

## **ENGINEERING EXHIBIT**

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

prepared for

**CBS Broadcasting Inc.**  
KPIX-DT San Francisco, CA  
Facility ID 25452  
Ch. 29 500 kW 371 m

*CBS Broadcasting Inc.* (“*CBS*”) is the licensee of television station KPIX-TV, analog Channel 5 and digital Channel 29, San Francisco, CA. A Construction Permit (“CP”, BPCDT-20080603AAG) authorizes construction of the final post-transition KPIX-DT facility with a top-mount antenna on Channel 29, as established in Appendix B of the Seventh Report and Order in MB Docket 87-278. *CBS* herein proposes to employ a new auxiliary antenna for KPIX-DT.

KPIX-DT is presently licensed on Channel 29 to operate at 1000 kW effective radiated power (“ERP”) using a directional side-mount antenna at a height above average terrain (“HAAT”) of 401 meters. The CP authorizes KPIX-DT to operate with a top-mount directional antenna at 1000 kW ERP and 512 meters HAAT. The proposed auxiliary antenna, to be shared with several other stations, will operate at 500 kW ERP (directional) and an antenna HAAT of 371 meters at the same site as the licensed and CP KPIX-DT facilities.

*CBS*’ plan for KPIX-DT as authorized by the current CP involves installation of a new top-mount main antenna for digital Channel 29 in place of the current analog transmitting antennas atop the shared Sutro Tower. The KPIX-DT main antenna will be shared with some of the eleven other television stations that operate from Sutro Tower. Installation of the various top-mounted digital transmitting antennas for KPIX-DT and the other stations cannot be accomplished until after analog operations cease in February 2009. Until the antenna reconfiguration is completed, KPIX-DT will continue to operate from its licensed, side-mount antenna. As needed to allow for worker safety during the construction, KPIX-DT will operate from the auxiliary antenna proposed herein, to be side-mounted at a lower elevation than the currently licensed antenna.

The proposed auxiliary antenna is a horizontally polarized Dielectric model TUA-C4SP-12/40U-1-S. The directional antenna's azimuthal pattern is depicted in **Figure 1**. **Figures 2** and **2A** provide the theoretical vertical plane (elevation) pattern.

The antenna will be side-mounted on the existing Sutro Tower antenna supporting structure (FCC Antenna Structure Registration number 1001289). No change to the overall structure height will result from this proposal.

**Figure 3** shows that the 41 dB $\mu$  contour of the proposed auxiliary facility does not extend beyond the 41 dB $\mu$  contour of the licensed main facility (BLCDT-19990301KF) over land area, and is completely encompassed by that of the CP facility (BMPCDT-20080603AAG). Thus the proposal complies with §73.1675(a). As an auxiliary facility, compliance with the 95 percent population match (Certification Item 1(e) on Form 301 Expedited Processing) is not required.

### **Human Exposure to Radiofrequency Electromagnetic Field (Environmental)**

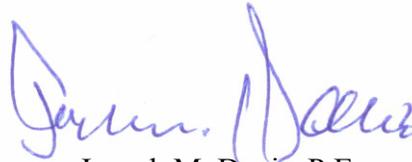
The proposed auxiliary antenna will be side-mounted on an existing antenna support structure. The use of existing transmitting locations has been characterized as being environmentally preferable by the Commission, according to Note 1 of §1.1306 of the FCC Rules.

The proposed operation was evaluated for human exposure to RF energy using the procedures outlined in the Commission's OET Bulletin Number 65. Based on OET-65 equation (10), and considering 15 percent antenna relative field in downward elevations (pattern data shows less than 15 percent relative field at angles 10 to 90 degrees below the antenna), the calculated signal density near the tower at two meters above ground level attributable to the proposed facility is 17.6  $\mu\text{W}/\text{cm}^2$ , which is 4.7 percent of the general population/uncontrolled maximum permitted exposure limit. This is below the five percent threshold limit described in §1.1307(b) regarding sites with multiple emitters, categorically excluding the applicant from responsibility for taking any corrective action in the areas where the proposal's contribution is less than five percent.

The general public will not be exposed to RF levels attributable to the proposal in excess of the FCC's guidelines. RF exposure warning signs will continue to be posted. With respect to worker safety, the applicant will coordinate exposure procedures with all pertinent stations and will reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from RF electromagnetic field exposure in excess of FCC guidelines.

### **Certification**

The undersigned hereby certifies that the foregoing statement and associated attachments were prepared by him or under his direction, and that they are true and correct to the best of his knowledge and belief.



Joseph M. Davis, P.E.  
September 26, 2008

**Chesapeake RF Consultants, LLC**  
11993 Kahns Road  
Manassas, VA 20112  
703-650-9600

### List of Attachments

- Figure 1      Antenna Horizontal Plane Pattern
- Figure 2, 2A    Antenna Vertical Plane (Elevation) Pattern
- Figure 3      Coverage Contour Comparison
- Form 301      Saved Version of Engineering Sections from FCC Form at Time of Upload

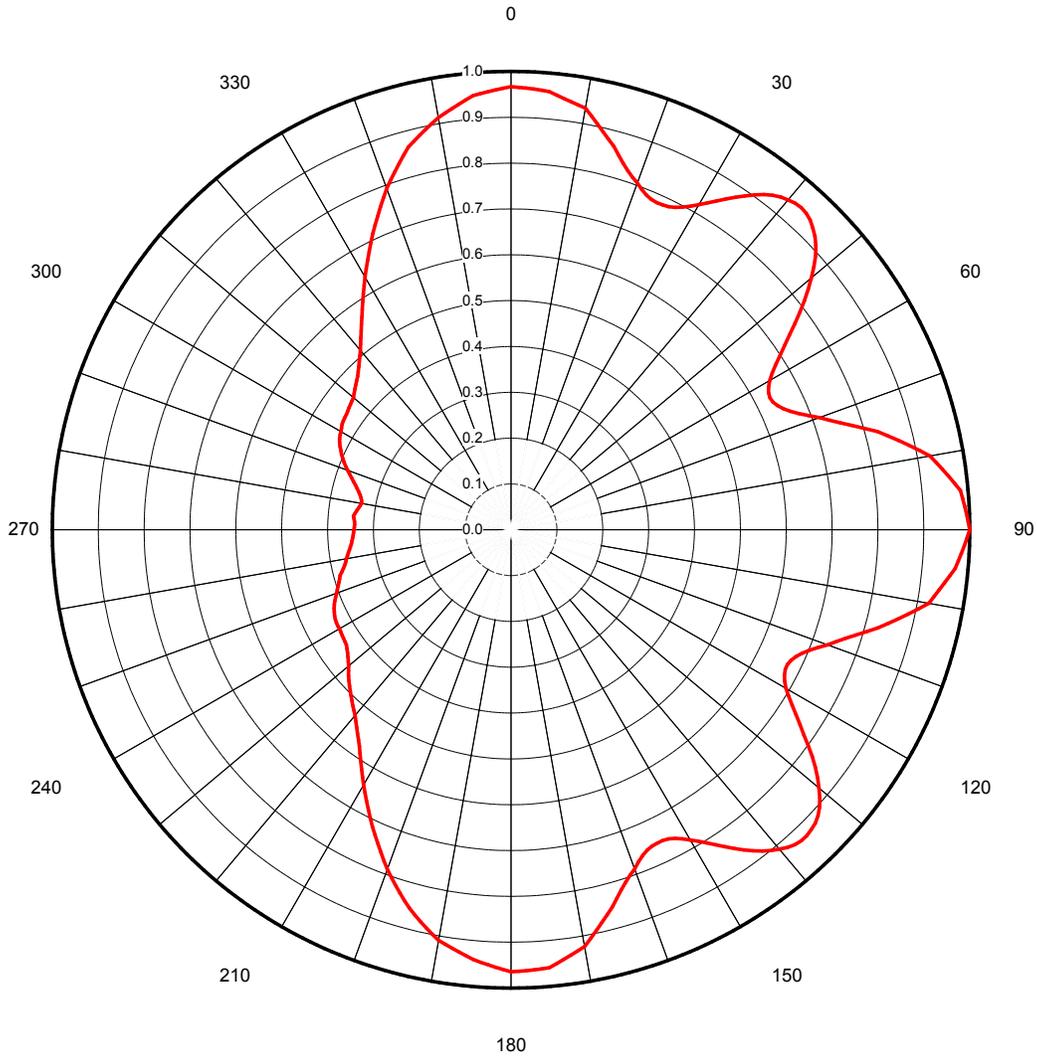
*This material was entered September 26, 2008 for filing electronically. Since the FCC's electronic filing system may be accessed by anyone with the applicant's name and password, and electronic data may otherwise be altered in an unauthorized fashion, we cannot be responsible for changes made subsequent to our entry of this data and related attachments.*

Proposal Number **C-01146**  
Date **8-Mar-07**  
Call Letters **KPIX-DT** Channel **29**  
Location **San Francisco, CA**  
Customer **Sutro Tower Inc.**  
Antenna Type **TUA-C4SP-12/40U-1-S**

**AZIMUTH PATTERN**

Gain **1.80 (2.55 dB)**  
Calculated / Measured **Calculated**

Frequency **563.00 MHz**  
Drawing # **TUA-C4SP-5630**



**Figure 1**  
**Antenn Horizontal Plane Pattern**  
**KPIX-DT San Francisco, CA**  
**Facility ID 25452**  
**Ch. 29 500 kW 371 m**  

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**CBS Broadcasting Inc.**  

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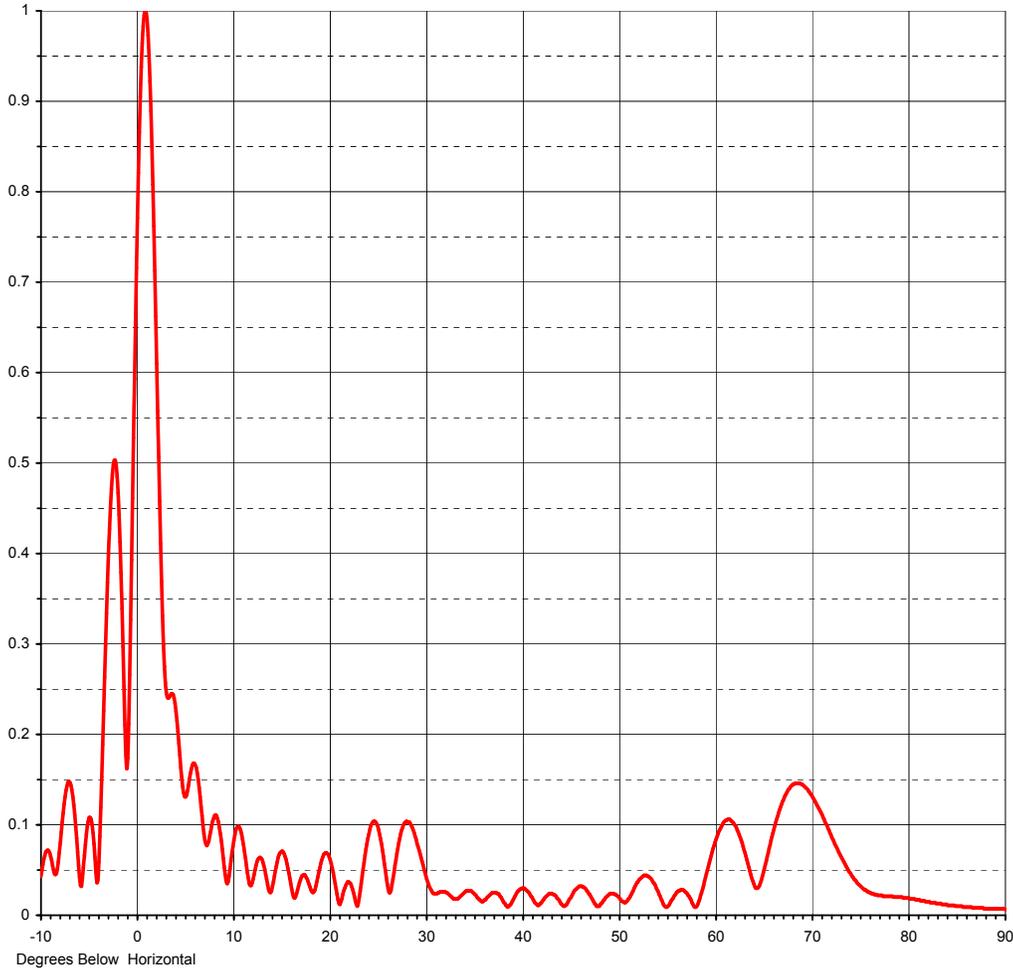
**September, 2008**



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Customer **Sutro Tower Inc.**  
Antenna Type **TUA-C4SP-12/40U-1-S**

### ELEVATION PATTERN

RMS Gain at Main Lobe	<b>20.70 ( 13.16 dB )</b>	Beam Tilt	<b>0.75 deg</b>
RMS Gain at Horizontal	<b>12.30 ( 10.90 dB )</b>	Frequency	<b>563.00 MHz</b>
Calculated / Measured	<b>Calculated</b>	Drawing #	<b>12U222075-90</b>



**Figure 2**  
**Antenna Vertical (Elevation)**  
**Plane Pattern**  
**KPIX-DT San Francisco, CA**  
**Facility ID 25452**  
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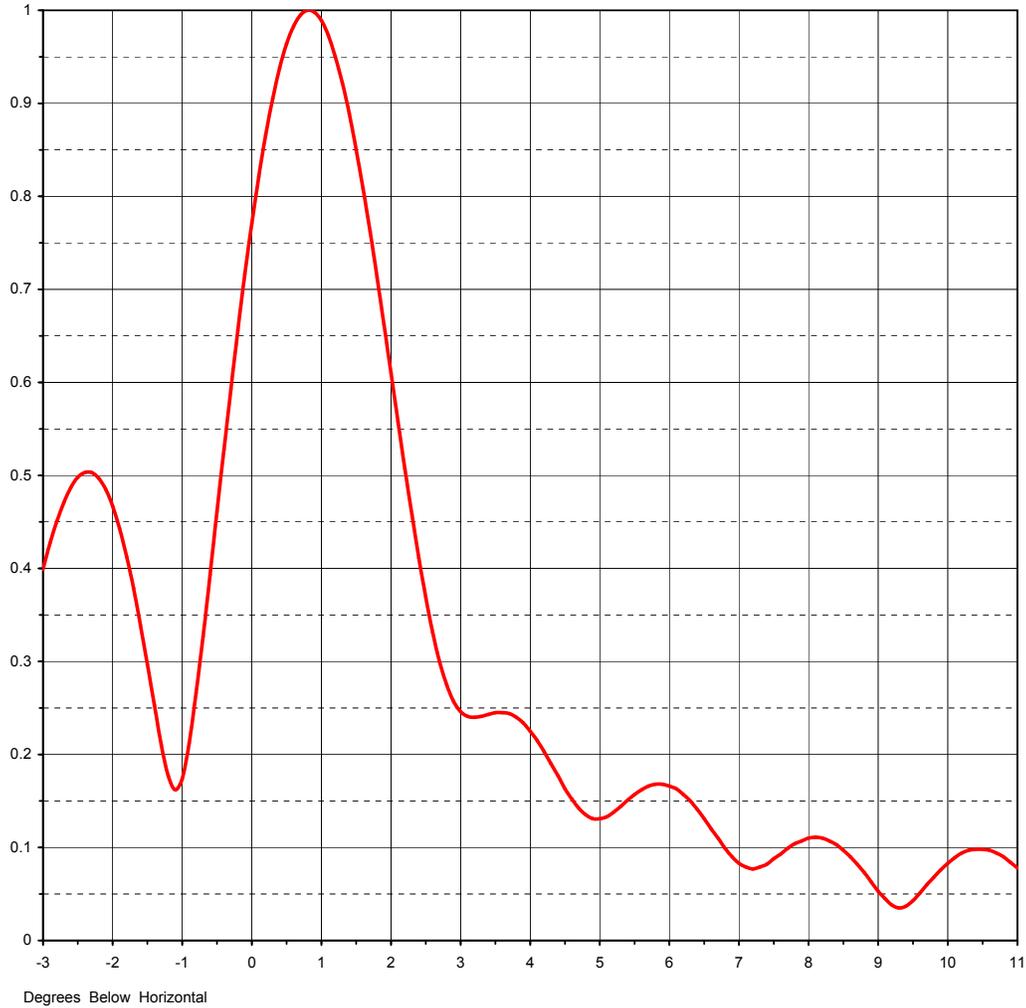
September, 2008



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Calculated / Measured	<b>Calculated</b>	Drawing #	<b>12U222075</b>



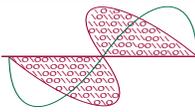
**Figure 2A**  
**Antenna Vertical (Elevation)**  
**Plane Pattern - Detail**  
**KPIX-DT San Francisco, CA**  
**Facility ID 25452**  
**Ch. 29 500 kW 371 m**

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prepared for  
**CBS Broadcasting Inc.**

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September, 2008



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

**Figure 3**  
**Coverage Contour Comparison**  
**KPIX-DT San Francisco, CA**  
**Facility ID 25452**  
**Ch. 29 500 kW 371 m**

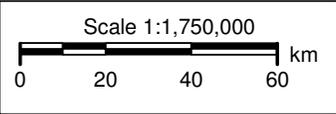
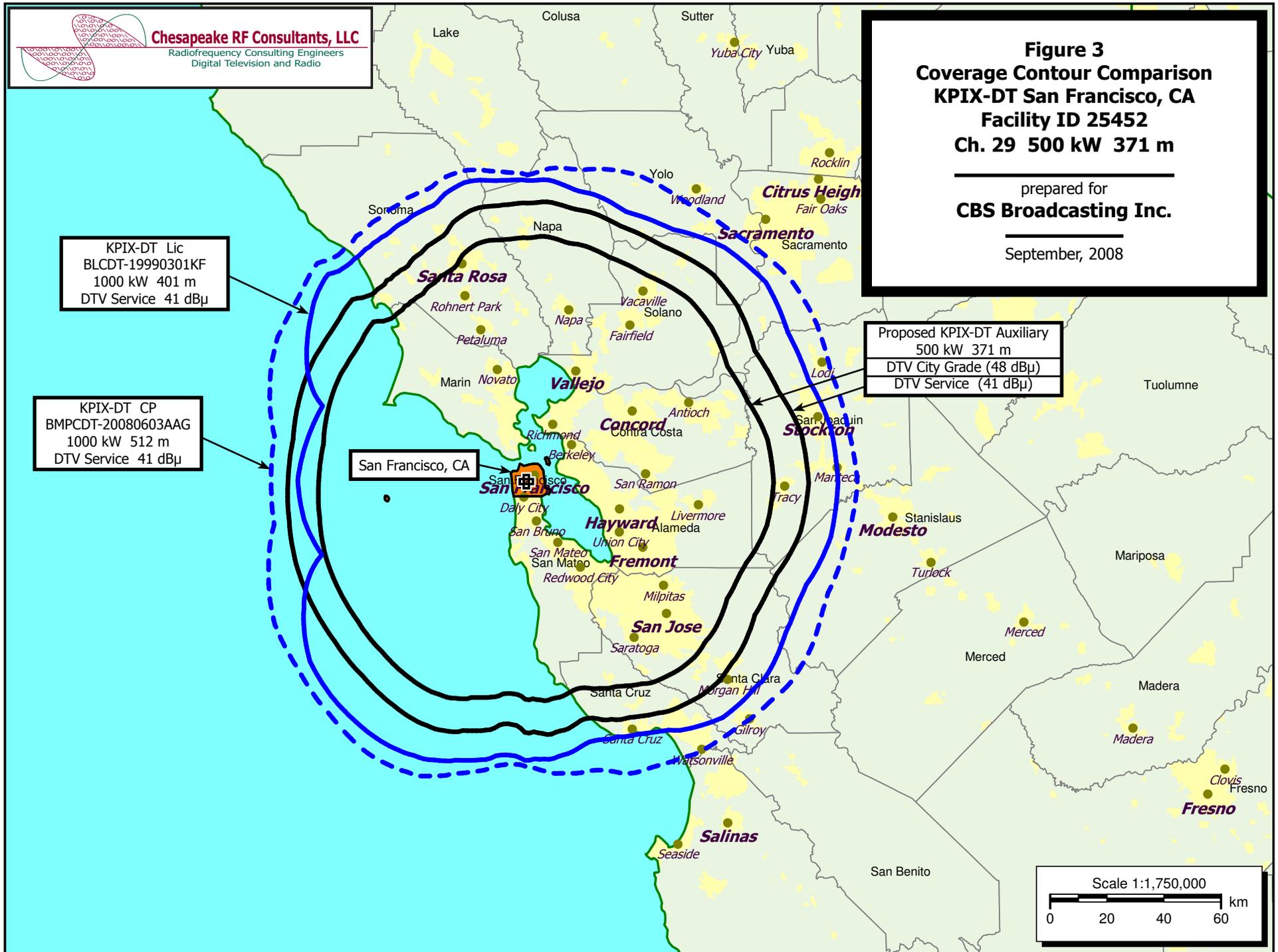
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September, 2008

KPIX-DT Lic  
 BLCDDT-19990301KF  
 1000 kW 401 m  
 DTV Service 41 dBμ

KPIX-DT CP  
 BMPCDT-20080603AAG  
 1000 kW 512 m  
 DTV Service 41 dBμ

Proposed KPIX-DT Auxiliary  
 500 kW 371 m  
 DTV City Grade (48 dBμ)  
 DTV Service (41 dBμ)



<b>SECTION III-D - DTV Engineering</b>	
<b>Complete Questions 1-5, and provide all data and information for the proposed facility, as requested in Technical Specifications, Items 1-13.</b>	
<p><b>Pre-Transition Certification Checklist:</b> An application concerning a pre-transition channel must complete questions 1(a)-(c), and 2-5. A correct answer of "Yes" to all of the questions will ensure an expeditious grant of a construction permit application to change pre-transition facilities. However, if the proposed facility is located within the Canadian or Mexican borders, coordination of the proposal under the appropriate treaties may be required prior to grant of the application. An answer of "No" will require additional evaluation of the applicable information in this form before a construction permit can be granted.</p> <p><b>Post-Transition Expedited Processing.</b> An application concerning a post-transition channel must complete questions 1(a), (d)-(e), and 2-5. A station applying for a construction permit to build its post-transition channel will receive expedited processing if its application (1) does not seek to expand the noise-limited service contour in any direction beyond that established by Appendix B of the Seventh Report and Order in MB Docket No. 87-268 establishing the new DTV Table of Allotments in 47 C.F.R. § 73.622(i) ("new DTV Table Appendix B"); (2) specifies facilities that match or closely approximate those defined in the new DTV Table Appendix B facilities; and (3) is filed within 45 days of the effective date of Section 73.616 of the rules adopted in the Report and Order in the Third DTV Periodic Review proceeding, MB Docket No. 07-91.</p>	
1. The proposed DTV facility complies with 47 C.F.R. Section 73.622 in the following respects:	
(a) It will operate on the DTV channel for this station as established in 47 C.F.R. Section 73.622.	<input checked="" type="radio"/> Yes <input type="radio"/> No
(b) It will operate a pre-transition facility from a transmitting antenna located within 5.0 km (3.1 miles) of the DTV reference site for this station as established in 47 C.F.R. Section 73.622.	<input checked="" type="radio"/> Yes <input type="radio"/> No
(c) It will operate a pre-transition facility with an effective radiated power (ERP) and antenna height above average terrain (HAAT) that do not exceed the DTV reference ERP and HAAT for this station as established in 47 C.F.R. Section 73.622.	<input checked="" type="radio"/> Yes <input type="radio"/> No
(d) It will operate at post-transition facilities that do not expand the noise-limited service contour in any direction beyond that established by Appendix B of the Seventh Report and Order in MB Docket No. 87-268 establishing the new DTV Table of Allotments in 47 C.F.R. § 73.622(i) ("new DTV Table Appendix B").	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
(e) It will operate at post-transition facilities that match or reduce by no more than five percent with respect to predicted population from those defined in the new DTV Table Appendix B.	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> N/A
2. The proposed facility will not have a significant environmental impact, including exposure of workers or the general public to levels of RF radiation exceeding the applicable health and safety guidelines, and therefore will not come within 47 C.F.R. Section 1.1307. Applicant must <b>submit the Exhibit</b> called for in Item 13.	<input checked="" type="radio"/> Yes <input type="radio"/> No
3. Pursuant to 47 C.F.R. Section 73.625, the DTV coverage contour of the proposed facility will encompass the allotted principal community.	<input checked="" type="radio"/> Yes <input type="radio"/> No
4. The requirements of 47 C.F.R. Section 73.1030 regarding notification to radio astronomy installations, radio receiving installations and FCC monitoring stations have either been satisfied or are not applicable.	<input checked="" type="radio"/> Yes <input type="radio"/> No
5. The antenna structure to be used by this facility has been registered by the Commission and will not require registration to support the proposed antenna, OR the FAA has previously determined that the proposed structure will not adversely effect safety in air navigation and this structure qualifies for later registration under the Commission's phased registration plan, OR the proposed installation on this structure does not require notification to the FAA pursuant to 47 C.F.R. Section 17.7.	<input checked="" type="radio"/> Yes <input type="radio"/> No

<b>SECTION III-D - DTV Engineering</b>	
<b>TECHNICAL SPECIFICATIONS</b>	
Ensure that the specifications below are accurate. Contradicting data found elsewhere in this application will be disregarded. All items must be completed. The response "on file" is not acceptable.	
<b>TECH BOX</b>	
1. Channel Number:	DTV 29 Analog TV, if any 5
2. Zone:	<input type="radio"/> I <input checked="" type="radio"/> II <input type="radio"/> III
3. Antenna Location Coordinates: (NAD 27)	Latitude: Degrees 37 Minutes 45 Seconds 19 <input checked="" type="radio"/> North <input type="radio"/> South  Longitude: Degrees 122 Minutes 27 Seconds 06 <input checked="" type="radio"/> West <input type="radio"/> East
4. Antenna Structure Registration Number: 1001289	<input type="checkbox"/> Not Applicable <input type="checkbox"/> Notification filed with FAA
5. Antenna Location Site Elevation Above Mean Sea Level:	254.2 meters
6. Overall Tower Height Above Ground Level:	297.7 meters
7. Height of Radiation Center Above Ground Level:	148.1 meters
8. Height of Radiation Center Above Average Terrain :	371.4 meters
9. Maximum Effective Radiated Power (average power):	500 kW
10. Antenna Specifications:	<p>a. Manufacturer DIE Model TUA-C4SP-12/40U-1-S</p> <p>b. Electrical Beam Tilt: 0.75 degrees <input type="checkbox"/> Not Applicable</p> <p>c. Mechanical Beam Tilt: degrees toward azimuth degrees True <input checked="" type="checkbox"/> Not Applicable</p> <p>Attach as an Exhibit all data specified in 47 C.F.R. Section 73.625(c).</p>

[Exhibit  
421

d. Polarization:

Horizontal  Circular  Elliptical

e. Directional Antenna Relative Field Values:  Not applicable (Nondirectional)

[For a composite directional (not off-the-shelf) antenna, press the following button to fill in the relative field values subform.]  
[Relative Field Values]

**10e. Directional Antenna Relative Field Values**

[Fill in this subform for a composite directional (not off-the-shelf) antenna, only.]

e. Directional Antenna Relative Field Values:

Rotation (Degrees):  No Rotation

Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value
0	0.967	10	0.934	20	0.805	30	0.819	40	0.94	50	0.854
60	0.651	70	0.715	80	0.927	90	1	100	0.925	110	0.734
120	0.692	130	0.876	140	0.91	150	0.782	160	0.788	170	0.923
180	0.964	190	0.91	200	0.789	210	0.643	220	0.529	230	0.462
240	0.432	250	0.405	260	0.364	270	0.342	280	0.331	290	0.379
300	0.428	310	0.448	320	0.511	330	0.637	340	0.793	350	0.913
Additional Azimuths		42	0.946	136	0.928						

[Relative Field Polar Plot](#)

If a directional antenna is proposed, the requirements of 47 C.F.R. Sections 73.625(c) must be satisfied. **Exhibit required.** [Exhibit 43]

11. Does the proposed facility satisfy the pre-transition interference protection provisions of 47 C.F.R. Section 73.623(a) (Applicable only if **Certification Checklist** Items 1(a), (b), or (c) are answered "No.") and/or the post-transition interference protection provisions of 47 C.F.R. Section 73.616?  Yes  No [Exhibit 44]

If "No," attach as an Exhibit justification therefor, including a summary of any related previously granted waivers.

12. If the proposed facility will not satisfy the coverage requirement of 47 C.F.R. Section 73.625, attach as an Exhibit justification therefore. [Exhibit 45]  
(Applicable only if **Certification Checklist** item 3 is answered "No.")

13. **Environmental Protection Act. Submit in an Exhibit** the following: [Exhibit 46]

If **Certification Checklist** Item 2 is answered "Yes," a brief explanation of why an Environmental Assessment is not required. Also describe in the Exhibit the steps that will be taken to limit RF radiation exposure to the public and to persons authorized access to the tower site.

By checking "Yes" to **Certification Checklist** Item 2, the applicant also certifies that it, in coordination with other users of the site, will reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic exposure in excess of FCC guidelines.

If **Certification Checklist** Item 2 is answered "No," an Environmental Assessment as required by 47 C.F.R Section 1.1311.

**PREPARERS CERTIFICATION ON SECTION III MUST BE COMPLETED AND SIGNED.**

**SECTION III - PREPARER'S CERTIFICATION**

I certify that I have prepared Section III (Engineering Data) on behalf of the applicant, and that after such preparation, I have examined and found it to be accurate and true to the best of my knowledge and belief.

Name JOSEPH M. DAVIS, P.E.	Relationship to Applicant (e.g., Consulting Engineer) CONSULTING ENGINEER	
Signature	Date 9/26/2008	
Mailing Address CHESAPEAKE RF CONSULTANTS, LLC 11993 KAHNS ROAD		
City MANASSAS	State or Country (if foreign address) VA	Zip Code 20112 -
Telephone Number (include area code) 7036509600	E-Mail Address (if available) JOSEPH.DAVIS@RF-CONSULTANTS.COM	

WILLFUL FALSE STATEMENTS ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. CODE, TITLE 47, SECTION 312(a)(1)), AND/OR FORFEITURE (U.S. CODE, TITLE 47, SECTION 503).

Any specified rotation has already been applied to the plotted pattern.

Field strength values shown on a rotated pattern may differ from the listed values because intermediate azimuths are interpolated between entered azimuths.

