ENGINEERING EXHIBIT

Application for Modification of Digital Low Power Television Construction Permit

prepared for

Gray Television Licensee, LLC
KSBF-LD Casper, WY
Facility ID 185416
Ch. 41 (digital) 1.9 kW

Gray Television Licensee, LLC ("Gray") is the permittee of digital Low Power Television ("LPTV") station KSBF-LD, Channel 41, Casper, WY, Facility ID 185416. KSBF-LD is authorized to operate pursuant to a Construction Permit ("CP", BNPDTL-20100324ACI) at a site on Casper Mountain with 15 kW effective radiated power ("ERP"), nondirectional. *Gray* herein seeks a modification of the CP to utilize an alternate transmitting location.

As proposed herein, KSBF-LD will be relocated to the studio location associated with KCWY-DT (Ch. 12, Facility ID 68713, Casper, WY) and K16JI-D (Ch. 16, Facility ID 185414, Casper WY), 13.1 km from the authorized KSBF-LD site. *Gray* is the licensee of KCWY-DT and K16JI-D. The proposed KSBF-LD will utilize a directional transmitting antenna to be side mounted on an existing pole adjacent to the KCWY-DT studio building. The pole is used to support the K16JI-D antenna and the microwave transmit antenna associated with KCWY-DT's studio to transmitter link. The structure does not require an FCC Antenna Structure Registration number since its overall height is less than 61 meters above ground and the structure passes the FCC's "TOWAIR" slope test program.

The proposed KSBF-LD will operate with 1.9 kW ERP using a "simple" out of channel emission mask. Figure 1 provides a plot of the directional antenna's azimuthal pattern. Figure 2 depicts the coverage contour of the proposed facility as well as that of the CP facility. The service area overlap demonstrates compliance with §73.3572 for a minor change.

Interference study per OET Bulletin 69[1] shows that the proposal complies with the FCC's interference protection requirements toward all digital television, television translator, LPTV, and Class A stations. The results, summarized in Table 1, show that any new interference does not exceed the FCC's interference limits (0.5 percent to full power and Class A stations, and 2.0 percent to secondary stations) to any facility.

The only authorized AM station within 3 km of the proposed site is nondirectional AM station KKTL (1400 kHz, Casper, WY) which is located 0.69 km distant. The distance to KKTL is greater than the 0.214 km threshold distance (one wavelength at KKTL's frequency) described in §1.30002(a), therefore notification to KKTL and consideration of AM pattern disturbance is not required. Further, no change to the overall structure height will result from this proposal.

The nearest FCC monitoring station is 692 km distant at Grand Island, NE. This exceeds by a large margin the threshold minimum distance specified in §73.1030(c)(3) that would suggest consideration of the monitoring station. The site is not located within the areas requiring coordination with "quiet" zones specified in §73.1030(a) and (b). The site location is beyond the border areas requiring international coordination.

Human Exposure to Radiofrequency Electromagnetic Field (Environmental)

The proposed KSBF-LD operation was evaluated for human exposure to RF energy using the procedures outlined in the Commission's OET Bulletin Number 65. The transmitting antenna is a Kathrein panel array. Figure 3 supplies a plot of the antenna's elevation pattern as provided by the manufacturer. Based on OET-65 equation (10), and considering the antenna relative field in downward elevations, the graph in Figure 4 depicts calculated power density levels attributable to the proposed KSBF-LD at locations near the support pole at a height of two meters above ground level. The maximum calculated RF electromagnetic field attributable to the proposed KSBF-LD is

[1]FCC Office of Engineering and Technology Bulletin number 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004 ("OET-69"). The implementation of OET-69 for this study followed the guidelines of OET-69 as specified therein. The default cell size of 1 km was employed. Comparisons of various results of this computer program (run on a Sun Sparc processor) to the Commission's implementation of OET-69 show excellent correlation.

10 percent of the general population / uncontrolled MPE limit at any location two meters above ground level, which occurs within 25 meters of the pole's base.

Two other LPTV facilities emitters are authorized or proposed at this site. The following table supplies a summary of RF signal density calculations for the proposed KSBF-LD and the other LPTV facilities at this site. No other authorized broadcast facilities are near enough to the site to contribute significant RF levels.

Summary of Radiofrequency Electromagnetic Field Calculations

Facility	Channel	ERP (kW)	Polari-zation	Height (meters)	S - Calculated ($\mu W/cm^2$)	S - Limit ($\mu W/cm^2$)	Percent of Limit
KSBF-LD Casper, WY Proposed Herein	41	1.9	H	8.5	42.5	423.3	10.0%
K16JI-D Casper, WY Lic 0000008309	16	12.6	H	12.8	182.1	323.3	56.3%
K18JQ-D Casper, WY Proposed Contemporaneously	18	2.3	H	12.8	33.2	331.3	10.0%
					Total Calculated Signal Density:		**76.3%**

ERP: Effective Radiated Power
Polarization: H - Horizontal; V - Vertical
Height: Height of radiation center above ground level
S-Calc: OET Bulletin 65 maximum calculated value of signal density at two meters above ground level (From elevation pattern and distance graph for each facility)
S-Limit §1.1310 uncontrolled/general population limit for signal density

Based on this analysis and considering all broadcast facilities, the total maximum calculated RF density at two meters above ground level near the proposed site will be 76.3 percent of the FCC's uncontrolled / general population maximum permissible exposure limit. This summary assumes the maximum RF density values occur at the same horizontal distance for each facility. The total calculated RF exposure will be lower when the relative horizontal distances are considered. No other television or radio broadcast facilities are authorized within sufficient distance to be a significant contributor to RF exposure at this location.

The general public will not be exposed to RF levels attributable to the proposal in excess of the FCC's guidelines. Access to the building's rooftop will be restricted. The KSBF-LD facility will reduce power or cease operation as necessary to protect persons having access to the rooftop, pole, or

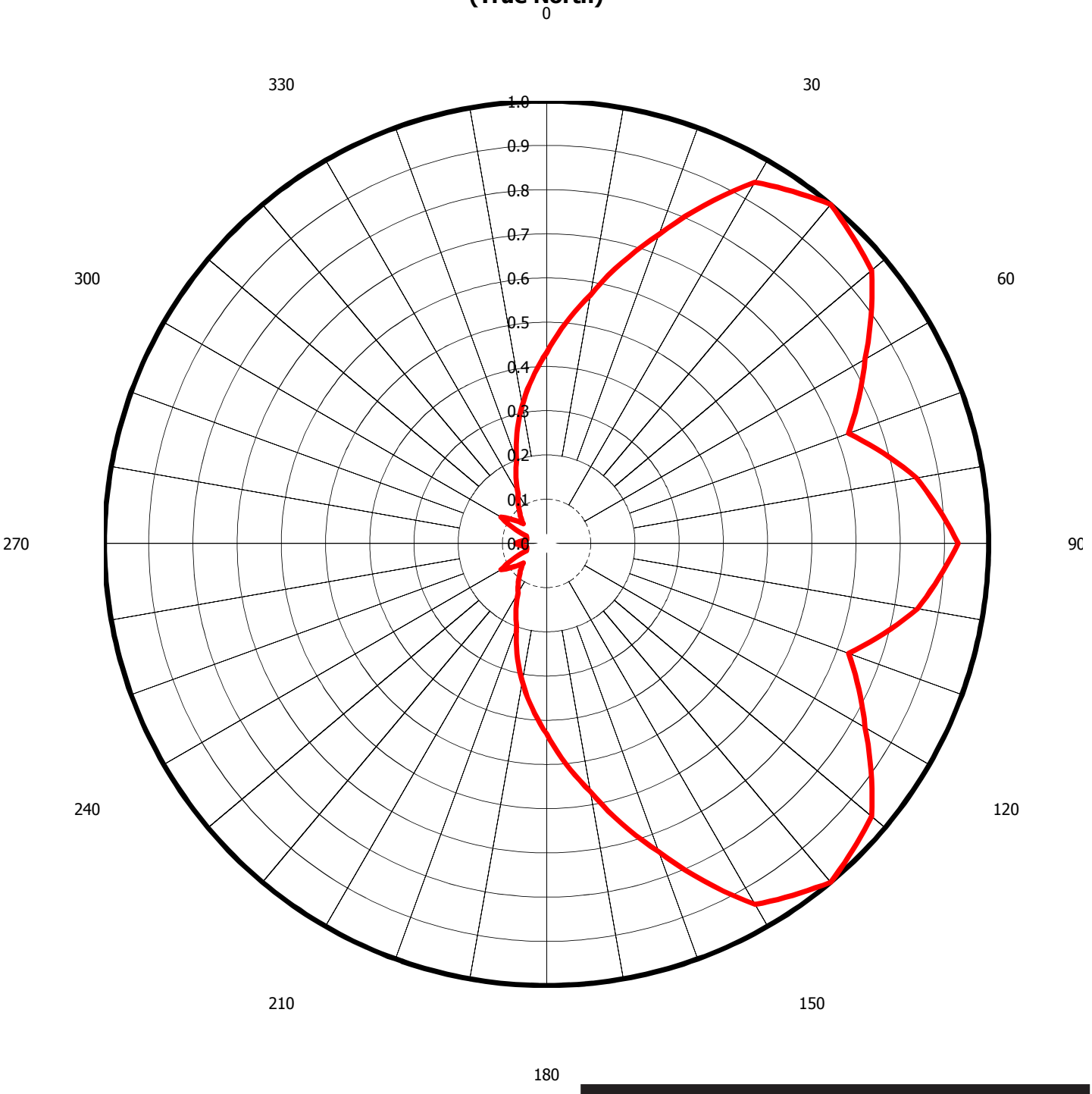
antenna from RF electromagnetic field exposure in excess of FCC guidelines. RF exposure warning signs will be posted at rooftop access points.

List of Attachments

Figure 1	Antenna Azimuthal Pattern
Figure 2	Coverage Contour Comparison
Figure 3	Antenna Elevation Pattern
Figure 4	Calculated RF Electromagnetic Field
Table 1	Interference Analysis Results Summary
Form 2100	Saved Version of Engineering Sections from FCC Form at Time of Upload

Chesapeake RF Consultants, LLC
Joseph M. Davis, P.E. June 10, 2016
207 Old Dominion Road Yorktown, VA 23692 703-650-9600

Azimuth Pattern - Relative Field
(True North)

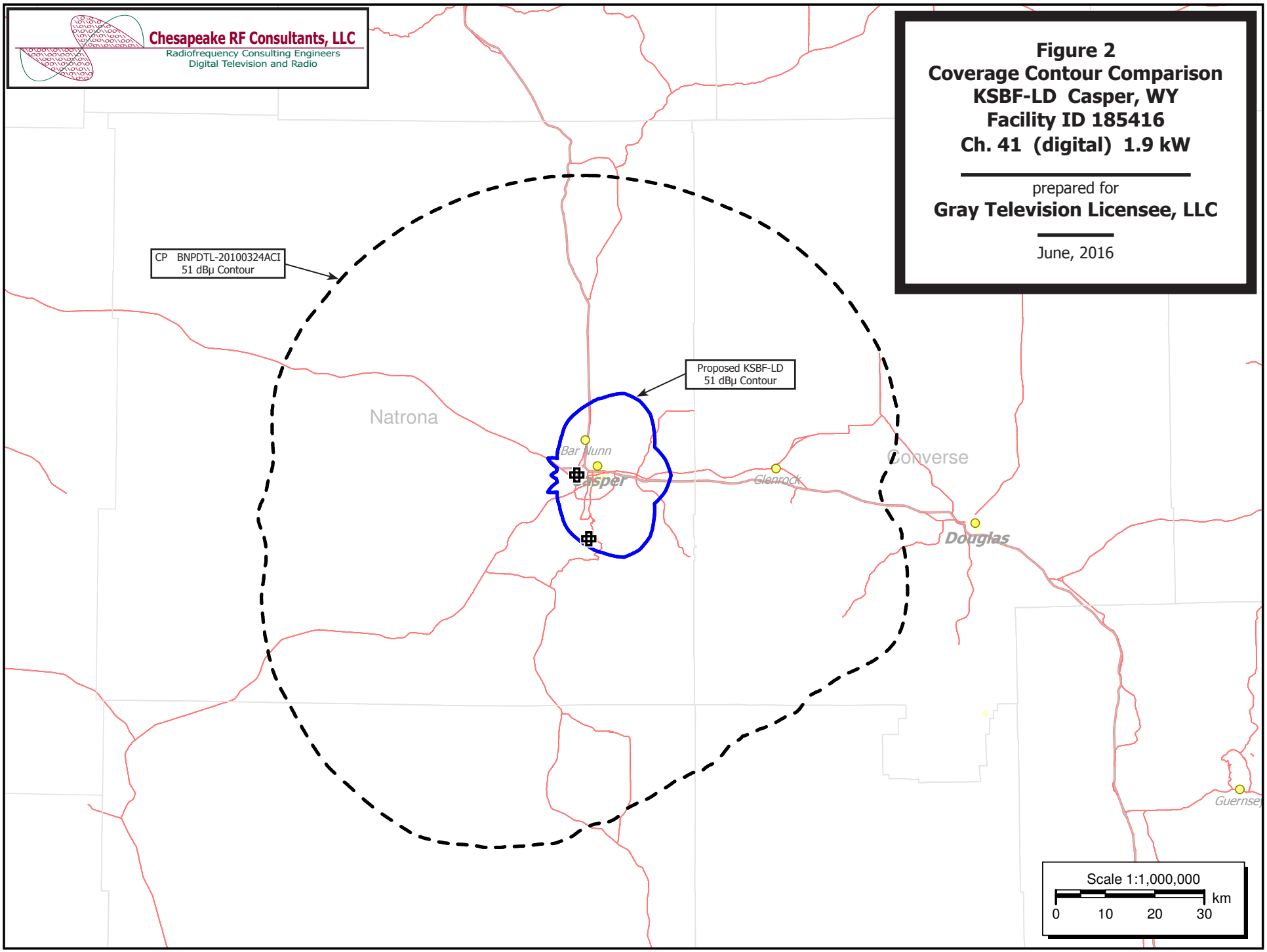


Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio

Figure 1
Antenna Azimuthal Pattern
KSBF-LD Casper, WY
Facility ID 185416
Ch. 41 (digital) 1.9 kW

prepared for
Gray Television Licensee, LLC

June, 2016

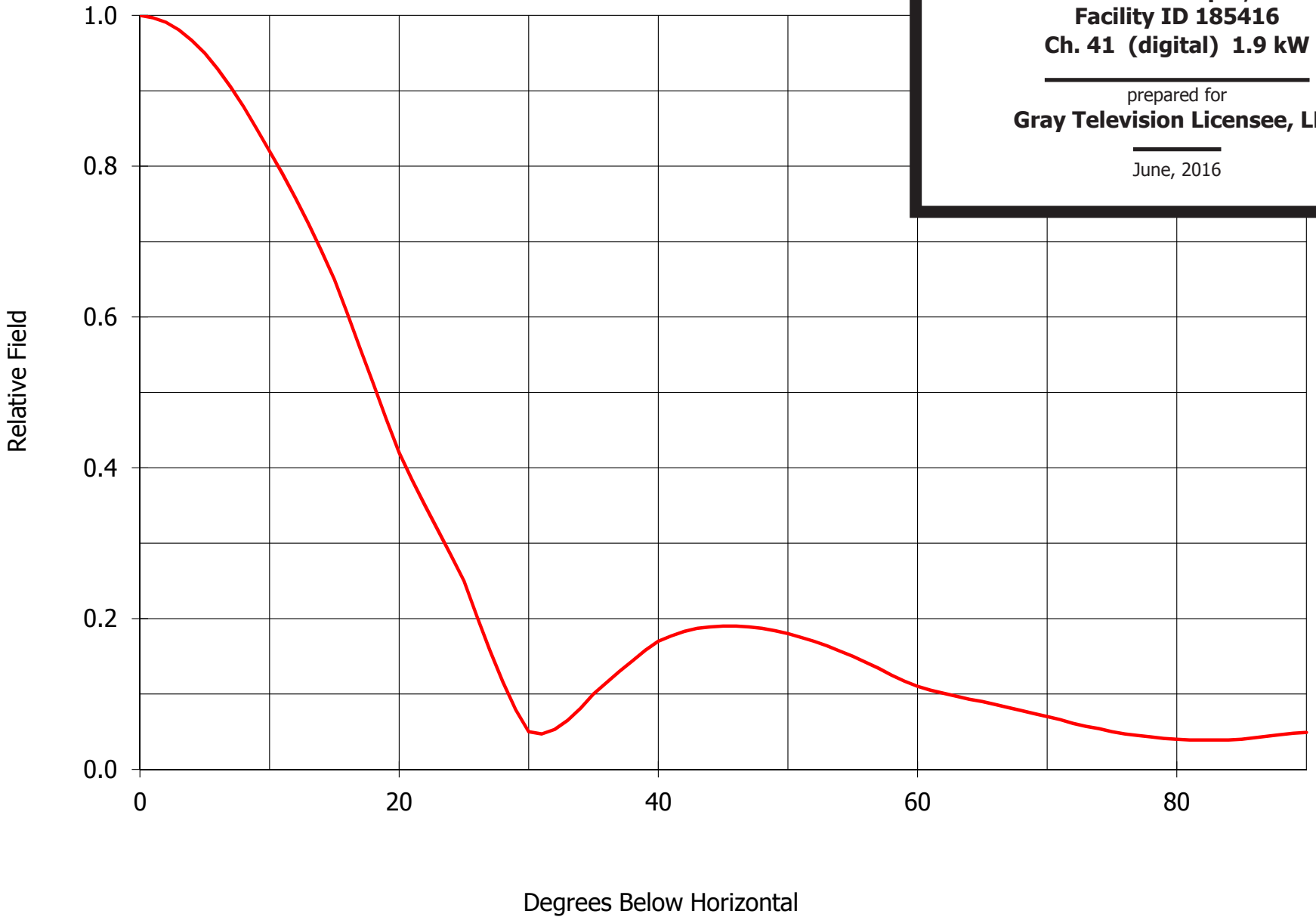

Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio
Figure 2
Coverage Contour Comparison
KSBF-LD Casper, WY
Facility ID 185416
Ch. 41 (digital) 1.9 kW
prepared for
Gray Television Licensee, LLC
June, 2016
CP BNPDTL-20100324ACI
51 dBµ Contour
Proposed KSBF-LD
51 dBµ Contour
Natrona
Converse
Bar Nunn
Casper
Glenrock
Douglas
Scale 1:1,000,000
km
0
10
20
30

Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio

Figure 3
Antenna Elevation Pattern
Kathrein Model K723147 1x2
KSBF-LD Casper, WY
Facility ID 185416
Ch. 41 (digital) 1.9 kW

prepared for
Gray Television Licensee, LLC

June, 2016



Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio

Figure 4
Calculated RF Electromagnetic Field
KSBF-LD Casper, WY
Facility ID 185416
Ch. 41 (digital) 1.9 kW

prepared for
Gray Television Licensee, LLC

June, 2016

Graph depicts calculated percentage of General Population/Uncontrolled Maximum Exposure Limit attributable to K18JQ-D for locations 2 meters above ground level. Flat terrain assumed. Calculations conducted pursuant to FCC OET Bulletin Number 65.

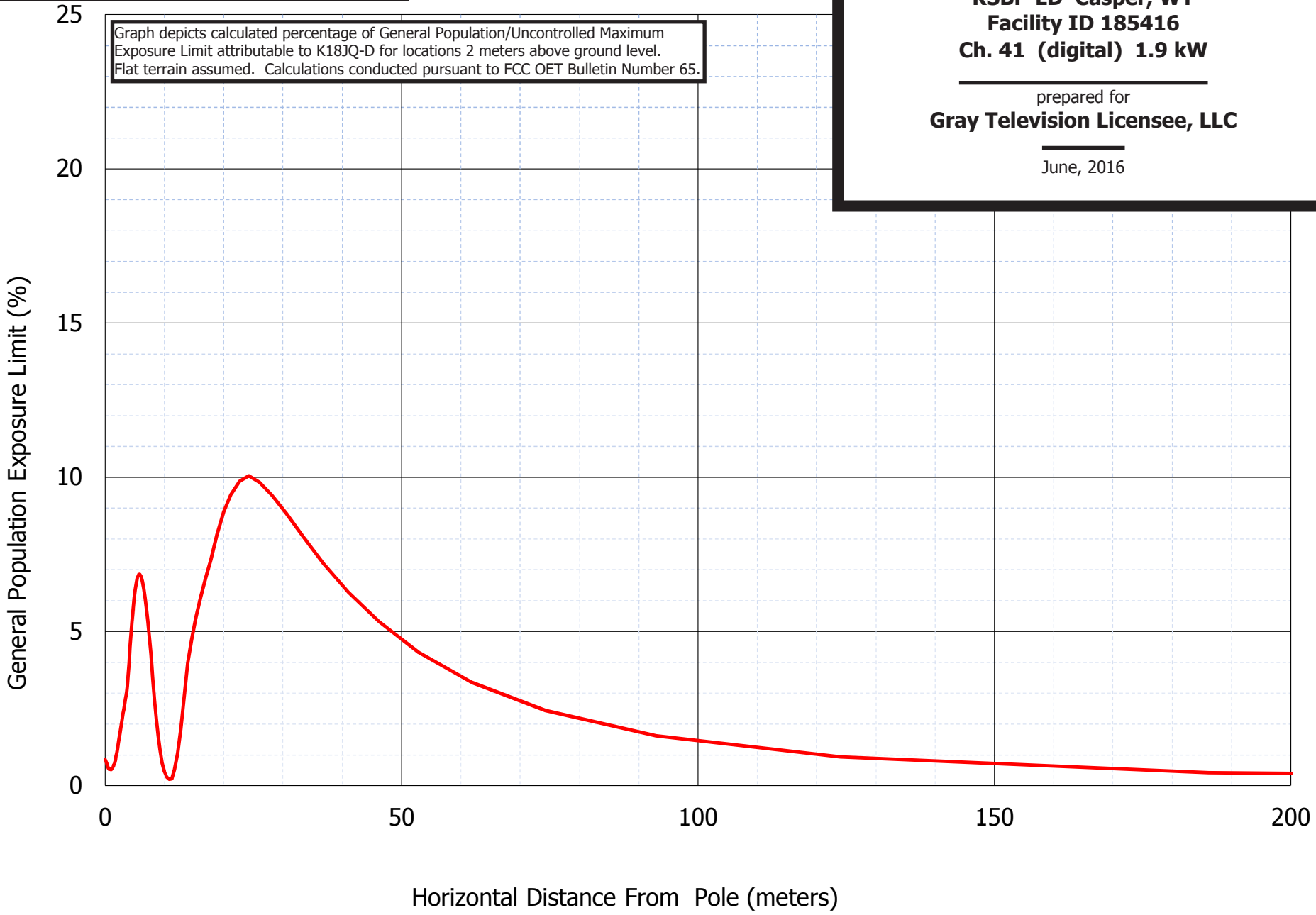


Table 1

Interference Analysis Results Summary

prepared for

Gray Television Licensee, LLC

KSBF-LD Casper, WY

Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio

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KSBF-LD  USERRECORD-01              CASPER                WY US
Channel 41 ERP 1.9    kW   HAAT   30. m  RCAMSL 01584 m SIMPLE MASK
Latitude 042-51-00  Longitude 0106-21-46
Dir Antenna Make usr  Model K723147_1x2     Beam tilt N  Ref Azimuth 90.
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The LMS application requires NAD-83 coordinates. FCC internal systems then convert to NAD-27 and port over to CDBS for processing. This interference analysis utilizes truncated NAD-27 coordinates to replicate FCC processing.

			Dist			---Population (2000 Census)----	
Ch.	Call	City/State	(km)	Status	Application Ref. No.	Baseline	New Interference
40	K40NC-D	CASPER WY	13.1	CP	BNPDTL-20101012AEX	69,392	172 (0.25%)
40	K40MN-D	CHEYENNE WY	188.2	CP	BNPDTL-20100510AER	---	none
40	K40MQ-D	GILLETTE WY	175.7	CP	BNPDTL-20100505AIR	---	none
40	K40AQ-D	SHOSHONI WY	147.7	CP	BLANK-7871	---	none
40	K40AQ-D	SHOSHONI WY	163.2	LIC	BLDTT-20120807ABV	---	none
41	K41EV-D	AKRON CO	393.9	LIC	BLDTT-20110210ACL	---	none
41	K41LA-D	CARBONDALE CO	390.2	LIC	BLDTT-20100503ACX	---	none
41	KSBS-CD	DENVER CO	359.4	LIC	BLDTA-20130528AIK	---	none
41	K41IT-D	HAXTUN CO	391.0	LIC	BLDTT-20110928AKF	---	none
41	KZFC-LD	WINDSOR CO	276.9	CP	BDCCDTL-20101119AGT	---	none
41	K41LS-D	FORSYTH MT	387.4	LIC	BLDTT-20120611ACN	---	none
41	K41KM-D	GREYBULL WY	217.9	LIC	BLDTT-20081028ABQ	---	none
41	K41ML-D	MOORCROFT WY	204.2	CP	BNPDTL-20100505AIL	---	none
41	K41MK-D	SHERIDAN WY	219.3	CP	BNPDTL-20100505AHN	---	none
41	K41KH-D	TETON VILLAGE WY	374.4	LIC	BLDTT-20090611ACI	---	none
42	K42LG-D	CASPER WY	13.1	CP	BNPDTL-20101012AEY	69,371	172 (0.25%)
42	K42KQ-D	CHEYENNE WY	188.2	CP	BNPDTL-20100510AES	---	none
42	K42HY-D	RAWLINS WY	139.8	LIC	BLDTT-20090611ACH	---	none

Channel and Facility Information

Section	Question	Response
Proposed Community of License	Facility ID	185416
	State	Wyoming
	City	CASPER
	LPD Channel	41

Antenna Location Data

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	No
	ASR Number	
Coordinates (NAD83)	Latitude	42° 50' 59.9" N+
	Longitude	106° 21' 48.9" W-
	Structure Type	POLE-Pole used only to mount an antenna
	Overall Structure Height	16.5 meters
	Support Structure Height	9.1 meters
	Ground Elevation (AMSL)	1575.3 meters
Antenna Data	Height of Radiation Center Above Ground Level	8.5 meters
	Height of Radiation Center Above Mean Sea Level	1583.8 m
	Effective Radiated Power	1.9 kW

Antenna Technical Data

Section	Question	Response
Antenna Type	Antenna Type	Directional Custom
	Do you have an Antenna ID?	No
	Antenna ID	
Antenna Manufacturer and Model	Manufacturer:	KAT
	Model	K723147 1x2
	Rotation	0 degrees
	Electrical Beam Tilt	Not Applicable
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Horizontal
Elevation Radiation Pattern	Does the proposed antenna propose elevation radiation patterns that vary with azimuth for reasons other than the use of mechanical beam tilt?	No
	Uploaded file for elevation antenna (or radiation) pattern data	
	Out-of-Channel Emission Mask:	Simple

Directional Antenna Relative Field Values (Pre-rotated Pattern)

Degree	V_A (Authorized Value)	Degree	V_A (Authorized Value)	Degree	V_A (Authorized Value)	Degree	V_A (Authorized Value)
0	0.431	**90**	0.931	**180**	0.431	**270**	0.070
10	0.57	**100**	0.852	**190**	0.317	**280**	0.045
20	0.743	**110**	0.727	**200**	0.199	**290**	0.048
30	0.943	**120**	0.832	**210**	0.129	**300**	0.119
40	1	**130**	0.96	**220**	0.095	**310**	0.069
50	0.96	**140**	1	**230**	0.069	**320**	0.095
60	0.832	**150**	0.943	**240**	0.119	**330**	0.129
70	0.727	**160**	0.742	**250**	0.048	**340**	0.199
80	0.85	**170**	0.57	**260**	0.045	**350**	0.317

Additional Azimuths

Degree	V_A