

RF TEST REPORT



Report No.: FCC_IC_RF_SL18020109-SLX-009R1_DTS

Supersede Report No.:

Applicant	:	Silex Technology, Inc
Product Name	:	SDIO Wireless Module
Model No.	:	SX-SDMAC
Test Standard	:	47 CFR 15.247 RSS247 Issue 2, 2017
Test Method	:	ANSI C63.10: 2013 RSS-Gen Issue 4, Nov 2014 FCC Public Notice DA 00-705
FCC ID	:	N6C-SDMAC
IC ID	:	4908A-SDMAC
Dates of test	:	03/10/2018 -04/04/2018
Issue Date	:	04/10/2018
Test Result	:	☒ Pass ☐ Fail
Equipment complied with the specification ☒		
Equipment did not comply with the specification ☐		

This Test Report is Issued Under the Authority of:

	
Rachana Khanduri	Chen Ge
Test Engineer	Engineer Reviewer

Issued By:
SIEMIC Laboratories
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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.



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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_SL18020109-SLX-009R1_DTS	None	Original	04/10/2018

2 Executive Summary

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

Company: Silex Technology, Inc
Product Name: SDIO Wireless Module
Model No.: SX-SDMAC

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	Silex Technology, Inc
Applicant Address	2-3-1 Hikaridai, Seika-cho, Kyoto 619-0237, Japan
Manufacturer Name	Silex Technology, Inc
Manufacturer Address	2-3-1 Hikaridai, Seika-cho, Kyoto 619-0237, Japan

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	SDIO Wireless Module
Model No.	SX-SDMAC
Trade Name	Silex
Serial No.	N/A
Input Power	100-240VAC,50/60Hz
Power Adapter Manu/Model	WB-10E05R
Power Adapter SN	N/A
Product Hardware version	N/A
Product Software version	v19.07
Radio Hardware version	A
Radio Software version	v1.0.0
Date of EUT received	03/09/2018
Equipment Class/ Category	DTS
Port/Connectors	RJ45,USB,Serial port
Remark	None

6.2 Radio Description

Radio Type	802.11b	802.11g	802.11n-20M	802.11n-40M
Operating Frequency	2412-2462MHz	2412-2462MHz	2412-2462MHz	2422-2452MHz
Modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)
Channel Spacing	5MHz	5MHz	5MHz	5MHz
Number of Channels	11	11	11	7
Antenna Type	Ethertronics-1004078			
Antenna Gain (Peak)	2.4GHz: 3.4 dBi			
Antenna Connector Type	U.FL connector			
Note	2.4GHz and 5GHz Radio does not transmit simultaneously			

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	2	Unshielded	-
RJ45	RJ45	EUT	RJ45	Laptop	2	Unshielded	-

7.3 Test Software Description

Test Item	Software	Description
RF Testing	QRCT	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	☒ Pass
	IC	-	IC	558074 D01 DTS Meas. Guidance v03r02	☐ N/A
Restricted Band of Operation	FCC	15.205	FCC	ANSI C63.10:2013	☒ Pass
	IC	RSS Gen 8.10	IC	558074 D01 DTS Meas Guidance v04	☐ N/A
AC Conducted Emissions	FCC	15.207(a)	FCC	ANSI C63.10:2013	☒ Pass *
	IC	RSS Gen 8.8	IC	RSS Gen Issue 4: 2014	☐ N/A

DTS Band Requirement

Test Item	Test standard		Test Method/Procedure		Pass / Fail
99% Occupied Bandwidth	-	-	-	-	☒ Pass*
	IC	RSS Gen 6.6	IC	RSS Gen Issue 4: 2014 -	☐ N/A
6dB Bandwidth	FCC	15.247(a)(2)	FCC	558074 D01 DTS Meas Guidance v04	☒ Pass*
	IC	RSS247 (5.2.1)	IC		☐ N/A
Band Edge and Radiated Spurious Emissions	FCC	15.247(d)	FCC	ANSI C63.10:2013	☒ Pass
	IC	RSS247 (5.5)	IC	558074 D01 DTS Meas Guidance v04	☐ N/A
Output Power	FCC	15.247(b)	FCC	558074 D01 DTS Meas Guidance v04	☒ Pass*
	IC	RSS247 (5.4.4)	IC		☐ N/A
Receiver Spurious Emissions	IC	RSS Gen (4.8)	IC	RSS Gen Issue 4: 2014	☐ Pass ☒ N/A
Antenna Gain > 6 dBi	FCC	15.247(e)	FCC	-	☐ Pass
	IC	-	IC	-	☒ N/A
Power Spectral Density	FCC	15.247(e)	FCC	558074 D01 DTS Meas Guidance v04	☒ Pass*
	IC	RSS247 (5.2.2)	IC		☐ N/A
RF Exposure requirement	FCC	15.247(i)	FCC	-	☐ Pass
	IC	RSS Gen(5.5)	IC	RSS Gen Issue 4: 2014	☒ N/A
Remark	- All measurement uncertainties do not take into consideration for all presented test results. - 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 FCC ID: N6C-SDMAC test report.				

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.

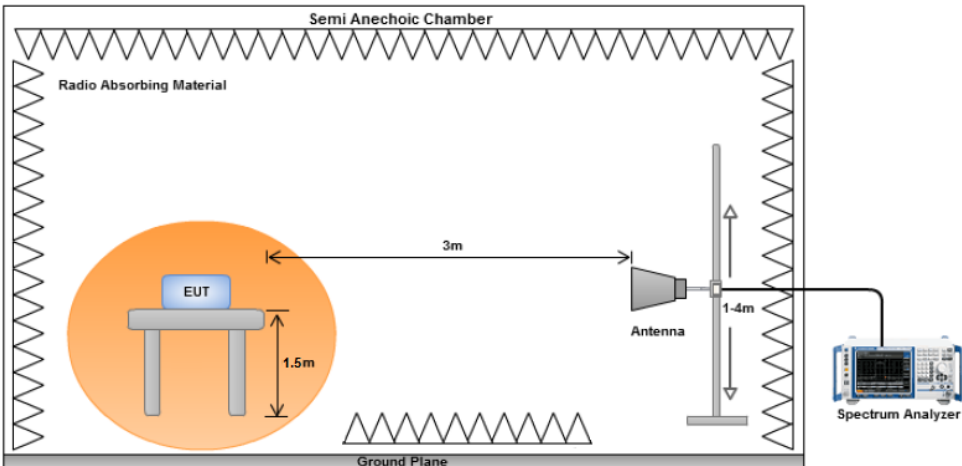
10 Measurements, Examination and Derived Results

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 uses a u.fl connector for antenna connection which meet the requirement.	
Result	☒ PASS ☐ FAIL	

10.2 Radiated Spurious Emissions in restricted band

Requirement(s):

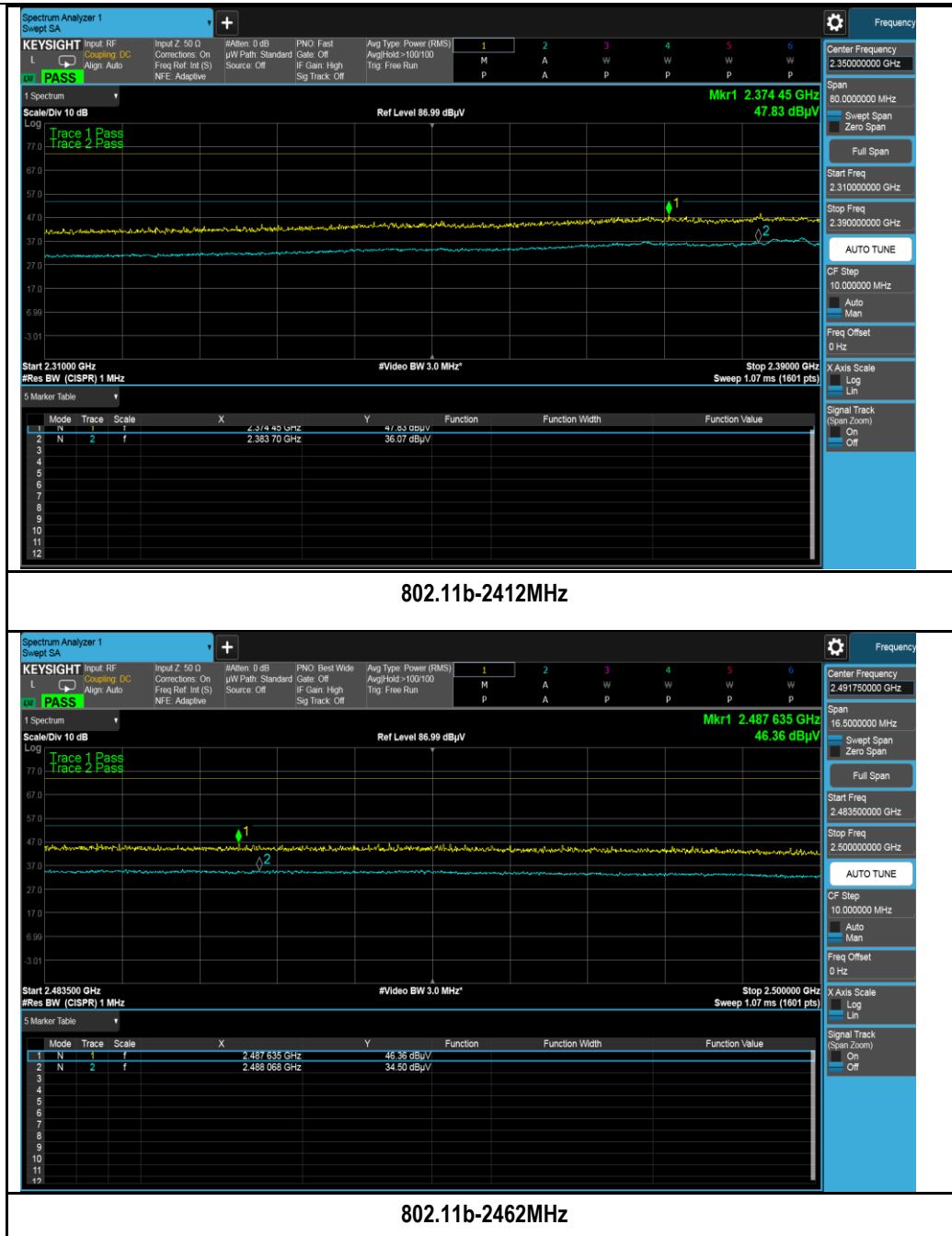
Spec	Item	Requirement	Applicable
47CFR§15.247(d), RSS247(A8.5)	a)	For non-restricted band, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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	- The EUT was switched on and allowed to warm up to its normal operating condition. - 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: - Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. - The EUT was then rotated to the direction that gave the maximum emission. - Finally, the antenna height was adjusted to the height that gave the maximum emission. - An average measurement was then made for that frequency point. - 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		

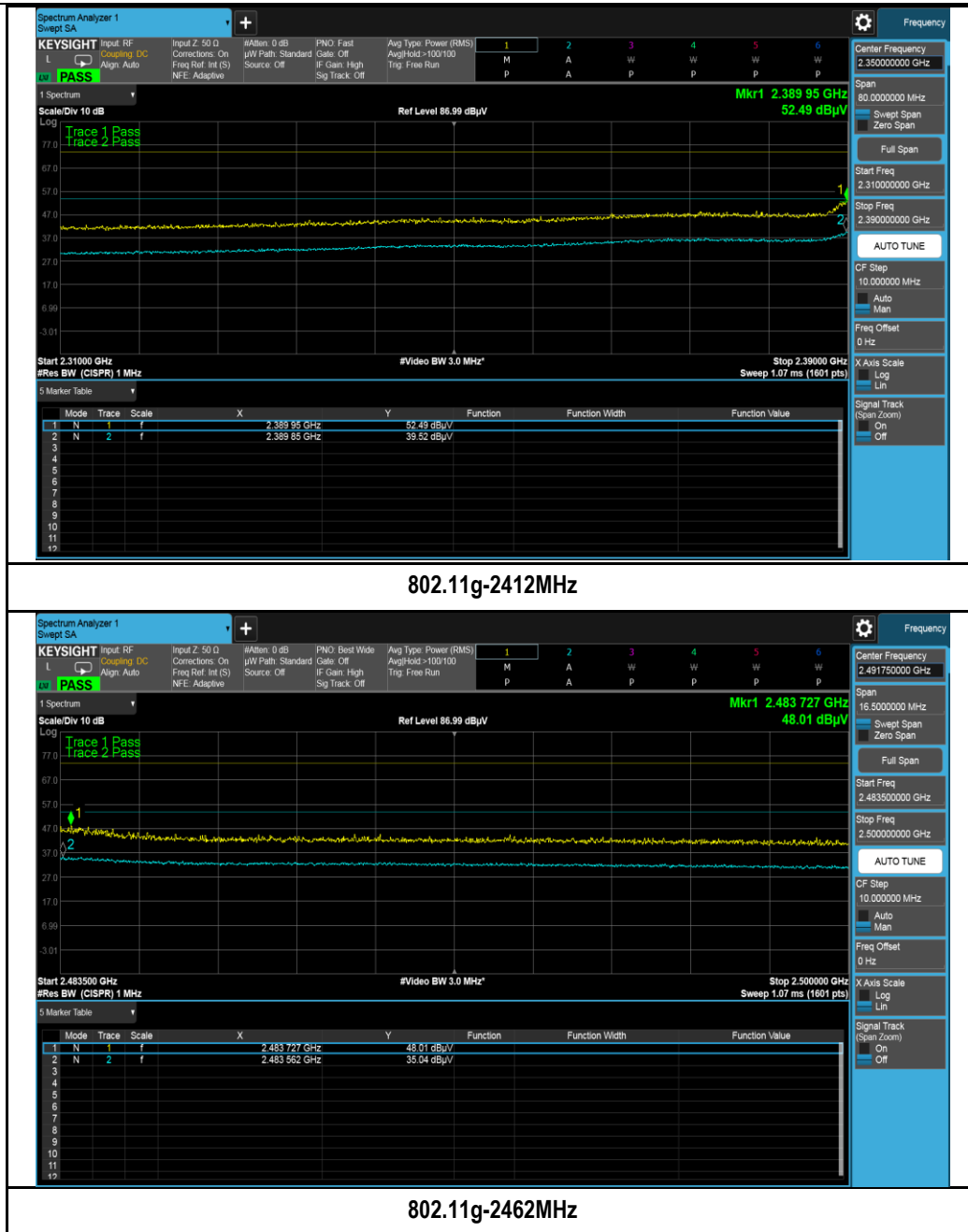
Test Data ☐ Yes (See below) ☒ N/A

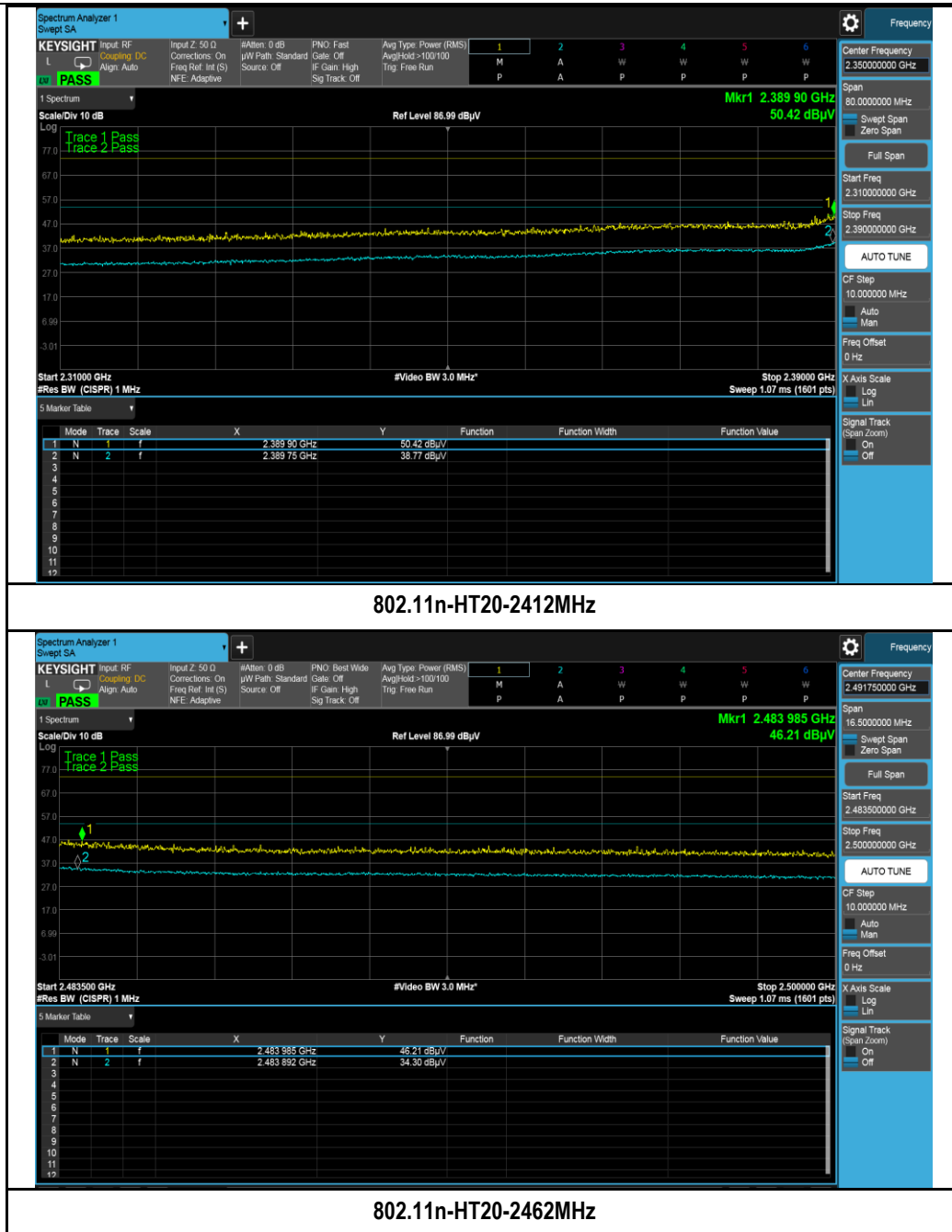
Test Plot ☒ Yes (See below) ☐ N/A

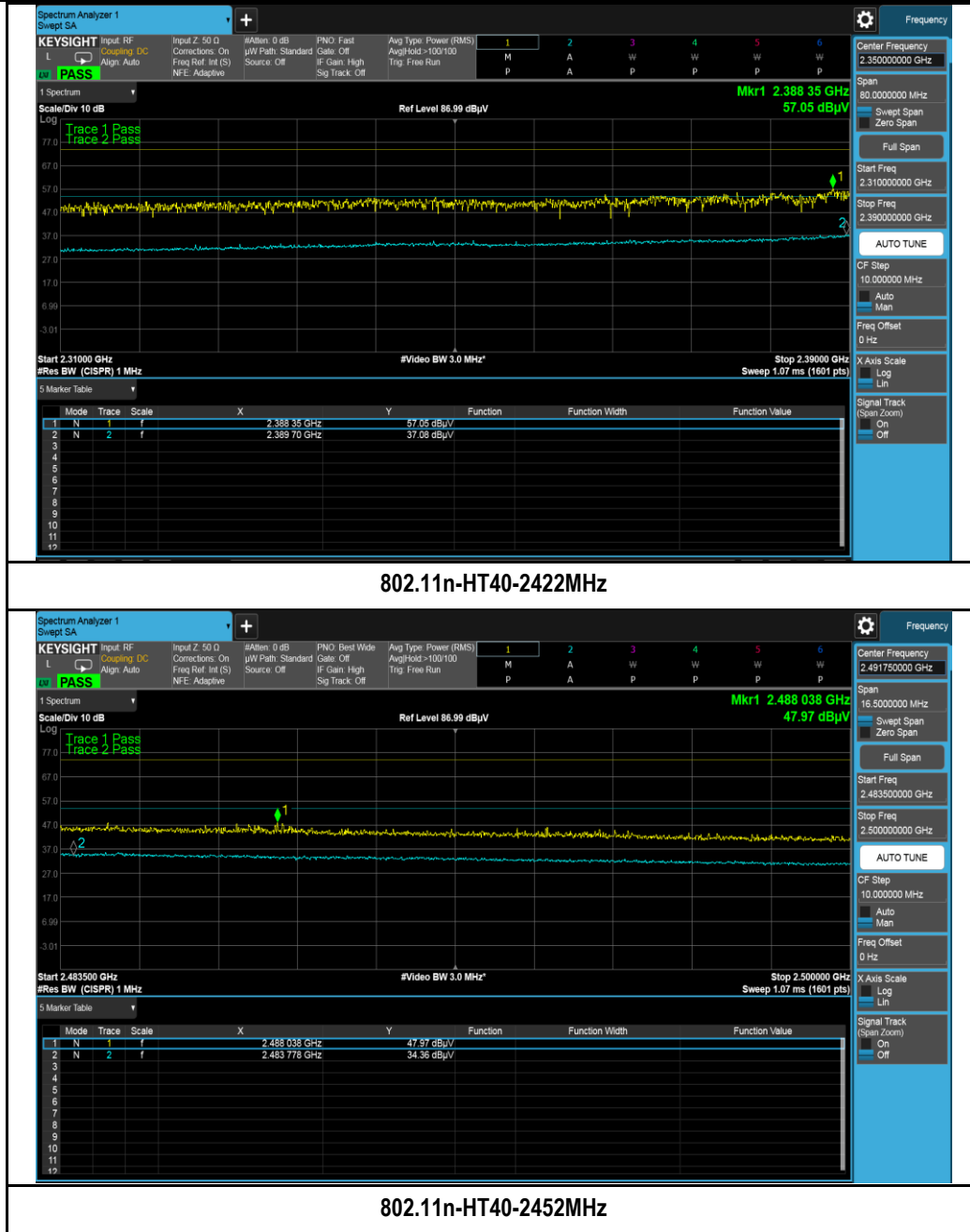
Test was done by Rachana Khanduri at 10m chamber.

Restricted Band Measurement Plots:



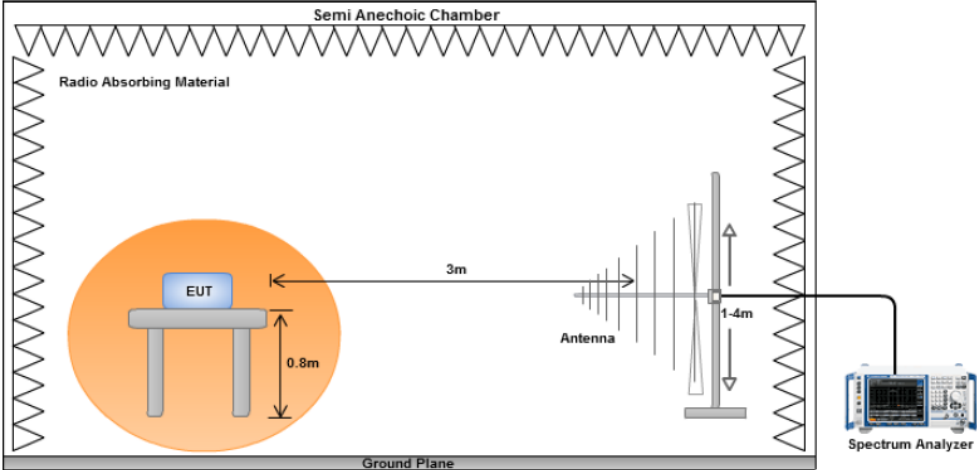






10.3 Radiated Spurious Emissions below 1GHz

Requirement(s):

Spec	Item	Requirement	Applicable							
47CFR§15.247(d) RSS247 (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	☒							
		<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>200</td></tr><tr><td>Above 960</td><td>500</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	200									
Above 960	500									
Test Setup										
Procedure	1. 2. 3. 4. The EUT was switched on and allowed to warm up to its normal operating condition. 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. b. c. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. The EUT was then rotated to the direction that gave the maximum emission. Finally, the antenna height was adjusted to the height that gave the maximum emission. A Quasi-peak measurement was then made for that frequency point. 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									

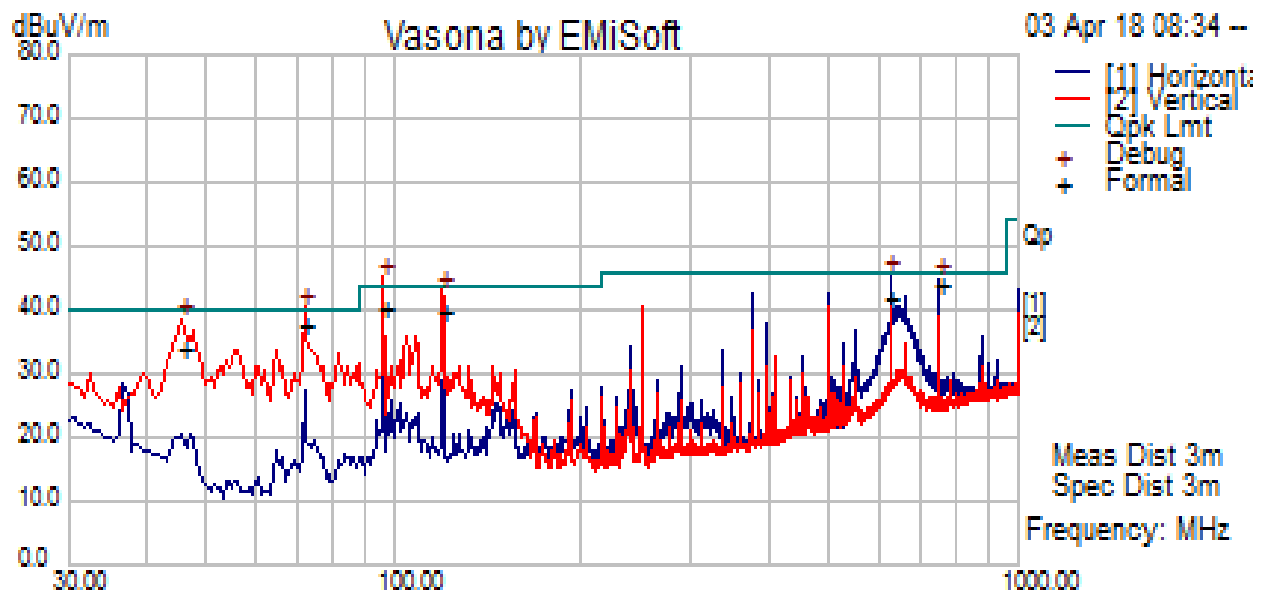
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Rachana Khanduri 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:	Rachana Khanduri			
Test Date:	04/03/2018			
Remarks:	802.11b, Middle Channel			



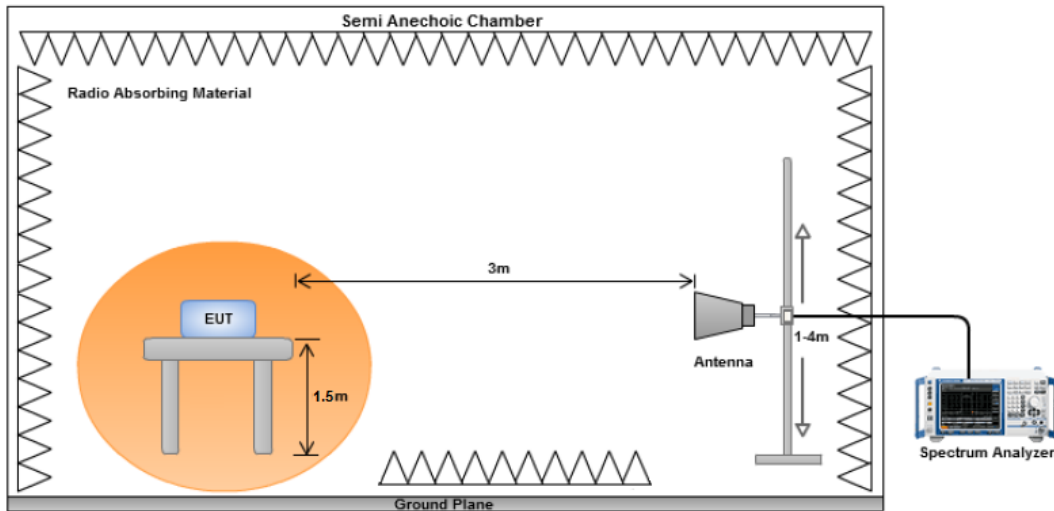
Quasi Max Measurements

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
45.74	47.71	11.41	-24.86	34.26	Quasi Max	V	106	58	40	-5.74	Pass
71.98	54.13	11.6	-27.69	38.04	Quasi Max	V	108	231	40	-1.96	Pass
95.97	55.11	11.85	-26.36	40.6	Quasi Max	V	104	63	43.5	-2.91	Pass
119.97	50.54	12.07	-22.87	39.74	Quasi Max	V	103	77	43.5	-3.76	Pass
624.97	44.12	14.6	-16.69	42.03	Quasi Max	H	137	208	46	-3.97	Pass
750.00	44.61	15.28	-15.61	44.28	Quasi Max	H	103	213	46	-1.72	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	- The EUT was switched on and allowed to warm up to its normal operating condition. - 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: - Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. - The EUT was then rotated to the direction that gave the maximum emission. - Finally, the antenna height was adjusted to the height that gave the maximum emission. - An average measurement was then made for that frequency point. - 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 Rachana Khanduri 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
1530.64	41.15	2.37	-6.33	37.19	Peak Max	H	180	53	74	-36.81	Pass
4824.07	50.10	4.12	-0.93	53.29	Peak Max	V	119	89	74	-20.71	Pass
17863.59	34.70	8.02	8.53	51.24	Peak Max	V	164	209	74	-22.76	Pass
1530.64	28.25	2.37	-6.33	24.29	Average Max	H	180	53	54	-29.71	Pass
4824.07	46.85	4.12	-0.93	50.04	Average Max	V	119	89	54	-3.96	Pass
17863.59	22.75	8.02	8.53	39.29	Average Max	V	164	209	54	-14.71	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
1529.68	41.68	2.37	-6.34	37.71	Peak Max	V	300	212	74	-36.29	Pass
4879.09	40.65	4.18	-0.99	43.83	Peak Max	V	253	60	74	-30.17	Pass
17956.26	39.29	7.91	8.71	55.90	Peak Max	H	199	15	74	-18.10	Pass
1529.68	30.08	2.37	-6.34	26.11	Average Max	V	300	212	54	-27.89	Pass
4879.09	27.27	4.18	-0.99	30.45	Average Max	V	253	60	54	-23.55	Pass
17956.26	26.66	7.91	8.71	43.27	Average Max	H	199	15	54	-10.73	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
4924.40	40.12	4.17	-0.99	43.30	Peak Max	V	195	230	74	-30.70	Pass
7387.42	39.01	5.14	-0.51	43.64	Peak Max	V	238	169	74	-30.36	Pass
17565.68	38.69	8.24	7.84	54.77	Peak Max	V	345	346	74	-19.23	Pass
4924.40	26.92	4.17	-0.99	30.11	Average Max	V	195	230	54	-23.89	Pass
7387.42	26.51	5.14	-0.51	31.14	Average Max	V	238	169	54	-22.86	Pass
17565.68	26.52	8.24	7.84	42.60	Average Max	V	345	346	54	-11.41	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
4823.42	39.02	4.12	-0.93	42.22	Peak Max	V	267	18	74	-31.79	Pass
7237.65	38.36	5.16	-0.46	43.05	Peak Max	V	112	217	74	-30.95	Pass
17436.26	39.43	8.22	7.54	55.19	Peak Max	V	191	29	74	-18.81	Pass
4823.42	26.03	4.12	-0.93	29.22	Average Max	V	267	18	54	-24.78	Pass
7237.65	26.24	5.16	-0.46	30.94	Average Max	V	112	217	54	-23.07	Pass
17436.26	26.37	8.22	7.54	42.13	Average Max	V	191	29	54	-11.87	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
4823.97	38.93	4.12	-0.93	42.12	Peak Max	V	295	116	74	-31.88	Pass
7262.80	38.44	5.16	-0.47	43.13	Peak Max	V	210	219	74	-30.87	Pass
17797.93	38.49	8.09	8.32	54.90	Peak Max	H	281	163	74	-19.10	Pass
4823.97	26.03	4.12	-0.93	29.23	Average Max	V	295	116	54	-24.78	Pass
7262.80	26.21	5.16	-0.47	30.90	Average Max	V	210	219	54	-23.10	Pass
17797.93	26.43	8.09	8.32	42.83	Average Max	H	281	163	54	-11.17	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
4922.26	39.47	4.22	-1.04	42.64	Peak Max	V	310	188	74	-31.36	Pass
7387.89	38.99	5.14	-0.51	43.62	Peak Max	V	305	198	74	-30.38	Pass
16890.48	37.51	8.10	6.67	52.28	Peak Max	V	177	93	74	-21.72	Pass
4922.26	26.48	4.22	-1.04	29.66	Average Max	V	310	188	54	-24.34	Pass
7387.89	26.50	5.14	-0.51	31.13	Average Max	V	305	198	54	-22.87	Pass
16890.48	25.97	8.10	6.67	40.74	Average Max	V	177	93	54	-13.26	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
1530.15	41.82	2.37	-6.34	37.86	Peak Max	H	159	285	74	-36.14	Pass
4826.06	39.89	4.13	-0.93	43.08	Peak Max	V	201	350	74	-30.92	Pass
17965.19	39.30	7.90	8.72	55.92	Peak Max	H	214	313	74	-18.08	Pass
1530.15	28.54	2.37	-6.34	24.57	Average Max	H	159	285	54	-29.43	Pass
4826.06	26.52	4.13	-0.93	29.72	Average Max	V	201	350	54	-24.29	Pass
17965.19	26.62	7.90	8.72	43.24	Average Max	H	214	313	54	-10.77	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
4875.40	39.50	4.17	-0.99	42.69	Peak Max	V	138	158	74	-31.31	Pass
7315.05	38.90	5.15	-0.49	43.56	Peak Max	V	302	4	74	-30.44	Pass
15850.66	38.80	7.79	5.75	52.35	Peak Max	V	117	188	74	-21.65	Pass
4875.40	26.97	4.17	-0.99	30.15	Average Max	V	138	158	54	-23.85	Pass
7315.05	26.18	5.15	-0.49	30.84	Average Max	V	302	4	54	-23.16	Pass
15850.66	26.64	7.79	5.75	40.19	Average Max	V	117	188	54	-13.82	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
4923.96	39.21	4.18	-0.90	42.49	Peak Max	H	142	216	74	-31.51	Pass
7386.16	38.25	5.15	-0.49	42.91	Peak Max	H	281	260	74	-31.09	Pass
17223.41	39.39	8.20	7.50	55.09	Peak Max	H	115	194	74	-18.91	Pass
4923.96	26.64	4.18	-0.90	29.92	Average Max	H	142	216	54	-24.08	Pass
7386.16	26.50	5.15	-0.49	31.16	Average Max	H	281	260	54	-22.84	Pass
17223.41	27.11	8.20	7.50	42.81	Average Max	H	115	194	54	-11.19	Pass

Above 1GHz-25GHz- 802.11n40 - 2422MHz

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
4826.68	39.18	4.13	-0.93	42.37	Peak Max	V	171	274	74	-31.63	Pass
7242.30	37.93	5.16	-0.46	42.63	Peak Max	V	115	256	74	-31.38	Pass
16506.20	38.07	8.10	5.90	52.08	Peak Max	V	280	250	74	-21.92	Pass
4826.68	26.15	4.13	-0.93	29.35	Average Max	V	171	274	54	-24.65	Pass
7242.30	26.10	5.16	-0.46	30.80	Average Max	V	115	256	54	-23.20	Pass
16506.20	26.29	8.10	5.90	40.29	Average Max	V	280	250	54	-13.71	Pass

Above 1GHz-25GHz – 802.11n40 – 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
4875.85	38.74	4.17	-0.99	41.92	Peak Max	V	275	63	74	-32.08	Pass
7314.53	38.69	5.15	-0.49	43.35	Peak Max	V	104	205	74	-30.65	Pass
15966.85	39.21	7.80	5.97	52.98	Peak Max	V	110	312	74	-21.02	Pass
4875.85	26.76	4.17	-0.99	29.94	Average Max	V	275	63	54	-24.06	Pass
7314.53	26.22	5.15	-0.49	30.88	Average Max	V	104	205	54	-23.12	Pass
15966.85	26.76	7.80	5.97	40.53	Average Max	V	110	312	54	-13.47	Pass

Above 1GHz-25GHz- 802.11n40 - 2452MHz

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
4906.29	39.73	4.20	-1.04	42.89	Peak Max	V	124	173	74	-31.11	Pass
7385.02	38.79	5.14	-0.51	43.42	Peak Max	V	120	269	74	-30.58	Pass
13136.78	36.82	6.95	4.69	48.46	Peak Max	V	245	279	74	-25.54	Pass
4906.29	26.51	4.20	-1.04	29.67	Average Max	V	124	173	54	-24.33	Pass
7385.02	26.45	5.14	-0.51	31.09	Average Max	V	120	269	54	-22.91	Pass
13136.78	24.96	6.95	4.69	36.6	Average Max	V	245	279	54	-17.41	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	09/06/2017	1 Year	09/06/2018	☒
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	03/09/2018	2 Year	03/09/2020	☒
Horn Antenna (1GHz~26GHz)	3115	100059	11/09/2017	1 Year	11/09/2018	☒
Horn Antenna (18GHz~40GHz)	PA-840	181251	06/23/2017	1 Year	06/23/2018	☒
Preamplifier (100KHz~7GHz)	LPA-6-30	11170602	05/09/2017	1 Year	05/09/2018	☒
Pre-Amplifier (1-26.5GHz)	8449B	3008A00715	08/16/2017	1 Year	08/16/2018	☒

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 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