

K210AM-FX

Broadcast Transmissions Bandwidth Specifications
FCC Rules Part 73.317
Facility ID 60158

May 6, 2015

K210AM-FX EMISSIONS REPORT

This report is to show compliance with part 73.317 of the FCC Rules for Broadcast Transmissions Bandwidth Specifications. Myself, Richard Jones license PG-13-5961, took the following measurements on May 6, 2015. All readings were taken under my direct supervision and are true and accurate to the best of my knowledge.

An Anritsu 2721B S/N 0716214 swept-frequency RF spectrum analyzer using a peak hold duration of several minutes, with no video filtering, was used for most of the tests. The signals were taken off a sample port on the transmission line of the transmitter. The harmonic measurements were taken after the 2 station combiner. The use of a high pass filter to filter out the main carrier frequency from the spectrum analyzer. This prevents mixing and overload of the analyzer.

These measurements were taken to comply with the CP for K210AM-FX. This station is also combined with KOHR-FM into a single antenna using a Shively 2 station combiner with a Nicom BKG-1P antenna.

Sweep 3 and 4 shows the potential mix between this station and the combine station KOHR-FM on 88.9 mHz.

Sweep 5 is a reference taken for harmonic measurements. The measurements were taken after the 2 station combiner. The sample port available before the filter was before the 2nd harmonic filter so the harmonic measurements were taken after the combiner.

Sweep 6 is the 2nd harmonic. This and the other harmonic measurements were taken with a high pass filter to prevent mixing and harmonic generation within the analyzer.

Sweep 7 is the 3rd harmonic.

All measurements were taken with both stations running full operating power.

The station is shown to be in compliance with the FCC rules.

All spectrum analyzer measurements were taken on May 6, 2015.

All measurements taken are true and correct to the best of my knowledge.

Richard Jones

Digitally signed by Richard Jones
DN: cn=Richard Jones, o=RJ Engineering,
ou=Engineering,
email=rjeng@webworks.net, c=US
Date: 2015.05.06 22:03:03 -06'00'

Richard G. Jones
K210AM-FX

Date:

§73.317 FM transmission system requirements.

(a) FM broadcast stations employing transmitters authorized after January 1, 1960, must maintain the bandwidth occupied by their emissions in accordance with the specification detailed below. FM broadcast stations employing transmitters installed or type accepted before January 1, 1960, must achieve the highest degree of compliance with these specifications practicable with their existing equipment. In either case, should harmful interference to other authorized stations occur, the licensee shall correct the problem promptly or cease operation.

(b) Any emission appearing on a frequency removed from the carrier by between 120 kHz and 240 kHz inclusive must be attenuated at least 25 dB below the level of the unmodulated carrier. Compliance with this requirement will be deemed to show the occupied bandwidth to be 240 kHz or less.

(c) Any emission appearing on a frequency removed from the carrier by more than 240 kHz and up to and including 600 kHz must be attenuated at least 35 dB below the level of the unmodulated carrier.

(d) Any emission appearing on a frequency removed from the carrier by more than 600 kHz must be attenuated at least $43 + 10 \log_{10}(\text{Power, in watts})$ dB below the level of the unmodulated carrier, or 80 dB, whichever is the lesser attenuation.

(e) Preemphasis shall not be greater than the impedance-frequency characteristics of a series inductance resistance network having a time constant of 75 microseconds. (See upper curve of Figure 2 of §73.333.)

FM Occupied Bandwidth Measurements

Station Call Letters K210AM-FX Frequency 89.9000 Date 5-6-15
 Transmitter Crown FM150 Engineer Conducting Tests Richard Jones
 Test Equipment Anritsu 2721B Analyzer, Microwave filter 5000V-9 High Pass Filter

Notes The high pass filter was used for harmonic measurements.

Measurements

Carrier Frequency: 89.900 Carrier Level +1.0

Frequency	Limit	Measured Level
120 to 240 KHz	-25 DB	-34.0 dBm
240 to 600 KHz	-35 DB	-76.0 dBm
Greater than 600 KHz	See Chart	-76.0 dBm

Harmonics

Harmonic Frequency	Measured Level	Harmonic Frequency	Measured Level
2 nd 179.8 Mhz	-110.0 dBm	7 th 629.3 Mhz	-110.0 dBm
3 rd 269.7 Mhz	-105.0 dBm	8 th 719.2 Mhz	-110.0 dBm
4 th 359.6 Mhz	-110.0 dBm	9 th 809.1 Mhz	-110.0 dBm
5 th 449.5 Mhz	-110.0 dBm	10 th 899.0 Mhz	-110.0 dBm
6 th 539.4 Mhz	-110.0 dBm		

Spurious and Harmonic Levels

Spurious and harmonic radiation beyond 600 KHz from carrier must be suppressed below the limits listed below. 1 – 10 watt translators are allowed –60 DB. Formula = Power in watts Log X 10 + 43 = DB

250 Watts = -66.9 DB
 500 Watts = -70.0 DB
 1000 Watts = -73.0 DB
 1500 Watts = -74.7 DB

2500 Watts = -77.0 DB
 3500 Watts = -78.4 DB
 5000 Watts = -80.0 DB

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Prepared for:

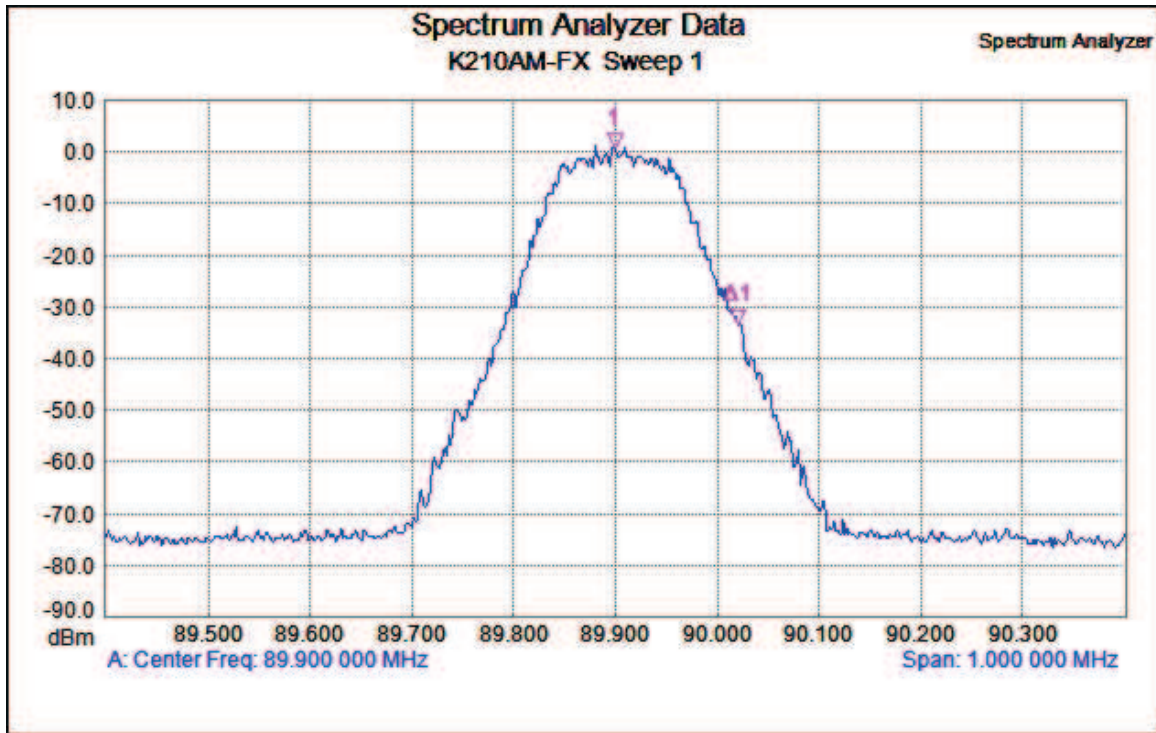
Location:

Date:

Educational Media Foundation

N 44° 47'54" W 106° 55'53"

Date: 5/6/2015 11:53:52 AM



Measurement Summary			
Trace A data		Center Frequency	89.900 000 MHz
Trace Mode	Max Hold	Start Frequency	89.400 000 MHz
Preamp	OFF	Stop Frequency	90.400 000 MHz
Min Sweep Time	0.001 S	Frequency Span	1.000 000 MHz
Reference Level Offset	0 dB	Reference Level	10.000 dBm
Input Attenuation	30.0 dB	Scale	10.0 dB/div
RBW	1.0 kHz		
VBW	3.0 MHz	GPS Longitude	W 106 55 53
Detection	Peak	GPS Latitude	N 44 47 54

Device Summary			
Serial Number	716214	Model	MS2721B
Base Ver.	V4.32	Options	9, 19, 20, 25, 31
App Ver.	V5.73	Date	5/6/2015 11:53:52 AM

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Prepared for:

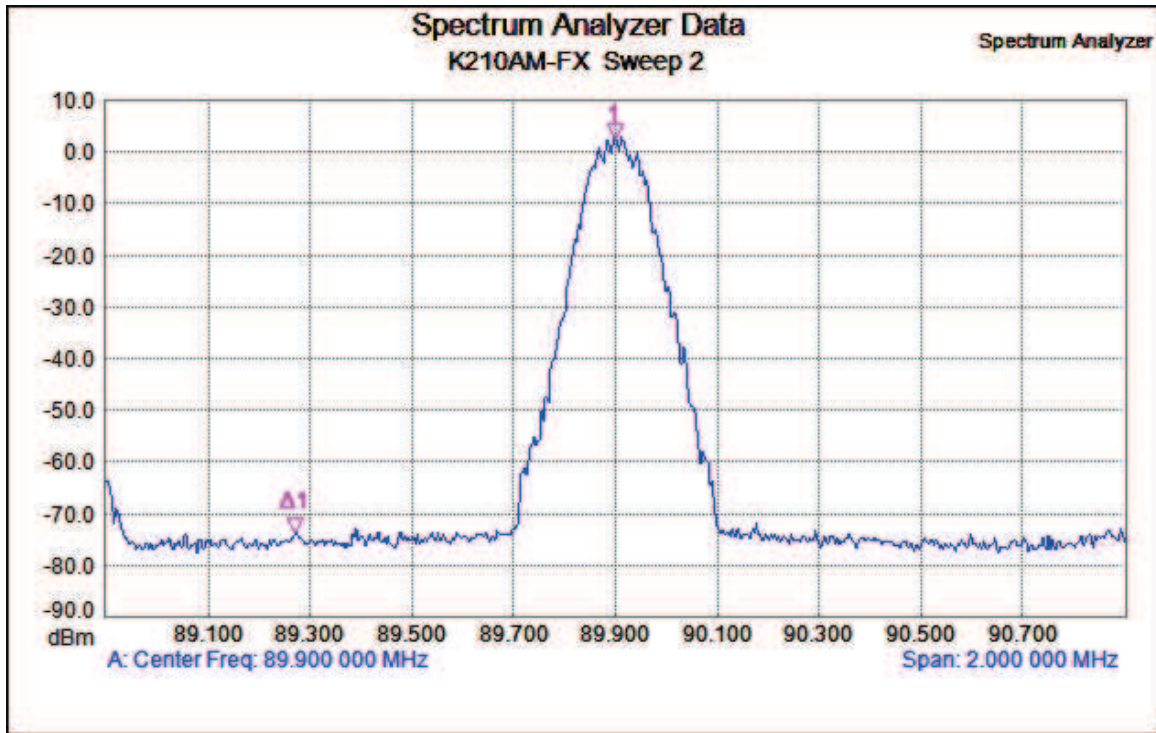
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Educational Media Foundation

N 44° 47'54" W 106° 55'53"

Date: 5/6/2015 11:55:46 AM



Measurement Summary			
Trace A data		Center Frequency	89.900 000 MHz
Trace Mode	Max Hold	Start Frequency	88.900 000 MHz
Preamp	OFF	Stop Frequency	90.900 000 MHz
Min Sweep Time	0.001 S	Frequency Span	2.000 000 MHz
Reference Level Offset	0 dB	Reference Level	10.000 dBm
Input Attenuation	30.0 dB	Scale	10.0 dB/div
RBW	1.0 kHz		
VBW	3.0 MHz	GPS Longitude	W 106 55 53
Detection	Peak	GPS Latitude	N 44 47 54

Device Summary			
Serial Number	716214	Model	MS2721B
Base Ver.	V4.32	Options	9, 19, 20, 25, 31
App Ver.	V5.73	Date	5/6/2015 11=55=46 AM

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Prepared for:

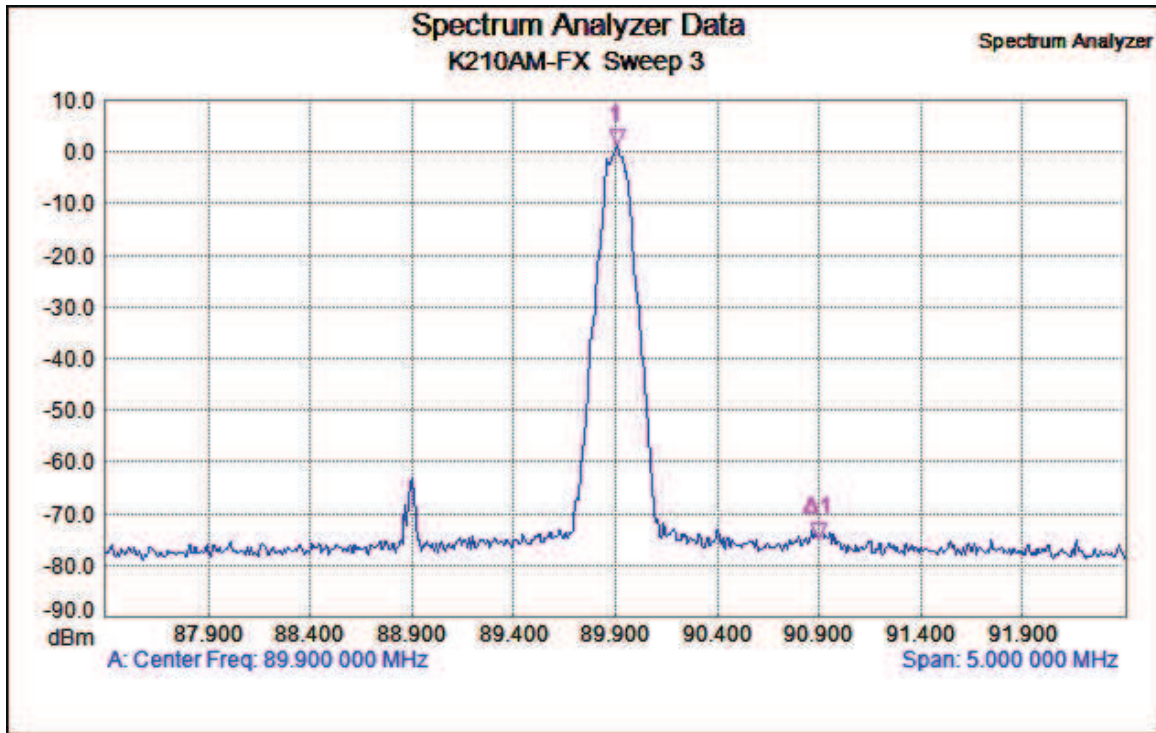
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Educational Media Foundation

N 44° 47'54" W 106° 55'53"

Date: 5/6/2015 11:57:32 AM



Measurement Summary			
Trace A data		Center Frequency	89.900 000 MHz
Trace Mode	Max Hold	Start Frequency	87.400 000 MHz
Preamp	OFF	Stop Frequency	92.400 000 MHz
Min Sweep Time	0.001 S	Frequency Span	5.000 000 MHz
Reference Level Offset	0 dB	Reference Level	10.000 dBm
Input Attenuation	30.0 dB	Scale	10.0 dB/div
RBW	1.0 kHz		
VBW	3.0 MHz	GPS Longitude	W 106 55 53
Detection	Peak	GPS Latitude	N 44 47 54

Device Summary			
Serial Number	716214	Model	MS2721B
Base Ver.	V4.32	Options	9, 19, 20, 25, 31
App Ver.	V5.73	Date	5/6/2015 11:57:32 AM

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Prepared for:

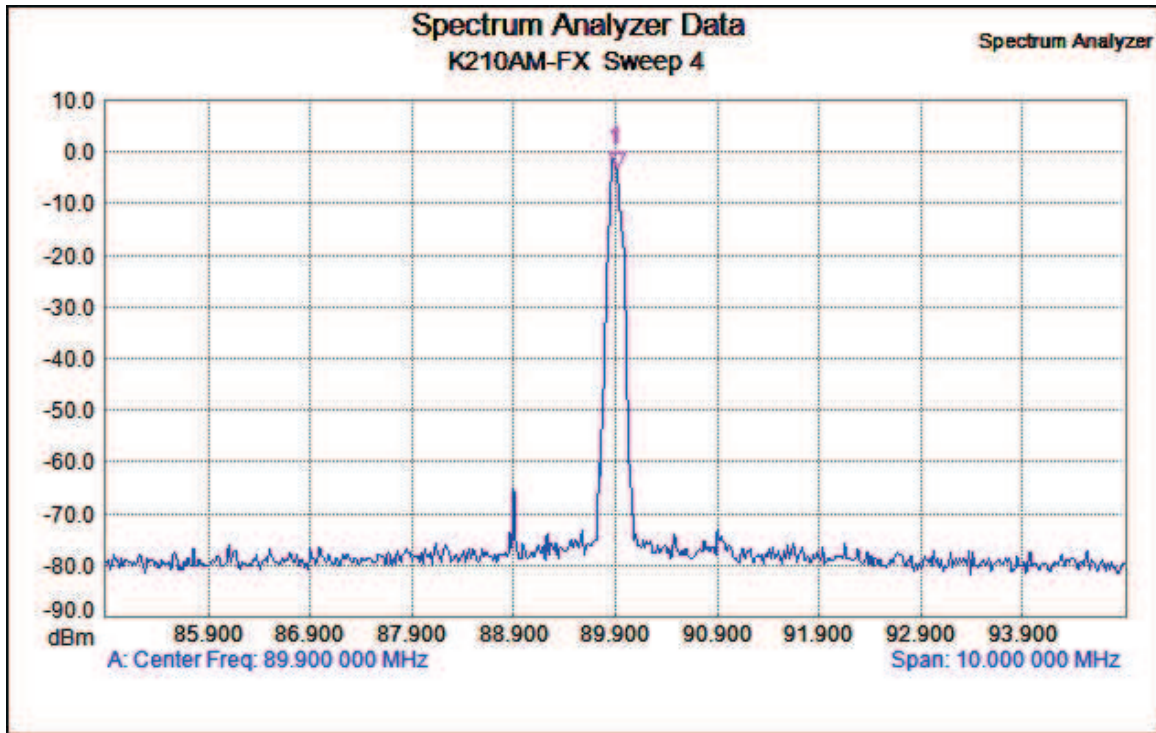
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Educational Media Foundation

N 44° 47'54" W 106° 55'53"

Date: 5/6/2015 11:58:13 AM



Measurement Summary			
Trace A data		Center Frequency	89.900 000 MHz
Trace Mode	Max Hold	Start Frequency	84.900 000 MHz
Preamp	OFF	Stop Frequency	94.900 000 MHz
Min Sweep Time	0.001 S	Frequency Span	10.000 000 MHz
Reference Level Offset	0 dB	Reference Level	10.000 dBm
Input Attenuation	30.0 dB	Scale	10.0 dB/div
RBW	1.0 kHz		
VBW	3.0 MHz	GPS Longitude	W 106 55 53
Detection	Peak	GPS Latitude	N 44 47 54

Device Summary			
Serial Number	716214	Model	MS2721B
Base Ver.	V4.32	Options	9, 19, 20, 25, 31
App Ver.	V5.73	Date	5/6/2015 11:58:13 AM

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Prepared for:

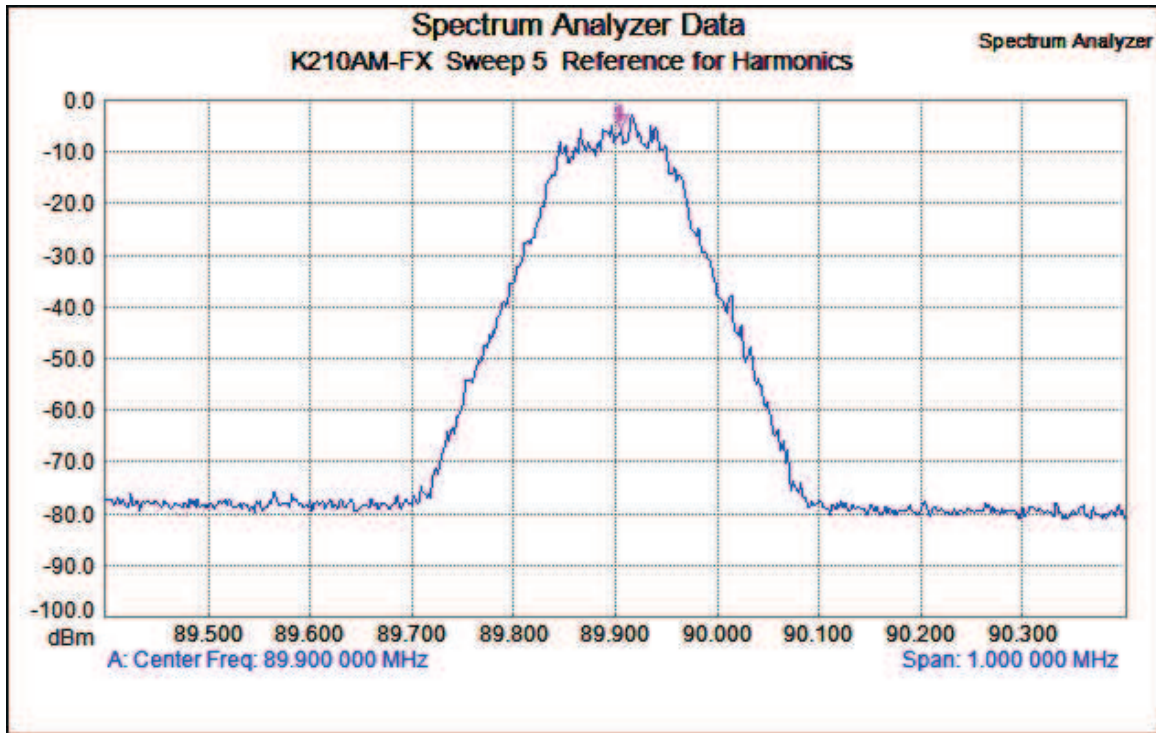
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N 44° 47'54" W 106° 55'53"

Date: 5/6/2015 12:27:15 PM



Measurement Summary			
Trace A data		Center Frequency	89.900 000 MHz
Trace Mode	Max Hold	Start Frequency	89.400 000 MHz
Preamp	OFF	Stop Frequency	90.400 000 MHz
Min Sweep Time	0.001 S	Frequency Span	1.000 000 MHz
Reference Level Offset	0 dB	Reference Level	0.000 dBm
Input Attenuation	20.0 dB	Scale	10.0 dB/div
RBW	1.0 kHz		
VBW	3.0 MHz	GPS Longitude	W 106 55 53
Detection	Peak	GPS Latitude	N 44 47 54

Device Summary			
Serial Number	716214	Model	MS2721B
Base Ver.	V4.32	Options	9, 19, 20, 25, 31
App Ver.	V5.73	Date	5/6/2015 12=27=15 PM

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Prepared for:

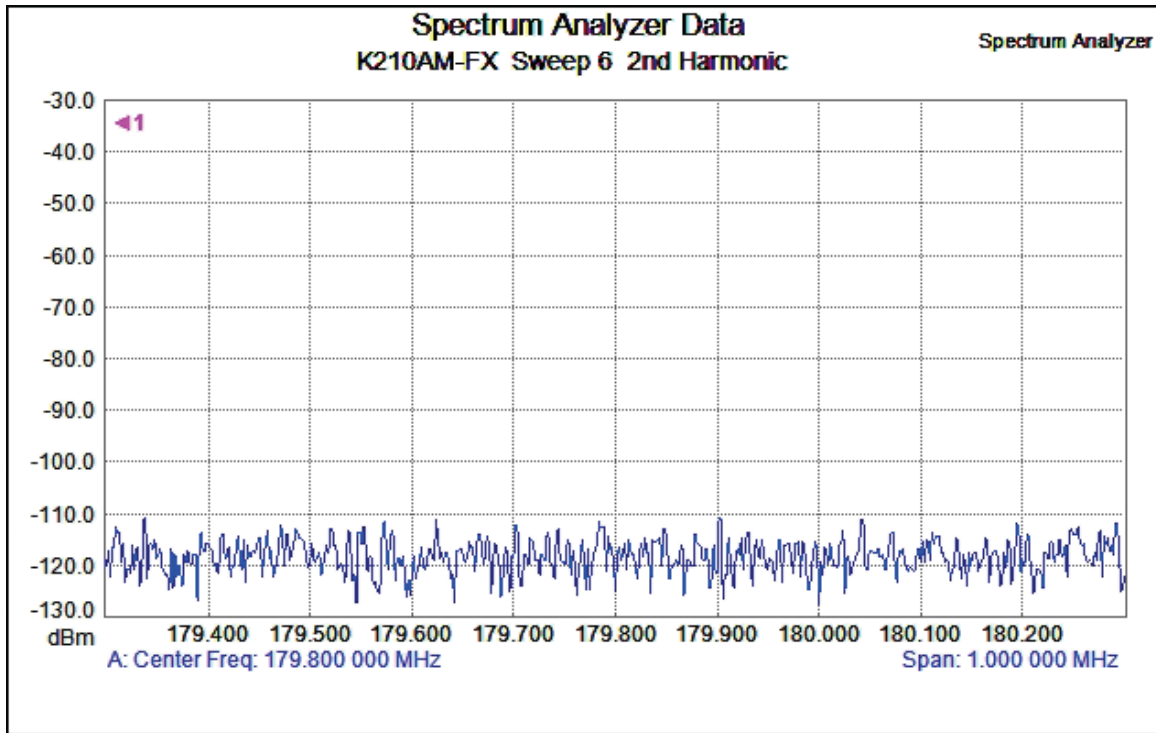
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N 44° 47'54" W 106° 55'53"

Date: 5/6/2015 12:28:14 PM



Measurement Summary			
Trace A data		Center Frequency	179.800 000 MHz
Trace Mode	Normal	Start Frequency	179.300 000 MHz
Preamp	OFF	Stop Frequency	180.300 000 MHz
Min Sweep Time	0.001 S	Frequency Span	1.000 000 MHz
Reference Level Offset	0 dB	Reference Level	-30.000 dBm
Input Attenuation	0.0 dB	Scale	10.0 dB/div
RBW	1.0 kHz		
VBW	3.0 MHz	GPS Longitude	W 106 55 53
Detection	Peak	GPS Latitude	N 44 47 54

Device Summary			
Serial Number	716214	Model	MS2721B
Base Ver.	V4.32	Options	9, 19, 20, 25, 31
App Ver.	V5.73	Date	5/6/2015 12=28=14 PM

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Prepared for:

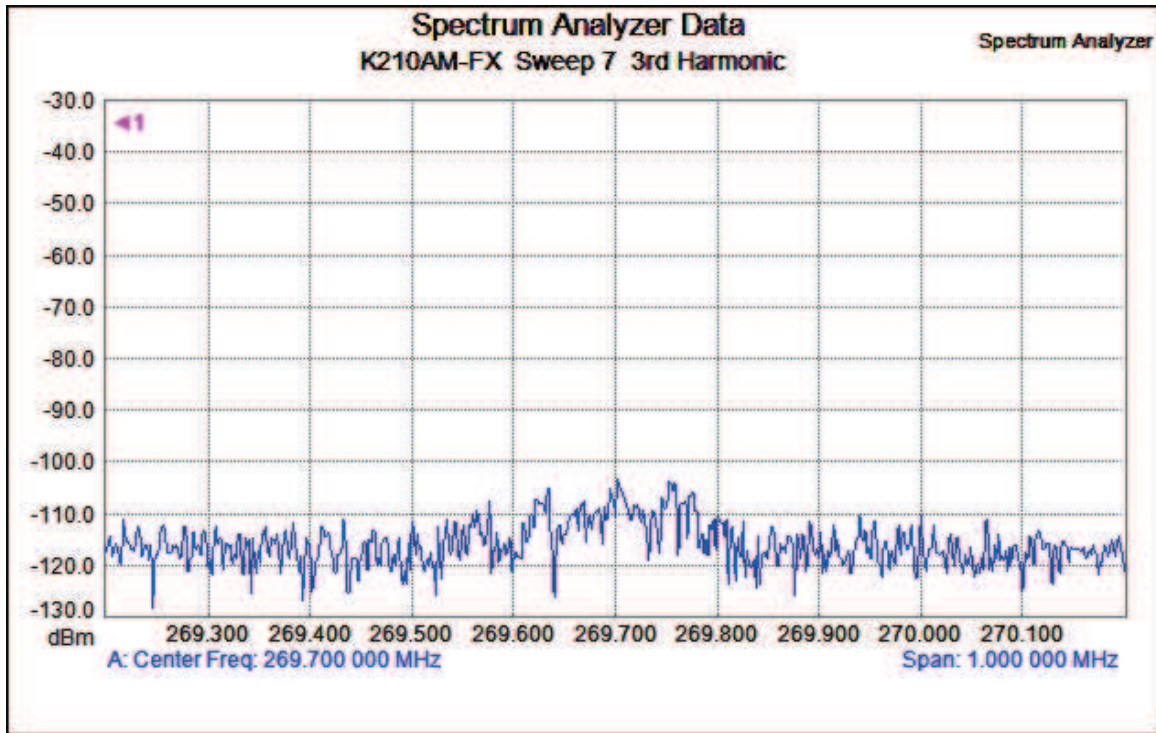
Location:

Date:

Educational Media Foundation

N 44° 47'54" W 106° 55'53"

Date: 5/6/2015 12:28:34 PM



Measurement Summary			
Trace A data		Center Frequency	269.700 000 MHz
Trace Mode	Normal	Start Frequency	269.200 000 MHz
Preamp	OFF	Stop Frequency	270.200 000 MHz
Min Sweep Time	0.001 S	Frequency Span	1.000 000 MHz
Reference Level Offset	0 dB	Reference Level	-30.000 dBm
Input Attenuation	0.0 dB	Scale	10.0 dB/div
RBW	1.0 kHz		
VBW	3.0 MHz	GPS Longitude	W 106 55 53
Detection	Peak	GPS Latitude	N 44 47 54

Device Summary			
Serial Number	716214	Model	MS2721B
Base Ver.	V4.32	Options	9, 19, 20, 25, 31
App Ver.	V5.73	Date	5/6/2015 12=28=34 PM