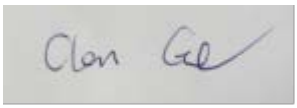
RF TEST REPORT

SIEMIC
GLOBAL TESTING & CERTIFICATIONS
YOUR CHOICE FOR- TCB FCB CB NB CAB RCB

Report No.: FCC_RF_ SL16040101-AER-001_UNII_Rev. 1.0
Supersede Report No.: None

Applicant	:	Aerohive Networks, Inc.
Product Name	:	Access Point
Model No.	:	AP245X
Test Standard	:	47 CFR 15.407
Test Method	:	ANSI C63.4: 2014 789033 D02 General UNII Test Procedures New Rules v01
FCC ID	:	WBV-AP245
IC ID	:	7774A-AP245
Dates of test	:	05/12/2016 – 06/02/2016
Issue Date	:	06/16/2016
Test Result	:	☒ Pass ☐ Fail
Equipment complied with the specification [X] Equipment did not comply with the specification [ ]		

This Test Report is Issued Under the Authority of:	
	
Rachana Khanduri	Chen Ge
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_SL16040101-AER-001_UNII	None	Original	06/10/2016
FCC_RF_SL16040101-AER-001_UNII_Rev. 1.0	Rev. 1.0	Updated Internal Photos and Test Instruments information	06/16/2016

2 Executive Summary

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

Company: Aerohive Networks, Inc.
Product: Access Point
Model: AP245X

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	:	Aerohive Networks, Inc.
Applicant Address	:	1011 McCarthy Blvd, Milpitas, CA 95035, California, United States
Manufacturer Name	:	Aerohive Networks, Inc.
Manufacturer Address	:	1011 McCarthy Blvd, Milpitas, CA 95035, California, United States

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.	AP245X
Trade Name	Aerohive
Serial No.	N/A
Host Model No.	N/A
Input Power	100-240V, 50/60Hz
Power Adapter Manu/Model	Microsemi 9001GR
Power Adapter SN	C15336594000002605
Product Hardware version	1
Product Software version	HIVEOS 7.0r1
Radio Hardware version	1
Radio Software version	HIVEOS 7.0r1
Test Software version	N/A
Date of EUT received	05/07/2016
Equipment Class/ Category	DTS, UNII
Clock Frequencies	N/A
Port/Connectors	PoE, Ethernet

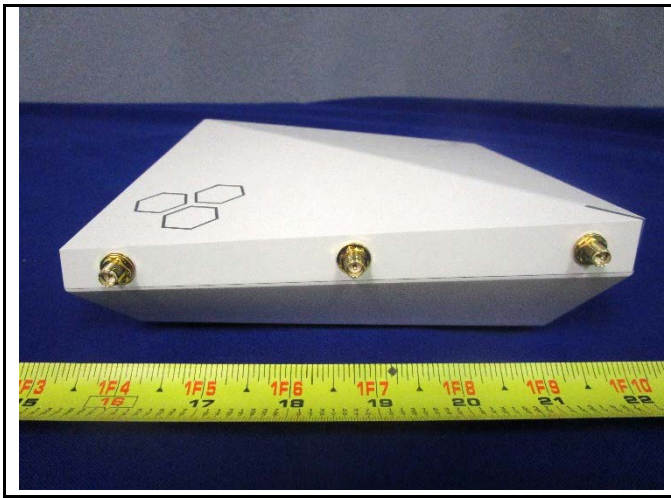
6.2 Radio Description

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	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(2.4GHz) 9 (5GHz)	9(2.4GH) 5(5GHz)	2
Antenna Type	Omnidirectional Antenna					
Antenna Gain (Peak)	5.7 dBi (2.4GHz), 5.7 dBi (5 GHz)					
Antenna Connector Type	U.FL					

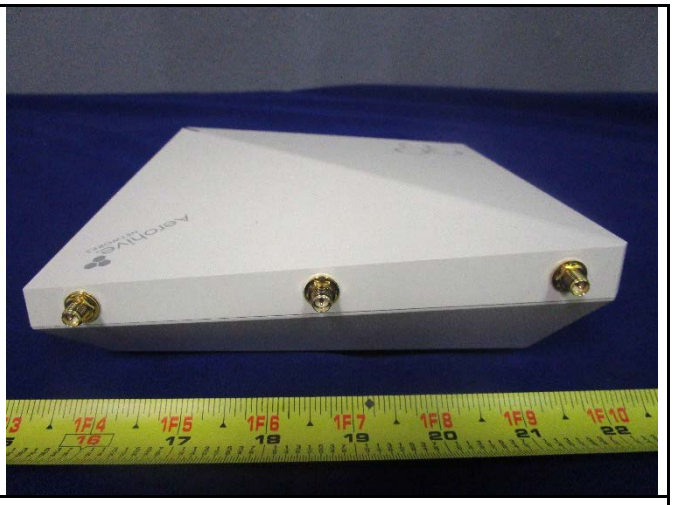
EUT Power level setting

Mode	Frequency	Power Setting
802.11-a	5180	88
802.11-a	5200	88
802.11-a	5240	88
802.11-n-20	5180	88
802.11-n-20	5200	88
802.11-n-20	5240	88
802.11-n-40	5190	88
802.11-n-40	5230	88
802.11-ac-80	5210	88
802.11-a	5745	88
802.11-a	5785	88
802.11-a	5825	88
802.11-n-20	5745	88
802.11-n-20	5785	88
802.11-n-20	5825	88
802.11-n-40	5755	88
802.11-n-40	5795	88
802.11-ac-80	5775	88

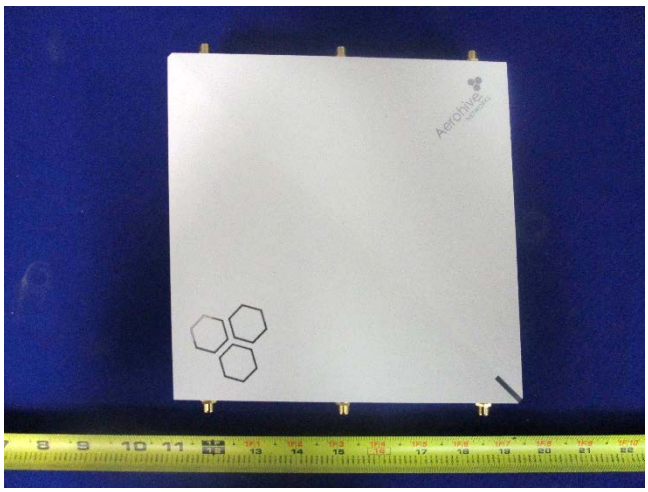
6.3 EUT Photos-External



EUT - Front View

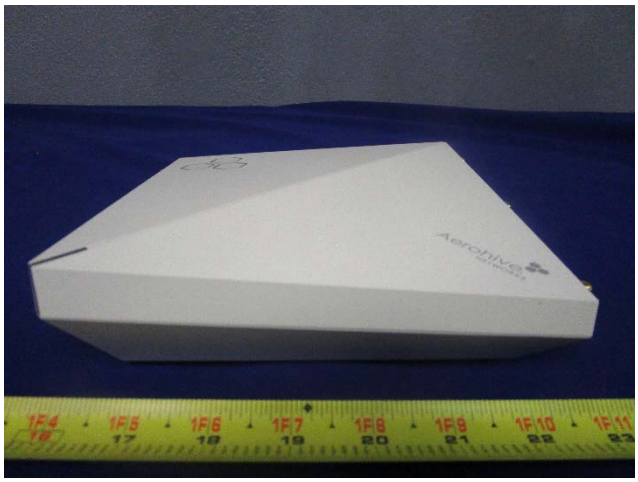


EUT – Rear View

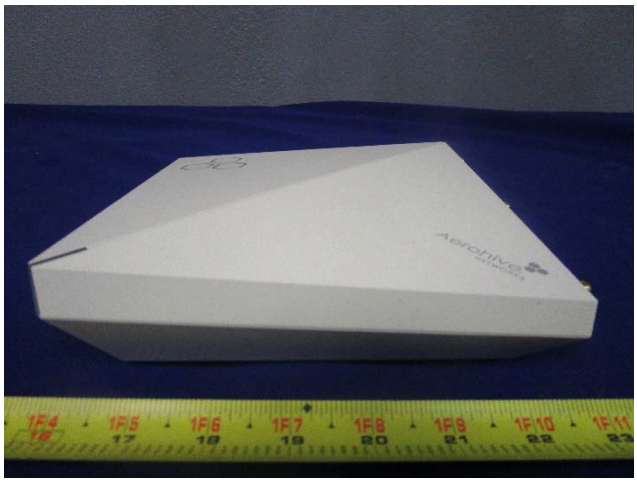


EUT - Top View

EUT – Bottom View



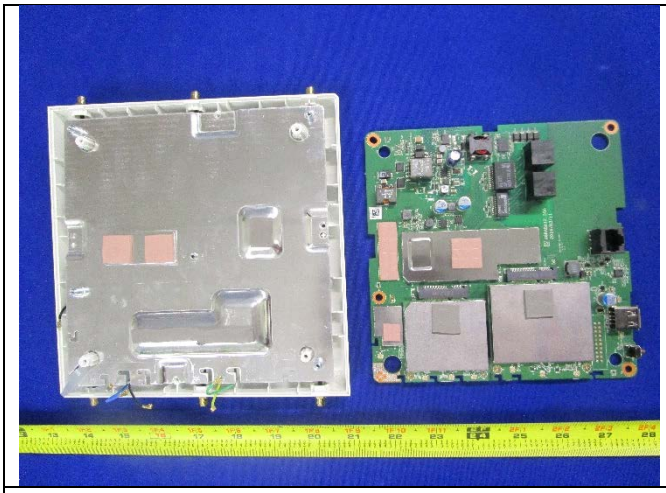
EUT – Left Side View



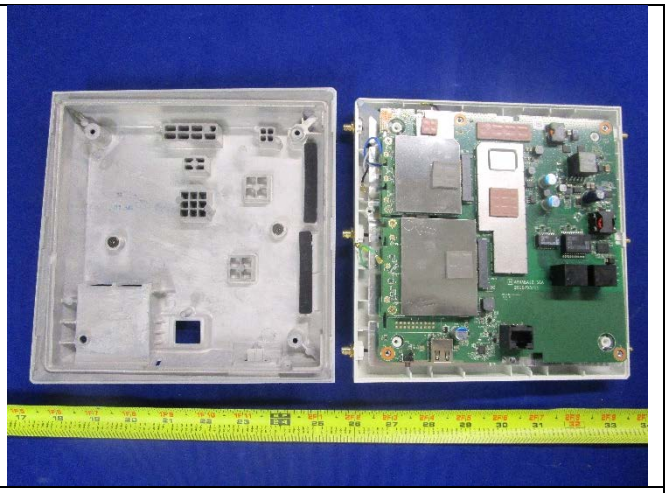
EUT – Right Side View

	
Antenna- View 1	Antenna –View 2
	
Support Equipment Power Supply Top View	Support Equipment Power Supply Bottom View

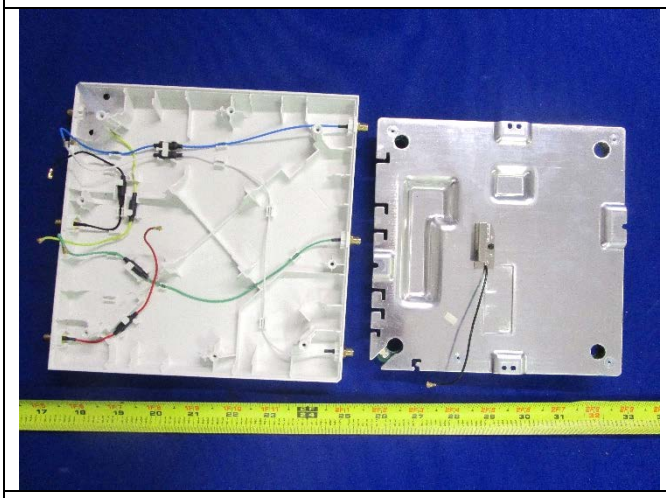
6.4 EUT Photos – Internal



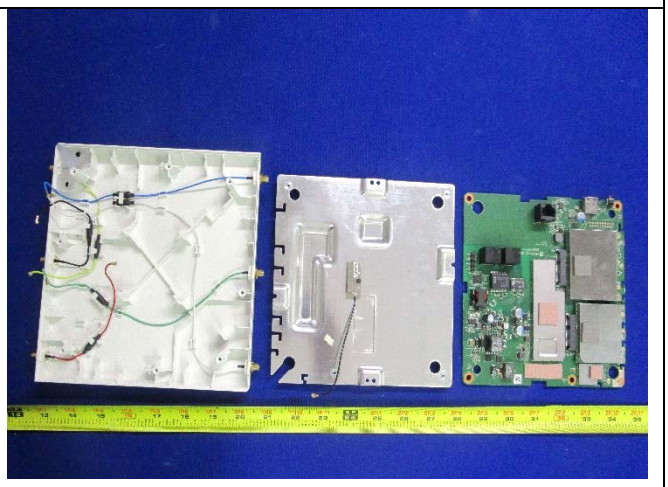
EUT: Cover Off View 1



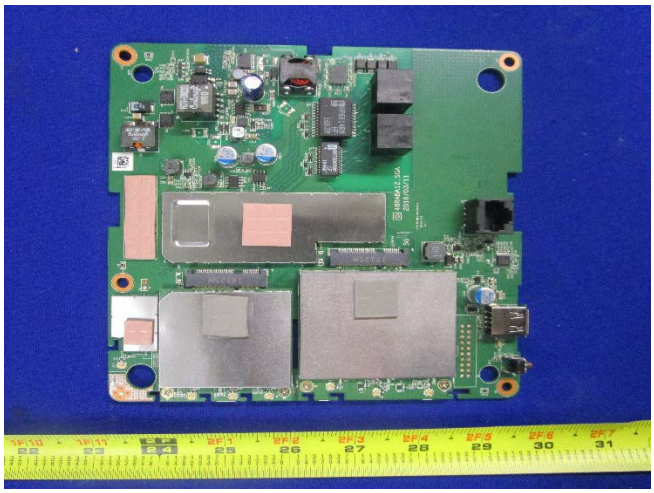
EUT: Cover Off View 2



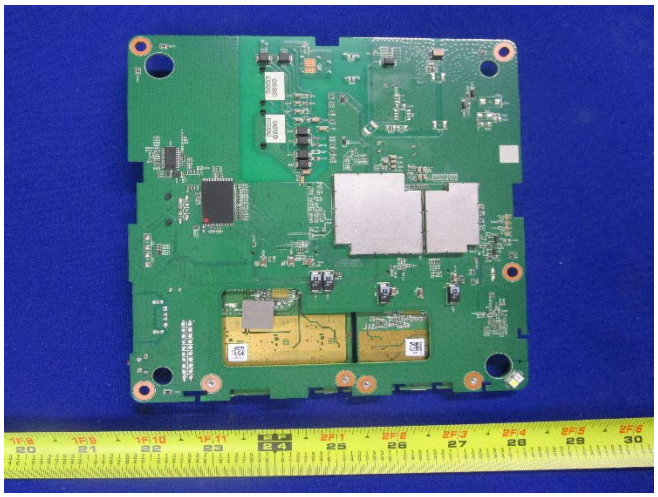
EUT: Cover Off View 3



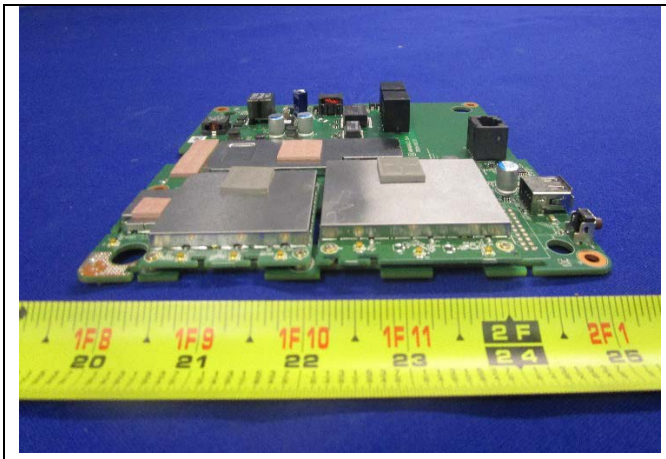
EUT: Cover Off View 4



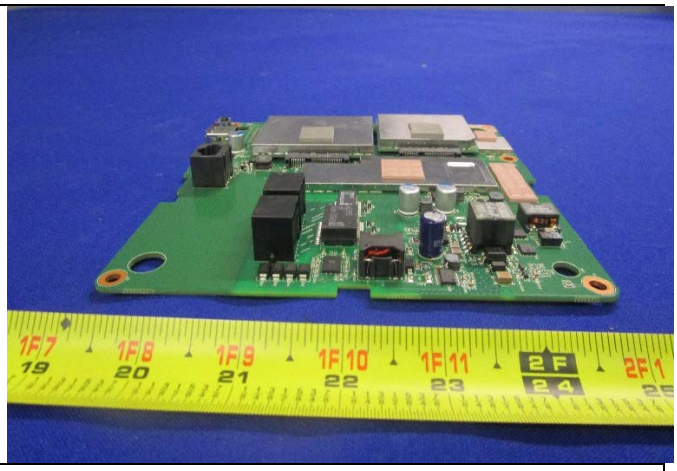
PCBA Top View



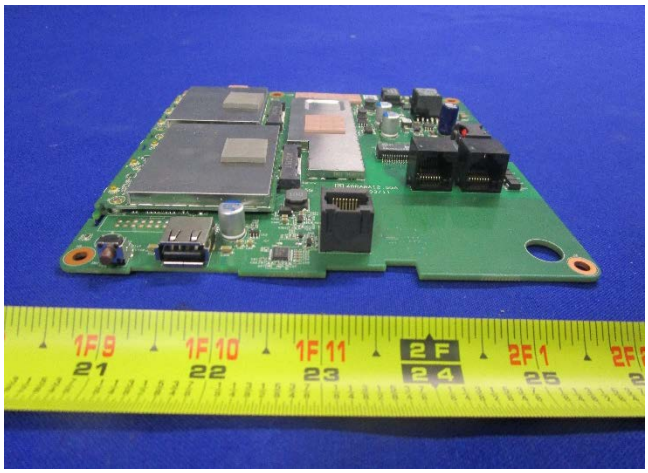
PCBA Bottom View



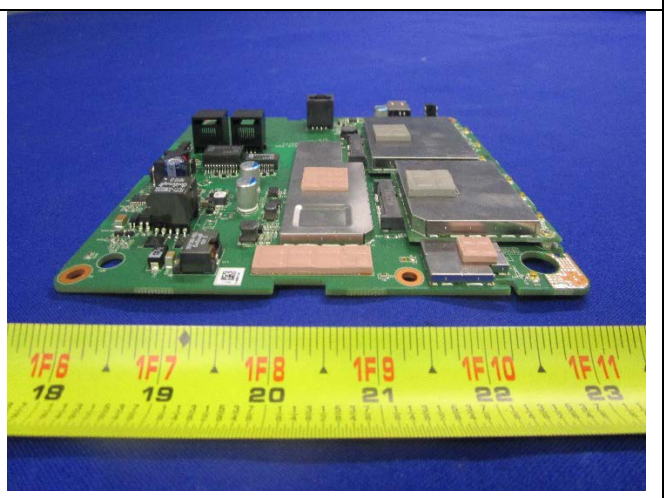
PCBA Front View



PCBA Rear View



PCBA Left-Side View



PCBA Right-Side View

6.5 EUT Test Setup Photos

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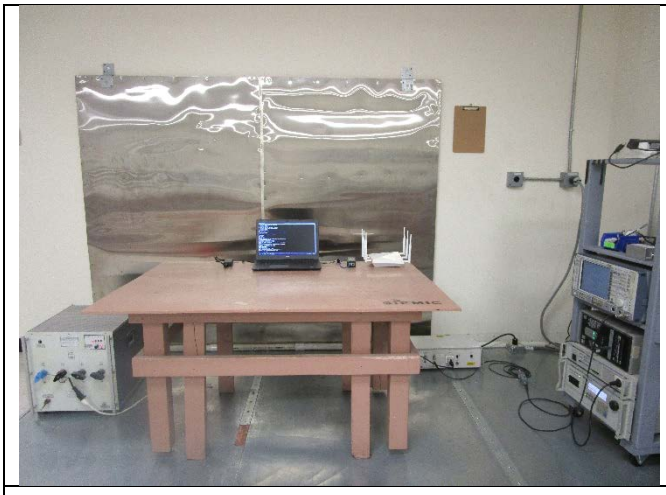
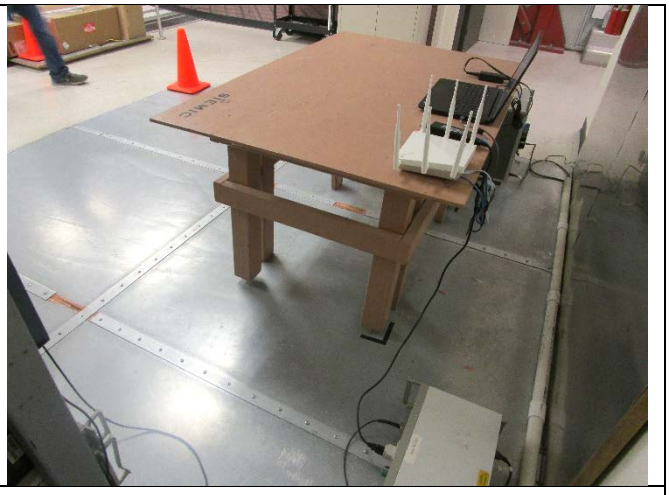
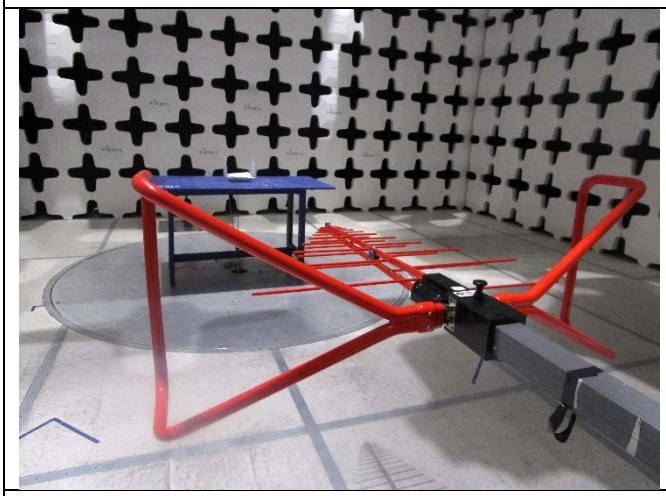
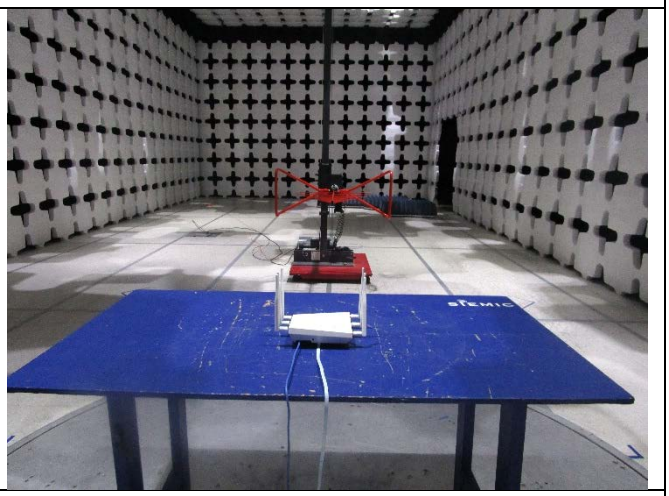
<tr><td>  </td><td>  </td></tr>
<tr><td>AC Line Conducted Emissions – Front View</td><td>AC Line Conducted Emissions – Rear View</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Radiated Emissions (<1GHz) – Front View</td><td>Radiated Emissions (<1GHz) – Rear View</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Radiated Emissions (>1GHz) – Front View</td><td>Radiated Emissions (>1GHz) – Rear View</td></tr>
</table>

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	Laptop	Latitude 3550	N/A	Dell	-

7.2 Cabling Description

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

7.3 Test Software Description

Test Item	Software	Description
RF Testing	Tera Term	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. 3. The device is operating at near 98% duty cycle.			

9 Measurement Uncertainty

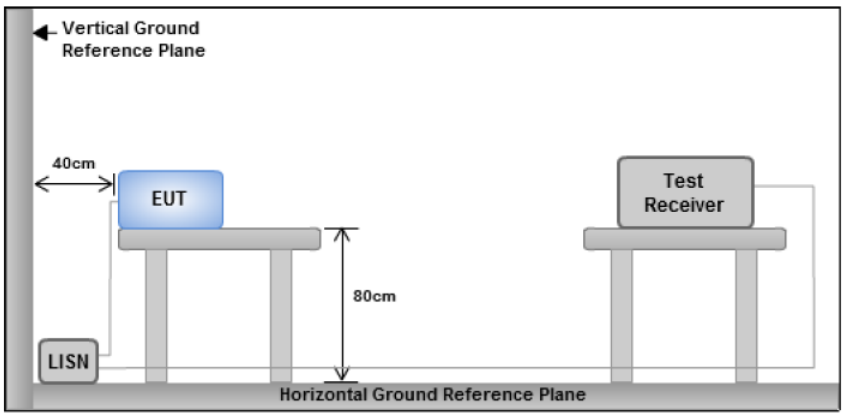
Emissions			
Test Item	Frequency Range	Description	Uncertainty
AC Conducted Emissions	150KHz – 30MHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2	±3.5dB
Band Edge and Radiated Spurious Emissions	30MHz – 1GHz	Confidence level of approximately 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 80 cm from EUT and at least 80 cm from other units and other metal planes		
Procedure	- The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table, as shown in Annex B. - The power supply for the EUT was fed through a 50Ω/50μH EUT LISN, connected to filtered mains. - The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable. - All other supporting equipment was powered separately from another main supply.		
Remark	EUT was tested at 120VAC, 60Hz		
Result	☒ Pass ☐ Fail		

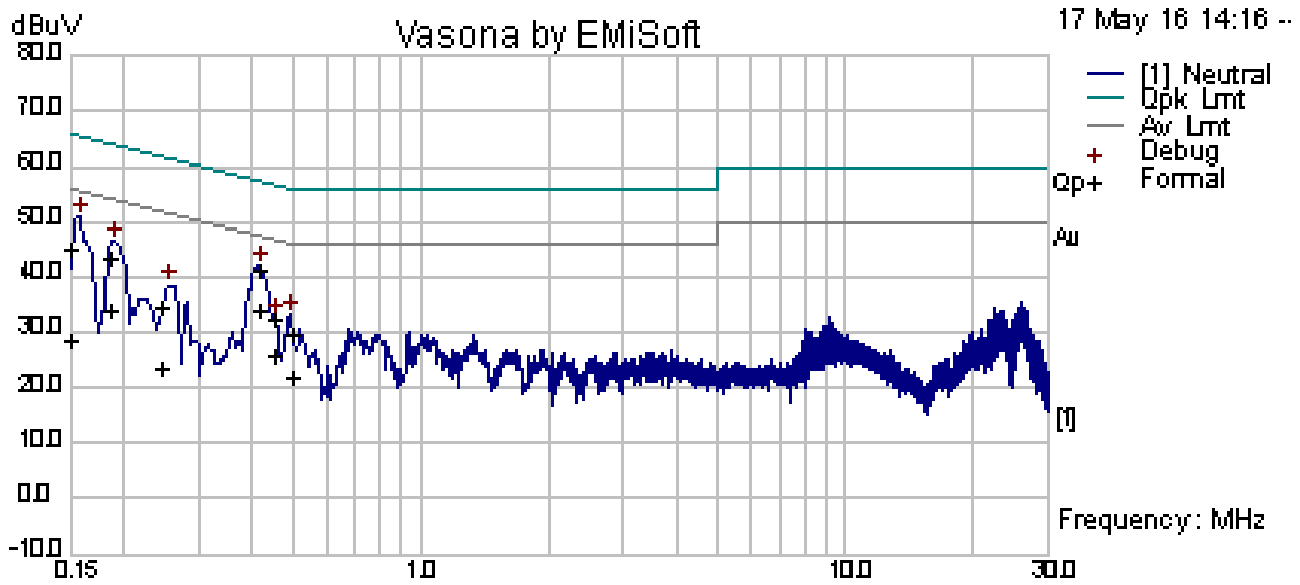
Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by *Rachana Khanduri* at *Conducted Emission Test Site*.

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:	Rachana Khanduri			
Test Date:	05/17/2016			
Remarks	AC Line @ Neutral			

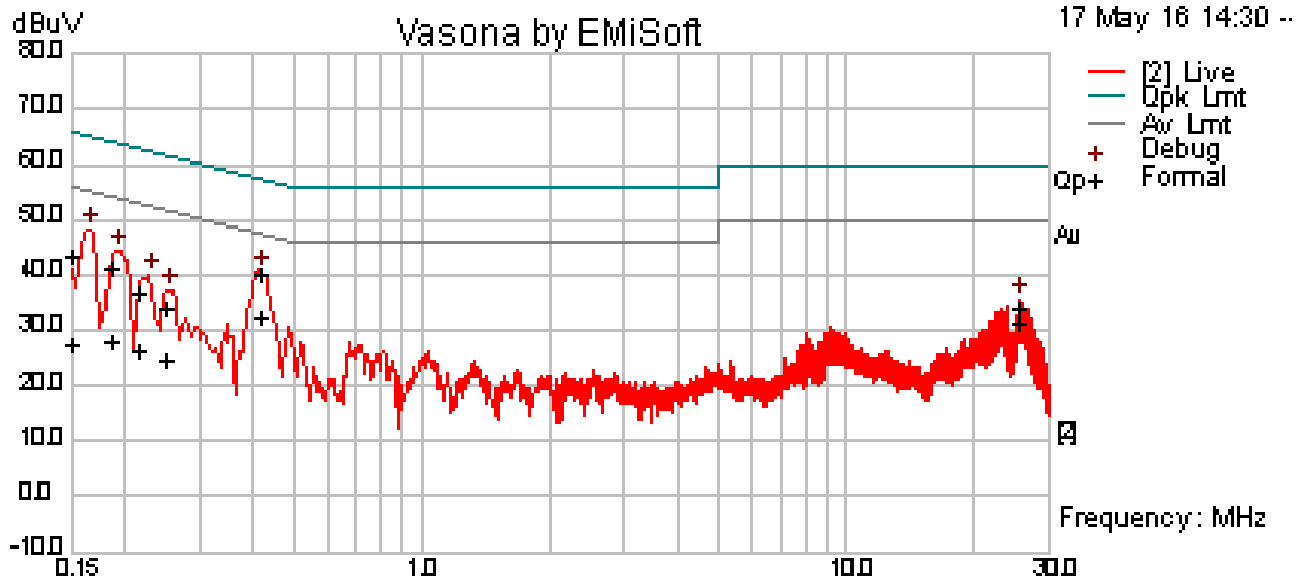


Neutral Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line	Limit (dBuV)	Margin (dB)	Pass /Fail
0.15	33.20	10.00	1.80	45.00	Quasi Peak	Neutral	66.00	-21.00	Pass
0.42	30.83	10.01	0.74	41.58	Quasi Peak	Neutral	57.54	-15.96	Pass
0.19	32.20	10.00	1.42	43.62	Quasi Peak	Neutral	64.21	-20.59	Pass
0.50	18.82	10.01	0.68	29.51	Quasi Peak	Neutral	56.04	-26.53	Pass
0.25	23.35	10.00	1.08	34.43	Quasi Peak	Neutral	61.91	-27.47	Pass
0.45	22.03	10.01	0.71	32.75	Quasi Peak	Neutral	56.85	-24.10	Pass
0.15	16.60	10.00	1.80	28.41	Average	Neutral	56.00	-27.59	Pass
0.42	23.29	10.01	0.74	34.03	Average	Neutral	47.54	-13.51	Pass
0.19	22.59	10.00	1.42	34.01	Average	Neutral	54.21	-20.21	Pass
0.50	11.38	10.01	0.68	22.07	Average	Neutral	46.04	-23.97	Pass
0.25	12.49	10.00	1.08	23.57	Average	Neutral	51.91	-28.33	Pass
0.45	15.2	10.01	0.71	25.92	Average	Neutral	46.85	-20.93	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:	Rachana Khanduri			
Test Date:	05/17/2016			
Remarks	AC Line @ Line			



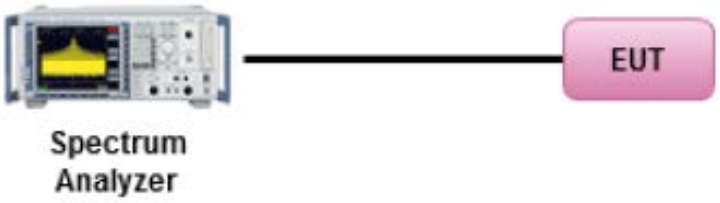
Line Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line	Limit (dBuV)	Margin (dB)	Pass /Fail
0.41	29.36	10.01	0.74	40.11	Quasi Peak	Live	57.55	-17.44	Pass
0.15	31.48	10.00	1.80	43.28	Quasi Peak	Live	66.00	-22.72	Pass
0.18	29.71	10.00	1.43	41.15	Quasi Peak	Live	64.29	-23.14	Pass
0.21	25.52	10.00	1.23	36.75	Quasi Peak	Live	63.02	-26.27	Pass
0.25	23.32	10.00	1.06	34.38	Quasi Peak	Live	61.77	-27.39	Pass
25.49	23.16	10.08	0.78	34.01	Quasi Peak	Live	60.00	-25.99	Pass
0.41	21.97	10.01	0.74	32.72	Average	Live	47.55	-14.83	Pass
0.15	15.49	10.00	1.80	27.30	Average	Live	56.00	-28.70	Pass
0.18	16.43	10.00	1.43	27.86	Average	Live	54.29	-26.43	Pass
0.21	15.37	10.00	1.23	26.60	Average	Live	53.02	-26.42	Pass
0.25	13.55	10.00	1.06	24.61	Average	Live	51.77	-27.16	Pass
25.49	20.47	10.08	0.78	31.33	Average	Live	50	-18.67	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. o Set RBW = around 1% of emission bandwidth o Set VBW > RBW o Detector = Peak o 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. o Set RBW = 100 KHz o Set VBW ≥ 3 x RBW o Detector = Peak o Trace mode = max hold o Sweep = auto couple - Capture the plot. - Repeat above steps for different test channel and other modulation type.		
Test Date	05/17/2016	Environmental condition	Temperature 22ºC Relative Humidity 38% Atmospheric Pressure 1020mbar
Remark	-		
Result	☒ Pass ☐ Fail		

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

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

26dB Bandwidth measurement result for 5.2GHz

Type	Test mode	Freq (MHz)	CH	Result (MHz)	Limit (MHz)
26dB BW	802.11a	5180	Low	21.22	-
26dB BW	802.11a	5200	Mid	21.43	-
26dB BW	802.11a	5240	High	21.69	-
26dB BW	802.11n-20	5180	Low	21.83	-
26dB BW	802.11n-20	5200	Mid	21.42	-
26dB BW	802.11n-20	5240	High	22.04	-
26dB BW	802.11n-40	5190	Low	45.64	-
26dB BW	802.11n-40	5230	High	40.50	-
26dB BW	802.11ac-80	5210	Mid	80.13	-

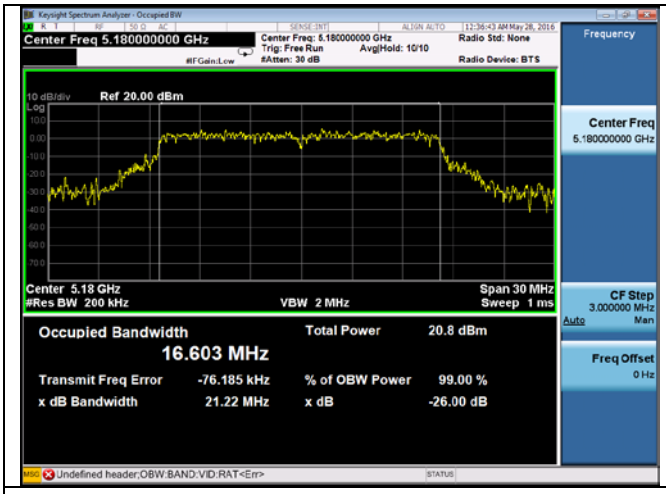
6dB Bandwidth measurement result for 5.8GHz

Type	Test mode	Freq (MHz)	CH	Result (MHz)	Limit (MHz)	Result
6dB BW	802.11a	5745	Low	16.50	≥0.5	Pass
6dB BW	802.11a	5785	Mid	16.39	≥0.5	Pass
6dB BW	802.11a	5825	High	16.52	≥0.5	Pass
6dB BW	802.11n-20	5745	Low	17.29	≥0.5	Pass
6dB BW	802.11n-20	5785	Mid	17.56	≥0.5	Pass
6dB BW	802.11n-20	5825	High	17.39	≥0.5	Pass
6dB BW	802.11n-40	5755	Low	36.34	≥0.5	Pass
6dB BW	802.11n-40	5795	High	35.69	≥0.5	Pass
6dB BW	802.11ac-80	5775	Mid	76.36	≥0.5	Pass

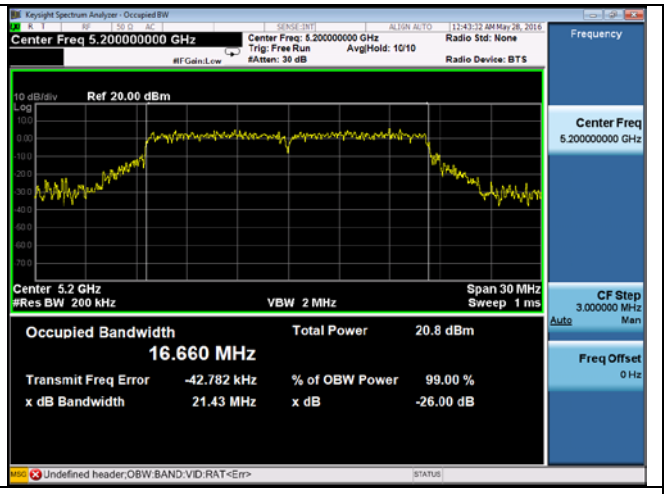
99% Occupied Bandwidth measurement result for 5.2GHz

Type	Test mode	Freq (MHz)	CH	Result (MHz)	Limit (MHz)
99% OBW	802.11a	5180	Low	16.60	-
99% OBW	802.11a	5200	Mid	16.66	-
99% OBW	802.11a	5240	High	16.61	-
99% OBW	802.11n-20	5180	Low	17.83	-
99% OBW	802.11n-20	5200	Mid	17.80	-
99% OBW	802.11n-20	5240	High	17.56	-
99% OBW	802.11n-40	5190	Low	45.64	-
99% OBW	802.11n-40	5230	High	40.50	-
99% OBW	802.11ac-80	5210	-	80.13	-

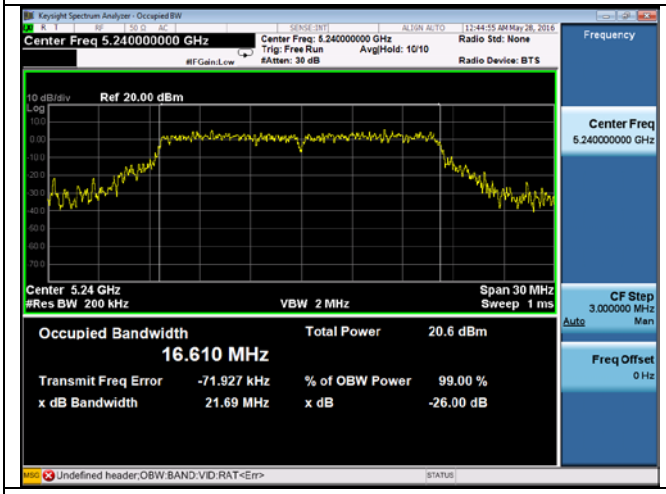
26dB Bandwidth Test Plots



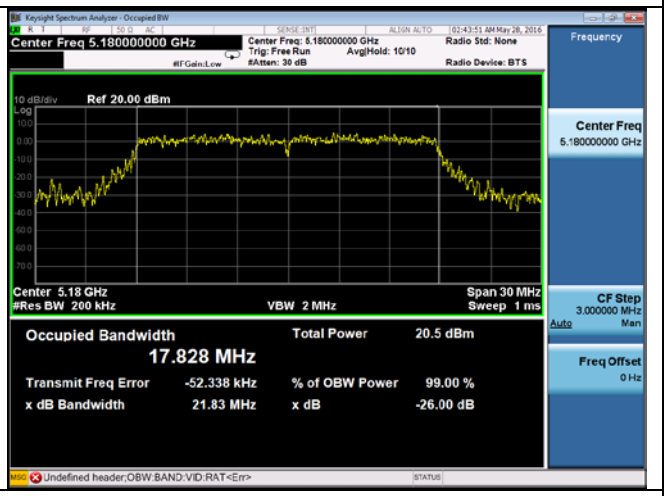
26dB BW - 802.11a 5180MHz



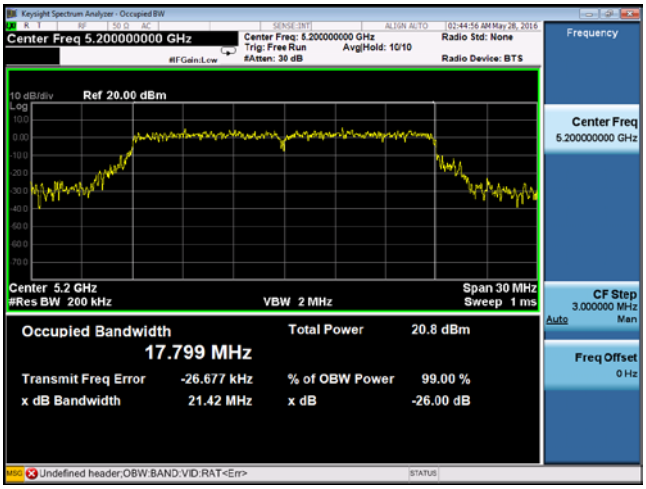
26dB BW - 802.11a 5200MHz



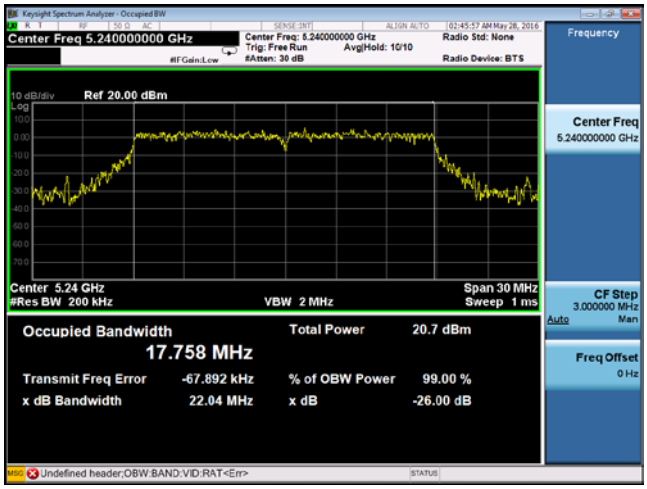
26dB BW - 802.11a 5240MHz



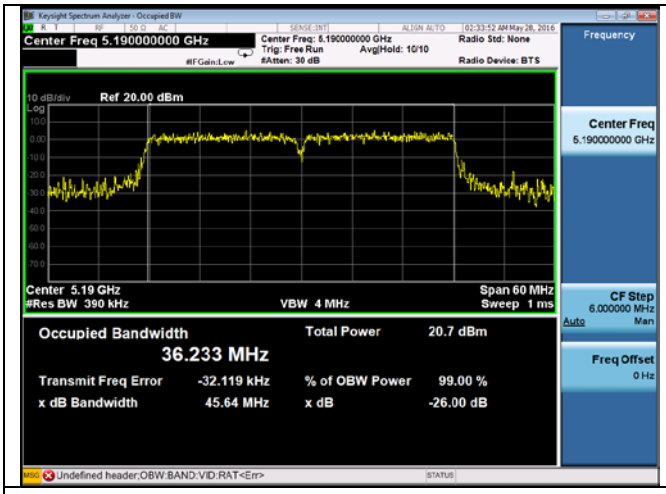
26dB BW - 802.11n-20M 5180MHz



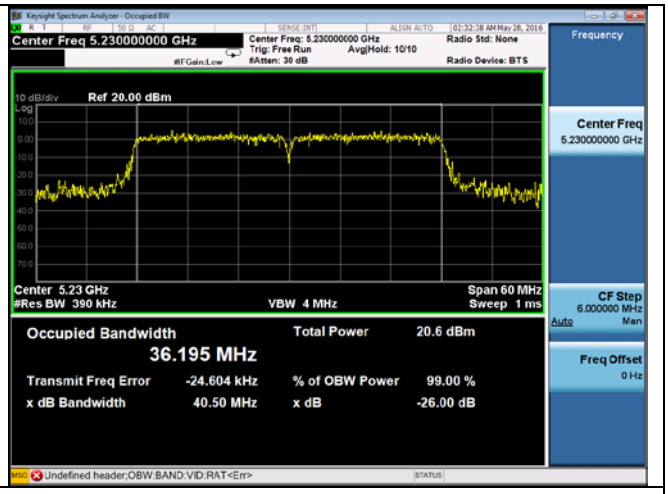
26dB BW - 802.11n-20M 5200MHz



26dB BW - 802.11n-20M 5240MHz



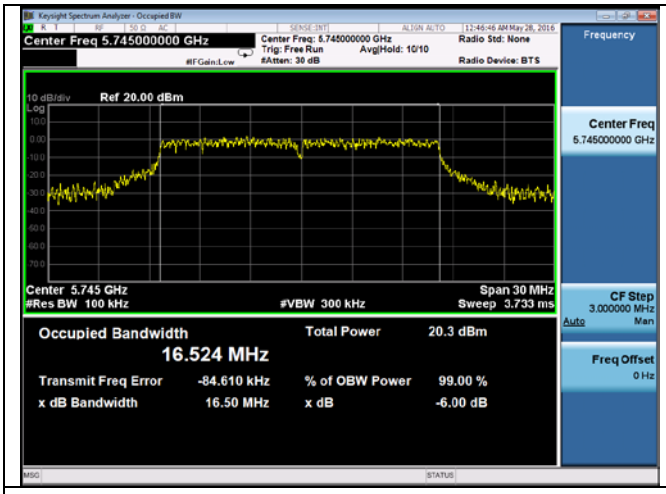
26dB BW - 802.11n-40M 5190MHz



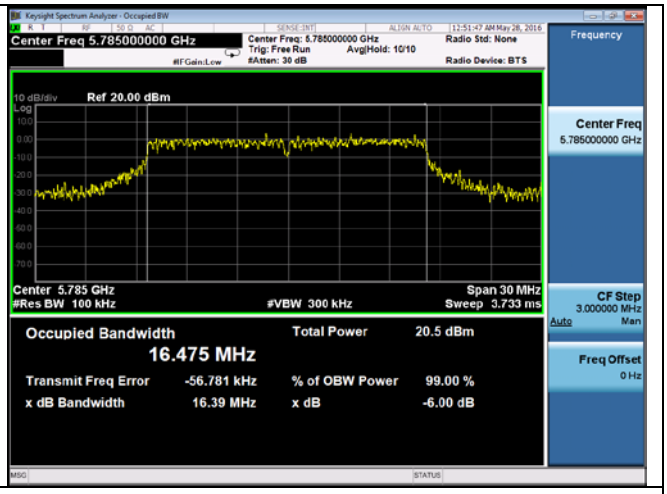
26dB BW - 802.11n-40M 5230MHz

26dB BW - 802.11ac-80M 5210MHz

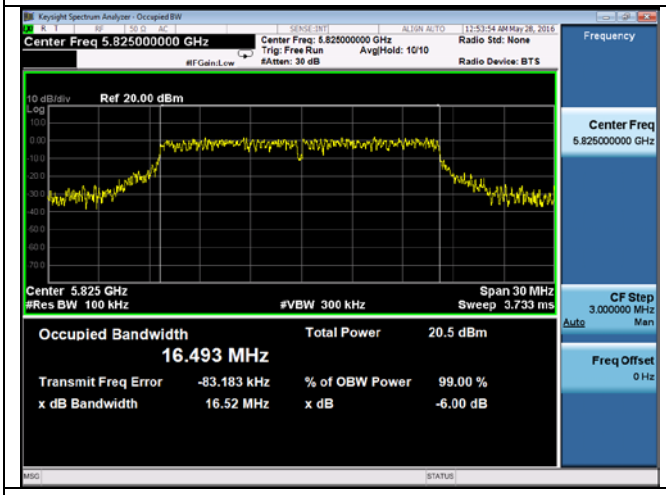
6dB Bandwidth Test Plots



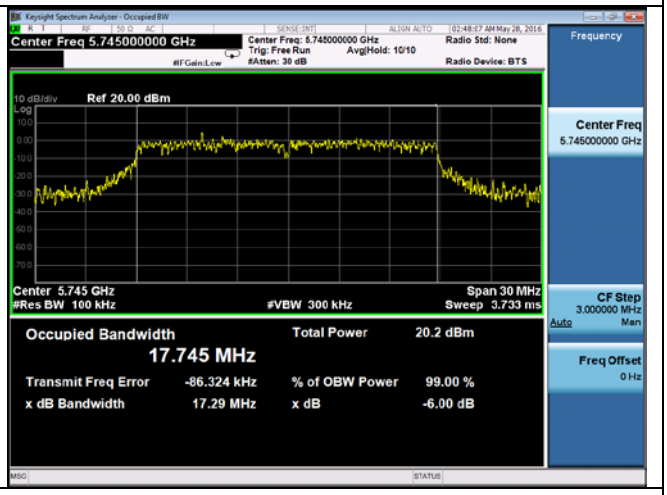
6dB BW 802.11a 5745MHz



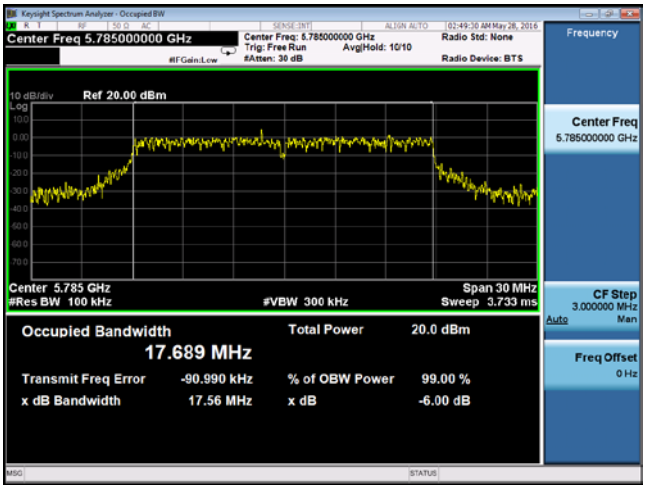
6dB BW 802.11a 5785MHz



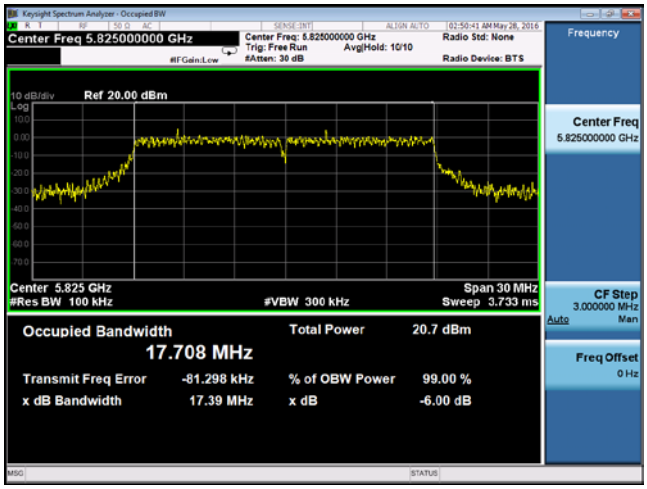
6dB BW 802.11a 5825MHz



6dB BW 802.11n-20M 5745MHz

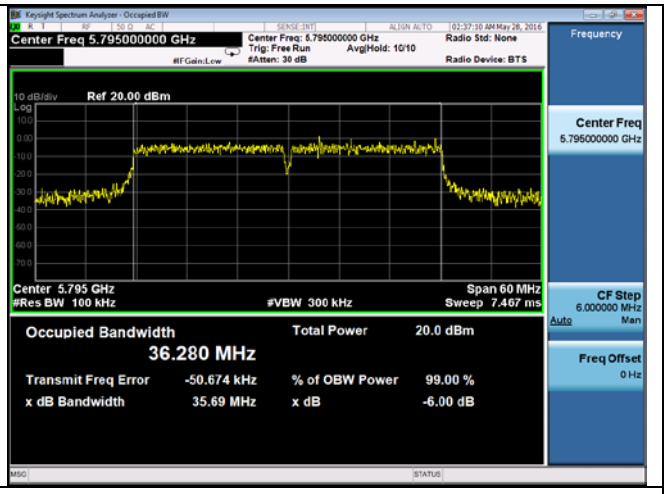


6dB BW 802.11n-20M 5785MHz

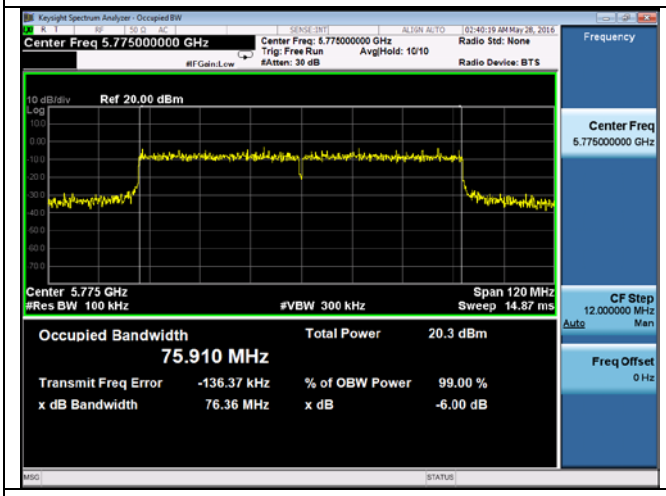


6dB BW 802.11n-20M 5825MHz

6dB BW 802.11n-40M 5755MHz



6dB BW 802.11n-40M 5795MHz



6dB BW 802.11ac-80M 5775MHz

10.3 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	05/26/2016	Environmental condition	Temperature 21ºC Relative Humidity 40% Atmospheric Pressure 1019mbar
Remark	Directional Gain = G_{ANT} + 10*log(N_{ANT}) dBi Antenna Gain (G_{ANT}) = 5.7dBi N_{ANT} = 3		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

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

Output Power measurement result for 5.2GHz

For Non-Beamforming

Type	Test mode	Freq (MHz)	CH	Conducted Power (dBm)				Limit (dBm)	Result
				Chain 1	Chain 2	Chain 3	Combined Power		
Output power	802.11a	5180	Low	18.31	18.02	18.09	22.91	30	Pass
Output power	802.11a	5200	Mid	18.49	17.95	18.05	22.94	30	Pass
Output power	802.11a	5240	High	18.32	17.92	17.90	22.82	30	Pass
Output power	802.11n-20M	5180	Low	18.44	18.22	18.11	23.03	30	Pass
Output power	802.11n-20M	5200	Mid	18.36	18.09	18.07	22.95	30	Pass
Output power	802.11n-20M	5240	High	18.32	17.85	17.85	22.78	30	Pass
Output power	802.11n-40M	5190	Low	18.51	17.49	18.14	22.84	30	Pass
Output power	802.11n-40M	5230	High	18.37	17.30	18.15	22.74	30	Pass
Output power	802.11ac-80M	5210	-	17.76	19.04	21.40	24.44	30	Pass

For Beamforming

Type	Test mode	Freq (MHz)	CH	Conducted Power (dBm)				Limit (dBm)	Result
				Chain 1	Chain 2	Chain 3	Combined Power		
Output power	802.11a	5180	Low	18.31	18.02	18.09	22.91	25.53	Pass
Output power	802.11a	5200	Mid	18.49	17.95	18.05	22.94	25.53	Pass
Output power	802.11a	5240	High	18.32	17.92	17.90	22.82	25.53	Pass
Output power	802.11n-20M	5180	Low	18.44	18.22	18.11	23.03	25.53	Pass
Output power	802.11n-20M	5200	Mid	18.36	18.09	18.07	22.95	25.53	Pass
Output power	802.11n-20M	5240	High	18.32	17.85	17.85	22.78	25.53	Pass
Output power	802.11n-40M	5190	Low	18.51	17.49	18.14	22.84	25.53	Pass
Output power	802.11n-40M	5230	High	18.37	17.30	18.15	22.74	25.53	Pass
Output power	802.11ac-80M	5210	-	17.76	19.04	21.40	24.44	25.53	Pass
Note	Directional Gain = 5.7 + 10* log(3) = 10.47dBi Directional Gain is greater than 6dBi. So, Limit = 30- 4.47 = 25.53dBm								

Output Power Measurement Results for 5.8GHz

For Non-Beamforming

Type	Test mode	Freq (MHz)	CH	Conducted Power (dBm)				Limit (dBm)	Result
				Chain 1	Chain 2	Chain 3	Combined Power		
Output power	802.11a	5745	Low	18.25	17.70	18.46	22.92	30	Pass
Output power	802.11a	5785	Mid	18.20	17.64	18.50	22.90	30	Pass
Output power	802.11a	5825	High	18.35	17.56	18.48	22.92	30	Pass
Output power	802.11n-20M	5745	Low	18.39	17.68	18.46	22.96	30	Pass
Output power	802.11n-20M	5785	Mid	18.34	17.61	18.51	22.94	30	Pass
Output power	802.11n-20M	5825	High	18.25	17.6	18.40	22.87	30	Pass
Output power	802.11n-40M	5755	Low	18.34	17.81	18.62	23.04	30	Pass
Output power	802.11n-40M	5795	High	18.29	17.82	18.67	23.05	30	Pass
Output power	802.11ac-80M	5775	-	18.50	17.61	19.09	23.21	30	Pass

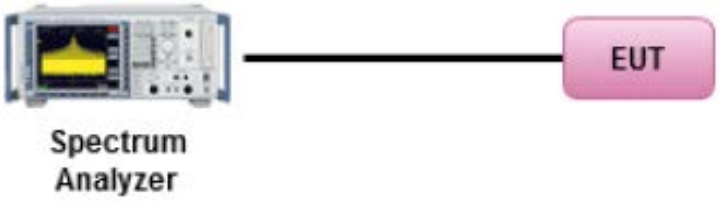
For Beamforming

Type	Test mode	Freq (MHz)	CH	Conducted Power (dBm)				Limit (dBm)	Result
				Chain 1	Chain 2	Chain 3	Combined Power		
Output power	802.11a	5745	Low	18.25	17.70	18.46	22.92	25.53	Pass
Output power	802.11a	5785	Mid	18.20	17.64	18.50	22.90	25.53	Pass
Output power	802.11a	5825	High	18.35	17.56	18.48	22.92	25.53	Pass
Output power	802.11n-20M	5745	Low	18.39	17.68	18.46	22.96	25.53	Pass
Output power	802.11n-20M	5785	Mid	18.34	17.61	18.51	22.94	25.53	Pass
Output power	802.11n-20M	5825	High	18.25	17.60	18.40	22.87	25.53	Pass
Output power	802.11n-40M	5755	Low	18.34	17.81	18.62	23.04	25.53	Pass
Output power	802.11n-40M	5795	High	18.29	17.82	18.67	23.05	25.53	Pass
Output power	802.11ac-80M	5775	-	18.50	17.61	19.09	23.21	25.53	Pass
Note	Directional Gain = 5.7 + 10* log(3) = 10.47dBi Directional Gain is greater than 6dBi. So, Limit = 30- 4.47 = 25.53dBm								

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	05/26/2016	Environmental condition	Temperature Relative Humidity Atmospheric Pressure	22ºC 42% 1020mbar
Remark	Directional Gain = G_{ANT} + 10*log(N_{ANT}) dBi Antenna Gain (G_{ANT}) = 5.7dBi N_{ANT} = 3			
Result	☒ Pass ☐ Fail			

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

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

PSD Measurement Results for 5.2GHz

For Non-Beamforming

Type	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/MHz)				Limit (dBm)	Result
				Chain 1	Chain 2	Chain 3	Combined PSD		
PSD	802.11a	5180	Low	6.95	6.24	6.26	11.27	17	Pass
PSD	802.11a	5200	Mid	6.63	6.12	6.34	11.14	17	Pass
PSD	802.11a	5240	High	6.38	6.11	6.20	11.00	17	Pass
PSD	802.11n-20	5180	Low	6.53	5.95	6.18	11.00	17	Pass
PSD	802.11n-20	5200	Mid	6.22	5.78	6.01	10.78	17	Pass
PSD	802.11n-20	5240	High	6.03	5.54	5.82	10.57	17	Pass
PSD	802.11n-40	5190	Low	3.34	2.15	3.24	7.72	17	Pass
PSD	802.11n-40	5230	High	3.49	1.99	2.84	7.59	17	Pass
PSD	802.11ac-80	5210	-	0.58	1.68	3.79	7.00	17	Pass

For Beamforming

Type	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/MHz)				Limit (dBm/MHz)	Result
				Chain 1	Chain 2	Chain 3	Combined PSD		
PSD	802.11a	5180	Low	6.95	6.24	6.26	11.27	12.53	Pass
PSD	802.11a	5200	Mid	6.63	6.12	6.34	11.14	12.53	Pass
PSD	802.11a	5240	High	6.38	6.11	6.20	11.00	12.53	Pass
PSD	802.11n-20	5180	Low	6.53	5.95	6.18	11.00	12.53	Pass
PSD	802.11n-20	5200	Mid	6.22	5.78	6.01	10.78	12.53	Pass
PSD	802.11n-20	5240	High	6.03	5.54	5.82	10.57	12.53	Pass
PSD	802.11n-40	5190	Low	3.34	2.15	3.24	7.72	12.53	Pass
PSD	802.11n-40	5230	High	3.49	1.99	2.84	7.59	12.53	Pass
PSD	802.11ac-80	5210	-	0.58	1.68	3.79	7.00	12.53	Pass
Note	Directional Gain = 5.7 + 10* log(3) = 10.47dBi Directional Gain is greater than 6dBi. So, Limit = 17- 4.47 = 12.53dBm/MHz								

PSD Measurement Results for 5.8GHz

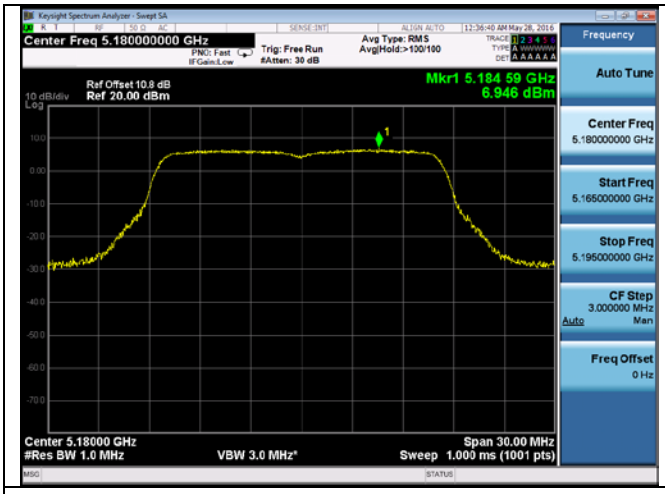
For Non-Beamforming

Type	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/100kHz)				Correction Factor (dB)	Combined PSD (dBm/500 kHz)	Limit (dBm/ 500kHz)	Result
				Chain 1	Chain 2	Chain 3	Combined				
PSD	802.11a	5745	Low	-3.28	-3.45	-3.07	1.51	6.99	8.50	30	Pass
PSD	802.11a	5785	Mid	-2.84	-3.44	-2.92	1.71	6.99	8.70	30	Pass
PSD	802.11a	5825	High	-2.83	-3.75	-2.69	1.71	6.99	8.70	30	Pass
PSD	802.11n-20	5745	Low	-3.82	-4.03	-3.05	1.56	6.99	8.55	30	Pass
PSD	802.11n-20	5785	Mid	-3.30	-3.70	-3.11	1.41	6.99	8.40	30	Pass
PSD	802.11n-20	5825	High	-3.18	-3.71	-2.78	1.56	6.99	8.55	30	Pass
PSD	802.11n-40	5755	Low	-6.63	-6.82	-5.88	-1.65	6.99	5.34	30	Pass
PSD	802.11n-40	5795	High	-6.71	-6.90	-5.58	-1.58	6.99	5.41	30	Pass
PSD	802.11ac-80	5775	Mid	-9.25	-10.03	-8.66	-4.51	6.99	2.48	30	Pass
Note	BW correction factor = 10log(500kHz/RBW), RBW was set to 100kHz during test.										

For Beamforming

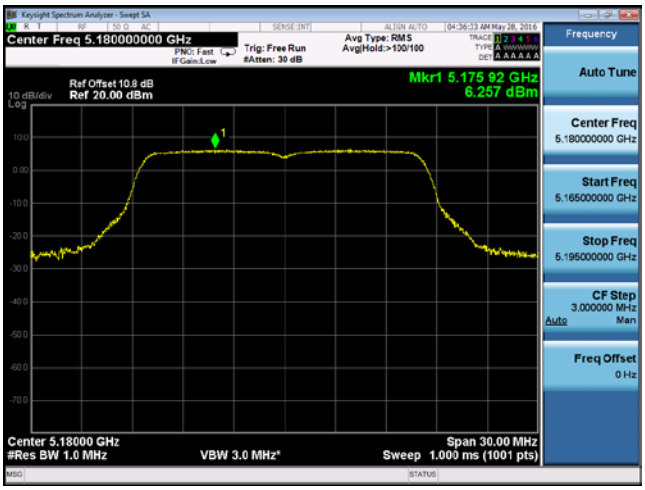
Type	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/100kHz)				Correction Factor (dB)	Combined PSD (dBm/500 kHz)	Limit (dBm/ 500kHz)	Result
				Chain 1	Chain 2	Chain 3	Combined				
PSD	802.11a	5745	Low	-3.28	-3.45	-3.07	1.51	6.99	8.50	25.53	Pass
PSD	802.11a	5785	Mid	-2.84	-3.44	-2.92	1.71	6.99	8.70	25.53	Pass
PSD	802.11a	5825	High	-2.83	-3.75	-2.69	1.71	6.99	8.70	25.53	Pass
PSD	802.11n-20	5745	Low	-3.82	-4.03	-3.05	1.56	6.99	8.55	25.53	Pass
PSD	802.11n-20	5785	Mid	-3.30	-3.70	-3.11	1.41	6.99	8.40	25.53	Pass
PSD	802.11n-20	5825	High	-3.18	-3.71	-2.78	1.56	6.99	8.55	25.53	Pass
PSD	802.11n-40	5755	Low	-6.63	-6.82	-5.88	-1.65	6.99	5.34	25.53	Pass
PSD	802.11n-40	5795	High	-6.71	-6.90	-5.58	-1.58	6.99	5.41	25.53	Pass
PSD	802.11ac-80	5775	Mid	-9.25	-10.03	-8.66	-4.51	6.99	2.48	25.53	Pass
Note	BW correction factor = 10log(500kHz/RBW), RBW was set to 100kHz during test.										
Remark	Directional Gain = 5.7 + 10* log(3) = 10.47dBi Directional Gain is greater than 6dBi. So, Limit = 30- 4.47 = 25.53dBm/500kHz										

Test Plots

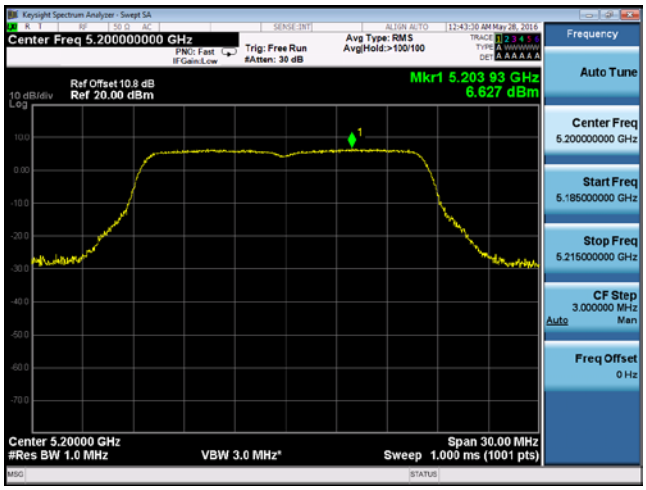


PSD-802.11a-5180M-chain1

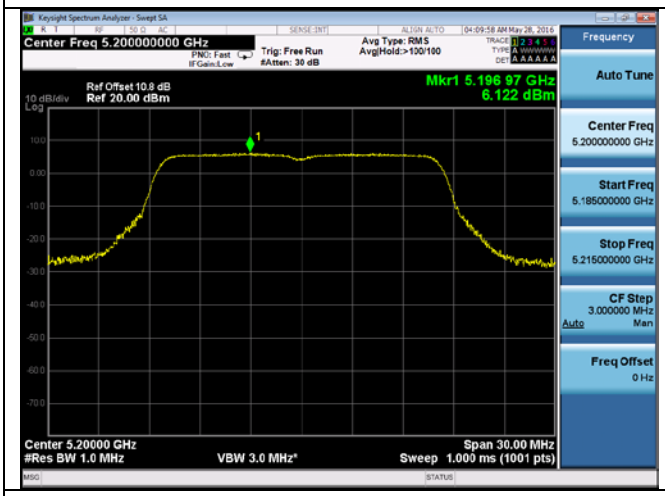
PSD-802.11a-5180M-chain2



PSD-802.11a-5180M-chain3

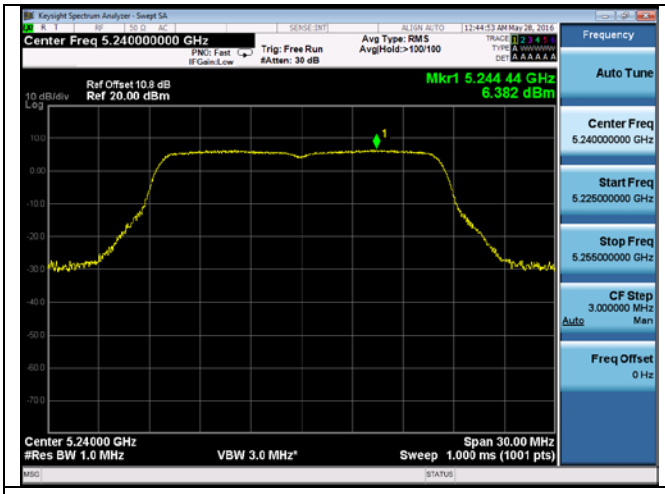


PSD-802.11a-5200M-chain1



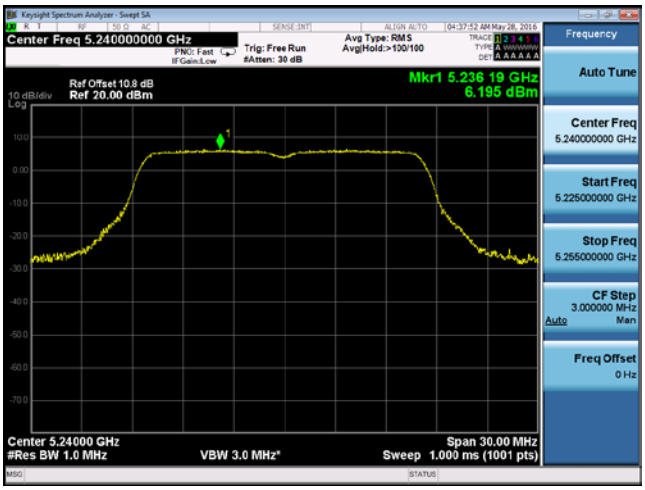
PSD-802.11a-5200M-chain2

PSD-802.11a-5200M-chain3

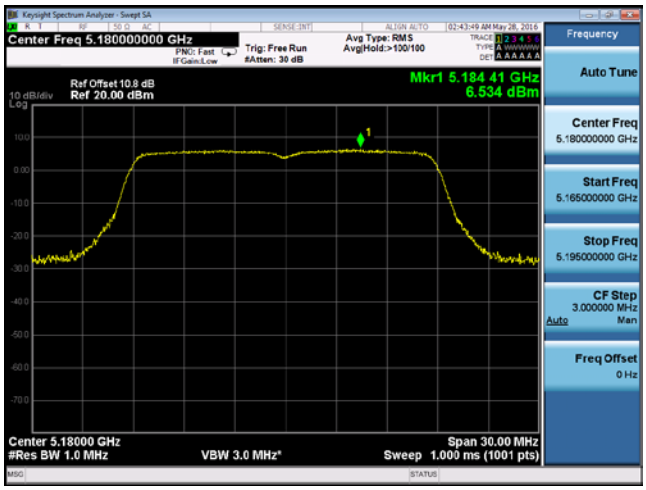


PSD-802.11a-5240M-chain1

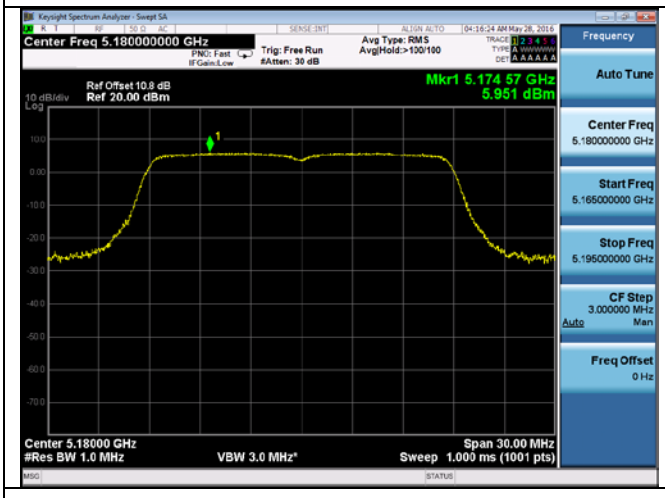
PSD-802.11a-5240M-chain2



PSD-802.11a-5240M-chain3

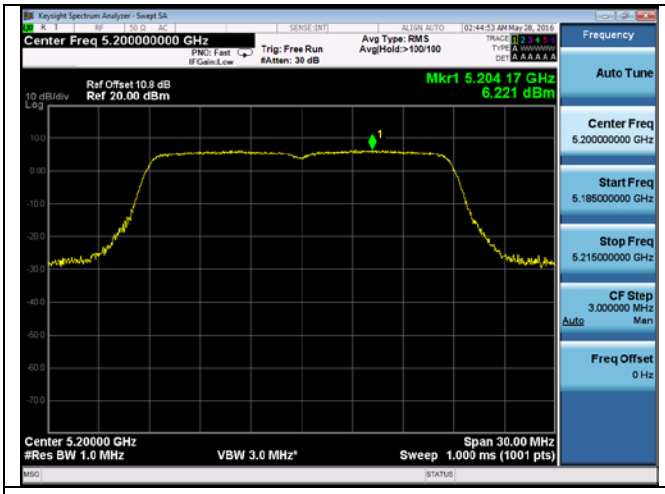


PSD-802.11n-20M -5180M-chain1



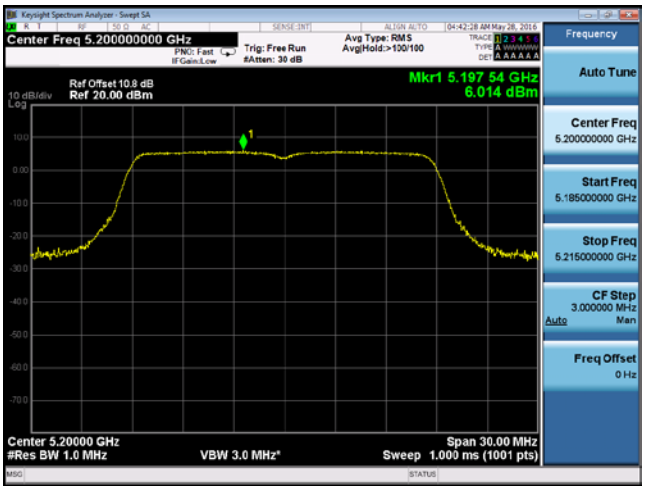
PSD-802.11n-20M -5180M-chain2

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

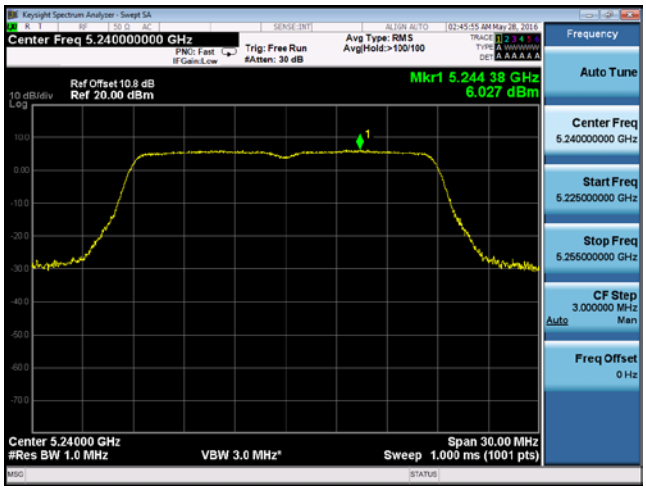


PSD-802.11n-20M-5200M-chain1

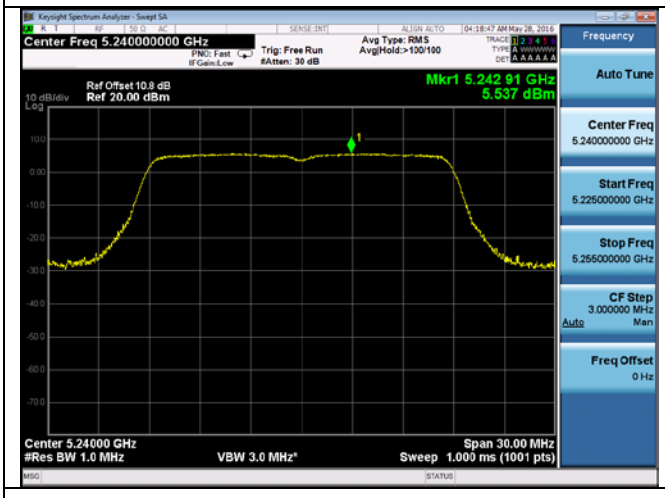
PSD-802.11n-20M-5200M-chain2



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

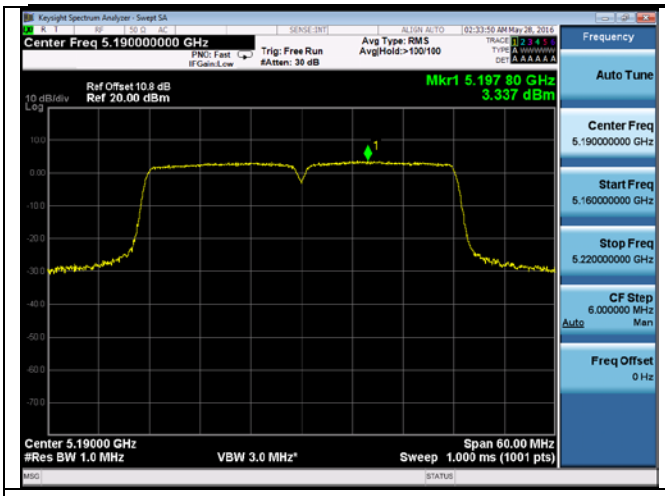


PSD-802.11n-20M-5240M-chain1

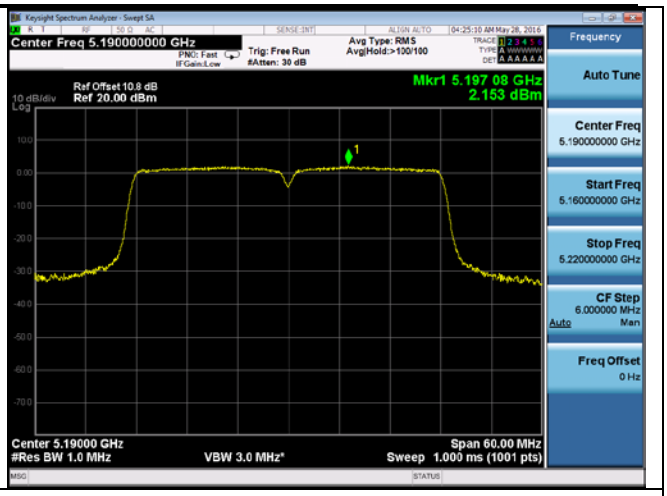


PSD-802.11n-20M-5240M-chain2

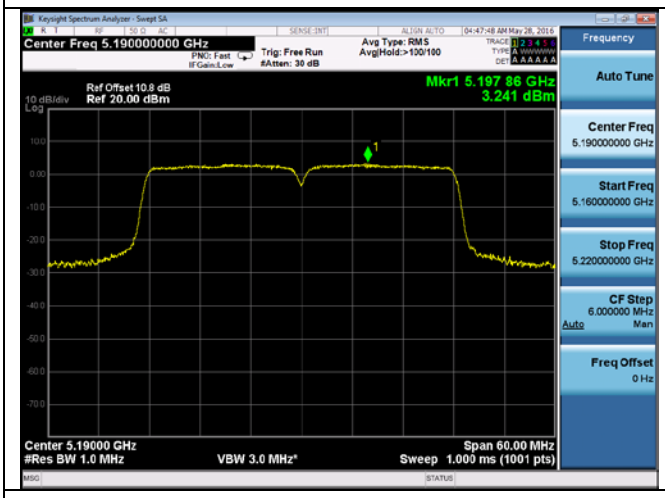
PSD-802.11n-20M-5240M-chain3



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

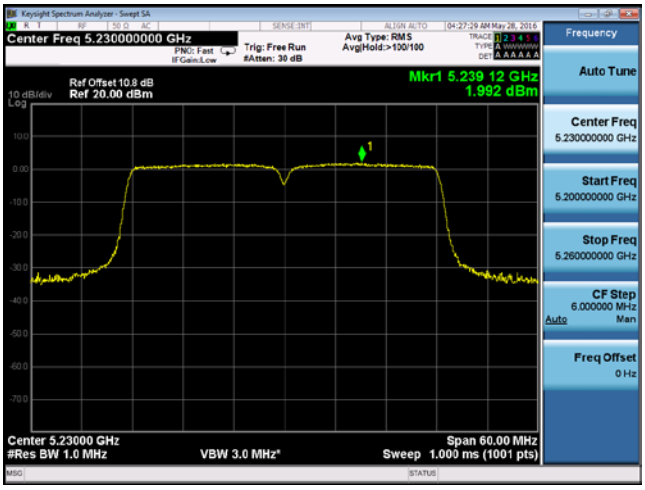


PSD-802.11n-40M-5190M-chain2



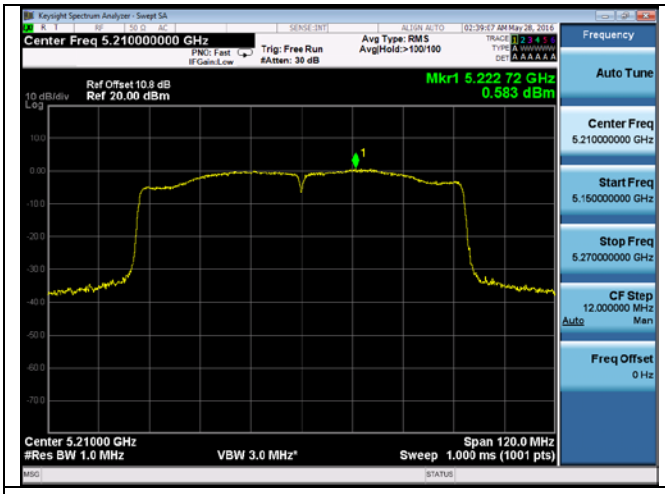
PSD-802.11n-40M-5190M-chain3

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



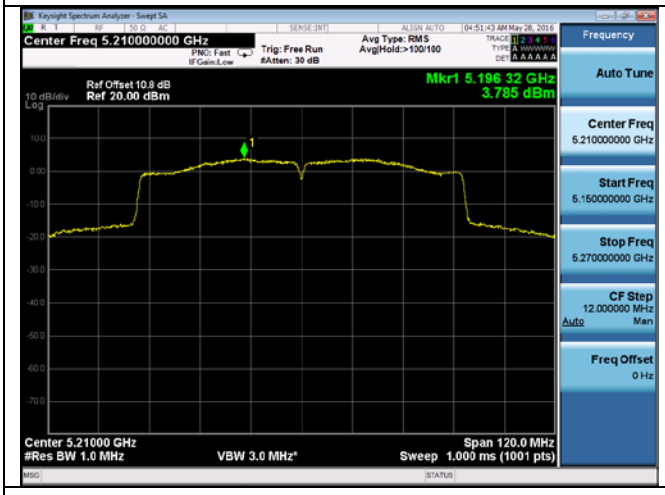
PSD-802.11n-40M-5230M-chain2

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

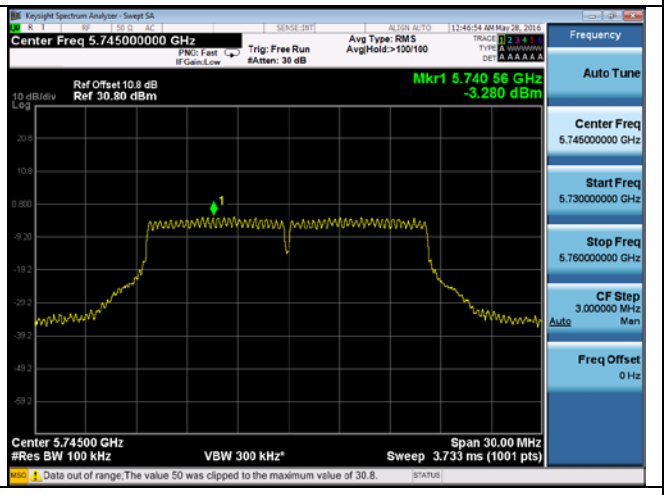


PSD-802.11ac-80M-5210M-chain1

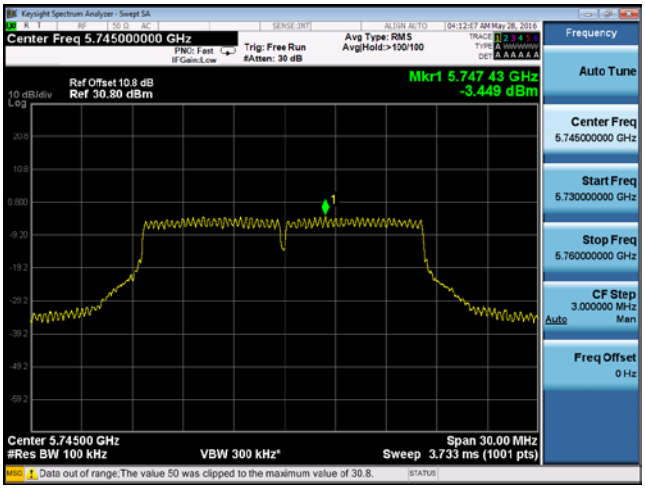
PSD-802.11ac-80M-5210M-chain2



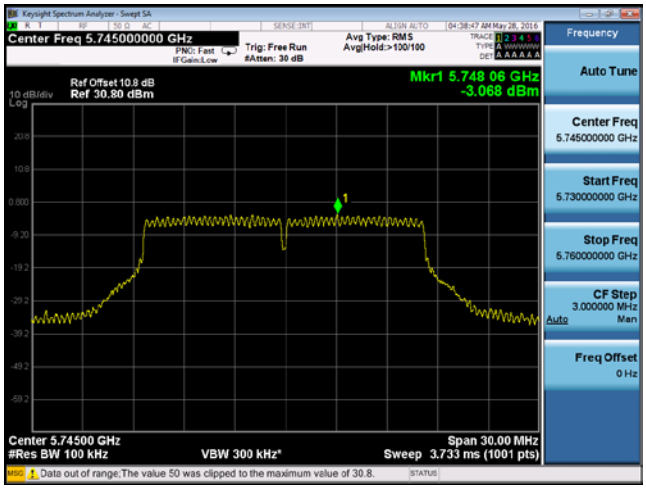
PSD-802.11ac-80M-5210M-chain3



PSD-802.11a-5745M-chain1



PSD-802.11a-5745M-chain2



PSD-802.11a-5745M-chain3