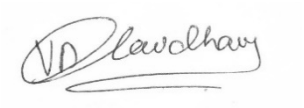
RF TEST REPORT

SIEMIC
A Bureau Veritas Group Company

Report No.: FCC-IC_RF_SL18030801-PIR-001
Supersede Report No.: None

Applicant	:	IKS International US Corp
Host Product Name / Model No.	:	Calypso : 100844, Telesto : 100845
Module Model No.	:	X-CC1110
Test Standard	:	47 CFR 15.245 RSS 210 Iss 9: Aug 2016
Test Method	:	ANSI C63.10: 2013 RSS Gen Iss 4: Nov 2014
FCC ID	:	2APNTX-CC1110
IC ID	:	23713-XCC1110
Dates of test	:	03/19/2018-03/23/2018
Issue Date	:	04/04/2018
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:	
	
Vijay Chaudhary	Chen Ge
RF Test Engineer	Engineer Reviewer

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

ilac-MRA
A2LA ACCREDITED
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	Safety, EMC, RF/Wireless, Telecom
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_SL18030801-PIR-001	None	Original	04/04/2018

2 Executive Summary

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

Company: IKS International US Corp
Host Product: Calypso : 100844, Telesto : 100845
Module Model: X-CC1110

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	:	IKS International US Corp
Applicant Address	:	4660 La Jolla Village Dr, San Diego, CA-92122
Manufacturer Name	:	IKS International US Corp
Manufacturer Address	:	4660 La Jolla Village Dr, San Diego, CA-92122

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 / Model No.	:	Calypso : 100844, Telesto : 100845
Module Model No.	:	X-CC1110
Trade Name	:	Xiltrix
Serial No.	:	Calypso: CAL0100170291602, Telesto: TEL0100172600005
Input Power	:	12 VDC
Power Adapter Manu/Model	:	N/A
Power Adapter SN	:	N/A
Product Hardware version	:	Calypso : V1.5A, Telesto : V1.6A
Product Software version	:	FW 30.0
Radio Hardware version	:	NA
Radio Software version	:	NA
Date of EUT received	:	03/19/2018
Port/Connectors	:	N/A

6.2 Spec for Radio

Radio Type	RFID
Operating Frequency	915.0-915.6 MHz
Modulation	GFSK
Antenna Type	Whip Antenna – Omni Directional
Antenna Gain	3 dBi
Antenna Connector Type	SMA Connector

6.3 EUT test modes/configuration Description

Mode	Note
RFID	GFSK

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	N/A	N/A	N/A	N/A	-

7.2 Cabling Description

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

7.3 Test Software Description

Test Item	Software	Description
-	-	-

8 Test Summary

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Restricted Band of Operation	FCC	15.205	FCC	ANSI C63.10:2013 558074 D01 DTS Meas Guidance v04	☐ Pass ☒ N/A
	IC	RSS Gen 8.10	IC		
AC Conducted Emissions	FCC	15.207(a)	FCC	ANSI C63.10:2013	☒ Pass ☐ N/A
	IC	RSS Gen 8.8	IC	RSS Gen Issue 4: 2014	

Band Requirement

Test Item	Test standard		Test Method/Procedure		Pass / Fail
99% Occupied Bandwidth	-	-	-	-	☒ Pass ☐ N/A
	IC	RSS Gen 6.6	IC	RSS Gen Issue 4: 2014 -	
	-	-	-	-	
Radiated Spurious Emissions	FCC	15.245(b)	FCC	ANSI C63.10:2013 558074 D01 DTS Meas Guidance v04	☒ Pass ☐ N/A
	IC	RSS210 (5.5)	IC		
Remark	1. All measurement uncertainties do not take into consideration for all presented test results. 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. 3. Device was tested with two host Calypso & Telesto 4. Both host cannot operate independently, therefore both hosts was on during testing.				

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

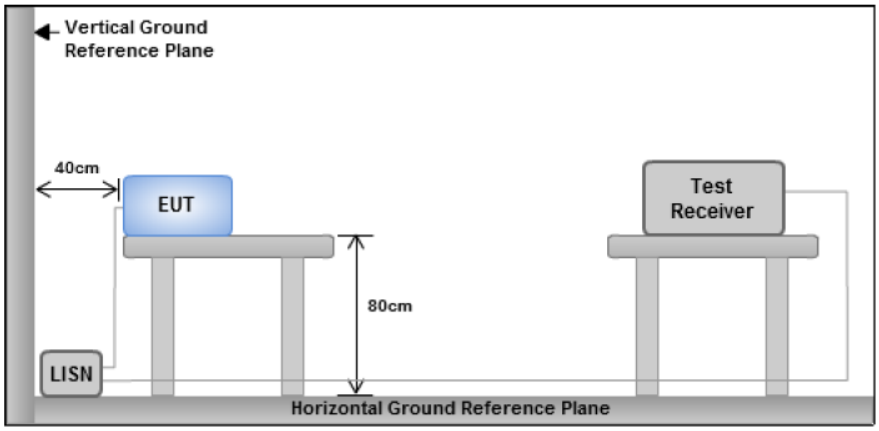
10.1 Antenna Requirement

Spec	Requirement	Applicable
§15.203	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	All Radio use SMA connector for antenna connection. Professional Installation requereid which meets the requirement.	
Result	☒ PASS ☐ FAIL	

10.2 Conducted Emissions

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
47CFR§15.207	a)	For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequency ranges.	☒
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.		
Remark	EUT tested with AC 120V 60Hz		
Result	☒ Pass ☐ Fail		

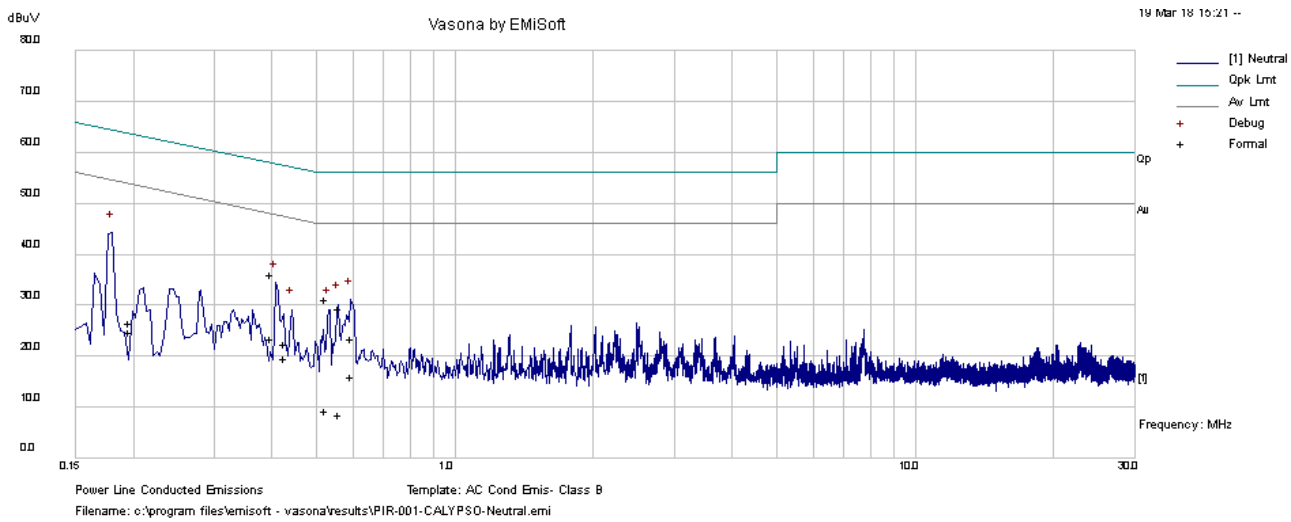
Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by *Vijay Chaudhary* at *Conducted Emission Test Site*.

Conducted Emission Test Results

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	21	Result:	☒ Pass ☐ Fail
	Humidity (%):	45		
	Atmospheric(mbar):	1021		
Mains Power:	120VAC, 60Hz			
Tested by:	Vijay Chaudhary			
Test Date:	03/19/2018			
Remarks	Conducted @ Neutral : Calypso			

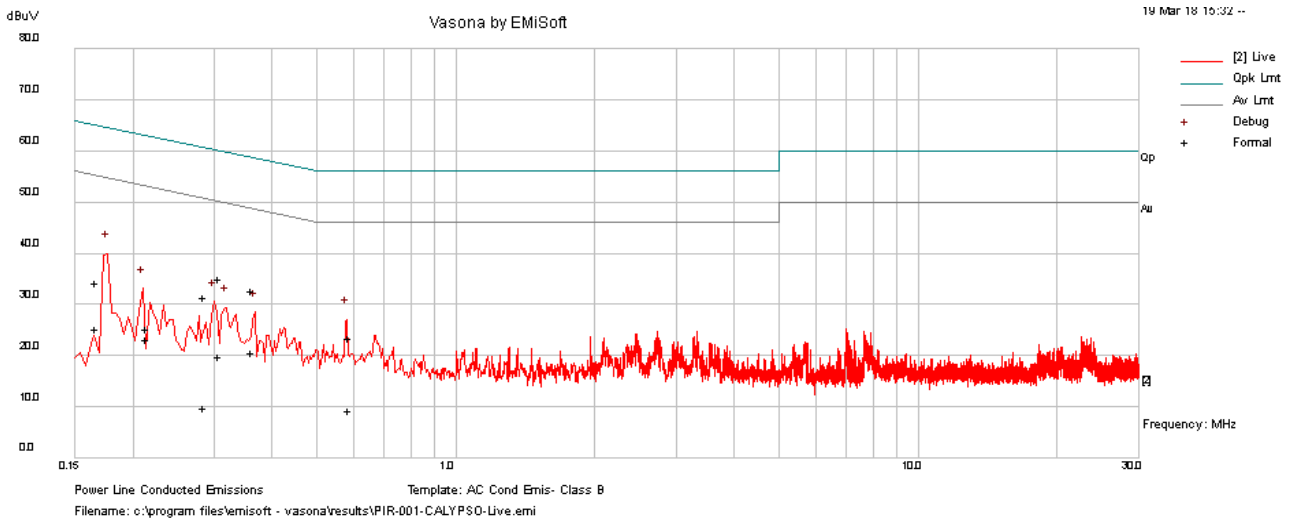


Neutral Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line / Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
0.19	17.2	9.32	0.04	26.57	Quasi Peak	Neutral	63.78	-37.21	Pass
0.39	26.62	9.33	0.04	35.98	Quasi Peak	Neutral	57.9	-21.92	Pass
0.59	14.09	9.33	0.06	23.48	Quasi Peak	Neutral	56	-32.52	Pass
0.56	19.98	9.33	0.05	29.36	Quasi Peak	Neutral	56	-26.64	Pass
0.52	21.73	9.33	0.04	31.11	Quasi Peak	Neutral	56	-24.89	Pass
0.42	13.16	9.33	0.04	22.52	Quasi Peak	Neutral	57.33	-34.8	Pass
0.19	15.45	9.32	0.04	24.82	Average	Neutral	53.78	-28.96	Pass
0.39	14.2	9.33	0.04	23.57	Average	Neutral	47.9	-24.33	Pass
0.59	6.49	9.33	0.06	15.88	Average	Neutral	46	-30.12	Pass
0.56	-0.94	9.33	0.05	8.44	Average	Neutral	46	-37.56	Pass
0.52	0.04	9.33	0.04	9.41	Average	Neutral	46	-36.59	Pass
0.42	10.32	9.33	0.04	19.68	Average	Neutral	47.33	-27.65	Pass

Conducted Emission Test Results

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	22	Result:	☒ Pass ☐ Fail
	Humidity (%):	45		
	Atmospheric(mbar):	1021		
Mains Power:	120Vac, 60Hz			
Tested by:	Vijay Chaudhary			
Test Date:	03/19/2018			
Remarks	Conducted @ Live : Calypso			



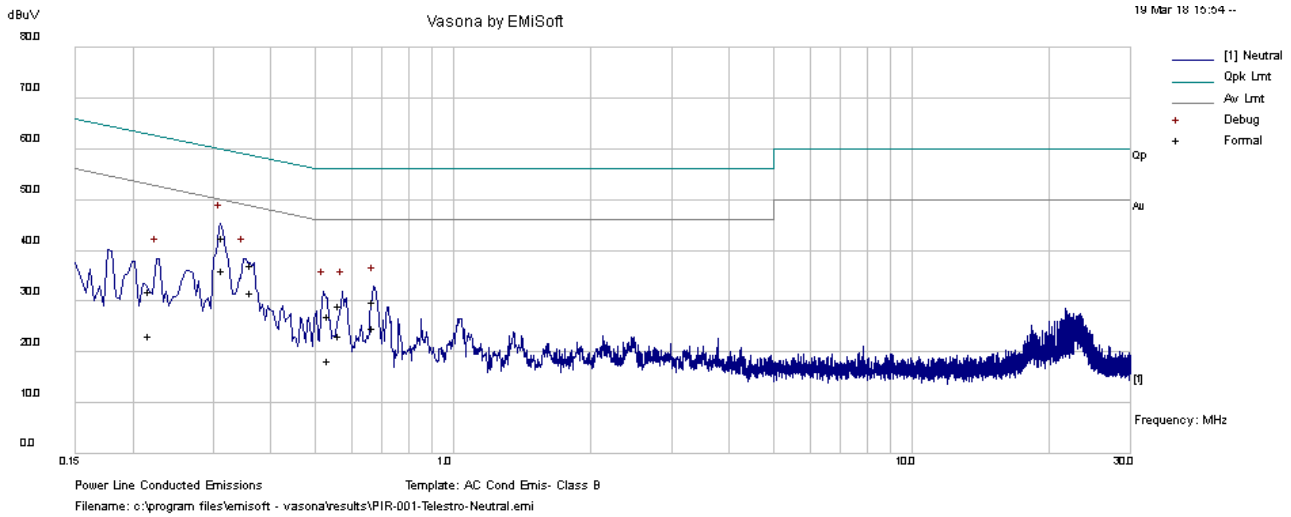
Live Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line / Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
0.16	24.98	9.33	0.05	34.36	Quasi Peak	Live	65.11	-30.75	Pass
0.58	14.09	9.33	0.06	23.48	Quasi Peak	Live	56	-32.52	Pass
0.28	22.08	9.32	0.04	31.44	Quasi Peak	Live	60.68	-29.24	Pass
0.21	15.84	9.32	0.04	25.2	Quasi Peak	Live	63.01	-37.81	Pass
0.36	23.29	9.33	0.04	32.65	Quasi Peak	Live	58.68	-26.02	Pass
0.30	25.79	9.32	0.04	35.15	Quasi Peak	Live	60.01	-24.86	Pass
0.16	15.97	9.33	0.05	25.35	Average	Live	55.11	-29.77	Pass
0.58	0.02	9.33	0.06	9.41	Average	Live	46	-36.59	Pass
0.28	0.49	9.32	0.04	9.86	Average	Live	50.68	-40.83	Pass
0.21	13.75	9.32	0.04	23.11	Average	Live	53.01	-29.9	Pass
0.36	11.37	9.33	0.04	20.74	Average	Live	48.68	-27.94	Pass
0.30	10.59	9.32	0.04	19.96	Average	Live	50.01	-30.06	Pass

Note: The results above show only the worst case.

Conducted Emission Test Results

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	21	Result:	☒ Pass ☐ Fail
	Humidity (%):	45		
	Atmospheric(mbar):	1021		
Mains Power:	120VAC, 60Hz			
Tested by:	Vijay Chaudhary			
Test Date:	03/19/2018			
Remarks	Conducted @ Neutral : Telestro			

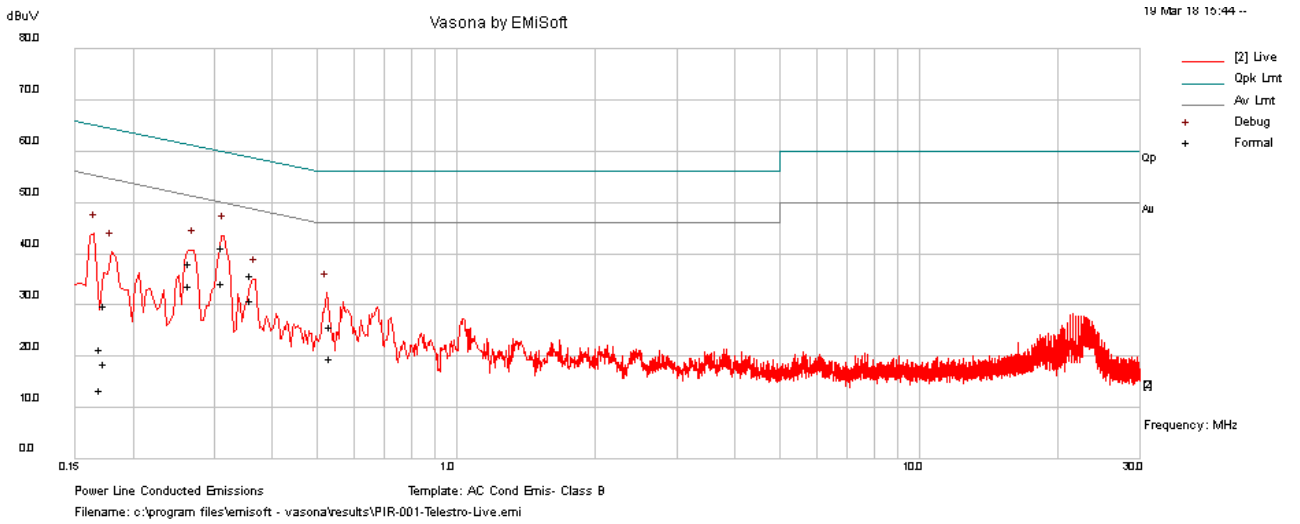


Neutral Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line / Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
0.31	33.16	9.32	0.04	42.52	Quasi Peak	Neutral	59.88	-17.36	Pass
0.36	27.78	9.33	0.04	37.15	Quasi Peak	Neutral	58.69	-21.55	Pass
0.66	20.44	9.33	0.05	29.81	Quasi Peak	Neutral	56	-26.19	Pass
0.56	19.65	9.33	0.05	29.04	Quasi Peak	Neutral	56	-26.96	Pass
0.53	17.75	9.33	0.05	27.12	Quasi Peak	Neutral	56	-28.88	Pass
0.21	22.6	9.32	0.04	31.97	Quasi Peak	Neutral	62.92	-30.96	Pass
0.31	26.81	9.32	0.04	36.17	Average	Neutral	49.88	-13.71	Pass
0.36	22.36	9.33	0.04	31.72	Average	Neutral	48.69	-16.97	Pass
0.66	15.29	9.33	0.05	24.66	Average	Neutral	46	-21.34	Pass
0.56	13.73	9.33	0.05	23.11	Average	Neutral	46	-22.89	Pass
0.53	8.94	9.33	0.05	18.32	Average	Neutral	46	-27.68	Pass
0.21	13.93	9.32	0.04	23.3	Average	Neutral	52.92	-29.63	Pass

Conducted Emission Test Results

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	22	Result:	☒ Pass ☐ Fail
	Humidity (%):	45		
	Atmospheric(mbar):	1021		
Mains Power:	120Vac, 60Hz			
Tested by:	Vijay Chaudhary			
Test Date:	03/19/2018			
Remarks	Conducted @ Live : Telestro			



Live Plot at 120Vac, 60Hz

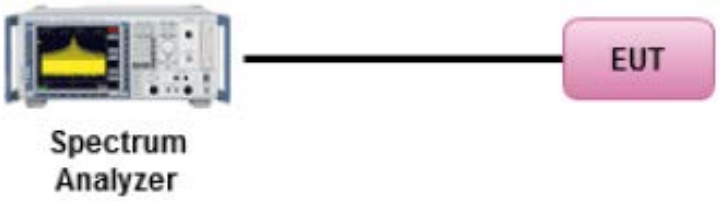
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line / Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
0.31	31.83	9.32	0.04	41.2	Quasi Peak	Live	59.9	-18.7	Pass
0.26	28.84	9.32	0.04	38.2	Quasi Peak	Live	61.28	-23.08	Pass
0.17	20.48	9.33	0.05	29.86	Quasi Peak	Live	64.76	-34.9	Pass
0.35	26.36	9.33	0.04	35.72	Quasi Peak	Live	58.74	-23.02	Pass
0.53	16.33	9.33	0.05	25.7	Quasi Peak	Live	56	-30.3	Pass
0.17	12.07	9.33	0.05	21.45	Quasi Peak	Live	64.95	-43.5	Pass
0.31	24.94	9.32	0.04	34.31	Average	Live	49.9	-15.59	Pass
0.26	24.3	9.32	0.04	33.66	Average	Live	51.28	-17.62	Pass
0.17	9.27	9.33	0.05	18.64	Average	Live	54.76	-36.12	Pass
0.35	21.67	9.33	0.04	31.03	Average	Live	48.74	-17.71	Pass
0.53	10.16	9.33	0.05	19.54	Average	Live	46	-26.46	Pass
0.17	4.00	9.33	0.05	13.38	Average	Live	54.95	-41.58	Pass

Note: The results above show only the worst case.

10.3 Occupied Bandwidth

Requirement(s):

Spec	Requirement	Applicable
47 CFR §15.247	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 2/3 of 20 dB bandwidth of the hopping channel, whichever is greater.	☒

Test Setup			
Procedure	20dB Emission bandwidth measurement procedure - Set RBW ≥ 1% of 20dB Bandwidth - Set the video bandwidth (VBW) ≥ RBW. - Detector = Peak. - Trace mode = max hold. - Sweep = auto couple. - Allow the trace to stabilize. - Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. 99% bandwidth measurement procedure 1. EUT was set for low , mid, high channel with modulated mode and highest RF output power. 2. The spectrum analyzer was connected to the antenna terminal.		
Test Date	01/08/2018-01/29/2018	Environmental condition	Temperature 23oC Relative Humidity 47% Atmospheric Pressure 1019mbar
Remark	-		
Result	☐ Pass ☐ Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

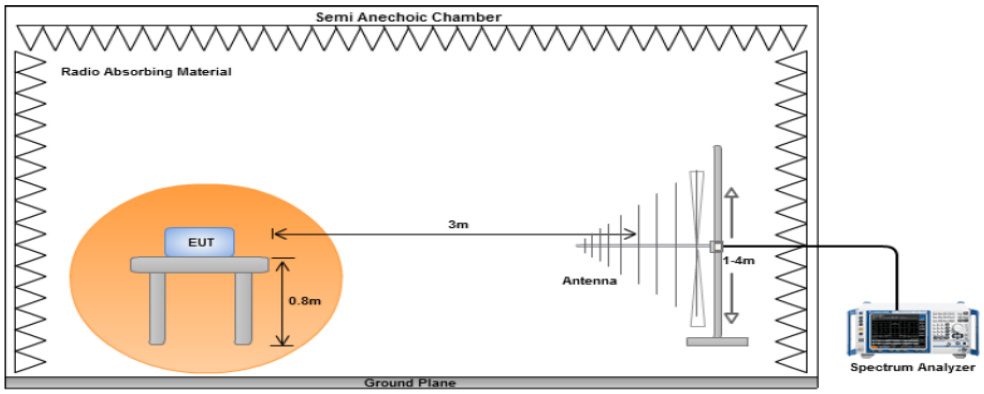
Test was done by *Vijay Chaudhary* at *RF Test Site*.

Test Mode:

Channel	Channel Frequency (MHz)	OBW
		99% (KHz)
Mid	915.4	380

10.4 Radiated Spurious Emissions below 1GHz

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.245, RSS210</td><td>a)</td><td>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges
<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>
<table>
<tr><th>Frequency range (MHz)</th><th>Field Strength of Fundamental (uV/m)</th><th>Field Strength of harmonics (uV/m)</th></tr>
<tr><td>902-928</td><td>500</td><td>1.6</td></tr>
<tr><td>2435-2465</td><td>500</td><td>1.6</td></tr>
<tr><td>5785-5815</td><td>500</td><td>1.6</td></tr>
<tr><td>10500-10550</td><td>2500</td><td>25.0</td></tr>
<tr><td>24075-24175</td><td>2500</td><td>25.0</td></tr>
</table></td><td>☒</td></tr>
<tr><td>Test Setup2</td><td colspan="3"> 
</td></tr>
<tr><td>Procedure</td><td colspan="3">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>Remark</td><td colspan="3">The EUT was scanned up to 1GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.</td></tr>
<tr><td>Result</td><td colspan="3">☒ Pass ☐ Fail</td></tr>
</table>

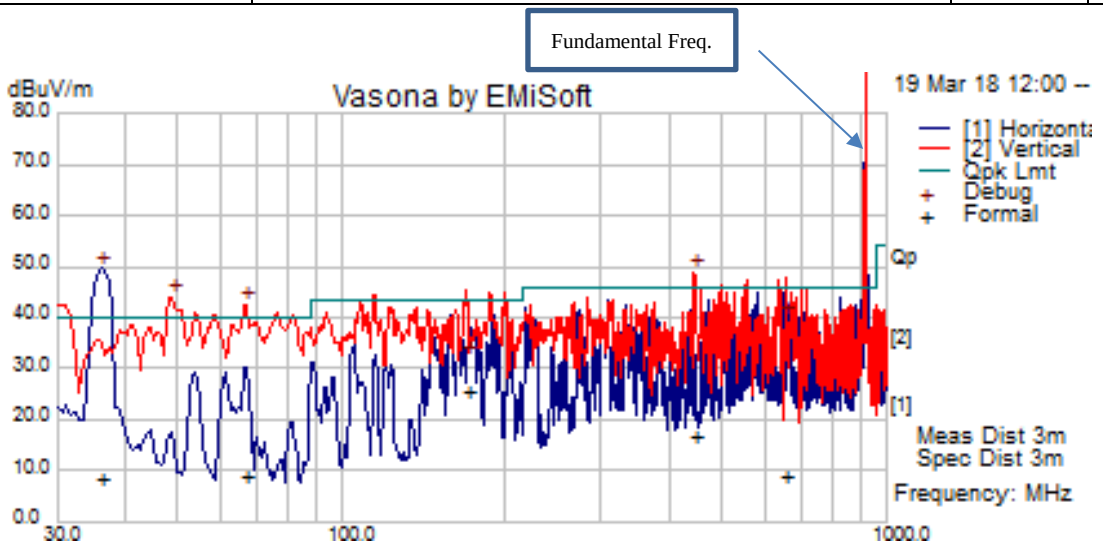
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Vijay Chaudhary at 10m chamber.

Radiated Emission Test Results (Below 1GHz)

Test specification	Below 1GHz			
Environmental Conditions:	Temp (°C):	26.1	Result	Pass
	Humidity (%)	47.5		
	Atmospheric (mbar):	1020		
Mains Power:	3VDC			
Tested by:	Vijay Chaudhary			
Test Date:	06/27/2017			
Remarks:	915.4MHz			



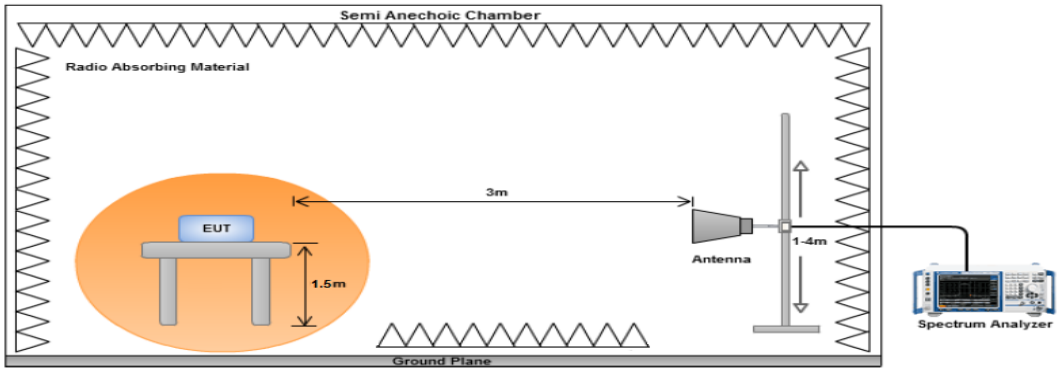
Quasi Max Measurement

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
35.95	16.71	10	-18.16	8.55	Quasi Max	H	338	11	40	-31.45	Pass
48.69	17.10	10	-26.54	0.56	Quasi Max	V	194	151	40	-39.44	Pass
443.87	26.22	10	-19.65	16.57	Quasi Max	V	122	199	46	-29.43	Pass
66.26	26.70	10	-27.62	9.08	Quasi Max	V	133	72	40	-30.92	Pass
655.23	15.15	10	-16.52	8.63	Quasi Max	H	284	66	46	-37.37	Pass
169.33	39.66	10	-24.07	25.59	Quasi Max	V	103	202	43.5	-17.91	Pass

Note: Both horizontal and vertical polarities were investigated. The results above show only the worst case.

10.5 Radiated Spurious Emissions between 1GHz – 25GHz

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td rowspan="2">47CFR§15.245, RSS210</td><td>a)</td><td>For non-restricted band, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209(a) is not required
☐ 20 dB down ☒ 30 dB down
The field strength of emissions from intentional radiators operatored within these freq. band shall comply with the following:
<table>
<tr><th>Frequency range (MHz)</th><th>Field Strength of harmonics (uV/m)</th></tr>
<tr><td>902-928</td><td>1.6</td></tr>
<tr><td>2435-2465</td><td>1.6</td></tr>
<tr><td>5785-5815</td><td>1.6</td></tr>
<tr><td>10500-10550</td><td>25.0</td></tr>
<tr><td>24075-24175</td><td>25.0</td></tr>
</table></td><td>☒</td></tr>
<tr><td>b)</td><td>or restricted band, emission must also comply with the radiated emission limits specified in 15.209</td><td>☒</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 
</td></tr>
<tr><td>Procedure</td><td colspan="3">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. An average 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>Remark</td><td colspan="3">The EUT was scanned up to 26GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case. Testing was performed according to more strict limit than 15.245 standard limit.</td></tr>
<tr><td>Result</td><td colspan="3">☒ Pass ☐ Fail</td></tr>
</table>

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test was done by Vijay Chaudhary at 10m chamber.

Radiated Emission Test Results (Above 1GHz)

915.0MHz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
1830.72	51.03	2.63	-3.33	50.33	Peak Max	V	282	134	74	-23.67	Pass
3661.95	40.91	3.57	-1.31	43.18	Peak Max	V	128	317	74	-30.82	Pass
5489.37	47.01	4.45	-1.00	50.46	Peak Max	V	137	265	74	-23.54	Pass
1830.72	28.09	2.63	-3.33	27.39	Average Max	V	282	134	54	-26.61	Pass
3661.95	27.92	3.57	-1.31	30.18	Average Max	V	128	317	54	-23.82	Pass
5489.37	42.50	4.45	-1.00	45.95	Average Max	V	137	265	54	-8.05	Pass

915.4 MHz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
1830.47	57.89	2.63	-3.33	57.19	Peak Max	V	214	309	74	-16.81	Pass
2741.30	39.55	3.15	-2.67	40.03	Peak Max	V	305	291	74	-33.98	Pass
5492.63	40.18	4.45	-1.00	43.63	Peak Max	V	348	125	74	-30.37	Pass
1830.47	28.52	2.63	-3.33	27.82	Average Max	V	214	309	54	-26.18	Pass
2741.30	27.31	3.15	-2.67	27.78	Average Max	V	305	291	54	-26.22	Pass
5492.63	27.26	4.45	-1.00	30.71	Average Max	V	348	125	54	-23.29	Pass

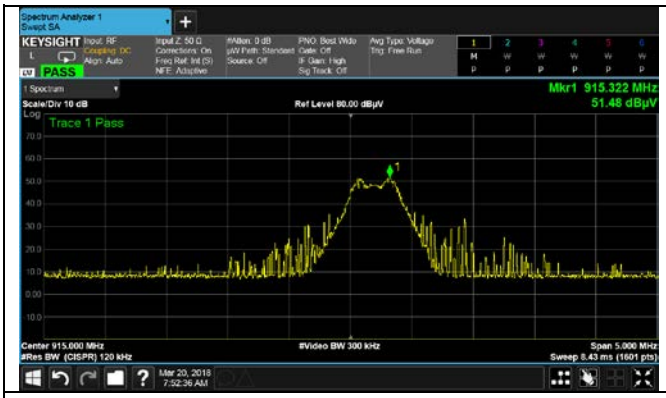
915.6 MHz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
2742.58	44.57	3.15	-2.67	45.05	Peak Max	V	123	213	74	-28.95	Pass
3664.81	42.72	3.57	-1.30	45.00	Peak Max	V	221	20	74	-29.00	Pass
1831.22	61.86	2.63	-3.33	61.17	Peak Max	V	199	168	74	-12.83	Pass
2742.58	27.31	3.15	-2.67	27.79	Average Max	V	123	213	54	-26.21	Pass
3664.81	27.46	3.57	-1.30	29.73	Average Max	V	221	20	54	-24.27	Pass
1831.22	30.07	2.63	-3.33	29.37	Average Max	V	199	168	54	-24.63	Pass

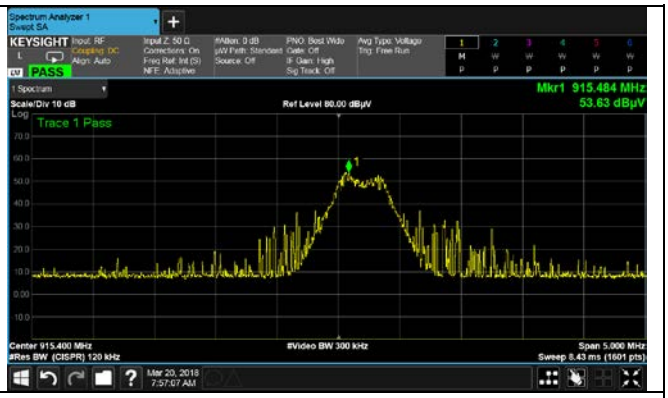
Note: Both horizontal and vertical polarities were investigated. The results above show only the worst case.

Field Strenght:

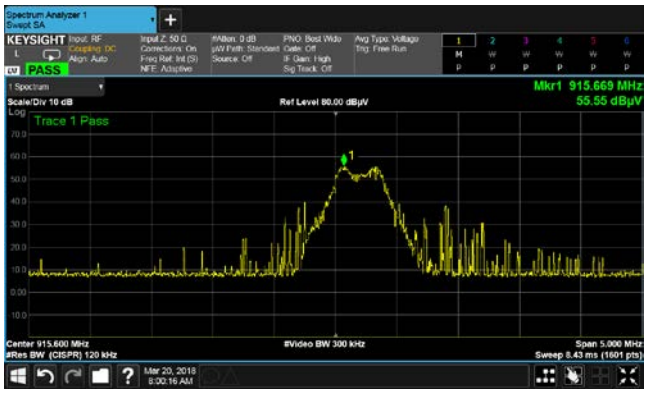
Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Pass /Fail
915	51.48	113.98	Pass
915.4	53.63	113.98	Pass
915.6	55.55	113.98	Pass



915 MHz



915.4 MHz



915.6 MHz

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Conducted Emissions						
R & S Receiver	ESIB 40	100179	04/21/2017	1 Year	04/21/2018	☑
CHASE LISN	NNLK8129	8129-190	11/19/2017	1 Year	11/19/2018	☑
Radiated Emissions						
Keysight EXA 44GHz Spectrum Analyzer	N9010A	MY51440112	11/08/2017	1 Year	11/08/2018	☑
Bi-Log antenna (30MHz~2GHz)	JB6	A111717	12/05/2017	1 Year	12/05/2018	☑
Horn Antenna (1GHz~26GHz)	3115	10SL0059	01/26/2018	2 Year	01/26/2020	☑
Pre-Amplifier (1-40GHz)	SAS-474	579	04/04/2017	1 Year	05/04/2018	☑
Preamplifier (100KHz-7GHz)	LPA-6-30	11170601	07/21/2017	1 Year	07/21/2018	☑

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 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
		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