

ENGINEERING EXHIBIT

Application for Minor Modification of Digital Low Power Television Station

prepared for

Ramar Communications, Inc.

KLBB-LD Lubbock, TX

Facility ID 192484

Ch. 19 (digital) 15 kW

Ramar Communications, Inc. (“Ramar”) is the licensee of digital Low Power Television station KLBB-LD, Channel 19, Lubbock TX, Facility ID 192484. KLBB-LD is licensed to operate (file# 0000004404) with 15 kW effective radiated power (“ERP”), nondirectional. *Ramar* herein seeks a minor modification to specify use of a directional antenna having an increased height above ground (by 12.2 meters). No change in ERP or site location is proposed.

KLBB-LD will continue to utilize the tower structure associated with FCC Antenna Structure Registration number 1248244. As proposed herein, KLBB-LD will utilize a new shared, directional broadband antenna to be side-mounted on the tower rather than the nondirectional antenna which is currently authorized. No change to the overall structure height is proposed.

The proposed side-mount antenna is an RFS model SBB-16C160 having horizontal polarization. The ERP is 15 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 51 dB μ coverage contour of the proposed and licensed facilities. The service area overlap demonstrates 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*

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

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 20 percent antenna relative field in downward elevations (pattern data shows less than 20 percent relative field at angles 10 to 90 degrees below the antenna), 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 $0.3 \mu\text{W}/\text{cm}^2$, which is 0.1 percent of the general population / uncontrolled maximum permissible exposure limit. This is well 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.

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 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

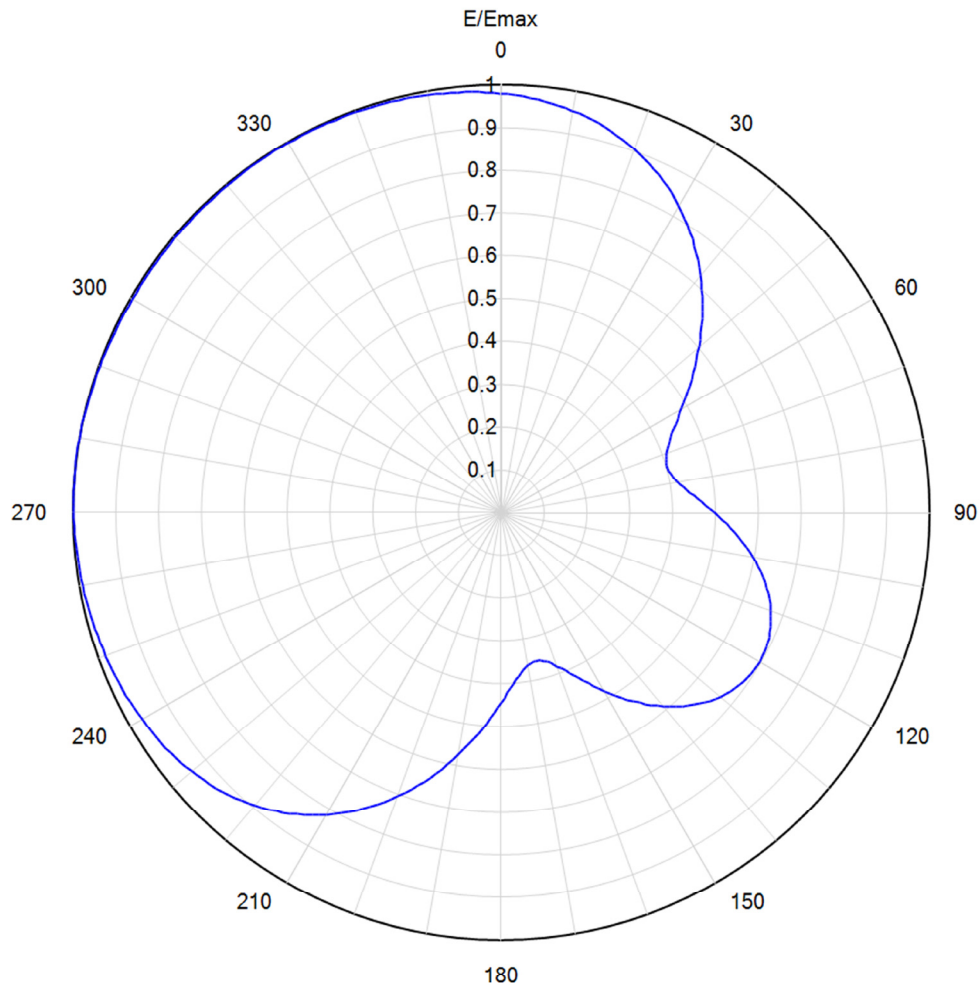
Figure 1	Antenna Azimuthal Pattern
Figure 2	Coverage Contour Comparison
Table 1	TVStudy Analysis of Proposal
Form 2100	Saved Version of Engineering Sections from FCC Form at Time of Upload

Chesapeake RF Consultants, LLC

Joseph M. Davis, P.E.	August 28, 2018	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600



Azimuth Pattern



Model: SBB-16C160
Location: Lubbock, TX
Customer: Ramar Communications
Date: August 22, 2018
Rotation Angle: 300 degrees

Polarization: Horizontal
Frequency: 503.00 MHz
Directivity: 1.6 (1.97 dB)
Elevation Angle: 1.50 degrees
Horizontal Unit Pattern:
File = SBBC160HP_HRP_500.pat

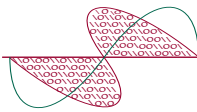
Note: Pattern Tolerance +/-5% of Emax

Figure 1
Antenna Azimuthal Pattern
KLBB-LD Lubbock, TX
Facility ID 192484
Ch. 19 (digital) 15 kW

prepared for
Ramar Communications, Inc.

August, 2018





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

Figure 2
Coverage Contour Comparison
KLBB-LD Lubbock, TX
Facility ID 192484
Ch. 19 (digital) 15 kW

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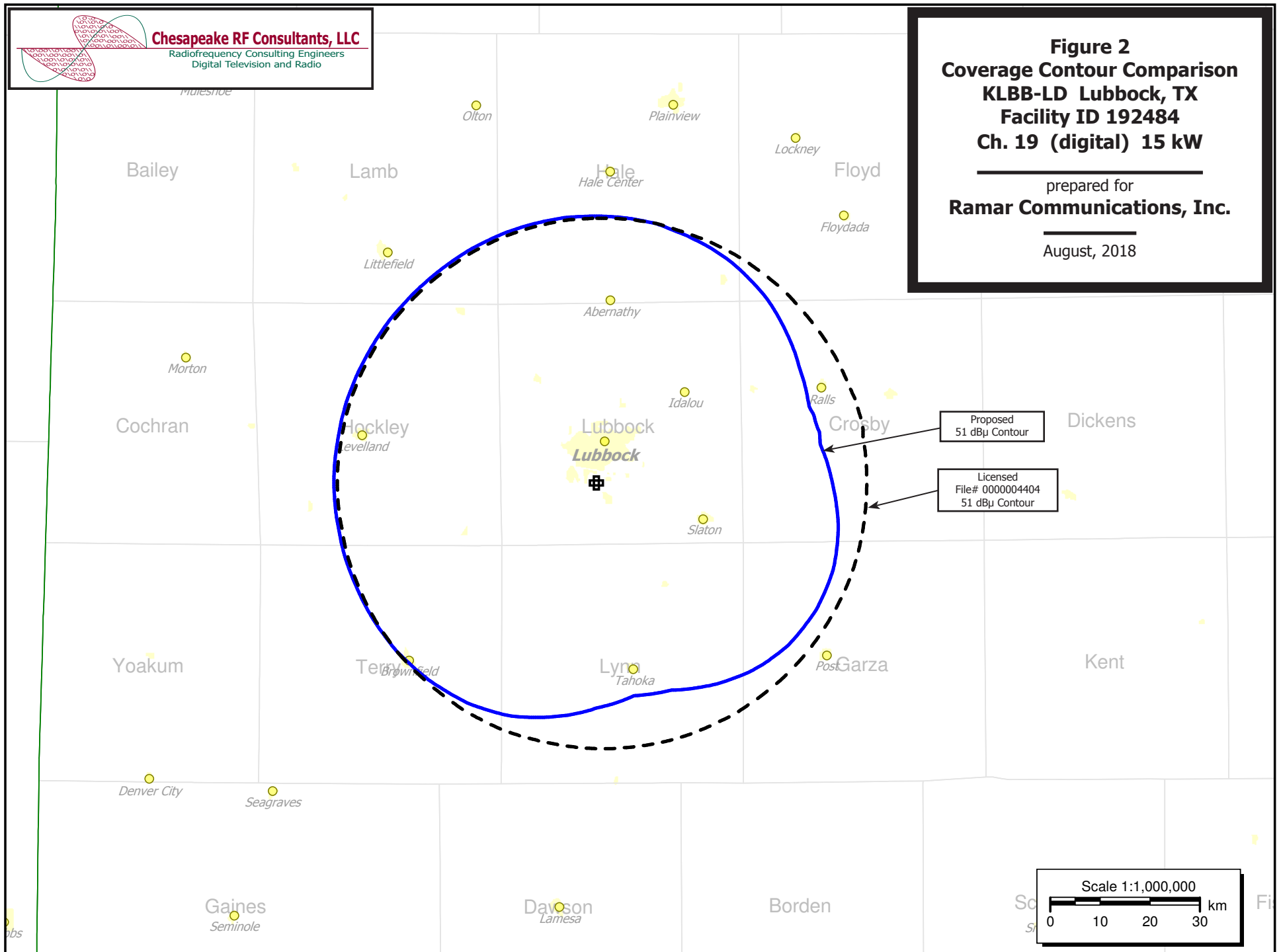


Table 1 KLBB-LD TVStudy Analysis of Proposal (page 1 of 2)



tvstudy v2.2.5 (4uoc83)
Database: localhost, Study: KLBB-LD SBB_15kW, Model: Longley-Rice
Start: 2018.08.28 11:50:48

Study created: 2018.08.28 11:50:48

Study build station data: LMS TV 2018-08-27

Proposal: KLBB-LD D19 LD APP Lubbock, TX
File number: KLBB-LD SBB 15kW
Facility ID: 192484
Station data: User record
Record ID: 2258
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	KPTF-DT	D18	DT	LIC	FARWELL, TX	BLCDT20090612AEB	161.1 km
No	KUPB	D18	DT	LIC	MIDLAND, TX	BLCDT20090615ABW	195.0
No	KXVZ-LP	N18z	TX	LIC	PLAINVIEW, TX	BLTTL20061218ABI	81.8
No	K18JP-D	D18	LD	CP	TAHOKA, TX	BNPDTL20100323AIR	48.7
No	KVBA-LP	N19+	TX	LIC	ALAMOGORDO, NM	BLTTL20070720AAD	379.5
No	K19JZ-D	D19	LD	LIC	CARLSBAD, NM	BLDTT20120705ABT	231.2
No	K43BU	D19	LD	CP	CLOVIS, NM	BLANK0000054419	161.5
No	K45IL-D	D19	LD	CP	HOBBS, NM	BLANK0000030467	143.0
No	K19AA-D	D19	LD	LIC	ALTUS, OK	BLDTT20091229ACU	264.0
No	KAUT-TV	D19	DT	CP	OKLAHOMA CITY, OK	BLANK0000054735	462.4
No	K23IY-D	D19	LD	LIC	Weatherford, OK	BLANK0000001396	362.8
No	K19IZ-D	D19	LD	CP	ACKERLY, TX	BNPDTL20100323AIJ	102.5
Yes	KAMR-TV	D19	DT	LIC	AMARILLO, TX	BLCDT20080519ACZ	204.6
No	K19JN-D	D19	LD	CP	BALMORHEA, TX	BNPDTL20100416ABF	329.9
No	KTVT	D19	DT	LIC	FORT WORTH, TX	BLCDT20121115ABM	470.1
No	K19KE-D	D19	LD	CP	JOLLY, TX	BNPDTL20100510AGJ	328.1
No	KIDY	D19	DT	LIC	SAN ANGELO, TX	BLCDT20110520ADN	247.7
No	K20KT-D	D20	LD	LIC	DORA, NM	BLDTT20110809ABU	158.0
No	KDAX-LD	D20	LD	CP	AMARILLO, TX	BDCCDTL20081215AAW	201.5
No	KFIQ-LP	D20	LD	CP	LUBBOCK, TX	BDISDTL20090630AAZ	2.7
No	KTXS-TV	D20	DT	APP	SWEETWATER, TX	BLANK0000035779	204.3
No	KTXS-TV	D20	DT	LIC	SWEETWATER, TX	BLCDT20080815ABJ	204.3
No	KTXS-TV	D20	DT	CP	SWEETWATER, TX	BPCDT20110801ALU	204.3

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D19
Mask: Full Service
Latitude: 33 30 8.30 N (NAD83)
Longitude: 101 52 21.30 W
Height AMSL: 1248.8 m
HAAT: 0.0 m
Peak ERP: 15.0 kW
Antenna: Ramar RFS SBB-16C160 503 Ch-19 0.0 deg
Elev Pattn: Generic
Elec Tilt: 1.50

49.3 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	14.3 kW	267.4 m	55.4 km
45.0	6.43	280.2	51.9
90.0	3.74	285.9	49.4
135.0	5.91	283.5	51.7
180.0	2.89	268.9	47.1
225.0	12.5	253.7	53.9

Table 1 KLBB-LD TVStudy Analysis of Proposal
(page 2 of 2)



270.0 14.9 247.0 54.5
315.0 14.9 250.9 54.7

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m Computed HAAT: 267 m

Distance to Canadian border: 1722.5 km

Distance to Mexican border: 404.8 km

Conditions at FCC monitoring station: Douglas AZ
Bearing: 255.2 degrees Distance: 762.4 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 338.9 degrees Distance: 793.4 km

No land mobile station failures found

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 BLCDT20080519ACZ LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KAMR-TV	D19	DT	LIC	AMARILLO, TX	BLCDT20080519ACZ	
Undesireds:	KLBB-LD	D19	LD	APP	Lubbock, TX	KLBB-LD SBB 15kW	204.6 km
	KAUT-TV	D19	DT	CP	OKLAHOMA CITY, OK	BLANK0000054735	393.1
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
35065.5	366,500	34601.1	366,447	34584.1	366,447	34506.7 366,352	0.22 0.03
Undesired				Total IX	Unique IX, before	Unique IX, after	
KLBB-LD D19 LD APP				77.4 95	77.4 95		
KAUT-TV D19 DT CP				16.9 0	16.9 0	16.9 0	

Interference to proposal scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KLBB-LD	D19	LD	APP	Lubbock, TX	KLBB-LD SBB 15kW	
Undesireds:	K18JP-D	D18	LD	CP	TAHOKA, TX	BNPDTL20100323AIR	48.7 km
	KAMR-TV	D19	DT	LIC	AMARILLO, TX	BLCDT20080519ACZ	204.6
	KFIQ-LP	D20	LD	CP	LUBBOCK, TX	BDISDTL20090630AAZ	2.7
Service area		Terrain-limited		IX-free		Percent IX	
8620.1	322,603	8595.3	322,603	8558.6	322,590	0.43 0.00	
Undesired				Total IX	Unique IX	Prct Unique IX	
K18JP-D D18 LD CP				10.0 0	10.0 0	0.12 0.00	
KAMR-TV D19 DT LIC				1.0 0	1.0 0	0.01 0.00	
KFIQ-LP D20 LD CP				25.8 13	25.8 13	0.30 0.00	

**Channel and
Facility
Information**

Section	Question	Response
Proposed Community of License	Facility ID	192484
	State	Texas
	City	LUBBOCK
	LPD Channel	19

**Antenna Location
Data**

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1248244
Coordinates (NAD83)	Latitude	33° 30' 08.3" N+
	Longitude	101° 52' 21.3" W-
	Structure Type	GTOWER-Guyed Structure Used for Communication Purposes
	Overall Structure Height	297.2 meters
	Support Structure Height	295.7 meters
	Ground Elevation (AMSL)	977.5 meters
Antenna Data	Height of Radiation Center Above Ground Level	271.3 meters
	Height of Radiation Center Above Mean Sea Level	1248.8 meters
	Effective Radiated Power	15 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:	RFS
	Model	SBB-16C160
	Rotation	0 degrees
	Electrical Beam Tilt	1.5
	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	0.976	90	0.499	180	0.439	270	0.998
10	0.949	100	0.595	190	0.566	280	1.000
20	0.898	110	0.668	200	0.695	290	0.998
30	0.819	120	0.694	210	0.805	300	0.996
40	0.714	130	0.666	220	0.886	310	0.996
50	0.595	140	0.589	230	0.937	320	0.997
60	0.481	150	0.482	240	0.965	330	0.998
70	0.410	160	0.385	250	0.981	340	0.995
80	0.420	170	0.362	260	0.992	350	0.989

Additional Azimuths

Degree	V _A
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