

**Occupied Bandwidth, Spurious Emissions Measurements and  
RFR Compliance statement**

**To Demonstrate Compliance with  
Section 73.317(b) through 73.317(d) of the  
FCC Rules and Regulations and OET 65.**

**Capstar TX Limited Partnership  
WQBT(FM) – 94.1 MHz  
Savannah, GA (Facility ID No: 8594)  
WAEV(FM) – 97.3 MHz  
Savannah, GA (Facility ID No: 50403)  
February 20, 2017**

Measurements were conducted to demonstrate that WQBT (FM), Savannah, GA and WAEV (FM) Savannah, GA operating into a combined antenna system as specified in Licenses BLH-20020604AAV & BLH-20020604AAW, comply with section 73.317(b) through 73.317(d) of the FCC Rules and Regulations. The measurements were conducted on 2/16/2017 by James Gay under supervision by Benjamin Brinitzer CPBE, with both stations simultaneously utilizing the shared antenna. The spectrum analyzer used for the measurements was a Rigol DSA815 SN:DSA8A150800353. A sample of the WQBT (FM) and WAEV (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-142 50Ω double-shielded coaxial cable. A switchable RF pad was inserted ahead of the analyzer to avoid overload and to provide isolation.

The measured unmodulated carrier level of both WQBT (FM) and WAEV (FM) was +9 Dbm and this level 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.

Figure #1 WQBT

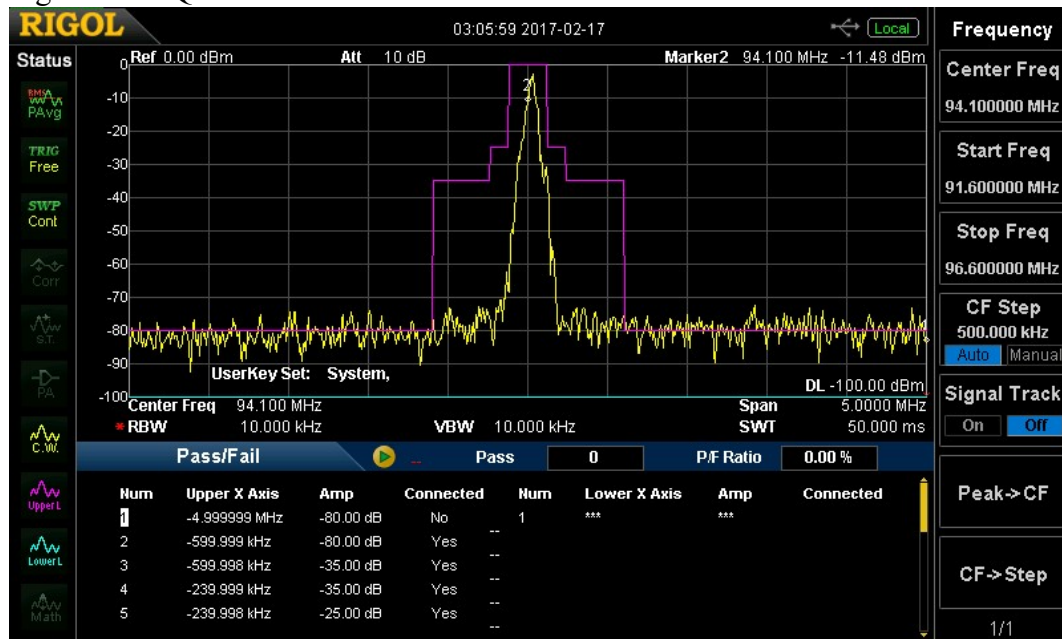
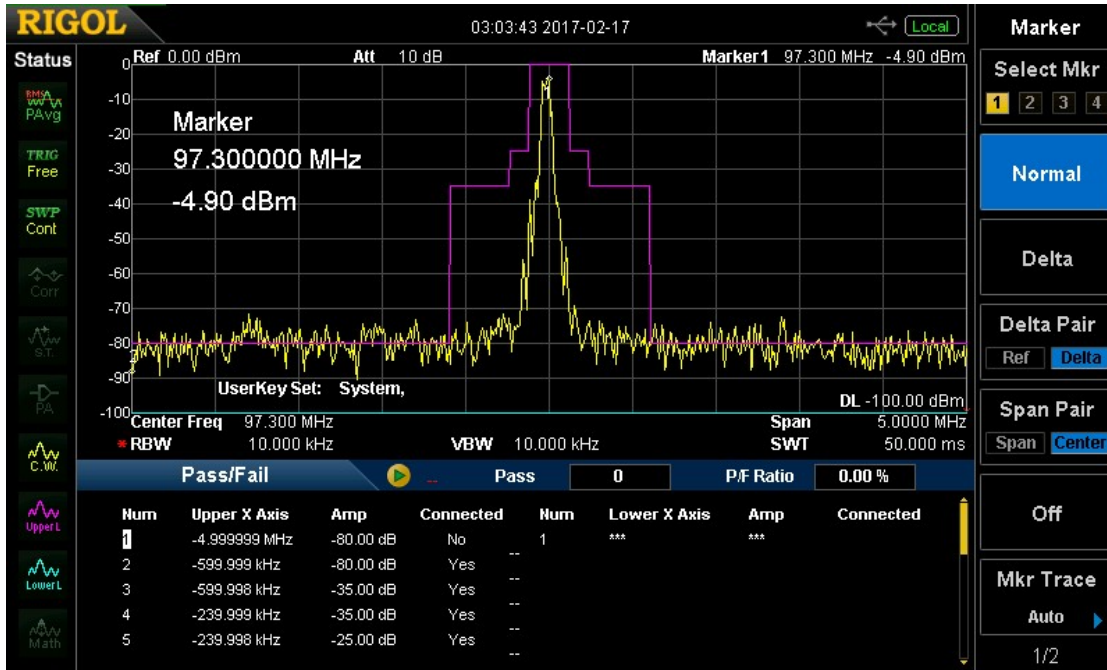
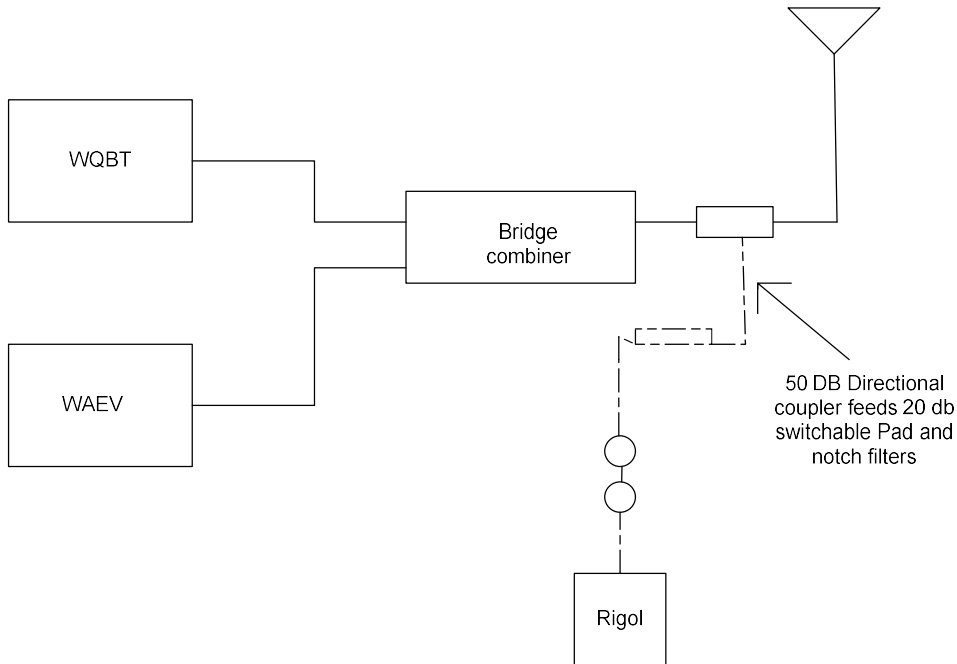


Figure #2 WAEV



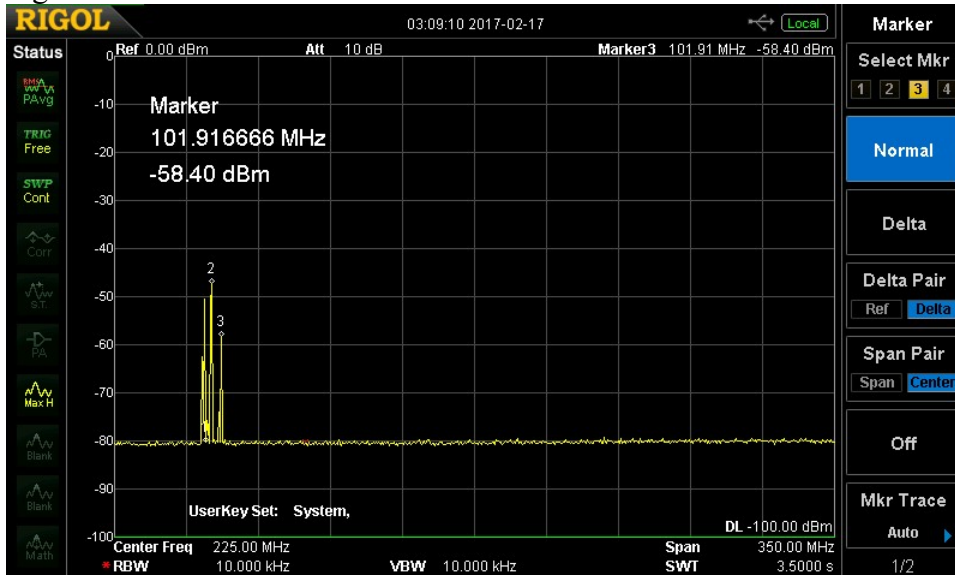
For all occupied bandwidth measurements, the spectrum analyzer was placed in the peak hold mode for at least 10 minutes per measurement before the waveforms were observed. Both transmitters were observed to be in full compliance with section 73.317(b) of the FCC Rules with emissions appearing on frequencies 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.

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 switchable RF pad so that the spectrum analyzer gain could be increased by 25 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 54.6 dB at 94.1 MHz and 44.1 dB at 97.3 MHz.



All harmonic and intermodulation frequencies in the range of frequencies between 5 MHz and 600 MHz through the 3<sup>rd</sup> order that could be produced by the combined operation of WQBT (FM) and WAEV (FM) were predicted with a computer program, the results of which are shown in Table 1. Figure 3 shows a broad span measurement

Figure #3



(Note: Marker 3 displayed is WEAS FM located on the same supporting tower and not a product of WAEV/WQBT)

TABLE 1

#	Order	x	Freq.	Sum/Dif	Order	x	Freq.	=	Product
1.	1	x	94.1	+	1	x	97.3	=	191.4
2.	1	x	97.3	+	1	x	94.1	=	191.4
3.	1	x	94.1	+	2	x	97.3	=	288.7
4.	1	x	97.3	+	2	x	94.1	=	285.5
5.	1	x	94.1	+	3	x	97.3	=	386
6.	1	x	97.3	+	3	x	94.1	=	379.6
7.	2	x	94.1	=				=	188.2
8.	2	x	94.1	+	1	x	97.3	=	285.5
9.	2	x	94.1	-	1	x	97.3	=	90.9
10.	2	x	97.3	=				=	194.6
11.	2	x	97.3	+	1	x	94.1	=	288.7
12.	2	x	97.3	-	1	x	94.1	=	100.5
13.	2	x	94.1	+	2	x	97.3	=	382.8
14.	2	x	97.3	+	2	x	94.1	=	382.8
15.	2	x	97.3	-	2	x	94.1	=	6.4
16.	2	x	94.1	+	3	x	97.3	=	480.1
17.	2	x	97.3	+	3	x	94.1	=	476.9
18.	3	x	94.1	=				=	282.3
19.	3	x	94.1	+	1	x	97.3	=	379.6
20.	3	x	94.1	-	1	x	97.3	=	185
21.	3	x	97.3	=				=	291.9
22.	3	x	97.3	+	1	x	94.1	=	386
23.	3	x	97.3	-	1	x	94.1	=	197.8
24.	3	x	94.1	+	2	x	97.3	=	476.9
25.	3	x	94.1	-	2	x	97.3	=	87.7
26.	3	x	97.3	+	2	x	94.1	=	480.1
27.	3	x	97.3	-	2	x	94.1	=	103.7
28.	3	x	94.1	+	3	x	97.3	=	574.2
29.	3	x	97.3	+	3	x	94.1	=	574.2
30.	3	x	97.3	-	3	x	94.1	=	9.6

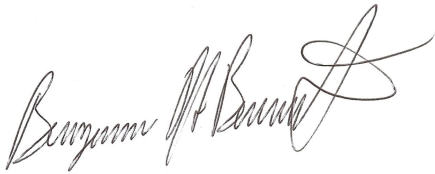
While special attention was given to the “product” frequencies listed in Table 1, measurements were conducted covering the entire range of frequencies between 5 MHz and 600 MHz. The only signals detected at levels attenuated by less than 80 dB below the unmodulated carrier levels and appearing on frequencies removed from the WQBT (FM) and WAEV (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 -71 dBm (80 dB below the unmodulated carrier level of WQBT (FM) and WAEV (FM) which was +9 dBm) both the WQBT(FM) and WAEV(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 WQBT(FM) and WAEV(FM).

Results of the measurements at the specific frequencies where harmonic or intermodulation products were predicted to possibly occur are shown in Table 2.

TABLE 2

DESCRIPTION	FREQ. MHz	ATTENUATION dB	DESCRIPTION	FREQ. MHz	ATTENUATION dB
94.1 + 97.3	191.4	100	(3 X 94.1) - (2 X 97.3)	87.7	100
(2 X 94.1) + 97.3	285.5	98	(3 X 97.3) - (2 X 94.1)	103.7	100
(2 X 97.3) + 94.1	288.7	100	(3 X 94.1) + (3 X 97.3)	574.2	100
(3 X 94.1) + 97.3	379.6	100	(3 X 97.3) - (3 X 94.1)	9.6	99
(3 X 97.3) + 94.1	386.0	100			
2 X 94.1	188.2	98			
(2 X 94.1) - 97.3	90.9	100			
2 X 97.3	194.6	100			
(2 X 97.3) - 94.1	100.5	100			
(2 X 94.1) + (2 X 97.3)	382.8	100			
(2 X 97.3) - (2 X 94.1)	6.4	95			
(2 X 94.1) + (3 X 97.3)	480.1	100			
(2 X 97.3) + (3 X 94.1)	476.9	98			
3 X 94.1	282.3	92			
(3 X 94.1) - 97.3	185.0	100			
3 X 97.3	291.9	99			
(3 X 97.3) - 94.1	197.8	100			

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

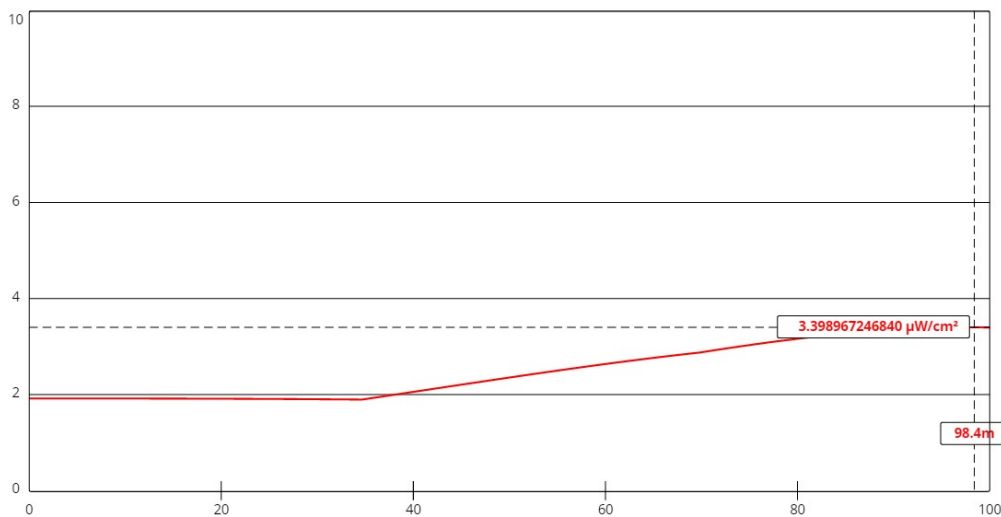



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## Radio Frequency Radiation Study and Statement

The proposed facilities were evaluated in terms of potential radio frequency radiation exposure at ground level in accordance with OET Bulletin No. 65, "Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radio frequency Radiation." The proposed antenna system is an ERI 10 element "rototiller" SHP-10AC6-SP full wave spaced antenna array which has been evaluated using the online program "FM Model" set for this type of radiating element; an EPA type 3 "opposed U Dipole" mounted with its center of radiation 398 meters above ground level, and operated with an worse case effective radiated power of 200 kilowatts (WQBT 100KW + WAEV 100 KW) in both the horizontal and vertical. At 2 meters above ground, at 98.4 meters from the base of the tower, this proposal will contribute worst case, 3.39 microwatts per square centimeter for both WQBT and WAEV, or 0.003 percent of the allowable ANSI limit for controlled exposure, and 0.017 percent of the allowable limit for uncontrolled exposure.



This figure is less than 5% of the applicable FCC exposure limit at all locations extending out from the base of the tower. Section 1.1307(b)(3) excludes applications when the calculated level is predicted to be less than 5% of the applicable exposure limit. It is therefore believed that this proposal is in compliance with OET Bulletin Number 65 as required by the Federal Communications Commission.

Further, the applicant will see that signs are posted in the vicinity of the tower, warning of potential radio frequency hazards at the site. The site itself is restricted from public access. The applicant will cooperate with other users of the tower to reduce power of the facility, or discontinue operation, as necessary to limit human exposure to levels less than specified by the Federal Communications Commission should anyone be required to climb the tower for maintenance.