

## **ENGINEERING EXHIBIT**

### **Application for Digital Flashcut Low Power Television Station**

prepared for

**Hearst Properties Inc.**  
W27BL Berlin, NH  
Facility ID 73291  
Ch. 27 1.8 kW Directional

*Hearst Properties Inc. (“Hearst”)* is the licensee of analog Low Power Television station W27BL, Channel 27, Berlin NH, Facility ID 73291 (BLTTL-19950530IQ). *Hearst* herein seeks a Construction Permit that would authorize W27BL to flashcut to digital operation on its current Channel 27 at its existing site location.

The W27BL antenna supporting structure is not registered as the overall structure height is less than 61 meters above ground and passes the FCC’s TOWAIR program for the tower location. A coordinate correction of 0.9 seconds latitude and 2.1 seconds longitude is applied, as well as a correction of the ground elevation to 533.4 meters AMSL. The proposed W27BL facility will use the existing antenna system and no change to the overall structure height is proposed.

The W27BL antenna is an MCI model 955212 having horizontal polarization. The ERP is 1.8 kW 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 relevant coverage contours of the licensed analog facility (74 dB $\mu$ ) and that proposed digital facility (51 dB $\mu$ ), demonstrating compliance with §73.3572 for a minor change.

Interference study per OET Bulletin 69<sup>1</sup> shows that the proposal complies with the FCC’s interference protection requirements toward all digital television, television translator, LPTV, and

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<sup>1</sup>FCC 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 current “TVStudy” software with the default application processing template settings, 1.0 km cell size, and 1.0 km terrain increment. Comparisons of various results of this computer program (run on a Mac processor) to the FCC’s implementation of

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.

### **Human Exposure to Radiofrequency Electromagnetic Field**

The proposed facility was evaluated for human exposure to RF energy using the procedures outlined in the FCC's OET Bulletin Number. 65. Based on OET-65 equation (10) and assuming a conservative 30 percent antenna relative field in downward elevations, the calculated power density attributable to the proposed facility at locations near the transmitter site at a height of two meters above ground level is  $6.5 \mu\text{W}/\text{cm}^2$ , which is 1.8 percent of the general population / uncontrolled maximum permissible exposure limit. This is below the five percent threshold limit described in §1.1307(b) regarding sites with multiple emitters, categorically excluding the applicant from responsibility for taking any corrective action in the areas where the proposal's contribution is less than five percent.

The general public will not be exposed to RF levels attributable to the proposal in excess of the FCC's guidelines. RF exposure warning signs will continue to be posted. With respect to worker safety, the applicant will coordinate exposure procedures with all pertinent stations and will reduce power or cease operation as necessary to protect persons having access to the site, tower, or antenna from RF electromagnetic field exposure in excess of FCC guidelines. This exhibit is limited to the evaluation of exposure to RF electromagnetic field. No increase in structure height is proposed.

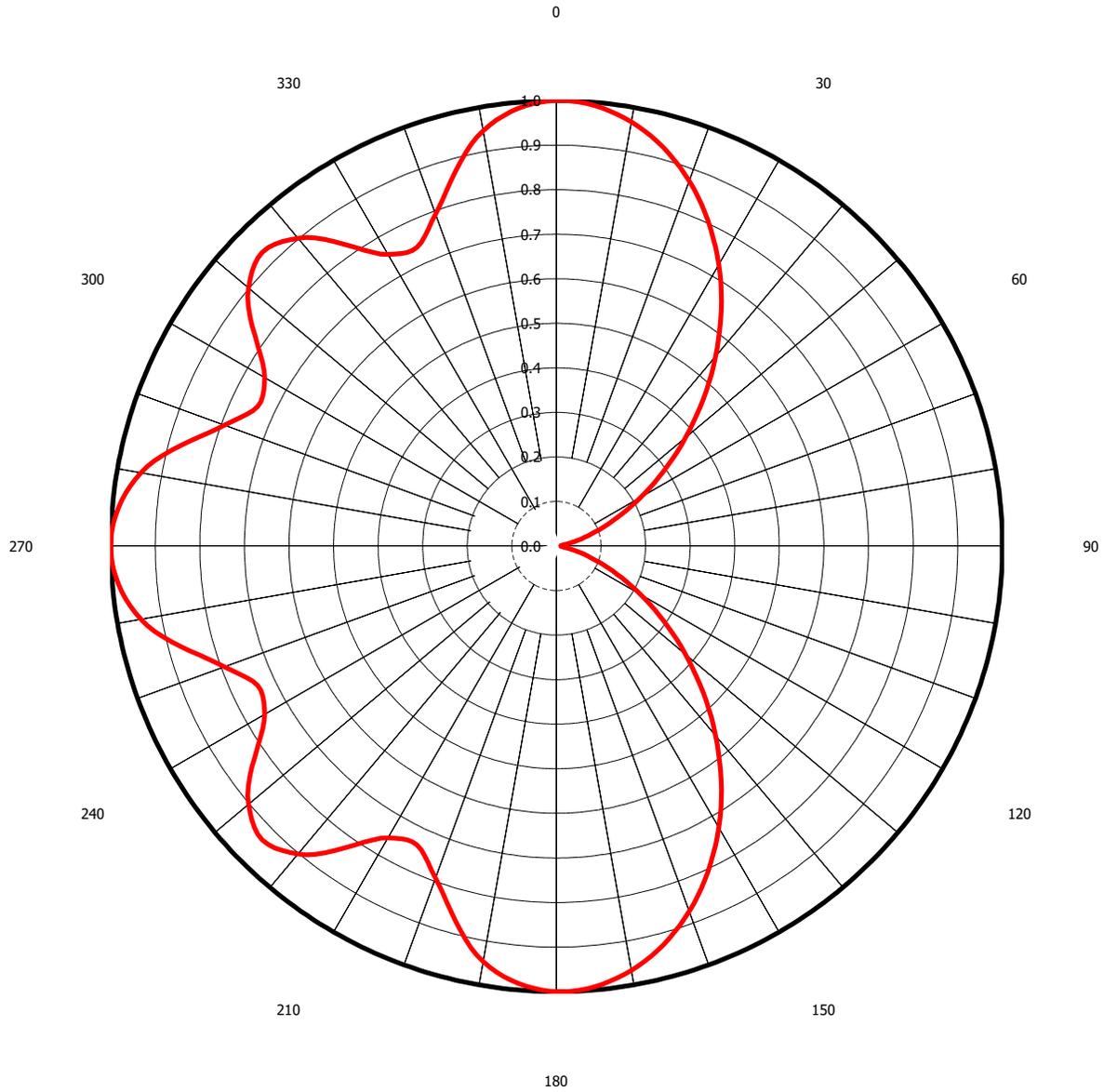
List of Attachments

Figure 1	Antenna Azimuthal Pattern
Figure 2	Coverage Contour Comparison
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.	April 20, 2019	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600

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



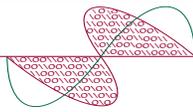
**Figure 1**  
**Antenna Azimuthal Pattern**  
**W27BL Berlin, NH**  
**Facility ID 73291**  
**Ch. 27 1.8 kW Directional**

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prepared for  
**Hearst Properties Inc.**

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April, 2021

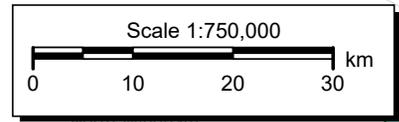
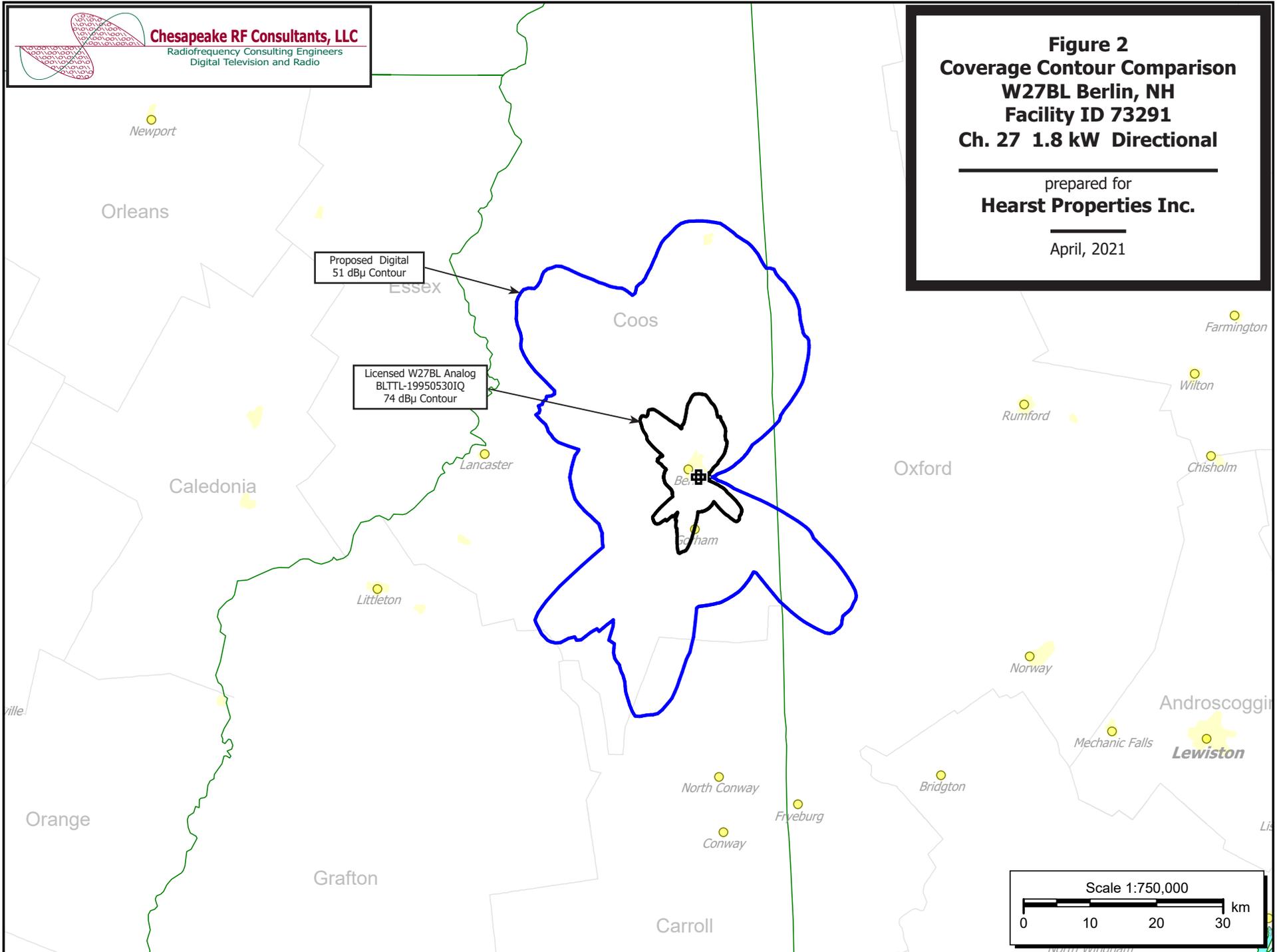


**Chesapeake RF Consultants, LLC**  
Radiofrequency Consulting Engineers  
Digital Television and Radio

**Figure 2**  
**Coverage Contour Comparison**  
**W27BL Berlin, NH**  
**Facility ID 73291**  
**Ch. 27 1.8 kW Directional**

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April, 2021



**Table 1 W27BL TVStudy Analysis of Proposal**  
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tvstudy v2.2.5 (4uoc83)  
 Database: localhost, Study: W27BL\_flashcut, Model: Longley-Rice  
 Start: 2021.04.20 16:00:06

Study created: 2021.04.20 16:00:06

Study build station data: LMS TV 2021-04-16

Proposal: W27BL D27 LD APP BERLIN, NH  
 File number: W27BL\_flashcut  
 Facility ID: 73291  
 Station data: User record  
 Record ID: 3608  
 Country: U.S.

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

Search options:  
 Baseline record excluded if station has CP

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	WGGB-TV	D26	DT	LIC	SPRINGFIELD, MA	BLANK0000083684	273.9 km
No	WMTW	D26	LD	LIC	POLAND SPRING, ME	BLCDT20100423ABV	114.7
No	WYCU-LD	D26	LD	LIC	CHARLESTOWN, ETC., NH	BLDTL20121214ABJ	148.8
No	WUNI	D27	DT	LIC	MARLBOROUGH, MA	BLANK0000030092	232.0
No	WUNI	D27	DT	CP	MARLBOROUGH, MA	BLANK0000035720	239.6
No	WNYT	D27	LD	CP	ALBANY, NY	BLANK0000053981	271.6
No	WIVT	D27	DT	LIC	BINGHAMTON, NY	BLANK0000090477	469.5
No	WNYW	D27	DT	LIC	NEW YORK, NY	BLANK0000079881	477.0
No	W16AL	D27+	LD	CP	BURLINGTON, VT	BLANK0000118485	153.0
No	W28ED-D	D28	LD	CP	ETNA, ME	BNPDTL20100504AMC	167.8
Yes	WVTB	D28	DT	LIC	ST. JOHNSBURY, VT	BLANK0000098226	59.0
No	W28DQ-D	D28	LD	LIC	WINDSOR, VT	BLDTL20120507ABK	152.7
No	WMUR-LP	N29-	TX	LIC	LITTLETON, NH	BLTTL20000601AEG	54.0

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D27  
 Mask: Full Service  
 Latitude: 44 27 29.30 N (NAD83)  
 Longitude: 71 9 58.10 W  
 Height AMSL: 563.4 m  
 HAAT: 0.0 m  
 Peak ERP: 1.80 kW  
 Antenna: MCI-955212 (ID 20053) 270.0 deg  
 Elev Pattn: Generic

50.0 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	1.80 kW	190.3 m	39.4 km
45.0	0.393	88.9	24.0
90.0	0.000	-134.8	2.1
135.0	0.393	191.5	31.6
180.0	1.80	26.2	20.6
225.0	1.57	120.8	34.4
270.0	1.80	-26.3	20.6
315.0	1.57	200.0	39.2

Database HAAT does not agree with computed HAAT  
 Database HAAT: 0 m Computed HAAT: 82 m

\*\*Proposal 25.05 dBu contour crosses Canadian border, coordination required  
 Distance to Canadian border: 67.1 km

Distance to Mexican border: 3088.9 km

**Table 1 W27BL TVStudy Analysis of Proposal**  
 (page 2 of 2)



Conditions at FCC monitoring station: Belfast ME  
 Bearing: 89.8 degrees Distance: 165.3 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:  
 Bearing: 272.2 degrees Distance: 2819.4 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 BLANK0000098226 LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WVTB	D28	DT	LIC	ST. JOHNSBURY, VT	BLANK0000098226	
Undesireds:	W27BL	N27+	TX	LIC	BERLIN, NH	BLTTL19950530IQ	58.9 km
	W27BL	D27	LD	APP	BERLIN, NH	W27BL_flashcut	59.0
	WHPX-TV	D28	DT	LIC	NEW LONDON, CT	BLANK0000080171	327.6
	WWDG-CD	D28	DC	LIC	UTICA, NY	BLANK0000001609	307.2
	Service area		Terrain-limited		IX-free, before	IX-free, after	Percent New IX
	25390.2	458,123	18361.7	246,827	18268.7	245,139	0.18 0.10
	5175.6	279,857	3653.6	189,458	3653.6	189,458	0.00 0.00
	(in Canada)						
Undesired				Total IX	Unique IX, before	Unique IX, after	
W27BL N27+ TX LIC				0.0	0	0	
W27BL D27 LD APP				33.0	248	33.0	248
WHPX-TV D28 DT LIC				93.0	1,688	93.0	1,688

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 Interference to proposal scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	W27BL	D27	LD	APP	BERLIN, NH	W27BL_flashcut	
Undesireds:	WUNI	D27	DT	LIC	MARLBOROUGH, MA	BLANK0000030092	232.0 km
	WVTB	D28	DT	LIC	ST. JOHNSBURY, VT	BLANK0000098226	59.0
	Service area		Terrain-limited		IX-free	Percent IX	
	2252.8	16,627	1793.2	15,617	1791.2	15,617	0.11 0.00
Undesired				Total IX	Unique IX	Prcnt Unique IX	
WVTB D28 DT LIC				2.0	0	2.0	0.11 0.00

**Channel and Facility Information**

Section	Question	Response
Facility ID	73291	
State	New Hampshire	
City	BERLIN	
LPD Channel	27	

**Antenna Location Data**

Section	Question	Response
<b>Antenna Structure Registration</b>	Do you have an FCC Antenna Structure Registration (ASR) Number?	No
	ASR Number	
<b>Coordinates (NAD83)</b>	Latitude	44° 27' 29.3" N+
	Longitude	071° 09' 58.1" W-
	Structure Type	TOWER-A free standing or guyed struct
	Overall Structure Height	31 meters
	Support Structure Height	31 meters
	Ground Elevation (AMSL)	533.4 meters
<b>Antenna Data</b>	Height of Radiation Center Above Ground Level	30 meters
	Height of Radiation Center Above Mean Sea Level	563.4 meters
	Effective Radiated Power	1.8 kW

**Antenna  
Technical Data**

Section	Question	Response
<b>Antenna Type</b>	Antenna Type	Off the Shelf
	Do you have an Antenna ID?	Yes
	Antenna ID	20053
<b>Antenna Manufacturer and Model</b>	Manufacturer:	MCI
	Model	955212
	Rotation	270 degrees
	Electrical Beam Tilt	Not Applicable
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Horizontal
<b>Elevation Radiation Pattern</b>	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	Value	Degree	Value	Degree	Value	Degree	Value
0	1	90	1	180	0.01	270	1
10	0.947	100	0.967	190	0.021	280	0.947
20	0.793	110	0.872	200	0.094	290	0.793
30	0.756	120	0.729	210	0.218	300	0.756
40	0.902	130	0.556	220	0.378	310	0.902
50	0.902	140	0.378	230	0.556	320	0.902
60	0.756	150	0.218	240	0.729	330	0.756
70	0.793	160	0.094	250	0.872	340	0.793
80	0.947	170	0.021	260	0.967	350	0.947

**Additional Azimuths**

Degree	V <sub>A</sub>
65	0.74
45	0.933
335	0.74
315	0.933
295	0.74
25	0.74