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.
W287CO – 105.3 MHz
Tallahassee, FL (Facility ID No: 144674)
And
W243EG – 96.5MHz
Tallahassee, FL (Facility ID No: 200511)
June 26, 2019

Occupied Bandwidth and Spurious Emissions Measurements

Measurements were conducted to demonstrate that FM Translators W287CO and W243EG operating into a combined antenna system, comply with section 73.317(b) through 73.317(d) of the FCC Rules and Regulations [section 74.1236(a)(2) requires translators with a power output greater than 10 watts to also meet the requirements of 73.317(b) through (d)]. Randall L. Mullinax conducted the measurements on June 26, 2019, with both transmitters simultaneously utilizing the shared antenna as specified in "Special operating conditions or restrictions" 3 of W243EG Construction Permit BNPFT-20171220AAI. The spectrum analyzer used for the measurements was an Agilent Technologies model E4402B, S/N MY41441731. A sample of both 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) were inserted ahead of the analyzer to avoid overload and to provide isolation.

The measured unmodulated carrier level of W287CO was -5 dBm and the unmodulated carrier level of W243EG was -8 dBm. With a transmitter power output of 810 Watts, all harmonic, spurious and intermodulation products from the W287CO transmitter must be attenuated by 43 + 10(log 810) = 72.1 dB or a maximum level of -5 dBm -72.1 dB = -77.1 dBm. With a transmitter power output of 350 Watts, all products from W243EG must be attenuated by 43 + 10(log 350) = 68.4 dB or a maximum level of -8 dBM – 68.4 dB = -76.4 dBm. Thus, any product attenuated by 72.1 dB or greater below the W287CO unmodulated carrier level of -5 dBm also meets the attenuation requirement for W243EG (-5 dBm – 72.1 dB = -77.1 dBM which is 69.1 dB below the W243EG unmodulated carrier level of -8 dBm). With this in mind, the W287CO reference level was used as the reference for all harmonic, spurious and intermoduation 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
W287CO

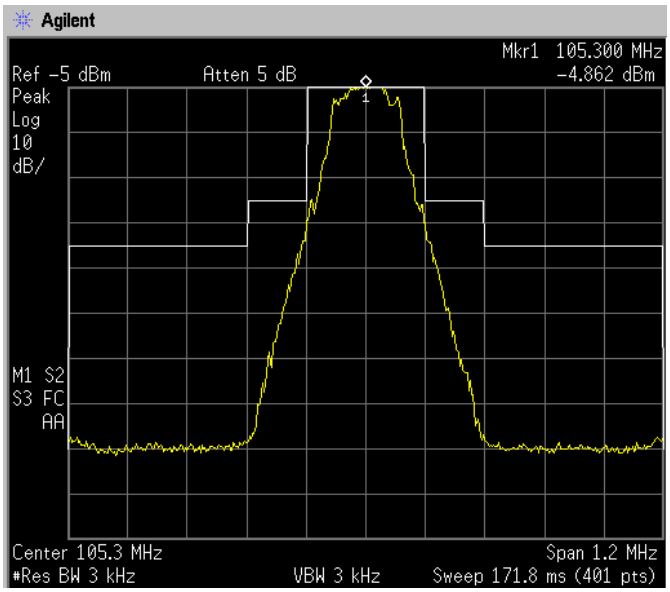
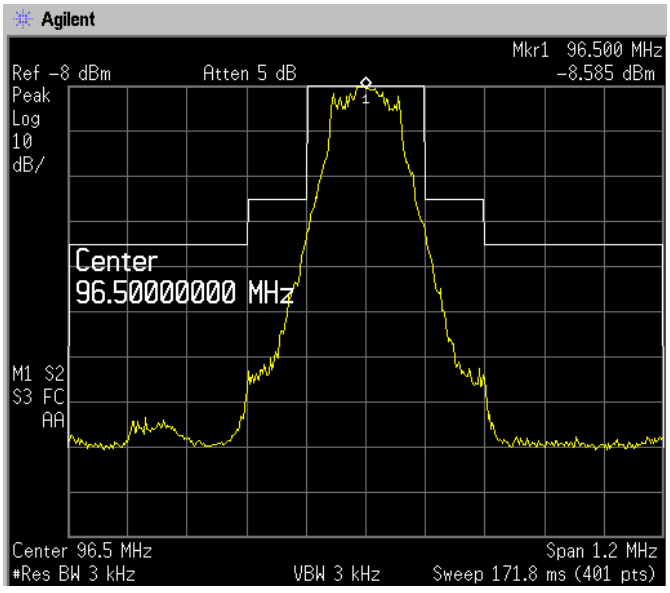


Figure 2
W243EG



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 72.1 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 up to 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 49.2 dB at 105.3 MHz and 44.0 dB at 96.5 MHz.

All harmonic and intermodulation frequencies in the range of frequencies between 5 MHz and 520 MHz through the 3rd order that could be produced by the combined operation of W287CO and W243EG were calculated and the results of the measurements at these frequencies are listed in Table 1 along with measurements through the 8th harmonic.

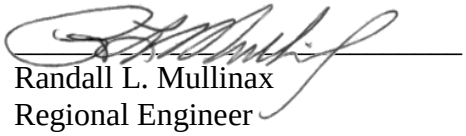
Table 1

Frequency A	105.3
Frequency B	96.5

DESCRIPTION	FREQ. MHZ	ATTENUATION DB	DESCRIPTION	FREQ. MHZ	ATTENUATION DB
A + B	201.8	>95	3 X B	289.5	>95
A + (2 X B)	298.3	>95	(3 X B) - A	184.2	>95
B + (2 X A)	307.1	>95	(3 X A) - (2 X B)	122.9	>95
A + (3 X B)	394.8	>95	(3 X B) - (2 X A)	78.9	>95
B + (3 X A)	412.4	>95	(3 X A) - (3 X B)	26.4	>95
2 X A	210.6	>95	4 X A	421.2	>95
(2 X A) - B	114.1	>95	4 X B	386	>95
2 X B	193	>95	5 X A	526.5	>95
(2 X B) - A	87.7	>95	5 X B	482.5	>95
(2 X A) + (2 X B)	403.6	>95	6 X A	631.8	>95
(2 X A) - (2 X B)	17.6	>95	6 X B	579	>95
(2 X A) + (3 X B)	500.1	>95	7 X A	737.1	>95
(2 X B) + (3 X A)	508.9	>95	7 XB	675.5	>95
3 X A	315.9	>95	8 X A	842.4	>95
(3 X A) - B	219.4	>95	8 X B	772	>95

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 900 MHz. The only signals detected at levels attenuated by less than 72.1 dB below the unmodulated carrier levels and appearing on frequencies removed from the W287CO and W243EG carrier frequencies by more than 600 kHz were the carriers of other nearby FM stations. In each case where these signals were observed to be at a level greater than –77.1 dBm (72.1 dB below the unmodulated carrier level of W287CO which was -5 dBm) both the W287CO and W243EG 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 W287CO and W243EG.

The results of these measurements confirm that the combined operations of FM Translators W287CO and W243EG into the shared antenna are in full compliance with section 73.317(b) through 73.317(d) and section 74.1236(a)(2) of the FCC Rules and Regulations.



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