

ENGINEERING STATEMENT  
APPLICATION FOR A DTV  
CONSTRUCTION PERMIT FOR  
DISPLACEMENT FOR  
EXISTING TELEVISION TRANSLATOR  
K42FI, WATERTOWN, SOUTH DAKOTA  
CH 28 4.92 KW MAX ERP 645.8 METERS RC/AMSL

OCTOBER 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         )

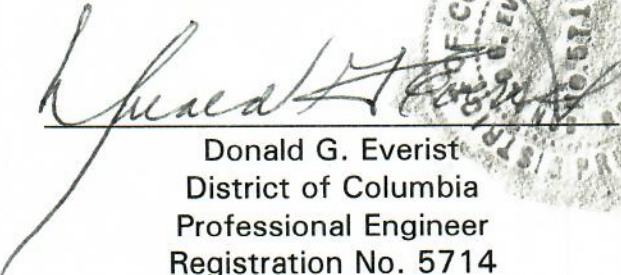
Donald G. Everist, being duly sworn upon his oath, deposes and states that:

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;

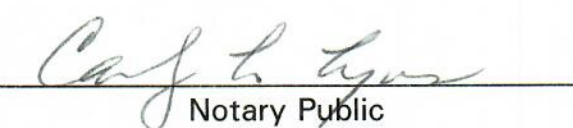
That his qualifications are a matter of record in the Federal Communications Commission;

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 25<sup>th</sup> day of October, 2017.

  
Notary Public

My Commission Expires: 2/28/2018



### Introduction

This engineering statement has been prepared on behalf of Red River Broadcast Co. LLC, licensee of TV translator, K42FI, Watertown, South Dakota. This displacement application supports the licensee's request to convert the present operation on the currently licensed digital Channel 42 to Channel 28 with a maximum DTV effective radiated power ("ERP") of 4.92 kW at a radiation center above mean sea level ("RCAMSL") of 645.8 meters. A companion special temporary authority ("STA") request is concurrently filed with this displacement application.

### Transmitter Site

The existing antenna will be utilized and no significant alteration of the tower is proposed or required. The existing tower (Exhibit E-1) is located 3.2 km south of Watertown on Highway 81. There is no change in transmitter site. The geographic coordinates of the site follow below.

North Latitude: 44° 52' 16"

West Longitude: 97° 06' 34"

NAD-27

The antenna registration number is 1042185. The application will specify the ASRN NAD-83 coordinates which are:

North Latitude: 44° 52' 16"

West Longitude: 97° 06' 35"

NAD-83

Equipment Data

Transmitter: Type-approved

Transmission Line: Andrew, Type HJ7-50A, 1-5/8", 103.6 meters (340 feet) with 0.506 dB loss/100 ft.

Antenna: ERI, AL80-28H with maximum gain of 8.68 (9.39 dB) and 1.75° electrical beam tilt

Emission Mask: Simple

Power Data

Transmitter at output Filter:	0.841 kW	-0.75 dBk
Transmission Line Efficiency/Loss:	67.3 %	1.72 dB
Input Into Antenna:	0.566 kW	-2.47 dBk
Antenna Gain:	8.68	9.39 dB
ERP:	4.92 kW	6.92 dBk

Elevation Data

Elevation of site above mean sea level	525.8 meters (1725 feet)
Center of radiation of antenna above ground level	120.0 meters (393.7 feet)
Center of radiation of antenna above mean sea level	645.8 meters (2118.8 feet)
Overall height of tower above ground level including appurtenances	124 meters (407 feet)

As indicated above, the transmitter with typical power output at the filter of 0.841 kW will deliver 0.566 kW to the input of the antenna. The antenna, having a maximum gain of 9.39 dB and an electrical beam tilt of 1.75°, will produce maximum ERP of 4.92 kW. The antenna elevation pattern and associated tabulation and the horizontal pattern and accompanying tabulation are included in Exhibit E-2.

#### Interference Analysis

A study of predicted interference caused by the proposed Channel 28 low-power digital operation has been performed using the Longley-Rice program for which the source data has been posted by the Commission on its website at <http://www.fcc.gov/oet/tvstudy>. Comparison of service/interference areas and population indicates this model closely matches the FCC's digital low-power TV/translator evaluation program. Best efforts have been made to use data and calculation identical to the FCC's program. The model employs the Longley-Rice propagation methodology and evaluates in grid cells of approximately 1 sq. km. Using one-second terrain data sampled approximately every 1.0 km at one-degree azimuth intervals with 2000 census centroids, all studies are based upon data in the current LMS database update of the FCC's engineering database. A Longley-Rice study was performed with the proposed Channel 28 K42FI low-power digital facilities and all relevant stations listed in the FCC database. The study results demonstrate that the proposed Channel 28 operation is in compliance with the FCC interference criteria and the included stations are listed in Exhibit E-3.

#### Coverage

A map providing the protected contour of the proposed Channel 28 facility is provided.

Table I provides the calculated contour distance.

Exhibit E-4 provides the coverage map.

Other Broadcast Facilities

A brief analysis was completed to determine the presence of stations in the vicinity of the K42FI tower using the July 1, 2015 data contained within the Commission's Consolidated Database System ("CDBS"). Within 500 meters of the proposed site, there are one authorized FM radio stations on same tower, no authorized DTV and NTSC television stations, and no authorized low-power analog television or television translator stations aside from K42FI. There is one AM facility within 3.2 km of the existing tower. Although no adverse technical effects are expected due to the proposed changes, the licensee will take measures to resolve any problems proven to be related to the changes proposed in this application.

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 licensee will install filters or take other measures as necessary to resolve the problem.

FCC Rule, Section 1.1307

Pursuant to OET Bulletin No. 65 dated August 1997, these non-broadcast stations are all exempt from RFF evaluations for the following reason:

<u>Station</u>	<u>Licensed Under Part No.</u>	<u>Reason for Exemption</u>
	Part 74, Subpart F	Subpart F Exempt
	Part 90	Antenna Height > 10 meters
	Part 90	ERP < 1000 watts
	Part 74, Subpart F	Subpart F Exempt

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

The proposed 4.92 kW directional operation will utilize an ERI, Type AL8O-28-H antenna (or equivalent) described above with a center of radiation above ground of 120 meters. The proposed antenna is side-mounted on an existing tower with an overall height of 124 meters above ground. The proposed digital Channel 28 operation of K42FI will create a radiofrequency field level of approximately  $1.0 \mu\text{W}/\text{cm}^2$  at the base of the tower (field value of 0.029 at  $80^\circ$  -  $90^\circ$ ). This level is approximately 0.3% of the Maximum Permissible Exposure ("MPE") limit for the general population and uncontrolled environment.

Authorized personnel and rigging contractors will be alerted to the potential zone of high field levels 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.

Environmental Assessment

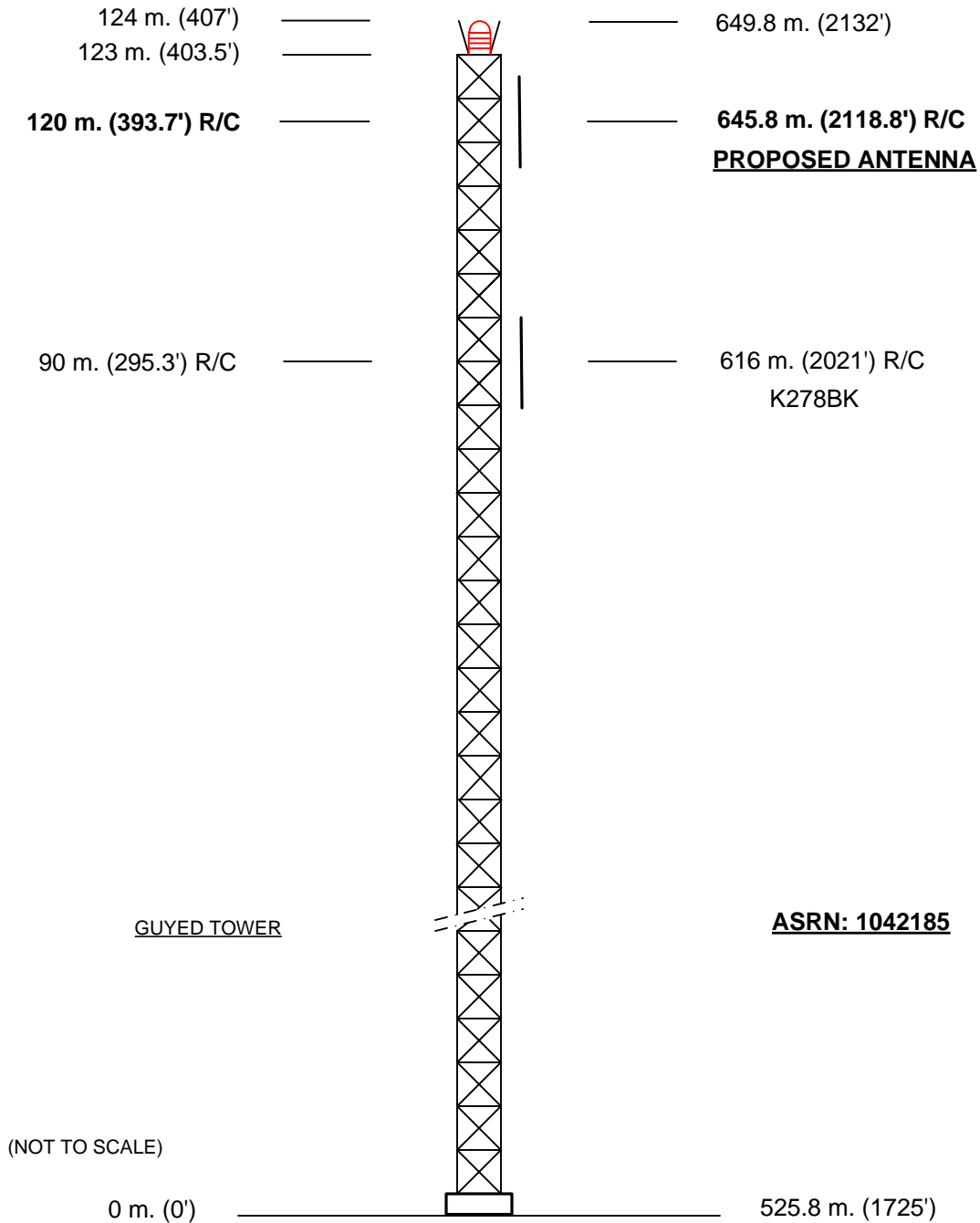
An environmental assessment (“EA”) is categorically excluded under Section 1.1306 of the FCC Rules and Regulations as the tower was constructed prior to the requirements specified in WT Docket No. 03-128 and the licensee indicates:

- (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 installation of the DTV facilities on an existing 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 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.



ABOVE GROUND

ABOVE MEAN SEA LEVEL



(NOT TO SCALE)

EXHIBIT E - 1  
VERTICAL SKETCH  
FOR DISPLACEMENT CHANNEL 28 OPERATION OF  
**K42FI, WATERTOWN, SOUTH DAKOTA**  
OCTOBER 2017

COHEN, DIPPELL and EVERIST, P.C. CONSULTING ENGINEERS

EXHIBIT E-2

ANTENNA MANUFACTURER DATA

***PRELIMINARY SPECIFICATION FOR  
ERI AL HORIZONTALLY POLARIZED  
COAXIAL SLOTTED ARRAY ANTENNA***

*Prepared For Channel 28  
KDLT Television*

*Watertown, SD  
October 25, 2017*

**ANTENNA TYPE:  
AL80-28-H**

**SPECIFICATION NO:  
K42FI-D - 20171017-993 Rev A**



## **PRELIMINARY SPECIFICATION FOR ERIAL HORIZONTALLY POLARIZED COAXIAL SLOTTED ARRAY ANTENNA**

### **ELECTRICAL CHARACTERISTICS:**

CHANNEL:	DTV:	28
FREQUENCY RANGE:	DTV:	554.00 - 560.00 MHz
AZIMUTH PATTERN NUMBER:	Hor Pol:	AL-O
ELEVATION PATTERN NUMBER:	Hor Pol:	AL8
AZIMUTH DIRECTIVITY:	Hor Pol:	1.00 (0.00 dB)
ELEVATION DIRECTIVITY:	Hor Pol:	8.68 (9.39 dBd)
PEAK POWER GAIN:	Hor Pol:	8.68 (9.39 dBd)
GAIN AT HORIZONTAL:	Hor Pol:	7.17 (8.56 dBd)
ELECTRICAL BEAM TILT:		-1.75 Degrees
INPUT POWER REQUIRED:		1.152 kW Average Power, 8VSB Digital
MAXIMUM INPUT POWER:		2.00 kW Average Power
INPUT TYPE:		7/8" EIA
ANTENNA VSWR (MAXIMUM):	DTV:	1.10 Over 6 MHz of Channel

*Preliminary, subject to final design and review.*

## **PRELIMINARY SPECIFICATION FOR ERI AL HORIZONTALLY POLARIZED COAXIAL SLOTTED ARRAY ANTENNA**

### **MECHANICAL CHARACTERISTICS:**

#### **MOUNTING CONFIGURATION:**

*\*(Tower Interface supplied and  
installed by others.)*

Side Mount

HEIGHT OF ANTENNA:

CONTACT ERI

HEIGHT OF CENTER OF  
RADIATION:

CONTACT ERI

OVERALL HEIGHT (A):

CONTACT ERI

DEICING:

*Radomes or deicing heaters not  
normally required for radial  
ice less than 1/2-inch*

RADOME DIAMETER (C):

CONTACT ERI

RADOME COLOR:

GRAY

CLIMBING DEVICE:

NOT APPLICABLE

CALCULATED WEIGHT<sup>1</sup>:

CONTACT ERI

ANTENNA AREA:

CONTACT ERI

***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 transitional and three rotational degrees of freedom.***

<sup>1</sup> Calculated weight is based on the PRELIMINARY design of the antenna. The actual weight of the antenna will be within  $\pm 10\%$  of the calculated weight. The actual weight will be given in the technical manual that accompanies the antenna. This figure is for the antenna only and does not include the antenna input section.

**Note: Localized conditions may require higher wind speed specifications than TIA/EIA specifications. Check with local authorities to verify wind speed requirements.**

**Preliminary, subject to final design and review.**

## Broadcast Antenna System

### Power Analysis

**KDLT Television Channel 28**  
**Watertown, SD**  
**AL8O-28-H**

#### ANTENNA PARAMETERS

##### **Azimuth Directivity:**

Hor. Pol: 1.00  
dBd: 0.00

##### **Elevation Directivity:**

Hor. Pol: 8.68  
dBd: 9.39

##### **POWER GAIN:**

Ratio: 8.68  
dBd: 9.39

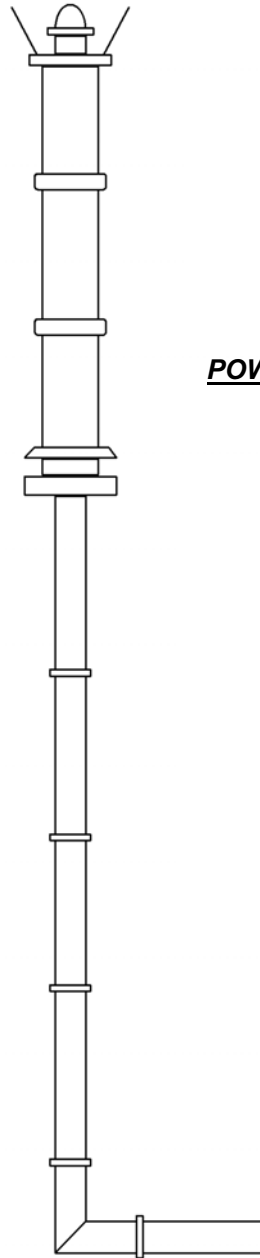
#### TRANSMISSION LINE:

##### **VERTICAL RUN:**

Type: HJ7-50A  
Length, ft: 340 ft.  
Attenuation, dB/100 ft: 0.506 dB/100 ft.

##### **HORIZONTAL RUN:**

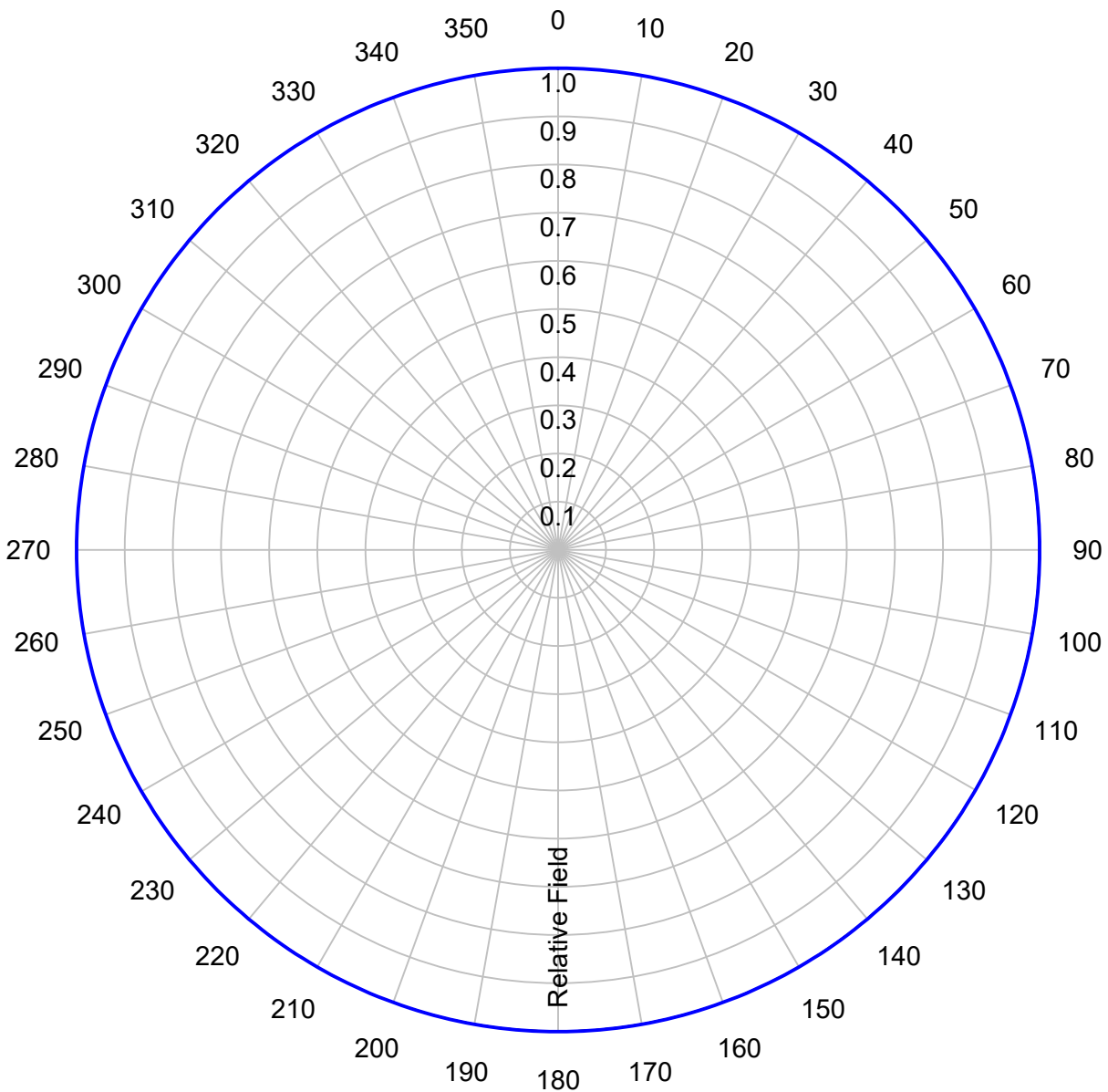
Type: HJ7-50A  
Length, ft: 50 ft.  
Attenuation, dB/100 ft: 0.506 dB/100 ft.



Preliminary, subject to final design and review.

**AZIMUTH PATTERN****Type:****AL-O****Directivity:****Numeric****1.00****dBd****0.00****Peak(s) at:****Channel:****28****Location:****Watertown, SD****Polarization:****Horizontal**

Note: Pattern shape and directivity may vary with channel and mouting configuration.



*Preliminary, subject to final design and review.*

## TABULATED DATA FOR AZIMUTH PATTERN

Type: AL-O

Polarization: Horizontal

ANGLE	FIELD	dB	ANGLE	FIELD	dB	ANGLE	FIELD	dB	ANGLE	FIELD	dB
0	1.000	0.00	92	1.000	0.00	184	1.000	0.00	276	1.000	0.00
2	1.000	0.00	94	1.000	0.00	186	1.000	0.00	278	1.000	0.00
4	1.000	0.00	96	1.000	0.00	188	1.000	0.00	280	1.000	0.00
6	1.000	0.00	98	1.000	0.00	190	1.000	0.00	282	1.000	0.00
8	1.000	0.00	100	1.000	0.00	192	1.000	0.00	284	1.000	0.00
10	1.000	0.00	102	1.000	0.00	194	1.000	0.00	286	1.000	0.00
12	1.000	0.00	104	1.000	0.00	196	1.000	0.00	288	1.000	0.00
14	1.000	0.00	106	1.000	0.00	198	1.000	0.00	290	1.000	0.00
16	1.000	0.00	108	1.000	0.00	200	1.000	0.00	292	1.000	0.00
18	1.000	0.00	110	1.000	0.00	202	1.000	0.00	294	1.000	0.00
20	1.000	0.00	112	1.000	0.00	204	1.000	0.00	296	1.000	0.00
22	1.000	0.00	114	1.000	0.00	206	1.000	0.00	298	1.000	0.00
24	1.000	0.00	116	1.000	0.00	208	1.000	0.00	300	1.000	0.00
26	1.000	0.00	118	1.000	0.00	210	1.000	0.00	302	1.000	0.00
28	1.000	0.00	120	1.000	0.00	212	1.000	0.00	304	1.000	0.00
30	1.000	0.00	122	1.000	0.00	214	1.000	0.00	306	1.000	0.00
32	1.000	0.00	124	1.000	0.00	216	1.000	0.00	308	1.000	0.00
34	1.000	0.00	126	1.000	0.00	218	1.000	0.00	310	1.000	0.00
36	1.000	0.00	128	1.000	0.00	220	1.000	0.00	312	1.000	0.00
38	1.000	0.00	130	1.000	0.00	222	1.000	0.00	314	1.000	0.00
40	1.000	0.00	132	1.000	0.00	224	1.000	0.00	316	1.000	0.00
42	1.000	0.00	134	1.000	0.00	226	1.000	0.00	318	1.000	0.00
44	1.000	0.00	136	1.000	0.00	228	1.000	0.00	320	1.000	0.00
46	1.000	0.00	138	1.000	0.00	230	1.000	0.00	322	1.000	0.00
48	1.000	0.00	140	1.000	0.00	232	1.000	0.00	324	1.000	0.00
50	1.000	0.00	142	1.000	0.00	234	1.000	0.00	326	1.000	0.00
52	1.000	0.00	144	1.000	0.00	236	1.000	0.00	328	1.000	0.00
54	1.000	0.00	146	1.000	0.00	238	1.000	0.00	330	1.000	0.00
56	1.000	0.00	148	1.000	0.00	240	1.000	0.00	332	1.000	0.00
58	1.000	0.00	150	1.000	0.00	242	1.000	0.00	334	1.000	0.00
60	1.000	0.00	152	1.000	0.00	244	1.000	0.00	336	1.000	0.00
62	1.000	0.00	154	1.000	0.00	246	1.000	0.00	338	1.000	0.00
64	1.000	0.00	156	1.000	0.00	248	1.000	0.00	340	1.000	0.00
66	1.000	0.00	158	1.000	0.00	250	1.000	0.00	342	1.000	0.00
68	1.000	0.00	160	1.000	0.00	252	1.000	0.00	344	1.000	0.00
70	1.000	0.00	162	1.000	0.00	254	1.000	0.00	346	1.000	0.00
72	1.000	0.00	164	1.000	0.00	256	1.000	0.00	348	1.000	0.00
74	1.000	0.00	166	1.000	0.00	258	1.000	0.00	350	1.000	0.00
76	1.000	0.00	168	1.000	0.00	260	1.000	0.00	352	1.000	0.00
78	1.000	0.00	170	1.000	0.00	262	1.000	0.00	354	1.000	0.00
80	1.000	0.00	172	1.000	0.00	264	1.000	0.00	356	1.000	0.00
82	1.000	0.00	174	1.000	0.00	266	1.000	0.00	358	1.000	0.00
84	1.000	0.00	176	1.000	0.00	268	1.000	0.00	360	1.000	0.00
86	1.000	0.00	178	1.000	0.00	270	1.000	0.00			
88	1.000	0.00	180	1.000	0.00	272	1.000	0.00			
90	1.000	0.00	182	1.000	0.00	274	1.000	0.00			

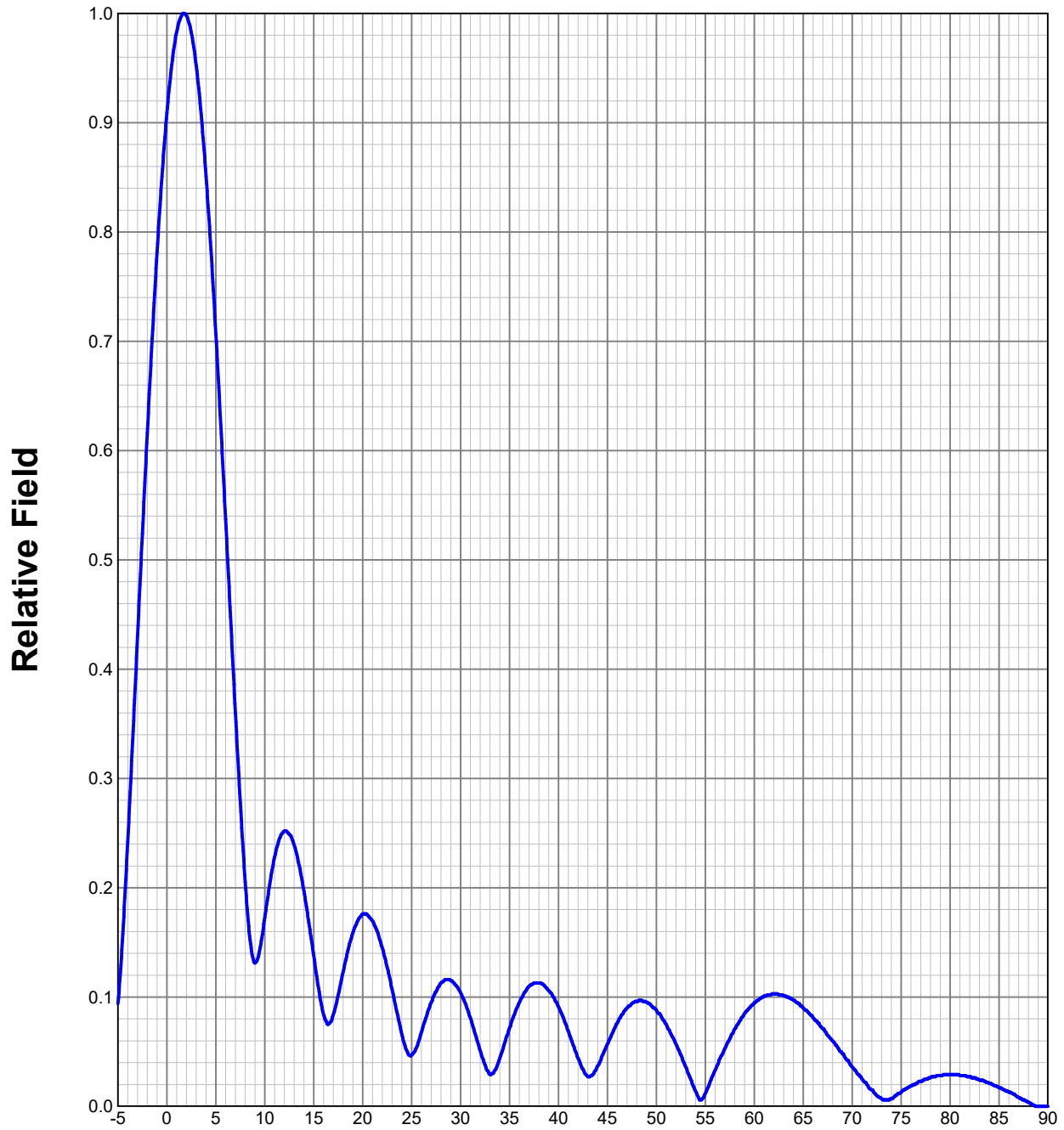
Preliminary, subject to final design and review.



**ELEVATION PATTERN**

Type:	<u>AL8</u>	
Directivity:	<u>Numeric</u>	<u>dBd</u>
Main Lobe:	<u>8.68</u>	<u>9.39</u>
Horizontal:	<u>7.17</u>	<u>8.56</u>

Channel:	<u>28</u>
Location:	<u>Watertown, SD</u>
Beam Tilt:	<u>1.75</u>
Polarization:	<u>Horizontal</u>



*Preliminary, subject to final design and review.*

## TABULATED DATA FOR ELEVATION PATTERN

Type: AL8

Polarization: Horizontal

ANGLE	FIELD	dB	ANGLE	FIELD	dB	ANGLE	FIELD	dB	ANGLE	FIELD	dB	ANGLE	FIELD	dB
-5.00	0.094	-20.54	6.75	0.403	-7.88	27.00	0.095	-20.45	50.50	0.082	-21.72	74.00	0.007	-43.10
-4.75	0.122	-18.24	7.00	0.360	-8.87	27.50	0.105	-19.58	51.00	0.075	-22.50	74.50	0.010	-40.00
-4.50	0.158	-16.03	7.25	0.318	-9.95	28.00	0.113	-18.94	51.50	0.066	-23.61	75.00	0.013	-37.72
-4.25	0.200	-14.00	7.50	0.278	-11.12	28.50	0.116	-18.71	52.00	0.057	-24.88	75.50	0.016	-35.92
-4.00	0.242	-12.32	7.75	0.240	-12.40	29.00	0.115	-18.79	52.50	0.047	-26.56	76.00	0.019	-34.42
-3.75	0.287	-10.83	8.00	0.205	-13.76	29.50	0.111	-19.09	53.00	0.036	-28.87	76.50	0.021	-33.56
-3.50	0.334	-9.53	8.25	0.175	-15.11	30.00	0.104	-19.66	53.50	0.025	-32.04	77.00	0.023	-32.77
-3.25	0.382	-8.37	8.50	0.152	-16.36	30.50	0.094	-20.54	54.00	0.014	-37.08	77.50	0.025	-32.04
-3.00	0.430	-7.33	8.75	0.137	-17.27	31.00	0.081	-21.83	54.50	0.006	-44.44	78.00	0.026	-31.70
-2.75	0.478	-6.42	9.00	0.131	-17.65	31.50	0.066	-23.61	55.00	0.012	-38.42	78.50	0.027	-31.37
-2.50	0.524	-5.61	9.25	0.135	-17.43	32.00	0.051	-25.85	55.50	0.023	-32.77	79.00	0.028	-31.06
-2.25	0.571	-4.87	9.50	0.144	-16.83	32.50	0.038	-28.40	56.00	0.033	-29.63	79.50	0.029	-30.75
-2.00	0.616	-4.21	9.75	0.157	-16.08	33.00	0.029	-30.75	56.50	0.044	-27.13	80.00	0.029	-30.75
-1.75	0.661	-3.60	10.00	0.173	-15.24	33.50	0.033	-29.63	57.00	0.053	-25.51	80.50	0.029	-30.75
-1.50	0.703	-3.06	10.50	0.203	-13.85	34.00	0.044	-27.13	57.50	0.062	-24.15	81.00	0.028	-31.06
-1.25	0.743	-2.58	11.00	0.228	-12.84	34.50	0.058	-24.73	58.00	0.071	-22.97	81.50	0.028	-31.06
-1.00	0.782	-2.14	11.50	0.245	-12.22	35.00	0.072	-22.85	58.50	0.078	-22.16	82.00	0.027	-31.37
-0.75	0.818	-1.74	12.00	0.252	-11.97	35.50	0.084	-21.51	59.00	0.085	-21.41	82.50	0.026	-31.70
-0.50	0.851	-1.40	12.50	0.249	-12.08	36.00	0.095	-20.45	59.50	0.090	-20.92	83.00	0.024	-32.40
-0.25	0.881	-1.10	13.00	0.239	-12.43	36.50	0.104	-19.66	60.00	0.095	-20.45	83.50	0.023	-32.77
0.00	0.909	-0.83	13.50	0.221	-13.11	37.00	0.110	-19.17	60.50	0.098	-20.18	84.00	0.021	-33.56
0.25	0.933	-0.61	14.00	0.197	-14.11	37.50	0.113	-18.94	61.00	0.101	-19.91	84.50	0.019	-34.42
0.50	0.953	-0.42	14.50	0.168	-15.49	38.00	0.113	-18.94	61.50	0.102	-19.83	85.00	0.017	-35.39
0.75	0.970	-0.26	15.00	0.138	-17.20	38.50	0.111	-19.09	62.00	0.103	-19.74	85.50	0.015	-36.48
1.00	0.983	-0.15	15.50	0.108	-19.33	39.00	0.106	-19.49	62.50	0.102	-19.83	86.00	0.013	-37.72
1.25	0.992	-0.07	16.00	0.084	-21.51	39.50	0.100	-20.00	63.00	0.101	-19.91	86.50	0.011	-39.17
1.50	0.998	-0.02	16.50	0.075	-22.50	40.00	0.091	-20.82	63.50	0.100	-20.00	87.00	0.008	-41.94
1.75	1.000	0.00	17.00	0.084	-21.51	40.50	0.081	-21.83	64.00	0.097	-20.26	87.50	0.006	-44.44
2.00	0.998	-0.02	17.50	0.102	-19.83	41.00	0.069	-23.22	64.50	0.094	-20.54	88.00	0.004	-47.96
2.25	0.992	-0.07	18.00	0.123	-18.20	41.50	0.056	-25.04	65.00	0.090	-20.92	88.50	0.001	-60.00
2.50	0.982	-0.16	18.50	0.143	-16.89	42.00	0.044	-27.13	65.50	0.086	-21.31	89.00	0.000	-40.00
2.75	0.969	-0.27	19.00	0.159	-15.97	42.50	0.034	-29.37	66.00	0.081	-21.83	89.50	0.000	-40.00
3.00	0.952	-0.43	19.50	0.170	-15.39	43.00	0.027	-31.37	66.50	0.076	-22.38	90.00	0.000	-40.00
3.25	0.931	-0.62	20.00	0.176	-15.09	43.50	0.029	-30.75	67.00	0.071	-22.97			
3.50	0.908	-0.84	20.50	0.175	-15.14	44.00	0.037	-28.64	67.50	0.065	-23.74			
3.75	0.881	-1.11	21.00	0.170	-15.39	44.50	0.047	-26.56	68.00	0.060	-24.44			
4.00	0.851	-1.40	21.50	0.160	-15.92	45.00	0.057	-24.88	68.50	0.054	-25.35			
4.25	0.819	-1.74	22.00	0.145	-16.77	45.50	0.067	-23.48	69.00	0.048	-26.38			
4.50	0.784	-2.11	22.50	0.127	-17.92	46.00	0.076	-22.38	69.50	0.042	-27.54			
4.75	0.746	-2.54	23.00	0.107	-19.41	46.50	0.084	-21.51	70.00	0.036	-28.87			
5.00	0.707	-3.01	23.50	0.086	-21.31	47.00	0.090	-20.92	70.50	0.030	-30.46			
5.25	0.667	-3.52	24.00	0.066	-23.61	47.50	0.094	-20.54	71.00	0.025	-32.04			
5.50	0.624	-4.10	24.50	0.051	-25.85	48.00	0.096	-20.35	71.50	0.020	-33.98			
5.75	0.581	-4.72	25.00	0.047	-26.56	48.50	0.097	-20.26	72.00	0.015	-36.48			
6.00	0.537	-5.40	25.50	0.054	-25.35	49.00	0.095	-20.45	72.50	0.010	-40.00			
6.25	0.492	-6.15	26.00	0.068	-23.35	49.50	0.092	-20.72	73.00	0.007	-43.10			
6.50	0.448	-6.97	26.50	0.082	-21.72	50.00	0.088	-21.11	73.50	0.006	-44.44			

Preliminary, subject to final design and review.

EXHIBIT E-3

ALLOCATION STUDY

tvstudy v2.2.3 (Dxtpx3)  
Database: localhost, Study: K42FI-Replicate28, Model: Longley-Rice  
Start: 2017.10.25 12:32:55

Study created: 2017.10.25 12:27:14

Study build station data: LMS TV 2017-10-24 (24)

Proposal: K42FI-D D28+ LD CP WATERTOWN, SD  
File number: Replicate28  
Facility ID: 129133  
Station data: User record  
Record ID: 98  
Country: U.S.

Build options:  
Protect records not on baseline channel

No protected stations found.

No non-directional AM stations found within 0.8 km

Directional AM stations within 3.2 km:  
KWAT 950 L DAN D WATERTOWN, SD BL  
KWAT 950 L DAN N WATERTOWN, SD BL

Record parameters as studied:

Channel: D28+  
Mask: Simple  
Latitude: 44 52 16.00 N (NAD83)  
Longitude: 97 6 35.00 W  
Height AMSL: 645.8 m  
HAAT: 0.0 m  
Peak ERP: 4.92 kW  
Antenna: ERI-AL12-42PL (ID 65864) 0.0 deg  
Elev Pattn: Generic  
Elec Tilt: 1.2

50.1 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	4.45 kW	109.6 m	38.7 km
45.0	2.70	86.6	33.5
90.0	1.78	75.3	29.9
135.0	2.18	105.8	34.7
180.0	2.03	115.1	35.2
225.0	1.89	98.0	33.1

270.0	3.31	114.4	37.6
315.0	4.78	116.1	39.6

Database HAAT does not agree with computed HAAT  
Database HAAT: 0 m    Computed HAAT: 103 m

Distance to Canadian border: 459.0 km

Distance to Mexican border: 1666.3 km

Conditions at FCC monitoring station: Grand Island NE  
Bearing: 194.2 degrees    Distance: 451.8 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:  
Bearing: 234.5 degrees    Distance: 846.1 km

Study cell size: 1.00 km  
Profile point spacing: 1.00 km

Maximum new IX to full-service and Class A: 0.50%  
Maximum new IX to LPTV: 2.00%

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Interference to proposal, scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	K42FI-D	D28+	LD	CP	WATERTOWN, SD	Replicate28	
Undesireds:	KAWB	D28	DT	LIC	BRAINERD, MN	BLEDT20101012ADI	268.4 km
	KILW-LD	D28	LD	LIC	Minneapolis, MN	BLANK0000004615	322.9
	K28IF-D	D28	LD	LIC	WILLMAR, MN	BLDTL20110203ACI	165.6

	Service area		Terrain-limited		IX-free	Percent IX	
	3958.3	32,628	3924.9	32,518	3918.8	32,513	0.15    0.02
Undesired			Total IX		Unique IX	Prcnt Unique IX	
KAWB D28 DT LIC		5.1	5	0.0	0	0.00	0.00
K28IF-D D28 LD LIC		6.1	5	1.0	0	0.03	0.00

TABLE I  
COMPUTED COVERAGE DATA  
FOR THE PROPOSED DTV OPERATION OF  
K42FI, WATERTOWN, SOUTH DAKOTA  
CHANNEL 28 4.92 KW ERP 645.8 METERS RC/AMSL  
OCTOBER 2017

<u>Radial</u> N ° E, T	<u>Average</u> <u>Elevation</u> meters	<u>Effective</u> <u>Height</u> meters	<u>Depression</u> <u>Angle</u> degrees	<u>Effective</u> <u>Radiated</u> <u>Power</u> kW	<u>Distance to Contour</u>	
					<u>58 dBu</u> km	<u>50.140 dBu</u> km
0	536.2	109.6	0.290	4.4	29.4	38.7
10	540.2	105.6	0.285	4.1	28.6	37.9
20	551.9	93.9	0.268	3.7	26.8	36.1
30	560.9	84.9	0.255	3.3	25.1	34.3
40	569.9	75.9	0.241	2.9	23.2	32.4
50	550.6	95.2	0.270	2.5	24.9	34.3
60	558.4	87.4	0.259	2.2	23.2	32.6
70	571.0	74.8	0.240	2.0	21.0	30.3
80	573.0	72.8	0.236	1.8	20.4	29.6
90	570.5	75.3	0.240	1.8	20.6	29.9
100	561.7	84.1	0.254	1.8	21.8	31.2
110	557.4	88.4	0.261	1.9	22.6	32.0
120	551.5	94.3	0.269	2.0	23.6	33.0
130	544.6	101.2	0.279	2.1	24.7	34.1
140	535.2	110.6	0.291	2.2	25.8	35.3
150	527.1	118.7	0.302	2.2	26.6	36.0
160	523.7	122.1	0.306	2.2	26.8	36.2
170	534.9	110.9	0.292	2.1	25.6	35.1
180	530.7	115.1	0.297	2.0	25.7	35.2
190	533.1	112.7	0.294	1.9	25.2	34.7
200	534.0	111.8	0.293	1.8	24.9	34.3
210	540.4	105.4	0.284	1.8	24.2	33.6
220	547.5	98.3	0.275	1.8	23.5	33.0
230	544.4	101.4	0.279	2.0	24.2	33.7
240	538.8	107.0	0.287	2.2	25.4	34.9
250	531.1	114.7	0.297	2.5	26.8	36.2
260	521.2	124.6	0.309	2.9	28.3	37.7
270	531.4	114.4	0.296	3.3	28.2	37.6

TABLE I  
COMPUTED COVERAGE DATA  
FOR THE PROPOSED DTV OPERATION OF  
K42FI, WATERTOWN, SOUTH DAKOTA  
CHANNEL 28 4.92 KW ERP 645.8 METERS RC/AMSL  
OCTOBER 2017

<u>Radial</u> N ° E, T	<u>Average</u> <u>Elevation</u> meters	<u>Effective</u> <u>Height</u> meters	<u>Depression</u> <u>Angle</u> degrees	<u>Effective</u> <u>Radiated</u> <u>Power</u> kW	<u>Distance to Contour</u>	
					<u>58 dBu</u> km	<u>50.140 dBu</u> km
280	531.7	114.1	0.296	3.7	28.9	38.2
290	532.5	113.3	0.295	4.1	29.3	38.6
300	531.4	114.4	0.296	4.4	29.8	39.1
310	531.7	114.1	0.296	4.7	30.1	39.4
320	532.1	113.7	0.295	4.9	30.2	39.5
330	529.9	115.9	0.298	4.9	30.4	39.7
340	526.9	118.9	0.302	4.9	30.6	39.9
350	536.5	109.3	0.290	4.7	29.6	38.9

