

TELECOMMUNICATIONS ENGINEERING

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OCCUPIED BANDWIDTH AND SPURIOUS EMISSIONS  
MEASUREMENTS, UPPER AUXILIARY ANTENNA  
KBVM – FM, PORTLAND, OREGON

20 April 2011

## ENGINEERING REPORT

On the afternoon of 30 March 2011, I made the equipment performance measurements contemplated in 47 CFR § 73.1590 (a & b) and described in 47 CFR § 73.317 (b-d), for radio station KBVM(FM), Portland, Oregon. These measurements were made as a condition to BXPED-20100526ACV.

Measurements were made while the station was broadcasting programming material typical of its daily operation using its upper auxiliary antenna. KBVM operates stereophonically with no subsidiary communications services.

The KBVM signal is combined with the signals of KQAC, 89.9 MHz., Portland, Oregon, and KMHD, 89.1 MHz., Portland, Oregon, using a Shively three station balanced combiner. The upper auxiliary antenna is a three around by three high, horizontally polarized panel antenna.

KMHD and KQAC were operating at their licensed powers with HD signals.

47 CFR § 73.317 (b) & (c) requires that all signals between 120 and 240 kHz removed from the carrier be attenuated below the level of the carrier by at least 25 dB; that all signals between 240 kHz and 600 kHz removed from the carrier be attenuated by at least 35 dB below the level of the carrier; and that all signals greater than 600 kHz removed from the carrier be attenuated by at least 80 dB below the level of the carrier.

Two sets of measurements were made to assure compliance with these requirements. The first measurement looked at the spectrum between -600 kHz and +600 kHz, relative to the carrier frequency, in order to assess the station's occupied bandwidth under modulation. The second set of measurements scanned the spectrum from 9 KHz to 500 MHz. in order to detect any out-of-band intermodulation products or harmonics.

All measurements were taken with a Rohde & Schwarz Model FSP3 Spectrum Analyzer, Serial Number 835151/011, within current calibration. The measurement sample was taken at the output of the transmitter using a Bird directional coupler.

To measure the occupied bandwidth, the spectrum analyzer was set to 88.3 MHz center frequency, 150 KHz/div span, 1 KHz resolution bandwidth, and 3 KHz video filtering. This results in a measurement noise floor of approximately -78 dBC. A sample of the signal was obtained using a directional coupler located at the FM output port of the combiner.

The analyzer was temporarily set to 300 kHz resolution bandwidth and the reference level adjusted until the trace was at the top of the screen.

The analyzer was then placed in the peak hold mode and modulation applied. After ten minutes of data collection, the resultant spectrum was saved and a plot made of it for analysis.

A copy of this plot is included as Figure 1, below. The emission limits of 47 CFR § 73.317 (b-d) are shown on the plot as red lines. It can be clearly seen from this plot that the occupied bandwidth of KBVM lies well within the prescribed limits between -600 kHz and +600 kHz, relative to the carrier frequency. The signal that appears at +600 KHz and grows to the upper end of the frequency span is the signal of KMHD, 89.1 MHz.

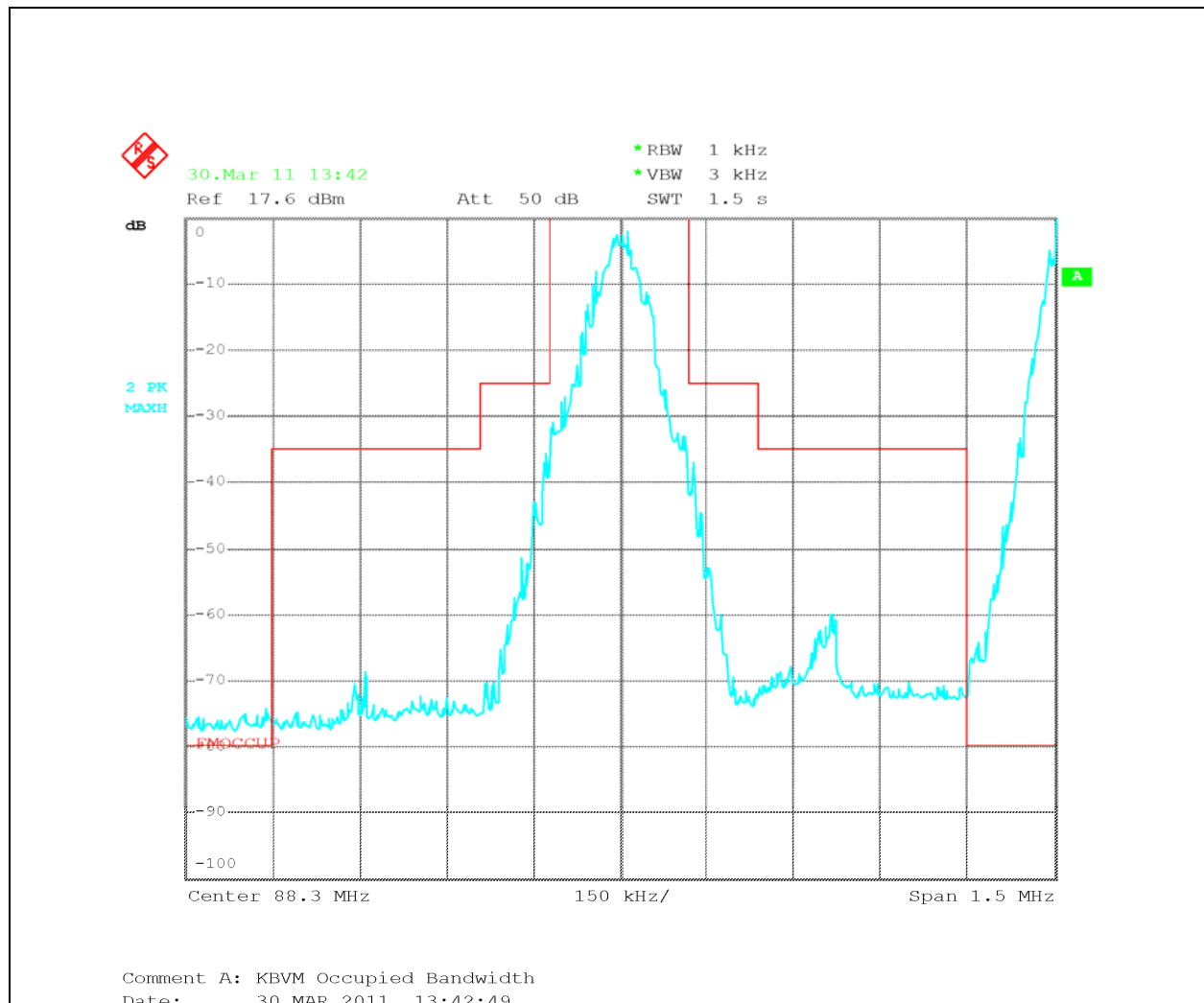


FIGURE 1

To measure spurious signals and harmonics, the spectrum analyzer was set to 2 MHz/div span, 300 Hz resolution bandwidth, and 3 KHz video filtering which reduced the instrument noise floor to -87 dBc. The analyzer was initially set at 10 MHz center frequency and then incremented successively by 20 MHz to scan the spectrum from 9 kHz to 500 MHz. Any signals that were greater -80 dBc were noted and compared to a list of known transmitters in the area for elimination of ingress signals.

All such signals were found to be ingress signals from other nearby FM and television stations. No intermodulation products or harmonics attributable to the operation of KBVM were found

In light of the above measurements I believe that KBVM is in compliance with the requirements of 47 CFR § 73.317 (a) through (d).

ENGINEER'S STATEMENT

I , Gray Frierson Haertig, do hereby affirm that:

I have been retained by KBVM to ascertain its compliance with 47 CFR § 73.1590 (a) & (b) and 47 CFR § 73.317 (b-d) and to prepare this report;

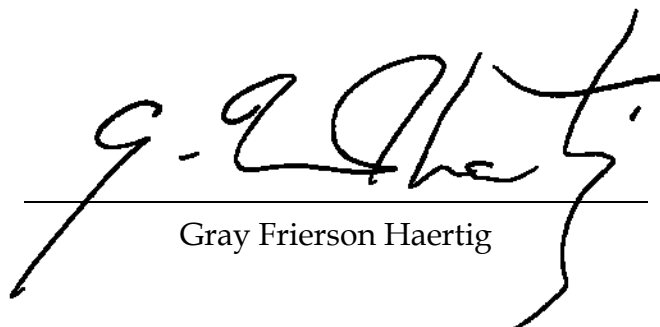
This report and associated exhibits were prepared by me, and are based on measurements made by me;

To the best of my knowledge all statements made herein are true and reflect the actual facts of the matter;

I am a Broadcast Engineer of 46 years experience and;

And that my qualifications are a matter of record with the Commission.

Respectfully submitted this 20<sup>th</sup> day of April, 2011,



Gray Frierson Haertig