

RF TEST REPORT



Report No.: NCC_SL18050403-MED-016A1-SE3695_Rev1.0
Supersede Report No.: None

Applicant	美敦力醫療產品股份有限公司
Product Name	RapidVac Smoke Evacuator
Model No.	SE3695
Test Standard	LP0002: 2018
Test Method	LP0002: 2018
Date of test	05/23/2018 – 05/29/2018
Issue Date	06/26/2018
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:	
	
Rachana Khanduri	Chen Ge
Test Engineer	Engineer Reviewer
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Issued By:
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Laboratory Introduction

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



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

Accreditations for Conformity Assessment

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

Accreditations for Product Certifications

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

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1 Report Revision History

Report No.	Report Version	Description	Issue Date
NCC_SL18050403-MED-016A1-SE3695	None	Original	06/04/2018
NCC_SL18050403-MED-016A1-SE3695_Rev1.0	None	Updated applicant name	06/26/2018

2 Executive Summary

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

Company: Covidien LLC
Product: RapidVac Smoke evacuator
Model: SE3695

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	:	美敦力醫療產品股份有限公司
Applicant Address	:	15 Hampshire Street, Mansfield, MZ 02048
Manufacturer Name	:	Covidien LLC
Manufacturer Address	:	15 Hampshire Street, Mansfield, MZ 02048

4 Test site information

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

5 Modification

Index	Item	Description	Note
-	-	-	-

6 EUT Information

6.1 EUT Description

Product Name	:	RapidVac Smoke evacuator
Model No.	:	SE3695
Trade Name	:	RapidVac
Serial No.	:	VL011241X
Input Power	:	220-240VAC-50/60Hz
Power Adapter Manu/Model	:	N/A
Power Adapter SN	:	N/A
Date of EUT received	:	02/10/2018
Equipment Class/ Category	:	13.56MHz
Port/Connectors	:	N/A

6.2 Radio Description

Specifications for Radio:

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

Channel List:

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

6.3 EUT test modes/configuration Description

Test mode

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

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

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

7.2 Cabling Description

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

7.3 Test Software Description

Test Item	Software	Description
RF Testing	-	The EUT continuously transmit itself when powered on.

8 Test Summary

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Antenna Requirement	NCC	LP0002, 2.2	NCC	-	☒ Pass ☐ N/A
Conducted Emissions Voltage	NCC	LP0002, 2.3	NCC	LP0002: 2018 Appendix	☒ Pass ☐ N/A
Restricted Band of Operation	NCC	LP0002, 2.7	NCC	-	☒ Pass ☐ N/A

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Radiated Spurious Emissions	NCC	LP0002, 3.2.1.2	NCC	LP0002: 2018 Appendix	☒ Pass ☐ N/A
Frequency Tolerance	NCC	LP0002, 3.2.1.3	NCC	LP0002: 2018 Appendix	☒ Pass ☐ N/A
TX Fundamental Field Strength	NCC	LP0002, 3.2.1.1	NCC	LP0002: 2018 Appendix	☒ Pass ☐ N/A
Remark	1. All measurement uncertainties are not taken into consideration for all presented test result. 2. EUT operates with 220V AC power supply.				

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

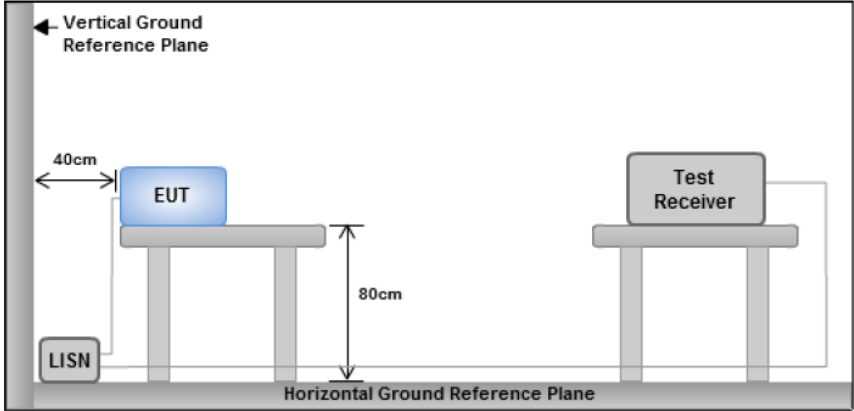
10.1 Antenna Requirement

Spec	Item	Requirement	Applicable
LP0002:2018	§2.2	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) Antenna must use a unique type of connector to attach to the device. c) Device must be professionally installed. Installer shall be responsible for ensuring that the correct antenna is employed with the device.	☒
Remark	The EUT uses a unique type of connector for antenna connection which meet the requirement.		
Result	☒ PASS ☐ FAIL		

10.2 Conducted Emissions

Conducted Emission Limit

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

Spec	Item	Requirement	Applicable
LP0002, 2.3	1	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 [mu]H/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 were powered separately from another main supply.		
Remark	EUT was tested at 220VAC, 60Hz		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

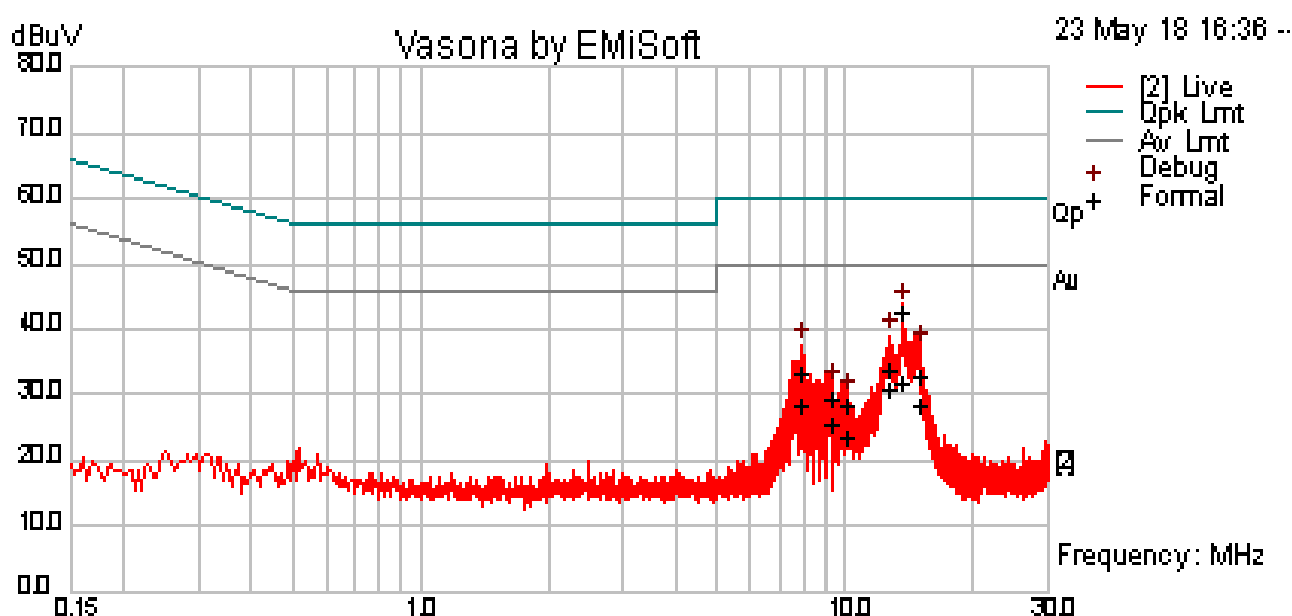
Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Rachana Khanduri at Conducted Emission test site.

Conducted Emission Test Results:

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	22	Result:	☒ Pass ☐ Fail
	Humidity (%):	45		
	Atmospheric(mbar):	1021		
Mains Power:	220VAC, 60Hz			
Tested by:	Rachana Khanduri			
Test Date:	05/23/2018			
Remarks	Conducted @ Live			

Live Plot at 220VAC, 60Hz



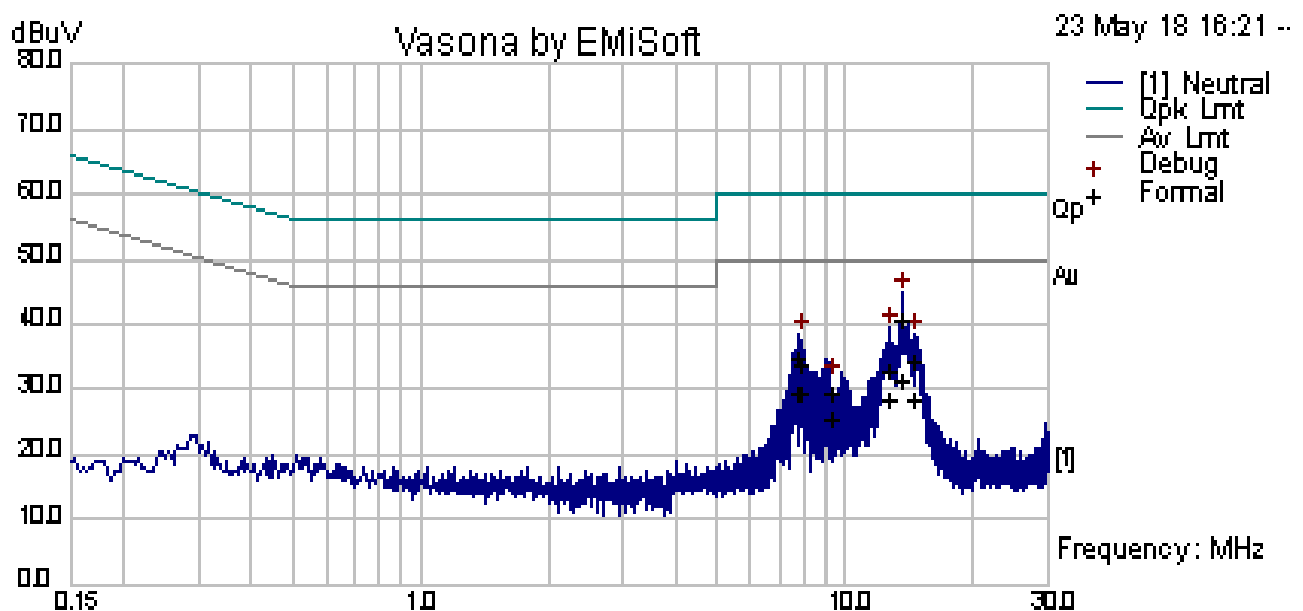
Line Measurement at 220VAC, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line / Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
13.56	33.01	9.38	0.33	42.72	Quasi Peak	Live	60.00	-17.28	Pass
12.75	24.12	9.37	0.30	33.79	Quasi Peak	Live	60.00	-26.21	Pass
7.87	23.97	9.35	0.15	33.47	Quasi Peak	Live	60.00	-26.53	Pass
15.06	22.94	9.40	0.36	32.70	Quasi Peak	Live	60.00	-27.30	Pass
9.26	19.84	9.36	0.20	29.40	Quasi Peak	Live	60.00	-30.60	Pass
10.02	18.75	9.36	0.22	28.33	Quasi Peak	Live	60.00	-31.67	Pass
13.56	22.17	9.38	0.33	31.87	Average	Live	50.00	-18.13	Pass
12.75	21.19	9.37	0.30	30.86	Average	Live	50.00	-19.14	Pass
7.87	19.12	9.35	0.15	28.62	Average	Live	50.00	-21.38	Pass
15.06	18.58	9.40	0.36	28.34	Average	Live	50.00	-21.66	Pass
9.26	15.82	9.36	0.20	25.37	Average	Live	50.00	-24.63	Pass
10.02	14.10	9.36	0.22	23.68	Average	Live	50.00	-26.32	Pass

Conducted Emission Test Results

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	22	Result:	☒ Pass ☐ Fail
	Humidity (%):	45		
	Atmospheric(mbar):	1021		
Mains Power:	220VAC, 60Hz			
Tested by:	Rachana Khanduri			
Test Date:	05/23/2018			
Remarks	conducted @ Neutral			

Neutral Plot at 220VAC, 60Hz

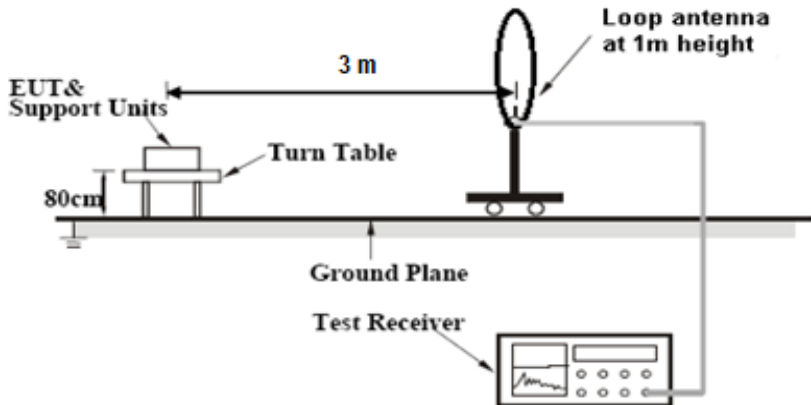


Neutral Measurement at 220VAC, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line / Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
13.56	31.13	9.38	0.33	40.83	Quasi Peak	Neutral	60.00	-19.17	Pass
12.78	22.96	9.37	0.30	32.63	Quasi Peak	Neutral	60.00	-27.37	Pass
7.80	25.24	9.35	0.14	34.74	Quasi Peak	Neutral	60.00	-25.26	Pass
7.83	24.48	9.35	0.14	33.98	Quasi Peak	Neutral	60.00	-26.02	Pass
14.48	24.39	9.39	0.35	34.13	Quasi Peak	Neutral	60.00	-25.87	Pass
9.26	19.75	9.36	0.20	29.30	Quasi Peak	Neutral	60.00	-30.70	Pass
13.56	21.65	9.38	0.33	31.36	Average	Neutral	50.00	-18.64	Pass
12.78	18.71	9.37	0.30	28.38	Average	Neutral	50.00	-21.62	Pass
7.80	20.08	9.35	0.14	29.58	Average	Neutral	50.00	-20.42	Pass
7.83	19.99	9.35	0.14	29.48	Average	Neutral	50.00	-20.52	Pass
14.48	18.69	9.39	0.35	28.43	Average	Neutral	50.00	-21.57	Pass
9.26	15.89	9.36	0.20	25.45	Average	Neutral	50.00	-24.55	Pass

10.3 Fundamental Field Strength Test Result

Requirement(s):

Spec	Item	Requirement	Applicable
LP0002: 2018, 3.2.1.1	1	Fundamental Emission ---The field strength of any emissions within 13.553MHz – 13.567MHz operating band shall be less than or equal 15848 microvolts/meter at 30 meters. 15848microvolts/meter = 84 dBuV/m Limit at 3meters is 84 dBuV/m + 40 log (30m/3m) = 124 dBuV/m	☒
LP0002:2018, 3.2.1.2	-	Unwanted Emission : The field strength of unwanted emissions shall not exceed the general radiated emission limits in Section 2.8	☒
Test Setup			
Procedure	For < 30MHz, Radiated emissions were measured according to ANSI C63.4. The EUT was set to transmit at the highest output power. The EUT was set 3 meter away from the measuring antenna. The loop antenna was positioned 1 meter above the ground from the centre of the loop. The measuring bandwidth was set to 10 kHz. (Note: During testing the receive antenna was rotated about its axis to maximize the emission from the EUT.) The limit is converted from microvolt/meter to decibel microvolt/meter.		
Remark	None		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test was done by Rachana Khanduri at 10-meter chamber.

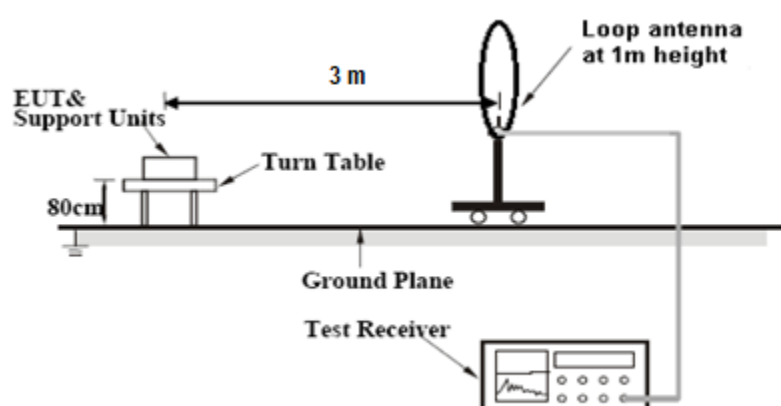
Field Strength Test Result

Test specification:	LP0002:2018			
Environmental Conditions:	Temp(°C):	22	Result:	☒ Pass ☐ Fail
	Humidity (%):	48		
	Atmospheric(mbar):	1008		
Mains Power:	220VAC, 60Hz			
Test Date:	Rachana Khanduri			
Tested by:	05/29/2018			
Remarks:	Cont-TX			

Index	Frequency (MHz)	Antenna Deg	Measured (dBuV/m) @3m	Limit (dBuV/m) @3m	Result
1	13.56	0deg	62.26	124	Pass
2	13.56	90deg	57.08		

10.4 Radiated Measurement below 30MHz

Requirement(s):

Spec	Item	Requirement	Applicable																								
LP0002:2018 3.2.1.2	-	Unwanted Emission : The field strength of unwanted emissions shall not exceed the general radiated emission limits in Section 2.8. <table><thead><tr><th>Frequency (MHz)</th><th>Field strength (micro-volts/meter)</th><th>Measurement distance (meters)</th></tr></thead><tbody><tr><td>0.009 - 0.490 (included)</td><td>2,400/Freq.(kHz)</td><td>300</td></tr><tr><td>0.490 (excluded) - 1.705 (included)</td><td>24,000/Freq.(kHz)</td><td>30</td></tr><tr><td>1.705 (excluded) - 30 (excluded)</td><td>30</td><td>30</td></tr><tr><td>30 (included) - 88 (included)</td><td>100</td><td>3</td></tr><tr><td>88 (excluded) -216 (included)</td><td>150</td><td>3</td></tr><tr><td>216 (excluded) -960 (included)</td><td>200</td><td>3</td></tr><tr><td>above 960 (excluded)</td><td>500</td><td>3</td></tr></tbody></table>	Frequency (MHz)	Field strength (micro-volts/meter)	Measurement distance (meters)	0.009 - 0.490 (included)	2,400/Freq.(kHz)	300	0.490 (excluded) - 1.705 (included)	24,000/Freq.(kHz)	30	1.705 (excluded) - 30 (excluded)	30	30	30 (included) - 88 (included)	100	3	88 (excluded) -216 (included)	150	3	216 (excluded) -960 (included)	200	3	above 960 (excluded)	500	3	☒
Frequency (MHz)	Field strength (micro-volts/meter)	Measurement distance (meters)																									
0.009 - 0.490 (included)	2,400/Freq.(kHz)	300																									
0.490 (excluded) - 1.705 (included)	24,000/Freq.(kHz)	30																									
1.705 (excluded) - 30 (excluded)	30	30																									
30 (included) - 88 (included)	100	3																									
88 (excluded) -216 (included)	150	3																									
216 (excluded) -960 (included)	200	3																									
above 960 (excluded)	500	3																									
Test Setup																											
Procedure	For < 30MHz, Radiated emissions were measured according to ANSI C63.4. The EUT was set to transmit at the highest output power. The EUT was set 3 meters away from the measuring antenna. The loop antenna was positioned 1 meter above the ground from the center of the loop. The measuring bandwidth was set to 10 kHz. The limit is converted from microvolt/meter to decibel microvolt/meter.																										
Remark	-																										
Result	☒ Pass ☐ Fail																										

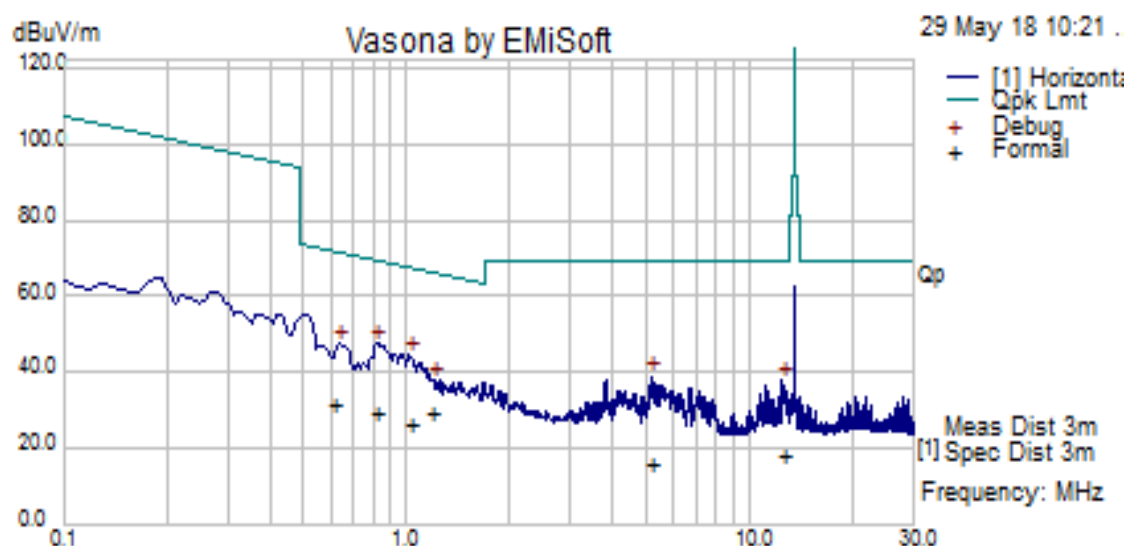
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Rachana Khanduri at 10-meter chamber.

Radiated Emission Test Results (Below 30MHz)

Test specification:	Radiated Spurious Emissions		
Mains Power:	220VAC, 60Hz	Result:	☒ Pass ☐ Fail
Tested by:	Rachana Khanduri		
Test Date:	05/29/2018		
Remarks:	f= 100kHz – 30MHz plot, and loop antenna at 0 degree		

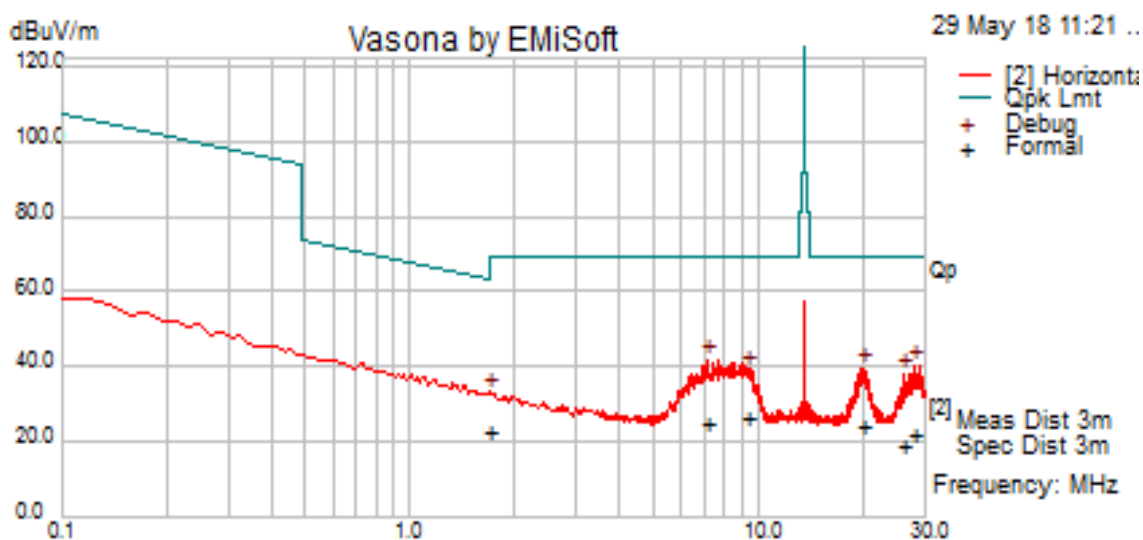


Quasi Max Measurement

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol (0/90)	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
0.81	4.37	10	14.49	28.85	Quasi Max	0	100	276	69.45	-40.6	Pass
1.03	3.94	10	12.57	26.51	Quasi Max	0	100	183	67.36	-40.85	Pass
0.62	4.65	10	16.68	31.33	Quasi Max	0	100	339	71.81	-40.49	Pass
1.19	7.36	10	11.48	28.84	Quasi Max	0	100	21	66.13	-37.28	Pass
5.19	4.27	10	1.85	16.12	Quasi Max	0	100	348	69.54	-53.42	Pass
12.48	5.66	10.82	1.62	18.1	Quasi Max	0	100	253	69.54	-51.44	Pass

Note: Emissions were scanned between 9 KHz- 100 KHz; no emissions were detected above the noise floor which was at least 20 dB below the specification limit. The results above show only the worst case.

Test specification:	Radiated Spurious Emissions		
Mains Power:	220VAC, 60Hz	Result:	☒ Pass ☐ Fail
Tested by:	Rachana Khanduri		
Test Date:	05/29/2018		
Remarks:	f= 100kHz – 30MHz plot, and loop antenna at 90 degree		



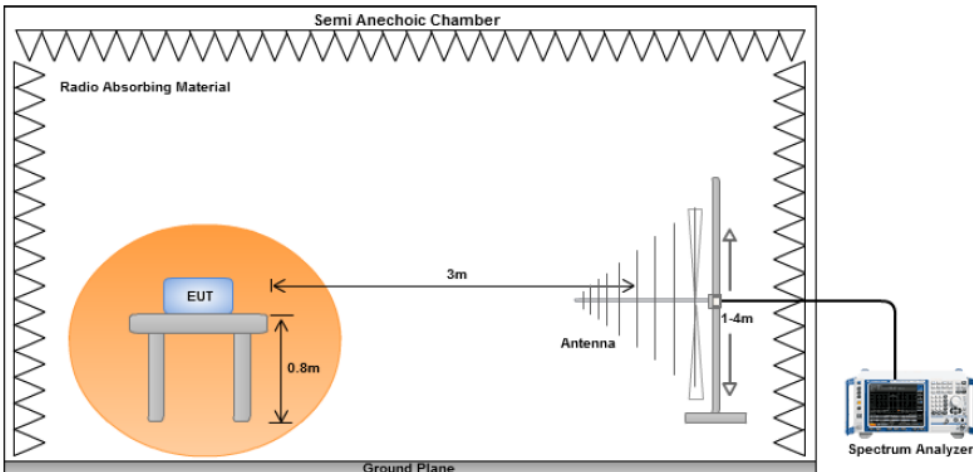
Quasi Max Measurement

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol (0/90)	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
7.12	12.67	10.00	2.12	24.79	Quasi Max	90	100	22	69.54	-44.75	Pass
28.10	10.38	11.09	0.59	22.06	Quasi Max	90	100	161	69.54	-47.48	Pass
1.68	3.32	10.00	8.84	22.16	Quasi Max	90	100	299	63.12	-40.95	Pass
19.99	12.15	10.95	0.93	24.03	Quasi Max	90	100	268	69.54	-45.51	Pass
9.20	14.69	10.00	1.55	26.24	Quasi Max	90	100	312	69.54	-43.30	Pass
26.17	6.46	11.05	1.39	18.9	Quasi Max	90	100	318	69.54	-50.64	Pass

Note: Emissions were scanned between 9 KHz- 100 KHz; no emissions were detected above the noise floor which was at least 20 dB below the specification limit. The results above show only the worst case.

10.5 Radiated Emissions below 1GHz

Requirement(s):

Spec	Item	Requirement	Applicable																								
LP0002:2018 3.2.1.2	-	Unwanted Emission : The field strength of unwanted emissions shall not exceed the general radiated emission limits in Section 2.8.	☒																								
		<table><tr><th>Frequency (MHz)</th><th>Field strength (micro-volts/meter)</th><th>Measurement distance (meters)</th></tr><tr><td>0.009 - 0.490 (included)</td><td>2,400/Freq.(kHz)</td><td>300</td></tr><tr><td>0.490 (excluded) - 1.705 (included)</td><td>24,000/Freq.(kHz)</td><td>30</td></tr><tr><td>1.705 (excluded) - 30 (excluded)</td><td>30</td><td>30</td></tr><tr><td>30 (included) - 88 (included)</td><td>100</td><td>3</td></tr><tr><td>88 (excluded) -216 (included)</td><td>150</td><td>3</td></tr><tr><td>216 (excluded) -960 (included)</td><td>200</td><td>3</td></tr><tr><td>above 960 (excluded)</td><td>500</td><td>3</td></tr></table>	Frequency (MHz)	Field strength (micro-volts/meter)	Measurement distance (meters)	0.009 - 0.490 (included)	2,400/Freq.(kHz)	300	0.490 (excluded) - 1.705 (included)	24,000/Freq.(kHz)	30	1.705 (excluded) - 30 (excluded)	30	30	30 (included) - 88 (included)	100	3	88 (excluded) -216 (included)	150	3	216 (excluded) -960 (included)	200	3	above 960 (excluded)	500	3	
		Frequency (MHz)	Field strength (micro-volts/meter)	Measurement distance (meters)																							
		0.009 - 0.490 (included)	2,400/Freq.(kHz)	300																							
		0.490 (excluded) - 1.705 (included)	24,000/Freq.(kHz)	30																							
		1.705 (excluded) - 30 (excluded)	30	30																							
		30 (included) - 88 (included)	100	3																							
		88 (excluded) -216 (included)	150	3																							
		216 (excluded) -960 (included)	200	3																							
above 960 (excluded)	500	3																									
Test Setup																											
		Procedure	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.																								
			Remark	-																							
			Result	☒ Pass ☐ Fail																							

Test Data ☒ Yes (See below) ☐ N/A

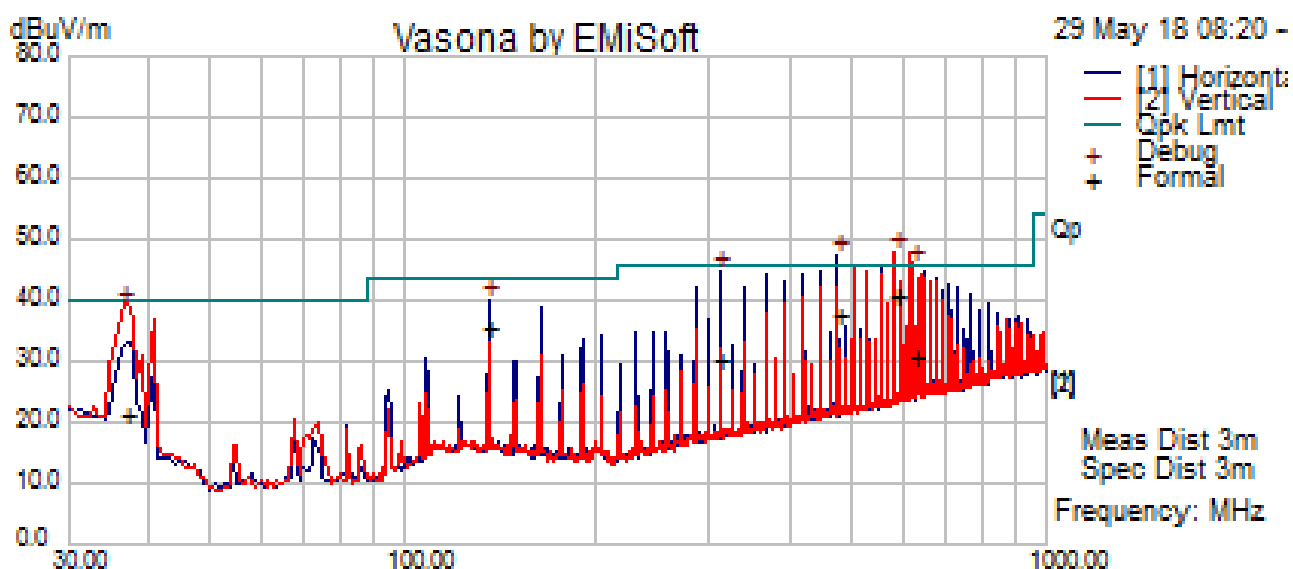
Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Rachana Khanduri at 10-meter chamber.

Radiated Emission Test Results (Below 1GHz)

Test specification:	Radiated Emissions		
Mains Power:	220VAC, 60Hz	Result:	☒ Pass ☐ Fail
Tested by:	Rachana Khanduri		
Test Date:	05/29/2018		
Remarks:	30MHz – 1000MHz plot at 3 meter distance		

$f=30\text{MHz} - 1000\text{MHz}$ plot and 3 meter distance



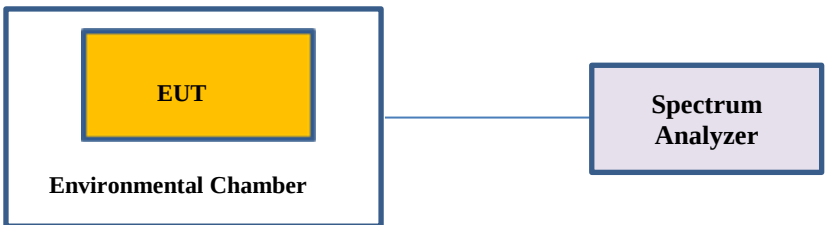
$f=30\text{MHz} - 1000\text{MHz}$ Measurements

Frequency MHz	Raw dBuV/m	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
582.97	44.00	14.65	-17.54	41.11	Quasi Max	V	162	327	46	-4.89	Pass
474.51	42.30	14.2	-18.85	37.66	Quasi Max	H	144	41	46	-8.34	Pass
623.64	33.18	14.57	-16.83	30.92	Quasi Max	V	212	121	46	-15.08	Pass
36.80	29.12	11.24	-18.82	21.53	Quasi Max	V	141	169	40	-18.47	Pass
311.82	39.65	13.29	-22.73	30.21	Quasi Max	H	121	174	46	-15.79	Pass
135.58	46.71	12.19	-23.26	35.64	Quasi Max	H	185	68	43.5	-7.86	Pass

Note: The results above show only the worst case.

10.6 Frequency Tolerance

Requirement(s):

Spec	Item	Requirement	Applicable
LP0002: 2018, 3.2.1.3	a)	The frequency tolerance of the carrier shall be $\pm 0.01\%$. This frequency tolerance shall be maintained for a temperature variation of -20 to +50°C at normal supply voltage, and for a variation in the primary supply voltage within $\pm 15\%$ of the rated supply voltage at a temperature of 20°C. For battery operated equipment, the equipment tests shall be performed using a new battery and shall conform to the requirements set forth in section 5.18.	☒
Test Setup	 - The EUT was set up inside an environmental chamber. - The EUT was placed in the centre of the environmental.		
Procedure	- The EUT was switched on and allowed to warm up to its normal operating condition. - To measure conducted, a SMA cable was used to replace the EUT antenna. To measure radiated, an external antenna was used to detect EUT transmission signal. - Measurement of the frequency of EUT transmission signal and make record.		
Remark	None		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test was done by Rachana Khanduri at RF test site.

Test Result for 13.56MHz Radio

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

Reference Frequency: 13.56 MHz

Temperature ($^{\circ}\text{C}$)	Measured Freq. (MHz)	Freq. Drift (Hz)	Freq. Deviation(Hz) (Limit: $\pm 0.01\%$)	Pass/Fail
50	13.56045	450	± 1356	Pass
40	13.56045	450	± 1356	Pass
30	13.56045	450	± 1356	Pass
20	13.56045	450	± 1356	Pass
10	13.56045	450	± 1356	Pass
0	13.56031	310	± 1356	Pass
-10	13.56031	310	± 1356	Pass
-20	13.56031	310	± 1356	Pass

Frequency Stability versus Input Voltage: The frequency tolerance of the carrier shall be $\pm 0.01\%$. This frequency tolerance shall be maintained for a variation in the primary supply voltage within $\pm 15\%$ of the rated supply voltage at a temperature of 20°C .

Carrier Frequency: 13.56 MHz at 20°C at 220 VDC

Measured Voltage $\pm 15\%$ of nominal (DC)	Measured Freq. (MHz)	Freq. Drift (Hz)	Freq. Deviation(Hz) (Limit: 0.01%)	Pass/Fail
187	13.56045	450	± 1356	Pass
253	13.56045	450	± 1356	Pass

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Radiated Emissions						
Keysight EXA 44GHz Spectrum Analyzer	N9030B(PXA)	MY57140374	09/06/2017	1 Year	09/06/2018	☒
Pre-Amplifier (1-26.5GHz)	8449B	3008A00715	08/16/2017	1 Year	08/16/2018	☒
RF Preamplifier (100KHz-7GHz)	LPA-6-30	11170601	07/21/2017	1 Year	07/21/2018	☒
ETS-Lingren Loop Antenna	6512	00049120	08/20/2016	1 Year	08/20/2018	☒
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	03/09/2018	2 Year	03/09/2020	☒
RF Conducted Measurement						
Agilent Spectrum Analyzer	N9010A	10SL0219	11/16/2017	1 Year	11/16/2018	☒
Test Equity Environment Chamber	1007H	61201	11/08/2017	1 Year	11/08/2018	☒

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
HongKong 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 EMIEMS: KCC Notice 2008-38, RRL Notice 2008-4: CA Procedures for EMS KN24, KN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11: Test Method for EMS Radio: RRL Notice 2008-26, RRL Notice 2008-2, RRL Notice 2008-10, RRL Notice 2007-49, RRL Notice 2007-20, RRL Notice 2007-21, RRL Notice 2007-80, RRL Notice 2004-68 Telecom: President Notice 20664, RRL Notice 2007-30, RRL Notice 2008-7 with attachments 1, 3, 5, 6; President Notice 20664, RRL Notice 2008-7 with attachment 4
Taiwan NCC CAB Recognition		LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08
Taiwan BSMI CAB Recognition		CNS 13438
Japan VCCI		R-3083: Radiation 3 meter site C-3421: Main Ports Conducted Interference Measurement T-1597: Telecommunication Ports Conducted Interference Measurement
Australia CAB Recognition		EMC: AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4 Radiocommunications: AS/NZS 4281, AS/NZS 4268, AS/NZS 4280.1, AS/NZS 4280.2, AS/NZS 4295, AS/NZS 4582, AS/NZS 4583, AS/NZS 4769.1, AS/NZS 4769.2, AS/NZS 4770, AS/NZS 4771 Telecommunications: AS/ACIF S002:05, AS/ACIF S003:06, AS/ACIF S004:06, AS/ACIF S006:01, AS/ACIF S016:01, AS/ACIF S031:01, AS/ACIF S038:01, AS/ACIF S040:01, AS/ACIF S041:05, AS/ACIF S043.2:06, AS/ACIF S60950.1
Australia NATA Recognition		AS/ACIF S002, AS/ACIF S003, AS/ACIF S004, AS/ACIF S006, AS/ACIF S016, AS/ACIF S031, AS/ACIF S038, AS/ACIF S040, AS/ACIF S041, AS/ACIF S043.2