

TELECOMMUNICATIONS ENGINEERING
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OCCUPIED BANDWIDTH AND SPURIOUS EMISSIONS MEASUREMENTS
KCHG – FM, CEDAR CITY, UTAH

24 October 2020

ENGINEERING REPORT

On the afternoon of 22 October 2020, 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 KCHG, Cedar City, Utah. These measurements were occasioned by the commencement of operation permitted in BPED-20190716AAW, and are conditioned therein.

Measurements were made while the station was broadcasting programming material typical of its daily operation. KCHG operates monophonically with no SCA's. KCHG was operating at its full permitted power of 15 KW ERP. KCHG shares a common antenna with the facilities of KUQU, Enoch, Utah. Both stations were operating at full licensed power at the time these measurements were made.

A sample of the KCHG signal was taken at the output of the transmitter combiner using a directional coupler inserted in the 1-5/8" coax. The coupling factor of this directional coupler was characterized across a frequency range of 2 MHz to 1.5 GHz using a Hewlett Packard 8712B network analyzer. The corrections for coupling factor were applied to the final data.

This sample was fed to a Rhode and Schwartz Model FSP-3 spectrum analyzer, Serial Number 835151/011, within current calibration. The analyzer was set to a center frequency of 88.7 MHz, span of 1.5 MHz, resolution bandwidth of 1 kHz, video filtering of 3 kHz and using a peak detector. Because it was not possible to remove modulation from the signal, the reference level was established by setting the analyzer's resolution bandwidth to 300 kHz and measuring the power in this bandwidth. Because the power in an FM signal remains constant irrespective of modulation, if the measurement bandwidth is greater than the signal bandwidth, the measured power will be equal to the power in the carrier alone. This technique for establishing the FM reference level has been independently verified and found to be accurate. Modulation was then applied and the analyzer set to peak hold mode and allowed to collect data for 10 minutes.

The resulting plot was saved in the analyzer's memory and a copy is included below as Figure 1.

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. These limits are superimposed on the plot.

The plot readily demonstrates that that the occupied bandwidth of the KCHG signal lies within the limits established in 47 CFR § 73.317 (b) & (c) at frequencies removed from the carrier as much as 600 kHz.

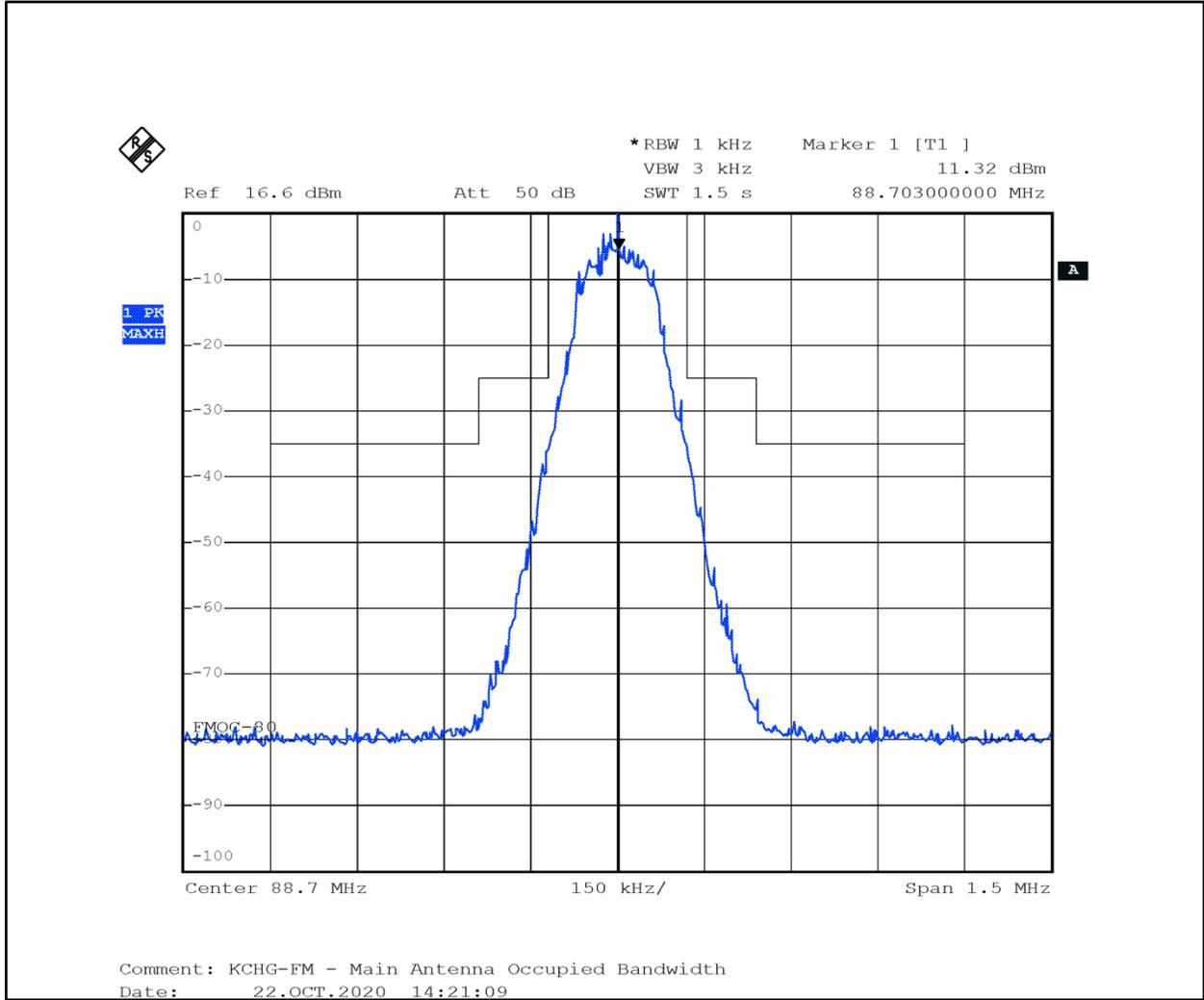


FIGURE 1

To measure spurious signals and harmonics beyond 600 kHz from the carrier, the spectrum analyzer was set to 20 MHz span, 3 kHz resolution bandwidth, and 10 kHz video filtering. At this resolution bandwidth, the internal noise of the analyzer is reduced sufficiently to resolve signals below -80.0 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 1 GHz. Any signals that were greater than -80.0 dBC were noted. No such signals were found. No intermodulation products, spurious signals or harmonics were found that could be attributed to the operation of KCHG.

In light of the above measurements I believe that KCHG 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 Calvary Chapel Cedar City, licensee of KCHG, to ascertain its station’s 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 54 years’ experience and;

My qualifications are a matter of record with the Commission.

Respectfully submitted this 24th day of October 2020,



ELECTRONIC SIGNATURE
Gray Frierson Haertig