

NRSC and Harmonic Occupied Bandwidth Measurements

**For station KTNF-AM
Eden Prairie, MN**

950Khz

These measurements were taken on

September 14, 2020

**Prepared by
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Description

The following measurements of station KTNF-AM, 950 KHz were conducted on September 14, 2020, between the hours of 9:30am and 11:30am.

Both KTNF-AM transmitters were operating at the licensed output power of 1000 watts. Measurements were recorded on both transmitters with the antenna system operated in the normal daytime and nighttime modes (four sets of measurements total).

These measurements indicate that the station and both transmitters are in compliance with FCC Rules section 73.44 pertaining to the allowable limits of occupied bandwidth for an AM broadcast station.

Method

The measurements were taken during normal programming using a Signal Hound model SA44B spectrum analyzer.

Measurements were taken at a location approximately .5 Km north of the KTNF antenna, approximately 200' west of the intersection of Willow Wood and Bryant Lake Dr, near the cul de sac and in the main radiation lobe of the antenna system.

A Chris Scott model LP-3 directional loop antenna was employed to collect the RF signal. The antenna was oriented to provide maximum incoming signal from the broadcast towers. It was verified that the loop was oriented with the towers, which could be seen in the distance, in order to minimize potential re-radiation distortion.

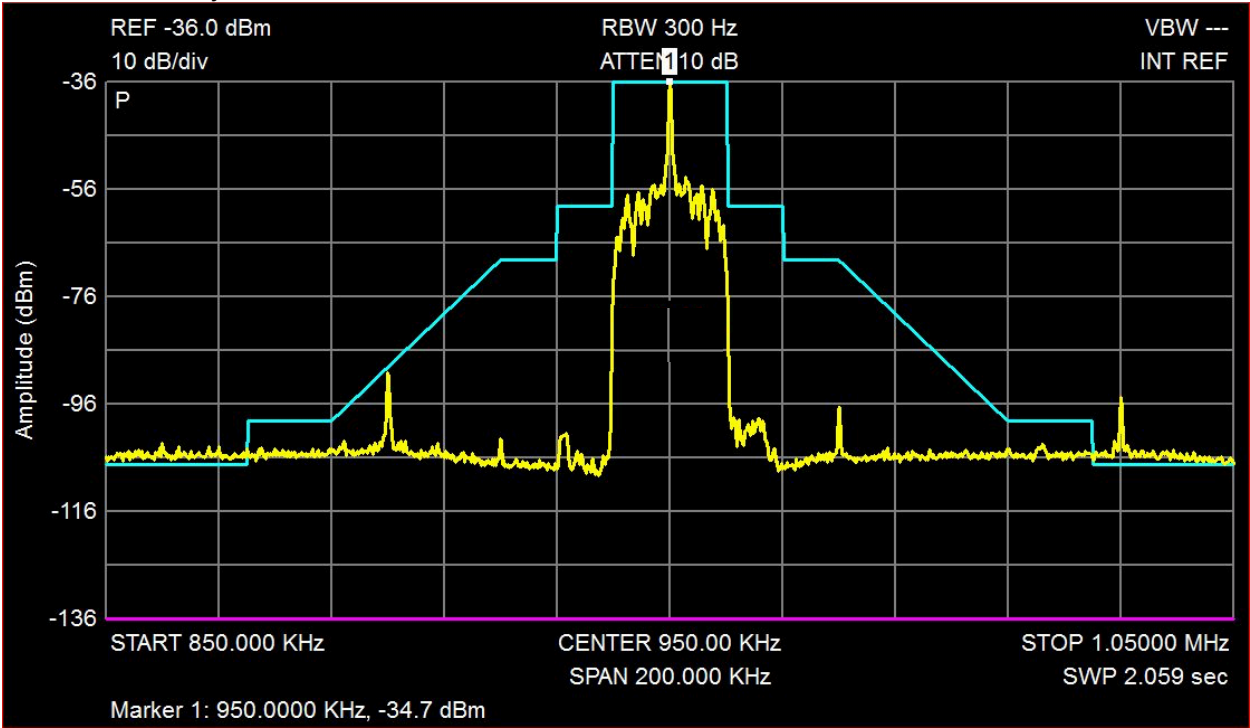
The analyzer was set to display 200KHz on-screen and the video bandwidth was set to provide appropriate resolution of the audio sidebands. Once reference levels were established, the gain of the analyzer was adjusted so that the peak of the AM carrier was at the top of the screen, providing as much carrier-to-noise of resolution as possible. In 'peak hold' mode the noise level came up to approximately -71dBc. The scan was set to the Peak Hold mode and at least 10 minutes of signal compilation was allowed before the occupied bandwidth measurement was recorded. The input attenuator of the analyzer was adjusted periodically and levels checked prior to actual measurements to ensure the analyzer input amplifier was not being overloaded.

As displayed, the measurements indicate that KTNF is operating within the FCC defined AM-NRSC mask and that harmonic radiation is within the prescribed limits.

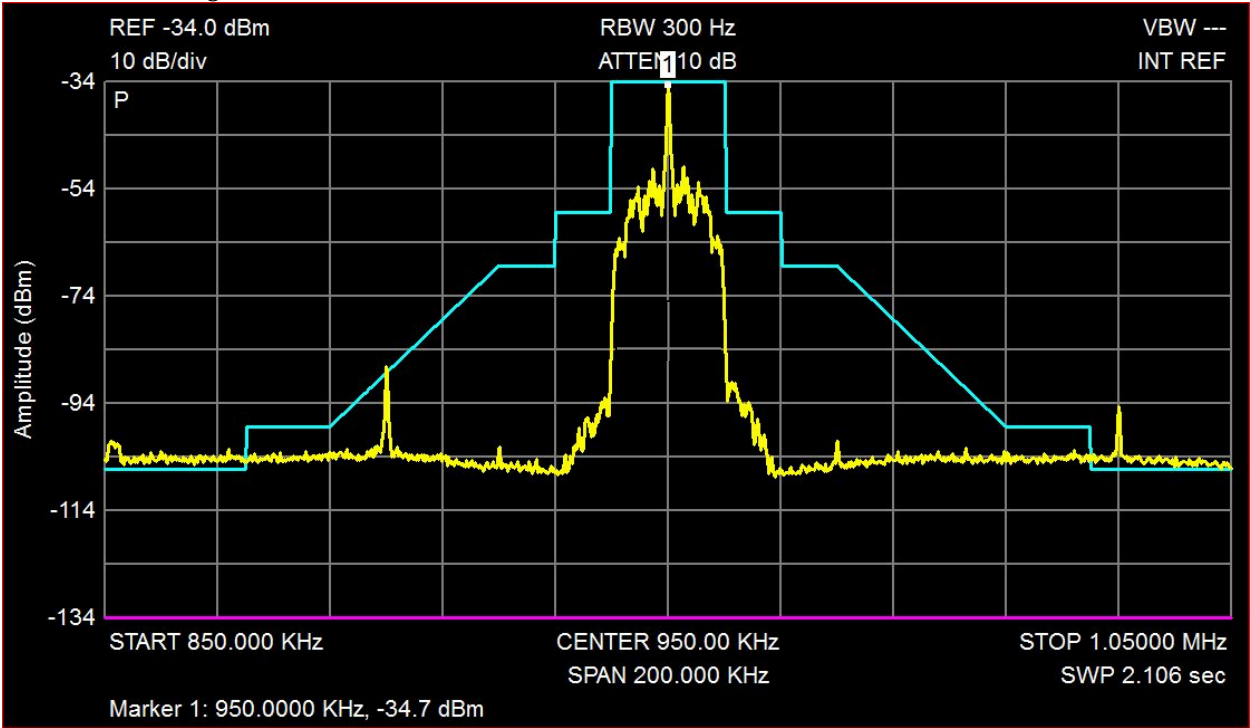
Measurement Results

Spectrum Analyzer Data

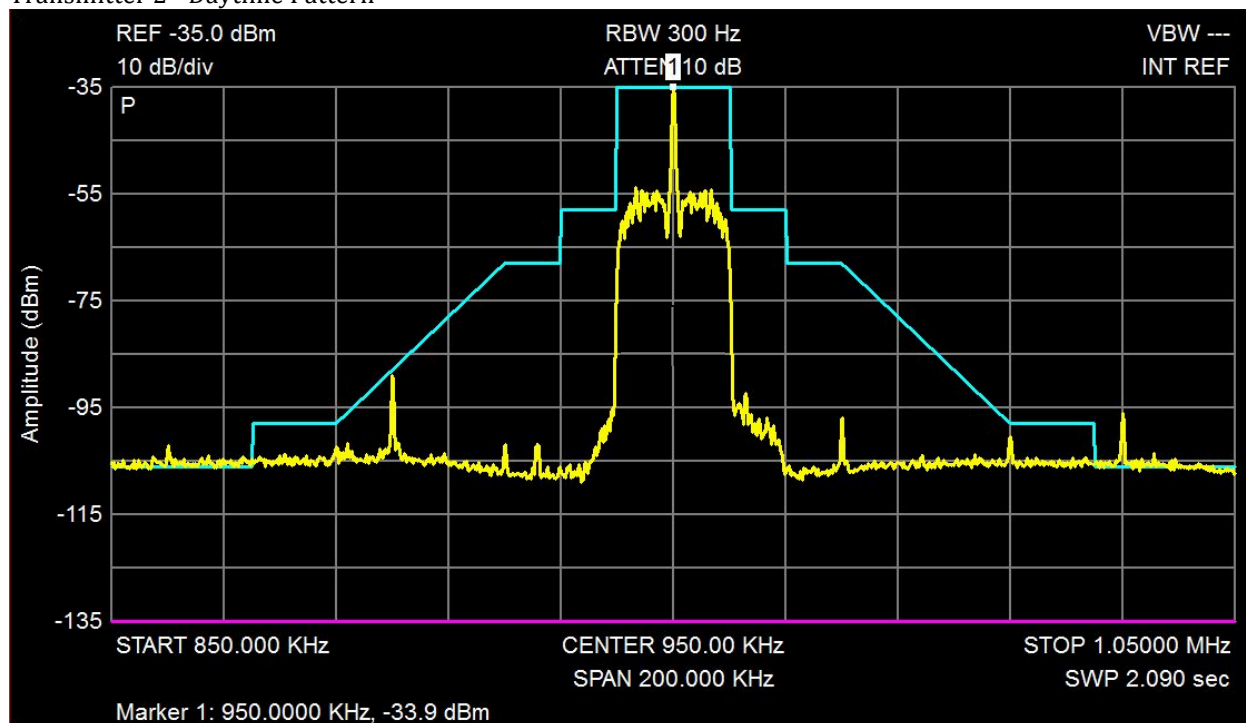
Transmitter 1 - Daytime Pattern



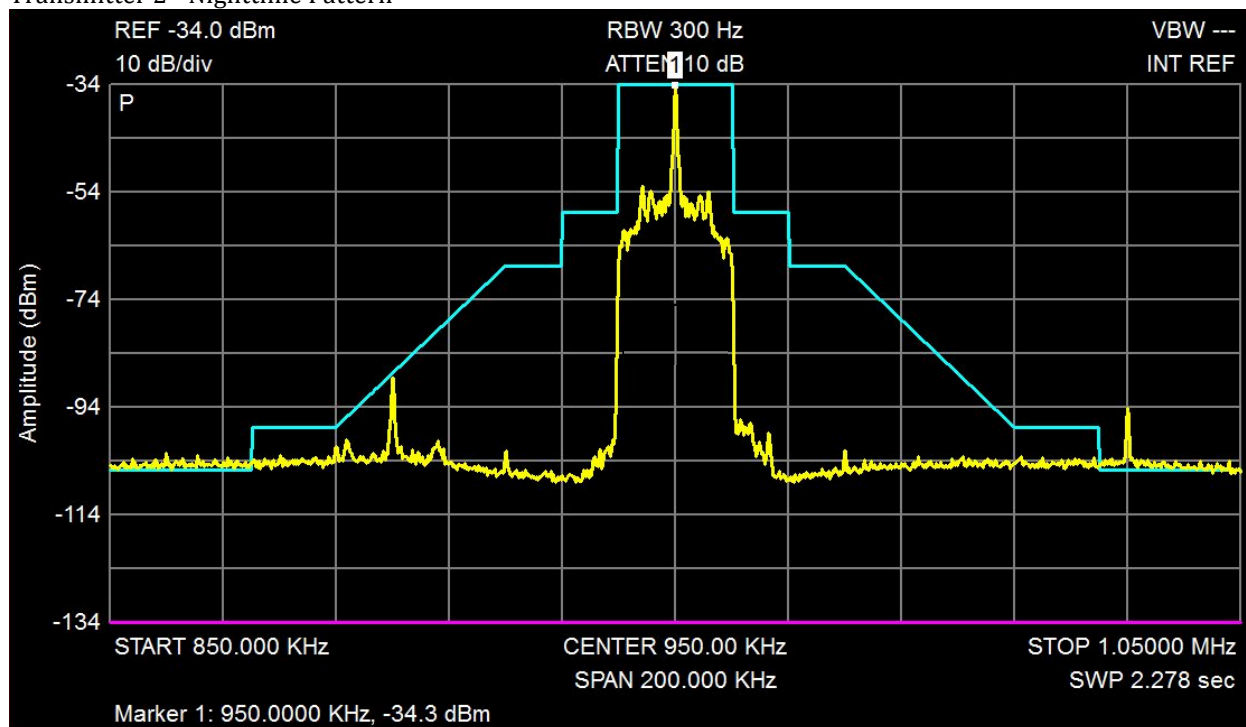
Transmitter 1 - Nighttime Pattern



Transmitter 2 - Daytime Pattern



Transmitter 2 - Nighttime Pattern



Harmonic Measurements

For harmonic measurements, after a reference level was established for the primary carrier, a Chris Scott AM Notch Filter was inserted between the antenna and analyzer and tuned to the station's primary frequency to attenuate the carrier approximately 30 dB in order to improve measurement resolution and lower the analyzer noise floor.

TX-1 - Day:

950 KHz (primary carrier): -37dBm reference level
1900 KHz (second harmonic): -118dBm (noise floor)
2850 KHz (third harmonic): -121dBm (noise floor)
3800 KHz (fourth harmonic): -114dBm (noise floor)
4750 KHz (fifth harmonic): -117dBm (noise floor)

TX-1 - Night:

950 KHz (primary carrier): -34dBm reference level
1900 KHz (second harmonic): -124dBm (noise floor)
2850 KHz (third harmonic): -120dBm (-86dBc)
3800 KHz (fourth harmonic): -128dBm (noise floor)
4750 KHz (fifth harmonic): -127dBm (noise floor)

TX-2 - Day:

950 KHz (primary carrier): -37dBm reference level
1900 KHz (second harmonic): -131dBm (noise floor)
2850 KHz (third harmonic): -127dBm (noise floor)
3800 KHz (fourth harmonic): -129dBm (noise floor)
4750 KHz (fifth harmonic): -130dBm (noise floor)

TX-2 - Night:

950 KHz (primary carrier): -33dBm reference level
1900 KHz (second harmonic): -129dBm (noise floor)
2850 KHz (third harmonic): -121dBm (-88dBc)
3800 KHz (fourth harmonic): -129dBm (noise floor)
4750 KHz (fifth harmonic): -128dBm (noise floor)

The frequency band from 950Khz to 10Mhz was scanned to determine if there were any spurious signals being generated by KTNF, and none were found.

The input attenuator of the analyzer was adjusted periodically prior to actual measurements and levels checked to ensure the analyzer input was not being overloaded.

Certification

All measurements were conducted and recorded by Douglas Thompson. Douglas has worked as a Chief Engineer for AM broadcast stations since 1975 and has had extensive involvement in the planning, construction, tuning and maintaining of AM directional and non-directional antenna systems.

I hereby state that the station for which this information has been prepared has retained me to conduct the measurements and prepare this report.

All information contained within this report is true and accurate to the limits of the test equipment used.



Douglas Thompson
Intellitech Engineering Services LLC
September 20, 2020

