

RF TEST REPORT



Report No.: FCC_RF_SL14031801-SLX-005-DTS_Rev1.0

Supersede Report No.: FCC_RF_SL14031801-SLX-005

Applicant	:	Navico Auckland Limited
Product Name	:	Silex Technology 802.11 bgn-BT mini PCIe module
Model No.	:	SX-PCEGN-BT
Test Standard	:	47 CFR 15.247 RSS 210 Issue8: 2010
Test Method	:	ANSI C63.4: 2009 RSS Gen 558074 D01 DTS Meas Guidance v03r02
FCC ID	:	RAYWIFIBT1
IC ID	:	4697A-WIFIBT1
Dates of test	:	October 17, 2014 to October 31, 2014
Issue Date	:	12/12/2014
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:

	
Nima Molaei	David Zhang
Test Engineer	Engineer Reviewer

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



775 Montague Expressway, Milpitas, CA 95035, USA • Phone: (+1) 408 526 1188 • Facsimile (+1) 408 526 1088

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Laboratory Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



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Accreditations for Conformity Assessment

Country/Region	Accreditation Body	Scope
USA	FCC, A2LA	EMC, RF/Wireless, Telecom
Canada	IC, A2LA, NIST	EMC, RF/Wireless, Telecom
Taiwan	BSMI, NCC, NIST	EMC, RF, Telecom, Safety
Hong Kong	OFTA, NIST	RF/Wireless, Telecom
Australia	NATA, NIST	EMC, RF, Telecom, Safety
Korea	KCC/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 & 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_SL14031801-SLX-005	None	Original	12/08/2014
FCC_RF_SL14031801-SLX-005-DTS_Rev1.0	1.0	Correct OBW limit Separate DTS and DSS report	12/12/2014

2 Executive Summary

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

Company: Navico Auckland Limited
Product: Silex Technology 802.11 bgn-BT mini PCIe module
Model: SX-PCEGN-BT

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	:	Navico Auckland Limited
Applicant Address	:	44 Arrenway Drive Rosedale, Auckland, New Zealand 0632
Manufacturer Name	:	Silex Technology, Inc
Manufacturer Address	:	2-3-1 Hikaridai, Seika-cho, Kyoto 619-0237, Japan
Manufacturer Name	:	Advantech Co., Ltd.
Manufacturer Address	:	No. 1, Alley 20, Lane 26, Rueiguang Rd, Neihu District, Taipei 114, Taiwan, R.O.C

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	:	Mini-PCle 802.11 b/g/n WiFi with BT4.0 Combo
Model No.	:	SX-PCEGN-BT
Trade Name	:	Navico
Serial No.	:	N/A
Host Model No.	:	N/A
Input Power	:	3.3 VDC
Power Adapter Manu/Model	:	N/A
Power Adapter SN	:	N/A
Hardware version	:	N/A
Software version	:	N/A
Date of EUT received	:	10/20/2014
Equipment Class/ Category	:	DSS, DTS
Clock Frequencies	:	N/A
Port/Connectors	:	N/A

6.2 Radio Description

Spec for Radio -

Radio Type	802.11b	802.11g	802.11n-20M	802.11n-40M
Operating Frequency	2412-2462MHz	2412-2462MHz	2412-2462MHz	2422-2452MHz
Modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)
Channel Spacing	5MHz	5MHz	5MHz	40MHz
Number of Channels	11	11	11(2.4GH)	7(2.4GH)
Antenna Type	Embedded PCB antenna			
Antenna Gain	2.4GHz: 3.14 dBi			
Antenna Connector Type	U.FL connector			

Spec for BT Radio -

Radio Type	Bluetooth (Ver4.0+EDR)
Operating Frequency	2402MHz-2480MHz
Modulation	FHSS (BDR, EDR), DSSS (LE)
Channel Spacing	1MHz (BDR, EDR), 2MHz (LE)
Antenna Type	Embedded PCB antenna
Antenna Gain	2.4GHz: 3.14 dBi
Antenna Connector Type	U.FL connector

Channel List

Type		Channel No.	Frequency (MHz)	Available (Y/N)
802.11b/g/n-HT20	2412-2462	1	2412	Y
		2	2417	Y
		3	2422	Y
		4	2427	Y
		5	2432	Y
		6	2437	Y
		7	2442	Y
		8	2447	Y
		9	2452	Y
		10	2457	Y
		11	2462	Y
	2467-2472	12	2467	N
		13	2472	N

Type		Channel No.	Frequency (MHz)	Available (Y/N)
802.11n-HT40	2412-2462	1	2412	N
		2	2417	N
		3	2422	Y
		4	2427	Y
		5	2432	Y
		6	2437	Y
		7	2442	Y
		8	2447	Y
		9	2452	Y
		10	2457	N
		11	2462	N
	2467-2472	12	2467	N
		13	2472	N

Type		Channel No.	Frequency (MHz)	Available (Y/N)
Bluetooth	(BDR, EDR) 2402-2480MHz	0	2402	Y
		...	...	Y
		39	2441	Y
		...	...	Y
		78	2480	Y
	Blue Tooth (LE)	0	2402	Y
		...	...	Y
		19	2440	Y
		...	...	Y
		39	2480	Y

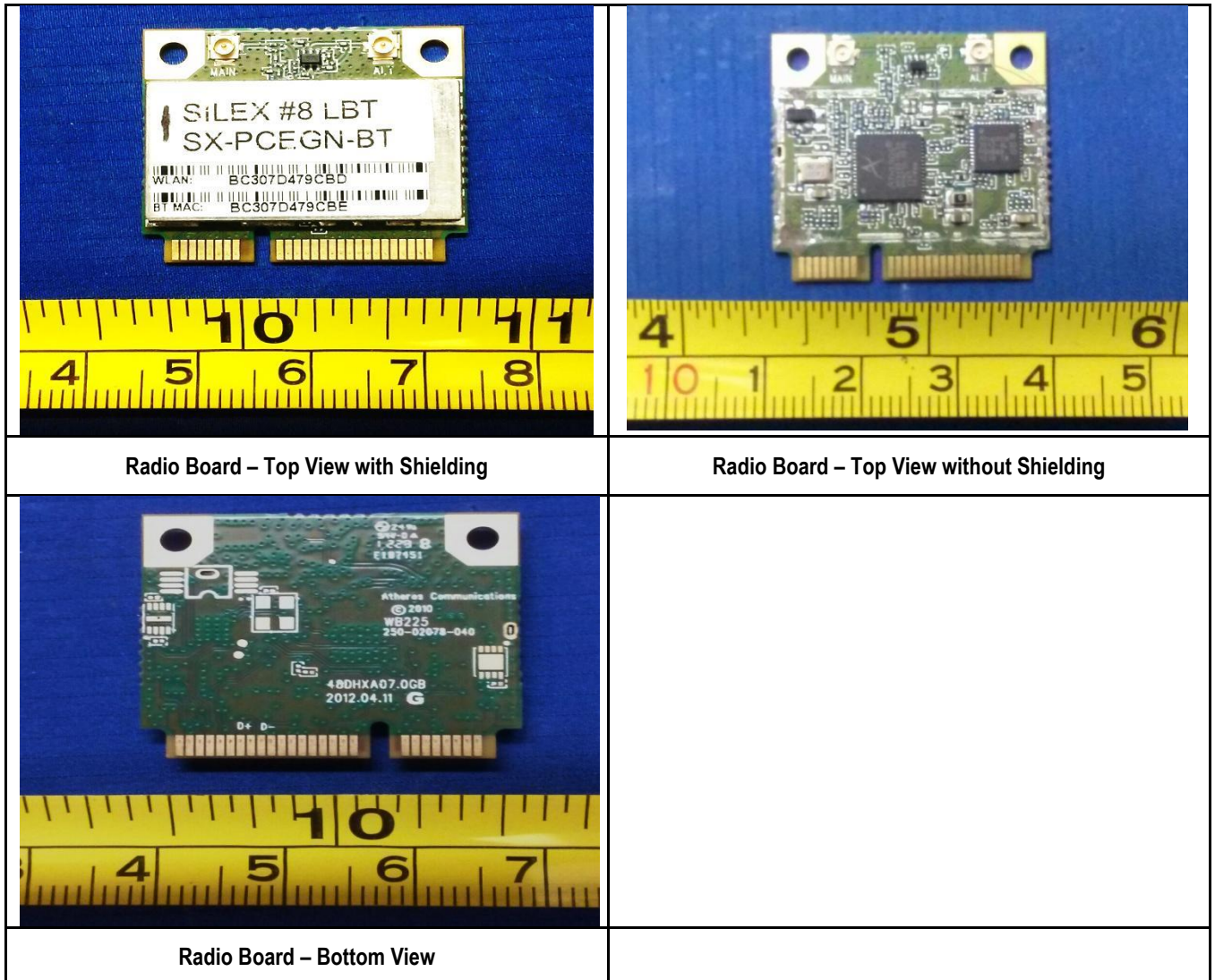
6.3 EUT test modes/configuration Description

Mode	Note
Bluetooth LE	LE (GFSK)
802.11b	1Mbps
802.11g	6Mbps
802.11n-20MHz (2.4GHz)	HT20, MCS0
802.11n-40MHz (2.4GHz)	HT40, MCS0

EUT Power level setting

Mode	Frequency (MHz)	ART Power setting
802.11-b	2412	16.5
802.11-b	2437	16.5
802.11-b	2462	16.5
802.11-g	2412	14.5
802.11-g	2437	16.5
802.11-g	2462	13
802.11-n-20	2412	13.5
802.11-n-20	2437	16
802.11-n-20	2462	12
802.11-n-40	2422	11
802.11-n-40	2437	13
802.11-n-40	2452	10

6.4 EUT Photos



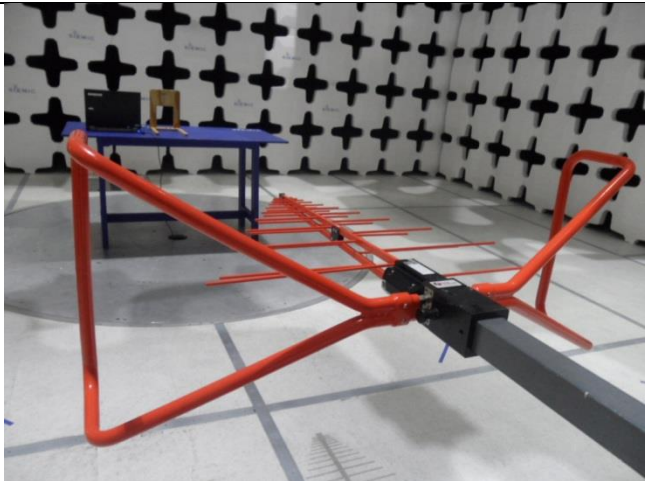
6.5 EUT Test Setup Photos



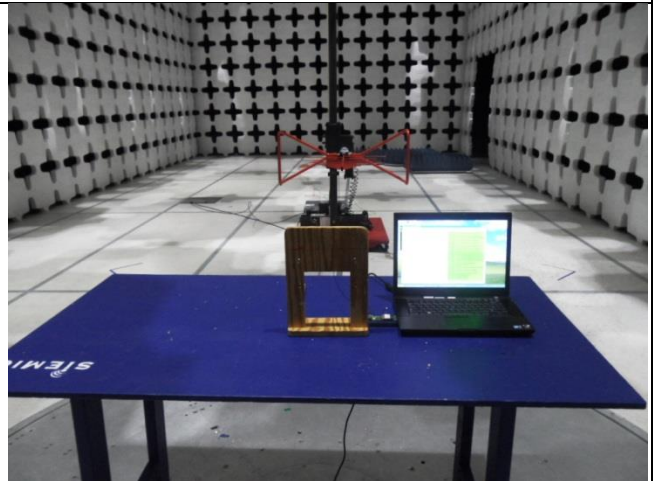
AC Line Conducted Emissions – Front View



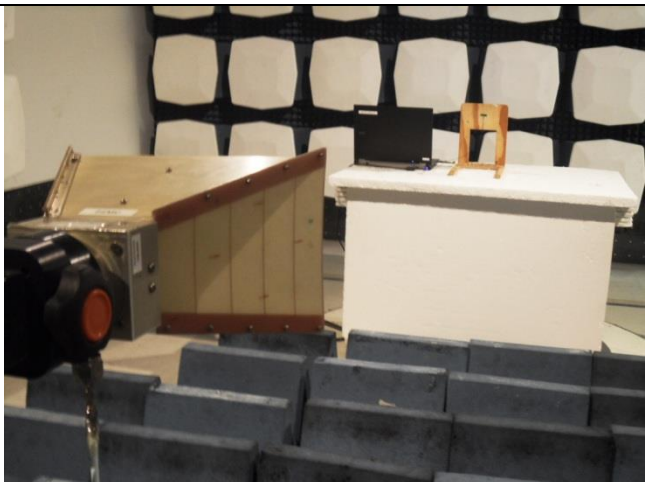
AC Line Conducted Emissions – Rear View



Radiated Emissions (<1GHz) – Front View



Radiated Emissions (<1GHz) – Rear View



Radiated Emissions (>1GHz) – Front View



Radiated Emissions (>1GHz) – Rear View

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	Laptop	Lattitude E6500	N/A	Dell	-
2					

7.2 Cabling Description

Name	Connection Start		Connection Stop		Length / shielding Info		Note
	From	I/O Port	To	I/O Port	Length (m)	Shielding	
-	-	-	-	-	-	-	-

7.3 Test Software Description

Test Item	Software	Description
RF Testing	BtUSBTool/ART	Set the EUT to different modulation and channels

8 Test Summary

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Restricted Band of Operation	FCC	15.205	FCC	ANSI C63.4 – 2009 558074 D01 DTS Meas Guidance v03r02	☒ Pass ☐ N/A
AC Conducted Emissions Voltage	FCC	15.207(a)	FCC	ANSI C63.4 – 2009	☒ Pass ☐ N/A

DTS band Requirement

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Channel Separation	FCC	15.247 (a)(1)	FCC	-	☐ Pass
	IC	RSS210 (A8.1)	IC	-	☒ N/A
99% Occupied Bandwidth	IC	RSS210(A8.1)	IC	RSS Gen (6.6)	☒ Pass ☐ N/A
6db Bandwidth	FCC	15.247(a)(2)	FCC	558074 D01 DTS Meas Guidance v03r02	☒ Pass
	IC	RSS210 (A8.2)	IC	-	☐ N/A
Number of Hopping Channels	FCC	15.247(a)(1)	FCC	-	☐ Pass
	IC	RSS210(A8.1)	IC	-	☒ N/A
Band Edge and Radiated Spurious Emissions	FCC	15.247(d)	FCC	ANSI C63.4 – 2009, 558074 D01 DTS Meas Guidance v03r02	☒ Pass
	IC	RSS210(A8.5)	IC	-	☐ N/A
Time of Occupancy	FCC	15.247(a)(1)	FCC	-	☐ Pass
	IC	RSS210(A8.1)	IC	-	☒ N/A
Output Power	FCC	15.247(b)	FCC	558074 D01 DTS Meas Guidance v03r02	☒ Pass
	IC	RSS210 (A8.4)	IC	-	☐ N/A
Receiver Spurious Emissions	IC	RSS Gen (7.1)	IC	RSS Gen (7.1)	☒ Pass ☐ N/A
Antenna Gain > 6 dBi	FCC	15.247(e)	FCC	-	☐ Pass
	IC	RSS210(A8.4)	IC	-	☒ N/A
Power Spectral Density	FCC	15.247(e)	FCC	558074 D01 DTS Meas Guidance v03r02	☒ Pass
	IC	RSS210(A8.3)	IC	-	☐ N/A
Hybrid System Requirement	FCC	15.247(f)	FCC	-	☐ Pass
	IC	RSS210(A8.3)	IC	-	☒ N/A
Hopping Capability	FCC	15.247(g)	FCC	-	☐ Pass
	IC	RSS210(A8.1)	IC	-	☒ N/A
Hopping Coordination Requirement	FCC	15.247(h)	FCC	-	☐ Pass
	IC	RSS210(A8.1)	IC	-	☒ N/A
RF Exposure requirement	FCC	15.247(i)	FCC	-	☐ Pass
	IC	RSS Gen(5.5)	IC	-	☒ N/A
Remark	- All measurement uncertainties do not take into consideration for all presented test results. - The applicant shall ensure frequency stability by showing that an emission is maintained within the band of operation under all normal operating conditions as specified in the user's manual.				

9 Measurement Uncertainty

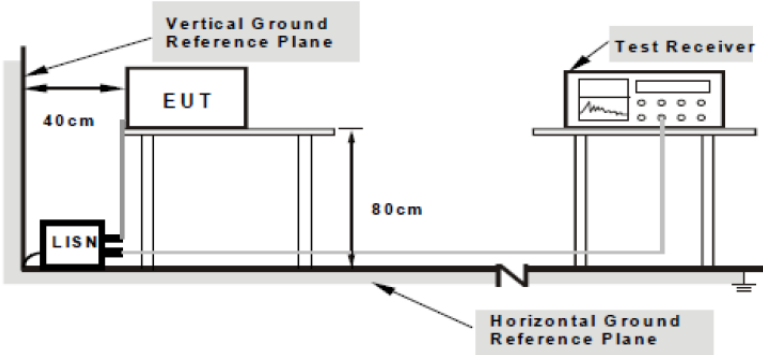
Emissions			
Test Item	Frequency Range	Description	Uncertainty
Band Edge and Radiated Spurious Emissions	30MHz – 1GHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
Band Edge and Radiated Spurious Emissions	1GHz – 40GHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+4.3dB/-4.1dB

10 Measurements, Examination and Derived Results

10.1 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

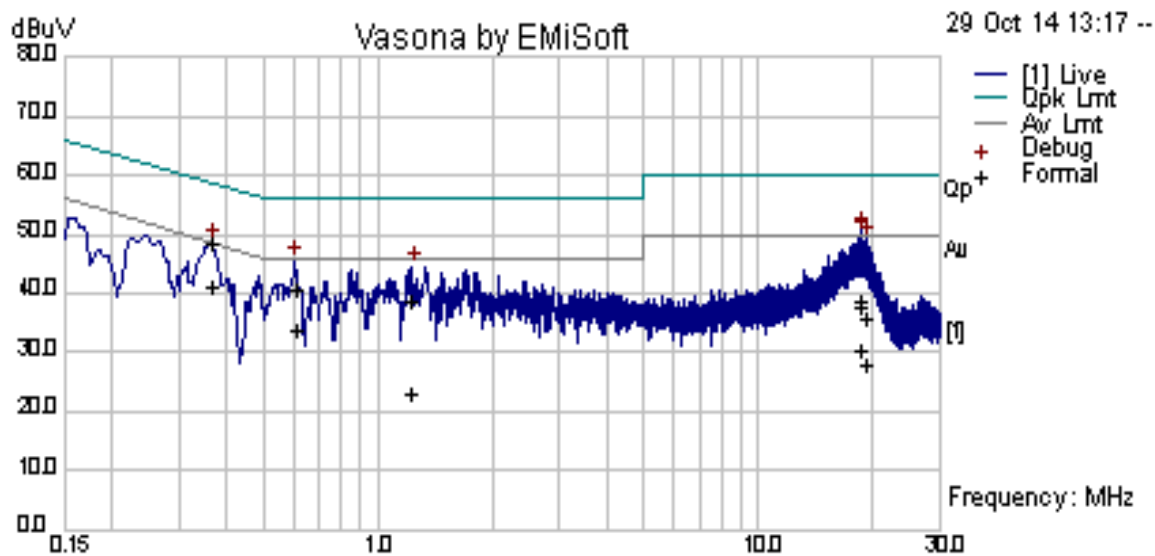
Spec	Item	Requirement	Applicable
47CFR§15.207	a)	For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, 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.	☒
Test Setup	 Note: 1. Support units were connected to second LISN. 2. Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.		
Procedure	- 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 110V 60Hz		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Conducted Emission Test Results (Live)

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	22	Result:	☒ Pass ☐ Fail
	Humidity (%):	40		
	Atmospheric(mbar):	1022		
Mains Power:	110Vac, 60Hz			
Tested by:	Teody Manansala			
Test Date:	10/29/2014			
Remarks	Line			

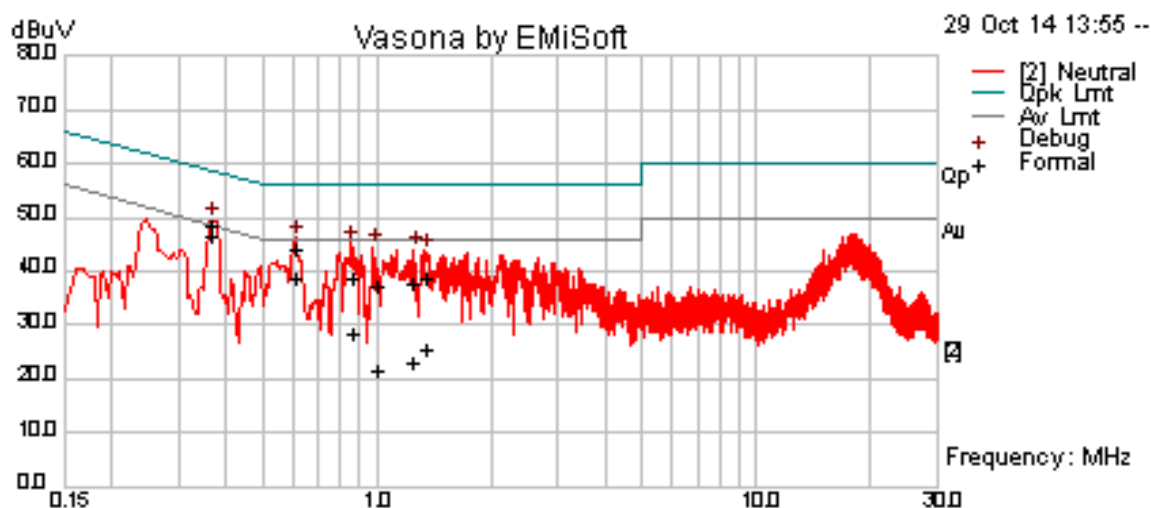


Line Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line	Limit (dBuV)	Margin (dB)	Pass /Fail
18.54	25.34	10.07	2.15	37.55	Quasi Peak	Line	60.00	-22.45	Pass
18.43	26.43	10.07	2.14	38.63	Quasi Peak	Line	60.00	-21.37	Pass
0.37	37.96	10.01	0.72	48.68	Quasi Peak	Line	58.61	-9.93	Pass
0.61	29.83	10.01	0.75	40.59	Quasi Peak	Line	56.00	-15.41	Pass
19.19	23.67	10.07	2.20	35.94	Quasi Peak	Line	60.00	-24.06	Pass
1.23	27.71	10.02	0.82	38.55	Quasi Peak	Line	56.00	-17.45	Pass
18.54	18.13	10.07	2.15	30.34	Average	Line	50.00	-19.66	Pass
18.43	18.04	10.07	2.14	30.24	Average	Line	50.00	-19.76	Pass
0.37	30.61	10.01	0.72	41.34	Average	Line	48.61	-7.27	Pass
0.61	23.15	10.01	0.75	33.91	Average	Line	46.00	-12.09	Pass
19.19	15.59	10.07	2.20	27.86	Average	Line	50.00	-22.14	Pass
1.23	12.24	10.02	0.82	23.08	Average	Line	46.00	-22.92	Pass

Conducted Emission Test Results (Neutral)

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	22	Result:	☒ Pass ☐ Fail
	Humidity (%):	40		
	Atmospheric(mbar):	1022		
Mains Power:	110Vac, 60Hz			
Tested by:	Teody Manansala			
Test Date:	10/29/2014			
Remarks	Neutral			



Neutral Line Plot @ 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line	Limit (dBuV)	Margin (dB)	Pass /Fail
0.36	37.91	10.01	0.72	48.64	Quasi Peak	Neutral	58.62	-9.98	Pass
0.61	33.29	10.01	0.75	44.05	Quasi Peak	Neutral	56.00	-11.95	Pass
0.86	28.08	10.01	0.72	38.82	Quasi Peak	Neutral	56.00	-17.18	Pass
0.99	26.72	10.02	0.78	37.52	Quasi Peak	Neutral	56.00	-18.48	Pass
1.24	26.89	10.02	0.82	37.73	Quasi Peak	Neutral	56.00	-18.27	Pass
1.35	27.80	10.02	0.85	38.66	Quasi Peak	Neutral	56.00	-17.34	Pass
0.36	35.79	10.01	0.72	46.52	Average	Neutral	48.62	-2.10	Pass
0.61	28.00	10.01	0.75	38.76	Average	Neutral	46.00	-7.24	Pass
0.86	17.77	10.01	0.72	28.51	Average	Neutral	46.00	-17.49	Pass
0.99	10.98	10.02	0.78	21.77	Average	Neutral	46.00	-24.23	Pass
1.24	12.02	10.02	0.82	22.86	Average	Neutral	46.00	-23.14	Pass
1.35	14.45	10.02	0.85	25.31	Average	Neutral	46.00	-20.69	Pass

Note: The results above show only the worst case.

10.2 Peak Output Power (WLAN & Bluetooth LE)

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247	a)	FHSS in 2400-2483.5MHz with ≥ 75 channels: ≤ 1 Watt	☐
	b)	FHSS in 5725-5850MHz: ≤ 1 Watt	☐
	c)	For all other FHSS in the 2400-2483.5MHz band: ≤ 0.125 Watt.	☐
	d)	FHSS in 902-928MHz with ≥ 50 channels: ≤ 1 Watt	☐
	e)	FHSS in 902-928MHz with ≥ 25 & < 50 channels: ≤ 0.25 Watt	☐
	f)	DSSS in 902-928MHz, 2400-2483.5MHz, 5725-5850MHz: ≤ 1 Watt	☒
Test Setup			
Test Procedure	<u>Measurement using a Power Meter (PM)</u> Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required. - Connect EUT's RF output power to power meter - Set EUT to be continuous transmission mode - Measurement the average output power using power meter and record the result - Repeat above steps for different test channel and other modulation type.		
Test Date	10/23/2014	Environmental condition	Temperature 23°C Relative Humidity 44% Atmospheric Pressure 1021mbar
Remark			
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Output Power measurement result (WLAN)

Type	Test mode	Freq (MHz)	CH	Conducted Power (dBm)	Limit (dBm)	Result
Output power	802.11b	2412	Low	16.6	30	Pass
Output power	802.11b	2437	Mid	16.8	30	Pass
Output power	802.11b	2462	High	16.7	30	Pass
Output power	802.11g	2412	Low	14.9	30	Pass
Output power	802.11g	2437	Mid	17.4	30	Pass
Output power	802.11g	2462	High	14.1	30	Pass
Output power	802.11n-20M	2412	Low	13.9	30	Pass
Output power	802.11n-20M	2437	Mid	16.4	30	Pass
Output power	802.11n-20M	2462	High	12.9	30	Pass
Output power	802.11n-40M	2422	Low	11.5	30	Pass
Output power	802.11n-40M	2437	Mid	13.7	30	Pass
Output power	802.11n-40M	2452	High	10.8	30	Pass

Output Power measurement result (Bluetooth)

Type	Test mode	Freq (MHz)	CH	Conducted Power (dBm)	Limit (dBm)	Result
Output power	Bluetooth LE	2402	Low	1.6	30	Pass
Output power	Bluetooth LE	2440	Mid	1.6	30	Pass
Output power	Bluetooth LE	2480	High	1.6	30	Pass

10.3 Band Edge (WLAN & Bluetooth LE)

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 ☐ 20 dB down ☒ 30 dB down	☒
Test Setup			
Test Procedure	558074 D01 DTS Meas Guidance v03r02 <u>Band Edge measurement procedure</u> 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 RMS 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	10/17/2014	Environmental condition	Temperature 22°C Relative Humidity 46% Atmospheric Pressure 1020mbar
Remark	-		
Result	☒ Pass ☐ Fail		

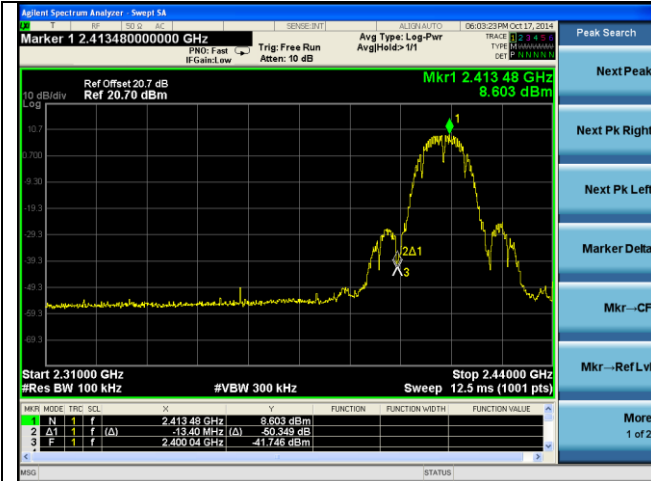
Equipment Setting

TEST	RBW	VBW	SPAN	Detector	SWEEP	Trace	NOTES
Band Edge	100KHz	≥3 x RBW	135 MHz / 55 MHz	Peak	Auto	Peak MAX	-

Test Data ☐ Yes ☒ N/A

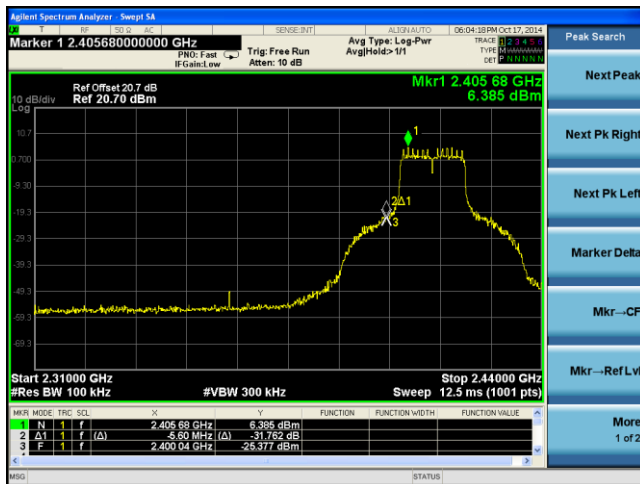
Test Plot ☒ Yes (See below) ☐ N/A

Band EdgeTest Plots (WLAN)



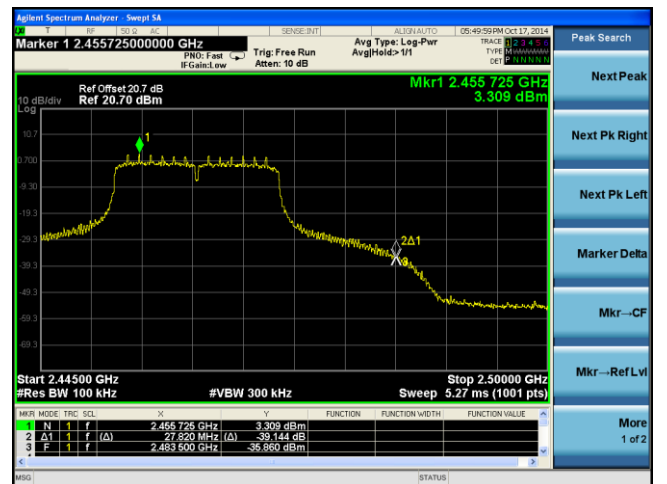
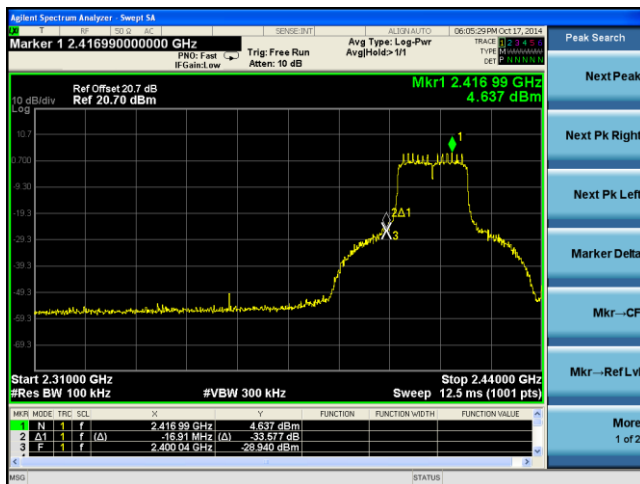
Band Edge-2.4G-802.11b Low

Band Edge-2.4G-802.11b High



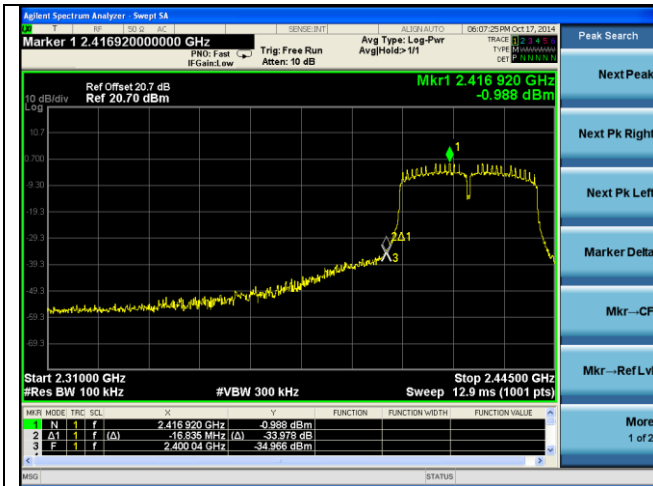
Band Edge-2.4G-802.11g Low

Band Edge-2.4G-802.11g High



Band Edge-2.4G-802.11n20 Low

Band Edge-2.4G-802.11n20 High

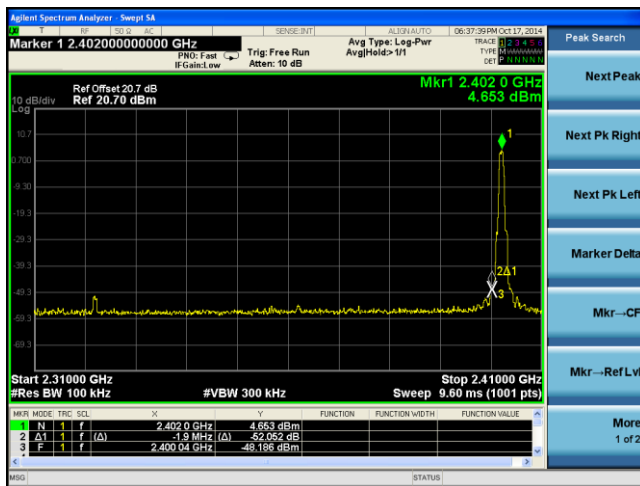


Band Edge-2.4G-802.11n40 Low

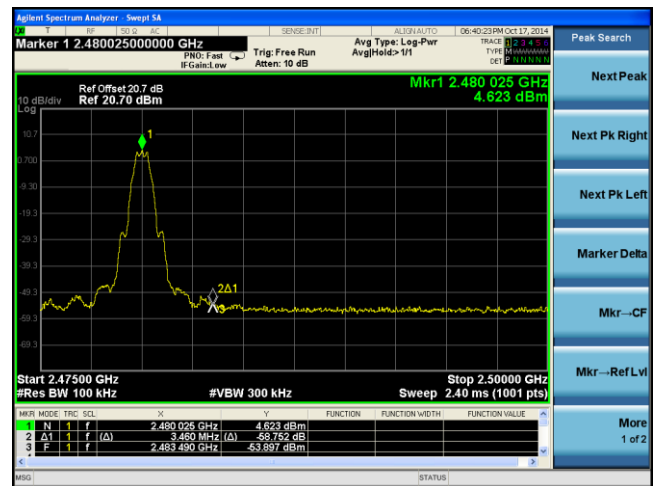


Band Edge-2.4G-802.11n40 High

Band Edge Test Plots (Bluetooth LE)



Band Edge-LE Low



Band Edge-LE High

10.4 99% Occupied Bandwidth (WLAN & BT LE)

Requirement(s):

Spec	Requirement	Applicable
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	☒
Test Setup		
Procedure	- EUT was set for low , mid, high channel with modulated mode and highest RF output power. - The spectrum analyzer was connected to the antenna terminal.	
Test Date	10/20/2014	Environmental condition Temperature 23oC Relative Humidity 47% Atmospheric Pressure 1019mbar
Remark	-	
Result	☒ Pass ☐ Fail	

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

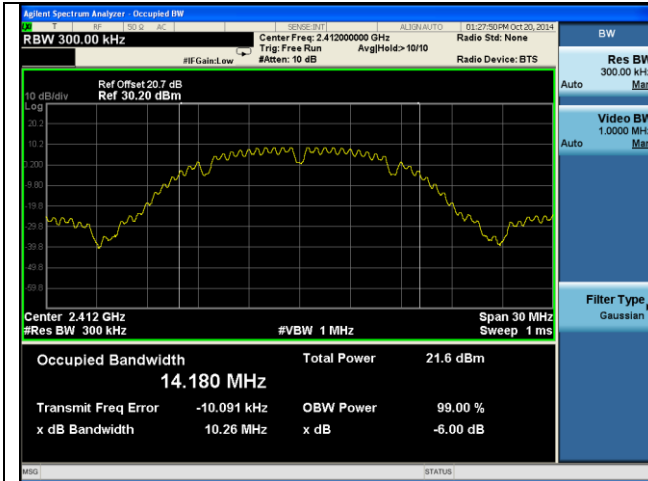
99%dB Bandwidth measurement result for WLAN

Type	Test mode	Freq (MHz)	CH	Result (MHz)	Limit (MHz)	Result
99% BW	802.11b	2412	Low	14.180	N/A	N/A
99% BW	802.11b	2437	Mid	14.330	N/A	N/A
99% BW	802.11b	2462	High	14.426	N/A	N/A
99% BW	802.11g	2412	Low	16.873	N/A	N/A
99% BW	802.11g	2437	Mid	17.837	N/A	N/A
99% BW	802.11g	2462	High	16.948	N/A	N/A
99% BW	802.11n-20M	2412	Low	17.826	N/A	N/A
99% BW	802.11n-20M	2437	Mid	18.214	N/A	N/A
99% BW	802.11n-20M	2462	High	17.851	N/A	N/A
99% BW	802.11n-40M	2422	Low	36.042	N/A	N/A
99% BW	802.11n-40M	2437	Mid	36.041	N/A	N/A
99% BW	802.11n-40M	2452	High	36.023	N/A	N/A

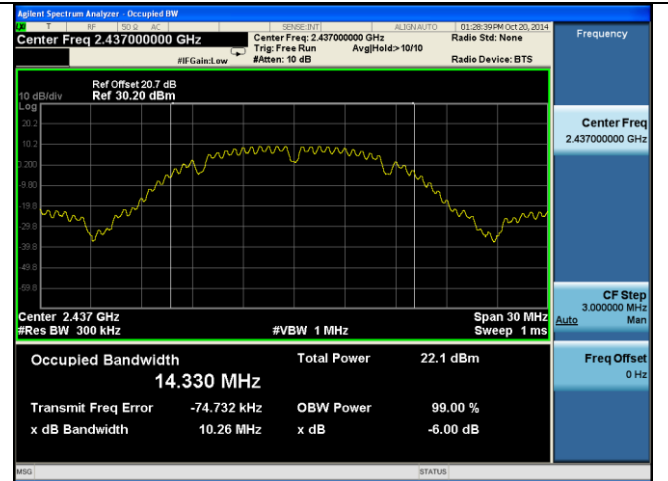
99%dB Bandwidth measurement result for BT (LE)

Type	Test mode	Freq (MHz)	CH	Result (MHz)	Limit (MHz)	Result
99% BW	BT-LE	2402	Low	1.086	N/A	N/A
99% BW	BT-LE	2440	Mid	1.123	N/A	N/A
99% BW	BT-LE	2480	High	1.087	N/A	N/A

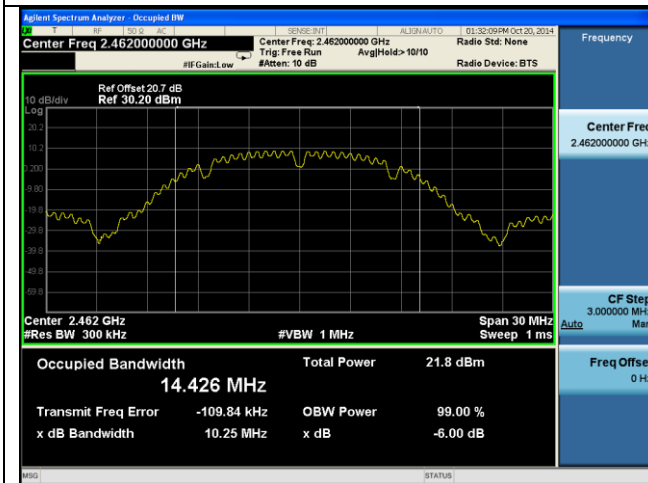
99%dB Bandwidth Test Plot (WLAN)



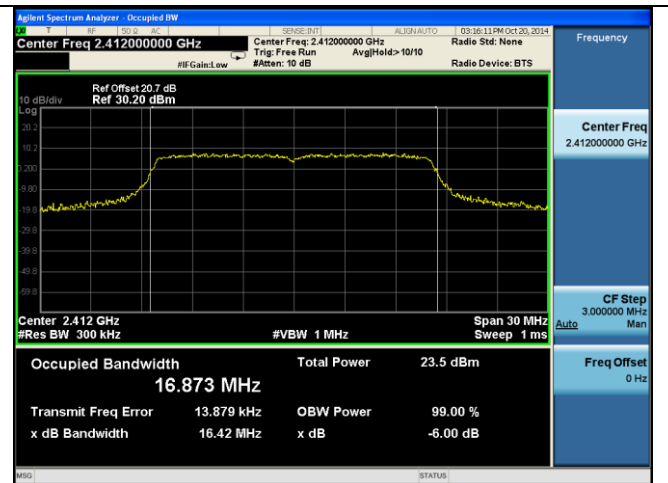
99% BW -2.4G 802.11b 2412MHz



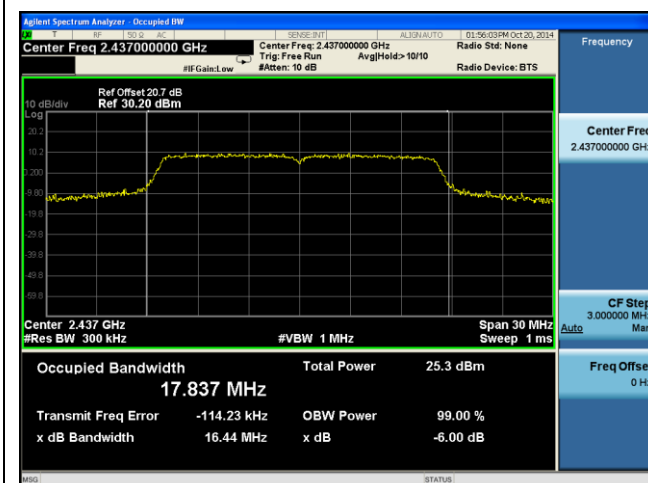
99% BW -2.4G 802.11b 2437MHz



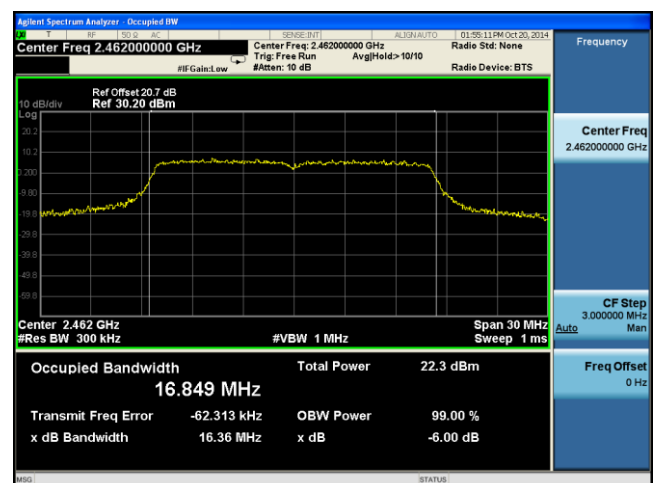
99% BW -2.4G 802.11b 2462MHz



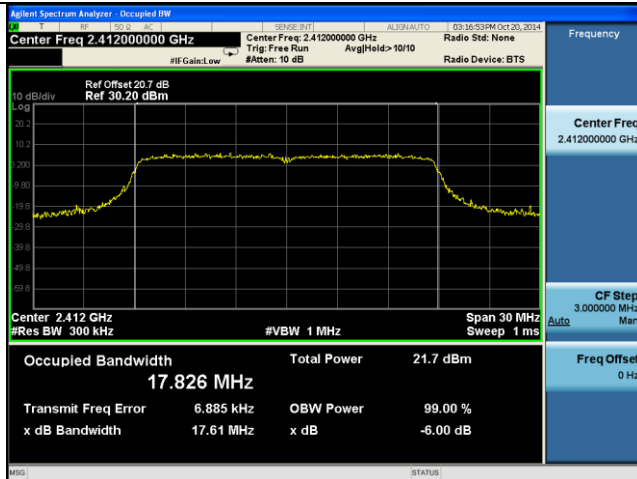
99% BW -2.4G 802.11g 2412MHz



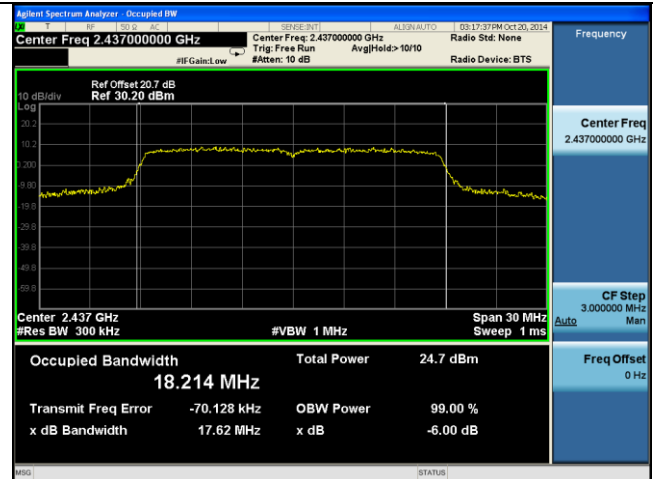
99%BW -2.4G 802.11g 2437MHz



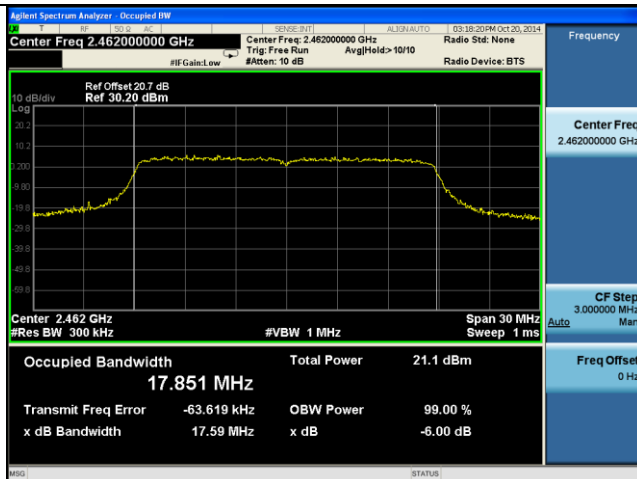
699% BW -2.4G 802.11g 2462MHz



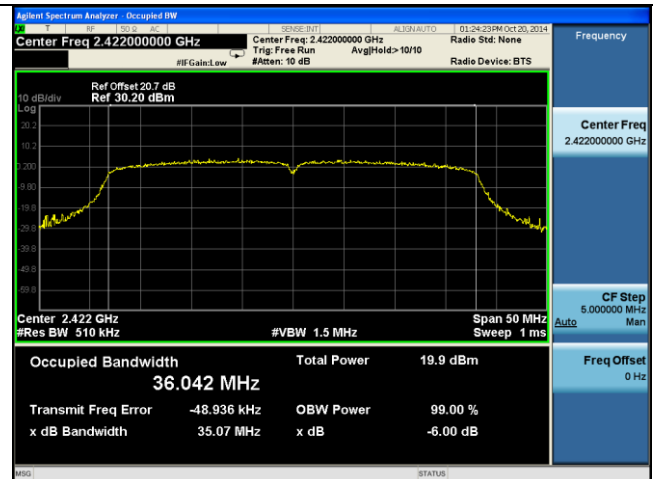
99% BW -2.4G 802.11n-20M 2412MHz



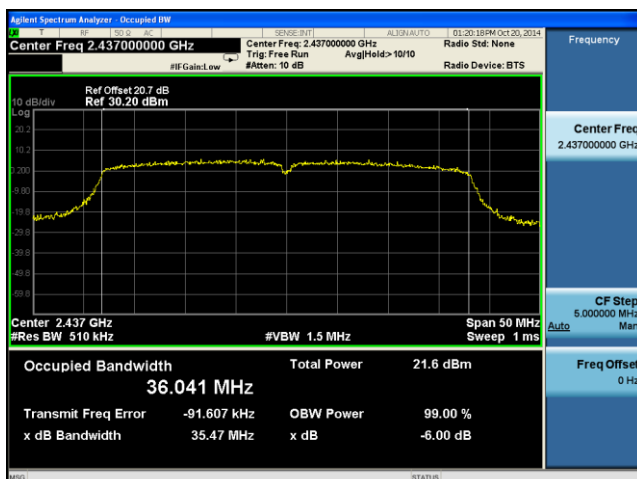
99% BW -2.4G 802.11n-20M 2437MHz



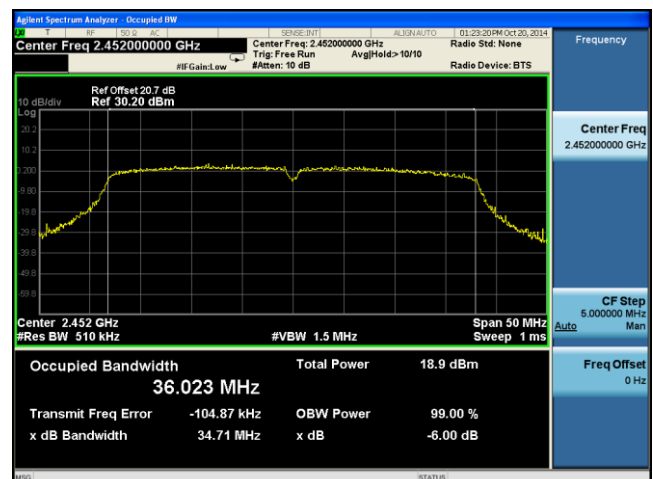
99% BW -2.4G 802.11n-20M 2462MHz



99% BW -2.4G 802.11n-40M 2422MHz

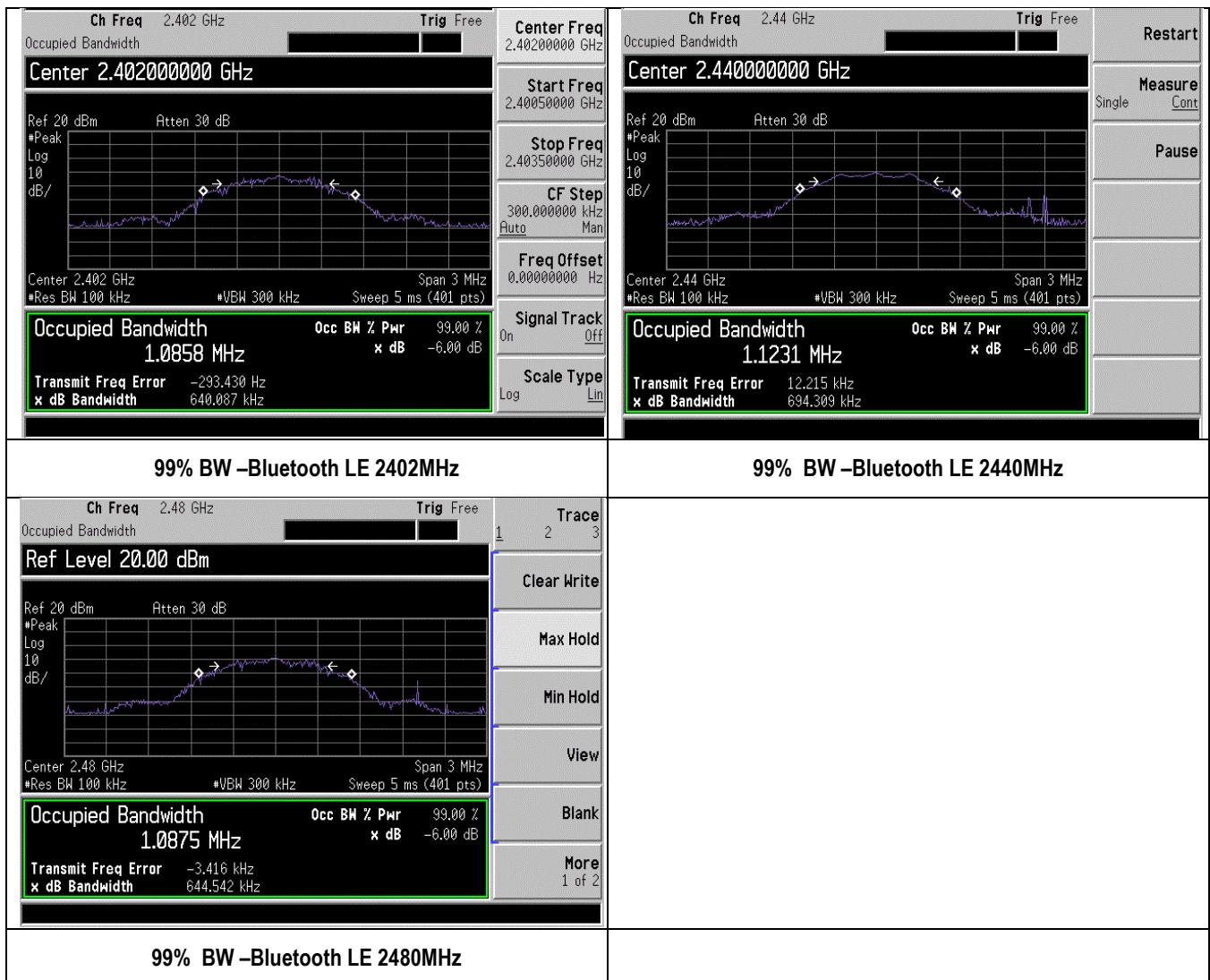


99% BW -2.4G 802.11n-40M 2437MHz



99% BW -2.4G 802.11n-40M 2452MHz

99%dB Bandwidth Test Plot (BT)



10.5 6dB Bandwidth (WLAN & Bluetooth LE)

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247	a)(2)	6dB BW≥500KHz;	☒
Test Setup			
Test Procedure	558074 D01 DTS Meas Guidance v03r02, 8.1 DTS bandwidth <u>6dB Emission bandwidth measurement procedure</u> - Set RBW = 100 kHz. - Set the video bandwidth (VBW) $\geq 3 \times$ 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.		
Test Date	10/20/2014	Environmental condition	Temperature 23°C Relative Humidity 42% Atmospheric Pressure 1021mbar
Remark	N/A		
Result	☒ Pass ☐ Fail		

Equipment Setting

TEST	RBW	VBW	SPAN	Detector	SWEEP	Trace	NOTES
6 dB DTS Bandwidth	100KHz	3 x RBW	>EBW	PK	Auto	Max hold	-

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes ☐ N/A

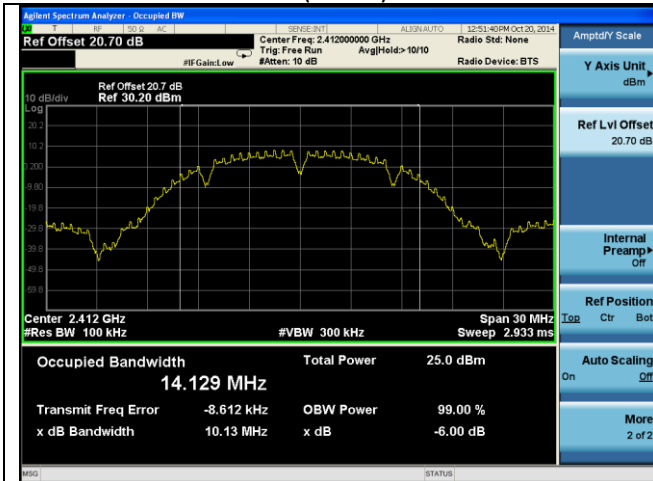
6dB Bandwidth measurement result for WLAN

Type	Test mode	Freq (MHz)	CH	Result (MHz)	Limit (MHz)	Result
6dB BW	802.11b	2412	Low	10.13	≥0.5	Pass
6dB BW	802.11b	2437	Mid	10.12	≥0.5	Pass
6dB BW	802.11b	2462	High	10.11	≥0.5	Pass
6dB BW	802.11g	2412	Low	16.35	≥0.5	Pass
6dB BW	802.11g	2437	Mid	16.34	≥0.5	Pass
6dB BW	802.11g	2462	High	16.32	≥0.5	Pass
6dB BW	802.11n-20M	2412	Low	17.58	≥0.5	Pass
6dB BW	802.11n-20M	2437	Mid	17.22	≥0.5	Pass
6dB BW	802.11n-20M	2462	High	17.33	≥0.5	Pass
6dB BW	802.11n-40M	2422	Low	35.15	≥0.5	Pass
6dB BW	802.11n-40M	2437	Mid	35.15	≥0.5	Pass
6dB BW	802.11n-40M	2452	High	35.14	≥0.5	Pass

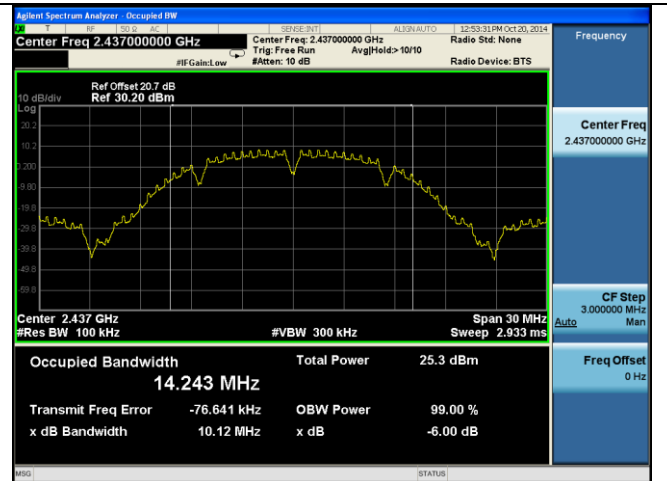
6dB Bandwidth measurement result for Bluetooth LE

Type	Test mode	Freq (MHz)	CH	Result (MHz)	Limit (MHz)	Result
6dB BW	Bluetooth LE	2402	Low	0.640	≥0.5	Pass
6dB BW	Bluetooth LE	2440	Mid	0.694	≥0.5	Pass
6dB BW	Bluetooth LE	2480	High	0.644	≥0.5	Pass

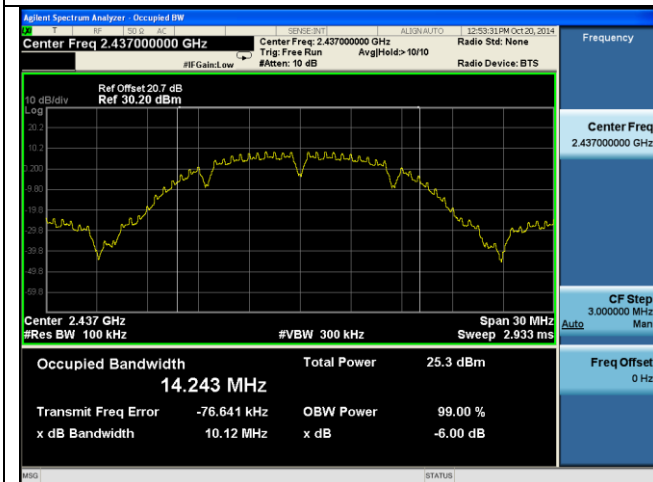
6dB Bandwidth Test Plots(WLAN)



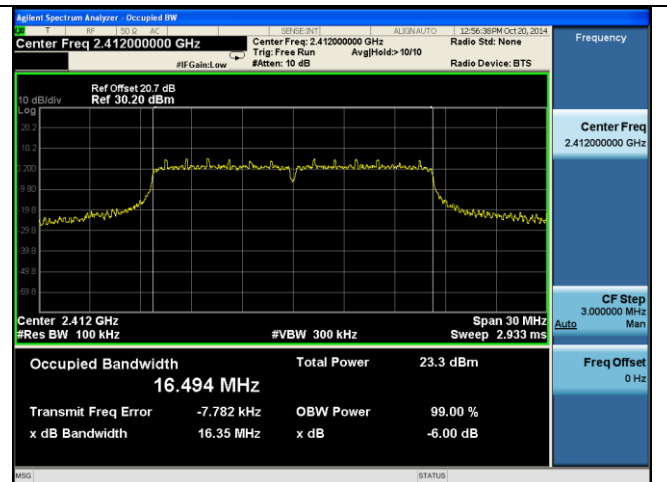
6dB BW -2.4G 802.11b 2412MHz



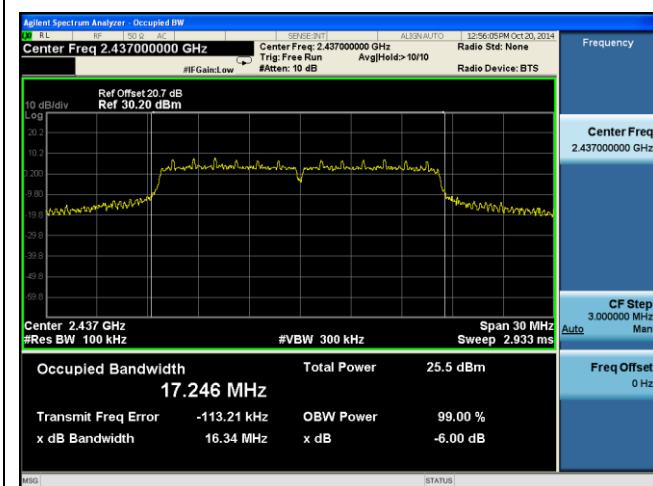
6dB BW -2.4G 802.11b 2437MHz



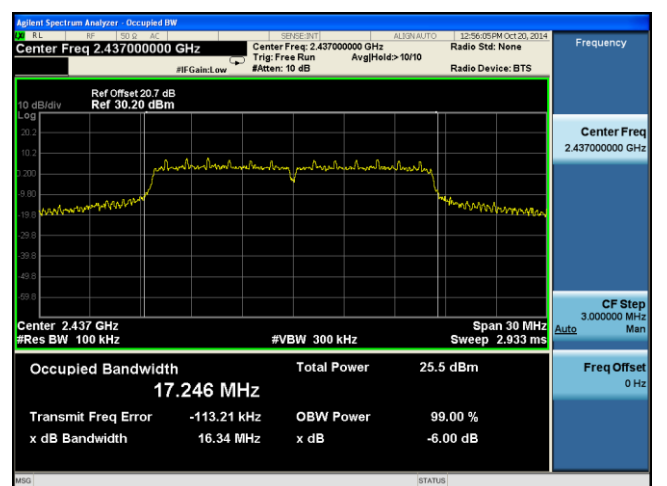
6dB BW -2.4G 802.11b 2462MHz



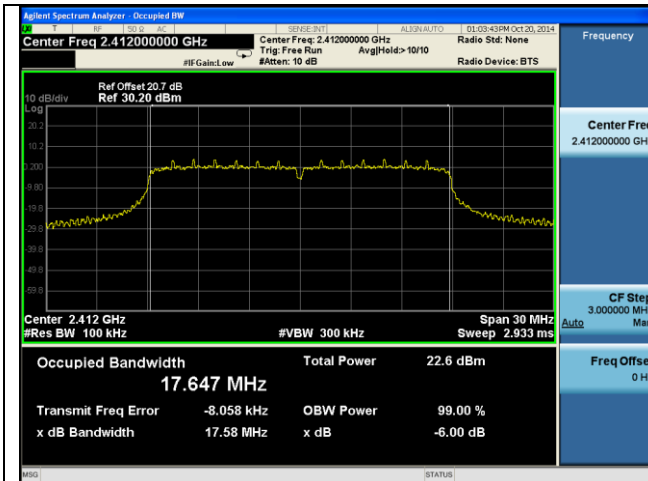
6dB BW -2.4G 802.11g 2412MHz



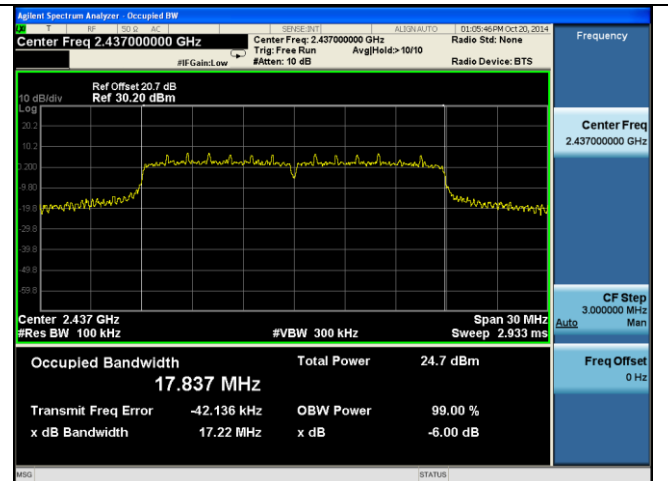
6dB BW -2.4G 802.11g 2437MHz



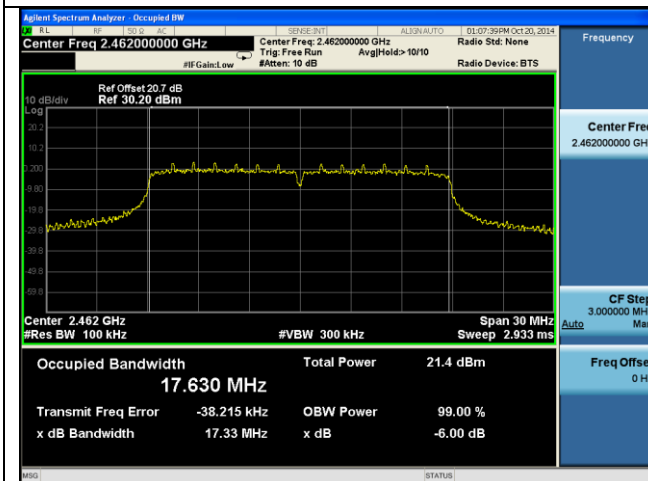
6dB BW -2.4G 802.11g 2462MHz



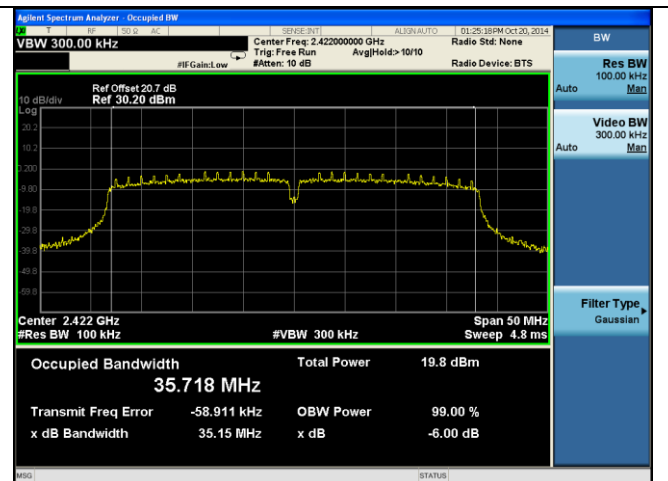
6dB BW -2.4G 802.11n-20M 2412MHz



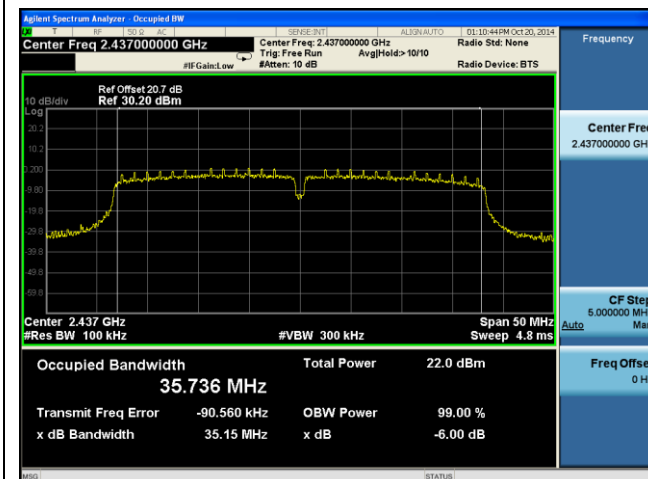
6dB BW -2.4G 802.11n-20M 2437MHz



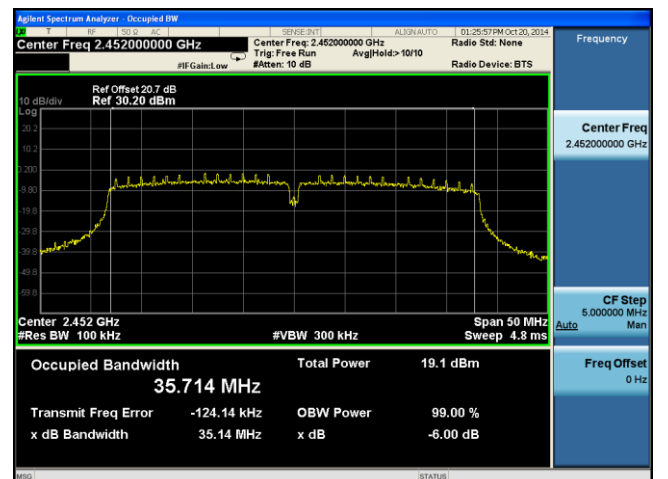
6dB BW -2.4G 802.11n-20M 2462MHz



6dB BW -2.4G 802.11n-40M 2422MHz

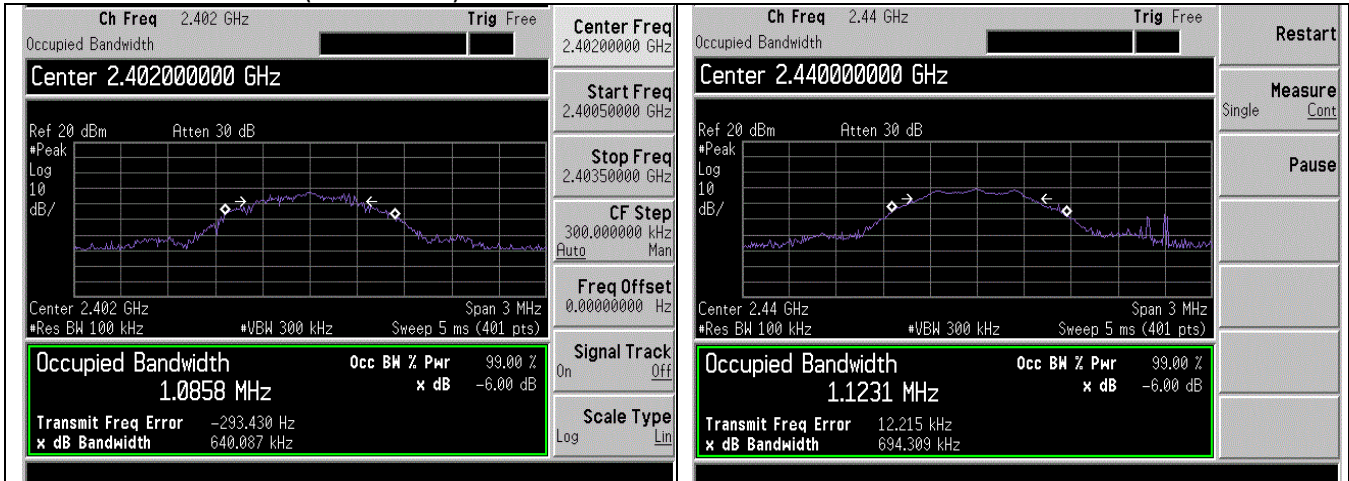


6dB BW -2.4G 802.11n-40M 2437MHz

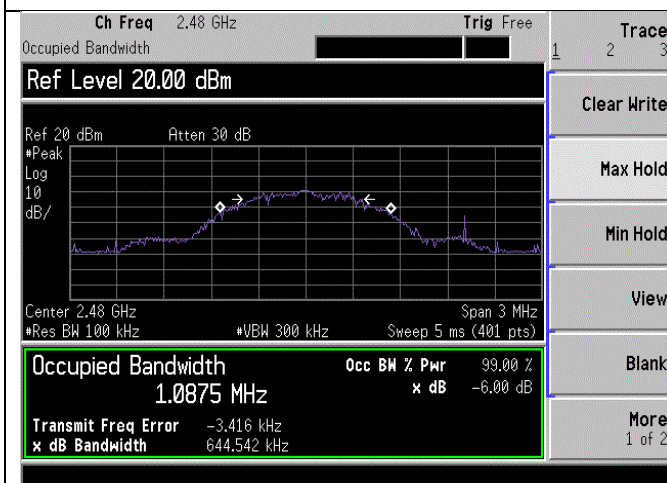


6dB BW -2.4G 802.11n-40M 2452MHz

6dB Bandwidth Test Plots(Bluetooth LE)



6dB BW –Bluetooth LE 2402MHz



6dB BW –Bluetooth LE 2480MHz

6dB BW –Bluetooth LE 2440MHz

10.6 Peak Spectral Density (WLAN & Bluetooth LE)

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247(e)	e)	DSSS: ≤8dBm/3KHz	☒
	f)	DSSS in hybrid sys with FH turned off: ≤8dBm/3KHz	☐
Test Setup			
Test Procedure	558074 D01 DTS Meas Guidance v03r02, 10.3 Method AVGPSD-1 <u>Peak spectral density measurement procedure</u> - Set analyzer center frequency to DTS channel center frequency. - Set the span to 1.5 times the DTS bandwidth. - Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz. - Set the VBW ≥ 3 x RBW. - Detector = RMS - Sweep time = auto couple. - Trace mode = Trace average over 100 traces - Allow trace to fully stabilize. - Use the peak marker function to determine the maximum amplitude level within the RBW. - If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.		
Test Date	10/20/2014	Environmental condition	Temperature 22°C Relative Humidity 46% Atmospheric Pressure 1020mbar
Remark	-		
Result	☒ Pass ☐ Fail		

Equipment Setting

TEST	RBW	VBW	SPAN	Detector	SWEEP	Trace	NOTES
PSD	100KHz	≥3x RBW	1.5x DTS BW	RMS	Auto	Trace average	-

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

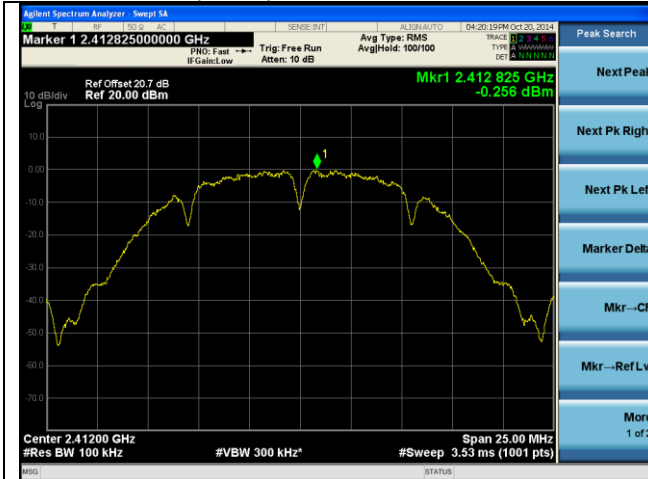
PSD measurement result (WLAN)

Type	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/100KHz)	Limit (dBm/3KHz)	Result
PSD	802.11b	2412	Low	-0.256	≤8	Pass
PSD	802.11b	2437	Mid	0.407	≤8	Pass
PSD	802.11b	2462	High	0.058	≤8	Pass
PSD	802.11g	2412	Low	-3.905	≤8	Pass
PSD	802.11g	2437	Mid	-1.210	≤8	Pass
PSD	802.11g	2462	High	-5.233	≤8	Pass
PSD	802.11n-20M	2412	Low	-5.831	≤8	Pass
PSD	802.11n-20M	2437	Mid	-2.967	≤8	Pass
PSD	802.11n-20M	2462	High	-6.089	≤8	Pass
PSD	802.11n-40M	2422	Low	-10.806	≤8	Pass
PSD	802.11n-40M	2437	Mid	-8.163	≤8	Pass
PSD	802.11n-40M	2452	High	-11.069	≤8	Pass

PSD measurement result (Bluetooth LE)

Type	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/100KHz)	Limit (dBm/3KHz)	Result
PSD	Bluetooth LE	2402	Low	4.303	≤8	Pass
PSD	Bluetooth LE	2440	Mid	4.423	≤8	Pass
PSD	Bluetooth LE	2480	High	4.168	≤8	Pass

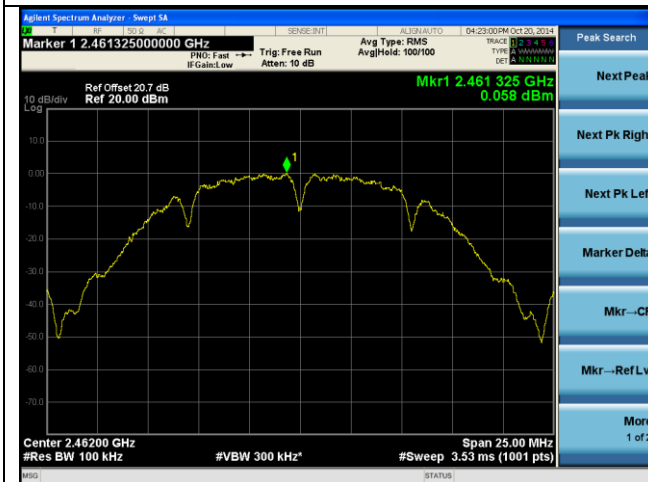
PSD Test Plots (WLAN)



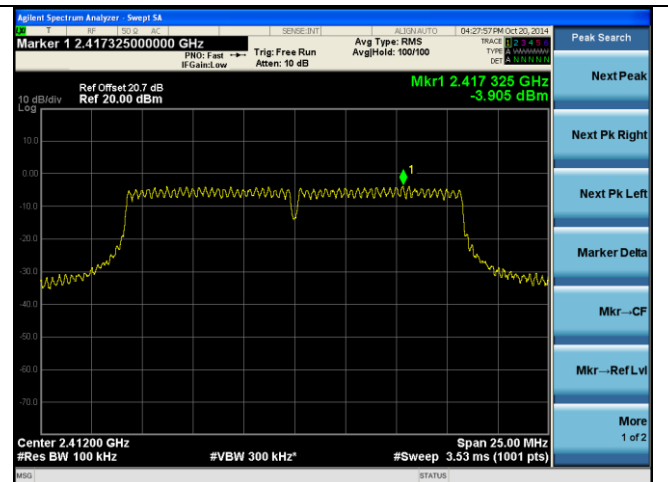
PSD-2.4G-802.11b Low



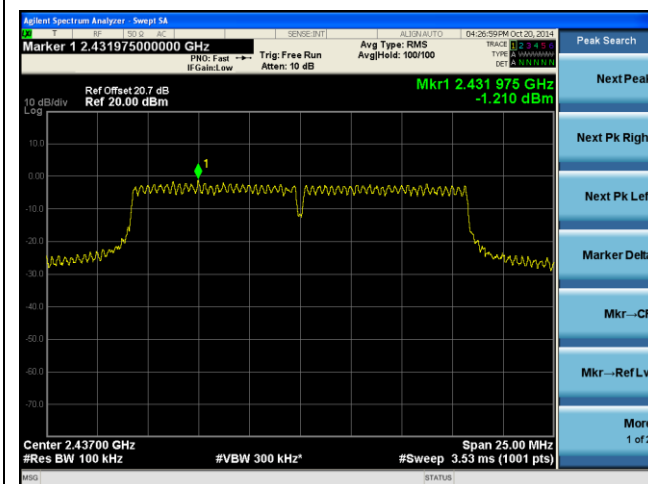
PSD-2.4G-802.11b Mid



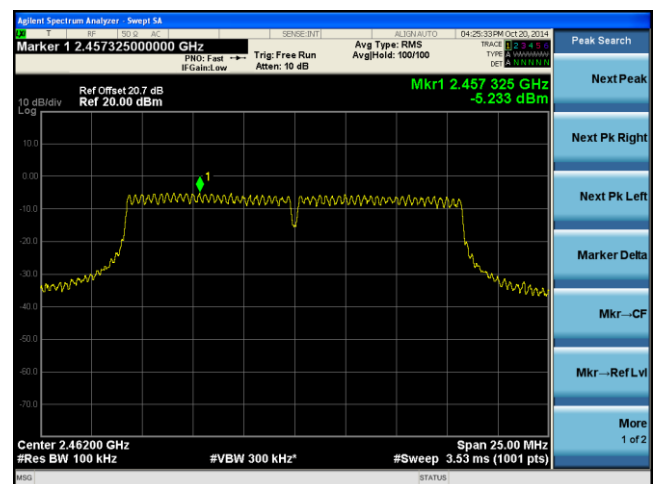
PSD-2.4G-802.11b High



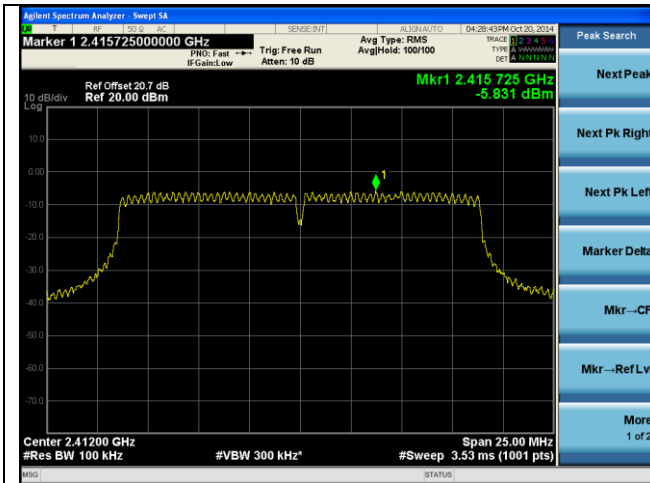
PSD-2.4G-802.11g Low



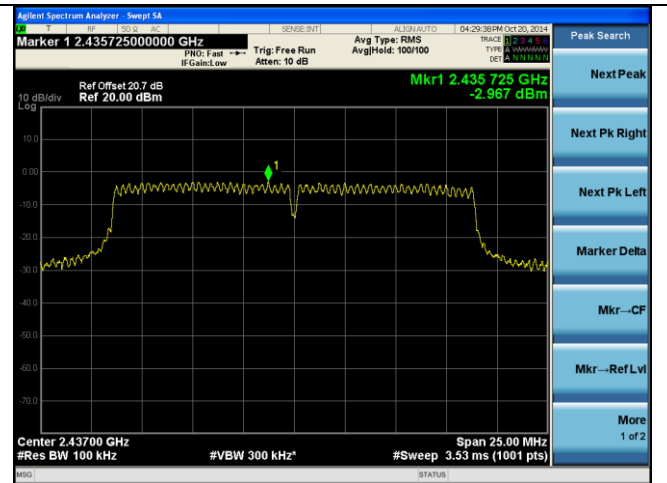
PSD-2.4G-802.11g Mid



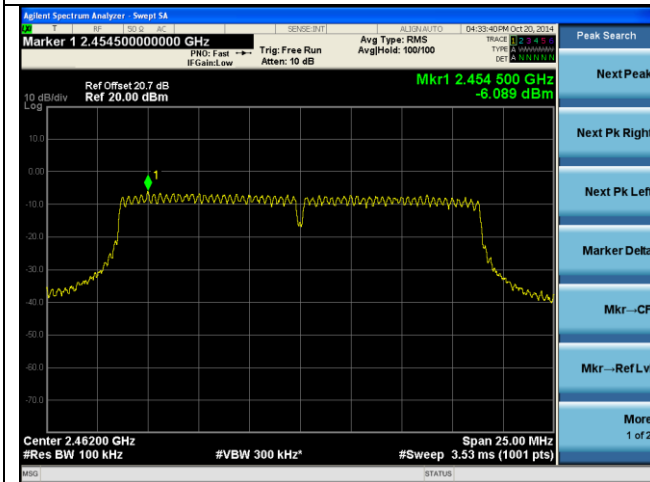
PSD-2.4G-802.11g High



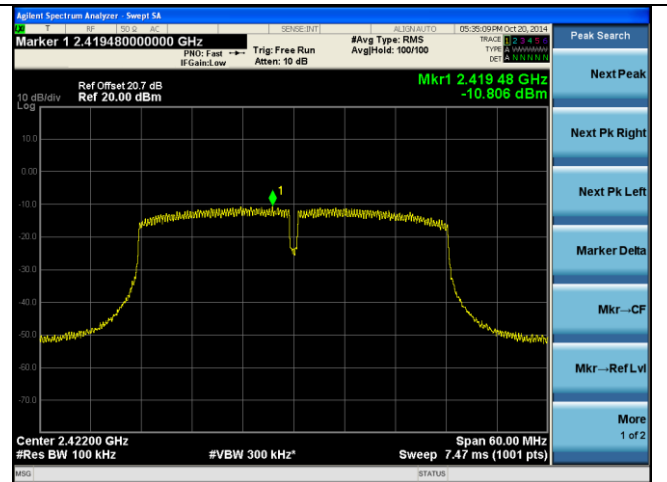
PSD-2.4G-802.11n-20M Low



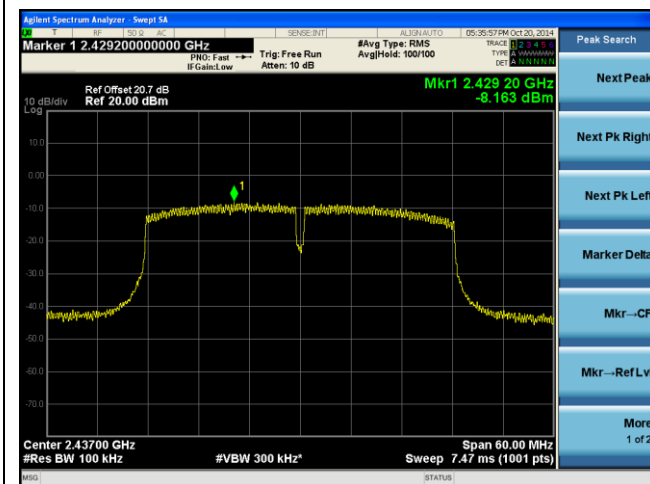
PSD-2.4G-802.11n-20M Mid



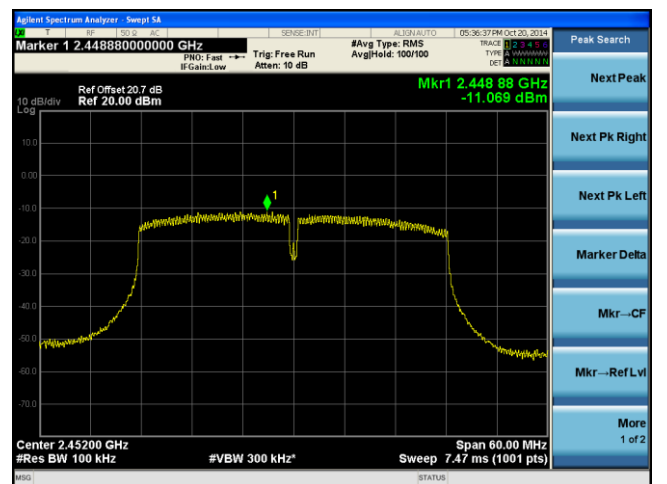
PSD-2.4G-802.11n-20M High



PSD-2.4G-802.11n-40M Low

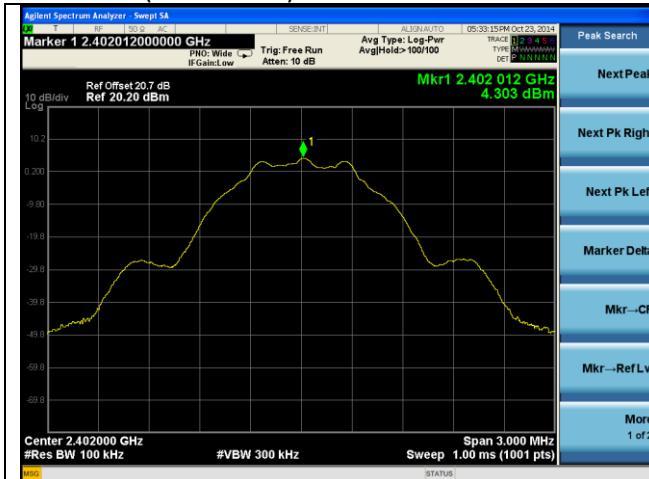


PSD-2.4G-802.11n-40M Mid

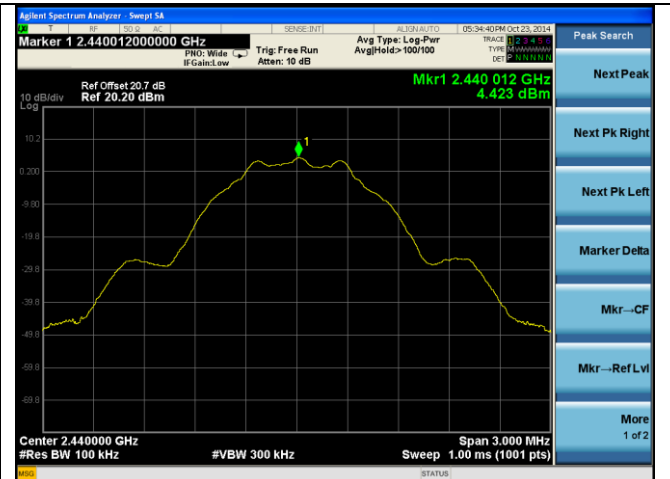


PSD-2.4G-802.11n-40M High

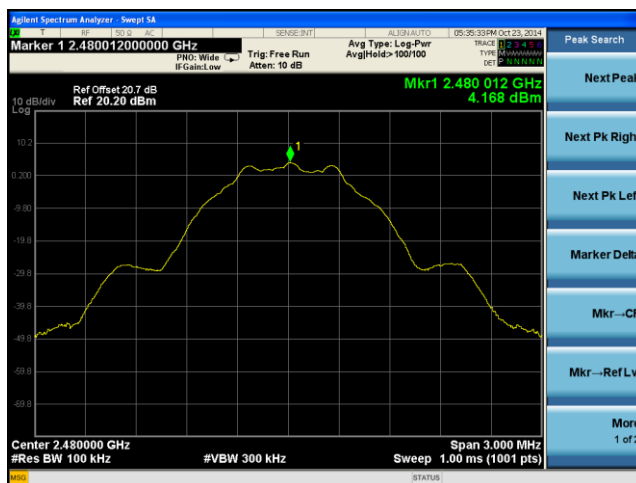
Test Plots (Bluetooth LE)



PSD -Bluetooth LE Low



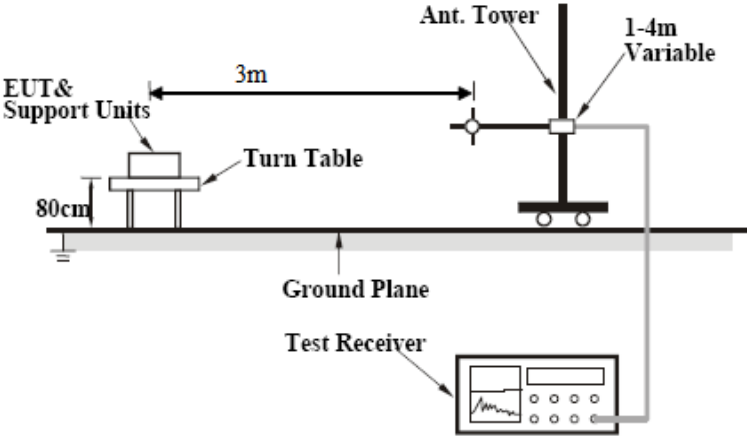
PSD -Bluetooth LE Mid



PSD -Bluetooth LE High

10.7 Transmitter Radiated Spurious Emissions Below 1GHz

Requirement(s):

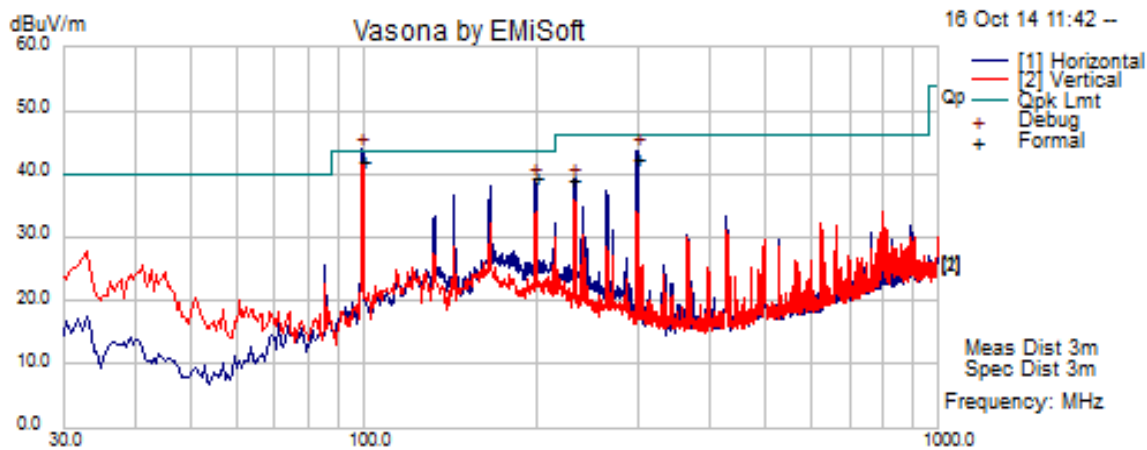
Spec	Item	Requirement	Applicable							
47CFR§15.247(d), RSS210(A8.5)	a)	Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges	☒							
		<table><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>		Frequency range (MHz)	Field Strength (uV/m)	30 – 88	100	88 – 216	150	216 960
Frequency range (MHz)	Field Strength (uV/m)									
30 – 88	100									
88 – 216	150									
216 960	200									
Above 960	500									
Test Setup										
Procedure	1. The EUT was switched on and allowed to warm up to its normal operating condition. 2. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. b. The EUT was then rotated to the direction that gave the maximum emission. c. Finally, the antenna height was adjusted to the height that gave the maximum emission. 3. A Quasi-peak measurement was then made for that frequency point. 4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.									
Remark	The EUT was scanned up to 1GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.									
Result	☒ Pass ☐ Fail									

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Radiated Emission Test Results (Below 1GHz)

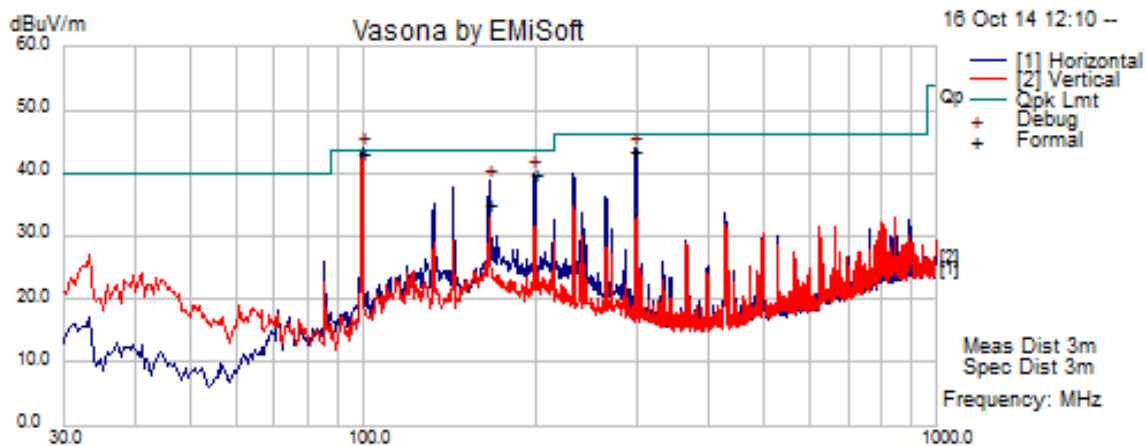
Test specification:	Radiated Spurious Emissions (30MHz – 1000MHz)			
Environmental Conditions:	Temp(°C):	20	Result:	☒ Pass ☐ Fail
	Humidity (%):	36		
	Atmospheric(mbar):	1021		
Mains Power:	120VAC, 60Hz			
Tested by:	Teody Manansala			
Test Date:	16-Oct-14			
Remarks:	WLAN 2.4GHz 802.11b – 2462MHz			



Quasi Max Measurement

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	PoI (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
99.57	69.93	1.82	-29.83	41.92	Quasi Max	H	205.00	228.00	43.50	-1.58	Pass
298.93	65.43	3.00	-26.19	42.23	Quasi Max	H	105.00	25.00	46.00	-3.77	Pass
199.02	63.73	2.50	-27.04	39.19	Quasi Max	H	175.00	29.00	43.50	-4.31	Pass
232.60	64.57	2.69	-28.37	38.89	Quasi Max	H	142.00	23.00	46.00	-7.11	Pass

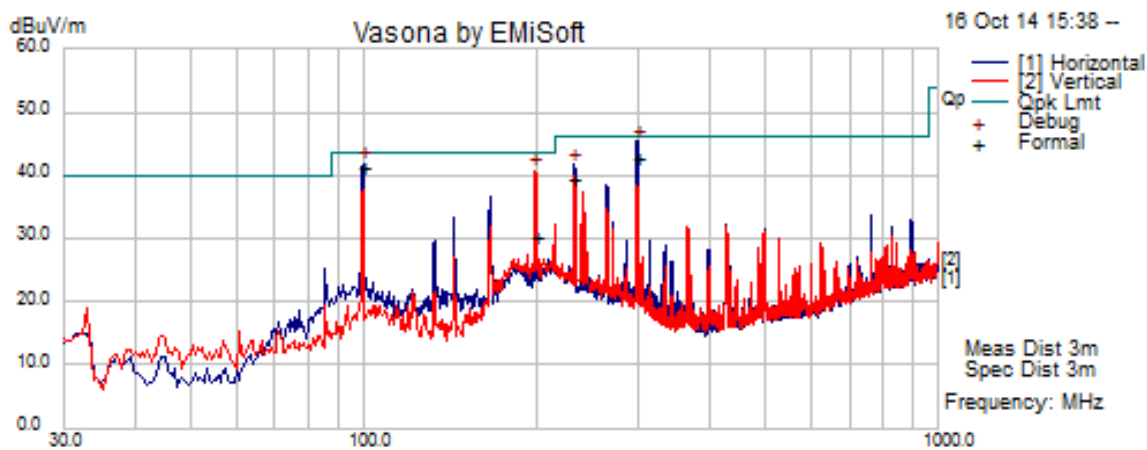
Test specification:	Radiated Spurious Emissions (30MHz – 1000MHz)			
Environmental Conditions:	Temp(°C):	20	Result:	☒ Pass ☐ Fail
	Humidity (%):	36		
	Atmospheric(mbar):	1021		
Mains Power:	120VAC, 60Hz			
Tested by:	Teody Manansala			
Test Date:	16-Oct-14			
Remarks:	WLAN 2.4GHz 802.11g – 2462MHz			



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
99.93	70.80	1.83	-29.72	42.91	Quasi Max	H	324.00	233.00	43.50	-0.59	Pass
298.45	66.69	2.99	-26.20	43.48	Quasi Max	H	106.00	14.00	46.00	-2.52	Pass
199.02	64.14	2.50	-27.04	39.59	Quasi Max	H	157.00	245.00	43.50	-3.91	Pass
165.95	60.45	2.32	-28.00	34.77	Quasi Max	H	170.00	63.00	43.50	-8.73	Pass

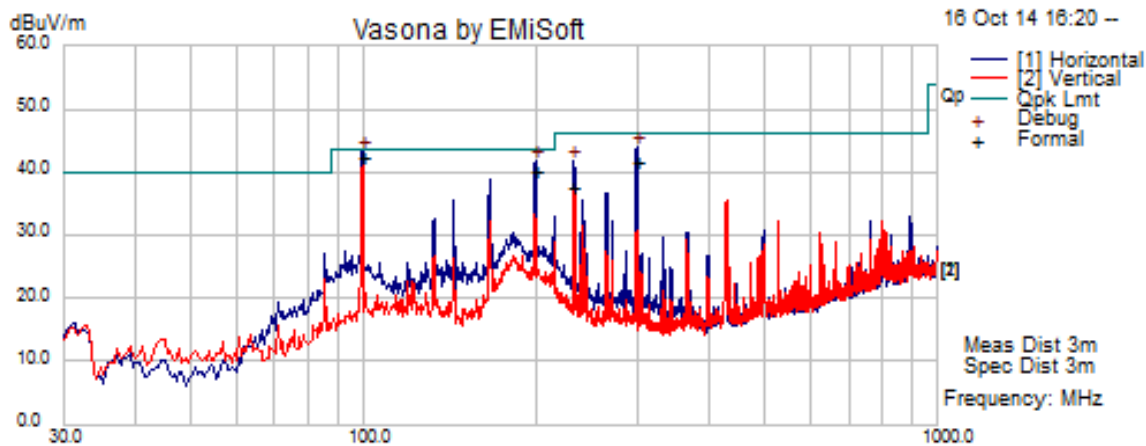
Test specification:	Radiated Spurious Emissions (30MHz – 1000MHz)			
Environmental Conditions:	Temp(°C):	20	Result:	☒ Pass ☐ Fail
	Humidity (%):	36		
	Atmospheric(mbar):	1021		
Mains Power:	120VAC, 60Hz			
Tested by:	Teody Manansala			
Test Date:	16-Oct-14			
Remarks:	WLAN 2.4GHz 802.11n20 – 2462MHz			



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
299.44	65.92	3.00	-26.18	42.73	Quasi Max	H	104.00	65.00	46.00	-3.27	Pass
99.68	69.10	1.83	-29.79	41.13	Quasi Max	H	309.00	39.00	43.50	-2.37	Pass
199.02	54.87	2.50	-27.04	30.32	Quasi Max	V	234.00	144.00	43.50	-13.18	Pass
232.18	65.01	2.68	-28.38	39.31	Quasi Max	H	153.00	198.00	46.00	-6.69	Pass

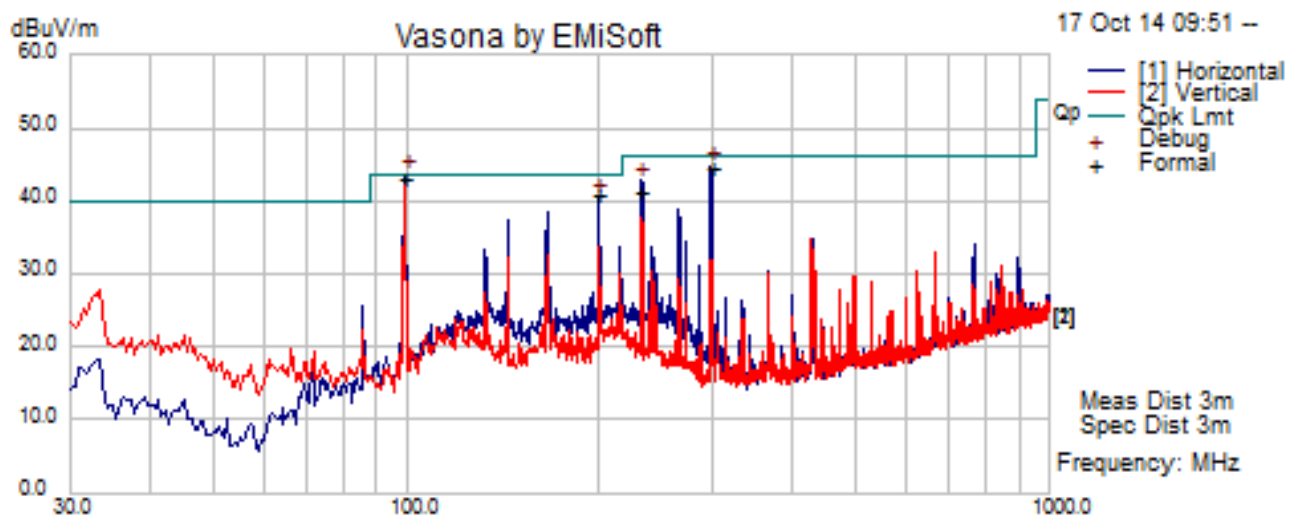
Test specification:	Radiated Spurious Emissions (30MHz – 1000MHz)			
Environmental Conditions:	Temp(°C):	20	Result:	☒ Pass ☐ Fail
	Humidity (%):	36		
	Atmospheric(mbar):	1021		
Mains Power:	120VAC, 60Hz			
Tested by:	Teody Manansala			
Test Date:	16-Oct-14			
Remarks:	WLAN 2.4GHz 802.11n40 – 2462MHz			



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
99.69	70.36	1.83	-29.79	42.40	Quasi Max	H	310.00	50.00	43.50	-1.10	Pass
199.57	64.40	2.50	-26.92	39.97	Quasi Max	H	103.00	45.00	43.50	-3.53	Pass
299.32	64.75	3.00	-26.18	41.57	Quasi Max	H	101.00	201.00	46.00	-4.43	Pass
232.30	63.27	2.68	-28.38	37.58	Quasi Max	H	158.00	301.00	46.00	-8.42	Pass

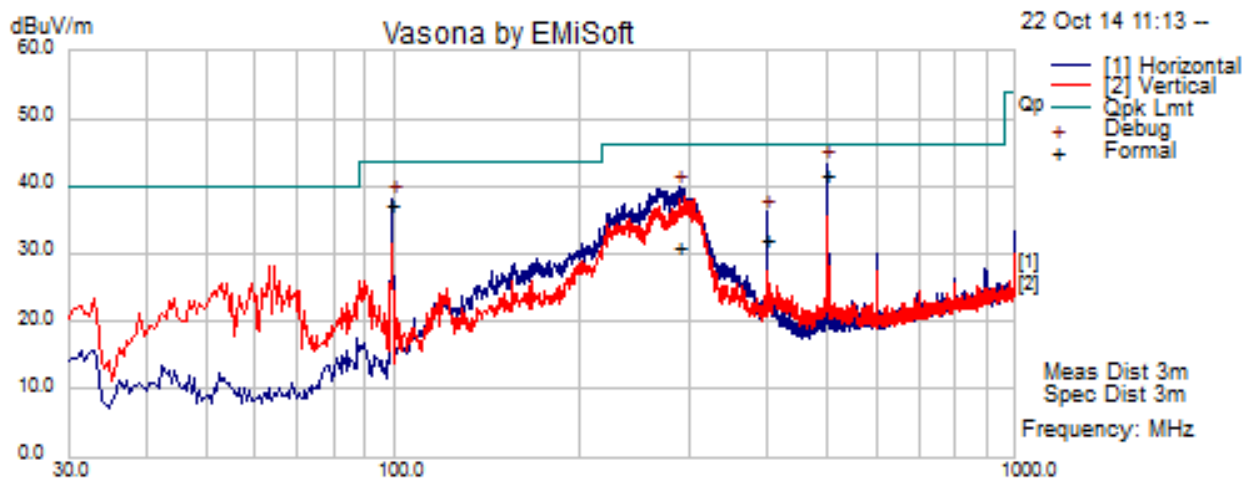
Test specification:	Radiated Spurious Emissions (30MHz – 1000MHz)			
Environmental Conditions:	Temp(°C):	20	Result:	☒ Pass ☐ Fail
	Humidity (%):	36		
	Atmospheric(mbar):	1021		
Mains Power:	120VAC, 60Hz			
Tested by:	Teody Manansala			
Test Date:	17-Oct-14			
Remarks:	Bluetooth LE – 2480MHz			



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
99.75	71.04	1.83	-29.78	43.09	Quasi Max	H	305.00	203.00	43.50	-0.41	Pass
298.45	67.87	2.99	-26.20	44.66	Quasi Max	H	102.00	347.00	46.00	-1.34	Pass
199.01	65.20	2.50	-27.04	40.65	Quasi Max	H	159.00	25.00	43.50	-2.85	Pass
232.48	67.00	2.69	-28.37	41.32	Quasi Max	H	134.00	358.00	46.00	-4.68	Pass

Test specification:	Radiated Spurious Emissions (30MHz – 1000MHz)			
Environmental Conditions:	Temp(°C):	20	Result:	☒ Pass ☐ Fail
	Humidity (%):	36		
	Atmospheric(mbar):	1021		
Mains Power:	120VAC, 60Hz			
Tested by:	Teody Manansala			
Test Date:	22-Oct-14			
Remarks:	WLAN 802.11g (2462MHz) and Bluetooth LE (2480MHz) transmitting simultaneously			

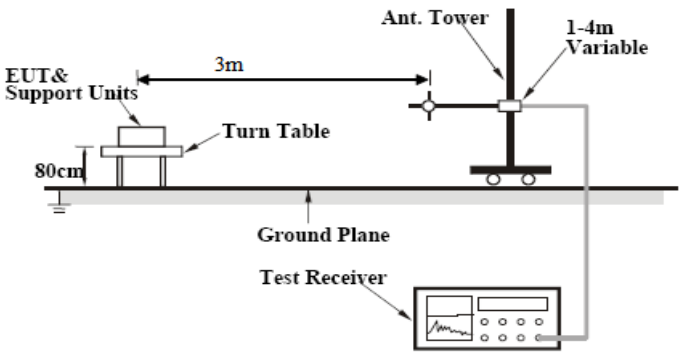


Quasi Max Measurement

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
499.66	59.40	4.16	-21.89	41.67	Quasi Max	H	170.00	44.00	46.00	-4.33	Pass
99.59	65.05	1.82	-29.82	37.05	Quasi Max	H	339.00	213.00	43.50	-6.45	Pass
288.26	54.36	2.95	-26.42	30.89	Quasi Max	H	139.00	268.00	46.00	-15.11	Pass
398.26	52.87	3.33	-24.14	32.05	Quasi Max	H	271.00	3.00	46.00	-13.95	Pass

10.8 Transmitter Radiated Spurious Emissions Above 1GHz

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	- The EUT was switched on and allowed to warm up to its normal operating condition. - The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: - Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. - The EUT was then rotated to the direction that gave the maximum emission. - Finally, the antenna height was adjusted to the height that gave the maximum emission. - An average measurement was then made for that frequency point. - Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.		
Remark	The EUT was scanned up to 40GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.		
Result	☒ Pass ☐ Fail		

Equipment Setting

TEST	RBW	VBW	SPAN	Detector	SWEEP	Trace	NOTES
Radiated Spurious Emission	1MHz	3MHz	1GHz - 25 GHz	Peak	Auto	Max hold	PK Measurement
Radiated Spurious Emission	1MHz	10Hz	1GHz - 25 GHz	Peak	Auto	Max hold	Ave Measurement

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Transmitter Radiated Emission Test Results (Above 1GHz)

Test specification:	Radiated Spurious Emissions (above 1GHz)				
Environmental Conditions:	Temp(°C):	20	Result:	☒ Pass ☐ Fail	
	Humidity (%):	36			
	Atmospheric(mbar):	1021			
Mains Power:	120VA, 60Hz				
Tested by:	Teody Manansala				
Test Date:	10/20/2014				
Remarks:	WLAN b/g/n-20/n-40				

WLAN 802.11b – 2412MHz

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
12464.22	41.28	5.40	6.26	52.94	Peak Max	H	204.00	291.00	74.00	-21.06	Pass
4185.26	41.55	3.37	-0.22	44.70	Peak Max	H	102.00	119.00	74.00	-29.30	Pass
12464.22	28.56	5.40	6.26	40.22	Average Max	H	204.00	291.00	54.00	-13.78	Pass
4185.26	28.88	3.37	-0.22	32.02	Average Max	H	102.00	119.00	54.00	-21.98	Pass

Restricted Band WLAN 802.11b – 2412MHz

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
2390	42.14	2.69	-3.53	41.30	Peak Max	V	187.00	1.00	74.00	-32.70	Pass
2390	50.26	2.69	-3.53	49.42	Peak Max	H	115.00	183.00	74.00	-24.58	Pass
2390	29.04	2.69	-3.53	28.20	Average Max	V	187.00	1.00	54.00	-25.80	Pass
2390	42.81	2.69	-3.53	41.97	Average Max	H	115.00	183.00	54.00	-12.03	Pass

WLAN 802.11b – 2437MHz

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
17959.30	39.84	6.61	14.33	60.78	Peak Max	V	216.00	299.00	74.00	-13.22	Pass
8076.65	41.20	4.21	4.59	50.00	Peak Max	V	287.00	328.00	74.00	-24.00	Pass
1041.90	46.65	1.78	-7.10	41.33	Peak Max	V	295.00	238.00	74.00	-32.67	Pass
17959.30	26.79	6.61	14.33	47.73	Average Max	V	216.00	299.00	54.00	-6.27	Pass
8076.65	28.93	4.21	4.59	37.72	Average Max	V	287.00	328.00	54.00	-16.28	Pass
1041.90	33.94	1.78	-7.10	28.62	Average Max	V	295.00	238.00	54.00	-25.38	Pass

WLAN 802.11b – 2462MHz

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
17882.00	40.10	6.60	14.07	60.77	Peak Max	H	221.00	93.00	74.00	-13.23	Pass
4203.84	42.08	3.37	-0.23	45.22	Peak Max	H	227.00	190.00	74.00	-28.78	Pass
1007.55	47.24	1.75	-7.17	41.81	Peak Max	V	242.00	275.00	74.00	-32.19	Pass
17882.00	26.89	6.60	14.07	47.56	Average Max	H	221.00	93.00	54.00	-6.44	Pass
4203.84	29.19	3.37	-0.23	32.33	Average Max	H	227.00	190.00	54.00	-21.67	Pass
1007.55	34.32	1.75	-7.17	28.90	Average Max	V	242.00	275.00	54.00	-25.10	Pass

Restricted Band WLAN 802.11b – 2462MHz

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
2483.5	40.54	2.72	-3.32	39.95	Peak Max	V	148.00	183.00	74.00	-34.05	Pass
2483.5	40.27	2.72	-3.32	39.67	Peak Max	H	124.00	305.00	74.00	-34.33	Pass
2483.5	27.71	2.72	-3.32	27.12	Average Max	V	148.00	183.00	54.00	-26.88	Pass
2483.5	27.69	2.72	-3.32	27.09	Average Max	H	124.00	305.00	54.00	-26.91	Pass

WLAN 802.11g – 2412MHz

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
17957.72	39.96	6.61	14.32	60.89	Peak Max	H	215.00	170.00	74.00	-13.11	Pass
8262.69	41.77	4.22	4.96	50.94	Peak Max	V	275.00	288.00	74.00	-23.06	Pass
1008.97	47.36	1.75	-7.17	41.94	Peak Max	V	226.00	110.00	74.00	-32.06	Pass
17957.72	26.80	6.61	14.32	47.74	Average Max	H	215.00	170.00	54.00	-6.26	Pass
8262.69	28.71	4.22	4.96	37.88	Average Max	V	275.00	288.00	54.00	-16.12	Pass
1008.97	34.41	1.75	-7.17	28.99	Average Max	V	226.00	110.00	54.00	-25.01	Pass

Restricted Band WLAN 802.11g – 2412MHz

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
2390	59.44	2.69	-3.53	58.60	Peak Max	V	113.00	145.00	74.00	-15.40	Pass
2390	61.89	2.69	-3.53	61.05	Peak Max	H	166.00	118.00	74.00	-12.95	Pass
2390	42.17	2.69	-3.53	41.33	Average Max	V	113.00	145.00	54.00	-12.67	Pass
2390	45.25	2.69	-3.53	44.41	Average Max	H	166.00	118.00	54.00	-9.59	Pass

WLAN 802.11g – 2437MHz

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
17989.92	39.46	6.61	14.43	60.51	Peak Max	V	284.00	110.00	74.00	-13.49	Pass
4001.96	41.78	3.31	-0.18	44.91	Peak Max	H	226.00	144.00	74.00	-29.09	Pass
1009.96	47.23	1.75	-7.17	41.81	Peak Max	V	296.00	274.00	74.00	-32.19	Pass
17989.92	26.74	6.61	14.43	47.78	Average Max	V	284.00	110.00	54.00	-6.22	Pass
4001.96	28.73	3.31	-0.18	31.86	Average Max	H	226.00	144.00	54.00	-22.14	Pass
1009.96	34.48	1.75	-7.17	29.06	Average Max	V	296.00	274.00	54.00	-24.94	Pass

WLAN 802.11g – 2462MHz

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
17949.91	40.23	6.61	14.30	61.13	Peak Max	H	241.00	336.00	74.00	-12.87	Pass
2219.13	43.87	2.62	-3.95	42.54	Peak Max	V	298.00	267.00	74.00	-31.46	Pass
1009.66	47.23	1.75	-7.17	41.81	Peak Max	H	300.00	149.00	74.00	-32.19	Pass
17949.91	26.85	6.61	14.30	47.75	Average Max	H	241.00	336.00	54.00	-6.25	Pass
2219.13	31.01	2.62	-3.95	29.68	Average Max	V	298.00	267.00	54.00	-24.32	Pass
1009.66	34.23	1.75	-7.17	28.81	Average Max	H	300.00	149.00	54.00	-25.19	Pass

Restricted Band WLAN 802.11g – 2462MHz

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
2483.5	51.16	2.72	-3.32	50.56	Peak Max	V	104.00	196.00	74.00	-23.44	Pass
2483.5	40.81	2.72	-3.32	40.22	Peak Max	H	307.00	84.00	74.00	-33.78	Pass
2483.5	33.54	2.72	-3.32	32.95	Average Max	V	104.00	196.00	54.00	-21.05	Pass
2483.5	28.06	2.72	-3.32	27.47	Average Max	H	307.00	84.00	54.00	-26.53	Pass

WLAN 802.11n20 – 2412MHz

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
17870.90	39.86	6.60	14.03	60.49	Peak Max	V	235.00	133.00	74.00	-13.51	Pass
4251.74	42.19	3.39	-0.24	45.34	Peak Max	V	174.00	62.00	74.00	-28.66	Pass
1009.60	47.36	1.75	-7.17	41.94	Peak Max	H	125.00	85.00	74.00	-32.06	Pass
17870.90	26.86	6.60	14.03	47.49	Average Max	V	235.00	133.00	54.00	-6.51	Pass
4251.74	29.16	3.39	-0.24	32.31	Average Max	V	174.00	62.00	54.00	-21.69	Pass
1009.60	34.51	1.75	-7.17	29.10	Average Max	H	125.00	85.00	54.00	-24.90	Pass

Restricted Band WLAN 802.11n20 – 2412MHz

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
2390	60.91	2.69	-3.53	60.06	Peak Max	V	130.00	355.00	74.00	-13.94	Pass
2390	57.68	2.69	-3.53	56.84	Peak Max	H	101.00	170.00	74.00	-17.16	Pass
2390	42.63	2.69	-3.53	41.79	Average Max	V	130.00	355.00	54.00	-12.21	Pass
2390	41.01	2.69	-3.53	40.17	Average Max	H	101.00	170.00	54.00	-13.83	Pass

WLAN 802.11n20 – 2437MHz

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
18000.93	8.19	6.61	45.73	60.54	Peak Max	V	160.00	45.00	74.00	-13.46	Pass
3998.10	42.29	3.31	-0.18	45.42	Peak Max	V	284.00	192.00	74.00	-28.58	Pass
1032.53	47.09	1.77	-7.12	41.75	Peak Max	H	313.00	210.00	74.00	-32.25	Pass
18000.93	-4.49	6.61	45.73	47.86	Average Max	V	160.00	45.00	54.00	-6.14	Pass
3998.10	29.08	3.31	-0.18	32.21	Average Max	V	284.00	192.00	54.00	-21.79	Pass
1032.53	34.38	1.77	-7.12	29.03	Average Max	H	313.00	210.00	54.00	-24.97	Pass

WLAN 802.11n20 – 2462MHz

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
17890.08	40.24	6.60	14.10	60.93	Peak Max	V	153.00	5.00	74.00	-13.07	Pass
9033.83	41.30	4.28	5.74	51.32	Peak Max	H	126.00	12.00	74.00	-22.68	Pass
1025.31	47.53	1.76	-7.13	42.16	Peak Max	V	326.00	341.00	74.00	-31.84	Pass
17890.08	26.83	6.60	14.10	47.53	Average Max	V	153.00	5.00	54.00	-6.47	Pass
9033.83	28.27	4.28	5.74	38.29	Average Max	H	126.00	12.00	54.00	-15.71	Pass
1025.31	34.30	1.76	-7.13	28.93	Average Max	V	326.00	341.00	54.00	-25.07	Pass

Restricted Band WLAN 802.11n20 – 2462MHz

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
2483.5	47.37	2.72	-3.32	46.77	Peak Max	V	100.00	181.00	74.00	-27.23	Pass
2483.5	42.39	2.72	-3.32	41.80	Peak Max	H	177.00	148.00	74.00	-32.20	Pass
2483.5	31.06	2.72	-3.32	30.46	Average Max	V	100.00	181.00	54.00	-23.54	Pass
2483.5	28.67	2.72	-3.32	28.07	Average Max	H	177.00	148.00	54.00	-25.93	Pass

WLAN 802.11n40 – 2412MHz

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
17974.21	39.35	6.61	14.38	60.33	Peak Max	H	171.00	353.00	74.00	-13.67	Pass
5050.69	43.31	3.61	0.41	47.33	Peak Max	V	152.00	223.00	74.00	-26.67	Pass
1007.53	47.24	1.75	-7.17	41.81	Peak Max	H	272.00	23.00	74.00	-32.19	Pass
17974.21	26.65	6.61	14.38	47.64	Average Max	H	171.00	353.00	54.00	-6.36	Pass
5050.69	29.91	3.61	0.41	33.93	Average Max	V	152.00	223.00	54.00	-20.07	Pass
1007.53	34.41	1.75	-7.17	28.99	Average Max	H	272.00	23.00	54.00	-25.01	Pass

Restricted Band WLAN 802.11n40 – 2412MHz

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
2390	59.58	2.69	-3.54	58.74	Peak Max	V	139.00	167.00	74.00	-15.26	Pass
2390	53.11	2.69	-3.53	52.27	Peak Max	H	101.00	159.00	74.00	-21.73	Pass
2390	42.68	2.69	-3.54	41.83	Average Max	V	139.00	167.00	54.00	-12.17	Pass
2390	38.74	2.69	-3.53	37.90	Average Max	H	101.00	159.00	54.00	-16.10	Pass

WLAN 802.11n40 – 2437MHz

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
17845.29	39.98	6.60	13.95	60.52	Peak Max	V	280.00	232.00	74.00	-13.48	Pass
11887.30	40.63	5.24	6.38	52.25	Peak Max	H	231.00	25.00	74.00	-21.75	Pass
1018.19	47.31	1.76	-7.15	41.92	Peak Max	H	310.00	108.00	74.00	-32.08	Pass
17845.29	26.72	6.60	13.95	47.27	Average Max	V	280.00	232.00	54.00	-6.73	Pass
11887.30	28.16	5.24	6.38	39.78	Average Max	H	231.00	25.00	54.00	-14.22	Pass
1018.19	34.46	1.76	-7.15	29.07	Average Max	H	310.00	108.00	54.00	-24.93	Pass

WLAN 802.11n40 – 2462MHz

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
17922.70	39.48	6.60	14.21	60.29	Peak Max	H	130.00	218.00	74.00	-13.71	Pass
4278.40	41.93	3.39	-0.24	45.08	Peak Max	V	110.00	89.00	74.00	-28.92	Pass
1007.78	47.11	1.75	-7.17	41.68	Peak Max	H	219.00	152.00	74.00	-32.32	Pass
17922.70	26.77	6.60	14.21	47.58	Average Max	H	130.00	218.00	54.00	-6.42	Pass
4278.40	28.95	3.39	-0.24	32.11	Average Max	V	110.00	89.00	54.00	-21.89	Pass
1007.78	34.31	1.75	-7.17	28.88	Average Max	H	219.00	152.00	54.00	-25.12	Pass

Restricted Band WLAN 802.11n40 – 2412MHz

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
2483.5	40.41	2.72	-3.31	39.82	Peak Max	V	150.00	152.00	74.00	-34.18	Pass
2483.5	41.08	2.72	-3.32	40.49	Peak Max	H	216.00	16.00	74.00	-33.51	Pass
2483.5	27.73	2.72	-3.31	27.14	Average Max	V	150.00	152.00	54.00	-26.86	Pass
2483.5	27.64	2.72	-3.32	27.05	Average Max	H	216.00	16.00	54.00	-26.95	Pass

Test specification:	Radiated Spurious Emissions (above 1GHz)			
Environmental Conditions:	Temp(°C):	20	Result:	☒ Pass ☐ Fail
	Humidity (%):	36		
	Atmospheric(mbar):	1021		
Mains Power:	120VA, 60Hz			
Tested by:	Teody Manansala			
Test Date:	10/20/2014			
Remarks:	Bluetooth LE			

Bluetooth LE – 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
17990.26	39.95	6.61	14.43	61.00	Peak Max	H	195.00	3.00	74.00	-13.00	Pass
4200.37	42.21	3.37	-0.23	45.35	Peak Max	V	247.00	193.00	74.00	-28.65	Pass
1008.86	47.49	1.75	-7.17	42.07	Peak Max	V	199.00	298.00	74.00	-31.93	Pass
17990.26	26.68	6.61	14.43	47.72	Average Max	H	195.00	3.00	54.00	-6.28	Pass
4200.37	29.14	3.37	-0.23	32.29	Average Max	V	247.00	193.00	54.00	-21.71	Pass
1008.86	34.25	1.75	-7.17	28.83	Average Max	V	199.00	298.00	54.00	-25.17	Pass

Restricted Band Bluetooth LE – 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
2390	41.35	2.69	-3.53	40.51	Peak Max	V	248.00	316.00	74.00	-33.49	Pass
2390	41.62	2.69	-3.53	40.78	Peak Max	H	151.00	79.00	74.00	-33.22	Pass
2390	28.84	2.69	-3.53	28.00	Average Max	V	248.00	316.00	54.00	-26.00	Pass
2390	28.84	2.69	-3.53	28.00	Average Max	H	151.00	79.00	54.00	-26.00	Pass

Bluetooth LE – 2440MHz

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
17958.24	39.96	6.61	14.32	60.90	Peak Max	V	147.00	183.00	74.00	-13.10	Pass
4146.56	41.83	3.36	-0.21	44.97	Peak Max	V	100.00	153.00	74.00	-29.03	Pass
1008.82	47.49	1.75	-7.17	42.07	Peak Max	V	149.00	168.00	74.00	-31.93	Pass
17958.24	26.73	6.61	14.32	47.66	Average Max	V	147.00	183.00	54.00	-6.34	Pass
4146.56	28.94	3.36	-0.21	32.08	Average Max	V	100.00	153.00	54.00	-21.92	Pass
1008.82	34.34	1.75	-7.17	28.91	Average Max	V	149.00	168.00	54.00	-25.09	Pass

Bluetooth LE – 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
17725.47	39.86	6.58	13.54	59.99	Peak Max	V	209.00	68.00	74.00	-14.01	Pass
12078.43	41.70	5.29	6.49	53.49	Peak Max	V	268.00	254.00	74.00	-20.51	Pass
1016.34	46.67	1.76	-7.15	41.27	Peak Max	V	100.00	211.00	74.00	-32.73	Pass
17725.47	27.17	6.58	13.54	47.29	Average Max	V	209.00	68.00	54.00	-6.71	Pass
12078.43	28.39	5.29	6.49	40.18	Average Max	V	268.00	254.00	54.00	-13.82	Pass
1016.34	34.28	1.76	-7.15	28.88	Average Max	V	100.00	211.00	54.00	-25.12	Pass

Restricted Band Bluetooth LE – 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
2483.5	48.22	2.72	-3.32	47.62	Peak Max	V	105.00	159.00	74.00	-26.38	Pass
2483.5	41.35	2.72	-3.32	40.76	Peak Max	H	148.00	282.00	74.00	-33.24	Pass
2483.5	36.58	2.72	-3.32	35.98	Average Max	V	105.00	159.00	54.00	-18.02	Pass
2483.5	27.58	2.72	-3.32	26.99	Average Max	H	148.00	282.00	54.00	-27.01	Pass

WLAN 802.11n20 - 2437MHz and Bluetooth BDR – 2441MHz transmitting simultaneously

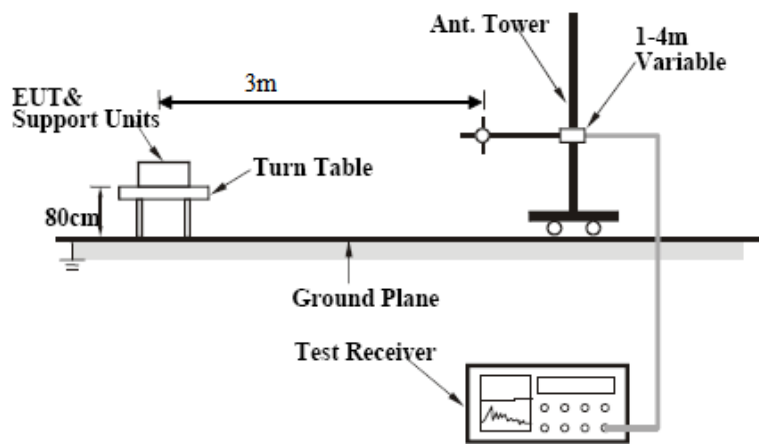
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
17881.05	39.73	6.60	14.07	60.40	Peak Max	H	234.00	350.00	74.00	-13.60	Pass
5113.47	42.93	3.63	0.48	47.04	Peak Max	V	197.00	305.00	74.00	-26.96	Pass
1015.98	47.58	1.76	-7.15	42.18	Peak Max	V	112.00	229.00	74.00	-31.82	Pass
17881.05	26.90	6.60	14.07	47.56	Average Max	H	234.00	350.00	54.00	-6.44	Pass
5113.47	30.13	3.63	0.48	34.24	Average Max	V	197.00	305.00	54.00	-19.76	Pass
1015.98	34.75	1.76	-7.15	29.35	Average Max	V	112.00	229.00	54.00	-24.65	Pass

WLAN 802.11n20 – 2437MHz and Bluetooth LE – 2402MHz transmitting simultaneously

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
17754.04	39.99	6.59	13.64	60.21	Peak Max	H	233.00	113.00	74.00	-13.79	Pass
11604.82	41.28	5.16	5.98	52.42	Peak Max	V	119.00	81.00	74.00	-21.58	Pass
1026.58	47.00	1.77	-7.13	41.63	Peak Max	V	235.00	128.00	74.00	-32.37	Pass
17754.04	26.92	6.59	13.64	47.14	Average Max	H	233.00	113.00	54.00	-6.86	Pass
11604.82	28.32	5.16	5.98	39.45	Average Max	V	119.00	81.00	54.00	-14.55	Pass
1026.58	34.62	1.77	-7.13	29.26	Average Max	V	235.00	128.00	54.00	-24.74	Pass

10.9 Receiver Radiated Spurious Emissions Below 1GHz

Requirement(s):

Spec	Item	Requirement	Applicable							
47CFR§15.247(d), RSS210(A8.5)	a)	Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges	☒							
		<table><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>		Frequency range (MHz)	Field Strength (uV/m)	30 – 88	100	88 – 216	150	216 960
Frequency range (MHz)	Field Strength (uV/m)									
30 – 88	100									
88 – 216	150									
216 960	200									
Above 960	500									
Test Setup										
Procedure	1. The EUT was switched on and allowed to warm up to its normal operating condition. 2. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. b. The EUT was then rotated to the direction that gave the maximum emission. c. Finally, the antenna height was adjusted to the height that gave the maximum emission. 3. A Quasi-peak measurement was then made for that frequency point. 4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.									
Remark	The EUT was scanned up to 1GHz. Both horizontal and vertical polarities were investigated. No outstanding emission except the noise floor was found.									
Result	☒ Pass ☐ Fail									

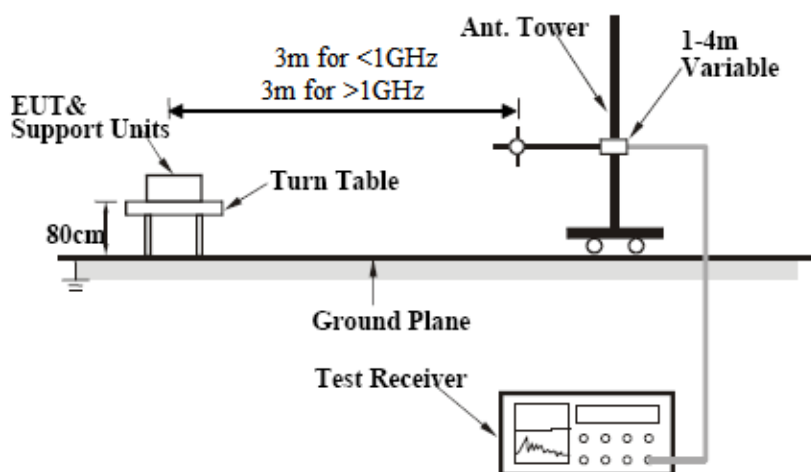
Test Data ☐ Yes (See below) ☒ N/A

Test Plot ☐ Yes (See below) ☒ N/A

10.10 Receiver Spurious Emissions Above 1GHz

Requirement(s):

Spec	Item	Requirement	Applicable
§ 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(a)	☐

Test Setup			
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Procedure	- The EUT was switched on and allowed to warm up to its normal operating condition. - The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: - Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. - The EUT was then rotated to the direction that gave the maximum emission. - Finally, the antenna height was adjusted to the height that gave the maximum emission. - 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.		
Test Date	10/21/2014	Environmental condition	Temperature 20 Relative Humidity 36 Atmospheric Pressure 1020
Remark	-		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test specification:	Receiver Radiated Spurious Emissions (Above 1GHz)			
Environmental Conditions:	Temp(°C):	20	Result:	☒ Pass ☐ Fail
	Humidity (%):	36		
	Atmospheric(mbar):	1021		
Mains Power:	120VA, 60Hz			
Tested by:	Teody Manansala			
Test Date:	21-Oct-14			
Remarks:	WLAN and Bluetooth LE Receiver Mode			

WLAN Receiver Mode

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
17975.09	40.22	7.01	14.38	61.61	Peak Max	V	187.00	249.00	74.00	-12.39	Pass
14183.19	42.43	6.45	10.36	59.24	Peak Max	V	326.00	232.00	74.00	-14.76	Pass
1000.00	46.40	0.93	-7.19	40.13	Peak Max	V	134.00	166.00	74.00	-33.87	Pass
17975.09	26.70	7.01	14.38	48.10	Average Max	V	187.00	249.00	54.00	-5.90	Pass
14183.19	29.47	6.45	10.36	46.28	Average Max	V	326.00	232.00	54.00	-7.72	Pass
1000.00	33.41	0.93	-7.19	27.14	Average Max	V	134.00	166.00	54.00	-26.86	Pass

Bluetooth LE – 2480MHz Receiver Mode

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
17899.14	40.10	7.00	14.13	61.23	Peak Max	H	174.00	349.00	74.00	-12.77	Pass
14499.14	42.59	6.61	10.97	60.17	Peak Max	V	261.00	226.00	74.00	-13.83	Pass
1000.00	46.92	0.93	-7.19	40.65	Peak Max	V	189.00	106.00	74.00	-33.35	Pass
17899.14	26.86	7.00	14.13	47.99	Average Max	H	174.00	349.00	54.00	-6.01	Pass
14499.14	29.20	6.61	10.97	46.78	Average Max	V	261.00	226.00	54.00	-7.22	Pass
1000.00	33.47	0.93	-7.19	27.20	Average Max	V	189.00	106.00	54.00	-26.80	Pass

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Conducted Emissions						
R & S Receiver	ESIB 40	100179	04/20/2014	1 Year	04/20/2015	☒
R&S LISN	ESH2-Z5	861741/013	05/18/2014	1 Year	05/18/2015	☒
CHASE LISN	MN2050B	1018	07/24/2014	1 Year	07/24/2015	☒
Sekonic Hygro Hermograph	ST-50	HE01-000092	05/25/2014	1 Year	05/25/2015	☒
Radiated Emissions						
R & S Receiver	ESL6	100178	03/01/2014	1 Year	03/01/2015	☒
R & S Receiver	ESIB 40	100179	04/20/2014	1 Year	04/20/2015	☒
ETS-Lingren Loop Antenna	6512	00049120	05/13/2014	1 Year	05/13/2015	☐
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	07/03/2014	1 Year	07/03/2015	☒
Horn Antenna (1-26.5GHz)	3115	10SL0059	04/26/2014	1 Year	04/26/2015	☒
Horn Antenna (18-40 GHz)	AH-840	101013	04/23/2014	1 Year	04/23/2015	☐
Pre-Amplifier (1-26.5GHz)	8449B	3008A00715	05/30/2014	1 Year	05/30/2015	☒
Microwave Preamplifier (18-40 GHz)	PA-840	181251	05/30/2014	1 Year	05/30/2015	☐
3 Meters SAC	3M	N/A	10/13/2014	1 Year	10/13/2015	☒
10 Meters SAC	10M	N/A	06/05/2014	1 Year	06/05/2015	☒
Sekonic Hygro Hermograph	ST-50	HE01-000092	05/25/2014	1 Year	05/25/2015	☒
RF Conducted Measurement						
Spectrum Analyzer	N9010A	MY50210206	05/30/2014	1 Year	05/30/2015	☒
Spectrum Analyzer	E4407B	US88441016	05/31/2014	1 Year	05/31/2015	☐
R & S Receiver	ESIB 40	100179	04/20/2014	1 Year	04/20/2015	☒

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		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 Measurement
Australia CAB Recognition		EMC: AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4 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 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