FM Combiner Measurements

W279EI – 103.7 MHz
Colonial Media and Entertainment, LLC
Little River, SC

&

W255BZ – 98.9 MHz
Colonial Radio Group, Inc.
Fayetteville, NC

7/22/2022

Albert Broadcast Services, Inc.

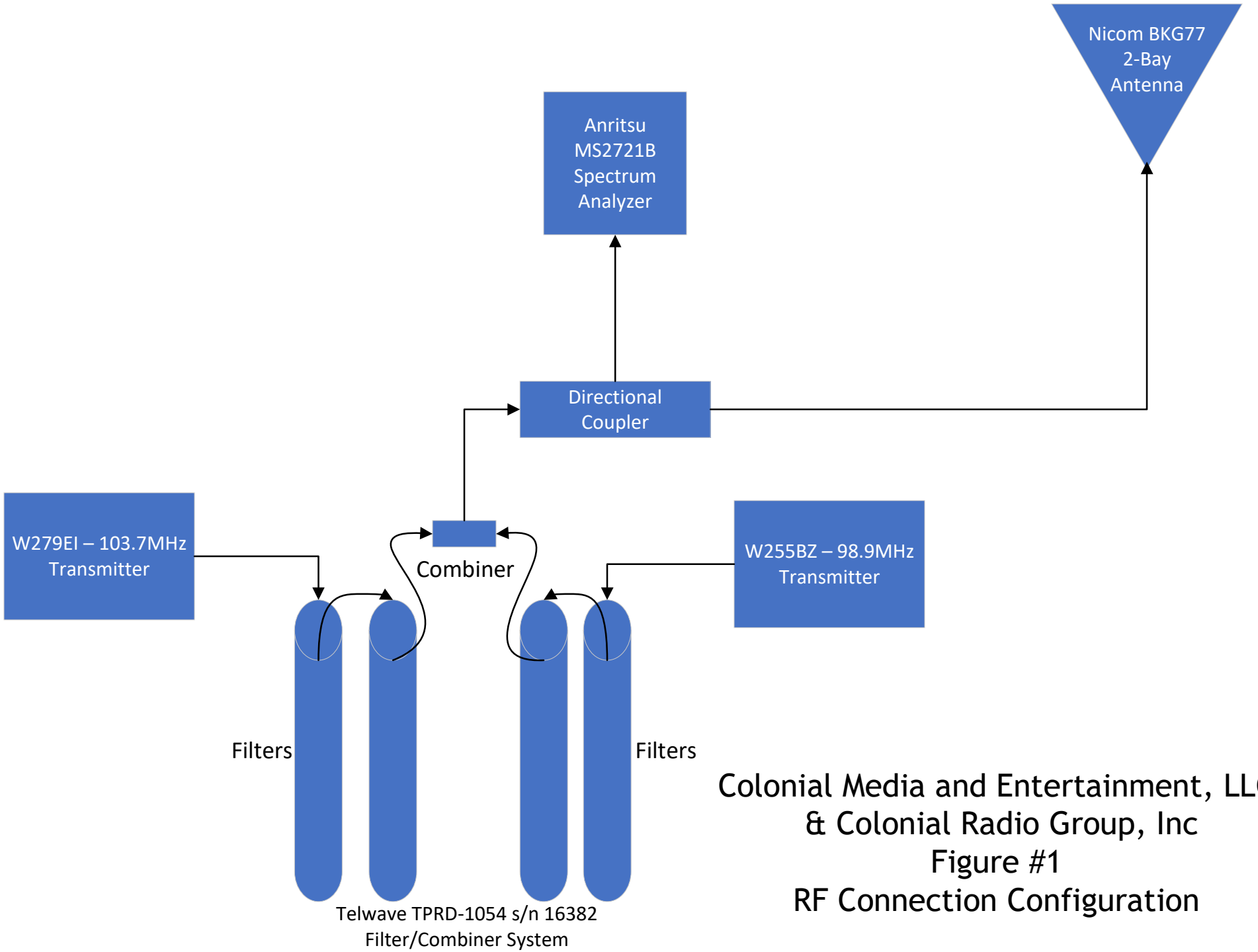
Overview

At the time of this writing, Colonial Media and Entertainment applies to cover and modify License File No. BLFT-20180907ACY (W279EI) to change frequency to 103.7 MHz and co-locate with Colonial Radio Group, Inc. modified permit 0000164504 (W255BZ), utilizing a 2-bay non-directional full-wave spaced FM antenna and common combiner.

The two stations seek to operate into a combiner/filter arrangement feeding a common antenna on a tower located at 1708 Oak Street, Conway, SC.

This report certifies that the as-built operation, depicted in Figure 1 was measured for compliance with FCC rule section 47 C.F.R. Sections 73.317(b) through 73.317(d) including standards for occupied bandwidth emissions, as well as for certifying that the Telwave TPRD-1054 provided combiner/filter arrangement was installed correctly and performing per the manufacturer's specifications.

In summary, both stations, W279EI and W255BZ were found to be in compliance with all applicable FCC rules and NRSC recommended practices when simultaneously operated through the combiner/filter system.



Colonial Media and Entertainment, LLC
& Colonial Radio Group, Inc
Figure #1
RF Connection Configuration

W279EI (CH279) 103.7 MHz
Occupied Bandwidth Measurements
7/22/2022

The measurements contained in this report were obtained with the use of an Anritsu Spectrum Analyzer, Model MS2721B serial number 0720137 by Albert Broadcast Services, Inc., Charlotte, NC on July 22, 2022.

The measurements were taken at the output terminal of the W279EI/W255BZ transmission line combiner, through a suitable directional coupler.

All measurements were taken with a 1 KHz resolution bandwidth at 3 MHz video bandwidth with a measurement span to allow for accurate averaging of modulation peaks filling the occupied bandwidth, except where noted.

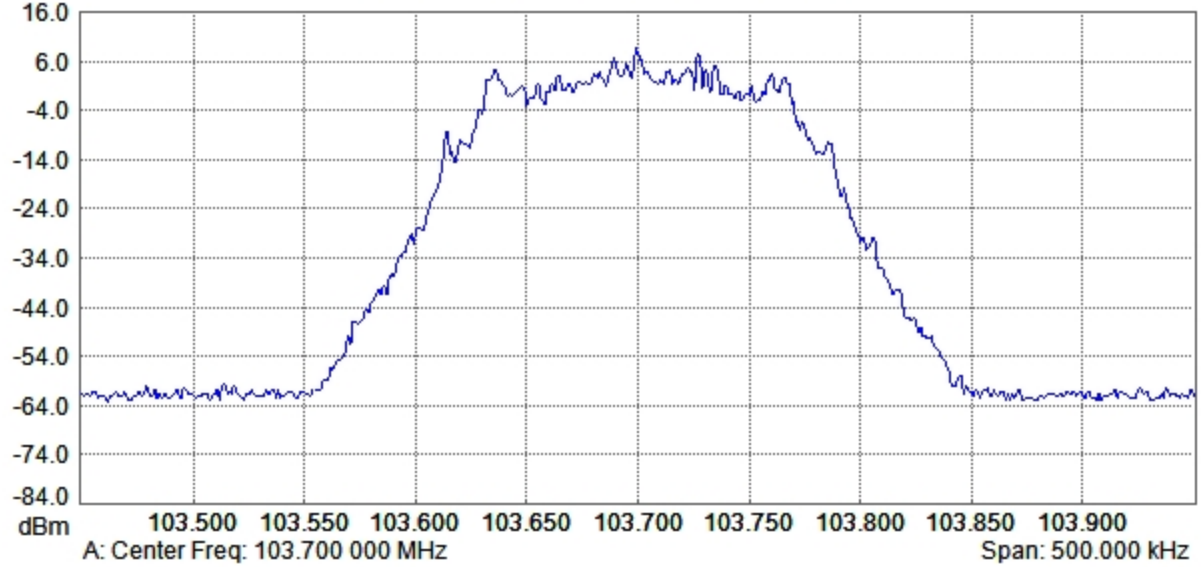
The requirements for FM transmission system occupied bandwidth limitations are outlined in FCC Rules and Regulations, paragraph 73.317. Station W279EI (CH279), met the requirements of these rules at the time of this measurement.

Emissions between 120 kHz and 240 kHz were found to be below 25 dB. The Occupied Bandwidth emission products within this range totaled no more than 178.766 KHz. Emissions between 240 kHz and 600 kHz were measured under 35 dB and emissions greater than 600 kHz removed from the un-modulated carrier were greater than 67 dB down from the carrier reference ($43+10\log^{10}$ (250Watts) dB).

Spectrum Analyzer Data

Spectrum Analyzer

Conway103.7_1 (7/22/2022 11:37:14 AM)



Occ BW dBc Down

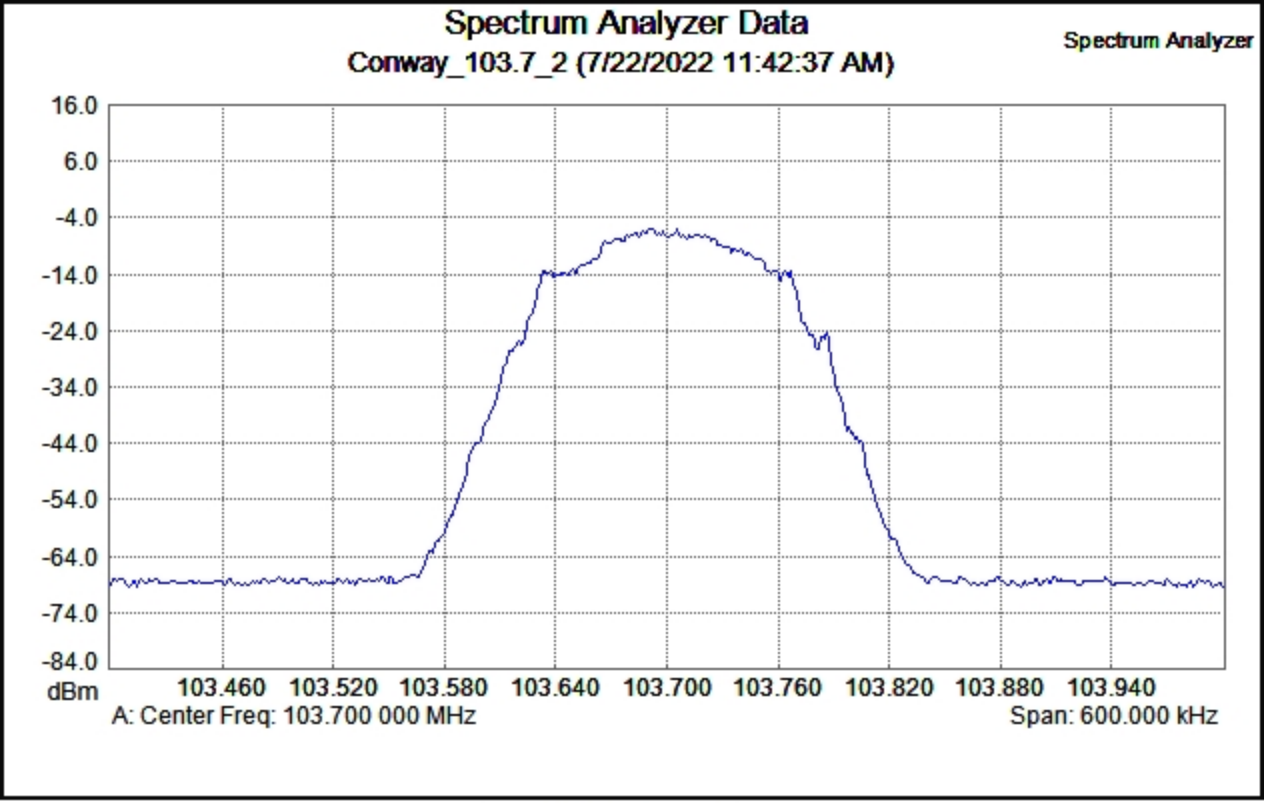
dBc Down: 25

Occ BW: 178.766 kHz

Measured %: 99.95

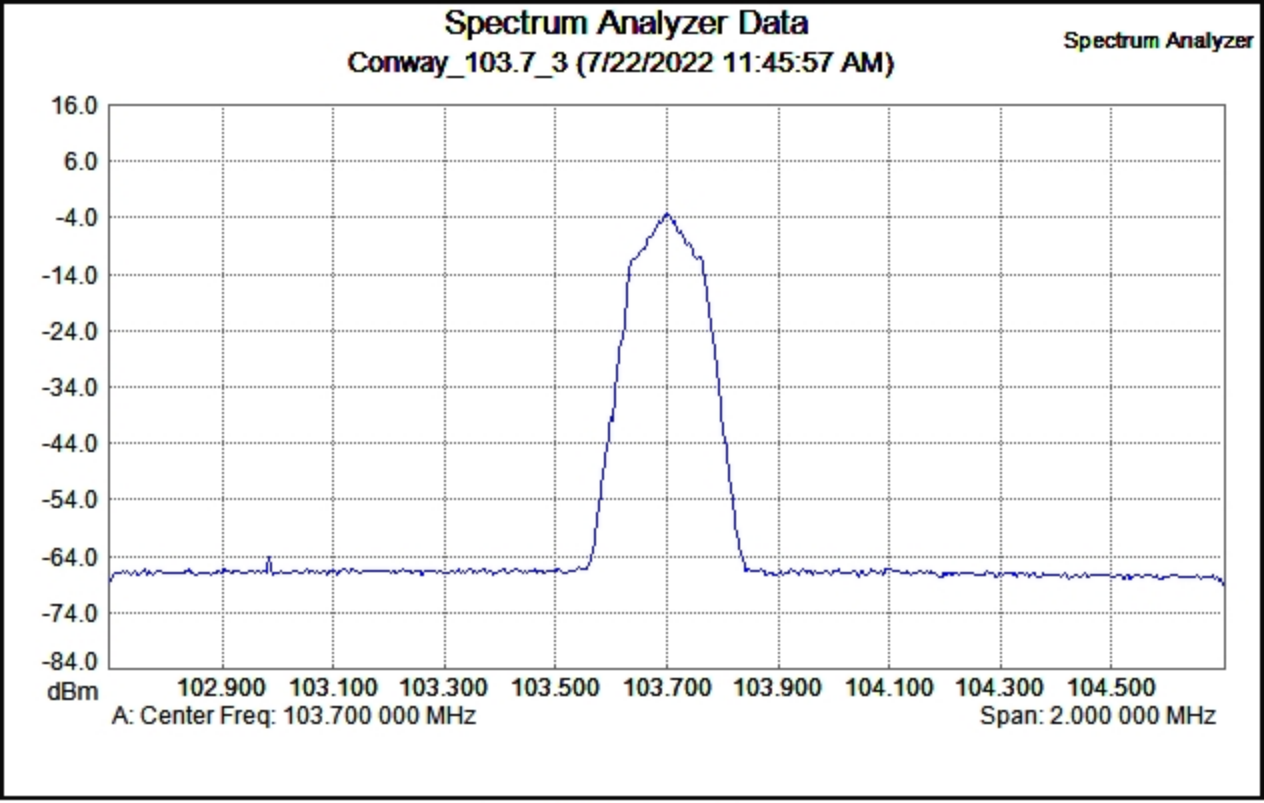
Measurement Parameters

		Stop Frequency	103.950 000 MHz
Trace Mode	Max Hold	Frequency Span	500.000 000 kHz
Preamp	OFF	Reference Level	16.000 dBm
Min Sweep Time	0.001 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	747076
Input Attenuation	40.0 dB	Base Ver.	V5.71
RBW	1.0 kHz	App Ver.	V5.73
VBW	3.0 MHz	Model	MS2721B
Detection	Peak	Options	25, 27
Center Frequency	103.700 000 MHz	Date	7/22/2022 11:37:14 AM
Start Frequency	103.450 000 MHz	Device Name	



Measurement Parameters

Trace A data:Trace Average	50	Stop Frequency	104.000 000 MHz
Trace Mode	Average	Frequency Span	600.000 000 kHz
Preamp	OFF	Reference Level	16.000 dBm
Min Sweep Time	0.001 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	747076
Input Attenuation	40.0 dB	Base Ver.	V5.71
RBW	1.0 kHz	App Ver.	V5.73
VBW	3.0 MHz	Model	MS2721B
Detection	Peak	Options	25, 27
Center Frequency	103.700 000 MHz	Date	7/22/2022 11:42:37 AM
Start Frequency	103.400 000 MHz	Device Name	



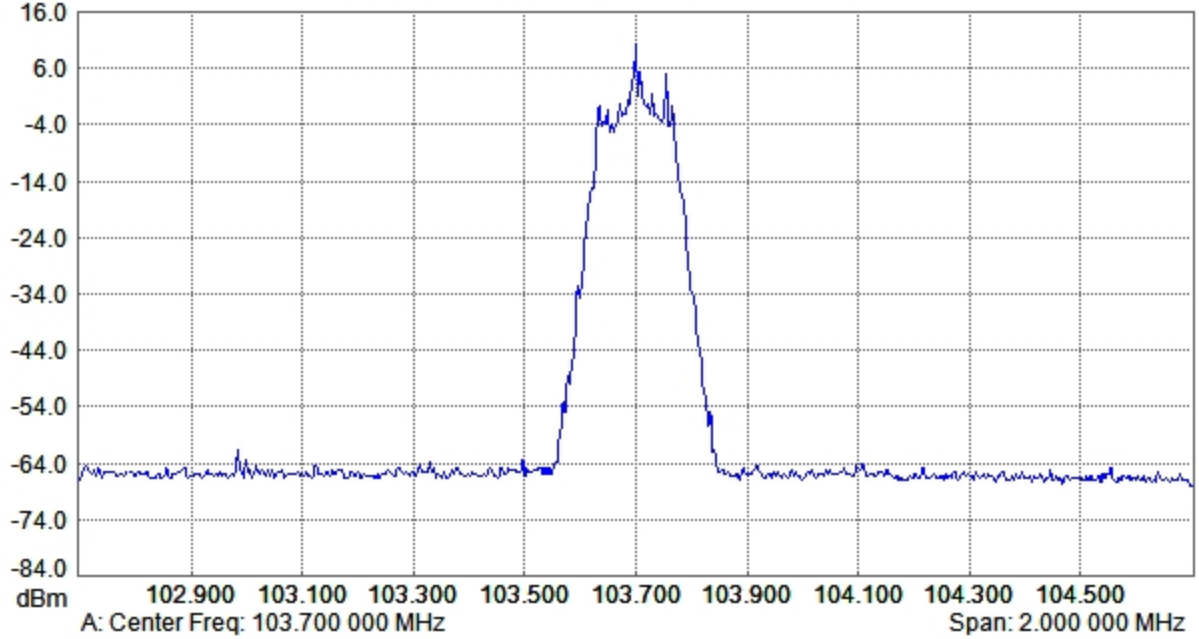
Measurement Parameters

Trace A data:Trace Average	50	Stop Frequency	104.700 000 MHz
Trace Mode	Average	Frequency Span	2.000 000 MHz
Preamp	OFF	Reference Level	16.000 dBm
Min Sweep Time	0.001 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	747076
Input Attenuation	40.0 dB	Base Ver.	V5.71
RBW	1.0 kHz	App Ver.	V5.73
VBW	3.0 MHz	Model	MS2721B
Detection	Peak	Options	25, 27
Center Frequency	103.700 000 MHz	Date	7/22/2022 11:45:57 AM
Start Frequency	102.700 000 MHz	Device Name	

Spectrum Analyzer Data

Spectrum Analyzer

Conway_103.7_4 (7/22/2022 11:53:11 AM)



Measurement Parameters

		Stop Frequency	104.700 000 MHz
Trace Mode	Max Hold	Frequency Span	2.000 000 MHz
Preamp	OFF	Reference Level	16.000 dBm
Min Sweep Time	0.001 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	747076
Input Attenuation	40.0 dB	Base Ver.	V5.71
RBW	300.0 Hz	App Ver.	V5.73
VBW	3.0 MHz	Model	MS2721B
Detection	Peak	Options	25, 27
Center Frequency	103.700 000 MHz	Date	7/22/2022 11:53:11 AM
Start Frequency	102.700 000 MHz	Device Name	

W255BZ (CH255) 98.9 MHz
Occupied Bandwidth Measurements
7/22/2022

The measurements contained in this report were obtained with the use of an Anritsu Spectrum Analyzer, Model MS2721B serial number 0720137 by Albert Broadcast Services, Inc., Charlotte, NC on July 22, 2022.

The measurements were taken at the output terminal of the W279EI/W255BZ transmission line combiner, through a suitable directional coupler.

All measurements were taken with a 1 KHz resolution bandwidth at 3 MHz video bandwidth with a measurement span to allow for accurate averaging of modulation peaks filling the occupied bandwidth, except where noted.

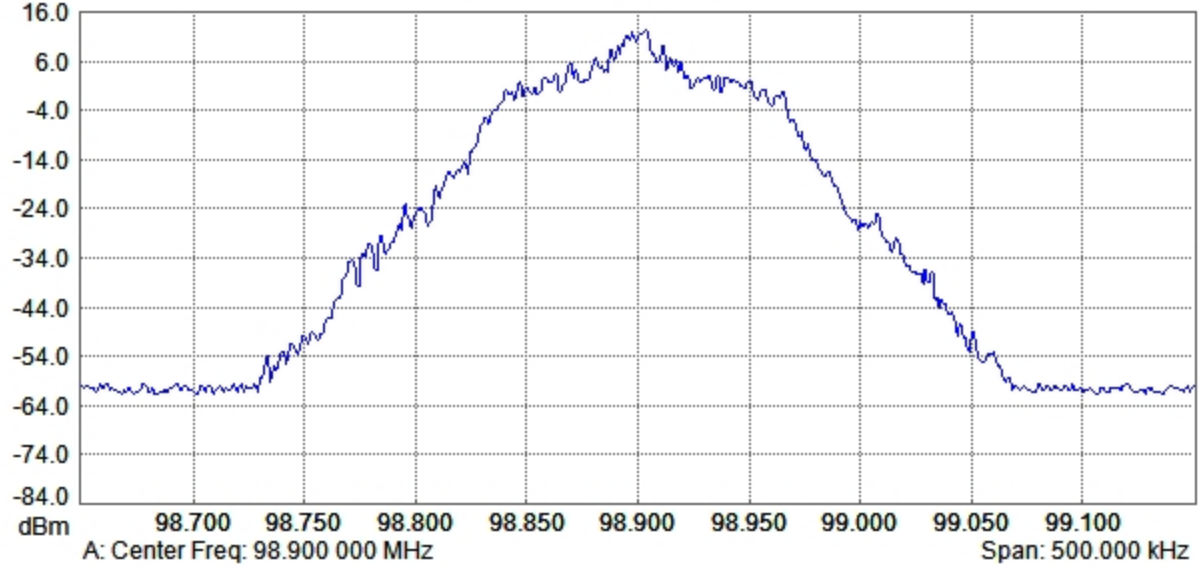
The requirements for FM transmission system occupied bandwidth limitations are outlined in FCC Rules and Regulations, paragraph 73.317. Station W255BZ (CH255), met the requirements of these rules at the time of this measurement.

Emissions between 120 kHz and 240 kHz were found to be below 25 dB. The Occupied Bandwidth emission products within this range totaled no more than 157.895 KHz. Emissions between 240 kHz and 600 kHz were measured under 35 dB and emissions greater than 600 kHz removed from the un-modulated carrier were greater than 67 dB down from the carrier reference ($43+10\log^{10}$ (250Watts) dB).

Spectrum Analyzer Data

Spectrum Analyzer

Conway_98.9_1 (7/22/2022 12:41:34 PM)



Occ BW dBc Down

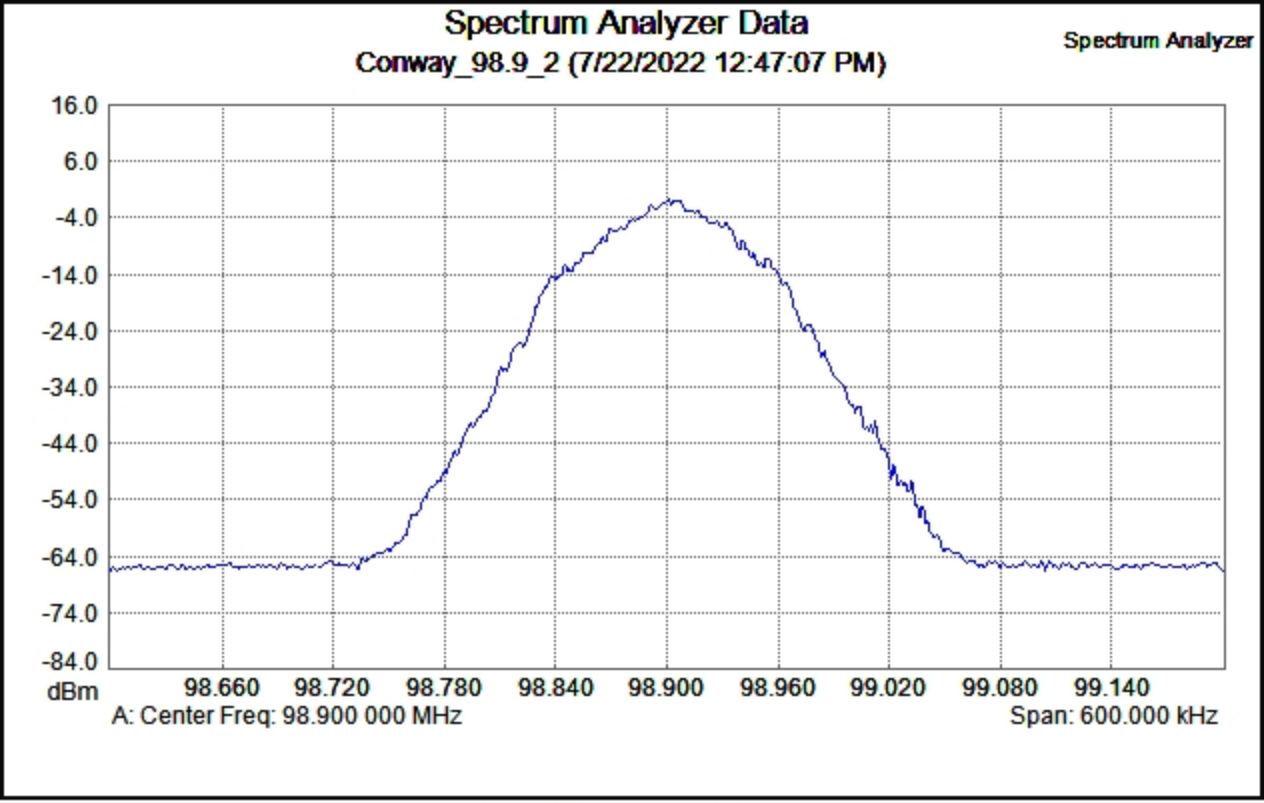
dBc Down: 25

Occ BW: 157.895 kHz

Measured %: 99.86

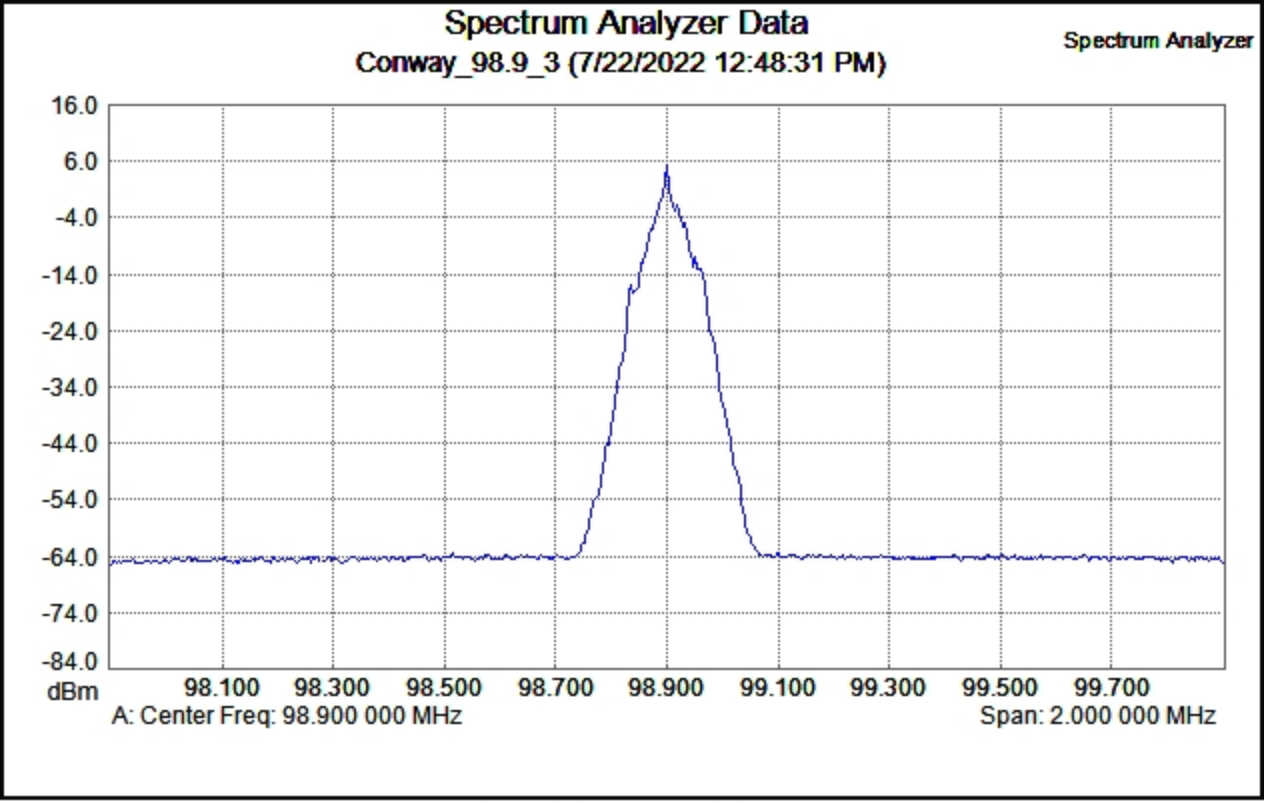
Measurement Parameters

		Stop Frequency	99.150 000 MHz
Trace Mode	Max Hold	Frequency Span	500.000 000 kHz
Preamp	OFF	Reference Level	16.000 dBm
Min Sweep Time	0.001 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	747076
Input Attenuation	40.0 dB	Base Ver.	V5.71
RBW	1.0 kHz	App Ver.	V5.73
VBW	300.0 Hz	Model	MS2721B
Detection	Peak	Options	25, 27
Center Frequency	98.900 000 MHz	Date	7/22/2022 12:41:34 PM
Start Frequency	98.650 000 MHz	Device Name	



Measurement Parameters

Trace A data:Trace Average	50	Stop Frequency	99.200 000 MHz
Trace Mode	Average	Frequency Span	600.000 000 kHz
Preamp	OFF	Reference Level	16.000 dBm
Min Sweep Time	0.001 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	747076
Input Attenuation	40.0 dB	Base Ver.	V5.71
RBW	1.0 kHz	App Ver.	V5.73
VBW	3.0 MHz	Model	MS2721B
Detection	Peak	Options	25, 27
Center Frequency	98.900 000 MHz	Date	7/22/2022 12:47:07 PM
Start Frequency	98.600 000 MHz	Device Name	



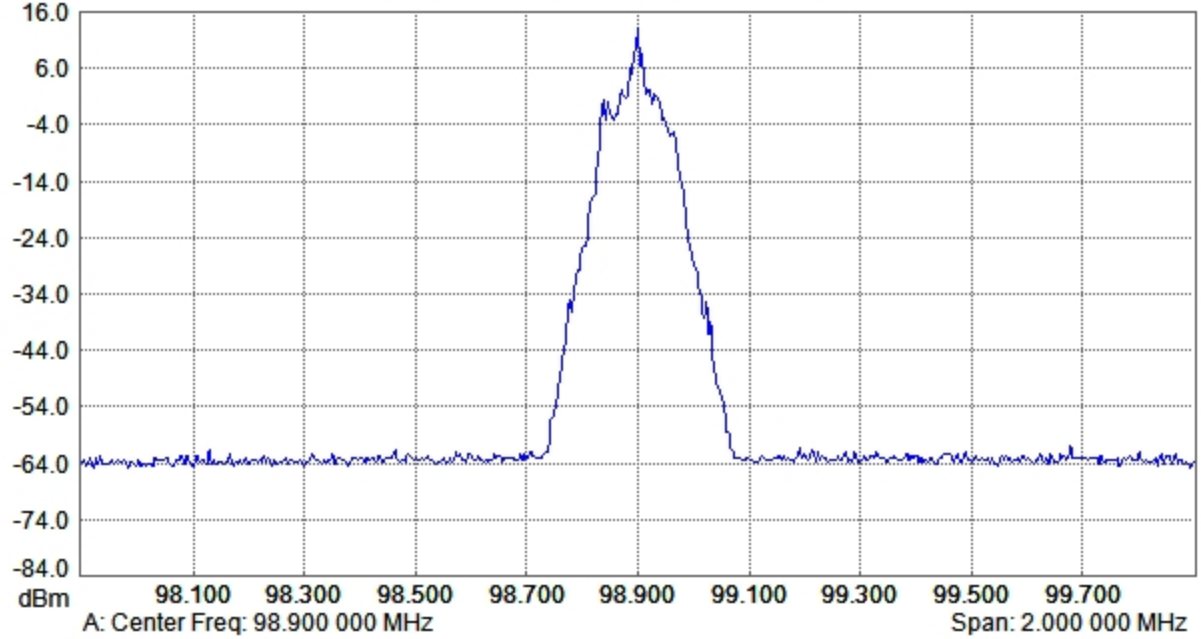
Measurement Parameters

Trace A data:Trace Average	50	Stop Frequency	99.900 000 MHz
Trace Mode	Average	Frequency Span	2.000 000 MHz
Preamp	OFF	Reference Level	16.000 dBm
Min Sweep Time	0.001 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	747076
Input Attenuation	40.0 dB	Base Ver.	V5.71
RBW	1.0 kHz	App Ver.	V5.73
VBW	3.0 MHz	Model	MS2721B
Detection	Peak	Options	25, 27
Center Frequency	98.900 000 MHz	Date	7/22/2022 12:48:31 PM
Start Frequency	97.900 000 MHz	Device Name	

Spectrum Analyzer Data

Spectrum Analyzer

Conway_98.9_4 (7/22/2022 12:55:51 PM)

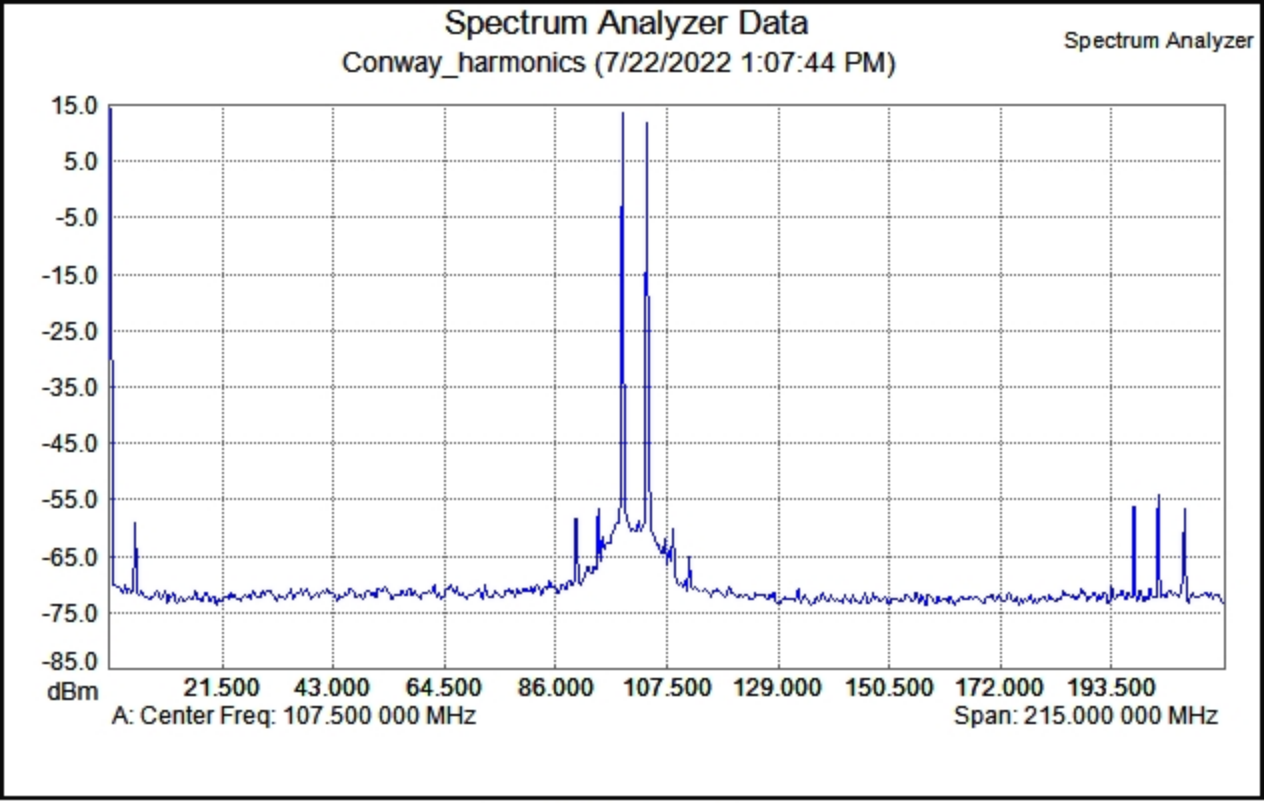


Measurement Parameters

		Stop Frequency	99.900 000 MHz
Trace Mode	Max Hold	Frequency Span	2.000 000 MHz
Preamp	OFF	Reference Level	16.000 dBm
Min Sweep Time	0.001 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	747076
Input Attenuation	40.0 dB	Base Ver.	V5.71
RBW	300.0 Hz	App Ver.	V5.73
VBW	3.0 MHz	Model	MS2721B
Detection	Peak	Options	25, 27
Center Frequency	98.900 000 MHz	Date	7/22/2022 12:55:51 PM
Start Frequency	97.900 000 MHz	Device Name	

Combined Filter Measurements
7/22/2022

The swept response measurements of the combiner/filter arrangement were completed and certified by Albert Broadcast Services, Inc., and are made a part of this report. Additionally, an RF sweep of the spectrum sufficient to show the sum and difference frequencies for W279EI and W255BZ was made with both stations operating at their permitted RF amplitudes. The spectrum analyzer was connected via a suitable directional coupler at the output terminals of the diplexer filter, with the station antenna connected as the normal load. No out-of-tolerance spurious emissions were noted in the entire RF spectrum, indicating that the stations operate satisfactorily with this diplexer arrangement.



Measurement Parameters

		Stop Frequency	215.000 000 MHz
Trace Mode	Max Hold	Frequency Span	215.000 000 MHz
Preamp	OFF	Reference Level	15.000 dBm
Min Sweep Time	0.001 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	747076
Input Attenuation	35.0 dB	Base Ver.	V5.71
RBW	1.0 kHz	App Ver.	V5.73
VBW	300.0 kHz	Model	MS2721B
Detection	Peak	Options	25, 27
Center Frequency	107.500 000 MHz	Date	7/22/2022 1:07:44 PM
Start Frequency	0.000 000 Hz	Device Name	

Telwave Model TPRD-1054
Serial Number 16382
Combiner/Filter Swept Measurements

For

W279EI (103.7MHz) and W255BZ (98.9MHz)

Performed 5/28/2022

The swept response measurements of the combiner/filter arrangement were completed and certified by Albert Broadcast Services, Inc., on May 28, 2022 utilizing the following equipment:

Network Analyzer:

Sigilent Technologies, Co., LTD
Model #SVA1015X, Calibrated
Serial #SVA1XEAD3R0596

Return Loss Bridge :
Amtronix Instruments, Inc.
Model #SW2012N
Serial #50162

Calibration Standards :
Rhode & Schwarz USA, Inc.
Model #1300.7504.02
Serial #100142

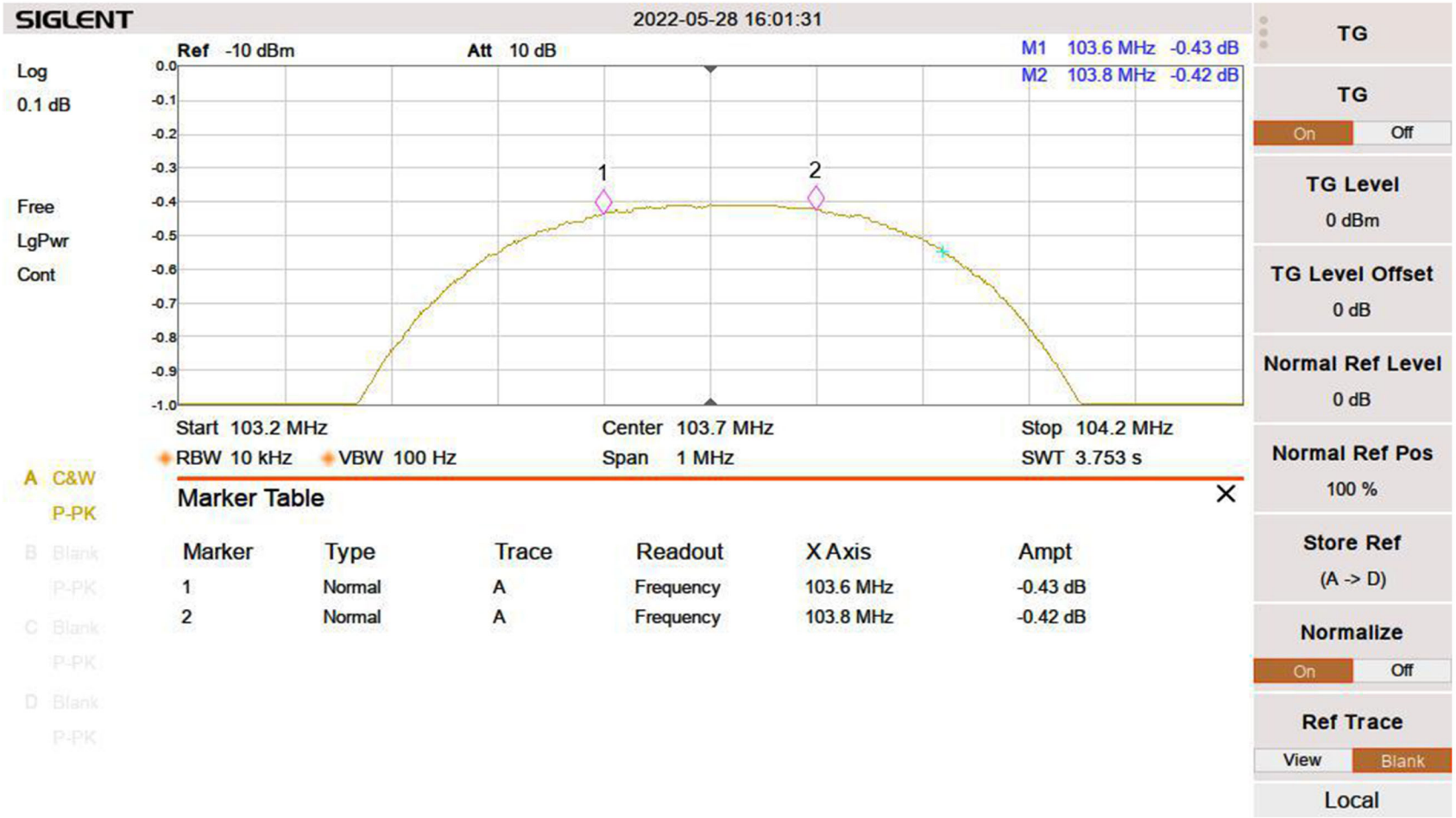
RF Reference Load :
Narda-MITEQ
Model #370BNM
DC-18GHz, 50 Ohm, 5 Watt

The following sweep measurement graphs support that the Telwave TPRD-1054 filter, serial number 16382 met and exceeded the performance measurements for combined antenna performance when measured with the equipment listed above. The resultant intermodulation products meet the requirements of CFR 73.317(b) through CFR 73.317(d).

I hereby certify that the above statements are true and accurate.

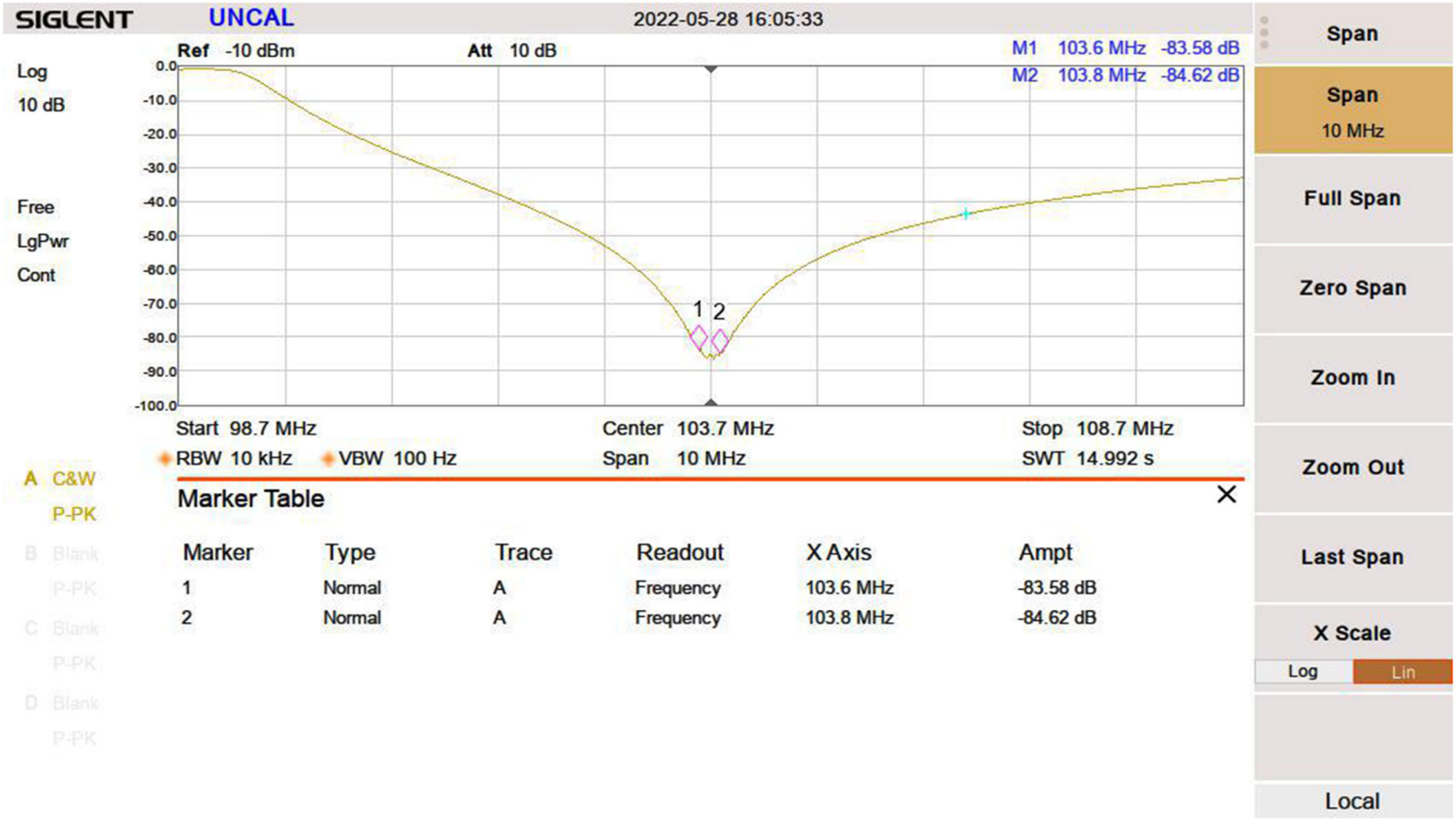
Steward R. Albert, President
Albert Broadcast Services, Inc.
PO Box 4170
Florence, SC 29502
(704) 507-4987

Telwave TPRD-1054 s/n 16382 - 103.7 MHz Insertion Loss



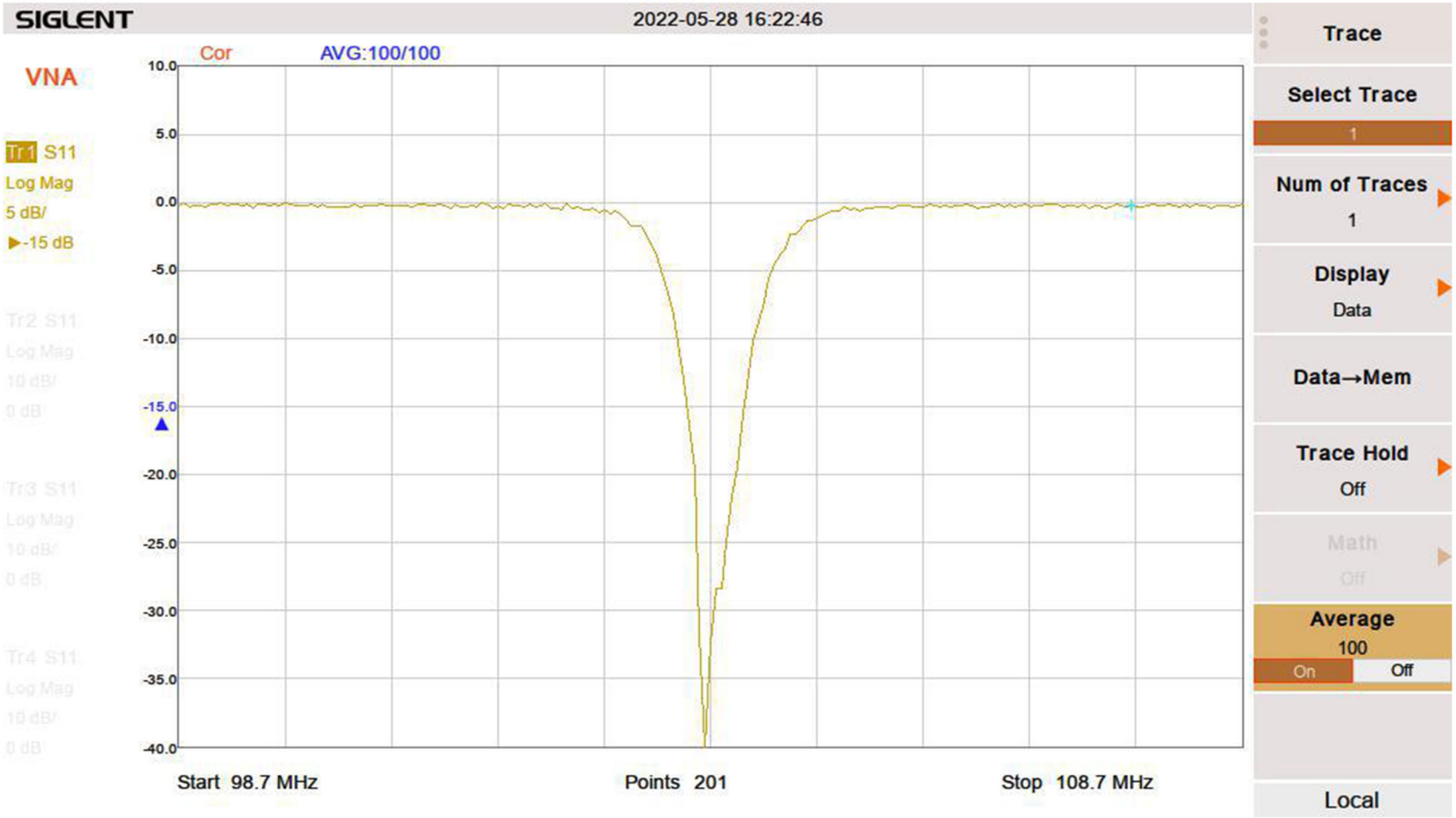
Albert Broadcast Services, Inc.

Telwave TPRD-1054 s/n 16382 - 103.7 MHz Rejection in 98.9 MHz Filter Path



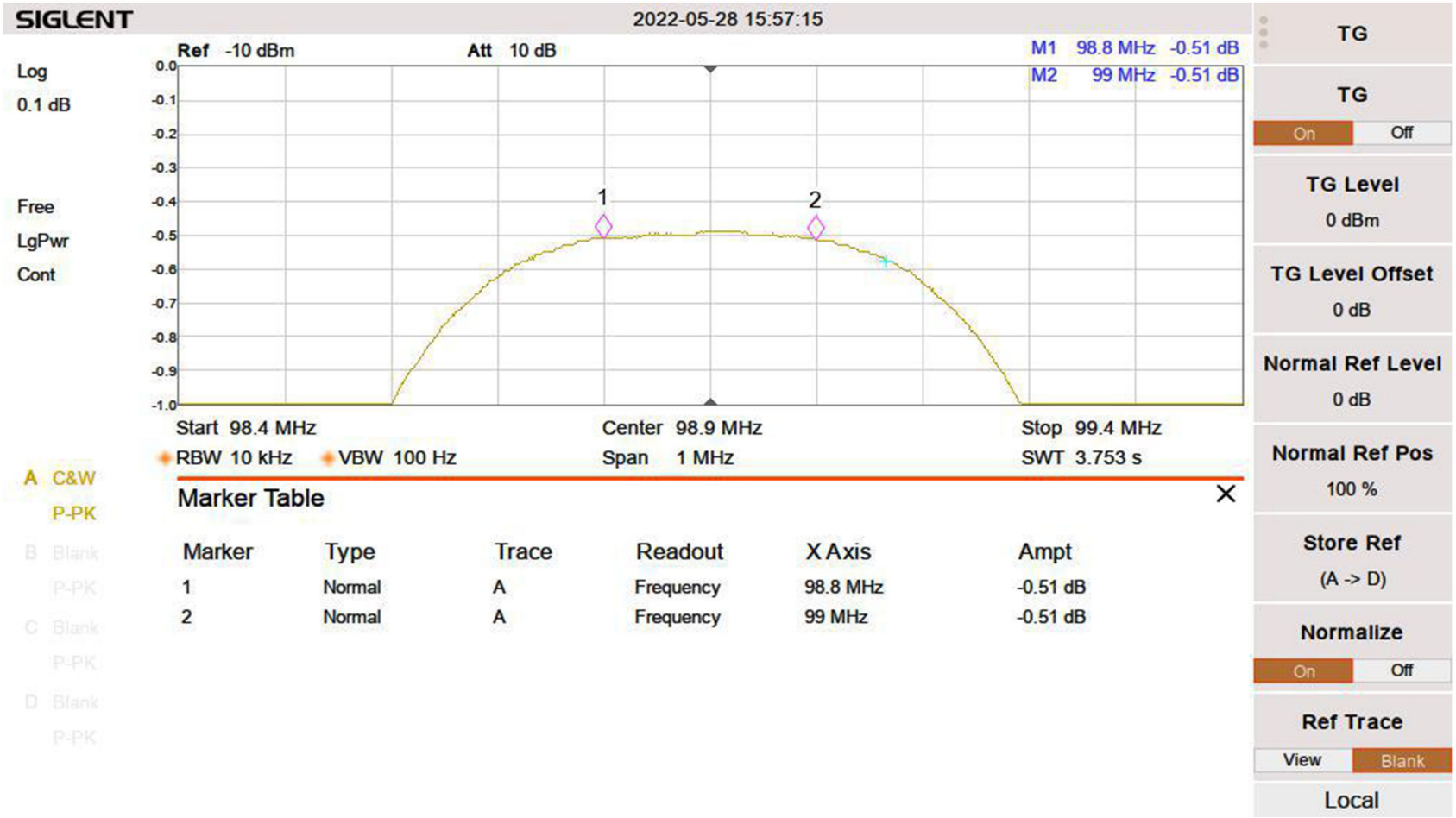
Albert Broadcast Services, Inc.

Telwave TPRD-1054 s/n 16382 - 103.7 MHz Return Loss



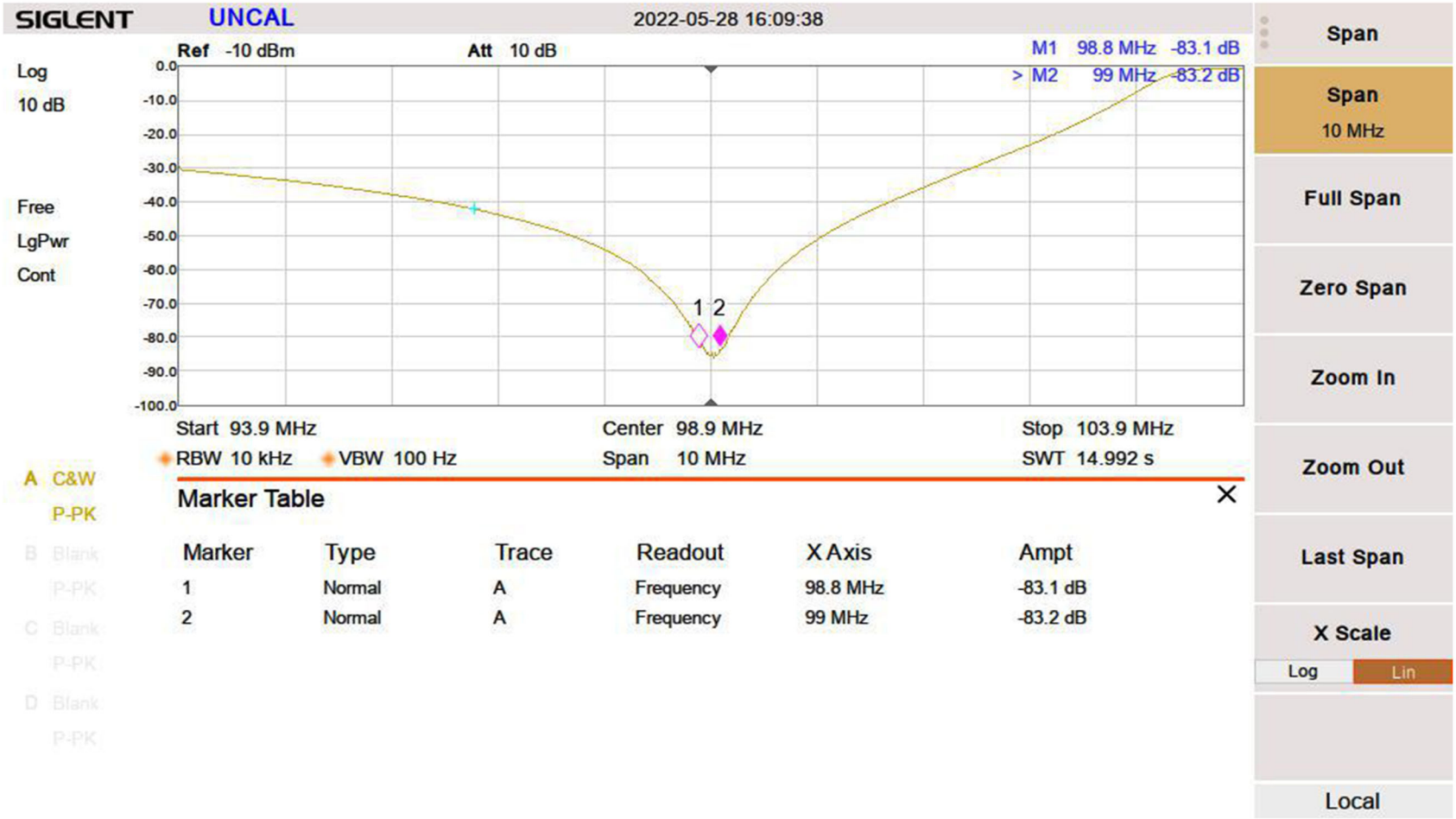
Albert Broadcast Services, Inc.

Telwave TPRD-1054 s/n 16382 - 98.9 MHz Insertion Loss



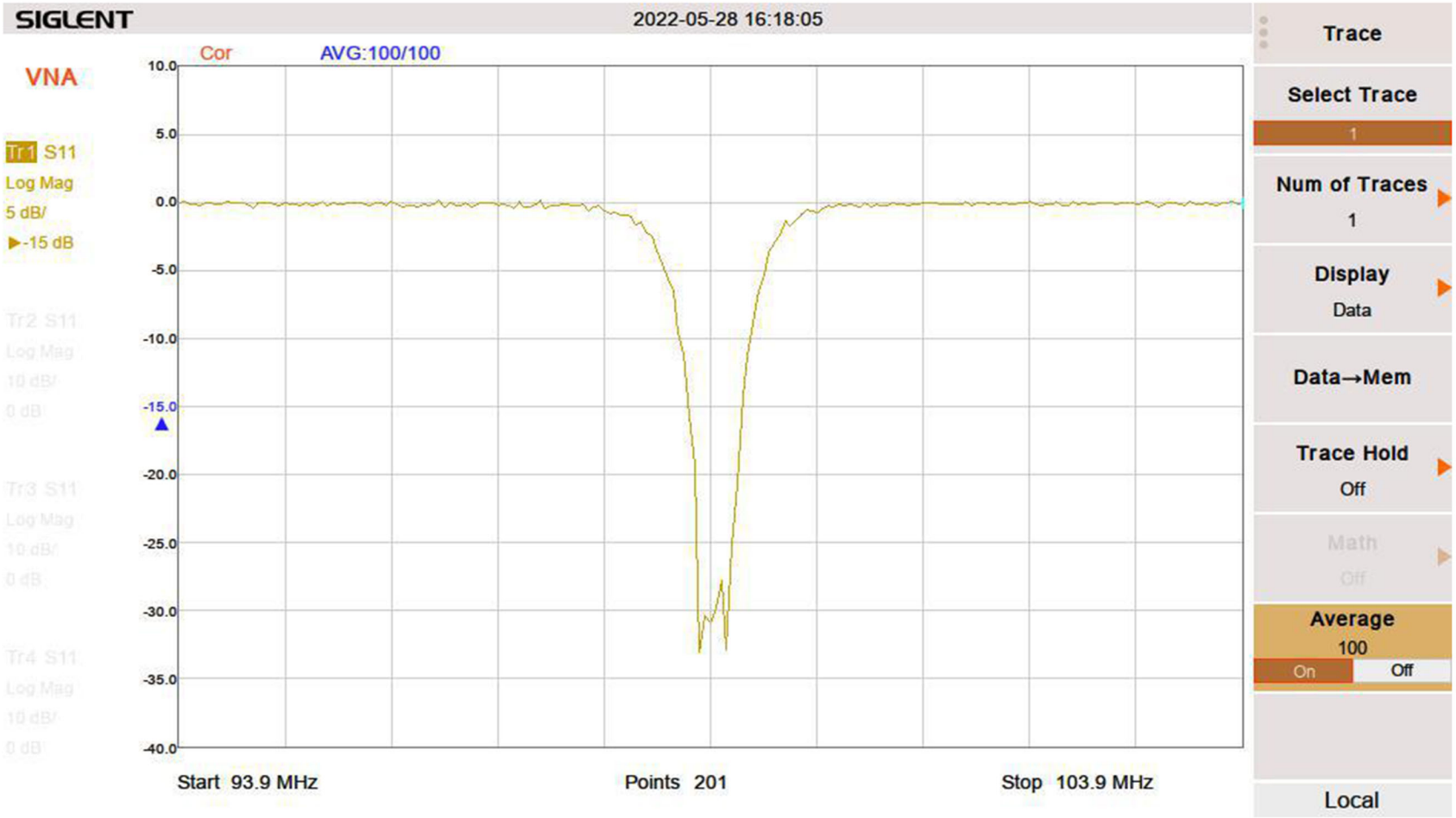
Albert Broadcast Services, Inc.

Telwave TPRD-1054 s/n 16382 - 98.9 MHz Rejection in 103.7 MHz Filter Path



Albert Broadcast Services, Inc.

Telwave TPRD-1054 s/n 16382 - 98.9 MHz Return Loss



Albert Broadcast Services, Inc.

Exhibit B

Transmitter Output Power Calculation

Date 2022-07-22

File No. 0000169450 **Facility ID** 88011

W279EI Conway SC

103.7 MHz **Channel** 279

ERP 0.175 kW

Antenna Nicom **Model** BKG77-2-FW **Bays:** 2 **Spacing:** Full Wave

Antenna Power Gain 0.900 -0.458 dB

Antenna Input Power 0.194 kW For 0.175 kW ERP

Transmission Line Losses

Manufacturer Andrew LDF50 Series

Type 7/8 inch Foam Dielectric

Loss per 100 feet -0.370 dB At: 103.7 MHz

Transmission Line Length 217 ft

Transmission Line Loss -0.803 dB

Efficiency 83.1%

Additional System Losses

Filter -0.41 dB

Isolator 0 dB

Misc 0 dB

Total Losses -1.213 dB

System Efficiency 75.64%

Transmitter Output 0.256 kW For 0.175 kW ERP

Exhibit A

Transmitter Output Power Calculation

Date 2022-07-22

File No. 0000186164 **Facility ID** 147982

W255BZ Conway SC

98.9 MHz **Channel** 255

ERP 0.250 kW

Antenna Nicom **Model** BKG-77 **Bays:** 2 **Spacing:** Full Wave

Antenna Power Gain 0.900 -0.458 dB

Antenna Input Power 0.278 kW For 0.250 kW ERP

Transmission Line Losses

Manufacturer Andrew LDF50 Series

Type 7/8 inch Foam Dielectric

Loss per 100 feet -0.361 dB At: 98.9 MHz

Transmission Line Length 217 ft

Transmission Line Loss -0.783 dB

Efficiency 83.5%

Additional System Losses

Filter -0.5 dB

Isolator 0 dB

Misc 0 dB

Total Losses -1.283 dB

System Efficiency 74.43%

Transmitter Output 0.374 kW For 0.250 kW ERP

Certification

I hereby certify that I am a technical consultant to radio and television stations throughout the United States of America, with over 45 years of experience in broadcast engineering.

My qualifications are a matter of record with the Federal Communications Commission.

I have prepared the report herein and certify that all facts herein are true and accurate to the best of my knowledge and belief.

Steward R. Albert, President
Albert Broadcast Services, Inc.
PO Box 11836
Charlotte, NC 28220-1836
(704) 507-4987