

RF TEST REPORT



Report No.: FCC_RF_SL16032301-RUC-014_UNII Rev 2.0

Supersede Report No.: FCC_RF_SL16032301-RUC-014_UNII Rev 1.0

Applicant	:	Ruckus Wireless, Inc.
Product Name	:	H510 Access Point
Model No.	:	H510
Test Standard	:	47 CFR 15.407
Test Method	:	ANSI C63.4: 2014 789033 D02 General UNII Test Procedures New Rules v01r02
FCC ID	:	S9GH510
IC ID	:	5912A-H510
Dates of test	:	05/27/2016 to 06/20/2016
Issue Date	:	07/06/2016
Test Result	:	☒ Pass ☐ Fail
Equipment complied with the specification ☒		
Equipment did not comply with the specification ☐		

This Test Report is Issued Under the Authority of:

Gary Chou

Chen Ge

Gary Chou

Chen Ge

Test Engineer

Engineer Reviewer

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Test result presented in this test report is applicable to the tested sample only

Issued By:
SIEMIC Laboratories
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Laboratory Introduction

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



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

Accreditations for Conformity Assessment

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

Accreditations for Product Certifications

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

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1 Report Revision History

Report No.	Report Version	Description	Issue Date
FCC_RF_SL16032301-RUC-014_UNII	None	Original	06/22/2016
FCC_RF_SL16032301-RUC-014_UNII Rev 1.0	1.0	Updated per customer	07/06/2016
FCC_RF_SL16032301-RUC-014_UNII Rev 2.0	2.0	Updated per TCB reviewer	07/18/2016

2 Executive Summary

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

Company: Ruckus Wireless, Inc.
Product: H510 Access Point
Model: H510

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	H510 Access Point
Model No.	H510
Trade Name	Ruckus
Serial No.	141606000019
Host Model No.	N/A
Input Power	48VDC (PoE)
Power Adapter Manu/Model	N/A
Power Adapter SN	N/A
Date of EUT received	05/26/2016
Equipment Class/ Category	DTS, UNII
Clock Frequencies	48MHz XTAL Frequency, 25MHz Clock
Port/Connectors	PoE, Ethernet
Product Hardware version	705-60455-001
Product Software version	812-72425-001
Radio Hardware version	705-60455-001
Radio Software version	812-72425-001
Test Software version	117-11343-001

6.2 Radio Description

Radio Type	802.11a	802.11n-20M	802.11n-40M	802.11ac-80M
Operating Frequency	5180-5240MHz 5745-5825MHz	5180-5240MHz 5745-5825MHz	5190-5230MHz 5755-5795MHz	5210MHz 5775MHz
Modulation	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Channel Spacing	20MHz	20MHz	40MHz	80MHz
Number of Channels	9	9	4	2
Antenna Type	Internal Omni PCB Antenna			
Antenna Gain (Peak)	5GHz: 1dBi			
Antenna Connector Type	U.FL			
Note	2.4GHz and 5GHz Radio transmit simultaneously			

EUT Power level setting

Mode	Frequency	ART Power Setting
802.11-a	5180	17
802.11-a	5200	20
802.11-a	5240	20
802.11-n-20	5180	16
802.11-n-20	5200	20
802.11-n-20	5240	20
802.11-n-40	5190	13
802.11-n-40	5230	20
802.11-ac-80	5210	13
802.11-a	5745	22
802.11-a	5785	22
802.11-a	5825	22
802.11-n-20	5745	22
802.11-n-20	5785	22
802.11-n-20	5825	22
802.11-n-40	5755	22
802.11-n-40	5795	22
802.11-ac-80	5775	21

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	740-64211-001	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 v01r02	☒ 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 v01r02	☒ Pass ☐ N/A
Maximum conducted Output Power	FCC	15.407 (a) (2)	789033 D02 General UNII Test Procedures New Rules v01r02	☒ 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 v01r02	☒ Pass ☐ N/A
Power Spectral Density	FCC	15.407 (a) (2)	789033 D02 General UNII Test Procedures New Rules v01r02	☒ 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	- All measurement uncertainties are not taken into consideration for all presented test result. - 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.
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9 Measurement Uncertainty

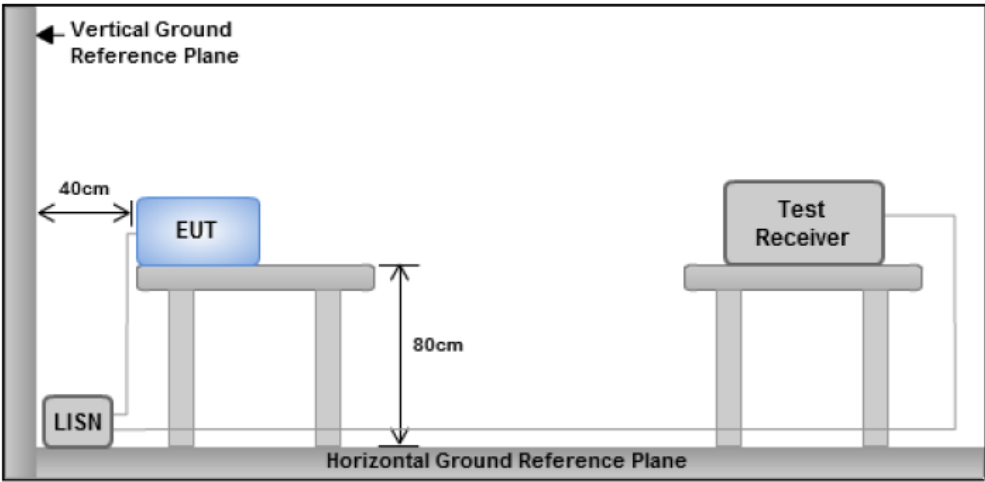
Emissions			
Test Item	Frequency Range	Description	Uncertainty
Band Edge and Radiated Spurious Emissions	30MHz – 1GHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
Band Edge and Radiated Spurious 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
RSS247(A8.1)	a)	For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequency ranges.	☒
Test Setup	 Note: 1. Support units were connected to second LISN. 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes		
Procedure	- The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table, as shown in Annex B. - The power supply for the EUT was fed through a 50Ω/50μH EUT LISN, connected to filtered mains. - The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable. - All other supporting equipment was powered separately from another main supply.		
Remark	EUT was tested at 120VAC, 60Hz		
Result	☒ Pass ☐ Fail		

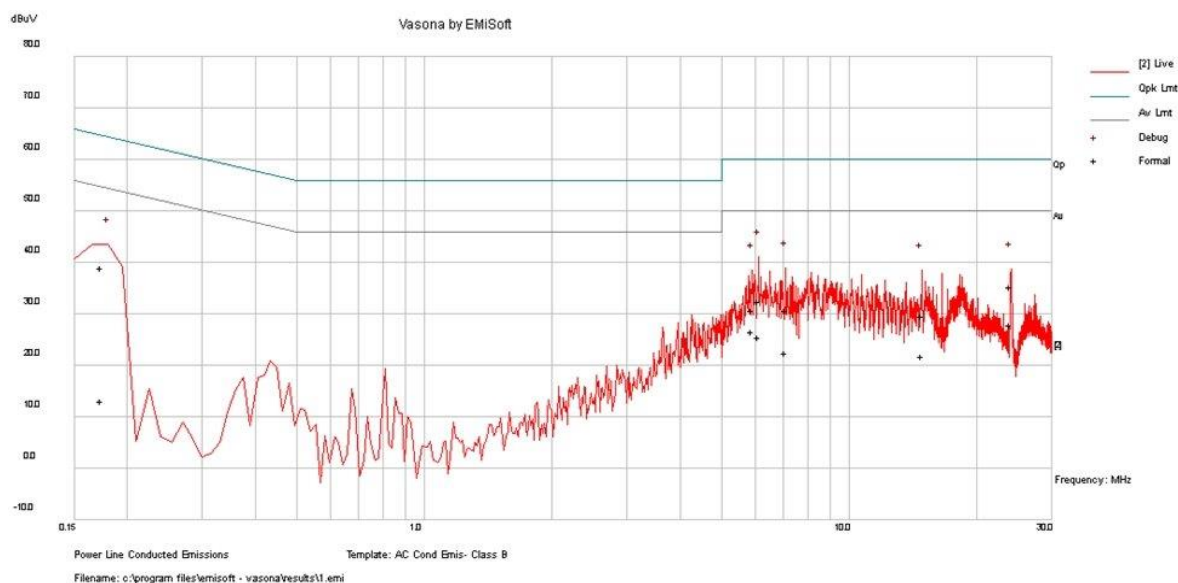
Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Gary Chou 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:	Gary Chou			
Test Date:	06/22/2016			
Remarks	Power Supply, Line			

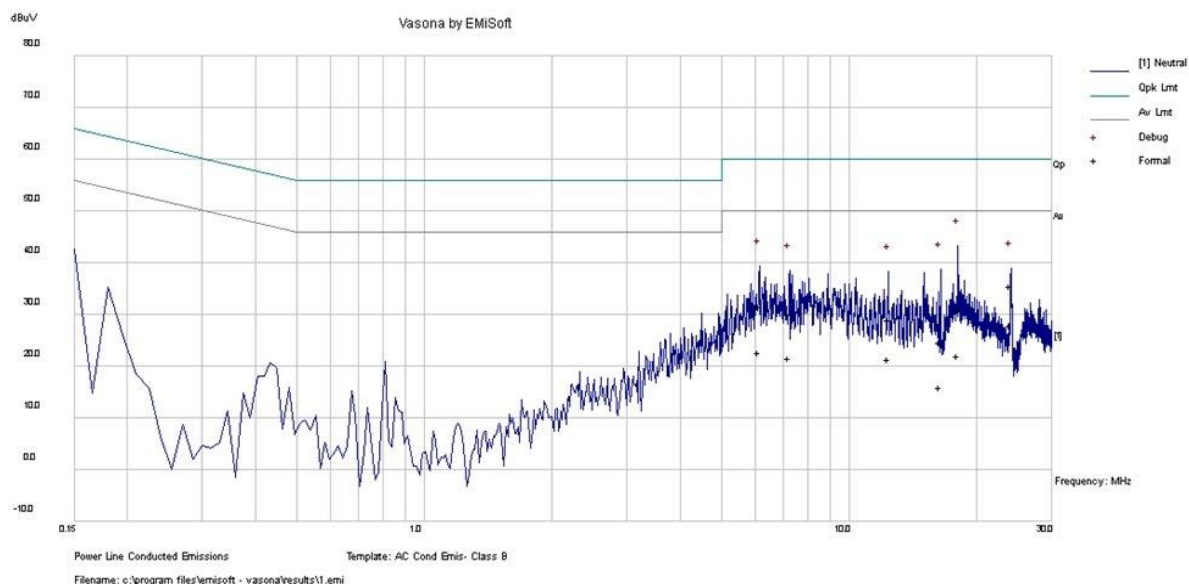


Line Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line / Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
6.13	22.03	10.04	0.55	32.62	Quasi Peak	Line	60	-27.38	Pass
7.07	20.14	10.04	0.55	30.73	Quasi Peak	Line	60	-29.27	Pass
0.17	27.63	10	1.51	39.15	Quasi Peak	Line	64.76	-25.61	Pass
24.00	24.53	10.08	0.76	35.37	Quasi Peak	Line	60	-24.63	Pass
5.90	20.32	10.04	0.55	30.91	Quasi Peak	Line	60	-29.09	Pass
14.81	18.99	10.06	0.6	29.65	Quasi Peak	Line	60	-30.35	Pass
6.13	15.01	10.04	0.55	25.6	Average	Line	50	-24.4	Pass
7.07	12.05	10.04	0.55	22.64	Average	Line	50	-27.36	Pass
0.17	1.63	10	1.51	13.15	Average	Line	54.76	-41.61	Pass
24.00	17.2	10.08	0.76	28.03	Average	Line	50	-21.97	Pass
5.90	16.21	10.04	0.55	26.8	Average	Line	50	-23.2	Pass
14.81	11.29	10.06	0.6	21.95	Average	Line	50	-28.05	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:	Gary Chou			
Test Date:	06/22/2016			
Remarks	Power Supply, Neutral			

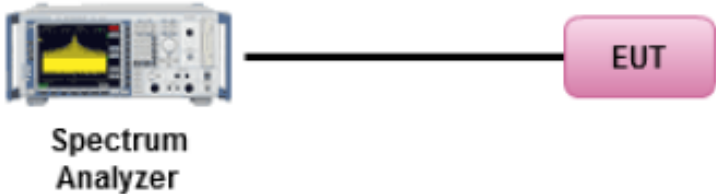


Neutral Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line / Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
18.03	20.42	10.07	0.66	31.14	Quasi Peak	Neutral	60	-28.86	Pass
6.13	21.16	10.04	0.55	31.75	Quasi Peak	Neutral	60	-28.25	Pass
23.99	24.74	10.08	0.76	35.57	Quasi Peak	Neutral	60	-24.43	Pass
16.38	14.07	10.06	0.63	24.76	Quasi Peak	Neutral	60	-35.24	Pass
7.24	19.64	10.04	0.55	30.24	Quasi Peak	Neutral	60	-29.76	Pass
12.35	18.37	10.05	0.58	29	Quasi Peak	Neutral	60	-31	Pass
18.03	11.34	10.07	0.66	22.06	Average	Neutral	50	-27.94	Pass
6.13	12.14	10.04	0.55	22.73	Average	Neutral	50	-27.27	Pass
23.99	17.24	10.08	0.76	28.07	Average	Neutral	50	-21.93	Pass
16.38	5.31	10.06	0.63	16	Average	Neutral	50	-34	Pass
7.24	11.05	10.04	0.55	21.65	Average	Neutral	50	-28.35	Pass
12.35	10.94	10.05	0.58	21.57	Average	Neutral	50	-28.43	Pass

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 v01r02 <u>26dB Emission bandwidth measurement procedure (Other than 5.725-5.85 GHz)</u> - 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. <u>6 dB Minimum emission bandwidth measurement procedure (for 5.725-5.85 GHz)</u> - 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	05/26/2016 – 06/03/2016	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		

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

Test was done by Chen Ge 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	29.30	-
	802.11a	5200	Mid	28.72	-
	802.11a	5240	High	29.80	-
	802.11n-20	5180	Low	29.80	-
	802.11n-20	5200	Mid	28.34	-
	802.11n-20	5240	High	30.00	-
	802.11n-40	5190	Low	38.87	-
	802.11n-40	5230	High	59.91	-
	802.11ac-80	5210	Mid	79.10	-

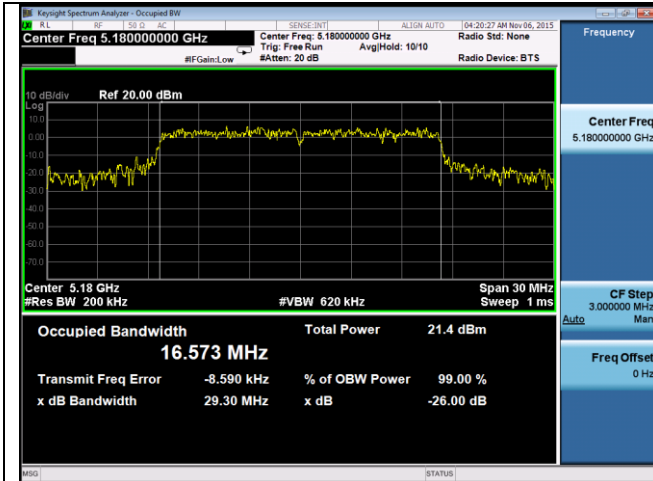
6dB Bandwidth measurement result for 5.8GHz

Type	Test mode	Freq (MHz)	CH	Result (MHz)	Limit (MHz)	Result
6dB BW	802.11a	5745	Low	16.44	≥0.5	Pass
	802.11a	5785	Mid	16.41	≥0.5	Pass
	802.11a	5825	High	16.38	≥0.5	Pass
	802.11n-20	5745	Low	17.67	≥0.5	Pass
	802.11n-20	5785	Mid	17.62	≥0.5	Pass
	802.11n-20	5825	High	17.75	≥0.5	Pass
	802.11n-40	5755	Low	34.40	≥0.5	Pass
	802.11n-40	5795	High	36.30	≥0.5	Pass
	802.11ac-80	5775	Mid	76.03	≥0.5	Pass

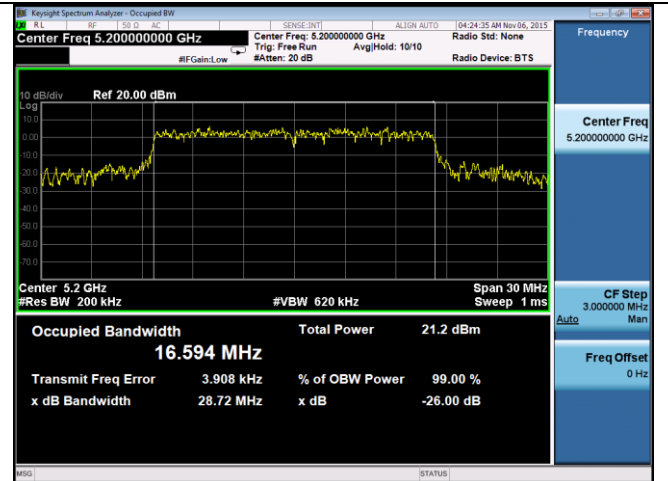
99% Bandwidth Measurement Result for 5.2GHz

Type	Test mode	Freq (MHz)	CH	Result (MHz)	Limit
99% OBW	802.11a	5180	Low	16.57	-
	802.11a	5200	Mid	16.59	-
	802.11a	5240	High	16.71	-
	802.11n-20	5180	Low	17.92	-
	802.11n-20	5200	Mid	17.71	-
	802.11n-20	5240	High	17.92	-
	802.11n-40	5190	Low	36.19	-
	802.11n-40	5230	High	36.61	-
	802.11ac-80	5210	Mid	75.91	-

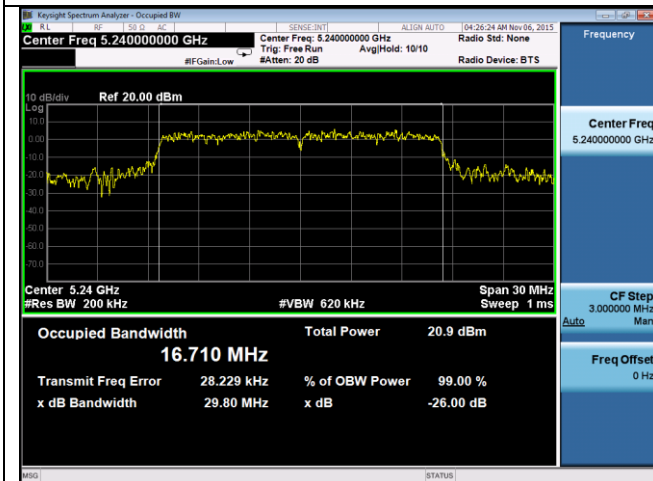
26dB Bandwidth Test Plots



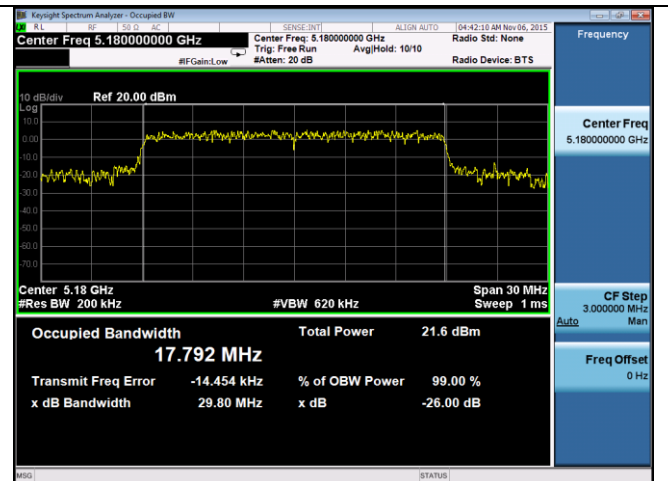
26dB BW - 802.11a 5180MHz



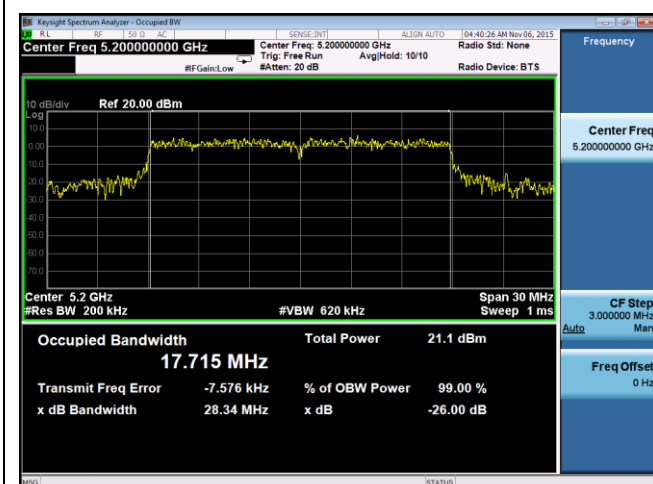
26dB BW - 802.11a 5200MHz



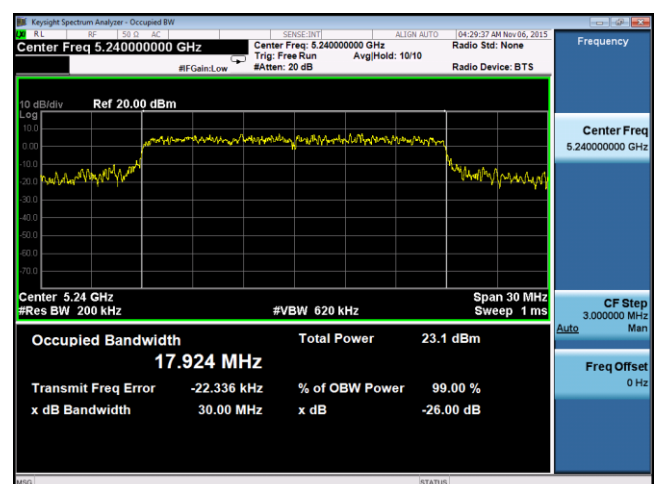
26dB BW - 802.11a 5240MHz



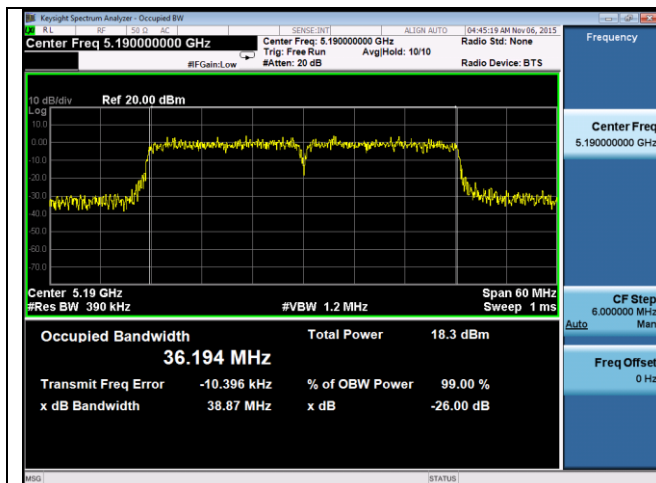
26dB BW - 802.11n-20M 5180MHz



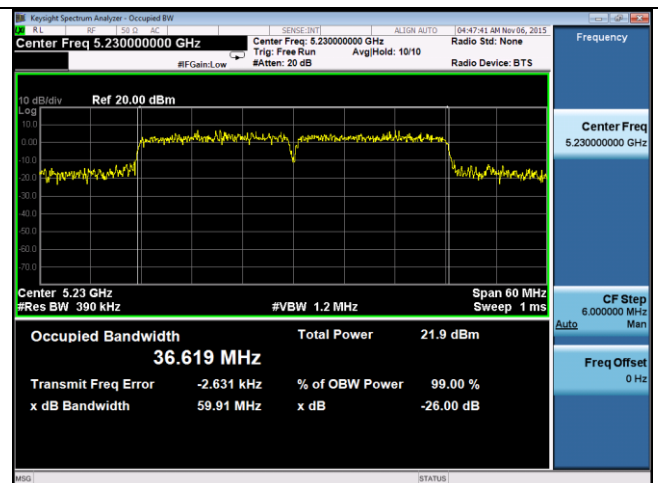
26dB BW - 802.11n-20M 5200MHz



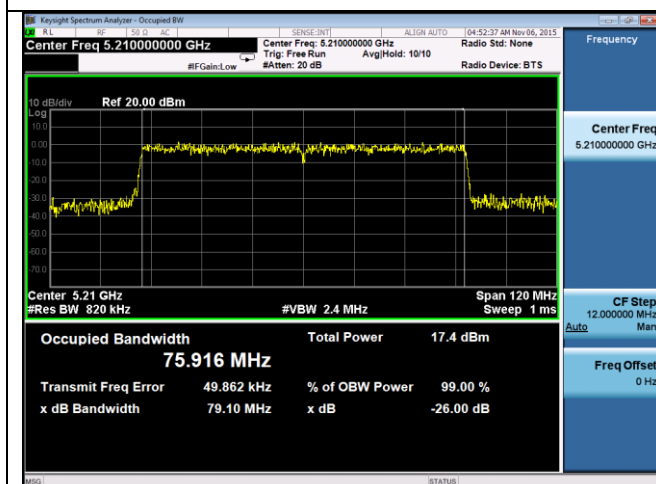
26dB BW - 802.11n-20M 5240MHz



26dB BW - 802.11n-40M 5190MHz

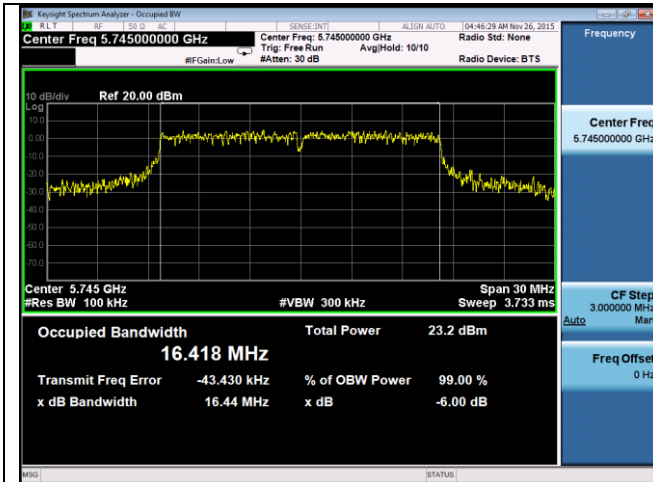


26dB BW - 802.11n-40M 5230MHz

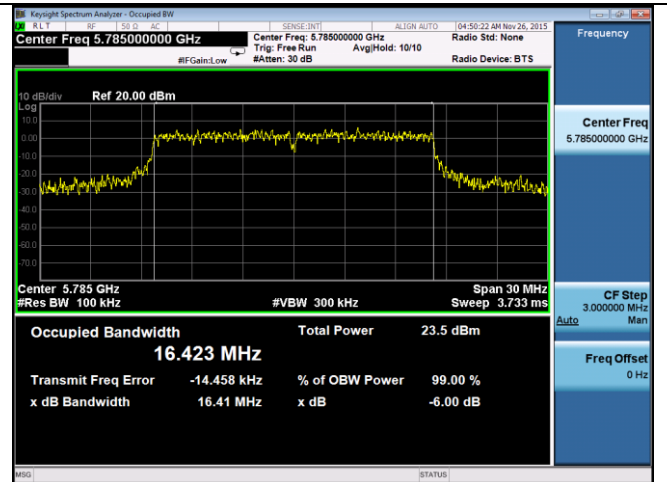


26dB BW - 802.11ac-80M 5210MHz

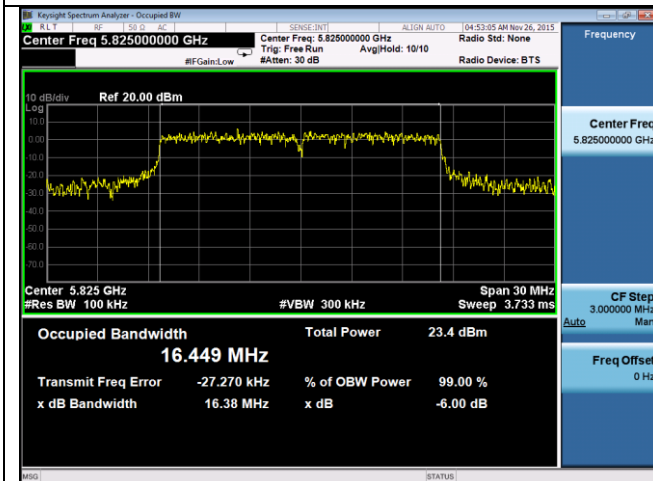
6dB Bandwidth Test Plots



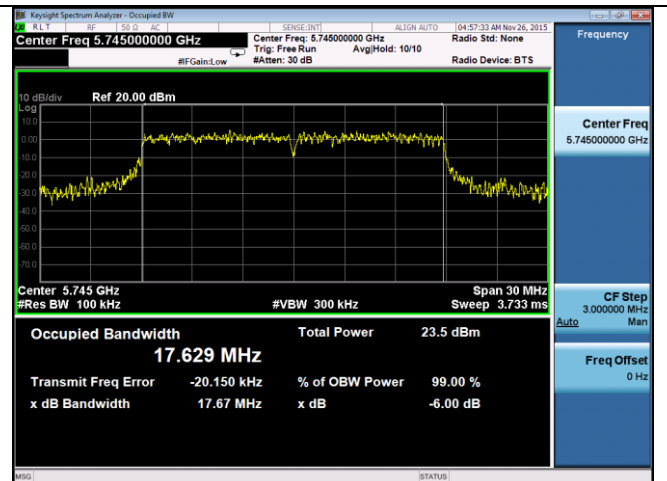
6dB BW 802.11a 5745MHz



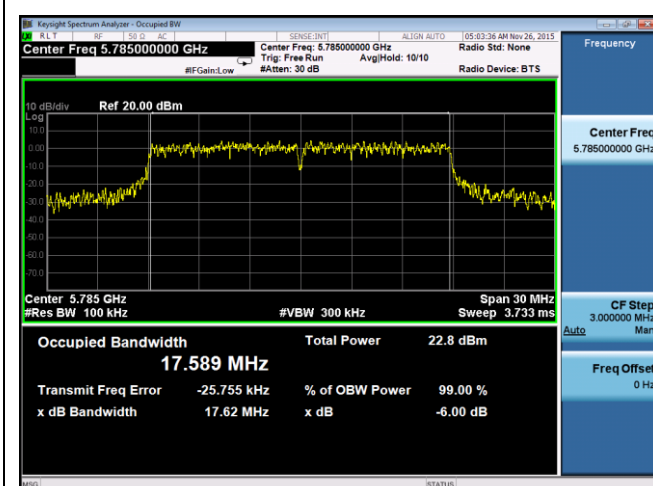
6dB BW 802.11a 5785MHz



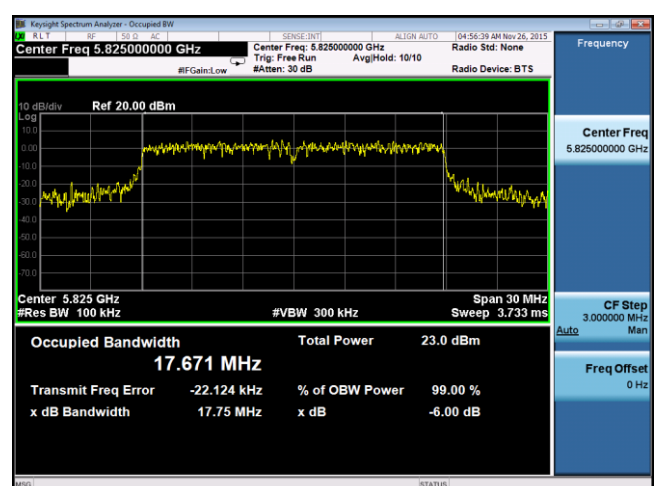
6dB BW 802.11a 5825MHz



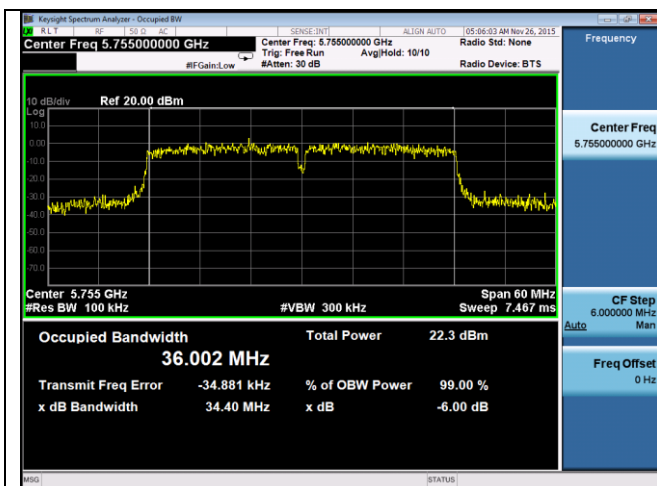
6dB BW 802.11n-20M 5745MHz



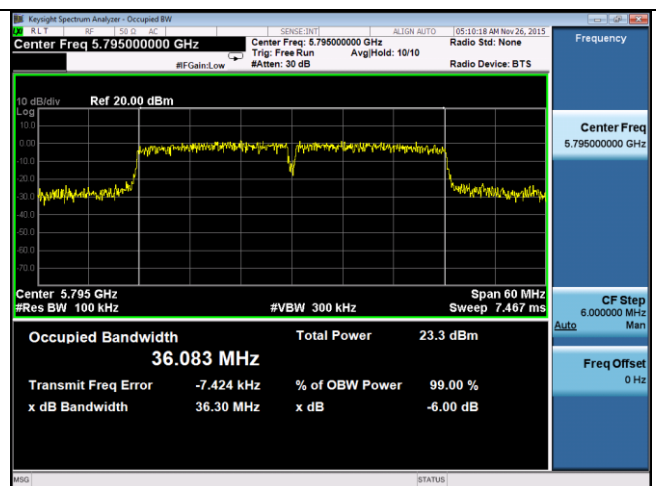
6dB BW 802.11n-20M 5785MHz



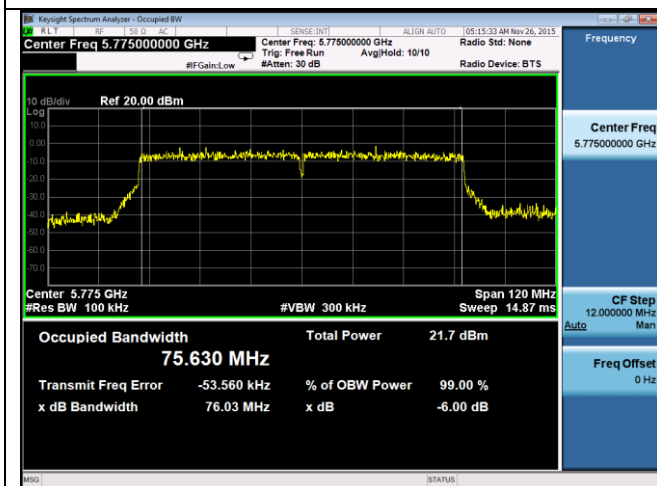
6dB BW 802.11n-20M 5825MHz



6dB BW 802.11n-40M 5755MHz



6dB BW 802.11n-40M 5795MHz



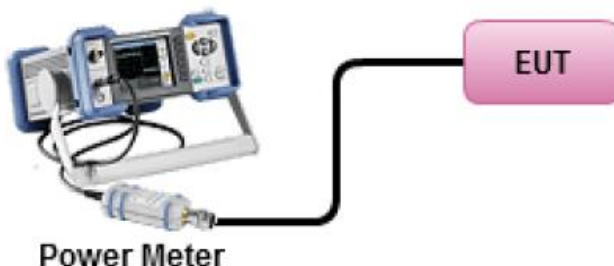
6dB BW 802.11ac-80M 5775MHz

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



Power Meter

Test Procedure

789033 D02 General UNII Test Procedures New Rules v01r02

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 – 06/03/2016	Environmental condition	Temperature 21°C Relative Humidity 40% Atmospheric Pressure 1019mbar
Remark	The EUT has two antennas which are cross-polarized, the directional gain=individual gain of each antenna =1dBi.		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test was done by Chen Ge at RF test site.

Output Power measurement result for 5.2GHz

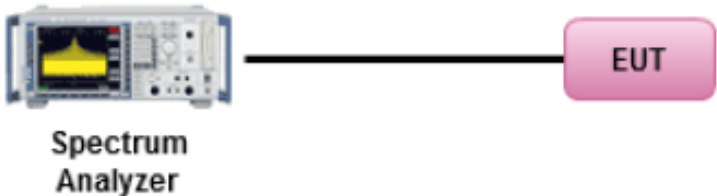
Type	Test mode	Freq (MHz)	CH	Conducted Power (dBm)			Limit (dBm)	Result
				Chain 0	Chain 1	Combined Power		
Output	802.11a	5180	Low	17.41	17.07	20.25	30	Pass
Output	802.11a	5200	Mid	20.16	20.49	23.34	30	Pass
Output	802.11a	5240	High	20.16	20.38	23.28	30	Pass
Output	802.11n-20M	5180	Low	16.84	16.62	19.74	30	Pass
Output	802.11n-20M	5200	Mid	20.35	19.94	23.16	30	Pass
Output	802.11n-20M	5240	High	20.08	20.70	23.41	30	Pass
Output	802.11n-40M	5190	Low	13.98	13.95	16.98	30	Pass
Output	802.11n-40M	5230	High	20.22	20.59	23.42	30	Pass
Output	802.11ac-80M	5210	-	13.74	13.69	16.73	30	Pass

Output Power Measurement Results for 5.8GHz

Type	Test mode	Freq (MHz)	CH	Conducted Power (dBm)			Limit (dBm)	Result
				Chain 0	Chain 1	Combined Power		
Output	802.11a	5745	Low	19.52	20.18	22.87	30	Pass
Output	802.11a	5785	Mid	20.23	20.40	23.33	30	Pass
Output	802.11a	5825	High	20.19	20.15	23.18	30	Pass
Output	802.11n-20M	5745	Low	20.07	20.38	23.24	30	Pass
Output	802.11n-20M	5785	Mid	20.13	20.35	23.25	30	Pass
Output	802.11n-20M	5825	High	20.26	20.57	23.43	30	Pass
Output	802.11n-40M	5755	Low	19.94	20.40	23.19	30	Pass
Output	802.11n-40M	5795	Mid	20.05	20.28	23.18	30	Pass
Output	802.11ac-80M	5775	-	19.60	20.06	22.85	30	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 v01r02, II.F. Method SA-1 <u>Maximum spectral density measurement procedure</u> - 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 – 06/03/2016	Environmental condition	Temperature 22°C Relative Humidity 42% Atmospheric Pressure 1020mbar
Remark	The EUT has two antennas which are cross-polarized, the directional gain=individual gain of each antenna =1dBi.		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

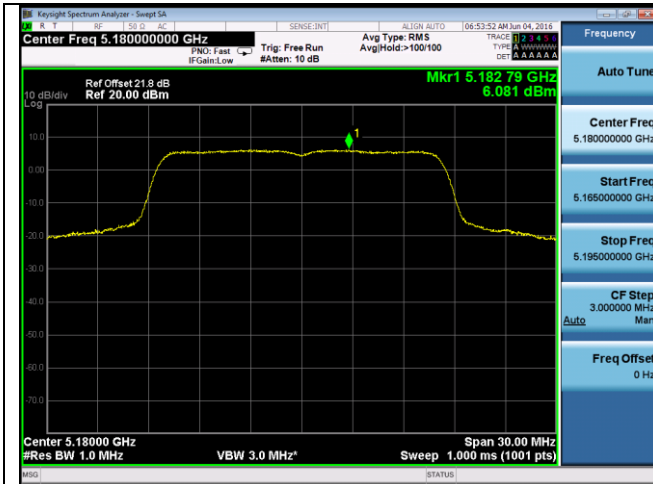
Test was done by Chen Ge at RF test site.

PSD measurement result

Type	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/MHz)			Limit (dBm)	Result
				Chain 0	Chain 1	Combined PSD		
PSD	802.11a	5180	Low	6.08	5.57	8.84	17	Pass
PSD	802.11a	5200	Mid	8.93	9.04	12.00	17	Pass
PSD	802.11a	5240	High	8.88	9.07	11.99	17	Pass
PSD	802.11n-20	5180	Low	5.01	5.27	8.15	17	Pass
PSD	802.11n-20	5200	Mid	8.46	8.35	11.42	17	Pass
PSD	802.11n-20	5240	High	8.51	8.89	11.71	17	Pass
PSD	802.11n-40	5190	Low	-0.43	-0.40	2.60	17	Pass
PSD	802.11n-40	5230	High	5.74	6.10	8.93	17	Pass
PSD	802.11ac-80	5210	-	-3.97	-4.12	-1.03	17	Pass

Type	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/100kHz)			Combined PSD(dBm/500kHz)	Limit (dBm/500kHz)	Result
				Chain 0	Chain 1	correction factor (dB)			
PSD	802.11a	5745	Low	-0.12	-0.02	6.99	9.93	30	Pass
PSD	802.11a	5785	Mid	-0.02	0.17	6.99	10.08	30	Pass
PSD	802.11a	5825	High	-0.31	-0.03	6.99	9.83	30	Pass
PSD	802.11n-20	5745	Low	-0.48	-0.10	6.99	9.71	30	Pass
PSD	802.11n-20	5785	Mid	-0.15	-0.37	6.99	9.74	30	Pass
PSD	802.11n-20	5825	High	-0.41	-0.58	6.99	9.51	30	Pass
PSD	802.11n-40	5755	Low	-3.03	-2.81	6.99	7.08	30	Pass
PSD	802.11n-40	5795	High	-3.44	-3.13	6.99	6.72	30	Pass
PSD	802.11ac-80	5775	Mid	-6.48	-6.03	6.99	3.75	30	Pass
Note	BW correction factor = $10\log(500\text{kHz}/\text{RBW})$, RBW was set to 100kHz during test.								

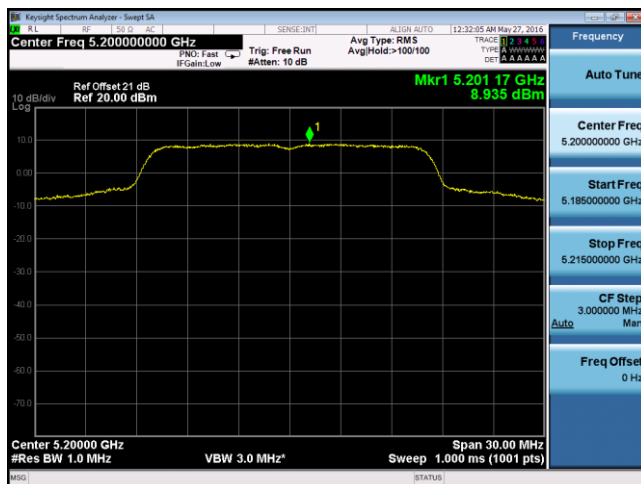
Test Plots



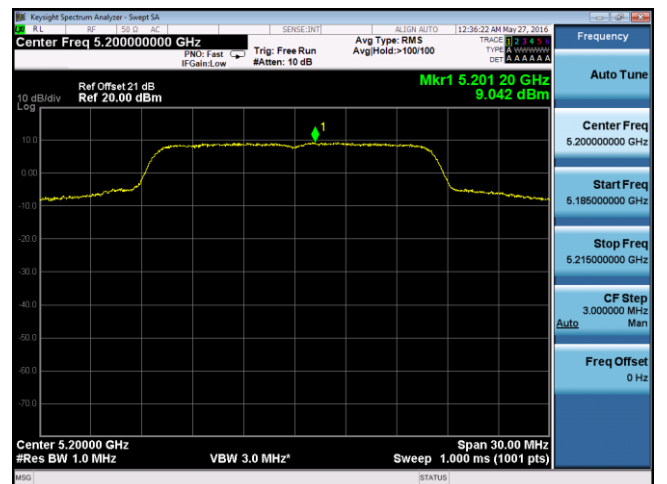
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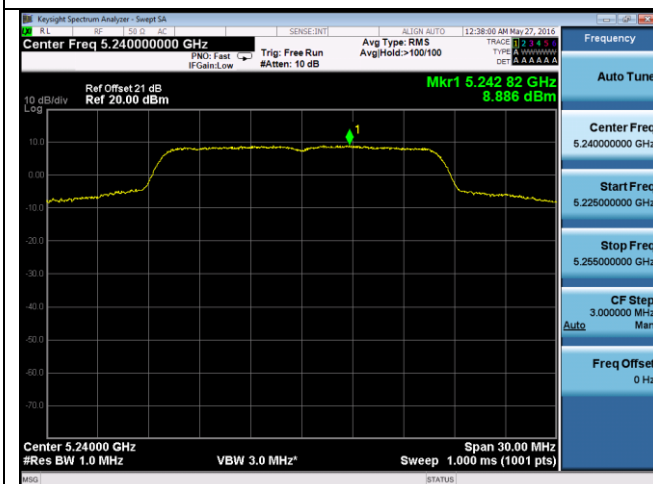
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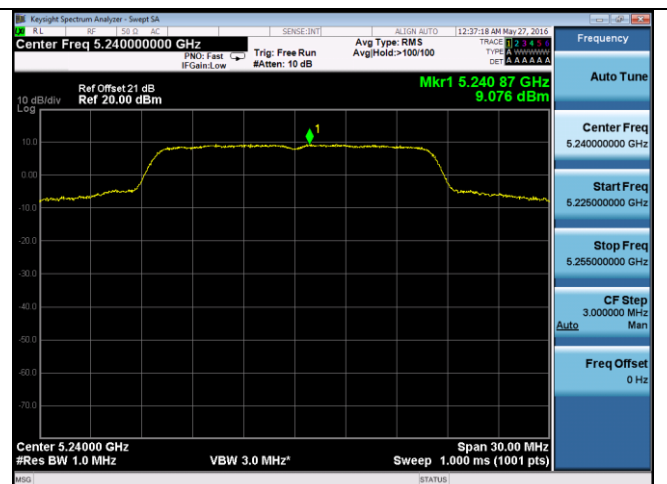
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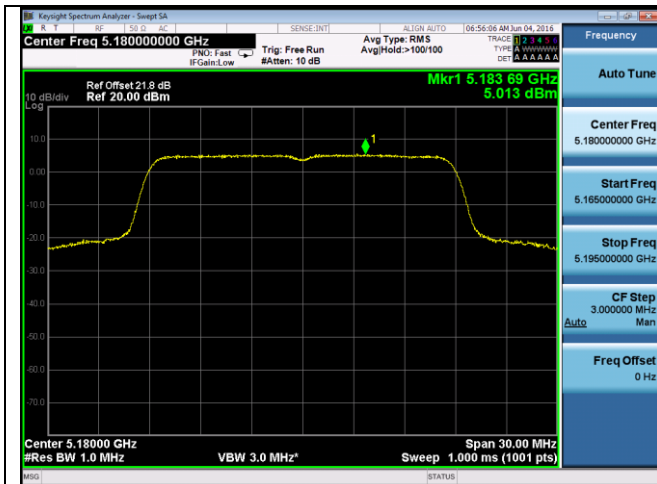
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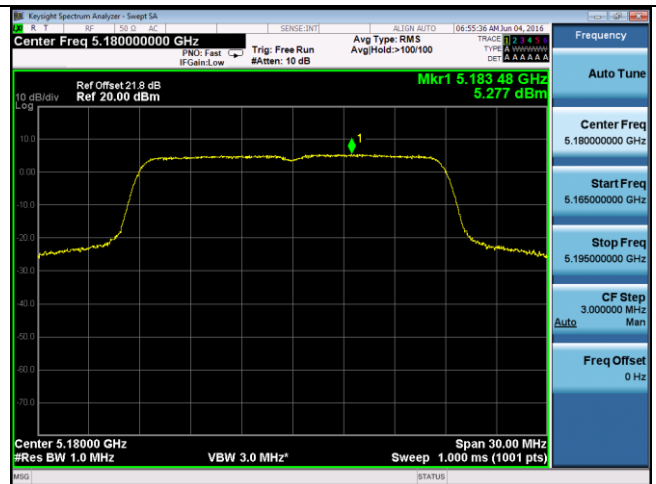
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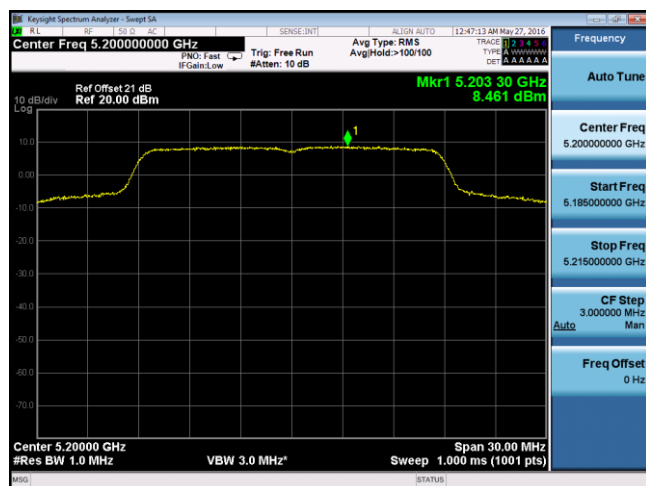
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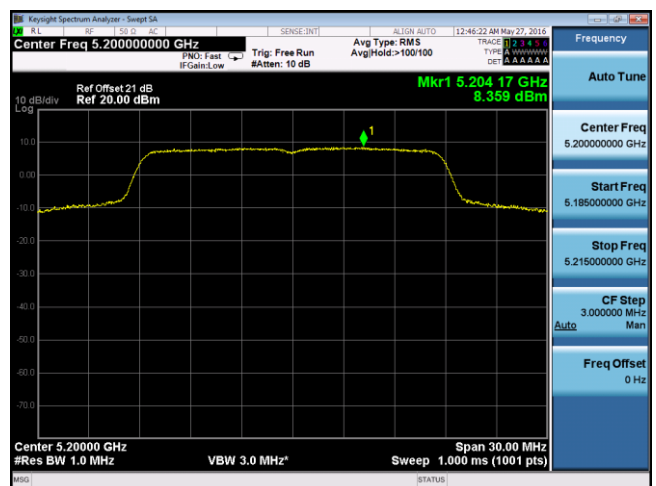
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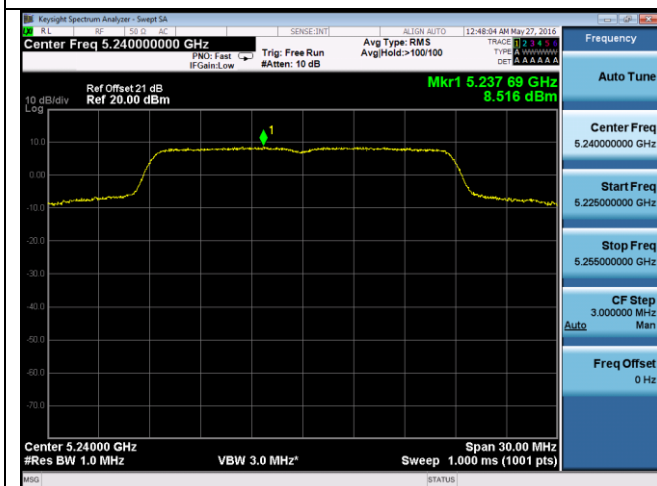
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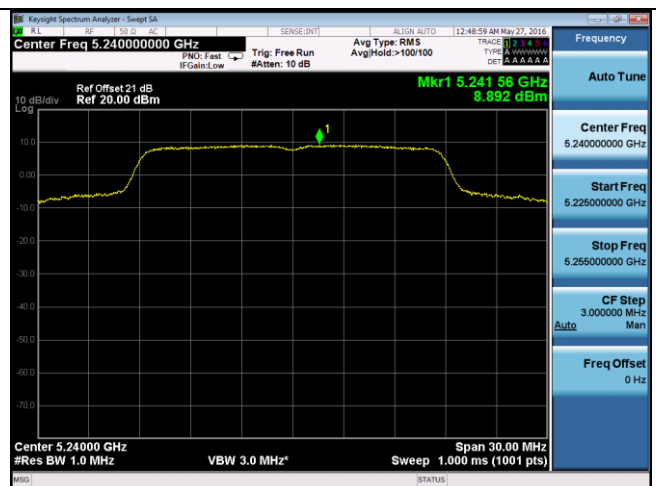
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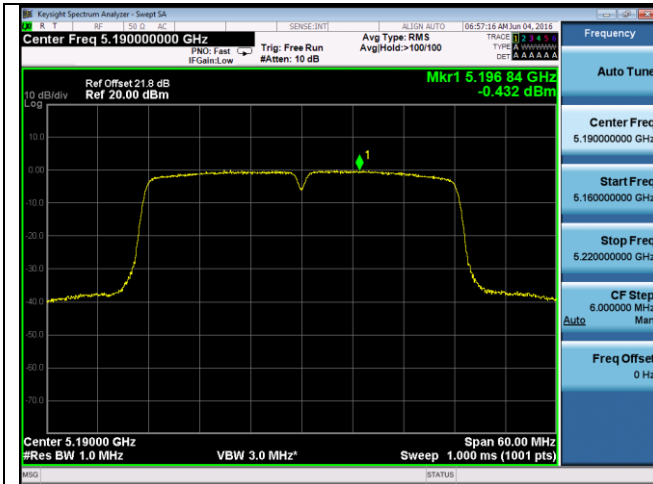
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PSD-802.11n-20M -5240M-chain0



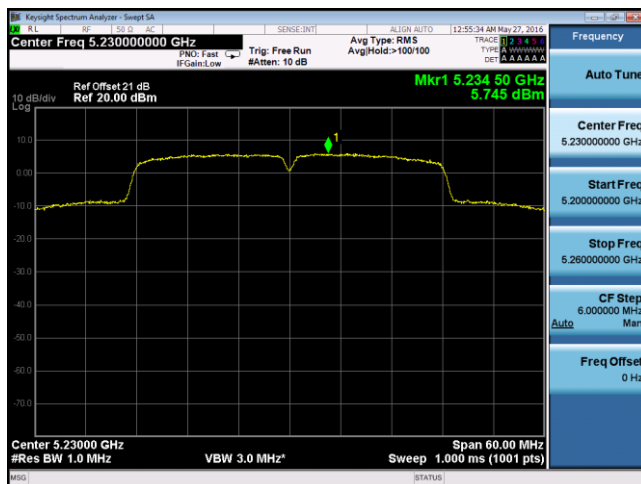
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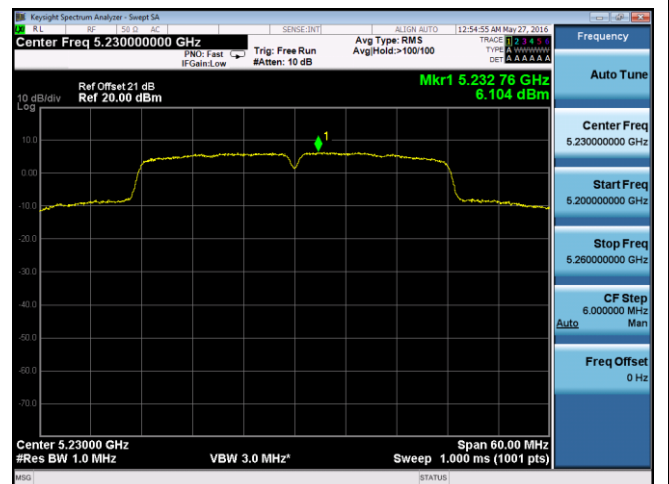
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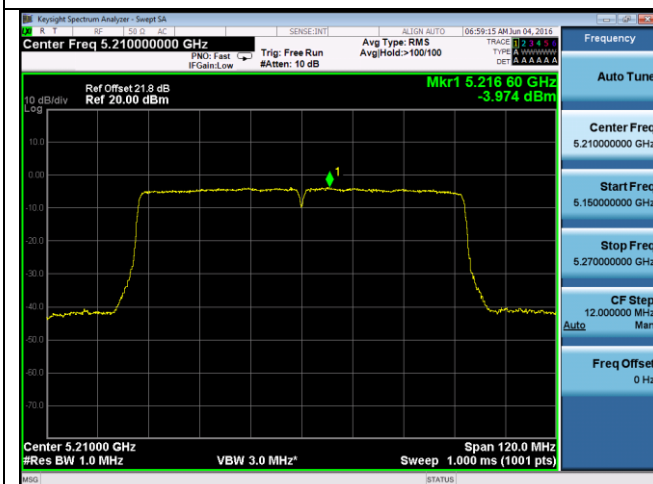
PSD-802.11n-40M-5190M-chain1



PSD-802.11n-40M-5230M-chain0



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



PSD-802.11ac-80M-5210M-chain0



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