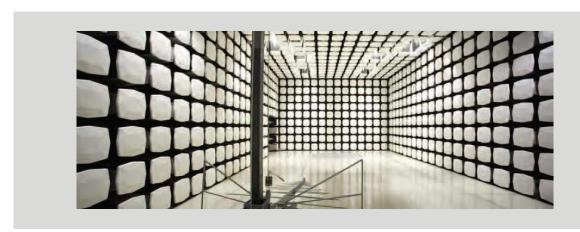


Abbott Laboratories

GLP12154 Switch 90 Convergent

FCC 15.225:2021 13.56 MHz Radio

Report: ABBO0090 Rev. 2, Issue Date: October 3, 2022





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CERTIFICATE OF TEST



Last Date of Test: September 9, 2021
Abbott Laboratories
EUT: GLP12154 Switch 90 Convergent

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2021	- ANSI C63.10:2013
FCC 15.225:2021	ANSI 003.10.2013

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	
6.5 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



Revision Number	Description	Date (yyyy-mm-dd)	Page Number
01	Changed Powerline CE spec from Class A to FCC 15.209	2021-09-02	15, 17, 19 and 21
	Updated power settings and antenna information	2022-08-30	11
00	Updated equipment out of cal	2022-08-30	24, 26, 28
	Updated data for convergent	2022-08-30	27
	Added a statement about the mode of operation for the radio during testing.	2022-08-30	31
02	Updated the block diagram	2022-08-30	7
	Added a description of the dummy load on the antenna in the powerline CE testing.	2022-08-30	15-19
	Updated spectrum analyzer for Spurious Above 30 MHz.	2022-10-03	28

ACCREDITATIONS AND AUTHORIZATIONS



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:

<u>California</u> <u>Minnesota</u> <u>Oregon</u> <u>Texas</u> <u>Washington</u>

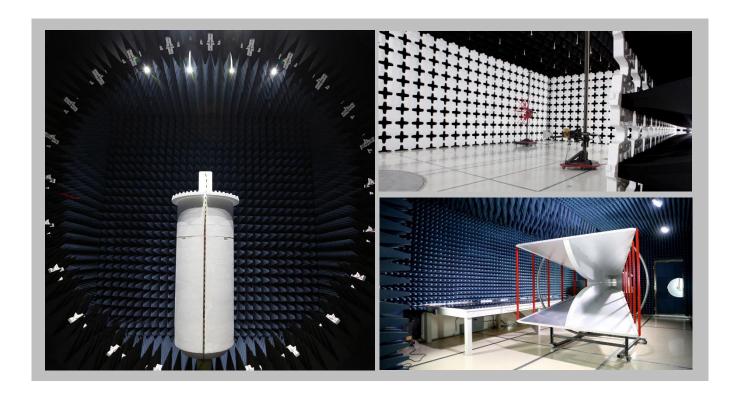
FACILITIES







California Labs OC01-17 41 Tesla	Minnesota Labs MN01-11 9349 W Broadway Ave.	Oregon Labs EV01-12 6775 NE Evergreen Pkwy #400	Texas Labs TX01-09 3801 E Plano Pkwy	Washington Labs NC01-05 19201 120 th Ave NE
Irvine, CA 92618 (949) 861-8918	Brooklyn Park, MN 55445 (612)-638-5136	Hillsboro, OR 97124 (503) 844-4066	Plano, TX 75074 (469) 304-5255	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, Sci	ence and Economic Develop	ment 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



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

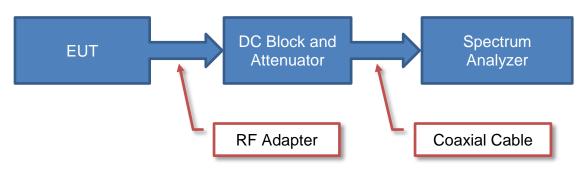


Measurement Bandwidths

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

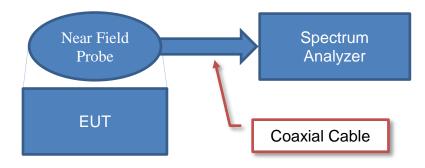


Sample Calculation (logarithmic units)

Measured Value Measured Level Coffset

71.2 = 42.6 + 28.6

Near Field Test Fixture Measurements



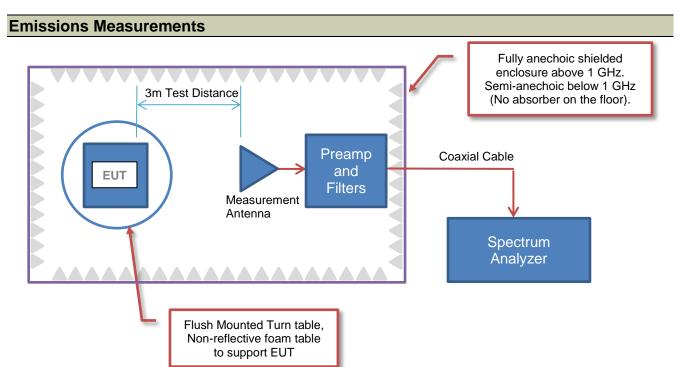
Sample Calculation (logarithmic units)

Measured Value Measured Level Coffset

71.2 = 42.6 + 28.6

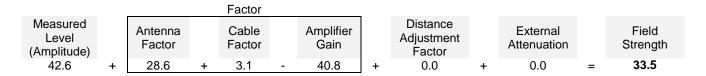
TEST SETUP BLOCK DIAGRAMS



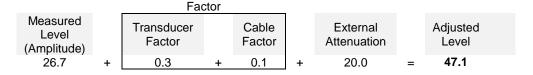


Sample Calculation (logarithmic units)

Radiated Emissions:



Conducted Emissions:



Radiated Power (ERP/EIRP) - Substitution Method:

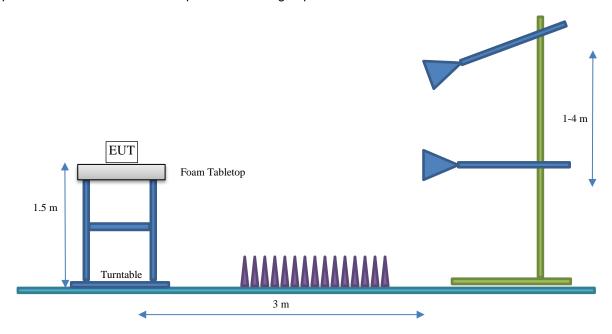


TEST SETUP BLOCK DIAGRAMS



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:	GLP12154 Switch 90 Convergent
First Date of Test:	June 10, 2021
Last Date of Test:	September 9, 2021
Receipt Date of Samples:	June 10, 2021
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

Switch 90 Convergent is used to merge a CAR from a GLP module back onto the track and contains one RFID reader.

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

Туре	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 ABBO0090 - 2

Software/Firmware Running during test			
Description	Version		
Firmware	TrackEmvTest_scc_Version_0.0_46817.bin		

EUT				
Description	Manufacturer	Model/Part Number	Serial Number	
Switch 90 Convergent Track Radio	GLP Systems	GLP12154	ENG01-CN	

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
CrossSwitch Radio	GLP Systems	20005732	ENG05-CS
AccessPoint Radio	GLP Systems	20008971/20008841	ENG02-AP
PassPoint Track Radio	GLP Systems	GLP12191	ENG02-PP
ChargeLane M Track Radio	GLP Systems	GLP12553	ENG02-CL M
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	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 ABBO0090 - 4

Software/Firmware Running during test				
Description	Version			
Firmware	TrackEmvTest_scc_Version_0.0_46817.bin			

EUT					
Description	Manufacturer	Model/Part Number	Serial Number		
Switch 90 Convergent Track Radio	GLP Systems	GLP12154	ENG01-CN		

Peripherals in test setup boundary						
Description	Manufacturer	Model/Part Number	Serial Number			
Switch 90 Divergent Track Radio	GLP Systems	GLP12153	ENG01-DV			
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	Switch 90 Convergent		
Ribbon Cable	No	0.1m	No	Switch 90 Convergent	Switch 90 Divergent		

MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2021-07-24	Frequency Stability	Tested as delivered to test station	None	EUT remained at Element following the test.
2	2021-07-29	Occupied Bandwidth	Tested as delivered to test station	None	EUT remained at Element following the test.
3	2021-08-31	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.
6	2021-09-09	Field Strength of Fundamental	Tested as delivered to test station.	None	EUT remained at Element following the test.
7	2021-09-09	Field Strength of Spurious Emissions (Less Than 30 MHz)	Tested as delivered to test station	None	Scheduled testing was completed.



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

ABBO0090 - 4

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 Assembly	Northwest EMC	TXA, HFC, TQU	TXAA	2021-01-26	2022-01-26
LISN	Solar Electronics	9252-50-R-24-BNC	LJL	2021-08-06	2022-08-06
LISN	Solar Electronics	9252-50-R-24-BNC	LJK	2021-08-06	2022-08-06
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 +/- 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.

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

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

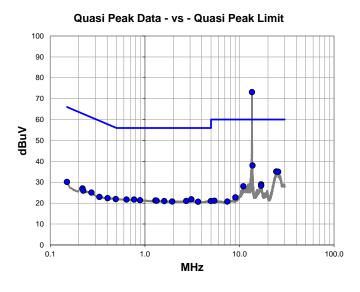
For a device with a permanent or detachable antenna operating at or below 30 MHz, the FCC will accept measurements performed with a suitable dummy load in lieu of the antenna under the following conditions:

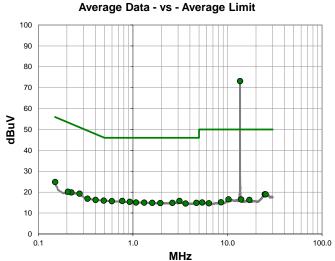
- (1) perform the AC power-line conducted tests with the antenna connected to determine compliance with Section 15.207 limits outside the transmitter's fundamental emission band;
- (2) retest with a dummy load in lieu of the antenna to determine compliance with Section 15.207 limits within the transmitter's 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.



					EmiR5 2021.06.24.0	PSA-ESCI 2021.03.17.0
Work Order:	ABBO0090	Date:	2021-08-31		11.	
Project:	None	Temperature:	21.1 °C		4 6,	/
Job Site:	TX03	Humidity:	57.2% RH			
Serial Number:	ENG01-CN	Barometric Pres.:	1012 mbar	Т	ested by: Mark Baytan	
EUT:	GLP12154 Switch 90	Convergent				_
Configuration:	4					
Customer:	Abbott Laboratories					
Attendees:	Don Mendell					
EUT Power:	220VAC/60Hz					
Operating Mode:	Transmitting 13.56 MH	Hz				
Deviations:	None					
Comments:	None					
Test Specifications			Test Me	thod		
FCC 15.207:2021			ANSI C	3.10:2013		
Run # 5	Line:	High Line	Ext. Attenuation	1: 0	Results	NA





Quasi Peak Data - vs - Quasi Peak Limit							
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)		
13.560	52.1	21.1	73.2	60.0	13.2		
13.719	17.0	21.1	38.1	60.0	-21.9		
24.474	13.0	22.2	35.2	60.0	-24.8		
25.634	12.8	22.3	35.1	60.0	-24.9		
16.931	7.6	21.4	29.0	60.0	-31.0		

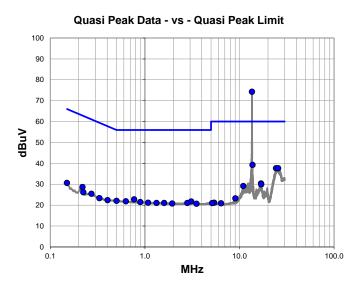
Average Data - vs - Average Limit								
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)			
13.560	52.1	21.1	73.2	50.0	23.2			
0.769	-4.4	20.2	15.8	46.0	-30.2			
3.096	-4.5	20.3	15.8	46.0	-30.2			
0.490	-4.2	20.2	16.0	46.2	-30.2			
0.597	-4.5	20.2	15.7	46.0	-30.3			

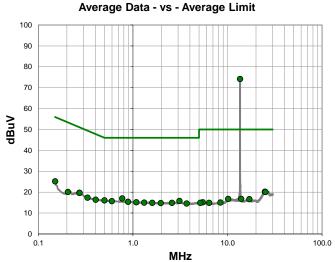
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
16.966	7.0	21.4	28.4	60.0	-31.6
10.986	7.3	20.8	28.1	60.0	-31.9
0.492	1.8	20.2	22.0	56.1	-34.1
3.098	1.6	20.3	21.9	56.0	-34.1
0.640	1.6	20.2	21.8	56.0	-34.2
0.768	1.6	20.2	21.8	56.0	-34.2
0.888	1.1	20.3	21.4	56.0	-34.6
1.290	1.0	20.3	21.3	56.0	-34.7
1.331	0.9	20.3	21.2	56.0	-34.8
2.730	0.8	20.3	21.1	56.0	-34.9
1.601	0.7	20.3	21.0	56.0	-35.0
4.987	0.7	20.3	21.0	56.0	-35.0
1.943	0.5	20.3	20.8	56.0	-35.2
3.655	0.4	20.3	20.7	56.0	-35.3
0.403	2.2	20.2	22.4	57.8	-35.4
0.150	9.8	20.4	30.2	66.0	-35.8
0.219	6.7	20.4	27.1	62.9	-35.8
0.272	4.7	20.4	25.1	61.1	-36.0
0.330	2.8	20.2	23.0	59.5	-36.5
0.223	5.6	20.4	26.0	62.7	-36.7
9.039	2.2	20.6	22.8	60.0	-37.2
5.429	0.8	20.4	21.2	60.0	-38.8
7.434	0.3	20.5	20.8	60.0	-39.2

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.924	-4.9	20.3	15.4	46.0	-30.6
1.076	-5.1	20.2	15.1	46.0	-30.9
1.311	-5.3	20.3	15.0	46.0	-31.0
24.769	-3.2	22.2	19.0	50.0	-31.0
25.245	-3.2	22.2	19.0	50.0	-31.0
0.150	4.5	20.4	24.9	56.0	-31.1
1.596	-5.4	20.3	14.9	46.0	-31.1
2.607	-5.4	20.3	14.9	46.0	-31.1
4.674	-5.4	20.3	14.9	46.0	-31.1
1.944	-5.5	20.3	14.8	46.0	-31.2
3.598	-5.7	20.3	14.6	46.0	-31.4
0.402	-3.9	20.2	16.3	47.8	-31.5
0.272	-1.1	20.4	19.3	51.1	-31.8
0.330	-3.3	20.2	16.9	49.5	-32.6
0.223	-0.5	20.4	19.9	52.7	-32.8
0.205	-0.2	20.4	20.2	53.4	-33.2
10.226	-4.1	20.7	16.6	50.0	-33.4
13.930	-4.6	21.1	16.5	50.0	-33.5
16.970	-5.1	21.4	16.3	50.0	-33.7
8.522	-5.4	20.6	15.2	50.0	-34.8
5.394	-5.3	20.4	15.1	50.0	-34.9
6.352	-5.7	20.4	14.7	50.0	-35.3



107		1000000		2024 22 24	1	EmiR5 2021.06.24.0	PSA-ESCI 2021.03.17.0				
VVC	ork Order:		Date:	2021-08-31		46					
	Project:		Temperature:	21.1 °C		THE CONTRACTOR	1-				
	Job Site:		Humidity:	57.2% RH							
Seria	l Number:		Barometric Pres.:	1012 mbar		Tested by: Mark Baytan					
	EUT:	GLP12154 Switch 90	Convergent				_				
Conf	iguration:	4									
C	Customer:	Abbott Laboratories	bott Laboratories								
A	ttendees:	Don Mendell	n Mendell								
EU	JT Power:	220VAC/60Hz									
Operati	ing Mode:	Transmitting 13.56 MI	Hz								
D	eviations:	None									
C	omments:	None									
Test Speci	ifications			Test N	lethod						
FCC 15.20		!		ANSI (263.10:2013	1					
Run#	6	Line:	Neutral	Ext. Attenuati	on: 0	Results	NA				





Quasi Peak Data - vs - Quasi Peak Limit							
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)		
13.560	53.2	21.1	74.3	60.0	14.3		
13.719	18.2	21.1	39.3	60.0	-20.7		
24.383	15.5	22.2	37.7	60.0	-22.3		
25.611	15.4	22.3	37.7	60.0	-22.3		
16.897	9.0	21.4	30.4	60.0	-29.6		

Average Data - vs - Average Limit							
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)		
13.560	53.1	21.1	74.2	50.0	24.2		
0.769	-3.2	20.2	17.0	46.0	-29.0		
24.828	-2.0	22.2	20.2	50.0	-29.8		
0.498	-4.1	20.2	16.1	46.0	-29.9		
25.159	-2.1	22.2	20.1	50.0	-29.9		

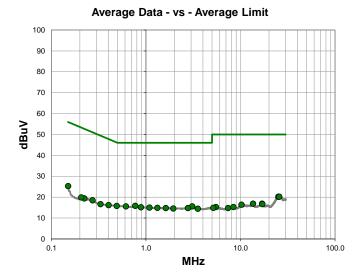
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
16.978	8.6	21.4	30.0	60.0	-30.0
10.977	8.4	20.8	29.2	60.0	-30.8
0.769	2.6	20.2	22.8	56.0	-33.2
0.501	1.9	20.2	22.1	56.0	-33.9
0.629	1.7	20.2	21.9	56.0	-34.1
0.219	8.3	20.4	28.7	62.9	-34.2
3.090	1.5	20.3	21.8	56.0	-34.2
0.895	1.2	20.3	21.5	56.0	-34.5
1.082	1.0	20.2	21.2	56.0	-34.8
1.328	0.8	20.3	21.1	56.0	-34.9
1.596	0.8	20.3	21.1	56.0	-34.9
2.811	0.8	20.3	21.1	56.0	-34.9
1.943	0.5	20.3	20.8	56.0	-35.2
0.150	10.3	20.4	30.7	66.0	-35.3
3.514	0.4	20.3	20.7	56.0	-35.3
0.403	2.2	20.2	22.4	57.8	-35.4
0.272	5.1	20.4	25.5	61.1	-35.6
0.330	3.2	20.2	23.4	59.5	-36.1
0.223	5.8	20.4	26.2	62.7	-36.5
9.038	2.7	20.6	23.3	60.0	-36.7
5.399	0.8	20.4	21.2	60.0	-38.8
5.150	0.7	20.3	21.0	60.0	-39.0
6.377	0.5	20.4	20.9	60.0	-39.1

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.098	-4.5	20.3	15.8	46.0	-30.2
0.597	-4.5	20.2	15.7	46.0	-30.3
0.885	-4.9	20.3	15.4	46.0	-30.6
0.150	4.8	20.4	25.2	56.0	-30.8
1.084	-5.0	20.2	15.2	46.0	-30.8
1.311	-5.3	20.3	15.0	46.0	-31.0
1.596	-5.4	20.3	14.9	46.0	-31.1
2.582	-5.4	20.3	14.9	46.0	-31.1
1.964	-5.5	20.3	14.8	46.0	-31.2
0.403	-3.8	20.2	16.4	47.8	-31.4
3.685	-5.7	20.3	14.6	46.0	-31.4
0.271	-0.7	20.4	19.7	51.1	-31.4
0.272	-0.7	20.4	19.7	51.1	-31.4
0.330	-2.8	20.2	17.4	49.5	-32.1
10.144	-3.9	20.7	16.8	50.0	-33.2
13.931	-4.3	21.1	16.8	50.0	-33.2
0.205	-0.3	20.4	20.1	53.4	-33.3
16.966	-4.7	21.4	16.7	50.0	-33.3
5.466	-5.2	20.4	15.2	50.0	-34.8
8.408	-5.5	20.6	15.1	50.0	-34.9
5.150	-5.4	20.3	14.9	50.0	-35.1
6.377	-5.5	20.4	14.9	50.0	-35.1



								EmiR5 2021.06.24.0	PSA-ESCI 2021.03.17.0		
Work C	Order:	ABBO0090	Date:	2021-	08-31		11				
Pro	oject:	None	Temperature:	21.	5 °C		4	6	1		
Job	Site:	TX03	Humidity:	56.59	6 RH						
Serial Nur	mber:	ENG01-CN	Barometric Pres.:	1009	mbar		Tested by:	Mark Baytan			
	EUT:	GLP12154 Switch 90	Convergent								
Configura	ation:	4									
Custo	omer:	Abbott Laboratories	bott Laboratories								
Atten	dees:	Don Mendell	on Mendell								
EUT P	ower:	220VAC/60Hz									
Operating N	Mode:	ransmitting 13.56 MHz									
Deviat	tions:	None									
Comm		Coil antenna separate	ed from the transmitter	portion of t	ne radio. Te	erminated v	vith load.				
Test Specificat	tions				Test Meth	od					
FCC 15.207:202					ANSI C63.		l .				
Run#	11	Line:	Neutral	Ext. At	tenuation:	0		Results	Pass		

Quasi Peak Data - vs - Quasi Peak Limit 100 80 70 60 40 30 20 10 0 0.1 1.0 MHz



Quasi Peak Data - vs - Quasi Peak Limit							
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)		
25.042	15.0	22.2	37.2	60.0	-22.8		
25.623	14.9	22.3	37.2	60.0	-22.8		
16.890	8.9	21.4	30.3	60.0	-29.7		
16.987	8.0	21.4	29.4	60.0	-30.6		
13.602	6.9	21.1	28.0	60.0	-32.0		

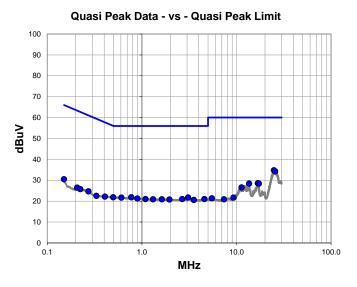
Average Data - vs - Average Limit							
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)		
25.050	-2.0	22.2	20.2	50.0	-29.8		
25.614	-2.1	22.3	20.2	50.0	-29.8		
0.769	-4.3	20.2	15.9	46.0	-30.1		
0.614	-4.6	20.2	15.6	46.0	-30.4		
3.081	-4.7	20.3	15.6	46.0	-30.4		

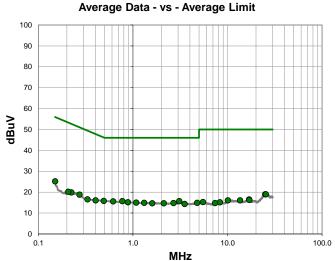
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
11.111	6.2	20.8	27.0	60.0	-33.0
0.492	1.7	20.2	21.9	56.1	-34.2
0.769	1.6	20.2	21.8	56.0	-34.2
0.612	1.5	20.2	21.7	56.0	-34.3
3.083	1.3	20.3	21.6	56.0	-34.4
0.885	1.0	20.3	21.3	56.0	-34.7
1.287	8.0	20.3	21.1	56.0	-34.9
1.413	0.7	20.3	21.0	56.0	-35.0
1.863	0.6	20.3	20.9	56.0	-35.1
2.788	0.6	20.3	20.9	56.0	-35.1
1.949	0.4	20.3	20.7	56.0	-35.3
0.150	10.2	20.4	30.6	66.0	-35.4
0.220	6.9	20.4	27.3	62.8	-35.5
3.524	0.2	20.3	20.5	56.0	-35.5
0.402	2.0	20.2	22.2	57.8	-35.6
0.272	4.0	20.4	24.4	61.1	-36.7
0.330	2.5	20.2	22.7	59.5	-36.8
0.223	5.0	20.4	25.4	62.7	-37.3
9.329	1.1	20.6	21.7	60.0	-38.3
5.530	0.9	20.4	21.3	60.0	-38.7
7.182	0.6	20.5	21.1	60.0	-38.9
5.200	0.7	20.3	21.0	60.0	-39.0

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.490	-4.4	20.2	15.8	46.2	-30.4
0.150	4.9	20.4	25.3	56.0	-30.7
0.884	-5.1	20.3	15.2	46.0	-30.8
1.088	-5.2	20.2	15.0	46.0	-31.0
1.320	-5.4	20.3	14.9	46.0	-31.1
1.619	-5.5	20.3	14.8	46.0	-31.2
2.770	-5.5	20.3	14.8	46.0	-31.2
1.943	-5.7	20.3	14.6	46.0	-31.4
3.533	-5.8	20.3	14.5	46.0	-31.5
0.402	-4.0	20.2	16.2	47.8	-31.6
0.272	-1.9	20.4	18.5	51.1	-32.6
0.330	-3.5	20.2	16.7	49.5	-32.8
13.562	-4.2	21.1	16.9	50.0	-33.1
16.890	-4.5	21.4	16.9	50.0	-33.1
16.963	-4.7	21.4	16.7	50.0	-33.3
0.223	-1.0	20.4	19.4	52.7	-33.3
0.206	-0.5	20.4	19.9	53.3	-33.4
10.226	-4.3	20.7	16.4	50.0	-33.6
5.499	-5.1	20.4	15.3	50.0	-34.7
8.406	-5.3	20.6	15.3	50.0	-34.7
5.141	-5.4	20.3	14.9	50.0	-35.1
7.379	-5.7	20.5	14.8	50.0	-35.2



						EmiR5 2021.06.24.0	PSA-ESCI 2021.03.17.0			
Work Order:	ABBO0090	Date:	2021-08-31		11					
Project:	None	Temperature:	21.5 °C		1/1	()+				
Job Site:	TX03	Humidity:	56.5% RH							
Serial Number:	ENG01-CN	Barometric Pres.:	1009 mbar		Tested by:	Mark Baytan				
EUT:	GLP12154 Switch 90	Convergent					_			
Configuration:	4									
Customer:	Abbott Laboratories	bott Laboratories								
Attendees:	Don Mendell	n Mendell								
EUT Power:	220VAC/60Hz									
Operating Mode:	Transmitting 13.56 MI	ransmitting 13.56 MHz								
Deviations:	None	None								
Comments		ed from the transmitter p	portion of the radio	Terminated v	with load.					
Test Specifications			Test M	ethod						
FCC 15.207:2021	•		ANSI C	63.10:2013	•					
Run # 12	Line:	High Line	Ext. Attenuation	on: 0		Results	Pass			





Quasi Peak Data - Vs - Quasi Peak Limit									
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)				
24.915	12.6	22.2	34.8	60.0	-25.2				
25.622	12.0	22.3	34.3	60.0	-25.7				
16.874	7.2	21.4	28.6	60.0	-31.4				
13.586	7.3	21.1	28.4	60.0	-31.6				
17.212	7.0	21.4	28.4	60.0	-31.6				

Average Data - vs - Average Limit								
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)			
0.771	-4.5	20.2	15.7	46.0	-30.3			
3.081	-4.6	20.3	15.7	46.0	-30.3			
0.617	-4.6	20.2	15.6	46.0	-30.4			
0.490	-4.4	20.2	15.8	46.2	-30.4			
0.150	4.8	20.4	25.2	56.0	-30.8			

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
11.320	5.7	20.9	26.6	60.0	-33.4
0.498	1.7	20.2	21.9	56.0	-34.1
0.771	1.7	20.2	21.9	56.0	-34.1
3.081	1.5	20.3	21.8	56.0	-34.2
0.606	1.5	20.2	21.7	56.0	-34.3
0.896	1.0	20.3	21.3	56.0	-34.7
1.090	0.8	20.2	21.0	56.0	-35.0
2.671	0.7	20.3	21.0	56.0	-35.0
4.582	0.7	20.3	21.0	56.0	-35.0
1.313	0.6	20.3	20.9	56.0	-35.1
1.624	0.6	20.3	20.9	56.0	-35.1
1.954	0.5	20.3	20.8	56.0	-35.2
3.537	0.3	20.3	20.6	56.0	-35.4
0.150	10.1	20.4	30.5	66.0	-35.5
0.406	2.0	20.2	22.2	57.7	-35.5
0.272	4.3	20.4	24.7	61.1	-36.4
0.206	6.1	20.4	26.5	63.3	-36.8
0.330	2.4	20.2	22.6	59.5	-36.9
0.223	5.4	20.4	25.8	62.7	-36.9
9.293	1.1	20.6	21.7	60.0	-38.3
5.498	1.0	20.4	21.4	60.0	-38.6
7.379	0.4	20.5	20.9	60.0	-39.1

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.884	-5.1	20.3	15.2	46.0	-30.8
1.082	-5.2	20.2	15.0	46.0	-31.0
25.025	-3.2	22.2	19.0	50.0	-31.0
25.330	-3.2	22.2	19.0	50.0	-31.0
1.313	-5.4	20.3	14.9	46.0	-31.1
4.770	-5.4	20.3	14.9	46.0	-31.1
2.680	-5.5	20.3	14.8	46.0	-31.2
1.596	-5.6	20.3	14.7	46.0	-31.3
2.112	-5.6	20.3	14.7	46.0	-31.3
3.508	-5.9	20.3	14.4	46.0	-31.6
0.402	-4.1	20.2	16.1	47.8	-31.7
0.272	-1.6	20.4	18.8	51.1	-32.3
0.223	-0.5	20.4	19.9	52.7	-32.8
0.330	-3.6	20.2	16.6	49.5	-32.9
0.206	-0.2	20.4	20.2	53.3	-33.1
16.890	-4.9	21.4	16.5	50.0	-33.5
16.963	-5.1	21.4	16.3	50.0	-33.7
10.062	-4.6	20.7	16.1	50.0	-33.9
13.559	-5.0	21.1	16.1	50.0	-33.9
5.498	-5.1	20.4	15.3	50.0	-34.7
8.290	-5.4	20.6	15.2	50.0	-34.8
7.379	-5.7	20.5	14.8	50.0	-35.2

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

ABBO0090 - 4

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



14/-										EmiR5 2021.06.24.0	PS	
VVC	ork Order:		00090		Date:		09-09		11			
	Project:		one	Ter	nperature:		3°C		11,	4	2/-	
	Job Site:		(02		Humidity:		RH					
Serial	I Number:		01-CN		etric Pres.:	1015	mbar		Tested by:	Jarrod Bren	nden and N	∕lark Bay
			Switch 90 (Converger	nt							
Conf	iguration:	4										
C	Customer:	Abbott Lab	oratories									
		Don Mende										
		220VAC/60										
	ing Mode:	Tropomittie	ng RFID 13.	56 MHz								
D	eviations:											
Co	omments:		nt radio on, I	Divergent i	adio off. Er	nissions gr	eater than 2	20 dB belov	w the limit.			
t Sneci	ifications						Test Metho	nd				
C 15.22							ANSI C63.					
D #1		I T Di		40		11-1-146		4()				
Run#	0	lest Dis	stance (m)	10	Antenna	Height(s)		1(m)		Results	Pa	ass
Г												
80												
70												
60												
50												
50												
=												
40							•					
40 - 30 -							•					
40							•					
40 - 30 -												
30 30 20 -												
40 - 30 -												
30 - 20 -							•					
30 30 20 -							•					
30 - 20 -							•					
40 - 40 - 20 - 10 - 0 - 0 - 0								•				
30 - 20 -	3	13	13	13	13	14	14		14	14	14	15
40 - 40 - 30 - 30 - 30 - 30 - 30 - 30 -	3	13	13	13	13	14 MHz			14	14 PK		15 • QP
40 - 40 - 30 - 30 - 30 - 30 - 30 - 30 -	3	13	13	13	13			•	14			
40 - 40 - 30 - 30 - 30 - 30 - 30 - 30 -	Amplitude (dBuV)		13 Antenna Height (meters)	13 Azimuth (degrees)	13 Test Distance (meters)			Detector	Distance Adjustment (dB)			
40 20 10 10 11 15 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)	Ompared Spec. (dB)
20 10 13 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 Spec. (dB)
20 10 13 Freq MHz) 4.091 3.018	Amplitude (dBuV) 7.2 7.1	Factor (dB/m) 11.6 11.6	Antenna Height (meters) 1.0 1.0	Azimuth (degrees) 159.0 289.0	Test Distance (meters) 10.0 10.0	External Attenuation (dB) 0.0 0.0	Polarity/ Transducer Type Perp to EUT Perp to EUT	Detector QP QP	Distance Adjustment (dB)	Adjusted (dBuV/m) -0.3 -0.4	Spec. Limit (dBuV/m) 29.5 29.5	• QP Compared Spec. (dB) -29.8 -29.9
40	Amplitude (dBuV) 7.2 7.1 22.3	Factor (dB/m) 11.6 11.6 11.6	Antenna Height (meters) 1.0 1.0 1.0	Azimuth (degrees) 159.0 289.0 122.0	Test Distance (meters) 10.0 10.0 10.0	External Attenuation (dB) 0.0 0.0 0.0	Polarity/ Transducer Type Perp to EUT Perp to EUT Perp to EUT	Detector QP QP QP	Distance Adjustment (dB) -19.1 -19.1	Adjusted (dBuV/m) -0.3 -0.4 14.8	◆ AV Spec. Limit (dBuV/m) 29.5 29.5 50.5	• QP Compared Spec. (dB) -29.8 -29.9 -35.7
20 10 13 Freq MHz) 4.091 3.018	Amplitude (dBuV) 7.2 7.1	Factor (dB/m) 11.6 11.6	Antenna Height (meters) 1.0 1.0	Azimuth (degrees) 159.0 289.0	Test Distance (meters) 10.0 10.0	External Attenuation (dB) 0.0 0.0	Polarity/ Transducer Type Perp to EUT Perp to EUT	Detector QP QP	Distance Adjustment (dB)	Adjusted (dBuV/m) -0.3 -0.4	Spec. Limit (dBuV/m) 29.5 29.5	Ompared Spec.
40	Amplitude (dBuV) 7.2 7.1 22.3 22.0	Factor (dB/m) 11.6 11.6 11.6 11.6	Antenna Height (meters) 1.0 1.0 1.0 1.0	Azimuth (degrees) 159.0 289.0 122.0 105.9	Test Distance (meters) 10.0 10.0 10.0 10.0 10.0	External Attenuation (dB) 0.0 0.0 0.0 0.0	Polarity/ Transducer Type Perp to EUT Perp to EUT Perp to EUT Perp to EUT	QP QP QP QP	Distance Adjustment (dB) -19.1 -19.1 -19.1 -19.1	Adjusted (dBuV/m) -0.3 -0.4 14.8 14.5	◆ AV Spec. Limit (dBuV/m) 29.5 29.5 50.5 50.5	• QP Compared Spec. (dB) -29.8 -29.9 -35.7 -36.0

FIELD STRENGTH OF SPURIOUS EMISSIONS (Less Than 30 MHz)



PSA-ESCI 2021.03.17.

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

ABBO0090 - 4

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.

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)



	\A/-	rk Order:	4 DD 0000	^		Data	0004	00.00			EmiR5 2021.06.24.0	PS	SA-ESCI 2021.03.17.0
_	VVC	Project:	ABBO009 None	U	To	Date: mperature:		-09-09 8 °C		4	1	7 ,	
		Job Site:	TX02		16	Humidity:		6 RH	-	1		71	
	Serial	Number:	ENG01-CI	N	Barom	etric Pres.:		mbar		Tested by:	Jarrod Bren	nden	
			GLP12154 Swi	tch 90 (•		ı		_
		iguration:											
			Abbott Laborato	ories									
			Don Mendell										
			220VAC/60Hz	TID 42	EC MILI-								
0	perati	ing Mode:	Transmitting RF	ינו חוד.	OO IVITIZ								
	De	eviations:	None										
	Co	omments:	None										
Test	Speci	fications						Test Met	hod				
		5:2021	I.					ANSI C63					
В	0.110 #I	1	Toot Dictore	no (m)	10	Antonna	. Usiaht(s)		1(m)		Poculto	Do	200
K	Run#	1	Test Distance	ce (m)	10	Antenna	Height(s)		1(m)		Results	Pa	ass
	Γ												
	80												
	70												
	60												
	00												
	50												
Ε													
≥	40				- 								
dBuV/m													
σ	30				+								
	20												
	10												
	10						•						
									•				
	0										•		
											•		
	-10												400
	0				1				10				100
							MHz	:			■ PK	◆ AV	QP
	eq Hz)	Amplitude (dBuV)		na Height neters)	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)
3.3	386	15.8	11.7	1.0	300.0	10.0	0.0	Perp to EU		-19.1	8.4	29.5	-21.1
4.5	522	13.0	11.7	1.0	223.0	10.0	0.0	Perp to EU	T QP	-19.1	5.6	29.5	-23.9
	780 122	12.1		1.0	196.9	10.0	0.0	Perp to EU		-19.1 -10.1	4.6	29.5	-24.9
27.	.122 .121	7.1 6.8		1.0 1.0	81.9 200.0	10.0 10.0	0.0 0.0	Perp to EU		-19.1 -19.1	-2.0 -2.3	29.5 29.5	-31.5 -31.8
	122	5.3		1.0	10.9	10.0	0.0	Para to GNI		-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

ABBO0090 - 4

FREQUENCY RANGE INVESTIGATED

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
Cable	Northwest EMC	1-8.2 GHz	TXC	2021-05-24	2022-05-24
Cable	Northwest EMC	8-18 GHz	TXD	2021-04-30	2022-04-30
Amplifier - Pre-Amplifier	Fairview Microwave	FMAM63001	PAS	2021-05-24	2022-05-24
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAJ	2021-05-24	2022-05-24
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	PAL	2020-09-17	2021-09-17
Amplifier - Pre-Amplifier	Cernex	FMAM63001	PAX	2021-02-23	2022-02-23
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
Antenna - Standard Gain	ETS Lindgren	3160-07	AJF	NCR	NCR
Antenna - Standard Gain	ETS Lindgren	3160-08	AJG	NCR	NCR
Antenna - Double Ridge	ETS Lindgren	3115	AJL	2020-10-20	2021-10-20
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)



Wo	ork Order:		00090		Date:	2021-			110	EmiR5 2021.06.24.0	P	SA-ESCI 2021.03.17.0
	Project:		one		nperature:		3°C)			
	Job Site:		(02		Humidity:	59%		ε				
Seria	Number:		01-CN		etric Pres.:	1015	mbar		Tested by:	Jarrod Brer	nden	
			Switch 90 (Convergen	t							
	iguration:											
		Abbott Lab										
		Don Mend										
E	JI Power:	220VAC/6										
Operat	ing Mode:		ansmitting RFID 13.56 MHz									
D	eviations:	None										
C	omments:		ivergant radio off, Convergent radio on									
Test Speci	fications						Test Meth	od				
FCC 15.22							ANSI C63.					
Run#	6	Test Di	stance (m)	3	Antenna	Height(s)		1 to 4(m)		Results	Pi	ass
		100121	otalioo (iii)		7	g(0)				Hooding		200
80 +												+++
											-	
70												
60												
											-	
- ⁵⁰ +												+++
m//ngp												
5 40												
설 40 +												
30 +												
30												
20												
10												
10												
0												
10			100			1000			10000			100000
						MHz				■ PK	◆ AV	• QP
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)
53.783	51.5	-26.9	1.0	360.0	3.0	0.0	Vert	QP	0.0	24.6	40.0	-15.4
67.315	45.1	-26.0	1.0	186.0	3.0	0.0	Vert	QP	0.0	19.1	40.0	-20.9
94.928	43.3	-24.8	1.0	279.0	3.0	0.0	Vert	QP	0.0	18.5	43.5	-25.0
67.813	35.8	-25.9	3.9	96.0	3.0	0.0	Horz	QP	0.0	9.9	40.0	-30.1
94.933	37.2	-24.8	3.23	165.9	3.0	0.0	Horz	QP	0.0	12.4	43.5	-31.1
53.832	32.1	-26.9	1.0	212.0	3.0	0.0	Horz	QP	0.0	5.2	40.0	-34.8



XMit 2020.12.30.

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:

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

Mid Channel, 13.56 MHz



EUT: GLP12154 Switch 90 Convergent
Serial Number: ENG01-CN
Customer: Abbott Laboratories
Attendees: Don Mendell Work Order: ABBO0090
Date: 24-Jul-21
Temperature: 25 °C Humidity: 48.1% RH
Barometric Pres.: 1019 mbar Project: None
Tested by: Mark Baytan
TEST SPECIFICATIONS Power: 220VAC/60Hz Test Method Job Site: TX05 FCC 15.225:2021 COMMENTS Transmitting 13.56 MHz RFID CW DEVIATIONS FROM TEST STANDARD 146,4 Configuration # 2 Signature Measured Value (MHz) Value (MHz) Results (ppm) (ppm) Normal Voltage Mid Channel, 13.56 MHz 13.560083 13.560083 0 100 Pass Extreme Voltage +15% Mid Channel, 13.56 MHz 13.560083 13.560083 Ω 100 Pass Mid Channel, 13.56 MHz 13.560083 13.560083 0 100 Pass re +50°C Mid Channel, 13.56 MHz sure +40°C 13.55998267 13.560083 7.4 100 Pass Mid Channel, 13.56 MHz ure +30°C 13.56001667 13.560083 49 100 Pass Mid Channel, 13.56 MHz 13.56004967 13.560083 2.5 100 Pass ure +20°C Mid Channel, 13,56 MHz 13.560083 13 560083 Ω 100 Pass re +10°C Mid Channel, 13.56 MHz ure 0°C 13.56015 13.560083 4.9 100 Pass Mid Channel, 13.56 MHz 13.56014967 13.560083 4.9 100 Pass re -10°C Mid Channel, 13.56 MHz Extreme Temperature -20°C 13.56016633 13.560083 6.1 100 Pass

13.56014967

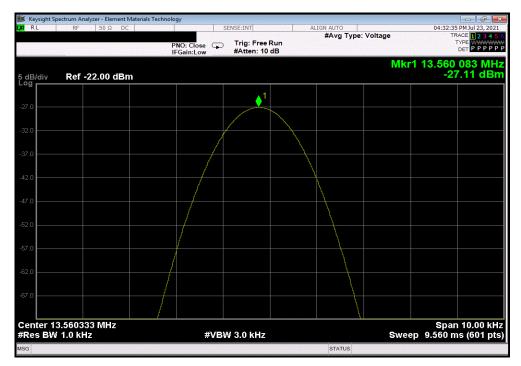
13.560083

4.9

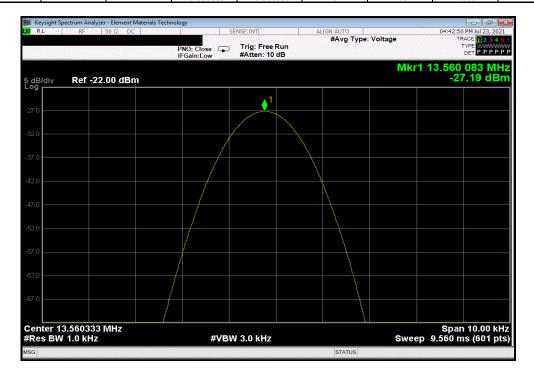
100

Pass





	Extreme Voltage +15%, Mid Channel, 13.56 MHz									
	Measured Nominal Error Limit									
			Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results			
1			13.560083	13.560083	0	100	Pass			



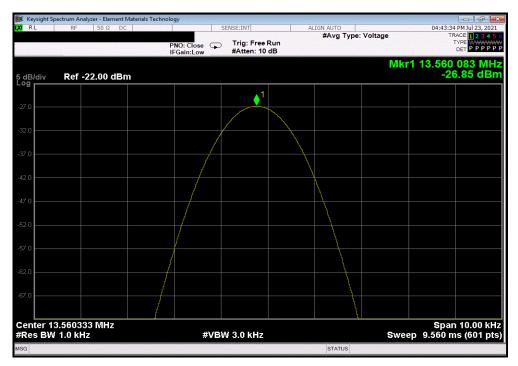


Extreme Voltage -15%, Mid Channel, 13.56 MHz

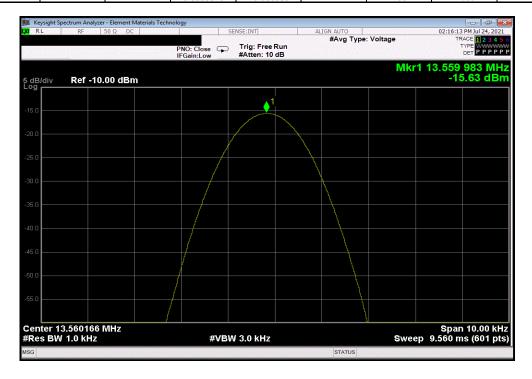
Measured Nominal Error Limit

Value (MHz) Value (MHz) (ppm) (ppm) Results

13.560083 13.560083 0 100 Pass

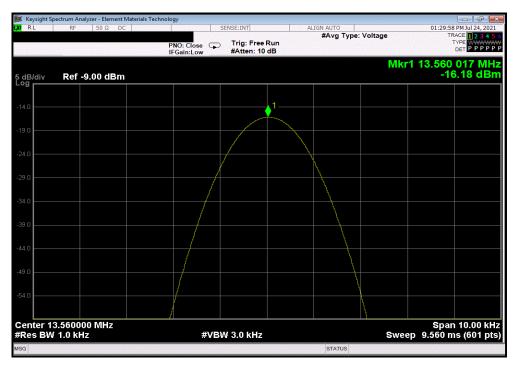


Extreme Temperature +50°C, Mid Channel, 13.56 MHz									
Measured Nominal Error Limit									
	Val	ue (MHz)	Value (MHz)	(ppm)	(ppm)	Results			
	13.5	55998267	13.560083	7.4	100	Pass			

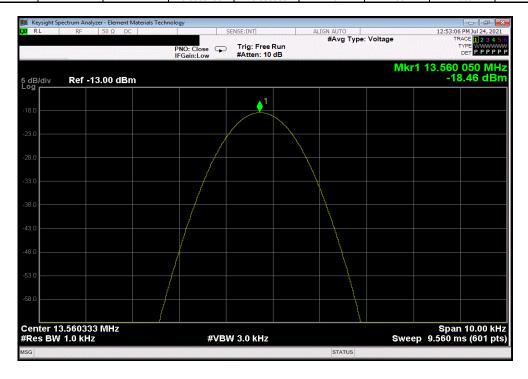




| Extreme Temperature +40°C, Mid Channel, 13.56 MHz
| Measured Nominal Error Limit
| Value (MHz) Value (MHz) (ppm) (ppm) Results
| 13.56001667 | 13.560083 | 4.9 | 100 | Pass

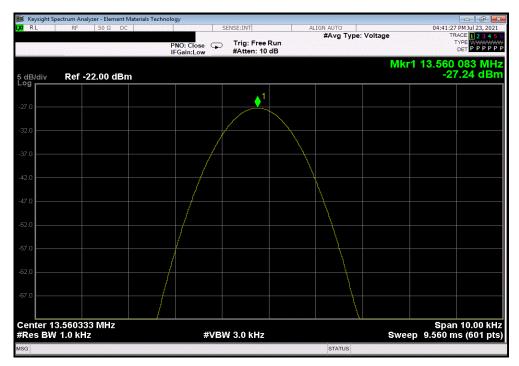


Extreme Temperature +30°C, Mid Channel, 13.56 MHz									
Measured Nominal Error Limit									
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results			
		13.56004967	13.560083	2.5	100	Pass			

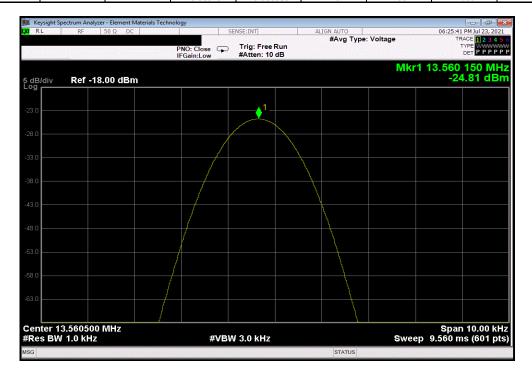




| Extreme Temperature +20°C, Mid Channel, 13.56 MHz
| Measured Nominal Error Limit
| Value (MHz) Value (MHz) (ppm) (ppm) Results
| 13.560083 | 13.560083 | 0 | 100 | Pass

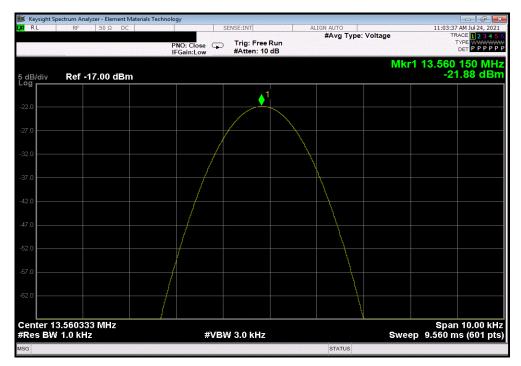


Extreme Temperature +10°C, Mid Channel, 13.56 MHz									
Measured Nominal Error Limit									
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results			
		13.56015	13.560083	4.9	100	Pass			

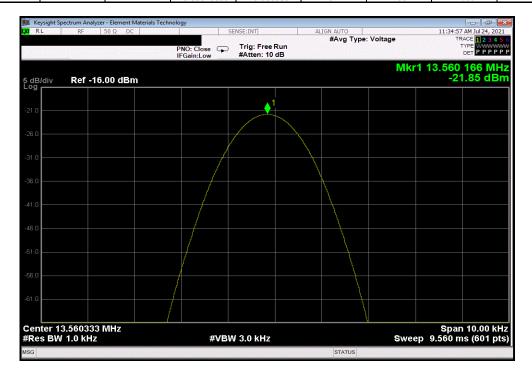




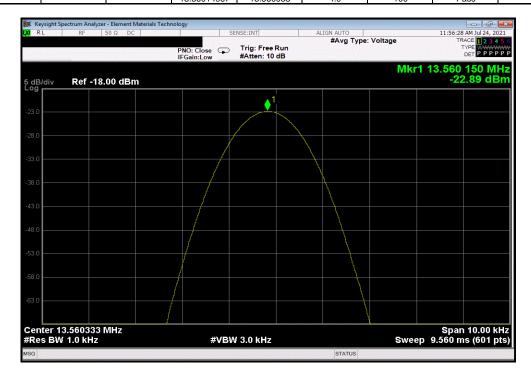
| Extreme Temperature 0°C, Mid Channel, 13.56 MHz
| Measured Nominal Error Limit
| Value (MHz) Value (MHz) (ppm) (ppm) Results
| 13.56014967 | 13.560083 | 4.9 | 100 | Pass



	Extreme Temperature -10°C, Mid Channel, 13.56 MHz								
	Measured Nominal Error Limit								
			Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results		
1			13.56016633	13.560083	6.1	100	Pass		







OCCUPIED BANDWIDTH



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
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 by 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.

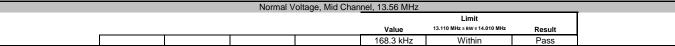
OCCUPIED BANDWIDTH

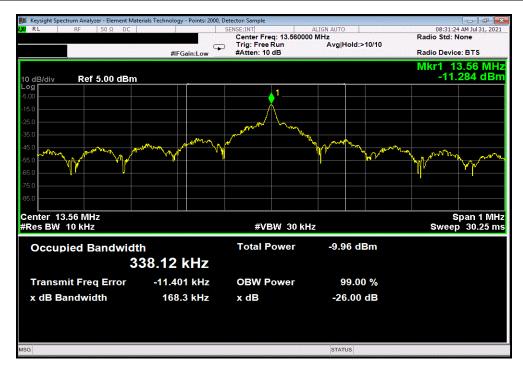


_							TbtTx 2021.03.19.1	XMit 2020.12.30.0		
EUT:	GLP12154 Switch 90 Co	nvergent			Work Order	: ABBO0090				
Serial Number:	ENG01-CN			Date: 29-Jul-21						
Customer:	Abbott Laboratories				Temperature	: 21 °C				
Attendees:	Don Mendell			Humidity	: 57.9% RH					
Project:	None			Barometric Pres.	: 1021 mbar					
Tested by:	Mark Baytan		Power:	Job Site: TX02						
TEST SPECIFICAT	TIONS			Test Method						
FCC 15.225:2021										
COMMENTS										
Emissions bandwi	idth taken with a 26 dB ba	indwidth. This is worst case as comp	15.							
	M TEST STANDARD									
None										
Configuration #	2	Signature	11/46	5,+						
		3				Lim	it			
					Value	13.110 MHz ≥ BW		Result		
Normal Voltage										
	Mid Channel, 13.56 MHz				168.3 kHz	With	in	Pass		

OCCUPIED BANDWIDTH









End of Test Report