RF TEST REPORT

SIEMIC
A Bureau Veritas Group Company

Report No.: FCC_IC_SL18071803-SEV-034A2_DTS

Applicant	:	ChargePoint, Inc.
Product Name		WLAN module
Module Model No.	:	241083S
Test Standard	:	47 CFR 15.247 RSS-247 Issue 2, 2017
Test Method	:	ANSI C63.10: 2013 RSS-Gen Issue 5, Apr 2018 FCC Public Notice DA 00-705
FCC ID	:	W38-241083S
IC ID	:	8854A-241083S
Dates of test	:	12/04/2018 to 12/12/2018
Issue Date	:	12/17/2018
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:	
Gary Chou	
Gary Chou	**Chen Ge**
Test Engineer	Engineer Reviewer

Issued By:
SIEMIC Laboratories
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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_SL18071803-SEV-034A2_DTS	None	Original	12/17/ 2018

2 Executive Summary

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

Company: ChargePoint , Inc.
Product: WLAN module
Model: 241083S

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 95008
Manufacturer Name	ChargePoint , Inc.
Manufacturer Address	254 E. Hacienda Ave , Campbell, CA 95008

4 Test site information

Lab performing tests	SIEMIC Laboratories
Lab Address	775 Montague Expressway, Milpitas, CA 95035
FCC Test Site No.	540430
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	WLAN module
Model No.	241083S
Trade Name	ChargePoint
Serial No.	183560A03817
Host Model No.	N/A
Input Power	120Vac/ 60Hz
Date of EUT received	12/02/2018
Equipment Class/ Category	Wideband transmission system
Port/Connectors	1X USB Port, 1X Console Port

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		
Note	-		

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	Laptop	PP01L Latitude E5440	F1WPF12	Dell	-
2	Adaptor	DKI10FB	DKI10FB	OPEN PEAK	-

7.2 Cabling Description

Name	Connection Start		Connection Stop		Length / shielding Info		Note
	From	I/O Port	To	I/O Port	Length (m)	Shielding	
USB	EUT	I/O Port	Laptop	USB	2	Unshielded	-

7.3 Test Software Description

Test Item	Software	Description
RF Testing	Putty	Set the EUT connect to Laptop
RF Testing	Labtool	Set the EUT to transmit continuously in different test modes and channels

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 v03r02	☒ Pass ☐ N/A
	IC	-	IC		
Restricted Band of Operation	FCC	15.205	FCC	ANSI C63.10:2013 558074 D01 DTS Meas Guidance v04	☒ Pass ☐ N/A
	IC	RSS Gen 8.10	IC		
AC Conducted Emissions	FCC	15.207(a)	FCC	ANSI C63.10:2013	☒ Pass* ☐ N/A
	IC	RSS Gen 8.8	IC	RSS-Gen Issue 5, Apr 2018	

DTS Band Requirement

Test Item	Test standard		Test Method/Procedure		Pass / Fail
99% Occupied Bandwidth	-	-	-	-	☒ Pass* ☐ N/A
	IC	RSS Gen 6.7	IC	RSS-Gen Issue 5, Apr 2018	
6dB Bandwidth	FCC	15.247(a)(2)	FCC	558074 D01 DTS Meas Guidance v04	☒ Pass* ☐ N/A
	IC	RSS-247 (5.2)	IC		
Band Edge and Radiated Spurious Emissions	FCC	15.247(d)	FCC	ANSI C63.10:2013 558074 D01 DTS Meas Guidance v04	☒ Pass ☐ N/A
	IC	RSS-247 (5.5)	IC		
Output Power	FCC	15.247(b)	FCC	558074 D01 DTS Meas Guidance v04	☒ Pass* ☐ N/A
	IC	RSS-247 (5.4.4)	IC		
Receiver Spurious Emissions	IC	RSS Gen (7.3)	IC	RSS-Gen Issue 5, Apr 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 v04	☒ Pass* ☐ N/A
	IC	RSS-247 (5.2.2)	IC		
RF Exposure requirement	FCC	15.247(i)	FCC	-	☐ Pass ☒ N/A
	IC	RSS Gen(3.4)	IC	RSS-102 Issue 5, March 2015	
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. Pass* : Please refer to test report (Number: FCC_RF_ SL14111201-CPC_015_2.4GHz Rev. 1.0, FCC ID: W38-241083G).				

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.

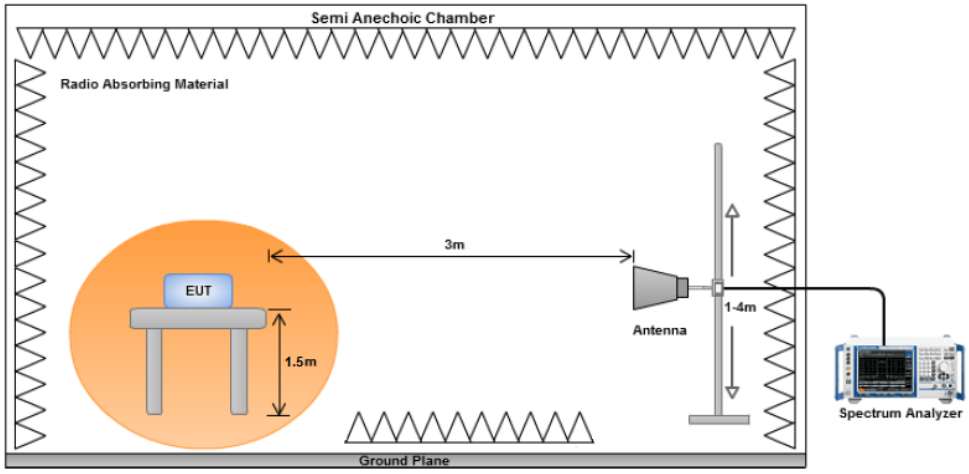
10 Measurements, Examination and Derived Results

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	The EUT can't change antenna which meet the requirement. Antenna is permanently attached to the device.	
Result	☒ PASS ☐ FAIL	

10.2 Radiated Spurious Emissions in restricted band

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR§15.247(d), RSS-247(5.5)	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

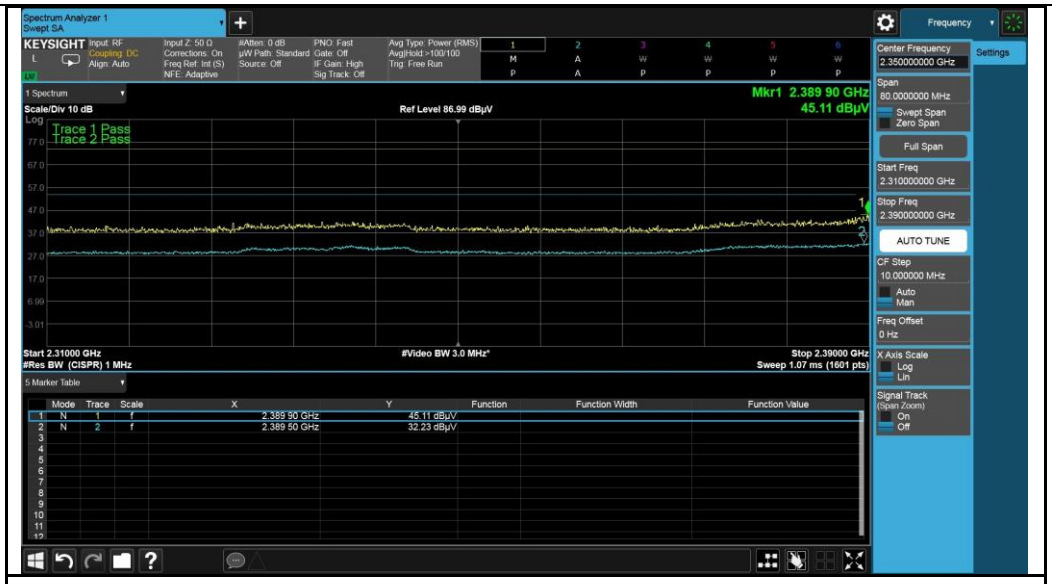
Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Gary Chou at 10m chamber.

Restricted Band Measurement Plots:

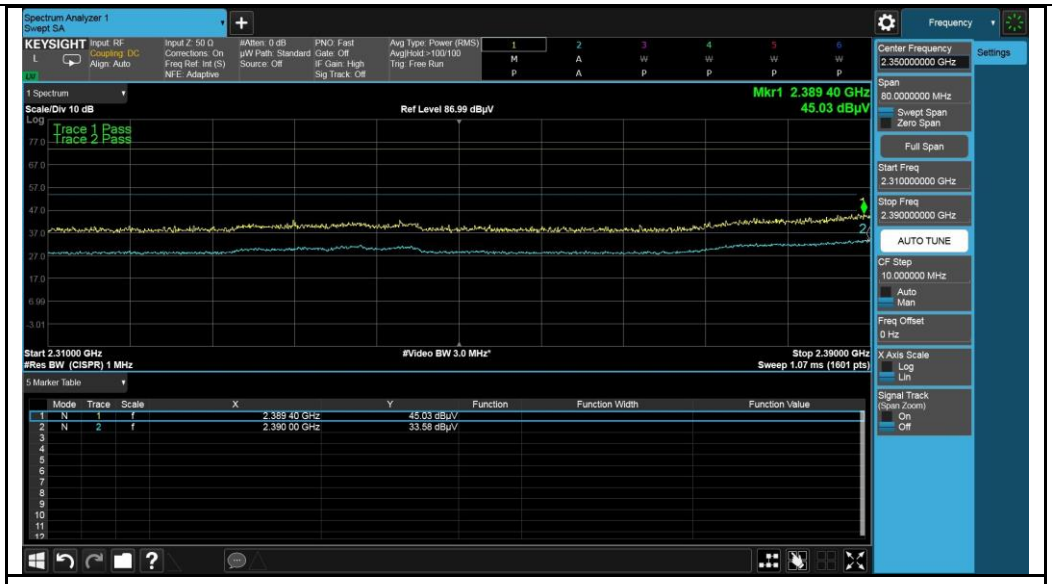
802.11b-2412MHz

802.11b-2462MHz

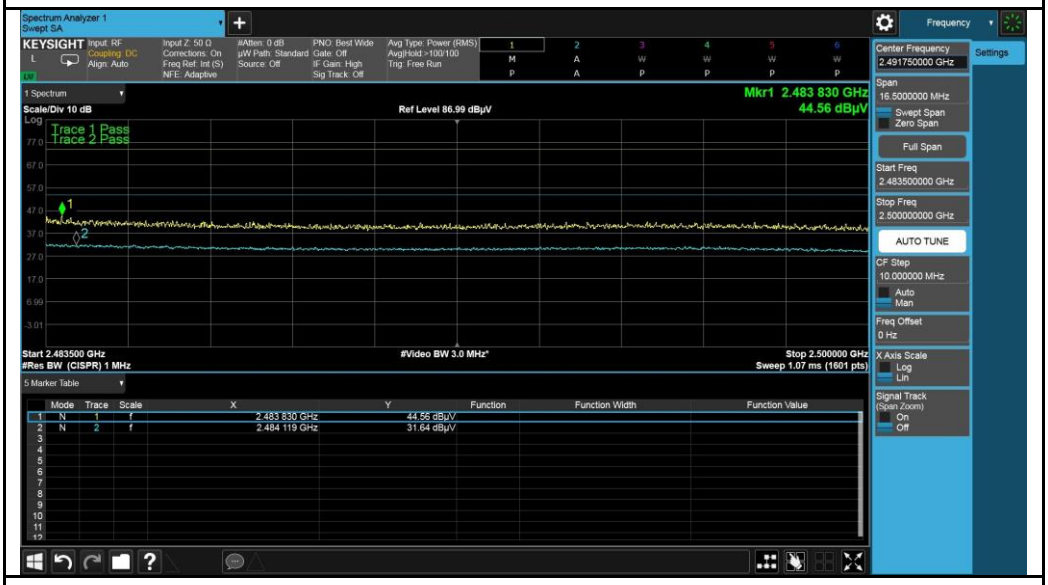


802.11g-2412MHz

802.11g-2462MHz



802.11n-HT20-2412MHz



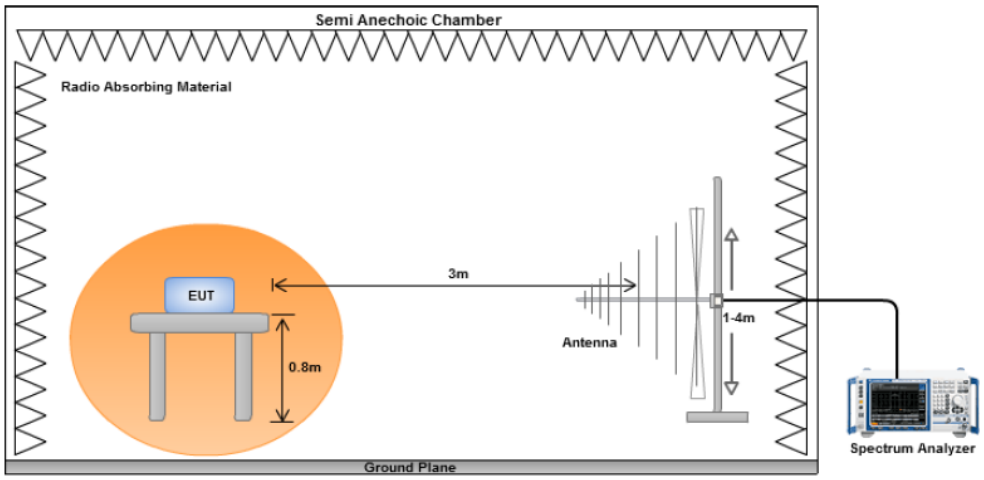
802.11n-HT20-2462MHz

10.3 Radiated Spurious Emissions below 1GHz

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR§15.247(d) RSS-247 (5.5)	a)	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	☒

Frequency range (MHz)	Field Strength (uV/m)
30 – 88	100
88 – 216	150
216 960	200
Above 960	500

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	The EUT was scanned up to 1GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.
Result	☒ Pass ☐ Fail

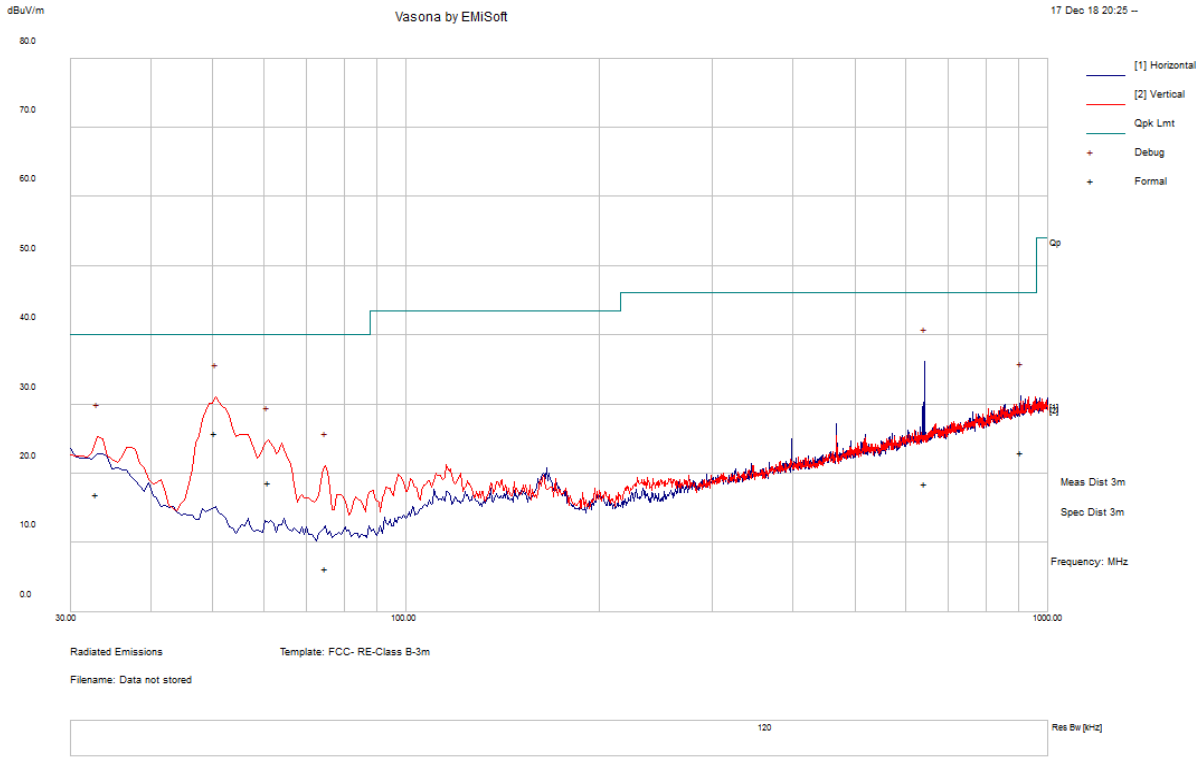
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Gary Chou at 10m chamber.

Radiated Emission Test Results (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:	12/17/2018			
Remarks:	802.11n HT20, Middle Channel			



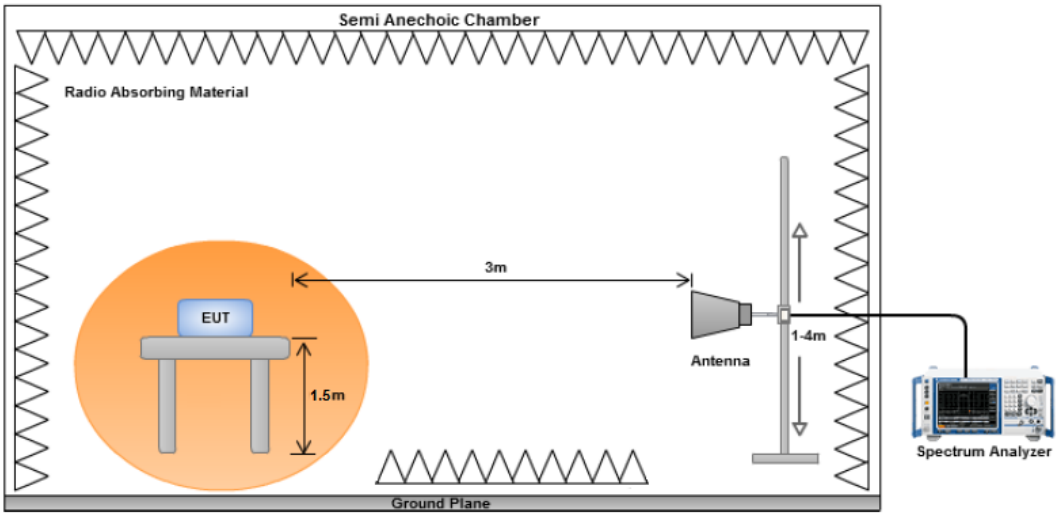
Quasi Max Measurements

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
50.488125	40.94	11.45	-26.58	25.81	Quasi Max	V	113	266	40	-14.2	Pass
642.409063	19.42	14.95	-15.84	18.54	Quasi Max	H	147	119	46	-27.46	Pass
32.945	20.63	11.16	-14.81	16.98	Quasi Max	V	126	339	40	-23.02	Pass
907.046875	20.06	15.93	-12.88	23.11	Quasi Max	H	104	347	46	-22.89	Pass
61.08875	34.55	11.52	-27.34	18.73	Quasi Max	V	108	209	40	-21.28	Pass
74.916563	22.18	11.63	-27.49	6.32	Quasi Max	V	196	90	40	-33.68	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), RSS-247(5.5)	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
3249.35	49.42	3.46	-1.55	51.33	Peak Max	V	247	309	74	-22.67	Pass
9972.44	38.36	5.88	1.26	45.5	Peak Max	H	157	161	74	-28.5	Pass
4824.23	38.44	4.15	-0.94	41.65	Peak Max	V	261	241	74	-32.35	Pass
3249.35	46.52	3.46	-1.55	48.43	Average Max	V	247	309	54	-5.57	Pass
9972.44	26.73	5.88	1.26	33.87	Average Max	H	157	161	54	-20.13	Pass
4824.23	26.19	4.15	-0.94	29.4	Average Max	V	261	241	54	-24.6	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
7311.39	38.24	5.11	-0.41	42.94	Peak Max	V	256	45	74	-31.06	Pass
4873.43	39.16	3.89	-0.58	42.47	Peak Max	V	187	314	74	-31.53	Pass
1890.51	40.54	2.67	-2.73	40.48	Peak Max	V	169	246	74	-33.52	Pass
7311.39	25.35	5.11	-0.41	30.05	Average Max	V	256	45	54	-23.95	Pass
4873.43	26.17	3.89	-0.58	29.48	Average Max	V	187	314	54	-24.52	Pass
1890.51	27.31	2.67	-2.73	27.25	Average Max	V	169	246	54	-26.75	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
3249.18	50.36	3.46	-1.55	52.27	Peak Max	V	185	311	74	-21.73	Pass
7385.36	39.52	5.37	-0.72	44.17	Peak Max	V	152	221	74	-29.83	Pass
4924.47	39.13	3.87	-0.43	42.57	Peak Max	V	277	4	74	-31.43	Pass
3249.18	47.27	3.46	-1.55	49.18	Average Max	V	185	311	54	-4.82	Pass
7385.36	26.43	5.37	-0.72	31.08	Average Max	V	152	221	54	-22.92	Pass
4924.47	26.25	3.87	-0.43	29.69	Average Max	V	277	4	54	-24.31	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
3249.43	50.36	3.46	-1.55	52.27	Peak Max	V	189	311	74	-21.73	Pass
9934.28	39.41	5.81	1.19	46.41	Peak Max	V	233	4	74	-27.59	Pass
4824.39	39.52	4.18	-0.99	42.71	Peak Max	V	107	119	74	-31.29	Pass
3249.43	47.64	3.46	-1.55	49.55	Average Max	V	189	311	54	-4.45	Pass
9934.28	26.37	5.81	1.19	33.37	Average Max	V	233	4	54	-20.63	Pass
4824.39	26.69	4.18	-0.99	29.88	Average Max	V	107	119	54	-24.12	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
9058.25	38.17	5.66	0.14	43.97	Peak Max	V	311	63	74	-30.03	Pass
7310.16	38.34	4.77	-0.25	42.86	Peak Max	V	205	154	74	-31.14	Pass
4873.52	39.42	3.89	-0.55	42.76	Peak Max	V	168	319	74	-31.24	Pass
9058.8	26.39	5.66	0.14	32.19	Average Max	V	311	63	54	-21.81	Pass
7310.43	25.13	4.77	-0.25	29.65	Average Max	V	205	154	54	-24.35	Pass
4873.57	26.4	3.89	-0.55	29.74	Average Max	V	168	319	54	-24.26	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
10000.43	39.25	5.93	1.33	46.51	Peak Max	V	130	70	74	-27.49	Pass
4923.17	39.34	4.23	-1.04	42.53	Peak Max	V	195	8	74	-31.47	Pass
2007.38	40.43	2.74	-2.44	40.73	Peak Max	V	195	344	74	-33.27	Pass
10000.43	26.17	5.93	1.33	33.43	Average Max	V	130	70	54	-20.57	Pass
4923.17	26.16	4.23	-1.04	29.35	Average Max	V	195	8	54	-24.65	Pass
2007.38	28.34	2.74	-2.44	28.64	Average Max	V	195	344	54	-25.36	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
3249.37	49.36	3.46	-1.55	51.27	Peak Max	V	175	310	74	-22.73	Pass
9831.43	38.35	5.63	0.99	44.97	Peak Max	H	192	135	74	-29.03	Pass
4822.51	40.24	4.17	-0.98	43.43	Peak Max	V	101	314	74	-30.57	Pass
3249.37	46.16	3.46	-1.55	48.07	Average Max	V	175	310	54	-5.93	Pass
9831.43	26.43	5.63	0.99	33.05	Average Max	H	192	135	54	-20.95	Pass
4822.51	28.27	4.17	-0.98	31.46	Average Max	V	101	314	54	-22.54	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
9683.14	39.39	5.53	0.71	45.63	Peak Max	V	255	98	74	-28.37	Pass
4873.16	39.43	4.19	-1.02	42.6	Peak Max	V	138	324	74	-31.4	Pass
1933.24	40.52	2.7	-2.72	40.5	Peak Max	V	225	35	74	-33.5	Pass
9683.14	26.23	5.53	0.71	32.47	Average Max	V	255	98	54	-21.53	Pass
4873.16	26.45	4.19	-1.02	29.62	Average Max	V	138	324	54	-24.38	Pass
1933.24	28.18	2.7	-2.72	28.16	Average Max	V	225	35	54	-25.84	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
9725.34	39.17	5.5	0.77	45.44	Peak Max	V	112	75	74	-28.56	Pass
7188.43	38.25	5.14	-0.45	42.94	Peak Max	V	157	305	74	-31.06	Pass
4871.18	41.43	4.17	-0.98	44.62	Peak Max	V	190	194	74	-29.38	Pass
9725.34	26.64	5.5	0.77	32.91	Average Max	V	112	75	54	-21.09	Pass
7188.43	26.27	5.14	-0.45	30.96	Average Max	V	157	305	54	-23.04	Pass
4871.18	29.39	4.17	-0.98	32.58	Average Max	V	190	194	54	-21.42	Pass

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Conducted Emissions						
R & S Receiver	ESIB 40	100179	06/08/2018	1 Year	06/07/2019	☑
LISN (9kHz - 30MHz)	3816/2NM	214372	09/27/2018	1 Year	09/26/2019	☑
Radiated Emissions						
50GHz Spectrum Analyzer	N9030B (PXA)	MY57140584	1/3/2018	1 Year	1/2/2019	☑
Broadband Hybrid Antenna (30MHz - 6GHz)	JB6	A111717	12/04/2018	1 Year	12/03/2019	☑
Horn Antenna (1GHz~26GHz)	3115	100059	01/25/2018	1 Year	01/24/2019	☑
Horn Antenna (26GHz~40GHz)	AH-840	101013	08/27/2018	1 Year	08/26/2019	☑
Pre-Amp (30MHz~40GHz)	LPA-6-30	11140711	02/09/2018	1 Year	02/08/2019	☑
RF Conducted Measurement						
50GHz Spectrum Analyzer	N9030B (PXA)	MY57140584	1/3/2018	1 Year	1/2/2019	☑

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