

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

**WRFQ-FM – 104.5 MHz
Mount Pleasant, SC
WXY-FM – 102.5 MHz
North Charleston, SC
WEZL-FM- 103.5
Charleston, SC**

Tuesday, March 23, 2004

Measurements were conducted to demonstrate that WRFQ – FM, WXLY - FM and WEZL –FM operating into a combined antenna system as specified in Construction Permits BPH20030210AAU and BPH20030210AAU, comply with section 73.317(b) through 73.317(d) of the FCC Rules and Regulations. (No CP is deemed necessary for WEZL - FM as it is utilizing an antenna at the same HAAT and location as current license BLH19811208AA specifies, A form 302 to cover WEZL-FM is hereby filed simultaneously with forms 302 for WXLY -FM and WRFQ - FM. A copy of this report is attached to each.) The measurements were conducted on Tuesday, March 23, 2004 by Benjamin H Brinitzer CSRE, with all stations simultaneously utilizing the shared antenna as specified in “Special operating conditions or restrictions 3.” of granted Construction Permits. The spectrum analyzer used for the measurements was a Agilent model E4402B, S/N MY41441731. A sample of the WEZL-FM, WRFQ-FM and WXLY –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. One 6 dB pad (Bird model 5-A-MFN-06) was inserted ahead of the analyzer to avoid overload and to provide isolation.

The unmodulated carrier level of WEZL was -14 dBm, The unmodulated carrier of WXLY-FM was -15 dbm and the unmodulated carrier level of WRFQ-FM was -16 dBm. Since the WRFQ-FM reference level 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. All 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 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 as required by section 73.317(d) of the FCC Rules. To facilitate these measurements, notch filters were placed After one 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 -45.9 dB at 102.5 MHz, -48.3 dB at 104.5 MHz and -18.4db at 103.5.

All harmonic and intermodulation frequencies in the range of frequencies between 3 MHz and 500 MHz through the 3rd order that could be produced by the combined operation of WRFQ –FM, WEZL – FM and WXLV - FM were predicted with a computer program, the results of which are shown in Table 1.

TABLE 1

Mult x Freq. Plus Mult x Freq. Minus Mult x Freq. = Product

1.	1 x 102.5	+	1 x 103.5	-	1 x 104.5	=	101.5
2.	1 x 102.5	+	1 x 104.5	-	1 x 103.5	=	103.5
3.	1 x 103.5	+	1 x 104.5	-	1 x 102.5	=	105.5
4.	1 x 102.5	+	2 x 103.5	-	1 x 104.5	=	205
5.	1 x 102.5	+	2 x 104.5	-	1 x 103.5	=	208
6.	1 x 103.5	+	2 x 102.5	-	1 x 104.5	=	204
7.	1 x 103.5	+	2 x 104.5	-	1 x 102.5	=	210
8.	1 x 104.5	+	2 x 102.5	-	1 x 103.5	=	206
9.	1 x 104.5	+	2 x 103.5	-	1 x 102.5	=	209
10.	1 x 102.5	+	2 x 103.5	-	2 x 104.5	=	100.5
11.	1 x 102.5	+	2 x 104.5	-	2 x 103.5	=	104.5
12.	1 x 103.5	+	2 x 102.5	-	2 x 104.5	=	99.5
13.	1 x 103.5	+	2 x 104.5	-	2 x 102.5	=	107.5
14.	1 x 104.5	+	2 x 102.5	-	2 x 103.5	=	102.5
15.	1 x 104.5	+	2 x 103.5	-	2 x 102.5	=	106.5
16.	1 x 102.5	+	3 x 103.5	-	2 x 104.5	=	204
17.	1 x 102.5	+	3 x 104.5	-	2 x 103.5	=	209
18.	1 x 103.5	+	3 x 102.5	-	2 x 104.5	=	202
19.	1 x 103.5	+	3 x 104.5	-	2 x 102.5	=	212
20.	1 x 104.5	+	3 x 102.5	-	2 x 103.5	=	205
21.	1 x 104.5	+	3 x 103.5	-	2 x 102.5	=	210
22.	1 x 102.5	+	3 x 103.5	-	3 x 104.5	=	99.5
23.	1 x 102.5	+	3 x 104.5	-	3 x 103.5	=	105.5
24.	1 x 103.5	+	3 x 102.5	-	3 x 104.5	=	97.5
25.	1 x 103.5	+	3 x 104.5	-	3 x 102.5	=	109.5
26.	1 x 104.5	+	3 x 102.5	-	3 x 103.5	=	101.5
27.	1 x 104.5	+	3 x 103.5	-	3 x 102.5	=	107.5
28.	2 x 102.5	+	2 x 103.5	-	2 x 104.5	=	203
29.	2 x 102.5	+	2 x 104.5	-	2 x 103.5	=	207
30.	2 x 103.5	+	2 x 104.5	-	2 x 102.5	=	211
31.	2 x 102.5	+	2 x 103.5	-	3 x 104.5	=	98.5
32.	2 x 102.5	+	2 x 104.5	-	3 x 103.5	=	103.5
33.	2 x 103.5	+	2 x 104.5	-	3 x 102.5	=	108.5
34.	2 x 102.5	+	3 x 103.5	-	3 x 104.5	=	202
35.	2 x 102.5	+	3 x 104.5	-	3 x 103.5	=	208
36.	2 x 103.5	+	3 x 102.5	-	3 x 104.5	=	201
37.	2 x 103.5	+	3 x 104.5	-	3 x 102.5	=	213
38.	2 x 104.5	+	3 x 102.5	-	3 x 103.5	=	206
39.	2 x 104.5	+	3 x 103.5	-	3 x 102.5	=	212

No More Frequency Products Within Desired Range

While special attention was given to the “product” frequencies listed in Table 1, measurements were conducted covering the entire range of frequencies between 3 MHz and 900 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 WXLY – FM, WRFQ –FM and WEZL - 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 –80 dBm, the WRFQ-FM, WXLY-FM and WEZL-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 under test. The majority of results fell below the threshold of – 90 dbm from carrier reference.

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

Harmonic & Intermodulation Measurements

	Calls	Freq's
A	WRFQ	104.5
B	WEZL	103.5
C	wxly	102.5

Description	Result	Atten in DB	Description	Result	Atten in DB
A =	104.5	0	4B =	414	>90
2A =	209	86	5B =	517.5	>90
3A =	313.5	>90	6B =	621	>90
4A =	418	>90	7B =	724.5	>90
5A =	522.5	>90	C =	102.5	+2
6A =	627	>90	2C =	205	68**
7A =	731.5	>90	3C =	307.5	>90
B =	103.5	+1	4C =	410	>90
2B =	207	65**	5C =	512.5	>90
3B =	310.5	>90	6C =	615	>90
			7C =	717.5	>90

Description	Result	Atten in DB	Description	Result	Atten in DB
A + B =	208	76**	2B + A =	311.5	>90
A + 2B =	311.5	>90	2B + 2A =	416	>90
A + 3B =	415	>90	2B + 3A =	520.5	>90
A + C =	207	65**	2B + C =	309.5	>90

A + 2C	=	309.5	>90	2B + 2C	=	412	>90
A + 3C	=	412	>90	2B + 3C	=	514.5	>90
Description		Result	Atten in DB	Description		Result	Atten in DB
2A + B	=	312.5	>90	3B + A	=	415	>90
2A + 2B	=	416	>90	3B + 2A	=	519.5	>90
2A + 3B	=	519.5	>90	3B + 3A	=	624	>90
2A + C	=	311.5	>90	3B + C	=	413	>90
2A + 2C	=	414	>90	3B + 2C	=	515.5	>90
2A + 3C	=	516.5	>90	3B + 3C	=	618	>90
3A + B	=	417	>90	C + A	=	207	>90
3A + 2B	=	520.5	>90	C + 2A	=	311.5	>90
3A + 3B	=	624	>90	C + 3A	=	416	>90
3A + C	=	416	>90	C + B	=	206	>90
3A + 2C	=	518.5	>90	C + 2B	=	309.5	>90
3A + 3C	=	621	>90	C + 3B	=	413	>90
B + A	=	208	>90	2C + A	=	309.5	>90
B + 2A	=	312.5	>90	2C + 2A	=	414	>90
B + 3A	=	417	>90	2C + 3A	=	518.5	>90
B + C	=	206	>90	2C + B	=	308.5	>90
B + 2C	=	308.5	>90	2C + 2B	=	412	>90
B + 3C	=	411	>90	2C + 3B	=	515.5	>90
				3C + A	=	412	>90
				3C + 2A	=	516.5	>90
				3C + 3A	=	621	>90
				3C + B	=	411	>90
				3C + 2B	=	514.5	>90
				3C + 3B	=	618	>90

*DBc is delta from Carrier

** Local Television or other carriers verified present with all transmitters under test turned off

The results of these measurements confirm that the combined operations of WRFQ-FM, WXLY-FM and WEZL-FM into a 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 black ink, appearing to read "Ben H Brinitzer", with a stylized flourish at the end.

Benjamin H Brinitzer
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Clear Channel Communications