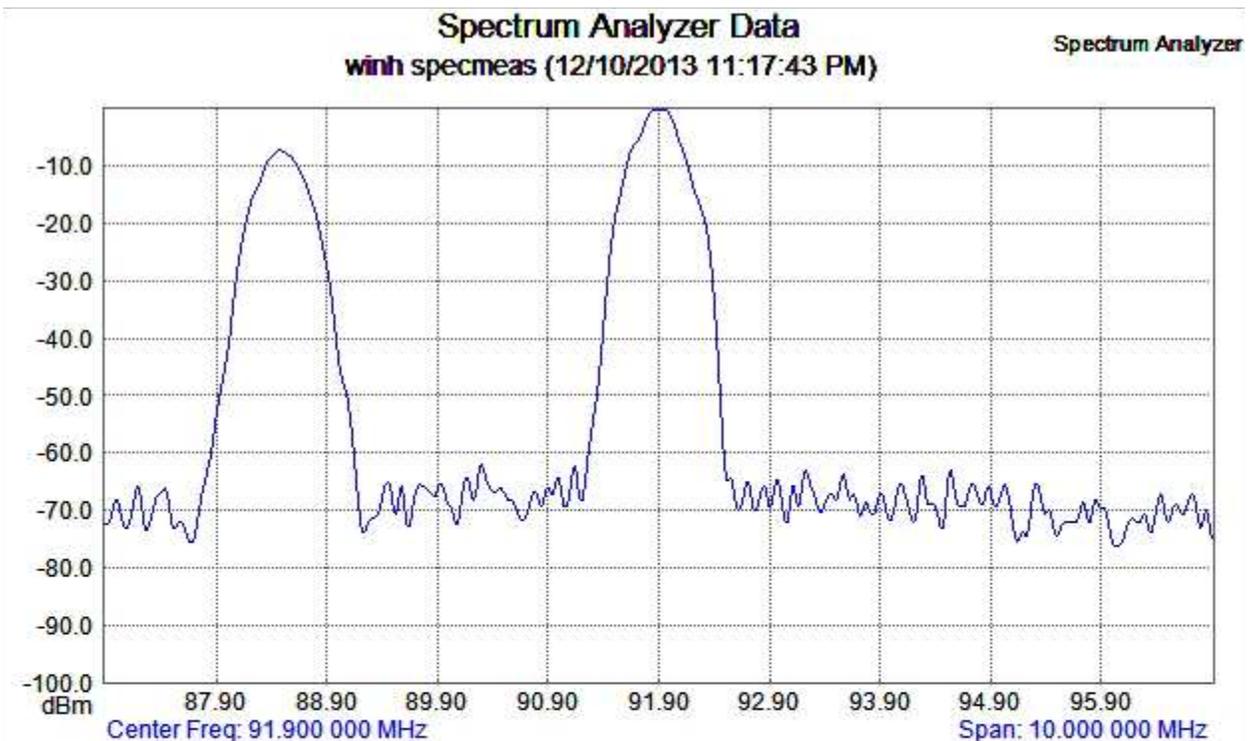


WINH 91.9 MHz
WGRH 88.5 MHz
Spectrum Measurements

On December 11, 2013 a series of measurements were made on radio station WGRH, 88.5 MHz, Hinckley, MN and newly constructed radio station WINH, 91.9 MHz, Hinckley, MN. These measurements were made to determine if the operation of the two stations into a two station combiner and common antenna met the FCC rules and regulations in regards to spurious emissions. The results of the measurements are in this report.

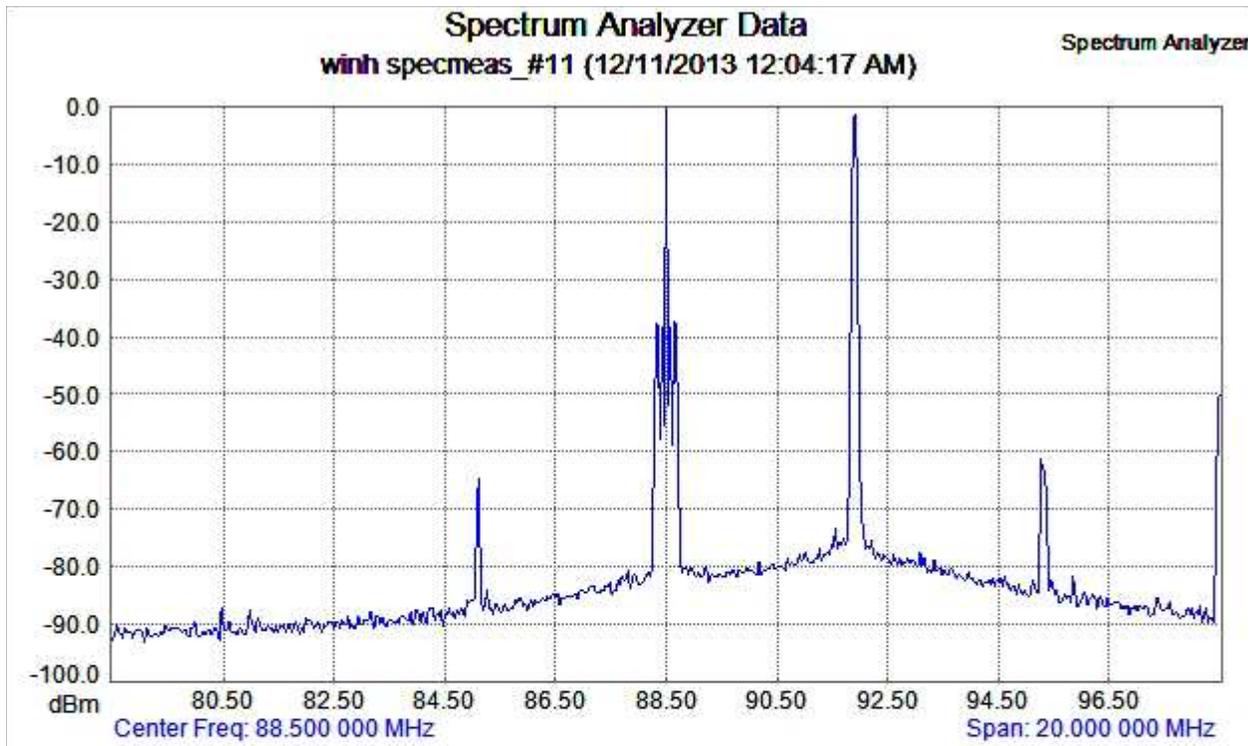
The two station combiner was manufactured by Howell Laboratories, Inc of Bridgton, ME. It is a model 2604-3A/25163A, serial number 31221-1. The antenna was manufactured by the Shively Division of Howell Laboratories. The model number of the antenna is 6814BB-6R-PS. This antenna was originally installed upon the construction of WGRH. The combiner was installed upon the construction of WINH.

The results of the measurements show no spurious emissions in the range of 50 MHz to 450 MHz. The measurements began with adjusting the spectrum analyzer for a span of 10 MHz with a bandwidth of 300 kHz. This was to establish a '0' dB reference level. The WINH carrier was used as the reference. The amplitude display was adjusted to indicate a relative level of 0 dB.

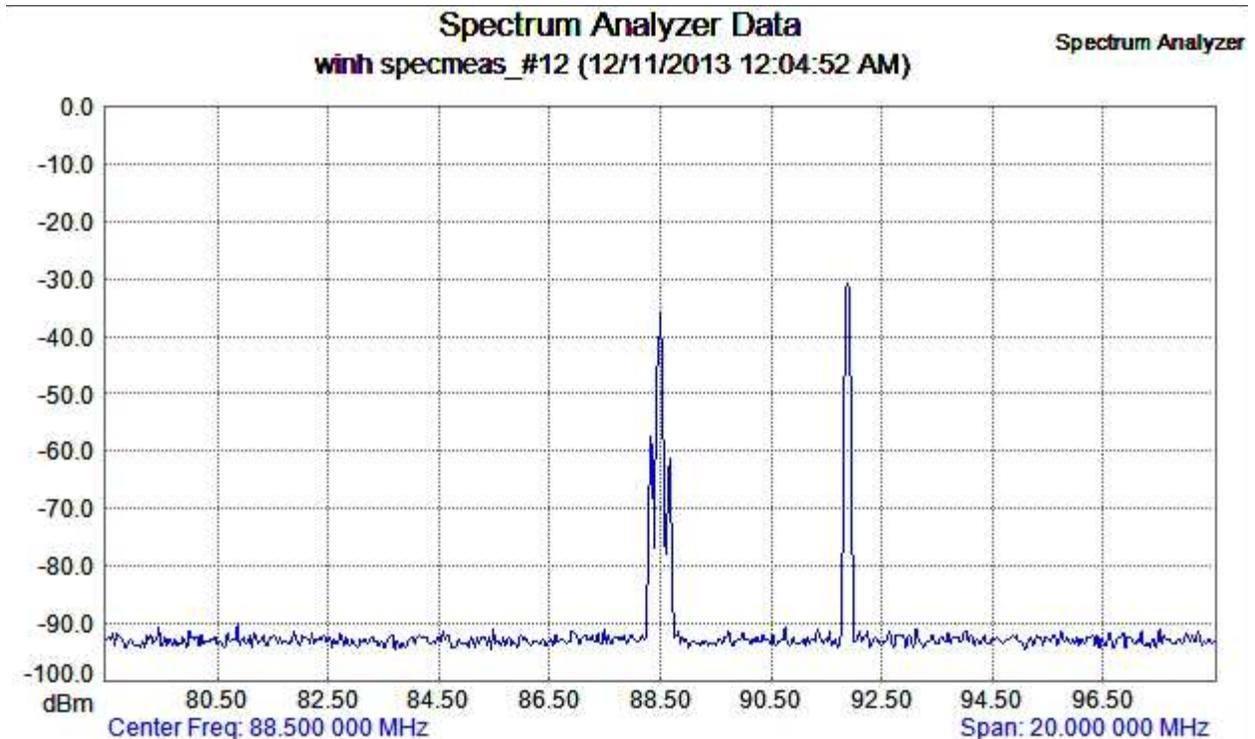


Calibrating measurements

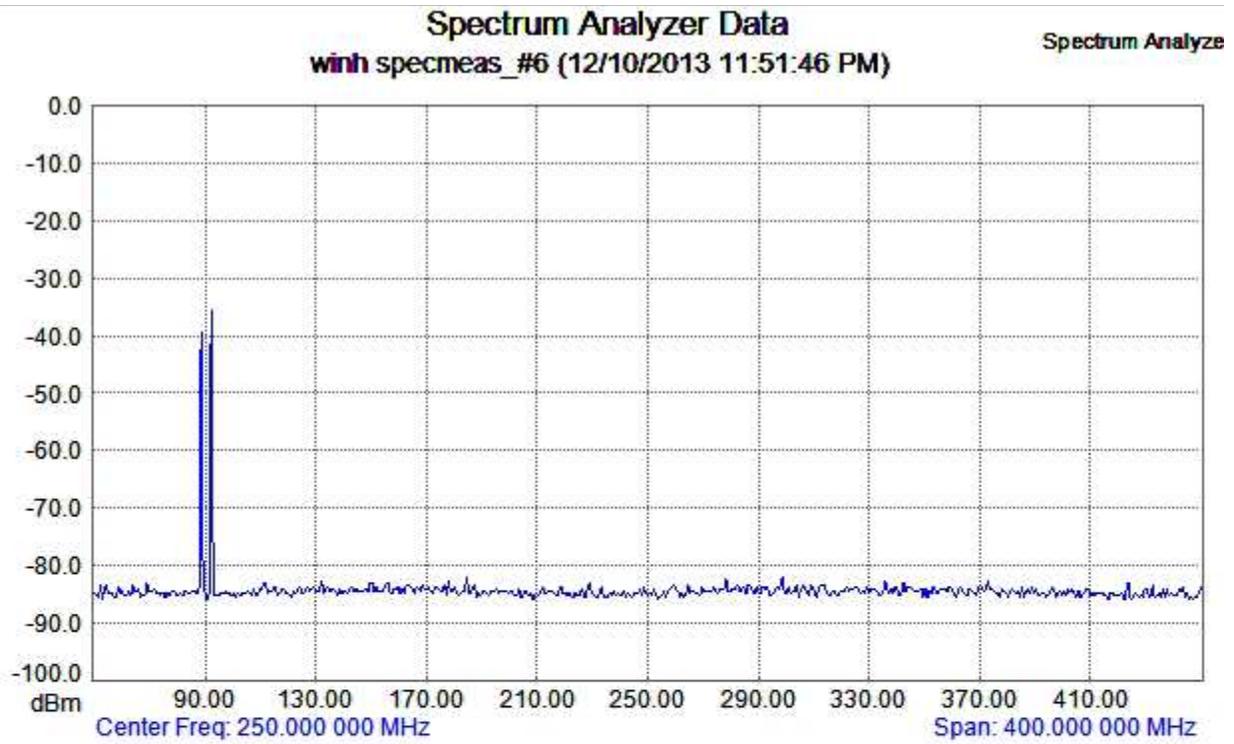
The below image is the first measurement made of the two stations. It was obvious that analyzer was being overloaded by the input signal. When the analyzer's input was changed by 10 dB, the spurious emissions changed by more than 10 dB.

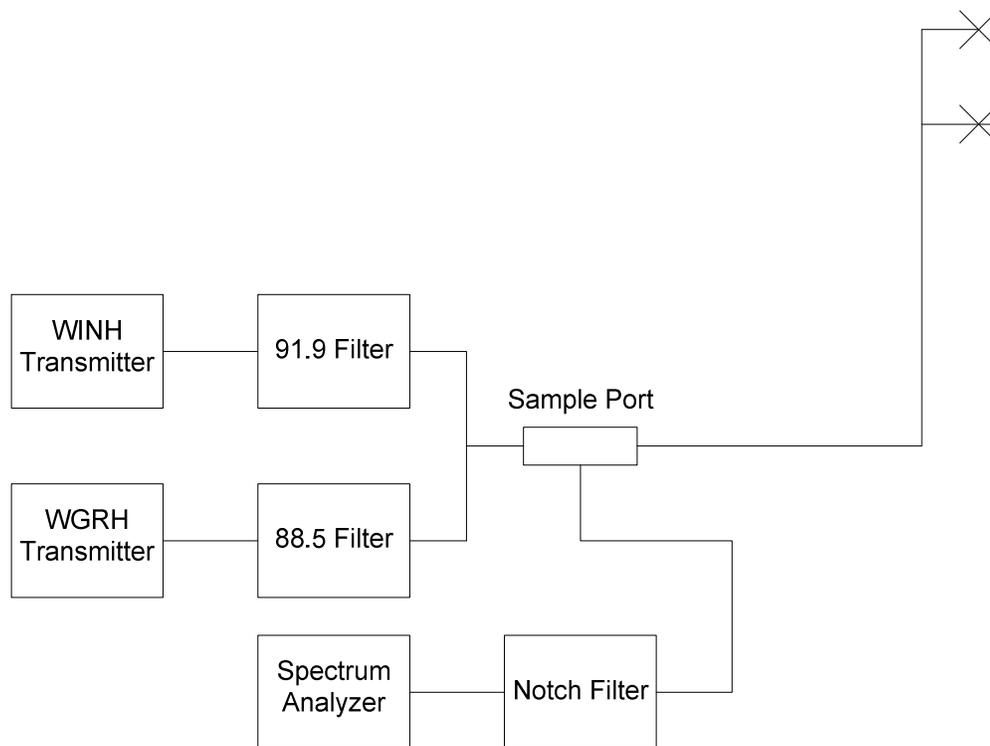


The below image shows the result of the insertion of the tunable notch filter. There was a notch placed on both 88.5 MHz and 91.9 MHz. The 3 dB bandwidth of the filter was approximately 3 MHz. The insertion loss was less than 1 dB.



The final measurement was made with a span from 50 Mhz to 450 MHz with the notch filters inserted in the input of the analyzer. As can be seen from the figure there are no spurious emissions being produced by the combining of the two stations into a single antenna.





Spectrum Analyzer model MS2034B, SN 1310028.

Respectfully submitted by

Michael Hendrickson
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Minnesota Public Radio
Dec. 16, 2013