

ENGINEERING STATEMENT  
APPLICATION FOR A DTV  
CONSTRUCTION PERMIT FOR  
AN EXISTING TELEVISION TRANSLATOR  
K04DA, DIAMOND BASIN, WYOMING  
ON BEHALF OF  
KTVQ COMMUNICATIONS, INC.  
CHANNEL 20 1.26 KW ND ERP 2385 METERS RC/AMSL  
MAY 2012

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;

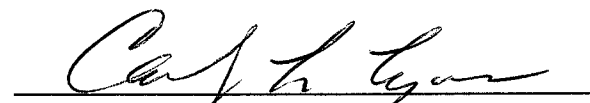
That his qualifications are a matter of record in the Federal Communications Commission;

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

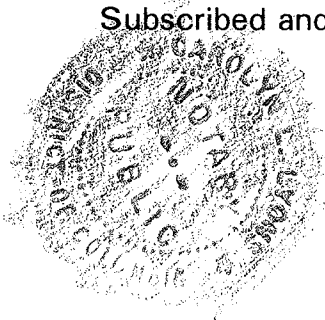
That the facts stated herein are true of his own knowledge, except such facts as are stated to be on information and belief, and as to such facts he believes them to be true.

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

Subscribed and sworn to before me this 7<sup>th</sup> day of May, 2012.

  
Notary Public

My Commission Expires: 2/28/2013



### Introduction

This engineering statement has been prepared on behalf of KTVQ Communications, Inc., licensee of KTVQ-DT, Billings, Montana. The engineering statement accompanies a request for an application for digital operation for TV translator K04DA, licensed to Diamond Basin, Wyoming. This statement supports the licensee's request to convert to DTV operation and to correct the existing site information. The operation proposed herein is for Channel 20 with a DTV effective radiated power ("ERP") of 1.26 kW at a radiation center above mean sea level ("RCAMSL") of 2385 meters.

### Transmitter Site

A new antenna will be utilized and no significant alteration of the tower is proposed. The existing tower is located on Cedar Mountain approximately five miles on an unimproved road from the nearest paved road. There is no change in transmitter site. The corrected geographic coordinates of the site follow below.

North Latitude: 44° 29' 37"

West Longitude: 109° 10' 07"

NAD-27

### Equipment Data

Transmitter: Type-approved

Transmission Line: Andrew, Type LDF-50 7/8", 13.7 meters (45 feet) with 91.4% efficiency  
[0.868 dB loss/100 ft]

Antenna: Scala, Model No. SL-8 with maximum gain of 13.8 and 1.75° electrical beam tilt. Exhibit E-1 provides the antenna manufacturer information

Power Data

Transmitter:	0.100 kW	-10.0 dBk
Transmission Line Efficiency Loss:	91.4 %	-0.391 dB
Input Into Antenna:	0.0914 kW	-10.391 dBk
Antenna Gain:	13.8	11.4 dB
ERP:	1.26 kW	1.009 dBk

Elevation Data

Elevation of site above mean sea level	2377.4 meters (7800 feet)
Center of radiation of antenna above ground level	7.63 meters (25 feet)
Center of radiation of antenna above mean sea level	2385 meters (7825 feet)
Overall height above ground of antenna including appurtenances	9.14 meters (30 feet)
Overall height above mean sea level of tower including appurtenances	2386.6 meters (7830 feet)

Slight differences may result due to conversion to metric

The existing structure does not require FAA airspace approval.

As indicated above, the transmitter with typical power output of 0.1 kW will deliver 0.0914 kW to the input of the antenna. The antenna, having a maximum power gain of 13.8 and an electrical beam tilt of  $1.75^{\circ}$ , will produce maximum ERP of 1.26 kW. The antenna pattern information is included as Exhibit E-1. A coverage map of the proposed facility has been included as Exhibit E-2 of this report. Exhibit E-3 provides the coverage of the normally protected contour for the proposed facility and that now provided by the analog facility K04DA.

#### Other Broadcast Facilities

A brief analysis was completed to determine the presence of stations in the vicinity of the existing tower using the May 2, 2012 data contained within the Commission's Consolidated Database System ("CDBS"). Within 100 meters of the proposed site, no authorized FM radio or FM translator stations were identified; no full-service DTV stations; and one authorized DTV television translator station is found within 100 meters. There are no AM facilities within 3.2 km of the existing tower. Although no adverse technical affects are expected due to the proposed changes, the applicant will take measures to resolve any problems proven to be related to the changes proposed in this application.

#### Interference Analysis

A study of predicted interference caused by the proposed Channel 20 K04DA low-power/translator 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/dtv/dtv\\_apps.html](http://www.fcc.gov/oet/dtv/dtv_apps.html). The FCC's FORTRAN-77 code was modified only to the extent necessary (primarily input/output handling) for the program to run on a Microsoft

Windows XP/Intel platform. 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 3-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 CDBS database update of the FCC's engineering database. A Longley-Rice study was performed with the proposed channels K04DA low-power/translator digital facilities and all relevant stations listed in the FCC data base as of May 2, 2012. The study results and the included stations are listed in Table 1.

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

#### FCC Rule, Section 1.1307

The proposed 1.26 kW non-directional operation will utilize a Scala, Type SL-8 antenna (or equivalent) described above with a center of radiation above ground of 7.63 meters. The proposed antenna is top-mounted on a tower with an overall height of 9.14 meters above ground.

As previously indicated, there are no AM stations located within 3.2 km of the proposed tower site. According to the FCC database, there are also no FM nor FM translator stations, nor

full power DTV stations and one translator station located within 100 meters of the existing tower.

The proposed operation based upon the current OET Bulletin No. 65, Edition 97-01 dated August 1997 and Supplement A meets the provisions of the FCC radiofrequency field ("RFF") guidelines, and thus, complies with Section 1.1307 of the FCC Rules. The elevation pattern for the Scala, Type SL-8 antenna, Exhibit E-1 shows a maximum relative field of less than 0.25 toward the ground (20° to 90° below the horizontal). Calculation according to OET Bulletin 65 predicts a maximum RFF power density of less than 90  $\mu\text{W}/\text{cm}^2$ , 2 meters above ground or less than 5.3% of the controlled Maximum Permissible Exposure ("MPE") guideline.

For completeness, the contribution by facilities located within 100 meters to the electromagnetic field environment is considered herein, as there is one other licensed operation in the area.

The RFF study will also consider the following stations:

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

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

where:

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

F = relative field factor

Total ERP = ERP Horizontal Polarization + ERP Vertical Polarization

$$R = RCAGL - 2 \text{ meters}$$

$$ERP = \text{RMS ERP in watts for DTV Stations}$$

$$ERP = ERP (\text{horizontally polarized}) + ERP (\text{vertically polarized})$$

K32IF-D DTV Facility

Channel 32	Freq:	566-572 MHz range
	ERP =	0.20 kW
	Polarization =	Horizontal
	RCAGL -2 meters =	5.63 meters (assumed)

$$S = \frac{33.4 (F^2) \text{ Tot ERP}}{R^2} \quad \text{Tot ERP} = 0.2 \text{ kW (Horizontal Only)}$$
$$R = 5.63 \text{ meters}$$
$$F = 0.3 \text{ (assumed)}$$

$$S = < 20 \mu\text{W}/\text{cm}^2$$

Therefore, K32IF-D contributes less than  $20 \mu\text{W}/\text{cm}^2$  at 2 meters above ground.

The limit for a controlled environment for this frequency is  $1896 \mu\text{W}/\text{cm}^2$ .

**K32IF-D contributes less than 2% RFF level for a controlled environment two meters above the ground.**

Proposed Digital Translator Facility

Channel 20	Freq:	506-512 MHz range
	ERP =	1.26 kW
	Polarization =	Horizontal
	RCAGL -2 meters =	5.63 meters

$$S = \frac{33.4 (F^2) \text{ Tot ERP}}{R^2} \quad \text{Tot ERP} = 1.26 \text{ kW (Horizontal Only)}$$
$$R = 5.63 \text{ meters}$$
$$F = 0.25 \text{ (from manufacturer's data)}$$

$$S = < 83 \mu\text{W}/\text{cm}^2$$



Therefore, the proposed Channel 20 operation contributes less than  $83 \mu\text{W}/\text{cm}^2$  at 2 meters above ground.

The limit for a controlled environment for this frequency is  $1696 \mu\text{W}/\text{cm}^2$ .

**The proposed channel operation contributes less than 5.3% RFF level for a controlled environment two meters above the ground.**

**Total RFF contribution**

$5.3\% \text{ (proposed)} + 2\% \text{ (LPTV)} \leq 8\%$  for the controlled environment two meters above ground including the proposed DTV translator operation.

The applicant indicates that access to the site is approximately 5 miles on an unpaved road from a main road. The road is not regularly traveled. 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 proposed Channel 20 facility would not be exposed to RFF levels exceeding the FCC standards.

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 applicant indicates:

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 applicant 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.

Cohen, Dippell and Everist, P.C.

**EXHIBIT E-1**

ANTENNA MANUFACTURER  
DATA



## SL-8

### UHF-TV PARASLOT® ANTENNA

11.4 dBd Gain  
470 to 862 MHz (Channels 14–69\*)  
Horizontally polarized

The Kathrein Scala Division SL-8 Paraslot UHF-TV antenna is a high performance slot array offering excellent performance in UHF-TV transmit applications requiring omnidirectional coverage. The SL-8 is available in single and multichannel models with a 1,000 watt power rating and optional null-fill.

Kathrein Scala Division's patented symmetrical parallel feed system is completely housed within the center of the antenna, and resists changes in radiation pattern caused by ice or snow buildup on the periphery of the antenna.

The standard SL-8 is a single-channel slot array with a power input rating of 1000 watts, VSWR of 1.1:1 maximum, 1.75 degrees of electrical beamtilt, and 7/8" EIA flange or 7/16 DIN female termination. Options include null-fill and additional beamtilt.

The SL-8-2 is designed for wideband performance over two alternate nonadjacent 6 MHz UHF-TV channels (e.g. Channels 60 and 62) permitting two transmitters to be diplexed into a single antenna. The SL-8-2 provides VSWR of 1.15:1 or better across the two specified channels.

The SL-8-3 Paraslot provides coverage of three 6 MHz alternate nonadjacent UHF-TV channels (e.g. Channels 60, 62, and 64). This arrangement allows three UHF-TV transmitters to be multiplexed into a single antenna. VSWR is held to 1.25:1 or better over the three specified channels.

\*Available for 6, 7, or 8 MHz channels in accordance with various international channel allocation plans.



10479-F



**PARASLOT** is a registered trademark of Kathrein Inc., Scala Division.



# SL-8

## UHF-TV PARASLOT® ANTENNA

11.4 dBd Gain  
470 to 862 MHz (Channels 14–69\*)  
Horizontally polarized

### Specifications: One UHF-TV Channel (up to 8 MHz bandwidth)

Frequency range (MHz)	470 to 548	548 to 674	674 to 788	788 to 862
Maximum gain (dBd)	11.4 dBd	11.4 dBd	11.4 dBd	11.4 dBd
Power gain	13.8	13.8	13.8	13.8
VSWR	< 1.1:1	< 1.1:1	< 1.1:1	< 1.1:1

### Specifications: One UHF-TV Channel with Null Fill (up to 8 MHz bandwidth)

Frequency range (MHz)	470 to 554	554 to 686	686 to 800	800 to 862
Maximum gain (dBd)	10.5 dBd	10.5 dBd	10.5 dBd	10.5 dBd
Power gain	11.22	11.22	11.22	11.22
VSWR	< 1.1:1	< 1.1:1	< 1.1:1	< 1.1:1

### Specifications: Two UHF-TV Channels (up to 24 MHz bandwidth)

Frequency range (MHz)	470 to 554	542 to 680	668 to 794	782 to 862
Maximum gain (dBd)	10.5 dBd	10.5 dBd	10.5 dBd	10.5 dBd
Power gain	11.22	11.22	11.22	11.22
VSWR				
18 MHz band	< 1.15:1	< 1.15:1	< 1.15:1	< 1.15:1
24 MHz band	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1

### Specifications: Three UHF-TV Channels (up to 40 MHz bandwidth)

Frequency range (MHz)	470 to 566	542 to 692	668 to 806	782 to 862
Maximum gain (dBd)	10.5 dBd	10.5 dBd	10.5 dBd	10.5 dBd
Power gain	11.22	11.22	11.22	11.22
VSWR				
30 MHz band	< 1.25:1	< 1.25:1	< 1.25:1	< 1.25:1
40 MHz band	< 1.3:1	< 1.3:1	< 1.3:1	< 1.3:1

### Mechanical Specifications:

Weight	95 lb (44 kg)	75 lb (34 kg)	65 lb (30 kg)	35 lb (16 kg)
Height	288 inches (732 cm)	240 inches (610 cm)	216 inches (549 cm)	180 inches (457 cm)
Diameter	4 inches (102 mm)	3.5 inches (89 mm)	2.875 inches (73 mm)	2.375 inches (60 mm)
Equivalent flat plate area	8 ft <sup>2</sup> (0.743 m <sup>2</sup> )	5.83 ft <sup>2</sup> (0.542 m <sup>2</sup> )	4.31 ft <sup>2</sup> (0.401 m <sup>2</sup> )	2.97 ft <sup>2</sup> (0.276 m <sup>2</sup> )
Wind survival rating	80 mph (130 kph)	90 mph (145 kph)	90 mph (145 kph)	80 mph (130 kph)
Shipping dimensions	302 x 9 x 7 inches (767 x 23 x 18 cm)	280 x 9 x 7 inches (711 x 23 x 18 cm)	254 x 9 x 7 inches (645 x 23 x 18 cm)	193 x 7 x 7 inches (490 x 18 x 18 cm)
Shipping weight	210 lb (96 kg)	170 lb (78 kg)	130 lb (59 kg)	70 lb (32 kg)

\*Available for 6, 7, or 8 MHz channels in accordance with various international channel allocation plans.

All specifications are subject to change without notice. The latest specifications are available at [www.kathrein-scala.com](http://www.kathrein-scala.com).

Kathrein Inc., Scala Division Post Office Box 4580 Medford, OR 97501 (USA) Phone: (541) 779-6500 Fax: (541) 779-3991  
Email: [broadcast@kathrein.com](mailto:broadcast@kathrein.com) Internet: [www.kathrein-scala.com](http://www.kathrein-scala.com)

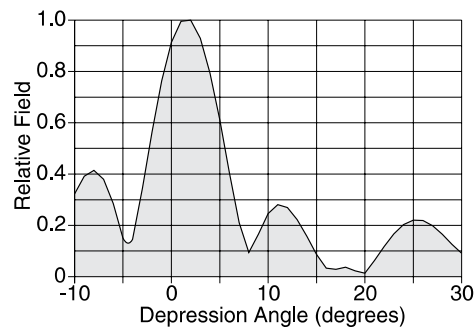
## SL-8 PARASLOT® ANTENNA

11.4 dBd Gain

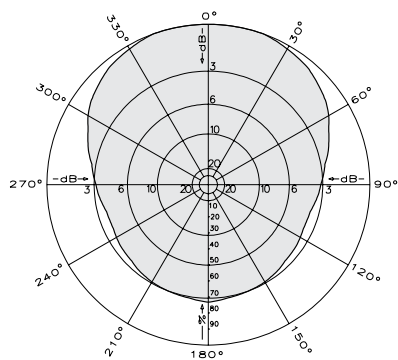
470 to 862 MHz (Channels 14–69\*)  
Horizontally polarized

### General Specifications:

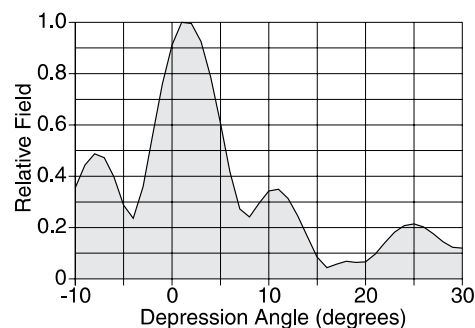
Frequency range	470 to 862 MHz*
Impedance	50 ohms
Polarization	Horizontal
Maximum input power	1000 watts
Electrical beamtilt	1.75 degrees standard (special beamtilt options are available)
Null fill	Optional
Connector	7/8" EIA flange
Mounting	Mounting kits are available for attachment to a flat vertical surface or to masts with 2.375 to 4.5 inch (60 to 114 mm) OD.



**Standard elevation pattern  
(H-plane)**



**Typical azimuth pattern  
(E-plane)**



**Typical elevation pattern  
(H-plane) with null fill**

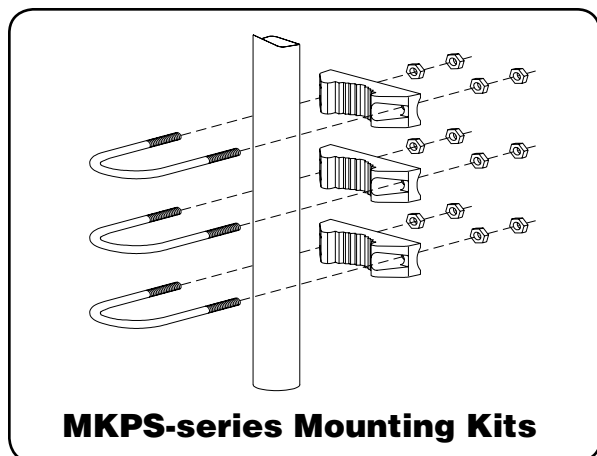
### Order Information:

Contact Kathrein Scala Division Customer Service for detailed order information.

# SL-8

## UHF-TV PARASLOT® ANTENNA

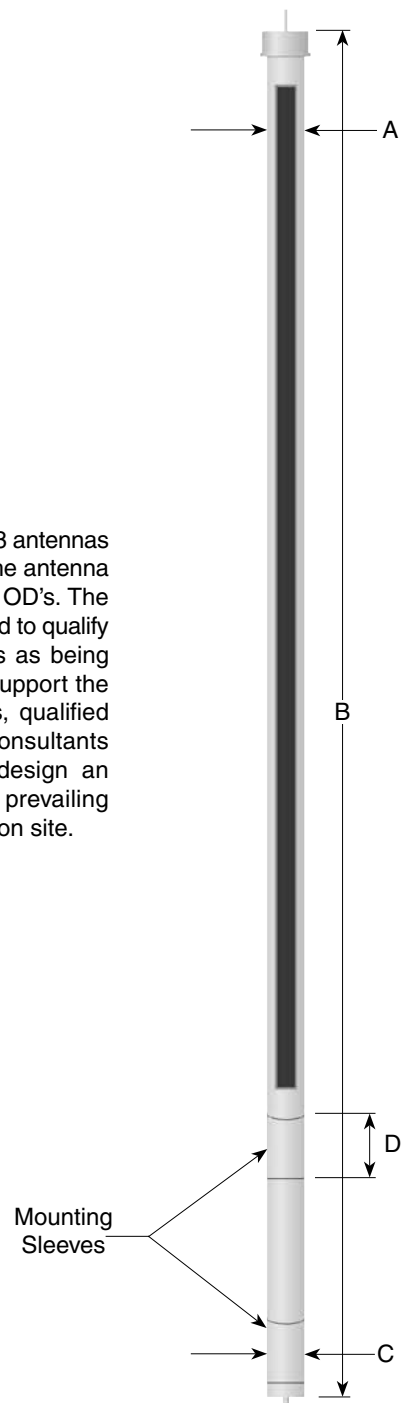
11.4 dBd Gain  
470 to 862 MHz (Channels 14–69\*)  
Horizontally polarized



### Mounting Options:

Model	Description
<b>788–862 MHz</b>	
MKPS-13	Mounting Kit for mounting to a flat plate
MKPP-23*	Mounting Kit for 2.375–3.5 inch (60–89 mm) OD mast.
MKPP-26*	Mounting Kit for 2.375–5 inch (60–127 mm) OD mast.
MKGK-1	Guy Kit
MKSK-1	Spreader Kit
<b>674–788 MHz</b>	
MKPS-14	Mounting Kit for mounting to a flat plate
MKPP-23*	Mounting Kit for 2.375–3.5 inch (60–89 mm) OD mast.
MKPP-26*	Mounting Kit for 2.375–5 inch (60–127 mm) OD mast.
MKGK-2	Guy Kit
MKSK-2	Spreader Kit
<b>548–674 MHz</b>	
MKPS-15	Mounting Kit for mounting to a flat plate
MKPP-26*	Mounting Kit for 2.375–5 inch (60–127 mm) OD mast.
MKGK-3	Guy Kit
MKSK-3	Spreader Kit
<b>470–548 MHz</b>	
MKPS-16	Mounting Kit for mounting to a flat plate
MKPP-26*	Mounting Kit for 2.375–5 inch (60–127 mm) OD mast.
MKGK-4	Guy Kit
MKSK-4	Spreader Kit

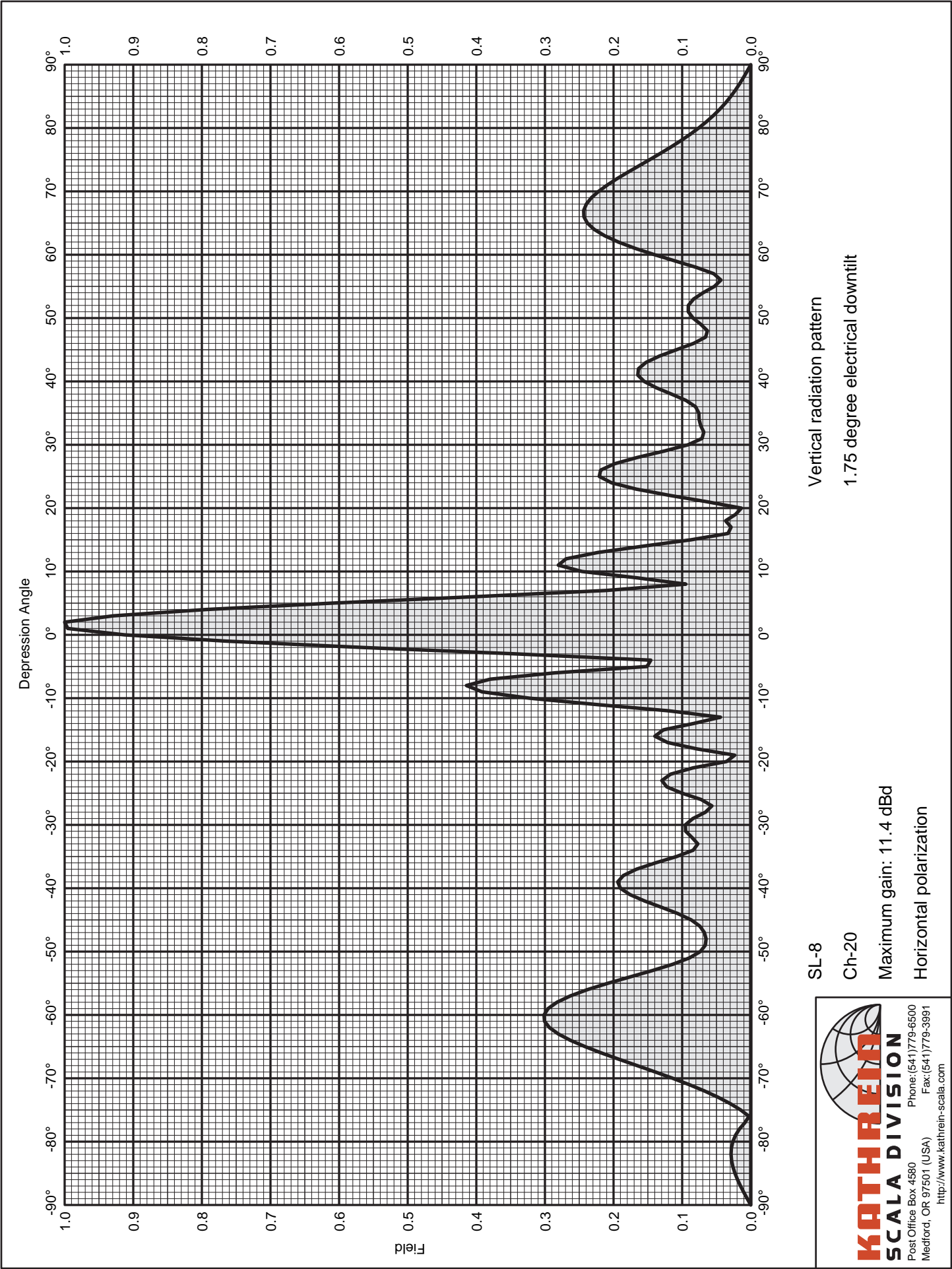
\* Pipe mounting kits for SL-8 antennas permit the installation of the antenna to a variety of pipe mast OD's. The range of OD is not intended to qualify those pipe support masts as being structurally adequate to support the antenna and in all cases, qualified structural engineering consultants should be engaged to design an adequate mount for all prevailing conditions at the installation site.



A	B	C	D
2.375 inches (60 mm)	180 inches (457 cm)	2.875 inches (74 mm)	7.9 inches (201 mm)
2.875 inches (73 mm)	216 inches (549 cm)	3.5 inches (89 mm)	7.9 inches (201 mm)
3.5 inches (89 mm)	240 inches (610 cm)	4 inches (102 mm)	7.9 inches (201 mm)
4 inches (102 mm)	288 inches (732 cm)	4.5 inches (114 mm)	7.9 inches (201 mm)

All specifications are subject to change without notice. The latest specifications are available at [www.kathrein-scala.com](http://www.kathrein-scala.com).





SL-8

Ch-20

Maximum gain: 11.4 dBd

Horizontal polarization



**KATHREIN**  
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<http://www.kathrein-scala.com>



SL-8

Ch-20

Maximum gain: 11.4 dBd

Horizontal polarization

Vertical radiation pattern

1.75 degree electrical downtilt

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
0	0.913	-0.79	10.61	11.51	45	0.108	-19.30	-7.90	0.16
1	0.995	-0.04	11.36	13.68	46	0.083	-21.58	-10.18	0.10
2	1.000	0.00	11.40	13.80	47	0.066	-23.63	-12.23	0.06
3	0.929	-0.64	10.76	11.91	48	0.063	-23.98	-12.58	0.06
4	0.793	-2.01	9.39	8.69	49	0.073	-22.77	-11.37	0.07
5	0.611	-4.28	7.12	5.15	50	0.084	-21.50	-10.10	0.10
6	0.407	-7.81	3.59	2.29	51	0.091	-20.81	-9.41	0.11
7	0.211	-13.51	-2.11	0.62	52	0.091	-20.82	-9.42	0.11
8	0.095	-20.48	-9.08	0.12	53	0.083	-21.58	-10.18	0.10
9	0.166	-15.59	-4.19	0.38	54	0.070	-23.16	-11.76	0.07
10	0.246	-12.18	-0.78	0.84	55	0.053	-25.52	-14.12	0.04
11	0.281	-11.04	0.36	1.09	56	0.044	-27.23	-15.83	0.03
12	0.269	-11.40	0.00	1.00	57	0.054	-25.36	-13.96	0.04
13	0.223	-13.04	-1.64	0.69	58	0.079	-22.01	-10.61	0.09
14	0.157	-16.10	-4.70	0.34	59	0.110	-19.19	-7.79	0.17
15	0.087	-21.19	-9.79	0.10	60	0.140	-17.07	-5.67	0.27
16	0.033	-29.58	-18.18	0.02	61	0.168	-15.47	-4.07	0.39
17	0.029	-30.84	-19.44	0.01	62	0.193	-14.29	-2.89	0.51
18	0.037	-28.69	-17.29	0.02	63	0.213	-13.43	-2.03	0.63
19	0.022	-33.04	-21.64	0.01	64	0.228	-12.83	-1.43	0.72
20	0.014	-37.29	-25.89	0.00	65	0.238	-12.46	-1.06	0.78
21	0.064	-23.94	-12.54	0.06	66	0.243	-12.28	-0.88	0.82
22	0.118	-18.58	-7.18	0.19	67	0.244	-12.27	-0.87	0.82
23	0.167	-15.55	-4.15	0.38	68	0.240	-12.41	-1.01	0.79
24	0.203	-13.85	-2.45	0.57	69	0.232	-12.68	-1.28	0.74
25	0.221	-13.12	-1.72	0.67	70	0.222	-13.08	-1.68	0.68
26	0.219	-13.20	-1.80	0.66	71	0.209	-13.59	-2.19	0.60
27	0.199	-14.04	-2.64	0.54	72	0.195	-14.20	-2.80	0.52
28	0.165	-15.63	-4.23	0.38	73	0.179	-14.92	-3.52	0.44
29	0.126	-17.96	-6.56	0.22	74	0.163	-15.73	-4.33	0.37
30	0.091	-20.78	-9.38	0.12	75	0.147	-16.63	-5.23	0.30
31	0.071	-22.97	-11.57	0.07	76	0.132	-17.61	-6.21	0.24
32	0.068	-23.29	-11.89	0.06	77	0.116	-18.68	-7.28	0.19
33	0.073	-22.74	-11.34	0.07	78	0.102	-19.83	-8.43	0.14
34	0.075	-22.46	-11.06	0.08	79	0.088	-21.07	-9.67	0.11
35	0.076	-22.42	-11.02	0.08	80	0.076	-22.39	-10.99	0.08
36	0.080	-21.89	-10.49	0.09	81	0.065	-23.80	-12.40	0.06
37	0.094	-20.50	-9.10	0.12	82	0.054	-25.32	-13.92	0.04
38	0.116	-18.74	-7.34	0.18	83	0.045	-26.96	-15.56	0.03
39	0.138	-17.22	-5.82	0.26	84	0.037	-28.75	-17.35	0.02
40	0.155	-16.17	-4.77	0.33	85	0.029	-30.74	-19.34	0.01
41	0.165	-15.67	-4.27	0.37	86	0.022	-33.03	-21.63	0.01
42	0.164	-15.72	-4.32	0.37	87	0.016	-35.83	-24.43	0.00
43	0.153	-16.32	-4.92	0.32	88	0.010	-39.58	-28.18	0.00
44	0.133	-17.51	-6.11	0.24	89	0.010	-40.00	-28.60	0.00
					90	0.010	-40.00	-28.60	0.00



SL-8

Ch-20

Maximum gain: 11.4 dBd

Horizontal polarization

Vertical radiation pattern

1.75 degree electrical downtilt

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
-90	0.010	-40.00	-28.60	0.00	-45	0.087	-21.23	-9.83	0.10
-89	0.010	-40.00	-28.60	0.00	-44	0.106	-19.47	-8.07	0.16
-88	0.010	-39.82	-28.42	0.00	-43	0.130	-17.70	-6.30	0.23
-87	0.015	-36.49	-25.09	0.00	-42	0.155	-16.19	-4.79	0.33
-86	0.019	-34.29	-22.89	0.01	-41	0.176	-15.08	-3.68	0.43
-85	0.023	-32.75	-21.35	0.01	-40	0.190	-14.42	-3.02	0.50
-84	0.026	-31.71	-20.31	0.01	-39	0.194	-14.25	-2.85	0.52
-83	0.028	-31.07	-19.67	0.01	-38	0.186	-14.62	-3.22	0.48
-82	0.029	-30.81	-19.41	0.01	-37	0.167	-15.56	-4.16	0.38
-81	0.028	-30.98	-19.58	0.01	-36	0.139	-17.14	-5.74	0.27
-80	0.026	-31.65	-20.25	0.01	-35	0.108	-19.31	-7.91	0.16
-79	0.022	-33.04	-21.64	0.01	-34	0.084	-21.52	-10.12	0.10
-78	0.016	-35.66	-24.26	0.00	-33	0.077	-22.25	-10.85	0.08
-77	0.010	-40.00	-28.60	0.00	-32	0.086	-21.35	-9.95	0.10
-76	0.010	-40.00	-28.60	0.00	-31	0.095	-20.45	-9.05	0.12
-75	0.015	-36.63	-25.23	0.00	-30	0.095	-20.41	-9.01	0.13
-74	0.030	-30.49	-19.09	0.01	-29	0.084	-21.48	-10.08	0.10
-73	0.048	-26.46	-15.06	0.03	-28	0.066	-23.59	-12.19	0.06
-72	0.068	-23.41	-12.01	0.06	-27	0.057	-24.94	-13.54	0.04
-71	0.090	-20.94	-9.54	0.11	-26	0.072	-22.82	-11.42	0.07
-70	0.114	-18.88	-7.48	0.18	-25	0.100	-19.99	-8.59	0.14
-69	0.139	-17.12	-5.72	0.27	-24	0.122	-18.24	-6.84	0.21
-68	0.166	-15.62	-4.22	0.38	-23	0.130	-17.75	-6.35	0.23
-67	0.192	-14.33	-2.93	0.51	-22	0.117	-18.64	-7.24	0.19
-66	0.218	-13.24	-1.84	0.65	-21	0.084	-21.50	-10.10	0.10
-65	0.242	-12.34	-0.94	0.81	-20	0.035	-29.03	-17.63	0.02
-64	0.263	-11.60	-0.20	0.95	-19	0.023	-32.62	-21.22	0.01
-63	0.281	-11.04	0.36	1.09	-18	0.079	-22.07	-10.67	0.09
-62	0.293	-10.65	0.75	1.19	-17	0.121	-18.33	-6.93	0.20
-61	0.301	-10.44	0.96	1.25	-16	0.140	-17.09	-5.69	0.27
-60	0.301	-10.42	0.98	1.25	-15	0.127	-17.90	-6.50	0.22
-59	0.295	-10.59	0.81	1.21	-14	0.084	-21.56	-10.16	0.10
-58	0.282	-10.98	0.42	1.10	-13	0.044	-27.11	-15.71	0.03
-57	0.263	-11.60	-0.20	0.95	-12	0.119	-18.48	-7.08	0.20
-56	0.238	-12.47	-1.07	0.78	-11	0.225	-12.95	-1.55	0.70
-55	0.208	-13.63	-2.23	0.60	-10	0.323	-9.82	1.58	1.44
-54	0.176	-15.09	-3.69	0.43	-9	0.392	-8.14	3.26	2.12
-53	0.144	-16.86	-5.46	0.28	-8	0.414	-7.65	3.75	2.37
-52	0.114	-18.89	-7.49	0.18	-7	0.380	-8.41	2.99	1.99
-51	0.089	-20.97	-9.57	0.11	-6	0.285	-10.89	0.51	1.12
-50	0.074	-22.67	-11.27	0.07	-5	0.151	-16.41	-5.01	0.32
-49	0.066	-23.57	-12.17	0.06	-4	0.146	-16.73	-5.33	0.29
-48	0.065	-23.72	-12.32	0.06	-3	0.344	-9.27	2.13	1.63
-47	0.068	-23.40	-12.00	0.06	-2	0.565	-4.96	6.44	4.41
-46	0.074	-22.60	-11.20	0.08	-1	0.764	-2.34	9.06	8.05
					0	0.913	-0.79	10.61	11.51

COHEN, DIPPELL AND EVERIST, P.C.

TABLE I  
LONGLEY-RICE ANALYSIS  
FOR THE PROPOSED DIGITAL OPERATION OF  
K04DA, DIAMOND BASIN, ETC., WYOMING  
CH 20 1.26 KW ERP 2385 METERS RC/AMSL  
MAY 2012

N 44° 29' 37"  
W 109° 10' 07"

Simple Mask

<u>Channel</u>	<u>Call</u>	<u>City/State</u>	<u>Dist(km)</u>	<u>Status</u>	<u>FCC File No.</u>	<u>Result</u>
19	K19CO	EMIGRANT MT	151.9	LIC	BLTT-19911118JH	0.00%
19	K19JM-D	EMIGRANT MT	151.9	CP	BNPDTT-20100601AAE	0.00%
19	K19FG-D	JACKSON WY	170.7	LIC	BLDTT-20100713AJP	0.00%
20	950306KF	IDAHO FALLS ID	309.3	CP	BPCDT-20080215AJF	No interference
20	K20KU-D	MONTPELIER ID	282.3	LIC	BLDTT-20111115AGX	No interference
20	K20HB	BILLINGS MT	152.1	LIC	BLTT-20041123AKE	No interference
20	K58IH	COLSTRIP, ETC. MT	232	CP MO	BMPDTT-20120117AFU	No interference
20	K20KL-D	DRUMMOND MT	391.4	CP	BNPDTT-20090831AAY	0.00%
20	NEW	GLEN MT	301.4	APP	BNPDTL-20100609AIO	No interference
20	K20KQ-D	LIVINGSTON, ETC. MT	163.6	CP MO	BMPDTL-20120104ABG	No interference
20	K20KQ-D	LIVINGSTON, ETC. MT	163.6	LIC	BLDTL-20120124ABQ	No interference
20	KFNB	CASPER WY	298.4	CP	BPCDT-20100929AEK	No interference
20	KFNB	CASPER WY	298.4	LIC	BLCDDT-20090225AAN	No interference
21	K21LJ-D	WORDON MT	194.6	CP	BNPDTL-20100510ABS	0.00%
21	K21JU-D	MEETEETSE WY	39.9	LIC	BLDTT-20120321AAN	No interference
21	K21LM-D	SHERIDAN WY	183.5	CP	BNPDTL-20100505AHL	0.00%

TABLE II  
PREDICTED CONTOUR DATA  
FOR THE PROPOSED DIGITAL OPERATION OF  
K04DA, DIAMOND BASIN, WYOMING  
CHANNEL 20 1.26 KW ERP 2385 METERS RC/AMSL  
MAY 2012

<u>Radial</u> <u>Bearing</u> (N ° E, T)	<u>Average*</u> <u>Elevation</u> <u>3.2 to 16.1 km</u> meters	<u>Effective</u> <u>Height</u> meters	<u>Radio</u> <u>Horizon</u> kW	<u>Distance to Contour</u> F(50/90) 51 dBu km
0	1876.9	508.1	1.26	49.6
10	1787.1	597.9	1.26	51.6
20	1729.3	655.7	1.26	52.5
30	1659.8	725.2	1.26	53.7
40	1610.5	774.5	1.26	54.6
50	1551.7	833.3	1.26	55.7
60	1502.8	882.2	1.26	56.5
70	1552.6	832.4	1.26	55.7
80	1587.6	797.4	1.26	55.0
90	1621.6	763.4	1.26	54.4
100	1624.6	760.4	1.26	54.4
110	1628.4	756.6	1.26	54.3
120	1660.9	724.1	1.26	53.7
130	1689.3	695.7	1.26	53.2
140	1690.1	694.9	1.26	53.2
150	1706.7	678.3	1.26	52.9
160	1740.7	644.3	1.26	52.3
170	1799.0	586.0	1.26	51.4
180	1827.4	557.6	1.26	50.9
190	1783.1	601.9	1.26	51.6
200	1759.6	625.4	1.26	52.0
210	1719.5	665.5	1.26	52.6
220	1679.5	705.5	1.26	53.3
230	1721.3	663.7	1.26	52.6
240	1930.7	454.3	1.26	47.8
250	1932.1	452.9	1.26	47.7
260	1756.2	628.8	1.26	52.0
270	1690.0	695.0	1.26	53.2

COHEN, DIPPELL AND EVERIST, P.C.

TABLE II  
PREDICTED CONTOUR DATA  
FOR THE PROPOSED DIGITAL OPERATION OF  
K04DA, DIAMOND BASIN, WYOMING  
CHANNEL 20 1.26 KW ERP 2385 METERS RC/AMSL  
MAY 2012

<u>Radial</u> <u>Bearing</u> (N ° E, T)	<u>Average*</u> <u>Elevation</u> <u>3.2 to 16.1 km</u> meters	<u>Effective</u> <u>Height</u> meters	<u>Radio</u> <u>Horizon</u> kW	<u>Distance to Contour</u> F(50/90) 51 dBu km
280	1843.2	541.8	1.26	50.6
290	1934.9	450.1	1.26	47.6
300	1960.4	424.6	1.26	47.0
310	2432.6	-47.6	1.26	17.8
320	2541.0	-156.0	1.26	17.8
330	2255.0	130.0	1.26	32.7
340	2078.1	306.9	1.26	42.4
350	1954.1	430.9	1.26	47.1

DTV Channel 20 (506-512 MHz)  
Center of Radiation 2385 meters AMSL  
Antenna Height Above Average Terrain 593 meters  
Effective Radiated Power 1.26 kW (1.009 dBk)

North Latitude: 44° 29' 37"  
West Longitude: 109° 10' 07"

(NAD-27)

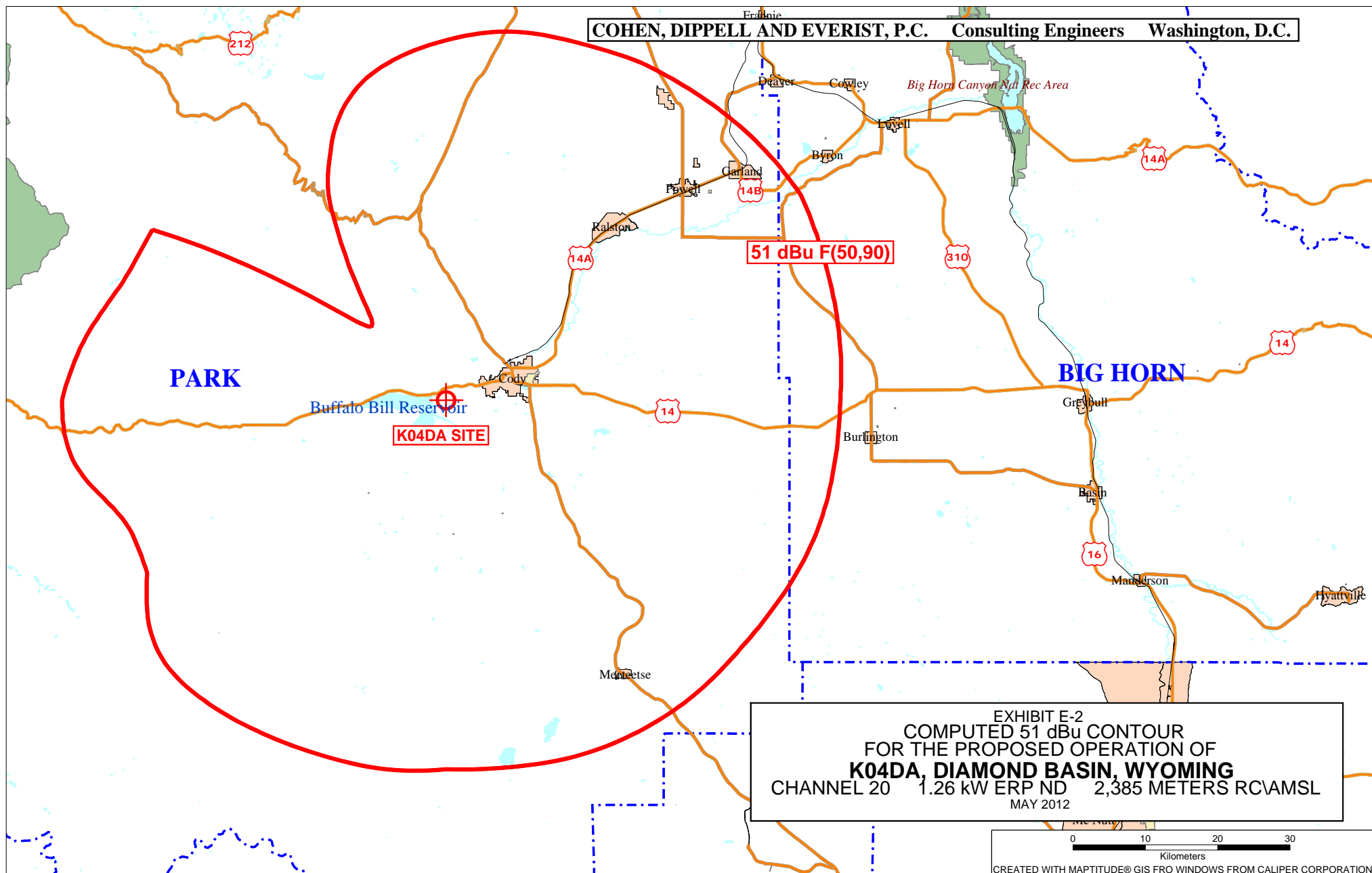


EXHIBIT E-2  
COMPUTED 51 dBu CONTOUR  
FOR THE PROPOSED OPERATION OF  
**K04DA, DIAMOND BASIN, WYOMING**  
CHANNEL 20 1.26 kW ERP ND 2,385 METERS RCVMSL  
MAY 2012

TABLE III  
CONTOUR DATA FOR THE LICENSED ANALOG OPERATION OF  
K04DA, DIAMOND BASIN, WYOMING  
CHANNEL 4 0.021 KW ERP 2403 METERS RCAMSL  
MAY 2012

<u>Radial</u> <u>Bearing</u> (N ° E, T)	<u>Average*</u> <u>Elevation</u> <u>3.2 to 16.1 km</u> meters	<u>Effective</u> <u>Height</u> meters	<u>Radio</u> <u>Horizon</u> kW	<u>Distance to Contour</u> <u>F(50/50)</u> <u>74 dBu</u> km
0	1883.0	520.0	0.001	1.199
10	1790.6	612.4	0.001	1.398
20	1728.5	674.5	0.001	1.500
30	1656.4	746.6	0.002	1.730
40	1604.6	798.4	0.002	1.852
50	1545.5	857.5	0.002	1.991
60	1506.4	896.6	0.003	2.510
70	1560.4	842.6	0.006	3.154
80	1595.3	807.7	0.009	3.904
90	1623.7	779.3	0.013	4.671
100	1617.4	785.6	0.017	5.314
110	1626.9	776.1	0.02	5.604
120	1661.9	741.1	0.019	5.439
130	1696.2	706.8	0.015	4.895
140	1694.5	708.5	0.01	4.140
150	1710.1	692.9	0.007	3.521
160	1747.6	655.4	0.008	3.678
170	1807.1	595.9	0.01	4.035
180	1836.3	566.7	0.013	4.394
190	1791.4	611.6	0.015	4.882
200	1768.3	634.7	0.017	5.177
210	1725.6	677.4	0.017	5.130
220	1685.5	717.5	0.014	4.805
230	1711.5	691.5	0.014	4.776
240	1916.8	486.2	0.015	4.727
250	1948.5	454.5	0.016	4.805
260	1801.1	601.9	0.019	5.282
270	1677.5	725.5	0.021	5.715
280	1813.6	589.4	0.019	5.280



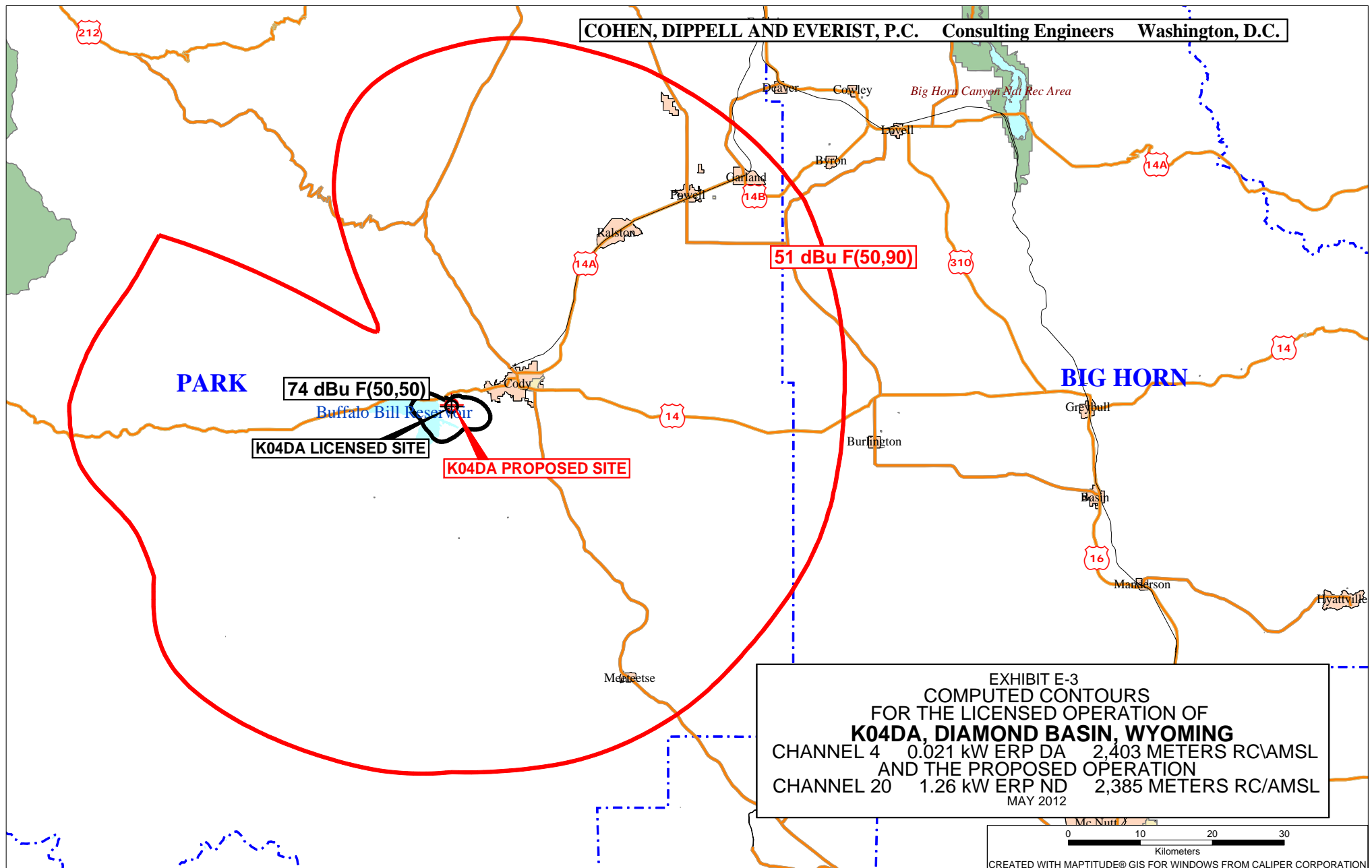
TABLE III  
CONTOUR DATA FOR THE LICENSED ANALOG OPERATION OF  
K04DA, DIAMOND BASIN, WYOMING  
CHANNEL 4 0.021 KW ERP 2403 METERS RCAMSL  
MAY 2012

<u>Radial</u> <u>Bearing</u> (N ° E, T)	<u>Average*</u> <u>Elevation</u> <u>3.2 to 16.1 km</u> meters	<u>Effective</u> <u>Height</u> meters	<u>Radio</u> <u>Horizon</u> kW	<u>Distance to Contour</u> F(50/50) 74 dBu km
290	1927.6	475.4	0.014	4.548
300	1922.3	480.7	0.009	3.707
310	2358.4	44.6	0.004	1.500
320	2548.9	-145.9	0.002	1.500
330	2281.9	121.1	0.001	1.270
340	2098.3	304.7	0.001	1.077
350	1965.3	437.7	0.001	1.058

DTV Channel 4 (66-72 MHz)  
Center of Radiation 2403 meters AMSL  
Effective Radiated Power 0.021 kW (-16.778 dBk)

North Latitude: 44° 29' 29"  
West Longitude: 109° 10' 08"

(NAD-27)



### Section III - Engineering (Digital)

**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: \_\_\_\_\_

2. Translator Input Channel No. \_\_\_\_\_

3. Station proposed to be rebroadcast:

Call Sign	City	State	Channel
-----------	------	-------	---------

4. Antenna Location Coordinates: (NAD 27)

\_\_\_\_° \_\_\_\_' \_\_\_\_" ☐ N ☐ S Latitude  
\_\_\_\_° \_\_\_\_' \_\_\_\_" ☐ E ☐ W Longitude

5. Antenna Structure Registration Number: \_\_\_\_\_

☐

Not applicable

See Explanation  
in Exhibit No.

☐

FAA Notification Filed with FAA

6. Antenna Location Site Elevation Above Mean Sea Level: \_\_\_\_\_ meters

7. Overall Tower Height Above Ground Level: \_\_\_\_\_ meters

8. Height of Radiation Center Above Ground Level: \_\_\_\_\_ meters

9. Maximum Effective Radiated Power (ERP): \_\_\_\_\_ kW

10. Transmitter Output Power: \_\_\_\_\_ kW

11. a. Transmitting Antenna: ☐ Nondirectional ☐ Directional ☐ Directional composite

Manufacturer	Model
--------------	-------

b. Electrical Beam Tilt: \_\_\_\_\_ degrees ☐ Not applicable

c. Directional Antenna Relative Field Values:

Rotation: \_\_\_\_\_ ° ☐ No rotation ☐ N/A (Nondirectional)

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											

- d. Does the proposed antenna propose elevation radiation patterns that vary with azimuth for reasons other than the use of mechanical beam tilt? ☐ Yes ☐ No

If Yes, attach an Exhibit (see instructions for details).

Exhibit No.

**NOTE: In addition to the information called for in this section, an explanatory exhibit providing full particulars must be submitted for each question for which a "No" response is provided.**

12. **Out-of-Channel Emission Mask:** Simple ☐ Stringent ☐ Full Service ☐

**CERTIFICATION**

13. **Interference.** The proposed facility complies with all of the following applicable rule sections. 47 C.F.R. Sections 74.709, 74.793(e), 74.793(f), 74.793(g), 74.793(h), 74.794(b) and 73.1030. ☐ Yes ☐ No 

See Explanation in Exhibit No.
14. **Environmental Protection Act.** The proposed facility is excluded from environmental processing under 47 C.F.R. Section 1.1306 (i.e., the facility will not have a significant environmental impact and complies with the maximum permissible radio frequency electromagnetic exposure limits for controlled and uncontrolled environments). Unless the applicant can determine RF compliance. **An Exhibit is required.** ☐ Yes ☐ No 

See Explanation in Exhibit No.

Exhibit No.

By checking "Yes" above, 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 radio frequency electromagnetic exposure in excess of FCC guidelines.

**PREPARER'S CERTIFICATION ON PAGE 8 MUST BE COMPLETED AND SIGNED.**

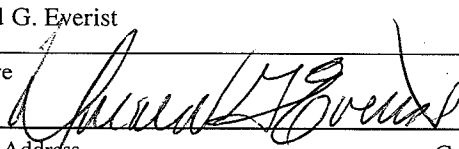
15. **Channels 52-59.** If the proposed channel is within channels 52-59, the applicant certifies compliance with the following requirements, as applicable:

- ☐ The applicant is applying for a digital companion channel for which no suitable channel from channel 2-51 is available.
- ☐ Pursuant to Section 74.786(d), the applicant has notified, within 30 days of filing this application, all commercial wireless licensees of the spectrum comprising the proposed TV channel and the first adjacent channels thereto, for which the proposed digital LPTV or TV translator antenna site lies inside the licensed geographic boundaries of the wireless licensees or within 75 miles and 50 miles, respectively, of the geographic boundaries of co-channel and adjacent-channel wireless licensees.

16. **Channels 60-69.** If the proposed channel is within channels 60-69, the applicant certifies compliance with the following requirements, as applicable:

- ☐ Pursuant to Section 74.786(e), the applicant has notified, within 30 days of filing this application, all commercial wireless licensees of the spectrum comprising the proposed TV channel and the first adjacent channels thereto, for which the proposed digital LPTV or TV translator antenna site lies inside the licensed geographic boundaries of the wireless licensees or within 75 miles and 50 miles, respectively, of the geographic boundaries of co-channel and adjacent-channel wireless licensees.
- ☐ Pursuant to Section 74.786(e), the applicant proposing operation on channel 63, 64, 68 and 69 ("public safety channels") has secured a coordinated spectrum use agreement(s) with 700 MHz public safety regional planning committee(s) and state frequency administrator(s) of the region(s) and state(s) within which the antenna site of the digital LPTV or TV translator station is proposed to locate, and those adjoining regions and states with boundaries within 75 miles of the proposed station location.
- ☐ Pursuant to Section 74.786(e), an applicant for a channel adjacent to channel 63, 64, 68 or 69 has notified, within 30 days of filing this application, the 700 MHz public safety regional planning committee(s) and state administrator(s) of the region and state containing the proposed digital LPTV or TV translator antenna site and regions and states whose geographic boundaries lie within 50 miles of the proposed LPTV or TV translator antenna site.

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 5/7/12	
Mailing Address Cohen, Dippell and Everist, P.C. 1420 N Street, NW, Suite One			
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).