

## **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 dBμ 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 μW/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.

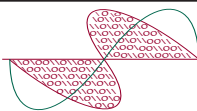
exhibit is limited to the evaluation of exposure to RF electromagnetic field. No increase in structure height is proposed.

*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 |

**Chesapeake RF Consultants, LLC**

|                       |                    |              |
|-----------------------|--------------------|--------------|
| Joseph M. Davis, P.E. | May 8, 2023        |              |
| 207 Old Dominion Road | Yorktown, VA 23692 | 703-650-9600 |

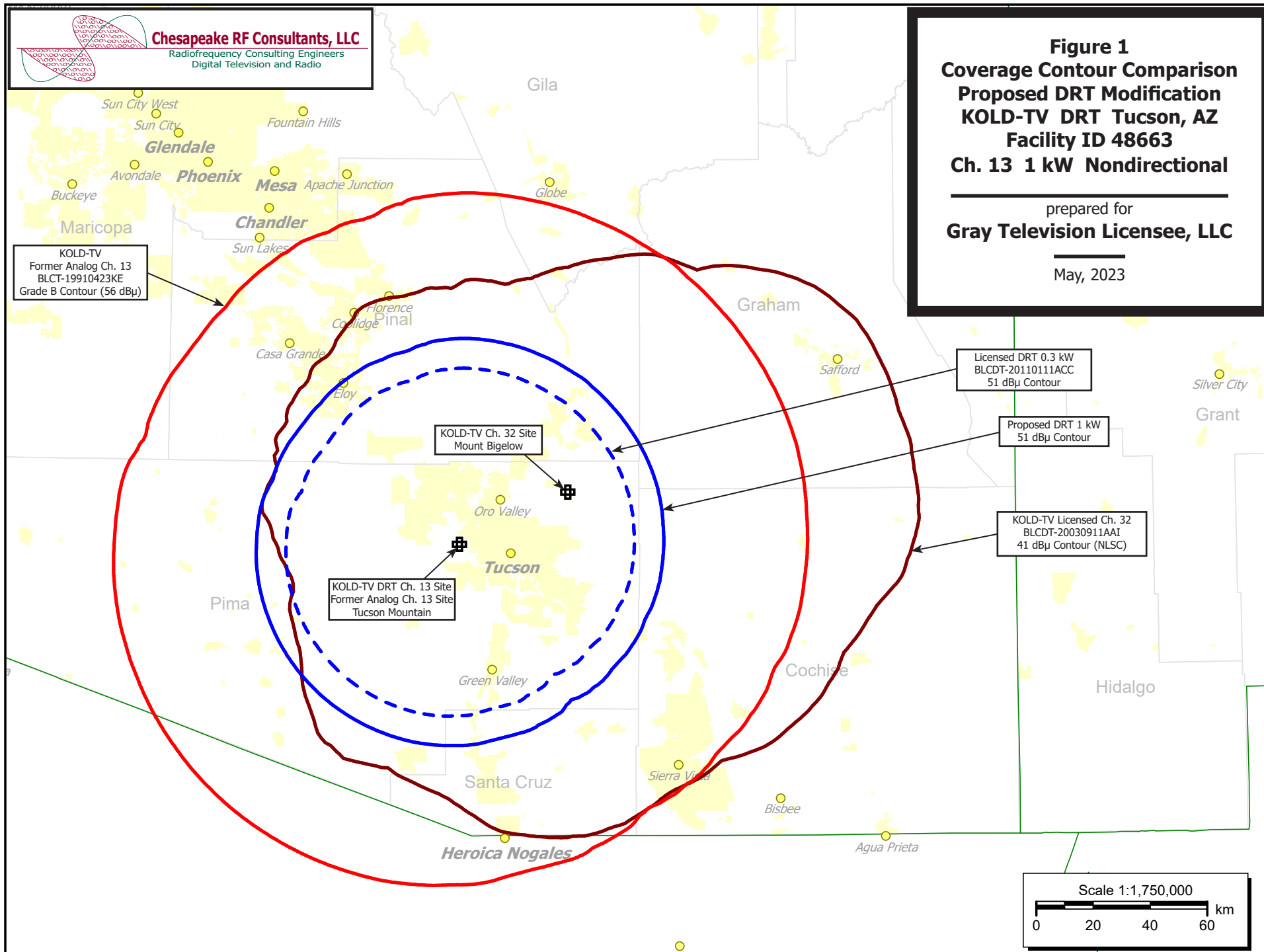


**Chesapeake RF Consultants, LLC**  
Radiofrequency Consulting Engineers  
Digital Television and Radio

**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



**Table 1 KOLD-TV DRT TVStudy Analysis of Proposal**  
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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 Pattn: 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**  
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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<br>KFPH-DT | Chan<br>D13     | Svc<br>DT | Status<br>LIC | City, State<br>FLAGSTAFF, AZ | File Number<br>BLCDT20090901AEY | Distance       |                  |                |      |  |
| 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              | 1.0              | 0              |      |  |
| KTNV-TV      | D13             | DT              | LIC       | 256.1         | 42                           | 255.1                           | 42             | 255.1            | 42             |      |  |

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Interference to BLANK0000197875 LIC scenario 1

|              |           |                 |           |                 |                   |                  |                  |             |
|--------------|-----------|-----------------|-----------|-----------------|-------------------|------------------|------------------|-------------|
|              | Call      | Chan            | Svc       | Status          | City, State       | File Number      | Distance         |             |
| Desired:     | 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             | 7.9              | 3,183            | 5.9 3,108   |
| KFPH-DT      | D13       | DT              | LIC       | 249.1           | 10,879            | 248.1            | 10,879           | 172.2 4,263 |
| KYMA-DT      | D13       | DT              | LIC       | 1.0             | 0                 | 0.0              | 0                | 0.0 0       |

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Interference to BLCDT20120426ABZ LIC scenario 1

|              |           |                 |     |                 |                   |                  |                  |                |             |
|--------------|-----------|-----------------|-----|-----------------|-------------------|------------------|------------------|----------------|-------------|
|              | Call      | Chan            | Svc | Status          | City, State       | File Number      | Distance         |                |             |
| Desired:     | 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           | 18.8             | 0              |             |
| KCOP-TV      | D13       | DT              | LIC | 73.5            | 4                 | 73.5 4           | 73.5             | 4              |             |
| KCOP-TV      | D13       | DT              | LIC | 7.0             | 0                 | 7.0 0            | 7.0              | 0              | (in Mexico) |
| KTNV-TV      | D13       | DT              | LIC | 70.3            | 17                | 67.3 17          | 67.3             | 17             |             |

(in Mexico)

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

|              |                 |                 |           |               |                           |                                |                 |
|--------------|-----------------|-----------------|-----------|---------------|---------------------------|--------------------------------|-----------------|
| Desired:     | Call<br>KOLD-TV | Chan<br>D13     | Svc<br>LD | Status<br>APP | City, State<br>TUCSON, AZ | File Number<br>KOLD-TV DRT 1kW | Distance        |
| 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                            | 0.00 0.00       |
| KDPH-LD      | D13             | LD              | LIC       | 1116.7        | 3,321                     | 1099.6                         | 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   |
|-----------------------------------|---|--|
| Antenna Structure<br>Registration | Do you have an FCC Antenna Structure Registration (ASR) Number? | Yes  |
|                                   | ASR Number  | 1218220  |
| Coordinates (NAD83)               | Latitude  | 32° 14' 56.2" N+   |
|                                   | Longitude   | 111° 07' 01.1" W-  |
|                                   | Structure Type  | GTOWER-Guyed Structure<br>Used for Communication<br>Purposes |
|                                   | Overall Structure Height  | 60.1 meters  |
|                                   | Support Structure Height  | 60.1 meters  |
|                                   | Ground Elevation (AMSL)   | 1334.1 meters  |
| Antenna Data                      | 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        |
|--------------------------------|---|-----------------|
| Antenna Type                   | Antenna Type  | Non-Directional |
|                                | Do you have an Antenna ID?  |                 |
|                                | Antenna ID  |                 |
| Antenna Manufacturer and Model | Manufacturer:   | Dielectric      |
|                                | Model   | TW-12A13        |
|                                | Rotation  |                 |
|                                | Electrical Beam Tilt  | 0.75            |
|                                | 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:   | Stringent       |