ENGINEERING EXHIBIT

Application for New Digital Television Translator Construction Permit

prepared for

Hawaii Public Television Foundation

New-LD Hilo, Hawaii

Ch. 51 (Digital) 1.0 kW

Table of Contents

This material supplies a "hard copy" of the engineering portions of this application as entered August 25, 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:
51

2. Translator Input Channel No. : 10

3. Primary station proposed to be rebroadcast:

Facility Identifier	Call Sign	City	State	Channel
26428	KMEB	WAILUKU	HI	10

4. Antenna Location Coordinates: (NAD 27)
Latitude:
Degrees 19 Minutes 35 Seconds 18 (•) North ( ) South

Longitude:
Degrees 155 Minutes 27 Seconds 10 (•) West ( ) East

5. Antenna Structure Registration Number:
[x] Not Applicable [Exhibit 10] [ ] Notification filed with FAA

6. Antenna Location Site Elevation Above Mean Sea Level: 2492 meters

7. Overall Tower Height Above Ground Level: 18 meters

8. Height of Radiation Center Above Ground Level: 8.2 meters

9. Maximum Effective Radiated Power (ERP): 1 kW

10. Transmitter Output Power: 0.024 kW

11. a.Transmitting Antenna:
Before selecting Directional "Off-the-Shelf", refer to "Search for Antenna Information" under CDBS Public Access (http://fjallfoss.fcc.gov/prod/cdbs/pubacc/prod/cdbs_pa.htm). 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.

( ) Nondirectional ( ) Directional "Off-the-shelf" (•) Directional composite

Manufacturer SCA Model PRTV

b. Electrical Beam Tilt: degrees [x] Not Applicable

c. Directional Antenna Relative Field Values: [ ] N/A (Nondirectional or Directional "Off-the-shelf")

Rotation (Degrees): 70 [ ] No Rotation

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											

Relative Field Polar Plot

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.

12. **Out-of-channel Emission Mask:** (•) Simple ( ) Stringent

CERTIFICATION

13.	**Interference** : 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.	(•) Yes ( ) No See Explanation in [Exhibit 11]
14.	**Environmental Protection Act.** 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 **Exhibit is required.** 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.	(•) Yes ( ) No See Explanation in [Exhibit 12]
15.	**Channels 52-59.** If the proposed channel is within channels 52-59, the applicant certifies compliance with the following requirements, as applicable: ☐ The applicant is applying for a digital companion channel for which no suitable channel from channel 2-51 is available. ☐ 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.	**Channels 60-69.** If the proposed channel is within channels 60-69, the applicant certifies compliance with the following requirements, as applicable: ☐ 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. ☐ 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. ☐ 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.	

PREPARERS CERTIFICATION ON PAGE 3 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	Relationship to Applicant (e.g., Consulting Engineer)
ROBERT J. CLINTON	CONSULTANT
Signature	Date 8/25/2009

Mailing Address
CAVELL, MERTZ & ASSOCIATES, INC. 7839 ASHTON AVENUE

City	State or Country (if foreign address)	Zip Code
MANASSAS	VA	20109 - 2883

Telephone Number (include area code)	E-Mail Address (if available)
7033919090	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 - STRUCTURE REGISTRATION

PLEASE SEE EXHIBIT 11 - STATEMENT A FOR STRUCTURE REGISTRATION DISCUSSION.

Attachment 10

Exhibit 11
Description: EXHIBIT 11 - STATEMENT A

EXHIBIT 11 - STATEMENT A - CONSOLIDATED ENGINEERING STATEMENT (WITH TABLE OF CONTENTS AND COPY OF FORM 346, SECTION III - ENGINEERING)

Attachment 11

Description
EXHIBIT 11 - STATEMENT A

Exhibit 12
Description: EXHIBIT 12 - ENVIRONMENTAL

PLEASE SEE EXHIBIT 11 - STATEMENT A FOR ENVIRONMENTAL CONSIDERATION DISCUSSION.

Attachment 12

Exhibit 11 – Statement A

NATURE OF THE PROPOSAL
ALLOCATION AND ENVIRONMENTAL CONSIDERATIONS

prepared for

Hawaii Public Television Foundation

New-LD Hilo, Hawaii
Ch. 51 (Digital) 1.0 kW

Hawaii Public Television Foundation ("HPTF") is submitting the instant application for a new digital Low Power Television Translator station in response to the August filing window announced by the FCC's Public Notice[1]. HPTF is currently operating a UHF STL on Channel 51 from near the top of Mauna Loa, with an effective radiated power ("ERP") of 1.0 kW with vertical polarization and a directional antenna oriented to 70 degrees True (see license WQJR673). The instant application proposes to operate with the same parameters on Channel 51 and to orient the antenna to produce horizontal polarization in order to operate as a translator.

The existing antenna is a Scala PRTV, and is side-mounted on the same unregistered tower specified in the STL license. The antenna will operate with an ERP of 1.0 kW. **Exhibit 11 – Figure 1** depicts the digital 51 dBµ contour of the proposed service contour. A mechanical beam tilt of three degrees below the horizontal is specified on the 70-degree azimuth in order to assure a good signal at the coastline of the island.

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")[2]. The interference study examined the change in interference as experienced by nearby pertinent stations that would result from the proposed facility.

[1] Public Notice, Commencement of Rural, First-Come, First-Served Digital Licensing for Low Power Television and TV Translators Beginning August 25, 2009 and Commencement of Nationwide, First-Come, First-Served Digital Licensing For Low Power Television and TV Translator Services Beginning January 25, 2010, Released June 29, 2009, DA 09-1487.

[2] 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.

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) with the exception of the modification application for K67BA-D. *HPTF* is the permittee for K67BA-D and is prepared to accept the predicted interference from the instant proposal. 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. The nearest FCC monitoring station is at Waipahu, Hawaii at a distance of 331.4 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 is 18 meters. The proposed ERP is 1.0 kilowatts with an antenna radiation center height above ground of 8.2 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 proposed overall height of 18 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.

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 New-LD antenna will have a center of radiation 8.2 meters above ground level. An ERP of 1.0 kilowatts, horizontally polarized, will be employed utilizing a Scala model PRTV omni-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 51. 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 51 (center frequency of 695 MHz) is 463.3 $\mu W/cm^2$.

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:

$$\mathbf{S = (33.4098)\ (F^2)\ (ERP)\ /\ D^2}$$

Where:

S	=	power density in microwatts/cm^2
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 8.7 μW/cm² at two meters above ground, or 1.9 percent of the general 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 the proposal 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.

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.

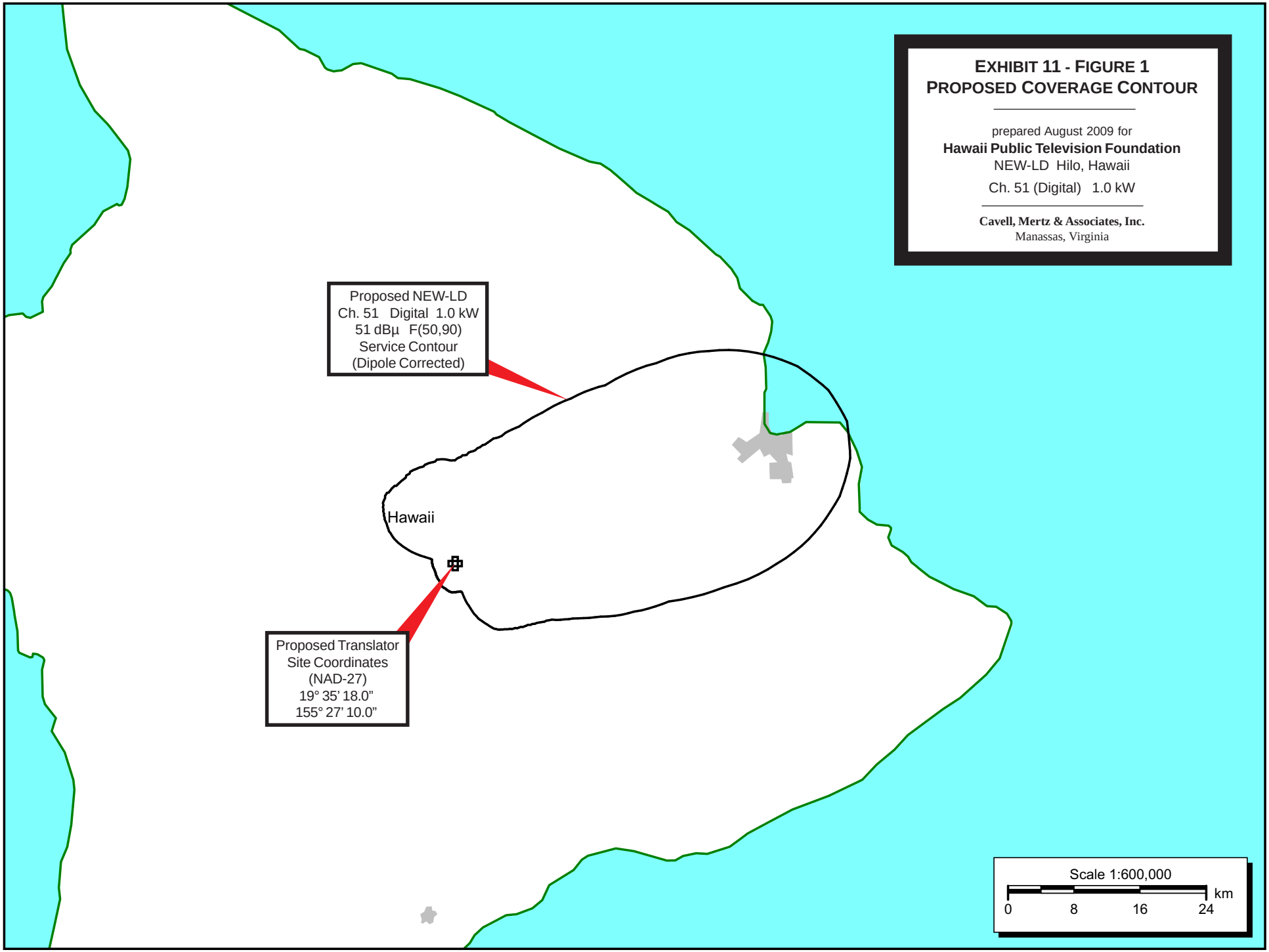
EXHIBIT 11 - FIGURE 1
PROPOSED COVERAGE CONTOUR
prepared August 2009 for
Hawaii Public Television Foundation
NEW-LD Hilo, Hawaii
Ch. 51 (Digital) 1.0 kW
Cavell, Mertz & Associates, Inc.
Manassas, Virginia
Proposed NEW-LD
Ch. 51 Digital 1.0 kW
51 dBµ F(50,90)
Service Contour
(Dipole Corrected)
Hawaii
Proposed Translator
Site Coordinates
(NAD-27)
19° 35' 18.0"
155° 27' 10.0"
Scale 1:600,000
km
0
8
16
24

Exhibit 11 - Table I

INTERFERENCE ANALYSIS RESULTS SUMMARY

prepared for

Hawaii Public Television Foundation

New-LD Hilo, Hawaii

Ch. 51 (Digital) 1.0 kW

						----Population (2000 Census)----	
Ch.	Call	City/State	Dist(km)	Status	File Number	Baseline	New Interference
50	K67BA	Hakalau, HI	45.9	CP	BDISDTT-20060331BFB	---	none
50	K67BA	Hakalau, HI	45.9	APP	BMPDTT-20090824AIZ	10,114	1,903 / 18.8%
51	KAUI-LP	Wailuku, HI	152.1	LIC	BLTTL-19990412JD	---	none