

ENGINEERING EXHIBIT

Application for Minor Modification of Digital Television Translator Station

prepared for

Gray Television Licensee, LLC

W16DA-D Fort Kent, ME

Facility ID 181585

Ch. 16 (digital) 3.5 kW

Gray Television Licensee, LLC (“Gray”) is the licensee of digital television translator station W16DA-D, Channel 16, Fort Kent ME, Facility ID 181585. W16DA-D is licensed (file# BLDTT-20141014AAM) to operate at 3 kW effective radiated power (“ERP”) with a directional antenna. *Gray* proposes herein a minor modification to relocate W16DA-D to a different transmitting location, increase ERP, and change the directional antenna.

As proposed herein, W16DA-D will be relocated a distance of 47.2 km (29.3 miles). The proposed W16DA-D will utilize a directional transmitting antenna to be placed on a rooftop mast atop an existing building. The structure does not require an FCC Antenna Structure Registration number since the antenna and mast extends the building’s overall height less than 6.1 meters. Further, the overall height is less than 61 meters above ground and the structure passes the FCC’s “TOWAIR” slope test program.

The proposed W16DA-D facility will operate with a directional antenna at 3.5 kW ERP using a “full service” out of channel emission mask. A plot of the directional antenna’s azimuthal pattern is supplied in Figure 1. Figure 2 depicts the 51 dB μ coverage contour of the licensed and proposed facilities, demonstrating compliance with §73.3572 for a minor change.

Interference study per OET Bulletin 69¹ shows that the proposal complies with the FCC’s interference protection requirements toward all digital television, television translator, LPTV,

¹FCC Office of Engineering and Technology Bulletin number 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004 (“OET-69”). This analysis employed the FCC’s

and Class A stations (existing and post-auction). 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.

Human Exposure to Radiofrequency Electromagnetic Field (Environmental)

The proposed W16DA-D facility was evaluated for human exposure to Radiofrequency ("RF") energy using the procedures outlined in the FCC's OET Bulletin Number 65. Based on OET-65 equation (10), and considering the antenna relative field in downward elevations, the graph in Figure 3 depicts calculated power density levels attributable to the proposed facility at locations near the site at a height of two meters above ground level. The maximum calculated RF electromagnetic field attributable to the proposed facility is 36.4 percent of the general population / uncontrolled maximum permissible exposure limit at any location two meters above ground level, which occurs within 20 meters of the proposed site location. 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 in excess of the FCC's guidelines. The W16DA-D facility will reduce power or cease operation as necessary to protect persons having access to the rooftop, mast, or antenna from RF electromagnetic field exposure in excess of FCC guidelines. Environmental matters covered by this exhibit are limited to the evaluation of exposure to RF electromagnetic field.

current "TVStudy" software with the default application processing template settings, 1 km cell size, and 1 km terrain increment. Comparisons of various results of this computer program (run on a Mac processor) to the FCC's implementation of TVStudy show excellent correlation.

List of Attachments

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

Chesapeake RF Consultants, LLC

Joseph M. Davis, P.E.	May 20, 2019	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600

**Azimuth Pattern - Relative Field
(True North)**

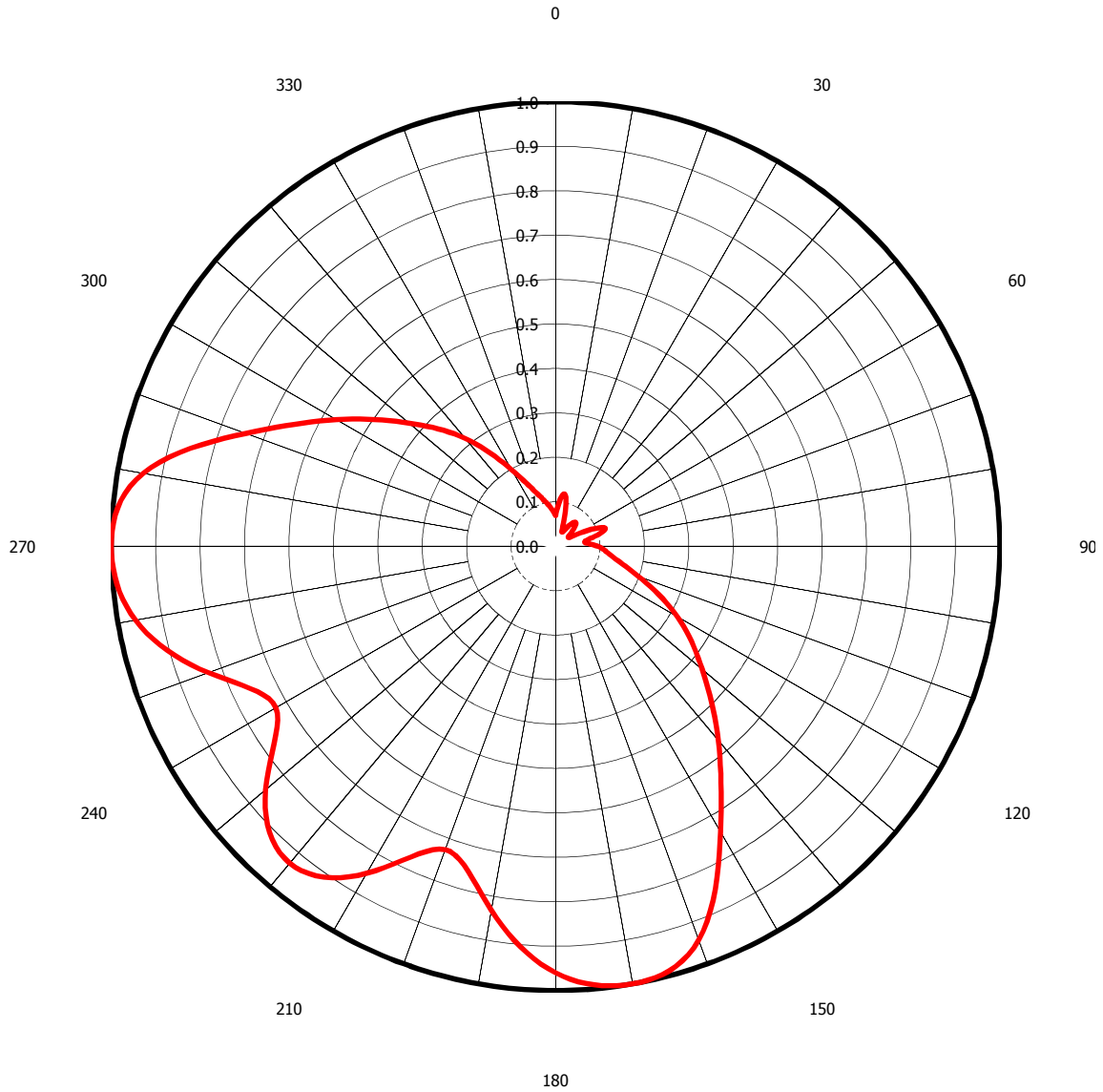


Figure 1
Antenna Azimuthal Pattern
W16DA-D Fort Kent, ME
Facility ID 181585
Ch. 16 (digital) 3.5 kW

prepared for
Gray Television Licensee, LLC

May, 2019



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

Figure 2
Coverage Contour Comparison
W16DA-D Fort Kent, ME
Facility ID 181585
Ch. 16 (digital) 3.5 kW

prepared for
Gray Television Licensee, LLC

May, 2019

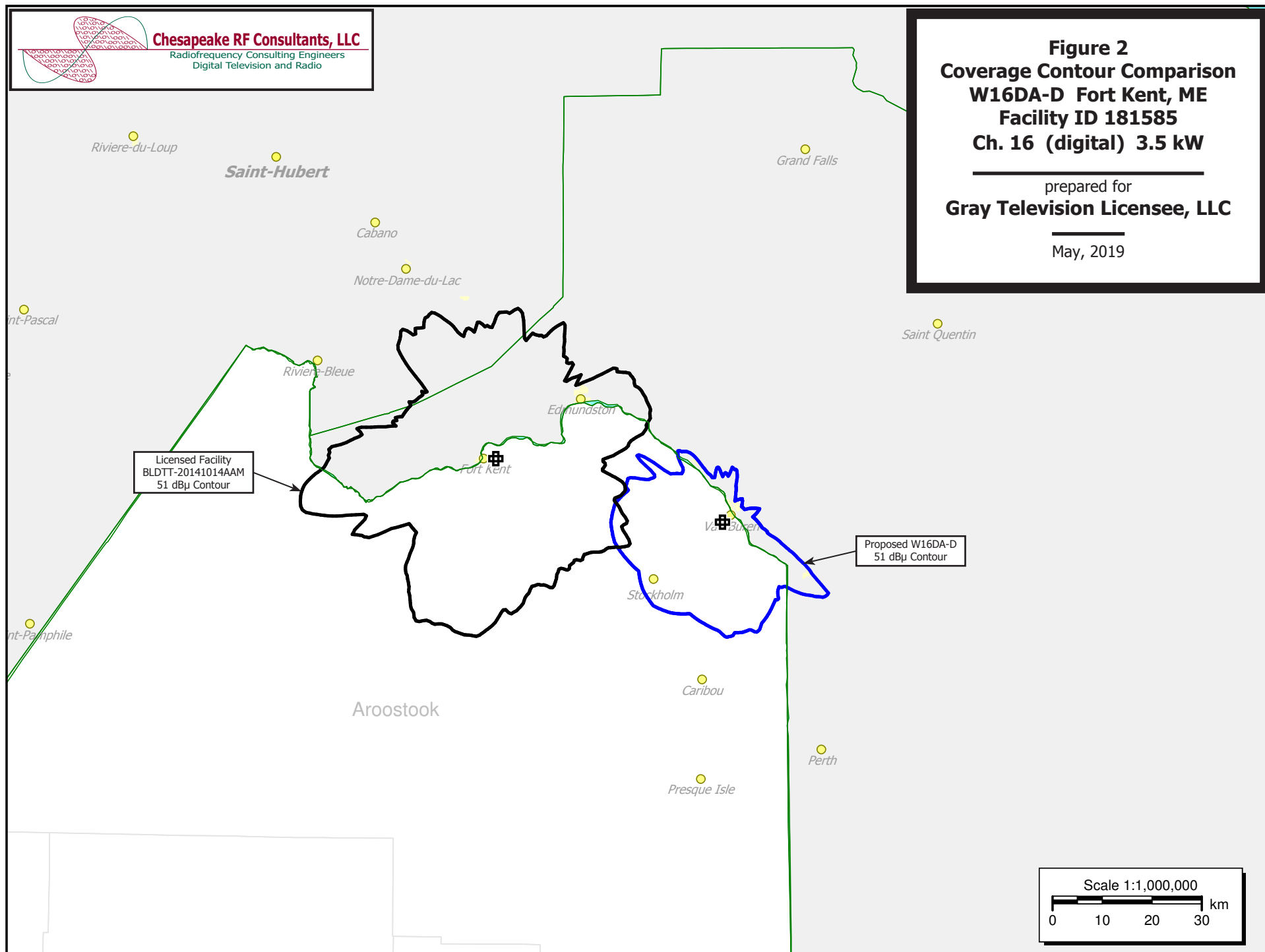


Figure 3
Calculated RF Electromagnetic Field
W16DA-D Fort Kent, ME
Facility ID 181585
Ch. 16 (digital) 3.5 kW

prepared for
Gray Television Licensee, LLC

May, 2019

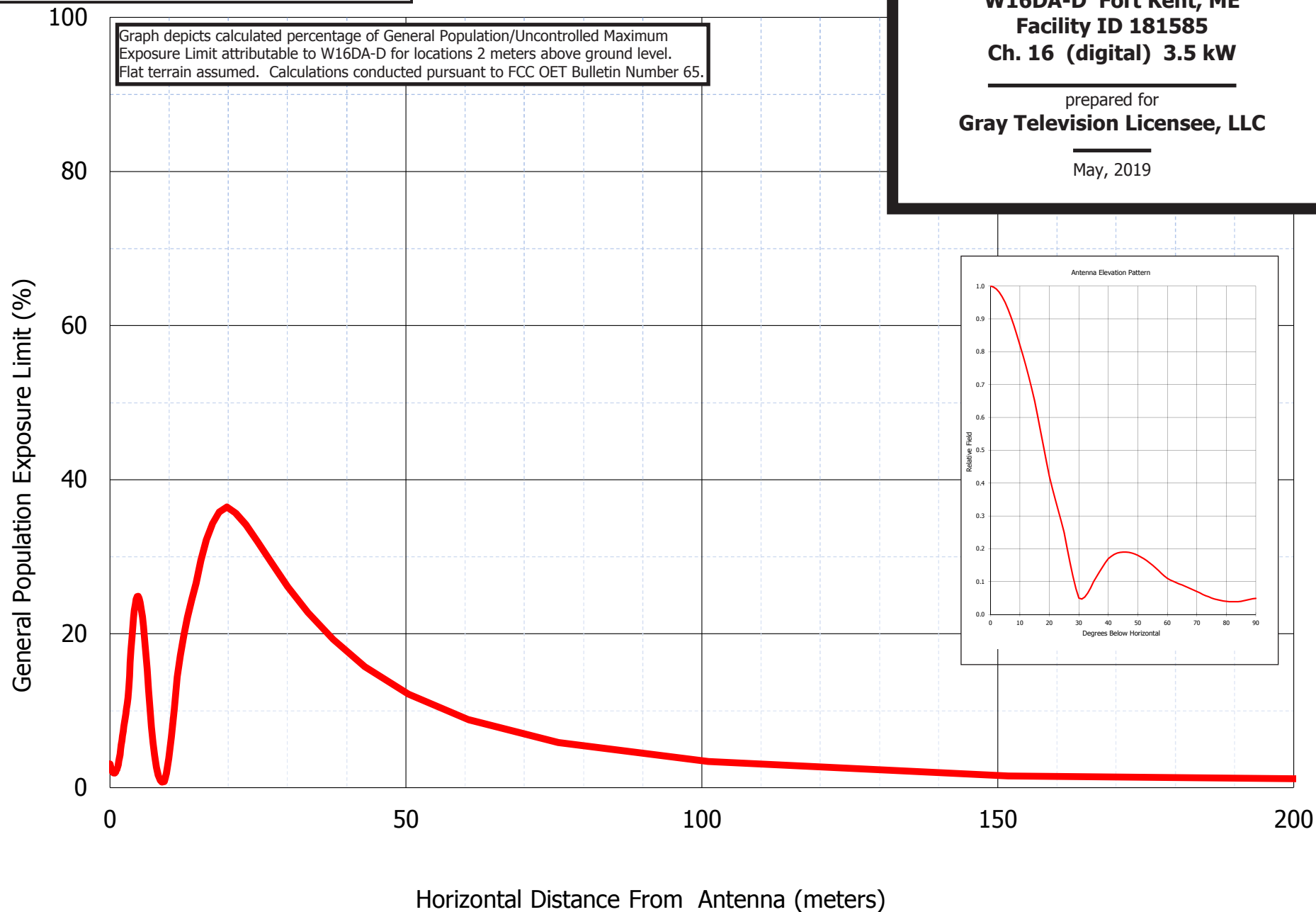


Table 1 W16DA-D TVStudy Analysis of Proposal
(page 1 of 2)



tvstudy v2.2.5 (4uoc83)
Database: localhost, Study: W16DA-D VanBuren prop, Model: Longley-Rice
Start: 2019.05.20 08:48:51

Study created: 2019.05.20 08:48:51

Study build station data: LMS TV 2019-05-17

Proposal: W16DA-D D16 LD APP FORT KENT, ME
File number: W16DA-D VanBuren prop
Facility ID: 181585
Station data: User record
Record ID: 2712
Country: U.S.

Build options:
Protect pre-transition records not on baseline channel

Search options:
Non-U.S. records included
Baseline record excluded if station has CP

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	W16DG-D	D16	LD	LIC	BANGOR, ME	BLANK0000013416	261.8 km
No	WFFF-TV	D16	DT	CP	BURLINGTON, VT	BLANK0000029843	475.5
No	CIHF-DT-11D15	D15	DT	LIC	WOODSTOCK, NB	BLANKCANADA135	86.0
No	CIVK-DT	D15	DT	LIC	CARLETON, QC	BLANKCANADA255	176.5
No	CIVQ-DT	D15	DT	LIC	QUBEC, QC	BLANKCANADA284	250.0
No	CIHF-DT-1	D16	DT	LIC	FREDERICTON, NB	BLANKCANADA126	166.2
No	CFCM-DT	D17	DT	LIC	QUBEC, QC	BLANKCANADA285	254.0
No	CFTF-DT-2	D17	DC	LIC	TROISPISTOLES, QC	BLANKCANLP419	140.2

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D16
Mask: Full Service
Latitude: 47 8 40.00 N (NAD83)
Longitude: 67 57 26.50 W
Height AMSL: 248.0 m (Adjusted based on actual ground elevation calculation)
HAAT: 0.0 m
Peak ERP: 3.50 kW
Antenna: KAT-K723147 1X2 (ID 1001019) 220.0 deg
Elev Pattn: Generic

48.9 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	0.017 kW	72.0 m	10.5 km
45.0	0.012	-7.2	6.3
90.0	0.032	31.2	8.1
135.0	0.877	43.3	21.9
180.0	3.23	34.9	25.7
225.0	2.78	-8.4	23.8
270.0	3.50	6.6	24.8
315.0	0.490	25.3	15.6

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m Computed HAAT: 25 m

**Proposal 23.94 dBu contour crosses Canadian border, coordination required
Distance to Canadian border: 2.5 km

Distance to Mexican border: 3450.4 km

Conditions at FCC monitoring station: Belfast ME
Bearing: 196.6 degrees Distance: 312.4 km

Proposal is not within the West Virginia quiet zone area

Table 1 W16DA-D TVStudy Analysis of Proposal
(page 2 of 2)



Conditions at Table Mountain receiving zone:
Bearing: 269.1 degrees Distance: 3064.8 km

No land mobile station failures found

Proposal is not within the Offshore Radio Service protected area

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%

Interference to proposal scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	W16DA-D	D16	LD	APP	FORT KENT, ME	W16DA-D VanBuren prop	
Undesireds:	CIHF-DT-1	D16	DT	LIC	FREDERICTON, NB	BLANKCANADA126	166.2 km

	Service area		Terrain-limited		IX-free		Percent IX
945.2	5,182	857.9	5,003	856.8	4,994	0.12	0.18
185.1	10,575	169.8	10,575	165.8	10,105	2.39	4.44 (in Canada)

Undesired			Total IX		Unique IX	Prct Unique IX
CIHF-DT-1	D16	DT	LIC	1.0	9	1.0
CIHF-DT-1	D16	DT	LIC	4.1	470	4.1
						0.12
						0.18
						2.39
						4.44 (in Canada)

Channel and Facility Information

Section	Question	Response
Facility ID	181585	
State	Maine	
City	FORT KENT	
LPT Channel	16	

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	47° 08' 40.0" N+
	Longitude	067° 57' 26.5" W-
	Structure Type	BANT-Building with antenna on top
	Overall Structure Height	7.9 meters
	Support Structure Height	6.1 meters
	Ground Elevation (AMSL)	237.7 meters
Antenna Data	Height of Radiation Center Above Ground Level	7.3 meters
	Height of Radiation Center Above Mean Sea Level	245.0 meters
	Effective Radiated Power	3.5 kW

Antenna
Technical Data

Section	Question	Response
Antenna Type	Antenna Type	Directional Custom
	Do you have an Antenna ID?	Yes
	Antenna ID	1001019
Antenna Manufacturer and Model	Manufacturer:	KAT
	Model	K723147 1X2
	Rotation	220 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:	Full Service

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	.931	90	.431	180	.070	270	.431
10	.852	100	.317	190	.045	280	.570
20	.727	110	.199	200	.048	290	.743
30	.832	120	.129	210	.119	300	.943
40	.960	130	.095	220	.069	310	1.00
50	1.00	140	.069	230	.095	320	.960
60	.943	150	.119	240	.129	330	.832
70	.742	160	.048	250	.199	340	.727
80	.570	170	.045	260	.317	350	.850

Additional Azimuths

Degree	V _A
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