



# RF TEST REPORT



Report No.: FCC\_IC\_RF\_SL18102901-JPS-004\_WIFI  
Supersede Report No.:





Applicant	:	Juniper Systems, Inc.
Product Name	:	Ultra-rugged Handheld computer
Model No.	:	AR3
Test Standard	:	47 CFR 15.247 RSS 247 Iss 2: Feb 2017
Test Method	:	ANSI C63.10: 2013 RSS Gen Iss 5: Apr 2018 558074 D01 DTS Meas Guidance v04
FCC ID	:	VSF-AR3
IC ID	:	7980A-AR3
Dates of test	:	02/26/2019-02/28/2019
Issue Date	:	02/28/2019
Test Result	:	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Equipment complied with the specification [X] Equipment did not comply with the specification [ ]		

This Test Report is Issued Under the Authority of:	
	
<b>Cipher</b>	<b>Chen Ge</b>
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.



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_IC_RF_SL18102901-JPS-004_WIFI	None	Original	02/28/2019

## 2 Executive Summary

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

Company: Juniper Systems, Inc.  
Product: Ultra-rugged Handheld computer  
Model: AR3

against the current Stipulated Standards. The specified model product stated above has demonstrated compliance with the Stipulated Standard listed on 1<sup>st</sup> page.

## 3 Customer information

Applicant Name	:	Juniper Systems, Inc.
Applicant Address	:	1132 1700 N, Logan, UT 84321
Manufacturer Name	:	Juniper Systems, Inc.
Manufacturer Address	:	1132 1700 N, Logan, UT 84321

## 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	Ultra-rugged Handheld computer
Model No.	AR3
Trade Name	Juniper Systems, Inc.
Serial No.	AR3E106
Host Model No.	N/A
Input Power	100-240VAC, 50-60Hz 0.5A
Power Adapter Manu/Model	PSAA20R-120L6
Power Adapter SN	N/A
Date of EUT received	12/18/2018
Equipment Class/ Category	DTS
Port/Connectors	USB, Micro-USB, Serial

### 6.2 Radio Description

Radio Type	802.11b/g/n-20M	802.11n-40M	Bluetooth LE
Operating Frequency	2412-2462MHz	2412-2462MHz	2402MHz-2480MHz
Modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	GFSK
Channel Spacing	5MHz	5MHz	2MHz
Number of Channels	11	7	39
Antenna Type	PCB		
Antenna Gain (Peak)	2.28 dBi		
Antenna Connector Type	PCB		
Note	N/A		

## 7 Supporting Equipment/Software and cabling Description

### 7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	Laptop	LATITUDE E6530	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	
USB	EUT	Micro USB	Laptop	USB	1	Unshielded	-
USB to Serial	EUT	Serial	Laptop	USB	1	Unshielded	-
USB to Ethernet	EUT	USB	Laptop	Ethernet	1	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
Restricted Band of Operation	FCC	15.205	FCC	ANSI C63.10:2013 558074 D01 DTS Meas Guidance v04	<input type="checkbox"/> Pass
	IC	RSS Gen 8.10	IC		<input checked="" type="checkbox"/> N/A
AC Conducted Emissions	FCC	15.207(a)	FCC	ANSI C63.10:2013	<input type="checkbox"/> Pass
	IC	RSS Gen 8.8	IC	RSS Gen Issue 5: 2018	<input checked="" type="checkbox"/> N/A

### DTS Band Requirement

Test Item	Test standard		Test Method/Procedure		Pass / Fail
99% Occupied Bandwidth	-	-	-	-	<input type="checkbox"/> Pass
	IC	RSS Gen 6.6	IC	RSS Gen Issue 5: 2018	<input checked="" type="checkbox"/> N/A
6dB Bandwidth	FCC	15.247(a)(2)	FCC	558074 D01 DTS Meas Guidance v04	<input type="checkbox"/> Pass
	IC	RSS247 (5.2.1)	IC		<input checked="" type="checkbox"/> N/A
Radiated Spurious Emissions	FCC	15.247(d)	FCC	ANSI C63.10:2013 558074 D01 DTS Meas Guidance v04	<input checked="" type="checkbox"/> Pass
	IC	RSS247 (5.5)	IC		<input type="checkbox"/> N/A
Output Power	FCC	15.247(b)	FCC	558074 D01 DTS Meas Guidance v04	<input type="checkbox"/> Pass
	IC	RSS247 (5.4.4)	IC		<input checked="" type="checkbox"/> N/A
Receiver Spurious Emissions	IC	RSS Gen (4.8)	IC	RSS Gen Issue 5: 2018	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
Antenna Gain > 6 dBi	FCC	15.247(e)	FCC	-	<input checked="" type="checkbox"/> Pass
	IC	-	IC	-	<input type="checkbox"/> N/A
Power Spectral Density	FCC	15.247(e)	FCC	558074 D01 DTS Meas Guidance v04	<input type="checkbox"/> Pass
	IC	RSS247 (5.2.2)	IC		<input checked="" type="checkbox"/> N/A
RF Exposure requirement	FCC	15.247(i)	FCC	-	<input type="checkbox"/> Pass
	IC	RSS Gen(5.5)	IC	RSS Gen Issue 5: 2018	<input checked="" type="checkbox"/> N/A
Remark	<ol style="list-style-type: none"> <li>All measurement uncertainties do not take into consideration for all presented test results.</li> <li>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.</li> <li>All the RF testing refer to report no. ER/2017/70042</li> </ol>				



## 9 Measurement Uncertainty

### 9.1 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
<b>Expanded Uncertainty (K=2)</b>					<b>6.0118262</b>

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

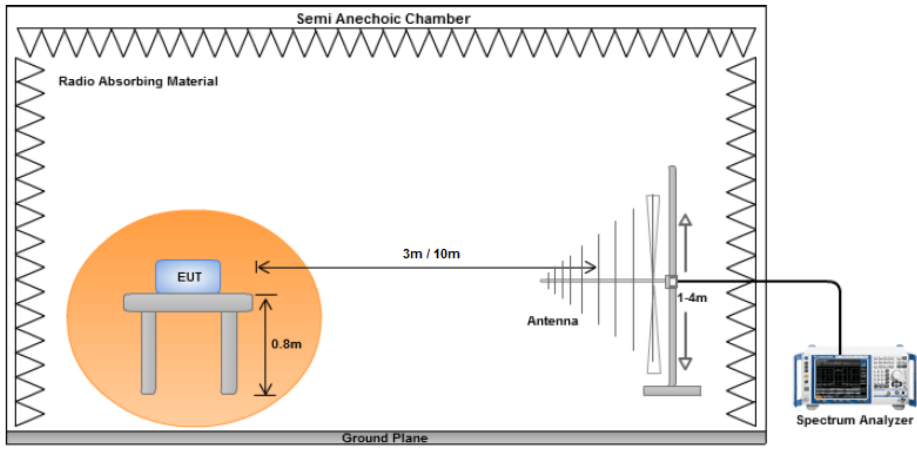
Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.0692840
Cable Insertion Loss	0.21	Normal	2	1	0.1050000
Filter Insertion Loss	0.25	Normal	2	1	0.1250000
Antenna Factor	0.65	Normal	2	1	0.3250000
Receiver 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
<b>Expanded Uncertainty (K=2)</b>					<b>8.4726</b>

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

## 10 Measurements, Examination and Derived Results

### 10.1 Radiated Spurious Emissions below 1GHz

Requirement(s):

Spec	Item	Requirement	Applicable										
47CFR§15.247(d) RSS247 (5.5)	a)	<p>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</p> <table border="1"> <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	200	Above 960	500	☒
Frequency range (MHz)	Field Strength (uV/m)												
30 – 88	100												
88 – 216	150												
216 960	200												
Above 960	500												
Test Setup													
Procedure		<ol style="list-style-type: none"> <li>The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>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: <ol style="list-style-type: none"> <li>Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</li> <li>The EUT was then rotated to the direction that gave the maximum emission.</li> <li>Finally, the antenna height was adjusted to the height that gave the maximum emission.</li> </ol> </li> <li>A Quasi-peak measurement was then made for that frequency point.</li> <li>Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</li> </ol>											
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											

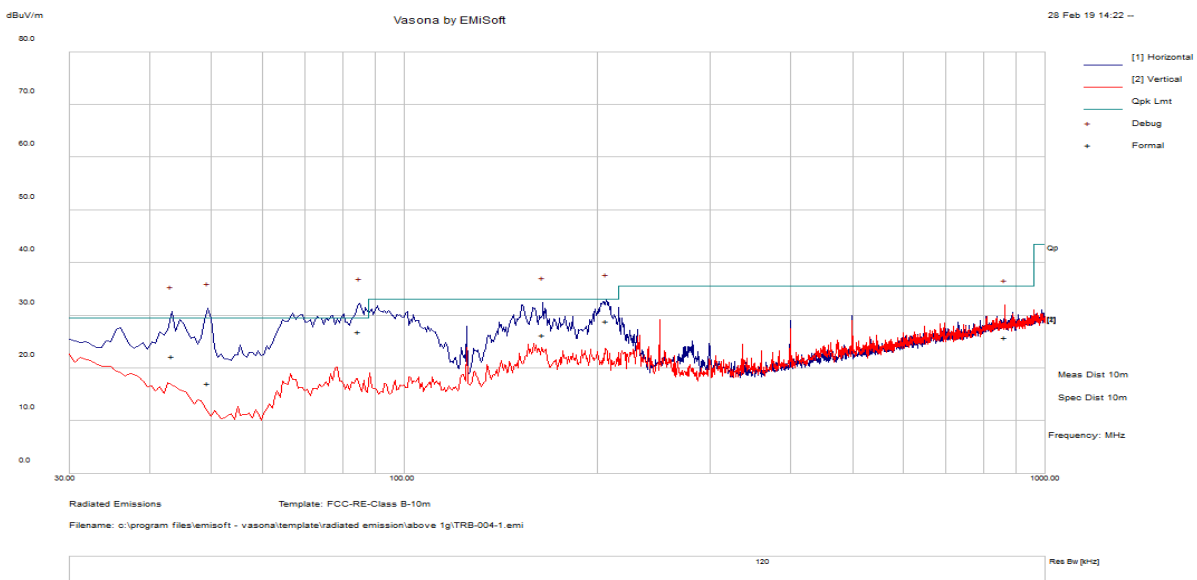
Test Data    ☒ Yes (See below)      ☐ N/A

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

Test was done by Cipher at 10m chamber.

### Radiated Emission Test Results (Below 1GHz)

Test specification	below 1GHz			Result	Pass
Environmental Conditions:	Temp (°C):	26			
	Humidity (%)	47			
	Atmospheric (mbar):	1020			
Mains Power:	120VAC, 60Hz				
Tested by:	Cipher				
Test Date:	02/26/2019-02/28/2019				
Remarks:	802.11b, 2437MHz				

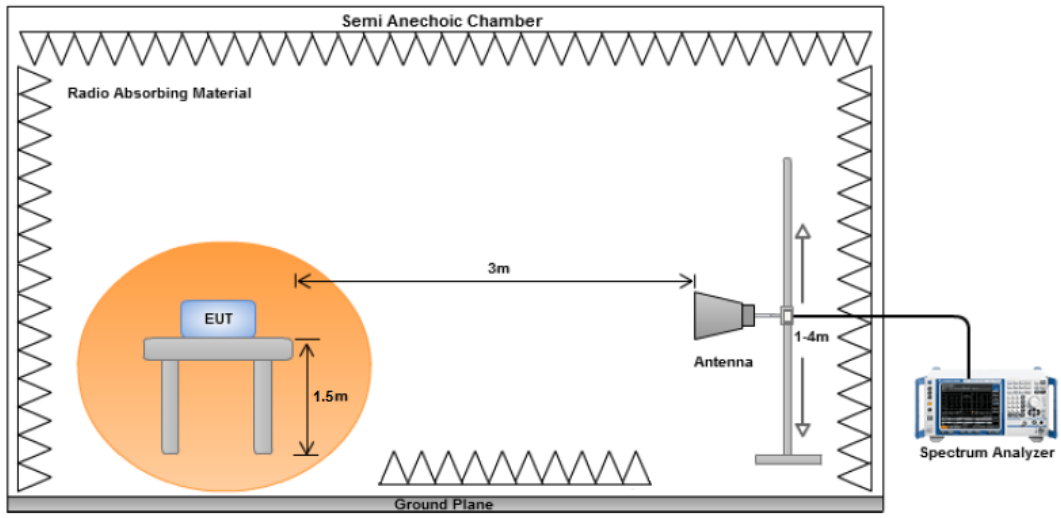


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Po l	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
84.932188	43.26	11.73	-27.99	27.01	Quasi Max	H	123	81	29.5	-2.49	Pass
49.299375	32.6	11.44	-26.87	17.17	Quasi Max	H	159	217	29.5	-12.33	Pass
43.456875	34.34	11.37	-23.47	22.24	Quasi Max	H	125	148	29.5	-7.26	Pass
206.65875	41.7	12.68	-25.39	28.99	Quasi Max	H	188	263	33	-4.01	Pass
164.37969	37.69	12.31	-23.73	26.27	Quasi Max	H	106	120	33	-6.73	Pass
864.24844	24.39	15.6	-14.09	25.9	Quasi Max	V	133	262	35.5	-9.6	Pass

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

## 10.2 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  <input type="checkbox"/> 20 dB down <input checked="" type="checkbox"/> 30 dB down	<input checked="" type="checkbox"/>
	b)	or restricted band, emission must also comply with the radiated emission limits specified in 15.209	<input checked="" type="checkbox"/>
Test Setup			
Procedure	<ol style="list-style-type: none"> <li>The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>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: <ol style="list-style-type: none"> <li>Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</li> <li>The EUT was then rotated to the direction that gave the maximum emission.</li> <li>Finally, the antenna height was adjusted to the height that gave the maximum emission.</li> </ol> </li> <li>An average measurement was then made for that frequency point.</li> <li>Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</li> </ol>		
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	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Test Data     Yes (See below)     N/A

Test Plot     Yes (See below)     N/A

Test was done by Cipher at 3m chamber.

## Radiated Emission Test Results (Above 1GHz)

### BLE - 2402MHz

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
3370.7061	54.91	3.52	-13.74	44.69	Peak Max	H	213	296	74	-29.31	Pass
4804.74	56.16	4.1	-10.91	49.35	Peak Max	V	220	32	74	-24.65	Pass
7600.24218	56.75	5.17	-7.46	54.46	Peak Max	H	161	153	74	-19.54	Pass
3370.7061	48.14	3.52	-13.74	37.92	Average Max	V	213	296	54	-16.08	Pass
4804.74	44.75	4.1	-10.91	37.94	Average Max	H	220	32	54	-16.06	Pass
7600.24218	45.59	5.17	-7.46	43.3	Average Max	H	161	153	54	-10.7	Pass

### BLE - 2440MHz

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
3058.64926	54.47	3.32	-13.94	43.85	Peak Max	H	211	294	74	-30.15	Pass
4881.93	55.24	4.18	-11.03	48.39	Peak Max	V	217	27	74	-25.61	Pass
7951.12437	57.36	5.39	-7.07	55.68	Peak Max	H	166	148	74	-18.32	Pass
3058.64926	49.25	3.32	-13.94	38.63	Average Max	H	211	294	54	-15.37	Pass
4881.93	43.28	4.18	-11.03	36.43	Average Max	H	217	27	54	-17.57	Pass
7951.12437	45.54	5.39	-7.07	43.86	Average Max	H	166	148	54	-10.14	Pass

### BLE - 2480MHz

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
3655.9898	54.91	3.57	-13.37	45.11	Peak Max	H	207	293	74	-28.89	Pass
4960.55	55.23	4.25	-11.16	48.32	Peak Max	H	221	30	74	-25.68	Pass
7274.16575	56.37	5.16	-7.69	53.84	Peak Max	H	170	154	74	-20.16	Pass
3655.9898	48.81	3.57	-13.37	39.01	Average Max	H	207	293	54	-14.99	Pass
4960.55	43.63	4.25	-11.16	36.72	Average Max	V	221	30	54	-17.28	Pass
7274.16575	44.58	5.16	-7.69	42.05	Average Max	H	170	154	54	-11.95	Pass

### 802.11b – 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
3178.24753	55.1	3.41	-13.79	44.72	Peak Max	H	205	299	74	-29.28	Pass
4824.79	55.62	4.12	-10.92	48.82	Peak Max	H	218	29	74	-25.18	Pass
8426.25014	56.49	5.48	-6.93	55.04	Peak Max	V	162	154	74	-18.96	Pass
3178.24753	48.95	3.41	-13.79	38.57	Average Max	V	205	299	54	-15.43	Pass
4824.79	44.23	4.12	-10.92	37.43	Average Max	V	218	29	54	-16.57	Pass
8426.25014	44.83	5.48	-6.93	43.38	Average Max	V	162	154	54	-10.62	Pass

### 802.11b - 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
3158.33002	54.83	3.4	-13.81	44.42	Peak Max	V	211	299	74	-29.58	Pass
4873.16	55.36	4.17	-11.01	48.52	Peak Max	V	216	31	74	-25.48	Pass
8426.8468	56.49	5.48	-6.93	55.04	Peak Max	V	168	153	74	-18.96	Pass
3158.33002	49.32	3.4	-13.81	38.91	Average Max	V	211	299	54	-15.09	Pass
4873.16	43.39	4.17	-11.01	36.55	Average Max	V	216	31	54	-17.45	Pass
8426.8468	44.74	5.48	-6.93	43.29	Average Max	H	168	153	54	-10.71	Pass

### 802.11b – 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
3119.65642	54.68	3.37	-13.83	44.22	Peak Max	V	206	295	74	-29.78	Pass
4924.61	55.26	4.22	-11.11	48.37	Peak Max	V	215	33	74	-25.63	Pass
8005.76296	57.26	5.43	-7.03	55.66	Peak Max	H	162	146	74	-18.34	Pass
3119.65642	48.55	3.37	-13.83	38.09	Average Max	H	206	295	54	-15.91	Pass
4924.61	43.57	4.22	-11.11	36.68	Average Max	V	215	33	54	-17.32	Pass
8005.76296	46.16	5.43	-7.03	44.56	Average Max	V	162	146	54	-9.44	Pass

### 802.11g - 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
3090.85219	54.67	3.34	-13.87	44.14	Peak Max	V	208	292	74	-29.86	Pass
4824.77	55.62	4.12	-10.92	48.82	Peak Max	H	216	34	74	-25.18	Pass
8443.35336	56.7	5.49	-6.91	55.28	Peak Max	H	169	153	74	-18.72	Pass
3090.85219	48.83	3.34	-13.87	38.3	Average Max	V	208	292	54	-15.7	Pass
4824.77	43.88	4.12	-10.92	37.08	Average Max	V	216	34	54	-16.92	Pass
8443.35336	45.12	5.49	-6.91	43.7	Average Max	V	169	153	54	-10.3	Pass

### 802.11g - 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
3877.61249	54.3	3.71	-12.79	45.22	Peak Max	H	206	295	74	-28.78	Pass
4873.02	55.37	4.17	-11.01	48.53	Peak Max	V	224	34	74	-25.47	Pass
8580.96791	56.25	5.56	-6.74	55.07	Peak Max	V	168	153	74	-18.93	Pass
3877.61249	48	3.71	-12.79	38.92	Average Max	V	206	295	54	-15.08	Pass
4873.02	44.21	4.17	-11.01	37.37	Average Max	V	224	34	54	-16.63	Pass
8580.96791	44.31	5.56	-6.74	43.13	Average Max	H	168	153	54	-10.87	Pass

### 802.11g - 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
3056.52185	54.4	3.32	-13.96	43.76	Peak Max	V	212	301	74	-30.24	Pass
4924.26	55.25	4.22	-11.11	48.36	Peak Max	H	217	25	74	-25.64	Pass
8154.87795	57.25	5.38	-7.09	55.54	Peak Max	V	161	151	74	-18.46	Pass
3056.52185	49.04	3.32	-13.96	38.4	Average Max	V	212	301	54	-15.6	Pass
4924.26	43.89	4.22	-11.11	37	Average Max	H	217	25	54	-17	Pass
8154.87795	46.05	5.38	-7.09	44.34	Average Max	H	161	151	54	-9.66	Pass

### 802.11n20 - 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
3993.68268	55.44	3.84	-12.63	46.65	Peak Max	H	212	299	74	-27.35	Pass
4824.44	55.65	4.12	-10.92	48.85	Peak Max	V	217	29	74	-25.15	Pass
8397.8295	58.31	5.46	-6.96	56.81	Peak Max	H	168	151	74	-17.19	Pass
3993.68268	49.98	3.84	-12.63	41.19	Average Max	H	212	299	54	-12.81	Pass
4824.44	44.14	4.12	-10.92	37.34	Average Max	V	217	29	54	-16.66	Pass
8397.8295	47.2	5.46	-6.96	45.7	Average Max	V	168	151	54	-8.3	Pass

### 802.11n20 – 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
3574.46142	54.6	3.58	-13.6	44.58	Peak Max	V	210	292	74	-29.42	Pass
4873.42	55.36	4.17	-11.01	48.52	Peak Max	H	223	28	74	-25.48	Pass
8596.14055	57.21	5.57	-6.7	56.08	Peak Max	H	166	146	74	-17.92	Pass
3574.46142	48.98	3.58	-13.6	38.96	Average Max	V	210	292	54	-15.04	Pass
4873.42	43.42	4.17	-11.01	36.58	Average Max	V	223	28	54	-17.42	Pass
8596.14055	45.23	5.57	-6.7	44.1	Average Max	H	166	146	54	-9.9	Pass

### 802.11n20 - 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
3410.8712	54	3.54	-13.73	43.81	Peak Max	H	208	300	74	-30.19	Pass
4924.25	55.25	4.22	-11.11	48.36	Peak Max	V	224	26	74	-25.64	Pass
8364.92279	57.5	5.43	-7	55.93	Peak Max	H	170	145	74	-18.07	Pass
3410.8712	47.81	3.54	-13.73	37.62	Average Max	V	208	300	54	-16.38	Pass
4924.25	43.26	4.22	-11.11	36.37	Average Max	V	224	26	54	-17.63	Pass
8364.92279	46.38	5.43	-7	44.81	Average Max	H	170	145	54	-9.19	Pass



### 802.11n40 - 2422MHz

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
3971.26027	55.23	3.82	-12.69	46.36	Peak Max	H	208	300	74	-27.64	Pass
4843.22	56.36	4.14	-10.94	49.56	Peak Max	H	223	32	74	-24.44	Pass
8354.67298	57.12	5.43	-7.01	55.54	Peak Max	V	166	154	74	-18.46	Pass
3971.26027	49.14	3.82	-12.69	40.27	Average Max	V	208	300	54	-13.73	Pass
4843.22	44.9	4.14	-10.94	38.1	Average Max	H	223	32	54	-15.9	Pass
8354.67298	45.14	5.43	-7.01	43.56	Average Max	V	166	154	54	-10.44	Pass

### 802.11n40 - 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
3496.89089	54.26	3.58	-13.72	44.12	Peak Max	V	206	292	74	-29.88	Pass
4873.5	55.35	4.17	-11.01	48.51	Peak Max	H	220	27	74	-25.49	Pass
8842.97431	56.94	5.63	-6.23	56.34	Peak Max	V	169	147	74	-17.66	Pass
3496.89089	48	3.58	-13.72	37.86	Average Max	V	206	292	54	-16.14	Pass
4873.5	43.66	4.17	-11.01	36.82	Average Max	H	220	27	54	-17.18	Pass
8842.97431	45.29	5.63	-6.23	44.69	Average Max	V	169	147	54	-9.31	Pass

















### 802.11n40 - 2452MHz








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
3129.38495	54.38	3.37	-13.82	43.93	Peak Max	V	211	294	74	-30.07	Pass
4904.05	55.61	4.2	-11.09	48.72	Peak Max	V	219	29	74	-25.28	Pass
8785.95603	57.39	5.63	-6.36	56.66	Peak Max	H	166	145	74	-17.34	Pass
3129.38495	48.89	3.37	-13.82	38.44	Average Max	V	211	294	54	-15.56	Pass
4904.05	43.84	4.2	-11.09	36.95	Average Max	H	219	29	54	-17.05	Pass
8785.95603	46.32	5.63	-6.36	45.59	Average Max	V	166	145	54	-8.41	Pass

## Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
<b>Radiated Emissions</b>						
Keysight EXA 44GHz Spectrum Analyzer	N9010A	MY51440112	11/16/2018	1 Year	11/16/2019	<input checked="" type="checkbox"/>
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	03/09/2018	2 Year	03/09/2020	<input checked="" type="checkbox"/>
Horn Antenna (1GHz~26GHz)	3115	100059	11/09/2018	1 Year	11/09/2019	<input checked="" type="checkbox"/>
Horn Antenna (26GHz~40GHz)	AH-840	101013	08/27/2018	1 Year	08/28/2019	<input checked="" type="checkbox"/>
Pre-Amp (30MHz~40GHz)	LPA-6-30	11140711	02/09/2019	1 Year	02/10/2020	<input checked="" type="checkbox"/>

## 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		<a href="#">A1</a> , <a href="#">A2</a> , <a href="#">A3</a> , <a href="#">A4</a> , <a href="#">B1</a> , <a href="#">B2</a> , <a href="#">B3</a> , <a href="#">B4</a> , 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		<b>Radio &amp; Telecommunications Terminal Equipment:</b> EN45001 – EN ISO/IEC 17025
		<b>Electromagnetic Compatibility:</b> EN45001 – EN ISO/IEC 17025
Singapore iDA CB(Certification Body)	 	<a href="#">Phase I</a> , <a href="#">Phase II</a>
Vietnam MIC CAB Accreditation		Please see the document for the detailed scope
Hong Kong OFCA		<b>(Phase II)</b> OFCA Foreign Certification Body for Radio and Telecom
		<b>(Phase I)</b> Conformity Assessment Body for Radio and Telecom
Industry Canada CAB		<b>Radio:</b> Scope A – All Radio Standard Specification in Category I
		<b>Telecom:</b> CS-03 Part I, II, V, VI, VII, VIII

Japan Recognized Certification Body Designation		<p><b>Radio:</b> A1. Terminal equipment for purpose of calling</p> <p><b>Telecom:</b> B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law</p>
Korea CAB Accreditation		<p><b>EMI:</b> KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI</p> <p><b>EMS:</b> 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</p>
		<p><b>Radio:</b> 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</p> <p><b>Telecom:</b> 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</p>
Taiwan NCC CAB Recognition		LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08
Taiwan BSMI CAB Recognition		CNS 13438
Japan VCCI		<p>R-3083: Radiation 3 meter site</p> <p>C-3421: Main Ports Conducted Interference Measurement</p> <p>T-1597: Telecommunication Ports Conducted Interference Measurement</p>
Australia CAB Recognition		<p><b>EMC:</b> AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4</p>
		<p><b>Radio communications:</b> 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</p>
		<p><b>Telecommunications:</b> 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</p>
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