

# **ENGINEERING EXHIBIT**

## **Application to Modify Digital Television Translator Construction Permit**

prepared for

**Hawaii Public Television Foundation**  
K41JT-D Kilauea Military Camp, Hawaii  
Facility ID 26419  
Ch. 41 (Digital) 2.1 kW

### **Table of Contents**

FCC Form 346, Section III – Engineering Data (Digital)

#### **Exhibit 11**

Statement A	Consolidated Engineering Statement
Figure 1	Coverage Contour Comparison
Table I	Interference Analysis Results Summary

*This material supplies a “hard copy” of the engineering portions of this application as entered August 24, 2009 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.*

**SECTION III - ENGINEERING DATA (Digital)****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: 41																																																																																																
2.	Translator Input Channel No. : 28																																																																																																
3.	Primary station proposed to be rebroadcast: <table border="1"><tr><td>Facility Identifier</td><td>Call Sign</td><td>City</td><td>State</td><td>Channel</td></tr><tr><td>26428</td><td>KMEB</td><td>WAILUKU</td><td>HI</td><td>10</td></tr></table>	Facility Identifier	Call Sign	City	State	Channel	26428	KMEB	WAILUKU	HI	10																																																																																						
Facility Identifier	Call Sign	City	State	Channel																																																																																													
26428	KMEB	WAILUKU	HI	10																																																																																													
4.	Antenna Location Coordinates: (NAD 27) Latitude: Degrees 19 Minutes 31 Seconds 23.2 <input checked="" type="radio"/> North <input type="radio"/> South  Longitude: Degrees 155 Minutes 18 Seconds 06.2 <input checked="" type="radio"/> West <input type="radio"/> East																																																																																																
5.	Antenna Structure Registration Number: <input checked="" type="checkbox"/> Not Applicable [Exhibit 10] <input type="checkbox"/> Notification filed with FAA																																																																																																
6.	Antenna Location Site Elevation Above Mean Sea Level: 1679 meters																																																																																																
7.	Overall Tower Height Above Ground Level: 54.9 meters																																																																																																
8.	Height of Radiation Center Above Ground Level: 45.7 meters																																																																																																
9.	Maximum Effective Radiated Power (ERP): 2.1 kW																																																																																																
10.	Transmitter Output Power: 0.1 kW																																																																																																
11.	a. Transmitting Antenna: Before selecting Directional "Off-the-Shelf", refer to "Search for Antenna Information" under <a href="http://fjallfoss.fcc.gov/prod/cdbforms/pubacc/prod/cdb_pa.htm">CDBS Public Access</a> ( <a href="http://fjallfoss.fcc.gov/prod/cdbforms/pubacc/prod/cdb_pa.htm">http://fjallfoss.fcc.gov/prod/cdbforms/pubacc/prod/cdb_pa.htm</a> ). Make sure that the Standard Pattern is marked Yes and that the relative field values shown match your values. Enter the Manufacturer (Make) and Model exactly as displayed in the Antenna Search. <input type="radio"/> Nondirectional <input type="radio"/> Directional "Off-the-shelf" <input checked="" type="radio"/> Directional composite  Manufacturer SCA Model PRTV  b. Electrical Beam Tilt: degrees <input checked="" type="checkbox"/> Not Applicable																																																																																																
	c. Directional Antenna Relative Field Values: <input checked="" type="checkbox"/> N/A (Nondirectional or Directional "Off-the-shelf") Rotation (Degrees): 210 <input type="checkbox"/> No Rotation <table border="1"><thead><tr><th>Degrees</th><th>Value</th><th>Degrees</th><th>Value</th><th>Degrees</th><th>Value</th><th>Degrees</th><th>Value</th><th>Degrees</th><th>Value</th><th>Degrees</th><th>Value</th></tr></thead><tbody><tr><td>0</td><td>1.000</td><td>10</td><td>0.808</td><td>20</td><td>0.430</td><td>30</td><td>0.165</td><td>40</td><td>0.090</td><td>50</td><td>0.059</td></tr><tr><td>60</td><td>0.052</td><td>70</td><td>0.049</td><td>80</td><td>0.049</td><td>90</td><td>0.047</td><td>100</td><td>0.045</td><td>110</td><td>0.046</td></tr><tr><td>120</td><td>0.046</td><td>130</td><td>0.040</td><td>140</td><td>0.038</td><td>150</td><td>0.030</td><td>160</td><td>0.028</td><td>170</td><td>0.026</td></tr><tr><td>180</td><td>0.025</td><td>190</td><td>0.026</td><td>200</td><td>0.028</td><td>210</td><td>0.030</td><td>220</td><td>0.038</td><td>230</td><td>0.040</td></tr><tr><td>240</td><td>0.046</td><td>250</td><td>0.046</td><td>260</td><td>0.045</td><td>270</td><td>0.047</td><td>280</td><td>0.049</td><td>290</td><td>0.049</td></tr><tr><td>300</td><td>0.052</td><td>310</td><td>0.059</td><td>320</td><td>0.090</td><td>330</td><td>0.165</td><td>340</td><td>0.430</td><td>350</td><td>0.808</td></tr><tr><td>Additional Azimuths</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table>	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	0	1.000	10	0.808	20	0.430	30	0.165	40	0.090	50	0.059	60	0.052	70	0.049	80	0.049	90	0.047	100	0.045	110	0.046	120	0.046	130	0.040	140	0.038	150	0.030	160	0.028	170	0.026	180	0.025	190	0.026	200	0.028	210	0.030	220	0.038	230	0.040	240	0.046	250	0.046	260	0.045	270	0.047	280	0.049	290	0.049	300	0.052	310	0.059	320	0.090	330	0.165	340	0.430	350	0.808	Additional Azimuths											
Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value																																																																																						
0	1.000	10	0.808	20	0.430	30	0.165	40	0.090	50	0.059																																																																																						
60	0.052	70	0.049	80	0.049	90	0.047	100	0.045	110	0.046																																																																																						
120	0.046	130	0.040	140	0.038	150	0.030	160	0.028	170	0.026																																																																																						
180	0.025	190	0.026	200	0.028	210	0.030	220	0.038	230	0.040																																																																																						
240	0.046	250	0.046	260	0.045	270	0.047	280	0.049	290	0.049																																																																																						
300	0.052	310	0.059	320	0.090	330	0.165	340	0.430	350	0.808																																																																																						
Additional Azimuths																																																																																																	
<a href="#">Relative Field Polar Plot</a>																																																																																																	
	<b>NOTE: In addition to the information called for in this section, an explanatory exhibit providing full particulars must be submitted for each question for which a "No" response is provided.</b>																																																																																																
12.	Out-of-channel Emission Mask: <input checked="" type="radio"/> Simple <input type="radio"/> Stringent																																																																																																
<b>CERTIFICATION</b>																																																																																																	

13.	<b>Interference</b> : The proposed facility complies with all of the following applicable rule sections. 47.C.F.R Sections 74.709, 74.793(e), 74.793(f), 74.793(g), 74.793(h), 74.794(b) and 73.1030.	<input checked="" type="radio"/> Yes <input type="radio"/> No See Explanation in [Exhibit 11]
14.	<b>Environmental Protection Act.</b> The proposed facility is excluded from environmental processing under 47. C.F.R. Section 1.1306 (i.e., The facility will not have a significant environmental impact and complies with the maximum permissible radiofrequency electromagnetic exposure limits for controlled and uncontrolled environments). Unless the applicant can determine RF compliance, an <b>Exhibit is required.</b>  By checking "Yes" above, 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.	<input checked="" type="radio"/> Yes <input type="radio"/> No See Explanation in [Exhibit 12]
15.	<b>Channels 52-59.</b> If the proposed channel is within channels 52-59, the applicant certifies compliance with the following requirements, as applicable:	
	<input type="checkbox"/> The applicant is applying for a digital companion channel for which no suitable channel from channel 2-51 is available.	
	<input type="checkbox"/> Pursuant to Section 74.786(d), the applicant has notified, within 30 days of filing this application, all commercial wireless licenses of the spectrum comprising the proposed TV channel and the first adjacent channels thereto, for which the proposed digital LPTV or TV translator antenna site lies inside the licensed geographic boundaries of the wireless licensees or within 75 miles and 50 miles, respectively, of the geographic boundaries of co-channel and adjacent-channel wireless licensees.	
16.	<b>Channels 60-69.</b> If the proposed channel is within channels 60-69, the applicant certifies compliance with the following requirements, as applicable:	
	<input type="checkbox"/> Pursuant to Section 74.786(e), the applicant has notified, within 30 days of filing this application , all commercial wireless licenses of the spectrum comprising the proposed TV channel and the first adjacent channels thereto, for which the proposed digital LPTV or TV translator antenna site lies inside the licensed geographic boundaries of the wireless licensees or within 75 miles and 50 miles, respectively, of the geographic boundaries of co-channel and adjacent-channel wireless licensees.	
	<input type="checkbox"/> Pursuant to Section 74.786(e), the applicant proposing operation on channel 63, 64, 68 and 69 ("public safety channels") has secured a coordinated spectrum use agreements(s) with 700 MHz public safety regional planning committee(s) and state administrator(s) of the region(s) and state(s) within which the antenna site of the digital LPTV or TV translator station is proposed to locate, and those adjoining regions and states with boundaries within 75 miles of the proposed station location.	
	<input type="checkbox"/> Pursuant to Section 74.786(e), the applicant for a channel adjacent to channel 63, 64, 68 or 69 has notified, within 30 days of filing this application, the 700 MHz public safety regional planning committee(s) and state administrator(s) of the region and state containing the proposed digital LPTV or TV translator antenna site and regions and states whose geographic boundaries lie within 50 miles of the proposed LPTV or TV translator antenna site.	
<b>PREPARERS CERTIFICATION ON PAGE 3 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 ROBERT J. CLINTON	Relationship to Applicant (e.g., Consulting Engineer) CONSULTANT	
Signature	Date 8/24/2009	
Mailing Address CAVELL, MERTZ & ASSOCIATES, INC. 7839 ASHTON AVENUE		
City MANASSAS	State or Country (if foreign address) VA	Zip Code 20109 - 2883
Telephone Number (include area code) 7033929090	E-Mail Address (if available) BCLINTON@CAVELLMERTZ.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).

---

## Exhibits

---

### Exhibit 10

**Description:** EXHIBIT 10

EXHIBIT 10 - SEE EXHIBIT 11 - STATEMENT A FOR ANTENNA STRUCTURE DISCUSSION.

---

### Attachment 10

---

### Exhibit 11

**Description:** EXHIBIT 11 - STATEMENT A

EXHIBIT 11 - STATEMENT A - ALLOCATION CONSIDERATIONS

---

### Attachment 11

Description
<a href="#">EXHIBIT 11 - STATEMENT A</a>

---

### Exhibit 12

**Description:** EXHIBIT 12 - ENVIRONMENTAL

PLEASE SEE EXHIBIT 11 - STATEMENT A FOR ENVIRONMENTAL DISCUSSION.

---

### Attachment 12

---

Exhibit 11 – Statement A  
**NATURE OF THE PROPOSAL**  
**ALLOCATION AND ENVIRONMENTAL CONSIDERATIONS**

prepared for  
**Hawaii Public Television Foundation**  
K41JT-D Kilauea Military Camp, Hawaii  
Facility ID 26419  
Ch. 41 (Digital) 2.1 kW

*Hawaii Public Television Foundation* (“HPTF”) is the licensee of analog low power television translator station K56BD (Ch. 56, Kilauea Military Camp, Hawaii) and permittee of the associated digital flash-cut facility, K41JT-D (FCC file number BDISDTT-20060331BHA, “CP”). K41JT-D is authorized to operate on Channel 41 with an ERP of 0.3 kW utilizing a Scala 4DR-4S directional antenna. The instant application proposes to specify a different directional antenna, to operate with an increased effective radiated power (“ERP”), and to correct the site elevation and coordinates of the existing antenna support structure.

The proposed antenna is a Scala PRTV and will be side-mounted on the same unregistered tower specified in the CP. The proposed antenna will operate with an ERP of 2.1 kW. **Exhibit 11 - Figure 1** includes the analog 74 dBμ service contour of the licensed facility, the digital 51 dBμ contour of the authorized facility, and the proposed contour. As demonstrated on the provided map, the service area overlap shown complies with the minor change provisions of §73.3572.

**Allocation Considerations**

The instant proposal complies with the Commission’s interference protection requirements toward all NTSC, DTV, television translator, LPTV, and Class A stations. A detailed interference study was conducted in accordance with the terrain dependent Longley-Rice point-to-point propagation model, per the Commission’s Office of Engineering and Technology Bulletin 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004 (“OET-69”)<sup>1</sup>. The interference study examined the change in interference as experienced by nearby pertinent stations that would result from the proposed facility.

---

<sup>1</sup> The implementation of OET-69 for this study followed the guidelines of OET-69 as specified therein. **A cell size of 1 km was employed.** Comparisons of various results of this computer program (run on a Sun processor) to the Commission’s implementation of OET-69 show excellent correlation.

Exhibit 11 - Statement A  
**ALLOCATION AND ENVIRONMENTAL CONSIDERATIONS**  
(page 2 of 5)

The results, summarized in **Exhibit 11 - Table I**, show that any new interference does not exceed the Commission's interference limits (0.5 percent to full service and Class A stations, and 2.0 percent to secondary stations). Accordingly, the instant proposal complies with §74.793 regarding interference protection to analog and digital television, low power television, television translator, and Class A television facilities.

Based on data extracted from the FCC's CDBS database, no AM broadcast stations are located within 3.2 km (2 miles) of the proposed site. As a result, no impact to nearby directional antenna systems is anticipated. The nearest FCC monitoring station is at Waipahu, Hawaii at a distance of 178 km from the proposed site. This exceeds by a great margin the minimum distance specified in §73.1030(c)(3)(iv) that would suggest consideration of the monitoring station.

It is thus believed that the facility proposed herein will satisfy all of the pertinent Commission Rules and Policies now in effect regarding allocation matters for a television translator facility.

### **Environmental Considerations**

The proposed antenna will be side-mounted on an existing unregistered antenna support structure. The overall height of the support structure will be 54.9 meters. The proposed ERP is 2.1 kilowatts with an antenna height above ground of 45.7 meters.

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. Since the existing tower's overall height of 54.9 meters passes the FCC's TOWAIR program, and there are no known airports within 15 km of the proposed site, it is believed that an aeronautical study is not necessary. 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.

Exhibit 11 - Statement A  
**ALLOCATION AND ENVIRONMENTAL CONSIDERATIONS**  
(page 3 of 5)

**Human Exposure to Radiofrequency Radiation**

In keeping with §1.1307(b) of the Commission's Rules, the proposed operation has been evaluated for human exposure to radiofrequency energy using the procedures outlined by the Federal Communications Commission in FCC OET Bulletin 65 ("OET-65"). OET-65 describes a means of determining whether a proposed facility exceeds the radiofrequency exposure guidelines specified in §1.1310 of the Commission's Rules. Under present Commission policy, a facility may be presumed to comply with the limits in §1.1310 of the Commission's Rules if it satisfies the exposure criteria set forth in OET-65. Based upon that methodology, and as demonstrated in the following, the proposed transmitting system will comply with the cited adopted guidelines.

The proposed K41JT-D antenna will have a center of radiation 45.7 meters above ground level. An ERP of 2.1 kilowatts, horizontally polarized, will be employed utilizing a Scala model PRTV directional antenna. According to elevation pattern data provided by the antenna manufacturer, the Scala PRTV antenna has a relative field of 10 percent or less from 15 to 90 degrees below the horizontal plane (i.e.: below the antenna) on Channel 41. Thus, a value of 10 percent relative field is used for this calculation. The "uncontrolled/general population" limit specified in §1.1310 for television Channel 41 (center frequency of 635 MHz) is 423.3  $\mu\text{W}/\text{cm}^2$ .

OET-65's formula for television transmitting antennas is based on the NTSC transmission standards, where the average power is normally much less than the peak power. For the DTV facility in the instant proposal, the peak-to-average ratio is different than the NTSC ratio. The DTV ERP figure herein refers to the average power level. The formula used for calculating DTV signal density in this analysis is essentially the same as equation (10) in OET-65:

$$S = (33.4098) (F^2) (ERP) / D^2$$

Where:

S	=	power density in microwatts/cm <sup>2</sup>
ERP	=	total (average) ERP in Watts
F	=	relative field factor
D	=	distance in meters

Using this formula and the above assumptions, the proposed facility would contribute a maximum power density of 0.4  $\mu\text{W}/\text{cm}^2$  at two meters above ground, or 0.09 percent of the general

Exhibit 11 - Statement A  
**ALLOCATION AND ENVIRONMENTAL CONSIDERATIONS**  
(page 4 of 5)

population/uncontrolled MPE limit. At ground level locations away from the base of the tower, the calculated RF power density is lower, due to the increasing distance from the transmitting antenna. Thus, the proposed facility complies with §1.1307(b) of the Commission's Rules regarding exposure to radiofrequency radiation.

§1.1307(b)(3) states that facilities are categorically excluded from responsibility for taking any corrective action in the areas where their contribution is less than five percent. Since the instant situation meets the five percent exclusion test at all ground level areas, the impact of other facilities using this site may be considered independently. Accordingly, it is believed that the impact of the proposed operation should not be considered to be a factor at or near ground level as defined under §1.1307(b).

**Safety of Tower Workers and the General Public**

As demonstrated herein, excessive levels of RF energy attributable to K41JT-D will not be caused at publicly accessible areas at ground level near the antenna supporting structure. Consequently, members of the general public will not be exposed to RF levels in excess of the Commission's guidelines. Nevertheless, appropriate RF exposure warning signs will continue to be posted and access will be restricted by fencing and other appropriate means.

With respect to worker safety, it is believed that based on the preceding analysis, excessive exposure would not occur in areas at ground level. A site exposure policy is employed protecting maintenance workers from excessive exposure when work must be performed on the structure or in areas where high RF levels may be present. Such protective measures include, but are not limited to, restriction of access to areas where levels in excess of the guidelines may be expected, power reduction, or the complete shutdown of facilities when work or inspections must be performed in areas where the exposure guidelines would otherwise be exceeded. *HPTF* will coordinate with other licensees utilizing this site. On-site RF exposure measurements may also be undertaken to establish the bounds of safe working areas.



Exhibit 11 - Statement A  
**ALLOCATION AND ENVIRONMENTAL CONSIDERATIONS**  
(page 5 of 5)

**Conclusion**

Based on the preceding, it is believed that the instant proposal may be categorically excluded from environmental processing under §1.1306 of the Rules; hence preparation of an Environmental Assessment is not required.

**EXHIBIT 11 - FIGURE 1**  
**COVERAGE CONTOUR COMPARISON**

prepared August 2009 for  
**Hawaii Public Television Foundation**  
K41JT-D Kilauea Military Camp, Hawaii  
Facility ID 26419

Ch. 41 (Digital) 2.1 kW

**Cavell, Mertz & Associates, Inc.**  
Manassas, Virginia

Hawaii

K56BD License  
Ch. 56 Analog 1.32 kW  
BLTT-19810803JE  
74 dB $\mu$  F(50,50)  
Service Contour  
(Dipole Corrected)

Proposed K41JT-D  
Ch. 41 Digital 2.1 kW  
51 dB $\mu$  F(50,90)  
Service Contour  
(Dipole Corrected)

K41JT-D CP  
Ch. 41 Digital 0.3 kW  
BDISDTT-20060331BHA  
51 dB $\mu$  F(50,90)  
Service Contour  
(Dipole Corrected)

Scale 1:500,000

0 7 14 21 km

Exhibit 11 - Table I  
**INTERFERENCE ANALYSIS RESULTS SUMMARY**  
 prepared for  
**Hawaii Public Television Foundation**  
 K41JT-D Kilauea Military Camp, Hawaii  
 Facility ID 26419  
 Ch. 41 (Digital) 2.1 kW

<u>Ch.</u>	<u>Call</u>	<u>City/State</u>	<u>Dist(km)</u>	<u>Status</u>	<u>File Number</u>	----Population (2000 Census)----	
						<u>Baseline</u>	<u>New Interference</u>
41	KPXO-TV	Kaneohe, HI	325.1	LIC	BLCDT-20060705ACA	---	none
43	NEW	Hilo, HI	20.0	APP	BNPTTL-20000829AVO	---	none
44	NEW	Hilo, HI	33.5	APP	BNPTTL-20000828AFF	---	none
44	K44JD	Kahului, HI	170.9	CP	BNPTTL-20000828AHL	---	none
45	K45CT	Hilo, HI	17.4	LIC	BLTT-19940307IE	---	none
48	KDKU-LP	Kula, HI	168.1	CP	BNPTTL-20000831CKF	---	none
49	KHIW-LP	Wailuku, HI	168.1	CP	BNPTTL-20000829AWV	---	none