



# element

**Abbott Laboratories**

**GLP12152 Cross Switch**

**FCC 15.225:2021**

**13.56 MHz Radio**

**Report: ABBO0084 Rev. 2, Issue Date: September 27, 2022**



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# CERTIFICATE OF TEST

**Last Date of Test: September 2, 2021**  
**Abbott Laboratories**  
**EUT: GLP12152 Cross Switch**

## Radio Equipment Testing

### Standards

Specification	Method
FCC 15.207:2021	ANSI C63.10:2013
FCC 15.225:2021	

### Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
6.4	Field Strength of Fundamental	Yes	Pass	
6.4	Field Strength of Spurious Emissions (Less Than 30 MHz)	Yes	Pass	
6.5	Field Strength of Spurious Emissions (Greater Than 30 MHz)	Yes	Pass	
6.8	Frequency Stability	Yes	Pass	
6.9	Occupied Bandwidth	Yes	Pass	

### Deviations From Test Standards

None

### Approved By:



Adam Bruno, Operations Manager

*Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.*

# REVISION HISTORY



<b>Revision Number</b>	<b>Description</b>	<b>Date</b> (yyyy-mm-dd)	<b>Page Number</b>
01	Changed Powerline CE spec from Class A to FCC 15.209	2021-09-02	16 and 18
02	Updated accreditations page	2022-09-27	4
	Updated test dates	2022-09-27	10
	Updated antenna information	2022-09-27	11
	Fixed analyzer that was out of cal during the measurement.	2022-09-27	21, 23, 25
	Updated power settings module	2022-09-27	11
	Updated the block diagram	2022-09-27	7-9
	Removed notation that does not apply	2022-09-27	16
	Adjusted the values.	2022-09-27	28

# ACCREDITATIONS AND AUTHORIZATIONS



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## United States

**FCC** - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

**A2LA** - Each laboratory is accredited by A2LA to ISO / IEC 17025, and as a product certifier to ISO / IEC 17065 which allows Element to certify transmitters to FCC and IC specifications.

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## Canada

**ISED** - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB) and as a CAB for the acceptance of test data.

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## European Union

**European Commission** – Recognized as an EU Notified Body validated for the EMCD and RED Directives.

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## United Kingdom

**BEIS** – Recognized by the UK as an Approved Body under the UK Radio Equipment and UK EMC Regulations.

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## Australia/New Zealand

**ACMA** - Recognized by ACMA as a CAB for the acceptance of test data.

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## Korea

**MSIT / RRA** - Recognized by KCC's RRA as a CAB for the acceptance of test data.

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## Japan

**VCCI** - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

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## Taiwan

**BSMI** – Recognized by BSMI as a CAB for the acceptance of test data.

**NCC** - Recognized by NCC as a CAB for the acceptance of test data.

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## Singapore

**IDA** – Recognized by IDA as a CAB for the acceptance of test data.

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## Israel

**MOC** – Recognized by MOC as a CAB for the acceptance of test data.

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## Hong Kong

**OFCA** – Recognized by OFCA as a CAB for the acceptance of test data.

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## Vietnam

**MIC** – Recognized by MIC as a CAB for the acceptance of test data.

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## SCOPE

For details on the Scopes of our Accreditations, please visit:

[California](#)

[Minnesota](#)

[Oregon](#)

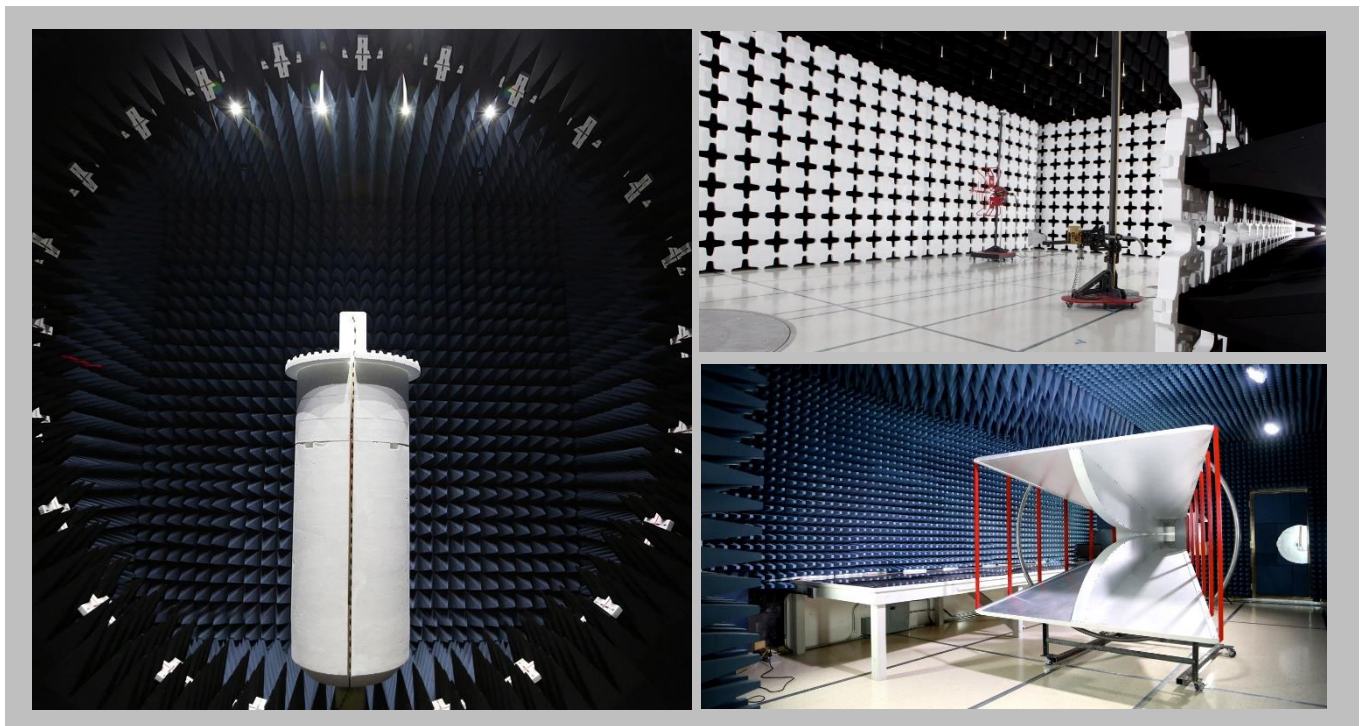
[Texas](#)

[Washington](#)

# FACILITIES



<b>California</b> Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	<b>Minnesota</b> Labs MN01-11 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	<b>Oregon</b> Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	<b>Texas</b> Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	<b>Washington</b> Labs NC01-05 19201 120 <sup>th</sup> Ave NE Bothell, WA 98011 (425)984-6600
<b>A2LA</b>				
Lab Code: 3310.04	Lab Code: 3310.05	Lab Code: 3310.02	Lab Code: 3310.03	Lab Code: 3310.06
<b>Innovation, Science and Economic Development Canada</b>				
2834B-1, 2834B-3	2834E-1, 2834E-3	2834D-1	2834G-1	2834F-1
<b>BSMI</b>				
SL2-IN-E-1154R	SL2-IN-E-1152R	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
<b>VCCI</b>				
A-0029	A-0109	A-0108	A-0201	A-0110
<b>Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA</b>				
US0158	US0175	US0017	US0191	US0157



# MEASUREMENT UNCERTAINTY



## Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found in the table below. A lab specific value may also be found in the applicable test description section. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

<b>Test</b>	<b>+ MU</b>	<b>- MU</b>
Frequency Accuracy	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.1 dB	-5.1 dB
AC Powerline Conducted Emissions (dB)	3.1 dB	-3.1 dB

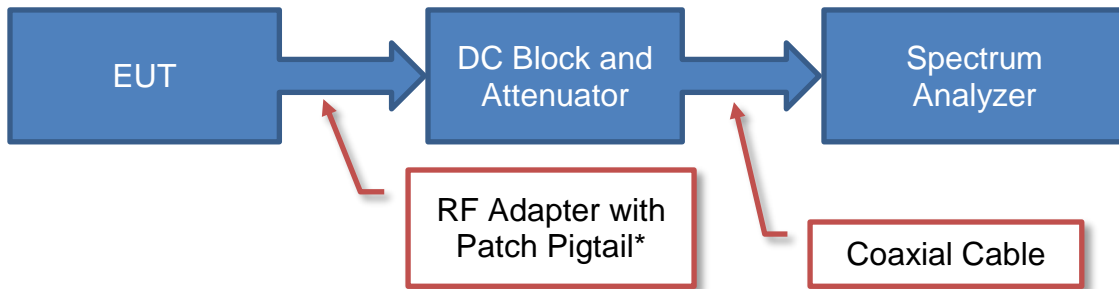
# TEST SETUP BLOCK DIAGRAMS

## Measurement Bandwidths

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Unless otherwise stated, measurements were made using the bandwidths and detectors specified. No video filter was used.

## Antenna Port Conducted Measurements

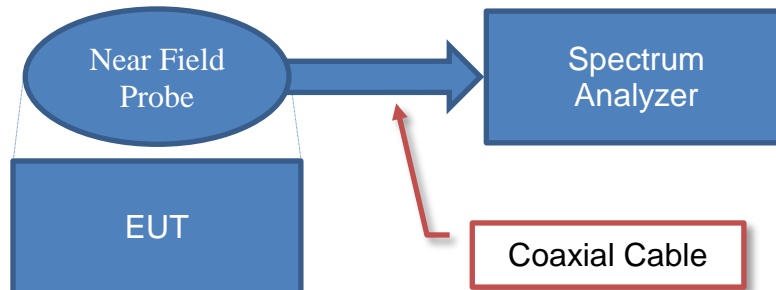


### Sample Calculation (logarithmic units)

Measured Value	=	Measured Level	+	Reference Level Offset
71.2		42.6		28.6

\*Patch pigtail connector used during measurements and accounted for in reference level offset.

## Near Field Test Fixture Measurements

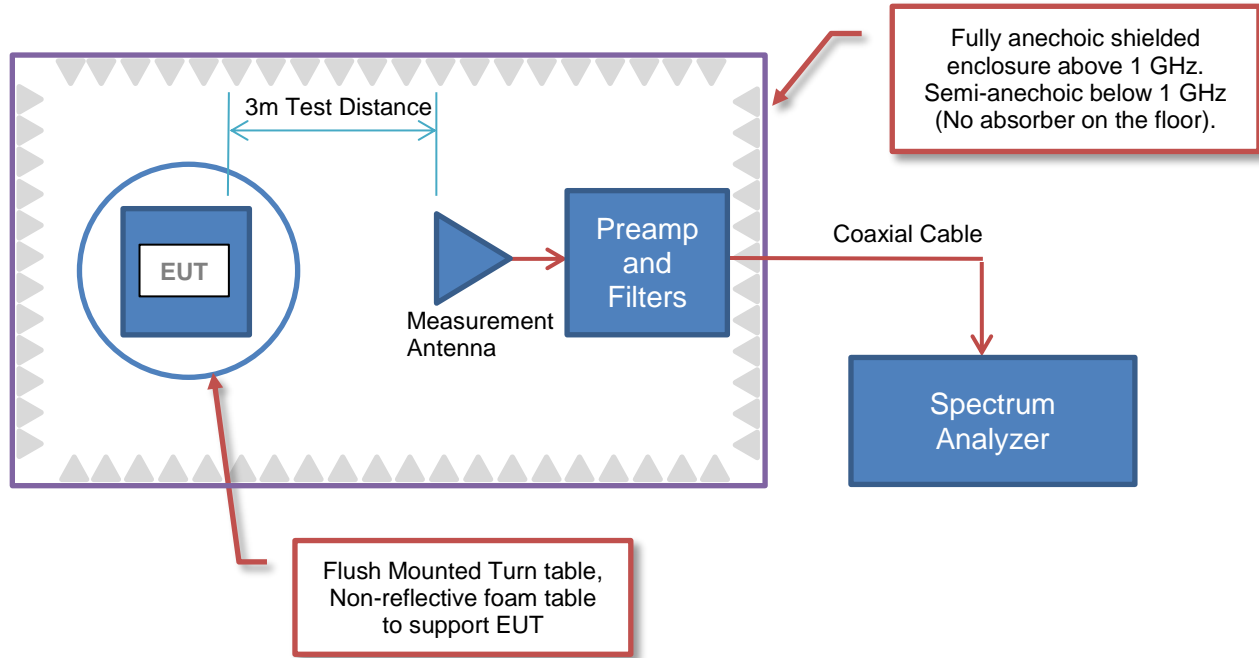


### Sample Calculation (logarithmic units)

Measured Value	=	Measured Level	+	Reference Level Offset
71.2		42.6		28.6

# TEST SETUP BLOCK DIAGRAMS

## Emissions Measurements



## Sample Calculation (logarithmic units)

### Radiated Emissions:

Measured Level (Amplitude)	Factor			Distance Adjustment Factor	External Attenuation	Field Strength
	Antenna Factor	Cable Factor	Amplifier Gain			
42.6	28.6	3.1	40.8	0.0	0.0	33.5

42.6 + 28.6 + 3.1 - 40.8 + 0.0 + 0.0 = 33.5

### Conducted Emissions:

Measured Level (Amplitude)	Factor		External Attenuation	Adjusted Level
	Transducer Factor	Cable Factor		
26.7	0.3	0.1	20.0	47.1

26.7 + 0.3 + 0.1 + 20.0 = 47.1

### Radiated Power (ERP/EIRP) – Substitution Method:

Measured Level into Substitution Antenna (Amplitude dBm)	Substitution Antenna Factor (dBi)	EIRP to ERP (if applicable)	Measured power (dBm ERP/EIRP)
10.0	6.0	2.15	13.9/16.0

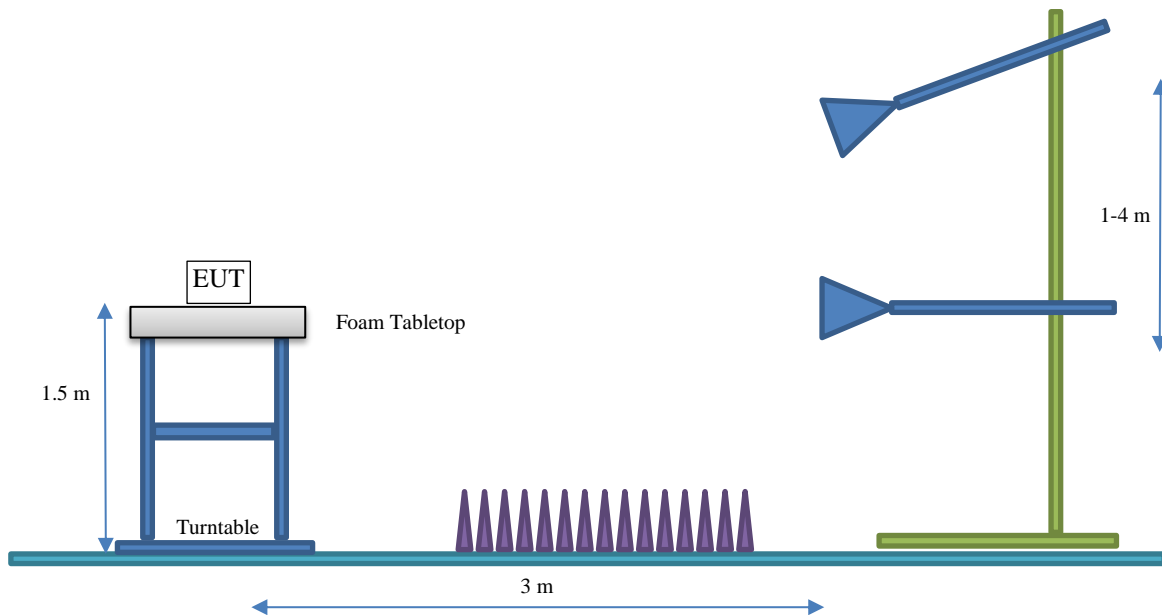
10.0 + 6.0 - 2.15 = 13.9/16.0



# TEST SETUP BLOCK DIAGRAMS

## Bore Sighting (>1GHz)

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.



# PRODUCT DESCRIPTION



## Client and Equipment Under Test (EUT) Information

<b>Company Name:</b>	Abbott Laboratories
<b>Address:</b>	1921 Hurd Drive
<b>City, State, Zip:</b>	Irving, TX 75038
<b>Test Requested By:</b>	Don Mendell
<b>EUT:</b>	GLP12152 Cross Switch
<b>First Date of Test:</b>	June 14, 2021
<b>Last Date of Test:</b>	September 2, 2021
<b>Receipt Date of Samples:</b>	June 14, 2021
<b>Equipment Design Stage:</b>	Production
<b>Equipment Condition:</b>	No Damage
<b>Purchase Authorization:</b>	Verified

## Information Provided by the Party Requesting the Test

### Functional Description of the EUT:

Cross Switch allows for a CAR to change lanes, and contains an RFID reader for each lane

### Testing Objective:

To demonstrate compliance to FCC Part 15.225 specifications.

# POWER SETTINGS AND ANTENNAS



The power settings, antenna gain value(s) and cable loss (if applicable) used for the testing contained in this report were provided by the customer and will affect the validity of the results. Element assumes no responsibility for the accuracy of this information.

## ANTENNA INFORMATION

Type	Provided by:	Dimensions
Embedded Inductive Loop	GLP Systems	51mm x 35mm

## POWER SETTING

Radio	Modulation	Protocol	Data Rate	Frequency	Power Setting (mW)
RFID	OOK	ISO 13693	26.48 kbps	13.56 MHz	200

\*Power is set internally through product firmware at the default maximum.

# CONFIGURATIONS



## Configuration ABBO0084- 1

Software/Firmware Running during test	
Description	Version
Firmware	TrackEmvTest_ap_wp_Version_0.0_46817.bin
Firmware	TrackEmvTest_scc_Version_0.0_46817.bin
Firmware	TrackEmvTest_scd_Version_0.0_46817.bin
Firmware	TrackEmvTest_scx_scr_Version_0.0_46817.bin
Firmware	Aliquoter_Version_2.5_47948.bin

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
CrossSwitch Track Radio	GLP Systems	GLP12152	ENG07-CS

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Aliquoter Module	GLP Systems	GLP12260	AM000057
AccessPoint Radio 1	GLP Systems	20008971/20008841	ENG03-AP
AccessPoint Radio 2	GLP Systems	20008971/20008841	ENG04-AP
AccessPoint Radio 3	GLP Systems	20008971/20008841	ENG05-AP
CrossSwitch Radio	GLP Systems	20005732	ENG06-CS
CAN Bus	GLP Systems	None	None
Power Strip	GLP Systems	GLP12015	None
AC Line Filter	GLP Systems	GLP12013	None
Module Power Supply	GLP Systems	20027692	0001439
24V Power Supply	GLP Systems	GLP12010	0001045
CrossSwitch Track Radio	GLP Systems	GLP12152	ENG07-CS
Convergent 90 Track Radio	GLP Systems	GLP12154	ENG02-CN
Divergent 90 Track Radio	GLP Systems	GLP12153	ENG02-DV
Car 1	GLP Systems	GLP12677	0033406
Car 2	GLP Systems	GLP12677	0033416
Car 3	GLP Systems	GLP12677	0033506
Car 4	GLP Systems	GLP12677	0033514
Laptop	Dell	Optiplex XE3	71HQQ72

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power Cable	No	2.7m	No	AC Mains	AC Line Filter
AC Power Cable	No	2.7m	No	AC Line Filter	24V Power Supply
Ethernet	Yes	10.0m	No	Laptop	Aliquoter Module
USB	No	5.0m	No	Laptop	Aliquoter Module

# CONFIGURATIONS



## Configuration ABBO0084 - 2

Software/Firmware Running during test	
Description	Version
Firmware	TrackEmvTest_ap_wp_Version_0.0_46817.bin
Firmware	TrackEmvTest_atr_Version_0.0_47120.bin
Firmware	TrackEmvTest_cp_pp_tac_Version_0.0_46817.bin
Firmware	TrackEmvTest_scc_Version_0.0_46817.bin
Firmware	TrackEmvTest_scx_scr_Version_0.0_46817.bin
Firmware	TrackEmvTest_scd_Version_0.0_46817.bin

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
CrossSwitch Track Radio	GLP Systems	GLP12152	ENG05-CS

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Power Strip	GLP Systems	GLP12015	None
CAN Bus	GLP Systems	None	None
24V Power Supply	GLP Systems	GLP12010	C06A001511
Power Board	GLP Systems	GLP12014	None
AC Line Filter	GLP Systems	GLP12013	0001002
AccessPoint Radio	GLP Systems	GLP12195	ENG02-AP
PassPoint Track Radio	GLP Systems	GLP12191	ENG02-PP
ChargeLane M Track Radio	GLP Systems	GLP12553	ENG02-CL M
Switch 90 Convergent Track Radio	GLP Systems	GLP12154	ENG01-CN
Switch 90 Divergent Track Radio	GLP Systems	GLP12153	ENG01-DV
Drawer Reader Radio	GLP Systems	20001805 Rev C (PCB: 20001791 Rev B)	ENG05-DR

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power Cable	Yes	1.1m	No	AC Mains	AC Line Filter
Auxiliary Bus Line	Yes	1.0m	No	AC Line Filter	24V Power Supply
DC Power Cable	No	0.6m	Yes	Power Board	Switch 90 Divergent
DC Power Cable	No	0.6m	Yes	Power Board	Switch 90 Convergent
DC Power Cable	No	0.6m	Yes	Power Board	ChargeLane
DC Power Cable	No	0.6m	Yes	Power Board	Cross Switch
DC Power Cable	No	0.6m	Yes	Power Board	PassPoint
DC Power Cable	No	0.6m	Yes	Power Board	AccessPoint
DC Power Cable	No	0.6m	Yes	Power Board	Drawer Reader

# CONFIGURATIONS



## Configuration ABBO0084 - 3

Software/Firmware Running during test	
Description	Version
Firmware	TrackEmvTest_scx_scr_Version_0.0_46817.bin

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
CrossSwitch Track Radio	GLP Systems	GLP12152	ENG05-CS

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Power Strip	GLP Systems	GLP12015	None
CAN Bus	GLP Systems	None	None
24V Power Supply	GLP Systems	GLP12010	C06A001511
Power Board	GLP Systems	GLP12014	None
AC Line Filter	GLP Systems	GLP12013	0001002

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power Cable	Yes	1.1m	No	AC Mains	AC Line Filter
Auxiliary Bus Line	Yes	1.0m	No	AC Line Filter	24V Power Supply
DC Power Cable	No	0.6m	Yes	Power Board	Cross Switch

# MODIFICATIONS



## Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2021-07-21	Frequency Stability	Tested as delivered to test station.	None	EUT remained at Element following the test.
2	2021-07-21	Occupied Bandwidth	Tested as delivered to test station.	None	EUT remained at Element following the test.
3	2021-08-17	Powerline Conducted Emissions	Tested as delivered to test station.	None	EUT remained at Element following the test.
4	2021-09-02	Field Strength of Spurious Emissions (Greater Than 30 MHz)	Tested as delivered to test station.	None	EUT remained at Element following the test.
5	2021-08-31	Field Strength of Fundamental	Tested as delivered to test station.	None	EUT remained at Element following the test.
6	2021-08-31	Field Strength of Spurious Emissions (Less Than 30 MHz)	Tested as delivered to test station.	None	Scheduled testing was completed.

# POWERLINE CONDUCTED EMISSIONS



PSA-ESCI 2021.03.17.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## MODES OF OPERATION

Transmitting RFID 13.56 MHz

## POWER SETTINGS INVESTIGATED

220VAC/60Hz

## CONFIGURATIONS INVESTIGATED

ABBO0084 - 1

## SAMPLE CALCULATIONS

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Gauss	TDEMI 30M	ARL	2021-03-23	2022-03-23
Terminator	Fairview Microwave	ST3B-C	RGX	2021-06-04	2022-06-04
Cable - Conducted Cable	Northwest EMC	TXA, HFC, TQU	TXAA	2021-01-26	2022-01-26
LISN	Solar Electronics	9252-50-R-24-BNC	LJL	2020-08-25	2021-08-25
LISN	Solar Electronics	9252-50-R-24-BNC	LJK	2020-08-25	2021-08-25
Power Source/Analyzer	Hewlett Packard	6841A	THC	NCR	NCR

## MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	BWI (kHz)
0.15 - 30.0	1.0
30.0 - 400.0	10.0
400.0 - 1000.0	100.0
1000.0 - 6000.0	1000.0

## MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

## TEST DESCRIPTION

The EUT will be powered either directly or indirectly from the AC power line. Therefore, conducted emissions measurements were made on the AC input of the EUT, or on the AC input of the device used to power the EUT.

The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.10.



# POWERLINE CONDUCTED EMISSIONS



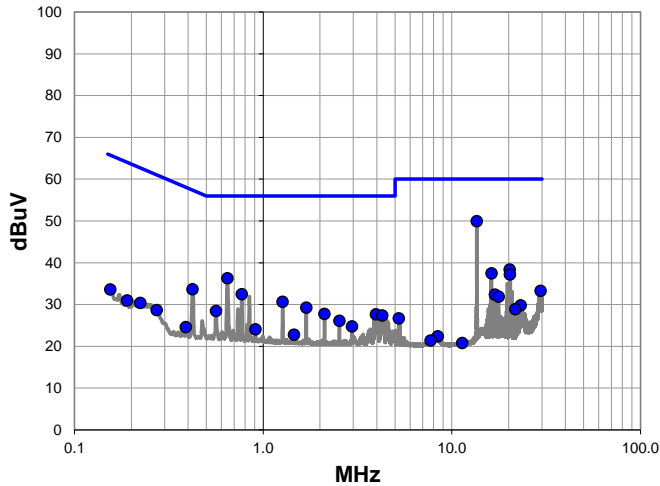
EmiR5 2021.06.24.0      PSA-ESCI 2021.03.17.0

<b>Work Order:</b>	ABBO0084	<b>Date:</b>	2021-08-17	
<b>Project:</b>	None	<b>Temperature:</b>	21.5 °C	
<b>Job Site:</b>	TX02	<b>Humidity:</b>	59.2% RH	
<b>Serial Number:</b>	ENG07-CS	<b>Barometric Pres.:</b>	1016 mbar	
<b>Tested by:</b>	Travis Glasser			
<b>EUT:</b>	GLP12152 CrossSwitch			
<b>Configuration:</b>	1			
<b>Customer:</b>	Abbott Laboratories			
<b>Attendees:</b>	Don Mendell			
<b>EUT Power:</b>	220VAC/60Hz			
<b>Operating Mode:</b>	Transmitting RFID 13.56			
<b>Deviations:</b>	None			
<b>Comments:</b>	CrossSwitch track radio within GLP12260 Aliquoter Module.			

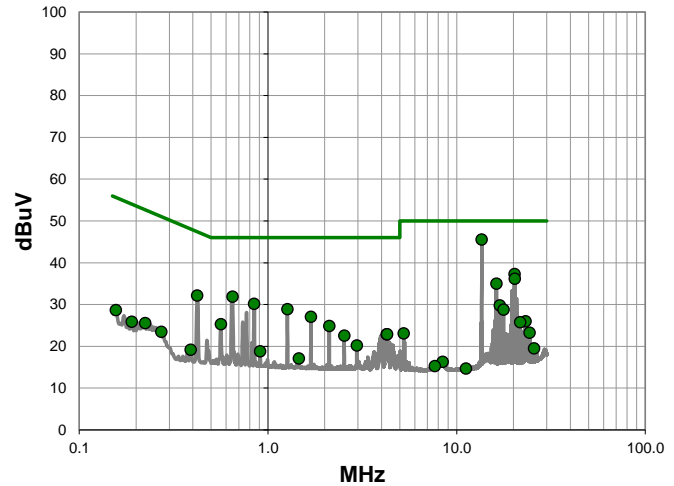
<b>Test Specifications</b>	FCC 15.207:2021	<b>Test Method</b>	ANSI C63.10:2013
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<b>Run #</b>	35	<b>Line:</b>	High Line	<b>Ext. Attenuation:</b>	0	<b>Results</b>	Pass
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Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
13.560	28.9	21.1	50.0	60.0	-10.0
0.646	16.1	20.2	36.3	56.0	-19.7
20.259	16.8	21.6	38.4	60.0	-21.6
16.227	16.1	21.4	37.5	60.0	-22.5
20.320	15.6	21.6	37.2	60.0	-22.8

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
13.560	24.5	21.1	45.6	50.0	-4.4
20.259	15.7	21.6	37.3	50.0	-12.7
20.320	14.6	21.6	36.2	50.0	-13.8
0.649	11.7	20.2	31.9	46.0	-14.1
16.227	13.6	21.4	35.0	50.0	-15.0

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.769	12.3	20.2	32.5	56.0	-23.5
0.422	13.5	20.2	33.7	57.4	-23.7
1.267	10.4	20.3	30.7	56.0	-25.3
1.690	9.0	20.3	29.3	56.0	-26.7
29.552	10.6	22.7	33.3	60.0	-26.7
0.562	8.3	20.2	28.5	56.0	-27.5
16.900	11.0	21.4	32.4	60.0	-27.6
17.694	10.5	21.4	31.9	60.0	-28.1
2.112	7.5	20.3	27.8	56.0	-28.2
3.954	7.4	20.3	27.7	56.0	-28.3
4.277	7.1	20.3	27.4	56.0	-28.6
2.535	5.8	20.3	26.1	56.0	-29.9
23.129	7.9	21.9	29.8	60.0	-30.2
21.662	7.1	21.8	28.9	60.0	-31.1
2.957	4.5	20.3	24.8	56.0	-31.2
0.908	3.8	20.3	24.1	56.0	-31.9
0.155	13.2	20.4	33.6	65.8	-32.2
0.223	10.0	20.4	30.4	62.7	-32.3
0.272	8.3	20.4	28.7	61.1	-32.4
0.190	10.6	20.4	31.0	64.1	-33.1
1.456	2.5	20.3	22.8	56.0	-33.2
5.237	6.4	20.3	26.7	60.0	-33.3
0.388	4.4	20.2	24.6	58.1	-33.5
8.415	1.8	20.6	22.4	60.0	-37.6
7.712	0.9	20.5	21.4	60.0	-38.6
11.345	-0.1	20.9	20.8	60.0	-39.2

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.422	12.0	20.2	32.2	47.4	-15.2
0.844	10.0	20.2	30.2	46.0	-15.8
1.267	8.6	20.3	28.9	46.0	-17.1
1.690	6.8	20.3	27.1	46.0	-18.9
16.900	8.4	21.4	29.8	50.0	-20.2
0.562	5.1	20.2	25.3	46.0	-20.7
2.112	4.6	20.3	24.9	46.0	-21.1
17.694	7.4	21.4	28.8	50.0	-21.2
4.257	2.6	20.3	22.9	46.0	-23.1
4.277	2.6	20.3	22.9	46.0	-23.1
2.535	2.3	20.3	22.6	46.0	-23.4
23.129	4.1	21.9	26.0	50.0	-24.0
21.662	4.0	21.8	25.8	50.0	-24.2
2.957	-0.1	20.3	20.2	46.0	-25.8
24.349	1.1	22.2	23.3	50.0	-26.7
5.236	2.8	20.3	23.1	50.0	-26.9
0.156	8.3	20.4	28.7	55.7	-27.0
0.223	5.2	20.4	25.6	52.7	-27.1
0.908	-1.5	20.3	18.8	46.0	-27.2
0.272	3.1	20.4	23.5	51.1	-27.6
0.190	5.5	20.4	25.9	54.1	-28.2
1.456	-3.2	20.3	17.1	46.0	-28.9
0.390	-1.0	20.2	19.2	48.1	-28.9
25.694	-2.8	22.3	19.5	50.0	-30.5
8.415	-4.3	20.6	16.3	50.0	-33.7
7.654	-5.2	20.5	15.3	50.0	-34.7
11.188	-6.2	20.9	14.7	50.0	-35.3

# POWERLINE CONDUCTED EMISSIONS



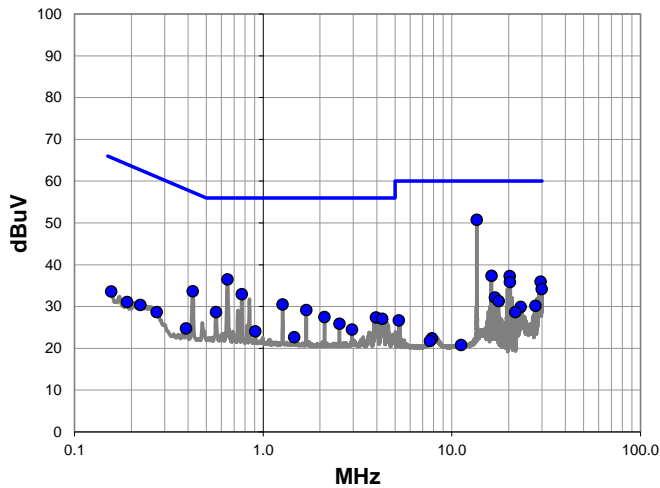
EmiR5 2021.06.24.0      PSA-ESCI 2021.03.17.0

<b>Work Order:</b>	ABBO0084	<b>Date:</b>	2021-08-17	
<b>Project:</b>	None	<b>Temperature:</b>	21.5 °C	
<b>Job Site:</b>	TX02	<b>Humidity:</b>	59.2% RH	
<b>Serial Number:</b>	ENG07-CS	<b>Barometric Pres.:</b>	1016 mbar	
<b>Tested by:</b>	Travis Glasser			
<b>EUT:</b>	GLP12152 CrossSwitch			
<b>Configuration:</b>	1			
<b>Customer:</b>	Abbott Laboratories			
<b>Attendees:</b>	Don Mendell			
<b>EUT Power:</b>	220VAC/60Hz			
<b>Operating Mode:</b>	Transmitting RFID 13.56			
<b>Deviations:</b>	None			
<b>Comments:</b>	CrossSwitch track radio within GLP12260 Aliquoter Module.			

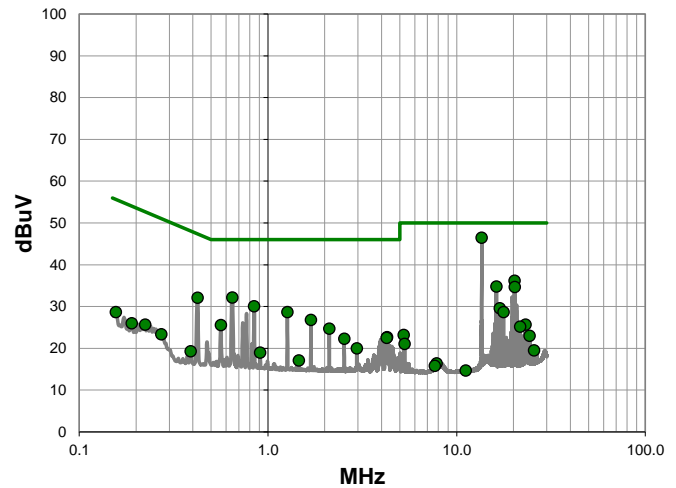
<b>Test Specifications</b>	FCC 15.207:2021	<b>Test Method</b>	ANSI C63.10:2013
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<b>Run #</b>	36	<b>Line:</b>	Neutral	<b>Ext. Attenuation:</b>	0	<b>Results</b>	Pass
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Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
13.560	29.7	21.1	50.8	60.0	-9.2
0.646	16.3	20.2	36.5	56.0	-19.5
16.227	16.0	21.4	37.4	60.0	-22.6
20.259	15.7	21.6	37.3	60.0	-22.7
0.769	12.8	20.2	33.0	56.0	-23.0

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
13.560	25.4	21.1	46.5	50.0	-3.5
0.647	12.0	20.2	32.2	46.0	-13.8
20.259	14.6	21.6	36.2	50.0	-13.8
16.227	13.4	21.4	34.8	50.0	-15.2
20.320	13.1	21.6	34.7	50.0	-15.3

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.423	13.5	20.2	33.7	57.4	-23.7
29.545	13.3	22.7	36.0	60.0	-24.0
20.320	14.3	21.6	35.9	60.0	-24.1
1.267	10.2	20.3	30.5	56.0	-25.5
29.966	11.6	22.6	34.2	60.0	-25.8
1.690	8.9	20.3	29.2	56.0	-26.8
0.562	8.5	20.2	28.7	56.0	-27.3
16.900	10.8	21.4	32.2	60.0	-27.8
2.112	7.2	20.3	27.5	56.0	-28.5
3.954	7.1	20.3	27.4	56.0	-28.6
17.694	9.9	21.4	31.3	60.0	-28.7
4.277	6.8	20.3	27.1	56.0	-28.9
27.695	7.7	22.5	30.2	60.0	-29.8
23.127	8.0	21.9	29.9	60.0	-30.1
2.535	5.6	20.3	25.9	56.0	-30.1
21.662	6.9	21.8	28.7	60.0	-31.3
2.956	4.2	20.3	24.5	56.0	-31.5
0.907	3.8	20.3	24.1	56.0	-31.9
0.156	13.2	20.4	33.6	65.7	-32.1
0.223	10.0	20.4	30.4	62.7	-32.3
0.272	8.3	20.4	28.7	61.1	-32.4
0.190	10.7	20.4	31.1	64.1	-33.0
5.236	6.4	20.3	26.7	60.0	-33.3
0.390	4.6	20.2	24.8	58.1	-33.3
1.458	2.4	20.3	22.7	56.0	-33.3
7.832	1.8	20.6	22.4	60.0	-37.6
7.655	1.3	20.5	21.8	60.0	-38.2
11.188	-0.1	20.9	20.8	60.0	-39.2

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.423	11.9	20.2	32.1	47.4	-15.3
0.844	9.9	20.2	30.1	46.0	-15.9
1.267	8.4	20.3	28.7	46.0	-17.3
1.690	6.5	20.3	26.8	46.0	-19.2
16.900	8.2	21.4	29.6	50.0	-20.4
0.562	5.4	20.2	25.6	46.0	-20.4
17.694	7.3	21.4	28.7	50.0	-21.3
2.112	4.4	20.3	24.7	46.0	-21.3
4.277	2.4	20.3	22.7	46.0	-23.3
4.257	2.2	20.3	22.5	46.0	-23.5
2.535	2.0	20.3	22.3	46.0	-23.7
23.129	3.8	21.9	25.7	50.0	-24.3
21.662	3.4	21.8	25.2	50.0	-24.8
2.957	-0.3	20.3	20.0	46.0	-26.0
5.237	2.9	20.3	23.2	50.0	-26.8
24.349	0.8	22.2	23.0	50.0	-27.0
0.908	-1.3	20.3	19.0	46.0	-27.0
0.156	8.3	20.4	28.7	55.7	-27.0
0.223	5.3	20.4	25.7	52.7	-27.0
0.272	3.0	20.4	23.4	51.1	-27.7
0.190	5.6	20.4	26.0	54.1	-28.1
0.390	-0.9	20.2	19.3	48.1	-28.8
5.298	0.8	20.3	21.1	50.0	-28.9
1.456	-3.2	20.3	17.1	46.0	-28.9
25.694	-2.8	22.3	19.5	50.0	-30.5
7.832	-4.2	20.6	16.4	50.0	-33.6
7.654	-4.7	20.5	15.8	50.0	-34.2
11.172	-6.2	20.9	14.7	50.0	-35.3

# FIELD STRENGTH OF FUNDAMENTAL



PSA-ESCI 2021.03.17.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

## MODES OF OPERATION

Transmitting RFID 13.56 MHz

## POWER SETTINGS INVESTIGATED

220VAC/60Hz

## CONFIGURATIONS INVESTIGATED

ABBO0084 - 3

## FREQUENCY RANGE INVESTIGATED

Start Frequency 490 kHz Stop Frequency 30 MHz

## SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable	Northwest EMC	RE 9kHz - 1GHz	TXB	2021-05-24	2022-05-24
Antenna - Loop	ETS Lindgren	6502	AZM	2020-07-09	2022-07-09
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	2021-03-11	2022-03-11

## TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified.

The fundamental carrier of the EUT was maximized by rotating the EUT on a turntable and adjusting the measurement antenna height and polarization (per ANSI C63.10). A calibrated active loop antenna was used for this test in order to provide sufficient measurement sensitivity. The reference point of the loop antenna was maintained at 1m above the ground plane during the testing.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector  
PK = Peak Detector  
AV = RMS Detector

As outlined in 15.209(e), 15.31(f)(2), and RSS-GEN, 6.5, measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

# FIELD STRENGTH OF FUNDAMENTAL

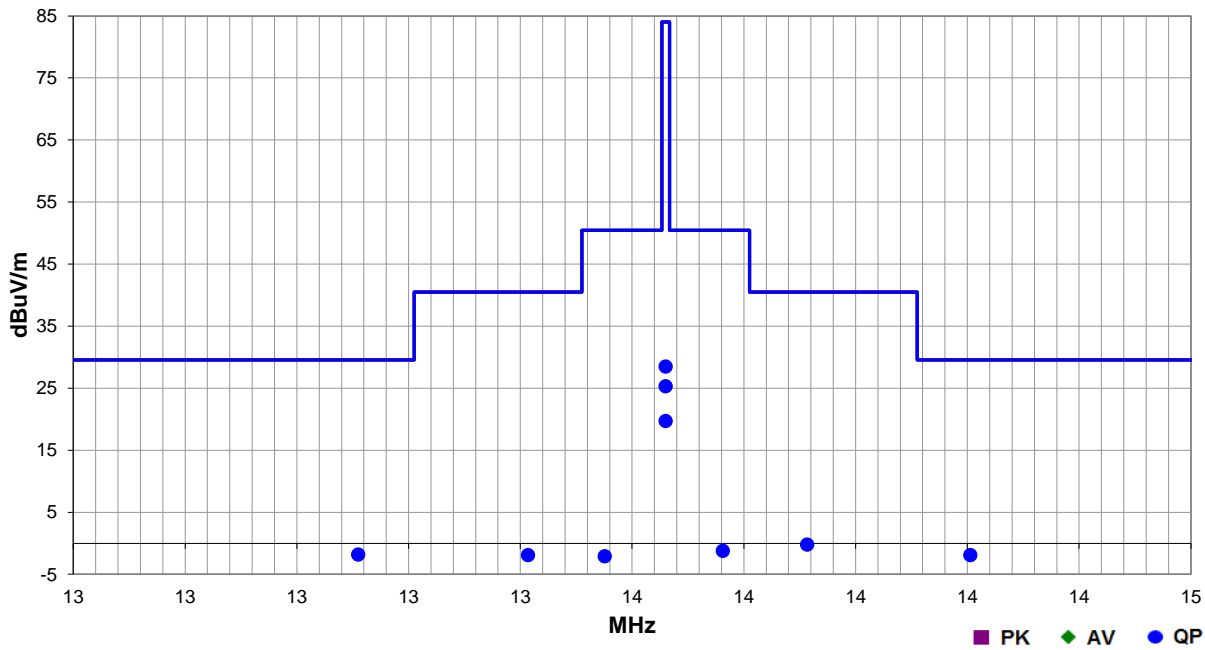


EmR5 2021.06.24.0      PSA-ESCI 2021.03.17.0

<b>Work Order:</b>	ABBO0084	<b>Date:</b>	2021-08-31	
<b>Project:</b>	None	<b>Temperature:</b>	21.4 °C	
<b>Job Site:</b>	TX02	<b>Humidity:</b>	57.7% RH	
<b>Serial Number:</b>	ENG05-CS	<b>Barometric Pres.:</b>	1009 mbar	
<b>EUT:</b>	GLP12152 Cross Switch			
<b>Configuration:</b>	3			
<b>Customer:</b>	Abbott Laboratories			
<b>Attendees:</b>	Don Mendell			
<b>EUT Power:</b>	220VAC/60Hz			
<b>Operating Mode:</b>	Transmitting RFID 13.56 MHz			
<b>Deviations:</b>	None			
<b>Comments:</b>	All emissions were greater than 20 dB below the limit.			

<b>Test Specifications</b>	<b>Test Method</b>
FCC 15.225:2021	ANSI C63.10:2013

<b>Run #</b>	0	<b>Test Distance (m)</b>	10	<b>Antenna Height(s)</b>	1(m)	<b>Results</b>	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
13.010	5.7	11.6	1.0	249.9	10.0	0.0	Perp to EUT	QP	-19.1	-1.80	29.5	-31.3	Both radios on
14.105	5.6	11.6	1.0	303.9	10.0	0.0	Perp to EUT	QP	-19.1	-1.90	29.5	-31.4	Both radios on
13.813	7.3	11.6	1.0	270.0	10.0	0.0	Perp to EUT	QP	-19.1	-0.20	40.5	-40.7	Both radios on
13.314	5.6	11.6	1.0	315.0	10.0	0.0	Perp to EUT	QP	-19.1	-1.90	40.5	-42.4	Both radios on
13.662	6.3	11.6	1.0	274.9	10.0	0.0	Perp to EUT	QP	-19.1	-1.20	50.5	-51.7	Both radios on
13.451	5.4	11.6	1.0	9.0	10.0	0.0	Perp to EUT	QP	-19.1	-2.10	50.5	-52.6	Both radios on
13.560	36.0	11.6	1.0	201.9	10.0	0.0	Perp to EUT	QP	-19.1	28.50	84.0	-55.5	Both radios on
13.560	32.8	11.6	1.0	205.0	10.0	0.0	Perp to EUT	QP	-19.1	25.30	84.0	-58.7	Radio 1 on
13.560	27.2	11.6	1.0	188.0	10.0	0.0	Perp to EUT	QP	-19.1	19.70	84.0	-64.3	Radio 2 on

# FIELD STRENGTH OF SPURIOUS EMISSIONS (Less Than 30 MHz)



PSA-ESCI 2021.03.17.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

## MODES OF OPERATION

Transmitting RFID 13.56 MHz

## POWER SETTINGS INVESTIGATED

220VAC/60Hz

## CONFIGURATIONS INVESTIGATED

ABBO0084 - 3

## FREQUENCY RANGE INVESTIGATED

Start Frequency	490 kHz	Stop Frequency	30 MHz
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## SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable	Northwest EMC	RE 9kHz - 1GHz	TXB	2021-05-24	2022-05-24
Antenna - Loop	ETS Lindgren	6502	AZM	2020-07-09	2022-07-09
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	2021-03-11	2022-03-11

## TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These "pre-scans" are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). An active loop antenna was used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector  
PK = Peak Detector  
AV = RMS Detector

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

As outlined in 15.209(e), 15.31(f)(2), and RSS-GEN, 6.5, measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

# FIELD STRENGTH OF SPURIOUS EMISSIONS (Less Than 30 MHz)

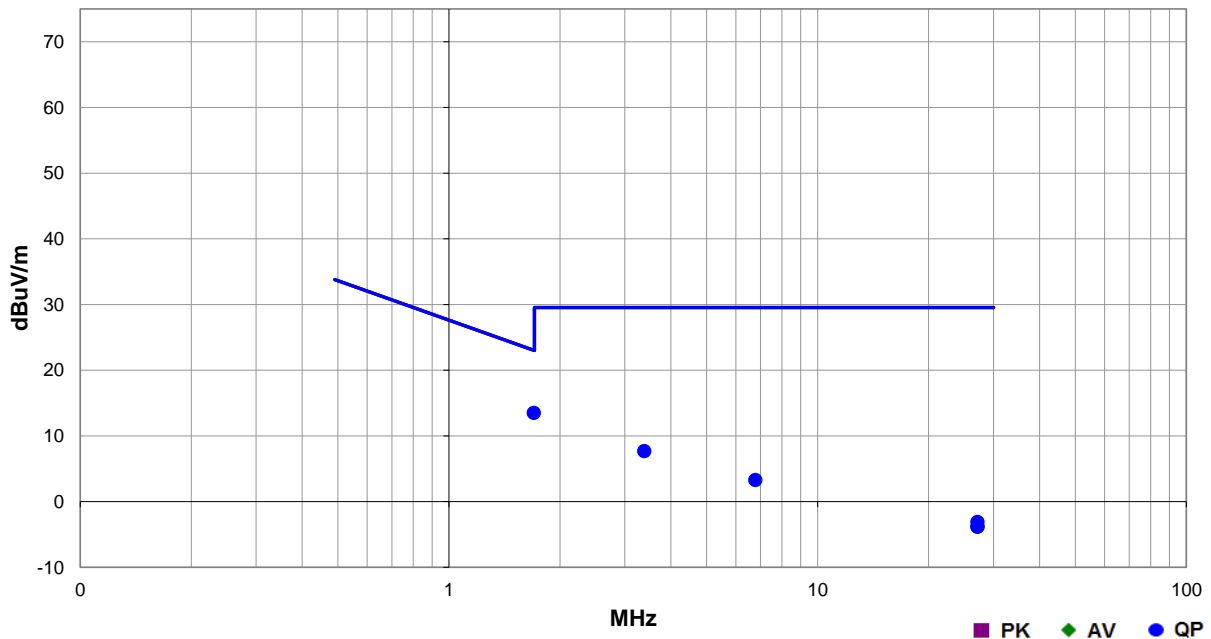


EmRS 2021.06.24.0 PSA-ESCI 2021.03.17.0

<b>Work Order:</b>	ABBO0084	<b>Date:</b>	2021-08-31	
<b>Project:</b>	None	<b>Temperature:</b>	21.4 °C	
<b>Job Site:</b>	TX02	<b>Humidity:</b>	57.7% RH	
<b>Serial Number:</b>	ENG05-CS	<b>Barometric Pres.:</b>	1009 mbar	
<b>Tested by:</b>	Jarrod Brenden			
<b>EUT:</b>	GLP12152 Cross Switch			
<b>Configuration:</b>	3			
<b>Customer:</b>	Abbott Laboratories			
<b>Attendees:</b>	Don Mendell			
<b>EUT Power:</b>	220VAC/60Hz			
<b>Operating Mode:</b>	Transmitting RFID 13.56 MHz			
<b>Deviations:</b>	None			
<b>Comments:</b>	None			

<b>Test Specifications</b>	<b>Test Method</b>
FCC 15.225:2021	ANSI C63.10:2013

<b>Run #</b>	1	<b>Test Distance (m)</b>	10	<b>Antenna Height(s)</b>	1(m)	<b>Results</b>	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
1.698	21.1	11.5	1.0	166.9	10.0	0.0	Perp to EUT	QP	-19.1	13.5	23.0	-9.5
3.385	15.1	11.7	1.0	88.9	10.0	0.0	Perp to EUT	QP	-19.1	7.7	29.5	-21.8
6.778	10.8	11.6	1.0	315.0	10.0	0.0	Perp to EUT	QP	-19.1	3.3	29.5	-26.2
27.125	6.0	10.0	1.0	204.0	10.0	0.0	Perp to EUT	QP	-19.1	-3.1	29.5	-32.6
27.130	5.3	10.0	1.0	348.0	10.0	0.0	Para to GND	QP	-19.1	-3.8	29.5	-33.3
27.125	5.3	10.0	1.0	6.0	10.0	0.0	Para to EUT	QP	-19.1	-3.8	29.5	-33.3



# FIELD STRENGTH OF SPURIOUS EMISSIONS (Greater than 30 MHz)



PSA-ESCI 2021.03.17.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

## MODES OF OPERATION

Transmitting RFID 13.56 MHz

## POWER SETTINGS INVESTIGATED

220VAC/60Hz

## CONFIGURATIONS INVESTIGATED

ABBO0084 - 3

## FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	1000 MHz
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## SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable	Northwest EMC	RE 9kHz - 1GHz	TXB	2021-05-24	2022-05-24
Amplifier - Pre-Amplifier	Fairview Microwave	FMAM63001	PAS	2021-05-24	2022-05-24
Filter - Low Pass	Micro-Tronics	LPM50004	HHV	2021-07-27	2022-07-27
Antenna - Biconilog	ETS Lindgren	3143B	AYF	2020-06-25	2022-06-25
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	2021-03-11	2022-03-11

## TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was transmitting while set at the operating channel.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector  
 PK = Peak Detector  
 AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

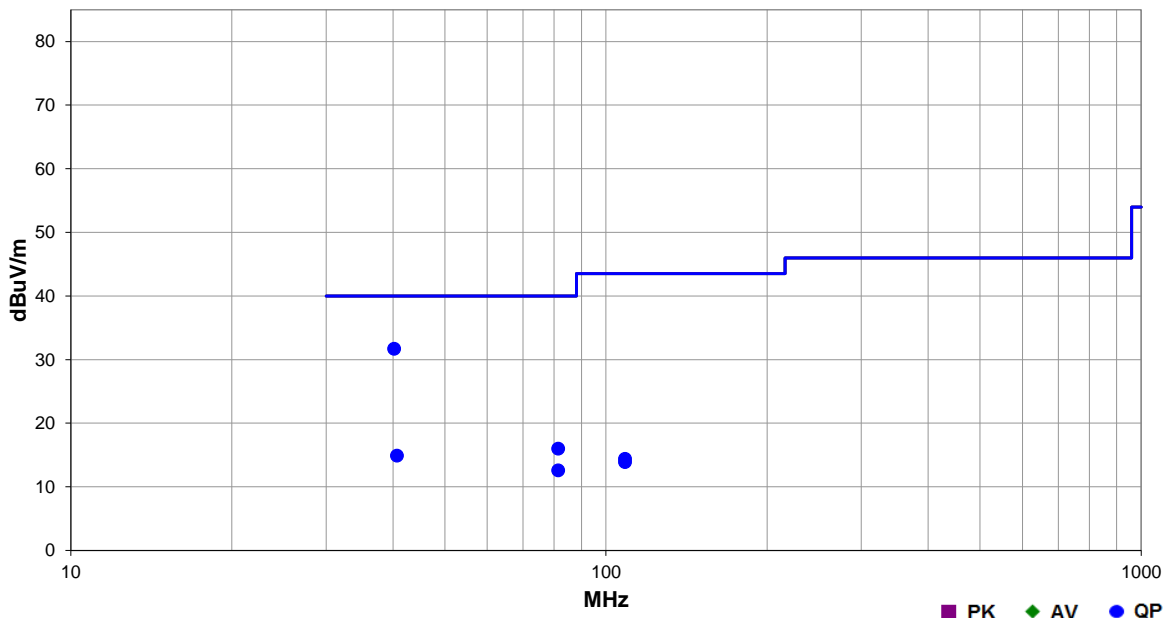
If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

# FIELD STRENGTH OF SPURIOUS EMISSIONS (Greater than 30 MHz)



Work Order:	ABBO0084	Date:	2021-09-02	<i>Jarrod Brenden</i>
Project:	None	Temperature:	20.8 °C	
Job Site:	TX02	Humidity:	59.4% RH	
Serial Number:	ENG05-CS	Barometric Pres.:	1017 mbar	
EUT:	GLP12152 CrossSwitch			
Configuration:	3			
Customer:	Abbott Laboratories			
Attendees:	Don Mendell			
EUT Power:	220VAC/60Hz			
Operating Mode:	Transmitting RFID 13.56 MHz			
Deviations:	None			
Comments:	Both radios on			

Test Specifications	FCC 15.225:2021	Test Method	ANSI C63.10:2013				
Run #	2	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
40.192	54.7	-23.0	1.0	93.0	3.0	0.0	Vert	QP	0.0	31.7	40.0	-8.3
81.368	41.4	-25.4	1.0	154.9	3.0	0.0	Vert	QP	0.0	16.0	40.0	-24.0
40.690	38.1	-23.2	2.96	244.9	3.0	0.0	Horz	QP	0.0	14.9	40.0	-25.1
81.378	38.0	-25.4	2.27	181.0	3.0	0.0	Horz	QP	0.0	12.6	40.0	-27.4
108.490	38.6	-24.2	1.04	315.9	3.0	0.0	Vert	QP	0.0	14.4	43.5	-29.1
108.490	38.1	-24.2	2.66	261.9	3.0	0.0	Horz	QP	0.0	13.9	43.5	-29.6

# FREQUENCY STABILITY



XMIT 2020.12.30.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Meter - Multimeter	Fluke	77-IV	MLT	2020-10-15	2023-10-15
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPH-8-2-SCT/AC	TBH	NCR	NCR
Transformer	Staco Energy Products Co.	3PN2520B	XFZ	NCR	NCR
Thermometer	Omega Engineering, Inc.	HH311	DUI	2021-02-02	2024-02-02
Probe - Near Field Set	ETS Lindgren	7405	IPS	NCR	NCR
Cable	UtiFlex Micro-Coax	UFD1150A-1-0720-200200	TXJ	2020-09-22	2021-09-22
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2021-01-06	2022-01-06

## TEST DESCRIPTION

The spectrum analyzer is equipped with a precision frequency reference that exceeds the stability requirement of the EUT.

Measurements were made on the single transmit frequency as called out on the data sheets. Testing was done while the EUT was continuously polling.

The primary supply voltage was varied from 85 % to 115% of the nominal voltage while at ambient temperature. Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range of -20 ° to +50° C and at 10°C intervals.

The requirement of a frequency tolerance of  $\pm 0.01\%$  is equivalent to 100 ppm  
The formula to check for compliance is:

$$\text{ppm} = (\text{Measured Frequency} / \text{Measured Nominal Frequency} - 1) * 1,000,000$$

# FREQUENCY STABILITY



TelTx 2021.03.19.1 XMt 2020.12.30.0

EUT: GLP12152 CrossSwitch		Work Order: ABBO0084	
Serial Number: ENG05-CS		Date: 24-Jul-21	
Customer: Abbott Laboratories		Temperature: 25 °C	
Attendees: Don Mendell		Humidity: 47.8% RH	
Project: None		Barometric Pres.: 1019 mbar	
Tested by: Mark Baytan		Power: 220VAC/60Hz	
TEST SPECIFICATIONS		Test Method	
FCC 15.225:2021		ANSI C63.10:2013	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature	

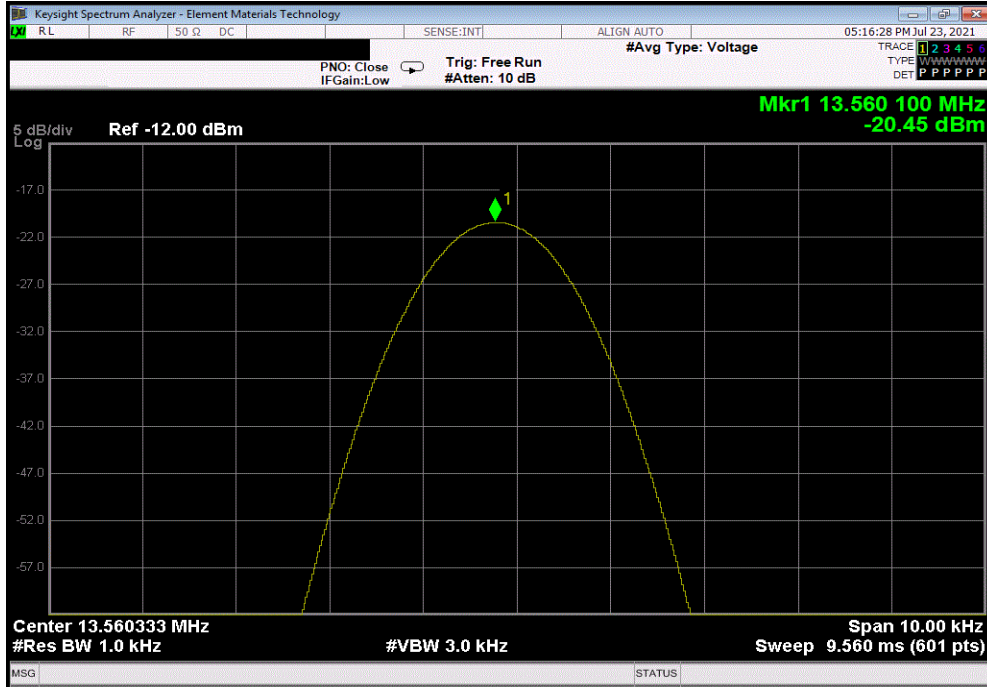
	Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
CrossSwitch Radio - Antenna 1					
Normal Voltage					
Mid Channel, 13.56 MHz	13.56009967	13.56009967	0	100	Pass
Extreme Voltage +15%					
Mid Channel, 13.56 MHz	13.56009967	13.56009967	0	100	Pass
Extreme Voltage -15%					
Mid Channel, 13.56 MHz	13.56006633	13.56009967	2.5	100	Pass
Extreme Temperature +50°C					
Mid Channel, 13.56 MHz	13.55998267	13.56009967	8.6	100	Pass
Extreme Temperature +40°C					
Mid Channel, 13.56 MHz	13.560016	13.56009967	6.2	100	Pass
Extreme Temperature +30°C					
Mid Channel, 13.56 MHz	13.56004967	13.56009967	3.7	100	Pass
Extreme Temperature +20°C					
Mid Channel, 13.56 MHz	13.56006633	13.56009967	2.5	100	Pass
Extreme Temperature +10°C					
Mid Channel, 13.56 MHz	13.56014967	13.56009967	3.7	100	Pass
Extreme Temperature 0°C					
Mid Channel, 13.56 MHz	13.560183	13.56009967	6.1	100	Pass
Extreme Temperature -10°C					
Mid Channel, 13.56 MHz	13.5602	13.56009967	7.4	100	Pass
Extreme Temperature -20°C					
Mid Channel, 13.56 MHz	13.560183	13.56009967	6.1	100	Pass
CrossSwitch Radio - Antenna 2					
Normal Voltage					
Mid Channel, 13.56 MHz	13.56003267	13.56003267	0	100	Pass
Extreme Voltage +15%					
Mid Channel, 13.56 MHz	13.56009967	13.56003267	4.9	100	Pass
Extreme Voltage -15%					
Mid Channel, 13.56 MHz	13.560016	13.56003267	1.2	100	Pass
Extreme Temperature +50°C					
Mid Channel, 13.56 MHz	13.55994933	13.56003267	6.1	100	Pass
Extreme Temperature +40°C					
Mid Channel, 13.56 MHz	13.55993367	13.56003267	7.3	100	Pass
Extreme Temperature +30°C					
Mid Channel, 13.56 MHz	13.55998333	13.56003267	3.6	100	Pass
Extreme Temperature +20°C					
Mid Channel, 13.56 MHz	13.560066	13.56003267	2.5	100	Pass
Extreme Temperature +10°C					
Mid Channel, 13.56 MHz	13.560066	13.56003267	2.5	100	Pass
Extreme Temperature 0°C					
Mid Channel, 13.56 MHz	13.56009967	13.56003267	4.9	100	Pass
Extreme Temperature -10°C					
Mid Channel, 13.56 MHz	13.56011633	13.56003267	6.2	100	Pass
Extreme Temperature -20°C					
Mid Channel, 13.56 MHz	13.56008367	13.56003267	3.8	100	Pass

# FREQUENCY STABILITY

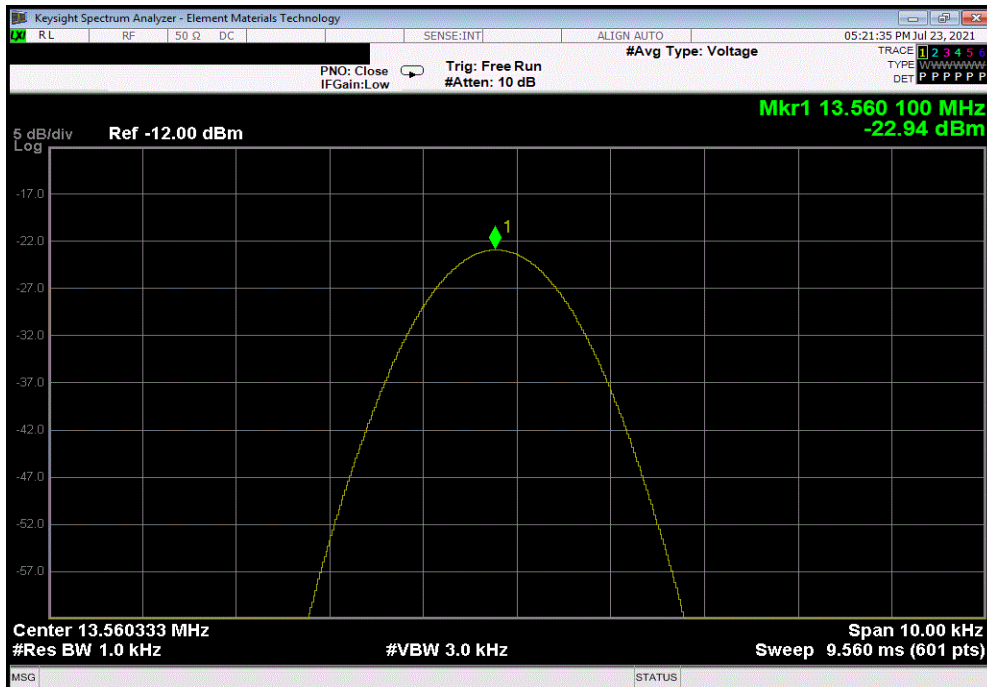


TbTx 2021.03.19.1 XMI 2020.12.30.0

CrossSwitch Radio - Antenna 1, Normal Voltage, Mid Channel, 13.56 MHz					
	Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
	13.56009967	13.56009967	0	100	Pass



CrossSwitch Radio - Antenna 1, Extreme Voltage +15%, Mid Channel, 13.56 MHz					
	Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
	13.56009967	13.56009967	0	100	Pass

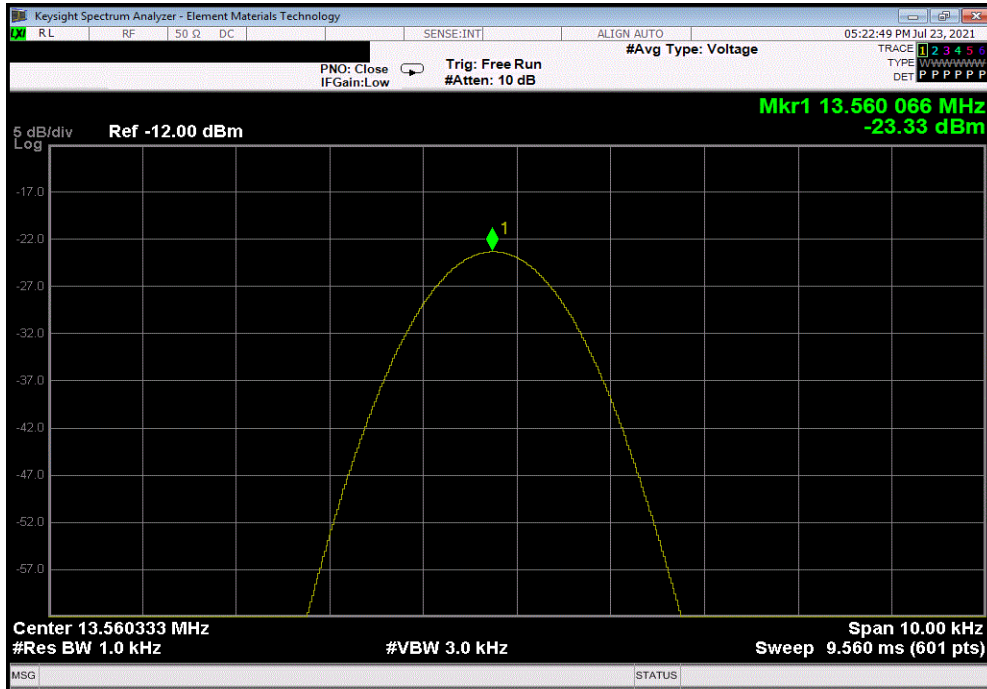


# FREQUENCY STABILITY

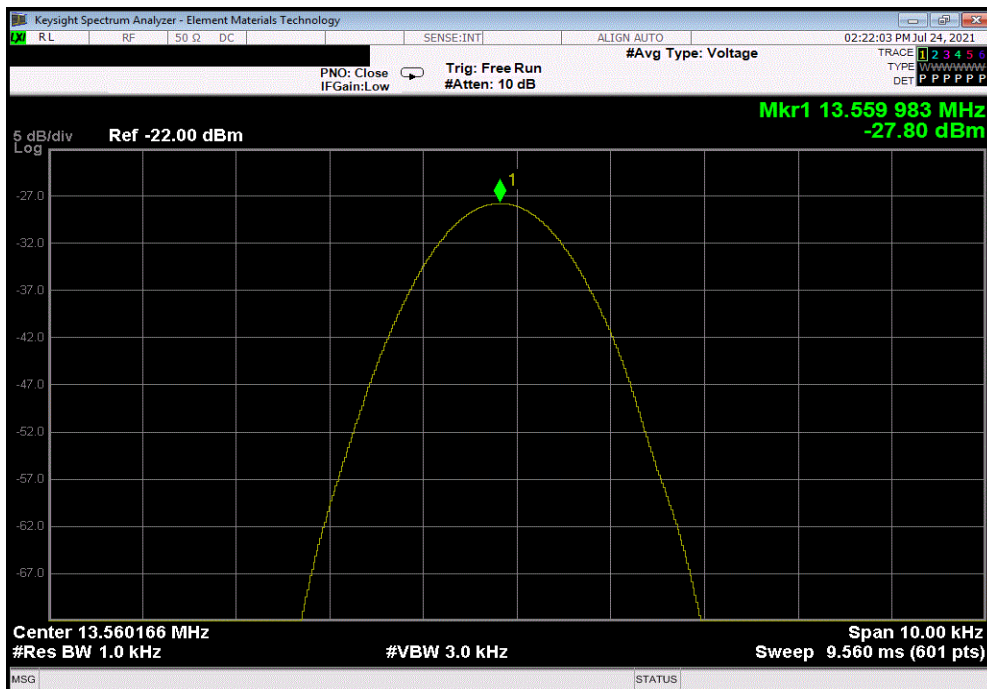


TbTx 2021.03.19.1 XMI 2020.12.30.0

CrossSwitch Radio - Antenna 1, Extreme Voltage -15%, Mid Channel, 13.56 MHz					
Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results	
13.56006633	13.56009967	2.458241519	100	Pass	



CrossSwitch Radio - Antenna 1, Extreme Temperature +50°C, Mid Channel, 13.56 MHz					
Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results	
13.55998267	13.56009967	8.628255166	100	Pass	

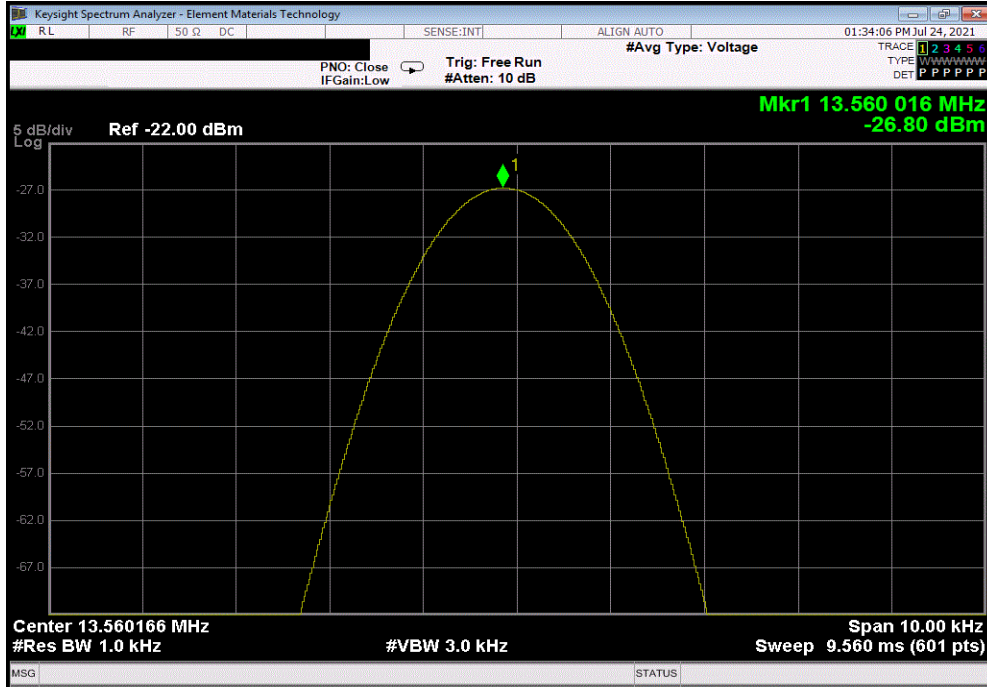


# FREQUENCY STABILITY

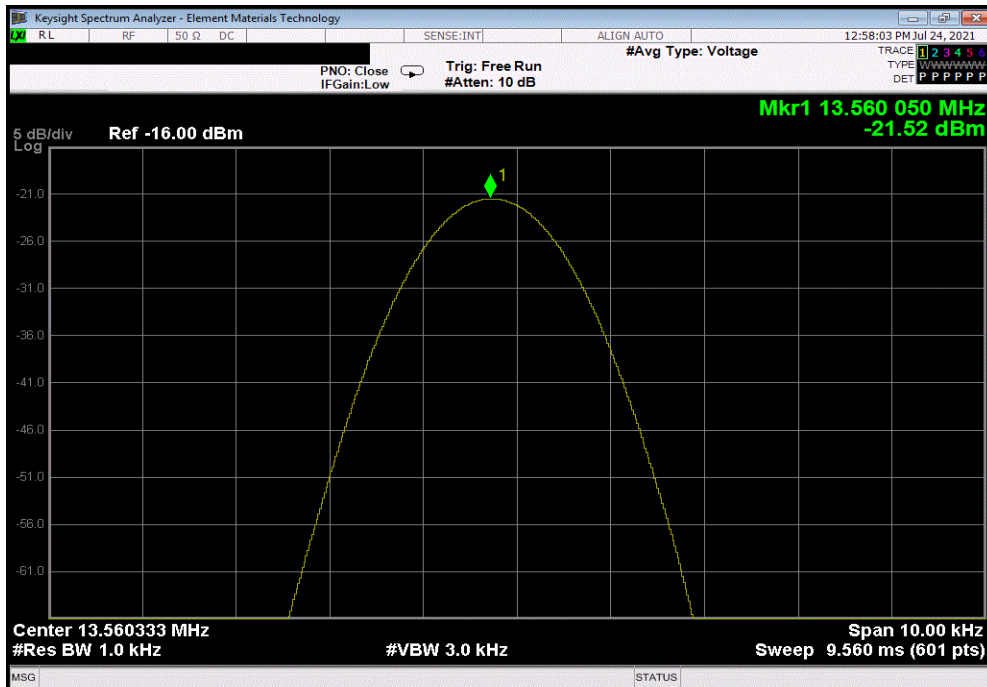


TbTx 2021.03.19.1 XMi 2020.12.30.0

CrossSwitch Radio - Antenna 1, Extreme Temperature +40°C, Mid Channel, 13.56 MHz					
Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results	
13.560016	13.56009967	6.170087393	100	Pass	



CrossSwitch Radio - Antenna 1, Extreme Temperature +30°C, Mid Channel, 13.56 MHz					
Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results	
13.56004967	13.56009967	3.687288532	100	Pass	

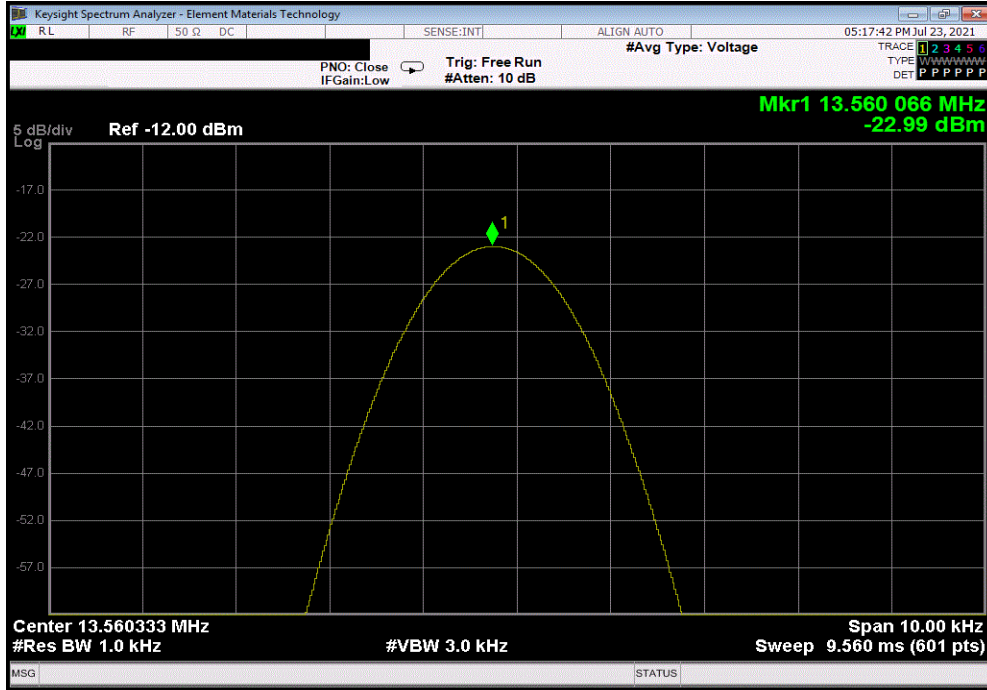


# FREQUENCY STABILITY

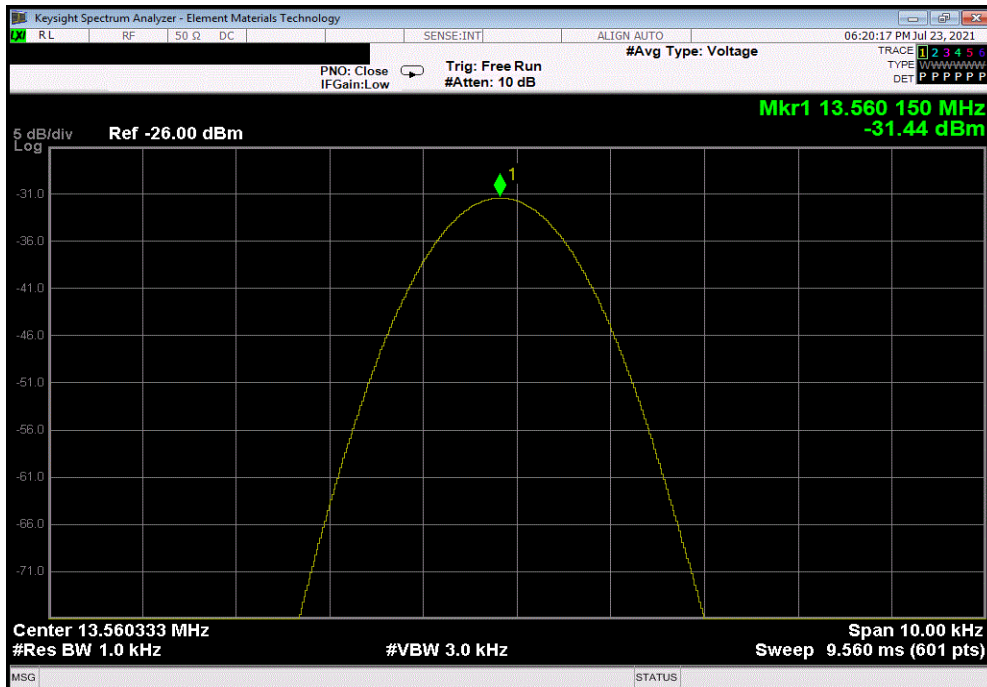


TbTx 2021.03.19.1 XMI 2020.12.30.0

CrossSwitch Radio - Antenna 1, Extreme Temperature +20°C, Mid Channel, 13.56 MHz					
	Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
	13.56006633	13.56009967	2.458241519	100	Pass



CrossSwitch Radio - Antenna 1, Extreme Temperature +10°C, Mid Channel, 13.56 MHz					
	Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
	13.56014967	13.56009967	3.687288532	100	Pass



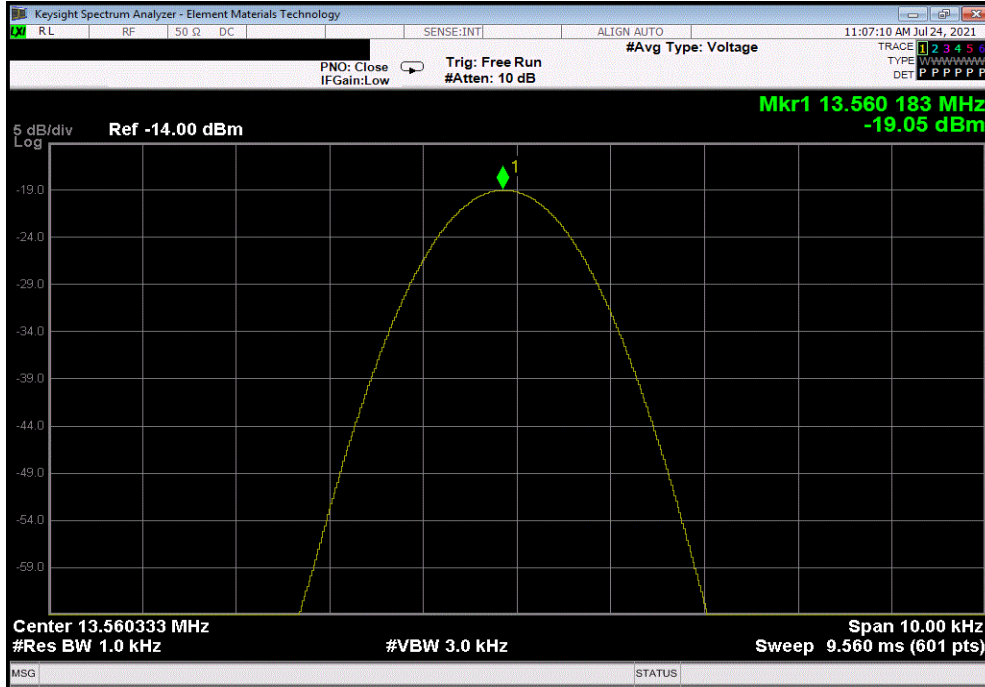


# FREQUENCY STABILITY

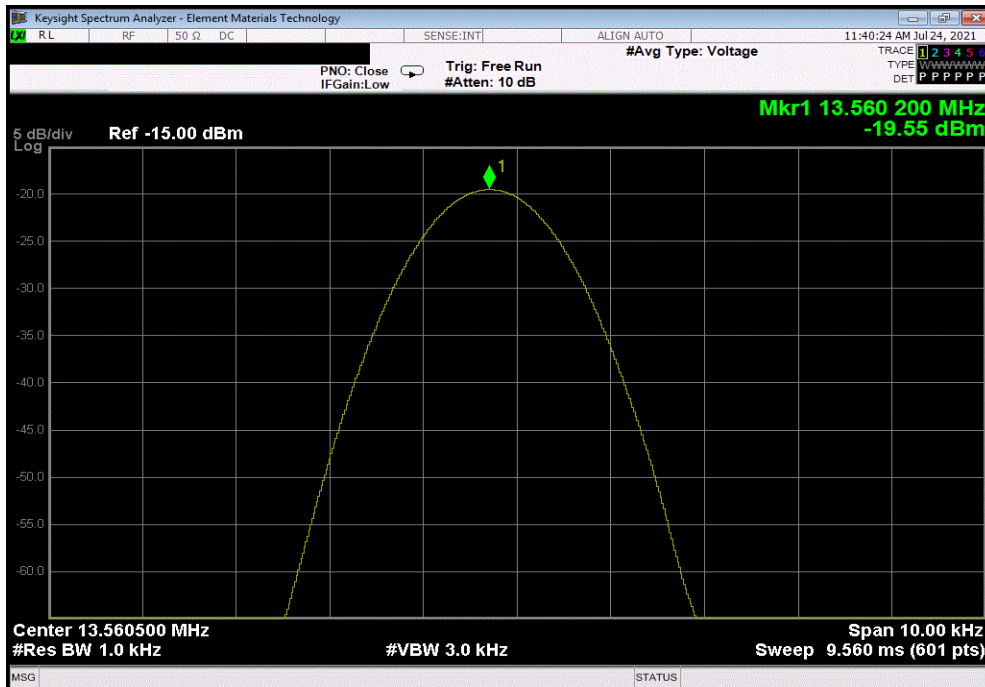


TbTx 2021.03.19.1 XMi 2020.12.30.0

CrossSwitch Radio - Antenna 1, Extreme Temperature 0°C, Mid Channel, 13.56 MHz					
Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results	
13.560183	13.56009967	6.145456305	100	Pass	



CrossSwitch Radio - Antenna 1, Extreme Temperature -10°C, Mid Channel, 13.56 MHz					
Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results	
13.5602	13.56009967	7.399134407	100	Pass	

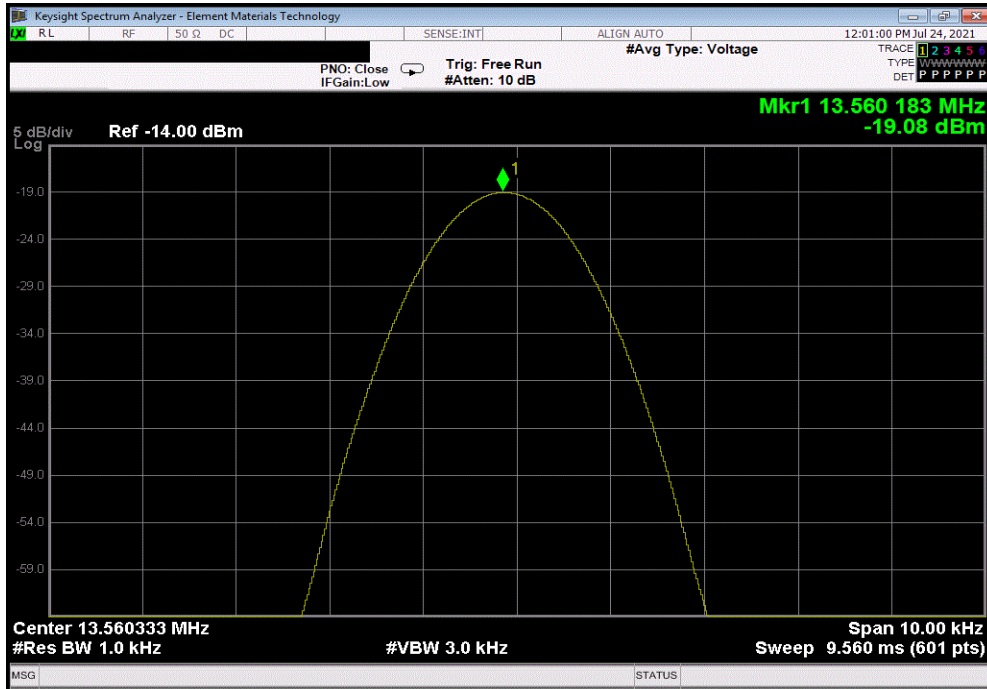


# FREQUENCY STABILITY

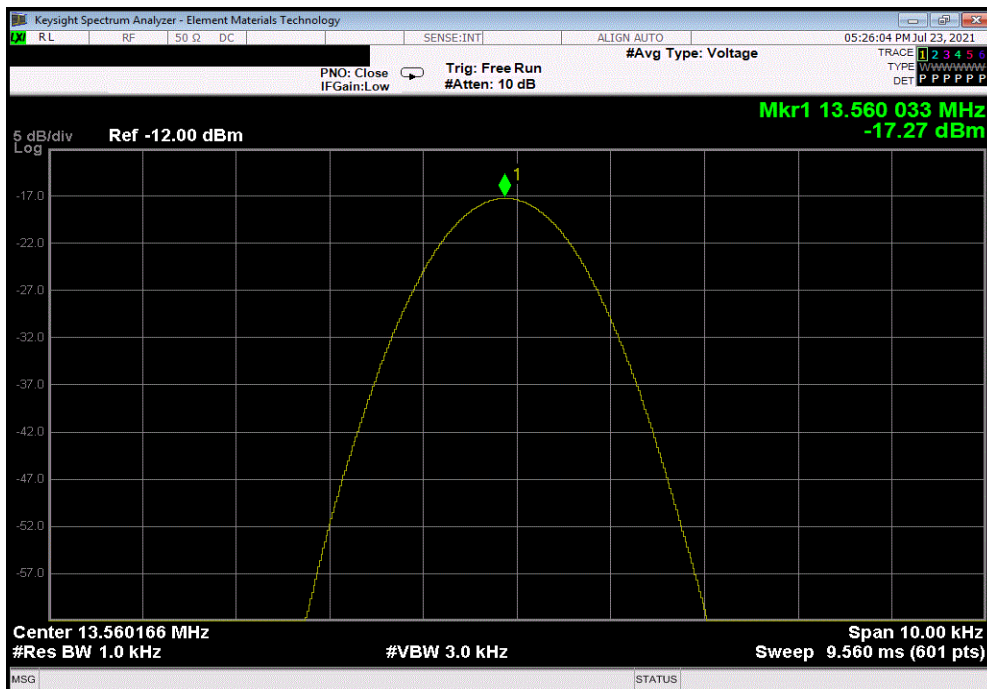


TbTx 2021.03.19.1 XMi 2020.12.30.0

CrossSwitch Radio - Antenna 1, Extreme Temperature -20°C, Mid Channel, 13.56 MHz					
Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results	
13.560183	13.56009967	6.145456305	100	Pass	



CrossSwitch Radio - Antenna 2, Normal Voltage, Mid Channel, 13.56 MHz					
Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results	
13.56003267	13.56003267	0	100	Pass	

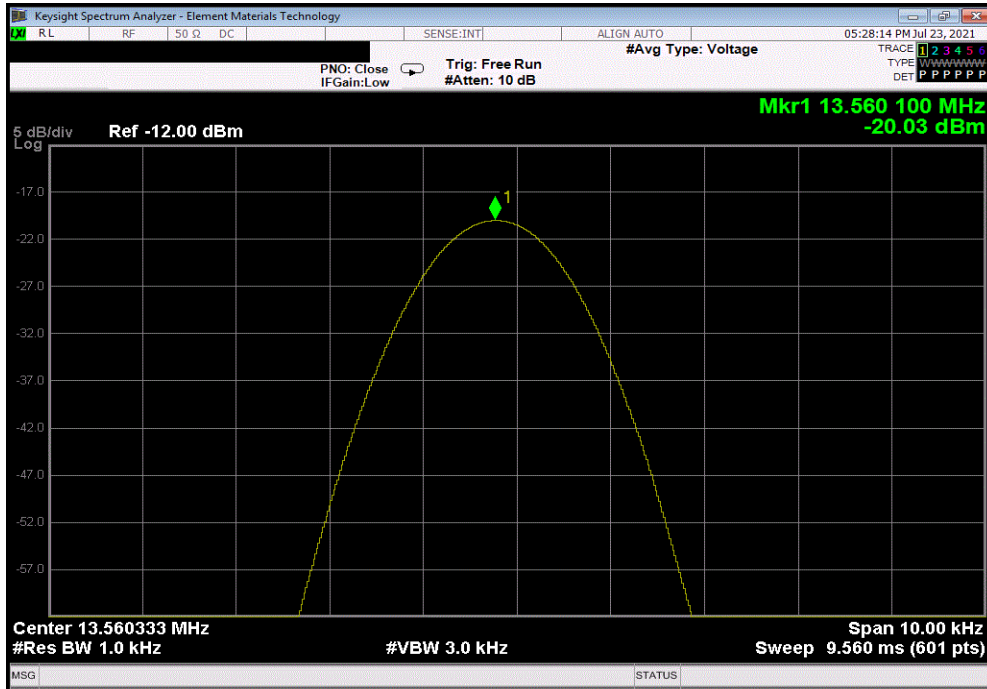


# FREQUENCY STABILITY

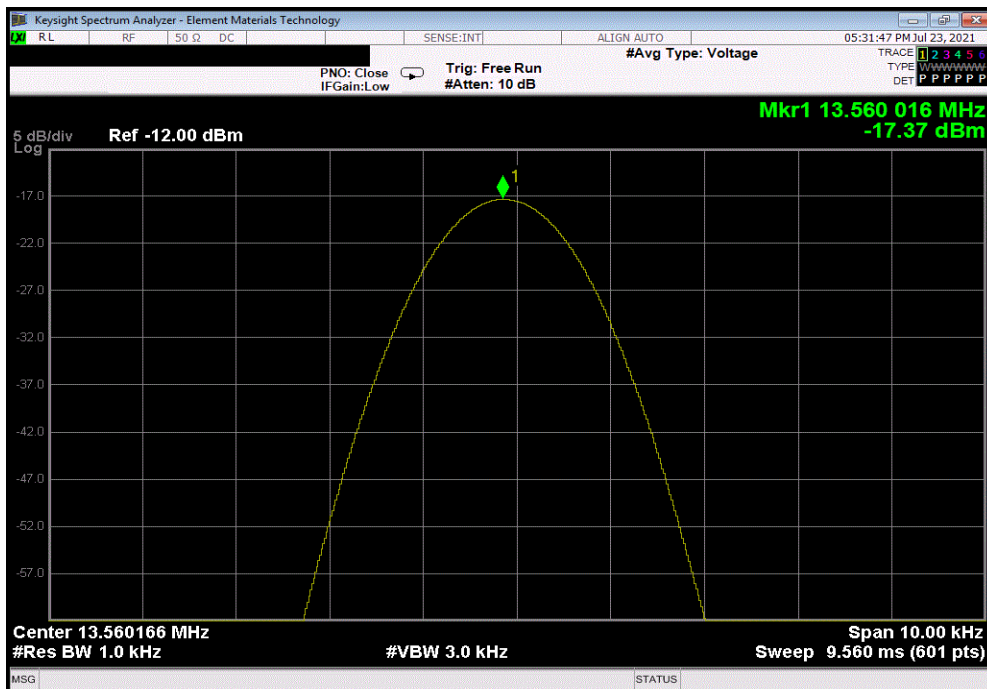


TbTx 2021.03.19.1 XMI 2020.12.30.0

CrossSwitch Radio - Antenna 2, Extreme Voltage +15%, Mid Channel, 13.56 MHz					
Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results	
13.56009967	13.56003267	4.940991047	100	Pass	



CrossSwitch Radio - Antenna 2, Extreme Voltage -15%, Mid Channel, 13.56 MHz					
Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results	
13.560016	13.56003267	1.229126833	100	Pass	

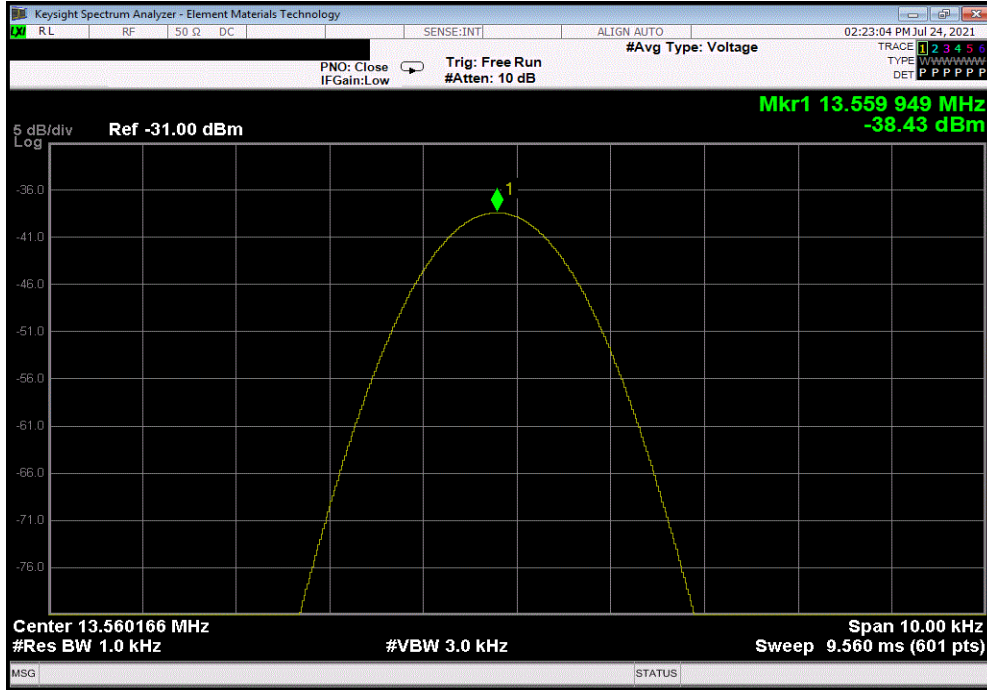


# FREQUENCY STABILITY

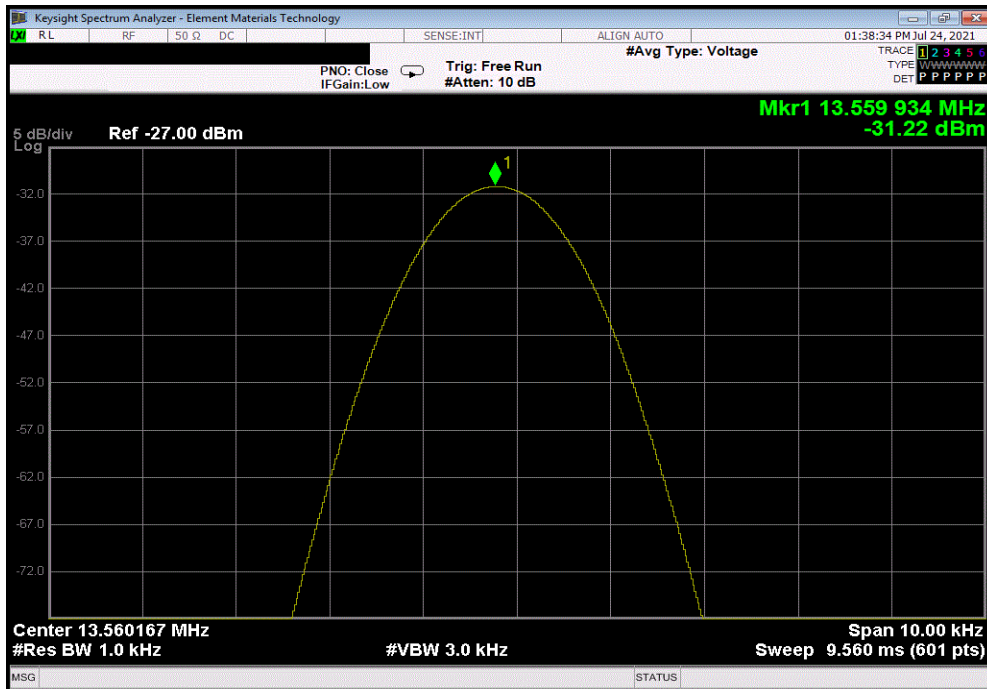


TbTx 2021.03.19.1 XMI 2020.12.30.0

CrossSwitch Radio - Antenna 2, Extreme Temperature +50°C, Mid Channel, 13.56 MHz					
Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results	
13.55994933	13.56003267	6.145560416	100	Pass	



CrossSwitch Radio - Antenna 2, Extreme Temperature +40°C, Mid Channel, 13.56 MHz					
Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results	
13.55993367	13.56003267	7.300867367	100	Pass	

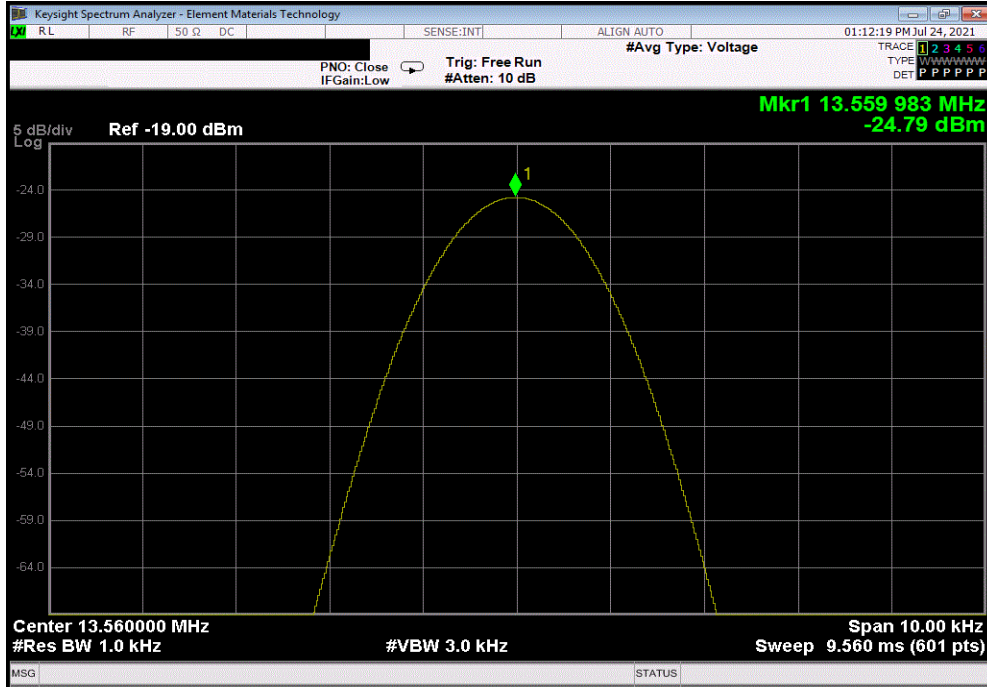


# FREQUENCY STABILITY

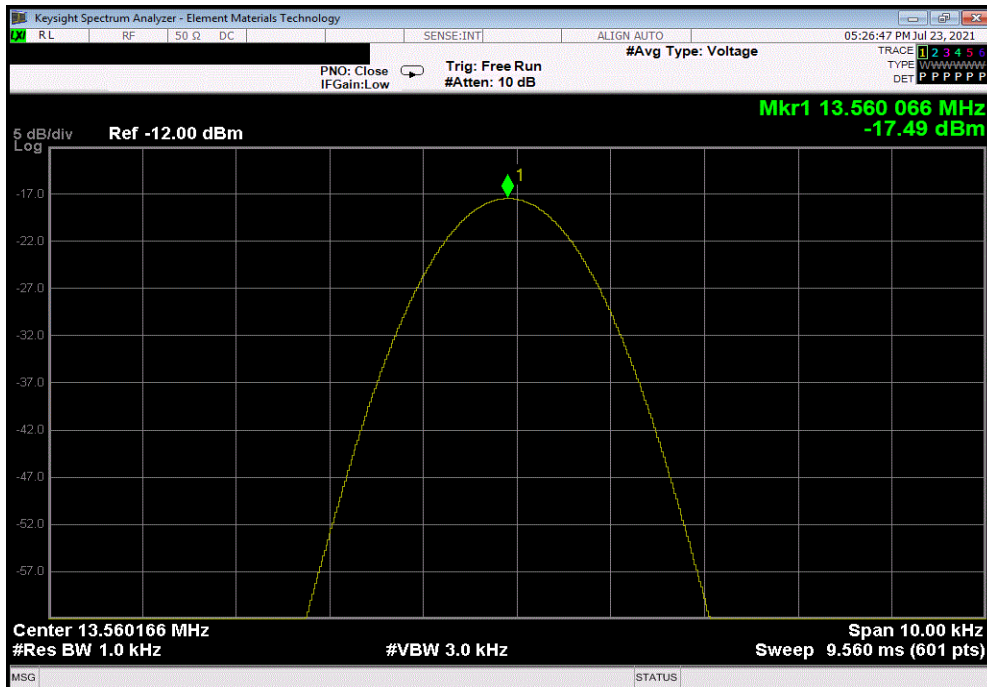


TbTx 2021.03.19.1 XMi 2020.12.30.0

CrossSwitch Radio - Antenna 2, Extreme Temperature +30°C, Mid Channel, 13.56 MHz					
	Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
	13.55998333	13.56003267	3.638191825	100	Pass



CrossSwitch Radio - Antenna 2, Extreme Temperature +20°C, Mid Channel, 13.56 MHz					
	Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
	13.560066	13.56003267	2.458179919	100	Pass

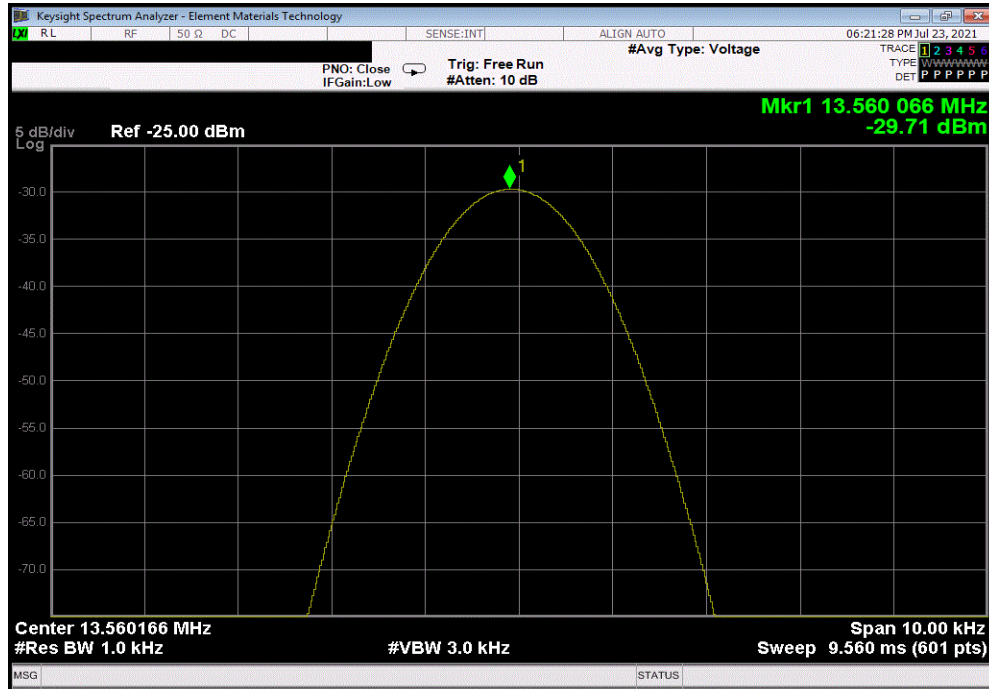


# FREQUENCY STABILITY

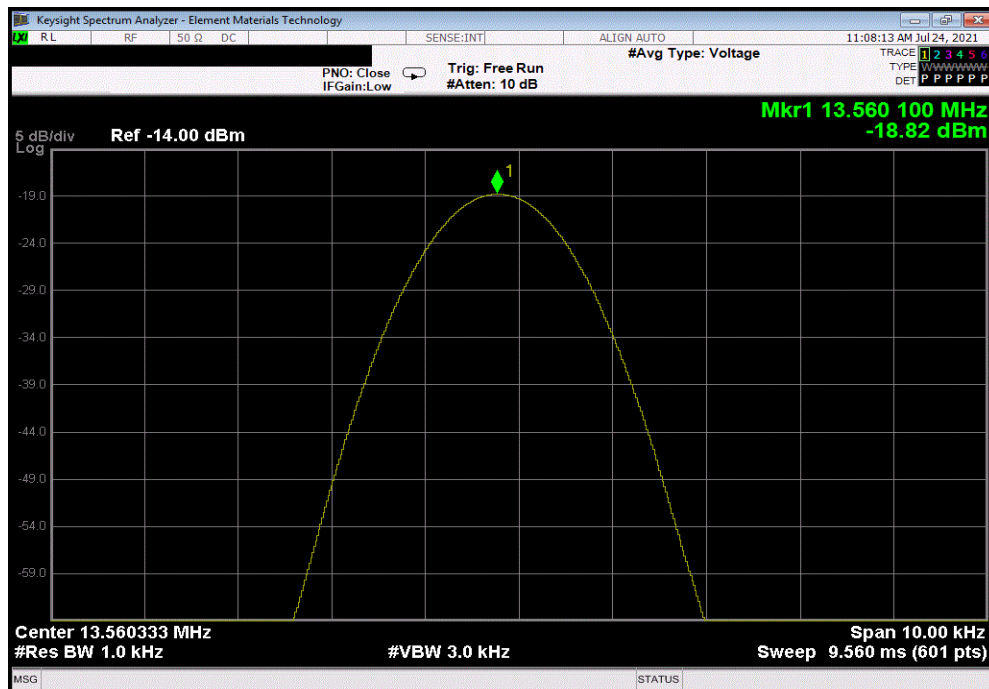


TbTx 2021.03.19.1 XMI 2020.12.30.0

CrossSwitch Radio - Antenna 2, Extreme Temperature +10°C, Mid Channel, 13.56 MHz					
Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results	
13.560066	13.56003267	2.458179919	100	Pass	



CrossSwitch Radio - Antenna 2, Extreme Temperature 0°C, Mid Channel, 13.56 MHz					
Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results	
13.56009967	13.56003267	4.940991047	100	Pass	

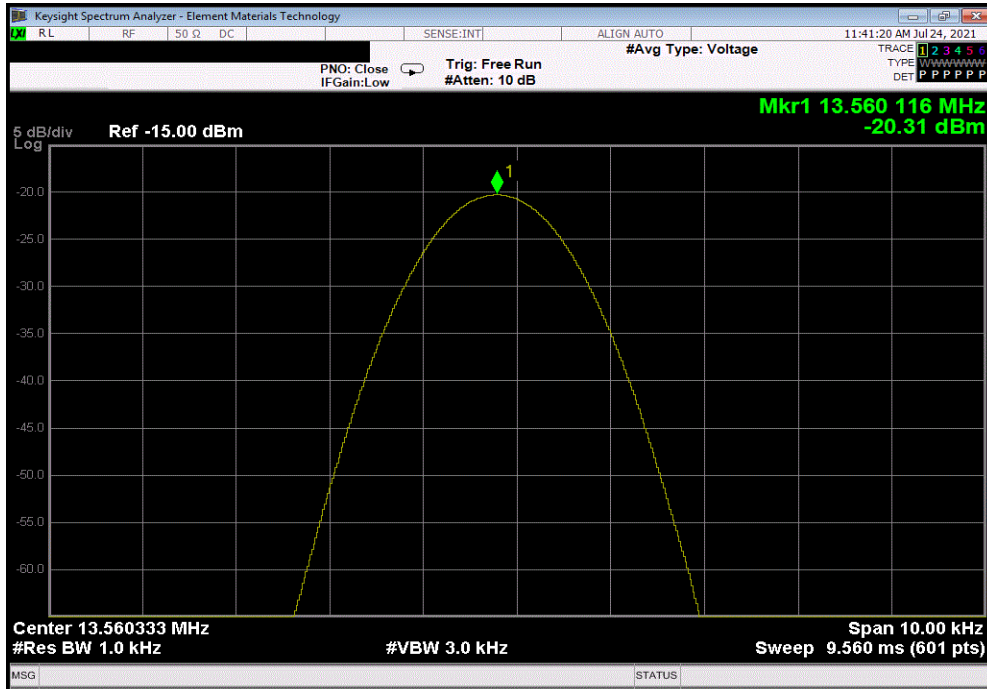


# FREQUENCY STABILITY

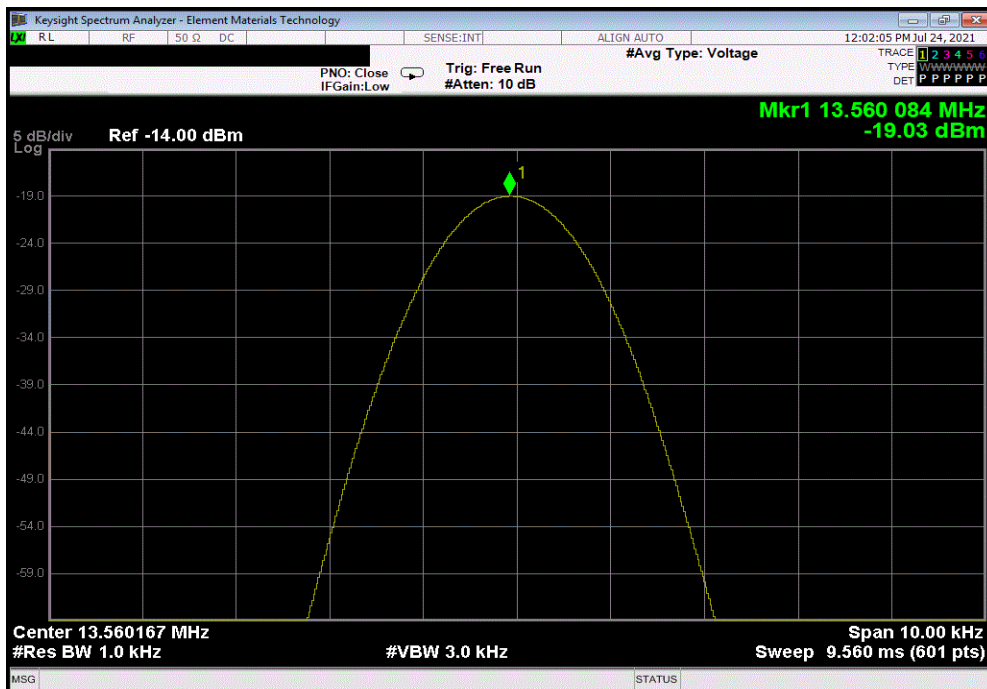


TbTx 2021.03.19.1 XMI 2020.12.30.0

CrossSwitch Radio - Antenna 2, Extreme Temperature -10°C, Mid Channel, 13.56 MHz					
Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results	
13.56011633	13.56003267	6.170044133	100	Pass	



CrossSwitch Radio - Antenna 2, Extreme Temperature -20°C, Mid Channel, 13.56 MHz					
Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results	
13.56008367	13.56003267	3.761052886	100	Pass	





XMIT 2020.12.30.0

# OCCUPIED BANDWIDTH

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Probe - Near Field Set	ETS Lindgren	7405	IPS	NCR	NCR
Cable	UtiFlex Micro-Coax	UFD1150A-1-0720-200200	TXJ	2020-09-22	2021-09-22
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2021-01-06	2022-01-06

## TEST DESCRIPTION

As defined in FCC 15.215 Part (c), intentional radiators must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designed in the rule section under which the equipment is operating.

The 20 dB bandwidth must be contained within the band 13.110-14.010 MHz.

The emissions bandwidth was measured with the EUT configured for continuous modulated operation.

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth (RBW) of the spectrum analyzer was set to the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) bandwidth was set to at least 3 times the resolution bandwidth. The analyzer sweep time was set to auto to prevent video filtering or averaging. A sample detector was used unless the device was not able to be operated in a continuous transmit mode, in which case a peak detector was used.


The spectrum analyzer occupied bandwidth measurement function was used to find the emissions bandwidth.



# OCCUPIED BANDWIDTH



TotTx 2021.03.19.1 XMit 2020.12.30.0

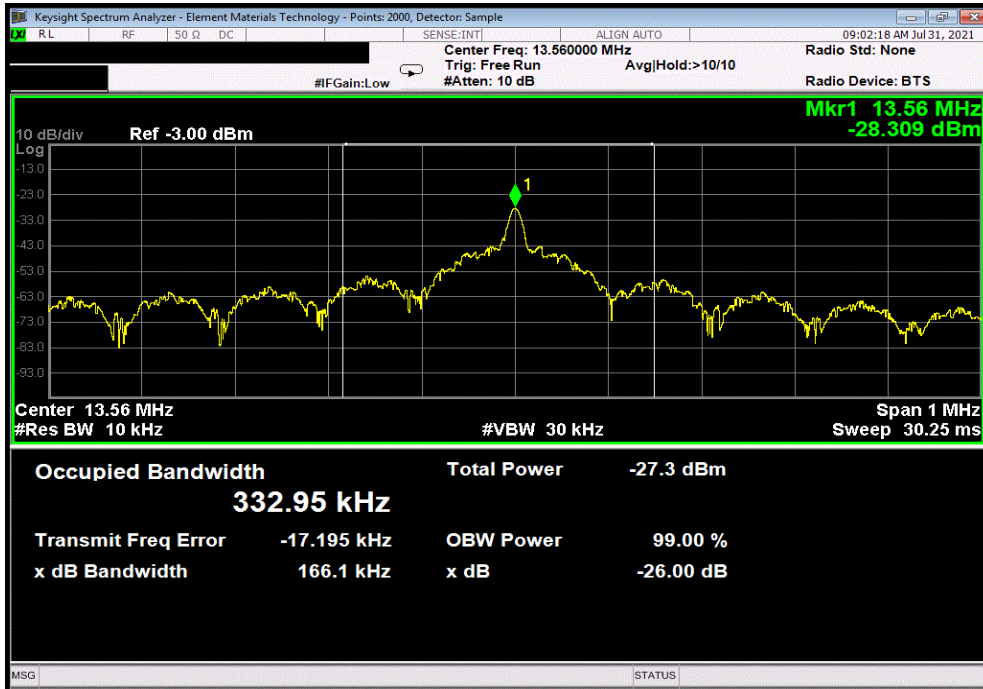
EUT: GLP12152 CrossSwitch		Work Order: ABBO0084
Serial Number: ENG05-CS		Date: 29-Jul-21
Customer: Abbott Laboratories		Temperature: 21.1 °C
Attendees: Don Mendell		Humidity: 57.8% RH
Project: None		Barometric Pres.: 1021 mbar
Tested by: Mark Baytan		Power: 220VAC/60Hz
		Job Site: TX02
<b>TEST SPECIFICATIONS</b>		
FCC 15.225:2021		Test Method: ANSI C63.10:2013
<b>COMMENTS</b>		
CrossSwitch Radio. Emissions bandwidth taken with a 26 dB bandwidth. This is worst case as compared with the 20 dB bandwidth called out in FCC 15.215.		
<b>DEVIATIONS FROM TEST STANDARD</b>		
None		
Configuration #	2	Signature 
		<b>Limit</b>
		<b>Value</b> 13.110 MHz $\geq$ BW $\leq$ 14.010 MHz <b>Result</b>
CrossSwitch Radio - Antenna 1		
Normal Voltage		
Mid Channel, 13.56 MHz		
		166.1 kHz Within Pass
CrossSwitch Radio - Antenna 2		
Normal Voltage		
Mid Channel, 13.56 MHz		
		167.7 kHz Within Pass

# OCCUPIED BANDWIDTH

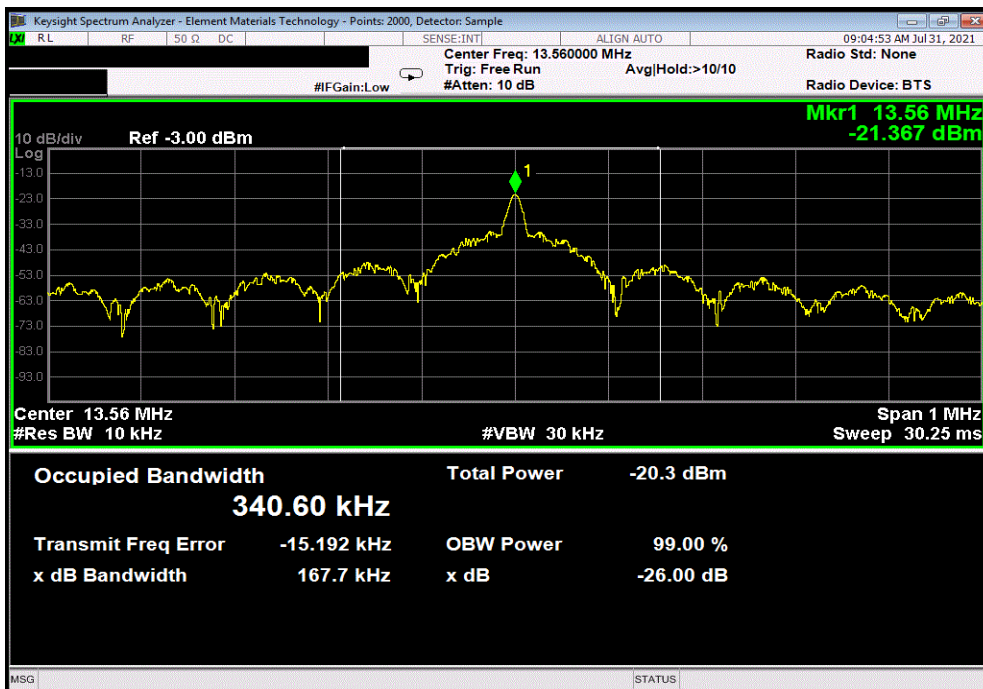


TbTx 2021.03.19.1 XMt 2020.12.30.0

CrossSwitch Radio - Antenna 1, Normal Voltage, Mid Channel, 13.56 MHz			
Limit			
Value	13.110 MHz $\geq$ BW $\leq$ 14.010 MHz	Result	
	166.1 kHz	Within	Pass



CrossSwitch Radio - Antenna 2, Normal Voltage, Mid Channel, 13.56 MHz			
Limit			
Value	13.110 MHz $\geq$ BW $\leq$ 14.010 MHz	Result	
	167.7 kHz	Within	Pass



End of Test Report