



**J.M. Stitt & Associates, Inc.**

**WNKN-FM 105.9 MHz  
Middletown, Ohio**

**Performance Measurements**

As required by 47 CFR 73.1590 the following performance measurements were made by me or under my direct supervision for the new transmitter and feedline installed at WNKN-FM 105.9 MHz tower site located at 4502 Rosedale Avenue, Middletown, Ohio on 2/3/2017.

I am a Certified Professional Broadcast Engineer with over 40 years experience in this field and President of JMS & Associates, Inc. a technical consulting and contract engineering firm with over 140 radio and TV clients.

Respectfully submitted,

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## WNKN-FM Performance Measurements

As required by 47 CFR 73.1590 following the installation of new Commscope HJ8-50B feedline to the existing Harris FMH-6AE non-DA antenna, and installation of a new Nautel GV-15 transmitter S/N HO200, the following performance measurements were made on 2/3/2017.

### Test Equipment

Spectrum Analyzer: Anritsu MS2720T-709F S/N 1317082

Wattmeter: Factory calibrated Bird 3127-400

PowerAim 120 Antenna Analyzer

### POWER CAL

The transmitter was operated into a 50 ohm non-reactive test load and set for the power output (TPO) required for licensed ERP of 34KW as derived below. The power reading was verified by the factory calibrated Bird wattmeter located at the output of the transmitter and all metering was checked for proper calibration.

ERP = 34,000 watts

Harris FMH-6AC Antenna Gain = 3.3028 (5.1888dB)

Antenna Input = 10,294 watts

Line Loss 515 ft HJ8-50B = 0.752 dB (0.146dB/100 ft @ 105.9 MHz)

Efficiency = 84.1%

TPO = 12,240 watts

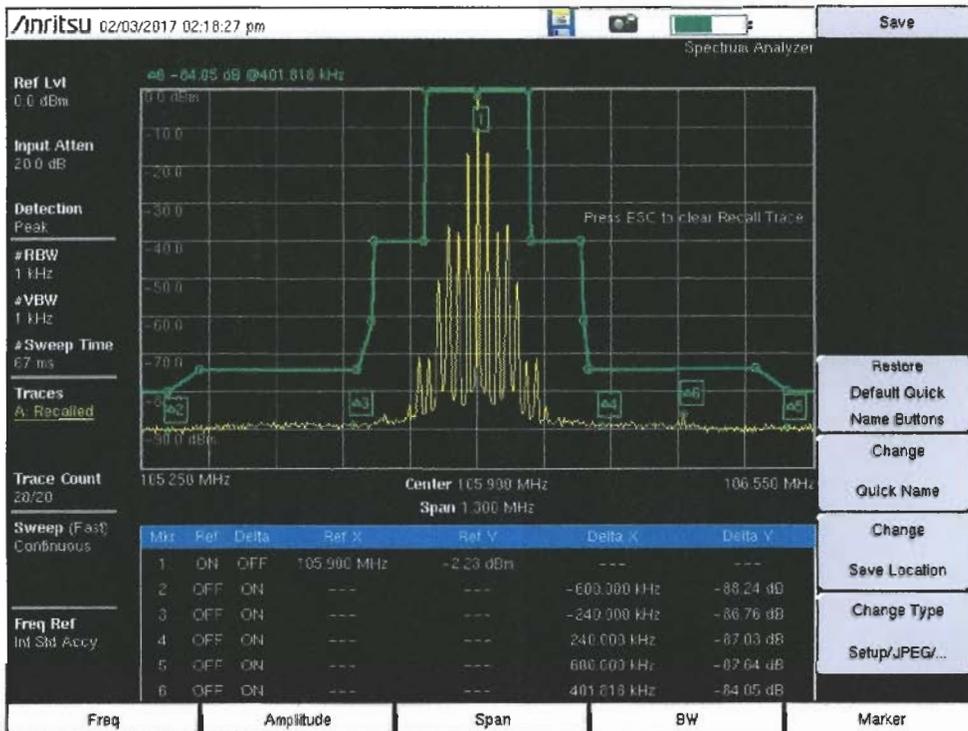
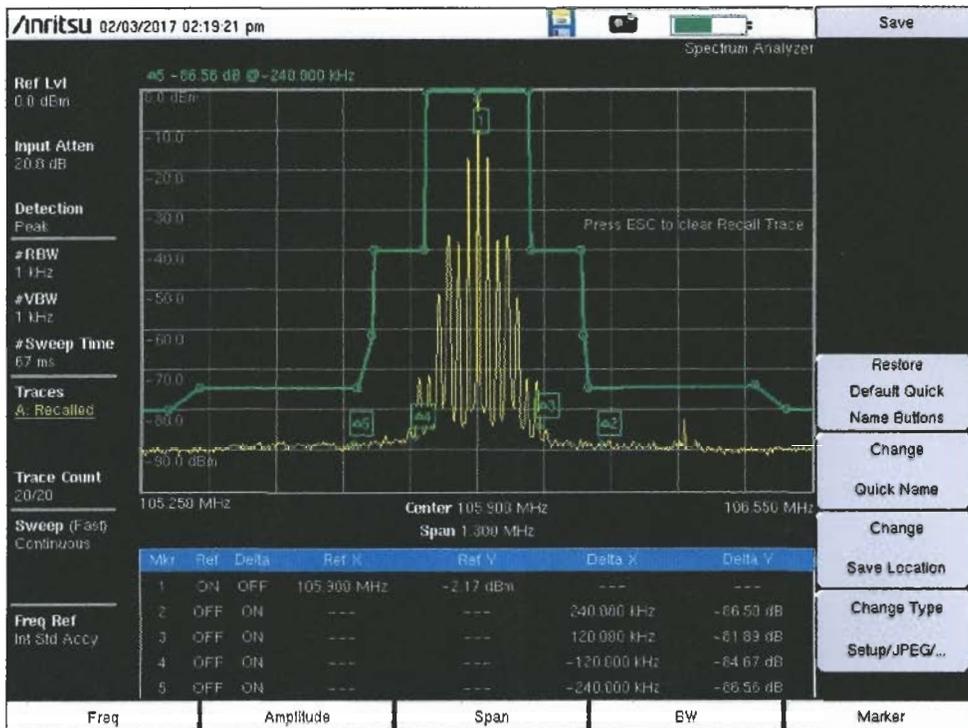
### SPECTRUM MEASUREMENTS

Per 47 CFR 73.1590 the following spectrum measurements were made to demonstrate harmonic and spurious emission compliance with 73.317. The spectrum analyzer was connected to the RF sample port through a fixed attenuator located at the output of the transmitter. Peak of Carrier centered at 105.9 MHz was set as the reference and a 2 MHz span was observed.

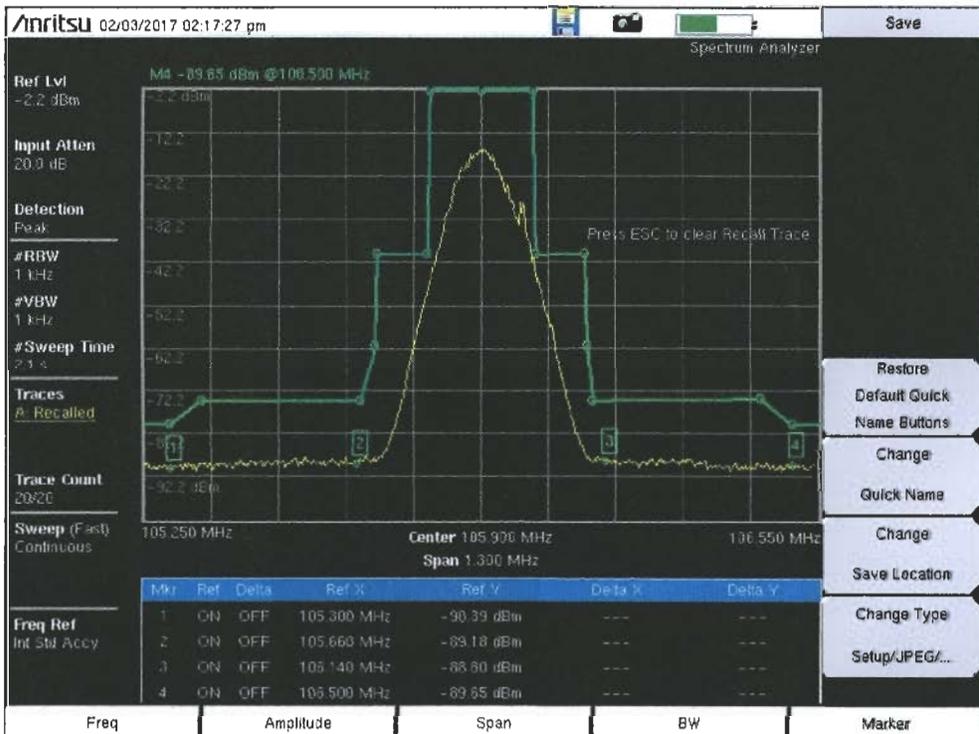
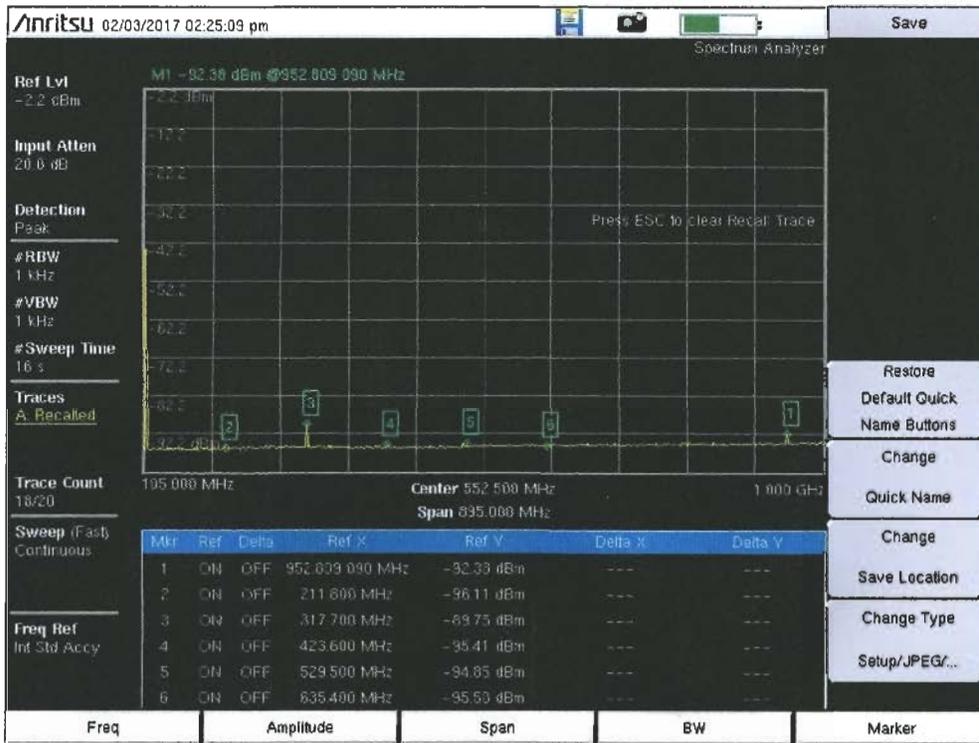
Harmonic and spurious measurements were also conducted out to 1 GHz with markers at the 2<sup>nd</sup> to 9<sup>th</sup> harmonics. A notch filter tuned to the 105.9 MHz carrier was inserted in the line to prevent overload of the spectrum analyzer.

All emissions meet 73.317 requirements. All emissions beyond +600KHz from the carrier are below -80 dBc.

# WNKN 73.317(b)(c)(d) Compliance $\pm 120, 240, & 600\text{KHz}$



# WNKN Harmonics and Occupied Bandwidth



# ANTENNA SYSTEM

The frequency, VSWR and return loss of the antenna and feedline were checked.

