

Equipment Performance Measurements
Including interference analysis with FCC ID 48390

For

WTRJ-FM
91.7 MHz
Orange Park Fl.

FCC ID 47425

June 11, 2015

Measurements taken by
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General

These pages document the procedures and results of the measurements required by title 47 section 73.1590, as specified in Title 47, Section 73.317 of the Code of Federal Regulations, to demonstrate compliance with in-band emission requirements, and for harmonic content of a FM Broadcast Station. These measurements also include an analysis of intermodulation components as required by the Construction Permit.

Measurement Procedure

A swept frequency RF spectrum analyzer with a resolution of 3 kHz was used for these measurements. The signal was received from a sample port in the transmission line following the combining filters. A sampling element of known frequency response was used. In-band emissions removed from the carrier by more than 600 kHz, as well as checks for harmonic content were made with a precision communications receiver. During harmonic sweeps and out of band spur measurement a notch filter tuned to the fundamental frequency was inserted in series with the input to prevent false indications. All measurements were made under normal modulation conditions.

Equipment list

Spectrum Analyzer.....	IFR Com 120B
Precision Communications Receiver	IFR Com 120B
Notch Filter	Microwave Filter Co. 6367-3B
Sampling Element.....	Bird Electronics 4274-025

Technical Qualifications

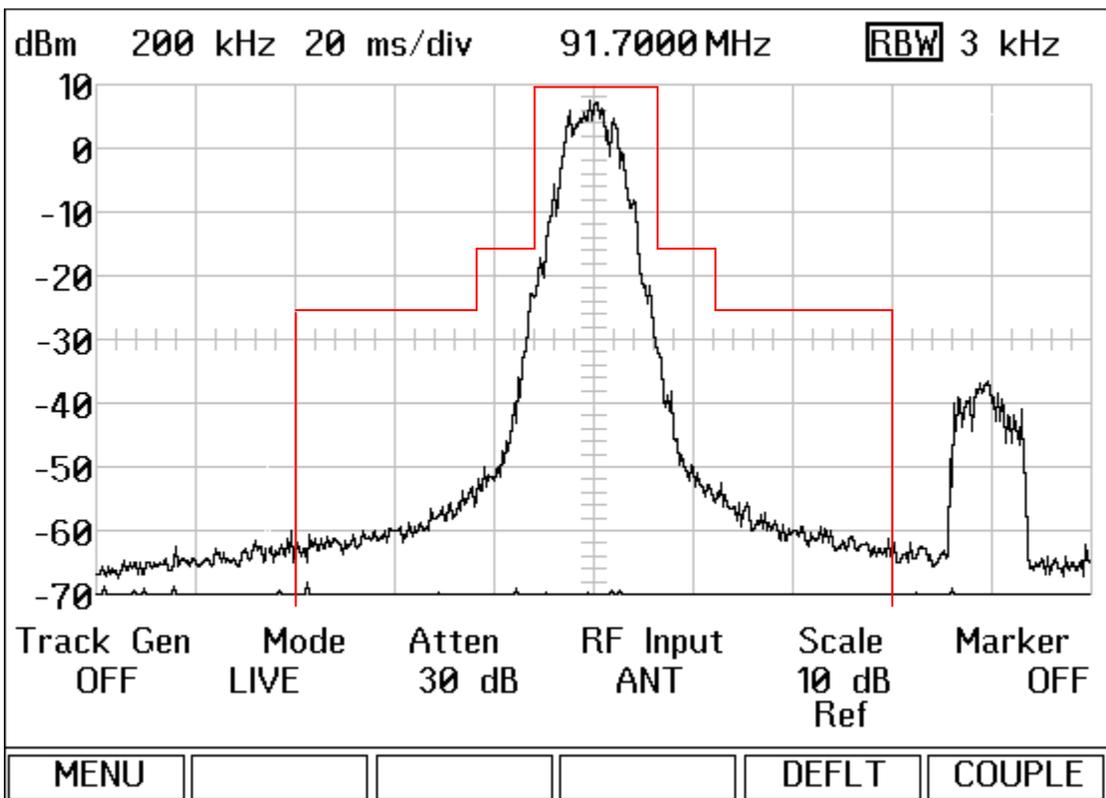
All measurements were made by Alan Alsobrook, who is a Certified Senior Radio Engineer #3338 by the SBE, and also holds FCC General Radio Telephone Operators License PG-6-11216. Mr. Alsobrook has served as a Radio Engineer since 1977.

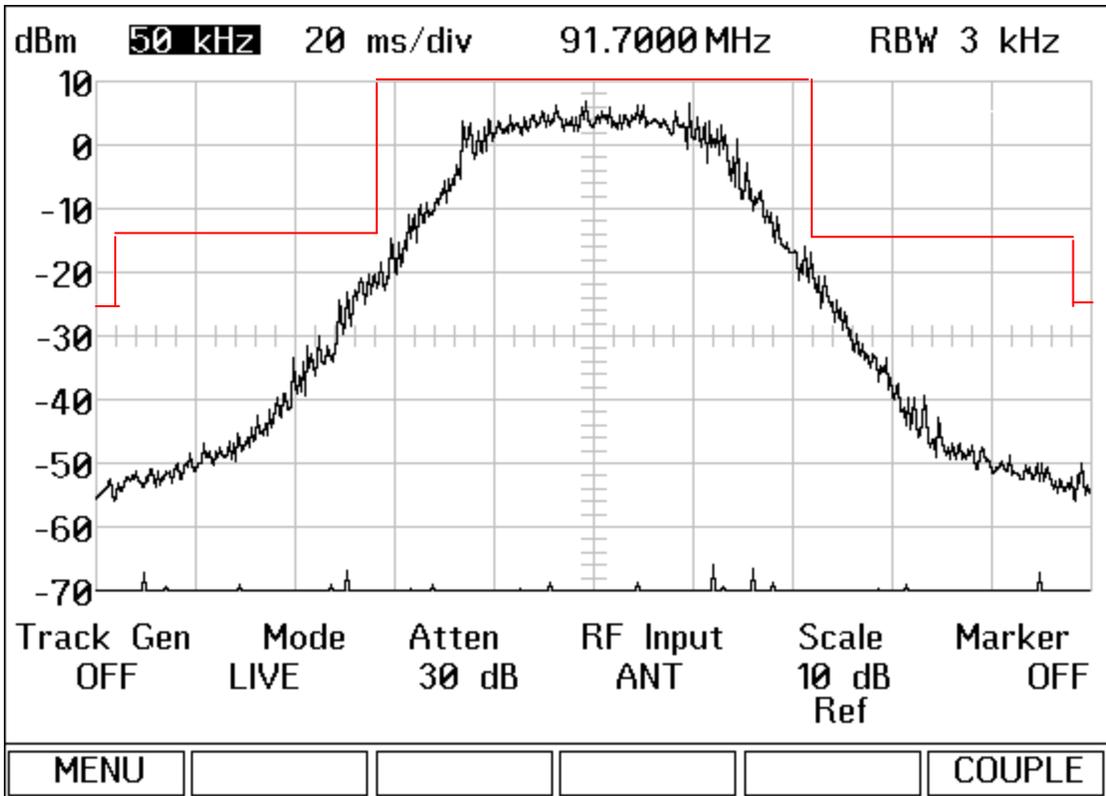
 Alan H Alsobrook

Harmonic & Spurious Measurement

Second Harmonic not detected
Third Harmonic not detected
Fourth Harmonic not detected
Fifth harmonic not detected
Sixth Harmonic..... not detected
Seventh Harmonic not detected
Eighth harmonic..... not detected
Ninth Harmonic not detected

No Spurious transmissions other than the harmonics noted above were noted on a sweep starting at 1 MHz and extending to 1,000 MHz.





73.317 FM transmission system requirements.

Range		Requirement	Measured
120	to 240kHz	-25db	-30db
240	to 600kHz	-35db	-62db
Beyond 75 kHz,		The lesser of 80db or $43 + 10 \text{ Log (Power in watts)}$	
600KHz +		-80.0db	Noise Floor

Note: An additional 10db of attenuation was used in addition to the 30db internal attenuator of the analyzer.

Additional Notes:

Due to construction permit requirements specific spurious emission measurements were performed from 1MHz to 1GHz in frequency.

From these measurements only found one spur generated well within FCC tolerances. It was found at 87.1MHz and was measured at -96db from carrier.

Due to the high number of signals present at the site Reference and difference spectrum sweeps were done to confirm any changes when the two translator signals were operating.

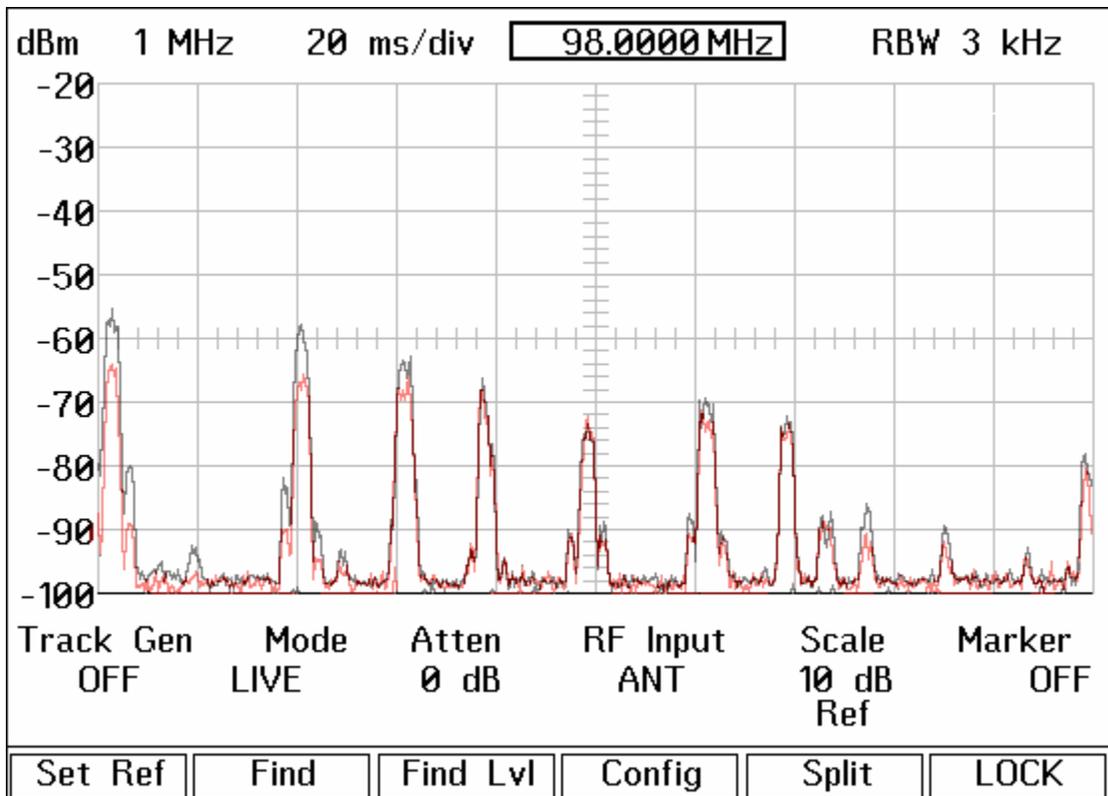
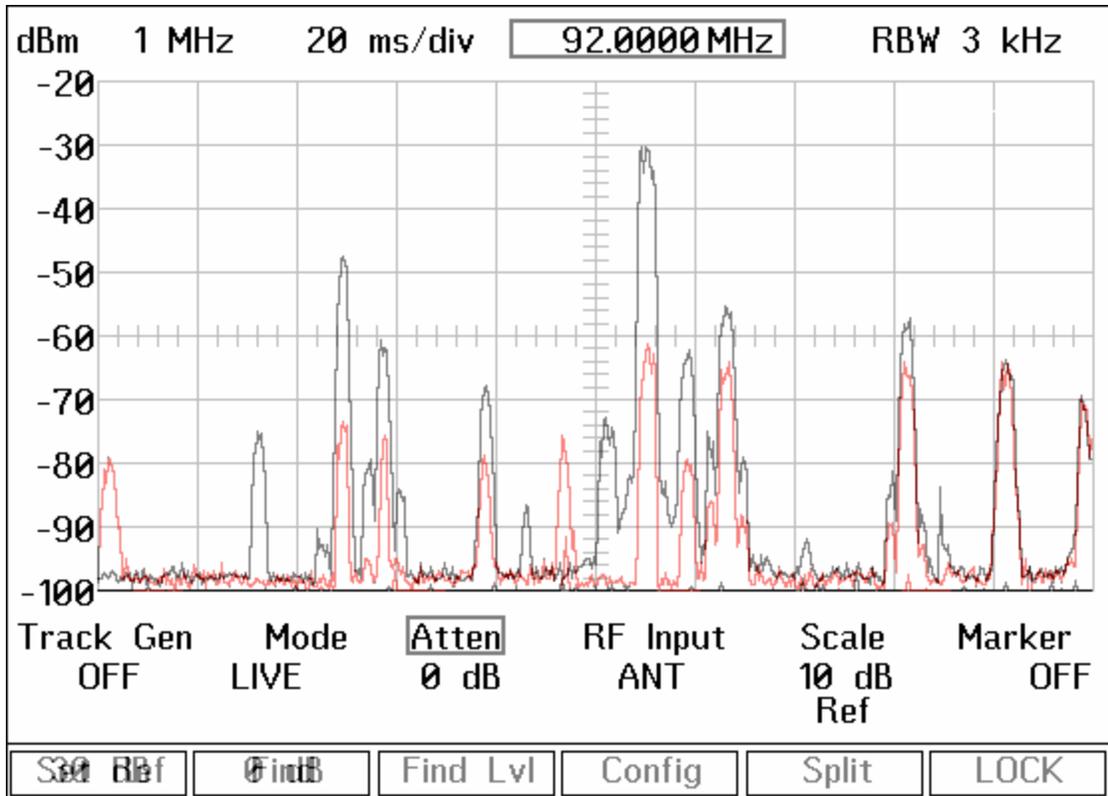
3 separate sweeps were done with at 1Mhz/div resolution and saved. Then both transmitters 88.1 & 91.7 were energized at normal operational parameters. Once both transmitters were operating the sweeps were repeated with notch filters in place to attenuate both carrier frequencies. Using the same test setup as described previously.

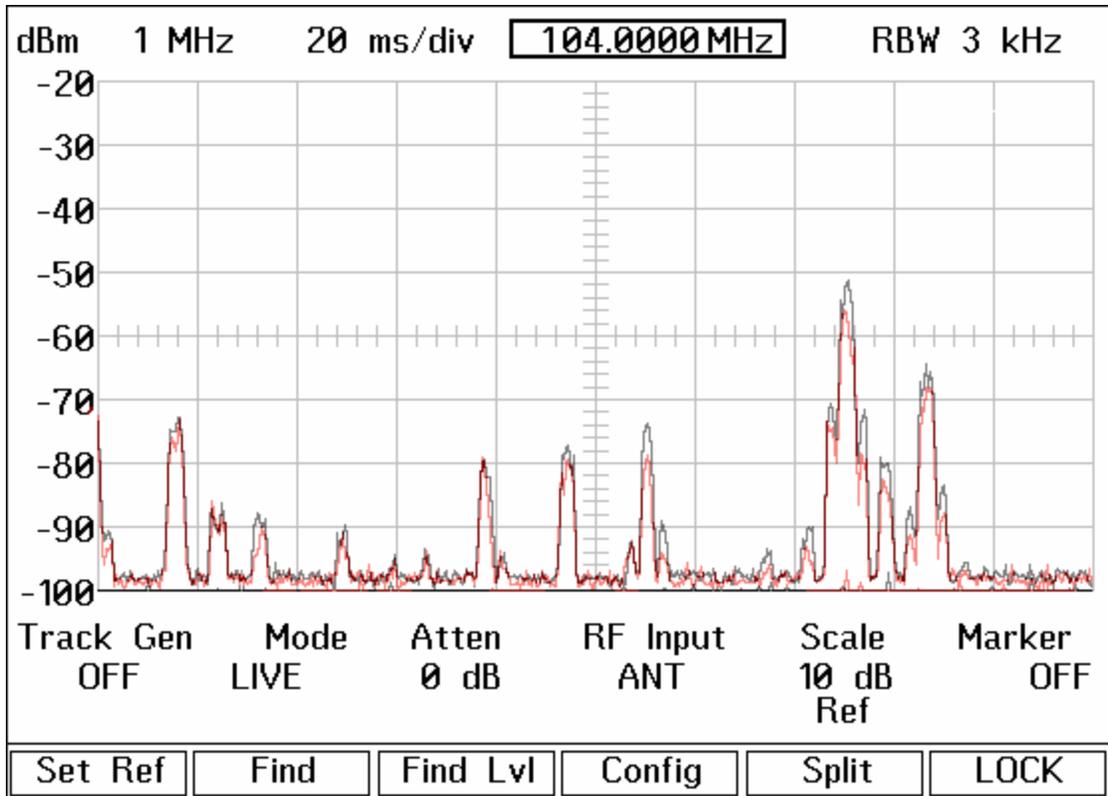
The graphs were then overlaid and compared for differences. Outside the FM broadcast band a slow continuous sweep was performed. The only instances of spurious emission's were found on the 3rd harmonic of each translator. Each of those instances were found to be well within tolerance as indicated previously.

The overlay graphs are shown below with both the 88.1 and 92.7 transmitters off with notch filters removed in black and with both transmitters operating and with notch filters in place in red.

The Notch filters provided approximately 90db of isolation at each respective carrier frequency.

Due to the need to add 10db of external attenuation for the measurement of the base line it should be noted that the -80dbc level is at -62db on the graphs below.





The graphs indicate that the constructed facility is in compliance with FCC rules for spurious emission.