



RF TEST REPORT



Report No.: FCC_IC_RF_SL18102901-JPS-004_DSS
Supersede Report No.:

Applicant	:	Juniper Systems, Inc.
Product Name	:	Ultra-rugged Handheld computer
Model No.	:	AR3
Test Standard	:	47 CFR 15.247 RSS-247 Issue 2, May 2017
Test Method	:	ANSI C63.10: 2013 RSS-Gen Issue 4, Nov 2014 FCC Public Notice DA 00-705
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 <input checked="" type="checkbox"/>		
Equipment did not comply with the specification <input type="checkbox"/>		

This Test Report is Issued Under the Authority of:

	
Cipher	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.



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/RRR, 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 & 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_SL18102901-JPS-004_DSS	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 1st 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
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	:	DSSS
Port/Connectors	:	USB, Micro-USB, Serial

6.2 Spec for BT Radio

Radio Type	Bluetooth (BDR+EDR)
Operating Frequency	2402MHz-2480MHz
Modulation	FHSS (BDR, EDR)
Channel Spacing	1MHz (BDR, EDR)
Antenna Type	PCB
Antenna Gain	2.28 dBi
Antenna Connector Type	PCB

Channel List

Type	Channel No.	Frequency (MHz)	Power Setting
Bluetooth(BRD) 2402-2480MHz	0	2402	8
	39	2441	8
	78	2480	8
Bluetooth(EDR) 2402-2480MHz	0	2402	8
	39	2441	8
	78	2480	8

6.3 EUT test modes/configuration Description

Mode	Note
Bluetooth	BDR (GFSK)
Bluetooth	EDR (8-DPSK)

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
Antenna Requirement	FCC	15.203	FCC	ANSI C63.10 – 2013 558074 D01 DTS Meas. Guidance v03r02	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
	IC	-	IC		
Restricted Band of Operation	FCC	15.205	FCC	ANSI C63.10: 2013 Public Notice DA 00-705	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
	IC	RSS Gen 8.10	IC	RSS Gen Issue 4: 2014	
AC Conducted Emissions Voltage	FCC	15.207(a)	FCC	ANSI C63.10: 2013	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
	IC	RSS Gen 8.8	IC	RSS Gen Issue 4: 2014	

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	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
	IC	RSS247 (5.1.5)	IC	-	
20dB Occupied Bandwidth	FCC	15.247(a)(1)	FCC	Public Notice DA 00-705	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
	IC	RSS247 (5.1.2)	IC	-	
99% Occupied Bandwidth	FCC	15.247(a)(2)	FCC		<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
	IC	RSS Gen 6.6	IC	RSS Gen Issue 4: 2014 -	
Number of Hopping Channels	FCC	15.247(a)(1)	FCC	Public Notice DA 00-705	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
	IC	RSS247 (5.1.5)	IC	-	
Band Edge and Radiated Spurious Emissions	FCC	15.247(d)	FCC	Public Notice DA 00-705	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
	IC	RSS247(5.5)	IC	-	
Time of Occupancy	FCC	15.247(a)(1)	FCC	Public Notice DA 00-705	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
	IC	RSS247 (5.1.5)	IC	-	
Output Power	FCC	15.247(b)	FCC	Public Notice DA 00-705	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
	IC	RSS247 (5.4.2)	IC	-	
Receiver Spurious Emissions	FCC	15.247(d)	FCC	-	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
	IC	RSS Gen (7.1)	IC	RSS Gen (7.1)	
Antenna Gain > 6 dBi	FCC	15.247(e)	FCC	Public Notice DA 00-705	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
	IC	RSS247 (5.4.6)	IC	-	
Power Spectral Density	FCC	15.247(e)	FCC	Public Notice DA 00-705	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
	IC	RSS247 (5.2.2)	IC	-	
Hybrid System Requirement	FCC	15.247(f)	FCC	Public Notice DA 00-705	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
	IC	RSS247 (5.3)	IC	-	
Hopping Capability	FCC	15.247(g)	FCC	Public Notice DA 00-705	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
	IC	RSS247 (5.1.5)	IC	-	
RF Exposure requirement	FCC	15.247(i)	FCC	Public Notice DA 00-705	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
	IC	RSS Gen(3.2)	IC	-	
Remark	<ol style="list-style-type: none"> All measurement uncertainties are not taken into consideration for all presented test result. 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. 				

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

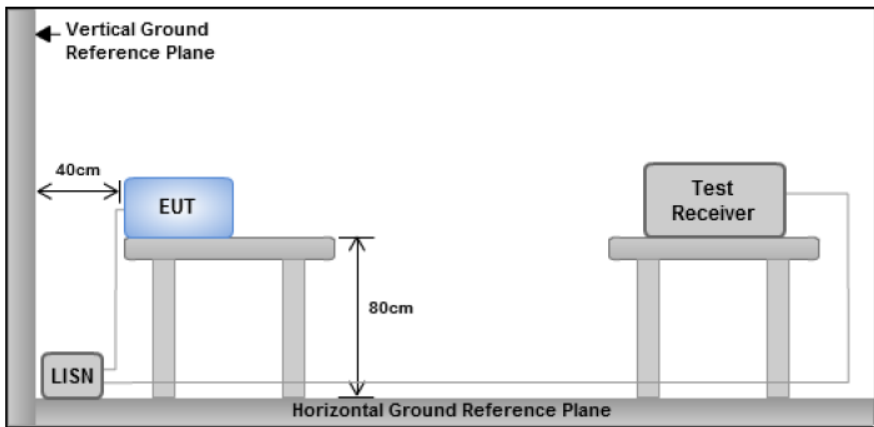
10.1 Antenna Requirement

Spec	Requirement	Applicable
§15.203	<p>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.</p> <p>Antenna requirement must meet at least one of the following:</p> <p>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.</p>	☒
Remark	The EUT uses a u.fl connector for antenna connection which meet the requirement.	
Result	☒ PASS ☐ FAIL	

10.2 Conducted Emissions

Conducted Emission Limit

Frequency ranges (MHz)	Limit (dBuV)	
	QP	Average
0.15 ~ 0.5	66 – 56	56 – 46
0.5 ~ 5	56	46
5 ~ 30	60	50

Spec	Item	Requirement	Applicable
47CFR§15.207 RSS Gen 8.8	a)	For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequency ranges.	<input checked="" type="checkbox"/>
Test Setup	 <p style="text-align: center;"> Note: 1. Support units were connected to second LISN. 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes </p>		
Procedure	<ul style="list-style-type: none"> - The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table, as shown in Annex B. - The power supply for the EUT was fed through a 50Ω/50μH EUT LISN, connected to filtered mains. - The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable. - All other supporting equipment was powered separately from another main supply. 		
Remark	EUT tested with AC 120V 60Hz		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

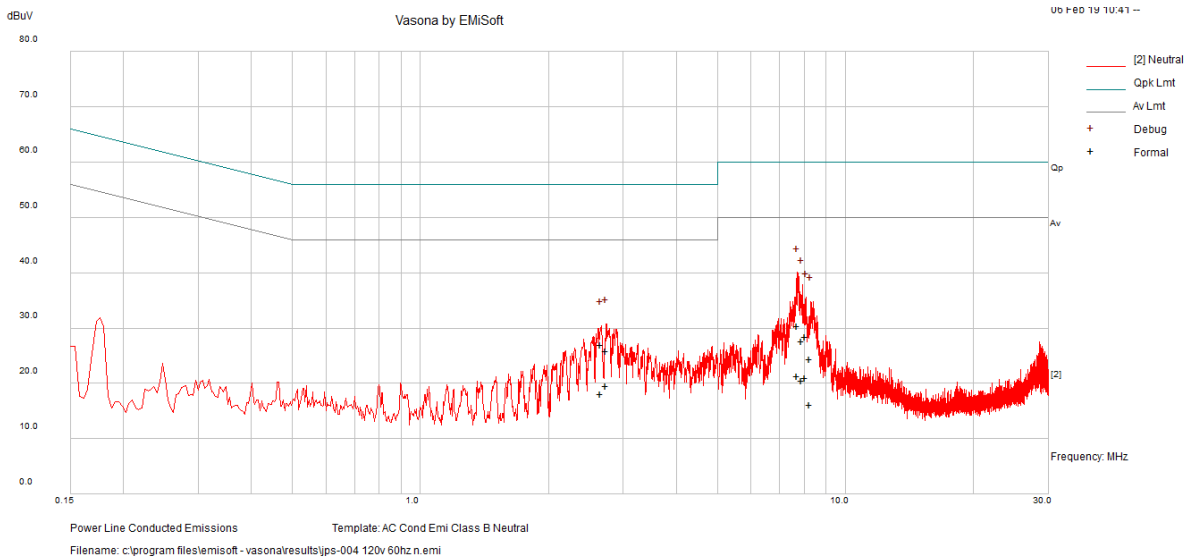
Test Data Yes N/A

Test Plot Yes (See below) N/A

Test was done by George Hsu at Conducted Emission Test Site.

Conducted Emission Test Results

Test specification:	Conducted Emissions			Result:	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Environmental Conditions:	Temp(°C):	47.3			
	Humidity (%):	17.6			
	Atmospheric(mbar):	999.3			
Mains Power:	120Vac, 60Hz				
Tested by:	Han He				
Test Date:	02/06/2019				
Remarks	AC Line @ Neutral				



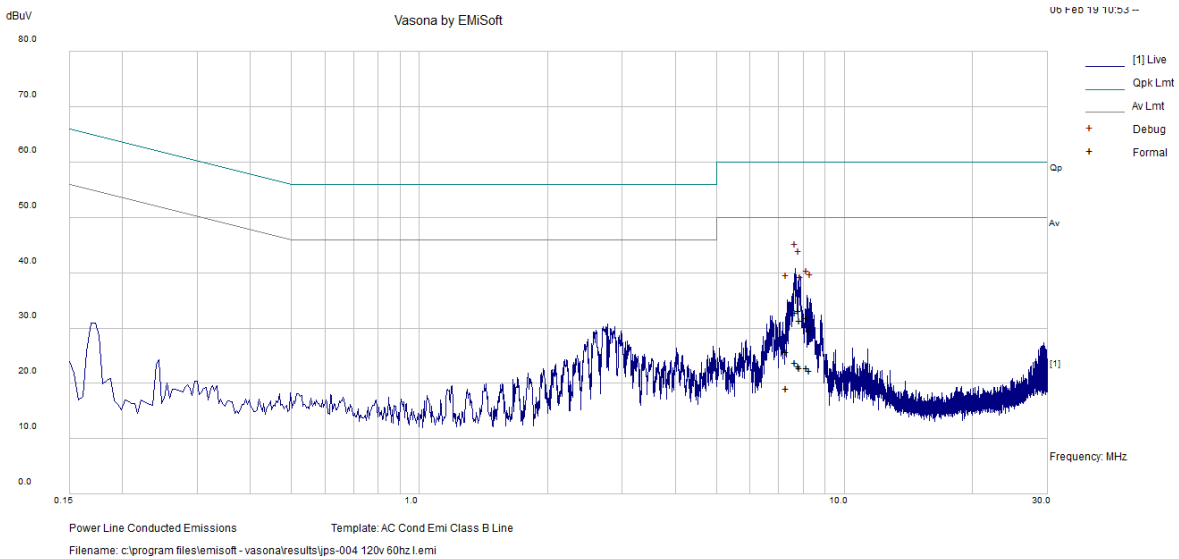
Neutral Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line	Limit (dBuV)	Margin (dB)	Pass /Fail
2.666515	19.03	7.91	0.06	27.01	Quasi Peak	Neutral	56	-28.99	Pass
2.733026	17.89	7.92	0.06	25.87	Quasi Peak	Neutral	56	-30.13	Pass
7.71679	21.9	8.27	0.16	30.33	Quasi Peak	Neutral	60	-29.67	Pass
7.920044	19.15	8.27	0.17	27.6	Quasi Peak	Neutral	60	-32.4	Pass
8.073758	20.05	8.28	0.18	28.51	Quasi Peak	Neutral	60	-31.49	Pass
8.280401	15.99	8.29	0.19	24.47	Quasi Peak	Neutral	60	-35.53	Pass
2.666515	10.13	7.91	0.06	18.11	Average	Neutral	46	-27.89	Pass
2.733026	11.58	7.92	0.06	19.56	Average	Neutral	46	-26.44	Pass
7.71679	12.89	8.27	0.16	21.32	Average	Neutral	50	-28.68	Pass
7.920044	12.01	8.27	0.17	20.45	Average	Neutral	50	-29.55	Pass
8.073758	12.56	8.28	0.18	21.01	Average	Neutral	50	-28.99	Pass
8.280401	7.66	8.29	0.19	16.14	Average	Neutral	50	-33.86	Pass

Note: The results above show only the worst case.

Conducted Emission Test Results

Test specification:	Conducted Emissions			Result:	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Environmental Conditions:	Temp(°C):	47.3			
	Humidity (%):	17.6			
	Atmospheric(mbar):	999.3			
Mains Power:	120Vac, 60Hz				
Tested by:	Han He				
Test Date:	02/06/2019				
Remarks	AC Line @ Line				



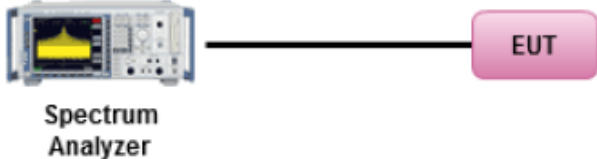
Line Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line	Limit (dBuV)	Margin (dB)	Pass /Fail
7.332299	17.25	8.26	0.12	25.63	Quasi Peak	Line	60	-34.37	Pass
7.675086	24.42	8.27	0.14	32.83	Quasi Peak	Line	60	-27.17	Pass
7.840299	24.66	8.27	0.14	33.07	Quasi Peak	Line	60	-26.93	Pass
7.892137	22.88	8.27	0.15	31.3	Quasi Peak	Line	60	-28.7	Pass
8.170297	23.35	8.29	0.16	31.79	Quasi Peak	Line	60	-28.21	Pass
8.322018	21.09	8.3	0.16	29.55	Quasi Peak	Line	60	-30.45	Pass
8.322018	13.78	8.3	0.16	22.23	Average	Line	50	-27.77	Pass
7.332299	10.71	8.26	0.12	19.09	Average	Line	50	-30.91	Pass
7.675086	15.33	8.27	0.14	23.74	Average	Line	50	-26.26	Pass
7.840299	14.76	8.27	0.14	23.18	Average	Line	50	-26.82	Pass
7.892137	14.42	8.27	0.15	22.83	Average	Line	50	-27.17	Pass
8.170297	14.4	8.29	0.16	22.85	Average	Line	50	-27.15	Pass

Note: The results above show only the worst case.

10.3 Channel Separation (Bluetooth BDR/EDR)

Requirement(s):

Spec	Item	Requirement	Applicable
47 CFR §15.247 (e) RSS-247 (A2.6)	a)	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.	<input checked="" type="checkbox"/>
Test Setup	 <p style="text-align: center;">Spectrum Analyzer ————— EUT</p>		
Test Procedure	<p>DA 00-705 Measurement Guidelines for Frequency Hopping Spread Spectrum Systems</p> <p><u>Channel Separation procedure</u></p> <ul style="list-style-type: none"> - The EUT must have its hopping function enabled. - Span = wide enough to capture the peaks of two adjacent channels - Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span - Video (or Average) Bandwidth (VBW) ≥ RBW. - Detector = Peak. - Trace mode = max hold. - Use the marker-delta function to determine the separation between the peaks of the adjacent channels. 		
Test Date	10/23/2018	Environmental condition	Temperature 21°C Relative Humidity 46% Atmospheric Pressure 1019mbar
Remark	NONE		
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 *Rachana Khanduri* at *RF Test Site*.

Configuration : Bluetooth Mode , BDR Mode

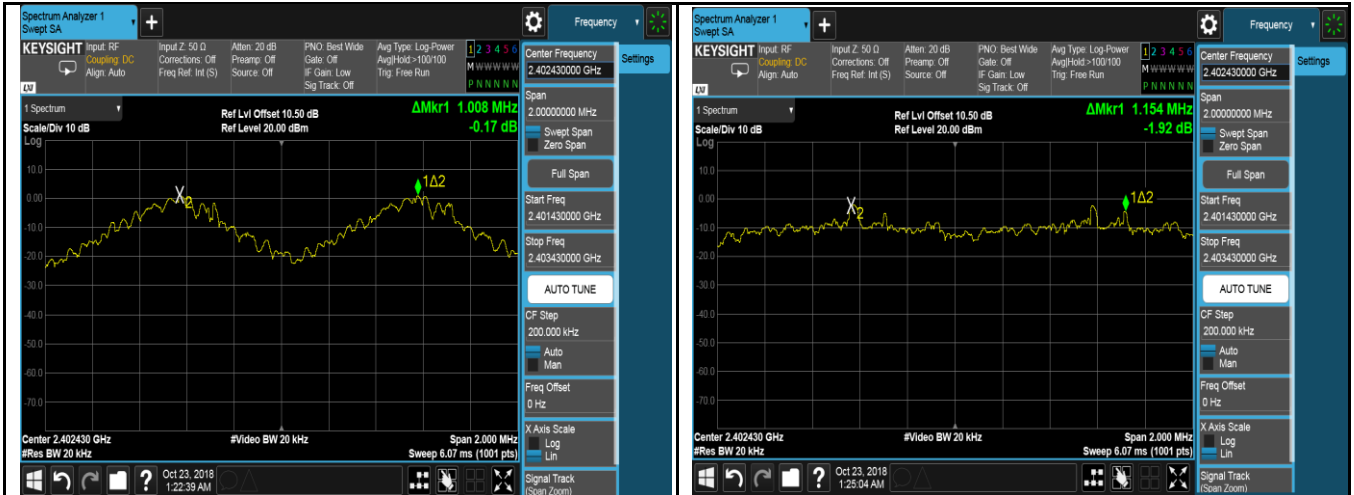
Channel	Channel Frequency (MHz)	Channel Separation (MHz)	>2/3 20dB Bandwidth (MHz)	Pass/Fail
Low	2402	1.008	>0.613	Pass
Mid	2441	1.034	>0.614	Pass
High	2480	1.002	>0.613	Pass

Configuration : Bluetooth Mode , EDR Mode

Channel	Channel Frequency (MHz)	Channel Separation (MHz)	>2/3 20dB Bandwidth (MHz)	Pass/Fail
Low	2402	1.154	>0.831	Pass
Mid	2441	1.026	>0.832	Pass
High	2480	1.014	>0.833	Pass

Note: The results of 20dB BW can be found in section 10.3.

Channel Separation Test Plot (Bluetooth BDR/EDR)



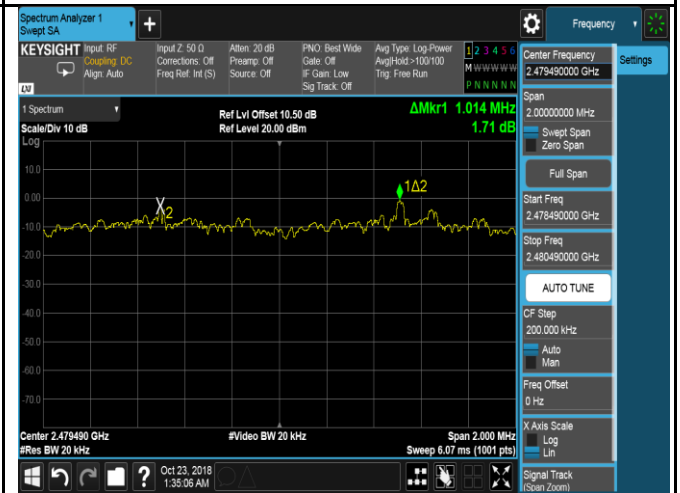
Channel Separation-BDR 2402MHz

Channel Separation-EDR 2402MHz



Channel Separation-BDR 2441MHz

Channel Separation-EDR 2441MHz

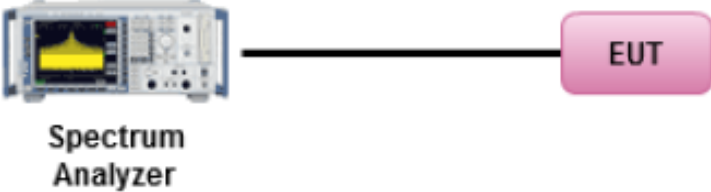


Channel Separation-BDR 2480MHz

Channel Separation-EDR 2480MHz

10.4 20dB and 99% Occupied Bandwidth (Bluetooth BDR/EDR)

Requirement(s):

Spec	Requirement	Applicable									
47 CFR §15.247	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 2/3 of 20 dB bandwidth of the hopping channel, whichever is greater.	<input checked="" type="checkbox"/>									
RSS Gen 4.6.1	The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual. The trace data points are recovered and directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth	<input checked="" type="checkbox"/>									
Test Setup	 <p style="text-align: center;">Spectrum Analyzer EUT</p>										
Procedure	<p><u>20dB Emission bandwidth measurement procedure</u></p> <ul style="list-style-type: none"> - Set RBW \geq 1% of 20dB Bandwidth - Set the video bandwidth (VBW) \geq RBW. - Detector = Peak. - Trace mode = max hold. - Sweep = auto couple. - Allow the trace to stabilize. - Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. <p><u>99% bandwidth measurement procedure</u></p> <ol style="list-style-type: none"> 1. EUT was set for low , mid, high channel with modulated mode and highest RF output power. 2. The spectrum analyzer was connected to the antenna terminal. 										
Test Date	10/23/2018	<table border="1"> <tr> <td>Environmental condition</td> <td>Temperature</td> <td>23oC</td> </tr> <tr> <td></td> <td>Relative Humidity</td> <td>47%</td> </tr> <tr> <td></td> <td>Atmospheric Pressure</td> <td>1019mbar</td> </tr> </table>	Environmental condition	Temperature	23oC		Relative Humidity	47%		Atmospheric Pressure	1019mbar
Environmental condition	Temperature	23oC									
	Relative Humidity	47%									
	Atmospheric Pressure	1019mbar									
Remark	-										
Result	<input 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 *Rachana Khanduri* at RF Test Site.

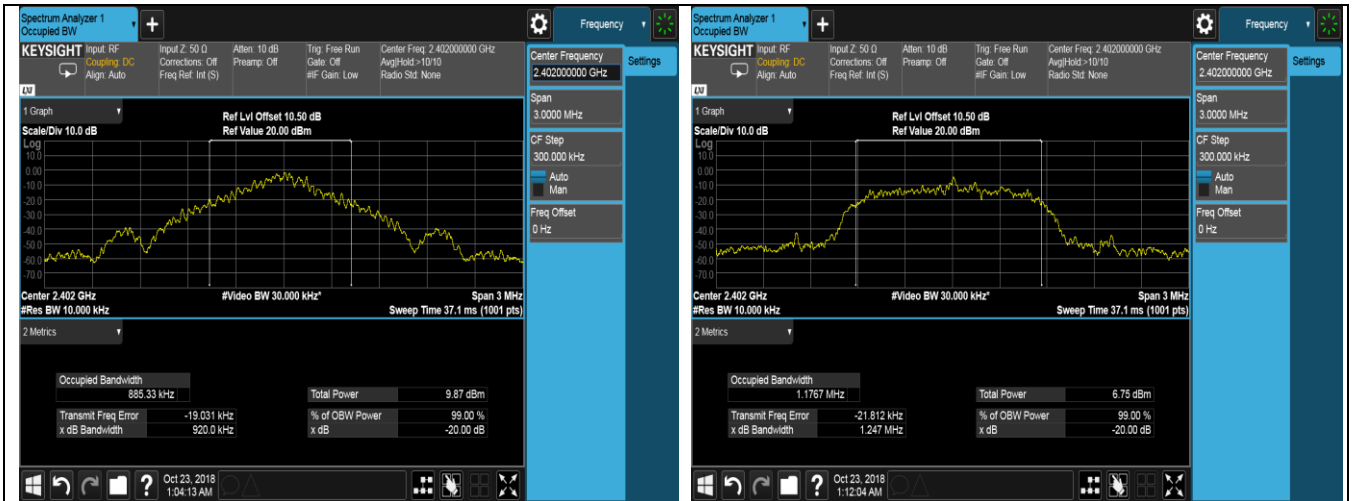
Configuration : Bluetooth mode , BDR Mode

Channel	Channel Frequency (MHz)	OBW		2/3 20dB Bandwidth (KHz)
		99% (KHz)	20dB(KHz)	
Low	2402	885.33	920.00	613.33
Mid	2441	881.26	920.80	613.87
High	2480	884.93	919.70	613.13

Configuration : Bluetooth mode , EDR mode

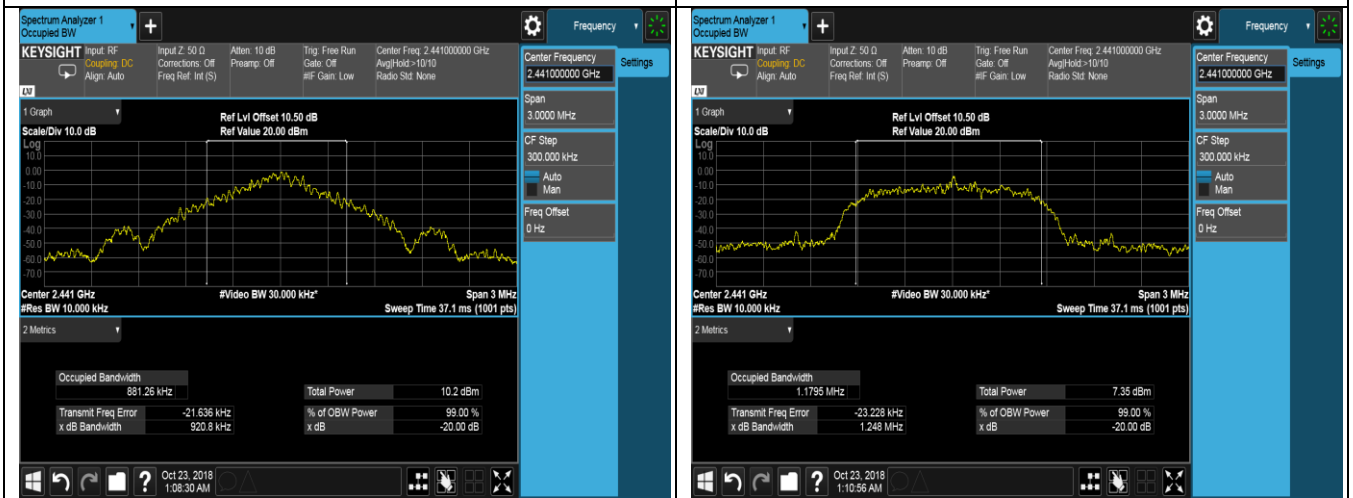
Channel	Channel Frequency (MHz)	OBW		2/3 20dB Bandwidth (MHz)
		99%(MHz)	20dB(MHz)	
Low	2402	1.177	1.247	0.831
Mid	2441	1.180	1.248	0.832
High	2480	1.180	1.250	0.833

99% & 20dB Bandwidth Test Plots(Bluetooth BDR, EDR)



99% and 20dB BW –Bluetooth BDR 2402MHz

99% and 20dB BW –Bluetooth EDR 2402MHz



99% and 20dB BW –Bluetooth BDR 2441MHz

99% and 20dB BW –Bluetooth EDR 2441MHz

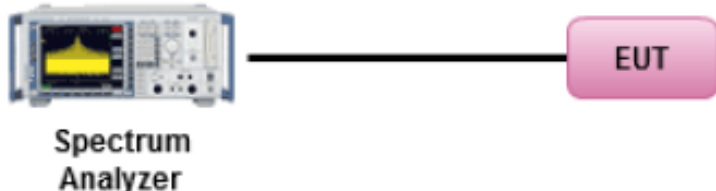


99% and 20dB BW –Bluetooth BDR 2480MHz

99% and 20dB BW –Bluetooth EDR 2480MHz

10.5 Number of Hopping Channel (Bluetooth BDR/EDR)

Requirement(s):

Spec	Requirement	Applicable
47 CFR §15.247 RSS247 (5.1.5)	For frequency hopping systems in the 2400-2483.5MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850MHz band: below 1 Watt (inclusive).	<input checked="" type="checkbox"/>
Test Setup	 <p>Spectrum Analyzer</p>	
Procedure	<u>Number of hopping frequencies procedure</u> <ol style="list-style-type: none"> 1. The EUT must have its hopping function enabled 2. Span = the frequency band of operation. 3. Resolution (or IF) Bandwidth (RBW) \geq 1% of the span. 4. Video (or Average) Bandwidth (VBW) \geq RBW. 5. Detector = peak. 6. Sweep time = auto couple. 7. Trace mode = max hold. 8. Allow trace to fully stabilize. 9. Save the plot 	
Test Date	10/23/2018	Environmental condition Temperature 23oC Relative Humidity 47% Atmospheric Pressure 1019mbar
Remark	-	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	

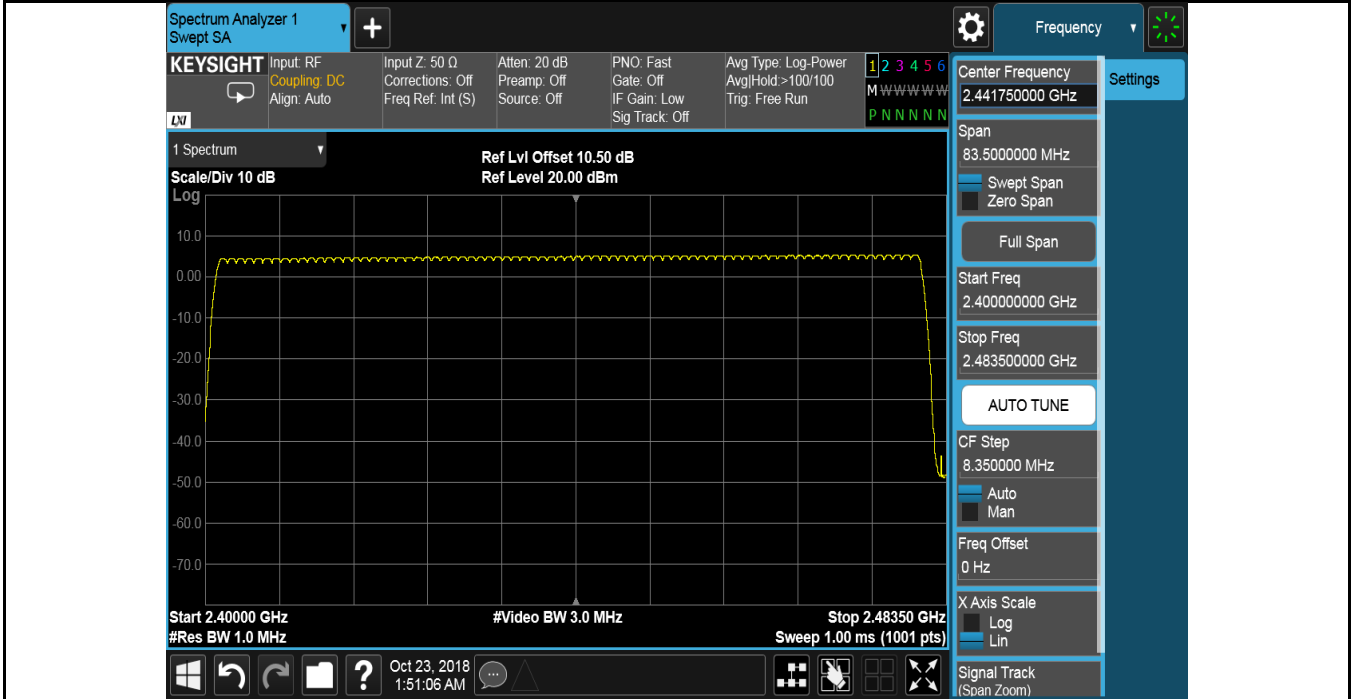
Test Data Yes (See below) N/A

Test Plot Yes (See below) N/A

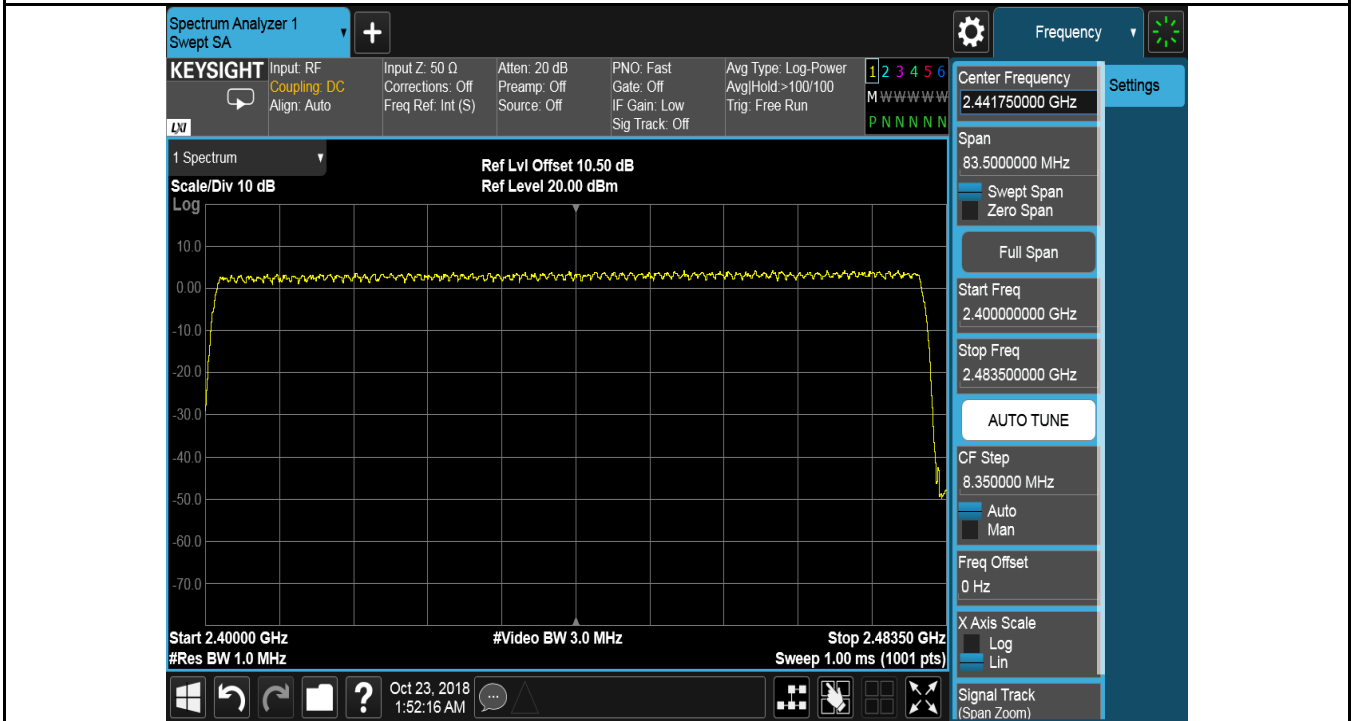
Test was done by *Rachana Khanduri* at *RF Test Site*.

Channel Number	Limit	Pass/Fail
79	>15	Pass

Hopping Channel Test Plots(Bluetooth BDR, EDR)



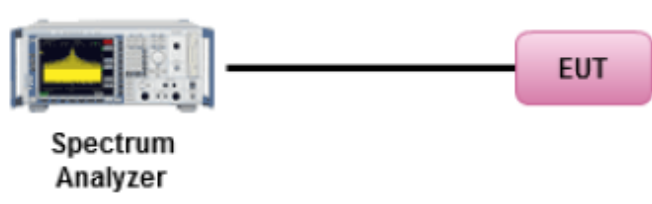
BDR – 79 Channels



EDR – 79 Channels

10.6 Time of Occupancy (Bluetooth BDR/EDR)

Requirement(s):

Spec	Requirement	Applicable
47 CFR §15.247 RSS247 (5.1.5)	Frequency hopping systems in the 2400-2483.5MHz band shall use at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems which use fewer than 75 hopping frequencies may employ intelligent hopping techniques to avoid interference to other transmissions.	<input checked="" type="checkbox"/>
Test Setup	 <p style="text-align: center;">Spectrum Analyzer</p>	
Test Procedure	DA 00-705 Measurement Guidelines for Frequency Hopping Spread Spectrum Systems <u>Channel Separation procedure</u> <ul style="list-style-type: none"> - The EUT must have its hopping function enabled. - Span = zero span - centered on a hopping channel - RBW = 1 MHz; VBW ≥ RBW - Sweep = as necessary to capture the entire dwell time per hopping channel. - Detector = Peak. - Trace mode = max hold. - If possible, use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. 	
Test Date	10/23/2018	Environmental condition Temperature 21°C Relative Humidity 46% Atmospheric Pressure 1019mbar
Remark	Dwell Time=Pulse time*(1600/6/79)*31.6s	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	

Test Data Yes (See below) N/A

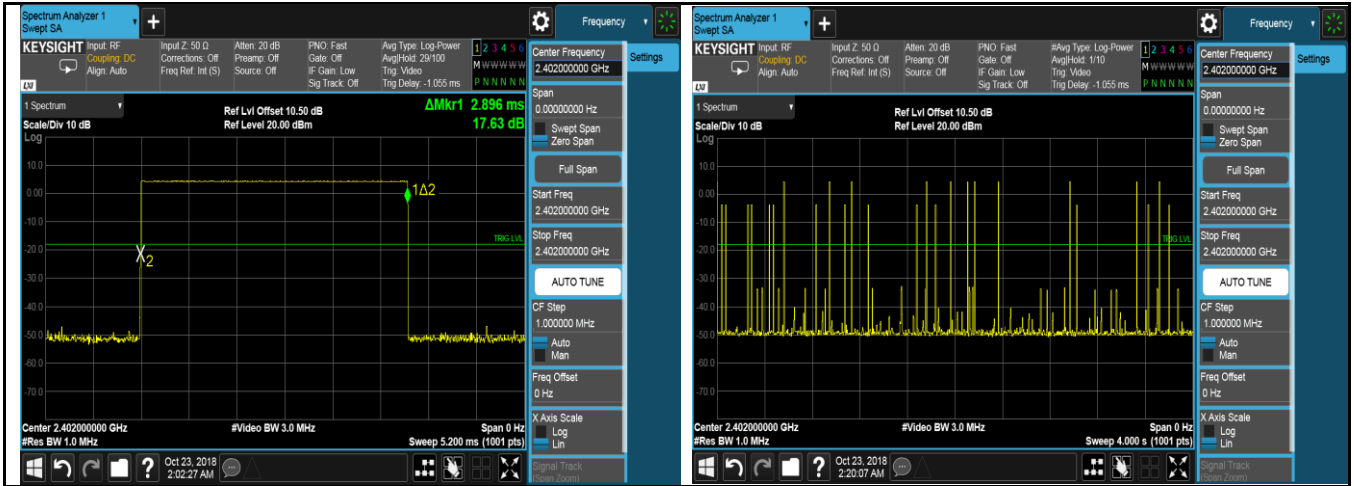
Test Plot Yes (See below) N/A

Test was done by *Rachana Khanduri* at RF Test Site.

Bluetooth-BDR-EDR Dwell Time Measurements:

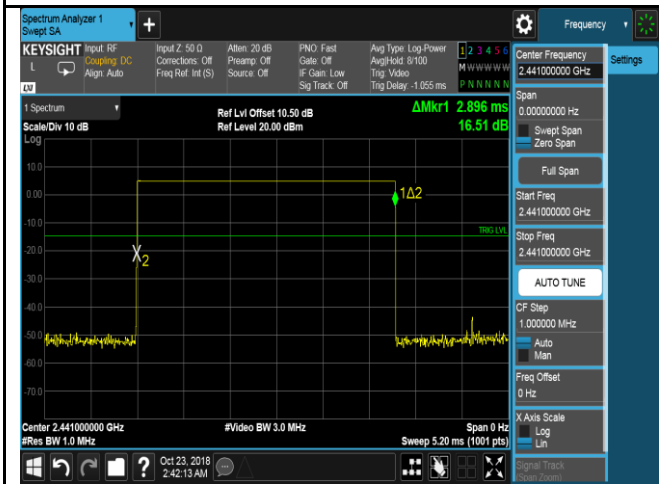
Type	Channel Frequency (MHz)	Number of Hopping	Number of Transmission in a period (Channel Number X 0.4 Sec)				Length of transmission on-time (Sec)	Dwell Time (Sec)	Limit (Sec)	Result
			Period (Sec)	Sweep Time (Sec)	Times in a sweep	Times in a period				
BDR	2402 MHz	79	31.6	4	12	94.80	0.0029	0.27	≤0.4	Pass
BDR	2441 MHz	79	31.6	4	13	102.70	0.0029	0.30	≤0.4	Pass
BDR	2480 MHz	79	31.6	4	9	71.10	0.0029	0.21	≤0.4	Pass
EDR	2402 MHz	79	31.6	4	7	55.30	0.0029	0.16	≤0.4	Pass
EDR	2441 MHz	79	31.6	4	8	63.20	0.0029	0.18	≤0.4	Pass
EDR	2480 MHz	79	31.6	4	7	55.30	0.0029	0.16	≤0.4	Pass

Time of Occupancy Test Plot (Bluetooth BDR/EDR)



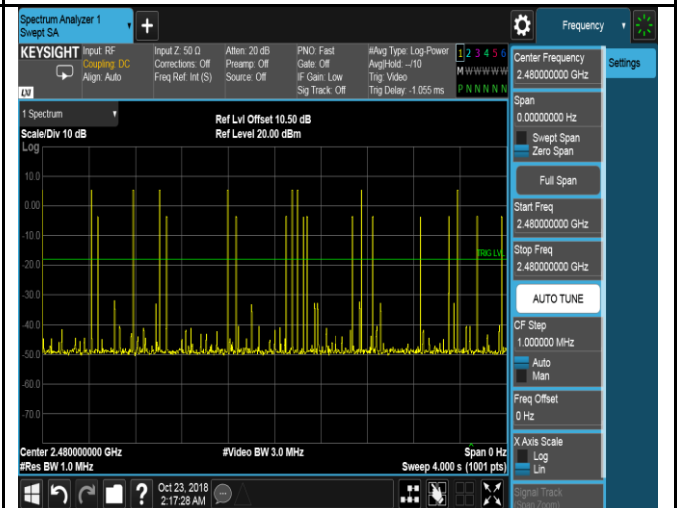
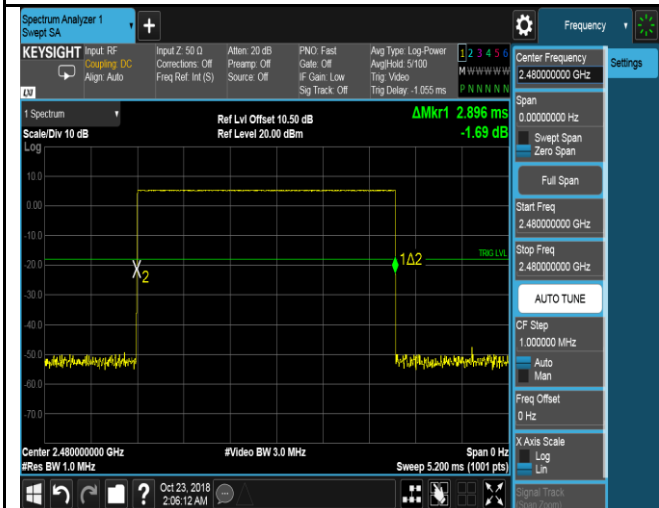
BDR Low Channel (On-Time)

BDR Low Dwell Time-Number of Hopping



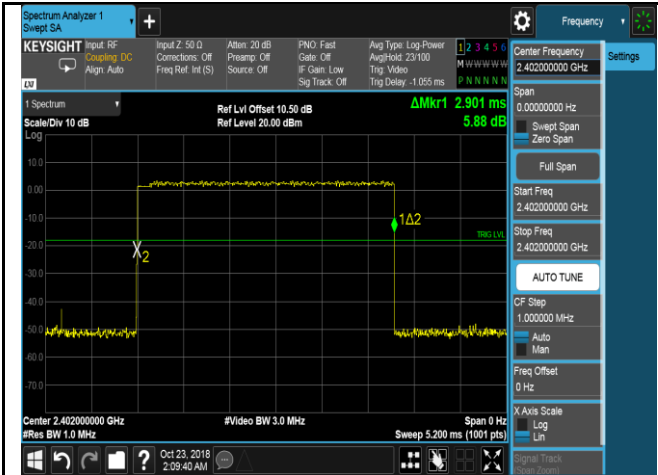
BDR Middle Channel (On-Time)

BDR Middle Dwell Time-Number of Hopping

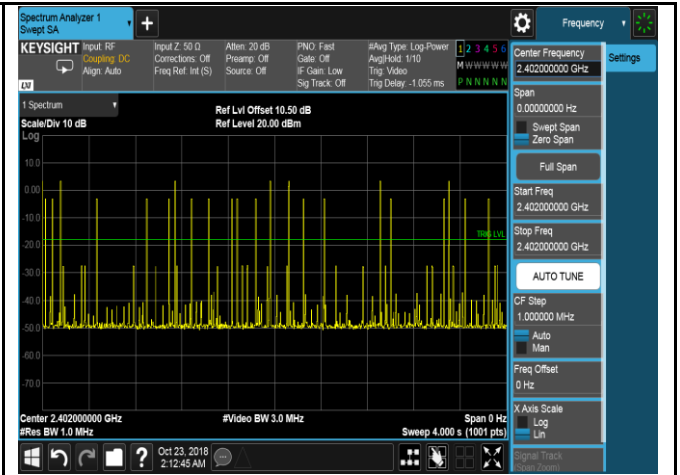


BDR High Channel (On-Time)

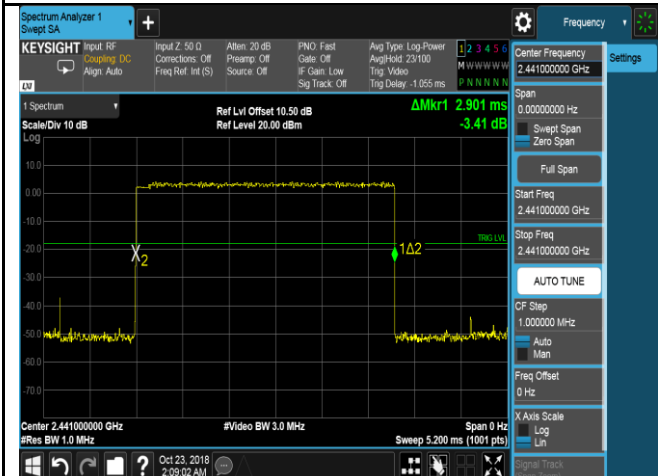
BDR High Dwell Time-Number of Hopping



EDR Low Channel (On-Time)



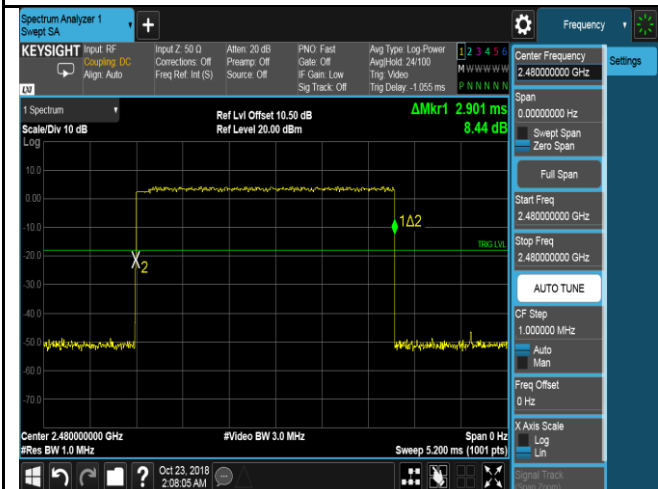
EDR Low Dwell Time-Number of Hopping



EDR Middle Channel (On-Time)



EDR Middle Dwell Time-Number of Hopping



EDR High Channel (On-Time)

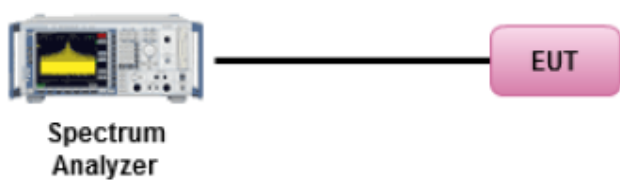


EDR High- Dwell Time-Number of Hopping

Note: The results above show only the worst case. DH5 used for testing.

10.7 Peak Output Power (Bluetooth BDR/EDR)

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247	a)	For frequency hopping systems in the 2400-2483.5MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850MHz band: below 1 Watt (inclusive).	<input checked="" type="checkbox"/>
	b)	Power reduction (antenna gain > 6dBi)	<input type="checkbox"/>
§ 15.247		Frequency hopping systems operated in 2400-2483.5MHz with output power not greater than 125mW, the intervals of hopping channel carrier frequencies shall not be less than 25kHz or two thirds of the 20dB bandwidth of the hopping channel, whichever is greater.	<input type="checkbox"/>
Test Setup	 <p style="text-align: center;">Spectrum Analyzer ————— EUT</p>		
Test Procedure	<p><u>Maximum output power measurement procedure</u></p> <ul style="list-style-type: none"> - Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel. - RBW > 20 dB bandwidth of the emission being measured; - VBW ≥ RBW. - Detector = peak. - Sweep time = auto couple. - Trace mode = max hold. - Allow trace to fully stabilize. - Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power. 		
Test Date	10/23/2018	Environmental condition	Temperature 21°C Relative Humidity 46% Atmospheric Pressure 1019mbar
Remark	NONE		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Test Data Yes N/A

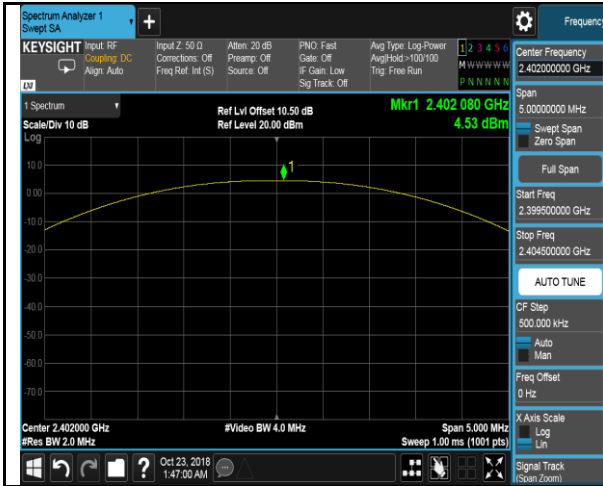
Test Plot Yes N/A

Test was done by *Rachana Khanduri* at *RF Test Site*.

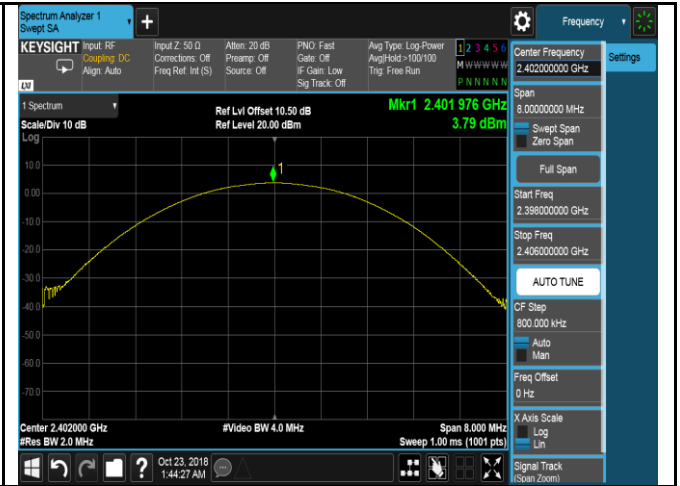
Output Power measurement results

Type	Freq (MHz)	Test mode	CH	Conducted Power (dBm)	Limit (dBm)	Result
Output power	2402	Bluetooth BDR	Low	4.53	≤30	Pass
	2441	Bluetooth BDR	Mid	5.19	≤30	Pass
	2480	Bluetooth BDR	High	5.42	≤30	Pass
	2402	Bluetooth EDR	Low	3.79	≤30	Pass
	2441	Bluetooth EDR	Mid	4.44	≤30	Pass
	2480	Bluetooth EDR	High	4.81	≤30	Pass

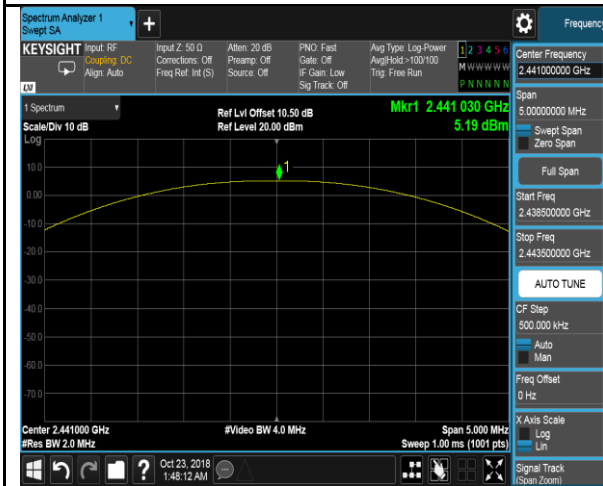
Peak Output Power Test Plot (Bluetooth BDR/EDR)



Output power - BDR 2402MHz



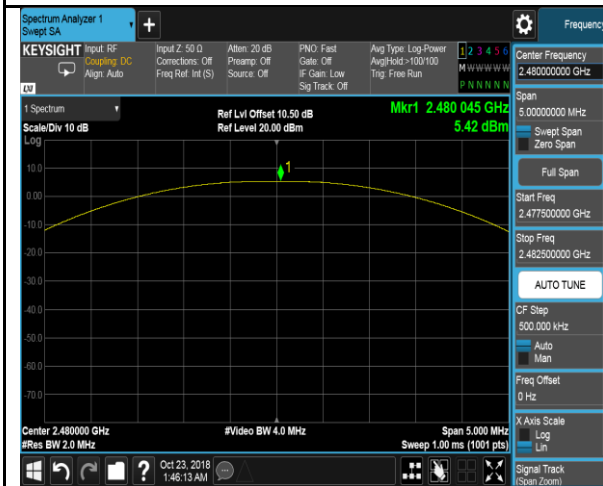
Output power - EDR 2402MHz



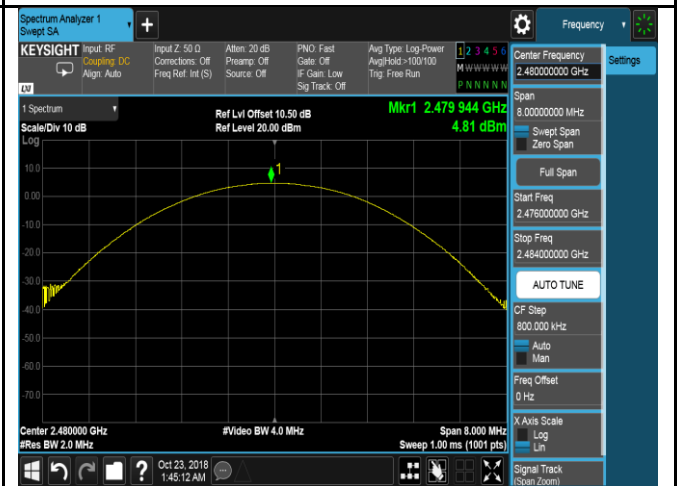
Output power - BDR 244MHz



Output power - EDR 244MHz



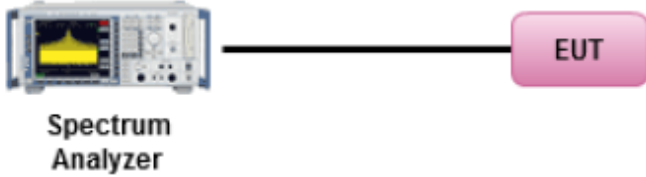
Output power - BDR 248MHz



Output power - EDR 248MHz

10.8 Band Edge (Bluetooth BDR/EDR)

Requirement(s):

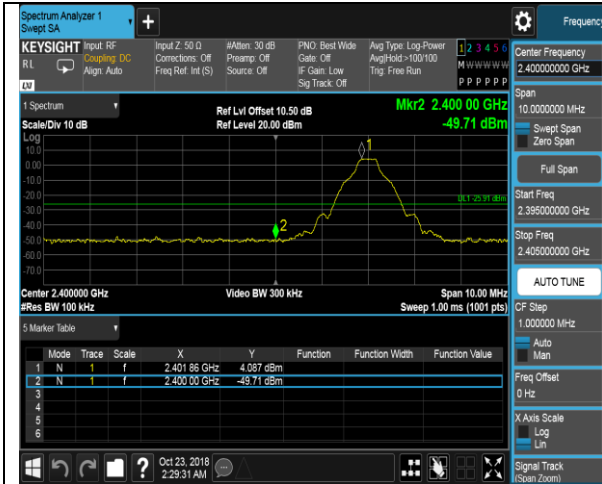
Spec	Item	Requirement	Applicable
§ 15.247	d)	For non-restricted band, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 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 checked="" type="checkbox"/> 20 dB down <input type="checkbox"/> 30 dB down	☒
Test Setup	 <p style="text-align: center;">Spectrum Analyzer EUT</p>		
Test Procedure	<u>Band Edge measurement procedure</u> <ol style="list-style-type: none"> 1. Set the EUT to maximum power setting and enable the EUT transmit continuously. 2. Band edge emissions must be at least 30 dB down from the highest emission level within the authorized band as a measured. The attenuation shall be 30 dB instead of 20 dB when Peak conducted output power procedure is used. 3. Change modulation and channel bandwidth then repeat step 1 to 2. 4. Measured and record the results in the test report. 		
Test Date	10/23/2018	Environmental condition	Temperature 22°C Relative Humidity 46% Atmospheric Pressure 1020mbar
Remark	N/A		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Test Data Yes N/A

Test Plot Yes (See below) N/A

Test was done by *Rachana Khanduri* at *RF Test Site*.

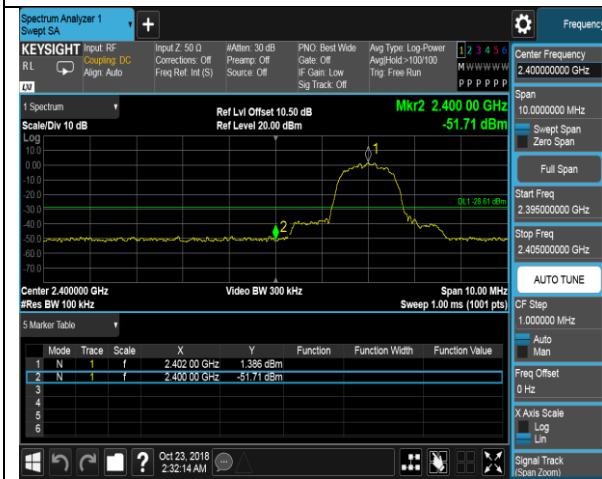
Band Edge Test Plots (Bluetooth)



Band Edge -BDR 2402MHz



Band Edge -BDR 2480MHz

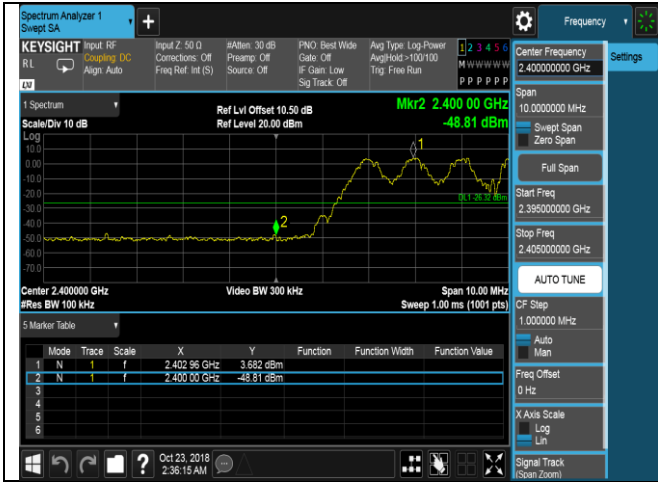


Band Edge -EDR 2402MHz



Band Edge -EDR 2480MHz

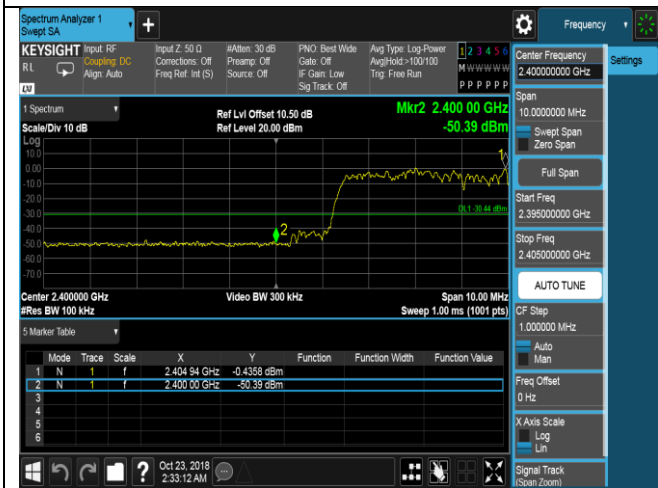
Band Edge Hopping Test Plots (Bluetooth)



Band Edge-Hopping-BDR 2402MHz



Band Edge- Hopping-BDR 2480MHz



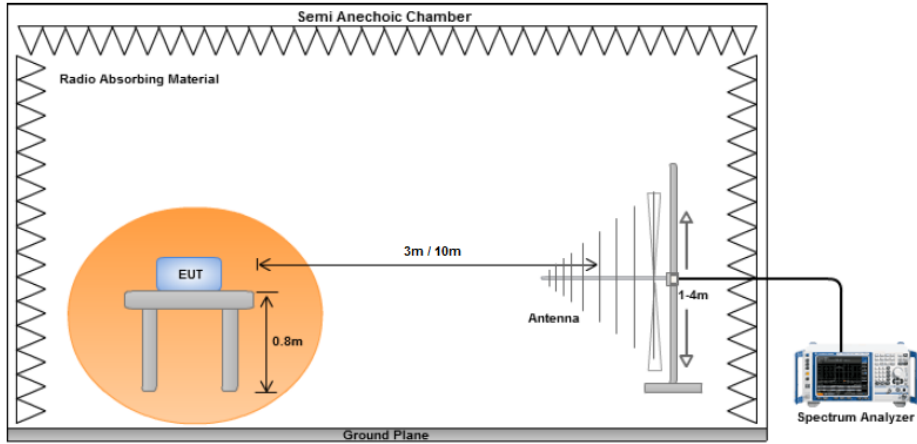
Band Edge- Hopping-EDR 2402MHz



Band Edge- Hopping-EDR 2480MHz

10.9 Transmitter 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"> 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: <ol style="list-style-type: none"> 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											

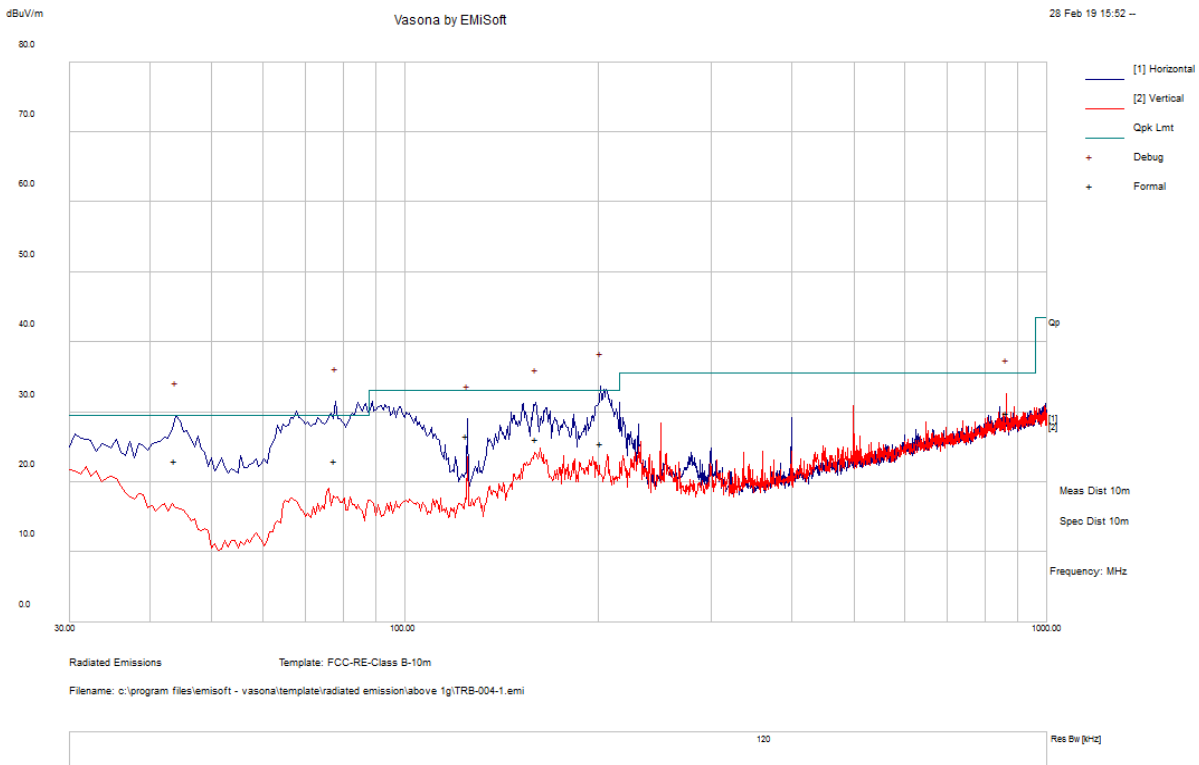
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Cipher at 10m Chamber.

Radiated Emission Test Results (Below 1GHz)

Test specification:	Radiated Spurious Emissions (30MHz – 1000MHz)			Result :	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Environmental Conditions:	Temp(°C):	22			
	Humidity (%):	37			
	Atmospheric(mbar):	1021			
Mains Power:	120VAC, 60Hz				
Tested by:	Cipher				
Test Date:	02/26/2019-02/28/2019				
Remarks:	BDR 2480MHz				



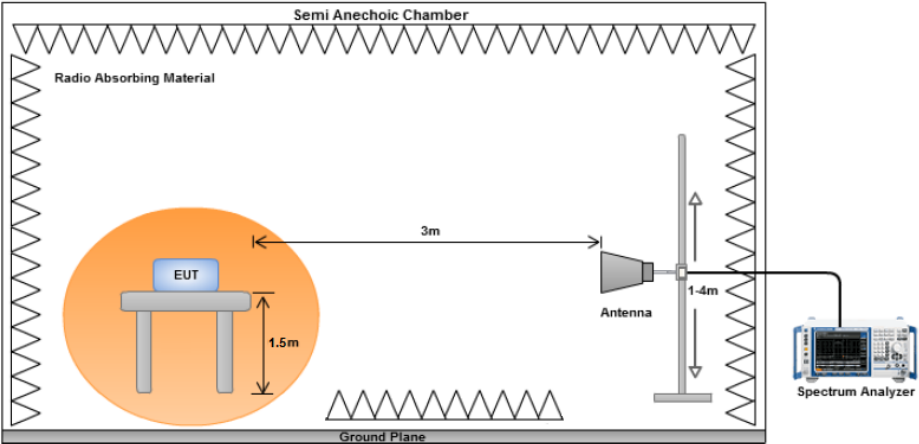
Quasi Max Measurement

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
77.68	39.51	11.65	-28.05	23.12	Quasi Max	H	204	165	29.5	-6.38	Pass
201.69	37.47	12.64	-24.51	25.6	Quasi Max	H	191	218	33	-7.4	Pass
43.76	35.29	11.38	-23.66	23.01	Quasi Max	H	109	218	29.5	-6.49	Pass
159.92	37.48	12.27	-23.62	26.13	Quasi Max	H	100	139	33	-6.87	Pass
864.32	28.39	15.6	-14.09	29.9	Quasi Max	V	111	256	35.5	-5.6	Pass
124.99	37.38	12.12	-22.93	26.58	Quasi Max	H	187	46	33	-6.42	Pass

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

10.10 Transmitter Radiated Spurious Emissions > 1GHz

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR§15.247(d), RSS247(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 <input checked="" type="checkbox"/> 20 dB down <input 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"> 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: <ol style="list-style-type: none"> 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 26GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.		
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

Bluetooth BDR – 2402MHz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
4804	45.28	5.47	-2.03	48.73	Peak Max	H	138	107	74	-25.28	Pass
1995	42.63	3.55	-6.06	40.11	Peak Max	V	284	356	74	-33.89	Pass
1328	51.7	3.01	-9.22	45.49	Peak Max	V	159	146	74	-28.51	Pass
4804	37.33	5.47	-2.03	40.77	Average Max	H	138	107	54	-13.23	Pass
1995	30.53	3.55	-6.06	28.01	Average Max	V	284	356	54	-25.99	Pass
1328	32.21	3.01	-9.22	26	Average Max	V	159	146	54	-28	Pass

Bluetooth BDR – 2441MHz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
4882	43.36	5.51	-2.15	46.72	Peak Max	H	134	115	74	-27.28	Pass
1869	43.52	3.45	-6.69	40.28	Peak Max	V	356	231	74	-33.72	Pass
1330	47.77	3.01	-9.2	41.58	Peak Max	H	127	84	74	-32.42	Pass
4882	33.95	5.51	-2.15	37.31	Average Max	H	134	115	54	-16.69	Pass
1869	30.67	3.45	-6.69	27.42	Average Max	V	356	231	54	-26.58	Pass
1330	31.97	3.01	-9.2	25.78	Average Max	H	127	84	54	-28.22	Pass

Bluetooth BDR – 2480MHz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
4960	44.15	5.56	-2.17	47.54	Peak Max	H	122	96	74	-26.46	Pass
1330	54.03	3.01	-9.2	47.84	Peak Max	H	206	102	74	-26.16	Pass
2266	43.51	3.78	-6.12	41.17	Peak Max	V	262	181	74	-32.83	Pass
4960	36.63	5.56	-2.17	40.02	Average Max	H	122	96	54	-13.98	Pass
1330	32.73	3.01	-9.2	26.54	Average Max	H	206	102	54	-27.46	Pass
2266	31.13	3.78	-6.12	28.79	Average Max	V	262	181	54	-25.21	Pass

Bluetooth EDR – 2402MHz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
4804	40.93	5.47	-2.03	44.37	Peak Max	V	137	76	74	-29.63	Pass
1793	50.87	3.38	-7.2	47.05	Peak Max	V	127	67	74	-26.95	Pass
1328	53.27	3.01	-9.22	47.06	Peak Max	V	163	143	74	-26.94	Pass
4804	28.87	5.47	-2.03	32.31	Average Max	V	137	76	54	-21.69	Pass
1793	30.25	3.38	-7.2	26.43	Average Max	V	127	67	54	-27.57	Pass
1328	33.87	3.01	-9.22	27.66	Average Max	V	163	143	54	-26.34	Pass

Bluetooth EDR – 2441MHz

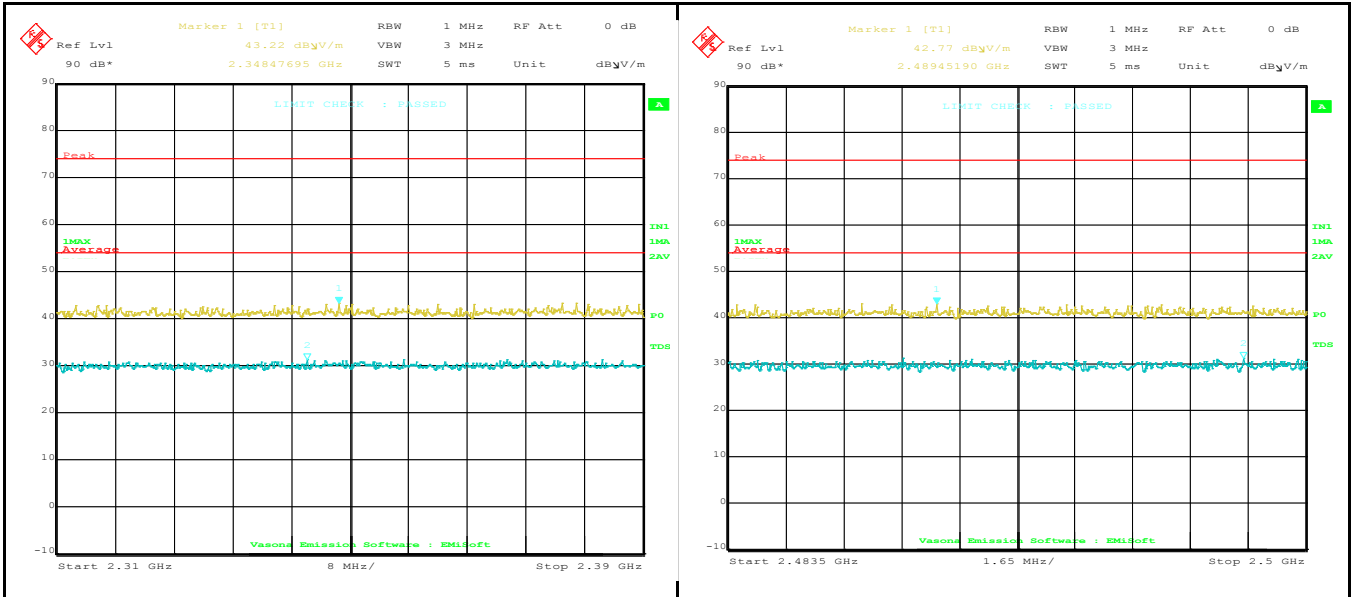
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
4882	46.66	5.51	-2.15	50.02	Peak Max	H	205	255	74	-23.98	Pass
1330	55.62	3.01	-9.2	49.43	Peak Max	H	392	62	74	-24.57	Pass
2011	41.58	3.56	-6.02	39.11	Peak Max	H	257	324	74	-34.89	Pass
4882	37.95	5.51	-2.15	41.31	Average Max	H	205	255	54	-12.69	Pass
1330	30.81	3.01	-9.2	24.62	Average Max	H	392	62	54	-29.38	Pass
2011	29.97	3.56	-6.02	27.51	Average Max	H	257	324	54	-26.49	Pass

Bluetooth EDR – 2480MHz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
4960	50.57	5.56	-2.17	53.96	Peak Max	H	105	89	74	-20.04	Pass
1329	53.35	3.01	-9.21	47.15	Peak Max	V	108	323	74	-26.85	Pass
1107	43.45	2.86	-11.23	35.09	Peak Max	V	336	261	74	-38.92	Pass
4960	43.83	5.56	-2.17	47.21	Average Max	H	105	89	54	-6.79	Pass
1329	31.39	3.01	-9.21	25.19	Average Max	V	108	323	54	-28.81	Pass
1107	31.16	2.86	-11.23	22.8	Average Max	V	336	261	54	-31.2	Pass

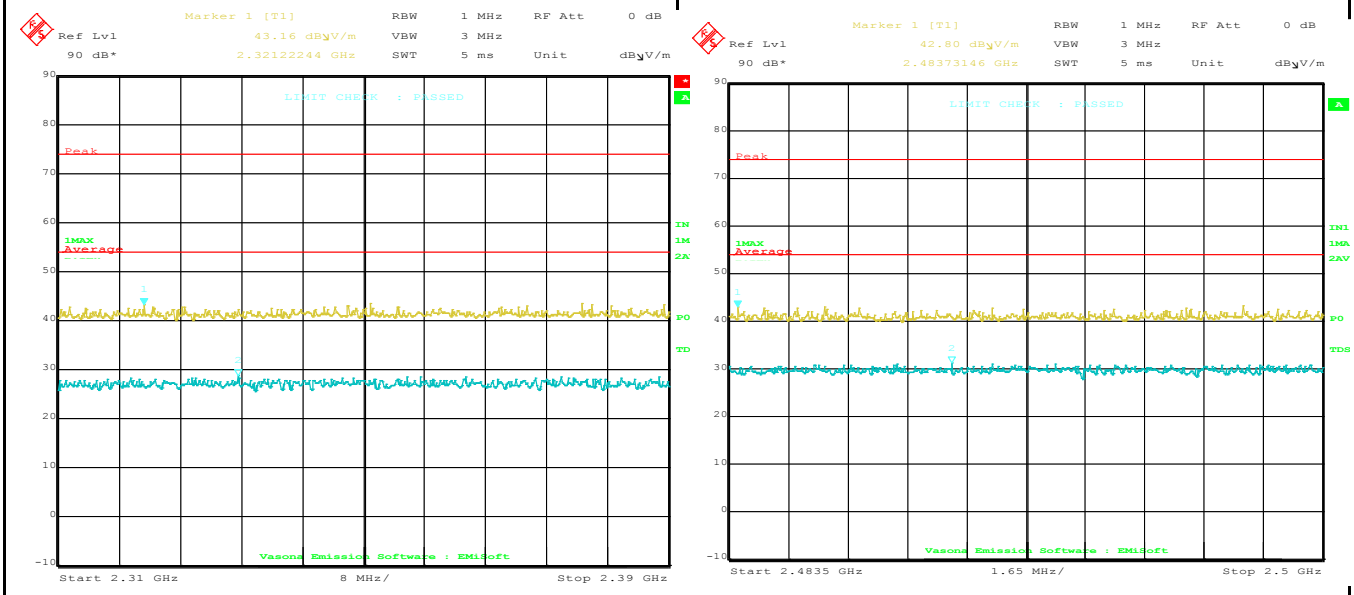
Note: Both horizontal and vertical polarities were investigated. The results above show only the worst case.

Restricted Band Test plot (Bluetooth BDR/EDR)



Restricted Band BDR 2402MHz

Restricted Band BDR 2480MHz



















Restricted Band EDR 2402MHz








Restricted Band EDR 2480MHz

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Radiated Emissions						
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		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 & Telecommunications Terminal Equipment: EN45001 – EN ISO/IEC 17025
		Electromagnetic Compatibility: EN45001 – EN ISO/IEC 17025
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		<p>Radio: A1. Terminal equipment for purpose of calling</p> <p>Telecom: B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law</p>
Korea CAB Accreditation		<p>EMI: KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI</p> <p>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</p>
		<p>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</p> <p>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</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>EMC: AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4</p>
		<p>Radio communications: 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>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</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