

Engineering Exhibit
WQIK-FM, Jacksonville, FL
Channel 256C0 - FID 29728
Application for Modification of Station License
BLH-20030328ALN

INTRODUCTION

WQIK-FM is licensed to operate from a non-directional shared antenna system with WJGH(FM) and WNWW(FM). The purpose of this application is to modify the Station License of WQIK-FM to correct the “Transmitter Power Output” due to replacement of the main antenna with a non-directional antenna with a different number of elements and different spacing between the elements.

GEOGRAPHICAL COORDINATES AND ANTENNA HEIGHT DATA

The WQIK-FM shared antenna is mounted on a leased tower structure, ASR number 1235223. The coordinates licensed to WQIK-FM differ slightly from those specified on the ASR. There is no change to the “Antenna Height Above Average Terrain”, “Antenna Height Above Mean Sea Level” or “Antenna Height Above Ground Level”. A tabulation of the presently licensed and proposed coordinates and heights are as follows:

	Licensed	Proposed
Antenna Coordinates (NAD27)		
North Latitude:	30° 16' 51”	30° 16' 51”
West Longitude:	81° 34' 12”	81° 34' 13”
Height of radiation center above ground (Meters):	306	306
Height of radiation center above mean sea level (Meters):	308	308
Height of radiation center above average terrain (Meters):	302	302
Overall height of antenna structure above ground:		318

There are no changes to the structure or its location and these minor corrections will bring the WQIK-FM license in full compliance with the ASR.

There is no change to the “Effective radiated power in the Horizontal Plane”. The present WQIK-FM facility is licensed under section 73.207 of the rules and this minor coordinate correction does not result in any new short spacings.

RF RADIATION COMPLIANCE

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 antenna system serves as a master antenna for WNWW(FM), WJGH(FM) and WQIK-FM in a combined operation. The antenna system is an EPA type 7, 16-bay, half-wave spaced antenna mounted with its center of radiation 306 meters above ground level and operates with a combined effective radiated power of 210.5 Kilowatts in both the horizontal and vertical planes. At 2 meters above ground, at 4,852 meters from the base of the tower, this proposal will contribute worst case, 0.24 microwatts per square centimeter, or 0.024 percent of the allowable ANSI limit for controlled exposure, and 0.12 percent of the allowable limit for uncontrolled exposure. It is therefore believed that this proposal is in compliance with OET Bulletin No. 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 operations, 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 or inspection.

Occupied Bandwidth and Spurious Emissions Measurements

Measurements were conducted to demonstrate that WNWW(FM), Neptune Beach, FL, WJGH(FM), Green Cove Springs, FL and WQIK-FM, Jacksonville, FL 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 September 16, 2011, with all 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 WNWW(FM), WJGH(FM) and WQIK-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 unmodulated carrier level of WNWW(FM) was -7 dBm and the unmodulated carrier levels of both WJGH(FM) and WQIK-FM were +1 dBm. Since the WNWW(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. As shown in Figures 1, 2 and 3, 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.

Figure 1
WNWW(FM)

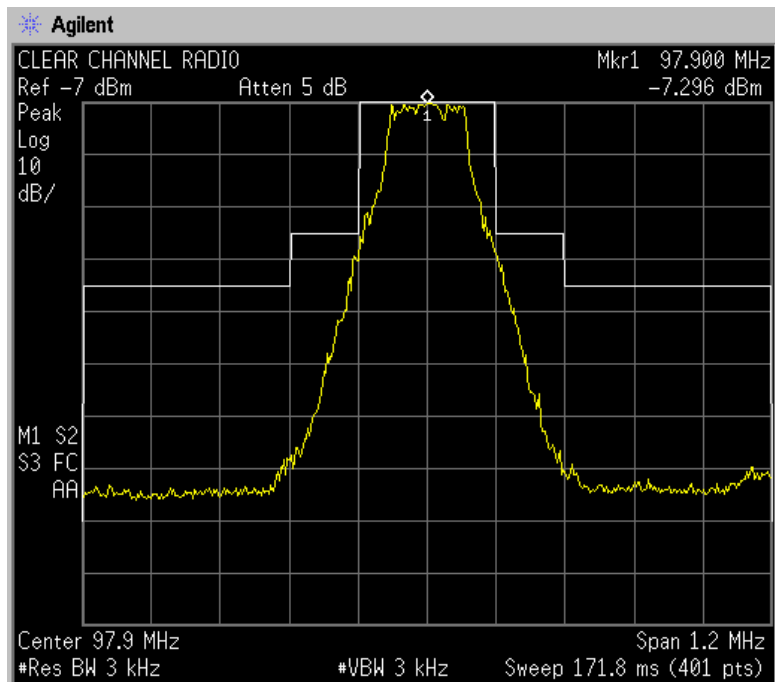


Figure 2
WJGH(FM)

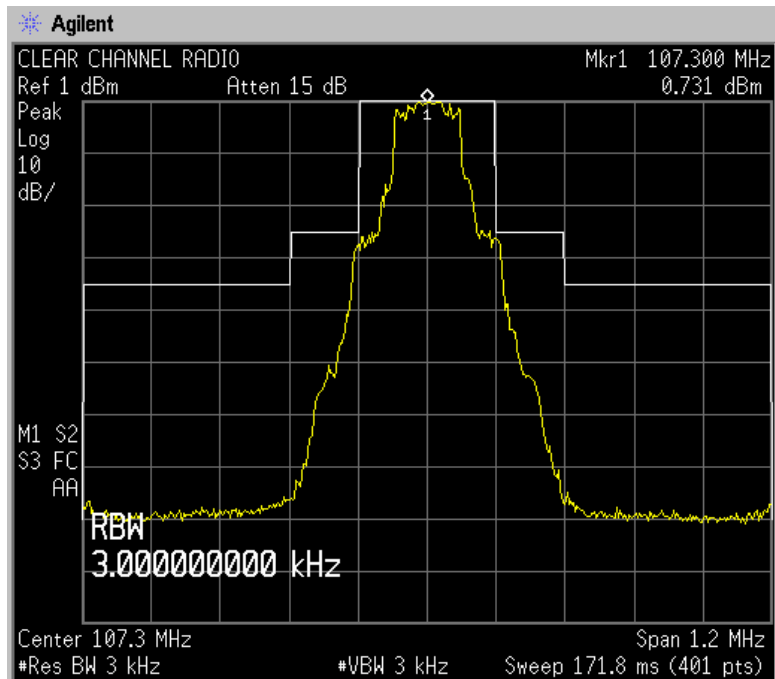
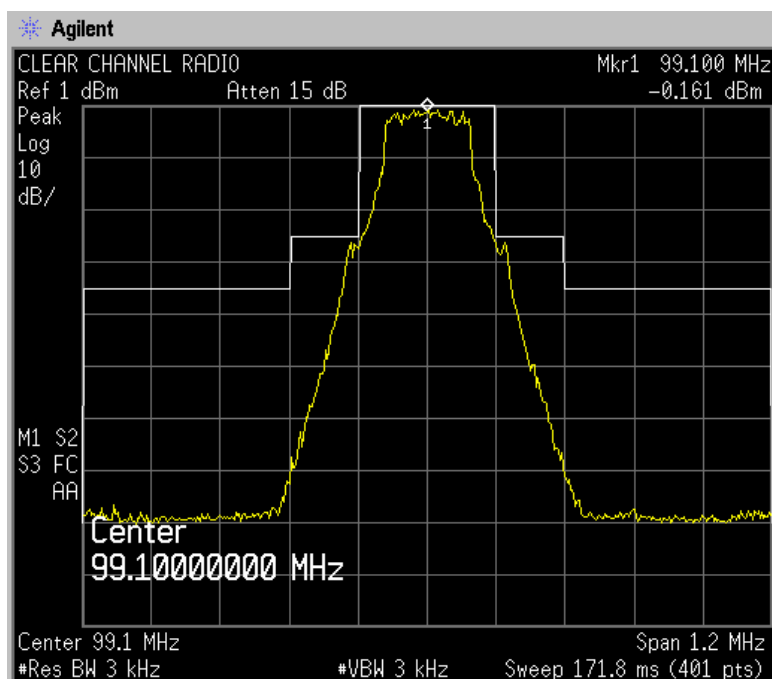


Figure 3
WQIK-FM



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 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 17.8 dB at 97.9 MHz, 47.7 dB at 107.3 MHz and 45.1 dB at 99.1 MHz.

The most likely intermodulation frequencies in the range 5 MHz to 550 MHz that could be produced by the combined operation of WNWW(FM), WJGH(FM) and WQIK-FM and harmonic frequencies through the 5th harmonic were calculated and the results of the measurements at these frequencies are listed in Table 1.

Table 1

Frequency A 107.3
Frequency B 99.1
Frequency C 97.9

DESCRIPTION	FREQ. MHZ	ATTENUATION DB	DESCRIPTION	FREQ. MHZ	ATTENUATION DB
A + B	206.4	>95	(2 X A) + (2 X C)	410.4	>95
A - B	8.2	>95	(2 X A) - (2 X C)	18.8	>95
A + (2 X B)	305.5	>95	(2 X A) + (3 X C)	508.3	>95
B + (2 X A)	313.7	>95	(2 X C) + (3 X A)	517.7	>95
A + (3 X B)	404.6	>95	(3 X A) - C	224	>95
B + (3 X A)	421	>95	3 X C	293.7	>95
2 X A	214.6	>95	(3 X C) - A	186.4	>95
(2 X A) - B	115.5	>95	(3 X A) - (2 X C)	126.1	>95
2 X B	198.2	>95	(3 X C) - (2 X A)	79.1	>95
(2 X B) - A	90.9	87	(3 X A) - (3 X C)	28.2	>95
(2 X A) + (2 X B)	412.8	>95	B + C	197	>95
(2 X A) - (2 X B)	16.4	>95	B + (2 X C)	294.9	>95
(2 X A) + (3 X B)	511.9	>95	C + (2 X B)	296.1	>95
(2 X B) + (3 X A)	520.1	>95	B + (3 X C)	392.8	>95
3 X A	321.9	>95	C + (3 X B)	395.2	>95
(3 X A) - B	222.8	>95	(2 X B) - C	100.3	88
3 X B	297.3	>95	(2 X C) - B	96.7	>95
(3 X B) - A	190	>95	(2 X B) + (2 X C)	394	>95
(3 X A) - (2 X B)	123.7	>95	(2 X B) + (3 X C)	491.9	>95
(3 X B) - (2 X A)	82.7	>95	(2 X C) + (3 X B)	493.1	>95
(3 X A) - (3 X B)	24.6	>95	(3 X B) - C	199.4	>95
A + C	205.2	>95	(3 X C) - B	194.6	>95
A - C	9.4	>95	(3 X B) - (2 X C)	101.5	87
A + (2 X C)	303.1	>95	(3 X C) - (2 X B)	95.5	>95
C + (2 X A)	312.5	>95	4 X A	429.2	>95
A + (3 X C)	401	>95	4 X B	396.4	>95
C + (3 X A)	419.8	>95	4 X C	391.6	>95
(2 X A) - C	116.7	>95	5 X A	536.5	>95
2 X C	195.8	>95	5 X B	495.5	>95
(2 X C) - A	88.5	>95	5 X C	489.5	>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 550 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 WNWW(FM), WJGH(FM) and WQIK-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 -87 dBm (80 dB below the unmodulated carrier level of WNWW(FM) which was -7 dBm) the WNWW(FM), WJGH(FM) and WQIK-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 WNWW(FM), WJGH(FM) and WQIK-FM.

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


Randall L. Mullinax
Regional Engineer
Clear Channel Radio