

KCRB 88.5 MHz
KNBJ 91.3 MHz
Auxiliary Antenna
Spectrum Measurements

On December 14, 2013 a series of measurements were made on radio stations KCRB, 88.5 MHz and KNBJ, 91.3 MHz while operating using the newly constructed auxiliary antenna. These measurements were made to determine if the operation of the two stations into a two station combiner and the auxiliary common antenna met the FCC rules and regulations in regards to spurious emissions. The results of the measurements are in this report.

The two station combiner is the existing two station combiner that is utilized for normal operation in the existing main antenna. The auxiliary antenna is a 5 section, ERI SHP-5AE 1 wavelength spaced antenna.

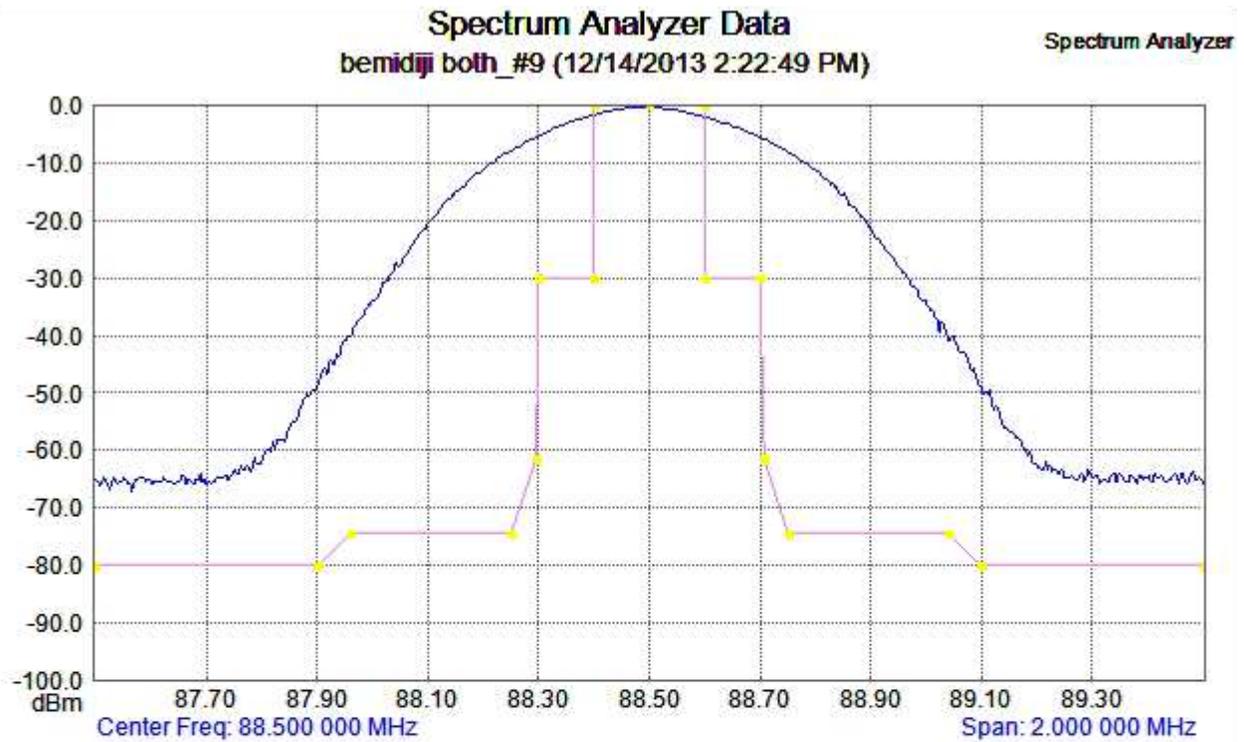
The measurements were conducted while normal programming was on each station. Each station was set for normal operation into the auxiliary antenna. The first measurements were of each individual station to both establish the reference levels for the analyzer and to demonstrate compliance with the requirements for HD transmission.

The measurements did show a set of intermodulation products at 85.7 MHz and at 94.1 MHz. It was determined that the products were being generated in the spectrum analyzer. The insertion of notch filters in the sample line removed the product generation. But, since the products being produced were lower than -80 dB below the carrier, it was decided to not insert the notch filters except for the final measurement with a 450 Mhz Span.

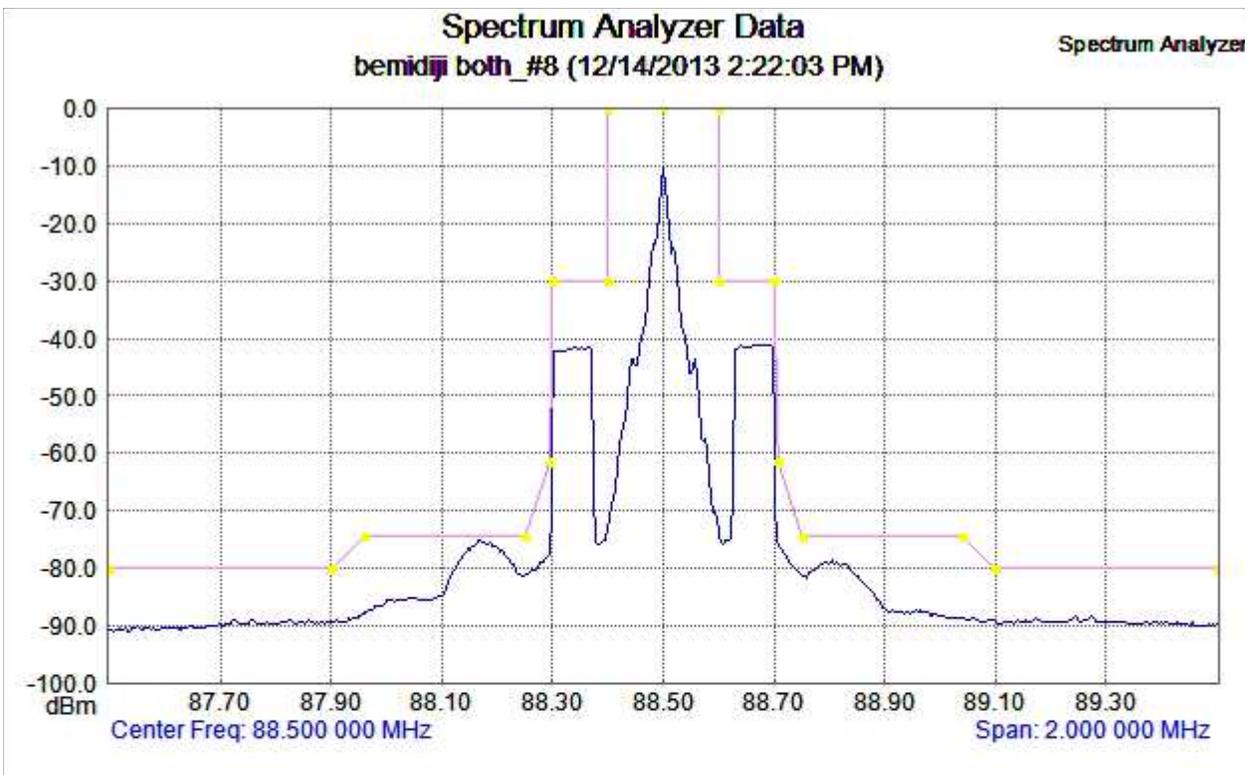
The results of the measurements show that any spurious emissions in the range of 50 MHz to 500 MHz are under the limit of 80 dB as required under section 73.317 of the FCC rules.

Respectfully Submitted,

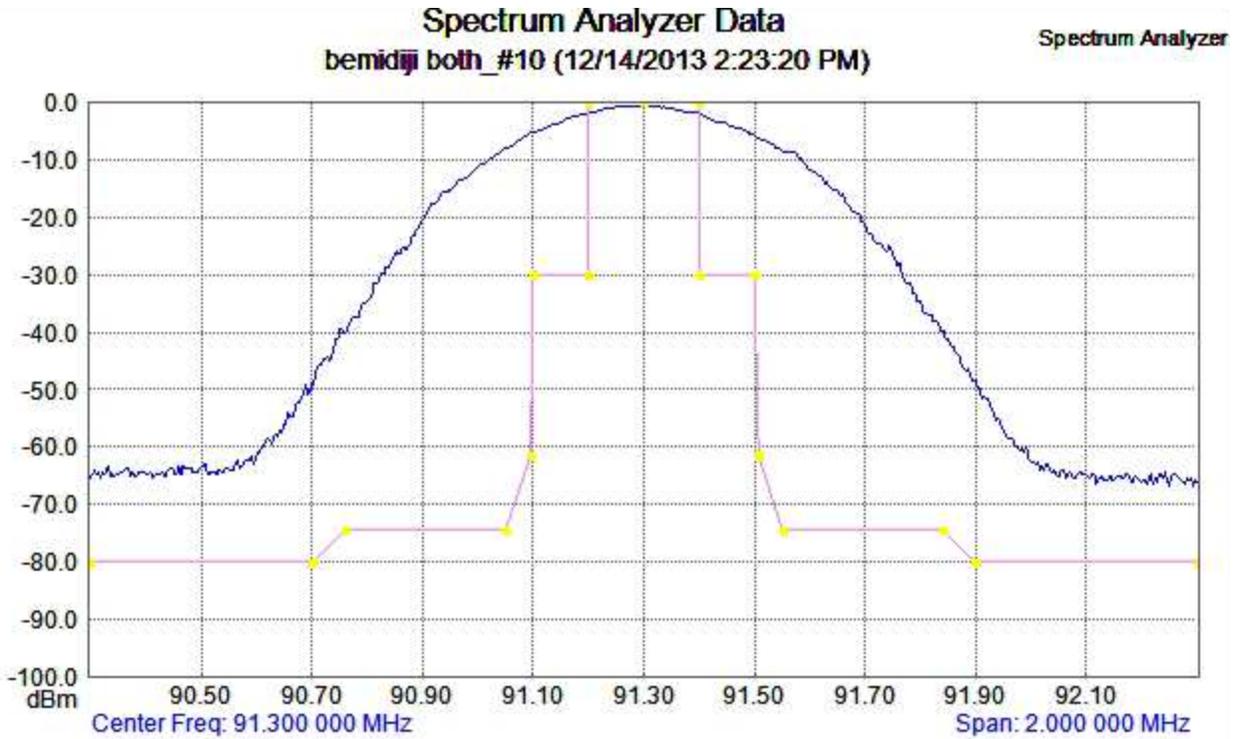
Michael Hendrickson
Radio Network Engineering Manager
Minnesota Public Radio
Dec. 27, 2013



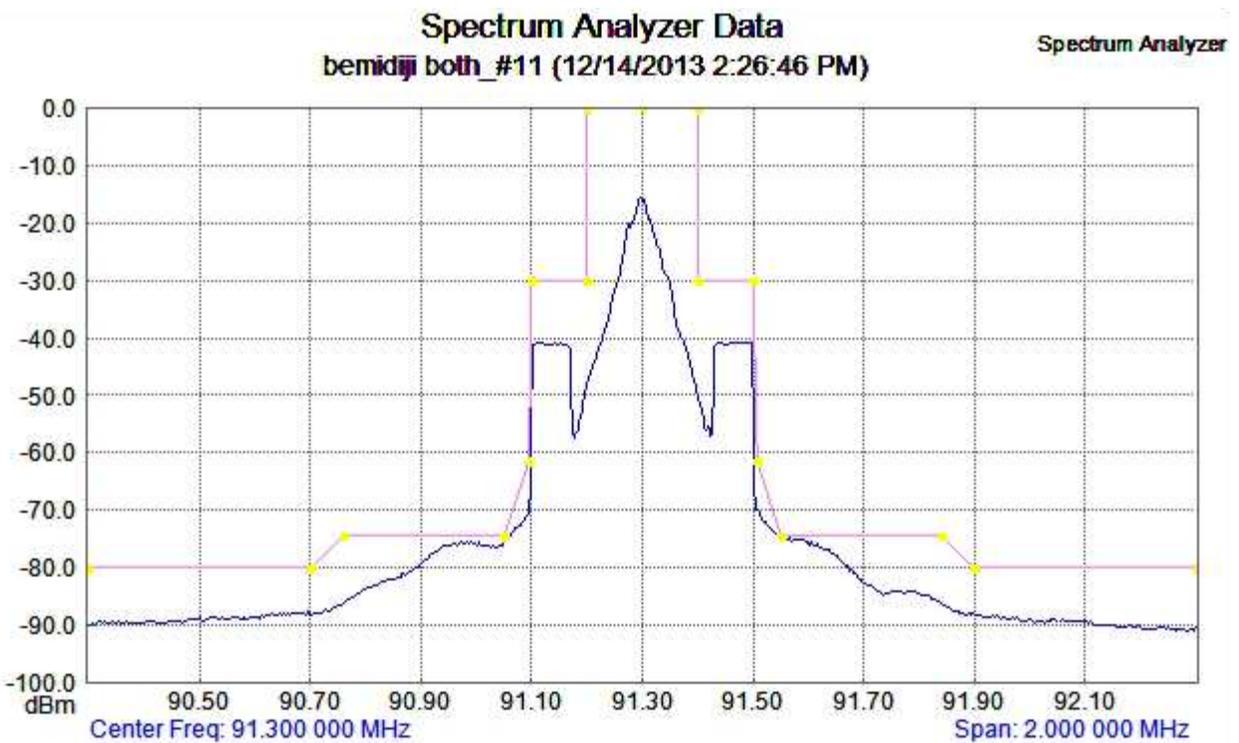
Calibration of analyzer for 88.5 Mhz. Resolution bandwidth set for 300 kHz to establish the carrier reference level. The detection was set for RMS. The span is 2.0 MHz. The relative amplitude was adjusted to permit the reference level to have a relative setting of '0 dBm'.



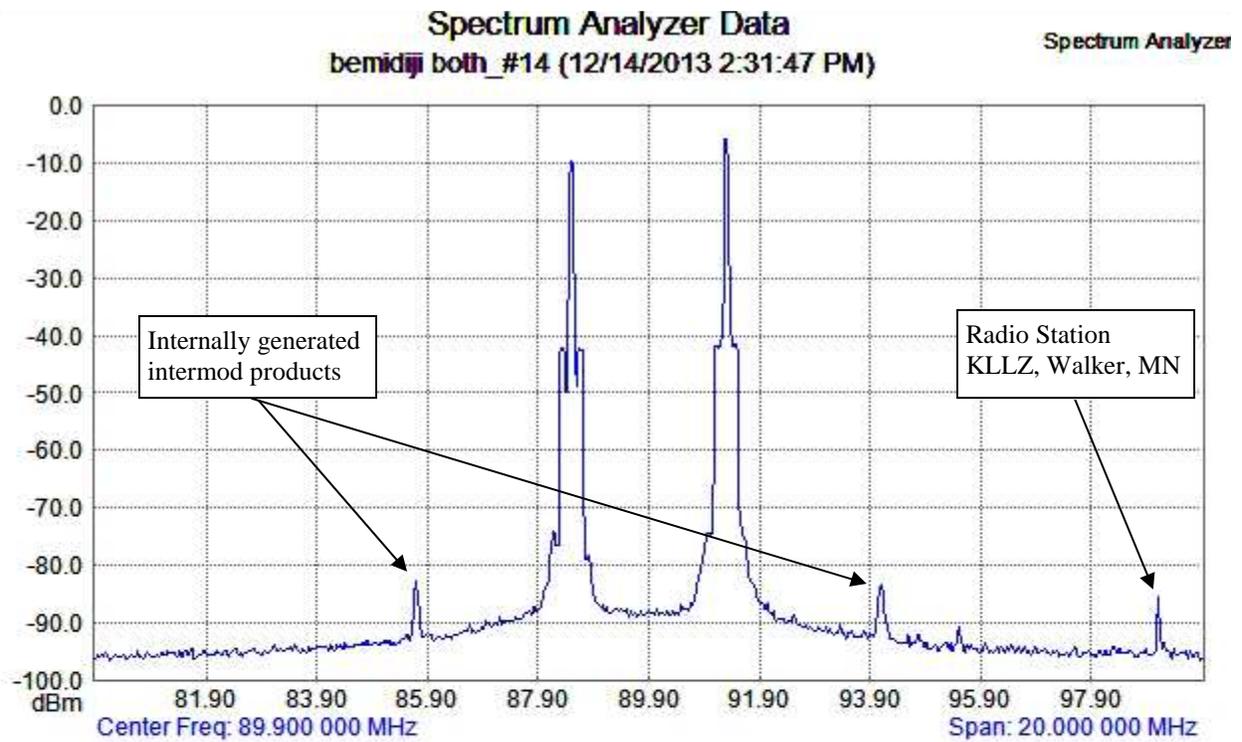
Results of the measurement of KCRB FM and HD.



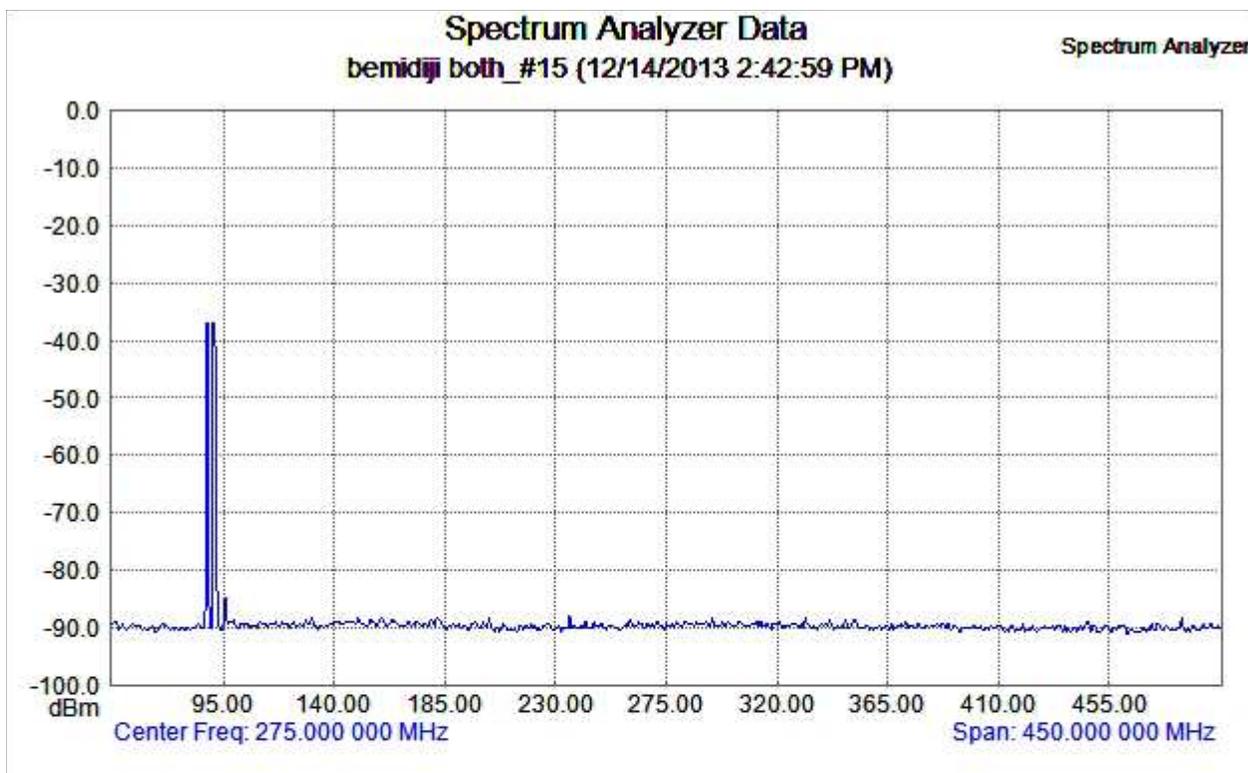
Calibration of analyzer for 91.3 Mhz. Resolution bandwidth set for 300 kHz to establish the carrier reference level. The detection was set for RMS. The span is 2.0 MHz. The relative amplitude was adjusted to permit the reference level to have a relative setting of '0 dBm'.



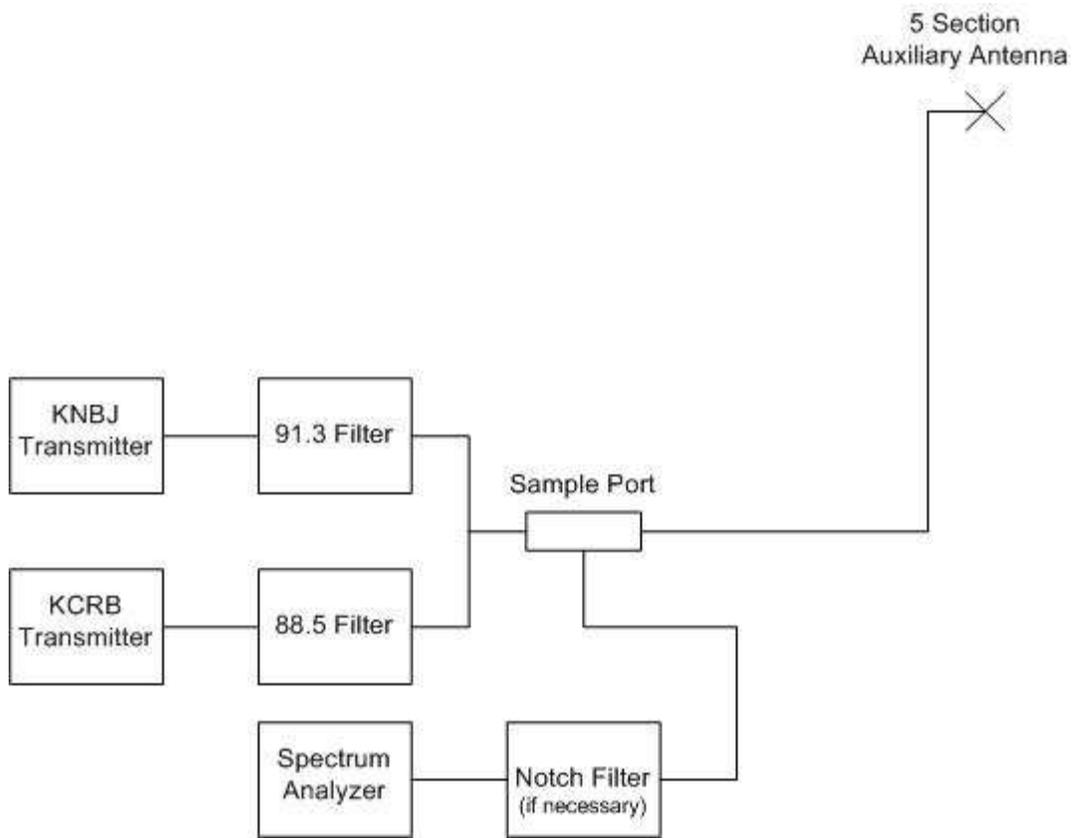
Results of the measurement of KNBJ FM and HD.



Measurement of both stations with the span set to 20 MHz. The bandwidth was set to 300 Hz.



Measurement of both stations with a span of 50 MHz to 500 MHz. The bandwidth was set to 1 kHz.



Block diagram of test setup

Spectrum Analyzer model MS2034B, SN 1310028.