

# EMC TEST REPORT

**Report:** EMC\_SL16122101-SPC-006\_FCC

**Supersedes:** None

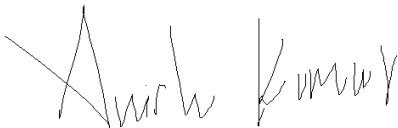

<b>Applicant Name:</b>	SpiderCloud Wireless
<b>Product Name:</b>	SpiderCloud Radio Node
<b>Model Name:</b>	SCRN-320-0446 and SCR320-0446E
<b>Test Standard:</b>	FCC 15 Subpart B (Class A)
<b>Test Method:</b>	ANSI C63.4: 2014
<b>Date of Test:</b>	Jan 26 <sup>th</sup> to Feb 6 <sup>th</sup> - 2017
<b>Report Issue Date:</b>	2/15/2017

**Test Result:** ☒ Pass ☐ Fail

**Equipment complied with the specifications:** ☒

**Equipment did not comply with the specifications:** ☐

This test report is issued under the authority of:

			
Full Name:	Anish Kumar	Full Name:	Michael R. Gates
Title:	Compliance Test Engineer	Title:	Quality Engineer

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Test result presented in this test report is applicable to the tested sample only.

**ISSUED BY:**

**SIEMIC Laboratories**

**775 Montague Expressway, Milpitas, CA 95035 USA**



## 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 conformity assessment

Country/Region	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.	Version No.	Description	Issue Date
EMC_SL16122101-SPC-006_FCC	Original Report	FCC 15 Subpart B (Class A)	2/15/2017

## 2. Executive summary

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

Company: SpiderCloud Wireless  
Product: SpiderCloud Radio Node  
Model: SCRN-320-0446 and SCRN 320-0446E

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:	Spider Cloud Wireless
Applicant Address:	475 Sycamore Drive, Milpitas, CA 95035 US
Manufacturer Name:	Flextronics International USA, Inc
Manufacturer Address:	927 Gibraltar Dr., Bldg. 6, Milpitas, CA95035 US

## 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

## 5. Modification

Item	Description	Note
1	External Antenna- LTE_B4_B252	Larsen Antennas
2	External Antenna- LTE_BR_B255	Larsen Antennas
3	Internal Antenna- LTE_B4_B252	SpiderCloud Antenna
4	Internal Antenna- LTE_B4_B255	SpiderCloud Antenna

## 6. Test software version

Test Item	Vendor	Software	Version
Radiated Emission	EMISoft	EMISoft Vasona	V6.0
Conducted Emission	EMISoft	EMISoft Vasona	V5.0

## 7. EUT Information

### 7.1. EUT Description

Product Name:	SpiderCloud Radio Node
Model No.:	SCRN-320-0446 and SCRN 320-0446E
Trade Name:	SpiderCloud Wireless
Serial No.:	16298X25439
Input Power:	56V, .6 A
PoE Input Voltage	100-240V~1.0A
Power Adapter Manu/Model:	PoE P832000567A1/ Phihong Switching Power Supply
Hardware version:	02650-06-001
Software version:	6.1.0
Date of EUT received:	Jan 25 <sup>th</sup> , 2017
Equipment Class/ Category:	Class A/ ITE
Highest frequency generated or used in the device or on which the device operates or tunes:	5.8GHz
Port/Connectors:	RJ45
Remark:	The EUT was powered by PoE which was connected to the input port of the PoE port and the other port PoE's was connected to the laptop which was used to make the EUT function as well as to change the modes. The PoE comes along the EUT
AC Power Cord Type:	IEC Type B (PoE)
DC Power Cable Type:	N/A

## 7.2. EUT Test modes / Configuration description

### 7.2.1.EUT Test modes: Pre-test mode

Pre-Scan Test Mode		Notes
Pre-test Mode 1	LTE_B4_B255	Both External and Internal antennas were tested with this configuration The operating frequencies are: 2100MHz and 5GHz
Pre-test Mode 2	LTE_B4_B252	Both External and Internal antennas were tested with this configuration The operating frequencies are: 2100MHz and 5GHz
Remark:	The above mentioned operating frequencies were tested all together.	

### 7.2.2.EUT Test modes: Final test mode

Final Test Mode		Notes
Pre-test Mode 1	LTE_B4_B255	Both External and Internal antennas were tested with this configuration The operating frequencies are: 2100MHz and 5GHz
Pre-test Mode 2	LTE_B4_B255	Both External and Internal antennas were tested with this configuration The operating frequencies are: 2100MHz and 5GHz
Remark:	The above mentioned operating frequencies were tested all together.	



### 7.3. EUT Photos | External



Picture 1: Top View- External Antenna



Picture 2: Front View- External Antenna



Picture 3: Left View- External Antenna



Picture 4: Rear View- External Antenna



Picture 5: Right View- External Antenna



Picture 6: Back View- External Antenna





Picture 1: Front View- Internal Antenna



Picture 2: Top View- Internal Antenna



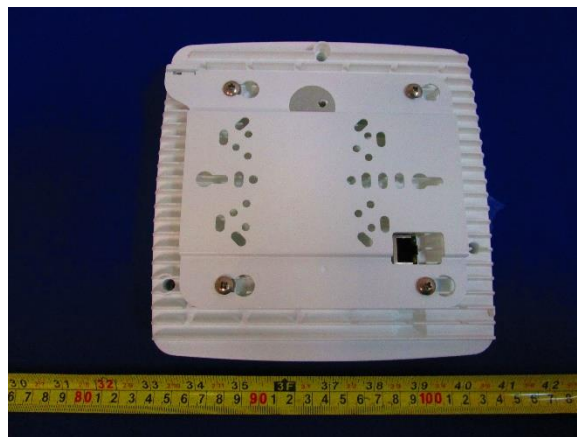
Picture 3: Right View- Internal Antenna



Picture 4: Rear View- Internal Antenna

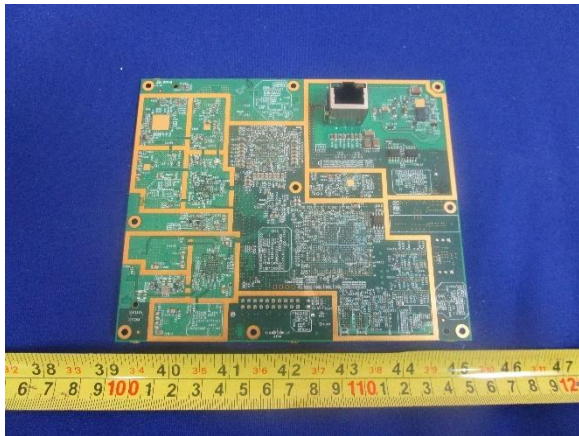


Picture 5: Left View- Internal Antenna



Picture 6: Back View- Internal Antenna

## 7.4. EUT Photos | Internal



Picture 1: Main Board- Back View



Picture 2: Main Board- Top View



Picture 3: Main Board- Front View



Picture 4: Main Board- Left View



Picture 5: Main Board- Rear View

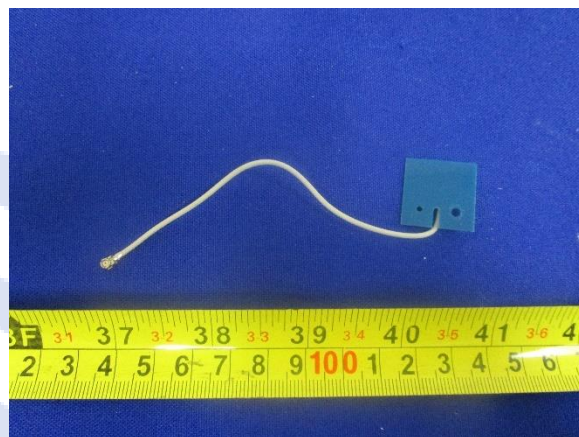


Picture 6: Main Board- Right View





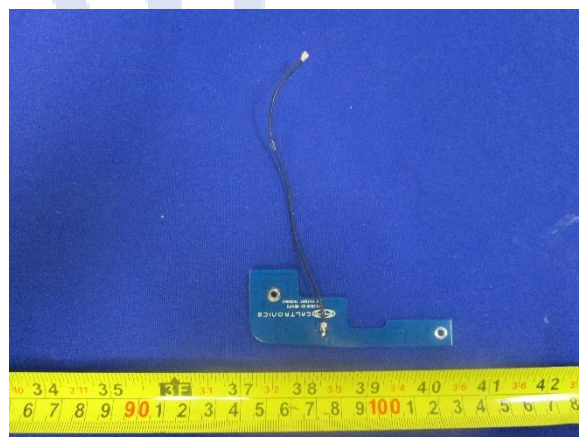
Picture 7: 5GHz PCB Board- Front View



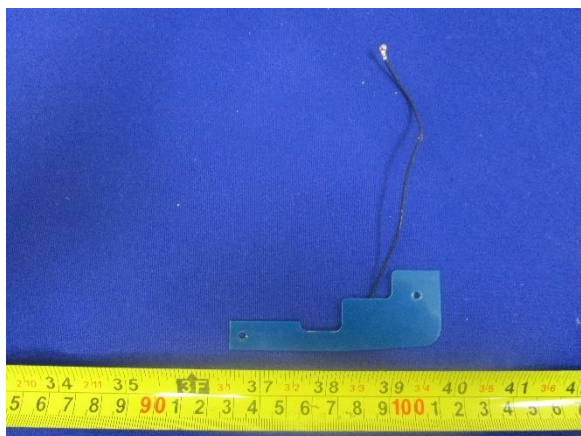
Picture 8: 5GHz PCB Board- Rear View



Picture 7: Serail Number of the 5GHz PCB Board



Picture 7: 2.4GHz PCB Board- Front View



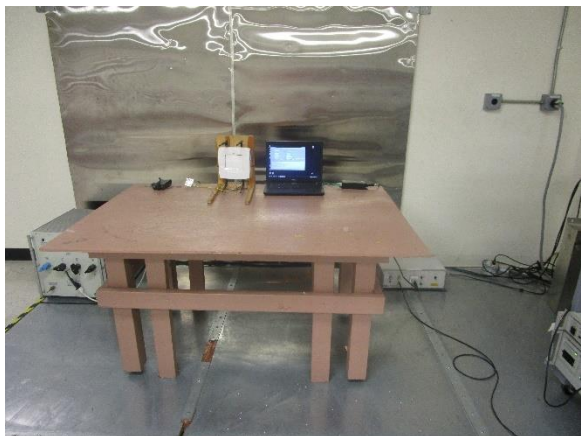
Picture 7: 2.4GHz PCB Board- Rear View



Picture 8: Serial Number of 2.4GHz PCB Board



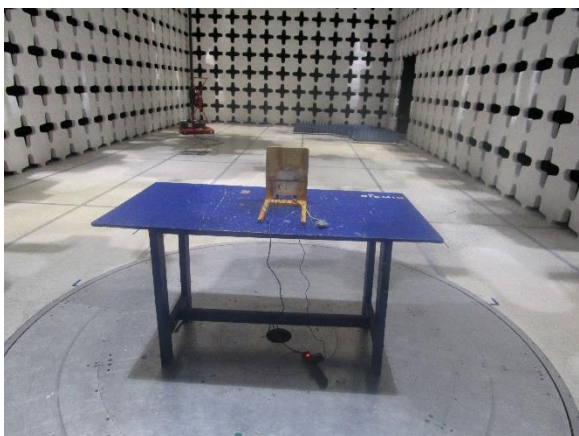
## 7.5. EUT Photos | Test setup



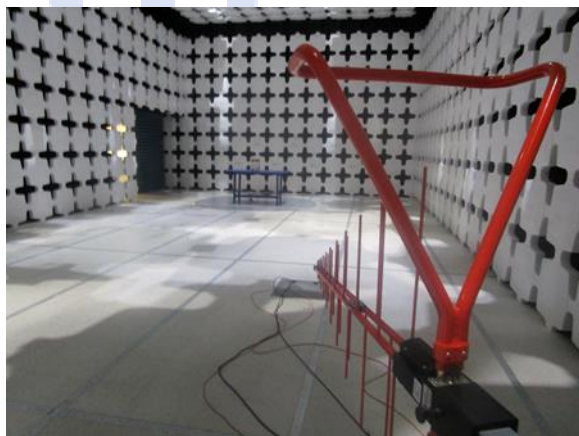
Picture 1: AC Conducted Emissions- Front View



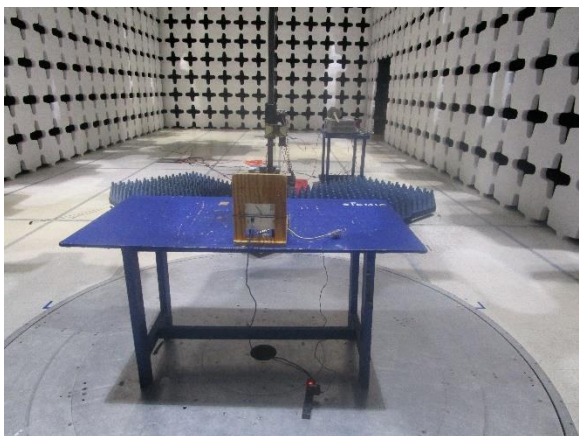
Picture 2: AC Conducted Emissions- Rear View



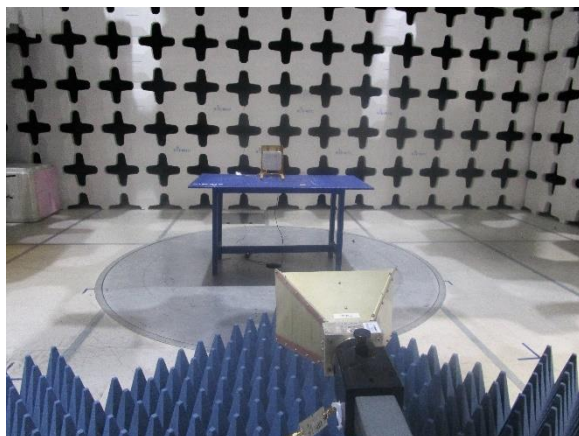
Picture 3: Radiated Emissions B 1GHz - Front View



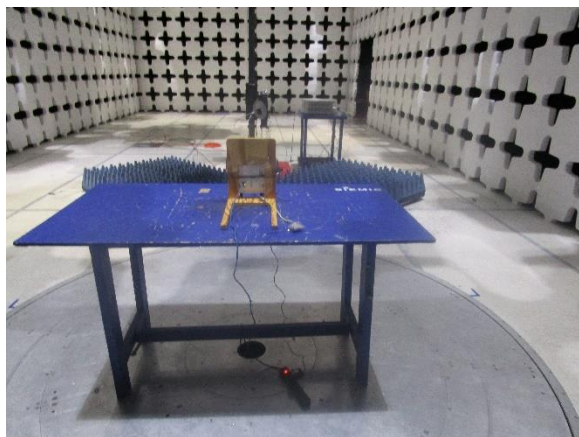
Picture 4: Radiated Emissions B 1GHz- Rear View



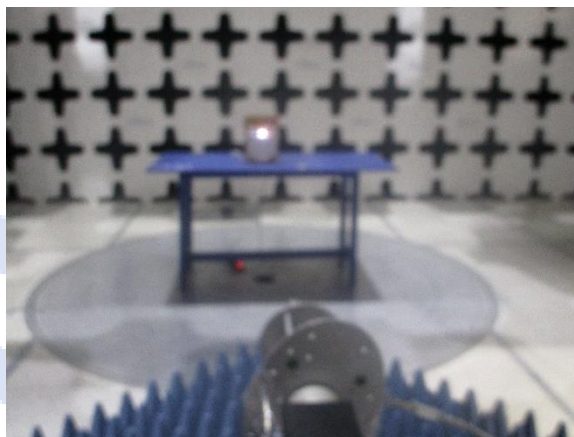
Picture 5: Radiated Emissions 1-18GHz- Front View



Picture 6: Radiated Emissions 1-18GHz- Rear View



Picture 7: Radiated Emissions 18-29GHz- Front View



Picture 8: Radiated Emissions 18-29GHz- Rear View

## 8. Supporting equipment / Software / Cabling information

### 8.1. Support equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	Laptop	Latitude E6400	CBMXRK1	Dell	N/A
2	PoE	POE36U-1AT-R	N/A	Phihong	N/A
3	AC/DC power Adapter	PA-1900-02D	9T215	Dell	N/A
4	10MHz signal reference source	DSA-12R-12 AUS 120120	332-10006-01	NetGear	Provide power to 10MHz signal source



## 8.2. I/O Ports

Item	Connection Start		Connection Stop		Length / shielding Info		Note
	From	I/O Port	To	I/O Port	Length (m)	Shielding	
1	Laptop	RJ45	PoE	RJ45 (Output Port)	3.5m	Unshielded	-
2	EUT	RJ45	PoE	RJ45 (Input Port)	4.3m	Unshielded	-
3	10MHz reference Source	SMA male	EUT (Antenna Port)	SMA female	2m	Unshielded	Connected to the 10MHz reference port of the EUT

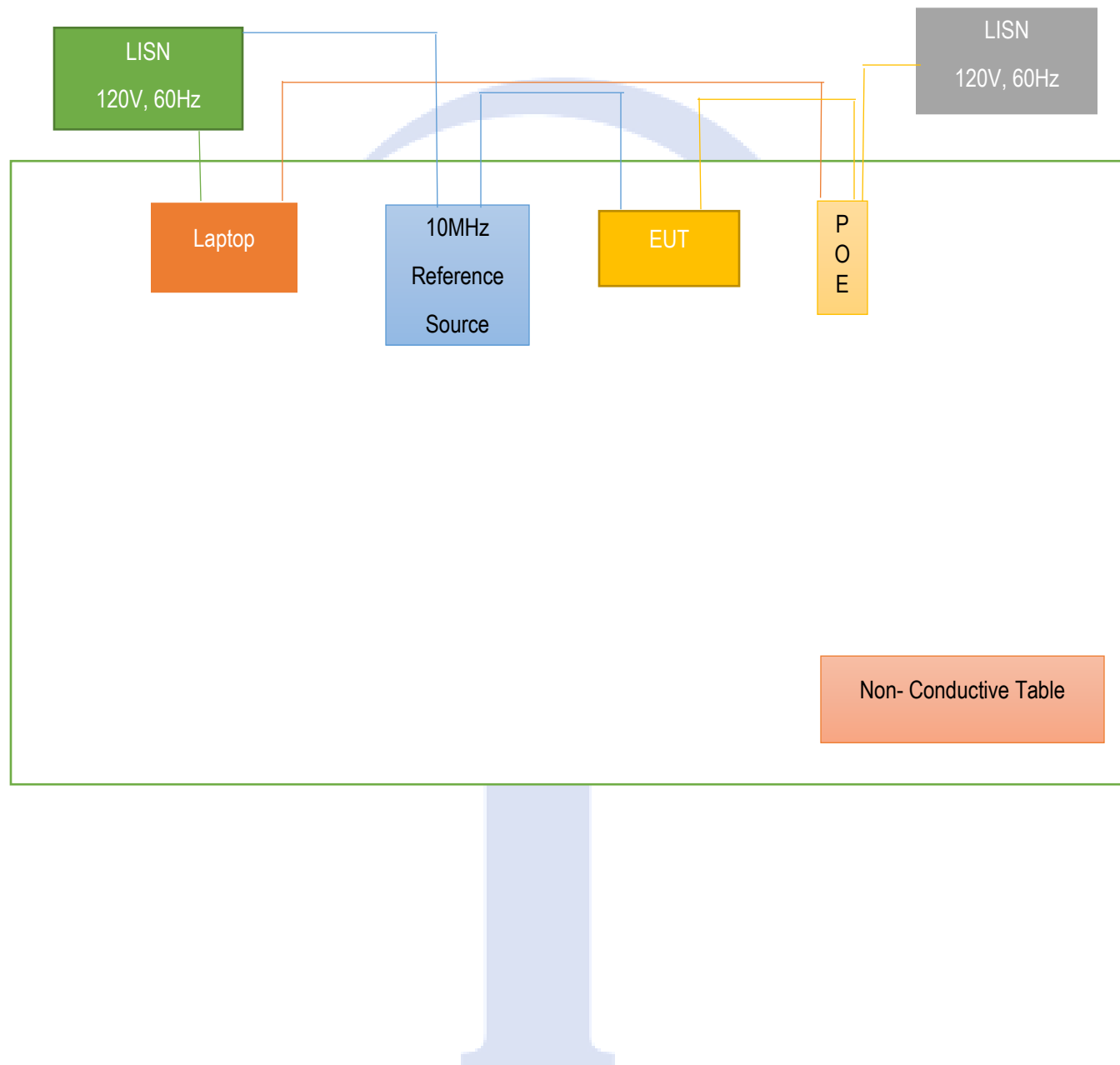


### 8.3. Test software description

Test Item	Software	Description
1	Small Cell DVT test Client	This is laptop software used for configuring the EUT.



#### 8.4. System setup block diagram



## 9. Test summary

Emissions			
Test Item	Test Standard	Test Method / Procedure	Pass / Fail
AC Conducted Emissions	FCC 15 Subpart B (Class A)	ANSI C63.4:2014	X Pass Fail N/A
Radiated Spurious Emissions Below 1GHz	FCC 15 Subpart B (Class A)	ANSI C63.4:2014	X Pass Fail N/A
Radiated Spurious Emissions Above 1GHz	FCC 15 Subpart B (Class A)	ANSI C63.4:2014	X Pass Fail N/A

## 10. Measurement uncertainty

Emissions			
Test Item	Frequency Range	Description	Uncertainty
AC Conducted Emissions	150KHz – 30MHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2	±3.5dB
Radiated Spurious Emissions	30MHz – 1GHz	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
Radiated Spurious Emissions	>1GHz	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)	+4.3dB/-4.1dB

## 11. Frequency Range of Radiated Measurements

(b) For unintentional radiators:

- (1) Except as otherwise indicated in paragraphs (b)(2) or (b)(3) of this section, for an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:
- (2) A unintentional radiator, excluding a digital device, in which the highest frequency generated in the device, the highest frequency used in

highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30.
1.705-108	1000.
108-500	2000.
500-1000	5000.
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

the device and the highest frequency on which the device operates or tunes are less than 30 MHz and which, in accordance with §15.109, is required to comply with standards on the level of radiated emissions within the frequency range 9 kHz to 30 MHz, such as a CB receiver or a device designed to conduct its radio frequency emissions via connecting wires or cables, e.g., a carrier current system not intended to radiate, shall be investigated from the lowest radio frequency generated or used in the device, without going below 9 kHz (25 MHz for CB receivers), up to the frequency shown in the following table. If the unintentional radiator contains a digital device, the upper frequency to be investigated shall be that shown in the table below or in the table in paragraph (b)(1) of this section, as based on both the highest frequency generated and the highest frequency used in the digital device, whichever range is higher.

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-10	400
10-30	500

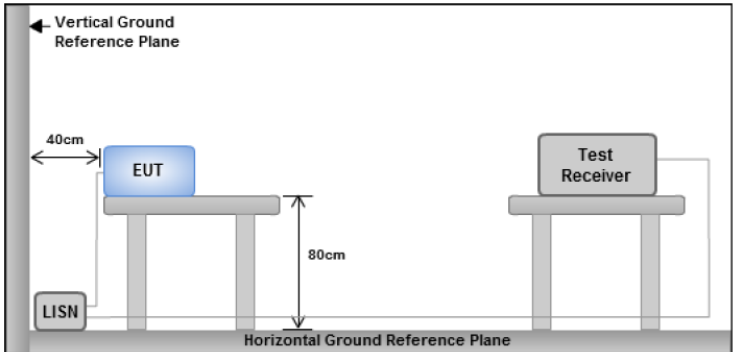
- (3) Except for a CB receiver, a receiver employing superheterodyne techniques shall be investigated from 30 MHz up to at least the second harmonic of the highest local oscillator frequency generated in the device. If such receiver is controlled by a digital device, the frequency range shall be investigated up to the higher of the second harmonic of the highest local oscillator frequency generated in the device or the upper frequency of the measurement range specified for the digital device in paragraph (b)(1) of this section.

Example:

If the EUT has a transceiver operating or tunes at 2.4GHz, then both the Receiver, and the Transmitter needs to be tested separately to the Fifth Harmonic (e.g. Upper Frequency range would be 12GHz). A Transceiver consists of both a transmitter and a receiver, the receiver portion of which is always subject to the part 15 Subpart B Unintentional Radiator rules.

## 12. Guideline for interference allowed

### 12.1. AC Conducted emissions (Class A)

Spec	Item	Requirement	Applicable													
§ 15.107	a)	<p>For a Class A digital device 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 following table, as measured using a 50 <math>\mu</math>H/50 ohms LISN.</p> <p><b>Limits for Conducted Emissions at the AC Mains Ports</b></p> <table border="1"> <thead> <tr> <th rowspan="2">Section</th><th rowspan="2">Frequency ranges (MHz)</th><th colspan="2">Limit (dBuV)</th></tr> <tr> <th>QP</th><th>Average</th></tr> </thead> <tbody> <tr> <td rowspan="2">Class A devices</td><td>0.15 ~ 0.5</td><td>79</td><td>66</td></tr> <tr> <td>0.5 ~ 30</td><td>73</td><td>60</td></tr> </tbody> </table> <p>NOTE 1 The lower limit shall apply at the transition frequencies.</p>	Section	Frequency ranges (MHz)	Limit (dBuV)		QP	Average	Class A devices	0.15 ~ 0.5	79	66	0.5 ~ 30	73	60	Yes
Section	Frequency ranges (MHz)	Limit (dBuV)														
		QP	Average													
Class A devices	0.15 ~ 0.5	79	66													
	0.5 ~ 30	73	60													
Test Setup		 <p>Note: 1. Support units were connected to second LISN. 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes</p>														
Procedure		<ol style="list-style-type: none"> <li>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.</li> <li>The power supply for the EUT was fed through a 50<math>\mu</math>H/50<math>\Omega</math> EUT LISN, connected to filtered mains.</li> <li>The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.</li> <li>All other supporting equipment was powered separately from another main supply.</li> <li>The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>A scan was made on the Neutral/Phase line (for AC mains) or Earth line over the required frequency range using an EMI test receiver.</li> <li>High peaks, relative to the limit line, were then selected.</li> <li>The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz. For FCC tests, only Quasi-peak measurements were made; while for CISPR/EN tests, both Quasi-peak and Average measurements were made</li> <li>All possible modes of operation were investigated. Only the 6 worst case emissions were measured and reported. All other emissions were relatively insignificant.</li> </ol>														

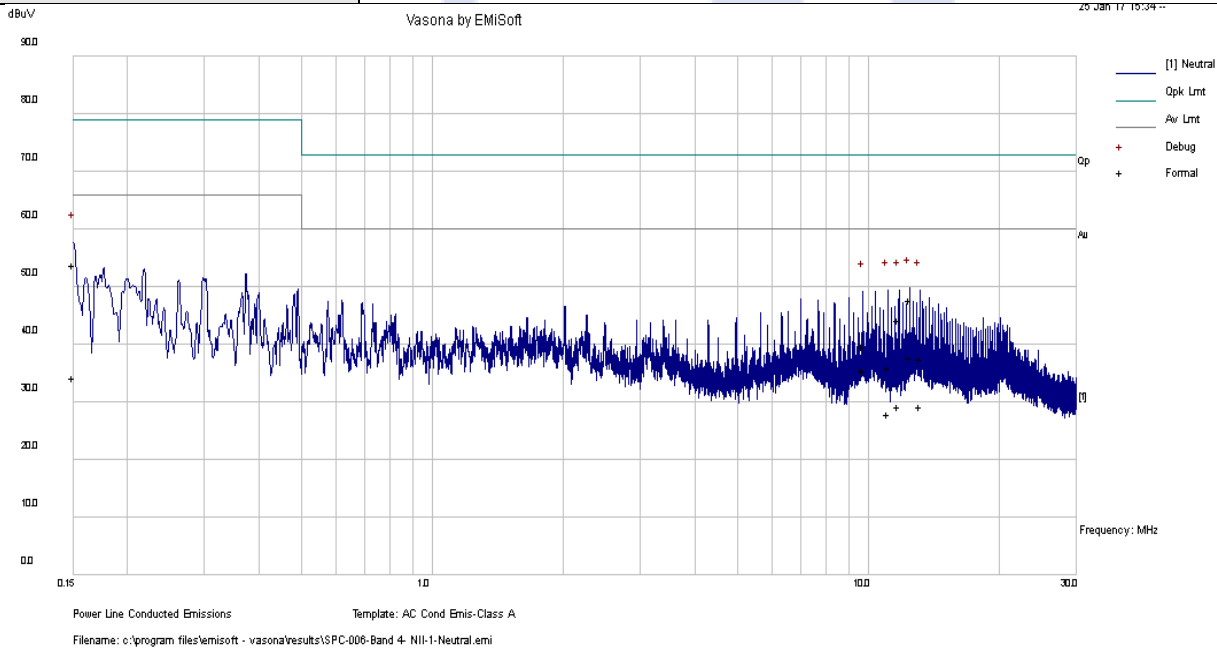
Description of the Conducted Emission Program	This EMC Measurement software, EMI Soft Vasona offers a common user interface for electromagnetic interference (EMI) measurements. This software is a modern and powerful tool for controlling and monitoring EMI test receivers and EMC test systems. It guarantees reliable collection, evaluation, and documentation of measurement results. Basically, this program will run a pre-scan measurement before it proceeds with the final measurement. The pre-scan routine will run the common scan range from 15 kHz to 30 MHz; the program will first start a peak and average scan on selectable measurement time and step size. After the program complete the pre-scan, this program will perform the Quasi Peak and Average measurement, based on the pre-scan peak data reduction result.
Sample Calculation Example	<p>At 20 MHz      limit = <math>250 \mu V = 47.96 \text{ dB}\mu V</math></p> <p>Transducer factor of LISN, pulse limiter &amp; cable loss at 20 MHz = 11.20 dB</p> <p>Q-P reading obtained directly from EMI Receiver = <math>40.00 \text{ dB}\mu V</math></p> <p style="text-align: right;">(Calibrated for system losses)</p> <p>Therefore, Q-P margin = <math>47.96 - 40.00 = 7.96</math>      i.e. 7.96 dB below limit</p>
Remarks	<p>Configurations tested are LTE_B4_B255 and LTE_B4_B252.</p> <p>The operating frequencies are: 2100MHz and 5GHz. Both the frequencies were operated at the same time.</p>

**Test Data:**      **X** Yes      N/A

**Test Plot:**      **X** Yes (See below)      N/A

## Conducted Emission Test Results per FCC 15 Subpart B (Class A)

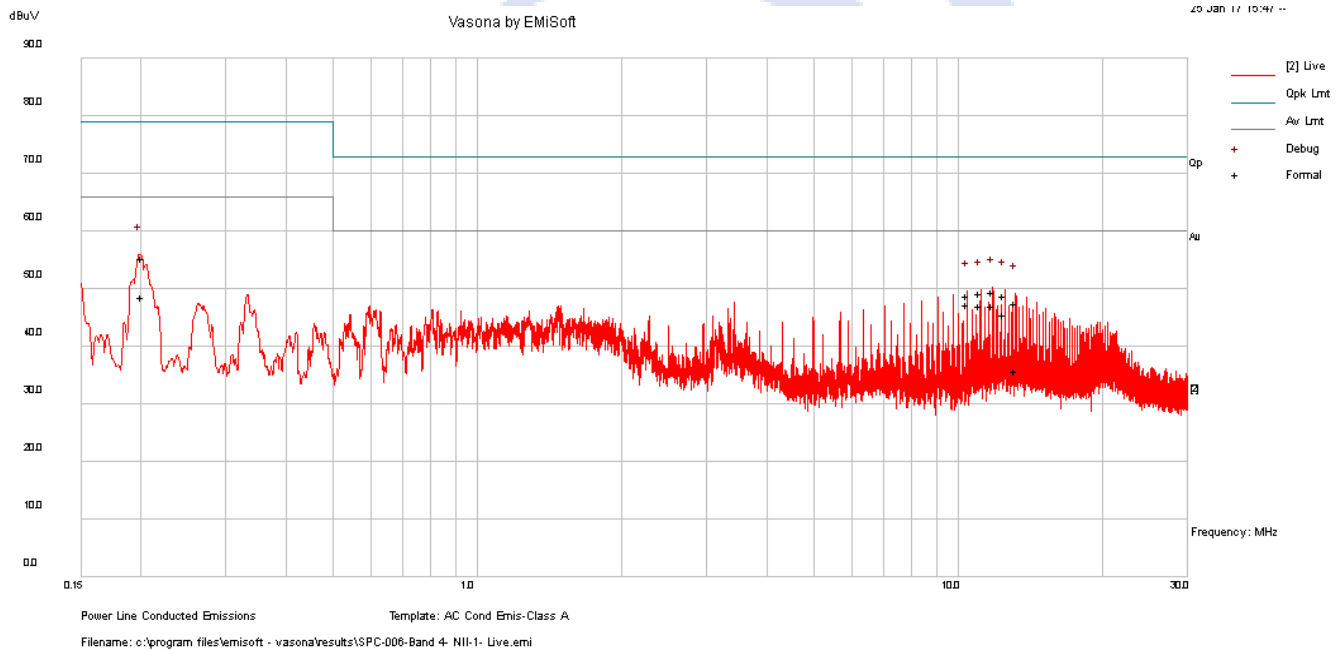
Test specification:	AC Conducted Emissions (Class A)			
Environmental Conditions:	Temp(°C):	25.0	Result:	
	Humidity (%):	53.17		X Pass
	Atmospheric(mbar):	1016.7		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	25 <sup>th</sup> Jan, 2017			
Remarks:	Neutral Line- Internal Antenna-LTE_B4_ B255 Mode. The operating frequencies are: 2100MHz and 5GHz. Both the frequencies were operated at the same time.			



Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line/ Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
0.15	42.18	10.00	1.74	53.93	Quasi Peak	Neutral	79.00	-25.07	Pass
12.43	37.17	10.05	0.54	47.76	Quasi Peak	Neutral	73.00	-25.24	Pass
11.75	33.65	10.05	0.53	44.23	Quasi Peak	Neutral	73.00	-28.77	Pass
13.11	26.95	10.06	0.54	37.55	Quasi Peak	Neutral	73.00	-35.45	Pass
11.07	25.39	10.05	0.52	35.96	Quasi Peak	Neutral	73.00	-37.04	Pass
9.69	29.23	10.05	0.51	39.79	Quasi Peak	Neutral	73.00	-33.21	Pass
0.15	22.65	10.00	1.74	34.40	Average	Neutral	66.00	-31.60	Pass
12.43	27.22	10.05	0.54	37.81	Average	Neutral	60.00	-22.19	Pass
11.75	18.63	10.05	0.53	29.21	Average	Neutral	60.00	-30.79	Pass
13.11	18.69	10.06	0.54	29.29	Average	Neutral	60.00	-30.71	Pass
11.07	17.39	10.05	0.52	27.97	Average	Neutral	60.00	-32.03	Pass
9.69	25.09	10.05	0.51	35.65	Average	Neutral	60.00	-24.35	Pass

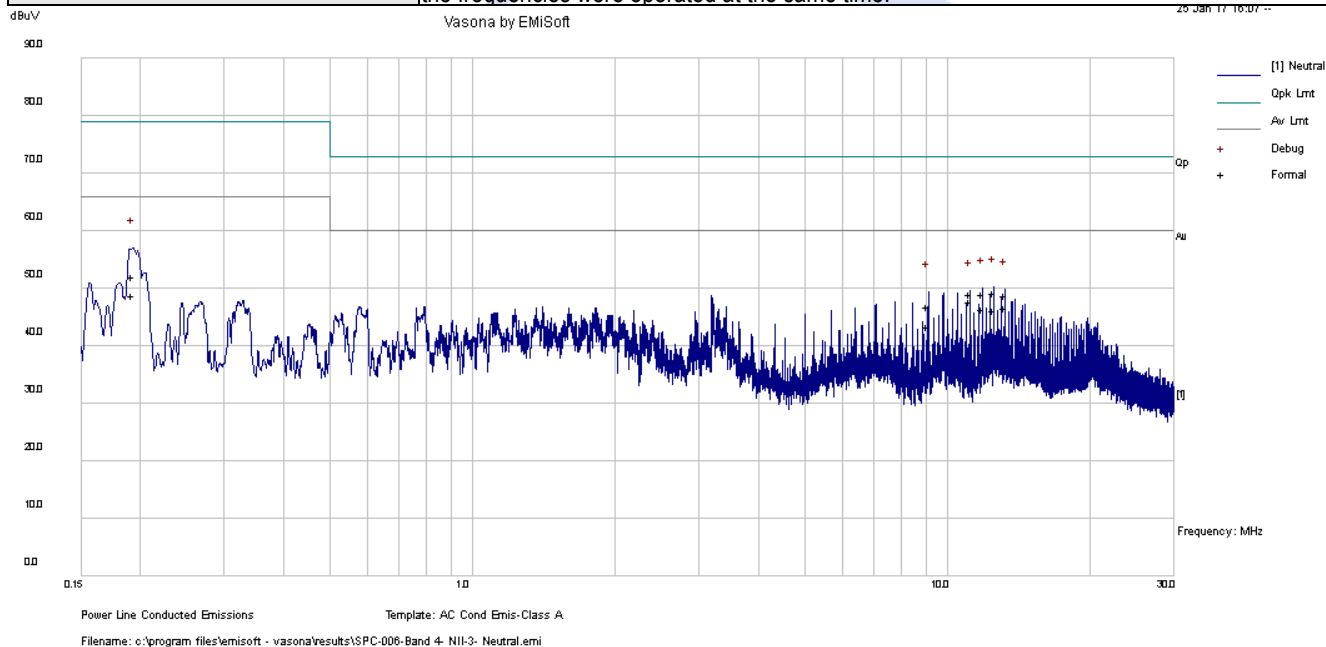


Test specification:	AC Conducted Emissions (Class B)			
Environmental Conditions:	Temp(°C):	25.0	Result:	
	Humidity (%):	53.17		X Pass
	Atmospheric(mbar):	1016.7		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	25th Jan, 2017			
Remarks:	Phase Line. Internal Antenna-LTE_B4_B255. The operating frequencies are: 2100MHz and 5GHz. Both the frequencies were operated at the same time.			



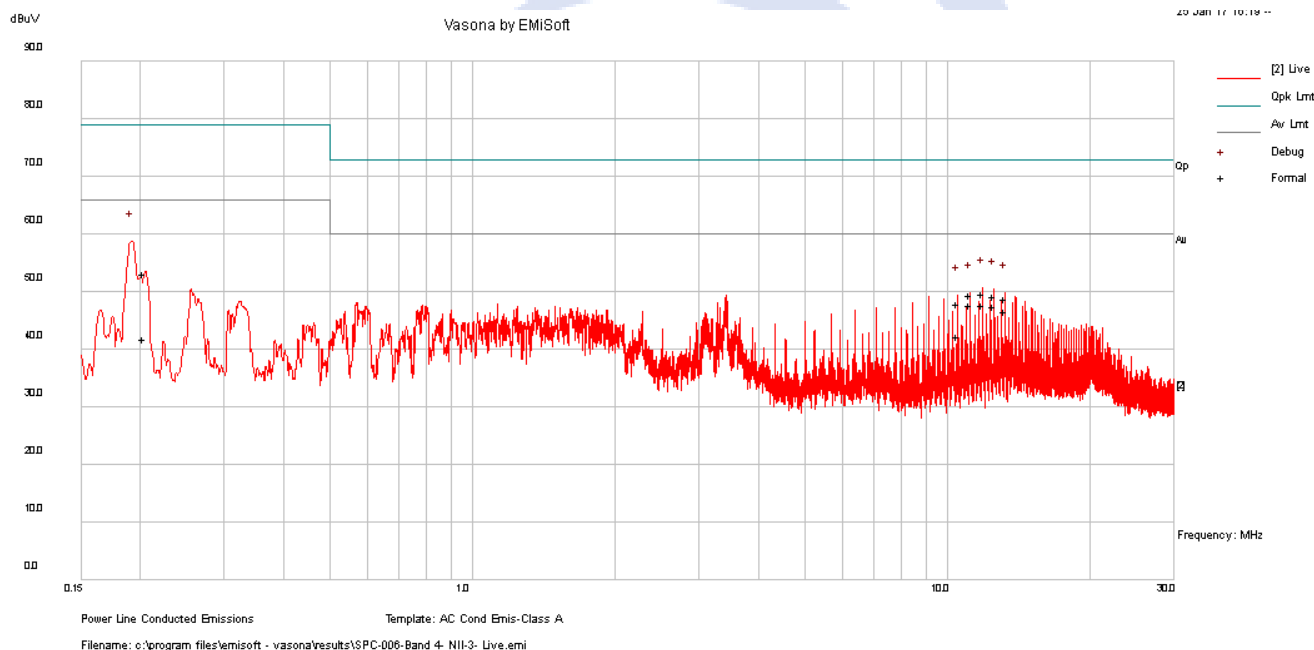
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line/Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
11.80	38.92	10.05	0.53	49.51	Quasi Peak	Live	73.00	-23.49	Pass
0.20	44.03	10.00	1.25	55.28	Quasi Peak	Live	79.00	-23.72	Pass
11.13	38.65	10.05	0.52	49.22	Quasi Peak	Live	73.00	-23.78	Pass
12.49	38.36	10.05	0.54	48.95	Quasi Peak	Live	73.00	-24.05	Pass
10.45	38.32	10.05	0.52	48.89	Quasi Peak	Live	73.00	-24.11	Pass
13.17	37.01	10.06	0.54	47.61	Quasi Peak	Live	73.00	-25.39	Pass
11.80	36.44	10.05	0.53	47.03	Average	Live	60.00	-12.97	Pass
0.20	37.37	10.00	1.25	48.62	Average	Live	66.00	-17.38	Pass
11.13	36.56	10.05	0.52	47.13	Average	Live	60.00	-12.87	Pass
12.49	35.06	10.05	0.54	45.65	Average	Live	60.00	-14.35	Pass
10.45	36.85	10.05	0.52	47.42	Average	Live	60.00	-12.58	Pass
13.17	25.19	10.06	0.54	35.79	Average	Live	60.00	-24.21	Pass

Test specification:	AC Conducted Emissions (Class A)			
Environmental Conditions:	Temp(°C):	25.0	Result:	
	Humidity (%):	53.17		X Pass
	Atmospheric(mbar):	1016.7		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	25 <sup>th</sup> Jan, 2017			
Remarks:	Neutral Line- Internal Antenna- LTE_B4_B252. The operating frequencies are: 2100MHz and 5GHz. Both the frequencies were operated at the same time.			



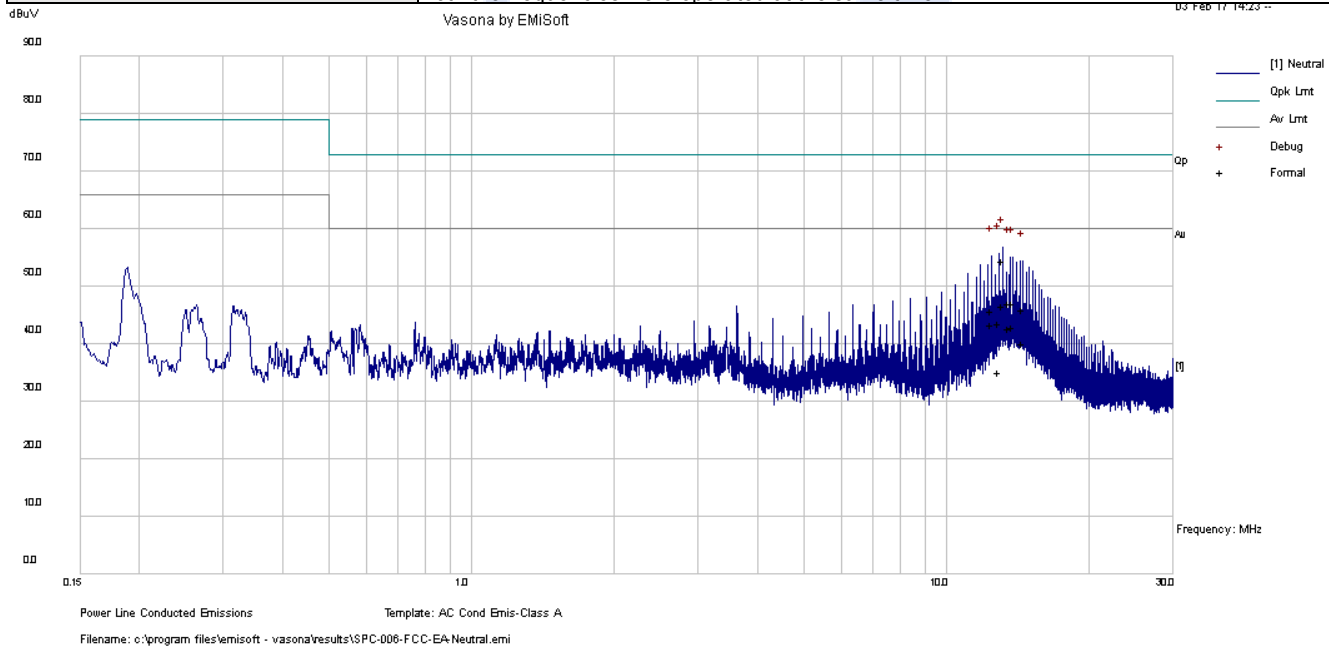
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line/Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
0.19	40.83	10.00	1.31	52.14	Quasi Peak	Neutral	79.00	-26.86	Pass
12.52	38.68	10.05	0.54	49.27	Quasi Peak	Neutral	73.00	-23.73	Pass
11.84	38.41	10.05	0.53	49.00	Quasi Peak	Neutral	73.00	-24.00	Pass
13.21	38.16	10.06	0.54	48.76	Quasi Peak	Neutral	73.00	-24.24	Pass
11.16	38.52	10.05	0.52	49.10	Quasi Peak	Neutral	73.00	-23.90	Pass
9.11	36.43	10.05	0.51	46.99	Quasi Peak	Neutral	73.00	-26.01	Pass
0.19	37.55	10.00	1.31	48.86	Average	Neutral	66.00	-17.14	Pass
12.52	35.74	10.05	0.54	46.34	Average	Neutral	60.00	-13.66	Pass
11.84	35.99	10.05	0.53	46.57	Average	Neutral	60.00	-13.43	Pass
13.21	36.03	10.06	0.54	46.63	Average	Neutral	60.00	-13.37	Pass
11.16	37.19	10.05	0.52	47.76	Average	Neutral	60.00	-12.24	Pass
9.11	32.77	10.05	0.51	43.33	Average	Neutral	60.00	-16.67	Pass

Test specification:	AC Conducted Emissions (Class B)			
Environmental Conditions:	Temp(°C):	25.0	Result:	
	Humidity (%):	53.17		X Pass
	Atmospheric(mbar):	1016.7		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	25th Jan, 2017			
Remarks:	Phase Line. Internal Antenna-LTE_B4_B252. The operating frequencies are: 2100MHz and 5GHz. Both the frequencies were operated at the same time.			



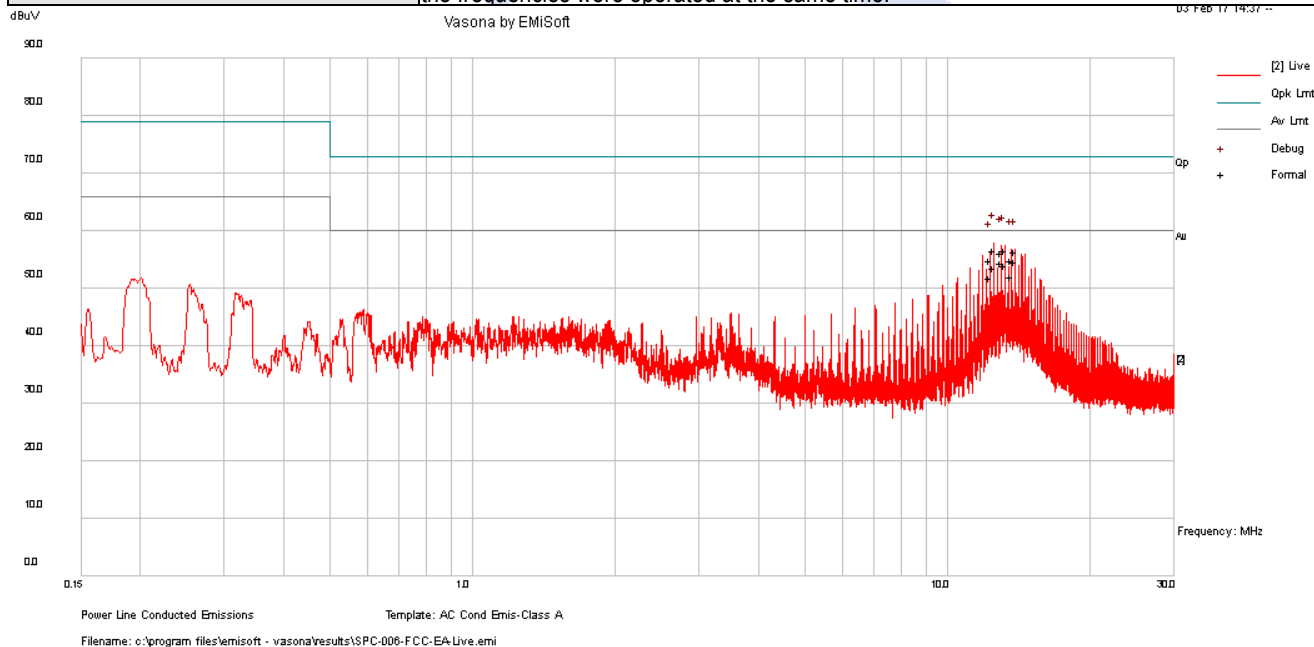
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line/Neutral	Limit (dBuV)	Margin (dB)	Pass/Fail
0.20	41.89	10.00	1.23	53.12	Quasi Peak	Live	79.00	-25.88	Pass
11.85	39.15	10.05	0.53	49.74	Quasi Peak	Live	73.00	-23.26	Pass
12.54	38.81	10.05	0.54	49.41	Quasi Peak	Live	73.00	-23.59	Pass
13.22	38.35	10.06	0.54	48.95	Quasi Peak	Live	73.00	-24.05	Pass
11.17	38.84	10.05	0.52	49.41	Quasi Peak	Live	73.00	-23.59	Pass
10.48	37.35	10.05	0.52	47.92	Quasi Peak	Live	73.00	-25.08	Pass
0.20	30.77	10.00	1.23	42.01	Average	Live	66.00	-23.99	Pass
11.85	37.17	10.05	0.53	47.75	Average	Live	60.00	-12.25	Pass
12.54	36.99	10.05	0.54	47.59	Average	Live	60.00	-12.41	Pass
13.22	35.99	10.06	0.54	46.59	Average	Live	60.00	-13.41	Pass
11.17	37.10	10.05	0.52	47.67	Average	Live	60.00	-12.33	Pass
10.48	31.78	10.05	0.52	42.34	Average	Live	60.00	-17.66	Pass

Test specification:	AC Conducted Emissions (Class B)			
Environmental Conditions:	Temp(°C):	25.0	Result:	
	Humidity (%):	53.17		X Pass
	Atmospheric(mbar):	1016.7		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	25th Jan, 2017			
Remarks:	Neutral Line. External Antenna-LTE_B4_ B255. The operating frequencies are: 2100MHz and 5GHz. Both the frequencies were operated at the same time.			



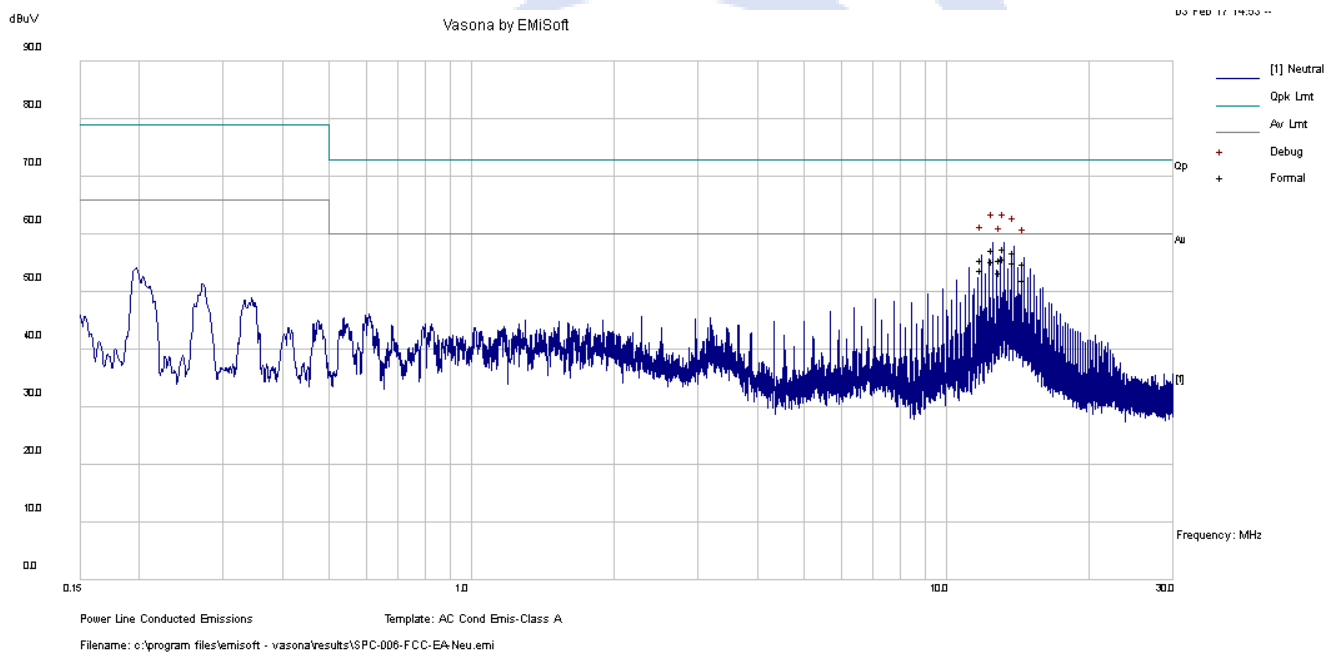
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line/Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
13.14	43.84	10.06	0.54	54.44	Quasi Peak	Neutral	73.00	-18.56	Pass
12.91	33.14	10.06	0.54	43.74	Quasi Peak	Neutral	73.00	-29.26	Pass
12.42	35.15	10.05	0.54	45.74	Quasi Peak	Neutral	73.00	-27.26	Pass
13.79	36.52	10.06	0.55	47.13	Quasi Peak	Neutral	73.00	-25.87	Pass
13.57	36.45	10.06	0.55	47.05	Quasi Peak	Neutral	73.00	-25.95	Pass
14.48	35.43	10.06	0.56	46.05	Quasi Peak	Neutral	73.00	-26.95	Pass
13.14	36.05	10.06	0.54	46.65	Average	Neutral	60.00	-13.35	Pass
12.91	24.46	10.06	0.54	35.06	Average	Neutral	60.00	-24.94	Pass
12.42	32.81	10.05	0.54	43.4	Average	Neutral	60.00	-16.60	Pass
13.79	32.46	10.06	0.55	43.07	Average	Neutral	60.00	-16.93	Pass
13.57	32.24	10.06	0.55	42.84	Average	Neutral	60.00	-17.16	Pass
14.48	29.58	10.06	0.56	40.19	Average	Neutral	60.00	-19.81	Pass

Test specification:	AC Conducted Emissions (Class B)			
Environmental Conditions:	Temp(°C):	25.0	Result:	
	Humidity (%):	53.17		X Pass
	Atmospheric(mbar):	1016.70		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	25th Jan, 2017			
Remarks:	Phase Line. External Antenna- LTE_B4_B255. The operating frequencies are: 2100MHz and 5GHz. Both the frequencies were operated at the same time.			



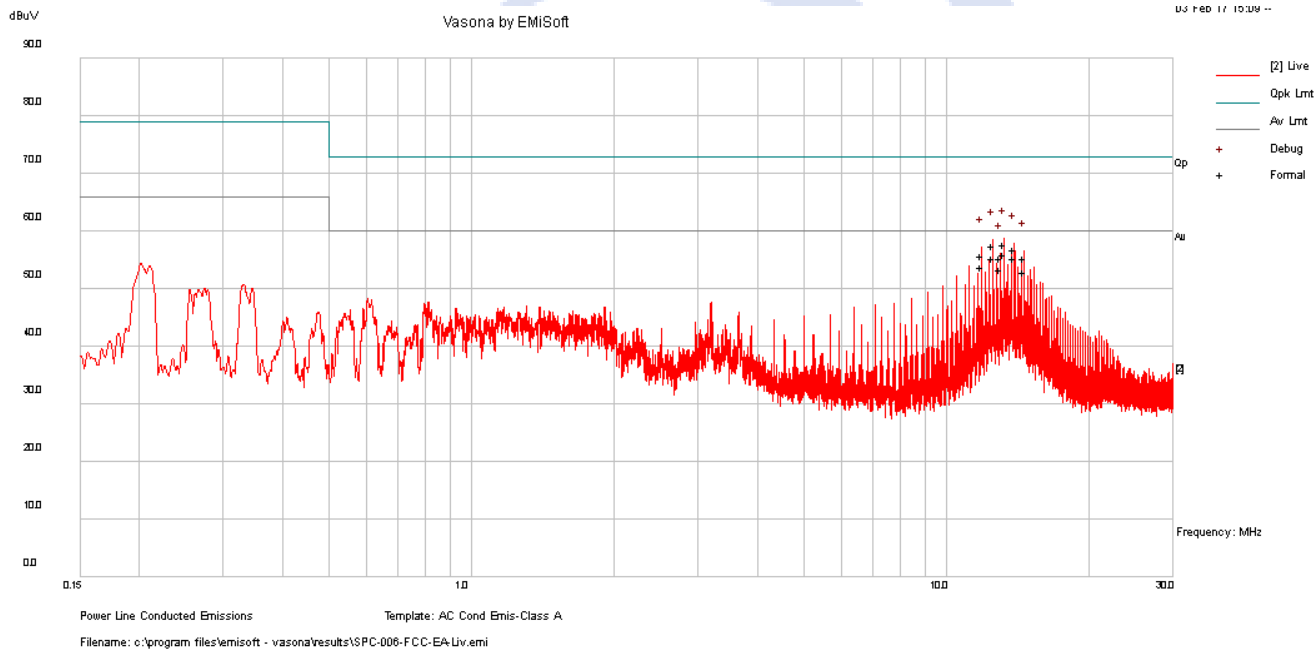
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line/Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
12.51	46.03	10.05	0.54	56.62	Quasi Peak	Live	73.00	-16.38	Pass
13.19	46.18	10.06	0.54	56.78	Quasi Peak	Live	73.00	-16.22	Pass
12.97	45.68	10.06	0.54	56.28	Quasi Peak	Live	73.00	-16.72	Pass
13.65	44.33	10.06	0.55	54.94	Quasi Peak	Live	73.00	-18.06	Pass
13.89	45.82	10.06	0.55	56.43	Quasi Peak	Live	73.00	-16.57	Pass
12.29	44.33	10.05	0.54	54.92	Quasi Peak	Live	73.00	-18.08	Pass
12.51	42.96	10.05	0.54	53.56	Average	Live	60.00	-6.44	Pass
13.19	43.47	10.06	0.54	54.07	Average	Live	60.00	-5.93	Pass
12.97	43.84	10.06	0.54	54.43	Average	Live	60.00	-5.57	Pass
13.65	41.45	10.06	0.55	52.06	Average	Live	60.00	-7.94	Pass
13.89	44.05	10.06	0.55	54.66	Average	Live	60.00	-5.34	Pass
12.29	41.38	10.05	0.54	51.97	Average	Live	60.00	-8.03	Pass

Test specification:	AC Conducted Emissions (Class B)			
Environmental Conditions:	Temp(°C):	25.0	Result:	
	Humidity (%):	53.17		X Pass
	Atmospheric(mbar):	1016.70		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	25th Jan, 2017			
Remarks:	Neutral Line. External Antenna- LTE_B4_B252. The operating frequencies are: 2100MHz and 5GHz. Both the frequencies were operated at the same time.			



Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line/Neutral	Limit (dBuV)	Margin (dB)	Pass/Fail
12.52	46.76	10.05	0.54	57.35	Quasi Peak	Neutral	73.00	-15.65	Pass
13.21	46.91	10.06	0.54	57.51	Quasi Peak	Neutral	73.00	-15.49	Pass
13.89	46.23	10.06	0.55	56.84	Quasi Peak	Neutral	73.00	-16.16	Pass
11.84	45.10	10.05	0.53	55.68	Quasi Peak	Neutral	73.00	-17.32	Pass
12.98	44.98	10.06	0.54	55.58	Quasi Peak	Neutral	73.00	-17.42	Pass
14.57	44.24	10.06	0.56	54.86	Quasi Peak	Neutral	73.00	-18.14	Pass
12.52	44.75	10.05	0.54	55.34	Average	Neutral	60.00	-4.66	Pass
13.21	45.19	10.06	0.54	55.79	Average	Neutral	60.00	-4.21	Pass
13.89	44.47	10.06	0.55	55.07	Average	Neutral	60.00	-4.93	Pass
11.84	43.22	10.05	0.53	53.80	Average	Neutral	60.00	-6.20	Pass
12.98	42.87	10.06	0.54	53.46	Average	Neutral	60.00	-6.54	Pass
14.57	41.57	10.06	0.56	52.18	Average	Neutral	60.00	-7.82	Pass

Test specification:	AC Conducted Emissions (Class B)			
Environmental Conditions:	Temp(°C):	25.0	Result:	
	Humidity (%):	53.17		X Pass
	Atmospheric(mbar):	1016.70		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	25th Jan, 2017			
Remarks:	Phase Line. External Antenna- B252. The operating frequencies are: 2100MHz and 5GHz. Both the frequencies were operated at the same time.			

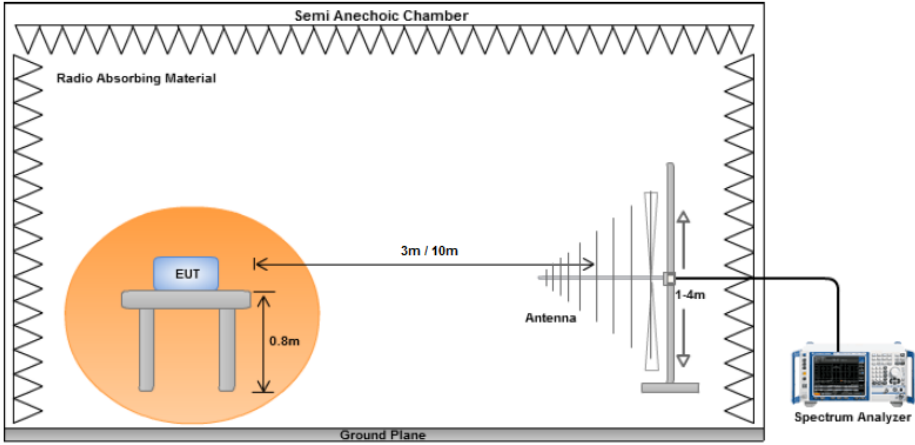


Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line/ Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
13.21	47.12	10.06	0.54	57.73	Quasi Peak	Live	73.00	-15.27	Pass
12.53	46.86	10.05	0.54	57.45	Quasi Peak	Live	73.00	-15.55	Pass
13.90	46.35	10.06	0.55	56.95	Quasi Peak	Live	73.00	-16.05	Pass
11.85	45.25	10.05	0.53	55.84	Quasi Peak	Live	73.00	-17.16	Pass
14.58	44.83	10.06	0.56	55.44	Quasi Peak	Live	73.00	-17.56	Pass
12.99	44.82	10.06	0.54	55.41	Quasi Peak	Live	73.00	-17.59	Pass
13.21	45.53	10.06	0.54	56.13	Average	Live	60.00	-3.87	Pass
12.53	44.73	10.05	0.54	55.32	Average	Live	60.00	-4.68	Pass
13.90	44.67	10.06	0.55	55.28	Average	Live	60.00	-4.72	Pass
11.85	43.36	10.05	0.53	53.95	Average	Live	60.00	-6.05	Pass
14.58	42.39	10.06	0.56	53.01	Average	Live	60.00	-6.99	Pass
12.99	42.86	10.06	0.54	53.46	Average	Live	60.00	-6.54	Pass



## 12.2. Radiated Spurious Emissions Below 1GHz (Class A)

Requirement(s):

Spec	Item	Requirement	Applicable							
§ 15.109	a)	The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following:	Yes							
		<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>210</td></tr><tr><td>Above 960</td><td>300</td></tr></tbody></table>		Frequency range (MHz)	Field Strength (uV/m)	30 – 88	100	88 – 216	150	216 960
Frequency range (MHz)	Field Strength (uV/m)									
30 – 88	100									
88 – 216	150									
216 960	210									
Above 960	300									
Test Setup										
Procedure		<div>1. 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</div> <div>2. The EUT was switched on and allowed to warm up to its normal operating condition.</div> <div>3. 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:<div>a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</div><div>b. The EUT was then rotated to the direction that gave the maximum emission.</div><div>c. Finally, the antenna height was adjusted to the height that gave the maximum emission.</div></div> <div>4. A Quasi-peak measurement was then made for that frequency point.</div> <div>5. Steps 3 and 4 were repeated for the next frequency point, until all selected frequency points were measured.</div> <div>6. The frequency range covered was from 30MHz to 1GHz using the broadband antenna.</div>								
Description of the Radiated Emissions Program		<p>This EMC Measurement software, EMI Soft Vasona offers a common user interface for electromagnetic interference (EMI) measurements. This software is a modern and powerful tool for controlling and monitoring EMI test receivers and EMC test systems. It guarantees reliable collection, evaluation, and documentation of measurement results. Basically, this program will run a pre-scan measurement before it proceeds with the final measurement. The pre-scan routine will run the scan on four different antenna heights, 2 antenna polarity, and 360 degrees table rotation. For example, the program was set to run 30 MHz to 1 GHz scan; the program will first start from a meter antenna height and divide the 30 MHz to 1 GHz into 10 separate parts of maximum hold sweeps. Each parts of maximum hold sweep, the program will collect the data from 0 degree to 360 degrees table rotation. After the program complete the 1m scan, the antenna continues to rise to 2m and continue the scan. The step will repeated for all specified antenna height and polarity. This program will perform the Quasi Peak measurement after the signal maximization process and pre-scan routine. The final measurement will be based on the pre-scan data reduction result.</p>								

Sample Calculation Example	<p>At 300 MHz limit = <math>200 \mu\text{V/m} = 46.00 \text{ dB}\mu\text{V/m}</math></p> <p>Log-periodic antenna factor &amp; cable loss at 300 MHz = 18.50 dB</p> <p>Q-P reading obtained directly from EMI Receiver = 40.00 dB<math>\mu\text{V/m}</math></p> <p>(Calibrated level including antenna factors &amp; cable losses)</p> <p>Therefore, Q-P margin = <math>46.00 - 40.00 = 6.00</math> i.e. 6 dB below limit</p>
Remarks	<p>The configurations tested: LTE_B4_B255 and LTE_B4_B252.</p> <p>The operating frequencies are: 2100MHz and 5GHz. Both the frequencies were operated at the same time.</p>

**Test Data:** X Yes (See below)

N/A

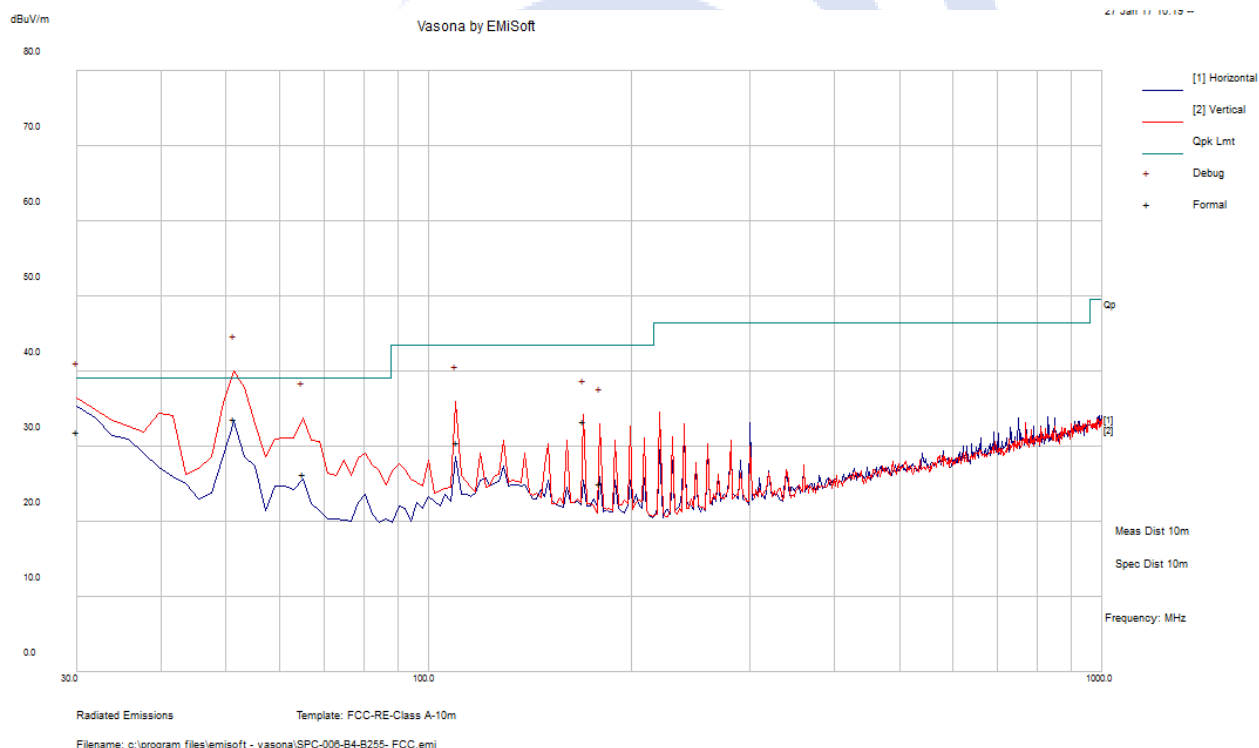
**Test Data:** X Yes (See below)

N/A



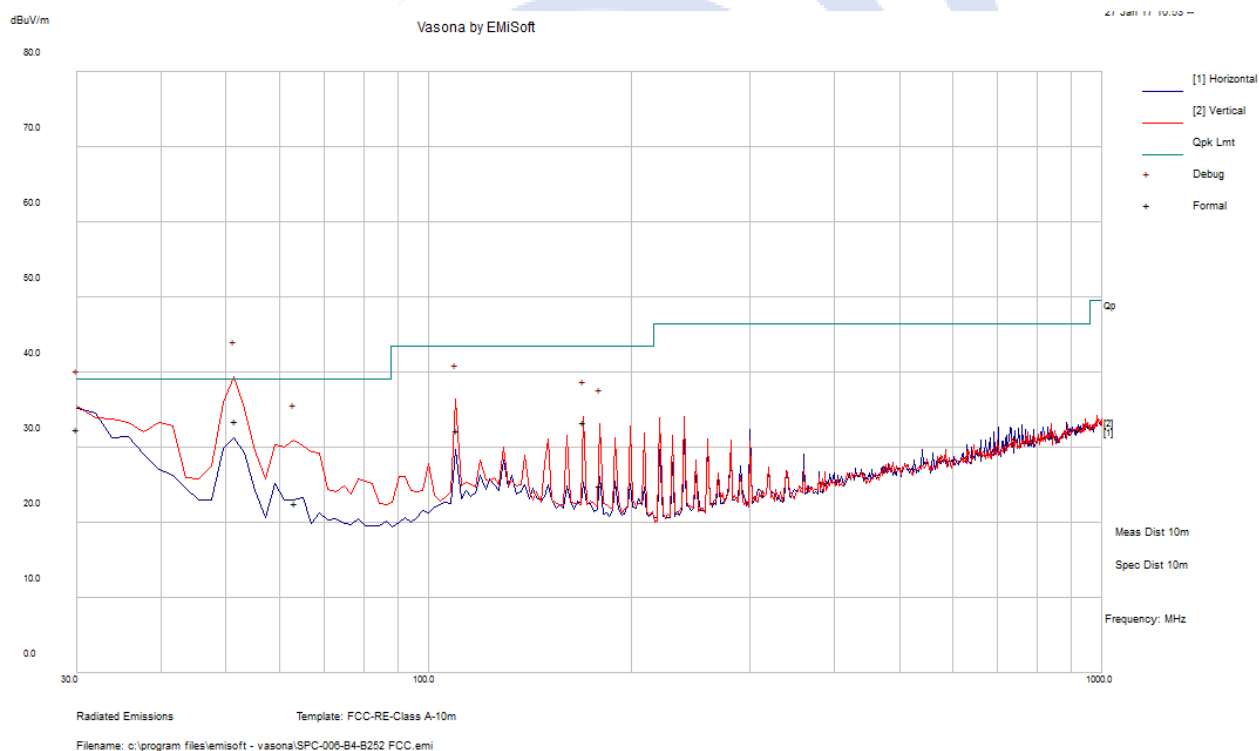
## Radiated Emission Test Results (Below 1GHz, Class A)

Test specification:	Radiated Emissions (Below 1GHz)			
Environmental Conditions:	Temp(°C):	23.60	Result:	
	Humidity (%):	37.12		X Pass
	Atmospheric(mbar):	1016.70		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	27th Jan 2017			
Remarks:	30 – 1000 MHz- Internal Antenna Configuration-LTE_B4_B255. The operating frequencies are: 2100MHz and 5GHz. Testing was done at 10m chamber			



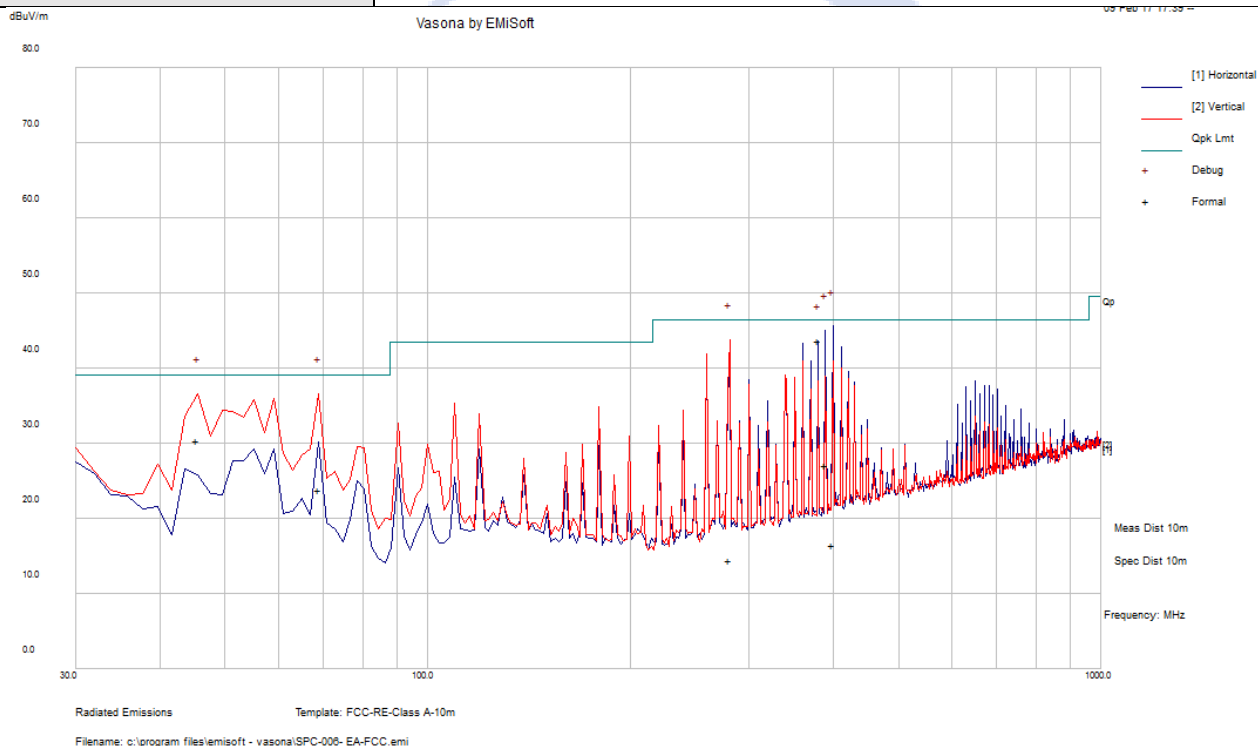
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Po l	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
51.61	45.60	1.34	-13.38	33.56	Quasi Max	V	223	264	39.08	-5.52	Pass
30.00	31.44	0.99	0.06	32.49	Quasi Max	V	150	200	39.08	-6.59	Pass
109.94	40.51	1.75	-9.98	32.27	Quasi Max	V	99	239	43.52	-11.25	Pass
63.23	35.62	1.44	-14.44	22.62	Quasi Max	V	119	289	39.08	-16.46	Pass
169.99	41.92	2.11	-10.73	33.3	Quasi Max	V	102	297	43.52	-10.22	Pass
179.92	33.89	2.18	-11.14	24.93	Quasi Max	V	100	266	43.52	-18.59	Pass

Test specification:	Radiated Emissions (Below 1GHz)			
Environmental Conditions:	Temp(°C):	23.60	Result:	
	Humidity (%):	37.12		X Pass
	Atmospheric(mbar):	1016.70		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	27th Jan 2017			
Remarks:	30 – 1000 MHz- Internal Antenna Configuration. LTE_B4_ B252. The operating frequencies are: 2100MHz and 5GHz. Testing was done at 10m chamber			



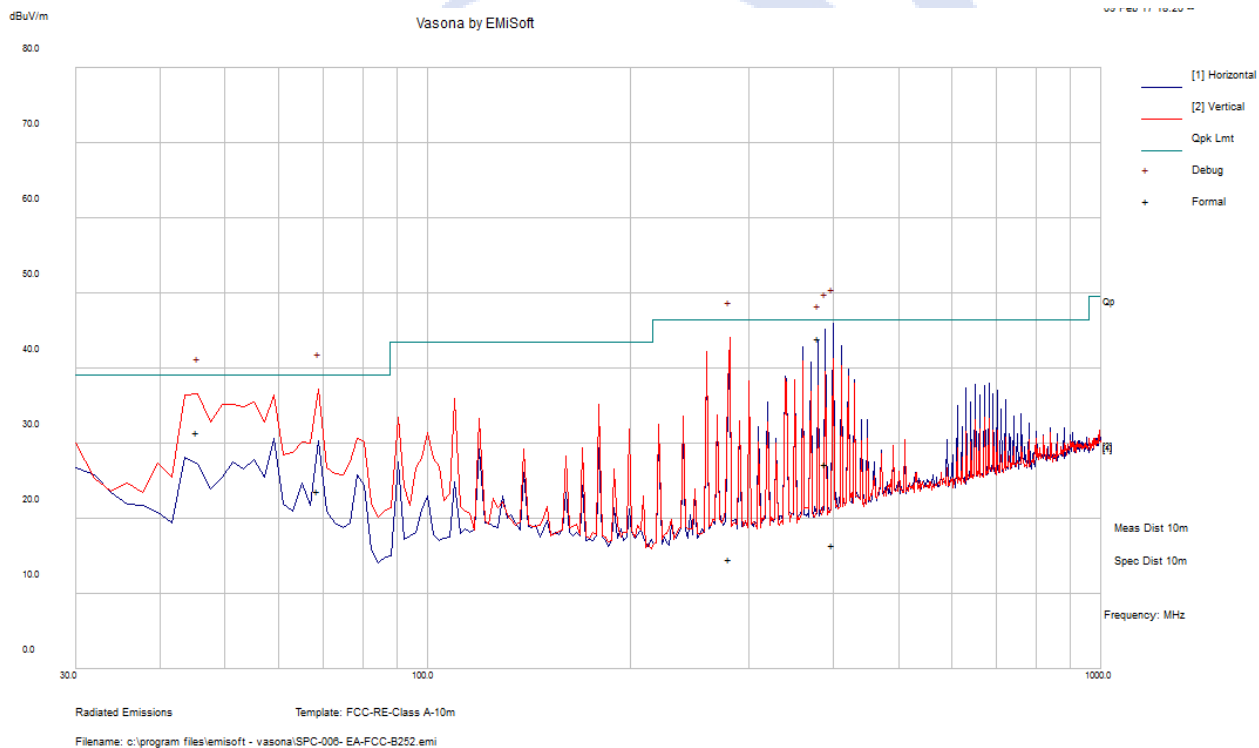
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Po I	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
51.61	45.60	1.34	-13.38	33.56	Quasi Max	V	223	264	39.08	-5.52	Pass
30.00	31.44	0.99	0.06	32.49	Quasi Max	V	150	200	39.08	-6.59	Pass
109.94	40.51	1.75	-9.98	32.27	Quasi Max	V	99	239	43.52	-11.25	Pass
63.23	35.62	1.44	-14.44	22.62	Quasi Max	V	119	289	39.08	-16.46	Pass
169.99	41.92	2.11	-10.73	33.3	Quasi Max	V	102	297	43.52	-10.22	Pass
179.92	33.89	2.18	-11.14	24.93	Quasi Max	V	100	266	43.52	-18.59	Pass

Test specification:	Radiated Emissions (Below 1GHz)			
Environmental Conditions:	Temp(°C):	23.60	Result:	
	Humidity (%):	37.12		X Pass
	Atmospheric(mbar):	1016.70		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	27th Jan 2017			
Remarks:	30 – 1000 MHz- External Antenna Configuration.LTE_B4_ B255. The operating frequencies are: 2100MHz and 5GHz. Testing was done at 10m chamber			



Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Po l	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
399.16	33.88	3.25	-20.64	16.49	Quasi Max	H	384	59	46.44	-29.95	Pass
389.86	44.93	3.19	-21.07	27.04	Quasi Max	H	198	140	46.44	-19.40	Pass
68.81	50.34	1.47	-28.07	23.74	Quasi Max	V	277	182	39.08	-15.34	Pass
45.31	54.31	1.25	-25.21	30.35	Quasi Max	V	194	27	39.08	-8.73	Pass
280.99	34.60	2.84	-23.05	14.39	Quasi Max	V	142	339	46.44	-32.05	Pass
379.98	61.72	3.13	-21.17	43.68	Quasi Max	H	262	132	46.44	-2.76	Pass

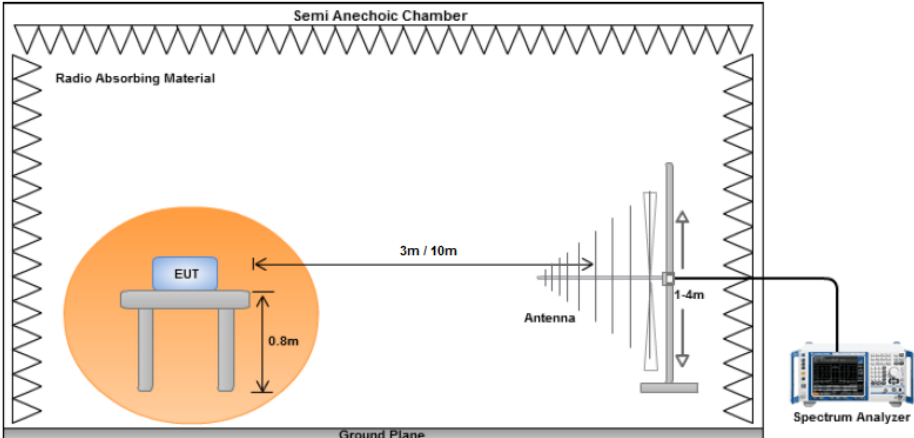
Test specification:	Radiated Emissions (Below 1GHz)			
Environmental Conditions:	Temp(°C):	23.60	Result:	
	Humidity (%):	37.12		X Pass
	Atmospheric(mbar):	1016.70		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	27th Jan 2017			
Remarks:	30 – 1000 MHz- External Antenna Configuration. LTE_B4_ B255. The operating frequencies are: 2100MHz and 5GHz. Testing was done at 10m chamber			



Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Po I	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
399.28	33.91	3.25	-20.63	16.53	Quasi Max	H	162	49	46.44	-29.91	Pass
389.86	45.17	3.19	-21.07	27.29	Quasi Max	H	216	146	46.44	-19.15	Pass
68.72	50.24	1.47	-28.10	23.61	Quasi Max	V	227	224	39.08	-15.47	Pass
280.63	34.80	2.84	-23.05	14.60	Quasi Max	V	380	345	46.44	-31.84	Pass
45.45	55.54	1.25	-25.29	31.51	Quasi Max	V	164	22	39.08	-7.57	Pass
379.99	62.00	3.13	-21.17	43.95	Quasi Max	H	243	146	46.44	-2.49	Pass

### 12.3. Radiated Spurious Emissions above 1GHz (Class A)

Requirement(s):

Spec	Item	Requirement	Applicable						
§ 15.109	a)	<p>The field strength of radiated emissions from a Class A digital device, as determined at a distance of 3 meters, shall not exceed the following:</p> <table><tr><th>Frequency range (GHz)</th><th>Average limit dB(uV/m)</th><th>Peak limit dB(uV/m)</th></tr><tr><td>Above 1</td><td>60</td><td>80</td></tr></table>	Frequency range (GHz)	Average limit dB(uV/m)	Peak limit dB(uV/m)	Above 1	60	80	Yes
	Frequency range (GHz)	Average limit dB(uV/m)	Peak limit dB(uV/m)						
Above 1	60	80							
Test Setup									
Procedure	<ol style="list-style-type: none"><li>1. 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</li><li>2. The EUT was switched on and allowed to warm up to its normal operating condition.</li><li>3. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:<ol style="list-style-type: none"><li>a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</li><li>b. The EUT was then rotated to the direction that gave the maximum emission.</li><li>c. Finally, the antenna height was adjusted to the height that gave the maximum emission.</li></ol></li><li>4. A Peak and Average measurement was then made for that frequency point.</li><li>5. Steps 3 and 4 were repeated for the next frequency point, until all selected frequency points were measured.</li><li>6. The frequency range covered was from 1GHz to 6GHz (for FCC tests, until the 5<sup>th</sup> harmonic for operating frequencies ≥ 1000MHz) using a horn antenna.</li></ol>								
Remarks	<p>Configurations were tested: LTE_B4_B255 and LTE_B4_B252.</p> <p>The operating frequencies are: 2100MHz and 5GHz. Both the frequencies were operated at the same time.</p>								

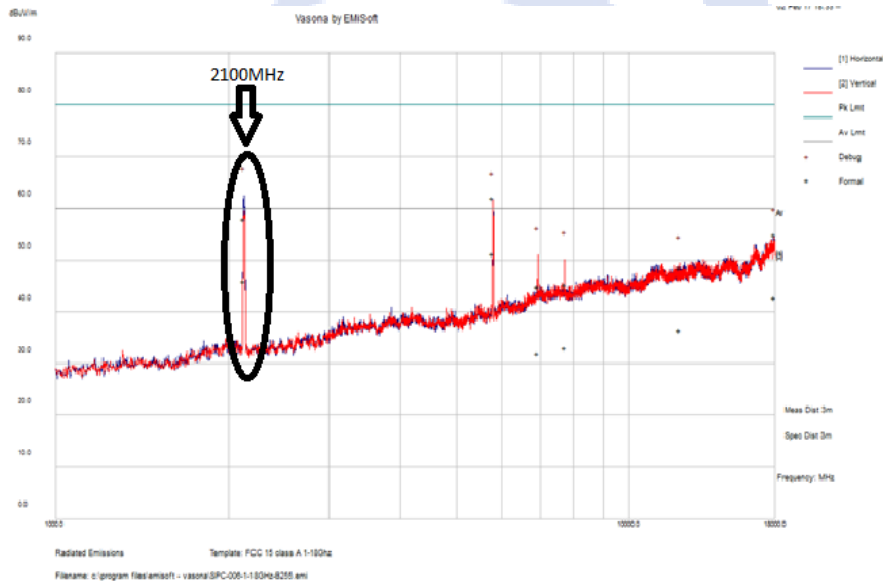
Test Data: X Yes (See below) N/A

Test Data: X Yes (See below) N/A



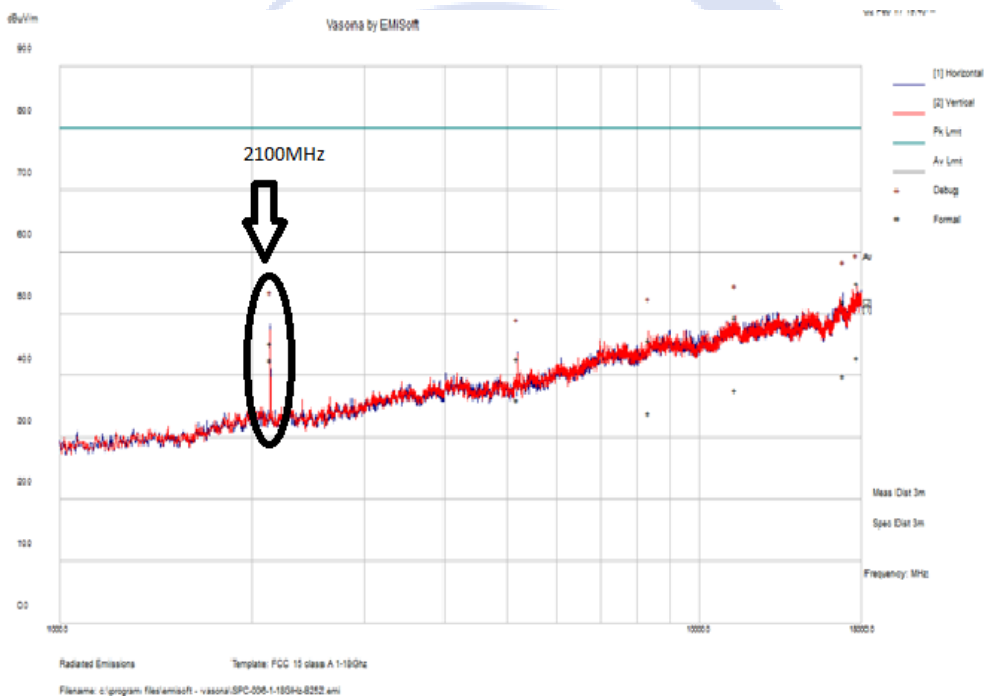
## Radiated Emission Test Results (Above 1GHz, Class A)

Test specification:	Radiated Emissions (Above 1GHz)			
Environmental Conditions:	Temp(°C):	23.10	Result:	
	Humidity (%):	37.19		X Pass
	Atmospheric(mbar):	1017.70		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	2nd Feb 2017			
Remarks:	1-18Ghz. Internal Antenna Configuration- B255 Mode. The operating frequencies are: 2100MHz and 5GHz. Testing was done at 10m chamber			



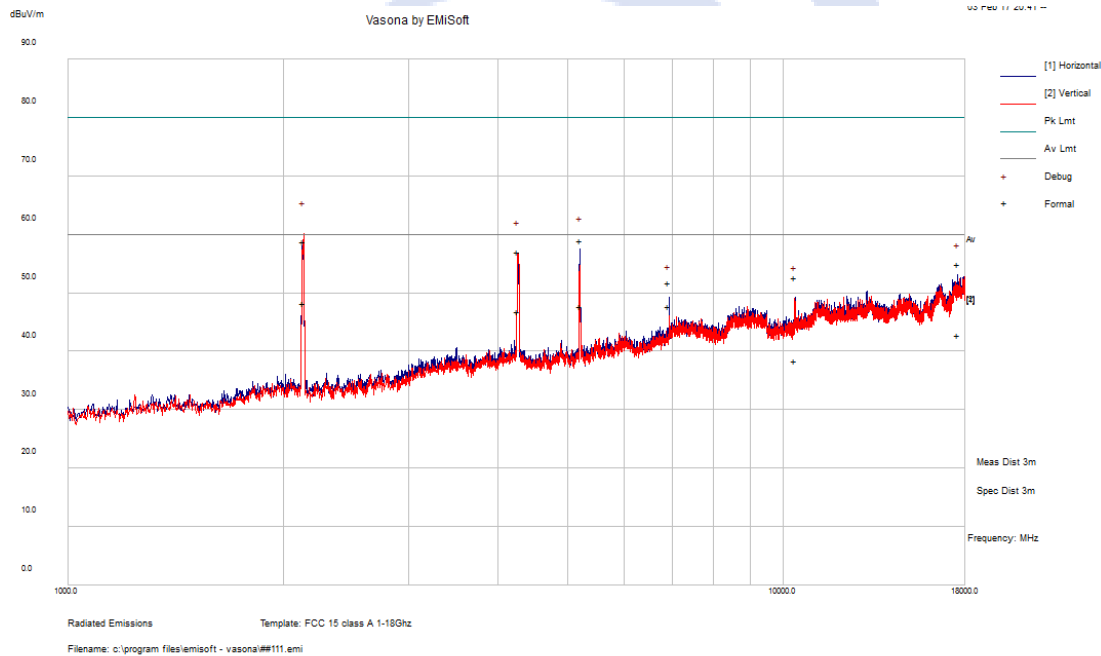
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Po I	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
2127.17	66.28	3.34	-11.77	57.84	Peak Max	H	159	12	80.00	-22.16	Pass
5776.66	59.87	5.56	-3.48	61.94	Peak Max	V	222	357	80.00	-18.06	Pass
17931.63	37.40	9.14	8.44	54.98	Peak Max	V	240	304	80.00	-25.02	Pass
6930.38	39.61	5.73	-0.49	44.86	Peak Max	V	184	260	80.00	-35.14	Pass
7711.53	39.43	5.93	-0.12	45.23	Peak Max	V	102	50	80.00	-34.77	Pass
12231.21	38.95	7.34	2.37	48.66	Peak Max	V	249	39	80.00	-31.34	Pass
2127.17	54.33	3.34	-11.77	45.90	Average Max	H	159	12	60.00	-14.10	Pass
5776.66	49.11	5.56	-3.48	51.18	Average Max	V	222	357	60.00	-8.82	Pass
17931.63	25.14	9.14	8.44	42.72	Average Max	V	240	304	60.00	-17.28	Pass
6930.38	26.83	5.73	-0.49	32.08	Average Max	V	184	260	60.00	-27.92	Pass
7711.53	27.29	5.93	-0.12	33.10	Average Max	V	102	50	60.00	-26.90	Pass
12231.21	26.81	7.34	2.37	36.52	Average Max	V	249	39	60.00	-23.48	Pass

Test specification:	Radiated Emissions (Above 1GHz)			
Environmental Conditions:	Temp(°C):	23.1	Result:	
	Humidity (%):	37.19		X Pass
	Atmospheric(mbar):	1017.7		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	2nd Feb 2017			
Remarks:	1-18Ghz. Internal Antenna Configuration-LTE_B4_ B252. The operating frequencies are: 2100MHz and 5GHz. Testing was done at 10m chamber			



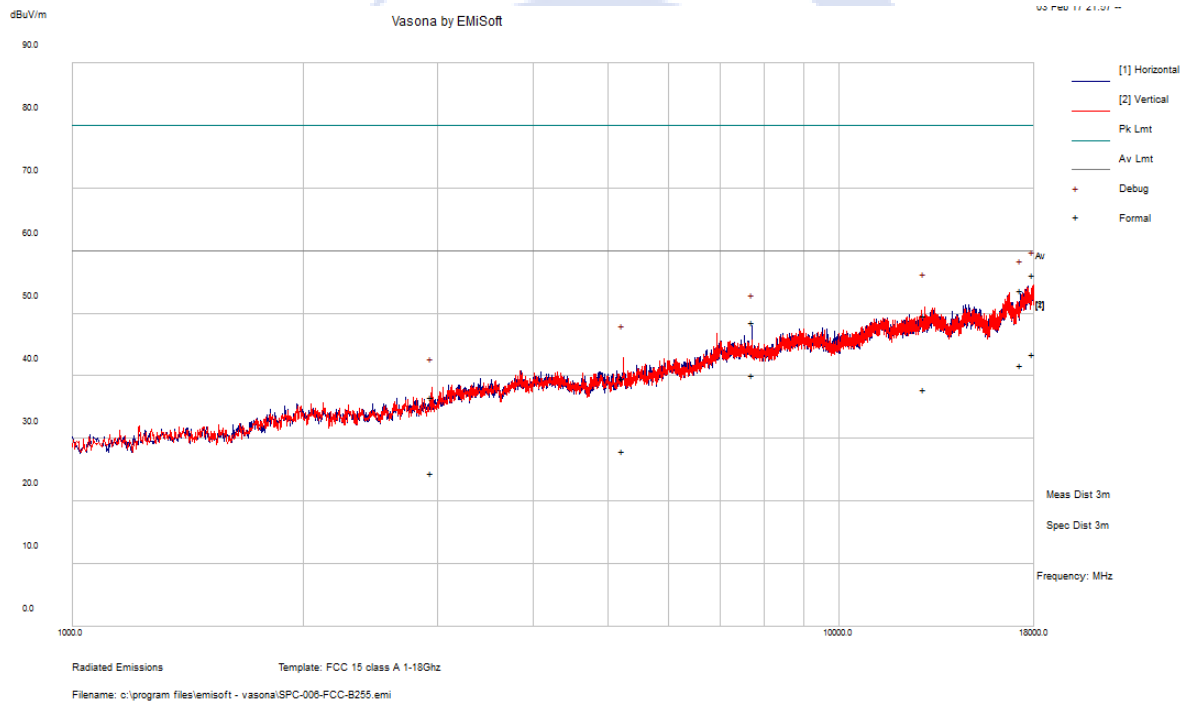
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Po I	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
17674.88	37.50	9.07	8.39	54.95	Peak Max	V	308	104	80.00	-25.05	Pass
16779.01	37.37	8.87	5.74	51.97	Peak Max	H	194	113	80.00	-28.03	Pass
11413.21	39.45	7.67	2.29	49.41	Peak Max	V	203	218	80.00	-30.59	Pass
2132.62	53.71	3.34	-11.8	45.25	Peak Max	H	144	276	80.00	-34.75	Pass
8354.67	39.39	6.45	-0.10	45.74	Peak Max	H	197	4	80.00	-34.26	Pass
5200.04	42.46	4.88	-4.50	42.83	Peak Max	H	200	25	80.00	-37.17	Pass
17674.88	25.45	9.07	8.39	42.91	Average Max	V	308	104	60.00	-17.09	Pass
16779.01	25.40	8.87	5.74	40.01	Average Max	H	194	113	60.00	-20.00	Pass
11413.21	27.69	7.67	2.29	37.65	Average Max	V	203	218	60.00	-22.35	Pass
2132.62	51.00	3.34	-11.8	42.53	Average Max	H	144	276	60.00	-17.47	Pass
8354.67	27.62	6.45	-0.10	33.98	Average Max	H	197	4	60.00	-26.02	Pass
5200.04	35.75	4.88	-4.5	36.12	Average Max	H	200	25	60.00	-23.88	Pass

Test specification:	Radiated Emissions (Above 1GHz)			
Environmental Conditions:	Temp(°C):	23.1	Result:	
	Humidity (%):	37.19		X Pass
	Atmospheric(mbar):	1017.7		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	2nd Feb 2017			
Remarks:	1-18Ghz. External Antenna Configuration-LTE_B4_ B252. The operating frequencies are: 2100MHz and 5GHz. Testing was done at 10m chamber			



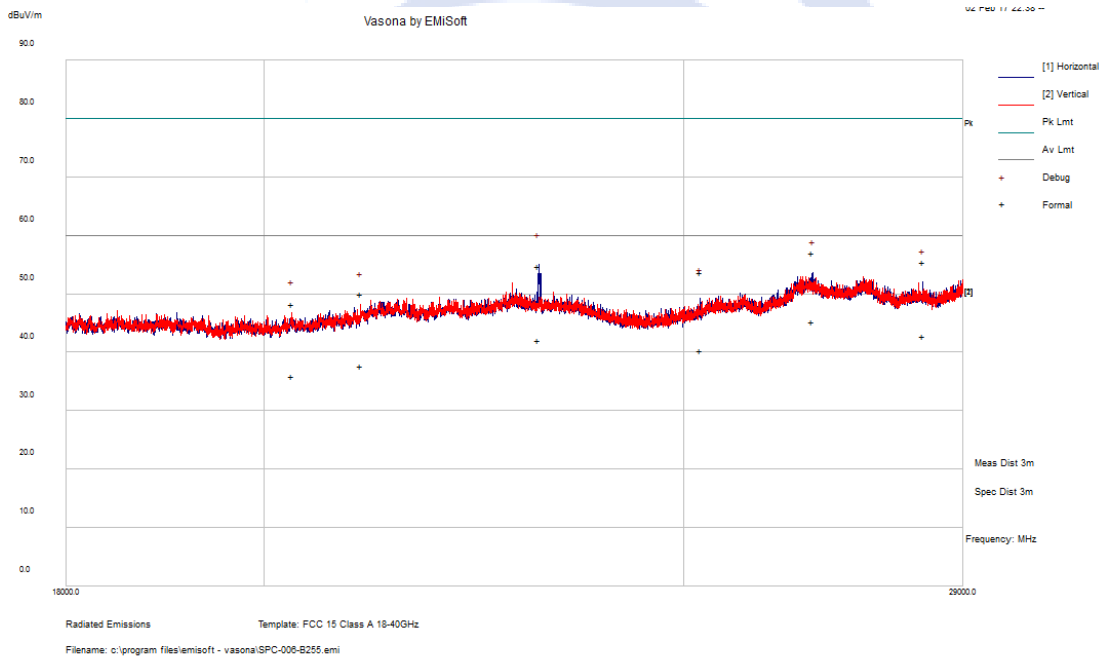
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Po I	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
2135.95	67.24	3.34	-11.82	58.76	Peak Max	V	396	189	80.00	-21.24	Pass
5208.04	58.55	4.89	-4.48	58.97	Peak Max	H	155	49	80.00	-21.04	Pass
4265.12	57.87	4.88	-5.76	56.99	Peak Max	V	194	305	80.00	-23.01	Pass
17566.67	38.16	9.04	7.77	54.97	Peak Max	H	341	311	80.00	-25.03	Pass
6933.24	46.49	5.73	-0.47	51.75	Peak Max	H	132	45	80.00	-28.25	Pass
10405.20	45.23	7.24	0.15	52.61	Peak Max	H	107	18	80.00	-27.39	Pass
2135.95	56.81	3.34	-11.82	48.33	Average Max	V	396	189	60.00	-11.67	Pass
5208.04	47.36	4.89	-4.48	47.78	Average Max	H	155	49	60.00	-12.22	Pass
4265.12	47.73	4.88	-5.76	46.85	Average Max	V	194	305	60.00	-13.15	Pass
17566.67	25.94	9.04	7.77	42.75	Average Max	H	341	311	60.00	-17.25	Pass
6933.24	42.51	5.73	-0.47	47.77	Average Max	H	132	45	60.00	-12.23	Pass
10405.20	30.93	7.24	0.15	38.31	Average Max	H	107	18	60.00	-21.69	Pass

Test specification:	Radiated Emissions (Above 1GHz)			
Environmental Conditions:	Temp(°C):	23.10	Result:	
	Humidity (%):	37.19		X Pass
	Atmospheric(mbar):	1017.7 0		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	6 <sup>th</sup> Feb 2017			
Remarks:	Above 1-18Ghz. External Antenna Configuration- B255 Mode. The operating frequencies are: 2100MHz and 5GHz. Testing was done at 10m chamber			



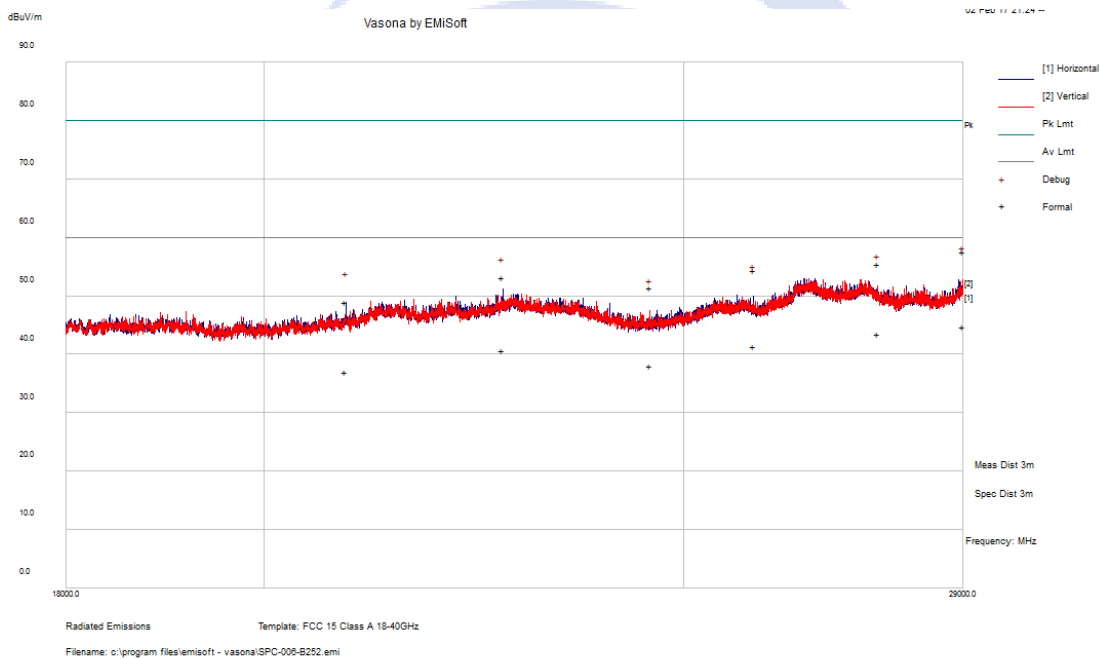
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Po I	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
17948.92	38.75	9.14	8.35	56.25	Peak Max	V	143	216	80	-23.76	Pass
17292.14	37.86	9.00	6.77	53.63	Peak Max	H	166	308	80	-26.37	Pass
12944.80	38.72	7.53	3.48	49.73	Peak Max	V	158	12	80	-30.27	Pass
7713.52	42.82	5.93	-0.13	48.62	Peak Max	H	102	304	80	-31.38	Pass
5233.57	39.17	4.94	-4.41	39.70	Peak Max	V	198	133	80	-40.3	Pass
2944.96	42.76	3.86	-9.93	36.70	Peak Max	V	260	131	80	-43.3	Pass
17948.92	25.99	9.14	8.35	43.49	Average Max	V	143	216	60	-16.51	Pass
17292.14	25.99	9.00	6.77	41.76	Average Max	H	166	308	60	-18.24	Pass
12944.80	26.80	7.53	3.48	37.81	Average Max	V	158	12	60	-22.19	Pass
7713.52	34.37	5.93	-0.13	40.17	Average Max	H	102	304	60	-19.83	Pass
5233.57	27.54	4.94	-4.41	28.07	Average Max	V	198	133	60	-31.93	Pass
2944.96	30.62	3.86	-9.93	24.56	Average Max	V	260	131	60	-35.44	Pass

Test specification:	Radiated Emissions (Above 1GHz)			
Environmental Conditions:	Temp(°C):	21.50	Result:	
	Humidity (%):	35.50		X Pass
	Atmospheric(mbar):	1015.60		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	6 <sup>th</sup> Feb 2017			
Remarks:	Above 18-29Ghz. Internal Antenna Configuration- B255 Mode. The operating frequencies are: 2100MHz and 5GHz. Testing was done at 10m chamber			



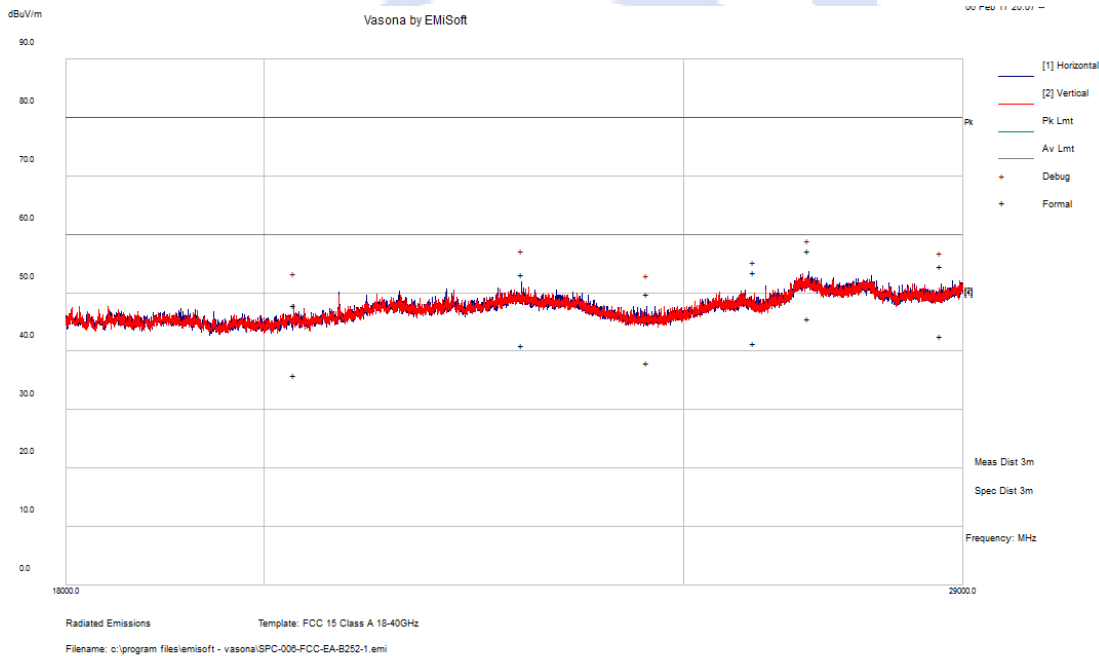
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Po I	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
23142.20	39.59	10.33	4.78	54.70	Peak Max	H	99	12	80.00	-25.30	Pass
26770.67	38.51	11.52	7.04	57.07	Peak Max	H	241	87	80.00	-22.93	Pass
28384.28	38.37	11.51	5.49	55.37	Peak Max	H	212	290	80.00	-24.63	Pass
25216.82	39.18	10.97	3.56	53.71	Peak Max	H	180	4	80.00	-26.29	Pass
21051.68	37.36	10.00	2.65	50.02	Peak Max	V	202	132	80.00	-29.98	Pass
20295.03	38.20	9.80	0.30	48.31	Peak Max	V	364	336	80.00	-31.69	Pass
23142.20	26.99	10.33	4.78	42.10	Average Max	H	99	12	60.00	-17.90	Pass
26770.67	26.73	11.52	7.04	45.29	Average Max	H	241	87	60.00	-14.72	Pass
28384.28	25.72	11.51	5.49	42.73	Average Max	H	212	290	60.00	-17.28	Pass
25216.82	25.76	10.97	3.56	40.29	Average Max	H	180	4	60.00	-19.71	Pass
21051.68	25.00	10.00	2.65	37.65	Average Max	V	202	132	60.00	-22.35	Pass
20295.03	25.89	9.80	0.30	36.00	Average Max	V	364	336	60.00	-24.00	Pass

Test specification:	Radiated Emissions (Above 1GHz)			
Environmental Conditions:	Temp(°C):	21.50	Result:	
	Humidity (%):	35.50		X Pass
	Atmospheric(mbar):	1015.60		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	6 <sup>th</sup> Feb 2017			
Remarks:	Above 18-29Ghz. Internal Antenna Configuration- B252 Mode. The operating frequencies are: 2100MHZ and 5GHz. Testing was done at 10m chamber			



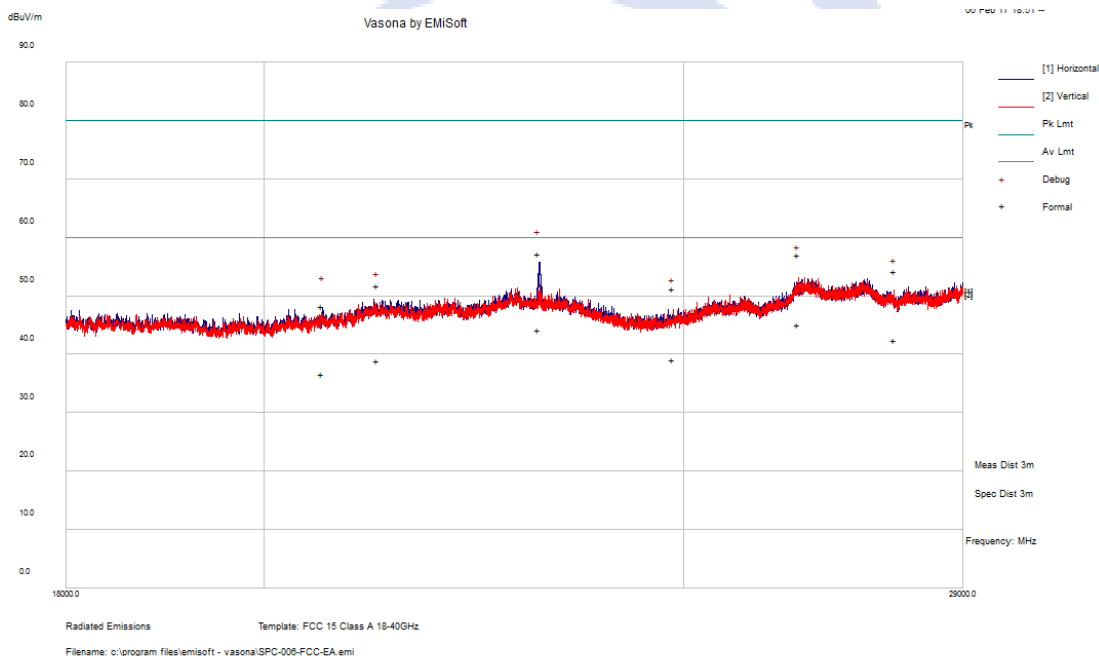
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Po I	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
28999.88	38.93	11.71	6.90	57.54	Peak Max	V	144	219	80.00	-22.46	Pass
27711.45	37.60	11.44	6.43	55.47	Peak Max	V	225	169	80.00	-24.53	Pass
22702.14	38.28	10.17	4.71	53.17	Peak Max	H	356	108	80.00	-26.83	Pass
25940.87	39.43	11.07	3.84	54.33	Peak Max	H	218	301	80.00	-25.67	Pass
20888.08	37.04	9.94	2.04	49.02	Peak Max	H	259	80	80.00	-30.98	Pass
24550.51	39.11	10.60	1.78	51.49	Peak Max	V	233	71	80.00	-28.51	Pass
28999.88	26.08	11.71	6.90	44.70	Average Max	V	144	219	60.00	-15.30	Pass
27711.45	25.65	11.44	6.43	43.52	Average Max	V	225	169	60.00	-16.48	Pass
22702.14	25.84	10.17	4.71	40.72	Average Max	H	356	108	60.00	-19.28	Pass
25940.87	26.44	11.07	3.84	41.35	Average Max	H	218	301	60.00	-18.65	Pass
20888.08	25.06	9.94	2.04	37.04	Average Max	H	259	80	60.00	-22.96	Pass
24550.51	25.71	10.60	1.78	38.09	Average Max	V	233	71	60.00	-21.91	Pass

Test specification:	Radiated Emissions (Above 1GHz)			
Environmental Conditions:	Temp(°C):	21.5	Result:	
	Humidity (%):	35.50		X Pass
	Atmospheric(mbar):	1015.6		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	6 <sup>th</sup> Feb 2017			
Remarks:	Above 18-29Ghz. External Antenna Configuration- B252 Mode. The operating frequencies are: 2100MHZ and 5GHz. Testing was done at 10m chamber			



Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Po I	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
26712.67	38.70	11.52	7.06	57.28	Peak Max	H	313	115	80.00	-22.73	Pass
22936.11	37.88	10.27	4.95	53.10	Peak Max	H	225	253	80.00	-26.90	Pass
28661.03	37.15	11.58	5.87	54.60	Peak Max	H	263	347	80.00	-25.40	Pass
25952.62	38.71	11.07	3.83	53.60	Peak Max	V	163	302	80.00	-26.40	Pass
20323.49	37.83	9.80	0.34	47.97	Peak Max	V	389	216	80.00	-32.03	Pass
24512.44	37.56	10.58	1.68	49.82	Peak Max	H	381	303	80.00	-30.18	Pass
26712.67	27.00	11.52	7.06	45.57	Average Max	H	313	115	60.00	-14.43	Pass
22936.11	25.75	10.27	4.95	40.98	Average Max	H	225	253	60.00	-19.02	Pass
28661.03	25.23	11.58	5.87	42.68	Average Max	H	263	347	60.00	-17.32	Pass
25952.62	26.41	11.07	3.83	41.31	Average Max	V	163	302	60.00	-18.69	Pass
20323.49	25.82	9.80	0.34	35.96	Average Max	V	389	216	60.00	-24.04	Pass
24512.44	25.74	10.58	1.68	38.00	Average Max	H	381	303	60.00	-22.00	Pass

Test specification:	Radiated Emissions (Above 1GHz)			
Environmental Conditions:	Temp(°C):	21.5	Result:	
	Humidity (%):	35.50		X Pass
	Atmospheric(mbar):	1015.6		
Mains Power:	120Vac, 60Hz			
Tested by:	Anish Kumar			Fail
Test Date:	6 <sup>th</sup> Feb 2017			
Remarks:	Above 18-29Ghz. External Antenna Configuration- B255 Mode. The operating frequencies are: 2100MHz and 5GHz. Testing was done at 10m chamber			




















Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Po I	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
23141.37	42.15	10.33	4.78	57.26	Peak Max	H	99	293	80.00	-22.74	Pass
26568.18	38.50	11.52	7.06	57.07	Peak Max	V	103	183	80.00	-22.93	Pass
27951.68	37.15	11.50	5.63	54.28	Peak Max	V	299	11	80.00	-25.72	Pass
21238.29	38.36	10.08	3.30	51.74	Peak Max	H	262	99	80.00	-28.26	Pass
20626.72	37.45	9.84	1.04	48.33	Peak Max	H	314	35	80.00	-31.67	Pass
24857.67	37.86	10.78	2.52	51.16	Peak Max	V	272	85	80.00	-28.84	Pass
23141.37	29.16	10.33	4.78	44.27	Average Max	H	99	293	60.00	-15.73	Pass
26568.18	26.55	11.52	7.06	45.13	Average Max	V	103	183	60.00	-14.87	Pass
27951.68	25.31	11.50	5.63	42.43	Average Max	V	299	11	60.00	-17.57	Pass
21238.29	25.59	10.08	3.30	38.98	Average Max	H	262	99	60.00	-21.03	Pass
20626.72	25.80	9.84	1.04	36.68	Average Max	H	314	35	60.00	-23.32	Pass
24857.67	25.74	10.78	2.52	39.05	Average Max	V	272	85	60.00	-20.95	Pass








### 13. Annex A | Test instruments and method

Instrument	Model	Serial #	Cal Cycle	Cal Due	In use
<b>Conducted Emissions</b>					
EMI Test Receiver (9kHz - 6GHz)	ESL6	100178	1 Year	8/17/2017	YES
Transient Limiter (9kHz - 100MHz)	EM-7600	287	1 Year	4/7/2017	YES
V-LISN (150 kHz - 30 MHz)	NNLK 8129	8129-190	1 Year	8/4/2017	YES
LISN (9kHz - 30MHz)	MN2050B	1018	1 Year	8/16/2017	YES
<b>Radiated Emissions</b>					
EMI Test Receiver	ESIB 40	100179	1 Year	6/8/2017	YES
Keysight EXA 44 GHz Spectrum Analyzer	N9010A	MY51440112	1 Year	8/2/2017	YES
Antenna - Biconlog (30MHz - 2GHz)	JB1	A030702	1 Year	7/8/2017	YES
Double Ridged Waveguide Horn Antenna (1 - 18 GHz)	3115	10SL0059	1 Year	8/11/2017	YES
Horn Antenna (18-40GHz)	AH-840	101013	1 Year	7/15/2017	YES
Horn Antenna (700MHz - 18GHz)	SAS-571	411	1 Year	4/4/2017	NO
RF Pre-Amplifier (9kHz - 6.5GHz)	LPA-6-30	11140711	1 Year	2/10/2017	YES
1-40GHz Preamp	RLNA00M45GA	1611210047	N/A	N/A	YES
High Pass Filter	HFCN-3100+	N/A	N/A	N/A	YES
Pre-Amplifier (1 - 26.5GHz)	8449B	3008A00715	1 Year	3/30/2017	NO
2.4GHz Notch Filter	BRM50702	G242	1 Year	4/14/2017	YES
5.7GHz Notch Filter	BRC50705	G093	1 Year	4/14/2017	YES
10 Meters SAC	10M	N/A	1 Year	7/6/2017	YES

## 14. 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 EM, 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