

FCC UNII REPORT

FCC Certification

Applicant Name:

SAMSUNG Electronics Co.,Ltd.

Date of Issue:

November 04, 2015

Test Site/Location:

HCT CO., LTD., 74, Seoicheon-ro 578beon-gil,
Majang-myeon, Icheon-si, Gyeonggi-do, Korea

Address:

129, Samsung-ro, Yeongtong-gu, Suwon-si,
Gyeonggi-do, 16677, Rep. of Korea

Report No.: HCT-R-1510-F035-1

HCT FRN: 0005866421

FCC ID : A3LSMW2016
APPLICANT : SAMSUNG Electronics Co.,Ltd.
FCC Model(s):

SM-W2016

EUT Type:

Mobile Phone

Modulation type

OFDM

FCC Classification:

Unlicensed National Information Infrastructure(UNII)

FCC Rule Part(s):

Part 15.407

Band	Mode	Channel Bandwidth (MHz)	Frequency Range (MHz)	Power (dBm)	Power (W)
UNII1	802.11a	20	5180 – 5240	11.37	0.0137
	802.11n	20	5180 – 5240	11.33	0.0136
	802.11n	40	5190 - 5230	11.21	0.0132
	802.11ac	20	5180 – 5240	11.36	0.0137
	802.11ac	40	5190 - 5230	11.31	0.0135
	802.11ac	80	5210	12.14	0.0164
UNII2A	802.11a	20	5260 – 5320	12.68	0.0185
	802.11n	20	5260 – 5320	12.70	0.0186
	802.11n	40	5270 – 5310	12.41	0.0174
	802.11ac	20	5260 – 5320	12.61	0.0182
	802.11ac	40	5270 – 5310	12.31	0.0170
	802.11ac	80	5290	13.37	0.0217
UNII2C	802.11a	20	5500 – 5720	12.28	0.0169
	802.11n	20	5500 – 5720	12.29	0.0169
	802.11n	40	5510 – 5710	11.78	0.0151
	802.11ac	20	5500 – 5720	12.29	0.0169
	802.11ac	40	5510 – 5710	11.88	0.0154
	802.11ac	80	5530 – 5690	12.64	0.0184
UNII3	802.11a	20	5745 – 5825	12.14	0.0164
	802.11n	20	5745 – 5825	12.21	0.0166
	802.11n	40	5755 – 5795	11.89	0.0155
	802.11ac	20	5745 – 5825	12.24	0.0167
	802.11ac	40	5755 – 5795	11.92	0.0156
	802.11ac	80	5775	12.64	0.0184

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998, 21 U.S. C. 853(a)



Report prepared by
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Test Engineer of RF Team



Approved by
: Sang Jun Lee
Manager of RF Team

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1510-F035	October 26, 2015	- First Approval Report
HCT-R-1510-F035-1	November 04, 2015	- Added the straddle channels(138, 142, 144) test about EBW, Power, PSD.

Table of Contents

1. GENERAL INFORMATION	5
2. EUT DESCRIPTION	5
3. TEST METHODOLOGY	6
3.1 EUT CONFIGURATION	6
3.2 EUT EXERCISE	6
3.3 GENERAL TEST PROCEDURES	6
3.4 DESCRIPTION OF TEST MODES	6
4. INSTRUMENT CALIBRATION.....	7
5. FACILITIES AND ACCREDITATIONS	7
5.1 FACILITIES	7
5.2 EQUIPMENT	7
6. ANTENNA REQUIREMENTS	7
7. SUMMARY OF TEST RESULTS	8
8. TEST RESULT	9
8.1 DUTY CYCLE.....	9
8.2 EMISSION BANDWIDTH AND MINIMUM EMISSION BANDWIDTH MEASUREMENT	12
8.3 OUTPUT POWER MEASUREMENT	34
8.4 POWER SPECTRAL DENSITY	68
8.5 FREQUENCY STABILITY.	87
8.6 RADIATED MEASUREMENT.....	99
8.6.1 RADIATED SPURIOUS EMISSIONS.....	99
8.6.2 RADIATED RESTRICTED BAND EDGE MEASUREMENTS	229
8.7 POWERLINE CONDUCTED EMISSIONS	263
9. LIST OF TEST EQUIPMENT	268
9.1 LIST OF TEST EQUIPMENT(Conducted Test)	268
9.2 LIST OF TEST EQUIPMENT(Radiated Test).....	269

1. GENERAL INFORMATION

Applicant: SAMSUNG Electronics Co.,Ltd.
Address: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID: A3LSMW2016
EUT Type: Mobile Phone
Model name(s): SM-W2016
Date(s) of Tests: September 01, 2015 ~ November 03, 2015
Place of Tests: HCT Co., Ltd.
74, Seoicheon-ro 578beon-gil, Majang-myeo, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA
(IC Recognition No. : 5944A-5)

2. EUT DESCRIPTION

FCC Model Name	SM-W2016	
EUT Type	Mobile Phone	
Power Supply	DC 3.85 V	
Battery Information	Model: EB-BW201ABE Type: Secondary Li-On Battery	
Frequency Range	TX_20 MHz BW: 40 MHz BW: 80 MHz BW: RX_20 MHz BW: 40 MHz BW: 80 MHz BW:	5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2A)/ 5500 MHz - 5720 MHz (UNII 2C)/ 5745 MHz - 5825 MHz (UNII 3) 5190 MHz - 5230 MHz (UNII 1)/ 5270 MHz - 5310 MHz (UNII 2A)/ 5510 MHz - 5710 MHz (UNII 2C) / 5755 MHz - 5795 MHz (UNII 3) 5210 MHz(UNII 1)/ 5290 MHz(UNII 2A)/ 5530 MHz - 5690 MHz(UNII 2C)/ 5775 MHz (UNII 3) 5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2A)/ 5500 MHz - 5720 MHz (UNII 2C)/ 5745 MHz - 5825 MHz (UNII 3) 5190 MHz - 5230 MHz (UNII 1)/ 5270 MHz - 5310 MHz (UNII 2A)/ 5510 MHz - 5710 MHz (UNII 2C) / 5755 MHz - 5795 MHz (UNII 3) 5210 MHz(UNII 1)/ 5290 MHz(UNII 2A)/ 5530 MHz - 5690 MHz(UNII 2C)/ 5775 MHz (UNII 3)
Modulation Type	OFDM(802.11a, 802.11n, 802.11ac)	
Antenna Specification	Manufacturer: Partron Antenna type: INTERNAL ANTENNA Peak Gain : -13.67 dBi (5180~5240 UNII1 BAND) / -16.42 dBi (5260~5325 UNII2A BAND) -12.19 dBi (5500~5720 UNII2C BAND) / -10.66 dBi (5745~5825 UNII3 BAND)	

3. TEST METHODOLOGY

The measurement procedure described in FCC KDB 789033 D02 General UNII Test Procedures New Rules v01 dated June 06, 2014 entitled “ Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part15, Subpart E” and the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) were used in the measurement. For 802.11ac, KDB644545 D03 v01 dated August 14, 2014

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.407 under the FCC Rules Part 15 Subpart E.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz. Above 1GHz with 1.5m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 8 of ANSI C63.10. (Version: 2013)

Conducted Antenna Terminal

See Section from 8.1 to 8.4.(KDB 789033)

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low, mid and high with highest data rate (worst case) is chosen for full testing.

4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 07, 2015 (Registration Number: 90661)

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203, §15.407

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

* The antennas of this E.U.T are permanently attached.

* The E.U.T Complies with the requirement of §15.203, §15.407

7. SUMMARY OF TEST RESULTS

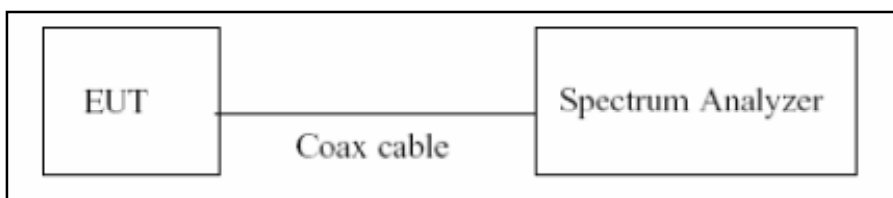
Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
26dB Bandwidth	§15.407 (for Power Measurement)	N/A	CONDUCTED	PASS
6 dB Bandwidth	§15.407(e)	>500 kHz (5725-5850 MHz)		PASS
Maximum Conducted Output Power	§15.407(a)(1)	< 250 mW (5150-5250 MHz) < 250 mW or 11+10 log log ₁₀ (BW) dBm (5250-5350 MHz) < 250 mW or 11+10 log log ₁₀ (BW) dBm (5470-5725 MHz) <1 W (5725-5850 MHz)		PASS
Peak Power Spectral Density	§15.407(a)(1),(5)	<11 dBm/ MHz (5150-5250 MHz) <11 dBm/ MHz (5250-5350 MHz) <11 dBm/ MHz (5470-5725 MHz) <30 dBm/500 kHz(5725-5850 MHz)		PASS
Frequency Stability	§15.407(g)	NA		PASS
AC Conducted Emissions 150 kHz-30 MHz	15.207	<FCC 15.207 limits		PASS
Undesirable Emissions	§15.407(b)	<-27 dBm/MHz EIRP (UNII1, 2A, 2C) <-17 dBm/MHz EIRP within 5715-5725 MHz and 5850-5860 MHz (UNII3) <-27 dBm/MHz EIRP outside 5715-5860 MHz (UNII 3)	RADIATED	PASS
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	15.205, 15.407(b)(5), (6)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		PASS

8. TEST RESULT

8.1 DUTY CYCLE

The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set $RBW \geq EBW$ if possible; otherwise, set RBW to the largest available value. Set $VBW \geq RBW$. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$, where T is defined in section B)1)a), and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

■ TEST CONFIGURATION



■ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. We tested according to the zero-span measurement method, (B.2 in KDB 789033 D02, issued 06/06/2014)

The largest available value of RBW is 8 MHz and VBW is 50 MHz. The zero-span method of measuring duty cycle shall not be used if $T \leq 6.25$ microseconds. ($50/6.25 = 8$)

The zero-span method was used because all measured T data are > 6.25 microseconds and both RBW and VBW are $> 50/T$.

1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz ($\geq$ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10 \cdot \log(1/\text{Duty Cycle})$

Duty Cycle Factor

Mode	Data Rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11a	6	1.428	1.527	0.93516699	0.291
	9	0.960	1.059	0.90651558	0.426
	12	0.723	0.822	0.87956204	0.557
	18	0.492	0.591	0.83248731	0.796
	24	0.372	0.471	0.78980892	1.025
	36	0.257	0.356	0.72191011	1.415
	48	0.196	0.296	0.66216216	1.790
	54	0.180	0.280	0.64285714	1.919
802.11n_20 MHz BW	6.5	1.335	1.435	0.93031359	0.314
	13	0.690	0.790	0.87341772	0.588
	19.5	0.470	0.570	0.82456140	0.838
	26	0.365	0.465	0.78494624	1.052
	39	0.256	0.355	0.72112676	1.420
	52	0.199	0.299	0.66555184	1.768
	58.5	0.184	0.283	0.65017668	1.870
	65	0.168	0.266	0.63157895	1.996
802.11n_40 MHz BW	13.5	0.663	0.763	0.86893840	0.610
	27	0.351	0.450	0.78000000	1.079
	40.5	0.248	0.348	0.71264368	1.471
	54	0.196	0.295	0.66440678	1.776
	81	0.142	0.242	0.58677686	2.315
	108	0.116	0.216	0.53703704	2.700
	121.5	0.107	0.207	0.51690821	2.866
	135	0.100	0.199	0.50251256	2.989

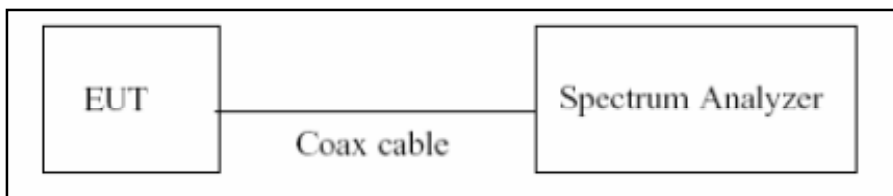
Mode	Data Rate	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11ac_20 MHz BW	6.5	1.345	1.445	0.93079585	0.311
	13	0.690	0.790	0.87341772	0.588
	19.5	0.475	0.575	0.82608696	0.830
	26	0.368	0.468	0.78632479	1.044
	39	0.260	0.360	0.72222222	1.413
	52	0.204	0.304	0.67105263	1.732
	58.5	0.188	0.287	0.65505226	1.837
	65	0.176	0.275	0.64000000	1.938
	78	0.152	0.252	0.60317460	2.196
5.8 GHz Band 802.11ac_40 MHz BW	13.5	0.668	0.768	0.86979167	0.606
	27	0.356	0.456	0.78070175	1.075
	40.5	0.252	0.352	0.71590909	1.451
	54	0.200	0.298	0.67114094	1.732
	81	0.148	0.248	0.59677419	2.242
	108	0.120	0.219	0.54794521	2.613
	121.5	0.112	0.211	0.53080569	2.751
	135	0.108	0.208	0.51923077	2.846
	162	0.100	0.200	0.50000000	3.010
5.8 GHz Band 802.11ac_80 MHz BW	180	0.092	0.191	0.48167539	3.172
	29.3	0.332	0.431	0.77030162	1.133
	58.5	0.188	0.287	0.65505226	1.837
	87.8	0.144	0.244	0.59016393	2.290
	117	0.116	0.215	0.53953488	2.680
	175.5	0.096	0.195	0.49230769	3.078
	234	0.080	0.180	0.44444444	3.522
	263.3	0.076	0.175	0.43428571	3.622
	292.5	0.072	0.171	0.42105263	3.757
	351	0.068	0.167	0.40718563	3.902
	390	0.064	0.163	0.39263804	4.060

8.2 EMISSION BANDWIDTH AND MINIMUM EMISSION BANDWIDTH MEASUREMENT

The bandwidth at 26 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum power control level, as defined in KDB 789033 D02(issued 06/06/2014), at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26 dB bandwidth.

The 26 dB bandwidth is used to determine the conducted power limits.

■ TEST CONFIGURATION



■ TEST PROCEDURE (26dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to (C.1 in KDB 789033 D02, issued 06/06/2014)

1. RBW = approximately 1 % of the emission bandwidth
2. VBW > RBW
3. Detector = Peak
4. Trace mode = max hold
5. Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1 %.

Note : We tested 26 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 26 dB.

■ TEST PROCEDURE (for the band 5.725-5.85 GHz, 6 dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to(C.2 in KDB 789033 D02, issued 06/06/2014)

1. RBW = 100 kHz
2. VBW $\geq$ 3*RBW
3. Detector = Peak
4. Trace mode = max hold
5. Allow the trace to stabilize
6. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points(upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Note : We tested 6 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 6 dB.

TEST RESULTS for 802.11a_20 MHz BW

Conducted 26 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	21.619	N/A	Pass
5200	40	21.619	N/A	Pass
5240	48	18.764	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	18.609	N/A	Pass
5300	60	21.394	N/A	Pass
5320	64	21.424	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	21.480	N/A	Pass
5580	116	18.506	N/A	Pass
5720	144	21.480	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11a

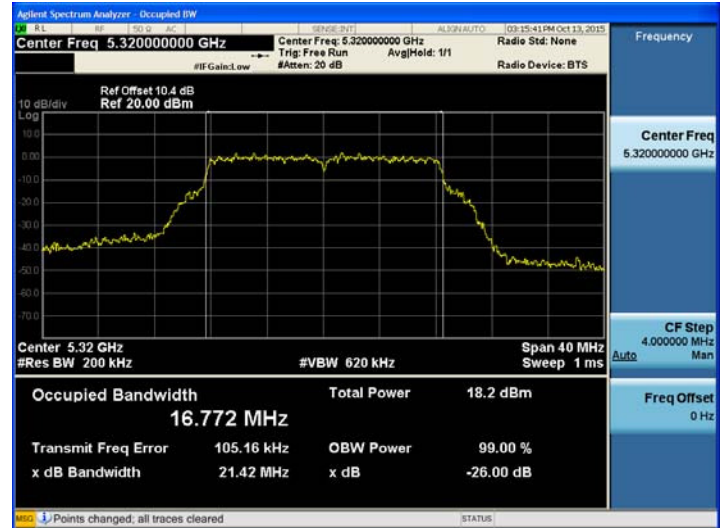
802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	21.601	N/A	Pass
5785	157	21.707	N/A	Pass
5825	165	21.695	N/A	Pass

TEST Plot for 802.11a_20MHz BW

802.11a UNII 1 BAND 26dB Bandwidth (CH36)



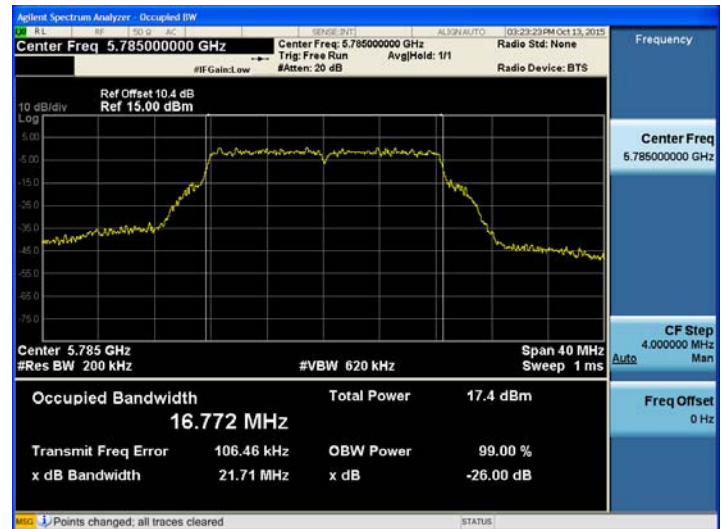
802.11a UNII 2A BAND 26dB Bandwidth (CH 64)



802.11a UNII 2C BAND 26dB Bandwidth (CH100)



802.11a UNII 3 BAND 26dB Bandwidth (CH 157)



Note :

In order to simplify the report, attached plots were only the most wide channel.

TEST RESULTS for 802.11n_20MHz BW

Conducted 26 dB Bandwidth Measurements for 802.11n 20M BW

802.11n(20MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	21.734	N/A	Pass
5200	40	21.621	N/A	Pass
5240	48	18.797	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n 20M BW

802.11n(20MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	18.945	N/A	Pass
5300	60	21.712	N/A	Pass
5320	64	21.730	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n 20M BW

802.11n(20MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	21.540	N/A	Pass
5580	116	18.820	N/A	Pass
5720	144	21.462	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n 20M BW

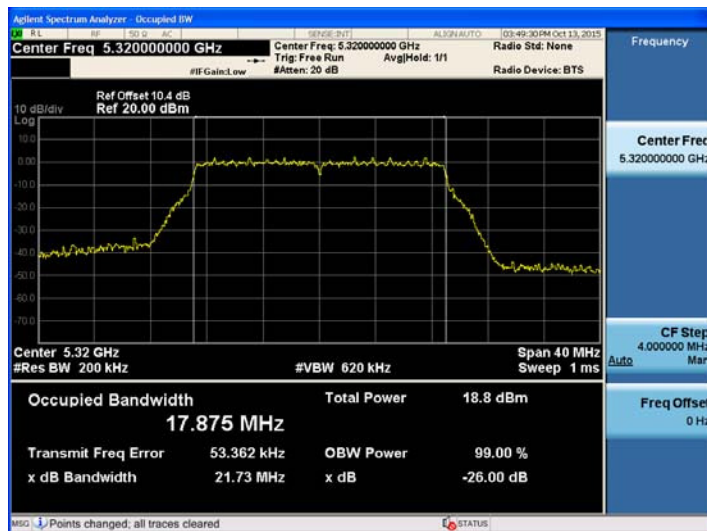
802.11n(20MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	21.589	N/A	Pass
5785	157	21.754	N/A	Pass
5825	165	21.631	N/A	Pass

TEST Plot for 802.11n _20MHz BW

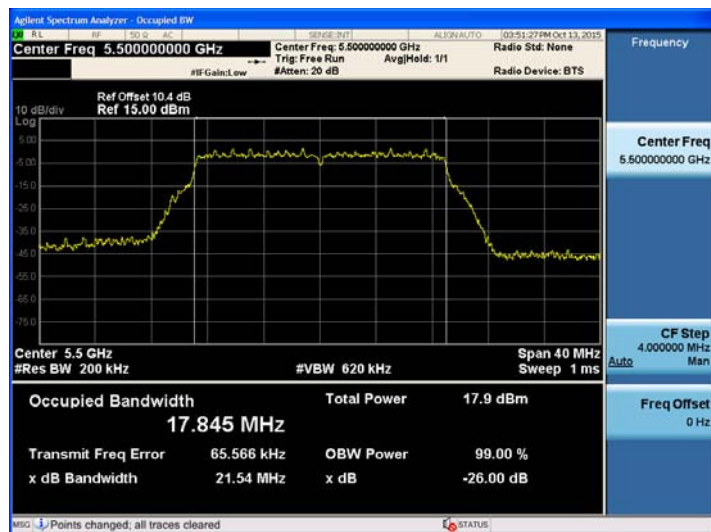
802.11n_20 MHz BW UNII 1 BAND 26dB Bandwidth(CH 36)



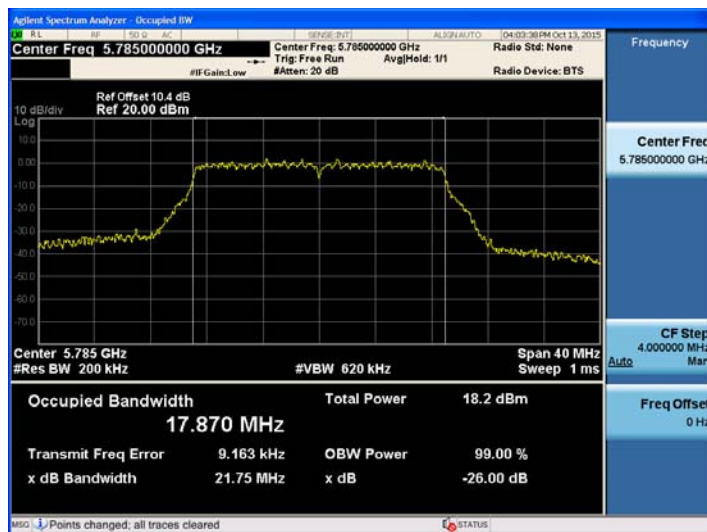
802.11n_20 MHz BW UNII 2A BAND 26dB Bandwidth(CH 64)



802.11n_20 MHz BW UNII 2C BAND 26dB Bandwidth(CH 100)



802.11n_20 MHz BW UNII 3 BAND 26dB Bandwidth(CH 157)



Note :

In order to simplify the report, attached plots were only the most wide channel.

TEST RESULTS for 802.11ac _20MHz BW

Conducted 26 dB Bandwidth Measurements for 802.11ac 20M BW

802.11ac(20MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	21.590	N/A	Pass
5200	40	21.674	N/A	Pass
5240	48	18.853	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac 20M BW

802.11ac(20MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	18.836	N/A	Pass
5300	60	21.560	N/A	Pass
5320	64	21.478	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac 20M BW

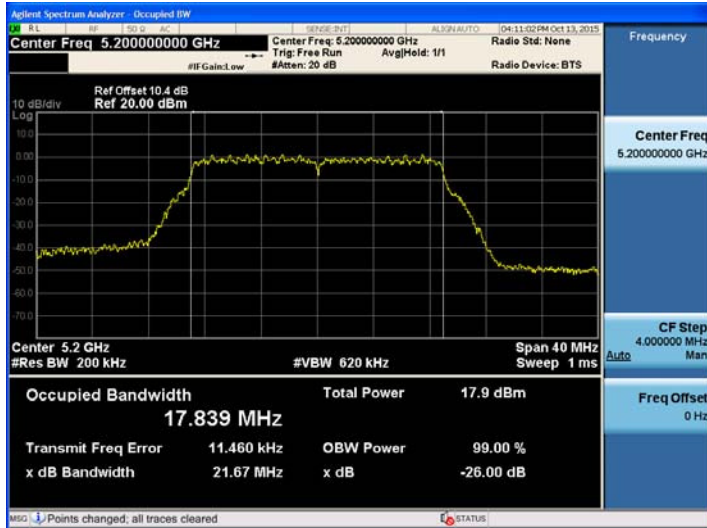
802.11ac(20MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	21.496	N/A	Pass
5580	116	18.942	N/A	Pass
5720	144	21.450	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac 20M BW

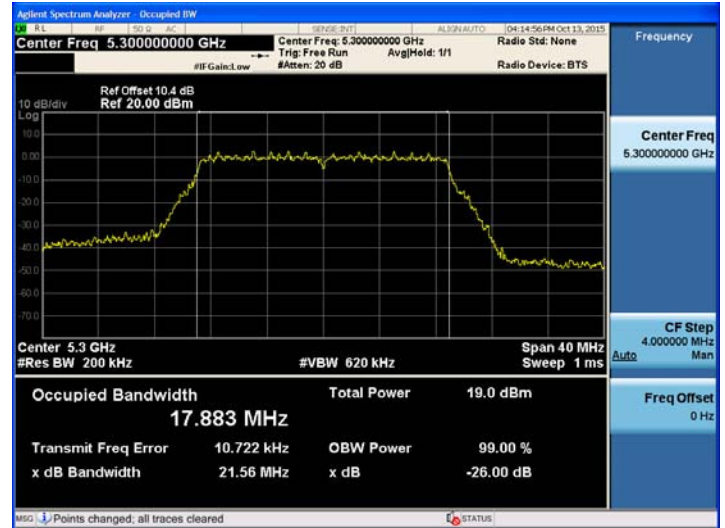
802.11ac(20MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	21.536	N/A	Pass
5785	157	21.530	N/A	Pass
5825	165	21.658	N/A	Pass

■ TEST Plot for 802.11ac _20MHz BW

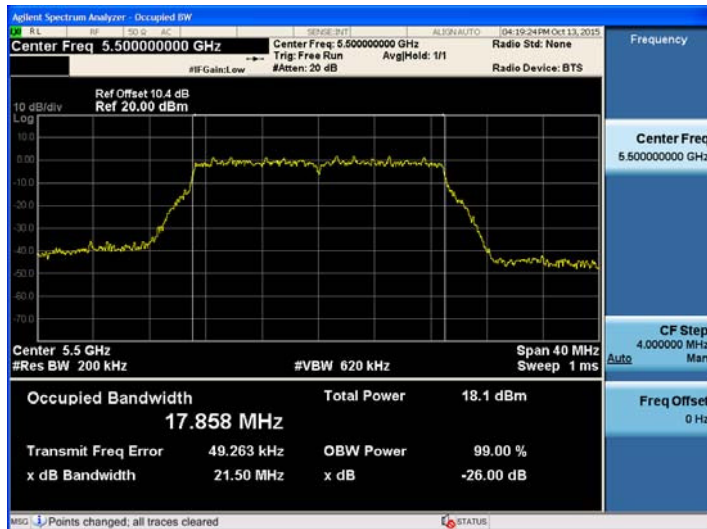
802.11ac_20 MHz BW UNII 1 BAND 26dB Bandwidth(CH 40)



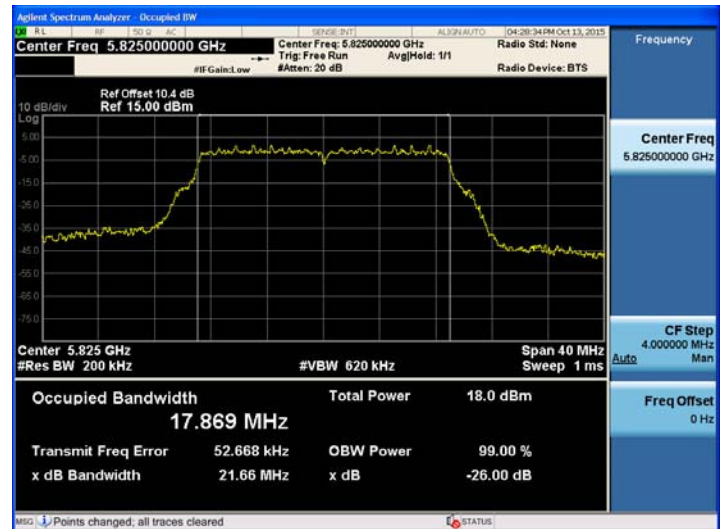
802.11ac_20 MHz BW UNII 2A BAND 26dB Bandwidth (CH 60)



802.11ac_20 MHz BW UNII 2C BAND 26dB Bandwidth (CH 100)



802.11ac_20 MHz BW UNII 3 BAND 26dB Bandwidth(CH 165)



Note :

In order to simplify the report, attached plots were only the most wide channel.

TEST RESULTS for 802.11n_40MHz BW

Conducted 26 dB Bandwidth Measurements for 802.11n_40 M BW

802.11n(40MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5190	38	39.435	N/A	Pass
5230	46	39.417	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_40 M BW

802.11n(40MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5270	54	39.372	N/A	Pass
5310	62	39.339	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_40 M BW

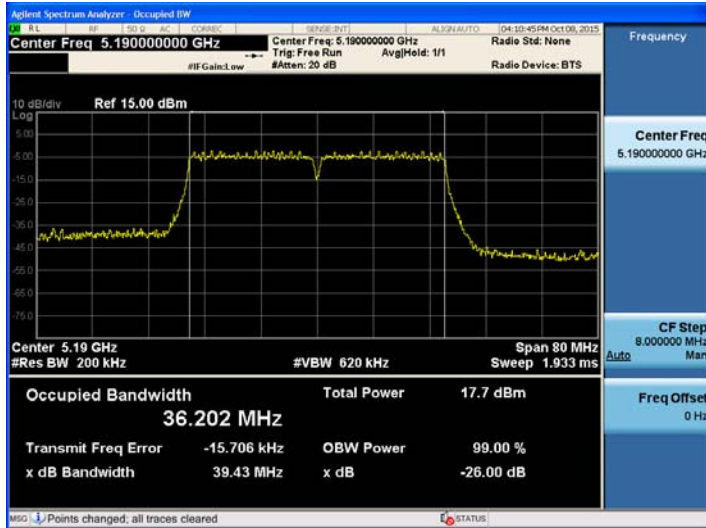
802.11n(40MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5510	102	39.295	N/A	Pass
5550	110	39.386	N/A	Pass
5710	142	39.382	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_40 M BW

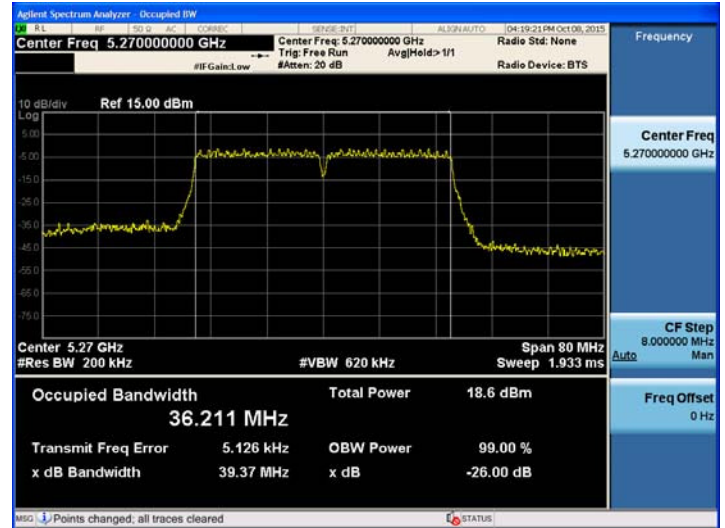
802.11n(40MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	39.247	N/A	Pass
5795	159	39.524	N/A	Pass

■ TEST Plot for 802.11n_40MHz BW

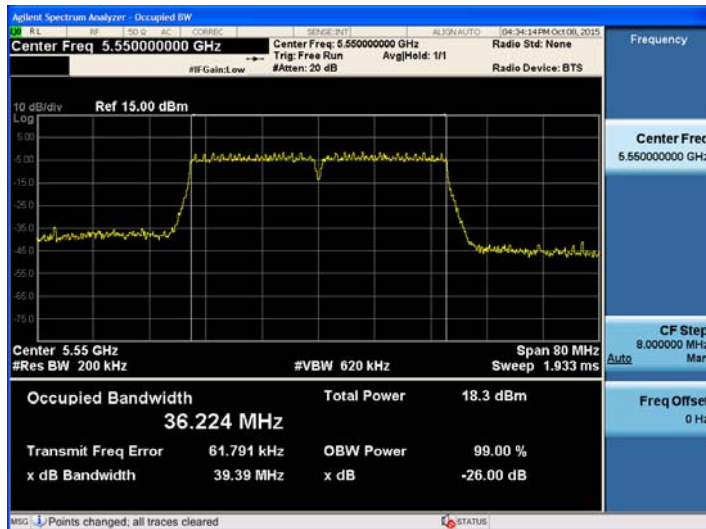
802.11n_40 MHz BW UNII 1 BAND 26dB Bandwidth(CH 38)



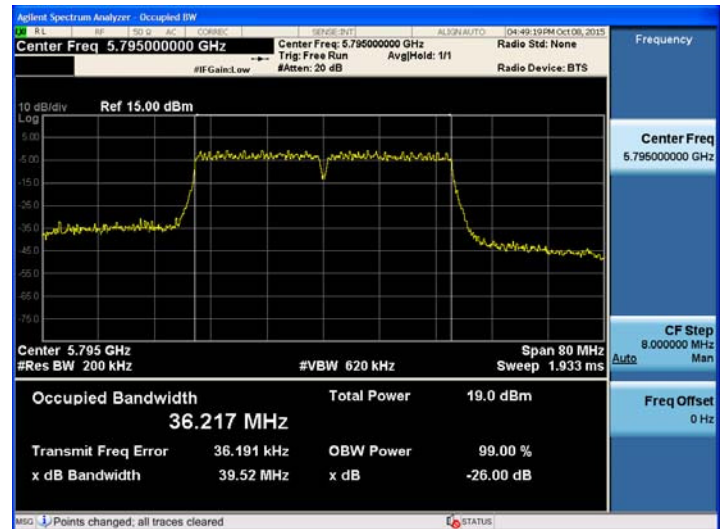
802.11n_40 MHz BW UNII 2A BAND 26dB Bandwidth (CH 54)



802.11n_40 MHz BW UNII 2C BAND 26dB Bandwidth(CH 110)



802.11n_40 MHz BW UNII 3 BAND 26dB Bandwidth (CH 159)



Note :

In order to simplify the report, attached plots were only the most wide channel.

TEST RESULTS for 802.11ac_40MHz BW

Conducted 26 dB Bandwidth Measurements for 802.11ac_40 M BW

802.11ac(40MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5190	38	39.568	N/A	Pass
5230	46	39.329	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_40 M BW

802.11ac(40MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5270	54	39.466	N/A	Pass
5310	62	39.383	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_40 M BW

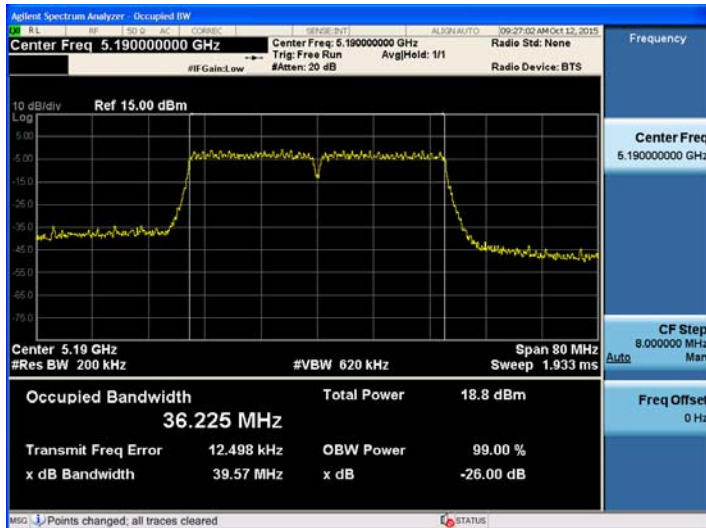
802.11ac(40MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5510	102	39.382	N/A	Pass
5550	110	39.215	N/A	Pass
5710	142	39.354	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_40 M BW

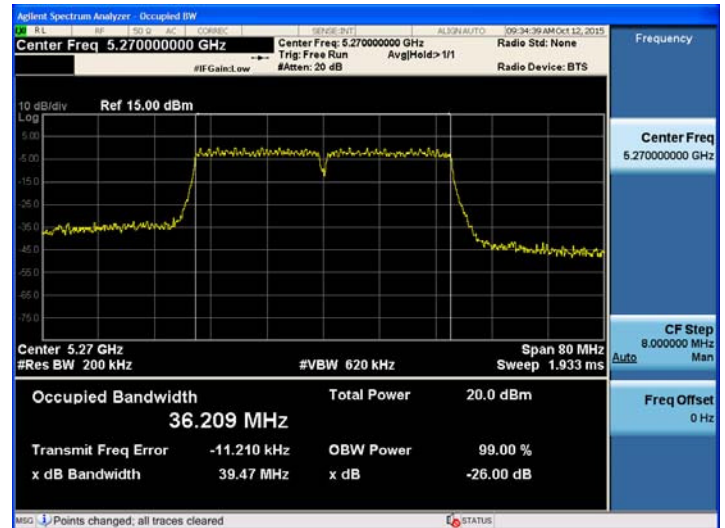
802.11ac(40MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	39.492	N/A	Pass
5795	159	39.407	N/A	Pass

■ TEST Plot for 802.11ac_40MHz BW

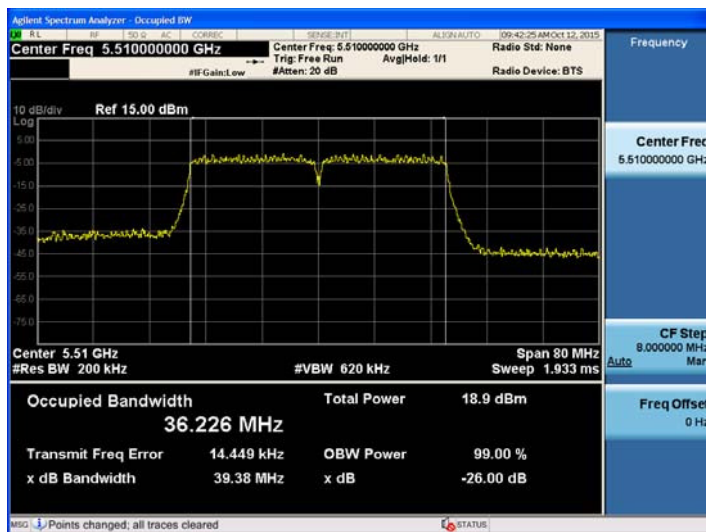
802.11ac_40 MHz BW UNII 1 BAND 26dB Bandwidth(CH 38)



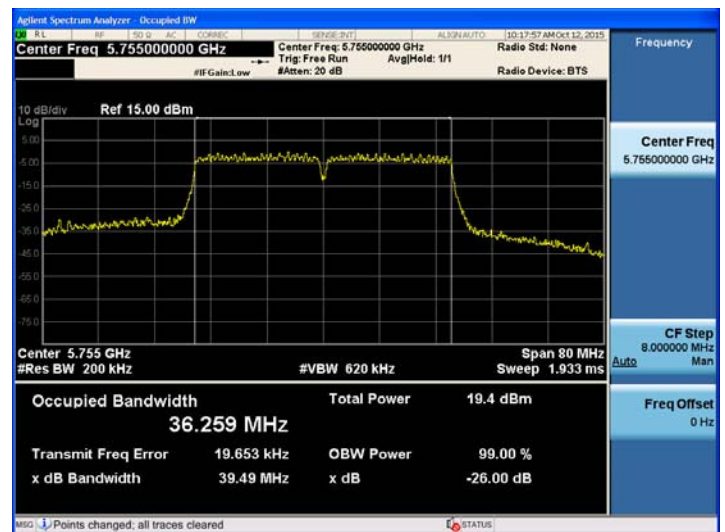
802.11ac_40 MHz BW UNII 2A BAND 26dB Bandwidth(CH 54)



802.11ac_40 MHz BW UNII 2C BAND 26dB Bandwidth(CH 102)



802.11ac_40 MHz BW UNII 3 BAND 26dB Bandwidth(CH 151)



Note :

In order to simplify the report, attached plots were only the most wide channel.

■ TEST RESULTS for 802.11ac_80MHz BW

Conducted 26 dB Bandwidth Measurements for 802.11ac_80M BW

802.11ac(80M) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5210	42	81.255	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_80M BW

802.11ac(80M) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5290	58	81.254	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_80M BW

802.11ac(80M) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5530	106	81.011	N/A	Pass
5610	122	81.182	N/A	Pass
5690	138	81.340	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_80M BW

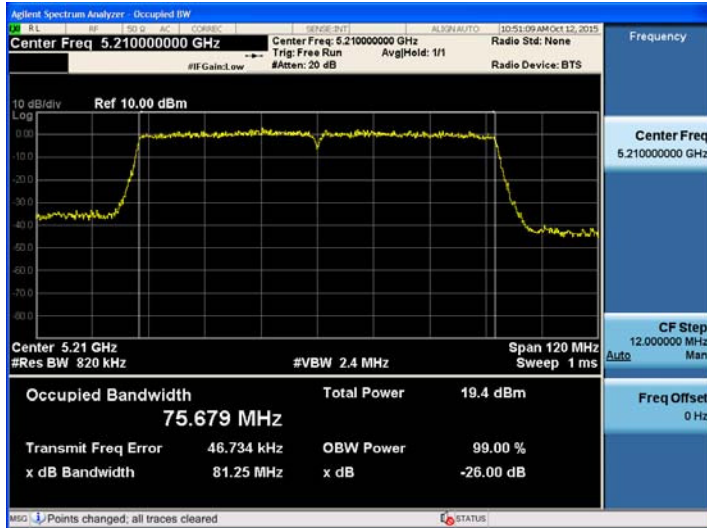
802.11ac(80M) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	81.277	N/A	Pass

Note :

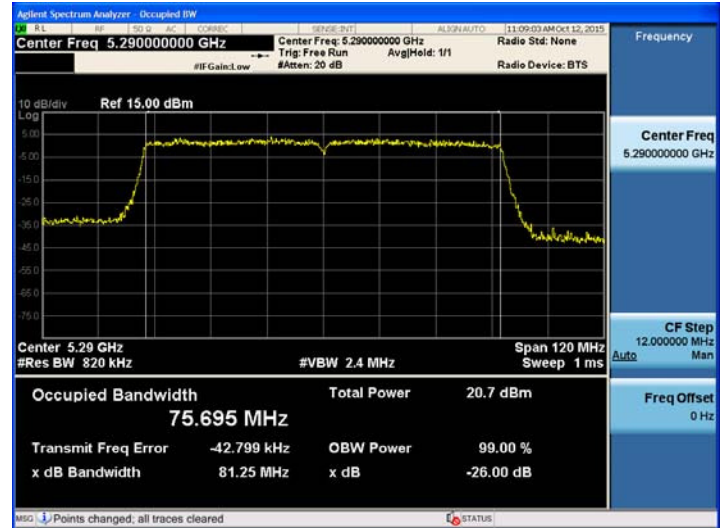
1. In order to simplify the report, attached plots were only the most wide channel.
2. DFS test channels should be defined. So, We performed the OBW test to prove that no part of the fundamental emissions of any channels belong to UNII1 and UNII3 band for DFS.
3. In case of UNII channels 138, 142 and 144, this device is satisfied with KDB644545 D03.

■ TEST Plot for 802.11ac_80MHz BW

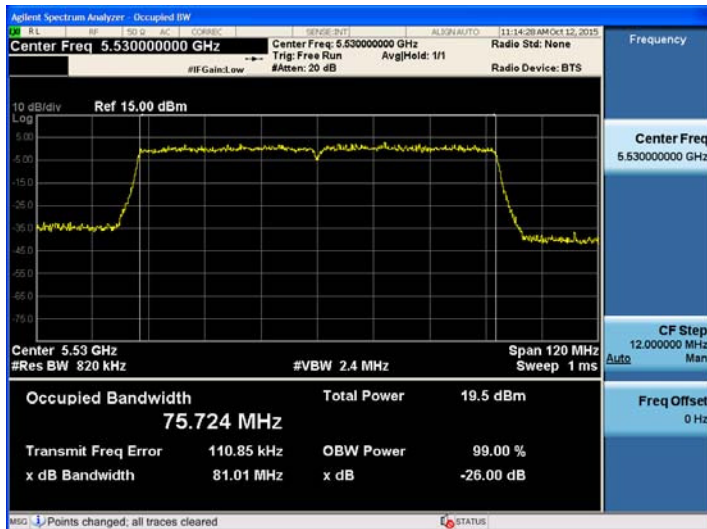
802.11ac_80 MHz BW UNII 1 BAND 26dB Bandwidth(CH 42)



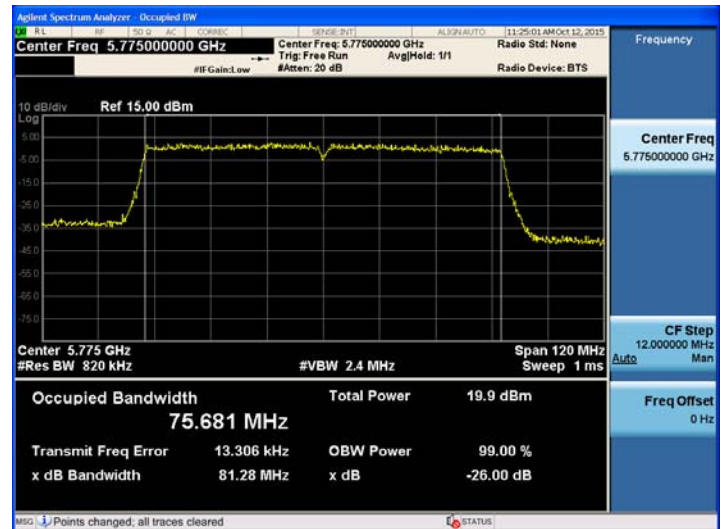
802.11ac_80 MHz BW UNII 2A BAND 26dB Bandwidth(CH 58)



802.11ac_80 MHz BW UNII 2C BAND 26dB Bandwidth(CH 138)



802.11ac_80 MHz BW UNII 3 BAND 26dB Bandwidth(CH 155)



Note :

In order to simplify the report, attached plots were only the most wide channel.

Conducted 6 dB Bandwidth

■ TEST RESULTS for 802.11a/n/ac_20MHz BW

Conducted 6 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.411	0.5	Pass
5785	157	16.404	0.5	Pass
5825	165	16.405	0.5	Pass

Conducted 6 dB Bandwidth Measurements for 802.11n_20MHz BW

802.11n(20MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.624	0.5	Pass
5785	157	17.655	0.5	Pass
5825	165	17.647	0.5	Pass

Conducted 6 dB Bandwidth Measurements for 802.11ac_20 MHz BW

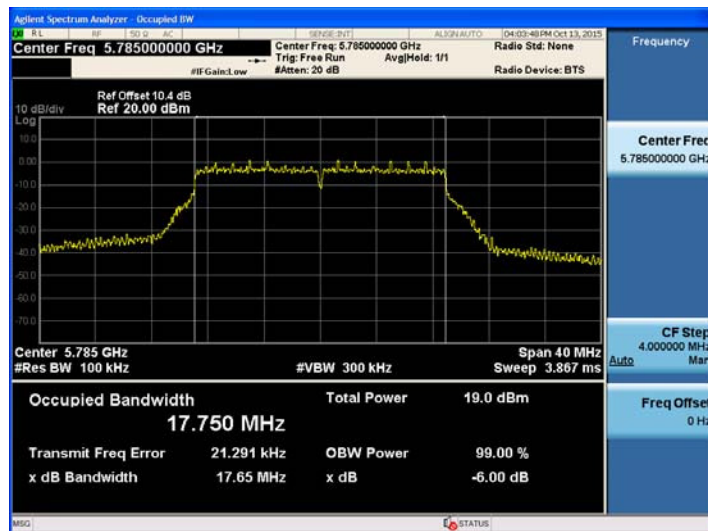
802.11ac(20MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.635	0.5	Pass
5785	157	17.628	0.5	Pass
5825	165	17.642	0.5	Pass

TEST Plot for 802.11a/n/ac_20MHz BW

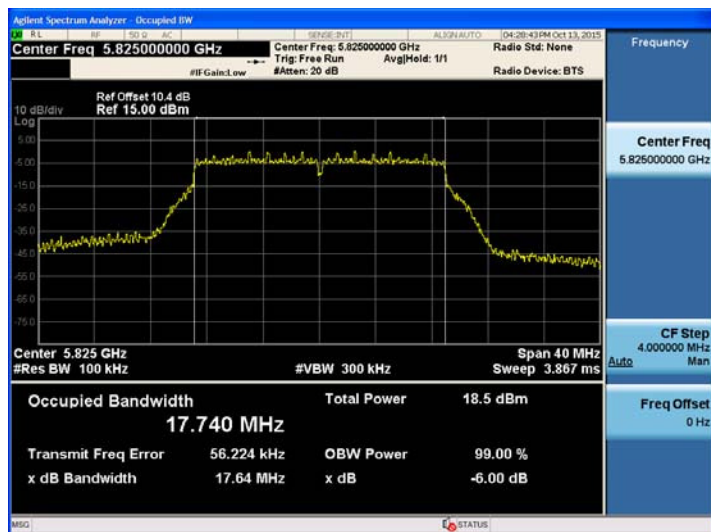
802.11a UNII 3 BAND 6dB Bandwidth (CH.149)



802.11n_20 MHz BW UNII 3 BAND 6dB Bandwidth(CH.157)



802.11ac_20 MHz BW UNII 3 BAND 6dB Bandwidth(CH.165)



Note :

- In order to simplify the report, attached plots were only the most wide channel.

TEST RESULTS for 802.11n/ac_40MHz BW

Conducted 6 dB Bandwidth Measurements for 802.11n_40MHz BW

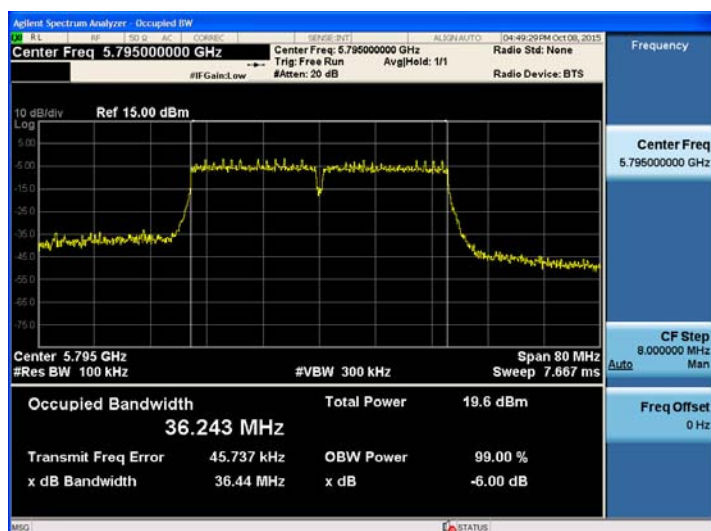
802.11n(40MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.384	0.5	Pass
5795	159	36.443	0.5	Pass

Conducted 6 dB Bandwidth Measurements for 802.11ac_40 MHz BW

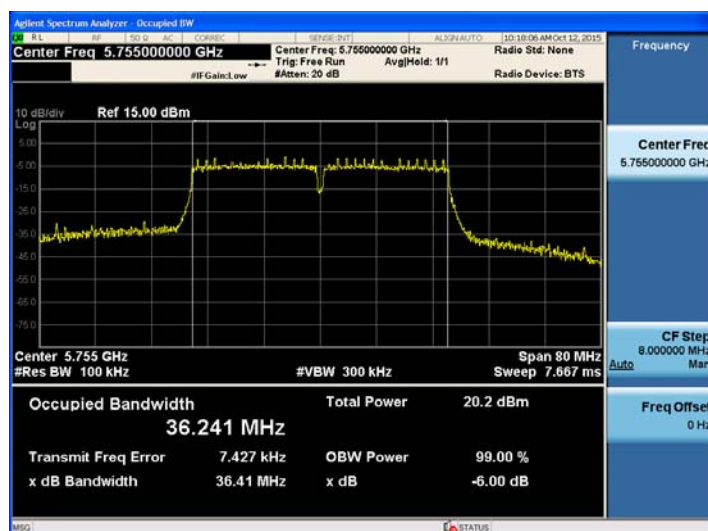
802.11ac(40MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.413	0.5	Pass
5795	159	36.371	0.5	Pass

TEST Plot for 802.11n/ac_40MHz BW

802.11n_40 MHz BW UNII 3 BAND 6dB Bandwidth(CH.159)



802.11ac_40 MHz BW UNII 3 BAND 6dB Bandwidth(CH.151)



Note :

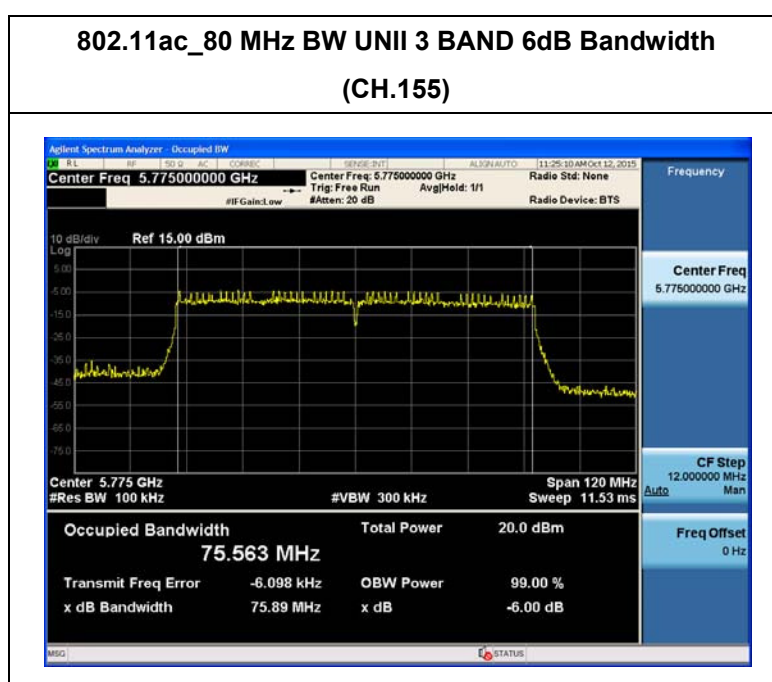
- In order to simplify the report, attached plots were only the most wide channel.

TEST RESULTS for 802.11ac_80MHz BW

Conducted 6 dB Bandwidth Measurements for 802.11ac_80MHz BW

802.11ac(80MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	75.892	0.5	Pass

TEST Plot for 802.11ac_80MHz BW



Note :

- In order to simplify the report, attached plots were only the most wide channel.

■ Straddle channels TEST RESULTS

Conducted Bandwidth Measurements for 802.11a/n/ac_20MHz BW (UNII 2C Band)

Mode	Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
802.11a	5720	144	15.64	N/A	Pass
802.11n			15.80	N/A	Pass
802.11ac			15.68	N/A	Pass

Conducted Bandwidth Measurements for 802.11a/n/ac_20MHz BW (UNII 3 Band)

Mode	Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
802.11a	5720	144	5.80	N/A	Pass
802.11n			5.92	N/A	Pass
802.11ac			5.96	N/A	Pass

■ Straddle channels TEST Plot for 802.11a/n/ac_20MHz BW

802.11a CH.144 Bandwidth



802.11n_20MHz BW CH.144 Bandwidth



802.11ac_20MHz BW CH.144 Bandwidth



Straddle channels TEST RESULTS

Conducted Bandwidth Measurements for 802.11n/ac_40MHz BW (UNII 2C Band)

Mode	Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
802.11n	5710	142	34.68	N/A	Pass
802.11ac			34.74	N/A	Pass

Conducted Bandwidth Measurements for 802.11n/ac_40MHz BW (UNII 3 Band)

Mode	Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
802.11n	5710	142	4.74	N/A	Pass
802.11ac			4.74	N/A	Pass

Straddle channels TEST Plot for 802.11n/ac_40MHz BW

802.11n_40MHz BW CH.142 Bandwidth



802.11ac_40MHz BW CH.142 Bandwidth



■ **Straddle channels TEST RESULTS**

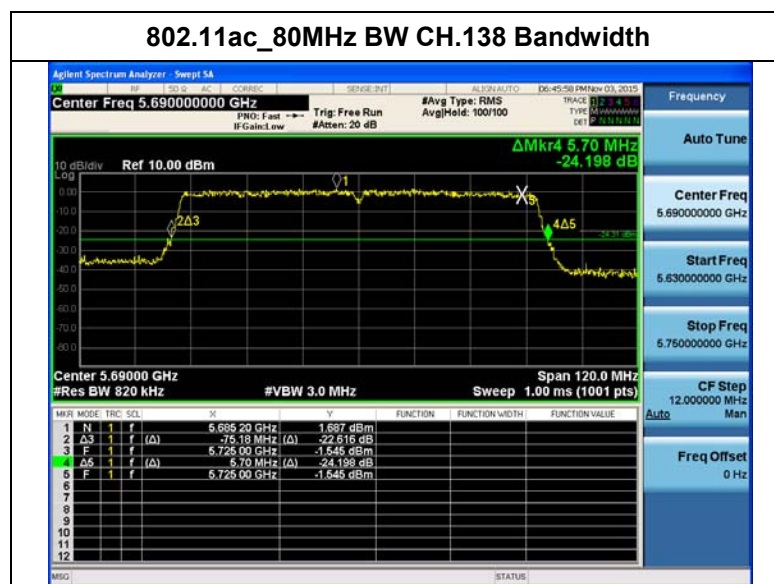
Conducted Bandwidth Measurements for 802.11ac_80MHz BW (UNII 2C Band)

Mode	Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
802.11ac	5690	138	75.18	N/A	Pass

Conducted Bandwidth Measurements for 802. 11ac_80MHz BW (UNII 3 Band)

Mode	Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
802.11ac	5690	138	5.70	N/A	Pass

■ **Straddle channels TEST Plot for 802.11ac_80MHz BW**



8.3 OUTPUT POWER MEASUREMENT

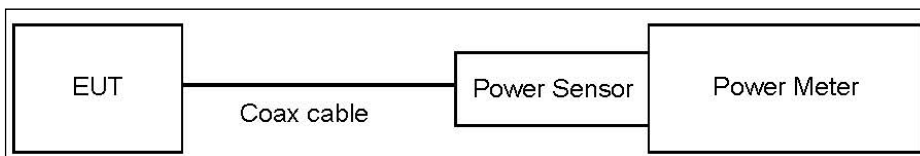
Test Requirements and limit, §15.407(a)(1)

A transmitter antenna terminal of EUT is connected to the input of a Power meter or Spectrum Analyzer .Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies.

■ Limit

Band	Mode	Limit (dBm)
UNII 1, 2A, 2C	802.11a,n,ac	23.98
UNII 3	802.11a,n,ac	30.00

■ TEST CONFIGURATION(20 MHz BW)



■ TEST PROCEDURE(20 MHz BW)

- Average Power (Procedure E.3.a in KDB 789033, issued 06/06/2014).
 1. Measure the duty cycle.
 2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
 3. Add $10 \log (1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Note :

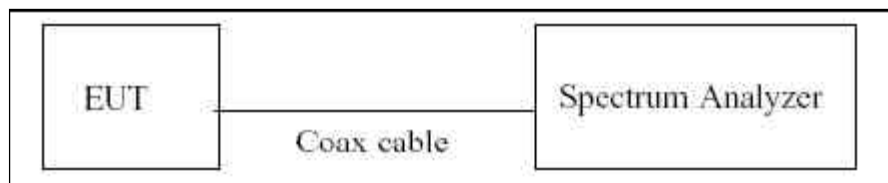
1. Actual value of loss for the attenuator and cable combination is below table.

Band	Loss(dB)
UNII 1, 2A, 2C, 3	10.4

(Actual value of loss for the attenuator and cable combination)

2. In case of UNII channels 138, 142 and 144, this device is satisfied with KDB644545 D03.

■ TEST CONFIGURATION(40 MHz BW & 80 MHz BW)



■ TEST PROCEDURE(40 MHz BW & 80 MHz BW)

▪ Average Power

The transmitter output is connected to the Spectrum Analyzer. We use the spectrum analyzer's integrated band power measurement function. We tested according to Method SA-2 in KDB 789033(issued 06/06/2014).

The Spectrum Analyzer is set to

1. Measure the duty cycle.
2. Set span to encompass the 26 dB EBW of the signal.
3. RBW = 1 MHz.
4. VBW $\geq$ 3 MHz.
5. Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$.
6. Sweep time = auto.
7. Detector = RMS.
8. Do not use sweep triggering. Allow the sweep to "free run".
9. Trace average at least 100 traces in power averaging(RMS) mode
10. Integrated bandwidth = OBW
11. Add $10\log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

■ Sample Calculation (Conducted)

Output Power = Reading Value + ATT loss + Cable loss(1 ea) + Duty Cycle Factor

■ Sample Calculation (EIRP)

Output Power = Reading Value + ATT loss + Cable loss(1 ea) + Duty Cycle Factor + Ant gain

Note: 1. Spectrum reading values are not plot data. The power results in plot is already including the actual values of loss for the attenuator and cable combination.

2. Spectrum offset = Attenuator loss + Cable loss

3. Actual value of loss for the attenuator and cable combination is below table.

Band	Loss(dB)
UNII 1, 2A, 2C, 3	10.4

(Actual value of loss for the attenuator and cable combination)

802.11a_20MHz BW (UNII 1)

■ TEST RESULTS

Conducted Output Power Measurements (802.11a_20M BW Mode: 5180~5240)

802.11a(20MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	6	10.66	0.29	10.95	23.98
		9	10.40	0.43	10.83	23.98
		12	10.31	0.56	10.87	23.98
		18	10.02	0.80	10.82	23.98
		24	9.99	1.02	11.01	23.98
		36	9.59	1.42	11.01	23.98
		48	9.32	1.79	11.11	23.98
		54	9.16	1.92	11.08	23.98
5200	40	6	10.64	0.29	10.93	23.98
		9	10.40	0.43	10.83	23.98
		12	10.40	0.56	10.96	23.98
		18	10.16	0.80	10.96	23.98
		24	10.10	1.02	11.12	23.98
		36	9.74	1.42	11.16	23.98
		48	9.38	1.79	11.17	23.98
		54	9.24	1.92	11.16	23.98
5240	48	6	10.87	0.29	11.16	23.98
		9	10.68	0.43	11.11	23.98
		12	10.62	0.56	11.18	23.98
		18	10.38	0.80	11.18	23.98
		24	10.34	1.02	11.36	23.98
		36	9.90	1.42	11.32	23.98
		48	9.58	1.79	11.37	23.98
		54	9.44	1.92	11.36	23.98

802.11a _20MHz BW (UNII 2A)

■ TEST RESULTS

Conducted Output Power Measurements (802.11a_20M Mode: 5260~5320)

802.11a Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5260	52	6	12.20	0.29	12.49	23.98
		9	11.93	0.43	12.36	23.98
		12	11.79	0.56	12.35	23.98
		18	11.55	0.80	12.35	23.98
		24	11.49	1.02	12.51	23.98
		36	11.13	1.42	12.55	23.98
		48	10.80	1.79	12.59	23.98
		54	10.70	1.92	12.62	23.98
5300	60	6	12.16	0.29	12.45	23.98
		9	11.92	0.43	12.35	23.98
		12	11.82	0.56	12.38	23.98
		18	11.62	0.80	12.42	23.98
		24	11.55	1.02	12.57	23.98
		36	11.13	1.42	12.55	23.98
		48	10.85	1.79	12.64	23.98
		54	10.66	1.92	12.58	23.98
5320	64	6	12.21	0.29	12.50	23.98
		9	11.99	0.43	12.42	23.98
		12	11.87	0.56	12.43	23.98
		18	11.65	0.80	12.45	23.98
		24	11.56	1.02	12.58	23.98
		36	11.18	1.42	12.60	23.98
		48	10.89	1.79	12.68	23.98
		54	10.72	1.92	12.64	23.98

802.11a _20MHz BW (UNII 2C)

■ TEST RESULTS

Conducted Output Power Measurements (802.11a_20M Mode: 5500~5720)

802.11a Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5500	100	6	11.69	0.29	11.98	23.98
		9	11.51	0.43	11.94	23.98
		12	11.40	0.56	11.96	23.98
		18	11.19	0.80	11.99	23.98
		24	11.19	1.02	12.21	23.98
		36	10.78	1.42	12.20	23.98
		48	10.42	1.79	12.21	23.98
		54	10.22	1.92	12.14	23.98
5580	116	6	11.76	0.29	12.05	23.98
		9	11.55	0.43	11.98	23.98
		12	11.44	0.56	12.00	23.98
		18	11.24	0.80	12.04	23.98
		24	11.20	1.02	12.22	23.98
		36	10.78	1.42	12.20	23.98
		48	10.49	1.79	12.28	23.98
		54	10.31	1.92	12.23	23.98
5720	144	6	11.58	0.29	11.87	23.98
		9	11.40	0.43	11.83	23.98
		12	11.36	0.56	11.92	23.98
		18	11.03	0.80	11.83	23.98
		24	11.01	1.02	12.03	23.98
		36	10.62	1.42	12.04	23.98
		48	10.34	1.79	12.13	23.98
		54	10.12	1.92	12.04	23.98

802.11a _20MHz BW (UNII 3)

■ TEST RESULTS

Conducted Output Power Measurements (802.11a_20M BW Mode: 5745~5825)

802.11a (20MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5745	149	6	11.78	0.29	12.07	30
		9	11.40	0.43	11.83	30
		12	11.38	0.56	11.94	30
		18	11.07	0.80	11.87	30
		24	11.05	1.02	12.07	30
		36	10.69	1.42	12.11	30
		48	10.32	1.79	12.11	30
		54	10.18	1.92	12.10	30
5785	157	6	11.57	0.29	11.86	30
		9	11.39	0.43	11.82	30
		12	11.32	0.56	11.88	30
		18	11.03	0.80	11.83	30
		24	10.99	1.02	12.01	30
		36	10.66	1.42	12.08	30
		48	10.35	1.79	12.14	30
		54	10.10	1.92	12.02	30
5825	165	6	11.58	0.29	11.87	30
		9	11.41	0.43	11.84	30
		12	11.25	0.56	11.81	30
		18	11.11	0.80	11.91	30
		24	10.95	1.02	11.97	30
		36	10.58	1.42	12.00	30
		48	10.30	1.79	12.09	30
		54	10.19	1.92	12.11	30

802.11n_20MHz BW (UNII 1)

■ TEST RESULTS

Conducted Output Power Measurements (802.11n_20M BW Mode: 5180~5240)

802.11n(20MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	6.5	10.48	0.31	10.79	23.98
		13	10.22	0.59	10.81	23.98
		19.5	9.96	0.84	10.80	23.98
		26	9.98	1.05	11.03	23.98
		39	9.66	1.42	11.08	23.98
		52	9.35	1.77	11.12	23.98
		58.5	9.25	1.87	11.12	23.98
		65	9.07	2.00	11.07	23.98
5200	40	6.5	10.49	0.31	10.80	23.98
		13	10.39	0.59	10.98	23.98
		19.5	10.03	0.84	10.87	23.98
		26	10.13	1.05	11.18	23.98
		39	9.78	1.42	11.20	23.98
		52	9.30	1.77	11.07	23.98
		58.5	9.24	1.87	11.11	23.98
		65	9.13	2.00	11.13	23.98
5240	48	6.5	10.73	0.31	11.04	23.98
		13	10.35	0.59	10.94	23.98
		19.5	10.11	0.84	10.95	23.98
		26	10.28	1.05	11.33	23.98
		39	9.91	1.42	11.33	23.98
		52	9.53	1.77	11.30	23.98
		58.5	9.37	1.87	11.24	23.98
		65	9.28	2.00	11.28	23.98

802.11n_20MHz BW (UNII 2A)

■ TEST RESULTS

Conducted Output Power Measurements (802.11n_20M BW Mode: 5260~5320)

802.11n(20MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5260	52	6.5	11.90	0.31	12.21	23.98
		13	11.61	0.59	12.20	23.98
		19.5	11.37	0.84	12.21	23.98
		26	11.48	1.05	12.53	23.98
		39	11.08	1.42	12.50	23.98
		52	10.73	1.77	12.50	23.98
		58.5	10.67	1.87	12.54	23.98
		65	10.53	2.00	12.53	23.98
5300	60	6.5	12.02	0.31	12.33	23.98
		13	11.67	0.59	12.26	23.98
		19.5	11.49	0.84	12.33	23.98
		26	11.56	1.05	12.61	23.98
		39	11.18	1.42	12.60	23.98
		52	10.82	1.77	12.59	23.98
		58.5	10.74	1.87	12.61	23.98
		65	10.54	2.00	12.54	23.98
5320	64	6.5	12.05	0.31	12.36	23.98
		13	11.80	0.59	12.39	23.98
		19.5	11.51	0.84	12.35	23.98
		26	11.61	1.05	12.66	23.98
		39	11.20	1.42	12.62	23.98
		52	10.93	1.77	12.70	23.98
		58.5	10.74	1.87	12.61	23.98
		65	10.57	2.00	12.57	23.98

802.11n_20MHz BW (UNII 2C)

■ TEST RESULTS

Conducted Output Power Measurements (802.11n_20M BW Mode: 5500~5720)

802.11n(20MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5500	100	6.5	11.59	0.31	11.90	23.98
		13	11.40	0.59	11.99	23.98
		19.5	11.08	0.84	11.92	23.98
		26	11.11	1.05	12.16	23.98
		39	10.77	1.42	12.19	23.98
		52	10.46	1.77	12.23	23.98
		58.5	10.35	1.87	12.22	23.98
		65	10.10	2.00	12.10	23.98
5580	116	6.5	11.64	0.31	11.95	23.98
		13	11.33	0.59	11.92	23.98
		19.5	11.13	0.84	11.97	23.98
		26	11.19	1.05	12.24	23.98
		39	10.84	1.42	12.26	23.98
		52	10.45	1.77	12.22	23.98
		58.5	10.42	1.87	12.29	23.98
		65	10.22	2.00	12.22	23.98
5720	144	6.5	11.52	0.31	11.83	23.98
		13	11.25	0.59	11.84	23.98
		19.5	11.05	0.84	11.89	23.98
		26	11.14	1.05	12.19	23.98
		39	10.72	1.42	12.14	23.98
		52	10.44	1.77	12.21	23.98
		58.5	10.29	1.87	12.16	23.98
		65	10.10	2.00	12.10	23.98

802.11n_20MHz BW (UNII 3)

■ TEST RESULTS
Conducted Output Power Measurements (802.11n_20M BW Mode: 5745~5825)

802.11n(20MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5745	149	6.5	11.54	0.31	11.85	30
		13	11.28	0.59	11.87	30
		19.5	11.04	0.84	11.88	30
		26	11.13	1.05	12.18	30
		39	10.78	1.42	12.20	30
		52	10.41	1.77	12.18	30
		58.5	10.27	1.87	12.14	30
		65	10.16	2.00	12.16	30
5785	157	6.5	11.55	0.31	11.86	30
		13	11.22	0.59	11.81	30
		19.5	11.00	0.84	11.84	30
		26	11.14	1.05	12.19	30
		39	10.72	1.42	12.14	30
		52	10.44	1.77	12.21	30
		58.5	10.27	1.87	12.14	30
		65	10.09	2.00	12.09	30
5825	165	6.5	11.53	0.31	11.84	30
		13	11.22	0.59	11.81	30
		19.5	10.91	0.84	11.75	30
		26	11.06	1.05	12.11	30
		39	10.68	1.42	12.10	30
		52	10.30	1.77	12.07	30
		58.5	10.31	1.87	12.18	30
		65	10.14	2.00	12.14	30

802.11ac _20MHz BW (UNII 1)

■ TEST RESULTS
Conducted Output Power Measurements (802.11ac_20M BW Mode: 5180~5240)

802.11ac(20MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	6.5	10.46	0.31	10.77	23.98
		13	10.17	0.59	10.76	23.98
		19.5	9.96	0.83	10.79	23.98
		26	10.18	1.04	11.22	23.98
		39	9.74	1.41	11.15	23.98
		52	9.36	1.73	11.09	23.98
		58.5	9.25	1.84	11.09	23.98
		65	9.1	1.94	11.04	23.98
		78	8.93	2.20	11.13	23.98
5200	40	6.5	10.47	0.31	10.78	23.98
		13	10.2	0.59	10.79	23.98
		19.5	9.95	0.83	10.78	23.98
		26	10.07	1.04	11.11	23.98
		39	9.73	1.41	11.14	23.98
		52	9.43	1.73	11.16	23.98
		58.5	9.35	1.84	11.19	23.98
		65	9.15	1.94	11.09	23.98
		78	8.98	2.20	11.18	23.98
5240	48	6.5	10.62	0.31	10.93	23.98
		13	10.34	0.59	10.93	23.98
		19.5	10.09	0.83	10.92	23.98
		26	10.26	1.04	11.30	23.98
		39	9.86	1.41	11.27	23.98
		52	9.62	1.73	11.35	23.98
		58.5	9.43	1.84	11.27	23.98
		65	9.4	1.94	11.34	23.98
		78	9.16	2.20	11.36	23.98

802.11ac _20MHz BW (UNII 2A)

■ TEST RESULTS

Conducted Output Power Measurements (802.11ac_20M BW Mode: 5260~5320)

802.11ac(20MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5260	52	6.5	11.91	0.31	12.22	23.98
		13	11.58	0.59	12.17	23.98
		19.5	11.32	0.83	12.15	23.98
		26	11.44	1.04	12.48	23.98
		39	11.09	1.41	12.50	23.98
		52	10.77	1.73	12.50	23.98
		58.5	10.71	1.84	12.55	23.98
		65	10.54	1.94	12.48	23.98
		78	10.31	2.20	12.51	23.98
5300	60	6.5	12.02	0.31	12.33	23.98
		13	11.70	0.59	12.29	23.98
		19.5	11.47	0.83	12.30	23.98
		26	11.53	1.04	12.57	23.98
		39	11.18	1.41	12.59	23.98
		52	10.82	1.73	12.55	23.98
		58.5	10.77	1.84	12.61	23.98
		65	10.61	1.94	12.55	23.98
		78	10.37	2.20	12.57	23.98
5320	64	6.5	11.96	0.31	12.27	23.98
		13	11.67	0.59	12.26	23.98
		19.5	11.45	0.83	12.28	23.98
		26	11.55	1.04	12.59	23.98
		39	11.18	1.41	12.59	23.98
		52	10.86	1.73	12.59	23.98
		58.5	10.74	1.84	12.58	23.98
		65	10.62	1.94	12.56	23.98
		78	10.35	2.20	12.55	23.98

802.11ac _20MHz BW (UNII 2C)

■ TEST RESULTS

Conducted Output Power Measurements (802.11ac_20M BW Mode: 5500~5720)

802.11ac(20MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5500	100	6.5	11.64	0.31	11.95	23.98
		13	11.25	0.59	11.84	23.98
		19.5	11.06	0.83	11.89	23.98
		26	11.13	1.04	12.17	23.98
		39	10.82	1.41	12.23	23.98
		52	10.52	1.73	12.25	23.98
		58.5	10.38	1.84	12.22	23.98
		65	10.30	1.94	12.24	23.98
		78	9.97	2.20	12.17	23.98
5580	116	6.5	11.61	0.31	11.92	23.98
		13	11.31	0.59	11.90	23.98
		19.5	11.08	0.83	11.91	23.98
		26	11.23	1.04	12.27	23.98
		39	10.88	1.41	12.29	23.98
		52	10.50	1.73	12.23	23.98
		58.5	10.35	1.84	12.19	23.98
		65	10.32	1.94	12.26	23.98
		78	10.03	2.20	12.23	23.98
5720	144	6.5	11.55	0.31	11.86	23.98
		13	11.21	0.59	11.80	23.98
		19.5	11.00	0.83	11.83	23.98
		26	11.10	1.04	12.14	23.98
		39	10.77	1.41	12.18	23.98
		52	10.35	1.73	12.08	23.98
		58.5	10.23	1.84	12.07	23.98
		65	10.28	1.94	12.22	23.98
		78	9.91	2.20	12.11	23.98

802.11ac _20MHz BW (UNII 3)

■ TEST RESULTS

Conducted Output Power Measurements (802.11ac_20M BW Mode: 5745~5825)

802.11ac(20MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5745	149	6.5	11.60	0.31	11.91	30
		13	11.32	0.59	11.91	30
		19.5	11.03	0.83	11.86	30
		26	11.19	1.04	12.23	30
		39	10.81	1.41	12.22	30
		52	10.50	1.73	12.23	30
		58.5	10.35	1.84	12.19	30
		65	10.25	1.94	12.19	30
		78	10.00	2.20	12.20	30
5785	157	6.5	11.56	0.31	11.87	30
		13	11.27	0.59	11.86	30
		19.5	11.08	0.83	11.91	30
		26	11.14	1.04	12.18	30
		39	10.70	1.41	12.11	30
		52	10.47	1.73	12.20	30
		58.5	10.34	1.84	12.18	30
		65	10.18	1.94	12.12	30
		78	9.98	2.20	12.18	30
5825	165	6.5	11.64	0.31	11.95	30
		13	11.27	0.59	11.86	30
		19.5	11.05	0.83	11.88	30
		26	11.00	1.04	12.04	30
		39	10.75	1.41	12.16	30
		52	10.42	1.73	12.15	30
		58.5	10.40	1.84	12.24	30
		65	10.22	1.94	12.16	30
		78	9.90	2.20	12.10	30

802.11n_40MHz BW (UNII 1)

■ TEST RESULTS

Conducted Output Power Measurements (802.11n_40M BW Mode: 5190~5230)

802.11n(40MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	13.5	10.29	0.61	10.90	23.98
		27	9.73	1.08	10.81	23.98
		40.5	9.34	1.47	10.81	23.98
		54	9.20	1.78	10.98	23.98
		81	8.72	2.32	11.04	23.98
		108	8.28	2.70	10.98	23.98
		121.5	8.34	2.87	11.21	23.98
		135	7.98	2.99	10.97	23.98
5230	46	13.5	10.44	0.61	11.05	23.98
		27	9.97	1.08	11.05	23.98
		40.5	9.55	1.47	11.02	23.98
		54	9.35	1.78	11.13	23.98
		81	8.86	2.32	11.17	23.98
		108	8.42	2.70	11.12	23.98
		121.5	8.23	2.87	11.09	23.98
		135	8.06	2.99	11.05	23.98

802.11n_40MHz BW (UNII 2A)

■ TEST RESULTS

Conducted Output Power Measurements (802.11n_40M BW Mode: 5270~5310)

802.11n(40MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5270	54	13.5	11.62	0.61	12.23	23.98
		27	11.02	1.08	12.10	23.98
		40.5	10.72	1.47	12.19	23.98
		54	10.49	1.78	12.27	23.98
		81	9.93	2.32	12.25	23.98
		108	9.50	2.70	12.20	23.98
		121.5	9.55	2.87	12.41	23.98
		135	9.22	2.99	12.21	23.98
5310	62	13.5	11.40	0.61	12.01	23.98
		27	10.88	1.08	11.96	23.98
		40.5	10.55	1.47	12.02	23.98
		54	10.37	1.78	12.15	23.98
		81	9.86	2.32	12.18	23.98
		108	9.38	2.70	12.08	23.98
		121.5	9.29	2.87	12.16	23.98
		135	9.02	2.99	12.01	23.98

802.11n_40MHz BW (UNII 2C)

■ TEST RESULTS

Conducted Output Power Measurements (802.11n_40M BW Mode: 5510~5710)

802.11n(40MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5510	102	13.5	10.38	0.61	10.99	23.98
		27	9.81	1.08	10.89	23.98
		40.5	9.39	1.47	10.86	23.98
		54	9.34	1.78	11.12	23.98
		81	8.85	2.32	11.17	23.98
		108	8.47	2.70	11.17	23.98
		121.5	8.24	2.87	11.10	23.98
		135	8.18	2.99	11.17	23.98
5550	110	13.5	10.71	0.61	11.32	23.98
		27	10.30	1.08	11.37	23.98
		40.5	9.92	1.47	11.39	23.98
		54	9.78	1.78	11.55	23.98
		81	9.23	2.32	11.54	23.98
		108	8.80	2.70	11.50	23.98
		121.5	8.72	2.87	11.58	23.98
		135	8.40	2.99	11.39	23.98
5710	142	13.5	11.01	0.61	11.62	23.98
		27	10.58	1.08	11.66	23.98
		40.5	10.13	1.47	11.60	23.98
		54	9.94	1.78	11.72	23.98
		81	9.46	2.32	11.78	23.98
		108	9.04	2.70	11.74	23.98
		121.5	8.80	2.87	11.67	23.98
		135	8.58	2.99	11.56	23.98

802.11n_40MHz BW (UNII 3)

■ TEST RESULTS

Conducted Output Power Measurements (802.11n_40M BW Mode: 5755~5795)

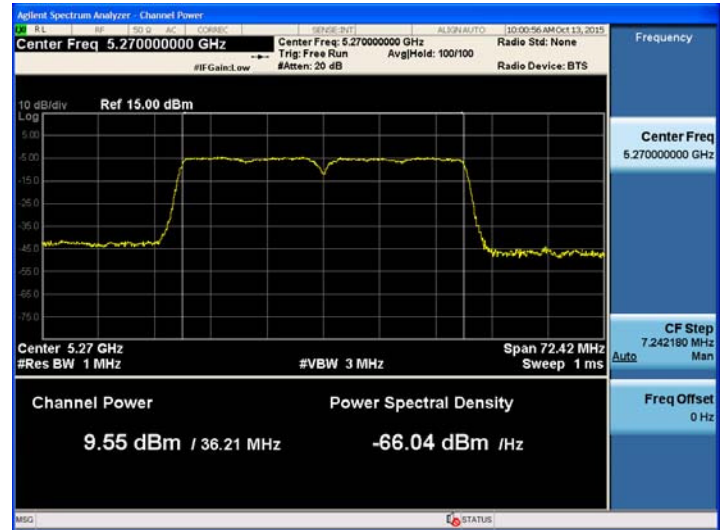
802.11n(40MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5755	151	13.5	11.00	0.61	11.61	30
		27	10.58	1.08	11.66	30
		40.5	10.11	1.47	11.58	30
		54	9.91	1.78	11.69	30
		81	9.57	2.32	11.89	30
		108	9.03	2.70	11.73	30
		121.5	8.93	2.87	11.80	30
		135	8.75	2.99	11.74	30
5795	159	13.5	10.53	0.61	11.14	30
		27	10.14	1.08	11.22	30
		40.5	9.83	1.47	11.30	30
		54	9.62	1.78	11.39	30
		81	9.15	2.32	11.46	30
		108	8.64	2.70	11.34	30
		121.5	8.63	2.87	11.50	30
		135	8.48	2.99	11.47	30

■ TEST Plot for Ant.0_802.11n_40MHz BW

**802.11n_40 MHz BW UNII 1 BAND Average Power
(5190 MHz ~5230 MHz) CH 38 121.5Mbps**



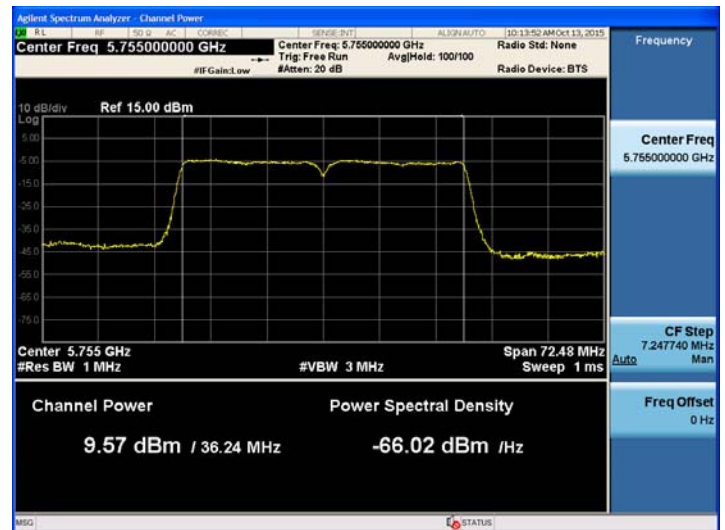
**802.11n_40 MHz BW UNII 2A BAND Average Power
(5270 MHz ~5310 MHz) CH 54 121.5 Mbps**



**802.11n_40 MHz BW UNII 2C BAND Average Power
(5510 MHz ~5710 MHz) CH 142 81Mbps**



**802.11n_40 MHz BW UNII 3 BAND Average Power
(5755 MHz ~5795 MHz) CH 151 81Mbps**



802.11ac_40 MHz BW (UNII 1)

■ TEST RESULTS

Conducted Output Power Measurements (802.11ac_40M BW Mode: 5190~5230)

802.11ac(40MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	13.5	10.26	0.61	10.86	23.98
		27	9.83	1.08	10.91	23.98
		40.5	9.52	1.45	10.97	23.98
		54	9.31	1.73	11.04	23.98
		81	9.02	2.24	11.26	23.98
		108	8.34	2.61	10.95	23.98
		121.5	8.31	2.75	11.06	23.98
		135	8.22	2.85	11.06	23.98
		162	8.10	3.01	11.11	23.98
		180	8.07	3.17	11.24	23.98
5230	46	13.5	10.54	0.61	11.15	23.98
		27	10.01	1.08	11.09	23.98
		40.5	9.56	1.45	11.01	23.98
		54	9.42	1.73	11.16	23.98
		81	9.07	2.24	11.31	23.98
		108	8.47	2.61	11.08	23.98
		121.5	8.39	2.75	11.14	23.98
		135	8.31	2.85	11.16	23.98
		162	8.16	3.01	11.17	23.98
		180	8.02	3.17	11.19	23.98

802.11ac _40MHz BW (UNII 2A)

■ TEST RESULTS

Conducted Output Power Measurements (802.11ac_40M BW Mode: 5270~5310)

802.11ac(40MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5270	54	13.5	11.58	0.61	12.18	23.98
		27	11.01	1.08	12.09	23.98
		40.5	10.58	1.45	12.03	23.98
		54	10.45	1.73	12.18	23.98
		81	10.03	2.24	12.27	23.98
		108	9.57	2.61	12.18	23.98
		121.5	9.56	2.75	12.31	23.98
		135	9.27	2.85	12.11	23.98
		162	9.19	3.01	12.20	23.98
		180	9.02	3.17	12.19	23.98
5310	62	13.5	11.37	0.61	11.98	23.98
		27	10.76	1.08	11.83	23.98
		40.5	10.35	1.45	11.80	23.98
		54	10.21	1.73	11.94	23.98
		81	9.90	2.24	12.14	23.98
		108	9.34	2.61	11.95	23.98
		121.5	9.25	2.75	12.00	23.98
		135	9.12	2.85	11.96	23.98
		162	9.06	3.01	12.07	23.98
		180	8.91	3.17	12.08	23.98

802.11ac _40MHz BW (UNII 2C)

■ TEST RESULTS

Conducted Output Power Measurements (802.11ac_40M BW Mode: 5510~5710)

802.11ac(40MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5510	102	13.5	10.56	0.61	11.17	23.98
		27	9.82	1.08	10.89	23.98
		40.5	9.55	1.45	11.00	23.98
		54	9.47	1.73	11.21	23.98
		81	8.95	2.24	11.20	23.98
		108	8.58	2.61	11.19	23.98
		121.5	8.31	2.75	11.06	23.98
		135	8.25	2.85	11.10	23.98
		162	8.17	3.01	11.18	23.98
		180	7.97	3.17	11.14	23.98
5590	118	13.5	10.76	0.61	11.37	23.98
		27	10.28	1.08	11.36	23.98
		40.5	9.93	1.45	11.38	23.98
		54	9.79	1.73	11.52	23.98
		81	9.35	2.24	11.59	23.98
		108	8.95	2.61	11.56	23.98
		121.5	8.78	2.75	11.53	23.98
		135	8.61	2.85	11.45	23.98
		162	8.37	3.01	11.38	23.98
		180	8.30	3.17	11.47	23.98
5710	142	13.5	10.96	0.61	11.56	23.98
		27	10.39	1.08	11.47	23.98
		40.5	10.22	1.45	11.68	23.98
		54	9.91	1.73	11.65	23.98
		81	9.59	2.24	11.83	23.98
		108	9.15	2.61	11.76	23.98
		121.5	8.96	2.75	11.71	23.98
		135	9.01	2.85	11.86	23.98
		162	8.87	3.01	11.88	23.98
		180	8.58	3.17	11.75	23.98

802.11ac_40MHz BW (UNII 3)

■ TEST RESULTS

Conducted Output Power Measurements (802.11ac_40M BW Mode: 5755~5795)

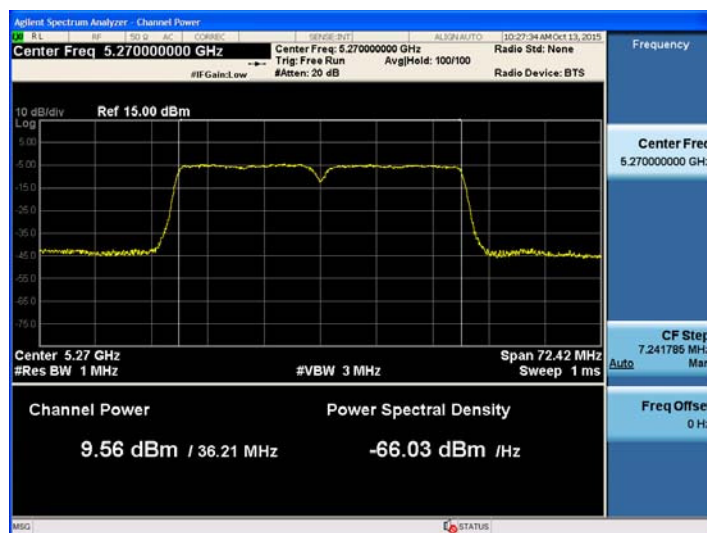
802.11ac(40MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5755	151	13.5	11.19	0.61	11.80	30
		27	10.55	1.08	11.63	30
		40.5	10.29	1.45	11.74	30
		54	10.09	1.73	11.82	30
		81	9.61	2.24	11.85	30
		108	9.30	2.61	11.91	30
		121.5	9.17	2.75	11.92	30
		135	8.93	2.85	11.78	30
		162	8.86	3.01	11.87	30
		180	8.67	3.17	11.85	30
5795	159	13.5	10.67	0.61	11.27	30
		27	10.20	1.08	11.27	30
		40.5	9.79	1.45	11.24	30
		54	9.75	1.73	11.48	30
		81	9.31	2.24	11.55	30
		108	8.77	2.61	11.38	30
		121.5	8.55	2.75	11.30	30
		135	8.60	2.85	11.45	30
		162	8.46	3.01	11.47	30
		180	8.36	3.17	11.54	30

■ TEST Plot for 802.11ac_40MHz BW

**802.11ac_40 MHz BW UNII 1 BAND Average Power
(5190 ~ 5230 MHz) CH 46 81 Mbps**



**802.11ac_40 MHz BW UNII 2A BAND Average Power
(5270 ~ 5310 MHz) CH 54 121.5 Mbps**



**802.11ac_40 MHz BW UNII 2C BAND Average Power
(5510 ~ 5710 MHz) CH 144 162 Mbps**



**802.11ac_40 MHz BW UNII 3 BAND Average Power
(5755 ~ 5795 MHz) CH 151 121.5 Mbps**



802.11ac_80 MHz BW (UNII 1)

TEST RESULTS

Conducted Output Power Measurements (802.11ac_80MHz Mode: 5210)

802.11ac(80MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5210	42	29.3	10.52	1.13	11.66	22.09
		58.5	9.77	1.84	11.60	22.09
		87.8	9.39	2.29	11.68	22.09
		117	9.39	2.68	12.07	22.09
		175.5	9.06	3.08	12.14	22.09
		234	8.55	3.52	12.07	22.09
		263.3	8.39	3.62	12.02	22.09
		292.5	8.33	3.76	12.09	22.09
		351	8.18	3.90	12.08	22.09
		390	8.08	4.06	12.14	22.09

802.11ac_80MHz BW (UNII 2A)

■ TEST RESULTS

Conducted Output Power Measurements (802.11ac_80MHz Mode: 5290)

802.11ac(80MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5290	58	29.3	11.84	1.13	12.98	23.98
		58.5	11.00	1.84	12.84	23.98
		87.8	10.64	2.29	12.93	23.98
		117	10.69	2.68	13.37	23.98
		175.5	10.24	3.08	13.32	23.98
		234	9.81	3.52	13.33	23.98
		263.3	9.59	3.62	13.21	23.98
		292.5	9.46	3.76	13.22	23.98
		351	9.30	3.90	13.20	23.98
		390	9.17	4.06	13.23	23.98

802.11ac_80MHz BW (UNII 2C)

■ TEST RESULTS

Conducted Output Power Measurements (802.11ac_80MHz Mode: 5530 ~ 5690 MHz)

802.11ac(80MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5530	106	29.3	10.52	1.13	11.65	23.98
		58.5	9.73	1.84	11.57	23.98
		87.8	9.33	2.29	11.62	23.98
		117	9.21	2.68	11.89	23.98
		175.5	8.96	3.08	12.04	23.98
		234	8.45	3.52	11.97	23.98
		263.3	8.28	3.62	11.91	23.98
		292.5	8.23	3.76	11.99	23.98
		351	8.10	3.90	12.00	23.98
		390	7.94	4.06	12.00	23.98
5610	122	29.3	10.92	1.13	12.05	23.98
		58.5	10.27	1.84	12.11	23.98
		87.8	9.81	2.29	12.10	23.98
		117	9.84	2.68	12.52	23.98
		175.5	9.33	3.08	12.41	23.98
		234	8.99	3.52	12.51	23.98
		263.3	8.85	3.62	12.47	23.98
		292.5	8.72	3.76	12.48	23.98
		351	8.50	3.90	12.40	23.98
		390	8.42	4.06	12.48	23.98
5690	138	29.3	11.05	1.13	12.19	23.98
		58.5	10.33	1.84	12.17	23.98
		87.8	9.99	2.29	12.28	23.98
		117	9.91	2.68	12.59	23.98
		175.5	9.56	3.08	12.64	23.98
		234	9.04	3.52	12.56	23.98
		263.3	8.93	3.62	12.56	23.98
		292.5	8.84	3.76	12.60	23.98
		351	8.71	3.90	12.61	23.98
		390	8.50	4.06	12.56	23.98

802.11ac_80MHz BW (UNII 3)

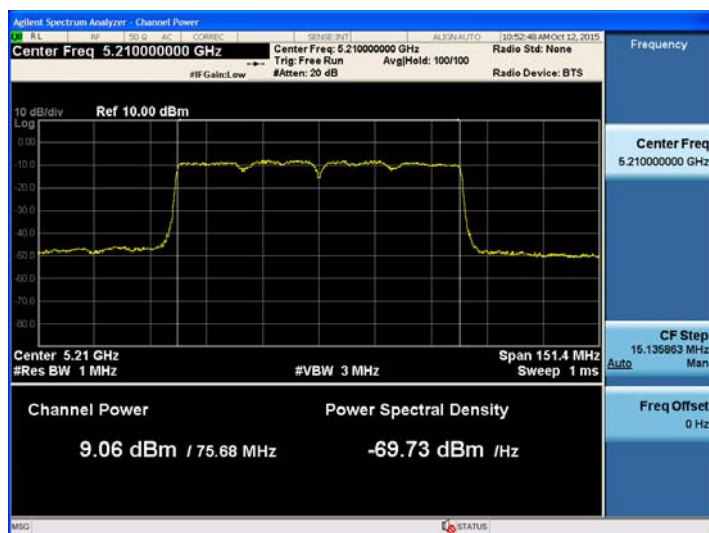
TEST RESULTS

Conducted Output Power Measurements (802.11ac_80MHz Mode: 5775 MHz)

802.11ac(80MHz) Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5775	155	29.3	11.13	1.13	12.26	30
		58.5	10.38	1.84	12.21	30
		87.8	9.89	2.29	12.18	30
		117	9.87	2.68	12.55	30
		175.5	9.48	3.08	12.56	30
		234	9.10	3.52	12.62	30
		263.3	9.02	3.62	12.64	30
		292.5	8.81	3.76	12.56	30
		351	8.66	3.90	12.56	30
		390	8.57	4.06	12.63	30

■ TEST Plot for 802.11ac_80MHz BW

**802.11ac_80 MHz BW UNII 1 BAND Average Power
(5210 MHz) CH 42 175.5 Mbps**



**802.11ac_80 MHz BW UNII 2A BAND Average Power
(5290 MHz) CH 58 117 Mbps**



**802.11ac_80 MHz BW UNII 2C BAND Average Power
(5530 ~ 5690 MHz) CH 138 175.5 Mbps**



**802.11ac_80 MHz BW UNII 3 BAND Average Power
(5775 MHz) CH 155 263.3 Mbps**



■ Straddle channels TEST RESULTS

Conducted Output Power Measurements (802.11a/n/ac_20M Mode: UNII 2C Band 5720MHz)

Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11a	5720	144	9.28	1.79	11.07	23.98
802.11n			8.75	1.77	10.52	23.98
802.11ac			8.83	1.94	10.77	23.98

Conducted Output Power Measurements (802.11a/n/ac_20M Mode: UNII 3 Band 5720MHz)

Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11a	5720	144	2.91	1.79	4.70	30.00
802.11n			3.20	1.77	4.97	30.00
802.11ac			3.19	1.94	5.13	30.00

▣ Straddle channels TEST Plot for 802.11a/n/ac_20MHz BW

802.11a UNII 2C Band Average Power CH.144



802.11a UNII 3 Band Average Power CH.144



802.11n_20MHz BW UNII 2C Band Average Power CH.144



802.11n_20MHz BW UNII 3 Band Average Power CH.144



802.11ac_20MHz BW UNII 2C Band Average Power CH.144



802.11ac_20MHz BW UNII 3 Band Average Power CH.144



Straddle channels TEST RESULTS

Conducted Output Power Measurements (802.11n/ac_40M Mode: UNII 2C Band 5710MHz)

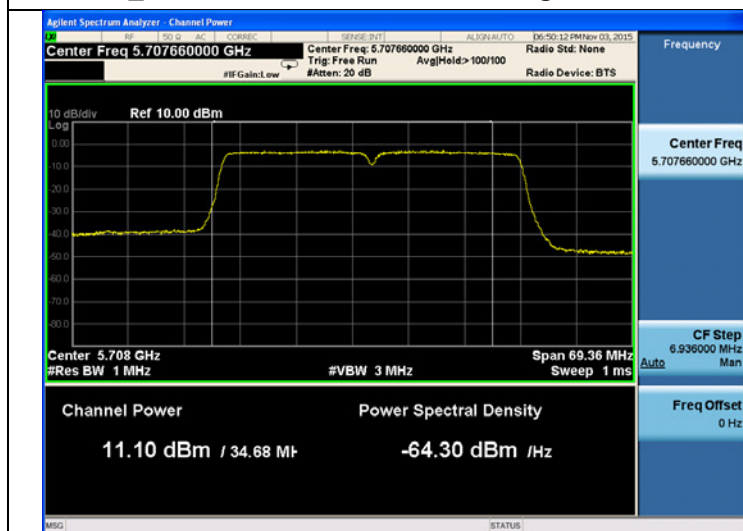
Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11n	5710	142	11.10	2.32	13.42	23.98
802.11ac			10.95	3.01	13.96	23.98

Conducted Output Power Measurements (802.11a/n/ac_20M Mode: UNII 3 Band 5710MHz)

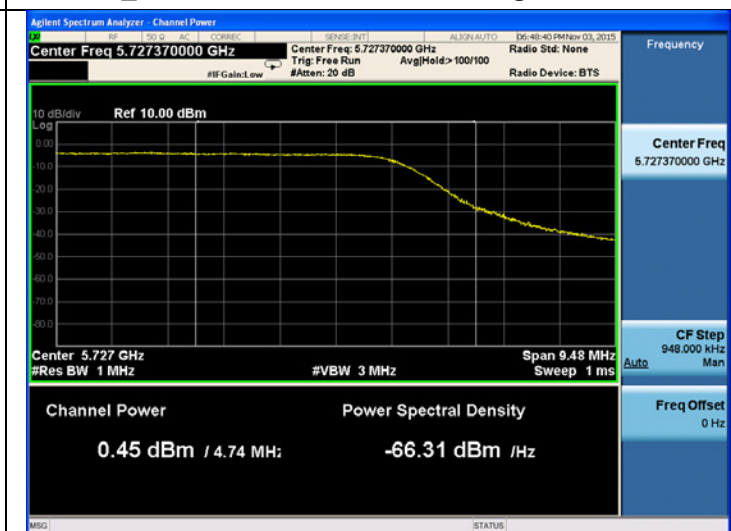
Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11n	5710	142	0.45	2.32	2.77	30.00
802.11ac			0.43	3.01	3.44	30.00

■ Straddle channels TEST Plot for 802.11n/ac_40MHz BW

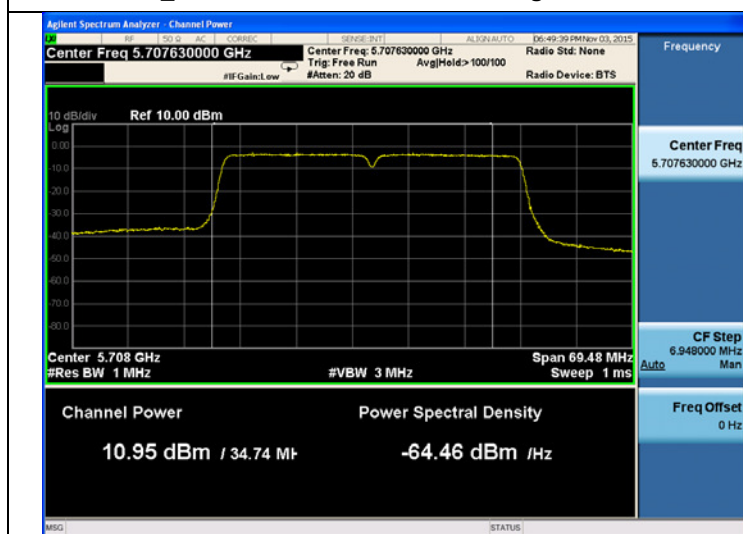
802.11n_40MHz BW UNII 2C Band Average Power CH.142



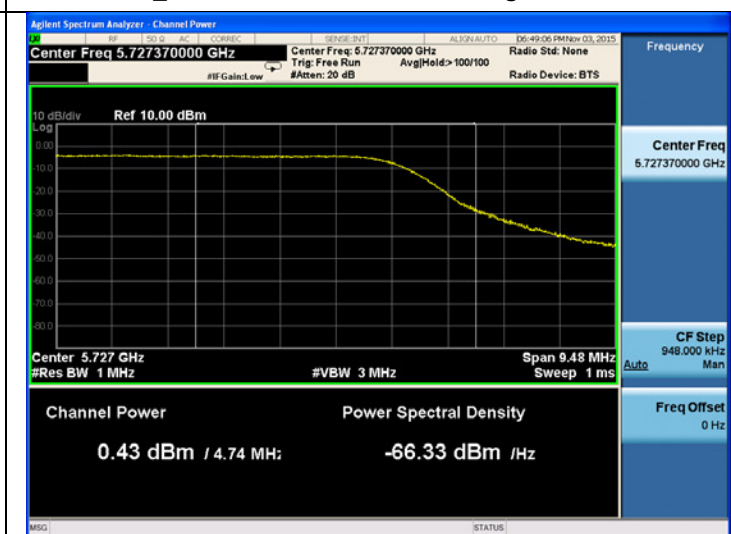
802.11n_40MHz BW UNII 3 Band Average Power CH.142



802.11ac_40MHz BW UNII 2C Band Average Power CH.142



802.11ac_40MHz BW UNII 3 Band Average Power CH.142



Straddle channels TEST RESULTS

Conducted Output Power Measurements (802.11ac_80M Mode: UNII 2C Band 5690MHz)

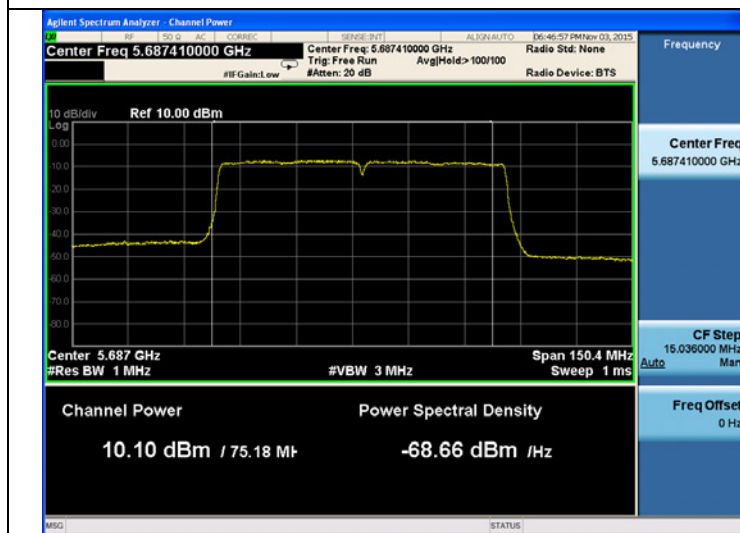
Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11ac	5690	138	10.10	3.08	13.18	23.98

Conducted Output Power Measurements (802.11ac_80M Mode: UNII 3 Band 5690MHz)

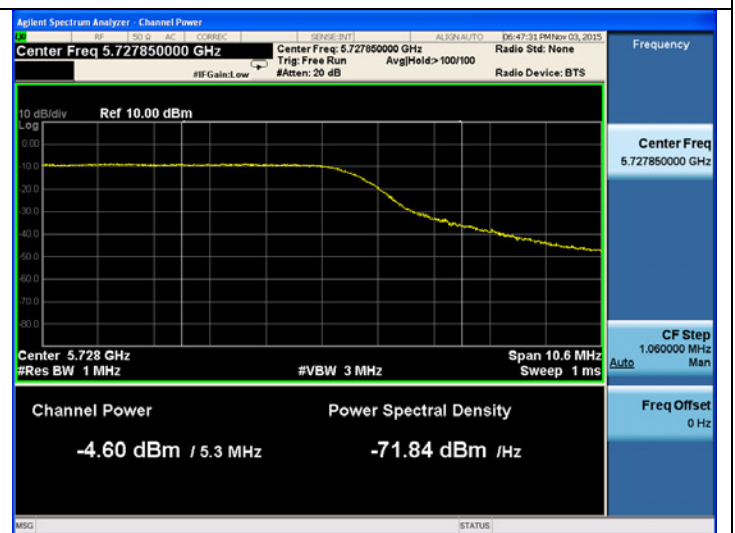
Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11ac	5690	138	-4.60	3.08	-1.52	30.00

Straddle channels TEST Plot for 802.11ac_80MHz BW

802.11ac_80MHz BW UNII 2C Band Average Power CH.138



802.11ac_80MHz BW UNII 3 Band Average Power CH.138



8.4 POWER SPECTRAL DENSITY

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies. The maximum permissible peak power spectral density is 11 dBm/ MHz for UNII 1,2A, 2C and 30 dBm/500 kHz for UNII 3.

■ Limit(CDD)

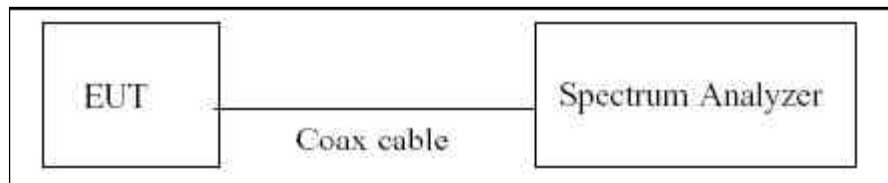
Power Spectral Density

Band	Mode	Limit
UNII 1	802.11 a,n,ac	11 dBm/MHz
UNII 2A	802.11a,n,ac	11 dBm/MHz
UNII 2C	802.11a,n,ac	11 dBm/MHz
UNII 3	802.11a,n,ac	30 dBm/500 kHz

Note :

1. The limits of conducted power spectral density were applied the antenna gain. Therefore, if conducted power is pass, e.i.r.p. is also pass. So, we attached only conducted power spectral density table.
2. In case of UNII channels 138, 142 and 144, this device is satisfied with KDB644545 D03.

■ TEST CONFIGURATION



■ TEST PROCEDURE

We tested according to Method in KDB 789033(issued 06/06/2014).

The spectrum analyzer is set to :

1. Set span to encompass the entire emission bandwidth(EBW) of the signal.
2. RBW = 1 MHz(510 kHz for UNII 3)
3. VBW $\geq$ 3 MHz
4. Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$.
5. Sweep time = auto.
6. Detector = RMS(i.e., power averaging), if available. Otherwise, use sample detector mode.
7. Do not use sweep triggering. Allow the sweep to "free run".
8. Trace average at least 100 traces in power averaging(RMS) mode
9. Use the peak search function on the spectrum analyzer to find the peak of the spectrum.
10. If Method SA-2 was used, add $10 \log(1/x)$, where x is the duty cycle, to the peak of the spectrum.

■ Sample Calculation

PSD = Reading Value + ATT loss + Cable loss(1 ea) + Duty Cycle Factor

Output Power = -5 dBm + 10 dB + 0.8 dB + 0.21 dB = 16.01 dBm

Note :

1. Spectrum reading values are not plot data. The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. We apply to the offset in the 5.2 GHz, 5.3 GHz and 5.6 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is below table.

Band	Loss(dB)
UNII 1, 2A, 2C, 3	10.4

(Actual value of loss for the attenuator and cable combination)

802.11a_20MHz BW

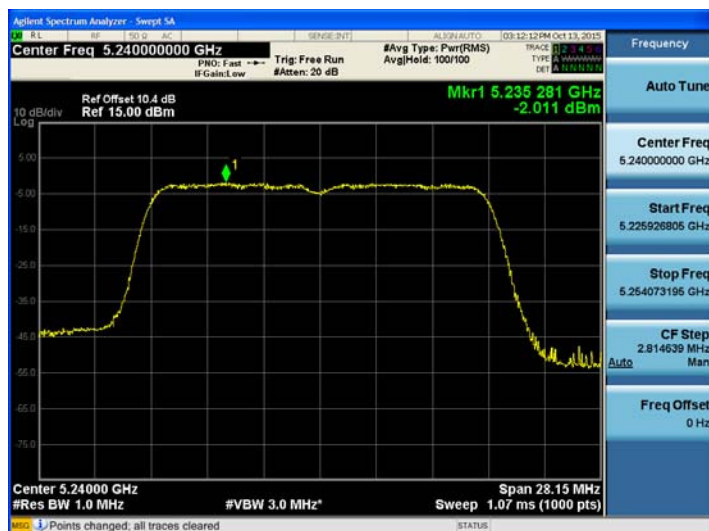
TEST RESULTS

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5180	36	802.11a	-2.408	1.790	-0.618	11	Pass
5200	40		-2.342	1.790	-0.552		Pass
5240	48		-2.011	1.790	-0.221		Pass
5260	52		-0.960	1.919	0.959	11	Pass
5300	60		-0.504	1.790	1.286		Pass
5320	64		-0.715	1.790	1.075		Pass
5500	100		-0.180	1.025	0.845	11	Pass
5580	116		-0.470	1.790	1.320		Pass
5720	144		-0.960	1.790	0.830		Pass
5745	149		-3.649	1.790	-1.859	30	Pass
5785	157		-3.810	1.790	-2.020		Pass
5825	165		-3.901	1.919	-1.982		Pass

■ TEST Plot for 802.11a 20MHz BW

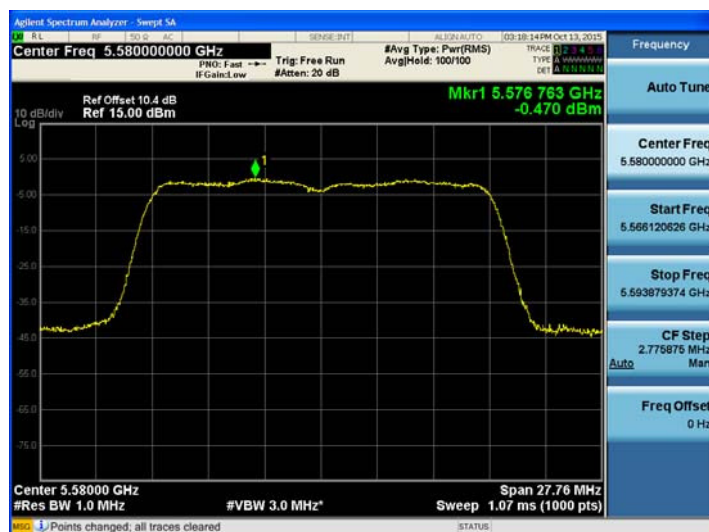
802.11a_20MHz BW UNII 1 BAND PSD CH 48



802.11a_20MHz BW UNII 2A BAND PSD CH 60



802.11a_20MHz BW UNII 2C BAND PSD CH 116



802.11a_20MHz BW UNII 3 BAND PSD CH 149



802.11n_20MHz BW

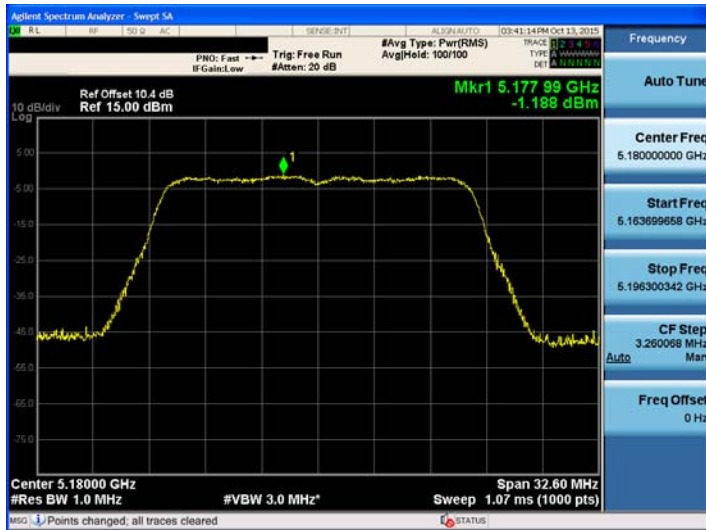
TEST RESULTS

Conducted Power Density Measurements

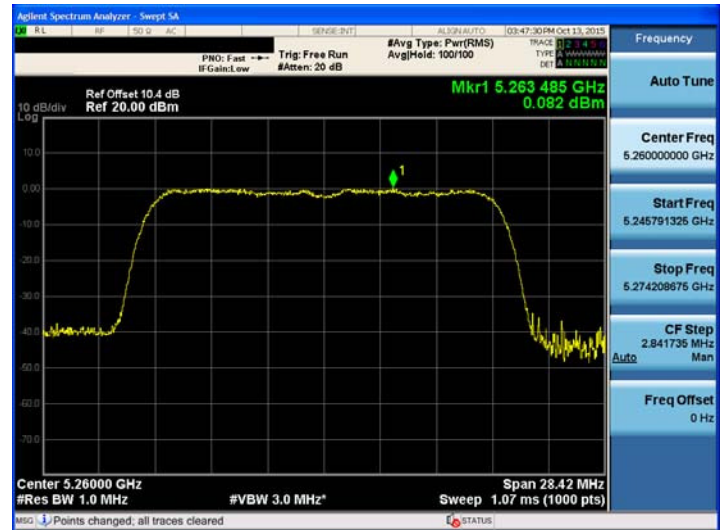
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5180	36	802.11n 20M BW	-1.188	1.870	0.682	11	Pass
5200	40		-0.875	1.420	0.545		Pass
5240	48		-0.448	1.052	0.604		Pass
5260	52		0.082	1.870	1.952	11	Pass
5300	60		0.361	1.052	1.413		Pass
5320	64		0.125	1.768	1.893		Pass
5500	100		-1.070	1.768	0.698	11	Pass
5580	116		-0.403	1.870	1.467		Pass
5720	144		-0.439	1.768	1.329		Pass
5745	149		-2.701	1.420	-1.281	30	Pass
5785	157		-3.400	1.768	-1.632		Pass
5825	165		-3.565	1.870	-1.695		Pass

■ TEST Plot for 802.11n 20MHz BW

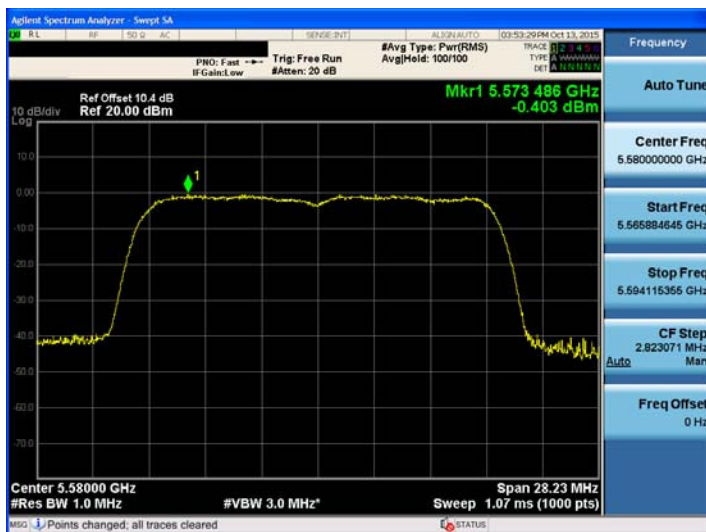
802.11n_20MHz BW UNII 1 BAND PSD CH 36



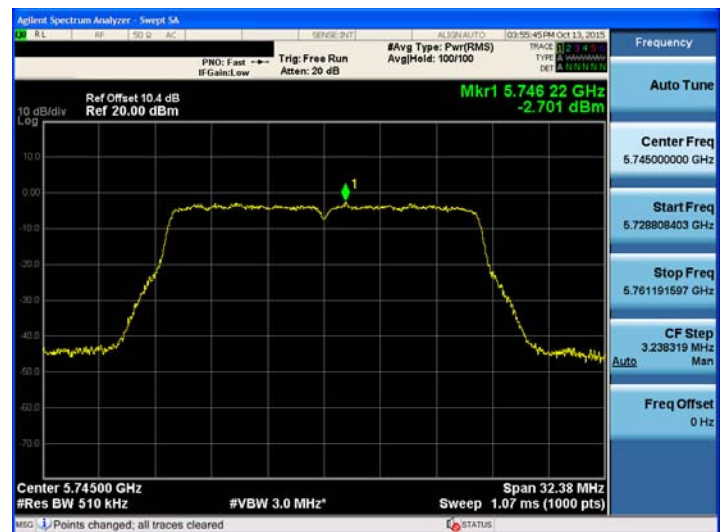
802.11n_20MHz BW UNII 2A BAND PSD CH 52



802.11n_20MHz BW UNII 2C BAND PSD CH 116



802.11n_20MHz BW UNII 3 BAND PSD CH 149



802.11ac_20MHz BW

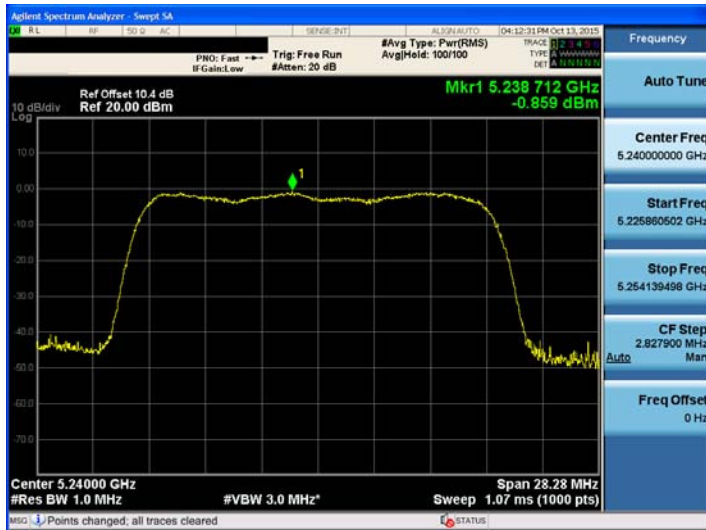
TEST RESULTS

Conducted Power Density Measurements

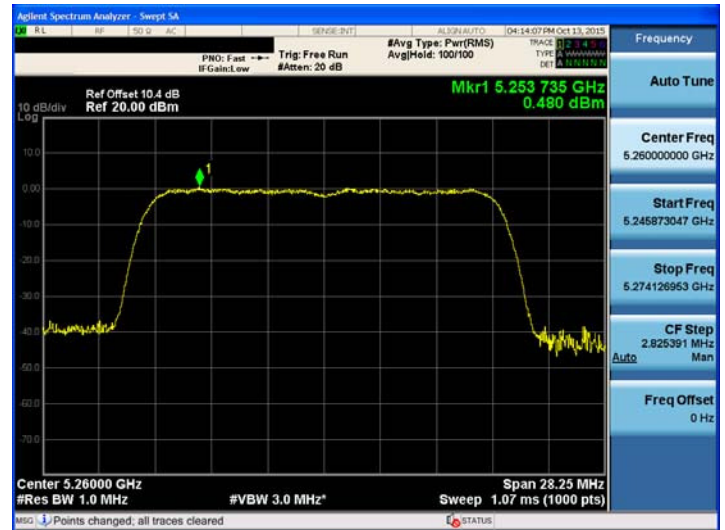
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5180	36	802.11ac _20MHz BW	-0.508	1.044	0.536	11	Pass
5200	40		-1.186	1.837	0.651		Pass
5240	48		-0.859	2.196	1.337		Pass
5260	52		0.480	1.837	2.317	11	Pass
5300	60		-0.241	1.837	1.596		Pass
5320	64		0.442	1.044	1.486		Pass
5500	100		-1.126	1.732	0.606	11	Pass
5580	116		-0.073	1.413	1.340		Pass
5720	144		-0.690	1.938	1.248		Pass
5745	149		-2.558	1.044	-1.514	30	Pass
5785	157		-3.539	1.732	-1.807		Pass
5825	165		-3.550	1.837	-1.713		Pass

■ TEST Plot for 802.11ac 20MHz BW

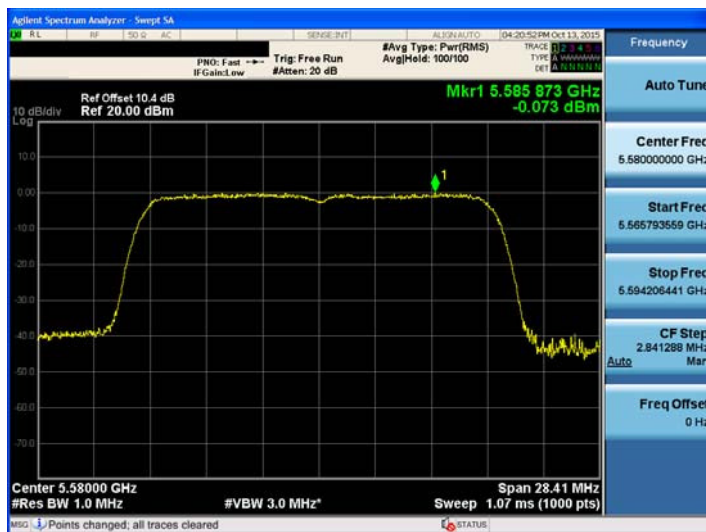
802.11ac_20MHz BW UNII 1 BAND PSD CH 48



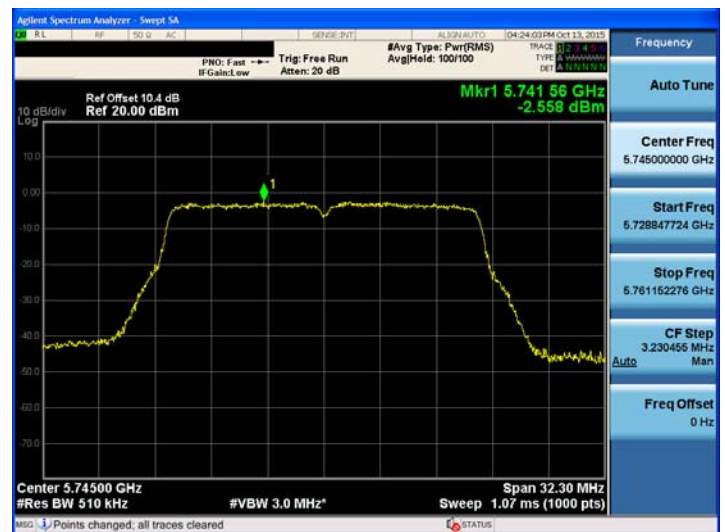
802.11ac_20MHz BW UNII 2A BAND PSD CH 52



802.11ac_20MHz BW UNII 2C BAND PSD CH 116



802.11ac_20MHz BW UNII 3 BAND PSD CH 149



802.11n_40MHz BW

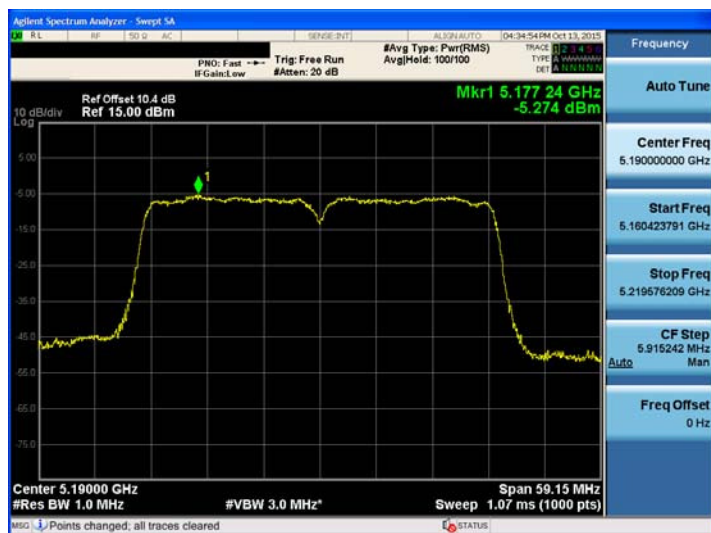
TEST RESULTS

Conducted Power Density Measurements

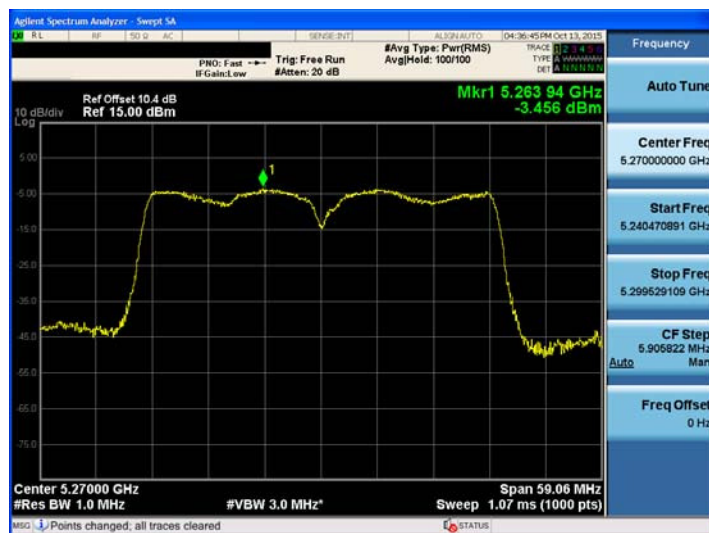
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5190	38	802.11n 40MHz BW	-5.274	2.866	-2.408	11	Pass
5230	46		-5.192	2.315	-2.877		Pass
5270	54		-3.456	2.866	-0.590	11	Pass
5310	62		-3.951	2.315	-1.636		Pass
5510	102		-5.104	2.700	-2.404	11	Pass
5550	110		-5.321	2.866	-2.455		Pass
5710	142		-5.098	2.315	-2.783		Pass
5755	151		-7.229	2.315	-4.914	30	Pass
5795	159		-7.647	2.866	-4.781		Pass

■ TEST Plot for 802.11n 40MHz BW

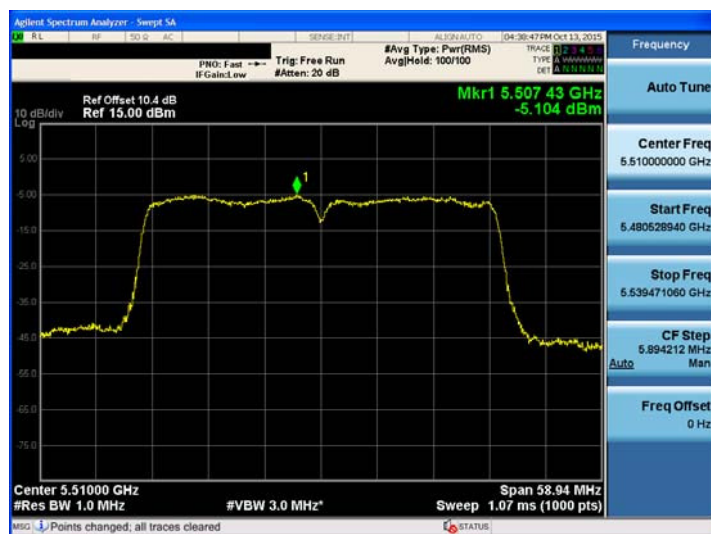
802.11n_40MHz BW UNII 1 BAND PSD CH 38



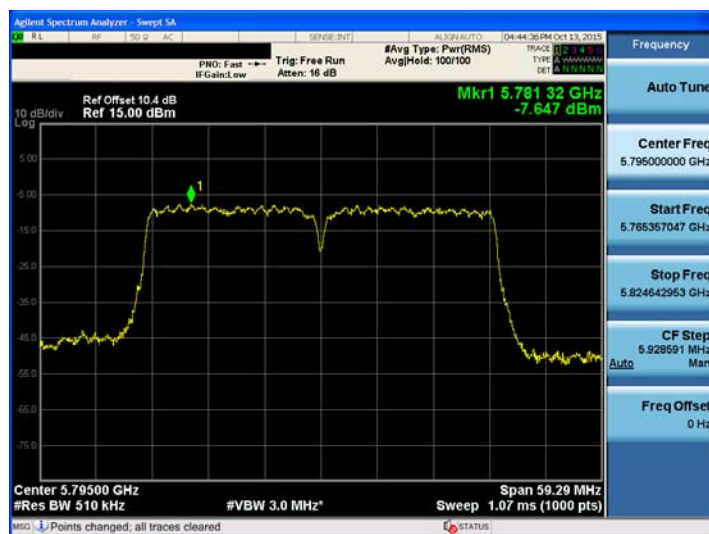
802.11n_40MHz BW UNII 2A BAND PSD CH 54



802.11n_40MHz BW UNII 2C BAND PSD CH 102



802.11n_40MHz BW UNII 3 BAND PSD CH 159



802.11ac_40MHz BW

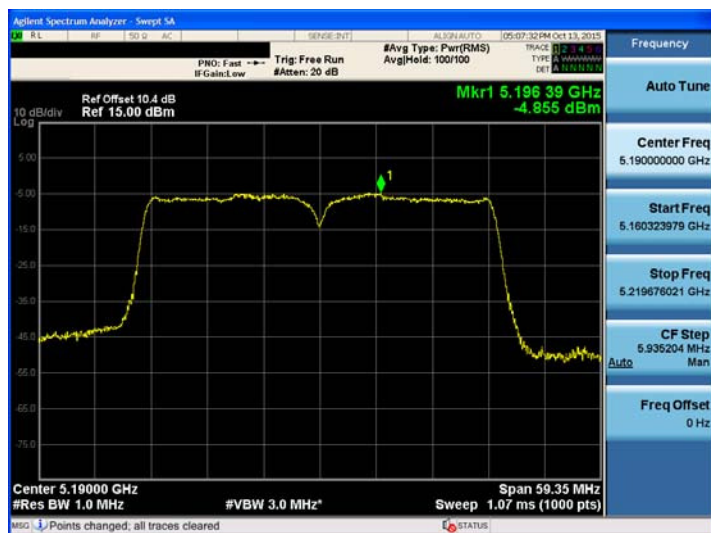
TEST RESULTS

Conducted Power Density Measurements

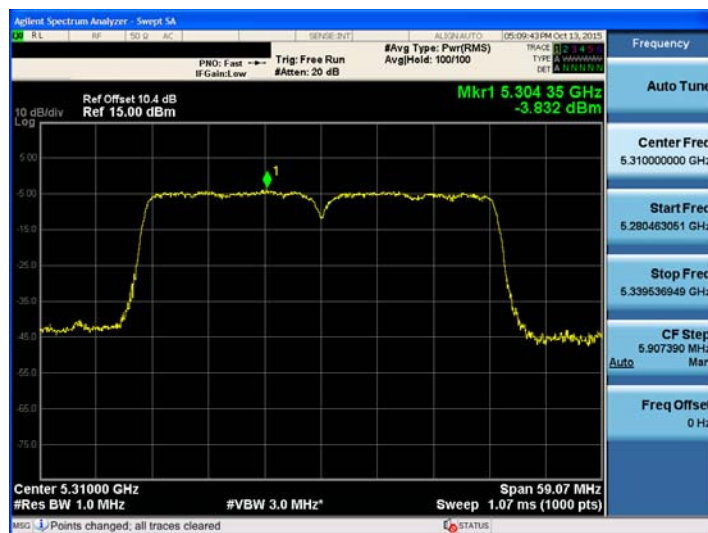
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5190	38	802.11ac 40MHz BW	-4.855	2.242	-2.613	11	Pass
5230	46		-4.866	2.242	-2.624		Pass
5270	54		-4.416	2.751	-1.665	11	Pass
5310	62		-3.832	2.242	-1.590		Pass
5510	102		-4.421	1.732	-2.689	11	Pass
5550	110		-4.553	2.242	-2.311		Pass
5710	142		-5.782	3.010	-2.772		Pass
5755	151		-7.304	2.751	-4.553	30	Pass
5795	159		-6.793	2.242	-4.551		Pass

■ TEST Plot for 802.11ac_40MHz BW

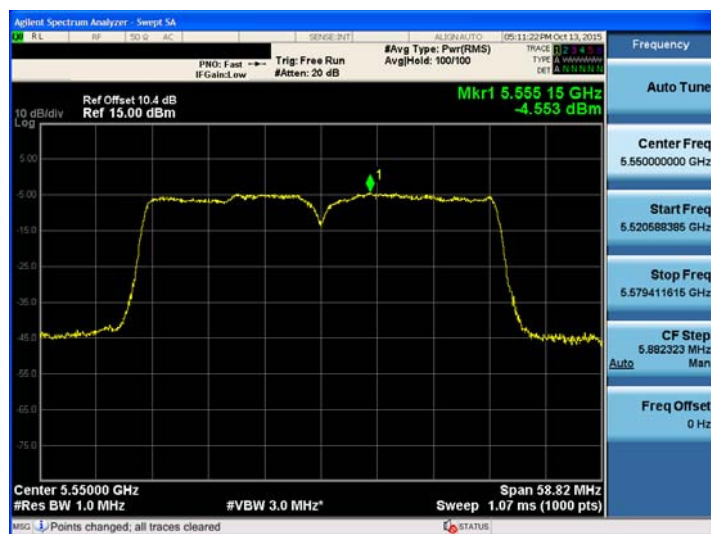
802.11ac_40MHz BW UNII 1 BAND PSD CH 38



802.11ac_40MHz BW UNII 2A BAND PSD CH 62



802.11ac_40MHz BW UNII 2C BAND PSD CH 110



802.11ac_40MHz BW UNII 3 BAND PSD CH 159



802.11ac_80MHz BW

TEST RESULTS

Conducted Power Density Measurements

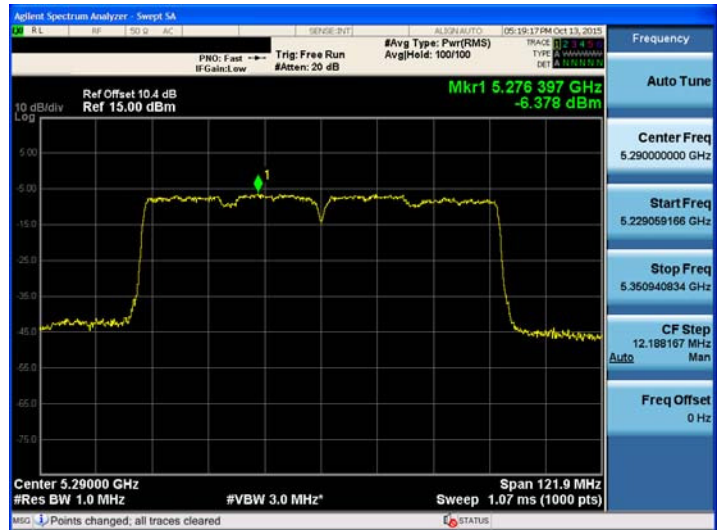
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5210	42	802.11ac 80MHz BW	-7.753	3.078	-4.675	11	Pass
5290	58		-6.378	2.680	-3.698		Pass
5530	106		-7.837	3.078	-4.759		Pass
5610	122		-6.961	2.680	-4.281		Pass
5690	138		-7.282	3.078	-4.204		Pass
5775	155		-10.272	3.622	-6.650	30	Pass

■ TEST Plot for 802.11ac_80MHz BW

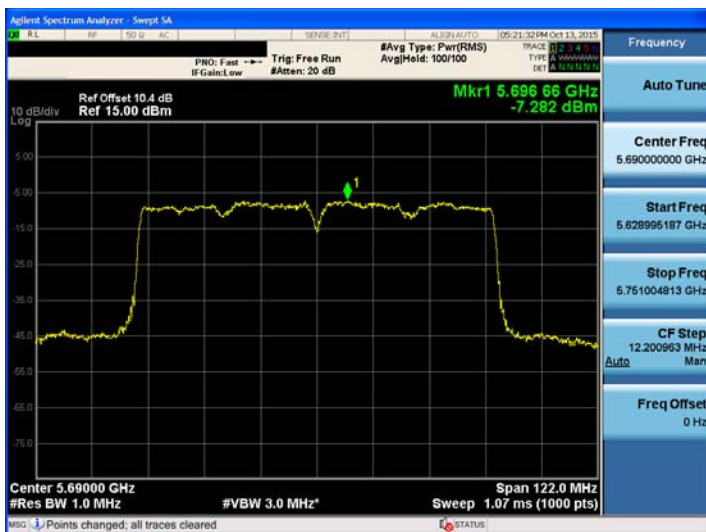
802.11ac_80MHz BW UNII 1 BAND PSD CH 42



802.11ac_80MHz BW UNII 2A BAND PSD CH 58



802.11ac_80MHz BW UNII 2C BAND PSD CH 138



802.11ac_80MHz BW UNII 3 BAND PSD CH 155



■ Straddle channels TEST RESULTS

Conducted Power Density Measurements (UNII 2C Band 5720MHz)

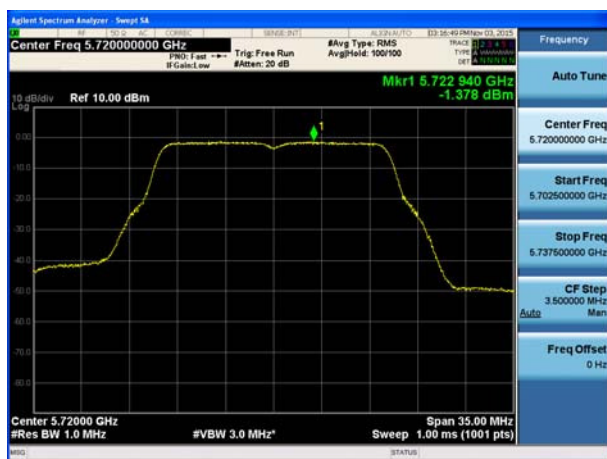
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5720	144	802.11a	-1.378	1.790	0.412	11	Pass
		802.11n	-1.466	1.768	0.302		Pass
		802.11ac	-1.330	1.938	0.608		Pass

Conducted Power Density Measurements (UNII 3 Band 5720MHz)

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5720	144	802.11a	-4.339	1.790	-2.549	30	Pass
		802.11n	-4.631	1.768	-2.863		Pass
		802.11ac	-4.756	1.938	-2.818		Pass

■ Straddle channels TEST Plot for 802.11a/n/ac_20MHz BW

802.11a UNII 2C Band PSD CH.144



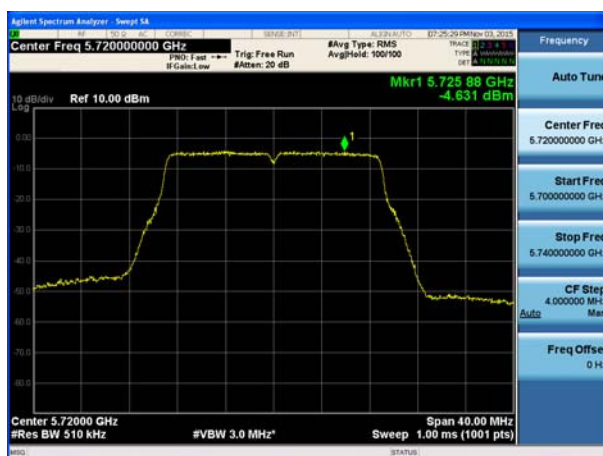
802.11a UNII 3 Band PSD CH.144



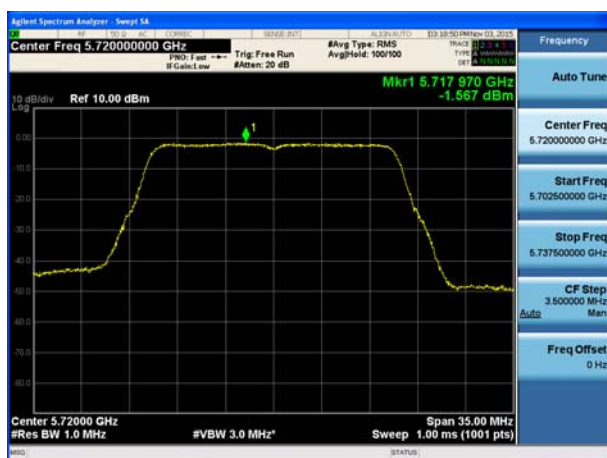
802.11n_20MHz BW UNII 2C Band PSD CH.144



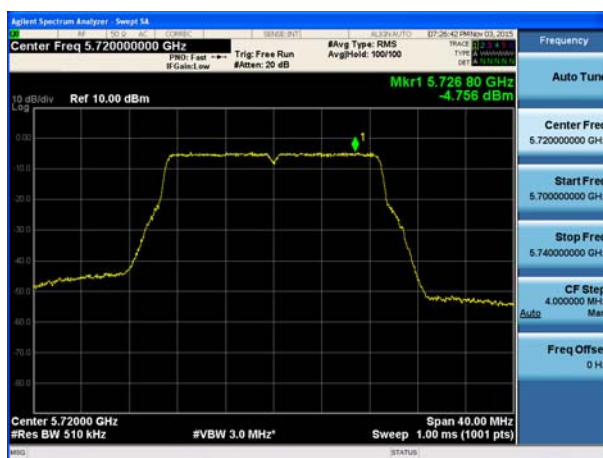
802.11n_20MHz BW UNII 3 Band PSD CH.144



802.11ac_20MHz BW UNII 2C Band PSD CH.144



802.11ac_20MHz BW UNII 3 Band PSD CH.144



Straddle channels TEST RESULTS

Conducted Power Density Measurements (UNII 2C Band 5710MHz)

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5710	142	802.11n	-4.245	2.315	-1.930	11	Pass
		802.11ac	-4.113	3.010	-1.103		Pass

Conducted Power Density Measurements (UNII 3 Band 5710MHz)

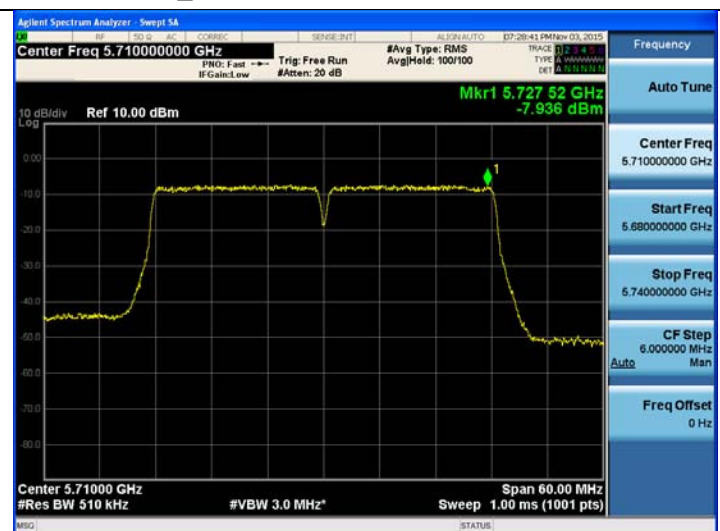
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5710	142	802.11n	-7.936	2.315	-5.621	30	Pass
		802.11ac	-7.415	3.010	-4.405		Pass

■ Straddle channels TEST Plot for 802.11n/ac_40MHz BW

802.11n_40MHz BW UNII 2C Band PSD CH.142



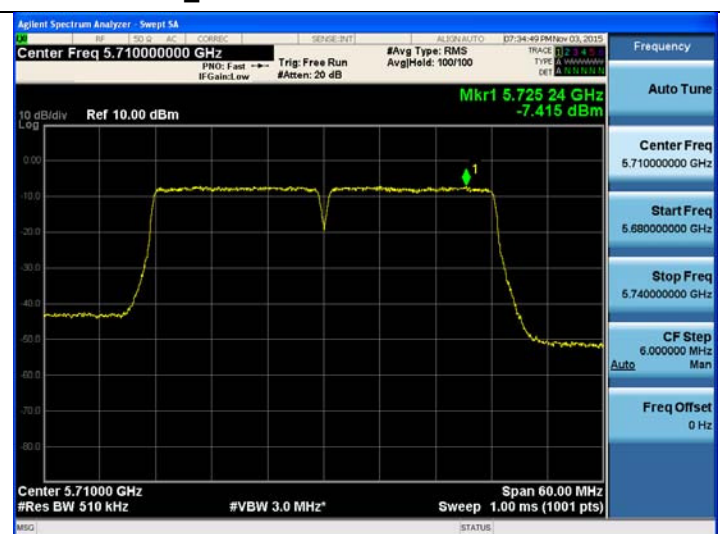
802.11n_40MHz BW UNII 3 Band PSD CH.142



802.11ac_40MHz BW UNII 2C Band PSD CH.142



802.11ac_40MHz BW UNII 3 Band PSD CH.142



Straddle channels TEST RESULTS

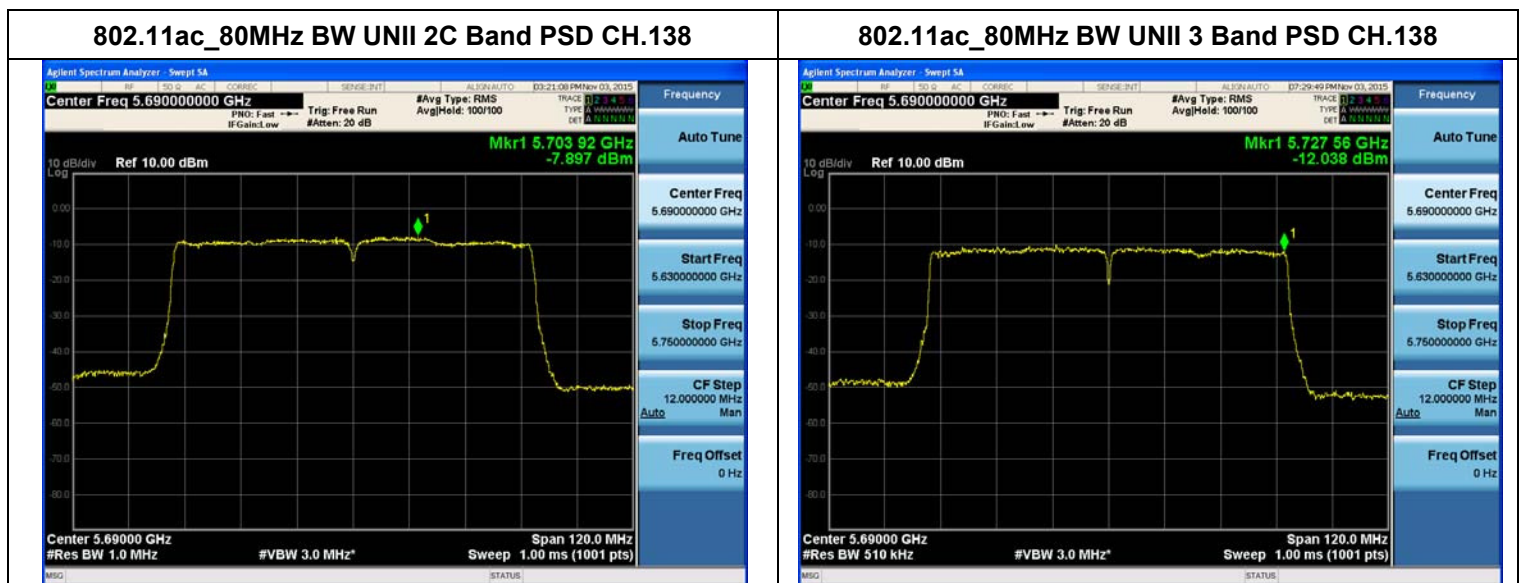
Conducted Power Density Measurements (UNII 2C Band 5710MHz)

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5690	138	802.11ac	-7.897	3.078	-4.819	11	Pass

Conducted Power Density Measurements (UNII 3 Band 5710MHz)

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5690	138	802.11ac	-12.038	3.078	-8.960	30	Pass

Straddle channels TEST Plot for 802.11ac_80MHz BW



8.5 FREQUENCY STABILITY.

The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between -30 °C and 50 °C. The temperature was incremented by 10 °C intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.

20 MHz BW

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,180,000,000 Hz
CHANNEL:	36
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5179999.06	-0.94
100%		-30	5179995.49	-4.51
100%		-20	5179996.22	-3.78
100%		-10	5179997.11	-2.89
100%		0	5179997.88	-2.12
100%		+10	5179998.74	-1.26
100%		+30	5180003.24	3.24
100%		+40	5180005.79	5.79
100%		+50	5180007.68	7.68
115%	4.4	+20	5179993.38	-6.62
Batt. Endpoint	3.6	+20	5180003.18	3.18

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2A
 OPERATING FREQUENCY: 5,260,000,000 Hz
 CHANNEL: 52
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5260000.91	0.91
100%		-30	5259993.18	-6.82
100%		-20	5259995.41	-4.59
100%		-10	5259996.11	-3.89
100%		0	5259998.77	-1.23
100%		+10	5259999.46	-0.54
100%		+30	5260002.46	2.46
100%		+40	5260003.50	3.50
100%		+50	5260007.89	7.89
115%	4.4	+20	5260005.13	5.13
Batt. Endpoint	3.6	+20	5259993.62	-6.38

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2C
 OPERATING FREQUENCY: 5,500,000,000 Hz
 CHANNEL: 100
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5500000.29	0.29
100%		-30	5499991.76	-8.24
100%		-20	5499995.31	-4.69
100%		-10	5499996.55	-3.45
100%		0	5499998.38	-1.62
100%		+10	5499999.43	-0.57
100%		+30	5500001.64	1.64
100%		+40	5500003.71	3.71
100%		+50	5500008.21	8.21
115%	4.4	+20	5500004.14	4.14
Batt. Endpoint	3.6	+20	5500003.13	3.13

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 3
 OPERATING FREQUENCY: 5,745,000,000 Hz
 CHANNEL: 149
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5745006.30	6.30
100%		-30	5744994.36	-5.64
100%		-20	5744997.06	-2.94
100%		-10	5744999.42	-0.58
100%		0	5745001.27	1.27
100%		+10	5745004.29	4.29
100%		+30	5745007.20	7.20
100%		+40	5745010.54	10.54
100%		+50	5745014.98	14.98
115%	4.4	+20	5745009.69	9.69
Batt. Endpoint	3.6	+20	5745003.90	3.90

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

40 MHz BW

OPERATING BAND: UNII Band 1
 OPERATING FREQUENCY: 5,190,000,000 Hz
 CHANNEL: 38
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5190005.24	5.24
100%		-30	5189981.55	-18.45
100%		-20	5189985.41	-14.59
100%		-10	5189988.44	-11.56
100%		0	5189994.06	-5.94
100%		+10	5190004.97	4.97
100%		+30	5190009.54	9.54
100%		+40	5190016.49	16.49
100%		+50	5190019.37	19.37
115%	4.4	+20	5189994.17	-5.83
Batt. Endpoint	3.6	+20	5190012.67	12.67

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2A
 OPERATING FREQUENCY: 5,270,000,000 Hz
 CHANNEL: 54
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5270006.30	6.30
100%		-30	5269981.33	-18.67
100%		-20	5269984.31	-15.69
100%		-10	5269988.66	-11.34
100%		0	5270001.68	1.68
100%		+10	5270004.16	4.16
100%		+30	5270009.58	9.58
100%		+40	5270011.67	11.67
100%		+50	5270019.54	19.54
115%	4.4	+20	5269978.99	-21.01
Batt. Endpoint	3.6	+20	5270018.13	18.13

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2C
 OPERATING FREQUENCY: 5,510,000,000 Hz
 CHANNEL: 102
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5510005.99	5.99
100%		-30	5509984.33	-15.67
100%		-20	5509985.38	-14.62
100%		-10	5509988.32	-11.68
100%		0	5509991.35	-8.65
100%		+10	5510002.89	2.89
100%		+30	5510008.64	8.64
100%		+40	5510012.67	12.67
100%		+50	5510016.70	16.70
115%	4.4	+20	5510015.21	15.21
Batt. Endpoint	3.6	+20	5509994.28	-5.72

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 3
 OPERATING FREQUENCY: 5,755,000,000 Hz
 CHANNEL: 151
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5755008.63	8.63
100%		-30	5754991.33	-8.67
100%		-20	5754984.06	-15.94
100%		-10	5754988.32	-11.68
100%		0	5754991.36	-8.64
100%		+10	5754995.32	-4.68
100%		+30	5755011.26	11.26
100%		+40	5755016.57	16.57
100%		+50	5755024.67	24.67
115%	4.4	+20	5755001.92	1.92
Batt. Endpoint	3.6	+20	5754995.56	-4.44

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

80 MHz BW

OPERATING BAND: UNII Band 1
 OPERATING FREQUENCY: 5,210,000,000 Hz
 CHANNEL: 42
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210007.51	7.51
100%		-30	5209975.35	-24.65
100%		-20	5209981.43	-18.57
100%		-10	5209983.32	-16.68
100%		0	5209991.33	-8.67
100%		+10	5210005.64	5.64
100%		+30	5210011.68	11.68
100%		+40	5210016.97	16.97
100%		+50	5210026.64	26.64
115%	4.4	+20	5210012.39	12.39
Batt. Endpoint	3.6	+20	5210005.14	5.14

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2A
 OPERATING FREQUENCY: 5,290,000,000 Hz
 CHANNEL: 58
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290011.64	11.64
100%		-30	5289978.33	-21.67
100%		-20	5289980.46	-19.54
100%		-10	5289983.41	-16.59
100%		0	5289991.33	-8.67
100%		+10	5290004.69	4.69
100%		+30	5290016.57	16.57
100%		+40	5290019.58	19.58
100%		+50	5290026.34	26.34
115%	4.4	+20	5290009.92	9.92
Batt. Endpoint	3.6	+20	5289988.75	-11.25

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2C
 OPERATING FREQUENCY: 5,530,000,000 Hz
 CHANNEL: 106
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530009.64	9.64
100%		-30	5529981.48	-18.52
100%		-20	5529984.36	-15.64
100%		-10	5529991.46	-8.54
100%		0	5529999.78	-0.22
100%		+10	5530003.69	3.69
100%		+30	5530012.68	12.68
100%		+40	5530016.59	16.59
100%		+50	5530022.37	22.37
115%	4.4	+20	5529991.80	-8.20
Batt. Endpoint	3.6	+20	5530014.33	14.33

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 3
 OPERATING FREQUENCY: 5,775,000,000 Hz
 CHANNEL: 155
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775007.89	7.89
100%		-30	5774973.46	-26.54
100%		-20	5774981.41	-18.59
100%		-10	5774983.36	-16.64
100%		0	5774988.43	-11.57
100%		+10	5775002.94	2.94
100%		+30	5775015.24	15.24
100%		+40	5775018.29	18.29
100%		+50	5775027.59	27.59
115%	4.4	+20	5774984.62	-15.38
Batt. Endpoint	3.6	+20	5775002.35	2.35

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.