

## **ENGINEERING EXHIBIT**

### **Application for Minor Modification of Digital Low Power Television Station Construction Permit**

prepared for

#### **Ramar Communications, Inc.**

K26PJ-D Lubbock, TX

Facility ID 181653

Ch. 26 1.8 kW Directional

*Ramar Communications, Inc.* (“*Ramar*”) is the permittee of unbuilt digital Low Power Television station K26PJ-D, Channel 26, Facility ID 181653, Lubbock TX. K26PJ-D is authorized to operate pursuant to a Construction Permit (“CP”, file# BNPDTL-20090825ARG) with 10 kW effective radiated power (“ERP”), directional. *Ramar* herein seeks a modification of the CP to specify a different transmitting location, a reduction in ERP and antenna height, and use of a different directional antenna pattern.

The proposed facility will employ a side-mounted antenna on the tower structure associated with FCC Antenna Structure Registration number 1248244. No change to the overall structure height is proposed. The proposed site is located more than 75 miles (121 km) from the reference coordinates of the markets listed in Appendix A of DA 09-1487<sup>1</sup> and is 2.7 km (1.7 miles) from the site authorized in the CP.

The proposed antenna is a Scala model PR-TV having horizontal polarization. The proposed ERP is 1.8 kW using a “simple” out of channel emission mask. A plot of the directional antenna’s azimuthal pattern is supplied in Figure 1. Figure 2 depicts the 51 dBμ coverage contour of the proposed facility as well as that of the CP facility, demonstrating compliance with §73.3572 for a minor change.

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<sup>1</sup>“Commencement of Rural, First-come, First-served digital licensing for Low Power Television and TV Translators Beginning August 25, 2009 and Commencement of Nationwide, First-come, First-served Digital Licensing for Low Power Television and TV Translator Services Beginning January 25, 2010,” Public Notice, DA 09-1487, Released June 29, 2009.

Interference study per OET Bulletin 69<sup>2</sup> 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.

### **Human Exposure to Radiofrequency Electromagnetic Field (Environmental)**

The proposed operation was evaluated for human exposure to RF energy using the procedures outlined in the FCC's OET Bulletin Number 65. OET-65 equation (10) was employed to calculate RF density levels along a radial two meters above ground extending out from the base of the antenna supporting structure along the directional pattern's azimuthal maxima, considering the antenna's elevation relative field pattern in downward elevations and the associated slant distances. The highest calculated signal density near the tower at two meters above ground level attributable to the proposed facility is  $13.0 \mu\text{W}/\text{cm}^2$ , occurring within 45 meters horizontally from the base of the antenna supporting structure, which is 3.6 percent of the general population/uncontrolled maximum permitted 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.

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<sup>2</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 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 TVStudy show excellent correlation.

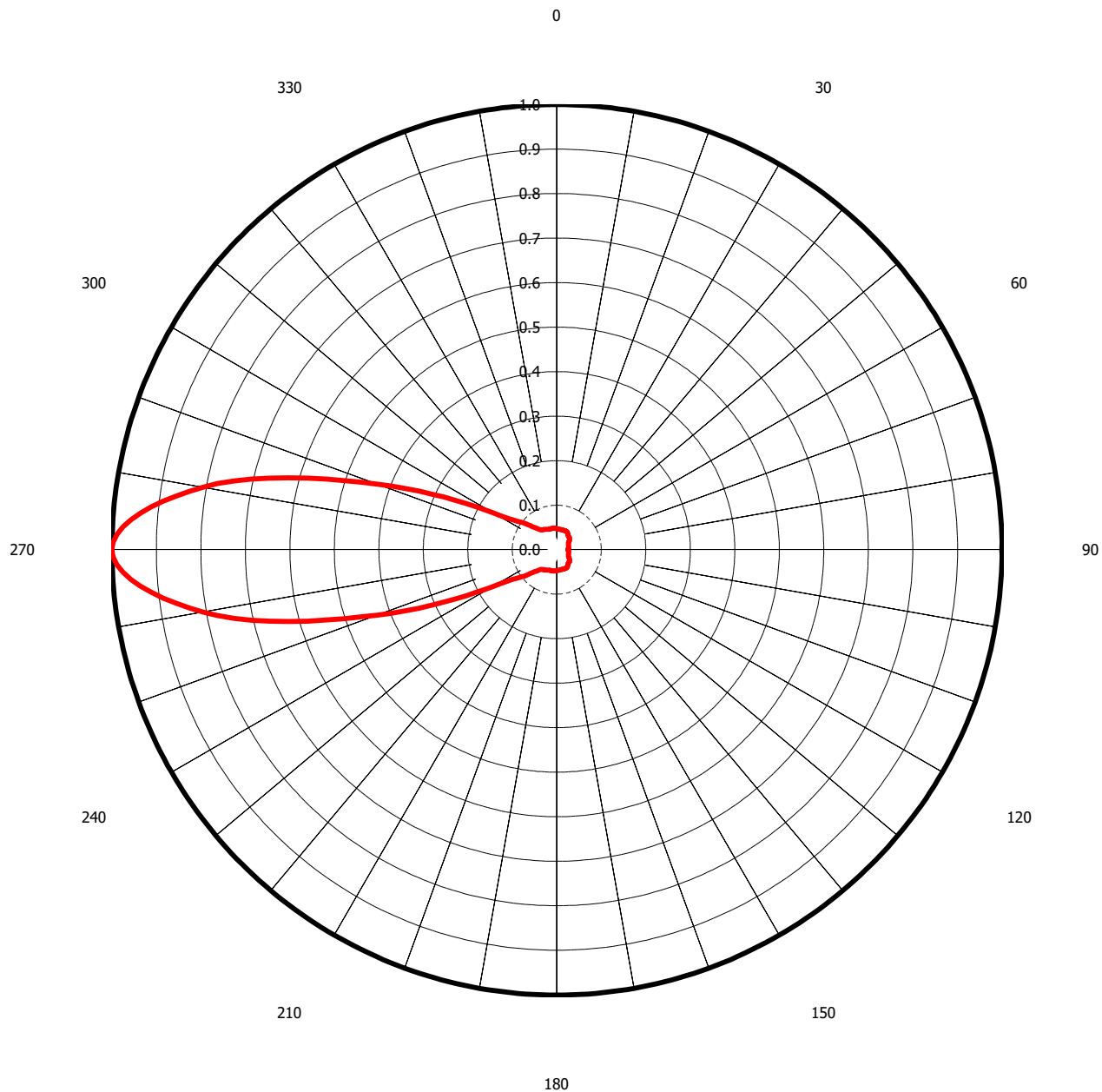
*List of Attachments*

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

**Chesapeake RF Consultants, LLC**

Joseph M. Davis, P.E.	March 21, 2023	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600

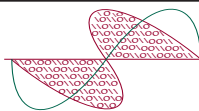
**Azimuth Pattern - Relative Field  
(True North)**



**Figure 1**  
**Antenna Azimuthal Pattern**  
**K26PJ-D Lubbock, TX**  
**Facility ID 181653**  
**Ch. 26 1.8 kW Directional**

prepared for  
**Ramar Communications, Inc.**

March, 2023



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

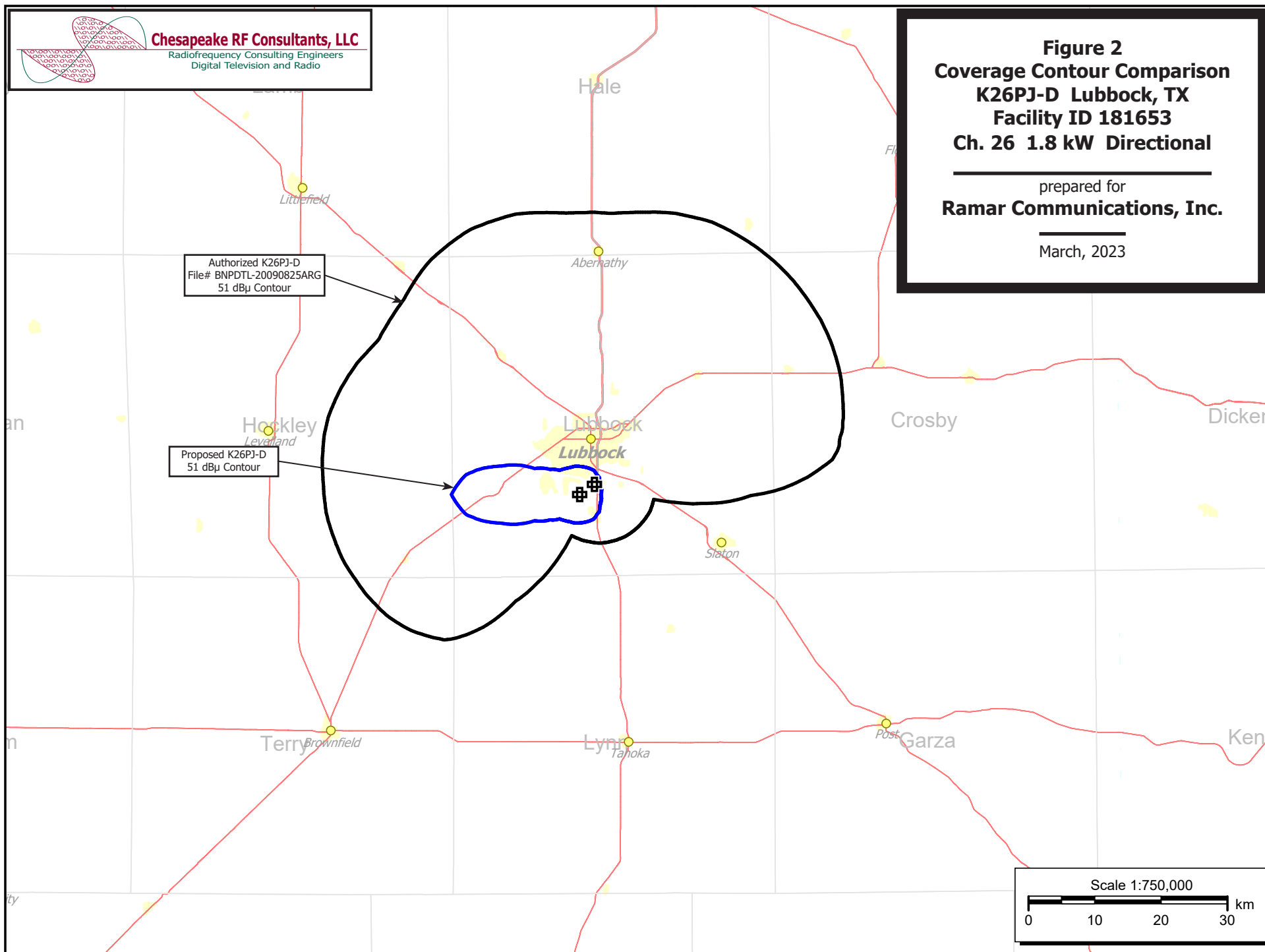
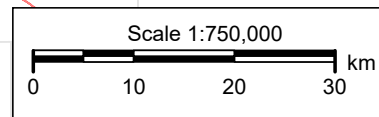
**Figure 2**  
**Coverage Contour Comparison**  
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March, 2023

Authorized K26PJ-D  
File# BNPDTL-20090825ARG  
51 dBu Contour

Proposed K26PJ-D  
51 dBu Contour



# **Table 1 K26PJ-D TVStudy Analysis of Proposal** (page 1 of 2)



tvstudy v2.2.5 (4uoc83)  
Database: localhost, Study: K26PJ-D 1248244\_PR-TV, Model: Longley-Rice  
Start: 2023.03.21 13:53:44

Study created: 2023.03.21 13:53:43

Study build station data: LMS TV 2023-03-21

Proposal: K26PJ-D D26 LD APP LUBBOCK, TX  
File number: K26PJ-D 1248244\_PR-TV  
Facility ID: 181653  
Station data: User record  
Record ID: 4923  
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	K32OV-D	N24+	TX	LIC	LUBBOCK, TX	BLTTL20050926ADH	2.7 km
No	KTEL-TV	D25	DT	LIC	CARLSBAD, NM	BLANK00000151164	246.3
No	KTTZ-TV	D25	DT	LIC	LUBBOCK, TX	BLANK0000063358	9.0
No	K25CP-D	D25	LD	LIC	TULIA, TX	BLDTT20110425ACD	115.6
No	KOB	D26	DT	LIC	ALBUQUERQUE, NM	BLCDT20051003BQP	460.9
No	KZBZ-CD	D26z	DC	LIC	CLOVIS, NM	BLANK0000001641	161.5
No	KTD0	D26	DT	LIC	LAS CRUCES, NM	BLANK0000072065	470.9
No	K26PL-D	D26z	LD	LIC	Roswell, NM	BLANK00000121621	231.7
No	K26PL-D	D26z	LD	CP	Roswell, NM	BLANK00000159429	210.0
No	K26MV-D	D26	LD	LIC	SOLDIER CANYON, NM	BLANK00000019173	364.5
No	K260J-D	D26	LD	LIC	TUCUMCARI, NM	BLANK00000156876	247.2
No	DKSWX-LD	D26-	LD	APP	DUNCAN, OK	BLANK0000074560	349.0
No	K26NC-D	D26	LD	LIC	ELK CITY, OK	BLANK0000058431	315.4
No	K26JO-D	D26	LD	LIC	GUYMON, OK	BLDTT20111227ACD	354.9
No	K26ND-D	D26	LD	LIC	HOLLIS, OK	BLANK0000058436	234.6
No	KTES-LD	D26	LD	LIC	ABILENE, TX	BLANK00000143282	204.3
No	KMID	D26	DT	LIC	MIDLAND, TX	BLCDT20110218AAS	160.9
No	KNMW-LD	D26	LD	LIC	MINERAL WELLS, TX	BLANK0000062727	357.5
No	K26JR-D	D26	LD	LIC	TURKEY, TX	BLDTT20101115FOD	121.6
No	K26NK-D	D26-	LD	LIC	WICHITA FALLS, TX	BLANK0000055164	305.3
No	K26NK-D	D26-	LD	CP	WICHITA FALLS, TX	BLANK00000144493	309.5
No	K27NL-D	D27	LD	LIC	CLOVIS, NM	BLANK0000086777	161.5
No	K27GL-D	D27	LD	CP	HOBBS, NM	BLANK0000060815	143.0
No	K27GL-D	D27	LD	LIC	HOBBS, NM	BLDTT20121128BPR	140.6
No	KRPV-DT	D27	DT	LIC	ROSWELL, NM	BLCDT20090211ABQ	232.5
No	K27OG-D	D27	LD	LIC	CLARENDON, TX	BLANK0000091157	178.2
No	KYAM-LD	D27	LD	LIC	HEREFORD, TX	BLANK00000161225	189.5
No	KYAM-LD	D27	LD	CP	HEREFORD, TX	BLANK00000199632	192.4
No	KAMC	D27	DT	LIC	LUBBOCK, TX	BLANK00000186464	2.7

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D26  
Mask: Simple  
Latitude: 33 30 8.30 N (NAD83)  
Longitude: 101 52 21.30 W  
Height AMSL: 986.6 m  
HAAT: 0.0 m  
Peak ERP: 1.80 kW  
Antenna: SCA PR-TV Ch-26 270.0 deg  
Elev Pattn: Generic

50.0 dBu contour:  
Azimuth ERP HAAT Distance  
0.0 deg 0.004 kW 5.2 m 4.6 km

**Table 1 K26PJ-D TVStudy Analysis of Proposal**  
(page 2 of 2)



45.0	0.003	18.0	4.2
90.0	0.001	23.7	3.3
135.0	0.003	21.3	4.2
180.0	0.004	6.7	4.6
225.0	0.010	-8.5	5.8
270.0	1.80	-15.2	20.7
315.0	0.010	-11.3	5.8

Database HAAT does not agree with computed HAAT  
Database HAAT: 0 m    Computed HAAT: 5 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

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 proposal scenario 1  
64.15% interference received

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	K26PJ-D	D26	LD	APP	LUBBOCK, TX	K26PJ-D 1248244_PR-TV	
Undesireds:	KTTZ-TV	D25	DT	LIC	LUBBOCK, TX	BLANK0000063358	9.0 km
	K26PL-D	D26z	LD	LIC	Roswell, NM	BLANK0000121621	231.7
	KMID	D26	DT	LIC	MIDLAND, TX	BLCDT20110218AAS	160.9
	KAMC	D27	DT	LIC	LUBBOCK, TX	BLANK0000186464	2.7
Service area		Terrain-limited		IX-free		Percent IX	
189.5	87,379	189.5	87,379	31.7	31,327	83.25	64.15
Undesired				Total IX	Unique IX	Prcnt Unique IX	
KTTZ-TV D25 DT LIC				100.2    22,603    0.0	0	0.00	0.00
KMID D26 DT LIC				6.9    12,227    2.0	5,259	1.05	6.02
KAMC D27 DT LIC				155.8    50,793    53.6	24,799	28.27	28.38

**Channel and  
Facility  
Information**

Section	Question	Response
Facility ID	181653	
State	Texas	
City	LUBBOCK	
LPD Channel	26	



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	9.1 meters
	Height of Radiation Center Above Mean Sea Level	986.6 meters
	Effective Radiated Power	1.8 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:	Scala
	Model	PR-TV
	Rotation	270 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	Value	Degree	Value	Degree	Value	Degree	Value
0	1.000	90	0.047	180	0.025	270	0.047
10	0.808	100	0.046	190	0.027	280	0.049
20	0.430	110	0.046	200	0.028	290	0.049
30	0.165	120	0.046	210	0.030	300	0.053
40	0.090	130	0.040	220	0.038	310	0.059
50	0.059	140	0.038	230	0.040	320	0.090
60	0.053	150	0.030	240	0.046	330	0.165
70	0.049	160	0.028	250	0.046	340	0.430
80	0.049	170	0.027	260	0.046	350	0.808

Additional Azimuths

Degree	V <sub>A</sub>
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