

ENGINEERING STATEMENT RE
APPLICATION TO REQUEST MODIFICATION OF
CONSTRUCTION PERMIT (BMPCDT-20011025ABQ)
TO BUILD DIGITAL TELEVISION FACILITIES
ON BEHALF OF
KPAX-DT, MISSOULA, MONTANA
CHANNEL 7 22.5 KW ND ERP 642 METERS HAAT
FACILITY ID# 35455
JULY 2006

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)

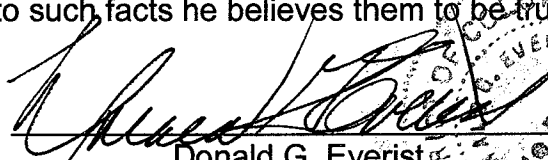
Donald G. Everist, being duly sworn upon his oath, deposes and states that:

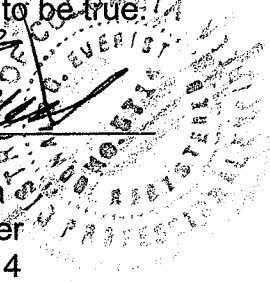
He is a graduate electrical engineer, a Registered Professional Engineer in the District of Columbia, and is President, Secretary and Treasurer of Cohen, Dippell and Everist, P.C., Consulting Engineers, Radio - Television, with offices at 1300 L Street, N.W., Suite 1100, Washington, D.C. 20005;

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

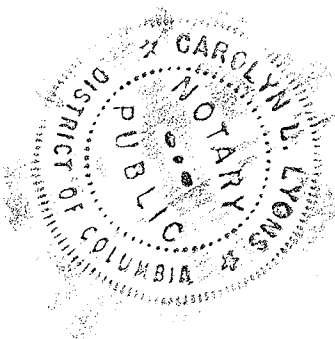
That the attached engineering report was prepared by him or under his supervision and direction and

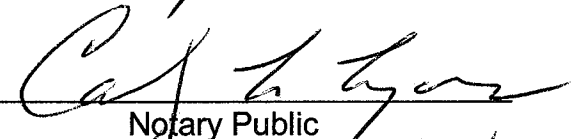
That the facts stated herein are true of his own knowledge, except such facts as are stated to be on information and belief, and as to such facts he believes them to be true.


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



Subscribed and sworn to before me this 13th day of July, 2006.




Notary Public

My Commission Expires: 2/28/2008

COHEN, DIPPELL AND EVERIST, P. C.


City of Washington)
) ss
District of Columbia)

Martin R. Doczkat being duly sworn upon his oath, deposes and states that:

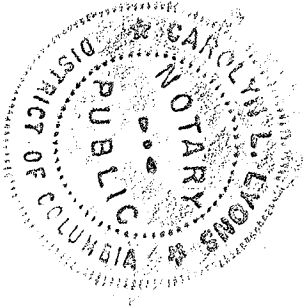
He is a graduate electrical engineer of the Pennsylvania State University, and is a staff engineer at Cohen, Dippell and Everist, P.C., Consulting Engineers, Radio - Television, with offices at 1300 L Street, N.W., Suite 1100, Washington, D.C. 20005;

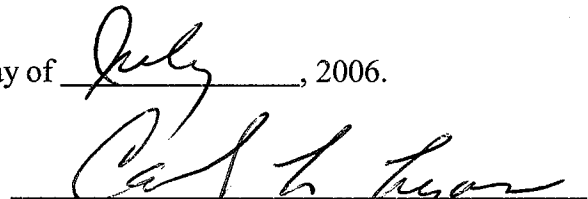
That the attached engineering report was prepared by him or under his supervision and direction and

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.


Martin R. Doczkat

Subscribed and sworn to before me this 13th day of July, 2006.




Notary Public

My Commission Expires: 2/28/2008

INTRODUCTION

This engineering statement has been prepared on behalf of KPAX Communications, Inc., licensee of KPAX-TV (Facility ID# 35455) in support of its request to modify its outstanding DTV construction permit (FCC File No. BMPCDT-20011025ABQ). KPAX-TV is licensed to operate on NTSC Channel 8 with 275 kW non-directional effective radiated power (“ERP”) at an antenna height above average terrain (“HAAT”) of 655 meters. A rule-making request to change the allotted DTV Channel 35 to DTV Channel 7 was submitted to the Commission and was adopted (FCC File No. BPRM-20001019ACH). KPAX-DT currently has an outstanding construction permit (FCC File No. BMPCDT-20011025ABQ) for DTV Channel 7 at 28 kW non-directional ERP at 623 meters HAAT. KPAX-DT now proposes to modify these currently authorized DTV facilities in its outstanding construction permit to 22.5 kW non-directional ERP at 642 meters HAAT from the same site.

TRANSMITTER SITE

It is proposed to replace the existing top-mounted antenna to a new dual channel antenna on the existing tower. There will be no change in overall tower height. The tower is located on TV Mountain, 4 miles East of Evaro, Montana. The geographic coordinates of the site are as follows:

North Latitude: 47° 01’ 06”

West Longitude: 114° 00’ 41”

NAD-27

Antenna Registration No. 1004605

ELEVATION DATA

(No change)

Elevation of site above mean sea level	2077.8 meters 6817 feet
Center of radiation of antenna above ground	73.7 meters 241.8 feet
Center of radiation of antenna above mean sea level	2151.5 meters 7058.7 feet
Overall height above ground of the existing antenna structure (including appurtenances)	87.5 meters 287.1 feet
Overall height above mean sea level of the existing antenna structure (including appurtenances)	2165.3 meters 7104 feet
Antenna height above average terrain	642 meters 2104.7 feet

A sketch of the supporting structure, Exhibit E-1, is provided.

EQUIPMENT DATA

Transmitter:	Type-approved
Transmission Line:	1-5/8" concentric, semiflexible, transmission line, or equivalent, approximately 85.3 meters (280 feet)
Antenna:	Dielectric, TF-10HT-H DC, or equivalent, non-directional with 0.75 degrees electrical beamtilt. Exhibits required by Section 73.625 of the FCC Rules are contained in Exhibit E-2.

POWER DATA

Transmitter Output	2.86 kW	4.57 dBk
Transmission line and combiner loss	81.9%	0.87 dB
Input power to the antenna	2.34 kW	3.69 dBk
Antenna power gain	9.6	9.82 dB
Effective Radiated Power	22.5 kW	13.52 dBk

COVERAGE

The average elevation data for 3.2 to 16.1 kilometers along each radial has been determined from a 3-second NGDC database. The F(50,90) DTV coverage contour has been computed from reference to the propagation data for Channels 7-13, as published by the FCC in Figure 10 and Figure 10a, Section 73.699 of the FCC Rules and Regulations.

The depression angle was calculated for every 45 degrees along the eight cardinal radials utilizing the formula set forth in Section 73.625(b)(2) of the rules. The relative vertical field was found to be greater than 90% at all depression angles, accordingly the maximum ERP, 22.5 kilowatts, was used in determining the distance to the DTV contour. The elevation patterns of the proposed antenna are attached as Exhibit E-2. Table I provides for each azimuth angle, the HAAT, the depression angle and the distance to each contour. The proposed 43 dBu contour encompasses the community of license, Missoula, Montana as required by the FCC Rules. Exhibit E-3 provides the predicted F(50,90) 43 and 36 dBu coverage contours for the proposed operation.

ALLOCATION

The use of a top-mounted dual channel antenna will increase for the DTV operation the center of radiation from that authorized of 55.2 meters to 73.7 meters above ground.¹ This increase of 18.5 meters will require the reduction of DTV ERP from the authorized value of 28 kW to 22.5 kW. Table II provides the distances to the 36 dBu contour authorized by the current construction permit. Exhibit E-4 is a map which shows the relationship of the authorized 36 dBu contour to that proposed. As demonstrated by both Exhibit E-4 and a comparison of the distances to the computed 36 dBu contours in Table I and Table II, the proposed 36 dBu contour is totally contained within that authorized by the construction permit. In addition based on the Longley-Rice analysis no new interference is predicted. Table III provides the stations potentially affected that were a basis of that Longley-Rice analysis. Further, the proposed operation of KPAX-DT is approximately 220 km from the nearest point of the Canadian border. According to Longley-Rice analysis and as demonstrated in Exhibit E-5, the proposed operation is not predicted to extend in any direction toward Canada beyond that already authorized by Canada. Therefore, no new interference is predicted to any Canadian facilities beyond that already authorized by Canada.

OTHER BROADCAST FACILITIES

According to a search of the surrounding area has been performed using the Commission's most recent Consolidated Database System (CDBS) information:

¹The engineering statement submitted with the outstanding construction permit (FCC File No. BMPCDT-20011025ABQ), entitled, "Engineering Statement Re Application to Request Construction Permit to Build Digital Television Facilities on Behalf of KPAX-DT, Missoula, Montana, Channel 7, 28 kW ERP, 623 Meters HAAT, October 2001", describes the RCAMSL to be 2133 meters, corresponding to 55.2 meters RCAGL. Addition of 18.5 meters to these figures yields a RCAMSL of 2151.5 meters and a RCAGL of 73.7 meters, specified herein.

- There are no AM stations located within 3.22 kilometers of the KPAX-TV tower.
- There are two other TV stations and two other DTV stations within 200 meters of the KPAX-TV tower site.
- Two TV translators and one FM station are within 200 meters of the KPAX-TV tower site.

Environmental Statement

The following broadcast stations are operating from the tower or within 200 meters of the tower:

KPAX-DT [Proposed]	KECI-DT [CP] ²
KPAX-TV [LIC]	KECI-TV [LIC]
KTMF-DT [CP] ³	K32EU TX [LIC]
KTMF(TV) [LIC]	K33IN TX [CP]
	KJFT(FM) [CP]

The radiofrequency field level (“RFF”) contribution of these stations will be calculated and summed, in the proceeding table, to form a representative value for a point located two meters above the ground at the base of the tower.

²KECI-DT has requested in an application (FCC File No. BMPCDT-20060705AAG) to modify its construction permit to a reduced ERP of 5.7 kW from 116 kW currently authorized with a height increase of 10 meters above that currently authorized.

³KTMF-DT has requested in an application (FCC File No. BMPCDT-20060707AEZ) to modify its construction permit to a reduced ERP of 5.1 kW from 122 kW currently authorized from the same height.

Radiofrequency Field Level

The KPAX-TV antenna is top-mounted on the existing tower at a radiation center above ground level of 73.7 meters.

The RFF contribution of each broadcasting station operating within 200 meters of the transmitting site will be calculated using the following formula:

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

where:

Tot ERP = $0.4 \text{ ERP}_V + \text{ERP}_A$ for NTSC and
Tot ERP = ERP for FM and DTV

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

F = relative field factor

Tot ERP = total ERP appropriate for use in calculating S

ERP_V = total peak visual ERP in watts

ERP_A = total peak aural ERP in watts

ERP = authorized effective radiated power, accounting for polarization

R = RCAGL - 2 meters

KPAX-TV NTSC Facility

Channel 8	Freq:	180-186 MHz range
	ERP =	(0.4)[275 kilowatts (visual)]+[27.5 kilowatts (aural)]
	Polarization =	Horizontal
	RCAGL -2 meters =	71.7 meters

$S = \frac{33.4 (F^2) \text{ Tot ERP}}{R^2}$	Tot ERP = 137,500 watts (Horizontal Only)
	R = 71.7 meters
	F = 0.2 (from manufacturer's data)

$$S = < 35.8 \mu\text{W}/\text{cm}^2$$

Therefore, KPAX-TV contributes less than $35.8 \mu\text{W}/\text{cm}^2$ at 2 meters above ground.

The limit for an uncontrolled environment for this frequency is $200 \mu\text{W}/\text{cm}^2$.

KPAX-TV contributes less than 17.9% RFF level for an uncontrolled environment two meters above the ground in the vicinity of the KPAX-TV tower site.

KPAX-DT DTV Facility (Proposed)

Channel 7	Freq:	174-180 MHz range
	ERP =	22.5 kW
	Polarization =	Horizontal
	RCAGL -2 meters =	71.7 meters

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

Tot ERP = 22.5 kW (Horizontal Only)
R = 71.7 meters
F = 0.15 (from manufacturer's data)

$$S = < 3.3 \mu\text{W}/\text{cm}^2$$

Therefore, KPAX-DT contributes less than $3.3 \mu\text{W}/\text{cm}^2$ at 2 meters above ground.

The limit for an uncontrolled environment for this frequency is $200 \mu\text{W}/\text{cm}^2$.

KPAX-DT contributes less than 1.7% RFF level for an uncontrolled environment two meters above the ground in the vicinity of the KPAX-TV tower site.

KTMF(TV) NTSC Facility

Channel 23	Freq:	524-530 MHz range
	ERP =	(0.4)[1,820 kilowatts (visual)]+[182 kilowatts (aural)]
	Polarization =	Horizontal
	RCAGL -2 meters =	76 meters

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

Tot ERP = 910,000 watts (Horizontal Only)
R = 76 meters
F = 0.05 (from manufacturer's data)

$$S = < 13.2 \mu\text{W}/\text{cm}^2$$

Therefore, KTMF-TV contributes less than $13.2 \mu\text{W}/\text{cm}^2$ at 2 meters above ground.

The limit for an uncontrolled environment for this frequency is $351.3 \mu\text{W}/\text{cm}^2$.

KTMF(TV) contributes less than 3.7% RFF level for an uncontrolled environment two meters above the ground in the vicinity of the KPAX-TV tower site.

KTMF-DT DTV Facility (Construction Permit)

Channel 36	Freq:	602-608 MHz range
	ERP =	122 kW
	Polarization =	Horizontal
	RCAGL -2 meters =	53 meters

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

Tot ERP = 122 kW (Horizontal Only)
R = 53 meters
F = 0.27 (from manufacturer's data)

$$S = < 105.8 \mu\text{W}/\text{cm}^2$$

Therefore, KTMF-DT contributes less than $105.8 \mu\text{W}/\text{cm}^2$ at 2 meters above ground.

The limit for an uncontrolled environment for this frequency is $403.3 \mu\text{W}/\text{cm}^2$.

KTMF-DT contributes less than 26.2% RFF level for an uncontrolled environment two meters above the ground in the vicinity of the KPAX-TV tower site.

KECI-TV NTSC Facility

Channel 13	Freq:	210-216 MHz range
	ERP =	(0.4)[229 kilowatts (visual)]+[22.9 kilowatts (aural)]
	Polarization =	Horizontal
	RCAGL -2 meters =	72 meters

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

Tot ERP = 114,500 watts (Horizontal Only)
R = 72 meters
F = 0.2 (assumed)

$$S = < 29.5 \mu\text{W}/\text{cm}^2$$

Therefore, KECI-TV contributes less than $29.5 \mu\text{W}/\text{cm}^2$ at 2 meters above ground.

The limit for an uncontrolled environment for this frequency is $200 \mu\text{W}/\text{cm}^2$.

KECI-TV contributes less than 14.8% RFF level for an uncontrolled environment two meters above the ground in the vicinity of the KPAX-TV tower site.

KECI-DT DTV Facility (Construction Permit)

Channel 40	Freq:	626-632 MHz range
	ERP =	116 kW
	Polarization =	Horizontal
	RCAGL -2 meters =	41 meters

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

Tot ERP = 116 kW (Horizontal Only)
R = 41 meters
F = 0.1 (assumed)

$$S = < 23.0 \mu\text{W}/\text{cm}^2$$

Therefore, KECI-DT contributes less than $23.0 \mu\text{W}/\text{cm}^2$ at 2 meters above ground.

The limit for an uncontrolled environment for this frequency is $419.3 \mu\text{W}/\text{cm}^2$.

KECI-DT contributes less than 5.5% RFF level for an uncontrolled environment two meters above the ground in the vicinity of the tower site.

K32EU TV Translator

Channel 32	Freq:	578-584 MHz range
	ERP =	(0.4)[10.02 kilowatts (visual)]+[1.002 kilowatts (aural)]
	Polarization =	Horizontal
	RCAGL -2 meters =	29 meters

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

Tot ERP = 5,010 watts (Horizontal Only)
R = 29 meters

$$F = 0.4 \text{ (assumed)}$$

$$S = < 31.8 \mu\text{W}/\text{cm}^2$$

Therefore, K32EU (TX) contributes less than $31.8 \mu\text{W}/\text{cm}^2$ at 2 meters above ground.

The limit for an uncontrolled environment for this frequency is $387.3 \mu\text{W}/\text{cm}^2$.

K32EU (TX) contributes less than 8.2% RFF level for an uncontrolled environment two meters above the ground in the vicinity of the KPAX-TV tower site.

K33IN TV Translator

Channel 33	Freq:	584-590 MHz range
	ERP =	(0.4)[5 kilowatts (visual)]+[0.5 kilowatts (aural)]
	Polarization =	Horizontal
	RCAGL -2 meters =	31 meters

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

Tot ERP = 2500 watts (Horizontal Only)
R = 31 meters
F = 0.4 (assumed)

$$S = < 13.9 \mu\text{W}/\text{cm}^2$$

Therefore, K33IN (TX) contributes less than $13.9 \mu\text{W}/\text{cm}^2$ at 2 meters above ground.

The limit for an uncontrolled environment for this frequency is $391.3 \mu\text{W}/\text{cm}^2$.

K33IN (TX) contributes less than 3.6% RFF level for an uncontrolled environment two meters above the ground in the vicinity of the KPAX-TV tower site.

KJFT(FM) FM Facility (Construction Permit)

Channel 212	Freq:	90.3 MHz range
	ERP =	110 watts
	Polarization =	Horizontal + Vertical
	RCAGL -2 meters =	16 meters

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

Tot ERP = 220 watts (Horizontal + Vertical)

R = 16 meters

F = 0.3 (assumed)

$$S = < 2.6 \mu\text{W}/\text{cm}^2$$

Therefore, KJFT(FM) contributes less than $2.6 \mu\text{W}/\text{cm}^2$ at 2 meters above ground.

The limit for an uncontrolled environment for this frequency is $200 \mu\text{W}/\text{cm}^2$.

KJFT(FM) contributes less than 1.3% RFF level for an uncontrolled environment two meters above the ground in the vicinity of the KPAX-TV tower site.

Radio Frequency Summary of Field Level Calculations (Summary)

<u>Station</u>	<u>Ch</u>	<u>Status</u>	<u>ERP</u> kW	<u>Relative</u> <u>Field</u> <u>Factor</u>	<u>RCAGL-2</u> meters	<u>S</u> <u>Calculated</u> $\mu\text{W}/\text{cm}^2$	<u>Uncontrolle</u> <u>d</u> <u>S Limit</u> $\mu\text{W}/\text{cm}^2$	<u>% of</u> <u>Limit*</u>
KPAX-TV	8	Lic	275 (H)	0.2	71.7	35.8	200	17.9%
KPAX-DT	7	Prop	22.5 (H)	0.15	71.7	3.3	200	1.7%
KTMF(TV)	23	Lic	1820 (H)	0.05	76.0	13.2	351.3	3.7%
KTMF-DT	36	CP	122 (H)	0.27	53.0	105.8	403.3	26.2%
KECI-TV	13	Lic	229 (H)	0.2	72.0	29.5	200	14.8%
KECI-DT	40	CP	116 (H)	0.1	41.0	23.0	419.3	5.5%
K32EU (TX)	32	Lic	10.02 (H)	0.4	29.0	31.8	387.3	8.2%
K33IN (TX)	33	CP	5 (H)	0.4	31.0	13.9	391.3	3.6%
KJFT(FM)	212	CP	0.11 (H+V)	0.3	16.0	2.6	200	1.3%

*Maximum exposure limit for an uncontrolled environment.

Therefore the total RFF percentage two meters above the ground at the highest RFF value will still be less than 82.9% of the limit for an uncontrolled environment, which is less than

16.6% of the limit for a controlled environment, when all of the aforementioned transmitters, both on the tower and in the nearby area, are fully operational at the currently authorized parameters for each facility.

The licensee indicates that access to the site is approximately 2 miles from a main road. The road is not regularly traveled. Two locked gates are in place on the access road that leads to the tower site. Therefore, it is believed this site qualifies under Situation B of OET Bulletin 65 as discussed below.

From Pages 77 and 78, guidance for such a situation is provided from the FCC publication entitled, *"Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields, OET Bulletin 65, Edition 97-01, August 1997"*, *"Appendix B, Summary of 1986 Mass Media Bureau, Public Notice on RF Compliance"*.

A portion is abstracted as follows:

Situations

(B) High RF levels are produced at ground level in a remote area not likely to be visited by the public.

- If the area of concern is marked by appropriate warning signs, an applicant may assume that there is no significant effect on the human environment with regard to exposure of the general public. It is recommended that fences also be used where feasible.

Therefore, members of the public and personnel working around the KPAX-TV facility would not be exposed to RFF levels exceeding the FCC standards since KPAX-TV has posted signs around the tower property.

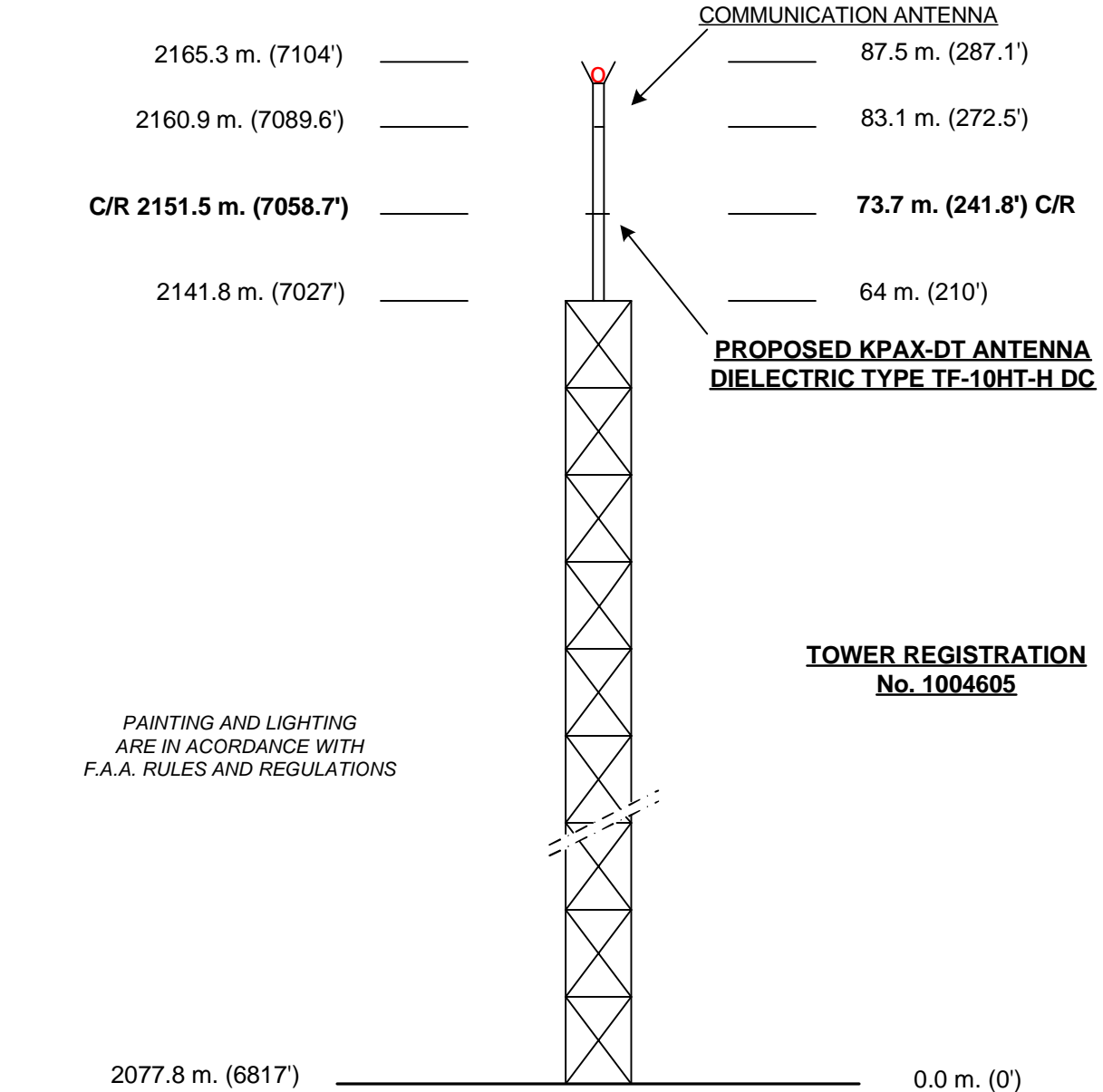
An environmental assessment (“EA”) is categorically excluded under Section 1.1306 of the FCC Rules and Regulations as the tower was constructed prior to the requirements specified in WT Docket No. 03-128 and the licensee indicates:

- (a)(1) The proposed facilities located on an existing tower are not located in an officially designated wilderness area.
- (a)(2) The proposed facilities located on an existing tower are not located in an officially designated wildlife preserve.
- (a)(3) The proposed facilities located on an existing tower will not affect any listed threatened or endangered species or habitats.
- (a)(3)(ii) The proposed facilities located on an existing tower will not jeopardize the continued existence of any proposed endangered or threatened species or likely to result in the destruction or adverse modification of proposed critical habitats.
- (a)(4) The proposed facilities located on a tower which was built prior to the adoption of WT Docket No. 03-128 and is grandfathered and has not affected any known districts, sites, buildings, structures, or objects significant in American history, architecture, archaeology, engineering, or culture.
- (a)(5) The proposed facilities located on an existing tower are not located near any known Indian religious sites.
- (a)(6) The proposed facilities located on an existing tower are not located in a flood plain.
- (a)(7) The installation of a dual channel antenna on an existing 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) The existing tower lighting will remain unchanged.

- (b) Workers and the general public will not be subjected to RFF levels in excess of the current FCC guidelines contained in OET Bulletin 65 (Edition 97-01) and Supplement A. Authorized personnel will be alerted to areas of the antennas where potential radiation levels are in excess of the FCC guidelines. A security fence with a locked gate precludes access to the tower site.

ABOVE MEAN SEA LEVEL

ABOVE GROUND



*PAINTING AND LIGHTING
ARE IN ACORDANCE WITH
F.A.A. RULES AND REGULATIONS*

TOWER REGISTRATION
No. 1004605

(NOT TO SCALE)

EXHIBIT E - 1
VERTICAL SKETCH
FOR THE PROPOSED OPERATION OF
KPAX-DT, MISSOULA, MONTANA
JULY 2006

EXHIBIT E-2

ANTENNA MANUFACTURER DATA

KPAX-DT, MISSOULA, MONTANA

Dielectric

Proposal #: **DCA-11058**

Antenna Type: **TF-10HT-H DC**

Channel: **8 NTSC**

Call Letters: **KPAX**

Location: **Missoula, MT**

7 DTV

Electrical Specifications		Value		Remarks
		Ratio	dB	
RMS Gain at Main Lobe over Halfwave Dipole	Hpol	9.7	9.87	N8; D7: 9.6 (9.82 dB)
	Vpol			
RMS Gain at Horizontal over Halfwave Dipole	Hpol	9.0	9.54	N8; D7: 8.9 (9.49 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		0.75 deg		N8; D7: 0.75 deg
Peak TV Power	20% Aural	50 kW	16.99 dBk	+5 kW average DTV power
Antenna Input:	T/L	3 1/8 in	50.0 ohm	Type: EIA/DCA
Maximum Antenna Input VSWR	Pix +.5MHz	1.05 : 1		Notes: Ch 8 on one 3.125" line
	Color	1.08 : 1		Ch 7 on one 1-5/8 line
	Aural	1.10 : 1		Requires 5 psi pressure
	Channel	1.10 : 1		D7: Channel: 1.10 : 1
Patterns	Azimuth	TF-O		N8 D7: TF-O
	Elevation	10S097075	10S097075-90	
		10S096075	10S096075-90	
Mechanical Specifications		Metric	English	
Height with Lightning Protector	H4	20.3 m	66.5 ft	
Height Less Lightning Protector	H2	19.1 m	62.5 ft	
Height of Center of Radiation	H3	9.7 m	31.8 ft	Above base flange
Basic Wind Speed	V	112.7 km/h	70 mi/h	TIA/EIA-222-F.
Force Coeff. x Projected Area	CaAc	8.45 m ²	91.0 ft ²	Above base flange
Moment Arm	D1	9.7 m	31.7 ft	Above base flange
Force Coeff. x Projected Area	CaAc	m ²	ft ²	
Moment Arm	D3	m	ft	
Pole Bury Length	D2	m	ft	
Weight	W	3.0 t	6,600 lbs	
Deicer Power (3 phase)		10.0 kW	240 V	
Antenna designed in accordance with AISC specifications for design of structural steel for building as prescribed by TIA/EIA-222-F.				

NOTE:

Flange Mounted

Prepared By : SWB

DLD

Approved By :

JLS

Original Date : 5-Jul-05

SWB

DLD

[Signature]

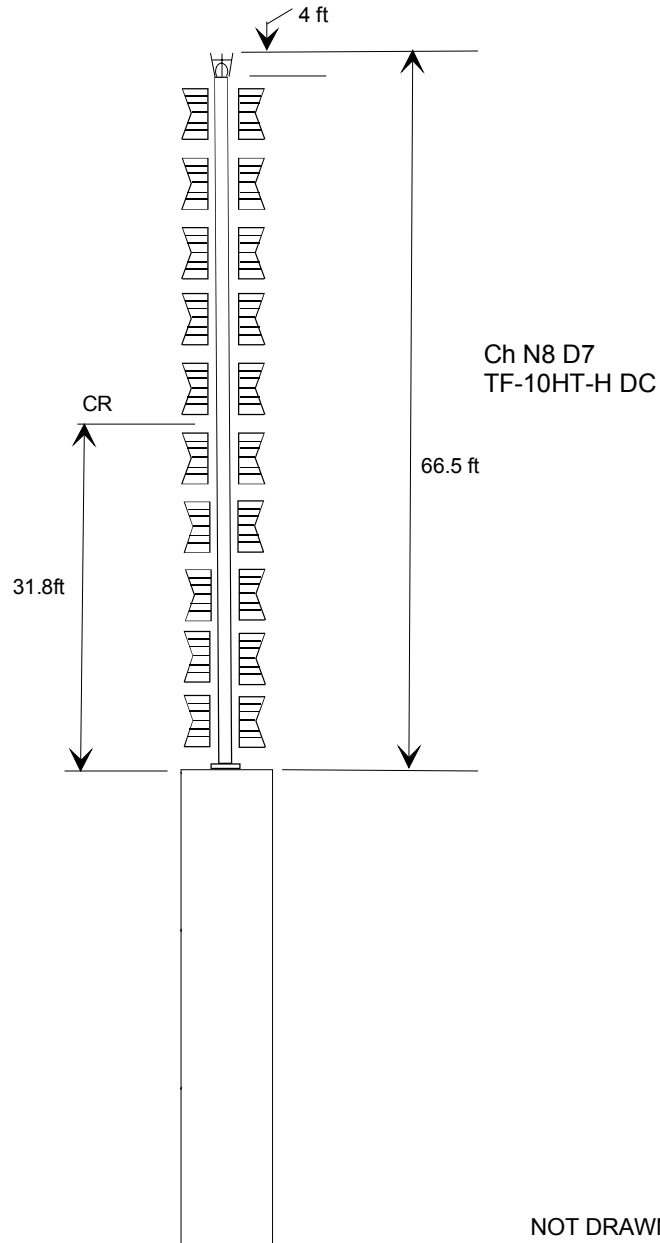


NTSC/DTV ANTENNA
TF-10HT-H DC
KPAX: Missoula, MT

MECHANICAL DATA

CaAc = 91 ft²
Moment arm = 31.7 ft
Weight = 6600 lbs

EIA-222-F Specification
(70 mph basic wind speed)



SWB-050705-1SK

NOT DRAWN TO SCALE

Proposal Number	DCA-11058	
Date	5-Jul-05	
Call Letters	KPAX-DT	Channel 7
Location	Missoula, MT	
Customer		
Antenna Type	TF-10HT-H DC	

SYSTEM SUMMARY

Antenna:

Type:	TF-10HT-H DC		H Pol
Channel:	7	ERP:	22.5 kW (13.52 dBk)
Location:	Missoula, MT	RMS Gain*:	9.6 (9.82 dB)
		Input Power:	2.34 kW (3.70 dBk)

Transmission Line:

Type:	EIA/DCA	Attenuation:	0.83 dB
Size:	1-5/8 FLEXLine	Efficiency:	82.6%
Impedance:	50 ohm		
Length:	280 ft		85.3 m

Combiner:	DCA	Attenuation:	0.04 dB
		Efficiency:	99.1%

Transmitter Out:

Power Required:	2.86 kW (4.57 dBk)
-----------------	-----------------------------

* Gain is with respect to half wave dipole.

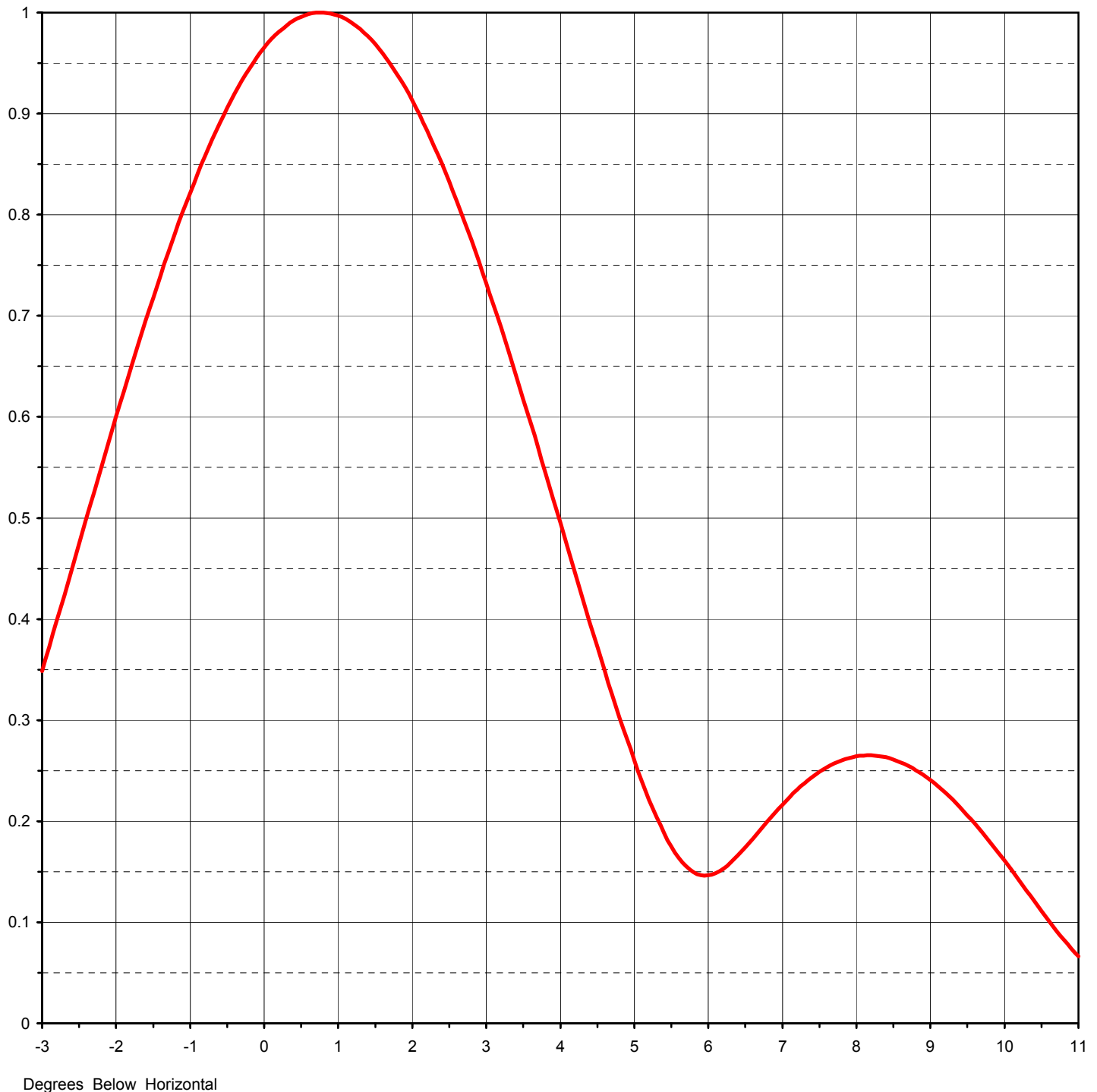


Proposal Number	DCA-11058	
Date	5-Jul-05	
Call Letters	KPAX-DT	Channel 7
Location	Missoula, MT	
Customer		
Antenna Type	TF-10HT-H DC	

ELEVATION PATTERN

RMS Gain at Main Lobe	9.60	(9.82 dB)
RMS Gain at Horizontal	8.90	(9.49 dB)
Calculated / Measured	Calculated	

Beam Tilt	0.75 deg
Frequency	177.00 MHz
Drawing #	10S096075



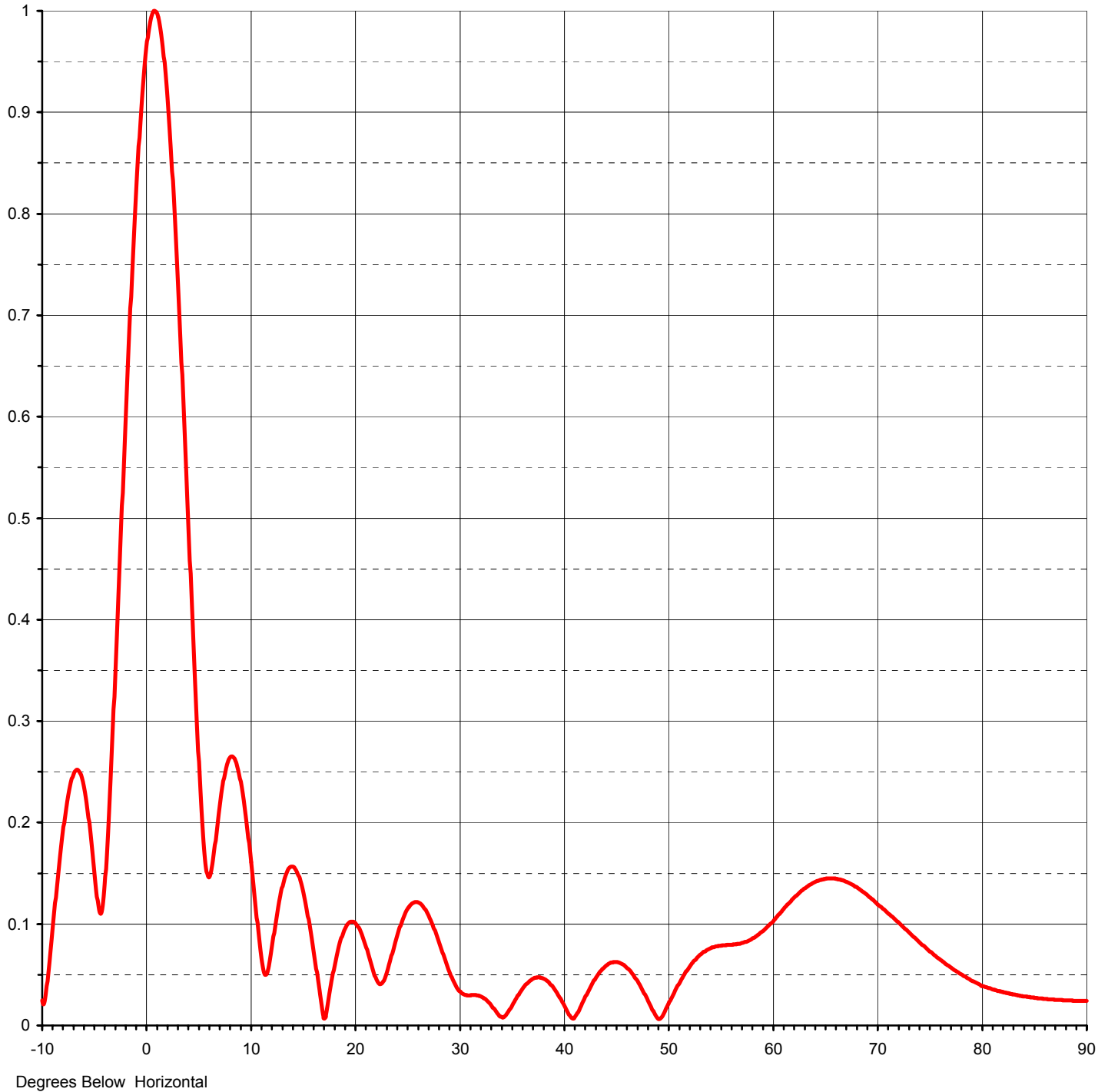


Proposal Number	DCA-11058	
Date	5-Jul-05	
Call Letters	KPAX-DT	Channel 7
Location	Missoula, MT	
Customer		
Antenna Type	TF-10HT-H DC	

ELEVATION PATTERN

RMS Gain at Main Lobe	9.60	(9.82 dB)
RMS Gain at Horizontal	8.90	(9.49 dB)
Calculated / Measured	Calculated	

Beam Tilt	0.75 deg
Frequency	177.00 MHz
Drawing #	10S096075-90





Proposal Number **DCA-11058**

Date **5-Jul-05**

Call Letters **KPAX-DT**

Channel **7**

Location **Missoula, MT**

Customer

Antenna Type **TF-10HT-H DC**

TABULATION OF ELEVATION PATTERN

Elevation Pattern Drawing #: **10S096075-90**

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.025	2.4	0.851	10.6	0.111	30.5	0.030	51.0	0.040	71.5	0.106
-9.5	0.043	2.6	0.814	10.8	0.092	31.0	0.030	51.5	0.049	72.0	0.101
-9.0	0.094	2.8	0.775	11.0	0.074	31.5	0.030	52.0	0.057	72.5	0.097
-8.5	0.146	3.0	0.733	11.5	0.050	32.0	0.029	52.5	0.063	73.0	0.092
-8.0	0.192	3.2	0.688	12.0	0.071	32.5	0.026	53.0	0.069	73.5	0.087
-7.5	0.227	3.4	0.641	12.5	0.104	33.0	0.021	53.5	0.073	74.0	0.082
-7.0	0.248	3.6	0.594	13.0	0.133	33.5	0.014	54.0	0.076	74.5	0.077
-6.5	0.251	3.8	0.545	13.5	0.150	34.0	0.009	54.5	0.078	75.0	0.073
-6.0	0.235	4.0	0.495	14.0	0.157	34.5	0.010	55.0	0.079	75.5	0.069
-5.5	0.200	4.2	0.445	14.5	0.151	35.0	0.018	55.5	0.079	76.0	0.065
-5.0	0.151	4.4	0.396	15.0	0.135	35.5	0.027	56.0	0.079	76.5	0.061
-4.5	0.112	4.6	0.349	15.5	0.111	36.0	0.035	56.5	0.080	77.0	0.057
-4.0	0.139	4.8	0.303	16.0	0.080	36.5	0.041	57.0	0.081	77.5	0.054
-3.5	0.231	5.0	0.260	16.5	0.045	37.0	0.045	57.5	0.083	78.0	0.050
-3.0	0.348	5.2	0.221	17.0	0.011	37.5	0.047	58.0	0.085	78.5	0.047
-2.8	0.398	5.4	0.188	17.5	0.025	38.0	0.047	58.5	0.088	79.0	0.044
-2.6	0.449	5.6	0.164	18.0	0.054	38.5	0.043	59.0	0.092	79.5	0.042
-2.4	0.500	5.8	0.149	18.5	0.077	39.0	0.038	59.5	0.097	80.0	0.039
-2.2	0.550	6.0	0.146	19.0	0.093	39.5	0.030	60.0	0.102	80.5	0.037
-2.0	0.600	6.2	0.153	19.5	0.101	40.0	0.021	60.5	0.108	81.0	0.036
-1.8	0.649	6.4	0.166	20.0	0.102	40.5	0.012	61.0	0.114	81.5	0.034
-1.6	0.695	6.6	0.183	20.5	0.094	41.0	0.007	61.5	0.119	82.0	0.033
-1.4	0.740	6.8	0.200	21.0	0.081	41.5	0.015	62.0	0.125	82.5	0.032
-1.2	0.782	7.0	0.216	21.5	0.064	42.0	0.026	62.5	0.130	83.0	0.031
-1.0	0.822	7.2	0.231	22.0	0.048	42.5	0.036	63.0	0.134	83.5	0.030
-0.8	0.858	7.4	0.244	22.5	0.041	43.0	0.045	63.5	0.138	84.0	0.029
-0.6	0.891	7.6	0.253	23.0	0.049	43.5	0.053	64.0	0.141	84.5	0.028
-0.4	0.920	7.8	0.260	23.5	0.067	44.0	0.058	64.5	0.143	85.0	0.027
-0.2	0.945	8.0	0.264	24.0	0.086	44.5	0.062	65.0	0.145	85.5	0.027
0.0	0.965	8.2	0.265	24.5	0.101	45.0	0.063	65.5	0.145	86.0	0.026
0.2	0.981	8.4	0.263	25.0	0.113	45.5	0.061	66.0	0.145	86.5	0.026
0.4	0.992	8.6	0.258	25.5	0.120	46.0	0.058	66.5	0.143	87.0	0.025
0.6	0.998	8.8	0.251	26.0	0.122	46.5	0.052	67.0	0.142	87.5	0.025
0.8	1.000	9.0	0.241	26.5	0.118	47.0	0.045	67.5	0.139	88.0	0.025
1.0	0.997	9.2	0.228	27.0	0.110	47.5	0.036	68.0	0.136	88.5	0.024
1.2	0.989	9.4	0.214	27.5	0.099	48.0	0.026	68.5	0.132	89.0	0.024
1.4	0.977	9.6	0.198	28.0	0.085	48.5	0.016	69.0	0.128	89.5	0.024
1.6	0.960	9.8	0.189	28.5	0.070	49.0	0.007	69.5	0.124	90.0	0.024
1.8	0.938	10.0	0.171	29.0	0.056	49.5	0.010	70.0	0.119		
2.0	0.913	10.2	0.151	29.5	0.043	50.0	0.020	70.5	0.115		
2.2	0.884	10.4	0.131	30.0	0.034	50.5	0.030	71.0	0.111		

TABLE I
COMPUTED COVERAGE DATA
FOR THE PROPOSED DTV OPERATION OF
KPAX-DT, MISSOULA, MONTANA
CHANNEL 7 22.5 KW ND ERP 642 METERS HAAT
JULY 2006

<u>Radial</u> <u>Bearing</u> N ° E, T	<u>Average*</u> <u>Elevation</u> <u>3.2 to 16.1 km</u>	<u>Effective</u> <u>Height</u> meters	<u>Depression</u> <u>Angle</u>	<u>ERP At</u> <u>Radio</u> <u>Horizon</u> kW	<u>Distance to Contour F(50,90)</u>	
	meters				<u>43 dBu</u> <u>City Grade</u> km	<u>36 dBu</u> <u>Noise-Limited</u> km
0	1376.5	775	0.772	22.5	110.4	126.6
45	2125.5	26	0.146	22.5	48.5	59.1
90	1919.5	232	0.424	22.5	83.0	95.4
135	1603.5	548	0.650	22.5	103.4	116.6
180	1159.5	992	0.874	22.5	114.4	130.5
225	1118.5	1033	0.891	22.5	115.2	131.4
270	1312.5	839	0.803	22.5	111.6	127.6
315	1460.5	691	0.729	22.5	108.4	124.4

*Based on data from FCC 3-second data base

DTV Channel 7 (174-180 MHz)
Average Elevation 3.2 to 16.1 km 1509.5 meters AMSL
Center of Radiation 2151.5 meters AMSL
Antenna Height Above Average Terrain 642 meters
Effective Radiated Power 22.5 kW (13.52 dBk) Max.

North Latitude: 47° 01' 06"
West Longitude: 114° 00' 41"

(NAD-27)

TABLE II
AUTHORIZED 36 DBU CONTOUR
BY BMPCDT-20011025ABQ
KPAX-DT, MISSOULA, MONTANA
CHANNEL 7 28 KW ND ERP 623 METERS HAAT
JULY 2006

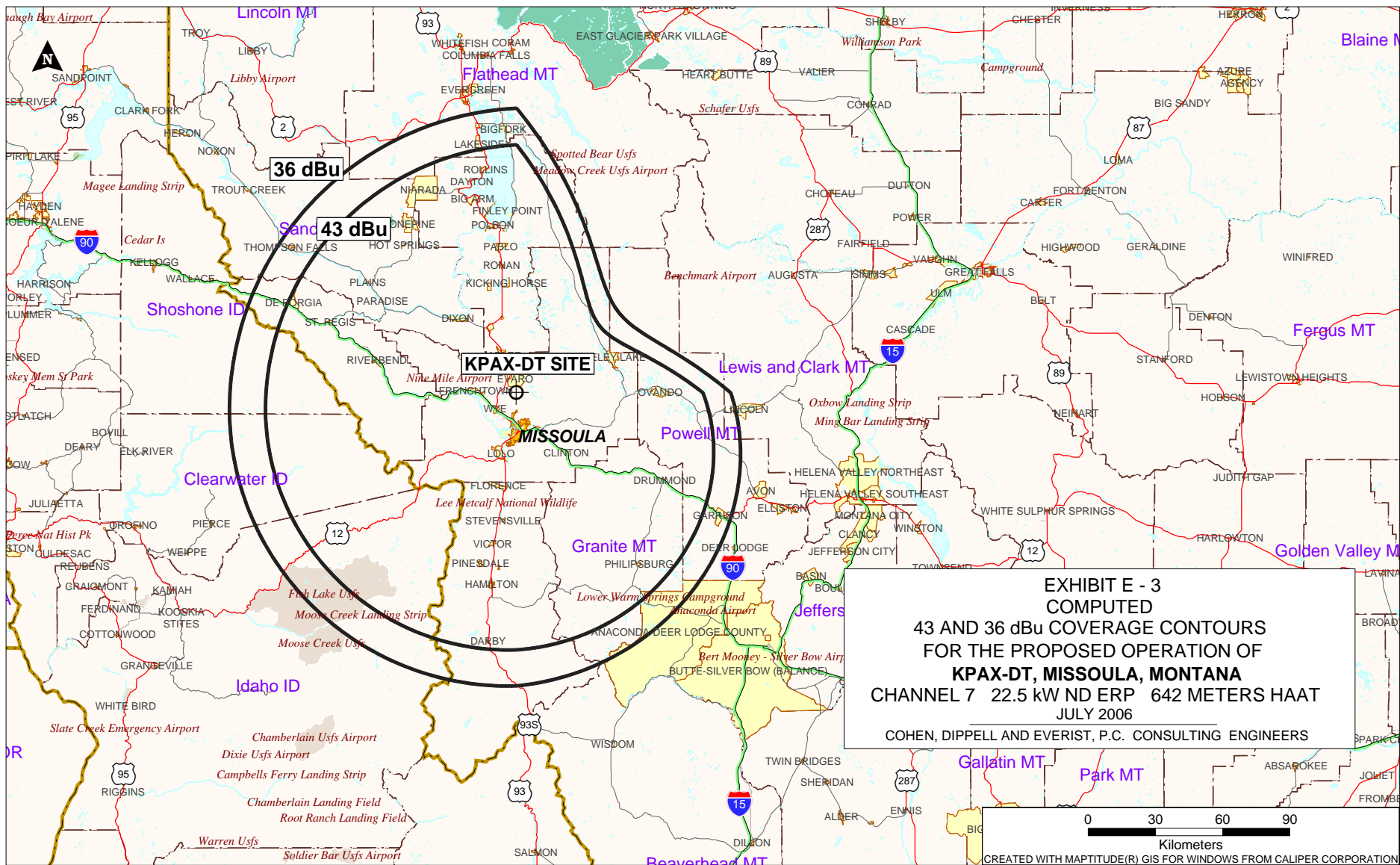
<u>Radial</u> <u>Bearing</u> N ° E, T	<u>HAAT</u> meters	<u>ERP</u> kW	<u>36 dBu</u> <u>Noise-Limited</u> km
0	756.5	28	128.7
45	7.5	28	60.6
90	213.5	28	95.5
135	529.5	28	117.5
180	973.5	28	132.6
225	1014.5	28	133.5
270	820.5	28	129.7
315	672.5	28	126.2

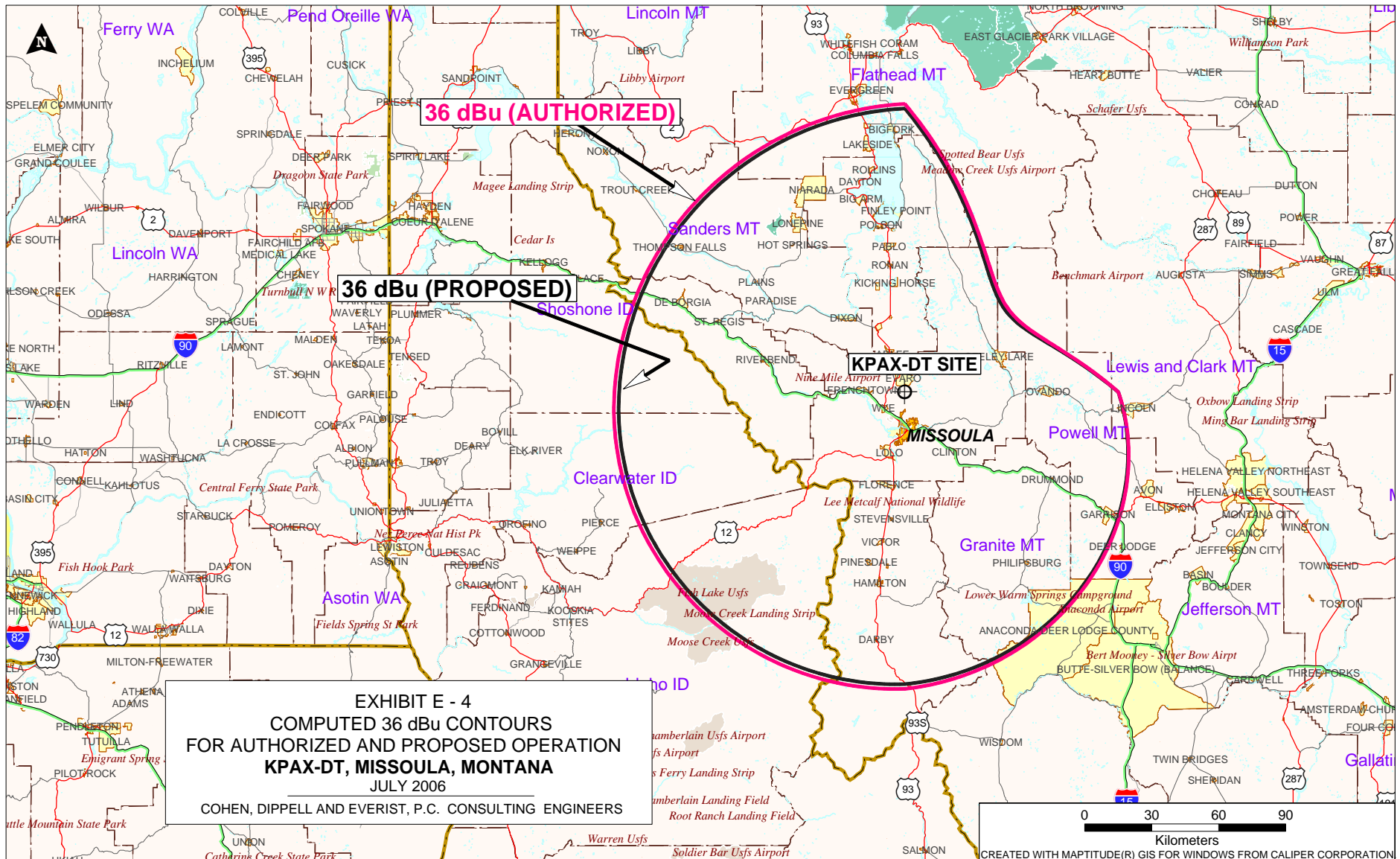
*Based on data from FCC 3-second data base

DTV Channel 7 (174-180 MHz)
 Average Elevation 3.2 to 16.1 km 1510 meters AMSL
 Center of Radiation 2133 meters AMSL
 Antenna Height Above Average Terrain 623 meters
 Effective Radiated Power 28 kW (14.47 dBk) Max.

North Latitude: 47° 01' 06"
 West Longitude: 114° 00' 41"

(NAD-27)

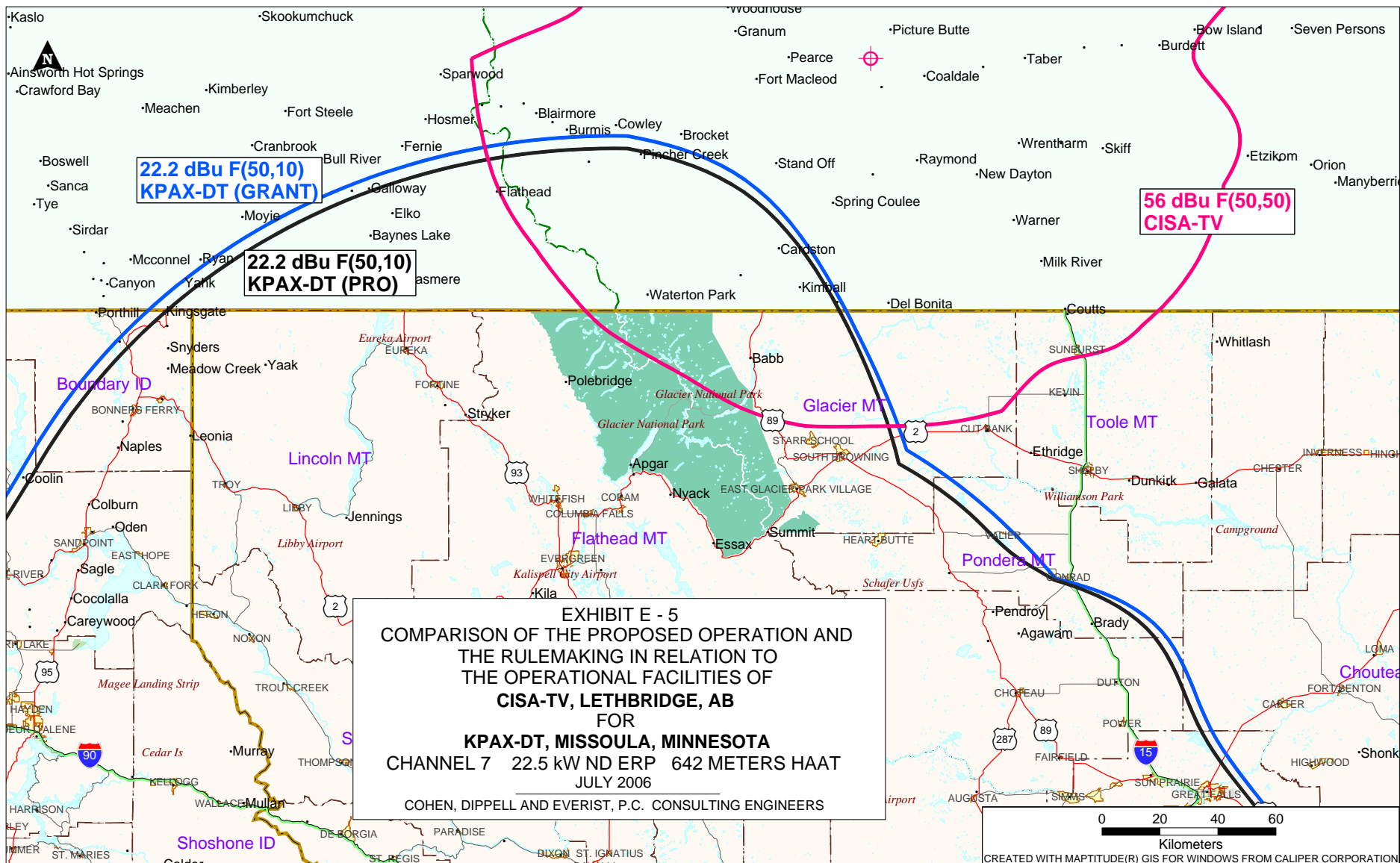




COHEN, DIPPELL AND EVERIST, P.C.

TABLE III
STATIONS POTENTIALLY AFFECTED BY
THE PROPOSED OPERATION OF
KPAX-DT, MISSOULA, MONTANA
CHANNEL 7 22.5 KW ERP 642 METERS HAAT
JULY 2006

<u>Channel</u>	<u>Call</u>	<u>City/State</u>	<u>Distance (km)</u>	<u>Status</u>	<u>Application Ref. No.</u>
7	KTVB	BOISE, ID	397.7	R2_PRT	BLCDT-20020503AAX
7	KTVB	BOISE, ID	397.7	LIC	BLCT-19821124KE
7	KBZK	BOZEMAN, MT	283.8	LIC	BLCT-19870908KG
7	KBZK	BOZEMAN, MT	283.8	CP	BPCT-20040730AHW
7	KRTV	GREAT FALLS, MT	213.6	APP	BMPCDT-20060706ADV
7	KRTV	GREAT FALLS, MT	213.6	CP	BPCDT-20030710ACH
7	KTRV	GREAT FALLS, MT	213.6	GRANT	BPRM-20000413AAK
7	KHQ-TV	SPOKANE, WA	255.4	R2_PRT	BDTV-473452
7	KSPS-TV	SPOKANE, WA	255.5	LIC	BLET-378
8	KFBB-TV	GREAT FALLS, MT	213.6	LIC	BLCDT-20020507AAI
8	KFBB-TV	GREAT FALLS, MT	213.6	APP	BPCDT-20060707AEY
8	KFBB-DR	GREAT FALLS, MT	213.6	GRANT	BPRM-19990429AAD
8	KPAX-TV	MISSOULA, MT	0	LIC	BLCT-1996



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

TECH BOX

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 Donald G. Everist	Relationship to Applicant (e.g., Consulting Engineer) Consulting Engineer	
Signature 	Date July 13, 2006	
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).