

## **ENGINEERING EXHIBIT**

### **Digital Replacement Translator Television Station Application for Minor Modification of Licensed Facility**

prepared for

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

KOLD-TV DRT Tucson, AZ

Facility ID 48663

Ch. 13 1 kW Nondirectional

*Gray Television Licensee, LLC* (“*Gray*”) is the licensee of television station KOLD-TV, Channel 32, Tucson AZ, Facility ID 48663. KOLD-TV’s operation includes an Analog-to-Digital Replacement Translator (“DRT”) facility on Channel 13 (BLCDT-20110111ACC) to aid in serving its principal community of Tucson and other nearby communities. *Gray* herein proposes a minor modification of the DRT facility to increase power. The DRT is licensed to operate at 0.3 kW effective radiated power (“ERP”) nondirectional. An increase to 1 kW ERP is proposed, with no change to the antenna, location, or height.

The proposed power increase will enhance the DRT facility’s ability to provide service to areas that were lost at the transition to digital. The KOLD-TV post-transition Channel 32 digital television site is at Mount Bigelow, which is 42.1 km (26.2 miles) distant from the KOLD-TV former analog Channel 13 site location at Tucson Mountain (see Figure 1). The distance and intervening terrain between these sites result in shadowing of the main KOLD-TV Channel 32 facility in the northern suburbs of Tucson. Since the DRT operates on a VHF channel, the proposed power increase will aid in overcoming manmade noise and building penetration factors that currently hamper indoor reception.

The DRT tower structure is associated with FCC Antenna Structure Registration (“ASR”) number 1218220. The DRT will continue to employ the antenna utilized by KOLD-TV’s former analog Channel 13 facility. Minor corrections to the geographic coordinates (0.4 seconds Latitude, 1.6 seconds Longitude) and ground elevation (increase of 9.1 meters) are made to match ASR site data.

Figure 1 depicts the 48 dB $\mu$  coverage contour of the proposed DRT facility as well as that of the licensed DRT. The service area overlap demonstrates compliance with §74.787(b) for a minor change. The proposed DRT coverage contour does not extend beyond KOLD-TV's former analog Grade B contour (BLCT-19910423KE), in compliance under the prior version of §74.787(a)(5) that underlies the establishment of Analog-to-Digital Replacement Translators.

Interference study per OET Bulletin 69<sup>1</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 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 considering 20 percent antenna relative field in downward elevations, 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 0.6  $\mu$ W/cm<sup>2</sup>, which is 0.3 percent of the general population / uncontrolled maximum permissible 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

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<sup>1</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 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.

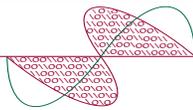
exhibit is limited to the evaluation of exposure to RF electromagnetic field. No increase in structure height is proposed.

*List of Attachments*

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

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

**Figure 1**  
**Coverage Contour Comparison**  
**Proposed DRT Modification**  
**KOLD-TV DRT Tucson, AZ**  
**Facility ID 48663**  
**Ch. 13 1 kW Nondirectional**

prepared for  
**Gray Television Licensee, LLC**

May, 2023

KOLD-TV  
 Former Analog Ch. 13  
 BLCT-19910423KE  
 Grade B Contour (56 dBμ)

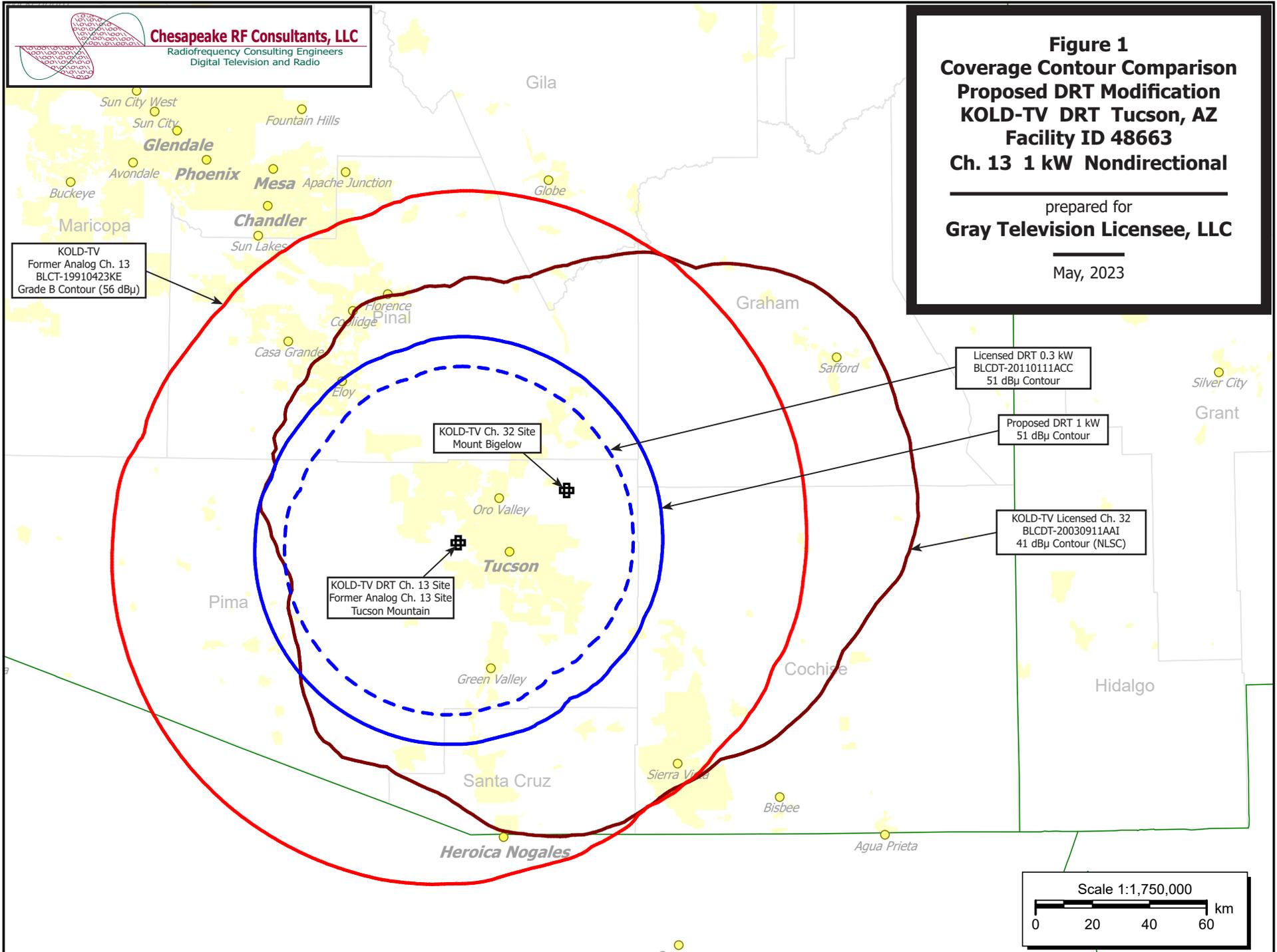
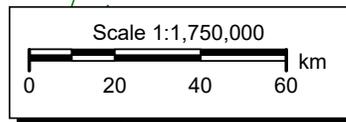
Licensed DRT 0.3 kW  
 BLCDT-20110111ACC  
 51 dBμ Contour

Proposed DRT 1 kW  
 51 dBμ Contour

KOLD-TV Licensed Ch. 32  
 BLCDT-20030911AAI  
 41 dBμ Contour (NLSC)

KOLD-TV Ch. 32 Site  
 Mount Bigelow

KOLD-TV DRT Ch. 13 Site  
 Former Analog Ch. 13 Site  
 Tucson Mountain



**Table 1 KOLD-TV DRT TVStudy Analysis of Proposal**  
 (page 1 of 3)



tvstudy v2.2.5 (4uoc83)  
 Database: localhost, Study: KOLD-TV DRT 1kW, Model: Longley-Rice  
 Start: 2023.05.05 10:13:50

Study created: 2023.05.05 10:13:49

Study build station data: LMS TV 2023-05-05

Proposal: KOLD-TV D13 LD APP TUCSON, AZ  
 File number: KOLD-TV DRT 1kW  
 Facility ID: 48663  
 Station data: User record  
 Record ID: 4977  
 Country: U.S.

Build options:  
 Protect pre-transition records not on baseline channel

Search options:  
 Non-U.S. records included  
 Baseline record excluded if station has CP

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	K12XP-D	D12	LD	LIC	PHOENIX, AZ	BLANK0000193009	149.6 km
Yes	KFPH-DT	D13	DT	LIC	FLAGSTAFF, AZ	BLCDT20090901AEY	304.4
Yes	KDPH-LD	D13	LD	LIC	PHOENIX, AZ	BLANK0000197875	149.5
Yes	KYMA-DT	D13	DT	LIC	YUMA, AZ	BLCDT20120426ABZ	358.7
No	K13UL-D	D13	LD	LIC	HILLSBORO, NM	BLDTV20100111ACE	342.7
No	KCOS	D13	DT	LIC	EL PASO, TX	BLEDT20110620AHQ	439.9

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D13  
 Mask: Stringent  
 Latitude: 32 14 56.20 N (NAD83)  
 Longitude: 111 7 1.10 W  
 Height AMSL: 1383.6 m  
 HAAT: 0.0 m  
 Peak ERP: 1.00 kW  
 Antenna: Omnidirectional  
 Elev Pattnr: Generic  
 Elec Tilt: 0.75

48.0 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	1.00 kW	663.8 m	72.1 km
45.0	1.00	661.4	72.1
90.0	1.00	640.0	71.4
135.0	1.00	550.2	68.4
180.0	1.00	595.5	70.1
225.0	1.00	648.3	71.7
270.0	1.00	625.8	71.0
315.0	1.00	558.5	68.7

Database HAAT does not agree with computed HAAT  
 Database HAAT: 0 m Computed HAAT: 618 m

Distance to Canadian border: 1861.6 km

\*\*Proposal is within coordination distance of Mexican border  
 Distance to Mexican border: 93.9 km

Conditions at FCC monitoring station: Douglas AZ  
 Bearing: 120.7 degrees Distance: 161.2 km

Proposal is not within the West Virginia quiet zone area

**Table 1 KOLD-TV DRT TVStudy Analysis of Proposal**  
(page 2 of 3)



Conditions at Table Mountain receiving zone:  
Bearing: 29.3 degrees Distance: 1020.0 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 BLCDT20090901AEY LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance			
	KFPH-DT	D13	DT	LIC	FLAGSTAFF, AZ	BLCDT20090901AEY				
Undesireds:	KOLD-TV	D13	LD	APP	TUCSON, AZ	KOLD-TV DRT 1kW	304.4 km			
	KYMA-DT	D13	DT	LIC	YUMA, AZ	BLCDT20120426ABZ	372.4			
	KTNV-TV	D13	DT	LIC	LAS VEGAS, NV	BLANK0000112823	337.9			
	Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX					
	42034.2	347,590	36421.3	276,938	36164.2	276,896	36087.1	276,551	0.21	0.12
Undesired			Total IX	Unique IX, before	Unique IX, after					
KOLD-TV D13 LD APP			77.1	345	77.1	345				
KYMA-DT D13 DT LIC			2.0	0	1.0	0				
KTNV-TV D13 DT LIC			256.1	42	255.1	42				

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Interference to BLANK0000197875 LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance			
	KDPH-LD	D13	LD	LIC	PHOENIX, AZ	BLANK0000197875				
Undesireds:	KOLD-TV	D13	LD	APP	TUCSON, AZ	KOLD-TV DRT 1kW	149.5 km			
	K12XP-D	D12	LD	LIC	PHOENIX, AZ	BLANK0000193009	0.4			
	KFPH-DT	D13	DT	LIC	FLAGSTAFF, AZ	BLCDT20090901AEY	188.6			
	KYMA-DT	D13	DT	LIC	YUMA, AZ	BLCDT20120426ABZ	259.1			
	Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX					
	16619.0	4,106,835	13518.1	4,075,498	13261.1	4,061,436	12705.3	3,980,409	4.19	2.00
Undesired			Total IX	Unique IX, before	Unique IX, after					
KOLD-TV D13 LD APP			633.6	87,718	555.8	81,027				
K12XP-D D12 LD LIC			7.9	3,183	5.9	3,108				
KFPH-DT D13 DT LIC			249.1	10,879	172.2	4,263				
KYMA-DT D13 DT LIC			1.0	0	0.0	0				

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Interference to BLCDT20120426ABZ LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance			
	KYMA-DT	D13	DT	LIC	YUMA, AZ	BLCDT20120426ABZ				
Undesireds:	KOLD-TV	D13	LD	APP	TUCSON, AZ	KOLD-TV DRT 1kW	358.7 km			
	KFPH-DT	D13	DT	LIC	FLAGSTAFF, AZ	BLCDT20090901AEY	372.4			
	KCOP-TV	D13	DT	LIC	LOS ANGELES, CA	BLANK0000196958	326.4			
	KTNV-TV	D13	DT	LIC	LAS VEGAS, NV	BLANK0000112823	321.9			
	Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX					
	28594.4	396,315	25434.4	391,789	25271.7	391,768	25260.7	391,768	0.04	0.00
	8254.0	1,093,124	7805.0	1,093,123	7797.9	1,093,123	7797.9	1,093,123	0.00	0.00
	(in Mexico)									
Undesired			Total IX	Unique IX, before	Unique IX, after					
KOLD-TV D13 LD APP			11.0	0	11.0	0				
KFPH-DT D13 DT LIC			21.8	0	18.8	0				
KCOP-TV D13 DT LIC			73.5	4	73.5	4				
KCOP-TV D13 DT LIC			7.0	0	7.0	0				0 (in Mexico)
KTNV-TV D13 DT LIC			70.3	17	67.3	17				17

**Table 1 KOLD-TV DRT TVStudy Analysis of Proposal**  
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Interference to proposal scenario 1

Call	Chan	Svc	Status	City, State	File Number	Distance
Desired: KOLD-TV	D13	LD	APP	TUCSON, AZ	KOLD-TV DRT 1kW	
Undesireds: KFPH-DT	D13	DT	LIC	FLAGSTAFF, AZ	BLCDT20090901AEY	304.4 km
KDPH-LD	D13	LD	LIC	PHOENIX, AZ	BLANK0000197875	149.5
Service area	Terrain-limited		IX-free		Percent IX	
15680.3	996,513	12323.9	987,579	11207.2	984,258	9.06 0.34
Undesired	Total IX		Unique IX		Prcnt Unique IX	
KFPH-DT D13 DT LIC	17.0	44	0.0	0	0.00	0.00
KDPH-LD D13 LD LIC	1116.7	3,321	1099.6	3,277	8.92	0.33

**Channel and  
Facility  
Information**

Section	Question	Response
Proposed Community of License	Facility ID	48663
	State	Arizona
	City	TUCSON
	DRT Channel	13
	Designated Market Area	Tucson (Sierra Vista)

**Antenna Location  
Data**

Section	Question	Response
<b>Antenna Structure Registration</b>	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1218220
<b>Coordinates (NAD83)</b>	Latitude	32° 14' 56.2" N+
	Longitude	111° 07' 01.1" W-
	Structure Type	GTOWER-Guyed Structure Used for Communication Purposes
	Overall Structure Height	60.1 meters
	Support Structure Height	60.1 meters
	Ground Elevation (AMSL)	1334.1 meters
<b>Antenna Data</b>	Height of Radiation Center Above Ground Level	49.5 meters
	Height of Radiation Center Above Mean Sea Level	1383.6 meters
	Effective Radiated Power	1.0 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:	Dielectric
	Model	TW-12A13
	Rotation	
	Electrical Beam Tilt	0.75
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Horizontal
<b>Elevation Radiation 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	
	Out-of-Channel Emission Mask:	Stringent