

ENGINEERING STATEMENT  
RE DTV BROADCAST ENGINEERING DATA  
ON BEHALF OF  
KXLF COMMUNICATIONS, INC.  
KXLF-DT, BUTTE, MONTANA  
CHANNEL 5 10.7 KW ERP 576 METERS HAAT

APRIL 2004

COHEN, DIPPELL AND EVERIST, P.C.  
CONSULTING ENGINEERS  
RADIO AND TELEVISION  
WASHINGTON, D.C.

COHEN, DIPPELL AND EVERIST, P. C.

City of Washington            )  
  ) ss  
District of Columbia         )

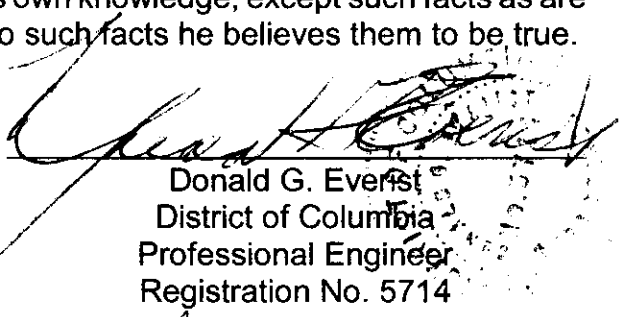
Donald G. Everist, being duly sworn upon his oath, deposes and states that:

He is a graduate electrical engineer, a Registered Professional Engineer in the District of Columbia, and is President, Secretary and Treasurer of Cohen, Dippell and Everist, P.C., Consulting Engineers, Radio - Television, with offices at 1300 L Street, N.W., Suite 1100, Washington, D.C. 20005;

That his qualifications are a matter of record in the Federal Communications Commission;

That the attached engineering report was prepared by him or under his supervision and direction and

That the facts stated herein are true of his own knowledge, except such facts as are stated to be on information and belief, and as to such facts he believes them to be true.

  
Donald G. Everist  
District of Columbia  
Professional Engineer  
Registration No. 5714

Subscribed and sworn to before me this 29<sup>th</sup> day of April, 2004.

  
Notary Public

My Commission Expires: 2/28/2008

COHEN, DIPPELL AND EVERIST, P. C.

City of Washington            )  
  ) ss  
District of Columbia         )

Daryl Mastracci, being duly sworn upon his oath, deposes and states that:


He is a graduate electrical engineer of the Pennsylvania State University, and is a staff engineer of Cohen, Dippell and Everist, P.C., Consulting Engineers, Radio - Television, with offices at 1300 L Street, N.W., Suite 1100, Washington, D.C. 20005;

That the attached engineering report was prepared by him or under his supervision and direction and

That the facts stated herein are true of his own knowledge, except such facts as are stated to be on information and belief, and as to such facts he believes them to be true.

  
Daryl Mastracci  
District of Columbia

Subscribed and sworn to before me this 29<sup>th</sup> day of April, 2004.

  
Notary Public

My Commission Expires: 4/28/2008



This engineering statement has been prepared on behalf of KXLF-TV Communications, Inc., licensee of KXLF-TV, Butte, Montana. The purpose of this engineering statement is to accompany its application to construct non-directional digital television ("DTV") facilities; specifically to modify the construction permit BMPCDT-20031204AID.

KXLF-TV is licensed to operate on NTSC television Channel 4 with a maximum visual effective radiated power ("ERP") of 100 kW (horizontal polarization) and height above average terrain ("HAAT") of 576 meters (1889.8 feet). KXLF-DT had petitioned and was granted DTV Channel 5 with facilities of 10.7 kW ERP (maximum directional) and HAAT of 588 meters. The engineering statement in response to the Report and Order in MB Docket 03-118 requested facilities for Channel 5 with an ERP of 5.45 kW Max DA and a HAAT of 588 meters. KXLF-DT now proposes to construct DTV facilities for Channel 5 of 10.7 kW (non-directional, horizontal polarization) with an HAAT of 576 meters at the existing site.

The proposed antenna will be diplexed into the existing Dielectric, Type TF-6MT-DC. Exhibit 1 shows a tower sketch and the antenna arrangement on the tower.

According to the FCC engineering database as of April 8, 2004, there are two AM stations located within 3.2 km of the existing KXLF-TV tower site and there are four FM and three TV stations within 100 meters. The tower currently supports the licensed operation of KXLF-TV, Channel 4, Butte, Montana.

The KXLF-DT antenna will be diplexed into the mounted NTSC antenna system (see Exhibit E-1). The existing transmitter site is located at XL Heights 3.23 miles east of Butte.

The tower registration number is 1001059.

The geographic coordinates of the site are:

North Latitude: 46° 00' 27"

West Longitude: 112° 26' 30"

NAD-27

Equipment Data

Antenna: Dielectric, Type TF-6MT-DC, horizontally polarized antenna with 0.5° electrical beam tilt. The vertical plane pattern and other exhibits required by Section 73.625(c) are herein included as Exhibits E-2i thru E-2n.

Transmission Line: 48.8 meters (160 feet) of Dielectric, Type EIA/DCA, 3-1/8", 50 ohm or equivalent

Power Data

Transmitter output	2.2 kW	3.39 dBk
Transmission line efficiency/loss	96.9%	0.14 dB
Antenna input	2.1 kW	3.26 dBk
Antenna gain, peak	6.0	7.78 dB
Antenna gain, horizontal plane	5.9	7.71 dB
Max. ERP, horizontal plane	10.7 kW	10.3 dBk

Elevation Data

Vertical dimension of Channel 5 top-mounted antenna	25.2 meters 82.7 feet
Overall height above ground of the existing antenna structure (including beacon)	62.0 meters 203.4 feet

Center of radiation of Channel 5 antenna above ground	48.3 meters 158.5 feet
Elevation of site above mean sea level	2516.0 meters 8254.6 feet
Center of radiation of Channel 5 antenna above mean sea level	2563.2 meters 8409.5 feet
Overall height above mean sea level of proposed tower (including beacon)	2578.0 meters 8458.0 feet
Antenna height above average terrain	576 meters <sup>1</sup>

Note: Slight height differences result due to conversion to metric.

### Coverage

The average elevation data for 3.2 to 16.1 km along each radial have been extracted from the license files of KXLF-TV. The F(50,90) DTV coverage contour has been computed from reference to the propagation data for Channels 2-6, as published by the FCC in Figure 9 and Figure 9a, Section 73.699 of the FCC Rules and Regulations.

Utilizing the formula in Section 73.625(b)(2) of the Rules for the effective heights, it is found that the depression angle,  $A_p$ , varies from 0.380 to 0.821 degrees. Since the relative vertical field is greater than 90% of the maximum at these depression angles, the maximum power was used in determining the distance to the DTV contour.

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<sup>1</sup> Antenna height above average terrain as calculated by Longley-Rice study is 587.4 meters.

Table 1 includes the distances to the 35 and 28 dBu F(50,90) coverage contours, the antenna height above average terrain, and the average elevation for the eight radials. Exhibit E-3 shows the contours and the city of license within these contours.

### Interference Analysis

A study of predicted interference caused by the proposed KXLF-DT service has been performed using a version of the Longley-Rice program as described in OET Bulletin No. 69 (July 2, 1997) and the Public Notice, "Additional Application Processing Guidelines for Digital Television (DTV)" (August 1998). The FCC's FORTRAN-77 code was modified only to the extent necessary (primarily input/output handling) for the program to run on a Windows98/Intel platform. Comparison of service/interference areas and populations indicates that this model closely matches the FCC's evaluation program. Best efforts have been made to use data and calculations identical to the FCC's program. Any slight differences are attributable to compiler, operating system and/or processor characteristics. The effect of any variance in calculated population values versus the FCC's program is minimized when differencing a given model's results, e.g., new interference equals total interference less baseline interference. The effect is further reduced for ratios of calculated population values, e.g., incremental population affected as a percent of total population #served. The model employs the Longley-Rice propagation methodology and evaluates in grid cells of approximately 4 km<sup>2</sup> using 3-second terrain data sampled approximately every 0.1 km at one degree azimuth intervals with 1990 census centroids. All studies are based upon data in the April 8, 2004, update of the FCC's engineering data base.

Table 2 lists the potential interferees which are to be considered according to the processing guidelines cited above. The last column of Table 2 shows the predicted new interference caused by the proposed KXLF-DT operation. None of the affected stations suffer more than 2% new interference from KXLF-DT.

#### Other Licensed and Broadcast Facilities

No adverse technical effect is anticipated by the proposed DTV operation to any other FCC licensed facility. If required, the permittee will install filters or take other measures as necessary to resolve the problem.

#### FCC Rule, Section 1.1307

The proposed 10.7 kW non-directional operation will utilize the Dielectric, Type TF-6MT-DC antenna (or equivalent) described above with a center of radiation above ground of 48.3 meters. The proposed diplexed antenna will be top-mounted on a steel lattice tower with an overall height of 62 meters above ground.

As previously indicated, there are two AM stations located within 3.2 km of the proposed tower site. Since there will be no change in height, the electrical characteristic at the AM frequencies will be unchanged. According to the FCC database, there are also four FM and three TV stations located within 100 meters of the KXLF-TV tower. Access to the tower property is prevented by an eight foot security fence with a locked gate.

The proposed operation based upon the current OET Bulletin No. 65, Edition 97-01 dated August 1997 and Supplement A meets the provisions of the FCC radio frequency field ("RFF") guidelines, and



thus, complies with Section 1.1307 of the FCC Rules. The elevation pattern for the Dielectric, Type TF-6MT-DC antenna [Exhibit E-2(j-l)] shows a maximum relative field of less than 0.27 toward the ground (10° to 90° below the horizontal). Calculation according to OET Bulletin 65 predicts a maximum RFF power density of less than 12.2  $\mu\text{W}/\text{cm}^2$ , 2 meters above ground or less than 1.2% of the controlled Maximum Permissible Exposure (“MPE”) guideline.

For completeness, the contribution by facilities located within 100 meters to the RF electromagnetic field environment is considered herein, as there are multiple emitters in the area.

The RFF study will consider the following stations:

Station

KXLF-TV	Channel 4	(same tower)
KXLF (DT)	Channel 5	proposed
KFRD (FM)	Channel 202C3	(adjacent tower)
KAPC (FM)	Channel 217C2	(adjacent tower)
KTVM (TV)	Channel 6	(adjacent tower)
KWYB (TV)	Channel 18	(93 meters away/ 175°)
KBTZ (TV)	Channel 24	(93 meters away/ 175°)
KAAR (FM)	Channel 223C1	(62 meters away/ 7°)
KMBR (FM)	Channel 238C	(62 meters away/ 7°)

The RFF contribution of each station will be calculated using the following basic formula:

$$S = \frac{33.4(F^2) \text{ Total ERP}}{R^2}$$

where:

S = power density in  $\mu\text{W}/\text{cm}^2$

F = relative field factor

Total ERP = ERP Horizontal Polarization + ERP Vertical Polarization

R = RCAGL - 2 meters

ERP = RMS ERP in watts for DTV Stations

ERP =  $[0.4 \text{ ERP}_V + \text{ERP}_A]$  for NTSC Stations

$\text{ERP}_V$  = peak visual ERP in watts

$\text{ERP}_A$  = RMS aural ERP in watts

### **KXLF-TV NTSC Facility**

Channel 4	Freq:	66-72 MHz range
	ERP =	$(0.4)[100 \text{ kilowatts (visual)}] + [10 \text{ kilowatts (aural)}]$
	Polarization =	Horizontal
	RCAGL -2 meters =	46.3 meters

$$S = \frac{33.4 (F^2) \text{ Tot ERP}}{R^2}$$

Tot ERP = 50,000 watts (Horizontal Only)  
 R = 46.3 meters  
 F = 0.25 (from manufacturer's data)

$$S = < 48.7 \mu\text{W}/\text{cm}^2$$

Therefore, KXLF-TV contributes less than  $48.7 \mu\text{W}/\text{cm}^2$  at 2 meters above ground.

The limit for a controlled environment for this frequency is  $1000 \mu\text{W}/\text{cm}^2$ .

**KXLF-TV contributes less than 4.9% RFF level for a controlled environment two meters above the ground.**

### **KXLF-DT DTV Facility (proposed)**

Channel 5	Freq:	76-82 MHz range
	ERP =	10.7 kW
	Polarization =	Horizontal
	RCAGL -2 meters =	46.3 meters

$$S = \frac{33.4 (F^2) \text{ Tot ERP}}{R^2}$$

Tot ERP = 10.7 kW (Horizontal Only)  
 R = 46.3 meters  
 F = 0.27 (from manufacturer's data)

$$S = < 12.2 \mu\text{W}/\text{cm}^2$$

Therefore, KXLF-DT contributes less than  $12.2 \mu\text{W}/\text{cm}^2$  at 2 meters above ground.

The limit for a controlled environment for this frequency is  $1000 \mu\text{W}/\text{cm}^2$ .

**KXLF-DT contributes less than 1.2% RFF level for a controlled environment two meters above the ground.**

#### **KFRD (FM) FM Facility**

Channel 202	Freq:	88.3 MHz
	ERP =	0.65 kW
	Polarization =	Vertical
	RCAGL -2 meters =	6 meters

$$S = \frac{33.4 (F^2) \text{Tot ERP}}{R^2}$$

Tot ERP = 650 watts (Vertical only)  
R = 6 meters  
F = 0.3 (assumed value)

$$S = < 54.3 \mu\text{W}/\text{cm}^2$$

Therefore, KFRD (FM) contributes less than  $54.3 \mu\text{W}/\text{cm}^2$  at 2 meters above the ground.

The limit for a controlled environment is  $1000 \mu\text{W}/\text{cm}^2$  for the FM band range.

**KFRD (FM) contributes less than 5.4% RFF level for a controlled environment two meters above the ground.**

#### **KAPC (FM) FM Facility**

Channel 217	Freq:	91.3 MHz
	ERP =	0.8 kW
	Polarization =	Circular
	RCAGL -2 meters =	32 meters

$$S = \frac{33.4 (F^2) \text{ Tot ERP}}{R^2}$$

Tot ERP = 1,600 watts (Horizontal and Vertical)

R = 32 meters

F = 0.3 (assumed value)

$$S = < 4.7 \mu\text{W}/\text{cm}^2$$

Therefore, KAPC (FM) contributes less than  $4.7 \mu\text{W}/\text{cm}^2$  at 2 meters above the ground.

The limit for a controlled environment is  $1000 \mu\text{W}/\text{cm}^2$  for the FM band range.

**KAPC (FM) contributes less than 0.5% RFF level for a controlled environment two meters above the ground.**

#### KTVM (TV) NTSC Facility

Channel 6	Freq:	82-88 MHz range
	ERP =	(0.4)[100 kilowatts (visual)]+[10 kilowatts (aural)]
	Polarization =	Horizontal
	RCAGL -2 meters =	49 meters

$$S = \frac{33.4 (F^2) \text{ Tot ERP}}{R^2}$$

Tot ERP = 50,000 watts (Horizontal Only)

R = 49 meters

F = 0.3 (assumed value)

$$S = < 62.6 \mu\text{W}/\text{cm}^2$$

Therefore, KTVM (TV) contributes less than  $62.6 \mu\text{W}/\text{cm}^2$  at 2 meters above ground.

The limit for a controlled environment for this frequency is  $1000 \mu\text{W}/\text{cm}^2$ .

**KTVM (TV) contributes less than 6.3% RFF level for a controlled environment two meters above the ground.**

#### KWYB (TV) NTSC Facility (93 meters away)

Channel 18	Freq:	494-500 MHz range
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ERP = (0.4)[1780 kilowatts (visual)]+[178 kilowatts (aural)]  
Polarization = Horizontal  
RCAGL -2 meters = 121.4 meters (in comparison to KXLF-DT site)

$$S = \frac{33.4 (F^2) \text{Tot ERP}}{R^2}$$

Tot ERP = 890,000 watts (Horizontal Only)  
R = 121.4 meters  
F = 0.2 (assumed value)

$$S = < 80.7 \mu\text{W}/\text{cm}^2$$

Therefore, KQYB (TV) contributes less than 80.7  $\mu\text{W}/\text{cm}^2$  at 2 meters above ground.

The limit for a controlled environment for this frequency is 1656.67  $\mu\text{W}/\text{cm}^2$ .

**KQYB (TV) contributes less than 4.9% RFF level for a controlled environment two meters above the ground.**

**KBTZ (TV) NTSC Facility** (93 meters away)

Channel 24 Freq: 530-536 MHz range  
ERP = (0.4)[330 kilowatts (visual)]+[33 kilowatts (aural)]  
Polarization = Horizontal  
RCAGL -2 meters = 105.6 meters (in comparison to KXLF-DT site)

$$S = \frac{33.4 (F^2) \text{Tot ERP}}{R^2}$$

Tot ERP = 165,000 watts (Horizontal Only)  
R = 105.6 meters  
F = 0.2 (assumed value)

$$S = < 19.8 \mu\text{W}/\text{cm}^2$$

Therefore, KBTZ (TV) contributes less than 19.8  $\mu\text{W}/\text{cm}^2$  at 2 meters above ground.

The limit for a controlled environment for this frequency is 1776.67  $\mu\text{W}/\text{cm}^2$ .

**KBTZ (TV) contributes less than 1.1% RFF level for a controlled environment two meters above the ground.**

**KAAR (FM) FM Facility** (62 meters away)

Channel 223                      Freq:                      92.5 MHz  
    ERP =                      4.5 kW  
    Polarization =                      Circular  
    RCAGL -2 meters =                      63.6 meters (in comparison to KXLF-DT site)

$$S = \frac{33.4 (F^2) \text{ Tot ERP}}{R^2}$$

Tot ERP = 9,000 watts (Horizontal and Vertical)  
 R = 63.6 meters  
 F = 0.3 (assumed value)

$$S = < 6.7 \mu\text{W}/\text{cm}^2$$

Therefore, KAAR (FM) contributes less than  $6.7 \mu\text{W}/\text{cm}^2$  at 2 meters above the ground.

The limit for a controlled environment is  $1000 \mu\text{W}/\text{cm}^2$  for the FM band range.

**KAAR (FM) contributes less than 0.7% RFF level for a controlled environment  
two meters above the ground.**

**KMBR (FM) FM Facility** (62 meters away)

Channel 238                      Freq:                      95.5 MHz  
    ERP =                      50 kW  
    Polarization =                      Circular  
    RCAGL -2 meters =                      67.6 meters (in comparison to KXLF-DT site)

$$S = \frac{33.4 (F^2) \text{ Tot ERP}}{R^2}$$

Tot ERP = 100,000 watts (Horizontal and Vertical)  
 R = 67.6 meters  
 F = 0.3 (assumed value)

$$S = < 65.8 \mu\text{W}/\text{cm}^2$$

Therefore, KMBR (FM) contributes less than  $65.8 \mu\text{W}/\text{cm}^2$  at 2 meters above the ground.

The limit for a controlled environment is  $1000 \mu\text{W}/\text{cm}^2$  for the FM band range.

**KMBR (FM) contributes less than 6.6% RFF level for a controlled environment two meters above the ground.**

**Total RFF contribution**

17.2% (TV) + 1.2% (DT) + 13.2% (FM) = **31.6%** for a controlled environment two meters above ground.

The entrance to the site is blocked by locked access.

Authorized personnel and rigging contractors will be alerted to the potential zone of high radiation on the tower, and if necessary, the station will operate with reduced power or terminate the operation of the transmitter as appropriate when it is necessary for authorized personnel or contractors to perform work on or near the tower. Workers and the general public, therefore, will not be subjected to RFF levels in excess of the current FCC guidelines.

An environmental assessment ("EA") is categorically excluded under Section 1.1306 of the FCC Rules and Regulations since the permittee indicates that:

- (a)(1) The existing facilities are not located in an officially designated wilderness area.
- (a)(2) The existing facilities are not located in an officially designated wildlife preserve.
- (a)(3) The proposed facilities will not affect any listed threatened or endangered species or habitats.
- (a)(3)(ii) The proposed facilities will not jeopardize the continued existence of any proposed endangered or threatened species and are not likely to result in the destruction or adverse modification of proposed critical habitats.

- (a)(4) The proposed facilities will not affect any known districts, sites, buildings, structures, or objects significant in American history, architecture, archaeology, engineering, or culture.
- (a)(5) The existing facilities are not located near any known Indian religious sites.
- (a)(6) The existing facilities are not located in a flood plain.
- (a)(7) The installation of the DTV facilities on a modified tower at an existing site will not involve a significant change in surface features of the ground in the vicinity of the tower.
- (a)(8) It is not proposed to equip the tower with high intensity white lights unless required by the FAA.
- (b) Workers and the general public will not be subjected to RFF levels in excess of the current FCC guidelines. Authorized personnel will be alerted to areas unauthorized on the tower where potential radiation levels are in excess of the FCC guidelines. A security fence with a locked gate prevents unauthorized access to the tower site.



TABLE I  
DTV COVERAGE DATA  
FOR THE PROPOSED OPERATION  
KXLF-DT, BUTTE, MONTANA  
CHANNEL 5 10.7 KW ND 576 METERS HAAT  
APRIL 2004

<u>Azimuth</u> N ° E, T	<u>Average Elevation</u> <sup>1</sup> feet / meters	<u>HAAT</u> <sup>1</sup> feet / meters	<u>ERP</u> kW	<u>Distance to Contour</u>	
				<u>35 dBu</u> km	<u>28 dBu</u> km
0	6597 / 2010.7	1812.5 / 552.5	10.7	108.6	124.7
45	7735 / 2357.6	674.5 / 205.6	10.7	85.6	98.8
90	6906 / 2104.9	1503.5 / 458.3	10.7	102.8	118.5
135	6419 / 1956.5	1990.5 / 606.7	10.7	112.2	130.0
180	6807 / 2074.8	1602.5 / 488.4	10.7	106.6	122.4
225	5853 / 1784.0	2556.5 / 779.2	10.7	120.6	137.7
270	5493 / 1674.3	2916.5 / 888.9	10.7	122.5	139.3
315	6334 / 1930.6	2075.5 / 632.6	10.7	112.2	129.8

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<sup>1</sup> Elevation data abstracted from FCC Licensed Application dated May 10, 1952.

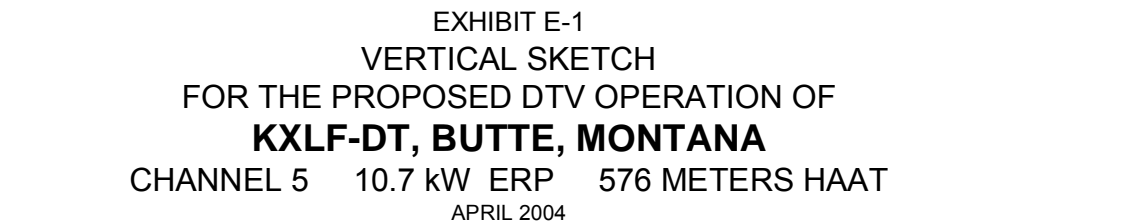
TABLE II  
POTENTIAL INTERFEREES OF  
PROPOSED KXLF-DT, BUTTE, MONTANA  
CHANNEL 5 10.7 KW ND 576 METERS HAAT  
APRIL 2004

<u>Call</u>	<u>Channel</u>	<u>City/State</u>	<u>Power</u> kW	<u>Bearing/Distance</u> <u>from KXLF-DT</u>	<u>New Interference</u>
KFBB-TV Lic.	5	Great Falls, MT	100	27°/192 km	1.45%
KIDA(TV) Lic.	5	Sun Valley, ID	10.25	211°/305 km	0.0%
KTVM(TV) Lic.	6	Butte, MT	100	0°/0 km	none
<u>Class A</u>					
K05CJ <sup>1</sup>	5	Challis, ID	0.01	219°/207 km	terrain shielded

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<sup>1</sup> Unchanged from authorization in BMPCDT-20031204AID

**ABOVE MEAN SEA LEVEL**



**COHEN, DIPPELL AND EVERIST, P.C.** Consulting Engineers Washington, D.C.



Proposal #:	<b>DCA-10220</b>	Antenna Type:	<b>TF-6MT-DC</b>	Channel:	<b>4 NTSC</b>
Call Letters:	<b>KXLF</b>	Location:	<b>Butte, MT</b>		<b>5 DTV</b>

Electrical Specifications		Value		Remarks
		Ratio	dB	
RMS Gain at Main Lobe over Halfwave Dipole	Hpol	5.8	7.63	N4: D5: 6.0 (7.78 dB)
	Vpol"			
RMS Gain at Horizontal over Halfwave Dipole	Hpol	5.8	7.63	N4: D5: 5.9 (7.71 dB)
	Vpol"			
Peak Directional Gain over Halfwave Dipole	Hpol			
	Vpol"			
Peak Directional Gain at Horizontal over Halfwave Dipole	Hpol			
	Vpol"			
Circularity		+/- 2.0 dB		
Axial Ratio		dB		
Beam Tilt		0.50 deg		N4: D5: 0.50 deg
Total Average Power		50 kW	16.99 dBk	
Antenna Input: T/L		3-1/8 in	50.0 ohm	Type: EIA/DCA
Maximum Antenna Input VSWR		Channel	1.10 : 1	Note: Dual feed line, Ch4 on one 3-1/8" line and Ch 5 on the other 3-1/8" line feeding the antenna D5: Channel: 1.10 : 1
Patterns	Azimuth	TF-O4-0690		D5: TF-O4-0790
	Elevation	06S058050	06S058050-90	
		06S060050	06S060050-90	N4 D5
Mechanical Specifications		Metric	English	
Height with Lightning Protector	H4	26.5 m	87.0 ft	
Height Less Lightning Protector	H2	25.3 m	83.0 ft	
Height of Center of Radiation	H3	12.7 m	41.8 ft	
Basic Wind Speed	V	136.8 km/h	85 mi/h	TIA/EIA-222-F.
Force Coeff. x Projected Area	CaAc	14.99 m <sup>2</sup>	161.4 ft <sup>2</sup>	Above base flange
Moment Arm	D1	11.0 m	36.0 ft	Above base flange
Force Coeff. x Projected Area	CaAc	1.2 m <sup>2</sup>	12.6 ft <sup>2</sup>	Below tower top
Moment Arm	D3	2.29 m	7.5 ft	Below tower top
Pole Bury Length	D2	5.00 m	16.4 ft	
Weight	W	5.4 t	12,000 lbs	
Deicer Power				
Antenna designed in accordance with AISC specifications for design of structural steel for building as prescribed by TIA/EIA-222-F.				

NOTE:

Prepared By :	SRR	Approved By :	RN
Original Date :	23-Apr-03		



Proposal Number

**DCA-10220**

Date

**23-Apr-03**

Call Letters

**KXLF**

Location

**Butte, MT**

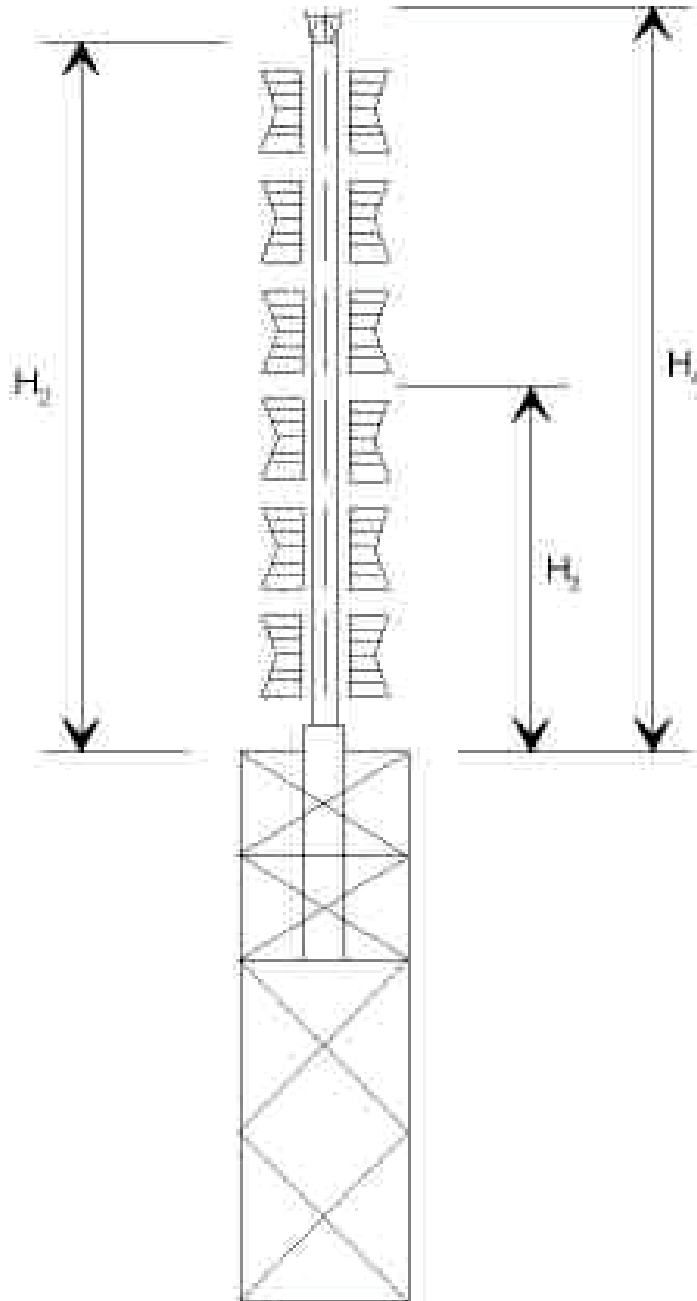
Customer

Antenna Type

**TF-6MT-DC**

EXHIBIT E - 2b

Channel **4**



Not Drawn to Scale



Proposal Number **DCA-10220**  
Date **23-Apr-03**  
Call Letters **KXLF**  
Location **Butte, MT**  
Customer  
Antenna Type **TF-6MT-DC**

EXHIBIT E - 2c

Channel **4**

## SYSTEM SUMMARY

### Antenna:

Type:	<b>TF-6MT-DC</b>	ERP:	<b>100 kW</b>	H Pol	<b>( 20.00 dBk )</b>
Channel:	<b>4</b>	RMS Gain*:	<b>5.8</b>		<b>( 7.63 dB )</b>
Location:	<b>Butte, MT</b>	Input Power:	<b>17.2 kW</b>		<b>( 12.37 dBk )</b>

### Transmission Line:

Type:	<b>EIA/DCA</b>	Attenuation:	<b>0.13 dB</b>
Size:	<b>3-1/8 in</b>	Efficiency:	<b>97.1%</b>
Impedance:	<b>50 ohm</b>		
Length:	<b>160 ft</b>		<b>48.8 m</b>

### Transmitter:

Power Required: **17.8 kW ( 12.49 dBk )**

\* Gain is with respect to half wave dipole.



Proposal Number **DCA-10220**  
Date **23-Apr-03**  
Call Letters **KXLF**  
Location **Butte, MT**  
Customer  
Antenna Type **TF-6MT-DC**

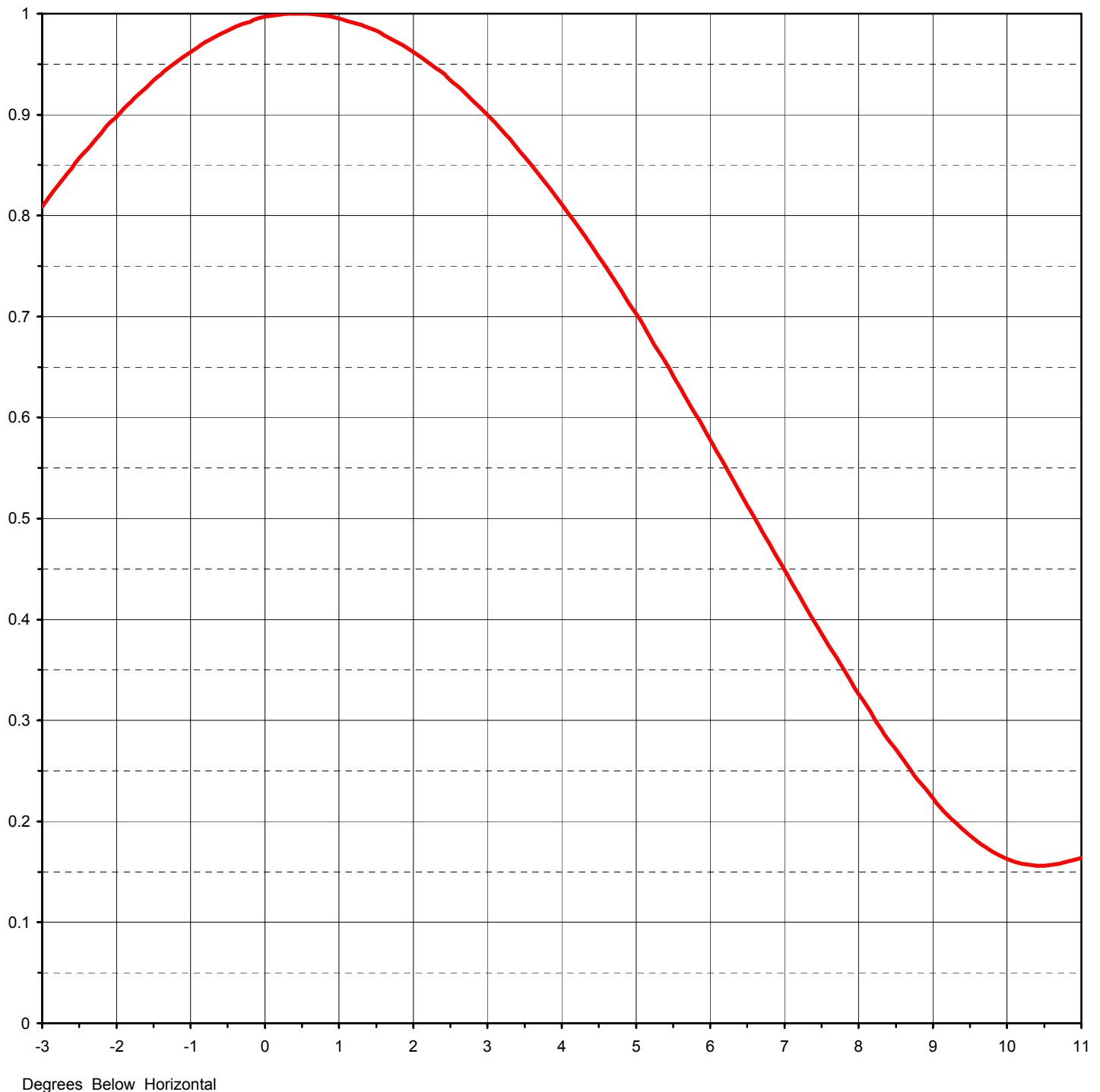
EXHIBIT E - 2d

Channel **4**

## ELEVATION PATTERN

RMS Gain at Main Lobe **5.80 ( 7.63 dB )**  
RMS Gain at Horizontal **5.80 ( 7.63 dB )**  
Calculated / Measured **Calculated**

Beam Tilt **0.50 deg**  
Frequency **69.00 MHz**  
Drawing # **06S058050**





Proposal Number **DCA-10220**  
Date **23-Apr-03**  
Call Letters **KXLF**  
Location **Butte, MT**  
Customer  
Antenna Type **TF-6MT-DC**

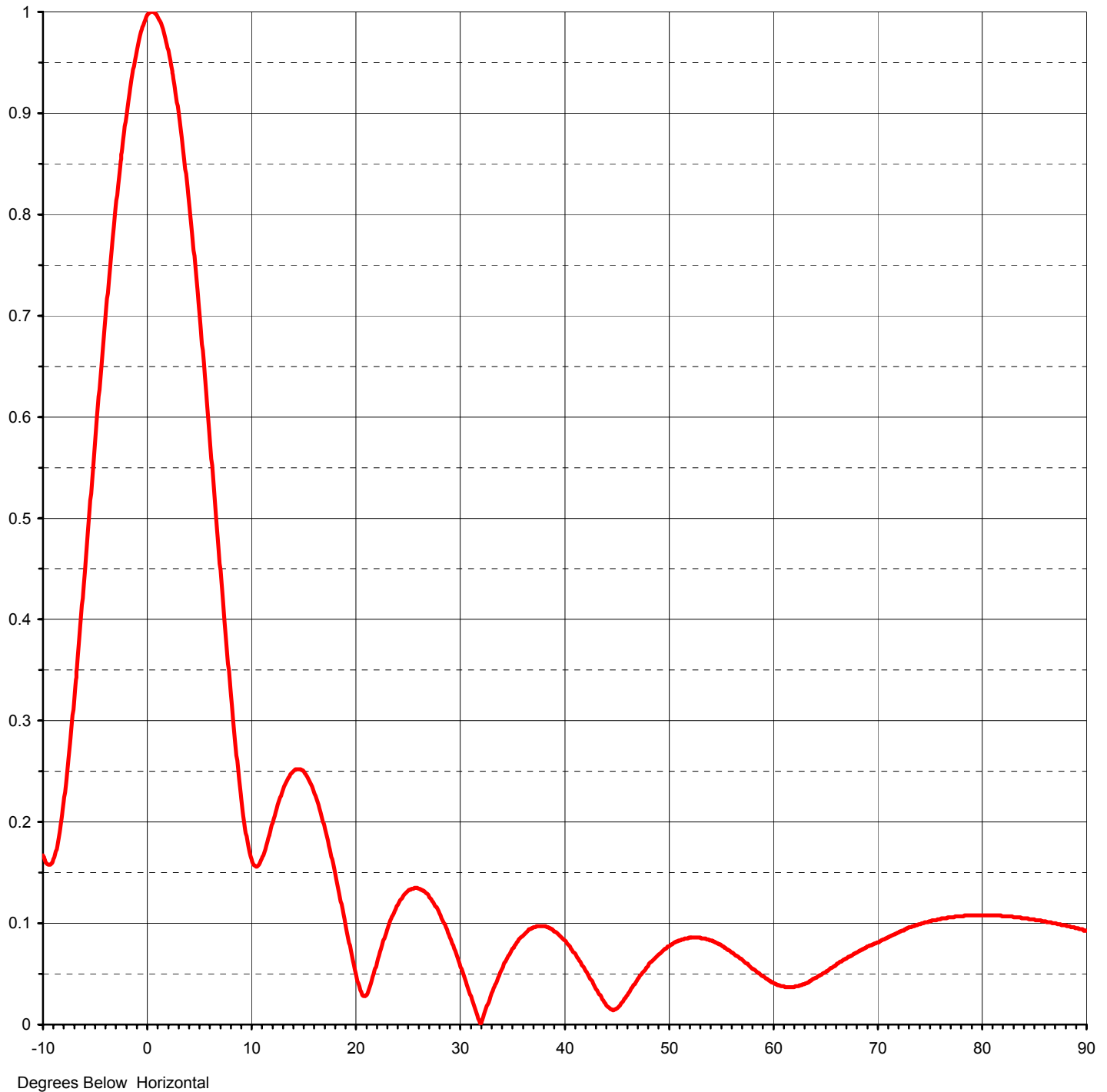
EXHIBIT E - 2e

Channel **4**

## ELEVATION PATTERN

RMS Gain at Main Lobe **5.80 ( 7.63 dB )**  
RMS Gain at Horizontal **5.80 ( 7.63 dB )**  
Calculated / Measured **Calculated**

Beam Tilt **0.50 deg**  
Frequency **69.00 MHz**  
Drawing # **06S058050-90**





Proposal Number **DCA-10220**Date **23-Apr-03**Call Letters **KXLF**Channel **4**Location **Butte, MT**

Customer

Antenna Type **TF-6MT-DC****TABULATION OF ELEVATION PATTERN**Elevation Pattern Drawing #: **06S058050-90**

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.167	2.4	0.941	10.6	0.156	30.5	0.046	51.0	0.083	71.5	0.089
-9.5	0.158	2.6	0.928	10.8	0.158	31.0	0.031	51.5	0.084	72.0	0.091
-9.0	0.163	2.8	0.914	11.0	0.162	31.5	0.016	52.0	0.086	72.5	0.093
-8.5	0.184	3.0	0.900	11.5	0.177	32.0	0.001	52.5	0.086	73.0	0.096
-8.0	0.220	3.2	0.884	12.0	0.195	32.5	0.014	53.0	0.086	73.5	0.097
-7.5	0.268	3.4	0.867	12.5	0.213	33.0	0.028	53.5	0.085	74.0	0.099
-7.0	0.323	3.6	0.849	13.0	0.229	33.5	0.041	54.0	0.083	74.5	0.101
-6.5	0.383	3.8	0.831	13.5	0.241	34.0	0.053	54.5	0.081	75.0	0.102
-6.0	0.446	4.0	0.811	14.0	0.249	34.5	0.064	55.0	0.079	75.5	0.103
-5.5	0.511	4.2	0.791	14.5	0.252	35.0	0.073	55.5	0.076	76.0	0.104
-5.0	0.576	4.4	0.770	15.0	0.251	35.5	0.081	56.0	0.072	76.5	0.105
-4.5	0.639	4.6	0.748	15.5	0.243	36.0	0.087	56.5	0.068	77.0	0.106
-4.0	0.699	4.8	0.726	16.0	0.232	36.5	0.092	57.0	0.065	77.5	0.107
-3.5	0.756	5.0	0.703	16.5	0.217	37.0	0.095	57.5	0.060	78.0	0.107
-3.0	0.809	5.2	0.678	17.0	0.198	37.5	0.097	58.0	0.056	78.5	0.108
-2.8	0.829	5.4	0.654	17.5	0.177	38.0	0.097	58.5	0.052	79.0	0.108
-2.6	0.847	5.6	0.629	18.0	0.154	38.5	0.096	59.0	0.048	79.5	0.108
-2.4	0.865	5.8	0.603	18.5	0.129	39.0	0.093	59.5	0.045	80.0	0.108
-2.2	0.882	6.0	0.578	19.0	0.104	39.5	0.089	60.0	0.042	80.5	0.108
-2.0	0.898	6.2	0.552	19.5	0.078	40.0	0.084	60.5	0.039	81.0	0.108
-1.8	0.913	6.4	0.526	20.0	0.054	40.5	0.078	61.0	0.038	81.5	0.108
-1.6	0.927	6.6	0.500	20.5	0.034	41.0	0.071	61.5	0.037	82.0	0.107
-1.4	0.940	6.8	0.475	21.0	0.028	41.5	0.063	62.0	0.037	82.5	0.107
-1.2	0.952	7.0	0.449	21.5	0.040	42.0	0.055	62.5	0.038	83.0	0.106
-1.0	0.962	7.2	0.424	22.0	0.057	42.5	0.046	63.0	0.040	83.5	0.106
-0.8	0.972	7.4	0.398	22.5	0.075	43.0	0.037	63.5	0.042	84.0	0.105
-0.6	0.980	7.6	0.374	23.0	0.091	43.5	0.029	64.0	0.045	84.5	0.104
-0.4	0.987	7.8	0.350	23.5	0.105	44.0	0.021	64.5	0.049	85.0	0.104
-0.2	0.992	8.0	0.326	24.0	0.117	44.5	0.015	65.0	0.052	85.5	0.103
0.0	0.997	8.2	0.303	24.5	0.125	45.0	0.015	65.5	0.056	86.0	0.102
0.2	0.999	8.4	0.281	25.0	0.131	45.5	0.021	66.0	0.059	86.5	0.101
0.4	1.000	8.6	0.261	25.5	0.134	46.0	0.028	66.5	0.062	87.0	0.100
0.6	1.000	8.8	0.241	26.0	0.135	46.5	0.036	67.0	0.065	87.5	0.099
0.8	0.998	9.0	0.223	26.5	0.132	47.0	0.043	67.5	0.068	88.0	0.098
1.0	0.995	9.2	0.206	27.0	0.128	47.5	0.050	68.0	0.071	88.5	0.096
1.2	0.991	9.4	0.192	27.5	0.121	48.0	0.057	68.5	0.074	89.0	0.095
1.4	0.986	9.6	0.180	28.0	0.112	48.5	0.063	69.0	0.077	89.5	0.094
1.6	0.979	9.8	0.175	28.5	0.101	49.0	0.068	69.5	0.079	90.0	0.093
1.8	0.971	10.0	0.166	29.0	0.089	49.5	0.073	70.0	0.081		
2.0	0.962	10.2	0.160	29.5	0.075	50.0	0.077	70.5	0.084		
2.2	0.952	10.4	0.157	30.0	0.061	50.5	0.080	71.0	0.086		



Proposal Number **DCA-10220**  
Date **23-Apr-03**  
Call Letters **KXLF-DT**  
Location **Butte, MT**  
Customer  
Antenna Type **TF-6MT-DC**

Channel **5**

## SYSTEM SUMMARY

### Antenna:

Type:	<b>TF-6MT-DC</b>	ERP:	<b>12.7 kW</b>	H Pol	<b>( 11.04 dBk )</b>
Channel:	<b>5</b>	RMS Gain*:	<b>6.0</b>		<b>( 7.78 dB )</b>
Location:	<b>Butte, MT</b>	Input Power:	<b>2.1 kW</b>		<b>( 3.26 dBk )</b>

### Transmission Line:

Type:	<b>EIA/DCA</b>	Attenuation:	<b>0.14 dB</b>
Size:	<b>3-1/8 in</b>	Efficiency:	<b>96.9%</b>
Impedance:	<b>50 ohm</b>		
Length:	<b>160 ft</b>		<b>48.8 m</b>

### Transmitter:

Power Required: **2.2 kW** ( 3.39 dBk )

\* Gain is with respect to half wave dipole.



Proposal Number **DCA-10220**  
Date **23-Apr-03**  
Call Letters **KXLF-DT**  
Location **Butte, MT**  
Customer  
Antenna Type **TF-6MT-DC**

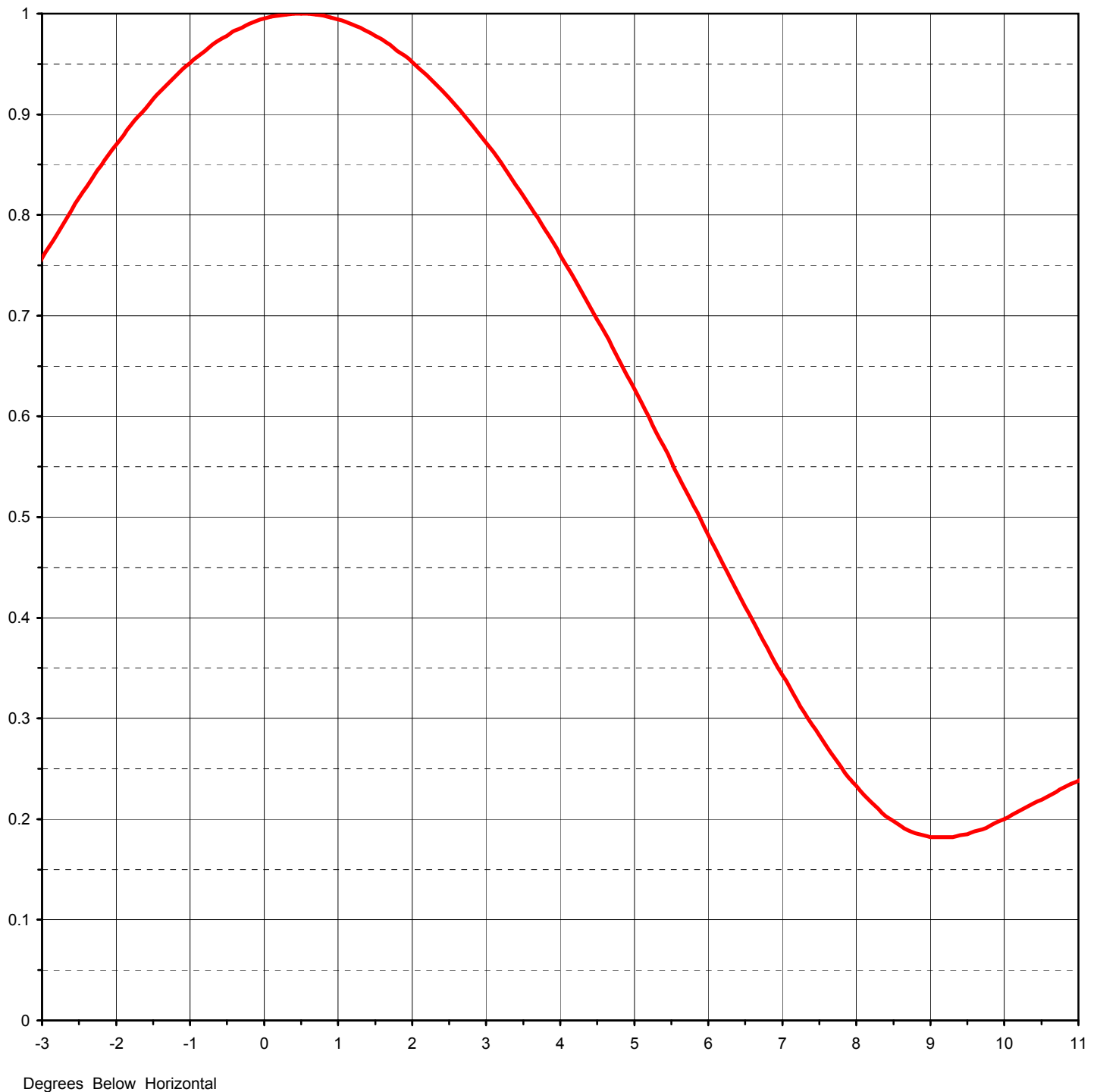
EXHIBIT E - 2h

Channel **5**

## ELEVATION PATTERN

RMS Gain at Main Lobe **6.00 ( 7.78 dB )**  
RMS Gain at Horizontal **5.90 ( 7.71 dB )**  
Calculated / Measured **Calculated**

Beam Tilt **0.50 deg**  
Frequency **79.00 MHz**  
Drawing # **06S060050**





Proposal Number

**DCA-10220**

EXHIBIT E - 2i

Date

**23-Apr-03**

Call Letters

**KXLF-DT**Channel **5**

Location

**Butte, MT**

Customer

Antenna Type

**TF-6MT-DC**

## ELEVATION PATTERN

RMS Gain at Main Lobe

**6.00 ( 7.78 dB )**

Beam Tilt

**0.50 deg**

RMS Gain at Horizontal

**5.90 ( 7.71 dB )**

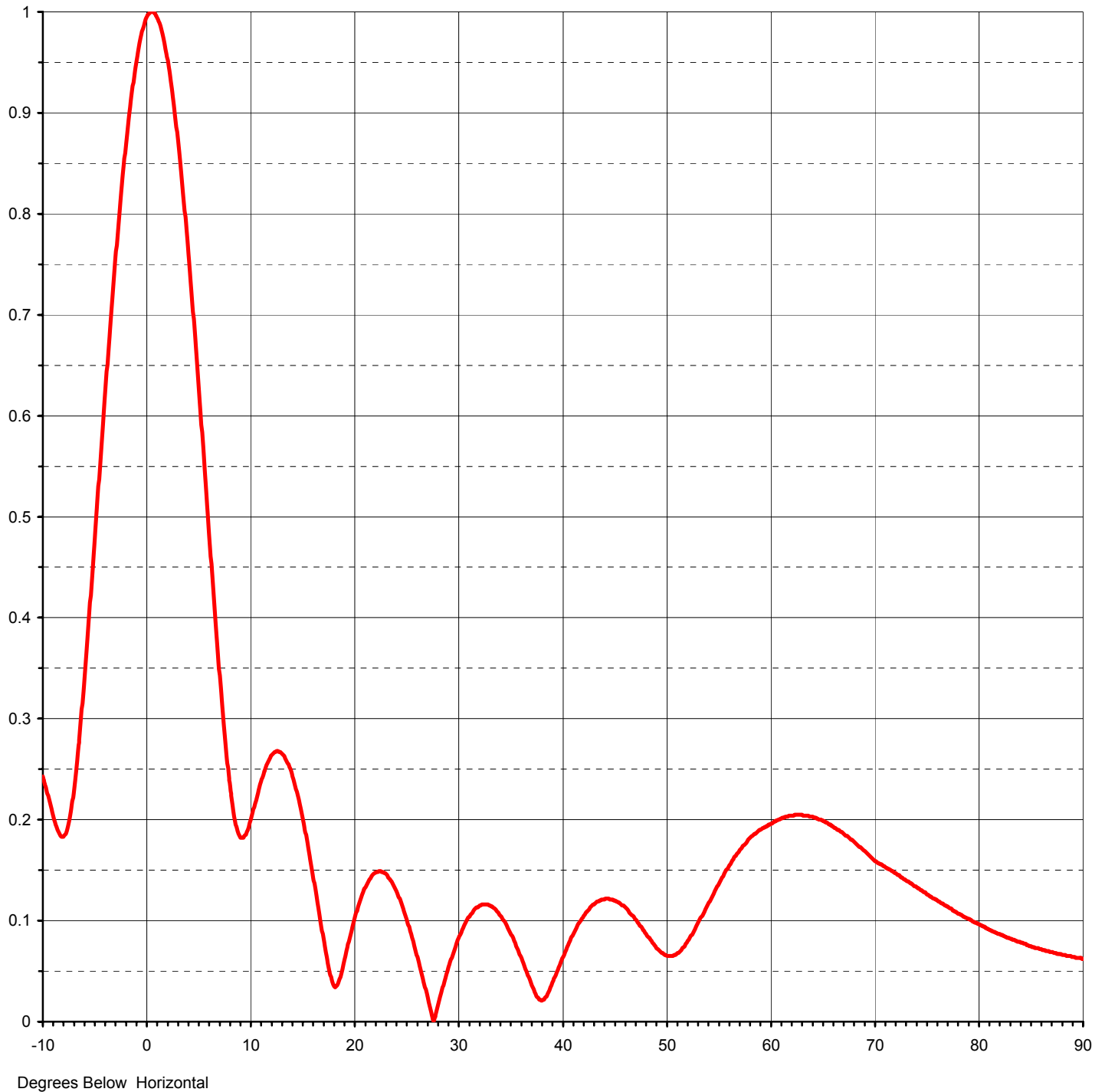
Frequency

**79.00 MHz**

Calculated / Measured

**Calculated**

Drawing #

**06S060050-90**

Proposal Number **DCA-10220**Date **23-Apr-03**Call Letters **KXLF-DT**Channel **5**Location **Butte, MT**

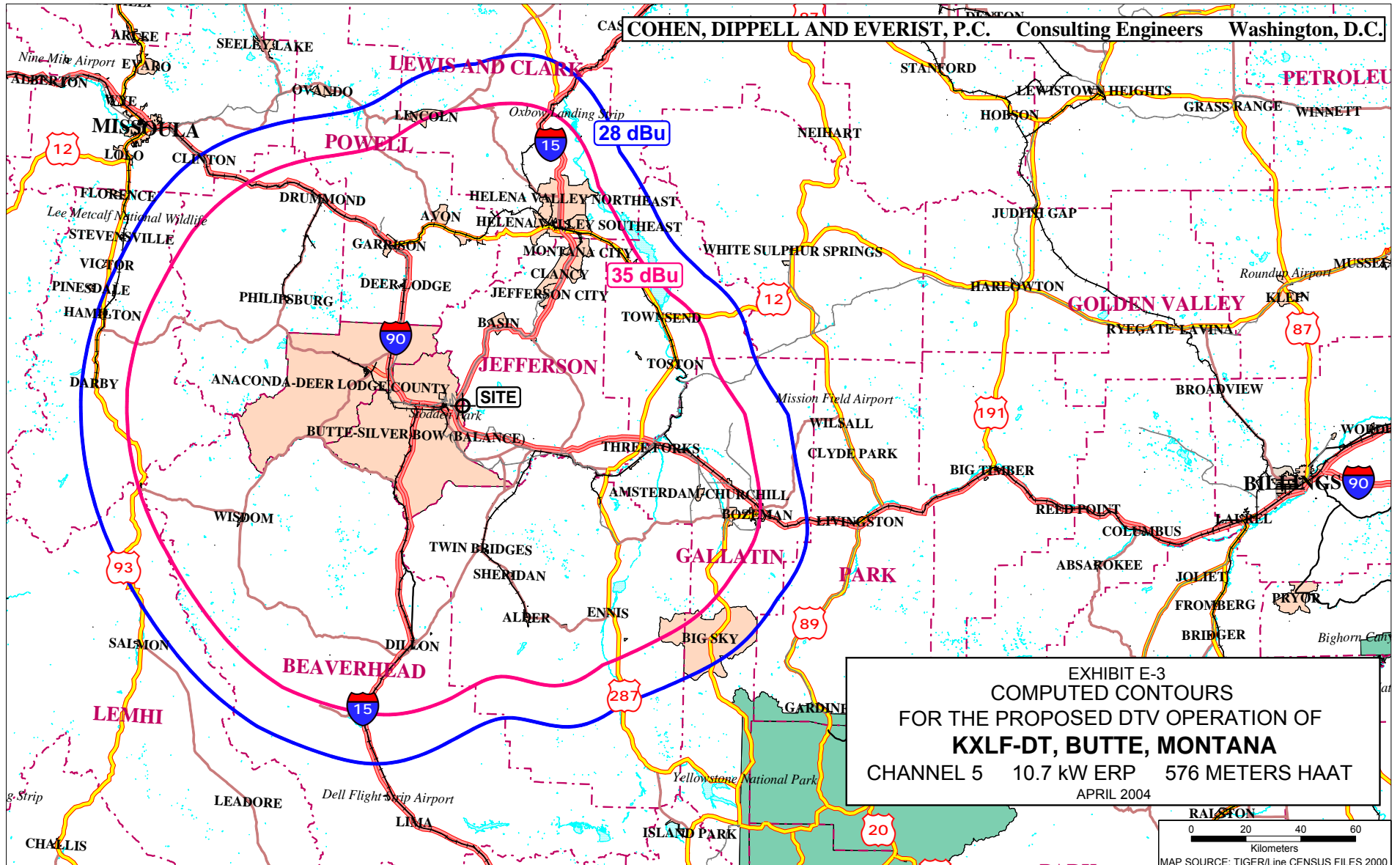
Customer

Antenna Type **TF-6MT-DC**

## TABULATION OF ELEVATION PATTERN

Elevation Pattern Drawing #: **06S060050-90**

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.243	2.4	0.924	10.6	0.219	30.5	0.093	51.0	0.067	71.5	0.150
-9.5	0.224	2.6	0.908	10.8	0.227	31.0	0.103	51.5	0.071	72.0	0.147
-9.0	0.204	2.8	0.890	11.0	0.235	31.5	0.110	52.0	0.078	72.5	0.143
-8.5	0.188	3.0	0.872	11.5	0.251	32.0	0.114	52.5	0.086	73.0	0.140
-8.0	0.183	3.2	0.852	12.0	0.262	32.5	0.116	53.0	0.096	73.5	0.137
-7.5	0.197	3.4	0.830	12.5	0.267	33.0	0.115	53.5	0.105	74.0	0.133
-7.0	0.230	3.6	0.808	13.0	0.266	33.5	0.112	54.0	0.115	74.5	0.130
-6.5	0.279	3.8	0.785	13.5	0.259	34.0	0.106	54.5	0.125	75.0	0.126
-6.0	0.340	4.0	0.760	14.0	0.247	34.5	0.099	55.0	0.135	75.5	0.123
-5.5	0.408	4.2	0.735	14.5	0.228	35.0	0.089	55.5	0.144	76.0	0.120
-5.0	0.479	4.4	0.709	15.0	0.206	35.5	0.078	56.0	0.153	76.5	0.117
-4.5	0.551	4.6	0.683	15.5	0.179	36.0	0.065	56.5	0.161	77.0	0.114
-4.0	0.623	4.8	0.655	16.0	0.149	36.5	0.052	57.0	0.168	77.5	0.110
-3.5	0.692	5.0	0.627	16.5	0.118	37.0	0.039	57.5	0.175	78.0	0.107
-3.0	0.757	5.2	0.599	17.0	0.087	37.5	0.027	58.0	0.181	78.5	0.104
-2.8	0.781	5.4	0.570	17.5	0.058	38.0	0.021	58.5	0.186	79.0	0.102
-2.6	0.805	5.6	0.540	18.0	0.037	38.5	0.025	59.0	0.190	79.5	0.099
-2.4	0.828	5.8	0.511	18.5	0.038	39.0	0.036	59.5	0.193	80.0	0.096
-2.2	0.849	6.0	0.482	19.0	0.057	39.5	0.049	60.0	0.195	80.5	0.094
-2.0	0.870	6.2	0.453	19.5	0.079	40.0	0.061	60.5	0.198	81.0	0.091
-1.8	0.889	6.4	0.425	20.0	0.099	40.5	0.074	61.0	0.201	81.5	0.089
-1.6	0.906	6.6	0.397	20.5	0.117	41.0	0.085	61.5	0.203	82.0	0.087
-1.4	0.923	6.8	0.370	21.0	0.131	41.5	0.095	62.0	0.204	82.5	0.084
-1.2	0.938	7.0	0.343	21.5	0.141	42.0	0.103	62.5	0.205	83.0	0.082
-1.0	0.951	7.2	0.318	22.0	0.147	42.5	0.110	63.0	0.205	83.5	0.080
-0.8	0.963	7.4	0.294	22.5	0.149	43.0	0.116	63.5	0.204	84.0	0.078
-0.6	0.974	7.6	0.272	23.0	0.147	43.5	0.119	64.0	0.203	84.5	0.077
-0.4	0.983	7.8	0.251	23.5	0.141	44.0	0.121	64.5	0.201	85.0	0.075
-0.2	0.990	8.0	0.233	24.0	0.131	44.5	0.122	65.0	0.199	85.5	0.073
0.0	0.995	8.2	0.217	24.5	0.119	45.0	0.120	65.5	0.196	86.0	0.072
0.2	0.998	8.4	0.203	25.0	0.104	45.5	0.118	66.0	0.193	86.5	0.070
0.4	1.000	8.6	0.193	25.5	0.087	46.0	0.114	66.5	0.190	87.0	0.069
0.6	1.000	8.8	0.186	26.0	0.068	46.5	0.108	67.0	0.186	87.5	0.067
0.8	0.998	9.0	0.182	26.5	0.048	47.0	0.102	67.5	0.182	88.0	0.066
1.0	0.994	9.2	0.182	27.0	0.028	47.5	0.095	68.0	0.178	88.5	0.065
1.2	0.989	9.4	0.184	27.5	0.007	48.0	0.088	68.5	0.173	89.0	0.064
1.4	0.982	9.6	0.188	28.0	0.013	48.5	0.081	69.0	0.169	89.5	0.063
1.6	0.974	9.8	0.190	28.5	0.032	49.0	0.075	69.5	0.164	90.0	0.062
1.8	0.963	10.0	0.197	29.0	0.050	49.5	0.069	70.0	0.159		
2.0	0.952	10.2	0.204	29.5	0.066	50.0	0.066	70.5	0.156		
2.2	0.939	10.4	0.212	30.0	0.081	50.5	0.065	71.0	0.153		



## SECTION III-D - DTV Engineering

**Complete Questions 1-5 of the Certification Checklist and provide all data and information for the proposed facility, as requested in Technical Specifications, Items 1-13.**

**Certification Checklist:** A correct answer of "Yes" to all of the questions below will ensure an expeditious grant of a construction permit. However, if the proposed facility is located within the Canadian or Mexican borders, coordination of the proposal under the appropriate treaties may be required prior to grant of the application. An answer of "No" will require additional evaluation of the applicable information in this form before a construction permit can be granted.

1. The proposed DTV facility complies with 47 C.F.R. Section 73.622 in the following respects:
  - (a) It will operate on the DTV channel for this station as established in 47 C.F.R. Section 73.622. ☐ Yes ☐ No
  - (b) It will operate from a transmitting antenna located within 5.0 km (3.1 miles) of the DTV reference site for this station as established in 47 C.F.R. Section 73.622. ☐ Yes ☐ No
  - (c) It will operate with an effective radiated power (ERP) and antenna height above average terrain (HAAT) that do not exceed the DTV reference ERP and HAAT for this station as established in 47 C.F.R. Section 73.622. ☐ Yes ☐ No
2. The proposed facility will not have a significant environmental impact, including exposure of workers or the general public to levels of RF radiation exceeding the applicable health and safety guidelines, and therefore will not come within 47 C.F.R. Section 1.1307. ☐ Yes ☐ No  
  
Applicant must **submit the Exhibit** called for in Item 13.
3. Pursuant to 47 C.F.R. Section 73.625, the DTV coverage contour of the proposed facility will encompass the allotted principal community. ☐ Yes ☐ No
4. The requirements of 47 C.F.R. Section 73.1030 regarding notification to radio astronomy installations, radio receiving installations and FCC monitoring stations have either been satisfied or are not applicable. ☐ Yes ☐ No
5. The antenna structure to be used by this facility has been registered by the Commission and will not require reregistration to support the proposed antenna, OR the FAA has previously determined that the proposed structure will not adversely effect safety in air navigation and this structure qualifies for later registration under the Commission's phased registration plan, OR the proposed installation on this structure does not require notification to the FAA pursuant to 47 C.F.R. Section 17.7. ☐ Yes ☐ No

## SECTION III-D DTV Engineering

### TECHNICAL SPECIFICATIONS

Ensure that the specifications below are accurate. Contradicting data found elsewhere in this application will be disregarded. All items must be completed. The response "on file" is not acceptable.

### TECH BOX

1. Channel Number: DTV \_\_\_\_\_ Analog TV, if any \_\_\_\_\_
2. Zone: ☐ I ☐ II ☐ III
3. Antenna Location Coordinates: (NAD 27)
- \_\_\_\_\_° \_\_\_\_\_' \_\_\_\_\_" ☐ N ☐ S Latitude  
\_\_\_\_\_° \_\_\_\_\_' \_\_\_\_\_" ☐ E ☐ W Longitude
4. Antenna Structure Registration Number: \_\_\_\_\_
- ☐ Not applicable ☐ FAA Notification Filed with FAA
5. Antenna Location Site Elevation Above Mean Sea Level: \_\_\_\_\_ meters
6. Overall Tower Height Above Ground Level: \_\_\_\_\_ meters
7. Height of Radiation Center Above Ground Level: \_\_\_\_\_ meters
8. Height of Radiation Center Above Average Terrain: \_\_\_\_\_ meters
9. Maximum Effective Radiated Power (average power): \_\_\_\_\_ kW
10. Antenna Specifications:
- a. 

Manufacturer	Model
--------------	-------
- b. Electrical Beam Tilt: \_\_\_\_\_ degrees ☐ Not Applicable
- c. Mechanical Beam Tilt: \_\_\_\_\_ degrees toward azimuth \_\_\_\_\_ degrees True ☐ Not Applicable
- Attach as an Exhibit all data specified in 47 C.F.R. Section 73.625(c). 

Exhibit No.
-------------
- d. Polarization: ☐ Horizontal ☐ Circular ☐ Elliptical



# TECHBOX

- e. Directional Antenna Relative Field Values: ☐ Not applicable (Nondirectional)  
 Rotation: \_\_\_\_\_ ° ☐ No rotation

Degree	Value	Degree	Value	Degree	Value	Degree	Value	Degree	Value	Degree	Value
0		60		120		180		240		300	
10		70		130		190		250		310	
20		80		140		200		260		320	
30		90		150		210		270		330	
40		100		160		220		280		340	
50		110		170		230		290		350	
Additional Azimuths											

If a directional antenna is proposed, the requirements of 47 C.F.R. Section 73.625(c) must be satisfied. **Exhibit required.**

Exhibit No.

11. Does the proposed facility satisfy the interference protection provisions of 47 C.F.R. Section 73.623(a)? (Applicable only if **Certification Checklist** Items 1(a), (b), or (c) are answered "No.") ☐ Yes ☐ No

If "No," attach as an Exhibit justification therefor, including a summary of any related previously granted waivers.

Exhibit No.

12. If the proposed facility will not satisfy the coverage requirement of 47 C.F.R. Section 73.625, attach as an Exhibit justification therefor. (Applicable only if **Certification Checklist** Item 3 is answered "No.")

Exhibit No.

13. **Environmental Protection Act. Submit in an Exhibit** the following:

Exhibit No.

- a. If **Certification Checklist** Item 2 is answered "Yes," a brief explanation of why an Environmental Assessment is not required. Also describe in the Exhibit the steps that will be taken to limit RF radiation exposure to the public and to persons authorized access to the tower site.

By checking "Yes" to **Certification Checklist** Item 2, the applicant also certifies that it, in coordination with other users of the site, will reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic exposure in excess of FCC guidelines.

If **Certification Checklist** Item 2 is answered "No," an Environmental Assessment as required by 47 C.F.R. Section 1.1311.

**PREPARER'S CERTIFICATION IN SECTION III MUST BE COMPLETED AND SIGNED.**


I certify that the statements in this application are true, complete, and correct to the best of my knowledge and belief, and are made in good faith. I acknowledge that all certifications and attached Exhibits are considered material representations. I hereby waive any claim to the use of any particular frequency as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and request an authorization in accordance with this application. (See Section 304 of the Communications Act of 1934, as amended.)

Typed or Printed Name of Person Signing	Typed or Printed Title of Person Signing
Signature	Date

WILLFUL FALSE STATEMENTS ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. CODE, TITLE 47, SECTION 312(a)(1)), AND/OR FORFEITURE (U.S. CODE, TITLE 47, SECTION 503).

### SECTION III PREPARER'S CERTIFICATION

I certify that I have prepared Section III (Engineering Data) on behalf of the applicant, and that after such preparation, I have examined and found it to be accurate and true to the best of my knowledge and belief.

Name Daryl Mastracci	Relationship to Applicant (e.g., Consulting Engineer) Consulting Engineer	
Signature 	Date <b>April 29, 2004</b>	
Mailing Address Cohen, Dippell and Everist, P.C., 1300 L Street, NW, Suite 1100		
City Washington	State or Country (if foreign address) DC	ZIP Code 20005
Telephone Number (include area code) (202) 898-0111	E-Mail Address (if available) cde@attglobal.net	

WILLFUL FALSE STATEMENTS ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. CODE, TITLE 47, SECTION 312(a)(1)), AND/OR FORFEITURE (U.S. CODE, TITLE 47, SECTION 503).