Engineering Statement **REQUEST FOR SPECIAL TEMPORARY AUTHORIZATION** prepared for **Hawaii Public Television Foundation** KMEB(TV) Wailuku, Hawaii Facility ID 26428 Ch. 10 11.1 kW 747 m

Hawaii Public Television Foundation ("HPTF") is the permittee of digital television station KMEB(TV), Channel 10, Wailuku, Hawaii (see BMPEDT-20080620AMY, "CP"). HPTF is currently authorized to construct the final post-transition KMEB facility on Channel 10 at 21.2 kW effective radiated power ("ERP") utilizing a directional antenna. HPTF has constructed and commenced digital operation necessitated by the early Hawaiian transition (January 17, 2009) pursuant to the authorized CP parameters, with the exception of the recently authorized 21.2 kW ERP. Since the authorization to operate at 21.2 kW ERP was recently granted (November 2008), it has been necessary to gain funding and order additional transmitter equipment. In the mean time, KMEB has the capacity to operate at 11.1 kW ERP until the final transmission equipment arrives. Delivery is expected in June 2009. Due to the funding process and final transmitter equipment availability, HPTF proposes now to avail itself of the "phased transition" provisions contained in the Third Periodic Review¹ by operating at a reduced ERP for a short period beyond the official digital transition date. Accordingly, the instant engineering statement has been prepared to support the request for a Special Temporary Authorization to provide interim digital operation on Channel 10 with an ERP of 11.1 kW beyond February 17, 2009.

The facility proposed for the temporary post-transition operation is identical to that of the current KMEB authorized facility with the exception of the ERP. The antenna for the proposed STA facility is the authorized, existing Dielectric THA-P2SP-4H/8H-1-B antenna, which is directional in the horizontal plane. **Figure 1** provides the proposed facility's service contour as well as the principal community coverage contour. As demonstrated therein, the principal community of Wailuku, Hawaii is predicted to receive the enhanced signal level of 43 dBµ as required in §73.625(a) of the Commission's Rules.

¹ See paragraphs 92 through 97, *Report and Order*, <u>Third Periodic Review of the Commission's Rules and Policies</u> <u>Affecting the Conversion To Digital Television</u>, MB Docket No. 07-91, FCC 07-228, Released December 31, 2007.

(Page 2 of 5)

As demonstrated in **Figure 1**, the proposed STA facility's contour lies entirely within the authorized contour. Thus, it is believed that the proposal complies with all Commission Rules and Policy regarding interference to other authorized facilities.

Human Exposure to Radiofrequency Radiation

The licensed operation was evaluated for human exposure to radiofrequency energy using the procedures outlined in the Commission's OET Bulletin No. 65 ("<u>OET 65</u>"). <u>OET 65</u> describes a means of determining whether a 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 <u>OET 65</u>. Based upon that methodology, and as demonstrated in the following, the licensed transmitting system will comply with the cited adopted guidelines.

The KMEB transmitting antenna system's center of radiation is 49 meters above ground level. An effective radiated power ("ERP") of 11.1 kilowatts, horizontally polarized, is employed, utilizing a Dielectric model THA-P2SP-4H/8H-1-B directional antenna. See **Figure 2** for a graphical representation of the manufacturer's vertical plane (elevation) pattern. The "uncontrolled/general population" limit specified in §1.1310 for the television Channel 10 (center frequency 195 MHz) is 200 μ W/cm².

The 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.

<u>OET 65</u>'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

 $(Page \; 3 \; of \; 5)$

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 facility at points two meters above ground level near the antenna support structure. Considering the theoretical elevation pattern of the KMEB antenna system along various depression angles and the "slant" distance from the antenna to locations two meters above the "flat earth," the highest RF electromagnetic field level attributable to KMEB is 4.52 μ W/cm², which is 2.26 percent of the uncontrolled / general public MPE limit at any location two meters above the "flat earth" maximum ground level. As demonstrated in **Figure 3**, the maximum calculated exposure occurs at a distance of 50 meters horizontally away from the base of the tower structure. 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.

§1.1307(b)(3) states that facilities contributing less than five percent of the exposure limit at locations with multiple transmitters 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 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

As demonstrated herein, excessive levels of RF energy attributable to the instant proposal are not caused at publicly accessible areas at ground level near the antenna supporting structure.

(Page 4 of 5)

Consequently, members of the general public are not exposed to RF levels in excess of the Commission's guidelines. Nevertheless, tower 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 does not occur in areas at ground level. A site exposure policy will continue to 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 any pertinent stations.

Certification

Under the penalty of perjury, the undersigned hereby certifies that the foregoing statement was prepared by him or under his direction and that it is true and correct to the best of his knowledge and belief. Mr. Clinton is a senior engineer in the firm of Cavell, Mertz & Associates, Inc. He has submitted numerous engineering exhibits to the Federal Communications Commission and his qualifications are a matter of record with that agency.

Robert J. Clinton February 2, 2009

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(Page 5 of 5)

Attachments

- Figure 1 Proposed Coverage Contours
- Figure 2 Antenna Vertical (Elevation) Radiation Pattern
- Figure 3 Calculated Radiofrequency Exposure



ELEVATION PATTERN



