EXHIBIT E

ENGINEERING STATEMENT
ON BEHALF OF
THE BOARD OF REGENTS OF THE
MONTANA UNIVERSITY SYSTEM
IN SUPPORT OF AN APPLICATION
TO CONSTRUCT REPACKED FACILITIES
PURSUANT TO DA 17-314
KUKL-TV KALISPELL, MONTANA
CHANNEL 15 12.1 KW (MAX) ERP 830 METERS HAAT
JUNE 2017

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 1420 N Street, N.W., Suite One, 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 9th day of June, 2017.

Notary Public

My Commission Expires: 2/28/2018

CAROLYN L. SHOLES NOTARY PUBLIC DISTRICT OF COLUMBIA 02-28-2018

This engineering statement has been prepared on behalf of The Board of Regents of the Montana University System ("MUS"). The purpose of this engineering statement is to support its application for a permit to construct new digital television ("DTV") facilities on Channel 15 to serve the community of Kalispell, Montana, and the surrounding area. This application is submitted in response to the Incentive Auction.

Channel 15 will continue as a noncommercial educational broadcast station to serve Kalispell, Montana.

MUS proposes to construct and to operate a noncommercial educational broadcast station on DTV Channel 15 with an average effective radiated power ("ERP") of 12.1 kW maximum directional (eliptical polarization) and a height above average terrain ("HAAT") of 830 meters (2723 feet).

KCFW-TV Tower

MUS has an agreement with the current tower owner, Bluestone License Holdings, Inc., licensee of KCFW-TV ("KCFW") to change the DTV antenna. The proposed new DTV antenna will be exchanged for the existing side-mounted antenna, therefore, the overall structure height will remain unchanged. The transmitter site is located in a very rural area on Blacktail Mountain near Lakeside, Montana. The Antenna Structure Registration No. is 1000780. Exhibit E-1 shows a vertical sketch of the tower.

The geographic coordinates of the existing tower are:

North Latitude: 48° 00' 48.2"

West Longitude: 114° 21' 54.5"

NAD 27

North Latitude: 48° 00' 48"

West Longitude: 114° 21' 58"

NAD 83

Equipment Data

Antenna: ERI, Type ETU-2U2-ESC1-15 (or equivalent) eliptically polarized directional antenna with 0.5° electrical beam tilt. The azimuth and vertical plane patterns and other exhibits required by Section 73.625(c) are included in Exhibit E-2.

Transmission Line: 175 feet (53.3 m) of Andrew, Heliax, Type HJ7-50 1-5/8" 50 ohm air dielectric line (or equivalent) with an attenuation of 0.466 dB/100 ft.

Power Data

Transmitter output ("TPO"): At filter output		0.890 kW	-0.506 dBk
Transmission Line Efficiency/(Loss):		82.9%	(0.816 dB)
Input power to the antenna:		0.738 kW	-1.32 dB
Antenna power gain maximum:	Horizontal	16.67	12.22 dB
	Vertical	5.00	6.99 dB
Effective Radiated Power (ERP)			
Maximum, Main Lobe:	Horizontal	12.1 kW	10.83 dBk
	Vertical	3.6 kW	5.6 dBk

Elevation Data

Vertical dimension of Channel 15 side-mounted antenna	2.4 meters 7.9 feet
Elevation of site above mean sea level	2035.8 meters 6679.1 feet
Overall height above ground of existing tower structure and appurtenances (including lightning protection)	73.1 meters 239.8 feet
Overall height above mean sea level of existing tower and appurtenances (including lightning protection)	2108.8 meters 6918.6 feet
Center of radiation of Channel 15 antenna above ground	47.2 meters 154.8 feet
Center of radiation of Channel 15 antenna above mean sea level	2083 meters 6833.9 feet
Antenna height above average terrain	830 meters 2723 feet

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 determined from the USGS one-second terrain data base. The F(50,90) 48dBu and 38.8 dBu (dipole adjusted 41 dBu) DTV coverage contours have been computed from reference to the propagation data curves for Channels 14-69, as published by the FCC in Figure 10b and Figure 10c, 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_h, varies from 0.61 to 0.92 degrees. Since the relative

vertical field of the antenna pattern is greater than 90% of the maximum at these depression angles, the maximum power was used in determining the distance to the DTV contours.

Table I includes at every 10º in azimuth beginning with True North, the average elevation from 3.2 to 16.1 km, and the distances to the 41 dBu and 38.8 dBu F(50,90) coverage contours. The antenna height above average terrain is based on the eight cardinal radials. The map of Exhibit E-3 shows that the 48 dBu F(50,90) coverage contour encompasses the community of license. In Exhibit E-4, the proposed 38.8 dBu F(50,90) coverage contour is similar to the contained licensed 41 dBu F(50,90) coverage contour.

RF Safety-FCC Rule, Section 1.1307 of the FCC Rules

Pursuant to OET Bulletin No. 65 dated August 1997, non-broadcast stations are all exempt from RFF evaluations.

The RFF contribution of the proposed KUKL-TV operation will be calculated using the following formula:

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

where:

S = power density in μW/cm²
F = relative field factor
Total ERP = ERP Horizontal Polarization + ERP Vertical Polarization
R = RCAGL - 2 meters

ERP = RMS ERP in watts for DTV Stations

There are no AM stations within 3.22 km of the existing tower site. There are two FM stations, KLKM(FM) and KALS(FM) operating on the tower. In addition digital television facilities, KCFW-TV and KAJJ-CD are operating from this tower. According to CDBS, there are no other broadcast stations operating within 100 meters of the site.

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

The radio frequency field ("RFF") contribution of the proposed operation operates is as follows.

Based on the elevation pattern from the manufacturer's antenna data, a maximum downward field of 0.220 in the range of 20º to 90º would create a maximum field level of 9.7 uW/cm^2 in the vicinity of the base of the tower.

The limit for an uncontrolled environment is 319 μW/cm^2 and for a controlled environment is 1597 μW/cm^2 for the UHF Channel 15.

The proposed operation contributes less than three percent RFF level for an uncontrolled environment two meters above the ground at the proposed site or approximately one percent RFF level for a controlled environment two meters above ground at the existing site.

The licensee indicates that access to the site is approximately 10 miles on an unimproved road from a main highway. The unimproved road is not regularly traveled. A gate prevents

vehicle access. 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 existing tower site would not be exposed to RFF levels exceeding the FCC standards. With respect to work performed on the tower, the licensee will establish procedure to ensure for the proposed facility that workers are not exposed to RFF levels above those prescribed by FCC, by reducing or turning off the power, as appropriate.

Although the proposed RFF contribution will be far less than 5% for controlled environment, if the application is granted and prior to construction, MUS represents that it will attempt to create a comprehensive RF safety plan, if necessary, with the buyer of this site for the site's compliance with the Commission's RF safety rules.

The tower site is located inside a chain link fence with a locked gate to prevent unauthorized access to the tower.

Environmental Assessment

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 that:

(a)(1)	The existing tower is not located in an officially designated wilderness area.
(a)(2)	The existing tower is 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 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 existing tower is not located near any known Indian religious sites.
(a)(6)	The existing tower is not located in a flood plain.
(a)(7)	The addition of a new side-mounted DTV antenna on an existing guyed tower 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 on the ground will not be subjected to RFF levels in excess of the current FCC guidelines contained in OET Bulletin No. 65, Edition 97-01, dated August 1997 and Supplement A.

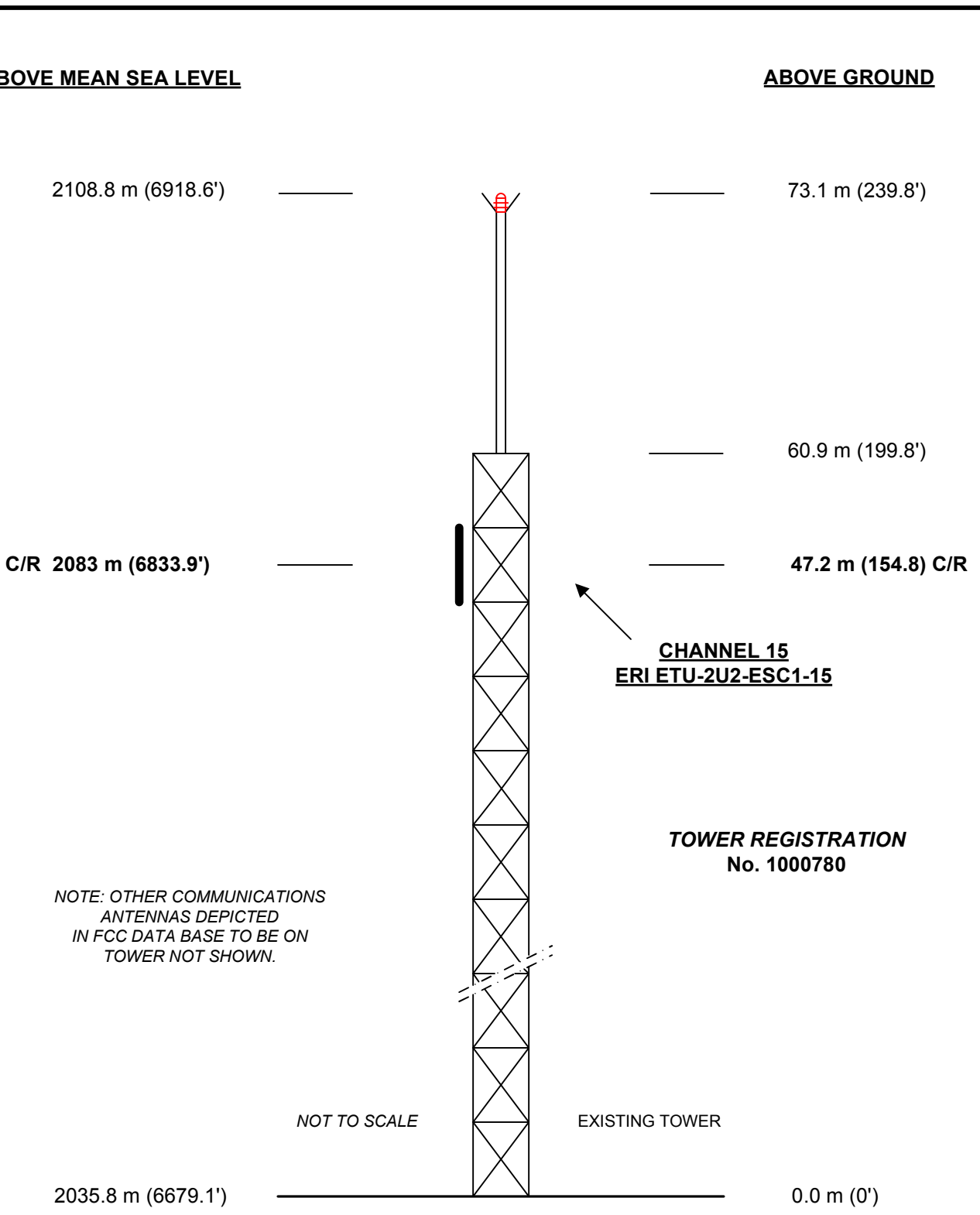


EXHIBIT E - 1
VERTICAL SKETCH
FOR THE REPACKED OPERATION OF
KUKL-TV, KALISPELL, MONTANA
CHANNEL 15 12.1 kW ERP 830 METERS HAAT
JUNE 2017

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

EXHIBIT E-2

ANTENNA MANUFACTURER DATA

Preliminary Specification for
ETU Series Side Mounted
UHF Elliptically Polarized
Panel Television Antenna

KUKL (DT), RF Channel 15
Montana State University, Kalispell, MT

May 15, 2017

Antenna Model:
ETU-2U2-ESC1-15

Specification Number
20170501-282

Electronics Research, Inc. 7777 Gardner Road Chandler IN 47610-9219 USA
+1 812 925-6000 (tel) +1 812 925-4030 (fax)

Preliminary Specification for ETU Series Side Mounted UHF Elliptically Polarized Panel Television Antenna

Electrical Characteristics:

Channel:		15	
Frequency:		476 MHz to 482 MHz	
Service:		ATSC	
Azimuth Pattern Number:	Horizontal Polarization	ETU-2PC1-H	
	Vertical Polarization	ETU-2PC1-V	
Elevation Pattern Number:	Horizontal Polarization	ETU-2U2-H	
	Vertical Polarization	ETU-2U2-V	
Azimuth Directivity:	Horizontal Polarization	2.50	(3.98 dB)
	Vertical Polarization	2.50	(3.98 dB)
Elevation Directivity:	Horizontal Polarization	8.67	(9.38 dBd)
	Vertical Polarization	8.67	(9.38 dBd)
Peak Power Gain:	Horizontal Polarization	16.67	(12.22 dBd)
	Vertical Polarization	5.00	(6.99 dBd)
Gain at Horizontal:	Horizontal Polarization	16.38	(12.14 dBd)
	Vertical Polarization	4.91	(6.91 dBd)
Vertical/Horizontal Ratio:		0.30	
Electrical Beam Tilt:		0.50 Degrees	
Input Power Required:		1.40 kW	(1.47 dBk)
RF Input:		1-5/8-inch EIA flange male	
Input Power Rating (maximum):		kW Average Power, 8VSB	
Antenna VSWR (maximum):		1.10 Over 6 MHz Channel	

Preliminary Specification for ETU Series Side Mounted UHF Elliptically Polarized Panel Television Antenna

Mechanical Characteristics:

Mounting Configuration: (*Tower interface supplied by others)		Side Mount*	
Height of Antenna:		7.9 feet	(2.4 meters)
Height of Center of Radiation:		3.9 feet	(1.2 meters)
Deicing:		Unpressurized element radome	
Radome Height:		9.8 inches	(250 millimeters)
Radome Color:		Aviation Orange	
Climbing Device:		Not Applicable	
Calculated Weight[1]:	No Ice	420.0 lbm	(190.5 kg)
Windload Data[2]:			
	EPA No Ice	46.0 sq.ft.	(4.3 sq.m.)

This antenna is designed to be supported by a structure that can resist the antenna base reactions and which provides a support that is rigid in the three translational and three rotational degrees of freedom.

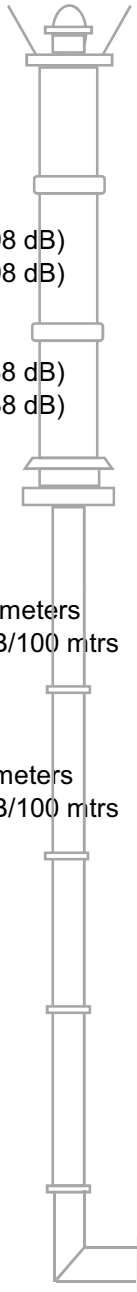
1 Please note, the listed weights and effective wind areas are based on the PRELIMINARY design of the antenna. Final As-Built values for the antenna are typically within +/-10% of the Preliminary design values, and will be provided in the technical manual that accompanies the antenna. Specified loads include the antenna, beacon and lightning spurs only. Custom mounting brackets/adapters and/or antenna input section are NOT included.

2 Loads calculated in accordance with the ANSI/TIA-222 standard.

NOTE: The purchaser or their representative shall be required to contact the tower owner, state and/or local building officials for specific design requirements and suitable parameters for a particular structure. Any variation from the parameters shown above must be communicated to ERI for comprehensive assessment.

Broadcast Antenna System
Power Analysis

KUKL (DT) **RF Channel: 15**
Montana State University
Kalispell, MT
ETU-2U2-ESC1-15



Antenna Parameters

Azimuth Directivity:

Horizontal:	2.50	(3.98 dB)
Vertical:	2.50	(3.98 dB)

Elevation Directivity:

Horizontal:	8.67	(9.38 dB)
Vertical:	8.67	(9.38 dB)

Transmission Line

Vertical Run:

Type:	1-5/8-inch Air HELIAX	
Length:	175 feet	53.3 meters
Attenuation:	0.466 dB/100 feet	1.529 dB/100 mtrs

Horizontal Run:

Type:	1-5/8-inch Air HELIAX	
Length:	25 feet	7.6 meters
Attenuation:	0.466 dB/100 feet	1.529 dB/100 mtrs

Total Losses: 0.932 dB

Line Efficiency: 80.69%

Effective Radiated Power:

Horizontal:	12.1 kW	(10.83 dBk)
Vertical:	3.6 kW	(5.6 dBk)

Power Gain:

Horizontal:	16.67 numeric	(12.22 dBd)
Vertical:	5.00 numeric	(6.99 dBd)

Antenna Input Power:

0.726 kW (-1.39 dBk)

Transmission Line Losses:

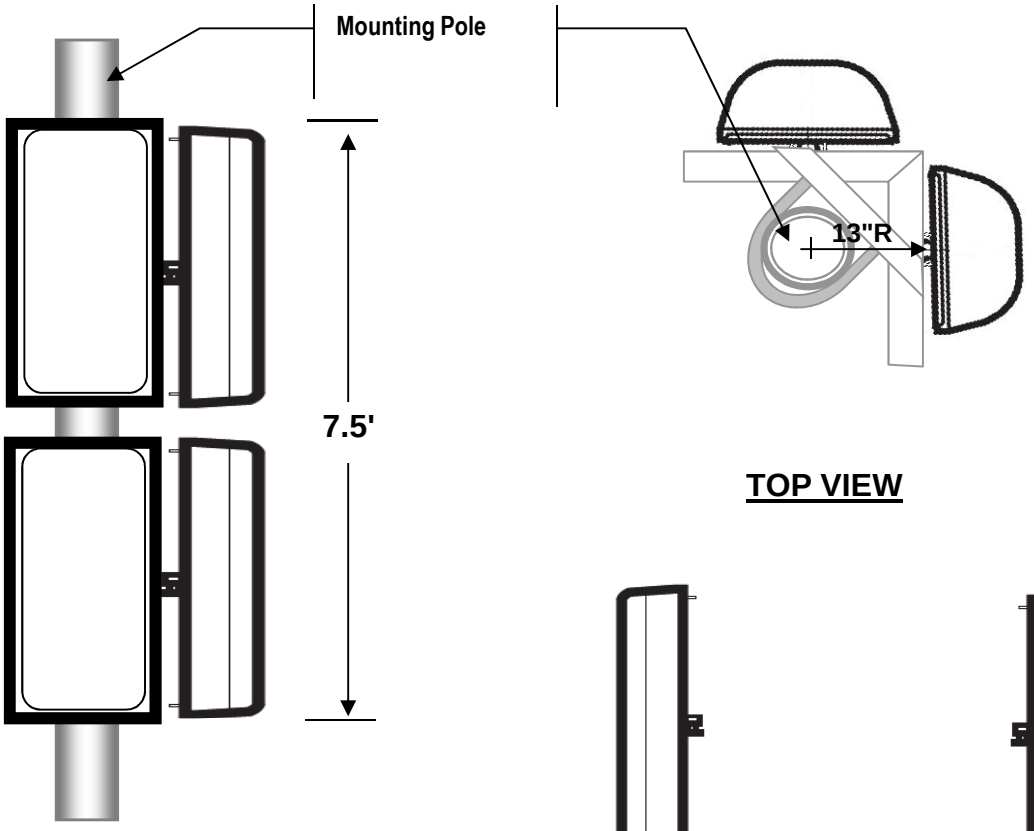
0.140 kW (0.932 dB)

Transmitter Power Output:

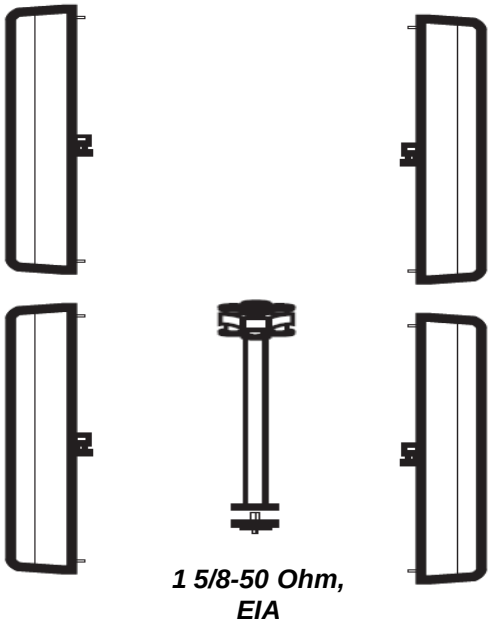
0.900 kW
(-0.458 dBk)

RF Operating Values Modified by Cohen, Dippell and Everist, P.C.

Typical Mounting Configuration Shown. Actual Configuration May Vary.



TOP VIEW



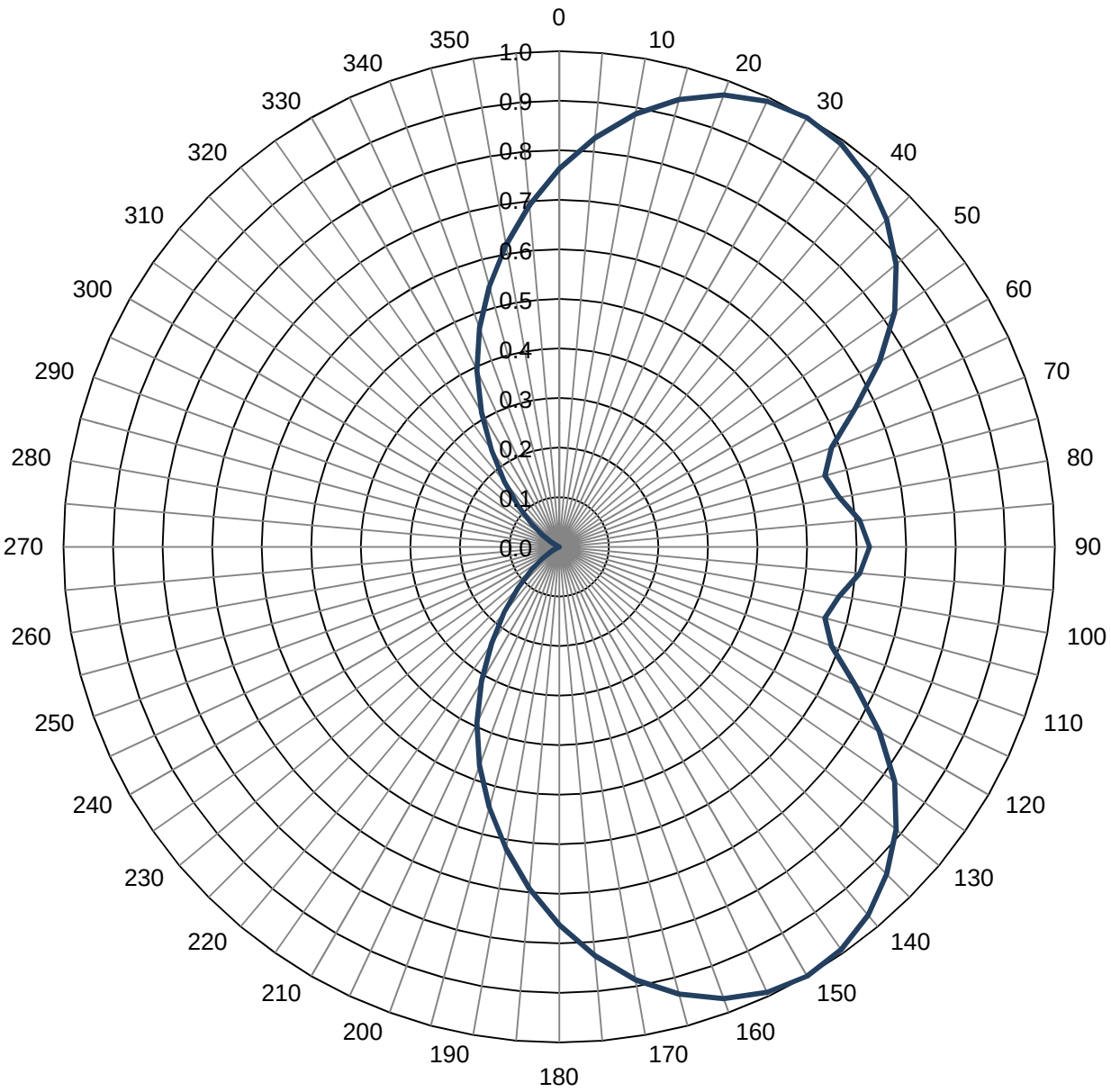
SCHEMATIC DIAGRAM

Azimuth Pattern

Type:	ETU-2PC1-H		**Polarization:**	Horizontal
Directivity:	2.50 numeric	(3.98 dB)	**Frequency:**	15 (ATSC)
Peak(s) at:			**Location:**	Kalispell, MT

NOTE: Pattern shape and directivity may vary with channel and mounting configuration.

Relative Field



Tabulated Data for Azimuth Pattern

Type: ETU-2PC1-H

Angle	Field	dB
0	0.763	-2.35
2	0.790	-2.05
4	0.816	-1.77
6	0.841	-1.50
8	0.864	-1.27
10	0.887	-1.04
12	0.907	-0.85
14	0.926	-0.67
16	0.943	-0.51
18	0.958	-0.37
20	0.970	-0.26
22	0.981	-0.17
24	0.989	-0.10
26	0.995	-0.04
28	0.999	-0.01
30	1.000	0.00
32	0.999	-0.01
34	0.995	-0.04
36	0.989	-0.10
38	0.981	-0.17
40	0.970	-0.26
42	0.958	-0.37
44	0.943	-0.51
46	0.926	-0.67
48	0.907	-0.85
50	0.887	-1.04
52	0.864	-1.27
54	0.841	-1.50
56	0.812	-1.81
58	0.780	-2.16
60	0.746	-2.55
62	0.711	-2.96
64	0.675	-3.41
66	0.641	-3.86
68	0.610	-4.29
70	0.585	-4.66
72	0.566	-4.94
74	0.556	-5.10
76	0.555	-5.11
78	0.562	-5.01
80	0.574	-4.82
82	0.588	-4.61
84	0.603	-4.39
86	0.615	-4.22
88	0.623	-4.11
90	0.626	-4.07
92	0.623	-4.11
94	0.615	-4.22
96	0.603	-4.39
98	0.588	-4.61

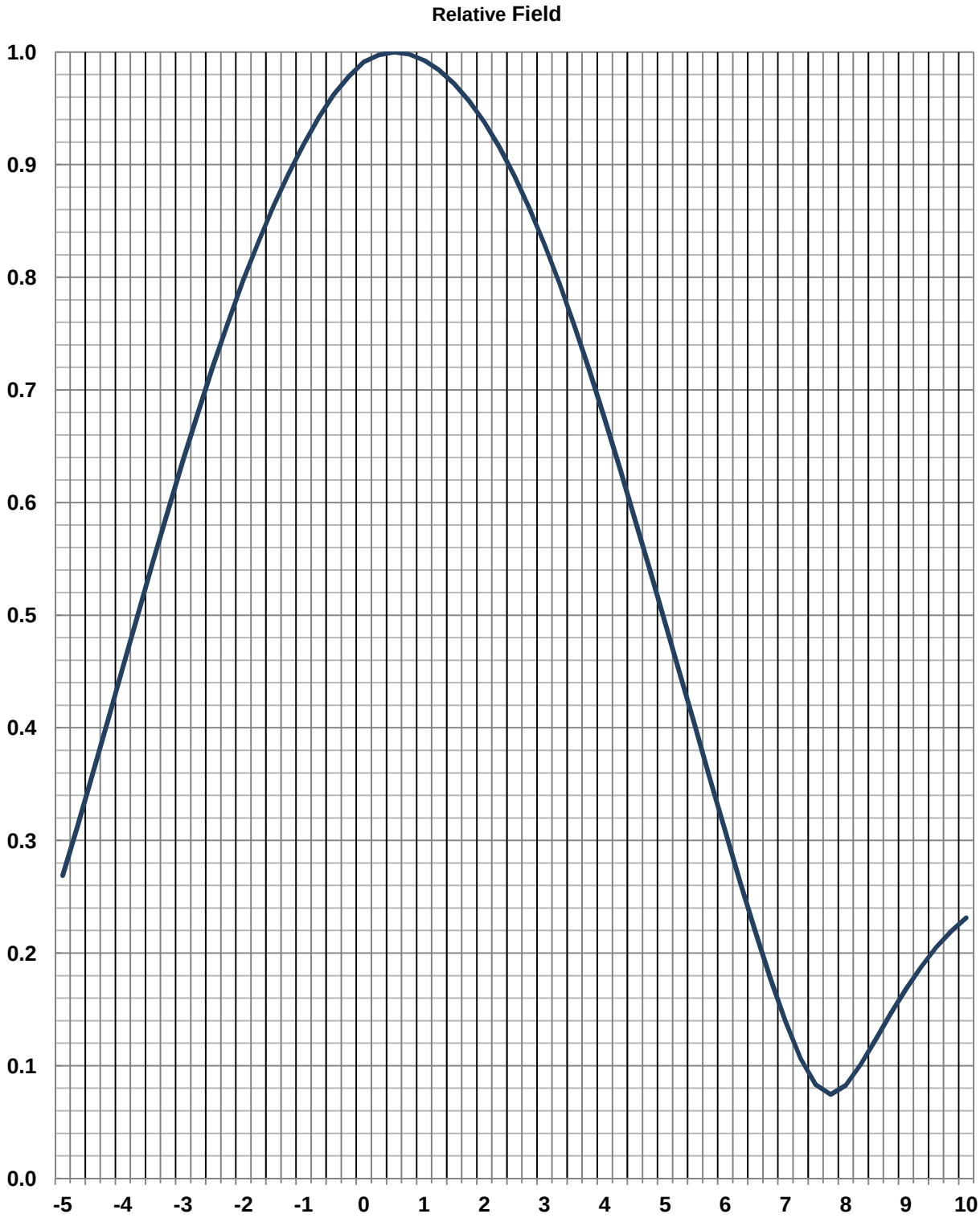
Angle	Field	dB
100	0.574	-4.82
102	0.562	-5.01
104	0.555	-5.11
106	0.556	-5.10
108	0.566	-4.94
110	0.585	-4.66
112	0.610	-4.29
114	0.641	-3.86
116	0.675	-3.41
118	0.711	-2.96
120	0.746	-2.55
122	0.780	-2.16
124	0.812	-1.81
126	0.841	-1.50
128	0.865	-1.26
130	0.887	-1.04
132	0.907	-0.85
134	0.926	-0.67
136	0.943	-0.51
138	0.958	-0.37
140	0.970	-0.26
142	0.981	-0.17
144	0.989	-0.10
146	0.995	-0.04
148	0.999	-0.01
150	1.000	0.00
152	0.999	-0.01
154	0.995	-0.04
156	0.989	-0.10
158	0.981	-0.17
160	0.970	-0.26
162	0.958	-0.37
164	0.943	-0.51
166	0.926	-0.67
168	0.907	-0.85
170	0.887	-1.04
172	0.865	-1.26
174	0.841	-1.50
176	0.816	-1.77
178	0.790	-2.05
180	0.763	-2.35
182	0.735	-2.67
184	0.706	-3.02
186	0.677	-3.39
188	0.648	-3.77
190	0.618	-4.18
192	0.588	-4.61
194	0.559	-5.05
196	0.529	-5.53
198	0.500	-6.02

Angle	Field	dB
200	0.470	-6.56
202	0.440	-7.13
204	0.408	-7.79
206	0.376	-8.50
208	0.344	-9.27
210	0.313	-10.09
212	0.282	-11.00
214	0.253	-11.94
216	0.224	-13.00
218	0.197	-14.11
220	0.172	-15.29
222	0.149	-16.54
224	0.127	-17.92
226	0.107	-19.41
228	0.089	-21.01
230	0.073	-22.73
232	0.059	-24.58
234	0.046	-26.74
236	0.035	-29.12
238	0.025	-32.04
240	0.017	-35.39
242	0.010	-40.00
244	0.005	-46.02
246	0.000	---
248	0.000	---
250	0.000	---
252	0.000	---
254	0.000	---
256	0.000	---
258	0.000	---
260	0.000	---
262	0.000	---
264	0.000	---
266	0.000	---
268	0.000	---
270	0.000	---
272	0.000	---
274	0.000	---
276	0.000	---
278	0.000	---
280	0.000	---
282	0.000	---
284	0.000	---
286	0.000	---
288	0.000	---
290	0.000	---
292	0.000	---
294	0.000	---
296	0.005	-46.02
298	0.010	-40.00

Angle	Field	dB
300	0.017	-35.39
302	0.025	-32.04
304	0.035	-29.12
306	0.046	-26.74
308	0.058	-24.73
310	0.073	-22.73
312	0.089	-21.01
314	0.107	-19.41
316	0.127	-17.92
318	0.149	-16.54
320	0.172	-15.29
322	0.197	-14.11
324	0.224	-13.00
326	0.253	-11.94
328	0.282	-11.00
330	0.313	-10.09
332	0.344	-9.27
334	0.376	-8.50
336	0.408	-7.79
338	0.440	-7.13
340	0.470	-6.56
342	0.500	-6.02
344	0.529	-5.53
346	0.559	-5.05
348	0.588	-4.61
350	0.618	-4.18
352	0.648	-3.77
354	0.677	-3.39
356	0.706	-3.02
358	0.735	-2.67
360	0.763	-2.35

Elevation Pattern

Type:	ETU-2U2-H		**Polarization:**	Horizontal
Directivity:			**Frequency:**	15 (ATSC)
Main Lobe:	8.67 numeric	(9.38 dB)	**Location:**	Kalispell, MT
Horizontal:	8.52 numeric	(9.30 dB)	**Beam Tilt:**	0.50 degrees



Tabulated Data for Elevation Pattern

Type: ETU-2U2-H

-5 to 10 degrees in 0.25 degree increments.
10 to 90 degrees in 0.50 degree increments.

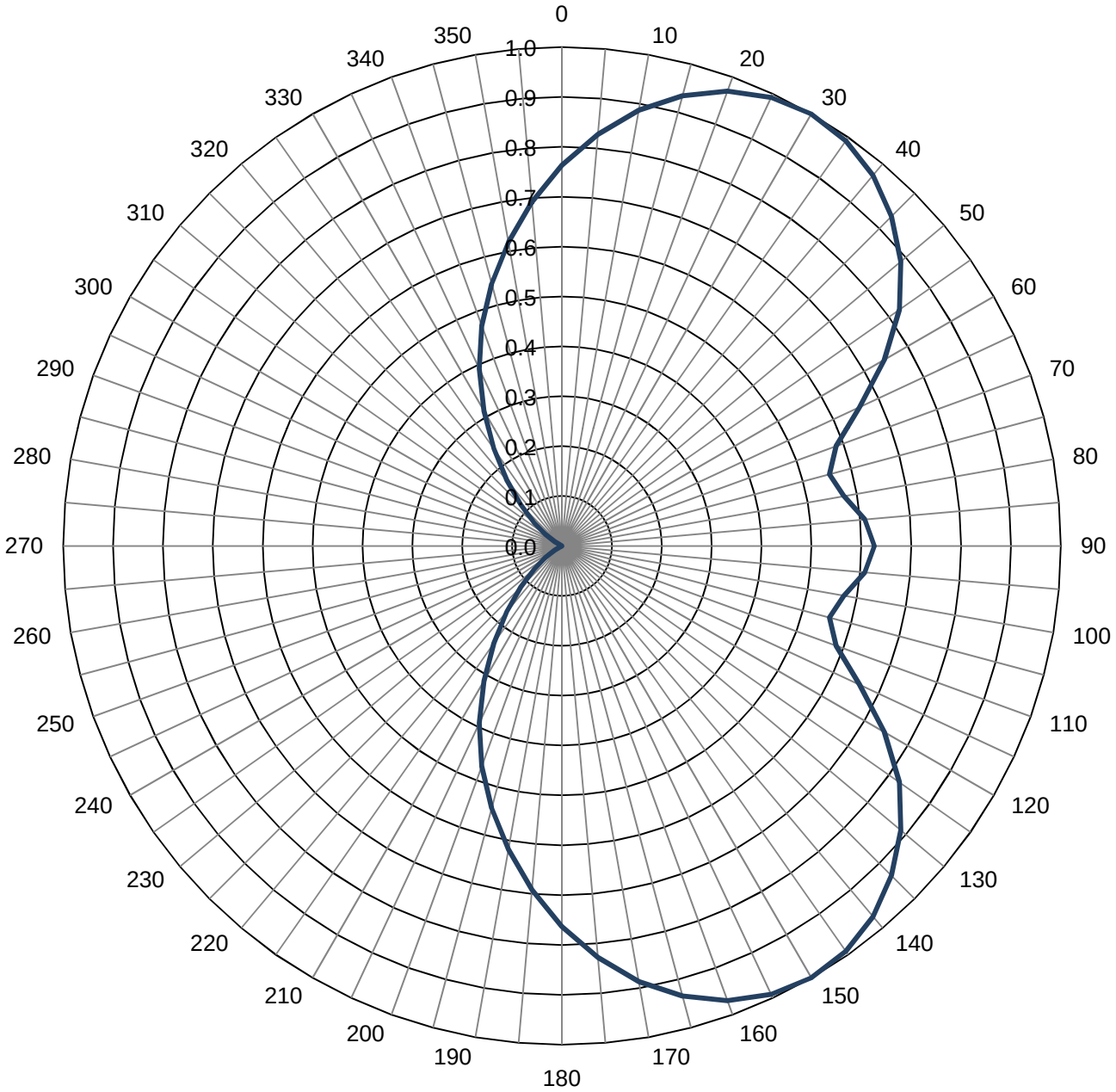
Angle	Field	dB	Angle	Field	dB	Angle	Field	dB	Angle	Field	dB	Angle	Field	dB
-5.00	0.269	-11.41	7.25	0.107	-19.44	29.00	0.064	-23.93	53.50	0.090	-20.91	78.00	0.036	-28.90
-4.75	0.314	-10.07	7.50	0.083	-21.61	29.50	0.048	-26.41	54.00	0.084	-21.48	78.50	0.035	-29.19
-4.50	0.360	-8.89	7.75	0.075	-22.56	30.00	0.033	-29.71	54.50	0.079	-22.08	79.00	0.033	-29.53
-4.25	0.406	-7.82	8.00	0.083	-21.66	30.50	0.022	-33.11	55.00	0.073	-22.71	79.50	0.032	-29.87
-4.00	0.454	-6.86	8.25	0.101	-19.90	31.00	0.024	-32.47	55.50	0.068	-23.36	80.00	0.031	-30.23
-3.75	0.501	-6.01	8.50	0.124	-18.17	31.50	0.035	-29.14	56.00	0.063	-24.05	80.50	0.030	-30.57
-3.50	0.548	-5.23	8.75	0.146	-16.70	32.00	0.049	-26.29	56.50	0.058	-24.79	81.00	0.028	-30.93
-3.25	0.593	-4.54	9.00	0.168	-15.49	32.50	0.062	-24.21	57.00	0.053	-25.58	81.50	0.027	-31.31
-3.00	0.638	-3.91	9.25	0.188	-14.53	33.00	0.073	-22.73	57.50	0.048	-26.41	82.00	0.026	-31.67
-2.75	0.680	-3.34	9.50	0.205	-13.76	33.50	0.082	-21.71	58.00	0.043	-27.33	82.50	0.025	-32.04
-2.50	0.722	-2.83	9.75	0.220	-13.17	34.00	0.089	-21.04	58.50	0.038	-28.34	83.00	0.024	-32.43
-2.25	0.760	-2.38	10.00	0.231	-12.71	34.50	0.093	-20.63	59.00	0.034	-29.47	83.50	0.023	-32.77
-2.00	0.797	-1.97	10.50	0.247	-12.15	35.00	0.095	-20.46	59.50	0.029	-30.75	84.00	0.022	-33.11
-1.75	0.831	-1.60	11.00	0.252	-11.97	35.50	0.094	-20.56	60.00	0.025	-32.22	84.50	0.021	-33.47
-1.50	0.863	-1.28	11.50	0.247	-12.14	36.00	0.090	-20.90	60.50	0.020	-33.89	85.00	0.020	-33.81
-1.25	0.892	-0.99	12.00	0.233	-12.66	36.50	0.084	-21.50	61.00	0.016	-35.81	85.50	0.020	-34.11
-1.00	0.918	-0.74	12.50	0.210	-13.55	37.00	0.076	-22.41	61.50	0.013	-37.86	86.00	0.019	-34.42
-0.75	0.942	-0.52	13.00	0.181	-14.84	37.50	0.066	-23.65	62.00	0.010	-39.66	86.50	0.018	-34.70
-0.50	0.962	-0.34	13.50	0.147	-16.64	38.00	0.054	-25.32	62.50	0.010	-40.18	87.00	0.018	-34.94
-0.25	0.978	-0.19	14.00	0.111	-19.12	38.50	0.042	-27.58	63.00	0.011	-39.09	87.50	0.017	-35.19
0.00	0.991	-0.08	14.50	0.075	-22.55	39.00	0.030	-30.49	63.50	0.014	-37.33	88.00	0.017	-35.39
0.25	0.997	-0.02	15.00	0.047	-26.52	39.50	0.022	-33.19	64.00	0.017	-35.55	88.50	0.017	-35.60
0.50	1.000	0.00	15.50	0.048	-26.32	40.00	0.024	-32.51	64.50	0.020	-34.02	89.00	0.016	-35.76
0.75	0.998	-0.02	16.00	0.074	-22.57	40.50	0.034	-29.32	65.00	0.023	-32.69	89.50	0.016	-35.86
1.00	0.993	-0.07	16.50	0.106	-19.53	41.00	0.048	-26.41	65.50	0.026	-31.60	90.00	0.016	-35.97
1.25	0.984	-0.14	17.00	0.135	-17.38	41.50	0.062	-24.14	66.00	0.029	-30.66			
1.50	0.972	-0.25	17.50	0.161	-15.86	42.00	0.076	-22.36	66.50	0.032	-29.90			
1.75	0.956	-0.39	18.00	0.183	-14.77	42.50	0.090	-20.95	67.00	0.035	-29.22			
2.00	0.938	-0.56	18.50	0.199	-14.02	43.00	0.102	-19.84	67.50	0.037	-28.66			
2.25	0.915	-0.77	19.00	0.211	-13.52	43.50	0.113	-18.93	68.00	0.039	-28.20			
2.50	0.890	-1.01	19.50	0.218	-13.24	44.00	0.123	-18.22	68.50	0.041	-27.81			
2.75	0.861	-1.30	20.00	0.220	-13.15	44.50	0.131	-17.65	69.00	0.042	-27.49			
3.00	0.829	-1.63	20.50	0.218	-13.21	45.00	0.138	-17.21	69.50	0.043	-27.25			
3.25	0.794	-2.00	21.00	0.214	-13.40	45.50	0.143	-16.89	70.00	0.044	-27.05			
3.50	0.757	-2.42	21.50	0.208	-13.64	46.00	0.147	-16.66	70.50	0.045	-26.90			
3.75	0.716	-2.90	22.00	0.201	-13.94	46.50	0.149	-16.53	71.00	0.046	-26.80			
4.00	0.674	-3.42	22.50	0.193	-14.28	47.00	0.150	-16.48	71.50	0.046	-26.76			
4.25	0.630	-4.01	23.00	0.185	-14.67	47.50	0.149	-16.51	72.00	0.046	-26.74			
4.50	0.585	-4.65	23.50	0.176	-15.07	48.00	0.148	-16.61	72.50	0.046	-26.78			
4.75	0.540	-5.35	24.00	0.169	-15.46	48.50	0.145	-16.77	73.00	0.046	-26.84			
5.00	0.494	-6.13	24.50	0.162	-15.83	49.00	0.142	-16.98	73.50	0.045	-26.94			
5.25	0.447	-6.99	25.00	0.155	-16.22	49.50	0.137	-17.26	74.00	0.044	-27.05			
5.50	0.401	-7.94	25.50	0.147	-16.65	50.00	0.132	-17.59	74.50	0.044	-27.21			
5.75	0.354	-9.02	26.00	0.139	-17.13	50.50	0.126	-17.97	75.00	0.043	-27.37			
6.00	0.308	-10.23	26.50	0.130	-17.71	51.00	0.121	-18.38	75.50	0.042	-27.58			
6.25	0.262	-11.62	27.00	0.120	-18.43	51.50	0.114	-18.84	76.00	0.041	-27.81			
6.50	0.219	-13.20	27.50	0.108	-19.35	52.00	0.108	-19.32	76.50	0.040	-28.05			
6.75	0.177	-15.02	28.00	0.094	-20.53	52.50	0.102	-19.82	77.00	0.038	-28.31			
7.00	0.139	-17.11	28.50	0.079	-22.04	53.00	0.096	-20.35	77.50	0.037	-28.59			

Azimuth Pattern

Type:	ETU-2PC1-V		**Polarization:**	Vertical
Directivity:	2.50 numeric	(3.98 dB)	**Frequency:**	15 (ATSC)
Peak(s) at:			**Location:**	Kalispell, MT

NOTE: Pattern shape and directivity may vary with channel and mounting configuration.

Relative Field



Tabulated Data for Azimuth Pattern

Type: ETU-2PC1-V

Angle	Field	dB
0	0.763	-2.35
2	0.790	-2.05
4	0.816	-1.77
6	0.841	-1.50
8	0.864	-1.27
10	0.887	-1.04
12	0.907	-0.85
14	0.926	-0.67
16	0.943	-0.51
18	0.958	-0.37
20	0.970	-0.26
22	0.981	-0.17
24	0.989	-0.10
26	0.995	-0.04
28	0.999	-0.01
30	1.000	0.00
32	0.999	-0.01
34	0.995	-0.04
36	0.989	-0.10
38	0.981	-0.17
40	0.970	-0.26
42	0.958	-0.37
44	0.943	-0.51
46	0.926	-0.67
48	0.907	-0.85
50	0.887	-1.04
52	0.864	-1.27
54	0.841	-1.50
56	0.812	-1.81
58	0.780	-2.16
60	0.746	-2.55
62	0.711	-2.96
64	0.675	-3.41
66	0.641	-3.86
68	0.610	-4.29
70	0.585	-4.66
72	0.566	-4.94
74	0.556	-5.10
76	0.555	-5.11
78	0.562	-5.01
80	0.574	-4.82
82	0.588	-4.61
84	0.603	-4.39
86	0.615	-4.22
88	0.623	-4.11
90	0.626	-4.07
92	0.623	-4.11
94	0.615	-4.22
96	0.603	-4.39
98	0.588	-4.61

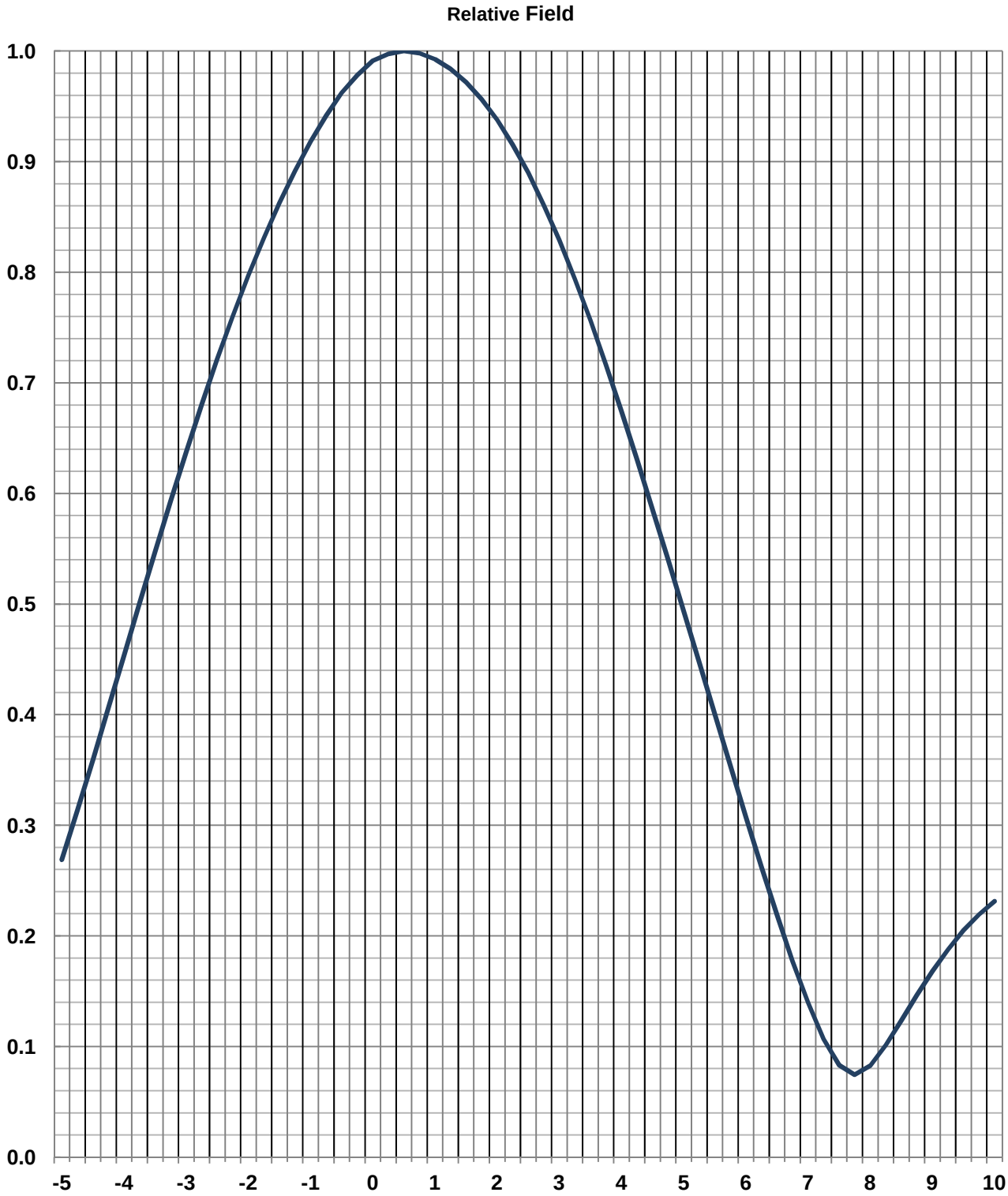
Angle	Field	dB
100	0.574	-4.82
102	0.562	-5.01
104	0.555	-5.11
106	0.556	-5.10
108	0.566	-4.94
110	0.585	-4.66
112	0.610	-4.29
114	0.641	-3.86
116	0.675	-3.41
118	0.711	-2.96
120	0.746	-2.55
122	0.780	-2.16
124	0.812	-1.81
126	0.841	-1.50
128	0.865	-1.26
130	0.887	-1.04
132	0.907	-0.85
134	0.926	-0.67
136	0.943	-0.51
138	0.958	-0.37
140	0.970	-0.26
142	0.981	-0.17
144	0.989	-0.10
146	0.995	-0.04
148	0.999	-0.01
150	1.000	0.00
152	0.999	-0.01
154	0.995	-0.04
156	0.989	-0.10
158	0.981	-0.17
160	0.970	-0.26
162	0.958	-0.37
164	0.943	-0.51
166	0.926	-0.67
168	0.907	-0.85
170	0.887	-1.04
172	0.865	-1.26
174	0.841	-1.50
176	0.816	-1.77
178	0.790	-2.05
180	0.763	-2.35
182	0.735	-2.67
184	0.706	-3.02
186	0.677	-3.39
188	0.648	-3.77
190	0.618	-4.18
192	0.588	-4.61
194	0.559	-5.05
196	0.529	-5.53
198	0.500	-6.02

Angle	Field	dB
200	0.470	-6.56
202	0.440	-7.13
204	0.408	-7.79
206	0.376	-8.50
208	0.344	-9.27
210	0.313	-10.09
212	0.282	-11.00
214	0.253	-11.94
216	0.224	-13.00
218	0.197	-14.11
220	0.172	-15.29
222	0.149	-16.54
224	0.127	-17.92
226	0.107	-19.41
228	0.089	-21.01
230	0.073	-22.73
232	0.059	-24.58
234	0.046	-26.74
236	0.035	-29.12
238	0.025	-32.04
240	0.017	-35.39
242	0.010	-40.00
244	0.005	-46.02
246	0.000	---
248	0.000	---
250	0.000	---
252	0.000	---
254	0.000	---
256	0.000	---
258	0.000	---
260	0.000	---
262	0.000	---
264	0.000	---
266	0.000	---
268	0.000	---
270	0.000	---
272	0.000	---
274	0.000	---
276	0.000	---
278	0.000	---
280	0.000	---
282	0.000	---
284	0.000	---
286	0.000	---
288	0.000	---
290	0.000	---
292	0.000	---
294	0.000	---
296	0.005	-46.02
298	0.010	-40.00

Angle	Field	dB
300	0.017	-35.39
302	0.025	-32.04
304	0.035	-29.12
306	0.046	-26.74
308	0.058	-24.73
310	0.073	-22.73
312	0.089	-21.01
314	0.107	-19.41
316	0.127	-17.92
318	0.149	-16.54
320	0.172	-15.29
322	0.197	-14.11
324	0.224	-13.00
326	0.253	-11.94
328	0.282	-11.00
330	0.313	-10.09
332	0.344	-9.27
334	0.376	-8.50
336	0.408	-7.79
338	0.440	-7.13
340	0.470	-6.56
342	0.500	-6.02
344	0.529	-5.53
346	0.559	-5.05
348	0.588	-4.61
350	0.618	-4.18
352	0.648	-3.77
354	0.677	-3.39
356	0.706	-3.02
358	0.735	-2.67
360	0.763	-2.35

Elevation Pattern

Type:	ETU-2U2-V		**Polarization:**	Vertical
Directivity:			**Frequency:**	15 (ATSC)
Main Lobe:	8.67 numeric	(9.38 dB)	**Location:**	Kalispell, MT
Horizontal:	8.52 numeric	(9.30 dB)	**Beam Tilt:**	0.50 degrees



Tabulated Data for Elevation Pattern

Type: ETU-2U2-V

-5 to 10 degrees in 0.25 degree increments.
10 to 90 degrees in 0.50 degree increments.

Angle	Field	dB	Angle	Field	dB	Angle	Field	dB	Angle	Field	dB	Angle	Field	dB
-5.00	0.269	-11.41	7.25	0.107	-19.44	29.00	0.064	-23.93	53.50	0.090	-20.91	78.00	0.036	-28.90
-4.75	0.314	-10.07	7.50	0.083	-21.61	29.50	0.048	-26.41	54.00	0.084	-21.48	78.50	0.035	-29.19
-4.50	0.360	-8.89	7.75	0.075	-22.56	30.00	0.033	-29.71	54.50	0.079	-22.08	79.00	0.033	-29.53
-4.25	0.406	-7.82	8.00	0.083	-21.66	30.50	0.022	-33.11	55.00	0.073	-22.71	79.50	0.032	-29.87
-4.00	0.454	-6.86	8.25	0.101	-19.90	31.00	0.024	-32.47	55.50	0.068	-23.36	80.00	0.031	-30.23
-3.75	0.501	-6.01	8.50	0.124	-18.17	31.50	0.035	-29.14	56.00	0.063	-24.05	80.50	0.030	-30.57
-3.50	0.548	-5.23	8.75	0.146	-16.70	32.00	0.049	-26.29	56.50	0.058	-24.79	81.00	0.028	-30.93
-3.25	0.593	-4.54	9.00	0.168	-15.49	32.50	0.062	-24.21	57.00	0.053	-25.58	81.50	0.027	-31.31
-3.00	0.638	-3.91	9.25	0.188	-14.53	33.00	0.073	-22.73	57.50	0.048	-26.41	82.00	0.026	-31.67
-2.75	0.680	-3.34	9.50	0.205	-13.76	33.50	0.082	-21.71	58.00	0.043	-27.33	82.50	0.025	-32.04
-2.50	0.722	-2.83	9.75	0.220	-13.17	34.00	0.089	-21.04	58.50	0.038	-28.34	83.00	0.024	-32.43
-2.25	0.760	-2.38	10.00	0.231	-12.71	34.50	0.093	-20.63	59.00	0.034	-29.47	83.50	0.023	-32.77
-2.00	0.797	-1.97	10.50	0.247	-12.15	35.00	0.095	-20.46	59.50	0.029	-30.75	84.00	0.022	-33.11
-1.75	0.831	-1.60	11.00	0.252	-11.97	35.50	0.094	-20.56	60.00	0.025	-32.22	84.50	0.021	-33.47
-1.50	0.863	-1.28	11.50	0.247	-12.14	36.00	0.090	-20.90	60.50	0.020	-33.89	85.00	0.020	-33.81
-1.25	0.892	-0.99	12.00	0.233	-12.66	36.50	0.084	-21.50	61.00	0.016	-35.81	85.50	0.020	-34.11
-1.00	0.918	-0.74	12.50	0.210	-13.55	37.00	0.076	-22.41	61.50	0.013	-37.86	86.00	0.019	-34.42
-0.75	0.942	-0.52	13.00	0.181	-14.84	37.50	0.066	-23.65	62.00	0.010	-39.66	86.50	0.018	-34.70
-0.50	0.962	-0.34	13.50	0.147	-16.64	38.00	0.054	-25.32	62.50	0.010	-40.18	87.00	0.018	-34.94
-0.25	0.978	-0.19	14.00	0.111	-19.12	38.50	0.042	-27.58	63.00	0.011	-39.09	87.50	0.017	-35.19
0.00	0.991	-0.08	14.50	0.075	-22.55	39.00	0.030	-30.49	63.50	0.014	-37.33	88.00	0.017	-35.39
0.25	0.997	-0.02	15.00	0.047	-26.52	39.50	0.022	-33.19	64.00	0.017	-35.55	88.50	0.017	-35.60
0.50	1.000	0.00	15.50	0.048	-26.32	40.00	0.024	-32.51	64.50	0.020	-34.02	89.00	0.016	-35.76
0.75	0.998	-0.02	16.00	0.074	-22.57	40.50	0.034	-29.32	65.00	0.023	-32.69	89.50	0.016	-35.86
1.00	0.993	-0.07	16.50	0.106	-19.53	41.00	0.048	-26.41	65.50	0.026	-31.60	90.00	0.016	-35.97
1.25	0.984	-0.14	17.00	0.135	-17.38	41.50	0.062	-24.14	66.00	0.029	-30.66			
1.50	0.972	-0.25	17.50	0.161	-15.86	42.00	0.076	-22.36	66.50	0.032	-29.90			
1.75	0.956	-0.39	18.00	0.183	-14.77	42.50	0.090	-20.95	67.00	0.035	-29.22			
2.00	0.938	-0.56	18.50	0.199	-14.02	43.00	0.102	-19.84	67.50	0.037	-28.66			
2.25	0.915	-0.77	19.00	0.211	-13.52	43.50	0.113	-18.93	68.00	0.039	-28.20			
2.50	0.890	-1.01	19.50	0.218	-13.24	44.00	0.123	-18.22	68.50	0.041	-27.81			
2.75	0.861	-1.30	20.00	0.220	-13.15	44.50	0.131	-17.65	69.00	0.042	-27.49			
3.00	0.829	-1.63	20.50	0.218	-13.21	45.00	0.138	-17.21	69.50	0.043	-27.25			
3.25	0.794	-2.00	21.00	0.214	-13.40	45.50	0.143	-16.89	70.00	0.044	-27.05			
3.50	0.757	-2.42	21.50	0.208	-13.64	46.00	0.147	-16.66	70.50	0.045	-26.90			
3.75	0.716	-2.90	22.00	0.201	-13.94	46.50	0.149	-16.53	71.00	0.046	-26.80			
4.00	0.674	-3.42	22.50	0.193	-14.28	47.00	0.150	-16.48	71.50	0.046	-26.76			
4.25	0.630	-4.01	23.00	0.185	-14.67	47.50	0.149	-16.51	72.00	0.046	-26.74			
4.50	0.585	-4.65	23.50	0.176	-15.07	48.00	0.148	-16.61	72.50	0.046	-26.78			
4.75	0.540	-5.35	24.00	0.169	-15.46	48.50	0.145	-16.77	73.00	0.046	-26.84			
5.00	0.494	-6.13	24.50	0.162	-15.83	49.00	0.142	-16.98	73.50	0.045	-26.94			
5.25	0.447	-6.99	25.00	0.155	-16.22	49.50	0.137	-17.26	74.00	0.044	-27.05			
5.50	0.401	-7.94	25.50	0.147	-16.65	50.00	0.132	-17.59	74.50	0.044	-27.21			
5.75	0.354	-9.02	26.00	0.139	-17.13	50.50	0.126	-17.97	75.00	0.043	-27.37			
6.00	0.308	-10.23	26.50	0.130	-17.71	51.00	0.121	-18.38	75.50	0.042	-27.58			
6.25	0.262	-11.62	27.00	0.120	-18.43	51.50	0.114	-18.84	76.00	0.041	-27.81			
6.50	0.219	-13.20	27.50	0.108	-19.35	52.00	0.108	-19.32	76.50	0.040	-28.05			
6.75	0.177	-15.02	28.00	0.094	-20.53	52.50	0.102	-19.82	77.00	0.038	-28.31			
7.00	0.139	-17.11	28.50	0.079	-22.04	53.00	0.096	-20.35	77.50	0.037	-28.59			

TABLE I
COMPUTED COVERAGE DATA
FOR THE PROPOSED DTV OPERATION OF
KUKL-TV, KALISPELL, MONTANA
CHANNEL 15 12.1 KW (MAX) ERP 830 METERS HAAT
JUNE 2017

Radial Bearing (N ° E, T)	Average* Elevation 3.2 to 16.1 km meters	Effective Height meters	Depression Angle degrees	ERP At Radio Horizon kW	Distance to Contour F(50/90) 48 dBu City Grade km	38.829 dBu Noise-Limited km
0	1378.7	704.5	0.735	7.161	68.8	84.7
10	1331.1	752.1	0.760	9.677	71.8	88.5
20	1283.6	799.6	0.783	11.573	74.0	91.3
30	1236.1	847.1	0.806	12.300	75.3	93.1
40	1188.6	894.6	0.829	11.573	75.8	93.7
50	1146.3	936.9	0.848	9.677	75.2	93.1
60	1109.2	974.0	0.864	6.845	73.2	90.9
70	1072.1	1011.1	0.881	4.209	70.2	87.5
80	1035.0	1048.2	0.897	4.053	70.5	88.0
90	998.0	1085.3	0.913	4.820	72.6	90.4
100	1070.1	1013.1	0.882	4.053	70.0	87.2
110	1142.3	940.9	0.850	4.209	69.0	85.8
120	1214.4	868.8	0.816	6.845	71.4	88.4
130	1286.6	796.6	0.782	9.677	72.6	89.7
140	1315.1	768.1	0.768	11.573	73.4	90.5
150	1299.9	783.3	0.775	12.300	74.1	91.5
160	1284.7	798.5	0.783	11.573	74.0	91.3
170	1269.5	813.7	0.790	9.677	72.9	90.1
180	1254.3	828.9	0.798	7.161	71.0	87.8
190	1292.3	790.9	0.779	4.698	67.5	83.3
200	1330.3	752.9	0.760	2.717	63.1	78.0
210	1368.3	714.9	0.741	1.205	56.9	71.3
220	1406.3	676.9	0.721	0.364	48.4	62.4
230	1419.6	663.6	0.714	0.066	37.2	50.8
240	1408.3	674.9	0.720	0.004	6.9	32.0
250	1397.1	686.1	0.726	0.004**	6.7	32.1
260	1385.8	697.4	0.732	0.004**	6.6	32.2
270	1374.5	708.7	0.737	0.004**	6.6	32.3

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JUNE 2017

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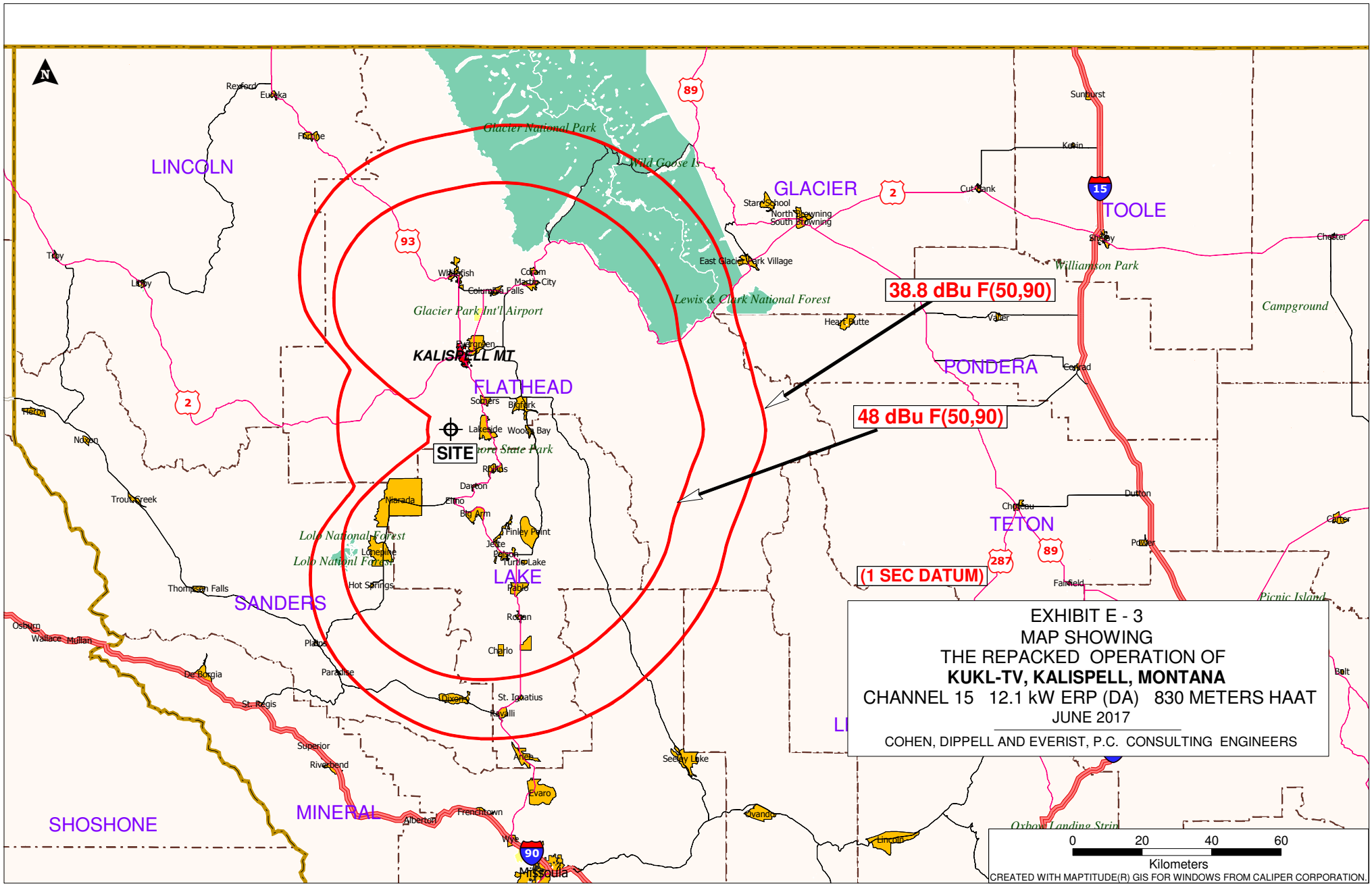
280	1329.8	753.4	0.760	0.004**	6.6	32.6
290	1285.2	798.0	0.783	0.004**	6.6	32.9
300	1240.5	842.7	0.804	0.004	6.7	33.2
310	1195.8	887.4	0.825	0.066	39.5	54.2
320	1196.3	886.9	0.825	0.364	51.5	65.8
330	1241.9	841.3	0.803	1.205	58.9	73.6
340	1287.5	795.7	0.781	2.717	63.8	78.9
350	1333.1	750.1	0.759	4.698	66.8	82.4

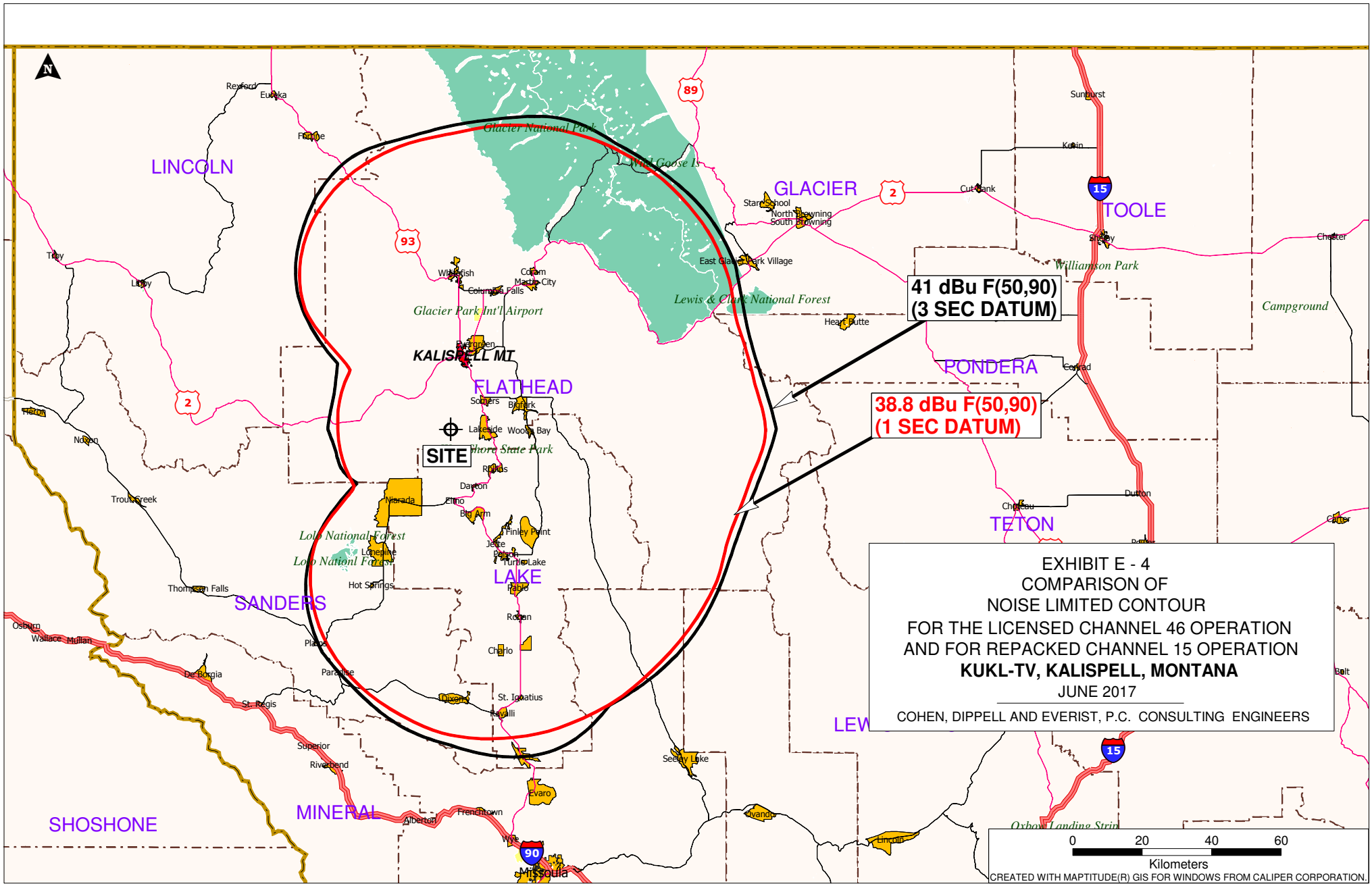
*Based on data from FCC 1-second data base.
**Field ratio 0.017 has been assumed.

DTV Channel 15 (476-482 MHz)
Average Elevation 3.2 to 16.1 km 1261.3 meters AMSL
Center of Radiation 2083 meters AMSL
Antenna Height Above Average Terrain 830 meters
Effective Radiated Power 12.3 kW (10.89 dBk) Max. Horizontal
3.7 kW (5.67 dBk) Max. Vertical

North Latitude: 48˚ 00' 48.2"
West Longitude: 114˚ 21' 54.5"

(NAD-27)


38.8 dBu F(50,90)
48 dBu F(50,90)
(1 SEC DATUM)
SITE
KALISPELL MT
LINCOLN
FLATHEAD
GLACIER
TOOLE
PONDERA
TETON
LAKE
SANDERS
MINERAL
SHOSHONE
Glacier National Park
Wild Goose Is
Glacier Park Int'l Airport
Lewis & Clark National Forest
Lolo National Forest
Williamson Park
Campground
Picnic Island
Oxbow Landing Strip
EXHIBIT E - 3
MAP SHOWING
THE REPACKED OPERATION OF
KUKL-TV, KALISPELL, MONTANA
CHANNEL 15 12.1 kW ERP (DA) 830 METERS HAAT
JUNE 2017
COHEN, DIPPELL AND EVERIST, P.C. CONSULTING ENGINEERS
0 20 40 60
Kilometers
CREATED WITH MAPTITUDE(R) GIS FOR WINDOWS FROM CALIPER CORPORATION.


41 dBu F(50,90)
(3 SEC DATUM)
38.8 dBu F(50,90)
(1 SEC DATUM)
SITE
KALISPELL MT
LINCOLN
FLATHEAD
GLACIER
TOOLE
PONDERA
TETON
LAKE
SANDERS
MINERAL
SHOSHONE
Glacier National Park
Lewis & Clark National Forest
Glacier Park Int'l Airport
Lolo National Forest
Williamson Park
Campground
EXHIBIT E - 4
COMPARISON OF
NOISE LIMITED CONTOUR
FOR THE LICENSED CHANNEL 46 OPERATION
AND FOR REPACKED CHANNEL 15 OPERATION
KUKL-TV, KALISPELL, MONTANA
JUNE 2017
COHEN, DIPPELL AND EVERIST, P.C. CONSULTING ENGINEERS
0 20 40 60
Kilometers
CREATED WITH MAPTITUDE(R) GIS FOR WINDOWS FROM CALIPER CORPORATION.