
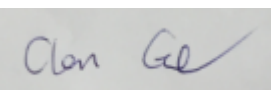


RF TEST REPORT




Report No.: FCC IC_RF_SL16120101-HID-034 Rev 1.0
 Supersede Report No.: FCC IC_RF_SL16120101-HID-034

Applicant	:	HID Global Corporation
Product Name	:	Smart Card Reader
Model No.	:	5422
Test Standard	:	FCC 15.225 RSS-210 Issue 9: 2016
Test Method	:	FCC 15.225 ANSI C63.10 2013 RSS Gen Issue 4 2014
FCC ID	:	JQ5-OK5422
IC ID	:	2236B-OK5422
Dates of test	:	01/16/2017 to 01/30/2017
Issue Date	:	02/16/2017
Test Result	:	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Equipment complied with the specification		[X]
Equipment did not comply with the specification		[]
This Test Report is Issued Under the Authority of:		
		
Gary Chou		Chen Ge
Test Engineer		Engineer Reviewer
This test report may be reproduced in full only Test result presented in this test report is applicable to the tested sample only		

Issued By:
 SIEMIC Laboratories
 775 Montague Expressway, Milpitas, CA 95035



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Laboratory Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Accreditation Body	Scope
USA	FCC, A2LA	EMC, RF/Wireless, Telecom
Canada	IC, A2LA, NIST	EMC, RF/Wireless, Telecom
Taiwan	BSMI, NCC, NIST	EMC, RF, Telecom, Safety
Hong Kong	OFTA, NIST	RF/Wireless, Telecom
Australia	NATA, NIST	EMC, RF, Telecom, Safety
Korea	KCC/RRA, NIST	EMI, EMS, RF, Telecom, Safety
Japan	VCCI, JATE, TELEC, RFT	EMI, RF/Wireless, Telecom
Mexico	NOM, COFETEL, Caniety	EMC, RF/Wireless, Telecom, Safety
Europe	A2LA, NIST	EMC, RF, Telecom, Safety
Israel	MOC, NIST	EMC, RF, Telecom, Safety

Accreditations for Product Certifications

Country	Accreditation Body	Scope
USA	FCC TCB, NIST	EMC, RF, Telecom
Canada	IC FCB, NIST	EMC, RF, Telecom
Singapore	iDA, NIST	EMC, RF, Telecom
EU	NB	EMC & R&TTE Directive
Japan	MIC (RCB 208)	RF, Telecom
Hong Kong	OFTA (US002)	RF, Telecom

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1 Report Revision History

Report No.	Report Version	Description	Issue Date
FCC IC_RF_SL16120101-HID-034	-	Original	02/01/2017
FCC IC_RF_SL16120101-HID-034 Rev 1.0	Rev 1.0	Updated FCC ID	02/16/2017

2 Executive Summary

The purpose of this test program was to demonstrate compliance of following product

Company: HID Global Corporation
Product: Smart Card Reader
Model: 5422

against the current Stipulated Standards. The specified model product stated above has demonstrated compliance with the Stipulated Standard listed on 1st page.

3 Customer information

Applicant Name	:	HID Global Corporation
Applicant Address	:	15370 Barranca Parkway. Irvine, CA 92618 USA
Manufacturer Name	:	HID Global Corporation
Manufacturer Address	:	15370 Barranca Parkway. Irvine, CA 92618 USA

4 Test site information

Lab performing tests	:	SIEMIC Laboratories
Lab Address	:	775 Montague Expressway, Milpitas, CA 95035
FCC Test Site No.	:	881796
IC Test Site No.	:	4842D-2
VCCI Test Site No.	:	A0133

5 Modification

Index	Item	Description	Note
-	-	-	-

6 EUT Information

6.1 EUT Description

Host Product Name	Smart Card Reader
Host Model No.	5422
Trade Name	HID
Serial No.	N/A
Input Power	5V _{DC}
Hardware version	N/A
Software version	N/A
Date of EUT received	January 09, 2016
Equipment Class/ Category	RFID
Working Frequencies	13.56MHz
Port/Connectors	USB
Remark	N/A

6.2 Radio Description

Specifications for Radio:

Radio Type	RFID
Operating Frequency	13.56MHz
Modulation	ASK (13.56MHz)
Number of Channels	1
Antenna Type	Loop
Antenna Gain	1 dBi
Antenna connector type	Printed Circuit Board-Permanent

Channel List:

Type	Mode	Channel No.	Frequency (MHz)	Available (Y/N)
RFID	13.56MHz	1	13.56	Y

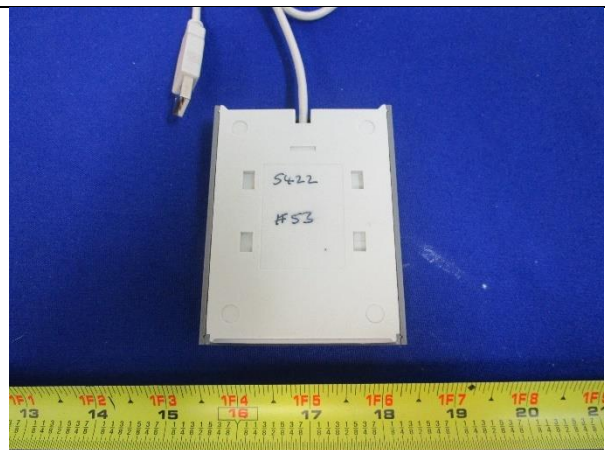
6.3 EUT test modes/configuration Description

Mode	Note
RF test	EUT is set to transmit at 13.56MHz
Note: None	

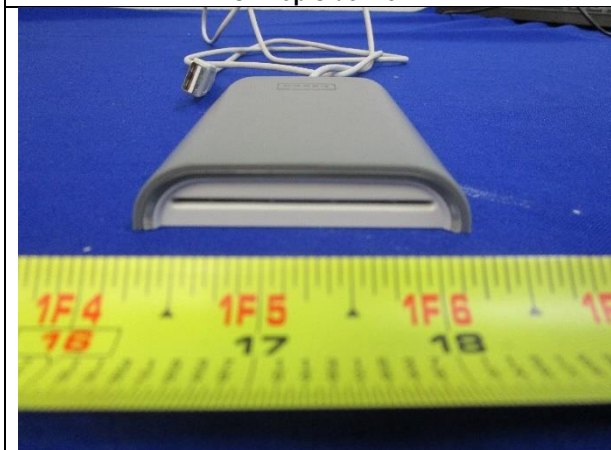
6.4 EUT Photos - External



EUT Top Side View



EUT Bottom Side View



EUT Front Side View



EUT Rear Side View

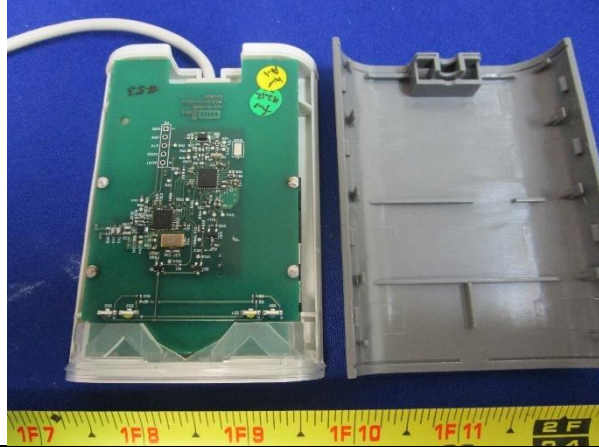


EUT Left Side View

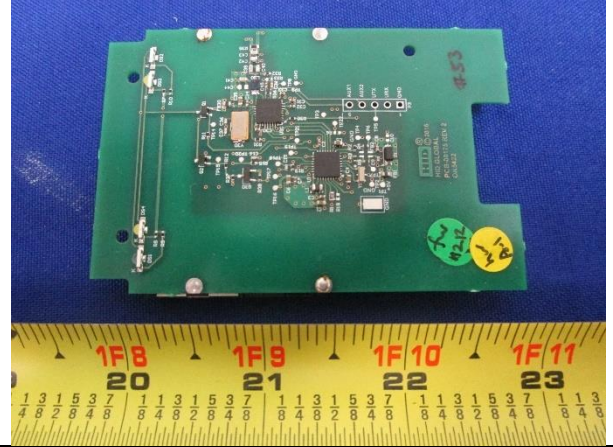


EUT Right Side View

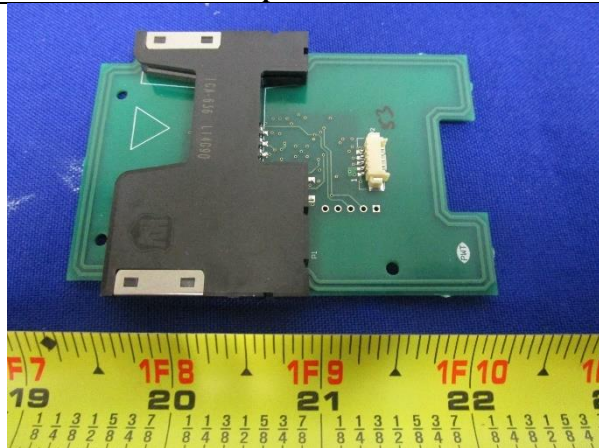
6.5 EUT Photos - Internal



EUT Open Case View



EUT Main PCB - Top View

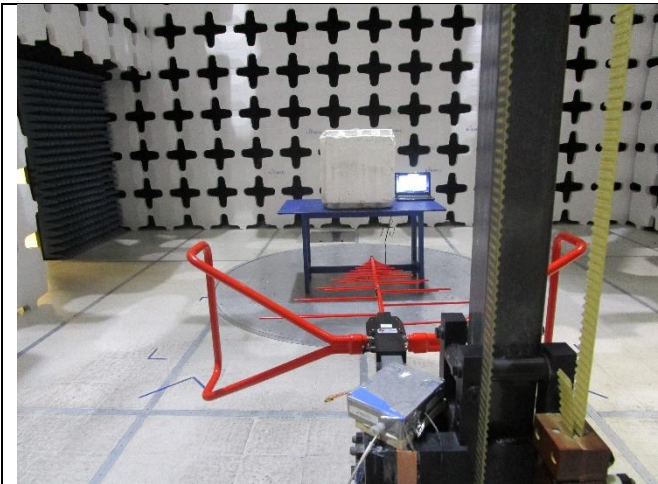


EUT Main PCB - Bottom View

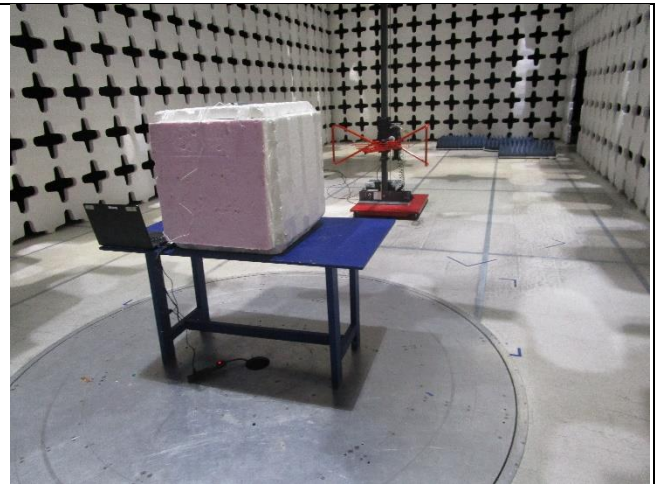


EUT Main PCB - Label View

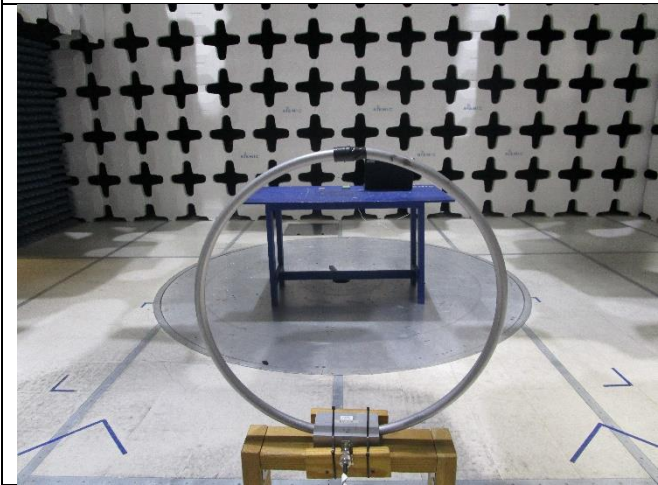
6.6 EUT Test Setup Photos



Radiated Emissions (<1GHz) – Front View



Radiated Emissions (<1GHz) – Rear View



Radiated Emissions (<30MHz) – Front View



Radiated Emissions (<30MHz) – Rear View

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Index	Supporting Equipment Description	Model	Serial No.	Manu	Note
1	Laptop	E5410	-	Dell	-

7.2 Test Software Description

Test Item	Software	Description
RF Testing	-	-

8 Test Summary

Test Item	Test standard		Test Method/Procedure	Pass / Fail
Antenna Requirement	FCC	15.203	ANSI C63.10 – 2013 558074 D01 DTS Meas. Guidance v03r02	<input checked="" type="checkbox"/> Pass
	IC			<input type="checkbox"/> N/A
AC Conducted Emissions Voltage	FCC	15.225(a)	ANSI C63.10 2013 RSS Gen. 8.8	<input checked="" type="checkbox"/> Pass
	IC	RSS Gen (7.2.2)		<input type="checkbox"/> N/A
Remark	1. AC Line tests were performed on the support equipment's power adapter, laptop.			

Test Item	Test standard		Test Method/Procedure	Pass / Fail	
Limit in the band of 13.553 – 13.567 MHz	FCC	15.225(a)	FCC	ANSI C63.10 2013	<input checked="" type="checkbox"/> Pass
	IC	RSS210(A2.6)	IC	RSS Gen 6.13	<input type="checkbox"/> N/A
Limit in the band of 13.410 – 13.553 MHz and 13.567 – 13.710 MHz	FCC	15.225(b)	FCC	ANSI C63.10 2013	<input checked="" type="checkbox"/> Pass
	IC	RSS210(A2.6)	IC	RSS Gen 6.13	<input type="checkbox"/> N/A
Limit in the band of 13.110 – 13.410 MHz and 13.710 – 14.010 MHz	FCC	15.225(c)	FCC	ANSI C63.10 2013	<input checked="" type="checkbox"/> Pass
	IC	RSS210(A2.6)	IC	RSS Gen 6.13	<input type="checkbox"/> N/A
Limit outside the band of 13.110 – 14.010 MHz	FCC	15.225(d), 15.209	FCC	ANSI C63.10 2013	<input checked="" type="checkbox"/> Pass
	IC	RSS210(A2.6)	IC	RSS Gen 6.13	<input type="checkbox"/> N/A
Receiver Spurious Emission	IC	-	IC	RSS Gen 7.1	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
Frequency Stability	FCC	15.225(e)	FCC	-	<input checked="" type="checkbox"/> Pass
	IC	RSS210(A2.6)	IC	RSS Gen 6.11	<input type="checkbox"/> N/A
Occupied Bandwidth	FCC	-	FCC	-	<input checked="" type="checkbox"/> Pass
	IC	RSS-210(5.9.1)	IC	RSS Gen 6.6	<input type="checkbox"/> N/A
Remark	2. All measurement uncertainties are not taken into consideration for all presented test result. 3. The applicant shall ensure frequency stability by showing that an emission is maintained within the band of operation under all normal operating conditions as specified in the user's manual. 4. Test Method: ANSI C63.10: 2013 / RSS – Gen Issue 4: November 2014.				

9 Measurement Uncertainty

9.1 Conducted Emissions

The test is to measure the conducted emissions to the mains port of the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the LISN
- Uncertainty of cables
- Uncertainty due to the mismatches
- Etc, see the below table for details

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Filter Insertion Loss	0.25	Normal	2	1	0.125
LISN Insertion Loss	0.40	Normal	2	1	0.20
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.86605081
PRF Response	1.5	Rectangular	1.732	1	0.86605081
Mismatch LISN - Receiver	0.25	U-Shape	1.414	1	0.1768033
LISN Impedance	2.5	Triangular	2.449	1	1.0208248
Combined Standard Uncertainty					1.928133
Expanded Uncertainty (K=2)					3.856266

The total derived measurement uncertainty is +/- 3.86 dB.

9.2 Radiated Emissions (30MHz to 1GHz)

The test is to measure the radiated emissions of the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- NSA Calibration
- Etc., details see the below table

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Filter Insertion Loss	0.25	Normal	2	1	0.125
Antenna Factor	0.65	Normal	2	1	0.325
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.86605081
PRF Response	1.5	Rectangular	1.732	1	0.86605081
Mismatch Filter - Receiver	0.25	U-Shape	1.414	1	0.1768033
NSA Calibration	4.0	U-Shape	1.414	1	2.8288543
Combined Standard Uncertainty					3.0059131
Expanded Uncertainty (K=2)					6.0118262

The total derived measurement uncertainty is +/- 6.00 dB.

9.3 Radiated Emissions (1GHz to 40GHz)

The test is to measure the radiated emissions of the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- VSWR Calibration
- Etc., details see the below table

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.0692840
Cable Insertion Loss	0.21	Normal	2	1	0.1050000
Filter Insertion Loss	0.25	Normal	2	1	0.1250000
Antenna Factor	0.65	Normal	2	1	0.3250000
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.8660508
PRF Response	1.5	Rectangular	1.732	1	0.8660508
Mismatch Filter - Receiver	0.25	U-Shape	1.414	1	0.1768033
VSWR Calibration	2.0	U-Shape	1.414	1	1.4144272
Combined Standard Uncertainty					4.2363
Expanded Uncertainty (K=2)					8.4726

The total derived measurement uncertainty is +/- 8.47 dB.

9.4 RF conducted measurement

The test is to measure the RF output power from the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the Reference Level Uncertainty
- Uncertainty of variable attenuators
- Uncertainty of cables
- Uncertainty due to the mismatches

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Reference Level	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Attenuator	0.25	Normal	2	1	0.125
Mismatch	0.25	U-Shape	1.414	1	0.1768033
Combined Standard Uncertainty					0.476087
Expanded Uncertainty (K=2)					0.952174

The total derived measurement uncertainty is +/- 0.95 dB.

10 Measurements, examination and derived results

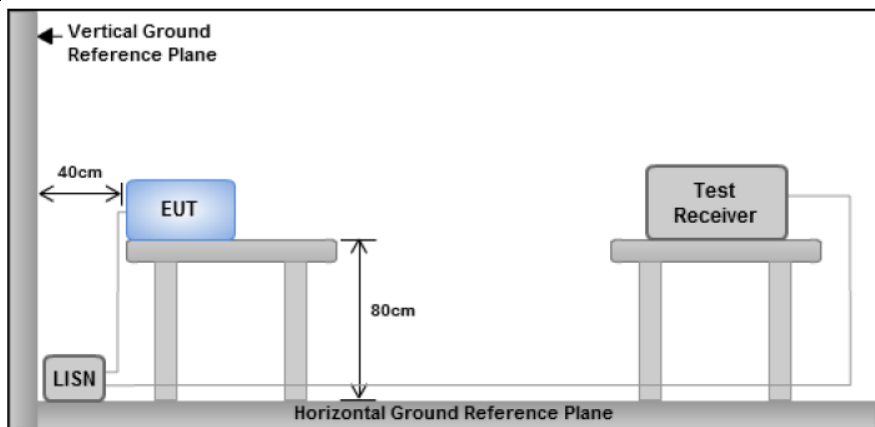
10.1 Antenna Requirement

Spec	Requirement	Applicable
§15.203	<p>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.</p> <p>Antenna requirement must meet at least one of the following:</p> <p>a) Antenna must be permanently attached to the device. b) The antenna must use a unique type of connector to attach to the device. c) Device must be professionally installed. The installer shall be responsible for ensuring that the correct antenna is employed by the device.</p>	☒
Remark	The RFID antenna is integral to the PCB board permanently to the device which meets the requirement (See Internal Photographs submitted as another Exhibit).	
Result	☒ PASS ☐ FAIL	

10.2 Conducted Emissions Test Result

Conducted Emission Limit

Frequency ranges (MHz)	Limit (dBuV)	
	QP	Average
0.15 ~ 0.5	66 – 56	56 – 46
0.5 ~ 5	56	46
5 ~ 30	60	50

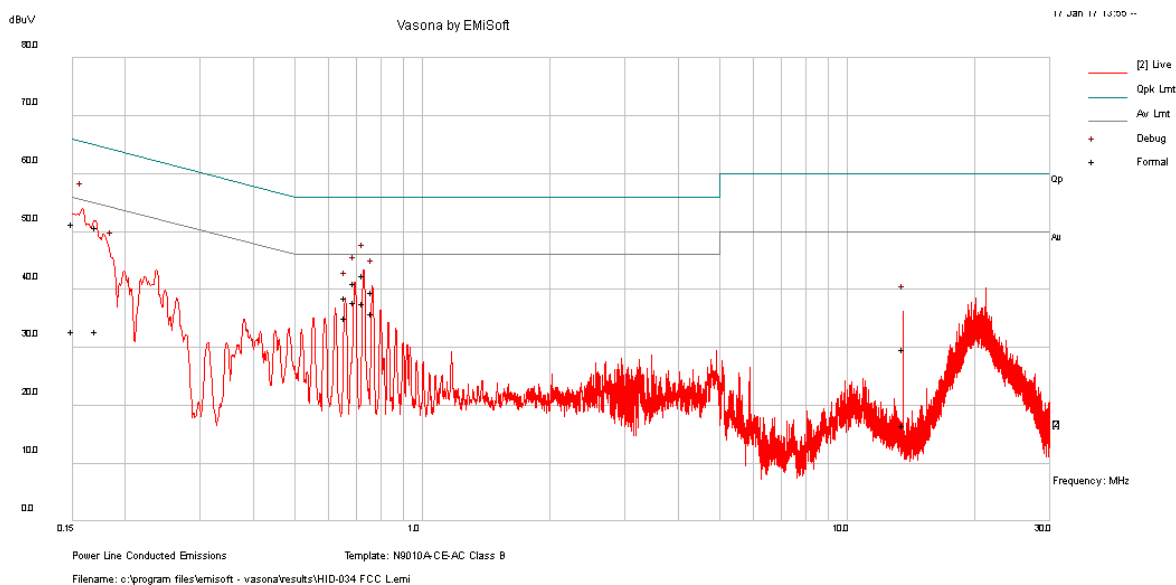
Spec	Item	Requirement	Applicable
§ 15.207, RSS210(A8.1)	a)	For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits set in § 15.207, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). AC Line conducted emission within the band 150kHz to 30MHz	<input checked="" type="checkbox"/>
Test Setup	 <p style="text-align: center;">Note: 1. Support units were connected to second LISN. 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes</p>		
Procedure	<ul style="list-style-type: none"> - 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, as shown in Annex B. - The power supply for the EUT was fed through a 50Ω/50μH EUT LISN, connected to filtered mains. - The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable. - All other supporting equipment was powered separately from another main supply. 		
Test Date	01/17/2017	Environmental conditions	Temperature 21°C Relative Humidity 38 % Atmospheric Pressure 1025 mbar
Remark	The EUT was tested at 120VAC, 60Hz.		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Test Data Yes N/A

Test Plot Yes N/A

Test was done by Bryan Smith at Conducted Emission test site.

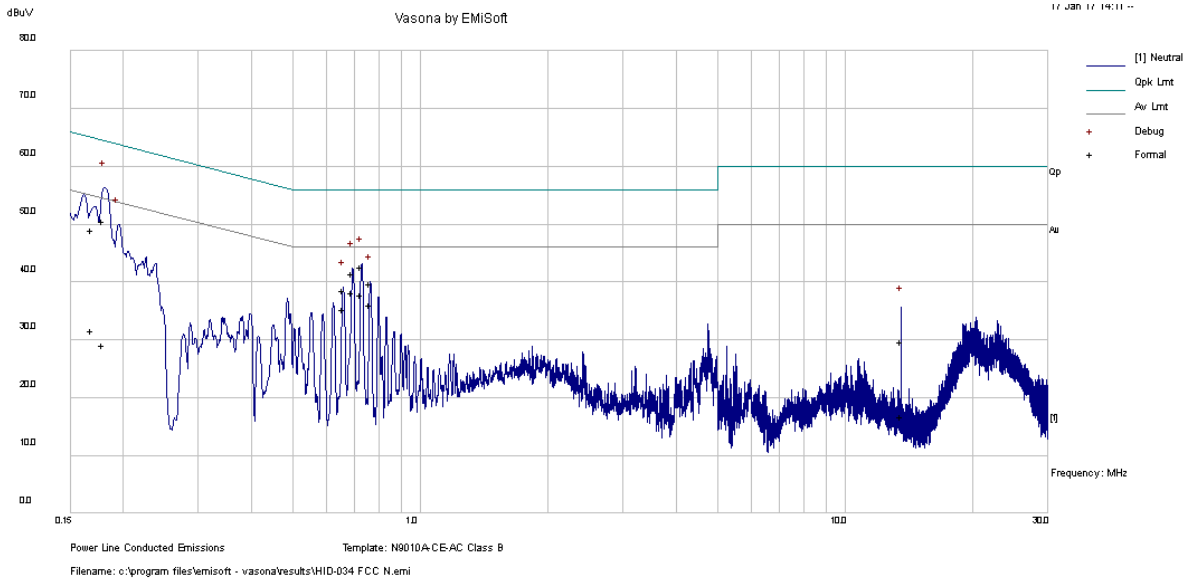
Test specification:	Conducted Emissions		
Mains Power:	5VDC		Result: <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Tested by:	Bryan Smith		
Test Date:	04/21/2016		
Remarks:	AC Line @ Live		



Live Measurements

Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Live/Neutral	Limit dBuV	Margin dB	Pass /Fail
0.15	39.52	10	1.74	51.26	Quasi Peak	Live	66	-14.74	Pass
0.72	31.82	10.01	0.56	42.39	Quasi Peak	Live	56	-13.61	Pass
0.69	30.61	10.01	0.56	41.18	Quasi Peak	Live	56	-14.82	Pass
0.76	29.06	10.01	0.55	39.63	Quasi Peak	Live	56	-16.37	Pass
0.65	27.99	10.01	0.57	38.58	Quasi Peak	Live	56	-17.42	Pass
0.17	39.21	10	1.5	50.71	Quasi Peak	Live	64.94	-14.23	Pass
13.56	19.02	10.06	0.55	29.63	Quasi Peak	Live	60	-30.37	Pass
0.15	21.13	10	1.74	32.87	Average	Live	56	-23.13	Pass
0.72	27.06	10.01	0.56	37.63	Average	Live	46	-8.37	Pass
0.69	27.23	10.01	0.56	37.8	Average	Live	46	-8.2	Pass
0.76	25.33	10.01	0.55	35.9	Average	Live	46	-10.1	Pass
0.65	24.47	10.01	0.57	35.05	Average	Live	46	-10.95	Pass
0.17	21.29	10	1.5	32.79	Average	Live	54.94	-22.15	Pass
13.56	5.99	10.06	0.55	16.6	Average	Live	50	-33.4	Pass

Test specification:	Conducted Emissions		
Mains Power:	5VDC		Result: <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Tested by:	Rachana Khanduri		
Test Date:	04/21/2016		
Remarks:	AC Line @ Neutral		



Neutral Measurements

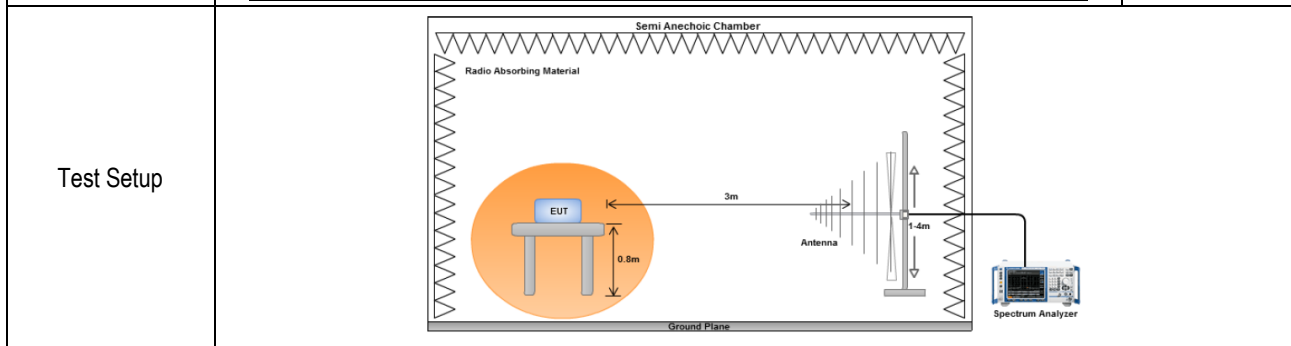
Frequency MHz	Raw dBµV	Cable Loss	Factors dB	Level dBµV	Measurement Type	Live/Neutral	Limit dBµV	Margin dB	Pass /Fail
0.17	37.49	10	1.52	49.01	Quasi Peak	Neutral	65.04	-16.02	Pass
0.73	32.16	10.01	0.56	42.73	Quasi Peak	Neutral	56	-13.27	Pass
0.69	31	10.01	0.56	41.58	Quasi Peak	Neutral	56	-14.42	Pass
0.18	39.16	10	1.42	50.58	Quasi Peak	Neutral	64.53	-13.94	Pass
0.76	29.13	10.01	0.55	39.69	Quasi Peak	Neutral	56	-16.31	Pass
0.66	28.08	10.01	0.57	38.67	Quasi Peak	Neutral	56	-17.33	Pass
13.56	19.09	10.06	0.55	29.7	Quasi Peak	Neutral	60	-30.31	Pass
0.17	20.14	10	1.52	31.67	Average	Neutral	55.04	-23.37	Pass
0.73	27.23	10.01	0.56	37.8	Average	Neutral	46	-8.2	Pass
0.69	27.69	10.01	0.56	38.26	Average	Neutral	46	-7.74	Pass
0.18	17.75	10	1.42	29.17	Average	Neutral	54.53	-25.35	Pass
0.76	25.52	10.01	0.55	36.09	Average	Neutral	46	-9.92	Pass

10.3 Radiated Measurements

10.3.1 Radiated Measurements 30MHz to 1GHz

Requirement(s):

Spec	Requirement	Applicable										
47 CFR §15.225 RSS-210 (A2.6)	<p>Operation within the band 13.110–14.010 MHz:</p> <p>(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.</p> <p>(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.</p> <p>(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.</p> <p>(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.</p> <table border="1"> <thead> <tr> <th>Frequency range (MHz)</th> <th>Field Strength (uV/m)</th> </tr> </thead> <tbody> <tr> <td>30 – 88</td> <td>100</td> </tr> <tr> <td>88 – 216</td> <td>150</td> </tr> <tr> <td>216 960</td> <td>200</td> </tr> <tr> <td>Above 960</td> <td>500</td> </tr> </tbody> </table>	Frequency range (MHz)	Field Strength (uV/m)	30 – 88	100	88 – 216	150	216 960	200	Above 960	500	☒
Frequency range (MHz)	Field Strength (uV/m)											
30 – 88	100											
88 – 216	150											
216 960	200											
Above 960	500											



Procedure	<ol style="list-style-type: none"> The EUT was switched on and allowed to warm up to its normal operating condition. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: <ol style="list-style-type: none"> Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. The EUT was then rotated to the direction that gave the maximum emission. Finally, the antenna height was adjusted to the height that gave the maximum emission. A Quasi-peak measurement was then made for that frequency point. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.
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Test Date	01/17/2017	Environmental conditions	Temperature 20.1°C Relative Humidity 36% Atmospheric Pressure 1026mbar
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Remark	-
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Result	☒ Pass ☐ Fail
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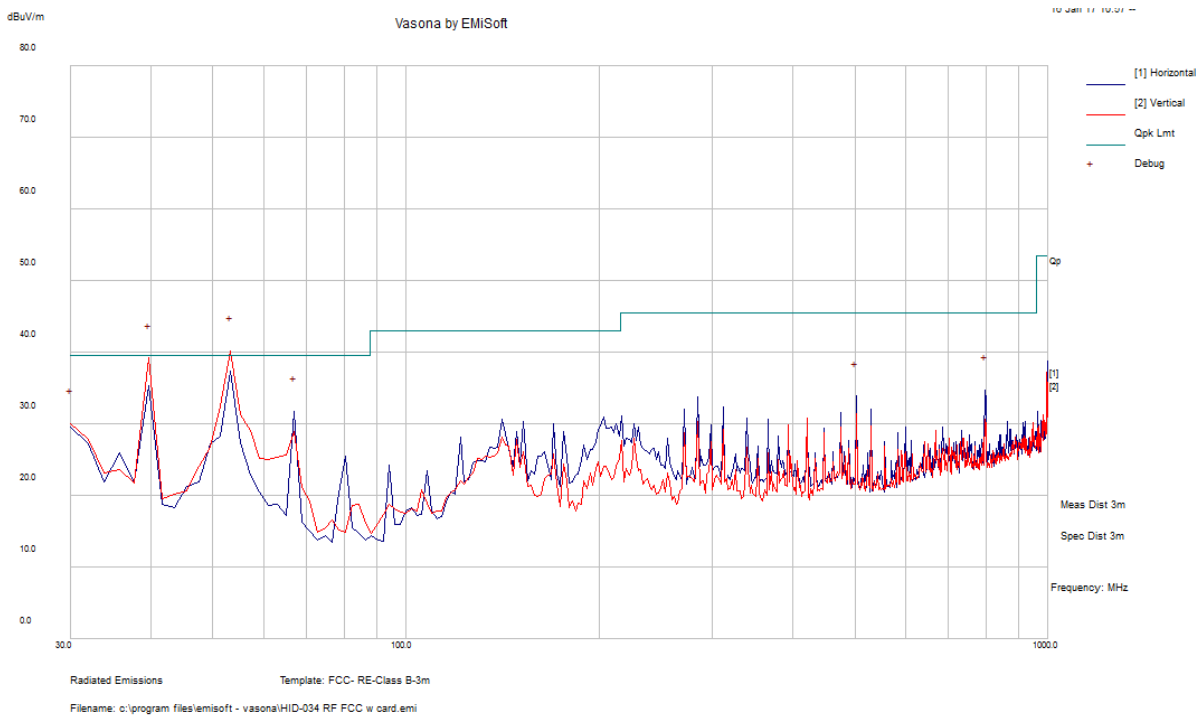
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Bryan Smith at 10 meter chamber.

Test specification:	Radiated Emissions		
Mains Power:	5V DC		Result: <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Tested by:	Bryan Smith		
Test Date:	04/18/2016		
Remarks:	N/A		

f=30MHz – 1000MHz plot and 3 meter distance

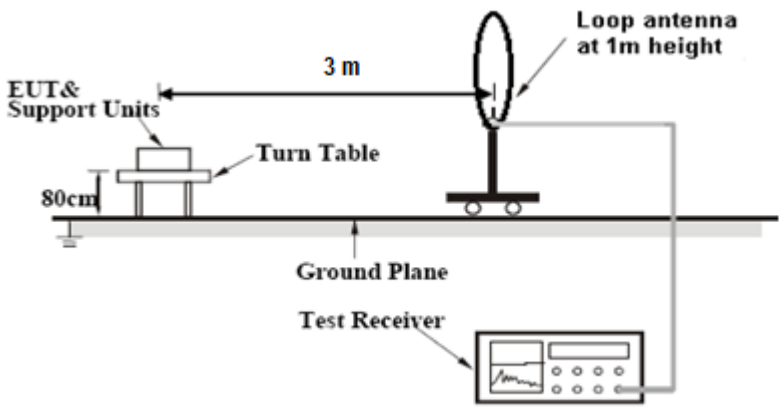


f=30MHz – 1000MHz Measurements

Frequency MHz	Raw dBuV/m	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
54.25	63.31	1.38	-30.68	34	Quasi Max	V	100	346	39.5	-5.5	Pass
40.69	61.8	1.18	-24.67	38.31	Quasi Max	V	99	310	39.5	-1.19	Pass
67.81	61.02	1.46	-31.16	31.33	Quasi Max	H	280	181	39.5	-8.17	Pass
30.00	39.01	0.99	-15.99	24.02	Quasi Max	V	141	59	39.5	-15.48	Pass
797.59	40.46	4.61	-17.25	27.81	Quasi Max	H	171	102	45.5	-17.69	Pass
501.74	53.32	3.61	-21.41	35.52	Quasi Max	H	169	150	45.5	-9.98	Pass

10.3.2 Radiated Measurements below 30MHz

Requirement(s):

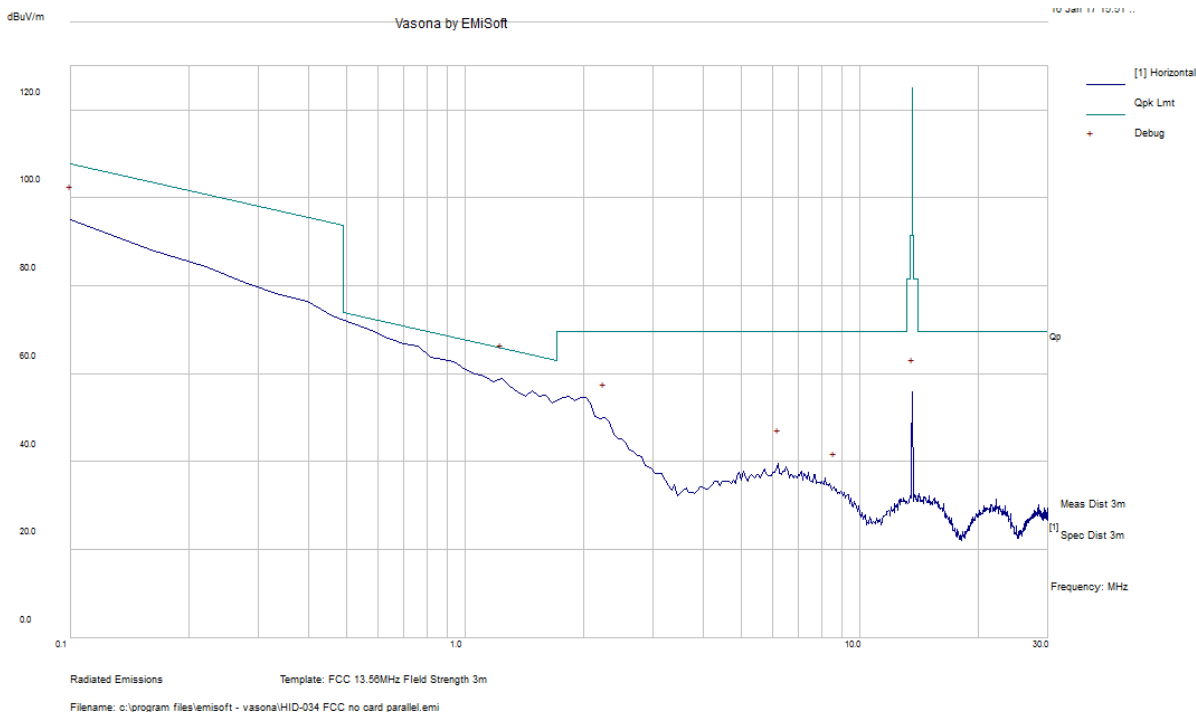
Spec	Requirement	Applicable									
47 CFR §15.225 RSS-210 (A2.6)	<p>Operation within the band 13.110–14.010 MHz</p> <p>(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.</p> <p>(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.</p> <p>(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.</p> <p>(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.</p>	☒									
Test Setup											
Procedure	<p>For < 30MHz, Radiated emissions were measured according to ANSI C63.10. The EUT was set to transmit at the highest output power.</p> <p>The EUT was set 3 meter away from the measuring antenna. The loop antenna was positioned 1 meter above the ground from the center of the loop. The measuring bandwidth was set to 10 kHz.</p> <p>The limit is converted from microvolt/meter to decibel microvolt/meter.</p>										
Test Date	01/17/2017	<table border="1"> <tr> <td>Environmental conditions</td> <td>Temperature</td> <td>22°C</td> </tr> <tr> <td></td> <td>Relative Humidity</td> <td>40%</td> </tr> <tr> <td></td> <td>Atmospheric Pressure</td> <td>1026mbar</td> </tr> </table>	Environmental conditions	Temperature	22°C		Relative Humidity	40%		Atmospheric Pressure	1026mbar
Environmental conditions	Temperature	22°C									
	Relative Humidity	40%									
	Atmospheric Pressure	1026mbar									
Remark	-										
Result	☒ Pass ☐ Fail										

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Bryan Smith at 10 meter chamber.

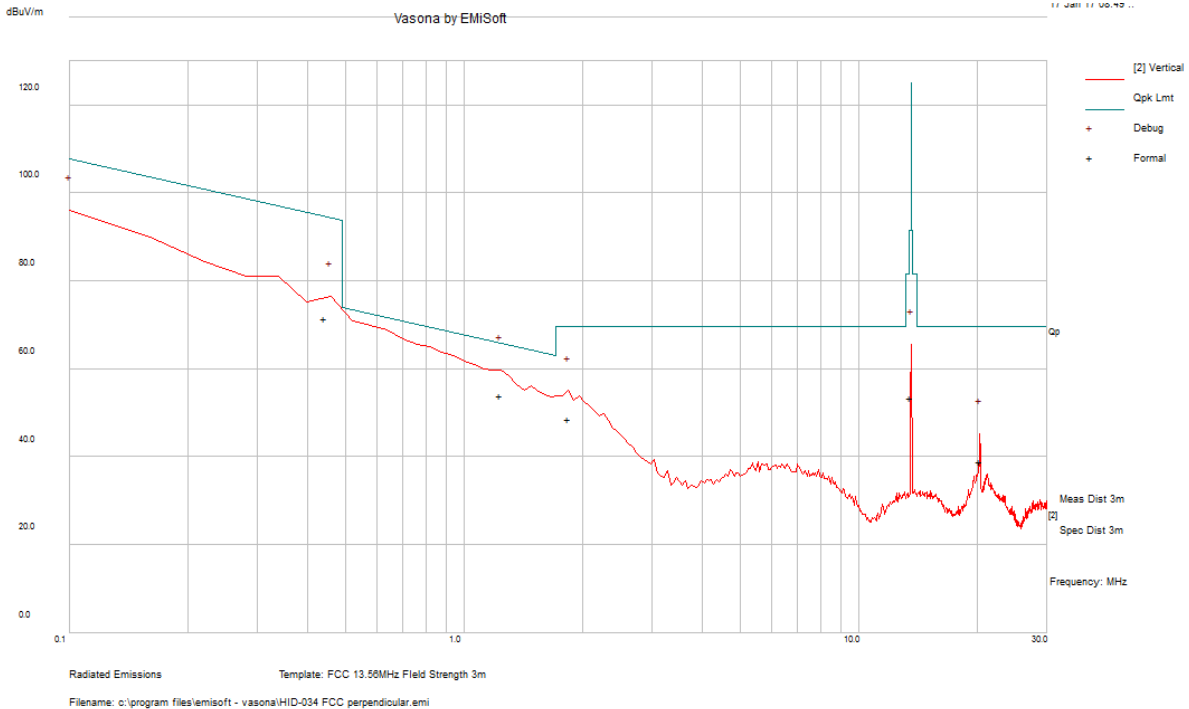
Test specification:	Radiated Spurious Emissions		
Mains Power:	5V DC		Result: <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Tested by:	Bryan Smith		
Test Date:	01/17/2015		
Remarks:	f= 100kHz – 30MHz plot, and loop antenna at 0 degree		



Quasi Max Measurement

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol (0/90)	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
1.24	35.46	0.45	17.79	53.7	Quasi Max	H	98	111	65.75	-12.05	Pass
0.10	41.39	0.21	48.31	89.92	Quasi Max	H	98	124	107.6	-17.68	Pass
2.26	33.45	0.51	10.77	44.73	Quasi Max	H	98	157	69.54	-24.81	Pass
6.22	30.83	0.61	2.34	33.77	Quasi Max	H	98	104	69.54	-35.77	Pass
8.62	28.88	0.64	0.32	29.84	Quasi Max	H	98	30	69.54	-39.7	Pass
13.56	45.21	0.68	-1.61	44.28	Quasi Max	H	98	108	124.92	-80.64	Pass

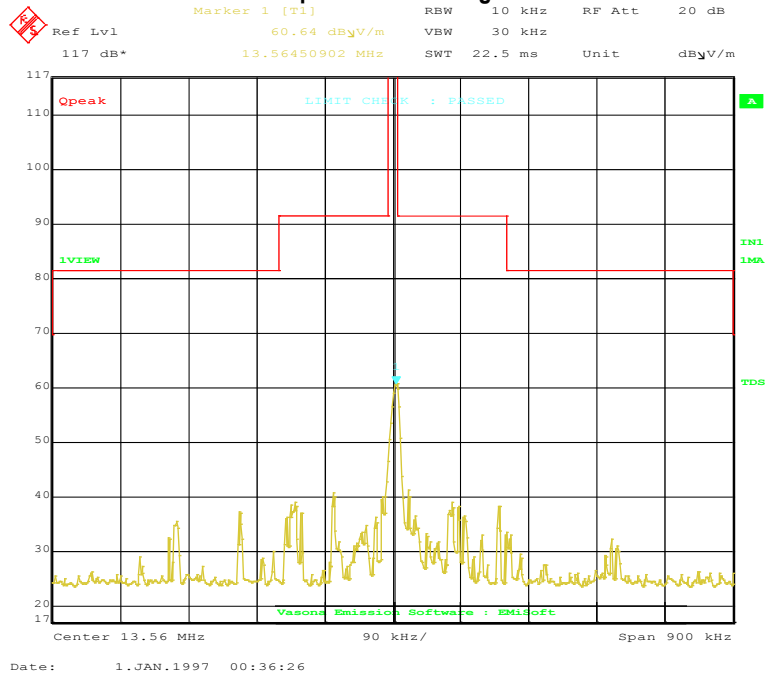
Test specification:	Radiated Spurious Emissions		
Mains Power:	5V DC		Result: <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Tested by:	Bryan Smith		
Test Date:	01/17/2015		
Remarks:	f= 100kHz – 30MHz plot, and loop antenna at 90 degree		



Quasi Max Measurement

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol (0/90)	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
1.23	35.57	0.45	17.83	53.85	Quasi Max	V	98	300	65.78	-11.94	Pass
0.10	41.39	0.21	48.31	89.92	Quasi Max	V	98	124	107.6	-17.68	Pass
1.84	34.95	0.49	13.15	48.59	Quasi Max	V	98	222	69.54	-20.95	Pass
0.44	40.99	0.36	30.22	71.56	Quasi Max	V	98	295	94.65	-23.09	Pass
20.28	41.06	0.82	-3.06	38.83	Quasi Max	V	98	175	69.54	-30.72	Pass
13.56	54.24	0.68	-1.61	53.31	Quasi Max	V	98	133	124.92	-71.61	Pass

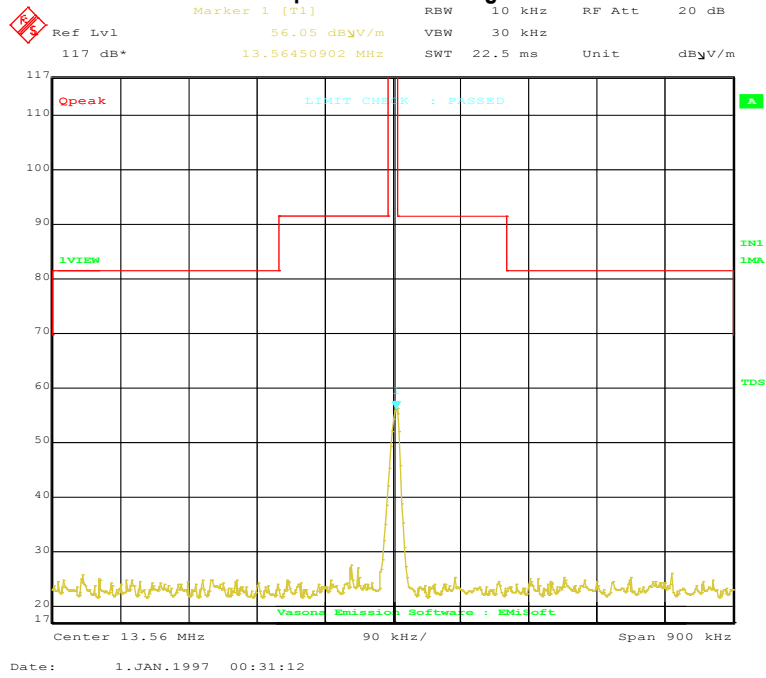
Loop antenna at 0 degree



Loop antenna at 0 degree

Frequency (MHz)	Amplitude (dBμV/m)
13.56450	60.64

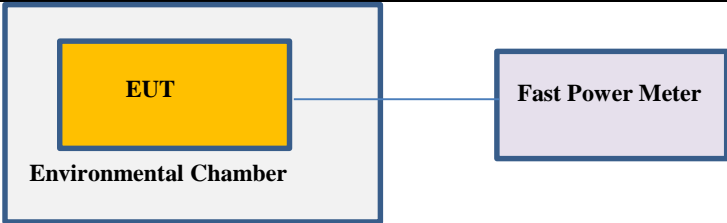
Loop antenna at 90 degree



Frequency (MHz)	Amplitude (dBμV/m)
13.56450	56.05

10.3.3 Frequency Stability

Requirement(s):

Spec	Requirement	Applicable									
47 CFR §15.225 e) RSS-210 (A2.6)	Limit: $\pm 0.01\%$ of 13.56 MHz = 1356 Hz	<input checked="" type="checkbox"/>									
Test Setup	 <ol style="list-style-type: none"> The EUT was set up inside an environmental chamber. The EUT was placed in the centre of the environmental. 										
Procedure	Frequency Stability was measured according to 47 CFR §2.1055. Measurement was taken with spectrum analyzer. The spectrum analyzer bandwidth and span was set to read in hertz. A voltmeter was used to monitor when varying the voltage.										
Test Date	04/27/2016	<table border="1"> <tr> <td>Environmental conditions</td> <td>Temperature</td> <td>20°C</td> </tr> <tr> <td></td> <td>Relative Humidity</td> <td>41%</td> </tr> <tr> <td></td> <td>Atmospheric Pressure</td> <td>1026mbar</td> </tr> </table>	Environmental conditions	Temperature	20°C		Relative Humidity	41%		Atmospheric Pressure	1026mbar
Environmental conditions	Temperature	20°C									
	Relative Humidity	41%									
	Atmospheric Pressure	1026mbar									
Remark	None										
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail										

Test Data Yes (See below) N/A

Test Plot Yes (See below) N/A

Test was done by Chen Ge at RF test site.

Test Result for 13.56MHz Radio

Frequency Stability versus Temperature: The Frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20°C to $+50^{\circ}\text{C}$ at normal supply voltage.

Reference Frequency: 13.56MHz

Temperature ($^{\circ}\text{C}$)	Measured Freq. (MHz)	Freq. Drift (Hz)	Freq. Deviation (Limit: 0.01%)	Pass/Fail
65	13.56083	830	<0.01	Pass
60	13.56083	830	<0.01	Pass
50	13.56083	830	<0.01	Pass
40	13.56083	830	<0.01	Pass
30	13.56083	830	<0.01	Pass
20	13.56083	830	<0.01	Pass
10	13.56083	830	<0.01	Pass
0	13.56081	810	<0.01	Pass
-10	13.56079	790	<0.01	Pass
-20	13.56081	810	<0.01	Pass

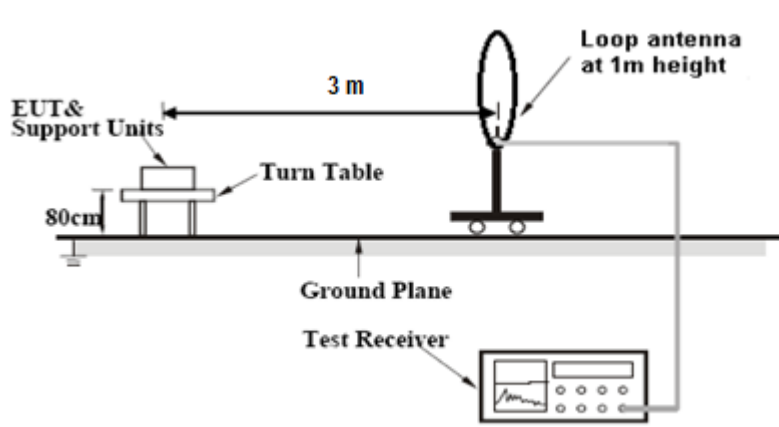
Frequency Stability versus Input Voltage: The Frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$, the frequency of the transmitter was measured at 85% and at 115% of the rated power supply voltage at a 20°C environmental temperature.

Carrier Frequency: 13.56MHz

Measured Voltage $\pm 15\%$ of nominal (AC)	Measured Freq. (MHz)	Freq. Drift (Hz)	Freq. Deviation (Limit: 0.01%)	Pass/Fail
5.75	13.56083	830	<0.01	Pass
4.25	13.56083	830	<0.01	Pass

10.3.4 Occupied bandwidth

Requirement(s):

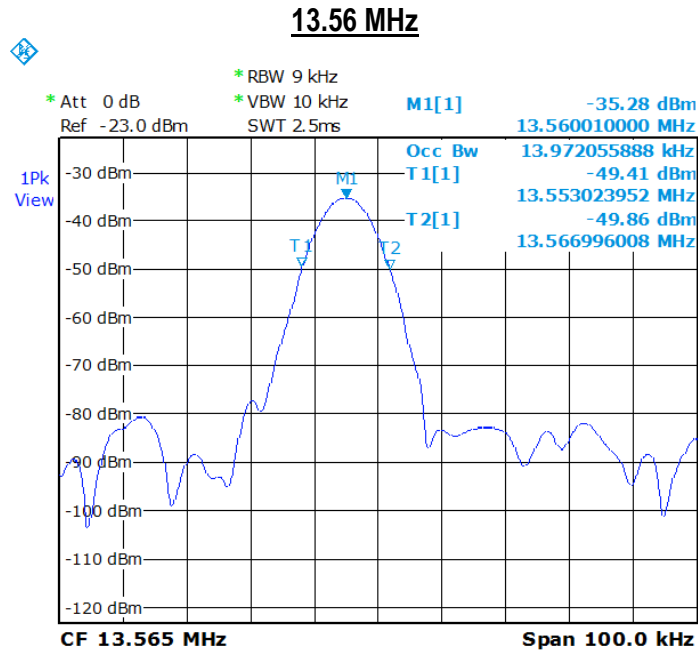
Spec	Requirement	Applicable	
RSS-Gen 4.6.1	The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual. The trace data points are recovered and directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth.	<input checked="" type="checkbox"/>	
Test Setup	 <p>The diagram illustrates the test setup. On the left, 'EUT & Support Units' are placed on a 'Turn Table' which is 80cm high. A 'Loop antenna at 1m height' is positioned 3m away from the turn table. Both the turn table and the antenna are on a 'Ground Plane'. A 'Test Receiver' is connected to the antenna.</p>		
Procedure	<ol style="list-style-type: none"> The EUT was switched on and allowed to warm up to its normal operating condition. To measure conducted, a SMA cable was used to replace the EUT antenna. To measure radiated, an external antenna was used to detect EUT transmission signal. Measurement of the 99% Occupied Bandwidth of EUT transmission signal and make record. 		
Test Date	04/19/2016	Environmental conditions	Temperature 22°C Relative Humidity 39% Atmospheric Pressure 1025mbar
Remark	-		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Test Data Yes (See below) N/A

Test Plot Yes (See below) N/A

Test was done by Rachana Khanduri at 10 meter chamber.

Test results:



Frequency (MHz)	Occupied Bandwidth (KHz)
13.56	13.972

















Annex A. TEST INSTRUMENT







Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Conducted Emissions						
R & S Receiver	ESL6	100178	05/27/2016	1 Year	05/27/2017	<input checked="" type="checkbox"/>
CHASE LISN	MN2050B	1018	08/07/2016	1 Year	08/07/2017	<input checked="" type="checkbox"/>
Radiated Emissions						
R & S Receiver	ESIB 40	100179	06/03/2016	1 Year	06/03/2017	<input checked="" type="checkbox"/>
Preamplifier (100KHz-7GHz)	LPA-6-30	11140711	02/10/2016	1 Year	02/10/2017	<input checked="" type="checkbox"/>
ETS-Lingren Loop Antenna	6512	00049120	08/20/2016	1 Year	08/20/2017	<input checked="" type="checkbox"/>
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	08/15/2016	1 Year	08/15/2017	<input checked="" type="checkbox"/>
Horn Antenna (1-26.5GHz)	3115	10SL0059	08/25/2016	1 Year	08/25/2017	<input checked="" type="checkbox"/>
10 Meters SAC	10M	N/A	09/05/2016	1 Year	09/05/2017	<input checked="" type="checkbox"/>

Test Software Version

Test Item	Vendor	Software	Version
Radiated Emission	EMISoft	EMISoft Vasona	V5.0
Conducted Emission	EMISoft	EMISoft Vasona	V5.0

Annex B. SIEMIC Accreditation

Accreditations	Document	Scope / Remark
ISO 17025 (A2LA)		Please see the documents for the detailed scope
ISO Guide 65 (A2LA)		Please see the documents for the detailed scope
TCB Designation		A1, A2, A3, A4, B1, B2, B3, B4, C
FCC DoC Accreditation		FCC Declaration of Conformity Accreditation
FCC Site Registration		3 meter site
FCC Site Registration		10 meter site
IC Site Registration		3 meter site
IC Site Registration		10 meter site
EU NB		Radio & Telecommunications Terminal Equipment: EN45001 – EN ISO/IEC 17025
		Electromagnetic Compatibility: EN45001 – EN ISO/IEC 17025
Singapore iDA CB(Certification Body)	 	Phase I, Phase II
Vietnam MIC CAB Accreditation		Please see the document for the detailed scope
Hong Kong OFCA		(Phase II) OFCA Foreign Certification Body for Radio and Telecom
		(Phase I) Conformity Assessment Body for Radio and Telecom
Industry Canada CAB		Radio: Scope A – All Radio Standard Specification in Category I
		Telecom: CS-03 Part I, II, V, VI, VII, VIII

Japan Recognized Certification Body Designation		<p>Radio: A1. Terminal equipment for purpose of calling</p> <p>Telecom: B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law</p>
Korea CAB Accreditation		<p>EMI: KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI</p> <p>EMS: KCC Notice 2008-38, RRL Notice 2008-4: CA Procedures for EMS KN24, KN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11: Test Method for EMS</p>
		<p>Radio: RRL Notice 2008-26, RRL Notice 2008-2, RRL Notice 2008-10, RRL Notice 2007-49, RRL Notice 2007-20, RRL Notice 2007-21, RRL Notice 2007-80, RRL Notice 2004-68</p> <p>Telecom: President Notice 20664, RRL Notice 2007-30, RRL Notice 2008-7 with attachments 1, 3, 5, 6; President Notice 20664, RRL Notice 2008-7 with attachment 4</p>
Taiwan NCC CAB Recognition		LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08
Taiwan BSMI CAB Recognition		CNS 13438
Japan VCCI		<p>R-3083: Radiation 3 meter site</p> <p>C-3421: Main Ports Conducted Interference Measurement</p> <p>T-1597: Telecommunication Ports Conducted Interference Measurements</p>
Australia CAB Recognition		<p>EMC: AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4</p>
		<p>Radio communications: AS/NZS 4281, AS/NZS 4268, AS/NZS 4280.1, AS/NZS 4280.2, AS/NZS 4295, AS/NZS 4582, AS/NZS 4583, AS/NZS 4769.1, AS/NZS 4769.2, AS/NZS 4770, AS/NZS 4771</p>
		<p>Telecommunications: AS/ACIF S002:05, AS/ACIF S003:06, AS/ACIF S004:06 AS/ACIF S006:01, AS/ACIF S016:01, AS/ACIF S031:01, AS/ACIF S038:01, AS/ACIF S040:01, AS/ACIF S041:05, AS/ACIF S043.2:06, AS/ACIF S60950.1</p>
Australia NATA Recognition		AS/ACIF S002, AS/ACIF S003, AS/ACIF S004, AS/ACIF S006, AS/ACIF S016, AS/ACIF S031, AS/ACIF S038, AS/ACIF S040, AS/ACIF S041, AS/ACIF S043.2