

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

**Citicasters Licenses, Inc.**  
**WUBL(FM) – 94.9 MHz**  
**Atlanta, GA (Facility ID No: 29835)**  
**WKLS(FM) – 96.1 MHz**  
**Atlanta, GA (Facility ID No: 11275)**  
**Combined Auxiliary**

**October 28, 2010**

Measurements were conducted to demonstrate that WUBL(FM), Atlanta, GA and WKLS(FM), Atlanta, GA, operating into a combined auxiliary antenna system, comply with section 73.317(b) through 73.317(d) of the FCC Rules and Regulations. The measurements were conducted on October 28, 2010 by Randall L. Mullinax, with both stations simultaneously utilizing the shared auxiliary antenna as specified in "Special operating conditions or restrictions 2" of the WUBL(FM) Construction Permit BXPB-20100310AAP. Station WWWQ(FM), FID #73345 was granted a construction permit to utilize the same antenna system as an auxiliary (BXPB-20090812ACQ) but the licensee of said station has not yet begun construction, thus it was not possible to make measurement with all three stations utilizing the shared auxiliary antenna. The spectrum analyzer used for the measurements was an Agilent Technologies model E4402B, S/N MY41441731. A sample of the signals of both stations 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 WUBL(FM), and WKLS(FM) was -2 dBm which 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. All four 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 – WUBL(FM)

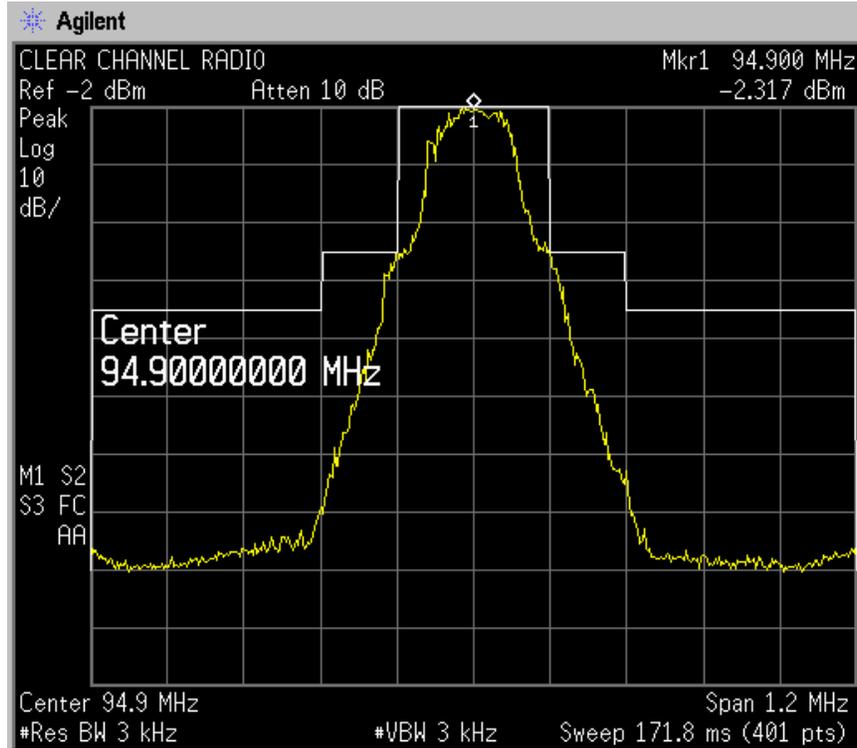
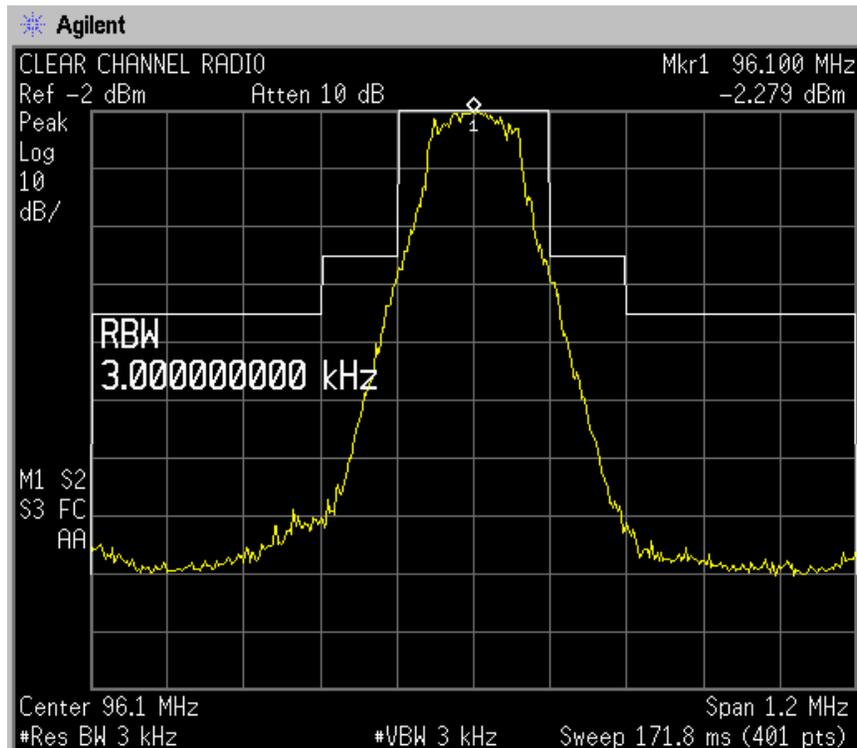


Figure 2 – WKLS(FM)



Extensive measurements 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 38.0 dB at 94.9 MHz and 44.4 dB at 96.1 MHz.

All possible harmonic and the most probable intermodulation frequencies in the range of frequencies between 5 MHz and 500 MHz through the 3<sup>rd</sup> order that could be produced by the combined operation of WUBL(FM) and WKLS(FM) were calculated and the results of measurements at those frequencies are listed in Table 1.

**TABLE 1**

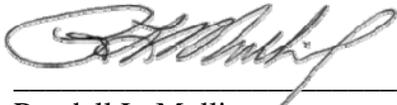
Frequency A	96.1	Transmitter Power Output - 12.5 kW	Required Attenuation 80 dB
Frequency B	94.9	Transmitter Power Output - 13.0 kW	Required Attenuation 80 dB

DESCRIPTION	FREQ. MHZ	ATTENUATION DB	DESCRIPTION	FREQ. MHZ	ATTENUATION DB
A + B	191	>100	(2 X B) + (3 X A)	478.1	>100
A + (2 X B)	285.9	>100	3 X A	288.3	>100
B + (2 X A)	287.1	>100	(3 X A) - B	193.4	>100
A + (3 X B)	380.8	>100	3 X B	284.7	>100
B + (3 X A)	383.2	>100	(3 X B) - A	188.6	>100
2 X A	192.2	98	(3 X A) - (2 X B)	98.5	74 - See Note 1
(2 X A) - B	97.3	>100	(3 X B) - (2 X A)	92.5	>100
2 X B	189.8	>100	(3 X A) - (3 X B)	3.6	>100
(2 X B) - A	93.7	>100	4 X A	384.4	>100
(2 X A) + (2 X B)	382	>100	4 X B	379.6	>100
(2 X A) - (2 X B)	2.4	>100	5 X A	480.5	>100
(2 X A) + (3 X B)	476.9	>100	5 X B	474.5	>100

Note 1 – Station WSB-FM operates on 98.5 MHz with an ERP of 100 kW, from a site located only 2.84 km away. The WUBL(FM) and WKLS(FM) transmitters were turned off while the amplitude of this signal was observed to be unchanged, indicating that the signal was not the result of the combined operation of WUBL(FM) and WKLS(FM).

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 WUBL(FM) and WKLS(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 -82 dBm (80 dB below the unmodulated carrier level of WUBL(FM) and WKLS(FM) which was -2 dBm) the WUBL(FM) and WKLS(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 WUBL(FM) and WKLS(FM).

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

A handwritten signature in cursive script, appearing to read "R. Mullinax", written in black ink.

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Randall L. Mullinax  
Regional Engineer  
Clear Channel Radio