RF TEST REPORT

SIEMIC
A Bureau Veritas Group Company

Report No.: FCC_IC_RF_SL19011001-SEV-006_DTS
Supersede Report No.:

Applicant	:	ChargePoint, Inc.
Product Name	:	Network Communication
Model No.	:	28010161
Test Standard	:	47 CFR 15.247 RSS-247 Issue 2, Feb 2017
Test Method	:	ANSI C63.10: 2013 RSS-Gen Issue 5, April 2018 558074 D01 DTS Meas Guidance v05
FCC ID	:	W38-28010161
IC ID	:	8854A- 28010161
Dates of test	:	01/17/2019 – 01/30/2019
Issue Date	:	01/30/2019
Test Result	:	☒ Pass ☐ Fail
Equipment complied with the specification [X] Equipment did not comply with the specification [ ]		

This Test Report is Issued Under the Authority of:	
Gary Chou	
Gary Chou	**Chen Ge**
Compliance Engineer	Engineer Reviewer

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

ilac-MRA
A2LA ACCREDITED
TESTING CERT # 2742-01

Laboratory Introduction

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

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

Accreditations for Conformity Assessment

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

Accreditations for Product Certifications

Country	Accreditation Body	Scope
USA	FCC TCB, NIST	EMC, RF, Telecom
Canada	IC FCB, NIST	EMC, RF, Telecom
Singapore	iDA, NIST	EMC, RF, Telecom
EU	NB	EMC & Radio Equipment Directive (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
FCC_IC_RF_SL19011001-SEV-006_DTS	None	Original	01/29/2019

2 Executive Summary

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

Company: ChargePoint, Inc.
Product Name: Network Communication
Model No.: 28010161

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	ChargePoint, Inc.
Applicant Address	254 E. Hacienda Ave Campbell, CA 95148
Manufacturer Name	ChargePoint, Inc.
Manufacturer Address	254 E. Hacienda Ave Campbell, CA 95148

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	Network Communication
Model No.	28010161
Trade Name	ChargePoint
Serial No.	N/A
Input Power	5Vdc
Radio Hardware version	27-010077
Radio Software version	4.0.0.41
Date of EUT received	01/17/2019
Equipment Class/ Category	DTS
Port/Connectors	N/A
Remark	None

6.2 Radio Description

Radio Type	802.11b	802.11g	802.11n-20M
Operating Frequency	2412-2462MHz	2412-2462MHz	2412-2462MHz
Modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)
Channel Spacing	5MHz	5MHz	5MHz
Number of Channels	11	11	11
Antenna Type	PIFA		
Antenna Gain (Peak)	2.5 dBi (for 2.4GHz)		
Note	2.4GHz and 5GHz Radio does not transmit simultaneously		

EUT Power level setting

Mode	Frequency (MHz)	Power setting
802.11-b	2412	20
802.11-b	2437	20
802.11-b	2462	20
802.11-g	2412	20
802.11-g	2437	20
802.11-g	2462	20
802.11-n-20	2412	20
802.11-n-20	2437	20
802.11-n-20	2462	20

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	Laptop	Latitude E6510	N/A	Dell	-

7.2 Cabling Description

Name	Connection Start		Connection Stop		Length / shielding Info		Note
	From	I/O Port	To	I/O Port	Length (m)	Shielding	
Serial to USB	Serial	EUT	USB	Laptop	10	Unshielded	-

7.3 Test Software Description

Test Item	Software	Description
RF Testing	Putty	Set the EUT to transmit continuously in diferent test mode

8 Test Summary

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Antenna Requirement	FCC	15.203	FCC	ANSI C63.10 – 2013 558074 D01 DTS Meas Guidance v05	☒ Pass ☐ N/A
	IC	-	IC		
Restricted Band of Operation	FCC	15.205	FCC	ANSI C63.10:2013 558074 D01 DTS Meas Guidance v05	☒ Pass* ☐ N/A
	IC	RSS Gen 8.10	IC		
AC Conducted Emissions	FCC	15.207(a)	FCC	ANSI C63.10:2013	☒ Pass* ☐ N/A
	IC	RSS Gen 8.8	IC	RSS Gen Issue 5: 2018	

DTS Band Requirement

Test Item	Test standard		Test Method/Procedure		Pass / Fail
99% Occupied Bandwidth	-	-	-	-	☒ Pass* ☐ N/A
	IC	RSS Gen 6.6	IC	RSS Gen Issue 5: 2018	
6dB Bandwidth	FCC	15.247(a)(2)	FCC	558074 D01 DTS Meas Guidance v05	☒ Pass* ☐ N/A
	IC	RSS247 (5.2.1)	IC		
Band Edge and Radiated Spurious Emissions	FCC	15.247(d)	FCC	ANSI C63.10:2013 558074 D01 DTS Meas Guidance v05	☒ Pass ☐ N/A
	IC	RSS247 (5.5)	IC		
Output Power	FCC	15.247(b)	FCC	558074 D01 DTS Meas Guidance v05	☒ Pass** ☐ N/A
	IC	RSS247 (5.4.4)	IC		
Receiver Spurious Emissions	IC	RSS Gen (4.8)	IC	RSS Gen Issue 5: 2018	☐ Pass ☒ N/A
Antenna Gain > 6 dBi	FCC	15.247(e)	FCC	-	☐ Pass ☒ N/A
	IC	-	IC	-	
Power Spectral Density	FCC	15.247(e)	FCC	558074 D01 DTS Meas Guidance v05	☒ Pass* ☐ N/A
	IC	RSS247 (5.2.2)	IC		
RF Exposure requirement	FCC	15.247(i)	FCC	-	☐ Pass ☒ N/A
	IC	RSS Gen(5.5)	IC	RSS Gen Issue 5: 2018	

Remark	1. All measurement uncertainties do not take into consideration for all presented test results. 2. The applicant shall ensure frequency stability by showing that an emission is maintained within the band of operation under all normal operating conditions as specified in the user's manual. 3. Pass** Output Power Verification 4. Pass* : Please refer to test report nomber FCC_IC_RF_SL15060501-CPC-006_DTS_2.4G FCC ID: W38-28010077 , IC: 8854A-28010077

9 Measurement Uncertainty

9.1 Conducted Emissions

The test is to measure the conducted emissions to the mains port of the EUT.
Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the LISN
- Uncertainty of cables
- Uncertainty due to the mismatches
- Etc, see the below table for details

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Filter Insertion Loss	0.25	Normal	2	1	0.125
LISN Insertion Loss	0.40	Normal	2	1	0.20
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.86605081
PRF Response	1.5	Rectangular	1.732	1	0.86605081
Mismatch LISN - Receiver	0.25	U-Shape	1.414	1	0.1768033
LISN Impedance	2.5	Triangular	2.449	1	1.0208248
Combined Standard Uncertainty					1.928133
Expanded Uncertainty (K=2)					**3.856266**

The total derived measurement uncertainty is +/- 3.86 dB.

9.2 Radiated Emissions (30MHz to 1GHz)

The test is to measure the radiated emissions of the EUT.
Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- NSA Calibration
- Etc., details see the below table

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Filter Insertion Loss	0.25	Normal	2	1	0.125
Antenna Factor	0.65	Normal	2	1	0.325
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.86605081
PRF Response	1.5	Rectangular	1.732	1	0.86605081
Mismatch Filter - Receiver	0.25	U-Shape	1.414	1	0.1768033
NSA Calibration	4.0	U-Shape	1.414	1	2.8288543
Combined Standard Uncertainty					3.0059131
Expanded Uncertainty (K=2)					**6.0118262**

The total derived measurement uncertainty is +/- 6.00 dB.

9.3 Radiated Emissions (1GHz to 40GHz)

The test is to measure the radiated emissions of the EUT.

Some error sources that can contribute to the total uncertainty:
- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- VSWR Calibration
- Etc., details see the below table

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.0692840
Cable Insertion Loss	0.21	Normal	2	1	0.1050000
Filter Insertion Loss	0.25	Normal	2	1	0.1250000
Antenna Factor	0.65	Normal	2	1	0.3250000
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.8660508
PRF Response	1.5	Rectangular	1.732	1	0.8660508
Mismatch Filter - Receiver	0.25	U-Shape	1.414	1	0.1768033
VSWR Calibration	2.0	U-Shape	1.414	1	1.4144272
Combined Standard Uncertainty					4.2363
Expanded Uncertainty (K=2)					**8.4726**

The total derived measurement uncertainty is +/- 8.47 dB.

9.4 RF conducted measurement

The test is to measure the RF output power from the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the Reference Level Uncertainty
- Uncertainty of variable attenuators
- Uncertainty of cables
- Uncertainty due to the mismatches

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Reference Level	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Attenuator	0.25	Normal	2	1	0.125
Mismatch	0.25	U-Shape	1.414	1	0.1768033
Combined Standard Uncertainty					0.476087
Expanded Uncertainty (K=2)					**0.952174**

The total derived measurement uncertainty is +/- 0.95 dB.

10 Measurements, Examination and Derived Results

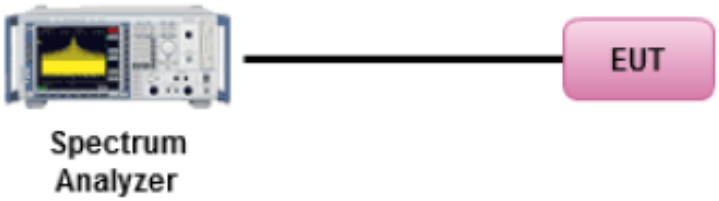
10.1 Antenna Requirement

Spec	Requirement	Applicable
§15.203	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. Antenna requirement must meet at least one of the following: a) Antenna must be permanently attached to the device. b) The antenna must use a unique type of connector to attach to the device. c) Device must be professionally installed. The installer shall be responsible for ensuring that the correct antenna is employed by the device.	☒
Remark	Antenna is permanently attached to the device.	
Result	☒ PASS ☐ FAIL	

10.2 Output Power

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247 RSS247 (5.4)	1	For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power.	☒

Test Setup				
Test Procedure	558074 D01 DTS Meas Guidance v04, 9.1.1 Measurement using a Spectrum Analyzer (SA) This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth. (a) Set the RBW ≥ DTS bandwidth. (b) Set VBW ≥ 3 RBW. (c) Set span ≥ 3 RBW (d) Sweep time = auto couple. (e) Detector = peak. (f) Trace mode = max hold. (g) Allow trace to fully stabilize (h) Use peak marker function to determine the peak amplitude level.			
Test Date	1/18/2019	Environmental condition	Temperature Relative Humidity Atmospheric Pressure	23°C 44% 1021mbar
Remark	NONE			
Result	☒ Pass ☐ Fail			

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

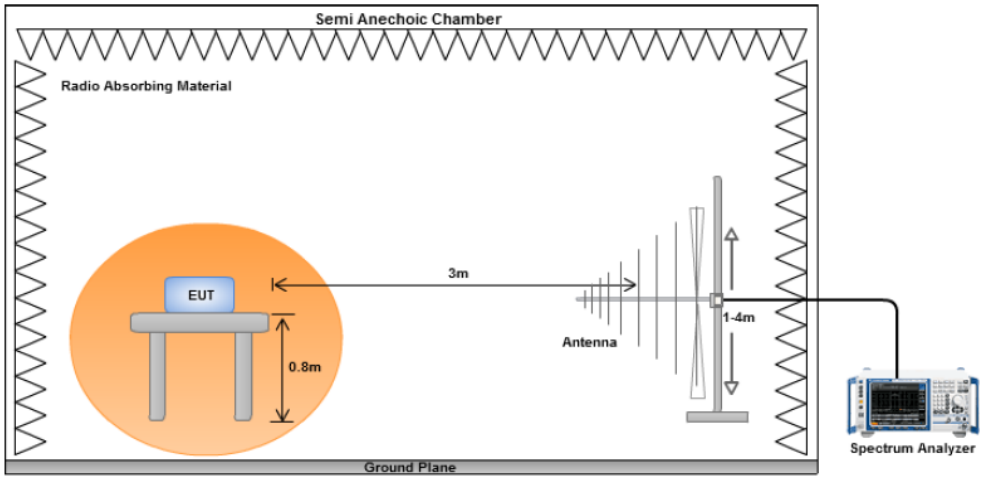
Verification Test was done by Gary Chou at RF test site.

Output Power measurement result

Type	Test mode	Freq (MHz)	CH	Output Power (dBm)	Limit (dBm)	Result
Conducted	802.11b	2412	Low	15.16	30	Pass
Conducted	802.11b	2437	Mid	15.25	30	Pass
Conducted	802.11b	2462	High	15.34	30	Pass
Conducted	802.11g	2412	Low	12.29	30	Pass
Conducted	802.11g	2437	Mid	12.16	30	Pass
Conducted	802.11g	2462	High	12.37	30	Pass
Conducted	802.11n-20M	2412	Low	11.33	30	Pass
Conducted	802.11n-20M	2437	Mid	11.02	30	Pass
Conducted	802.11n-20M	2462	High	11.61	30	Pass

10.3 Radiated Spurious Emissions below 1GHz

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.247(d)
RSS247 (5.5)</td><td>a)</td><td>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges
<table>
<tr><th>Frequency range (MHz)</th><th>Field Strength (uV/m)</th></tr>
<tr><td>30 – 88</td><td>100</td></tr>
<tr><td>88 – 216</td><td>150</td></tr>
<tr><td>216 960</td><td>200</td></tr>
<tr><td>Above 960</td><td>500</td></tr>
</table></td><td>☒</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 
</td></tr>
<tr><td>Procedure</td><td colspan="3">1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
b. The EUT was then rotated to the direction that gave the maximum emission.
c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
3. A Quasi-peak measurement was then made for that frequency point.
4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</td></tr>
<tr><td>Remark</td><td colspan="3">The EUT was scanned up to 1GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.</td></tr>
<tr><td>Result</td><td colspan="3">☒ Pass ☐ Fail</td></tr>
</table>

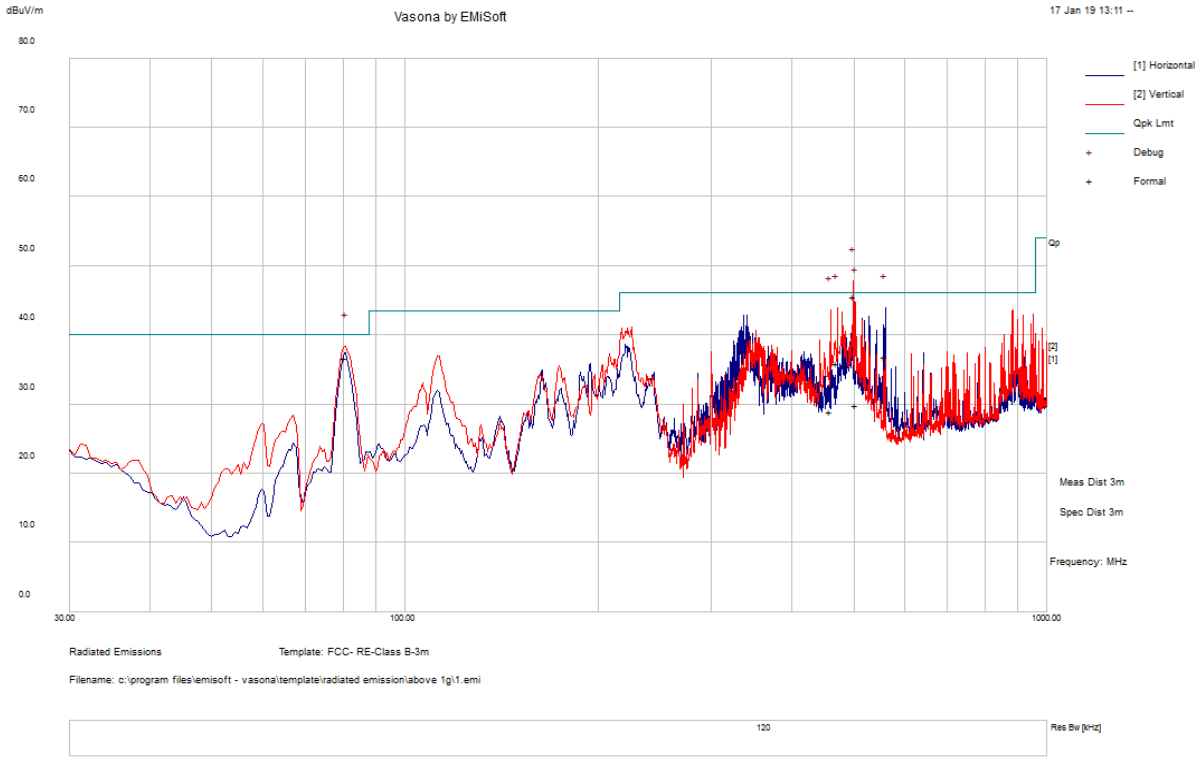
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Gary Chou at 10m chamber.

Radiated Emission Test Results (Below 1GHz)

Test specification	Below 1GHz			
Environmental Conditions:	Temp (°C):	23	Result	Pass
	Humidity (%)	46		
	Atmospheric (mbar):	1018		
Mains Power:	120VAC, 60Hz			
Tested by:	Gary Chou			
Test Date:	01/17/2019			
Remarks:	TX MODE 2437 MHz			



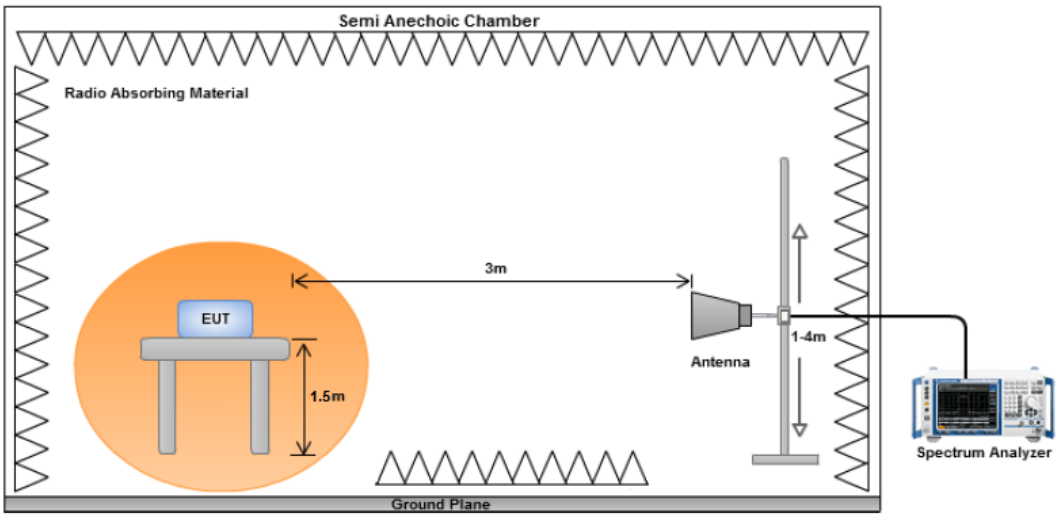
Quasi Max Measurements

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol (V/H)	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
500.004688	47.23	14.17	-18.27	43.13	Quasi Max	V	132	222	46	-2.87	Pass
503.399688	33.89	14.17	-18.15	29.91	Quasi Max	V	152	350	46	-16.09	Pass
80.7075	52.82	11.68	-27.74	36.76	Quasi Max	V	129	277	40	-3.24	Pass
471.319688	40.51	14.18	-18.67	36.02	Quasi Max	V	104	12	46	-9.98	Pass
559.93375	39.75	14.47	-17.32	36.9	Quasi Max	H	101	340	46	-9.1	Pass
459.949688	33.73	14.11	-18.89	28.95	Quasi Max	V	170	243	46	-17.06	Pass

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

10.4 Radiated Spurious Emissions between 1GHz – 25GHz

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR§15.247(d), RSS247(A8.5)	a)	For non-restricted band, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209(a) is not required ☐ 20 dB down ☒ 30 dB down	☒
	b)	or restricted band, emission must also comply with the radiated emission limits specified in 15.209	☒
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. An average measurement was then made for that frequency point. 4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.		
Remark	The EUT was scanned up to 40GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test was done by Gary Chou at 10m chamber.

Radiated Emission Test Results (Above 1GHz)

Above 1GHz-25GHz – 802.11b – 2412MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol (V/H)	Height cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
4824.07	50.43	4.12	-0.93	53.62	Peak Max	V	119	89	74	-20.38	Pass
1530.64	41.52	2.37	-6.33	37.56	Peak Max	H	180	53	74	-36.44	Pass
17863.59	34.64	8.02	8.53	51.19	Peak Max	V	164	209	74	-22.81	Pass
4824.07	46.18	4.12	-0.93	49.37	Average Max	V	119	89	54	-4.63	Pass
1530.64	28.35	2.37	-6.33	24.39	Average Max	H	180	53	54	-29.61	Pass
17863.59	22.39	8.02	8.53	38.94	Average Max	V	164	209	54	-15.06	Pass

Above 1GHz-25GHz- 802.11b - 2437MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol (V/H)	Height cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
17956.26	39.24	7.91	8.71	55.86	Peak Max	H	199	15	74	-18.14	Pass
1529.68	41.15	2.37	-6.34	37.18	Peak Max	V	300	212	74	-36.82	Pass
4879.09	40.43	4.18	-0.99	43.62	Peak Max	V	253	60	74	-30.38	Pass
17956.26	26.28	7.91	8.71	42.9	Average Max	H	199	15	54	-11.1	Pass
1529.68	30.51	2.37	-6.34	26.54	Average Max	V	300	212	54	-27.46	Pass
4879.09	27.39	4.18	-0.99	30.58	Average Max	V	253	60	54	-23.42	Pass

Above 1GHz-25GHz – 802.11b – 2462MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol (V/H)	Height cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
17565.68	38.41	8.24	7.84	54.49	Peak Max	V	345	346	74	-19.51	Pass
4924.4	40.27	4.17	-0.99	43.45	Peak Max	V	195	230	74	-30.55	Pass
7387.42	39.18	5.14	-0.51	43.81	Peak Max	V	238	169	74	-30.19	Pass
17565.68	26.43	8.24	7.84	42.51	Average Max	V	345	346	54	-11.49	Pass
4924.4	26.52	4.17	-0.99	29.7	Average Max	V	195	230	54	-24.3	Pass
7387.42	26.18	5.14	-0.51	30.81	Average Max	V	238	169	54	-23.19	Pass

Above 1GHz-25GHz- 802.11g - 2412MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol (V/H)	Height cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
17436.26	39.29	8.22	7.54	55.05	Peak Max	V	191	29	74	-18.95	Pass
7237.65	38.34	5.16	-0.46	43.04	Peak Max	V	112	217	74	-30.96	Pass
4823.42	39.71	4.12	-0.93	42.9	Peak Max	V	267	18	74	-31.1	Pass
17436.26	26.29	8.22	7.54	42.05	Average Max	V	191	29	54	-11.95	Pass
7237.65	26.54	5.16	-0.46	31.24	Average Max	V	112	217	54	-22.76	Pass
4823.42	26.36	4.12	-0.93	29.55	Average Max	V	267	18	54	-24.45	Pass

Above 1GHz-25GHz – 802.11g – 2437MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol (V/H)	Height cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
17797.93	38.45	8.09	8.32	54.86	Peak Max	H	281	163	74	-19.14	Pass
7262.8	38.61	5.16	-0.47	43.3	Peak Max	V	210	219	74	-30.7	Pass
4823.97	38.39	4.12	-0.93	41.58	Peak Max	V	295	116	74	-32.42	Pass
17797.93	26.52	8.09	8.32	42.93	Average Max	H	281	163	54	-11.07	Pass
7262.8	26.41	5.16	-0.47	31.1	Average Max	V	210	219	54	-22.9	Pass
4823.97	26.29	4.12	-0.93	29.48	Average Max	V	295	116	54	-24.52	Pass

Above 1GHz-25GHz- 802.11g - 2462MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol (V/H)	Height cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
16890.48	37.37	8.1	6.67	52.14	Peak Max	V	177	93	74	-21.86	Pass
7387.89	38.64	5.14	-0.51	43.27	Peak Max	V	305	198	74	-30.73	Pass
4922.26	39.19	4.22	-1.04	42.37	Peak Max	V	310	188	74	-31.63	Pass
16890.48	25.73	8.1	6.67	40.5	Average Max	V	177	93	54	-13.5	Pass
7387.89	26.45	5.14	-0.51	31.08	Average Max	V	305	198	54	-22.92	Pass
4922.26	26.53	4.22	-1.04	29.71	Average Max	V	310	188	54	-24.29	Pass

Above 1GHz-25GHz- 802.11n20 - 2412MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol (V/H)	Height cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
17965.19	26.71	7.9	8.72	43.33	Average Max	H	214	313	54	-10.67	Pass
1530.15	28.28	2.37	-6.34	24.31	Average Max	H	159	285	54	-29.69	Pass
4826.06	26.43	4.13	-0.93	29.63	Average Max	V	201	350	54	-24.37	Pass
17965.19	39.67	7.9	8.72	56.29	Peak Max	H	214	313	74	-17.71	Pass
1530.15	41.15	2.37	-6.34	37.18	Peak Max	H	159	285	74	-36.82	Pass
4826.06	39.24	4.13	-0.93	42.44	Peak Max	V	201	350	74	-31.56	Pass

Above 1GHz-25GHz – 802.11n20 – 2437MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol (V/H)	Height cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
15850.66	38.56	7.79	5.75	52.1	Peak Max	V	117	188	74	-21.9	Pass
7315.05	38.42	5.15	-0.49	43.08	Peak Max	V	302	4	74	-30.92	Pass
4875.4	39.33	4.17	-0.99	42.51	Peak Max	V	138	158	74	-31.49	Pass
15850.66	26.42	7.79	5.75	39.96	Average Max	V	117	188	54	-14.04	Pass
7315.05	26.18	5.15	-0.49	30.84	Average Max	V	302	4	54	-23.16	Pass
4875.4	26.35	4.17	-0.99	29.53	Average Max	V	138	158	54	-24.47	Pass

Above 1GHz-25GHz- 802.11n20 - 2462MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol (V/H)	Height cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
17223.41	39.4	8.2	7.5	55.1	Peak Max	H	115	194	74	-18.9	Pass
7386.16	38.52	5.15	-0.49	43.18	Peak Max	H	281	260	74	-30.82	Pass
4923.96	39.64	4.18	-0.9	42.92	Peak Max	H	142	216	74	-31.08	Pass
17223.41	27.54	8.2	7.5	43.24	Average Max	H	115	194	54	-10.76	Pass
7386.16	26.76	5.15	-0.49	31.42	Average Max	H	281	260	54	-22.58	Pass
4923.96	26.81	4.18	-0.9	30.09	Average Max	H	142	216	54	-23.91	Pass

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

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	7/22/2018	1 Year	07/22/2019	☑
Keysight Signal Generator	MXG N5182A	MY47071065	04/12/2018	1 Year	04/12/2019	☐
Pre-Amplifier (1-26.5GHz)	8449B	3008A00715	05/16/2018	1 Year	05/16/2019	☑
RF Pre-Amplifier (9kHz - 6.5GHz)	LPA-6-30	11170601	02/06/2018	1 Year	02/06/2019	☑
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	03/09/2018	2 Year	03/09/2020	☑
Horn Antenna (1GHz~26GHz)	3117	214309	11/22/2017	1 Year	11/22/2019	☑

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 Equipment: EN45011:** EN ISO/IEC 17065
		Electromagnetic Compatibility: EN45011 – EN ISO/IEC 17065
Singapore iDA CB(Certification Body)		Phase I, Phase II
Vietnam MIC CAB Accreditation		Please see the document for the detailed scope
Hong Kong OFCA		**(Phase II)** OFCA Foreign Certification Body for Radio and Telecom
		(Phase I) Conformity Assessment Body for Radio and Telecom
Industry Canada CAB		**Radio:** Scope A – All Radio Standard Specification in Category I
		Telecom: CS-03 Part I, II, V, VI, VII, VIII

Japan Recognized Certification Body Designation		**Radio**: A1. Terminal equipment for purpose of calling **Telecom**: B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law
Korea CAB Accreditation		**EMI:** KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI **EMS:** KCC Notice 2008-38, RRL Notice 2008-4: CA Procedures for EMS KN24, KN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11: Test Method for EMS
		Radio: RRL Notice 2008-26, RRL Notice 2008-2, RRL Notice 2008-10, RRL Notice 2007-49, RRL Notice 2007-20, RRL Notice 2007-21, RRL Notice 2007-80, RRL Notice 2004-68
		Telecom: President Notice 20664, RRL Notice 2007-30, RRL Notice 2008-7 with attachments 1, 3, 5, 6; President Notice 20664, RRL Notice 2008-7 with attachment 4
Taiwan NCC CAB Recognition		LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08
Taiwan BSMI CAB Recognition		CNS 13438
Japan VCCI		R-3083: Radiation 3 meter site C-3421: Main Ports Conducted Interference Measurement T-1597: Telecommunication Ports Conducted Interference Measuremet
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