FM Combiner Measurements

W248DC
Truth Broadcasting Corporation
Fairmont, NC

&

W246DR
WAGR Broadcasting, Inc.
Lumberton, NC

4/19/2021

Albert Broadcast Services, Inc.

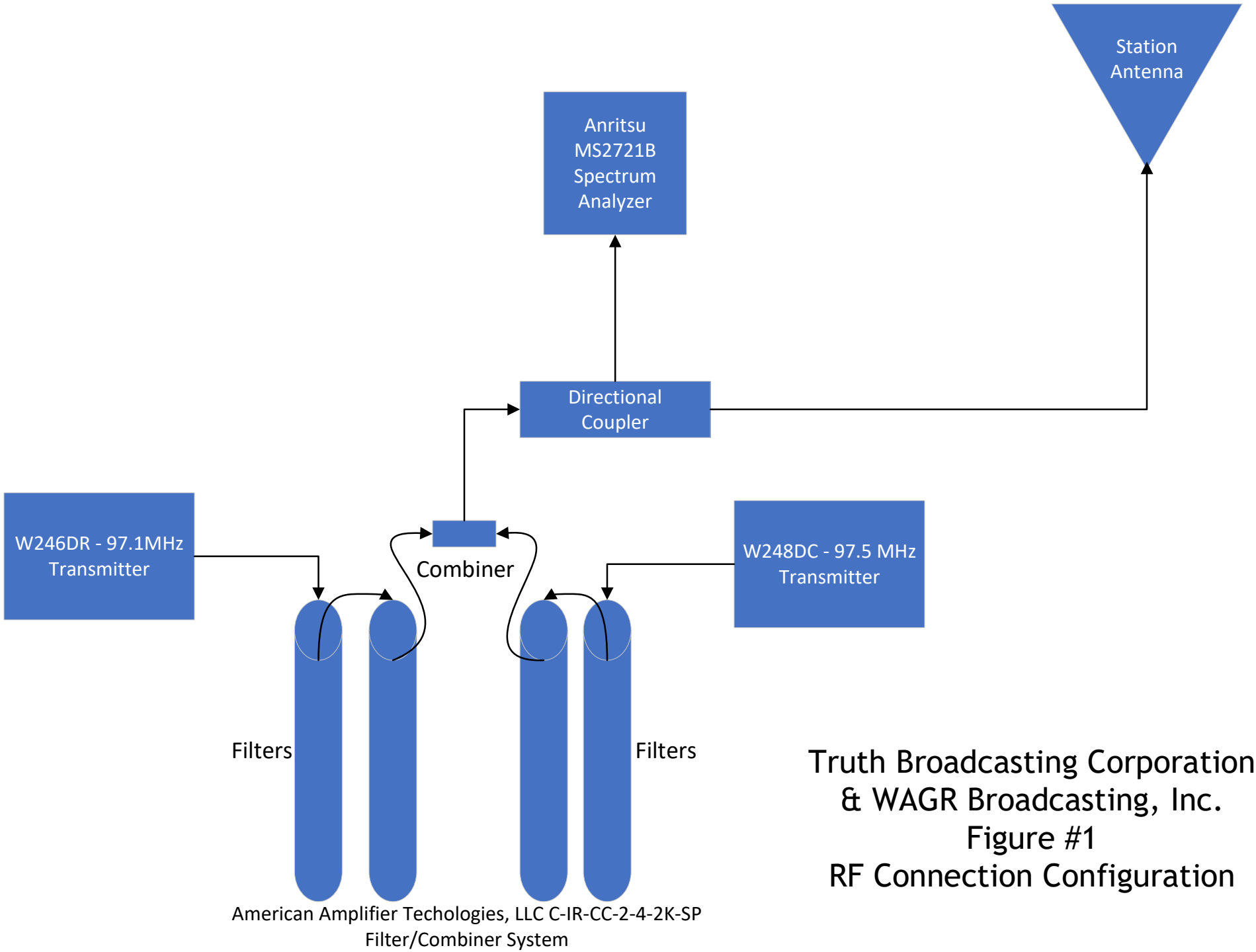
Overview

At the time of this writing, Truth Broadcasting Corporation has filed an application to cover FCC Construction Permit BNPFT-20180323AAZ, Facility ID 201296, Channel 248 (W248DC). Co-located at the same transmitter facility, WAGR Broadcasting, Inc. seeks to complete FCC Construction Permit BNPFT-20180314ABQ, Facility ID 201245, Channel 246 (W246DR).

The two stations seek to operate into a combiner/filter arrangement feeding a common antenna on a tower located at 3463 Oak Grove Church Road, Lumberton, NC 28360.

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 American Amplifier Technologies, LLC - provided combiner/filter arrangement was installed correctly and performing per the manufacturer's specifications.

In summary, both stations, W248DC and W246DR were found to be in compliance with all applicable FCC rules and NRSC recommended practices when simultaneously operated through the combiner/filter system.



Truth Broadcasting Corporation
& WAGR Broadcasting, Inc.
Figure #1
RF Connection Configuration

W248DC (CH248) 97.5 MHz
Occupied Bandwidth Measurements
4/19/2021

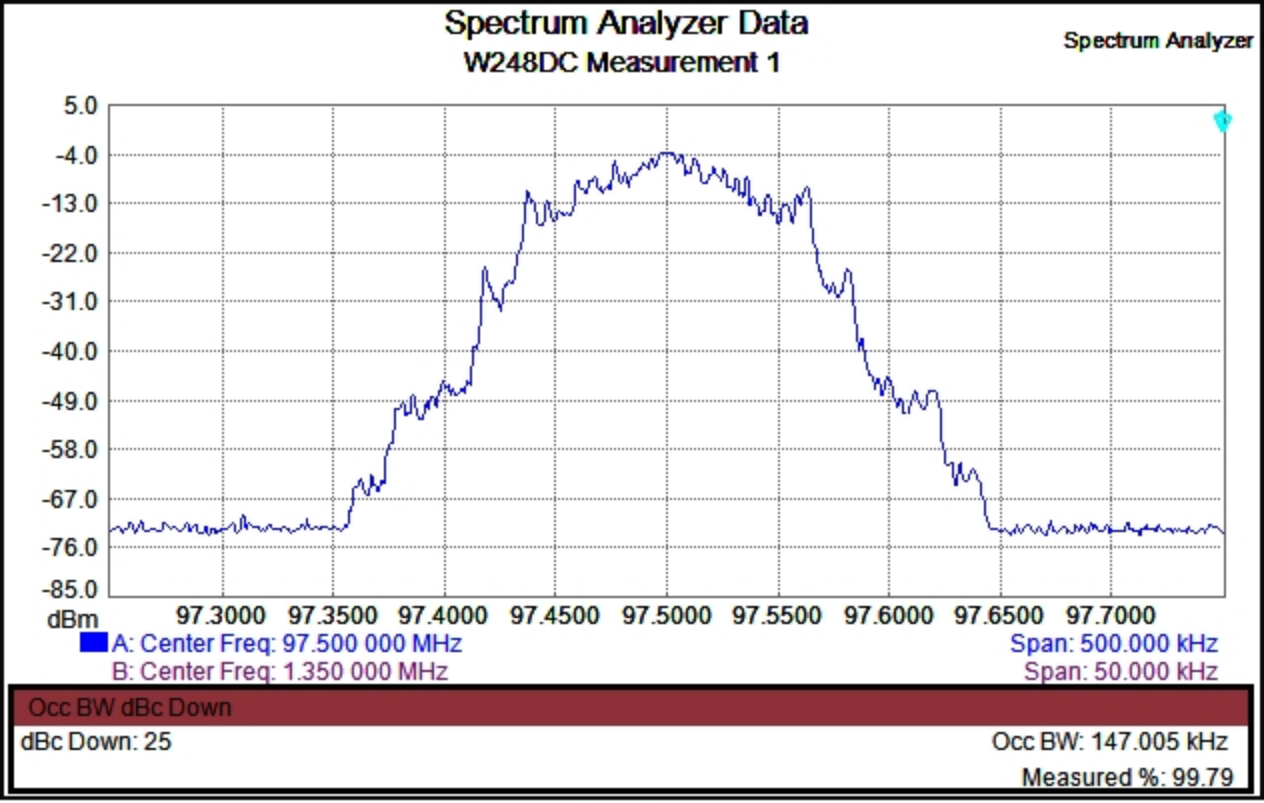
The measurements contained in this report were obtained with the use of an Anritsu Spectrum Analyzer, Model MS2721B serial number 0720137 by Albert Broadcast Services, Inc., Charlotte, NC on April 19, 2021.

The measurements were taken at the output terminal of the W248DC/W246DR 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.

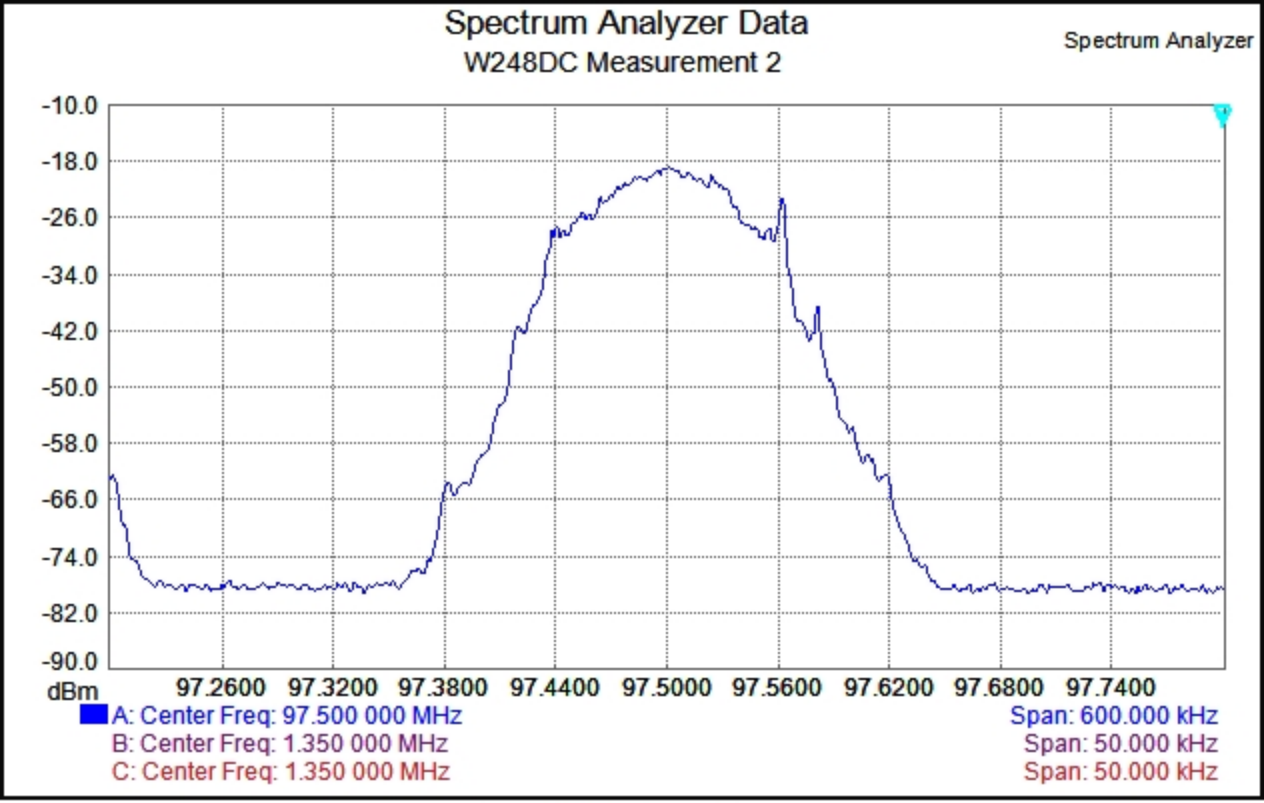
The requirements for FM transmission system occupied bandwidth limitations are outlined in FCC Rules and Regulations, paragraph 73.317. Station W248DC (CH248), met the requirements of these rules at the time of this measurement.

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 147.005 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).



Measurement Parameters

		Stop Frequency	97.750 000 MHz
Trace Mode	Max Hold	Frequency Span	500.000 000 kHz
Preamp	OFF	Reference Level	5.000 dBm
Min Sweep Time	0.001 S	Scale	9.0 dB/div
Reference Level Offset	0 dB	Serial Number	747076
Input Attenuation	30.0 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	97.500 000 MHz	Date	4/19/2021 12:17:46 PM
Start Frequency	97.250 000 MHz	Device Name	

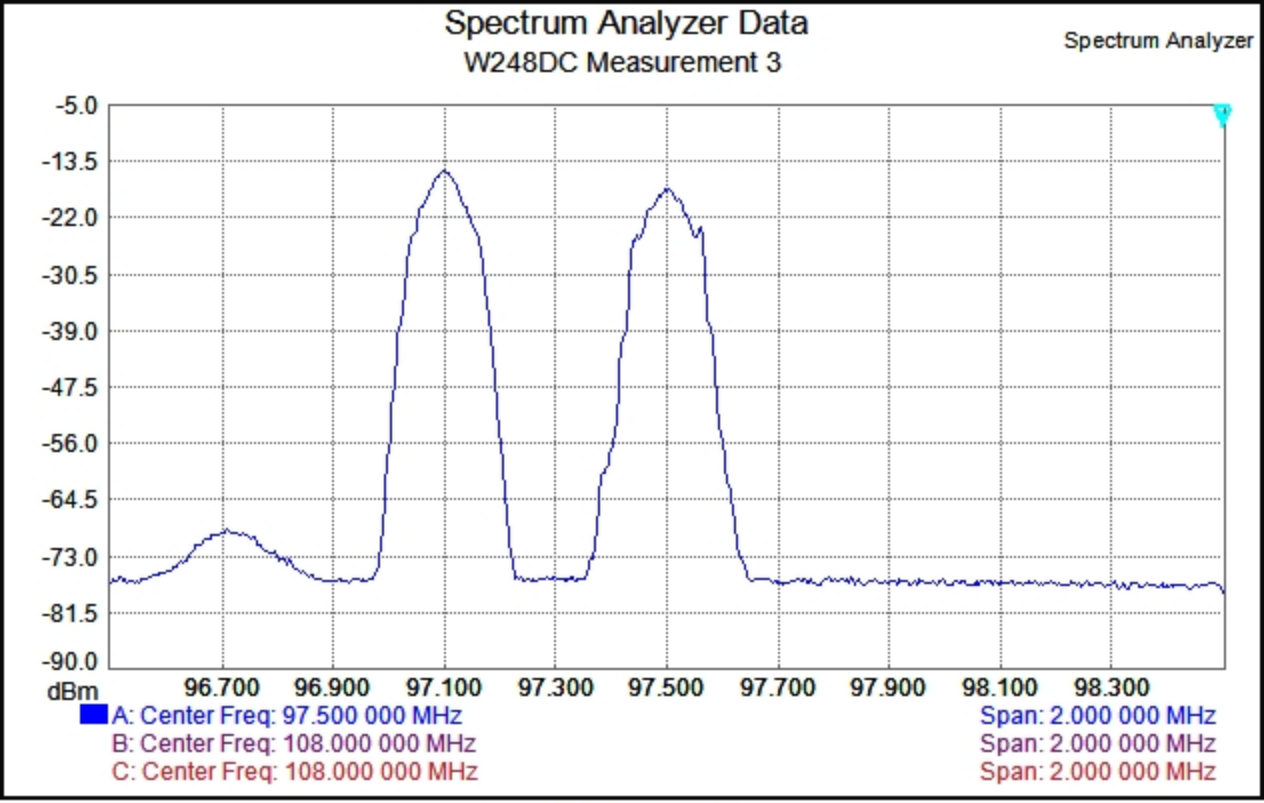


Measurement Parameters

Trace A data:Trace Average	50	Stop Frequency	97.800 000 MHz
Trace Mode	Average	Frequency Span	600.000 000 kHz
Preamp	OFF	Reference Level	-10.000 dBm
Min Sweep Time	0.001 S	Scale	8.0 dB/div
Reference Level Offset	0 dB	Serial Number	747076
Input Attenuation	30.0 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	97.500 000 MHz	Date	4/19/2021 12:24:59 PM
Start Frequency	97.200 000 MHz	Device Name	

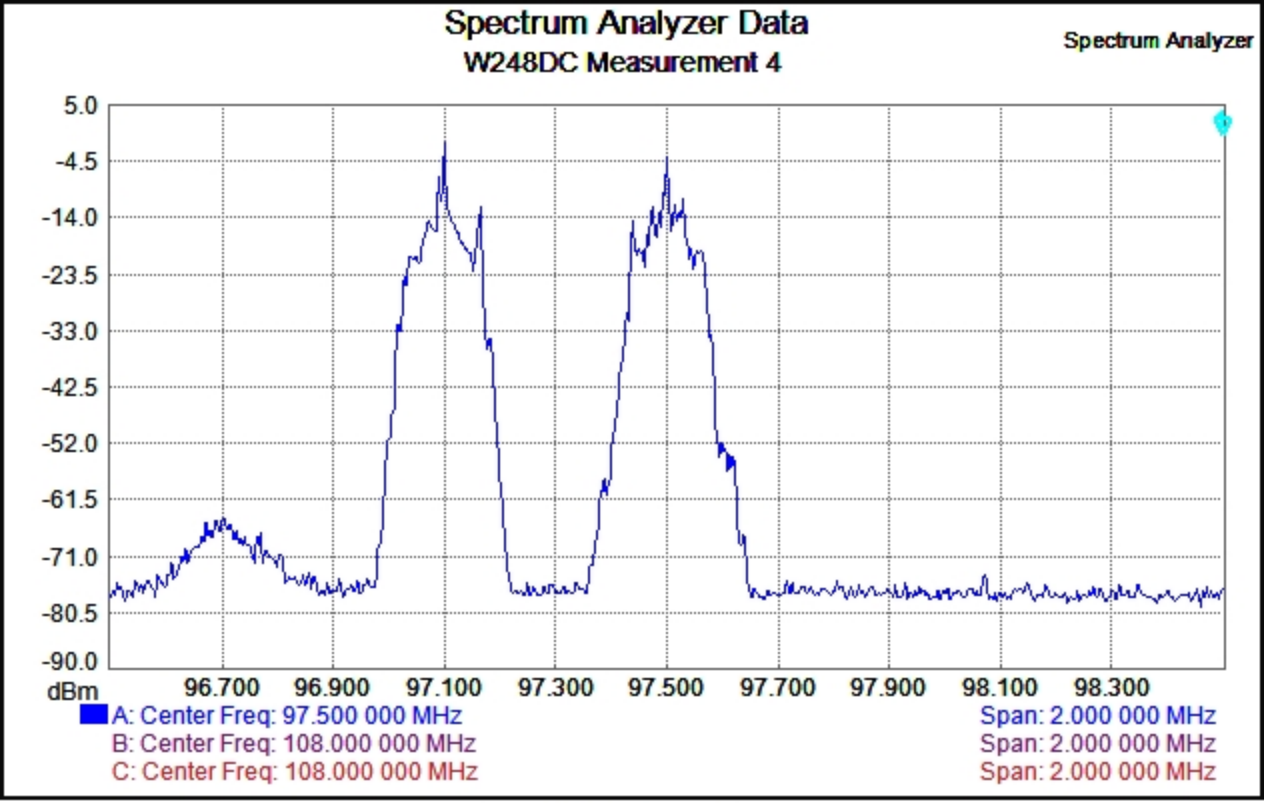
Spectrum Analyzer Data

W248DC Measurement 3



Measurement Parameters

Trace A data:Trace Average	50	Stop Frequency	98.500 000 MHz
Trace Mode	Average	Frequency Span	2.000 000 MHz
Preamp	OFF	Reference Level	-5.000 dBm
Min Sweep Time	0.001 S	Scale	8.5 dB/div
Reference Level Offset	0 dB	Serial Number	747076
Input Attenuation	30.0 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	97.500 000 MHz	Date	4/19/2021 12:28:20 PM
Start Frequency	96.500 000 MHz	Device Name	



Measurement Parameters

		Stop Frequency	98.500 000 MHz
Trace Mode	Max Hold	Frequency Span	2.000 000 MHz
Preamp	OFF	Reference Level	5.000 dBm
Min Sweep Time	0.001 S	Scale	9.5 dB/div
Reference Level Offset	0 dB	Serial Number	747076
Input Attenuation	30.0 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	97.500 000 MHz	Date	4/19/2021 12:34:43 PM
Start Frequency	96.500 000 MHz	Device Name	

W246DR (CH246) 97.1 MHz
Occupied Bandwidth Measurements
4/19/2021

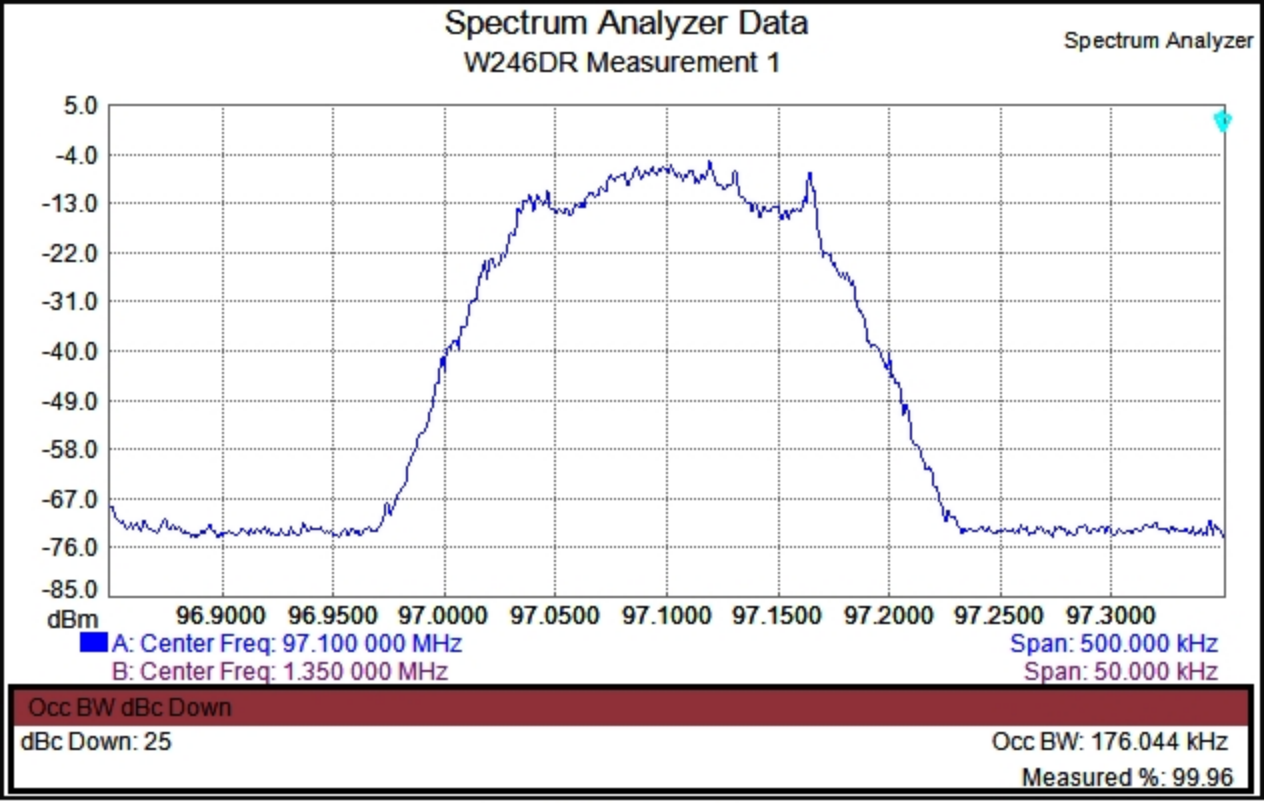
The measurements contained in this report were obtained with the use of an Anritsu Spectrum Analyzer, Model MS2721B serial number 0720137 by Albert Broadcast Services, Inc., Charlotte, NC on April 19, 2021.

The measurements were taken at the output terminal of the W248DC/W246DR 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 W248DC (CH248), 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 176.044 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).

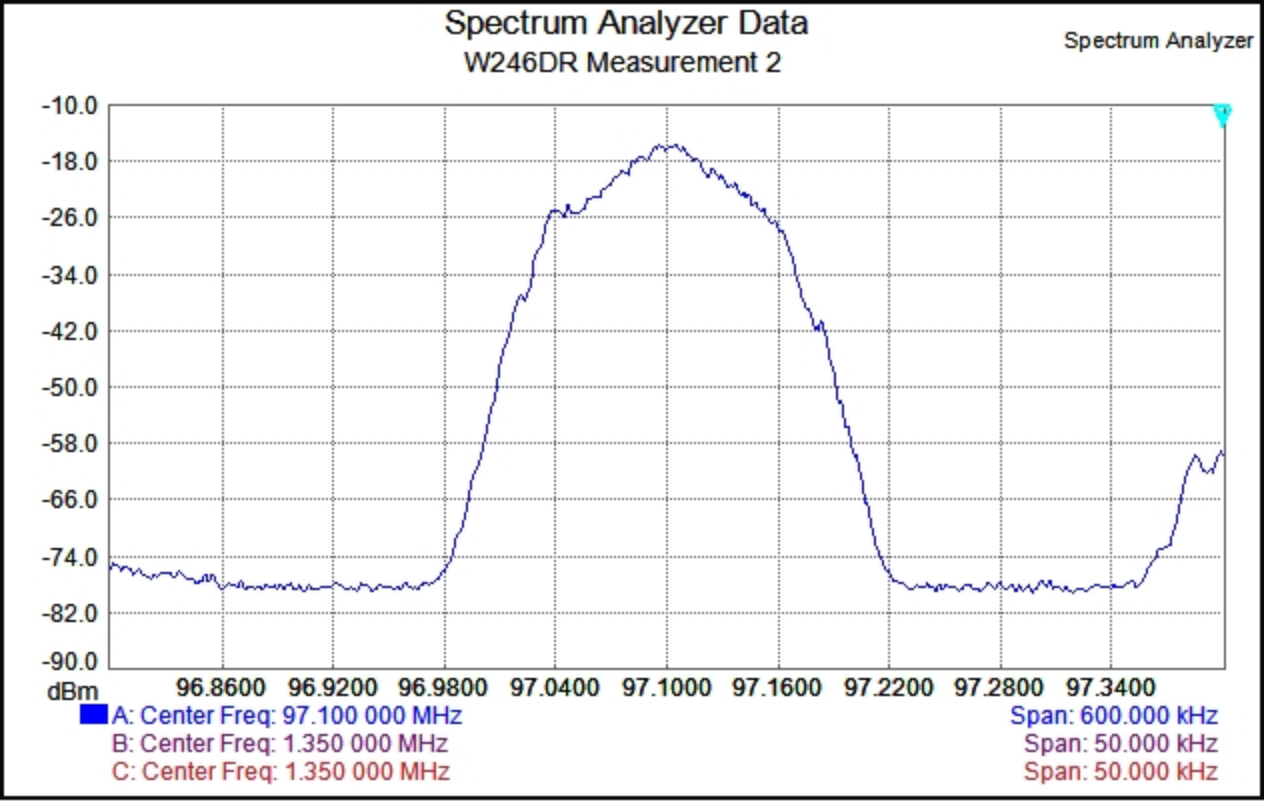


Measurement Parameters

		Stop Frequency	97.350 000 MHz
Trace Mode	Max Hold	Frequency Span	500.000 000 kHz
Preamp	OFF	Reference Level	5.000 dBm
Min Sweep Time	0.001 S	Scale	9.0 dB/div
Reference Level Offset	0 dB	Serial Number	747076
Input Attenuation	30.0 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	97.100 000 MHz	Date	4/19/2021 12:21:04 PM
Start Frequency	96.850 000 MHz	Device Name	

Spectrum Analyzer Data

W246DR Measurement 2

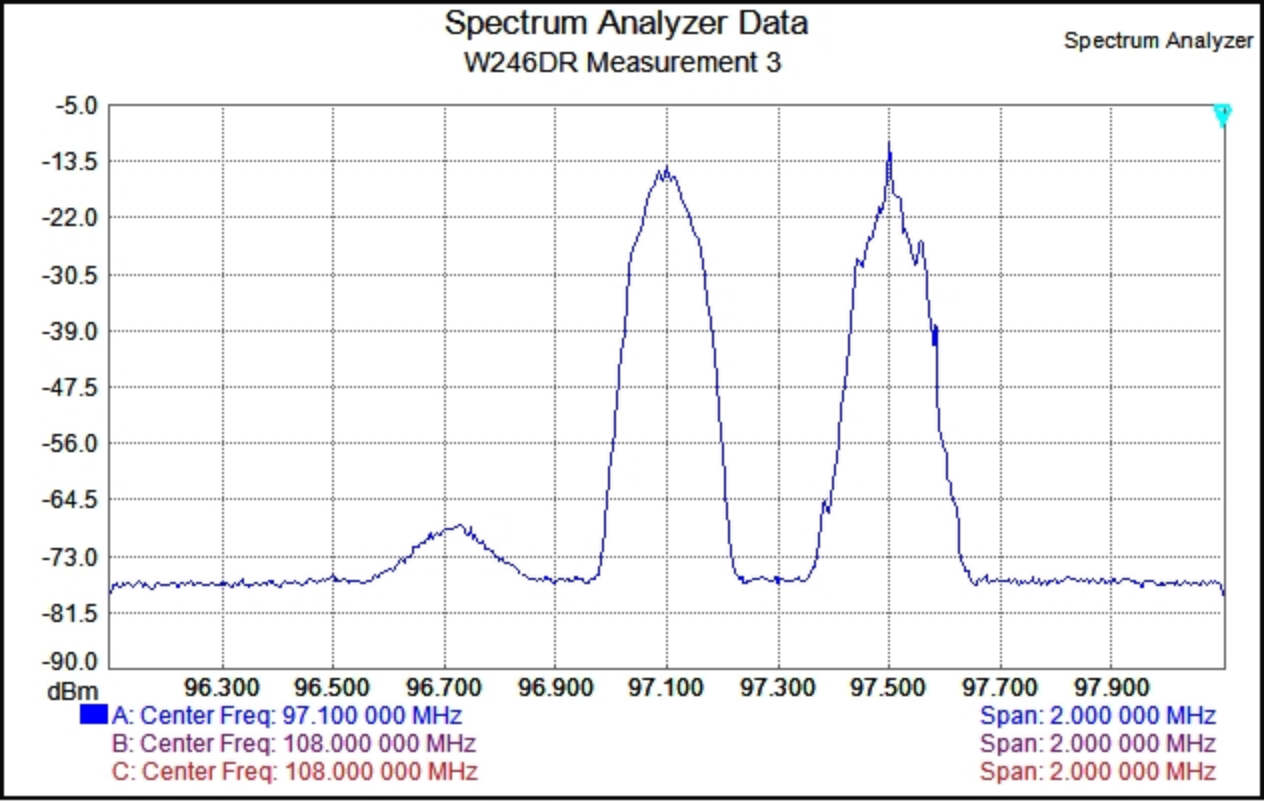


Measurement Parameters

Trace A data:Trace Average	50	Stop Frequency	97.400 000 MHz
Trace Mode	Average	Frequency Span	600.000 000 kHz
Preamp	OFF	Reference Level	-10.000 dBm
Min Sweep Time	0.001 S	Scale	8.0 dB/div
Reference Level Offset	0 dB	Serial Number	747076
Input Attenuation	30.0 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	97.100 000 MHz	Date	4/19/2021 12:25:48 PM
Start Frequency	96.800 000 MHz	Device Name	

Spectrum Analyzer Data

W246DR Measurement 3

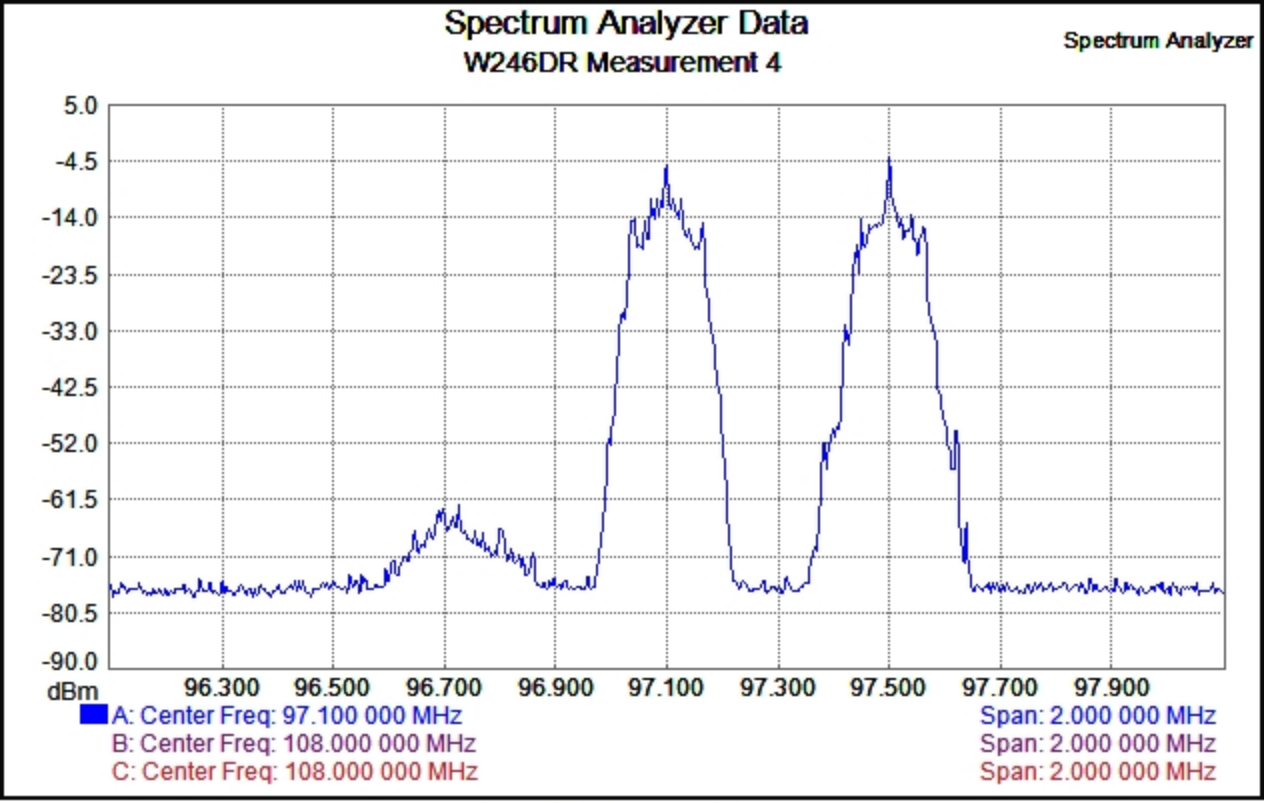


Measurement Parameters

Trace A data:Trace Average	50	Stop Frequency	98.100 000 MHz
Trace Mode	Average	Frequency Span	2.000 000 MHz
Preamp	OFF	Reference Level	-5.000 dBm
Min Sweep Time	0.001 S	Scale	8.5 dB/div
Reference Level Offset	0 dB	Serial Number	747076
Input Attenuation	30.0 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	97.100 000 MHz	Date	4/19/2021 12:29:20 PM
Start Frequency	96.100 000 MHz	Device Name	

Spectrum Analyzer Data

W246DR Measurement 4



Measurement Parameters

		Stop Frequency	98.100 000 MHz
Trace Mode	Max Hold	Frequency Span	2.000 000 MHz
Preamp	OFF	Reference Level	5.000 dBm
Min Sweep Time	0.001 S	Scale	9.5 dB/div
Reference Level Offset	0 dB	Serial Number	747076
Input Attenuation	30.0 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	97.100 000 MHz	Date	4/19/2021 12:38:04 PM
Start Frequency	96.100 000 MHz	Device Name	

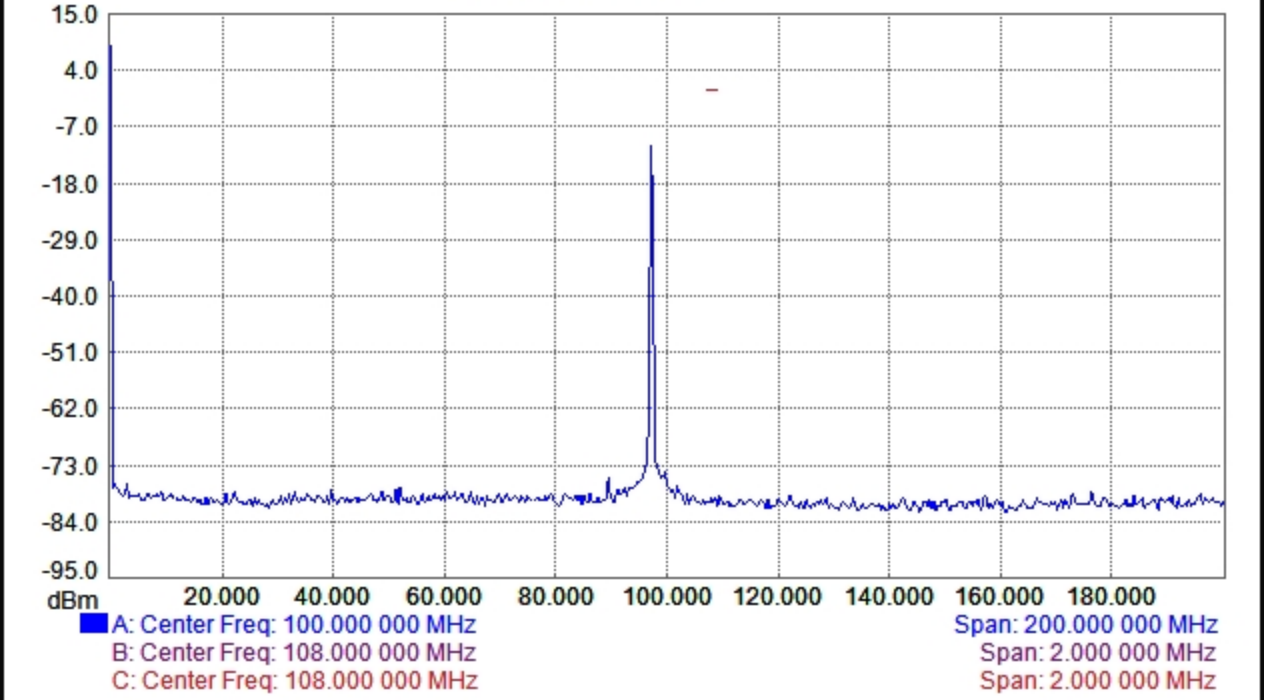
Combined Filter Measurements
4/19/2021

The swept response measurements of the combiner/filter arrangement were completed and supplied by American Amplifier Technologies, LLC, and are made a part of this report. Additionally, an RF sweep of the spectrum sufficient to show the sum and difference frequencies for W248DC and W246DR 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.

Spectrum Analyzer Data

Combined Measurement 1

Spectrum Analyzer



Measurement Parameters

		Stop Frequency	200.000 000 MHz
Trace Mode	Max Hold	Frequency Span	200.000 000 MHz
Preamp	OFF	Reference Level	15.000 dBm
Min Sweep Time	0.001 S	Scale	11.0 dB/div
Reference Level Offset	0 dB	Serial Number	747076
Input Attenuation	30.0 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	100.000 000 MHz	Date	4/19/2021 12:51:58 PM
Start Frequency	0.000 000 Hz	Device Name	

American Amplifier Technologies, LLC

Constant Impedance Combiner

C-IR-CC-2-4-2K-SP

Serial Number: 2977i

97.5 MHz
97.1 MHz

March 8, 2021

Prepared By:

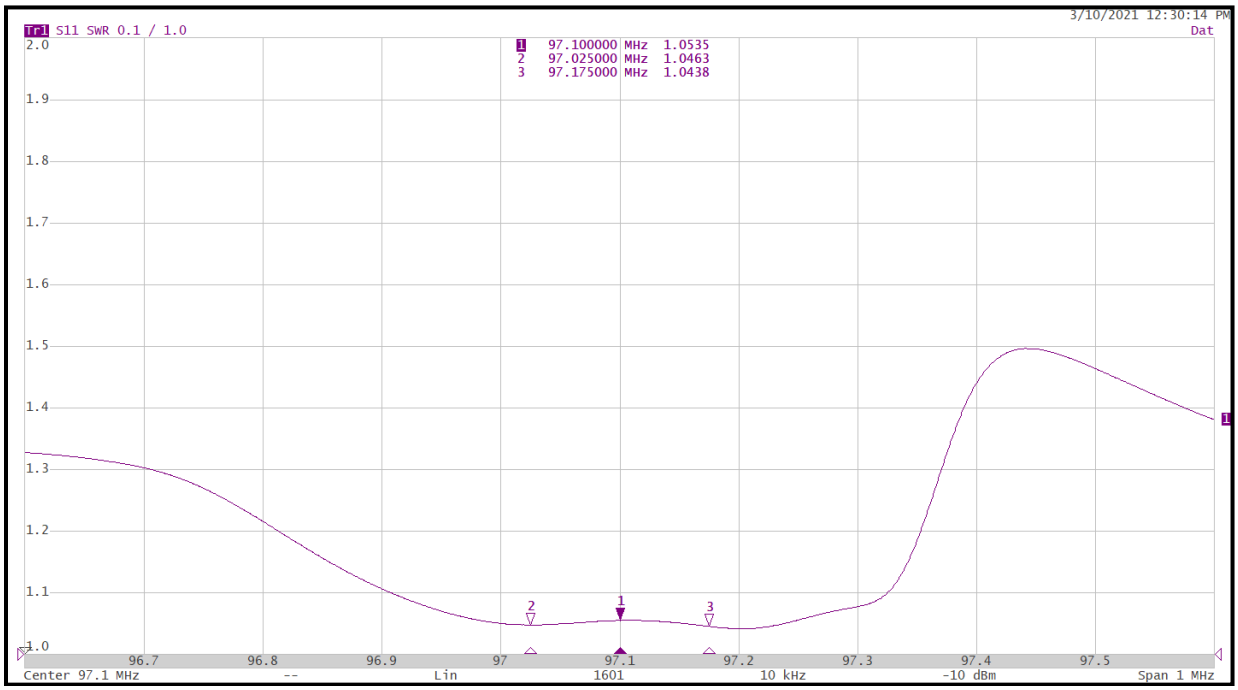
Jonathan Wilde

Jonathanw@americanamptech.com

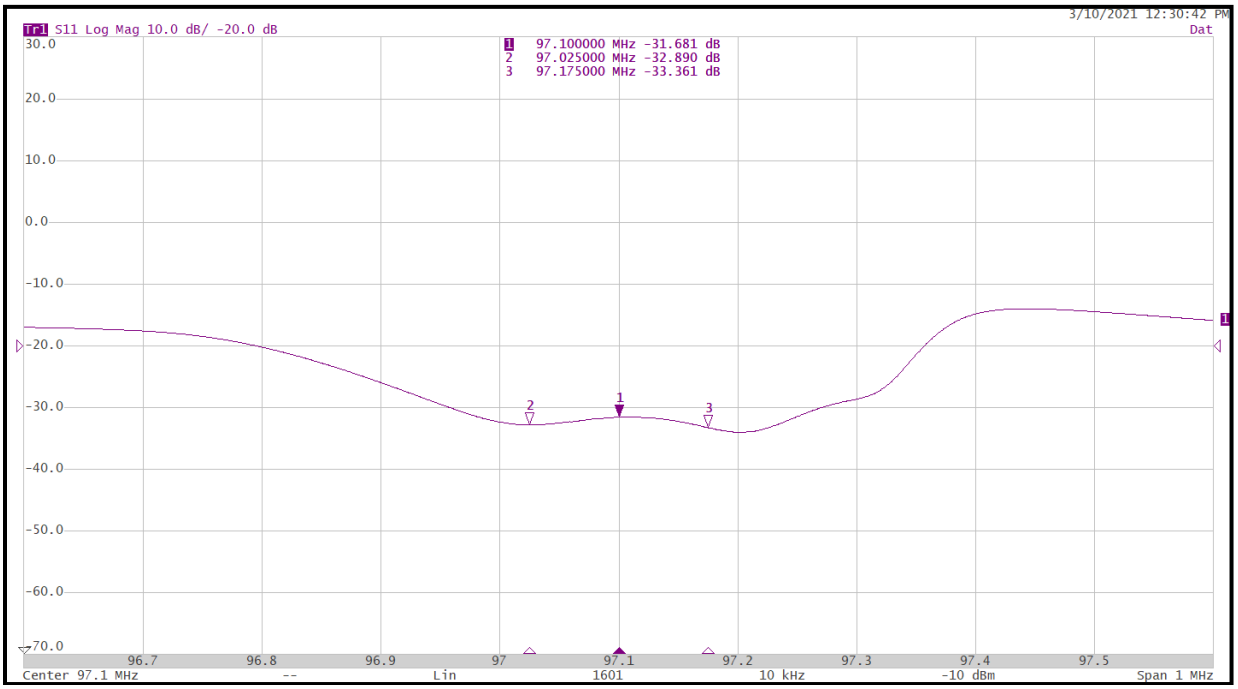
TABLE OF CONTENTS

Measurements

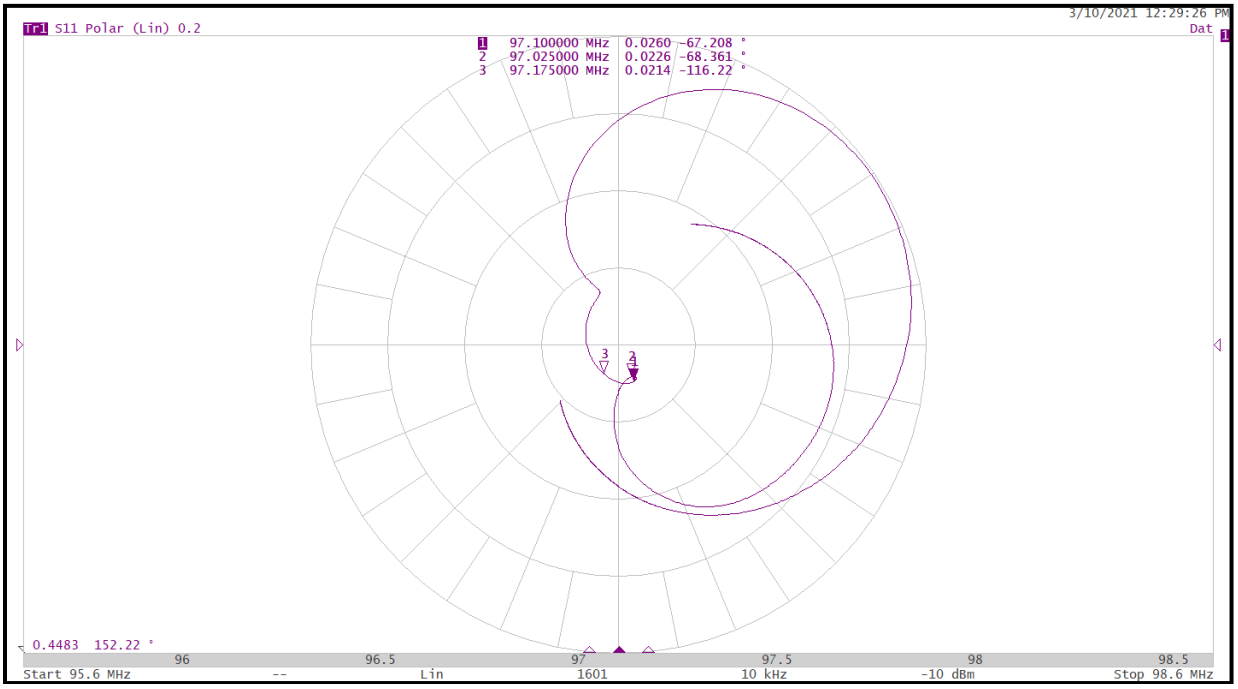
Measurement 1: VSWR 97.1 MHz



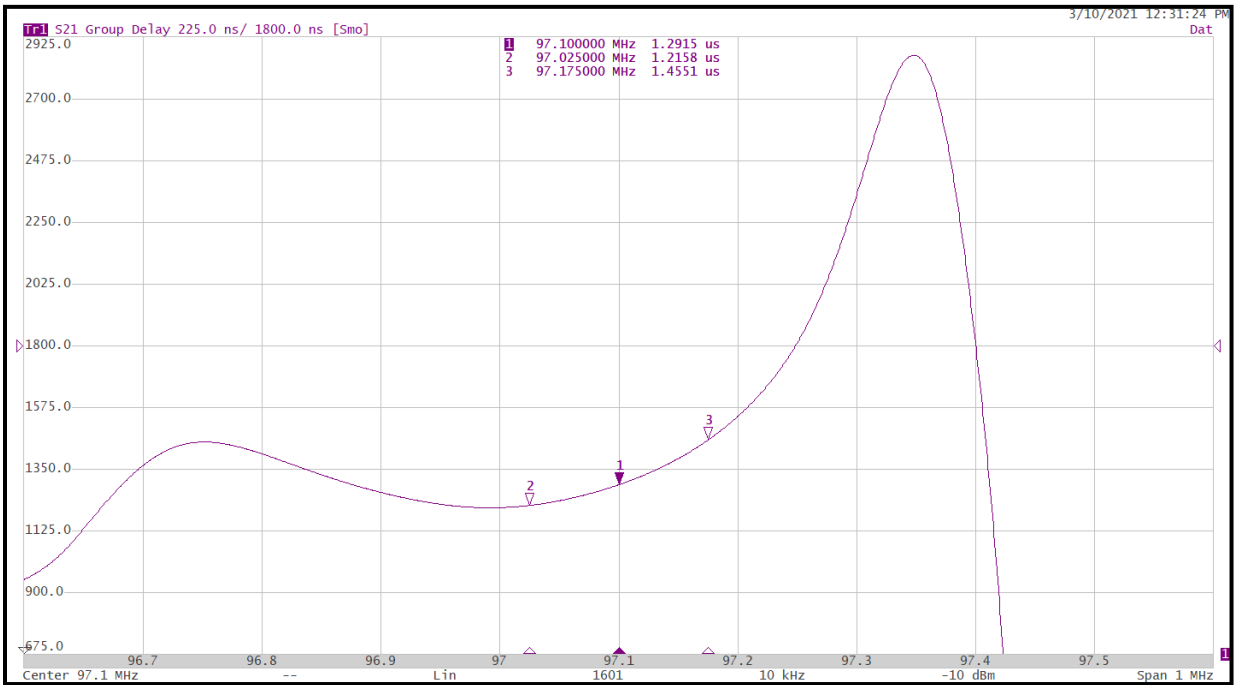
Measurement 2: Return Loss 97.1 MHz



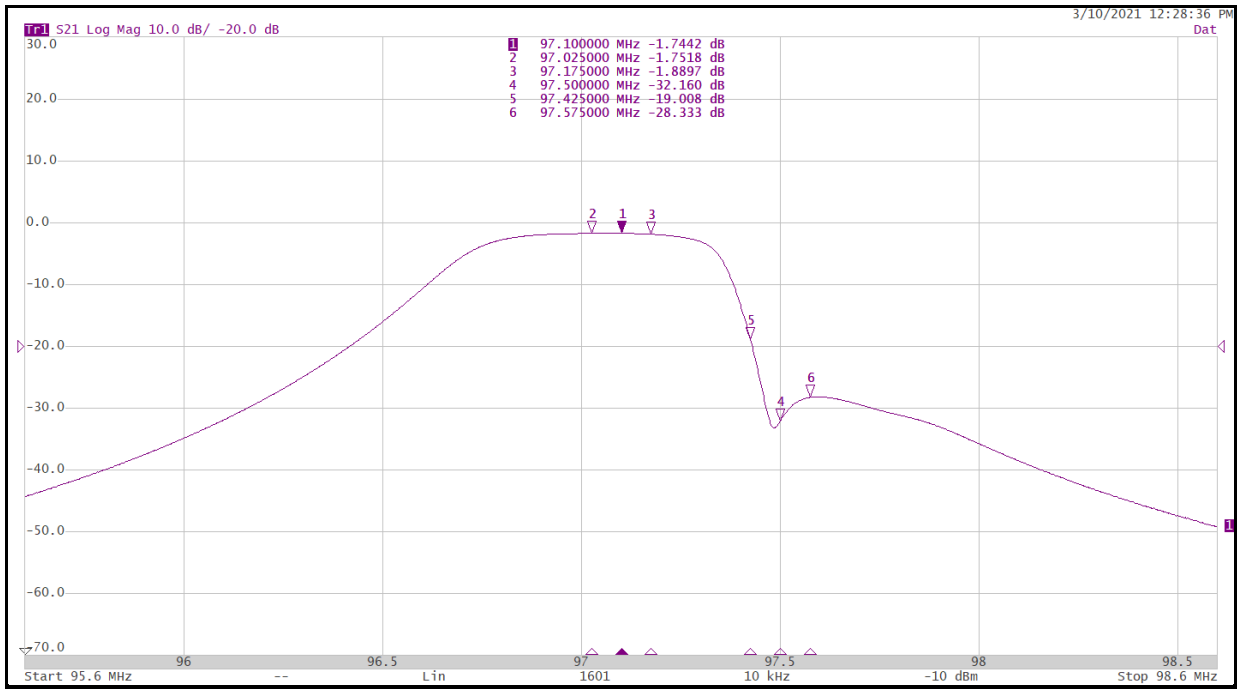
Measurement 3: Polar 97.1 MHz



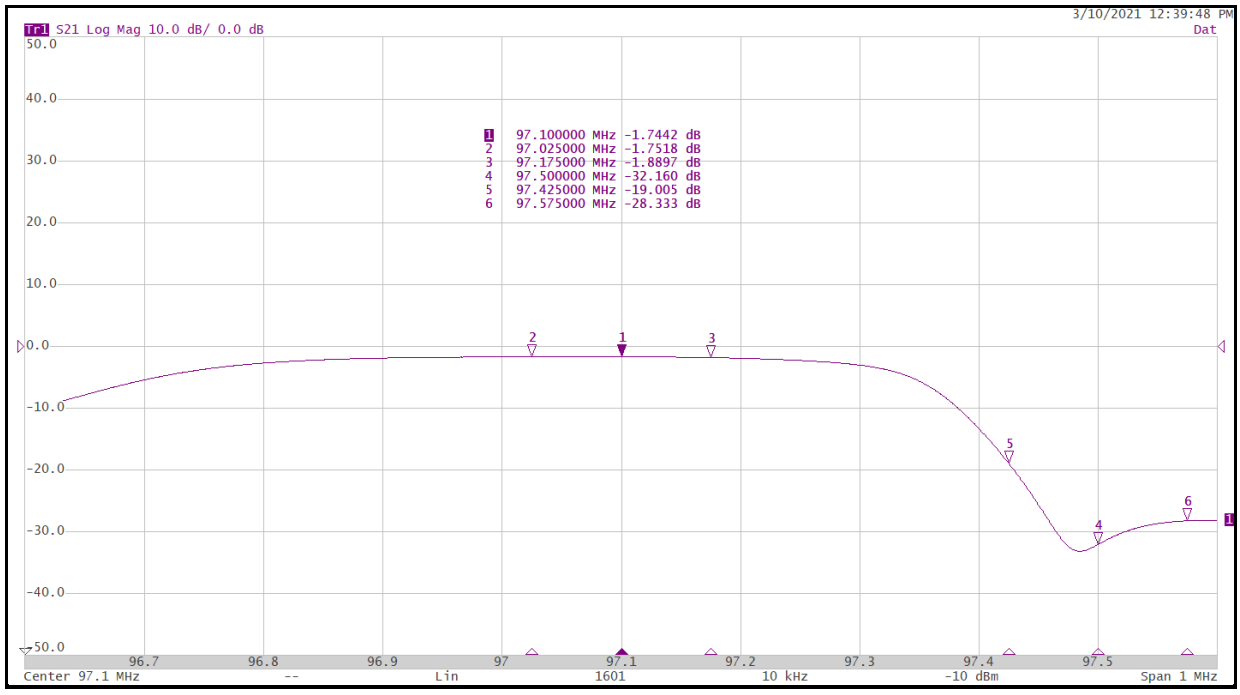
Measurement 4: Group Delay 97.1 MHz



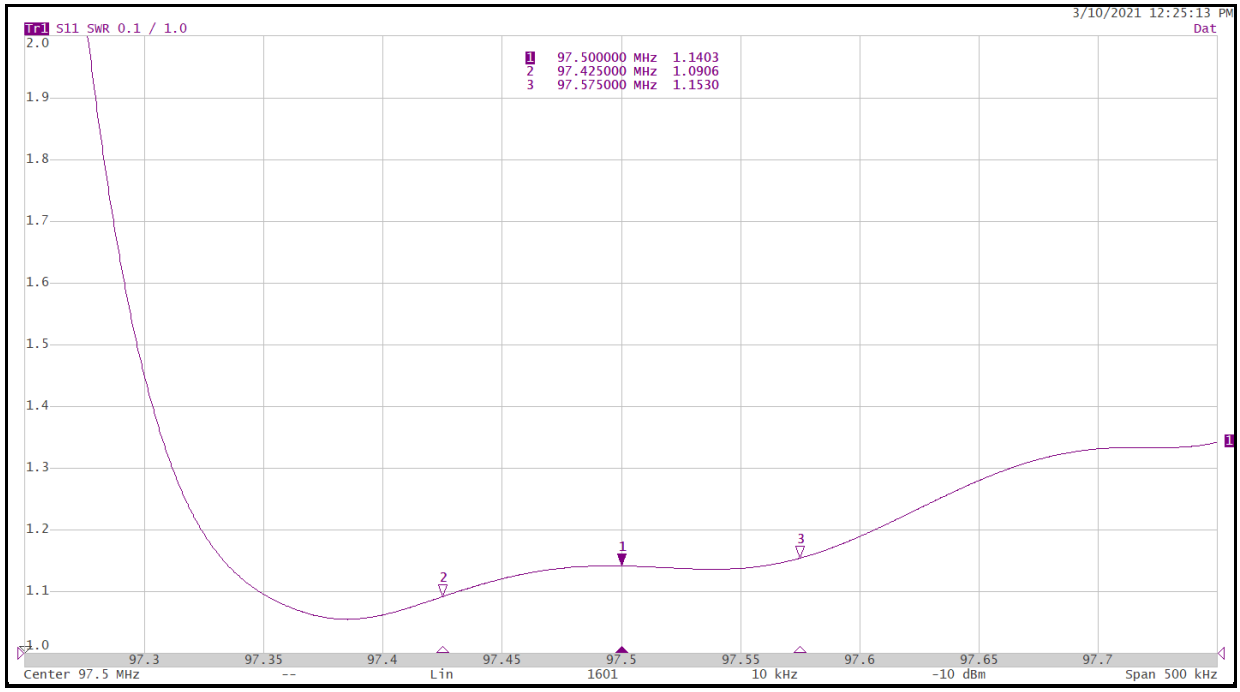
Measurement 5: Insertion Loss 97.1 MHz



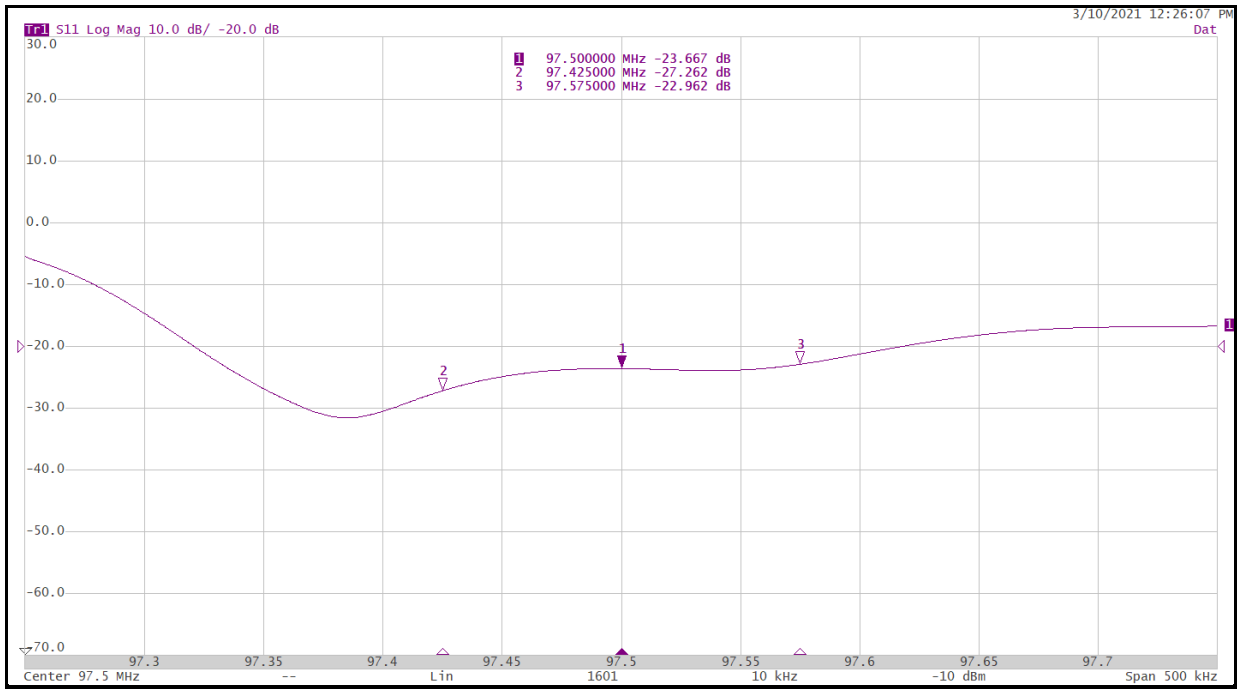
Measurement 6: Insertion Loss 98.7 1MHz Span



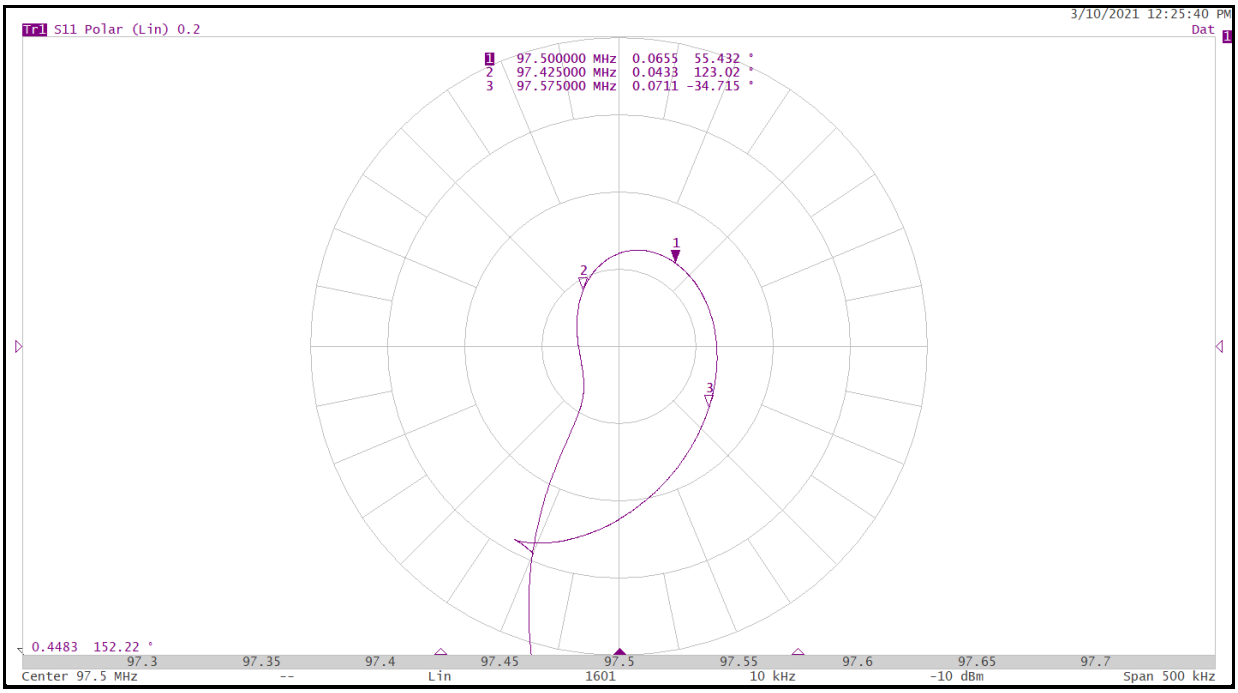
Measurement 7: VSWR 97.5 MHz



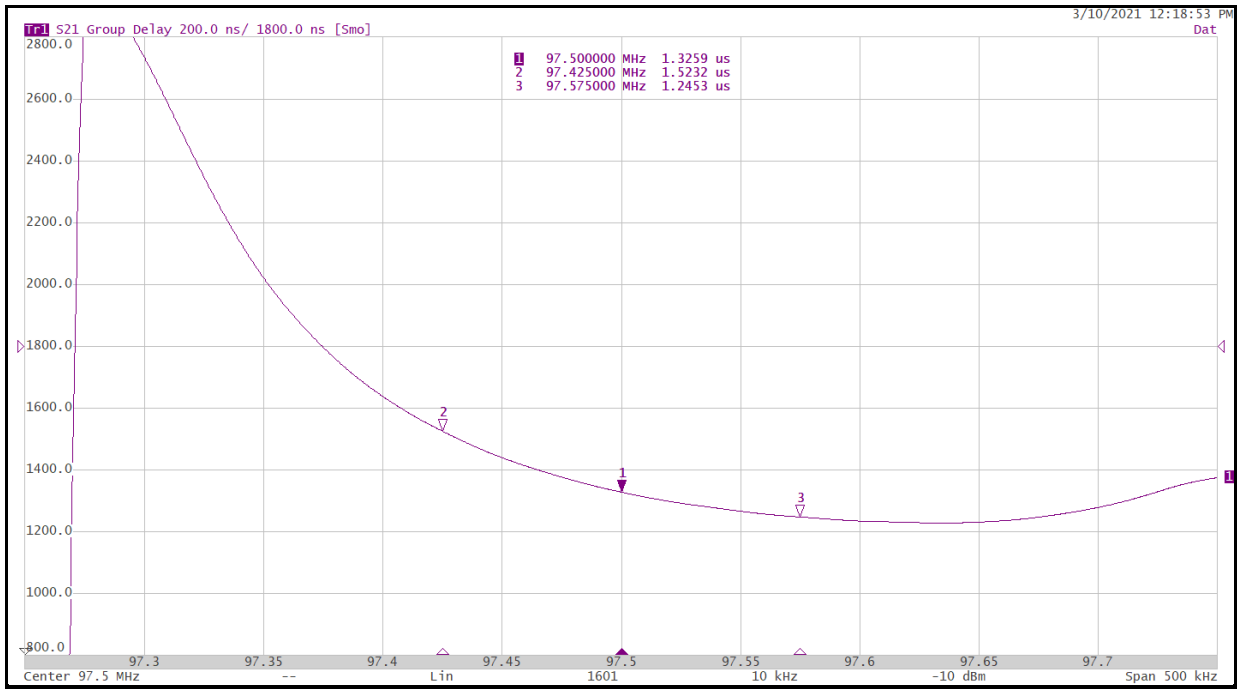
Measurement 8: Return Loss 97.5 MHz



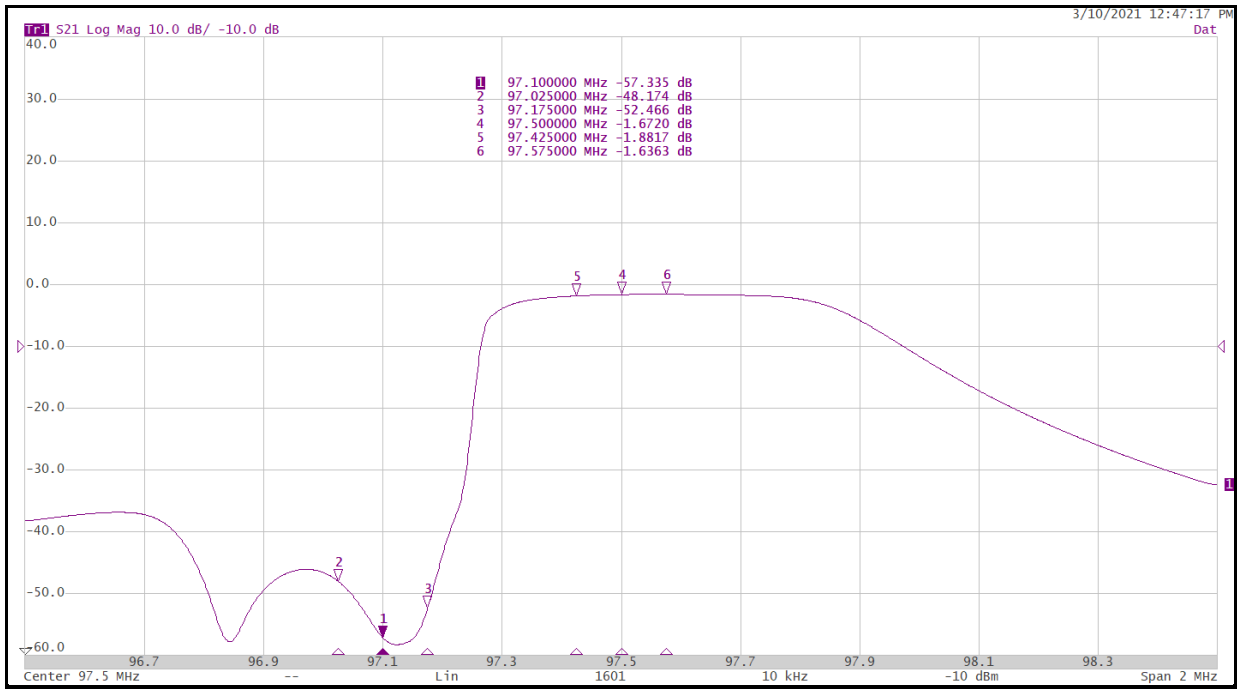
Measurement 9: Polar 97.5 MHz



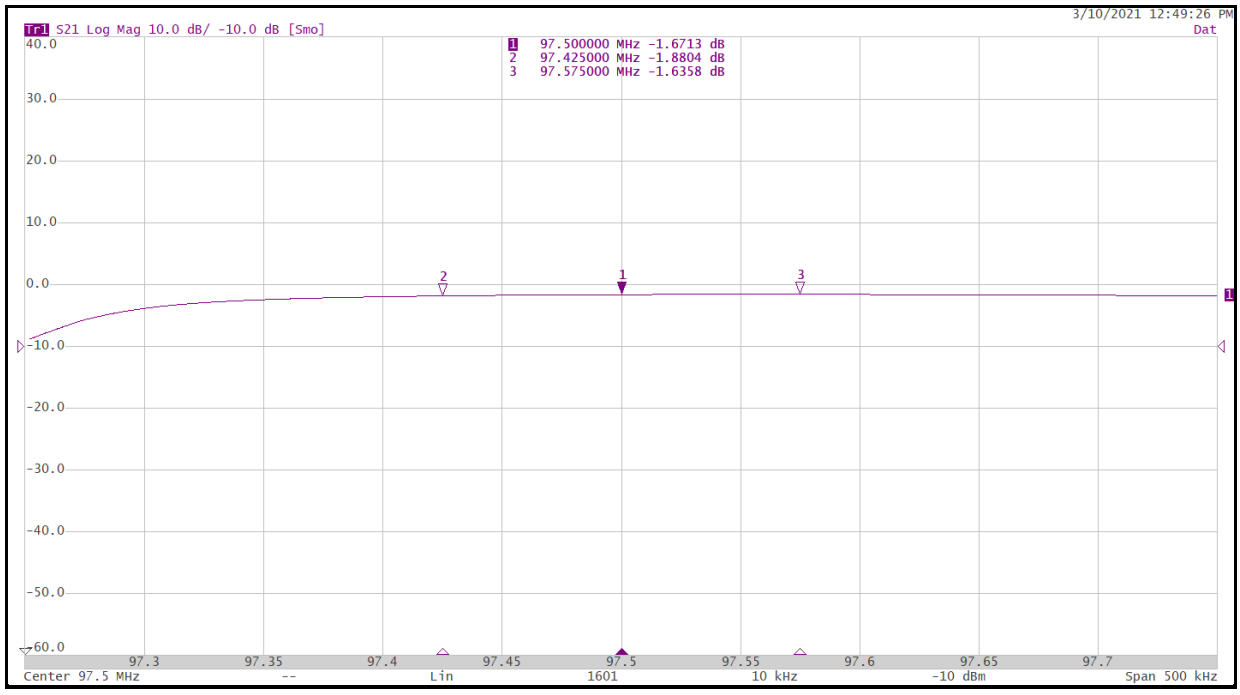
Measurement 10: Group Delay 97.5 MHz



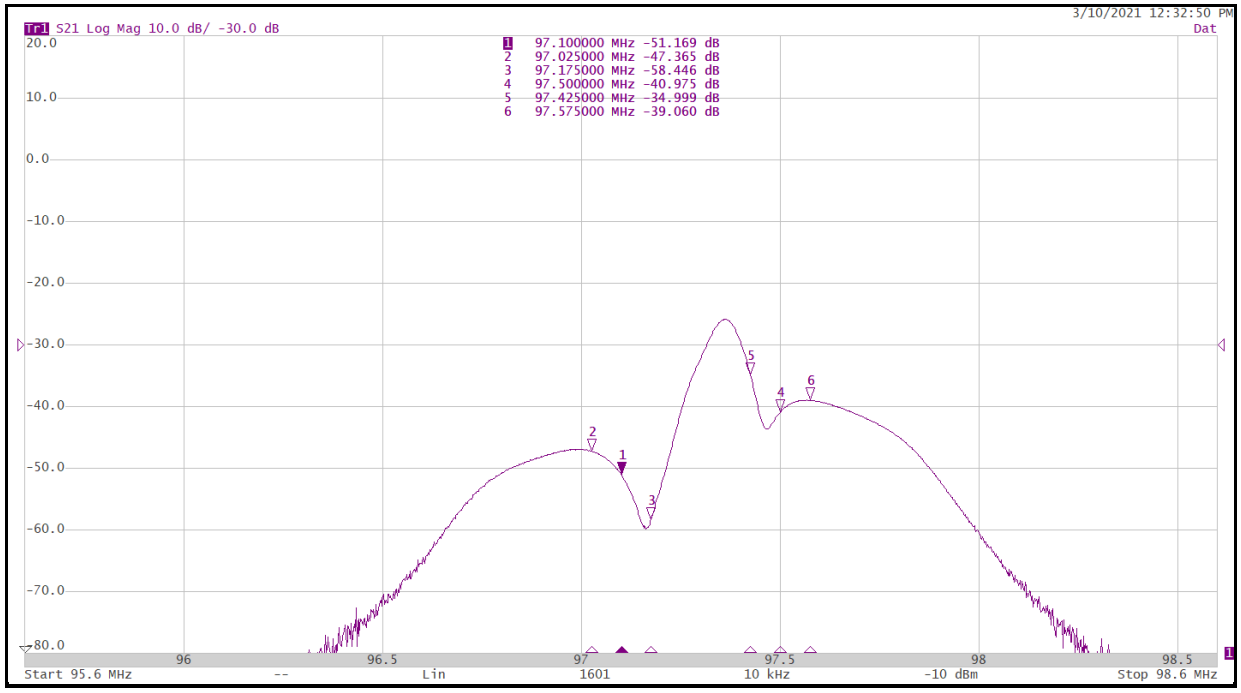
Measurement 11: Insertion Loss 97.5 MHz



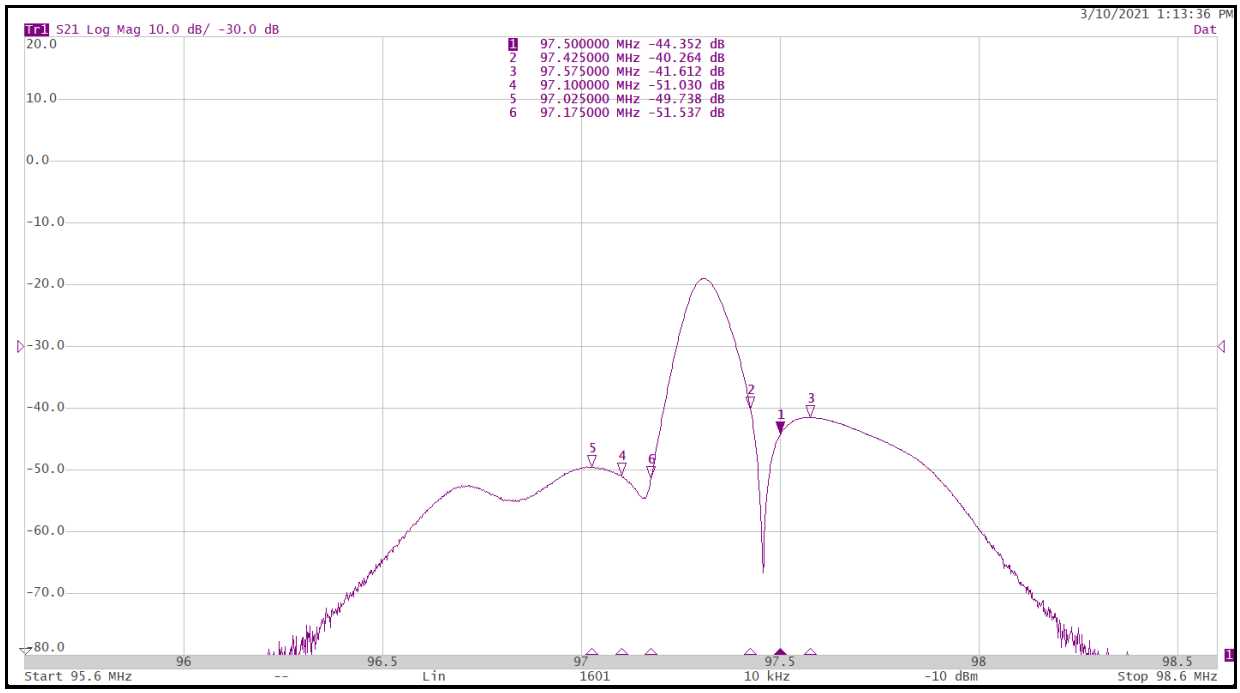
Measurement 12: Insertion Loss 97.5 MHz 500kHz Span



Measurement 13: Port to Port Isolation Transmit 97.1, Receive 97.5MHz



Measurement 14: Port to Port Isolation Transmit 97.5, Receive 97.1MHz



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