

## **ENGINEERING EXHIBIT**

### **Application for Digital Television Station Construction Permit**

prepared for

#### **Gray Television Licensee, LLC**

KOSA-TV Odessa, TX

Facility ID 6865

Ch. 7 51.7 kW 226 m

*Gray Television Licensee, LLC* (“Gray”) is the licensee of digital television station KOSA-TV, Channel 7, Facility ID 6865, Odessa, TX. KOSA-TV is licensed (file# BLCDT-20090622ACL) to operate with 48 kW effective radiated power (“ERP”) at 226 meters antenna height above average terrain. *Gray* proposes herein to increase the ERP to 51.7 kW. This application is intended to be filed during the temporary lift of the freeze on minor modification applications that expand the coverage contour.<sup>1</sup>

KOSA-TV will continue to employ its presently licensed antenna system which is top-mounted on the tower structure associated with FCC Antenna Structure Registration number 1233693. No change to overall structure height will result from this proposal.

The antenna is an elliptically polarized nondirectional ERI model ATW12V3-ETO-7 (15 percent vertical polarization). The horizontally polarized ERP is 51.7 kW and the vertically polarized ERP is 7.76 kW.

Figure 1 supplies a map that demonstrates compliance with §73.625(a)(1) regarding coverage of the entire principal community. The proposed facility’s predicted population exceeds 95 percent of the Incentive Auction<sup>2</sup> baseline facility population.

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<sup>1</sup>Public Notice “Media Bureau Temporarily Lifts the Freeze on the Filing of Minor Modification Applications that Expand the Contour of Full Power and Class A Television Stations from November 28 through December 7, 2017” DA 17-1086, released November 6, 2017.

<sup>2</sup>*Incentive Auction Closing and Channel Reassignment Public Notice*, DA 17-317, released April 13, 2017.

Interference study per FCC OET Bulletin 69<sup>3</sup> shows that the proposal complies with the 0.5 percent limit of new interference caused to pertinent nearby post-auction full service and Class A television stations and reassignments as required by §73.616. The interference study output report is provided as Table 1. TVStudy analysis also shows that the proposed power increase would not cause impermissible interference to any pre-auction facility that was reassigned or relinquished in the incentive auction.

The site location is within the Mexican coordination zone (222 km to the Mexico border). According to TVStudy analysis including non-US records from current FCC LMS data, no Mexican stations or allotments on relevant channels are located within the pertinent culling distances for interference analysis consideration.

The nearest FCC monitoring station is 669 km distant at Kingsville, TX. This exceeds by a large margin the threshold minimum distance specified in §73.1030(c)(3) that would suggest consideration of the monitoring station. The site is not located within the areas requiring coordination with “quiet” zones specified in §73.1030(a) and (b). There are no authorized AM stations within 3 kilometers of the site.

### **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. Based on OET-65 equation (10), and considering 10 percent antenna relative field in downward elevations (pattern data shows 10 percent relative field or less at angles 25 to 90 degrees below the antenna), the calculated signal density near the tower at two meters above ground level attributable to the proposed facility is  $0.5 \mu\text{W}/\text{cm}^2$ , which is 0.2 percent of the general population/uncontrolled maximum permitted 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

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<sup>3</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, 2 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.

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	Proposed Coverage Contours
Table 1	OET Bulletin 69 Interference Study
Form 2100	Saved Version of Engineering Sections from FCC Form at Time of Upload

**Chesapeake RF Consultants, LLC**

Joseph M. Davis, P.E.	December 6, 2017	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600

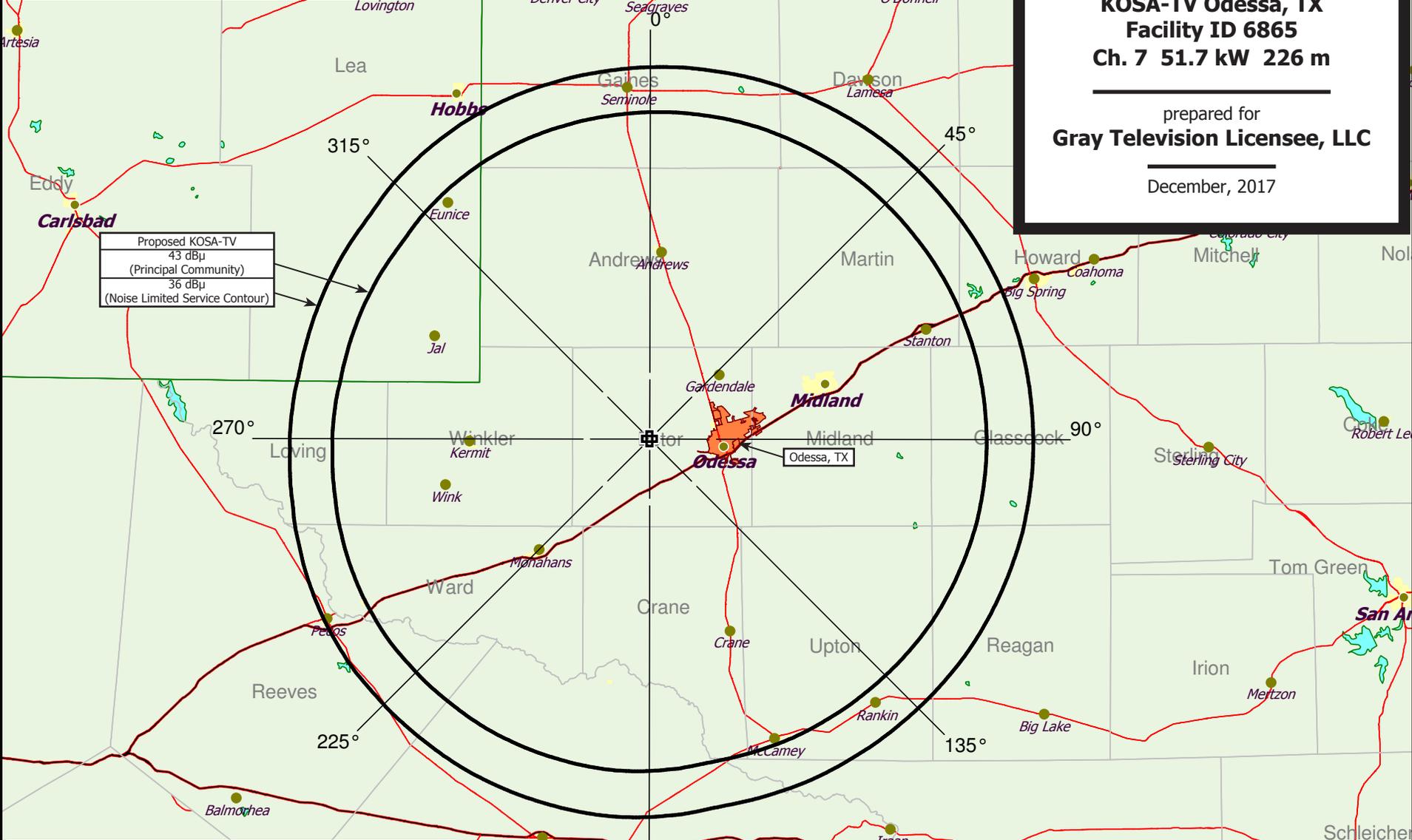
**Figure 1**  
**Proposed Coverage Contours**  
**KOSA-TV Odessa, TX**  
**Facility ID 6865**  
**Ch. 7 51.7 kW 226 m**

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prepared for  
**Gray Television Licensee, LLC**

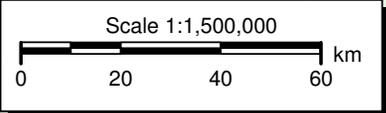
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December, 2017



Proposed KOSA-TV  
 43 dBµV  
 (Principal Community)  
 36 dBµV  
 (Noise Limited Service Contour)

Proposed Digital Coverage	Area (sq. km)	Population (2010 Census)
Within Noise Limited Service Contour	31,964.8	342,482
OET Bulletin 69: TVStudy		
Within noise limited contour	31,971.3	341,616
Not affected by terrain losses	31,559.7	338,708
Lost to all interference	0.0	0
Net Interference-Free Service	31,559.7	338,708



**Table 1 KOSA-TV OET Bulletin 69 Interference Study**  
(page 1 of 2)



tvstudy v2.2.4 (Z2Qqz3)  
Database: localhost, Study: KOSA-TV Prop 51.7, Model: Longley-Rice  
Start: 2017.12.06 13:37:22

Study created: 2017.12.06 13:37:22

Study build station data: LMS TV 2017-12-06 LMSTV

Proposal: KOSA-TV D7 DT APP ODESSA, TX  
File number: KOSA-TV Prop 51.7  
Facility ID: 6865  
Station data: User record  
Record ID: 266  
Country: U.S.  
Zone: II

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
Yes	KVII-TV	D7	DT	LIC	AMARILLO, TX	BLCDT20090612AHC	395.5 km
Yes	KVII-TV	D7	DT	APP	AMARILLO, TX	BLANK0000035799	395.5
No	KOBR	D8	DT	LIC	ROSWELL, NM	BLCDT20090619AAX	201.7

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D7  
Latitude: 31 51 50.80 N (NAD83)  
Longitude: 102 34 42.50 W  
Height AMSL: 1164.4 m  
HAAT: 225.5 m  
Peak ERP: 51.7 kW  
Antenna: Omnidirectional  
Elev Pattn: Generic  
Elec Tilt: 0.75

36.0 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	51.7 kW	217.4 m	100.3 km
45.0	51.7	240.9	102.4
90.0	51.7	260.1	103.6
135.0	51.7	243.4	102.6
180.0	51.7	235.3	102.0
225.0	51.7	228.7	101.4
270.0	51.7	186.2	97.1
315.0	51.7	191.6	97.7

Database HAAT does not agree with computed HAAT  
Database HAAT: 226 m Computed HAAT: 225 m

Distance to Canadian border: 1904.5 km

\*\*Proposal is within coordination distance of Mexican border  
Distance to Mexican border: 222.0 km

Conditions at FCC monitoring station: Kingsville TX  
Bearing: 136.1 degrees Distance: 668.6 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:  
Bearing: 346.2 degrees Distance: 947.7 km

Study cell size: 2.00 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%

**Table 1 KOSA-TV OET Bulletin 69 Interference Study**  
 (page 2 of 2)



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 Interference to BLCDT20090612AHC LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KVII-TV	D7	DT	LIC	AMARILLO, TX	BLCDT20090612AHC	
Undesireds:	KOSA-TV	D7	DT	BL	ODESSA, TX	DTVBL6865	395.5 km
	KOSA-TV	D7	DT	APP	ODESSA, TX	KOSA-TV Prop 51.7	395.5
	KOCO-TV	D7	DT	LIC	OKLAHOMA CITY, OK	BLCDT20100615ACT	398.1
	Service area		Terrain-limited		IX-free, before	IX-free, after	Percent New IX
	41188.9	379,042	39760.6	378,218	39632.4	378,177	39620.4 378,172 0.03 0.00
Undesired			Total IX		Unique IX, before	Unique IX, after	
KOSA-TV D7 DT BL		55.8	25	55.8	25		
KOSA-TV D7 DT APP		67.8	30			67.8	30
KOCO-TV D7 DT LIC		72.4	16	72.4	16	72.4	16

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 Interference to BLANK0000035799 APP scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KVII-TV	D7	DT	APP	AMARILLO, TX	BLANK0000035799	
Undesireds:	KOSA-TV	D7	DT	BL	ODESSA, TX	DTVBL6865	395.5 km
	KOSA-TV	D7	DT	APP	ODESSA, TX	KOSA-TV Prop 51.7	395.5
	KOAT-TV	D7	DT	LIC	ALBUQUERQUE, NM	BLCDT20090617ABU	414.8
	KOCO-TV	D7	DT	LIC	OKLAHOMA CITY, OK	BLCDT20100615ACT	398.1
	Service area		Terrain-limited		IX-free, before	IX-free, after	Percent New IX
	46367.0	383,815	44764.5	382,840	44472.1	382,170	44456.1 382,156 0.04 0.00
Undesired			Total IX		Unique IX, before	Unique IX, after	
KOSA-TV D7 DT BL		135.6	609	135.6	609		
KOSA-TV D7 DT APP		151.6	623			151.6	623
KOAT-TV D7 DT LIC		4.0	0	4.0	0	4.0	0
KOCO-TV D7 DT LIC		152.8	61	152.8	61	152.8	61

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 Interference to proposal scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KOSA-TV	D7	DT	APP	ODESSA, TX	KOSA-TV Prop 51.7	
Undesireds:	KVII-TV	D7	DT	LIC	AMARILLO, TX	BLCDT20090612AHC	395.5 km
	Service area		Terrain-limited		IX-free	Percent IX	
	31971.3	341,616	31559.7	338,708	31559.7	338,708	0.00 0.00

**Channel and Facility Information**

Section	Question	Response
<b>Proposed Community of License</b>	Facility ID	6865
	State	Texas
	City	ODESSA
	DTV Channel	7
<b>Facility Type</b>	Facility Type	Commercial
	Station Type	Main
<b>Zone</b>	Zone	2

**Antenna Location Data**

Section	Question	Response
<b>Antenna Structure Registration</b>	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1233693
<b>Coordinates (NAD83)</b>	Latitude	31° 51' 50.8" N+
	Longitude	102° 34' 42.5" W-
	Structure Type	TOWER-A free standing or guyed struct
	Overall Structure Height	222.5 meters
	Support Structure Height	198.3 meters
	Ground Elevation (AMSL)	955.6 meters
<b>Antenna Data</b>	Height of Radiation Center Above Ground Level	208.8 meters
	Height of Radiation Center Above Average Terrain	225.5 meters
	Height of Radiation Center Above Mean Sea Level	1164.4 meters
	Effective Radiated Power	51.7 kW

**Antenna  
Technical Data**

Section	Question	Response
<b>Antenna Type</b>	Antenna Type	Non-Directional
	Do you have an Antenna ID?	
	Antenna ID	
<b>Antenna Manufacturer and Model</b>	Manufacturer:	ERI
	Model	ATW12V3-ETO-7
	Rotation	
	Electrical Beam Tilt	0.75
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Elliptical
<b>DTV and DTS: Elevation 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	

**Construction  
Permit  
Certifications**

Section	Question	Response
<b>Post-Incentive Auction Expedited Processing</b>	It will operate on the DTV channel for this station as established in the post-incentive auction channel reassignment public notice.	Yes
	It will operate post-incentive auction facilities that do not expand the noise-limited service contour in any direction beyond that established by the post-incentive auction channel reassignment public notice.	No
	It will operate post-incentive auction facilities that match or reduce by no more than five percent with respect to predicted population from those defined in the post-incentive auction channel reassignment public notice.	Yes
	The antenna structure to be used by this facility has been registered by the Commission and will not require re-registration to support the proposed antenna, OR the FAA has previously determined that the proposed structure will not adversely affect safety in air navigation and this structure qualifies for later registration under the Commission's phased registration plan, OR the proposed installation on this structure does not require notification to the FAA pursuant to 47 C.F.R. Section 17.7.	Yes
<b>Environmental Effect</b>	Would a Commission grant of Authorization for this location be an action which may have a significant environmental effect? (See Section 1.1306 of 47 C.F.R.)	No
<b>Broadcast Facility</b>	The proposed facility complies with the applicable engineering standards and assignment requirements of 47 C.F.R. Sections 73.616, 73.622(j), 73.623(e), 73.625, 73.1030, and 73.1125.	Yes