ENGINEERING EXHIBIT

Incentive Auction Channel Reassignment

Application for Digital Television Station Construction Permit

prepared for

Woods Communications Corporation
KLCW-TV Wolfforth, TX
Facility ID 77719
Ch. 23 127 kW 282 m

Woods Communications Corporation ("Woods") is the licensee of digital television station KLCW-TV, Channel 43, Facility ID 77719, Wolfforth, TX. *Woods* herein proposes construction of the KLCW-TV post-auction facility on Channel 23. Reassignment of KLCW-TV from Channel 43 to Channel 23 was specified in the *Incentive Auction Closing and Channel Reassignment Public Notice* (*"CCRPN"*, DA 17-317, released April 13, 2017).

KLCW-TV presently shares an antenna with KJTV-TV (Fac ID 55031, Ch. 35, Lubbock TX). The proposed KLCW-TV Channel 23 operation will employ a new directional broadband antenna system to be top-mounted on the KLCW-TV tower that will also be shared with KJTV-TV. The antenna's center of radiation height above ground will increase by 4.3 meters. *Woods* proposes to operate KLCW-TV with an effective radiated power ("ERP") of 127 kW at 282 meters antenna height above average terrain ("HAAT").

The existing tower structure corresponds to FCC Antenna Structure Registration ("ASR") number 1248244. The proposed reconfiguration of the top of the tower will result in an increase of the structure's overall height by 7.6 meters to 297.2 meters above ground level. The FAA will be notified of the proposed height increase and, upon receipt of an FAA Determination of No Hazard, an application to modify the FCC ASR will be submitted. At that time an amendment will be supplied to this application to supply the ASR number.[1]

[1]As discussed with FCC staff, the ASR number is omitted on the accompanying Form 2100 because the LMS electronic filing system automatically pre-fills the overall structure height from ASR data, which presently is set to the existing height of 289.6 meters AGL. By omitting the ASR number, the proposed overall height can be

The proposed antenna is a horizontally polarized directional RFS model PHPR64U3313. The directional antenna's azimuthal pattern is supplied in Figure 1 and the elevation pattern is depicted in Figure 2. The directional antenna will be rotated 270 degrees from the plot of Figure 1.

A map is supplied as Figure 3 which depicts the standard predicted coverage contours. This map includes the location of Wolfforth, KLCW-TV's principal community. As demonstrated thereon, the proposed facility complies with §73.625(a)(1) as the entire principal community will be encompassed by the 48 dBμ contour.

The proposed noise limited service contour ("NLSC") extends beyond that of the *CCRPN* parameters of 119 kW ERP and 280 meters HAAT.[2] The proposal complies with §73.3700(b)(ii) as described in the following.

The *CCRPN* facility specifies a nondirectional antenna pattern corresponding to KLCW-TV's licensed Channel 43. The proposed replacement antenna for KLCW-TV's Channel 23 antenna has a wide cardioid directional pattern, having a region of mildly reduced power to the east (where population density is minimal). The use of a directional antenna results in variations of coverage contour location from the reassignment facility. Therefore, KLCW-TV qualifies under §73.3700(b)(ii)(A) for a contour extension due to the loss of coverage area that would otherwise result from implementation of the new channel assignment.

Interference study per FCC OET Bulletin 69[3] shows that the proposal complies with the 0.5 percent limit of new interference caused to pertinent nearby post-auction full service and

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entered on the form.

[2]The antenna height above ground will increase by 4.3 meters. The proposed KLCW-TV antenna HAAT is recalculated to be 282.1 meters, based on FCC 30 meter terrain data developed by OET.

[3]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 FCCs implementation of TVStudy show excellent correlation.

Class A television stations and reassignments as required by §73.616. The interference study output report is provided as Table 1. This satisfies §73.3700(b)(ii)(C) for the proposed NLSC extension.

The amount of NLSC extension does not exceed one percent in any direction. Figure 4 supplies a coverage contour comparison of the proposed KLCW-TV facility to the reassignment facility's contour and a one percent extension distance of the reassignment facility's contour. Here, the contour level is adjusted with the dipole factor to match FCC application processing. Table 1's results also demonstrate that the proposed contour is within the baseline contour plus one percent. Therefore the proposed contour extension complies with §73.3700(b)(ii)(B).

The proposed KLCW-TV facility's terrain-limited population provides a 99.1 percent match of the *CCRPN* baseline facility, as detailed in the following table. The OET Bulletin 69 report summary in Table 1 also concludes that the proposed service area population is more than 95 percent of the baseline population.

Terrain Limited Population - Match of Reassignment

Population Summary (2010 Census) OET Bulletin 69: TVStudy	Reassignment Parameters	 Proposed
Within Noise Limited Contour	376,442	373,200
Not affected by terrain losses	376,435	373,182
Match of Reassignment	---	**99.14%**

The nearest FCC monitoring station is 764 km distant at Douglas, AZ. 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). The site location is beyond the border areas requiring international coordination. 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 15 percent antenna relative field in downward elevations (pattern data shows

less than 15 percent relative field at angles 10 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 1.2 $\mu W/cm^2$, which is 0.3 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.

List of Attachments

Figure 1	Antenna Azimuthal Pattern
Figure 2	Antenna Elevation Pattern
Figure 3	Proposed Coverage Contours
Figure 4	Proposed Contour Expansion
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. July 9, 2017
207 Old Dominion Road Yorktown, VA 23692 703-650-9600

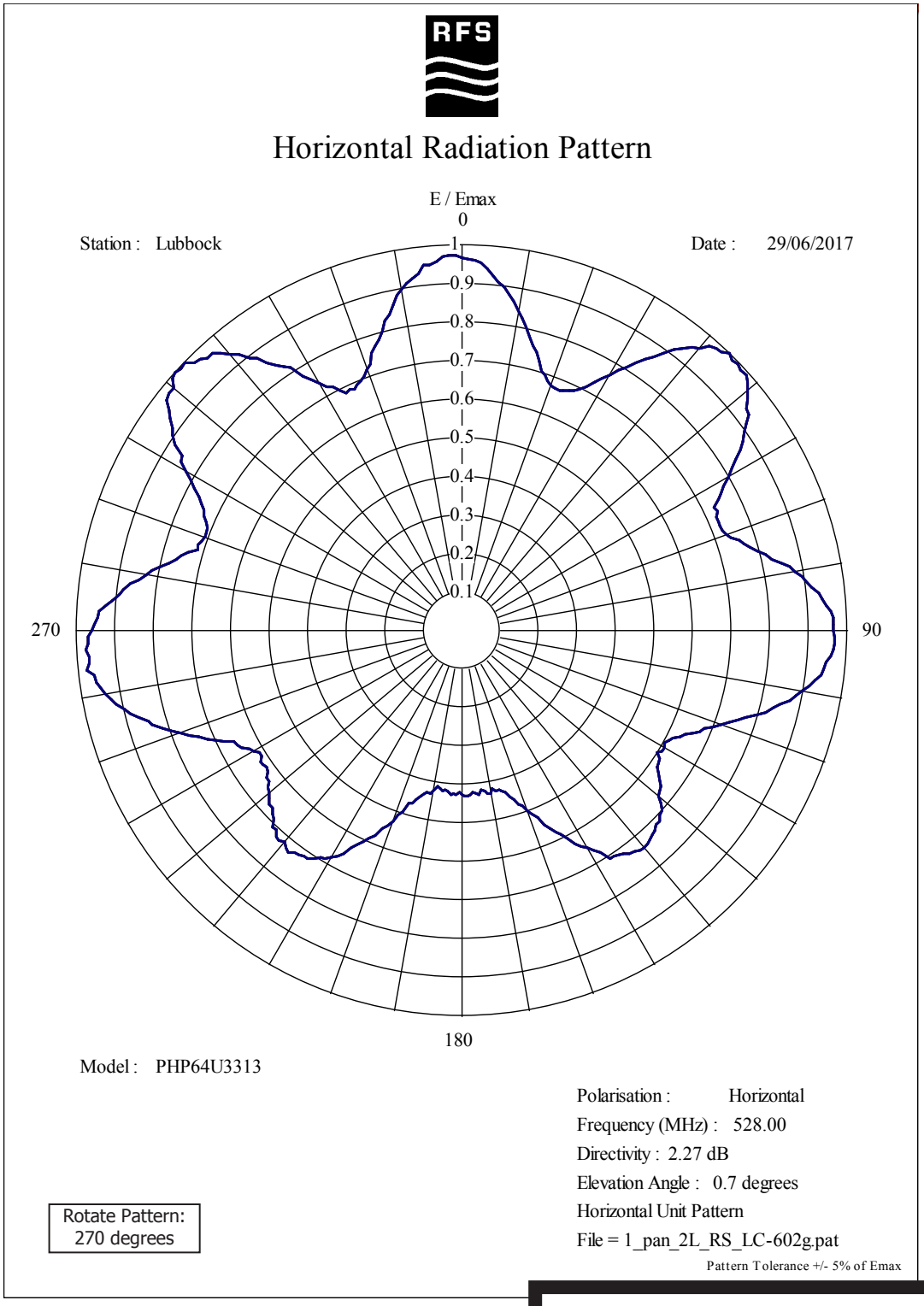


Figure 1
Antenna Azimuthal Pattern
KLCW-TV Wolfforth, TX
Facility ID 77719
Ch. 23 127 kW 282 m

prepared for
Woods Communications Corporation

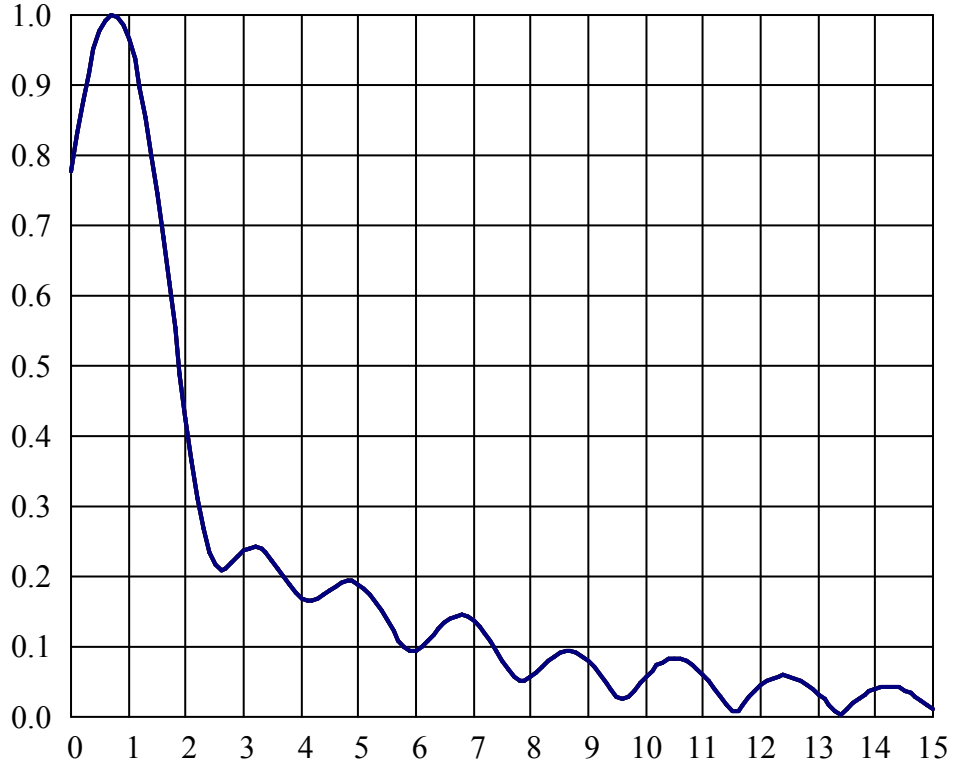
July, 2017

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

RADIO FREQUENCY SYSTEMS
The Clear Choice®

E / Emax

Vertical Radiation Pattern



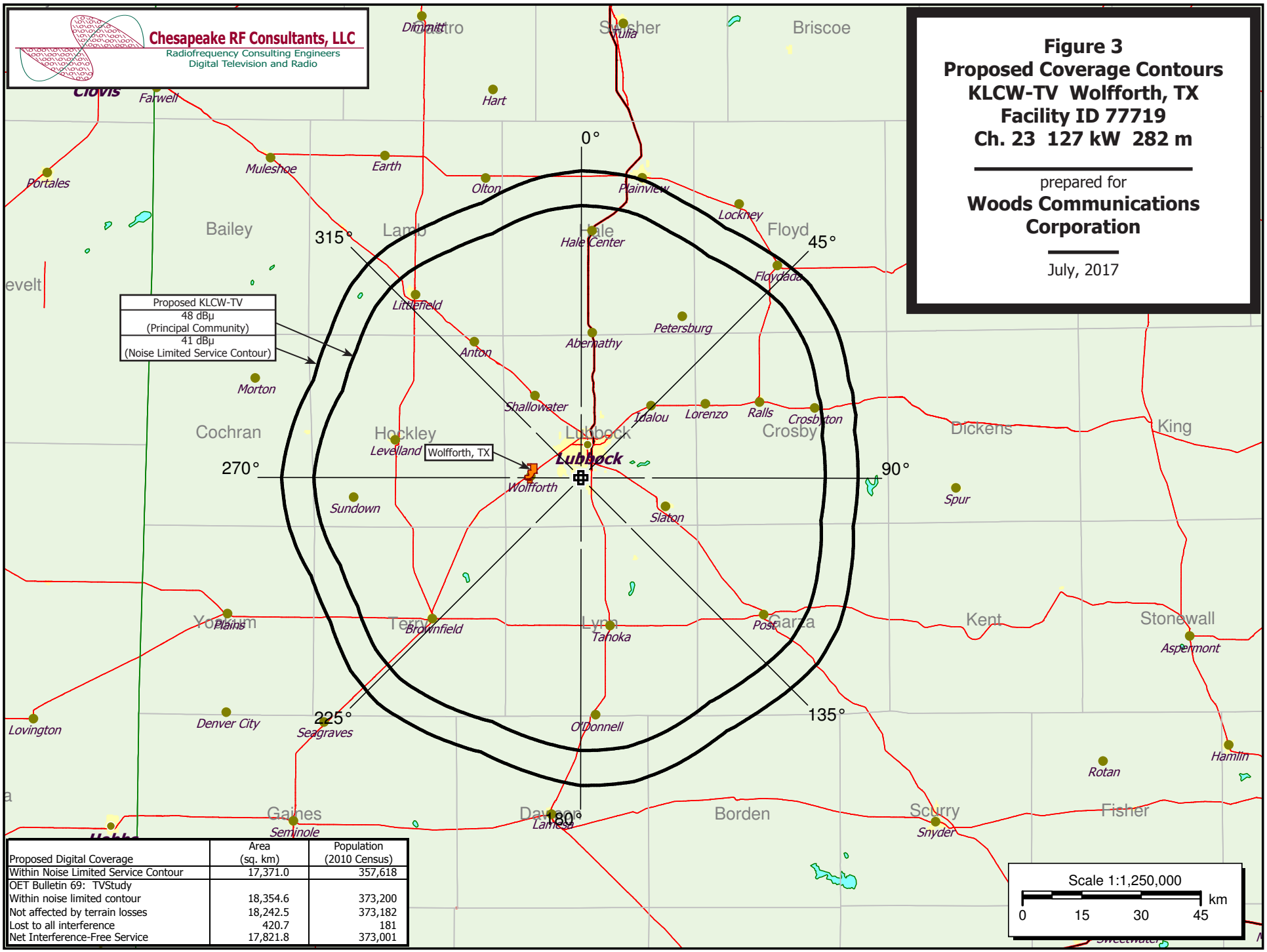
Date : 29/06/2017
Station : Lubbock
Model : PHP64U3313
Frequency (MHz) : 528.00
Directivity : 15.07 dBd
Tilt : 0.7 degrees
Azimuth Angle : 312 degrees
Vertical Unit Pattern : PHP4S-602.vup

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

Figure 2
Antenna Elevation Pattern
KLCW-TV Wolfforth, TX
Facility ID 77719
Ch. 23 127 kW 282 m

prepared for
Woods Communications Corporation

July, 2017



Proposed Digital Coverage	Area (sq. km)	Population (2010 Census)
Within Noise Limited Service Contour	17,371.0	357,618
OET Bulletin 69: TVStudy		
Within noise limited contour	18,354.6	373,200
Not affected by terrain losses	18,242.5	373,182
Lost to all interference	420.7	181
Net Interference-Free Service	17,821.8	373,001

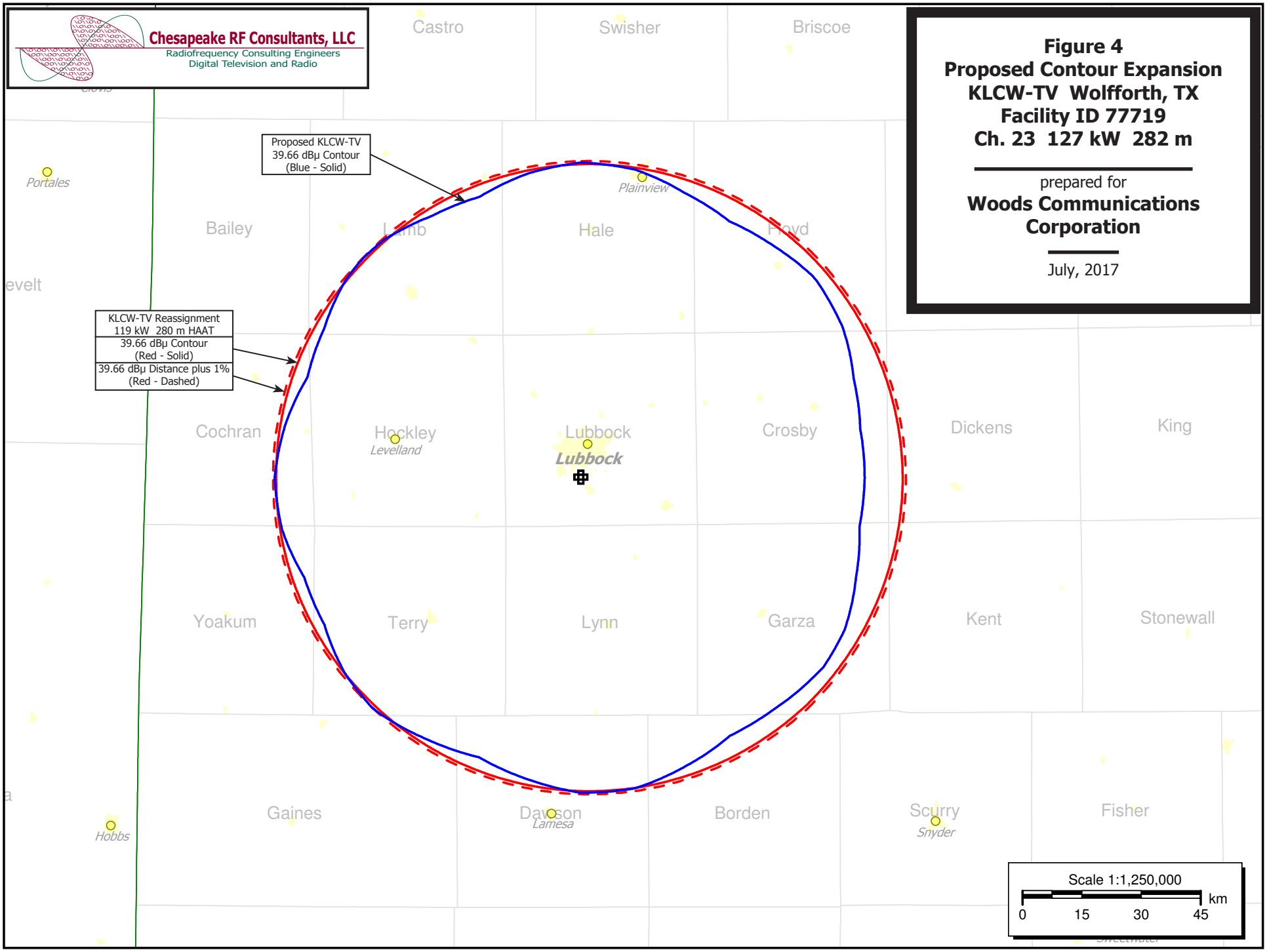

Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio
Figure 4
Proposed Contour Expansion
KLCW-TV Wolfforth, TX
Facility ID 77719
Ch. 23 127 kW 282 m
prepared for
Woods Communications Corporation
July, 2017
Proposed KLCW-TV
39.66 dBµ Contour
(Blue - Solid)
KLCW-TV Reassignment
119 kW 280 m HAAT
39.66 dBµ Contour
(Red - Solid)
39.66 dBµ Distance plus 1%
(Red - Dashed)
Castro
Swisher
Briscoe
Portales
Plainview
Bailey
Lamb
Hale
Floyd
Cochran
Hockley
Levelland
Lubbock
Lubbock
Crosby
Dickens
King
Yoakum
Terry
Lynn
Garza
Kent
Stonewall
Gaines
Hobbs
Dawson
Lamesa
Borden
Scurry
Snyder
Fisher
Scale 1:1,250,000
0 15 30 45 km

Table 1 KLCW-TV OET Bulletin 69 Interference Study
(page 1 of 2)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tvstudy v2.2.2
Database: localhost,  Study: KLCW-TV 127KW 270DEG,  Model: Longley-Rice
Start: 2017.07.09 10:55:07

Study created: 2017.07.09 10:55:00

Study build station data: LMS TV 2017-07-08 LMSTV

    Proposal: KLCW-TV D23 DT APP WOLFFORTH, TX
 File number: KLCW-TV 127KW 270DEG
 Facility ID: 77719
Station data: User record
   Record ID: 817
     Country: U.S.
        Zone: II

Stations potentially affected:

Call      Chan  Svc Status  City, State              File Number            Distance
KPEJ-TV   D23   DT  LIC     ODESSA, TX               BLCDT20060629AGO       160.9 km
KXTQ-CD   D24   DC  BL      LUBBOCK, TX              DTVBL55055               0.0

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

    Channel: D23
   Latitude:  33 30  8.30 N (NAD83)
  Longitude: 101 52 21.30 W
Height AMSL: 1263.7 m
       HAAT: 282.1 m
   Peak ERP: 127 kW
    Antenna: RFS PHPR64U3313 Ch-23 20170705 270.0 deg

39.7 dBu contour:
Azimuth      ERP       HAAT   Distance
  0.0 deg    118 kW   282.3 m   79.5 km
 45.0       62.7      295.1     77.0
 90.0       22.9      300.8     71.8
135.0       59.4      298.4     77.0
180.0        117      283.8     79.6
225.0        121      268.6     78.4
270.0        119      261.9     77.7
315.0        124      265.8     78.3

Proposal service area is within baseline plus 1.0%
Proposal service area population is more than 95.0% of baseline

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: 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%
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Table 1 KLCW-TV OET Bulletin 69 Interference Study
(page 2 of 2)

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

Interference to BLCDT20060629AGO LIC, scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KPEJ-TV	D23	DT	LIC	ODESSA, TX	BLCDT20060629AGO	
Undesireds:	KLCW-TV	D23	DT	BL	WOLFFORTH, TX	DTVBL77719	160.9 km
	KLCW-TV	D23	DT	APP	WOLFFORTH, TX	KLCW-TV 127KW 270DEG	160.9
	KXTQ-CD	D24	DC	BL	LUBBOCK, TX	DTVBL55055	160.9

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
26771.9	368,212	26660.2	368,208	26232.1	366,435	26351.8	366,445	-0.46	-0.00

Undesired	Total IX		Unique IX, before		Unique IX, after	
KLCW-TV D23 DT BL	428.1	1,773	428.1	1,773		
KLCW-TV D23 DT APP	308.4	1,763			308.4	1,763

Interference to DTVBL55055 BL, scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KXTQ-CD	D24	DC	BL	LUBBOCK, TX	DTVBL55055	
Undesireds:	KLCW-TV	D23	DT	BL	WOLFFORTH, TX	DTVBL77719	0.0 km
	KLCW-TV	D23	DT	APP	WOLFFORTH, TX	KLCW-TV 127KW 270DEG	0.0
	K24HH-D	D24	DC	LIC	WICHITA FALLS, TX	BLDTL20101026ABY	309.5
	KTTZ-TV	D25	DT	APP	LUBBOCK, TX	BLANK0000026301	9.0

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
8057.0	313,632	8025.2	313,632	8017.2	313,628	8017.2	313,628	0.00	0.00

Undesired	Total IX		Unique IX, before		Unique IX, after	
KLCW-TV D23 DT BL	4.0	0	4.0	0		
KLCW-TV D23 DT APP	4.0	0			4.0	0
KTTZ-TV D25 DT APP	4.0	4	4.0	4	4.0	4

Interference to DTVBL55055 BL, scenario 2

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KXTQ-CD	D24	DC	BL	LUBBOCK, TX	DTVBL55055	
Undesireds:	KLCW-TV	D23	DT	BL	WOLFFORTH, TX	DTVBL77719	0.0 km
	KLCW-TV	D23	DT	APP	WOLFFORTH, TX	KLCW-TV 127KW 270DEG	0.0
	K24HH-D	D24	DC	LIC	WICHITA FALLS, TX	BLDTL20101026ABY	309.5
	KTTZ-TV	D25	DT	BL	LUBBOCK, TX	DTVBL65355	9.0

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
8057.0	313,632	8025.2	313,632	8005.1	313,339	8005.1	313,339	0.00	0.00

Undesired	Total IX		Unique IX, before		Unique IX, after	
KLCW-TV D23 DT BL	4.0	0	4.0	0		
KLCW-TV D23 DT APP	4.0	0			4.0	0
KTTZ-TV D25 DT BL	16.1	293	16.1	293	16.1	293

Interference to proposal, scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KLCW-TV	D23	DT	APP	WOLFFORTH, TX	KLCW-TV 127KW 270DEG	
Undesireds:	KPEJ-TV	D23	DT	LIC	ODESSA, TX	BLCDT20060629AGO	160.9 km
	KXTQ-CD	D24	DC	BL	LUBBOCK, TX	DTVBL55055	0.0

Service area		Terrain-limited		IX-free		Percent IX	
18354.6	373,200	18242.5	373,182	17821.8	373,001	2.31	0.05

Undesired	Total IX		Unique IX		Prcnt Unique IX	
KPEJ-TV D23 DT LIC	420.6	181	420.6	181	2.31	0.05

Channel and Facility Information

Section	Question	Response
Proposed Community of License	Facility ID	77719
	State	Texas
	City	WOLFFORTH
	DTV Channel	23
Facility Type	Facility Type	Commercial
	Station Type	Main
Zone	Zone	2

Antenna Location Data

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	No
	ASR Number	
Coordinates (NAD83)	Latitude	33° 30' 08.3" N+
	Longitude	101° 52' 21.3" W-
	Structure Type	TOWER-A free standing or guyed struct
	Overall Structure Height	297.2 meters
	Support Structure Height	276.9 meters
	Ground Elevation (AMSL)	977.5 meters
Antenna Data	Height of Radiation Center Above Ground Level	286.2 meters
	Height of Radiation Center Above Average Terrain	282.1 meters
	Height of Radiation Center Above Mean Sea Level	1263.7 meters
	Effective Radiated Power	127 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	PHPR64U3313
	Rotation	270 degrees
	Electrical Beam Tilt	0.7
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Horizontal
DTV and DTS: Elevation 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	

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	0.967	**90**	0.963	**180**	0.425	**270**	0.961
10	0.841	**100**	0.896	**190**	0.418	**280**	0.832
20	0.676	**110**	0.716	**200**	0.525	**290**	0.709
30	0.767	**120**	0.605	**210**	0.679	**300**	0.828
40	0.956	**130**	0.664	**220**	0.714	**310**	0.977
50	0.968	**140**	0.733	**230**	0.654	**320**	0.935
60	0.797	**150**	0.651	**240**	0.624	**330**	0.739
70	0.727	**160**	0.500	**250**	0.773	**340**	0.719
80	0.876	**170**	0.427	**260**	0.939	**350**	0.898

Additional Azimuths

Degree	V_A
45	0.990
312	1.000
218	0.730
139	0.734

Construction Permit Certifications

Section	Question	Response
Post-Incentive Auction Expedited Processing	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.	No
Environmental Effect	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
Broadcast Facility	The proposed facility complies with the applicable engineering standards and assignment requirements of 47 C. F.R. Sections 73.616, 73.622(i), 73.623(e), 73.625, 73.1030, and 73.1125.	Yes