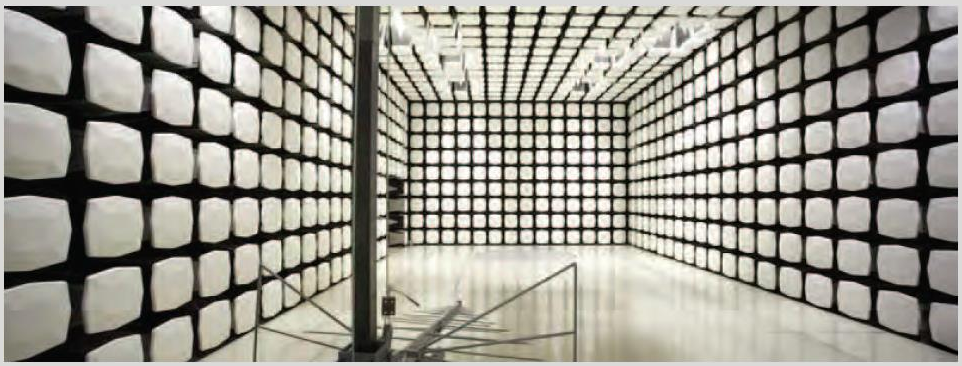
Abbott Laboratories

AAS Screwcapper

FCC 15.225:2022

13.56 MHz Radio

Report: ABBO0116.3 Rev. 1, Issue Date: August 4, 2023



ACCREDITED
CERT #3310.03

CERTIFICATE OF TEST

Last Date of Test: September 16, 2022
Abbott Laboratories
EUT: AAS Screwcapper

Radio Equipment Testing

Standards

Specification	Method
FCC 15.225:2022	ANSI C63.10:2013
FCC 15.207:2022	

Results

Test Description	Result	Specification Section(s)	Method Section(s)	Comments
Powerline Conducted Emissions	Pass	15.207	6.2	
Field Strength of Fundamental	Pass	15.225(a)-(c)	6.4	
Field Strength of Spurious Emissions (Less Than 30 MHz)	Pass	15.225(d), 15.209	6.4	
Field Strength of Spurious Emissions (Greater Than 30 MHz)	Pass	15.225(d), 15.209	6.5	
Frequency Stability	Pass	15.225(e), 2.1055	6.8	
Occupied Bandwidth	Pass	15.215(c)	6.9.2	

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

Revision Number	Description	Date (yyyy-mm-dd)	Page Number
01	Transcription error. Corrected to 35mm.	2023-08-04	13
	Removed EAR statement from cover.	2023-08-04	1

ACCREDITATIONS AND AUTHORIZATIONS

element
2021.09.01

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.

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.

European Union

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

United Kingdom

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

Australia/New Zealand

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

Korea

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

Japan

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

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.

Singapore

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

Israel

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

Hong Kong

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

Vietnam

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

SCOPE

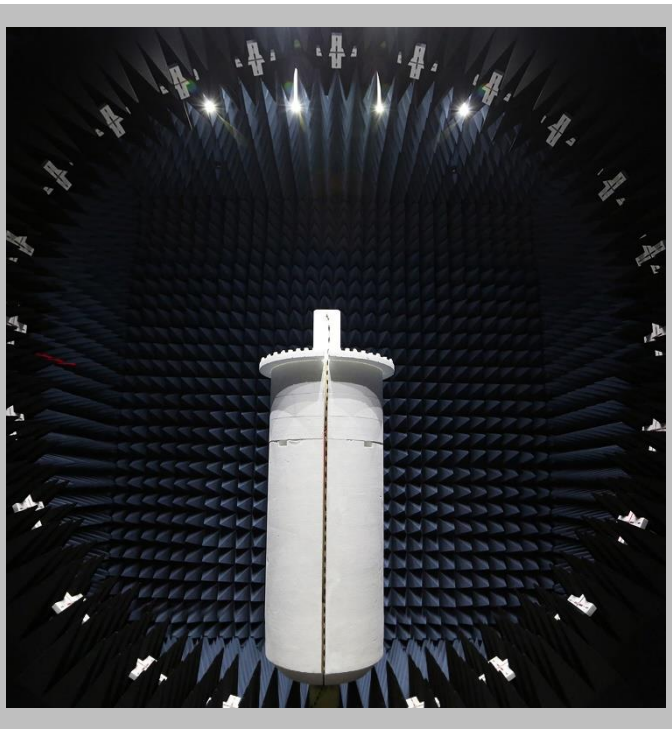
For details on the Scopes of our Accreditations, please visit:

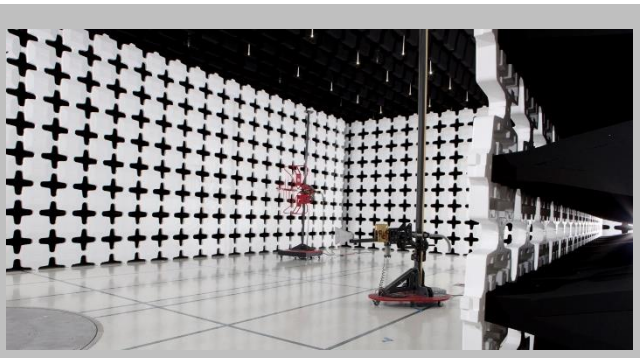
California Minnesota Oregon Texas Washington

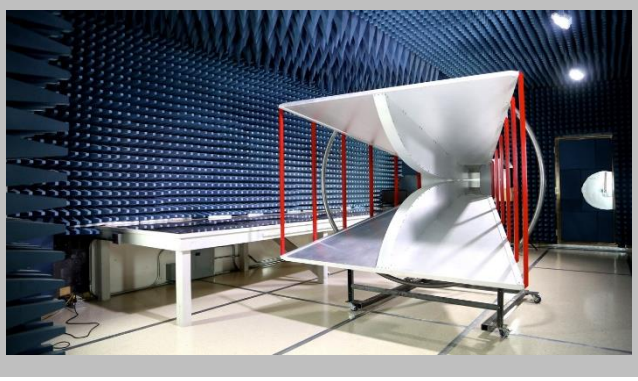
FACILITIES

element
2020.12.15

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







MEASUREMENT UNCERTAINTY

element
TMU.2015.07.10

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.

Test	+ MU	- MU
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

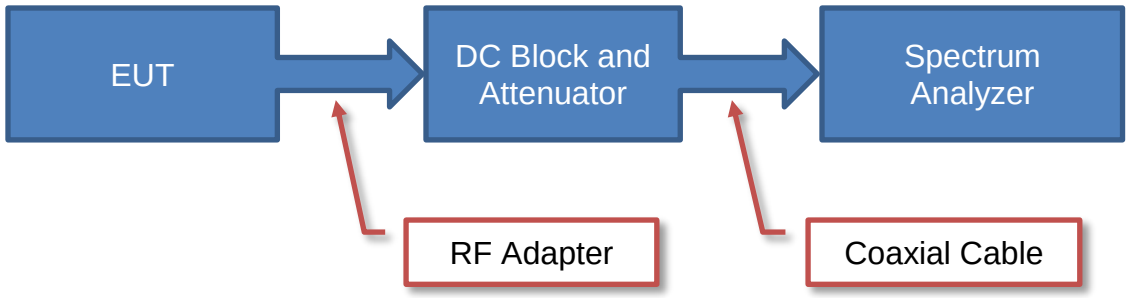
TEST SETUP BLOCK DIAGRAMS

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.

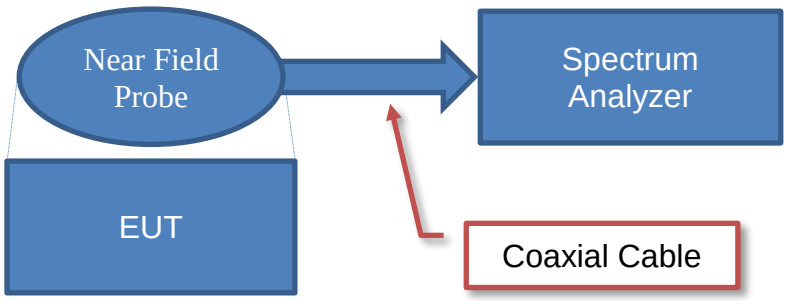
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

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

Near Field Test Fixture Measurements

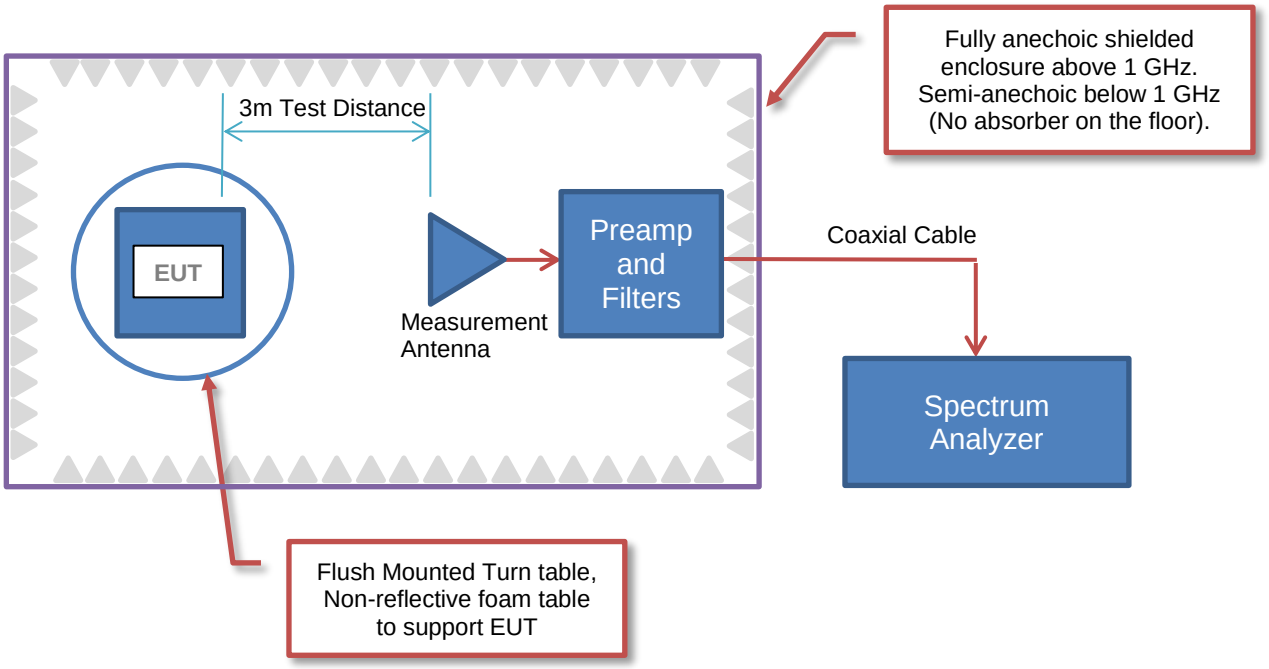


Sample Calculation (logarithmic units)

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: Antenna Factor		Factor: Cable Factor		Factor: Amplifier Gain		Distance Adjustment Factor		External Attenuation		Field Strength
42.6	+	28.6	+	3.1	-	40.8	+	0.0	+	0.0	=	**33.5**

Conducted Emissions:

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

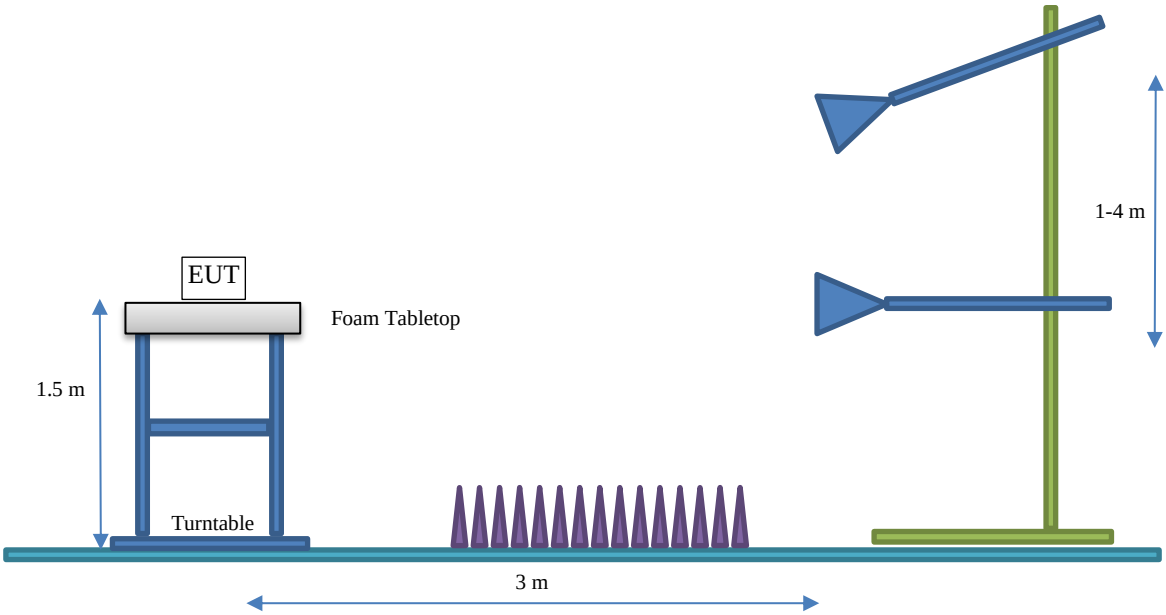
Radiated Power (ERP/EIRP) – Substitution Method:

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**

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

Company Name:	Abbott Laboratories
Address:	1921 Hurd Drive
City, State, Zip:	Irving, TX 75038
Test Requested By:	Don Mendell
EUT:	AAS Screwcapper
First Date of Test:	July 26, 2022
Last Date of Test:	September 16, 2022
Receipt Date of Samples:	July 26, 2022
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
This sample preparation module utilizes an internal robotic mechanism to screw and secure the top cap of the sample container, after the sample carrying CAR travels from the track system into the module. The CAR is secured on the track while the capping action is performed and released when capping is completed. This module contains a total of 1 RFID reader (1 Access Point).

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.

*Antenna information/power setting is identical for each 13.56 MHz radio.

CONFIGURATIONS

Configuration ABBO0116- 3

Software/Firmware Running During Test	
Description	**Version**
D000105502/A-AccessPoint RFID Test Firmware 02-47679 verification	A

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Screwcapper (EUT)	Abbott Laboratories	06Q18-51	SCCM000012

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
24V Track Power Supply	Abbott Laboratories	06U35-01	C06A002056
Track Filter Unit 3 (3 Phase)	Abbott Laboratories	06U35-04	None
Segment Controller	Abbott Laboratories	06R05-01	None
Track Section 40	Abbott Laboratories	06Q43-11	C33A002915

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power Cable A	Yes	1.0m	No	AC Mains	Track filter

Configuration ABBO0116- 4

Software/Firmware Running During Test	
Description	**Version**
D000105502/A-AccessPoint RFID Test Firmware 02-47679 verification	A

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Screwcapper (EUT)	Abbott Laboratories	06Q18-51	SCCM000012

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
24V Track Power Supply	Abbott Laboratories	06U35-01	C06A002056
Track Filter Unit 3 (3 Phase)	Abbott Laboratories	06U35-04	None
PCB Track Supply	Abbott Laboratories	20008483	None

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2022-07-26	Powerline Conducted Emission	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	2022-07-26	Field Strength of Fundamental	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	2022-07-26	Field Strength of Spurious Emissions (Less Than 30 MHz)	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
4	2022-08-02	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	2022-08-02	Frequency Stability	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
6	2022-09-16	Field Strength of Spurious Emissions (Greater Than 30 MHz)	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

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.

In the event that the operating frequency of 13.56 MHz is causing the product to fail the FCC 15.207 limits, the following guidance can be used:

FCC KDB 174176 D01 AC Conducted FAQ v01r01, June 3, 2015 Section Q5:

> For a device with a permanent or detachable antenna operating at or below 30 MHz, the FCC will accept measurements performed with a suitable dummy load in lieu of the antenna under the following conditions:
>
> (1) perform the AC powerline conducted tests with the antenna connected to determine compliance with Section 15.207 limits outside the transmitter's fundamental emission band;
>
> (2) retest with a dummy load in lieu of the antenna to determine compliance with Section 15.207 limits within the transmitter's fundamental emission band. For a detachable antenna, remove the antenna and connect a suitable dummy load to the antenna connector. For a permanent antenna, remove the antenna and terminate the RF output with a dummy load or network which simulates the antenna in the fundamental frequency band.
>
> All measurements must be performed as specified in clause 6.2 of ANSI C63.10-2013.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
LISN	Solar Electronics	9252-50-R-24-BNC	LJK	2021-08-06	2022-08-06
Power Source/Analyzer	Hewlett Packard	6841A	THC	NCR	NCR
Receiver	Rohde & Schwarz	ESCI	ARF	2021-09-16	2022-09-16
Cable - Conducted Cable Assembly	Northwest EMC	TXA, HFC, TQU	TXAA	2022-01-24	2023-01-24

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	3.1 dB	-3.1 dB

CONFIGURATIONS INVESTIGATED

ABBO0116-3

MODES INVESTIGATED

Transmitting 13.56 MHz RFID

POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

EUT:	AAS Screwcapper	Work Order:	ABBO0116
Serial Number:	SCCM000012	Date:	2022-07-26
Customer:	Abbott Laboratories	Temperature:	21.5°C
Attendees:	Frank Sun	Relative Humidity:	49.8%
Customer Project:	None	Bar. Pressure (PMSL):	1015 mb
Tested By:	Jarrod Brenden	Job Site:	TX01
Power:	220VAC/60Hz	Configuration:	ABBO0116-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2022	ANSI C63.10:2013

TEST PARAMETERS

Run #:	3	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

AccessPoint PCB has single antenna. AccessPoint Radio ON

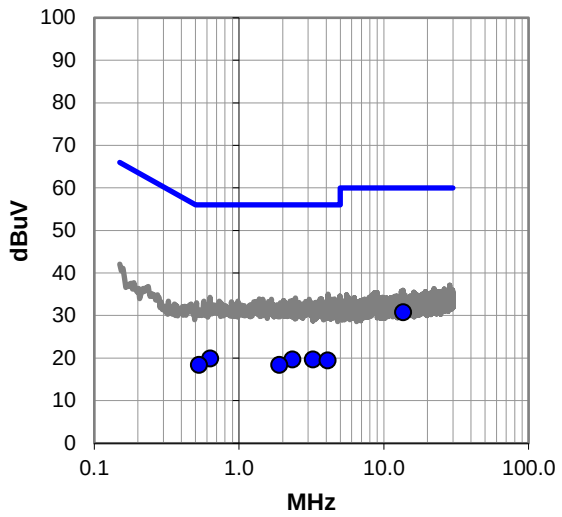
EUT OPERATING MODES

Transmitting 13.56 MHz RFID

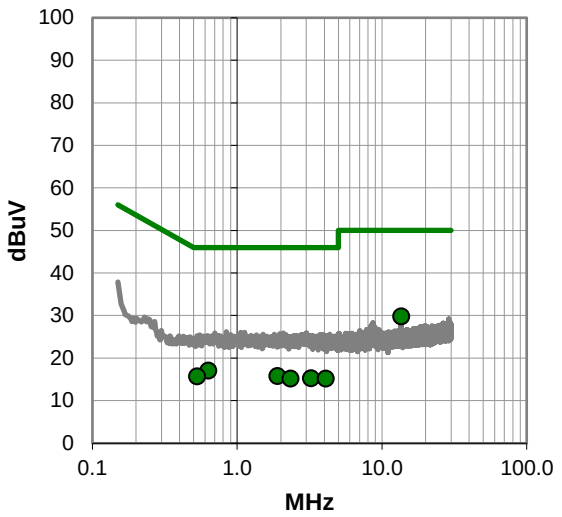
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

RESULTS - Run #3

Quasi Peak Data - vs - Quasi Peak Limit

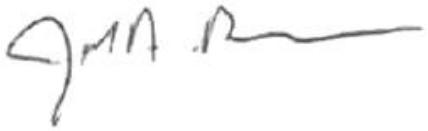
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.559	9.9	20.9	30.8	60.0	-29.2
0.632	-0.3	20.2	19.9	56.0	-36.1
2.334	-0.5	20.2	19.7	56.0	-36.3
3.241	-0.5	20.2	19.7	56.0	-36.3
4.092	-0.7	20.2	19.5	56.0	-36.5
1.896	-1.8	20.2	18.4	56.0	-37.6
0.530	-1.8	20.2	18.4	56.0	-37.6

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.559	8.9	20.9	29.8	50.0	-20.2
0.632	-3.1	20.2	17.1	46.0	-28.9
1.896	-4.4	20.2	15.8	46.0	-30.2
0.530	-4.5	20.2	15.7	46.0	-30.3
3.241	-4.9	20.2	15.3	46.0	-30.7
2.334	-5.0	20.2	15.2	46.0	-30.8
4.092	-5.0	20.2	15.2	46.0	-30.8

CONCLUSION

Pass



Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

EUT:	AAS Screwcapper	Work Order:	ABBO0116
Serial Number:	SCCM000012	Date:	2022-07-26
Customer:	Abbott Laboratories	Temperature:	21.5°C
Attendees:	Frank Sun	Relative Humidity:	49.8%
Customer Project:	None	Bar. Pressure (PMSL):	1015 mb
Tested By:	Jarrod Brenden	Job Site:	TX01
Power:	220VAC/60Hz	Configuration:	ABBO0116-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2022	ANSI C63.10:2013

TEST PARAMETERS

Run #:	4	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

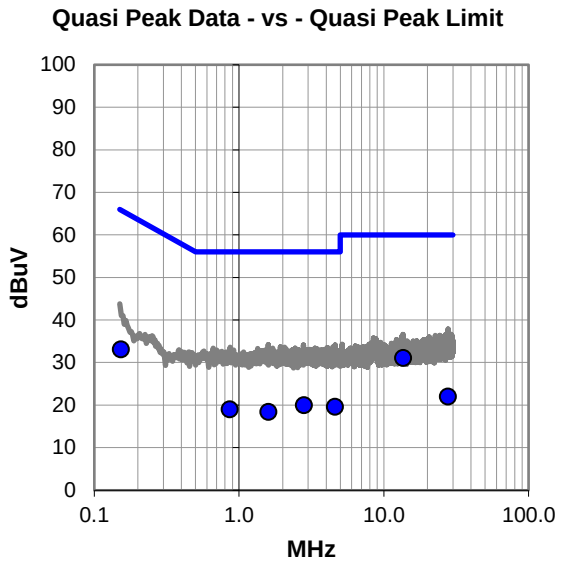
AccessPoint PCB has single antenna. AccessPoint Radio ON

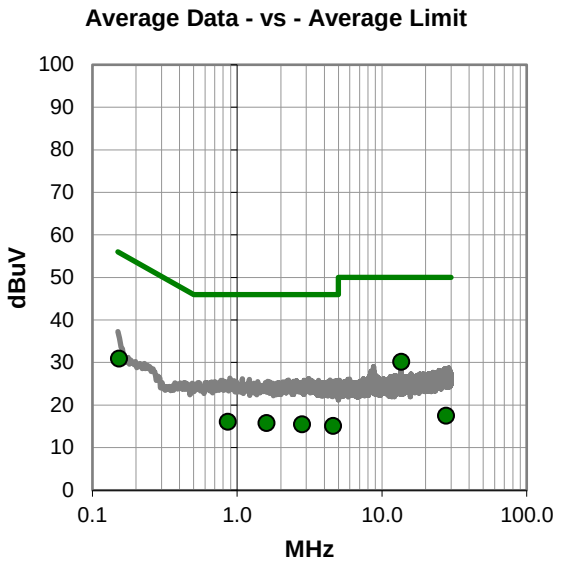
EUT OPERATING MODES

Transmitting 13.56 MHz RFID

DEVIATIONS FROM TEST STANDARD

None





POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

RESULTS - Run #4

Quasi Peak Data - vs - Quasi Peak Limit

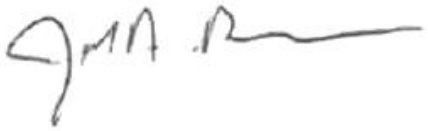
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	10.2	20.9	31.1	60.0	-28.9
0.153	12.5	20.6	33.1	65.8	-32.7
2.808	-0.2	20.2	20.0	56.0	-36.0
4.586	-0.6	20.2	19.6	56.0	-36.4
0.861	-1.1	20.1	19.0	56.0	-37.0
1.595	-1.8	20.2	18.4	56.0	-37.6
27.729	-0.4	22.4	22.0	60.0	-38.0

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	9.3	20.9	30.2	50.0	-19.8
0.153	10.3	20.6	30.9	55.8	-24.9
0.861	-4.0	20.1	16.1	46.0	-29.9
1.595	-4.4	20.2	15.8	46.0	-30.2
2.808	-4.7	20.2	15.5	46.0	-30.5
4.586	-5.1	20.2	15.1	46.0	-30.9
27.729	-4.9	22.4	17.5	50.0	-32.5

CONCLUSION

Pass



Tested By

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

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 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

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	2022-03-22	2023-03-22
Cable	Northwest EMC	RE 9kHz - 1GHz	TXB	2022-06-10	2023-06-10
Antenna - Loop	ETS Lindgren	6502	AZM	2022-07-19	2024-07-19

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	1.8 dB	-1.8 dB

FREQUENCY RANGE INVESTIGATED

12.06 MHz TO 15.06 MHz

POWER INVESTIGATED

220VAC/60Hz

CONFIGURATIONS INVESTIGATED

ABBO0116-3

MODES INVESTIGATED

Transmitting 13.56 MHz RFID

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

EUT:	AAS Screwcapper	Work Order:	ABBO0116
Serial Number:	SCCM000012	Date:	2022-07-26
Customer:	Abbott Laboratories	Temperature:	21°C
Attendees:	Frank sun	Relative Humidity:	53.5%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mb
Tested By:	Jarrod Brenden	Job Site:	TX02
Power:	220VAC/60Hz	Configuration:	ABBO0116-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2022	ANSI C63.10:2013

TEST PARAMETERS

Run #:	2	Test Distance (m):	10	Ant. Height(s) (m):	1(m)

COMMENTS

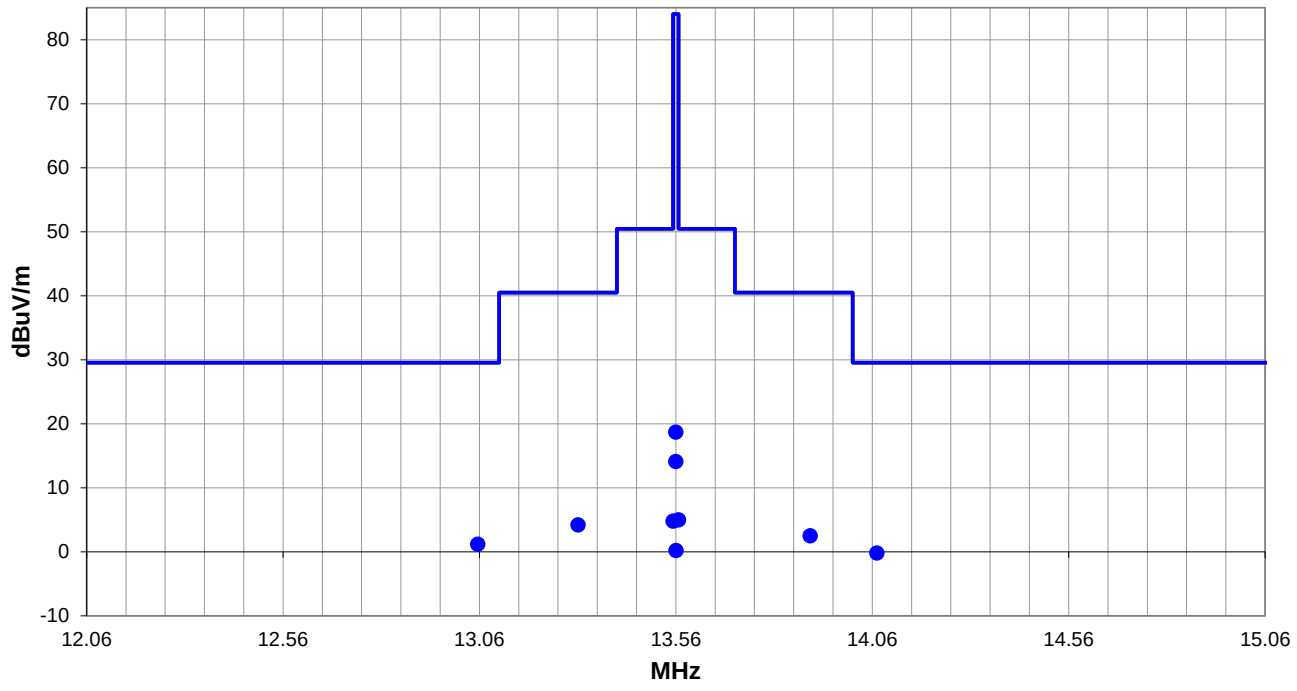
AccessPoint Radio ON.

EUT OPERATING MODES

Transmitting 13.56 MHz RFID

DEVIATIONS FROM TEST STANDARD

None



Run #: 2 ■ PK ◆ AV ● QP

FIELD STRENGTH OF FUNDAMENTAL

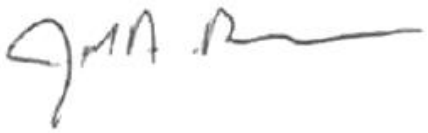
element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

RESULTS - Run #2

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)
13.055	8.9	11.4	1.0	148.9	10.0	0.0	Perp to EUT	QP	-19.1	1.2	29.5	-28.3
14.072	7.5	11.4	1.0	244.9	10.0	0.0	Perp to EUT	QP	-19.1	-0.2	29.5	-29.7
13.311	11.9	11.4	1.0	226.9	10.0	0.0	Perp to EUT	QP	-19.1	4.2	40.5	-36.3
13.902	10.2	11.4	1.0	43.0	10.0	0.0	Perp to EUT	QP	-19.1	2.5	40.5	-38.0
13.567	12.7	11.4	1.0	255.9	10.0	0.0	Perp to EUT	QP	-19.1	5.0	50.5	-45.5
13.553	12.5	11.4	1.0	169.0	10.0	0.0	Perp to EUT	QP	-19.1	4.8	50.5	-45.7
13.560	26.4	11.4	1.0	63.9	10.0	0.0	Perp to EUT	QP	-19.1	18.7	84.0	-65.3
13.560	21.8	11.4	1.0	285.9	10.0	0.0	Para to GND	QP	-19.1	14.1	84.0	-69.9
13.560	7.9	11.4	1.0	9.0	10.0	0.0	Para to EUT	QP	-19.1	0.2	84.0	-83.8

CONCLUSION

Pass



Tested By

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHz)

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

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 and adjusting the measurement antenna 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

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	2022-03-22	2023-03-22
Antenna - Loop	ETS Lindgren	6502	AZM	2022-07-19	2024-07-19
Cable	Northwest EMC	RE 9kHz - 1GHz	TXB	2022-06-10	2023-06-10

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	1.8 dB	-1.8 dB

FREQUENCY RANGE INVESTIGATED

9 kHz TO 30 MHz

POWER INVESTIGATED

220VAC/60Hz

CONFIGURATIONS INVESTIGATED

ABBO0116-3

MODES INVESTIGATED

Transmitting 13.56 MHz RFID

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHz)

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

EUT:	AAS Screwcapper	Work Order:	ABBO0116
Serial Number:	SCCM000012	Date:	2022-07-26
Customer:	Abbott Laboratories	Temperature:	21°C
Attendees:	Frank sun	Relative Humidity:	53.5%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mb
Tested By:	Jarrod Brenden	Job Site:	TX02
Power:	220VAC/60Hz	Configuration:	ABBO0116-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2022	ANSI C63.10:2013

TEST PARAMETERS

Run #:	3	Test Distance (m):	10	Ant. Height(s) (m):	1(m)

COMMENTS

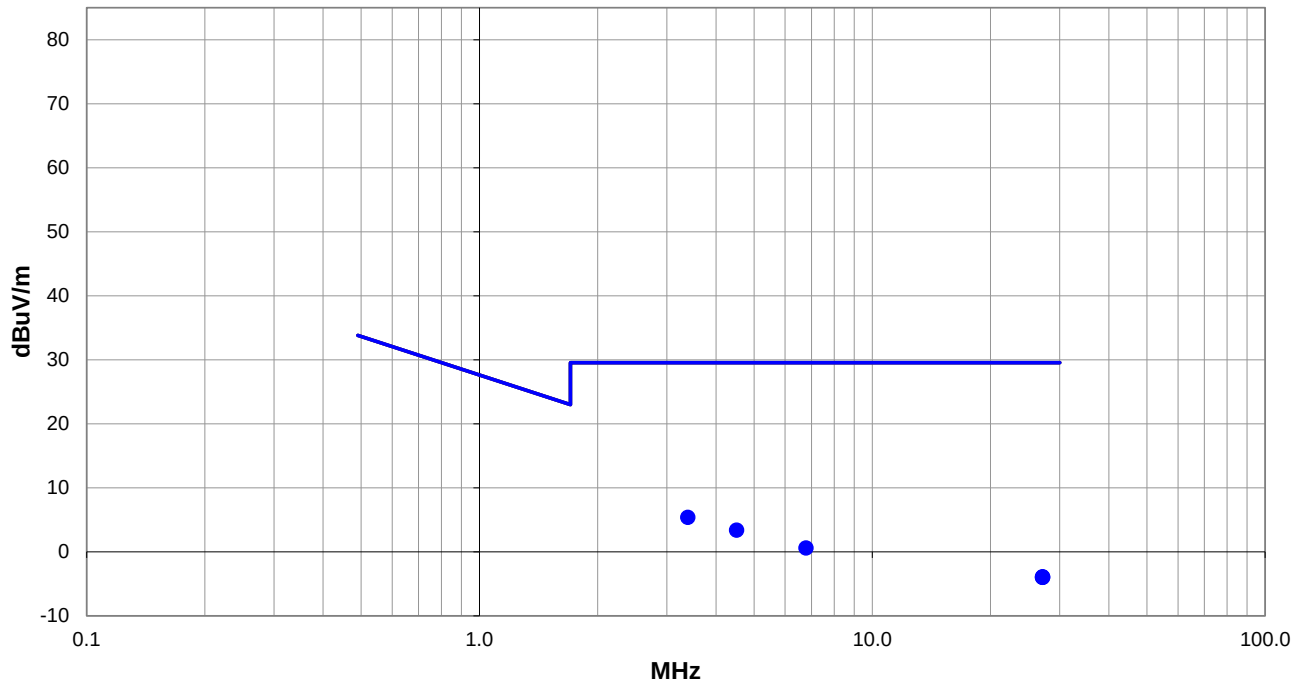
AccessPoint Radio ON.

EUT OPERATING MODES

Transmitting 13.56 MHz RFID

DEVIATIONS FROM TEST STANDARD

None



Run #: 3 ■ PK ◆ AV ● QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHz)

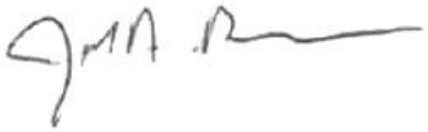
element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

RESULTS - Run #3

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)
3.389	13.1	11.4	1.0	115.0	10.0	0.0	Perp to EUT	QP	-19.1	5.4	29.5	-24.1
4.515	11.0	11.5	1.0	10.9	10.0	0.0	Perp to EUT	QP	-19.1	3.4	29.5	-26.1
6.781	8.3	11.4	1.0	237.0	10.0	0.0	Perp to EUT	QP	-19.1	0.6	29.5	-28.9
27.118	5.4	9.8	1.0	206.0	10.0	0.0	Perp to EUT	QP	-19.1	-3.9	29.5	-33.4
27.121	5.3	9.8	1.0	288.0	10.0	0.0	Para to GND	QP	-19.1	-4.0	29.5	-33.5
27.122	5.3	9.8	1.0	277.0	10.0	0.0	Para to EUT	QP	-19.1	-4.0	29.5	-33.5

CONCLUSION

Pass



Tested By

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

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

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Rohde & Schwarz	ESR26	ARQ	2022-05-02	2023-05-02
Antenna - Biconilog	ETS Lindgren	3143B	AYF	2022-09-02	2024-09-02
Filter - Low Pass	Micro-Tronics	LPM50004	HHV	2022-07-22	2023-07-22
Amplifier - Pre-Amplifier	Fairview Microwave	FMAM63001	PAS	2022-04-19	2023-04-19
Cable	Northwest EMC	RE 9kHz - 1GHz	TXB	2022-06-10	2023-06-10

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	4.6 dB	-4.6 dB

FREQUENCY RANGE INVESTIGATED

30 MHz TO 1000 MHz

POWER INVESTIGATED

220VAC/60Hz

CONFIGURATIONS INVESTIGATED

ABBO0116-3

MODES INVESTIGATED

Transmitting 13.56 MHz RFID

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

EUT:	AAS Screwcapper	Work Order:	ABBO0116
Serial Number:	SCCM000012	Date:	2022-09-16
Customer:	Abbott Laboratories	Temperature:	21.4°C
Attendees:	Frank Sun	Relative Humidity:	56.3%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mb
Tested By:	Jarrod Brenden	Job Site:	TX02
Power:	220VAC/60Hz	Configuration:	ABBO0116-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2022	ANSI C63.10:2013

TEST PARAMETERS

Run #:	12	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

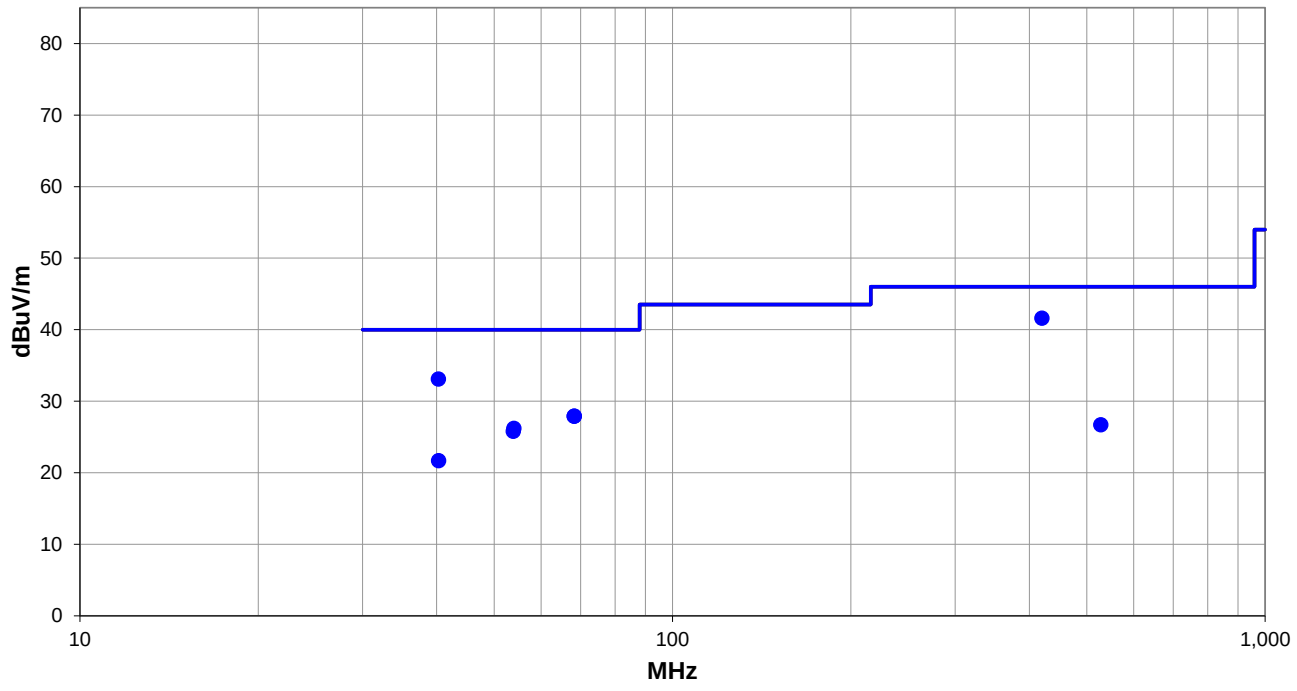
AccessPoint Radio ON.

EUT OPERATING MODES

Transmitting 13.56 MHz RFID

DEVIATIONS FROM TEST STANDARD

None



Run #: 12 ■ PK ◆ AV ● QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)

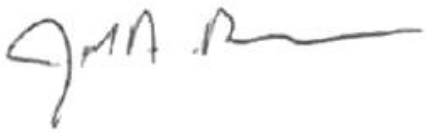
element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

RESULTS - Run #12

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)
420.031	54.6	-13.0	1.07	224.0	3.0	0.0	Horz	QP	0.0	41.6	46.0	-4.4
40.272	55.4	-22.3	1.0	140.0	3.0	0.0	Vert	QP	0.0	33.1	40.0	-6.9
68.271	53.8	-25.9	4.0	129.0	3.0	0.0	Horz	QP	0.0	27.9	40.0	-12.1
68.263	53.8	-25.9	1.0	182.0	3.0	0.0	Vert	QP	0.0	27.9	40.0	-12.1
53.966	52.9	-26.7	1.0	26.0	3.0	0.0	Vert	QP	0.0	26.2	40.0	-13.8
53.858	52.5	-26.7	1.0	26.0	3.0	0.0	Vert	QP	0.0	25.8	40.0	-14.2
40.285	44.0	-22.3	3.36	208.9	3.0	0.0	Horz	QP	0.0	21.7	40.0	-18.3
528.051	36.1	-9.4	1.0	135.0	3.0	0.0	Horz	QP	0.0	26.7	46.0	-19.3

CONCLUSION

Pass



Tested By

FREQUENCY STABILITY

XMit 2022.02.07.0

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
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2022-01-19	2023-01-19
Block - DC	Fairview Microwave	SD3239	ANE	2022-03-02	2023-03-02
Attenuator	Fairview Microwave	SA4018-20	TYW	2022-03-01	2023-03-01
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	2021-12-10	2022-12-10
Probe - Near Field Set	ETS Lindgren	7405	IPS	NCR	NCR
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPH-8-2-SCT/AC	TBH	NCR	NCR
Power Source/Analyzer	Hewlett Packard	6841A	THC	NCR	NCR
Thermometer	Omega Engineering, Inc.	HH311	DUI	2021-02-02	2024-02-02

TEST DESCRIPTION

A near-field probe was placed near the transmitter. A low-loss coaxial cable was used to connect the near-field probe to the spectrum analyzer.

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 ±0.01% is equivalent to 100 ppm
The formula to check for compliance is:

ppm = (Measured Frequency / Measured Nominal Frequency - 1) * 1,000,000

FREQUENCY STABILITY

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	**AAS Screwcapper**			**Work Order:**	**ABBO0116**
Serial Number:	**SCCM000012**			**Date:**	**2-Aug-22**
Customer:	**Abbott Laboratories**			**Temperature:**	**21 °C**
Attendees:	**Frank Sun**			**Humidity:**	**54.3% RH**
Project:	**None**			**Barometric Pres.:**	**1019 mbar**
Tested by:	**Jarrod Brenden**	**Power:**	**220VAC/60Hz**	**Job Site:**	**TX01**

TEST SPECIFICATIONS	**Test Method**
FCC 15.225:2022	ANSI C63.10:2013

COMMENTS

AccessPoint Radio ON.

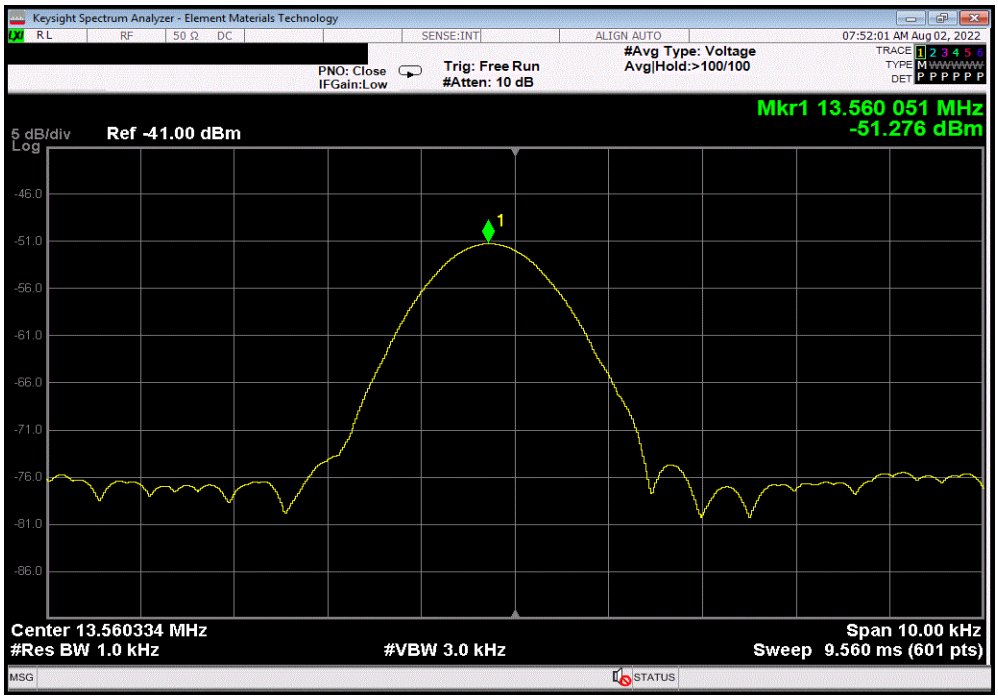
DEVIATIONS FROM TEST STANDARD

None

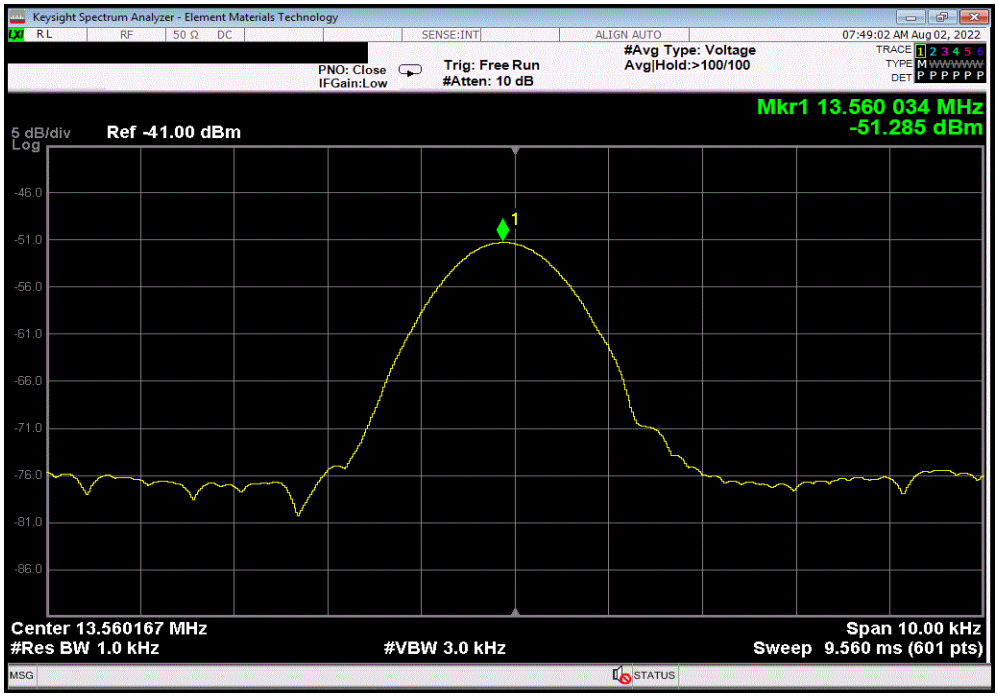
Configuration #	**4**	*Signature*

	Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
Transmitting RFID, 13.56 MHz					
AccessPoint					
Nominal Temperature, 20°C					
Voltage 115%, 253 V	13.56005	13.56003	1.47	100	Pass
Voltage Nominal, 220 V	13.56003	13.56003	0.00	100	Pass
Voltage 85%, 187 V	13.56005	13.56003	1.47	100	Pass
Nominal AC Voltage, 220 V					
Temperature, 50°C	13.55993	13.56003	7.37	100	Pass
Temperature, 40°C	13.55995	13.56003	5.90	100	Pass
Temperature, 30°C	13.55998	13.56003	3.69	100	Pass
Temperature, 20°C	13.56003	13.56003	0.00	100	Pass
Temperature, 10°C	13.56008	13.56003	3.69	100	Pass
Temperature, 0°C	13.56012	13.56003	6.64	100	Pass
Temperature, -10°C	13.56013	13.56003	7.37	100	Pass
Temperature, -20°C	13.56007	13.56003	2.95	100	Pass

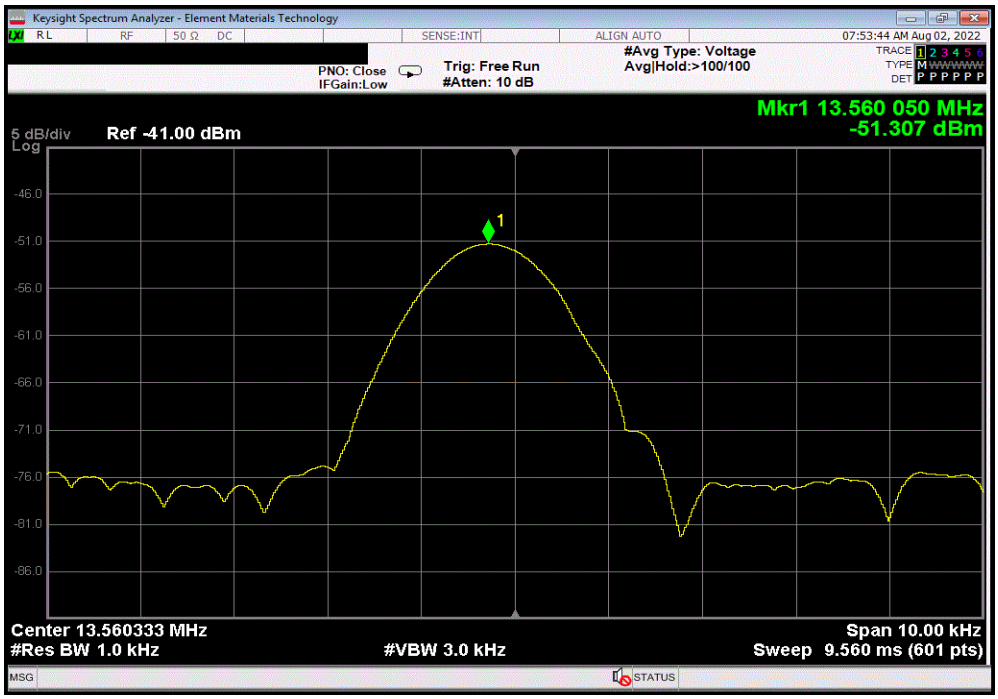
Transmitting RFID, 13.56 MHz, AccessPoint, Nominal Temperature, 20°C, Voltage 115%, 253 V						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.56005	13.56003	1.47	100	Pass



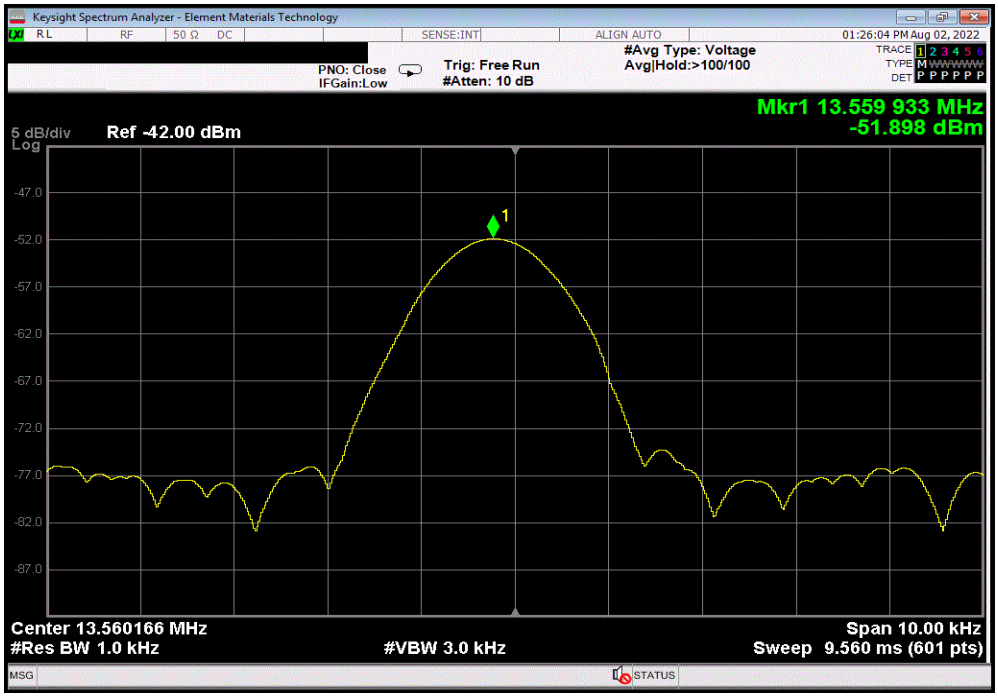
Transmitting RFID, 13.56 MHz, AccessPoint, Nominal Temperature, 20°C, Voltage Nominal, 220 V						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.56003	13.56003	0.00	100	Pass



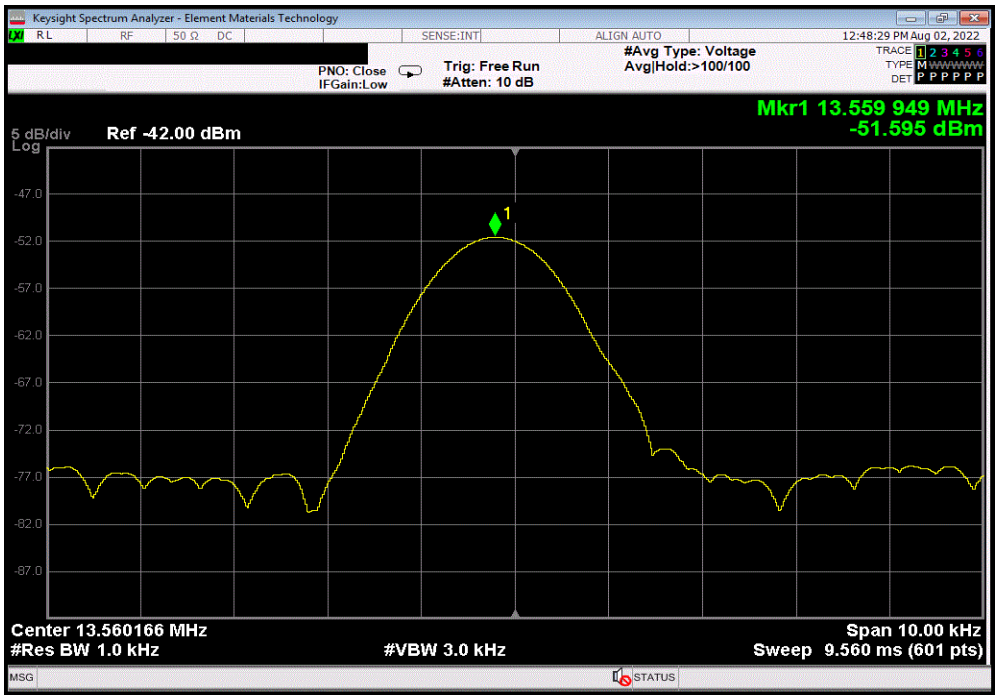
Transmitting RFID, 13.56 MHz, AccessPoint, Nominal Temperature, 20°C, Voltage 85%, 187 V						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.56005	13.56003	1.47	100	Pass



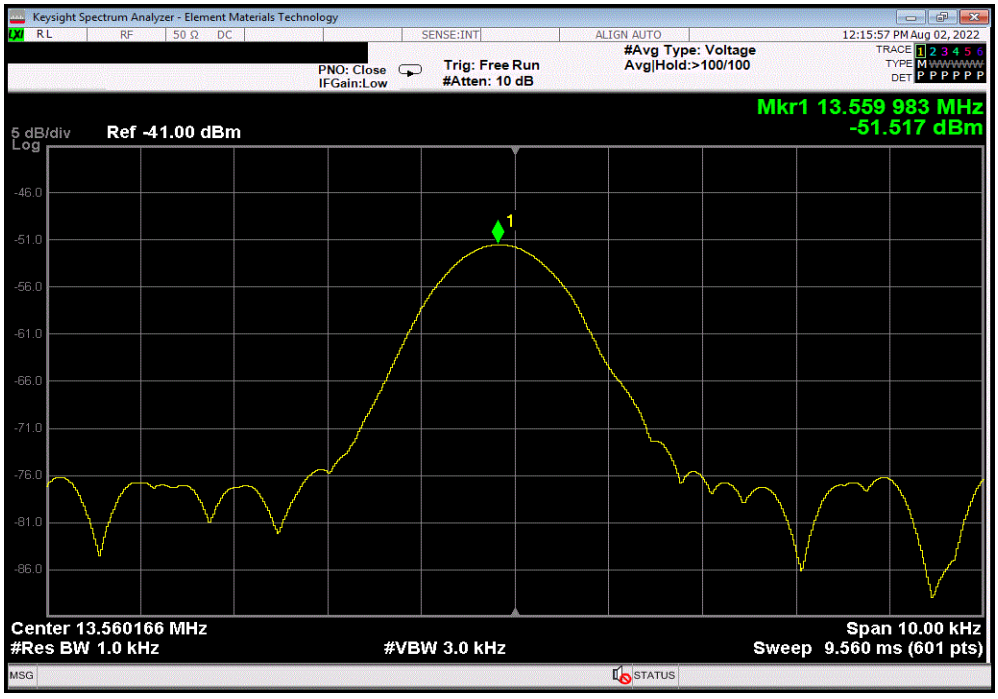
Transmitting RFID, 13.56 MHz, AccessPoint, Nominal AC Voltage, 220 V, Temperature, 50°C						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.55993	13.56003	7.37	100	Pass



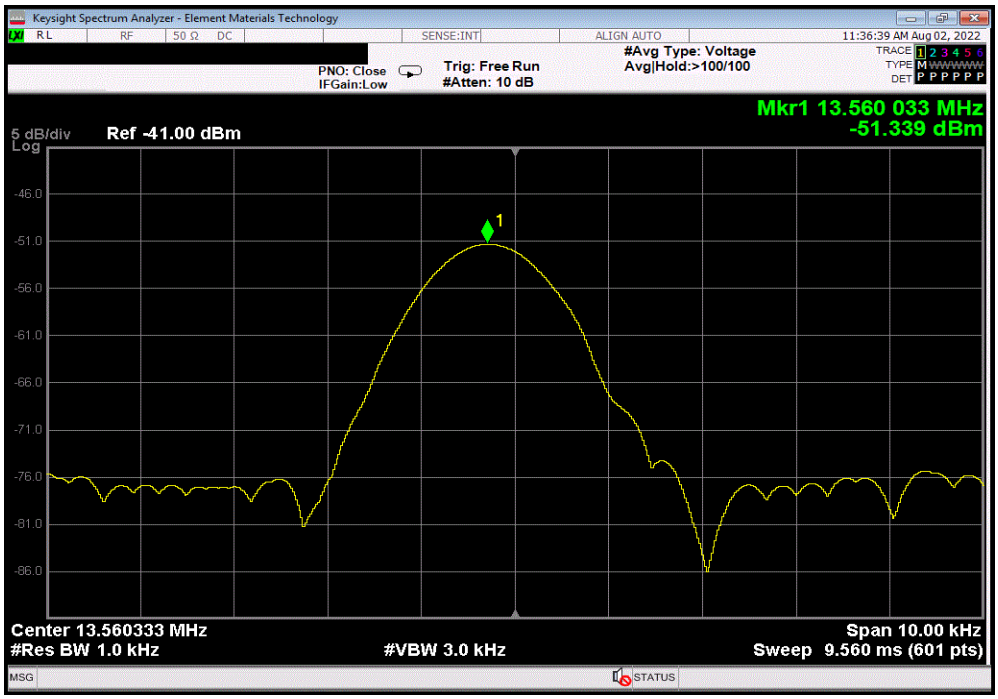
Transmitting RFID, 13.56 MHz, AccessPoint, Nominal AC Voltage, 220 V, Temperature, 40°C						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.55995	13.56003	5.90	100	Pass



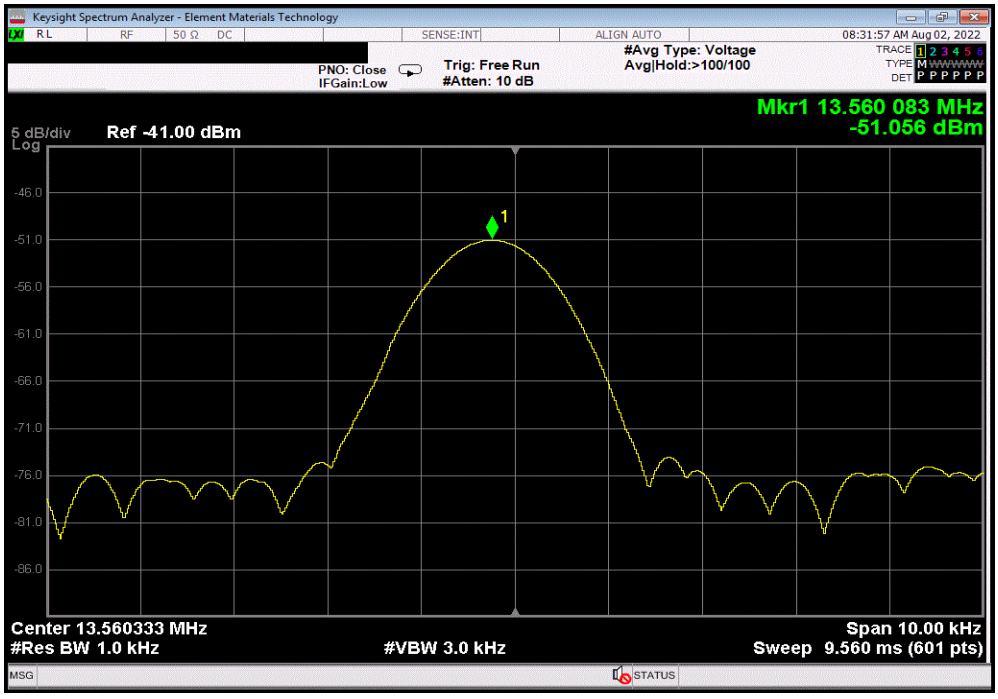
Transmitting RFID, 13.56 MHz, AccessPoint, Nominal AC Voltage, 220 V, Temperature, 30°C						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.55998	13.56003	3.69	100	Pass



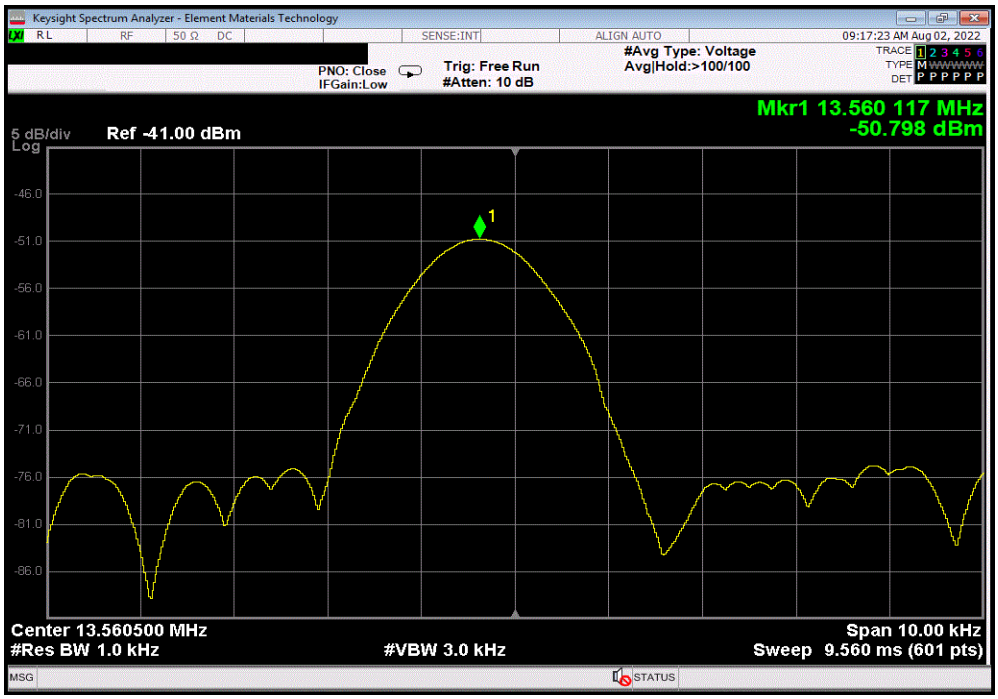
Transmitting RFID, 13.56 MHz, AccessPoint, Nominal AC Voltage, 220 V, Temperature, 20°C						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.56003	13.56003	0.00	100	Pass



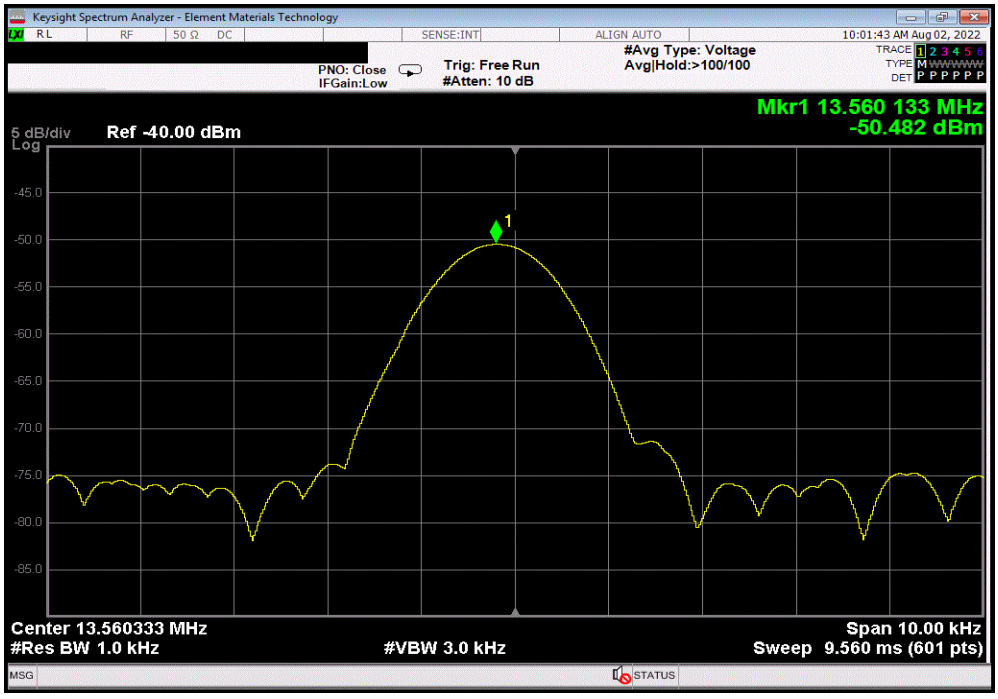
Transmitting RFID, 13.56 MHz, AccessPoint, Nominal AC Voltage, 220 V, Temperature, 10°C						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.56008	13.56003	3.69	100	Pass



Transmitting RFID, 13.56 MHz, AccessPoint, Nominal AC Voltage, 220 V, Temperature, 0°C						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.56012	13.56003	6.64	100	Pass

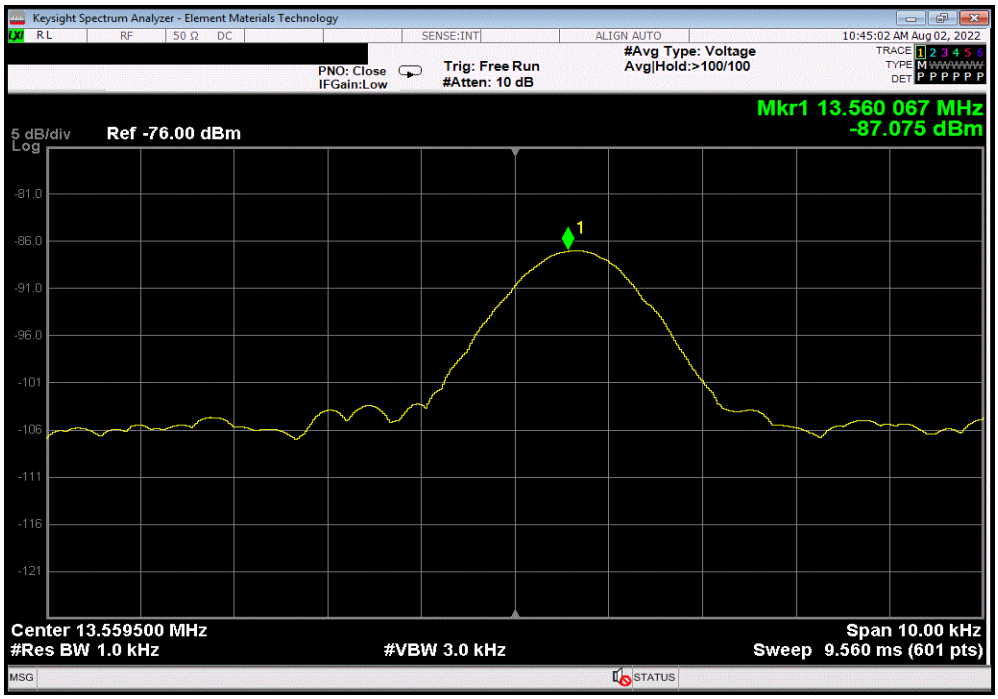


Transmitting RFID, 13.56 MHz, AccessPoint, Nominal AC Voltage, 220 V, Temperature, -10°C						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.56013	13.56003	7.37	100	Pass



FREQUENCY STABILITY

Transmitting RFID, 13.56 MHz, AccessPoint, Nominal AC Voltage, 220 V, Temperature, -20°C						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.56007	13.56003	2.95	100	Pass



OCCUPIED BANDWIDTH

XMit 2022.02.07.0

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
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2022-01-19	2023-01-19
Block - DC	Fairview Microwave	SD3239	ANE	2022-03-02	2023-03-02
Attenuator	Fairview Microwave	SA4018-20	TYW	2022-03-01	2023-03-01
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	2021-12-10	2022-12-10
Probe - Near Field Set	ETS Lindgren	7405	IPS	NCR	NCR

TEST DESCRIPTION

A near-field probe was placed near the transmitter. A low-loss coaxial cable was used to connect the near-field probe to the spectrum analyzer.

The 99% occupied bandwidth was measured utilizing the analyzer's peak detector and measuring the carrier's 20 dB occupied bandwidth.

The antenna is integral to the EUT, so a radiated measurement was made in a radiated configuration in a semi-anechoic chamber. The resolution bandwidth was >1% of the 20dB bandwidth and the video bandwidth was greater than the resolution bandwidth.

OCCUPIED BANDWIDTH

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	**Screwcapper**			**Work Order:**	**ABBO0116**
Serial Number:	**SCCM000012**			**Date:**	**2-Aug-22**
Customer:	**Abbott Laboratories**			**Temperature:**	**21 °C**
Attendees:	**Frank Sun**			**Humidity:**	**54.4% RH**
Project:	**None**			**Barometric Pres.:**	**1019 mbar**
Tested by:	**Jarrod Brenden**	**Power:**	**220VAC/60Hz**	**Job Site:**	**TX01**

TEST SPECIFICATIONS	**Test Method**
FCC 15.225:2022	ANSI C63.10:2013

COMMENTS

AccessPoint Radio ON. Emissions Bandwidth (20 dB) taken with 99% Bandwidth. This is worst case as compared with 20 dB bandwidth called out in FCC 15.215.

DEVIATIONS FROM TEST STANDARD

None

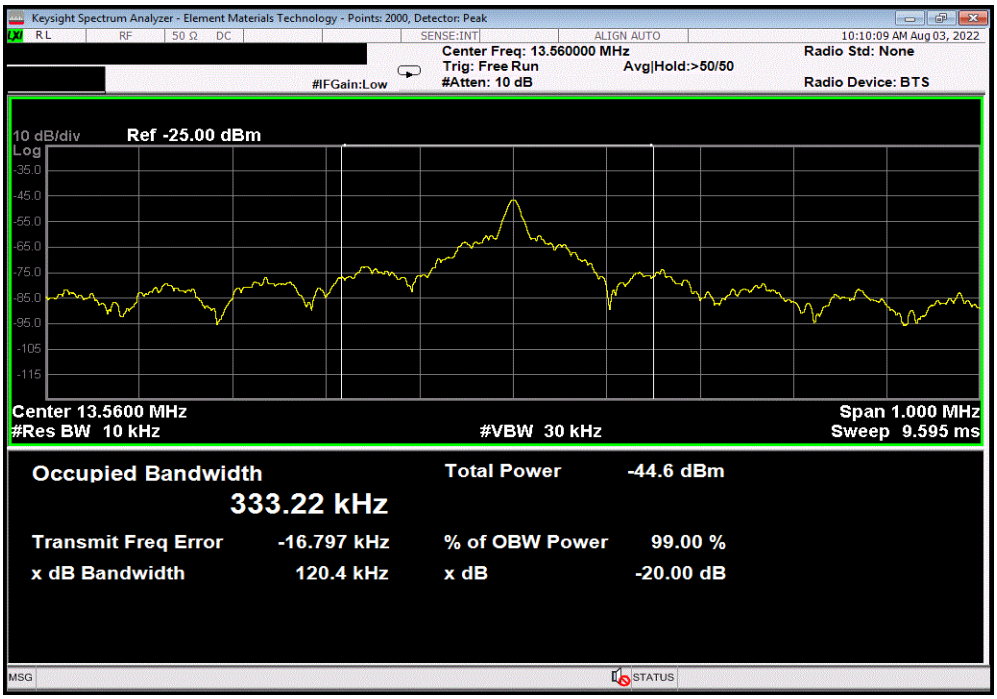
Configuration #	**4**	*Signature*

	Value (kHz)	**Limit 13.110 MHz ≤ BW ≤ 14.010 MHz**	**Result**
Nominal AC Voltage, 220V			
Mid Channel, RFID, 13.56 MHz	333.22	Within	Pass

OCCUPIED BANDWIDTH

TbtTx 2022.06.03.0 XMit 2022.02.07.0

Nominal AC Voltage, 220V, Mid Channel, RFID, 13.56 MHz							
					Value (kHz)	Limit 13.110 MHz ≤ BW ≤ 14.010 MHz	Result
					333.22	Within	Pass



End of Test Report