Interference Analysis of the Combined Signals

Of

W247CF, FCC ID 139259
W262AG, FCC ID 81215
W272CQ, FCC ID 148615
W300CU, FCC ID 49965

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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 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.

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Alan H Alsobrook

Measurement methodology:

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

From these measurements the only found variations from the reference sweeps were well within FCC tolerances.

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

3 separate sweeps were done with at 1Mhz/div resolution and saved. Then all four transmitters were energized at normal operational parameters.
Once all transmitters were operating the sweeps were repeated with notch filters in place to attenuate each carrier frequency. 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 and while audible they were not measureable.

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

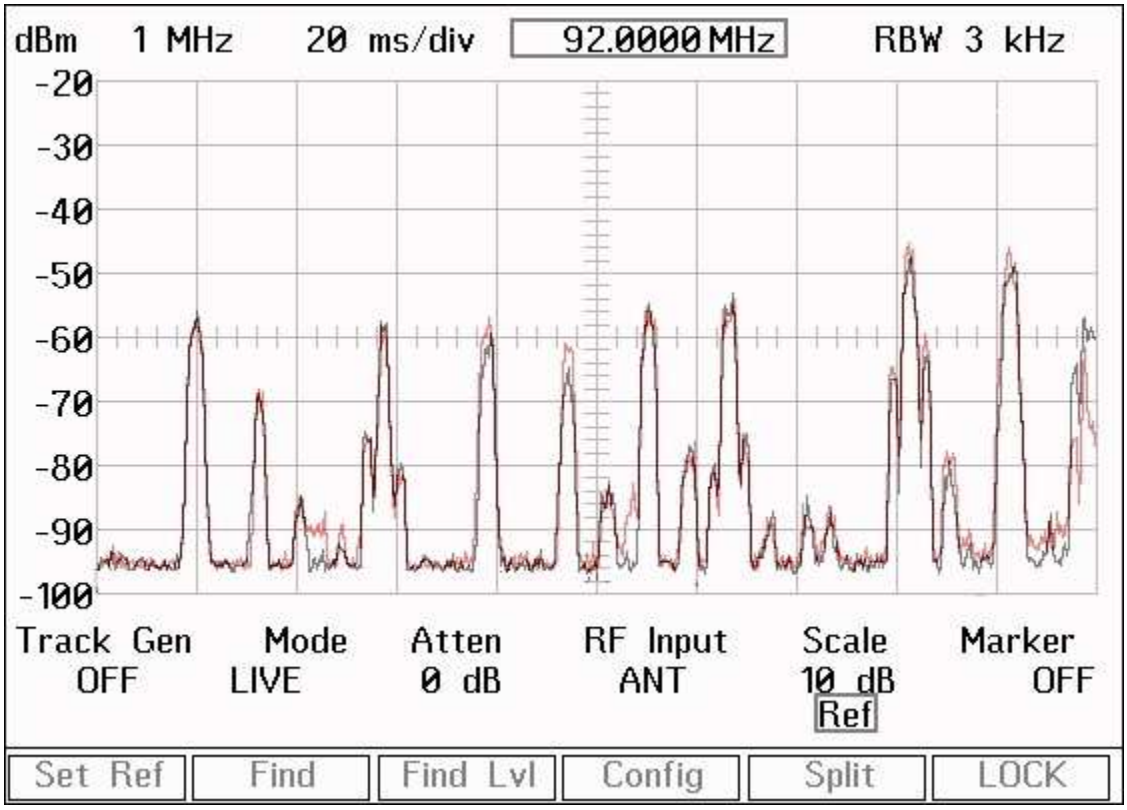
The Notch filters provided approximately 20 to 40db of isolation at each respective carrier frequency. Specific attenuation at each frequency is indicated below.

97.3 W247CF FCC ID 139259	1 Filter	-24db
100.3 W262AG FCC ID 81215	2 Filters	-48db
102.3 W272CQ FCC ID 148615	1 Filter	-24db
107.9 W300CU FCC ID 49965	2 Filters	-48db

Due to the need to add 10db of external attenuation for the measurement of the base line it should be noted that the unattuenuated reference level for each of the carriers in the study are as follows.

97.3 W247CF FCC ID 139259	+4db
100.3 W262AG FCC ID 81215	+8db
102.3 W272CQ FCC ID 148615	+4db
107.9 W300CU FCC ID 49965	+6db

All measurements are referenced to these levels.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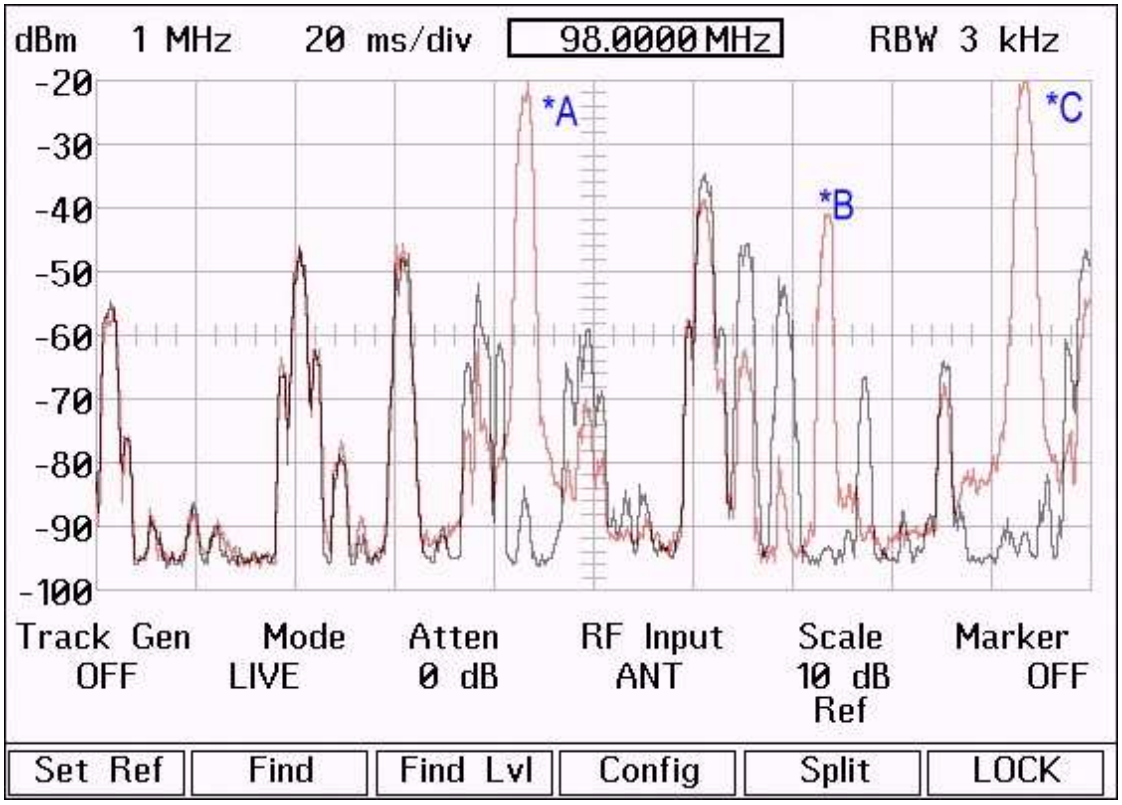
1 MHz
20 ms/div
92.0000 MHz
RBW 3 kHz
-20
-30
-40
-50
-60
-70
-80
-90
-100
Track Gen
OFF
Mode
LIVE
Atten
0 dB
RF Input
ANT
Scale
10 dB
Ref
Marker
OFF
Set Ref
Find
Find Lvl
Config
Split
LOCK


dBm
1 MHz
20 ms/div
98.0000 MHz
RBW 3 kHz
*A
*B
*C
-20
-30
-40
-50
-60
-70
-80
-90
-100
Track Gen
OFF
Mode
LIVE
Atten
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RF Input
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Scale
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Ref
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OFF
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Find Lvl
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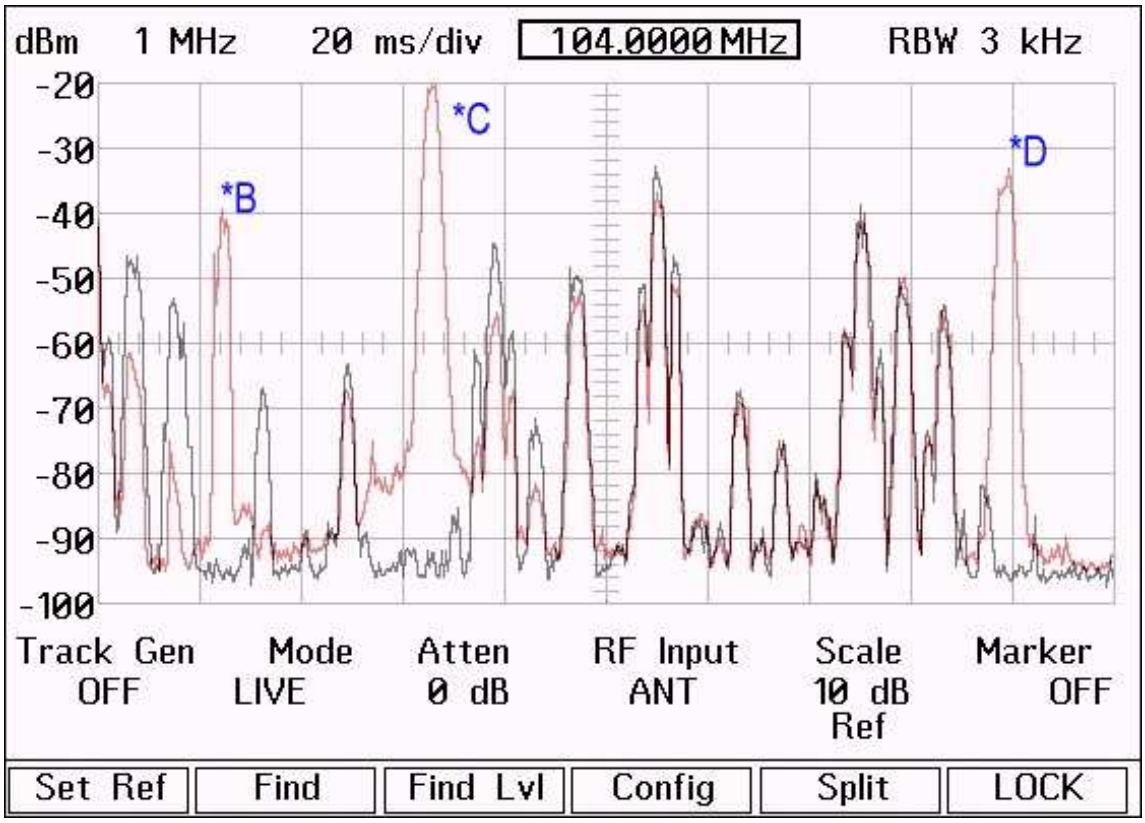
Split
LOCK



*A is the Attenuated Carrier of 97.3 W300AS ID 139259
*B is the Attenuated Carrier of 100.3 W262AG FCC ID 81215
*C is the Attenuated Carrier of 102.3 W272CQ FCC ID 148615
*D is the Attenuated Carrier of 107.9 W299BL FCC ID 49965

The graphs indicate that the constructed facility is in compliance with FCC rules for spurious emission. No in band or out of band spurious transmissions were noted in the test.