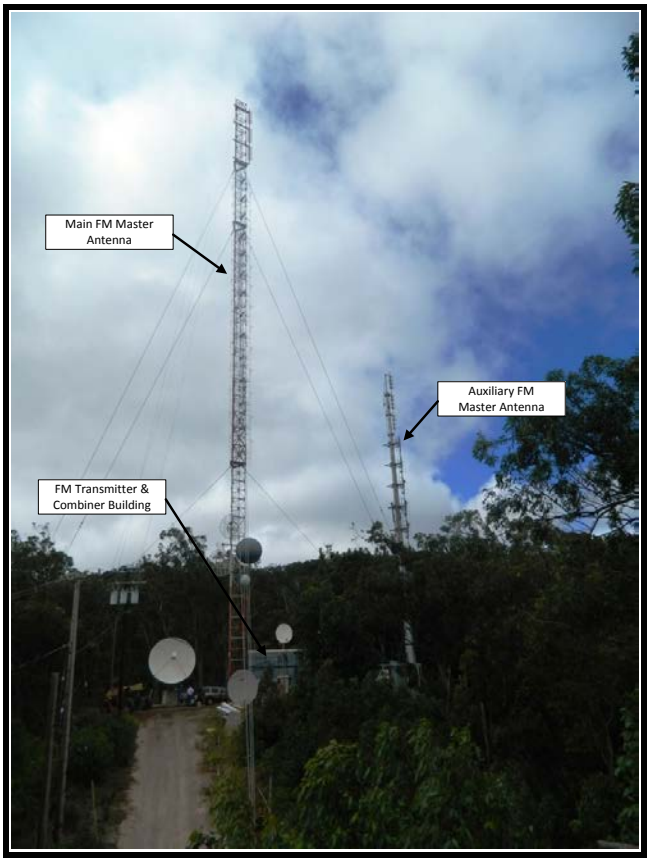
APPLICATION FOR LICENSE
AUXILIARY (STAND-BY) ANTENNA
STATIONS KGU-FM/KCCN-FM/KUCD/KHAI/KINE-FM/KPOI-FM/KKOL-FM
PALEHUA RIDGE, HAWAII

Technical Exhibit

This Technical Report was prepared on behalf of several radio stations located atop *Palehua Ridge* near Honolulu, Hawaii. These stations recently constructed adjacent to its main facility a new auxiliary FM antenna supporting structure and master panel antenna system. This technical exhibit supports the applications seeking to license these new auxiliary facilities (Form 302) pursuant to their respective underlying construction permits.



Picture 1. *Palehua Ridge* Transmitter Site.

Table 1 is a tabulation of the stations seeking auxiliary operation at the new facility.

CallSign / Frequency	FCC Construction Permit File Number	Maximum ERP	Transmitter Power Output
KGU-FM / 99.5 MHz	BXPH-20120822AAS	50 kW	3.6 kW
KCCN-FM / 100.3 MHz	BXPH-20120801AOT	50 kW	3.5 kW
KUCD(FM) / 101.9 MHz	BXPH-20120827ADK	50 kW	3.5 kW
KHAI(FM) / 103.5 MHz	BXPH-20120412AAE	2.2 kW	0.18 kW
KINE-FM / 105.1 MHz	BXPH-20120329AIN	50 kW	3.3 kW
KPOI-FM / 105.9 MHz	BXPH-20120817AAL	50 kW	3.5 kW
KKOL-FM / 107.9 MHz	BXPH-20120822AAT	50 kW	3.6 kW

Table 1. *Palehua Ridge* Auxiliary Facilities.

Installed Directional Antenna

The installed directional auxiliary antenna is a 7 level panel antenna that was formally part of the main antenna, a Shively 6014-14/1. The former main antenna that was incidentally also directly replaced is a 14 level panel. This former antenna was modified for 7 levels and is now identified by model number 6014-7/1-DA.

The antenna manufacturer, Shively Labs, has stated in a letter contained in Appendix A concerning the installed auxiliary antenna "*Seeing how this is a panel antenna system with only one panel per level, the azimuth patterns for all of the stations are unchanged even though the mounting structure is not the same as the original structure. Therefore, the original proofs-of-performances and supporting documentation as submitted to the FCC in support of their original applications for license, remain valid for this auxiliary antenna*." Therefore, based upon this certification, it is believed that no new proof-of-performance is necessary. Furthermore, as a convenience to the Commission, a research review was completed to obtain all the originals of the antenna proof-of-performances and

other documentation in support of those proofs. These documents are also contained in Appendix A.

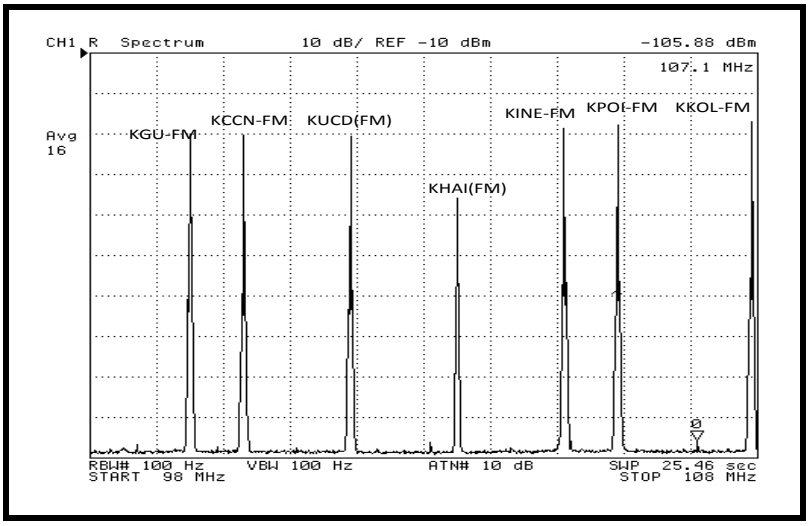
Appendix B is the required licensed surveyor affidavit that the auxiliary antenna is installed at the same orientation as the original. Appendix C is the required engineering certification that the antenna was installed pursuant to the manufacturer's direction.

Intermodulation Measurement Special Condition

The possible intermodulation products caused by the mixing of the subject FM stations into the combiner were measured by the undersigned. The equipment used for the measurements included a calibrated *HP 4395A Network/Spectrum/Impedance Analyzer* and *Trilithic Tuneable Bandpass Filter (5VFSS/110-5-50-CC).*

Both the unmodulated fundamental emissions and the predicted resulting possible intermodulation products were measured to ensure compliance with Section 73.317 of the Commission's Rules. All the stations were operating into the combiner and master auxiliary antenna system at the parameters (transmitter power output) with which they will eventually be licensed. Any possible intermodulation products occurring within the FM broadcast band were specifically analyzed. There is only one FM combiner at this facility. Therefore, the auxiliary antenna system uses the same combiner as the main antenna system.

Additionally, during the intermodulation tests, the spectrum analyzer was scanned for possible intermodulation products occurring outside the FM broadcast band, such as the 2nd harmonic of the fundamental emissions and the FAA aeronautical band. Any nearby full-service FM stations were off-the-air for these measurements to ensure no false intermodulation products were detected.



Picture 2. Sample Spectrum Plot at Combiner Output.

The results of the measurements are tabulated below:

Frequency (MHz)	Level Referenced to Carrier (dB)[1]
83.5	-83.4
84.3	-82.2
86.7	-83.1
87.5	-86.6
88.3	-84.1
89.1	-83.5
89.9	-84.2
90.7	-82.0
91.1	-83.3
91.5	-85.1
91.9	-84.4

[1] Most of the possible intermodulation measurements occurred at the noise floor of the spectrum analyzer.

Frequency (MHz)	Level Referenced to Carrier (dB)[1]
92.3	-90.4
92.7	-81.0
93.1	-86.3
93.5	-81.6
93.9	-84.1
94.3	-83.2
94.7	-86.2
95.1	-84.5
95.5	-86.7
95.9	-84.6
96.3	-81.6
96.7	-89.3
97.1	-85.6
97.5	-83.6
97.7	-89.5
97.9	-87.8
98.3	-83.7
98.7	-81.4
99.1	-81.7
99.9	-80.9
100.7	-81.1
101.1	-84.9
101.5	-80.8
102.3	-84.5
102.7	-87.1
103.1	-83.6
103.9	-80.8
104.3	-87.3
104.7	-82.3
105.5	-80.3
106.3	-85.2
106.7	-86.3
107.1	-87.2
107.5	-80.8
108.3	-81.6
108.7	-85.9
109.1	-80.2
109.5	-81.4
109.9	-81.4
110.3	-83.0
110.7	-81.9
111.1	-80.4
111.5	-89.7
111.9	-82.3
112.3	-84.7

Based upon these measurements, the aforementioned FM auxiliary transmission system located at *Palehua Ridge* is in compliance with Section 73.317 of the Commission's Rules.

FCC Monitoring Station & FAA Receiving Site Impacts

Each FM station has a maximum received field strength limit at the nearby *Wuipahu, Hawaii* FCC monitoring station. No field strength measurement was done by the undersigned at the monitoring station when the auxiliary facility was operational. However, the stations have operated over a 30 day period using this auxiliary facility with no reports of excessive field strength received at the FCC monitoring station. Furthermore, no reports of any other harmful interference occurring were received by the subject stations during that auxiliary facility operation.

Radiofrequency Electromagnetic Exposure

A ground level radiofrequency electromagnetic field exposure (RFR) survey was performed at the *Palehua Ridge* transmitter site. The purpose of these measurements was to measure the exposure occurring from the new auxiliary operation.[2] As discussed in further detail below, it appears that all the radiofrequency exposure measurements were below the Federal Communication Commission (FCC) controlled environment standard within the transmitter site compound except: (1) immediately around the new auxiliary FM supporting structure and (2) the guy wire base located along the compound access road. These locations that were measured above the FCC controlled environment standard are securely fenced prohibiting access when the auxiliary

[2] See OET Bulletin No. 65, Evaluating Compliance With FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields, August, 1997.

antenna system is in operation. The area was measured employing a Narda RFR test set.[3]

Measurements were completed at ground level at and near the transmitter site compound. There are seven full-service FM stations and one full-service television station that operate from this site, including from the auxiliary supporting structure. Picture 3 is a photograph of the new auxiliary supporting structure and installed antennas.

Picture 3. *Palehua Ridge* Auxiliary Antenna.

[3] The Narda 8718 test set, serial number 1575, was last calibrated in April, 2012. The associated Narda 8742 Isotropic Shaped Electric Field Probe, serial number 3013, was last calibrated in May, 2012. The instrumentation indicated the measured exposure value as a percent of the standard. The measurements were obtained by averaging the electric fields existing in a vertical line from ground level to a point 6 feet above ground level.

The facilities were confirmed to be at their proper auxiliary operation power levels during the exposure measurements. All the measurements are with respect to the controlled environment standard. The compound can be classified as a controlled environment as a lockable gate controls access. Appropriate signage indicating the controlled environment designation is provided as shown below in Picture 4.

Picture 4. Access Gate to *Palehua Ridge* Compound.

Within the compound, when the auxiliary antenna is operational, one area exceeded the Commission's controlled environment standard at ground level. The area is located immediately around the new auxiliary FM supporting

structure. This area is securely fenced which prohibits entry when the auxiliary antenna is operational. This area is also marked with signage stating that no access is permitted when the auxiliary facility is in operation. Below is a picture showing the locations of the areas exceeding the controlled environment standard that is surrounded by the additional fence.

Picture 5. Additional Access Gate to Auxiliary Antenna Tower Base.

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