

RF TEST REPORT



Report No.: FCC_RF_SL14091001-RUC-015_DTS Rev1.0
Supersede Report No.: FCC_RF_SL14091001-RUC-015_DTS

Applicant	:	Ruckus Wireless, Inc.
Product Name	:	Access Point
Model No.	:	H500
Test Standard	:	47 CFR 15.247
Test Method	:	ANSI C63.4: 2014 558074 D01 DTS Meas Guidance v03r02
FCC ID	:	S9GH500
IC ID	:	5912A-H500
Dates of test	:	11/08/ 2014 – 12/10/2014
Issue Date	:	02/06/2015
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:	
Angel Escamilla	David Zhang
Test Engineer	Engineer Reviewer
This test report may be reproduced in full only Test result presented in this test report is applicable to the tested sample only	

Issued By:
SIEMIC Laboratories
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Laboratory Introduction

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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_SL14091001-RUC-015_DTS	None	Original	01/26/2015
FCC_RF_SL14091001-RUC-015_DTS Rev1.0	Rev1.0	Update test plot description	02/06/2015

2 Executive Summary

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

Company: Ruckus Wireless, Inc.
Product: Access Point
Model: H500

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	:	Access Point
Model No.	:	H500
Trade Name	:	Ruckus
Serial No.	:	431406000022
Host Model No.	:	N/A
EUT DC Input Power	:	48VDC (PoE) and 12 VDC (AC/DC Adapter)
Adapter Input Power	:	100VAC - 240VAC
Power Adapter SN	:	CN3210372
Hardware version	:	N/A
Software version	:	N/A
Date of EUT received	:	11/08/2014
Equipment Class/ Category	:	DTS, UNII
Clock Frequencies	:	N/A
Port/Connectors	:	PoE, Ethernet, USB

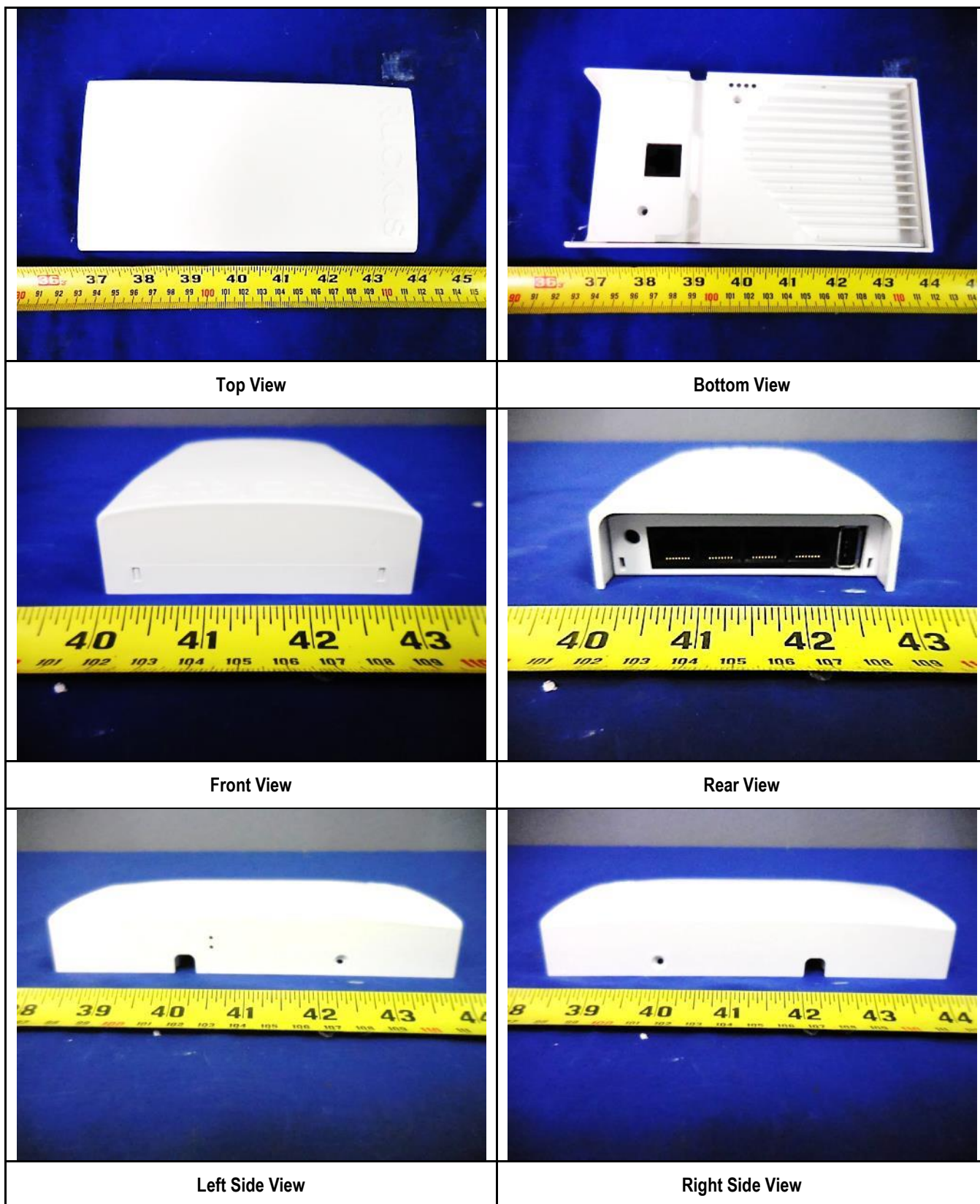
6.2 Radio Description

Radio Type	802.11b	802.11g	802.11a	802.11n-20M	802.11n-40M	802.11ac-80M
Operating Frequency	2412-2462MHz	2412-2462MHz	5180-5240MHz 5745-5825MHz	2412-2462MHz 5180-5240MHz 5745-5825MHz	2422-2452MHz 5190-5310MHz 5755-5795MHz	5210MHz, 5775MHz
Modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)
Channel Spacing	5MHz	5MHz	20MHz	5MHz(2.4GHz), 20MHz (5GHz)	40MHz	80MHz
Number of Channels	11	11	9	11(2.4GH) 9 (5GHz)	9(2.4GH) 5(5GHz)	2
Antenna Type	Internal Omni PCB Antennas					
Antenna Gain (Peak)	0 dBi (2.4GHz), 1 dBi (5 GHz)					
Antenna Connector Type	U.FL					
Note	N/A					

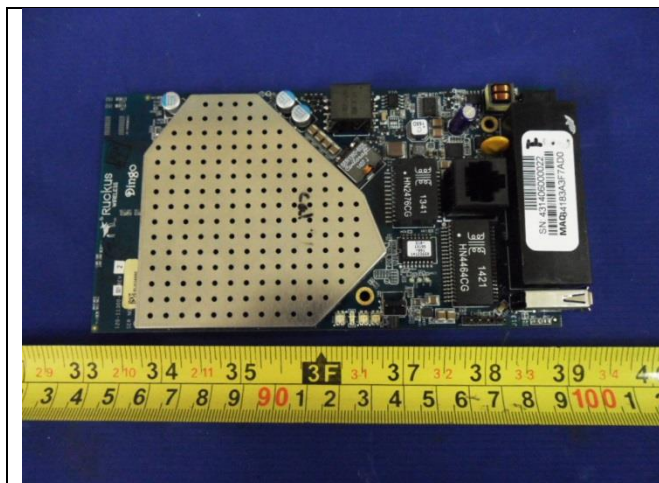
EUT ART Power level setting

Mode	Frequency (MHz)	ART 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	22
802.11-n-20	2412	22
802.11-n-20	2437	22
802.11-n-20	2462	22
802.11-n-40	2422	22
802.11-n-40	2437	22
802.11-n-40	2452	22

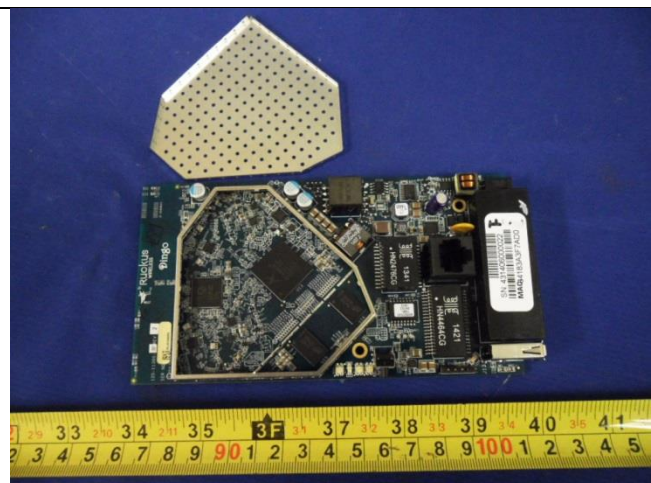
6.3 EUT Photos - External



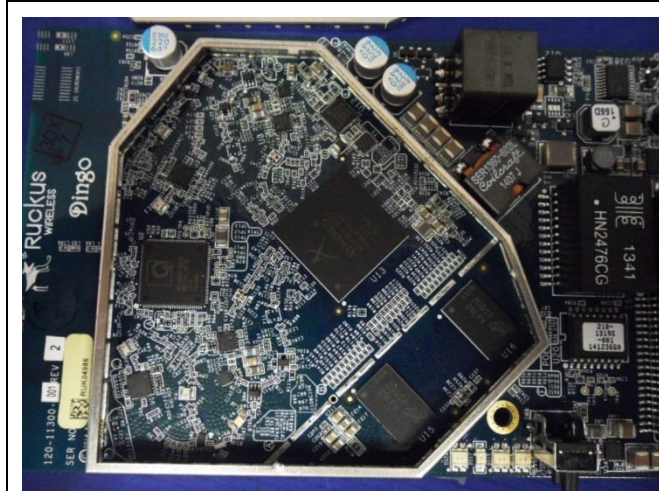
6.4 EUT Photos - Internal



EUT with Shielding Top View



EUT without Shielding Top View



EUT without Shielding Close View



EUT Bottom View

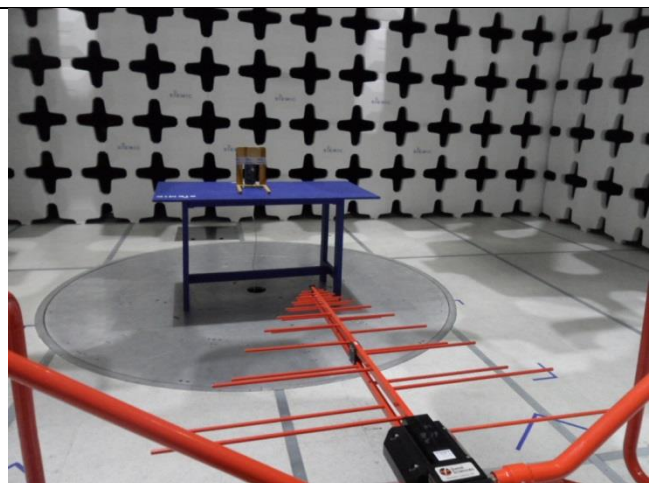
6.5 EUT Test Setup Photos



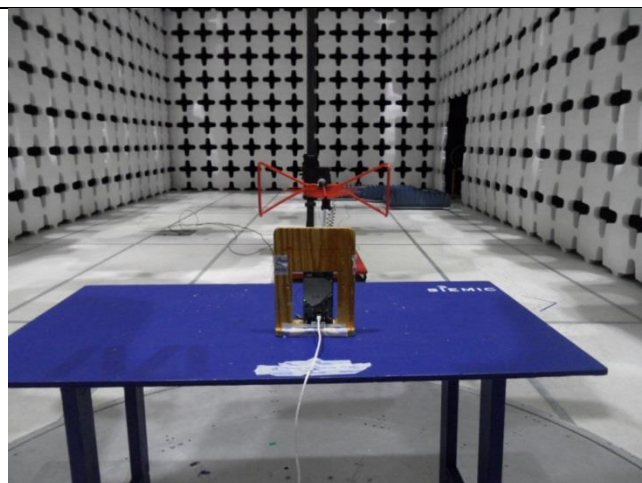
AC Line Conducted Emissions – Front View



AC Line Conducted Emissions – Rear View



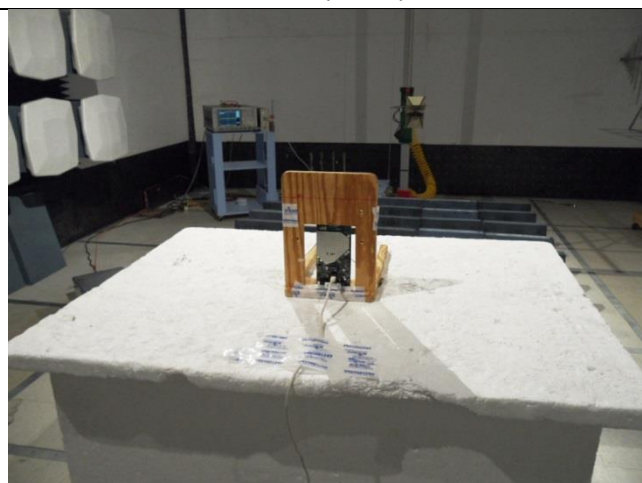
Radiated Emissions (<1GHz) – Front View



Radiated Emissions (<1GHz) – Rear View



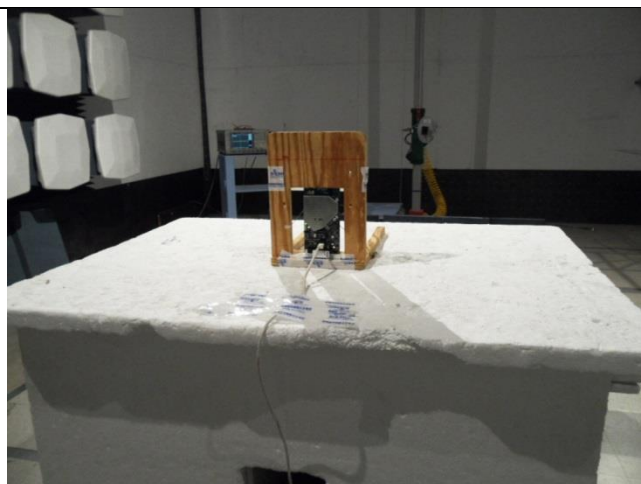
Radiated Emissions (>1GHz) – Front View



Radiated Emissions (>1GHz) – Rear View



Radiated Emissions (>18GHz) – Front View



Radiated Emissions (>18GHz) – Rear View

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	Laptop	S551M	E5NOCX02795518E	ASUS	-
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 modes 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 – 2014 558074 D01 DTS Meas Guidance v03r02	☒ Pass ☐ N/A
AC Conducted Emissions Voltage	FCC	15.207(a)	FCC	ANSI C63.4 – 2014	☒ Pass ☐ N/A

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Channel Separation	FCC	15.247 (a)(1)	FCC	-	☐ Pass ☒ N/A
6 dB Bandwidth	FCC	15.247(a)(2)	FCC	558074 D01 DTS Meas Guidance v03r02	☒ Pass ☐ N/A
Number of Hopping Channels	FCC	15.247(a)(1)	FCC	-	☐ Pass ☒ N/A
Band Edge and Radiated Spurious Emissions	FCC	15.247(d)	FCC	ANSI C63.4 – 2014 558074 D01 DTS Meas Guidance v03r02	☒ Pass ☐ N/A
Time of Occupancy	FCC	15.247(a)(1)	FCC	-	☐ Pass ☒ N/A
Output Power	FCC	15.247(b)	FCC	558074 D01 DTS Meas Guidance v03r02	☒ Pass ☐ N/A
Receiver Spurious Emissions	FCC	15.247(d)	FCC	-	☐ Pass ☒ N/A
Antenna Gain > 6 dBi	FCC	15.247(e)	FCC	-	☐ Pass ☒ N/A
Power Spectral Density	FCC	15.247(e)	FCC	558074 D01 DTS Meas Guidance v03r02	☒ Pass ☐ N/A
Hybrid System Requirement	FCC	15.247(f)	FCC	-	☐ Pass ☒ N/A
Hopping Capability	FCC	15.247(g)	FCC	-	☐ Pass ☒ N/A
Hopping Coordination Requirement	FCC	15.247(h)	FCC	-	☐ Pass ☒ N/A
RF Exposure requirement	FCC	15.247(i)	FCC	-	☐ Pass ☒ 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

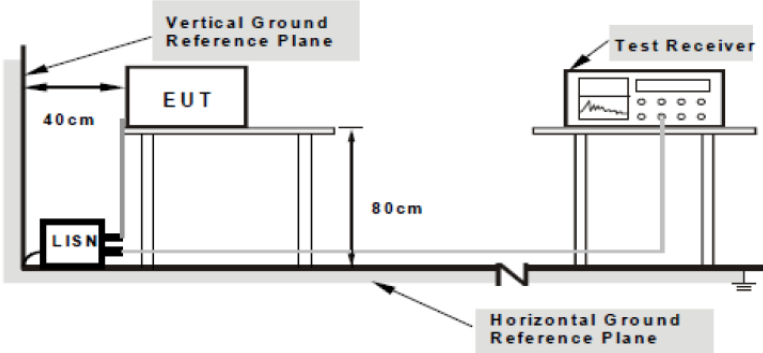
Emissions			
Test Item	Frequency Range	Description	Uncertainty
Band Edge and Radiated Spurious Emissions	30MHz – 1GHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
Band Edge and Radiated Spurious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

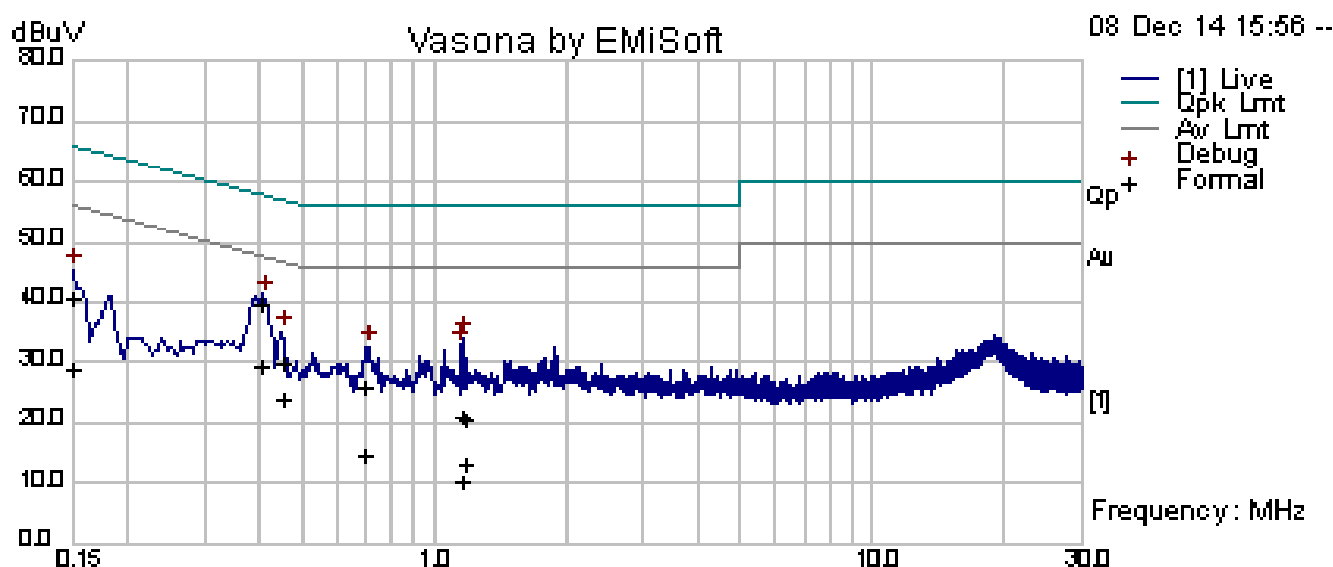
Spec	Item	Requirement	Applicable
47CFR§15.207	a)	For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz,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

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Conducted Emission Test Results

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	21	Result:	☒ Pass ☐ Fail
	Humidity (%):	42		
	Atmospheric(mbar):	1021		
Mains Power:	120Vac, 60Hz			
Tested by:	George Arias			
Test Date:	12/08/2014			
Remarks	Line			

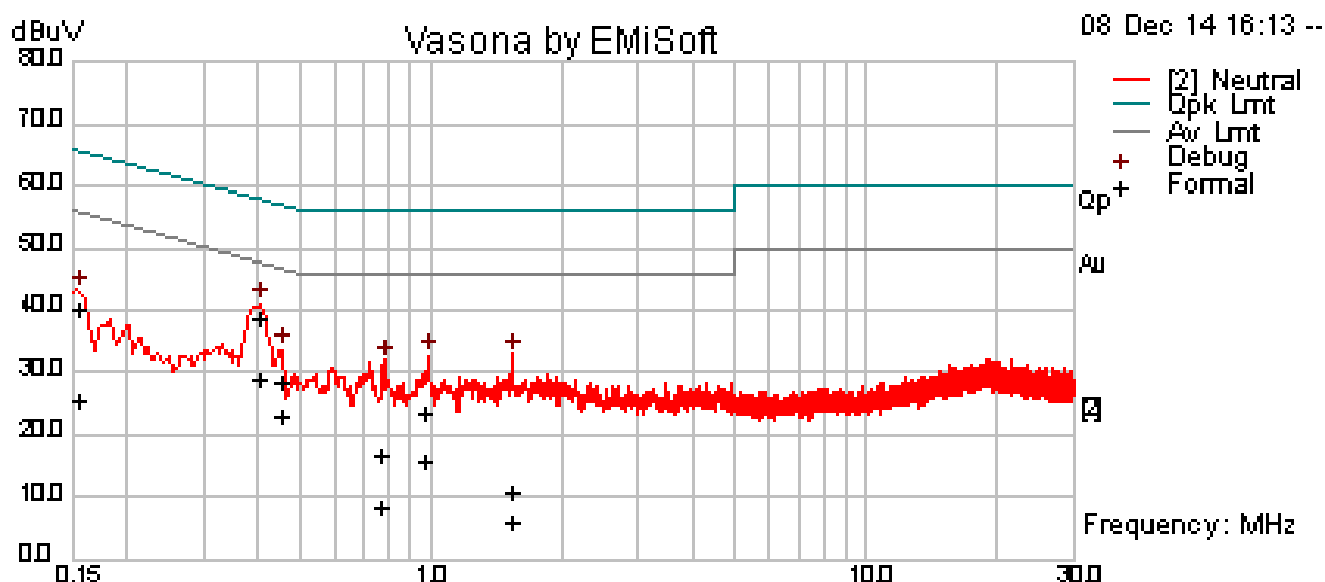


Line Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line	Limit (dBuV)	Margin (dB)	Pass /Fail
0.15	29.77	10.00	0.76	40.53	Quasi Peak	Line	66.00	-25.46	Pass
0.40	28.86	10.01	0.73	39.60	Quasi Peak	Line	57.81	-18.21	Pass
0.45	19.12	10.01	0.73	29.86	Quasi Peak	Line	56.87	-27.01	Pass
0.70	15.06	10.01	0.75	25.83	Quasi Peak	Line	56.00	-30.17	Pass
1.16	10.24	10.02	0.81	21.07	Quasi Peak	Line	56.00	-34.93	Pass
1.17	10.03	10.02	0.81	20.86	Quasi Peak	Line	56.00	-35.14	Pass
0.15	18.00	10.00	0.76	28.76	Average	Line	56.00	-27.24	Pass
0.40	18.93	10.01	0.73	29.66	Average	Line	47.81	-18.14	Pass
0.45	13.07	10.01	0.73	23.81	Average	Line	46.87	-23.07	Pass
0.70	4.17	10.01	0.75	14.93	Average	Line	46.00	-31.07	Pass
1.16	-0.43	10.02	0.81	10.40	Average	Line	46.00	-35.60	Pass
1.17	2.48	10.02	0.81	13.31	Average	Line	46.00	-32.69	Pass

Conducted Emission Test Results

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	21	Result:	☒ Pass ☐ Fail
	Humidity (%):	42		
	Atmospheric(mbar):	1021		
Mains Power:	120Vac, 60Hz			
Tested by:	George Arias			
Test Date:	12/08/2014			
Remarks	Neutral			



Neutral Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line	Limit (dBuV)	Margin (dB)	Pass /Fail
0.15	29.22	10.00	0.76	39.97	Quasi Peak	Neutral	65.78	-25.81	Pass
0.40	28.17	10.01	0.73	38.90	Quasi Peak	Neutral	57.83	-18.92	Pass
0.45	17.74	10.01	0.73	28.48	Quasi Peak	Neutral	56.84	-28.36	Pass
0.77	5.94	10.01	0.76	16.71	Quasi Peak	Neutral	56.00	-39.29	Pass
0.97	12.90	10.02	0.78	23.70	Quasi Peak	Neutral	56.00	-32.30	Pass
1.53	0.02	10.02	0.88	10.92	Quasi Peak	Neutral	56.00	-45.08	Pass
0.15	14.59	10.00	0.76	25.35	Average	Neutral	55.78	-30.43	Pass
0.40	18.43	10.01	0.73	29.16	Average	Neutral	47.83	-18.66	Pass
0.45	12.11	10.01	0.73	22.85	Average	Neutral	46.84	-23.99	Pass
0.77	-2.41	10.01	0.76	8.36	Average	Neutral	46.00	-37.64	Pass
0.97	5.16	10.02	0.78	15.95	Average	Neutral	46.00	-30.05	Pass
1.53	-4.84	10.02	0.88	6.06	Average	Neutral	46.00	-39.94	Pass

10.2 6dB Bandwidth

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) ≥ 3 x 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	11/19/2014	Environmental Condition	Temperature 23°C Relative Humidity 40% 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	-

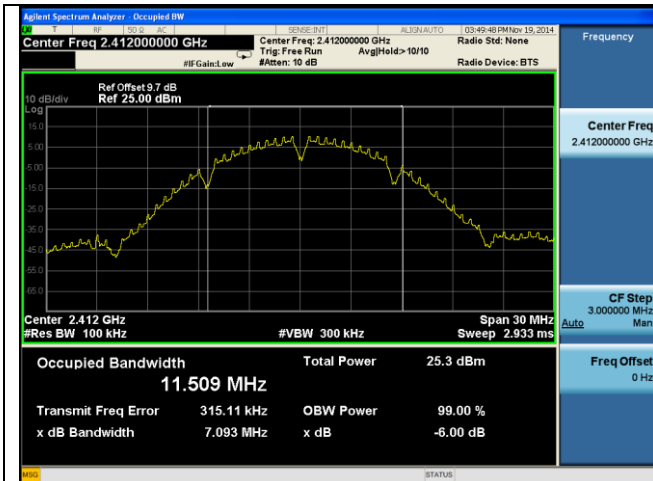
Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes ☐ N/A

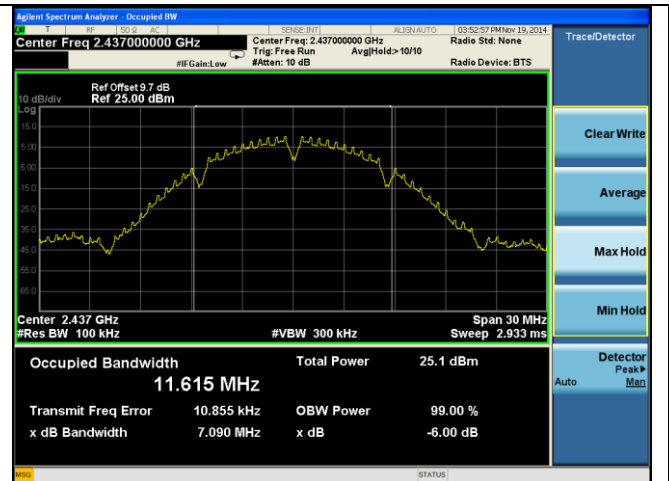
6dB Bandwidth Measurement Results

Type	Test mode	Freq (MHz)	CH	Result (MHz)	Limit (MHz)	Result
6dB BW	802.11b	2412	Low	7.093	≥0.5	Pass
6dB BW	802.11b	2437	Mid	7.090	≥0.5	Pass
6dB BW	802.11b	2462	High	7.095	≥0.5	Pass
6dB BW	802.11g	2412	Low	16.500	≥0.5	Pass
6dB BW	802.11g	2437	Mid	16.520	≥0.5	Pass
6dB BW	802.11g	2462	High	16.530	≥0.5	Pass
6dB BW	802.11n-20M	2412	Low	17.750	≥0.5	Pass
6dB BW	802.11n-20M	2437	Mid	17.790	≥0.5	Pass
6dB BW	802.11n-20M	2462	High	17.740	≥0.5	Pass
6dB BW	802.11n-40M	2422	Low	36.470	≥0.5	Pass
6dB BW	802.11n-40M	2437	Mid	36.490	≥0.5	Pass
6dB BW	802.11n-40M	2452	High	36.230	≥0.5	Pass

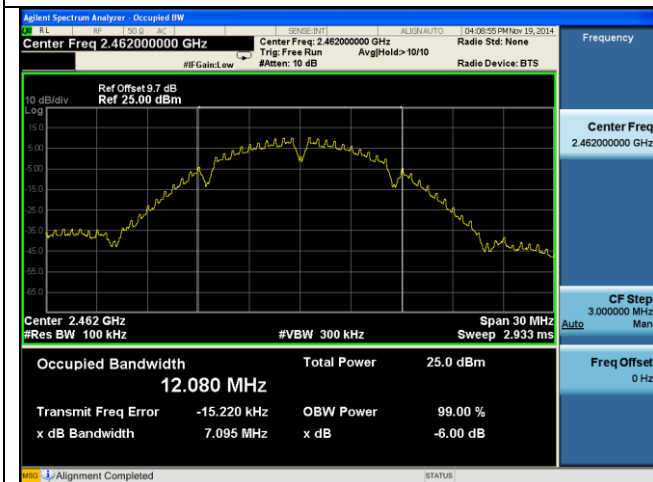
6dB Bandwidth Test Plots



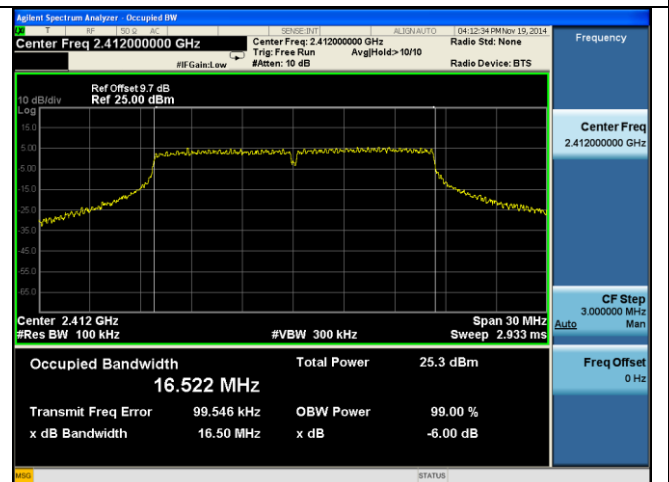
6dB BW - 2.4G 802.11b 2412MHz



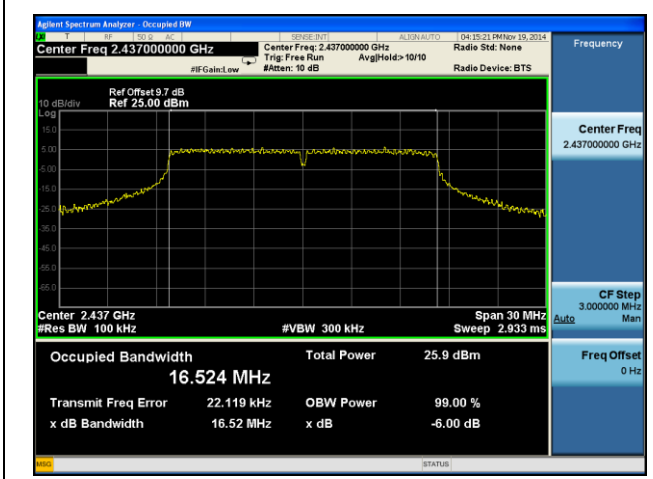
6dB BW - 2.4G 802.11b 2437MHz



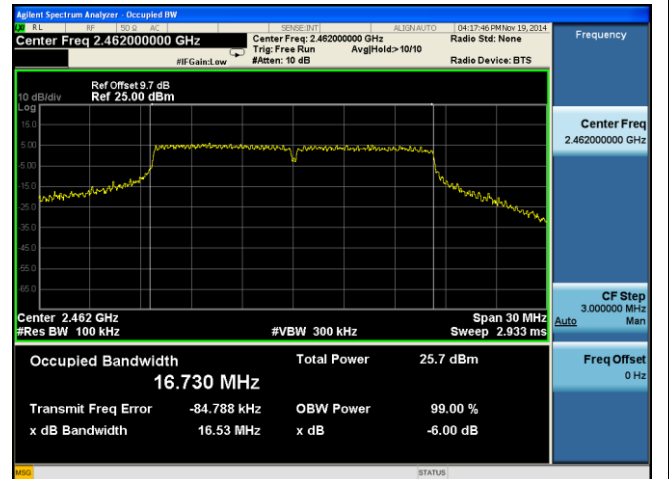
6dB BW - 2.4G 802.11b 2462MHz



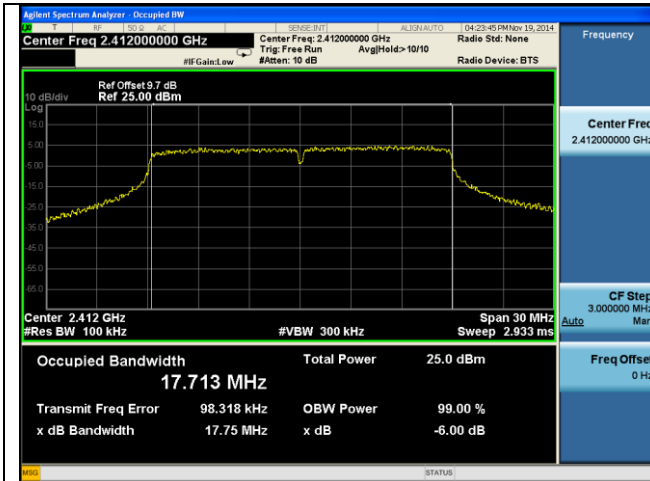
6dB BW - 2.4G 802.11g 2412MHz



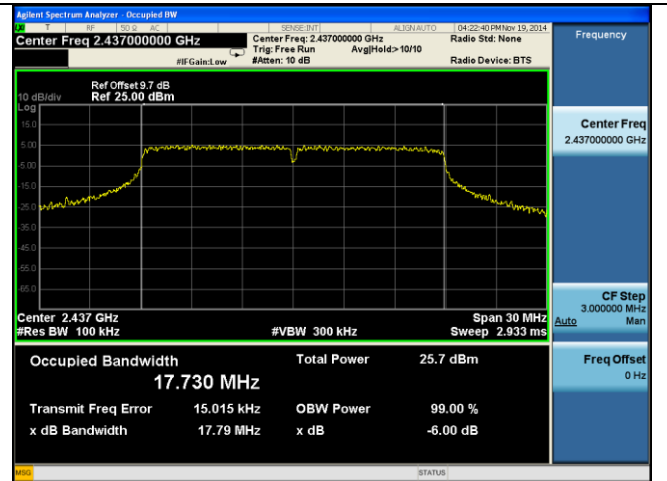
6dB BW - 2.4G 802.11g 2437MHz



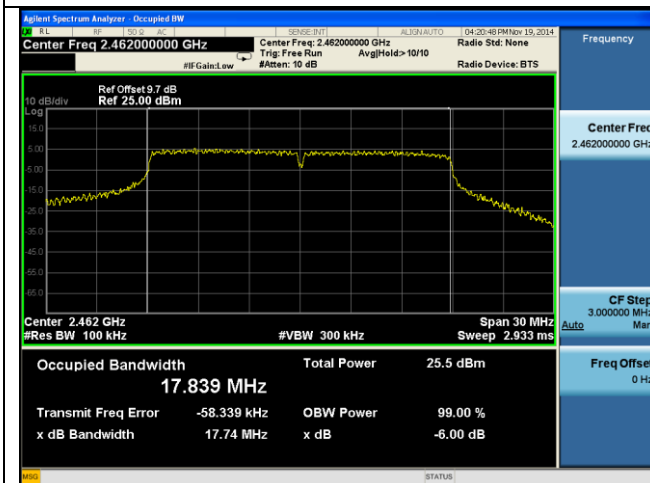
6dB BW - 2.4G 802.11g 2462MHz



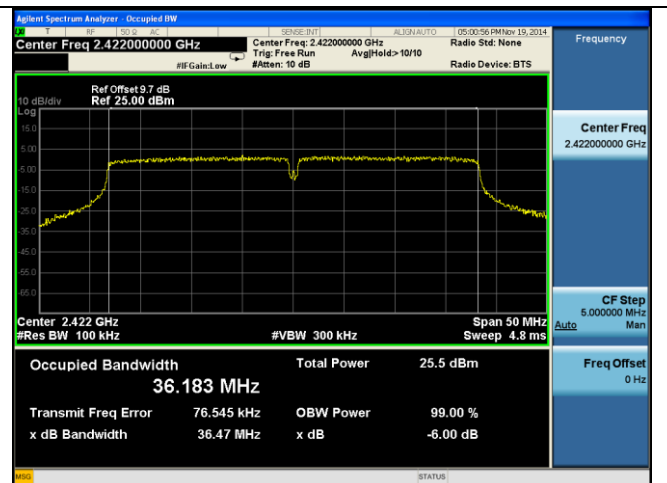
6dB BW - 2.4G 802.11n-20 2412MHz



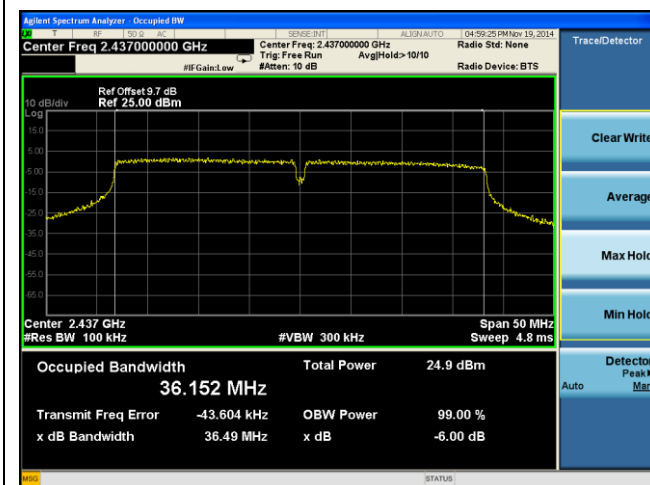
6dB BW - 2.4G 802.11n-20 2437MHz



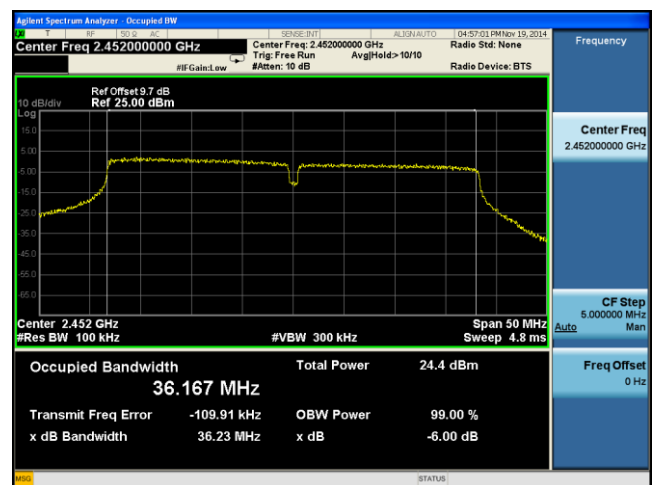
6dB BW - 2.4G 802.11n-20 2462MHz



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



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



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

10.3 Peak Output Power

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	558074 D01 DTS Meas Guidance v03r02 <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	11/22/2014	Environmental condition	Temperature 21°C Relative Humidity 40% Atmospheric Pressure 1019mbar
Remark			
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Output Power Measurement Results

Type	Test mode	Freq (MHz)	CH	Conducted Power (dBm)			Limit (dBm)	Result
				Chain 0	Chain1	Combined Power		
Output power	802.11b	2412	Low	17.20	16.40	19.83	30	Pass
Output power	802.11b	2437	Mid	17.20	17.20	20.21	30	Pass
Output power	802.11b	2462	High	16.40	16.50	19.46	30	Pass
Output power	802.11g	2412	Low	16.80	16.40	19.61	30	Pass
Output power	802.11g	2437	Mid	17.00	17.00	20.01	30	Pass
Output power	802.11g	2462	High	16.20	16.60	19.41	30	Pass
Output power	802.11n-20M	2412	Low	16.70	16.30	19.51	30	Pass
Output power	802.11n-20M	2437	Mid	17.30	17.50	20.41	30	Pass
Output power	802.11n-20M	2462	High	16.10	16.40	19.26	30	Pass
Output power	802.11n-40M	2422	Low	16.60	16.40	19.51	30	Pass
Output power	802.11n-40M	2437	Mid	16.10	16.10	19.11	30	Pass
Output power	802.11n-40M	2452	High	15.70	16.10	18.91	30	Pass

10.4 Peak Spectral Density

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247(e)	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 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: $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$. - 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	11/21/2014	Environmental condition	Temperature 24°C Relative Humidity 43% Atmospheric Pressure 1020mbar
Remark	-		
Result	☒ Pass ☐ Fail		

Equipment Setting

Test	RBW	VBW	Span	Detector	Sweep	Trace	Notes
PSD	100KHz	$\geq 3 \times \text{RBW}$	1.5x DTS BW	RMS	Auto	Trace average	-

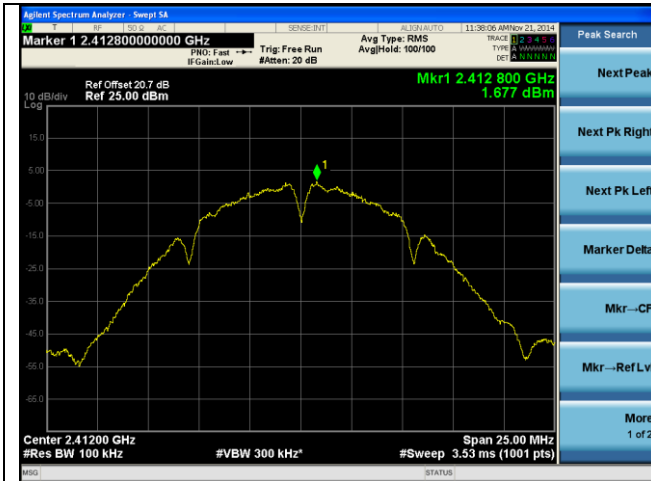
Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

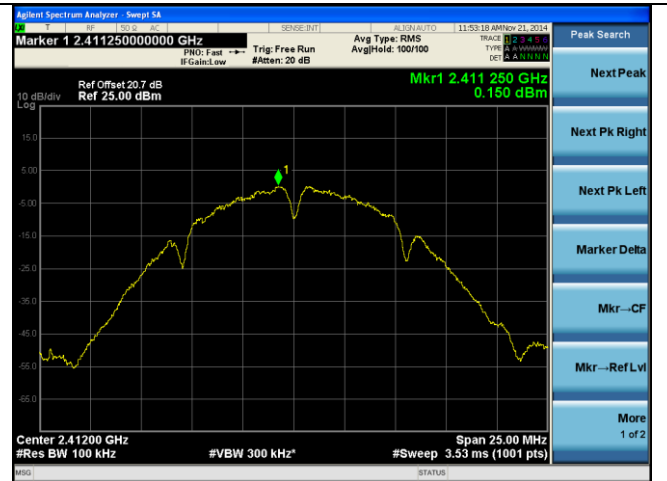
PSD Measurement Results

Type	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/100KHz)			Limit (dBm/3KHz)	Result
				Chain0	Chain1	Combined PSD		
PSD	802.11b	2412	Low	1.677	0.150	3.991	≤8	Pass
PSD	802.11b	2437	Mid	1.456	1.404	4.440	≤8	Pass
PSD	802.11b	2462	High	0.424	0.608	3.527	≤8	Pass
PSD	802.11g	2412	Low	-3.362	-3.405	-0.373	≤8	Pass
PSD	802.11g	2437	Mid	-2.787	-2.826	0.204	≤8	Pass
PSD	802.11g	2462	High	-3.088	-2.364	0.299	≤8	Pass
PSD	802.11n-20M	2412	Low	-3.228	-3.857	-0.521	≤8	Pass
PSD	802.11n-20M	2437	Mid	-2.824	-2.295	0.459	≤8	Pass
PSD	802.11n-20M	2462	High	-3.559	-3.200	-0.365	≤8	Pass
PSD	802.11n-40M	2422	Low	-7.010	-7.111	-4.050	≤8	Pass
PSD	802.11n-40M	2437	Mid	-6.505	-6.744	-3.613	≤8	Pass
PSD	802.11n-40M	2452	High	-6.285	-5.894	-3.075	≤8	Pass

Test Plots



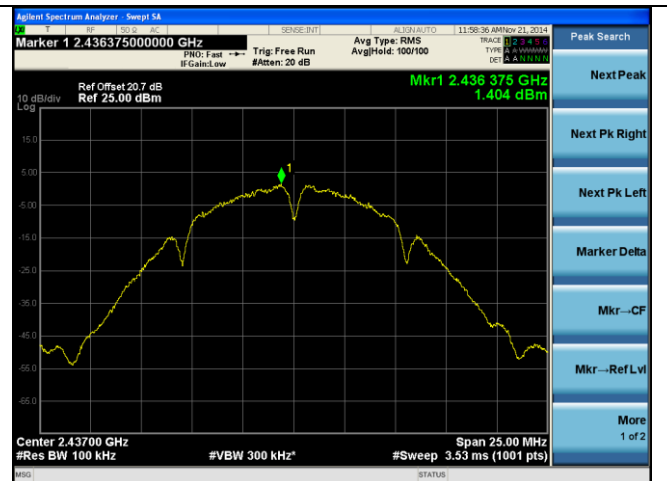
PSD-2.4G-802.11b Low-chain0



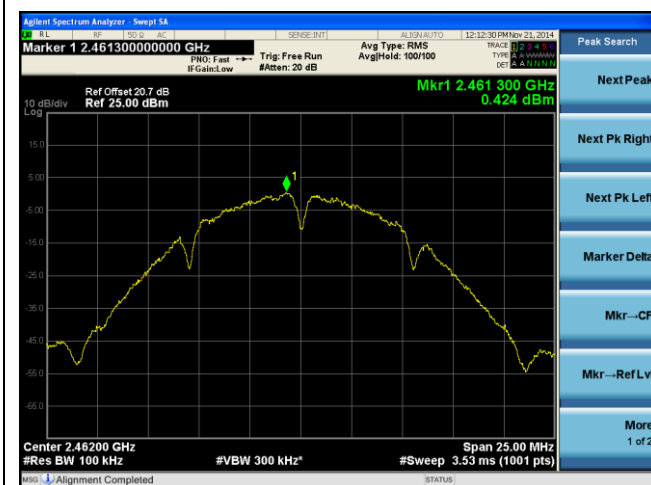
PSD-2.4G-802.11b Low-chain1



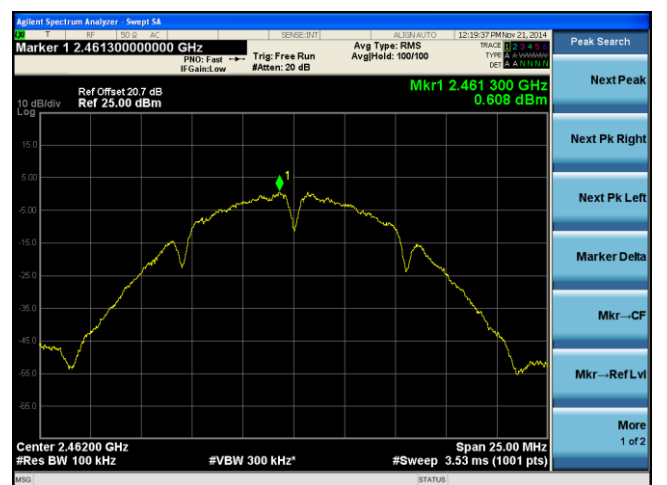
PSD-2.4G-802.11b Mid-chain0



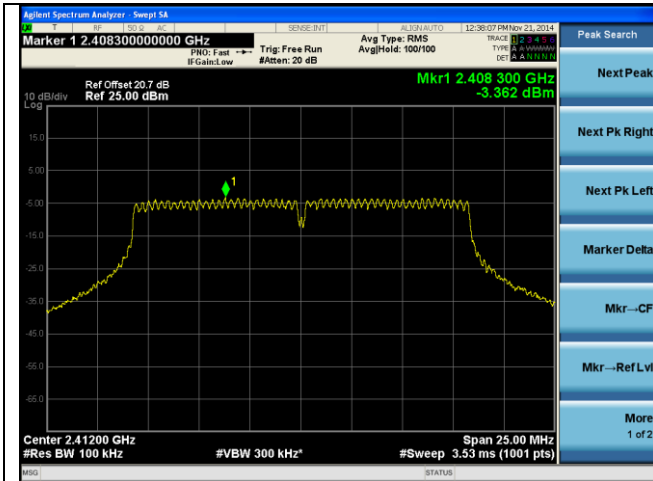
PSD-2.4G-802.11b Mid-chain1



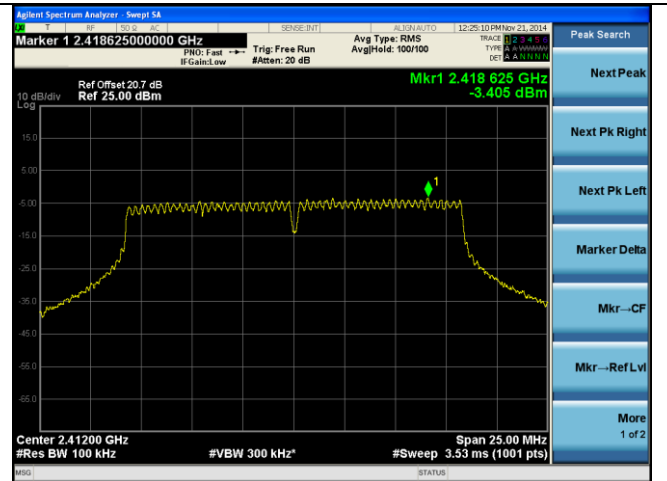
PSD-2.4G-802.11b High-chain0



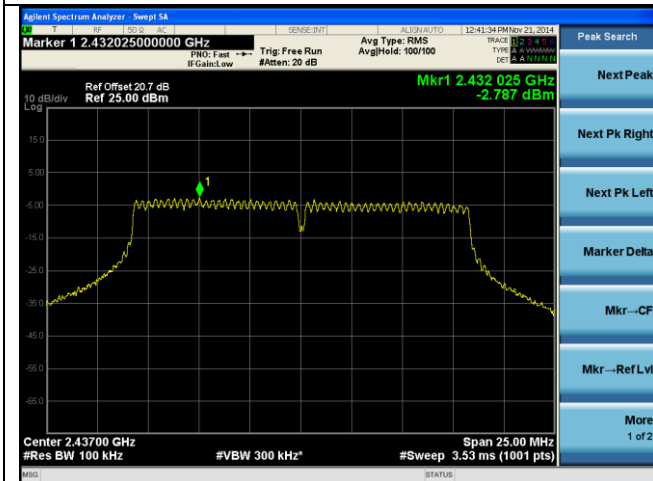
PSD-2.4G-802.11b High-chain1



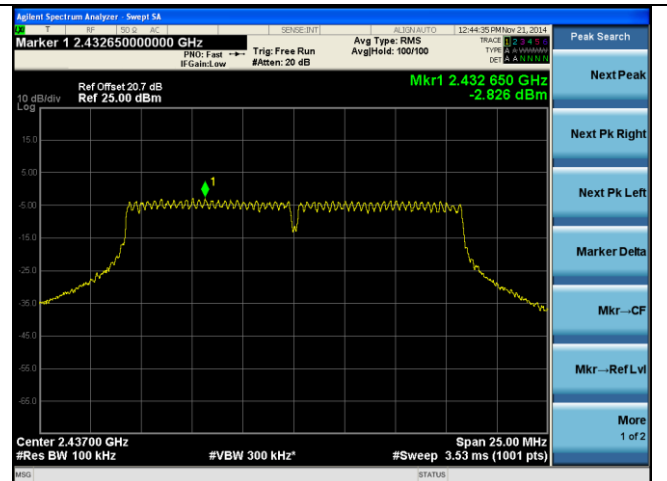
PSD-2.4G-802.11g Low-chain0



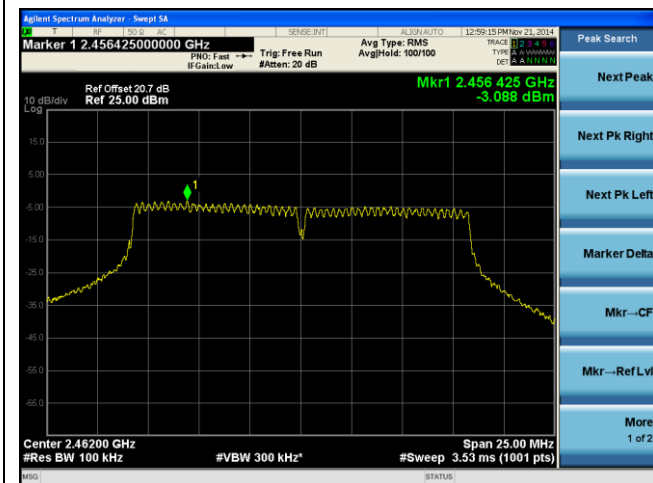
PSD-2.4G-802.11g Low-chain1



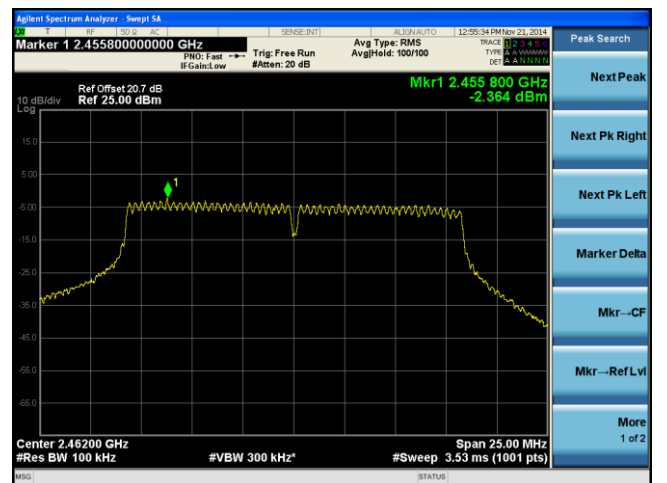
PSD-2.4G-802.11g Mid-chain0



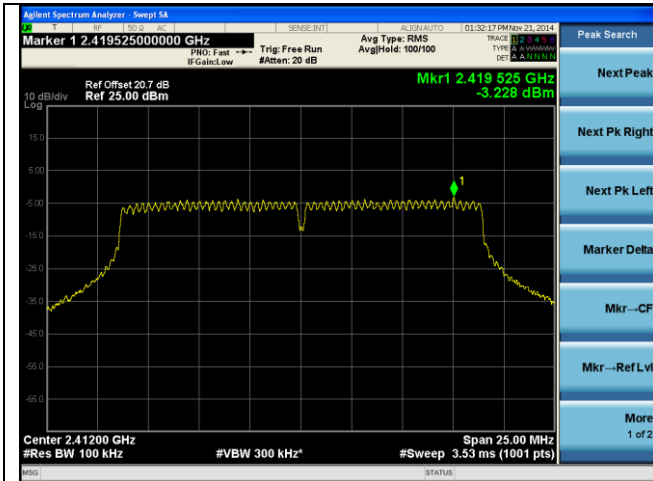
PSD-2.4G-802.11g Mid-chain1



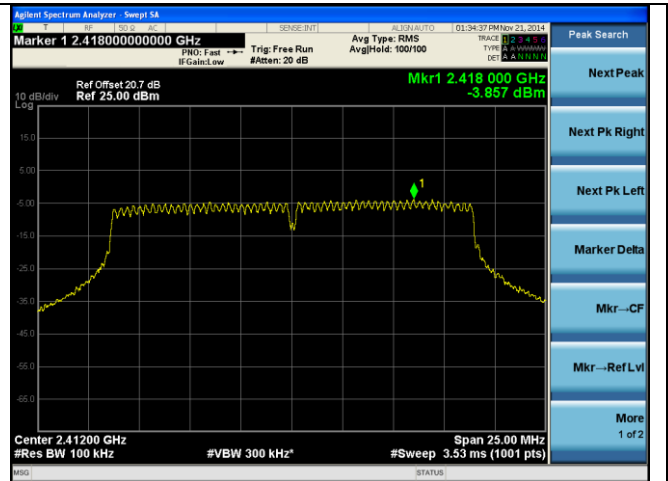
PSD-2.4G-802.11g High-chain0



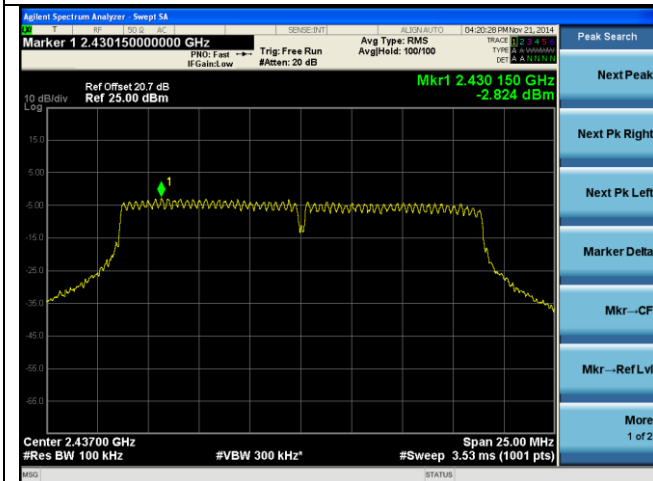
PSD-2.4G-802.11g High-chain1



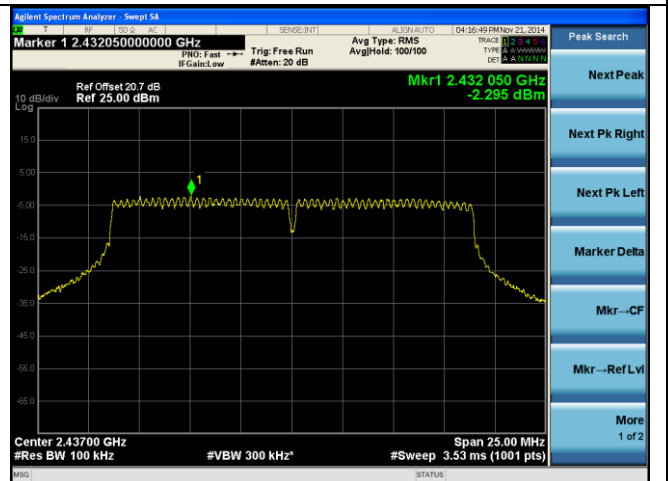
PSD-2.4G-802.11n-20M Low-chain0



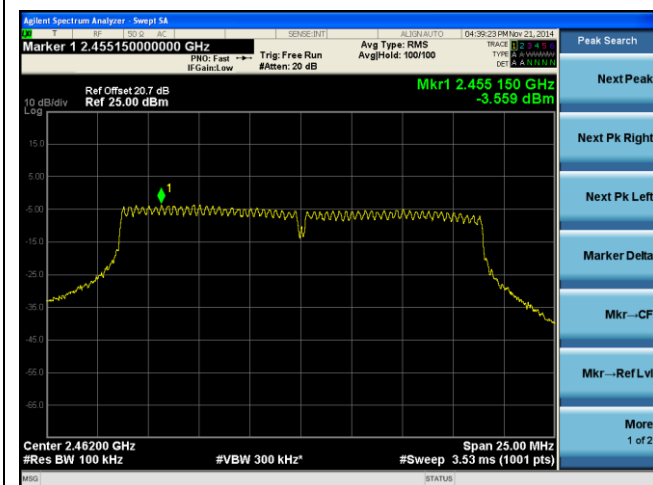
PSD-2.4G-802.11n-20M Low-chain1



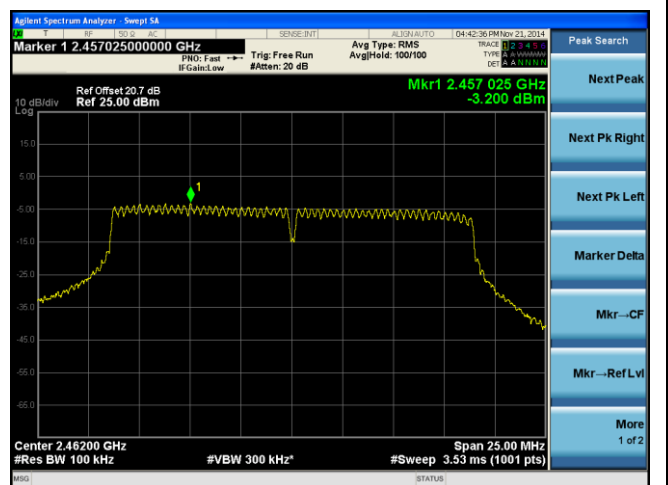
PSD-2.4G-802.11n-20M Mid-chain0



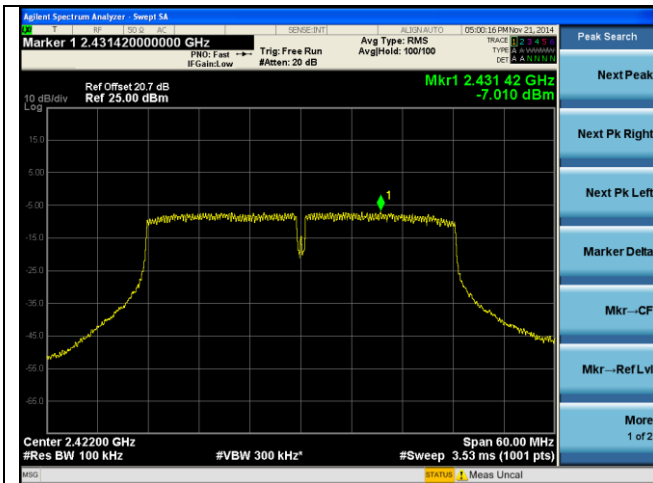
PSD-2.4G-802.11n-20M Mid-chain1



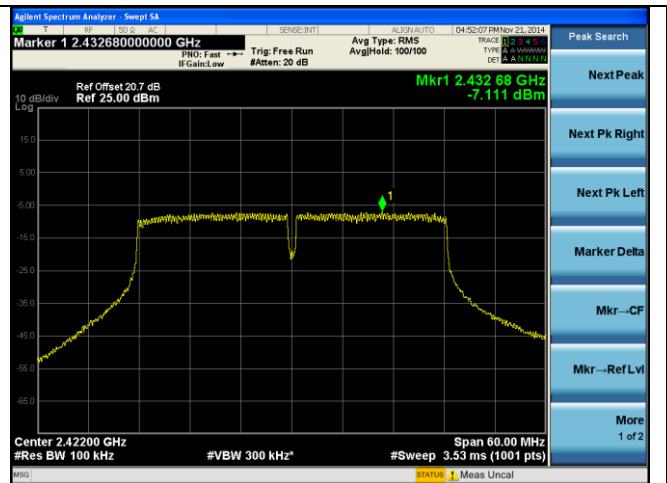
PSD-2.4G-802.11n-20M High-chain0



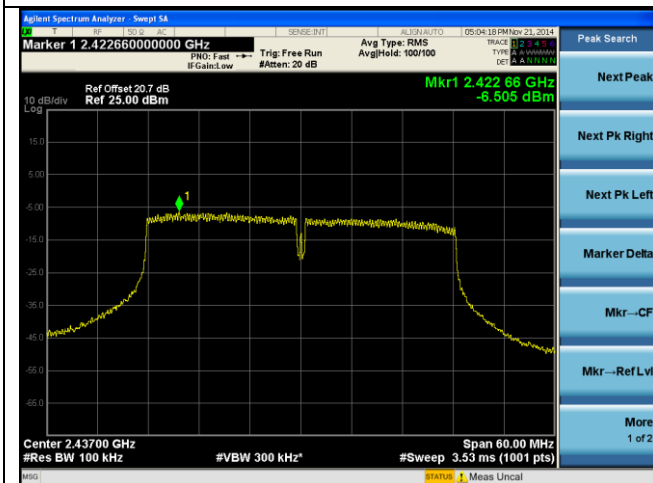
PSD-2.4G-802.11n-20M High-chain1



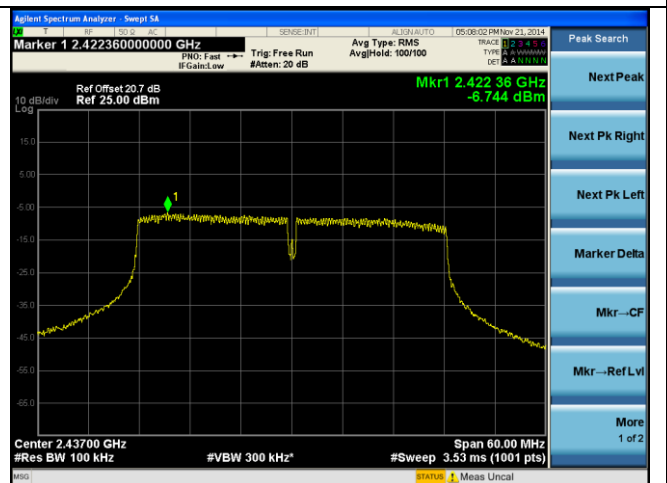
PSD-2.4G-802.11n-40M Low-chain0



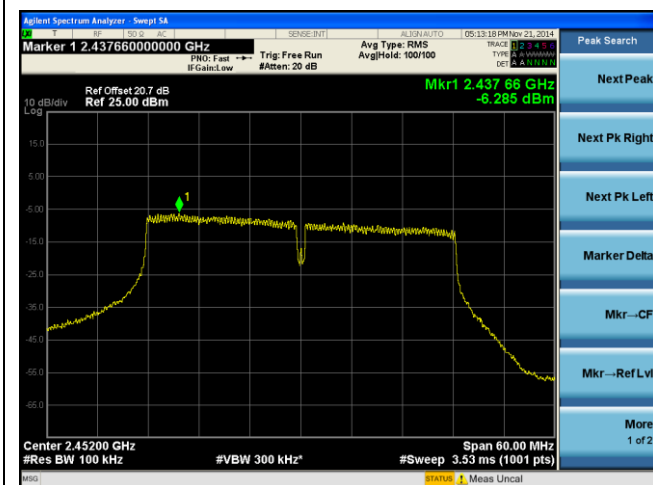
PSD-2.4G-802.11n-40M Low-chain1



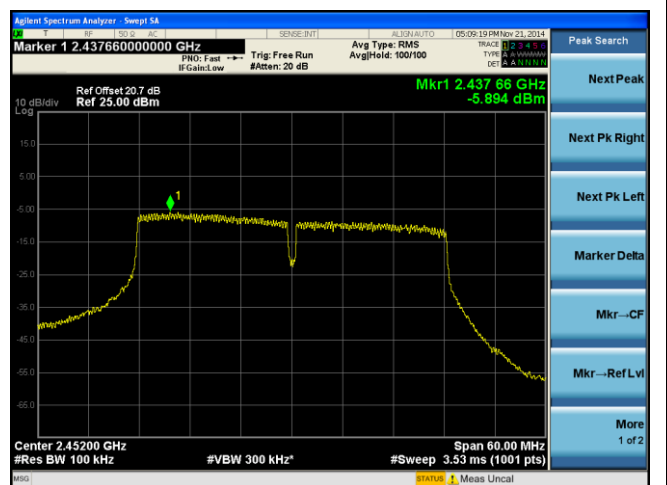
PSD-2.4G-802.11n-40M Mid-chain0



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



PSD-2.4G-802.11n-40M High-chain0



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

10.5 Conducted Spurious Emissions

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247	-	Restricted band, emission must also comply with the radiated emission limits specified in 15.209	☒
Test Setup			
Procedure	558074 D01 DTS Meas Guidance v03r02 <u>Conducted Spurious Emissions measurement procedure for restricted band</u> - Measure the conducted output power (in dBm) using the detector specified - Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level - Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz). - For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW). - Convert the resultant EIRP level to an equivalent electric field strength using the following relationship: $E = \text{EIRP} - 20 \log D + 104.8$ where: E = electric field strength in dBμV/m, EIRP = equivalent isotropic radiated power in dBm D = specified measurement distance in meters. f) Compare the resultant electric field strength level to the applicable limit.		
Test Date	12/17/2014	Environmental condition	Temperature 21°C Relative Humidity 45% Atmospheric Pressure 1020mbar
Remark	Per KDB 662911 D01 Multiple Transmitter Output v02r01, c), the measurement trace result on each plot has been added with 10 log(NANT) dB, where NANT is the number of outputs, to account for the summing of power due to MIMO mode.		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

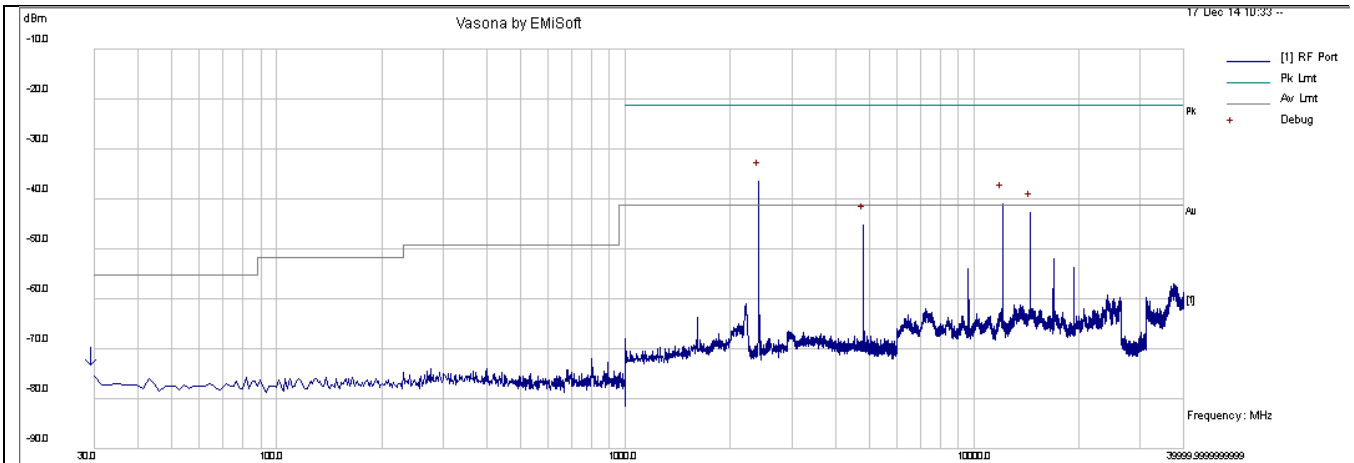
Conducted Spurious Emission Measurement Results

Test Mode	Chain	Frequency (MHz)	Level (dBm)	Measurement Type	Limit (dBm)	Margin (dB)	Pass /Fail
802.11b Low Channel	Chain 0	12057.17	-41.00	Peak	-21.23	-19.77	Pass
		12057.17	-48.67	Average	-41.23	-7.44	Pass
	Chain 1	12057.13	-38.10	Peak	-21.23	-16.87	Pass
		12057.13	-48.67	Average	-41.23	-7.44	Pass
802.11b Mid Channel	Chain 0	14621.73	-39.00	Peak	-21.23	-17.77	Pass
		14621.73	-45.34	Average	-41.23	-4.11	Pass
	Chain 1	12181.19	-39.1	Peak	-21.23	-17.87	Pass
		14621.73	-36.6	Peak	-21.23	-15.37	Pass
		12181.19	-47.67	Average	-41.23	-6.44	Pass
		14621.73	-42.17	Average	-41.23	-0.94	Pass
802.11b High Channel	Chain 0	9834.78	-38.50	Peak	-21.23	-17.27	Pass
		14773.14	-35.30	Peak	-21.23	-14.07	Pass
		9834.78	-45.41	Average	-41.23	-4.18	Pass
		14773.14	-41.33	Average	-41.23	-0.10	Pass
	Chain 1	9841.49	-35.30	Peak	-21.23	-14.07	Pass
		12773.14	-40.50	Peak	-21.23	-19.27	Pass
		14773.14	-39.10	Peak	-21.23	-17.87	Pass
		9841.49	-48.17	Average	-41.23	-6.94	Pass
		12773.14	-45.42	Average	-41.23	-4.19	Pass
		14773.14	-41.30	Average	-41.23	-0.07	Pass

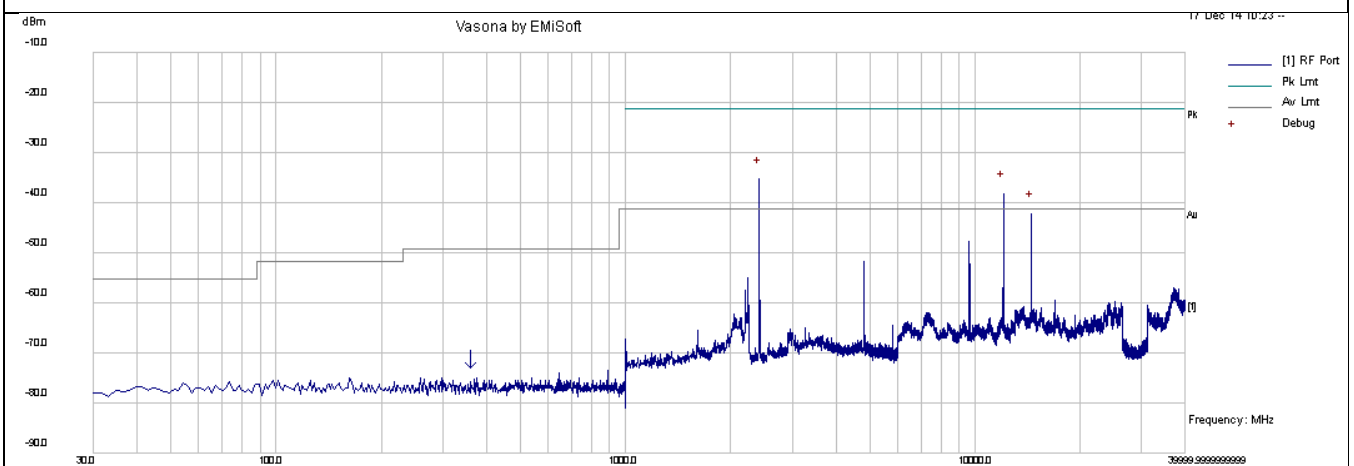
Test Mode	Chain	Frequency (MHz)	Level (dBm)	Measurement Type	Limit (dBm)	Margin (dB)	Pass /Fail
802.11g Low Channel	Chain 0	12072.01	-35.30	Peak	-21.23	-14.07	Pass
		12072.01	-52.33	Average	-41.23	-11.10	Pass
	Chain 1	12037.28	-21.23	Peak	-21.23	-14.07	Pass
		12037.28	-41.23	Average	-41.23	-8.94	Pass
802.11g Mid Channel	Chain 0	14638.19	-40.30	Peak	-21.23	-19.07	Pass
		14638.19	-55.67	Average	-41.23	-14.44	Pass
	Chain 1	12186.15	-36.30	Peak	-21.23	-15.07	Pass
		14628.46	-39.30	Peak	-21.23	-18.07	Pass
		12186.15	-52.50	Average	-41.23	-11.27	Pass
		14628.46	-53.17	Average	-41.23	-11.94	Pass
802.11g High Channel	Chain 0	14752.95	-37.50	Peak	-21.23	-16.27	Pass
		12305.25	-41.00	Peak	-21.23	-19.77	Pass
		9834.78	-41.00	Peak	-21.23	-19.77	Pass
		14752.95	-51.67	Average	-41.23	-10.44	Pass
		12305.25	-55.83	Average	-41.23	-14.60	Pass
		9834.78	-51.33	Average	-41.23	-10.10	Pass
	Chain 1	9848.12	-35.30	Peak	-21.23	-14.07	Pass
		12310.21	-38.10	Peak	-21.23	-16.87	Pass
		14749.58	-40.50	Peak	-21.23	-19.27	Pass
		9848.12	-54.17	Average	-41.23	-12.94	Pass
	Chain 1	12310.21	-52.67	Average	-41.23	-11.44	Pass
		14749.58	-55.33	Average	-41.23	-14.10	Pass

Test Mode	Chain	Frequency (MHz)	Level (dBm)	Measurement Type	Limit (dBm)	Margin (dB)	Pass /Fail
802.11n-20M Low Channel	Chain 0	12072.01	-35.30	Peak	-21.23	-14.07	Pass
		12072.01	-52.17	Average	-41.23	-10.94	Pass
	Chain 1	12047.20	-35.30	Peak	-21.23	-14.07	Pass
		12047.20	-50.50	Average	-41.23	-9.27	Pass
802.11n-20M Mid Channel	Chain 0	146335.19	-42.00	Peak	-21.23	-20.77	Pass
		146335.19	-56.33	Average	-41.23	-15.10	Pass
	Chain 1	12161.34	-37.50	Peak	-21.23	-16.27	Pass
		14634.82	-40.60	Peak	-21.23	-19.37	Pass
		12161.34	-53.00	Average	-41.23	-11.77	Pass
		14634.82	-53.50	Average	-41.23	-12.27	Pass
802.11n-20M High Channel	Chain 0	147559.68	-38.60	Peak	-21.23	-17.37	Pass
		147559.68	-52.50	Average	-41.23	-11.27	Pass
	Chain 1	9854.90	-35.30	Peak	-21.23	-14.07	Pass
		12295.33	-39.50	Peak	-21.23	-18.27	Pass
		9854.90	-44.50	Average	-41.23	-3.27	Pass
		12295.33	-53.00	Average	-41.23	-11.77	Pass

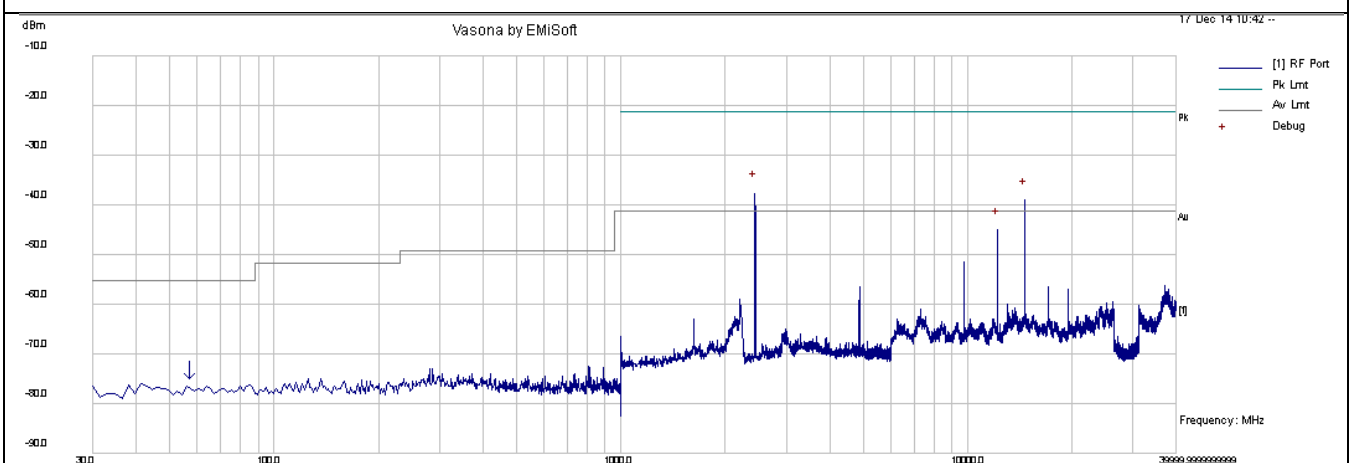
Test Mode	Chain	Frequency (MHz)	Level (dBm)	Measurement Type	Limit (dBm)	Margin (dB)	Pass /Fail
802.11n-40M Low Channel	Chain 0	-	-	Peak	-21.23	-	Pass
		-	-	Average	-41.23	-	Pass
	Chain 1	12151.41	-38.5	Peak	-21.23	-17.27	Pass
		12151.41	-51.83	Average	-41.23	-10.6	Pass
802.11n-40M Mid Channel	Chain 0	14675.56	-40.50	Peak	-21.23	-19.27	Pass
		14675.56	-56.50	Average	-41.23	-15.27	Pass
	Chain 1	9794.56	-38.30	Peak	-21.23	-17.07	Pass
		14682.29	-39.80	Peak	-21.23	-18.57	Pass
		9794.56	-49.33	Average	-41.23	-8.10	Pass
		14682.29	-53.00	Average	-41.23	-11.77	Pass
802.11n-40M High Channel	Chain 0	-	-	Peak	-21.23	-	Pass
		-	-	Average	-41.23	-	Pass
	Chain 1	9834.78	-35.30	Peak	-21.23	-14.07	Pass
		9834.78	-46.00	Average	-41.23	-4.77	Pass



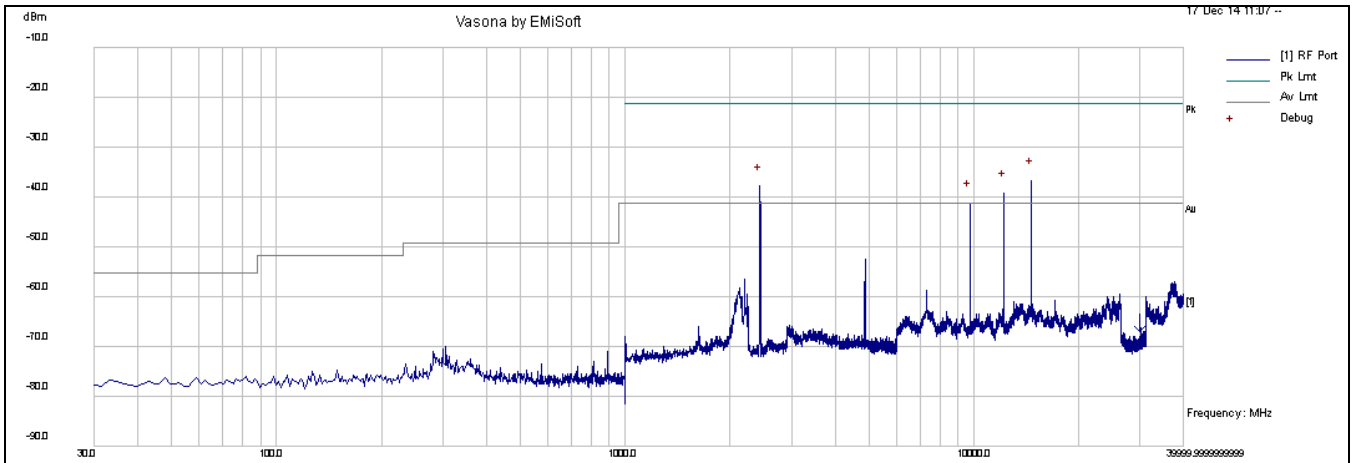
CSE - 2.4G-802.11b Low-chain0



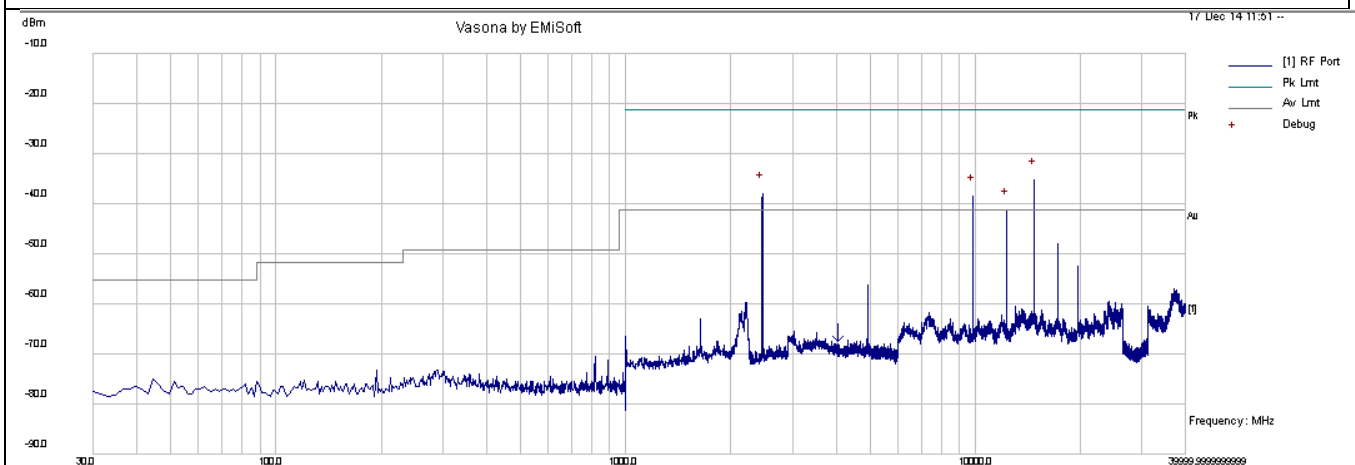
CSE - 2.4G-802.11b Low-chain1



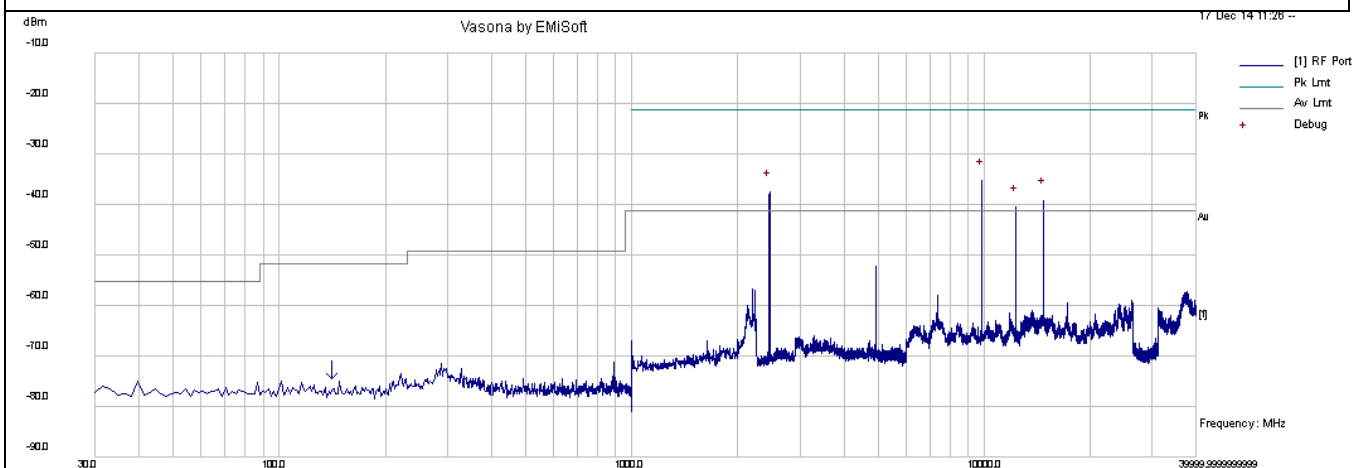
CSE - 2.4G-802.11b Mid-chain0



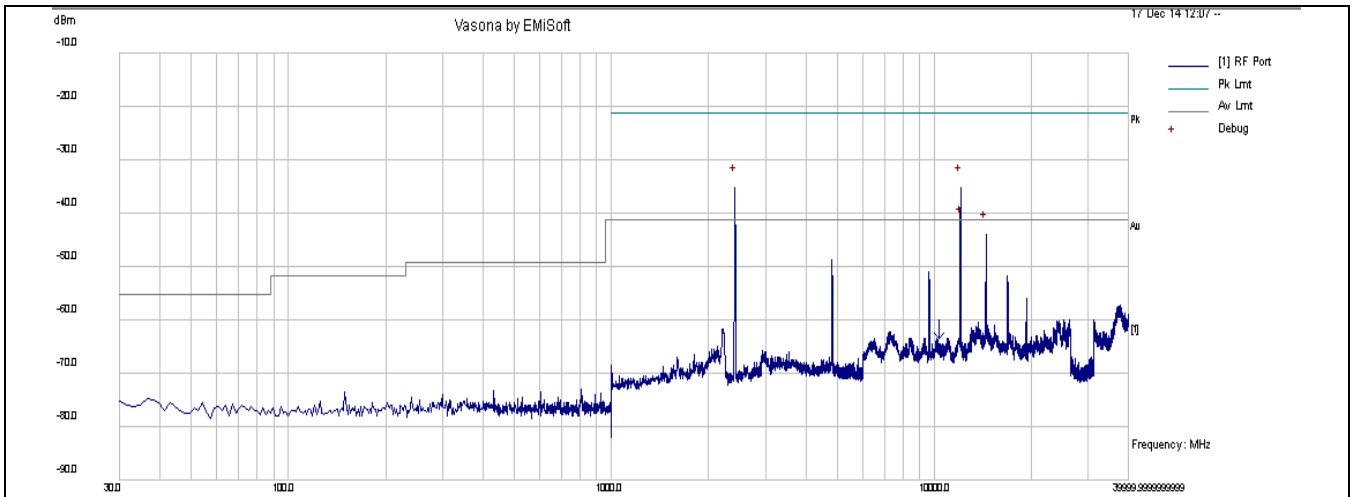
CSE - 2.4G-802.11b Mid-chain1



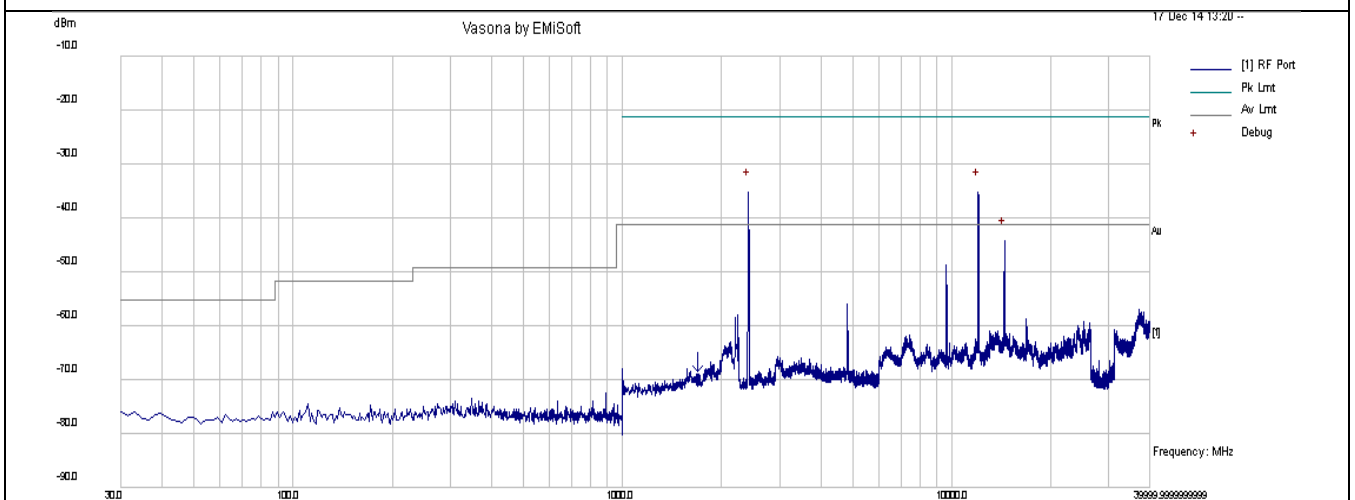
CSE - 2.4G-802.11b High-chain0



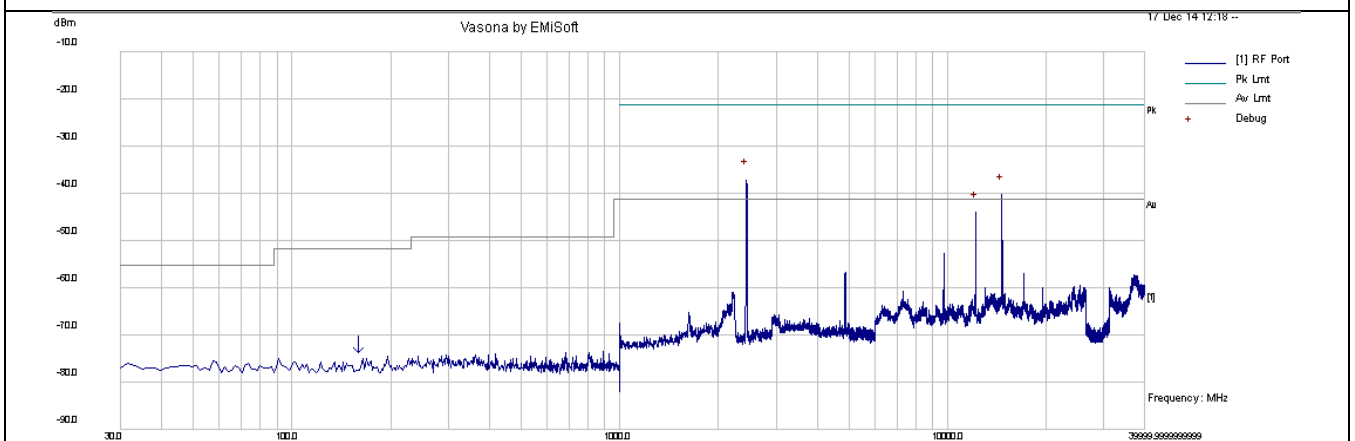
CSE - 2.4G-802.11b High-chain1



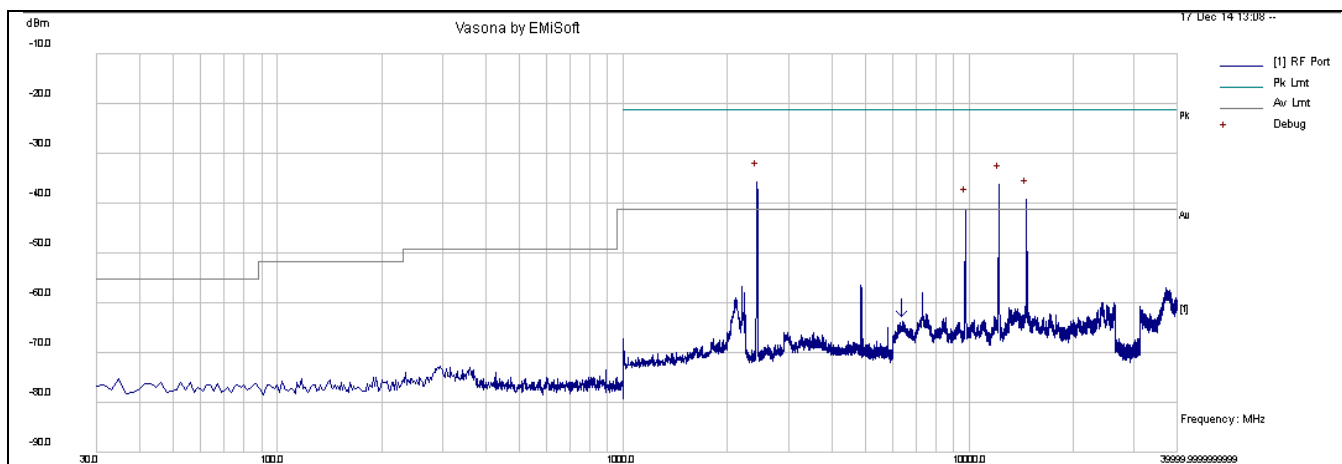
CSE - 2.4G-802.11g Low-chain0



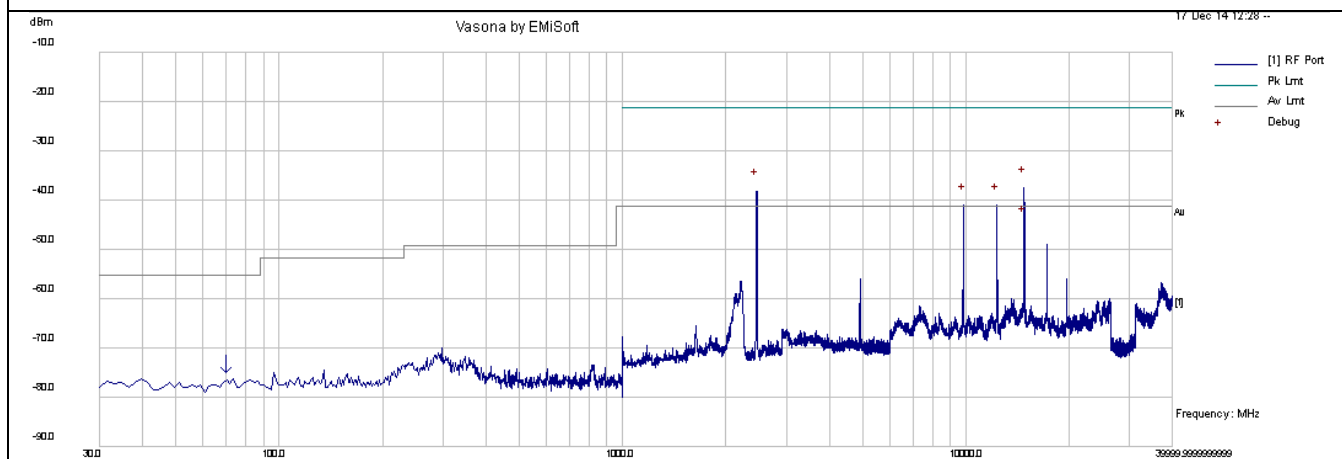
CSE - 2.4G-802.11g Low-chain1



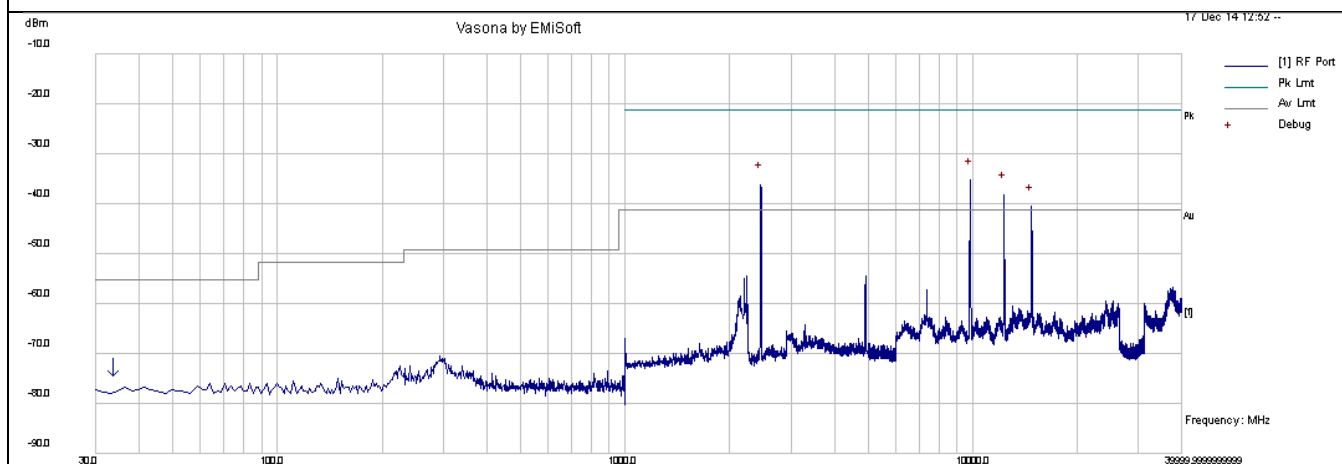
CSE - 2.4G-802.11g Mid-chain0



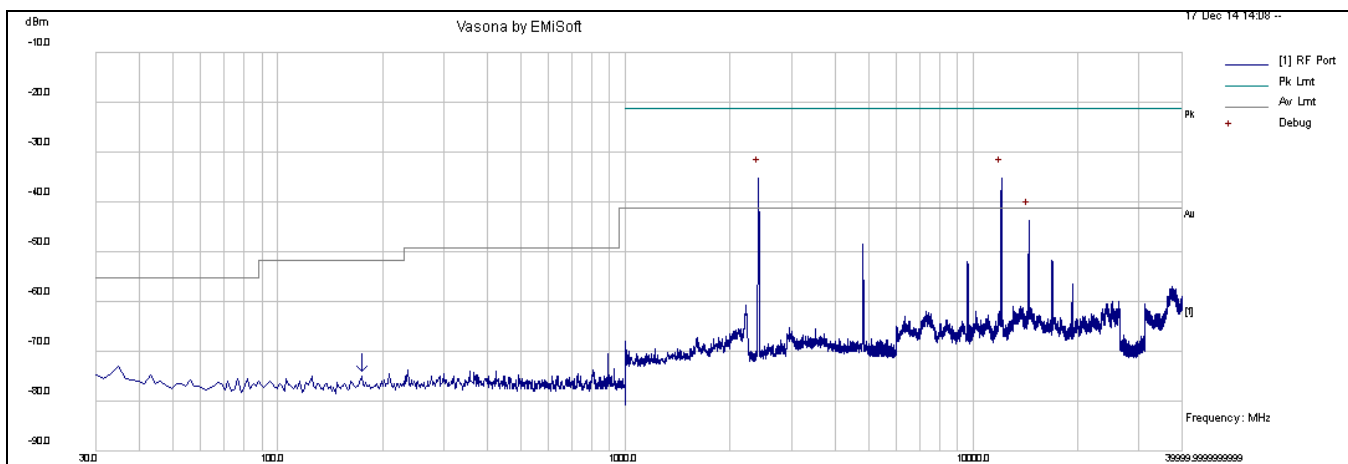
CSE - 2.4G-802.11g Mid-chain1



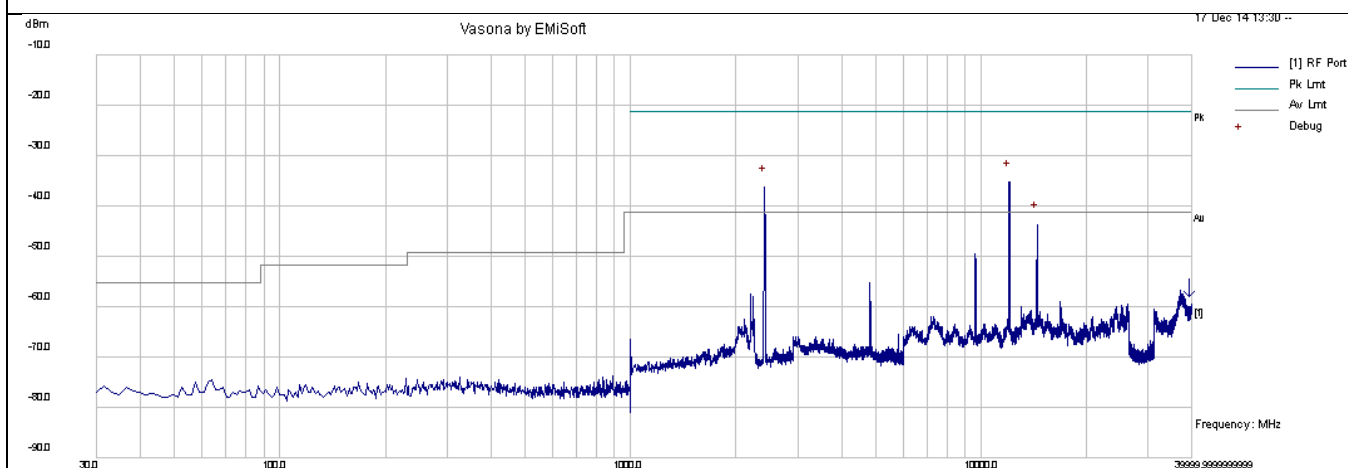
CSE - 2.4G-802.11g High-chain0



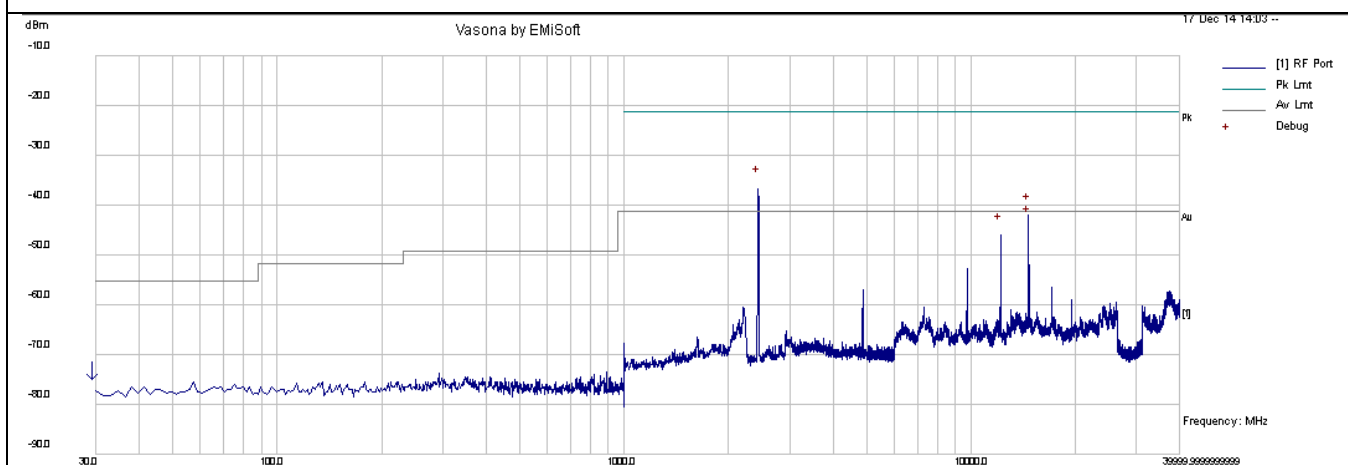
CSE - 2.4G-802.11g High-chain1



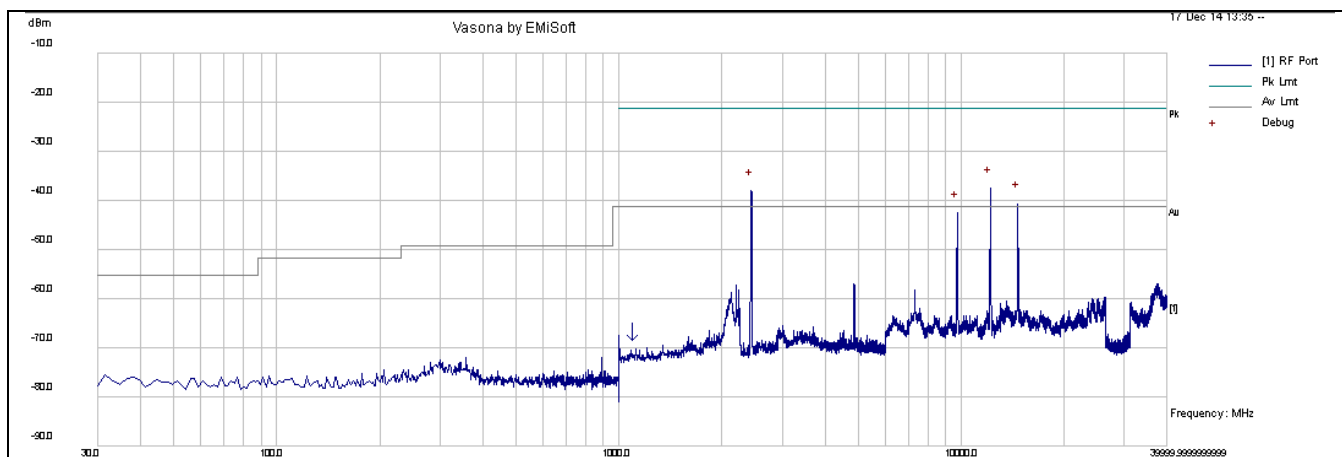
CSE – 2.4G-802.11n-20M Low-chain0



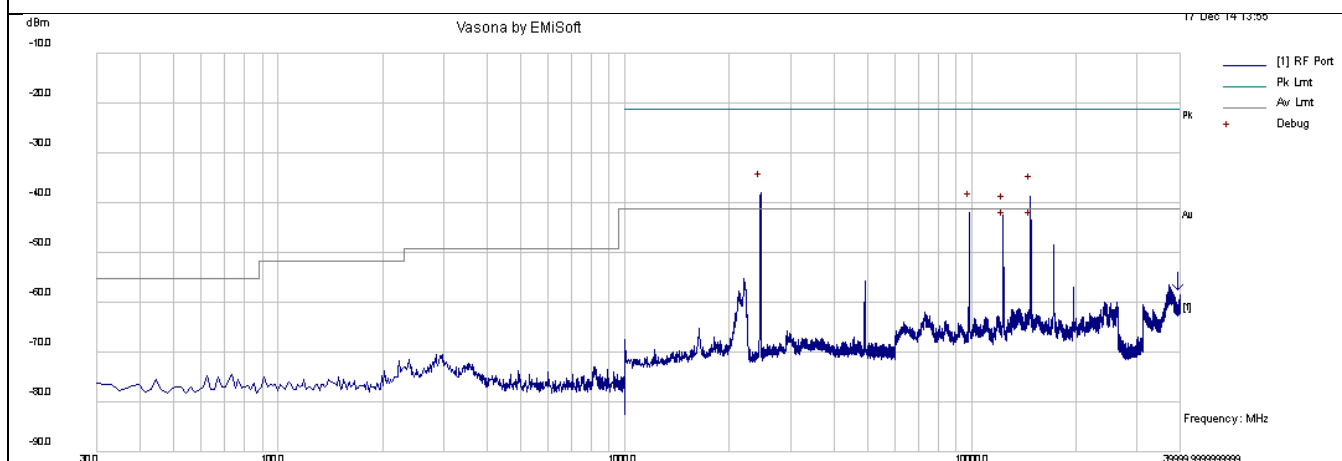
CSE – 2.4G-802.11n-20M Low-chain1



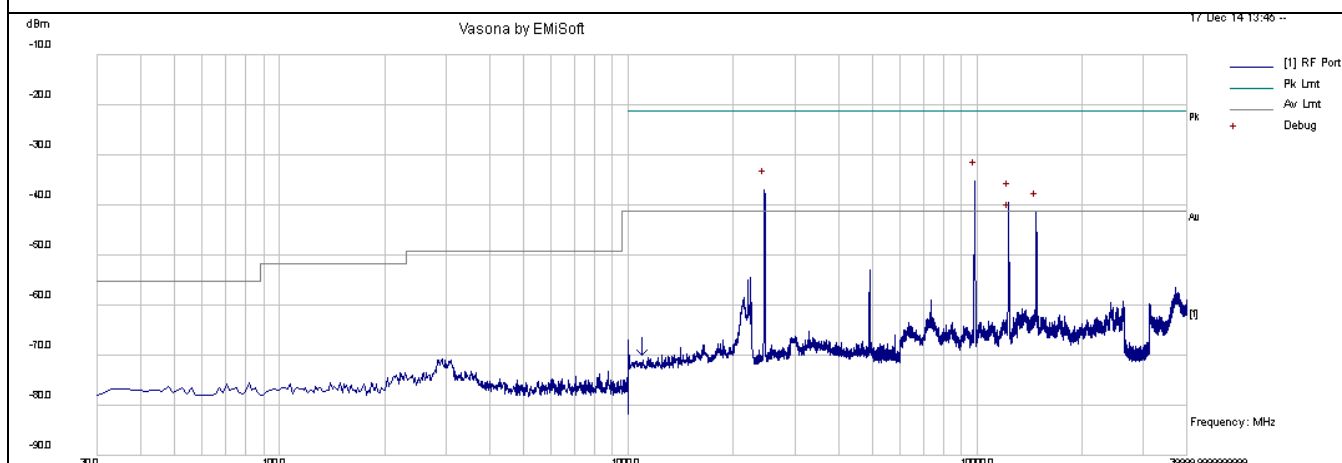
CSE – 2.4G-802.11n-20M Mid-chain0



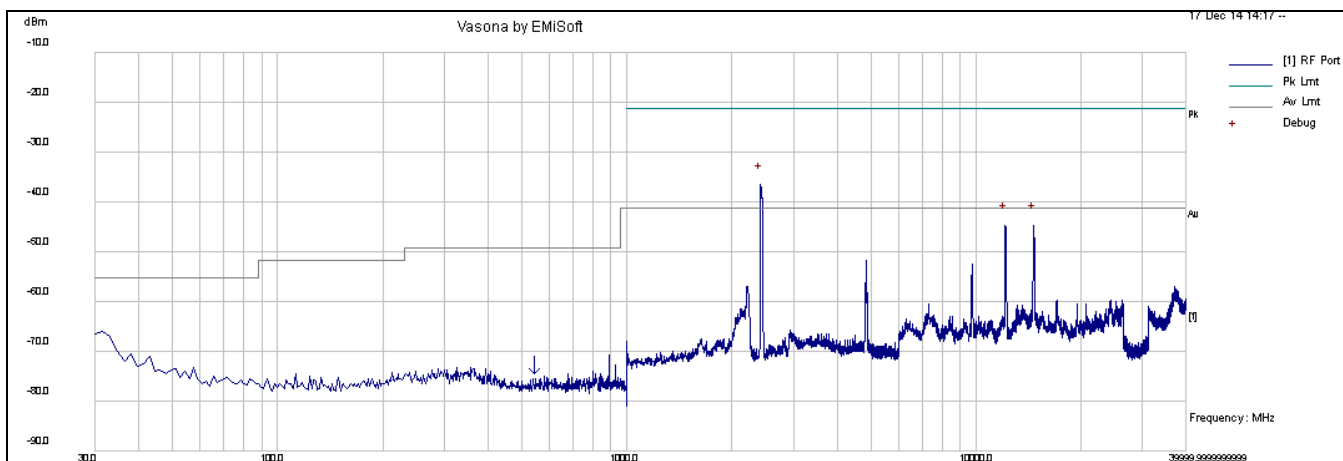
CSE – 2.4G-802.11n-20M Mid-chain1



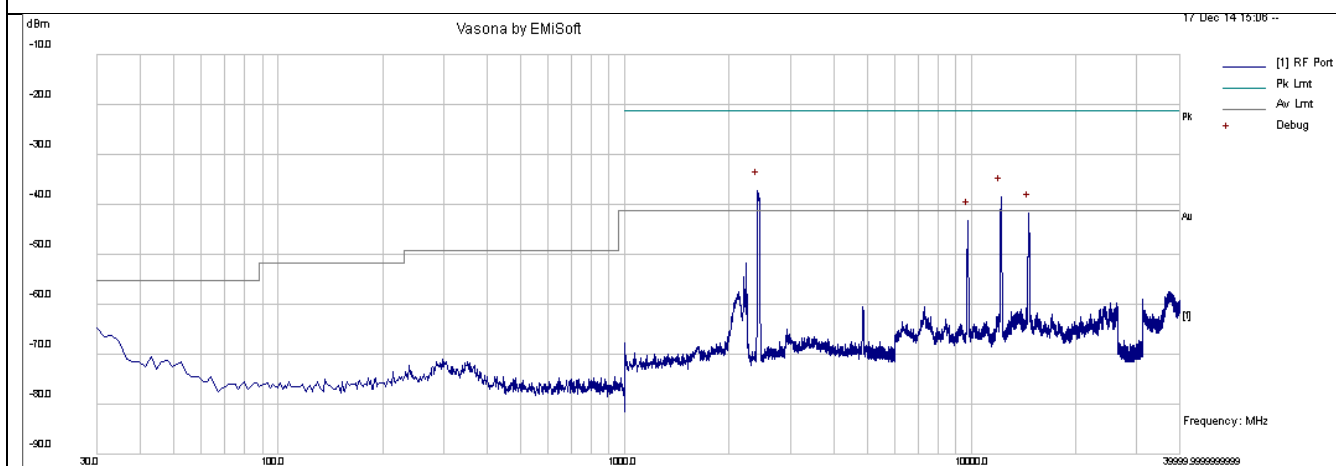
CSE – 2.4G-802.11n-20M High-chain0



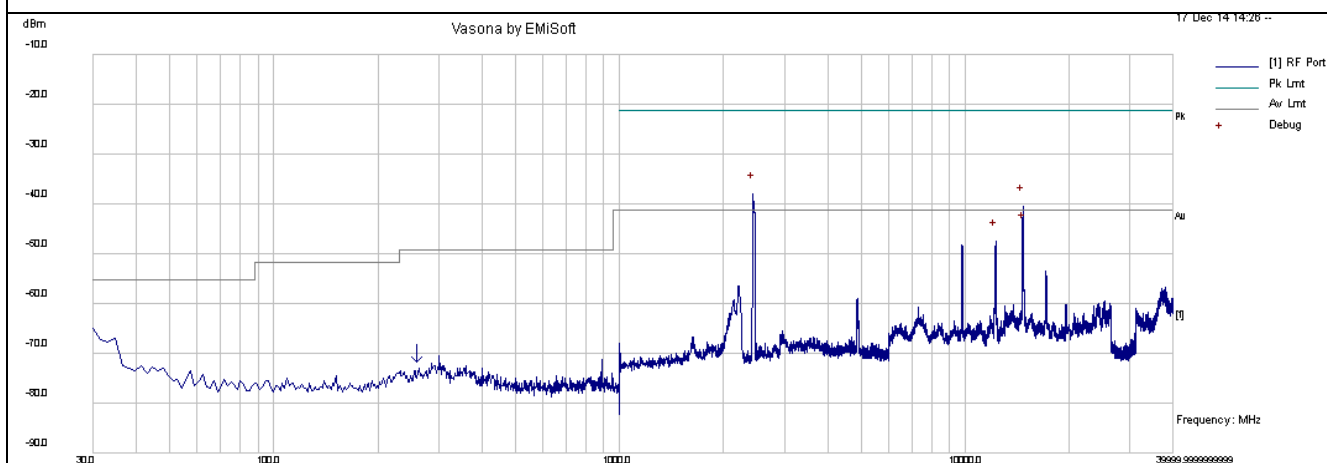
CSE – 2.4G-802.11n-20M High-chain1



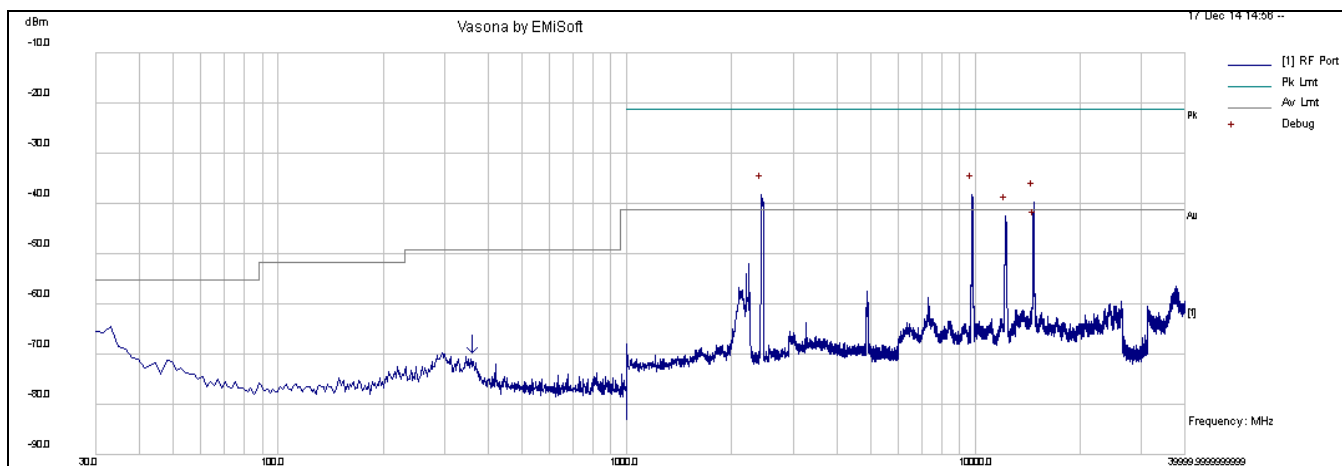
CSE - 2.4G-802.11n-40M Low-chain0



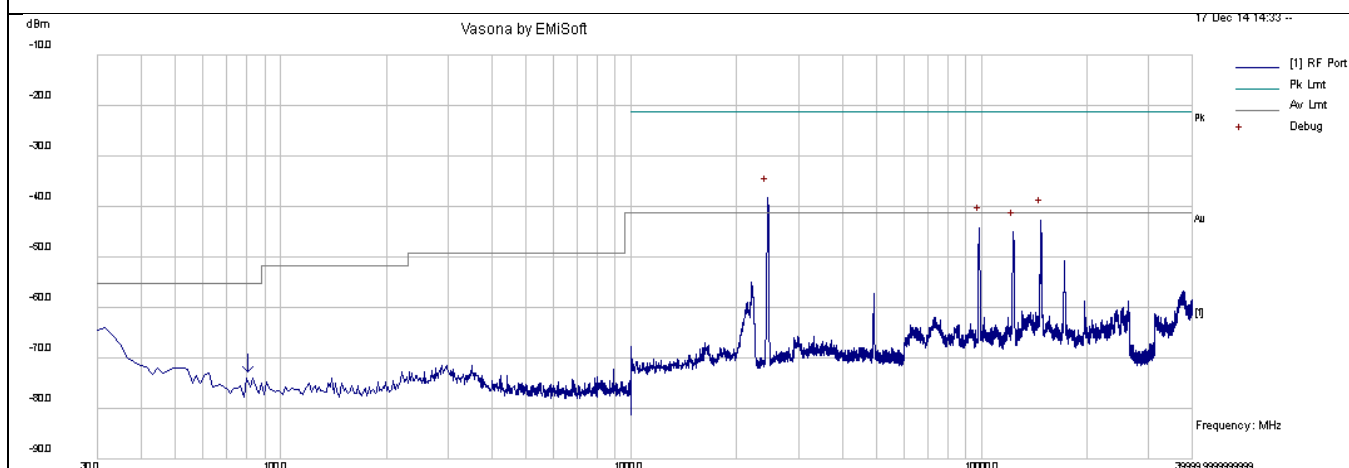
CSE - 2.4G-802.11n-40M Low-chain1



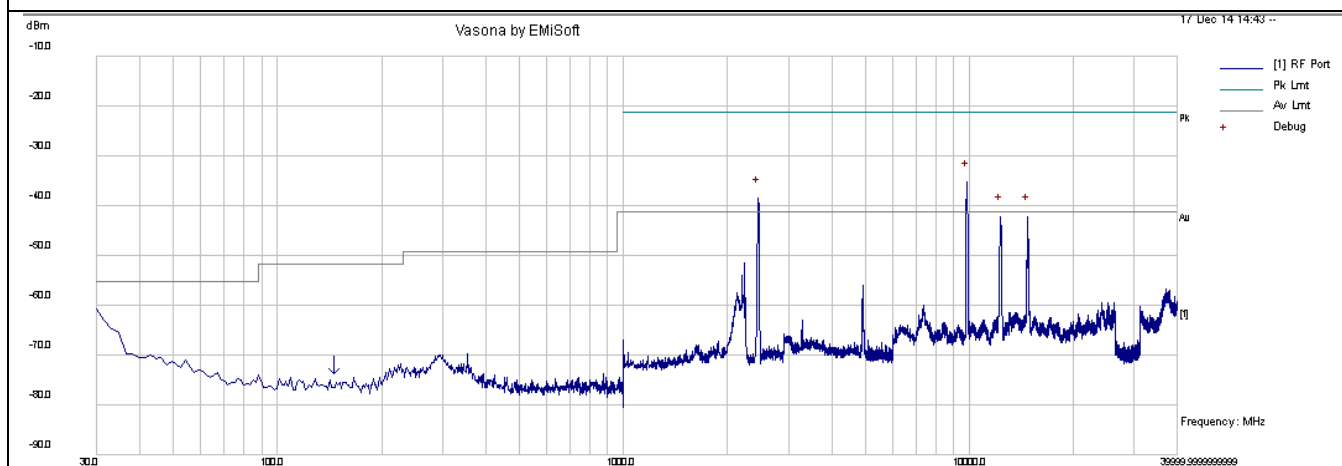
CSE - 2.4G-802.11n-40M Mid-chain0



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

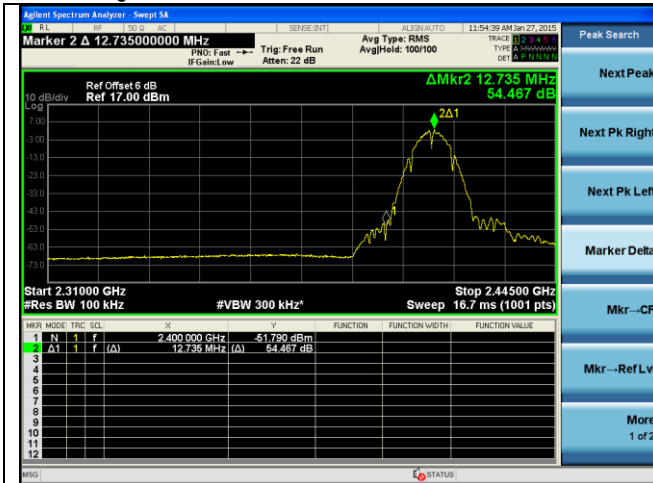


CSE - 2.4G-802.11n-40M High-chain0



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

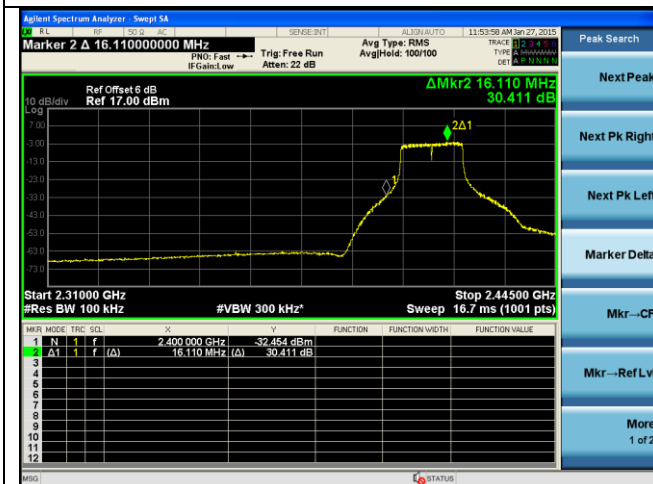
Band Edge Test Plots



Band Edge-2.4G-802.11b Low



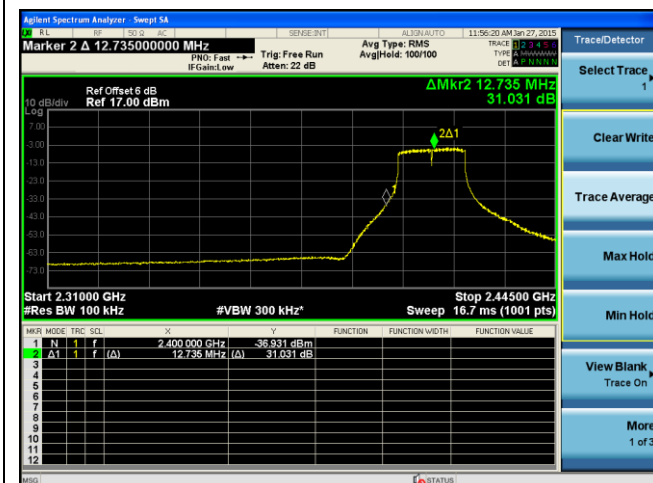
Band Edge-2.4G-802.11b High



Band Edge-2.4G-802.11g Low



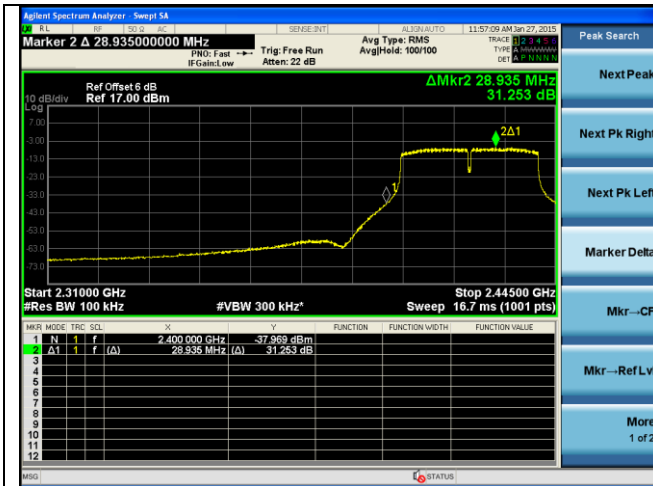
Band Edge-2.4G-802.11g High



Band Edge-2.4G-802.11n20 Low



Band Edge-2.4G-802.11n20 High



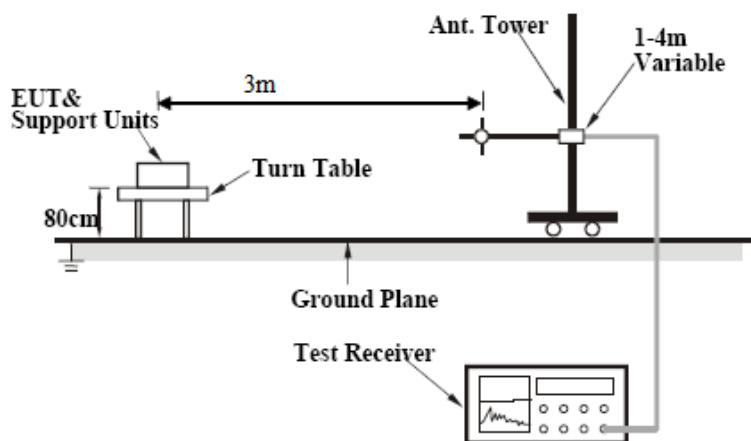
Band Edge-2.4G-802.11n40 Low



Band Edge-2.4G-802.11n40 High

10.6 Radiated Emissions below 1GHz

Requirement(s):

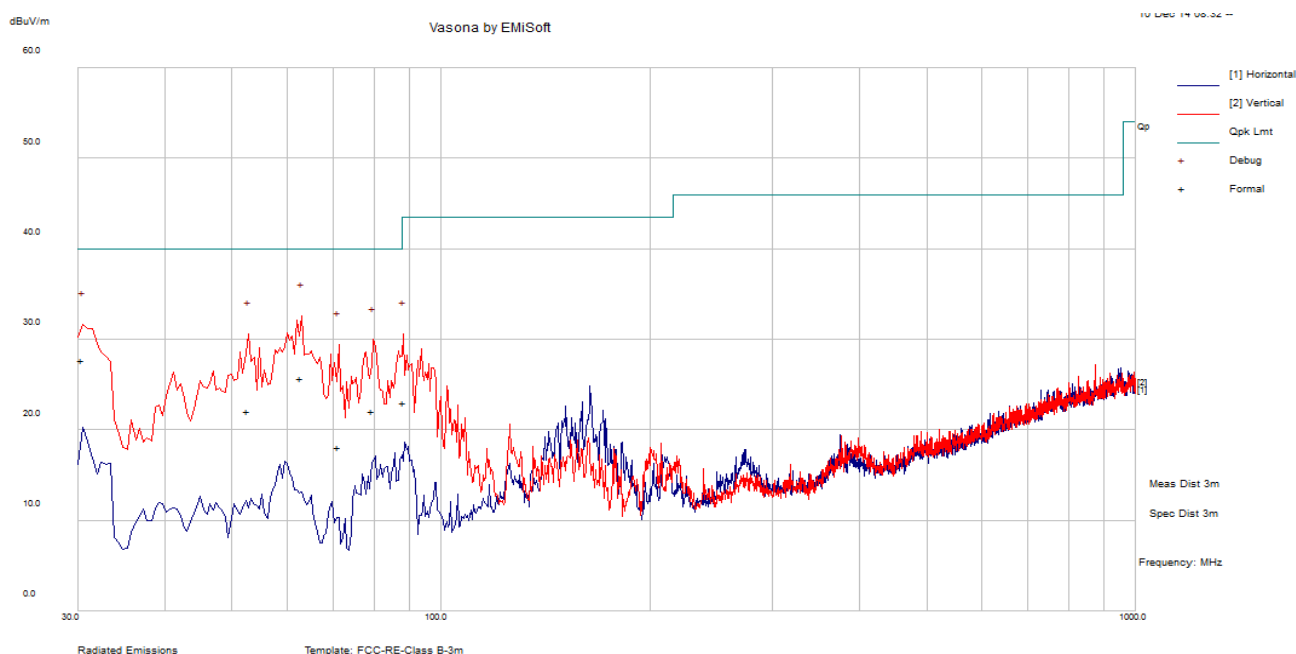
Spec	Item	Requirement	Applicable										
47CFR§15.247(d)	a)	Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall 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:	Radiated Emission			
Environmental Conditions:	Temp(°C):	21	Result:	☒ Pass ☐ Fail
	Humidity (%):	40		
	Atmospheric(mbar):	1019		
Mains Power:	120VAC, 60Hz			
Tested by:	Angel Escamilla			
Test Date:	12-10-2014			
Remarks:	802.11b: EUT Tx continuously at 2437MHz			

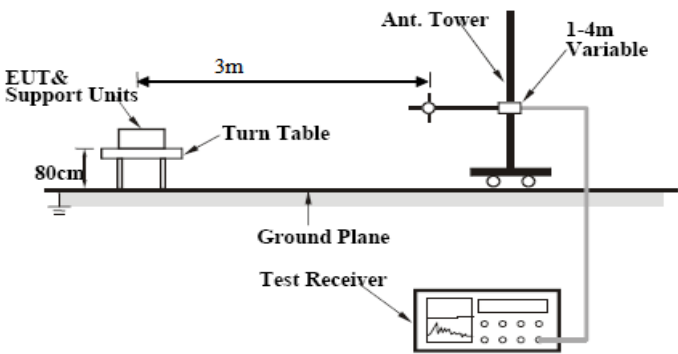


Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
30.43	46.08	1.16	-19.49	27.76	Quasi Max	V	105.00	49.00	40.00	-12.24	Pass
52.61	52.00	1.20	-31.16	22.04	Quasi Max	V	112.00	256.00	40.00	-17.96	Pass
62.88	55.52	1.33	-31.18	25.66	Quasi Max	V	131.00	207.00	40.00	-14.34	Pass
71.24	47.68	1.42	-31.02	18.08	Quasi Max	V	176.00	105.00	40.00	-21.92	Pass
79.73	52.15	1.50	-31.55	22.10	Quasi Max	V	174.00	30.00	40.00	-17.90	Pass
88.25	53.37	1.65	-32.05	22.96	Quasi Max	V	121.00	278.00	43.50	-20.54	Pass

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

10.7 Radiated Spurious Emissions above 1GHz

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR§15.247(d)	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 25GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case		
Result	☒ Pass ☐ Fail		

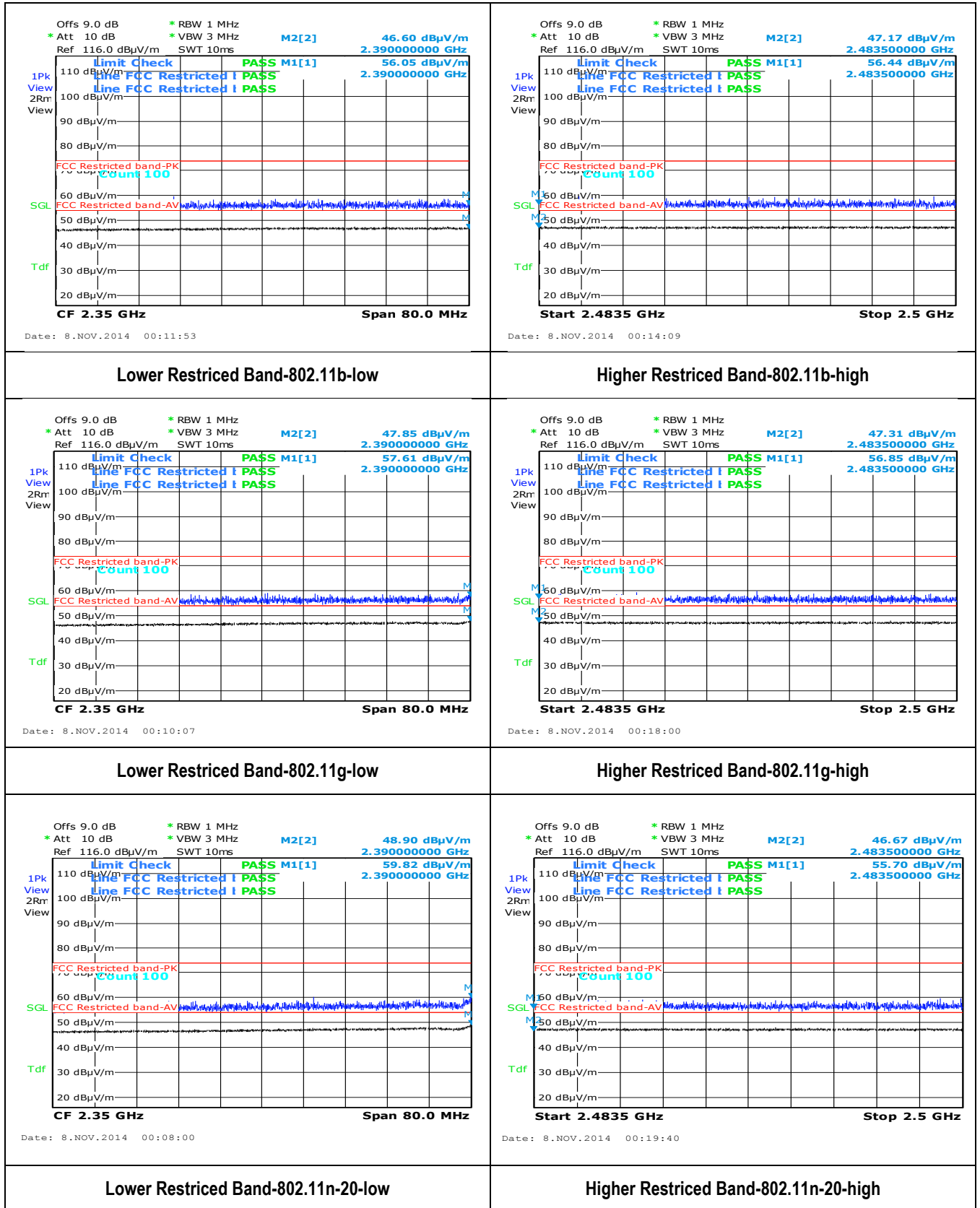
Equipment Setting

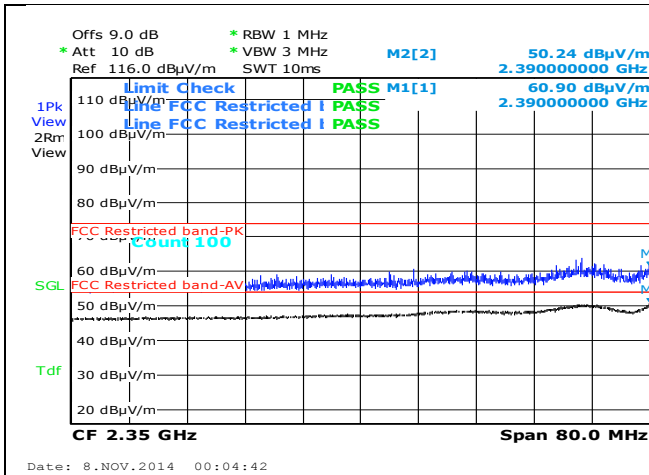
Test	RBW	VBW	Span	Detector	Sweep	Trace	Notes
Radiated Spurious Emission	1MHz	3MHz	1GHz - 25 GHz	Peak	Auto	Max hold	PK Measurement
Radiated Spurious Emission	1MHz	10Hz	1GHz - 25 GHz	Peak	Auto	Max hold	Ave Measurement

Test Data ☒ Yes (See below) ☐ N/A

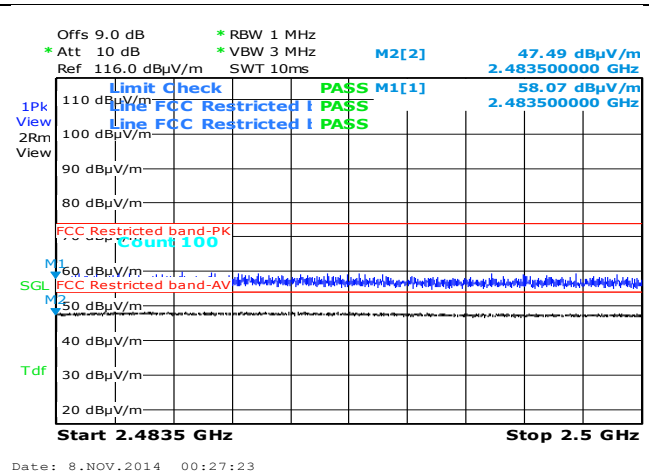
Test Plot ☒ Yes (See below) ☐ N/A

Radiated Restricted Band Measurement Plots:





Lower Restricted Band-802.11n-40-low-chain0



Higher Restrictd Band-802.11n-40-high

Radiated Emission Test Results (Above 1GHz)

Above 1GHz – 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
4208.38	44.62	3.39	-0.23	47.78	Peak Max	V	159.00	291.00	74.00	-26.22	Pass
4820.04	42.51	3.22	0.13	45.85	Peak Max	H	159.00	43.00	74.00	-28.15	Pass
9488.18	45.17	5.47	6.58	57.22	Peak Max	H	255.00	304.00	74.00	-16.78	Pass
4208.38	31.71	3.39	-0.23	34.87	Average Max	V	159.00	291.00	54.00	-19.13	Pass
4820.04	29.34	3.22	0.13	32.68	Average Max	H	159.00	43.00	54.00	-21.32	Pass
9488.18	31.36	5.47	6.58	43.41	Average Max	H	255.00	304.00	54.00	-10.59	Pass

Above 1GHz- 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
4178.34	45.48	3.43	-0.22	48.68	Peak Max	V	100.00	309.00	74.00	-25.32	Pass
8487.88	44.92	5.29	5.51	55.73	Peak Max	V	193.00	218.00	74.00	-18.27	Pass
4178.34	31.68	3.43	-0.22	34.89	Average Max	V	100.00	309.00	54.00	-19.11	Pass
8487.88	31.96	5.29	5.51	42.76	Average Max	V	193.00	218.00	54.00	-11.24	Pass

Above 1GHz- 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
3976.85	44.72	3.70	-0.22	48.19	Peak Max	V	240.00	117.00	74.00	-25.81	Pass
4924.18	46.18	3.28	0.26	49.72	Peak Max	H	100.00	180.00	74.00	-24.28	Pass
8437.09	45.02	5.26	5.49	55.76	Peak Max	V	121.00	70.00	74.00	-18.24	Pass
3976.85	31.45	3.70	-0.22	34.93	Average Max	V	240.00	117.00	54.00	-19.07	Pass
4924.18	38.88	3.28	0.26	42.42	Average Max	H	100.00	180.00	54.00	-11.58	Pass
8437.09	32.17	5.26	5.49	42.91	Average Max	V	121.00	70.00	54.00	-11.09	Pass

Above 1GHz – 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
4219.38	45.41	3.37	-0.23	48.55	Peak Max	V	282.00	312.00	74.00	-25.45	Pass
9028.03	45.44	4.14	5.64	55.23	Peak Max	V	220.00	113.00	74.00	-18.77	Pass
4219.38	31.80	3.37	-0.23	34.94	Average Max	V	282.00	312.00	54.00	-19.06	Pass
9028.03	31.98	4.14	5.64	41.76	Average Max	V	220.00	113.00	54.00	-12.24	Pass

Above 1GHz- 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
4196.35	45.45	3.40	-0.22	48.62	Peak Max	H	129.00	237.00	74.00	-25.38	Pass
7324.99	47.41	3.88	2.53	53.82	Peak Max	V	163.00	31.00	74.00	-20.18	Pass
4196.35	31.65	3.40	-0.22	34.82	Average Max	H	129.00	237.00	54.00	-19.18	Pass
7324.99	33.54	3.88	2.53	39.95	Average Max	V	163.00	31.00	54.00	-14.05	Pass

Above 1GHz- 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
4902.79	42.57	3.27	0.23	46.07	Peak Max	V	269.00	66.00	74.00	-27.93	Pass
7700.78	45.60	5.16	4.28	55.04	Peak Max	H	123.00	44.00	74.00	-18.96	Pass
4902.79	29.17	3.27	0.23	32.67	Average Max	V	269.00	66.00	54.00	-21.33	Pass
7700.78	32.87	5.16	4.28	42.32	Average Max	H	123.00	44.00	54.00	-11.68	Pass

Above 1GHz- 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
4236.29	44.85	3.35	-0.23	47.96	Peak Max	V	143.00	204.00	74.00	-26.04	Pass
8493.87	45.29	5.29	5.52	56.10	Peak Max	V	190.00	2.00	74.00	-17.90	Pass
4236.29	31.65	3.35	-0.23	34.77	Average Max	V	143.00	204.00	54.00	-19.23	Pass
8493.87	31.96	5.29	5.52	42.77	Average Max	V	190.00	2.00	54.00	-11.23	Pass

Above 1GHz- 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
4873.87	42.30	3.25	0.19	45.74	Peak Max	H	230.00	140.00	74.00	-28.26	Pass
9443.45	44.55	5.38	6.58	56.52	Peak Max	V	143.00	279.00	74.00	-17.48	Pass
15433.79	41.89	5.58	10.04	57.51	Peak Max	H	292.00	342.00	74.00	-16.49	Pass
4873.87	29.51	3.25	0.19	32.95	Average Max	H	230.00	140.00	54.00	-21.05	Pass
9443.45	31.25	5.38	6.58	43.21	Average Max	V	143.00	279.00	54.00	-10.79	Pass
15433.79	28.61	5.58	10.04	44.23	Average Max	H	292.00	342.00	54.00	-9.77	Pass

Above 1GHz- 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
4175.28	45.75	3.43	-0.22	48.95	Peak Max	H	215.00	123.00	74.00	-25.05	Pass
9482.30	44.99	5.40	6.55	56.94	Peak Max	V	149.00	105.00	74.00	-17.06	Pass
14995.52	43.27	6.16	9.99	59.41	Peak Max	H	161.00	247.00	74.00	-14.59	Pass
4175.28	31.64	3.43	-0.22	34.85	Average Max	H	215.00	123.00	54.00	-19.15	Pass
9482.30	31.63	5.40	6.55	43.57	Average Max	V	149.00	105.00	54.00	-10.43	Pass
14995.52	30.05	6.16	9.99	46.19	Average Max	H	161.00	247.00	54.00	-7.81	Pass

Above 1GHz- 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
2290.06	46.12	1.73	-4.29	43.56	Peak Max	V	215.00	249.00	74.00	-30.44	Pass
4837.19	42.52	3.23	0.15	45.90	Peak Max	H	127.00	297.00	74.00	-28.10	Pass
2290.06	32.94	1.73	-4.29	30.38	Average Max	V	215.00	249.00	54.00	-23.62	Pass
4837.19	29.38	3.23	0.15	32.76	Average Max	H	127.00	297.00	54.00	-21.24	Pass

Above 1GHz- 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
4135.80	44.73	3.48	-0.21	48.01	Peak Max	V	292.00	297.00	74.00	-25.99	Pass
15420.89	42.45	5.56	10.00	58.02	Peak Max	V	241.00	34.00	74.00	-15.98	Pass
4135.80	31.62	3.48	-0.21	34.89	Average Max	V	292.00	297.00	54.00	-19.11	Pass
15420.89	28.71	5.56	10.00	44.27	Average Max	V	241.00	34.00	54.00	-9.73	Pass

Above 1GHz- 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
4896.65	42.57	3.26	0.22	46.05	Peak Max	V	219.00	133.00	74.00	-27.95	Pass
9482.50	44.72	5.40	6.55	56.66	Peak Max	H	255.00	118.00	74.00	-17.34	Pass
4896.65	29.22	3.26	0.22	32.71	Average Max	V	219.00	133.00	54.00	-21.29	Pass
9482.50	31.61	5.40	6.55	43.56	Average Max	H	255.00	118.00	54.00	-10.44	Pass

Above 1GHz - Collocation testing (2.4GHz WLAN & 5GHz WLAN on the main-board transmitting simultaneously)

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
4340.26	44.66	3.09	-0.26	47.49	Peak Max	V	119.00	96.00	74.00	-26.51	Pass
8454.95	45.20	5.27	5.50	55.97	Peak Max	V	283.00	257.00	74.00	-18.03	Pass
4340.26	31.35	3.09	-0.26	34.18	Average Max	V	119.00	96.00	54.00	-19.82	Pass
8454.95	32.04	5.27	5.50	42.81	Average Max	V	283.00	257.00	54.00	-11.19	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. USER MANUAL, BLOCK & CIRCUIT DIAGRAM

Please see attachment

Annex C. 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