



Exhibits: April 16-19, 2023 | Education: April 15-19 | Las Vegas, NV

# **AM Radio FCC NRSC Compliance Reports**

**Tuesday, April 18, 10:00 to 10:30 am**

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# Summary



4,000+ AM Stations required to make “NRSC Measurements”

FCC requirements make measurements complex

Equipment required can be expensive (SA)

Engineers experienced to make measurements limited

Cost of making measurements can be high

# History



Performance” measurements important part of Broadcast history

Department of Commerce 1912  
frequency control of spark gap transmitters

Radio Act of 1927  
broadcast standards frequency and power

Communications Act of 1934 FCC  
Equipment performance Measurements (EMP)  
Audio Quality and modulation

1997 NRSC standards adopted by FCC  
Occupied BW  
BW = 10khz, AM Stereo, second adjacent chann

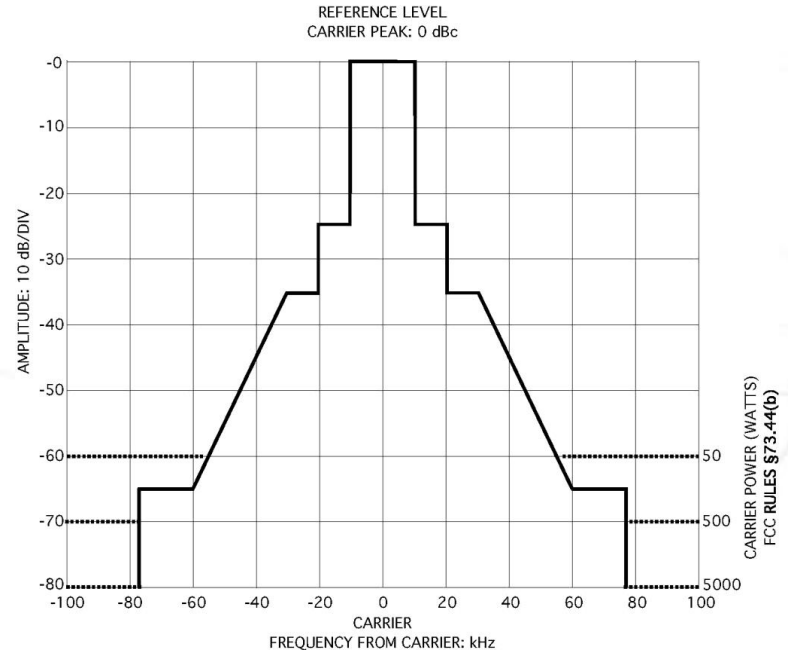
# FCC Rules Requirements



## FCC rule §73.44

## Spectral limits

Frequency band relative to carrier ( $\pm$ kHz)	Attenuation relative to carrier (dB)
0 to 10.2	0
10.2 to 20	at least 25 <sub>3</sub>
20 to 30	at least 35
30 to 60	-at least $(5 + 1 \text{ dB/kHz})$ from carrier <sub>4</sub>
60 to 75	at least 65 <sub>4</sub>
Above 75	at least 80 <sub>4</sub>



# Making the Measurements

## Suggested Spectrum Analyzer Setup

300 Hz RBW

No video filter

Peak hold for 10 minutes

2 Graphs

50 kHz span

200 kHz span

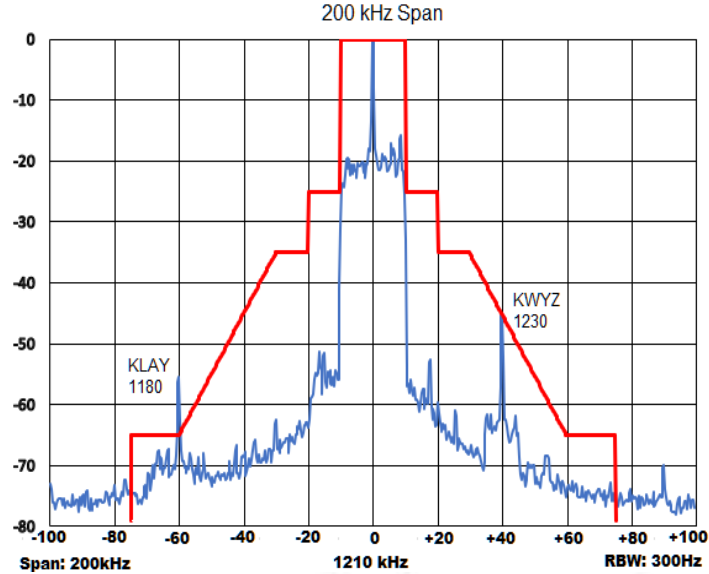
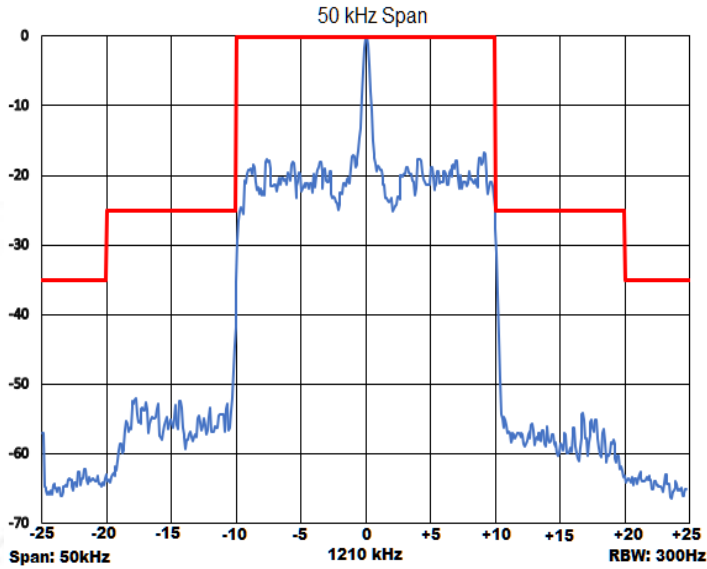


# In the field



Criterion:  
About 1 km  
Quiet  
Spacious  
Good S/N Ratio

# Graphic Results



Spectral Graphs processed for NRSC Report

# Harmonics & Intermod



Harmonics – multiples of carrier frequency

Field Meter

General Coverage Receiver

Intermodulation – multiplex transmitters

$$f_{IM} = mf_1 \pm nf_2$$

Eg. 1050 kHz and 1250 kHz

$$f_{IM1} = 2f_1 - f_2 = 3350 \text{ kHz}$$

$$f_{IM2} = 2f_2 - f_1 = 3550 \text{ kHz}$$



# The NRSC Report

## Acme Broadcast Service

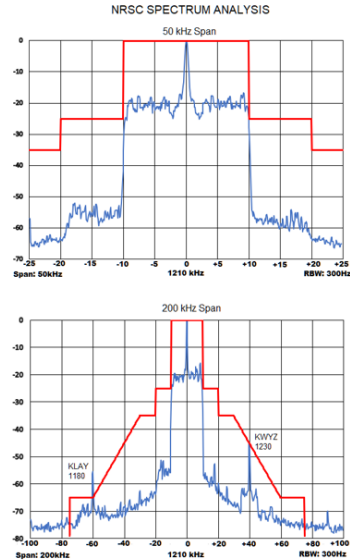
August 24, 2022

RE: KMIA NRSC Compliance Measurements

The attached Spectrum Analyzer graphs are records of measurements taken to demonstrate compliance of station KMIA-AM, Auburn, WA with the transmitter system emission requirements specified in §73.44 of the FCC Rules and Regulations. These measurements were taken on September 7, 2022 at location 47.301067, -122.248181 (WGS84) using a Rigol DSAB15 Spectrum Analyzer and a Fairchild ALR-25 Loop Antenna. The spectrum analyzer was adjusted as specified in §73.44(a).



James A. Dalke, CPRE CBNT 8-VSB AMD



A sample report for station files

# Conclusion

Recent low-cost Spectrum Analyzers available

Potential for SDR receivers

Proposed online training NRSC field measurements

Develop report templates and graphing software

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