

TELECOMMUNICATIONS ENGINEERING

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OCCUPIED BANDWIDTH AND SPURIOUS EMISSIONS
MEASUREMENTS
KKWF - FM, SEATTLE, WASHINGTON

13 November 2008

ENGINEERING REPORT

On the afternoon of 12 November 2008, 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 KKWF(FM), Seattle, Washington. These measurements were made in response to condition two imposed in construction permit BPH-20051201CBC.

KKWF is one of 7 stations sharing a master antenna system at the West Tiger transmitter site near Auburn, Washington. The outputs of the 7 transmitters are combined using a constant impedance balanced bandpass filter combining system designed and fabricated by ERI, Inc. Six of the seven stations also engage in HD Radio broadcasting using the same combiner. The HD signals travel through the combining system in the opposite direction as the FM signals and are carried to the common antenna in a separate transmission line where they feed the quadrature input of the panel antenna hybrids.

Both the FM and HD outputs of the combiner are split using 90 degree hybrids, feeding the upper and lower halves of the antenna separately. Sample loops are provided at both FM output transmission lines. The measurement sample was taken from one of these loops and then passed through a series of seven notch filters connected in series, and tuned to reduce the carrier level of the seven stations using the combiner, in order to increase the increase the dynamic range of the measurements.

Measurements were made while the station was broadcasting programming material typical of its daily operation. KKWF operates stereophonically with a standard RBDS subcarrier and no subsidiary communications subcarriers. All stations were operating into the combined antenna system at full licensed/permitted power during the measurements.

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 were made to ascertain the presence of intermodulation products outside of the +/- 600 kHz region.

All measurements were taken with a Rohde & Schwarz Model FSP3 Spectrum Analyzer, Serial Number 835151/011, within current calibration.

To measure the occupied bandwidth, the spectrum analyzer was set to 100.7 MHz center frequency, 200 kHz/div span, 1 kHz resolution bandwidth, and 3 kHz video filtering. The analyzer's peak detector was selected. This results in a measurement noise floor of approximately -79 dBc. The 100.7 MHz notch filter was temporarily bypassed and an unmodulated carrier was used to establish the reference point at the top of the screen. The analyzer was 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. The slightly elevated signal level at + 600 kHz is a result of the analyzer noise floor being greater than -80 dBc. A careful inspection of these areas with a reduced analyzer resolution bandwidth affording a lower noise floor, revealed that KKWF was in compliance. The signals which appear at -600 kHz and -800 kHz are ingress from the FM and HD signals of KISW (99.9 MHz), which operates at the same site. It can otherwise be clearly seen from this plot that the occupied bandwidth of KKWF lies well within the prescribed limits between -600 kHz and +600 kHz, relative to the carrier frequency.

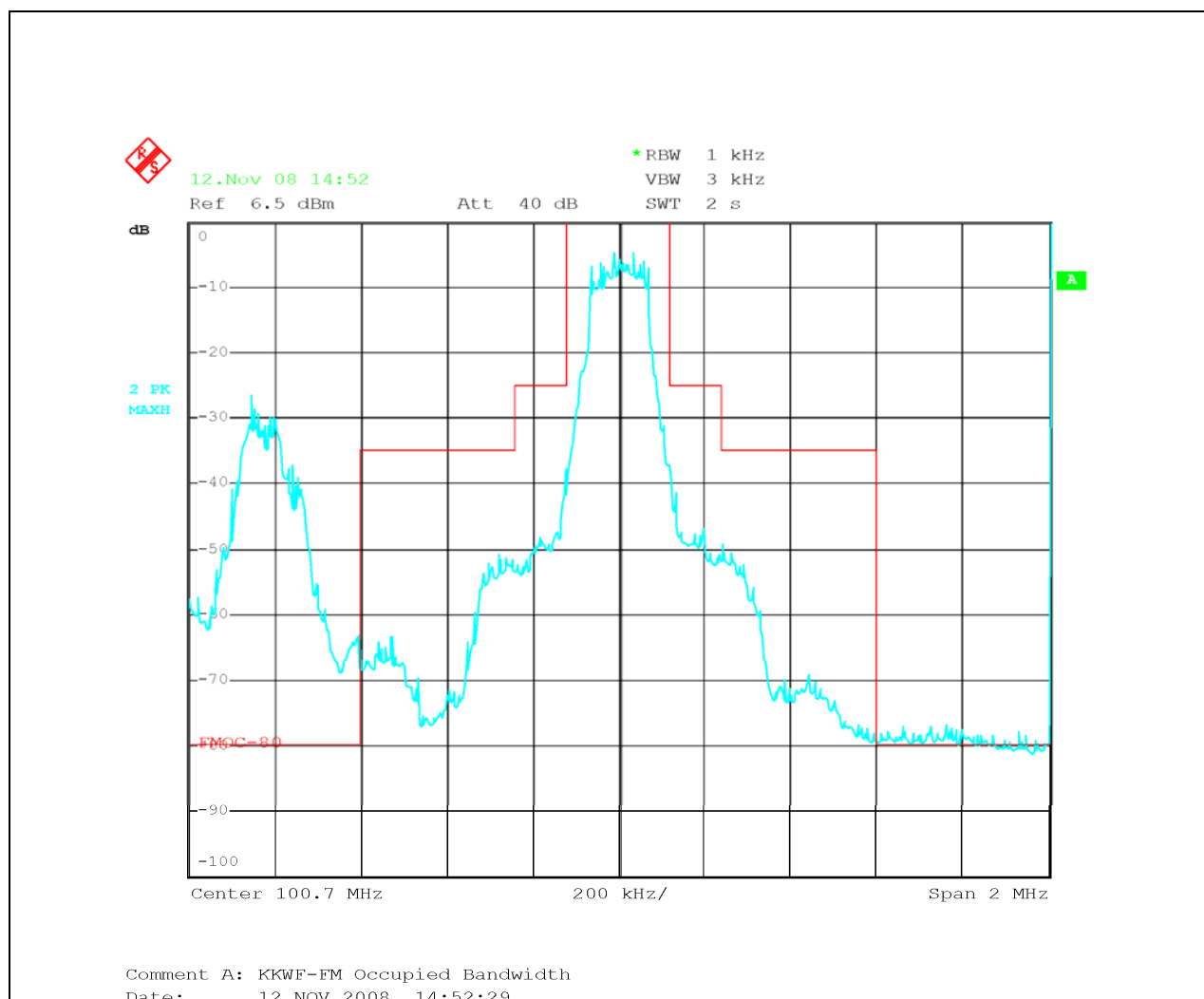


FIGURE 1

To measure spurious signals and harmonics, the 99.9 MHz notch filter was returned to the chain, the spectrum analyzer set to 2 MHz/div span, 10 kHz resolution bandwidth, and 30 kHz video filtering. 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 1 GHz. Any signals that were greater -80 dBc were noted. Upon completion of the scan, each of these signals was compared to a list of known transmitters in the area and the analyzer was used to demodulate the signal. No intermodulation products, spurious signals or harmonics were found that could be attributed to the operation of KKWF.

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

ENGINEER'S STATEMENT

I hereby affirm that:

I have been retained by Entercom Seattle License, LLC, licensee of KKWF, 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 41 years experience and;

My qualifications are a matter of record with the Commission.

Respectfully submitted this 13th day of November 2008,


ELECTRONIC SIGNATURE

Gray Frierson Haertig