



**Occupied Bandwidth and
Spurious Emissions Measurements
To Demonstrate Compliance with
Section 73.317(b) through 73.317(d) of the
FCC Rules and Regulations**

**Clear Channel Broadcasting Licenses, Inc.
WMXC(FM) – 99.9 MHz
Mobile, AL (Facility ID No: 8696)
WRKH(FM) – 96.1 MHz
Mobile, AL (Facility ID No: 53142)
January 18, 2013**

Occupied Bandwidth and Spurious Emissions Measurements

Measurements were conducted to demonstrate that WMXC(FM), Mobile, AL and WRKH(FM), Mobile, AL operating into a combined antenna system, comply with section 73.317(b) through 73.317(d) of the FCC Rules and Regulations. Randall L. Mullinax conducted the measurements on January 18, 2013, with both stations simultaneously utilizing the shared antenna. The spectrum analyzer used for the measurements was an Agilent Technologies model E4402B, S/N MY41441731. A sample of the WMXC(FM) and WRKH(FM) signals was derived from the main transmission line at the output of the combiner and was coupled to the analyzer using a short length of RG-223 50Ω double-shielded coaxial cable. Two 6 dB pads (Bird model 5-A-MFN-06 or equivalent) were inserted ahead of the analyzer to avoid overload and to provide isolation.

The measured unmodulated carrier level of WMXC(FM) was +1 dBm and the measured unmodulated carrier level of WRKH(FM) was -1 dBm. Since the WRKH(FM) unmodulated carrier level of -1 dBm was lower, it was used as the reference for all harmonic, spurious and intermodulation measurements. All measurements were conducted with the transmitters and associated equipment adjusted as used in normal program operation.

For all occupied bandwidth measurements, the spectrum analyzer was placed in the peak hold mode for at least 10 minutes per measurement before the waveforms were observed. As shown in Figures 1 and 2, both transmitters were observed to be in full compliance with section 73.317(b) of the FCC Rules with emissions appearing on frequencies removed from the carrier frequencies by between 120 kHz and 240 kHz attenuated by at least 25 dB below the unmodulated carrier level indicating the occupied bandwidth of each transmitter to be 240 kHz or less. Both transmitters were also observed to be in full compliance with section 73.317(c) of the FCC Rules with emissions appearing on frequencies removed from the carrier frequencies by between 240 kHz and 600 kHz attenuated by at least 35 dB.

Figure 1
WMXC(FM)

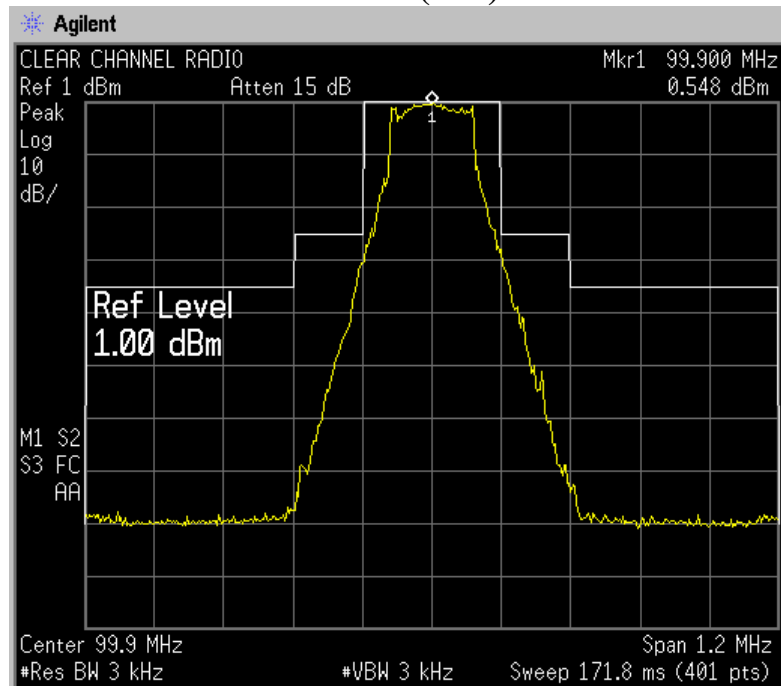
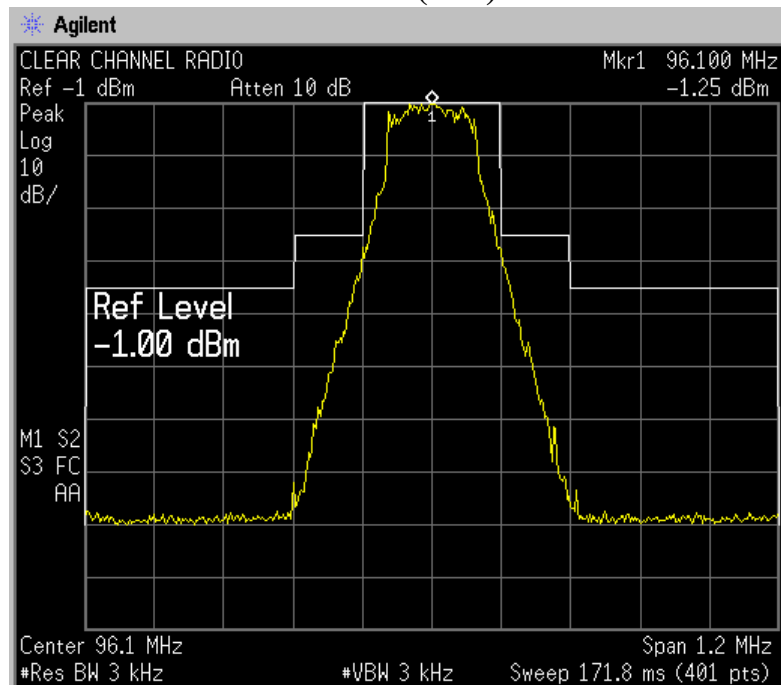


Figure 2
WRKH(FM)



Extensive measurement were also conducted to insure that emissions appearing on frequencies removed from the carrier frequencies by more than 600 kHz were attenuated by at least 80 dB as required by section 73.317(d) of the FCC Rules. To facilitate these measurements, notch filters were placed between the two 6 dB pads so that the spectrum analyzer gain could be increased by 20 dB. The filters were necessary to avoid the possible generation of false spurious or intermodulation products in the analyzer. The attenuation of the notch filters was 46.8 dB at 99.9 MHz and 44.4 dB at 96.1 MHz.

The most likely intermodulation and harmonic frequencies in the range of 5 MHz to 500 MHz that could be produced by the combined operation of WMXC(FM) and WRKH(FM) were calculated and the results of the measurements at these frequencies are listed in Table 1.

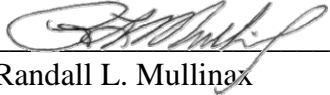
Table 1

Frequency A	99.9	Transmitter Power Output 22.5 kW	Required Attenuation 80 dB
Frequency B	96.1	Transmitter Power Output 17.5 kW	Required Attenuation 80 dB

DESCRIPTION	FREQ. MHZ	ATTENUATION DB	DESCRIPTION	FREQ. MHZ	ATTENUATION DB
A + B	196.0	>100	3 X A	299.7	>100
A + (2 X B)	292.1	>100	(3 X A) - B	203.6	>100
B + (2 X A)	295.9	>100	3 X B	288.3	>100
A + (3 X B)	388.2	>100	(3 X B) - A	188.4	>100
B + (3 X A)	395.8	>100	(3 X A) - (2 X B)	107.5	>100
2 X A	199.8	>100	(3 X B) - (2 X A)	88.5	89
(2 X A) - B	103.7	>100	(3 X A) - (3 X B)	11.4	>100
2 X B	192.2	>100	4 X A	399.6	>100
(2 X B) - A	92.3	>100	4 X B	384.4	>100
(2 X A) + (2 X B)	392.0	>100	5 X A	499.5	>100
(2 X A) + (3 X B)	488.1	>100	5 X B	480.5	>100
(2 X B) + (3 X A)	491.9	>100			

While special attention was given to the “product” frequencies listed in Table 1, measurements were conducted covering the entire range of frequencies between 5 MHz and 500 MHz. The only signals detected at levels attenuated by less than 80 dB below the unmodulated carrier levels and appearing on frequencies removed from the WMXC(FM) and WRKH(FM) carrier frequencies by more than 600 kHz were the carriers of nearby FM and Television stations. In each case where these signals were observed to be at a level greater than -81 dBm (80 dB below the WRKH(FM) unmodulated carrier level of -1 dBm) both the WMXC(FM) and WRKH(FM) transmitters were turned off while the amplitude of the signal was observed to be unchanged, indicating that the signal was not the result of the combined operation of WMXC(FM) and WRKH(FM).

The results of these measurements confirm that the combined operations of WMXC(FM) and WRKH(FM) into the shared antenna are in full compliance with section 73.317(b) through 73.317(d) of the FCC Rules and Regulations.

A handwritten signature in dark ink, appearing to read "R. Mullinax", is positioned above a horizontal line.

Randall L. Mullinax
Regional Engineer
Clear Channel Radio