

Engineering Exhibit

**APPLICATION FOR
CONSTRUCTION PERMIT FOR A
DIGITAL TELEVISION STATION**
prepared for
Hawaii Public Television Foundation

KMEB(TV) Honolulu, Hawaii

Facility ID 26428
Ch. 10 4.4 kW (MAX-DA) 747 m

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FCC Form 340 - Section VII – DTV Engineering

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This material supplies a "hard copy" of the engineering portions of this application as entered April 4, 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.

Section VII Preparer's Certification

I certify that I have prepared Section VII (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 4/4/2008	
Mailing Address CAVELL, MERTZ & ASSOCIATES, INC. 7839 ASHTON AVENUE			
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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).

SECTION VII - DTV Engineering

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

Pre-Transition Certification Checklist: 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.

Post-Transition Expedited Processing. 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.

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. Yes 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. Yes No
 - (c) It will operate a pre-transition facility with an effective radiated power (ERP) and antenna Yes No

	<p>height above average terrain (HAA1) that do not exceed the DTV reference ERP and HAAT for this station as established in 47 C.F.R. Section 73.622.</p> <p>(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").</p> <p>(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.</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> N/A</p> <p><input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A</p>
2.	<p>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 submit the Exhibit called for in Item 13.</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>
3.	<p>Pursuant to 47 C.F.R. Section 73.625, the DTV coverage contour of the proposed facility will encompass the allotted principal community.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>
4.	<p>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.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>
5.	<p>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.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>

SECTION VII - 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.	<p>Channel Number: DTV 10 Analog TV, if any 10</p>
2.	<p>Zone: <input type="radio"/> I <input checked="" type="radio"/> II <input type="radio"/> III</p>
3.	<p>Antenna Location Coordinates: (NAD 27)</p> <p>Latitude: Degrees 20 Minutes 39 Seconds 37 <input checked="" type="radio"/> North <input type="radio"/> South</p> <p>Longitude: Degrees 156 Minutes 21 Seconds 46 <input checked="" type="radio"/> West <input type="radio"/> East</p>
4.	<p>Antenna Structure Registration Number: <input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Notification filed with FAA</p>
5.	<p>Antenna Location Site Elevation Above Mean Sea Level: 1361 meters</p>
6.	<p>Overall Tower Height Above Ground Level: 60.7 meters</p>
7.	<p>...</p>

7.	Height of Radiation Center Above Ground Level:	49 meters
8	Height of Radiation Center Above Average Terrain (HAAT):	747 meters
9.	Maximum Effective Radiated Power (average power):	4.4 kW

10. Antenna Specifications:

a. Manufacturer DIE Model THA-P2SP-4H/8H-1-B

b. Electrical Beam Tilt:
1.7 degrees Not Applicable

c. Mechanical Beam Tilt:
degrees toward azimuth
degrees True Not Applicable

Attach as an Exhibit all data specified in 47 C.F.R. Section 73.625(c) [Exhibit 33]

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	0.298	10	0.154	20	0.043	30	0.019	40	0.01	50	0.01
60	0.019	70	0.043	80	0.154	90	0.298	100	0.462	110	0.628
120	0.778	130	0.897	140	0.974	150	1	160	0.974	170	0.897
180	0.778	190	0.628	200	0.453	210	0.296	220	0.191	230	0.191
240	0.296	250	0.453	260	0.628	270	0.778	280	0.897	290	0.974
300	1	310	0.974	320	0.897	330	0.778	340	0.628	350	0.462
Additional Azimuths		225	0.178								

[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 34]

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 35]

	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 therefor. (Applicable only if Certification Checklist item 3 is answered "No.")	[Exhibit 36]
13.	<p>Environmental Protection Act. Submit in an Exhibit the following:</p> <p>a. 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.</p> <p>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.</p> <p>If Certification Checklist Item 2 is answered "No," an Environmental Assessment as required by 47 C.F.R Section 1.1311.</p>	[Exhibit 37]
PREPARERS CERTIFICATION ON PAGE 8 MUST BE COMPLETED AND SIGNED.		

Exhibits

Exhibit 34

Description: EXHIBIT 34 - DIRECTIONAL ANTENNA

PLEASE SEE EXHIBIT 35 - STATEMENT A FOR DIRECTIONAL ANTENNA DISCUSSION.

Attachment 34

Exhibit 35

Description: EXHIBIT 35 - STATEMENT A

EXHIBIT 35 - STATEMENT A - NATURE OF THE PROPOSAL, PROPOSED ANTENNA SYSTEM

Attachment 35

Description
<u>EXHIBIT 35 - STATEMENT A</u>

Exhibit 37

Description: EXHIBIT 37 - STATEMENT B

EXHIBIT 37 - STATEMENT B - ENVIRONMENTAL CONSIDERATIONS (WITH TABLE OF CONTENTS AND COPY OF FCC FORM 340 SECTION VII - DTV ENGINEERING).

Attachment 37

Description
<u>EXHIBIT 37 - STATEMENT B</u>

Exhibit 37 - Statement B
ENVIRONMENTAL CONSIDERATIONS
prepared for
Hawaii Public Television Foundation
KMEB(TV) Wailuku, Hawaii
Facility ID 26428
Ch. 10 4.4 kW (MAX-DA) 747 m

Nature of The Proposal

Hawaii Public Television Foundation (“*HPTF*”) herein proposes to operate its post-transition Channel 10 digital operation for KMEB(TV) from a new common television transmitter site. A new common high-band VHF television antenna will be mounted on the proposed structure for the post-transition operation. The proposed structure will be 60.7 meters overall (199 feet) and passes the FCC’s “TOWAIR” program for the transmitter site, thus lighting, marking, and registration is not expected to be required.

HPTF will be a tenant on the proposed new tower structure. Various environmental studies have been completed and it is our understanding that the FCC is performing formal negotiations with the United States Fish and Wildlife Service to obtain the necessary NEPA certification for the structure. The instant application will be amended once all approvals have been obtained. Pending submission of that amendment, a response of “no” has been supplied in response to Item 2 of the Certification Checklist of the associated FCC Form 340 Section VII.

Human Exposure to Radiofrequency Radiation

The proposed operation was evaluated for human exposure to radiofrequency energy using the procedures outlined in the Commission’s OET Bulletin No. 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 proposed KMEB(TV) antenna that will be employed for the proposed post-transition operation will have a center of radiation 49 meters above ground level. An ERP of 4.4 kilowatts,

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horizontally polarized, will be employed. According to information provided by the manufacturer, the Dielectric model THA-P2SP-4H/8H-1-B antenna has a maximum relative field of less than 30 percent from 15 to 90 degrees below the horizontal plane (*i.e.*, below the antenna). Thus, a value of 30 percent relative field is used for this calculation. The “uncontrolled/general population” limit specified in §1.1310 for Channel 10 (center frequency 195 MHz) is 200 $\mu\text{W}/\text{cm}^2$.

The proposed KMEB(TV) transmitter site is situated on the side of a large mountain, but in an area of somewhat level terrain such that the highest nearby ground elevation within approximately 100 meters is 1,367 meters AMSL according to USGS topographic maps. For study purposes, it was assumed that the ground elevation surrounding the site area is flat, and corresponds to the maximum ground elevation of 1,367 meters AMSL (based on the maximum ground elevation corresponding to topographical map information). Thus, from this perspective, the antenna would appear to be 43 meters above the “flat earth” ground level. Also, to simplify calculations, the antenna is assumed to be omni-directional.

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 (9) in OET-65.

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

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, calculations were made to predict power density levels attributable to the KMEB(TV) facility at points two meters above ground level near the antenna support structure. Assuming a 30 percent relative field for the KMEB(TV) DTV antenna system from the antenna to the “flat earth,” the highest RF electromagnetic field level attributable to KMEB(TV) is 7.9 $\mu\text{W}/\text{cm}^2$,

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which is 3.95 percent of the uncontrolled / general public MPE limit at any location two meters above the “flat earth” maximum ground level. When the actual terrain elevations are considered (which are below the “flat earth” maximum along most azimuths), the calculated RF electromagnetic field will be lower. If the horizontal radiation pattern is considered, the calculated RF electromagnetic field density will be even lower.

§1.1307(b)(3) states that facilities at locations with multiple transmitters (such as the case at hand) 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 the any other facilities using 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 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, tower access will be restricted and controlled through the use of a locked fence. Additionally, appropriate RF exposure warning signs will 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. 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 will 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.