

ENGINEERING REPORT

**FM INTERMODULATION ANALYSIS
W298BJ(FX) and W265CY(FX)**

Fort Wayne, IN.

**Including additional stations
WFWI(FM) WMEE(FM) WQHK(FM)**

November 2015

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Broadcast Engineering Consultants
Coldwater, MI 49036**

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COMPLIANCE WITH FCC §73.317
W265CY(FX) and W298BJ(FX)
Including Additional Stations
WFWI(FM) 92.3 MHz - WMEE(FM) 97.3 MHz - WQHK(FM) 105.1 MHz
Fort Wayne, IN.

This firm was retained by Pathfinder Communications Corporation, Mishawaka, IN. to perform the required measurements to show compliance with the provisions of §73.317 of the Rules governing FM Broadcast and FM Translator Stations. The measurements were taken on November 24, 2015, in an unobstructed location within 0.5 kilometer of the tower.

Pathfinder has installed a new antenna and associated transmission equipment to combine two FM translator stations into a single operation on tower structure registration Number 1031010.

W265CY(FX) will operate with an ERP of 50 watts on 100.9 MHz and W298BJ(FX) will operate with an ERP of 75 watts on 107.5 MHz. The two stations have been combined in to a single feed line and antenna system on the specified tower. Measurements were taken off air to show compliance with the requirement of FCC part 73.317 of the rules governing FM emission standards. The combined translator stations as well as three other full service FM stations reside on the common tower structure. All of these broadcast facilities have been included in the study to confirm their compliance with the FCC rules.

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Potential inter-modulation products were calculated using a computer program to generate a list all possible frequencies that may have developed with the new combined translator operation. That list of frequencies was then employed to set the Anritsu MS2721B spectrum analyzer operating in "Field Meter Mode" as the metering device. Connected to the input of the spectrum analyzer was an Anritsu MP635A calibrated log-periodic antenna aimed at the stations in question.

Based on the Occupied Spectrum measurements of each station in the study and the inter-modulation measurement data logged in Table 1 and Table 2 we find the operation of W265CY(FX), W298BJ(FX), WFWI(FM), WMEE(FM) and WQHK(FM) to be well within the rules governing FM Broadcast Stations.

This report has been prepared by properly trained electronics specialists under the direction of the undersigned whose qualifications are a matter of record before the Federal Communications Commission. I declare under penalty of laws of perjury that the contents of this report are true and accurate to the best of my knowledge and belief.

December 4, 2015

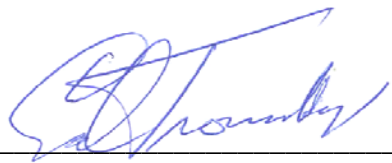
By 
Edmond R. Trombley
Field Engineer

TABLE 1

Tabulation of Inter-Modulation Frequencies and Fields

	Call Sign	Frequency	ERP	Required Attenuation
A	W265CY(FX)	100.9 MHz.	50.0 Watts	-59.99 dB
B	W298BJ(FX)	107.5 MHz.	75.0 Watts	-61.75 dB
C	WFWI(FM)	92.3 MHz.	2.2 kW	-76.42 dB
D	WMEE(FM)	93.7 MHz.	26.0 kW	-80.00 dB
E	WQHK(FM)	105.1 MHz.	5.7 kW	-80.00 dB

***Mixing products listed by frequency, negative mix numbers omitted.

	Frequency MHz.	Measured Field in dBm	Required	LIMIT
A (W265CY(FX))	100.9	-36.0	-59.99 dB	-95.99 dB
B (W298BJ(FX))	107.5	-34.1	-61.75 dB	-95.85 dB
2A-B	94.3	-110.7		PASSED
2B-A	114.1	-111.8		PASSED
2A	201.8	> -114.5 noise floor		PASSED
A+B	208.4	-113.7		PASSED
2B	215.0	> -114.5 noise floor		PASSED
3A	302.7	> -114.5 noise floor		PASSED
2A+B	309.3	-113.8		PASSED
2B+A	315.9	-105.7		PASSED
3B	322.5	> -114.5 noise floor		PASSED
4A	403.6	> -114.5 noise floor		PASSED
2A+2B	416.8	-110.8		PASSED
4B	430.0	> -114.5 noise floor		PASSED

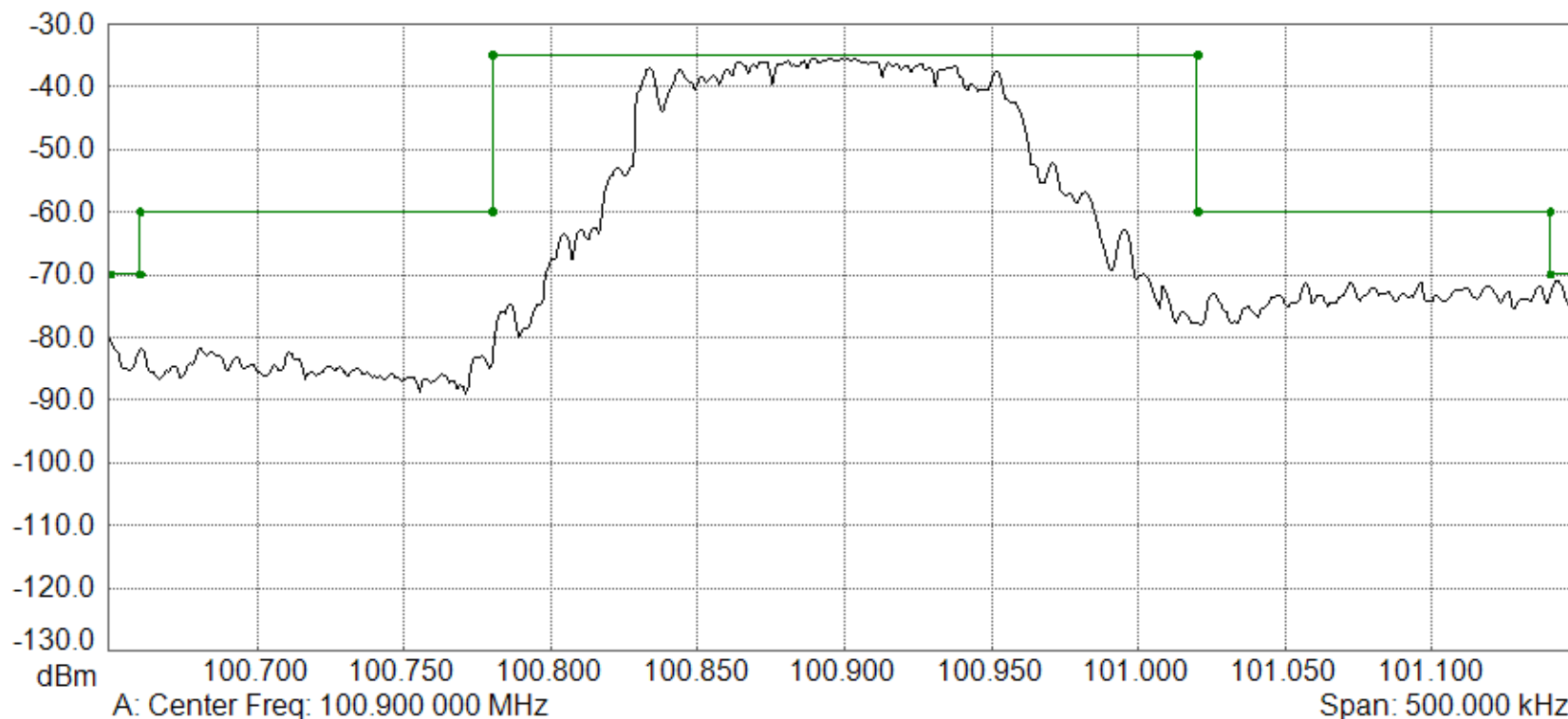
TABLE 2

Possible additional mixes created with the full service stations on the tower.

Mix	Frequency MHz.	Measured Field in dBm	FLAG
C+A	193.2 MHz.	> -114.5 noise floor	PASSED
C-A	8.6 MHz.	Not Measured	
C+B	199.8 MHz.	> -114.5 noise floor	PASSED
C-B	15.2 MHz.	Not Measured	
D+A	198.2 MHz.	> -114.5 noise floor	PASSED
D-A	3.6 MHz.	Not Measured	
D+B	204.8 MHz.	> -114.5 noise floor	PASSED
D-B	10.2 MHz.	> -114.5 noise floor	PASSED
E+A	206.0 MHz.	> -114.5 noise floor	PASSED
E-A	-4.2 MHz.	Not Measured	
E+B	212.6 MHz.	> -114.5 noise floor	PASSED
E-B	2.4 MHz.	Not Measured	

Spectrum Analyzer Data W265CY-A (11/24/2015 6:53:46 PM)

Spectrum Analyzer



Trace A data:
Trace Mode = Max Hold
Preamplifier = OFF
Min Sweep Time = 0.001 S
Reference Level Offset = 0 dB
Input Attenuation = 0.0 dB
RBW = 3.0 kHz
VBW = 1.0 kHz

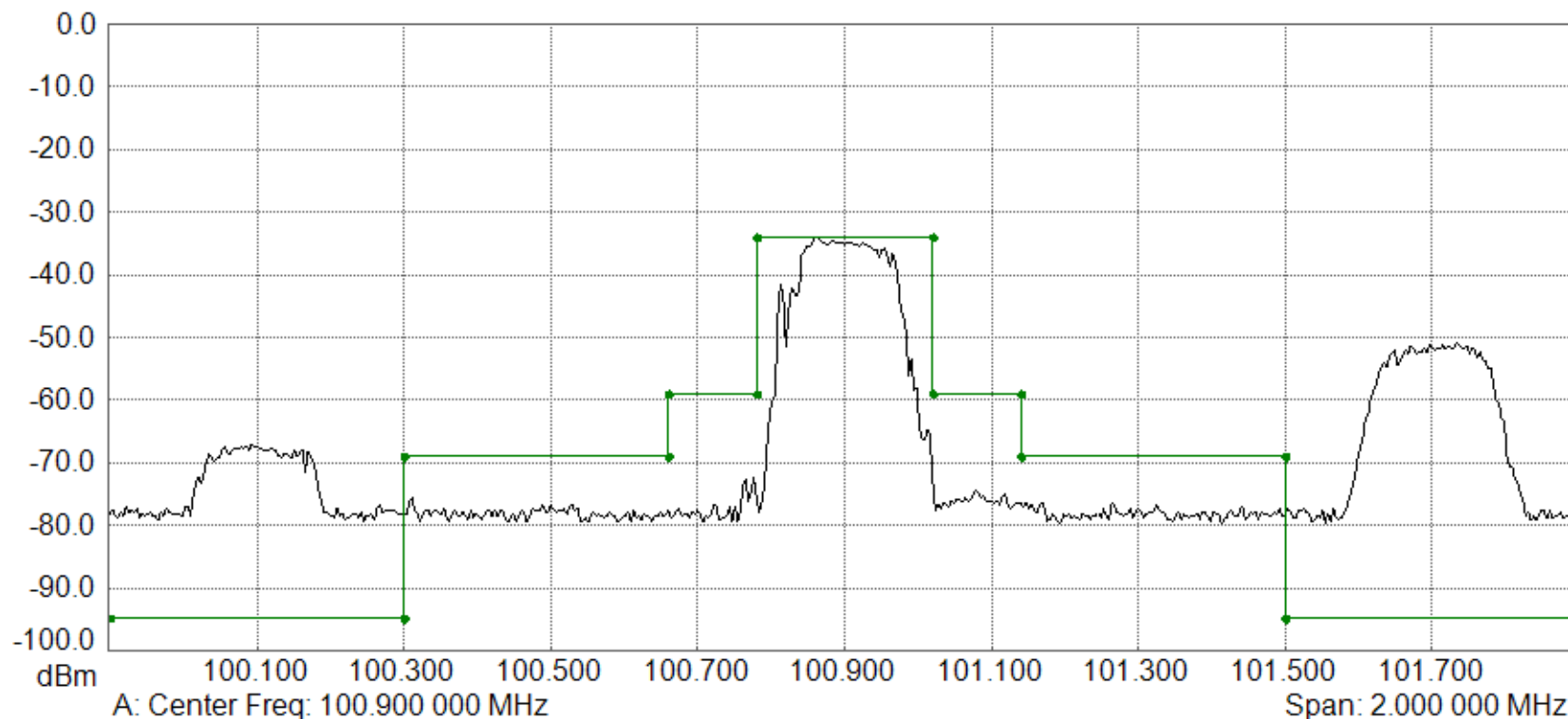
Detection = Peak
Center Frequency = 100.900 000 MHz
Start Frequency = 100.650 000 MHz
Stop Frequency = 101.150 000 MHz
Frequency Span = 500.000 000 kHz
Reference Level = -30.000 dBm
Scale = 10.0 dB/div
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Base Ver. = V4.32
App Ver. = V5.73
Model = MS2721B
Options = 9, 20, 31
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Device Name =

Spectrum Analyzer Data

W265CY-B (11/24/2015 6:51:19 PM)

Spectrum Analyzer



Trace A data:

Trace Mode = Max Hold

Preamplifier = OFF

Min Sweep Time = 0.001 S

Reference Level Offset = 0 dB

Input Attenuation = 20.0 dB

RBW = 30.0 kHz

VBW = 10.0 kHz

Detection = Peak

Center Frequency = 100.900 000 MHz

Start Frequency = 99.900 000 MHz

Stop Frequency = 101.900 000 MHz

Frequency Span = 2.000 000 MHz

Reference Level = 0.000 dBm

Scale = 10.0 dB/div

Serial Number = 1002033

Base Ver. = V4.32

App Ver. = V5.73

Model = MS2721B

Options = 9, 20, 31

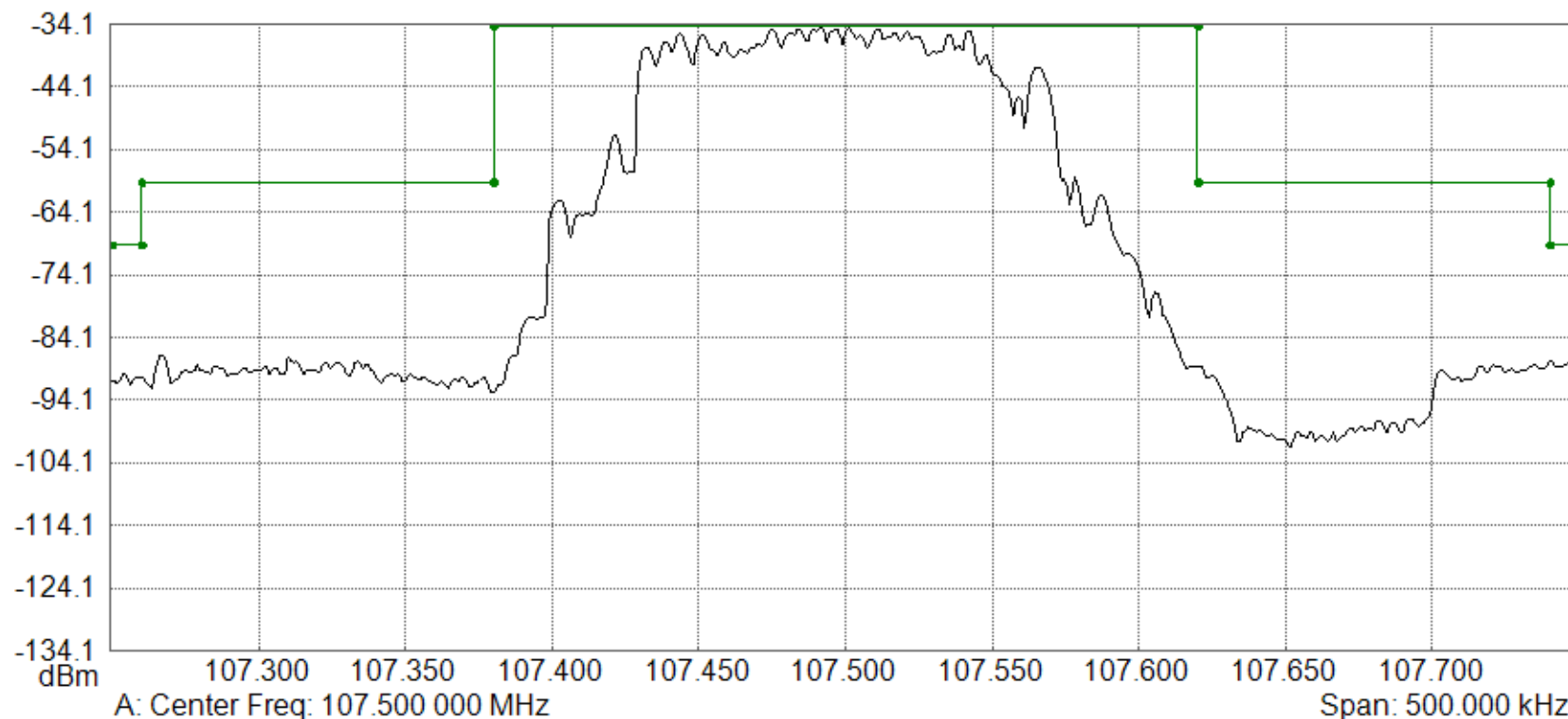
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Device Name =

Spectrum Analyzer Data

W298BJ-A (11/24/2015 6:47:59 PM)

Spectrum Analyzer



Trace A data:
Trace Mode = Max Hold
Preamplifier = OFF
Min Sweep Time = 0.001 S
Reference Level Offset = 0 dB
Input Attenuation = 0.0 dB
RBW = 3.0 kHz
VBW = 1.0 kHz

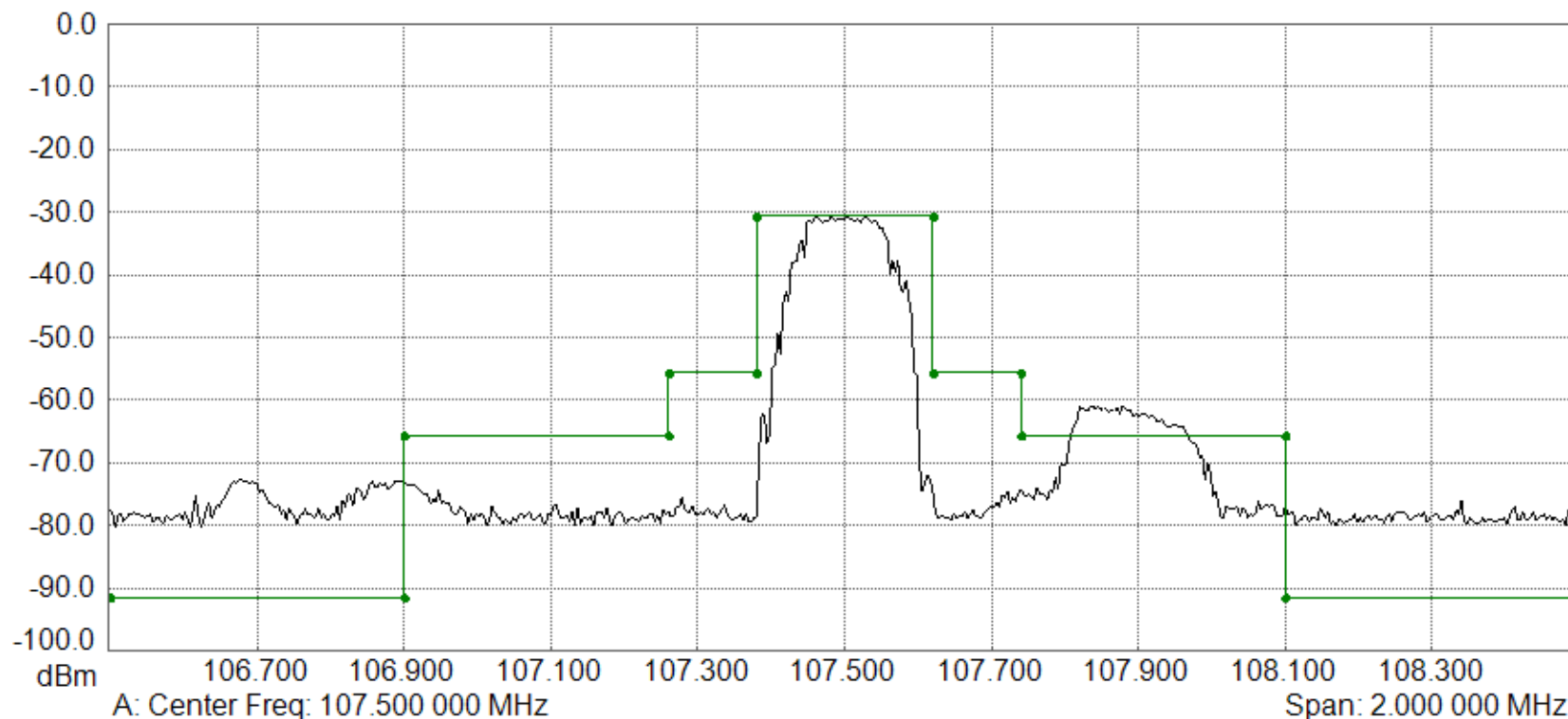
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Center Frequency = 107.500 000 MHz
Start Frequency = 107.250 000 MHz
Stop Frequency = 107.750 000 MHz
Frequency Span = 500.000 000 kHz
Reference Level = -34.100 dBm
Scale = 10.0 dB/div
Serial Number = 1002033

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App Ver. = V5.73
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Options = 9, 20, 31
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Device Name =

Spectrum Analyzer Data

W298BJ-B (11/24/2015 6:45:13 PM)

Spectrum Analyzer



Trace A data:

Trace Mode = Max Hold

Preamplifier = OFF

Min Sweep Time = 0.001 S

Reference Level Offset = 0 dB

Input Attenuation = 20.0 dB

RBW = 30.0 kHz

VBW = 10.0 kHz

Detection = Peak

Center Frequency = 107.500 000 MHz

Start Frequency = 106.500 000 MHz

Stop Frequency = 108.500 000 MHz

Frequency Span = 2.000 000 MHz

Reference Level = 0.000 dBm

Scale = 10.0 dB/div

Serial Number = 1002033

Base Ver. = V4.32

App Ver. = V5.73

Model = MS2721B

Options = 9, 20, 31

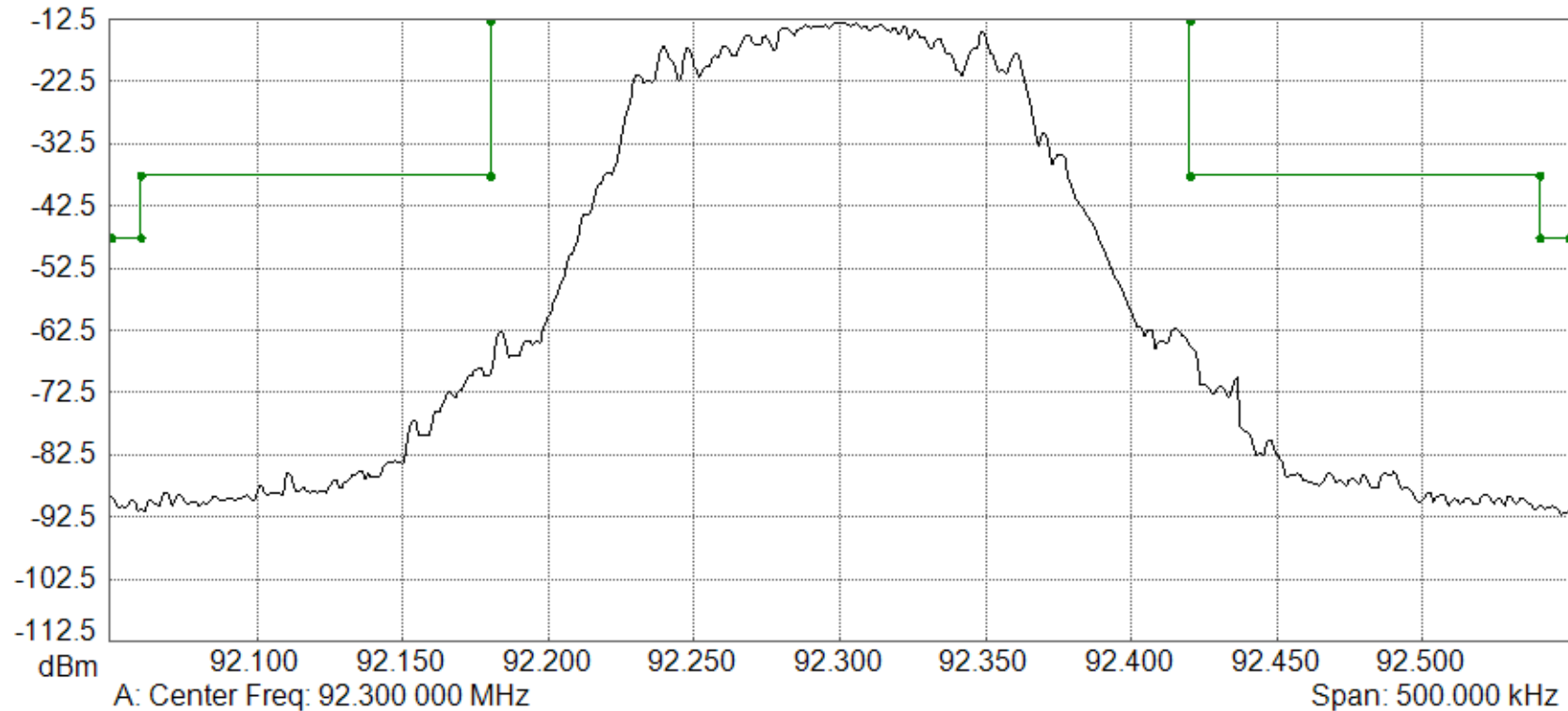
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Device Name =

Spectrum Analyzer Data

WFWI-FM-A (11/24/2015 1:17:51 PM)

Spectrum Analyzer



Trace A data:

Trace Mode = Max Hold

Preamplifier = OFF

Min Sweep Time = 0.001 S

Reference Level Offset = 0 dB

Input Attenuation = 10.0 dB

RBW = 3.0 kHz

VBW = 1.0 kHz

Detection = Peak

Center Frequency = 92.300 000 MHz

Start Frequency = 92.050 000 MHz

Stop Frequency = 92.550 000 MHz

Frequency Span = 500.000 000 kHz

Reference Level = -12.500 dBm

Scale = 10.0 dB/div

Serial Number = 1002033

Base Ver. = V4.32

App Ver. = V5.73

Model = MS2721B

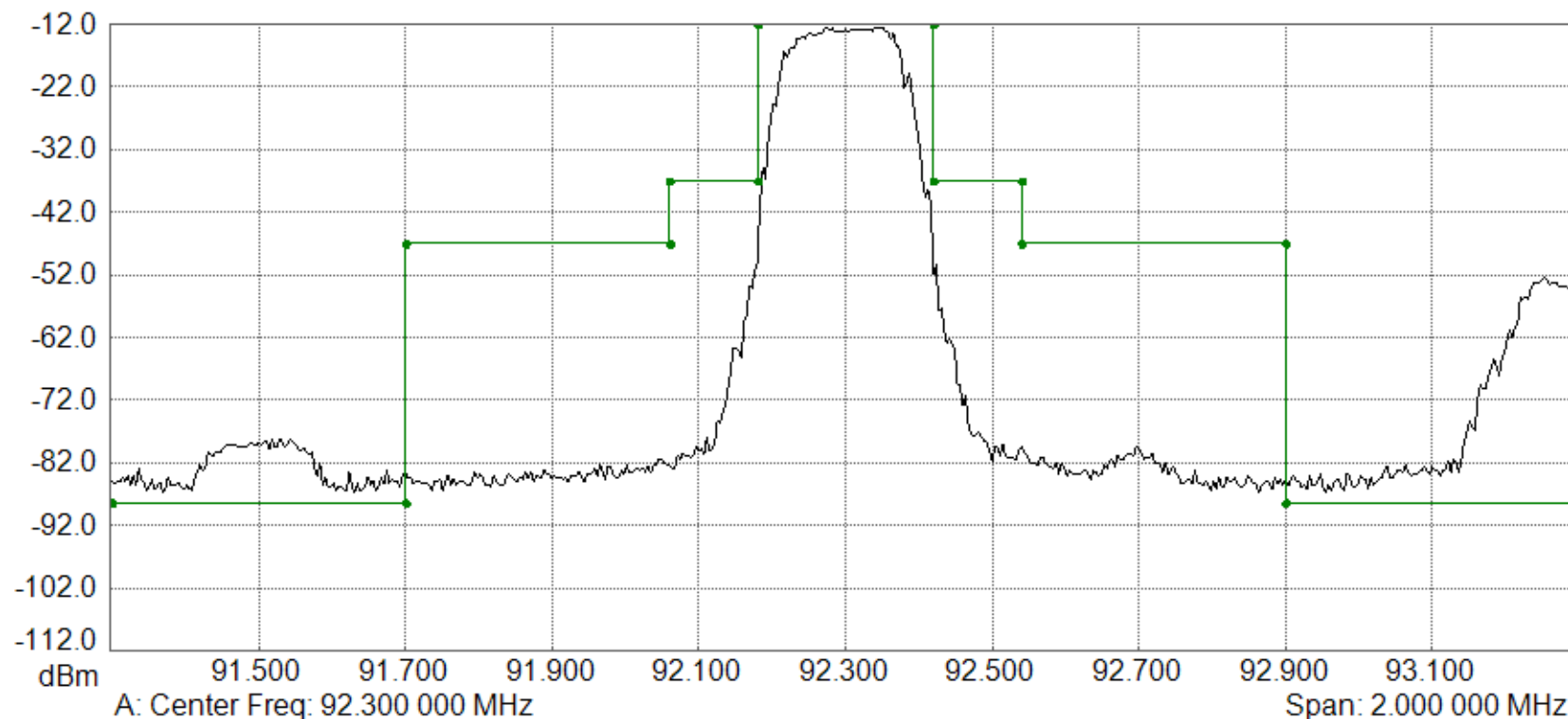
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Device Name =

Spectrum Analyzer Data WFWI-FM-B (11/24/2015 1:14:09 PM)

Spectrum Analyzer



Trace A data:

Trace Mode = Max Hold

Preamplifier = OFF

Min Sweep Time = 0.001 S

Reference Level Offset = 0 dB

Input Attenuation = 10.0 dB

RBW = 30.0 kHz

VBW = 10.0 kHz

Detection = Peak

Center Frequency = 92.300 000 MHz

Start Frequency = 91.300 000 MHz

Stop Frequency = 93.300 000 MHz

Frequency Span = 2.000 000 MHz

Reference Level = -12.000 dBm

Scale = 10.0 dB/div

Serial Number = 1002033

Base Ver. = V4.32

App Ver. = V5.73

Model = MS2721B

Options = 9, 20, 31

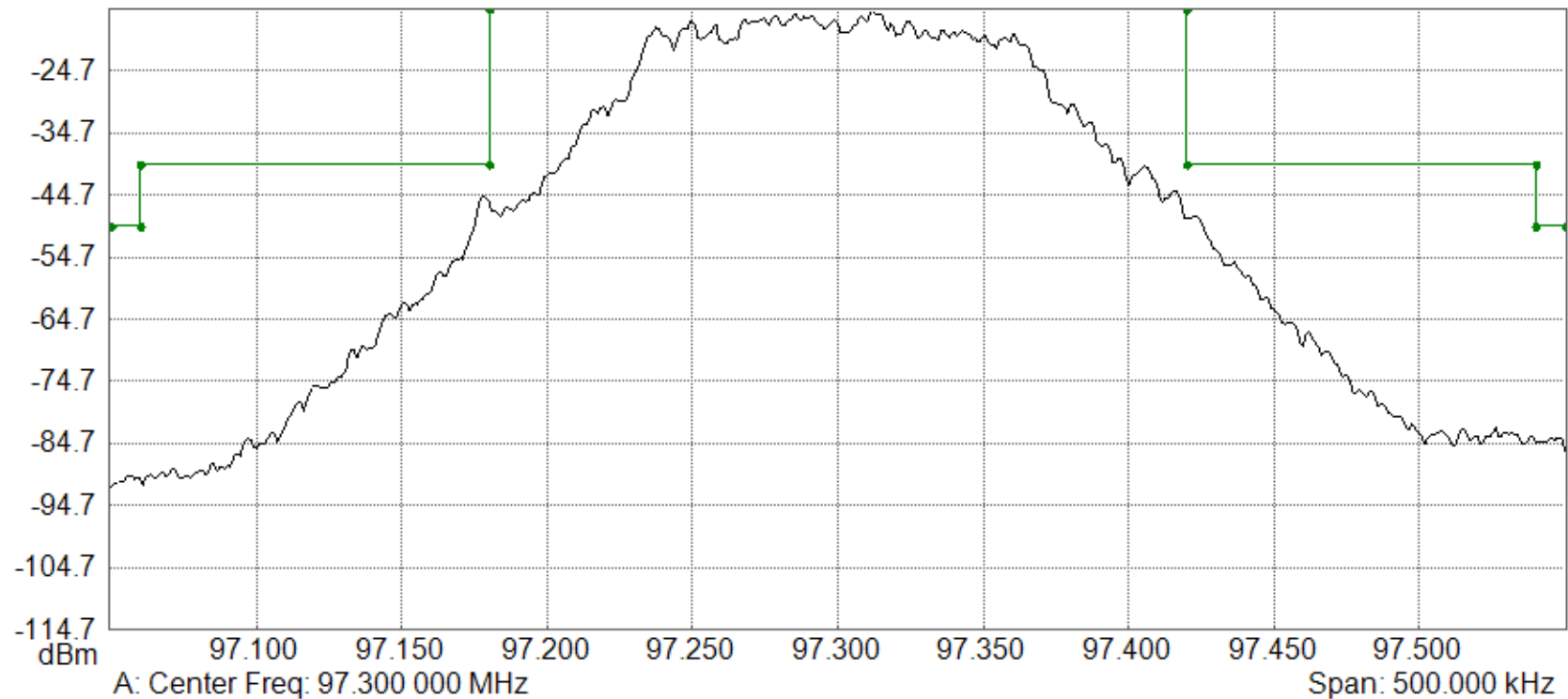
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Spectrum Analyzer Data

WMEE-FM-A (11/24/2015 12:55:53 PM)

Spectrum Analyzer



Trace A data:

Trace Mode = Max Hold

Preamplifier = OFF

Min Sweep Time = 0.001 S

Reference Level Offset = 0 dB

Input Attenuation = 10.0 dB

RBW = 3.0 kHz

VBW = 1.0 kHz

Detection = Peak

Center Frequency = 97.300 000 MHz

Start Frequency = 97.050 000 MHz

Stop Frequency = 97.550 000 MHz

Frequency Span = 500.000 000 kHz

Reference Level = -14.700 dBm

Scale = 10.0 dB/div

Serial Number = 1002033

Base Ver. = V4.32

App Ver. = V5.73

Model = MS2721B

Options = 9, 20, 31

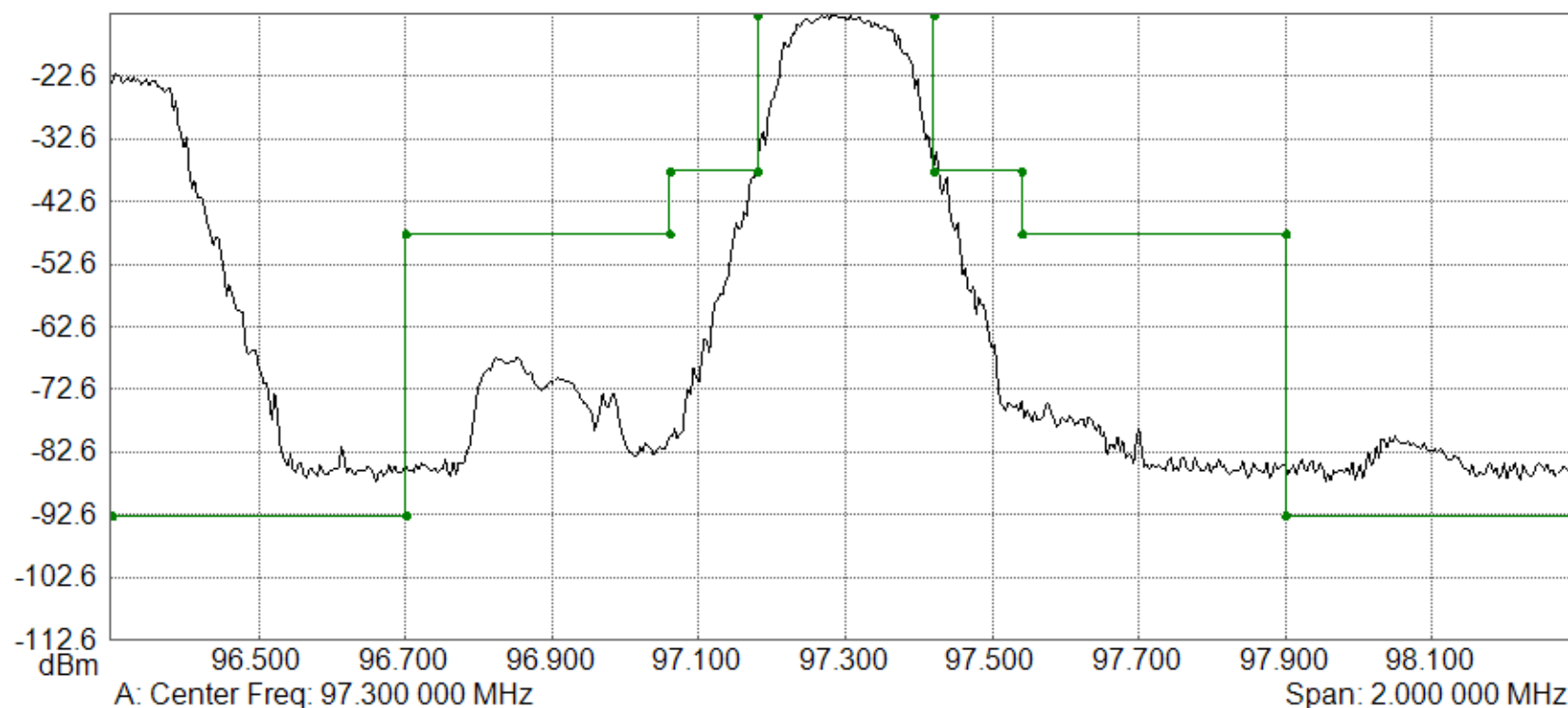
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Device Name =

Spectrum Analyzer Data

WMEE-FM-B (11/24/2015 12:53:06 PM)

Spectrum Analyzer



Trace A data:

Trace Mode = Max Hold

Preamplifier = OFF

Min Sweep Time = 0.001 S

Reference Level Offset = 0 dB

Input Attenuation = 10.0 dB

RBW = 30.0 kHz

VBW = 10.0 kHz

Detection = Peak

Center Frequency = 97.300 000 MHz

Start Frequency = 96.300 000 MHz

Stop Frequency = 98.300 000 MHz

Frequency Span = 2.000 000 MHz

Reference Level = -12.600 dBm

Scale = 10.0 dB/div

Serial Number = 1002033

Base Ver. = V4.32

App Ver. = V5.73

Model = MS2721B

Options = 9, 20, 31

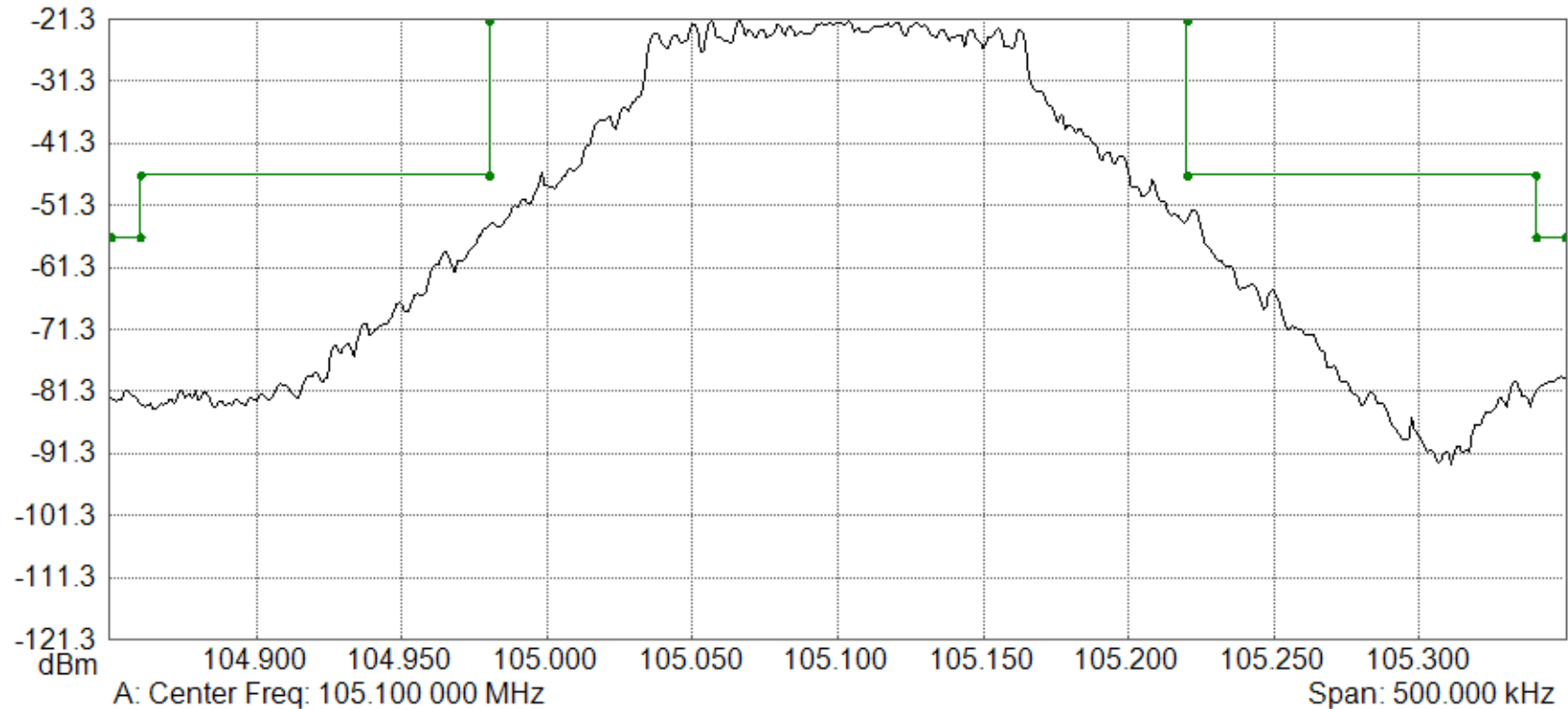
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Device Name =

Spectrum Analyzer Data

WQHK-FM-A (11/24/2015 1:04:44 PM)

Spectrum Analyzer



Trace A data:

Trace Mode = Max Hold

Preamplifier = OFF

Min Sweep Time = 0.001 S

Reference Level Offset = 0 dB

Input Attenuation = 0.0 dB

RBW = 3.0 kHz

VBW = 1.0 kHz

Detection = Peak

Center Frequency = 105.100 000 MHz

Start Frequency = 104.850 000 MHz

Stop Frequency = 105.350 000 MHz

Frequency Span = 500.000 000 kHz

Reference Level = -21.300 dBm

Scale = 10.0 dB/div

Serial Number = 1002033

Base Ver. = V4.32

App Ver. = V5.73

Model = MS2721B

Options = 9, 20, 31

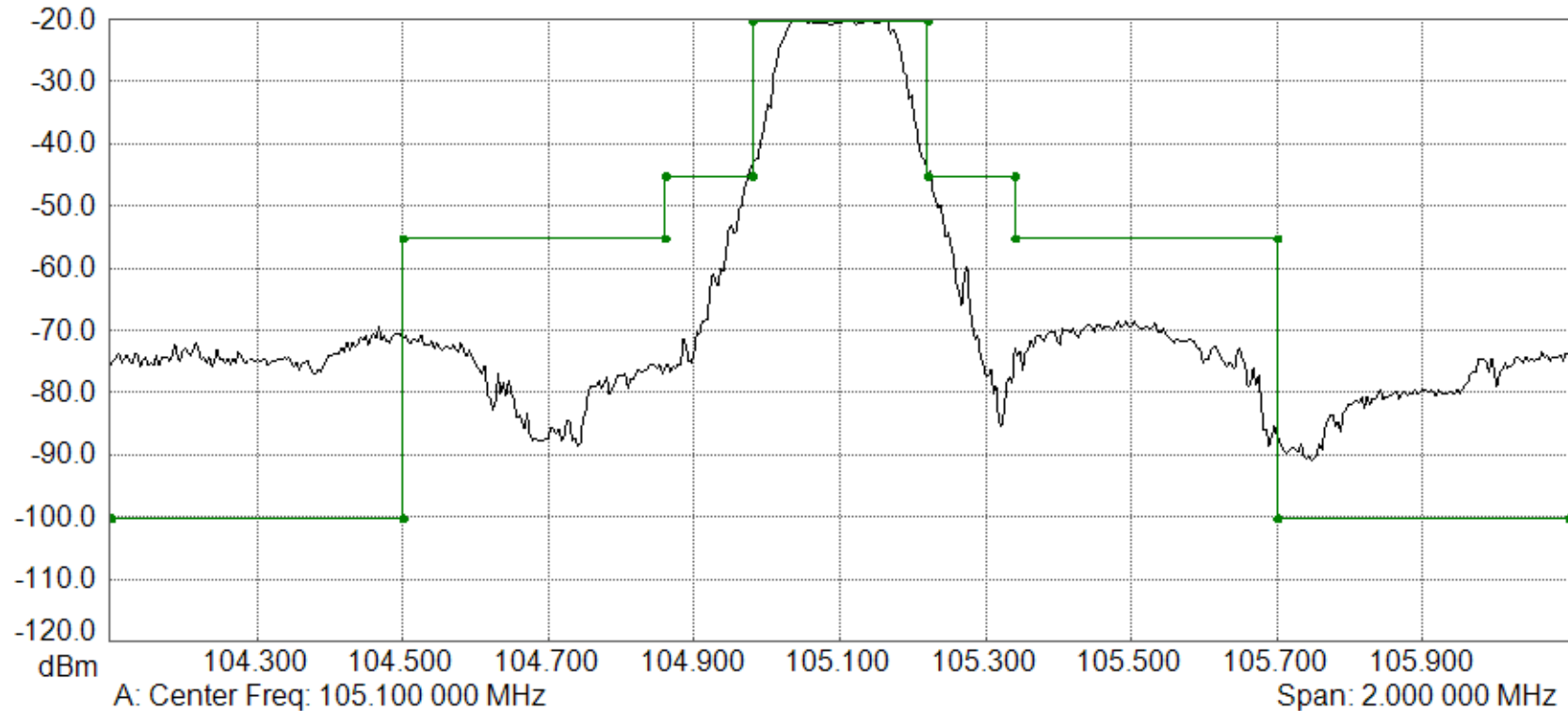
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Device Name =

Spectrum Analyzer Data

WQHK-FM-B (11/24/2015 1:01:41 PM)

Spectrum Analyzer



Trace A data:

Trace Mode = Max Hold

Preamplifier = OFF

Min Sweep Time = 0.001 S

Reference Level Offset = 0 dB

Input Attenuation = 0.0 dB

RBW = 30.0 kHz

VBW = 10.0 kHz

Detection = Peak

Center Frequency = 105.100 000 MHz

Start Frequency = 104.100 000 MHz

Stop Frequency = 106.100 000 MHz

Frequency Span = 2.000 000 MHz

Reference Level = -20.000 dBm

Scale = 10.0 dB/div

Serial Number = 1002033

Base Ver. = V4.32

App Ver. = V5.73

Model = MS2721B

Options = 9, 20, 31

Date = 11/24/2015 1:01:41 PM

Device Name =