

## ENGINEERING EXHIBIT

### Application for Construction Permit

prepared for

#### **Bluestone License Holdings Inc.**

KAEF-DT Arcata, CA

Facility ID 8263

Ch. 22 45 kW 550 m

*Bluestone License Holdings Inc.* (“*Bluestone*”) is the licensee of television station KAEF(TV), digital Channel 22 and analog Channel 23, Arcata, CA. *Bluestone* is licensed to operate the KAEF-DT digital Channel 22 facility at 50 kW effective radiated power (“ERP”) and an antenna height above average terrain (“HAAT”) of 535 meters (file number BLC DT-20070126AFH).

As due diligence during recent review and confirmation of the post-transition “Appendix B” parameters in MB Docket 87-268<sup>1</sup>, *Bluestone* has discovered discrepancies between the licensed and as-built KAEF-DT facility, as well as discrepancies between the as-built and certified (Appendix B) parameters. The instant application seeks a minor modification of the licensed KAEF-DT ERP and HAAT to correspond to the as-built operation. Separately, *Bluestone* intends to file a petition for reconsideration of the recent Seventh Report and Order in MB Docket 87-268 to seek changes in Appendix B to match the as-built KAEF-DT facility.

The KAEF-DT license specifies operation with an antenna radiation center height of 114.3 meters above ground level (“AGL”) on a shared tower structure. This height corresponds to a “down array” position, where the KAEF-DT antenna would be suspended beneath a candelabra arm appurtenance on the shared tower<sup>2</sup>. Final structural engineering concerns dictated that the antenna be installed on top of the candelabra, rather than beneath. Thus, the antenna’s radiation center height was increased to 127.7 meters AGL. To correct the discrepancy with the KAEF-DT license, a

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<sup>1</sup>*Advanced Television Systems and their Impact Upon the Existing Television Broadcast Service*, Seventh Report and Order and Eighth Further Notice of Proposed Rulemaking, MB Docket 87-268, FCC 07-138, released August 6, 2007.

<sup>2</sup>The tower is also utilized by station KEET(TV) (Eureka, CA) which is the structure owner. The analog KAEF Channel 23 facility employs an adjacent tower structure.

construction permit is sought herein to specify the increased antenna height along with a commensurate reduction in ERP to maintain the noise-limited service contour location.

The instant proposal specifies an ERP of 45 kW at 550 meters antenna HAAT, equivalent to the licensed 50 kW at 535 meters HAAT. No change in antenna model, directional pattern, or site location is requested. The KAEF-DT Channel 22 antenna system (Dielectric model TLP-12-R C170) is mounted on an existing antenna support structure having FCC Antenna Structure Registration number 1224088. No change to the antenna or overall structure height is proposed. The KAEF-DT directional antenna's horizontal plane pattern is depicted in **Figure 1**. **Figures 2** and **2A** provide the theoretical vertical plane (elevation) pattern<sup>3</sup>.

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

The map attached as **Figure 4** supplies a comparison of the 41 dBμ digital service contour corresponding to the present KAEF-DT license (50 kW / 535 m) and the modified KAEF-DT facility as proposed herein (45 kW / 550 m). No extension in contour location will result (the contours are essentially identical), in compliance with the Commission's August 3, 2004 "freeze" concerning expansion in service area.<sup>4</sup>

Additionally, **Figure 4** depicts the 41 dBμ digital service contour associated with the post-transition digital Appendix B allotment. KAEF's Appendix B allotment specifies Channel 22 at replication parameters (50 kW / 510 m) and includes the calculated replication directional antenna pattern rather than the licensed directional antenna pattern. The licensed and proposed KAEF-DT

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<sup>3</sup> These patterns are supplied in terms of relative field. In recent years, FCC Staff have not required pattern data in dBk format however such patterns are available upon request.

<sup>4</sup>Public Notice "Freeze on the Filing of Certain TV and DTV Requests for Allotment or Service Area Changes," DA 04-2446, released August 3, 2004.

contour extends slightly beyond the replication contour over a few azimuths to the north and south. Accordingly, *Bluestone* plans on separately seeking a change in the Appendix B certified coverage area to correspond to the instant proposal.

A detailed interference study per OET Bulletin 69<sup>5</sup> shows that the proposal complies with the Commission's 2% / 10% *de minimis* interference limits for operation during the transition. The results of the interference study, summarized in **Table 1**, indicate that any new interference does not exceed the *de minimis* limit. Protection requirements towards authorized Class A stations are satisfied. Thus, this proposal complies with the provisions of §73.623(c)(2) of the Commission's rules.

Regarding impact to post-transition operations, OET Bulletin 69 interference analysis shows that the proposal would not cause any additional interference to any other nearby Appendix B facility, as summarized in **Table 2**.

The nearest FCC monitoring station is 384 km distant at Livermore, CA. This exceeds by a large margin the threshold minimum distance specified in §73.1030(c)(3) that would suggest consideration of the monitoring station. The site is also located outside the areas specified in §73.1030(a)(1) and §73.1030(b). Thus, notification of the instant proposal to the National Radio Astronomy Observatory at Green Bank, West Virginia, or the Table Mountain Radio Receiving Zone in Boulder County, Colorado is not required. There are no AM stations within 3.2 kilometers of the KAEF-DT transmitter site, based on information contained within the Commission's database. The site location is beyond the border areas requiring international coordination.

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<sup>5</sup>FCC Office of Engineering and Technology Bulletin number 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004 ("OET-69"). The implementation of OET-69 for this study followed the guidelines of OET-69 as specified therein. A standard cell size of 2 km was employed. Comparisons of various results of this computer program (run on a Sun Sparc processor) to the Commission's implementation of OET-69 show excellent correlation.

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

The transmitting antenna is top-mounted on an existing candelabra-style 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. No change in structure height is proposed, thus no change in current structure marking and lighting requirements is anticipated. Therefore, it is believed that this application may be categorically excluded from environmental processing pursuant to §1.1306 of the Commission's 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  $2.1 \mu\text{W}/\text{cm}^2$ , which is 0.6 percent of the general population/uncontrolled maximum permitted exposure limit. This is well 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 13, 2007

**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	Proposed Coverage Contours
Figure 4	Coverage Contour Comparison
Table 1	Transition Interference Analysis Results Summary
Table 2	Post-Transition Interference Analysis Summary
Form 301	Saved Version of Engineering Sections from FCC Form at Time of Upload

*This material was entered September 13, 2007 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.*

**Figure 1**  
**Antenna Horizontal**  
**Plane Pattern**

## AZIMUTH PATTERN

Gain

**1.70****( 2.30 dB)**

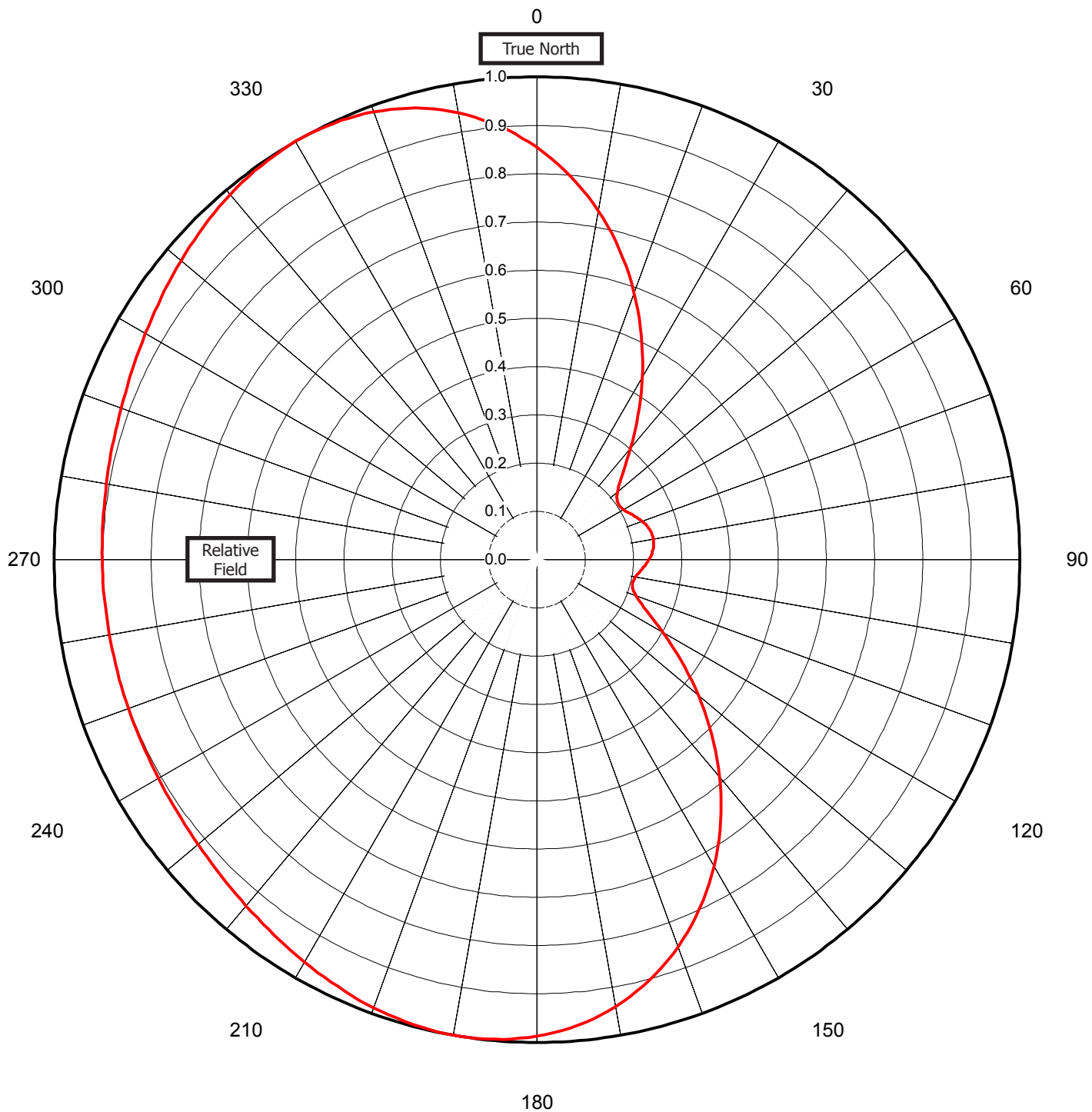
Calculated / Measured

**Calculated**

Frequency

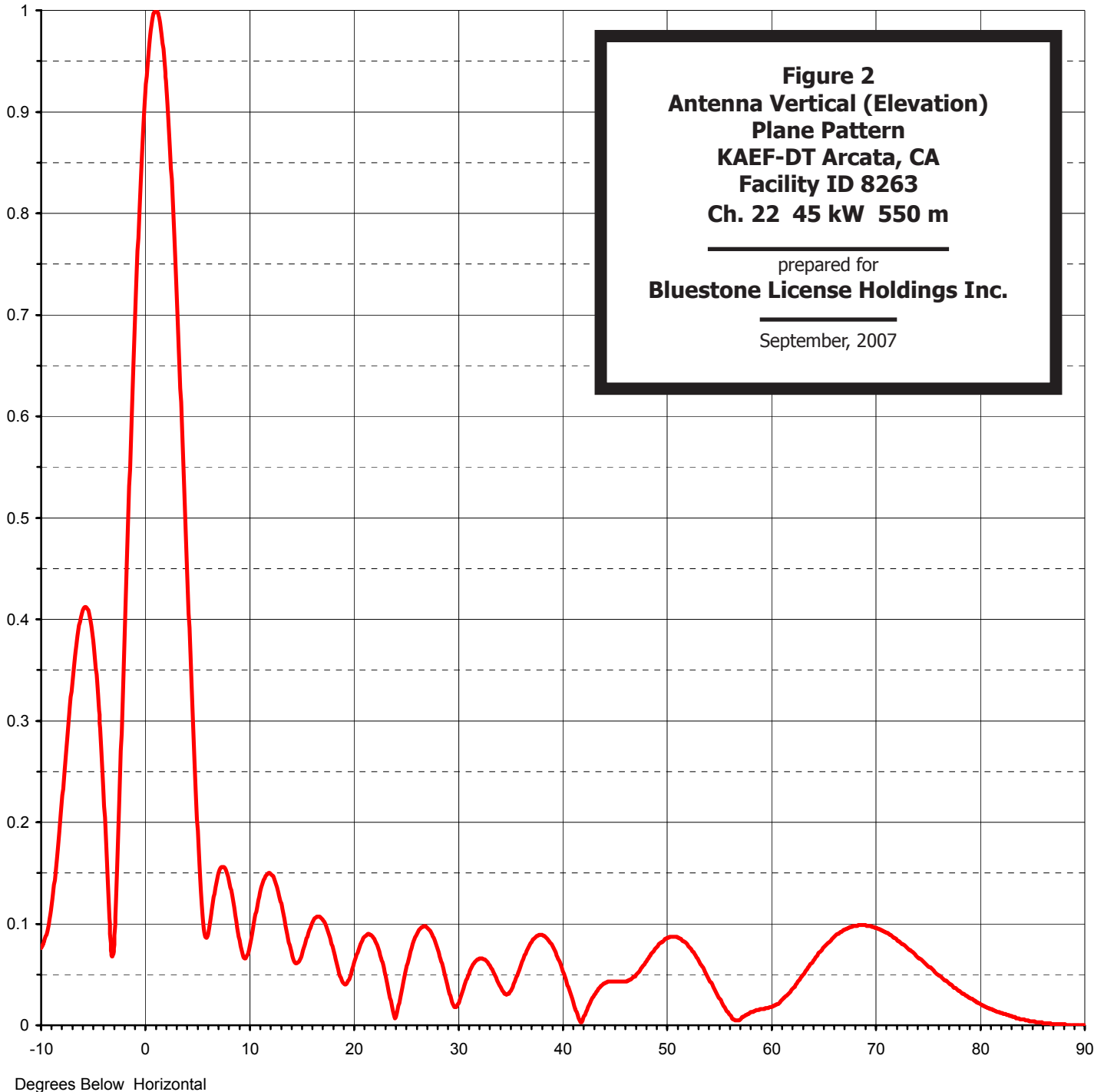
**521.00 MHz**

Drawing #

**TLP-C170**

## ELEVATION PATTERN

RMS Gain at Main Lobe	<b>12.00 ( 10.79 dB )</b>	Beam Tilt	<b>1.00 deg</b>
RMS Gain at Horizontal	<b>10.10 ( 10.04 dB )</b>	Frequency	<b>521.00 MHz</b>
Calculated / Measured	<b>Calculated</b>	Drawing #	<b>12L120100-90</b>



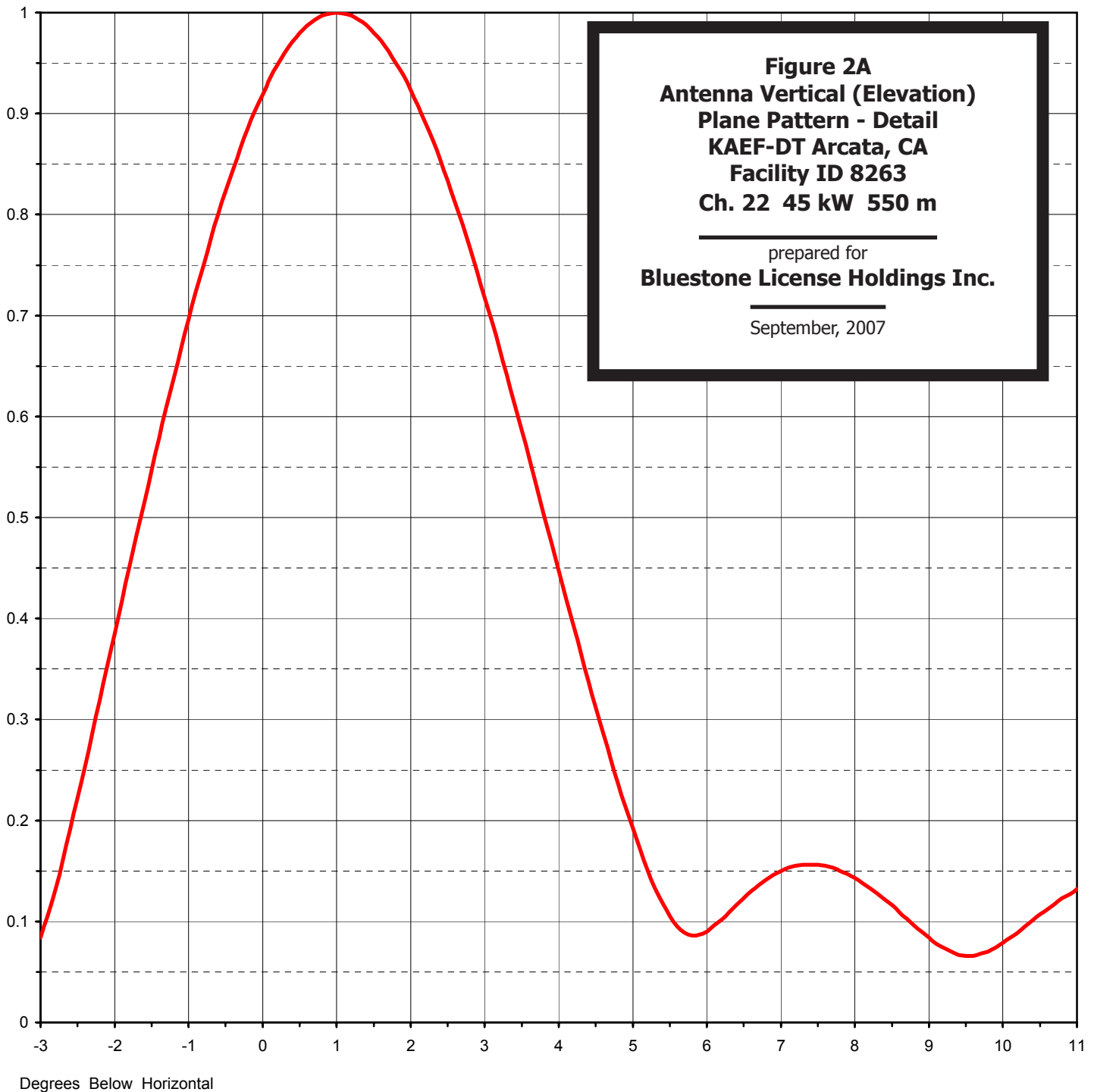


Proposal Number	<b>C-00315</b>	Revision:	<b>2</b>
Date	<b>1-Nov-06</b>		
Call Letters	<b>KAEF-DT</b>	Channel	<b>22</b>
Location	<b>Arcata, CA</b>		
Customer			
Antenna Type	<b>TLP-12-R C170</b>		

## ELEVATION PATTERN

RMS Gain at Main Lobe	<b>12.00 ( 10.79 dB )</b>
RMS Gain at Horizontal	<b>10.10 ( 10.04 dB )</b>
Calculated / Measured	<b>Calculated</b>

Beam Tilt	<b>1.00 deg</b>
Frequency	<b>521.00 MHz</b>
Drawing #	<b>12L120100</b>





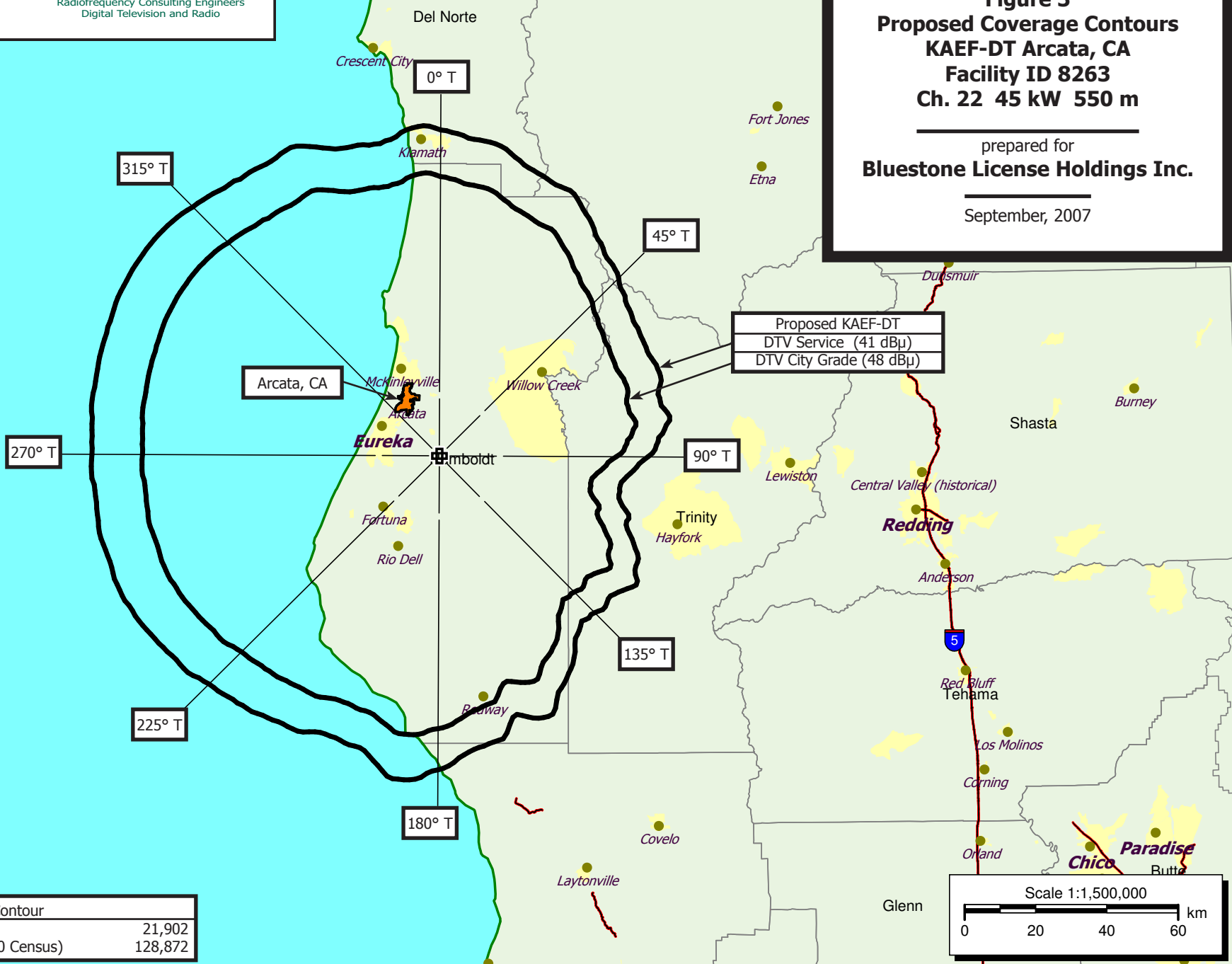


**Chesapeake RF Consultants, LLC**  
Radiofrequency Consulting Engineers  
Digital Television and Radio

**Figure 3**  
**Proposed Coverage Contours**  
**KAEF-DT Arcata, CA**  
**Facility ID 8263**  
**Ch. 22 45 kW 550 m**

prepared for  
**Bluestone License Holdings Inc.**

September, 2007





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**Figure 4**  
**Coverage Contour Comparison**  
**KAEF-DT Arcata, CA**  
**Facility ID 8263**  
**Ch. 22 45 kW 550 m**

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**Bluestone License Holdings Inc.**

September, 2007

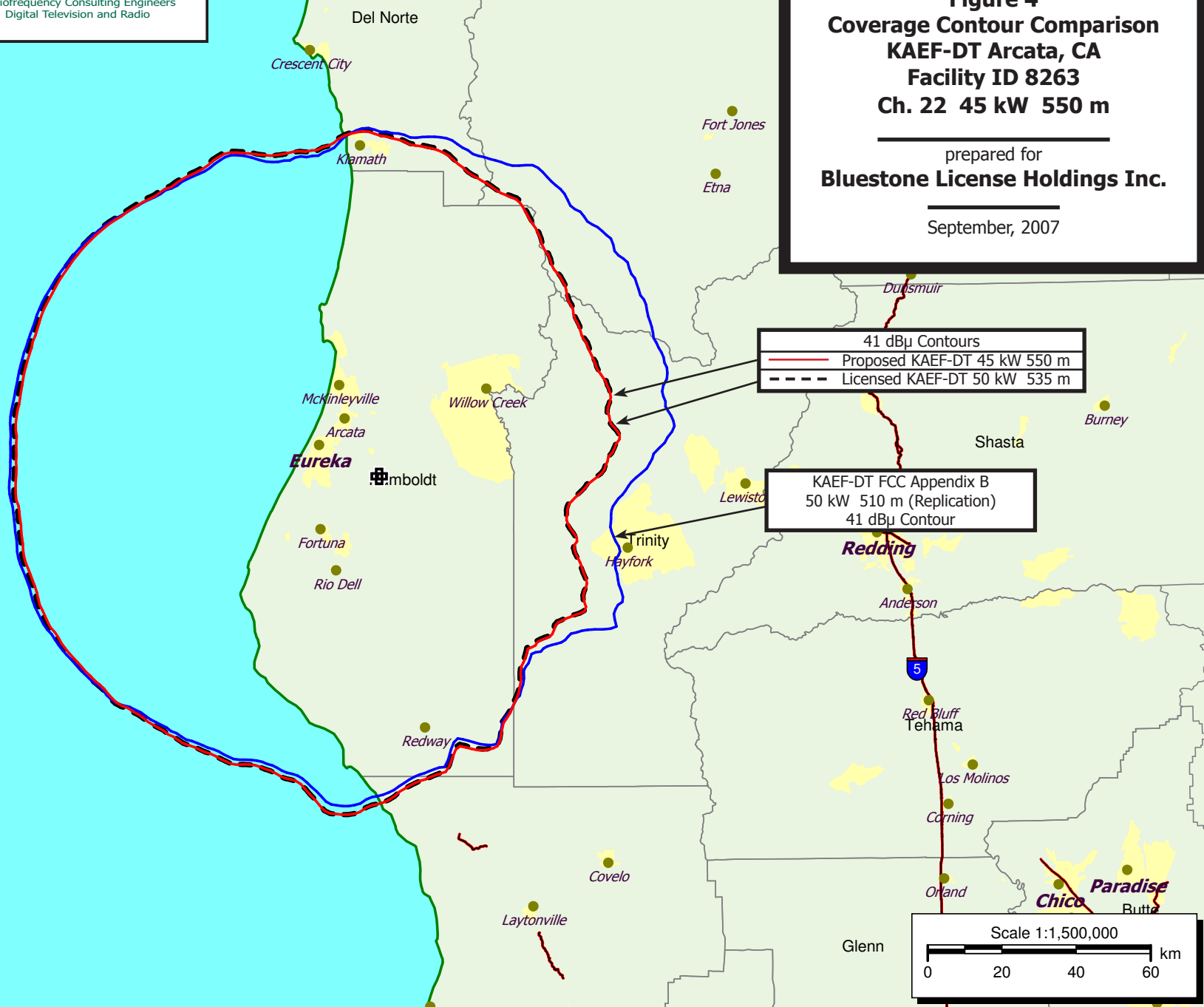


Table 1

**Transition Period  
Interference Analysis Results Summary**

prepared for

**Bluestone License Holdings Inc.**

KAEF-DT Arcata, CA



Ch.	Call	City/State	Dist (km)	Status	Application Ref. No.	-----Population (1990 Census)-----		
						Baseline	New Interference	Total Interference
22	KRCB	COTATI CA	290.2	CP MOD	BMPET-20060804AFX	---	none	n/a
22	KRCB	COTATI CA	290.3	LIC	BLET-19850115KG	---	none	n/a
22	KAME-DT	RENO NV	376.6	PLN	DTVPLN-DTVP0498	---	none	n/a
22	KMCB-DT	COOS BAY OR	296.7	PLN	DTVPLN-DTVP0501	---	none	n/a
22	KFTS	KLAMATH FALLS OR	247.3	LIC	BLET-19890127KE	---	none	n/a
23	KAEF	ARCATA CA	0.1	LIC	BLCT-19870811KH	123,013	235 (0.18%)	< 10%
29	KBVU	EUREKA CA	0.0	CP	BPCT-20020326AAN	---	none	n/a
29	KBVU	EUREKA CA	11.2	LIC	BLCT-19940824KI	---	none	n/a

Table 2

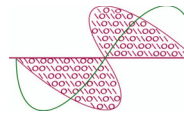
**Post-Transition**

**Interference Analysis Results Summary**

prepared for

**Bluestone License Holdings Inc.**

KAEF-DT Arcata, CA



**Chesapeake RF Consultants, LLC**

Radiofrequency Consulting Engineers  
Digital Television and Radio

Ch	Call Sign	State/City	Fac. ID	Power HAAT	Latitude Longitude	Dist (km) Bear (°T)	---- At Allotment ----		---- As Proposed ----	
							Service Population	Interference Percent	Service Population	Interference Percent
22	KMCB	OR COOS BAY	35183	10.0 179	43-23-39 124-07-56	296.6 357.5	----- no interference caused by proposal -----			

Service population and interference percentage figures  
consider incoming interference from all stations and  
employ 2000 Census data

**SECTION III-D - DTV ENGINEERING DATA**

**Complete Questions 1-5 of the Certification Checklist and provide all data and information for the proposed facility, as requested in Technical Specifications, Items 1-13.**

**Certification Checklist:** A correct answer of "Yes" to all of the questions below will ensure an expeditious grant of a construction permit. 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.

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 from a transmitting antenna located within 5.0 km (3.1 miles) of the DTV reference site for this location as established in 47 C.F.R. Section 73.622.	<input checked="" type="radio"/> Yes <input type="radio"/> No
(c) It will operate 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 type="radio"/> Yes <input checked="" type="radio"/> No
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

**SECTION III-D - DTV Engineering****TECHNICAL SPECIFICATIONS**

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.

**TECH BOX**

1.	Channel Number: DTV 22 Analog TV, if any 23
2.	Zone: <input type="radio"/> I <input checked="" type="radio"/> II <input type="radio"/> III
3.	Antenna Location Coordinates: (NAD 27) Latitude: Degrees 40 Minutes 43 Seconds 39 <input checked="" type="radio"/> North <input type="radio"/> South  Longitude: Degrees 123 Minutes 58 Seconds 17 <input checked="" type="radio"/> West <input type="radio"/> East
4.	Antenna Structure Registration Number: 1224088 <input type="checkbox"/> Not Applicable <input type="checkbox"/> Notification filed with FAA
5.	Antenna Location Site Elevation Above Mean Sea Level: 807.7 meters
6.	Overall Tower Height Above Ground Level: 134.4 meters
7.	Height of Radiation Center Above Ground Level: 127.7 meters
8.	Height of Radiation Center Above Average Terrain : 549.9 meters
9.	Maximum Effective Radiated Power : 45 kW
10.	Antenna Specifications:  a. Manufacturer DIE Model TLP-12-R C170  b. Electrical Beam Tilt: 1 degrees <input type="checkbox"/> Not Applicable  c. Mechanical Beam Tilt: degrees toward azimuth degrees True <input checked="" type="checkbox"/> Not Applicable Attach as an Exhibit all data specified in 47 C.F.R. Section 73.685. [Exhibit 42]  d. Polarization: <input checked="" type="radio"/> Horizontal <input type="radio"/> Circular <input type="radio"/> Elliptical  e. Directional Antenna Relative Field Values: <input type="checkbox"/> 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]												
<b>10e. Directional Antenna Relative Field Values</b>												
[Fill in this subform for a composite directional (not off-the-shelf) antenna, only.]												
e. Directional Antenna Relative Field Values:												
Rotation (Degrees): <input checked="" type="checkbox"/> No Rotation												
Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	
0	0.854	10	0.733	20	0.588	30	0.437	40	0.302	50	0.218	
60	0.207	70	0.232	80	0.245	90	0.232	100	0.207	110	0.218	
120	0.302	130	0.437	140	0.588	150	0.733	160	0.854	170	0.94	
180	0.987	190	1	200	0.988	210	0.963	220	0.936	230	0.917	
240	0.905	250	0.9	260	0.899	270	0.9	280	0.905	290	0.917	
300	0.936	310	0.963	320	0.988	330	1	340	0.987	350	0.94	
Additional Azimuths		56	0.204	104	0.204	189	1	331	1			
<u>Relative Field Polar Plot</u>												
If a directional antenna is proposed, the requirements of 47 C.F.R. Sections 73.625(c) must be satisfied. <b>Exhibit required.</b> [Exhibit 43]												
11.	Does the proposed facility satisfy the interference protection provisions of 47 C.F.R. Section 73.623(a)? (Applicable only if <b>Certification Checklist</b> items 1(a), (b), or (c) are answered "No".)										<input checked="" type="radio"/> Yes <input type="radio"/> No	
If No, attach as an Exhibit justification therefore, including a summary of any previously granted waivers. [Exhibit 44]												
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. (Applicable only if <b>Certification Checklist</b> item 3 is answered "No".)										[Exhibit 45]	
13.	<b>Environmental Protection Act.</b> Submit in an Exhibit the following: If <b>Certification Checklist</b> 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 <b>Certification Checklist</b> 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 <b>Certification Checklist</b> Item 2 is answered "No," an Environmental Assessment as required by 47 C.F.R Section 1.1311.										[Exhibit 46]	
<b>PREPARERS CERTIFICATION ON SECTION III MUST BE COMPLETED AND SIGNED.</b>												

### 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 9/13/2007	
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.

