



element

Abbott Laboratories

Switch 90 Convergent Centrifuge

FCC 15.225:2023

RSS-210 Issue 10:2019+A1:2020

RSS-Gen Issue 5:2018+A1:2019+A2:2021

13.56 MHz Radio

Report: ABBO0294.0 Rev. 0, Issue Date: January 4, 2024



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CERTIFICATE OF TEST

Last Date of Test: November 10, 2023
Abbott Laboratories
EUT: Switch 90 Convergent Centrifuge

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2023	ANSI C63.10:2013
FCC 15.225:2023	
RSS-210 Issue 10:2019+A1:2020	
RSS-Gen Issue 5:2018+A1:2019+A2:2021	

Guidance

Notice 2020 - DRS0023

Results

Test Description	Result	FCC Section(s)	RSS Section(s)	ANSI C63.10 Section(s)	Comments
Powerline Conducted Emissions	Pass	15.207	RSS-Gen 8.8	6.2	
Emissions Bandwidth (20 dB)	Pass	15.215(c)	N/A	6.9.2	
Field Strength of Fundamental	Pass	15.225(a)-(c)	RSS-210 B.6(a)(i-iv)	6.4	
Field Strength of Spurious Emissions (Less Than 30 MHz)	Pass	15.225(d), 15.209	RSS-210 B.6(a)(iv)	6.4	
Field Strength of Spurious Emissions (Greater Than 30 MHz)	Pass	15.225(d), 15.209	RSS-210 B.6(a)(iv)	6.5	
Frequency Stability	Pass	15.225(e), 15.31(e), 15.215(c), 2.1055	RSS-210 B.6(b)	6.8	
Occupied Bandwidth (99%)	Pass	N/A	RSS-Gen 6.7	6.9.3	

Deviations From Test Standards

None

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.

CERTIFICATE OF TEST



Approved By:

Adam Bruno, Operations Manager

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REVISION HISTORY



Revision Number	Description	Date (yyyy-mm-dd)	Page Number
00	None		

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:

[California](#)

[Minnesota](#)

[Oregon](#)

[Texas](#)

[Washington](#)

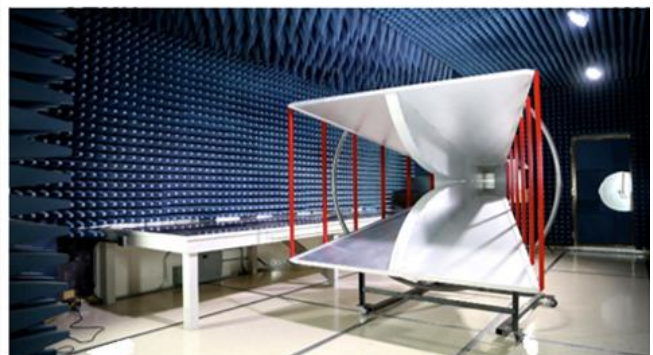
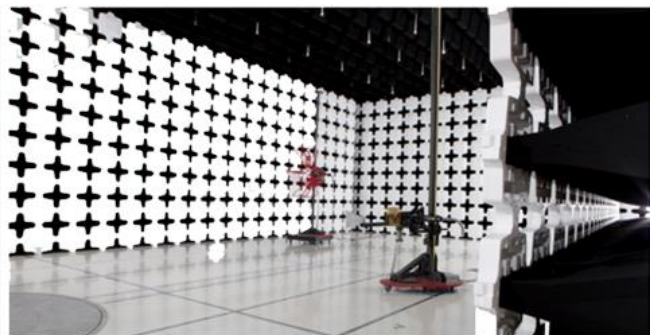
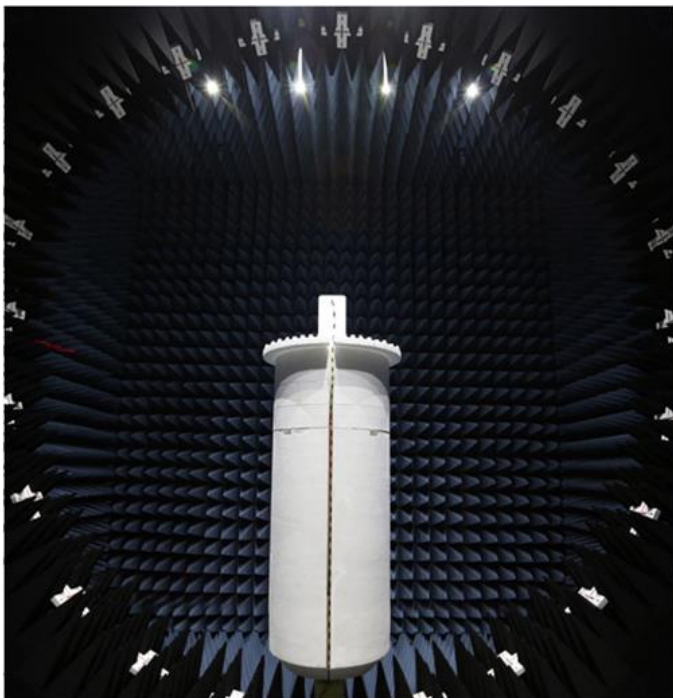
FACILITIES

Testing was performed at the following location(s)

Location	Labs ⁽¹⁾	Address	A2LA ⁽²⁾	ISED ⁽³⁾	BSMI ⁽⁴⁾	VCCI ⁽⁵⁾	CAB ⁽⁶⁾	FDA ⁽⁷⁾
<input type="checkbox"/> California	OC01-17	41 Tesla Irvine, CA 92618 (949) 861-8918	3310.04	2834B	SL2-IN-E-1154R	A-0029	US0158	TL-55
<input type="checkbox"/> Minnesota	MN01-11	9349 W Broadway Ave. Brooklyn Park, MN 55445 (612) 638-5136	3310.05	2834E	SL2-IN-E-1152R	A-0109	US0175	TL-57
<input type="checkbox"/> Oregon	EV01-12	6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	3310.02	2834D	SL2-IN-E-1017	A-0108	US0017	TL-56
<input checked="" type="checkbox"/> Texas	TX01-09	3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	3310.03	2834G	SL2-IN-E-1158R	A-0201	US0191	TL-54
<input type="checkbox"/> Washington	NC01-05	19201 120th Ave NE Bothell, WA 98011 (425) 984-6600	3310.06	2834F	SL2-IN-E-1153R	A-0110	US0157	TL-67
<input type="checkbox"/> Offsite	N/A	See Product Description	N/A	N/A	N/A	N/A	N/A	N/A

See data sheets for specific labs

- (1) The lab designations denote individual rooms within each location. (OC01, OC02, OC03, etc.)
- (2) A2LA Certificate No.
- (3) ISED Company No.
- (4) BSMI No.
- (5) VCCI Site Filing No.
- (6) CAB Identifier. Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA
- (7) FDA ASCA No.



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.

Field Strength Measurements (dB)

Range	TX02 (+/-)
10kHz-30MHz	1.8
30MHz-1GHz 3m	4.7
30MHz-1GHz 10m	3.3
1GHz-6GHz	5.1
6GHz-40GHz	5.1

AC Powerline Conducted Emissions Measurements (dB)

Range	TX01 (+/-)
9kHz-150kHz LISN	3.6
150kHz-30MHz LISN	3.1
150kHz-30MHz CVP	3
150kHz-30MHz Telecom-ISN	4.4

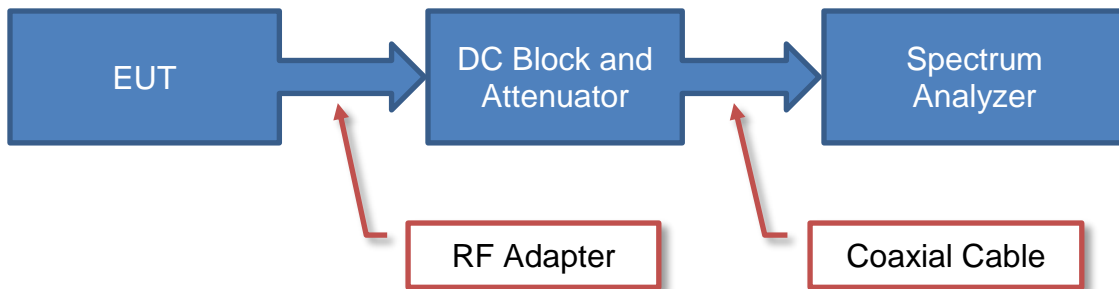
TEST SETUP BLOCK DIAGRAMS

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.

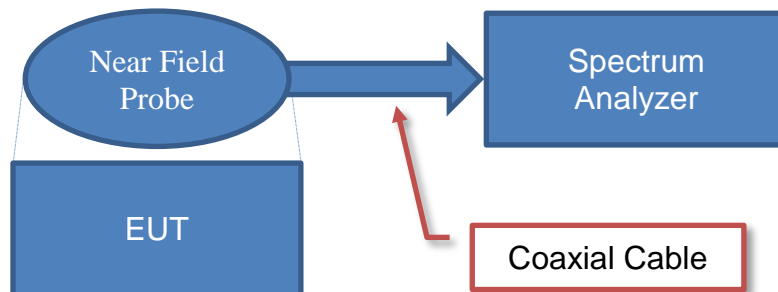
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

$$\begin{array}{r}
 \text{Measured Value} \\
 71.2
 \end{array}
 =
 \begin{array}{r}
 \text{Measured Level} \\
 42.6
 \end{array}
 +
 \begin{array}{r}
 \text{Reference Level Offset} \\
 28.6
 \end{array}$$

Near Field Test Fixture Measurements

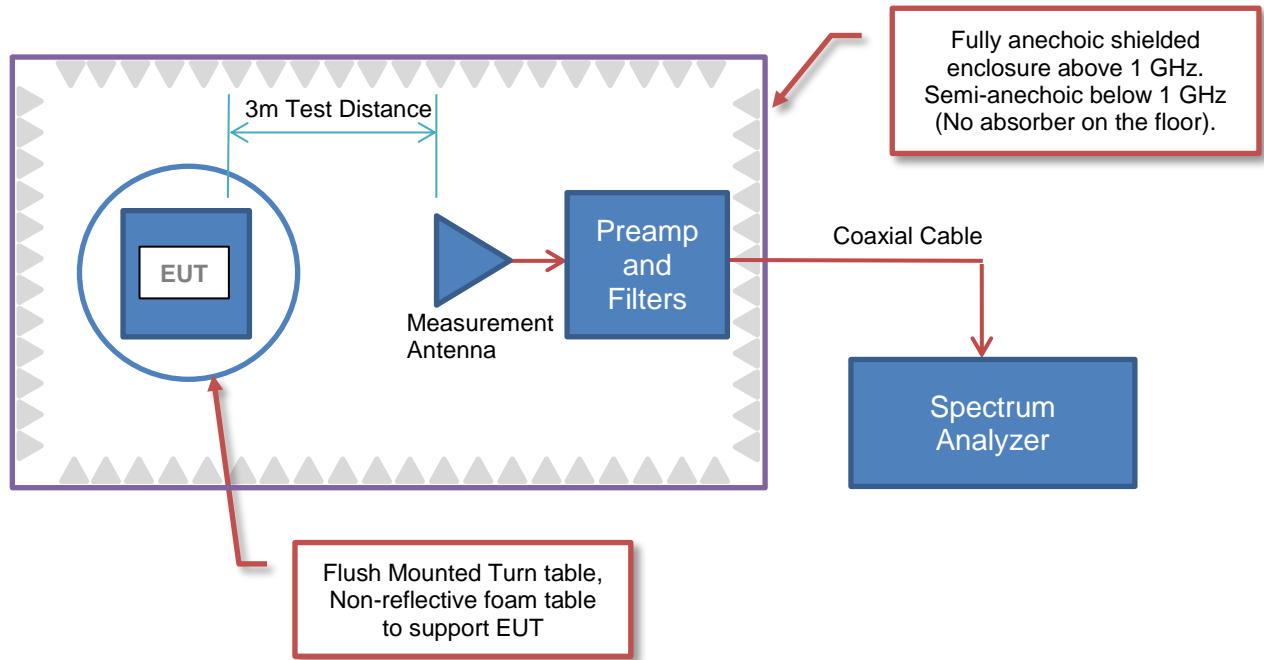


Sample Calculation (logarithmic units)

$$\begin{array}{r}
 \text{Measured Value} \\
 71.2
 \end{array}
 =
 \begin{array}{r}
 \text{Measured Level} \\
 42.6
 \end{array}
 +
 \begin{array}{r}
 \text{Reference Level Offset} \\
 28.6
 \end{array}$$

TEST SETUP BLOCK DIAGRAMS

Emissions Measurements



Sample Calculation (logarithmic units)

Radiated Emissions:

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

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

Conducted Emissions:

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

26.7 + 0.3 + 0.1 + 20.0 = 47.1

Radiated Power (ERP/EIRP) – Substitution Method:

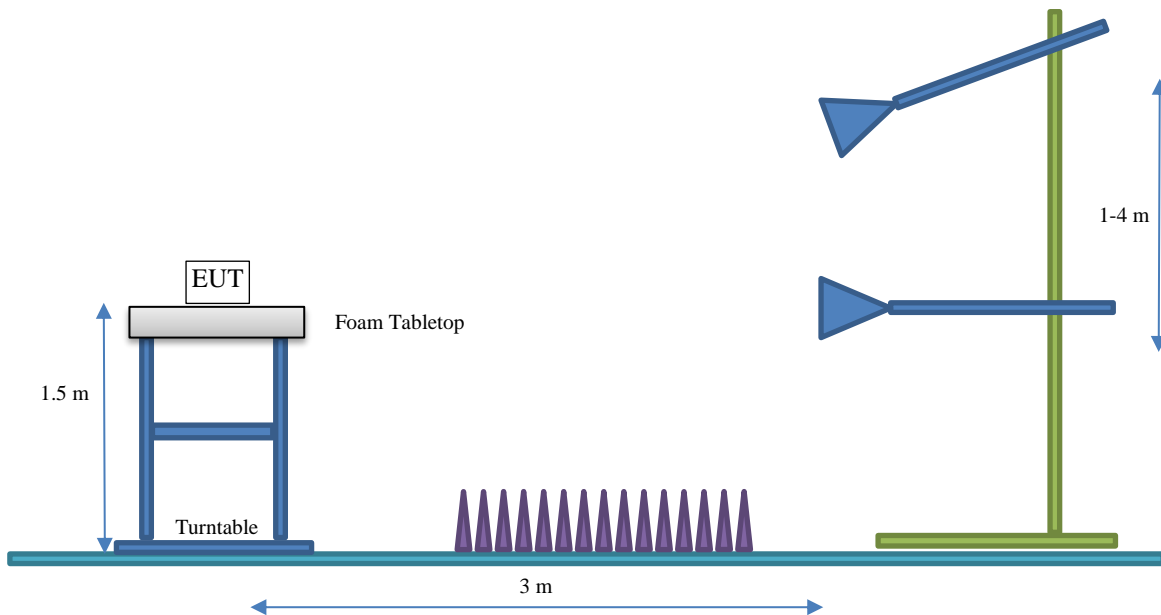
Measured Level into Substitution Antenna (Amplitude dBm)	Substitution Antenna Factor (dBi)	EIRP to ERP (if applicable)	Measured power (dBm ERP/EIRP)
10.0	6.0	2.15	13.9/16.0

10.0 + 6.0 - 2.15 = 13.9/16.0

TEST SETUP BLOCK DIAGRAMS

Bore Sighting (>1GHz)

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



PRODUCT DESCRIPTION

Client and Equipment under Test (EUT) Information

Company Name:	Abbott Laboratories
Address:	1921 Hurd Drive
City, State, Zip:	Irving, Texas 75038
Test Requested By:	Frank Sun
EUT:	Switch 90 Convergent Centrifuge
First Date of Test:	October 31, 2023
Last Date of Test:	November 10, 2023
Receipt Date of Samples:	October 31, 2023
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

The GLP systems Track is a modular laboratory automation system used to perform multiple pre-analytic and post-analytic steps to automate sample preparation and distribution processes in clinical laboratories. These processes include bar code identification of samples, centrifugation, aliquoting of samples, transport of samples between processes (modules), and delivery of samples to one or more Abbott and third-party commercially available laboratory analyzers. Each module includes a built-in touchscreen, a user interface that functions as a central operating and display element.

After samples have been loaded onto the system, they are loaded into transport vehicles (CARs) that run on an inter-module track system. Samples are then directed to the sample preparation modules and connected analyzers. After the analysis process is completed, the samples are available to be removed, archived, or disposed.

The CARs on the GLP systems Track transport the samples to the various modules. External analyzers are connected to the track through specific interfaces.

Switch 90 convergent centrifuge – The Switch 90 convergent centrifuge is a Switch 90 convergent track component paired with a Switch IO track component used as bridge for communication and power input in lieu of a Switch 90 divergent. It is only utilized as a track component when a Centrifuge Module is installed onto GLP systems Track. This track component contains a total of 1 RFID enabled PCB including 1 RFID reader.

Testing Objective:

To demonstrate compliance of the 13.56 MHz radio to FCC 15.225 requirements. and RSS-210 Annex B.6 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. The power settings below reflect the maximum power that the EUT is allowed to transmit at during normal operation.

ANTENNA GAIN (dBi)

Type	Provided by:	Frequency Range (MHz)	Dimensions
Embedded Loop Antenna, 2 Turns	GLP Systems	13.56 MHz	51mm x 35mm

The EUT was tested using the power settings provided by the manufacturer which were based upon:

- Test software settings Test software/firmware installed on EUT: See Configuration
- Rated power settings

POWER SETTING

Radio	Modulation	Protocol	Data Rate	Frequency	Power Setting (mW)
RFID	OOK	ISO 15693	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 ABBO0294-1

Software/Firmware Running During Test	
Description	Version
D000104071-Switch Controller Divergent and Convergent RFID Firmware Verification	A

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Switch 90 Convergent Centrifuge	Abbott Laboratories	20012034-101 (06R21-81)	S90CC1

Peripherals in Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Junction Box Assembly	Abbott Laboratories	06U35-06	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power Cable	Yes	1.2m	No	AC Mains	Junction Box
DC Power Cable	No	0.5m	Yes	Junction Box	Switch 90 Convergent Centrifuge

MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2023-10-31	Emissions Bandwidth (20 dB)	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	2023-10-31	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	2023-10-31	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	2023-10-31	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.	EUT remained at Element following the test.
5	2023-10-31	Occupied Bandwidth (99%)	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	2023-11-01	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.
7	2023-11-10	Powerline Conducted Emissions	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

AC POWERLINE CONDUCTED EMISSIONS



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 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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Rohde & Schwarz	ESCI	ARF	2023-10-02	2024-10-02
LISN	Solar Electronics	9252-50-R-24-BNC	LJK	2023-07-25	2024-07-25
Cable - Conducted Cable Assembly	Northwest EMC	TXA, HFC, TQU, VAC	TXAA	2023-04-18	2024-04-18

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	3.1 dB	-3.1 dB

CONFIGURATIONS INVESTIGATED

ABBO0294-1

MODES INVESTIGATED

Transmitting, 13.56 MHz, RFID

AC POWERLINE CONDUCTED EMISSIONS



EUT:	Switch 90 Convergent Centrifuge	Work Order:	ABBO0294
Serial Number:	S90CC1	Date:	2023-11-01
Customer:	Abbott Laboratories	Temperature:	22.8°C
Attendees:	None	Relative Humidity:	26.2%
Customer Project:	None	Bar. Pressure (PMSL):	1029 mb
Tested By:	Jarrod Brenden	Job Site:	TX01
Power:	220VAC/60Hz	Configuration:	ABBO0294-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2023	ANSI C63.10:2013
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

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

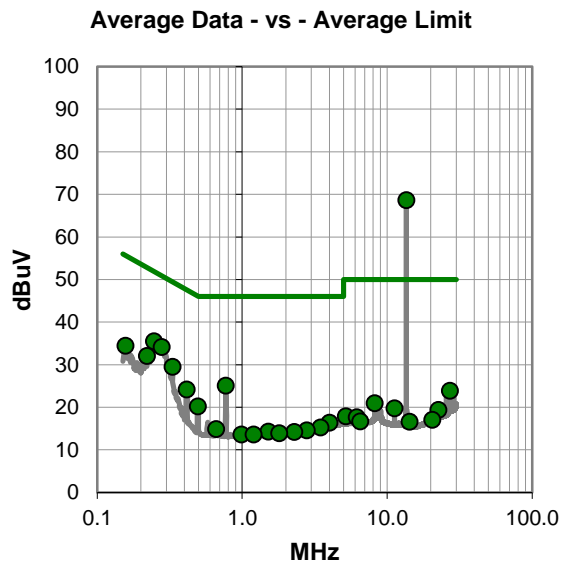
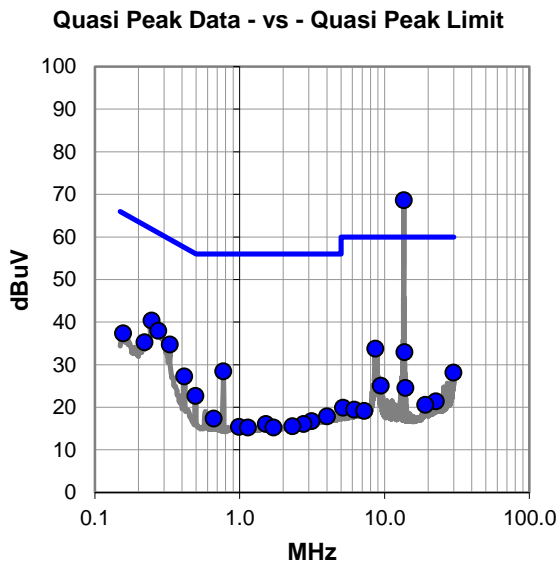
Test Protocol D000141866A EMC. Track component of Floor Standing equipment.

EUT OPERATING MODES

Transmitting, 13.56 MHz, RFID

DEVIATIONS FROM TEST STANDARD

None



AC POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #3

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	47.9	20.8	68.7	60.0	8.7
0.247	19.9	20.5	40.4	61.9	-21.5
0.274	17.7	20.3	38.0	61.0	-23.0
0.330	14.6	20.2	34.8	59.5	-24.7
8.650	13.2	20.6	33.8	60.0	-26.2
13.720	12.2	20.8	33.0	60.0	-27.0
0.770	8.3	20.2	28.5	56.0	-27.5
0.220	14.7	20.6	35.3	62.8	-27.5
0.157	16.8	20.6	37.4	65.6	-28.2
0.413	7.1	20.2	27.3	57.6	-30.3
29.970	5.9	22.3	28.2	60.0	-31.8
0.494	2.5	20.2	22.7	56.1	-33.4
9.422	4.5	20.6	25.1	60.0	-34.9
13.931	3.8	20.8	24.6	60.0	-35.4
4.000	-2.5	20.4	17.9	56.0	-38.1
0.661	-2.8	20.2	17.4	56.0	-38.6
22.590	-0.2	21.6	21.4	60.0	-38.6
3.131	-3.5	20.3	16.8	56.0	-39.2
19.111	-0.7	21.3	20.6	60.0	-39.4
1.516	-4.1	20.2	16.1	56.0	-39.9
2.770	-4.2	20.3	16.1	56.0	-39.9
5.179	-0.5	20.4	19.9	60.0	-40.1
2.317	-4.7	20.3	15.6	56.0	-40.4
6.164	-0.9	20.4	19.5	60.0	-40.5
0.989	-4.8	20.2	15.4	56.0	-40.6

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	47.9	20.8	68.7	50.0	18.7
0.247	15.0	20.5	35.5	51.9	-16.4
0.278	13.9	20.3	34.2	50.9	-16.7
0.330	9.3	20.2	29.5	49.5	-20.0
0.220	11.5	20.6	32.1	52.8	-20.7
0.770	4.9	20.2	25.1	46.0	-20.9
0.157	13.9	20.6	34.5	55.6	-21.1
0.413	4.0	20.2	24.2	47.6	-23.4
0.494	0.0	20.2	20.2	46.1	-25.9
27.121	1.0	22.9	23.9	50.0	-26.1
8.212	0.5	20.5	21.0	50.0	-29.0
4.000	-4.0	20.4	16.4	46.0	-29.6
11.245	-0.9	20.7	19.8	50.0	-30.2
22.590	-2.2	21.6	19.4	50.0	-30.6
3.469	-5.1	20.4	15.3	46.0	-30.7
0.661	-5.3	20.2	14.9	46.0	-31.1
2.790	-5.7	20.3	14.6	46.0	-31.4
1.516	-5.9	20.2	14.3	46.0	-31.7
2.290	-6.1	20.3	14.2	46.0	-31.8
1.800	-6.4	20.3	13.9	46.0	-32.1
5.179	-2.5	20.4	17.9	50.0	-32.1
6.164	-2.7	20.4	17.7	50.0	-32.3
0.989	-6.6	20.2	13.6	46.0	-32.4
1.200	-6.6	20.2	13.6	46.0	-32.4
20.537	-4.3	21.4	17.1	50.0	-32.9

CONCLUSION

Evaluation

AC POWERLINE CONDUCTED EMISSIONS



EUT:	Switch 90 Convergent Centrifuge	Work Order:	ABBO0294
Serial Number:	S90CC1	Date:	2023-11-01
Customer:	Abbott Laboratories	Temperature:	22.8°C
Attendees:	None	Relative Humidity:	26.2%
Customer Project:	None	Bar. Pressure (PMSL):	1029 mb
Tested By:	Jarrod Brenden	Job Site:	TX01
Power:	220VAC/60Hz	Configuration:	ABBO0294-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2023	ANSI C63.10:2013
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

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

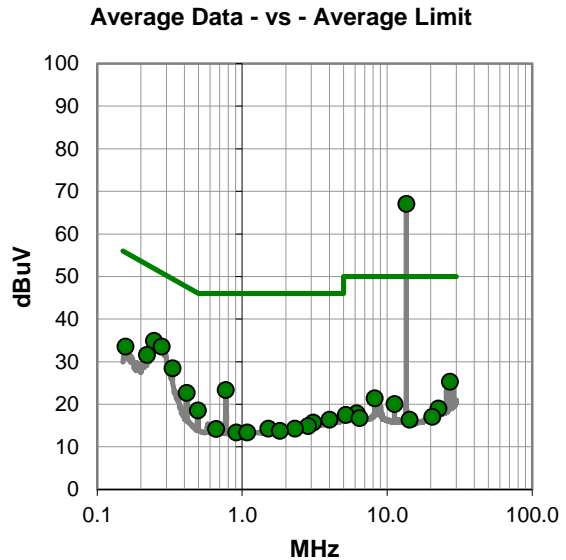
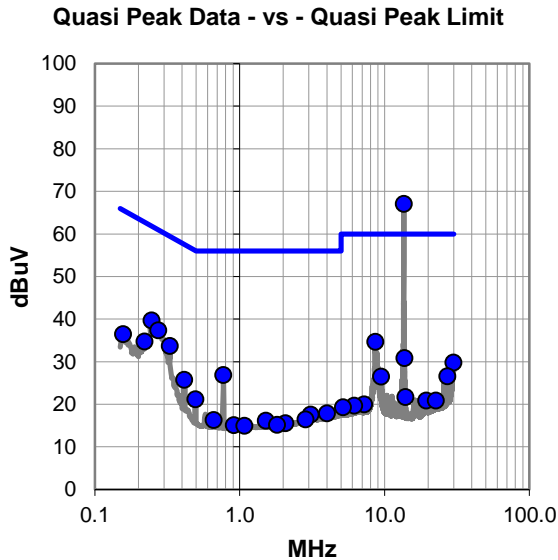
Test Protocol D000141866A EMC. Track component of Floor Standing equipment.

EUT OPERATING MODES

Transmitting, 13.56 MHz, RFID

DEVIATIONS FROM TEST STANDARD

None



AC POWERLINE CONDUCTED EMISSIONS

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	46.3	20.8	67.1	60.0	7.1
0.247	19.2	20.5	39.7	61.9	-22.2
0.274	17.1	20.3	37.4	61.0	-23.6
8.640	14.1	20.6	34.7	60.0	-25.3
0.330	13.5	20.2	33.7	59.5	-25.8
0.220	14.2	20.6	34.8	62.8	-28.0
0.157	15.9	20.6	36.5	65.6	-29.1
0.770	6.7	20.2	26.9	56.0	-29.1
13.720	10.1	20.8	30.9	60.0	-29.1
29.947	7.5	22.3	29.8	60.0	-30.2
0.413	5.6	20.2	25.8	57.6	-31.8
27.121	3.7	22.9	26.6	60.0	-33.4
9.449	5.9	20.6	26.5	60.0	-33.5
0.494	1.0	20.2	21.2	56.1	-34.9
4.000	-2.5	20.4	17.9	56.0	-38.1
13.931	0.9	20.8	21.7	60.0	-38.3
3.090	-2.7	20.3	17.6	56.0	-38.4
19.430	-0.4	21.3	20.9	60.0	-39.1
22.590	-0.7	21.6	20.9	60.0	-39.1
2.850	-3.8	20.3	16.5	56.0	-39.5
0.660	-3.9	20.2	16.3	56.0	-39.7
1.516	-4.0	20.2	16.2	56.0	-39.8
7.244	-0.4	20.4	20.0	60.0	-40.0
6.164	-0.7	20.4	19.7	60.0	-40.3
2.070	-4.7	20.3	15.6	56.0	-40.4

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	46.3	20.8	67.1	50.0	17.1
0.247	14.4	20.5	34.9	51.9	-17.0
0.278	13.3	20.3	33.6	50.9	-17.3
0.330	8.3	20.2	28.5	49.5	-21.0
0.220	11.0	20.6	31.6	52.8	-21.2
0.157	13.0	20.6	33.6	55.6	-22.0
0.770	3.2	20.2	23.4	46.0	-22.6
27.121	2.4	22.9	25.3	50.0	-24.7
0.413	2.5	20.2	22.7	47.6	-24.9
0.494	-1.6	20.2	18.6	46.1	-27.5
8.212	0.9	20.5	21.4	50.0	-28.6
4.000	-4.0	20.4	16.4	46.0	-29.6
11.245	-0.6	20.7	20.1	50.0	-29.9
3.086	-4.6	20.3	15.7	46.0	-30.3
22.590	-2.6	21.6	19.0	50.0	-31.0
2.839	-5.4	20.3	14.9	46.0	-31.1
1.516	-5.9	20.2	14.3	46.0	-31.7
2.310	-6.0	20.3	14.3	46.0	-31.7
0.660	-6.0	20.2	14.2	46.0	-31.8
6.164	-2.5	20.4	17.9	50.0	-32.1
1.817	-6.5	20.3	13.8	46.0	-32.2
5.179	-2.9	20.4	17.5	50.0	-32.5
0.908	-6.8	20.2	13.4	46.0	-32.6
1.080	-6.8	20.2	13.4	46.0	-32.6
20.510	-4.3	21.4	17.1	50.0	-32.9

CONCLUSION

Evaluation

AC POWERLINE CONDUCTED EMISSIONS



EUT:	Switch 90 Convergent Centrifuge	Work Order:	ABBO0294
Serial Number:	S90CC1	Date:	2023-11-10
Customer:	Abbott Laboratories	Temperature:	21.3°C
Attendees:	None	Relative Humidity:	53.4%
Customer Project:	None	Bar. Pressure (PMSL):	1002 mb
Tested By:	Jarrod Brenden	Job Site:	TX01
Power:	220VAC/60Hz	Configuration:	ABBO0294-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2023	ANSI C63.10:2013
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	27	Line:	High Line	Add. Ext. Attenuation (dB):	0
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COMMENTS

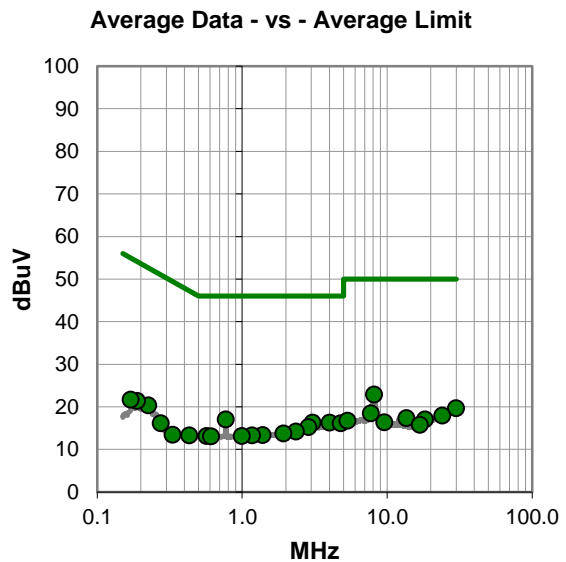
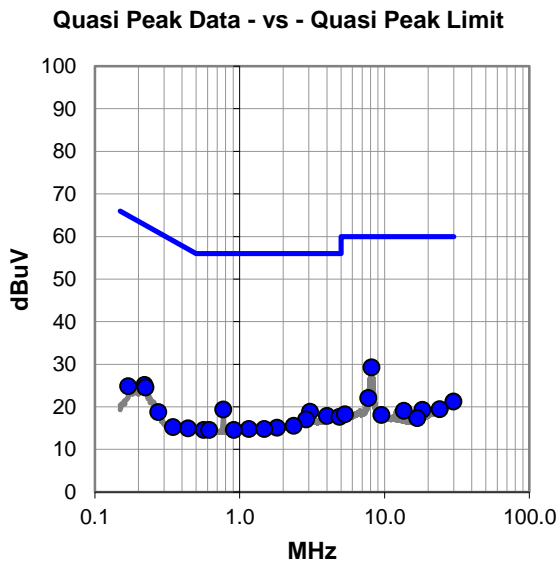
Test Protocol D000141866A EMC. Track component of Floor Standing equipment. Antenna disconnected and terminated with load.

EUT OPERATING MODES

Transmitting, 13.56 MHz, RFID

DEVIATIONS FROM TEST STANDARD

None



AC POWERLINE CONDUCTED EMISSIONS



RESULTS - Run #27

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
8.108	8.8	20.5	29.3	60.0	-30.7
0.770	-0.8	20.2	19.4	56.0	-36.6
3.060	-1.4	20.3	18.9	56.0	-37.1
0.220	4.6	20.6	25.2	62.8	-37.6
7.710	1.7	20.4	22.1	60.0	-37.9
0.224	4.0	20.6	24.6	62.7	-38.1
4.000	-2.5	20.4	17.9	56.0	-38.1
4.880	-2.7	20.4	17.7	56.0	-38.3
29.850	-1.1	22.4	21.3	60.0	-38.7
2.879	-3.2	20.3	17.1	56.0	-38.9
0.170	4.2	20.7	24.9	65.0	-40.1
2.360	-4.7	20.3	15.6	56.0	-40.4
24.060	-2.3	21.8	19.5	60.0	-40.5
18.283	-2.0	21.3	19.3	60.0	-40.7
1.808	-5.2	20.3	15.1	56.0	-40.9
13.560	-1.7	20.8	19.1	60.0	-40.9
1.156	-5.4	20.2	14.8	56.0	-41.2
1.475	-5.4	20.2	14.8	56.0	-41.2
0.566	-5.6	20.2	14.6	56.0	-41.4
0.616	-5.6	20.2	14.6	56.0	-41.4
0.910	-5.6	20.2	14.6	56.0	-41.4
5.330	-2.1	20.4	18.3	60.0	-41.7
9.530	-2.5	20.6	18.1	60.0	-41.9
0.440	-5.2	20.2	15.0	57.1	-42.1
0.274	-1.5	20.3	18.8	61.0	-42.2

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
8.110	2.4	20.5	22.9	50.0	-27.1
0.770	-3.1	20.2	17.1	46.0	-28.9
3.050	-4.0	20.3	16.3	46.0	-29.7
4.000	-4.1	20.4	16.3	46.0	-29.7
4.790	-4.2	20.4	16.2	46.0	-29.8
29.848	-2.7	22.4	19.7	50.0	-30.3
2.866	-5.0	20.3	15.3	46.0	-30.7
7.710	-1.9	20.4	18.5	50.0	-31.5
2.350	-6.1	20.3	14.2	46.0	-31.8
23.970	-3.8	21.8	18.0	50.0	-32.0
1.921	-6.5	20.3	13.8	46.0	-32.2
0.224	-0.2	20.6	20.4	52.7	-32.3
1.380	-6.8	20.2	13.4	46.0	-32.6
13.560	-3.4	20.8	17.4	50.0	-32.6
0.188	0.7	20.7	21.4	54.1	-32.7
1.170	-6.9	20.2	13.3	46.0	-32.7
0.566	-7.0	20.2	13.2	46.0	-32.8
0.994	-7.0	20.2	13.2	46.0	-32.8
0.610	-7.1	20.2	13.1	46.0	-32.9
18.242	-4.2	21.3	17.1	50.0	-32.9
5.330	-3.6	20.4	16.8	50.0	-33.2
0.170	1.0	20.7	21.7	55.0	-33.3
9.530	-4.2	20.6	16.4	50.0	-33.6
0.430	-6.9	20.2	13.3	47.3	-34.0
16.766	-5.3	21.1	15.8	50.0	-34.2

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS



EUT:	Switch 90 Convergent Centrifuge	Work Order:	ABBO0294
Serial Number:	S90CC1	Date:	2023-11-10
Customer:	Abbott Laboratories	Temperature:	21.3°C
Attendees:	None	Relative Humidity:	53.4%
Customer Project:	None	Bar. Pressure (PMSL):	1002 mb
Tested By:	Jarrod Brenden	Job Site:	TX01
Power:	220VAC/60Hz	Configuration:	ABBO0294-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2023	ANSI C63.10:2013
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	28	Line:	Neutral	Add. Ext. Attenuation (dB):	0
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COMMENTS

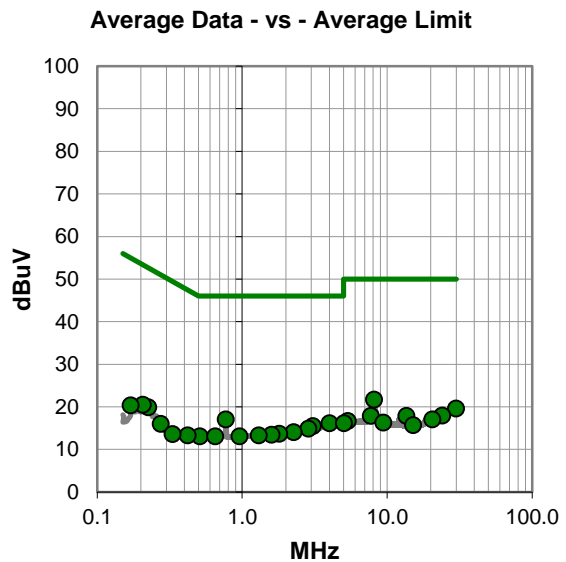
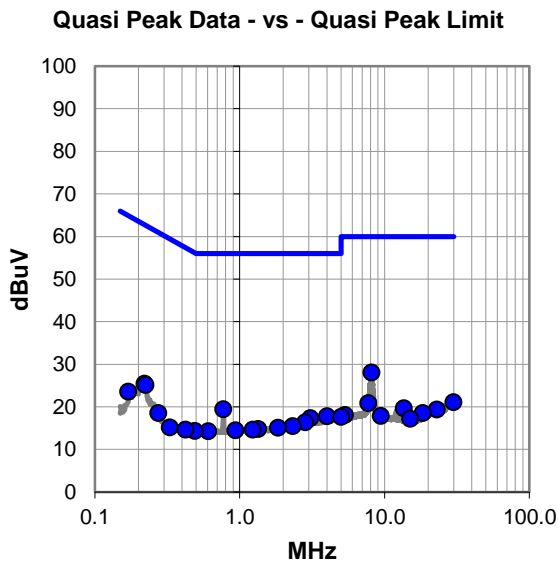
Test Protocol D000141866A EMC. Track component of Floor Standing equipment. Antenna disconnected and terminated with load.

EUT OPERATING MODES

Transmitting, 13.56 MHz, RFID

DEVIATIONS FROM TEST STANDARD

None



AC POWERLINE CONDUCTED EMISSIONS



RESULTS - Run #28

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
8.110	7.6	20.5	28.1	60.0	-31.9
0.770	-0.7	20.2	19.5	56.0	-36.5
0.220	4.9	20.6	25.5	62.8	-37.3
0.224	4.6	20.6	25.2	62.7	-37.5
4.000	-2.6	20.4	17.8	56.0	-38.2
3.068	-2.9	20.3	17.4	56.0	-38.6
29.860	-1.3	22.4	21.1	60.0	-38.9
7.712	0.5	20.4	20.9	60.0	-39.1
2.839	-3.9	20.3	16.4	56.0	-39.6
13.560	-1.1	20.8	19.7	60.0	-40.3
2.326	-4.8	20.3	15.5	56.0	-40.5
22.990	-2.2	21.6	19.4	60.0	-40.6
1.840	-5.2	20.3	15.1	56.0	-40.9
1.340	-5.4	20.2	14.8	56.0	-41.2
1.232	-5.5	20.2	14.7	56.0	-41.3
0.170	2.9	20.7	23.6	65.0	-41.4
18.320	-2.7	21.3	18.6	60.0	-41.4
0.935	-5.7	20.2	14.5	56.0	-41.5
0.607	-5.9	20.2	14.3	56.0	-41.7
0.490	-5.8	20.2	14.4	56.2	-41.8
5.330	-2.3	20.4	18.1	60.0	-41.9
9.410	-2.7	20.6	17.9	60.0	-42.1
5.012	-2.7	20.4	17.7	60.0	-42.3
0.274	-1.7	20.3	18.6	61.0	-42.4
0.422	-5.5	20.2	14.7	57.4	-42.7

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
8.110	1.2	20.5	21.7	50.0	-28.3
0.770	-3.1	20.2	17.1	46.0	-28.9
4.000	-4.2	20.4	16.2	46.0	-29.8
29.870	-2.8	22.4	19.6	50.0	-30.4
3.070	-4.8	20.3	15.5	46.0	-30.5
2.866	-5.4	20.3	14.9	46.0	-31.1
2.260	-6.2	20.3	14.1	46.0	-31.9
24.000	-3.8	21.8	18.0	50.0	-32.0
7.710	-2.5	20.4	17.9	50.0	-32.1
13.560	-2.9	20.8	17.9	50.0	-32.1
1.800	-6.6	20.3	13.7	46.0	-32.3
1.590	-6.7	20.2	13.5	46.0	-32.5
1.300	-6.9	20.2	13.3	46.0	-32.7
0.224	-0.7	20.6	19.9	52.7	-32.8
0.206	-0.1	20.6	20.5	53.4	-32.9
0.510	-7.1	20.2	13.1	46.0	-32.9
0.650	-7.1	20.2	13.1	46.0	-32.9
0.960	-7.1	20.2	13.1	46.0	-32.9
20.510	-4.3	21.4	17.1	50.0	-32.9
5.350	-3.7	20.4	16.7	50.0	-33.3
9.420	-4.3	20.6	16.3	50.0	-33.7
5.030	-4.2	20.4	16.2	50.0	-33.8
0.420	-6.9	20.2	13.3	47.4	-34.1
15.080	-5.2	20.9	15.7	50.0	-34.3
0.170	-0.3	20.7	20.4	55.0	-34.6

CONCLUSION

Pass

Tested By

EMISSIONS BANDWIDTH (20 DB)



TEST DESCRIPTION

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.

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.

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

The 20 dB bandwidth must be contained within the band 13.110-14.010 MHz. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

Due to the amplitude of the carrier with respect to the modulated signal, the EUT was unable to meet the 1-5% RBW requirement when based off the 20 dB Bandwidth. Therefore the 99% Bandwidth was used to determine the RBW setting for the 20 dB Bandwidth. Video bandwidth (VBW) bandwidth was set to at least 3 times the resolution bandwidth. This is considered worst case. The analyzer sweep time was set to auto and a peak detector was used.

The spectrum analyzer bandwidth measurement function was used to measure the 20 dB bandwidth.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	2023-03-17	2024-03-17
Block - DC	Fairview Microwave	SD3235-2148	ANF	2023-05-24	2024-05-24
Cable	UtiFlex Micro-Coax	UFD1150A-1-0720-200200	TXJ	2023-08-30	2024-08-30
Generator - Signal	Agilent	N5173B	TIW	2023-08-07	2026-08-07
Probe - Near Field Set	ETS Lindgren	7405	IPS	NCR	NCR
Thermometer	Omega Engineering, Inc.	HH311	DUI	2023-03-02	2024-03-02
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPH-8-2-SCT/AC	TBH	NCR	NCR
Power Source/Analyzer	Hewlett Packard	6841A	THC	NCR	NCR

EMISSIONS BANDWIDTH (20 DB)



EUT:	Switch 90 Convergent Centrifuge	Work Order:	ABBO0294
Serial Number:	S90CC1	Date:	2023-10-31
Customer:	Abbott Laboratories	Temperature:	22.6°C
Attendees:	None	Relative Humidity:	29.3%
Customer Project:	None	Bar. Pressure (PMSL):	1030 mbar
Tested By:	Jarrod Brenden	Job Site:	TX02
Power:	220VAC/60Hz	Configuration:	ABBO0294-1
Signature:			

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2023	ANSI C63.10:2013

COMMENTS

Test Protocol D000141866A_EMC. Track component of Floor Standing equipment.

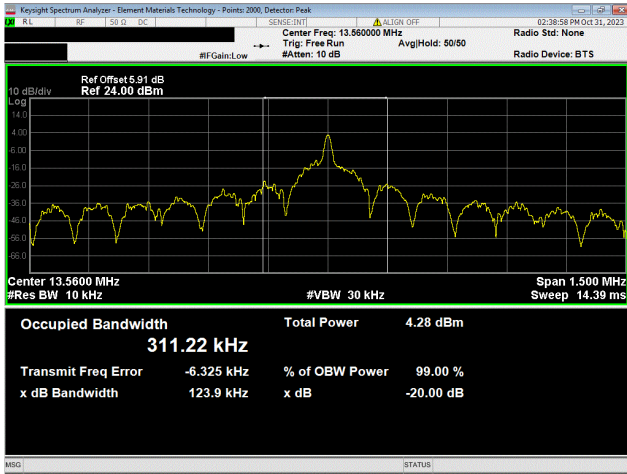
DEVIATIONS FROM TEST STANDARD

None

TEST RESULTS

	Value	Limit	Result
RFID, 13.56 MHz			
Switch 90 Convergent Centrifuge			
Nominal Temperature, 20°C			
Voltage, Nominal, 220V	123.908 kHz	Within	Pass

EMISSIONS BANDWIDTH (20 DB)



RFID, 13.56 MHz
Switch 90 Convergent Centrifuge
Nominal Temperature, 20°C
Voltage, Nominal, 220V

FIELD STRENGTH OF FUNDAMENTAL

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

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.

The limits in CFR 47, Part 15C 15.209(a) are identical to those in RSS-Gen section 8.9 Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohms. For example, an E-Field measurement in dBuV/m can be converted to dBuA/m via the following formula: $\text{dBuV/m} - 51.5 \text{ dB} = \text{dBuA/m}$. E-Field measurements have the same margin in dB to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limits.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Loop	ETS Lindgren	6502	AZM	2022-07-19	2024-07-19
Cable	Northwest EMC	RE 9kHz - 1GHz	TXB	2023-05-25	2024-05-25
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2023-02-09	2024-02-09

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

ABBO0294-1

MODES INVESTIGATED

Transmitting, 13.56 MHz, RFID

FIELD STRENGTH OF FUNDAMENTAL



EUT:	Switch 90 Convergent Centrifuge	Work Order:	ABBO0294
Serial Number:	S90CC1	Date:	2023-10-31
Customer:	Abbott Laboratories	Temperature:	22.1°C
Attendees:	None	Relative Humidity:	29.8%
Customer Project:	None	Bar. Pressure (PMSL):	1031 mb
Tested By:	Jarrod Brenden	Job Site:	TX02
Power:	220VAC/60Hz	Configuration:	ABBO0294-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2023	ANSI C63.10:2013
RSS-210 Issue 10:2019 +A1:2020	ANSI C63.10:2013

TEST PARAMETERS

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

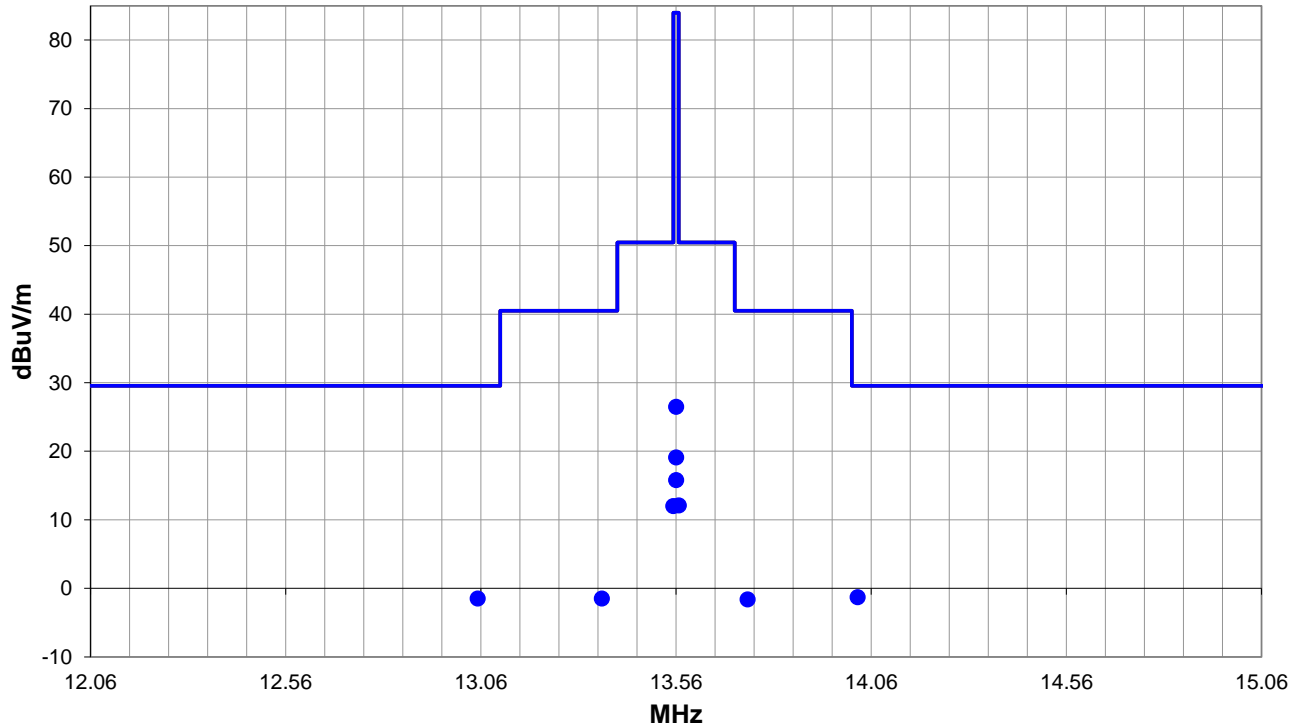
Test Protocol D000141866A_EMC. Track component of Floor Standing equipment.

EUT OPERATING MODES

Transmitting, 13.56 MHz, RFID

DEVIATIONS FROM TEST STANDARD

None



Run #: 3

■ PK ◆ AV ● QP

FIELD STRENGTH OF FUNDAMENTAL



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)
14.025	6.2	11.6	1.0	42.0	10.0	0.0	Perp to EUT	QP	-19.1	-1.3	29.5	-30.8
13.052	6.0	11.6	1.0	57.0	10.0	0.0	Perp to EUT	QP	-19.1	-1.5	29.5	-31.0
13.567	19.6	11.6	1.0	321.0	10.0	0.0	Perp to EUT	QP	-19.1	12.1	50.5	-38.4
13.553	19.5	11.6	1.0	273.9	10.0	0.0	Perp to EUT	QP	-19.1	12.0	50.5	-38.5
13.370	6.0	11.6	1.0	140.0	10.0	0.0	Perp to EUT	QP	-19.1	-1.5	40.5	-42.0
13.744	5.9	11.6	1.0	98.0	10.0	0.0	Perp to EUT	QP	-19.1	-1.6	40.5	-42.1
13.560	34.0	11.6	1.0	331.0	10.0	0.0	Perp to EUT	QP	-19.1	26.5	84.0	-57.5
13.560	26.6	11.6	1.0	72.0	10.0	0.0	Para to EUT	QP	-19.1	19.1	84.0	-64.9
13.560	23.3	11.6	1.0	357.9	10.0	0.0	Para to GND	QP	-19.1	15.8	84.0	-68.2

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHz)



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 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

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.

The limits in CFR 47, Part 15C 15.209(a) are identical to those in RSS-Gen section 8.9 Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohms. For example, an E-Field measurement in dBuV/m can be converted to dBuA/m via the following formula: $\text{dBuV/m} - 51.5 \text{ dB} = \text{dBuA/m}$. E-Field measurements have the same margin in dB to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limits.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Loop	ETS Lindgren	6502	AZM	2022-07-19	2024-07-19
Cable	Northwest EMC	RE 9kHz - 1GHz	TXB	2023-05-25	2024-05-25
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2023-02-09	2024-02-09

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

ABBO0294-1

MODES INVESTIGATED

Transmitting, 13.56 MHz, RFID

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHz)



EUT:	Switch 90 Convergent Centrifuge	Work Order:	ABBO0294
Serial Number:	S90CC1	Date:	2023-10-31
Customer:	Abbott Laboratories	Temperature:	22.1°C
Attendees:	None	Relative Humidity:	29.8%
Customer Project:	None	Bar. Pressure (PMSL):	1031 mb
Tested By:	Jarrod Brenden	Job Site:	TX02
Power:	220VAC/60Hz	Configuration:	ABBO0294-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2023	ANSI C63.10:2013
RSS-210 Issue 10:2019 +A1:2020	ANSI C63.10:2013

TEST PARAMETERS

Run #:	4	Test Distance (m):	10	Ant. Height(s) (m):	1(m)
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COMMENTS

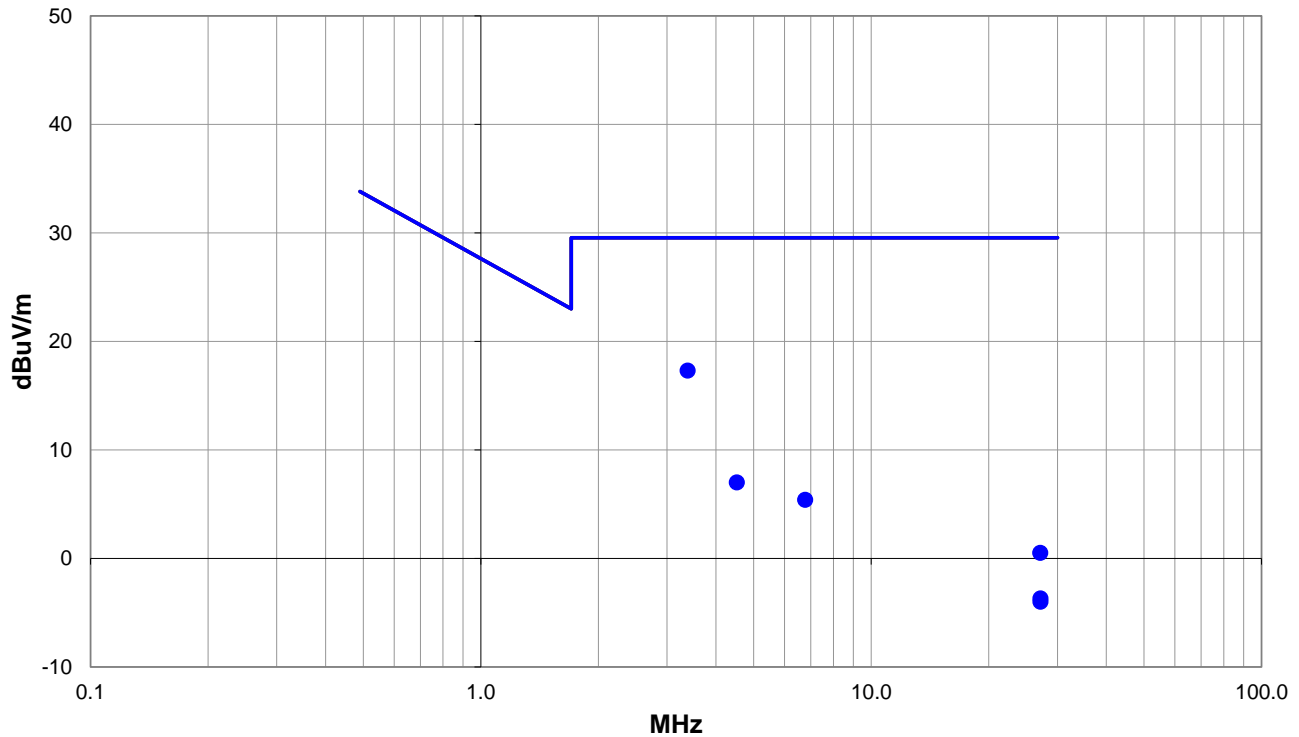
Test Protocol D000141866A_EMC. Track component of Floor Standing equipment.

EUT OPERATING MODES

Transmitting, 13.56 MHz, RFID

DEVIATIONS FROM TEST STANDARD

None



Run #: 4

■ PK ◆ AV ● QP

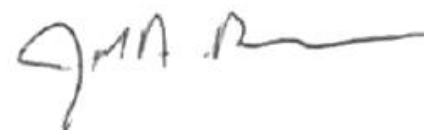
FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHz)

RESULTS - Run #4

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)
3.385	24.8	11.6	1.0	200.0	10.0	0.0	Perp to EUT	QP	-19.1	17.3	29.5	-12.2
4.524	14.3	11.8	1.0	141.0	10.0	0.0	Perp to EUT	QP	-19.1	7.0	29.5	-22.5
6.776	12.8	11.7	1.0	195.0	10.0	0.0	Perp to EUT	QP	-19.1	5.4	29.5	-24.1
27.116	9.6	10.0	1.0	349.0	10.0	0.0	Perp to EUT	QP	-19.1	0.5	29.5	-29.0
27.123	5.4	10.0	1.0	314.0	10.0	0.0	Para to EUT	QP	-19.1	-3.7	29.5	-33.2
27.145	5.1	10.0	1.0	261.9	10.0	0.0	Para to GND	QP	-19.1	-4.0	29.5	-33.5

CONCLUSION

Pass



Tested By

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)



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
Antenna - Biconilog	ETS Lindgren	3143B	AYF	2023-05-03	2025-05-03
Cable	Northwest EMC	RE 9kHz - 1GHz	TXB	2023-05-25	2024-05-25
Amplifier - Pre-Amplifier	Fairview Microwave	FMAM63001	PAS	2023-04-11	2024-04-11
Filter - Low Pass	Micro-Tronics	LPM50004	HHV	2023-07-21	2024-07-21
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2023-02-09	2024-02-09

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	4.7 dB	-4.7 dB

FREQUENCY RANGE INVESTIGATED

30 MHz TO 1000 MHz

POWER INVESTIGATED

220VAC/60Hz

CONFIGURATIONS INVESTIGATED

ABBO0294-1

MODES INVESTIGATED

Transmitting, 13.56 MHz, RFID

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)



EUT:	Switch 90 Convergent Centrifuge	Work Order:	ABBO0294
Serial Number:	S90CC1	Date:	2023-10-31
Customer:	Abbott Laboratories	Temperature:	22.1°C
Attendees:	None	Relative Humidity:	29.8%
Customer Project:	None	Bar. Pressure (PMSL):	1031 mb
Tested By:	Jarrod Brenden	Job Site:	TX02
Power:	220VAC/60Hz	Configuration:	ABBO0294-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2023	ANSI C63.10:2013
RSS-210 Issue 10:2019 +A1:2020	ANSI C63.10:2013

TEST PARAMETERS

Run #:	6	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)
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COMMENTS

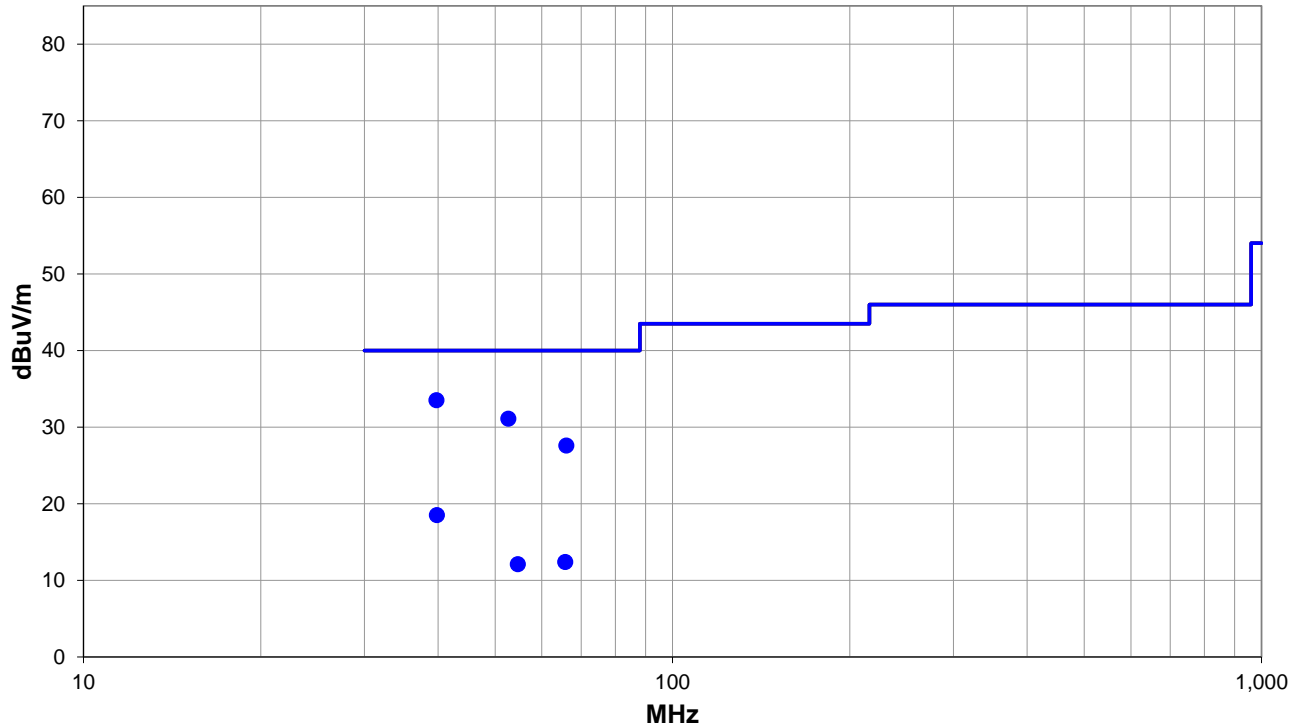
Test Protocol D000141866A_EMC. Track component of Floor Standing equipment.

EUT OPERATING MODES

Transmitting, 13.56 MHz, RFID

DEVIATIONS FROM TEST STANDARD

None



Run #: 6

■ PK ◆ AV ● QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)



RESULTS - Run #6

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)
39.746	56.4	-22.9	1.0	255.0	3.0	0.0	Vert	QP	0.0	33.5	40.0	-6.5
52.631	58.1	-27.0	1.0	159.0	3.0	0.0	Vert	QP	0.0	31.1	40.0	-8.9
66.043	53.6	-26.0	1.0	285.0	3.0	0.0	Vert	QP	0.0	27.6	40.0	-12.4
39.807	41.4	-22.9	1.0	178.9	3.0	0.0	Horz	QP	0.0	18.5	40.0	-21.5
65.769	38.4	-26.0	3.0	280.9	3.0	0.0	Horz	QP	0.0	12.4	40.0	-27.6
54.613	39.0	-26.9	1.0	141.9	3.0	0.0	Horz	QP	0.0	12.1	40.0	-27.9

CONCLUSION

Pass

Tested By

FREQUENCY STABILITY



TEST DESCRIPTION

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.

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 $\pm 0.01\%$ is equivalent to 100 ppm
The formula to check for compliance is:

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	2023-03-17	2024-03-17
Block - DC	Fairview Microwave	SD3235-2148	ANF	2023-05-24	2024-05-24
Cable	UtiFlex Micro-Coax	UFD1150A-1-0720-200200	TXJ	2023-08-30	2024-08-30
Generator - Signal	Agilent	N5173B	TIW	2023-08-07	2026-08-07
Probe - Near Field Set	ETS Lindgren	7405	IPS	NCR	NCR
Thermometer	Omega Engineering, Inc.	HH311	DUI	2023-03-02	2024-03-02
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPH-8-2-SCT/AC	TBH	NCR	NCR
Power Source/Analyzer	Hewlett Packard	6841A	THC	NCR	NCR

FREQUENCY STABILITY



EUT:	Switch 90 Convergent Centrifuge	Work Order:	ABBO0294
Serial Number:	S90CC1	Date:	2023-11-01
Customer:	Abbott Laboratories	Temperature:	22.5°C
Attendees:	None	Relative Humidity:	26%
Customer Project:	None	Bar. Pressure (PMSL):	1032 mbar
Tested By:	Jarrod Brenden	Job Site:	TX07
Power:	220VAC/60Hz	Configuration:	ABBO0294-1
Signature:			

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2023	ANSI C63.10:2013
RSS-210 Issue 10:2019+A1:2020	ANSI C63.10:2013

COMMENTS

Test Protocol D000141866A_EMC. Track component of Floor Standing equipment. RFID radios operate with modulation OOK, 100%, ISO 15693 at full rated power.

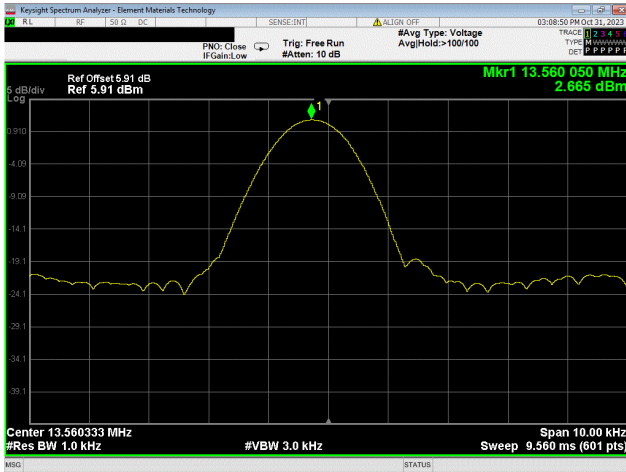
DEVIATIONS FROM TEST STANDARD

None

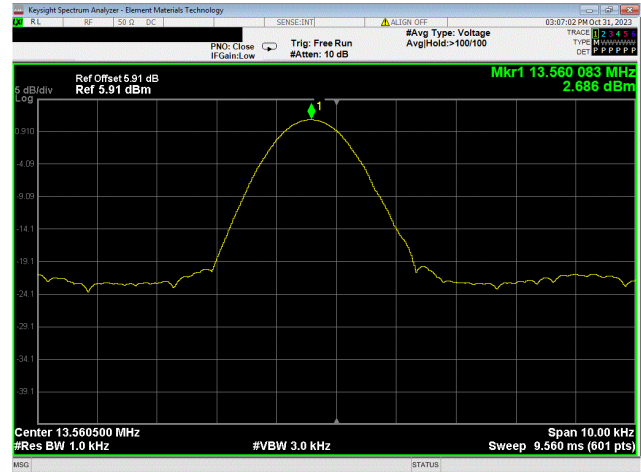
TEST RESULTS

	Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
RFID, 13.56 MHz					
Switch 90 Convergent Centrifuge					
Nominal Temperature, 20°C					
Voltage, 115%, 253V	13.560050	13.560083	2.48	100	Pass
Voltage, Nominal, 220V	13.560083	13.560083	0	100	Pass
Voltage, 85%, 187V	13.560050	13.560083	2.48	100	Pass
Nominal AC Voltage, 220V					
Temp, 50°C	13.559933	13.560083	11.11	100	Pass
Temp, 40°C	13.559950	13.560083	9.86	100	Pass
Temp, 30°C	13.560016	13.560083	4.94	100	Pass
Temp, 20°C	13.560050	13.560083	2.46	100	Pass
Temp, 10°C	13.560100	13.560083	1.23	100	Pass
Temp, 0°C	13.560150	13.560083	4.92	100	Pass
Temp, -10°C	13.560167	13.560083	6.15	100	Pass
Temp, -20°C	13.560133	13.560083	3.66	100	Pass

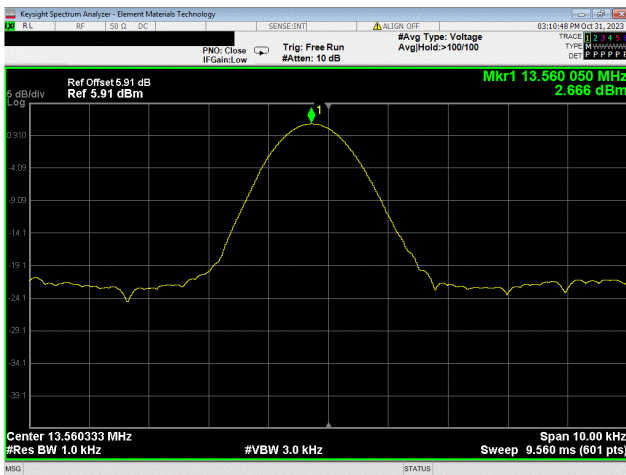
FREQUENCY STABILITY



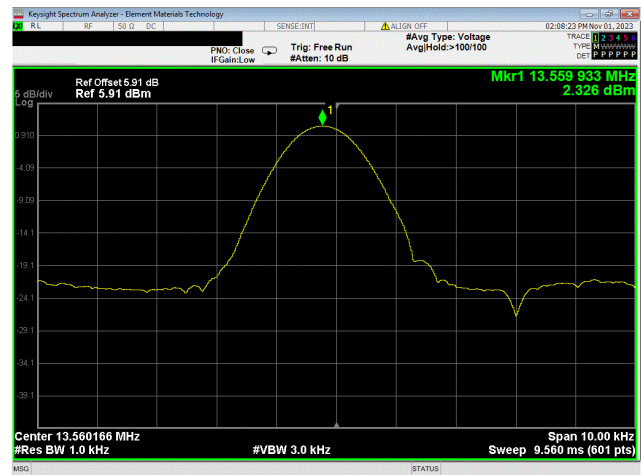
RFID, 13.56 MHz
Switch 90 Convergent Centrifuge
Nominal Temperature, 20°C
Voltage, 115%, 253V



RFID, 13.56 MHz
Switch 90 Convergent Centrifuge
Nominal Temperature, 20°C
Voltage, Nominal, 220V

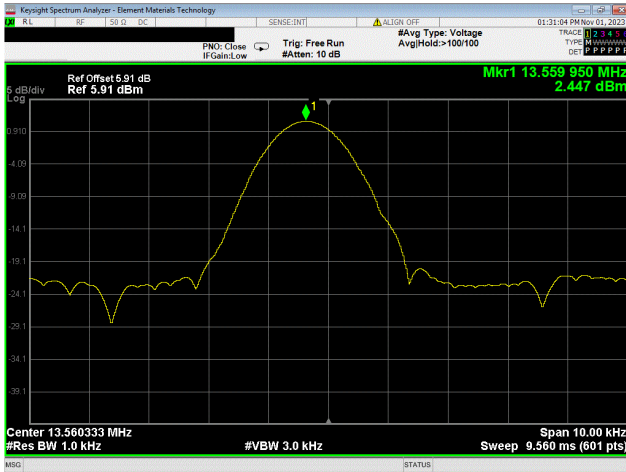


RFID, 13.56 MHz
Switch 90 Convergent Centrifuge
Nominal Temperature, 20°C
Voltage, 85%, 187V

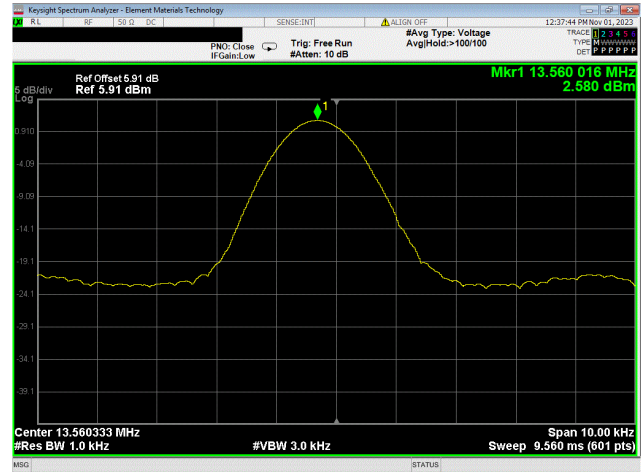


RFID, 13.56 MHz
Switch 90 Convergent Centrifuge
Nominal AC Voltage, 220V
Temp, 50°C

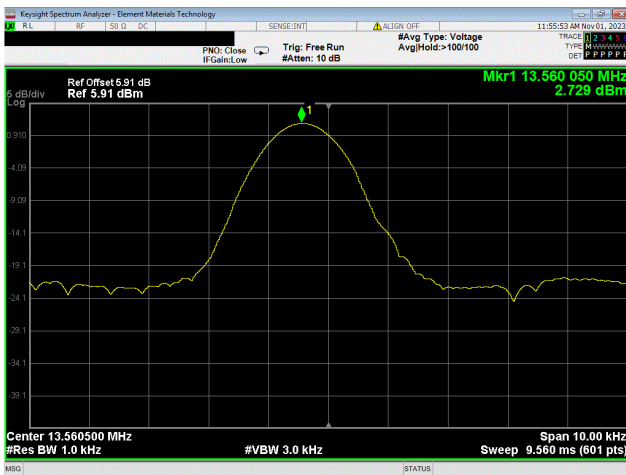
FREQUENCY STABILITY



RFID, 13.56 MHz
Switch 90 Convergent Centrifuge
Nominal AC Voltage, 220V
Temp, 40°C



RFID, 13.56 MHz
Switch 90 Convergent Centrifuge
Nominal AC Voltage, 220V
Temp, 30°C

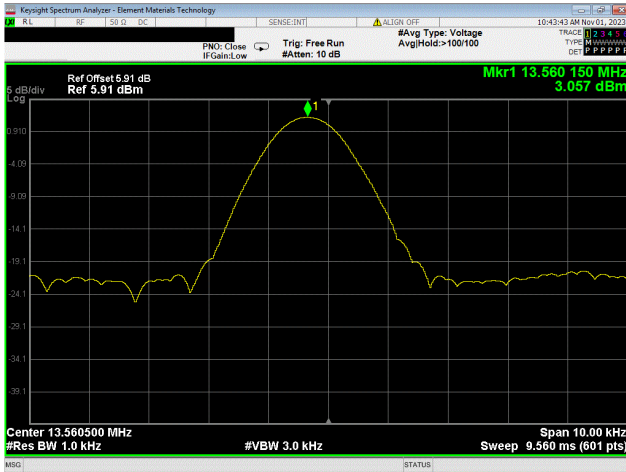


RFID, 13.56 MHz
Switch 90 Convergent Centrifuge
Nominal AC Voltage, 220V
Temp, 20°C

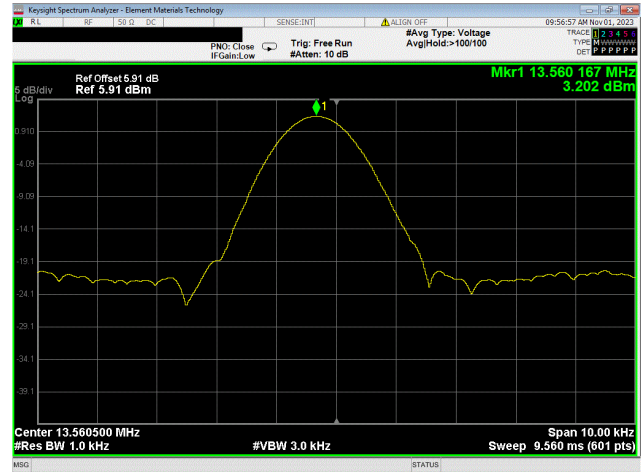


RFID, 13.56 MHz
Switch 90 Convergent Centrifuge
Nominal AC Voltage, 220V
Temp, 10°C

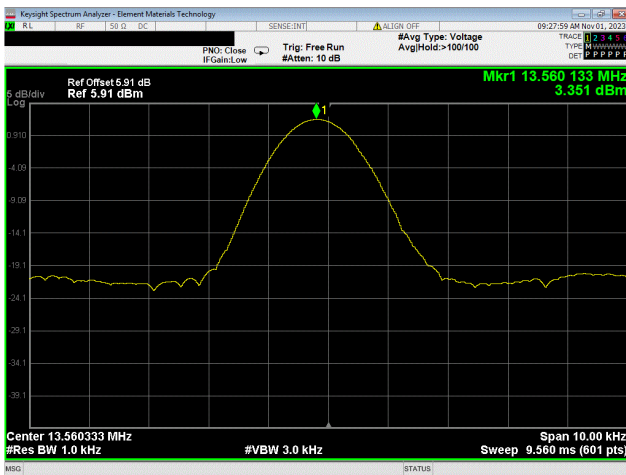
FREQUENCY STABILITY



RFID, 13.56 MHz
Switch 90 Convergent Centrifuge
Nominal AC Voltage, 220V
Temp, 0°C



RFID, 13.56 MHz
Switch 90 Convergent Centrifuge
Nominal AC Voltage, 220V
Temp, -10°C



RFID, 13.56 MHz
Switch 90 Convergent Centrifuge
Nominal AC Voltage, 220V
Temp, -20°C

OCCUPIED BANDWIDTH



TEST DESCRIPTION

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.

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.

When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99% emission bandwidth as defined in RSS-Gen.

The 99% occupied 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 Peak detector with max hold mode was used until the trace stabilized.

The spectrum analyzer occupied bandwidth measurement function was used to sum the power of the transmission in linear terms to obtain the 99% bandwidth.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	2023-03-17	2024-03-17
Block - DC	Fairview Microwave	SD3235-2148	ANF	2023-05-24	2024-05-24
Cable	UtiFlex Micro-Coax	UFD1150A-1-0720-200200	TXJ	2023-08-30	2024-08-30
Generator - Signal	Agilent	N5173B	TIW	2023-08-07	2026-08-07
Probe - Near Field Set	ETS Lindgren	7405	IPS	NCR	NCR
Thermometer	Omega Engineering, Inc.	HH311	DUI	2023-03-02	2024-03-02
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPH-8-2-SCT/AC	TBH	NCR	NCR
Power Source/Analyzer	Hewlett Packard	6841A	THC	NCR	NCR

OCCUPIED BANDWIDTH



EUT:	Switch 90 Convergent Centrifuge	Work Order:	ABBO0294
Serial Number:	S90CC1	Date:	2023-10-31
Customer:	Abbott Laboratories	Temperature:	22.6°C
Attendees:	None	Relative Humidity:	29%
Customer Project:	None	Bar. Pressure (PMSL):	1030 mbar
Tested By:	Jarrod Brenden	Job Site:	TX02
Power:	220VAC/60Hz	Configuration:	ABBO0294-1
Signature:			

TEST SPECIFICATIONS

Specification:	Method:
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013
RSS-210 Issue 10:2019+A1:2020	ANSI C63.10:2013

COMMENTS

Test Protocol D000141866A_EMC. Track component of Floor Standing equipment.

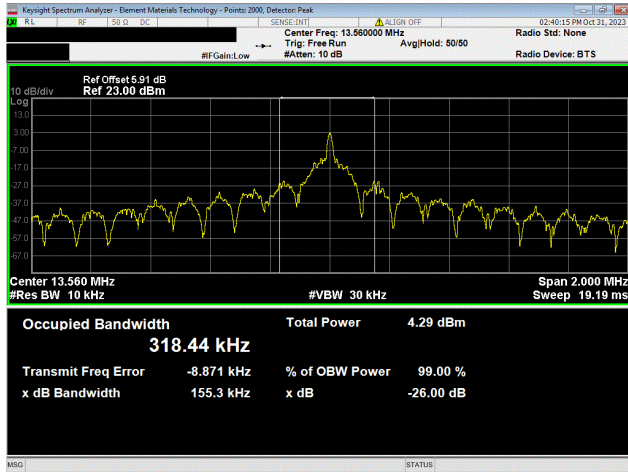
DEVIATIONS FROM TEST STANDARD

None

TEST RESULTS

	Value	Limit	Result
RFID, 13.56 MHz			
Switch 90 Convergent Centrifuge			
Nominal Temperature, 20°C			
Voltage, Nominal, 220V	318.445 kHz	N/A	N/A

OCCUPIED BANDWIDTH



RFID, 13.56 MHz
Switch 90 Convergent Centrifuge
Nominal Temperature, 20°C
Voltage, Nominal, 220V

End of Test Report