

## **ENGINEERING EXHIBIT**

### **Modification of a Licensed Facility for LPTV Station Application**

prepared for

**Hawaii Public Television Foundation**  
K41JT-D Kilauea Military Camp, Hawaii  
Facility ID 26419  
Ch. 17 (Digital) 3.16 kW

#### **Table of Contents**

FCC Form 2100, Schedule C – Engineering Data (Digital)

Statement A            Comprehensive Engineering Statement

Attachment            TV\_Study Interference Report

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Schedule C - Statement A  
**COMPREHENSIVE ENGINEERING STATEMENT**  
prepared for  
**Hawaii Public Television Foundation**  
K41JT-D Kilauea Military Camp, Hawaii  
Facility ID 26419  
Ch. 17 (Digital) 3.16 kW

*Hawaii Public Television Foundation* (“*Hawaii PTV*”) is the licensee of digital low power television translator station K41JT-D, Channel 41, Kilauea Military Camp, Hawaii, Facility ID 26419 (File No. BLDTT-20100922AEU). K41JT is displaced as a result of the TV Band Repack<sup>1</sup>. Under the provisions of the FCC’s Special Displacement Filing Window for low power television stations and television translators, *Hawaii PTV* requests a displacement channel change to Channel 17.

### **Nature of the Proposal**

The antenna system for the proposed K41JT operation is a directional antenna which will be side-mounted 38.1 m above ground on the existing tower. The tower is less than 200’ in overall height and does not require registration. No change in structure overall height is necessary to carry out this proposal. Since no change to the structure’s overall height is proposed, no change to structure marking/lighting requirements will result.

The proposed digital facility will operate on Channel 17 using a “simple” out of channel emission mask, a maximum effective radiated power of 3.16 kW, and an antenna height of 1717.1 meters AMSL. **Schedule C - Figure 1** depicts the licensed 51 dB $\mu$  F(50,90) and the proposed 51 dB $\mu$  F(50,90) coverage contours which are completely coincident. As demonstrated therein, the service area overlap complies with §74.787(b)(1)(ii). The proposed site is located at the same site as the licensed coordinates, thus complying with §74.787(b)(1)(iii) for a minor change application. The transmitter site location is some 10 km (6.1 miles) from the Kilauea Military Camp, thus complying with §74.787(a)(4) of the Rules for a displaced translator.

### **Allocation Considerations**

The instant proposal complies with the Commission’s interference protection requirements toward all DTV, television translator, LPTV, and Class A stations. A detailed interference study was conducted using the FCC’s TV Study program version 2.2.5. The interference study results are provided as a separate attachment to this application and show that

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<sup>1</sup> Specifically, Channel 51 K41JT is displaced as an “out-of-core” facility post-Repack.

Schedule C - Statement A  
**COMPREHENSIVE ENGINEERING STATEMENT**  
(Page 2 of 4)

no interference is caused to any full service, Class A station or secondary stations<sup>2</sup>. 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 for *both pre and post* transition.

**International Coordination**

The proposed transmitter site is located in Hawaii which is greater than the 100 km coordination distance from the US-Canadian and US-Mexican Borders. Thus, it is believed that international coordination will not be necessary for the instant proposal.

**Other Allocation Considerations**

The nearest FCC monitoring station is at Waipahu, Hawaii, at a distance of 348.4 km from the proposed site. This exceeds by a great margin the threshold minimum distance specified in §73.1030(c)(3) that would suggest consideration of the monitoring station. The proposed 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 broadcast stations located within 3.2 km (2 miles) of the proposed site, according to information extracted from the Commission's engineering database.

**Environmental Considerations**

The instant proposal is not believed to have a significant environmental impact as defined under §1.1306 of the Commission's Rules. Consequently, preparation of an Environmental Assessment is not required.

The use of existing antenna support structures 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

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<sup>2</sup> The instant application was studied with 1 km cell size, and 0.1 km terrain increment settings.

Schedule C - Statement A  
**COMPREHENSIVE ENGINEERING STATEMENT**  
(Page 3 of 4)

categorically excluded from environmental processing pursuant to §1.1306 of the Commission's rules.

**Human Exposure to Radiofrequency Electromagnetic Field**

The proposed operation was evaluated for human exposure to radiofrequency electromagnetic field using the procedures outlined in the Commission's OET Bulletin 65 ("OET 65"). OET 65 describes a means of determining whether a proposed facility exceeds the radiofrequency exposure guidelines adopted in §1.1310. Under present Commission policy, a facility may be presumed to comply with the limits specified in §1.1310 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 K41JT Channel 17 antenna center of radiation will be 38.1 meters above ground level. An effective radiated power of 3.16 kilowatts, horizontally polarized, will be employed utilizing a directional antenna, Scala Model PR-TV oriented at 210 degrees True. According to information provided by the antenna manufacturer, a "worst-case" relative field value of 10 percent (from 15° to 90° below the horizontal) is assumed for purposes of the calculation. The "uncontrolled/general population" limit specified in §1.1310 for Channel 17 (center frequency 491 MHz) is 327.3  $\mu\text{W}/\text{cm}^2$ .

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

Schedule C - Statement A  
**COMPREHENSIVE ENGINEERING STATEMENT**  
(Page 4 of 4)

power density of 0.81  $\mu\text{W}/\text{cm}^2$  at two meters above ground level near the antenna support structure, or 0.24 percent of the general population/uncontrolled limit.

§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 of the exposure limit. Since the instant situation meets the five percent exclusion test at all ground level areas, the impact of any other facilities near this site may be considered independently from this proposal. 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 the proposal will not be caused at publicly accessible areas at ground level or near the base of 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, site access will continue to be restricted and controlled through the use of a locked fence. Additionally, appropriate RF exposure warning signs will continue to be posted.

With respect to worker safety, it is believed that based on the preceding analysis, excessive exposure would not occur in areas at ground level or at the base of the top mounted tower structure. A site exposure policy will be employed protecting maintenance workers from excessive exposure when work must be performed on the tower or in areas where high RF levels may be present. Such protective measures may include, but will not be 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. On-site RF exposure measurements may also be undertaken to establish the bounds of safe working areas. The applicant will coordinate exposure procedures with all pertinent stations.

### **Conclusion**

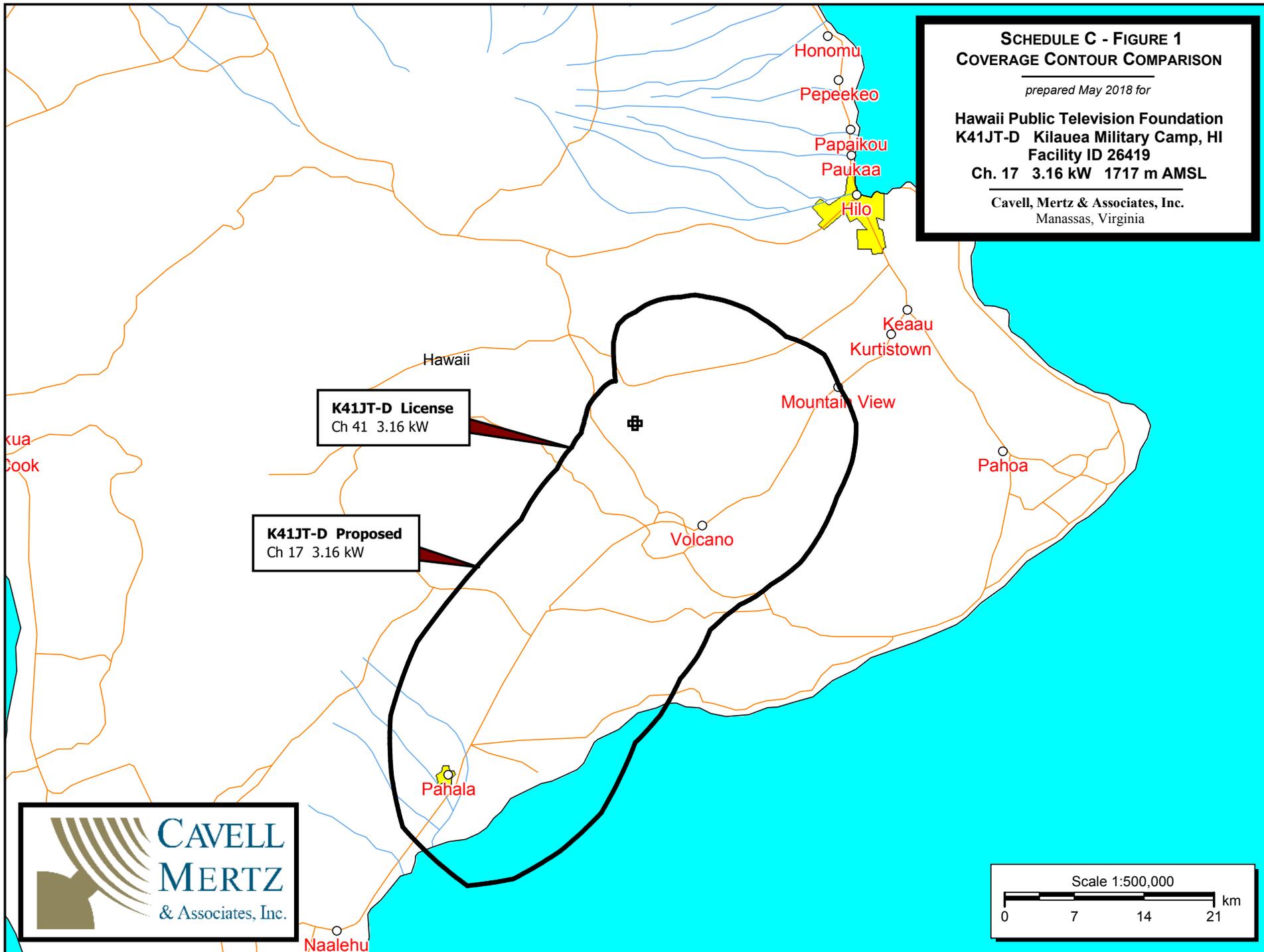
Based on the preceding, it is believed that the instant proposal complies with all Commission Rules and policies.

**SCHEDULE C - FIGURE 1  
COVERAGE CONTOUR COMPARISON**

*prepared May 2018 for*

**Hawaii Public Television Foundation  
K41JT-D Kilauea Military Camp, HI  
Facility ID 26419  
Ch. 17 3.16 kW 1717 m AMSL**

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



tvstudy v2.2.5 (4uoc83)

Database: localhost, Study: K41JT on 17 10ppkm\_PP, Model: Longley-Rice  
Start: 2018.05.29 16:05:02

Study created: 2018.05.29 16:05:02

Study build station data: LMS TV 2018-05-29

Proposal: K41JT-D D17 LD LIC KILAUEA MILITARY CAMP, HI  
File number: K41JT on 17 10ppkm  
Facility ID: 26419  
Station data: User record  
Record ID: 371  
Country: U.S.

Build options:

Protect pre-transition records not on baseline channel  
Protect baseline records from LPTV

Search options:

Baseline record excluded if station has CP

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	KOGG	D16	DT	LIC	WAILUKU, HI	BLCDT20090123ACH	168.0 km
No	K17GR	N17+	TX	LIC	KULA, HI	BLTTL20070122AJL	168.1

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D17  
Mask: Simple  
Latitude: 19 31 12.20 N (NAD83)  
Longitude: 155 17 56.20 W  
Height AMSL: 1717.1 m  
HAAT: 0.0 m  
Peak ERP: 3.16 kW  
Antenna: SCA-PRTV (ID 101359) 210.0 deg  
Elev Pattnr: Generic

49.0 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	0.003 kW	263.5 m	12.6 km
45.0	0.002	648.7	18.3
90.0	0.007	724.6	24.9
135.0	0.008	577.7	23.6
180.0	0.086	480.8	35.1
225.0	1.21	140.7	35.5
270.0	0.009	-583.5	5.8
315.0	0.007	-197.7	5.5

Database HAAT does not agree with computed HAAT

Database HAAT: 0 m Computed HAAT: 257 m

Distance to Canadian border: 4223.6 km

Distance to Mexican border: 4021.5 km

Conditions at FCC monitoring station: Waipahu HI

Bearing: 306.8 degrees Distance: 348.4 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:

Bearing: 52.9 degrees Distance: 5257.3 km

No land mobile station failures found

Proposal is not within the Offshore Radio Service protected area

Study cell size: 1.00 km  
Profile point spacing: 0.10 km

Maximum new IX to full-service and Class A: 0.50%  
Maximum new IX to LPTV: 2.00%

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Interference to proposal scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	K41JT-D	D17	LD	LIC	KILAUEA MILITARY CAMP, HI	K41JT on 17 10ppkm	

	Service area	Terrain-limited	IX-free	Percent IX
1768.7	12,206	1424.0	11,426	0.00 0.00