

RF TEST REPORT



Report No.: FCC_RF_SL15030801-JAD-006

Supersede Report No.: NONE

Applicant	:	JADAK, LLC
Product Name	:	RFID module
Serial No.	:	160317-002
Model No.	:	JDK-2254
Test Standard	:	FCC 15.225
Test Method	:	FCC 15.225 ANSI C63.10 2013
FCC ID	:	2AAVI-JDK2254
Dates of test	:	03/21/2016 to 03/29/2016
Issue Date	:	04/04/2016
Test Result	:	☒ Pass ☐ 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	Description	Issue Date
FCC_RF_SL15030801-JAD-006	-	Original	04/04/2016

2 Executive Summary

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

Company: JADAK, LLC
Product: RFID module
Serial No. 160317-002
Model: JDK-2254

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	JADAK LLC
Applicant Address	7279 William Barry Blvd., N. Syracuse, NY 13212
Manufacturer Name	JADAK LLC
Manufacturer Address	7279 William Barry Blvd., N. Syracuse, NY 13212

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

Product Name	RFID module
Serial No.	160317-002
Model No.	JDK-2254
Trade Name	JADAK
Input Power	24VDC
Product SW/HW version	N/A
Radio SW/HW version	N/A
Test SW Version	N/A
Date of EUT received	03/16/2016
Equipment Class/ Category	DXX
Working Frequencies	13.56MHz
Port/Connectors	I/O

6.2 Radio Description

Specifications for Radio:

Radio Type	RFID
Operating Frequency	13.56MHz
Modulation	ASK (13.56MHz)
Channel Spacing	None
Antenna Type	Chip antenna
Antenna Gain	0dBi
Antenna Connector Type	N/A

Channel List:

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

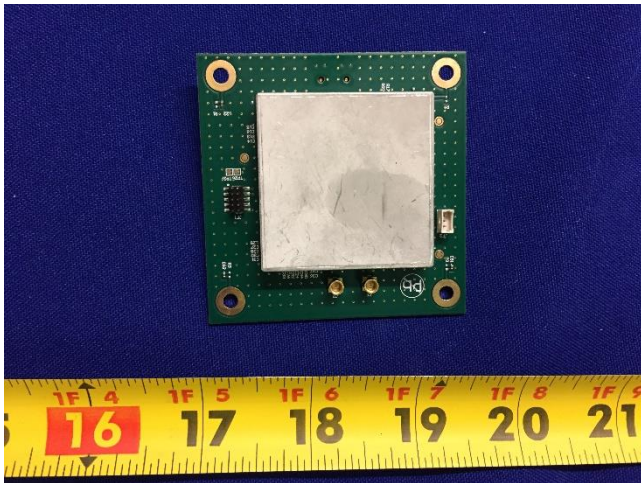
6.3 EUT test modes/configuration Description

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

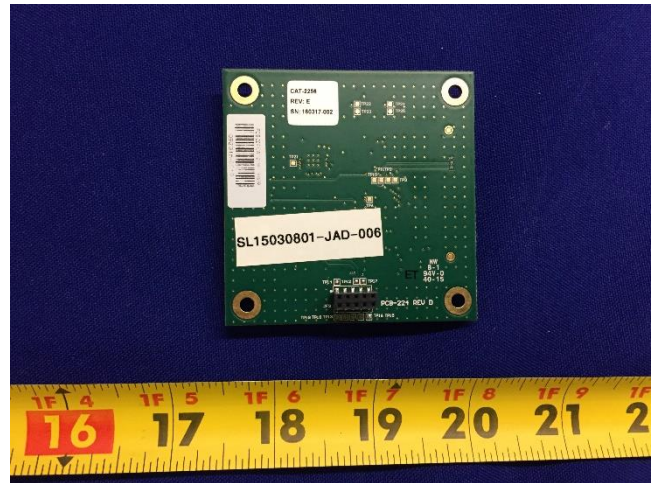
Test Item	Operating mode	Tested antenna port	Test frequencies
Antenna Requirement	N/A	-	13.56MHz
Conducted Emissions Voltage	Continuous Transmit	-	
Limit in the band of 13.553 – 13.567 MHz	Continuous Transmit	-	
Limit in the band of 13.410 – 13.553 MHz and 13.567 – 13.710 MHz	Continuous Transmit	-	
Limit in the band of 13.110 – 13.410 MHz and 13.710 – 14.010 MHz	Continuous Transmit	-	
Limit outside the band of 13.110 – 14.010 MHz	Continuous Transmit	-	
Frequency Stability	Continuous Transmit	-	
Occupied Bandwidth	Continuous Transmit	-	

Note: EUT uses a PCB trace antenna attached to the PCB board. Only radiated measurements were performed during the test.

6.4 EUT Photos



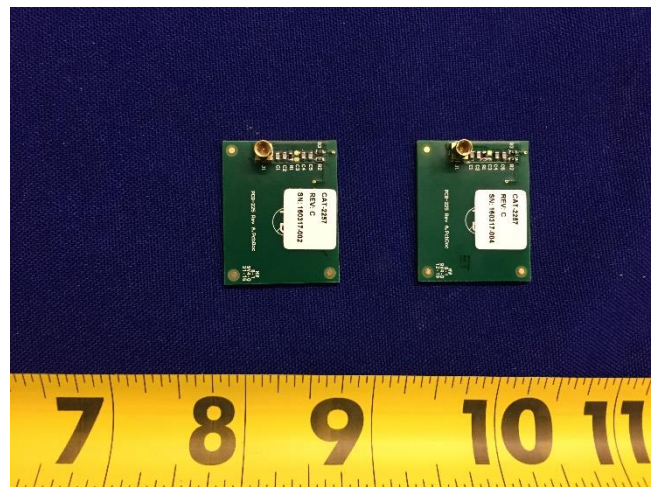
EUT – Top View



EUT – Bottom View



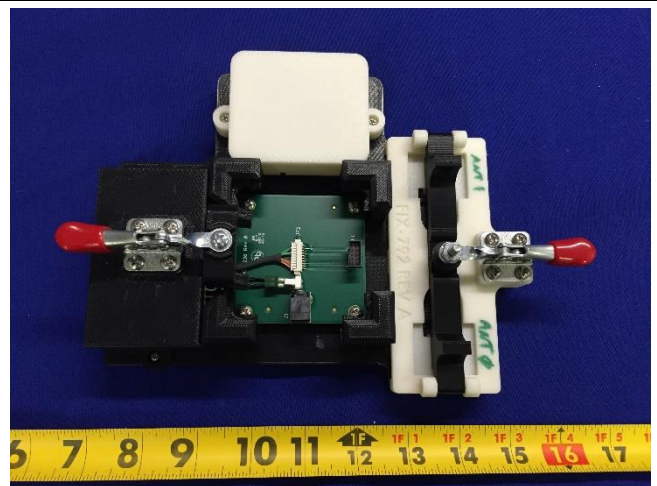
EUT – Top View without shielding



Antenna – Top View



Antenna – Bottom View



Support equipment View



AC adapter View

-

6.5 EUT Test Setup Photos



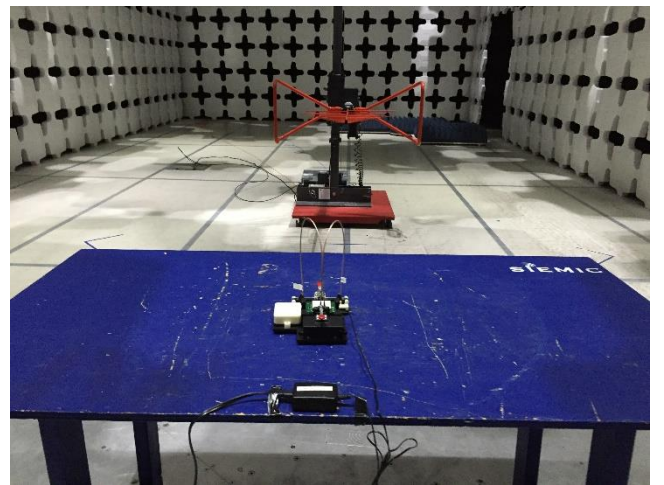
AC Line Conducted Emissions– Front View



AC Line Conducted Emissions– Rear View



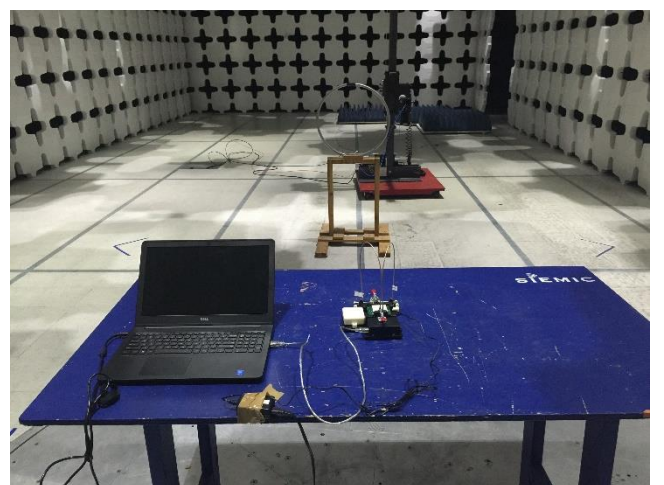
Radiated Emissions (<1GHz) – Front View



Radiated Emissions (<1GHz) – Rear View



Radiated Emissions (<30MHz) – Front View 0 Degree



Radiated Emissions (<30MHz) – Rear View 0 Degree



Radiated Emissions (<30MHz) – Front View 90 Degree



Radiated Emissions (<30MHz) – Rear View 90 Degree

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Index	Supporting Equipment Description	Model	Serial No	Manufacturer	Note
1	DC Power supply	ETSA240050UD	N/A	CUI Inc.	-
2	Custom Test Fixture	FIX-792 REV A	N/A	JADAK LLC	-

7.2 Cabling Description

Name	Connection Start		Connection Stop		Length / shielding Info		Note
	From	I/O Port	To	I/O Port	Length (m)	Shielding	
-	-	-	-	-	-	-	-

7.3 Test Software Description

Test Item	Software	Description
RF Testing	N/A	Set the EUT to transmit continuously at 13.56MHz

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	☒ Pass ☐ N/A
AC Conducted Emissions Voltage	FCC	15.225(a)	ANSI C63.10 2013	☒ Pass ☐ N/A
Remark	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	☒ Pass ☐ 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	☒ Pass ☐ 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	☒ Pass ☐ N/A
Limit outside the band of 13.110 – 14.010 MHz	FCC	15.225(d), 15.209	FCC	ANSI C63.10 2013	☒ Pass ☐ N/A
Frequency Stability	FCC	15.225(e)	FCC	-	☒ Pass ☐ N/A
Occupied Bandwidth	FCC	-	FCC	-	☒ Pass ☐ N/A
Remark	- All measurement uncertainties are not taken into consideration for all presented test result. - 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. - Test Method: ANSI C63.10: 2013				

9 Measurement Uncertainty

Test Item	Description	Uncertainty
AC Conducted Emissions Voltage	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2	$\pm 3.5\text{dB}$
Limit in the band of 13.553 – 13.567 MHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
Limit in the band of 13.410 – 13.553 MHz and 13.567 – 13.710 MHz		+5.6dB/-4.5dB
Limit in the band of 13.110 – 13.410 MHz and 13.710 – 14.010 MHz		+5.6dB/-4.5dB
Limit outside the band of 13.110 – 14.010 MHz		+5.6dB/-4.5dB
Radiated Spurious Emissions		+5.6dB/-4.5dB

10 Measurements, examination and derived results

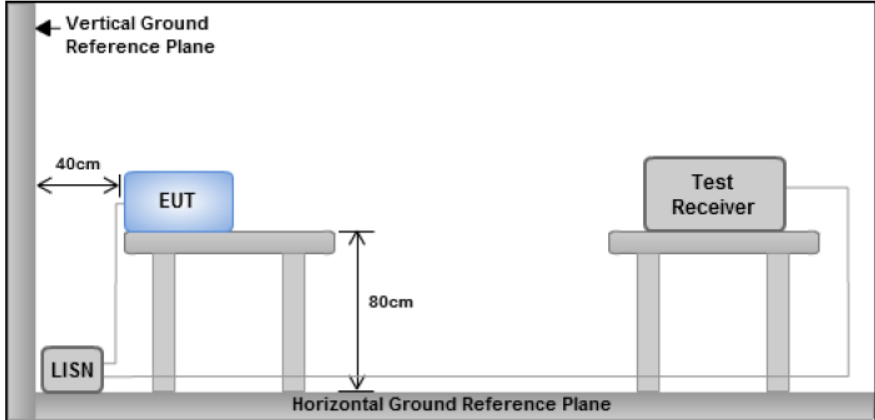
10.1 Antenna Requirement

Spec	Requirement	Applicable
§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. Antenna requirement must meet at least one of the following: 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.	☒
Remark	The RFID module is using a chip antenna with a unique type of connector which meets the requirement.	
Result	☒ PASS ☐ FAIL	

10.2 Conducted Emissions Test Result

Conducted Emission Limit

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

Spec	Item	Requirement	Applicable
§ 15.207	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	☒
Test Setup	 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		
Procedure	- 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	03/24/2016	Environmental conditions	Temperature 21°C Relative Humidity 38 % Atmospheric Pressure 1025 mbar
Remark	The EUT was tested at 120VAC, 60Hz.		
Result	☒ Pass ☐ Fail		

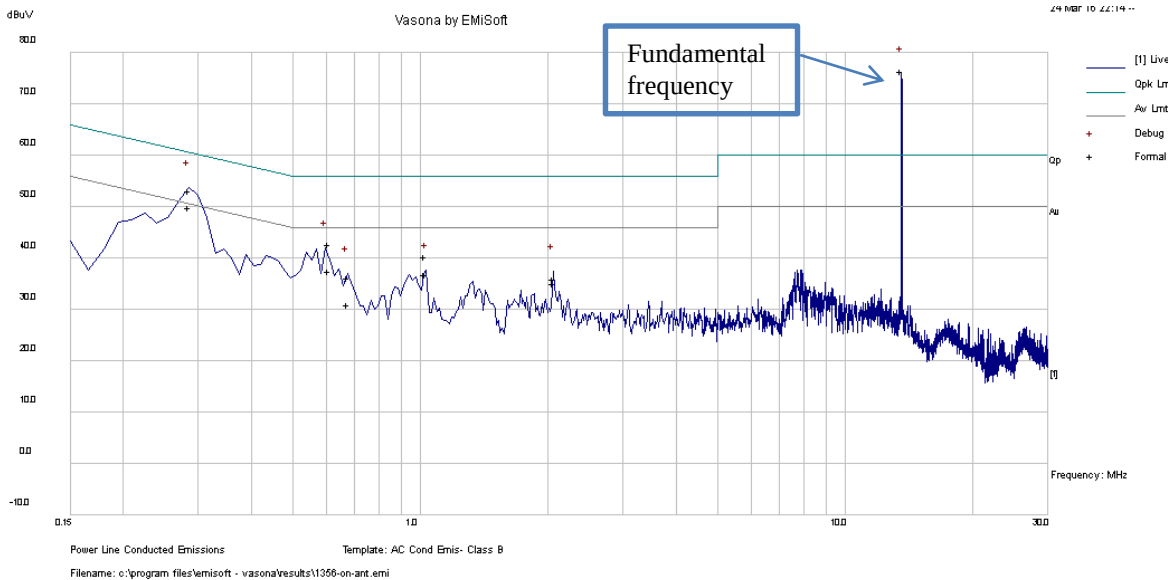
Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes ☐ N/A

Test was done by Gary Chou at Conducted Emission test site.

Test specification:	Conducted Emissions			
Mains Power:	120VAC, 60Hz		Result:	☒ Pass ☐ Fail
Tested by:	Gary Chou			
Test Date:	03/25/2016			
Remarks:	AC Line @ Line			

Neutral Plot at V=120VAC, f=60Hz



With antenna:

Live Measurements

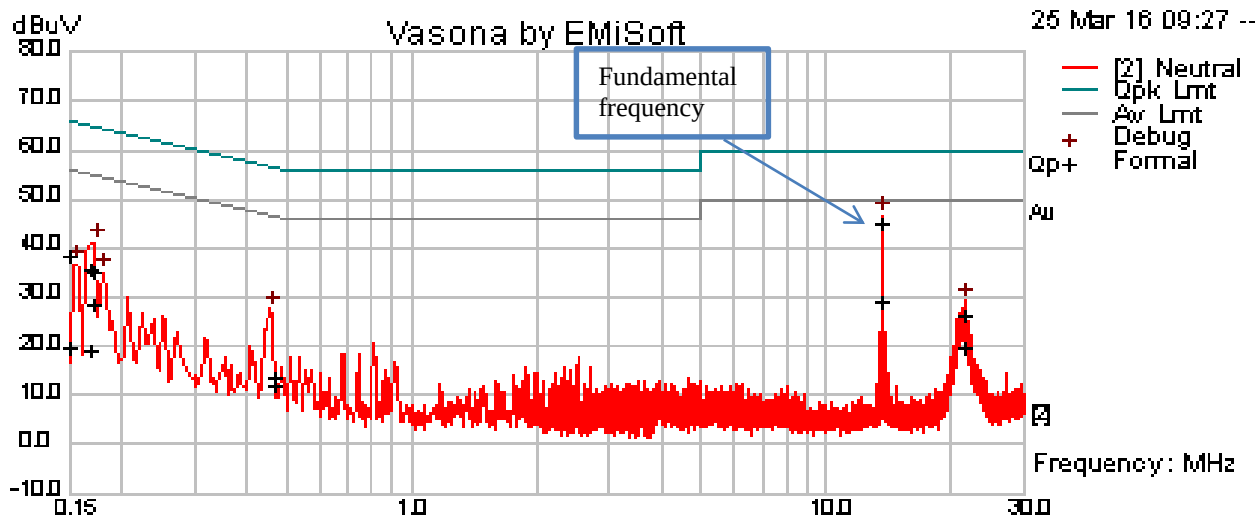
Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line/ Neutral	Limit dBuV	Margin dB	Pass /Fail
0.29	42.18	10	0.95	53.14	Quasi Peak	Live	60.65	-7.51	Pass
0.61	32.15	10.01	0.64	42.8	Quasi Peak	Live	56	-13.2	Pass
1.03	29.71	10.02	0.58	40.3	Quasi Peak	Live	56	-15.7	Pass
2.06	24.56	10.02	0.55	35.14	Quasi Peak	Live	56	-20.86	Pass
0.68	25.69	10.01	0.62	36.32	Quasi Peak	Live	56	-19.68	Pass
0.29	38.9	10	0.95	49.86	Average	Live	50.65	-0.79	Pass
0.61	26.97	10.01	0.64	37.61	Average	Live	46	-8.39	Pass
1.03	26.39	10.02	0.58	36.99	Average	Live	46	-9.01	Pass
2.06	25.56	10.02	0.55	36.14	Average	Live	46	-9.86	Pass
0.68	20.36	10.01	0.62	30.99	Average	Live	46	-15.01	Pass

With 50Ohm dummy load for 13.56MHz:

Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line/ Neutral	Limit dBuV	Margin dB	Pass /Fail
13.56	23.95	10.06	0.59	34.59	Quasi Peak	Live	60	-25.41	Pass
13.56	23.28	10.06	0.59	33.92	Average	Live	50	-16.08	Pass

Test specification:	Conducted Emissions			
Mains Power:	120VAC, 60Hz		Result:	☒ Pass ☐ Fail
Tested by:	Gary Chou			
Test Date:	03/25/2016			
Remarks:	AC Line @ Neutral			

Line Plot at V=120VAC, f=60Hz



With antenna:

Neutral Measurements

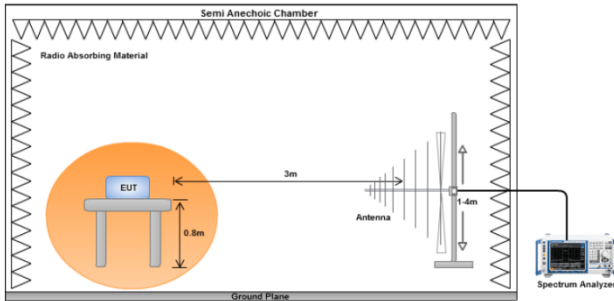
Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line/ Neutral	Limit dBuV	Margin dB	Pass /Fail
0.28	41.23	10	0.96	52.19	Quasi Peak	Neutral	60.7	-8.51	Pass
0.57	30.04	10.01	0.65	40.7	Quasi Peak	Neutral	56	-15.3	Pass
1.03	29.65	10.02	0.58	40.24	Quasi Peak	Neutral	56	-15.76	Pass
2.06	25.94	10.02	0.55	36.52	Quasi Peak	Neutral	56	-19.48	Pass
1.31	21.83	10.02	0.57	32.42	Quasi Peak	Neutral	56	-23.58	Pass
0.28	38.45	10	0.96	49.41	Average	Neutral	50.7	-1.29	Pass
0.57	25.63	10.01	0.65	36.29	Average	Neutral	46	-9.71	Pass
1.03	26.48	10.02	0.58	37.08	Average	Neutral	46	-8.92	Pass
2.06	25.87	10.02	0.55	36.45	Average	Neutral	46	-9.55	Pass
1.31	14.45	10.02	0.57	25.03	Average	Neutral	46	-20.97	Pass

With 50Ohm dummy load for 13.56MHz:

Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line/ Neutral	Limit dBuV	Margin dB	Pass /Fail
13.56	25.01	10.06	0.59	35.66	Quasi Peak	Neutral	60	-24.34	Pass
13.56	24.23	10.06	0.59	34.88	Average	Neutral	50	-15.12	Pass

10.3 Radiated Measurements below 1GHz (>30MHz)

Requirement(s):

Spec	Requirement	Applicable										
47 CFR §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. <table><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											
Test Setup												
Procedure	1. 2. 3. 4. 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: a. Vertical or horizontal polarisation (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. 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.											
Test Date	03/25/2016	Environmental conditions Temperature20.1°C Relative Humidity36% Atmospheric Pressure1026mbar										
Remark	All orientations for the EUT are investigated, the result shows the worst case only.											
Result	☒ Pass☐ Fail											

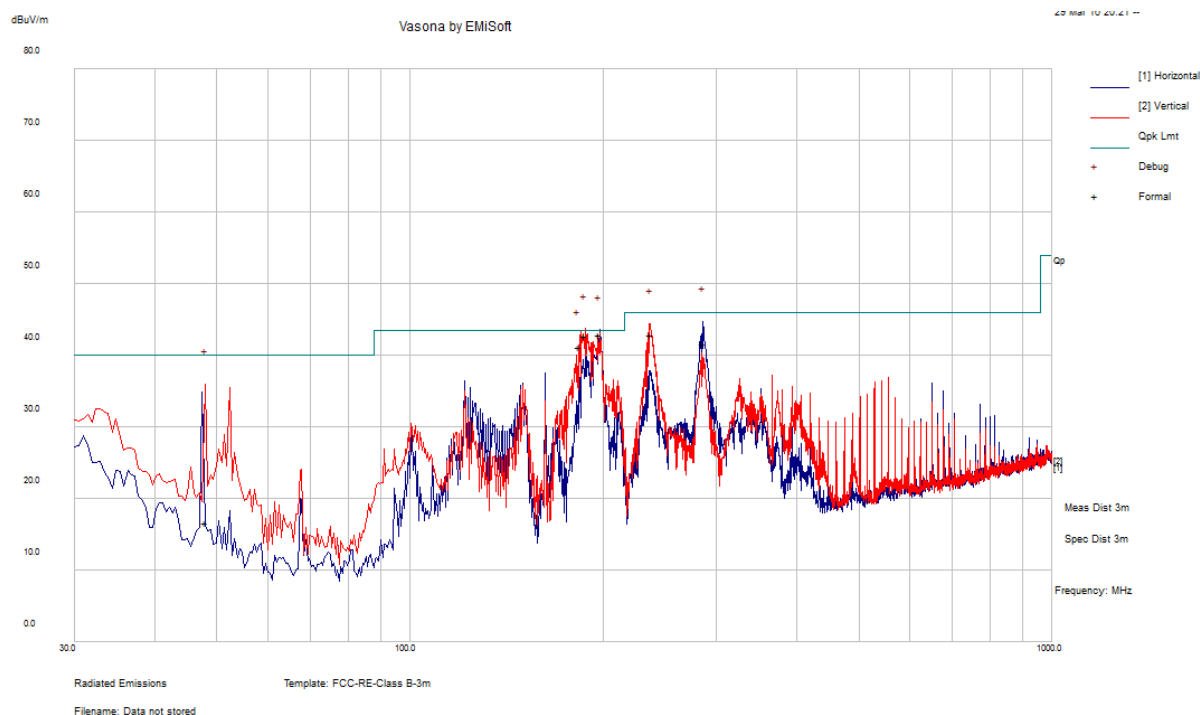
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Chen Ge at 10 meter chamber.

Test specification:	Radiated Emissions			
Mains Power:	120VAC, 60Hz		Result:	☒ Pass ☐ Fail
Tested by:	Chen Ge			
Test Date:	03/29/2016			
Remarks:	N/A			

f=30MHz – 1000MHz plot at V=120VAC, f=60Hz 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
187.16	69.04	2.04	-28.3	42.79	Quasi Max	V	101	126	43.52	-0.73	Pass
197.41	67.49	2.09	-26.71	42.87	Quasi Max	H	107	130	43.52	-0.65	Pass
285.66	65.36	2.6	-26.27	41.68	Quasi Max	H	103	106	46.02	-4.34	Pass
236.55	68.31	2.33	-27.72	42.92	Quasi Max	V	186	197	46.02	-3.1	Pass
183.02	67.55	2.02	-28.46	41.11	Quasi Max	V	101	127	43.52	-2.41	Pass
48.10	44.52	1.06	-29	16.58	Quasi Max	V	128	70	40	-23.42	Pass

10.4 Radiated Measurements below 30MHz

Requirement(s):

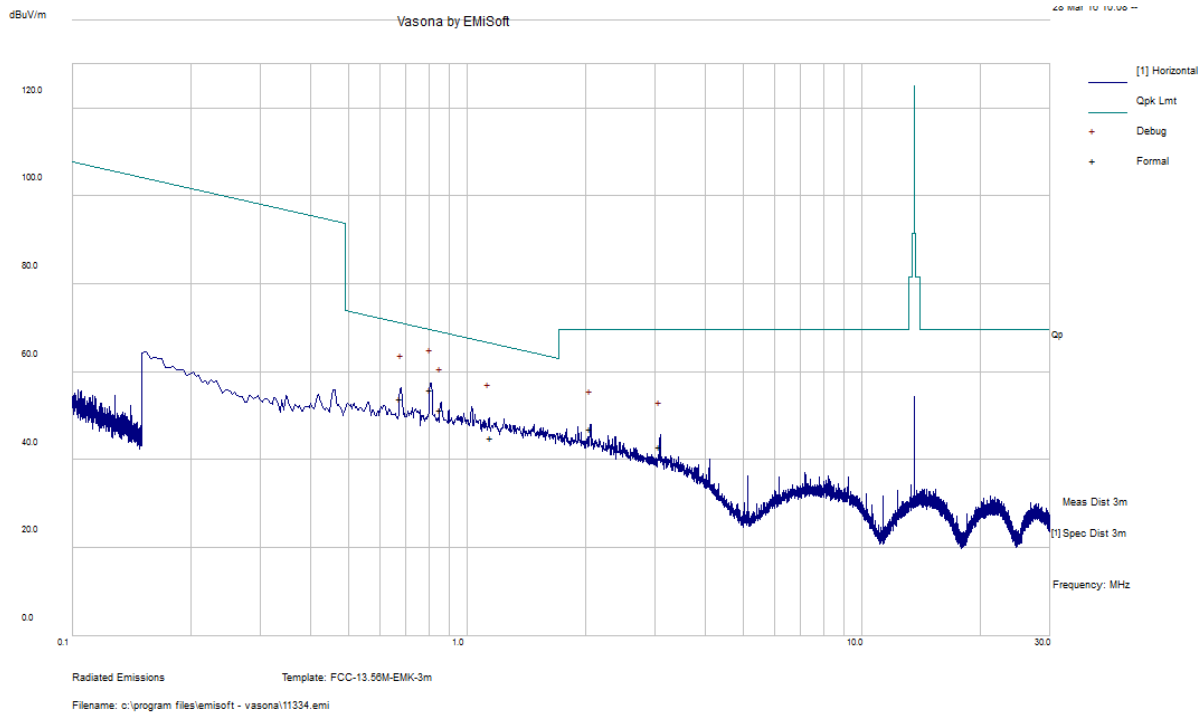
Spec	Requirement	Applicable									
47 CFR §15.225	Operation within the band 13.110–14.010 MHz (a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters. (b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength 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.	☒									
Test Setup	- The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m X 1.0m X 0.8m high, non-metallic table. - The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable. - The relevant loop antenna was set at the required test distance away from the EUT and supporting equipment boundary.										
Procedure	For < 30MHz, Radiated emissions were measured according to ANSI C63.10. The EUT was set to transmit at the highest output power. The EUT was set 3 meter away from the measuring antenna. The loop antenna was positioned 1 meter above the ground from the centre of the loop. The measuring bandwidth was set to 10 kHz. The limit is converted from microvolt/meter to decibel microvolt/meter.										
Test Date	03/28/2016	<table> <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	All orientations for the EUT are investigated, the result shows the worst case only.										
Result	☒ Pass ☐ Fail										

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Chen Ge at 10 meter chamber.

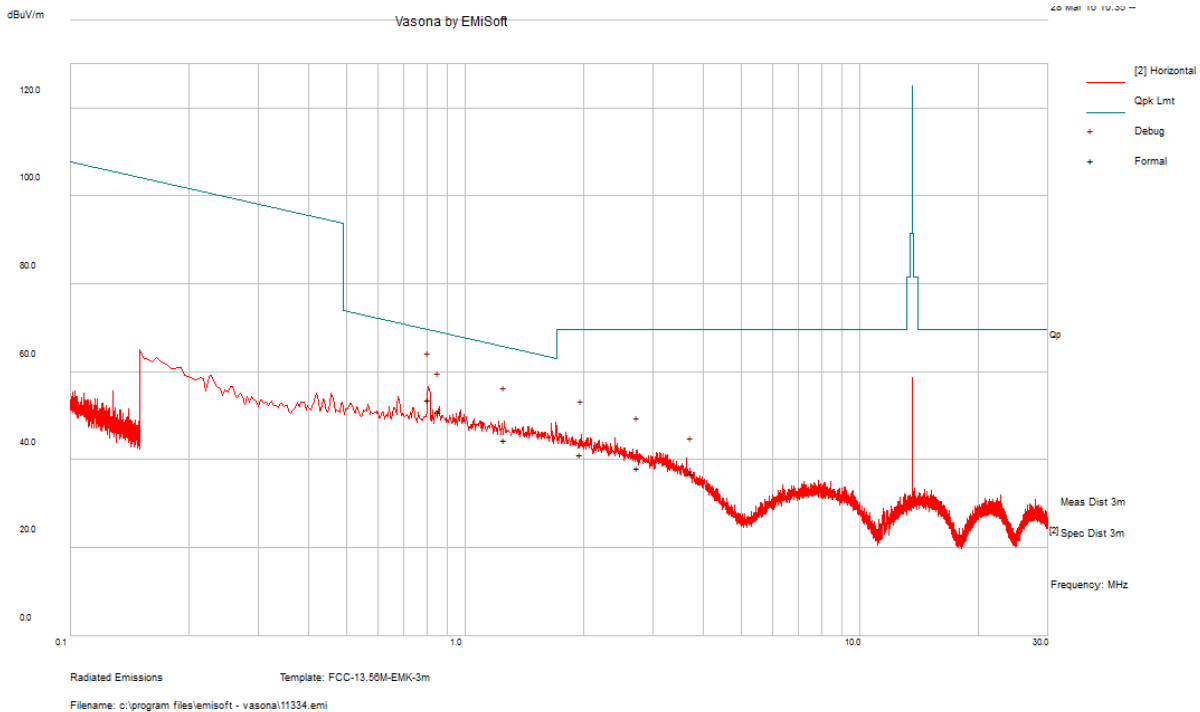
Test specification:	Radiated Spurious Emissions			
Mains Power:	120VAC, 60Hz		Result:	☒ Pass ☐ Fail
Tested by:	Chen Ge			
Test Date:	03/24//2016			
Remarks:	f= 100kHz – 30MHz plot, and loop antenna at 0 degree			



Quasi Max Measurement

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
0.81	41.87	0.2	13.88	55.96	Quasi Max	H	100	329	69.43	-13.48	Pass
0.68	38.52	0.19	15.28	53.99	Quasi Max	H	100	79	70.98	-16.99	Pass
0.86	37.7	0.21	13.43	51.34	Quasi Max	H	100	114	68.92	-17.58	Pass
1.15	34.26	0.22	10.6	45.08	Quasi Max	H	100	13	66.41	-21.33	Pass
2.06	41.04	0.29	5.86	47.19	Quasi Max	H	100	128	69.54	-22.35	Pass
3.08	39.88	0.31	2.79	42.98	Quasi Max	H	100	157	69.54	-26.56	Pass

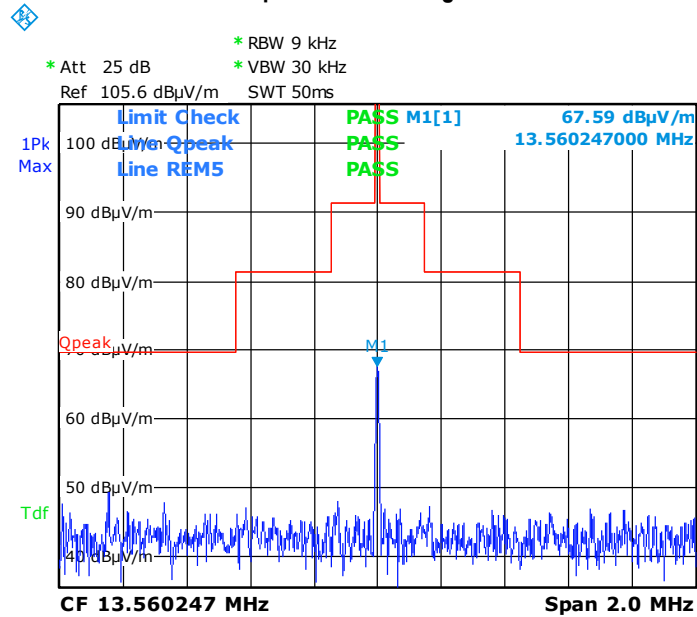
Test specification:	Radiated Spurious Emissions			
Mains Power:	110VAC, 60Hz		Result:	☒ Pass ☐ Fail
Tested by:	Chen Ge			
Test Date:	03/24/2016			
Remarks:	f= 100kHz – 30MHz plot, and loop antenna at 90 degree			



Quasi Max Measurement

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
0.81	39.56	0.2	13.9	53.67	Quasi Max	H	100	296	69.46	-15.8	Pass
0.86	37.16	0.21	13.43	50.8	Quasi Max	H	100	252	68.92	-18.12	Pass
1.26	34.49	0.23	9.81	44.54	Quasi Max	H	100	24	65.57	-21.04	Pass
1.97	34.86	0.28	6.2	41.34	Quasi Max	H	100	192	69.54	-28.2	Pass
2.73	34.11	0.31	3.68	38.1	Quasi Max	H	100	268	69.54	-31.44	Pass
3.74	35.03	0.31	1.56	36.9	Quasi Max	H	100	239	69.54	-32.64	Pass

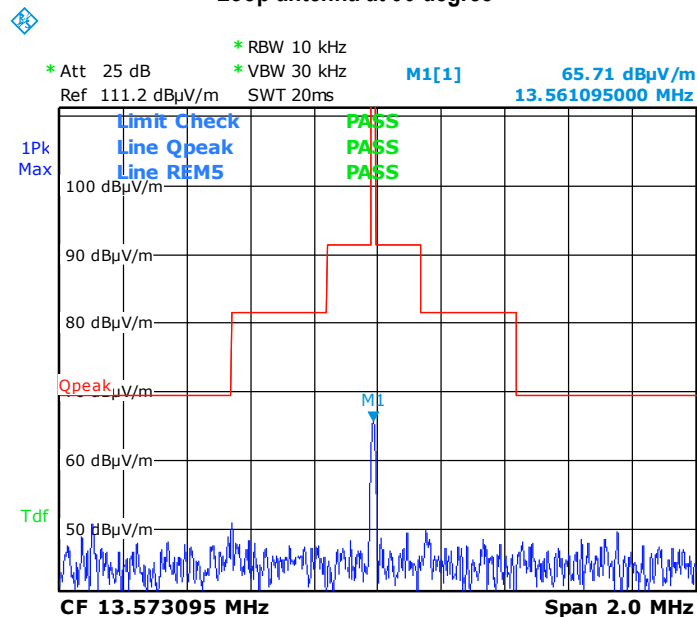
Loop antenna at 0 degree



Date: 28.MAR.2016 20:02:47

Frequency (MHz)	Amplitude (dBμV/m)
13.56	67.59

Loop antenna at 90 degree

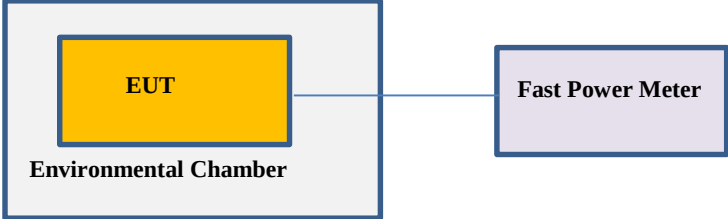


Date: 28.MAR.2016 20:17:40

Frequency (MHz)	Amplitude (dBμV/m)
13.56	65.71

10.5 Frequency Stability

Requirement(s):

Spec	Requirement	Applicable									
47 CFR §15.225 e)	Limit: $\pm 0.01\%$ of 13.56 MHz = 1356 Hz	☒									
Test Setup	 - 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	03/29/2016	<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	☒ Pass ☐ 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: 13.561214 MHz at 20°C at 12VDC

Temperature ($^{\circ}\text{C}$)	Measured Freq. (MHz)	Freq. Drift (Hz)	Freq. Deviation (Limit: 0.01%)	Pass/Fail
50	13.561108	-106	<0.01	Pass
40	13.561108	-106	<0.01	Pass
30	13.561224	10	<0.01	Pass
20	Reference (13.561214 MHz)			
10	13.561222	8	<0.01	Pass
0	13.561425	211	<0.01	Pass
-10	13.561425	211	<0.01	Pass
-20	13.561432	218	<0.01	Pass

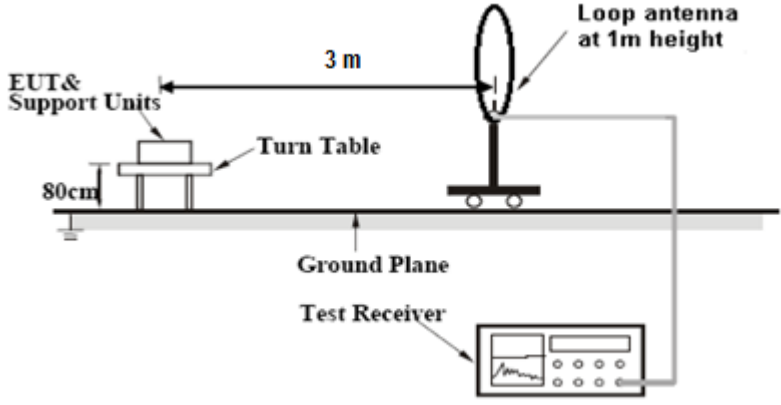
Frequency Stability versus Input Voltage: The Frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$, the frequency of the transmitter was measured at 85% and at 115% of the rated power supply voltage at a 20°C environmental temperature.

Carrier Frequency: 13.561214 at 20°C at 24VDC

Measured Voltage $\pm 15\%$ of nominal (AC)	Measured Freq. (MHz)	Freq. Drift (Hz)	Freq. Deviation (Limit: 0.01%)	Pass/Fail
27.60	13.561214	0.00	<0.01	Pass
20.40	13.561214	0.00	<0.01	Pass

10.6 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 analyser 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.	☒
Test Setup		
Procedure	1. The EUT was switched on and allowed to warm up to its normal operating condition. 2. 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. 3. Measurement of the 99% Occupied Bandwidth of EUT transmission signal and make record.	
Test Date	03/24/2016	Environmental conditions Temperature22°C Relative Humidity39% Atmospheric Pressure1025mbar
Remark	-	
Result	☒ Pass ☐ Fail	

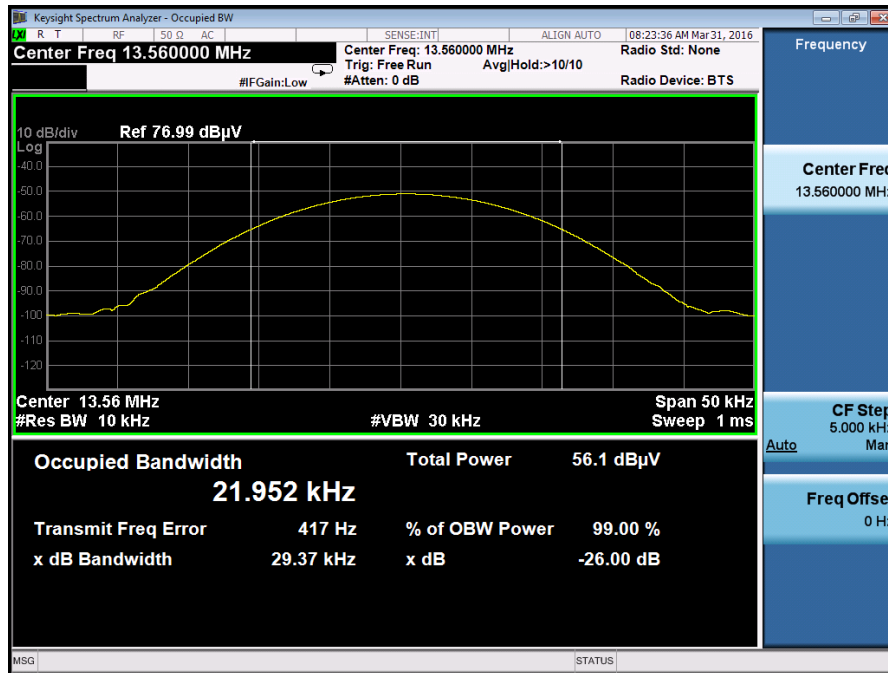
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Chen Ge at 10 meter chamber.

Test results:

13.56 MHz



Frequency (MHz)	Occupied Bandwidth (KHz)
13.56	21.95

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Conducted Emissions						
R & S Receiver	ESIB 40	100179	05/23/2015	1 Year	05/23/2016	☒
CHASE LISN	MN2050B	1018	08/07/2015	1 Year	08/07/2016	☒
Radiated Emissions						
R & S Receiver	ESL6	100178	05/27/2015	1 Year	05/27/2016	☒
R & S Receiver	ESIB 40	100179	05/23/2015	1 Year	05/23/2016	☒
Pre-Amplifier (1-26.5GHz)	8449B	3008A00715	03/04/2016	1 Year	03/04/2017	☐
Preamplifier (100KHz-7GHz)	LPA-6-30	11140711	02/19/2016	1 Year	02/19/2017	☒
ETS-Lingren Loop Antenna	6512	00049120	05/12/2015	1 Year	05/12/2016	☒
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	08/12/2015	1 Year	08/12/2016	☒
Horn Antenna (1-26.5GHz)	3115	10SL0059	08/25/2015	1 Year	08/25/2016	☐
Tuned Dipole Antenna 30 - 1000 MHz (4pcs set)	AD-100	40133	10/02/2015	1 Year	10/02/2016	☐
3 Meters SAC	3M	N/A	08/08/2015	1 Year	08/08/2016	☒
10 Meters SAC	10M	N/A	09/05/2015	1 Year	09/05/2016	☐
RF Conducted Measurement						
Spectrum Analyzer	N9010A	10SL0219	08/20/2015	1 Year	08/20/2016	☒
Agilent Signal Generator	MXG N5182A	MY47071065	04/06/2015	1 Year	04/06/2016	☐
R & S Receiver	ESIB 40	100179	05/23/2015	1 Year	05/23/2016	☐
Test Equity Environment Chamber	1007H	61201	07/31/2015	1 Year	07/31/2016	☒
USB RF Power Sensor	7002-006	10SL0190	09/03/2015	1 Year	09/03/2016	☐

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		Radio: A1. Terminal equipment for purpose of calling Telecom: B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law
Korea CAB Accreditation		EMI: KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI 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 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 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
Taiwan NCC CAB Recognition		LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08
Taiwan BSMI CAB Recognition		CNS 13438
Japan VCCI		R-3083: Radiation 3 meter site C-3421: Main Ports Conducted Interference Measurement T-1597: Telecommunication Ports Conducted Interference Measurements
Australia CAB Recognition		EMC: AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4 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 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
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