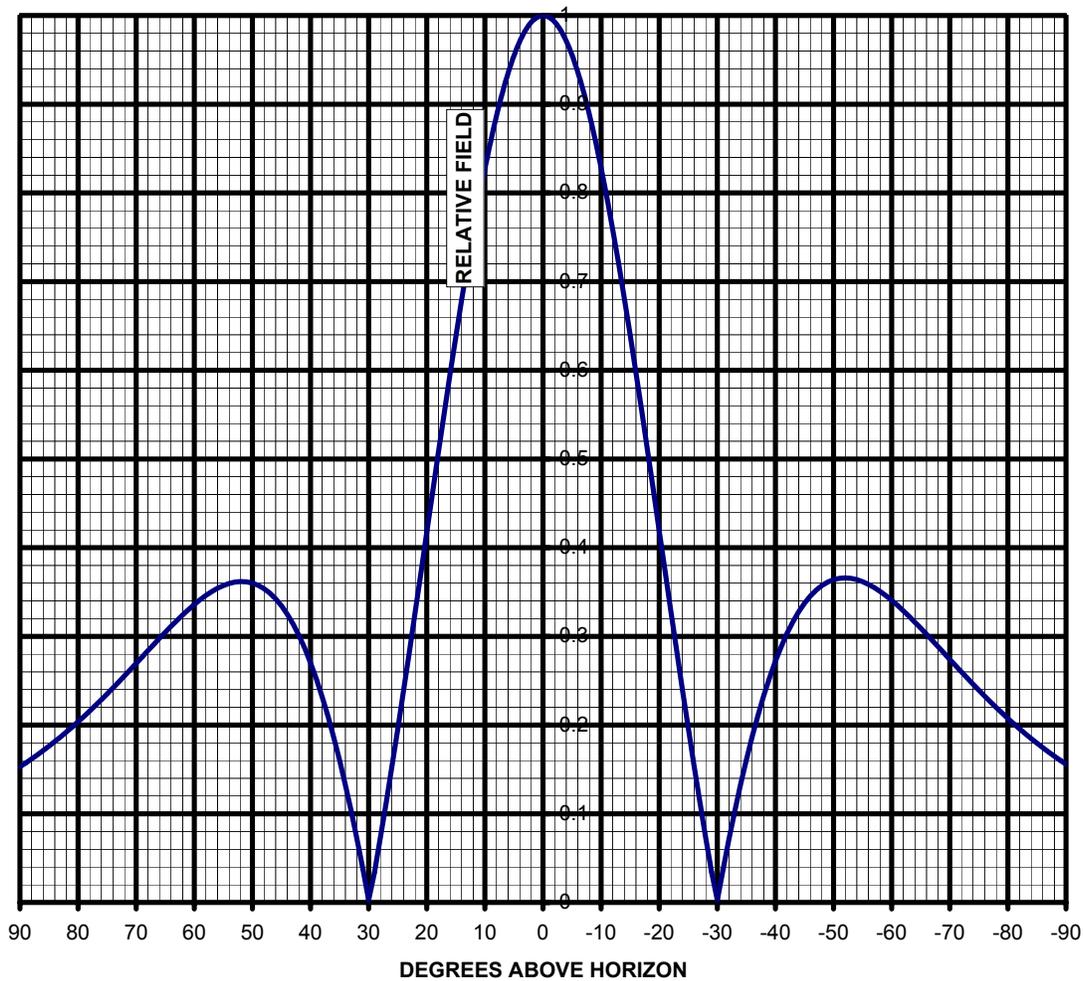


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### PLOT OF ELEVATION PLANE PATTERN

**STATION:** KBJs 90.3 MHz JADP-2-2(4) 1.00 lambda spacing





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### TABULATION OF ELEVATION PLANE PATTERN

**STATION:** KBJS 90.3 MHz JADP-2-2(4) 1.00 lambda spacing

<u>ELEVATION</u> <u>ANGLE</u>	<u>RELATIVE</u> <u>FIELD</u>	<u>ELEVATION</u> <u>ANGLE</u>	<u>RELATIVE</u> <u>FIELD</u>	<u>ELEVATION</u> <u>ANGLE</u>	<u>RELATIVE</u> <u>FIELD</u>
10	0.827	-25	0.196	-60	0.341
9	0.858	-26	0.154	-61	0.335
8	0.887	-27	0.113	-62	0.329
7	0.912	-28	0.073	-63	0.323
6	0.935	-29	0.034	-64	0.316
5	0.955	-30	0.003	-65	0.309
4	0.971	-31	0.038	-66	0.302
3	0.983	-32	0.071	-67	0.295
2	0.993	-33	0.103	-68	0.288
1	0.998	-34	0.133	-69	0.281
0	1.000	-35	0.161	-70	0.274
-1	0.998	-36	0.187	-71	0.267
-2	0.993	-37	0.211	-72	0.260
-3	0.984	-38	0.233	-73	0.253
-4	0.971	-39	0.254	-74	0.246
-5	0.955	-40	0.272	-75	0.239
-6	0.936	-41	0.289	-76	0.233
-7	0.913	-42	0.303	-77	0.226
-8	0.888	-43	0.316	-78	0.220
-9	0.859	-44	0.328	-79	0.213
-10	0.828	-45	0.337	-80	0.207
-11	0.794	-46	0.345	-81	0.202
-12	0.759	-47	0.352	-82	0.196
-13	0.721	-48	0.357	-83	0.190
-14	0.681	-49	0.361	-84	0.185
-15	0.640	-50	0.364	-85	0.180
-16	0.597	-51	0.365	-86	0.174
-17	0.553	-52	0.366	-87	0.170
-18	0.509	-53	0.365	-88	0.165
-19	0.464	-54	0.364	-89	0.160
-20	0.419	-55	0.362	-90	0.156
-21	0.373	-56	0.359		
-22	0.328	-57	0.355		
-23	0.284	-58	0.351		
-24	0.240	-59	0.346		