

ENGINEERING EXHIBIT

Application for Minor Modification of Licensed Digital Low Power Television Station

prepared for

Gray Television Licensee, LLC

KTLE-LD Odessa, TX

Facility ID 64993

Ch. 20 15 kW Directional

Gray Television Licensee, LLC (“Gray”) is the licensee of digital Low Power Television station KTLE-LD, Channel 20, Odessa TX, Facility ID 64993 (file# 0000068037). KTLE-LD is licensed to operate with 15 kW effective radiated power (“ERP”) and a directional antenna. *Gray* seeks a minor modification Construction Permit for KTLE-LD to utilize a different directional antenna. No change in site location, antenna height, or ERP is proposed.

The KTLE-LD site is associated with FCC Antenna Structure Registration number 1215312 and a replacement side-mounted antenna will be employed. No change to the overall structure height is proposed.

The proposed KTLE-LD facility will operate at 15 kW ERP using a “full service” out of channel emission mask. The proposed antenna is a horizontally polarized directional ERI model ALP12L2-HSOC-203 and will be shared with *Gray’s* KMDF-LD (Ch. 22, Fac ID 127009, Midland TX, file# 0000136326). 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 KTLE-LD and that of the licensed facility, 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, and

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 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

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 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 20 percent or less relative field at angles 25 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 $2.1 \mu\text{W}/\text{cm}^2$, which is 0.6 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 change 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

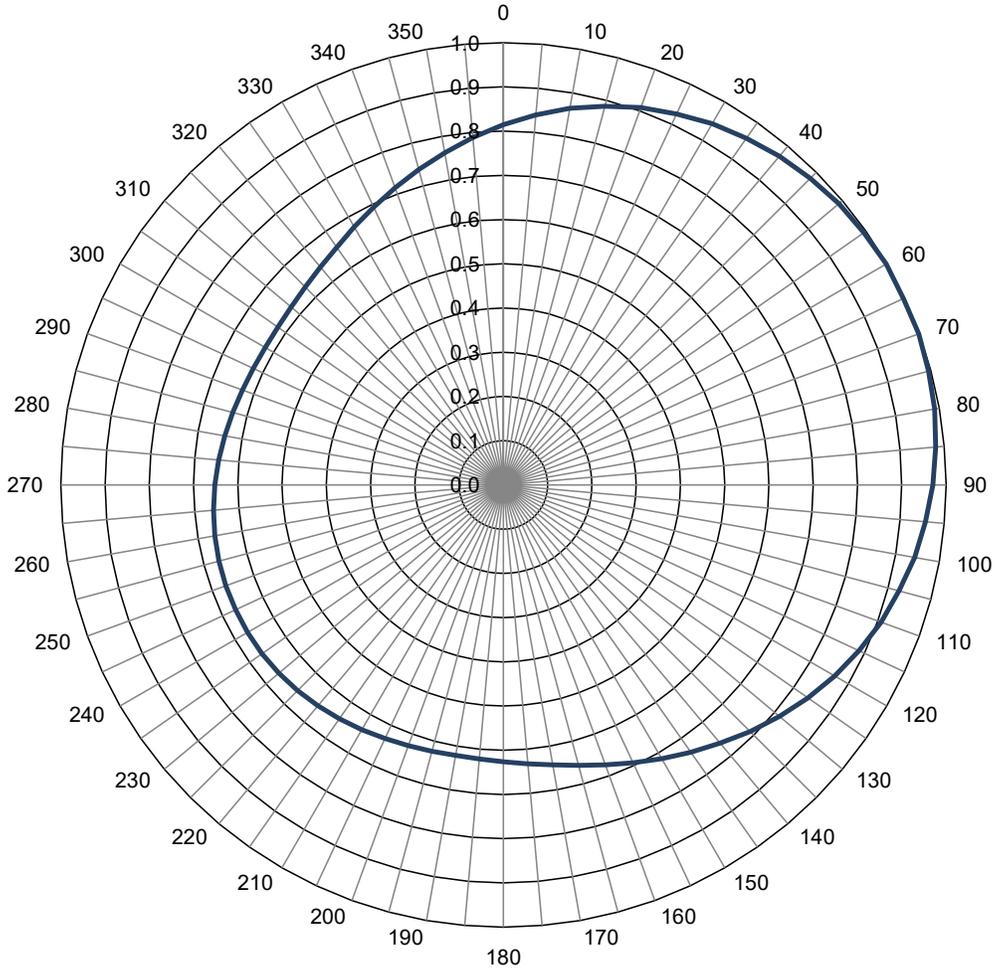
Joseph M. Davis, P.E. April 20, 2021
207 Old Dominion Road Yorktown, VA 23692 703-650-9600

TVStudy show excellent correlation.

Azimuth Pattern

Type:	ALP-OC	Polarization:	Horizontal
Directivity:	1.65 numeric (2.17 dB)	Frequency:	20 (ATSC)
Peak(s) at:		Location:	0
		NOTE: Pattern shape and directivity may vary with channel and mounting configuration.	

Relative Field



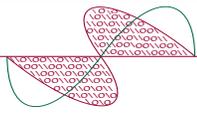
ELECTRONICS RESEARCH, INC. ERI



Figure 1
Antenna Azimuthal Pattern
KTLE-LD Odessa, TX
Facility ID 64993
Ch. 20 15 kW Directional

prepared for
Gray Television Licensee, LLC

April, 2021



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

Figure 2
Coverage Contour Comparison
KTLE-LD Odessa, TX
Facility ID 64993
Ch. 20 15 kW Directional

prepared for
Gray Television Licensee, LLC
April, 2021

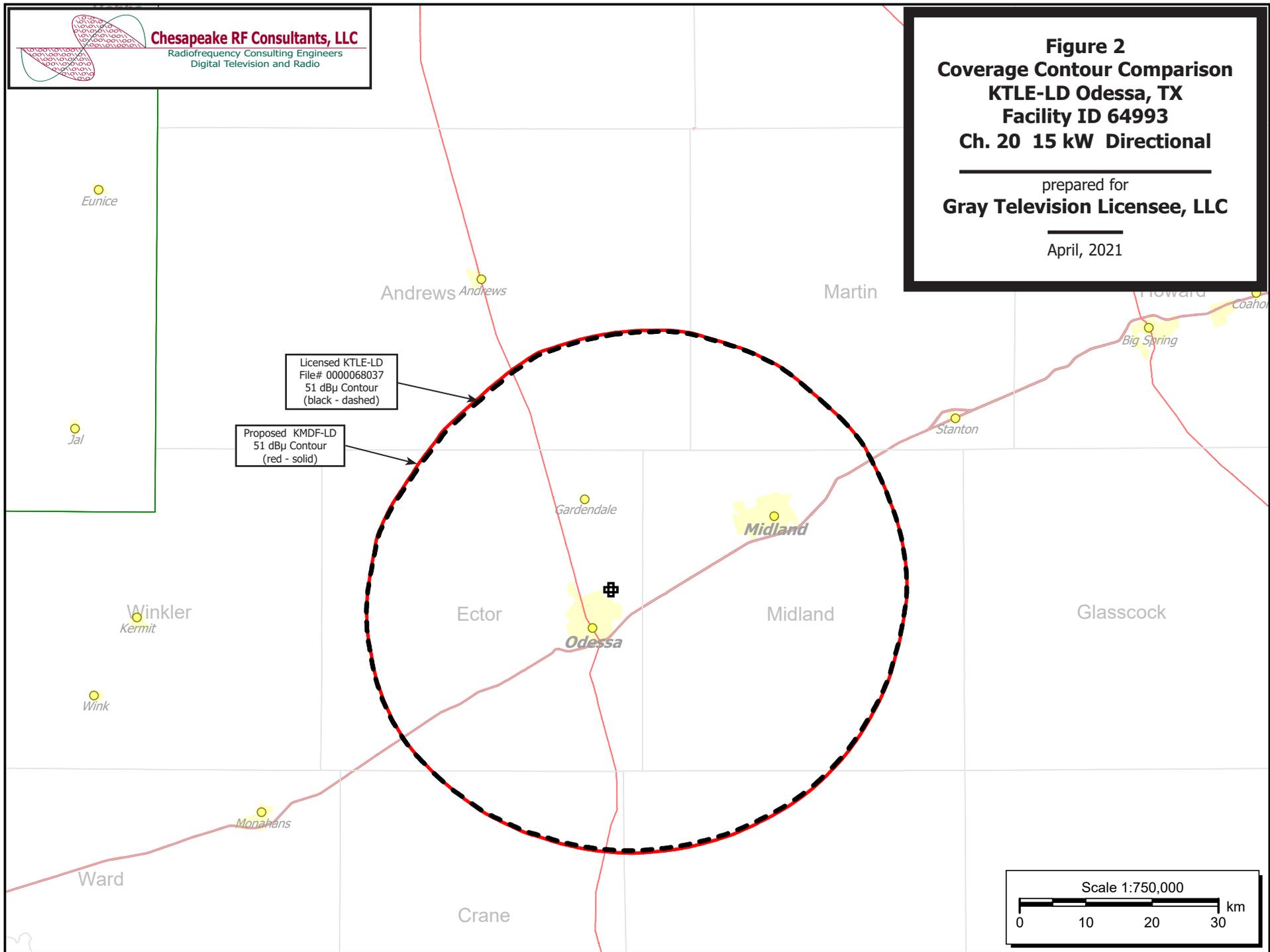


Table 1 KTLE-LD TVStudy Analysis of Proposal
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tvstudy v2.2.5 (4uoc83)
 Database: localhost, Study: KTLE-LD prop mod, Model: Longley-Rice
 Start: 2021.04.19 09:00:34

Study created: 2021.04.19 09:00:34

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

Proposal: KTLE-LD D20 LD APP ODESSA, TX
 File number: KTLE-LD prop mod
 Facility ID: 64993
 Station data: User record
 Record ID: 3606
 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	K19JZ-D	D19	LD	LIC	CARLSBAD, NM	BLDTT20120705ABT	202.0 km
No	K19KT-D	D19	LD	LIC	HOBBS, NM	BLANK0000060808	116.3
No	K19IZ-D	D19	LD	CP	ACKERLY, TX	BNPDTL20100323AIJ	92.1
No	K19JN-D	D19	LD	CP	BALMORHEA, TX	BNPDTL20100416ABF	167.6
No	KLBB-LD	D19	LD	LIC	LUBBOCK, TX	BLANK0000088509	183.6
No	KIDY	D19	DT	LIC	SAN ANGELO, TX	BLCDT20110520ADN	175.5
No	K20KT-D	D20	LD	LIC	DORA, NM	BLDTT20110809ABU	248.5
No	KGDR-LP	D20	LD	CP	RUIDOSO, NM	BLANK0000054750	363.3
No	KVII-TV	D20	DT	APP	AMARILLO, TX	BLANK0000127671	388.8
No	KDAX-LD	D20	LD	CP	AMARILLO, TX	BDCCTL20081215AAW	382.7
No	K20LI-D	D20	LD	CP	BALMORHEA, TX	BNPDTL20100416ABG	167.6
No	KTFN	D20	DT	LIC	EL PASO, TX	BLANK0000068199	391.5
No	NEW	D20	LD	CP	INGRAM, TX	BMJADTL20100524AGO	330.4
No	NEW	D20	LD	CP	LAREDO, TX	BMJADTL20100524AII	310.9
No	DDKFIQ-LP	D20	LD	APP	LUBBOCK, TX	BDISDTL20090630AAZ	186.3
No	K39GH-D	D20	LD	CP	QUANAH, TX	BLANK0000053926	353.4
No	K20LG-D	D20	LD	CP	SONORA, TX	BNPDTL20100329ACJ	220.7
Yes	KTXS-TV	D20	DT	CP	SWEETWATER, TX	BLANK0000035779	217.6
Yes	KTXS-TV	D20	DT	LIC	SWEETWATER, TX	BLCDT20080815ABJ	217.6
No	K21MC-D	D21	LD	CP	HOBBS, NM	BNPDTL20101004ADB	116.3
No	KRWB-TV	D21	DT	LIC	ROSWELL, NM	BLCDT20090619ABH	224.0
No	KDKW-LD	D21	LD	CP	LUBBOCK, TX	BLANK0000058681	189.0
Yes	K21GU	D21z	LD	CP	MIDLAND, TX	BLANK0000071620	30.5
No	K21GU	N21z	TX	LIC	MIDLAND, TX	BLTTL20061107AEL	29.8

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D20
 Mask: Full Service
 Latitude: 31 53 50.30 N (NAD83)
 Longitude: 102 20 15.50 W
 Height AMSL: 988.3 m
 HAAT: 0.0 m
 Peak ERP: 15.0 kW
 Antenna: ALP12L2-HSOC-203 20201228-013r2 0.0 deg
 Elev Pattn: Generic
 Elec Tilt: 0.50

49.4 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	9.94 kW	82.2 m	40.3 km
45.0	14.4	96.7	44.0
90.0	14.1	121.5	46.3
135.0	9.31	121.9	44.3
180.0	5.88	111.6	41.2

Table 1 KTLE-LD TVStudy Analysis of Proposal
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225.0 6.47 96.2 40.0
 270.0 6.38 83.8 38.3
 315.0 6.04 73.7 36.6

Database HAAT does not agree with computed HAAT
 Database HAAT: 0 m Computed HAAT: 98 m

Distance to Canadian border: 1900.8 km

**Proposal is within coordination distance of Mexican border
 Distance to Mexican border: 224.2 km

Conditions at FCC monitoring station: Kingsville TX
 Bearing: 137.9 degrees Distance: 655.8 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
 Bearing: 345.0 degrees Distance: 949.7 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 BLANK0000035779 CP scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance			
	KTXS-TV	D20	DT	CP	SWEETWATER, TX	BLANK0000035779				
Undesireds:	KTLE-LD	D20	LD	APP	ODESSA, TX	KTLE-LD prop mod	217.6 km			
	KIDY	D19	DT	LIC	SAN ANGELO, TX	BLCDT20110520ADN	99.4			
	KVII-TV	D20	DT	APP	AMARILLO, TX	BLANK0000127671	367.7			
	K20DN-D	D20	DC	LIC	WICHITA FALLS, TX	BLANK0000001589	218.4			
	Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX					
	37803.4	262,132	37227.9	258,749	36846.8	254,254	36825.6	254,253	0.06	0.00
Undesired			Total IX	Unique IX, before	Unique IX, after					
KTLE-LD D20 LD APP		35.4	312	21.2	1					
KIDY D19 DT LIC		208.8	4,477	208.8	4,477	198.6	4,166			
KVII-TV D20 DT APP		149.5	14	147.5	14	143.5	14			
K20DN-D D20 DC LIC		24.9	4	22.9	4	22.9	4			

 Interference to BLCDT20080815ABJ LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance			
	KTXS-TV	D20	DT	LIC	SWEETWATER, TX	BLCDT20080815ABJ				
Undesireds:	KTLE-LD	D20	LD	APP	ODESSA, TX	KTLE-LD prop mod	217.6 km			
	KIDY	D19	DT	LIC	SAN ANGELO, TX	BLCDT20110520ADN	99.4			
	KVII-TV	D20	DT	APP	AMARILLO, TX	BLANK0000127671	367.7			
	K20DN-D	D20	DC	LIC	WICHITA FALLS, TX	BLANK0000001589	218.4			
	Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX					
	30338.8	247,618	29994.9	245,759	29871.3	245,748	29865.2	245,733	0.02	0.01
Undesired			Total IX	Unique IX, before	Unique IX, after					
KTLE-LD D20 LD APP		9.1	15	6.0	15					
KIDY D19 DT LIC		64.8	7	61.8	7					
KVII-TV D20 DT APP		43.8	3	42.8	3					
K20DN-D D20 DC LIC		16.0	1	15.0	1					

 Interference to BLANK0000071620 CP scenario 1

Table 1 KTLE-LD TVStudy Analysis of Proposal
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Call	Chan	Svc	Status	City, State	File Number	Distance		
Desired: K21GU	D21z	LD	CP	MIDLAND, TX	BLANK0000071620			
Undesireds: KTLE-LD	D20	LD	APP	ODESSA, TX	KTLE-LD prop mod	30.5 km		
KMDF-LD	D22	LD	LIC	MIDLAND, TX	BLANK0000004506	19.8		
Service area	Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
2937.3 152,652	2935.3	152,612	2760.7	142,157	2760.7	142,157	0.00	0.00
Undesired	Total IX		Unique IX, before		Unique IX, after			
KTLE-LD D20 LD APP	18.2	7,049	174.6	10,455	0.0	0		
KMDF-LD D22 LD LIC	174.6	10,455	174.6	10,455	156.4	3,406		

Interference to BLANK0000071620 CP scenario 2

Call	Chan	Svc	Status	City, State	File Number	Distance		
Desired: K21GU	D21z	LD	CP	MIDLAND, TX	BLANK0000071620			
Undesireds: KTLE-LD	D20	LD	APP	ODESSA, TX	KTLE-LD prop mod	30.5 km		
KMDF-LD	D22	LD	CP	MIDLAND, TX	BLANK0000136326	30.5		
Service area	Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
2937.3 152,652	2935.3	152,612	2917.1	145,563	2917.1	145,563	0.00	0.00
Undesired	Total IX		Unique IX, before		Unique IX, after			
KTLE-LD D20 LD APP	18.2	7,049	0.0	0	0.0	0		
KMDF-LD D22 LD CP	18.2	7,049	18.2	7,049	0.0	0		

Interference to proposal scenario 1

Call	Chan	Svc	Status	City, State	File Number	Distance		
Desired: KTLE-LD	D20	LD	APP	ODESSA, TX	KTLE-LD prop mod			
Undesireds: KTXS-TV	D20	DT	CP	SWEETWATER, TX	BLANK0000035779	217.6 km		
K21GU	D21z	LD	CP	MIDLAND, TX	BLANK0000071620	30.5		
Service area	Terrain-limited		IX-free		Percent IX			
5409.3 272,997	5405.2	272,997	5343.6	272,671	1.14	0.12		
Undesired	Total IX		Unique IX		Prcnt Unique IX			
KTXS-TV D20 DT CP	35.4	0	34.4	0	0.64	0.00		
K21GU D21z LD CP	27.2	326	26.2	326	0.48	0.12		

Interference to proposal scenario 2

Call	Chan	Svc	Status	City, State	File Number	Distance		
Desired: KTLE-LD	D20	LD	APP	ODESSA, TX	KTLE-LD prop mod			
Undesireds: KTXS-TV	D20	DT	CP	SWEETWATER, TX	BLANK0000035779	217.6 km		
Service area	Terrain-limited		IX-free		Percent IX			
5409.3 272,997	5405.2	272,997	5369.8	272,997	0.66	0.00		
Undesired	Total IX		Unique IX		Prcnt Unique IX			
KTXS-TV D20 DT CP	35.4	0	35.4	0	0.66	0.00		

Interference to proposal scenario 3

Call	Chan	Svc	Status	City, State	File Number	Distance		
Desired: KTLE-LD	D20	LD	APP	ODESSA, TX	KTLE-LD prop mod			
Undesireds: K21GU	D21z	LD	CP	MIDLAND, TX	BLANK0000071620	30.5 km		
Service area	Terrain-limited		IX-free		Percent IX			
5409.3 272,997	5405.2	272,997	5378.0	272,671	0.50	0.12		
Undesired	Total IX		Unique IX		Prcnt Unique IX			
K21GU D21z LD CP	27.2	326	27.2	326	0.50	0.12		

Table 1 KTLE-LD TVStudy Analysis of Proposal
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 Interference to proposal scenario 4

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	KTLE-LD	D20	LD	APP	ODESSA, TX	KTLE-LD prop mod	
	Service area		Terrain-limited			IX-free	Percent IX
5409.3	272,997	5405.2	272,997	5405.2	272,997	0.00	0.00

Channel and Facility Information

Section	Question	Response
Facility ID	64993	
State	Texas	
City	ODESSA	
LPD Channel	20	

Antenna Location Data

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1215312
Coordinates (NAD83)	Latitude	31° 53' 50.3" N+
	Longitude	102° 20' 15.5" W-
	Structure Type	MAST-Self-support struct
	Overall Structure Height	112.1 meters
	Support Structure Height	106.7 meters
	Ground Elevation (AMSL)	889.3 meters
Antenna Data	Height of Radiation Center Above Ground Level	99 meters
	Height of Radiation Center Above Mean Sea Level	988.3 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:	ERI
	Model	ALP12L2-HSOC-203
	Rotation	0 degrees
	Electrical Beam Tilt	0.5
	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	Value	Degree	Value	Degree	Value	Degree	Value
0	0.814	90	0.970	180	0.626	270	0.652
10	0.865	100	0.943	190	0.621	280	0.639
20	0.908	110	0.908	200	0.628	290	0.628
30	0.943	120	0.865	210	0.639	300	0.621
40	0.970	130	0.814	220	0.652	310	0.626
50	0.989	140	0.762	230	0.662	320	0.643
60	0.999	150	0.715	240	0.667	330	0.673
70	0.999	160	0.673	250	0.667	340	0.715
80	0.989	170	0.643	260	0.662	350	0.762

Additional Azimuths

Degree	V _A
65	1.