Exhibit 51

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Technical Statement for Construction Permit Modification:

KAZN-TV Licensee LLC
KHIZ-DT
Channel 44
Barstow, CA

Distributed Transmission System (DTS) Operation Under Construction Permit in File No. BPCDT-20080403ABK

Introduction

This Technical Statement provides the supplemental technical data and information associated with the FCC Form 301-DTV application of KAZN-TV Licensee LLC ("KAZN") for a Construction Permit (CP) for digital television (DTV) Distributed Transmission System (DTS) facilities on Channel 44 in Barstow, CA. In particular, it addresses the system design and interference analyses connected with a network of three transmitters proposed for operation by Station KHIZ-DT. The instant application requests modification of the construction permit granted on April 30, 2008 in File Number BPCDT-20080403ABK.[1] This Technical Statement also addresses the environmental considerations, notification requirements, and similar factors associated with the proposed operation.

The existing Construction Permit for KHIZ-DT provides for operation using a directional antenna at a site known as Quartzite Mountain with 1000 kW Effective Radiated Power (ERP) at a Height Above Average Terrain (HAAT) of 597 meters. These parameters exceed the maximums that are routinely permitted under §73.622(f)(8) of the

[1] The facility previously authorized in the existing CP has been completed, and a Form 302 application for license to cover has been submitted, in File Number BLCDT-20090126ADZ. Since the license has not yet been issued, upon instructions from Commission staff, the current application is filed as a construction permit modification.

Commission's rules, but they meet the requirements of §73.622(f)(5) by not exceeding the geographic coverage area of the largest station within the same market, as has been documented in earlier applications. The Station originally used an omnidirectional antenna, but substitution of a directional antenna was necessitated when the original antenna design failed mechanically twice and a lower elevation gain antenna was required to permit physical construction that would survive in the high wind environment of the Quartzite Mountain site.

The DTS network will add to the main Quartzite Mountain transmitter a pair of "gap-filler" transmitters, at sites at Mt Harvard and Snow Peak, to provide service within the station's hypothetically maximized service area in regions that hitherto have been obstructed by the San Gabriel Mountains. Prior to the digital transition, the obstructed areas were served by an analog television station (KXLA) that precluded full service within its Predicted Noise-Limited Contour (PNLC) by KHIZ-DT. With the coming cessation of operation by the analog station on Channel 44, KHIZ-DT can begin to provide service to those areas from which it previously was blocked. Consequently, the current application is for post-transition operation, but approval of the construction permit modification is sought now so that service to the blocked areas can begin as close to the DTV transition date as possible.

The FCC's rules on DTS operations are contained in new Section 73.626 and in the Report and Order that established them.[2] The new rules include provisions that permit multiple transmitters to be located within the PNLC of the facilities authorized to a station combined with a "Table of Distances" limit, that require coverage of the station's entire replication service area such that every location within that area is within the PNLC of at least one DTS transmitter, that require service to the station's entire community of license with a City Grade (noise limited +7 dB) signal, that limit acceptable new interference to other stations to a maximum of 0.5 percent (the same as for single-transmitter operations), and that permit the contours of the several transmitters in a DTS network to extend beyond the authorized contour by a minimal amount as

[2] *Digital Television Distributed Transmission System Technologies*, Report and Order, MB Docket No. 05-312 (FCC 08-256, released November 7, 2008) (the "*DTS R&O*").

necessary to provide service within the authorized contour. The DTS R&O also includes provisions for a Table of Distances alternative that allows the hypothetically maximized service area to equal the service area of the largest station in the market, as provided in §73.622(f)(5). Under the new rules, the interference determination is to be based on interference occurring to a neighboring station in a study cell using root-sum-squared (RSS) aggregation of the field strengths of the signals from the several transmitters in the DTS network. All of these precepts have been followed in the design and evaluation of the proposed DTS network.

The DTS network design was reviewed with the Media Bureau staff, including those involved in setting policy, those engaged in processing applications, and various levels of management, on December 4, 2008. As a result of that meeting, a redesign of the antenna patterns was undertaken better to control the contours projected from the transmitter sites beyond the authorized contour. The contour projections were the only concerns raised by the staff members participating in the design review. It has taken from the design review meeting until now to complete that pattern redesign and to work out the details that will enable construction and installation of the two new sites.

This Technical Statement has sections treating Transmitter Sites, Facilities, Largest In Market Calculation and Service Areas, Principal Community Coverage, New Service, Interference Analyses, Considerations Regarding Class A Stations, Border Issues, Environmental Impact/Radio Frequency Radiation, and Notifications. Some interference tables appear in line with the text; all other tables and figures appear at the end of this document. While the Commission has used the abbreviation DTS to identify Distributed Transmission Systems; the term DTx, as used by the ATSC, also is used herein to discuss various aspects of Distributed Transmission beyond the system per se.

Transmitter Sites

There are three transmitter sites proposed – the existing "main" site at Quartzite Mountain (DTS Site 1 on the Form 301 application) and the two new gap-filler sites at Mt Harvard (DTS Site 2) and Snow Peak (DTS Site 3). Their locations are shown on the map in Figure 2. The main, Quartzite Mountain site is located at the reference point for

KHIZ-DT established in the Appendix B DTV Table of Allotments.[3] It is a communications site near Victorville, CA, and is the site from which the station has operated throughout its history. It does now and will continue to provide service to the principal community of Barstow, CA. It is the site for which an application already has been filed for a license to cover the facilities authorized in the construction permit currently held by the station.

The two new transmitter locations involve sites currently used by other television broadcasters. The site at Mt Harvard serves the Los Angeles basin and is part of the complex, together with Mt Wilson, at which transmitters for almost all other television stations in the Los Angeles market are situated. It is a shared site operated by American Tower Corporation. Locating a gap filler transmitter there effectively collocates it with its adjacent channel neighbors, thereby reducing interference to the adjacent channel stations. The Snow Peak site is a communications facility and also currently is used by the transmitter for Station KVMD-DT. It is privately owned, and KHIZ-DT will be a tenant of both the site owner and of KVMD for different aspects of the Snow Peak facility. The Snow Peak transmitter will provide a second DTV service to an area that currently is served by only one DTV station and no analog stations, as well as providing additional service in surrounding underserved areas.

Facilities

The facilities requested in this application include continued operation at 1000 kW ERP at a height above average terrain of 597 meters at the Quartzite site, operation at almost 170 kW ERP at 879 meters HAAT at Mt Harvard, and operation at 40 kW ERP at 768 meters HAAT at Snow Peak. The currently authorized facility at the Quartzite site meets the requirements of §73.622(f)(5) as it does not exceed "that needed to provide the same geographic coverage area as the largest station within [its] market." The relationships between the parameters in the cases of the added gap-filler transmitters result in power/height combinations that meet the requirements for maximum allowable facilities

[3] Memorandum Opinion and Order on Reconsideration of the Seventh Report and Order and the Eighth Report and Order *In the Matter of Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service*, MB Docket No. 87-268 (FCC 08-72, released March 6, 2008).

specified by the formula in §73.622(f)(8)(ii) of the Commission's Rules. The basic characteristics of each of the transmitters proposed in the KHIZ-DT DTS network are given in Figures 1a, 1b, and 1c at the end of this report and in the related DTS Engineering portions of the Form 301 application – one for each transmitter.

Three fundamental antenna designs are proposed for use in the KHIZ-DT DTS network. The Quartzite antenna is a cardioid, end-fed, slotted coaxial design with characteristics primarily intended to provide sufficient gain in both its azimuth and elevation patterns to meet the KHIZ-DT service objectives while permitting a more physically robust antenna to be installed than was originally put into operation by the station. As was noted in the Technical Statement that accompanied the application for the construction permit that this application seeks to modify, the original antenna twice failed physically. Consequently, it was necessary to add azimuth gain by reducing service in an area having little to no population in order to continue providing full service throughout the remainder of the KHIZ-DT service area. This situation and its solution were fully described in that earlier Technical Statement.

The antenna designs at Mt Harvard and Snow Peak will be similar, cavity-slot panel arrays, using panels that have azimuth patterns shaped through use of parasitic elements. Each will consist of a total of six panels in a single column. The Mt Harvard pattern will have a single main lobe, while the Snow Peak pattern will have a pair of main lobes in a "peanut" pattern. The azimuth patterns will be rather narrow in their main beams, with a smaller amount of radiation in other directions. A significant amount of electrical beam tilt will be used, with a sharp cut-off of the radiation above the main beam to control the extent of signal projection from each of the antennas, given their very high locations, to permit better control of interference to adjacent regions and within the DTS network. In addition, a small amount of mechanical beam tilt also will be applied to each antenna to position the contours as close to the authorized contour as possible while minimizing projections beyond the authorized contour.

A plot of the PNLCs[4] of the various transmitters is provided in Figure 2. Since the main, Quartzite Mountain transmitter facility authorized by the outstanding construction permit (herein DTS Site 1) already covers the entire authorized service area of the station,[5] the provisions of §73.626(f)(1) are met by that facility alone. By virtue of the overlap of the contours of the three transmitters, they are contiguous, thereby meeting the requirements of §73.626(f)(3). Also shown in Figure 2 is the 48 dBu contour of the DTS Site 1 facility, which can be seen to encompass the principal community of Barstow, CA. There are no major obstructions in the path over the principal community; thus, the requirements of §73.625(a) and correspondingly of §73.626(f)(4) also are met by the DTS Site 1 transmitter alone. All three transmitters in the proposed DTS network are located within the KHIZ authorized service area, consequently meeting the requirements of §73.626(f)(6).

Although they were filed in the Technical Statement accompanying the original construction permit application that this application now seeks to modify, a description and plots of the pattern characteristics for the DTS Site 1 (Quartzite) antenna nevertheless are reproduced herein. The DTS Site 1 antenna is oriented to place the center of the cardioid azimuth pattern at 218 degrees true. Elevation power gain of the antenna is 23.50 (13.71 dBd) at the vertical beam maximum (1.0 degree below horizontal), 12.10 (10.83 dBd) in the horizontal plane, and 22.02 (13.43 dBd) at 0.677 degree below horizontal, the average depression angle to the radio horizon (computed at 1-degree azimuth intervals). The azimuth power gain is 1.60 (2.04 dB), yielding a total power gain in the main beam of 37.60 (15.75 dBd), in the horizontal plane of 19.36 (12.87 dBd), and toward the radio horizon of 35.23 (15.47 dBd).

A plot of the azimuthal radiation pattern of the DTS Site 1 antenna in relative field values is included as Figure 3. The azimuthal power pattern expressed in decibels relative to 1 kW (dBk), at the depression angle having maximum power (1 degree depression), is

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[4] To account for the dipole correction factor, the PNLCs are plotted at 41.5 dBu, with service statistics of F(50,90).

[5] Per §73.626(b), "For purposes of compliance with this section, a station's 'authorized service area' is defined as the area within its predicted noise-limited service contour determined using the facilities authorized for the station in a license or construction permit for non-DTS, single-transmitter-location operation."

plotted in Figure 4. The tabulated azimuthal field and power values are given in Figure 5. The elevation radiation pattern in relative field values is included as Figure 6. The elevation power pattern expressed in decibels relative to 1 kW (dBk) is plotted in Figure 7. The tabulated elevation field and power values are given in Figure 8. Also uploaded to the CDBS Electronic Filing System (EFS) web site is a version of the elevation pattern in Office Open XML format, with the first column containing depression angle values and the second column containing relative field values of elevation pattern data. Only a single elevation pattern applies to the antenna, and there is no mechanical beam tilt, so only a single column of elevation data is supplied.

The antennas for DTS Site 2 (Mt Harvard) and DTS Site 3 (Snow Peak) are similar to one another in their basic designs, the major difference being the azimuth patterns created by the attached parasitic elements. They also have slightly different electrical beam tilt characteristics, with the DTS Site 2 antenna having its main beam at a depression angle of 3.8 degrees, while the DTS Site 3 antenna has its main beam at a depression angle of 3.5 degrees. Each antenna has somewhat different mechanical beam tilt applied in addition to the electrical beam tilt. Their characteristics and orientations are fully described in Figures 1b and 1c. Because mechanical beam tilt will be used and complete elevation data for the antennas for DTS Sites 2 and 3 is being supplied through files input to the CDBS Electronic Filing System, the azimuth pattern plots supplied in this Technical Statement and the azimuth pattern data supplied in the CDBS input document are for reference only and are at right angles to the axes of the antennas in their respective main beams (i.e., at 3.8 degrees depression for the Site 2 antenna and at 3.5 degrees depression for Site 3). Consequently, the azimuth patterns and data do not take account of the mechanical beam tilt, the effect of which is reflected wholly within the elevation data files.

The essential elevation pattern design of the antennas for DTS Sites 2 and 3 is somewhat unusual. It includes main beams at depression angles of 3.8 and 3.5 degrees, with a rapid fall-off of relative field values above the main beams to deep nulls at depression angles of 0.8 and 0.5 degrees, respectively. The nulls serve two purposes: They help to control the locations of the contours while permitting stronger field strengths to be delivered within the service areas, and they help in controlling interference to stations in neighboring markets. The latter consideration is significant in the discussion below on Border Issues. The elevation pattern design also includes a relatively broad peak and significant power levels to depression angles of approximately 17 degrees, thereby providing strong signals to the areas below the mountains on which the gap-filler transmitters are situated.

Elevation power gain of the antenna design for DTS Site 2 is 7.50 (8.75 dBd) at the beam maximum (3.8 degrees below horizontal), less than 0.0015 (–28 dBd) at the null above the main beam (0.8 degrees below horizontal), and 0.916 (–0.38 dBd) in the horizontal plane. The azimuth power gain is 5.70 (7.56 dB), yielding a total power gain in the main beam of 42.66 (16.30 dBd) and of 5.22 (7.18 dBd) in the horizontal plane. All plane and depression angle values are with respect to the antenna axis prior to the effects of any mechanical beam tilt. Because of the mechanical beam tilt applied to this antenna, effective radiated power toward the radio horizon is an inappropriate parameter for this antenna and therefore is not provided.

Equivalent characteristics for the DTS Site 3 antenna are elevation power gain of 7.55 (8.78 dBd) at the beam maximum (3.5 degrees below horizontal), less than 0.0015 (–28 dBd) at the null above the main beam (0.5 degrees below horizontal), and 0.095 (–10.2 dBd) in the horizontal plane. The azimuth power gain is 2.90 (4.62 dB), yielding a total power gain in the main beam of 21.93 (13.41 dBd) and of 0.277 (–5.58 dBd) in the horizontal plane. All plane and depression angle values are with respect to the antenna axis prior to the effects of any mechanical beam tilt. Again, because of the mechanical beam tilt applied to this antenna, effective radiated power toward the radio horizon is an inappropriate parameter for this antenna and therefore is not provided.

Plots of the DTS Sites 2 and 3 antenna azimuthal radiation patterns in relative field values are included as Figures 9a and 9b. The azimuthal power patterns expressed in decibels relative to 1 kW (dBk), at the depression angles having maximum power (3.8 and 3.5 degrees depression, respectively), are plotted in Figures 10a and 10b. The tabulated azimuthal field and power values are given in Figures 11a and 11b. The elevation radiation patterns in relative field values are included as Figures 12a and 12b.

The elevation power patterns expressed in decibels relative to 1 kW (dBk), in the azimuthal directions having maximum power, are plotted in Figures 13a and 13b. The tabulated elevation field and power values are given in Figures 14a and 14b. All of these plots and tables are prior to application of mechanical beam tilt and therefore do not incorporate its effects, which are fully expressed in the data of the elevation patterns placed on file in the online application. The elevation pattern data for each antenna has been uploaded to the CDBS Electronic Filing System (EFS) web site in array form in Office Open XML format, with the first columns containing depression angle values and the first rows containing azimuth values for each column.

Although only a single elevation pattern applies to each of the antennas for DTS Sites 2 and 3, mechanical beam tilt will be applied to each of them. Since the software that the Commission will use to evaluate this application is not yet capable of applying mechanical beam tilt, the pattern rotation implicit in mechanical beam tilt has been pre-applied to the data provided through the EFS. Consequently, a large array of elevation data has been supplied for each antenna. Correspondingly, the Forms 301 DTS have been marked that no mechanical beam tilt and, similarly, that no azimuth rotation is applicable because they already have been built into the data arrays uploaded with the application forms. The actual azimuth rotations and mechanical beam tilt angles and headings for the antennas at DTS Sites 2 and 3 are provided in Figures 1b and 1c below.

All of the transmitters to be used in the KHIZ-DT DTS network will be Type Verified as per Section 73.1660 of the Commission's Rules. All transmitters will be of solid state designs. They will be synchronized using the methods specified in the ATSC Synchronization Standard for Distributed Transmission (A/110B), and they will emit the RF Watermark transmitter identification signal defined in the A/110B document.

Largest In Market Calculation and Service Areas

As noted above, §73.622(f)(5) provides that stations may exceed the limits on power and antenna height included in §73.622(f)(6) through (8) "up to that needed to provide the same geographic coverage area as the largest station within their market." The DTS R&O applies the same exception to DTS operations. In ¶35 "Largest Station"

Alternative, it states, "As an alternative to the Table of Distances Approach for determining the hypothetically maximized service area, full-power stations may use the 'largest station' provision in section 73.622(f)(5) of the rules."[6]

To implement the provisions of §73.622(f)(5), a method has been followed to determine the radius of a circle that matches the area contained within the contour of the largest station in the same market as that of the applicant. The market has been defined by the Commission as the DMA in which a station is located.[7] KHIZ is located in the Los Angeles DMA. As noted in the First DTV Periodic Report and Order, "the geographical coverage determination is based on the area within the DTV station's noise-limited contour, calculated using predicted F(50,90) field strengths as set forth in section 73.622(e) of the rules and the procedure specified in section 73.625(b) of the rules."[8] The largest station in the Los Angeles DMA appears to be KTLA-DT, which is licensed on Channel 31 with a directional antenna pattern at 1000 kW and Height Above Average Terrain (HAAT) of 948 meters. Using the method of §73.625(b) (as implemented in the EDX SignalPro program[9]) and a field strength of 40.4 dBu for the contour, as determined using the dipole factor correction formula found in OET Bulletin No. 69, as referenced in §73.622(e), the PNLC of KTLA-DT encloses an area of 53,911.367 km^2. Treating this area as the area of a circle, the radius is found by first dividing by Pi and then taking the square root. The result is 130.998 km, which is the radius of the circle represented in green in Figure 2 and used as the outer boundary of the service area for the KHIZ DTS network. This circle is termed the "largest station circle" hereinafter.

As can be seen in Figure 2, as also determined using the SignalPro software and the methods of §73.625(b), there are a few minor areas where the contours of the gap filler

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[6] *Digital Television Distributed Transmission System Technologies*, Report and Order, MB Docket No. 05-312 (FCC 08-256, released November 7, 2008) ¶35.

[7] See *Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, MM Docket No. 00-39, Report and Order, 16 FCC Rcd 5946, 5973-4, ¶¶73-4 (2001) ("First DTV Periodic Report and Order").

[8] Id.

[9] The Fortran code in the SignalPro program was evaluated to confirm its conformance with the method defined in §73.625(b) of the rules, including computation of the HAAT from 3.2 – 16.1 km, use of the formula provided in the rule for determination of depression angle, application of the 90-percent field factor in determination of the consequent power value, and use of the Commission's TVFMFS Fortran code for contour distance determination. It evaluates the contour distance on 1-degree-spaced radials, however, rather than at 45-degree-spaced headings.

transmitters extend beyond the area of the largest station circle by small amounts. Most of these areas are over the Pacific Ocean or over desert and therefore should not be treated as extensions of the service areas of the gap fillers. Over land, there are two very small extensions beyond the largest station circle from the Site 2 transmitter and another extension from the Site 3 transmitter. From the Site 2 gap filler, there is an elongated extension from 215 to 220 degrees relative to Site 2, having a maximum extension of less than 0.74 km, and there is a triangular extension from 247 to 248 degrees relative to Site 2, having a maximum extension of 0.13 km. From the Site 3 gap filler, there is a crescent-shaped extension from 75 to 115 degrees relative to Site 3, having a maximum extension of less than 6.5 km.

Evaluation of the extension areas shows that the two projections from Site 2 beyond the largest station circle are about 2.145 km^2 and 0.05 km^2, taken in the same order as that in which they previously were described. Based on the 2000 census, their populations are 9,040 and 73 people, respectively. The projection from Site 3 is about 234 km^2, but it is over desert and has a population of only 509 people, despite its much larger area. To put these values into context, the total area of the projections represents about 0.4 percent of the area of the largest station circle, but their total population represents only about 0.06 percent of the population of the largest station circle. Thus, the areas and populations of the projections are *de minimis* and only incidental to providing service to the major populations that are contained within the PNLCs of the gap-filler transmitters.

The DTS R&O provides for small extensions beyond the authorized service areas of DTS facilities to be considered on a case-by-case basis when they are shown to be necessary to provide service within the authorized service areas.[10] In this case, the transmitters are located together with other broadcast transmitters at two of the very few sites available in the region for television broadcast operations. The transmitters are limited to these sites by a combination of the terrain, which favors use of transmitters at high locations, the need to minimize environmental impacts by keeping the number of such sites to a minimum, and the benefits to viewers of having transmitters collocated with one another so that receiving antennas can be pointed in the same direction to receive as many

[10] DTS R&O ¶33.

stations as possible. The Commission has been made aware of this situation in the Los Angeles region previously.[11] Moreover, in the case of the Site 3 extension, it arises from an effort to provide new service to the underserved region near Twentynine Palms, CA,[12] a prospect that the Commission foresaw in the DTS R&O as one of the potential benefits of use of the DTS method.[13] Given that the maximum projections are considerably less than the extension distances and many times less than the extension areas that the Commission has hitherto approved under the DTS Interim Policy STA procedure,[14] it is respectfully requested that the much more minor extensions in this case similarly be approved.

Principal Community Coverage

As required by Section 73.625(a)(1) of the FCC rules, the transmitter location must be chosen so as to put a minimum F(50,90) field strength of 48 dBu over the entire principal community to be served. Section 73.625(a)(2) further requires that "The location of the antenna must be so chosen that there is not a major obstruction in the path over the principal community to be served." Moreover, §73.626(f)(4) requires that the coverage from one or more DTS transmitters be shown to provide principal community coverage as required by §73.625(a). As demonstrated by the 48-dBu contour of the Quartzite transmitter, shown on the coverage map of Figure 2, the transmitter location chosen, combined with the other characteristics of the transmission system, indeed does deliver the minimum required field strength over the entire principal community to be served – Barstow, CA. Thus, the requirements of §73.626(f)(4) are met by a single transmitter.

New Service

One of the potential benefits that the FCC recognized as deriving from the use of DTS technology is the opportunity "to expand service into traditionally underserved rural areas in which populations have historically been insufficient to sustain a viable, full-service over-the-air station."[15] That is the case with the current application. While the KHIZ

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[11] See *Technical Statement – Response to Reply to Opposition to Informal Objection of Sunbelt Television, Inc. Re: Minor Modification of Licensed Facilities of KXLA(TV),* filed May 8, 2002, for a detailed analysis.
[12] See the section on New Service below.
[13] DTS R&O ¶36.
[14] DTS R&O ¶33 and FN136.
[15] DTS R&O ¶36 and FN148.

construction permit contour, in part, extends over an area in the region of Twentynine Palms, CA, and nearby communities that now receives only one DTV service, in fact, the Longley-Rice methods of OET-69 predict no service to the area from the existing KHIZ CP facilities. There are even larger areas nearby, moreover, that receive only 2, 3, or 4 services, thereby falling short of the FCC definition of a well-served area as one that receives 5 or more television services over the air. The facilities at DTS Site 3 are designed to ameliorate this situation by adding a service that is predicted by the Longley-Rice methodology actually to deliver service to the area.

A contour-based analysis of service to the region in an Engineering Statement from the firm of Smith and Fisher LLC, engineering consultants, is attached to this Technical Statement in Annex A. It shows the areas predicted by contour methods to receive service from stations in the Los Angeles and Palm Springs markets and provides an analysis of the areas covered by 1, 2, 3, 4, or more DTV stations. As can be seen in the attached report, a substantial number of underserved people are within the PNLC of the proposed DTS Site 3 facility. Moreover, subsequent, supplemental Longley-Rice studies have shown that a significant proportion of those people are predicted to receive signals from the new DTS transmitter. Thus, in addition to filling in areas that KHIZ hitherto has been unable to serve, the KHIZ DTS proposal also provides a public benefit conforming to long-standing Commission policy by bringing actual new service to an underserved area.

Interference Analyses

The interference analysis process for the KHIZ-DT application for a DTS construction permit has been a complex and thorough undertaking. In particular, two precepts of the new rules for authorization of DTS systems have been followed rigorously – namely, the requirement that, in each study cell, the field strength be aggregated from the multiple transmitters in the network using the root-sum-square (RSS) method prior to computing the D/U ratio and making a determination whether interference is predicted to that cell and the requirement that no more than 0.5 percent of additional interference be caused to any other station licensed by the Commission.

Interference analyses were conducted using a modified version of the Commission's TV_Process program. The program has been modified to conduct the new interference analyses specified in the DTS rules and is an early version of the software currently being installed at the Commission for its evaluation of DTS proposals. The edits to the program have been made by its author, William C. Meintel of Meintel, Sgrignoli and Wallace LLC. Aside from the changes being made to the program to meet the provisions of the new DTS rules (as promulgated in §73.626 and the DTS R&O), one additional capability has been made accessible in the program used. It is the determination of the depression angle from a transmitting antenna to a receiving antenna in a study cell based on the difference in heights of the two antennas (transmitting and receiving), using the sum of the height of the ground level at each location plus the height of the antenna above ground to obtain the actual height of each antenna. In other words, the height of each antenna above mean sea level (AMSL) is used to find the depression angle from the transmitting antenna and the corresponding relative field of the antenna in the direction of the receiver. The ability to use antenna height AMSL to compute the depression angle and relative field for quite some time has been in the code used by the Commission but has not been activated. The edited version of the software provides a setup switch to enable its use when desired.

The importance of using antenna height AMSL correctly to determine the depression angle from transmitter to receiver and the corresponding relative field and transmitted power values was the subject of a recent filing with the Commission in the DTS docket by a group of engineering firms.[16] The filing pointed out the erroneous results that would be obtained in areas having significant terrain variation without the use of the correct values for antenna height AMSL. A copy of the filing is attached hereto in Annex B. For purposes of this application, the interference analyses were conducted both ways – i.e., without applying the antenna height AMSL but just the height above ground level (AGL) and with the correct application of the antenna height AMSL. The results of both

[16] See *Reply Comments Of Cavell, Mertz & Associates, Inc.; Chesapeake RF Consultants, LLC; Du Treil, Lundin & Rackley, Inc.; Greg Best Consulting, Inc.; Hatfield & Dawson Consulting Engineers, LLC; Meintel, Sgrignoli, & Wallace, LLC; Merrill Weiss Group LLC; and Smith and Fisher LLC to Petition for Reconsideration of the Association for Maximum Service Television, Inc*., filed May 8, 2009, in MB Docket 05-312.

methods with respect to interference to other Commission licensees are reported separately below.

Because of the importance in the network design of the antenna elevation patterns to the avoidance of interference to other stations, particularly with respect to first adjacent channel operations within the same market and to co-channel stations in neighboring markets, the capability of TV_Process to analyze interference using the combination of azimuth and elevation patterns of the transmitting antennas was employed. Generally, this capability has not been used much by the Commission in the past, but it has been included in the version of the TV_Process software that the Staff routinely has used. Now, the new DTS rules require the submission of elevation patterns in addition to azimuth patterns, and both the CDBS Electronic Filing System and the new TV_Process software make provisions for its analysis. In the analyses reported herein, elevation patterns were applied throughout.

The interference analysis method applied by the TV_Process program was divided into two stages. In the first stage, all stations having specific channel relationships to the proposed facilities and within defined distances of any of the DTS transmitters were identified for inclusion in the studies. Next, stations among the selected group were studied preliminarily to determine whether there were any study cells to which interference was predicted to be caused, without consideration of masking by other stations, by the combined signals of the transmitters in the DTS network. (All evaluations using the combined signals from multiple transmitters in the network used the RSS summation of the field strengths to represent the aggregated signal from the network.) Once stations predicted to receive any amount of unmasked interference were identified, in the second stage, they then were studied in detail to determine the amount of any increase in interference predicted with respect to the interference predicted to be caused by the reference facilities. The reference facilities are those provided for KHIZ-DT in the DTV Table of Allotments in Appendix B to the DTV Reconsideration Order.[17]

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[17] *Memorandum Opinion and Order on Reconsideration of the Seventh Report and Order and Eighth Report and Order in the Matter of Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service*, MB Docket No. 87-268, FCC 08-72, adopted March 3, 2008, and released March 6, 2008 (the “DTV Reconsideration Order”).

The amount of interference is based upon population counts of those predicted to receive signals with less than the required ratio between desired and undesired signals as specified in the Commission's rules for the particular channel relationship.

The results of the interference analyses are shown in Tables 1 and 2. Table 1 provides the results of studies that did not use the correct evaluation of depression angle, deriving that value only from the height of the transmitting antenna above ground level, as previously implemented in the Commission's software. On the other hand, Table 2 provides the results of studies that correctly determine the depression angle by deriving it from the total heights of both the transmitting and receiving antennas AMSL. In these tables, each station that was identified by TV_Process as relevant and its basic identification information are listed in the leftmost four columns. The fifth column indicates which method was used to determine the depression angle from the transmitters to the receiver in each study cell. The five columns on the right side of the tables show the number of scenarios studied for each desired station, the baseline population against which changes are measured, the population predicted to receive interference from the reference facility, the population predicted to receive interference from the proposed facility, and the amount of change, expressed as a percentage.

Two symbols used in Tables 1 and 2 signify certain results reported by the TV_Process program. An asterisk (*) indicates that TV_Process reported that the "Proposed station is beyond the site to nearest cell evaluation distance." A dash (—) denotes that TV_Process reported that the "Proposal causes no interference." In both of these cases, the initial culling pass performed by TV_Process found that there would be no interference predicted to the subject stations. In the case of the asterisks, this resulted because the closest study cells were too far away from all the transmitters for evaluation. In the case of the dashes, the result occurred because an initial interference study found, without consideration of masking by other stations, that there was no interference predicted to any study cell in the service area of the desired station studied.

A total of six stations were studied – most of them in several variations, with the number of variations totaling 12. That is, licensed facilities, construction permit facilities, and

Table 1 — KHIZ DTS Interference Studies to Neighboring Stations Without Antenna Height AMSL Calculation

Chnl	Station	City	Application Reference Number	AMSL Used	# Scen-arios	Baseline Population	Ref IX Population	DTS IX Population	% IX Chg
43	KCBS-TV	Los Angeles, CA	DTVPLN-DTVP1528	No	4	14,815,908	77,071	76,935	–0.0009
43	KCBS-TV	Los Angeles, CA	BPCDT-20080409AAB	No	4	14,758,226	147,322	147,310	–0.0001
43	KCBS-TV	Los Angeles, CA	BMPCDT-20080616ABQ	No	2	15,083,917	148,223	132,050	–0.1072
43	KSKT-CA	San Marcon, CA	BDFCDTA-20051020AAP	No	*	*	*	*	*
45	KUVI-TV	Bakersfield, CA	DTVPLN-DTVP1601	No	—	—	—	—	—
45	KUVI-TV	Bakersfield, CA	BMPCDT-20080618AEJ	No	—	—	—	—	—
45	KRET-CA	Cathedral City, CA	BLTTA-20010711AAF	No	—	—	—	—	—
45	KRET-CA	Cathedral City, CA	BDFCDTA-20080801ASC	No	—	—	—	—	—
45	KRCA	Riverside, CA	DTVPLN-DTVP1602	No	1	15,069,450	399	490	0.0006
45	KSKJ-CA	Van Nuys, CA	BPTTA-20050714ACI	No	—	—	—	—	—
45	KSKJ-CA	Van Nuys, CA	BSTA-20050714ACK	No	—	—	—	—	—
45	KSKJ-CA	Van Nuys, CA	BSTA-20050801CEA	No	—	—	—	—	—

Table 2 — KHIZ DTS Interference Studies to Neighboring Stations With Antenna Height AMSL Calculation

Chnl	Station	City	Application Reference Number	AMSL Used	# Scen-arios	Baseline Population	Ref IX Population	DTS IX Population	% IX Chg
43	KCBS-TV	Los Angeles, CA	DTVPLN-DTVP1528	Yes	2	14,649,193	82,560	102,990	0.1395
43	KCBS-TV	Los Angeles, CA	BPCDT-20080409AAB	Yes	4	14,683,274	142,502	163,164	0.1407
43	KCBS-TV	Los Angeles, CA	BMPCDT-20080616ABQ	Yes	4	15,012,180	150,377	158,037	0.0510
43	KSKT-CA	San Marcon, CA	BDFCDTA-20051020AAP	Yes	*	*	*	*	*
45	KUVI-TV	Bakersfield, CA	DTVPLN-DTVP1601	Yes	—	—	—	—	—
45	KUVI-TV	Bakersfield, CA	BMPCDT-20080618AEJ	Yes	—	—	—	—	—
45	KRET-CA	Cathedral City, CA	BLTTA-20010711AAF	Yes	—	—	—	—	—
45	KRET-CA	Cathedral City, CA	BDFCDTA-20080801ASC	Yes	3	321,481	8,272	8,272	0.0000
45	KRCA	Riverside, CA	DTVPLN-DTVP1602	Yes	1	15,011,399	472	11,165	0.0712
45	KSKJ-CA	Van Nuys, CA	BPTTA-20050714ACI	Yes	—	—	—	—	—
45	KSKJ-CA	Van Nuys, CA	BSTA-20050714ACK	Yes	—	—	—	—	—
45	KSKJ-CA	Van Nuys, CA	BSTA-20050801CEA	Yes	—	—	—	—	—

Table 3 — KHIZ DTS Interference Study to Co-Channel Facility in Tijuana, BN

Chnl	Station	City	Application Reference Number	AMSL Used	# Scen-arios	U.S.-Only Baseline Population	Ref IX Population	DTS IX Population	% IX Chg
44	Mex New	Tijuana, BN	BPFS-20081118ACS	Yes	1	2,621,575	0	17,681	0.6744

DTV Plan facilities all were studied separately. Although the original DTV Plan facilities are now generally meaningless and will be more so post-transition, the rules still require that they be protected, so they are included in the tables herein when they appear in the various TV_Process output files. Of the stations shown in the tables, three are Class A stations, which will be discussed in detail in a subsequent section of this Technical Statement.

A total of three full-service stations (KCBS, KUVI, and KRCA) in six variations were identified by the TV_Process program as requiring study for potential interference from the proposed DTS network. Of these, the program reported that "The proposal causes no interference" with respect to one of them (KUVI) under all variations and conditions studied. Another (KRCA) is represented in the tables only by its DTV Plan facility because it has been granted use of another channel by the Commission through a rulemaking proceeding, and it therefore is irrelevant. Even so, the amount of interference predicted to it is negligible in Table 1 and minuscule in Table 2. That leaves one station (KCBS) in three variations to address. In Table 1, in which the correct antenna AMSL values are not taken into account, there are slight reductions in interference predicted to occur, ranging from negligible to minor. This makes no sense since there will be increases in undesired signal levels impacting the desired signals from the multiple transmitters in the DTS network. In Table 2, where the correct application of the antenna height AMSL is made, however, it can be seen that small increases in interference are predicted to the several variations studied. These increases range from minuscule with respect to the proposed maximization of the station, to minor with respect to the DTV Plan and currently authorized Construction Permit facilities of the station. Such moderate increases comport with reality in the sense that adding transmitters logically would be expected to lead to increased, rather than decreased, interference. This result leads to the conclusion that far more attention should be paid to the results in Table 2 and that the results in Table 1 should be discounted, although they have been provided in the interest of consistency with the Commission's past practice.

As shown in Table 2 regarding the three full-service stations listed, the result of the overall network design is that predicted new interference is non-existent with respect to one station, is minuscule with respect to an irrelevant DTV Plan facility, and is at most minor with respect to the one station in the list that is predicted to receive any increase in interference. Clearly, with respect to other full-service stations, the design meets the objectives set by the FCC for the management of interference when stations improve their facilities or adopt DTS technology.

Considerations Regarding Class A Stations

The Commission's TV_Process program also was used to locate and evaluate predicted interference to Class A stations. The TV_Process program identified and examined a total of six records for three Class A stations. One of these (KSKT-CA) shows that the "proposed station is beyond the site to nearest cell evaluation distance," indicating that the initial culling study done by TV_Process found that there is no need to evaluate it further because of the spacing between all of the DTS sites and the Class A station. For the other two Class A stations, the TV_Process program reported contour overlap from DTS Site 2 with respect to one (KSKJ-CA) and from DTS Site 3 with respect to the other (KRET-CA).

Section 73.623(c)(5) of the FCC rules specifies the contour overlap method as the principal means for determining protection to Class A stations, but it provides, in §73.623(c)(5)(iii) that "In support of a request for waiver of the interference protection requirements of this section, an applicant for a DTV broadcast station may make full use of terrain shielding and Longley-Rice terrain dependent propagation methods to demonstrate that the proposed facility would not be likely to cause interference to Class A TV stations." The cited rules section then points to the method of OET Bulletin No. 69 as the means for making the necessary demonstration. The TV_Process program is the Commission's implementation of the methodology of OET-69.

As shown above, the TV_Process program reported for all cases regarding KSKJ-CA and for one case regarding KRET-CA that the "proposal causes no interference," indicating that the Stage 1 culling study found there to be no interference to any study cells within the service area of the desired station studied, even without consideration of masking by other stations. For the one case with respect to KRET-CA in which the TV_Process program did not report the absence of interference during the initial culling study, it studied three scenarios and in all of them found 0.0000 percent change in interference. Thus, it can be stated that the TV_Process program reported for all variations of all relevant Class A stations that no new interference is predicted to be caused by the proposed DTS facilities. Therefore, KAZN respectfully requests a waiver of the interference protection requirements of §73.623(c)(5), based upon the provisions of §73.623(c)(5)(iii), in that an adequate showing has been presented that the Longley-Rice terrain-dependent methods of OET-69 have demonstrated that the proposed facility would not be likely to cause interference to Class A TV stations.

Border Issues

In accordance with the Memorandum of Understanding ("MOU") regarding DTV coordination between the United States and Mexico,[18] stations within 275 km of the Mexican border require coordination between the U.S. and Mexican governments as part of the authorization process. At 231.0 km to the nearest point on the Mexican border, the Quartzite Moutain site of the authorized construction permit facilities falls within the coordination distance and was coordinated with Mexico during its approval process. Based upon calculations performed by the TV_Process program, all three of the DTxTs in the current application are within the coordination distance, as shown in Table 4.

Table 4 — Distances from DTxTs to Mexican Border & Tijuana Site

Transmitter	Border Distance (km)	Tijuana Site Separation (km)
DTS Site 1	231.0	235.3
DTS Site 2	205.9	212.5
DTS Site 3	163.5	172.0

Specified in the MOU are minimum separation distances between stations that, if met, are intended to lead to automatic approval by the other country upon notification by an

[18] "Memorandum of Understanding Between the Federal Communications Commission of the United States of America and the Secretaria de Comunicaciones y Transportes of the United Mexican States Related to the Use of the 54-72 MHz, 76-88 MHz, 174-216 MHz, and 470-806 MHz Bands for the Digital Television Broadcasting Service Along the Common Border," effective July 22, 1998.

administration seeking to implement facilities within its borders. Under clause 3, when the facilities differ from those specified in the MOU, so long as the minimum separation distance is met, approval is deemed to have been given after a maximum of 45 days with no objection by the other administration. The minimum separation distances are given in Tables A and B of the MOU, and only the minimum separation distances for co-channel cases exceed the shortest distance from one of the DTxTs to the closest point on the Mexican border. Thus, only co-channel separations need be considered. The minimum separation distance requirements for the UHF band are 244 km for DTV to NTSC co-channel cases and 223 km for DTV to DTV co-channel cases, respectively.

The only Mexican state within 244 km of any of the proposed KHIZ DTxT sites is Baja California (BN). Upon examination of the table of Mexican NTSC Television Allotments in Appendix 1 and Mexican Digital Television Allotments in Appendix 3 of the MOU, there are within Baja California no entries shown in either table on Channel 44, the channel allotted to KHIZ-DT. There is in the FCC CDBS database, however, a recent entry on Channel 44 in Tijuana, BN, shown in FCC File No. BPFS-20081118ACS and indicated as a digital facility. Some technical details are provided in the CDBS entry, and they have been used to evaluate potential interference to such a facility if it were built. Shown in Table 4 in the right-most column are the distance separations between the several DTxTs and the coordinates from the Tijuana database record. Also provided in the database is an antenna azimuth pattern associated with the record plus height and effective radiated power data. These are sufficient to permit studies to be conducted of predicted interference to such a potential facility in the same way that such studies are conducted with respect to U.S. stations.

While there is no obligation of U.S. stations to protect Mexican stations in the U.S. (and conversely for Mexican stations to protect U.S. stations in Mexico), at the time that the MOU was signed, a regime was in place that required limiting interference to other U.S. stations to a maximum loss of 2 percent of the population predicted to be served. That threshold formed the basis for the maximizations in service that have taken place among U.S. broadcasters since that time. Consequently, in an effort to offer the same level of protection to the Tijuana facility now included in the CDBS, it has been analyzed using the Longley-Rice terrain-based propagation model and the methods of OET Bulletin No. 69 to determine the amount of interference predicted to occur and to compare it to the 2 percent threshold. Indeed, in designing the KHIZ DTS network, antenna patterns and orientations have been applied to the two gap filler transmitters (DTS Sites 2 and 3) to minimize the interference predicted to the Tijuana facility. In doing so, the population considered was only that within the U.S. because Mexican population data was not available. The results of that design effort and of the interference studies are reflected in Table 3 above.

Since there also would be a large population in Mexico that would be served by a station built according to the specifications in the CDBS, and since studies show that all of the interference to such a station would occur only in the U.S., the population predicted to receive interference in the analysis actually is a substantially higher percentage than would have been determined if the full population served by such a station on both sides of the border were counted. Thus, the analysis results are quite conservative. As shown in Table 3, considering only the U.S. population, interference is predicted to 0.6744 percent. If there were any more than 914,625 people in Mexico also receiving service from a station built using the parameters given in the CDBS database, the percentage would drop below 0.5 percent, the current limit imposed on new interference among U.S. stations. The latest official census data for Tijuana alone, without consideration of surrounding communities, was 1,410,687, as of 2005.[19] Estimates are that the official census number is substantially below the real population, but, in any event, it indicates that the protection provided to the potential Mexican facility is in the same class and meets the same threshold as the protection currently required among stations in the U.S.

For all the reasons outlined above, despite there being no requirement to do so, adequate protection has been provided to a Mexican facility that may be built according to the parameters recently added to the CDBS database. Power levels and antenna patterns of the DTS network have been specifically designed to provide such protection. The resulting predicted interference is well below the 0.5 percent maximum currently

[19] Instituto Nacional de Estadística y Geografía, Sistema Nacional de Información Estadística y Geográfica, http://www.inegi.org.mx/lib/olap/general_ver4/MDXQueryDatos.asp?#Regreso&c=10401.

permitted for interference to other U.S. stations when the population that such a station is likely to serve in Mexico is taken into account in addition to the population in the U.S. Consequently, Mexican concurrence with the construction of the additional transmitters in the KHIZ DTS network is anticipated.

Environmental Impact / Radio Frequency Radiation

None of the conditions specified in Section 1.1307 that would require the preparation of an Environmental Assessment pertain with respect to the proposed facilities at any of the sites included in this application. In particular, because they will be mounted on towers at existing sites, the new operations do not implicate many of the causes for further investigation and preparation of further reports.

With respect to Radio Frequency Radiation exposure, OET Bulletin No. 65 provides methods for evaluating the level of exposure for both employees (occupational/controlled situations) and non-employees (general population/uncontrolled situations). The combinations of the antenna radiation patterns, as provided in the manufacturer's technical specifications, with the antenna heights above ground level and the operating power levels indicate that the potential exposure would be less than 5 percent of the Maximum Permissible Exposure (MPE) limit for general population / uncontrolled situations at all three sites. Specifically, application of the formulas provided in OET-65 yields values of less than three percent of the MPE at one site and less than one percent at the others. Thus, the proposed operations are categorically excluded from having to submit detailed RF exposure analyses of the sites.

Notwithstanding the foregoing, KAZN recognizes its responsibility for the safety and health of employees and contractors when exposed to RF radiation conditions. It will take the steps necessary to assure that personnel working in its facilities and on the towers and antennas are protected from exposure to RF radiation levels exceeding those specified in the Commission's rules. The steps to be taken will include measurements and monitoring as well as power reductions or turning off the transmitters, if necessary to ensure a safe working environment.

Notifications & Measurements

None of the proposed sites is in proximity to any of the government radio astronomy installations named in Section 73.1030, nor is it proximate to any of the named radio receiving locations. Furthermore, the nearest FCC monitoring station is over 500 km distant from the closest DTxT site (Site 2 – Mount Harvard). Thus, none of the notifications mandated or recommended by Section 73.1030 is required in this instance.

Figure 1a — Technical Specifications — Proposed KHIZ-DTS Facility
Channel 44 — Barstow, CA — Site 1: Quartzite Mtn

Frequency

Channel	44
Frequency Band	650 – 656 MHz
Center Frequency	653 MHz

Location

Site	Quartzite Mountain, Victorville, CA
Geographic Coordinates (NAD27)	34° 36’ 33.93” N 117° 17’ 10.94” W
Tower Registration (FAA Study Number)	1014642 (2002-AWP-2863-OE)

Elevation

Elevation of site above mean sea level	1367.6 m
Overall height of tower above site elevation	156.0 m
Overall height of tower above mean sea level	1523.6 m
Height of antenna radiation center above site elevation	146.0 m
Elevation of average terrain (45-degree-spaced radials, 3.2-16.1 km)	916.7 m
Height of antenna radiation center above mean sea level	1513.6 m
Height of antenna radiation center above average terrain (HAAT)	596.9 m

Antenna

Manufacturer	Electronics Research, Inc.
Model	ATW24H4-HSCX-44H
Description	Side-Mounted UHF Slot
Orientation (rotation around vertical axis)	218 degrees true
Electrical beam tilt	1.0°
Mechanical beam tilt	None
Polarization	Horizontal
Gain (in horizontal plane – 0° depression)	19.36 (12.87 dBd)
Gain (peak of beam – 1.0° depression)	37.60 (15.75 dBd)

Power

Effective radiated power (ERP) (main beam – 1.0° depression)	1000 kW
Effective radiated power (ERP) (toward avg. radio horizon – 0.677° dn.)	937 kW
Effective radiated power (ERP) (horizontal plane)	515 kW

Figure 1b — Technical Specifications — Proposed KHIZ-DTS Facility Channel 44 — Barstow, CA — Site 2: Mt Harvard

Frequency

Channel	44
Frequency Band	650 – 656 MHz
Center Frequency	653 MHz

Location

Site	Mt Harvard, Mt Wilson, CA
Geographic Coordinates (NAD27)	34° 12’ 47.78” N 118° 03’ 40.95” W
Tower Registration (FAA Study Number)	1213941 (2008-AWP-2591-OE)

Elevation

Elevation of site above mean sea level	1654.8 m
Overall height of tower above site elevation	60.9 m
Overall height of tower above mean sea level	1715.7 m
Height of antenna radiation center above site elevation	30.5 m
Elevation of average terrain (45-degree-spaced radials, 3.2-16.1 km)	797.6 m
Height of antenna radiation center above mean sea level	1685.3 m
Height of antenna radiation center above average terrain (HAAT)	878.9m

Antenna

Manufacturer	Radio Frequency Systems
Model	DX24-D-44
Description	Side-Mounted UHF Cavity-Slot
Orientation (rotation around vertical axis)	152° true
Electrical beam tilt	3.8°
Mechanical beam tilt	0.1° down toward 210° true
Polarization	Horizontal
Gain (in horizontal plane – 0° depression)	5.22 (7.18 dB)
Gain (peak of beam – 3.8° depression)	42.66 (16.30 dB)

Power

Effective radiated power (ERP) (main beam – 1.0° depression)	169.3 kW
Effective radiated power (ERP) (horizontal plane)	20.72 kW

Figure 1c — Technical Specifications — Proposed KHIZ-DTS Facility Channel 44 — Barstow, CA — Site 3: Snow Peak

Frequency

Channel	44
Frequency Band	650 – 656 MHz
Center Frequency	653 MHz

Location

Site	Snow Peak, Banning, CA
Geographic Coordinates (NAD27)	34° 02’ 16.96” N 116° 48’ 46.93” W
Tower Registration (FAA Study Number)	1256620 (2006-AWP-6493-OE)

Elevation

Elevation of site above mean sea level	2407.9 m
Overall height of tower above site elevation	52.1 m
Overall height of tower above mean sea level	2460.0 m
Height of antenna radiation center above site elevation	30.5 m
Elevation of average terrain (45-degree-spaced radials, 3.2-16.1 km)	1617.0 m
Height of antenna radiation center above mean sea level	2438.4 m
Height of antenna radiation center above average terrain (HAAT)	767.6 m

Antenna

Manufacturer	Radio Frequency Systems
Model	DX24-H-44
Description	Side-Mounted UHF Cavity-Slot
Orientation (rotation around vertical axis)	135° true
Electrical beam tilt	3.5°
Mechanical beam tilt	1.2° down toward 207° true
Polarization	Horizontal
Gain (in horizontal plane – 0° depression)	0.277 (–5.58 dBd)
Gain (peak of beam – 3.5° depression)	21.93 (13.41 dBd)

Power

Effective radiated power (ERP) (main beam – 1.0° depression)	40.0 kW
Effective radiated power (ERP) (horizontal plane)	0.505 kW

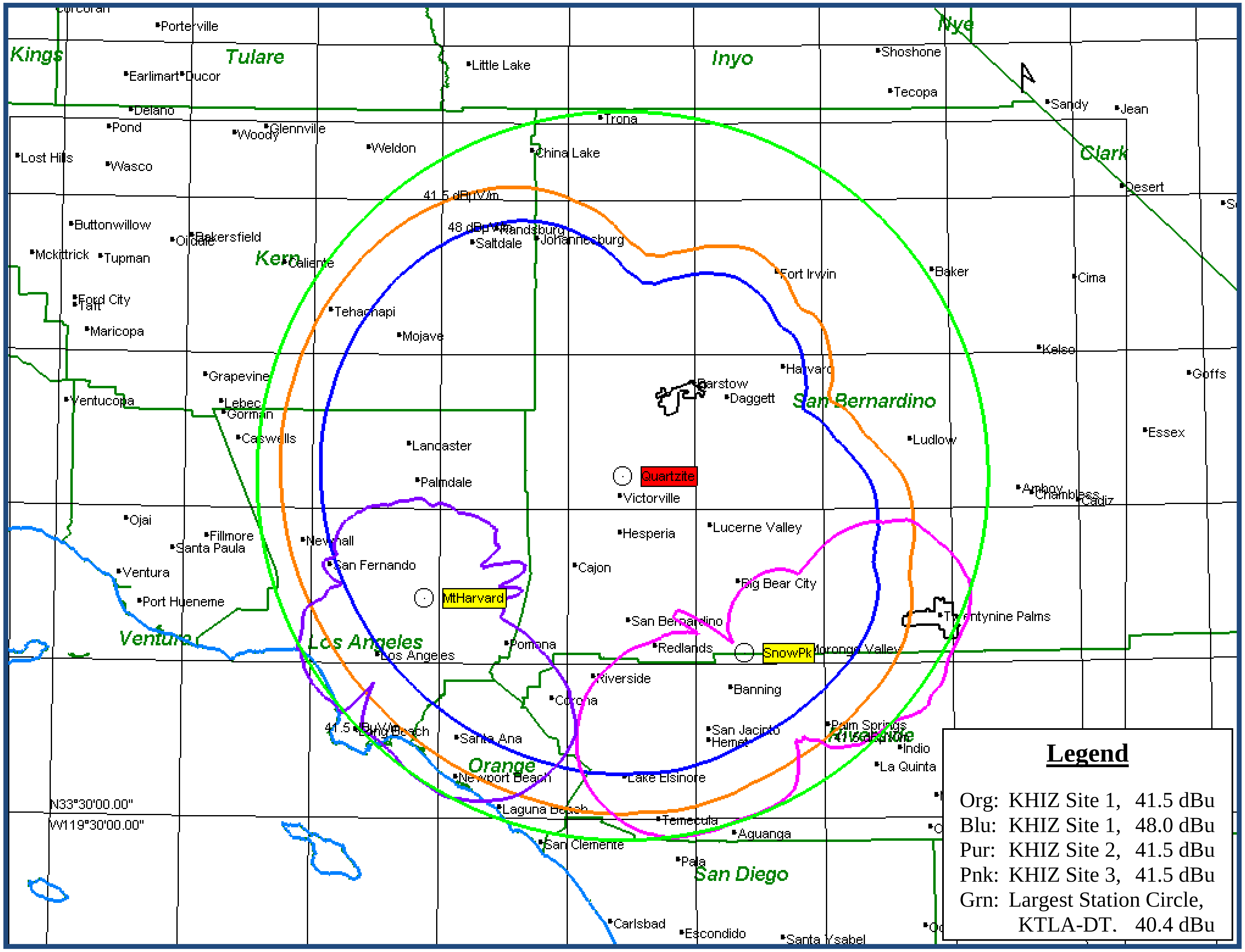

Figure 2 — KHIZ DTS Network Predicted Noise-Limited Contours & Largest Station Circle

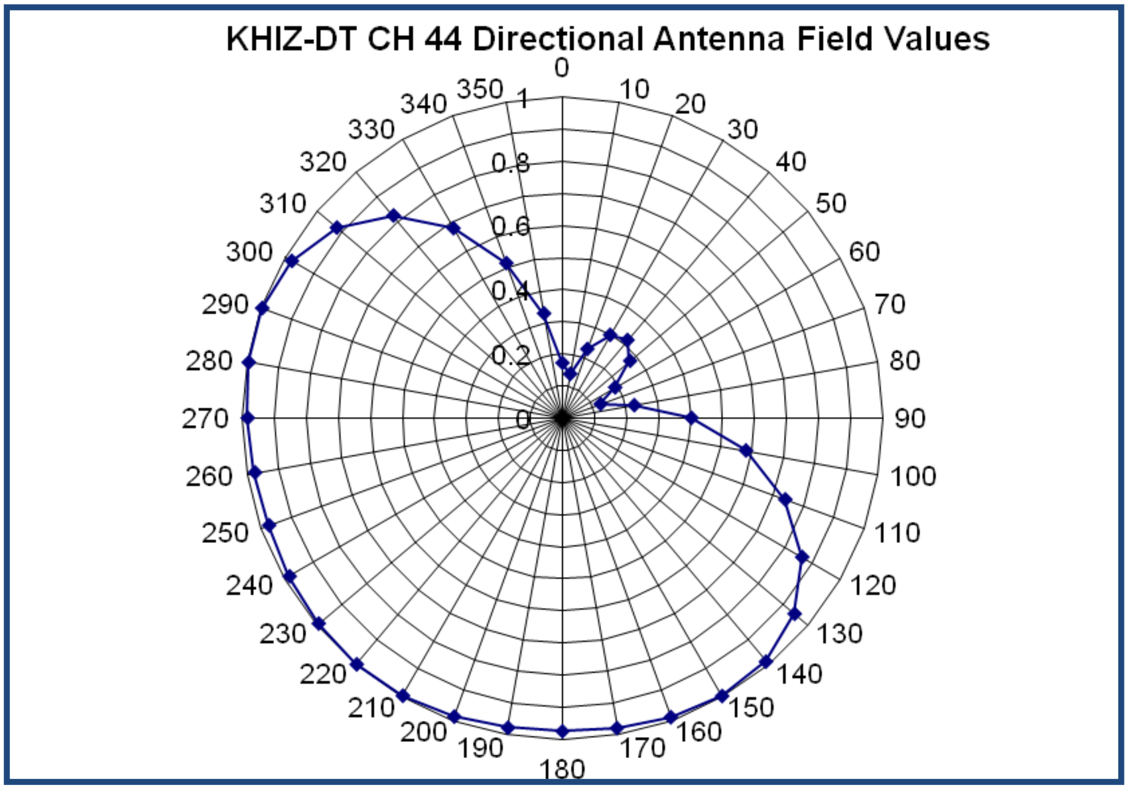

Figure 3 — KHIZ-DT Site 1 Azimuth Pattern in Relative Field Values

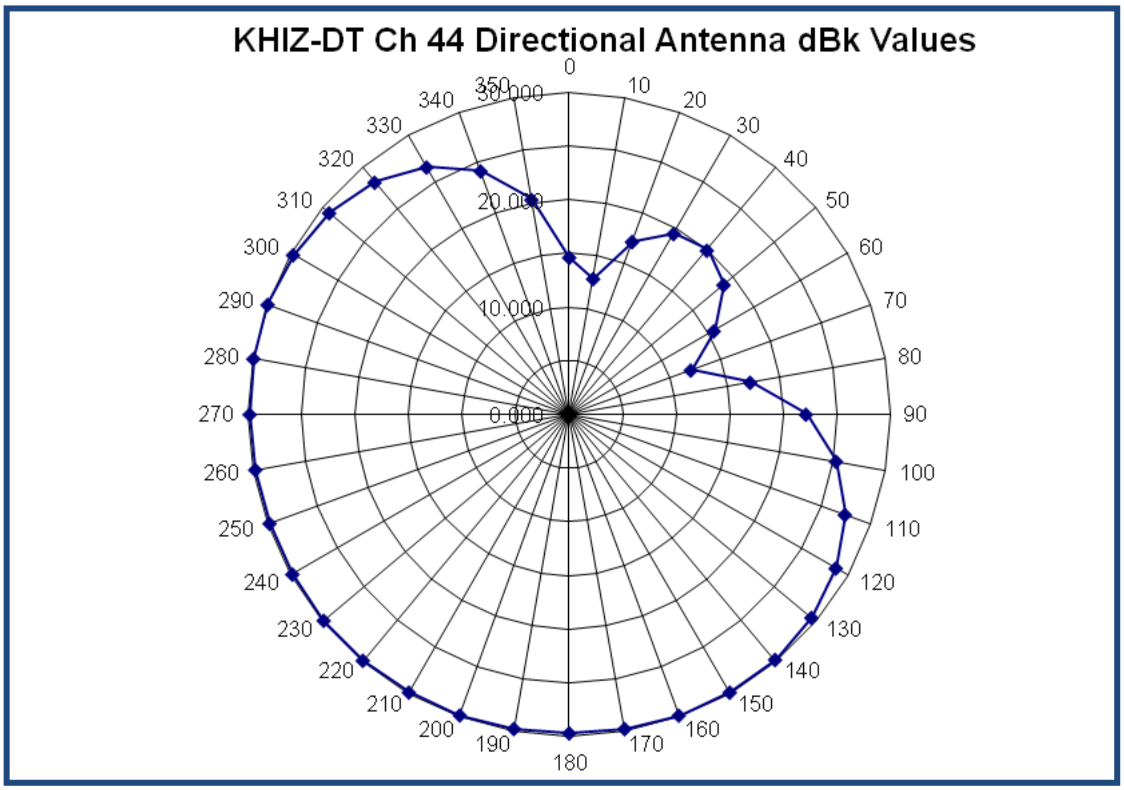

Figure 4 — KHIZ-DT Site 1 Azimuth Pattern in dBk

Figure 5 — KHIZ-DT Site 1 Azimuthal Radiation Pattern Tabulated Values

Azimuth	Relative Field	Effective Radiated Power (dBk)	Azimuth	Relative Field	Effective Radiated Power (dBk)
0	0.171	14.660	180	0.974	29.771
min 6	0.127	12.076	190	0.978	29.807
10	0.139	12.860	200	0.988	29.895
20	0.228	17.159	210	0.997	29.974
30	0.298	19.484	max 218	1.000	30.000
max 38	0.317	20.021	220	1.000	30.000
40	0.316	19.994	230	0.994	29.948
50	0.276	18.818	240	0.984	29.860
60	0.190	15.575	250	0.975	29.780
min 70	0.127	12.076	260	0.975	29.780
80	0.228	17.159	270	0.983	29.851
90	0.403	22.106	280	0.995	29.956
100	0.582	25.298	290	0.998	29.983
110	0.741	27.396	300	0.976	29.789
120	0.865	28.740	310	0.920	29.276
130	0.947	29.527	320	0.821	28.287
140	0.989	29.904	330	0.681	26.663
150	0.998	29.983	340	0.512	24.185
160	0.990	29.913	350	0.330	20.370
170	0.979	29.816			

Derived from data supplied by manufacturer

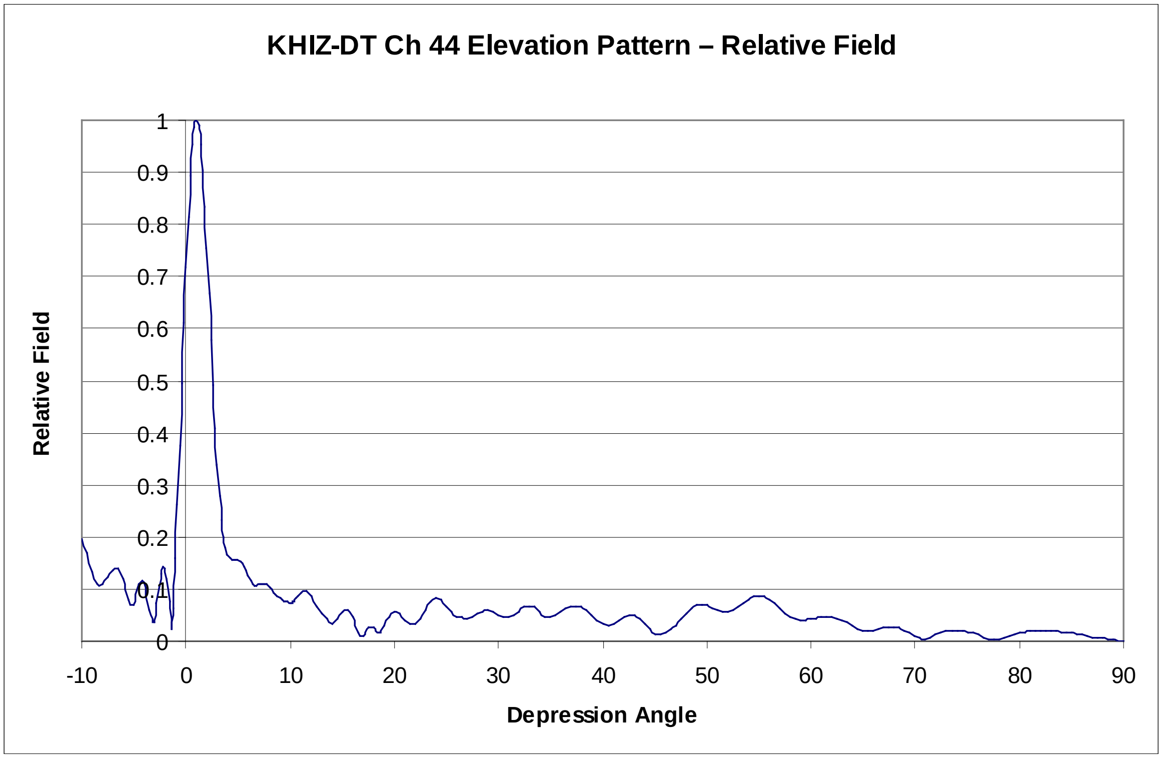

Figure 6 — KHIZ-DT Site 1 Elevation Pattern in Relative Field Values

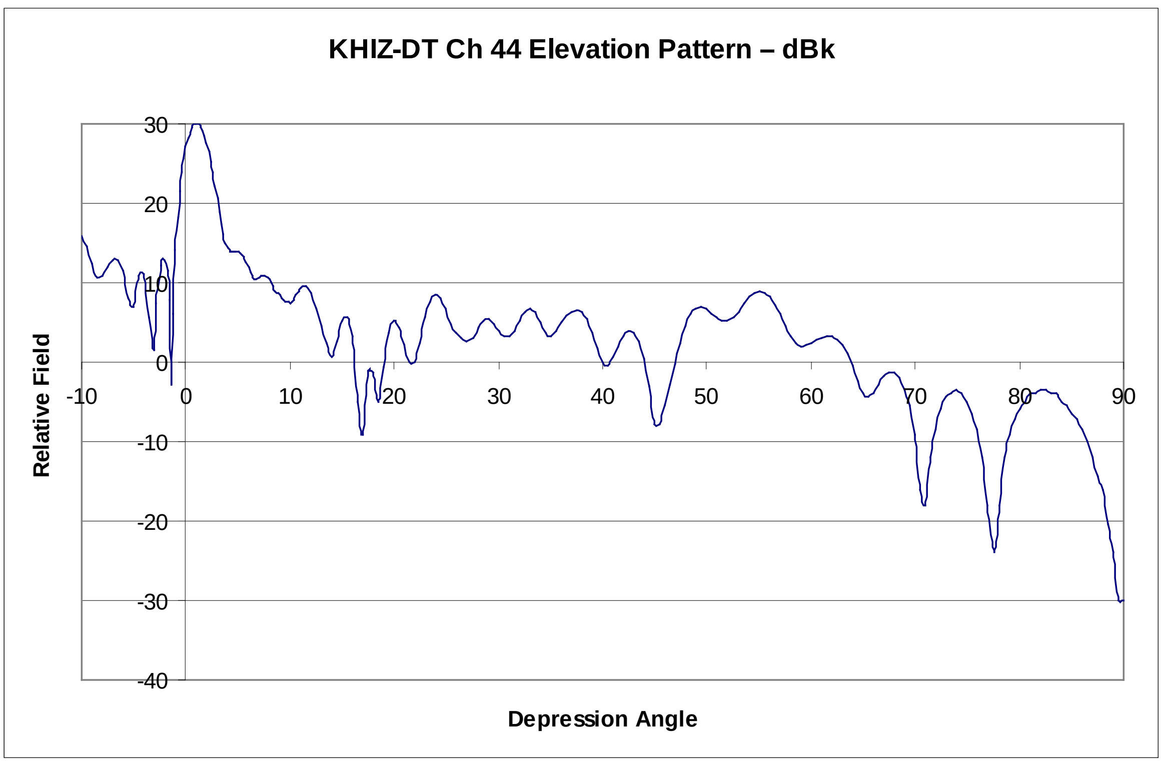

Figure 7 — KHIZ-DT Site 1 Elevation Pattern in dBk (at Azimuth w/Maximum)

Figure 8 — KHIZ-DT Site 1 Elevation Radiation Pattern Tabulated Values

Depression Angle	Relative Field	Effective Radiated Power (dBk)	Depression Angle	Relative Field	Effective Radiated Power (dBk)
-5.0	0.070	6.902	9.0	0.083	8.382
-4.5	0.110	10.828	9.5	0.077	7.729
-4.0	0.113	11.062	10.0	0.074	7.385
-3.5	0.061	5.707	10.5	0.081	8.112
-3.0	0.038	1.596	11.0	0.092	9.276
-2.5	0.118	11.392	11.5	0.096	9.645
-2.0	0.139	12.860	12.0	0.086	8.690
-1.5	0.051	2.538	12.5	0.068	6.650
-1.0	0.160	14.082	13.0	0.053	4.486
-0.5	0.436	22.701	13.5	0.042	2.465
0.0	0.718	27.122	14.0	0.034	0.630
0.5	0.923	29.295	14.5	0.043	2.669
1.0	1.000	30.000	15.0	0.058	5.269
1.5	0.929	29.357	15.5	0.061	5.707
2.0	0.754	27.547	16.0	0.046	3.255
2.5	0.535	24.530	16.5	0.018	-4.895
3.0	0.339	20.604	17.0	0.011	-9.172
3.5	0.217	16.702	17.5	0.028	-1.057
4.0	0.165	14.350	18.0	0.027	-1.373
4.5	0.155	13.807	18.5	0.018	-4.895
5.0	0.156	13.862	19.0	0.029	-0.752
5.5	0.147	13.345	19.5	0.048	3.625
6.0	0.126	12.007	20.0	0.057	5.117
6.5	0.108	10.667	20.5	0.052	4.320
7.0	0.108	10.668	21.0	0.041	2.256
7.5	0.111	10.906	21.5	0.032	0.103
8.0	0.104	10.341	22.0	0.032	0.103
8.5	0.092	9.225	22.5	0.042	2.465

Note: Partial listing, derived from data supplied by manufacturer. A more complete data set, meeting the requirements spelled out in the form, is included in the file uploaded in Form 301 to the Commission's Electronic Filing System.

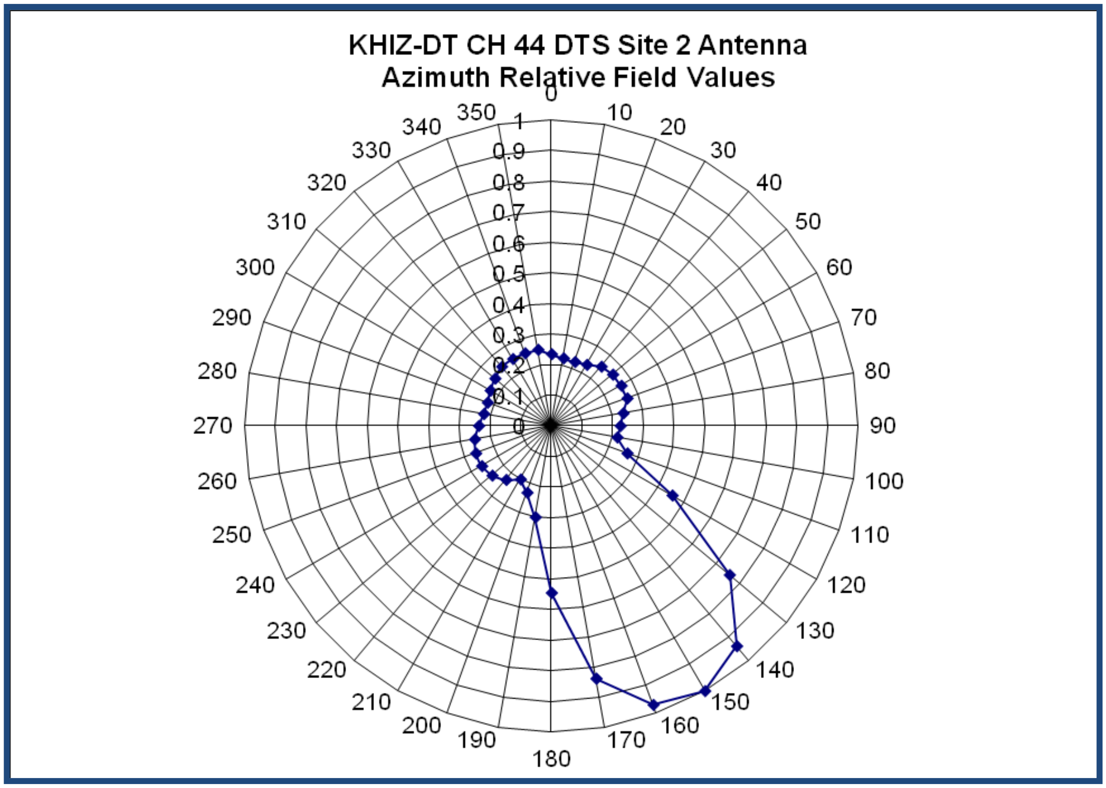

Figure 9a — DTS Site 2 Antenna Azimuth Relative Field Values

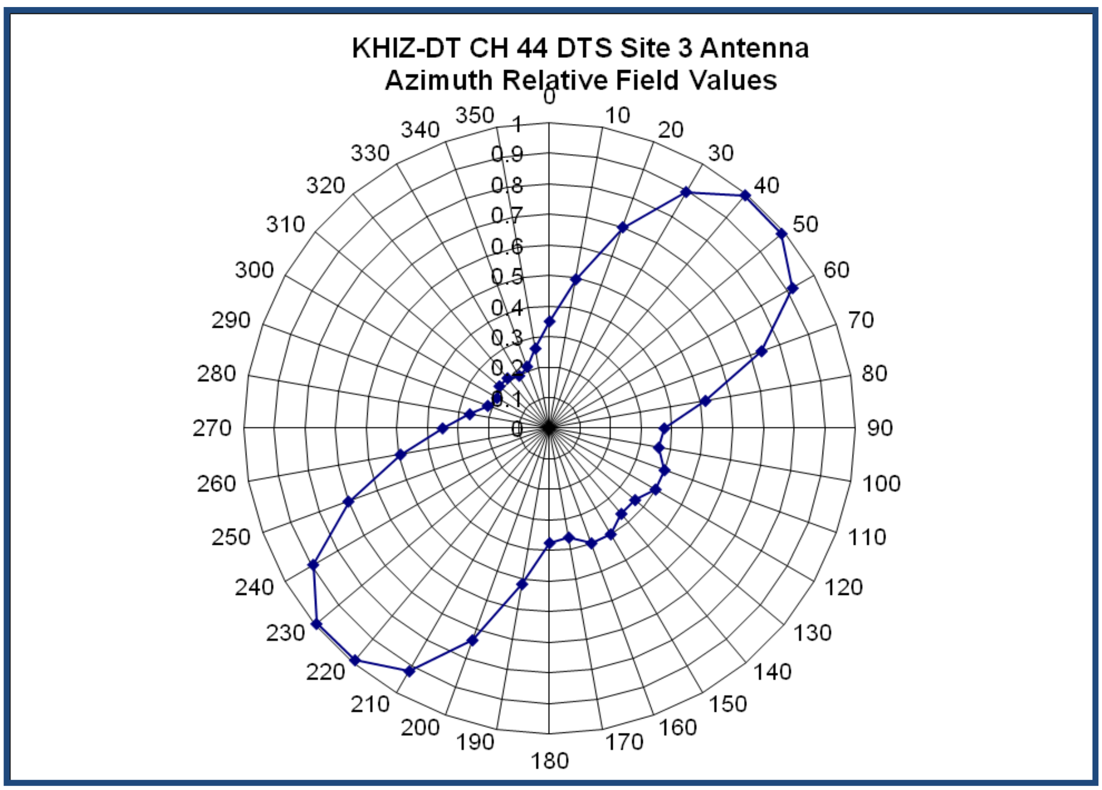

Figure 9b — DTS Site 3 Antenna Azimuth Relative Field Values

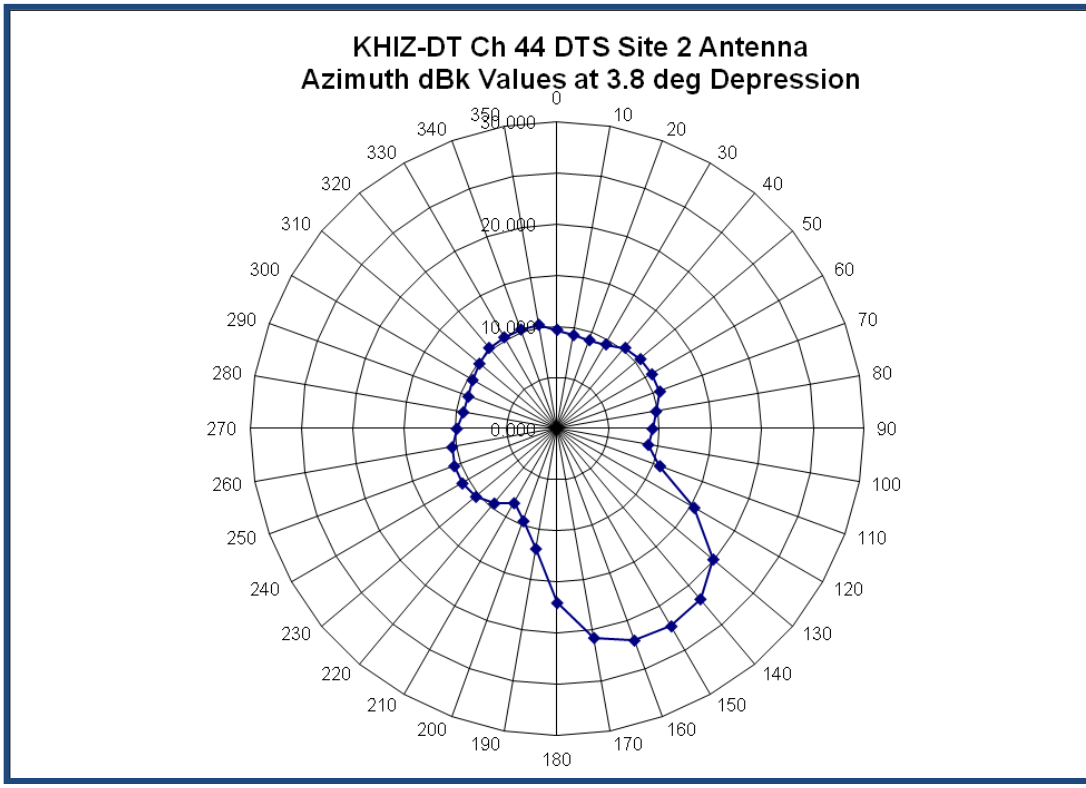

Figure 10a — DTS Site 2 Antenna Azimuth dBk Values

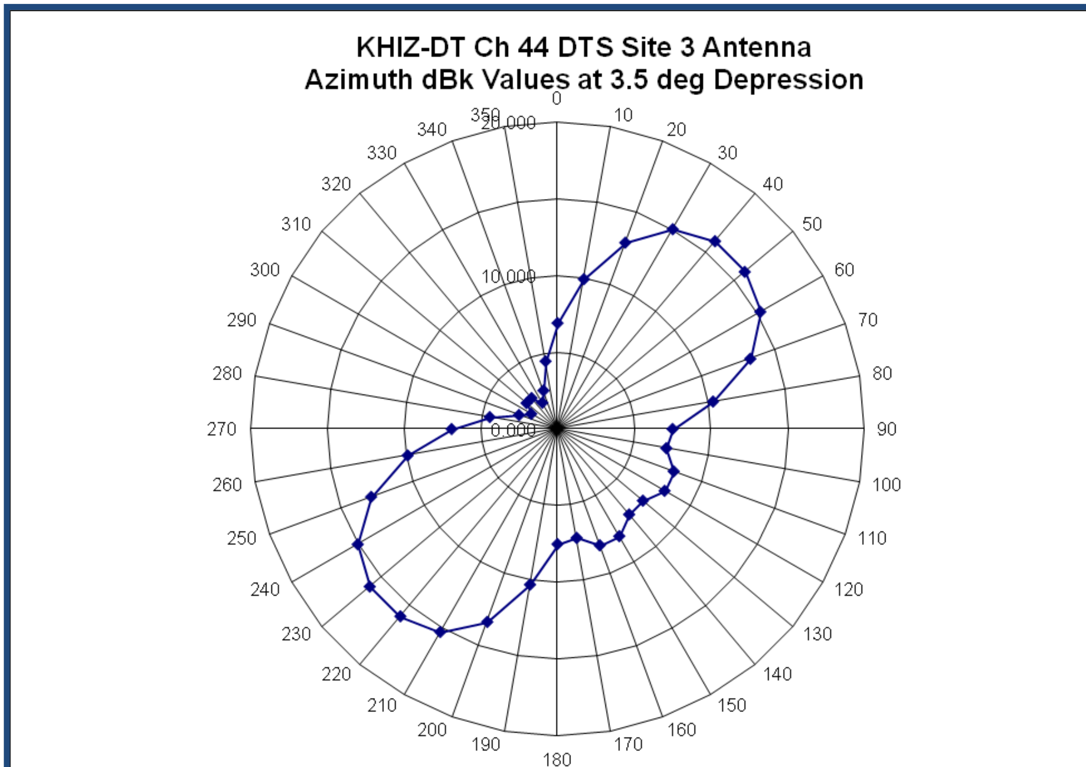

Figure 10b — DTS Site 3 Antenna Azimuth dBk Values

Figure 11a— KHIZ-DT Site 2 Azimuthal Radiation Pattern Tabulated Values

Azimuth	Relative Field	Effective Radiated Power (dBk)	Azimuth	Relative Field	Effective Radiated Power (dBk)
0	0.234	9.682	180	0.546	17.022
10	0.224	9.299	190	0.303	11.915
20	0.222	9.221	200	0.232	9.608
30	0.230	9.532	min 210	0.202	8.394
40	0.253	10.332	220	0.230	9.532
50	0.261	10.606	230	0.253	10.332
60	0.263	10.672	240	0.263	10.672
70	0.263	10.672	250	0.263	10.672
80	0.237	9.796	260	0.255	10.400
90	0.224	9.299	270	0.237	9.796
min 94	0.202	8.394	280	0.224	9.299
100	0.217	9.024	290	0.222	9.221
110	0.263	10.672	300	0.230	9.532
120	0.455	15.437	310	0.240	9.905
130	0.758	19.875	320	0.253	10.332
140	0.939	21.744	330	0.253	10.332
max 150	1.000	22.287	340	0.253	10.332
160	0.970	22.019	350	0.253	10.332
170	0.838	20.756			

Notes: Derived from data supplied by manufacturer. Complete data set available upon request.

Does not show the effects of mechanical beam tilt, which are included only in the file uploaded within Form 301 on FCC Electronic Filing System

Figure 11b— KHIZ-DT Site 3 Azimuthal Radiation Pattern Tabulated Values

Azimuth	Relative Field	Effective Radiated Power (dBk)	Azimuth	Relative Field	Effective Radiated Power (dBk)
0	0.350	6.902	180	0.375	7.501
10	0.495	9.913	190	0.518	10.299
20	0.700	12.923	200	0.738	13.376
30	0.893	15.033	210	0.918	15.273
40	0.995	15.977	220	0.990	15.933
50	0.990	15.933	max 226	1.000	16.021
max 44	1.000	16.021	230	0.995	15.977
60	0.918	15.273	240	0.893	15.033
70	0.738	13.376	250	0.700	12.923
80	0.518	10.299	260	0.495	9.913
90	0.375	7.501	270	0.350	6.902
min 97	0.360	7.147	280	0.265	4.486
100	0.363	7.207	290	0.215	2.669
110	0.400	8.062	min 295	0.190	1.596
120	0.400	8.062	300	0.199	1.976
130	0.365	7.266	310	0.214	2.629
140	0.365	7.266	320	0.214	2.629
150	0.400	8.062	330	0.199	1.976
160	0.400	8.062	min 335	0.190	1.596
170	0.363	7.207	340	0.215	2.669
min 173	0.360	7.147	350	0.265	4.486

Notes: Derived from data supplied by manufacturer. Complete data set available upon request.

Does not show the effects of mechanical beam tilt, which are included only in the file uploaded within Form 301 on FCC Electronic Filing System

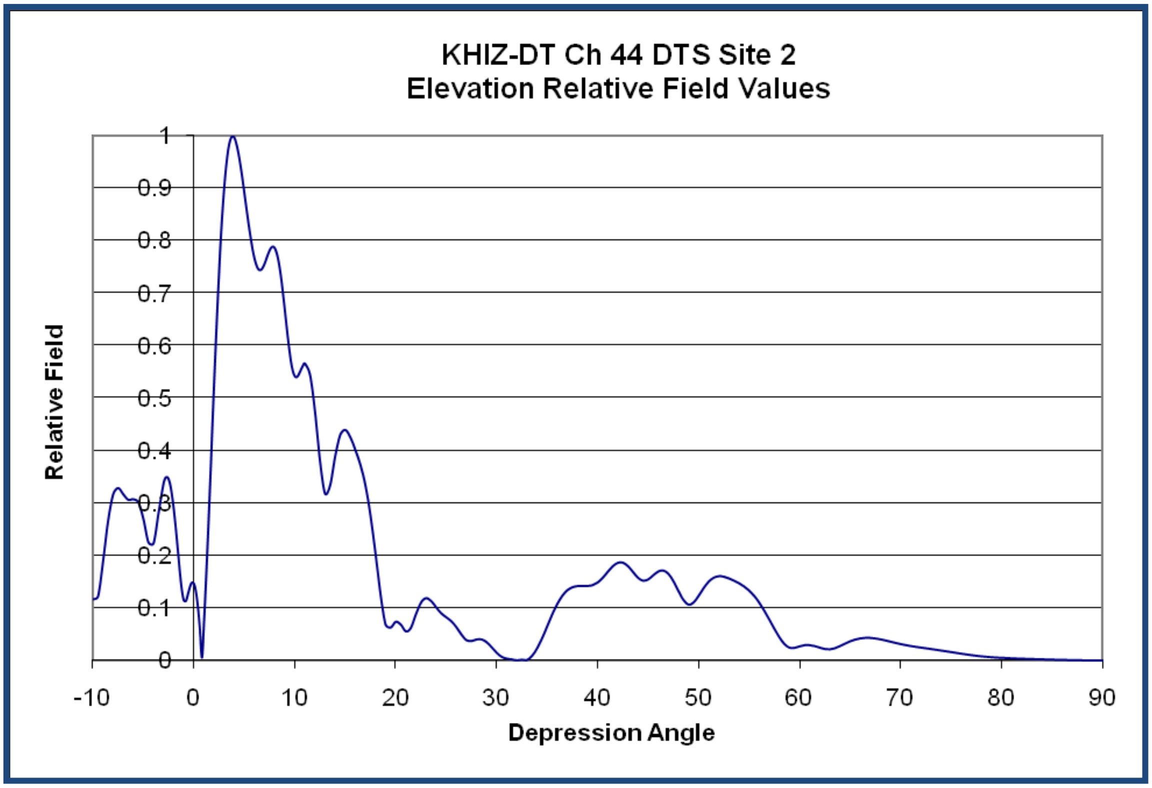

Figure 12a — DTS Site 2 Antenna Elevation Relative Field Values

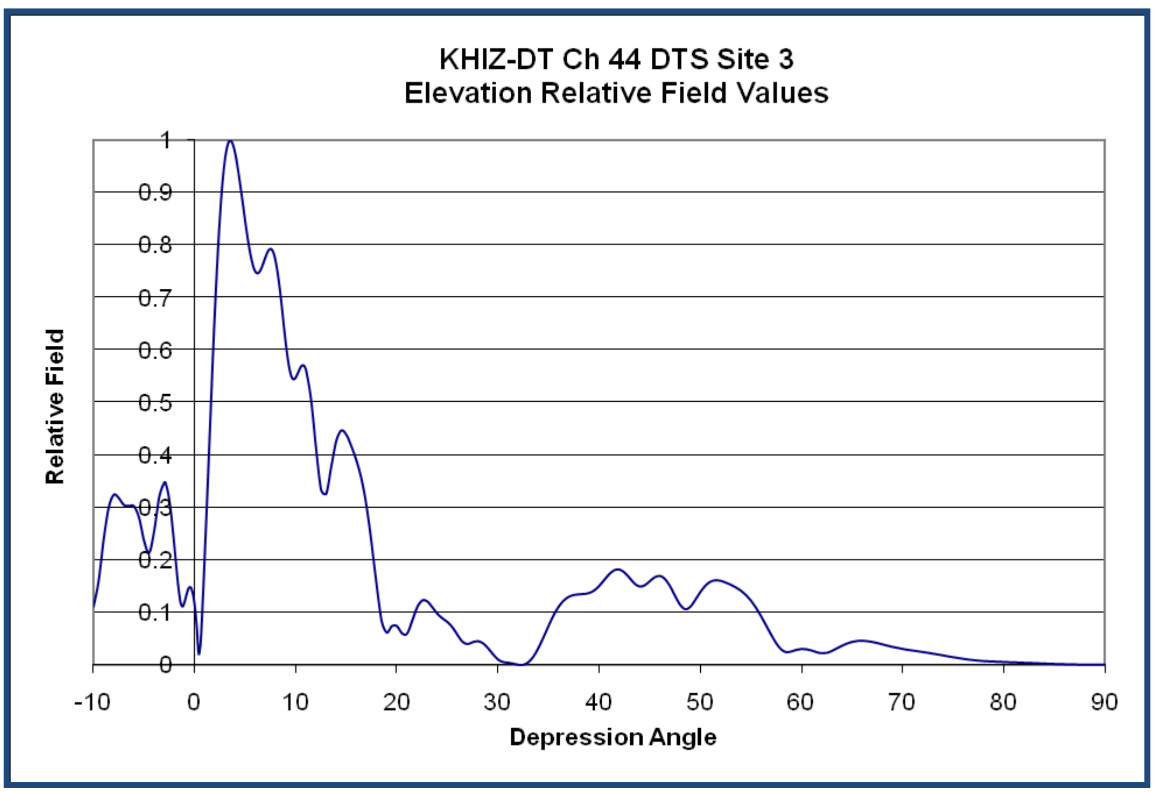

Figure 12b — DTS Site 3 Antenna Elevation Relative Field Values

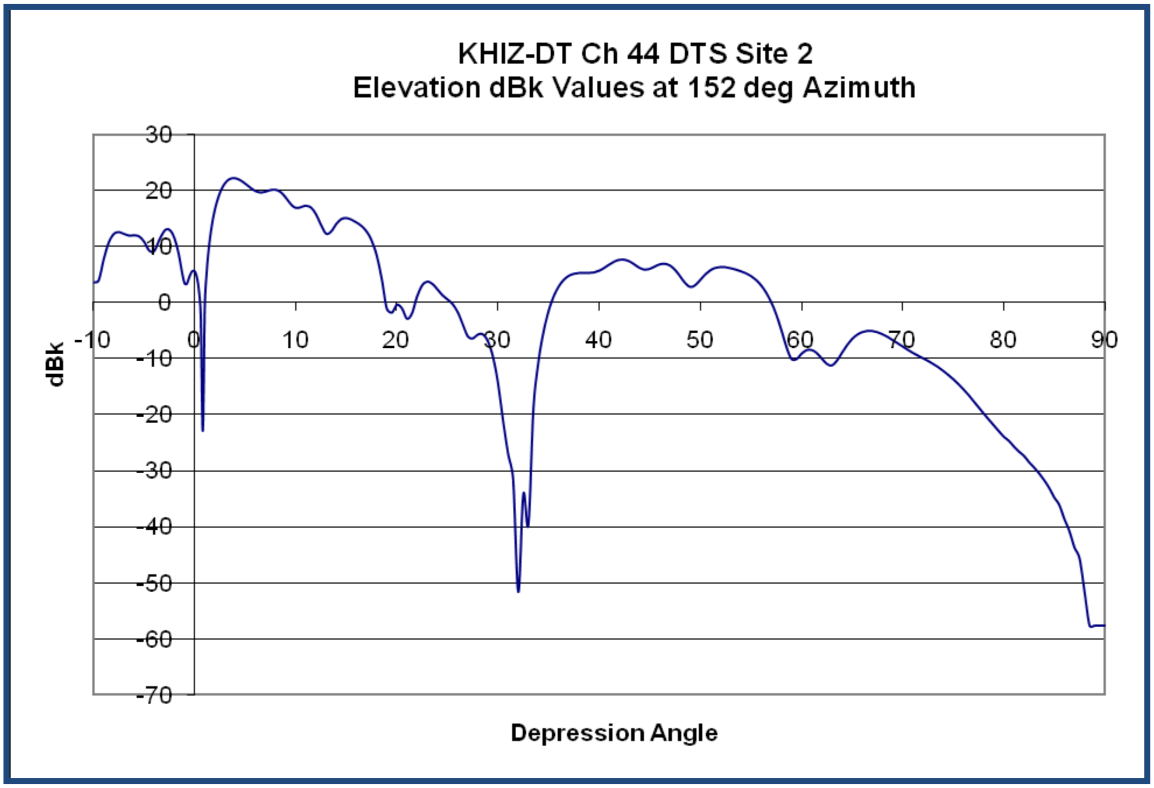

Figure 13a — DTS Site 2 Antenna Elevation dBk Values

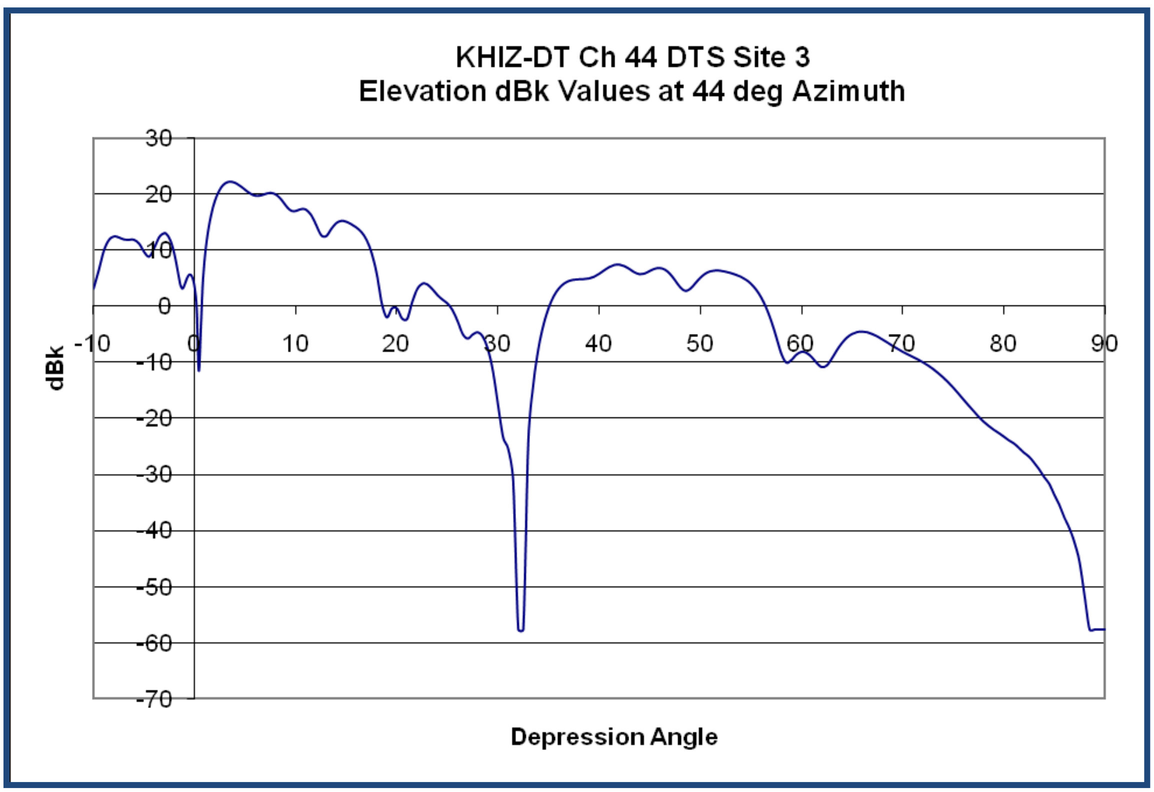

Figure 13b — DTS Site 3 Antenna Elevation dBk Values

Figure 14a — KHIZ-DT Site 2 Elevation Radiation Pattern Tabulated Values

Depression Angle	Relative Field	Effective Radiated Power (dBk)	Depression Angle	Relative Field	Effective Radiated Power (dBk)
-5.0	0.270	10.904	2	0.670	18.809
-4.5	0.225	9.338	9.5	0.586	17.647
-4.0	0.223	9.260	10.0	0.542	16.965
-3.5	0.281	11.264	10.5	0.550	17.094
-3.0	0.338	12.873	11.0	0.566	17.348
-2.5	0.344	13.027	11.5	0.545	17.019
-2.0	0.290	11.538	12.0	0.475	15.815
-1.5	0.192	7.886	12.5	0.379	13.869
-1.0	0.115	3.470	13.0	0.318	12.332
-0.5	0.133	4.721	13.5	0.334	12.764
0.0	0.147	5.609	14.0	0.390	14.099
0.5	0.080	0.034	14.5	0.430	14.964
1.0	0.070	-0.787	15.0	0.440	15.152
1.5	0.287	11.311	15.5	0.426	14.865
2.0	0.525	16.695	16.0	0.402	14.360
2.5	0.741	19.673	16.5	0.373	13.711
3.0	0.901	21.385	17.0	0.333	12.741
3.5	0.984	22.142	17.5	0.276	11.105
3.8	1.000	22.287	18.0	0.202	8.411
4.0	0.997	22.264	18.5	0.125	4.204
4.5	0.957	21.907	19.0	0.068	-1.050
5.0	0.892	21.292	19.5	0.063	-1.754
5.5	0.822	20.581	20.0	0.074	-0.364
6.0	0.767	19.982	20.5	0.068	-1.012
6.5	0.745	19.733	21.0	0.055	-2.859
7.0	0.757	19.865	21.5	0.062	-1.838
7.5	0.782	20.147	22.0	0.088	1.206
8.0	0.787	20.207	22.5	0.110	3.146
8.5	0.748	19.760			

Notes: Derived from data supplied by manufacturer. Complete data set available upon request.

Does not show the effects of mechanical beam tilt, which are included only in the file uploaded within Form 301 on FCC Electronic Filing System

Figure 14b — KHIZ-DT Site 3 Elevation Radiation Pattern Tabulated Values

Depression Angle	Relative Field	Effective Radiated Power (dBk)	Depression Angle	Relative Field	Effective Radiated Power (dBk)
-5.0	0.236	3.475	9.0	0.614	11.785
-4.5	0.214	2.621	9.5	0.555	10.899
-4.0	0.257	4.213	10.0	0.548	10.799
-3.5	0.321	6.148	10.5	0.568	11.105
-3.0	0.348	6.842	11.0	0.563	11.026
-2.5	0.311	5.875	11.5	0.506	10.110
-2.0	0.224	3.026	12.0	0.413	8.344
-1.5	0.132	-1.635	12.5	0.333	6.475
-1.0	0.120	-2.396	13.0	0.326	6.282
-0.5	0.147	-0.639	13.5	0.377	7.557
0.0	0.113	-2.956	14.0	0.427	8.635
0.5	0.034	-14.159	14.5	0.447	9.025
1.0	0.210	2.477	15.0	0.439	8.862
1.5	0.446	8.964	15.5	0.416	8.409
2.0	0.675	12.612	16.0	0.389	7.822
2.5	0.855	14.653	16.5	0.353	6.986
3.0	0.966	15.717	17.0	0.301	5.592
3.5	1.000	16.021	17.5	0.230	3.259
4.0	0.975	15.803	18.0	0.150	-0.458
4.5	0.915	15.250	18.5	0.082	-5.693
5.0	0.845	14.556	19.0	0.061	-8.216
5.5	0.784	13.906	19.5	0.074	-6.618
6.0	0.750	13.518	20.0	0.074	-6.630
6.5	0.753	13.555	20.5	0.060	-8.402
7.0	0.778	13.838	21.0	0.059	-8.518
7.5	0.792	13.999	21.5	0.084	-5.535
8.0	0.770	13.752	22.0	0.110	-3.183
8.5	0.702	12.940	22.5	0.123	-2.203

Notes: Derived from data supplied by manufacturer. Complete data set available upon request.

Does not show the effects of mechanical beam tilt, which are included only in the file uploaded within Form 301 on FCC Electronic Filing System

Annex A

Engineering Statement
by
Smith and Fisher, LLC
Engineering Consultants

ENGINEERING STATEMENT

The engineering data contained herein have been prepared on behalf of KAZN-TV LICENSEE LLC, licensee of digital television station KHIZ-DT on Channel 44 in Barstow, California, in support of its Application for Construction Permit for a new distributed transmission service (DTS) facility on Channel 44, transmitting from Snow Peak.

The purpose of this exhibit is to provide area and population figures for coverage of "underserved" area by the Channel 44 (DTS) facility proposed in the instant application. The Commission has determined that areas are considered to be underserved if they lie within the service contours of fewer than five full-power television stations. We have analyzed the coverage contour of the DTS facility proposed to serve the Lake Elsinore/Banning/Twenty-nine Palms portion of the KHIZ-DT service contour, with regard to other available post-transition digital television (DTV) facilities.

Figure 1 is a map on which the noise-limited contour of the proposed DTS facility is plotted. Figure 2 is a "spaghetti" map upon which the noise limited service contours of all authorized post-transition DTV contours in the area have been added. Figure 3 is a list of the full-power stations that were considered. Figure 4 is an expanded view of the underserved area. Larger pockets created by overlapping contours are defined on the map by the number of other services therein. It can be clearly seen that there is significant underserved area that lies within the proposed DTS facility contour.

We have determined the area and population (based on the 2000 U.S. Census) for each above-referenced pocket and have tabulated the results in Figure 5. It concludes that the proposed DTS facility will provide a second post-transition DTV signal to a significant number of people (24,466). In addition, a total of 79,136 people that presently live within underserved area (fewer than five television services) will be served by the DTS facility.

I declare under penalty of perjury that the foregoing statements and the attached exhibits, which were prepared by me or under my immediate supervision, are true and correct to the best of my knowledge and belief.

KEVIN T. FISHER

May 26, 2009

FIGURE 1
PREDICTED SERVICE CONTOUR
PROPOSED DTS FACILITY
KHIZ-DT - BARSTOW, CA

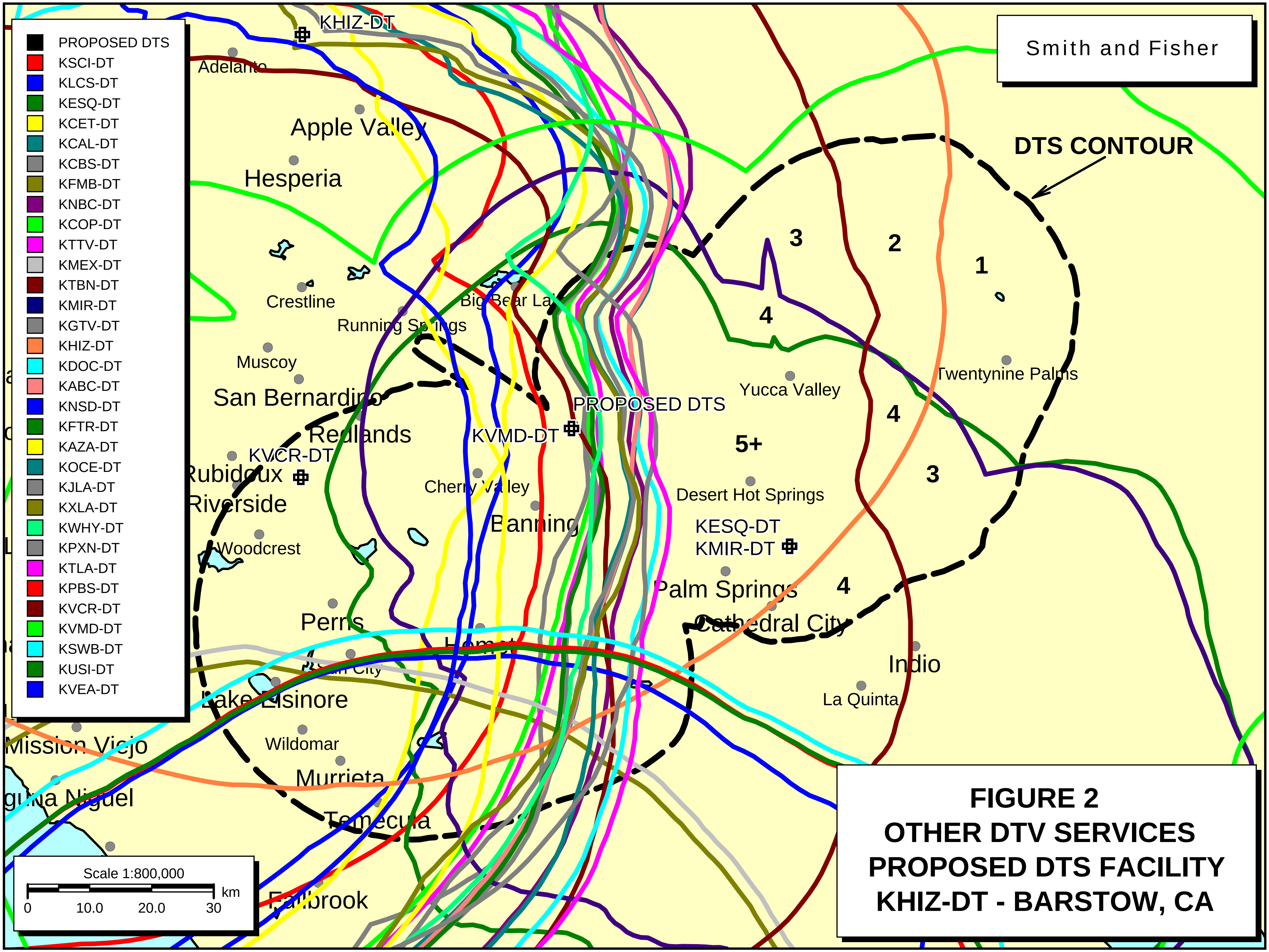

FIGURE 2
OTHER DTV SERVICES
PROPOSED DTS FACILITY
KHIZ-DT - BARSTOW, CA

FIGURE 3

AUTHORIZED POST-TRANSITION FULL-SERVICE DTV STATIONS IN AREA

Call Sign	Auth.	CH.	City, State
KDOX-DT	CP	32	Anaheim, CA
KAZA-DT	Lic.	47	Avalon, CA
KHIZ-DT	CP	44	Barstow, CA
KVEA-DT	Lic.	39	Corona, CA
KOCE-DT	Lic.	48	Huntington Beach, CA
KSCI-DT	CP	18	Long Beach, CA
KABC-DT	CP	7	Los Angeles, CA
KCAL-DT	CP	9	Los Angeles, CA
KTTV-DT	CP	11	Los Angeles, CA
KCOP-DT	CP	13	Los Angeles, CA
KCET-DT	CP	28	Los Angeles, CA
KTLA-DT	Lic.	31	Los Angeles, CA
KMEX-DT	CP	34	Los Angeles, CA
KNBC-DT	CP	36	Los Angeles, CA
KLCS-DT	CP	41	Los Angeles, CA
KWHY-DT	Lic.	42	Los Angeles, CA
KCBS-DT	CP	43	Los Angeles, CA
KFTR-DT	CP	29	Ontario, CA
KESQ-DT	CP	42	Palm Springs, CA
KMIR-DT	CP	46	Palm Springs, CA
KXLA-DT	Lic.	51	Rancho Palos Verdes, CA
KVCR-DT	Lic.	26	San Bernardino, CA
KPXN-DT	Lic.	38	San Bernardino, CA
KFMB-DT	CP	8	San Diego, CA
KGTV-DT	CP	10	San Diego, CA
KUSI-DT	Lic.	18	San Diego, CA
KSWB-DT	Lic.	19	San Diego, CA
KPBS-DT	Lic.	30	San Diego, CA
KNSD-DT	CP	40	San Diego, CA
KTBN-DT	CP	33	Santa Ana, CA
KVMD-DT	Lic.	23	Twentynine Palms, CA
KJLA-DT	Lic.	49	Ventura, CA

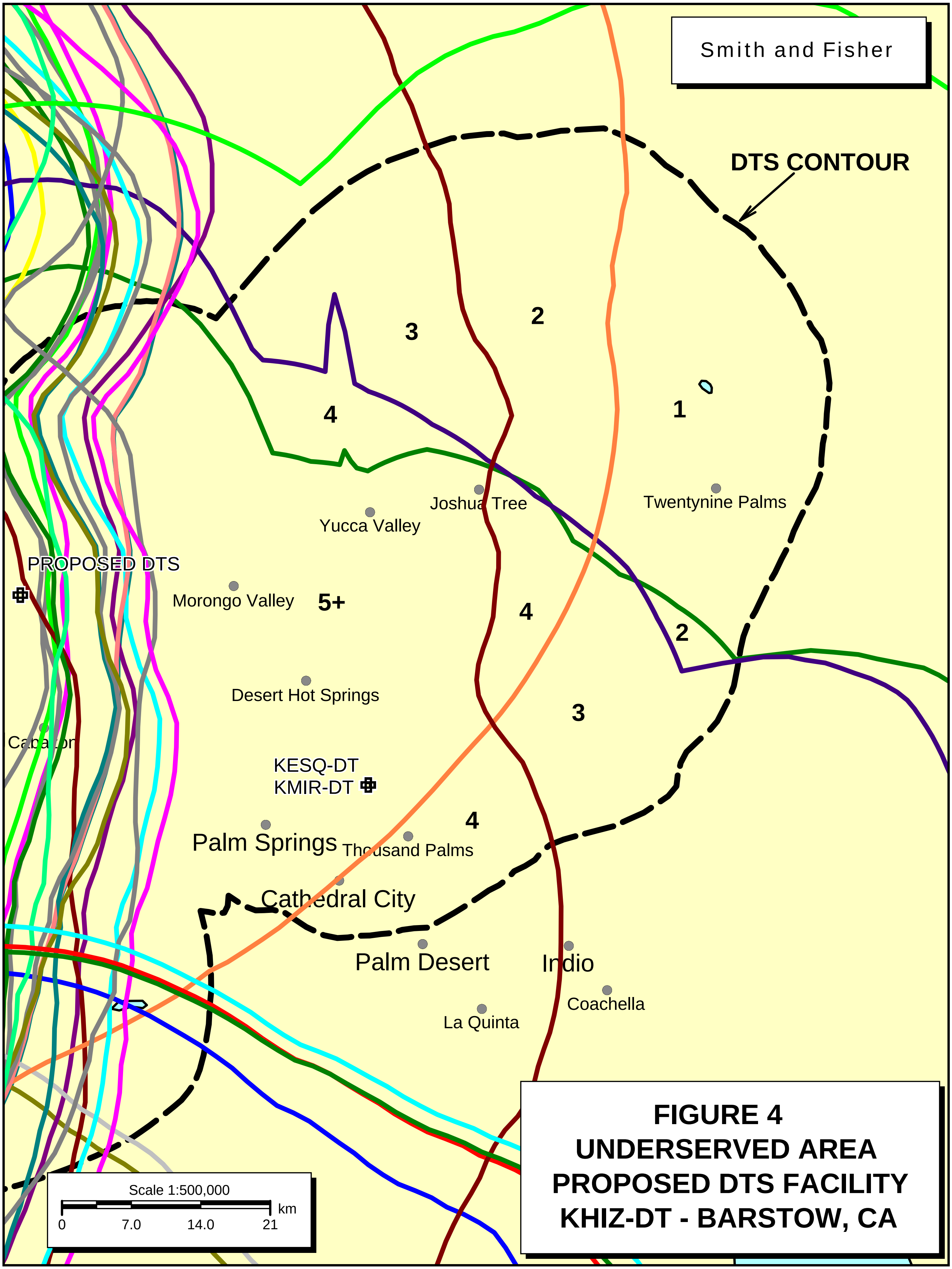

FIGURE 4
UNDERSERVED AREA
PROPOSED DTS FACILITY
KHIZ-DT - BARSTOW, CA

FIGURE 5

AREA AND POPULATION IN DTS COVERAGE CONTOUR WITH RESPECT TO OTHER DTV CONTOURS

Other Post-Transition DTV Services in Area	Area (Sq. Km)	Population (2000 Census)
0	0	0
1	797	24,466
2	571	7,060
3	840	4,752
4	599	42,858
5+	6,611	1,001,464
TOTAL	9,418	1,080,600

Annex B

Reply Comments
In
MB Docket #05-312
by
Group of Engineering Firms

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Digital Television Distributed Transmission System Technologies	)	MB Docket No. 05-312
	)	
	)	

REPLY COMMENTS OF CAVELL, MERTZ & ASSOCIATES, INC.; CHESAPEAKE RF CONSULTANTS, LLC; DU TREIL, LUNDIN & RACKLEY, INC.; GREG BEST CONSULTING, INC.; HATFIELD & DAWSON CONSULTING ENGINEERS, LLC; MEINTEL, SGRIGNOLI, & WALLACE, LLC; MERRILL WEISS GROUP LLC; and SMITH and FISHER LLC
TO PETITION FOR RECONSIDERATION OF THE ASSOCIATION FOR MAXIMUM SERVICE TELEVISION, INC.

The firms Cavell, Mertz & Associates, Inc.; Chesapeake RF Consultants, LLC; du Treil, Lundin & Rackley, Inc.; Greg Best Consulting, Inc.; Hatfield & Dawson Consulting Engineers, LLC; Meintel, Sgrignoli, & Wallace, LLC; Merrill Weiss Group LLC; and Smith and Fisher LLC (hereinafter, the "Engineering Firms") jointly file these comments in response to the Petition for Reconsideration of the Association for Maximum Service Television, Inc. (MSTV) in the above-captioned proceeding. The FCC released its Report and Order on Distributed Transmission System Technologies, FCC 08-256 (the "DTS R&O"), on November 7, 2008. MSTV filed its petition on December 31, 2008, and the Engineering Firms have waited since that time for notice of the petition to appear in the Federal Register. Since the petition has not yet been published in the Federal Register, the Engineering Firms now file these Reply Comments with the intention that they will be of assistance to the Commission staff as they proceed with implementation of the processing methodology for DTS systems.

As does MSTV, the Engineering Firms applaud the adoption by the Federal Communications Commission of rules for the routine licensing of digital television broadcast stations utilizing Distributed Transmission Systems (DTS) technology. As engineering and technical consultants who design transmission systems for licensed television stations and who prepare technical filings for those stations, we strongly recommend that the Commission adopt an interference evaluation regime for DTS that will yield the most accurate results that can be obtained within the general methodological approach of OET Bulletin No. 69.

In this regard, we support the request of MSTV that stations be required to submit and use the actual elevation patterns of their DTS antennas instead of the OET-69 standard pattern to more accurately evaluate the interference impact of the DTS transmitters. We find the MSTV suggestion that actual antenna elevation patterns should be applied to all stations involved in interference analyses to be the correct approach. We also find, however, that the MSTV request did not specify all important aspects of the issues surrounding use of elevation patterns in conducting the necessary interference analyses. These comments are filed to bring to the attention of the Commission at least one other factor that must be included in the adoption of the use of elevation patterns and to respectfully request its adoption upon reconsideration of the DTS Report and Order or its inclusion in a revision of OET-69 and its supporting software, as appropriate.

When both the azimuth and elevation patterns of transmitting antennas are to be taken into account in the analysis of interference between two or more stations, it is necessary to determine the received signal levels from all relevant stations at each geographic point to be studied for the presence of interference. To correctly compute the received signal levels, the relevant launch angles from the transmitting antennas must be determined to either the receiving antenna itself or to appropriate representations of any obstacles that obstruct the paths to that receiving antenna. Those launch angles comprise combinations of the azimuthal directions from the transmitting to receiving antennas and the depression angles from the transmitting antennas either to the receiving antennas or to any obstacles in the paths to those receiving antennas. From the launch angle information, the relative field values from the transmitting antennas can be determined for the relevant paths.

To determine the depression angle from a transmitting antenna, it is necessary to calculate the difference in heights of the transmitting and receiving antennas (or the transmitting antenna and any obstacle in the path) and the distance between them. The depression angle then is the arc-tangent of the ratio of the distance divided by the height difference. For improved precision, the height difference should be compensated for the curvature of the earth.

The difference in heights of the transmitting and receiving antennas (or obstacles) is found by adding the height above ground level (AGL) of each antenna to the height of the terrain above mean sea level (AMSL) at the antenna location to obtain the total height of each antenna AMSL. Of course, for obstacles in the path, the height is just the height of the obstacle as it is represented in the propagation model in use. The difference in heights then is just the difference in the two total height values.

Unfortunately, the mathematical process currently embodied in the Commission's software implementing the Longley-Rice propagation model according to OET Bulletin No. 69 leaves out an important step in the calculation of the difference in heights of the two antennas (or of the transmitting antenna and of any obstacle). It does not add the height of the terrain at the antenna location to the antenna height AGL. Rather it skips the step of adding the height of the terrain at the antenna location and uses only the height AGL in making the depression angle calculation.

Such a shortcut approach will be reasonably accurate in locations where the terrain is flat; this might be the case in some locations in the Midwest or the Great Plains, for example. But it clearly leads to serious errors in the computation of depression angle in markets with significant terrain variation, which is the case in much of the United States. Modern antenna design software permits both azimuth and elevation patterns to be achieved that were not previously possible. This enables obtaining results such as uniform field strengths over large areas around an antenna, with no “hot spots” in the region near the antenna itself, or placing sharp nulls in patterns – both in azimuth and elevation. The former of these techniques is valuable for providing protection to adjacent-channel stations in the same market, while the latter technique is useful for providing protection to stations in neighboring markets. Both of these methods have been applied in DTS networks designed to date; indeed, they both have been applied in the design of a single such network.

The principal objective in the design of a television transmission system is to obtain the best possible service to viewers of each station while minimizing interference to neighboring stations. This maximizes the efficiency of spectrum utilization. There is no economic method for accurately determining the actual interference results in the field, so the Commission’s methodology is predicated on limiting actual interference by limiting predicted interference and assuming the prediction to be reasonably accurate. It therefore is important that the model used reflect the real world as much as possible within the context of the general methodology applied. Given the foregoing discussion, we make the following recommendation for the process the FCC uses in collecting data and analyzing interference:

- Correct the methodology applied in the software associated with OET Bulletin No. 69 to include computation of the total antenna height AMSL for both transmitting and receiving antennas before determination of the depression angle from the transmitting antenna and the corresponding relative field of the emission toward the studied receiving location.

Please note that our recommendation does not deal with the issue of the launch angle toward any obstruction(s) that may be in the path from transmitter to receiver. That issue is rather complex, and the solution to it is not as readily apparent as is the case with unobstructed paths. Thus, we are not making a recommendation at this time for its solution, but we do strongly recommend that the actual height of the transmitting antenna AMSL be used in all calculations, as it resolves with the simplest of solutions the most serious of the problems in the Commission's software regarding the use of elevation patterns.

We are gratified that the collection of information on the elevation patterns at least of the antennas of DTS facilities already has been provided for in the new Form 301 that recently was approved by the Office of Management and Budget. Given that, it is our belief that our suggestion can be implemented through changes that we expect to be required in OET Bulletin No. 69 and in the software that supports interference analysis using the methodology of OET-69. Since that document and software already will be in revision, now is an opportune time to make a change that long has been pointed out by members of the engineering community as being necessary to improve the accuracy of the Commission's prediction of interference. The alternative is that DTS transmitter facilities will be designed to achieve the best predicted interference performance, but those predictions will not be correctly reflected in the real world.

Respectfully submitted,

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