Interference Analysis of the Combined Signals

Of

W231DH, FCC ID 144433
W242CS, FCC ID 139043

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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.

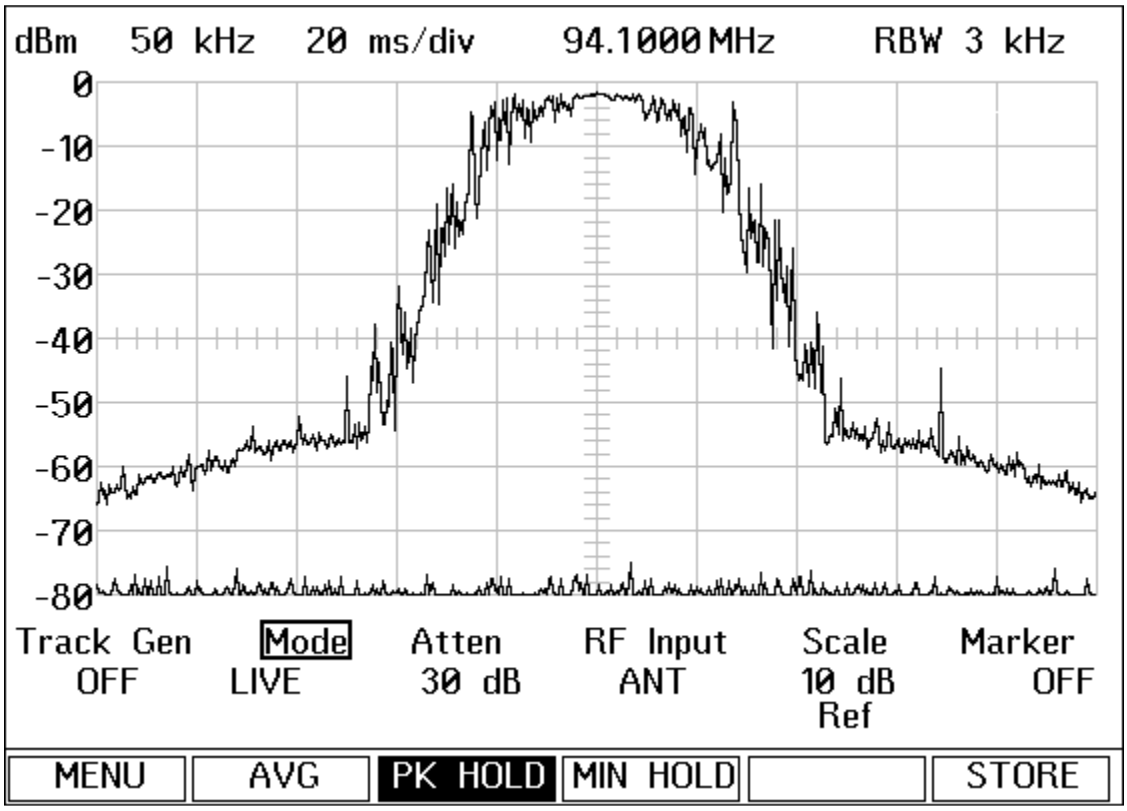
From these measurements the only found variations from the reference sweeps were well within FCC tolerances.

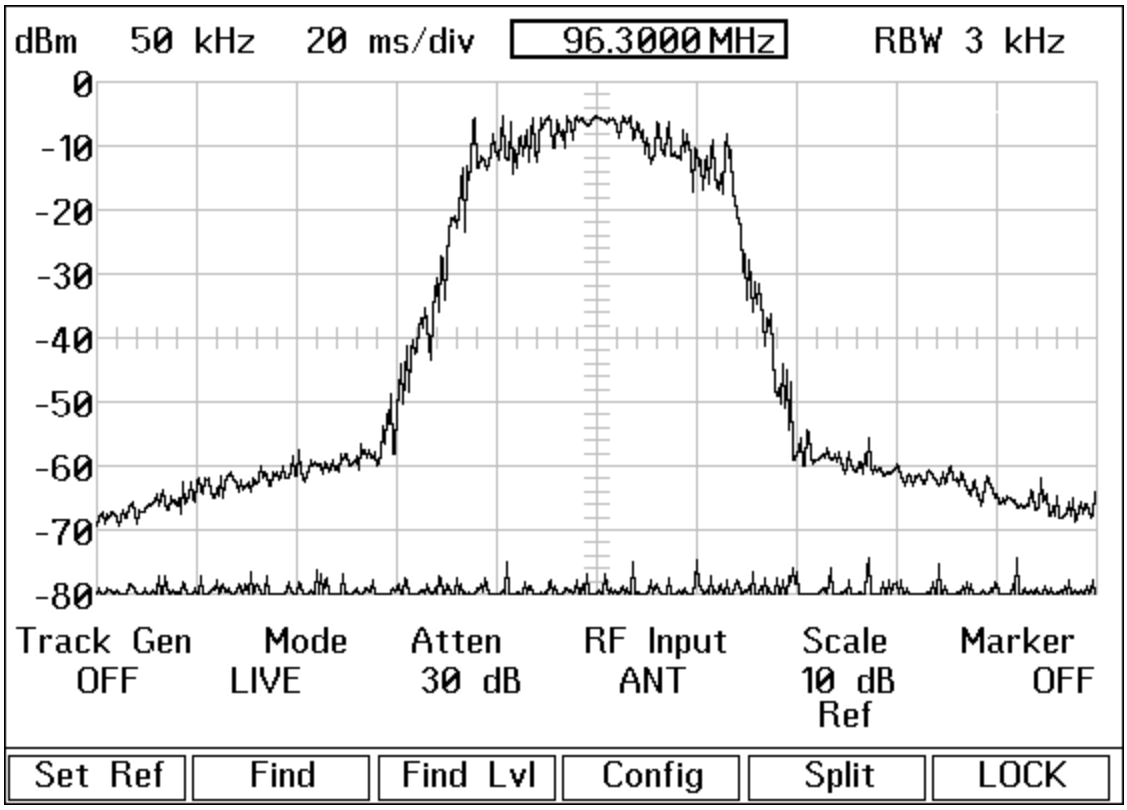
A RF sample probe was placed into the transmission line after the combiner circuit. This allows accurate sampling of any spurious emission being created by any portion of the transmission system.

The signals were first sampled for reference level, once the reference level was determined Notch filters were placed into the sample line to attenuate the fundamental frequency of each transmitter.

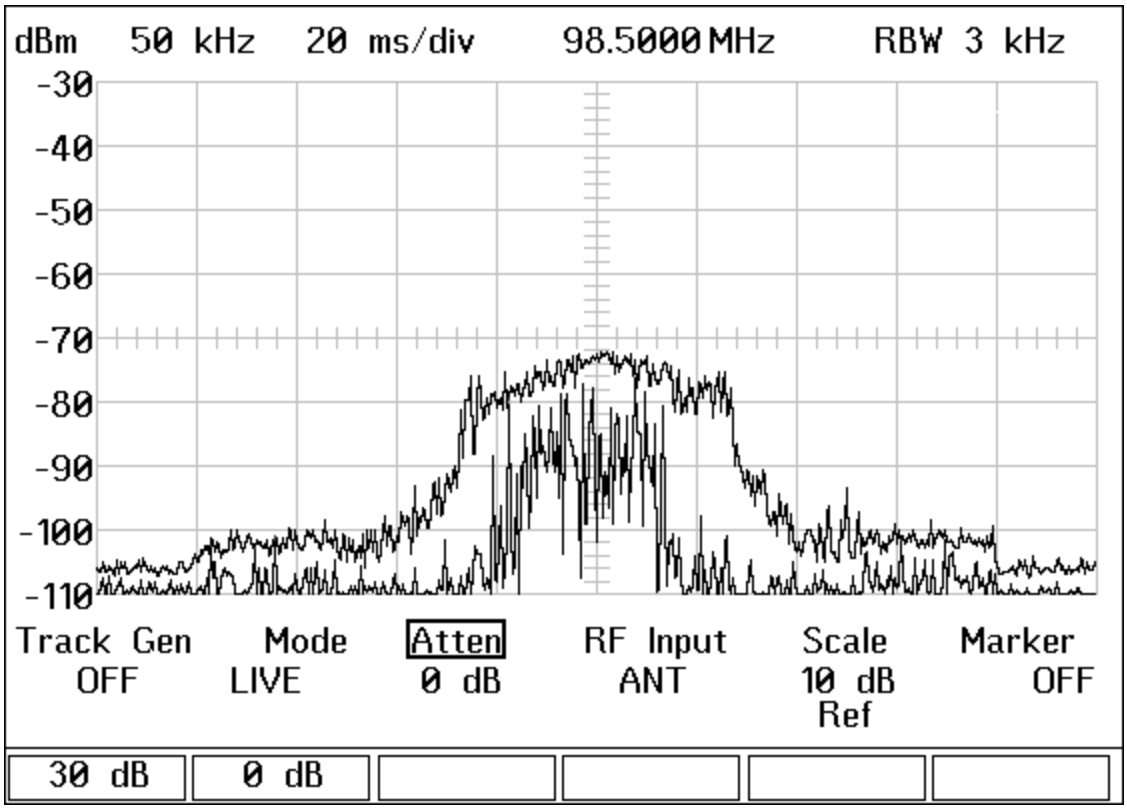
The Notch filters provided approximately 40 to 60db of isolation at each respective carrier frequency. Specific attenuation at each frequency is indicated below.

94.1 W231DH FCC ID 144433	3 Filters	-60db
100.3 W242CS FCC ID 139043	2 Filters	-48db

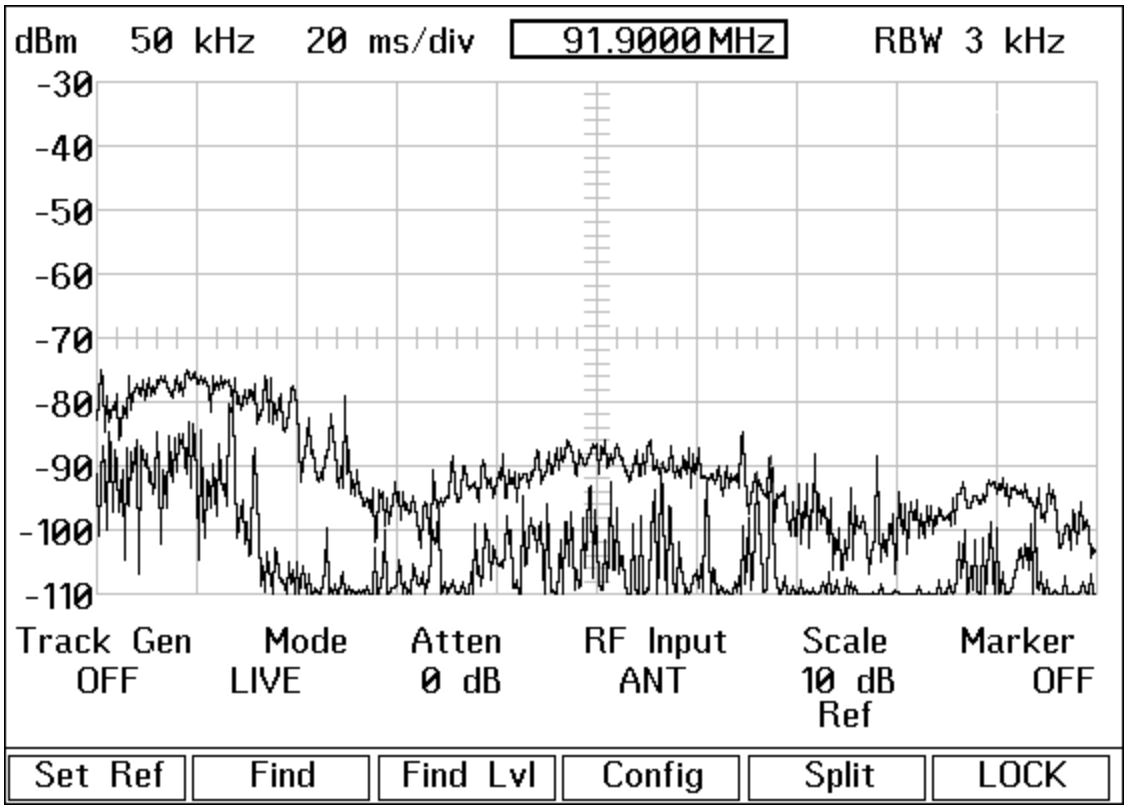




96.3 Without filtering and with 20db of external attenuation.



Upper mix product with 0db attenuation and filters in place.



Lower Mix product with no attenuation and filters in place. Note: the signal at 91.7 is WJLF, not a mix product.

Due to the need to add 20db 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.

94.1 W231DH FCC ID 144433	+15.1db
100.3 W242CS FCC ID 139043	+18.4db

All measurements are referenced to these levels.

The two noted spurious emissions were located at

91.9 MHz	-99db
98.5 MHz	-87db

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 other than the direct mix products shown above were noted in the test.