
FM DIRECTIONAL BROADCAST ANTENNA
PROOF-OF-PERFORMANCE

MODEL JMPC-6 RFR .5 DA

SERIAL NUMBER 17408

KDVS

Davis, CA



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



6340 Sky Creek Drive, Sacramento, California 95828
P.O. Box 292880, Sacramento, California 95829-2880

(916) 383-1177 FAX (916) 383-1182

TABLE OF CONTENTS

A.	Engineer's Statement	1,2
B.	Mechanical Drawings	3,4
C.	Composite Azimuth Pattern, Plot	5
D.	Composite Azimuth Pattern, Tabulation	6
E.	Azimuth Pattern, Horizontal & Vertical Polarizations, Plot	7
F.	Azimuth Pattern, Horizontal & Vertical Polarizations, Tabulation	8
G.	Elevation Plane Pattern, Plot	9
H.	Elevation Plane Pattern, Tabulation	10



6340 Sky Creek Drive, Sacramento, California 95828
P.O. Box 292880, Sacramento, California 95829-2880

(916) 383-1177 FAX (916) 383-1182

DATE: July 24, 2013

ANTENNA GAIN	<u>H-pol</u>	<u>V-pol</u>
relative	3.51	3.51
(dBd)	(5.45)	(5.45)

RMS OF THE
AZIMUTH PATTERNS:

FM ANTENNA FOR:

STATION: **KDVS**

LOCATION: **Davis, CA**

MODEL NUMBER: **JMPC-6 RFR .5 DA**

FREQUENCY & ERP: **90.3 MHz, 13.00 kW**

ANTENNA INPUT POWER: **3.705 kW**

ANTENNA BOOM HEADING: **320° T.**

Composite	H-pol	V-pol
0.781	0.715	0.756

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

Two bays of a standard CP FM antenna model were 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.



6340 Sky Creek Drive, Sacramento, California 95828
P.O. Box 292880, Sacramento, California 95829-2880

(916) 383-1177 FAX (916) 383-1182

Station: **KDVS**

Model: **JMPC-6 RFR .5 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

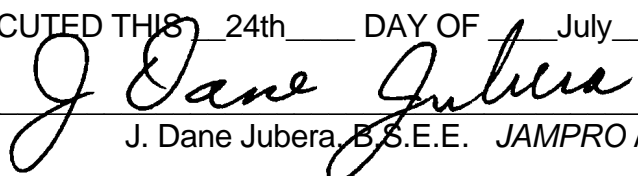
In the development of this pattern, *JAMPRO* antennas, Inc. observed known requirements of the FCC, as stated on the station construction permit.

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 24th DAY OF July, 2013

BY:


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

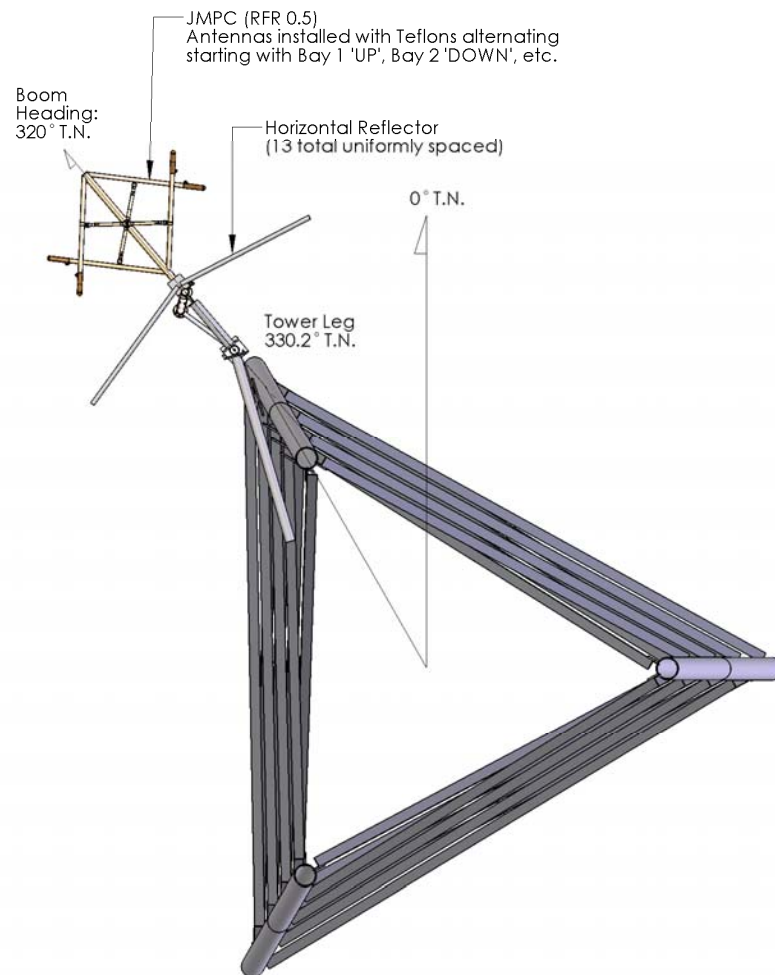


6340 Sky Creek Drive
Sacramento, California 95828 USA

Telephone (916) 383-1177
Fax (916) 383-1182

MECHANICAL DRAWINGS

TOP VIEW

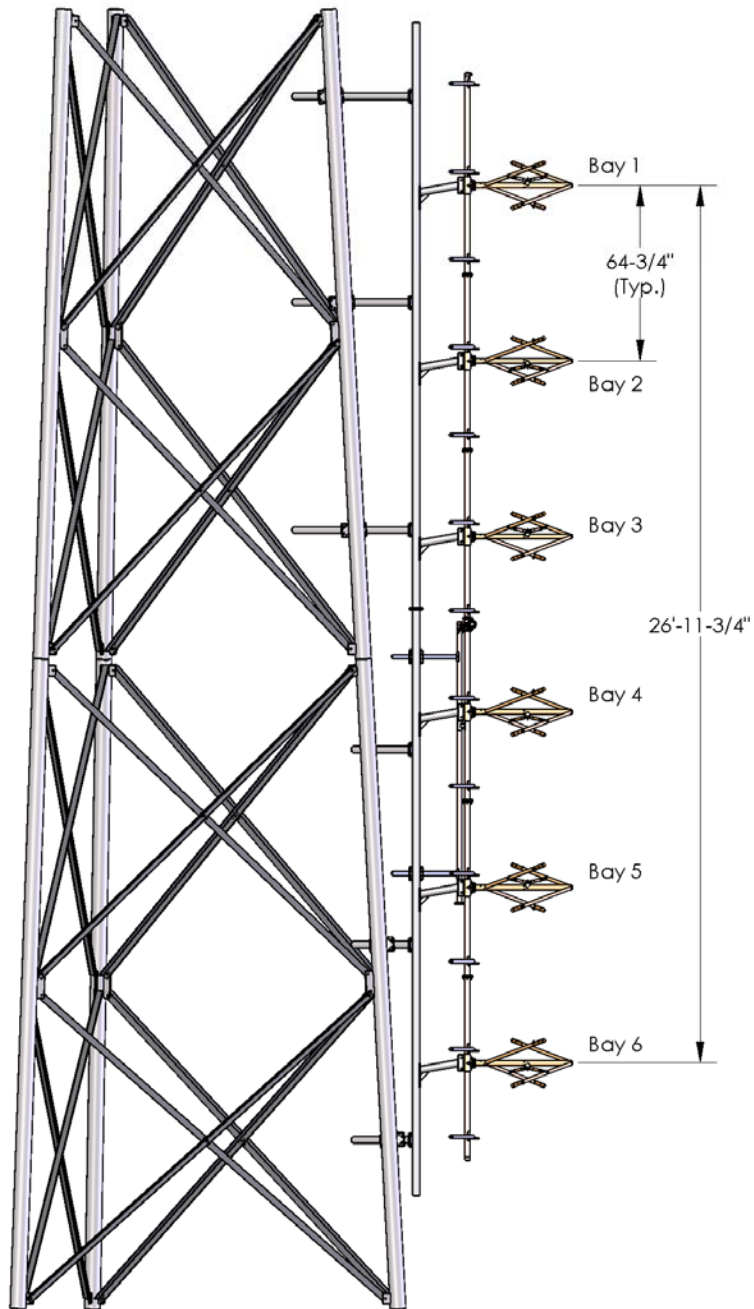


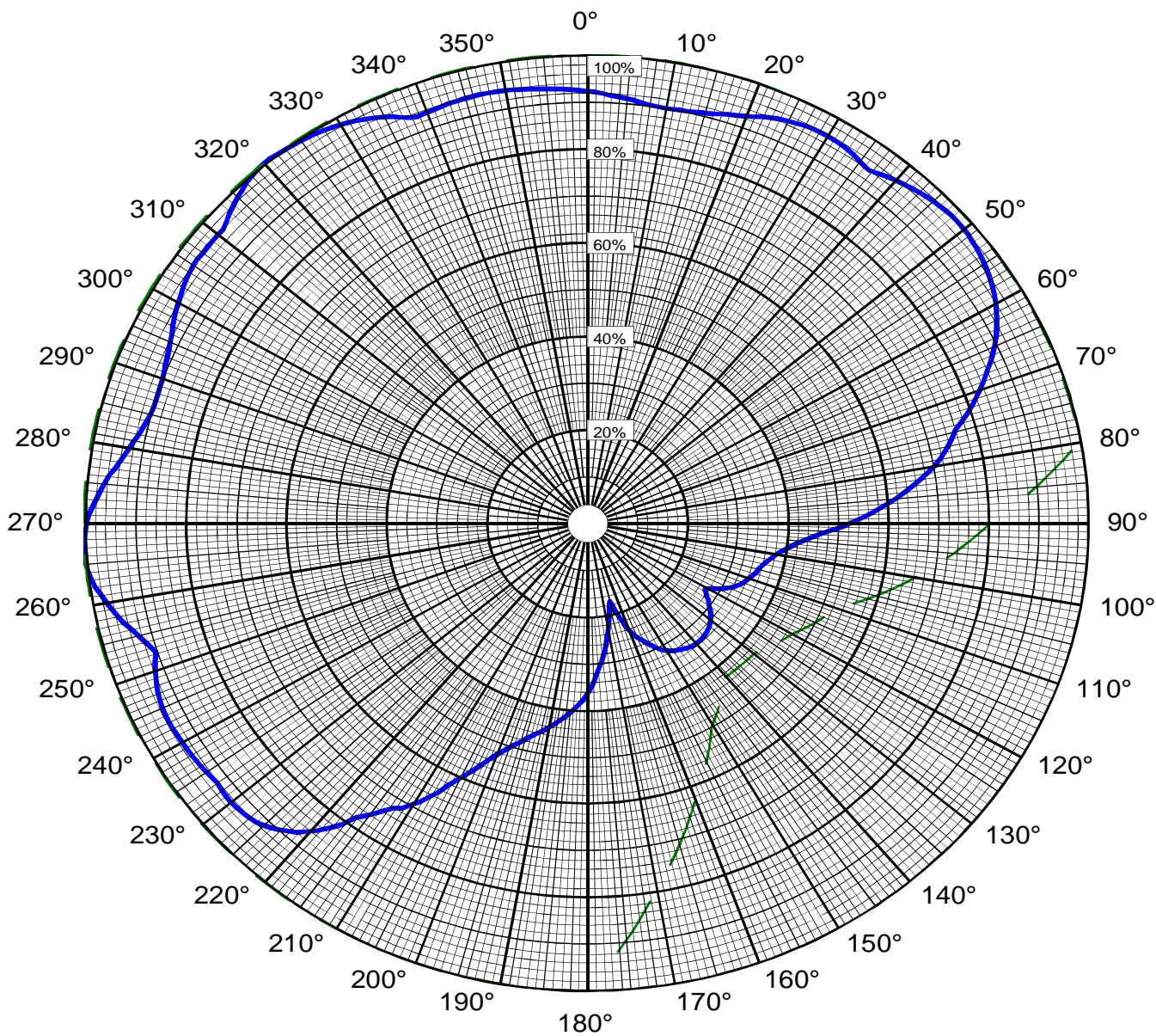


6340 Sky Creek Drive
Sacramento, California 95828 USA

Telephone (916) 383-1177
Fax (916) 383-1182

SIDE VIEW





Azimuth Pattern

Customer: KDVS	Date: July 22, 2013
Frequency: 90.3 MHz	Type Number: JMPC-6 RFR .5 DA
Notes:	
COMPOSITE PATTERN ENVELOPE (H & V)	



(916) 383-1177 Fax: (916) 383-1182
6340 Sky Creek Drive, Sacramento, CA 95828
P.O. Box 292880, Sacramento, CA 95829-2880



6340 Sky Creek Drive, Sacramento, California 95828
P.O. Box 292880, Sacramento, California 95829-2880

(916) 383-1177 FAX (916) 383-1182

KDVS

ERP = 13.00 kW

July 22, 2013

JMPC-6 RFR .5 DA

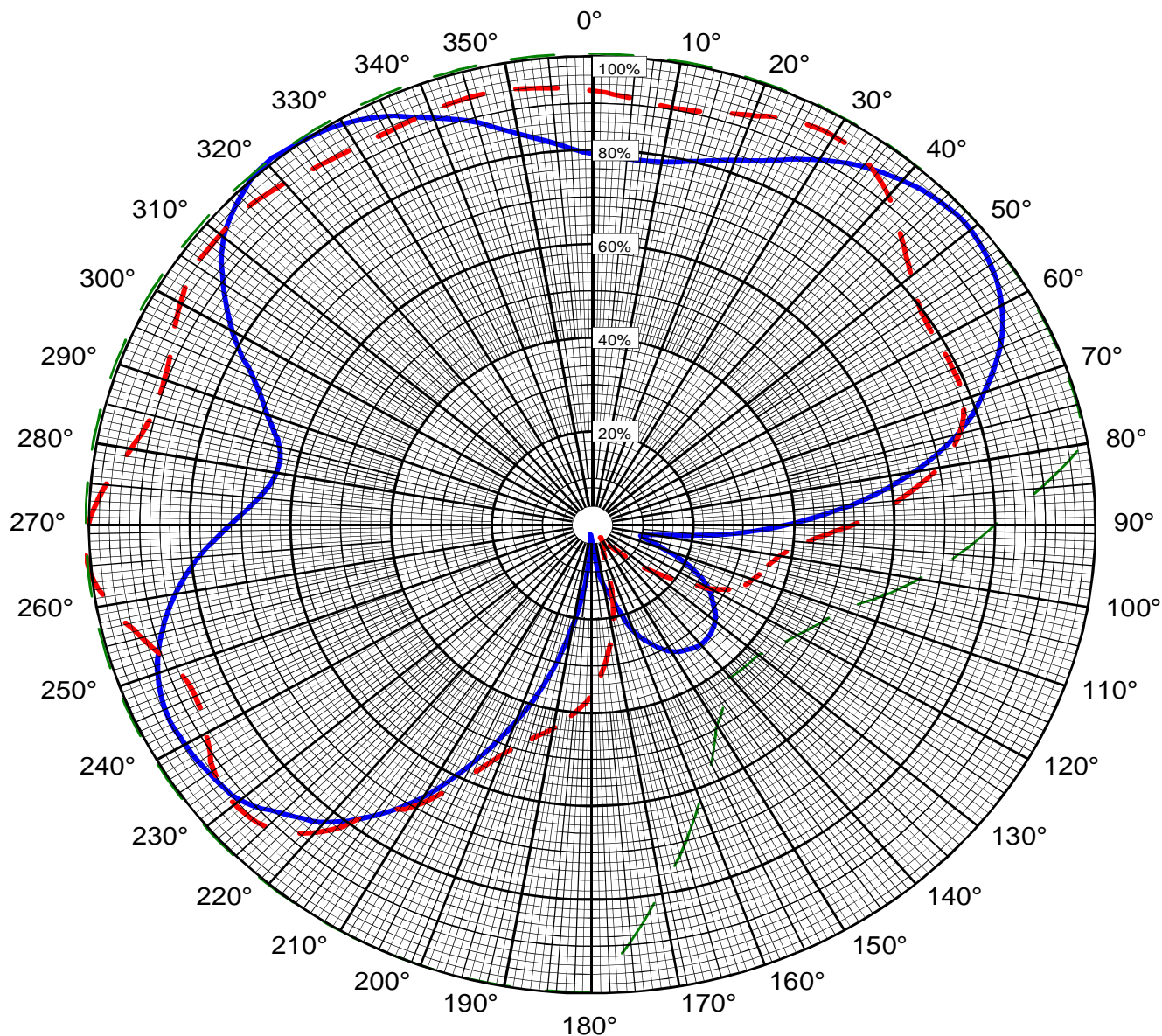
TABULATION OF RELATIVE FIELD

COMPOSITE MEASURED PATTERN (H & V)

<u>BEARING</u>	<u>FIELD</u>	<u>ERP</u> <u>(kW)</u>	<u>dBk</u>
0	0.923	11.06	10.44
10	0.900	10.53	10.22
20	0.925	11.12	10.46
30	0.956	11.89	10.75
40	0.956	11.89	10.75
50	0.981	12.52	10.98
60	0.944	11.58	10.64
70	0.838	9.12	9.60
80	0.708	6.51	8.13
90	0.531	3.67	5.65
100	0.388	1.95	2.90
110	0.348	1.57	1.96
120	0.281	1.03	0.12
130	0.325	1.37	1.38
140	0.340	1.50	1.77
150	0.315	1.29	1.11
160	0.238	0.73	-1.35
170	0.250	0.81	-0.90
180	0.373	1.80	2.56
190	0.448	2.60	4.16
200	0.531	3.67	5.65
210	0.698	6.32	8.01
220	0.863	9.67	9.85
230	0.925	11.12	10.46
240	0.931	11.27	10.52
250	0.913	10.82	10.34
260	0.971	12.26	10.89
270	0.994	12.84	11.08
280	0.923	11.06	10.44
290	0.898	10.47	10.20
300	0.938	11.43	10.58
310	0.956	11.89	10.75
320	1.000	13.00	11.14
330	0.981	12.52	10.98
340	0.931	11.27	10.52
350	0.938	11.43	10.58

Relative fields at other azimuths:

45	0.975	225	0.913
135	0.338	315	0.981



Azimuth Pattern

Customer: KDVS

Date: July 22, 2013

Frequency: 90.3 MHz

Type Number: JMPC-6 RFR .5 DA

Notes: MEASURED PATTERN IN FULL SCALE

— HPOL VPOL - - - LIMITS



(916) 383-1177 Fax: (916) 383-1182

6340 Sky Creek Drive, Sacramento, CA 95828
P.O. Box 292880, Sacramento, CA 95829-2880



6340 Sky Creek Drive, Sacramento, California 95828
P.O. Box 292880, Sacramento, California 95829-2880

(916) 383-1177 FAX (916) 383-1182

KDVS

ERP = 13.00 kW

July 22, 2013

JMPC-6 RFR .5 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	0.788	8.06	0.923	11.06
10	0.781	7.93	0.900	10.53
20	0.823	8.79	0.925	11.12
30	0.894	10.38	0.956	11.89
40	0.956	11.89	0.919	10.97
50	0.981	12.52	0.831	8.98
60	0.944	11.58	0.790	8.11
70	0.838	9.12	0.788	8.06
80	0.663	5.71	0.708	6.51
90	0.406	2.15	0.531	3.67
100	0.150	0.29	0.388	1.95
110	0.150	0.29	0.348	1.57
120	0.270	0.95	0.281	1.03
130	0.325	1.37	0.156	0.32
140	0.340	1.50	0.063	0.05
150	0.315	1.29	0.063	0.05
160	0.238	0.73	0.100	0.13
170	0.113	0.16	0.250	0.81
180	0.075	0.07	0.373	1.80
190	0.250	0.81	0.448	2.60
200	0.469	2.86	0.531	3.67
210	0.681	6.03	0.698	6.32
220	0.831	8.98	0.863	9.67
230	0.913	10.82	0.925	11.12
240	0.931	11.27	0.881	10.10
250	0.913	10.82	0.880	10.07
260	0.831	8.98	0.971	12.26
270	0.710	6.55	0.994	12.84
280	0.630	5.16	0.923	11.06
290	0.681	6.03	0.898	10.47
300	0.819	8.71	0.938	11.43
310	0.948	11.67	0.956	11.89
320	1.000	13.00	0.944	11.58
330	0.981	12.52	0.925	11.12
340	0.919	10.97	0.931	11.27
350	0.844	9.25	0.938	11.43
MAXIMUM FIELDS:				
320	1.000	13.00		
265			1.000	13.00
MINIMUM FIELDS:				
175	0.025	0.01		
145			0.038	0.02

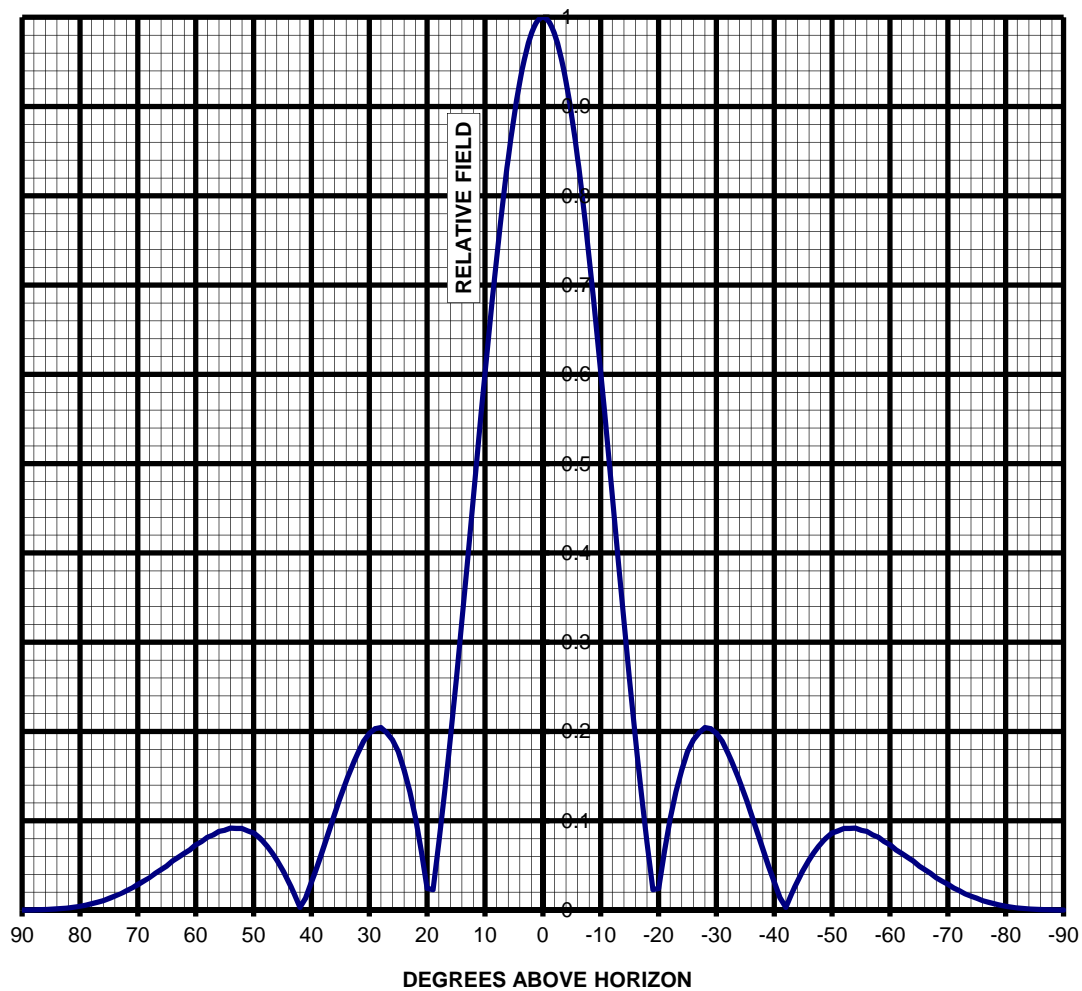


6340 Sky Creek Drive, Sacramento, California 95828
P.O. Box 292880, Sacramento, California 95829-2880

(916) 383-1177 FAX (916) 383-1182

PLOT OF ELEVATION PLANE PATTERN

STATION: KDVS 90.3 MHz JMPC-6 .5 RFR DA .50 lambda spacing





6340 Sky Creek Drive, Sacramento, California 95828
P.O. Box 292880, Sacramento, California 95829-2880

(916) 383-1177 FAX (916) 383-1182

TABULATION OF ELEVATION PLANE PATTERN

STATION: KDVS 90.3 MHz JMPC-6 .5 RFR DA .50 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	0.602	-25	0.177	-60	0.073
9	0.668	-26	0.191	-61	0.068
8	0.731	-27	0.199	-62	0.064
7	0.789	-28	0.204	-63	0.059
6	0.842	-29	0.203	-64	0.055
5	0.888	-30	0.198	-65	0.049
4	0.928	-31	0.189	-66	0.045
3	0.959	-32	0.175	-67	0.041
2	0.982	-33	0.161	-68	0.036
1	0.995	-34	0.145	-69	0.032
0	1.000	-35	0.126	-70	0.029
-1	0.995	-36	0.108	-71	0.025
-2	0.982	-37	0.089	-72	0.022
-3	0.959	-38	0.068	-73	0.018
-4	0.928	-39	0.050	-74	0.016
-5	0.888	-40	0.031	-75	0.013
-6	0.842	-41	0.014	-76	0.011
-7	0.789	-42	0.003	-77	0.009
-8	0.731	-43	0.018	-78	0.007
-9	0.668	-44	0.032	-79	0.005
-10	0.602	-45	0.045	-80	0.004
-11	0.533	-46	0.056	-81	0.003
-12	0.462	-47	0.066	-82	0.002
-13	0.394	-48	0.074	-83	0.002
-14	0.324	-49	0.081	-84	0.001
-15	0.256	-50	0.086	-85	0.001
-16	0.193	-51	0.089	-86	0.001
-17	0.132	-52	0.091	-87	0.000
-18	0.076	-53	0.091	-88	0.000
-19	0.023	-54	0.092	-89	0.000
-20	0.024	-55	0.089	-90	0.000
-21	0.066	-56	0.088		
-22	0.102	-57	0.084		
-23	0.133	-58	0.082		
-24	0.157	-59	0.077		