RF TEST REPORT

Report No.: FCC_IC_RF_SL18012901-ZBR-003_Rev1.0
Supersede Report No.: FCC_IC_RF_SL18012901-ZBR-003

Applicant	:	Zebra Technologies Corp.
Host Models	:	ZC300, ZC350
Module Model No.	:	T4NM-FDC0
Test Standard	:	FCC 15.225, 15.209 RSS-210 Issue 9: 2016
Test Method	:	FCC 15.225, 15.209 ANSI C63.10 2013 RSS Gen Issue 4 2014
FCC ID	:	I28MD-ZCLFHF
IC ID	:	3798B-ZCLFHF
Dates of test	:	02/01/2018 – 02/08/2018
Issue Date	:	03/06/2018
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:	
Shuo	
Shuo Zhang	Chen Ge
RF 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

TESTING CERT # 2742-01

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 & RED Directive
Japan	MIC (RCB 208)	RF, Telecom
Hong Kong	OFTA (US002)	RF, Telecom

CONTENTS

1 Report Revision History

Report No.	Report Version	Description	Issue Date
FCC_IC_RF_SL18012901-ZBR-003	None	Original	02/12/2018
FCC_IC_RF_SL18012901-ZBR-003_Rev1.0	1.0	Update EUT info	03/06/2018

2 Executive Summary

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

Company:	Zebra Technologies Corporation
Host Product:	Color Card Printer
Module:	T4NM-FDC0
Host Model:	ZC300, ZC350

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	:	Zebra Technologies Corp.
Applicant Address	:	3 Overlook Point Lincolnshire, IL 60069, USA
Manufacturer Name	:	Zebra Technologies Corp.
Manufacturer Address	:	3 Overlook Point Lincolnshire, IL 60069, 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	:	Color Card Printer
Module Model No.	:	T4NM-FDC0
Trade Name	:	Zebra Technologies Corporation
Serial No.	:	C3J17390595
Input Power	:	100-240Vac, 2.8A, 50/60Hz
Date of EUT received	:	February 5th, 2018
Working Frequencies	:	125 kHz, 13.56MHz

6.2 Radio Description

Specifications for Radio:

Radio Type	RFID
Operating Frequency	125KHz, 13.56MHz
Modulation	ASK (125KHz), ASK (13.56MHz)
Channel Spacing	None
Antenna Type	Loop Antenna
Antenna Gain(dB)	125KHz: -134dB / 13.56MHz: -51dB
Antenna Connector Type	N/A

Channel List:

Type	Mode	Channel No.	Frequency (MHz)	Available (Y/N)
RFID	125KHz	1	0.125	Y
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 and 125kHz
Note: None	

Test Item	Operating mode	Tested antenna port	Test frequencies
Antenna Requirement	N/A	-	125kHz 13.56MHz
Conducted Emissions Voltage	N/A	-	
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: N/A			

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Index	Supporting Equipment Description	Model	Serial No	Manu	Note
-	-	-	-	-	-

7.2 Cabling Description

Name	Connection Start		Connection Stop		Length / shielding Info		Note
	From	I/O Port	To	I/O Port	Length (m)	Shielding	
1	-	-	-	-	-	-	-

7.3 Test Software Description

Test Item	Software	Description
RF Testing	Tera Term	Set the EUT to transmit continuously in 125KHz and 13.56MHz test mode
-	-	-

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
	IC	-		
AC Conducted Emissions Voltage	FCC	15.225(a)	ANSI C63.10 2013 RSS Gen. 8.8	☒ Pass ☐ N/A
	IC	RSS Gen (7.2.2)		
Remark				

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
	IC	RSS210(B.6)	IC	RSS Gen 6.13	
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
	IC	RSS210(B.6)	IC	RSS Gen 6.13	
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
	IC	RSS210(B.6)	IC	RSS Gen 6.13	
Limit outside the band of 13.110 – 14.010 MHz	FCC	15.225(d), 15.209	FCC	ANSI C63.10 2013	☒ Pass ☐ N/A
	IC	RSS210(B.6)	IC	RSS Gen 6.13	
Receiver Spurious Emission	IC	-	IC	RSS Gen 7.1	☐ Pass ☒ N/A
Frequency Stability	FCC	15.225(e)	FCC	-	☒ Pass ☐ N/A
	IC	RSS210(B.6)	IC	RSS Gen 6.11	
Occupied Bandwidth	FCC	-	FCC	-	☒ Pass ☐ N/A
	IC	RSS-210(5.9.1)	IC	RSS Gen 6.6	
Remark	1. All measurement uncertainties are not taken into consideration for all presented test result. 2. 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.				

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	±3.5dB
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	N/A	
Result	☒ PASS ☐ FAIL	

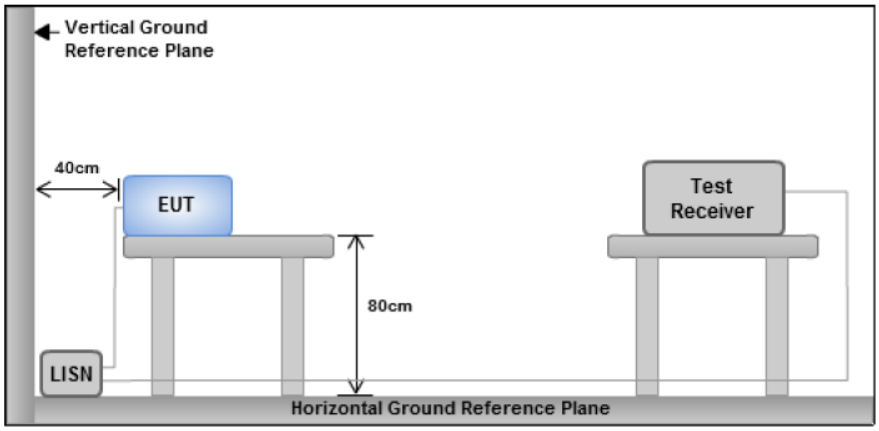
10.2 Conducted Emissions Test Result

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, 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 μH/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.

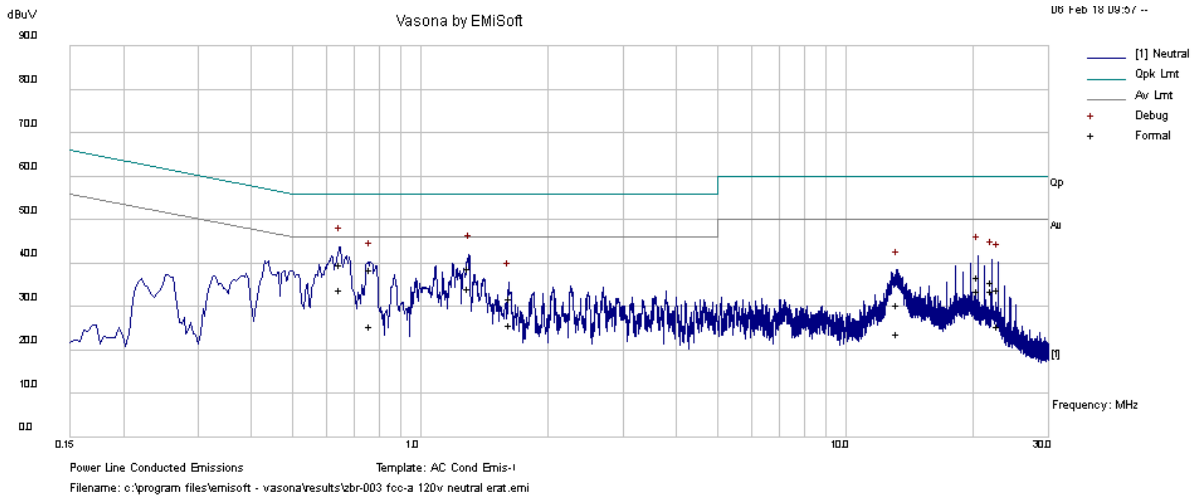
Test Date	February 6th, 2018	Environmental conditions	Temperature Relative Humidity Atmospheric Pressure	21°C 38 % 1025 mbar
Remark	The EUT was tested at 120VAC, 60Hz.			
Result	☒ Pass ☐ Fail			

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes ☐ N/A

Test was done by George Hsu at Conducted Emission test site.

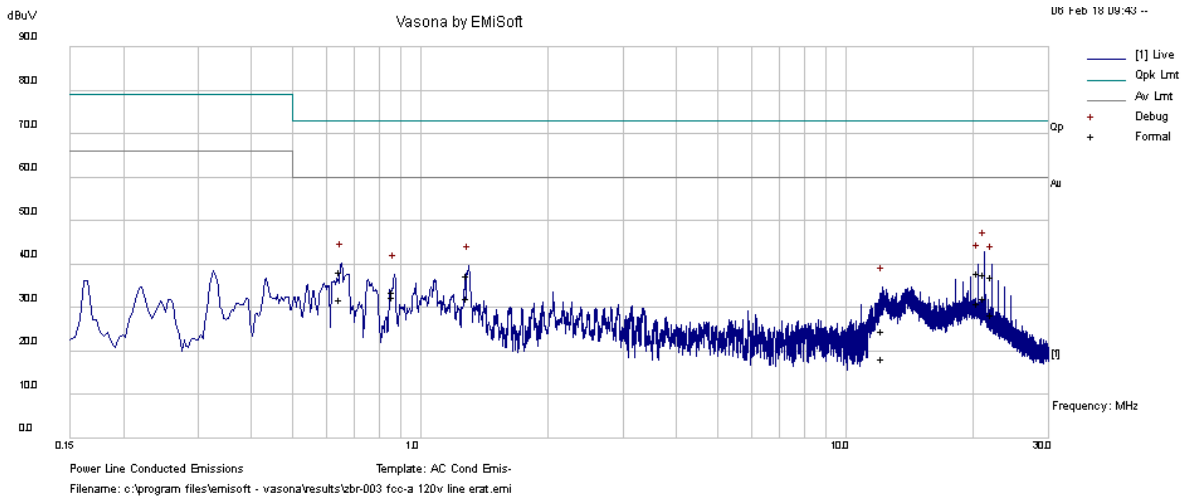
Test specification:	Conducted Emissions		
Mains Power:	120VAC, 60Hz	Result:	☒ Pass ☐ Fail
Tested by:	George Hsu		
Test Date:	February 6th, 2018		
Remarks:	AC Line @ Neutral		



Neutral Measurements

Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line/ Neutral	Limit dBuV	Margin dB	Pass /Fail
0.647098	30.26	9.33	0.05	39.64	Quasi Peak	Neutral	56	-16.36	Pass
1.298045	29.4	9.34	0.05	38.78	Quasi Peak	Neutral	56	-17.22	Pass
20.4813	26.89	9.39	0.47	36.75	Quasi Peak	Neutral	60	-23.25	Pass
22.04956	25.8	9.39	0.5	35.68	Quasi Peak	Neutral	60	-24.32	Pass
0.76289	29.15	9.32	0.04	38.51	Quasi Peak	Neutral	56	-17.49	Pass
22.83354	23.92	9.39	0.51	33.83	Quasi Peak	Neutral	60	-26.17	Pass
13.2682	20.67	9.37	0.32	30.35	Quasi Peak	Neutral	60	-29.65	Pass
0.647098	24.59	9.33	0.05	33.96	Average	Neutral	46	-12.04	Pass
1.298045	24.69	9.34	0.05	34.07	Average	Neutral	46	-11.93	Pass
20.4813	23.87	9.39	0.47	33.73	Average	Neutral	50	-16.27	Pass
22.04956	23.63	9.39	0.5	33.52	Average	Neutral	50	-16.48	Pass
0.76289	16.27	9.32	0.04	25.63	Average	Neutral	46	-20.37	Pass
22.83354	15.67	9.39	0.51	25.57	Average	Neutral	50	-24.43	Pass
13.2682	13.99	9.37	0.32	23.67	Average	Neutral	50	-26.33	Pass

Test specification:	Conducted Emissions			
Mains Power:	120VAC, 60Hz		Result:	☒ Pass ☐ Fail
Tested by:	George Hsu			
Test Date:	February 6th, 2018			
Remarks:	AC Line @ Live			



Live Measurements

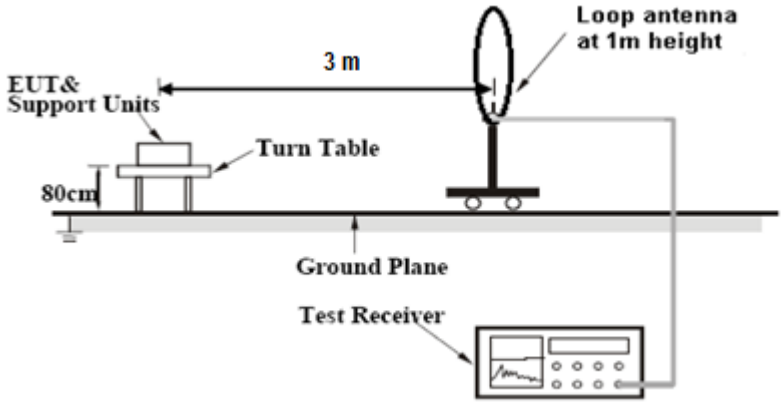
Frequency MHz	Raw dBµV	Cable Loss	Factors dB	Level dBµV	Measurement Type	Line/ Neutral	Limit dBµV	Margin dB	Pass /Fail
21.28018	27.77	9.39	0.48	37.64	Quasi Peak	Live	60	-22.36	Pass
0.645427	29.01	9.33	0.05	38.39	Quasi Peak	Live	56	-17.61	Pass
20.49141	28.14	9.39	0.47	37.99	Quasi Peak	Live	60	-22.01	Pass
22.06386	27.13	9.39	0.5	37.02	Quasi Peak	Live	60	-22.98	Pass
1.290998	28.04	9.34	0.05	37.42	Quasi Peak	Live	56	-18.58	Pass
0.86376	24.41	9.33	0.04	33.77	Quasi Peak	Live	56	-22.23	Pass
12.23534	14.94	9.48	0.29	24.71	Quasi Peak	Live	60	-35.29	Pass
21.28018	22.38	9.39	0.48	32.25	Average	Live	50	-17.75	Pass
0.645427	22.41	9.33	0.05	31.79	Average	Live	46	-14.21	Pass
20.49141	21.12	9.39	0.47	30.97	Average	Live	50	-19.03	Pass
22.06386	18.47	9.39	0.5	28.35	Average	Live	50	-21.65	Pass
1.290998	22.75	9.34	0.05	32.13	Average	Live	46	-13.87	Pass
0.86376	23	9.33	0.04	32.36	Average	Live	46	-13.64	Pass
12.23534	8.42	9.48	0.29	18.19	Average	Live	50	-31.81	Pass

10.3 Radiated Measurements

10.3.1 Radiated Measurements below 30MHz

Requirement(s):

Spec	Requirement	Applicable
47 CFR §15.225 RSS-210 (B.6)	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.	☒

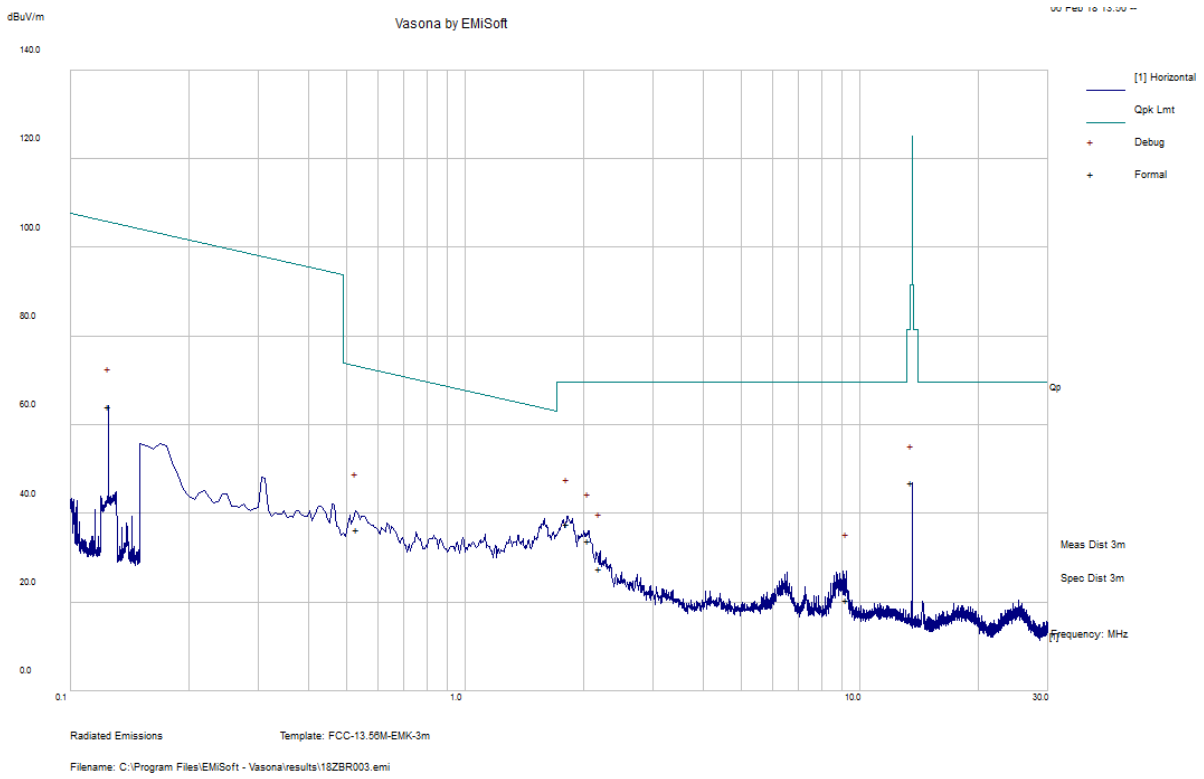
Test Setup				
Procedure	For < 30MHz, Radiated emissions were measured according to ANSI C63.10. The EUT was set to transmit at the highest output power. The EUT was set 3 meter away from the measuring antenna. The loop antenna was positioned 1 meter above the ground from the center of the loop. The measuring bandwidth was set to 10 kHz. The limit is converted from microvolt/meter to decibel microvolt/meter.			
Test Date	02/01/2018 – 02/08/2018	Environmental conditions	Temperature Relative Humidity Atmospheric Pressure	22°C 40% 1026mbar
Remark	-			
Result	☒ Pass ☐ Fail			

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Shuo Zhang at 10-meter chamber.

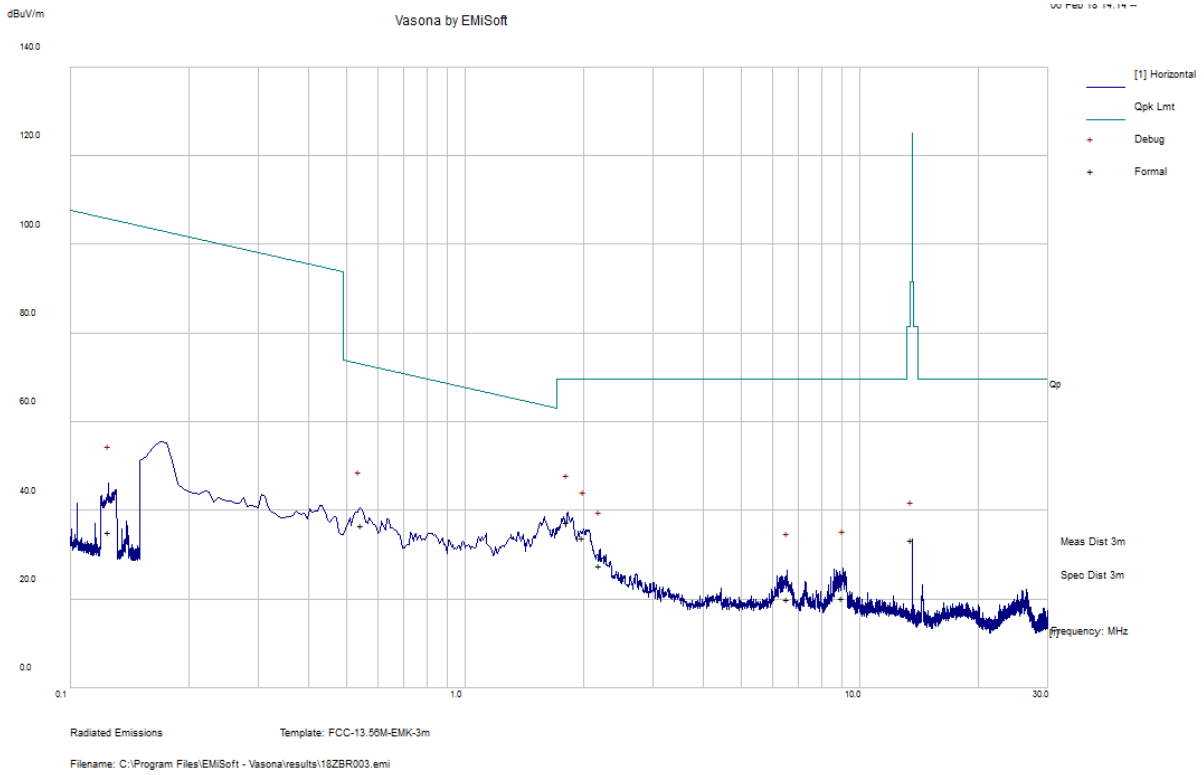
Test specification:	Radiated Spurious Emissions			
Mains Power:	120VAC, 60Hz		Result:	☒ Pass ☐ Fail
Tested by:	Shuo Zhang			
Test Date:	02/06/2018			
Remarks:	125KHz and 13.56MHz f= 100kHz – 30MHz plot, and loop antenna at 0 degree			



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
1.817	19.07	10.31	8.22	37.61	Quasi Max	H	100	42	69.54	-31.93	Pass
0.531	8.29	10.23	17.91	36.43	Quasi Max	H	100	278	73.11	-36.68	Pass
2.055	16.2	10.32	7.3	33.83	Quasi Max	H	100	319	69.54	-35.72	Pass
2.193	10.35	10.32	6.84	27.52	Quasi Max	H	100	18	69.54	-42.03	Pass
0.125	24.09	10.14	29.78	64.02	Quasi Max	H	100	356	105.67	-41.65	Pass
9.250	8.24	10.61	1.56	20.41	Quasi Max	H	100	174	69.54	-49.13	Pass

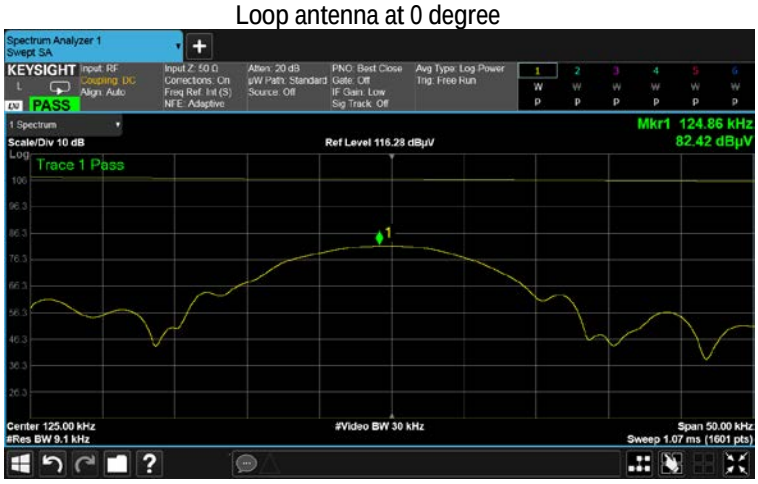
Test specification:	Radiated Spurious Emissions			
Mains Power:	120VAC, 60Hz		Result:	☒ Pass ☐ Fail
Tested by:	Shuo Zhang			
Test Date:	02/06/2018			
Remarks:	125KHz and 13.56MHz f= 100kHz – 30MHz plot, and loop antenna at 90 degrees			



Quasi Max Measurement

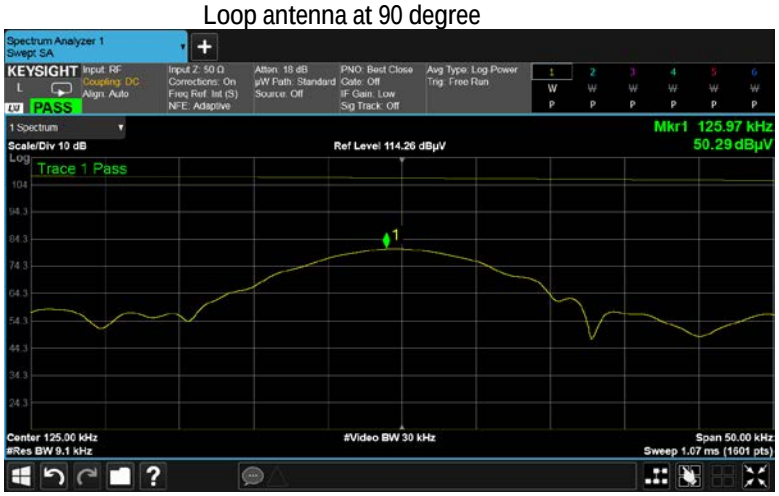
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol (0/90)	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
1.816	18.81	10.31	8.23	37.35	Quasi Max	H	100	97	69.54	-32.19	Pass
0.546	8.88	10.23	17.66	36.77	Quasi Max	H	100	117	72.85	-36.08	Pass
1.994	16.18	10.31	7.52	34.01	Quasi Max	H	100	148	69.54	-35.53	Pass
2.192	10.45	10.32	6.85	27.61	Quasi Max	H	100	196	69.54	-41.93	Pass
9.052	8.1	10.61	1.56	20.27	Quasi Max	H	100	59	69.54	-49.27	Pass
6.553	7.25	10.49	2.26	20	Quasi Max	H	100	282	69.54	-49.54	Pass

Loop antenna at 0 degree



Frequency (kHz)	Amplitude (dBµV)	Limit(dBµV)
124.86	82.42	106

Loop antenna at 90 degree

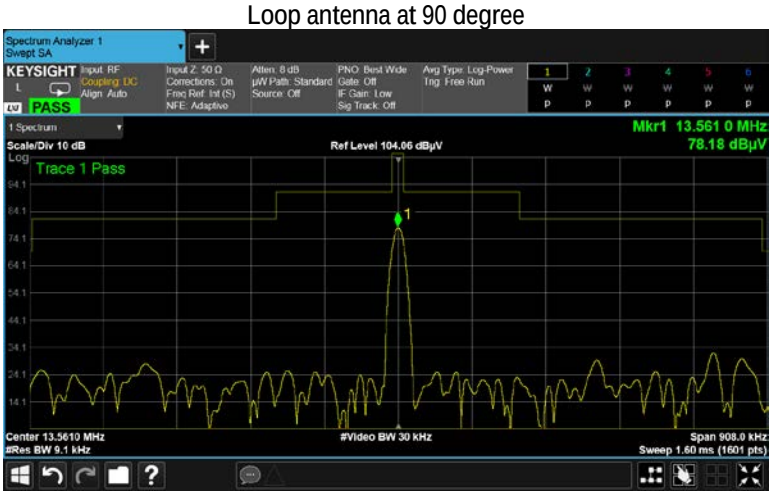


Frequency (kHz)	Amplitude (dBµV)	Limit(dBµV)
125.97	50.29	106

Loop antenna at 0 degree

Frequency (MHz)	Amplitude (dBµV/m)	Limit(dBµV)
13.5651	71.05	84

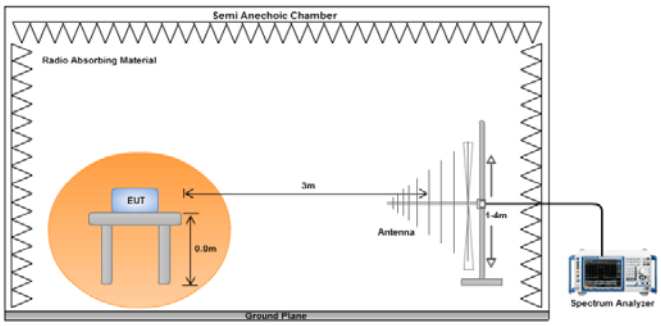
Loop antenna at 90 degree



Frequency (MHz)	Amplitude (dBµV/m)	Limit(dBµV)
13.5610	78.18	84

10.3.2 Radiated Measurements 30MHz to 1GHz

Requirement(s):

<table>
<tr><th>Spec</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47 CFR §15.225
RSS-210 (B.6)</td><td>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>
<tr><th>Frequency range (MHz)</th><th>Field Strength (uV/m)</th></tr>
<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>
</table>
</td><td>☒</td></tr>
<tr><td>Test Setup</td><td colspan="2"> 
</td></tr>
<tr><td>Procedure</td><td colspan="2">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 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.
3. A Quasi-peak measurement was then made for that frequency point.
4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</td></tr>
<tr><td>Test Date</td><td>02/01/2018 – 02/08/2018</td><td>Environmental conditions
Temperature 20.1°C
Relative Humidity 36%
Atmospheric Pressure 1026mbar</td></tr>
<tr><td>Remark</td><td colspan="2">-</td></tr>
<tr><td>Result</td><td colspan="2">☒ Pass ☐ Fail</td></tr>
</table>

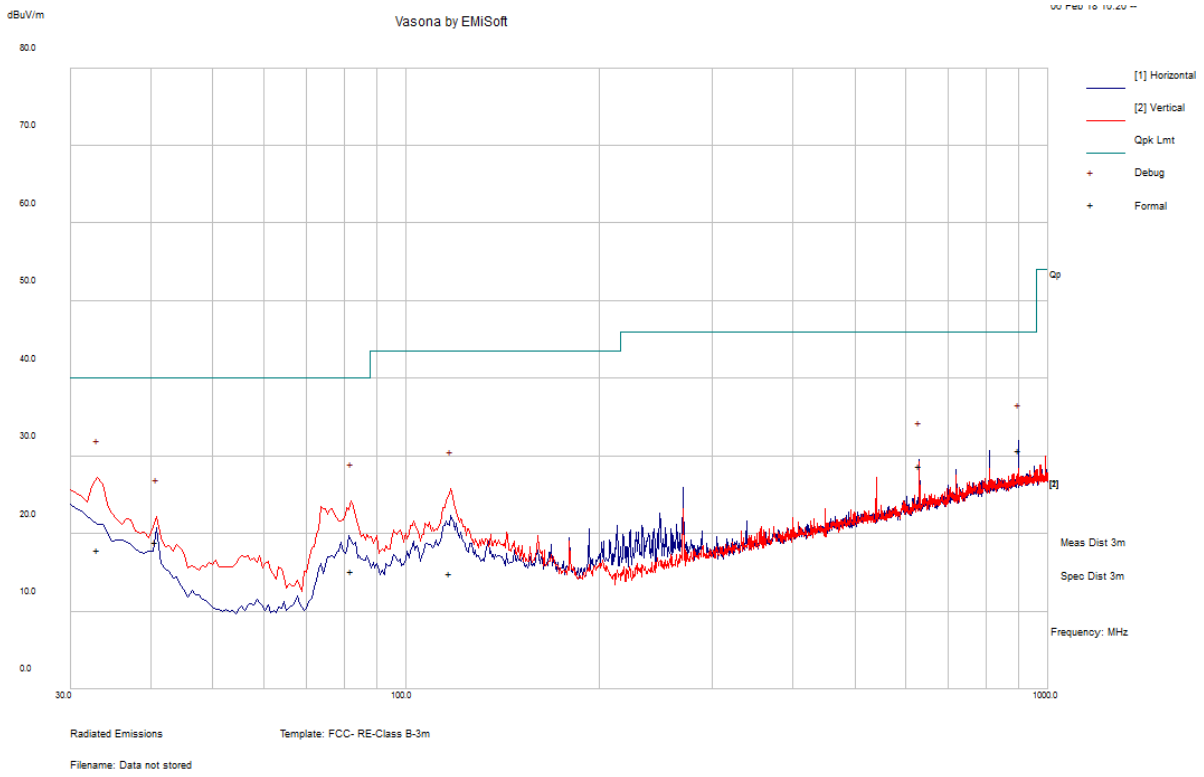
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Shuo Zhang at 10-meter chamber.

Test specification:	Radiated Emissions			
Mains Power:	120VAC, 60Hz		Result:	☒ Pass ☐ Fail
Tested by:	Shuo Zhang			
Test Date:	02/06/2018			
Remarks:	N/A			

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

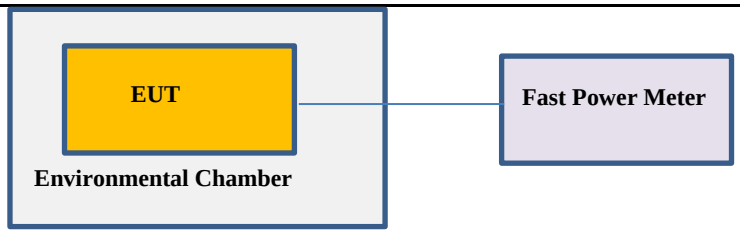


f=30MHz – 1000MHz Measurements

Frequency MHz	Raw dBµV/m	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
33.13	22.35	11.34	-15.79	17.9	Quasi Max	V	188	155	40	-22.11	Pass
899.96	27.78	16.68	-13.65	30.81	Quasi Max	H	100	92	46	-15.19	Pass
82.21	31.4	11.82	-28.09	15.14	Quasi Max	V	120	46	40	-24.86	Pass
629.98	29.73	15.2	-16.16	28.77	Quasi Max	H	142	130	46	-17.23	Pass
117.06	25.73	12.23	-23.09	14.87	Quasi Max	V	169	85	43.5	-28.63	Pass
40.70	29.14	11.46	-21.68	18.92	Quasi Max	V	105	215	40	-21.08	Pass

10.3.3 Frequency Stability

Requirement(s):

Spec	Requirement	Applicable
47 CFR §15.225 e) RSS-210 (B.6)	Limit: ±0.01% of 13.56 MHz = 1356 Hz	☒
Test Setup	 1. The EUT was set up inside an environmental chamber. 2. 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	02/01/2018 – 02/08/2018	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 Shuo Zhang at RF test site.

Test Result for 125KHz Radio

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: 0.125 MHz

Temperature (ºC)	Measured Freq. (MHz)	Freq. Drift (Hz)	Freq. Deviation (Limit: 0.01%)	Pass/Fail
50	0.125	0	<0.01	Pass
40	0.125	0	<0.01	Pass
30	0.125	0	<0.01	Pass
20	0.125	0	<0.01	Pass
10	0.125	0	<0.01	Pass
0	0.125	0	<0.01	Pass
-10	0.125	0	<0.01	Pass
-20	0.125	0	<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: 0.125 MHz at Normal Operation Voltage: 120V

Measured Voltage ±15% of nominal (AC)	Measured Freq. (MHz)	Freq. Drift (Hz)	Freq. Deviation (Limit: 0.01%)	Pass/Fail
11.5	0.125	0	<0.01	Pass
8.5	0.125	0	<0.01	Pass

Test Result for 13.56MHz Radio

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: 13.561 MHz

Temperature (ºC)	Measured Freq. (MHz)	Freq. Drift (Hz)	Freq. Deviation (Limit: 0.01%)	Pass/Fail
50	13.56	0	<0.01	Pass
40	13.561	0	<0.01	Pass
30	13.561	0	<0.01	Pass
20	13.561	0	<0.01	Pass
10	13.561	0	<0.01	Pass
0	13.561	0	<0.01	Pass
-10	13.561	0	<0.01	Pass
-20	13.561	0	<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.

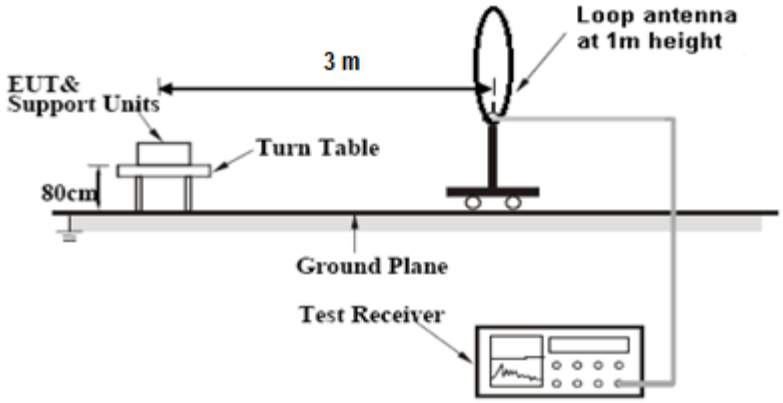
Carrier Frequency: 13.561 MHz at Normal Operation Voltage:120 V

Measured Voltage ±15% of nominal (AC)	Measured Freq. (MHz)	Freq. Drift (Hz)	Freq. Deviation (Limit: 0.01%)	Pass/Fail
11.5	13.561	0	<0.01	Pass
8.5	13.561	0	<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 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	12/08/2017-12/12/2017	Environmental conditions	Temperature 22°C Relative Humidity 39% Atmospheric Pressure 1025mbar
Remark	-		
Result	☒ Pass ☐ Fail		

Test Data ☐ Yes (See below) ☒ N/A

Test Plot ☒ Yes (See below) ☐ N/A

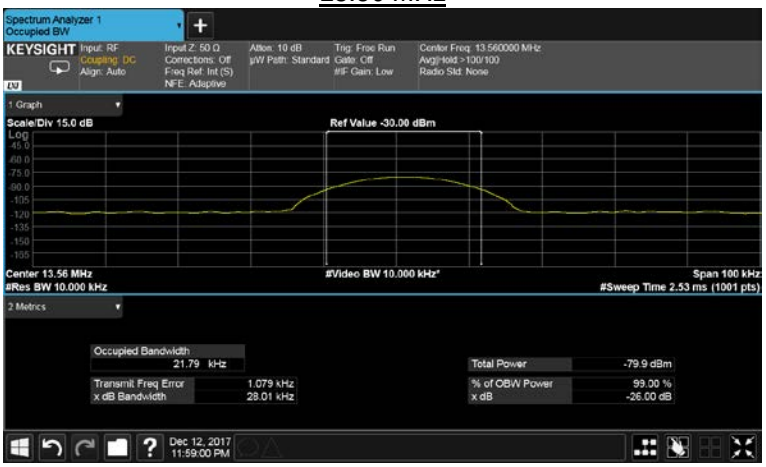
Test was done by Shuo Zhang at 10-meter chamber.

Test results:

125 kHz

Frequency (kHz)	Occupied Bandwidth (KHz)
125.00	24.28

13.56 MHz



Frequency (MHz)	Occupied Bandwidth (KHz)
13.56	21.79

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Radiated Emissions						
Spectrum Analyzer	N9030B	10SL0289	09/06/2017	1 Year	09/06/2018	☑
ETS-Lingren Loop Antenna	6512	00049120	07/14/2017	1 Year	07/14/2018	☑
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	01/13/2017	1 Year	01/13/2018	☑
Horn Antenna (1-26.5GHz)	3115	10SL0059	11/09/2017	1 Year	11/09/2018	☑
RF Conducted Measurement						
Spectrum Analyzer	N9030B	10SL0289	09/06/2017	1 Year	09/06/2018	☑
Test Equity Environment Chamber	1007H	61201	11/08/2017	1 Year	11/08/2018	☑

Annex A. 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 Equipment: EN45011: EN ISO/IEC 17065
		Electromagnetic Compatibility: EN45011 – EN ISO/IEC 17065
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 Measurement
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
		Radiocommunications: 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