KLBJ-FM Channel 229C
Facility ID No. 65792
Austin, Texas
Auxiliary License File No. 0000140273
Request for ERP Increase to 100.0 kW
ASR No. 1063584
Comprehensive Technical Exhibit
April 19, 2021

KLBJ-FM Austin, Texas
Auxiliary CP License Application File No. 0000140273
Special Notations

Please note there are numerous references to two FM translators owned by Waterloo Media Group, L.P. in the license application technical certifications. They are K259AJ, Facility ID No. 82261, Austin, Texas and K274AX, Facility ID No. 139278, Austin, Texas.

K259AJ and K274AX are licensed and currently operating from separate and different antennas on the same tower as KROX-FM, the KLBJ-FM auxiliary facility and the KBPA-FM auxiliary facility. Waterloo Media Group, L.P. will be filing minor change applications to add these two translators to the combined antenna system for the aforementioned full power FM facilities.

Waterloo apologizes for any confusion created by these references

TECHNICAL NARRATIVE

The applicant, Waterloo Media Group, L.P. ("Waterloo"), requests authority to increase the effective radiated power for KLBJ-FM auxiliary station File No. 0000140273 for KLBJ-FM, Channel 229C, Facility ID No. 65792, licensed to Austin, Texas.

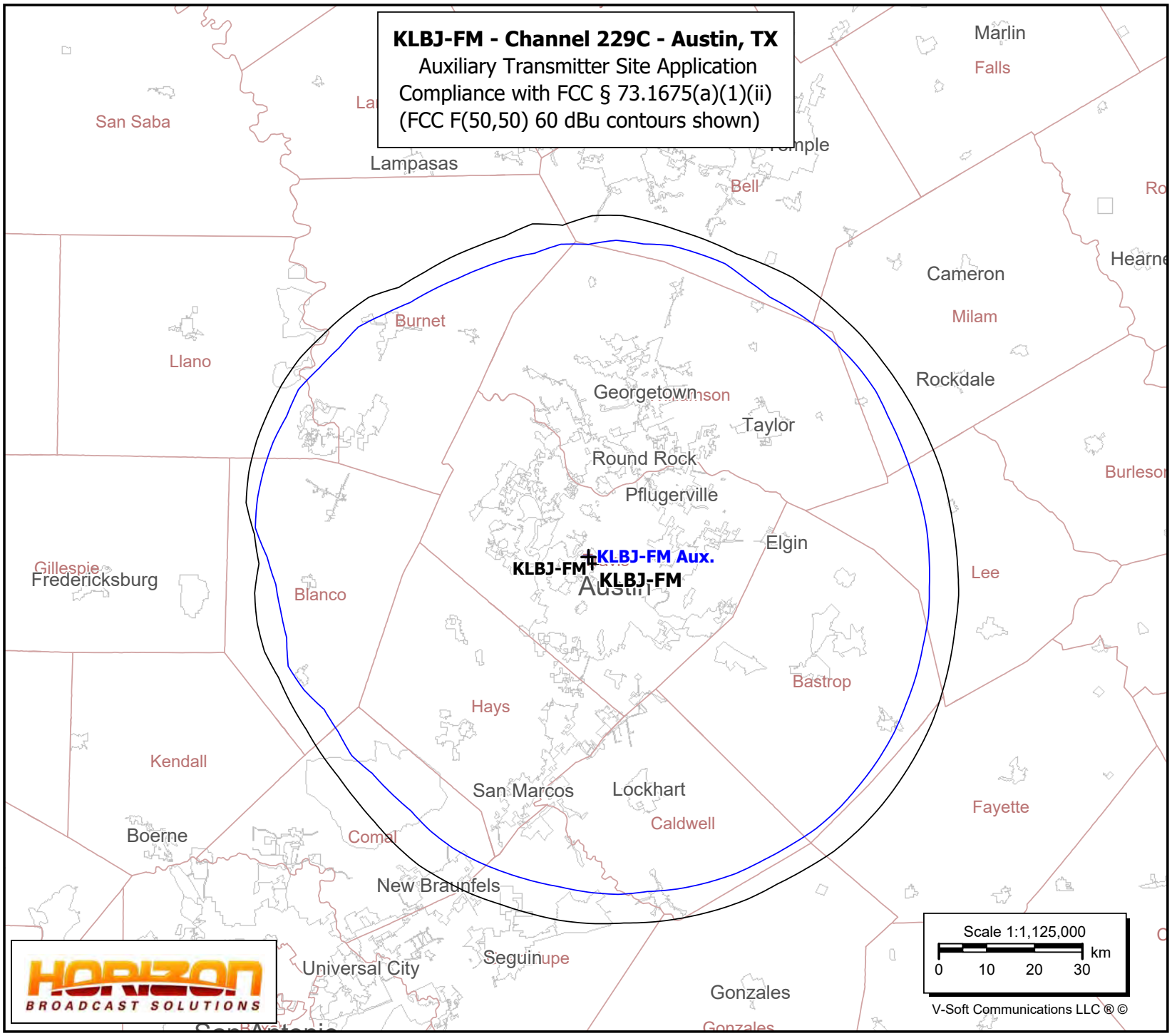
Waterloo requests to operate the KLBJ-FM auxiliary license with 100.0 kW ERP at 238.4 meters above ground level and 253.3 m HAAT from an existing tower associated with ASR number 1063584. The transmit antenna will be an ERI Model SHP-6AC6 broadband six bay full wave circularly polarized omni-directional antenna with a center of radiation of 238.4 meters height above ground level.

The proposed KLBJ-FM auxiliary station will not result in extension of the licensed main facility FCC F(50,50) 60 dBu contour in any direction as required in Section 73.1675(a). A contour map demonstrating compliance of Section 73.1675(a) is included in the exhibit titled Comprehensive Technical Exhibit.

Compliance with environmental processing is demonstrated in an Exhibit titled Compliance with RF Exposure Limits and Section 106 which is included in the Comprehensive Technical Exhibit and includes an FM Model for Windows.

KLBJ-FM
Austin, TX
BMLH20070405ABS
Latitude: 30-18-35.96 N
Longitude: 097-47-32.97 W
ERP: 97.00 kW
HAAT: 320.0 m
Channel: 229
Frequency: 93.7 MHz
AMSL Height: 539.0 m
Elevation: 275.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: FCC Model
Loc. Variability: 50.0%
Time Variability: 50.0%
HAAT Mthd: FCC

KLBJ-FM Aux.
Austin, TX
0000140273
Latitude: 30-19-21 N
Longitude: 097-48-04 W
ERP: 100.00 kW
HAAT: 253.3 m
Channel: 229
Frequency: 93.7 MHz
AMSL Height: 476.2 m
Elevation: 237.8 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: FCC Model
Loc. Variability: 50.0%
Time Variability: 50.0%
HAAT Mthd: FCC



FCC Section 73.1690
Modification of Transmission Systems

This KLBJ-FM license application proposes only to increase the effective radiated power from 65.0 kW to 100.0 kW. There is no change to the application coordinates, height above ground level or height above average terrain. There is no change to the transmit antenna. An exhibit is included demonstrating compliance with FCC Section 73.1675(a)(1)(ii). Therefore it is believed this KLBJ-FM license application is in compliance with FCC Section 73.1690

Human Exposure to Radiofrequency Electromagnetic Field
&
Section 106 Compliance
(Environmental)

A study has been made to determine whether this proposal is in compliance with 47 C.F.R. 1.1307 of the Commission's rules and with OET Bulletin #65, dated August 1997, regarding human exposure to radio frequency radiation in the vicinity of broadcast towers. Waterloo Media Group, L.P., licensee of KLBJ-FM seeks requests authority modify FM auxiliary station File No. 0000140273 for KLBJ-FM, Channel 229C, Facility ID No. 65792, licensed to Austin, Texas. The transmitting site is an existing tower 284.4 meters in overall height. This tower is registered with the FCC's Antenna Structure Registration (ASR) #1063584. The tower is located at 30° 19' 21.0" N Latitude ~ 97° 48' 04.0" W Longitude (NAD 83). The proposed antenna is a side mounted ERI Model SHP-8AC6-SP eight bay full wave circularly polarized broadband antenna. The KLBJ-FM auxiliary facility will operate with 100.0 kilowatts ERP at 238.4 meters above ground level and 253.25 meters HAAT. The use of existing transmitting locations has been characterized as being environmentally preferable by the Commission, according to Note 1 of § 1.1306 of the FCC Rules. The proposed operation was evaluated for human exposure to RF energy using the procedures outlined in the Commission's OET Bulletin Number 65. The ERI antenna is included in the Antenna Types in the OET's updated FM Model Program under Type 3 Opposed "U" dipole. Using the Commission's FM Model Program, the maximum calculated signal density near the tower at two meters above ground level attributable to the proposed facility is 6.976 μW/cm at 64.0 meters, which is 3.488 percent of the general population/uncontrolled maximum permitted exposure limit. This is well below the five percent threshold limit described in 1.1307(b) regarding sites with multiple emitters, which excludes applicant from responsibility for taking any corrective action in areas where the proposal's contribution is less than five percent.

The ERI Model SHP-8AC6 broadband antenna is proposed to also be the transmit antenna for KROX-FM Channel 268C2, Facility ID No. 54659, Buda Texas main facility license operating with 12.5 kW ERP and an auxiliary facility for KBPA, Channel 278C1, Facility ID No. 41213, licensed to Austin, Texas, operating with 50 kW ERP. A spurious emissions report has been conducted and is included as an exhibit.

The combined RFR predicted maximum calculated signal density for all three stations combined is as follows:

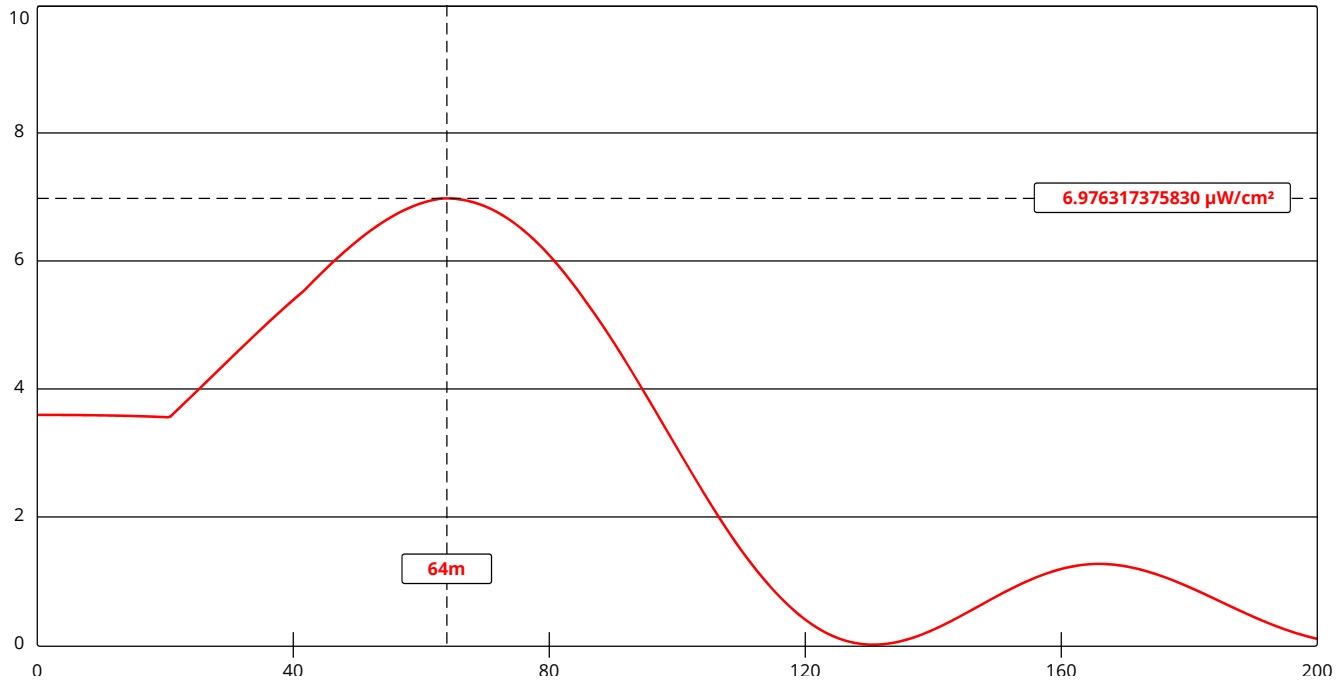
Call Sign	ERP	RFR level	Distance	Uncontrolled %
KBPA Aux	50.0 kW	3.488 μW/cm	64.0 meters	1.744%
KLBJ-FM Aux	100.0 kW	6.976 μW/cm	64.0 meters	3.488%
KROX-FM	12.5 kW	0.872 μW/cm	64 meters	0.436%
Total combined		11.336 μW/cm	64 meters	5.668%

The applicant will see that signs are posted in the vicinity of the tower, warning of potential radio frequency hazards at the site. The applicant will cooperate with other users of the tower to reduce power of the facility, or discontinue operation, as necessary to limit human exposure to levels less than specified by the Federal Communications Commission should anyone be required to climb the tower for maintenance or inspection.

Federal Communications Commission

FM Model

The FM Model calculator determines the potential exposure from radiofrequency (RF) electromagnetic fields produced by FM broadcast station antennas at ground level. The FM Model software was originally developed by the FCC in 1997 as a standalone executable program and this improved version provides more precise predictions and runs via a JavaScript enabled web browser. The FM Model is originally based on measured data published in 1985 by the EPA (http://nepis.epa.gov/Exe/ZyNET.exe/2000ED2W.TXT?ZyActionD=ZyDocument&Client=EPA&Index=1981+Thru+1985&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A\zyfiles\Index%20Data\81thru85\Txt\00000003\2000ED2W.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h|-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p|f&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL). ▼ Show More....



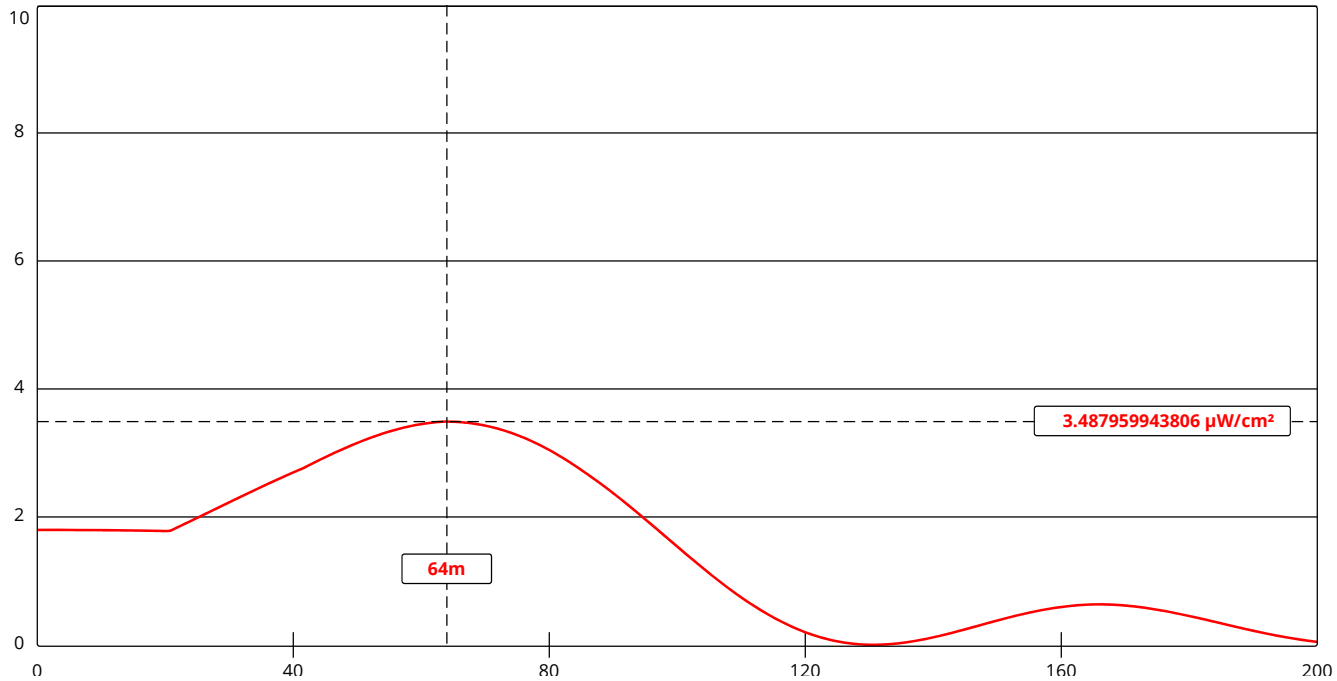
View Tabular Results +

Channel Selection	Channel 234 (94.7 MHz)		
Antenna Type +	EPA Type 3: Opposed U Dipole		
Height (m)	238.4	Distance (m)	200
ERP-H (W)	100000	ERP-V (W)	100000
Num of Elements	8	Element Spacing (λ)	1
Num of Points	500	Apply	

Federal Communications Commission

FM Model

The FM Model calculator determines the potential exposure from radiofrequency (RF) electromagnetic fields produced by FM broadcast station antennas at ground level. The FM Model software was originally developed by the FCC in 1997 as a standalone executable program and this improved version provides more precise predictions and runs via a JavaScript enabled web browser. The FM Model is originally based on measured data published in 1985 by the EPA (http://nepis.epa.gov/Exe/ZyNET.exe/2000ED2W.TXT?ZyActionD=ZyDocument&Client=EPA&Index=1981+Thru+1985&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A\zyfiles\Index%20Data\81thru85\Txt\00000003\2000ED2W.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h|-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p|f&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL). ▼ Show More....



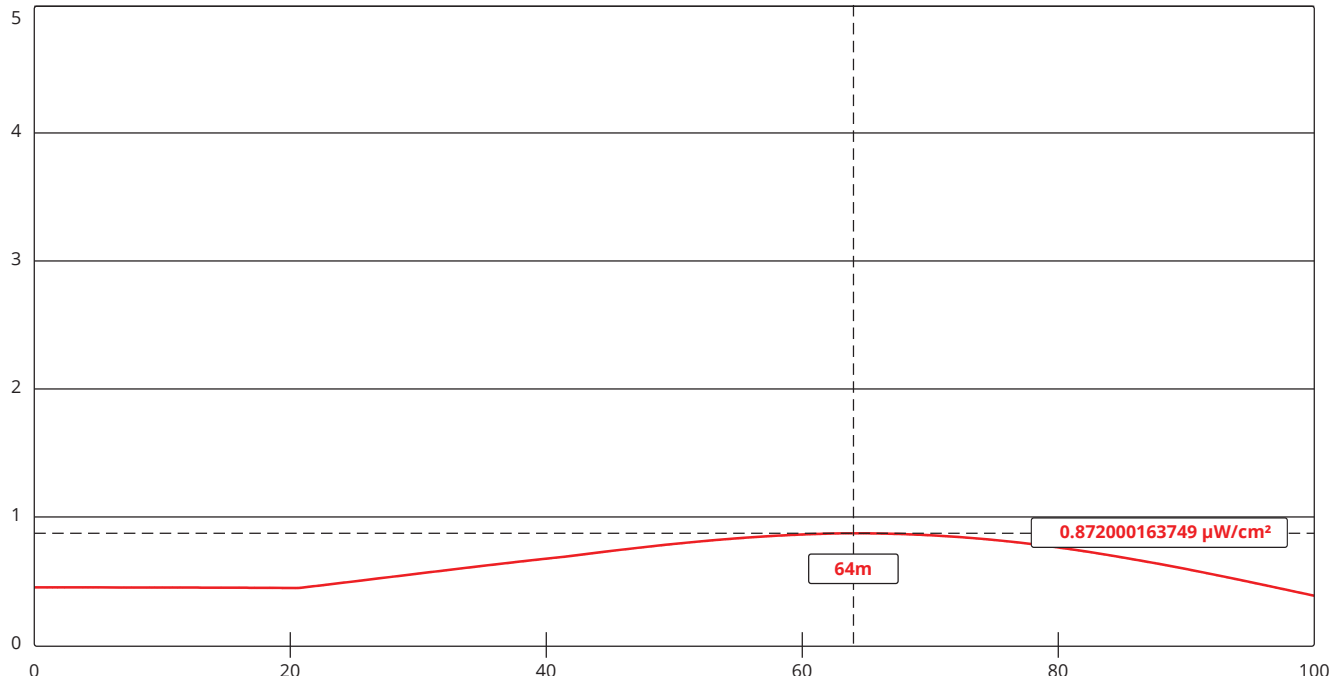
View Tabular Results +

Channel Selection	Channel 278 (103.5 MHz)		
Antenna Type +	EPA Type 3: Opposed U Dipole		
Height (m)	238.4	Distance (m)	200
ERP-H (W)	50000	ERP-V (W)	50000
Num of Elements	8	Element Spacing (λ)	1
Num of Points	500	Apply	

Federal Communications Commission

FM Model

The FM Model calculator determines the potential exposure from radiofrequency (RF) electromagnetic fields produced by FM broadcast station antennas at ground level. The FM Model software was originally developed by the FCC in 1997 as a standalone executable program and this improved version provides more precise predictions and runs via a JavaScript enabled web browser. The FM Model is originally based on measured data published in 1985 by the EPA (http://nepis.epa.gov/Exe/ZyNET.exe/2000ED2W.TXT?ZyActionD=ZyDocument&Client=EPA&Index=1981+Thru+1985&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A\zyfiles\Index%20Data\81thru85\Txt\00000003\2000ED2W.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h|-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p|f&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL). ▼ Show More....



View Tabular Results +

Channel Selection	Channel 268 (101.5 MHz)		
Antenna Type +	EPA Type 3: Opposed U Dipole		
Height (m)	238.4	Distance (m)	100
ERP-H (W)	12500	ERP-V (W)	12500
Num of Elements	8	Element Spacing (λ)	1
Num of Points	500	Apply	

KLBJ-FM Austin, Texas
Auxiliary License Application
Transmitter Power Output
April 19, 2021

Transmitter Power Output

The ERI SHP 8AC6-SP 8 bay full wave broadband antenna has a power gain of 4.342. The transmission line has a loss of 0.623 dB. The combiner total losses are 0.278 dB. The total losses are 0.901 dB for an overall line efficiency of 81.265 percent.

100.0 kW divided by 4.342 divided by 0.81265 = 28.34 kW Transmitter Power Output

ELECTRONICS RESEARCH, INC. ERI

Report Of
Intermodulation Product Findings

Austin, TX.

KLBJ-FM – 93.7 MHz.
K259AJ – 99.7 MHz.
KROX – 101.5 MHz.
K274AX – 102.7 MHz.
KBPA – 103.5 MHz.

Project# 38094

October 25, 2020

Electronics Research Inc.
7777 Gardner Road
Chandler, Indiana 47610
Phone (812) 925-6000 Fax (812) 925- 4030

TABLE OF CONTENTS

Report of Findings for Intermodulation Product Measurements

Exhibits Accompanying This Report

REPORT OF FINDINGS
AUSTIN, TEXAS
BROADCAST FACILITY

Introduction: This report of findings is based on data collected at the FM broadcast facility located in Austin, TX. The report includes measurements offered as proof that the combined operations of KLBJ-FM (93.7 MHz.), K259AJ (99.7 MHz.), KROX (101.5 MHz.), K274AX (102.7 MHz.), and KBPA (103.5 MHz.), transmitters are in compliance with the FCC Rules and Regulations as required by the Code of Federal Regulations (CFR) Title 47 section 73.317 paragraph (b) through (d). K259AJ (99.7 MHz.), and K274AX (102.7 MHz.), have the ability to operate into a separate antenna that is co-located on the tower. There affects have been considered in this report as well. In brief, the collection of measurements presented in this report shows that all possible third order inter-modulation (IM) products generated by this multiplexed and single station systems are less than the maximum allowable level as required by section 73.317 (b) through (d). Jeff Taylor of Electronics Research, Inc. located in Chandler, Indiana performed the measurements summarized herein on October 25, 2020.

The following exhibits are provided:

Exhibit A:
- A-1 Drawing Depicting Cog Antenna.
- A-2 SHP-8AC6-SP Antenna Specification Sheet.
- A-3 Drawing Depicting Multiplexed Scheme.
- A-4 Multiplexer Specification Sheet.
- A-5 Theoretical Vertical Plane Relative Field Antenna Plots

Exhibit B:
- B-1 Equipment Employed In Intermodulation Product Measurement.
- B-2 Broadcasting Scheme of the Multiplexed Systems.

Table 1. Carrier Reference Levels.
Table 2. Calculated Third Order Products.
Table 3. Intermodulation Analysis Measurements.

Exhibits Accompanying Report: Exhibit A provides comprehensive information on both antenna and filters used by these radio stations. Exhibit B illustrates the broadcasting scheme of each station, the layout of the equipment used to isolate and measure potential intermodulation products and forward carrier reference levels. Found within Table 1 are the narrow band carrier frequency measurements that provide relative output signal levels for the IM analysis. Table 2 lists the calculated third order products that can be generated from FM transmitters broadcasting from the multiplexed system. The IM Analysis Measurements, in Table 3, provides detailed information obtained from the product frequency investigation.

The Nature of Intermodulation Products (IM): Intermodulation products result from inadequate transmitter-to-transmitter isolation. Intermodulation products are commonly generated from radio stations operating into multiplexed facilities and congested antenna broadcast sites. The mechanics associated with the phenomenon have been well documented. When two or more transmitters are coupled to each other, new spectral components are produced by the mixing of the station frequencies in the active circuits of each transmitter. The common term used to describe this phenomenon is third order product denoted by the mathematical expression $[2(F_1)-(F_2)]$, where F_1 signifies the frequency of the transmitter that is generating the intermodulation product, and F2 signifies the frequency causing the interference.

The Multiplexed System: These measurements were taken with all FM stations operating from their respective antenna systems. The KLBJ-FM, K259AJ, KROX, K274AX, and KBPA, multiplexed system is fundamentally comprised of antenna, feed line and multiplexer unit. The SHP-8AC6-SP antenna, combiner units, MACXLine 450 feedline, are products of Electronics Research, Inc.
Refer to Exhibit B-1, for an illustration of the Broadcasting Scheme of these stations.

To accomplish the aggregation of 3 or 4 transmitter signals into a common antenna feed and provide transmitter-to-transmitter isolation, a multiplexing scheme consisting of: (1) 783-8 Constant Impedance combiner module for 93.7 MHz., (1) 780-6 Constant Impedance combiner module for 101.5 MHz., (1) 783-4 Band Pass Filter for 103.5 MHz., (1) 955-4 "T" combiner was installed for frequencies, 99.7, and 102.7 MHz. Interconnecting "u-links" , "T", and 3" switch are required to complete the combiner which is illustrated in the attached Exhibit A-3. Note: At this time the combiner is designed to operate as either a three station combined system or as a four station combined system depending on the position of the 3 1/8" switch. The multiplexer, fully assembled, exhibited transmitter port-to-port isolation in excess of -50 dB. Other performance measurements, such as match, loss, group-delay, etc, revealed that the multiplexer unit was in proper working condition. Refer to Exhibit A-4 for the Combiner Specification Sheet.

The IM Investigation: Directional Couplers were placed at key locations throughout the combiner to monitor and maintain the multiplexer's performance. All couplers furnished with the system are factory calibrated and capable of delivering accurate and repeatable RF measurements. To facilitate the taking of the measurements, the coupler located at the antenna output of the multiplexed system was used. Care was taken in the selection of the measurement location to ensure that the measurements would be made far removed from transmitters and any filtering used to reduce broadcast emissions. The coupler selected would normally be used for antenna reflection measurements and thus would provide greater than -38 dB directivity and a forward signal sample of -45 dB for the high-power stations and greater than -35 dB and a forward signal sample of -40 dB for the low-power stations.

The forward port of the coupler was used for sampling the outgoing carrier levels and IM products. The IM sampled signal was fed by shielded cable into a Band Pass Filter where all extraneous energy was steeply attenuated. Various attenuation pads were used, when needed, on the band pass filter and/or the Spectrum Analyzer to ensure an adequate signal level for measurements without overloading the measurement equipment. A Rohde & Schwarz Spectrum Analyzer serial# 103069 was employed to record the level of all signals investigated. A Rohde & Schwarz Network Analyzer serial# 100396 was used for selective tuning of the Band Pass Filter. The Rohde & Schwarz Spectrum Analyzer was also used to measure the close in spectral attenuation of each carrier and wide band search for any anomalies that may need further investigation. See attached Exhibit B-1 for an illustration of the measurement equipment.

Prior to recording measurements, all pertinent broadcasting equipment including Transmitters, Multiplexer, Feed Line and Antenna were adjusted to optimal performance. Also, it was confirmed before taking any measurements that all transmitters were operating at full licensed power. From the equipment setup described above, the relative output signal level of each stations forward carrier was made. The resulting signal levels of these measurements are listed in Table 1, column labeled "Adjusted Level". This level will be used as the reference level for possible IM products of each carrier and was necessary to confirm that no significant levels of spurious energy, referenced to each carrier, were present from any transmitter operating from the multiplexed system.

Table 1 - Carrier Reference Levels.

Carrier Frequency (MHz)	Pad One (dB)	Full Scale Range (dB)	Scale Reading (dBm)	**Carrier Level (dBm)**	Notes
KLBJ-FM 93.7	**10**	**---**	**16.7**	**26.7**	
K259AJ 99.7	**10**	**---**	**-0.3**	**9.7**	
KROX 101.5	**10**	**---**	**9.2**	**19.2**	
K274AX 102.7	**10**	**---**	**-0.2**	**9.8**	
KBPA 103.5	**10**	**---**	**15.7**	**25.7**	

Predictable third-order products due to system harmonics mixed with all on-site interfering frequencies that could be generated from the multiplexed system are calculated and listed in Table 2.

Table 2 - Third order Products.

	Carrier Frequencies				
Interfering Frequencies	**93.7**	**99.7**	**101.5**	**102.7**	**103.5**
93.7 MHz.	----	105.7	109.3	111.7	113.3
99.7 MHz.	87.7	----	103.3	105.7	107.3
101.5 MHz.	85.9	97.9	----	103.9	105.5
102.7 MHz.	84.7	96.7	100.3	----	104.3
103.5 MHz.	83.9	95.9	99.5	101.9	----

Using the equipment previously described the IM product measurements were recorded and are listed in Table 3. The signal levels referenced to the carriers are calculated and listed in the column labeled "Level Referenced to Carrier". Refer to Exhibit B-2 for a layout of the measurement equipment.

Table 3 – Intermodulation Measurements

IM Measurements Taken in Austin, Texas										
Product Frequency (MHz)	**Transmitter Frequency (MHz)**	**Interfering Frequency (MHz)**	**Pad (dB)**	**Bandpass Filter Loss (dB)**	**Total Loss**	**Measured Level (dBm)**	**Adjusted Level (dB)**	**Carrier Reference Level (dBm)**	**Level Referenced to Carrier (dB)**	**Notes***
Transmitter Mixes										
	93.7	**Ref.**	**10**		**10**	**16.7**	**26.7**	**26.7**		
	99.7	**Ref.**	**10**		**10**	**-0.3**	**5.1**	**9.7**		
	101.5	**Ref.**	**10**		**10**	**9.2**	**19.2**	**19.2**		
	102.7	**Ref.**	**10**		**10**	**-0.2**	**9.8**	**9.8**		
	103.5	**Ref.**	**10**		**10**	**15.7**	**25.7**	**25.7**		
84.7	**93.7**	**102.7**	**10**	**12.7**	**22.7**	**-95.1**	**-72.4**	**26.7**	**-99.1**	
85.9	**93.7**	**101.5**	**10**	**13.6**	**23.6**	**-94.8**	**-71.2**	**26.7**	**-97.9**	
87.7	**93.7**	**99.7**	**10**	**13.2**	**23.2**	**-97.1**	**-73.9**	**26.7**	**-100.6**	
96.7	**99.7**	**102.7**	**10**	**12.8**	**22.8**	**-88.89**	**-66.09**	**9.7**	**-75.79**	**2**
97.9	**99.7**	**101.5**	**10**	**12.7**	**22.7**	**-96.2**	**-73.5**	**9.7**	**-80.2**	**1**
100.3	**101.5**	**102.7**	**10**	**12.5**	**22.5**	**-95.9**	**-73.4**	**19.2**	**-92.6**	
103.3	**101.5**	**99.7**	**10**	**12.6**	**22.6**	**-95.2**	**-72.6**	**19.2**	**-91.8**	
103.9	**102.7**	**101.5**	**10**	**12.6**	**22.6**	**-94.8**	**-72.2**	**9.8**	**-82.0**	
105.7	**99.7**	**93.7**	**10**	**12.5**	**22.5**	**-94.9**	**-72.4**	**9.7**	**-82.1**	**1**
105.7	**102.7**	**99.7**	**10**	**12.5**	**22.5**	**-94.9**	**-72.4**	**9.8**	**-82.2**	
109.3	**101.5**	**93.7**	**10**	**12.9**	**22.9**	**-95.2**	**-72.3**	**19.2**	**-91.5**	
111.7	**102.7**	**93.7**	**10**	**12.5**	**22.5**	**-95.4**	**-72.9**	**9.8**	**-82.7**	

(1) Low Power rule Section 73.317 paragraph D.
(2) Local Carrier 96.7 MHz. KHFI

IM Measurements Taken in Austin, Texas

Product Frequency (MHz)	Transmitter Frequency (MHz)	Interfering Frequency (MHz)	Pad (dB)	Bandpass Filter Loss (dB)	Total Loss	Measured Level (dBm)	Adjusted Level (dB)	Carrier Reference Level (dBm)	Level Referenced to Carrier (dB)	Notes*
Transmitter Mixes										
	93.7	**Ref.**	**10**		**10**	**16.7**	**26.7**	**26.7**		
	99.7	**Ref.**	**10**		**10**	**-0.3**	**9.7**	**9.7**		
	101.5	**Ref.**	**10**		**10**	**9.2**	**19.2**	**19.2**		
	102.7	**Ref.**	**10**		**10**	**-0.2**	**9.8**	**9.8**		
	103.5	**Ref.**	**10**		**10**	**15.7**	**25.7**	**25.7**		
83.9	93.7	103.5	10	13.6	23.6	-95.6	-72.0	26.7	**-98.7**	
84.7	93.7	102.7	10	12.7	22.7	-95.1	-72.4	26.7	**-99.1**	
85.9	93.7	101.5	10	13.6	23.6	-94.9	-71.3	26.7	**-98.0**	
87.7	93.7	99.7	10	13.2	23.2	-97.1	-73.9	26.7	**-100.6**	
99.5	101.5	103.5	10	12.7	22.7	-94.3	-71.6	19.2	**-90.8**	
100.3	101.5	102.7	10	12.7	14.1	-95.9	-81.8	19.2	**-101**	
103.3	101.5	99.7	10	12.6	22.6	-89.9	-67.3	19.2	**-86.5**	
104.3	103.5	102.7	10	14.1	24.1	-93.8	-69.7	25.7	**-95.4**	
105.5	103.5	101.5	10	14.1	24.1	-96.5	-72.4	25.7	**-98.1**	
107.3	103.5	99.7	10	13.5	23.5	-95.2	-71.7	25.7	**-97.4**	
109.3	101.5	93.7	10	12.9	22.9	-95.2	-72.3	19.2	**-91.5**	
113.3	103.5	93.7	10	12.9	22.9	-94.7	-71.8	25.7	**-97.5**	

The Spectrum Analyzer was used to check the close in spectral attenuation of the carrier to confirm the operation of the transmitter, is in compliance with Sections (b) and (c) of the FCC Rules and Regulations.

As a final proof of the systems IM Product performance, a wide band search was undertaken using the Spectrum Analyzer. The purpose for this measurement was to look for suspicious anomalies that may warrant further investigation. My search ranged the complete frequency span of the receiver and resulted in no additional investigations.

Conclusion: Based upon my observations and measurements taken on October 25, 2020 as summarized in this document, I, Jeff Taylor, find the subject system, specifically the transmitters and filter systems for the operation of KLBJ-FM, K259AJ, KROX, K274AX, and KBPA into their respective antennas to be in proper working order. Furthermore, based on the measured data, it is my opinion that there are no inter-modulation products in excess of 80 dB below carrier levels generated from or within the station operating on the installed system. Based on this recorded data, I conclude that of KLBJ-FM, K259AJ, KROX, K274AX, and KBPA, are in compliance with the requirements of Section 73.317 paragraph (b) through (d) of the FCC Rules and Regulations.

Respectfully submitted,
Electronics Research, Inc.

Jeff Taylor, Field Technician

State of Indiana)
) SS:
County of Warrick)

AFFIDAVIT

I, Jeff Taylor, hereby declare that the following statements are true and correct to the best of my knowledge and belief :

1.) I am a Field Technician for Electronics Research, Inc ("ERI ") and have been employed by ERI for 24 years. I am familiar with and have assisted in the design, manufacturing and installation of FM Antennas and FM Multiplexers in my long tenure with ERI.

2.) I have either prepared and/or directly supervised the preparation of all technical information contained in this Report of Findings and to my knowledge to be accurate and true.

3.) ERI has been requested by Waterloo Media, L.P. on behalf of radio Stations KLBJ-FM, K259AJ, KROX K274AX, and KBPA in Austin, TX. to prepare this Report Of Findings.

Jeff Taylor; Field Technician

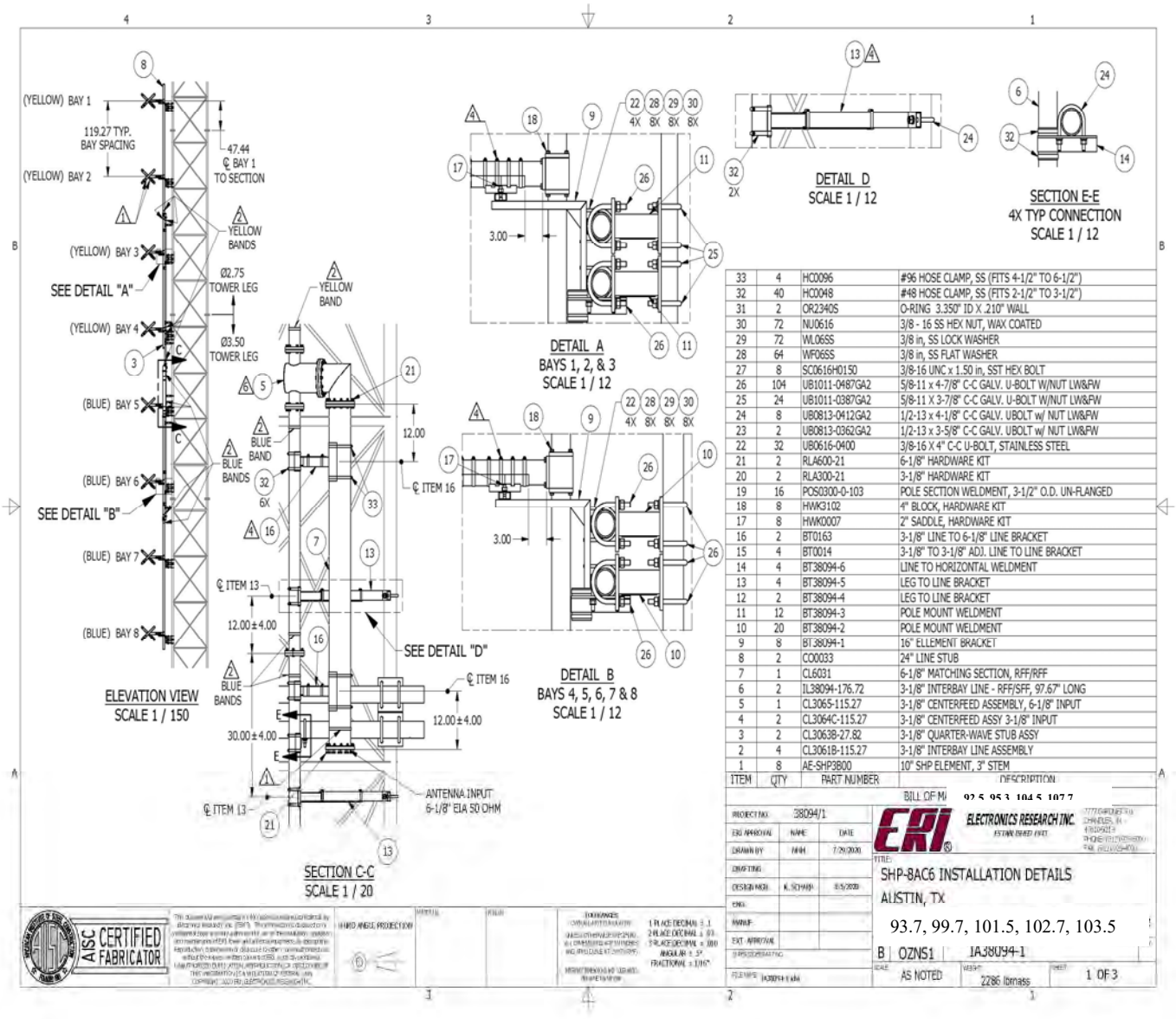
Subscribed and sworn to before me on this 28th, day of October, 2020.

Tabitha Heilman; Notary Public
My commission expires January 2, 2022

Tabitha Heilman

NOTARY PUBLIC SEAL INDIANA
TABITHA LYNNE HEILMAN
Notary Public, State of Indiana
Warrick County
Commission Number 649993
My Commission Expires
January 02, 2022

EXHIBIT, A-1



ITEM	QTY	PART NUMBER	DESCRIPTION
33	4	HC0096	#96 HOSE CLAMP, SS (FITS 4-1/2" TO 6-1/2")
32	40	HC0048	#48 HOSE CLAMP, SS (FITS 2-1/2" TO 3-1/2")
31	2	OR2340S	O-RING 3.350" ID X .210" WALL
30	72	NU0616	3/8 - 16 SS HEX NUT, WAX COATED
29	72	WL06SS	3/8 in, SS LOCK WASHER
28	64	WF06SS	3/8 in, SS FLAT WASHER
27	8	SC0616H0150	3/8-16 UNC x 1.50 in, SST HEX BOLT
26	104	UB1011-0487GA2	5/8-11 x 4-7/8" C-C GALV. U-BOLT W/NUT LW&FW
25	24	UB1011-0387GA2	5/8-11 X 3-7/8" C-C GALV. U-BOLT W/NUT LW&FW
24	8	UB0813-0412GA2	1/2-13 x 4-1/8" C-C GALV. UBOLT w/ NUT LW&FW
23	2	UB0813-0362GA2	1/2-13 x 3-5/8" C-C GALV. UBOLT w/ NUT LW&FW
22	32	UB0616-0400	3/8-16 X 4" C-C U-BOLT, STAINLESS STEEL
21	2	RLA600-21	6-1/8" HARDWARE KIT
20	2	RLA300-21	3-1/8" HARDWARE KIT
19	16	POS0300-0-103	POLE SECTION WELDMENT, 3-1/2" O.D. UN-FLANGED
18	8	HWK3102	4" BLOCK, HARDWARE KIT
17	8	HWK0007	2" SADDLE, HARDWARE KIT
16	2	BT0163	3-1/8" LINE TO 6-1/8" LINE BRACKET
15	4	BT0014	3-1/8" TO 3-1/8" ADJ. LINE TO LINE BRACKET
14	4	BT38094-6	LINE TO HORIZONTAL WELDMENT
13	4	BT38094-5	LEG TO LINE BRACKET
12	2	BT38094-4	LEG TO LINE BRACKET
11	12	BT38094-3	POLE MOUNT WELDMENT
10	20	BT38094-2	POLE MOUNT WELDMENT
9	8	BT38094-1	16" ELLEMENT BRACKET
8	2	CO0033	24" LINE STUB
7	1	CL6031	6-1/8" MATCHING SECTION, RFF/RFF
6	2	IL38094-176.72	3-1/8" INTERBAY LINE - RFF/SFF, 97.67" LONG
5	1	CL3065-115.27	3-1/8" CENTERFEED ASSEMBLY, 6-1/8" INPUT
4	2	CL3064C-115.27	3-1/8" CENTERFEED ASSY 3-1/8" INPUT
3	2	CL3063B-27.82	3-1/8" QUARTER-WAVE STUB ASSY
2	4	CL3061B-115.27	3-1/8" INTERBAY LINE ASSEMBLY
1	8	AE-SHP3800	10" SHP ELEMENT, 3" STEM

BILL OF MA 92.5 93.3 104.5 107.7

PROJECT NO: 38094/1

ERI APPROVAL	NAME	DATE
DRAWN BY	NHH	7/29/2020
DRAFTING		
DESIGN MGR	K. SCHAIR	8/5/2020
ENG.		
MANUF.		
EXT. APPROVAL		

ELECTRONICS RESEARCH INC.
ESTABLISHED 1961

TITLE: SHP-8AC6 INSTALLATION DETAILS
AUSTIN, TX
93.7, 99.7, 101.5, 102.7, 103.5

B | OZNS1 | IA38094-1

SCALE: AS NOTED | WEIGHT: 2286 lbmass | SHEET: 1 OF 3

AISC CERTIFIED FABRICATOR

A-2 ERI 1183 Antenna Specification Sheet

TRANSMISSION SITE
AUSTIN, TEXAS

General Specifications

Antenna Type ……High Power FM-Broadcast, Suitable For Multiplexing
Model Number SHP-8AC6-SP
Number of Bay Levels .....Eight
Polarization..... Right Hand Circular Polarized

Electrical Specifications

Antenna Input Power Capability . . . . . 51 kW Max (1)
Operating Frequency Band ..... 93.7 ~ 103.5 Megahertz.
VSWR. . . . . <1.20:1 @ Operating Frequencies(2)
Azimuthal Pattern Circularity ..... Better Then +/- 2dB From RMS (Free Space)
Power Split ..... 50/50 (Horizontal & Vertical)
Frequency Specific Information:

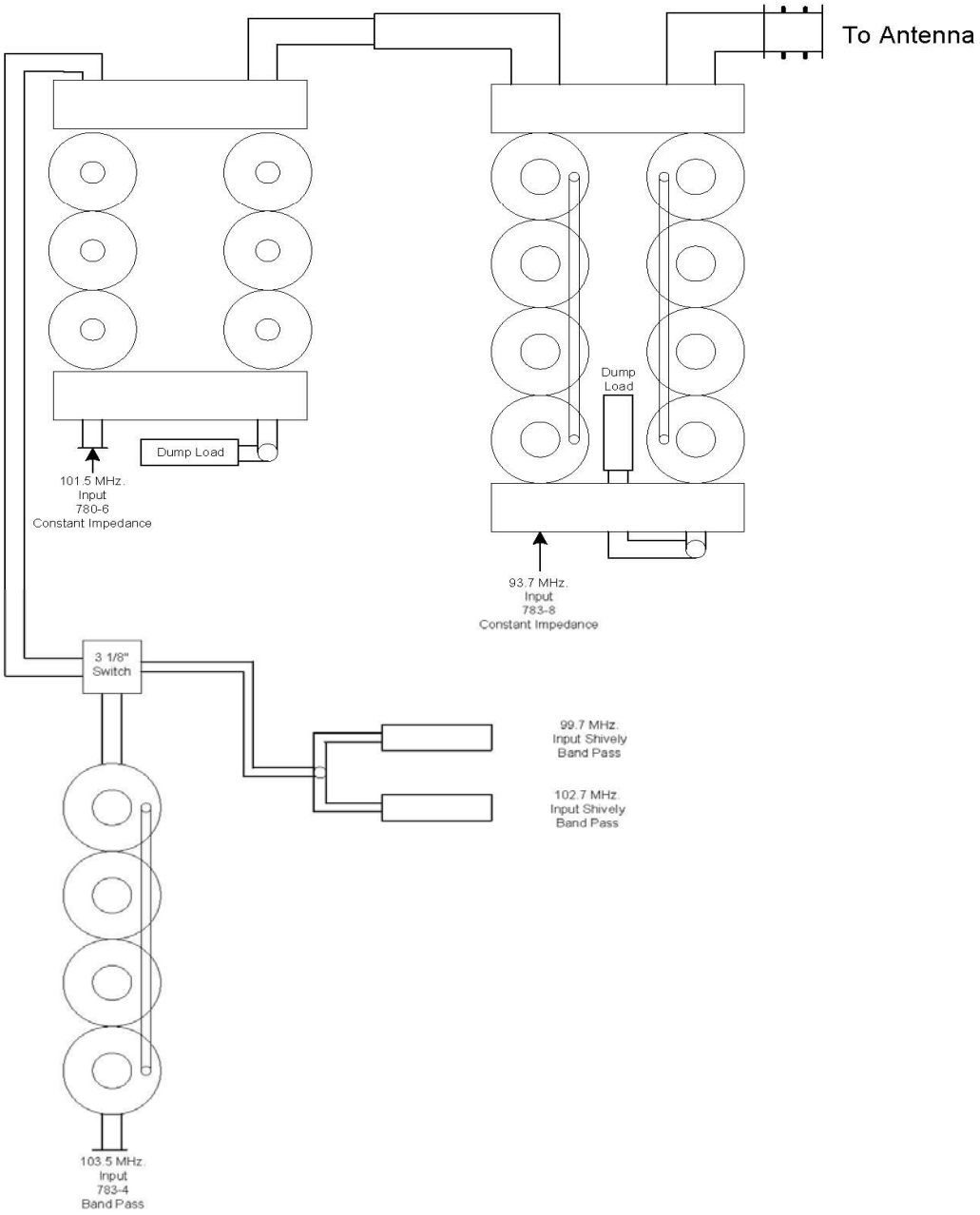
Frequency	Station ERP	Beam Tilt	First Null Fill	Second Null Fill	Power Gain	Line Loss (3)	Filter Loss (4)	Computed TPO
93.7	**100 KW**	**0.0°**	**0.0 %**	**10.8 %**	**4.342**	**-0.623 dB**	**-0.278 dB**	**28.33 kW**
99.7	**250 Watts**	**0.0°**	**5.5 %**	**0.0 %**	**4.424**	**-0.640 dB**	**-1.263 dB**	**123 Watts**
101.5	**12.5 KW**	**0.0°**	**14.6 %**	**0.4 %**	**4.176**	**-0.649 dB**	**-0.325 dB**	**3.746 kW**
102.7	**250 Watts**	**0.0°**	**20.7 %**	**1.1 %**	**3.930**	**-0.649 dB**	**-0.732 dB**	**122 Watts**
103.5	**11 KW**	**0.0°**	**0.0 %**	**10.8 %**	**4.154**	**-0.657 dB**	**-0.313 dB**	**3.311 kW**

Mechanical Specifications

Antenna Feed System..... Fed with one Line
Input Connector …….. 6 1/8 ”50-Ohm EIA Flanged
Element Deicing .....None
Interbay Spacing..... 119.27” Center to Center
Array Length ..... 74.5 Feet
Construction Material (Antenna)..... Galvanized Plated Steel and Stainless Steel

1) Power Capability Has Been Rated Assuming an Operating Transmission VSWR of 1.5:1
2) VSWR Specification Achieved After on Site Tuning For User Specific Frequencies.
3) Line Loss Assumes A Feed Run of 865 Feet of ERI MACXLine 4 1/16” Rigid 20 Foot Sticks.
3) Line Loss Assumes A Feed Run of 35 Feet of LDF4-50 Andrew Foam for 99.7 and 102.7 MHz.
4) Losses Taken from Actual Combiner.

Combiner Layout Austin, TX.
Project # 38094



A-4 ERI Combiner Specification Sheet

TRANSMISSION SITE
AUSTIN, TEXAS

General Specifications:

Multiplexer Type ..... Constant Impedance, Band Pass, and "T" Combiner
Number of Combining Units ..... Four
Injected Port to Injected Port Isolation ..... < - 50 dB
Output Connector ..... 6 1/8 "50 Ohm EIA (Flanged)
Output Power (Designed) ..... 51 kW(1)

Heat Removal .....Natural Convection Cooling
Physical Arrangement .....Free Standing and Mezzanine

Injected Port Specifications:

Frequency Assignment .....93.7 ~ 103.5 MHz.
Power Rating, Each Injected Port (Designed).....28.3 kW 93.7 MHz, 123 Watts 99.7 MHz.
Power Rating, Each Injected Port (Designed).....3.74 kW 101.5 MHz, 122 Watts 102.7 MHz.
Power Rating, Each Injected Port (Designed).....3.311 kW 103.5 MHz.
Input Connector .....3-1/8" 50 Ohm EIA (Flanged) 93.7, 101.5, and 105.3 MHz.
Input Connector ..... 7/8" 50 Ohm EIA (Flanged) 99.7, and 102.7 MHz.
VSWR.....< 1.20:1 @ +/-100 KHz.(2)
Group Delay .....Less than 200 ns Overall Variation, Carrier @ +/- 150 KHz.
Insertion Loss (Measured):

93.7 MHz. ..... - 0.278 dB
99.7 MHz. ..... - 1.263 dB
101.5 MHz. ..... - 0.325 dB
102.7 MHz. ..... - 0.732 dB
103.5 MHz. ..... - 0.313 dB

1) Power Rating Listed is as Designed Only. Actual Power Capabilities May Vary.
2) When Terminated in 50 Ohm Resistive Load.

EXHIBIT A – 5

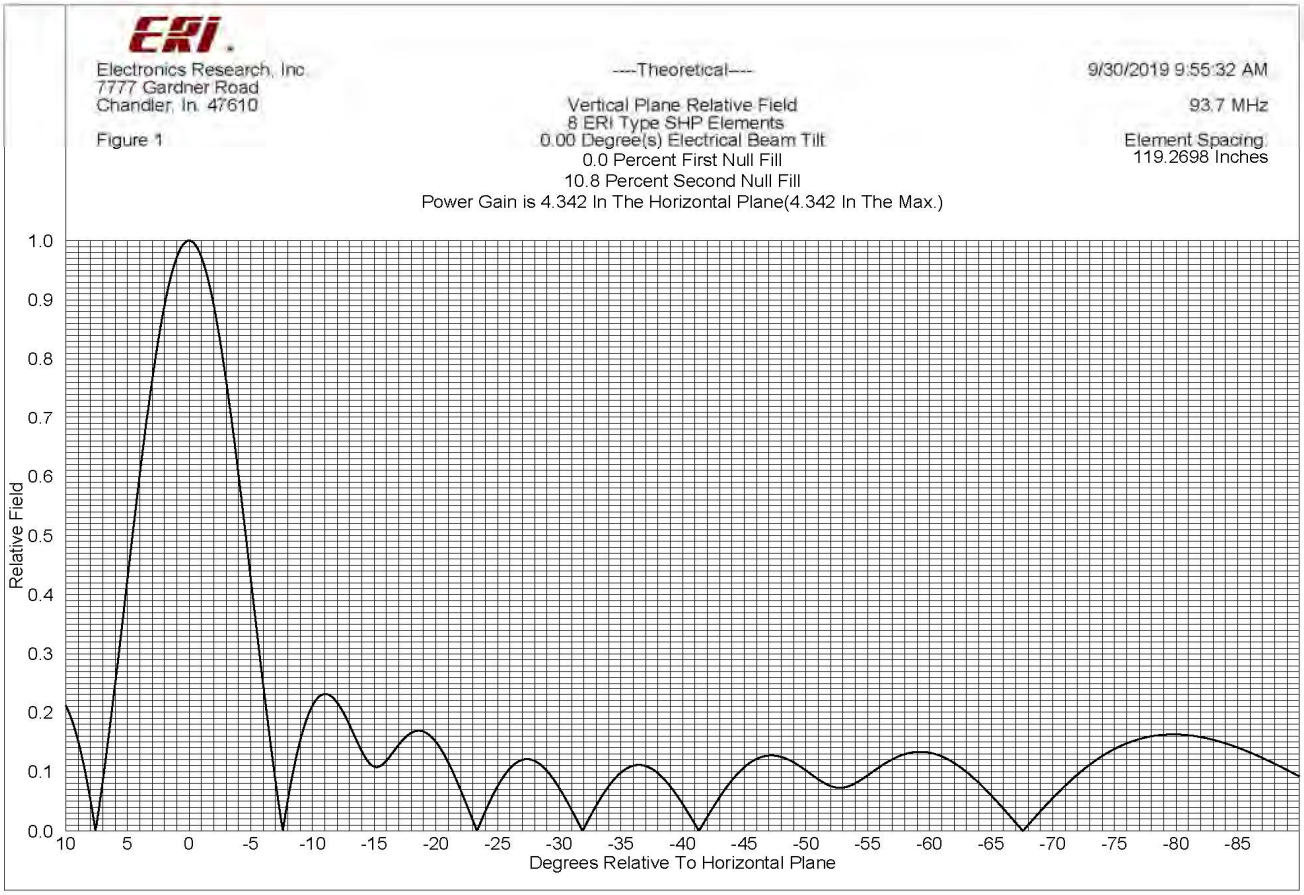

Electronics Research, Inc.
7777 Gardner Road
Chandler, In. 47610
Figure 1
----Theoretical----
Vertical Plane Relative Field
8 ERI Type SHP Elements
0.00 Degree(s) Electrical Beam Tilt
0.0 Percent First Null Fill
10.8 Percent Second Null Fill
Power Gain is 4.342 In The Horizontal Plane(4.342 In The Max.)
9/30/2019 9:55:32 AM
93.7 MHz
Element Spacing
119.2698 Inches
Relative Field
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10 5 0 -5 -10 -15 -20 -25 -30 -35 -40 -45 -50 -55 -60 -65 -70 -75 -80 -85
Degrees Relative To Horizontal Plane

EXHIBIT A – 5

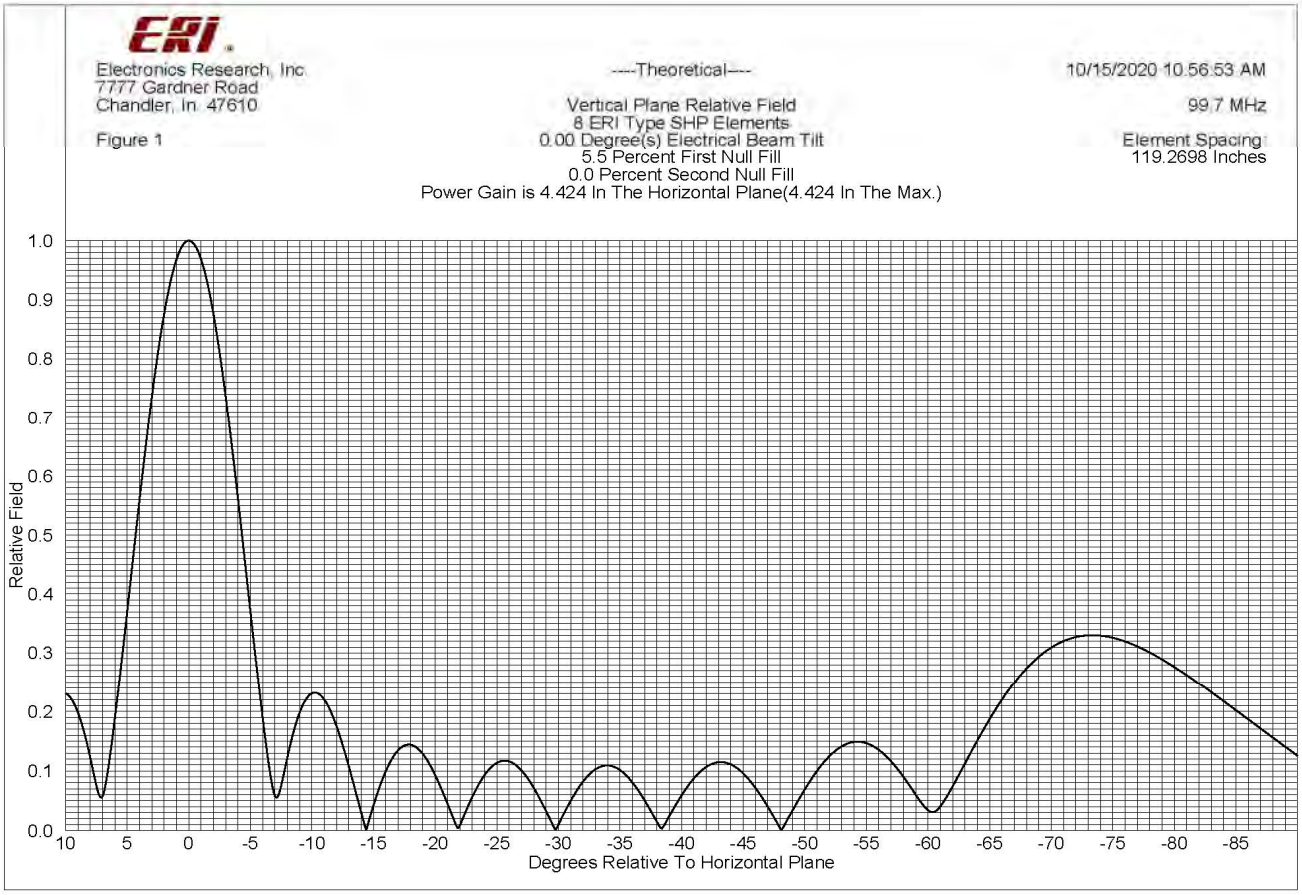

Electronics Research, Inc.
7777 Gardner Road
Chandler, In. 47610
Figure 1
----Theoretical----
Vertical Plane Relative Field
8 ERI Type SHP Elements
0.00 Degree(s) Electrical Beam Tilt
5.5 Percent First Null Fill
0.0 Percent Second Null Fill
Power Gain is 4.424 In The Horizontal Plane(4.424 In The Max.)
10/15/2020 10:56:53 AM
99.7 MHz
Element Spacing
119.2698 Inches
Relative Field
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10 5 0 -5 -10 -15 -20 -25 -30 -35 -40 -45 -50 -55 -60 -65 -70 -75 -80 -85
Degrees Relative To Horizontal Plane

EXHIBIT A – 5

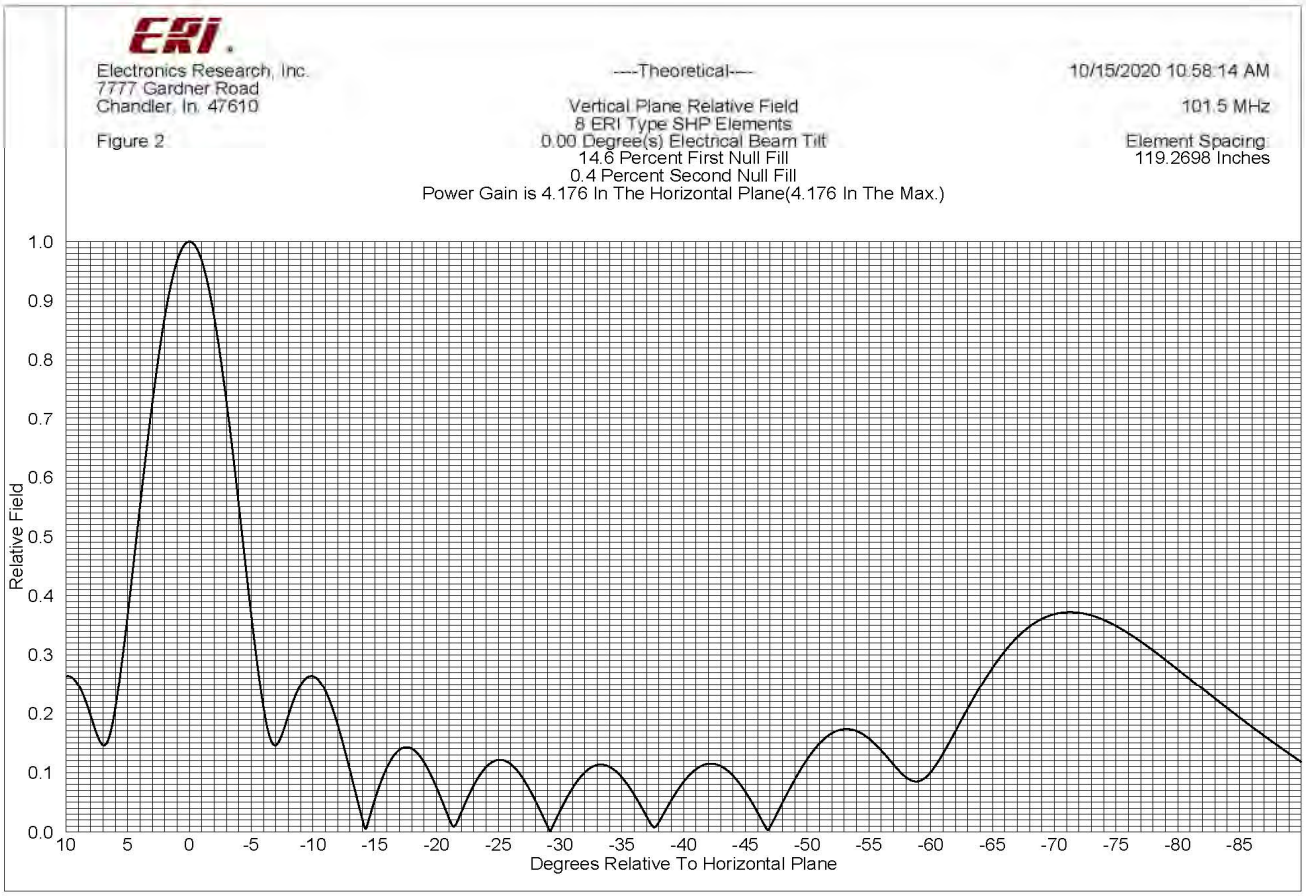

Electronics Research, Inc.
7777 Gardner Road
Chandler, In. 47610
Figure 2
----Theoretical----
Vertical Plane Relative Field
8 ERI Type SHP Elements
0.00 Degree(s) Electrical Beam Tilt
14.6 Percent First Null Fill
0.4 Percent Second Null Fill
Power Gain is 4.176 In The Horizontal Plane(4.176 In The Max.)
10/15/2020 10:58:14 AM
101.5 MHz
Element Spacing
119.2698 Inches
Relative Field
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10 5 0 -5 -10 -15 -20 -25 -30 -35 -40 -45 -50 -55 -60 -65 -70 -75 -80 -85
Degrees Relative To Horizontal Plane

EXHIBIT A – 5

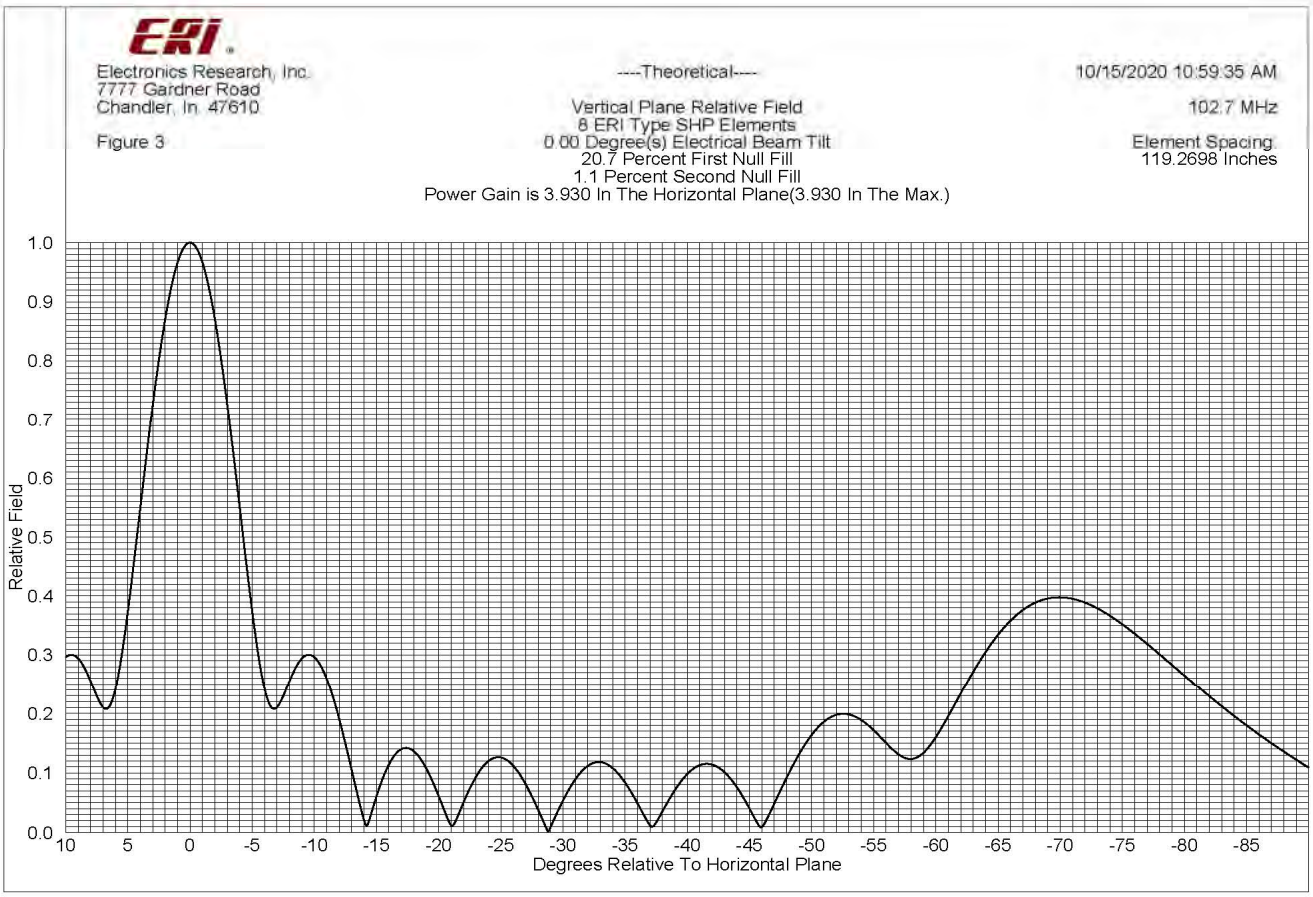
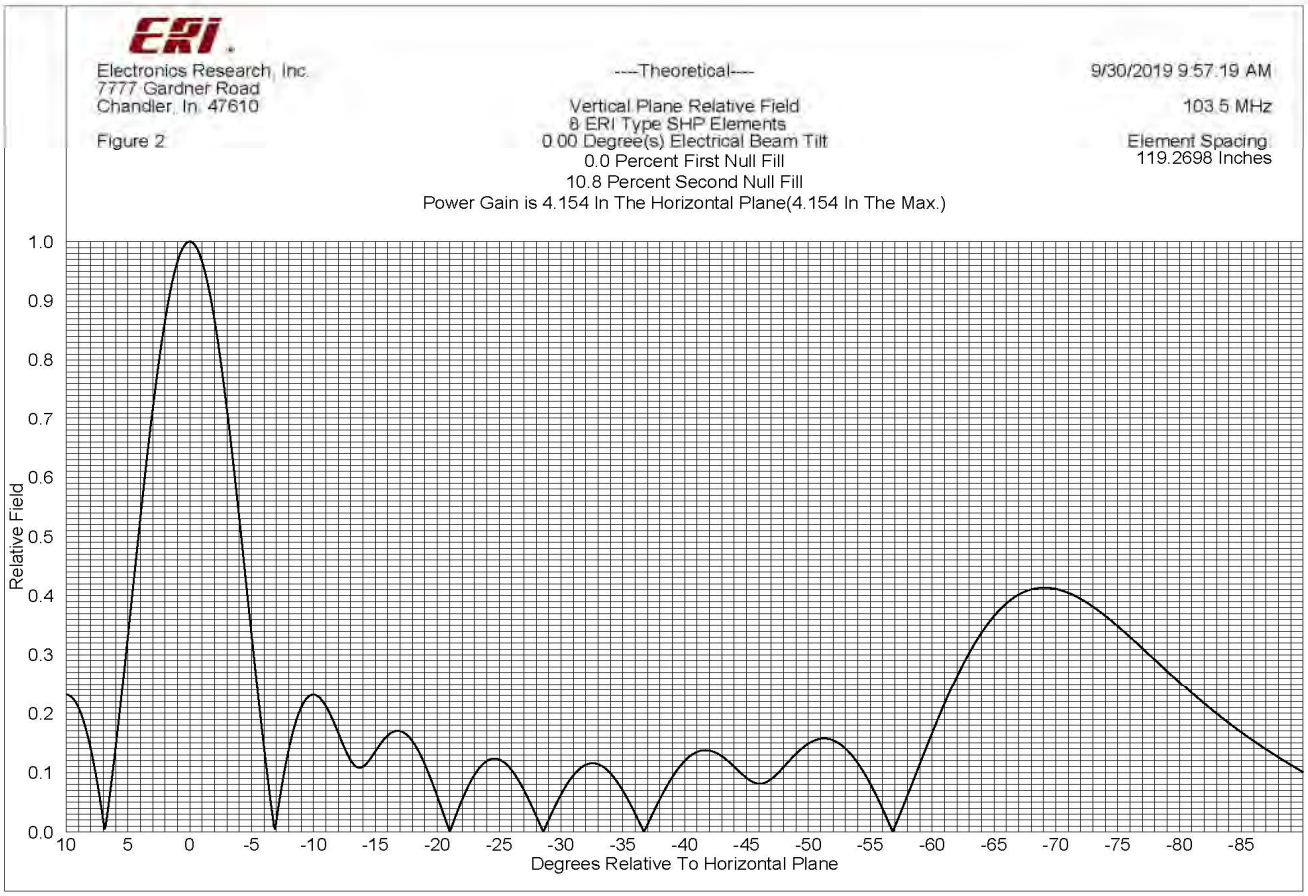
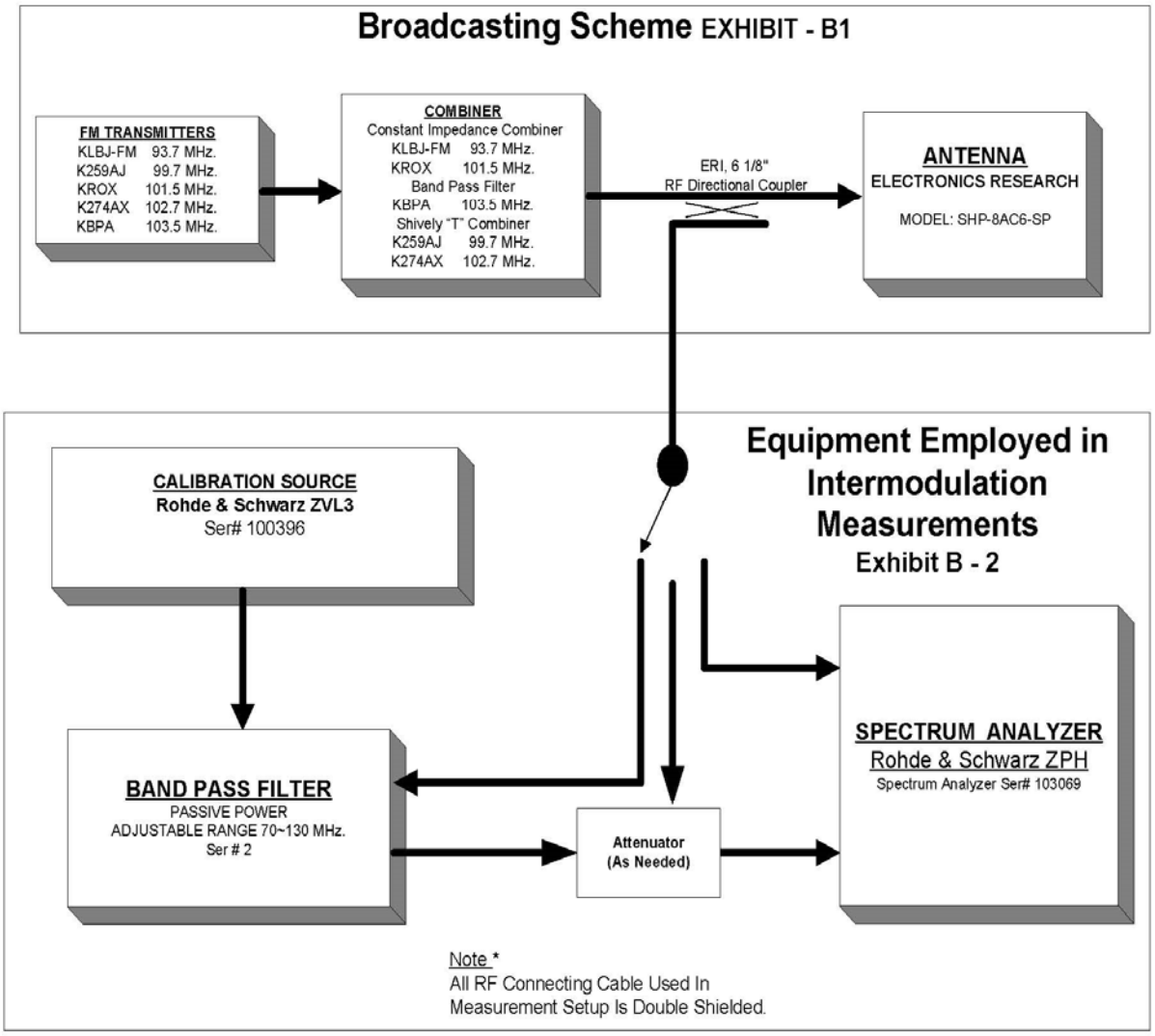

Electronics Research, Inc.
7777 Gardner Road
Chandler, In. 47610
Figure 3
----Theoretical----
Vertical Plane Relative Field
8 ERI Type SHP Elements
0.00 Degree(s) Electrical Beam Tilt
20.7 Percent First Null Fill
1.1 Percent Second Null Fill
Power Gain is 3.930 In The Horizontal Plane(3.930 In The Max.)
10/15/2020 10:59:35 AM
102.7 MHz
Element Spacing
119.2698 Inches
Relative Field
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10 5 0 -5 -10 -15 -20 -25 -30 -35 -40 -45 -50 -55 -60 -65 -70 -75 -80 -85
Degrees Relative To Horizontal Plane

EXHIBIT A – 5


Electronics Research, Inc.
7777 Gardner Road
Chandler, In. 47610
Figure 2
----Theoretical----
Vertical Plane Relative Field
8 ERI Type SHP Elements
0.00 Degree(s) Electrical Beam Tilt
0.0 Percent First Null Fill
10.8 Percent Second Null Fill
Power Gain is 4.154 In The Horizontal Plane(4.154 In The Max.)
9/30/2019 9:57:19 AM
103.5 MHz
Element Spacing
119.2698 Inches
Relative Field
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10 5 0 -5 -10 -15 -20 -25 -30 -35 -40 -45 -50 -55 -60 -65 -70 -75 -80 -85
Degrees Relative To Horizontal Plane



Broadcasting Scheme and Equipment Employed in Intermodulation Measurements

EXHIBIT B

ELECTRONICS RESEARCH, INC. ERI

Field Service Report
FM Combiner and Antenna System

Austin, TX.
Broadcast Facility

ERI Antenna: SHP-8AC6-SP
ERI Constant Impedance Combiner 93.7 & 101.5 MHz.
ERI Band Pass 103.5 MHz.
Shively “T” Combiner 99.7 & 102.7 MHz.
Feedline: Myat 4 1/16” Rigid 865 Feet

KLBJ-FM – 93.7 MHz. ~ K259AJ – 99.7 MHz.
KROX – 101.5 MHz. ~ K274AX – 102.7 MHz.
KBPA – 103.5 MHz.

ERI Project # 38094

October 25, 2020

Submitted By:

Jeff Taylor
7777 Gardner Rd.
Chandler, In. 47610
TX: 812-925-6000 Ext. 276
Cell: 812-459-6544
EM: JTaylor@eriinc.com

TABLE OF CONTENTS

INTRODUCTION

Listed below is a summary of the data and attached are the plots collected from the KLBJ-FM ~ K259AJ ~ KROX ~ K274AX ~ KBPA transmission site in Austin, TX. by Jeff Taylor October 25, 2020.

- The antenna is a SHP-10AC6-SP.
- The combiner is a 783-8 ~ 780-6 Constant Impedance Combiner, 783-4 Band Pass Low Power Shively "T" Combiner.
- Equipment used for testing combiner was a Copper Mountain S5048 VNA.
- Equipment used for filter to antenna testing was a Rohde & Schwarz ZVL3 VNA High RF setup.
- Equipment used for feedline and antenna testing was a Rohde & Schwarz ZVL3 VNA High RF setup.
- All output measurements of the combiner system were taken at the 6 1/8" output directional coupler unless noted otherwise.
- All input measurements of the ERI products were taken at the input directional couplers and the input Shively measurements were taken on the 7/8" input elbows of the band pass filters.
- All feedline and antenna measurements were taken on the 4 1/16" elbow on the gas block of the feedline in the transmitter room.

Site Address: 8300 Waymaker Way
Austin, Texas 78746

Attendees: Jeff Taylor Electronics Research, Inc.
Greg Shapiro, Jim Henkle, John Gifford Waterloo Media, L.C.

The reason for this Field Service Trip was install The ERI filter system, build the "T" network for the Shively band pass filters, and tie in the Shively "T" combiner to the ERI filter system, tune the antenna and conduct intermodulation measurements. The ERI constant impedance filter system is designed to operate with either the Shively "T" combiner or the ERI band pass filter system into the broad port of the constant impedance system via a 3 1/8" switch.
Please refer to the combiner layout drawing concerning the filter circuit.

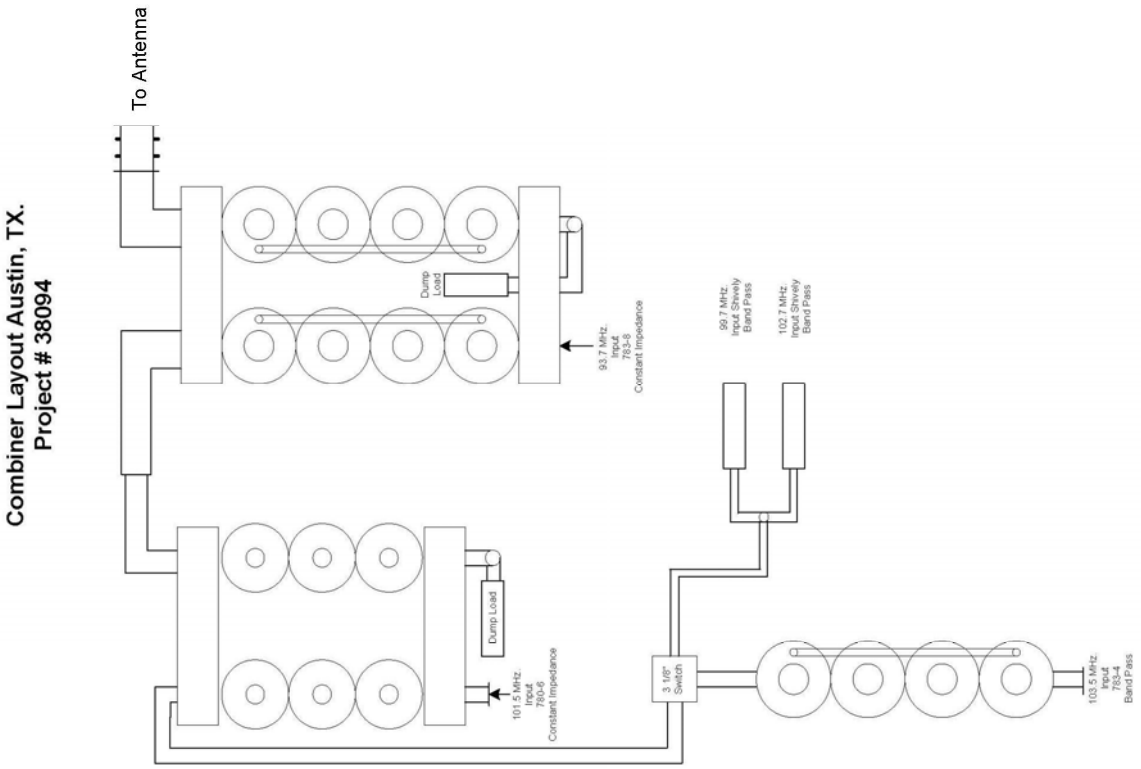
SUMMARY and RECOMMENDATIONS

All measurements were taken by Jeff Taylor of Electronics Research Inc. October 2020.

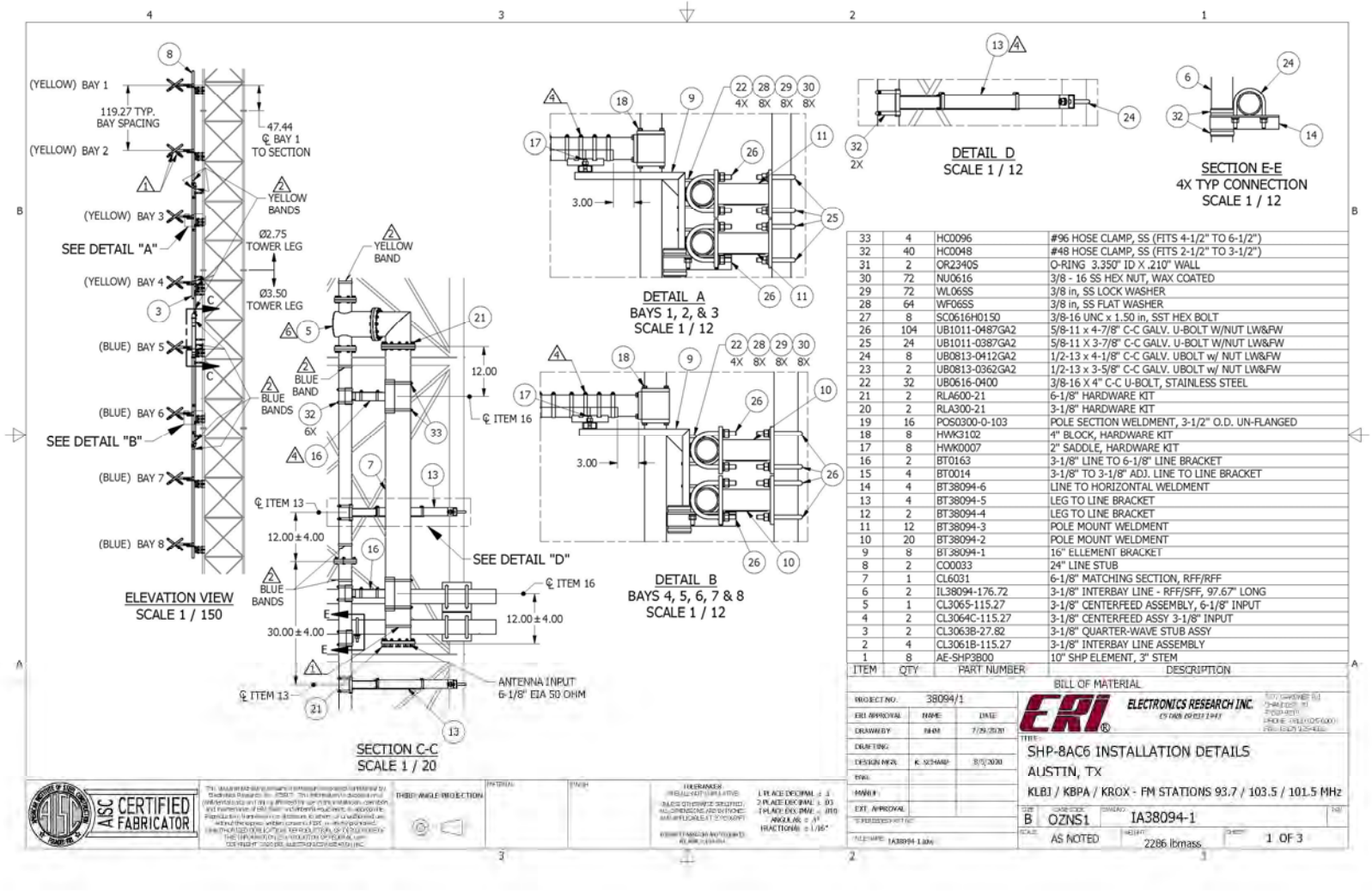
Sincerely Jeff Taylor

DRAWINGS

Drawing 1: Combiner Drawing.



Drawing 2: Antenna Drawing.



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23	2	UB0813-0362GA2	1/2-13 x 3-5/8" C-C GALV. UBOLT w/ NUT LW&FW
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21	2	RLA600-21	6-1/8" HARDWARE KIT
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19	16	POS0300-0-103	POLE SECTION WELDMENT, 3-1/2" O.D. UN-FLANGED
18	8	HWK3102	4" BLOCK, HARDWARE KIT
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4	2	CL3064C-115.27	3-1/8" CENTERFEED ASSY 3-1/8" INPUT
3	2	CL3063B-27.82	3-1/8" QUARTER-WAVE STUB ASSY
2	4	CL3061B-115.27	3-1/8" INTERBAY LINE ASSEMBLY
1	8	AE-SHP3800	10" SHP ELEMENT, 3" STEM

BILL OF MATERIAL

PROJECT NO. 38094/1

	NAME	DATE
ERI APPROVAL		
DRAWN BY	MHH	7/29/2020
DRAFTING		
DESIGN MGR.	K. SCHARP	8/5/2020
ENG.		
MANUF.		
EXT. APPROVAL		

ELECTRONICS RESEARCH INC.

TITLE: SHP-8AC6 INSTALLATION DETAILS
AUSTIN, TX
KLBJ / KBPA / KROX - FM STATIONS 93.7 / 103.5 / 101.5 MHz

SIZE B | CAGE CODE OZNS1 | DRAWING IA38094-1 | REV

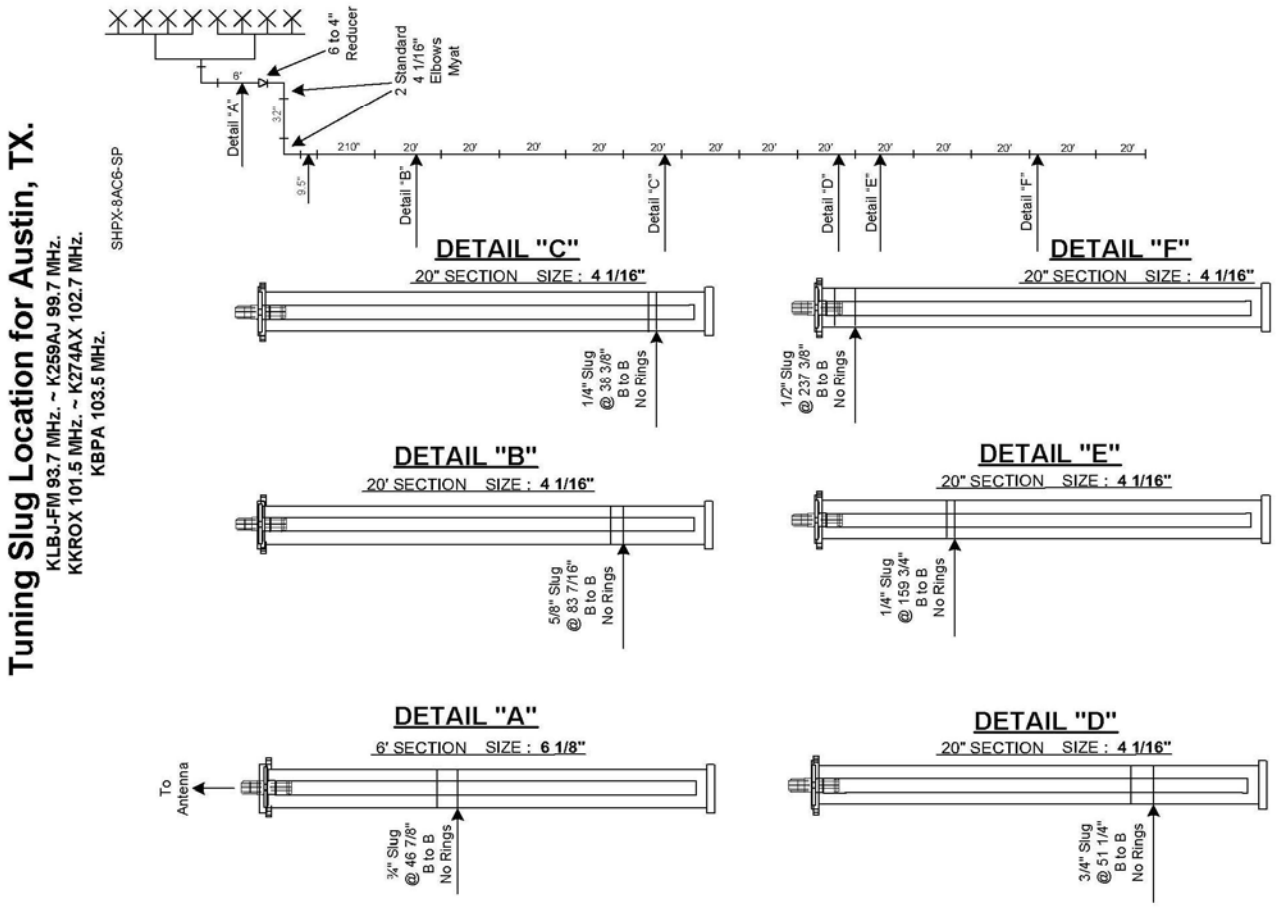
SCALE AS NOTED | WEIGHT 2286 lbmass | SHEET 1 OF 3

AISC CERTIFIED FABRICATOR

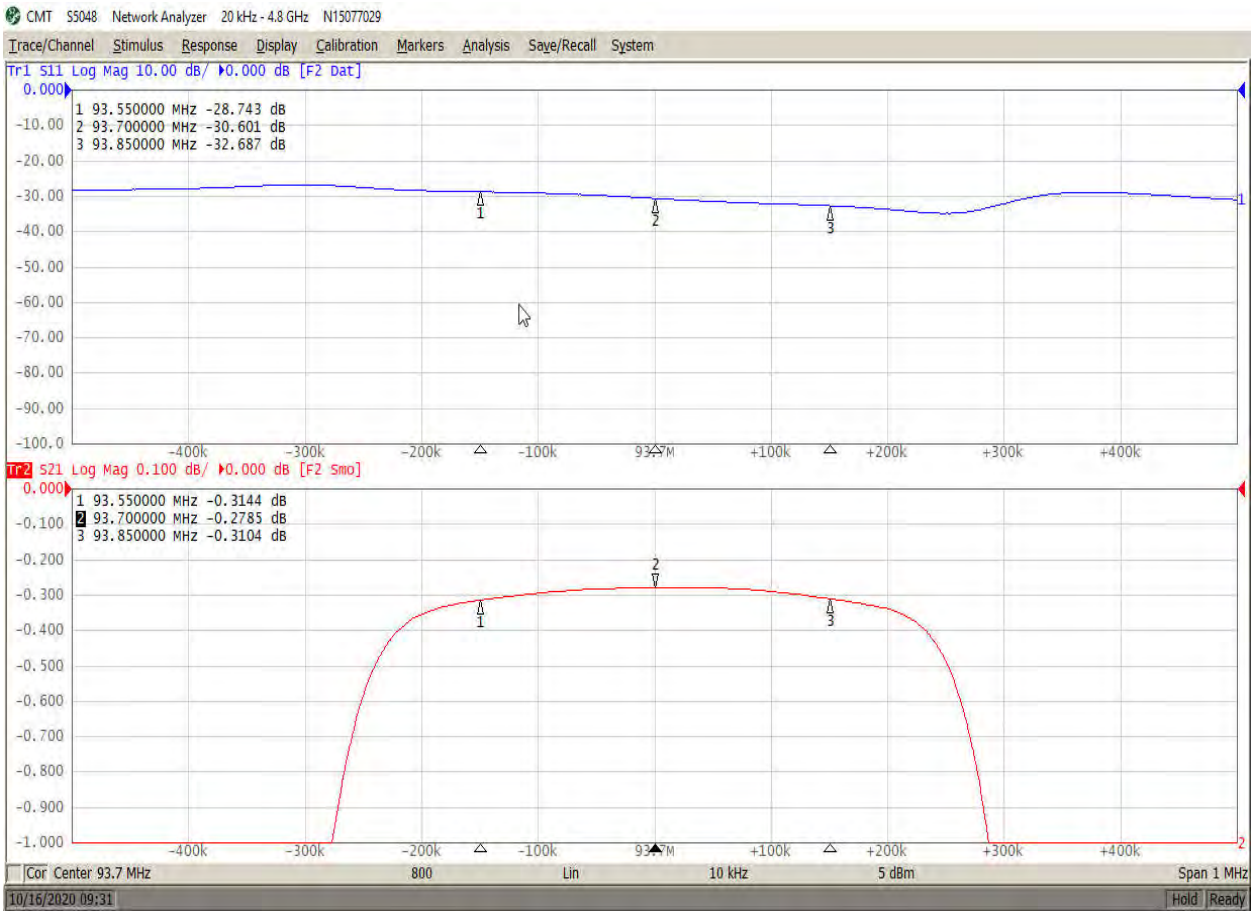
THIRD ANGLE PROJECTION

Drawing 3: Tuning Slug Location.

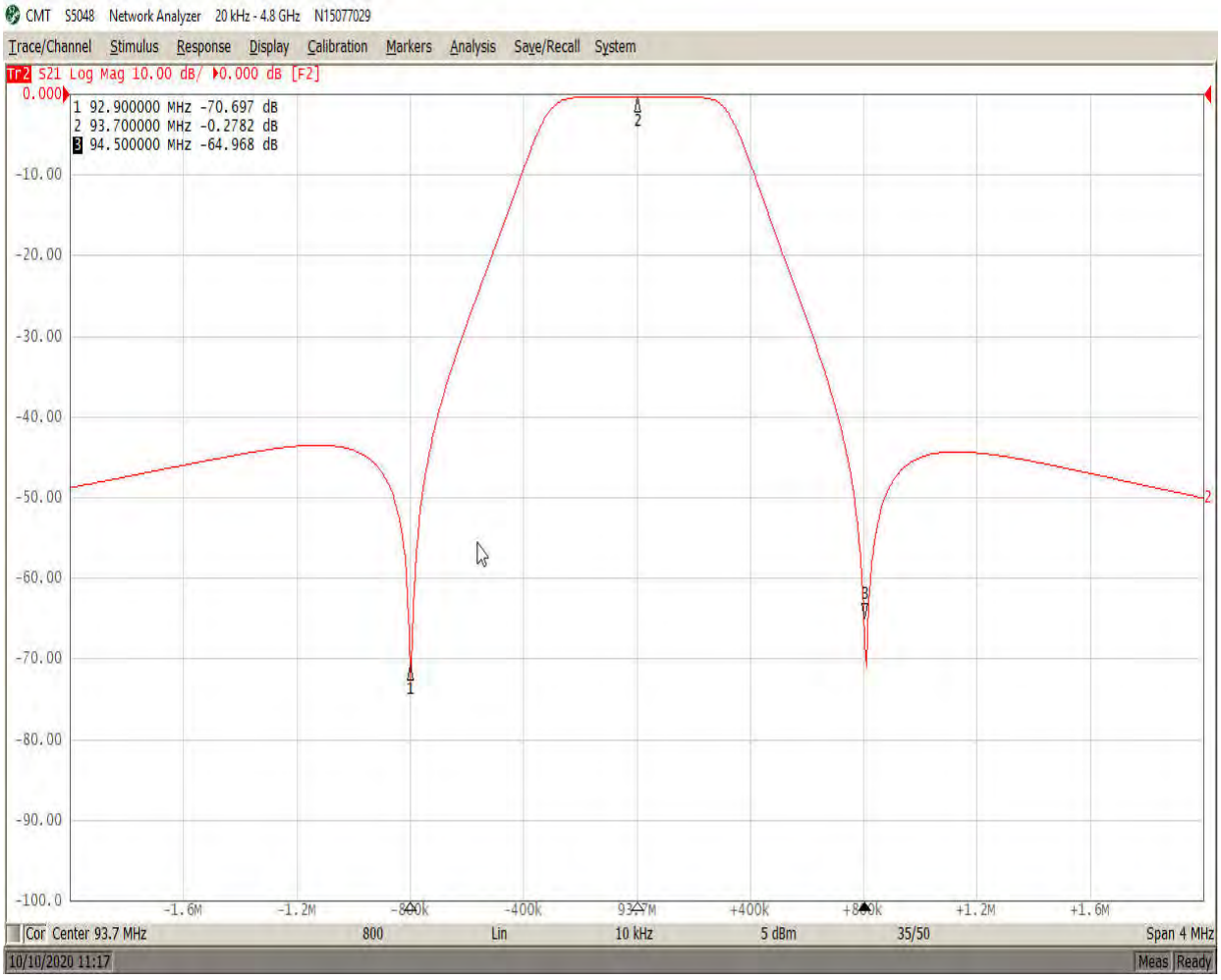
PROJECT # : **38094** DATE: 10-25-20 LINE SIZE: **MYAT 4 1/16" Rigid 20' Sticks.**



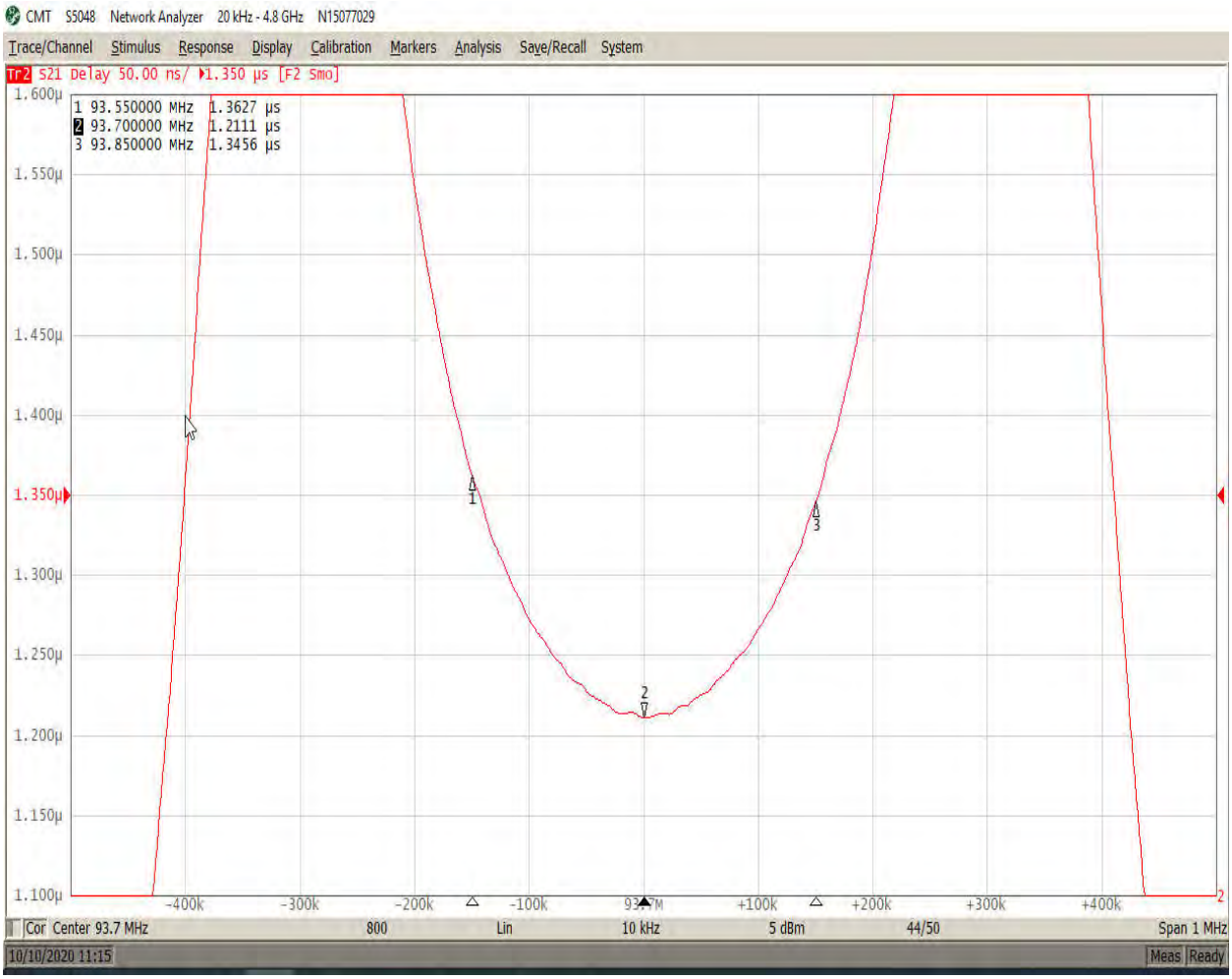
Measurement 1: Match and Insertion Loss of 93.7 MHz.



Measurement 2: Isolation +/- 800 KHz. of 93.7 MHz.

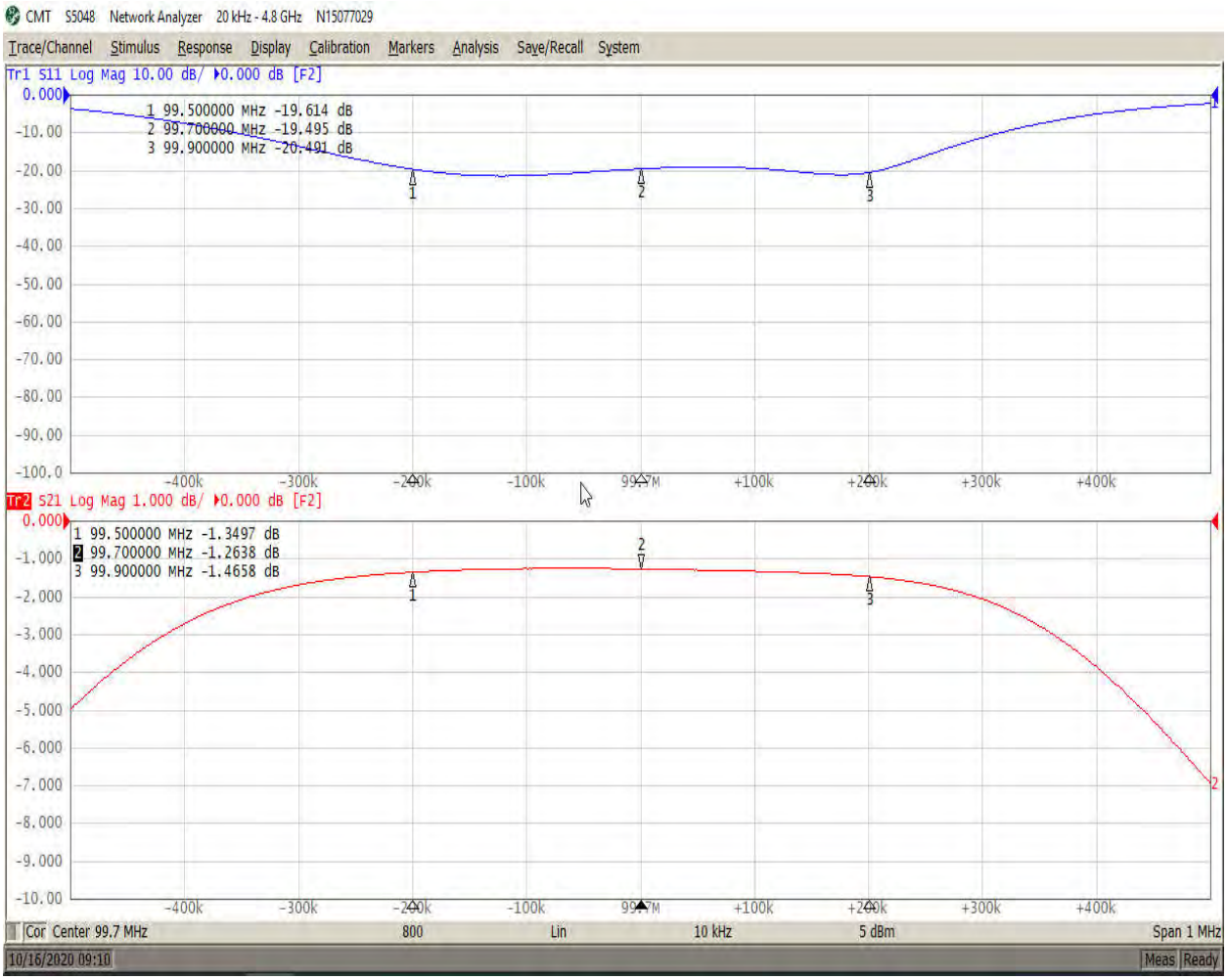


Measurement 3: Group Delay of 93.7 MHz.

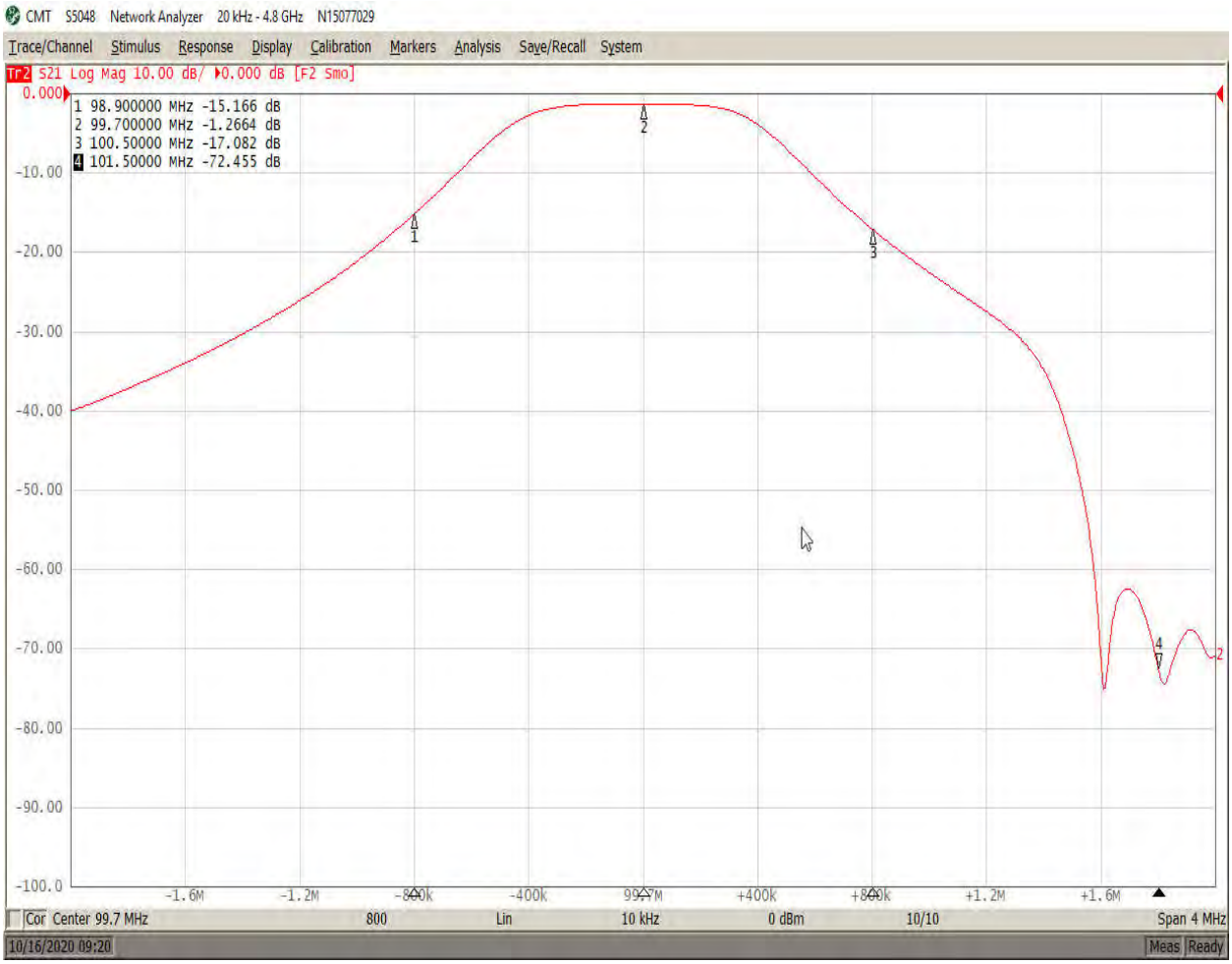


Measurement 4: Broad Port Isolation for 93.7 MHz.

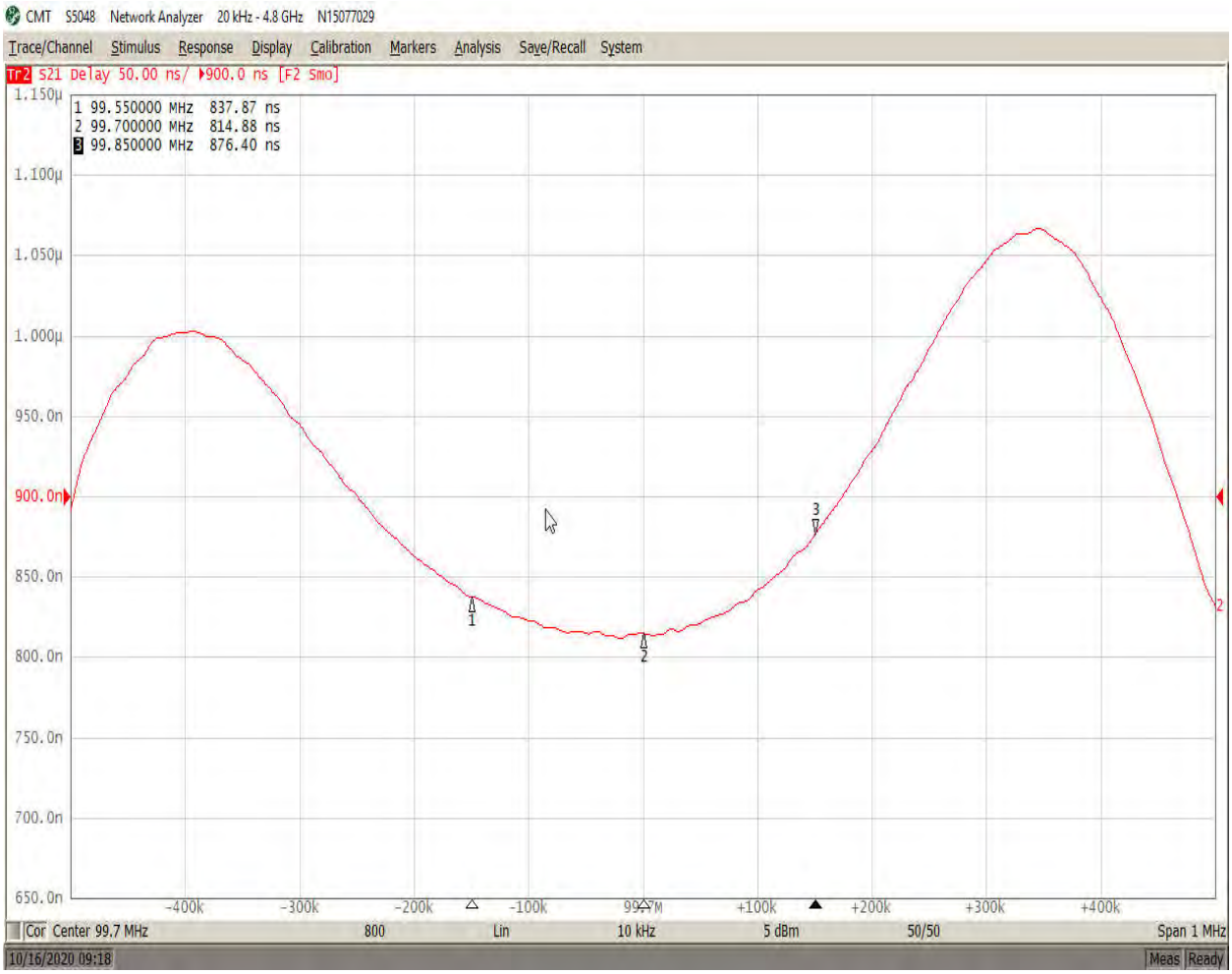
Measurement 5: Match and Insertion Loss of 99.7 MHz.



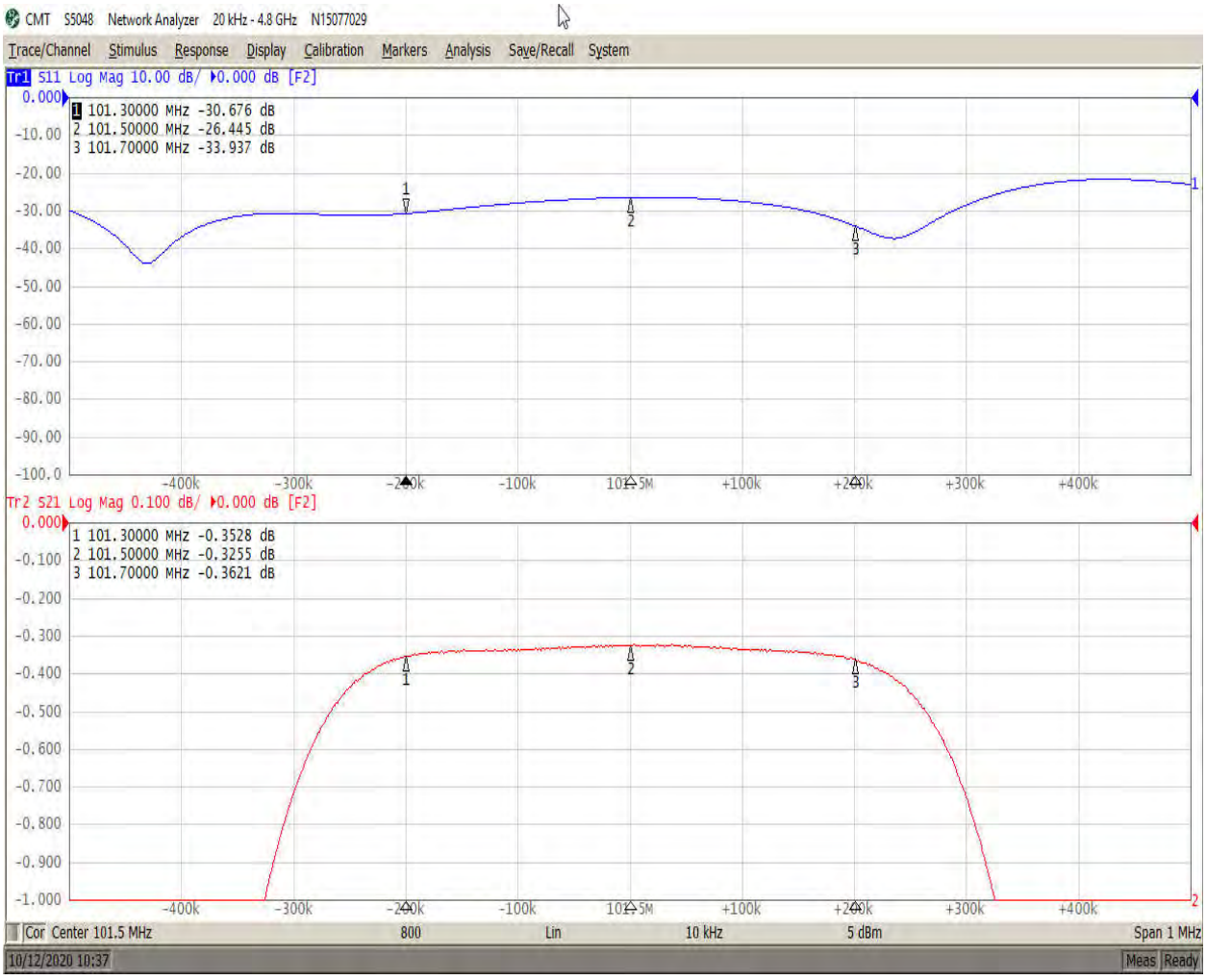
Measurement 6: Isolation +/- 800 KHz. of 99.7 MHz.



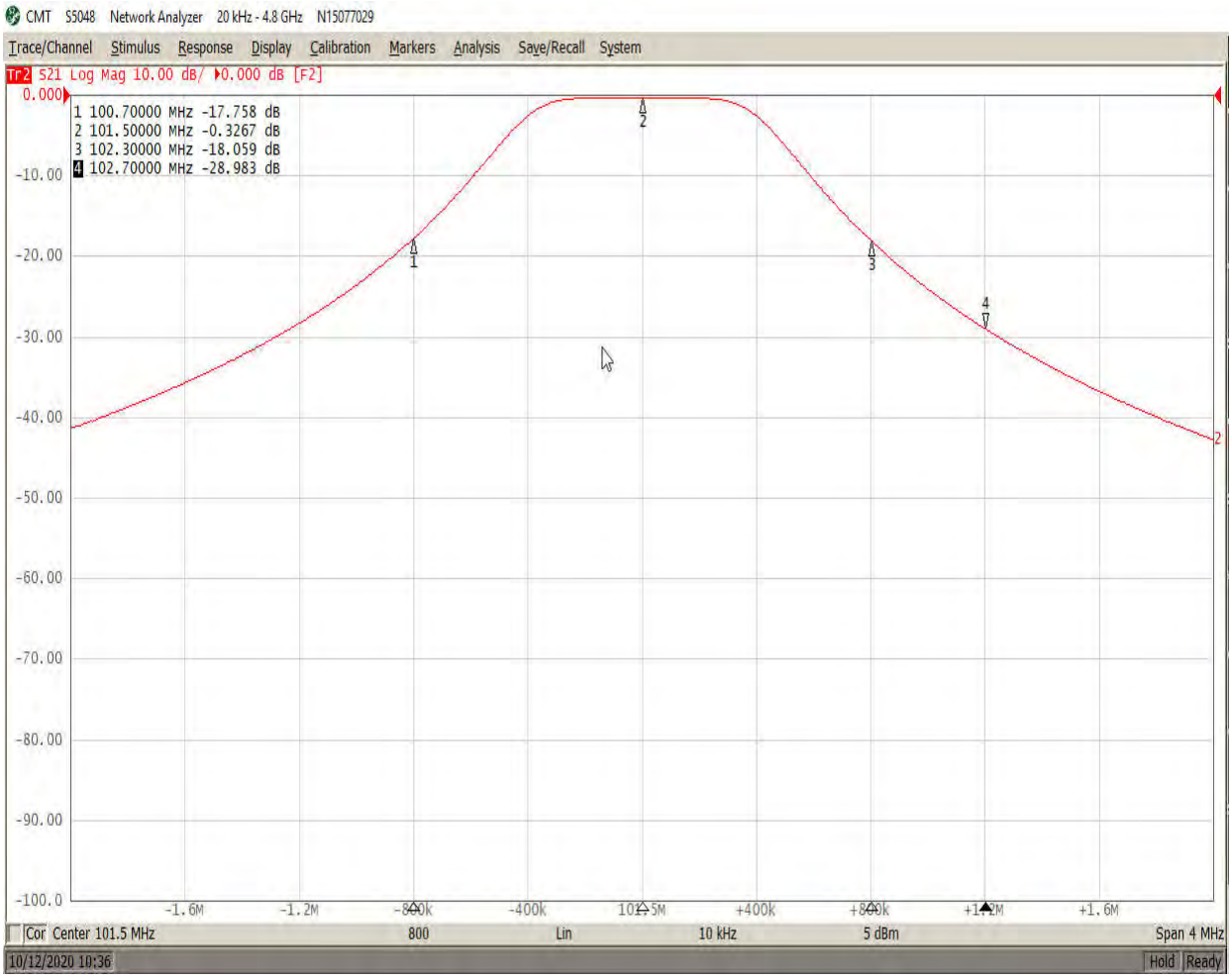
Measurement 7: Group Delay of 99.7 MHz.



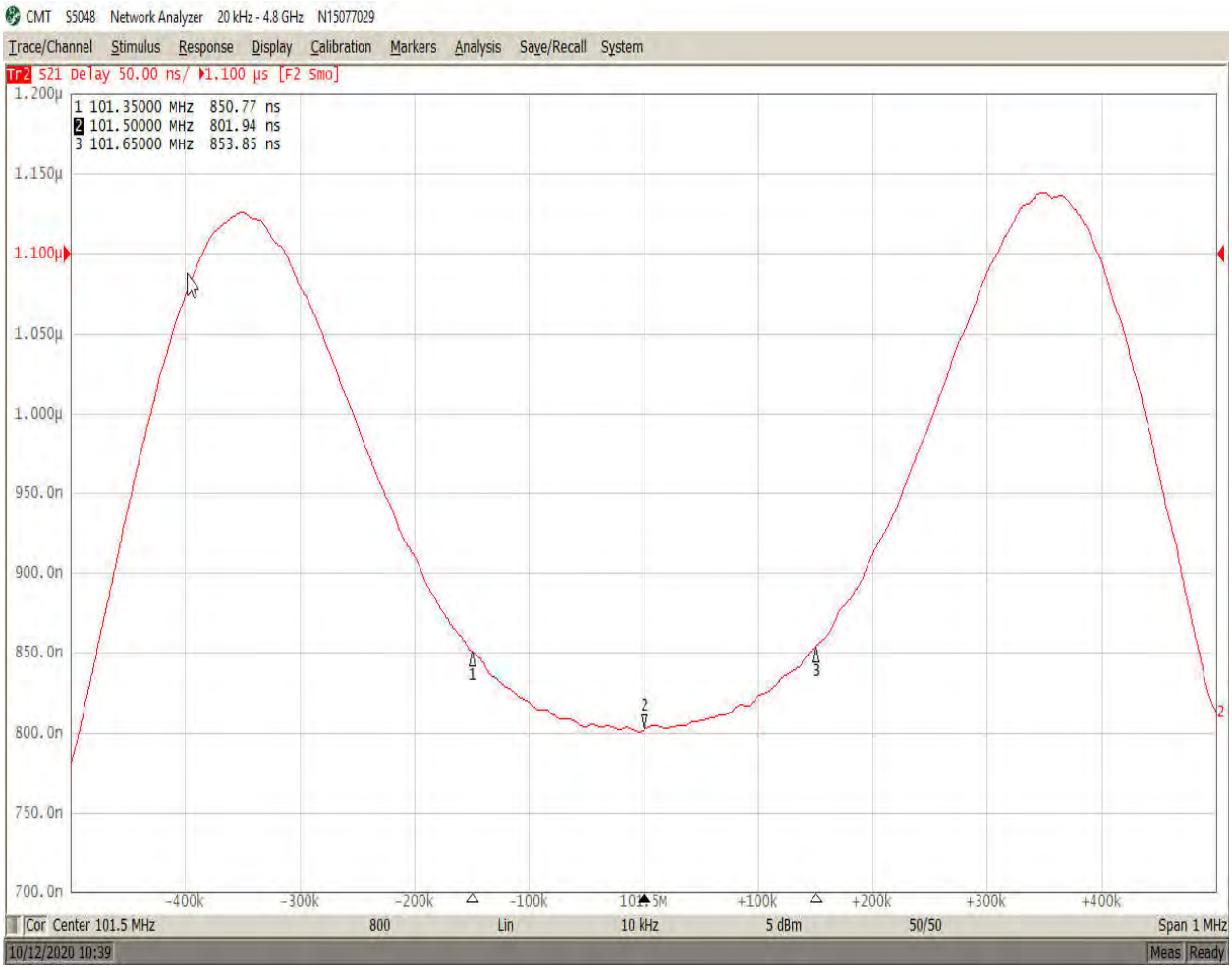
Measurement 8: Match & Insertion Loss of 101.5 MHz.



Measurement 9: Isolation +/- 800 KHz. of 101.5 MHz.



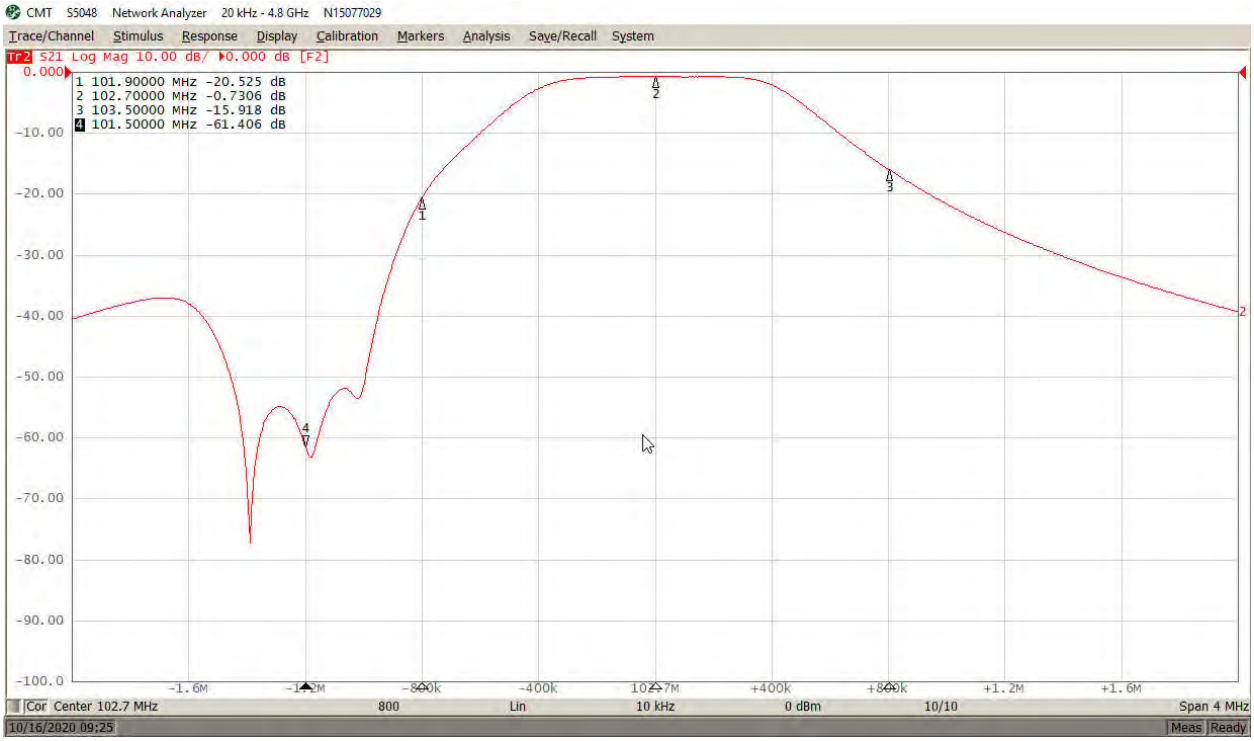
Measurement 10: Group Delay of 101.5 MHz.



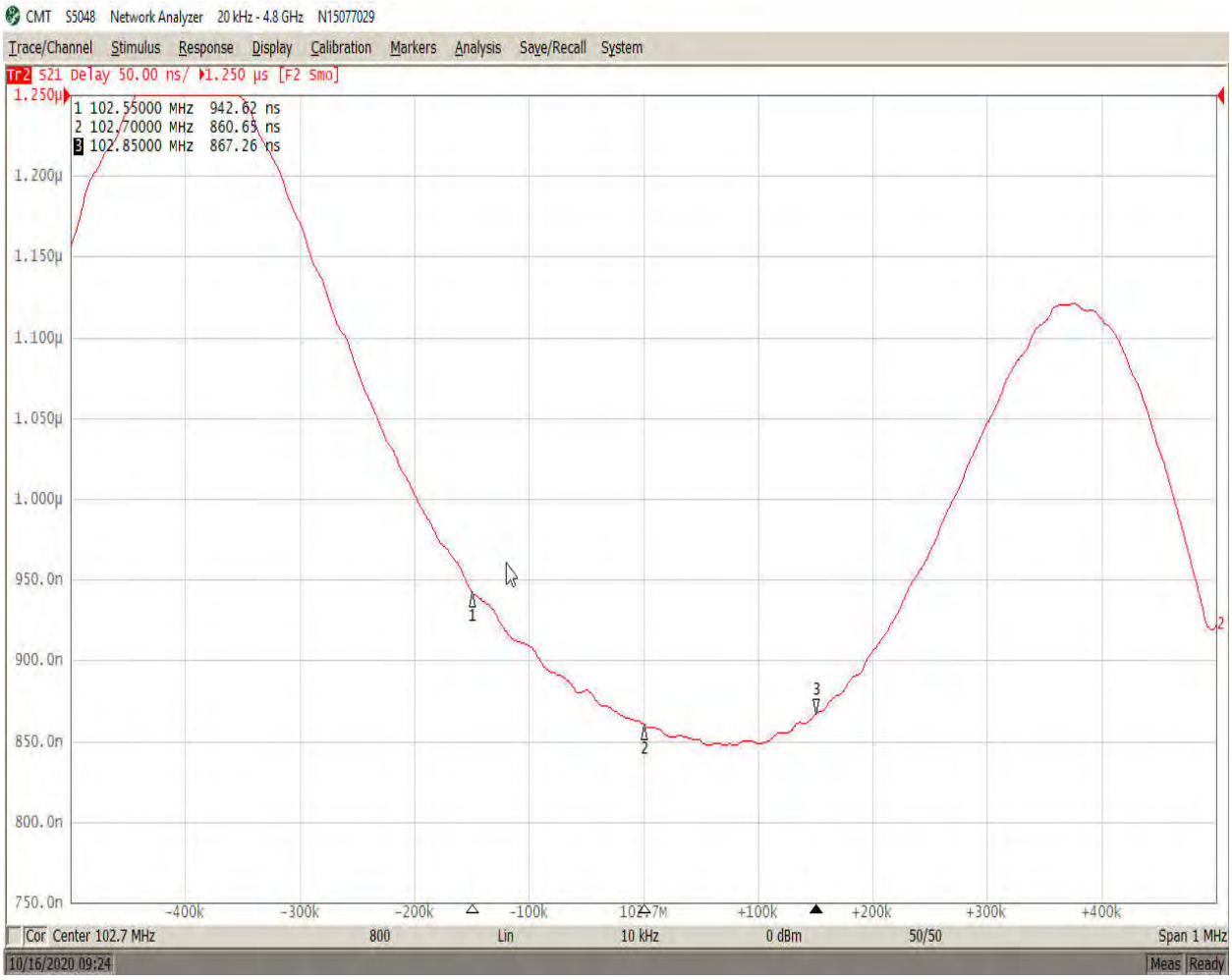
Measurement 11: Isolation to Broad Port of 101.5 MHz.

Measurement 12: Match and Insertion Loss of 102.7 MHz.

Measurement 13: Isolation +/- 800 KHz. of 102.7 MHz.

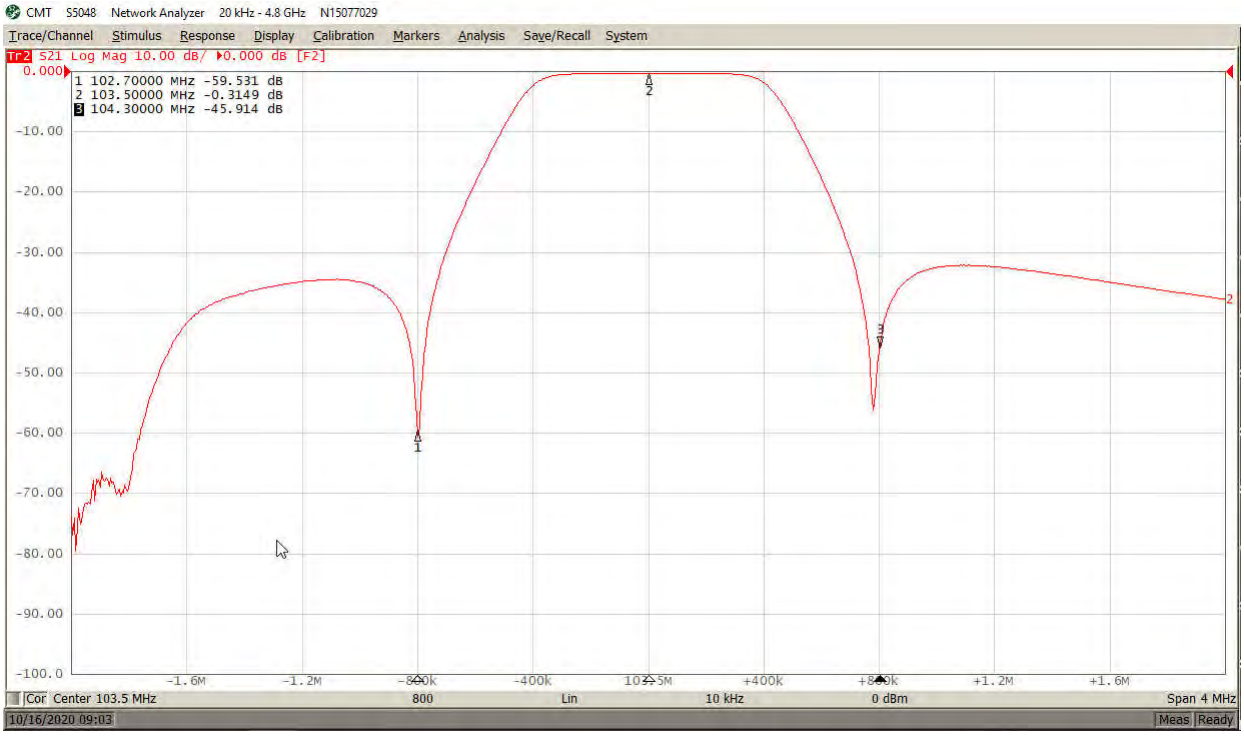


Measurement 14: Group Delay of 102.7 MHz.

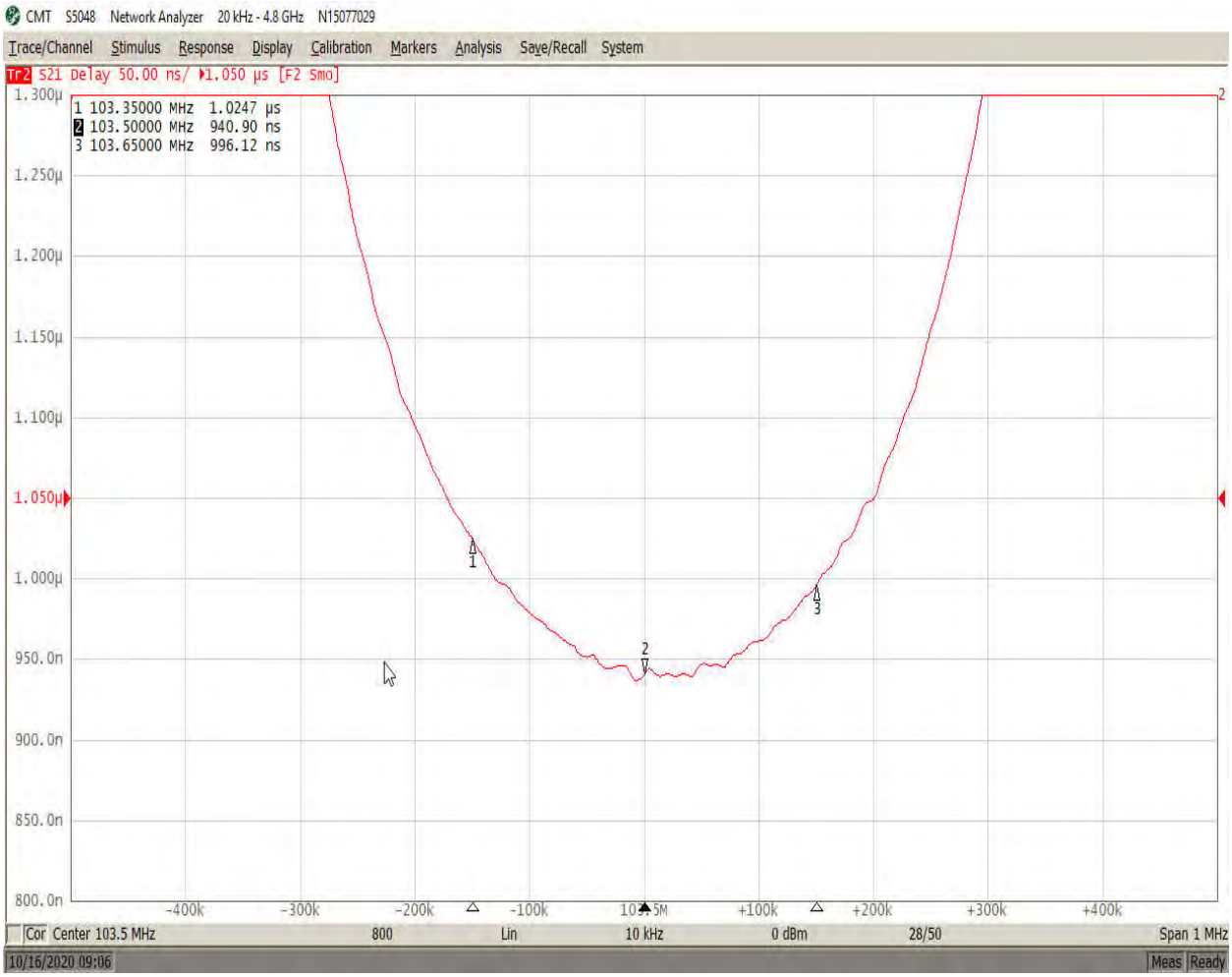


Measurement 15: Match & Insertion Loss of 103.5 MHz.

Measurement 16: Isolation +/- 800 KHz. of 103.5 MHz.

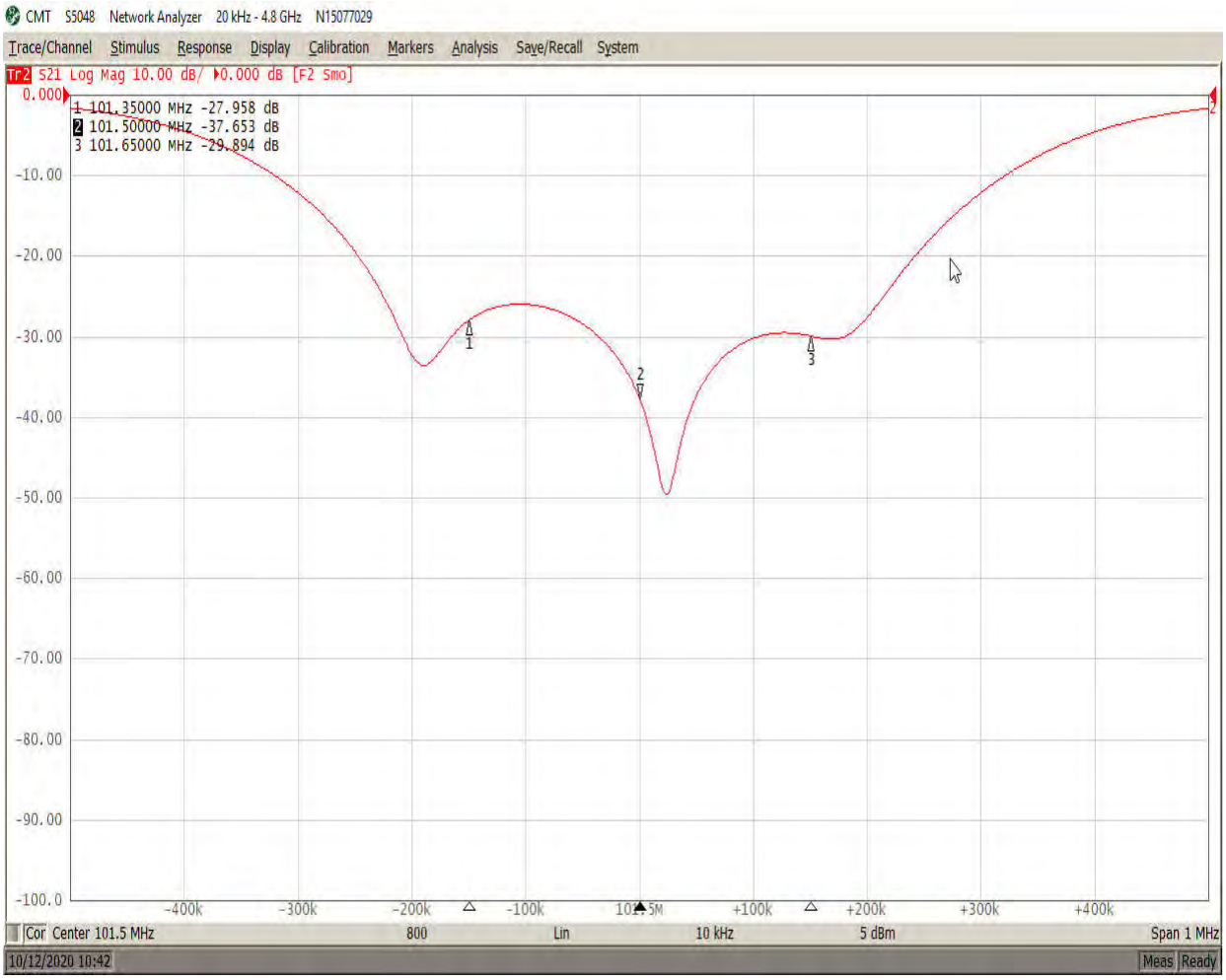


Measurement 17: Group Delay of 103.5 MHz.

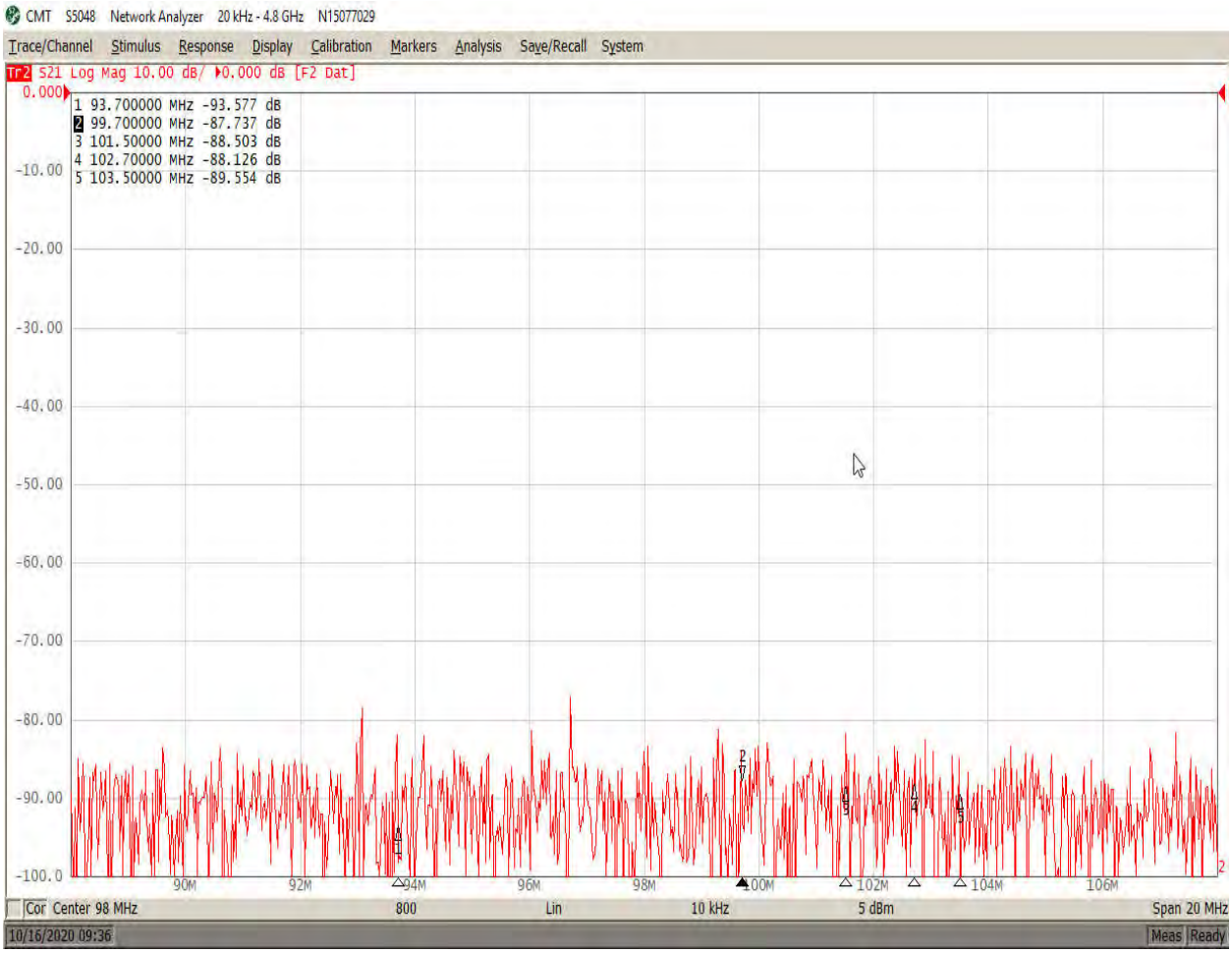


Measurement 18: Isolation to Dump Load 93.7 MHz.

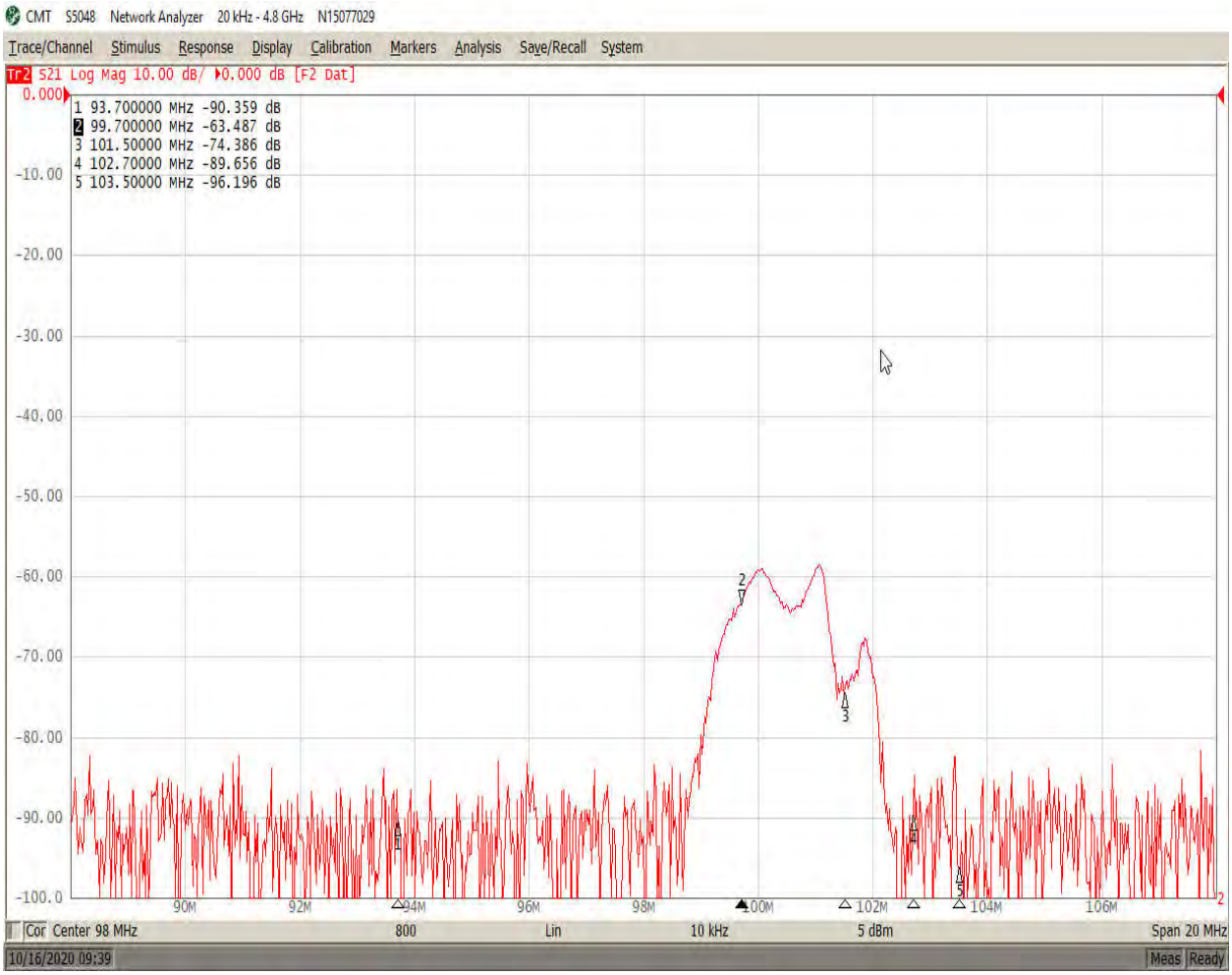
Measurement 19: Isolation to Dump Load 101.5 MHz.



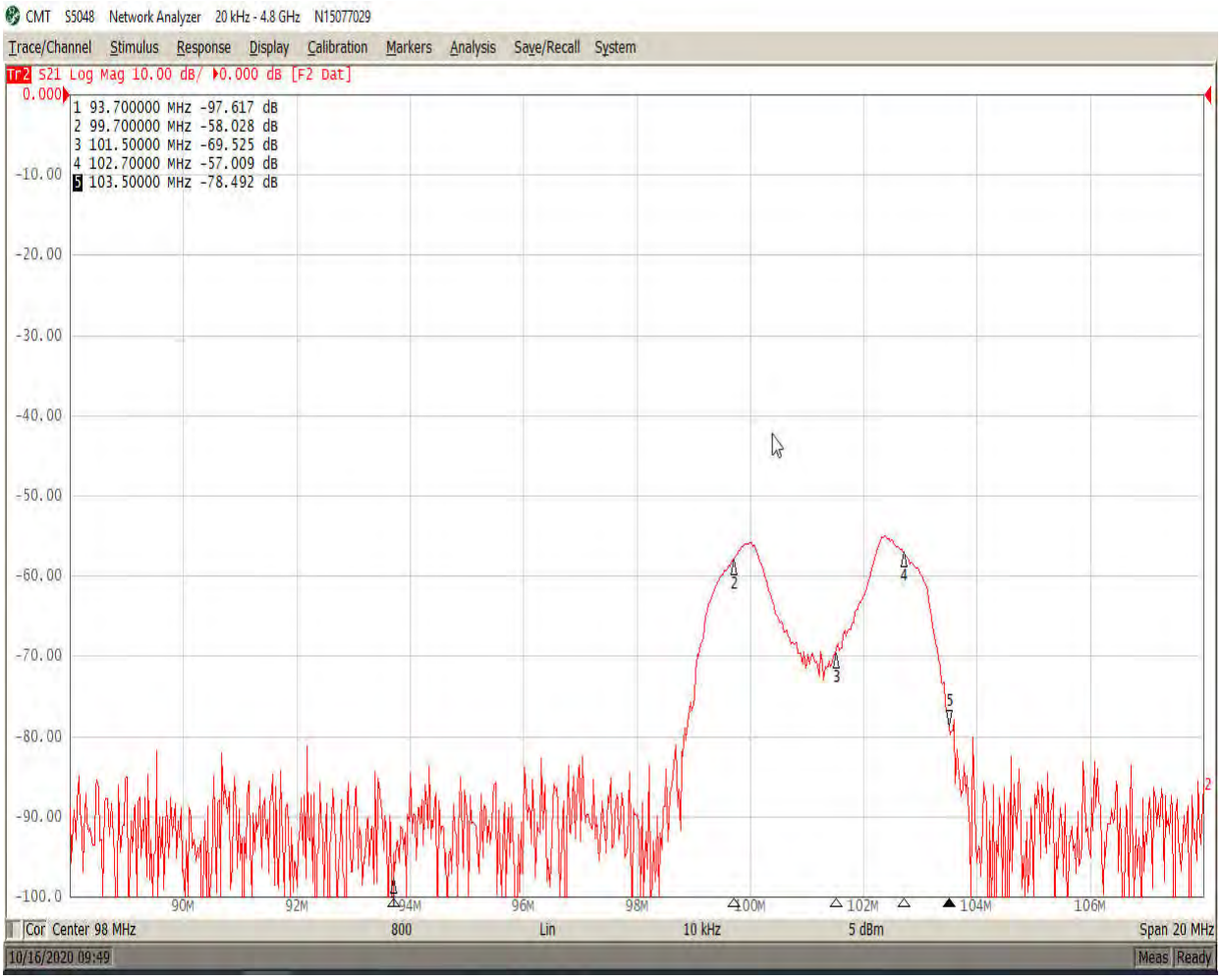
Measurement 20: Port to Port Isolation 93.7 to 99.7 MHz.



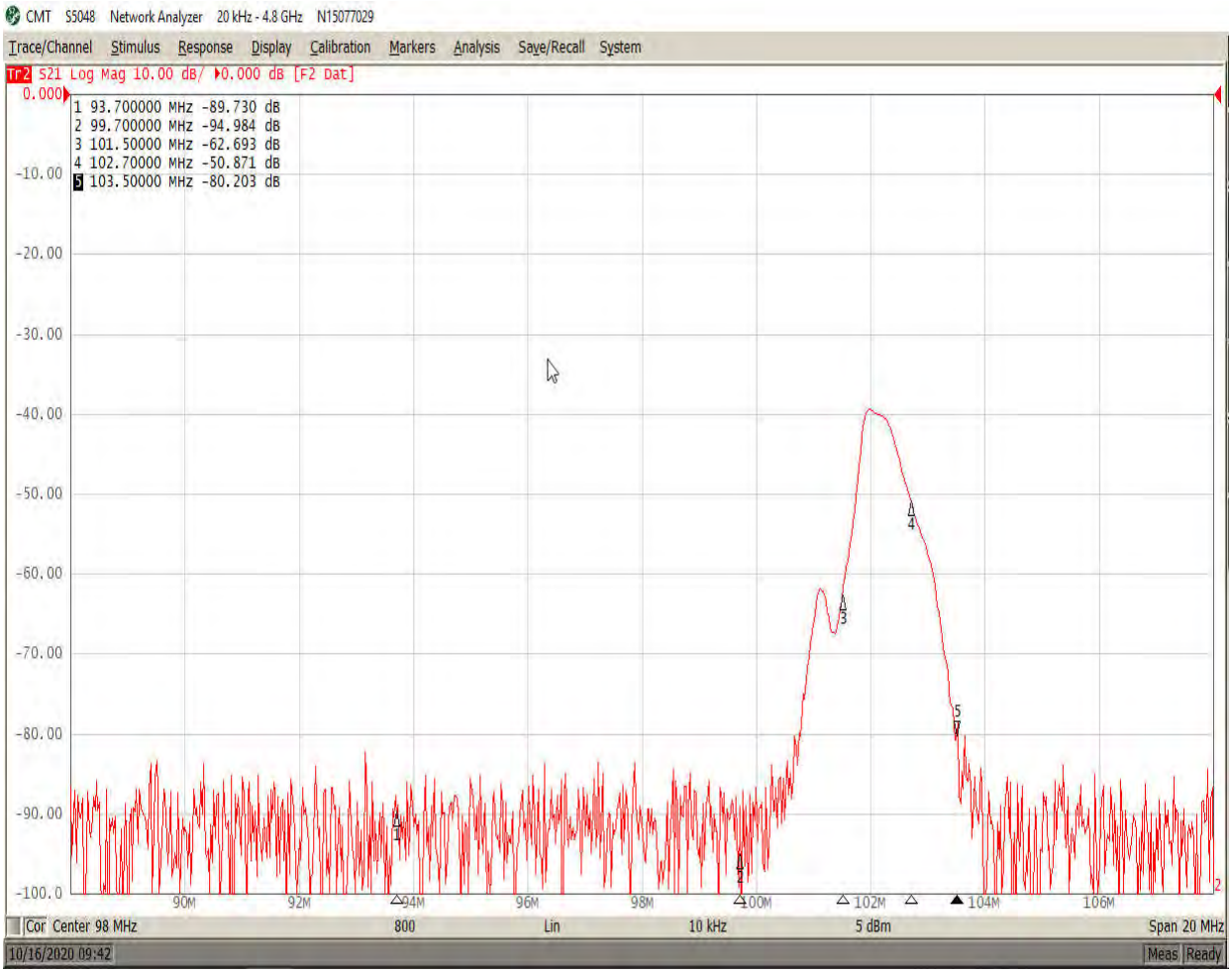
Measurement 21: Port to Port Isolation 99.7 to 101.5 MHz.



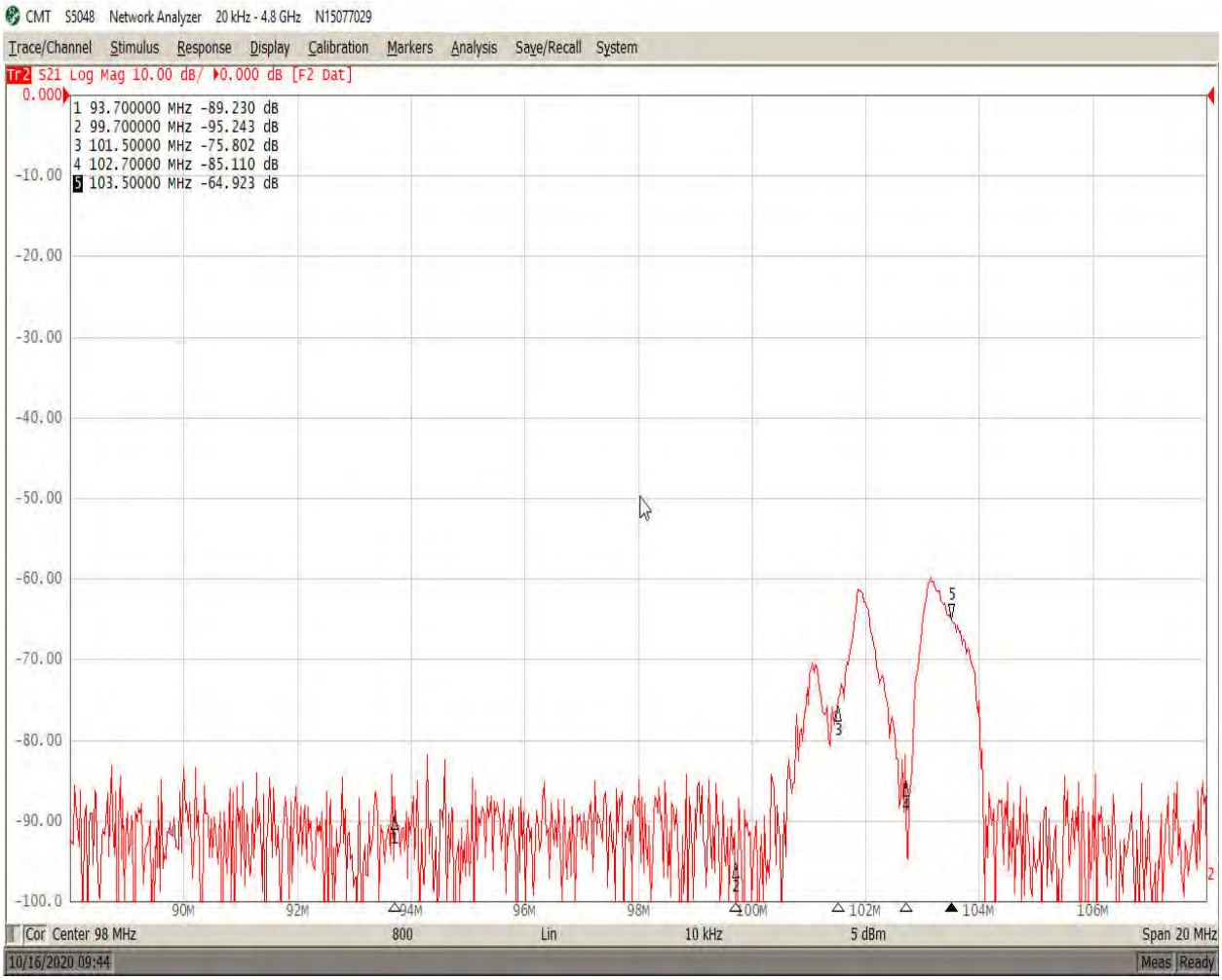
Measurement 22: Port to Port Isolation 99.7 to 102.7 MHz.



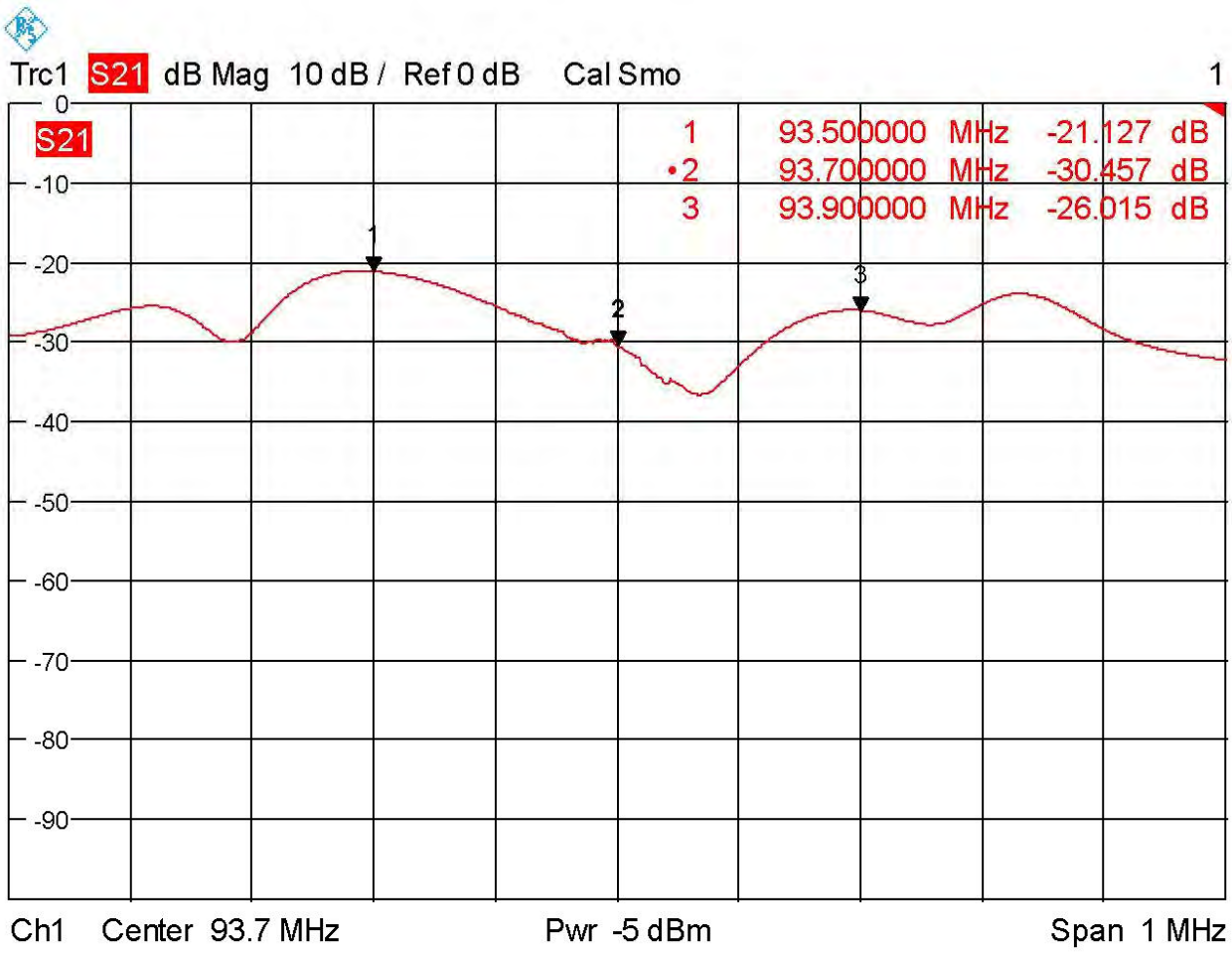
Measurement 23: Port to Port Isolation 102.7 to 101.5 MHz.



Measurement 24: Port to Port Isolation 103.5 to 101.5 MHz.

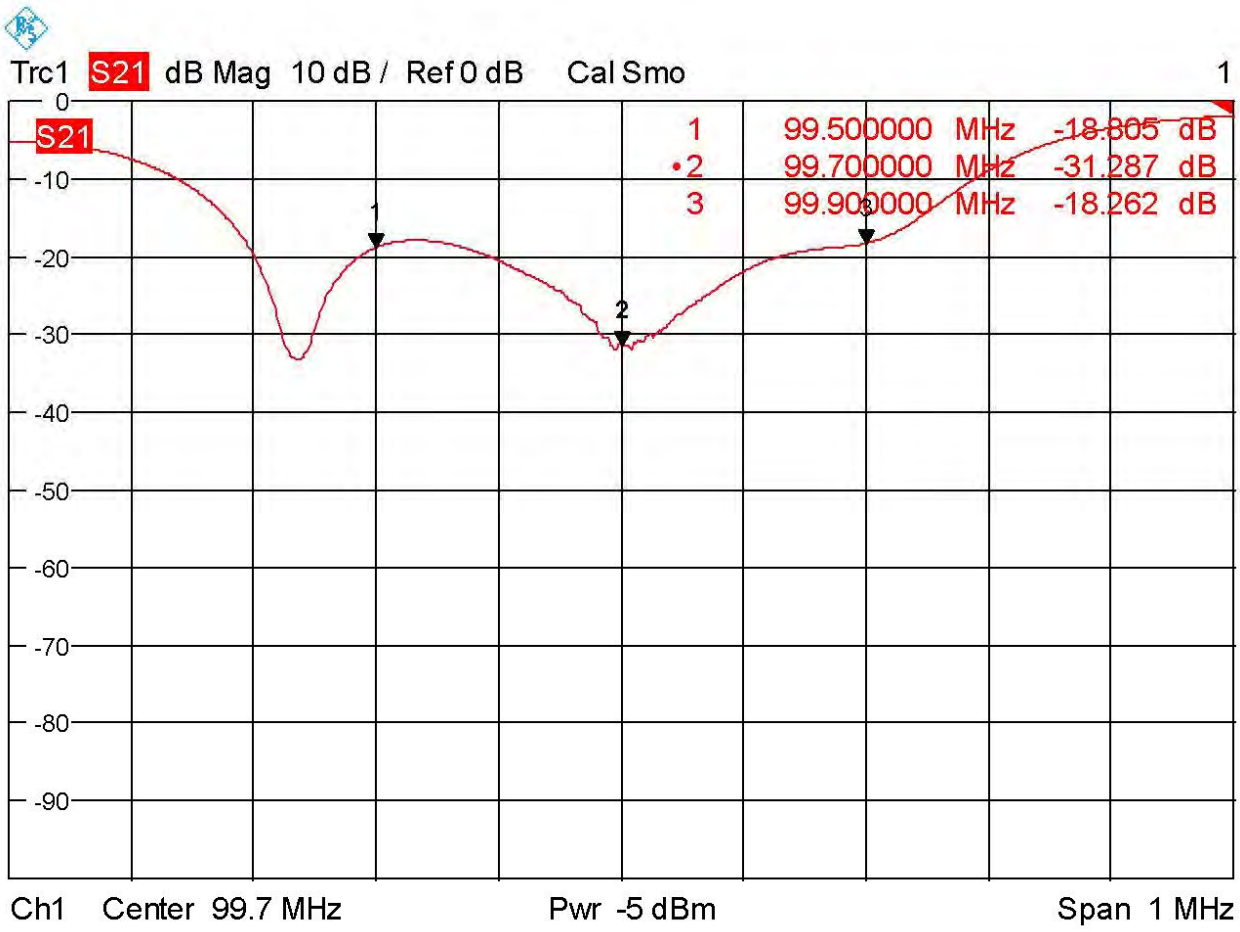


Measurement 25: Filter to Antenna Match 93.7 MHz.



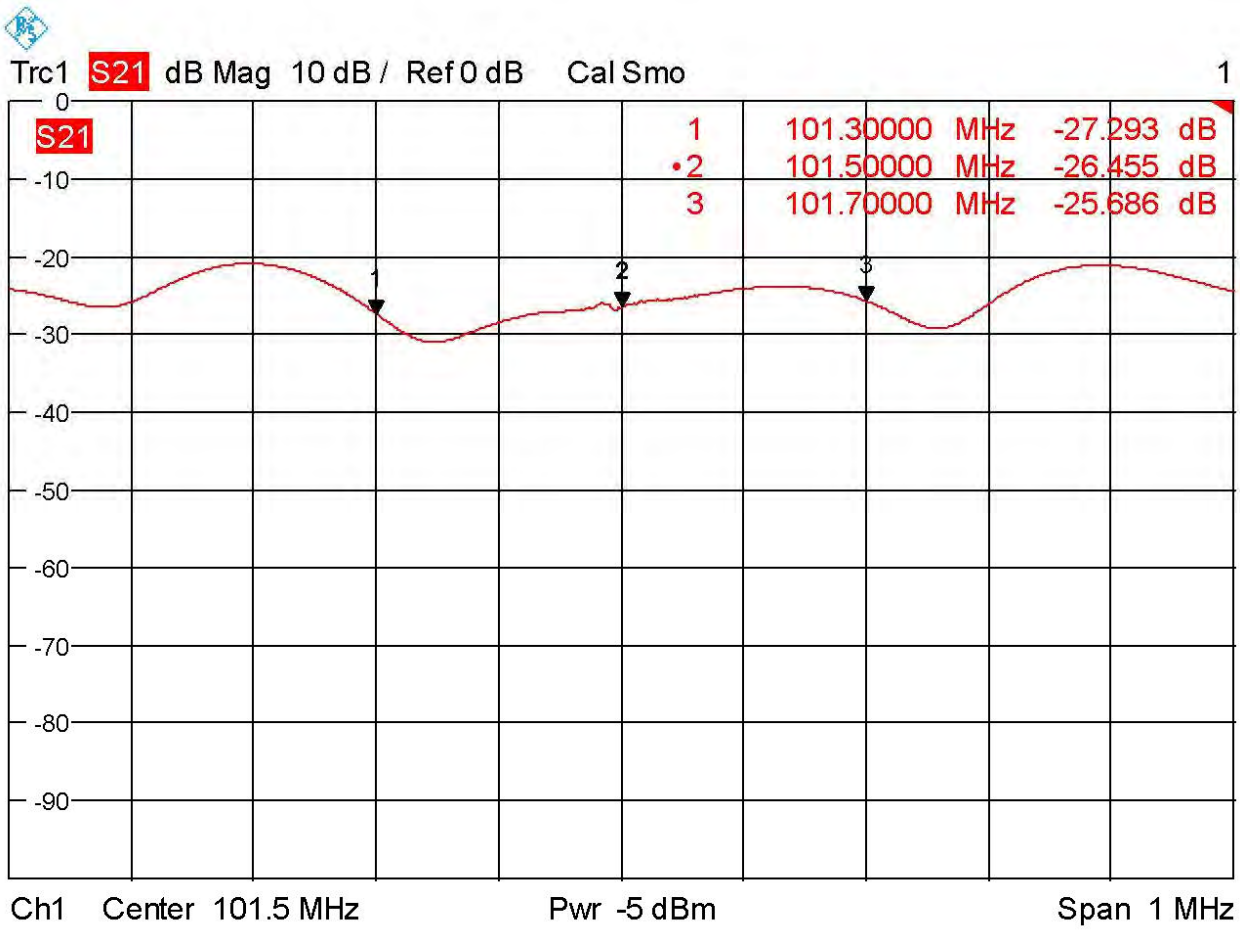
Date: 10-24-20

Measurement 26: Filter to Antenna Match 99.7 MHz.



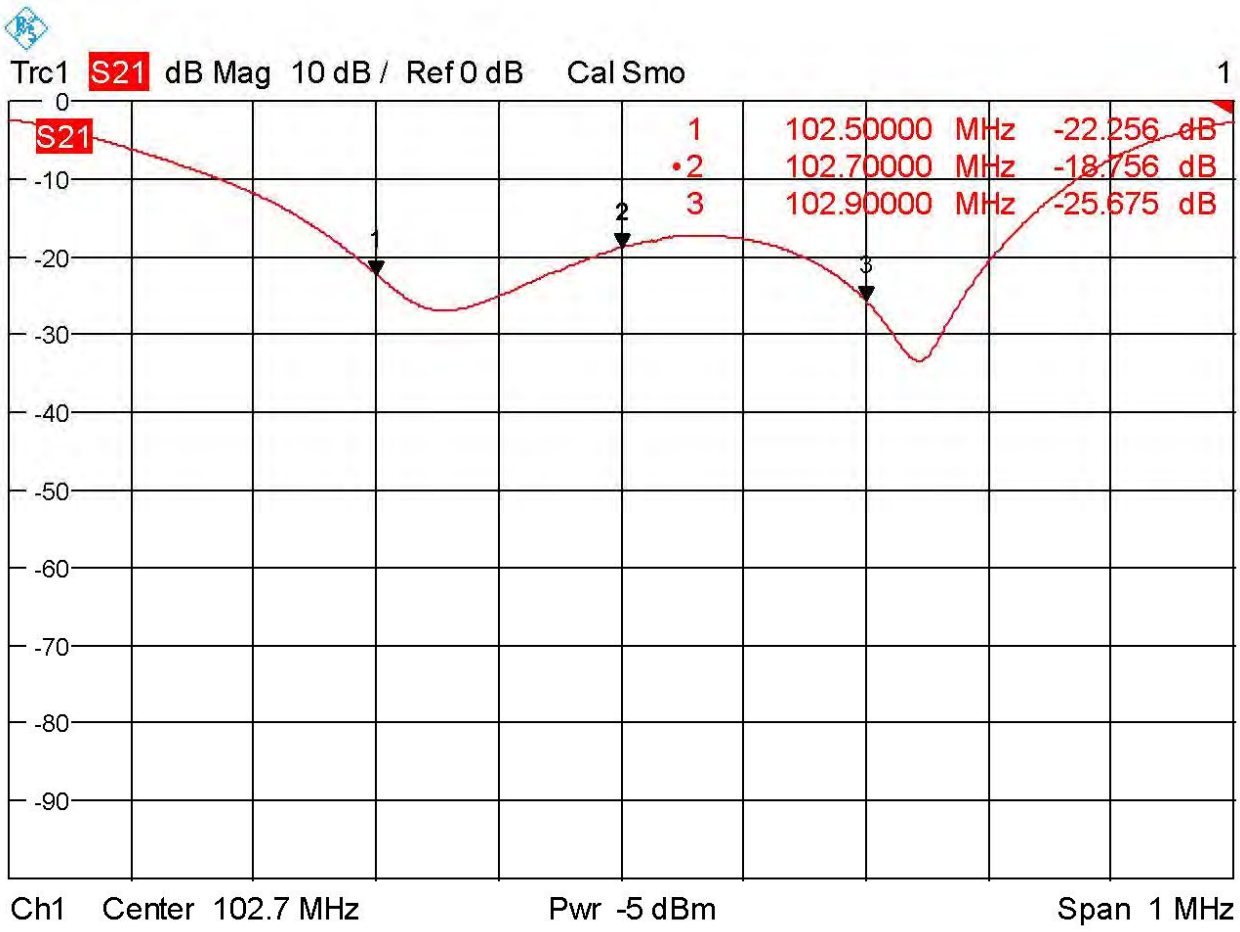
Date: 10-24-20

Measurement 27: Filter to Antenna Match 101.5 MHz.



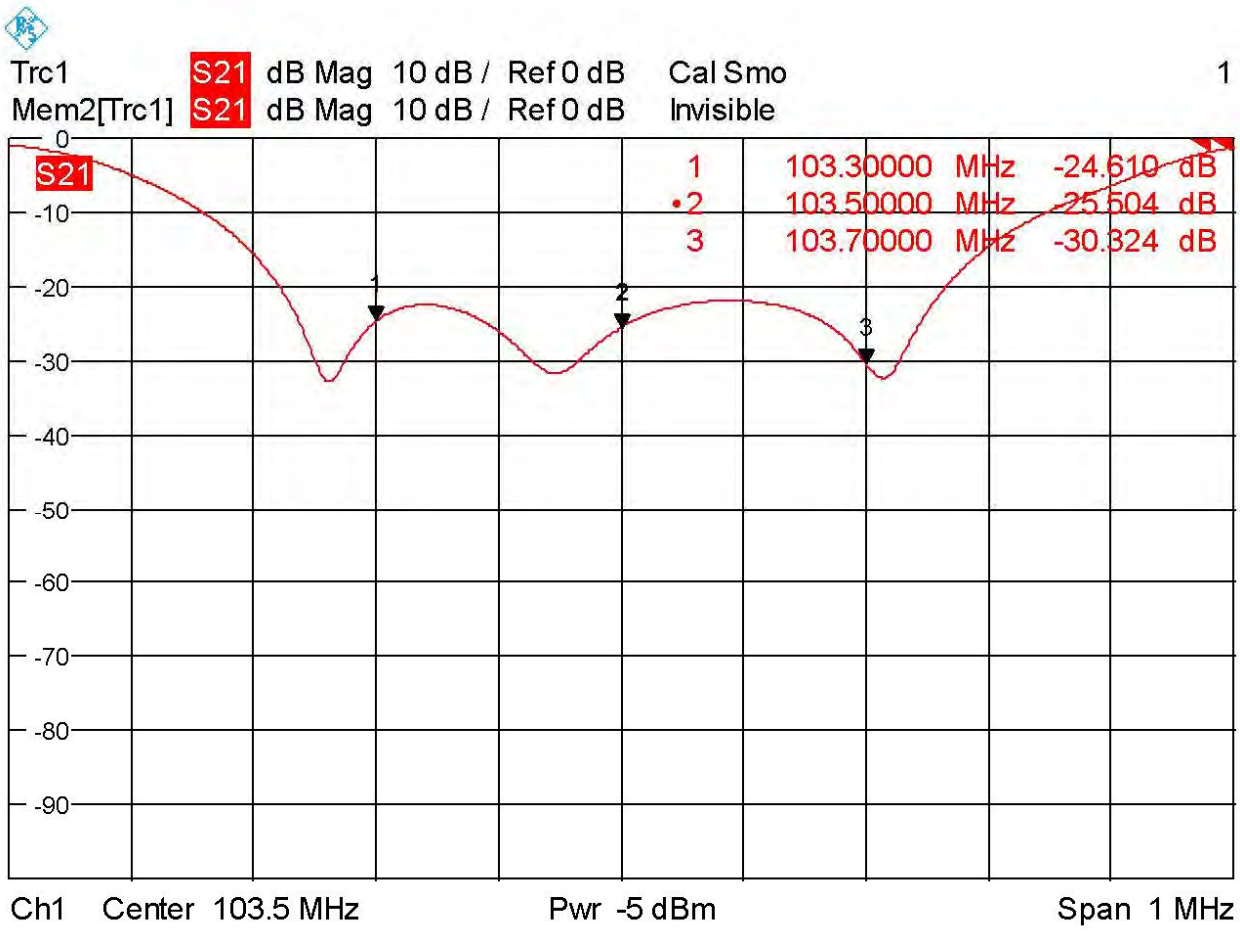
Date: 10-24-20

Measurement 28: Filter to Antenna Match 102.7 MHz.



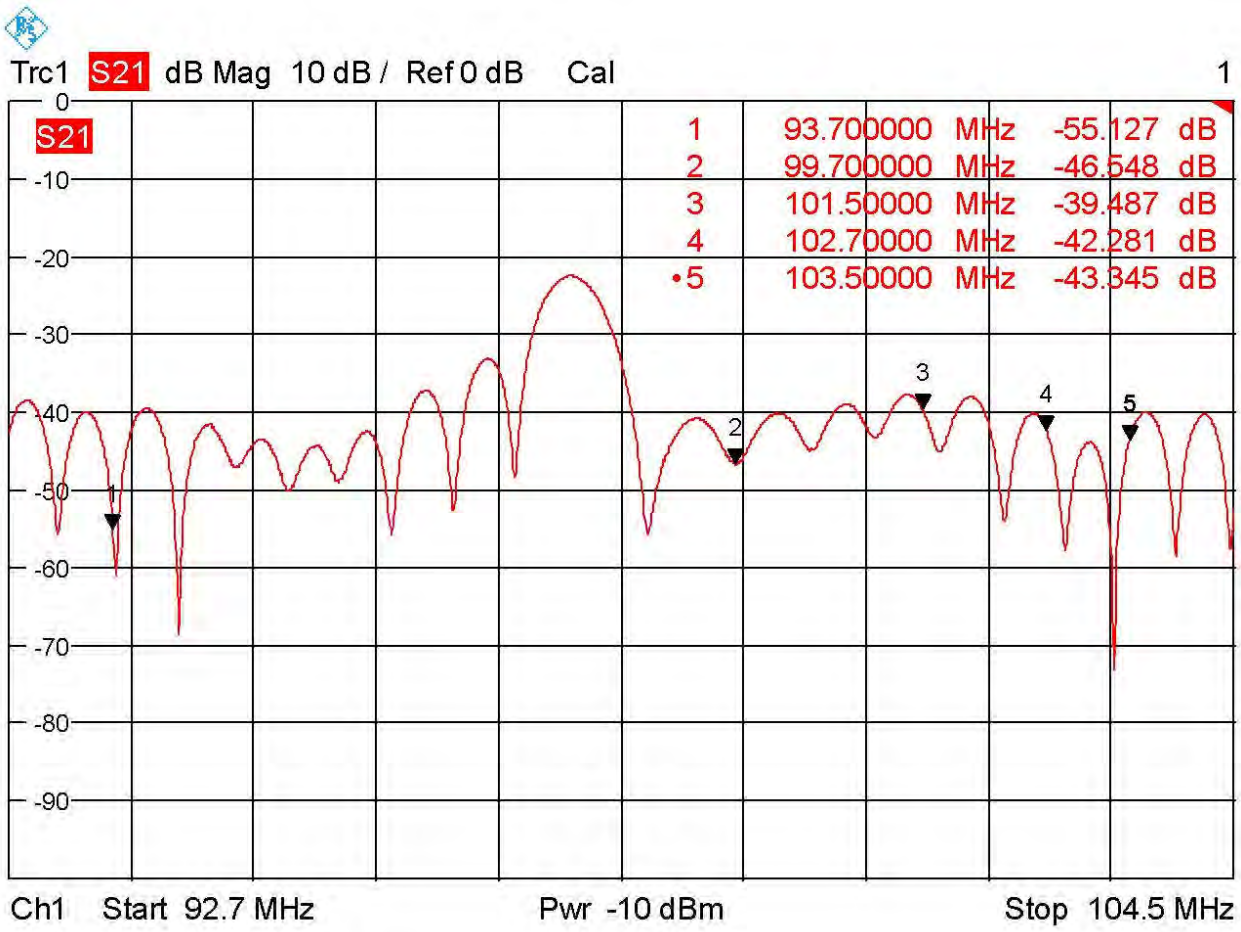
Date: 10-24-20

Measurement 29: Filter to Antenna Match 103.5 MHz.



Date: 10-24-20

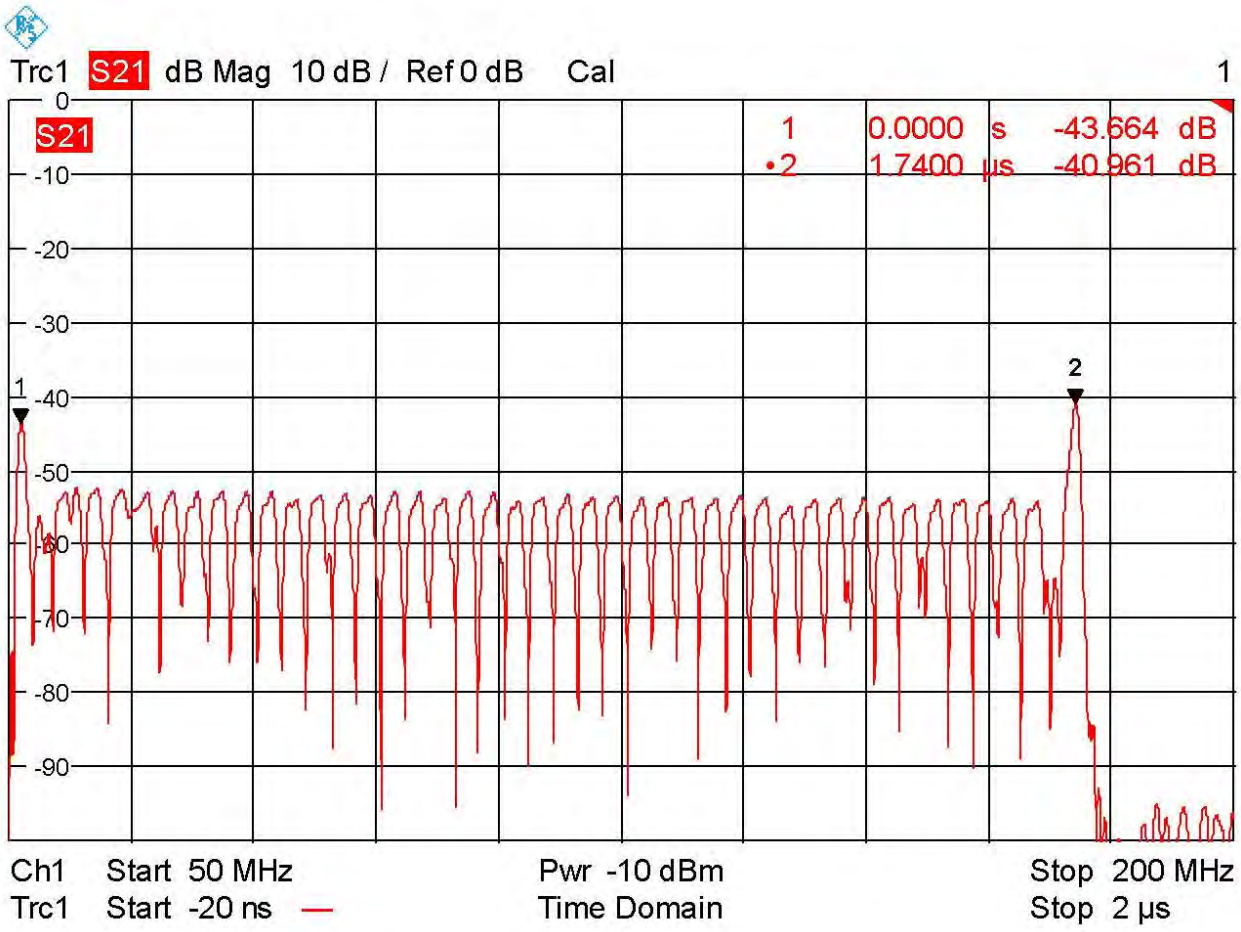
Measurement 30: 92.7 to 104.5 MHz. Sweep of Feedline with 50-ohm Load.



Date: 10-22-20

Measurement 31: 50 to 200 MHz. sweep of Feedline with 50-ohm Load.

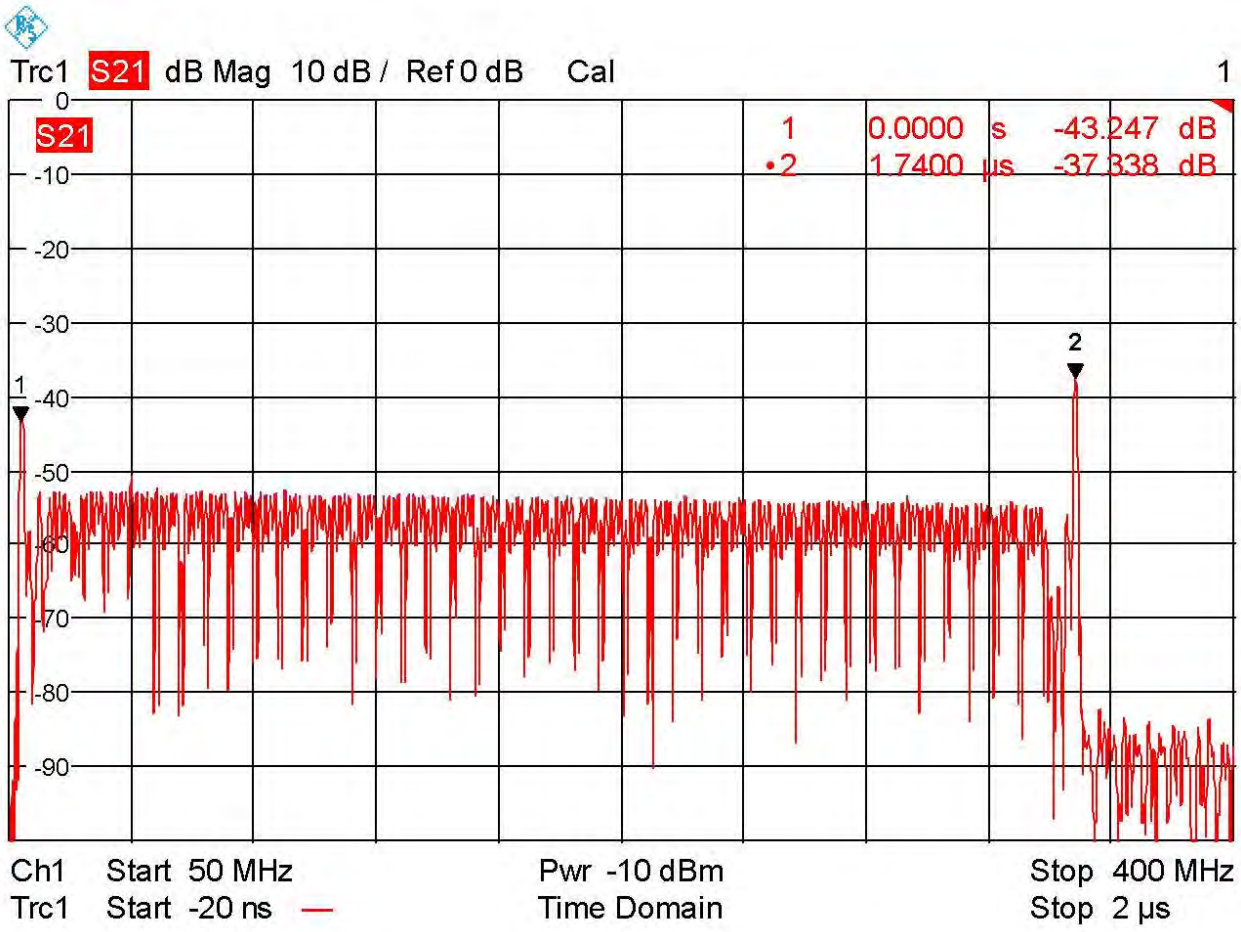
TDR Return Loss Measurement.
Mkr#1 is the Test Measurement Location @ Zero Feet.
Mkr#2 is the 50-ohm Load @ Approx. 865 Feet.



Date: 10-22-20

Measurement 32: 50 to 400 MHz Sweep of Feedline with 50-ohm Load.

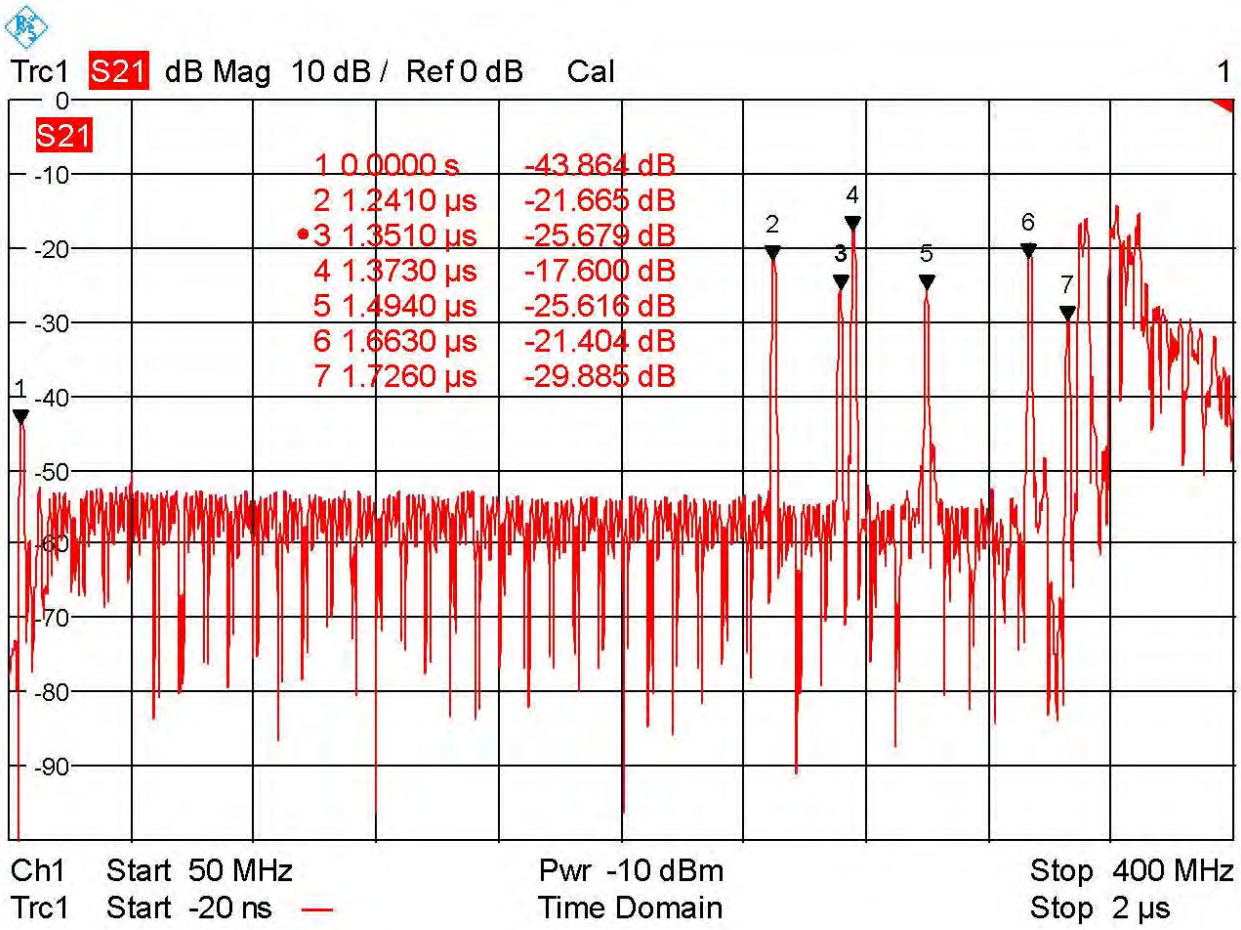
TDR Return Loss Measurement.
Mkr#1 is Test Measurement Location @ Zero Feet.
Mkr#2 is the 50-ohm Load @ Approx. 865 Feet.



Date: 10-22-20

Measurement 33: 50 to 400 MHz Sweep of Feedline and Antenna After Tuning.

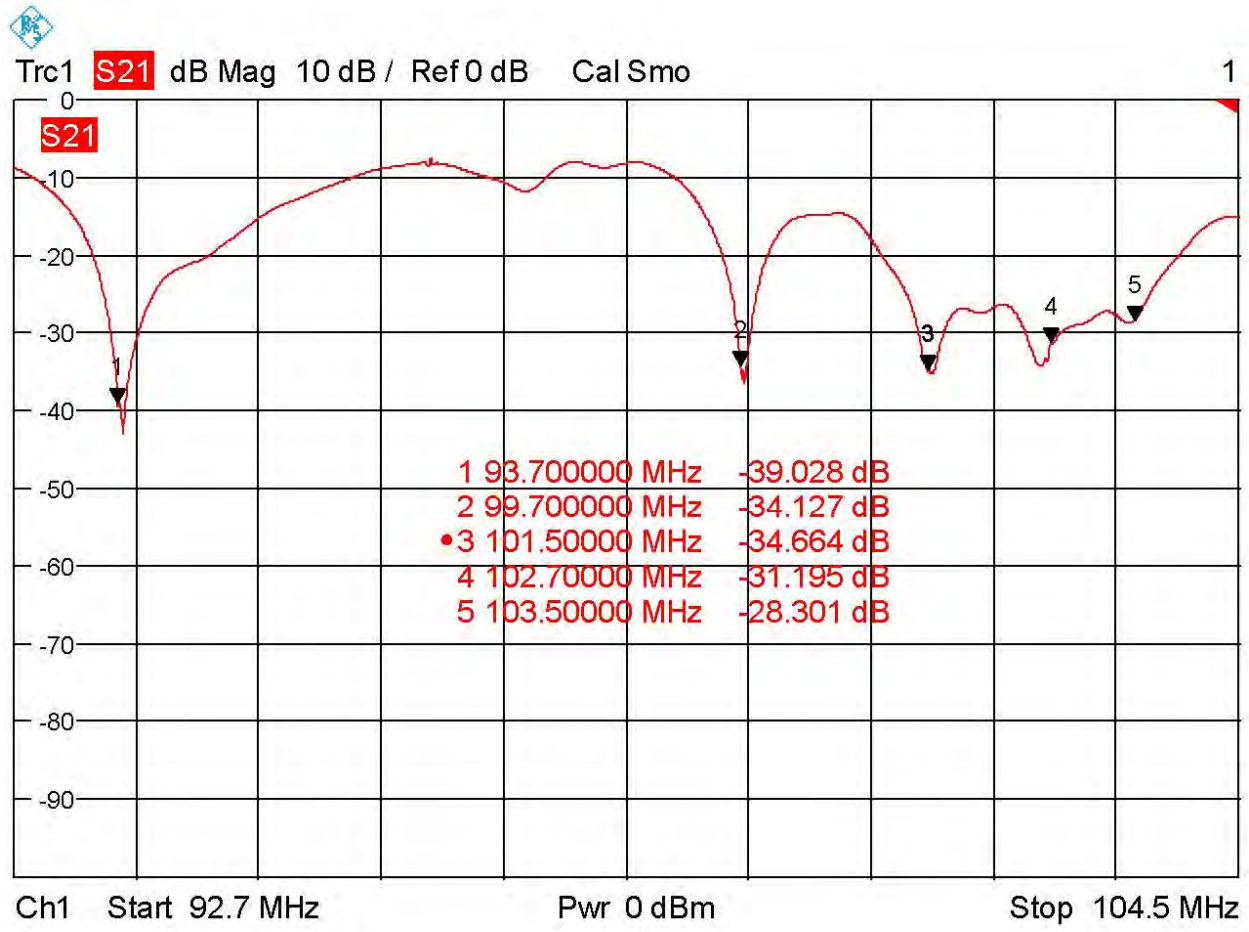
Mkr#1 is Test Measurement Location @ Zero Feet.
Mkr#2 is the Bottom Slug @ Approx. 609 Feet.
Mkr#3 is the Next Slug @ Approx. 664 Feet.
Mkr#4 is the Next Slug @ Approx. 675 Feet.
Mkr#5 is the Next Slug @ Approx. 734 Feet.
Mkr#6 is the Next Slug @ Approx. 817 Feet.
Mkr#7 is the Top Slug @ Approx. 848 Feet.



Date: 24.OCT.2020 13:16:56

Measurement 34: Final Antenna Measurement After Tuning.

92.7 to 104.5 MHz. Sweep.

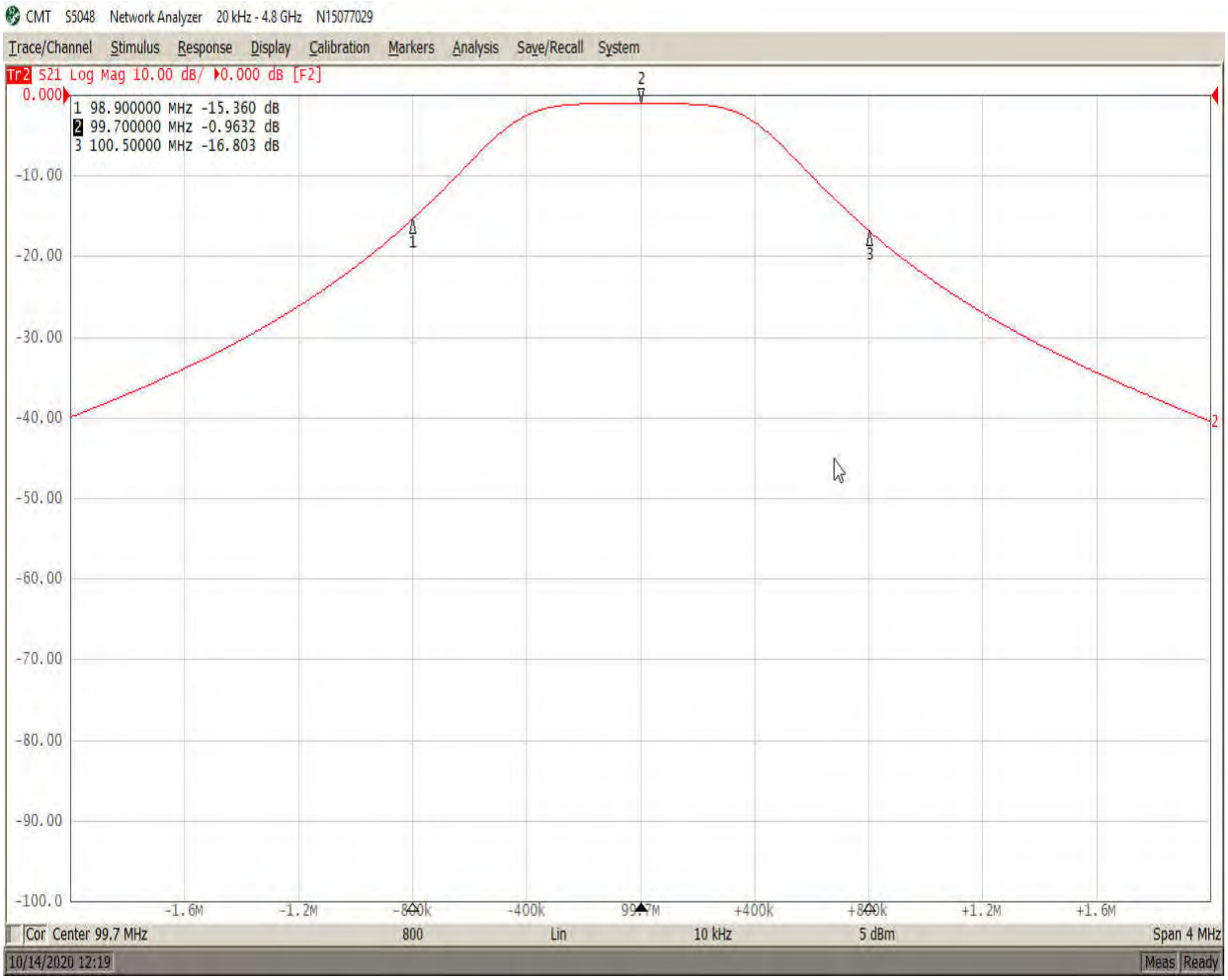


Date: 24.OCT.2020 13:12:09

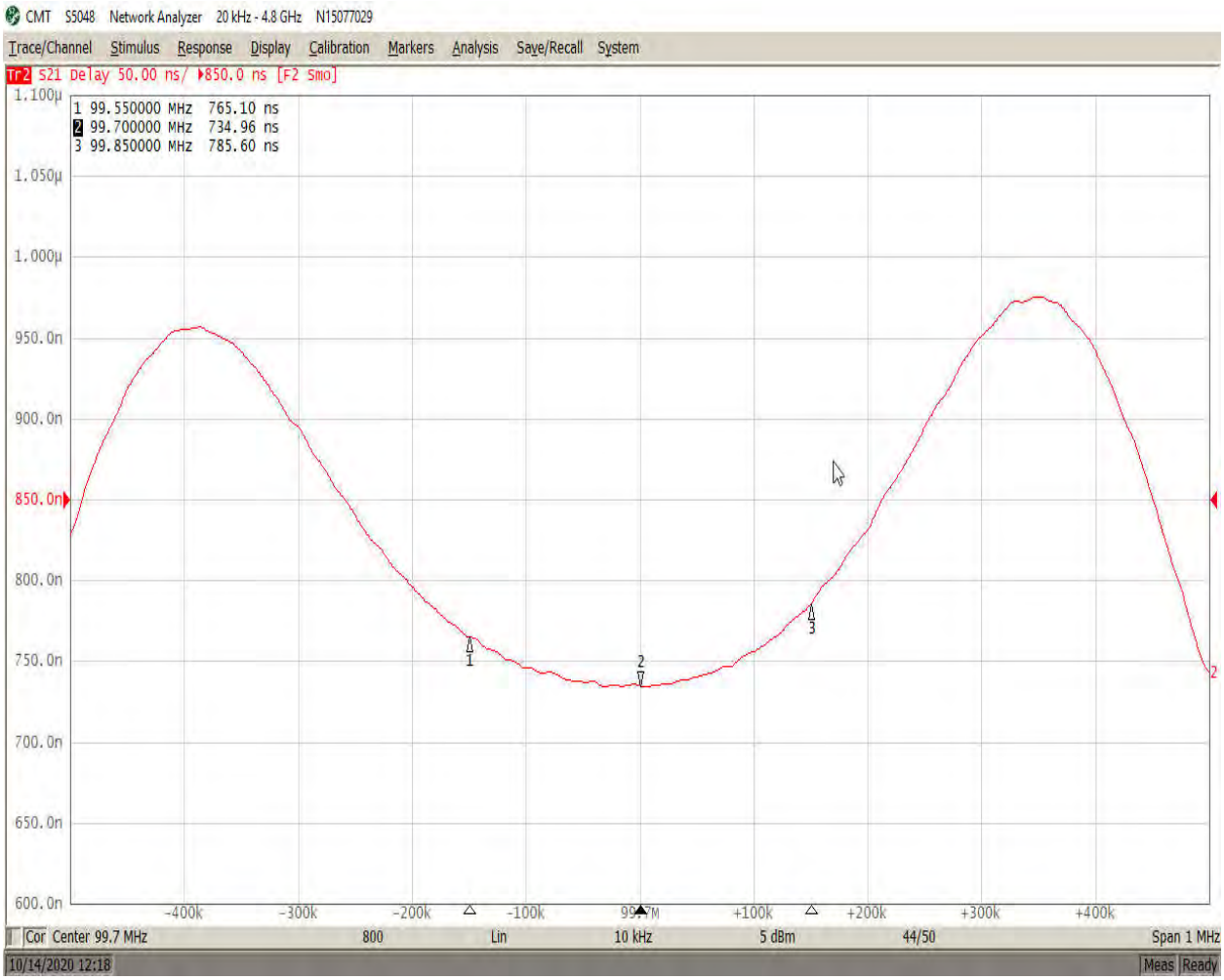
Stand Alone Shively "T" Combiner Data

Measurement 35: Match & Insertion Loss of 99.7 MHz.

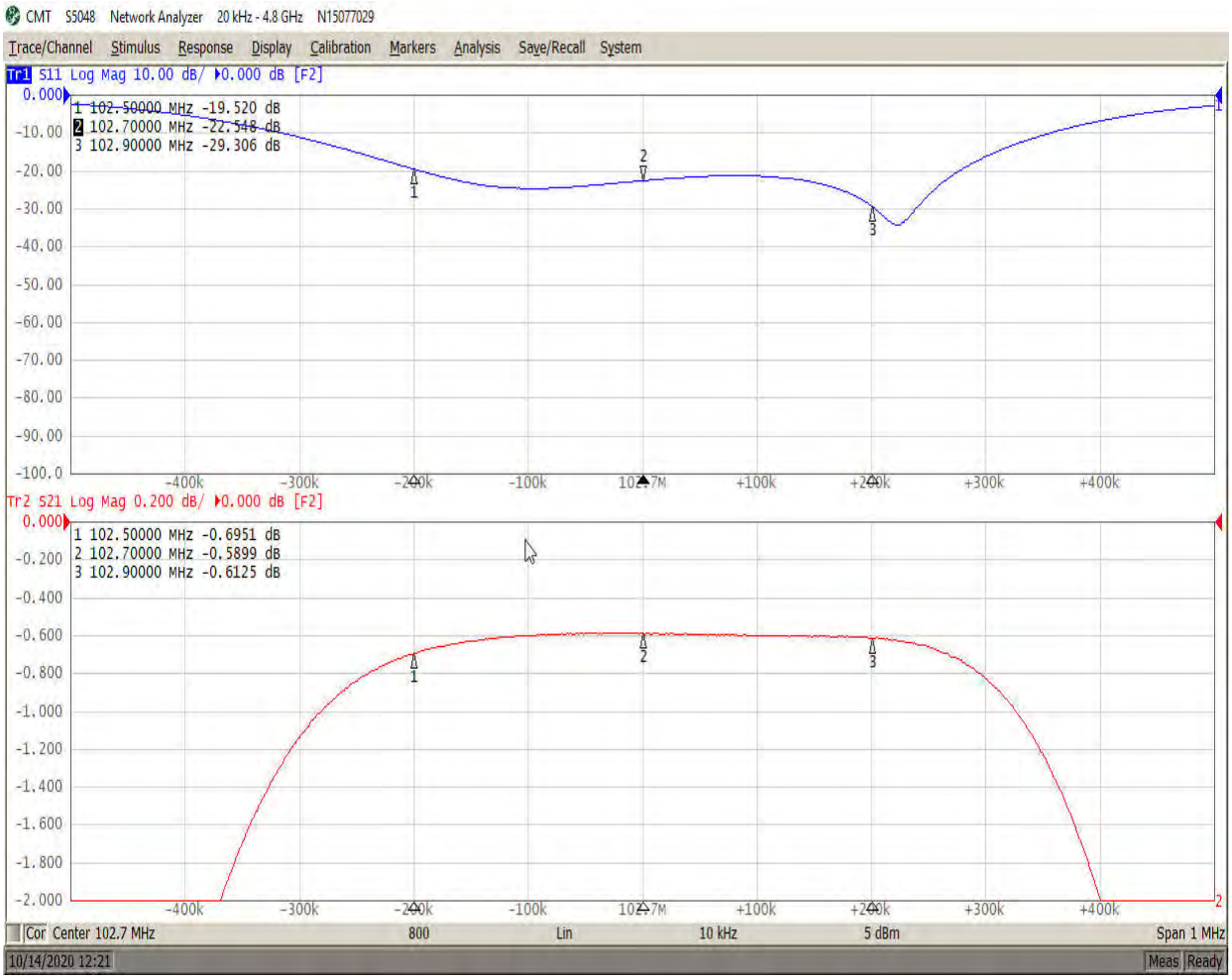
Measurement 36: Isolation +/- 800 KHz. of 99.7 MHz.



Measurement 37: Group Delay of 99.7 MHz.

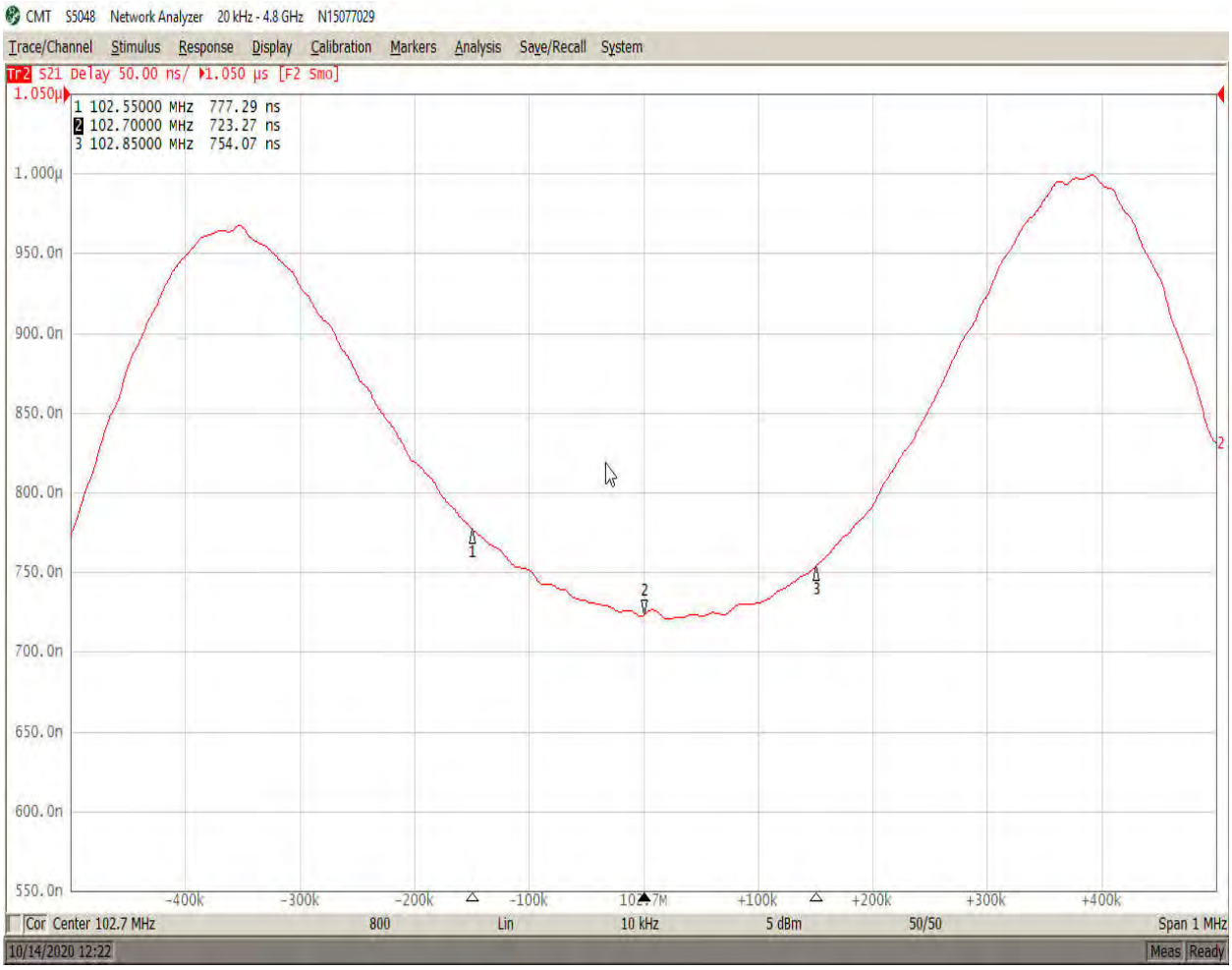


Measurement 38: Match & Insertion Loss of 102.7 MHz.

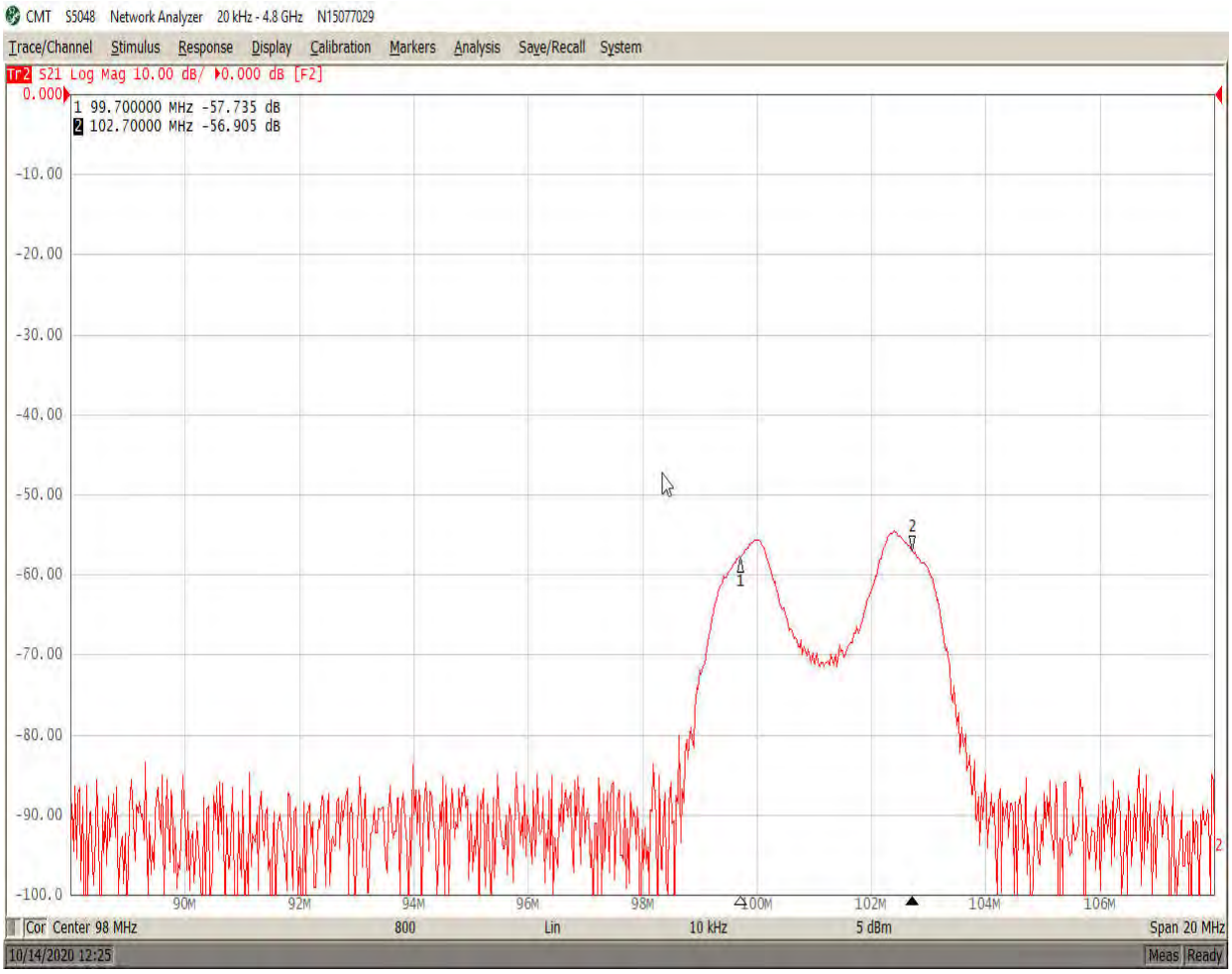


Measurement 39: Isolation +/- 800 KHz. of 102.7 MHz.

Measurement 40: Group Delay of 102.7 MHz.

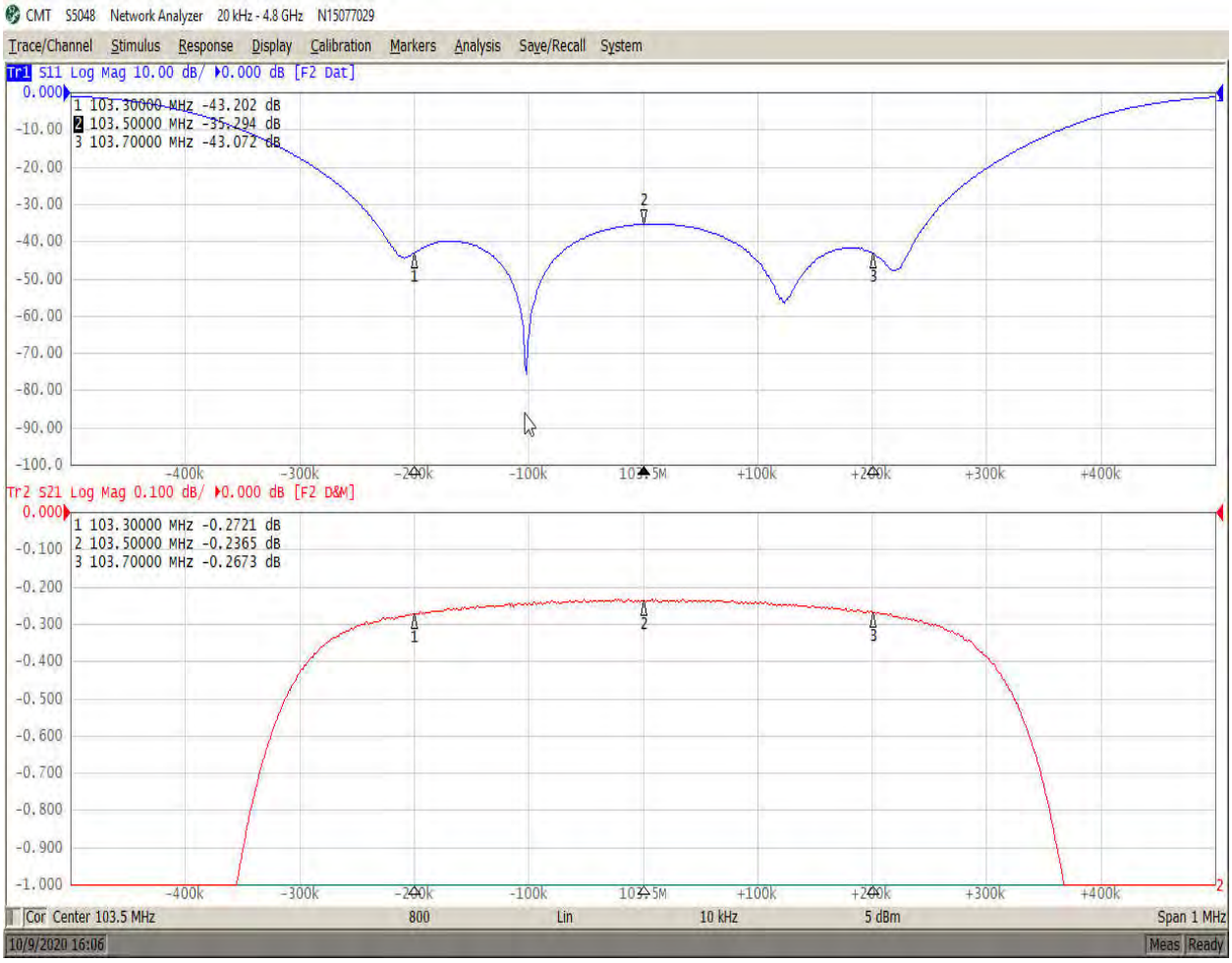


Measurement 41: Port to Port Isolation 99.7 to 102.7 MHz.

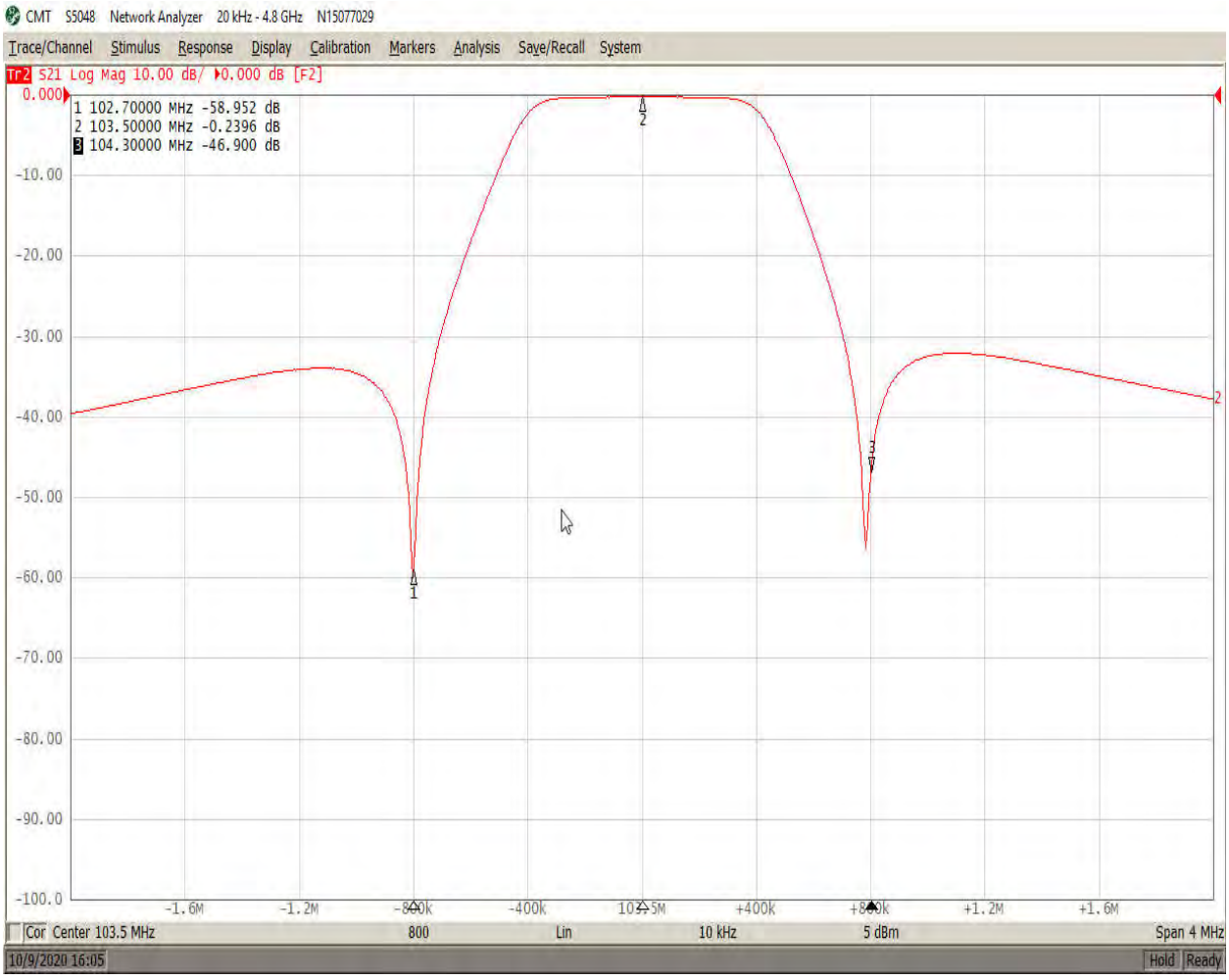


Stand Alone ERI Band Pass Filter Data

Measurement 42: Match & Insertion Loss of 103.5 MHz.



Measurement 43: Isolation +/- 800 KHz. of 103.5 MHz.



Measurement 44: Group Delay of 103.5 MHz.

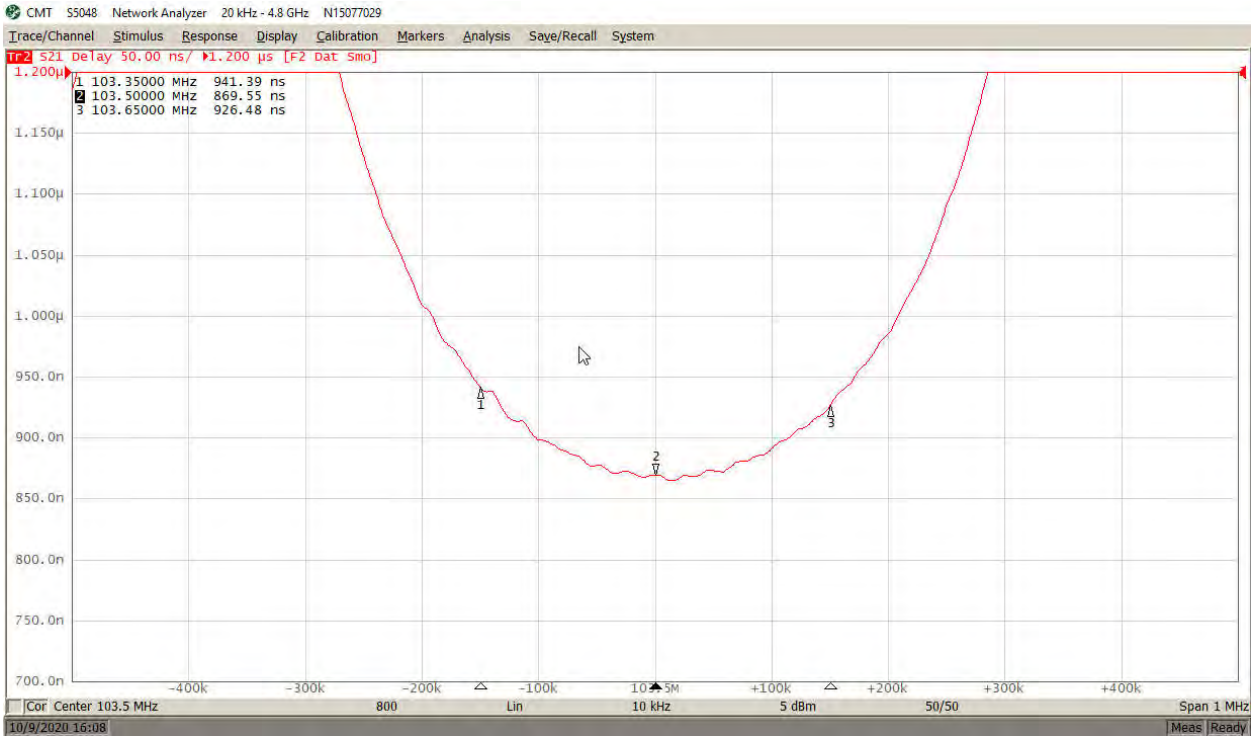


Figure 1: Vertical Plane Relative Field Plot of 93.7 MHz.

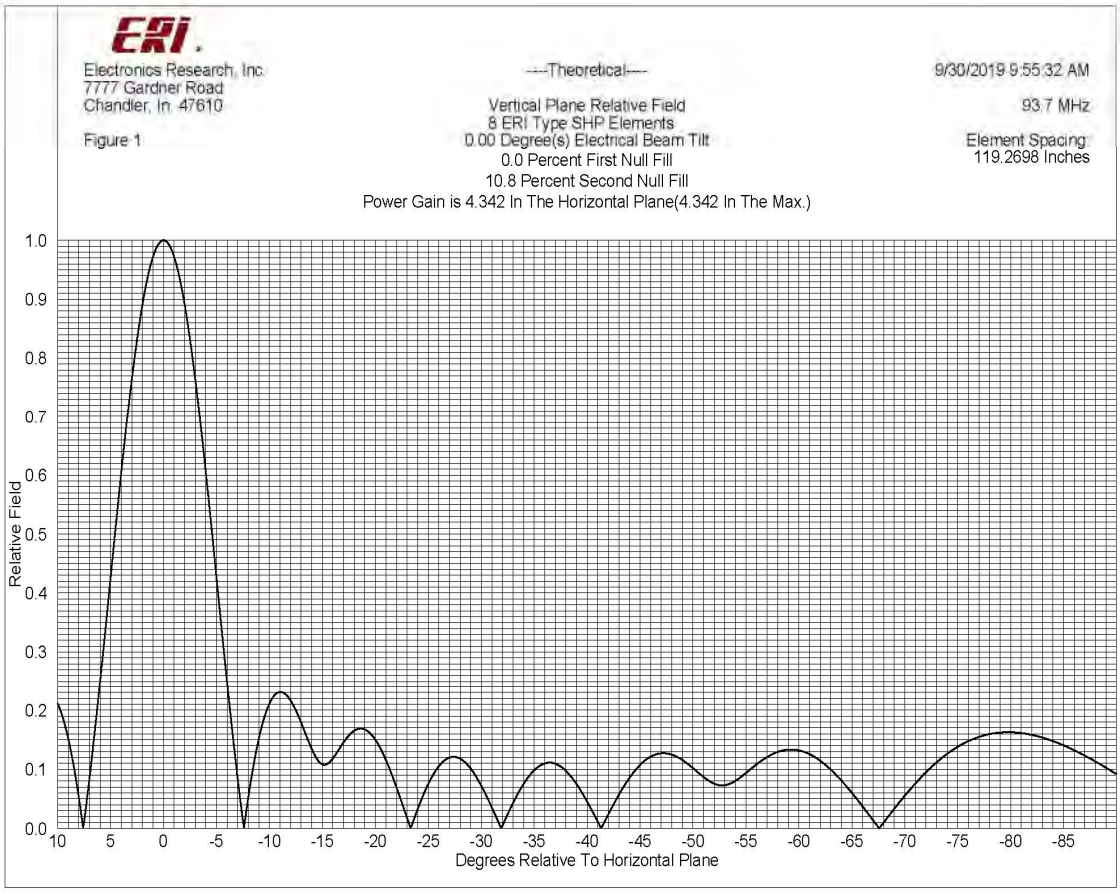


Figure 2: Vertical Plane Relative Field Plot of 99.7 MHz.

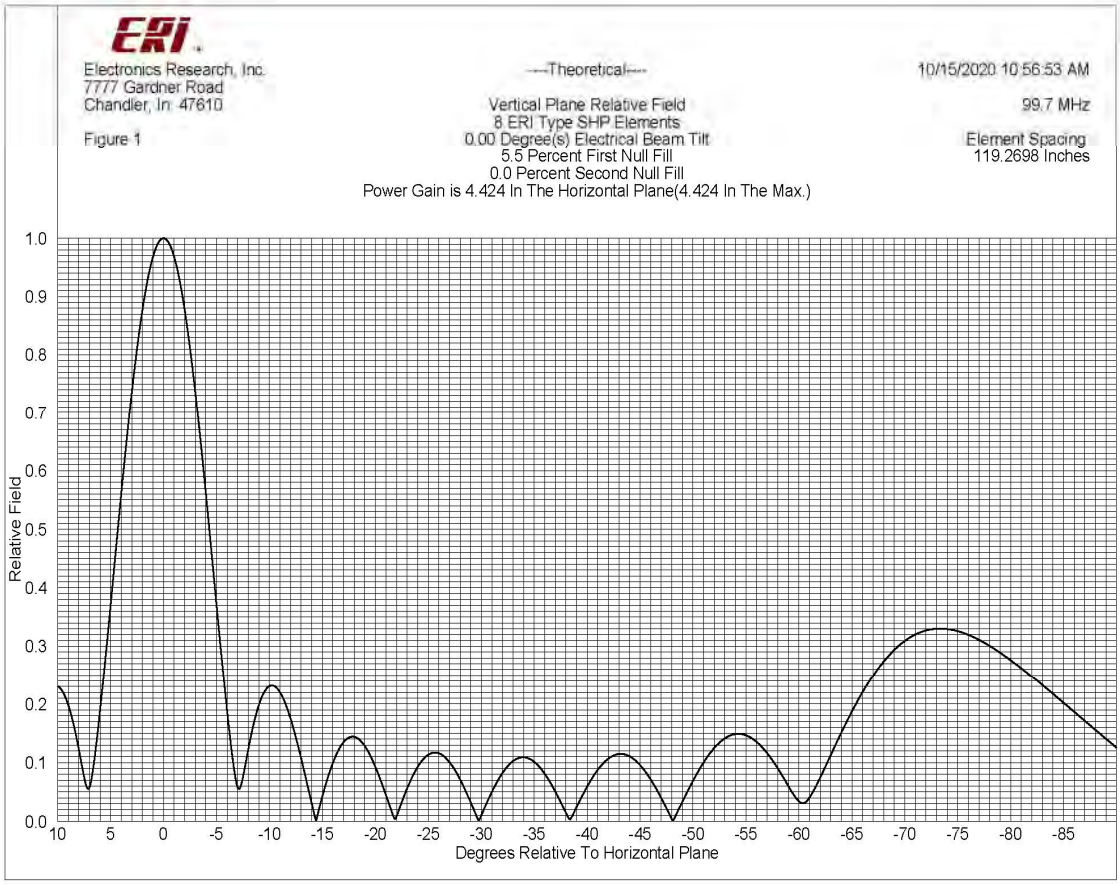


Figure 3: Vertical Plane Relative Field Plot of 101.5 MHz.

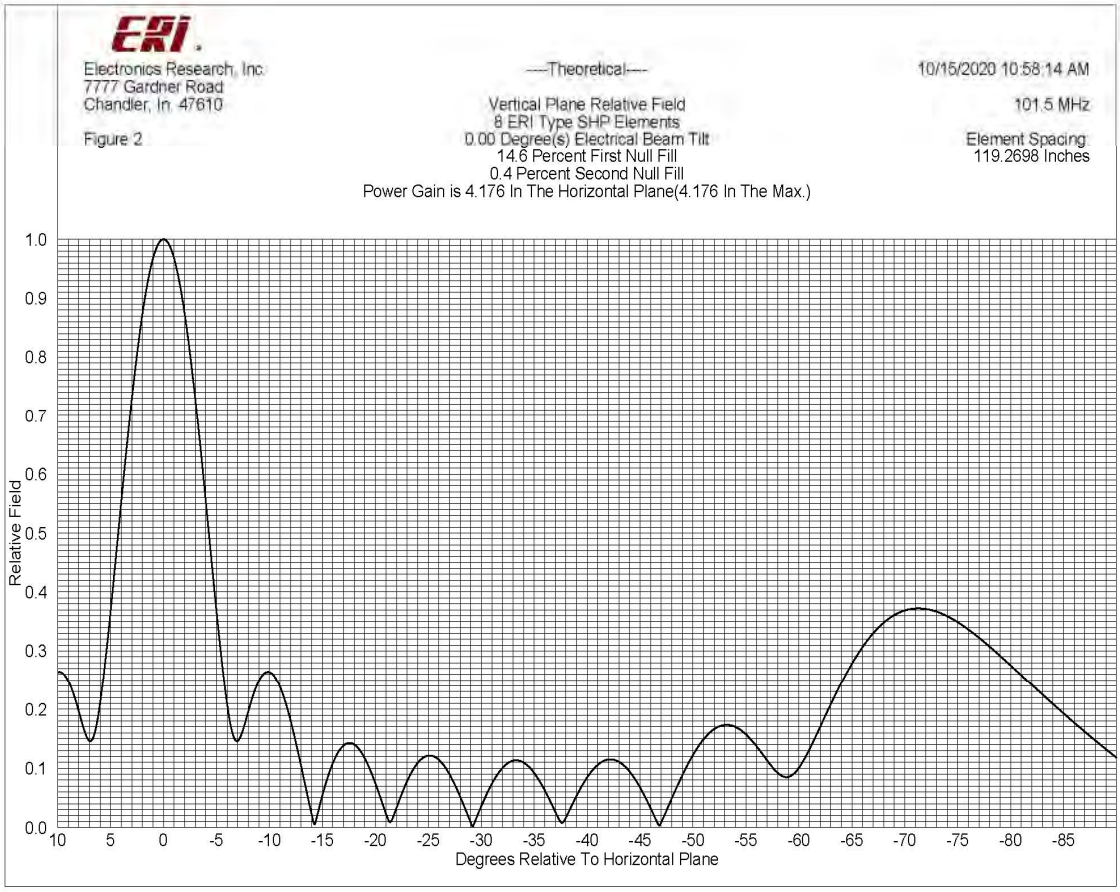


Figure 4: Vertical Plane Relative Field Plot of 102.7 MHz.

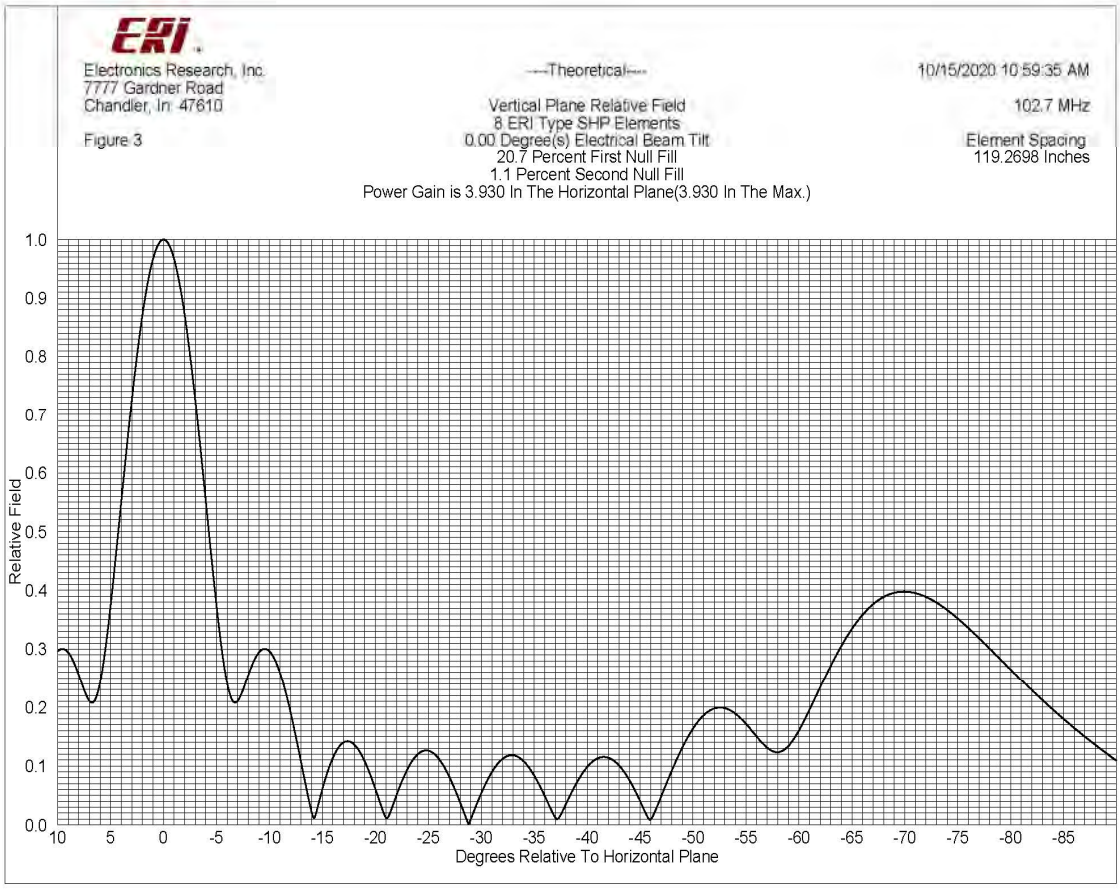


Figure 5: Vertical Plane Relative Field Plot of 103.5 MHz.

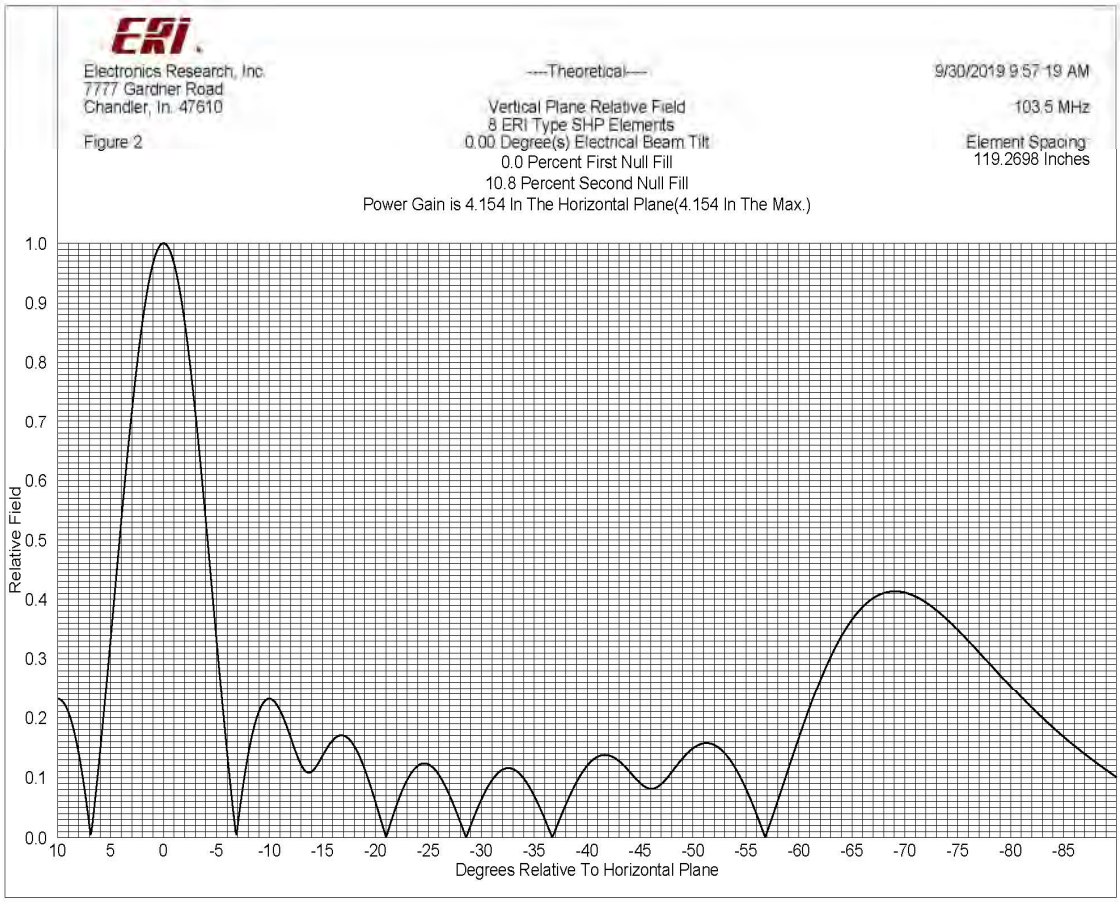


Table 1: Power Analysis for 93.7 MHz.

	Analog			*Digital (-14 dBc)*	
Call Letters:	KLBJ-FM, Austin, Texas				
Frequency:	93.7 MHz				
ERP:	100.000 kW	20.000 dBk		4.000 kW	6.021 dBk
Polarization:	Circular			Circular	
Antenna RMS Gain:	4.342 Numeric	6.377 dB		4.342 Numeric	6.377 dB
Antenna Input Power:	23.031 kW	13.623 dBk		0.921 kW	-0.356 dBk
Peak Voltage:	1,518 volts			607 volts	
Transmission Line Type - Vertical Run:	4-1/16-inch, 50-ohm, rigid line			4-1/16-inch, 50-ohm, rigid line	
Vertical Run Length:	765 feet	233.2 meters		765 feet	233.2 meters
Vertical Run Attenuation:	0.072 dB/100-feet	0.236 dB/100-meters		0.072 dB/100-feet	0.236 dB/100-meters
Transmission Line Type - Horizontal Run:	4-1/16-inch, 50-ohm, rigid line			4-1/16-inch, 50-ohm, rigid line	
Horizontal Run Length:	100 feet	30.5 meters		100 feet	30.5 meters
Horizontal Run Attenuation:	0.072 dB/100-feet	0.236 dB/100-meters		0.072 dB/100-feet	0.236 dB/100-meters
Line Loss:	-3.551 kW	0.623 dB		-0.142 kW	0.623 dB
Line Efficiency:	86.640%			86.640%	
Power Output from Combiner:	26.582 kW	14.246 dBk		1.063 kW	0.267 dBk
Peak Voltage:	1,630 volts			652 volts	
Combiner Losses:	-1.757 kW	0.278 dB		-0.070 kW	0.278 dB
Transmitter Power Output:	28.339 kW	14.524 dBk		1.134 kW	0.545 dBk

Table 2: Power Analysis for 99.7 MHz.

Call Letters:	K259AJ (FM), Austin, Texas				
Frequency:	99.7 MHz				
ERP:	0.250 kW	-6.021 dBk		0.010 kW	-20.000 dBk
Polarization:	Circular			Circular	
Antenna RMS Gain:	4.424 Numeric	6.458 dB		4.424 Numeric	6.458 dB
Antenna Input Power:	0.057 kW	-12.479 dBk		0.002 kW	-26.458 dBk
Peak Voltage:	75 volts			30 volts	
Transmission Line Type - Vertical Run:	4-1/16-inch, 50-ohm, rigid line			4-1/16-inch, 50-ohm, rigid line	
Vertical Run Length:	865 feet	263.6 meters		865 feet	263.6 meters
Vertical Run Attenuation:	0.074 dB/100-feet	0.243 dB/100-meters		0.074 dB/100-feet	0.243 dB/100-meters
Transmission Line Type - Horizontal Run:	1/2" Foam LDF4-50			1/2" Foam LDF4-50	
Horizontal Run Length:	35 feet	10.7 meters		35 feet	10.7 meters
Horizontal Run Attenuation:	0.683 dB/100-feet	2.241 dB/100-meters		0.683 dB/100-feet	2.241 dB/100-meters
Line Loss:	-0.013 kW	0.879 dB		-0.001 kW	0.879 dB
Line Efficiency:	81.674%			81.674%	
Power Output from Combiner:	0.069 kW	-11.600 dBk		0.003 kW	-25.579 dBk
Peak Voltage:	83 volts			33 volts	
Combiner Losses:	-0.023 kW	1.263 dB		-0.001 kW	1.263 dB
Transmitter Power Output:	0.123 kW	-10.337 dBk		0.004 kW	-24.316 dBk

Table 3: Power Analysis for 101.5 MHz.

Call Letters:	KROX (FM), Buda, Texas				
Frequency:	101.5 MHz				
ERP:	12.500 kW	10.969 dBk		0.500 kW	-3.010 dBk
Polarization:	Circular			Circular	
Antenna RMS Gain:	4.176 Numeric	6.208 dB		4.176 Numeric	6.208 dB
Antenna Input Power:	2.993 kW	4.761 dBk		0.120 kW	-9.218 dBk
Peak Voltage:	547 volts			219 volts	
Transmission Line Type - Vertical Run:	4-1/16-inch, 50-ohm, rigid line			4-1/16-inch, 50-ohm, rigid line	
Vertical Run Length:	765 feet	233.2 meters		765 feet	233.2 meters
Vertical Run Attenuation:	0.075 dB/100-feet	0.246 dB/100-meters		0.075 dB/100-feet	0.246 dB/100-meters
Transmission Line Type - Horizontal Run:	4-1/16-inch, 50-ohm, rigid line			4-1/16-inch, 50-ohm, rigid line	
Horizontal Run Length:	100 feet	30.5 meters		100 feet	30.5 meters
Horizontal Run Attenuation:	0.075 dB/100-feet	0.246 dB/100-meters		0.075 dB/100-feet	0.246 dB/100-meters
Line Loss:	-0.482 kW	0.649 dB		-0.019 kW	0.649 dB
Line Efficiency:	86.124%			86.124%	
Power Output from Combiner:	3.476 kW	5.410 dBk		0.139 kW	-8.569 dBk
Peak Voltage:	590 volts			236 volts	
Combiner Losses:	-0.270 kW	0.325 dB		-0.011 kW	0.325 dB
Transmitter Power Output:	3.746 kW	5.735 dBk		0.150 kW	-8.244 dBk

Table 4: Power Analysis for 102.7 MHz.

Call Letters:	K274AX (FM), Austin, Texas				
Frequency:	102.7 MHz				
ERP:	0.250 kW	-6.021 dBk		0.010 kW	-20.000 dBk
Polarization:	Circular			Circular	
Antenna RMS Gain:	3.930 Numeric	5.944 dB		3.930 Numeric	5.944 dB
Antenna Input Power:	0.064 kW	-11.965 dBk		0.003 kW	-25.944 dBk
Peak Voltage:	80 volts			32 volts	
Transmission Line Type - Vertical Run:	4-1/16-inch, 50-ohm, rigid line			4-1/16-inch, 50-ohm, rigid line	
Vertical Run Length:	865 feet	263.6 meters		865 feet	263.6 meters
Vertical Run Attenuation:	0.075 dB/100-feet	0.246 dB/100-meters		0.075 dB/100-feet	0.246 dB/100-meters
Transmission Line Type - Horizontal Run:	1/2" Foam LDF4-50			1/2" Foam LDF4-50	
Horizontal Run Length:	35 feet	10.7 meters		35 feet	10.7 meters
Horizontal Run Attenuation:	0.694 dB/100-feet	2.277 dB/100-meters		0.694 dB/100-feet	2.277 dB/100-meters
Line Loss:	-0.014 kW	0.892 dB		-0.001 kW	0.892 dB
Line Efficiency:	81.439%			81.439%	
Power Output from Combiner:	0.078 kW	-11.073 dBk		0.003 kW	-25.052 dBk
Peak Voltage:	88 volts			35 volts	
Combiner Losses:	-0.014 kW	0.732 dB		-0.001 kW	0.732 dB
Transmitter Power Output:	0.122 kW	-10.341 dBk		0.004 kW	-24.320 dBk

Table 5: Power Analysis for 103.5 MHz.

Call Letters:	KBPA (FM), Austin, Texas				
Frequency:	103.5 MHz				
ERP:	11.000 kW	10.414 dBk		0.440 kW	-3.565 dBk
Polarization:	Circular			Circular	
Antenna RMS Gain:	4.154 Numeric	6.185 dB		4.154 Numeric	6.185 dB
Antenna Input Power:	2.648 kW	4.229 dBk		0.106 kW	-9.750 dBk
Peak Voltage:	515 volts			206 volts	
Transmission Line Type - Vertical Run:	4-1/16-inch, 50-ohm, rigid line			4-1/16-inch, 50-ohm, rigid line	
Vertical Run Length:	765 feet	233.2 meters		765 feet	233.2 meters
Vertical Run Attenuation:	0.076 dB/100-feet	0.249 dB/100-meters		0.076 dB/100-feet	0.249 dB/100-meters
Transmission Line Type - Horizontal Run:	4-1/16-inch, 50-ohm, rigid line			4-1/16-inch, 50-ohm, rigid line	
Horizontal Run Length:	100 feet	30.5 meters		100 feet	30.5 meters
Horizontal Run Attenuation:	0.076 dB/100-feet	0.249 dB/100-meters		0.076 dB/100-feet	0.249 dB/100-meters
Line Loss:	-0.433 kW	0.657 dB		-0.017 kW	0.657 dB
Line Efficiency:	85.953%			85.953%	
Power Output from Combiner:	3.081 kW	4.887 dBk		0.123 kW	-9.093 dBk
Peak Voltage:	555 volts			222 volts	
Combiner Losses:	-0.231 kW	0.313 dB		-0.009 kW	0.313 dB
Transmitter Power Output:	3.311 kW	5.200 dBk		0.132 kW	-8.779 dBk