



## **Armstrong Road Transmit Facility**

**Measurement of Cross-Modulation Products  
April 7, 2004**

### **Introduction**

Entercom Wilkes-Barre/Scranton, LLC, licensee of WFEZ(FM) Avoca, PA (facility ID# 22666) and licensee of WDMT(FM) Pittston, PA (facility ID# 22925) has constructed a master antenna system to allow for the combined operation of the two stations. The following report details the measurements of the calculated cross-modulation products of the two facilities, and satisfies a condition of the WFEZ construction permit, BPH-20031119AIF.

A list of calculated cross-modulation frequencies was compiled to determine 2<sup>nd</sup> and 3<sup>rd</sup> order products (2A-B) and (3A-2B) generated by these two FM stations and then compared to the fundamental or operating frequencies. Measurements of the products were performed on April 7, 2004, by Lamar Smith, Director of Engineering, Entercom Wilkes-Barre/Scranton, LLC.

# Cross Modulation Report

Equipment used in making the measurements:

- Spectrum Analyzer for all signal measurements – HP Model 8590B, Serial Number 3009A00967
- FM Band Pass Filter – Wacom Products Model WP-715-1, Serial Number 9076
- Spectrum Analyzer with Tracking Generator to tune the Band Pass Filter – B&K Precision Model 2630 Serial 11312

Procedures used to measure the product frequencies:

- It was determined that the directional output coupler of the Shively combiner was overloading the input of the spectrum analyzer and causing it to generate inter-modulation products due to excessive input levels. Therefore a FM band pass filter was used to filter the fundamental frequencies to determine an accurate measurement of the product frequencies.
- For each measurement, proper attenuation was used to establish a reference level with the fundamental frequencies on the spectrum analyzer. This reference was then considered 0dBc for the product frequency measurements.
- The band pass filter was then tuned to the selected product frequency. Loss through the band pass filter was calculated at the frequency to be measured and was incorporated into the calculations.
- The band pass filter was then inserted in series to measure the product frequency.
- The level of the product frequency was then calculated in dB on the HP Spectrum analyzer. Levels that were undetectable were considered to be attenuated to a level greater than -125 dB.
- The Spectrum analyzer was also used to slowly scan the spectrum between 50 MHz and 1GHz to determine if there were any spurious emissions that were not predicted. None were found.

Product Frequency Measurements:

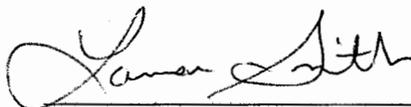
Product Frequency (MHz)	Reference Frequency (MHz)	Interfering Frequency (MHz)	Measured Value of Product	Calculated Filter Loss at Product	Level to Referenced Frequency
100.5	102.3	103.1	N.D	- 1 dB	> - 125 dB
101.5	102.3	103.1	- 91.5	- 1.5 dB	- 90.00 dB
103.9	103.1	102.3	- 94.25	- 1 dB	- 93.25 dB
104.5	103.1	102.3	N.D.	- 1 dB	> - 125 dB

N.D. = Not Detected

## Conclusion

All predicted cross-modulation products were determined to be greater than 80dB below the two stations carrier frequencies. No spurious emissions were detected between 50MHz and 1GHz that are greater than 80dB below the stations carrier frequencies. It is the belief of the undersigned that sufficient measurements have been made to establish that the operations for the combined WFEZ(FM) and WDMT(FM) facilities are in compliance with 47CFR Sections 73.317(b) through 73.317 (d).

April 7, 2004

A handwritten signature in black ink, appearing to read "Lamar Smith", written over a horizontal line.

Lamar Smith  
Director of Engineering  
Entercom Wilkes-Barre/Scranton, LLC