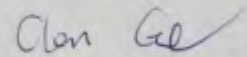


RF TEST REPORT



Report No.: FCC IC_RF_SL15101301-RUC-035_DTS Rev 1.0
Supersede Report No.: FCC IC_RF_SL15101301-RUC-035_DTS

Applicant	:	Ruckus Wireless, Inc.
Product Name	:	ZoneFlex T710 Access Point
Model No.	:	T710s
Test Standard	:	47 CFR 15.247 RSS-247 Iss 1: May 2015
Test Method	:	ANSI C63.10: 2013 RSS Gen Iss 4: Nov 2014 558074 D01 DTS Meas Guidance v03r04
FCC ID	:	S9GT710
IC ID	:	5912A-T710
Dates of test	:	11/01/2015 to 02/01/2016
Issue Date	:	02/09/2016
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:	
	
Gary Chou	Chen Ge
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.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Accreditation Body	Scope
USA	FCC, A2LA	EMC, RF/Wireless, Telecom
Canada	IC, A2LA, NIST	EMC, RF/Wireless, Telecom
Taiwan	BSMI, NCC, NIST	EMC, RF, Telecom, Safety
Hong Kong	OFTA, NIST	RF/Wireless, Telecom
Australia	NATA, NIST	EMC, RF, Telecom, Safety
Korea	KCC/RRA, NIST	EMI, EMS, RF, Telecom, Safety
Japan	VCCI, JATE, TELEC, RFT	EMI, RF/Wireless, Telecom
Mexico	NOM, COFETEL, Caniety	Safety, EMC, RF/Wireless, Telecom
Europe	A2LA, NIST	EMC, RF, Telecom, Safety
Israel	MOC, NIST	EMC, RF, Telecom, Safety

Accreditations for Product Certifications

Country	Accreditation Body	Scope
USA	FCC TCB, NIST	EMC, RF, Telecom
Canada	IC FCB, NIST	EMC, RF, Telecom
Singapore	iDA, NIST	EMC, RF, Telecom
EU	NB	EMC & R&TTE Directive
Japan	MIC (RCB 208)	RF, Telecom
Hong Kong	OFTA (US002)	RF, Telecom

CONTENTS

1	REPORT REVISION HISTORY	4
2	EXECUTIVE SUMMARY	5
3	CUSTOMER INFORMATION	5
4	TEST SITE INFORMATION	5
5	MODIFICATION	5
6	EUT INFORMATION	6
6.1	EUT Description	6
6.2	Radio Description	6
6.3	EUT Photos - External	8
6.4	EUT Photos - Internal	10
6.5	EUT Test Setup Photos	12
7	SUPPORTING EQUIPMENT/SOFTWARE AND CABLING DESCRIPTION	14
7.1	Supporting Equipment	14
7.2	Cabling Description	14
7.3	Test Software Description	14
8	TEST SUMMARY	15
9	MEASUREMENT UNCERTAINTY	16
10	MEASUREMENTS, EXAMINATION AND DERIVED RESULTS	17
10.1	Conducted Emissions	17
10.2	6dB & 99% Bandwidth	22
10.3	Output Power	26
10.4	Band Edge	28
10.5	Peak Power Spectral Density	31
10.6	Radiated Spurious Emissions in restricted band	41
10.7	Radiated Spurious Emissions below 1GHz	44
10.8	Radiated Spurious Emissions above 1GHz	46
	ANNEX A. TEST INSTRUMENT	51
	ANNEX B. SIEMIC ACCREDITATION	52

1 Report Revision History

Report No.	Report Version	Description	Issue Date
FCC_RF_SL15101301-RUC-035_DTS	None	Original	02/04/2016
FCC_RF_SL15101301-RUC-035_DTS Rev 1.0	1.0	Updated per TCB reviewer	02/09/2016

2 Executive Summary

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

Company: Ruckus Wireless, Inc.
Product: ZoneFlex T710s Access Point
Model: T710s

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	:	Ruckus Wireless, Inc.
Applicant Address	:	350 West Java Drive, Sunnyvale, California 94089 U.S.A
Manufacturer Name	:	Ruckus Wireless, Inc.
Manufacturer Address	:	350 West Java Drive, Sunnyvale, California 94089 U.S.A

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	ZoneFlex T710 Access Point
Model No.	T710s
Trade Name	Ruckus
Serial No.	421506000085
Host Model No.	N/A
Input Power	48VDC (PoE)
Power Adapter Manu/Model	N/A
Power Adapter SN	N/A
Product Hardware version	705-60425-001
Product Software version	812-72410-002
Radio Hardware version	705-60425-001
Radio Software version	812-72410-002
Test Software version	117-11325-001
Date of EUT received	11/05/2015
Equipment Class/ Category	DTS, UNII
Clock Frequencies	N/A
Port/Connectors	PoE, Ethernet

6.2 Radio Description

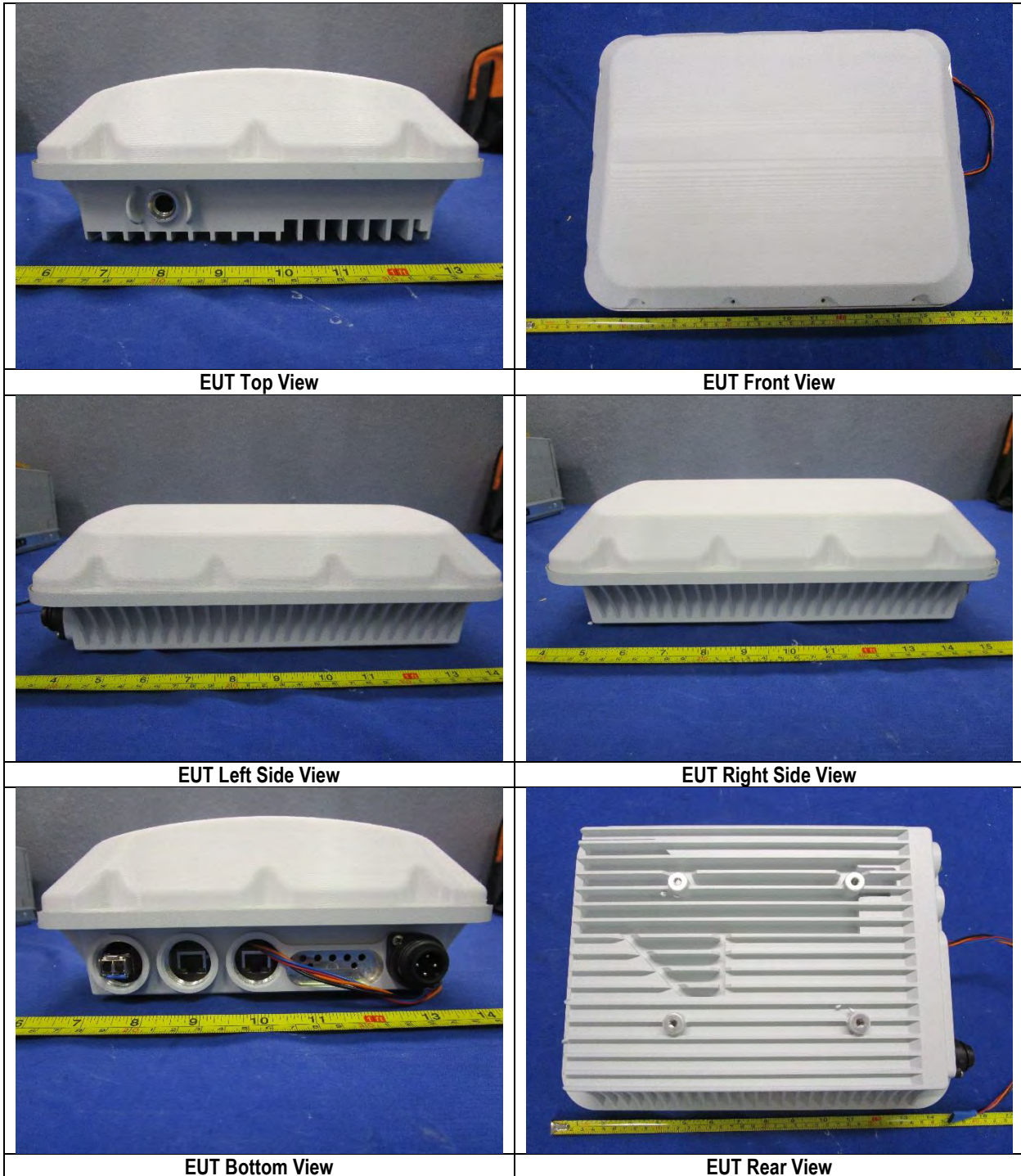
Radio Type	802.11b	802.11g	802.11n-20M	802.11n-40M
Operating Frequency	2412-2462MHz	2412-2462MHz	2412-2462MHz	2422-2452MHz
Modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)
Channel Spacing	5MHz	5MHz	5MHz	5MHz
Number of Channels	11	11	11	7
Antenna Type	Internal Sector Antenna			
Antenna Gain (Peak)	2.4GHz: 6dBi 5GHz: 8dBi			
Antenna Connector Type	U.FL			
Note	EUT has 4 antennas, 2 antennas are in horizontal polarity, and 2 antennas in vertical polarity. The 802.11b/g/a is in CDD mode with all 4 antenna transmit simultaneously. Since they're in 90 deg phase shift between the horizontal and vertical antennas, for radiated limit, the result from different polarization antenna will not be combined. So only the result for 2 vertical polarity antennas and 2 horizontal polarity antennas will be combined for MIMO mode separately. For cross-polarized antenna, the total gain—including array gain—is computed separately for each of polarizations using the procedures presented in this document. The highest of the total gains shall apply. For this case, the highest of the total gain will be the directional gain of 2 antennas. For conducted limit like power and psd, the result from all 4 chains will be summed. For 802.11b/g/a mode under CDD mode, the array gain for power will be 0 and for PSD will be 10 log (Nant/Nss) dB to be calculated separately for horizontal and vertical polarity. Reference to the following KDB for clarification. 662911 D01 Multiple Transmitter Output v02r01 662911 D02 MIMO with Cross-Polarized Antennas v01			

EUT Power level setting

Mode	Frequency (MHz)	Power setting
802.11-b	2412	22
802.11-b	2437	22
802.11-b	2462	22
802.11-g	2412	22
802.11-g	2437	22
802.11-g	2462	20
802.11-n-20	2412	21
802.11-n-20	2437	22
802.11-n-20	2462	18
802.11-n-40	2422	19
802.11-n-40	2437	22
802.11-n-40	2452	17

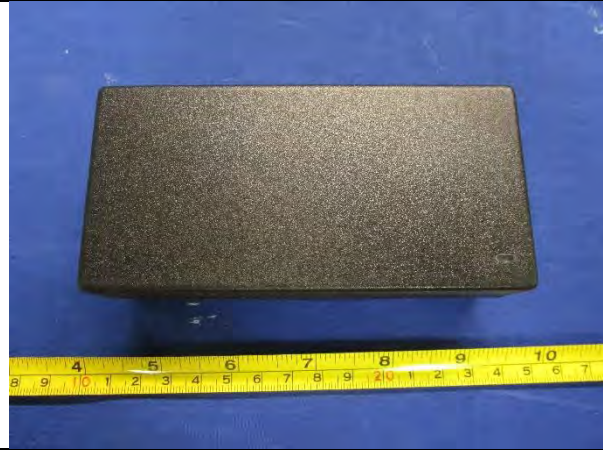
Note: All data rate has been verified and worst case was used for all test items.

6.3 EUT Photos - External





EUT AC Line Power Cord

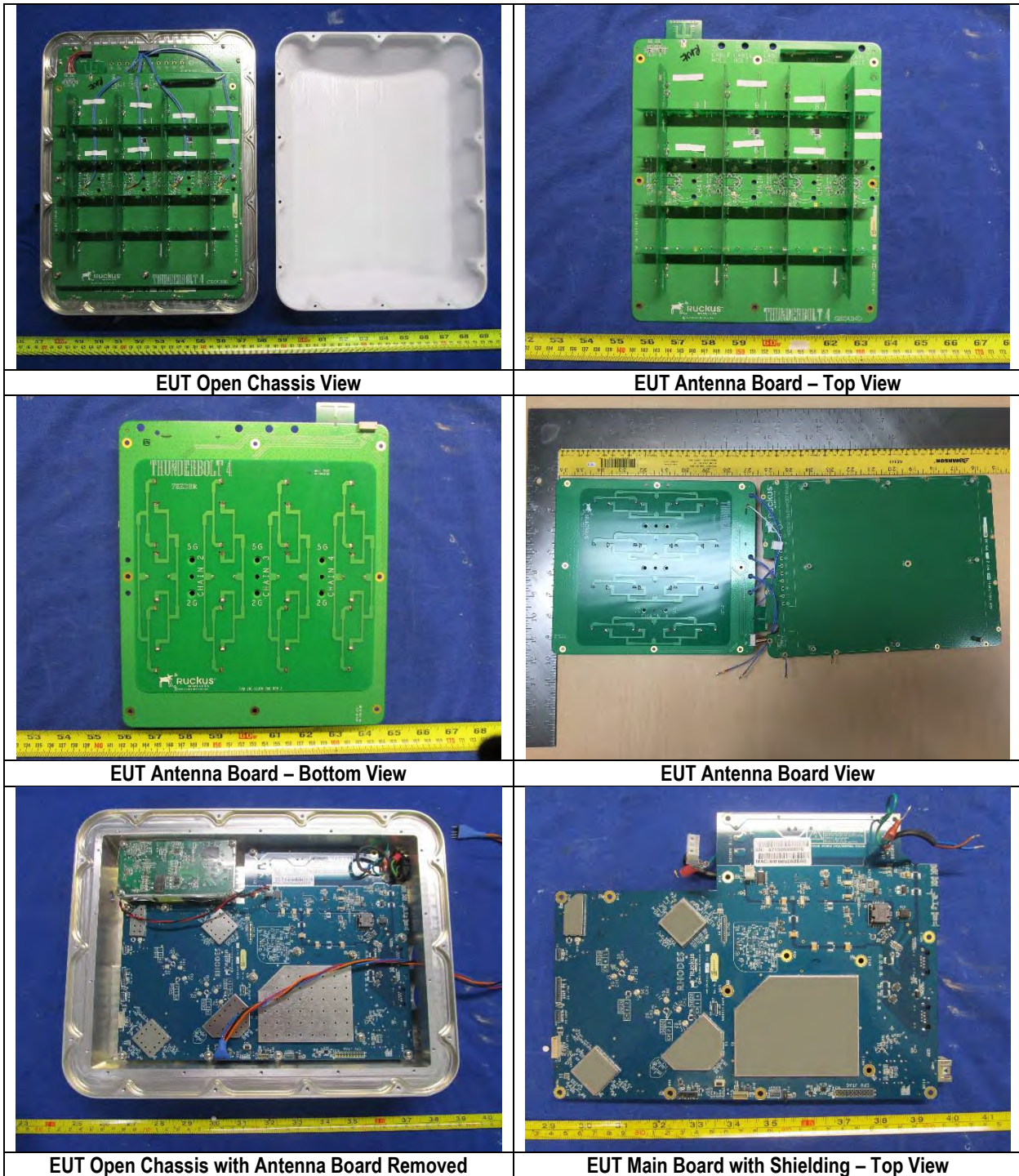


EUT PoE



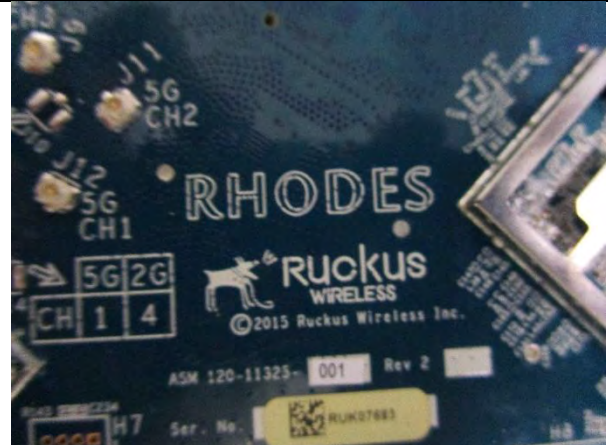
EUT PoE Label

6.4 EUT Photos - Internal





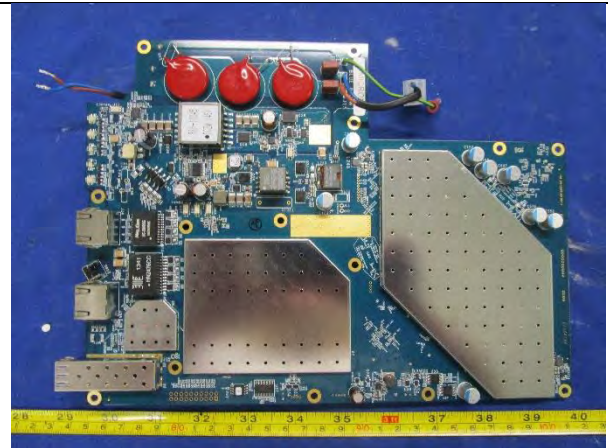
EUT Main Board without Shielding – Top View



EUT Main Board – Model View



EUT Main Board – SN View



EUT Main Board with Shielding – Bottom View

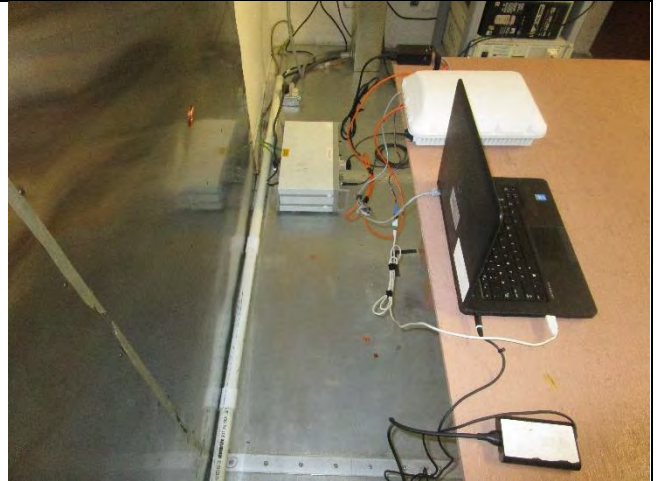


EUT Main Board without Shielding – Bottom View

6.5 EUT Test Setup Photos



AC Line Conducted Emissions – AC Power – Front View



AC Line Conducted Emissions – AC Power – Rear View



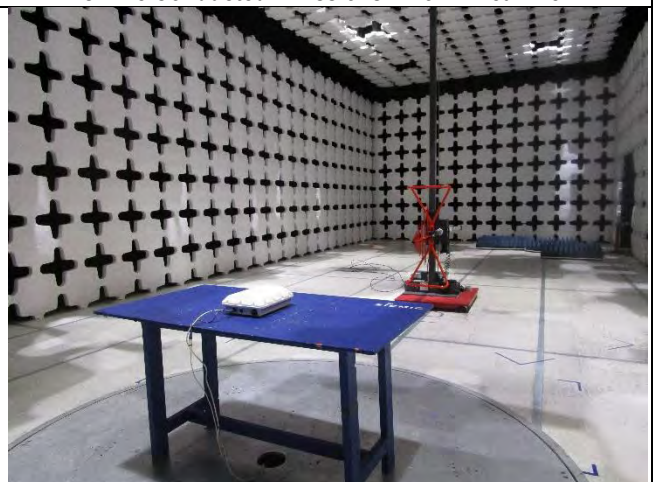
AC Line Conducted Emissions – PoE – Front View



AC Line Conducted Emissions – PoE – Rear View



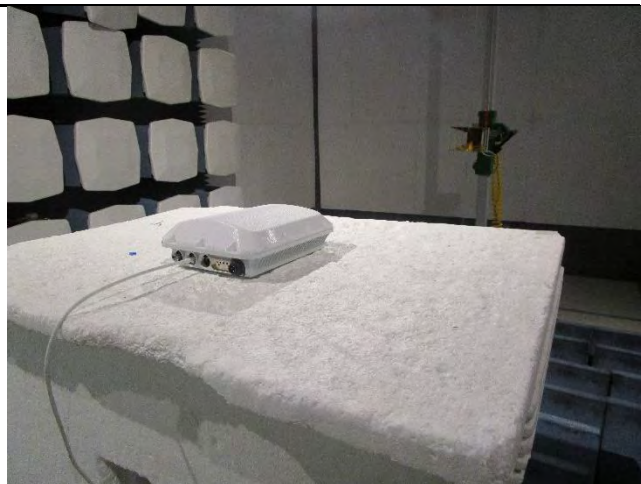
Radiated Emissions (<1GHz) – Front View



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	PP01L Latitude E5440	F1WPF12	Dell	-
2	POE Adapter	740-64157-001	133279963	Ruckus	-

7.2 Cabling Description

Name	Connection Start		Connection Stop		Length / shielding Info		Note
	From	I/O Port	To	I/O Port	Length (m)	Shielding	
RJ45	EUT	RJ45	POE	RJ45	2	Unshielded	-
RJ45	POE	RJ45	Laptop	RJ45	3	Unshielded	-

7.3 Test Software Description

Test Item	Software	Description
RF Testing	Command Line in windows	Set the EUT to transmit continuously in diferent test mode

8 Test Summary

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Restricted Band of Operation	FCC	15.205	FCC	ANSI C63.10:2013	☒ Pass
	IC	RSS Gen 8.10	IC	558074 D01 DTS Meas Guidance v03r03	☐ N/A
AC Conducted Emissions	FCC	15.207(a)	FCC	ANSI C63.10:2013	☒ Pass
	IC	RSS Gen 8.8	IC	RSS Gen Issue 4: 2014	☐ N/A

DTS Band Requirement

Test Item	Test standard		Test Method/Procedure		Pass / Fail
99% Occupied Bandwidth	-	-	-	-	☒ Pass
	IC	RSS Gen 6.6	IC	RSS Gen Issue 4: 2014 -	☐ N/A
6dB Bandwidth	FCC	15.247(a)(2)	FCC	558074 D01 DTS Meas Guidance v03r04	☒ Pass
	IC	RSS247 (5.2.1)	IC		☐ N/A
Band Edge and Radiated Spurious Emissions	FCC	15.247(d)	FCC	ANSI C63.10:2013	☒ Pass
	IC	RSS247 (5.5)	IC	558074 D01 DTS Meas Guidance v03r04	☐ N/A
Output Power	FCC	15.247(b)	FCC	558074 D01 DTS Meas Guidance v03r04	☒ Pass
	IC	RSS247 (5.4.4)	IC		☐ N/A
Receiver Spurious Emissions	IC	RSS Gen (4.8)	IC	RSS Gen Issue 4: 2014	☐ Pass ☒ N/A
Antenna Gain > 6 dBi	FCC	15.247(e)	FCC	-	☐ Pass
	IC	-	IC	-	☒ N/A
Power Spectral Density	FCC	15.247(e)	FCC	558074 D01 DTS Meas Guidance v03r04	☒ Pass
	IC	RSS247 (5.2.2)	IC		☐ N/A
RF Exposure requirement	FCC	15.247(i)	FCC	-	☐ Pass
	IC	RSS Gen(5.5)	IC	RSS Gen Issue 4: 2014	☒ N/A
Remark	- All measurement uncertainties do not take into consideration for all presented test results. - The applicant shall ensure frequency stability by showing that an emission is maintained within the band of operation under all normal operating conditions as specified in the user's manual.				

9 Measurement Uncertainty

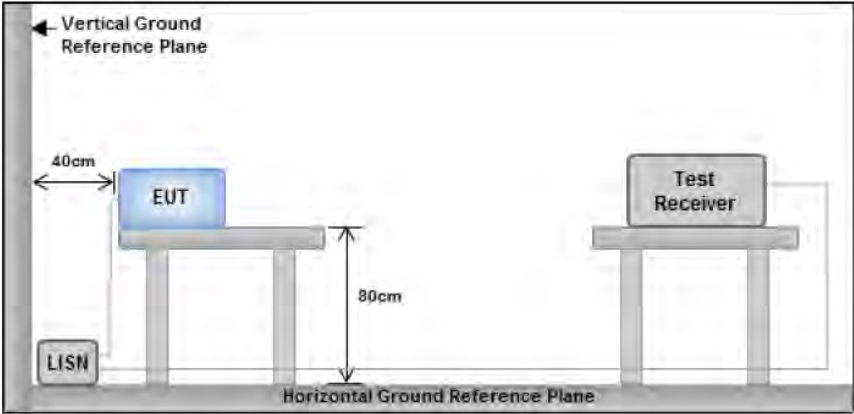
Emissions			
Test Item	Frequency Range	Description	Uncertainty
Band Edge and Radiated Spurious Emissions	30MHz – 1GHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
Band Edge and Radiated Spurious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

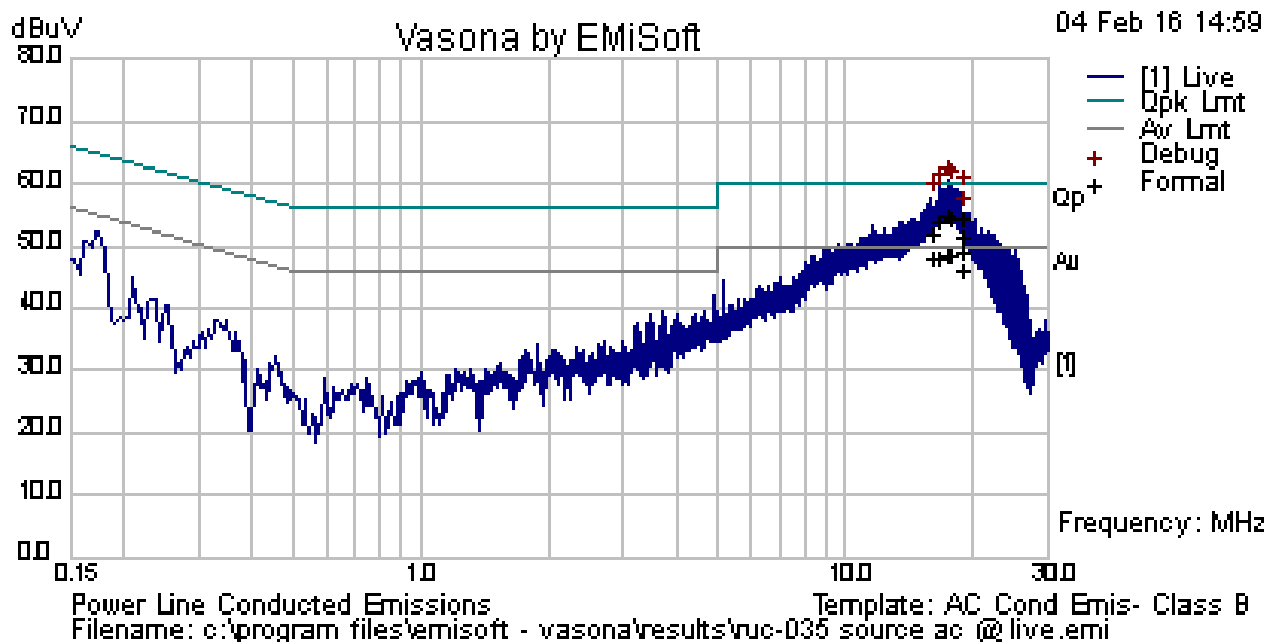
Spec	Item	Requirement	Applicable
47CFR§15.207	a)	For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, 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 80 cm from EUT and at least 80 cm from other units and other metal planes	
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 120V 60Hz	
Result		☒ Pass ☐ Fail	

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Conducted Emission Test Results (Line)

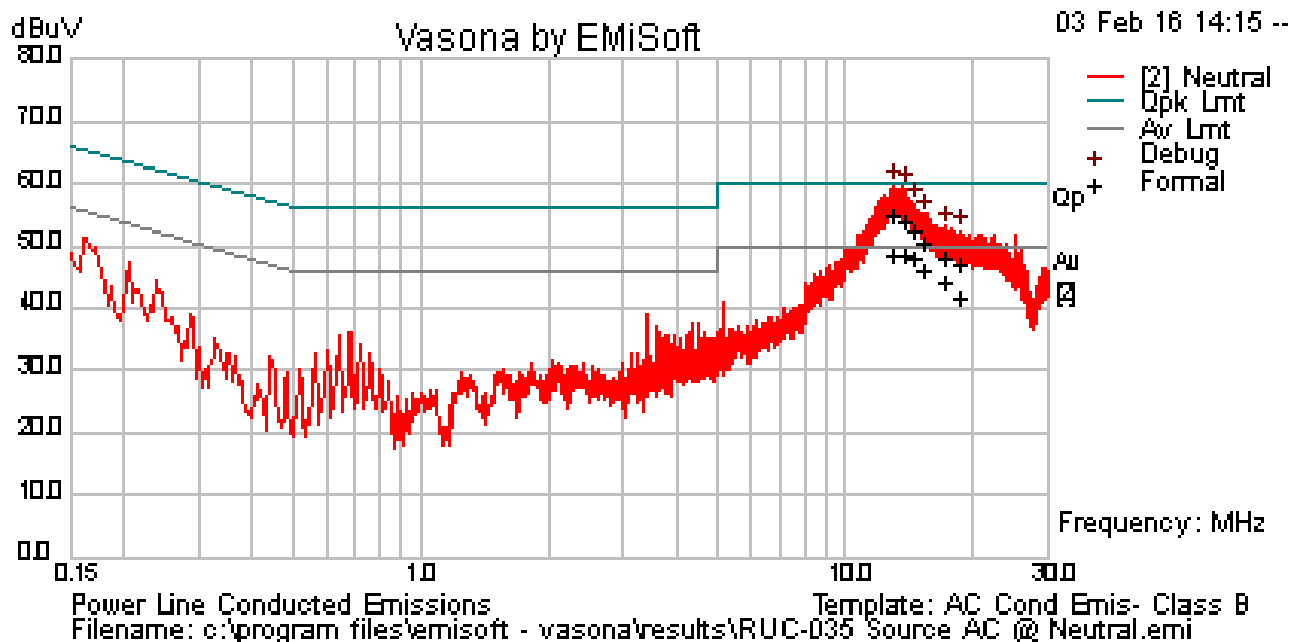
Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	23	Result:	☒ Pass ☐ Fail
	Humidity (%):	41		
	Atmospheric(mbar):	1015		
Mains Power:	120Vac, 60Hz			
Tested by:	Teody Manansala			
Test Date:	02/03/2016			
Remarks:	Line – Tested with AC Line Power Cord			



Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line/ Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
17.43	44.13	10.06	0.65	54.84	Quasi Peak	Live	60.00	-5.16	Pass
17.80	43.54	10.07	0.65	54.26	Quasi Peak	Live	60	-5.74	Pass
16.65	43.04	10.06	0.63	53.73	Quasi Peak	Live	60	-6.27	Pass
18.76	43.55	10.07	0.67	54.29	Quasi Peak	Live	60.00	-5.71	Pass
15.92	41.35	10.06	0.62	52.03	Quasi Peak	Live	60.00	-7.97	Pass
18.80	40.91	10.07	0.67	51.65	Quasi Peak	Live	60.00	-8.35	Pass
17.43	37.84	10.06	0.65	48.55	Average	Live	50.00	-1.45	Pass
17.80	37.77	10.07	0.65	48.49	Average	Live	50	-1.51	Pass
16.65	37.56	10.06	0.63	48.26	Average	Live	50	-1.74	Pass
18.76	38.39	10.07	0.67	49.12	Average	Live	50.00	-0.88	Pass
15.92	37.58	10.06	0.62	48.26	Average	Live	50.00	-1.74	Pass
18.80	35.21	10.07	0.67	45.95	Average	Live	50.00	-4.05	Pass

Conducted Emission Test Results (Neutral)

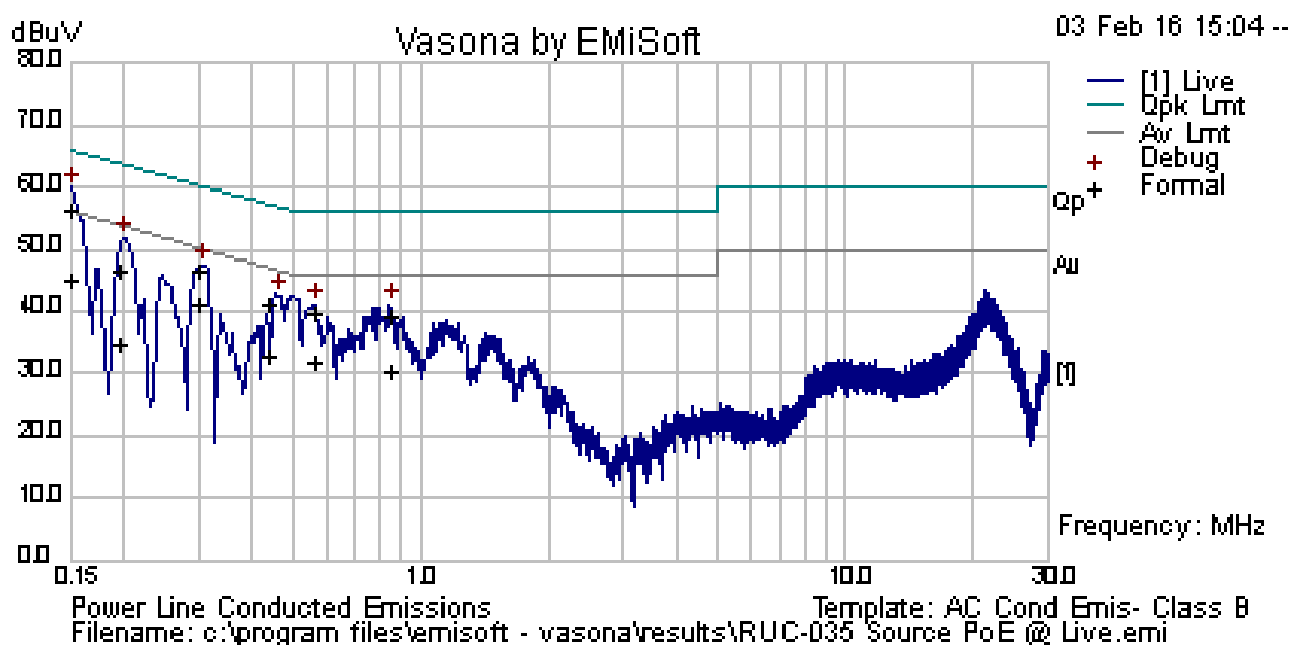
Conducted Emission Test Results (Neutral)				
Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	23	Result:	☒ Pass ☐ Fail
	Humidity (%):	41		
	Atmospheric(mbar):	1015		
Mains Power:	120Vac, 60Hz			
Tested by:	Teody Manansala			
Test Date:	02/03/2016			
Remarks:	Neutral – Tested with AC Line Power Cord			



Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line/ Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
12.99	44.14	10.06	0.58	54.78	Quasi Peak	Neutral	60.00	-5.22	Pass
13.75	43.37	10.06	0.59	54.02	Quasi Peak	Neutral	60.00	-5.98	Pass
14.44	41.75	10.06	0.6	52.4	Quasi Peak	Neutral	60.00	-7.60	Pass
15.27	39.72	10.06	0.61	50.38	Quasi Peak	Neutral	60.00	-9.62	Pass
17.21	37.13	10.06	0.64	47.84	Quasi Peak	Neutral	60.00	-12.16	Pass
18.68	36.23	10.07	0.67	46.96	Quasi Peak	Neutral	60.00	-13.04	Pass
12.99	38.09	10.06	0.58	48.73	Average	Neutral	50.00	-1.27	Pass
13.75	37.83	10.06	0.59	48.47	Average	Neutral	50.00	-1.53	Pass
14.44	37.22	10.06	0.6	47.87	Average	Neutral	50.00	-2.13	Pass
15.27	35.31	10.06	0.61	45.98	Average	Neutral	50.00	-4.02	Pass
17.21	33.26	10.06	0.64	43.97	Average	Neutral	50.00	-6.03	Pass
18.68	30.89	10.07	0.67	41.63	Average	Neutral	50.00	-8.37	Pass

Conducted Emission Test Results (Line)

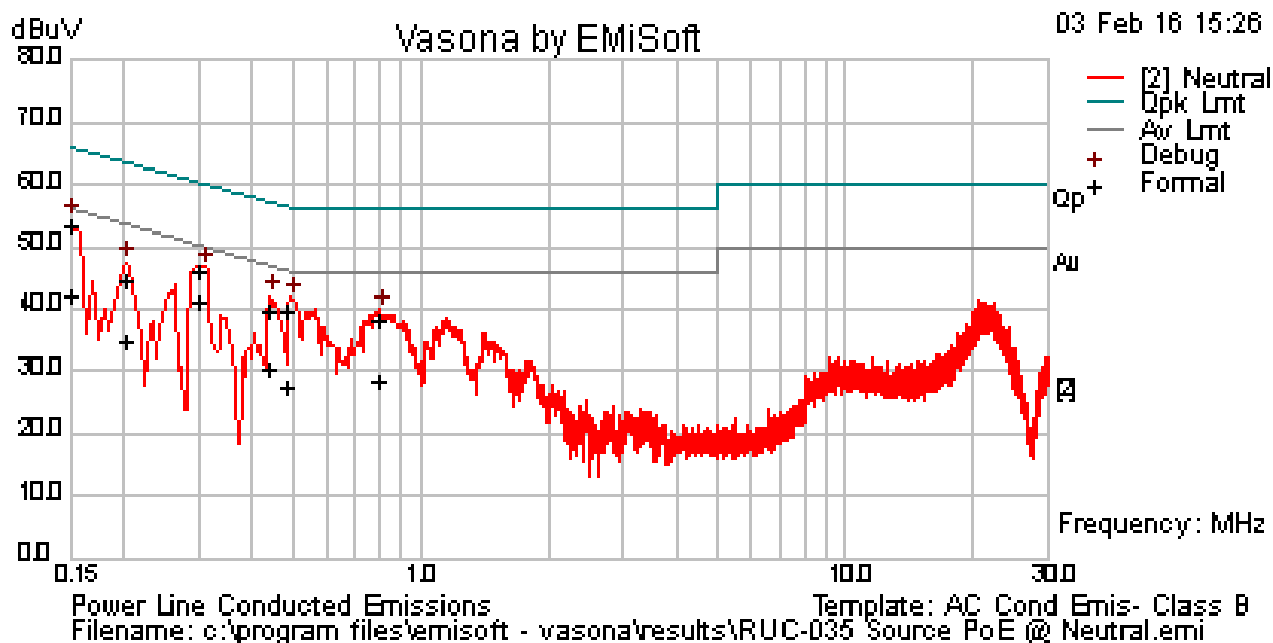
Test specification:	Conducted Emissions				
Environmental Conditions:	Temp(°C):	23	Result:	☒ Pass ☐ Fail	
	Humidity (%):	41			
	Atmospheric(mbar):	1015			
Mains Power:	120Vac, 60Hz				
Tested by:	Teody Manansala				
Test Date:	02/03/2016				
Remarks	Line – Tested with POE				



Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line	Limit (dBuV)	Margin (dB)	Pass /Fail
0.15	44.76	10.00	1.80	56.57	Quasi Peak	Live	66.00	-9.43	Pass
0.19	35.34	10.00	1.35	46.69	Quasi Peak	Live	63.83	-17.13	Pass
0.30	35.72	10.00	0.91	46.64	Quasi Peak	Live	60.23	-13.60	Pass
0.44	30.69	10.01	0.72	41.42	Quasi Peak	Live	57.04	-15.62	Pass
0.56	29.14	10.01	0.66	39.81	Quasi Peak	Live	56.00	-16.19	Pass
0.84	28.38	10.01	0.59	38.99	Quasi Peak	Live	56.00	-17.01	Pass
0.15	33.52	10.00	1.80	45.33	Average	Live	56.00	-10.67	Pass
0.19	23.58	10.00	1.35	34.94	Average	Live	53.83	-18.89	Pass
0.30	30.48	10.00	0.91	41.39	Average	Live	50.23	-8.84	Pass
0.44	22.22	10.01	0.72	32.95	Average	Live	47.04	-14.09	Pass
0.56	21.01	10.01	0.66	31.68	Average	Live	46.00	-14.32	Pass
0.84	19.88	10.01	0.59	30.49	Average	Live	46.00	-15.51	Pass

Conducted Emission Test Results (Neutral)

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	23	Result:	☒ Pass ☐ Fail
	Humidity (%):	41		
	Atmospheric(mbar):	1015		
Mains Power:	120Vac, 60Hz			
Tested by:	Teody Manansala			
Test Date:	02/03/2016			
Remarks	Neutral – Tested with POE			

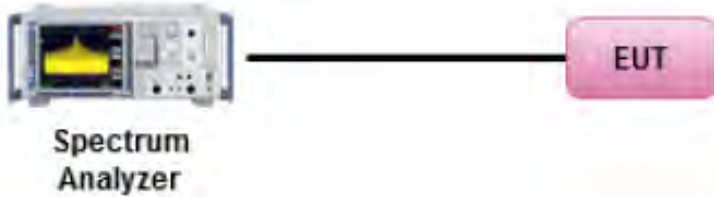


Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line	Limit (dBuV)	Margin (dB)	Pass /Fail
0.15	41.67	10.00	1.80	53.48	Quasi Peak	Neutral	66.00	-12.52	Pass
0.30	35.10	10.00	0.91	46.02	Quasi Peak	Neutral	60.27	-14.25	Pass
0.49	28.91	10.01	0.69	39.60	Quasi Peak	Neutral	56.23	-16.63	Pass
0.44	28.99	10.01	0.72	39.72	Quasi Peak	Neutral	57.04	-17.32	Pass
0.20	33.21	10.00	1.31	44.52	Quasi Peak	Neutral	63.60	-19.08	Pass
0.79	27.56	10.01	0.60	38.18	Quasi Peak	Neutral	56.00	-17.82	Pass
0.15	30.50	10.00	1.80	42.30	Average	Neutral	56.00	-13.70	Pass
0.30	30.16	10.00	0.91	41.08	Average	Neutral	50.27	-9.19	Pass
0.49	16.63	10.01	0.69	27.33	Average	Neutral	46.23	-18.90	Pass
0.44	19.74	10.01	0.72	30.47	Average	Neutral	47.04	-16.57	Pass
0.20	23.45	10.00	1.31	34.76	Average	Neutral	53.60	-18.84	Pass
0.79	17.60	10.01	0.60	28.21	Average	Neutral	46.00	-17.79	Pass

Note: The results above show only the worst case.

10.2 6dB & 99% Bandwidth

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247 RSS247 (5.2.1)	a)(2)	6dB BW≥500KHz;	☒
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			
Test Procedure	558074 D01 DTS Meas Guidance v03r04, 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. - Measure the 99% BW.		
Test Date	11/20/2015 – 02/01/2015	Environmental condition	Temperature 23°C Relative Humidity 42% Atmospheric Pressure 1021mbar
Remark	N/A		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A
Test Plot ☒ Yes ☐ N/A

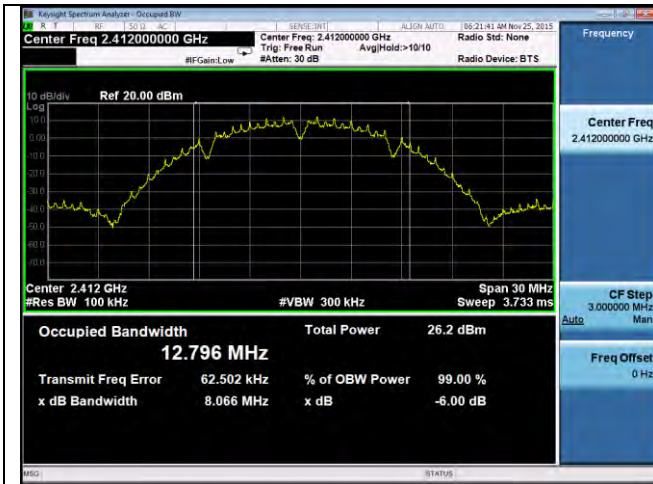
6dB Bandwidth measurement result for 2.4GHz

Type	Test mode	Freq (MHz)	CH	Result (MHz)	Limit (MHz)	Result
6dB BW	802.11b	2412	Low	8.06	≥0.5	Pass
6dB BW	802.11b	2437	Mid	8.07	≥0.5	Pass
6dB BW	802.11b	2462	High	7.75	≥0.5	Pass
6dB BW	802.11g	2412	Low	15.94	≥0.5	Pass
6dB BW	802.11g	2437	Mid	16.08	≥0.5	Pass
6dB BW	802.11g	2462	High	16.32	≥0.5	Pass
6dB BW	802.11n-20M	2412	Low	16.92	≥0.5	Pass
6dB BW	802.11n-20M	2437	Mid	16.90	≥0.5	Pass
6dB BW	802.11n-20M	2462	High	17.57	≥0.5	Pass
6dB BW	802.11n-40M	2422	Low	34.05	≥0.5	Pass
6dB BW	802.11n-40M	2437	Mid	35.42	≥0.5	Pass
6dB BW	802.11n-40M	2452	High	36.29	≥0.5	Pass

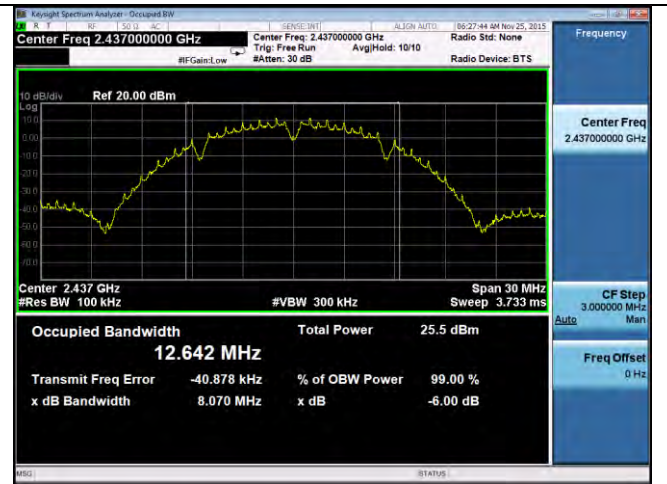
99% OBW measurement result for 2.4GHz

Type	Test mode	Freq (MHz)	CH	Result (MHz)
99% OBW	802.11b	2412	Low	12.79
99% OBW	802.11b	2437	Mid	12.64
99% OBW	802.11b	2462	High	12.74
99% OBW	802.11g	2412	Low	16.35
99% OBW	802.11g	2437	Mid	16.37
99% OBW	802.11g	2462	High	16.37
99% OBW	802.11n-20M	2412	Low	17.56
99% OBW	802.11n-20M	2437	Mid	17.55
99% OBW	802.11n-20M	2462	High	17.57
99% OBW	802.11n-40M	2422	Low	35.93
99% OBW	802.11n-40M	2437	Mid	35.88
99% OBW	802.11n-40M	2452	High	36.04

Test Plots



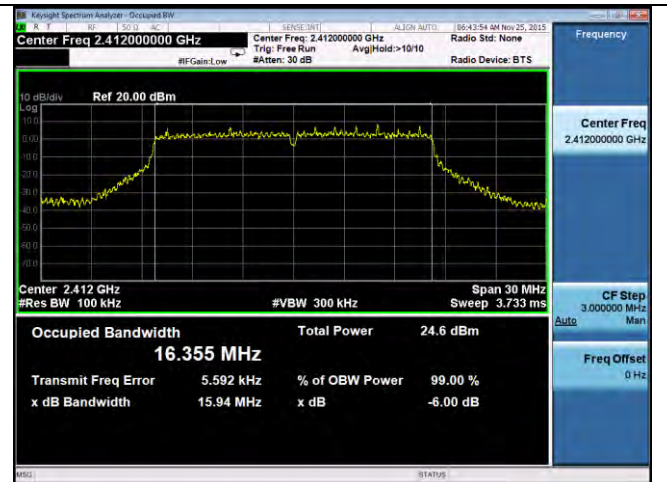
BW -2.4G 802.11b 2412MHz



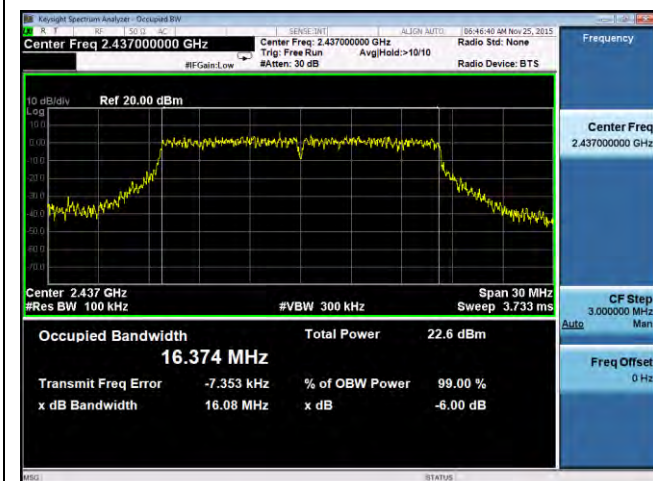
BW -2.4G 802.11b 2437MHz



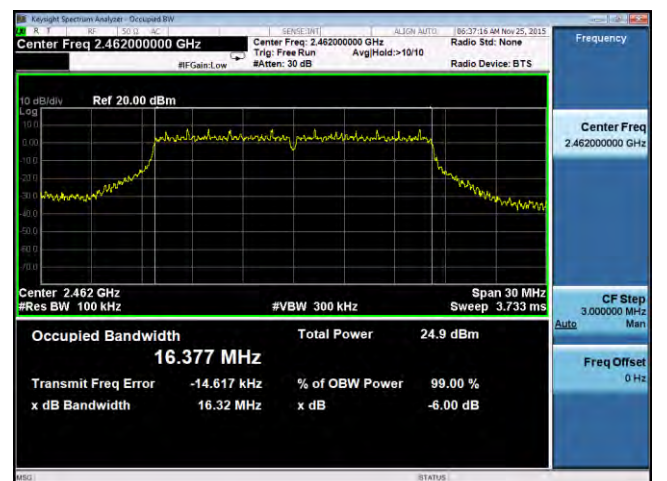
BW -2.4G 802.11b 2462MHz



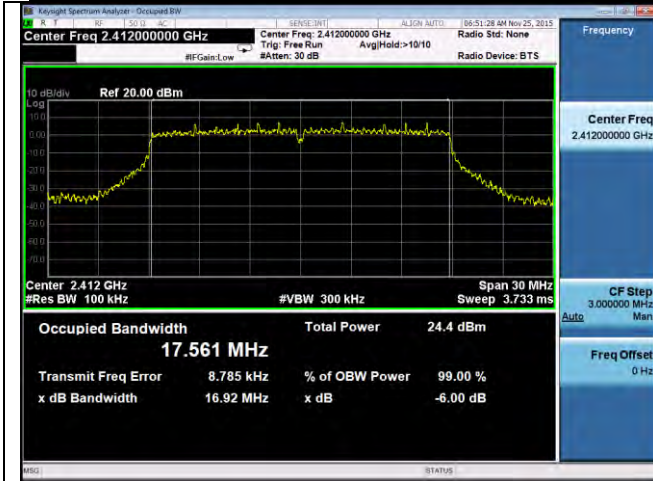
BW -2.4G 802.11g 2412MHz



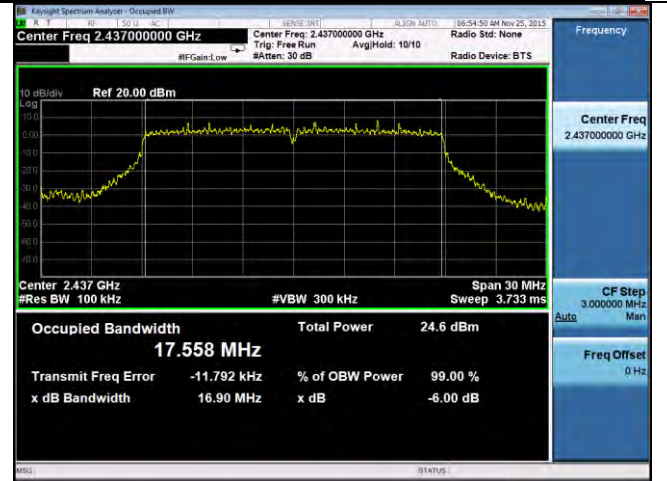
BW -2.4G 802.11g 2437MHz



BW -2.4G 802.11g 2462MHz



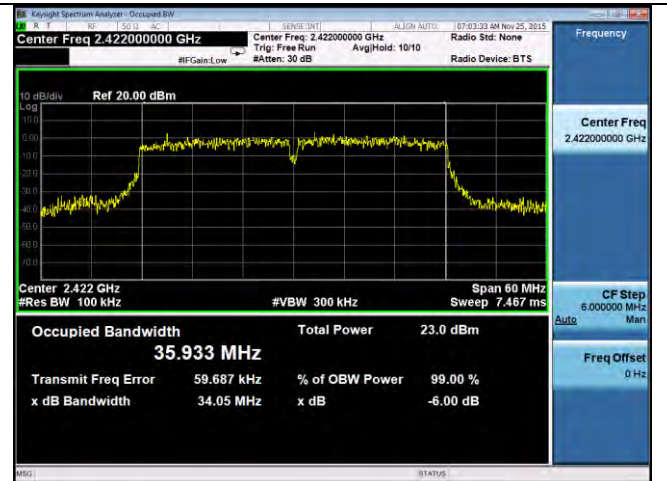
BW -2.4G 802.11n-20M 2412MHz



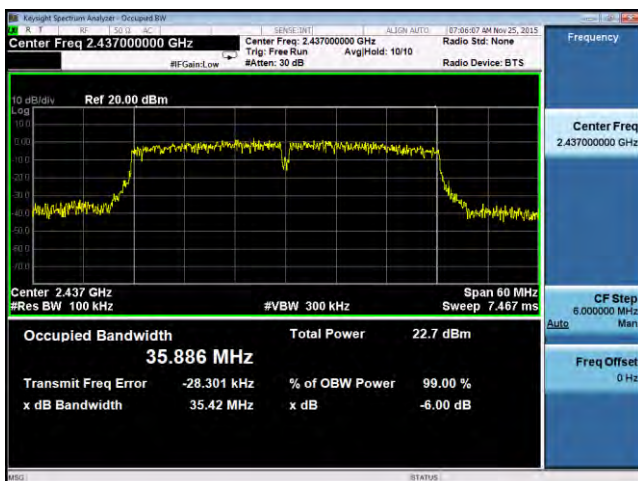
BW -2.4G 802.11n-20M 2437MHz



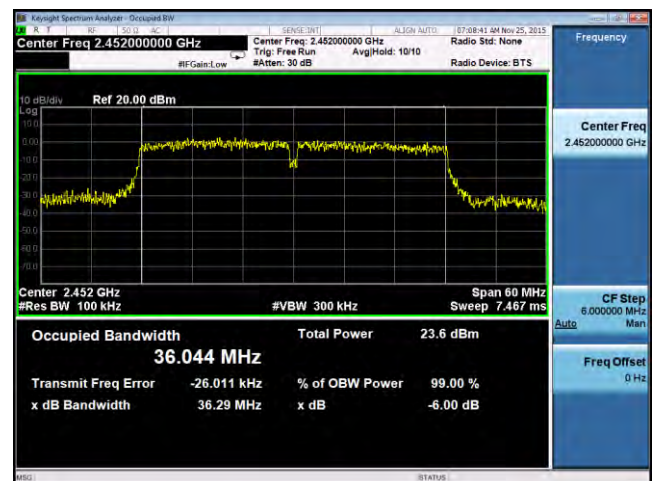
BW -2.4G 802.11n-20M 2462MHz



BW -2.4G 802.11n-40M 2422MHz



BW -2.4G 802.11n-40M 2437MHz



BW -2.4G 802.11n-40M 2452MHz

10.3 Output Power

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247 RSS247 (5.4.4)	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	 Power Meter		
Test Procedure	558074 D01 DTS Meas Guidance v03r04, 9.2.2.2 <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	11/20/2015 – 02/01/2016	Environmental condition	Temperature 23°C Relative Humidity 44% Atmospheric Pressure 1021mbar
Remark	Per KDB 662911 D01 Multiple Transmitter Output v02r01, the direction gain for horizontal polarization and vertical polarization is calculated separately. For 2.4GHz band, peak antenna gain = 6 dBi, directional gain = 9 dB. Highest of total directional gain is 9 dBi. The power limit and PSD limit will be reduced by amount of 1 dB.		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

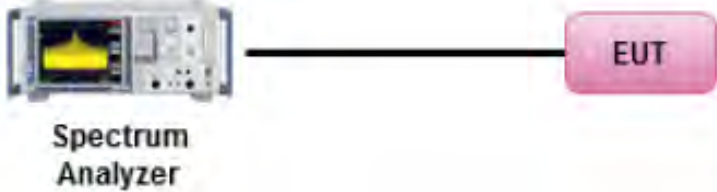
Test Plot ☐ Yes (See below) ☒ N/A

Output Power measurement result

Type	Test mode	Freq (MHz)	CH	Conducted Power (dBm)					Limit (dBm)	Result
				Chain1	Chain2	Chain3	Chain4	Combined Power		
Output Power	802.11b	2412	Low	20.29	19.3	19.94	19.95	25.91	29	Pass
		2437	Mid	19.66	20.57	20.15	20.18	26.17	29	Pass
		2462	High	18.48	18.55	18.98	18.35	24.62	29	Pass
	802.11g	2412	Low	18.70	18.88	18.89	18.90	24.86	29	Pass
		2437	Mid	19.00	19.29	18.99	19.11	25.12	29	Pass
		2462	High	16.58	16.81	16.55	16.59	22.65	29	Pass
	802.11n-20M	2412	Low	18.95	19.51	19.03	19.03	25.16	29	Pass
		2437	Mid	18.86	19.06	18.98	19.17	25.04	29	Pass
		2462	High	15.33	15.5	15.31	15.5	21.43	29	Pass
	802.11n-40M	2422	Low	17.64	17.81	17.44	17.28	23.57	29	Pass
		2437	Mid	19.68	20.23	19.85	19.92	25.95	29	Pass
		2452	High	14.94	15.41	14.67	15.95	21.29	29	Pass
Note	Directional gain of the EUT is 9dBi. Limit should be reduced by 1dB.									

10.4 Band Edge

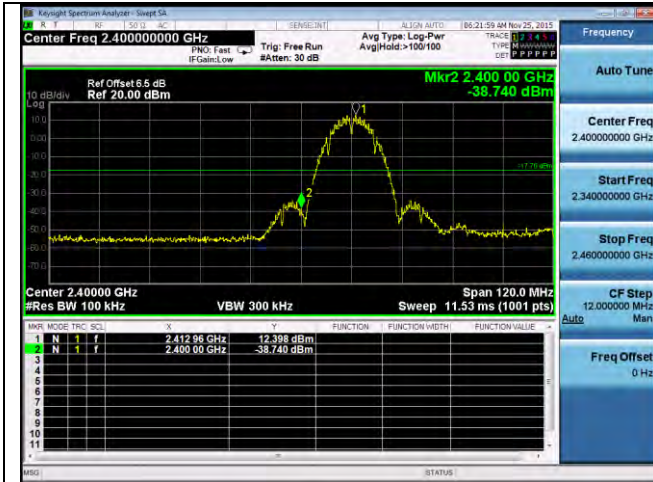
Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247 RSS247(5.5)	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 v03r04 <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	11/20/2015 – 12/03/2015	Environmental condition	Temperature 22°C Relative Humidity 46% Atmospheric Pressure 1020mbar
Remark	N/A		
Result	☒ Pass ☐ Fail		

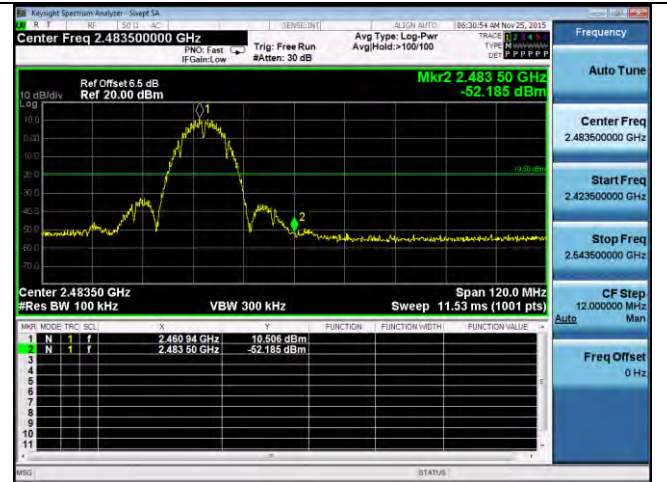
Test Data ☐ Yes ☒ N/A

Test Plot ☒ Yes (See below) ☐ N/A

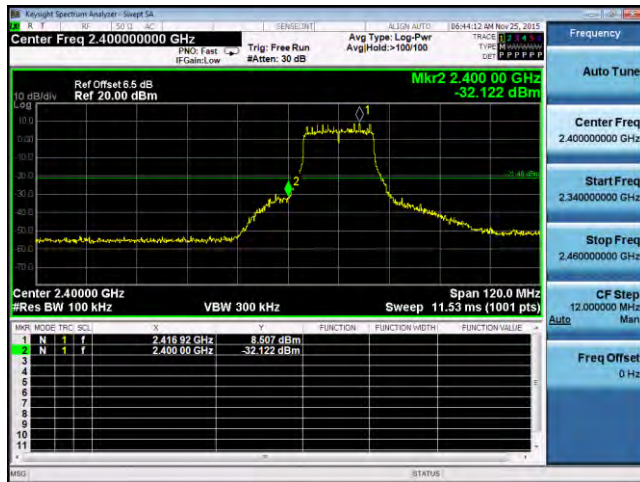
Test Plots (Worst case of 4 chains)



Band Edge-2.4G-802.11b Low



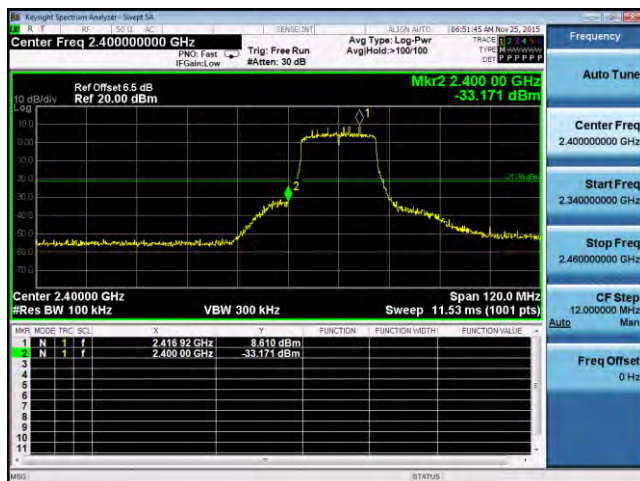
Band Edge-2.4G-802.11b High



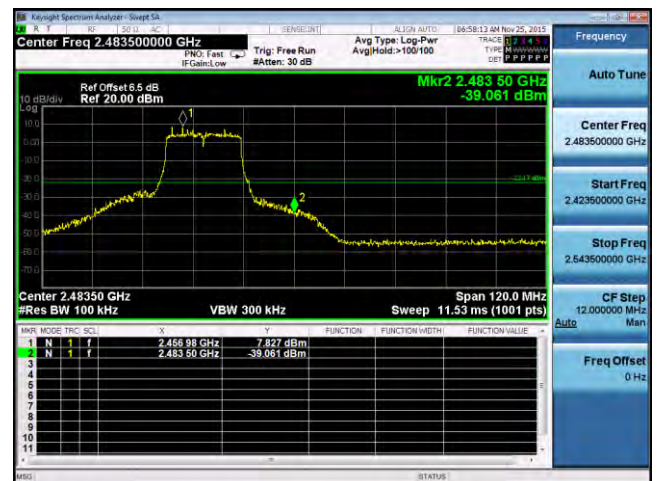
Band Edge-2.4G-802.11g Low



Band Edge-2.4G-802.11g High



Band Edge-2.4G-802.11n20 Low



Band Edge-2.4G-802.11n20 High



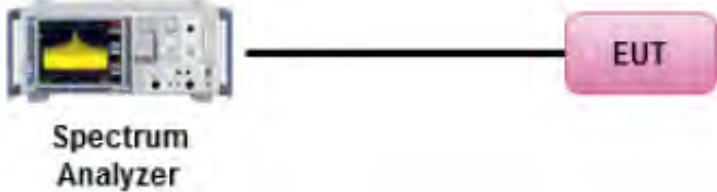
Band Edge-2.4G-802.11n40 Low



Band Edge-2.4G-802.11n40 High

10.5 Peak Power Spectral Density

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247(e) RSS247 (5.2.2)	e)	DSSS: $\leq 8\text{dBm}/3\text{KHz}$	☒
	f)	DSSS in hybrid sys with FH turned off: $\leq 8\text{dBm}/3\text{KHz}$	☐
Test Setup			
Test Procedure	558074 D01 DTS Meas Guidance v03r04, 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: $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$. - Set the VBW $\geq 3 \times \text{RBW}$. - 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	11/20/2015 – 02/01/2015	Environmental condition	Temperature 22°C Relative Humidity 46% Atmospheric Pressure 1020mbar
Remark	Per KDB 662911 D01 Multiple Transmitter Output v02r01, the direction gain for horizontal polarization and vertical polarization is calculated separately. For 2.4GHz band, peak antenna gain = 6 dBi, directional gain = 9 dB. Highest of total directional gain is 9 dBi. The power limit and PSD limit will be reduced by amount of 1 dB.		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

PSD measurement results

Type	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/3KHz)					Limit (dBm/3KHz)	Result
				Chain1	Chain2	Chain3	Chain4	Combined		
PSD	802.11b	2412	Low	-4.63	-4.45	-5.61	-4.45	1.26	≤7	Pass
		2437	Mid	-5.93	-3.81	-4.90	-4.88	1.21	≤7	Pass
		2462	High	-7.38	-7.19	-6.85	-5.74	-0.72	≤7	Pass
	802.11g	2412	Low	-6.83	-7.93	-8.76	-7.69	-1.73	≤7	Pass
		2437	Mid	-7.58	-7.47	-8.12	-7.44	-1.62	≤7	Pass
		2462	High	-9.83	-10.05	-10.51	-9.73	-4.00	≤7	Pass
	802.11n-20M	2412	Low	-7.80	-7.09	-7.4	-8.15	-1.57	≤7	Pass
		2437	Mid	-8.24	-7.97	-8.71	-8.30	-2.28	≤7	Pass
		2462	High	-11.33	-11.19	-11.37	-11.79	-5.39	≤7	Pass
	802.11n-40M	2422	Low	-10.28	-9.53	-10.45	-9.88	-4.00	≤7	Pass
		2437	Mid	-7.57	-9.40	-9.88	-8.54	-2.74	≤7	Pass
		2452	High	-12.91	-11.96	-13.23	-11.98	-6.46	≤7	Pass

Test Plots



PSD-2.4G-802.11b Low-chain1



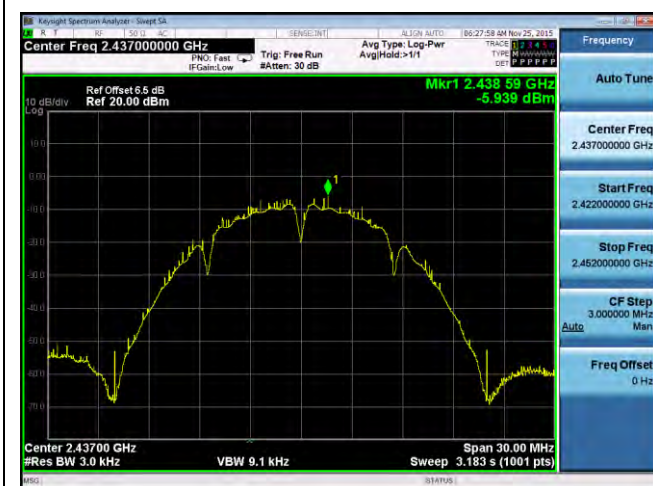
PSD-2.4G-802.11b Low-chain2



PSD-2.4G-802.11b Low-chain3



PSD-2.4G-802.11b Low-chain4



PSD-2.4G-802.11b Mid-chain1



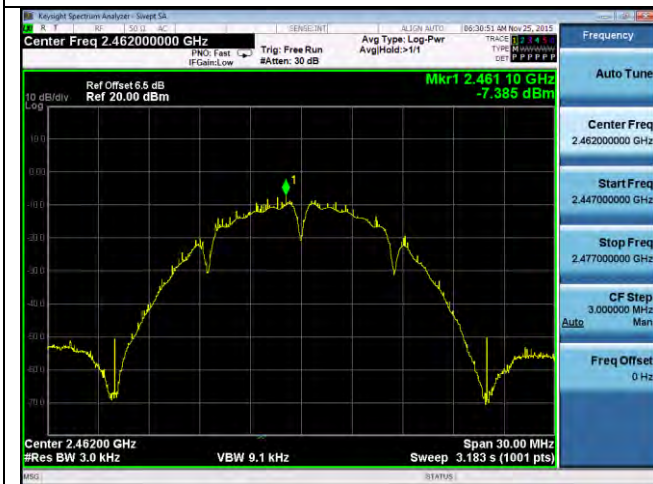
PSD-2.4G-802.11b Mid-chain2



PSD-2.4G-802.11b Mid-chain3



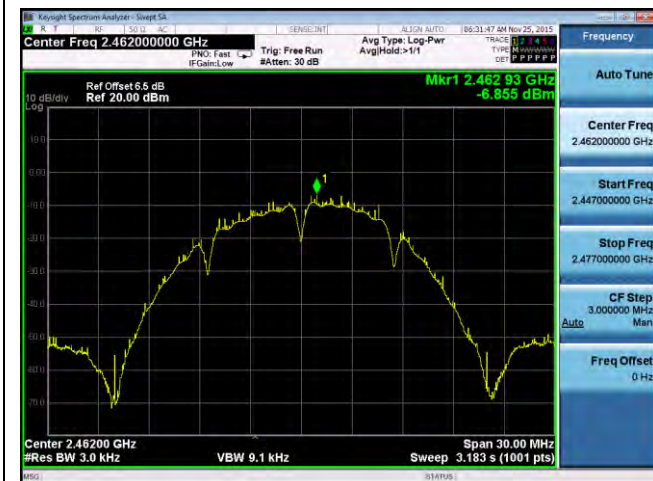
PSD-2.4G-802.11b Mid-chain4



PSD-2.4G-802.11b High-chain1



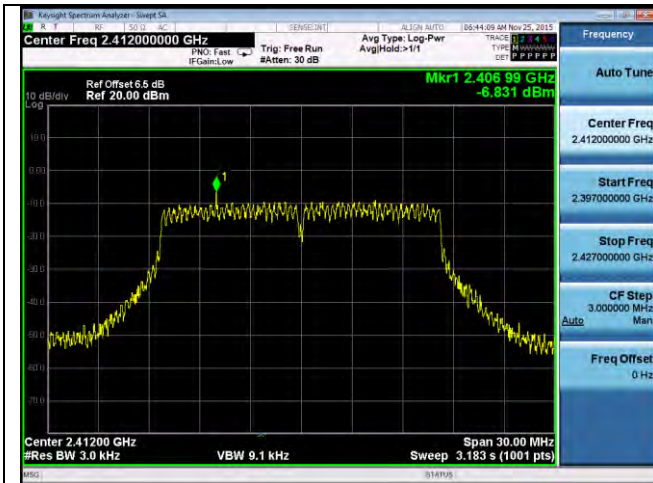
PSD-2.4G-802.11b High-chain2



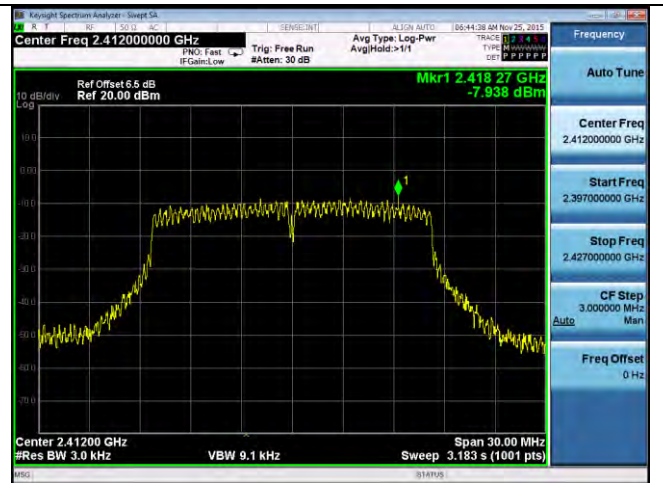
PSD-2.4G-802.11b High-chain3



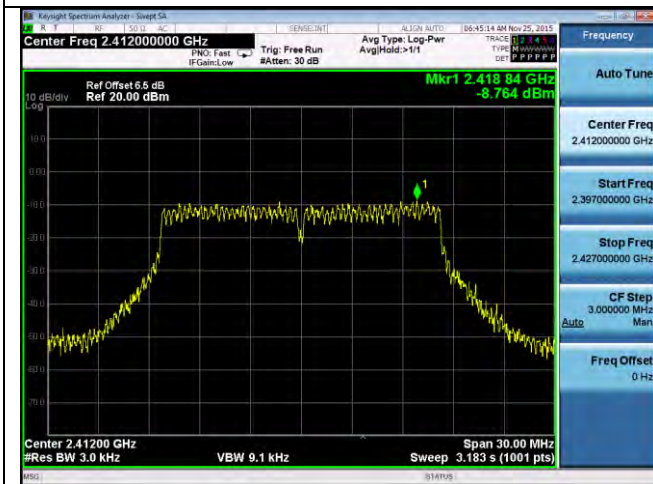
PSD-2.4G-802.11b High-chain4



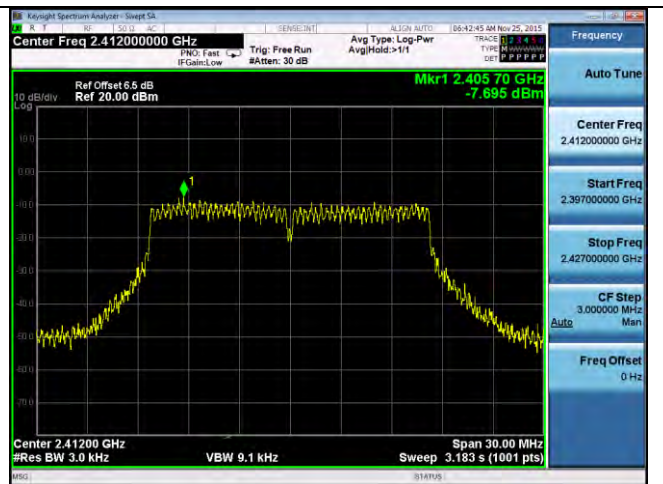
PSD-2.4G-802.11g Low-chain1



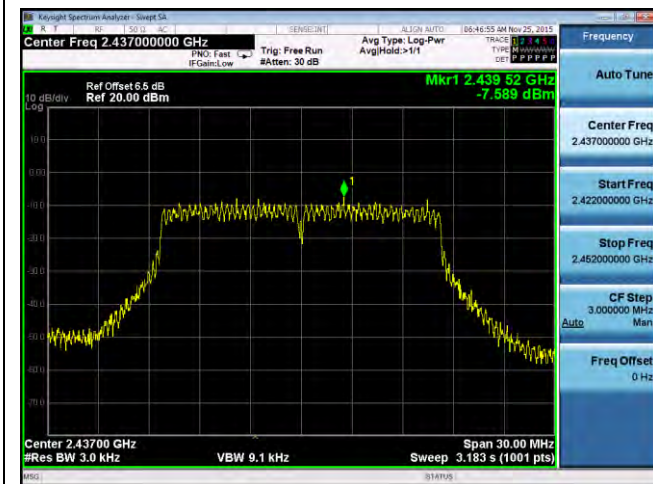
PSD-2.4G-802.11g Low-chain2



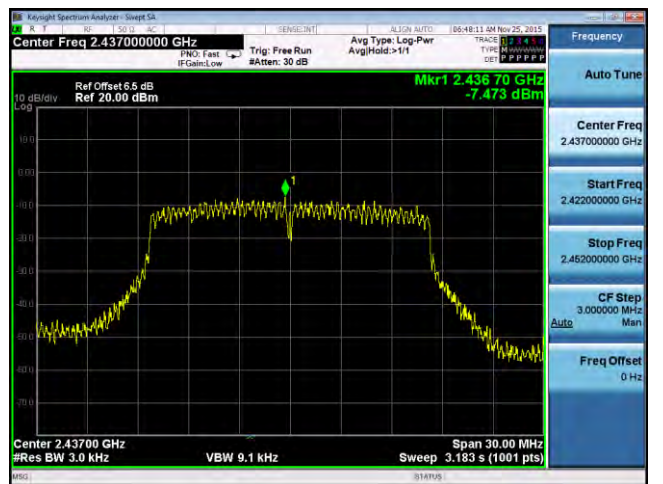
PSD-2.4G-802.11g Low-chain3



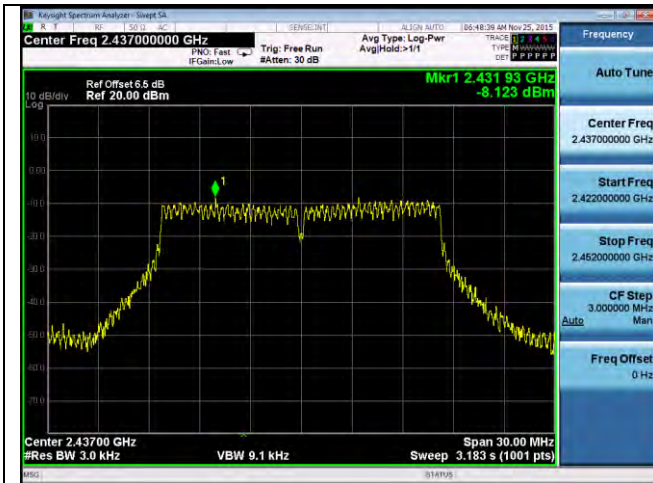
PSD-2.4G-802.11g Low-chain4



PSD-2.4G-802.11g Mid-chain1



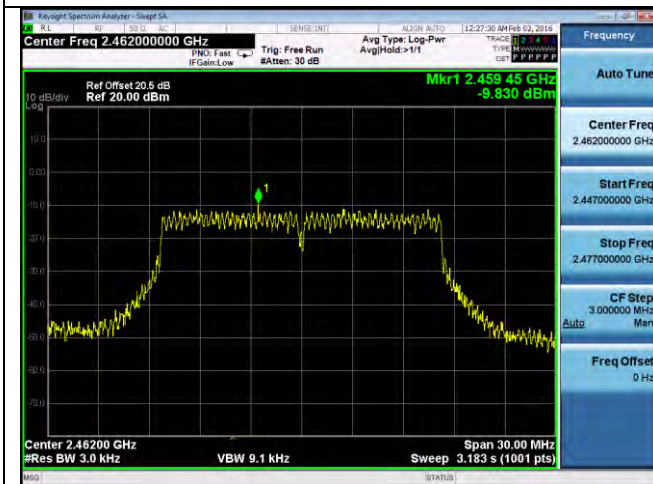
PSD-2.4G-802.11g Mid-chain2



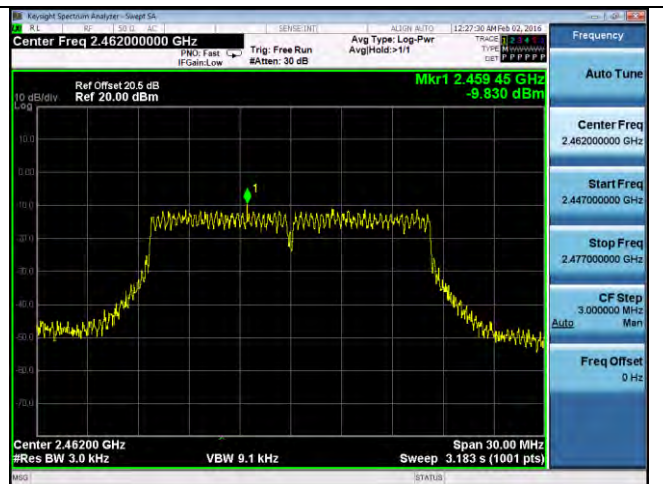
PSD-2.4G-802.11g Mid-chain3



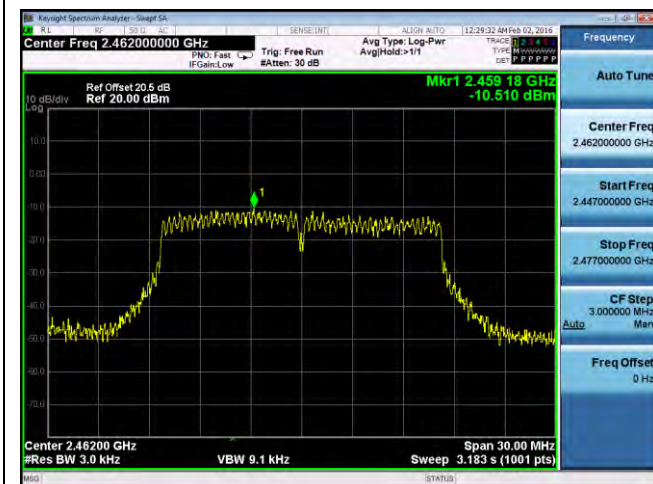
PSD-2.4G-802.11g Mid-chain4



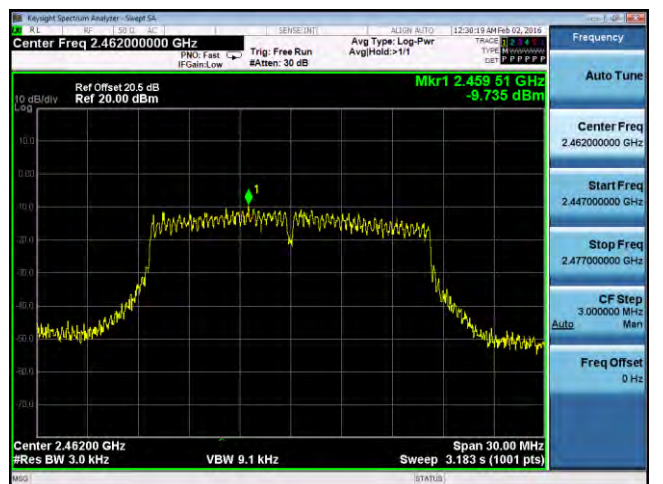
PSD-2.4G-802.11g High-chain1



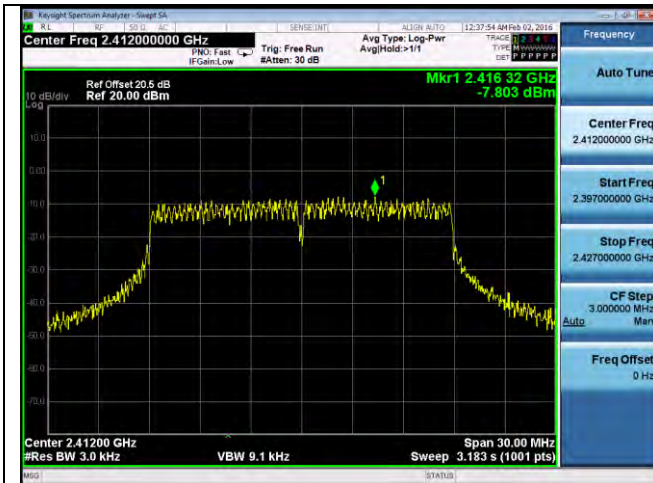
PSD-2.4G-802.11g High-chain2



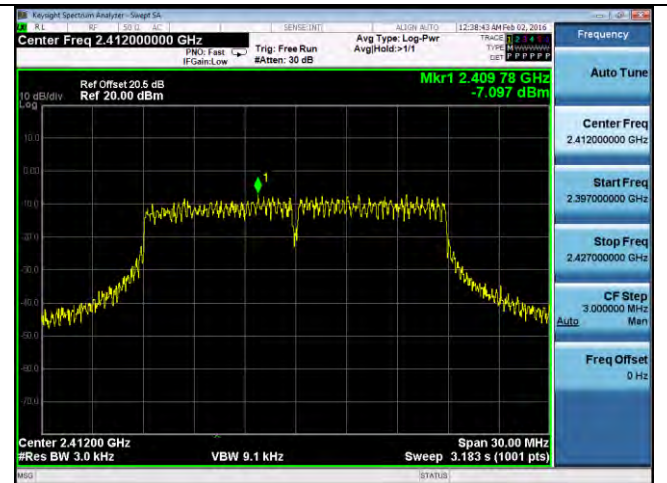
PSD-2.4G-802.11g High-chain3



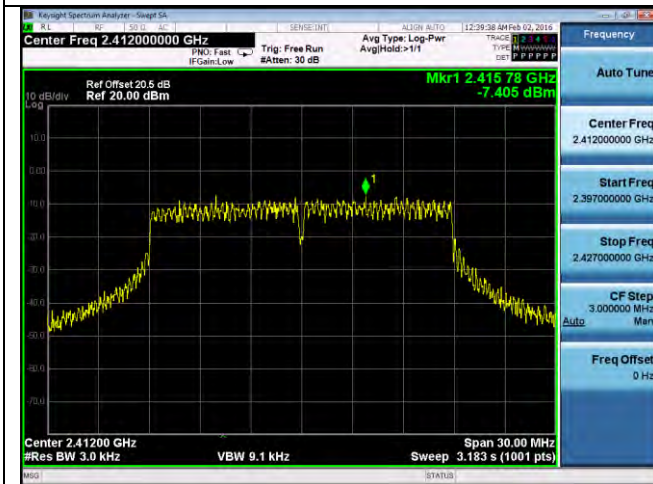
PSD-2.4G-802.11g High-chain4



PSD-2.4G-802.11n-20M Low-chain1



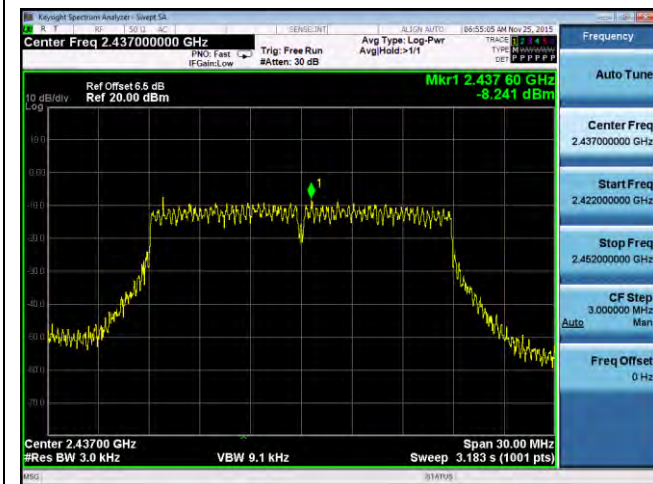
PSD-2.4G-802.11n-20M Low-chain2



PSD-2.4G-802.11n-20M Low-chain3



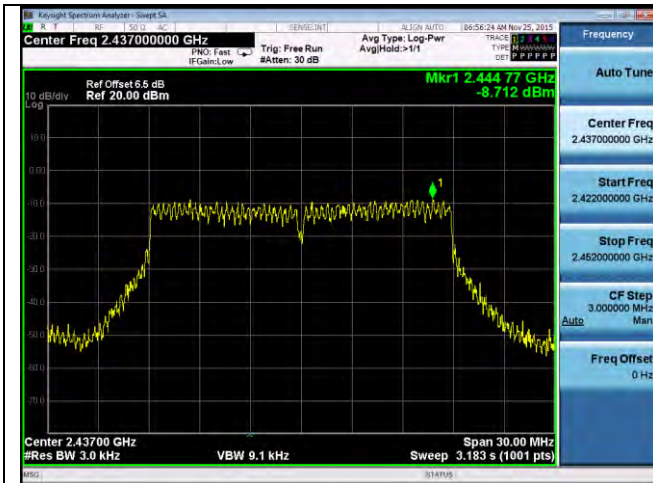
PSD-2.4G-802.11n-20M Low-chain4



PSD-2.4G-802.11n-20M Mid-chain1



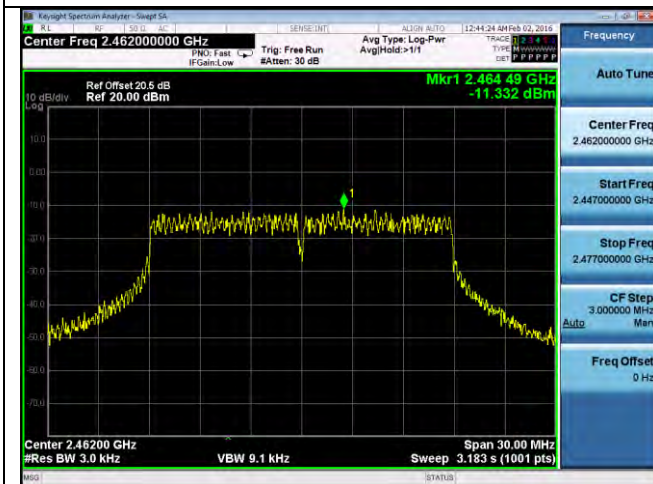
PSD-2.4G-802.11n-20M Mid-chain2



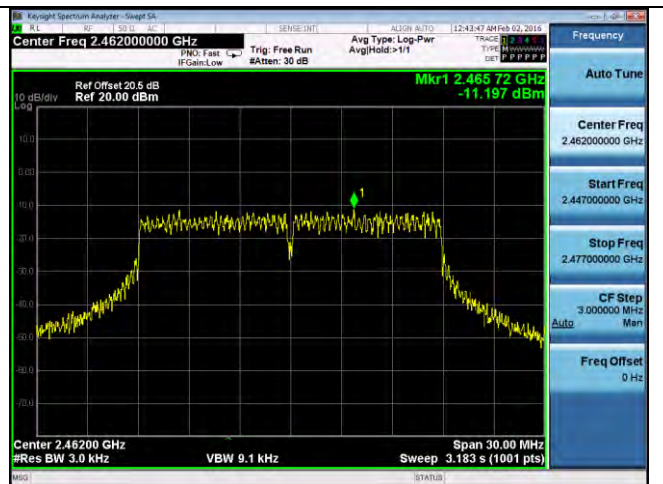
PSD-2.4G-802.11n-20M Mid-chain3



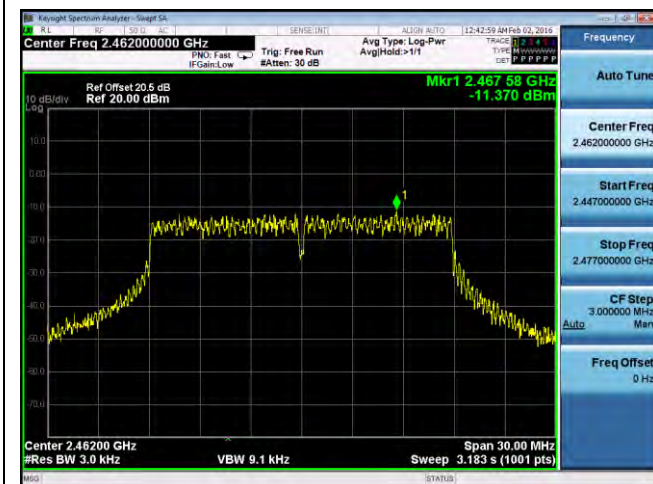
PSD-2.4G-802.11n-20M Mid-chain4



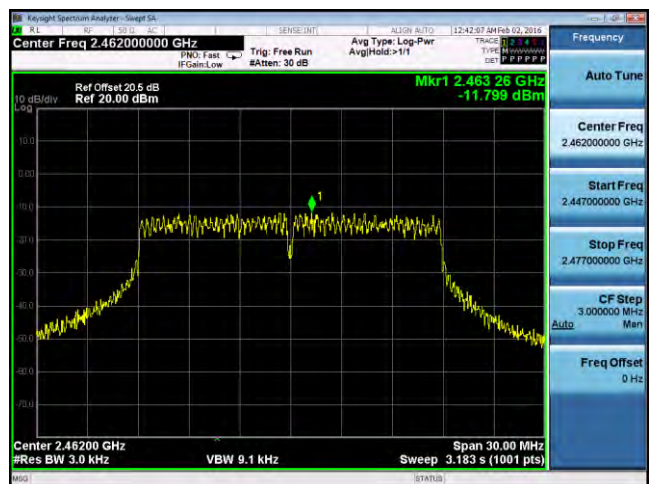
PSD-2.4G-802.11n-20M High-chain1



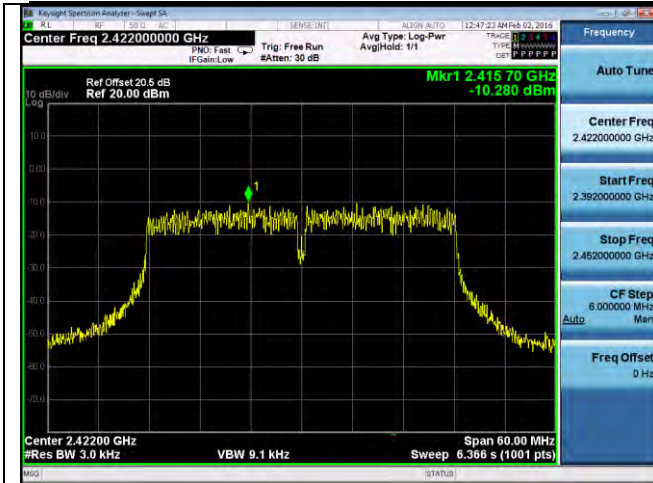
PSD-2.4G-802.11n-20M High-chain2



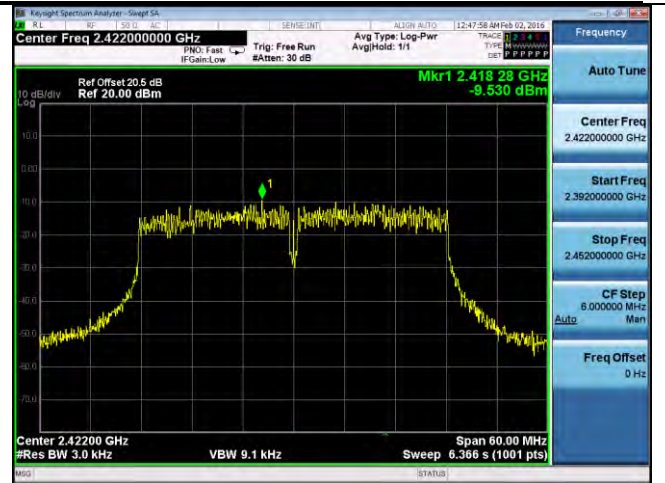
PSD-2.4G-802.11n-20M High-chain3



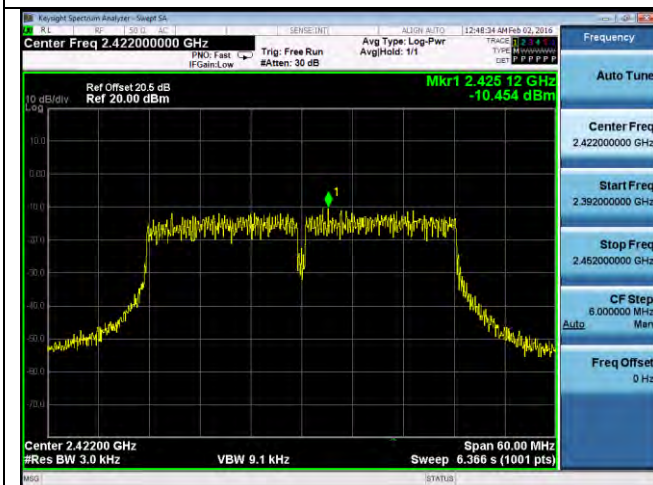
PSD-2.4G-802.11n-20M High-chain4



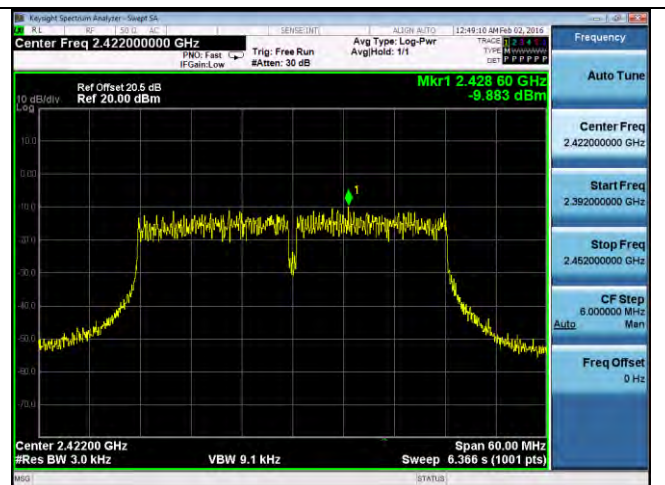
PSD-2.4G-802.11n-40M Low-chain1



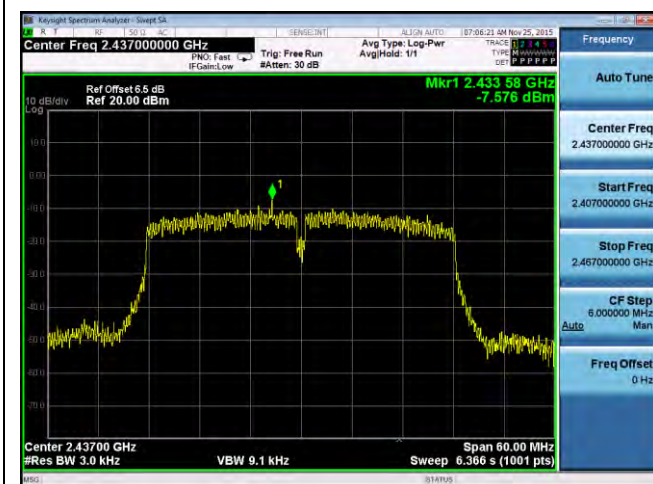
PSD-2.4G-802.11n-40M Low-chain2



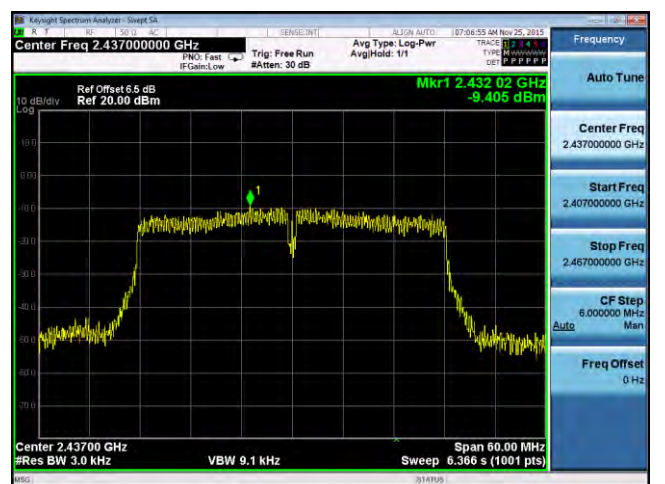
PSD-2.4G-802.11n-40M Low-chain3



PSD-2.4G-802.11n-40M Low-chain4



PSD-2.4G-802.11n-40M Mid-chain1



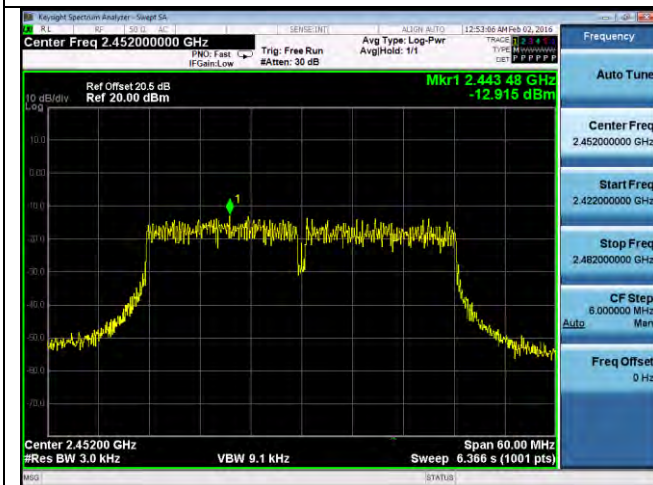
PSD-2.4G-802.11n-40M Mid-chain2



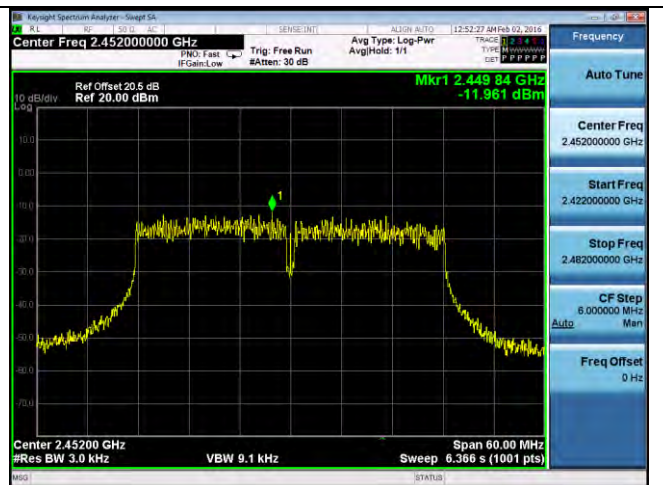
PSD-2.4G-802.11n-40M Mid-chain3



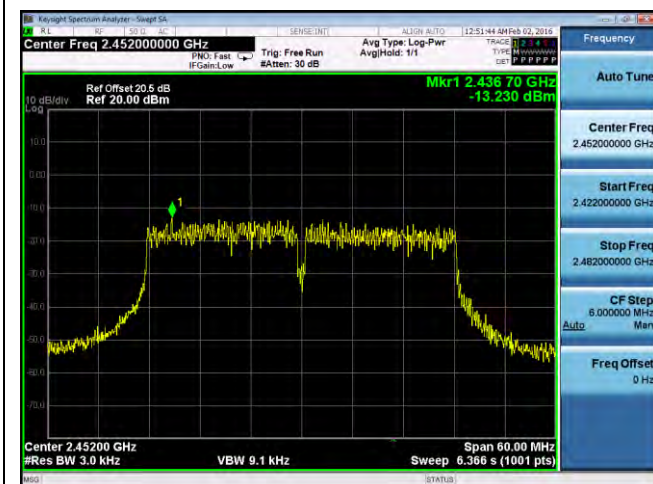
PSD-2.4G-802.11n-40M Mid-chain4



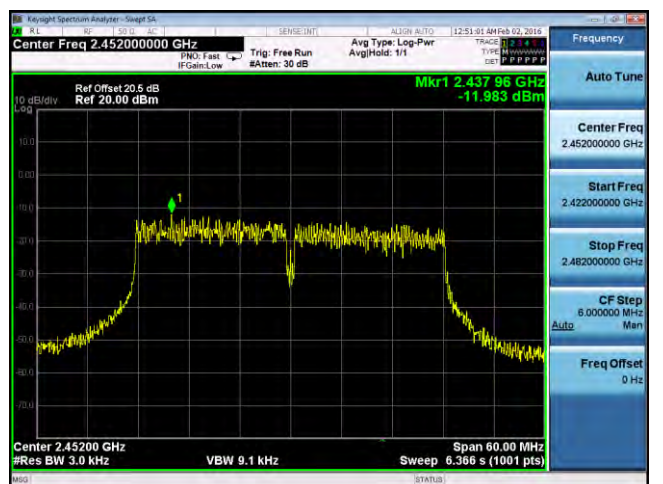
PSD-2.4G-802.11n-40M High-chain1



PSD-2.4G-802.11n-40M High-chain2



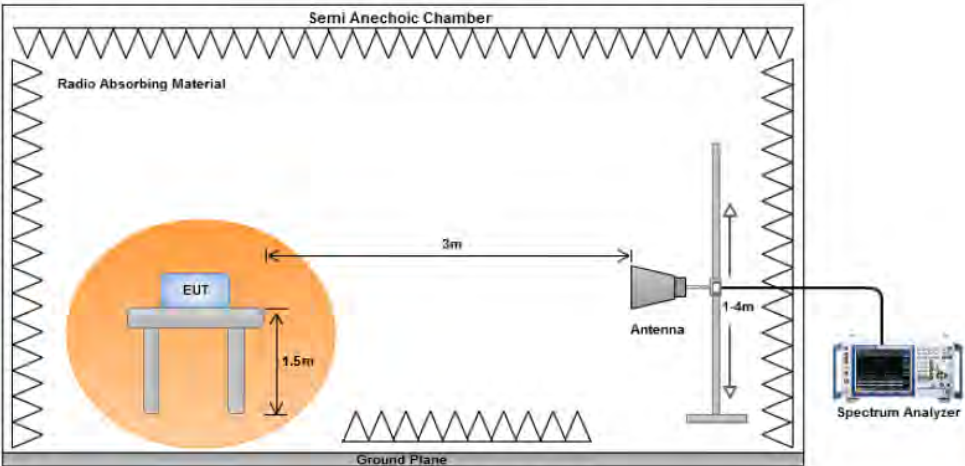
PSD-2.4G-802.11n-40M High-chain3



PSD-2.4G-802.11n-40M High-chain4

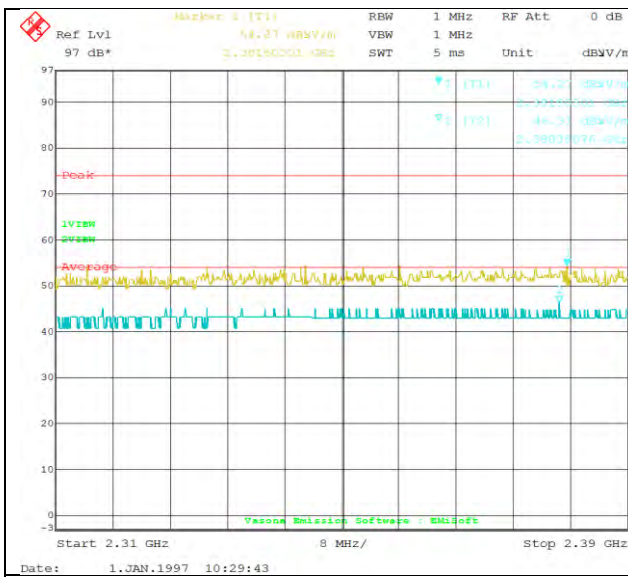
10.6 Radiated Spurious Emissions in restricted band

Requirement(s):

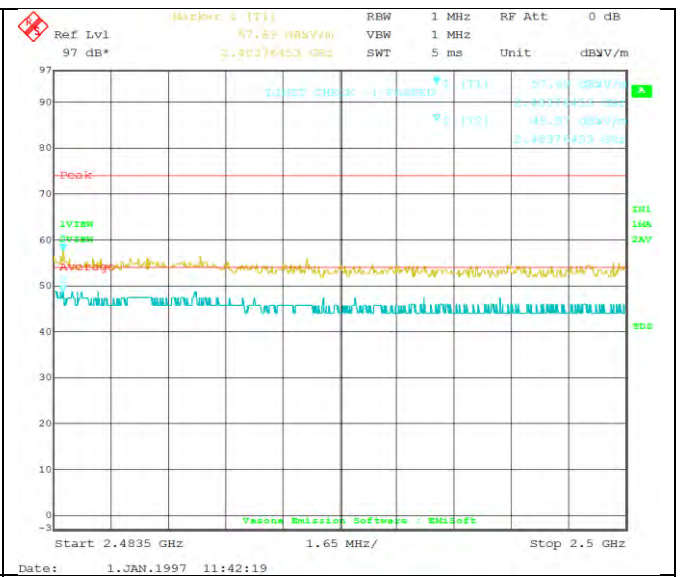
Spec	Item	Requirement	Applicable
47CFR§15.247(d), RSS247(A8.5)	a)	For non-restricted band, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209(a) is not required ☐ 20 dB down ☒ 30 dB down	☒
	b)	or restricted band, emission must also comply with the radiated emission limits specified in 15.209	☒
Test Setup			
Procedure	- The EUT was switched on and allowed to warm up to its normal operating condition. - The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: - Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. - The EUT was then rotated to the direction that gave the maximum emission. - Finally, the antenna height was adjusted to the height that gave the maximum emission. - An average measurement was then made for that frequency point. - Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.		
Remark	The EUT was scanned up to 40GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case. Radiated measurement was measured with antenna port terminated, there isn't outstanding emission found at the edge of restricted frequency, within x dB margin		
Result	☒ Pass ☐ Fail		

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

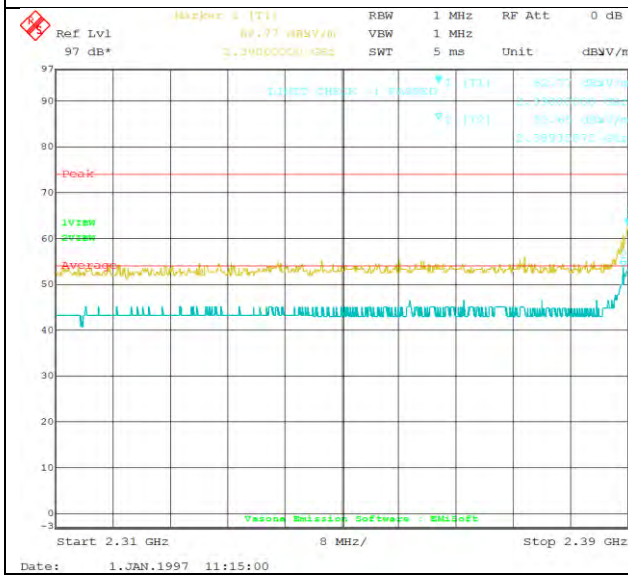
Restricted Band Measurement Plots:



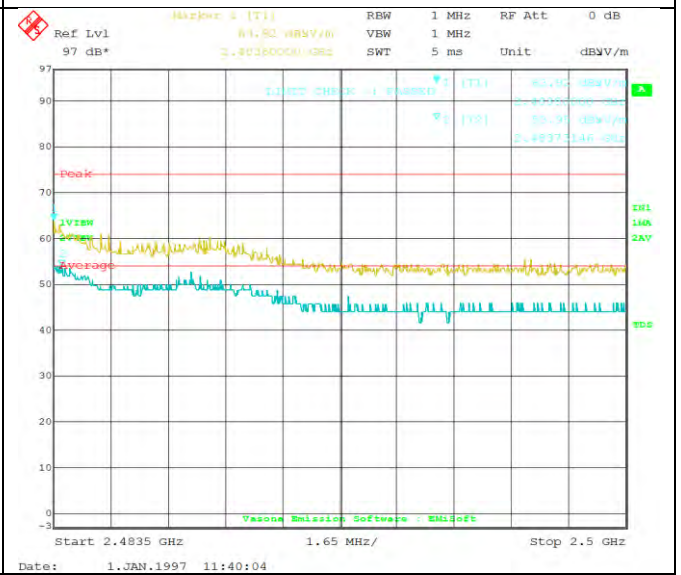
802.11b 2412M-Restricted Band 2310-2390MHz



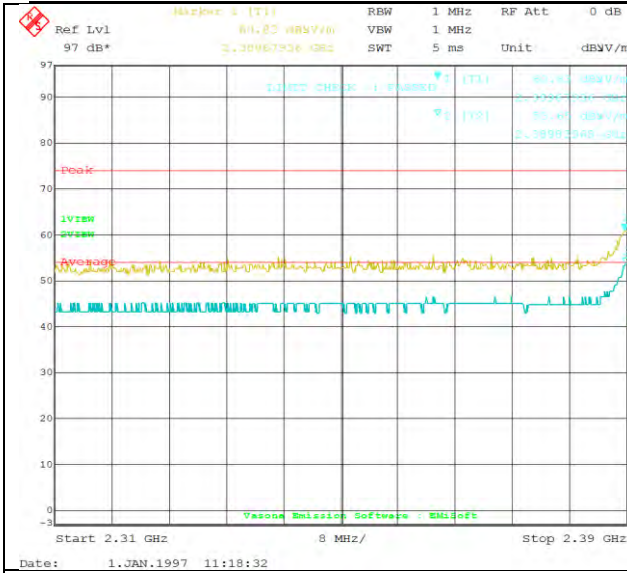
802.11b 2462M-Restricted Band 2483.5-2500MHz



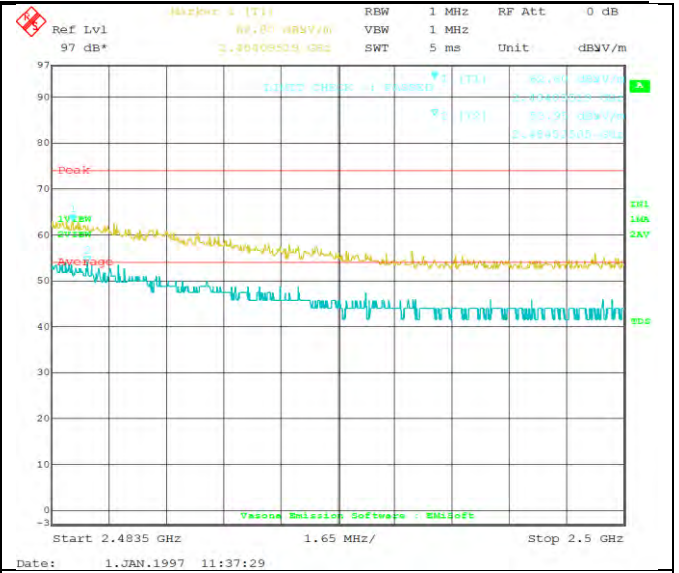
802.11g 2412M-Restricted Band 2310-2390MHz



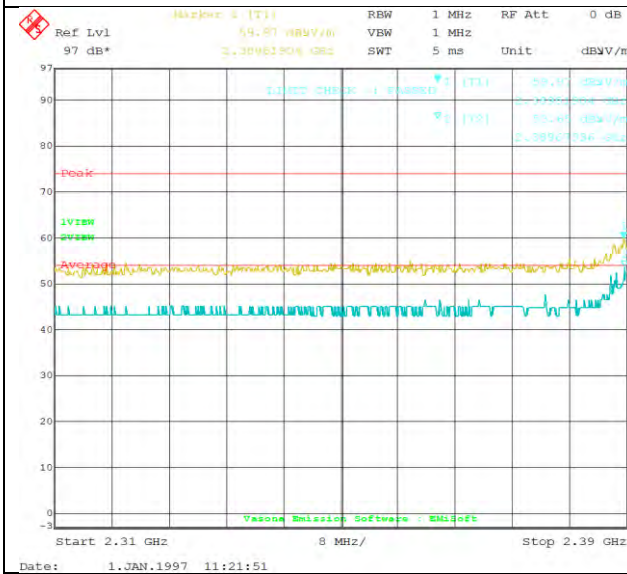
802.11g 2462M-Restricted Band 2483.5-2500MHz



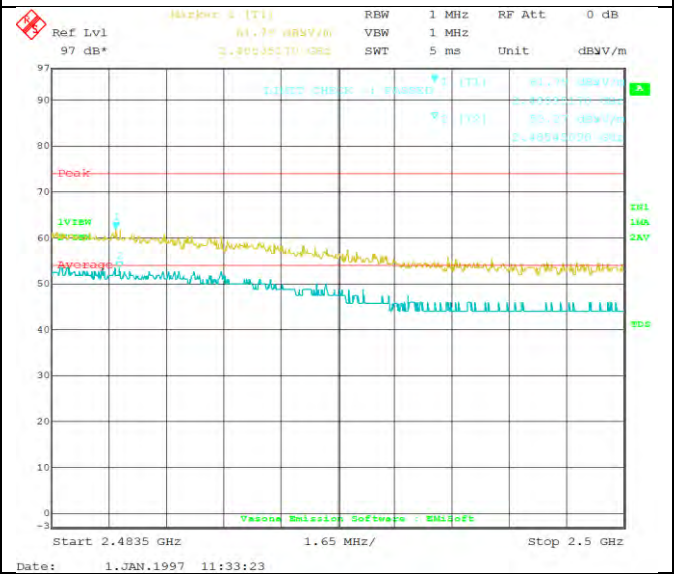
802.11n20 2412M-Restricted Band 2310-2390MHz



802.11n20 2462M-Restricted Band 2483.5-2500MHz



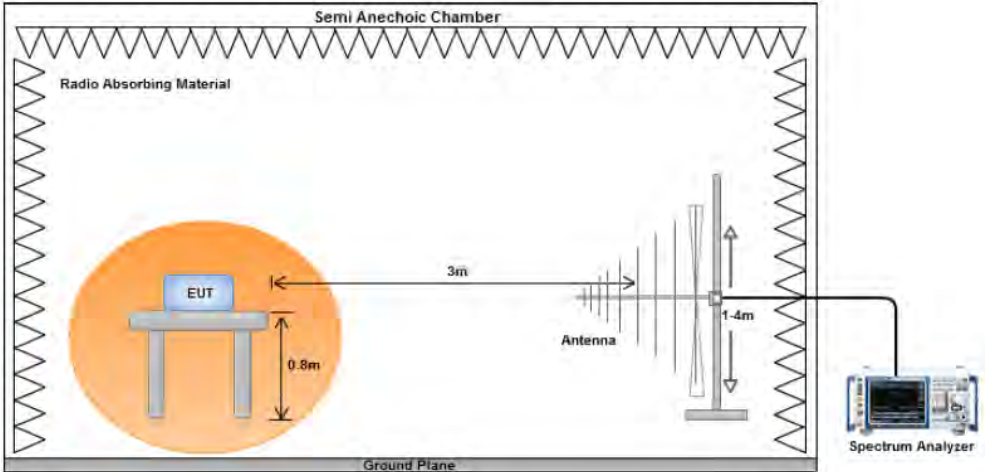
802.11n40 2422M-Restricted Band 2310-2390MHz



802.11n40 2452M-Restricted Band 2483.5-2500MHz

10.7 Radiated Spurious Emissions below 1GHz

Requirement(s):

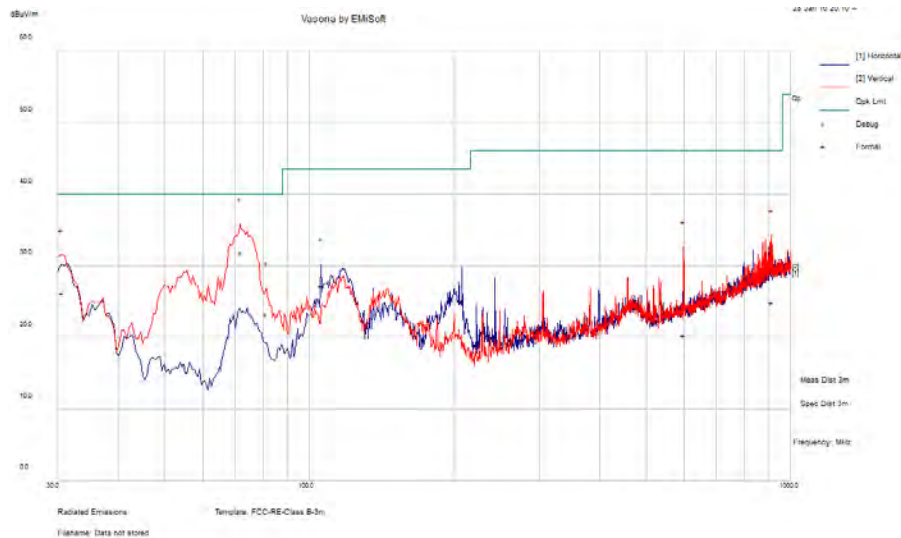
Spec	Item	Requirement	Applicable										
47CFR§15.247(d) RSS247 (5.5)	a)	Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges <table><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	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	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	below 1GHz			
Environmental Conditions:	Temp (°C):	25	Result	Pass
	Humidity (%)	45		
	Atmospheric (mbar):	1011		
Mains Power:	120VAC, 60Hz			
Tested by:	Gary Chou			
Test Date:	11/29/2015			
Remarks:	N/A			

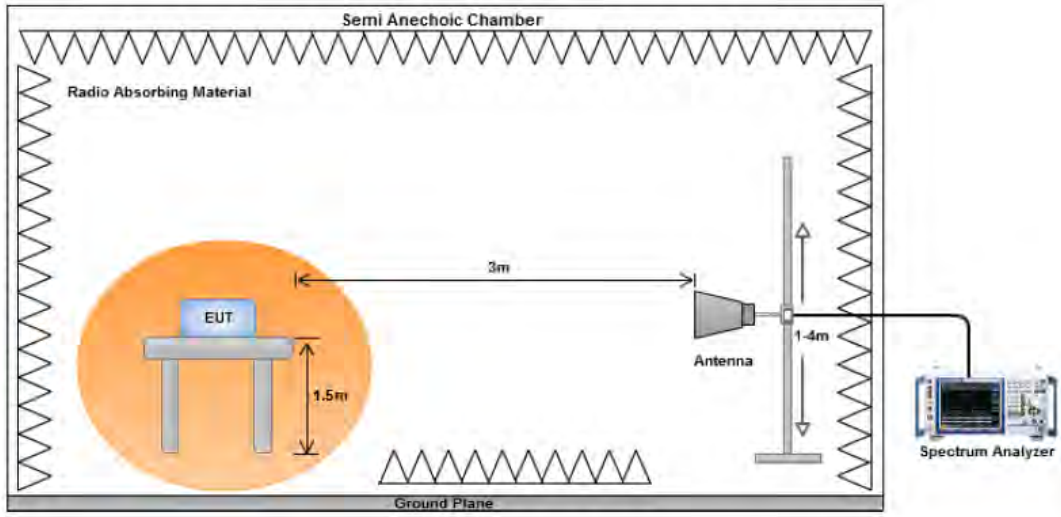


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
71.95	60.56	1.37	-30.16	31.77	Quasi Max	V	120	14	40	-8.23	Pass
30.61	40.35	0.81	-14.96	26.2	Quasi Max	V	216	29	40	-13.8	Pass
911.31	35.06	5.61	-15.83	24.84	Quasi Max	V	262	180	46.02	-21.18	Pass
81.23	52.48	1.44	-30.67	23.24	Quasi Max	V	100	278	40	-16.76	Pass
105.77	52.33	1.7	-26.84	27.19	Quasi Max	H	299	275	43.52	-16.33	Pass
597.42	35.68	4.27	-19.68	20.27	Quasi Max	V	175	152	46.02	-25.75	Pass

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

10.8 Radiated Spurious Emissions above 1GHz

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR§15.247(d), RSS247(A8.5)	a)	For non-restricted band, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209(a) is not required ☐ 20 dB down ☒ 30 dB down	☒
	b)	or restricted band, emission must also comply with the radiated emission limits specified in 15.209	☒
Test Setup			
Procedure	- The EUT was switched on and allowed to warm up to its normal operating condition. - The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: - Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. - The EUT was then rotated to the direction that gave the maximum emission. - Finally, the antenna height was adjusted to the height that gave the maximum emission. - An average measurement was then made for that frequency point. - Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.		
Remark	The EUT was scanned up to 40GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case. There isn't outstanding emission found at the edge of restricted frequency.		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Radiated Emission Test Results (Above 1GHz)

1GHz-25GHz – 802.11b – 2412MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
4157.36	38.34	8.9	11.54	58.77	Peak Max	H	208	174	74	-15.23	Pass
2074.86	40.79	4.35	11.24	56.38	Peak Max	V	133	112	74	-17.62	Pass
4157.36	26.09	8.9	11.54	46.53	Average Max	H	208	174	54	-7.47	Pass
2074.86	28.77	4.35	11.24	44.36	Average Max	V	133	112	54	-9.64	Pass

1GHz-25GHz- 802.11b - 2437MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
4126.02	37.9	8.82	11.67	58.4	Peak Max	V	121	46	74	-15.61	Pass
6160.04	37.28	10.68	10.68	58.64	Peak Max	V	127	142	74	-15.36	Pass
2019.81	41.17	4.3	11.41	56.89	Peak Max	V	178	123	74	-17.12	Pass
4126.02	25.91	8.82	11.67	46.41	Average Max	V	121	46	54	-7.59	Pass
6160.04	25.07	10.68	10.68	46.44	Average Max	V	127	142	54	-7.57	Pass
2019.81	28.76	4.3	11.41	44.47	Average Max	V	178	123	54	-9.53	Pass

1GHz-25GHz- 802.11b – 2462MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
4168.18	37.46	8.92	11.49	57.88	Peak Max	V	227	359	74	-16.12	Pass
6131.62	37.1	10.65	10.75	58.49	Peak Max	V	130	86	74	-15.51	Pass
4322.43	37.82	9.3	10.84	57.96	Peak Max	V	150	51	74	-16.04	Pass
4168.18	26	8.92	11.49	46.42	Average Max	V	227	359	54	-7.58	Pass
6131.62	25.07	10.65	10.75	46.47	Average Max	V	130	86	54	-7.54	Pass
4322.43	25.24	9.3	10.84	45.38	Average Max	V	150	51	54	-8.62	Pass

1GHz-25GHz – 802.11g – 2412MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
6063.52	37.4	10.56	10.91	58.87	Peak Max	V	228	324	74	-15.13	Pass
6305.04	36.02	10.86	10.34	57.21	Peak Max	V	201	114	74	-16.79	Pass
1970.40	41.14	4.27	11.25	56.65	Peak Max	V	185	278	74	-17.35	Pass
6063.52	24.86	10.56	10.91	46.33	Average Max	V	228	324	54	-7.67	Pass
6305.04	24.52	10.86	10.34	45.72	Average Max	V	201	114	54	-8.28	Pass
1970.40	28.51	4.27	11.25	44.03	Average Max	V	185	278	54	-9.98	Pass

1GHz-25GHz- 802.11g – 2437MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
4240.51	38.66	9.1	11.19	58.95	Peak Max	H	219	202	74	-15.05	Pass
6108.74	36.64	10.62	10.8	58.06	Peak Max	H	165	37	74	-15.94	Pass
4180.42	39.48	8.95	11.44	59.88	Peak Max	V	166	96	74	-14.13	Pass
4240.51	25.96	9.1	11.19	46.24	Average Max	H	219	202	54	-7.76	Pass
6108.74	24.92	10.62	10.8	46.34	Average Max	H	165	37	54	-7.66	Pass
4180.42	25.94	8.95	11.44	46.33	Average Max	V	166	96	54	-7.67	Pass

1GHz-25GHz- 802.11g - 2462MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
4063.90	37.82	8.66	11.95	58.42	Peak Max	V	179	18	74	-15.58	Pass
1063.93	42.77	3.45	9.58	55.79	Peak Max	H	109	299	74	-18.21	Pass
6321.07	35.66	10.88	10.3	56.84	Peak Max	V	189	290	74	-17.16	Pass
4063.90	25.65	8.66	11.95	46.26	Average Max	V	179	18	54	-7.74	Pass
1063.93	31.21	3.45	9.58	44.23	Average Max	H	109	299	54	-9.77	Pass
6321.07	24.38	10.88	10.3	45.56	Average Max	V	189	290	54	-8.44	Pass

1GHz-25GHz – 802.11n-20M – 2412MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
4071.53	37.79	8.68	11.91	58.39	Peak Max	V	130	45	74	-15.61	Pass
6130.02	36.9	10.64	10.75	58.3	Peak Max	H	251	114	74	-15.7	Pass
4298.55	37.26	9.24	10.94	57.44	Peak Max	V	251	29	74	-16.56	Pass
4071.53	25.62	8.68	11.91	46.22	Average Max	V	130	45	54	-7.78	Pass
6130.02	25.03	10.64	10.75	46.43	Average Max	H	251	114	54	-7.57	Pass
4298.55	25.24	9.24	10.94	45.43	Average Max	V	251	29	54	-8.57	Pass

1GHz-25GHz- 802.11n-20M - 2437MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
1968.65	39.98	4.26	11.23	55.48	Peak Max	H	251	86	74	-18.52	Pass
6256.91	36.8	10.8	10.45	58.05	Peak Max	V	251	268	74	-15.95	Pass
6258.48	36.64	10.8	10.45	57.89	Peak Max	V	251	242	74	-16.11	Pass
1968.65	28.48	4.26	11.23	43.98	Average Max	H	251	86	54	-10.02	Pass
6256.91	24.64	10.8	10.45	45.89	Average Max	V	251	268	54	-8.11	Pass
6258.48	24.66	10.8	10.45	45.91	Average Max	V	251	242	54	-8.09	Pass

1GHz-25GHz- 802.11n-20M – 2462MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
3127.90	39.55	5.34	10.11	55	Peak Max	V	251	183	74	-19	Pass
3256.68	39.19	5.45	10.18	54.82	Peak Max	V	251	284	74	-19.18	Pass
11173.08	35.25	12.71	8.16	56.12	Peak Max	V	251	28	74	-17.88	Pass
3127.90	27.83	5.34	10.11	43.29	Average Max	V	251	183	54	-10.72	Pass
3256.68	27.36	5.45	10.18	43	Average Max	V	251	284	54	-11	Pass
11173.08	23.78	12.71	8.16	44.65	Average Max	V	251	28	54	-9.35	Pass

1GHz-25GHz – 802.11n-40M – 2422MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
4242.61	37.79	9.1	11.18	58.07	Peak Max	V	155	149	74	-15.93	Pass
6151.53	36.27	10.67	10.7	57.64	Peak Max	V	109	28	74	-16.36	Pass
4104.36	37.34	8.76	11.77	57.87	Peak Max	V	111	250	74	-16.13	Pass
4242.61	25.85	9.1	11.18	46.13	Average Max	V	155	149	54	-7.87	Pass
6151.53	25.03	10.67	10.7	46.4	Average Max	V	109	28	54	-7.6	Pass
4104.36	25.65	8.76	11.77	46.18	Average Max	V	111	250	54	-7.82	Pass

1GHz-25GHz- 802.11n-40M – 2437MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
1990.56	40.76	4.28	11.4	56.44	Peak Max	V	174	121	74	-17.56	Pass
5067.13	37.21	10.37	9.52	57.11	Peak Max	V	139	342	74	-16.9	Pass
6258.53	36.79	10.8	10.45	58.04	Peak Max	V	199	23	74	-15.96	Pass
1990.56	28.58	4.28	11.4	44.26	Average Max	V	174	121	54	-9.74	Pass
5067.13	25.06	10.37	9.52	44.95	Average Max	V	139	342	54	-9.05	Pass
6258.53	24.61	10.8	10.45	45.86	Average Max	V	199	23	54	-8.14	Pass

1GHz-25GHz- 802.11n-40M - 2452MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
5393.12	37.16	8.78	9.74	55.67	Peak Max	V	125	335	74	-18.33	Pass
10185.08	35.34	10.99	8.71	55.05	Peak Max	V	233	106	74	-18.95	Pass
10635.52	35.81	11.8	8.45	56.06	Peak Max	H	119	92	74	-17.94	Pass
5393.12	25.55	8.78	9.74	44.06	Average Max	V	125	335	54	-9.94	Pass
10185.08	23.94	10.99	8.71	43.65	Average Max	V	233	106	54	-10.35	Pass
10635.52	24.43	11.8	8.45	44.68	Average Max	H	119	92	54	-9.32	Pass

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Conducted Emissions						
R & S Receiver	ESIB 40	100179	05/23/2015	1 Year	05/23/2016	☒
CHASE LISN	MN2050B	1018	08/07/2015	1 Year	08/07/2016	☒
Radiated Emissions						
R & S Receiver	ESL6	100178	05/27/2015	1 Year	05/27/2016	☒
R & S Receiver	ESIB 40	100179	05/23/2015	1 Year	05/23/2016	☒
ETS-Lingren Loop Antenna	6512	00049120	05/12/2015	1 Year	05/12/2016	☒
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	08/12/2015	1 Year	08/12/2016	☒
3 Meters SAC	3M	N/A	08/08/2015	1 Year	08/08/2016	☒
10 Meters SAC	10M	N/A	09/05/2015	1 Year	09/05/2016	☒
RF Conducted Measurement						
Spectrum Analyzer	N9010A	10SL0219	08/20/2015	1 Year	08/20/2016	☒
R & S Receiver	ESIB 40	100179	05/23/2015	1 Year	05/23/2016	☒
ETS-Lingren USB RF Power Sensor	7002-006	10SL0190	09/03/2015	1 Year	09/03/2016	☒

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