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

**MODEL JAHD-6/1(6)DA**

**SERIAL NUMBER 14272**

**KUHI**

**Haiku, HI**



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



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**DATE:** February 21, 2008

<b>ANTENNA GAIN</b>	<u>H-pol</u>	<u>V-pol</u>
relative	<b>11.40</b>	<b>11.40</b>
(dBd)	<b>(10.57)</b>	<b>(10.57)</b>

RMS OF THE  
AZIMUTH PATTERNS:

**FM ANTENNA FOR:**

STATION: **KUHI**

LOCATION: **Haiku, HI**

MODEL NUMBER: **JAHD-6/1(6)DA**

FREQUENCY & ERP: **106.5 MHz, 72.00 kW**

ANTENNA INPUT POWER: **6.32 k W**

ANTENNA BOOM HEADING: **310° T.**

Composite	H-pol	V-pol
<b>0.551</b>	<b>0.477</b>	<b>0.551</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 and parasitic reflectors were added to create the required directional patterns. This panel antenna system was built in 1997 and is presently in use by stations KLNH and KPOA on the island of Maui, Hawaii. A single bay duplicate of the referenced system was constructed for this measurement program.

**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: **KUHI** Model: **JAHD-6/1(6)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. 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

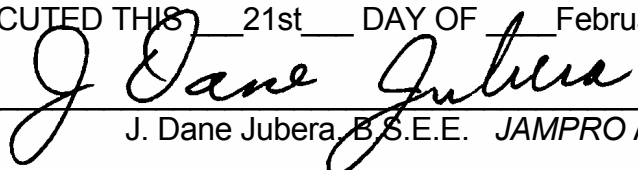
### **CONCLUSION**

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.

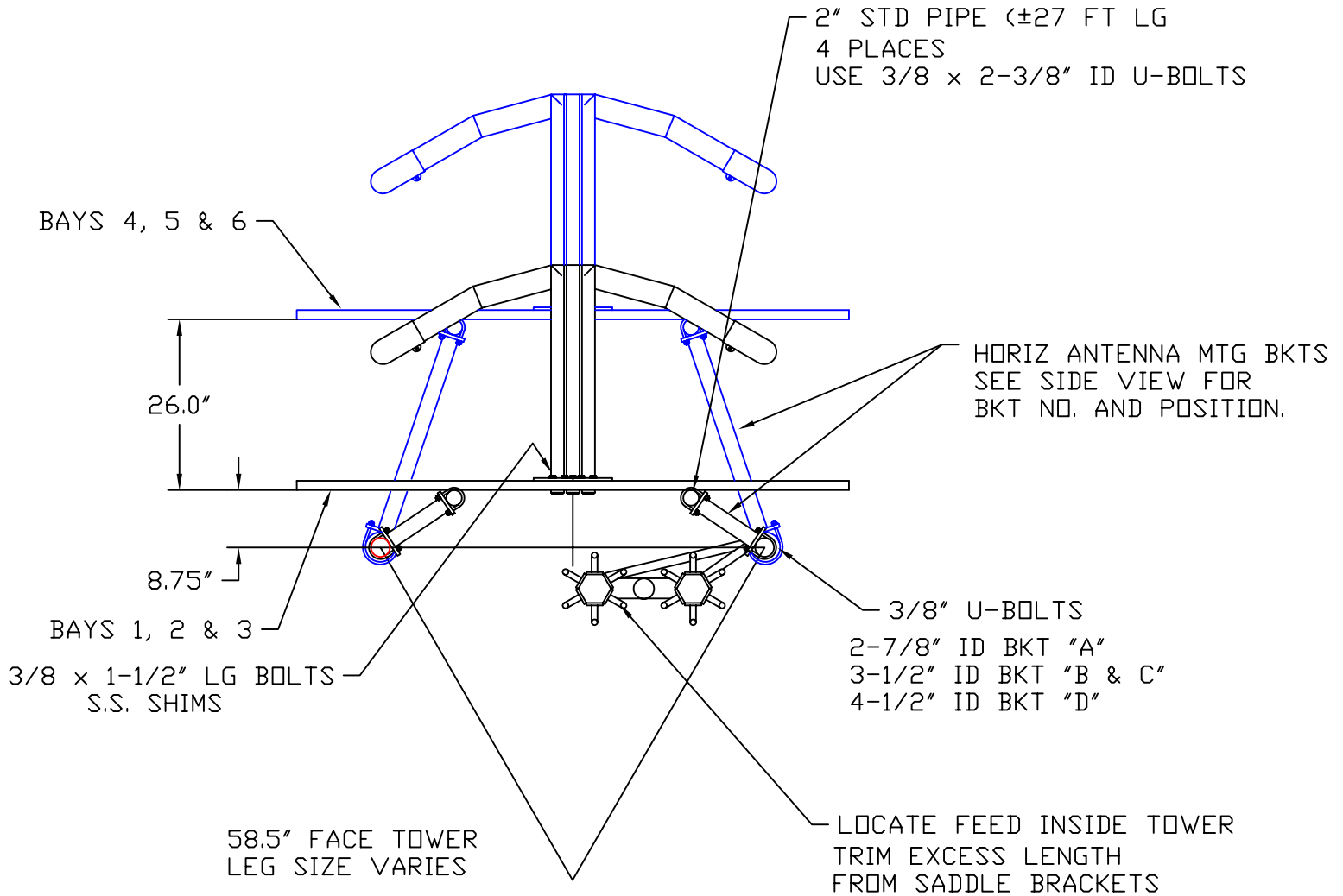
EXECUTED THIS 21st DAY OF February, 2008

BY:

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

12-22-94/RS

PAGE 2 OF 2

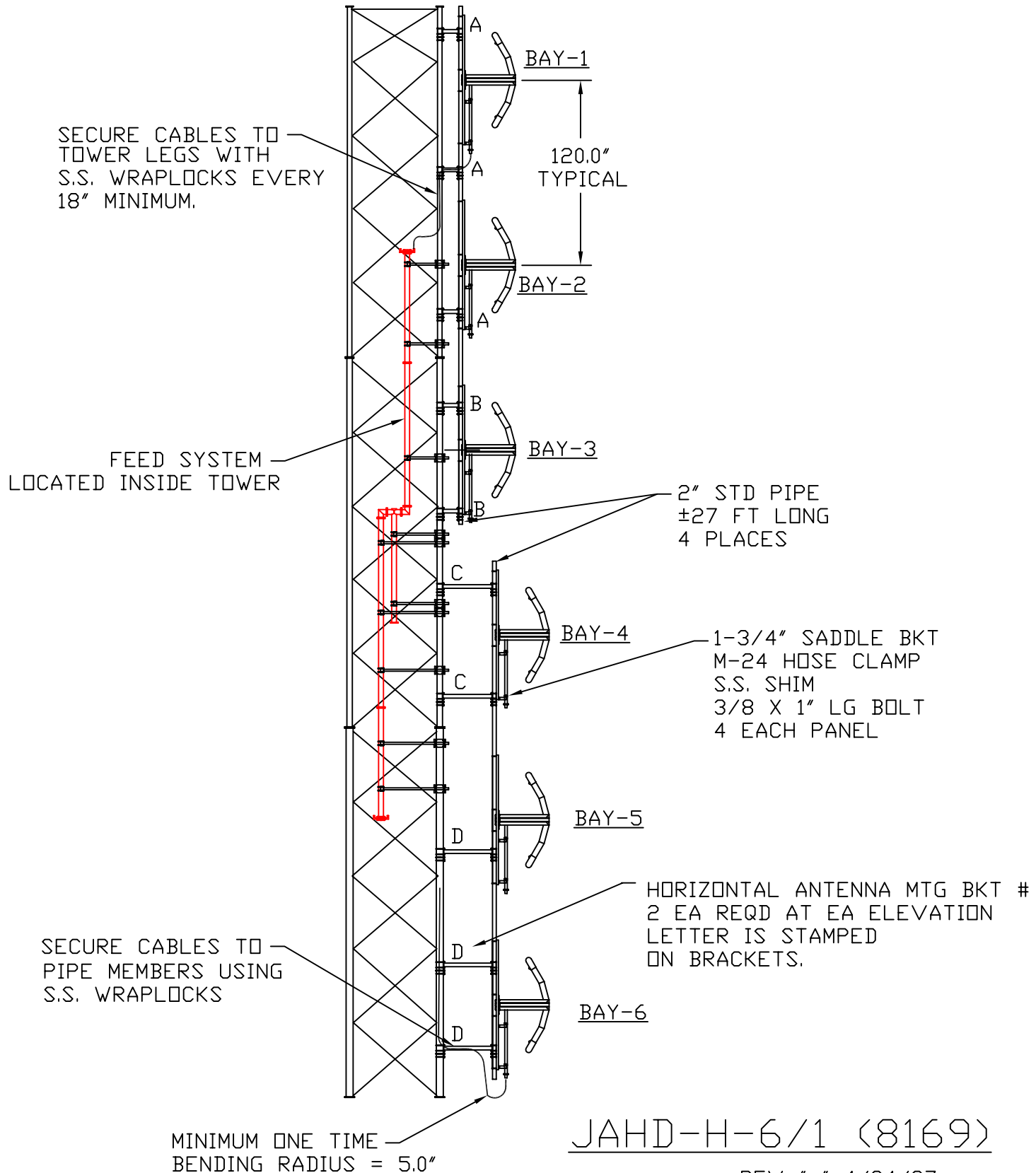


JAHD-H-6/1 (8169)

99.3 MHz

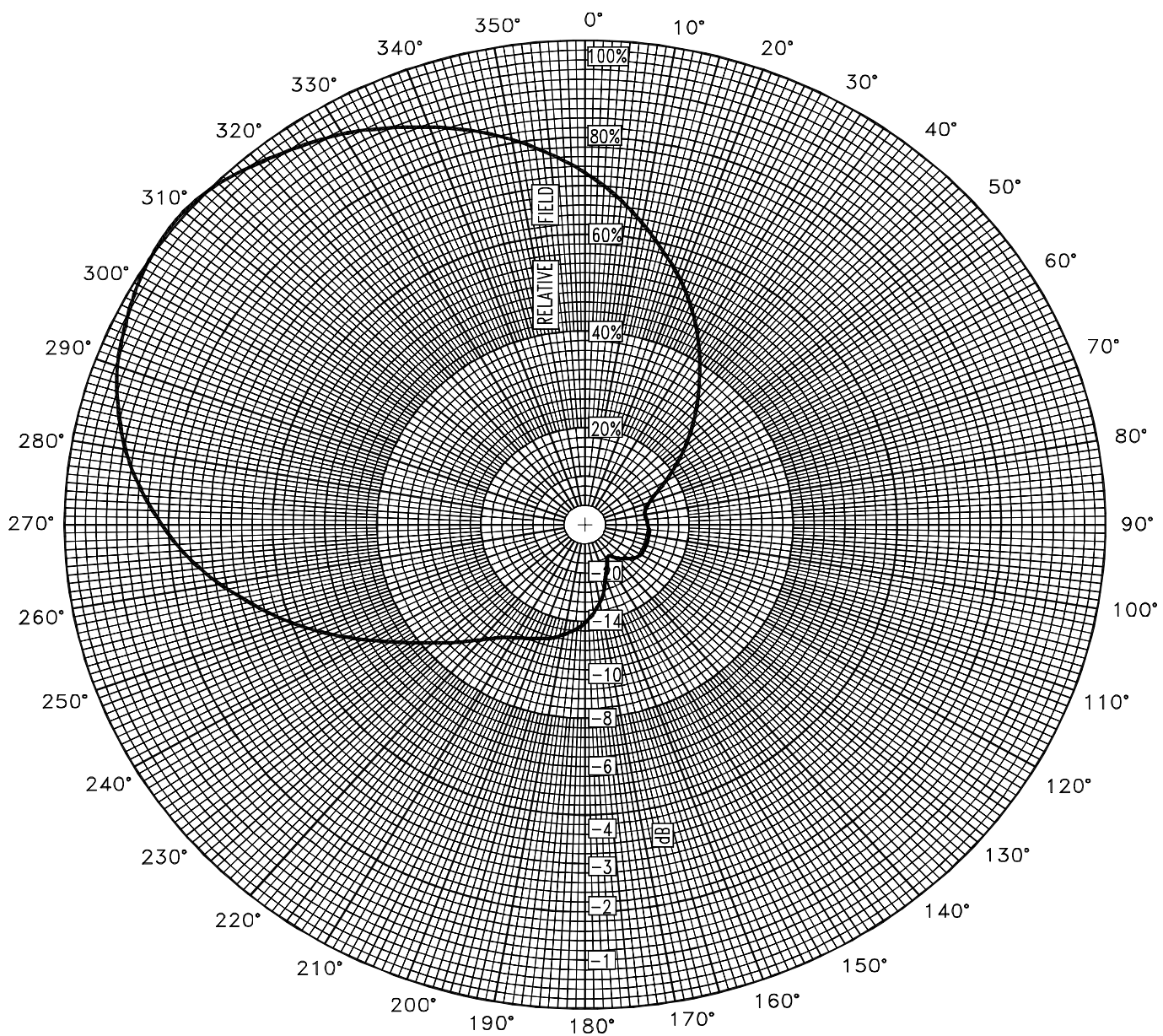
REV "-" 3/12/97

8102TOP.DWG



JAHD-H-6/1 (8169)

REV "-" 4/24/97  
8169SID.DWG



## Azimuth Pattern

Customer: KUHl

Date: February 20, 2008

Frequency: 106.5 MHz

Type Number: JAHD-6/1(6)DA

Notes:

COMPOSITE PATTERN ENVELOPE (H & V )



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KUHI

ERP = 72.00 kW

February 20, 2008

JAHD-6/1(6)DA

TABULATION OF RELATIVE FIELD

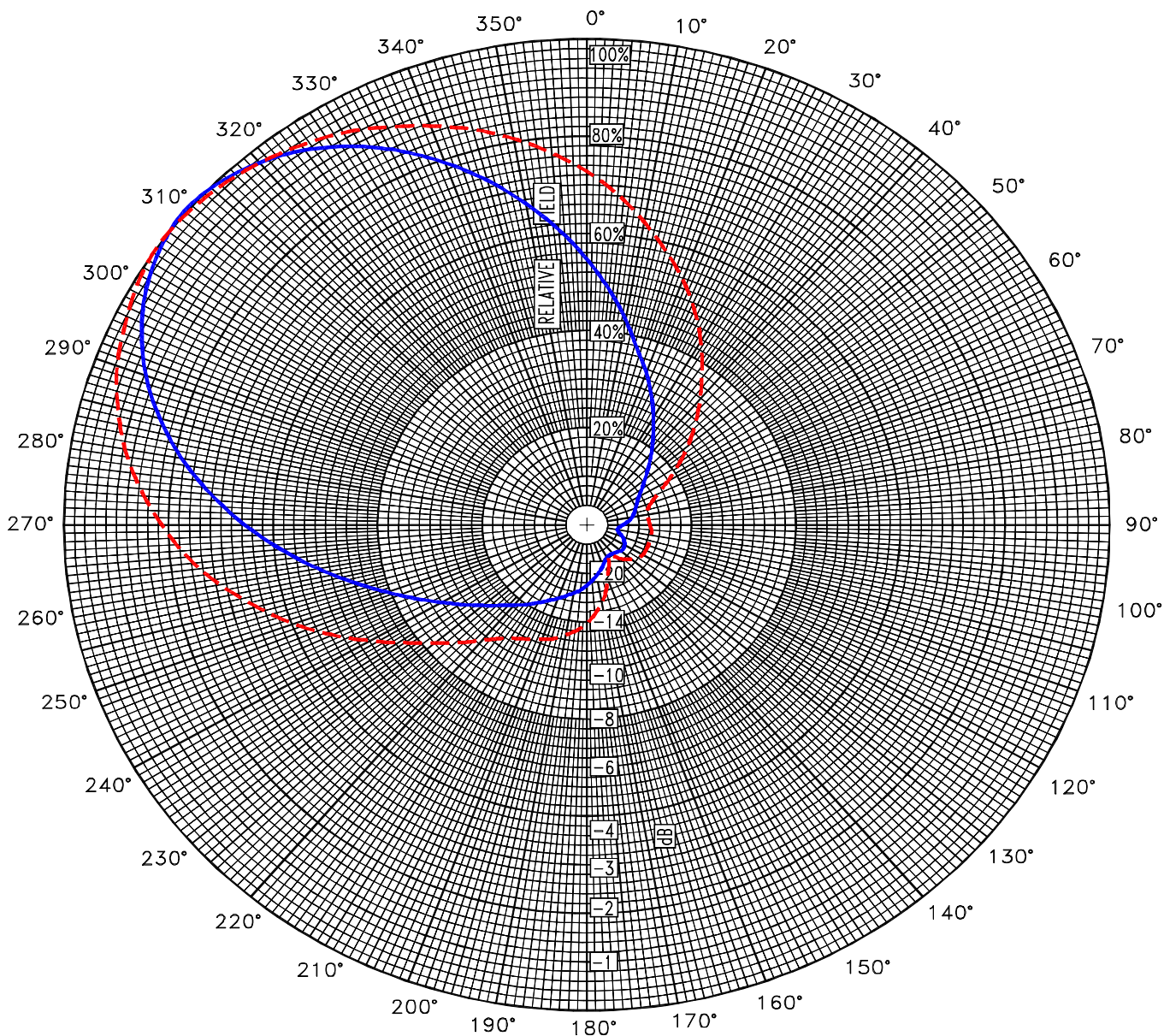
COMPOSITE MEASURED PATTERN (H & V)

<u>BEARING</u>	<u>FIELD</u>	<u>ERP</u> <u>(kW)</u>	<u>dBk</u>
0	0.730	38.37	15.84
10	0.635	29.03	14.63
20	0.540	21.00	13.22
30	0.440	13.94	11.44
40	0.340	8.32	9.20
50	0.255	4.68	6.70
60	0.180	2.33	3.68
70	0.130	1.22	0.85
80	0.115	0.95	-0.21
90	0.120	1.04	0.16
100	0.125	1.13	0.51
110	0.125	1.13	0.51
120	0.125	1.13	0.51
130	0.110	0.87	-0.60
140	0.090	0.58	-2.34
150	0.085	0.52	-2.84
160	0.115	0.95	-0.21
170	0.165	1.96	2.92
180	0.205	3.03	4.81
190	0.230	3.81	5.81
200	0.250	4.50	6.53
210	0.270	5.25	7.20
220	0.310	6.92	8.40
230	0.380	10.40	10.17
240	0.480	16.59	12.20
250	0.600	25.92	14.14
260	0.715	36.81	15.66
270	0.815	47.82	16.80
280	0.900	58.32	17.66
290	0.960	66.36	18.22
300	0.995	71.28	18.53
310	1.010	73.47	18.66
320	0.976	68.63	18.36
330	0.935	62.94	17.99
340	0.875	55.13	17.41
350	0.810	47.24	16.74

Relative fields at other azimuths:

45	0.295	225	0.345
135	0.100	315	0.998





## Azimuth Pattern

Customer: KUHJ Date: February 20, 2008

Frequency: 106.5 MHz Type Number: JAHD-6/1(6)DA

Notes: MEASURED PATTERN IN FULL SCALE

HPOL VPOL



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KUHI

ERP = 72.00 kW

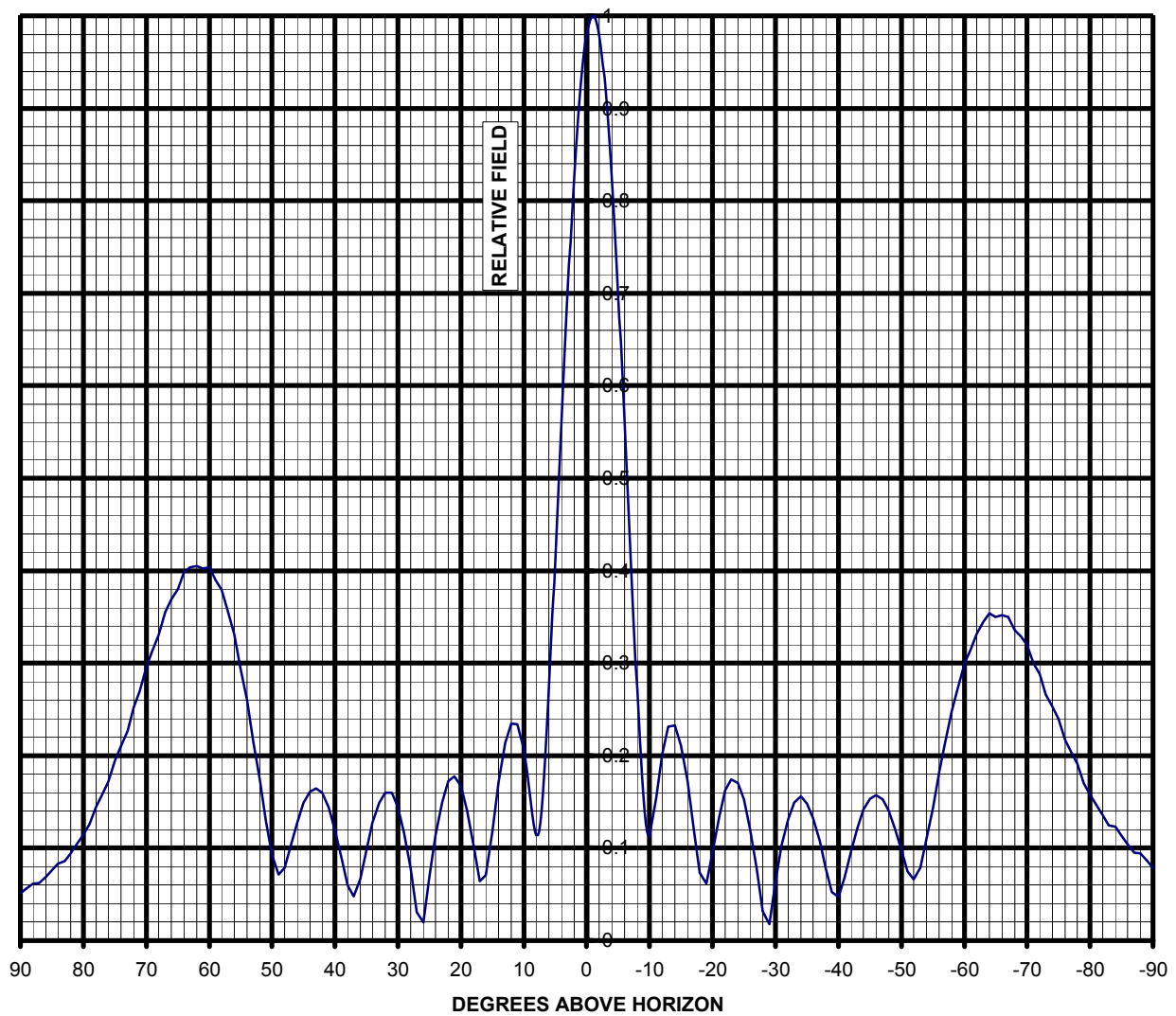
February 20, 2008

JAHD-6/1(6)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	0.550	21.76	0.730	38.37
10	0.432	13.47	0.635	29.03
20	0.336	8.14	0.540	21.00
30	0.257	4.76	0.440	13.94
40	0.193	2.69	0.340	8.32
50	0.145	1.52	0.255	4.68
60	0.115	0.94	0.180	2.33
70	0.100	0.72	0.130	1.22
80	0.089	0.56	0.115	0.95
90	0.070	0.35	0.120	1.04
100	0.058	0.24	0.125	1.13
110	0.074	0.39	0.125	1.13
120	0.084	0.50	0.125	1.13
130	0.085	0.53	0.110	0.87
140	0.078	0.43	0.090	0.58
150	0.077	0.42	0.085	0.52
160	0.091	0.59	0.115	0.95
170	0.107	0.82	0.165	1.96
180	0.125	1.12	0.205	3.03
190	0.142	1.46	0.230	3.81
200	0.162	1.88	0.250	4.50
210	0.186	2.48	0.270	5.25
220	0.217	3.39	0.310	6.92
230	0.260	4.86	0.380	10.40
240	0.321	7.40	0.480	16.59
250	0.407	11.95	0.600	25.92
260	0.524	19.79	0.715	36.81
270	0.658	31.19	0.815	47.82
280	0.791	45.02	0.900	58.32
290	0.901	58.46	0.960	66.36
300	0.977	68.68	0.995	71.28
310	1.010	73.47	1.000	72.00
320	0.976	68.63	0.975	68.45
330	0.902	58.55	0.935	62.94
340	0.796	45.58	0.875	55.13
350	0.674	32.69	0.810	47.24
<b>MAXIMUM FIELDS:</b>				
310	1.010	73.47		
310			1	72.00
<b>MINIMUM FIELDS:</b>				
100	0.058	0.24		
145			0.07	0.35

# ELEVATION PATTERN





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# TABULATION OF ELEVATION PLANE PATTERN

**STATION:** KUHI 106.5 MHz JAHD-6/1(6)DA 1.08 lambda spacing

<u>ELEVATION</u>	<u>RELATIVE</u>	<u>ELEVATION</u>	<u>RELATIVE</u>	<u>ELEVATION</u>	<u>RELATIVE</u>
<u>ANGLE</u>	<u>FIELD</u>	<u>ANGLE</u>	<u>FIELD</u>	<u>ANGLE</u>	<u>FIELD</u>
10	0.206	-25	0.153	-60	0.299
9	0.156	-26	0.120	-61	0.314
8	0.114	-27	0.078	-62	0.332
7	0.157	-28	0.031	-63	0.345
6	0.273	-29	0.018	-64	0.354
5	0.415	-30	0.064	-65	0.350
4	0.563	-31	0.103	-66	0.352
3	0.704	-32	0.131	-67	0.350
2	0.826	-33	0.150	-68	0.336
1	0.921	-34	0.156	-69	0.329
0	0.980	-35	0.148	-70	0.320
-1	1.000	-36	0.132	-71	0.300
-2	0.979	-37	0.108	-72	0.288
-3	0.919	-38	0.078	-73	0.266
-4	0.824	-39	0.052	-74	0.253
-5	0.702	-40	0.047	-75	0.240
-6	0.562	-41	0.068	-76	0.217
-7	0.414	-42	0.097	-77	0.204
-8	0.273	-43	0.121	-78	0.191
-9	0.157	-44	0.141	-79	0.170
-10	0.113	-45	0.154	-80	0.158
-11	0.153	-46	0.158	-81	0.146
-12	0.201	-47	0.153	-82	0.135
-13	0.231	-48	0.140	-83	0.125
-14	0.233	-49	0.121	-84	0.123
-15	0.211	-50	0.098	-85	0.113
-16	0.173	-51	0.075	-86	0.104
-17	0.121	-52	0.066	-87	0.095
-18	0.074	-53	0.079	-88	0.095
-19	0.062	-54	0.109	-89	0.086
-20	0.095	-55	0.144	-90	0.078
-21	0.133	-56	0.181		
-22	0.162	-57	0.214		
-23	0.175	-58	0.248		
-24	0.171	-59	0.273		