

FM Combiner Measurements

W242CB & W298BI
Community Broadcasters, LLC
Florence, SC

8/22/2021

Albert Broadcast Services, Inc.

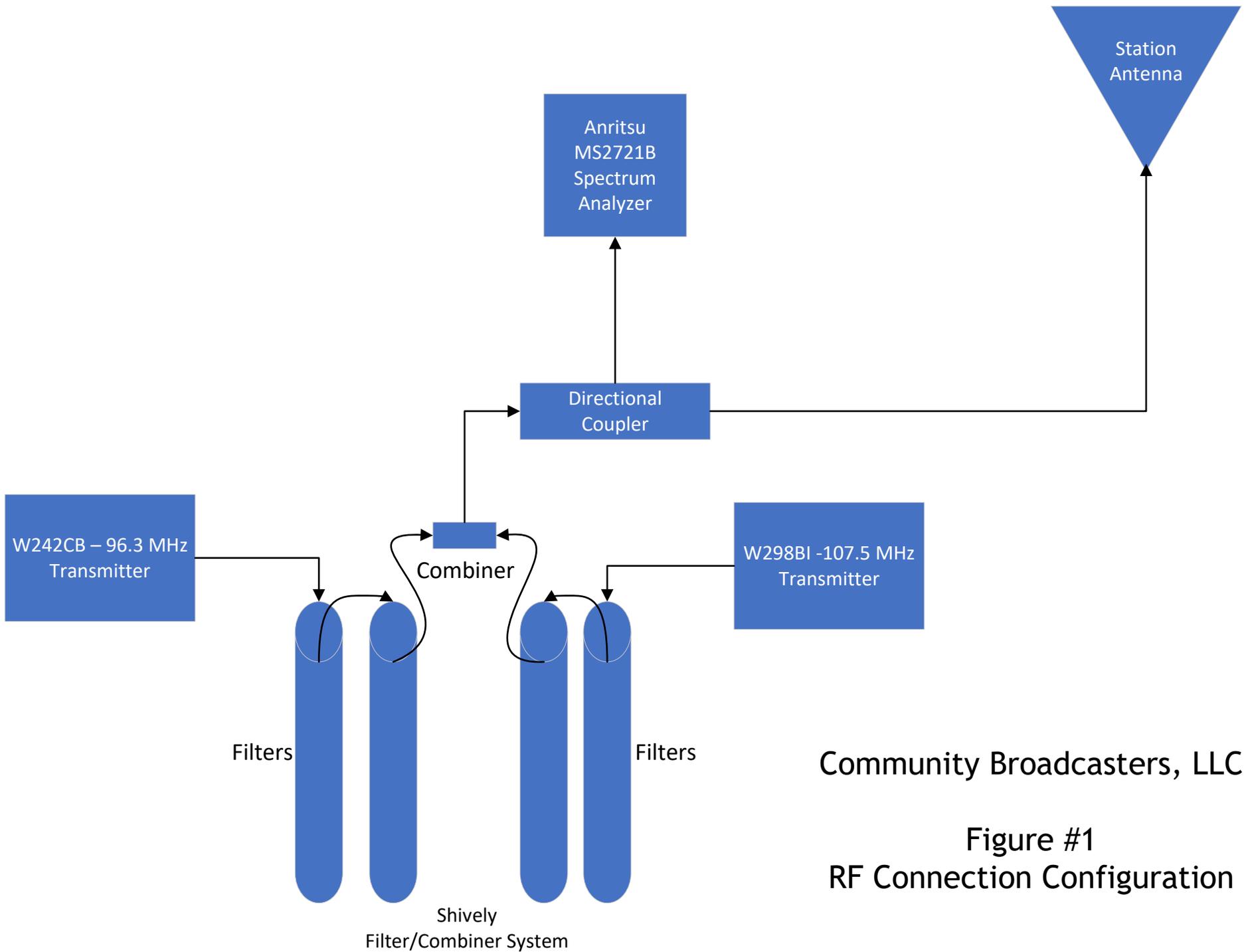
Overview

Community Broadcasters, LLC has filed an application to modify the antenna height of W298BI (107.5 MHz), co-located with, and operating into the same antenna as station W242CB (96.3 MHz). As such, sufficient measurements to ensure compliance with 47 C.F.R. 73.317 rules regarding spurious signal transmission was required. The report contained herein certifies compliance with the applicable rules for combining two transmitters into a common antenna.

The two stations seek to operate into a combiner/filter arrangement feeding a common antenna on a tower located West of the junction of I-20 and I-95 in Florence County, 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 Shively Labs - provided combiner/filter arrangement was installed correctly and performing per the manufacturer's specifications.

In summary, both stations, W242CB and W298BI were found to be in compliance with all applicable FCC rules and NRSC recommended practices when simultaneously operated through the combiner/filter system.



Community Broadcasters, LLC

Figure #1
RF Connection Configuration

W242CB - 96.3 MHz
Occupied Bandwidth Measurements
8/22/2021

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 August 22, 2021.

The measurements were taken at the output terminal of the W242CB/W298BI 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 W242CB 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 175.136 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 ($43+10\log^{10}(250\text{Watts})$ dB).

Save

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y z - _ +

Back Space

Change

Save

Location

Change Type

Setup/JPEG/...

Ref Lvl
20.0 dBm

Input Atten
40.0 dB

Detection
Peak

#RBW
1 kHz

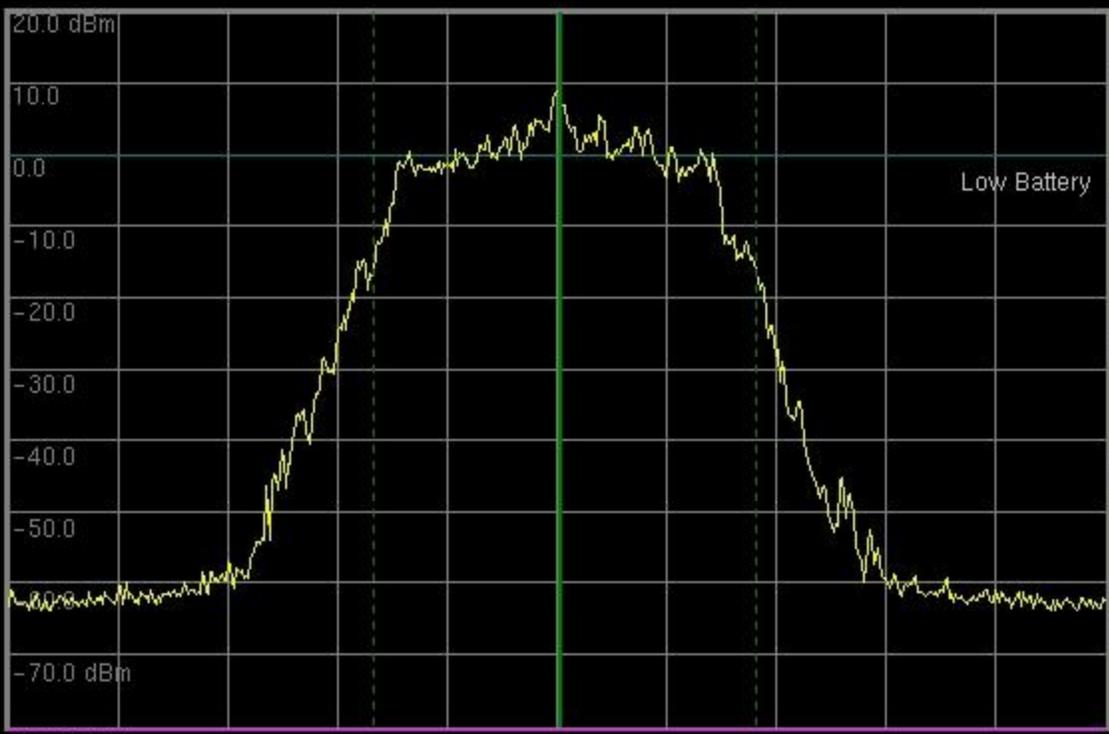
VBW
300 Hz

Sweep Time
199 ms

Traces
A: Max Hold
B: Trace Hold
C: Trace Hold

Sweep
Continuous

Freq Ref
Int Std Accy



96.050 MHz **Center** 96.300 MHz 96.550 MHz
Span 500.000 kHz

Occ BW dB Down > dBc 25 Occ BW: 175.136 kHz Measured : 99.84 %

| Freq | Amplitude | Span | BW | Marker |
|------|-----------|------|----|--------|
|------|-----------|------|----|--------|

Save

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p q r

s t u

v w x

y z - _ +

Back Space

Change

Save

Location

Change Type

Setup/JPEG/...

Low Battery

Ref Lvl
10.0 dBm

Input Atten
30.0 dB

Detection
Peak

#RBW
1 kHz

#VBW
3 MHz

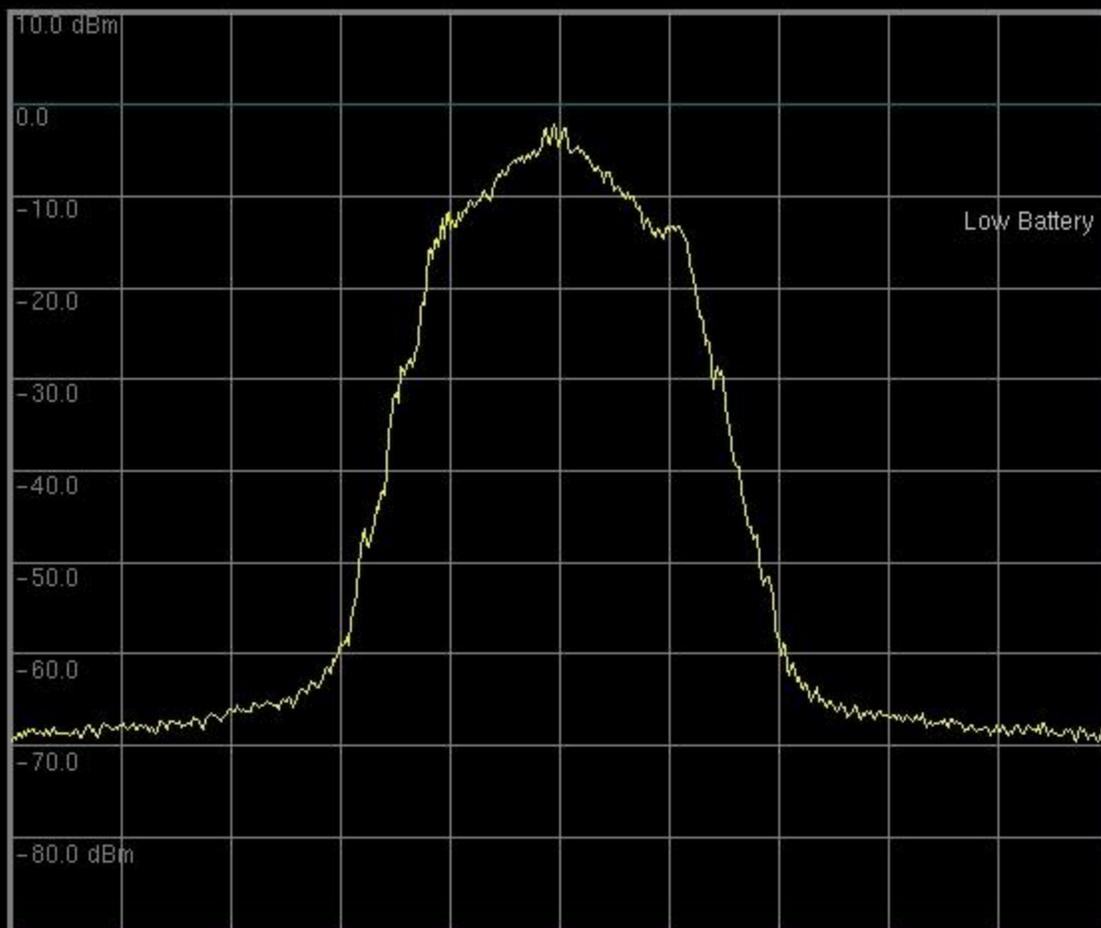
Sweep Time
207 ms

Traces
A: Average
B: Trace Hold
C: Trace Hold

Trace Count
50/50

Sweep
Continuous

Freq Ref
Int Std Accy



96.000 MHz

Center 96.300 MHz

96.600 MHz

Span 600.000 kHz

Freq

Amplitude

Span

BW

Marker

Low Battery

Ref Lvl
10.0 dBm

Input Atten
30.0 dB

Detection
Peak

#RBW
1 kHz

#VBW
3 MHz

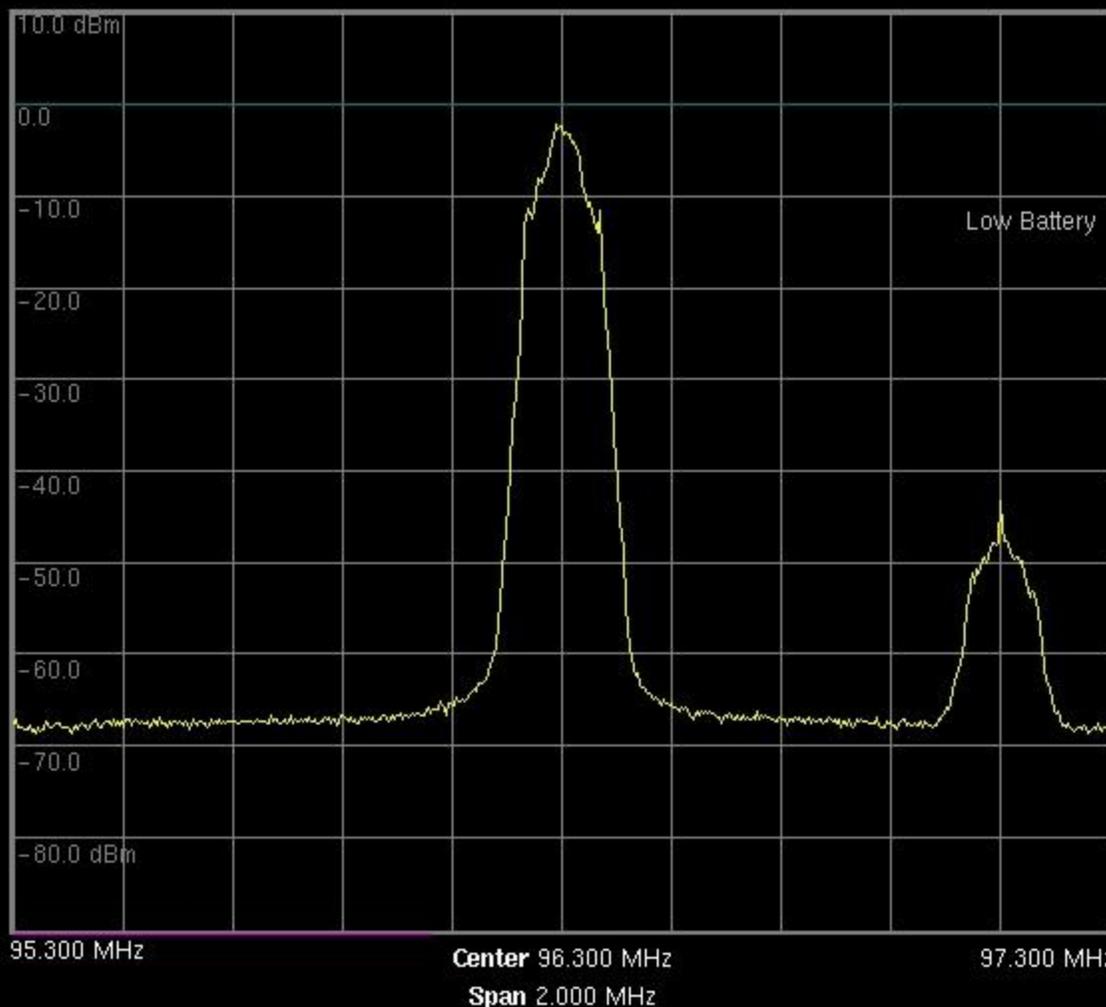
Sweep Time
516 ms

Traces
A: Average
B: Trace Hold
C: Trace Hold

Trace Count
50/50

Sweep
Continuous

Freq Ref
Int Std Accy



Freq

Amplitude

Span

BW

Marker

Save

a b c

d e f

g h i

j k l

m n o

p q r

s t u

v w x

y z - _ +

Back Space

Change

Save

Location

Change Type

Setup/JPEG/...

Low Battery

Ref Lvl
10.0 dBm

Input Atten
30.0 dB

Detection
Peak

#RBW
300 Hz

#VBW
3 MHz

Sweep Time
1.449 s

Traces

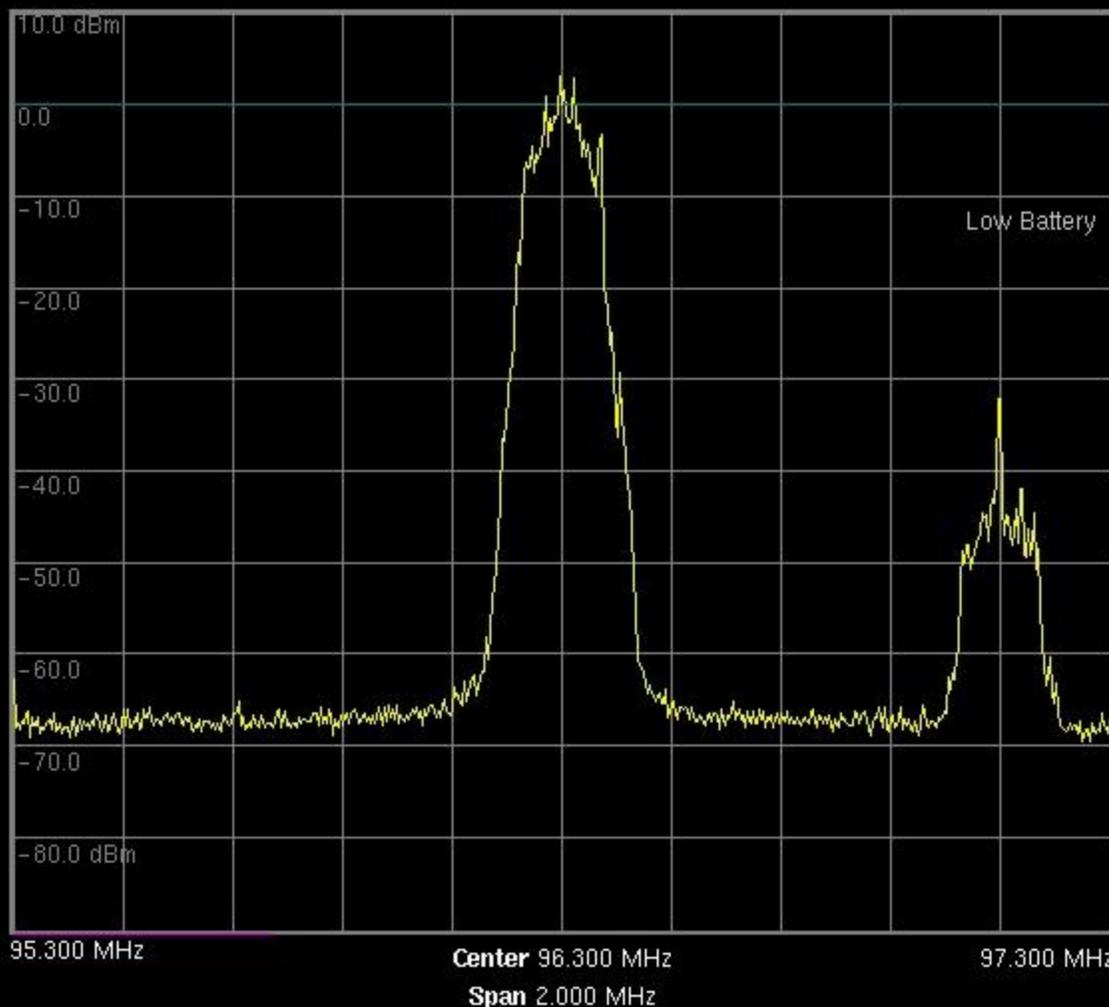
A: Max Hold

B: Trace Hold

C: Trace Hold

Sweep
Continuous

Freq Ref
Int Std Accy



Freq

Amplitude

Span

BW

Marker

W298BI – 107.5 MHz
Occupied Bandwidth Measurements
8/22/2021

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 August 22, 2021.

The measurements were taken at the output terminal of the W242CB/W298BI 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 W298BI 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 155.172 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 ($43+10\log^{10}(250\text{Watts})$ dB).

Save

a b c

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g h i

j k l

m n o

p q r

s t u

v w x

y z - _ +

Back Space

Change

Save

Location

Change Type

Setup/JPEG/...

Ref Lvl
20.0 dBm

Input Atten
40.0 dB

Detection
Peak

#RBW
1 kHz

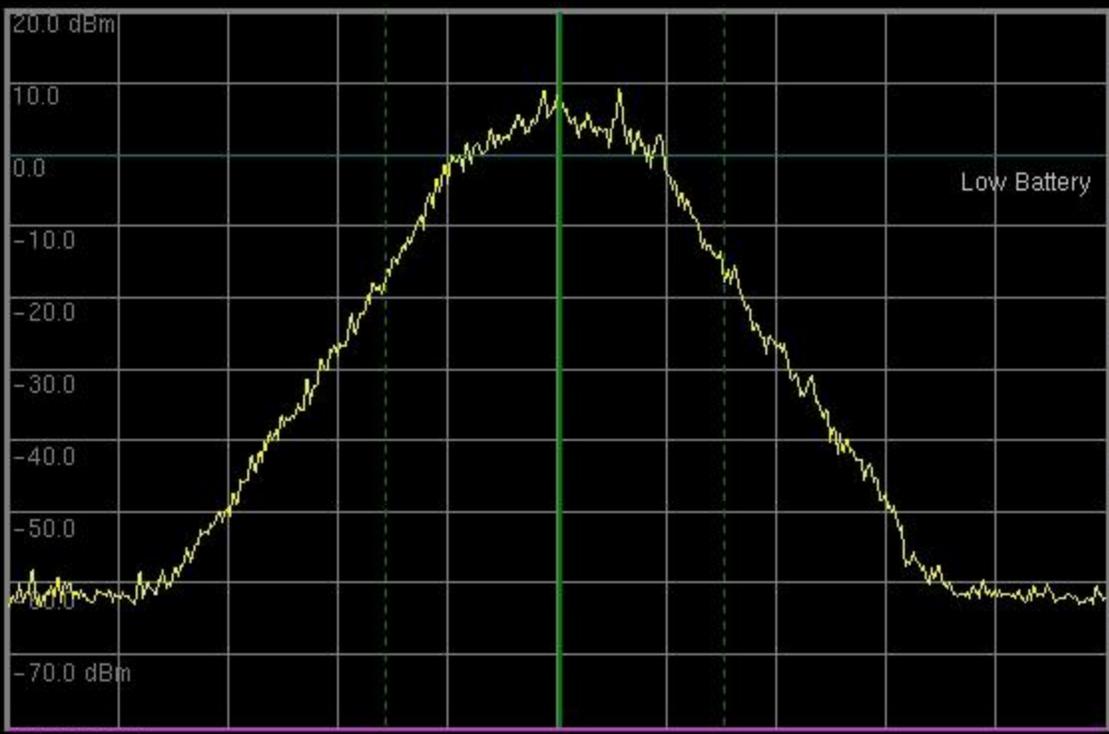
#VBW
300 Hz

Sweep Time
199 ms

Traces
A: Max Hold
B: Trace Hold
C: Trace Hold

Sweep
Continuous

Freq Ref
Int Std Accy



107.250 MHz **Center** 107.500 MHz 107.750 MHz
Span 500.000 kHz

| | |
|----------------|---------------------|
| Occ BW dB Down | |
| > dBc 25 | Occ BW: 155.172 kHz |
| | Measured : 99.83 % |

| Freq | Amplitude | Span | BW | Marker |
|------|-----------|------|----|--------|
|------|-----------|------|----|--------|

Save

a b c

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p q r

s t u

v w x

y z - _ +

Back Space

Change

Save

Location

Change Type

Setup/JPEG/...

Low Battery

Ref Lvl

10.0 dBm

Input Atten

30.0 dB

Detection

Peak

#RBW

1 kHz

#VBW

3 MHz

Sweep Time

207 ms

Traces

A: Average

B: Trace Hold

C: Trace Hold

Trace Count

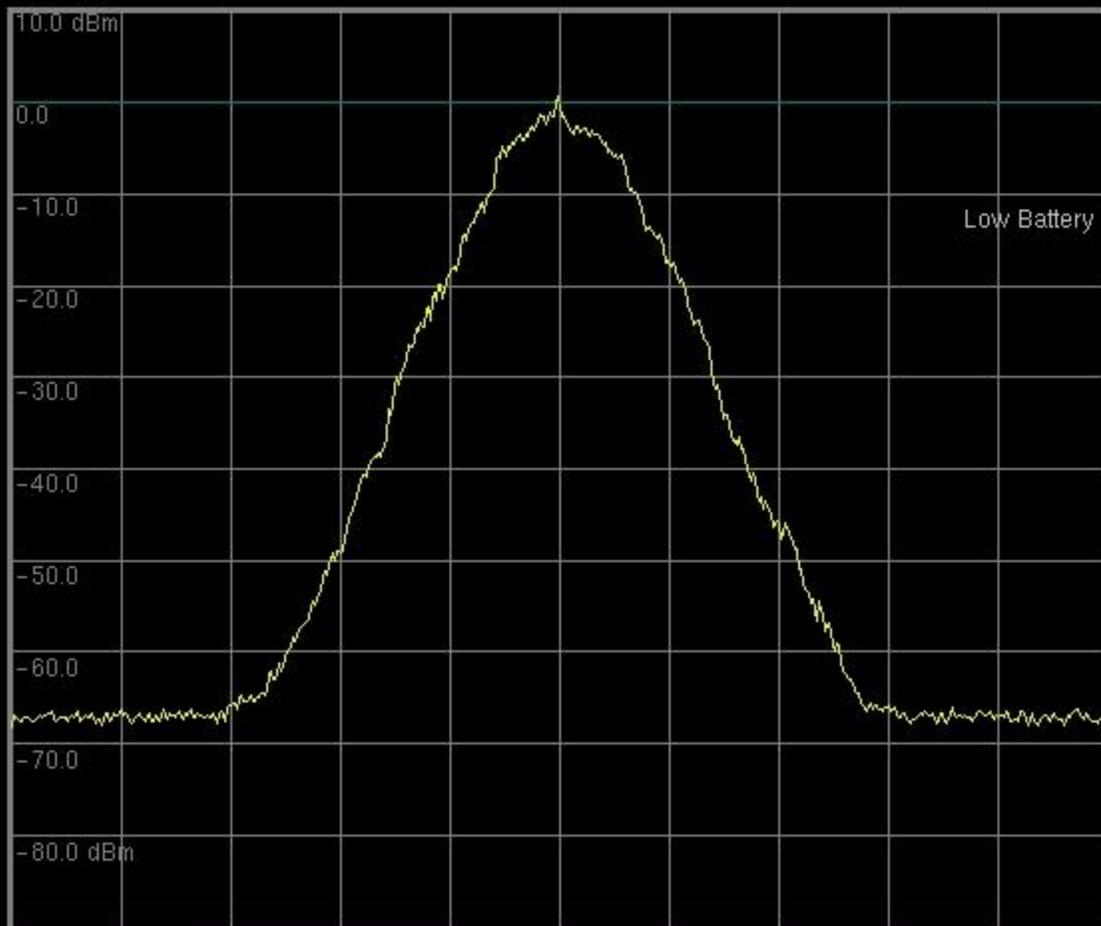
50/50

Sweep

Continuous

Freq Ref

Int Std Accy



107.200 MHz

Center 107.500 MHz

107.800 MHz

Span 600.000 kHz

Freq

Amplitude

Span

BW

Marker

Save

a b c

d e f

g h i

j k l

m n o

p q r

s t u

v w x

y z - _ +

Back Space

Change

Save

Location

Change Type

Setup/JPEG/...

Low Battery

Ref Lvl
10.0 dBm

Input Atten
30.0 dB

Detection
Peak

#RBW
1 kHz

#VBW
3 MHz

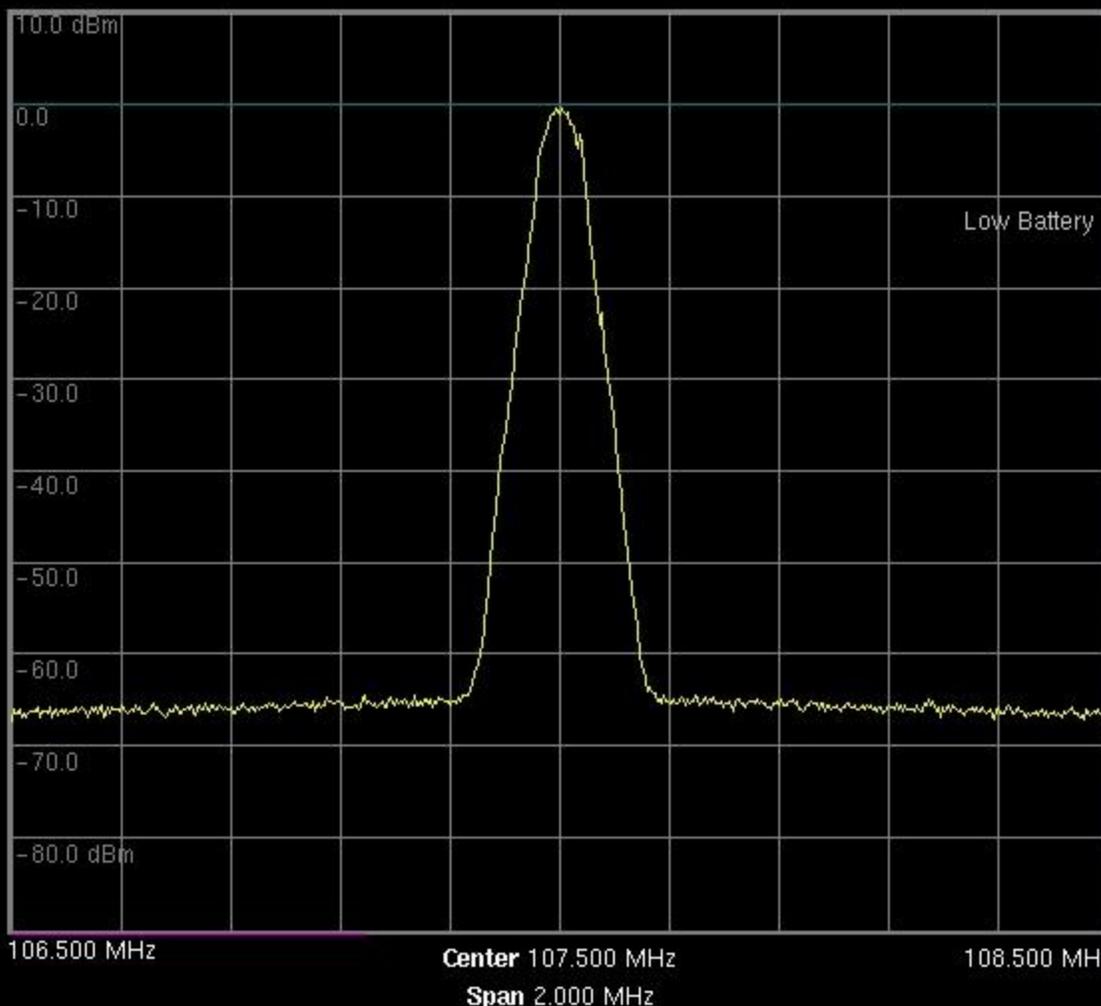
Sweep Time
516 ms

Traces
A: Average
B: Trace Hold
C: Trace Hold

Trace Count
50/50

Sweep
Continuous

Freq Ref
Int Std Accy



Freq

Amplitude

Span

BW

Marker

Save

a b c

d e f

g h i

j k l

m n o

p q r

s t u

v w x

y z - _ +

Back Space

Change

Save

Location

Change Type

Setup/JPEG/...

Low Battery

Ref Lvl
10.0 dBm

Input Atten
30.0 dB

Detection
Peak

#RBW
300 Hz

#VBW
3 MHz

Sweep Time
1.449 s

Traces

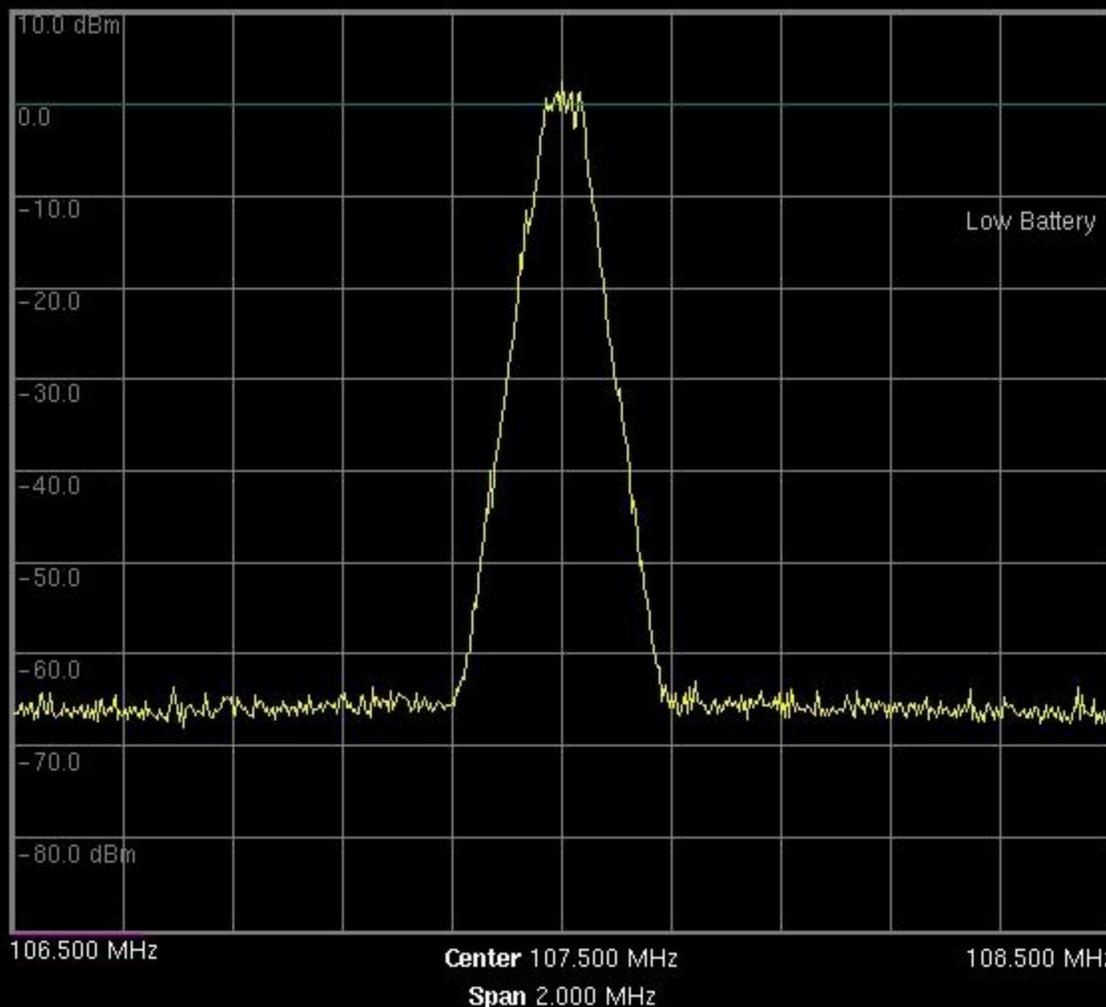
A: Max Hold

B: Trace Hold

C: Trace Hold

Sweep
Continuous

Freq Ref
Int Std Accy



Freq

Amplitude

Span

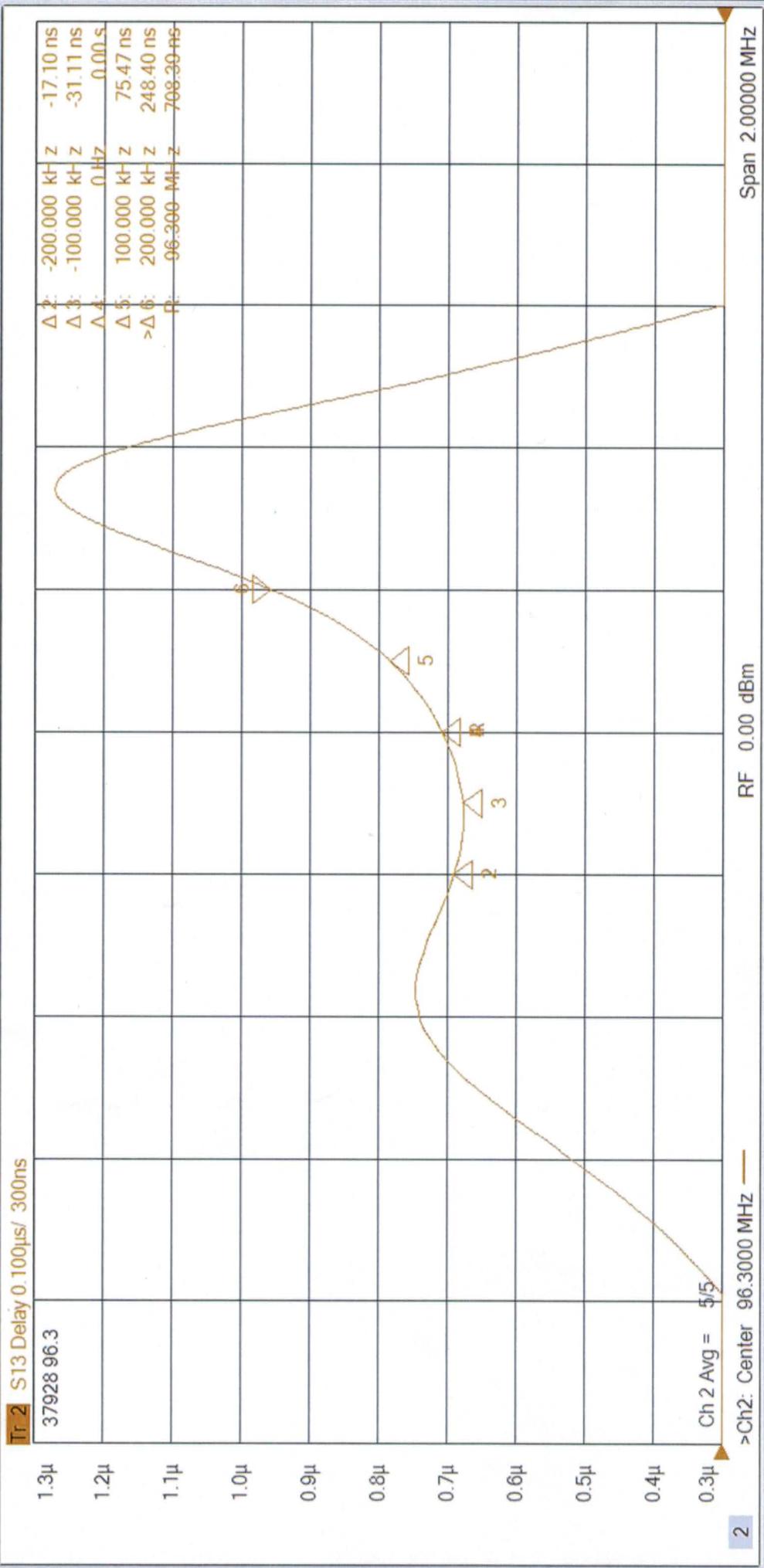
BW

Marker

Combined Filter Measurements 8/22/2021

The swept response measurements of the combiner/filter arrangement were completed and supplied by the manufacturer, Shively Labs, and are made a part of this report. Additionally, an RF sweep of the spectrum sufficient to show the sum and difference frequencies for W242CB and W298BI 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.

Percent of Span 5 %



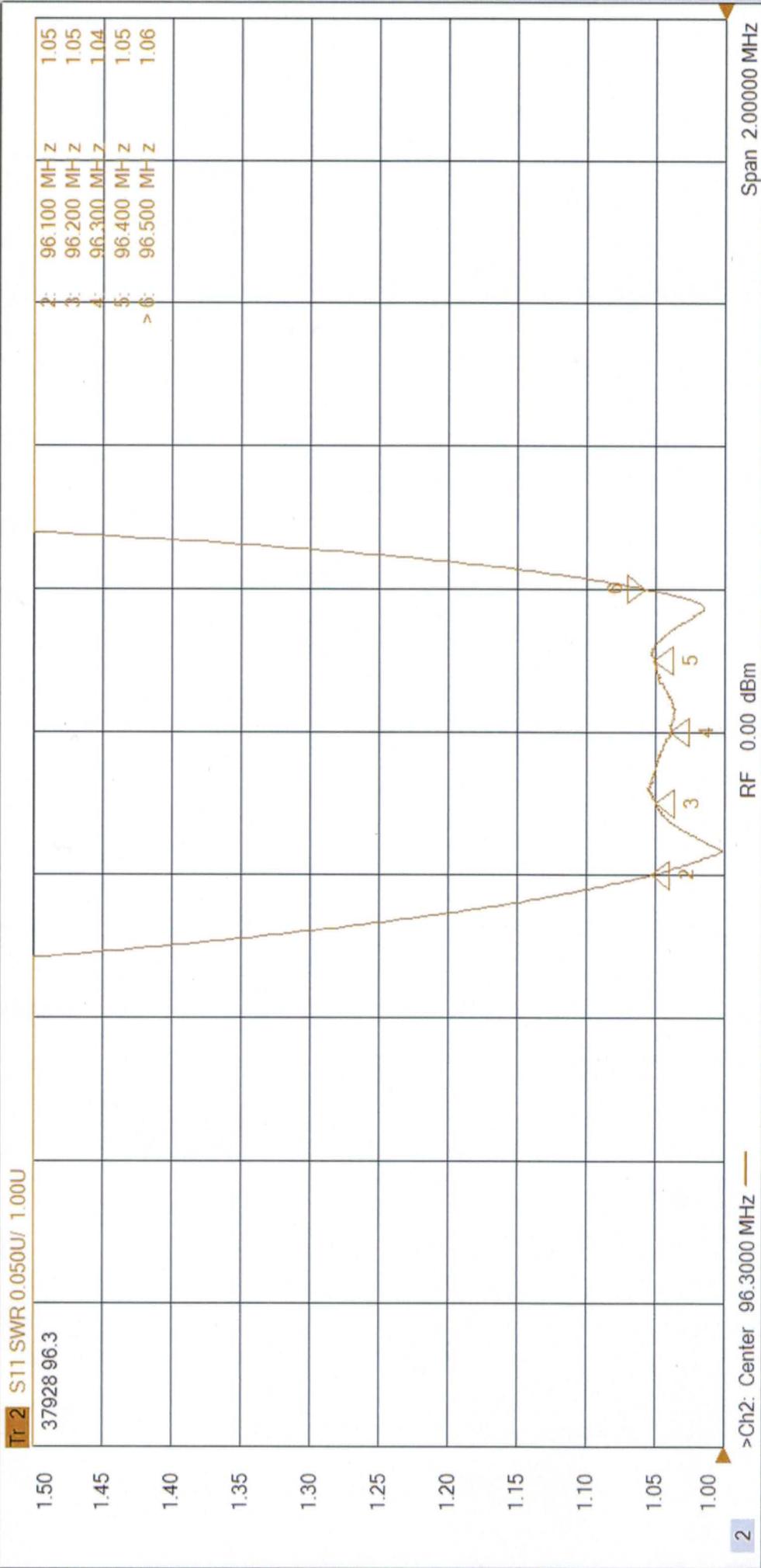
2

Tr 2 Ch 2 IntTrig Meas BW=100k C* 4-Port SrcCal Sim Smooth

Svc RFOOn UpdateOn IntRef Screenshots saved: D:\20210716_161007.png

LCL 2021/07/16-16:14

Marker 6 96.5 MHz



2

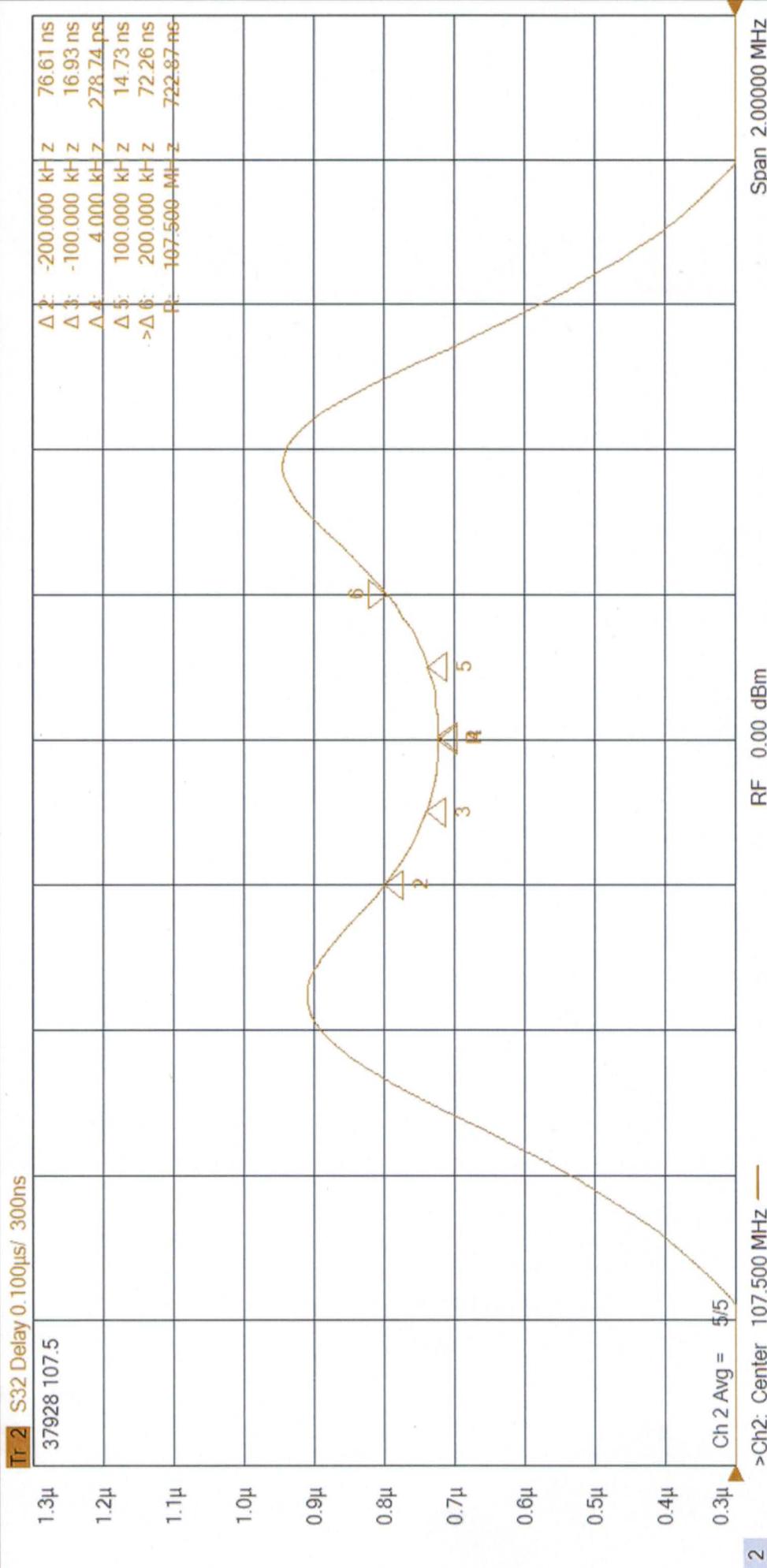
Tr 2 Ch 2 IntTrig Meas BW=100k C* 4-Port StrCat Sim

Svc RFOn UpdateOn InitRef no messages

LCL 2021/07/16-16:10



ΔMarker 6 200 kHz



Span 2.00000 MHz

RF 0.00 dBm

>Ch2: Center 107.500 MHz

2

Tr 2 S32 Delay 0.100μs/ 300ns

37928 107.5

Ch 2 Avg = 5/5

Meas BW=100k C* 4-Port SrcCal Slim Smooth

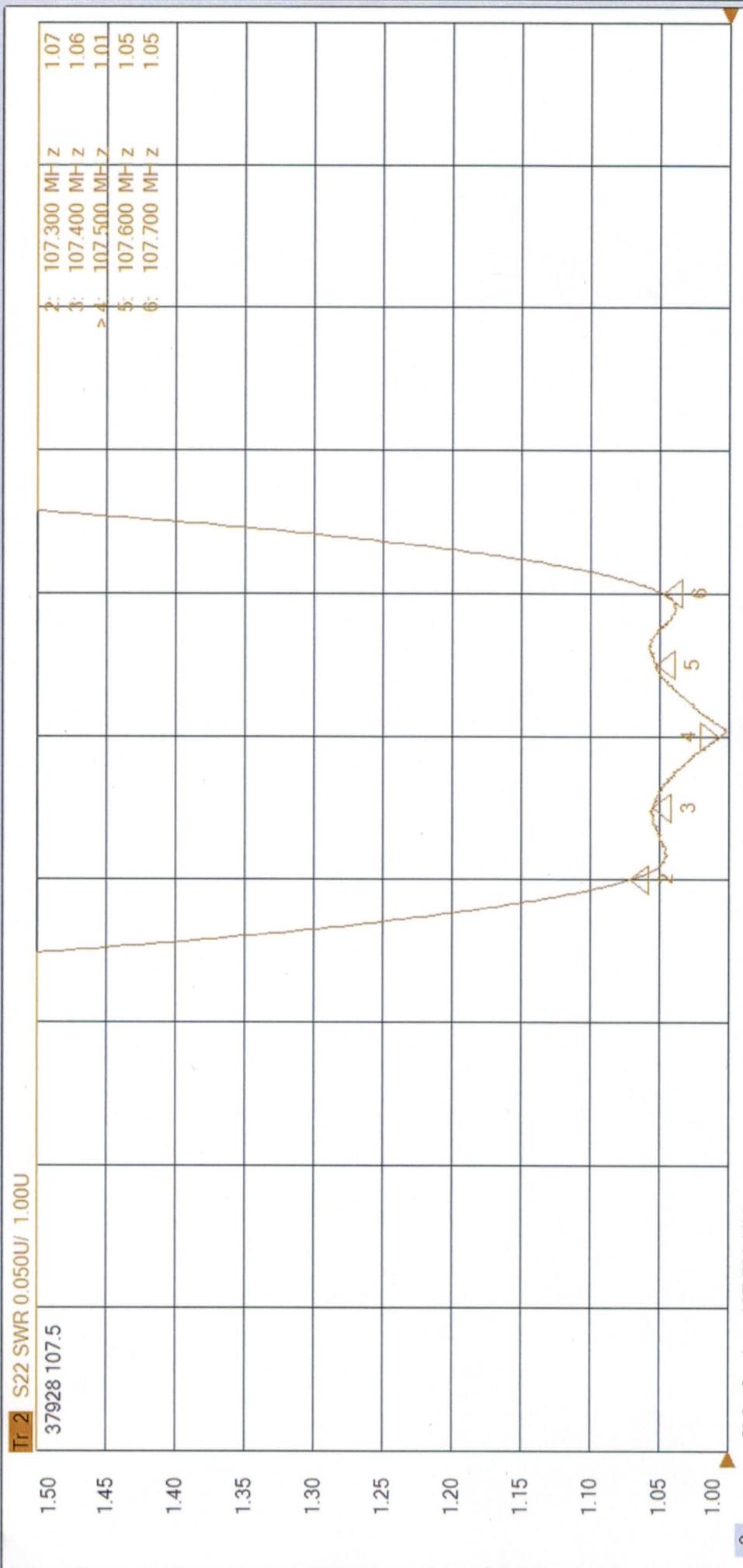
IntTrig IntRef UpdateOn

RFOn

IntRef Screenshots saved: D:\20210716_161418.png

LCL 2021/07/16-16:17

Percent of Span 5 %

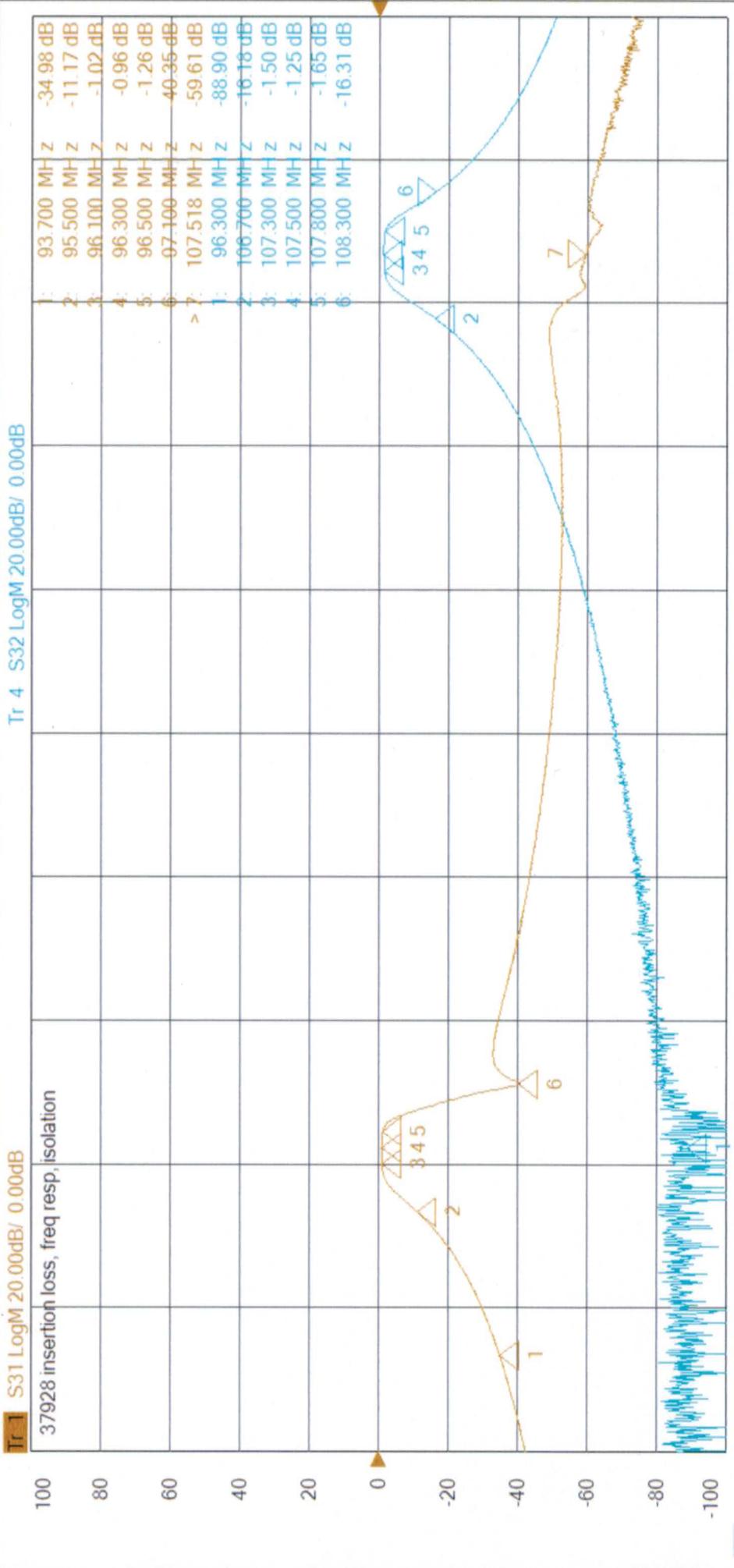


2 >Ch2: Center 107.500 MHz RF 0.00 dBm Span 2.00000 MHz

Tr 2 Ch 2 IntTrig Meas BW=100k C* 4-Port SrcCal Sim

RFOn UpdateOn IntRef Screenshots saved: D:\20210716_161722.png

LCL 2021/07/16-16:22



Save

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v w x

y z - _ +

Back Space

Change

Save

Location

Change Type

Setup/JPEG/...

Ref Lvl
10.0 dBm

Input Atten
30.0 dB

Detection
Peak

#RBW
1 kHz

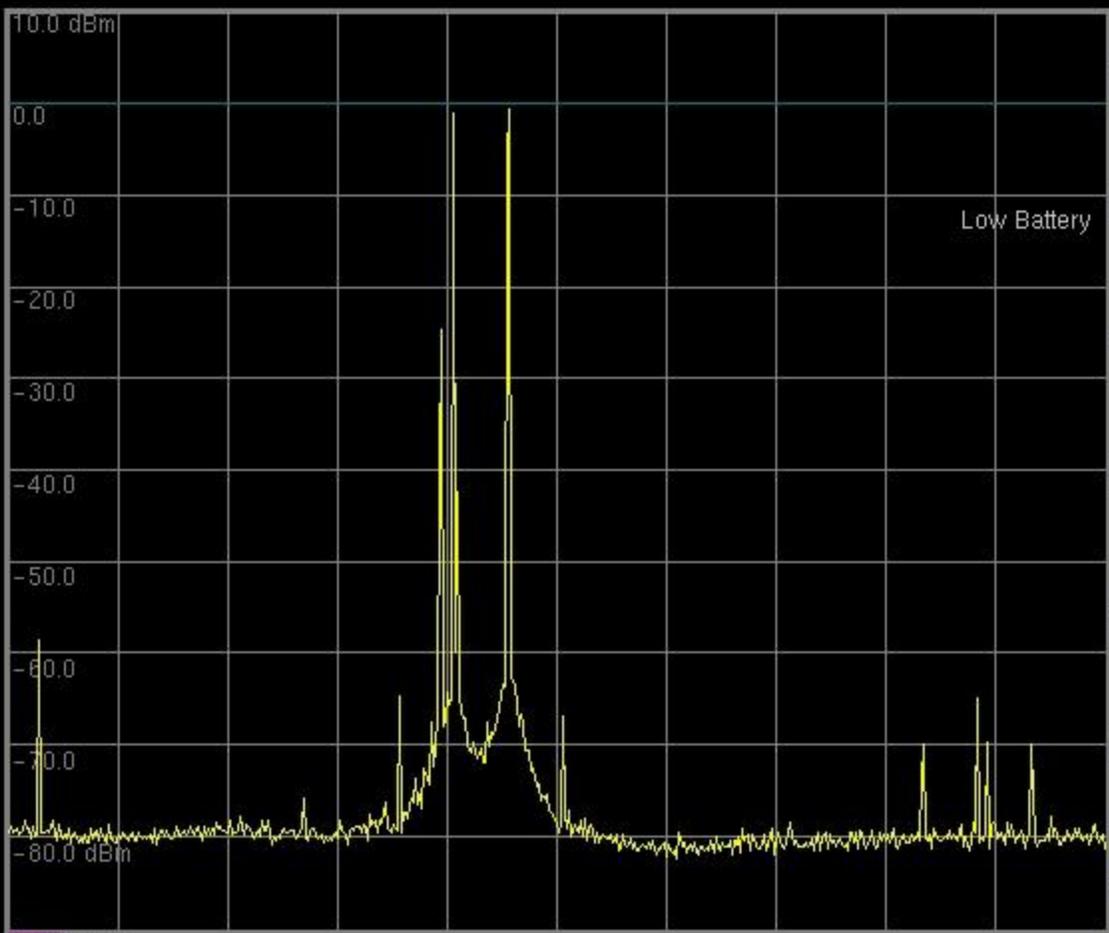
#VBW
300 Hz

Sweep Time
1.1242 min

Traces
A: Max Hold
B: Trace Hold
C: Trace Hold

Sweep
Continuous

Freq Ref
Int Std Accy



Center 117.500 MHz
Span 225.000 MHz

Freq

Amplitude

Span

BW

Marker

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.

A handwritten signature in black ink, appearing to read 'Steward R. Albert', with a large, stylized initial 'S' and 'A'.

Steward R. Albert, President
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