

Engineering Exhibit
In Support of
Application
By
KZCT, Vallejo
Ozcat Entertainment

The following engineering information is being provided to support the station application of KZCT, Vallejo following installation in compliance with the granted Construction Permit, Permit File Number: BNPED-20071022AEJ.

I am a qualified broadcast engineer holding FCC license PG-12-7920. In addition, I am a NARTE Certified Engineer, Class I, RF Radiating Master Endorsement, Certificate Number E1-01086.

I participated in and supervised the installation of KZCT's transmitting antenna, the Propagation Systems, Inc. PSIFMLV-1-DA following the instructions provided by the antenna manufacturer. A copy of those instructions and pattern certification is attached to this report.

The antenna was mounted to a wood pole at 4.0 meters AGL (13' 2") and aimed at 310 degrees True as specified in the instructions.

The antenna orientation was measured by Mr. Ty Hawkins, LS 7973 and a copy of his certification is included in this report.

KZCT's Transmitter Power Output was calculated to be 4.0 Watts based on the antenna manufacturer's stated gain of 1.9 and the loss of 55 feet of Andrew LDF4-50A coaxial cable. A copy of that calculation is included in this report. The TPO was measured using a calibrated power attenuator and spectrum analyzer and set to 4.0 Watts.

The predicted contour of KZCT was generated using the PSIFMLV-1-DA antenna pattern data provided by Propagation Systems, Inc. and a copy is included in this report.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'William F. Ruck', with a long horizontal flourish extending to the right.

William F. Ruck, NCE
PG-12-7920



Propagation Systems, Inc.

Quality Broadcast Antenna Systems

**Directional FM Antenna
KZCT
Ozcat Entertainment
Vallejo, CA**

A custom designed model PSIFMLV-1-DA, a vertical polarized dipole antenna, was used in conjunction with the customer's wooden support mast to create the necessary directional radiation pattern. The final antenna consists of one radiating element with custom support mast and two parasitic elements. The support mast attaches to the customer's wooden utility pole with integral mounting brackets.

Pattern testing was performed using a 1/3 scale model element and tower. The vertically polarized azimuth plane measurements were taken on a ground reflection test range. This type of test range utilizes the reflected signal and direct signal from the source antenna to form an interference pattern on the antenna under test. The antenna and mounting structure under test was mounted to a turntable that allowed the structure to be rotated 360° in the azimuth plane. The source antenna was located approximately 75 ft. from the antenna under test. The source height above ground was adjusted to peak the first lobe of the interference pattern at the antenna under test.

The test antenna was mounted in the center of rotation of the turntable. The antenna and mounting structure were rotated clockwise while data was recorded in a counter-clockwise direction. All feed cables to the antenna were secured and grounded during pattern measurements. A Hewlett Packard 8753A-network analyzer operating at 268.5 MHz was used as both the source and receiver. The level of the received signal was compared with a standard dipole to establish the directivity of the final pattern. The final pattern measured does not exceed the envelope pattern and is 89.5% of the envelope RMS. The principal minima achieved from 120-130 degrees true is .000229 kW and the maximum .007 kW ERP is achieved from 226-236 degrees true.

The antenna is to be mounted in accordance with the supplied instructions and drawings. The antenna center of radiation approved in the construction permit is 4m above ground level. The antenna is to be positioned 310 degrees true. It is recommended that a broadcast engineer is present to supervise the installation of the antenna and that he or she certifies the antenna has been installed according to the enclosed instructions.

General Specifications

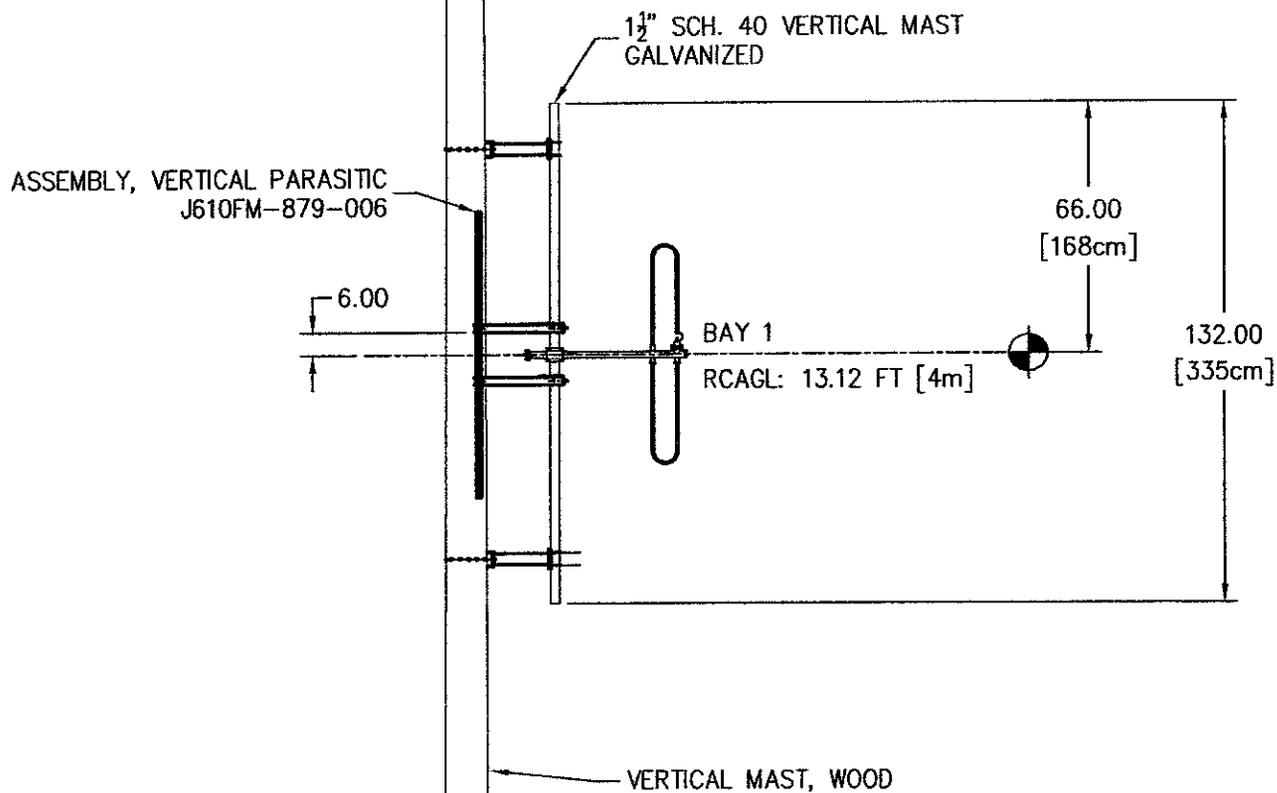
Antenna Model	PSIFMLV-1-DA
Type	1-bay directional FM antenna
Polarization	Vertical
Frequency	89.5 MHz
Gain (V-pol)	1.90 (2.79 dB)
RMS (V-pol)	.705
RMS Envelope	.788
ERP (V-pol)	.007 kW (-21.55 dBk)
Input	Type "N" female
Power rating	750 Watts
Input power	.00368 kW
Length	11.0 ft.
Weight	120.4 lbs.
Wind Area	7.42 sq-ft

Prepared By



8/19/2010

Douglas A. Ross
Propagation Systems Inc.



SPECIFICATIONS	
SPACING:	1.0λ
LENGTH:	11.0 FT [3.35m]
RATING:	750 W
GAIN:	1.90 (2.79 dB)
WEIGHT:	120.4 LB [54.7 Kg]
WINDAREA:	7.42 Ft ²
TIA-222-F (NO ICE)	

REV.	MADE BY	CHECKED BY	DATE	CHANGE

PROPAGATION SYSTEMS, INC.

Ebensburg, Pennsylvania USA 814-472-5540

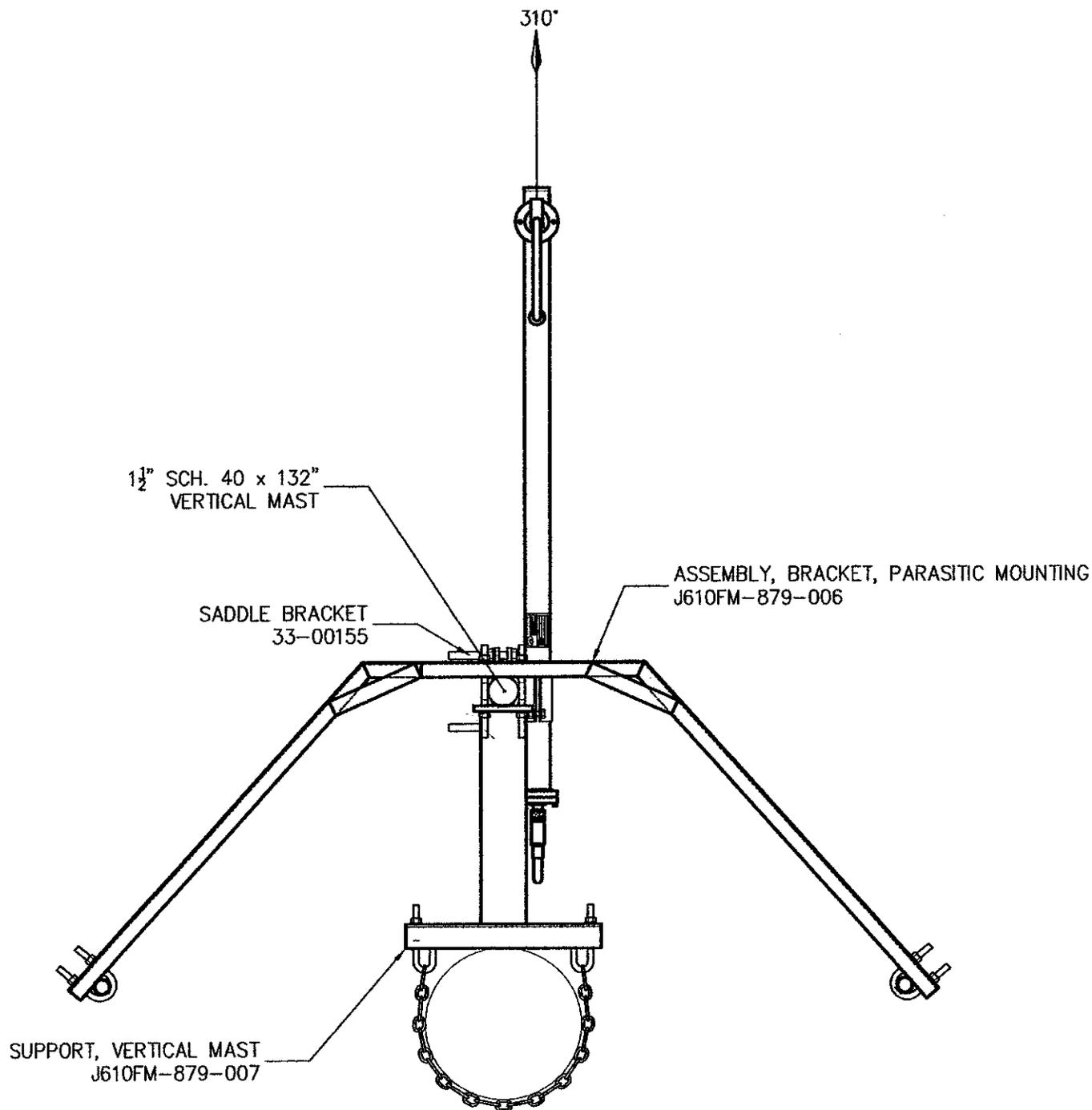
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SIZE

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ANTENNA ELEVATIONS AND SPECIFICATIONS

MODEL:	PSIFMLV-1-DA	DRAWN BY:	D.G. Kellar	DATE:	7/29/10
CHANNEL/ FREQUENCY:	89.5 MHz	APPROVED BY:		DATE:	
SCALE:	1:50	DRAWING NO.:	J610FM-879-001	REV.	



PROPAGATION SYSTEMS, INC.

Ebensburg, Pennsylvania USA 814-472-5540

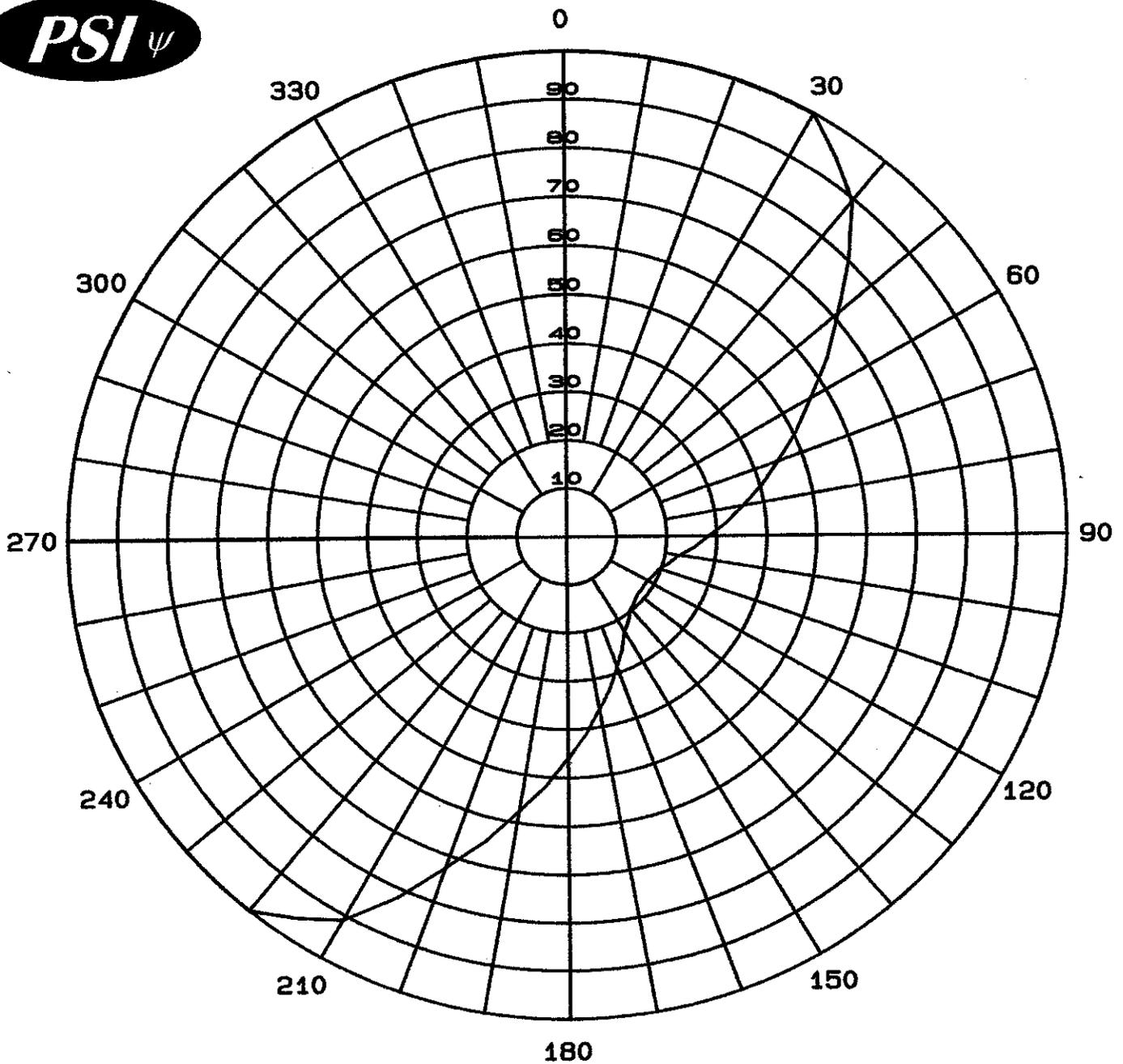
ANTENNA PLAN VIEW AND ORIENTATION

REV.	MADE BY CHECKED BY	DATE	CHANGE

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MODEL:	PSIFMLV-1-DA	DRAWN BY:	D.G. Kellar	DATE:	3/31/10
CHANNEL/ FREQUENCY:	89.5 MHz	APPROVED BY:		DATE:	
SCALE:	1:20	DRAWING NO.:	J610FM-879-002	REV.	

A



Maximum Envelope
Azimuth Plane Pattern
Antenna: PSIFMLV-1-DA
Type: 1-Bay Directional FM Antenna
ERP: .007 kW (-21.55 dBk)
Polarization: Vertical
RMS Envelope: .788
KZCT Vallejo, CA

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931

Envelope Pattern

Antenna: PSIFMLV-1-DA

Station: KZCT

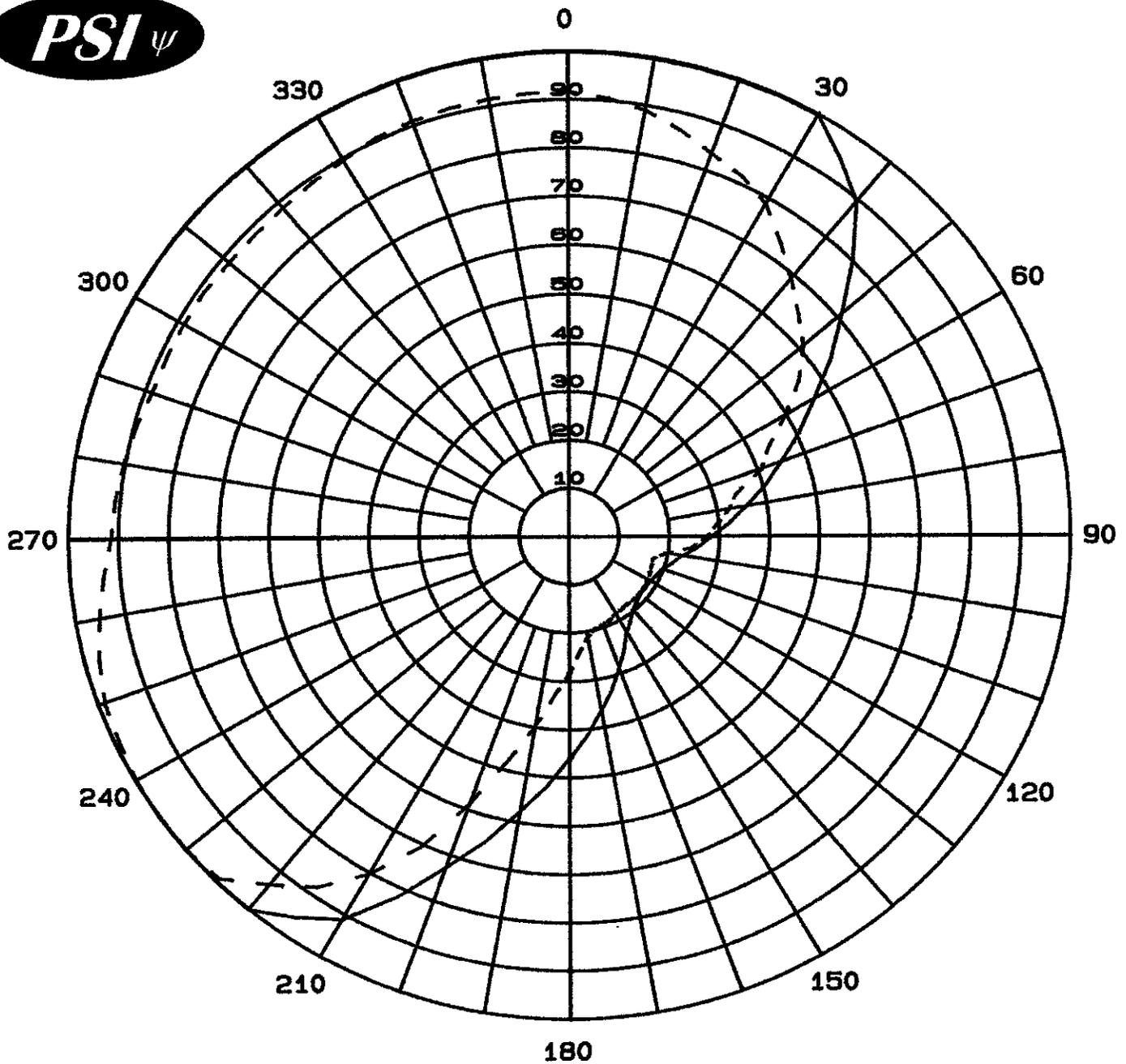
Frequency: 89.5 MHz

Location: Vallejo, CA

Maximum ERP: .007 kW (-21.55 dBk)

Vertical Component

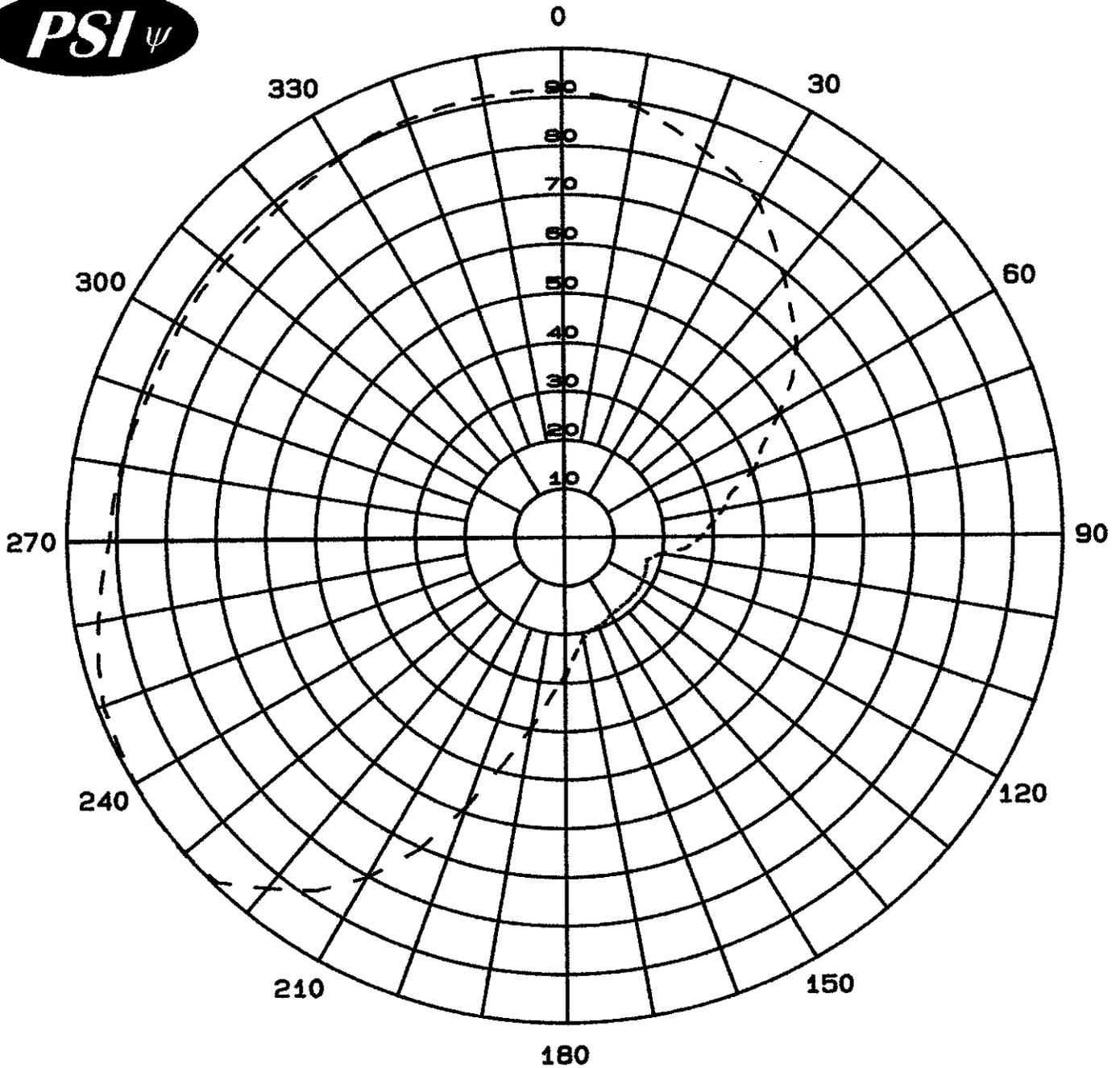
Angle	Relative Field	ERP kW	ERP dBk
0	1.000	0.0070	-21.55
10	1.000	0.0070	-21.55
20	1.000	0.0070	-21.55
30	1.000	0.0070	-21.55
40	0.896	0.0056	-22.50
50	0.712	0.0035	-24.50
60	0.565	0.0022	-26.51
70	0.449	0.0014	-28.50
80	0.357	0.0009	-30.50
90	0.283	0.0006	-32.51
100	0.226	0.0004	-34.47
110	0.196	0.0003	-35.70
120	0.184	0.0002	-36.25
130	0.184	0.0002	-36.25
140	0.197	0.0003	-35.66
150	0.228	0.0004	-34.39
160	0.287	0.0006	-32.39
170	0.362	0.0009	-30.37
180	0.456	0.0015	-28.37
190	0.573	0.0023	-26.39
200	0.722	0.0036	-24.38
210	0.909	0.0058	-22.38
220	1.000	0.0070	-21.55
230	1.000	0.0070	-21.55
240	1.000	0.0070	-21.55
250	1.000	0.0070	-21.55
260	1.000	0.0070	-21.55
270	1.000	0.0070	-21.55
280	1.000	0.0070	-21.55
290	1.000	0.0070	-21.55
300	1.000	0.0070	-21.55
310	1.000	0.0070	-21.55
320	1.000	0.0070	-21.55
330	1.000	0.0070	-21.55
340	0.891	0.0056	-22.55
350	0.708	0.0035	-24.55



Maximum Envelope and
Measured Pattern
Antenna: PSIFMLV-1-DA
Type: 1-Bay Directional FM Antenna
ERP: .007 kW (-21.55 dBk)
RMS Envelope: .788
RMS Measured: .705
Frequency: 89.5 MHz

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931

KZCT Vallejo, CA



Measured Relative Field
Azimuth Plane Pattern
Antenna: PSIFMLV-1-DA
Type: 1-Bay Directional FM Antenna
Gain V-pol (dash): 1.90 (2.79 dB)
RMA Measured: 705
Frequency: 89.5 MHz
KZCT Vallejo, CA

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931

Measured Relative Field Tabulation

Antenna: PSIFMLV-1-DA

Station: KZCT

Frequency: 89.5 MHz

Location: Vallejo, CA

Vertical Component Measured Relative Field

Angle	Relative Field	Power Gain	Gain dB
0	0.919	1.60	2.05
10	0.892	1.51	1.79
20	0.839	1.34	1.26
30	0.788	1.18	0.72
40	0.691	0.91	-0.42
50	0.613	0.71	-1.46
60	0.497	0.47	-3.29
70	0.408	0.32	-5.00
80	0.324	0.20	-7.00
90	0.274	0.14	-8.46
100	0.193	0.07	-11.50
110	0.175	0.06	-12.35
120	0.180	0.06	-12.11
130	0.181	0.06	-12.06
140	0.180	0.06	-12.11
150	0.182	0.06	-12.01
160	0.192	0.07	-11.55
170	0.208	0.08	-10.85
180	0.278	0.15	-8.33
190	0.394	0.29	-5.30
200	0.582	0.64	-1.91
210	0.799	1.21	0.84
220	0.932	1.65	2.18
230	1.000	1.90	2.79
240	0.998	1.89	2.77
250	0.987	1.85	2.67
260	0.953	1.73	2.37
270	0.915	1.59	2.02
280	0.903	1.55	1.90
290	0.887	1.49	1.75
300	0.888	1.50	1.76
310	0.886	1.49	1.74
320	0.887	1.49	1.75
330	0.898	1.53	1.85
340	0.911	1.58	1.98
350	0.917	1.60	2.03

Maximum Field (V-pol)

Field 1.00

Gain 1.90 (2.79 dB)

Azimuth Bearing 226-236 degrees

Minimum Field (V-pol)

Field 0.175

Gain .06 (-12.35 dB)

Azimuth Bearing 110 degrees

ERP Tabulation

Antenna: PSIFMLV-1-DA

Station: KZCT

Frequency: 89.5 MHz

Location: Vallejo, CA

Maximum ERP: .007 kW (-21.55 dBk)

Vertical Component

Angle	Relative Field	ERP kW	ERP dBk
0	0.919	0.0059	-22.28
10	0.892	0.0056	-22.54
20	0.839	0.0049	-23.07
30	0.788	0.0043	-23.62
40	0.691	0.0033	-24.76
50	0.613	0.0026	-25.80
60	0.497	0.0017	-27.62
70	0.408	0.0012	-29.34
80	0.324	0.0007	-31.34
90	0.274	0.0005	-32.79
100	0.193	0.0003	-35.84
110	0.175	0.0002	-36.69
120	0.180	0.0002	-36.44
130	0.181	0.0002	-36.40
140	0.180	0.0002	-36.44
150	0.182	0.0002	-36.35
160	0.192	0.0003	-35.88
170	0.208	0.0003	-35.19
180	0.278	0.0005	-32.67
190	0.394	0.0011	-29.64
200	0.582	0.0024	-26.25
210	0.799	0.0045	-23.50
220	0.932	0.0061	-22.16
230	1.000	0.0070	-21.55
240	0.998	0.0070	-21.57
250	0.987	0.0068	-21.66
260	0.953	0.0064	-21.97
270	0.915	0.0059	-22.32
280	0.903	0.0057	-22.44
290	0.887	0.0055	-22.59
300	0.888	0.0055	-22.58
310	0.886	0.0055	-22.60
320	0.887	0.0055	-22.59
330	0.898	0.0056	-22.48
340	0.911	0.0058	-22.36
350	0.917	0.0059	-22.30

Maximum ERP (V-pol)

Field 1.00

ERP .007 kW (-21.55 dBk)

Azimuth Bearing 226-236 degrees

Minimum ERP

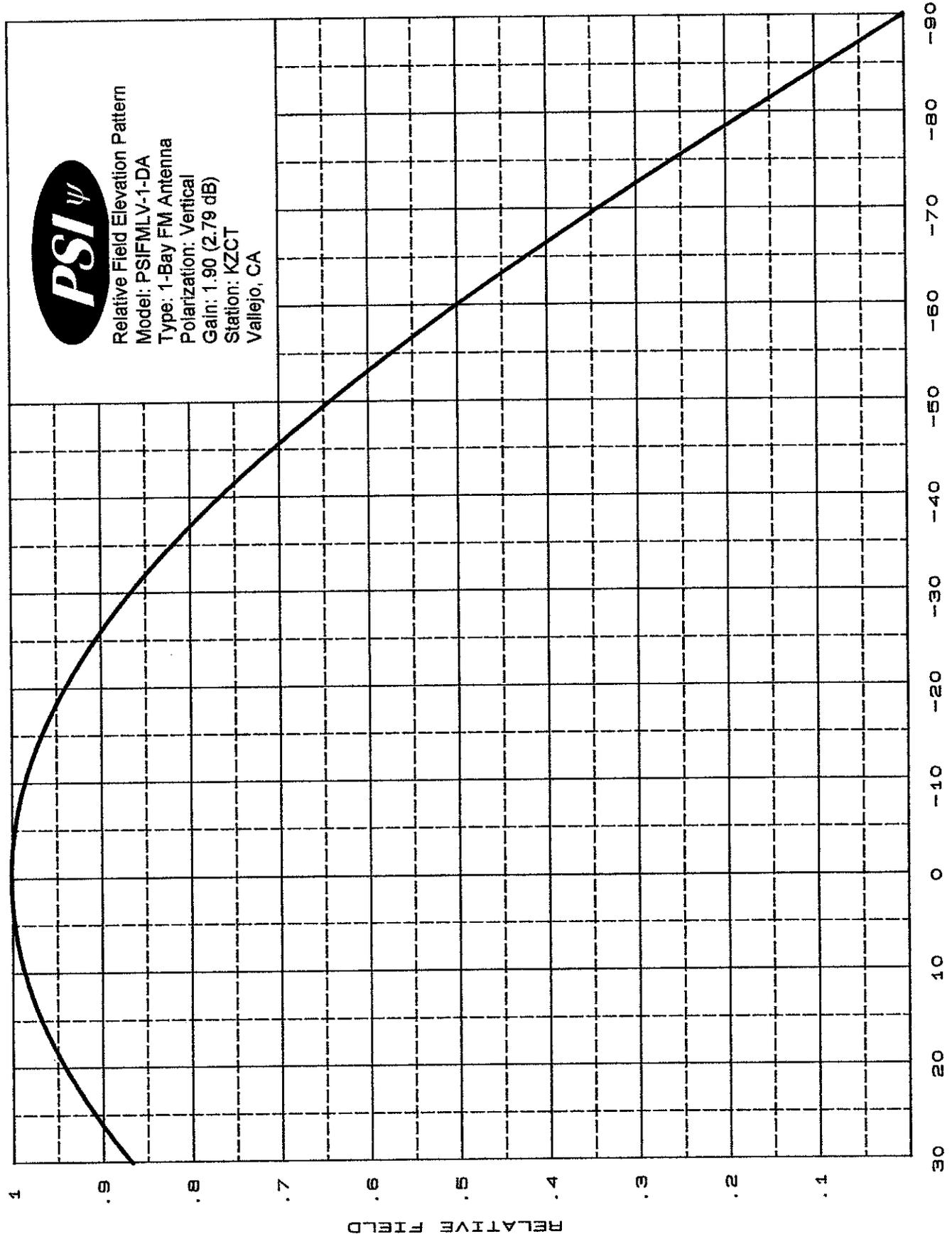
Field 0.175

ERP .0002 kW (-36.69 dBk)

Azimuth Bearing 110 degrees



Relative Field Elevation Pattern
Model: PSIFMLV-1-DA
Type: 1-Bay FM Antenna
Polarization: Vertical
Gain: 1.90 (2.79 dB)
Station: KZCT
Vallejo, CA



DEGREES BELOW HORIZONTAL



Hawkins Land Surveying

LS 7973

KZCT 89.5 FM
Attn: David Martin
1104 Georgia St.
Vallejo CA 94590

September 2, 2010

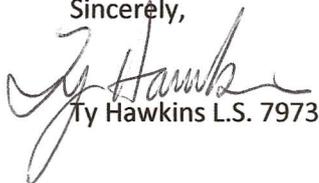
RE: KZCT FM Antenna Azimuth Certification – Permit File Number: BNPED-20071022AEJ.

David,

This letter will serve as certification that the directional FM antenna has been oriented to an azimuth of 310 degrees true, as called for in the specifications prepared by Propagation Systems Inc.

If you have any questions regarding this survey, please give me a call.

Sincerely,


Ty Hawkins L.S. 7973



KZCT Power Calculation

Licensed

	Watts	dBkW
ERP	7.0 W	-21.5 dBkW
PSIFMLV-1-DA Antenna Gain	1.9	2.79 dB
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
Antenna Input Power	3.684210526 W	-24.34 dBkW
Antenna Input Power Rounded	3.7 W	-24.3
LDF4-50A Coax Loss per 100' at 88 MHz	0.641 dB	
Actual Coax Length Feet	55	
Coax Loss	0.9220	0.353 dB
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
Transmitter Power Output	3.995760405 W	-23.984 dBkW
Transmitter Power Output, Rounded	4.0 W	-24.0 dBkW
Check vs Watts		-24.0 dBkW



EDX® SignalPro®: KZCT Vallejo 3

Interference contour study

Propagation models:
 service contour : FCC-EDX 50.0% time
 = 60.0 dBu/m service contour

Sites
 Site: KZCT_TX_Sulphur_Springs_Mtn
 N38°09'06.00" W122°11'28.89" 335.0 m
 KZCT_PSI_Tx_Ht_AGL: 4.0 m Total ERP: 7.00 W
 Model: 1 Use file-vertical/310.0° 89.5000 MHz

Notes
 Using as-built directional pattern for PSFMLV-1-DA

KILOMETERS
 -1 0 2

OZCAT ENTERTAINMENT
 KZCT
 Fri Sep 10 13:32:38 2010