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RF Test Report

Test Report Number	STA-22022831-G-FCC-IC-RFID
FCC ID	2AUAM-VTLi
IC	25398-VTLi
Applicant	Siemens Healthcare Diagnostics Inc.
Applicant Address	2 Edgewater Drive Norwood, MA 02062-4637 USA
Product Name	Atellica® VTLi Immunoassay Analyzer
Model (s)	Atellica VTLi
Date of Receipt	12/15/2022
Date of Test	12/28/2022 – 02/06/2023
Report Issue Date	02/07/2023
Test Standards	47CFR Part 15.225 RSS-210 Issue 10, Dec 2019
Test Result	**PASS**

Issued by:

Vista Compliance Laboratories
1261 Puerta Del Sol, San Clemente, CA 92673 USA
www.vista-compliance.com

Devin Tai (Test Engineer)

David Zhang (Technical Manager)

REVISION HISTORY

Report Number	Version	Description	Issued Date
STA-22022831-G-FCC-IC-RFID	01	Initial report	02/07/2023

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1 Test Summary

Test Item	Test Requirement	Test Method	Result
Antenna Requirement	47 CFR Part 15.203	ANSI C63.10 (2013)	Pass
Occupied Bandwidth	RSS-Gen Issue 5 Amd 2 Feb 2021	RSS-Gen Issue 5 Amd 2 Feb 2021	Pass
Emission Mask Limit in the band of 13.110 – 14.010 MHz	47 CFR Part 15.225 RSS-210 Issue 10: Dec 2019	ANSI C63.10 (2013)	Pass
Radiated Spurious Emission below 30MHz	47 CFR Part 15.225 RSS-210 Issue 10: Dec 2019	ANSI C63.10 (2013)	Pass
Radiated Spurious Emissions below 1GHz	47 CFR Part 15.225 RSS-210 Issue 10: Dec 2019	ANSI C63.10 (2013)	Pass
AC Power Line Conducted Emissions	47 CFR Part 15.207 RSS-Gen Issue 5, Mar 2019	ANSI C63.10 (2013)	Pass
Frequency Stability	47 CFR Part 15.225 RSS-210 Issue 10: Dec 2019	ANSI C63.10 (2013)	Pass

2 General Information

2.1 Applicant

Applicant	Siemens Healthcare Diagnostics Inc.
Applicant address	2 Edgewater Drive Norwood, MA 02062-4637 USA
Manufacturer	Siemens Healthcare Diagnostics Inc.
Manufacturer Address	2 Edgewater Drive Norwood, MA 02062-4637 USA

2.2 Product information

Product Name	Atellica® VTLi Immunoassay Analyzer
Model Number	Atellica VTLi
Family Models	N/A
Serial Number	000019035
Frequency Band	RFID: 13.56MHz
Type of modulation	RFID: ASK
Equipment Class	DXX
Antenna Information	Shielding loop antenna
Clock Frequencies	N/A
Input Power	Rechargeable Li-ion Battery: 14.8 VDC
Power Adapter Manufacturer/Model	Switching Power Adapter: Model No.: UES36LCP1-190189SPA Part No.: UE210416HKSH2RM Input: 100-240VAC, 50-60Hz, 1.0A Output: 19.0VDC, 1.89A, 35.9W Docking Station: Atellica® VTLi SN: 000019504; 19V, 1.57A
Power Adapter SN	N/A
Hardware version	N/A
Software version	N/A
Simultaneous Transmission	RFID and 2.4GHz/5GHz can transmit simultaneously. The simultaneous transmission has been evaluated in the testing.
Additional Info	This device contains a certified 2.4GHz/5GHz WLAN module. - Brand: F&S - Model: efusA9X, efusA9Xr2 FCC ID: 2A8IPEFUSA9X

2.3 Test standard and method

Test standard	47CFR Part 15.225 RSS-210 Issue 10: Dec 2019
Test method	ANSI C63.10-2013 RSS-Gen Issue 5 Amd 2 Feb 2021

3 Test Site Information

Lab performing tests	Vista Laboratories, Inc.
Lab Address	1261 Puerta Del Sol, San Clemente, CA 92673 USA
Phone Number	+1 (949) 393-1123
Website	www.vista-compliance.com

Test Condition	Temperature	Humidity	Atmospheric Pressure
RF Testing	23.5°C	58.2%	996 mbar
Radiated Emission Testing	23.5°C	58.2%	996 mbar

4 Modification of EUT / Deviations from Standards

N/A

5 Test Configuration and Operation

5.1 EUT Test Configuration

The EUT is an engineering test sample loaded with RF testing firmware specifically designed to support the RF TX/RX measurement in different aspects.

The following software was used for testing and to monitor EUT performance

Software	Description
EMCApp	Run RFID in test mode

5.2 Supporting Equipment

Description	Manufacturer	Model #	Serial #	Remark
AC/DC Adapter	Dell	DA130PE1-00	JU012	Provide by client
Test Laptop	Dell	Latitude E6510	3RZC1M1	Provide by client
Power Supply	UE	UES36LCP1-190189SPA	UE210416HKSH2RM	Provide by client
Charging Dock	SIEMENS Healthineers	11643523	000007001	Provide by client

6 Uncertainty of Measurement

Test item	Measurement Uncertainty (dB)
RF Output Power (Conducted)	±1.2 dB
Unwanted Emission (conducted)	±2.6 dB
Radiated Emission (9KHz-30MHz)	±3.5 dB
Radiated Emission (30MHz-1GHz)	±4.6 dB

7 Test Results

7.1 Antenna Requirement

7.1.1 Requirement

Per § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

7.1.2 Result

Analysis:

- EUT uses internal coil antenna. No standard RF connector is used.

Conclusion:

- EUT complies with antenna requirement in § 15.203.

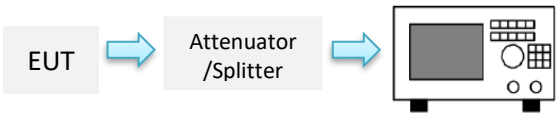
7.2 Occupied Bandwidth (99%)

7.2.1 Requirement

RSS-Gen §6.7

The occupied bandwidth or the "99% emission bandwidth" is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

7.2.2 Test Setup



7.2.3 Test Procedure

According to section RSS-Gen §6.7

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW ≥ 3 × RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.

1. Set RBW = 1% to 5% of the actual occupied BW.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Span = large enough to capture all products of the modulation process
7. Allow the trace to stabilize.
8. Use automatic bandwidth measurement capability on instrument to obtain BW result.

7.2.4 Test Result

Mode	Frequency (MHz)	Measured 99% OBW (KHz)	Limit (KHz)	Result
RFID	13.56	2.423	N/A	Pass

7.2.5 Test Plots

RFID-13.56MHz-OBW

7.3 Emission Mask Limit in the band of 13.110 – 14.010 MHz

7.3.1 Requirement

Per §15.225 Operation within the band 13.110–14.010 MHz:

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

Per RSS-210, B.6, Band 13.110-14.010 MHz

(a) the field strength of any emission shall not exceed the following limits:

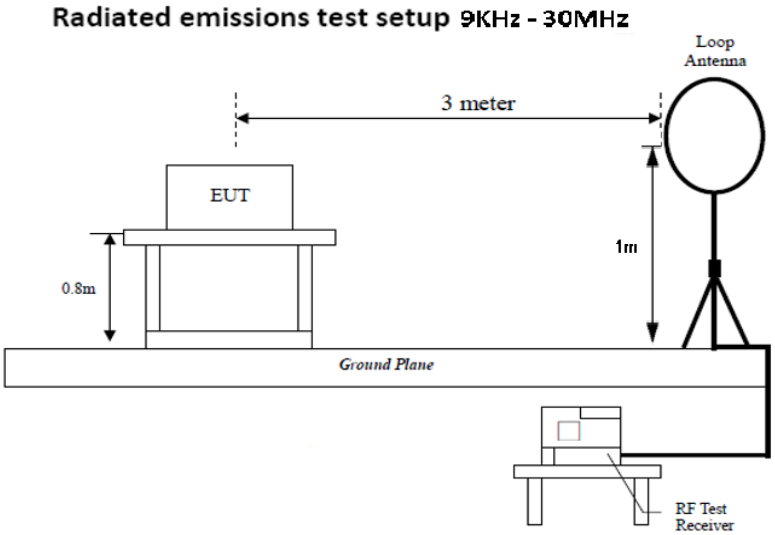
(i) 15.848 mV/m (84 dBµV/m) at 30 m, within the band 13.553-13.567 MHz

(ii) 334 µV/m (50.5 dBµV/m) at 30 m, within the bands 13.410-13.553 MHz and 13.567-13.710 MHz

(iii) 106 µV/m (40.5 dBµV/m) at 30 m, within the bands 13.110-13.410 MHz and 13.710-14.010 MHz

(iv) RSS-Gen general field strength limits for frequencies outside the band 13.110-14.010 MHz

7.3.2 Test Setup



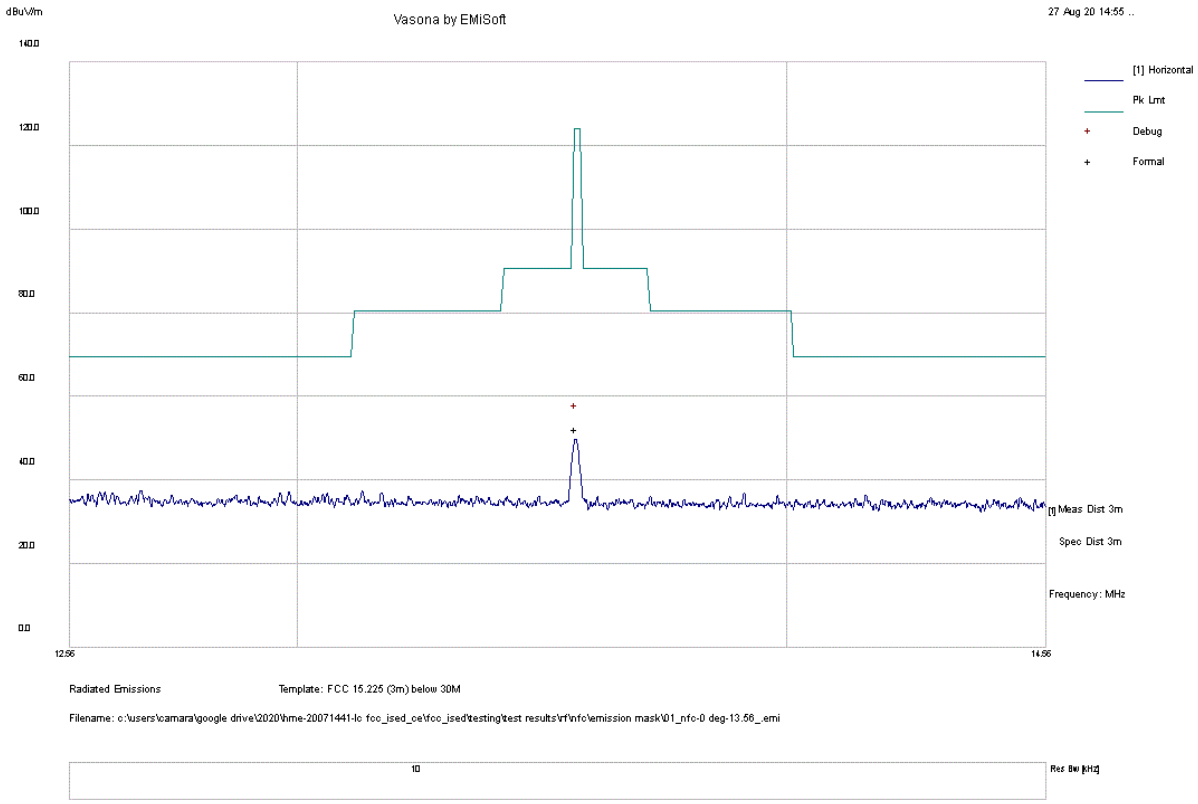
7.3.3 Test Procedure

According to section 6.4 of ANSI C63.10-2013 The process will be repeated in 3 EUT orientations.

1. The EUT was placed on a non-conducting table and switched on and allowed to warm up to its normal operating condition. Measuring loop antenna is placed at 1m height and at 3m distance away from EUT.
2. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna orientation at both 0 deg and 90 deg.
3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 300 Hz for frequency below 150KHz.
4. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 10 kHz for frequency between 150KHz – 30MHz.
5. Steps 2 and 4 were repeated for the next frequency point, until all selected frequency points were measured.

7.3.4 Test Result

Test Standard:	15.225, RSS-210	Mode:	RFID TX
Frequency Range:	Below 30MHz	Test Date:	02/06/2023
Antenna Type/Polarity:	Loop / 0 deg	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass

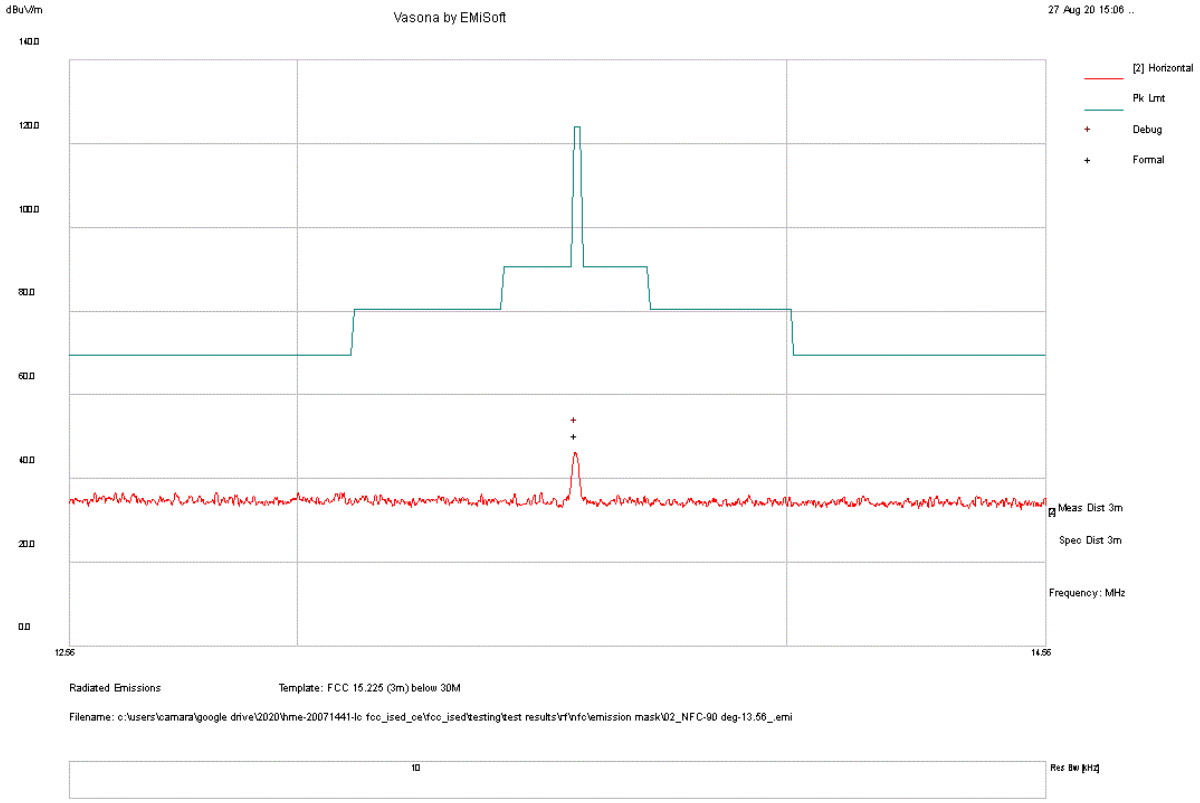


Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
13.559	41.8	1.3	15.1	58.3	Peak Max	0 deg	100	312	124.0	-64.7	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB/m) = Antenna Factor (dB) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	15.225, RSS-210	Mode:	RFID TX
Frequency Range:	Below 30MHz	Test Date:	02/06/2023
Antenna Type/Polarity:	Loop / 90 deg	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
13.561	37.9	1.3	15.1	54.4	Peak Max	90 deg	100	103	124.0	-69.6	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB/m) = Antenna Factor (dB) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

7.4 Radiated Spurious Emission below 30MHz

7.4.1 Requirement

Per §15.225 Operation within the band 13.110–14.010 MHz:

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

Per RSS-210, B.6, Band 13.110-14.010 MHz

(a) the field strength of any emission shall not exceed the following limits:

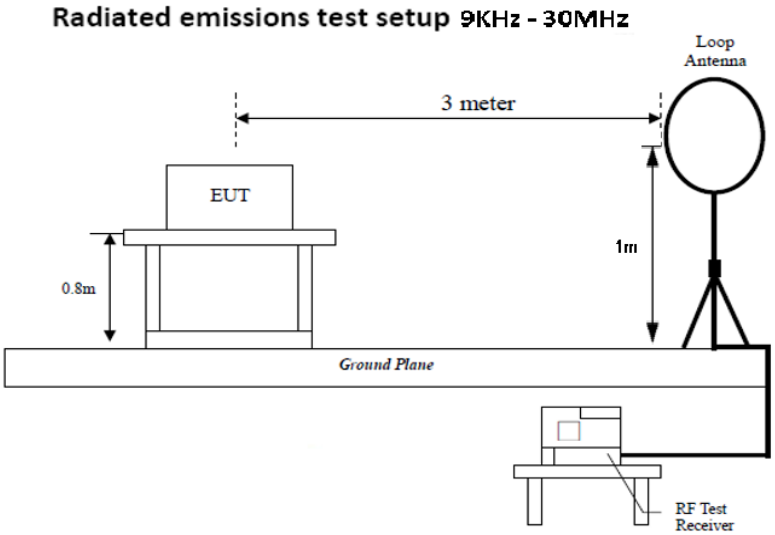
(i) 15.848 mV/m (84 dBµV/m) at 30 m, within the band 13.553-13.567 MHz

(ii) 334 µV/m (50.5 dBµV/m) at 30 m, within the bands 13.410-13.553 MHz and 13.567-13.710 MHz

(iii) 106 µV/m (40.5 dBµV/m) at 30 m, within the bands 13.110-13.410 MHz and 13.710-14.010 MHz

(iv) RSS-Gen general field strength limits for frequencies outside the band 13.110-14.010 MHz

7.4.2 Test Setup



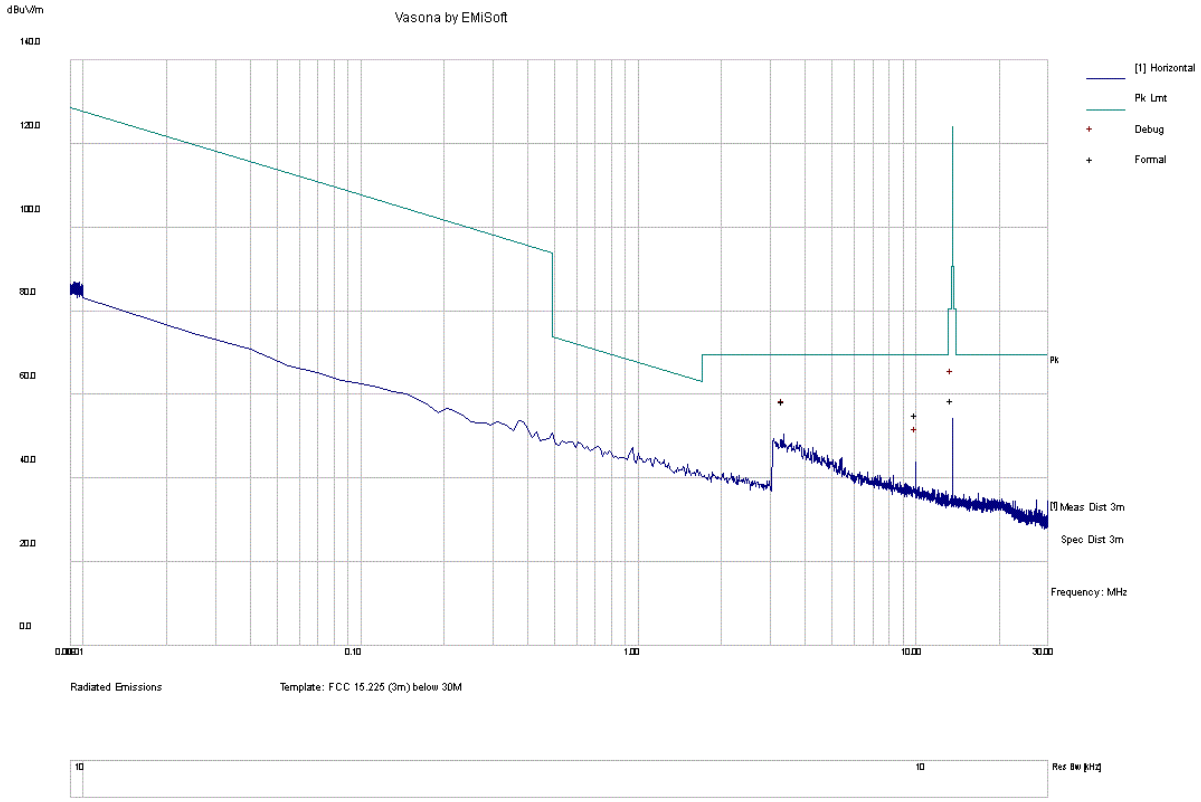
7.4.3 Test Procedure

According to section 6.4 of ANSI C63.10-2013 The process will be repeated in 3 EUT orientations.

1. The EUT was placed on a non-conducting table and switched on and allowed to warm up to its normal operating condition. Measuring loop antenna is placed at 1m height and at 3m distance away from EUT.
2. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna orientation at both 0 deg and 90 deg.
3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 300 Hz for frequency below 150KHz.
4. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 10 kHz for frequency between 150KHz – 30MHz.
5. Steps 2 and 4 were repeated for the next frequency point, until all selected frequency points were measured.

7.4.4 Test Result

Test Standard:	15.225, RSS-210	Mode:	RFID TX
Frequency Range:	Below 30MHz	Test Date:	02/06/2023
Antenna Type/Polarity:	Loop / 0 deg	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass

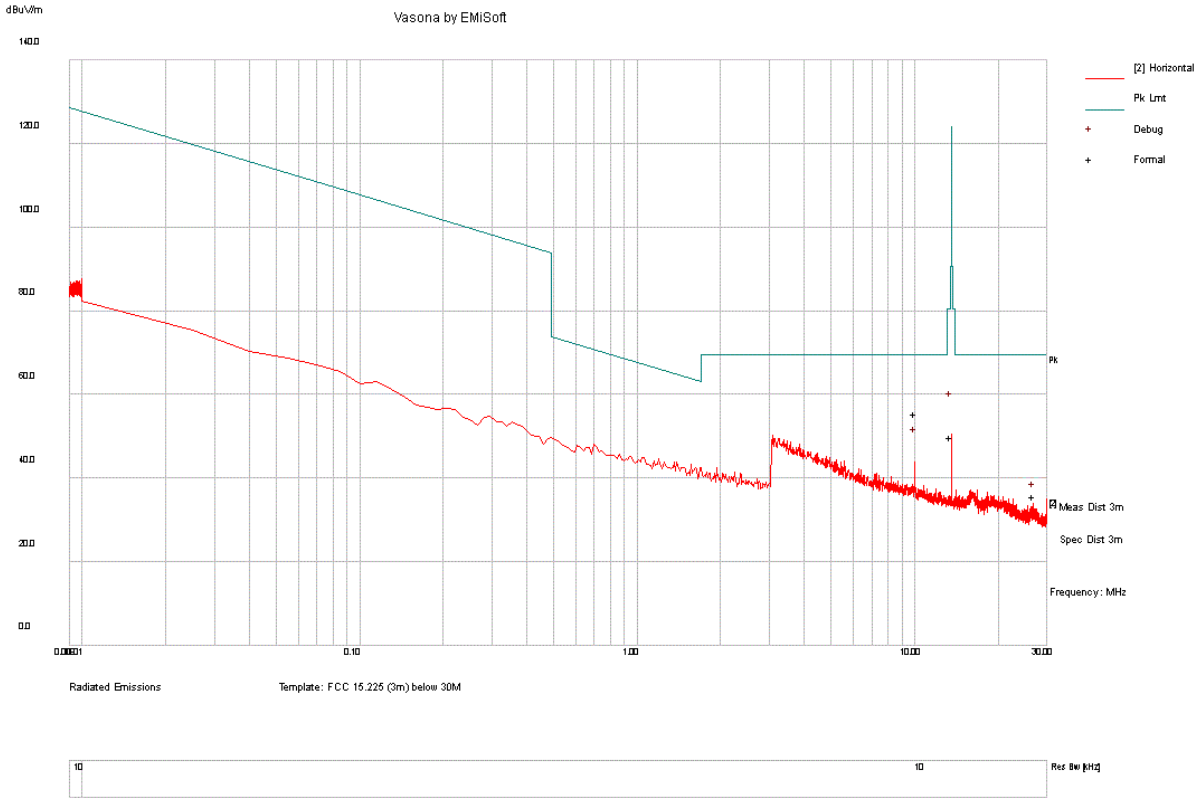


Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
3.322	42.1	0.9	15.1	58.0	Peak Max	0 deg	100	226	69.5	-11.5	Pass
9.999	37.6	1	15.5	54.1	Peak Max	0 deg	100	112	69.5	-15.4	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB/m) = Antenna Factor (dB) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	15.225, RSS-210	Mode:	RFID TX
Frequency Range:	Below 30MHz	Test Date:	02/06/2023
Antenna Type/Polarity:	Loop / 90 deg	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
10.000	38.2	1	15.5	54.7	Peak Max	90 deg	100	133	69.5	-14.8	Pass
27.118	31.5	2.1	13.8	47.5	Peak Max	90 deg	100	131	69.5	-22	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB/m) = Antenna Factor (dB) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

7.5 Radiated Spurious Emissions below 1GHz

7.5.1 Requirement

Per §15.225 Operation within the band 13.110–14.010 MHz:

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

Per RSS-210, B.6, Band 13.110-14.010 MHz

(a) the field strength of any emission shall not exceed the following limits:

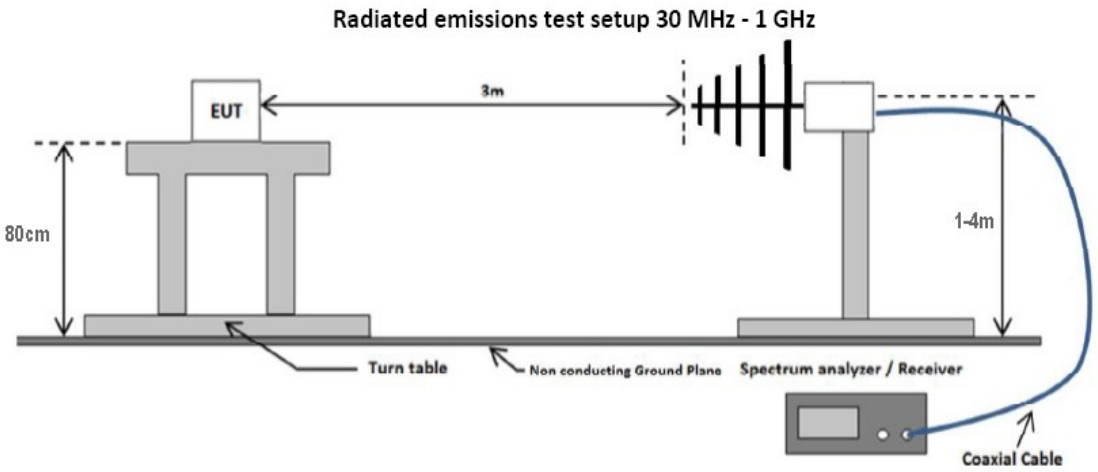
(i) 15.848 mV/m (84 dBµV/m) at 30 m, within the band 13.553-13.567 MHz

(ii) 334 µV/m (50.5 dBµV/m) at 30 m, within the bands 13.410-13.553 MHz and 13.567-13.710 MHz

(iii) 106 µV/m (40.5 dBµV/m) at 30 m, within the bands 13.110-13.410 MHz and 13.710-14.010 MHz

(iv) RSS-Gen general field strength limits for frequencies outside the band 13.110-14.010 MHz

7.5.2 Test Setup



7.5.3 Test Procedure

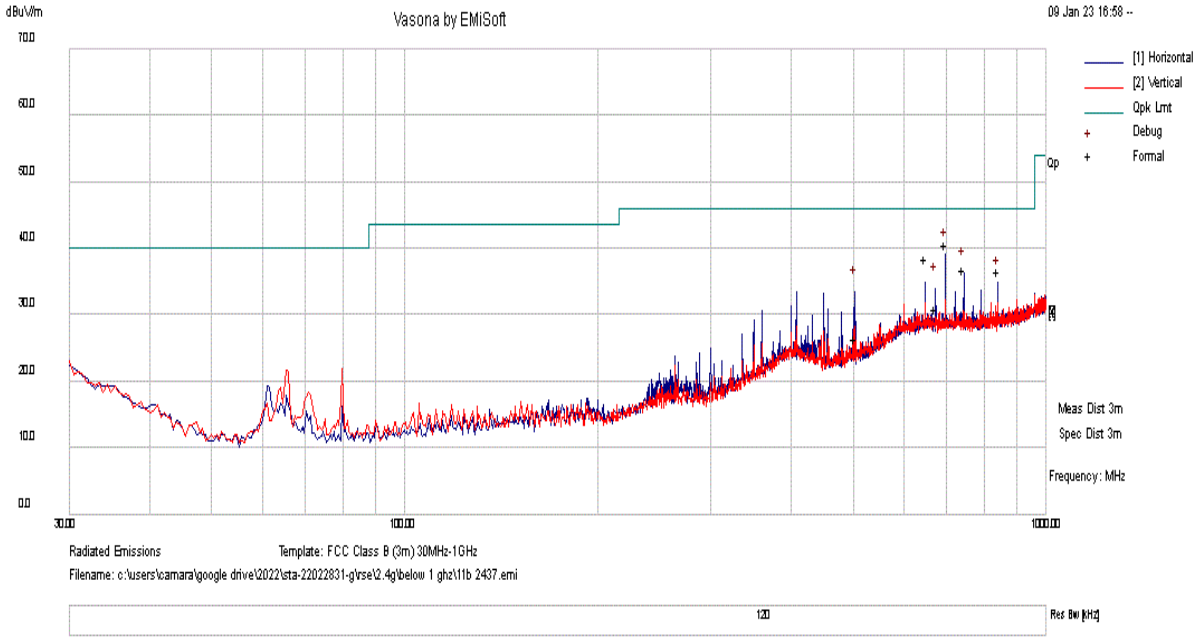
According to section 6.5 of ANSI C63.10-2013 as well as the procedures for maximizing and measuring radiated emissions that are described in ANSI C63.10 was followed. Boresight antenna mast was used during the scanning to point to EUT to maximize the emission. The process will be repeated in 3 EUT orientations.

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
   a. Vertical or horizontal polarization (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
   b. The EUT was then rotated to the direction that gave the maximum emission.
   c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 300 Hz for frequency below 150KHz.
4. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 10 kHz for frequency between 150KHz – 30MHz.
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-Peak detection at frequency between 30MHz - 1GHz.
6. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak and average measurement at frequency above 1GHz.
7. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.

7.5.4 Test Result

RADIATED EMISSIONS BELOW 1 GHZ

Test Standard:	15.225, RSS-210	Mode:	RFID TX
Frequency Range:	30 MHz - 1 GHz	Test Date:	01/09/2023
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Zach Peng
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
695.999	38.8	7.3	-5.4	40.7	Quasi Max	H	117	264	46.0	-5.3	Pass
743.971	34.5	7.3	-4.9	37.0	Quasi Max	H	101	71	46.0	-9.0	Pass
839.966	33.3	7.4	-4.0	36.7	Quasi Max	H	100	241	46.0	-9.3	Pass
647.982	36.3	7.2	-5.1	38.4	Quasi Max	H	112	242	46.0	-7.6	Pass
672.110	28.8	7.3	-5.3	30.9	Quasi Max	H	100	0	46.0	-15.1	Pass
503.666	28.7	6.1	-8.3	26.5	Quasi Max	H	167	260	46.0	-19.5	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + AF (dB).
2. AF(dB/m) = Antenna Factor (dB) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

7.6 Conducted Emissions

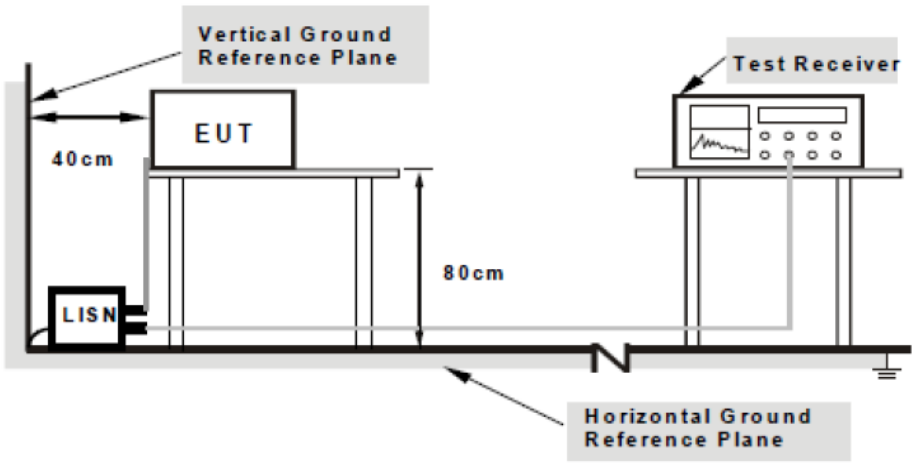
7.6.1 Requirement

Per § 15.207 (a) and RSS-Gen, an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Limits for Conducted Emissions at the Mains Ports

Section	Frequency ranges (MHz)	Limit (dBuV)	
		QP	Average
Class B devices	0.15 – 0.5	66 – 56	56 – 46
	0.5 – 5	56	46
	5 - 30	60	50
NOTE 1 The lower limit shall apply at the transition frequencies.			

7.6.2 Test setup



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.

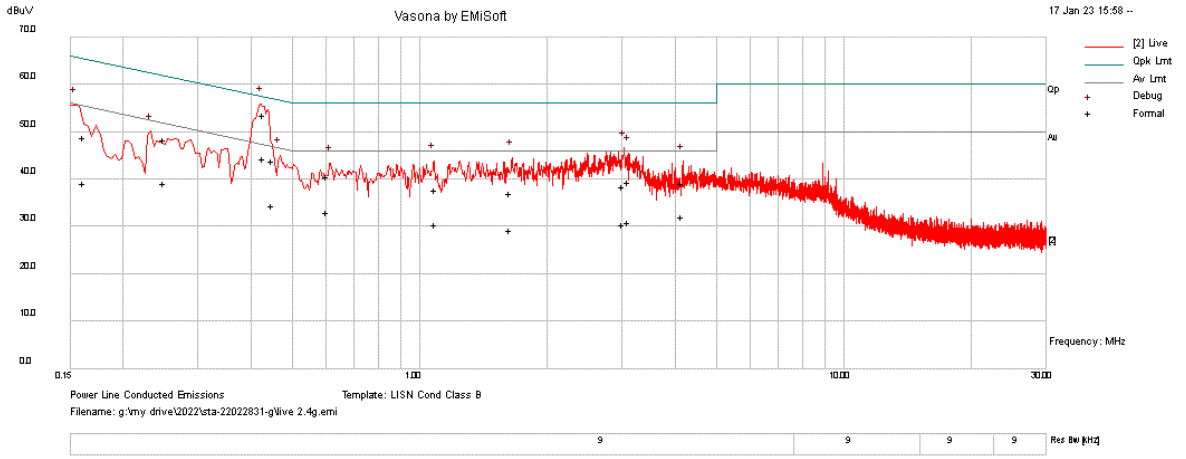
7.6.3 Test Procedure

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.
2. The power supply for the EUT was fed through a 50Ω/50μH EUT LISN, connected to filtered mains.
3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.
4. All other supporting equipment was powered separately from another main supply.
5. The EUT was switched on and allowed to warm up to its normal operating condition.
6. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver.
7. High peaks, relative to the limit line, were then selected.
8. The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz. For FCC tests, only Quasi-peak measurements were made; while for CISPR/EN tests, both Quasi-peak and Average measurements were made
9. All possible modes of operation were investigated. Only the worst case emissions were measured and reported. All other emissions were relatively insignificant.

7.6.4 Test Result

CONDUCTED EMISSIONS

Test Standard:	LISN B Cond Class B	Mode:	Normal operation
Frequency Range:	0.15 - 30MHz	Test Date:	01/17/2023
Line:	Live	Test Personnel:	Zach Peng
Remark:	Tested with charging dock	Test Result:	Pass

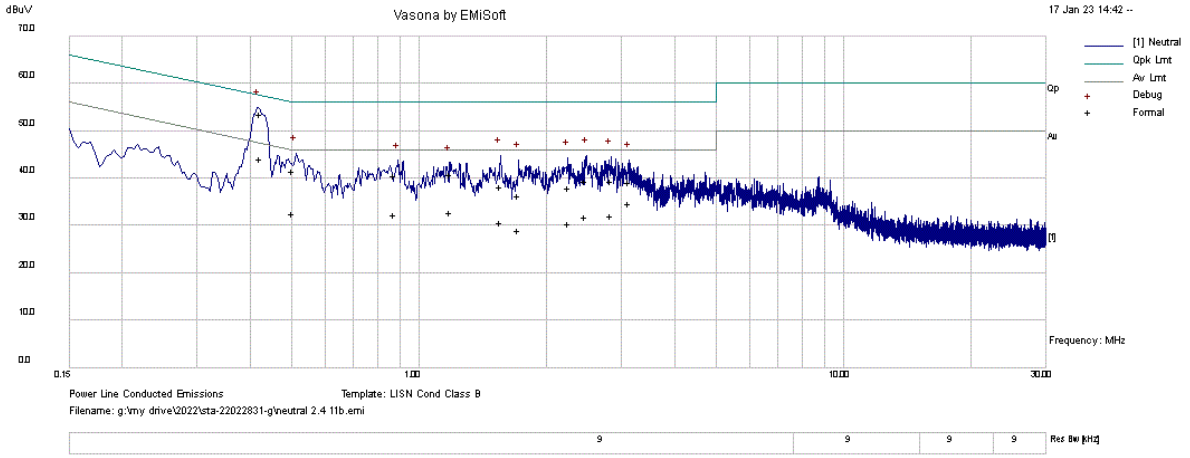


No.	Frequency MHz	Raw dBuV	Cable Loss dB	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass/Fail
1	.428	43.4	10.1	.1	53.7	Quasi Peak	Live	57.3	-3.6	Pass
2	3.281	28.1	10.3	.1	38.5	Quasi Peak	Live	56.0	-17.5	Pass
3	1.299	26.6	10.2	.1	36.9	Quasi Peak	Live	56.0	-19.1	Pass
4	.869	29.0	10.1	.1	39.3	Quasi Peak	Live	56.0	-16.7	Pass
5	.150	38.5	10.1	.2	48.8	Quasi Peak	Live	66.0	-17.2	Pass
6	.450	32.8	10.1	.1	43.1	Quasi Peak	Live	56.9	-13.8	Pass
7	.354	27.7	10.1	.1	37.9	Quasi Peak	Live	58.9	-21.0	Pass
8	3.331	31.2	10.3	.1	41.6	Quasi Peak	Live	56.0	-14.4	Pass
9	.696	29.9	10.1	.1	40.1	Quasi Peak	Live	56.0	-15.9	Pass
10	.222	37.3	10.1	.2	47.6	Quasi Peak	Live	62.7	-15.2	Pass
11	.428	34.2	10.1	.1	44.4	Average	Live	47.3	-2.9	Pass
12	3.281	19.7	10.3	.1	30.1	Average	Live	46.0	-15.9	Pass
13	1.299	18.8	10.2	.1	29.1	Average	Live	46.0	-16.9	Pass
14	.869	21.3	10.1	.1	31.5	Average	Live	46.0	-14.5	Pass
15	.150	27.2	10.1	.2	37.5	Average	Live	56.0	-18.5	Pass
16	.450	23.6	10.1	.1	33.8	Average	Live	46.9	-13.1	Pass
17	.354	19.7	10.1	.1	29.9	Average	Live	48.9	-19.0	Pass
18	3.331	23.5	10.3	.1	33.9	Average	Live	46.0	-12.1	Pass
19	.696	22.2	10.1	.1	32.4	Average	Live	46.0	-13.6	Pass
20	.222	26.9	10.1	.2	37.2	Average	Live	52.7	-15.6	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + Factor (dB).
2. Margin = Level (dBuV) - Limit value(dBuV)

Test Standard:	LISN B Cond Class B	Mode:	Normal operation
Frequency Range:	0.15 - 30MHz	Test Date:	1/17/2022
Line:	Neutral	Test Personnel:	Zach Peng
Remark:	Tested with charging dock	Test Result:	Pass



No.	Frequency MHz	Raw dBuV	Cable Loss dB	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass/Fail
1	.423	43.4	10.1	.1	53.6	Quasi Peak	Neutral	57.4	-3.8	Pass
2	.506	31.4	10.1	.1	41.6	Quasi Peak	Neutral	56.0	-14.4	Pass
3	2.472	29.0	10.3	.1	39.3	Quasi Peak	Neutral	56.0	-16.7	Pass
4	1.556	27.9	10.2	.1	38.2	Quasi Peak	Neutral	56.0	-17.8	Pass
5	2.835	29.1	10.3	.1	39.5	Quasi Peak	Neutral	56.0	-16.5	Pass
6	2.254	27.7	10.2	.1	38.0	Quasi Peak	Neutral	56.0	-18.0	Pass
7	1.719	26.1	10.2	.1	36.4	Quasi Peak	Neutral	56.0	-19.6	Pass
8	3.137	28.8	10.3	.1	39.2	Quasi Peak	Neutral	56.0	-16.8	Pass
9	.878	30.4	10.1	.1	40.7	Quasi Peak	Neutral	56.0	-15.3	Pass
10	1.185	30.7	10.2	.1	41.0	Quasi Peak	Neutral	56.0	-15.0	Pass
11	.423	33.8	10.1	.1	44.1	Average	Neutral	47.4	-3.3	Pass
12	.506	22.3	10.1	.1	32.5	Average	Neutral	46.0	-13.5	Pass
13	2.472	21.6	10.3	.1	32.0	Average	Neutral	46.0	-14.0	Pass
14	1.556	20.3	10.2	.1	30.6	Average	Neutral	46.0	-15.4	Pass
15	2.835	21.8	10.3	.1	32.1	Average	Neutral	46.0	-13.9	Pass
16	2.254	20.2	10.2	.1	30.5	Average	Neutral	46.0	-15.5	Pass
17	1.719	18.8	10.2	.1	29.1	Average	Neutral	46.0	-16.9	Pass
18	3.137	24.4	10.3	.1	34.8	Average	Neutral	46.0	-11.2	Pass
19	.878	22.0	10.1	.1	32.3	Average	Neutral	46.0	-13.7	Pass
20	1.185	22.5	10.2	.1	32.8	Average	Neutral	46.0	-13.2	Pass

Remarks:

1. Level (dBuV) = Raw (dBuV) + Cable loss(dB) + Factor (dB).
2. Margin = Level (dBuV) - Limit value(dBuV)

7.7 Frequency Stability

7.7.1 Requirement

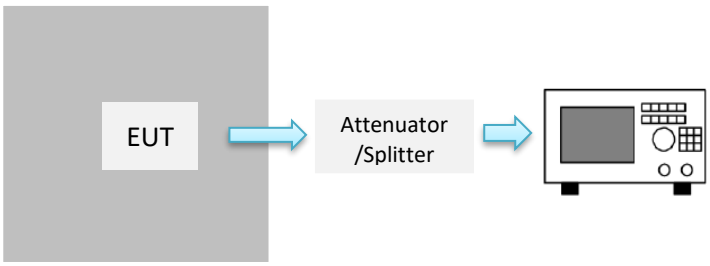
Per §15.225 Operation within the band 13.110–14.010 MHz:

(e) The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency over a temperature variation of −20 degrees to + 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

Per RSS-210, B.6, Band 13.110-14.010 MHz

(b) the carrier frequency stability shall not exceed ±100 ppm

7.7.2 Test Setup



7.7.3 Test Procedure

According to section 6.8 of ANSI C63.10-2013

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW ≥ 3 × RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.

1. Set RBW = 1% to 5% of the actual occupied BW.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Span = large enough to capture all products of the modulation process
7. Allow the trace to stabilize.
8. Use automatic bandwidth measurement capability on instrument to obtain BW result.

7.7.4 Test Result

Frequency Stability versus Temperature: The Frequency tolerance of the carrier signal shall be maintained within ± 0.01% of the operating frequency over a temperature variation of -20ºC to +50ºC at normal supply voltage.

Reference Frequency: 13.56MHz at 20°C at 14.8 VDC

Frequency Stability						
Temperature	Test Mode	Frequency (MHz)	Measured Freq.	Freq. Drift (%)	Freq. Deviation (Limit: 0.01%)	Result
50	RFID	13.56	13.5590	-0.007	<0.01	Pass
40	RFID	13.56	13.5594	-0.004	<0.01	Pass
30	RFID	13.56	13.5594	-0.004	<0.01	Pass
20	RFID	13.56	Reference			
10	RFID	13.56	13.5594	-0.004	<0.01	Pass
0	RFID	13.56	13.5594	-0.004	<0.01	Pass
-10	RFID	13.56	13.5594	-0.004	<0.01	Pass
-20	RFID	13.56	13.5595	-0.004	<0.01	Pass

Frequency Stability versus Input Voltage: The Frequency tolerance of the carrier signal shall be maintained within ± 0.01%, the frequency of the transmitter was measured at 85% and at 115% of the rated power supply voltage at a 20ºC environmental temperature.

Carrier Frequency: 13.56MHz at 20°C at 120VAC

Measured Voltage ±15% of nominal (VDC)	Measured Freq. (MHz)	Freq. Drift (%)	Freq. Deviation (Limit: 0.01%)	Pass/Fail
17.02	13.5594	-0.004	<0.01	Pass
12.58	13.5594	-0.004	<0.01	Pass

8 EUT and Test Setup Photos

See FCC exhibits

9 Test Instrument List

Equipment	Manufacturer	Model	Instrument Number	Cal. Date	Cal. Due
Semi-Anechoic Chamber	ETS-Lindgren	10M	VL001	10/18/2022	10/18/2023
Shielding Control Room	ETS-Lindgren	Series 81	VL006	N/A	N/A
Spectrum Analyzer	Keysight	N9020A	MY50110074	06/09/2022	06/09/2023
EMC Test Receiver	R&S	ESL6	100230	06/07/2022	06/07/2023
LISN (9KHz – 30MHz)	EMCO	3816/2	9705-1066	07/12/2022	07/12/2023
Bi-Log Antenna	ETS-Lindgren	3142E	217921	07/19/2022	07/19/2023
Horn Antenna (1-18GHz)	Electro-Metrics	EM-6961	6292	07/21/2022	07/21/2023
Horn Antenna (18-40GHz)	Com-Power	AH-840	101109	07/21/2022	07/21/2023
Preamplifier	RF Bay, Inc.	LPA-10-20	11180621	07/16/2022	07/16/2023
True RMS Multi-meter	UNI-T	UT181A	C173014829	06/07/2022	06/07/2023
Temp / Humidity / Pressure Meter	PCE Instruments	PCE-THB 40	R062028	06/07/2022	06/07/2023
RF Attenuator	Pasternack	PE7005-3	VL061	07/16/2022	07/16/2023
Preamplifier 100KHz - 40GHz	Aeroflex	33711-392-77150-11	064	07/16/2022	07/16/2023
EM Center Control	ETS-Lindgren	7006-001	160136	N/A	N/A
Turn Table	ETS-Lindgren	2181-3.03	VL002	N/A	N/A
Boresight Antenna Tower	ETS-Lindgren	2171B	VL003	N/A	N/A
Loop Antenna (9k-30MHz)	Com-Power	AL-130	121012	06/10/2022	06/10/2023
RE test cable(below 6GHz)	Vista	RE-6GHz-01	RE-6GHz-01	07/16/2022	07/16/2023
RE test cable (1-18GHz)	PhaseTrack	II-240	RE-18GHz-01	07/16/2022	07/16/2023
RE test cable (>18GHz)	Sucoflex	104	344903/4	07/16/2022	07/16/2023
Pulse limiter	Com-Power	LIT-930A	531727	07/16/2022	07/16/2023
CE test cable #1	FIRST RF	FRF-C-1002-001	CE-6GHz-01	07/16/2022	07/16/2023
CE test cable#2	FIRST RF	FRF-C-1002-001	CE-6GHz-02	07/16/2022	07/16/2023

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