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Harmonic and Intermodulation Measurements **KNOU-FM 96.3mHz St. Louis Missouri** **March 10, 2015**

Measurements conducted on March 10, 2015 by Dave Obergoenner for ObieOne Engineering Inc. with the assistance of station engineer Sam Caputa on KNOU-FM regarding FCC Construction Permit BPH-20120228acx for a power increase to 92kw ERP at 309 meters on the MacKenzie Road combined FM transmission facility near St. Louis Missouri.

Test Equipment:

Agilent E4402b spectrum analyzer
Custom 50db reject filter for 88-108mHz FM broadcast band
Modified multi-band mag-mount receive antenna

Method:

Test equipment was set up approximately 1km from the base of the MacKenzie Road combined tower facility near St. Louis Missouri. Signals from the mag-mount multi-band antenna atop a vehicle were fed through a custom built 50db band reject filter for the FM broadcast band (88-108mHz) to minimize the possibility of overload to the E4402b spectrum analyzer by the powerful signals there, and to expand the measurement capability of the analyzer to very low levels outside of the FM broadcast band.

Harmonic Measurements:

Harmonic frequency measurements:

2nd: 192.6mHz – Licensed Power: > -120dbc, Elevated CP Power: >-120dbc
3rd: 288.9mHz – Licensed Power: >-120dbc, Elevated CP Power: >-120dbc
4th: 385.2mHz – Licensed Power: >-120dbc, Elevated CP Power: >-120dbc
5th: 481.5mHz - Licensed Power: > -120dbc, Elevated CP Power: >-120dbc
6th: 577.8mHz – Unable to measure due to television station KDNL occupying the frequency
7th: 674.1mHz - Licensed Power: > -120dbc, Elevated CP Power: >-120dbc
8th: 770.4mHz - Licensed Power: > -120dbc, Elevated CP Power: >-120dbc
9th: 866.7mHz - Licensed Power: > -110dbc, Elevated CP Power: >-110dbc (elevated noise floor)
10th: 963.0mHz - Licensed Power: > -120dbc, Elevated CP Power: >-120dbc

Intermodulation Measurements:

Well over 100 predicted intermodulation frequencies for this combined tower were measured to the 9th order. Special attention was given to the aeronautical band immediately above the FM broadcast band. Only 3 frequencies showed any products even approaching the -80dbc point: 93.1, 91.1, and 89.9mHz. It was verified that the noise products measured at these frequencies were not caused by the KNOU transmitter by the carrier-break method.

Summary:

All measurements conducted on the KNOU transmission system were shown to be well within FCC limits both at the current licensed power, and at the elevated Construction Permit power.

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3/10/15