RF TEST REPORT

SIEMIC
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Report No.: FCC_RF_SL14121601-RUC-016_UNII Rev2.0
Supersede Report No.: FCC_RF_SL14121601-RUC-016_UNII

Applicant	:	Ruckus Wireless, Inc.
Product Name	:	Access Point
Model No.	:	R710
Test Standard	:	47 CFR 15.407
Test Method	:	ANSI C63.4: 2014 789033 D02 General UNII Test Procedures New Rules v01
FCC ID	:	S9GR710
IC ID	:	5912A-R710
Dates of test	:	01/09/2015 to 01/28/2015
Issue Date	:	03/18/2015
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:	
Ricky	David Zhang
Ricky Wang	**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
775 Montague Expressway, Milpitas, 95035 CA

ilac-MRA
A2LA ACCREDITED
TESTING CERT # 2742-01

Laboratory Introduction

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

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

Accreditations for Conformity Assessment

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

Accreditations for Product Certifications

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

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1 Report Revision History

Report No.	Report Version	Description	Issue Date
FCC_RF_SL14121601-RUC-016_UNII	None	Original	02/17/2015
FCC_RF_SL14121601-RUC-016_UNII Rev1.0	Rev1.0	Update test plots	02/20/2015
FCC_RF_SL14121601-RUC-016_UNII Rev2.0	Rev2.0	Remove EUT photo	03/18/2015

2 Executive Summary

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

Company: Ruckus Wireless, Inc.
Product: Access Point
Model: R710

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.	:	R710
Trade Name	:	Ruckus
Serial No.	:	911543202059
Host Model No.	:	N/A
Input Power	:	48VDC (PoE)
Power Adapter Manu/Model	:	N/A
Power Adapter SN	:	N/A
Product Hardware version	:	705-60398-001
Product Software version	:	812-11303-301
Radio Hardware version	:	705-60398-001
Radio Software version	:	812-11303-301
Test Software version	:	4_9_802_1_CS
Date of EUT received	:	01/05/2015
Equipment Class/ Category	:	DTS, UNII
Clock Frequencies	:	N/A
Port/Connectors	:	PoE, Ethernet

6.2 Radio Description

Radio Type	802.11b	802.11g	802.11a	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 5190-5230MHz 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 Patch Antenna					
Antenna Gain (Peak)	2.5 dBi (2.4GHz), 3.5 dBi (5 GHz)					
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 poparity antennas and 2 horizontal poparity 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 ART Power Level Settings

Mode	Frequency	ART Power Setting
802.11-a	5180	20.5
802.11-a	5200	20.5
802.11-a	5240	20.5
802.11-n-20	5180	20.5
802.11-n-20	5200	20.5
802.11-n-20	5240	20.5
802.11-n-40	5190	20.5
802.11-n-40	5230	20.5
802.11-ac-80	5210	20.5
802.11-a	5745	20.5
802.11-a	5785	22
802.11-a	5825	22
802.11-n-20	5745	20.5
802.11-n-20	5785	22
802.11-n-20	5825	22
802.11-n-40	5755	18.5
802.11-n-40	5795	21.5
802.11-ac-80	5775	17

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 modes and channels

8 Test Summary

Test Item	Test standard		Test Method/Procedure	Pass / Fail
Restricted Band of Operation	FCC	15.205	ANSI C63.4 – 2014 789033 D02 General UNII Test Procedures New Rules v01	☒ Pass ☐ N/A
AC Conducted Emissions Voltage	FCC	15.207(a)	ANSI C63.4 – 2014	☒ Pass ☐ N/A

Test Item	Test standard		Test Method/Procedure	Pass / Fail
26 & 6 dB Emission Bandwidth	FCC	15.407 (a) (2)	789033 D02 General UNII Test Procedures New Rules v01	☒ Pass ☐ N/A
Maximum conducted Output Power	FCC	15.407 (a) (2)	789033 D02 General UNII Test Procedures New Rules v01	☒ Pass ☐ N/A
Power reduction (Antenna Gain > 6 dBi)	FCC	15.407 (a) (2)	-	☐ Pass ☒ N/A
Band Edge and Radiated Spurious Emissions	FCC	15.407(b)(2), 15.407(b)(6)	ANSI C63.4 – 2014 789033 D02 General UNII Test Procedures New Rules v01	☒ Pass ☐ N/A
Power Spectral Density	FCC	15.407 (a) (2)	789033 D02 General UNII Test Procedures New Rules v01	☒ Pass ☐ N/A
Frequency Stability	FCC	15.407 (g)	-	☐ Pass ☒ N/A
Transmit Power Control (TPC)	FCC	15.407 (h)(1)	-	☐ Pass ☒ N/A
User Manual	FCC	-	-	☒ Pass ☐ N/A
Remark	1. All measurement uncertainties are not taken into consideration for all presented test result. 2. 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

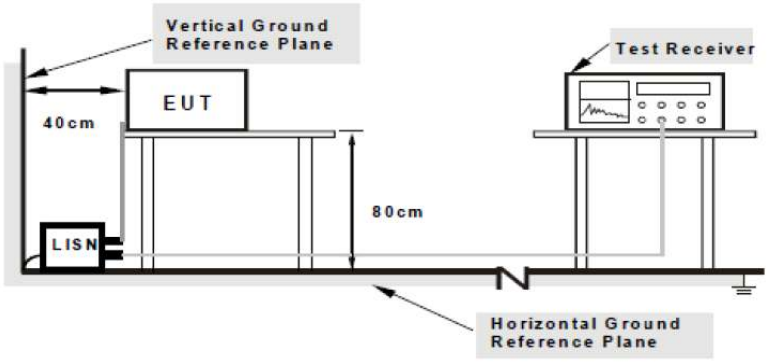
Emissions			
Test Item	**Frequency Range**	**Description**	**Uncertainty**
Band Edge and Radiated Spurious Emissions	30MHz – 1GHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
Band Edge and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

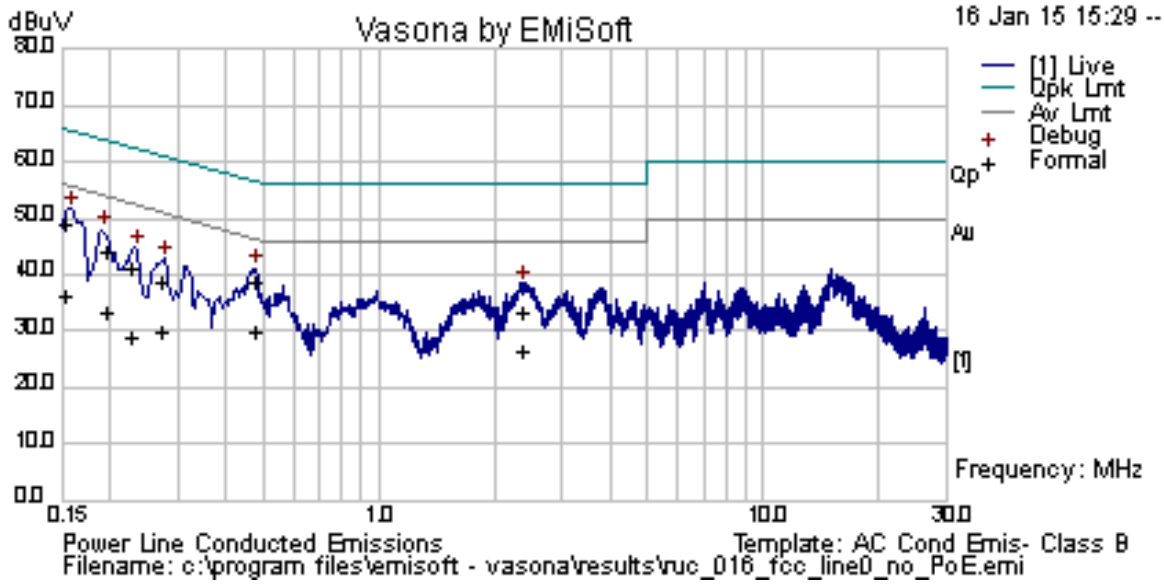
Spec	Item	Requirement	Applicable
47CFR§15.207	a)	For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/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 was 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:	01/16/2015			
Remarks	Line			

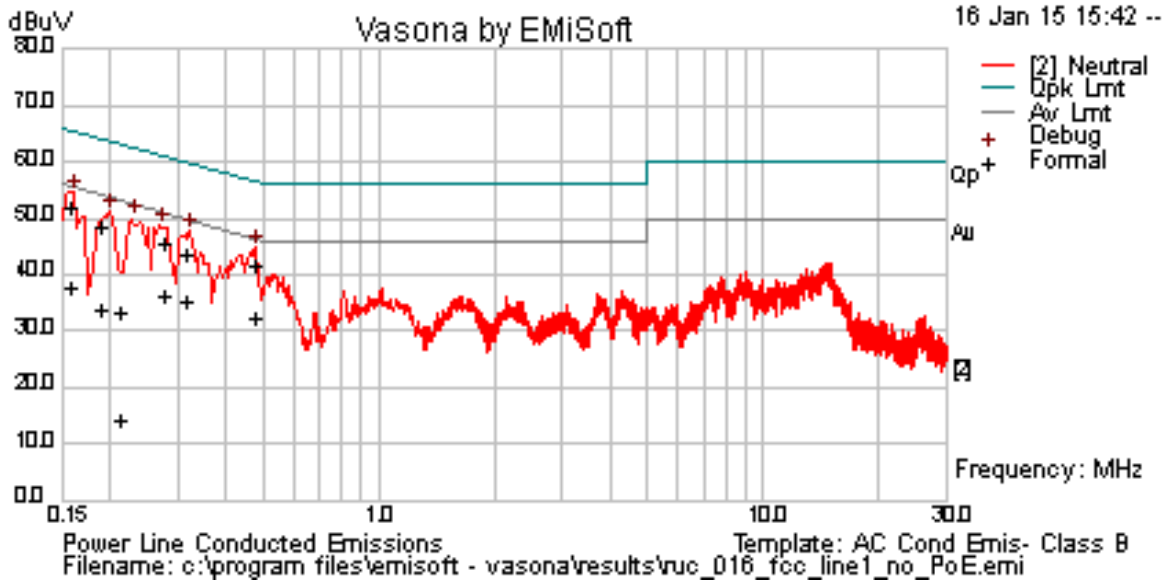


Line Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line	Limit (dBuV)	Margin (dB)	Pass /Fail
0.15	38.10	10.00	0.76	48.86	Quasi Peak	Line	65.86	-17.00	Pass
0.15	25.70	10.00	0.76	36.46	Average	Line	55.86	-19.40	Pass
0.19	33.46	10.00	0.74	44.20	Quasi Peak	Line	63.85	-19.65	Pass
0.19	22.66	10.00	0.74	33.41	Average	Line	53.85	-20.44	Pass
0.23	30.55	10.00	0.73	41.28	Quasi Peak	Line	62.54	-21.25	Pass
0.23	18.13	10.00	0.73	28.87	Average	Line	52.54	-23.67	Pass
0.27	28.02	10.00	0.72	38.74	Quasi Peak	Line	61.02	-22.28	Pass
0.27	19.17	10.00	0.72	29.89	Average	Line	51.02	-21.12	Pass
0.47	27.98	10.01	0.73	38.72	Quasi Peak	Line	56.44	-17.73	Pass
0.47	19.09	10.01	0.73	29.83	Average	Line	46.44	-16.61	Pass
2.36	22.20	10.02	0.96	33.19	Quasi Peak	Line	56.00	-22.81	Pass
2.36	15.70	10.02	0.96	26.68	Average	Line	46.00	-19.32	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:	01/16/2014			
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
0.16	41.30	10.00	0.75	52.06	Quasi Peak	Neutral	65.55	-13.49	Pass
0.16	27.15	10.00	0.75	37.91	Average	Neutral	55.55	-17.64	Pass
0.19	37.71	10.00	0.75	48.46	Quasi Peak	Neutral	64.08	-15.62	Pass
0.19	22.91	10.00	0.75	33.66	Average	Neutral	54.08	-20.42	Pass
0.21	22.76	10.00	0.74	33.50	Quasi Peak	Neutral	63.10	-29.60	Pass
0.21	3.72	10.00	0.74	14.46	Average	Neutral	53.10	-38.64	Pass
0.27	34.83	10.00	0.72	45.55	Quasi Peak	Neutral	61.00	-15.45	Pass
0.27	25.41	10.00	0.72	36.13	Average	Neutral	51.00	-14.87	Pass
0.31	33.01	10.00	0.71	43.72	Quasi Peak	Neutral	59.91	-16.19	Pass
0.31	24.38	10.00	0.71	35.09	Average	Neutral	49.91	-14.81	Pass
0.47	30.93	10.01	0.73	41.68	Quasi Peak	Neutral	56.43	-14.75	Pass
0.47	21.70	10.01	0.73	32.44	Average	Neutral	46.43	-13.98	Pass

Note: The results above show only the worst case.

10.2 26 dB Bandwidth & 6 dB Bandwidth

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.407	-	26 dB Emission BW: Report only for reference.	☒
	a) (2)	26 dB Emission BW: Report only for power limit calculation.	☐
	e)	Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.	☒

Test Setup

Test Procedure

789033 D02 General UNII Test Procedures New Rules v01

26dB Emission bandwidth measurement procedure (Other than 5.725-5.85 GHz)

- Allow the trace to stabilize.
- Use the spectrum analyzer built-in measurement function to determine the 26dB BW.
  - Set RBW = around 1% of emission bandwidth
  - Set VBW > RBW
  - Detector = Peak
  - Trace mode = max hold
- Capture the plot.
- Repeat above steps for different test channel and other modulation type.

6 dB Minimum emission bandwidth measurement procedure (for 5.725-5.85 GHz)

- Allow the trace to stabilize.
- Use the spectrum analyzer built-in measurement function to determine the 6dB BW.
  - Set RBW = 100 KHz
  - Set VBW ≥ 3 x RBW
  - Detector = Peak
  - Trace mode = max hold
  - Sweep = auto couple
- Capture the plot.
- Repeat above steps for different test channel and other modulation type.

Test Date	01/20/2015	Environmental condition	Temperature 22°C Relative Humidity 38% Atmospheric Pressure 1020mbar
Remark	99% BW result is presented here to show the channels in 5.1GHz is not crossing to DFS channel since the 26 dB BW is too wide.		
Result	☒ Pass ☐ Fail		

Equipment Setting

Test	RBW	VBW	Span	Detector	Sweep	Trace	Notes
26 dB Emission Bandwidth	1% of 26 dB EBW	>RBW	>EBW	PK	Auto	Maxhold	-
6 dB Bandwidth	100 KHz	≥3 x RBW	1.5 - 5 times of OBW	PK	Auto	Maxhold	-

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

26dB Bandwidth measurement result for 5.2GHz

Type	Test mode	Freq (MHz)	CH	Result (MHz)	Limit (MHz)
26dB BW	802.11a	5180	Low	20.36	-
26dB BW	802.11a	5200	Mid	20.26	-
26dB BW	802.11a	5240	High	20.70	-
26dB BW	802.11n-20	5180	Low	20.43	-
26dB BW	802.11n-20	5200	Mid	20.40	-
26dB BW	802.11n-20	5240	High	20.74	-
26dB BW	802.11n-40	5190	Low	39.07	-
26dB BW	802.11n-40	5230	High	39.28	-
26dB BW	802.11ac-80	5210	Mid	97.86	-

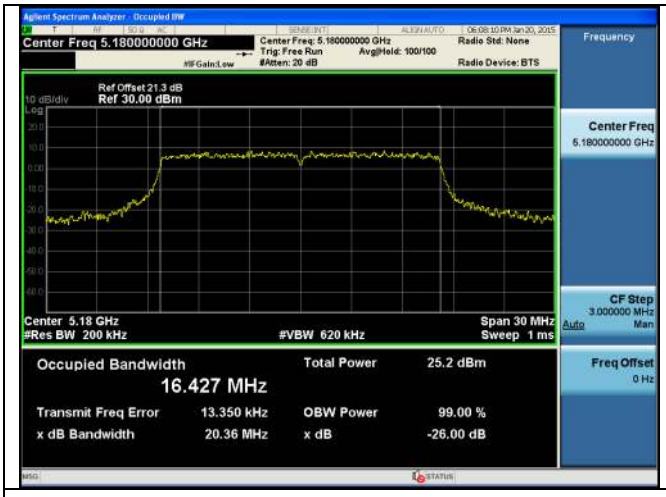
6dB Bandwidth measurement result for 5.8GHz

Type	Test mode	Freq (MHz)	CH	Result (MHz)	Limit (MHz)	Result
6dB BW	802.11a	5745	Low	16.39	≥0.5	Pass
6dB BW	802.11a	5785	Mid	16.37	≥0.5	Pass
6dB BW	802.11a	5825	High	16.35	≥0.5	Pass
6dB BW	802.11n-20	5745	Low	17.33	≥0.5	Pass
6dB BW	802.11n-20	5785	Mid	17.62	≥0.5	Pass
6dB BW	802.11n-20	5825	High	17.68	≥0.5	Pass
6dB BW	802.11n-40	5755	Low	35.73	≥0.5	Pass
6dB BW	802.11n-40	5795	High	36.03	≥0.5	Pass
6dB BW	802.11ac-80	5775	Mid	76.39	≥0.5	Pass

99% Occupied Bandwidth measurement result for 5.1GHz

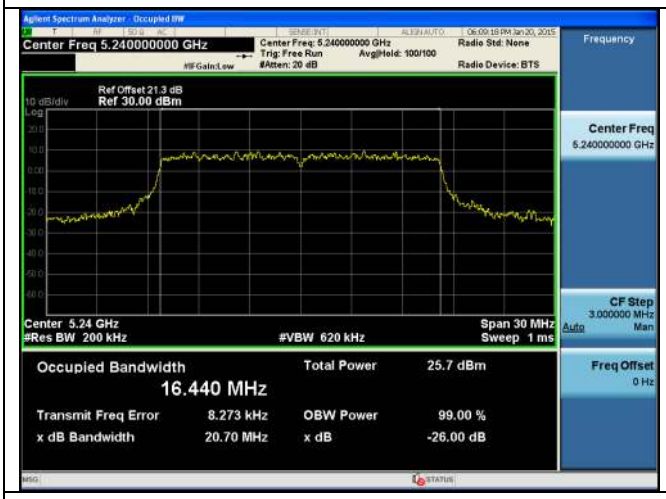
Type	Test mode	Freq (MHz)	CH	Result (MHz)	Limit (MHz)
99% OBW	802.11a	5180	Low	16.43	-
99% OBW	802.11a	5200	Mid	16.42	-
99% OBW	802.11a	5240	High	16.44	-
99% OBW	802.11n-20	5180	Low	17.64	-
99% OBW	802.11n-20	5200	Mid	17.63	-
99% OBW	802.11n-20	5240	High	17.64	-
99% OBW	802.11n-40	5190	Low	36.10	-
99% OBW	802.11n-40	5230	High	36.08	-
99% OBW	802.11ac-80	5210	Mid	75.77	-

26dB Bandwidth Test Plots



26dB BW - 802.11a 5180MHz

26dB BW - 802.11a 5200MHz

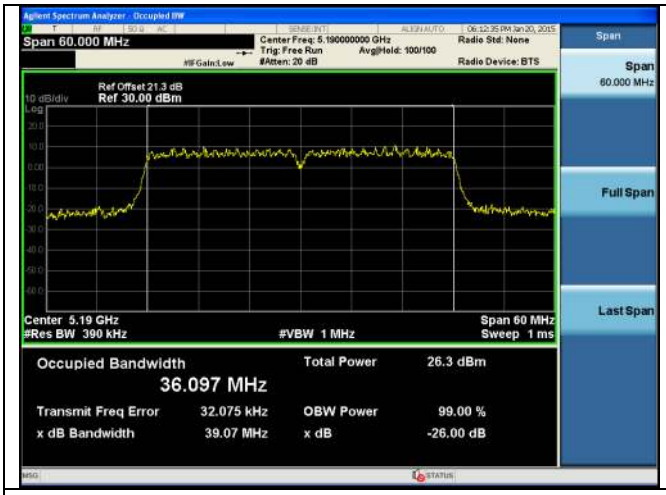


26dB BW - 802.11a 5240MHz

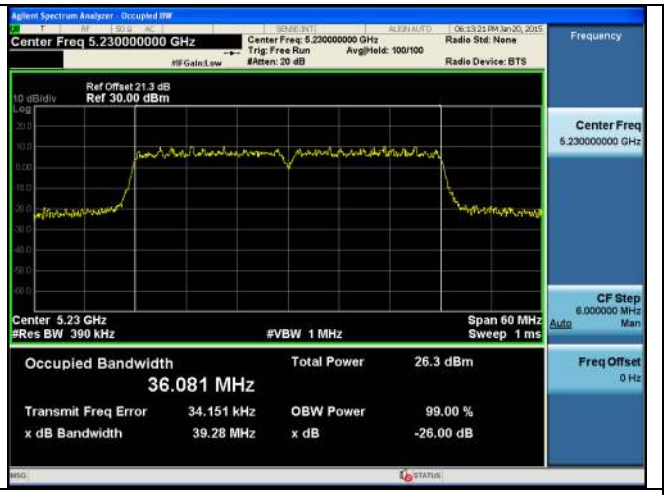
26dB BW - 802.11n-20M 5180MHz

26dB BW - 802.11n-20M 5200MHz

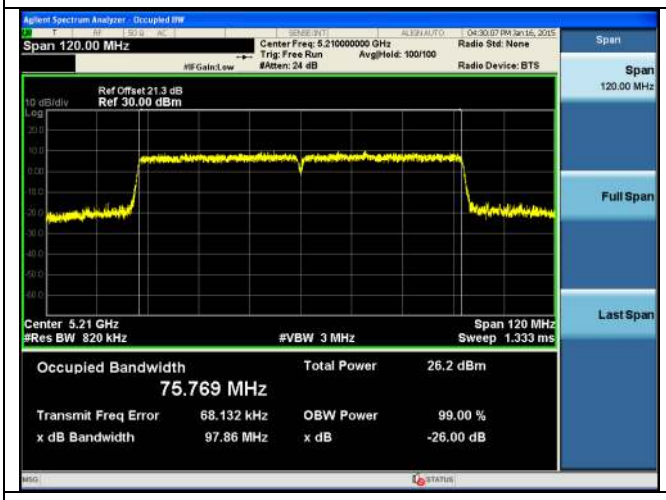
26dB BW - 802.11n-20M 5240MHz



26dB BW - 802.11n-40M 5190MHz



26dB BW - 802.11n-40M 5230MHz

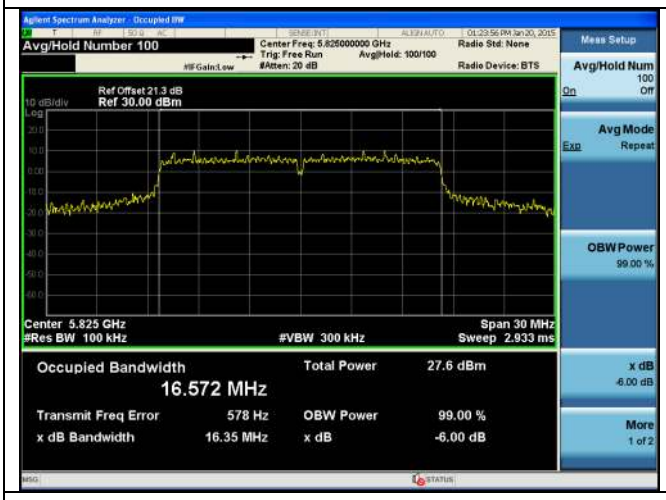


26dB BW - 802.11ac-80M 5210MHz

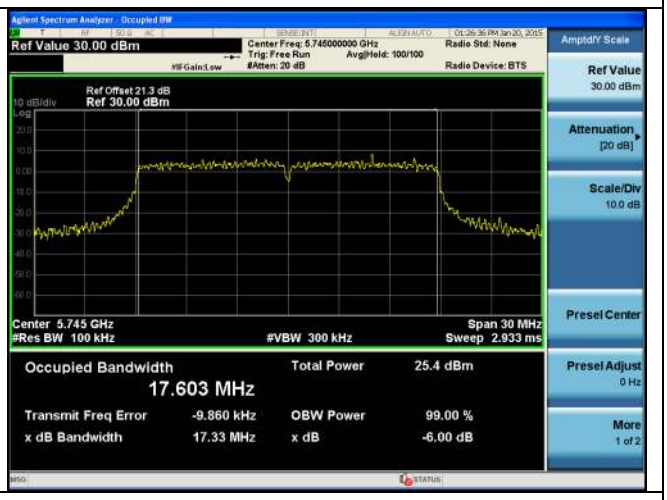
6dB Bandwidth Test Plots

6dB BW 802.11a 5745MHz

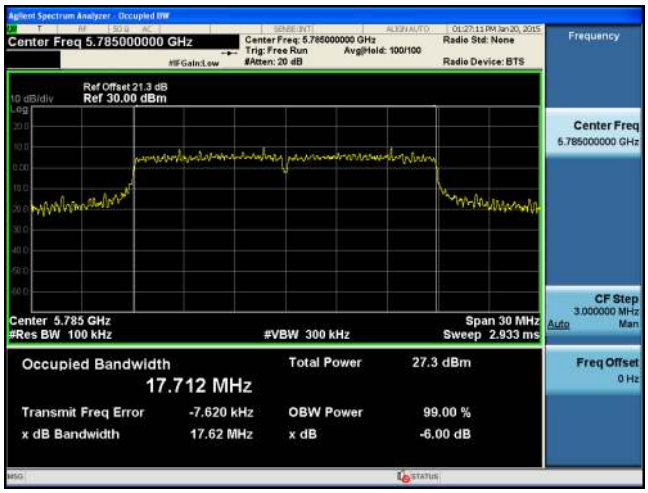
6dB BW 802.11a 5785MHz



6dB BW 802.11a 5825MHz

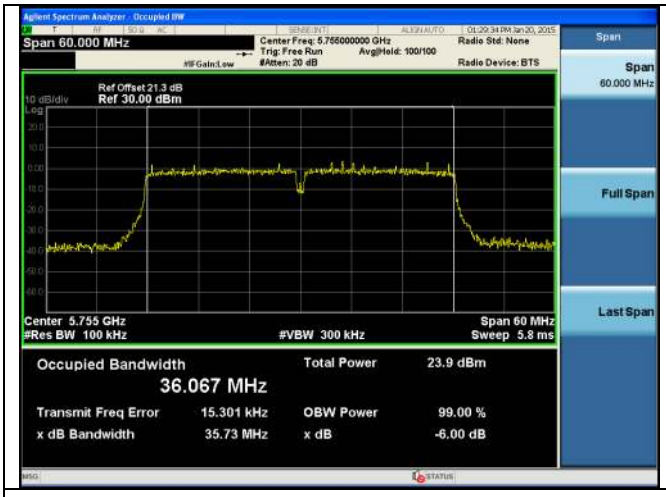


6dB BW 802.11n-20M 5745MHz

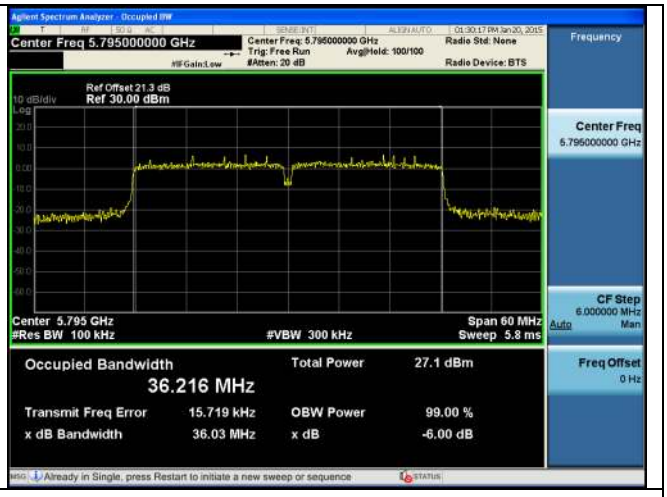


6dB BW 802.11n-20M 5785MHz

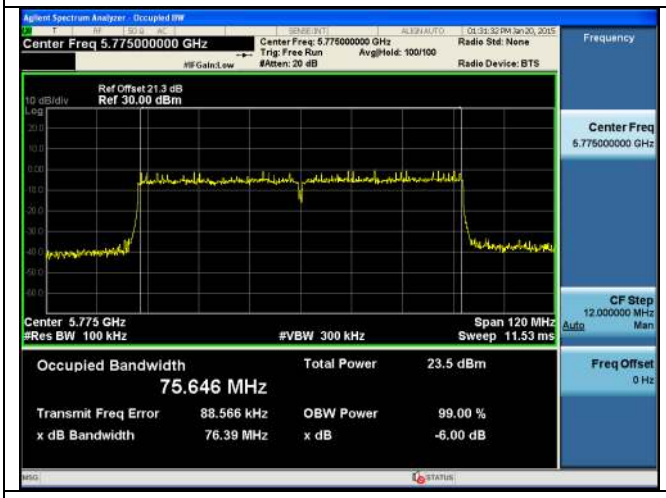
6dB BW 802.11n-20M 5825MHz



6dB BW 802.11n-40M 5755MHz



6dB BW 802.11n-40M 5795MHz



6dB BW 802.11ac-80M 5775MHz

10.3 Peak Output Power

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.407	a)(1)(i)	For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).	☐
	a)(1)(ii)	For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi.	☒
	a)(1)(iii)	For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi.	☐
	a)(1)(iv)	For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.	☐
	a)(2)	For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz.	☐
	a)(3)	For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.	☒

Test Setup				
Test Procedure	789033 D02 General UNII Test Procedures New Rules v01 Measurement using a Power Meter (PM) 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	01/16/2015	Environmental condition	Temperature Relative Humidity Atmospheric Pressure	21ºC 40% 1019mbar
Remark	Per KDB 662911 D01 Multiple Transmitter Output v02r01, the direction gain for horizontal polarization and vertical polarization is calculated separately. For 5Ghz band, peak antenna gain = 3.5 dBi, directional gain = 3 dB, total gain = 6.5 dBi Highest of totoal gain is 6.5 dBi. The power limit and PSD limit will be reduced by amount of 0.5 dB.			
Result	☒ Pass ☐ Fail			

Test Data ☒ Yes ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Output Power measurement result for 5.1GHz

Type	Test mode	Freq (MHz)	CH	Conducted Power (dBm)					Limit (dBm)	Result
				Chain1	Chain2	Chain3	Chain4	Combined Power		
Output	802.11a	5180	Low	19.45	19.62	19.38	19.41	25.49	29.5	Pass
Output	802.11a	5200	Mid	19.47	19.80	19.51	19.54	25.60	29.5	Pass
Output	802.11a	5240	High	19.57	19.73	19.51	19.64	25.63	29.5	Pass
Output	802.11n-20M	5180	Low	19.64	19.87	19.53	19.56	25.67	29.5	Pass
Output	802.11n-20M	5200	Mid	19.58	19.89	19.62	19.59	25.70	29.5	Pass
Output	802.11n-20M	5240	High	19.73	19.87	19.55	19.67	25.73	29.5	Pass
Output	802.11n-40M	5190	Low	19.81	20.19	19.85	19.68	25.91	29.5	Pass
Output	802.11n-40M	5230	Mid	19.85	20.36	20.08	19.99	26.09	29.5	Pass
Output	802.11ac-80M	5210	High	19.60	20.04	19.66	19.71	25.78	29.5	Pass

Output Power Measurement Results for 5.8GHz

Type	Test mode	Freq (MHz)	CH	Conducted Power (dBm)					Limit (dBm)	Result
				Chain1	Chain2	Chain3	Chain4	Combined Power		
Output	802.11a	5745	Low	19.08	19.18	19.39	19.28	25.25	29.5	Pass
Output	802.11a	5785	Mid	21.01	21.10	21.22	21.14	27.14	29.5	Pass
Output	802.11a	5825	High	21.30	21.26	21.30	21.41	27.34	29.5	Pass
Output	802.11n-20M	5745	Low	19.12	19.27	19.48	19.34	25.33	29.5	Pass
Output	802.11n-20M	5785	Mid	21.02	21.15	21.29	21.17	27.18	29.5	Pass
Output	802.11n-20M	5825	High	21.31	21.28	21.34	21.35	27.34	29.5	Pass
Output	802.11n-40M	5755	Low	17.37	17.32	17.45	17.67	23.48	29.5	Pass
Output	802.11n-40M	5795	Mid	20.80	20.91	21.13	21.11	27.01	29.5	Pass
Output	802.11ac-80M	5775	High	16.46	16.60	16.63	16.60	22.59	29.5	Pass

10.4 Peak Spectral Density

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.407	a)(1)(i)	For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.	☒
	a)(1)(ii)	For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.	☐
	a)(2)	For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.	☐
	a)(3)	For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.	☒

Test Setup			
Test Procedure	789033 D02 General UNII Test Procedures New Rules v01, II.F. Method SA-1 Maximum spectral density measurement procedure - Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal. - Set RBW = 1 MHz - Set VBW ≥ 3 MHz - Detector = RMS. - Sweep time = auto couple. - Trace mode = max hold. - Trace average at least 100 traces in power averaging - Use the peak marker function to determine the maximum amplitude level within the RBW. Apply correction to the result if different RBW is used.		
Test Date	01/16/2015	Environmental condition	Temperature 22ºC Relative Humidity 42% 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 5Ghz band, peak antenna gain = 3.5 dBi, directional gain = 3 dB, total gain = 6.5 dBi Highest of totoal gain is 6.5 dBi. The power limit and PSD limit will be reduced by amount of 0.5 dB.		
Result	☒ Pass ☐ Fail		

Equipment Setting

Test	RBW	VBW	Span	Detector	Sweep	Trace	Notes
PSD	1MHz	≥3MHz	>EBW	RMS	Auto	Average	-

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

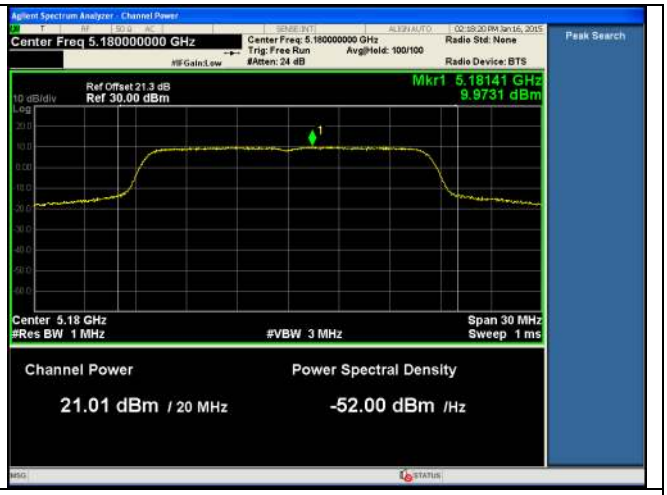
PSD measurement result

Type	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/MHz)					Limit (dBm/MHz)	Result
				Chain1	Chain2	Chain3	Chain4	Combined PSD		
PSD	802.11a	5180	Low	9.732	9.973	9.710	9.585	15.773	≤16.5	Pass
PSD	802.11a	5200	Mid	9.872	10.19	10.09	9.740	16.000	≤16.5	Pass
PSD	802.11a	5240	High	9.709	9.870	9.654	9.783	15.776	≤16.5	Pass
PSD	802.11n-20	5180	Low	9.549	10.03	9.975	9.602	15.817	≤16.5	Pass
PSD	802.11n-20	5200	Mid	9.793	9.737	9.671	9.593	15.817	≤16.5	Pass
PSD	802.11n-20	5240	High	9.927	9.842	9.518	9.673	15.720	≤16.5	Pass
PSD	802.11n-40	5190	Low	7.885	8.205	8.319	8.058	15.764	≤16.5	Pass
PSD	802.11n-40	5230	High	7.857	8.244	7.879	7.843	14.140	≤16.5	Pass
PSD	802.11ac-80	5210	Mid	4.230	4.880	4.439	4.546	13.980	≤16.5	Pass

Type	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/MHz)					Combined PSD	Limit (dBm/MHz)	Result
				Chain1	Chain2	Chain3	Chain4	correction factor (dB)			
PSD	802.11a	5745	Low	-0.981	-0.593	-0.859	-0.821	6.99	12.199	≤29.5	Pass
PSD	802.11a	5785	Mid	0.902	1.072	1.113	0.963	6.99	14.024	≤29.5	Pass
PSD	802.11a	5825	High	-.998	1.092	1.479	1.287	6.99	13.831	≤29.5	Pass
PSD	802.11n-20	5745	Low	-0.952	-1.055	-1.037	-0.884	6.99	12.029	≤29.5	Pass
PSD	802.11n-20	5785	Mid	0.943	1.116	1.007	1.010	6.99	14.030	≤29.5	Pass
PSD	802.11n-20	5825	High	1.156	1.071	1.089	1.399	6.99	14.191	≤29.5	Pass
PSD	802.11n-40	5755	Low	-5.993	-6.081	-5.919	-5.830	6.99	7.056	≤29.5	Pass
PSD	802.11n-40	5795	High	-2.595	-3.035	-2.631	-2.613	6.99	10.296	≤29.5	Pass
PSD	802.11ac-80	5775	Mid	-10.207	-10.336	-10.395	-10.134	6.99	2.744	≤29.5	Pass
Note	BW correction factor = 10log(500kHz/RBW)										

Test Plots

PSD-802.11a-5180M-chain1



PSD-802.11a-5180M-chain2

PSD-802.11a-5180M-chain3

PSD-802.11a-5180M-chain4

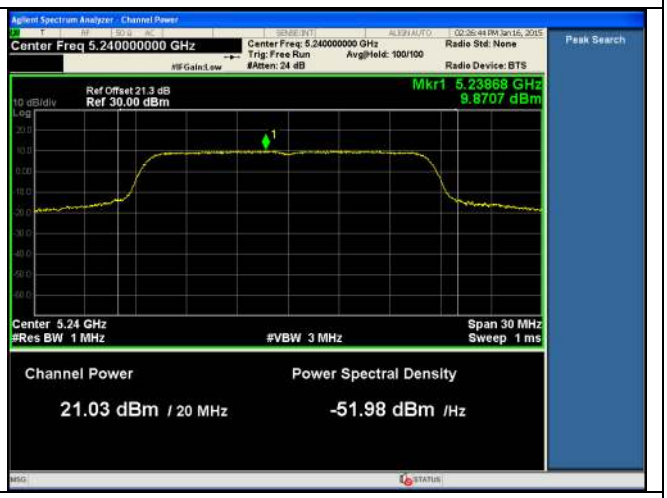
PSD-802.11a-5200M-chain1

PSD-802.11a-5200M-chain2

PSD-802.11a-5200M-chain3

PSD-802.11a-5200M-chain4

PSD-802.11a-5240M-chain1



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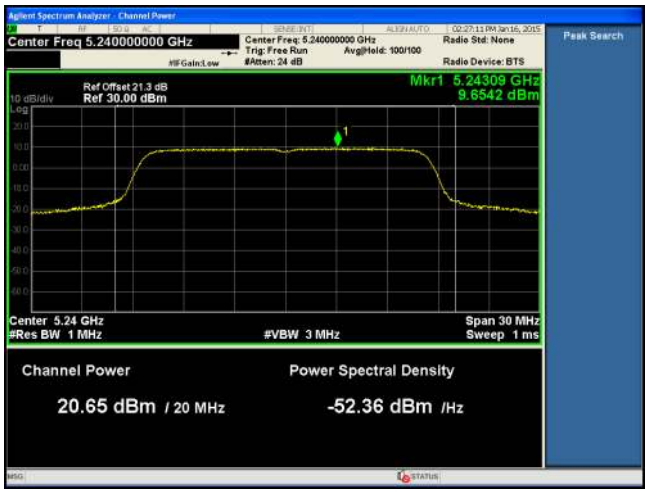
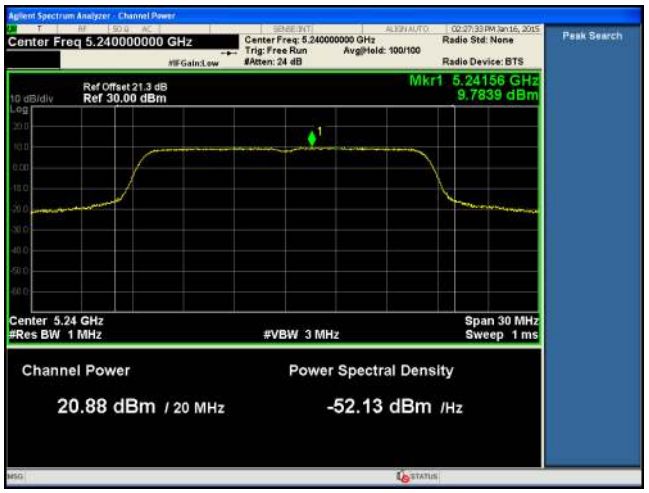


PSD-802.11a-5240M-chain3

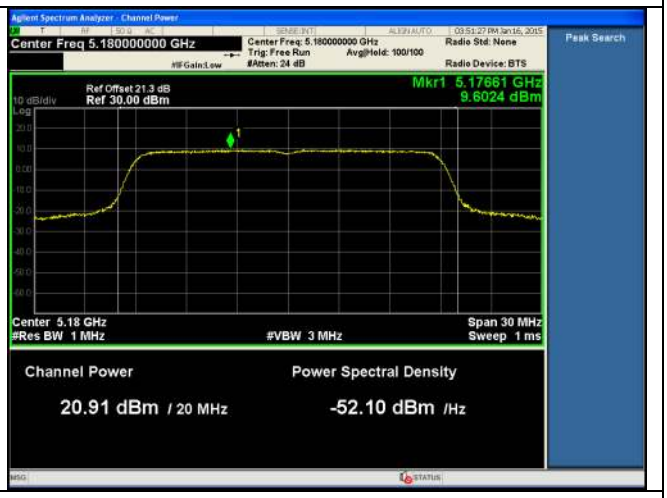


PSD-802.11a-5240M-chain4

PSD-802.11n-20M -5180M-chain1

PSD-802.11n-20M -5180M-chain2

PSD-802.11n-20M -5180M-chain3



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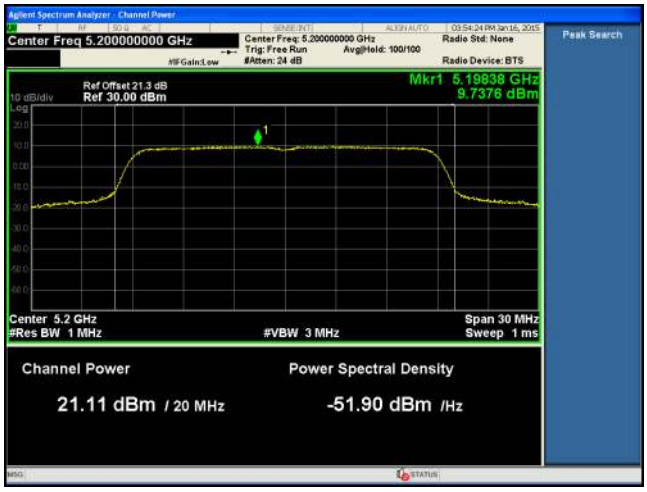
PSD-802.11n-20M-5200M-chain1



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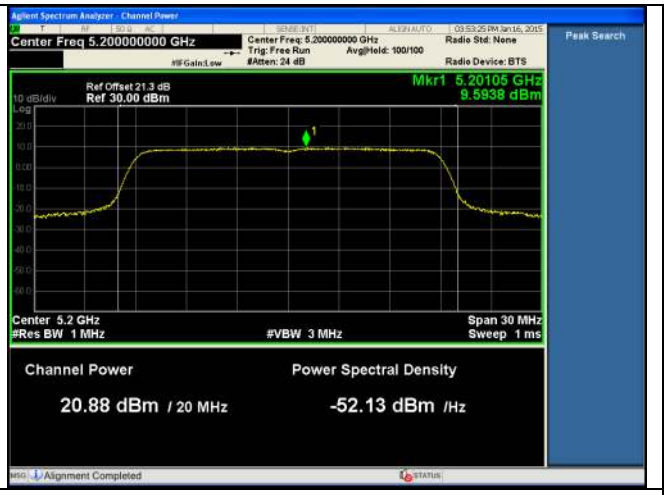
PSD-802.11n-20M-5200M-chain3



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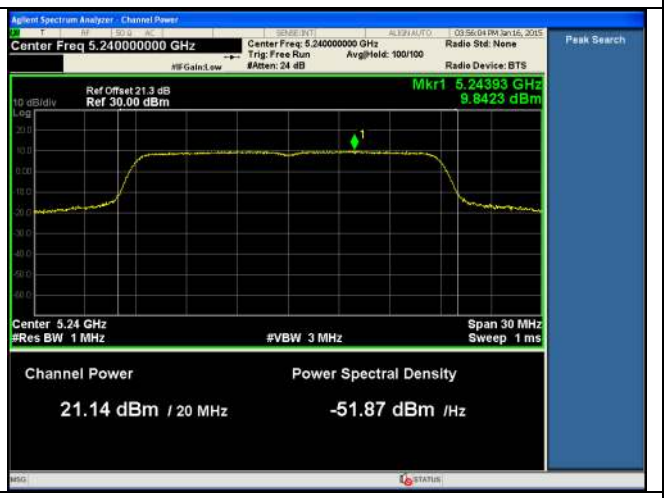
PSD-802.11n-20M-5240M-chain1



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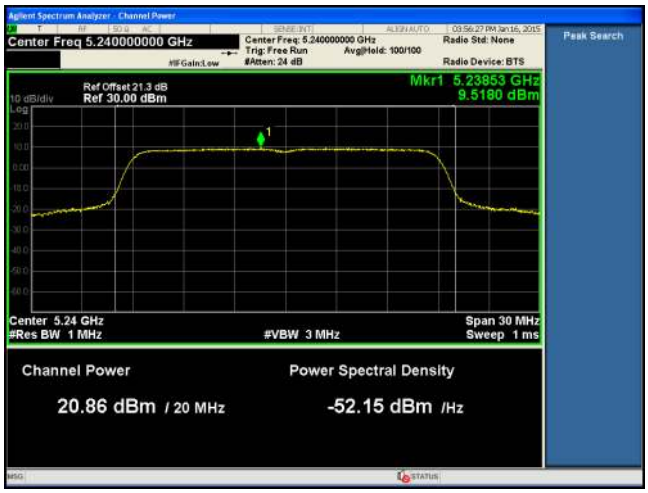
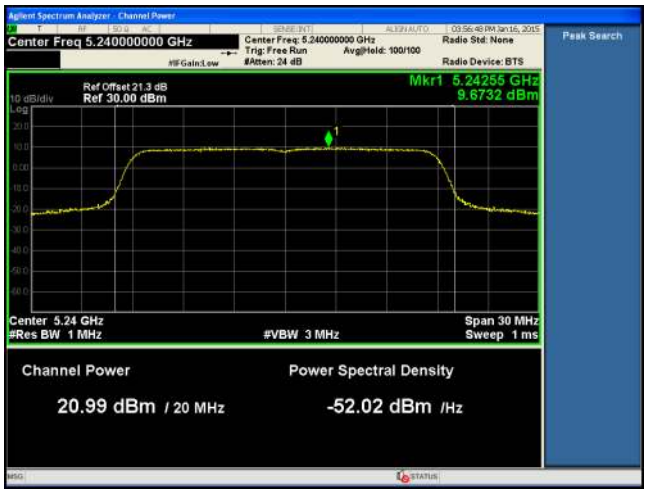


PSD-802.11n-20M-5240M-chain3



PSD-802.11n-20M-5240M-chain4

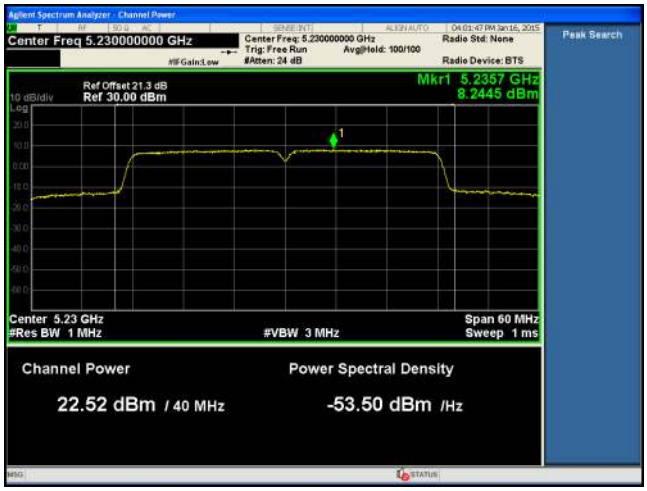
PSD-802.11n-40M-5190M-chain1

PSD-802.11n-40M-5190M-chain2

PSD-802.11n-40M-5190M-chain3

PSD-802.11n-40M-5190M-chain4

PSD-802.11n-40M-5230M-chain1



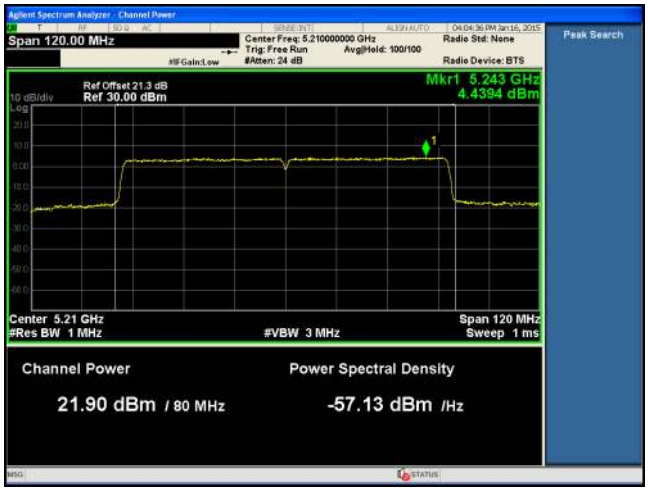
PSD-802.11n-40M-5230M-chain2

PSD-802.11n-40M-5230M-chain3

PSD-802.11n-40M-5230M-chain4

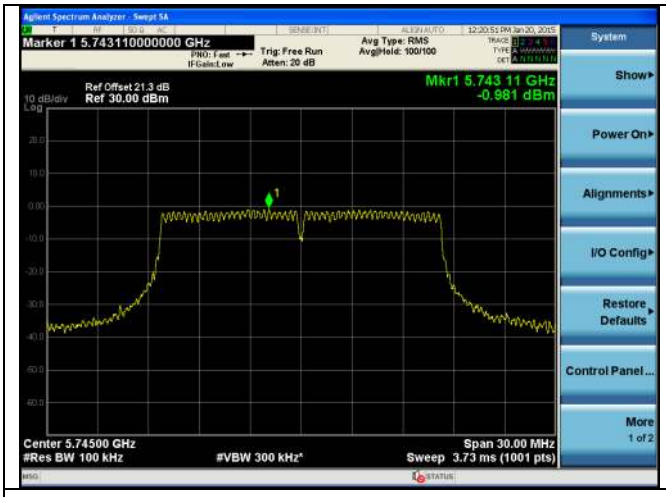
PSD-802.11ac-80M-5210M-chain1

PSD-802.11ac-80M-5210M-chain2



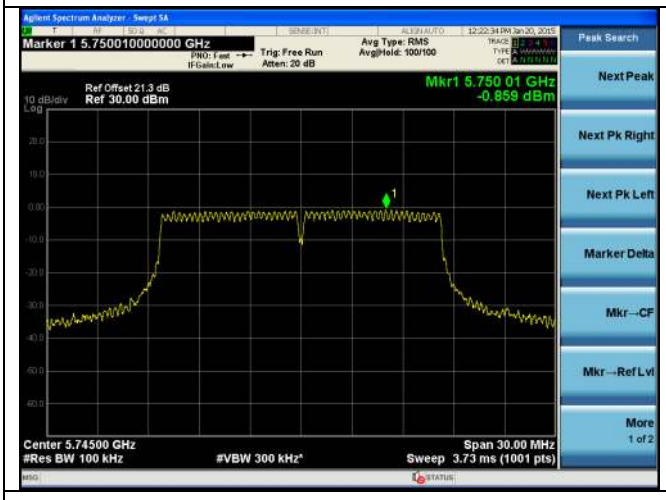
PSD-802.11ac-80M-5210M-chain3

PSD-802.11ac-80M-5210M-chain4



PSD-802.11a-5745M-chain1

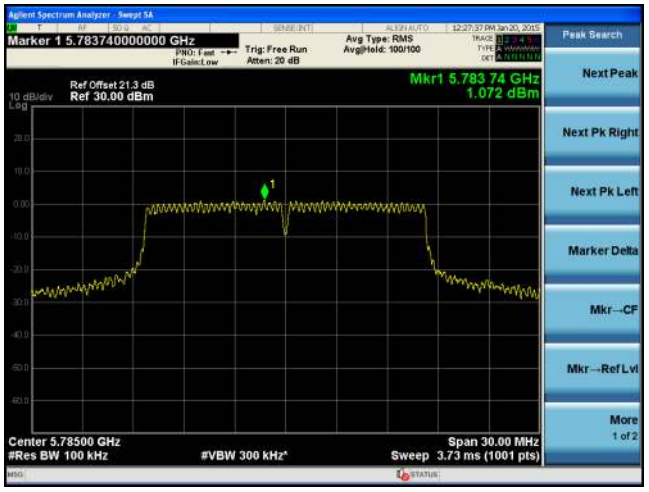
PSD-802.11a-5745M-chain2



PSD-802.11a-5745M-chain3

PSD-802.11a-5745M-chain4

PSD-802.11a-5785M-chain1



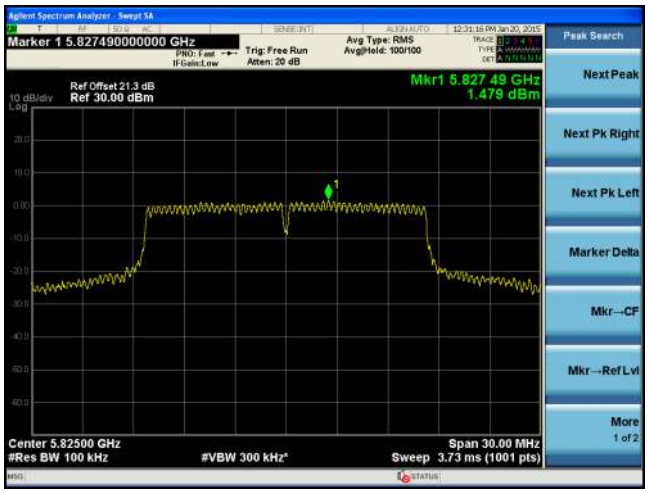
PSD-802.11a-5785M-chain2

PSD-802.11a-5785M-chain3

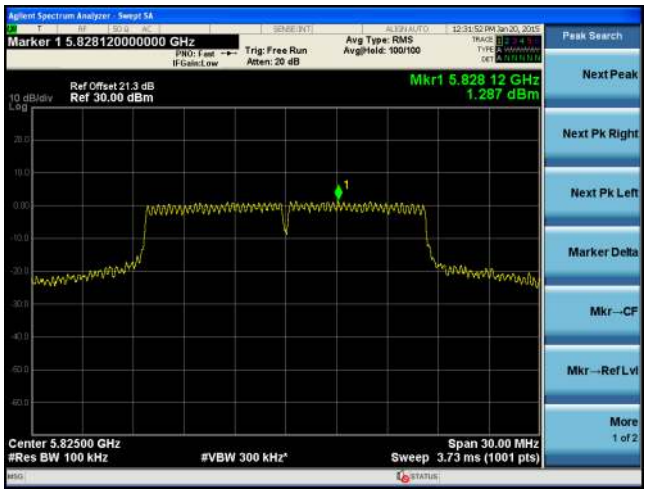
PSD-802.11a-5785M-chain4

PSD-802.11a-5825M-chain1

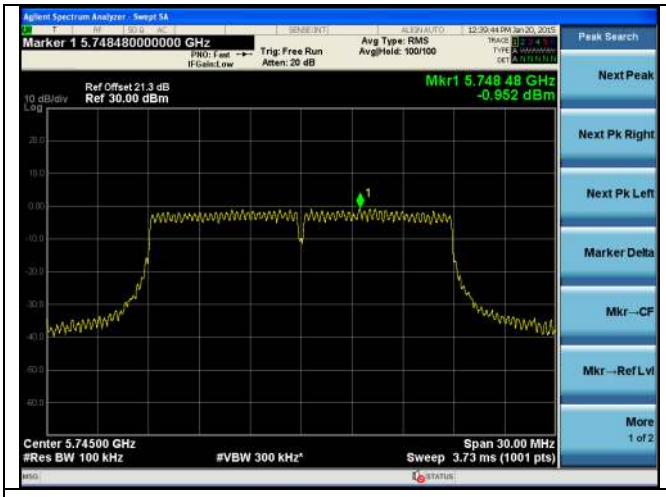
PSD-802.11a-5825M-chain2



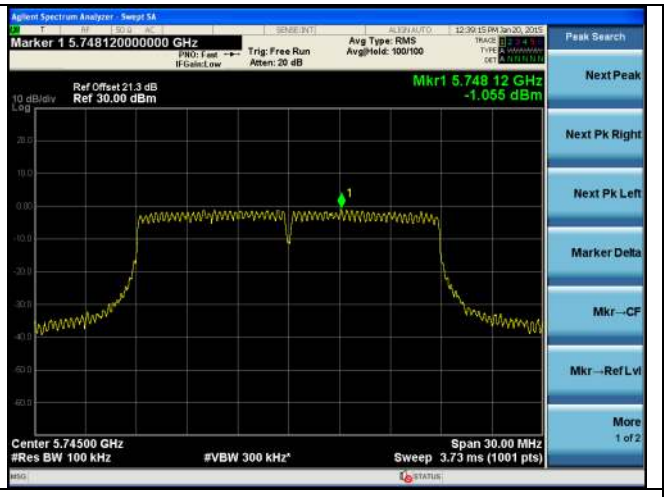
PSD-802.11a-5825M-chain3



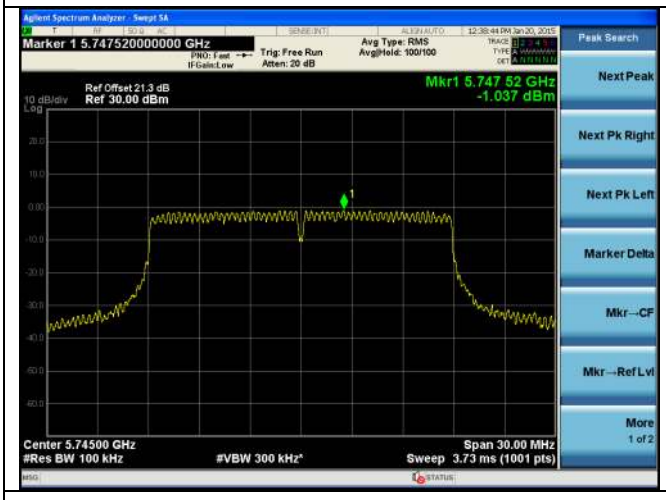
PSD-802.11a-5825M-chain4



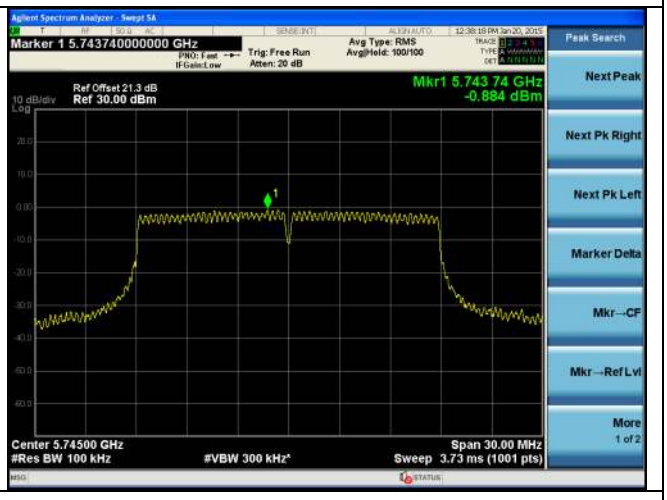
PSD-802.11n-20M -5745M-chain1



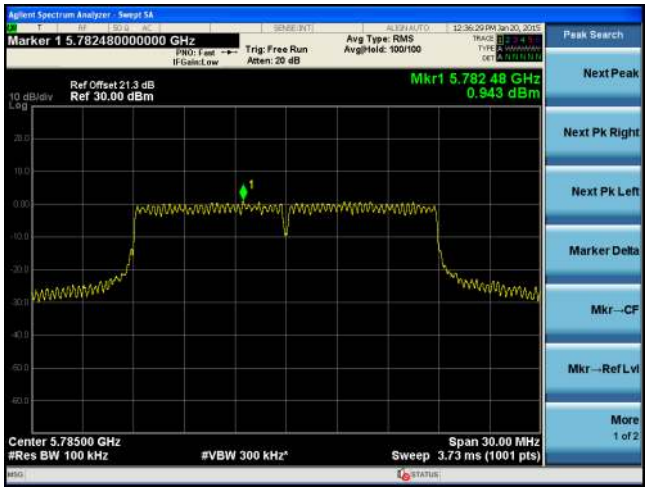
PSD-802.11n-20M -5745M-chain2



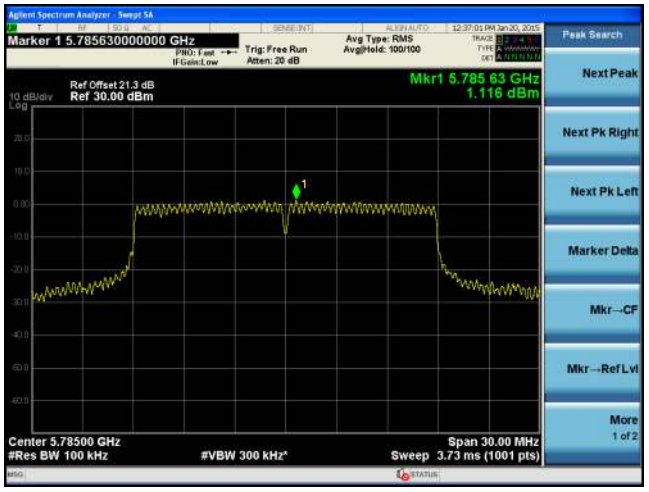
PSD-802.11n-20M -5745M-chain3



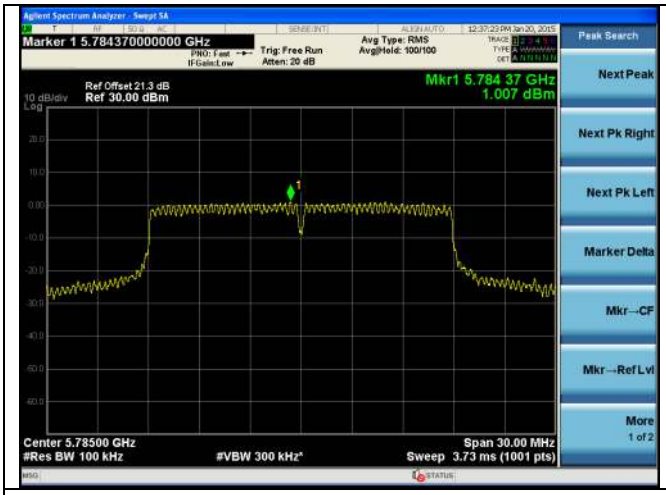
PSD-802.11n-20M -5745M-chain4



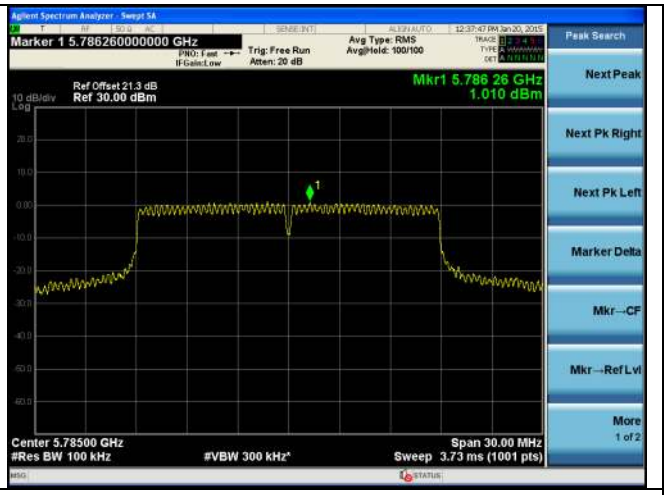
PSD-802.11n-20M-5785M-chain1



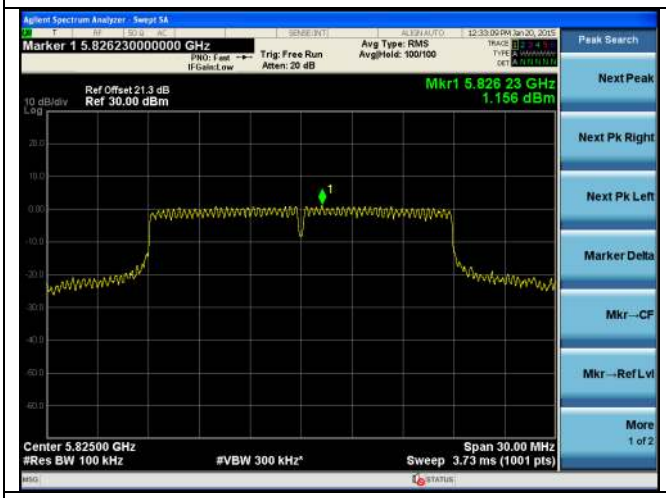
PSD-802.11n-20M-5785M-chain2



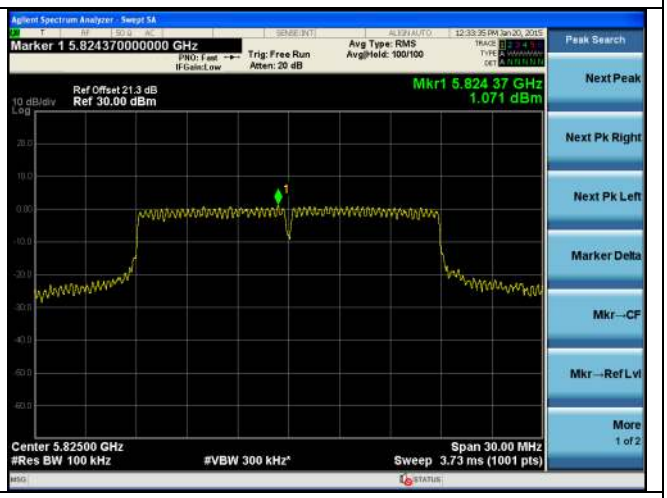
PSD-802.11n-20M-5785M-chain3



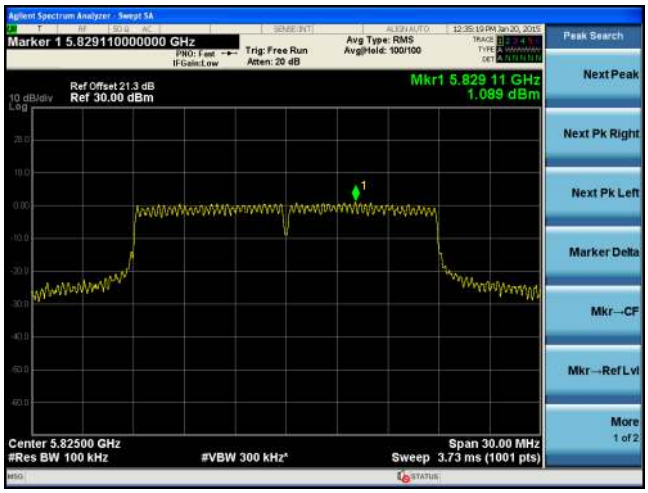
PSD-802.11n-20M-5785M-chain4



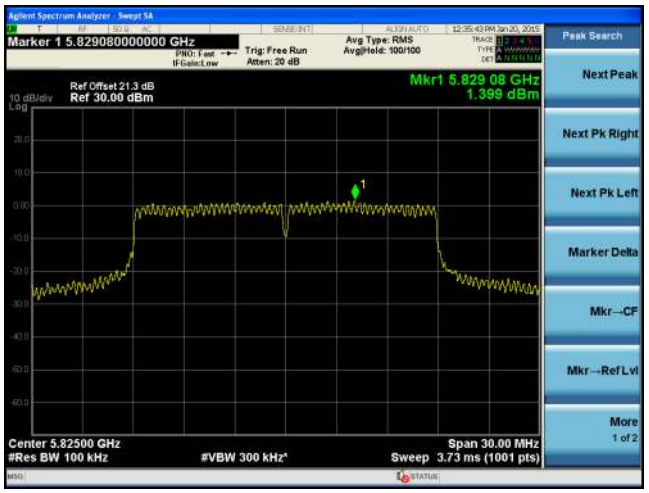
PSD-802.11n-20M-5825M-chain1



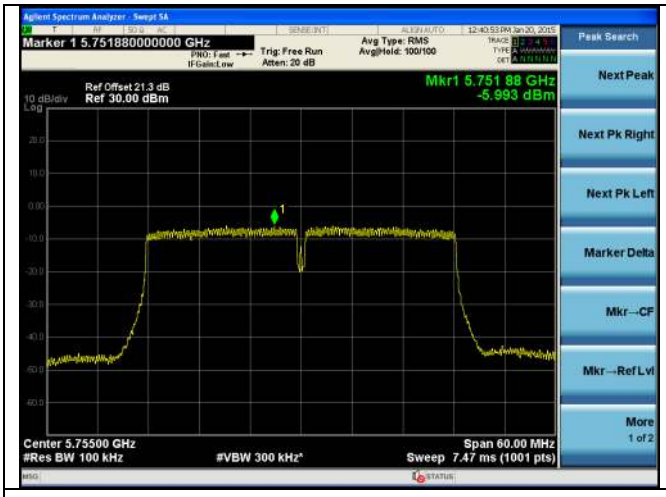
PSD-802.11n-20M-5825M-chain2



PSD-802.11n-20M-5825M-chain3



PSD-802.11n-20M-5825M-chain4



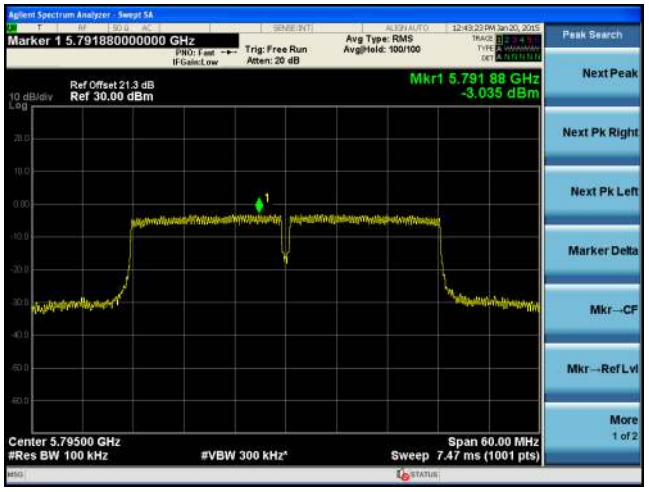
PSD-802.11n-40M-5755M-chain1

PSD-802.11n-40M-5755M-chain2

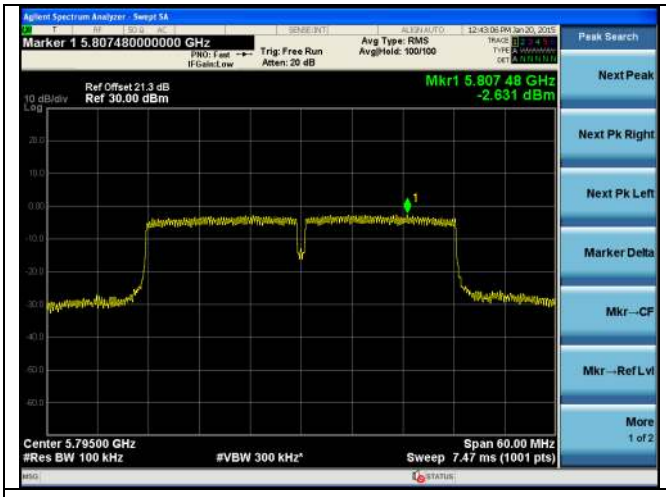
PSD-802.11n-40M-5755M-chain3

PSD-802.11n-40M-5755M-chain4

PSD-802.11n-40M-5795M-chain1

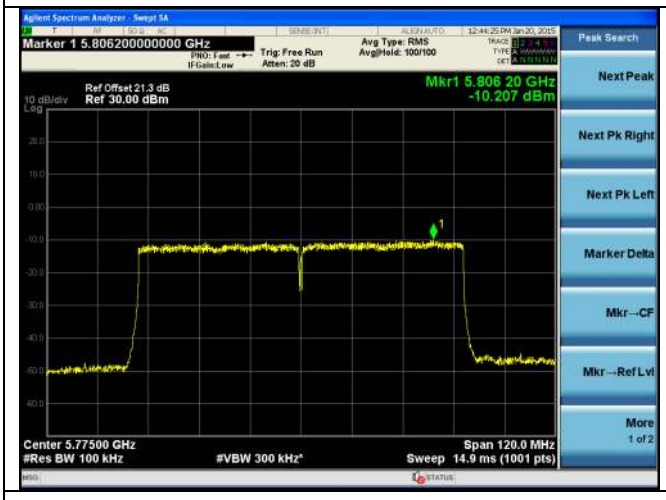


PSD-802.11n-40M-5795M-chain2



PSD-802.11n-40M-5795M-chain3

PSD-802.11n-40M-5795M-chain4



PSD-802.11ac-80M-5775M-chain1

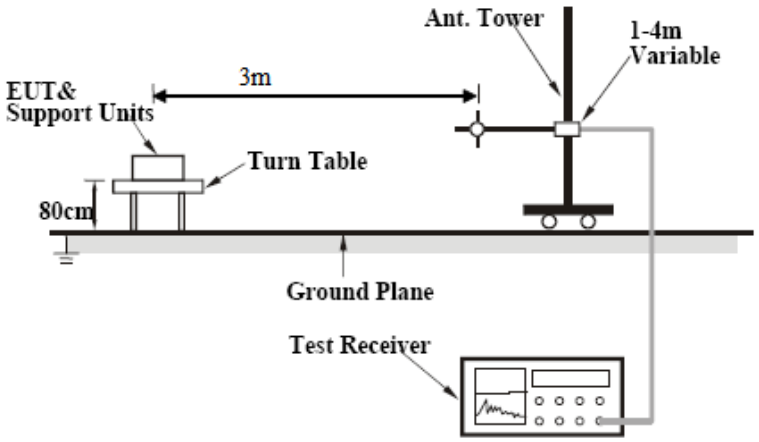
PSD-802.11ac-80M-5775M-chain2

PSD-802.11ac-80M-5775M-chain3

PSD-802.11ac-80M-5775M-chain4

10.5 Radiated Emissions below 1GHz

Requirement(s):

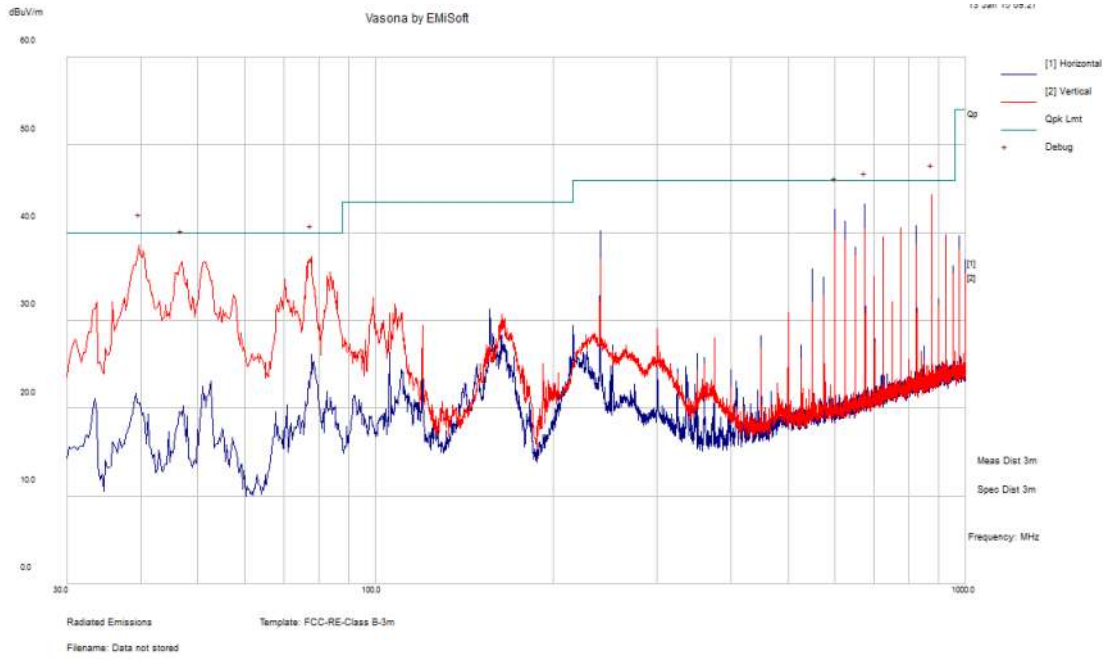
<table>
<tr><th>Spec</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§
15.407(b)
15.209 (a)</td><td>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following 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></td><td>☒</td></tr>
<tr><td>Test Setup</td><td> 
</td></tr>
<tr><td>Procedure</td><td>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.</td></tr>
<tr><td>Remark</td><td>The EUT was scanned up to 1GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.</td></tr>
<tr><td>Result</td><td>☒ Pass ☐ Fail</td></tr>
</table>

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):	26.1	Result	Pass
	Humidity (%)	47.5		
	Atmospheric (mbar):	1020		
Mains Power:	120VAC, 60Hz			
Tested by:	Ricky Wang			
Test Date:	01/29/2015			
Remarks:	N/A			

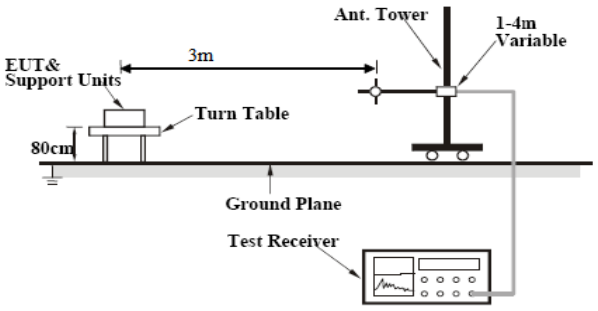


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
39.53	55.71	1.16	-25.82	31.05	Quasi Max	V	108.00	179.00	40.00	-8.95	Pass
875.00	50.66	4.96	-17.04	38.58	Quasi Max	V	100.00	202.00	46.00	-7.42	Pass
674.99	57.38	4.42	-19.57	42.23	Quasi Max	H	188.00	183.00	46.00	-3.77	Pass
77.84	63.87	1.48	-31.43	33.92	Quasi Max	V	124.00	277.00	40.00	-6.08	Pass
46.94	61.10	1.16	-28.76	33.50	Quasi Max	V	100.00	191.00	40.00	-6.50	Pass
599.99	58.06	4.17	-20.60	41.63	Quasi Max	H	100.00	62.00	46.00	-4.37	Pass

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

10.6 Radiated Spurious Emissions between 1GHz – 18GHz

Requirement(s):

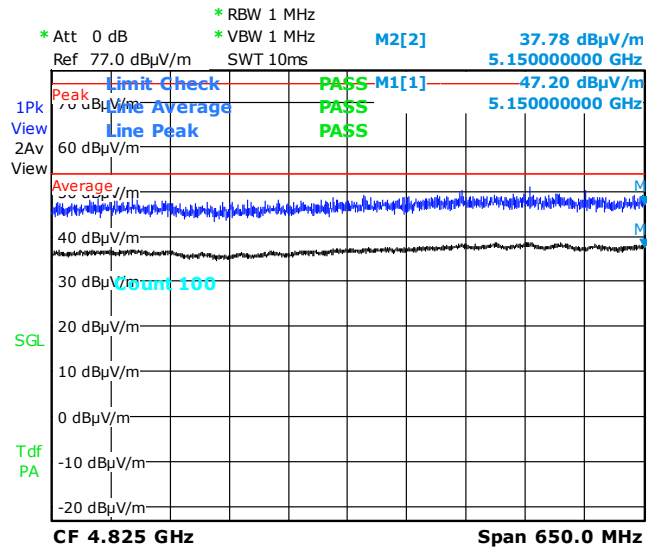
Spec	Item	Requirement	Applicable
47CFR§ 15.407(b)(2), 15.407(b)(6)	(1)	For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.	☒
	(2)	For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.	☐
	(3)	For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz.	☐
	(4)	For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz.	☒
	(5)	Restricted band, emission must also comply with the radiated emission limits specified in 15.209	☒
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. An average 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 40GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.		
Result	☒ Pass ☐ Fail		

Equipment Setting

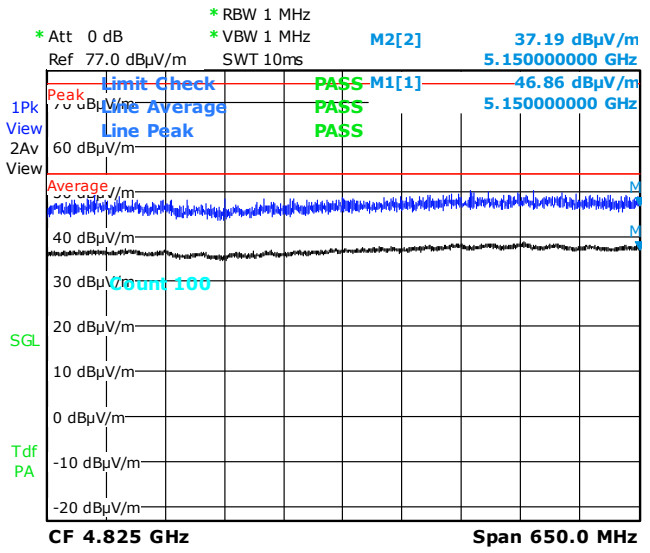
Test	RBW	VBW	Span	Detector	Sweep	Trace	Notes
Radiated Spurious Emission	1MHz	3MHz	1GHz - 40 GHz	Peak	Auto	Max hold	PK Measurement
Radiated Spurious Emission	1MHz	10Hz	1GHz - 40 GHz	Peak	Auto	Max hold	Ave Measurement

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

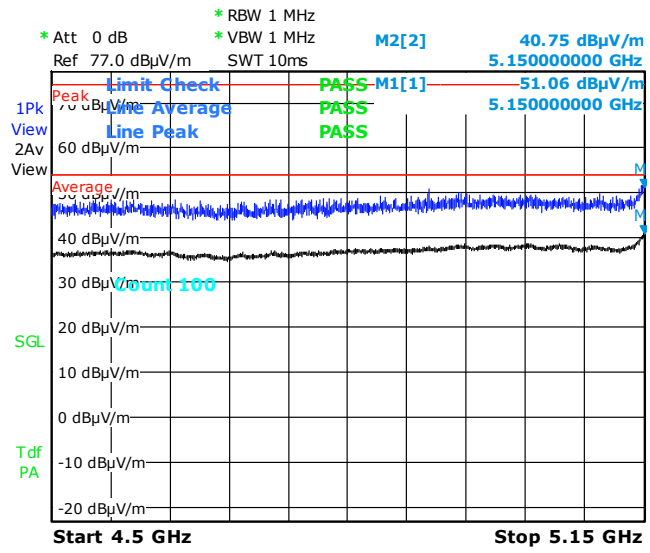
Restricted Band Measurement Plots:



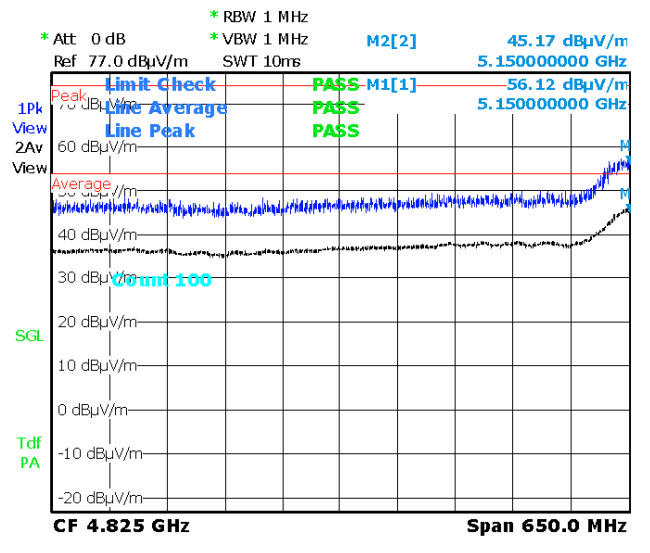
Restriced Band-802.11a 5180M– Edge Freq 5150MHz



Restriced Band-802.11n-20M 5180M– Edge Freq 5150MHz

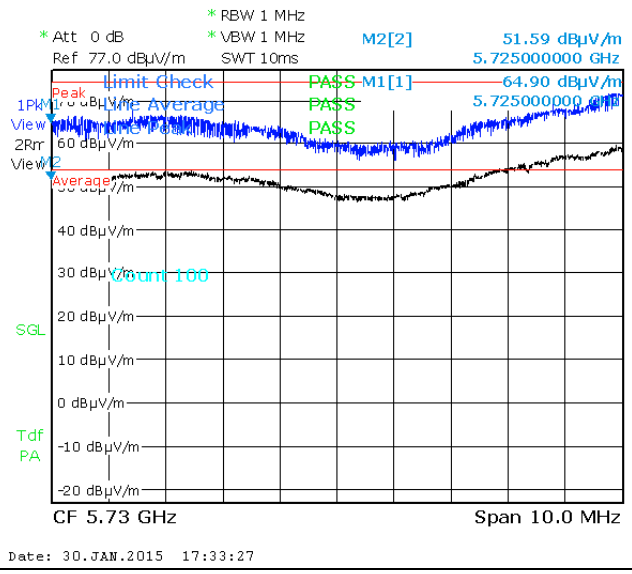


Restriced Band-802.11n-40M 5190M– Edge Freq 5150MHz

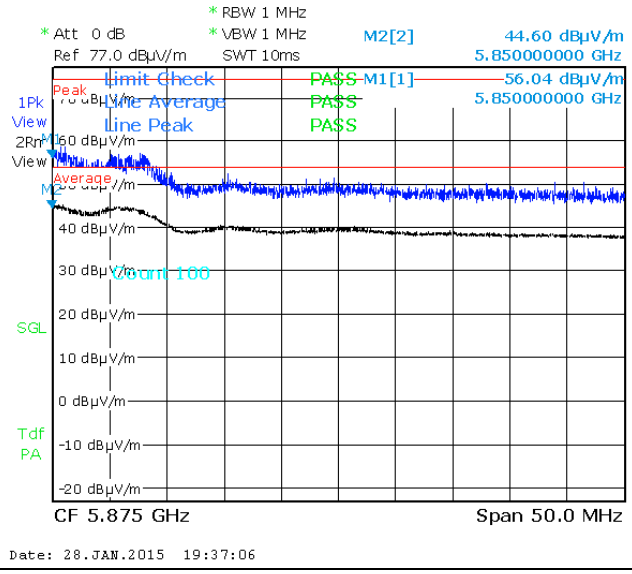


Restriced Band-802.11ac-80M 5210M– Edge Freq 5150MHz

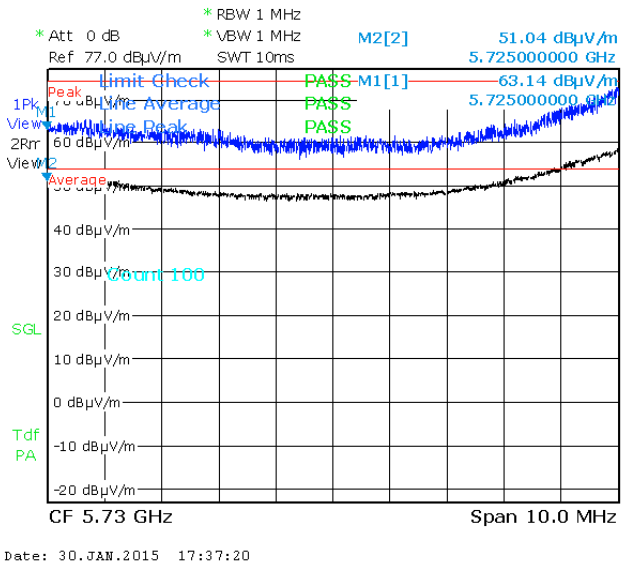
Radiated Band Edge Measurement Plots:



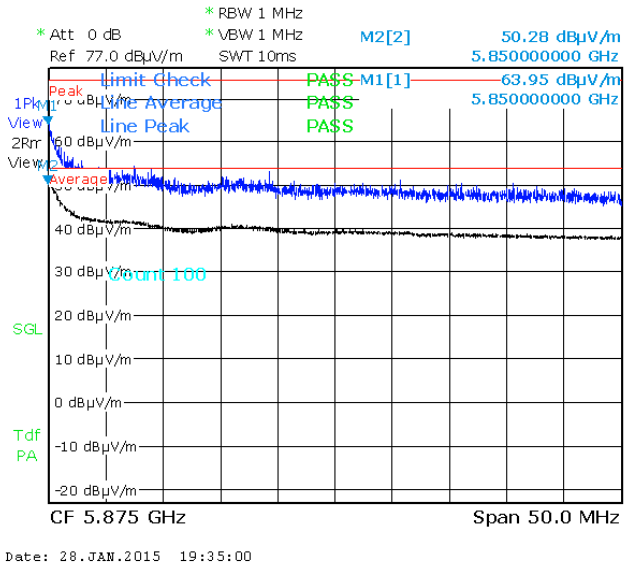
Radiated Band Edge-802.11a 5745M– Edge Freq 5725MHz



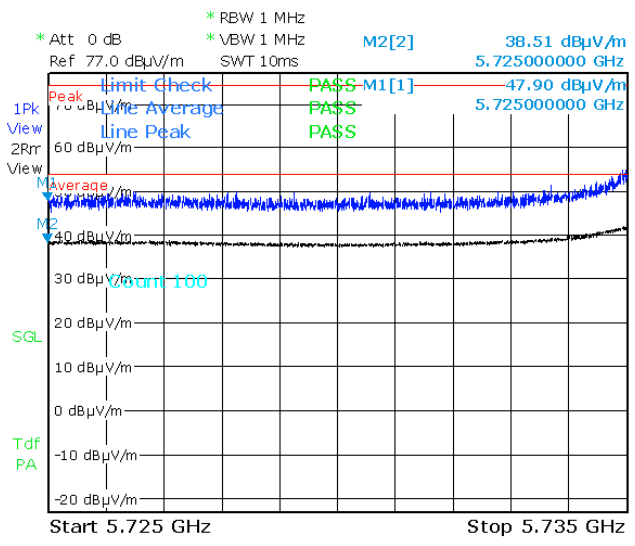
Radiated Band Edge-802.11a 5825M– Edge Freq 5850MHz



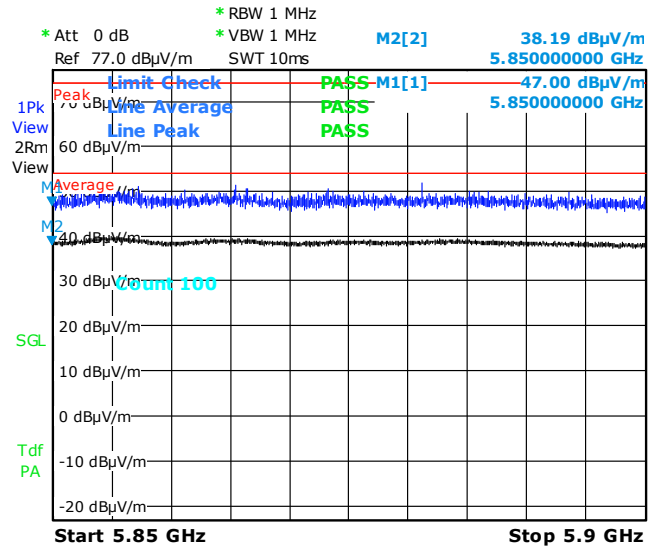
Radiated Band Edge-802.11n 5745M– Edge Freq 5725MHz



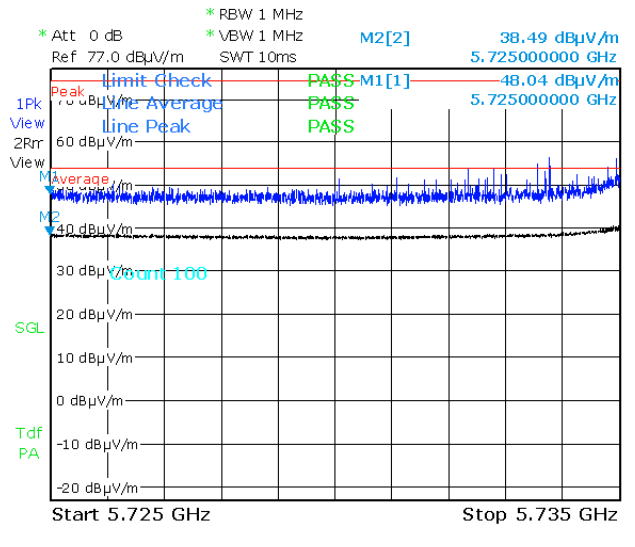
Radiated Band Edge-802.11n 5825M– Edge Freq 5850MHz



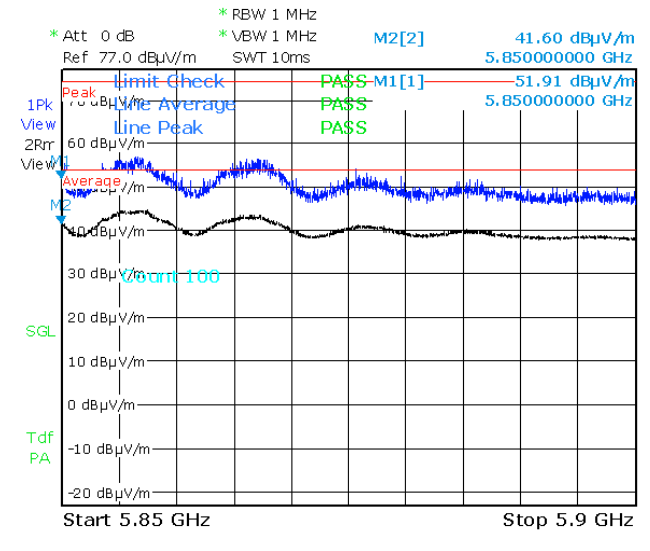
Radiated Band Edge-802.11n 5755M– Edge Freq 5725MHz



Radiated Band Edge-802.11n 5795M– Edge Freq 5850MHz



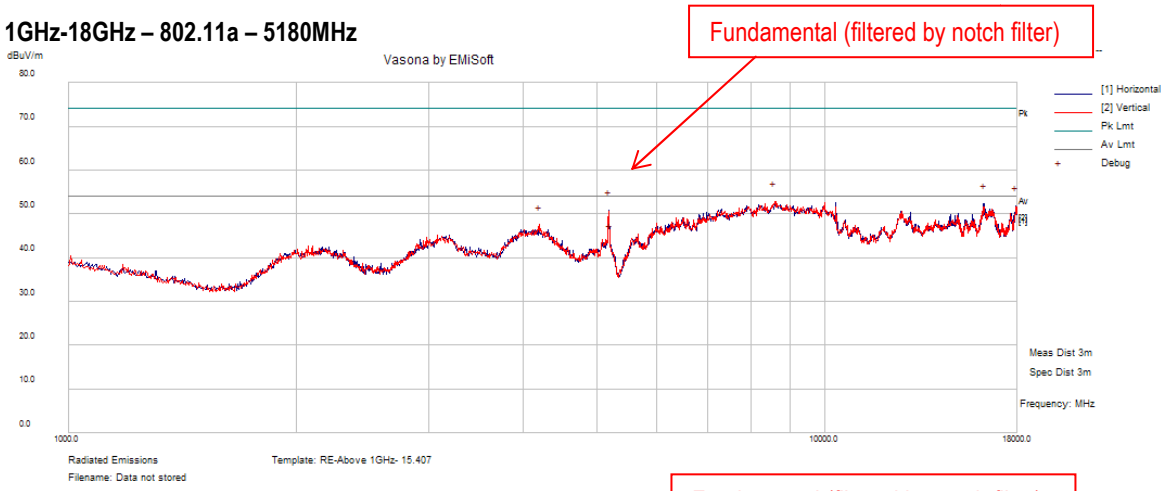
Restriced Band-802.11ac 5775M– Edge Freq 5725MHz



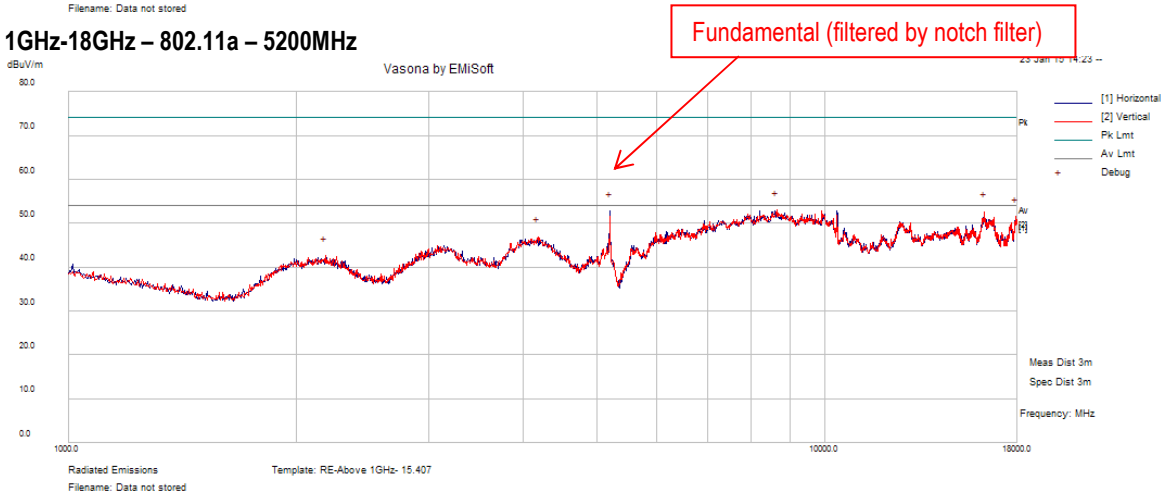
Radiated Band Edge-802.11ac 5775M– Edge Freq 5850MHz

Radiated Emission Test Results (Above 1GHz)

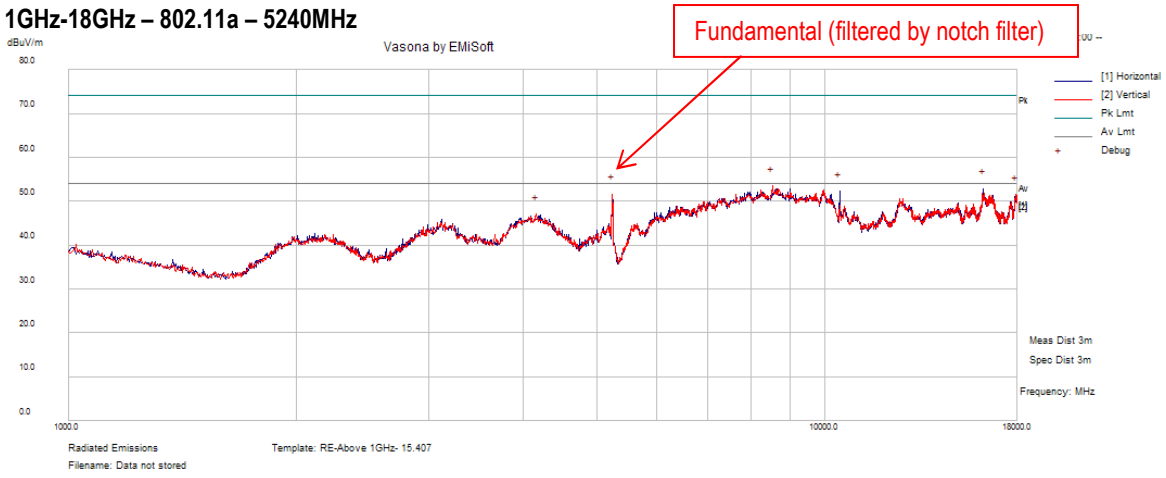
1GHz-18GHz – 802.11a – 5180MHz



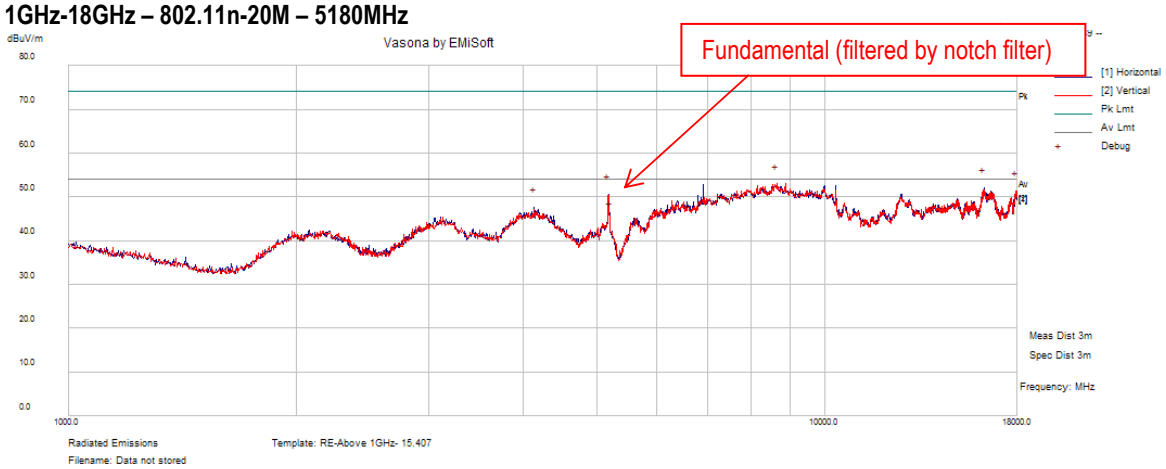
1GHz-18GHz – 802.11a – 5200MHz



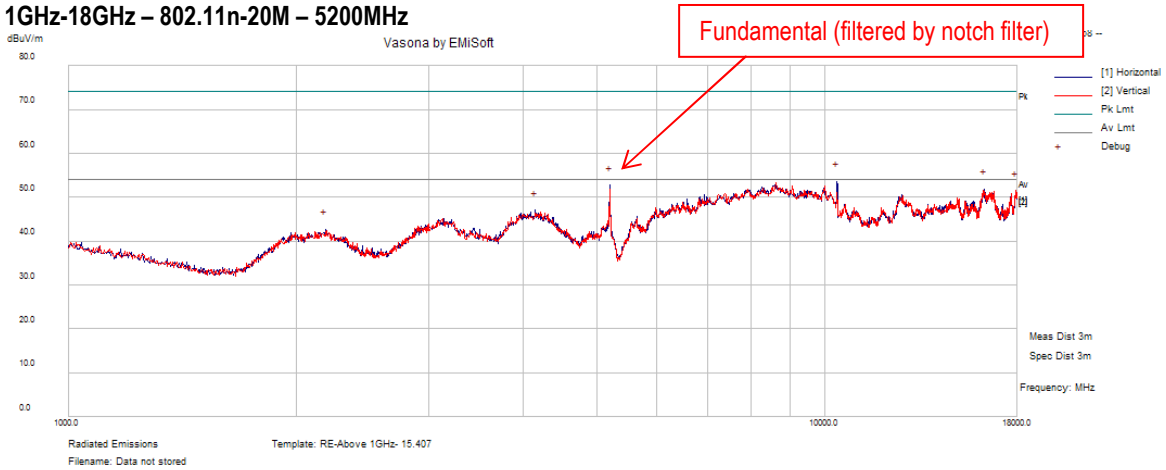
1GHz-18GHz – 802.11a – 5240MHz



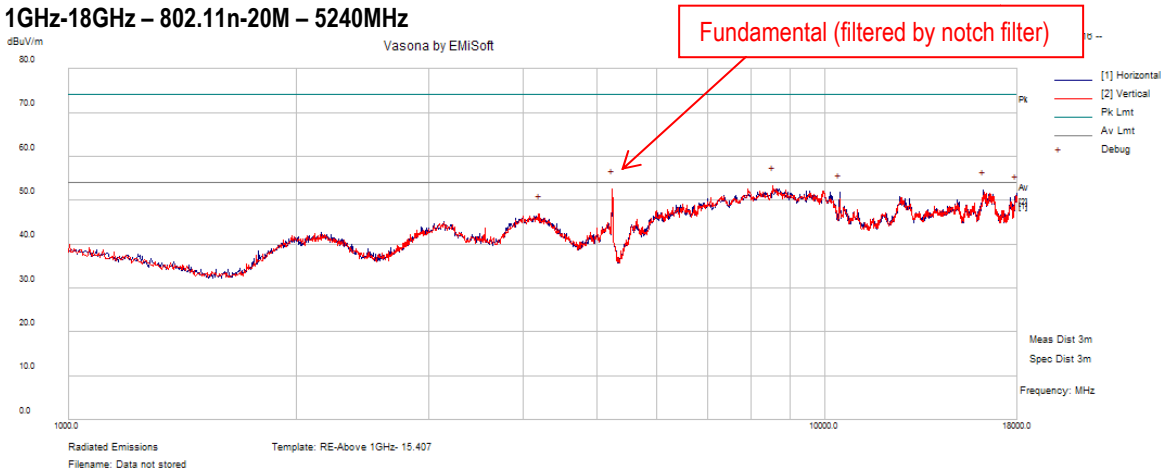
1GHz-18GHz – 802.11n-20M – 5180MHz



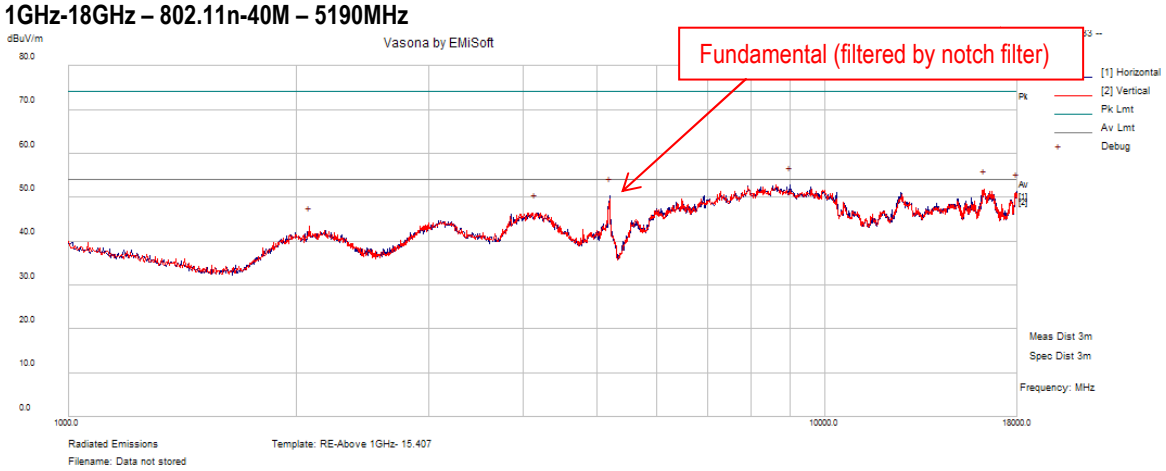
1GHz-18GHz – 802.11n-20M – 5200MHz



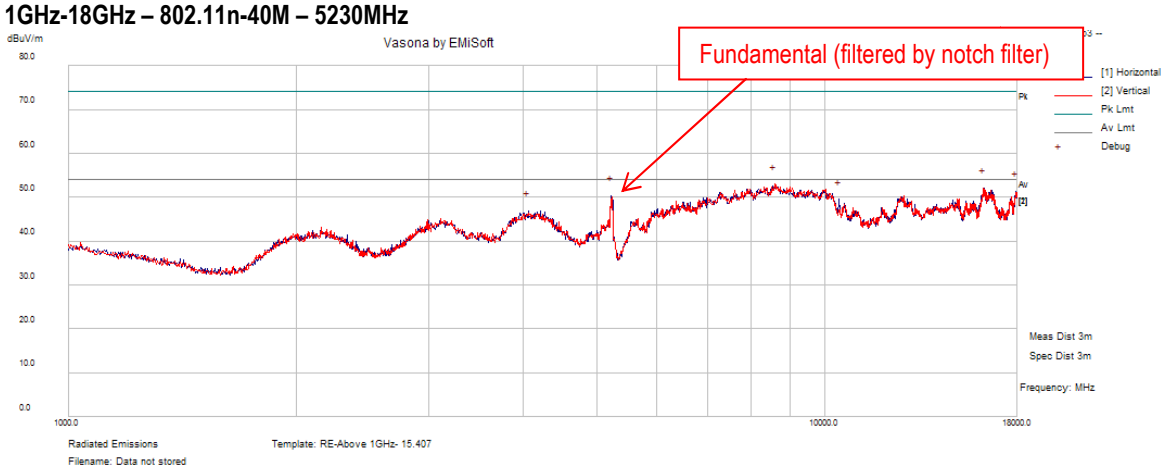
1GHz-18GHz – 802.11n-20M – 5240MHz



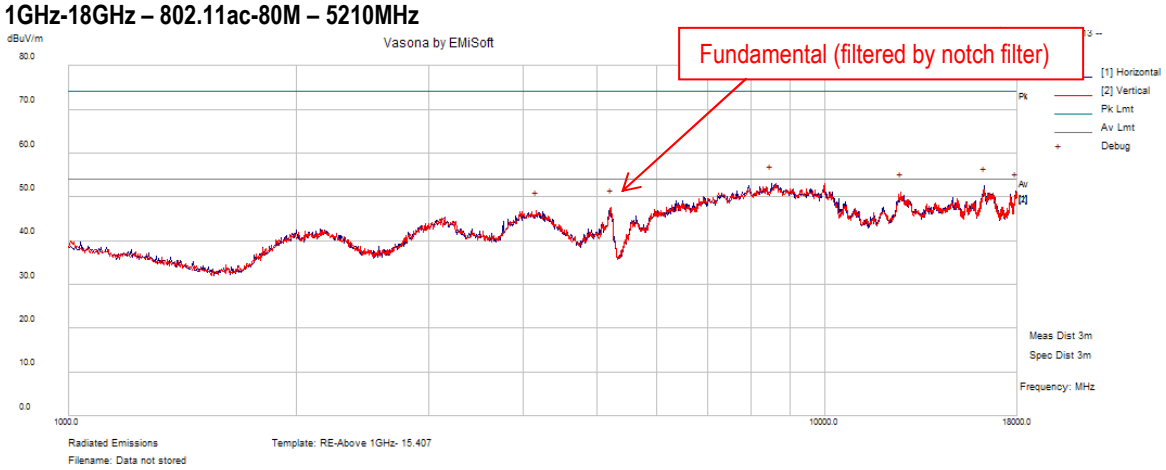
1GHz-18GHz – 802.11n-40M – 5190MHz



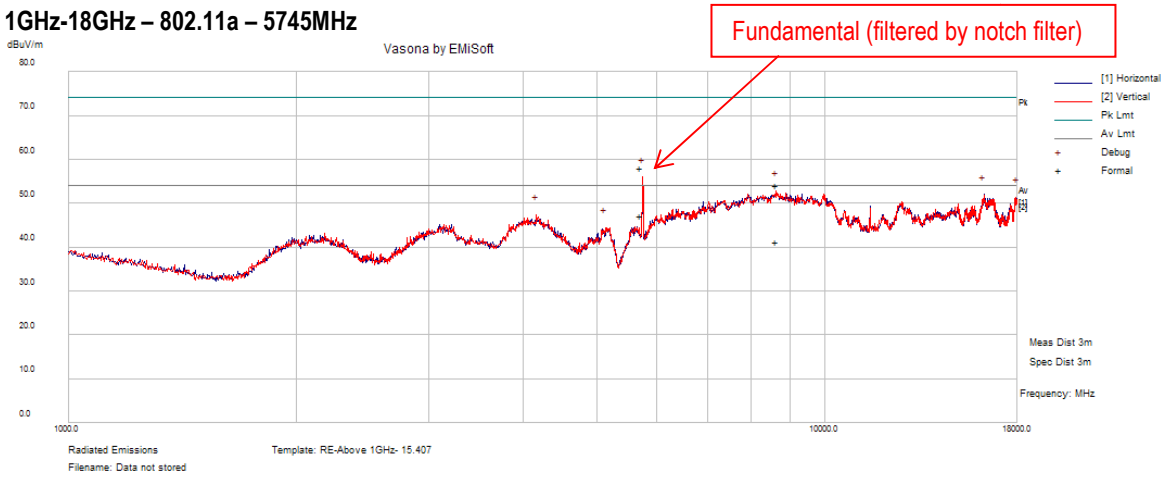
1GHz-18GHz – 802.11n-40M – 5230MHz



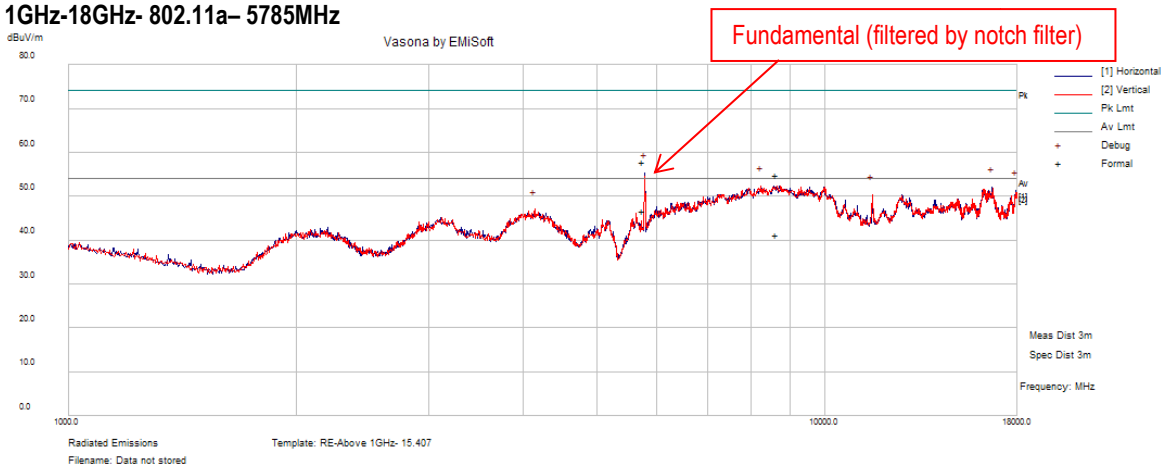
1GHz-18GHz – 802.11ac-80M – 5210MHz



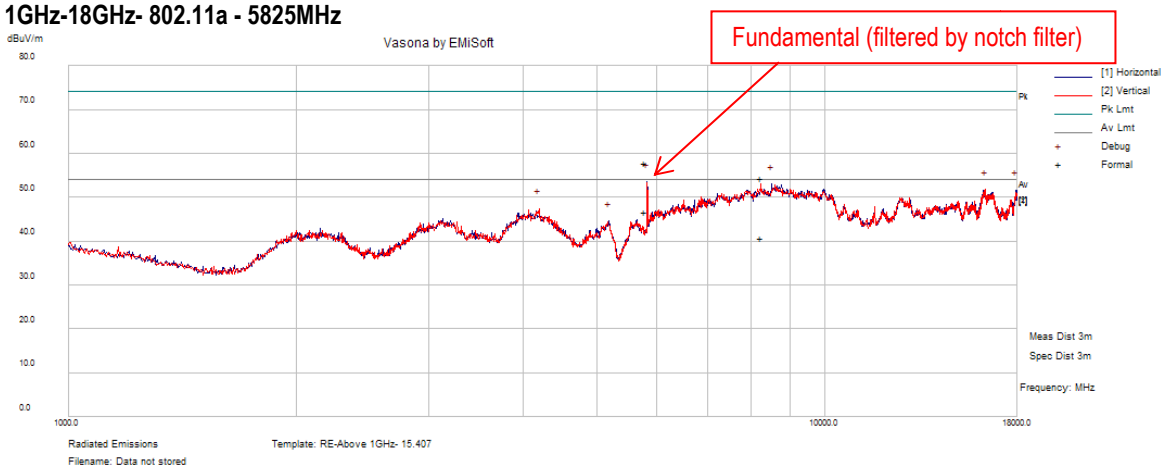
1GHz-18GHz – 802.11a – 5745MHz



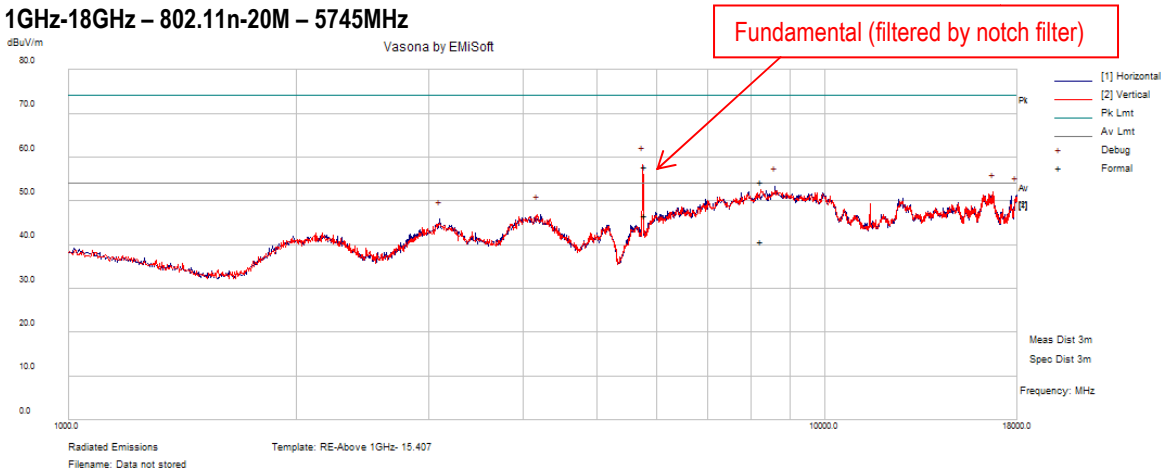
1GHz-18GHz- 802.11a– 5785MHz



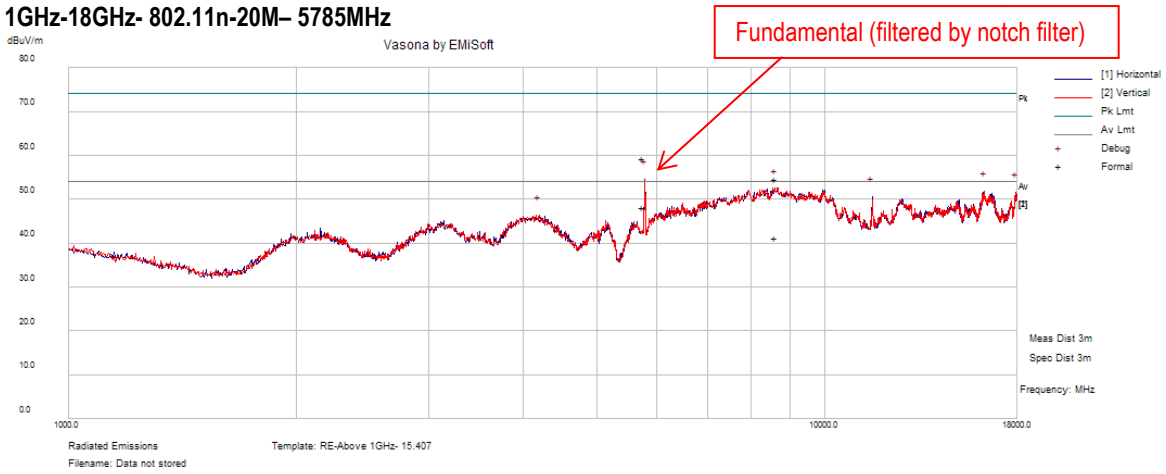
1GHz-18GHz- 802.11a - 5825MHz



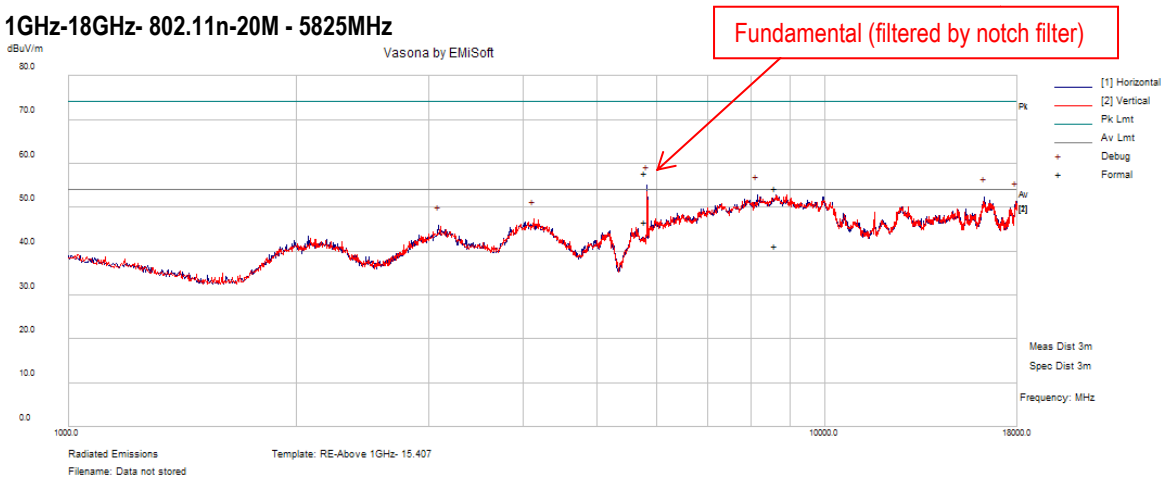
1GHz-18GHz – 802.11n-20M – 5745MHz



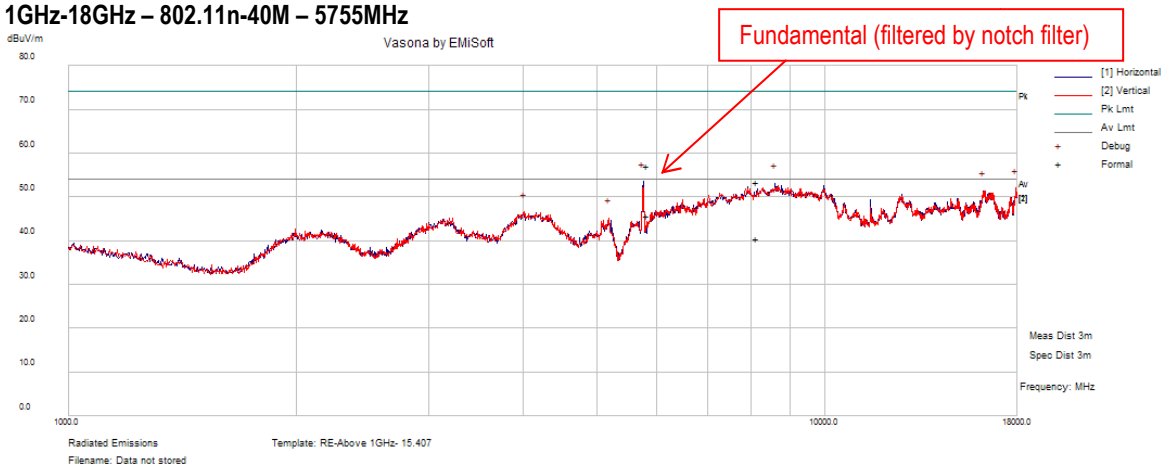
1GHz-18GHz- 802.11n-20M– 5785MHz



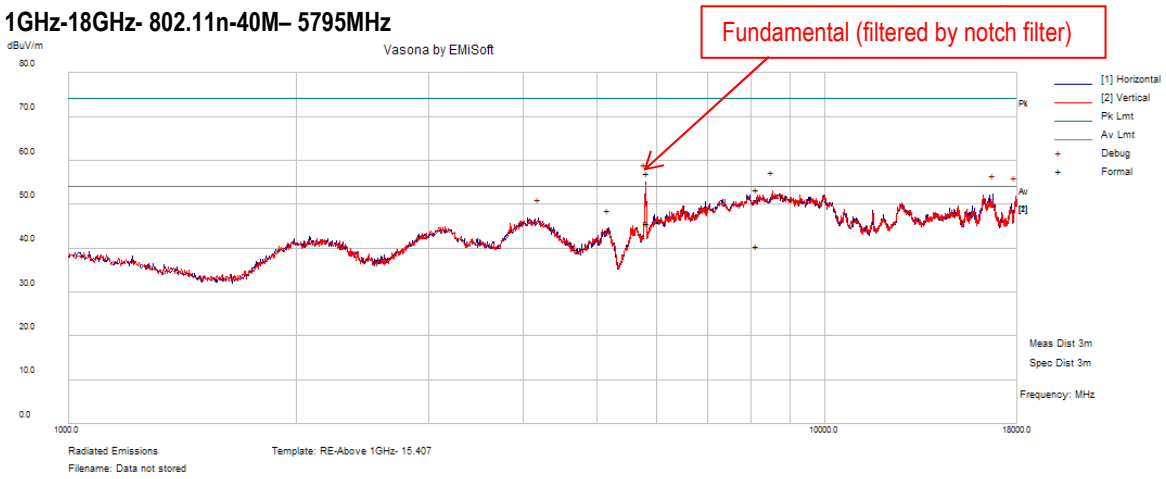
1GHz-18GHz- 802.11n-20M - 5825MHz



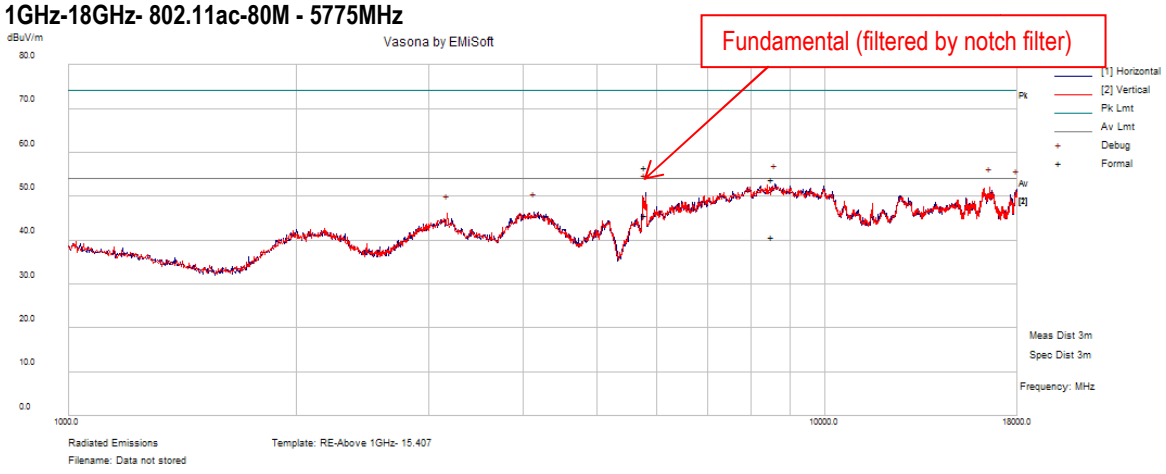
1GHz-18GHz – 802.11n-40M – 5755MHz



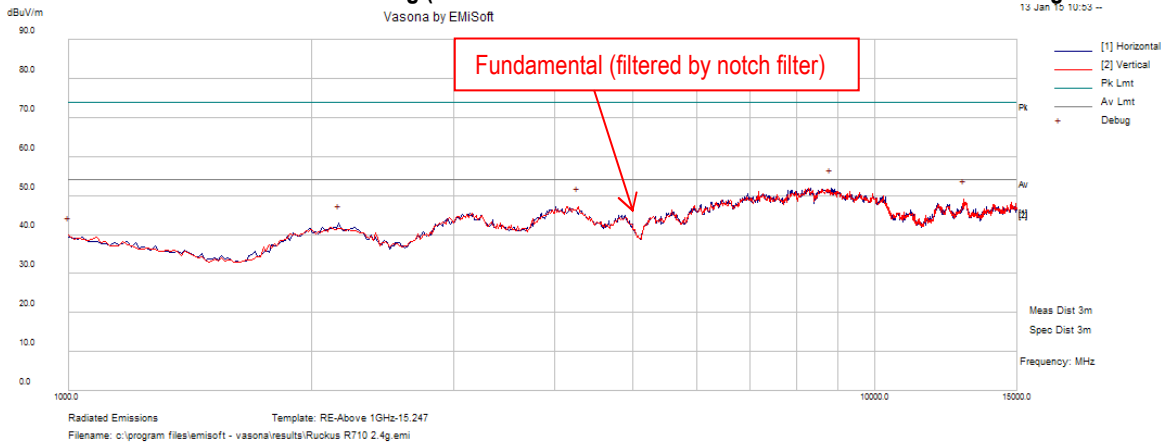
1GHz-18GHz- 802.11n-40M– 5795MHz



1GHz-18GHz- 802.11ac-80M - 5775MHz

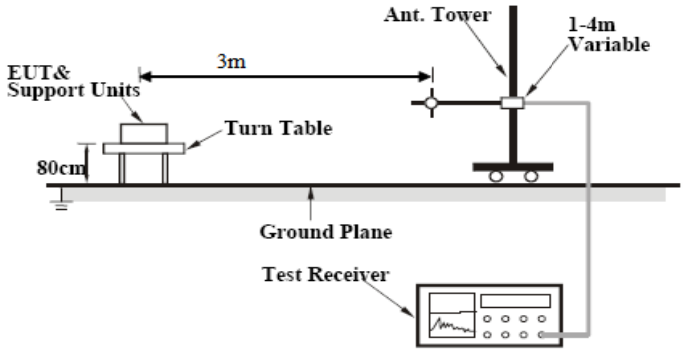


Above 1GHz-18GHz- Collocation testing (2.4GHz WLAN & 5GHz WLAN on the main-board transmitting simultaneously)



10.7 Radiated Spurious Emissions above 18GHz

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR§15.247(d), RSS210(A8.5)	a)	For non-restricted band, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209(a) is not required ☐ 20 dB down ☒ 30 dB down	☒
	b)	or restricted band, emission must also comply with the radiated emission limits specified in 15.209	☒
Test Setup			
Procedure		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. An average 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 40GHz. Both horizontal and vertical polarities were investigated. No outstanding emission was found except the noise floor emission.	
Result		☒ Pass ☐ Fail	

Equipment Setting

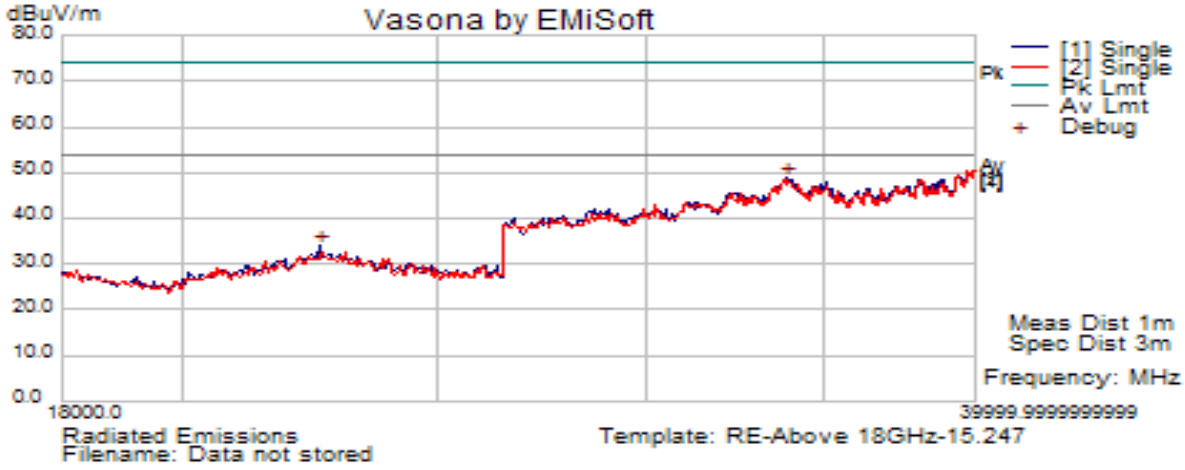
TEST	RBW	VBW	SPAN	Detector	SWEEP	Trace	NOTES
Radiated Spurious Emission	1MHz	3MHz	1GHz - 40 GHz	Peak	Auto	Max hold	PK Measurement
Radiated Spurious Emission	1MHz	10Hz	1GHz - 40 GHz	Peak	Auto	Max hold	Ave Measurement

Test Data ☐ Yes (See below) ☒ N/A

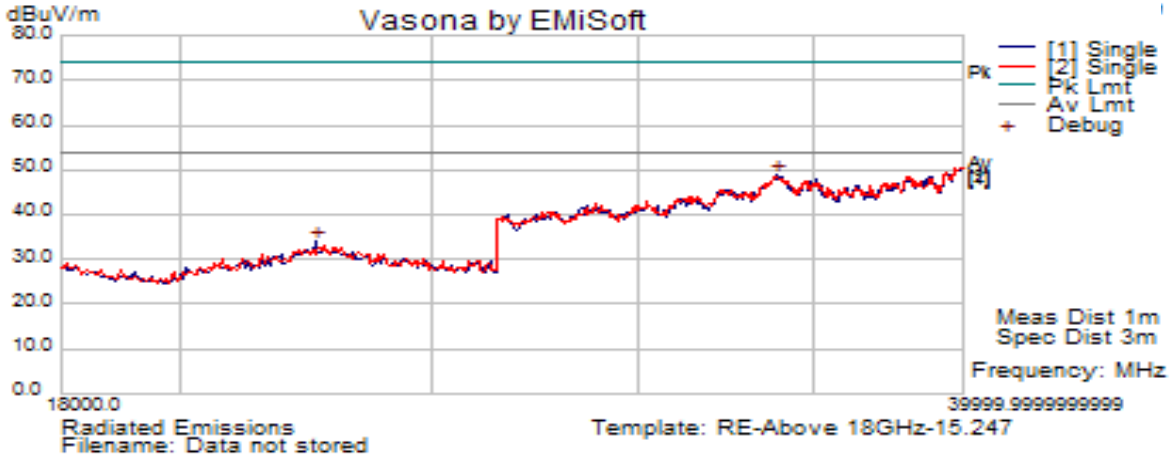
Test Plot ☒ Yes (See below) ☐ N/A

Radiated Emission test results (above 18 GHz)

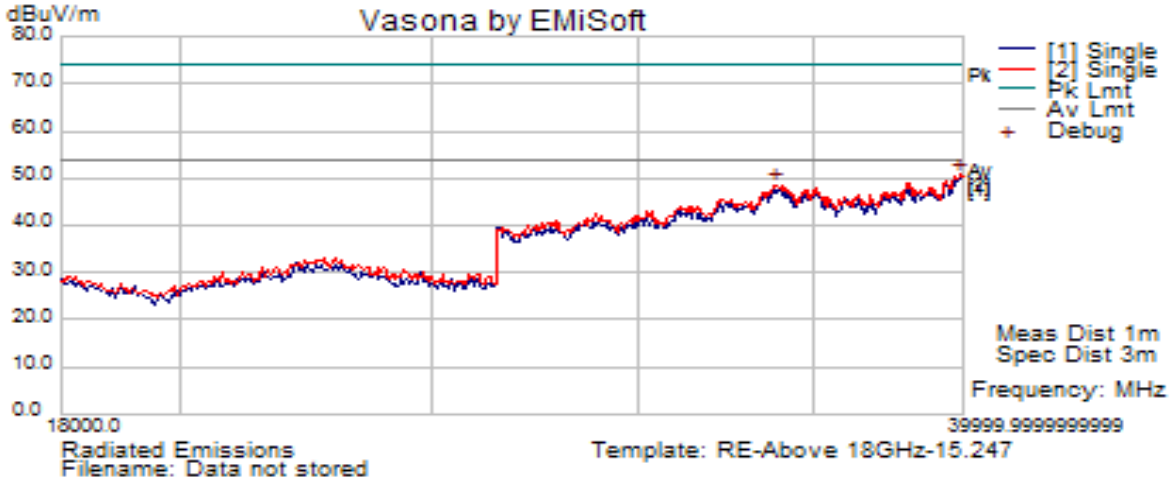
Above 18GHz – 802.11a – 5180MHz



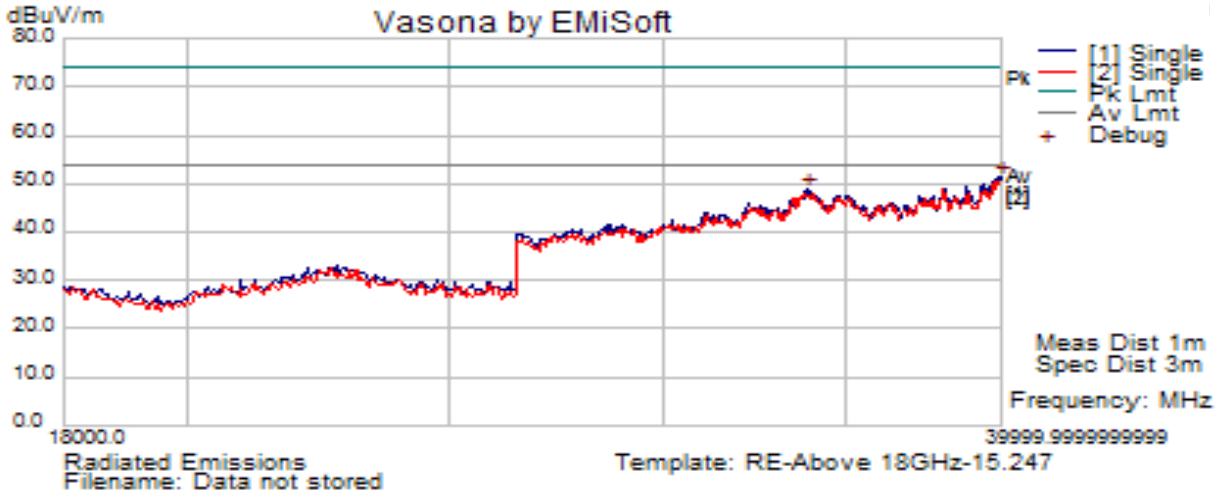
Above 18GHz – 802.11a – 5200MHz



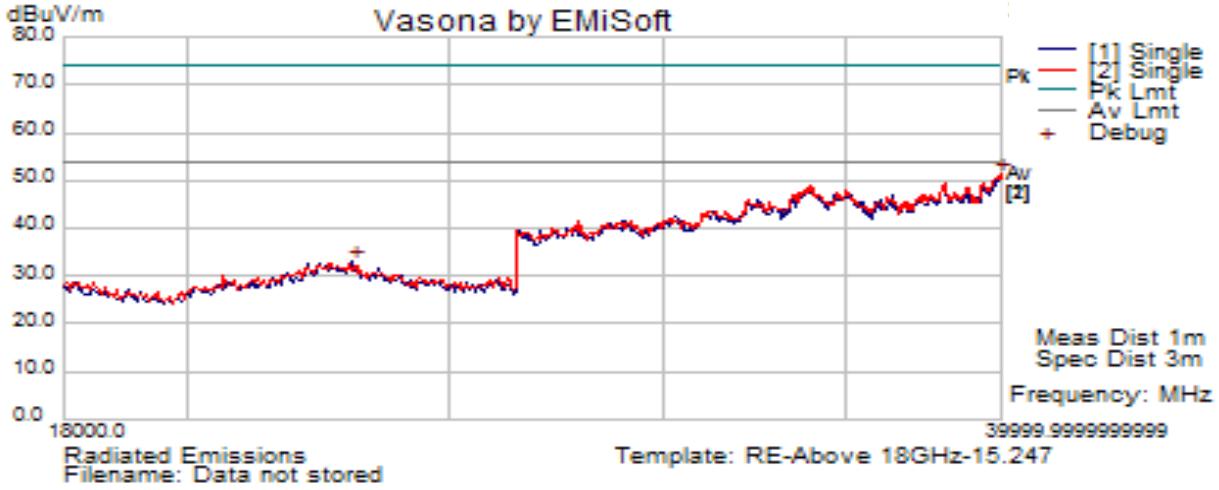
Above 18GHz – 802.11a – 5240MHz



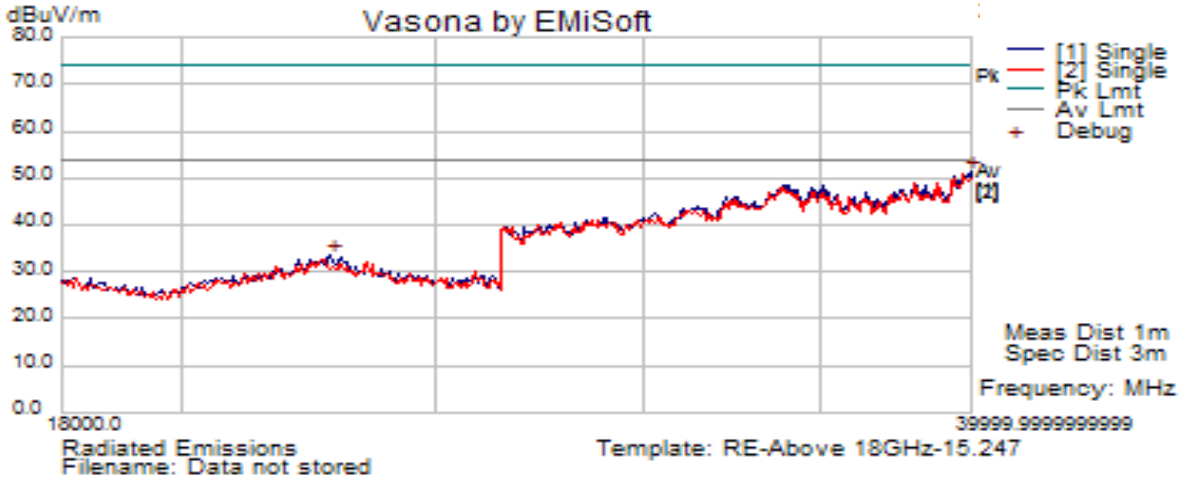
Above 18GHz – 802.11n-20M – 5180MHz



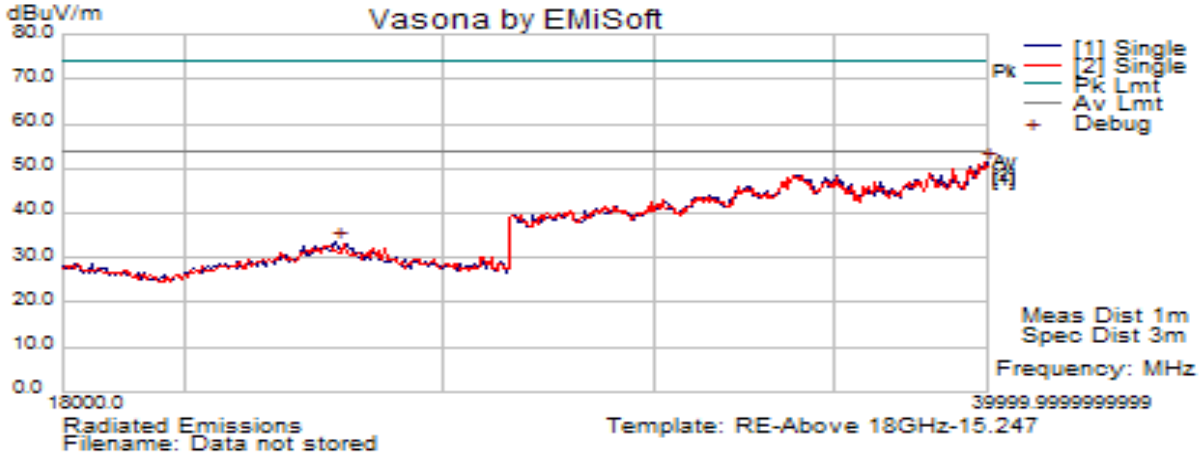
Above 18GHz – 802.11n-20M – 5200MHz



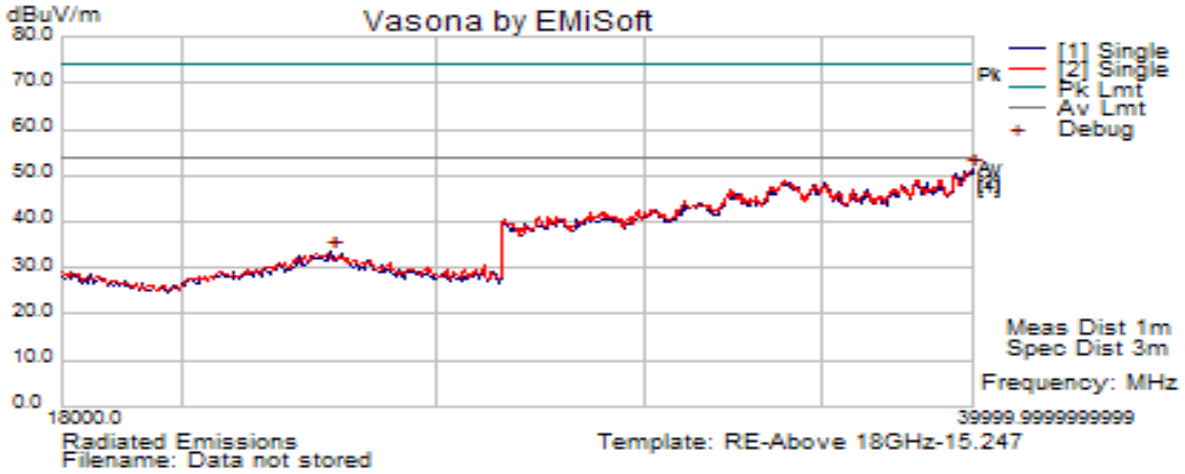
Above 18GHz – 802.11n-20M – 5240MHz



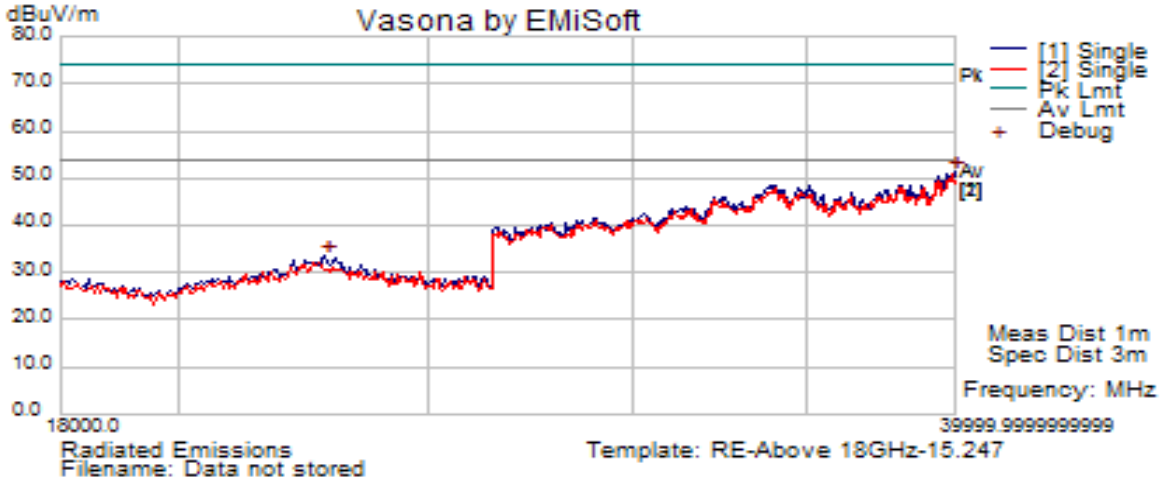
Above 18GHz – 802.11n-40M – 5190MHz



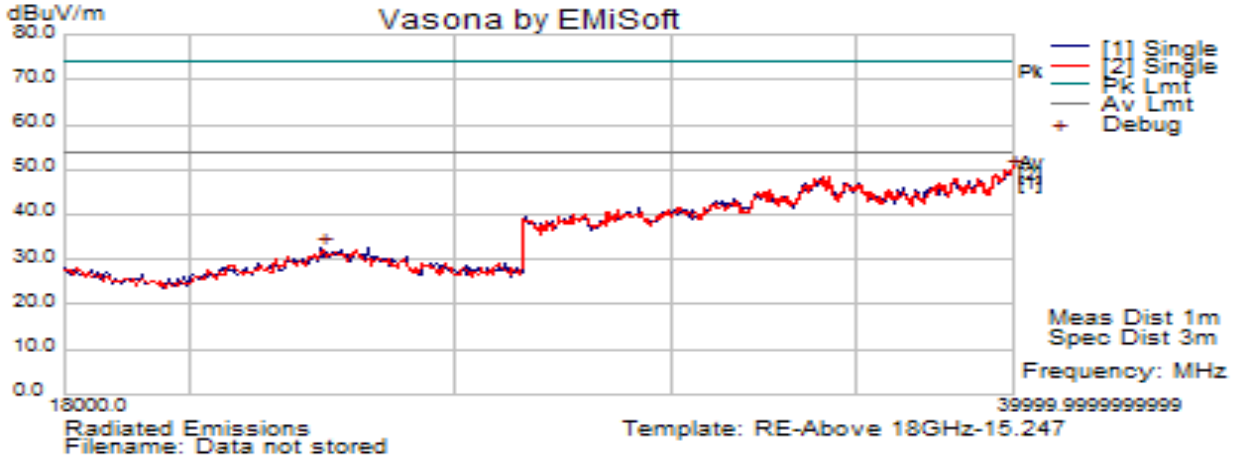
Above 18GHz – 802.11n-40M – 5230MHz



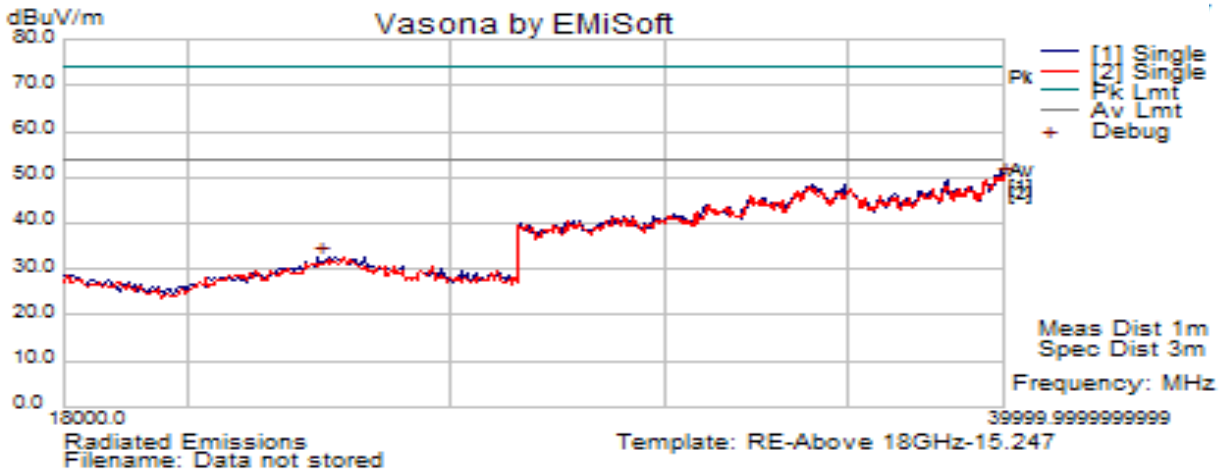
Above 18GHz – 802.11ac-80M – 5210MHz



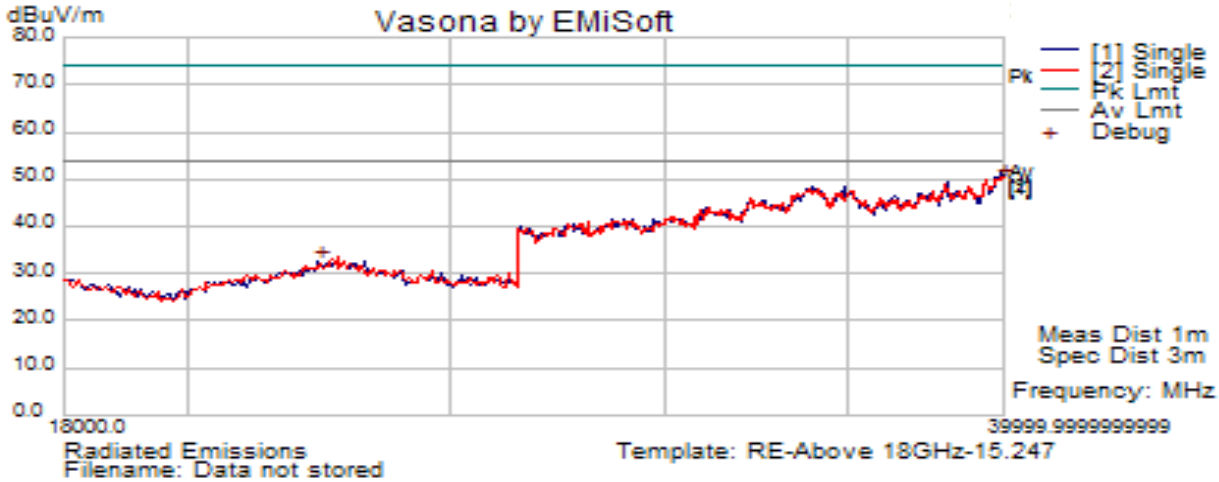
Above 18GHz – 802.11a – 5745MHz



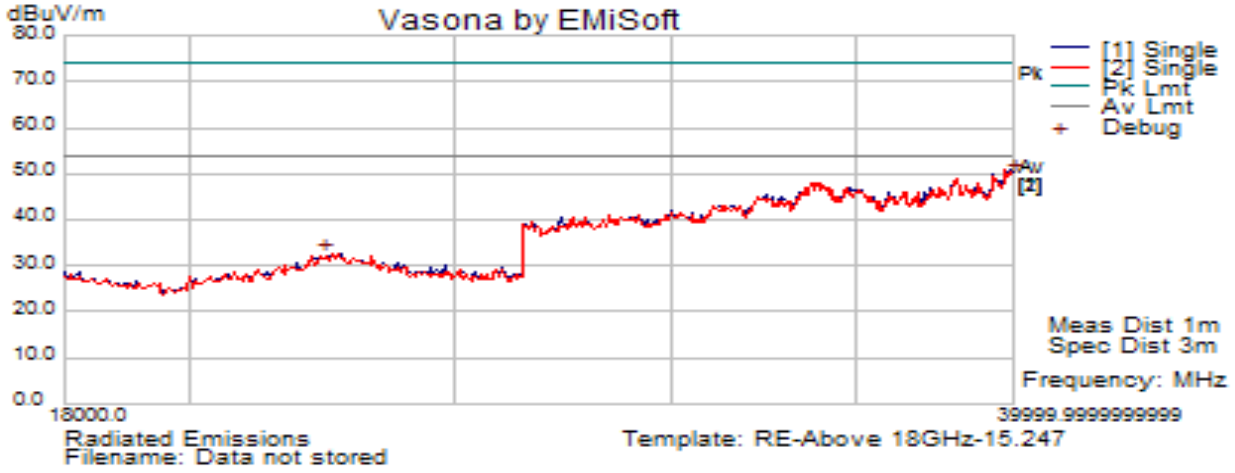
Above 18GHz - 802.11a– 5785MHz



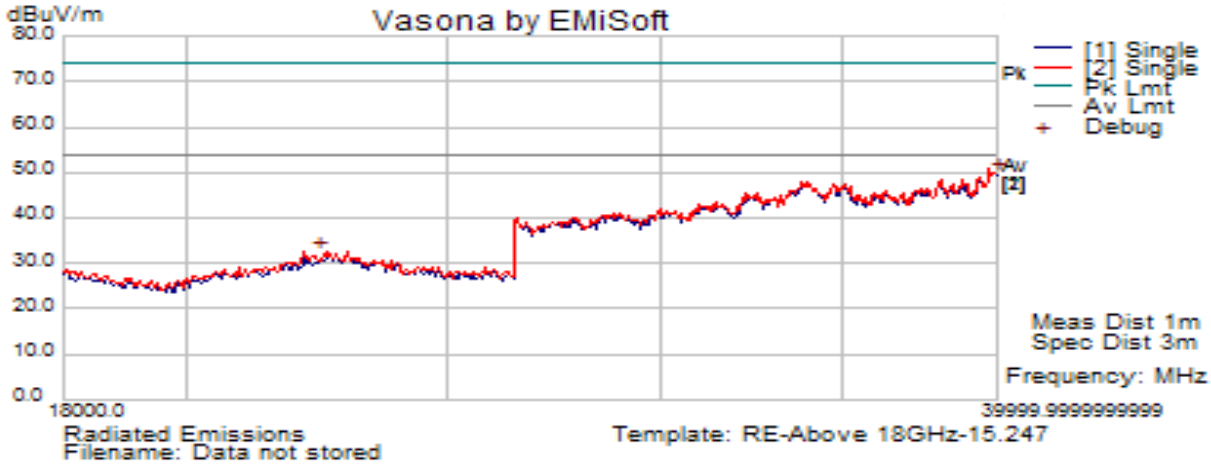
Above 18GHz - 802.11a - 5825MHz



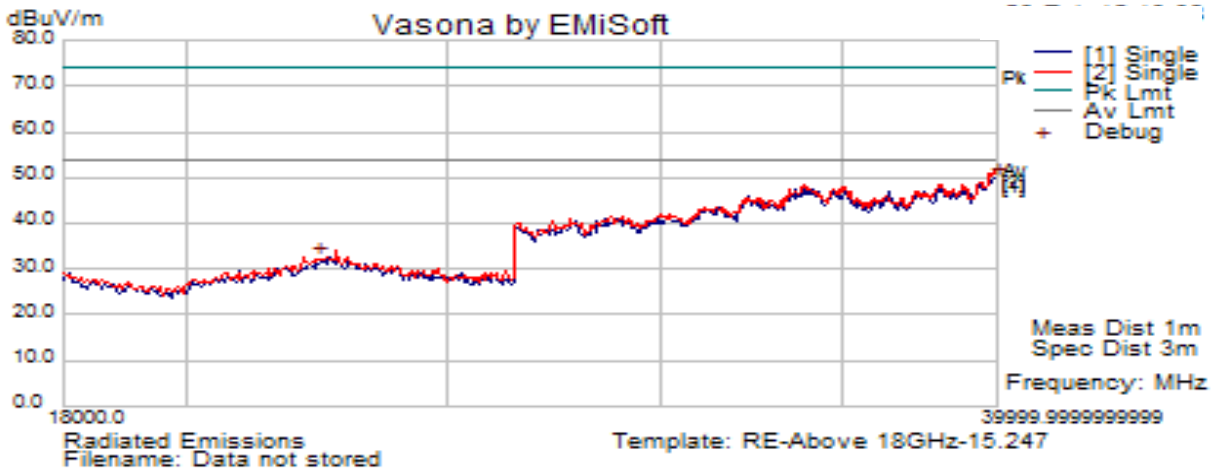
Above 18GHz – 802.11n-20M – 5745MHz



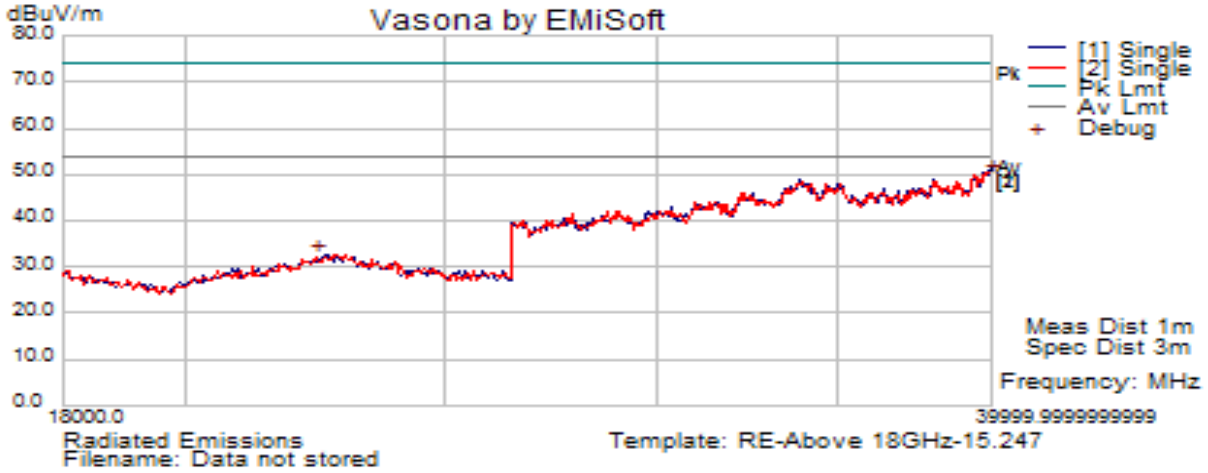
Above 18GHz - 802.11n-20M– 5785MHz



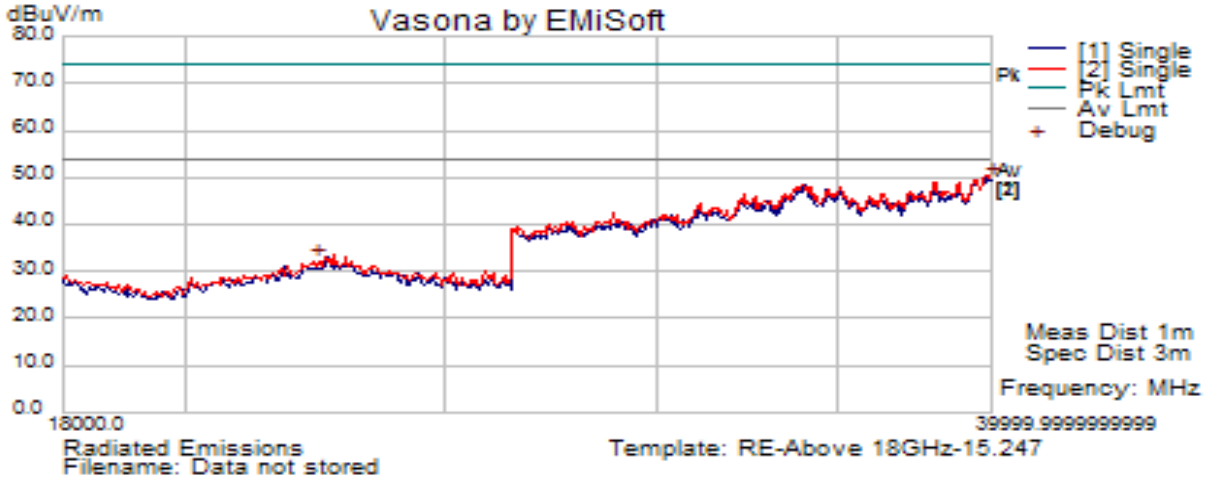
Above 18GHz - 802.11n-20M - 5825MHz



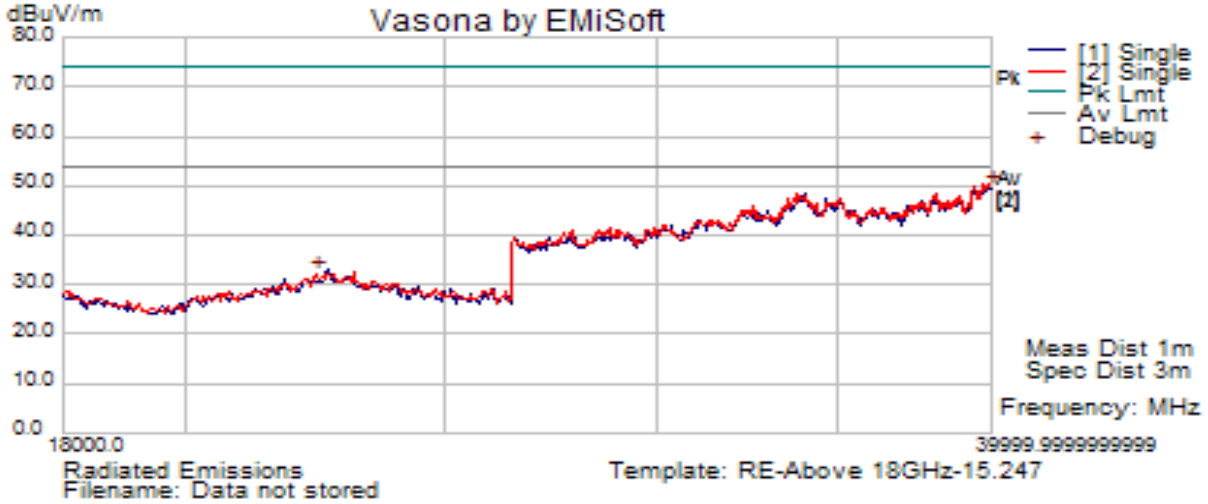
Above 18GHz – 802.11n-40M – 5755MHz



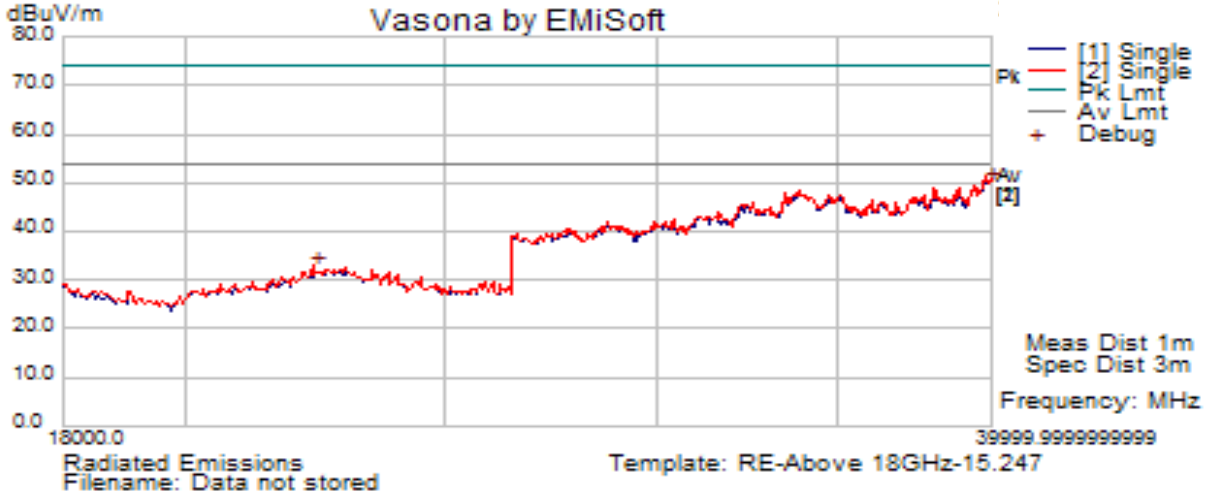
Above 18GHz - 802.11n-40M– 5795MHz



Above 18GHz - 802.11ac-80M - 5775MHz



Above 18GHz - Collocation testing (2.4GHz WLAN & 5GHz WLAN on the main-board transmitting simultaneously)



Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Conducted Emissions						
R & S Receiver	ESHS10	830223/0009	04/08/2014	1 Year	04/08/2015	☑
Spectrum Analyzer	FSIQ7	825555/013	05/31/2014	1 Year	04/08/2015	☑
Schwarzbeck LISN	NNLK 8129	8129-190	08/11/2014	1 Year	08/11/2015	☑
CHASE LISN	MN2050B	1018	07/31/2014	1 Year	07/31/2015	☑
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	03/04/2015	☑
R & S Receiver	ESIB 40	100179	05/24/2014	1 Year	05/24/2015	☑
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	08/12/2014	1 Year	08/12/2015	☑
Horn Antenna (1-26.5GHz)	3115	10SL0059	08/11/2014	1 Year	08/11/2015	☑
Horn Antenna (18-40 GHz)	AH-840	101013	08/11/2014	1 Year	08/11/2015	☑
Pre-Amplifier (100KHz-7GHz)	LPA-6-30	11140711	02/18/2014	1 Year	02/18/2015	☑
Microwave Preamplifier (18-40 GHz)	PA-840	181251	02/12/2014	1 Year	02/12/2015	☑
3 Meters SAC	3M	N/A	03/04/2014	1 Year	03/04/2015	☑
10 Meters SAC	10M	N/A	09/05/2014	1 Year	09/05/2015	☑
Sekonic Hygro Hermograph	ST-50	HE01-000092	05/25/2014	1 Year	05/25/2015	☑
RF Conducted Measurement						
Spectrum Analyzer	N9010A	MY50210206	05/30/2014	1 Year	05/30/2015	☑
Spectrum Analyzer	E4407B	US88441016	05/31/2014	1 Year	05/31/2015	☐
R & S Receiver	ESIB 40	100179	04/20/2014	1 Year	04/20/2015	☑

Annex B. SIEMIC Accreditation

Accreditations	Document	Scope / Remark
ISO 17025 (A2LA)		Please see the documents for the detailed scope
ISO Guide 65 (A2LA)		Please see the documents for the detailed scope
TCB Designation		A1, A2, A3, A4, B1, B2, B3, B4, C
FCC DoC Accreditation		FCC Declaration of Conformity Accreditation
FCC Site Registration		3 meter site
FCC Site Registration		10 meter site
IC Site Registration		3 meter site
IC Site Registration		10 meter site
EU NB		**Radio & Telecommunications Terminal Equipment:** EN45001 – EN ISO/IEC 17025
		Electromagnetic Compatibility: EN45001 – EN ISO/IEC 17025
Singapore iDA CB(Certification Body)		Phase I, Phase II
Vietnam MIC CAB Accreditation		Please see the document for the detailed scope
Hong Kong OFCA		**(Phase II)** OFCA Foreign Certification Body for Radio and Telecom
		(Phase I) Conformity Assessment Body for Radio and Telecom
Industry Canada CAB		**Radio:** Scope A – All Radio Standard Specification in Category I
		Telecom: CS-03 Part I, II, V, VI, VII, VIII

Japan Recognized Certification Body Designation		**Radio**: A1. Terminal equipment for purpose of calling **Telecom**: B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law
Korea CAB Accreditation		**EMI:** KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI **EMS:** KCC Notice 2008-38, RRL Notice 2008-4: CA Procedures for EMS KN24, KN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11: Test Method for EMS
		Radio: RRL Notice 2008-26, RRL Notice 2008-2, RRL Notice 2008-10, RRL Notice 2007-49, RRL Notice 2007-20, RRL Notice 2007-21, RRL Notice 2007-80, RRL Notice 2004-68
		Telecom: President Notice 20664, RRL Notice 2007-30, RRL Notice 2008-7 with attachments 1, 3, 5, 6; President Notice 20664, RRL Notice 2008-7 with attachment 4
Taiwan NCC CAB Recognition		LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08
Taiwan BSMI CAB Recognition		CNS 13438
Japan VCCI		R-3083: Radiation 3 meter site C-3421: Main Ports Conducted Interference Measurement T-1597: Telecommunication Ports Conducted Interference Measurement
Australia CAB Recognition		**EMC:** AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4
		Radio communications: AS/NZS 4281, AS/NZS 4268, AS/NZS 4280.1, AS/NZS 4280.2, AS/NZS 4295, AS/NZS 4582, AS/NZS 4583, AS/NZS 4769.1, AS/NZS 4769.2, AS/NZS 4770, AS/NZS 4771
		Telecommunications: AS/ACIF S002:05, AS/ACIF S003:06, AS/ACIF S004:06 AS/ACIF S006:01, AS/ACIF S016:01, AS/ACIF S031:01, AS/ACIF S038:01, AS/ACIF S040:01, AS/ACIF S041:05, AS/ACIF S043.2:06, AS/ACIF S60950.1
Australia NATA Recognition		AS/ACIF S002, AS/ACIF S003, AS/ACIF S004, AS/ACIF S006, AS/ACIF S016,AS/ACIF S031, AS/ACIF S038, AS/ACIF S040, AS/ACIF S041, AS/ACIF S043.2