RF TEST REPORT

SIEMIC
A Bureau Veritas Group Company

Report No.: FCC_RF_SL17120401-FLU-001-2.4GHz
Supersede Report No.: None

Applicant	:	Flume Inc
Product Name	:	Flume Bridge
Model No.	:	F1200
Test Standard	:	47 CFR 15.247
Test Method	:	ANSI C63.10: 2013 558074 D01 DTS Meas Guidance v04
FCC ID	:	2A0X8-F1200
Dates of test	:	01/08/2018-01/29/2018
Issue Date	:	02/08/2018
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:	
Vijay Chaudhary	**Chen Ge**
RF Test Engineer	Engineer Reviewer

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

ilac-MRA
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 & R&TTE Directive
Japan	MIC (RCB 208)	RF, Telecom
Hong Kong	OFTA (US002)	RF, Telecom

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1 Report Revision History

Report No.	Report Version	Description	Issue Date
FCC_RF_SL17120401-FLU-001-2.4GHz	None	Original	02/08/2018

2 Executive Summary

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

Company: Flume Inc
Product: Flume Bridge
Model: F1200

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	Flume Inc
Applicant Address	872 Higuera St, San Luis Obispo, CA-93405
Manufacturer Name	Green Circuits
Manufacturer Address	1130 Ringwood Court,San Jose,CA-95131

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	Flume Bridge
Model No.	F1200
Trade Name	Flume
Serial No.	N/A
Input Power	120V
Power Adapter Manu/Model	Switching
Power Adapter SN	GEO151UB-6025
Hardware version	R6
Software version	1.0
Date of EUT received	1/08/2018
Equipment Class/ Category	FHSS
Clock Freq	160MHz
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	Omni Antenna		
Antenna Gain (Peak)	3 dBi		
Antenna Connector Type	Integrated on PCB		

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	Laptop	ThinkPad T420s	N/A	Lenovo	-

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	Unshielde d	-

7.3 Test Software Description

Test Item	Software	Description
-	-	-

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
AC Conducted Emissions Voltage	FCC	15.207(a)	FCC	ANSI C63.10: 2013	☐ Pass ☒ N/A

DSS Band Requirement

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Channel Separation	FCC	15.247 (a)(1)	FCC	Public Notice DA 00-705	☒ * Pass ☐ N/A
20dB Occupied Bandwidth	FCC	15.247(a)(1)	FCC	Public Notice DA 00-705	☒ * Pass ☐ N/A
99% Occupied Bandwidth	FCC	15.247(a)(2)	FCC	Public Notice DA 00-705	☒ * Pass ☐ N/A
Number of Hopping Channels	FCC	15.247(a)(1)	FCC	Public Notice DA 00-705	☒ * Pass ☐ N/A
Radiated Spurious Emissions	FCC	15.247(d)	FCC	Public Notice DA 00-705	☒ Pass ☐ N/A
Time of Occupancy	FCC	15.247(a)(1)	FCC	Public Notice DA 00-705	☒ * Pass ☐ N/A
Output Power	FCC	15.247(b)	FCC	Public Notice DA 00-705	☒ * Pass ☐ N/A
Antenna Gain > 6 dBi	FCC	15.247(e)	FCC	Public Notice DA 00-705	☒ * Pass ☐ N/A
Power Spectral Density	FCC	15.247(e)	FCC	Public Notice DA 00-705	☒ * Pass ☐ N/A
Hybrid System Requirement	FCC	15.247(f)	FCC	Public Notice DA 00-705	☐ Pass ☒ N/A
Hopping Capability	FCC	15.247(g)	FCC	Public Notice DA 00-705	☐ Pass ☒ N/A
RF Exposure requirement	FCC	15.247(i)	FCC	Public Notice DA 00-705	☒ * Pass ☐ N/A

Remark	1. All measurement uncertainties are not taken into consideration for all presented test result. 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. Please refer original report No: SZEM160300123401 for *Pass. Only radited emission tested for this device

9 Measurement Uncertainty

9.1 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.

9.2 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.

9.3 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

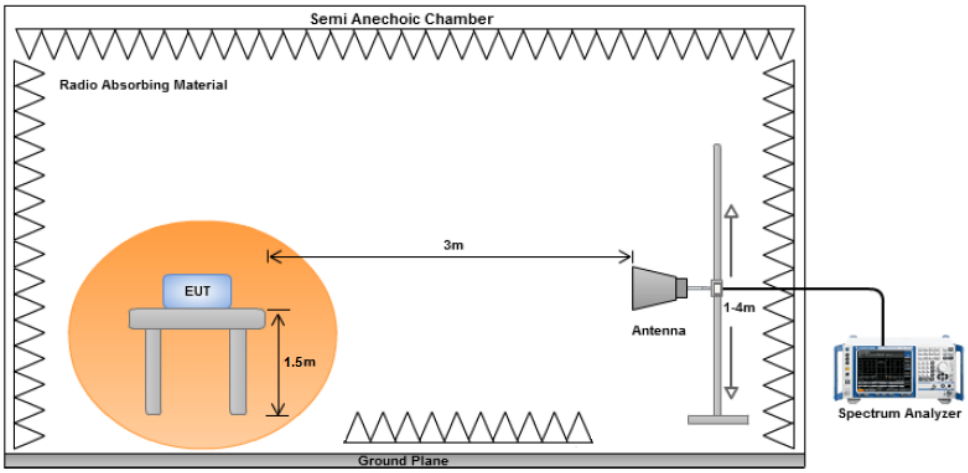
Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Reference Level	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Attenuator	0.25	Normal	2	1	0.125
Mismatch	0.25	U-Shape	1.414	1	0.1768033
Combined Standard Uncertainty					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 Radiated Spurious Emissions in Restricted band

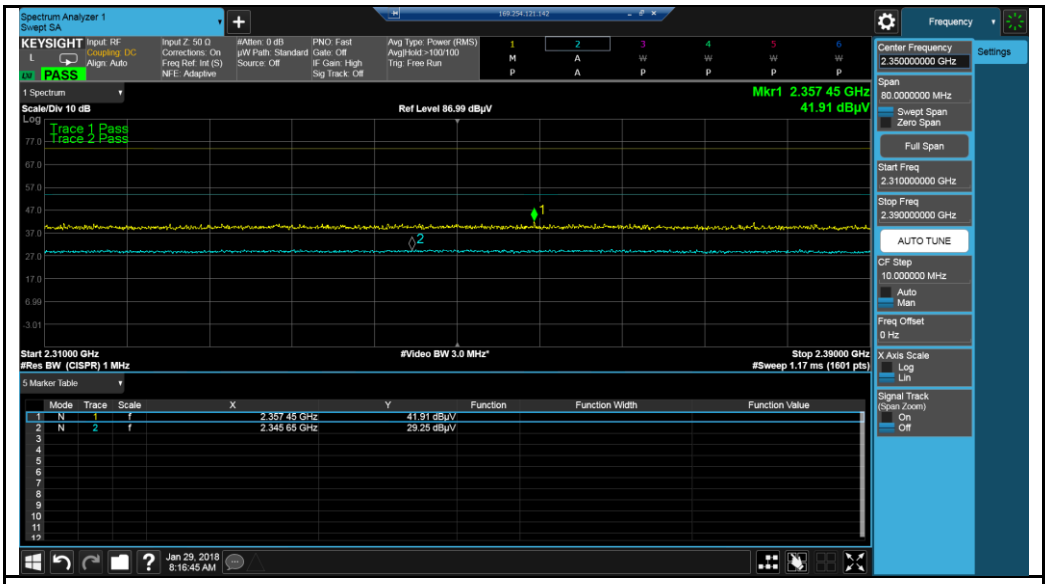
Requirement(s):

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	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. Radiated measurement was measured with antenna port terminated, there isn't outstanding emission found at the edge of restricted frequency, within x dB margin		
Result	☒ Pass ☐ Fail		

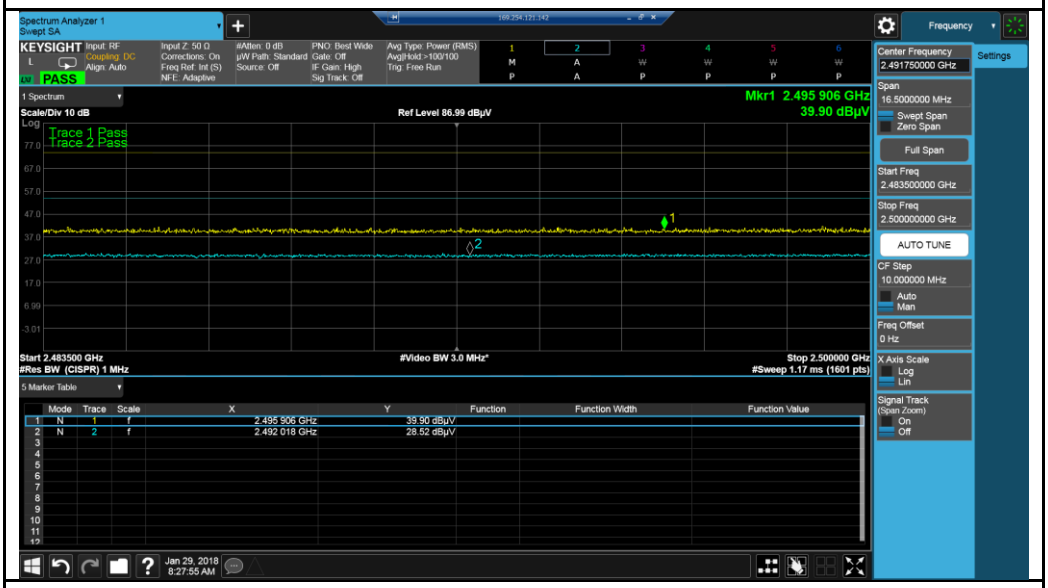
Test Data ☐ Yes (See below) ☒ N/A
Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Vijay Chaudhary at 10m chamber.

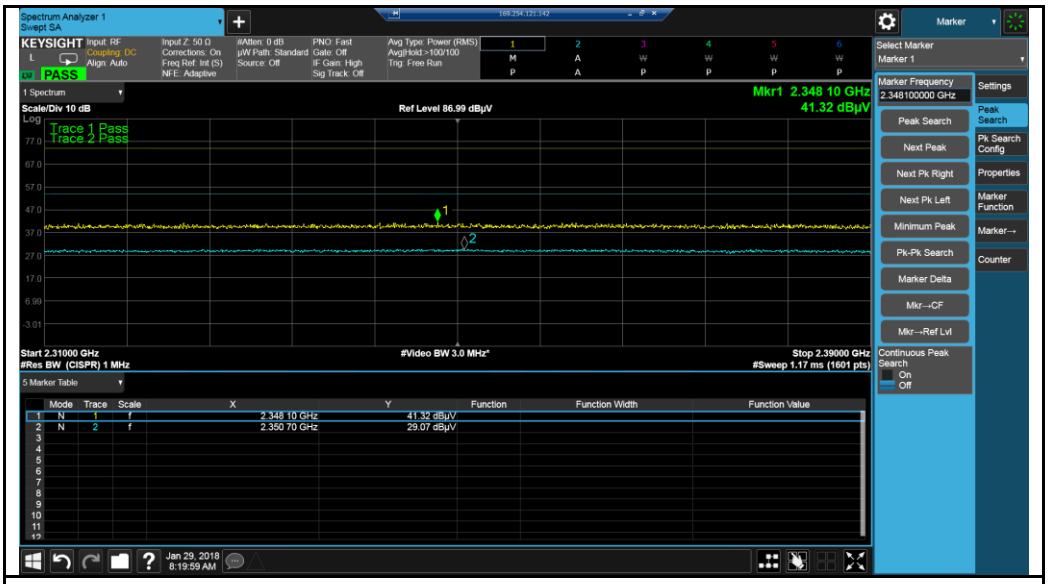
Restricted Band Measurement Plots:



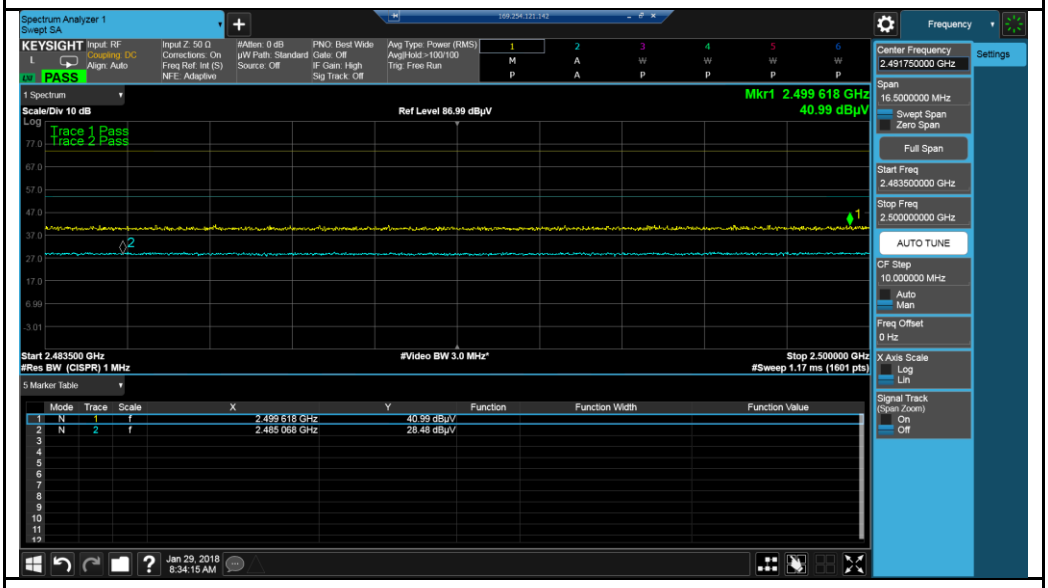
2.4GHz-11B-2412 MHz



2.4GHz-11B-2462 MHz

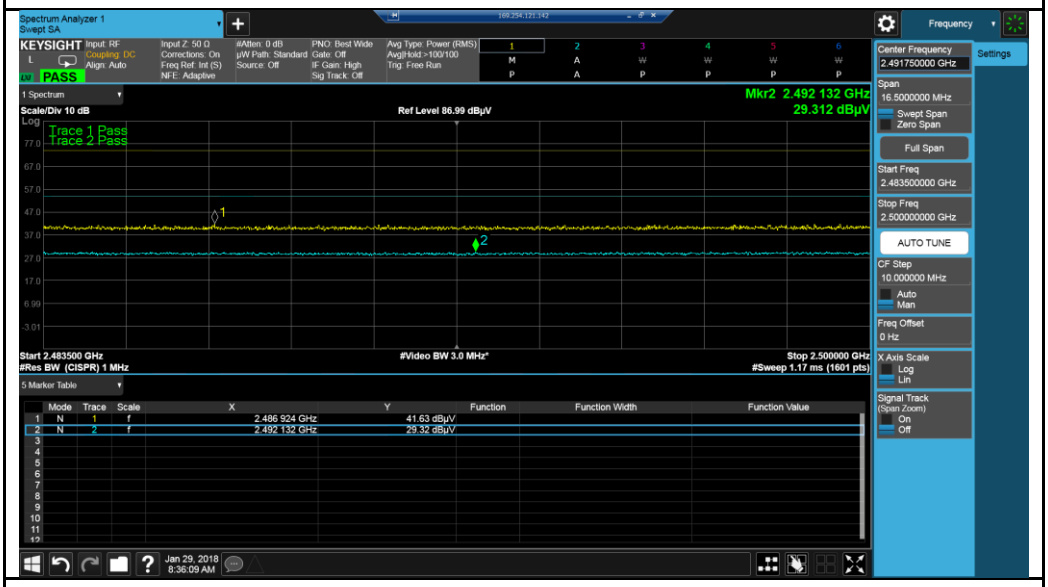


2.4GHz-11G-2412 MHz



2.4GHz-11G-2462 MHz

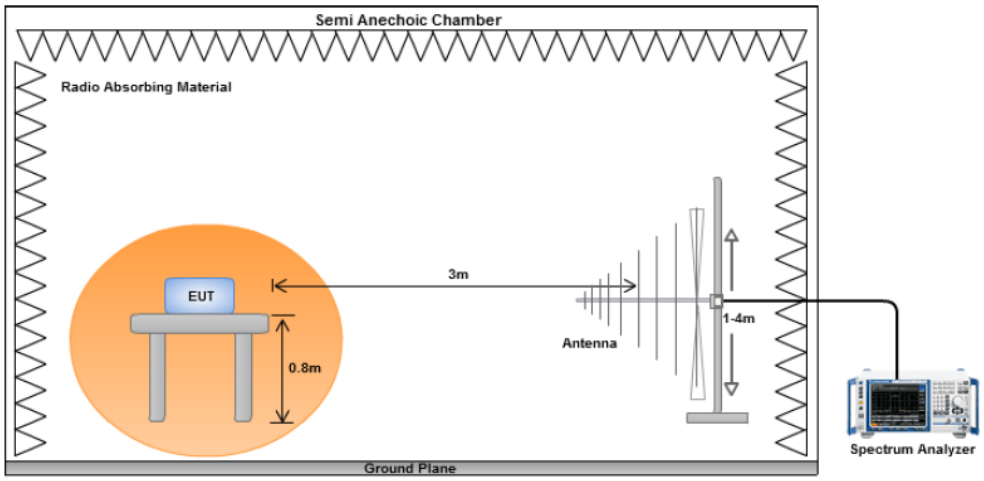
2.4GHz-11N20-2412 MHz



2.4GHz-11N20-2462 MHz

10.2 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>

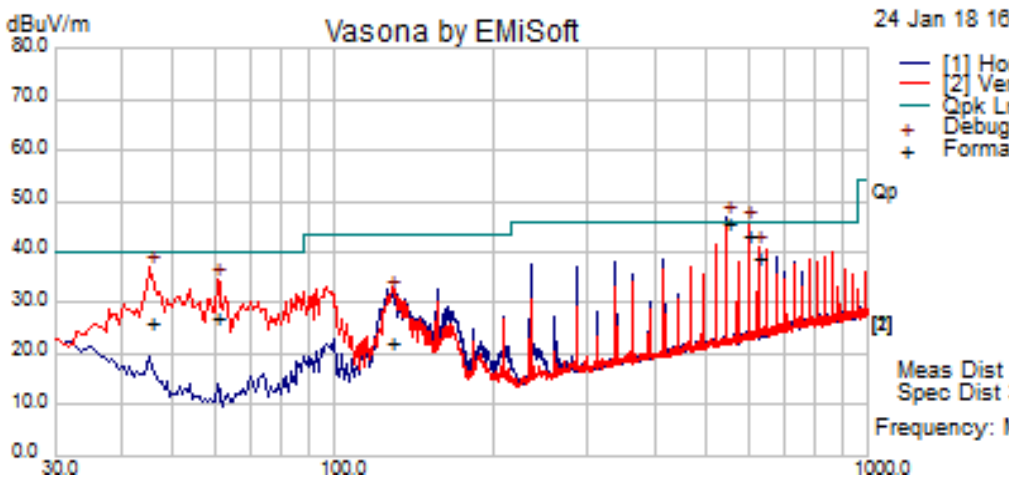
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Vijay Chaudhary at 10m chamber.

Radiated Emission Test Results (Below 1GHz)

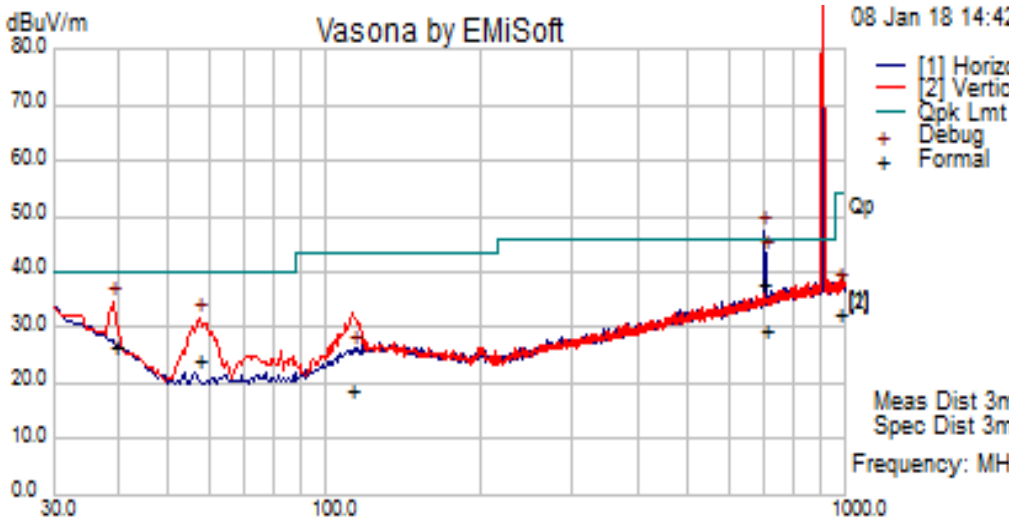
Test specification	below 1GHz			
Environmental Conditions:	Temp (°C):	26.1	Result	Pass
	Humidity (%)	47.5		
	Atmospheric (mbar):	1020		
Mains Power:	120VAC, 60Hz			
Tested by:	Vijay Chaudhary			
Test Date:	01/24/2018			
Remarks:	11B-2437 MHz			



Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
545.99	48.59	14.84	-17.99	45.45	Quasi Max	H	148	243	46	-0.55	Pass
597.99	45.60	15.15	-17.44	43.3	Quasi Max	V	100	106	46	-2.7	Pass
45.20	38.78	11.52	-24.54	25.77	Quasi Max	V	118	357	40	-14.24	Pass
624.00	40.61	15.06	-16.79	38.88	Quasi Max	V	101	357	46	-7.12	Pass
60.49	43.30	11.66	-27.73	27.23	Quasi Max	V	117	208	40	-12.77	Pass
128.77	32.78	12.29	-22.97	22.1	Quasi Max	H	107	239	43.5	-21.4	Pass

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

Test specification	below 1GHz			
Environmental Conditions:	Temp (°C):	26.1	Result	Pass
	Humidity (%)	47.5		
	Atmospheric (mbar):	1020		
Mains Power:	120VAC, 60Hz			
Tested by:	Vijay Chaudhary			
Test Date:	01/08/2018			
Remarks:	Co-Location (915 MHz & 2.4GHz) Emission at 915 is Fundamental Freq.			

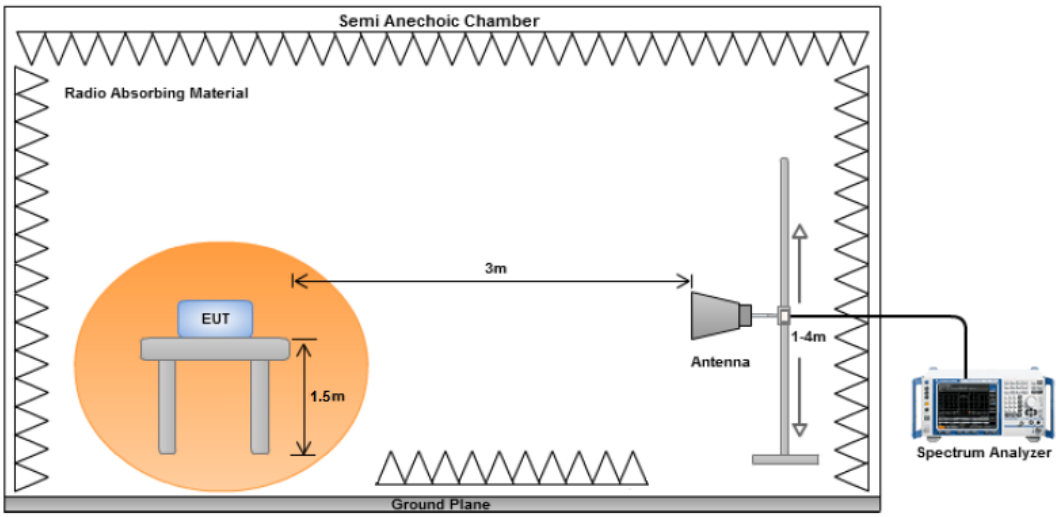


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
700.09	27.53	25.66	-15.55	37.64	Quasi Max	H	175	75	46	-8.36	Pass
703.43	19.13	25.71	-15.43	29.42	Quasi Max	H	400	39	46	-16.58	Pass
39.19	25.63	21.44	-20.62	26.45	Quasi Max	V	139	157	40	-13.55	Pass
57.15	30.10	21.64	-27.59	24.15	Quasi Max	V	140	357	40	-15.85	Pass
974.22	18.49	26.88	-12.98	32.4	Quasi Max	V	350	44	54	-21.6	Pass
112.91	19.89	22.17	-23.42	18.65	Quasi Max	H	216	33	43.5	-24.86	Pass

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

10.3 Radiated Spurious Emissions between 1GHz – 25GHz

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR§15.247(d) RSS210(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. There isn't outstanding emission found at the edge of restricted frequency.		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test was done by Vijay Chaudhary at 10m chamber.

Radiated Emission Test Results (Above 1GHz)

11b- 2412MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
3406.06	48.32	3.54	-2.19	49.67	Peak Max	V	148	96	74	-24.33	Pass
7233.14	38.67	5.15	-0.33	43.49	Peak Max	V	210	158	74	-30.51	Pass
4822.00	39.29	4.12	-0.8	42.61	Peak Max	V	169	143	74	-31.39	Pass
3406.06	44.92	3.54	-2.19	46.26	Average Max	V	148	96	54	-7.74	Pass
7233.14	26.34	5.15	-0.33	31.17	Average Max	V	210	158	54	-22.83	Pass
4822.00	26.44	4.12	-0.8	29.75	Average Max	V	169	143	54	-24.25	Pass

11b-2437MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
1741.97	47.10	2.57	-4.44	45.23	Peak Max	V	286	356	74	-28.77	Pass
7312.46	38.54	5.15	-0.35	43.34	Peak Max	V	237	253	74	-30.66	Pass
4876.53	39.73	4.17	-0.88	43.02	Peak Max	V	273	137	74	-30.98	Pass
1741.97	42.17	2.57	-4.44	40.3	Average Max	V	286	356	54	-13.7	Pass
7312.46	26.29	5.15	-0.35	31.09	Average Max	V	237	253	54	-22.91	Pass
4876.53	26.85	4.17	-0.88	30.14	Average Max	V	273	137	54	-23.86	Pass

11b-2462MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
1998.71	40.65	2.74	-2.48	40.91	Peak Max	V	152	262	74	-33.09	Pass
7384.47	38.58	5.14	-0.37	43.35	Peak Max	V	172	311	74	-30.65	Pass
4922.82	39.61	4.22	-0.95	42.88	Peak Max	V	242	250	74	-31.12	Pass
1998.71	28.06	2.74	-2.48	28.32	Average Max	V	152	262	54	-25.68	Pass
7384.47	26.45	5.14	-0.37	31.22	Average Max	V	172	311	54	-22.78	Pass
4922.82	26.62	4.22	-0.95	29.88	Average Max	V	242	250	54	-24.12	Pass

11g-2412MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
12878.06	37.35	6.77	4.73	48.86	Peak Max	H	220	191	74	-25.14	Pass
7238.39	38.81	5.16	-0.33	43.64	Peak Max	V	292	241	74	-30.36	Pass
4824.04	39.04	4.12	-0.8	42.35	Peak Max	V	127	302	74	-31.65	Pass
12878.06	25.58	6.77	4.73	37.09	Average Max	H	220	191	54	-16.91	Pass
7238.39	26.22	5.16	-0.33	31.05	Average Max	V	292	241	54	-22.96	Pass
4824.04	26.39	4.12	-0.8	29.71	Average Max	V	127	302	54	-24.29	Pass

11g-2437MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
7313.91	38.81	5.15	-0.35	43.61	Peak Max	V	275	4	74	-30.39	Pass
3457.70	45.71	3.56	-2.24	47.04	Peak Max	V	153	121	74	-26.96	Pass
4876.31	40.16	4.17	-0.88	43.45	Peak Max	V	166	126	74	-30.55	Pass
7313.91	26.21	5.15	-0.35	31.01	Average Max	V	275	4	54	-22.99	Pass
3457.70	40.95	3.56	-2.24	42.28	Average Max	V	153	121	54	-11.73	Pass
4876.31	26.70	4.17	-0.88	29.99	Average Max	V	166	126	54	-24.01	Pass

11g-2462MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
1995.45	40.57	2.74	-2.51	40.8	Peak Max	V	192	211	74	-33.2	Pass
7388.02	39.28	5.14	-0.38	44.05	Peak Max	V	211	98	74	-29.95	Pass
4922.89	39.22	4.22	-0.95	42.49	Peak Max	V	291	98	74	-31.51	Pass
1995.45	27.87	2.74	-2.51	28.1	Average Max	V	192	211	54	-25.9	Pass
7388.02	26.41	5.14	-0.38	31.18	Average Max	V	211	98	54	-22.82	Pass
4922.89	26.55	4.22	-0.95	29.82	Average Max	V	291	98	54	-24.18	Pass

11N20-2412MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
1871.08	40.15	2.66	-3.06	39.75	Peak Max	V	138	256	74	-34.25	Pass
7238.26	39.09	5.16	-0.33	43.92	Peak Max	V	270	34	74	-30.08	Pass
4824.35	38.93	4.12	-0.81	42.25	Peak Max	V	193	109	74	-31.75	Pass
1871.08	28.12	2.66	-3.06	27.72	Average Max	V	138	256	54	-26.28	Pass
7238.26	26.18	5.16	-0.33	31.01	Average Max	V	270	34	54	-23	Pass
4824.35	26.32	4.12	-0.81	29.64	Average Max	V	193	109	54	-24.36	Pass

11N20-2437MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
7311.23	38.41	5.15	-0.35	43.21	Peak Max	V	117	223	74	-30.79	Pass
2126.31	39.88	2.82	-2.8	39.9	Peak Max	V	120	256	74	-34.1	Pass
4873.51	39.58	4.17	-0.88	42.88	Peak Max	V	166	14	74	-31.12	Pass
7311.23	26.25	5.15	-0.35	31.05	Average Max	V	117	223	54	-22.95	Pass
2126.31	27.44	2.82	-2.8	27.46	Average Max	V	120	256	54	-26.54	Pass
4873.51	26.87	4.17	-0.88	30.16	Average Max	V	166	14	54	-23.84	Pass

11N20-2462MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
12878.34	37.79	6.77	4.73	49.3	Peak Max	V	263	268	74	-24.71	Pass
7387.47	38.91	5.14	-0.37	43.67	Peak Max	V	293	186	74	-30.33	Pass
4925.04	38.96	4.22	-0.95	42.22	Peak Max	V	167	296	74	-31.78	Pass
12878.34	25.55	6.77	4.73	37.05	Average Max	V	263	268	54	-16.95	Pass
7387.47	26.38	5.14	-0.37	31.15	Average Max	V	293	186	54	-22.85	Pass
4925.04	26.58	4.22	-0.95	29.85	Average Max	V	167	296	54	-24.15	Pass

Co-Location (915 MHz-2.4GHz)

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
1829.40	57.73	2.63	-3.41	56.95	Peak Max	V	109	186	74	-17.05	Pass
2747.47	39.94	3.15	-2.2	40.89	Peak Max	V	206	145	74	-33.11	Pass
4823.90	38.93	4.12	-0.8	42.25	Peak Max	V	278	137	74	-31.75	Pass
1829.40	51.87	2.63	-3.41	51.09	Average Max	V	109	186	54	-2.91	Pass
2747.47	27.30	3.15	-2.2	28.25	Average Max	V	206	145	54	-25.76	Pass
4823.90	26.45	4.12	-0.8	29.77	Average Max	V	278	137	54	-24.23	Pass

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Radiated Emissions						
Keysight PXA 50GHz Spectrum Analyzer	N9030B	MY57140584	10/02/2017	1 Year	10/02/2018	☑
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	01/13/2017	1 Year	01/13/2018	☑
Horn Antenna (1GHz~26GHz)	3115	100059	11/09/2017	1 Year	11/09/2018	☑
Pre-Amplifier (1-26GHz)	8449B	3008A00715	08/16/2017	1 Year	08/16/2018	☑
Preamplifier (100KHz-7GHz)	LPA-6-30	11140711	02/09/2017	1 Year	02/09/2018	☑

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 Regocnition		**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