HCT CO.,LTD
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea
TEL: +82-31-645-6300 **FAX: +82-31-645-6401**

FCC UNII REPORT

FCC Certification

Applicant Name:
SAMSUNG Electronics Co.,Ltd.

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

Date of Issue:
February 26, 2016
Test Site/Location:
HCT CO., LTD., 74,Seoicheon-ro 578beon-gil,Majang-myeo,Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA
Report No.: HCT-R-1602-F041
HCT FRN: 0005866421
IC Recognition No.: 5944A-5

FCC ID : A3LSMA9100
APPLICANT : SAMSUNG Electronics Co.,Ltd.

Model(s): SM-A9100
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	10.61	0.012
	802.11n	20	5180 – 5240	10.60	0.011
	802.11n	40	5190 - 5230	10.48	0.011
	802.11ac	80	5210	9.65	0.009
UNII2A	802.11a	20	5260 – 5320	10.51	0.011
	802.11n	20	5260 – 5320	10.58	0.011
	802.11n	40	5270 – 5310	10.46	0.011
	802.11ac	80	5290	9.43	0.009
UNII2C	802.11a	20	5500 – 5700	10.21	0.010
	802.11n	20	5500 – 5700	10.36	0.011
	802.11n	40	5510 – 5670	10.01	0.010
	802.11ac	80	5530 – 5610	9.08	0.008
UNII3	802.11a	20	5745 – 5825	9.91	0.010
	802.11n	20	5745 – 5825	10.04	0.010
	802.11n	40	5755 – 5795	9.57	0.009
	802.11ac	80	5775	8.90	0.008

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
: Seul Ki Lee
Test Engineer of RF Team

Approved by
: Sang Jun Lee
Manager of RF Team

This report only responds to the tested sample and may not be reproduced, except in full, without written approval of the HCT Co., Ltd.

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1602-F041	February 26, 2016	- First Approval Report

Table of Contents

1. GENERAL INFORMATION 4

2. EUT DESCRIPTION 4

3. TEST METHODOLOGY 5

3.1 EUT CONFIGURATION 5
3.2 EUT EXERCISE 5
3.3 GENERAL TEST PROCEDURES 5
3.4 DESCRIPTION OF TEST MODES 5

4. INSTRUMENT CALIBRATION 6

5. FACILITIES AND ACCREDITATIONS 6

5.1 FACILITIES 6
5.2 EQUIPMENT 6

6. ANTENNA REQUIREMENTS 6

7. SUMMARY OF TEST RESULTS 7

8. TEST RESULT 8

8.1 DUTY CYCLE 8
8.2 EMISSION BANDWIDTH AND MINIMUM EMISSION BANDWIDTH MEASUREMENT 11
8.3 OUTPUT POWER MEASUREMENT 24
8.4 POWER SPECTRAL DENSITY 44
8.5 FREQUENCY STABILITY. 54
8.6 RADIATED MEASUREMENT 66
8.6.1 RADIATED SPURIOUS EMISSIONS 66
8.6.2 RADIATED RESTRICTED BAND EDGE MEASUREMENTS 114
8.7 POWERLINE CONDUCTED EMISSIONS 134

9. LIST OF TEST EQUIPMENT 139

9.1 LIST OF TEST EQUIPMENT(Conducted Test) 139
9.2 LIST OF TEST EQUIPMENT(Radiated Test) 140

1. GENERAL INFORMATION

Applicant:	SAMSUNG Electronics Co.,Ltd.
Address:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID:	A3LSMA9100
EUT Type:	**Mobile Phone**
Model name(s):	SM-A9100
Date(s) of Tests:	February 04 ~ February 26, 2016
Place of Tests:	HCT Co., Ltd. 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea

2. EUT DESCRIPTION

Model Name	SM-A9100	
EUT Type	**Mobile Phone**	
Power Supply	DC 3.85 V	
Battery Infomation	Model: EB-BA910ABE Type: Li-ion Battery	
Frequency Range	TX_20 MHz BW:	5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2A)/ 5500 MHz - 5700 MHz (UNII 2C)/ 5745 MHz - 5825 MHz (UNII 3)
	40 MHz BW:	5190 MHz - 5230 MHz (UNII 1)/ 5270 MHz - 5310 MHz (UNII 2A)/ 5510 MHz - 5670 MHz (UNII 2C) / 5755 MHz - 5795 MHz (UNII 3)
	80 MHz BW:	5210 MHz(UNII 1)/ 5290 MHz(UNII 2A)/ 5530 MHz - 5610 MHz(UNII 2C)/ 5775 MHz (UNII 3)
	RX_20 MHz BW:	5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2A)/ 5500 MHz - 5700 MHz (UNII 2C)/ 5745 MHz - 5825 MHz (UNII 3)
	40 MHz BW:	5190 MHz - 5230 MHz (UNII 1)/ 5270 MHz - 5310 MHz (UNII 2A)/ 5510 MHz - 5670 MHz (UNII 2C) / 5755 MHz - 5795 MHz (UNII 3)
	80 MHz BW:	5210 MHz(UNII 1)/ 5290 MHz(UNII 2A)/ 5530 MHz - 5610 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 : -0.74 dBi (5180~5240 UNII1 BAND) / -1.4 dBi (5260~5320 UNII2A BAND) -2.97 dBi (5500~5700 UNII2C BAND) / -2.95 dBi (5745~5825 UNII3 BAND)	

3. TEST METHODOLOGY

The measurement procedure described in FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r01 dated January 08, 2016 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

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (latest edition).

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

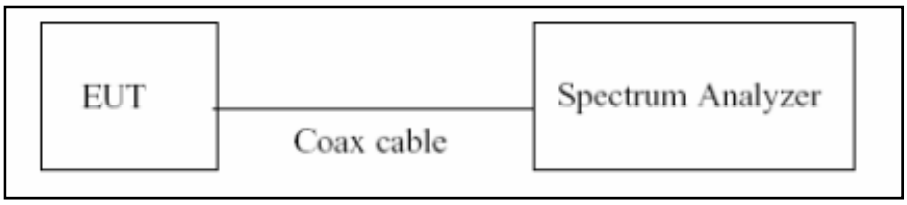
Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
26dB Bandwidth	§15.407 (for Power Measurement)	N/A	CONDUCTED	PASS
6 dB Bandwidth	§15.407(e)	>500 kHz (5725-5850 MHz)		PASS
Maximum Conducted Output Power	§15.407(a)(1)	< 250 mW (5150-5250 MHz) < 250 mW or 11+10 log $\log_{10}$ (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 ≥ EBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ 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* ≤ 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 01/08/2016)

The largest availble 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 ≤ 6.25 microseconds. (50/6.25 = 8)

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

1. RBW = 8 MHz (the largest availble value)
2. VBW = 8 MHz (≥ 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*log(1/Duty Cycle)

▣ Duty Cycle Factor

Mode	Data Rate (Mbps)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11a	6	1.398	1.494	0.93574297	0.288
	9	0.939	1.038	0.90462428	0.435
	12	0.708	0.804	0.88059701	0.552
	18	0.480	0.579	0.82901554	0.814
	24	0.363	0.462	0.78571429	1.047
	36	0.252	0.348	0.72413793	1.402
	48	0.192	0.291	0.65979381	1.806
	54	0.176	0.274	0.64233577	1.922
802.11n_20 MHz BW	MCS 0	1.296	1.395	0.92903226	0.320
	MCS 1	0.660	0.759	0.86956522	0.607
	MCS 2	0.447	0.546	0.81868132	0.869
	MCS 3	0.345	0.444	0.77702703	1.096
	MCS 4	0.234	0.333	0.70270270	1.532
	MCS 5	0.183	0.282	0.64893617	1.878
	MCS 6	0.168	0.266	0.63157895	1.996
	MCS 7	0.152	0.250	0.60800000	2.161
802.11n_40 MHz BW	MCS 0	0.636	0.736	0.86413043	0.634
	MCS 1	0.331	0.430	0.76976744	1.136
	MCS 2	0.228	0.328	0.69512195	1.579
	MCS 3	0.180	0.279	0.64516129	1.903
	MCS 4	0.128	0.226	0.56637168	2.469
	MCS 5	0.104	0.203	0.51231527	2.905
	MCS 6	0.092	0.191	0.48167539	3.172
	MCS 7	0.088	0.187	0.47058824	3.274

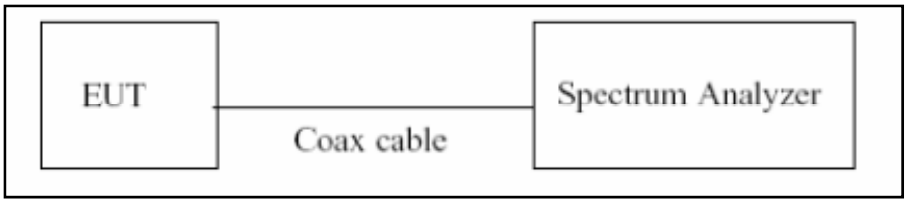
Mode	Data Rate (Mbps)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
5.8 GHz Band 802.11ac_80 MHz BW	MCS 0	0.248	0.348	0.71264368	1.471
	MCS 1	0.144	0.243	0.59259259	2.272
	MCS 2	0.111	0.211	0.52606635	2.790
	MCS 3	0.092	0.191	0.48167539	3.172
	MCS 4	0.076	0.176	0.43181818	3.647
	MCS 5	0.068	0.168	0.40476190	3.928
	MCS 6	0.064	0.164	0.39024390	4.087
	MCS 7	0.063	0.163	0.38650307	4.128
	MCS 8	0.060	0.159	0.37735849	4.232
	MCS 9	0.056	0.156	0.35897436	4.449

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 01/08/2016), 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 01/08/2016)

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.

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.

▣ 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 01/08/2016)

1. RBW = 100 kHz
2. VBW ≥ 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 lever 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	21.111	N/A	Pass
5200	40	21.449	N/A	Pass
5240	48	21.399	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	21.644	N/A	Pass
5300	60	21.431	N/A	Pass
5320	64	21.653	N/A	Pass

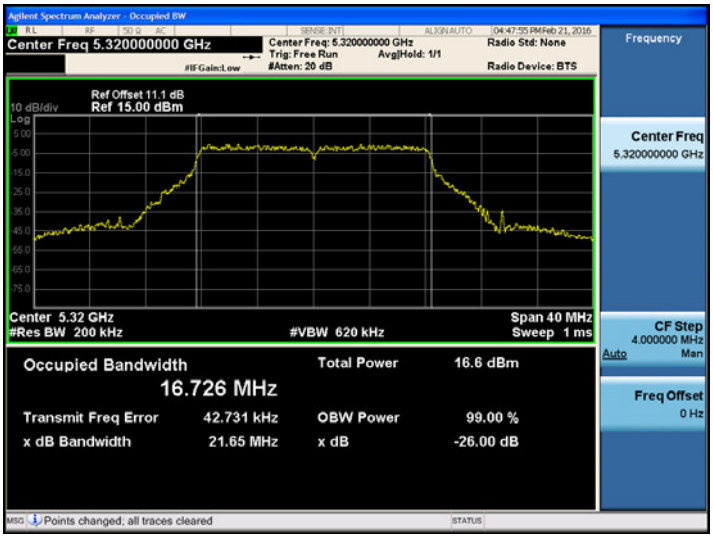
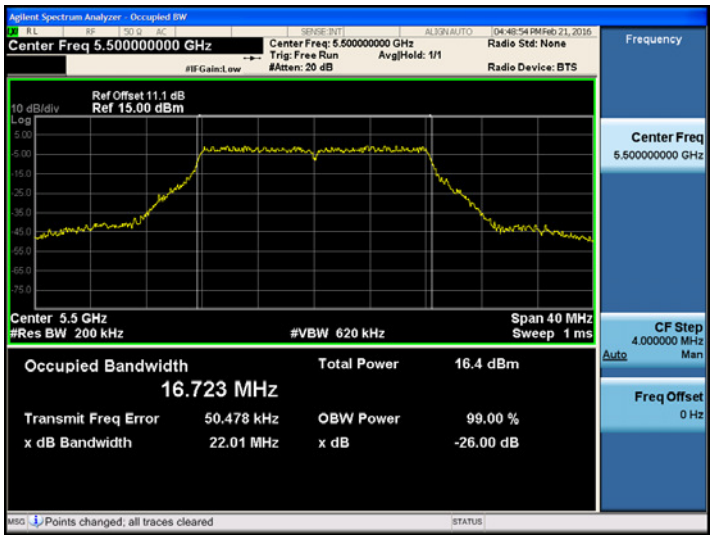
Conducted 26 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	22.009	N/A	Pass
5580	116	21.196	N/A	Pass
5700	140	21.755	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	21.685	N/A	Pass
5785	157	21.609	N/A	Pass
5825	165	21.189	N/A	Pass

▣ TEST Plot for 802.11a _20MHz BW

802.11a UNII 1 BAND 26dB Bandwidth (CH40)	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 149)**
	

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	21.840	N/A	Pass
5200	40	21.860	N/A	Pass
5240	48	21.848	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	21.738	N/A	Pass
5300	60	21.999	N/A	Pass
5320	64	21.907	N/A	Pass

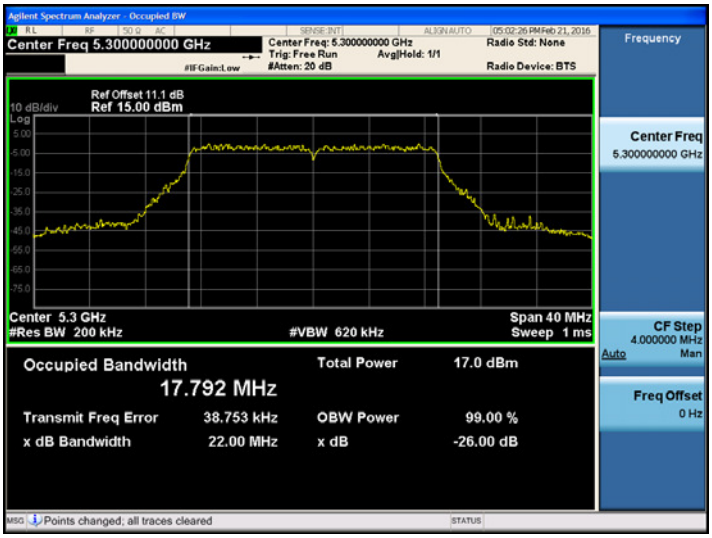
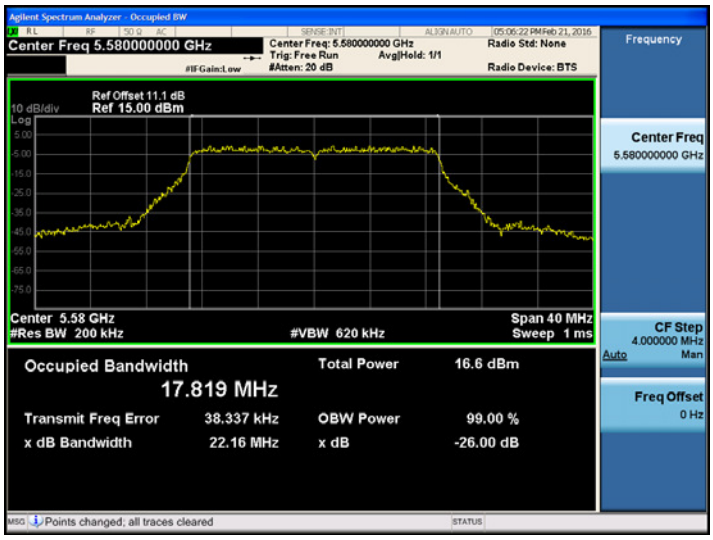
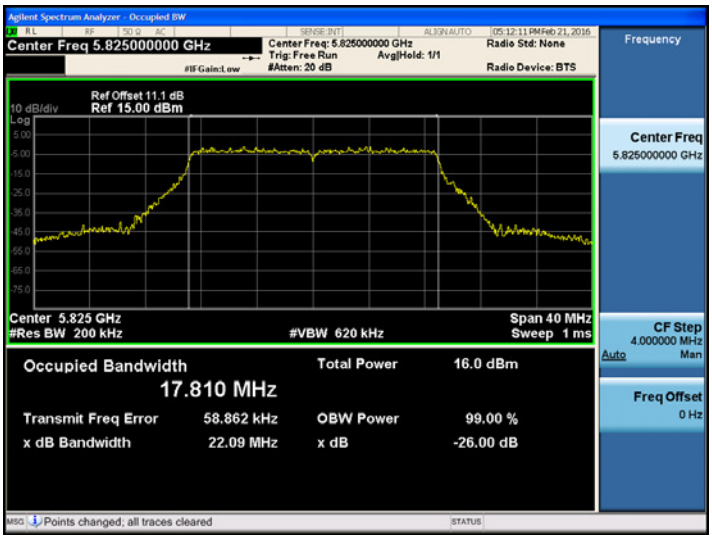
Conducted 26 dB Bandwidth Measurements for 802.11n 20M BW

802.11n(20MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	21.814	N/A	Pass
5580	116	22.159	N/A	Pass
5700	140	21.829	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	21.523	N/A	Pass
5785	157	21.764	N/A	Pass
5825	165	22.089	N/A	Pass

▣ TEST Plot for 802.11n _20MHz BW

802.11n_20 MHz BW UNII 1 BAND 26dB Bandwidth(CH 40)	802.11n_20 MHz BW UNII 2A BAND 26dB Bandwidth(CH 60)
	
802.11n_20 MHz BW UNII 2C BAND 26dB Bandwidth(CH 116)	**802.11n_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	42.356	N/A	Pass
5230	46	42.404	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	43.258	N/A	Pass
5310	62	42.908	N/A	Pass

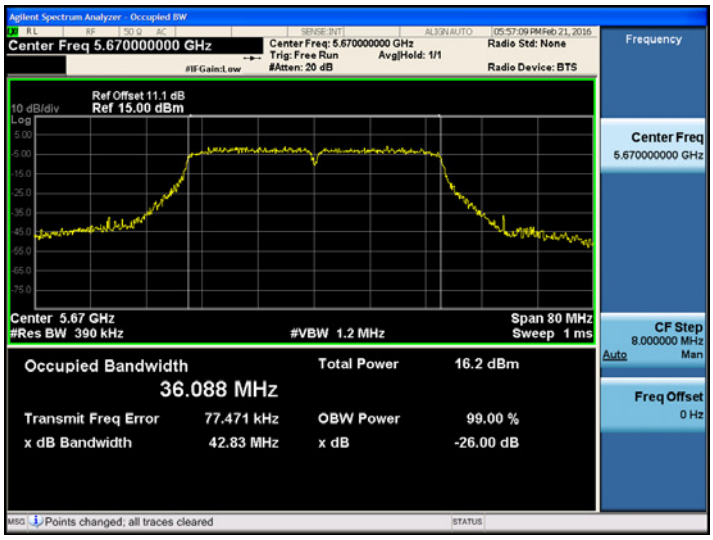
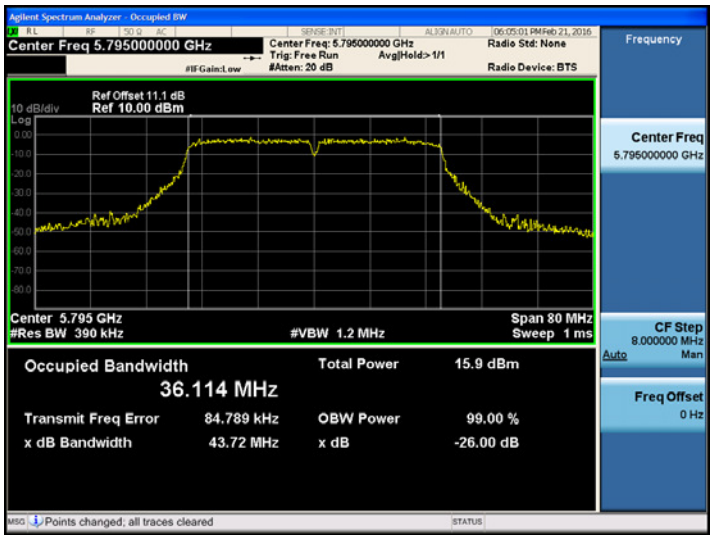
Conducted 26 dB Bandwidth Measurements for 802.11n_40 M BW

802.11n(40MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5510	102	42.616	N/A	Pass
5550	110	42.333	N/A	Pass
5670	134	42.826	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	42.174	N/A	Pass
5795	159	43.723	N/A	Pass

▣ TEST Plot for 802.11n_40MHz BW

802.11n_40 MHz BW UNII 1 BAND 26dB Bandwidth(CH 46)	802.11n_40 MHz BW UNII 2A BAND 26dB Bandwidth (CH 54)
802.11n_40 MHz BW UNII 2C BAND 26dB Bandwidth(CH 134)	**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_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	83.900	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	83.822	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	83.401	N/A	Pass
5610	122	83.200	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_80M BW

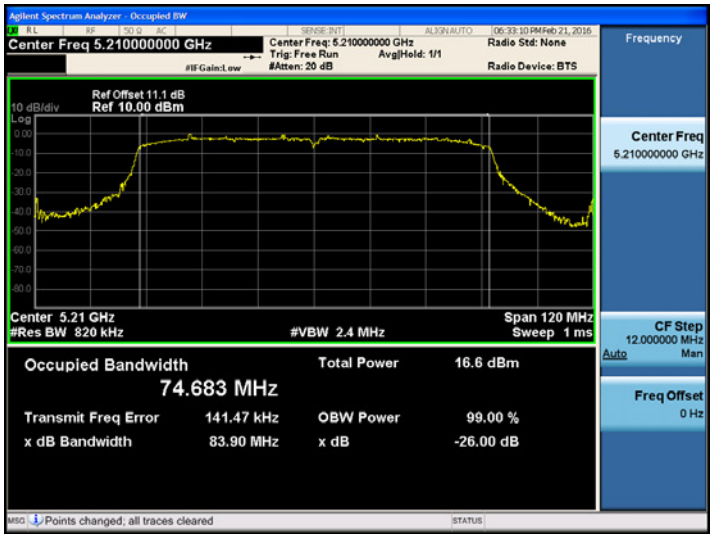
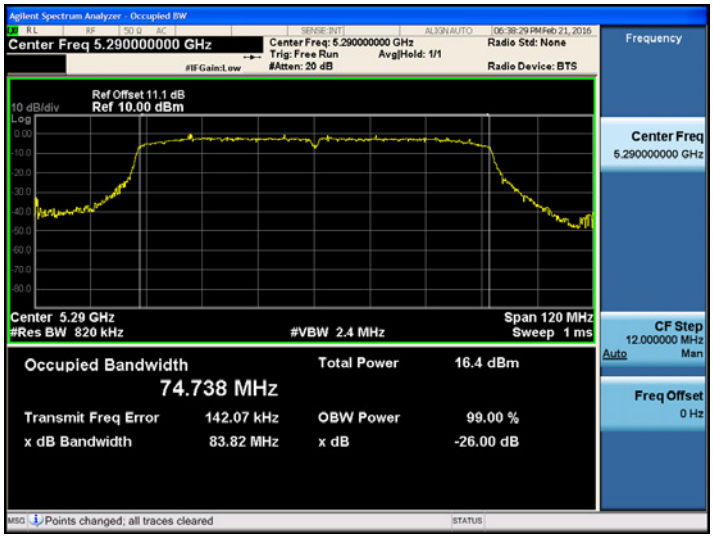
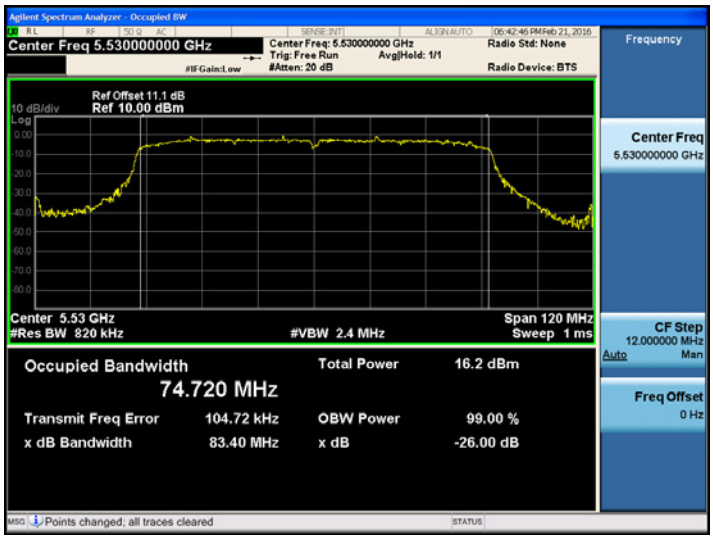
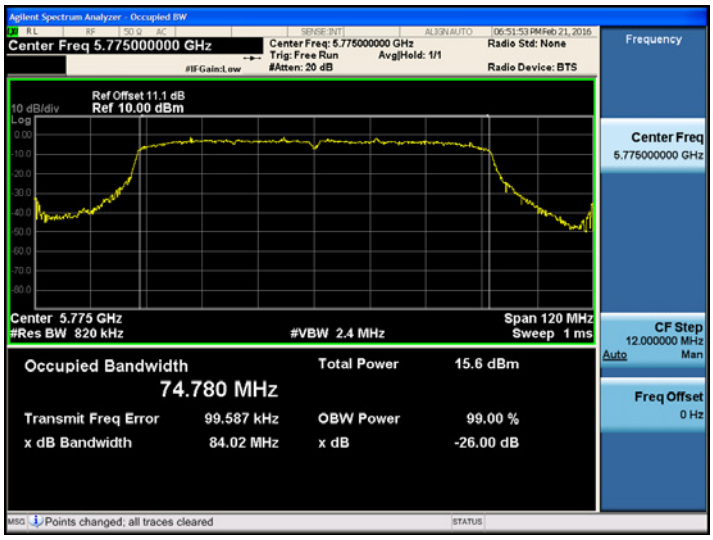
802.11ac(80M) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	84.021	N/A	Pass

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.

▣ 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 106)	**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 _20MHz BW

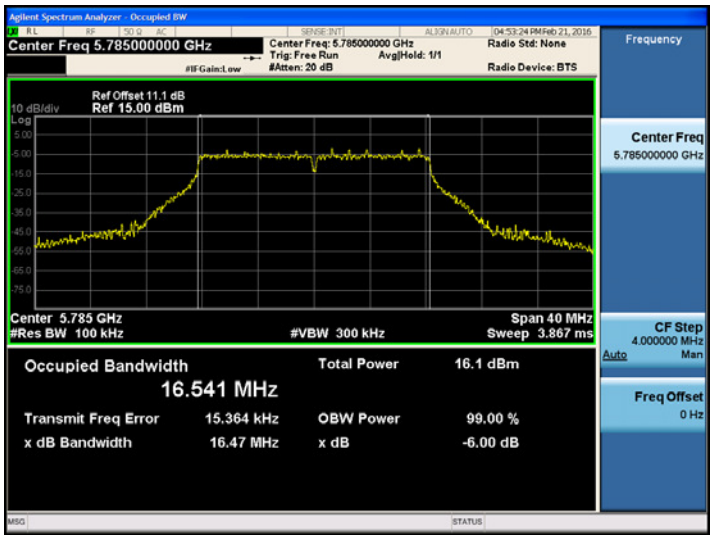
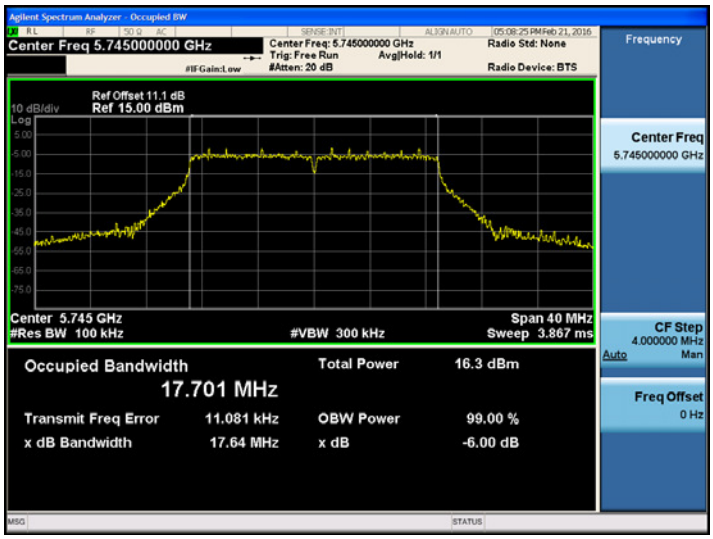
Conducted 6 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.427	0.5	Pass
5785	157	16.467	0.5	Pass
5825	165	16.425	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	17.642	0.5	Pass
5785	157	17.637	0.5	Pass
5825	165	17.631	0.5	Pass

▣ TEST Plot for 802.11a/n_20MHz BW

802.11a UNII 3 BAND 6dB Bandwidth (CH.157)	802.11n_20 MHz BW UNII 3 BAND 6dB Bandwidth(CH.149)
	

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

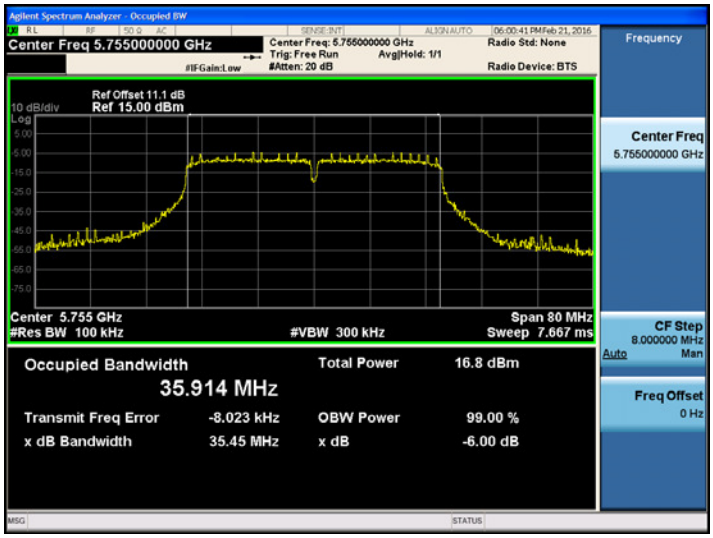
▣ TEST RESULTS for 802.11n_40MHz BW

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	35.446	0.5	Pass
5795	159	35.234	0.5	Pass

▣ TEST Plot for 802.11n _40MHz BW

802.11n_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.

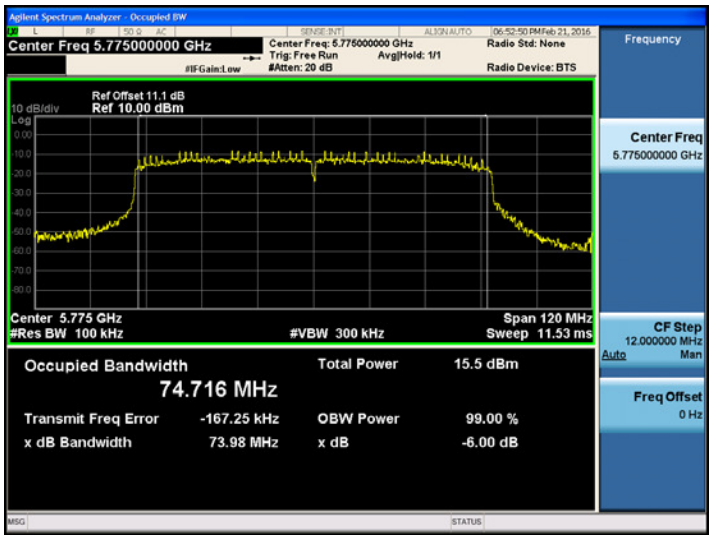
▣ TEST RESULTS for 802.11ac_80MHz BW

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	73.980	0.5	Pass

▣ TEST Plot for 802.11ac _80MHz BW

802.11ac_80 MHz BW UNII 3 BAND 6dB Bandwidth (CH.155)



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

8.3 OUTPUT POWER MEASUREMENT

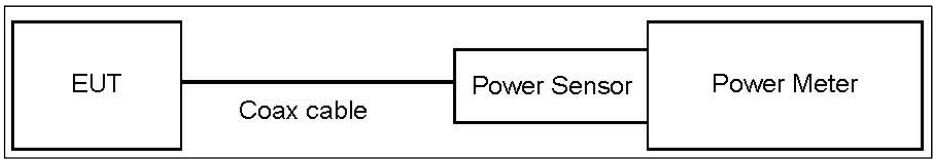
Test Requirements and limit, §15.407(a)(1)

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 01/08/2016).

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.

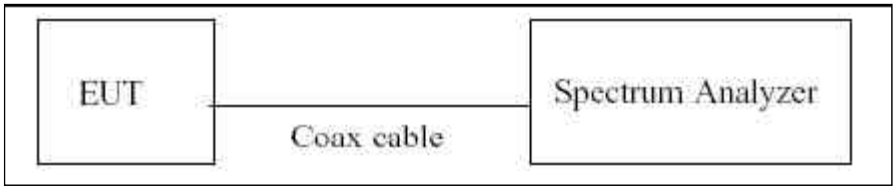
Note :

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

Band	Loss(dB)
UNII 1, 2A, 2C, 3	11.1

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

▣ 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 01/08/2016).

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 ≥ 3 MHz.
5. Number of points in sweep ≥ 2*span/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 10log(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	11.1

(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	10.32	0.29	10.61	23.98
		9	10.17	0.44	10.61	23.98
		12	10.04	0.55	10.59	23.98
		18	9.79	0.81	10.60	23.98
		24	9.33	1.05	10.38	23.98
		36	9.01	1.40	10.41	23.98
		48	8.64	1.81	10.45	23.98
		54	8.53	1.92	10.45	23.98
5200	40	6	10.30	0.29	10.59	23.98
		9	10.10	0.44	10.54	23.98
		12	10.02	0.55	10.57	23.98
		18	9.75	0.81	10.56	23.98
		24	9.53	1.05	10.58	23.98
		36	8.94	1.40	10.34	23.98
		48	8.59	1.81	10.40	23.98
		54	8.47	1.92	10.39	23.98
5240	48	6	10.14	0.29	10.43	23.98
		9	9.83	0.44	10.27	23.98
		12	9.72	0.55	10.27	23.98
		18	9.52	0.81	10.33	23.98
		24	9.10	1.05	10.15	23.98
		36	8.74	1.40	10.14	23.98
		48	8.41	1.81	10.22	23.98
		54	8.27	1.92	10.19	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	10.18	0.29	10.47	23.98
		9	10.02	0.44	10.46	23.98
		12	9.91	0.55	10.46	23.98
		18	9.68	0.81	10.49	23.98
		24	9.46	1.05	10.51	23.98
		36	8.90	1.40	10.30	23.98
		48	8.56	1.81	10.37	23.98
		54	8.44	1.92	10.36	23.98
5300	60	6	10.06	0.29	10.35	23.98
		9	9.94	0.44	10.38	23.98
		12	9.81	0.55	10.36	23.98
		18	9.57	0.81	10.38	23.98
		24	9.31	1.05	10.36	23.98
		36	8.95	1.40	10.35	23.98
		48	8.58	1.81	10.39	23.98
		54	8.30	1.92	10.22	23.98
5320	64	6	9.88	0.29	10.17	23.98
		9	9.72	0.44	10.16	23.98
		12	9.59	0.55	10.14	23.98
		18	9.38	0.81	10.19	23.98
		24	9.16	1.05	10.21	23.98
		36	8.58	1.40	9.98	23.98
		48	8.23	1.81	10.04	23.98
		54	8.29	1.92	10.21	23.98

802.11a _20MHz BW (UNII 2C)

▣ TEST RESULTS

Conducted Output Power Measurements (802.11a_20M Mode: 5500~5700)

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	9.87	0.29	10.16	23.98
		9	9.71	0.44	10.15	23.98
		12	9.61	0.55	10.16	23.98
		18	9.36	0.81	10.17	23.98
		24	9.14	1.05	10.19	23.98
		36	8.60	1.40	10.00	23.98
		48	8.23	1.81	10.04	23.98
		54	8.08	1.92	10.00	23.98
5580	116	6	9.92	0.29	10.21	23.98
		9	9.67	0.44	10.11	23.98
		12	9.54	0.55	10.09	23.98
		18	9.27	0.81	10.08	23.98
		24	9.01	1.05	10.06	23.98
		36	8.65	1.40	10.05	23.98
		48	8.19	1.81	10.00	23.98
		54	8.16	1.92	10.08	23.98
5700	140	6	9.72	0.29	10.01	23.98
		9	9.38	0.44	9.82	23.98
		12	9.30	0.55	9.85	23.98
		18	9.08	0.81	9.89	23.98
		24	8.86	1.05	9.91	23.98
		36	8.31	1.40	9.71	23.98
		48	7.97	1.81	9.78	23.98
		54	7.85	1.92	9.77	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	9.59	0.29	9.88	30
		9	9.47	0.44	9.91	30
		12	9.33	0.55	9.88	30
		18	8.91	0.81	9.72	30
		24	8.72	1.05	9.77	30
		36	8.34	1.40	9.74	30
		48	7.98	1.81	9.79	30
		54	7.86	1.92	9.78	30
5785	157	6	9.34	0.29	9.63	30
		9	9.21	0.44	9.65	30
		12	9.10	0.55	9.65	30
		18	8.87	0.81	9.68	30
		24	8.64	1.05	9.69	30
		36	8.22	1.40	9.62	30
		48	7.75	1.81	9.56	30
		54	7.61	1.92	9.53	30
5825	165	6	9.37	0.29	9.66	30
		9	9.07	0.44	9.51	30
		12	8.97	0.55	9.52	30
		18	8.72	0.81	9.53	30
		24	8.79	1.05	9.84	30
		36	8.36	1.40	9.76	30
		48	7.89	1.81	9.70	30
		54	7.78	1.92	9.70	30

802.11n _20MHz BW (UNII 1)

▣ TEST RESULTS

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

802.11n(20MHz) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	0	10.27	0.32	10.59	23.98
		1	9.97	0.61	10.58	23.98
		2	9.50	0.87	10.37	23.98
		3	9.26	1.10	10.36	23.98
		4	8.86	1.53	10.39	23.98
		5	8.35	1.88	10.23	23.98
		6	8.29	2.00	10.29	23.98
		7	8.26	2.16	10.42	23.98
5200	40	0	10.21	0.32	10.53	23.98
		1	9.95	0.61	10.56	23.98
		2	9.73	0.87	10.60	23.98
		3	9.01	1.10	10.11	23.98
		4	8.65	1.53	10.18	23.98
		5	8.34	1.88	10.22	23.98
		6	8.21	2.00	10.21	23.98
		7	8.06	2.16	10.22	23.98
5240	48	0	9.95	0.32	10.27	23.98
		1	9.71	0.61	10.32	23.98
		2	9.34	0.87	10.21	23.98
		3	9.11	1.10	10.21	23.98
		4	8.70	1.53	10.23	23.98
		5	8.36	1.88	10.24	23.98
		6	8.24	2.00	10.24	23.98
		7	8.07	2.16	10.23	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		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5260	52	0	10.23	0.32	10.55	23.98
		1	9.97	0.61	10.58	23.98
		2	9.56	0.87	10.43	23.98
		3	9.24	1.10	10.34	23.98
		4	8.89	1.53	10.42	23.98
		5	8.54	1.88	10.42	23.98
		6	8.23	2.00	10.23	23.98
		7	8.24	2.16	10.40	23.98
5300	60	0	10.04	0.32	10.36	23.98
		1	9.80	0.61	10.41	23.98
		2	9.52	0.87	10.39	23.98
		3	9.18	1.10	10.28	23.98
		4	8.71	1.53	10.24	23.98
		5	8.39	1.88	10.27	23.98
		6	8.26	2.00	10.26	23.98
		7	8.11	2.16	10.27	23.98
5320	64	0	9.90	0.32	10.22	23.98
		1	9.49	0.61	10.10	23.98
		2	9.24	0.87	10.11	23.98
		3	8.97	1.10	10.07	23.98
		4	8.60	1.53	10.13	23.98
		5	8.24	1.88	10.12	23.98
		6	8.10	2.00	10.10	23.98
		7	7.92	2.16	10.08	23.98

802.11n _20MHz BW (UNII 2C)

▣ TEST RESULTS

Conducted Output Power Measurements (802.11n_20M BW Mode: 5500~5700)

802.11n(20MHz) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5500	100	0	9.97	0.32	10.29	23.98
		1	9.51	0.61	10.12	23.98
		2	9.29	0.87	10.16	23.98
		3	9.04	1.10	10.14	23.98
		4	8.65	1.53	10.18	23.98
		5	8.29	1.88	10.17	23.98
		6	8.15	2.00	10.15	23.98
		7	8.00	2.16	10.16	23.98
5580	116	0	9.98	0.32	10.30	23.98
		1	9.73	0.61	10.34	23.98
		2	9.49	0.87	10.36	23.98
		3	9.07	1.10	10.17	23.98
		4	8.66	1.53	10.19	23.98
		5	8.30	1.88	10.18	23.98
		6	8.17	2.00	10.17	23.98
		7	8.02	2.16	10.18	23.98
5700	140	0	9.84	0.32	10.16	23.98
		1	9.43	0.61	10.04	23.98
		2	9.21	0.87	10.08	23.98
		3	8.95	1.10	10.05	23.98
		4	8.36	1.53	9.89	23.98
		5	8.02	1.88	9.90	23.98
		6	7.89	2.00	9.89	23.98
		7	7.75	2.16	9.91	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		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5745	149	0	9.69	0.32	10.01	30
		1	9.43	0.61	10.04	30
		2	9.16	0.87	10.03	30
		3	8.67	1.10	9.77	30
		4	8.33	1.53	9.86	30
		5	8.00	1.88	9.88	30
		6	7.88	2.00	9.88	30
		7	7.72	2.16	9.88	30
5785	157	0	9.38	0.32	9.70	30
		1	9.14	0.61	9.75	30
		2	8.90	0.87	9.77	30
		3	8.64	1.10	9.74	30
		4	8.02	1.53	9.55	30
		5	7.90	1.88	9.78	30
		6	7.76	2.00	9.76	30
		7	7.62	2.16	9.78	30
5825	165	0	9.50	0.32	9.82	30
		1	9.18	0.61	9.79	30
		2	8.93	0.87	9.80	30
		3	8.68	1.10	9.78	30
		4	8.17	1.53	9.70	30
		5	7.83	1.88	9.71	30
		6	7.67	2.00	9.67	30
		7	7.49	2.16	9.65	30

802.11n _40MHz BW (UNII 1)

▣ TEST RESULTS

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

802.11n(40MHz) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	0	9.80	0.63	10.44	23.98
		1	9.34	1.14	10.48	23.98
		2	8.85	1.58	10.43	23.98
		3	8.47	1.90	10.37	23.98
		4	7.76	2.47	10.23	23.98
		5	7.32	2.90	10.22	23.98
		6	7.13	3.17	10.30	23.98
		7	7.01	3.27	10.28	23.98
5230	46	0	9.84	0.63	10.47	23.98
		1	9.24	1.14	10.38	23.98
		2	8.78	1.58	10.36	23.98
		3	8.41	1.90	10.32	23.98
		4	7.85	2.47	10.32	23.98
		5	7.28	2.90	10.19	23.98
		6	7.02	3.17	10.20	23.98
		7	6.92	3.27	10.19	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		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5270	54	0	9.65	0.63	10.29	23.98
		1	9.25	1.14	10.39	23.98
		2	8.87	1.58	10.45	23.98
		3	8.41	1.90	10.31	23.98
		4	8.00	2.47	10.46	23.98
		5	7.41	2.90	10.32	23.98
		6	7.10	3.17	10.27	23.98
		7	6.89	3.27	10.16	23.98
5310	62	0	9.76	0.63	10.39	23.98
		1	9.28	1.14	10.42	23.98
		2	8.44	1.58	10.02	23.98
		3	8.12	1.90	10.03	23.98
		4	7.51	2.47	9.98	23.98
		5	7.07	2.90	9.97	23.98
		6	6.71	3.17	9.88	23.98
		7	6.61	3.27	9.89	23.98

802.11n _40MHz BW (UNII 2C)

▣ TEST RESULTS

Conducted Output Power Measurements (802.11n_40M BW Mode: 5510~5670)

802.11n(40MHz) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5510	102	0	9.32	0.63	9.95	23.98
		1	8.54	1.14	9.68	23.98
		2	8.24	1.58	9.82	23.98
		3	7.70	1.90	9.60	23.98
		4	7.04	2.47	9.51	23.98
		5	6.68	2.90	9.58	23.98
		6	6.43	3.17	9.60	23.98
		7	6.36	3.27	9.63	23.98
5550	110	0	9.38	0.63	10.01	23.98
		1	8.74	1.14	9.87	23.98
		2	8.33	1.58	9.91	23.98
		3	7.95	1.90	9.85	23.98
		4	7.21	2.47	9.68	23.98
		5	6.82	2.90	9.73	23.98
		6	6.57	3.17	9.75	23.98
		7	6.48	3.27	9.75	23.98
5670	134	0	8.95	0.63	9.58	23.98
		1	8.46	1.14	9.60	23.98
		2	7.91	1.58	9.49	23.98
		3	7.50	1.90	9.40	23.98
		4	6.97	2.47	9.44	23.98
		5	6.34	2.90	9.25	23.98
		6	6.24	3.17	9.41	23.98
		7	6.06	3.27	9.33	23.98

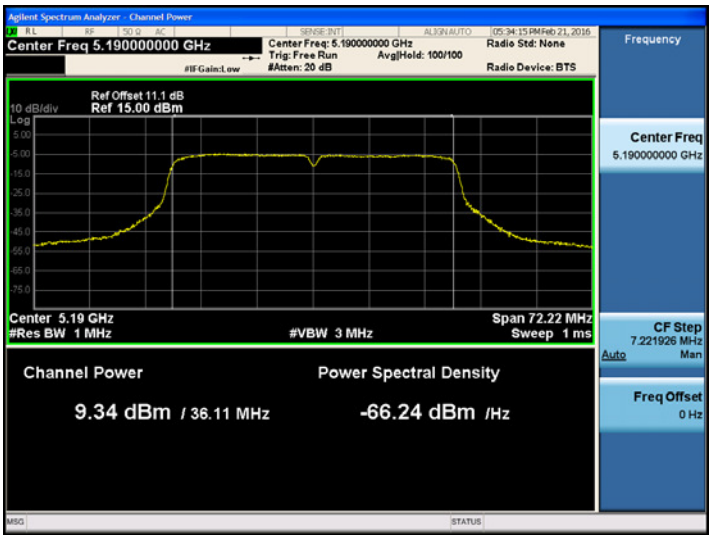
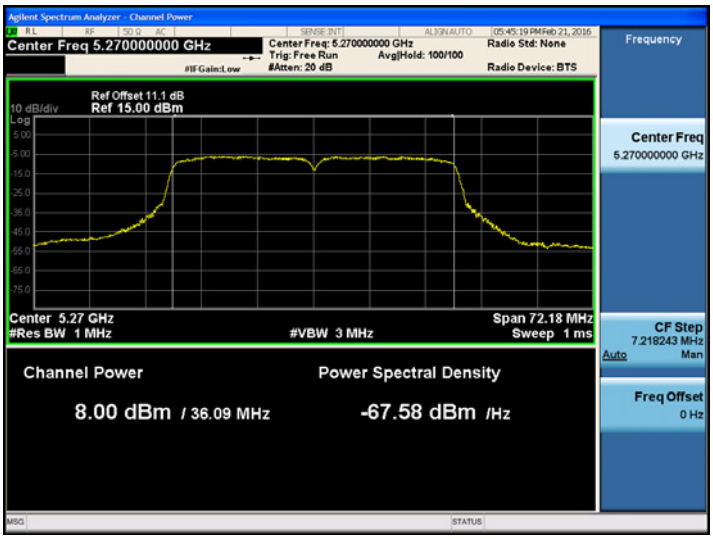
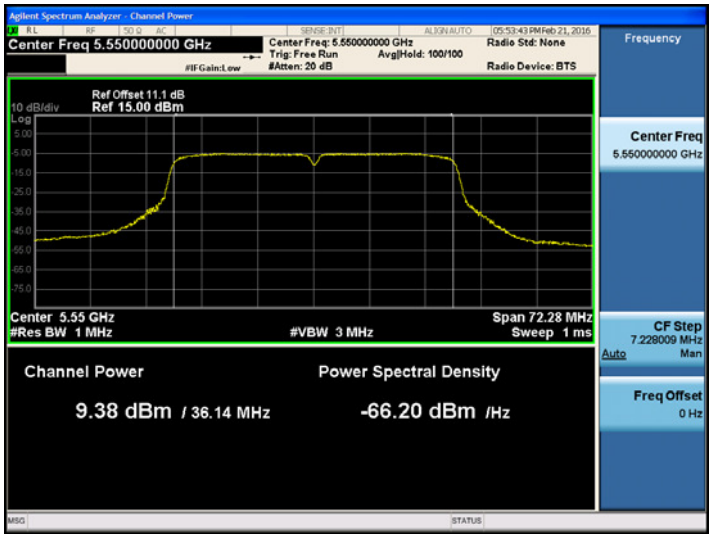
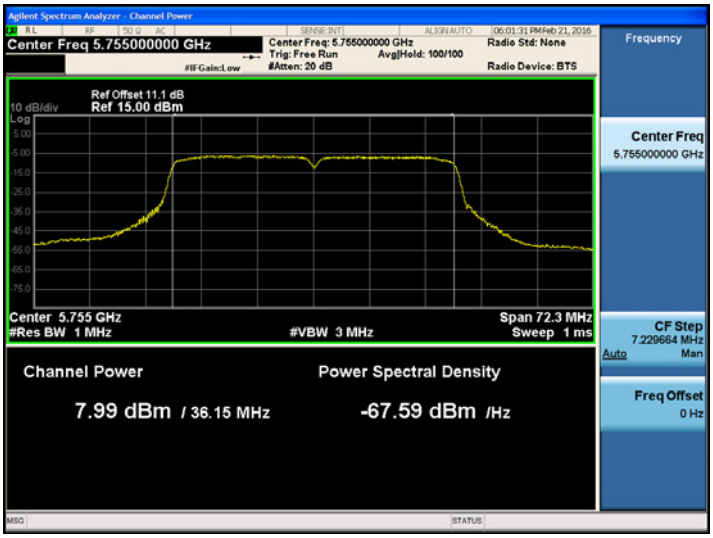
802.11n_40MHz BW (UNII 3)

▣ TEST RESULTS

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

802.11n(40MHz) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5755	151	0	8.88	0.63	9.51	30
		1	8.35	1.14	9.49	30
		2	7.99	1.58	9.57	30
		3	7.32	1.90	9.23	30
		4	6.89	2.47	9.36	30
		5	6.46	2.90	9.37	30
		6	6.28	3.17	9.45	30
		7	5.91	3.27	9.18	30
5795	159	0	8.77	0.63	9.41	30
		1	8.05	1.14	9.18	30
		2	7.75	1.58	9.33	30
		3	7.27	1.90	9.17	30
		4	6.61	2.47	9.08	30
		5	6.26	2.90	9.17	30
		6	5.86	3.17	9.03	30
		7	5.78	3.27	9.05	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 MCS1	802.11n_40 MHz BW UNII 2A BAND Average Power (5270 MHz ~5310 MHz) CH 54 MCS4
	
802.11n_40 MHz BW UNII 2C BAND Average Power (5510 MHz ~5710 MHz) CH 110 MCS0	**802.11n_40 MHz BW UNII 3 BAND Average Power (5755 MHz ~5795 MHz) CH 151 MCS2**
	

802.11ac_80 MHz BW (UNII 1)

▣ TEST RESULTS

Conducted Output Power Measurements (802.11ac_80MHz Mode: 5210)

802.11ac(80MHz) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5210	42	0	8.06	1.47	9.53	22.09
		1	7.24	2.27	9.51	22.09
		2	6.86	2.79	9.65	22.09
		3	6.35	3.17	9.52	22.09
		4	5.73	3.65	9.38	22.09
		5	5.48	3.93	9.41	22.09
		6	5.30	4.09	9.39	22.09
		7	5.30	4.13	9.43	22.09
		8	5.29	4.23	9.52	22.09
		9	4.95	4.45	9.40	22.09

802.11ac_80MHz BW (UNII 2A)

▣ TEST RESULTS

Conducted Output Power Measurements (802.11ac_80MHz Mode: 5290)

802.11ac(80MHz) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5290	58	0	7.95	1.47	9.43	23.98
		1	7.00	2.27	9.27	23.98
		2	6.55	2.79	9.34	23.98
		3	6.18	3.17	9.35	23.98
		4	5.71	3.65	9.35	23.98
		5	5.44	3.93	9.36	23.98
		6	5.11	4.09	9.20	23.98
		7	5.28	4.13	9.41	23.98
		8	5.02	4.23	9.26	23.98
		9	4.78	4.45	9.23	23.98

802.11ac _80MHz BW (UNII 2C)

▣ TEST RESULTS

Conducted Output Power Measurements (802.11ac_80MHz Mode: 5530 ~ 5610 MHz)

802.11ac(80MHz) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5530	106	0	7.61	1.47	9.08	23.98
		1	6.58	2.27	8.85	23.98
		2	6.14	2.79	8.93	23.98
		3	5.69	3.17	8.86	23.98
		4	5.26	3.65	8.91	23.98
		5	5.09	3.93	9.02	23.98
		6	4.89	4.09	8.98	23.98
		7	4.93	4.13	9.06	23.98
		8	4.79	4.23	9.02	23.98
		9	4.59	4.45	9.04	23.98
5610	122	0	7.39	1.47	8.86	23.98
		1	6.60	2.27	8.87	23.98
		2	6.17	2.79	8.96	23.98
		3	5.71	3.17	8.88	23.98
		4	5.06	3.65	8.70	23.98
		5	4.87	3.93	8.80	23.98
		6	4.67	4.09	8.76	23.98
		7	4.71	4.13	8.84	23.98
		8	4.56	4.23	8.79	23.98
		9	4.39	4.45	8.84	23.98

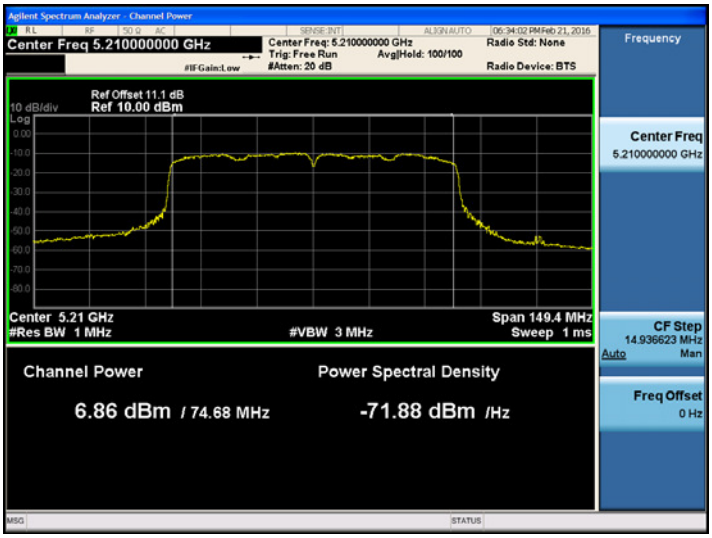
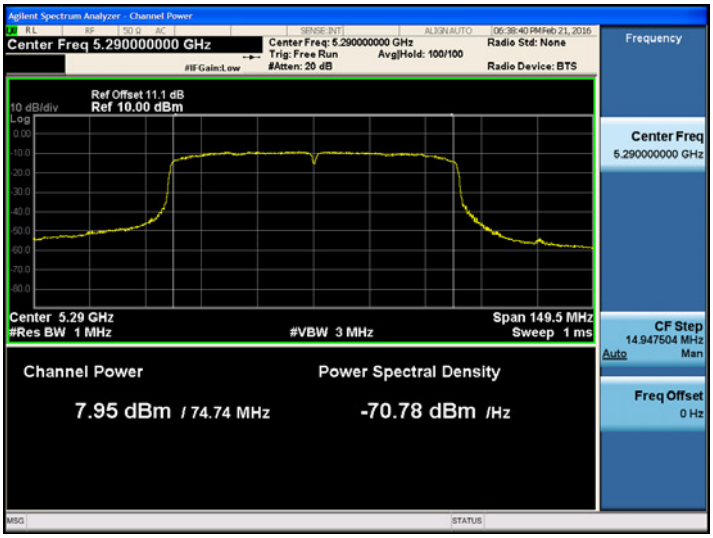
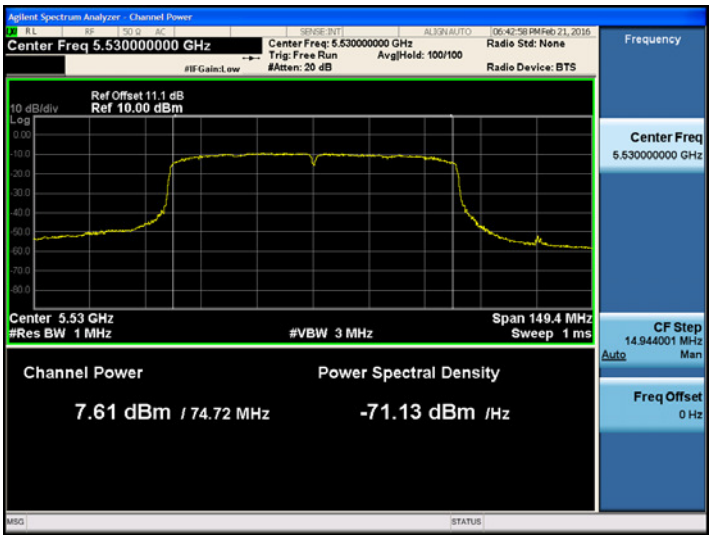
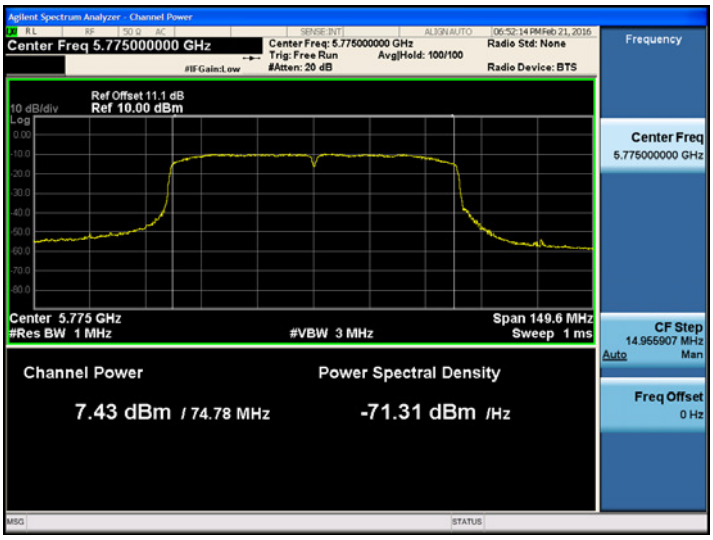
802.11ac _80MHz BW (UNII 3)

▣ TEST RESULTS

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

802.11ac(80MHz) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5775	155	0	7.43	1.47	8.90	30
		1	6.48	2.27	8.75	30
		2	5.93	2.79	8.72	30
		3	5.40	3.17	8.58	30
		4	4.91	3.65	8.55	30
		5	4.71	3.93	8.64	30
		6	4.46	4.09	8.55	30
		7	4.49	4.13	8.61	30
		8	4.45	4.23	8.68	30
		9	4.27	4.45	8.72	30

▣ TEST Plot for 802.11ac_80MHz BW

802.11ac_80 MHz BW UNII 1 BAND Average Power (5210 MHz) CH 42 MCS2	802.11ac_80 MHz BW UNII 2A BAND Average Power (5290 MHz) CH 58 MCS0
	
802.11ac_80 MHz BW UNII 2C BAND Average Power (5530 ~ 5690 MHz) CH 106 MCS0	**802.11ac_80 MHz BW UNII 3 BAND Average Power (5755 MHz) CH 155 MCS0**
	

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)

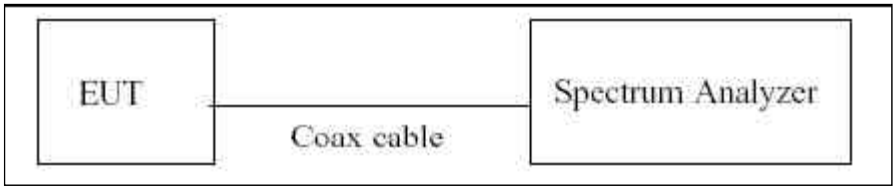
Power Spectral Density

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.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

We tested according to Method in KDB 789033(issued 01/08/2016).

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 ≥ 3 MHz
4. Number of points in sweep ≥ 2*span/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	11.1

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

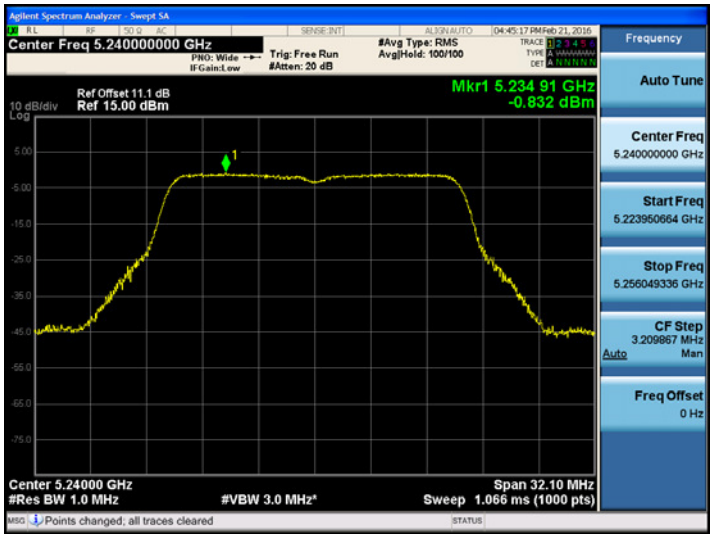
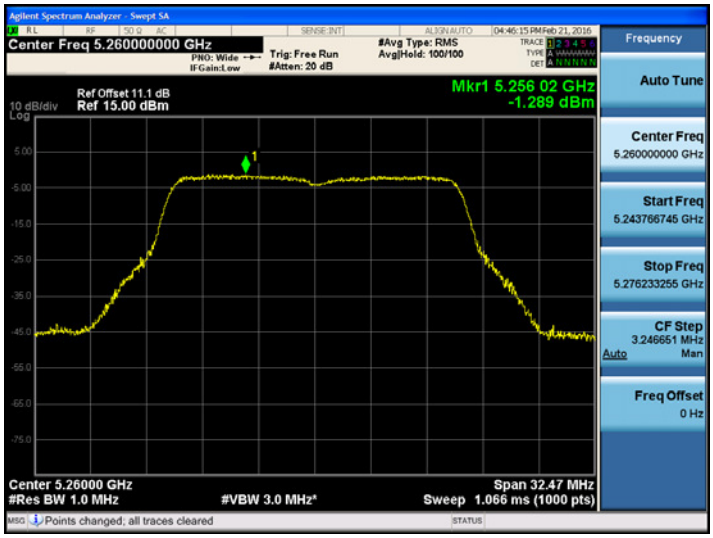
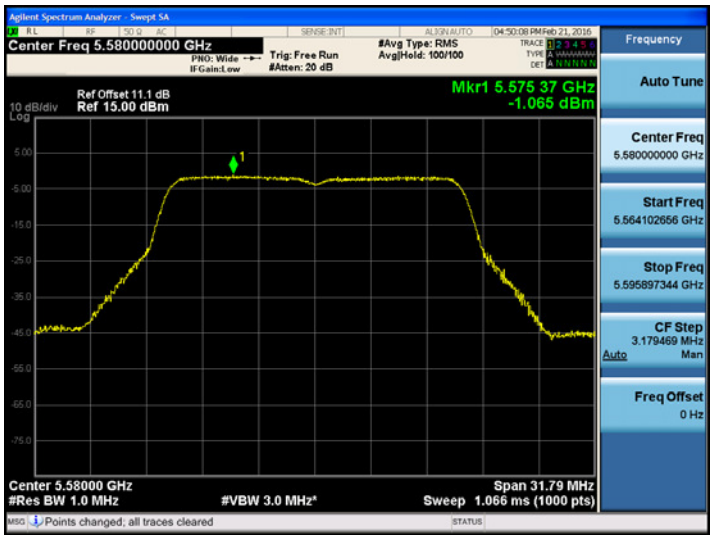
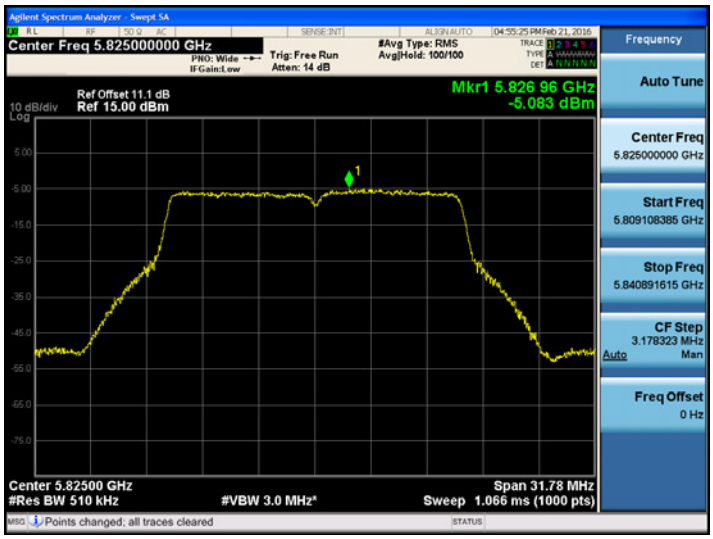
▣ 802.11a_20MHz BW

▣ 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	-1.031	0.288	-0.743	11	Pass
5200	40		-0.874	0.288	-0.586		Pass
5240	48		-0.832	0.288	-0.544		Pass
5260	52		-1.289	1.047	-0.242	11	Pass
5300	60		-2.054	1.806	-0.248		Pass
5320	64		-2.557	1.922	-0.635		Pass
5500	100		-1.950	1.047	-0.903	11	Pass
5580	116		-1.065	0.288	-0.777		Pass
5700	140		-1.609	0.288	-1.321		Pass
5745	149		-4.623	0.435	-4.188	30	Pass
5785	157		-5.363	1.047	-4.316		Pass
5825	165		-5.083	1.047	-4.036		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 52
	
802.11a_20MHz BW UNII 2C BAND PSD CH 116	**802.11a_20MHz BW UNII 3 BAND PSD CH 165**
	

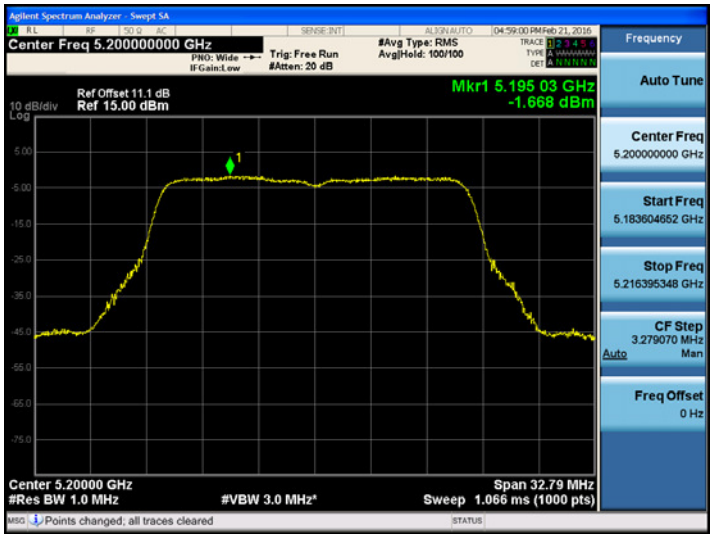
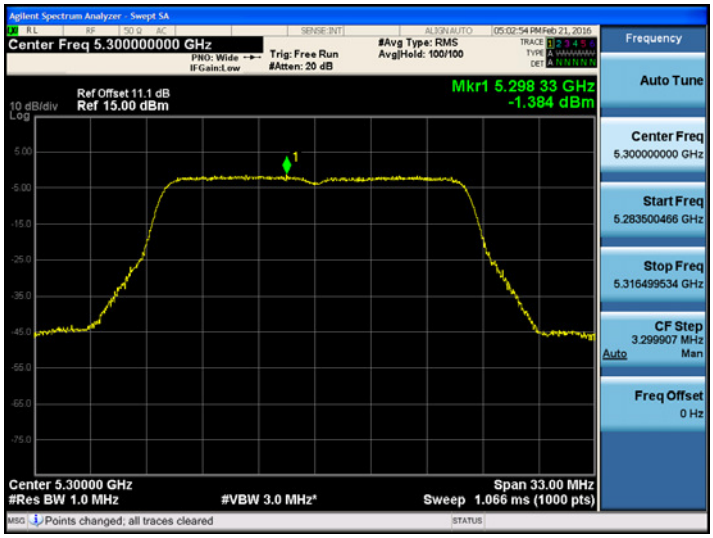
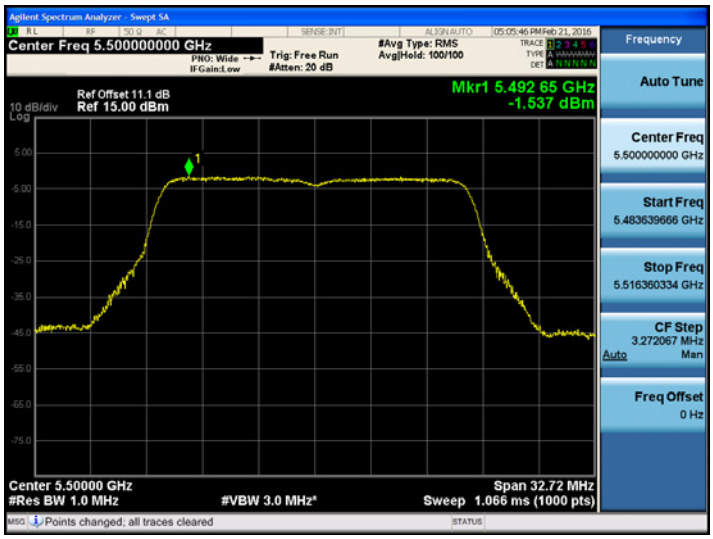
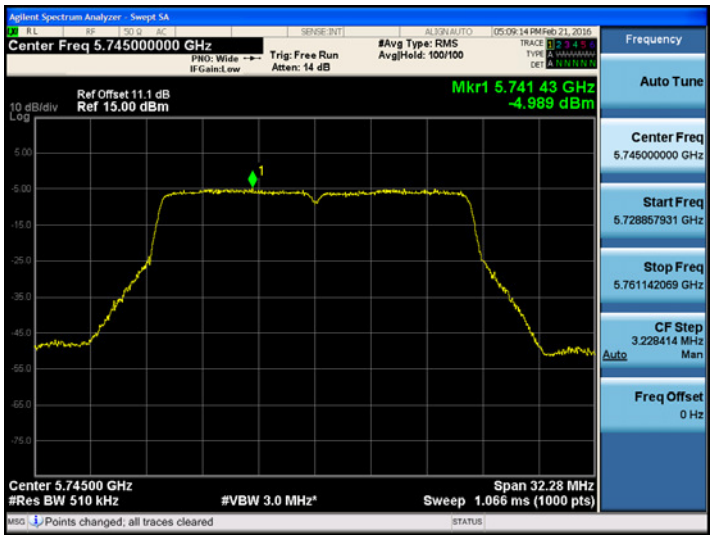
▣802.11n_20MHz BW

▣ 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	-1.405	0.320	-1.085	11	Pass
5200	40		-1.668	0.869	-0.799		Pass
5240	48		-1.621	0.607	-1.014		Pass
5260	52		-1.578	0.607	-0.971	11	Pass
5300	60		-1.384	0.607	-0.777		Pass
5320	64		-1.398	0.320	-1.078		Pass
5500	100		-1.537	0.320	-1.217	11	Pass
5580	116		-2.210	0.869	-1.341		Pass
5700	140		-1.941	0.320	-1.621		Pass
5745	149		-4.989	0.607	-4.382	30	Pass
5785	157		-6.635	2.161	-4.474		Pass
5825	165		-5.050	0.320	-4.730		Pass

▣ TEST Plot for 802.11n 20MHz BW

802.11n_20MHz BW UNII 1 BAND PSD CH 40	802.11n_20MHz BW UNII 2A BAND PSD CH 60
	
802.11n_20MHz BW UNII 2C BAND PSD CH 100	**802.11n_20MHz BW UNII 3 BAND PSD CH 149**
	

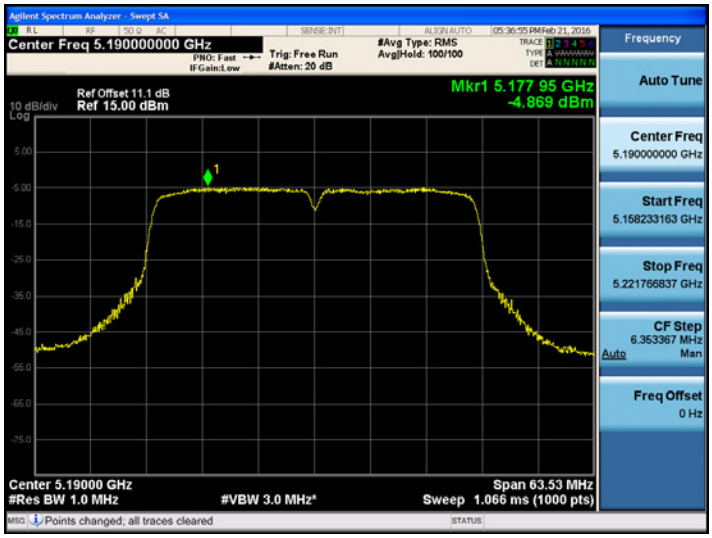
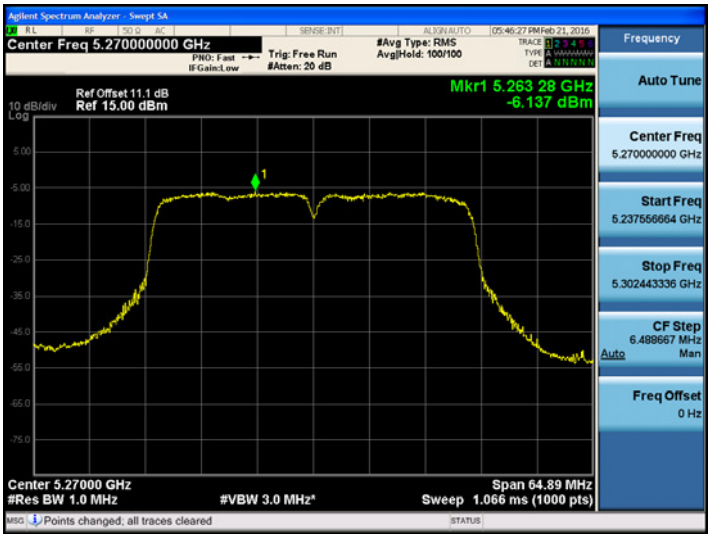
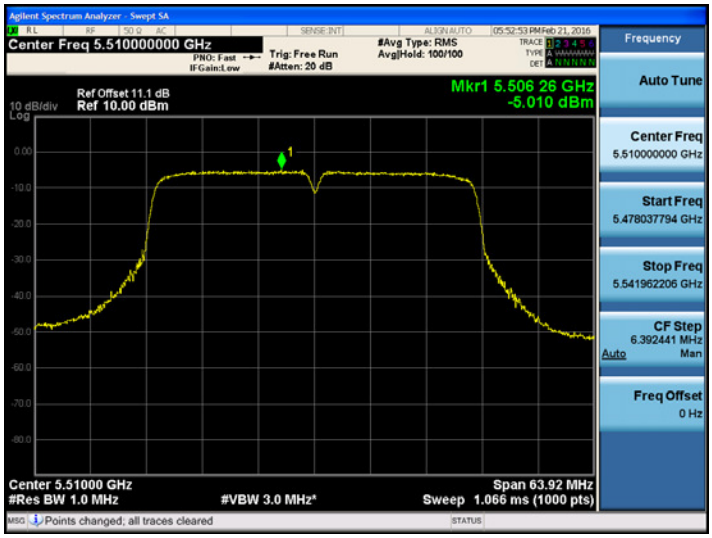
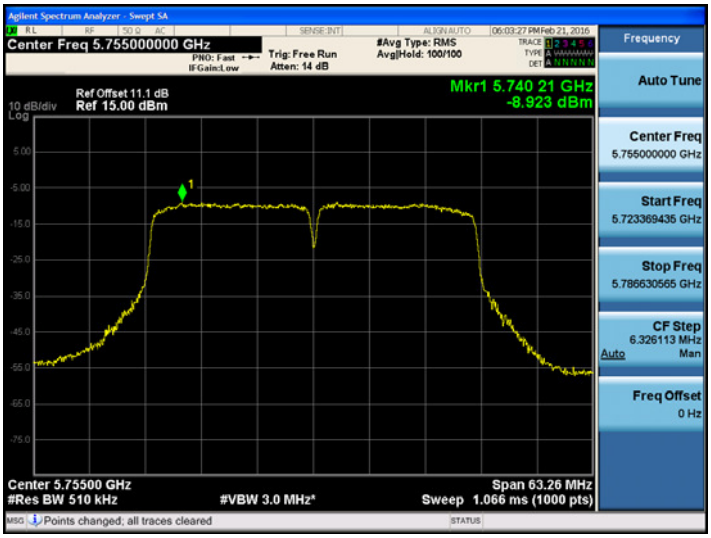
▣ 802.11n_40MHz BW

▣ 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	-4.869	1.136	-3.733	11	Pass
5230	46		-4.491	0.634	-3.857		Pass
5270	54		-6.137	2.469	-3.668	11	Pass
5310	62		-5.284	1.136	-4.148		Pass
5510	102		-5.010	0.634	-4.376	11	Pass
5550	110		-5.013	0.634	-4.379		Pass
5670	134		-5.853	1.136	-4.717		Pass
5755	151		-8.923	1.579	-7.344	30	Pass
5795	159		-8.318	0.634	-7.684		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 151**
	

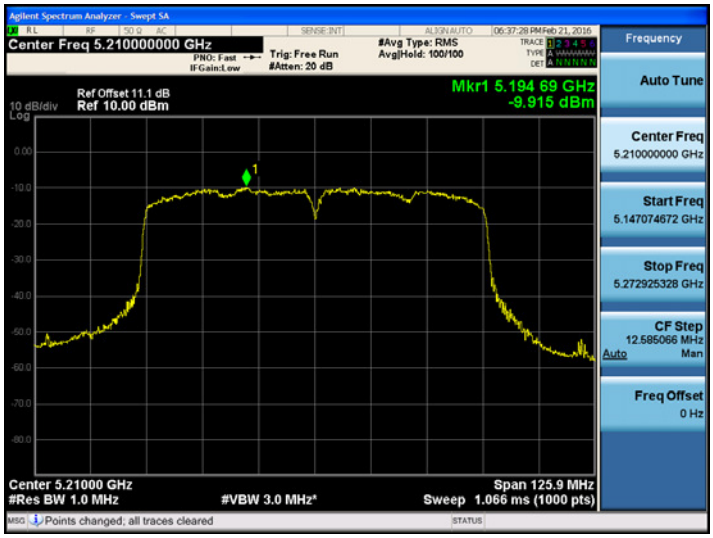
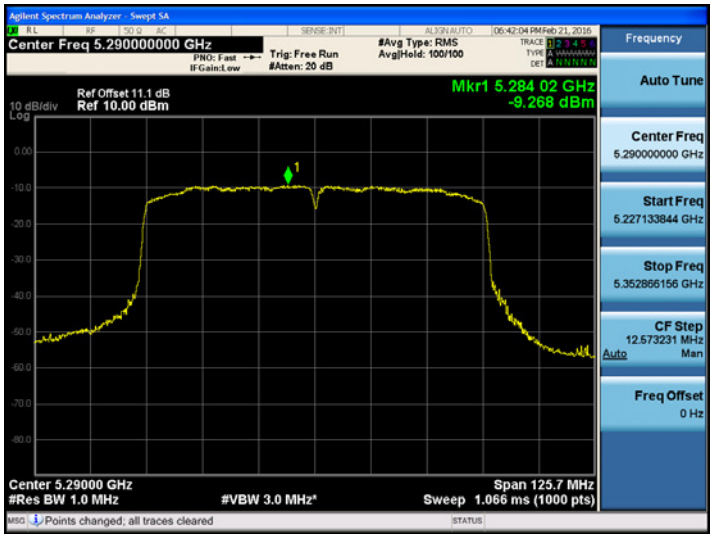
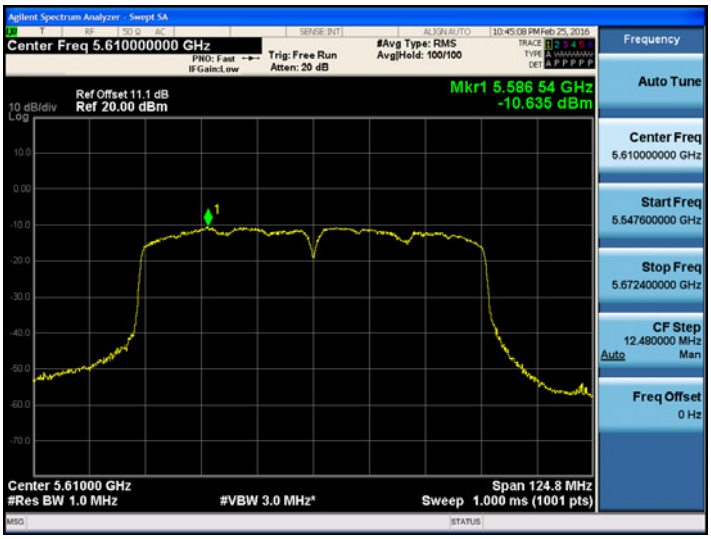
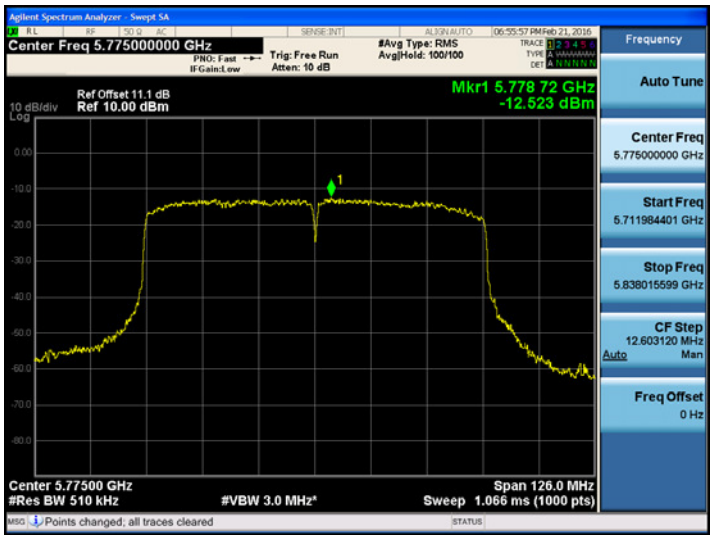
▣ 802.11ac_80MHz BW

▣ 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	-9.915	2.790	-7.125	11	Pass
5290	58		-9.268	1.471	-7.797	11	Pass
5530	106		-9.428	1.471	-7.957	11	Pass
5610	122		-10.635	2.790	-7.845		Pass
5775	155		-12.523	1.471	-11.052	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 122	**802.11ac_80MHz BW UNII 3 BAND PSD CH 155**
	

8.5 FREQUENCY STABILITY.

The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between -30 ℃ and 50 ℃. The temperature was incremented by 10 ℃ 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. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5180015.48	15.48
100%		-30	5179997.58	-2.42
100%		-20	5180010.23	10.23
100%		-10	5180004.84	4.84
100%		0	5180009.23	9.23
100%		+10	5180012.54	12.54
100%		+30	5180022.11	22.11
100%		+40	5180024.53	24.53
100%		+50	5180025.32	25.32
115%	4.2	+20	5180019.32	19.32
Batt. Endpoint	3.4	+20	5180015.48	15.48

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. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5260016.38	16.38
100%		-30	5259995.11	-4.89
100%		-20	5259998.77	-1.23
100%		-10	5260002.54	2.54
100%		0	5260007.44	7.44
100%		+10	5260012.02	12.02
100%		+30	5260020.32	20.32
100%		+40	5260024.88	24.88
100%		+50	5260027.99	27.99
115%	4.2	+20	5260019.76	19.76
Batt. Endpoint	3.4	+20	5260016.38	16.38

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. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5500017.21	17.21
100%		-30	5499995.78	-4.22
100%		-20	5499997.77	-2.23
100%		-10	5500003.65	3.65
100%		0	5500009.75	9.75
100%		+10	5500013.22	13.22
100%		+30	5500021.02	21.022
100%		+40	5500026.11	26.11
100%		+50	5500028.88	28.88
115%	4.2	+20	5500021.74	21.74
Batt. Endpoint	3.4	+20	5500017.21	17.21

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. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5745017.54	17.54
100%		-30	5744993.45	-6.55
100%		-20	5744998.32	-1.68
100%		-10	5745004.43	4.43
100%		0	5745009.52	9.52
100%		+10	5745015.11	15.11
100%		+30	5745023.02	23.02
100%		+40	5745026.67	26.67
100%		+50	5745029.57	29.57
115%	4.2	+20	5745019.84	19.84
Batt. Endpoint	3.4	+20	5745017.54	17.54

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. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5190015.57	15.57
100%		-30	5189992.70	-7.30
100%		-20	5189995.45	-4.55
100%		-10	5190001.02	1.02
100%		0	5190006.24	6.24
100%		+10	5190011.33	11.33
100%		+30	5190019.32	19.32
100%		+40	5190025.84	25.84
100%		+50	5190028.54	28.54
115%	4.2	+20	5190016.77	16.77
Batt. Endpoint	3.4	+20	5190015.57	15.57

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. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5270016.02	16.02
100%		-30	5269992.98	-7.02
100%		-20	5269997.67	-2.33
100%		-10	5270002.84	2.84
100%		0	5270007.44	7.44
100%		+10	5270011.21	11.21
100%		+30	5270020.11	20.11
100%		+40	5270024.23	24.23
100%		+50	5270029.32	29.32
115%	4.2	+20	5270019.84	19.84
Batt. Endpoint	3.4	+20	5270016.02	16.02

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. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5510016.88	16.88
100%		-30	5509995.12	-4.88
100%		-20	5509997.12	-2.88
100%		-10	5510001.79	1.79
100%		0	5510006.54	6.54
100%		+10	5510011.59	11.59
100%		+30	5510021.02	21.02
100%		+40	5510024.38	24.38
100%		+50	5510029.84	29.84
115%	4.2	+20	5510018.99	18.99
Batt. Endpoint	3.4	+20	5510016.88	16.88

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. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5755017.83	17.83
100%		-30	5754993.46	-6.54
100%		-20	5754995.82	-4.18
100%		-10	5754998.95	-1.05
100%		0	5755006.55	6.55
100%		+10	5755011.57	11.57
100%		+30	5755021.53	21.53
100%		+40	5755026.33	26.33
100%		+50	5755029.05	29.05
115%	4.2	+20	5755020.01	20.01
Batt. Endpoint	3.4	+20	5755017.83	17.83

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. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210015.35	15.35
100%		-30	5209992.11	-7.89
100%		-20	5209996.78	-3.22
100%		-10	5210002.02	2.02
100%		0	5210007.64	7.64
100%		+10	5210013.33	13.33
100%		+30	5210021.05	21.05
100%		+40	5210025.74	25.74
100%		+50	5210027.65	27.65
115%	4.2	+20	5210023.22	23.22
Batt. Endpoint	3.4	+20	5210015.35	15.35

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.

OPERATING BAND: UNII Band 2A

OPERATING FREQUENCY: 5,290,000,000 Hz

CHANNEL: 58

REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290016.11	16.11
100%		-30	5289992.58	-7.42
100%		-20	5289995.89	-4.11
100%		-10	5290001.20	1.2
100%		0	5290005.42	5.42
100%		+10	5290012.38	12.38
100%		+30	5290019.28	19.28
100%		+40	5290026.23	26.23
100%		+50	5290029.77	29.77
115%	4.2	+20	5290020.17	20.17
Batt. Endpoint	3.4	+20	5290016.11	16.11

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. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530016.58	16.58
100%		-30	5529991.78	-8.22
100%		-20	5529996.06	-3.94
100%		-10	5530001.84	1.84
100%		0	5530008.99	8.99
100%		+10	5530013.24	13.24
100%		+30	5530021.33	21.33
100%		+40	5530025.02	25.02
100%		+50	5530028.45	28.45
115%	4.2	+20	5530019.88	19.88
Batt. Endpoint	3.4	+20	5530016.58	16.58

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. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775017.34	17.34
100%		-30	5774993.41	-6.59
100%		-20	5774998.78	-1.22
100%		-10	5775003.21	3.21
100%		0	5775009.44	9.44
100%		+10	5775015.57	15.57
100%		+30	5775021.32	21.32
100%		+40	5775023.27	23.27
100%		+50	5775026.03	26.03
115%	4.2	+20	5775018.33	18.33
Batt. Endpoint	3.4	+20	5775017.34	17.34

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.

8.6 RADIATED MEASUREMENT

8.6.1 RADIATED SPURIOUS EMISSIONS.

Test Requirements and limit, §15.205, §15.209, §15.407

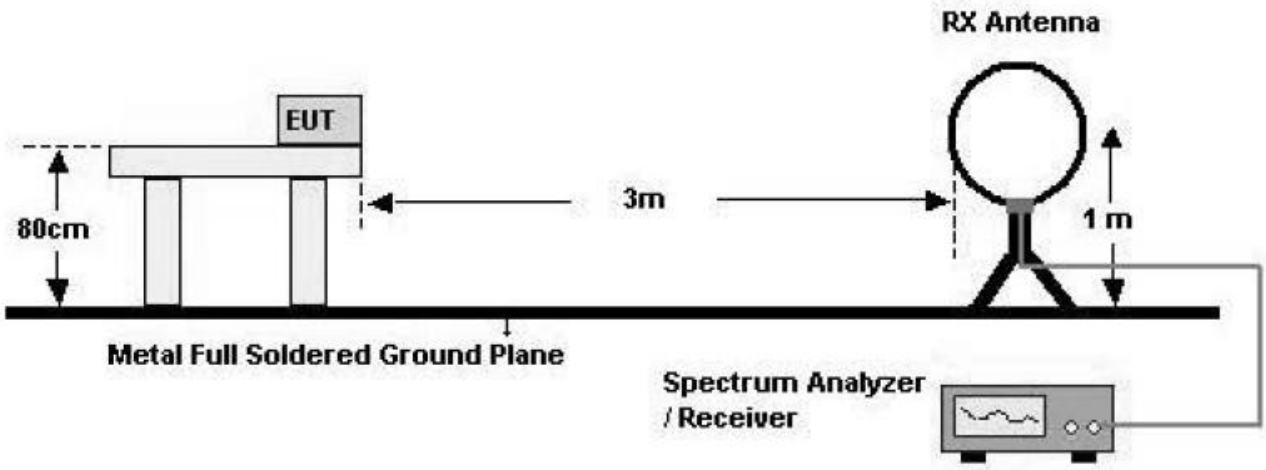
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

▣ §15.407, KDB 789033 D02

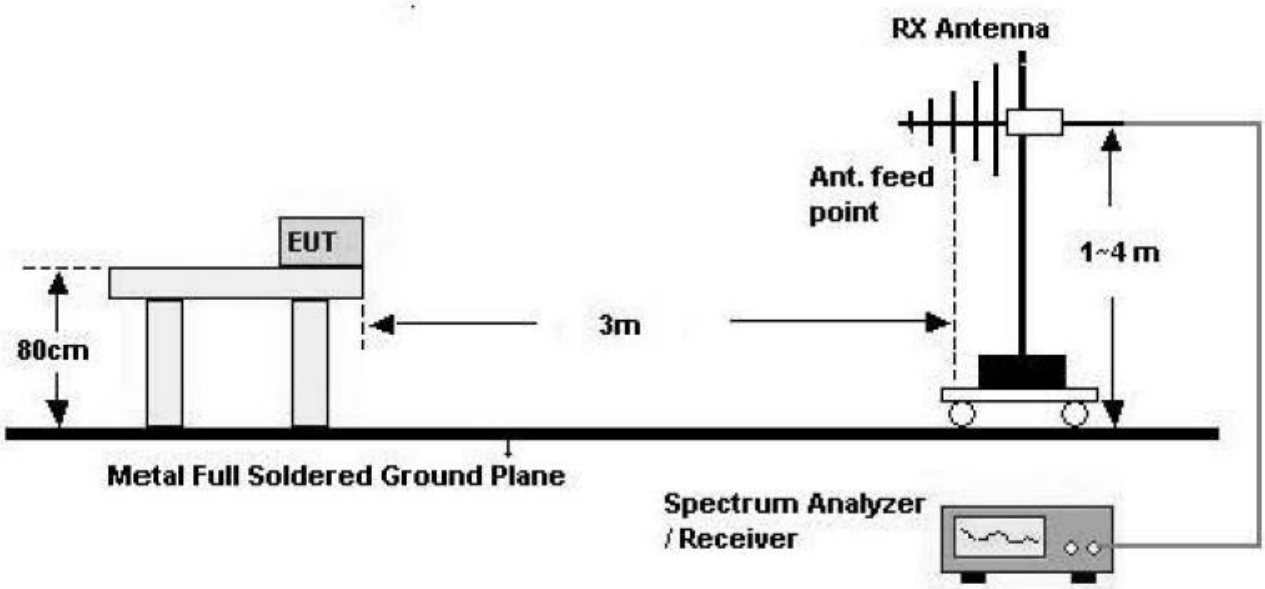
All harmonics that do not lie in a restricted band are subject to a peak limit of -27 dBm/MHz. At a distance of 3 meters the field strength limit in dBμV/m can be determined by adding a “conversion” factor of 95.2 dB to the EIRP limit of -27 dBm/MHz to obtain the limit for out of band spurious emissions of 68.2 dBμV/m. Espectally, for transmitter operating in the 5725 Mhz – 5850 MHz : all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequency 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

Test Configuration

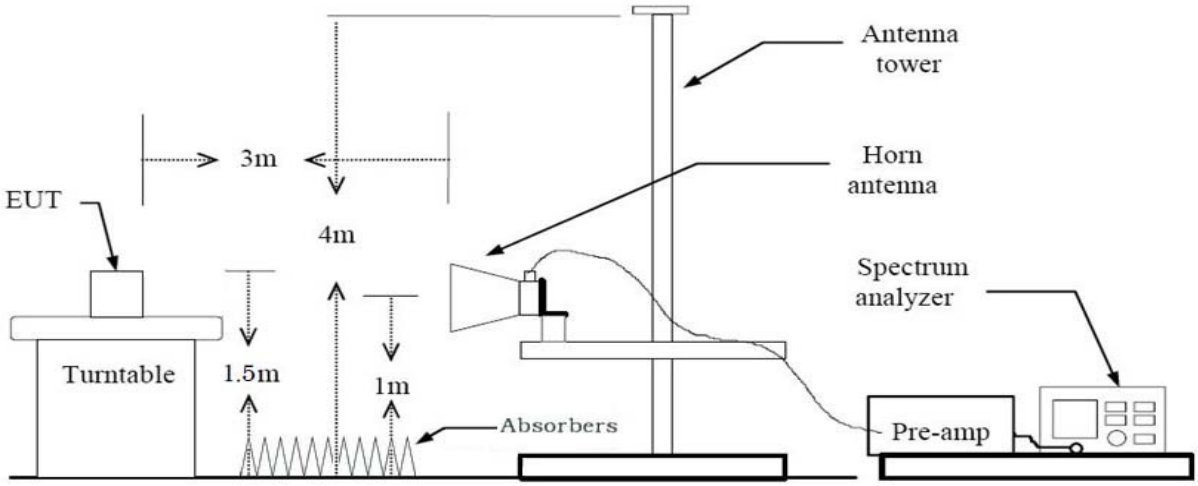
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE USED

ANSI C63.10:2013

Method G)5) in KDB 789033, issued 01/08/2016 (Peak)

Method G)6)d) in KDB 789033, issued 01/08/2016 (Average)

. Spectrum setting:

- Peak.

1. RBW = 1 MHz
2. VBW ≥ 3 MHz
3. Detector = Peak
4. Sweep Time = auto
5. Trace mode = max hold
6. Allow sweeps to continue until the trace stabilizes.
7. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle.

- Average (Method VB :Averaging using reduced video bandwidth)

1. RBW = 1 MHz
2. VBW
   2.1. If the EUT is configured to transmit with duty cycle ≥ 98 percent, set VBW ≤ RBW/100(i.e., 10 kHz) but not less than 10 Hz.
   2.2. If the EUT duty cycle is < 98 percent, set VBW ≥ 1/T, where T is the minimum transmission duration.
3. The analyzer is set to linear detector mode.

4. Detector = Peak.
5. Sweep time = auto.
6. Trace mode = max hold.
7. Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimym number of traces by a factor of 1/x, where x is the duty cycle.

Note :

1. We used the Method VB for 802.11a/n_20, n, ac_80 mode to perform the average filed strength measurements.
2. The actual setting value of VBW for 802.11a/n _20, n _40, ac_80

Mode	Worst Data rate (Mbps)	T_{on} (ms)	T_{total} (ms)	Duty Cycle (%)	VBW(1/T) (Hz)	The actual setting value of VBW (Hz)
a	**6**	**1.398**	**1.494**	**93.57**	**715**	**1000**
n_20	**MCS 0**	**1.296**	**1.395**	**92.90**	**772**	**1000**
n_40	**MCS 0**	**0.636**	**0.736**	**86.41**	**1572**	**3000**
ac_80	**MCS 0**	**0.248**	**0.348**	**71.26**	**4032**	**10000**

TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBμV	dB /m	dB	(H/V)	dBμV/m	dBμV/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
4. Limit line = specific Limits (dBuV) + Distance extrapolation factor
5. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

TEST RESULTS

Below 1 GHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBμV	dB /m	dB	(H/V)	dBμV/m	dBμV/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Above 1 GHz

Band :	UNII 1
Operation Mode:	802.11 a_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10360	66.15	-6.00	V	60.15	68.20	8.05	PK
15540	63.11	-6.13	V	56.98	73.98	17.00	PK
15540	49.58	-6.13	V	43.45	53.98	10.53	AV
10360	65.38	-6.00	H	59.38	68.20	8.82	PK
15540	63.10	-6.13	H	56.97	73.98	17.01	PK
15540	49.49	-6.13	H	43.36	53.98	10.62	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 1
Operation Mode:	802.11 a_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5200 MHz
Channel No.	40 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10400	65.52	-6.03	V	59.49	68.20	8.71	PK
15600	64.77	-6.71	V	58.06	73.98	15.92	PK
15600	50.12	-6.71	V	43.41	53.98	10.57	AV
10400	64.84	-6.03	H	58.81	68.20	9.39	PK
15600	64.69	-6.71	H	57.98	73.98	16.00	PK
15600	50.04	-6.71	H	43.33	53.98	10.65	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 1
Operation Mode:	802.11 a_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5240 MHz
Channel No.	48 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10480	66.20	-6.20	V	60.00	68.20	8.20	PK
15720	63.61	-6.46	V	57.15	73.98	16.83	PK
15720	50.31	-6.46	V	43.85	53.98	10.13	AV
10480	65.22	-6.20	H	59.02	68.20	9.18	PK
15720	63.59	-6.46	H	57.13	73.98	16.85	PK
15720	50.24	-6.46	H	43.78	53.98	10.20	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna

Band :	UNII 1
Operation Mode:	802.11 n_20 MHz BW
Transfer MCS Index:	0
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10360	65.81	-6.00	V	59.81	68.20	8.39	PK
15540	63.14	-6.13	V	57.01	73.98	16.97	PK
15540	49.60	-6.13	V	43.47	53.98	10.51	AV
10360	65.24	-6.00	H	59.24	68.20	8.96	PK
15540	63.13	-6.13	H	57.00	73.98	16.98	PK
15540	49.51	-6.13	H	43.38	53.98	10.60	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_20 MHz BW. Worst case is MCS 0 in 802.11n_20 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 1
Operation Mode:	802.11 n_20 MHz BW
Transfer MCS Index:	0
Operating Frequency	5200 MHz
Channel No.	40 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10400	65.39	-6.03	V	59.36	68.20	8.84	PK
15600	64.80	-6.71	V	58.09	73.98	15.89	PK
15600	50.14	-6.71	V	43.43	53.98	10.55	AV
10400	65.10	-6.03	H	59.07	68.20	9.13	PK
15600	64.72	-6.71	H	58.01	73.98	15.97	PK
15600	50.06	-6.71	H	43.35	53.98	10.63	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_20 MHz BW. Worst case is MCS 0 in 802.11n_20 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 1
Operation Mode:	802.11 n_20 MHz BW
Transfer MCS Index:	0
Operating Frequency	5240 MHz
Channel No.	48 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10480	65.81	-6.20	V	59.61	68.20	8.59	PK
15720	63.64	-6.46	V	57.18	73.98	16.80	PK
15720	50.33	-6.46	V	43.87	53.98	10.11	AV
10480	65.23	-6.20	H	59.03	68.20	9.17	PK
15720	63.62	-6.46	H	57.16	73.98	16.82	PK
15720	50.26	-6.46	H	43.80	53.98	10.18	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_20 MHz BW. Worst case is MCS 0 in 802.11n_20 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 1
Operation Mode:	802.11n_40 MHz BW
Transfer MCS Index:	0
Operating Frequency	5190 MHz
Channel No.	38 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10380	64.28	-5.67	V	58.61	68.20	9.59	PK
15570	63.90	-5.86	V	58.04	73.98	15.94	PK
15570	50.12	-5.86	V	44.26	53.98	9.72	AV
10380	63.56	-5.67	H	57.89	68.20	10.31	PK
15570	63.94	-5.86	H	58.08	73.98	15.90	PK
15570	50.08	-5.86	H	44.22	53.98	9.76	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_40 MHz BW. Worst case is MCS 0 in 802.11n_40 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 1
Operation Mode:	802.11n_40 MHz BW
Transfer MCS Index:	0
Operating Frequency	5230 MHz
Channel No.	46 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10460	65.35	-6.20	V	59.15	68.20	9.05	PK
15690	64.16	-6.34	V	57.82	73.98	16.16	PK
15690	50.75	-6.34	V	44.41	53.98	9.57	AV
10460	65.48	-6.20	H	59.28	68.20	8.92	PK
15690	64.18	-6.34	H	57.84	73.98	16.14	PK
15690	50.73	-6.34	H	44.39	53.98	9.59	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_40 MHz BW. Worst case is MCS 0 in 802.11n_40 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 1
Operation Mode:	802.11ac_80 MHz BW
Transfer MCS Index:	0
Operating Frequency	5210 MHz
Channel No.	42 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10420	64.21	-5.93	V	58.28	68.20	9.92	PK
15630	63.39	-6.78	V	56.61	73.98	17.37	PK
15630	49.45	-6.78	V	42.67	53.98	11.31	AV
10420	63.28	-5.93	H	57.35	68.20	10.85	PK
15630	63.38	-6.78	H	56.60	73.98	17.38	PK
15630	49.41	-6.78	H	42.63	53.98	11.35	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11ac_80 MHz BW. Worst case is MCS 0 in 802.11ac_80 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 2A
Operation Mode:	802.11 a_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5260 MHz
Channel No.	52 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10520	63.33	-6.00	V	57.33	68.20	10.87	PK
15780	63.31	-6.34	V	56.97	73.98	17.01	PK
15780	50.06	-6.34	V	43.72	53.98	10.26	AV
10520	64.24	-6.52	H	57.72	68.20	10.48	PK
15780	63.35	-6.34	H	57.01	73.98	16.97	PK
15780	50.11	-6.34	H	43.77	53.98	10.21	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 2A
Operation Mode:	802.11 a_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5300 MHz
Channel No.	60 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10600	62.89	-6.00	V	56.89	73.98	17.09	PK
10600	52.56	-6.00	V	46.56	53.98	7.42	AV
15900	64.41	-6.70	V	57.71	73.98	16.27	PK
15900	50.13	-6.70	V	43.43	53.98	10.55	AV
10600	63.44	-6.00	H	57.44	73.98	16.54	PK
10600	53.30	-6.00	H	47.30	53.98	6.68	AV
15900	64.37	-6.70	H	57.67	73.98	16.31	PK
15900	50.21	-6.70	H	43.51	53.98	10.47	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 2A
Operation Mode:	802.11 a_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10640	63.24	-5.60	V	57.64	73.98	16.34	PK
10640	52.67	-5.60	V	47.07	53.98	6.91	AV
15960	62.74	-6.81	V	55.93	73.98	18.05	PK
15960	49.06	-6.81	V	42.25	53.98	11.73	AV
10640	64.16	-5.60	H	58.56	73.98	15.42	PK
10640	53.47	-5.60	H	47.87	53.98	6.11	AV
15960	62.67	-6.81	H	55.86	73.98	18.12	PK
15960	48.97	-6.81	H	42.16	53.98	11.82	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna

Band :	UNII 2A
Operation Mode:	802.11 n_20 MHz BW
Transfer MCS Index:	0
Operating Frequency	5260 MHz
Channel No.	52 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10520	63.24	-6.00	V	57.24	68.20	10.96	PK
15780	63.32	-6.34	V	56.98	73.98	17.00	PK
15780	50.12	-6.34	V	43.78	53.98	10.20	AV
10520	64.04	-6.52	H	57.52	68.20	10.68	PK
15780	63.45	-6.34	H	57.11	73.98	16.87	PK
15780	50.18	-6.34	H	43.84	53.98	10.14	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_20 MHz BW. Worst case is MCS 0 in 802.11n_20 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 2A
Operation Mode:	802.11 n_20 MHz BW
Transfer MCS Index:	0
Operating Frequency	5300 MHz
Channel No.	60 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10600	63.81	-6.00	V	57.81	73.98	16.17	PK
10600	52.52	-6.00	V	46.52	53.98	7.46	AV
15900	64.34	-6.70	V	57.64	73.98	16.34	PK
15900	50.14	-6.70	V	43.44	53.98	10.54	AV
10600	64.25	-6.00	H	58.25	73.98	15.73	PK
10600	53.39	-6.00	H	47.39	53.98	6.59	AV
15900	64.47	-6.70	H	57.77	73.98	16.21	PK
15900	50.20	-6.70	H	43.50	53.98	10.48	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_20 MHz BW. Worst case is MCS 0 in 802.11n_20 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 2A
Operation Mode:	802.11 n_20 MHz BW
Transfer MCS Index:	0
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10640	63.64	-5.60	V	58.04	73.98	15.94	PK
10640	52.61	-5.60	V	47.01	53.98	6.97	AV
15960	62.67	-6.81	V	55.86	73.98	18.12	PK
15960	48.97	-6.81	V	42.16	53.98	11.82	AV
10640	64.29	-5.60	H	58.69	73.98	15.29	PK
10640	53.45	-5.60	H	47.85	53.98	6.13	AV
15960	62.77	-6.81	H	55.96	73.98	18.02	PK
15960	49.04	-6.81	H	42.23	53.98	11.75	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_20 MHz BW. Worst case is MCS 0 in 802.11n_20 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 2A
Operation Mode:	802.11n_40 MHz BW
Transfer MCS Index:	0
Operating Frequency	5270 MHz
Channel No.	54 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10540	63.02	-5.68	V	57.34	68.20	10.86	PK
15810	64.19	-7.39	V	56.80	73.98	17.18	PK
15810	50.18	-7.39	V	42.79	53.98	11.19	AV
10540	63.51	-5.68	H	57.83	68.20	10.37	PK
15810	64.13	-7.39	H	56.74	73.98	17.24	PK
15810	50.19	-7.39	H	42.80	53.98	11.18	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_40 MHz BW. Worst case is MCS 0 in 802.11n_40 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 2A
Operation Mode:	802.11n_40 MHz BW
Transfer MCS Index:	0
Operating Frequency	5310 MHz
Channel No.	62 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10620	63.14	-6.00	V	57.14	73.98	16.84	PK
10620	52.95	-6.00	V	46.95	53.98	7.03	AV
15930	62.89	-6.68	V	56.21	73.98	17.77	PK
15930	49.82	-6.68	V	43.14	53.98	10.84	AV
10620	63.98	-6.00	H	57.98	73.98	16.00	PK
10620	53.60	-6.00	H	47.60	53.98	6.38	AV
15930	63.08	-6.68	H	56.40	73.98	17.58	PK
15930	49.85	-6.68	H	43.17	53.98	10.81	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_40 MHz BW. Worst case is MCS 0 in 802.11n_40 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 2A
Operation Mode:	802.11ac_80 MHz BW
Transfer MCS Index:	0
Operating Frequency	5290 MHz
Channel No.	58 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10580	63.17	-5.73	V	57.44	68.20	10.76	PK
15870	63.83	-6.81	V	57.02	73.98	16.96	PK
15870	49.99	-6.81	V	43.18	53.98	10.80	AV
10580	63.88	-5.73	H	58.15	68.20	10.05	PK
15870	63.88	-6.81	H	57.07	73.98	16.91	PK
15870	50.06	-6.81	H	43.25	53.98	10.73	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11ac_80 MHz BW. Worst case is MCS 0 in 802.11ac_80 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 2C
Operation Mode:	802.11 a_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11000	64.09	-4.61	V	59.48	73.98	14.50	PK
11000	52.65	-4.61	V	48.04	53.98	5.94	AV
16500	62.50	-4.10	V	58.40	68.20	9.80	PK
11000	63.88	-4.61	H	59.27	73.98	14.71	PK
11000	52.26	-4.61	H	47.65	53.98	6.33	AV
16500	62.43	-4.10	H	58.33	68.20	9.87	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 2C
Operation Mode:	802.11 a_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5580 MHz
Channel No.	116 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11160	63.69	-5.27	V	58.42	73.98	15.56	PK
11160	52.04	-5.27	V	46.77	53.98	7.21	AV
16740	63.47	-3.23	V	60.24	68.20	7.96	PK
11160	63.15	-5.27	H	57.88	73.98	16.10	PK
11160	51.67	-5.27	H	46.40	53.98	7.58	AV
16740	63.48	-3.23	H	60.25	68.20	7.95	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna

Band :	UNII 2C
Operation Mode:	802.11 a_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5700 MHz
Channel No.	140 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11400	64.00	-5.41	V	58.59	73.98	15.39	PK
11400	51.68	-5.41	V	46.27	53.98	7.71	AV
17100	62.61	-0.96	V	61.65	68.20	6.55	PK
11400	63.53	-5.41	H	58.12	73.98	15.86	PK
11400	51.34	-5.41	H	45.93	53.98	8.05	AV
17100	62.54	-0.96	H	61.58	68.20	6.62	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna

Band :	UNII 2C
Operation Mode:	802.11 n_20 MHz BW
Transfer MCS Index:	0
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11000	63.65	-4.61	V	59.04	73.98	14.94	PK
11000	52.61	-4.61	V	48.00	53.98	5.98	AV
16500	62.56	-4.10	V	58.46	68.20	9.74	PK
11000	63.51	-4.61	H	58.90	73.98	15.08	PK
11000	52.36	-4.61	H	47.75	53.98	6.23	AV
16500	62.53	-4.10	H	58.43	68.20	9.77	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_20 MHz BW. Worst case is MCS 0 in 802.11n_20 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 2C
Operation Mode:	802.11 n_20 MHz BW
Transfer MCS Index:	0
Operating Frequency	5580 MHz
Channel No.	116 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11160	63.13	-5.27	V	57.86	73.98	16.12	PK
11160	51.97	-5.27	V	46.70	53.98	7.28	AV
16740	63.58	-3.23	V	60.35	68.20	7.85	PK
11160	63.80	-5.27	H	58.53	73.98	15.45	PK
11160	51.65	-5.27	H	46.38	53.98	7.60	AV
16740	63.40	-3.23	H	60.17	68.20	8.03	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_20 MHz BW. Worst case is MCS 0 in 802.11n_20 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 2C
Operation Mode:	802.11 n_20 MHz BW
Transfer MCS Index:	0
Operating Frequency	5720 MHz
Channel No.	140 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11400	63.83	-5.41	V	58.42	73.98	15.56	PK
11400	51.59	-5.41	V	46.18	53.98	7.80	AV
17100	62.60	-0.96	V	61.64	68.20	6.56	PK
11400	63.29	-5.41	H	57.88	73.98	16.10	PK
11400	51.24	-5.41	H	45.83	53.98	8.15	AV
17100	62.58	-0.96	H	61.62	68.20	6.58	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_20 MHz BW. Worst case is MCS 0 in 802.11n_20 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 2C
Operation Mode:	802.11n_40 MHz BW
Transfer MCS Index:	0
Operating Frequency	5510 MHz
Channel No.	102 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11020	63.02	-4.79	V	58.23	73.98	15.75	PK
11020	51.95	-4.79	V	47.16	53.98	6.82	AV
16530	63.51	-3.89	V	59.62	68.20	8.58	PK
11020	62.85	-4.79	H	58.06	73.98	15.92	PK
11020	51.69	-4.79	H	46.90	53.98	7.08	AV
16530	63.43	-3.89	H	59.54	68.20	8.66	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_40 MHz BW. Worst case is MCS 0 in 802.11n_40 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 2C
Operation Mode:	802.11n_40 MHz BW
Transfer MCS Index:	0
Operating Frequency	5590 MHz
Channel No.	118 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11180	62.74	-5.46	V	57.28	73.98	16.70	PK
11180	51.70	-5.46	V	46.24	53.98	7.74	AV
16770	63.03	-3.16	V	59.87	68.20	8.33	PK
11180	62.28	-5.46	H	56.82	73.98	17.16	PK
11180	51.46	-5.46	H	46.00	53.98	7.98	AV
16770	62.99	-3.16	H	59.83	68.20	8.37	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_40 MHz BW. Worst case is MCS 0 in 802.11n_40 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 2C
Operation Mode:	802.11n_40 MHz BW
Transfer MCS Index:	0
Operating Frequency	5670 MHz
Channel No.	134 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11340	62.87	-4.74	V	58.13	73.98	15.85	PK
11340	51.39	-4.74	V	46.65	53.98	7.33	AV
17010	61.99	-1.46	V	60.53	68.20	7.67	PK
11340	62.60	-4.74	H	57.86	73.98	16.12	PK
11340	51.11	-4.74	H	46.37	53.98	7.61	AV
17010	61.91	-1.46	H	60.45	68.20	7.75	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_40 MHz BW. Worst case is MCS 0 in 802.11n_40 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 2C
Operation Mode:	802.11ac_80 MHz BW
Transfer MCS Index:	0
Operating Frequency	5530 MHz
Channel No.	106 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11060	63.04	-5.10	V	57.94	73.98	16.04	PK
11060	51.76	-5.10	V	46.66	53.98	7.32	AV
16590	62.27	-3.19	V	59.08	68.20	9.12	PK
11060	62.88	-5.10	H	57.78	73.98	16.20	PK
11060	51.46	-5.10	H	46.36	53.98	7.62	AV
16590	62.21	-3.19	H	59.02	68.20	9.18	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11ac_80 MHz BW. Worst case is MCS 0 in 802.11ac_80 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 2C
Operation Mode:	802.11ac_80 MHz BW
Transfer MCS Index:	0
Operating Frequency	5610 MHz
Channel No.	122 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11220	63.32	-5.00	V	58.32	73.98	15.66	PK
11220	50.89	-5.00	V	45.89	53.98	8.09	AV
16830	62.92	-1.40	V	61.52	68.20	6.68	PK
11220	62.86	-5.00	H	57.86	73.98	16.12	PK
11220	50.68	-5.00	H	45.68	53.98	8.30	AV
16830	62.63	-1.40	H	61.23	68.20	6.97	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11ac_80 MHz BW. Worst case is MCS 0 in 802.11ac_80 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 3
Operation Mode:	802.11 a_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5745MHz
Channel No.	149 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11490	63.90	-5.43	V	58.47	73.98	15.51	PK
11490	52.42	-5.43	V	46.99	53.98	6.99	AV
17235	62.68	-1.30	V	61.38	68.20	6.82	PK
11490	64.33	-5.43	H	58.90	73.98	15.08	PK
11490	52.70	-5.43	H	47.27	53.98	6.71	AV
17235	62.61	-1.30	H	61.31	68.20	6.89	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 3
Operation Mode:	802.11 a_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5785 MHz
Channel No.	157 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11570	63.85	-5.41	V	58.44	73.98	15.54	PK
11570	52.48	-5.41	V	47.07	53.98	6.91	AV
17355	62.51	-0.40	V	62.11	68.20	6.09	PK
11570	64.14	-5.41	H	58.73	73.98	15.25	PK
11570	52.76	-5.41	H	47.35	53.98	6.63	AV
17355	62.59	-0.40	H	62.19	68.20	6.01	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 3
Operation Mode:	802.11 a_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5825 MHz
Channel No.	165 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11650	64.24	-5.43	V	58.81	73.98	15.17	PK
11650	53.66	-5.43	V	48.23	53.98	5.75	AV
17475	62.00	-0.28	V	61.72	68.20	6.48	PK
11650	65.15	-5.43	H	59.72	73.98	14.26	PK
11650	53.91	-5.43	H	48.48	53.98	5.50	AV
17475	61.99	-0.28	H	61.71	68.20	6.49	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna

Band :	UNII 3
Operation Mode:	802.11 n_20 MHz BW
Transfer MCS Index:	0
Operating Frequency	5745 MHz
Channel No.	149 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11490	63.58	-5.43	V	58.15	73.98	15.83	PK
11490	52.30	-5.43	V	46.87	53.98	7.11	AV
17235	62.61	-1.30	V	61.31	68.20	6.89	PK
11490	64.21	-5.43	H	58.78	73.98	15.20	PK
11490	52.69	-5.43	H	47.26	53.98	6.72	AV
17235	62.71	-1.30	H	61.41	68.20	6.79	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_20 MHz BW. Worst case is MCS 0 in 802.11n_20 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 3
Operation Mode:	802.11 n_20 MHz BW
Transfer MCS Index:	0
Operating Frequency	5785 MHz
Channel No.	157 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11570	63.92	-5.41	V	58.51	73.98	15.47	PK
11570	52.48	-5.41	V	47.07	53.98	6.91	AV
17355	62.52	-0.40	V	62.12	68.20	6.08	PK
11570	64.20	-5.41	H	58.79	73.98	15.19	PK
11570	52.72	-5.41	H	47.31	53.98	6.67	AV
17355	62.58	-0.40	H	62.18	68.20	6.02	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_20 MHz BW. Worst case is MCS 0 in 802.11n_20 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 3
Operation Mode:	802.11 n_20 MHz BW
Transfer MCS Index:	0
Operating Frequency	5825 MHz
Channel No.	165 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11650	64.84	-5.43	V	59.41	73.98	14.57	PK
11650	53.62	-5.43	V	48.19	53.98	5.79	AV
17475	61.98	-0.28	V	61.70	68.20	6.50	PK
11650	65.11	-5.43	H	59.68	73.98	14.30	PK
11650	53.88	-5.43	H	48.45	53.98	5.53	AV
17475	62.10	-0.28	H	61.82	68.20	6.38	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_20 MHz BW. Worst case is MCS 0 in 802.11n_20 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII3
Operation Mode:	802.11n_40 MHz BW
Transfer MCS Index:	0
Operating Frequency	5755 MHz
Channel No.	151 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11510	63.62	-5.23	V	58.39	73.98	15.59	PK
11510	52.07	-5.23	V	46.84	53.98	7.14	AV
17265	63.26	-1.12	V	62.14	68.20	6.06	PK
11510	63.87	-5.23	H	58.64	73.98	15.34	PK
11510	52.38	-5.23	H	47.15	53.98	6.83	AV
17265	63.28	-1.12	H	62.16	68.20	6.04	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_40 MHz BW. Worst case is MCS 0 in 802.11n_40 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 3
Operation Mode:	802.11n_40 MHz BW
Transfer MCS Index:	0
Operating Frequency	5795 MHz
Channel No.	159 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11590	63.91	-5.35	V	58.56	73.98	15.42	PK
11590	52.70	-5.35	V	47.35	53.98	6.63	AV
17385	62.61	-0.10	V	62.51	68.20	5.69	PK
11590	64.10	-5.35	H	58.75	73.98	15.23	PK
11590	53.05	-5.35	H	47.70	53.98	6.28	AV
17385	62.67	-0.10	H	62.57	68.20	5.63	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_40 MHz BW. Worst case is MCS 0 in 802.11n_40 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	UNII 3
Operation Mode:	802.11ac_80 MHz BW
Transfer MCS Index:	0
Operating Frequency	5775 MHz
Channel No.	155 Ch

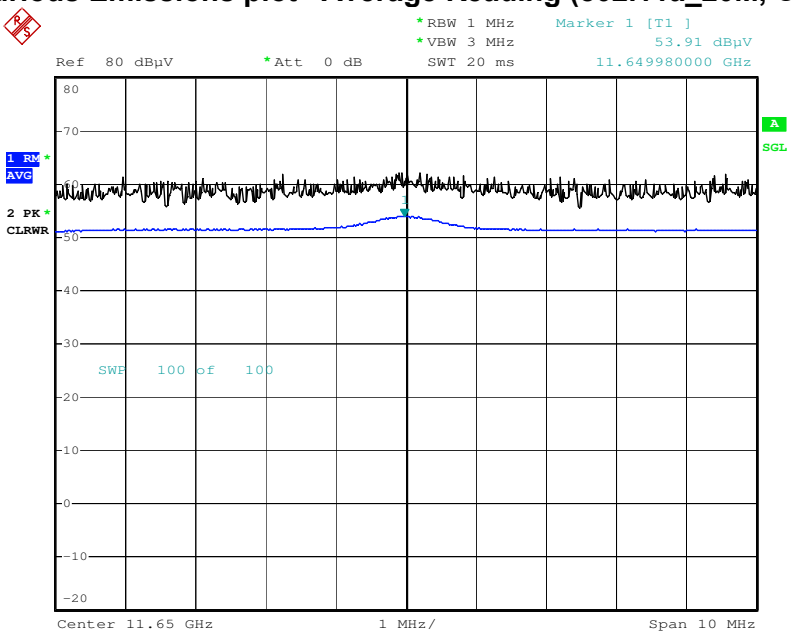
Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11550	63.20	-5.40	V	57.80	73.98	16.18	PK
11550	51.63	-5.40	V	46.23	53.98	7.75	AV
17325	62.20	-0.94	V	61.26	68.20	6.94	PK
11550	63.45	-5.40	H	58.05	73.98	15.93	PK
11550	51.80	-5.40	H	46.40	53.98	7.58	AV
17325	62.17	-0.94	H	61.23	68.20	6.97	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11ac_80 MHz BW. Worst case is MCS 0 in 802.11ac_80 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

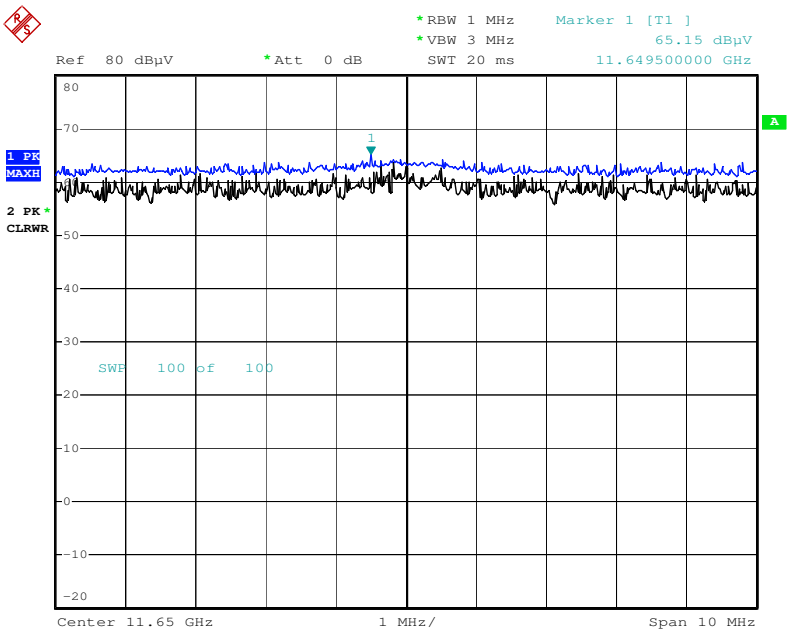
▣ RESULT PLOTS

Radiated Spurious Emissions plot –Average Reading (802.11a_20M, Ch.157 2rd Harmonic)



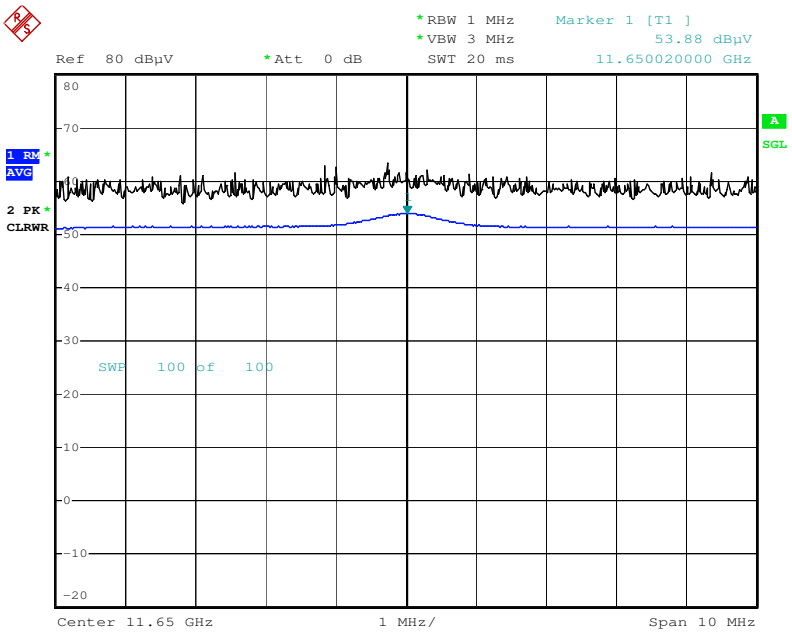
Date: 20.FEB.2016 14:02:50

Radiated Spurious Emissions plot – Peak Reading (802.11a_20M, Ch.157 2rd Harmonic)



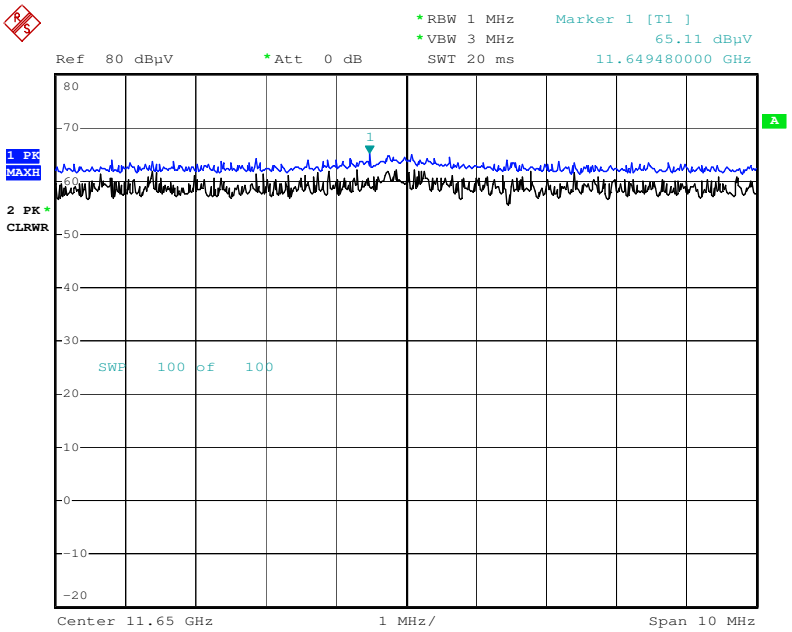
Date: 20.FEB.2016 14:03:12

Radiated Spurious Emissions plot – Average Reading (802.11n_20M, Ch.157 2rd Harmonic)



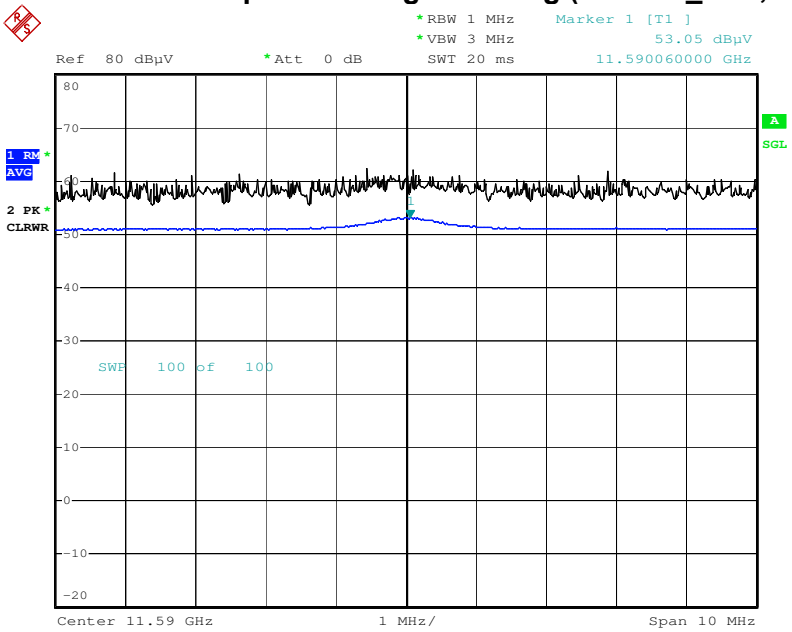
Date: 20.FEB.2016 14:08:44

Radiated Spurious Emissions plot – Peak Reading (802.11n_20M, Ch.157 2rd Harmonic)



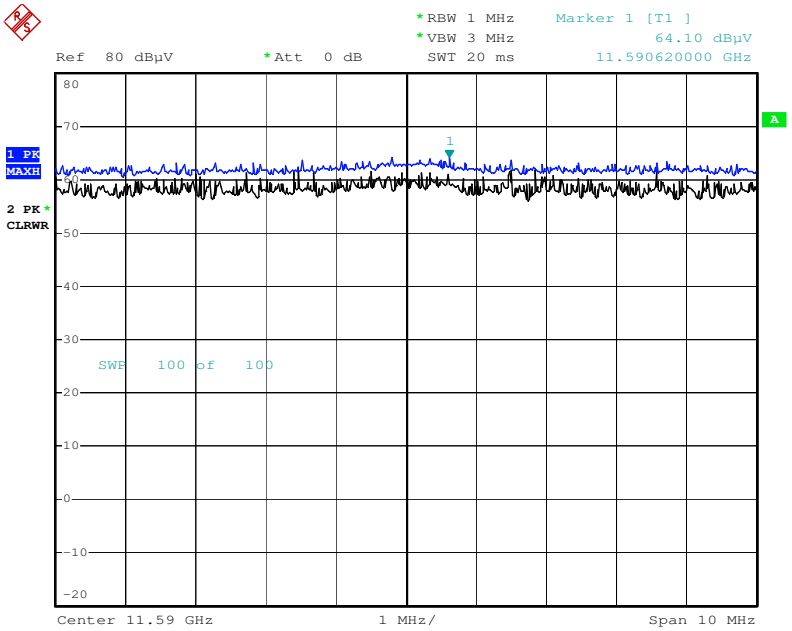
Date: 20.FEB.2016 14:08:25

Radiated Spurious Emissions plot –Average Reading (802.11n_40M, Ch.159 2rd Harmonic)



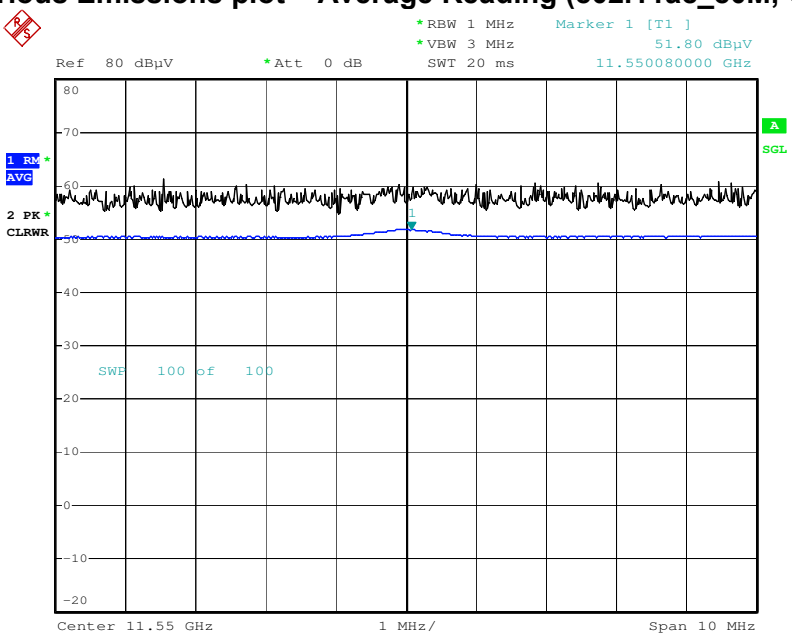
Date: 20.FEB.2016 14:11:20

Radiated Spurious Emissions plot – Peak Reading (802.11n_40M, Ch.159 2rd Harmonic)



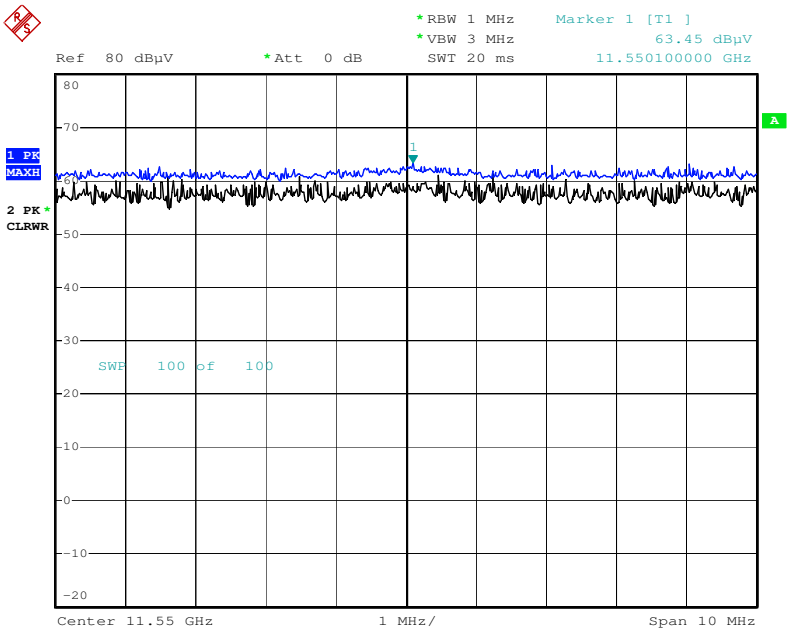
Date: 20.FEB.2016 14:11:05

Radiated Spurious Emissions plot – Average Reading (802.11ac_80M, Ch.155 2rd Harmonic)



Date: 20.FEB.2016 14:21:07

Radiated Spurious Emissions plot – Peak Reading (802.11ac_80M, Ch.155 2rd Harmonic)



Date: 20.FEB.2016 14:21:30

Note : Only the worst case plots for Radiated Spurious Emissions.

8.6.2 RADIATED RESTRICTED BAND EDGE MEASUREMENTS

Test Requirements and limit, §15.247(d) §15.205, §15.209

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a) (See section 15.205(c)).

Band :	UNII 1
Operation Mode:	802.11 a_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	50.09	8.18	H	58.27	73.98	15.71	PK
5150	38.76	8.18	H	46.94	53.98	7.04	AV
5150	49.92	8.18	V	58.1	73.98	15.88	PK
5150	38.63	8.18	V	46.81	53.98	7.17	AV

Band :	UNII 1
Operation Mode:	802.11 n_20 MHz BW
Transfer MCS Index:	0
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	50.69	8.18	H	58.87	73.98	15.11	PK
5150	38.90	8.18	H	47.08	53.98	6.90	AV
5150	50.23	8.18	V	58.41	73.98	15.57	PK
5150	38.72	8.18	V	46.9	53.98	7.08	AV

Band :	UNII 1
Operation Mode:	802.11 n_40 MHz BW
Transfer MCS Index:	0
Operating Frequency	5190 MHz
Channel No.	38 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	51.41	8.18	H	59.59	73.98	14.39	PK
5150	39.35	8.18	H	47.53	53.98	6.45	AV
5150	51.05	8.18	V	59.23	73.98	14.75	PK
5150	39.21	8.18	V	47.39	53.98	6.59	AV

Band :	UNII 1
Operation Mode:	802.11 ac_80 MHz BW
Transfer MCS Index:	0
Operating Frequency	5210 MHz
Channel No.	42 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	58.77	8.18	H	66.95	73.98	7.03	PK
5150	39.61	8.18	H	47.79	53.98	6.19	AV
5150	58.50	8.18	V	66.68	73.98	7.30	PK
5150	39.38	8.18	V	47.56	53.98	6.42	AV

Band :	UNII 2A
Operation Mode:	802.11 a_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	49.71	8.95	H	58.66	73.98	15.32	PK
5350	38.45	8.95	H	47.4	53.98	6.58	AV
5350	49.66	8.95	V	58.61	73.98	15.37	PK
5350	38.26	8.95	V	47.21	53.98	6.77	AV

Band :	UNII 2A
Operation Mode:	802.11 n_20 MHz BW
Transfer MCS Index:	0
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	49.65	8.95	H	58.60	73.98	15.38	PK
5350	38.53	8.95	H	47.48	53.98	6.50	AV
5350	48.90	8.95	V	57.85	73.98	16.13	PK
5350	38.46	8.95	V	47.41	53.98	6.57	AV

Band :	UNII 2A
Operation Mode:	802.11 n_40 MHz BW
Transfer MCS Index:	0
Operating Frequency	5310 MHz
Channel No.	62 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	51.76	8.95	H	60.71	73.98	13.27	PK
5350	38.42	8.95	H	47.37	53.98	6.61	AV
5350	51.37	8.95	V	60.32	73.98	13.66	PK
5350	38.24	8.95	V	47.19	53.98	6.79	AV

Band :	UNII 2A
Operation Mode:	802.11 ac_80 MHz BW
Transfer MCS Index:	0
Operating Frequency	5290 MHz
Channel No.	58 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	57.20	8.95	H	66.15	73.98	7.83	PK
5350	38.41	8.95	H	47.36	53.98	6.62	AV
5350	57.15	8.95	V	66.1	73.98	7.88	PK
5350	38.14	8.95	V	47.09	53.98	6.89	AV

Band :	UNII 2C
Operation Mode:	802.11 a_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	50.02	9.62	H	59.64	73.98	14.34	PK
5460	37.51	9.62	H	47.13	53.98	6.85	AV
5470	49.17	9.52	H	58.69	68.20	9.51	PK
5460	49.64	9.62	V	59.26	73.98	14.72	PK
5460	37.76	9.62	V	47.38	53.98	6.60	AV
5470	48.97	9.52	V	58.49	68.20	9.71	PK

Band :	UNII 2C
Operation Mode:	802.11 a_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5700 MHz
Channel No.	140 Ch

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5725	48.46	10.70	H	59.16	68.20	9.04	PK
5725	48.24	10.70	V	58.94	68.20	9.26	PK

Band :	UNII 2C
Operation Mode:	802.11 n_20MHz BW
Transfer MCS Index:	0
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	49.97	9.62	H	59.59	73.98	14.39	PK
5460	38.12	9.62	H	47.74	53.98	6.24	AV
5470	49.22	9.52	H	58.74	68.20	9.46	PK
5460	49.66	9.62	V	59.28	73.98	14.70	PK
5460	38.09	9.62	V	47.71	53.98	6.27	AV
5470	48.99	9.52	V	58.51	68.20	9.69	PK

Band :	UNII 2C
Operation Mode:	802.11 n_20MHz BW
Transfer MCS Index:	0
Operating Frequency	5700 MHz
Channel No.	140 Ch

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5725	48.56	10.70	H	59.26	68.20	8.94	PK
5725	48.43	10.70	V	59.13	68.20	9.07	PK

Band :	UNII 2C
Operation Mode:	802.11 n_40 MHz BW
Transfer MCS Index:	0
Operating Frequency	5510 MHz
Channel No.	102 Ch

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	49.37	9.62	H	58.99	73.98	14.99	PK
5460	37.48	9.62	H	47.1	53.98	6.88	AV
5470	51.52	9.52	H	61.04	68.20	7.16	PK
5460	49.14	9.62	V	58.76	73.98	15.22	PK
5460	37.41	9.62	V	47.03	53.98	6.95	AV
5470	51.38	9.52	V	60.9	68.20	7.30	PK

Band :	UNII 2C
Operation Mode:	802.11 n_40 MHz BW
Transfer MCS Index:	0
Operating Frequency	5670 MHz
Channel No.	134 Ch

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5725	48.97	10.70	H	59.67	68.20	8.53	PK
5725	48.66	10.70	V	59.36	68.20	8.84	PK

Band :	UNII 2C
Operation Mode:	802.11 ac_80 MHz BW
Transfer MCS Index:	0
Operating Frequency	5530 MHz
Channel No.	106 Ch

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	49.40	9.62	H	59.02	73.98	14.96	PK
5460	37.54	9.62	H	47.16	53.98	6.82	AV
# 5470	59.15	9.52	H	68.67	73.98	5.31	PK
# 5470	38.47	9.52	H	47.99	53.98	5.99	AV
5460	49.24	9.62	V	58.86	73.98	15.12	PK
5460	37.48	9.62	V	47.1	53.98	6.88	AV
# 5470	58.75	9.52	V	68.27	73.98	5.71	PK
# 5470	38.29	9.52	V	47.81	53.98	6.17	AV

Notes: The mark '#' is tested according to Ⅱ.G.2.c in KDB 789033 D02, issued 01/08/2016

II. MEASUREMENT PROCEDURES

G. Unwanted Emission Measurement

2. Unwanted Emissions that fall Outside of the Restricted Bands

c) At frequencies above 1000 MHz, use the procedure for maximum emissions described in section II.G.5., "Procedure for Unwanted Maximum Unwanted Emissions Measurements Above 1000 MHz".

As specified in § 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a maximum emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in § 15.407(b)(4)). However, an out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

Band :	UNII 3
Operation Mode:	802.11 a_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5745MHz
Channel No.	149 Ch

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5725	52.40	10.70	H	63.10	78.20	15.10	PK
5725	51.96	10.70	V	62.66	78.20	15.54	PK
5715	48.60	10.35	H	58.95	68.20	9.25	PK
5715	48.38	10.35	V	58.73	68.20	9.47	PK

Band :	UNII 3
Operation Mode:	802.11 a_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5825MHz
Channel No.	165 Ch

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5850	47.91	11.47	H	59.38	78.20	18.82	PK
5850	47.68	11.47	V	59.15	78.20	19.05	PK
5860	47.77	11.47	H	59.24	68.20	8.96	PK
5860	47.62	11.47	V	59.09	68.20	9.11	PK

Band : UNII 3
Operation Mode: 802.11 n_20MHz BW
Transfer MCS Index: 0
Operating Frequency 5745 MHz
Channel No. 149 Ch

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5725	55.33	10.70	H	66.03	78.20	12.17	PK
5725	54.86	10.70	V	65.56	78.20	12.64	PK
5715	48.90	10.35	H	59.25	68.20	8.95	PK
5715	48.67	10.35	V	59.02	68.20	9.18	PK

Band : UNII 3
Operation Mode: 802.11 n_20MHz BW
Transfer MCS Index: 0
Operating Frequency 5825 MHz
Channel No. 165 Ch

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5850	47.74	11.47	H	59.21	78.20	18.99	PK
5850	47.63	11.47	V	59.10	78.20	19.10	PK
5860	47.56	11.47	H	59.03	68.20	9.17	PK
5860	47.54	11.47	V	59.01	68.20	9.19	PK

Band :	UNII 3
Operation Mode:	802.11 n_40 MHz BW
Transfer MCS Index:	0
Operating Frequency	5755 MHz
Channel No.	151 Ch

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5725	59.80	10.70	H	70.50	78.20	7.70	PK
5725	59.37	10.70	V	70.07	78.20	8.13	PK
5715	49.45	10.35	H	59.80	68.20	8.40	PK
5715	49.38	10.35	V	59.73	68.20	8.47	PK

Band :	UNII 3
Operation Mode:	802.11 n_40 MHz BW
Transfer MCS Index:	0
Operating Frequency	5795 MHz
Channel No.	159 Ch

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5850	48.60	11.47	H	60.07	78.20	18.13	PK
5850	48.45	11.47	V	59.92	78.20	18.28	PK
5860	47.58	11.47	H	59.05	68.20	9.15	PK
5860	47.56	11.47	V	59.03	68.20	9.17	PK

Band :	UNII 3
Operation Mode:	802.11 ac_80 MHz BW
Transfer MCS Index:	0
Operating Frequency	5755 MHz
Channel No.	155 Ch

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5725	56.73	10.70	H	67.43	78.20	10.77	PK
5725	56.52	10.70	V	67.22	78.20	10.98	PK
# 5715	56.25	10.35	H	66.60	73.98	7.38	PK
# 5715	37.30	10.35	H	47.65	53.98	6.33	AV
# 5715	56.08	10.35	V	66.43	73.98	7.55	PK
# 5715	37.28	10.35	V	47.63	53.98	6.35	AV
5850	47.97	11.47	H	59.44	78.20	18.76	PK
5850	47.65	11.47	V	59.12	78.20	19.08	PK
5860	47.69	11.47	H	59.16	68.20	9.04	PK
5860	47.41	11.47	V	58.88	68.20	9.32	PK

Notes: The mark '#' is tested according to Ⅱ.G.2.c in KDB 789033 D02, issued 01/08/2016

II. MEASUREMENT PROCEDURES

G. Unwanted Emission Measurement

2. Unwanted Emissions that fall Outside of the Restricted Bands

c) At frequencies above 1000 MHz, use the procedure for maximum emissions described in section II.G.5., "Procedure for Unwanted Maximum Unwanted Emissions Measurements Above 1000 MHz".

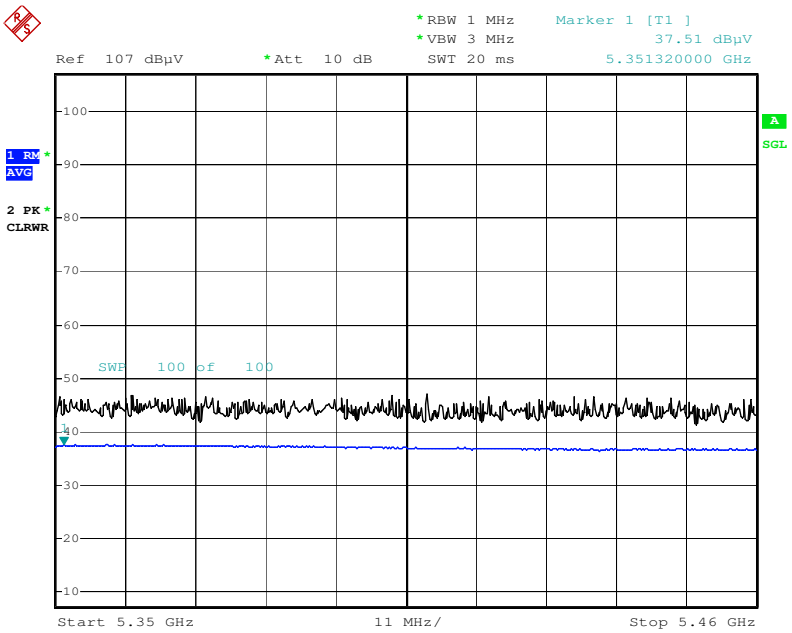
As specified in § 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a maximum emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in § 15.407(b)(4)). However, an out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

Notes:

1. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + ATT
2. We have done all data rate in 802.11a/n/ac mode test. . Worst case of EUT is lowest data rate in 802.11a/n.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. '*' is radiated band edge test frequency.(not restricted band emissions)

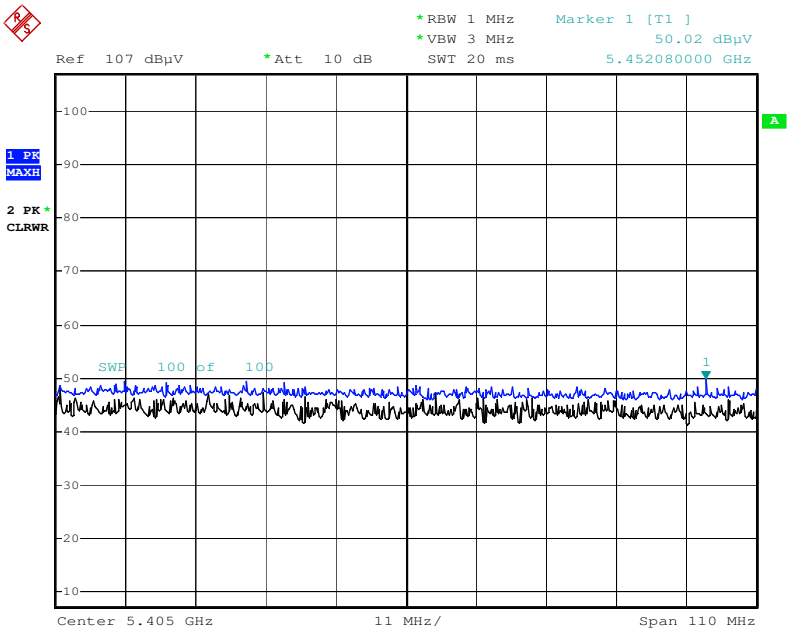
▣ RESULT PLOTS

Radiated Restricted Band Edges plot – Average Reading (802.11a_20M, Ch.100)



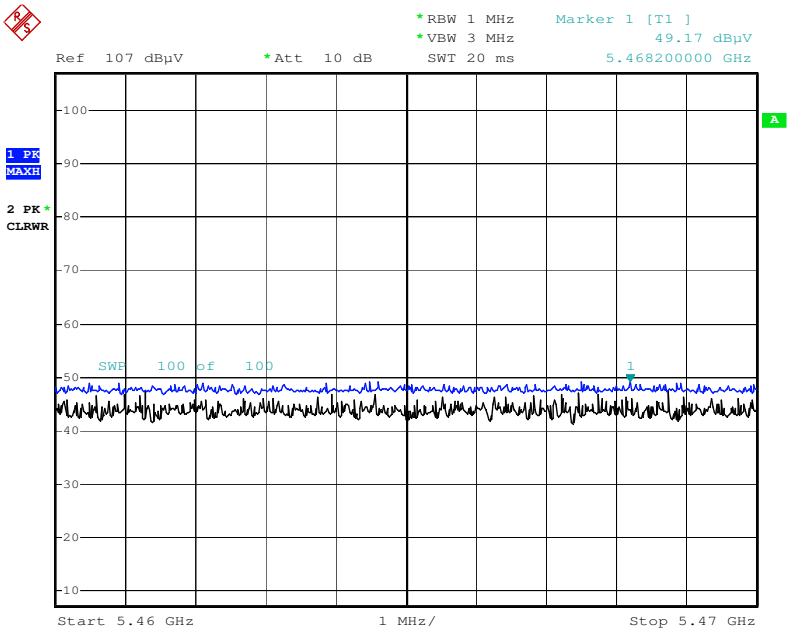
Date: 19.FEB.2016 16:55:39

Radiated Restricted Band Edges plot – Peak Reading (802.11a_20M, Ch.100)



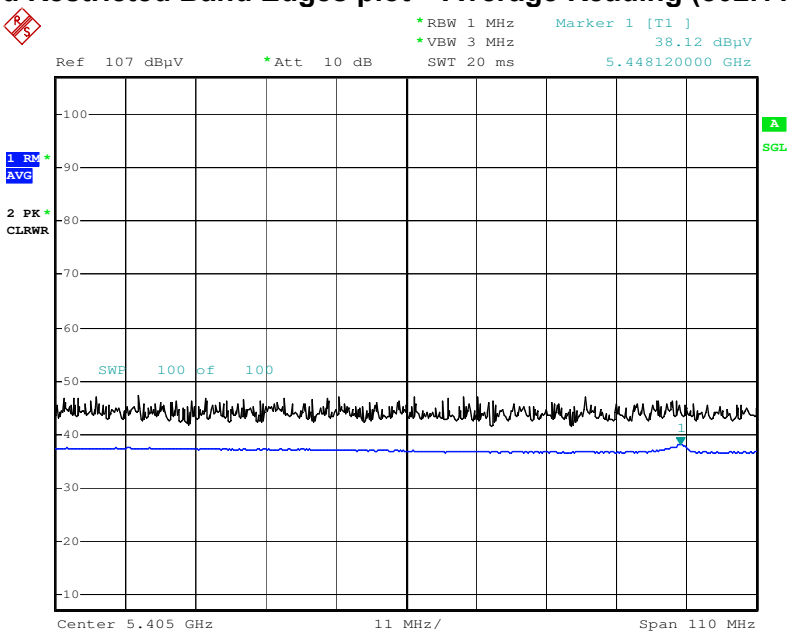
Date: 19.FEB.2016 16:54:52

Radiated Restricted Band Edges plot – Peak Reading (802.11a_20M, Ch.100)



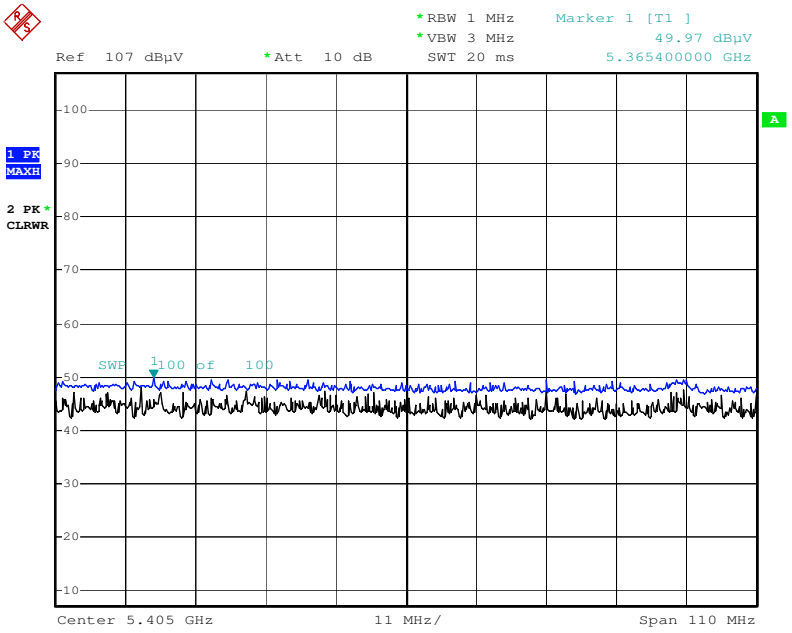
Date: 19.FEB.2016 16:54:13

Radiated Restricted Band Edges plot – Average Reading (802.11n_20M, Ch.100)



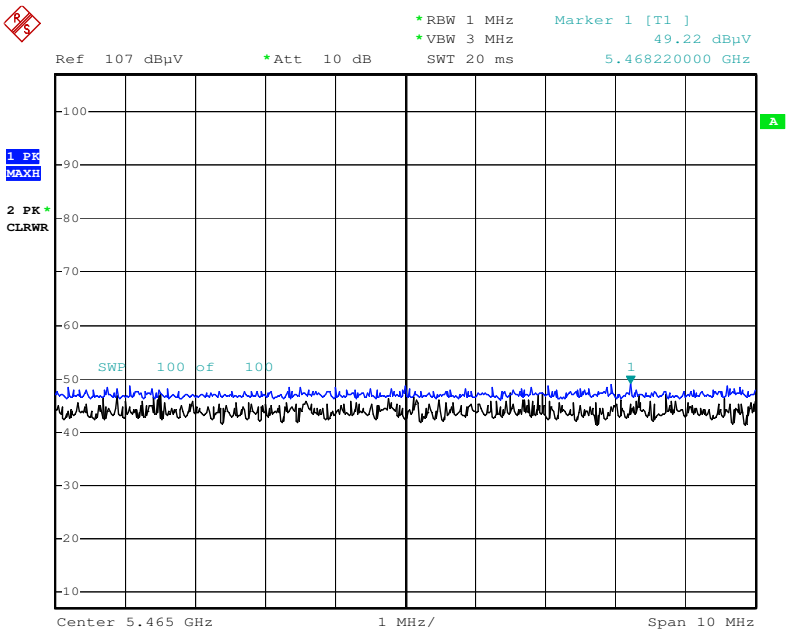
Date: 19.FEB.2016 17:01:21

Radiated Restricted Band Edges plot – Peak Reading (802.11n_20M, Ch.100)



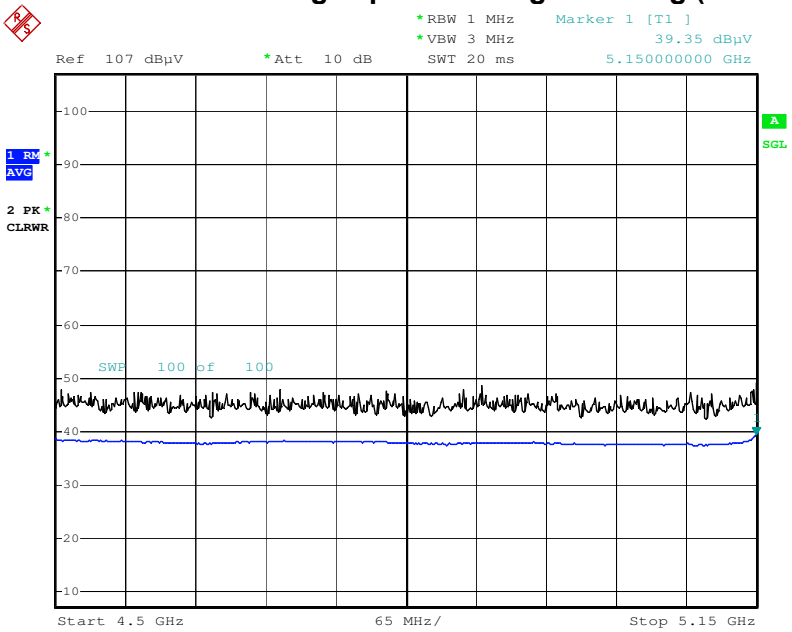
Date: 19.FEB.2016 17:02:36

Radiated Restricted Band Edges plot – Peak Reading (802.11n_20M, Ch.100)



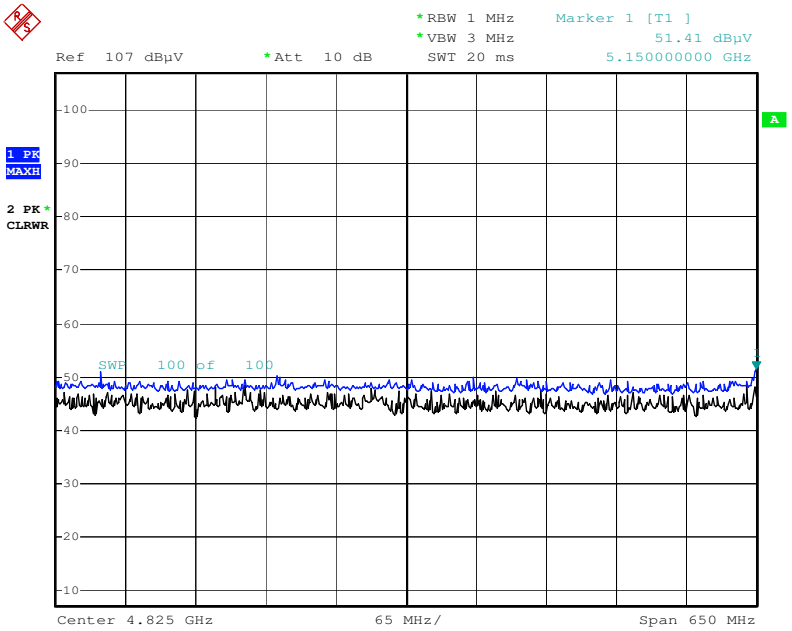
Date: 19.FEB.2016 17:03:41

Radiated Restricted Band Edges plot –Average Reading (802.11n_40M, Ch.38)



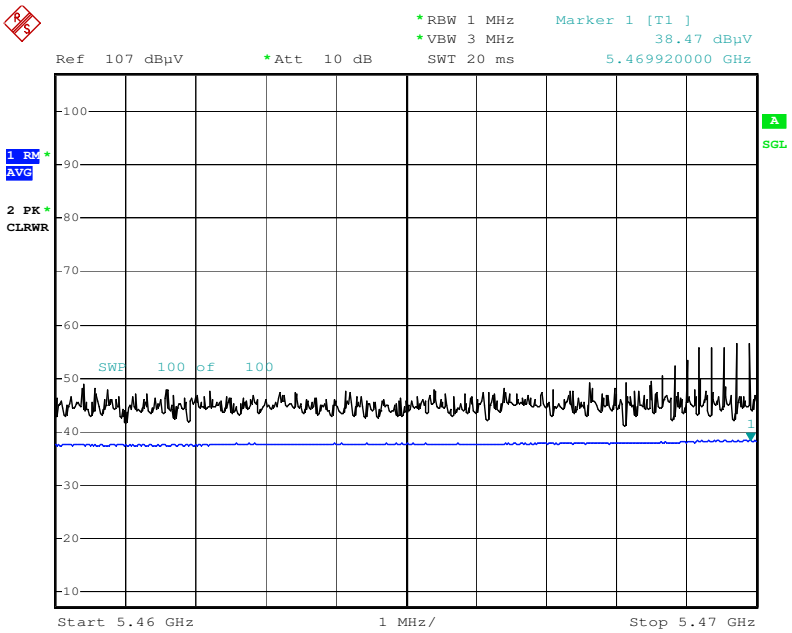
Date: 19.FEB.2016 17:19:24

Radiated Restricted Band Edges plot – Peak Reading (802.11n_40M, Ch.38)



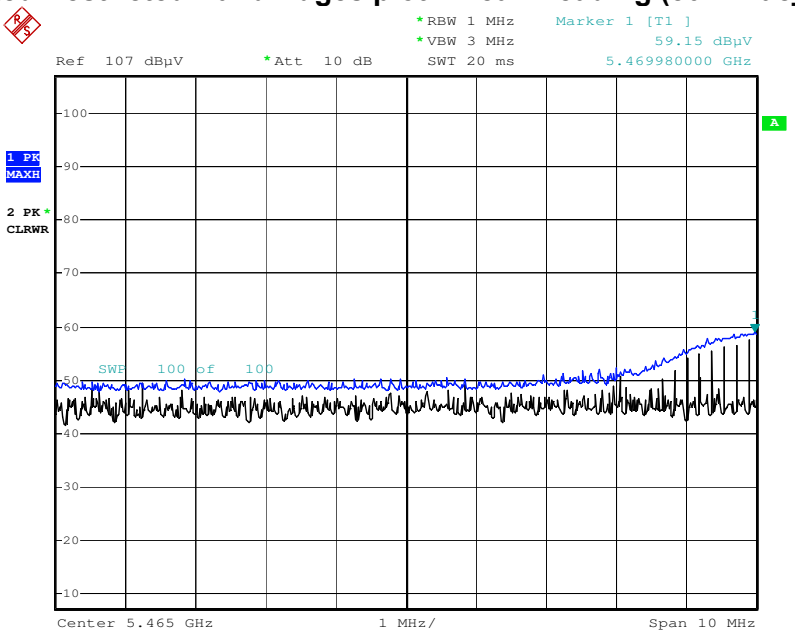
Date: 19.FEB.2016 17:20:13

Radiated Restricted Band Edges plot – Average Reading (802.11ac_80M, Ch.106)



Date: 19.FEB.2016 19:10:50

Radiated Restricted Band Edges plot – Peak Reading (802.11ac_80M, Ch.106)



Date: 19.FEB.2016 19:02:59

Note : Only the worst case plots for Radiated Restricted Band Edges.

8.7 POWERLINE CONDUCTED EMISSIONS

Test Requirements and limit, §15.207

For an intentional radiator which 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 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference groundplane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.

Sample Calculation

Quasi-peak(Final Result) = Reading Value + Correction Factor

▣ RESULT PLOTS

Conducted Emissions (Line 1)

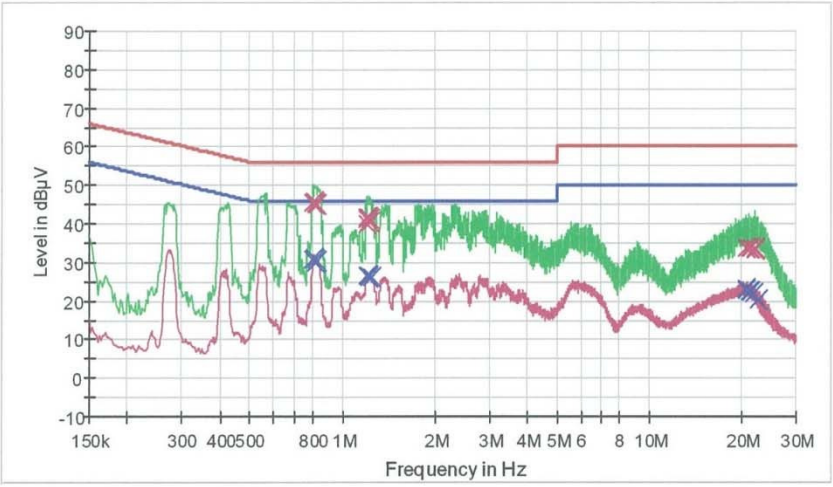
WLAN 5G_H 1 / 2

HCT TEST Report

Common Information

EUT:	SM-A9100
Manufacturer:	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions:	WLAN 5G

FCC CLASS B



FCC CLASS B_QP
Preview Result 2-AVG
FCC CLASS B_ AV
Final Result 1-QPK
Preview Result 1-PK+
Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.800000	45.4	9.000	Off	L1	9.7	10.6	56.0
0.806000	45.7	9.000	Off	L1	9.7	10.3	56.0
0.810000	45.8	9.000	Off	L1	9.7	10.2	56.0
0.816000	45.4	9.000	Off	L1	9.7	10.6	56.0
0.824000	44.9	9.000	Off	L1	9.7	11.1	56.0
0.832000	45.0	9.000	Off	L1	9.7	11.0	56.0
1.198000	40.1	9.000	Off	L1	9.7	15.9	56.0
1.202000	41.2	9.000	Off	L1	9.7	14.8	56.0
1.206000	41.6	9.000	Off	L1	9.7	14.4	56.0
1.216000	41.5	9.000	Off	L1	9.7	14.5	56.0
1.228000	41.1	9.000	Off	L1	9.7	14.9	56.0
1.238000	40.3	9.000	Off	L1	9.7	15.7	56.0
20.756000	33.7	9.000	Off	L1	10.3	26.3	60.0
21.104000	33.7	9.000	Off	L1	10.3	26.3	60.0
21.208000	33.9	9.000	Off	L1	10.3	26.1	60.0
21.462000	33.7	9.000	Off	L1	10.3	26.3	60.0
22.022000	33.3	9.000	Off	L1	10.3	26.7	60.0
22.146000	33.7	9.000	Off	L1	10.3	26.3	60.0

2/22/2016 8:46:01

WLAN 5G_H 2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.802000	30.9	9.000	Off	L1	9.7	15.1	46.0
0.808000	31.3	9.000	Off	L1	9.7	14.7	46.0
0.812000	31.1	9.000	Off	L1	9.7	14.9	46.0
0.816000	30.6	9.000	Off	L1	9.7	15.4	46.0
0.824000	30.1	9.000	Off	L1	9.7	15.9	46.0
0.832000	30.5	9.000	Off	L1	9.7	15.5	46.0
1.200000	26.6	9.000	Off	L1	9.7	19.4	46.0
1.208000	26.6	9.000	Off	L1	9.7	19.4	46.0
1.212000	26.5	9.000	Off	L1	9.7	19.5	46.0
1.218000	26.6	9.000	Off	L1	9.7	19.4	46.0
1.224000	26.2	9.000	Off	L1	9.7	19.8	46.0
1.240000	26.0	9.000	Off	L1	9.7	20.0	46.0
20.728000	22.8	9.000	Off	L1	10.3	27.2	50.0
20.756000	23.0	9.000	Off	L1	10.3	27.0	50.0
21.208000	22.5	9.000	Off	L1	10.3	27.5	50.0
21.462000	22.3	9.000	Off	L1	10.3	27.7	50.0
21.932000	21.8	9.000	Off	L1	10.3	28.2	50.0
22.546000	20.4	9.000	Off	L1	10.3	29.6	50.0

2/22/2016 8:46:01

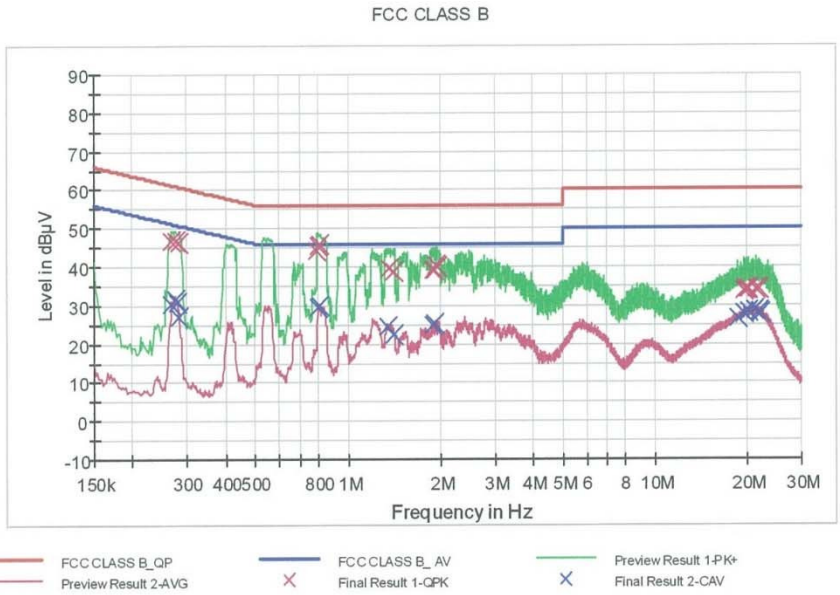
Conducted Emissions (Line 2)

EMI Auto Test(16) 1 / 2

HCT TEST Report

Common Information

EUT:	SM-A9100
Manufacturer:	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions:	WLAN 5G



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.268000	46.8	9.000	Off	N	9.6	14.4	61.2
0.278000	46.9	9.000	Off	N	9.6	14.0	60.9
0.284000	46.1	9.000	Off	N	9.6	14.6	60.7
0.796000	44.3	9.000	Off	N	9.7	11.7	56.0
0.802000	45.6	9.000	Off	N	9.7	10.4	56.0
0.808000	45.8	9.000	Off	N	9.7	10.2	56.0
1.358000	39.8	9.000	Off	N	9.7	16.2	56.0
1.418000	38.9	9.000	Off	N	9.7	17.1	56.0
1.884000	39.1	9.000	Off	N	9.7	16.9	56.0
1.920000	39.0	9.000	Off	N	9.7	17.0	56.0
1.938000	40.2	9.000	Off	N	9.7	15.8	56.0
1.954000	39.8	9.000	Off	N	9.7	16.2	56.0
19.602000	33.7	9.000	Off	N	10.3	26.3	60.0
19.736000	34.0	9.000	Off	N	10.3	26.0	60.0
19.972000	34.0	9.000	Off	N	10.3	26.0	60.0
20.116000	34.2	9.000	Off	N	10.3	25.8	60.0
21.340000	34.3	9.000	Off	N	10.3	25.7	60.0
21.796000	34.3	9.000	Off	N	10.3	25.7	60.0

2/22/2016 8:36:44

EMI Auto Test(16) 2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.268000	30.1	9.000	Off	N	9.6	21.1	51.2
0.276000	31.5	9.000	Off	N	9.6	19.4	50.9
0.280000	30.6	9.000	Off	N	9.6	20.2	50.8
0.284000	26.8	9.000	Off	N	9.6	23.9	50.7
0.802000	29.5	9.000	Off	N	9.7	16.5	46.0
0.810000	29.7	9.000	Off	N	9.7	16.3	46.0
1.348000	24.6	9.000	Off	N	9.7	21.4	46.0
1.352000	24.5	9.000	Off	N	9.7	21.5	46.0
1.418000	22.5	9.000	Off	N	9.7	23.5	46.0
1.884000	24.8	9.000	Off	N	9.7	21.2	46.0
1.904000	24.9	9.000	Off	N	9.7	21.1	46.0
1.920000	25.5	9.000	Off	N	9.7	20.5	46.0
18.624000	26.8	9.000	Off	N	10.2	23.2	50.0
19.602000	27.9	9.000	Off	N	10.3	22.1	50.0
20.116000	28.1	9.000	Off	N	10.3	21.9	50.0
21.018000	28.5	9.000	Off	N	10.3	21.5	50.0
21.796000	28.4	9.000	Off	N	10.3	21.6	50.0
22.102000	28.0	9.000	Off	N	10.3	22.0	50.0

2/22/2016 8:36:44

9. LIST OF TEST EQUIPMENT

9.1 LIST OF TEST EQUIPMENT(Conducted Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216/ LISN	12/28/2015	Annual	100073
Agilent	E4440A/ Spectrum Analyzer	03/18/2015	Annual	US45303008
Agilent	N9020A / SIGNAL ANALYZER	06/30/2015	Annual	MY51110085
Agilent	N9020A / SIGNAL ANALYZER	07/02/2015	Annual	MY50510304
Agilent	N1911A/Power Meter	07/09/2015	Annual	MY45100523
Agilent	N1921A /POWER SENSOR	07/09/2015	Annual	MY45241059
Agilent	87300B/Directional Coupler	11/30/2015	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	06/15/2015	Annual	5001
Hewlett Packard	E3632A / DC POWER SUPPLY	03/11/2015	Annual	KR75303962
Agilent	8493C / Attenuator(10 dB)	07/21/2015	Annual	07560
Rohde & Schwarz	CBT / BLUETOOTH TESTER	05/11/2015	Annual	100422

9.2 LIST OF TEST EQUIPMENT(Radiated Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Schwarzbeck	VULB 9160/ TRILOG Antenna	10/10/2014	Biennial	3368
HD	MA240/ Antenna Position Tower	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	12
Schwarzbeck	BBHA 9120D/ Horn Antenna	05/07/2015	Biennial	937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	04/30/2015	Biennial	BBHA9170124
Rohde & Schwarz	FSP / Spectrum Analyzer	01/15/2016	Annual	839117/011
Wainwright Instrument	WHF3.0/18G-10EF / High Pass Filter	06/29/2015	Annual	8
Wainwright Instrument	WHKX8-6090-7000-18000-40SS / High Pass Filter	08/05/2015	Annual	5
Wainwright Instrument	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	01/16/2016	Annual	2
Wainwright Instrument	WRCJ2400/2483.5-2370/2520-60/14SS / Band Reject Filter	06/15/2015	Annual	1
Rohde & Schwarz	LOOP ANTENNA	02/04/2016	Biennial	100179
CERNEX	CBL26405040 / POWER AMP	07/21/2015	Annual	19660
CERNEX	CBL18265035 / POWER AMP	07/27/2015	Annual	22966
CERNEX	CBL06185030 / POWER AMP	07/21/2015	Annual	22965