

FCC UNII REPORT

FCC Certification

Applicant Name:

SAMSUNG Electronics Co.,Ltd.

Date of Issue:

December 18, 2015

Test Site/Location:

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

Address:

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

Report No.: HCT-R-1512-F026

HCT FRN: 0005866421

FCC ID : A3LSMA510FD

APPLICANT : SAMSUNG Electronics Co.,Ltd.

FCC Model(s): SM-A510FD

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	13.09	0.0204
	802.11n	20	5180 – 5240	12.71	0.0187
	802.11n	40	5190 - 5230	12.39	0.0173
UNII2A	802.11a	20	5260 – 5320	12.89	0.0195
	802.11n	20	5260 – 5320	12.61	0.0182
	802.11n	40	5270 – 5310	11.85	0.0153
UNII2C	802.11a	20	5500 – 5720	12.66	0.0185
	802.11n	20	5500 – 5720	12.29	0.0169
	802.11n	40	5510 – 5710	11.79	0.0151
UNII3	802.11a	20	5745 – 5825	12.94	0.0197
	802.11n	20	5745 – 5825	12.64	0.0184
	802.11n	40	5755 – 5795	11.88	0.0154

Engineering Statement:

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

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



Report prepared by
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Test Engineer of RF Team



Approved by
: Sang Jun Lee
Manager of RF Team

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1512-F026	December 18, 2015	- First Approval Report

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1. GENERAL INFORMATION

Applicant: SAMSUNG Electronics Co.,Ltd.
Address: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID: A3LSMA510FD
EUT Type: Mobile Phone
Model name(s): SM-A510FD
Date(s) of Tests: November 30, 2015 ~ December 18, 2015
Place of Tests: HCT Co., Ltd.
 74, Seoicheon-ro 578beon-gil, Majang-myeo, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA
 (IC Recognition No. : 5944A-5)

2. EUT DESCRIPTION

FCC Model Name	SM-A510FD	
EUT Type	Mobile Phone	
Power Supply	DC 3.85 V	
Battery Information	Model: EB-BA510ABE Type: Li-ion Battery	
Frequency Range	TX_20 MHz BW:	5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2A)/ 5500 MHz - 5720 MHz (UNII 2C)/ 5745 MHz - 5825 MHz (UNII 3)
	40 MHz BW:	5190 MHz - 5230 MHz (UNII 1)/ 5270 MHz - 5310 MHz (UNII 2A)/ 5510 MHz - 5710 MHz (UNII 2C) / 5755 MHz - 5795 MHz (UNII 3)
	RX_20 MHz BW:	5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2A)/ 5500 MHz - 5720 MHz (UNII 2C)/ 5745 MHz - 5825 MHz (UNII 3)
	40 MHz BW:	5190 MHz - 5230 MHz (UNII 1)/ 5270 MHz - 5310 MHz (UNII 2A)/ 5510 MHz - 5710 MHz (UNII 2C) / 5755 MHz - 5795 MHz (UNII 3)
Modulation Type	OFDM(802.11a, 802.11n)	
Antenna Specification	Manufacturer: PARTRON CO.,LTD Antenna type: INTERNAL ANTENNA Peak Gain : 0.47 dBi (5180~5240 UNII1 BAND) / 0.65 dBi (5260~5325 UNII2A BAND) 2.21 dBi (5500~5720 UNII2C BAND) / 1.04 dBi (5745~5825 UNII3 BAND)	

3. TEST METHODOLOGY

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

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.

All equipments(spectrum, antenna, accessory, etc.) 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

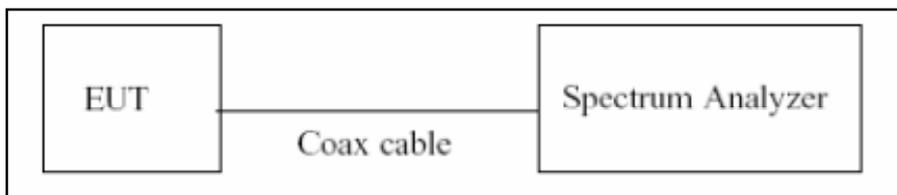
Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
26dB Bandwidth	§15.407 (for Power Measurement)	N/A	CONDUCTED	PASS
6 dB Bandwidth	§15.407(e)	>500 kHz (5725-5850 MHz)		PASS
Maximum Conducted Output Power	§15.407(a)(1)	< 250 mW (5150-5250 MHz) < 250 mW or 11+10 log log ₁₀ (BW) 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 $RBW \geq EBW$ if possible; otherwise, set RBW to the largest available value. Set $VBW \geq RBW$. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$, where T is defined in section B)1)a), and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

■ TEST CONFIGURATION



■ TEST PROCEDURE

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

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

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

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

■ **Duty Cycle Factor**

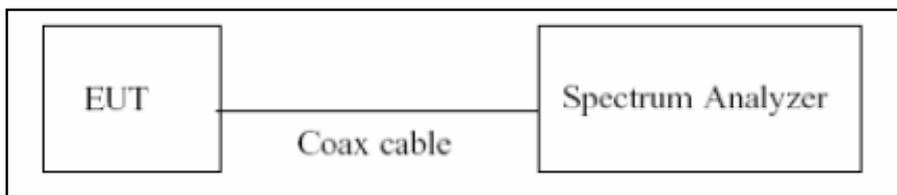
Mode	Data Rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11a	6	1.428	1.530	0.93333333	0.300
	9	0.960	1.062	0.90395480	0.439
	12	0.723	0.825	0.87636364	0.573
	18	0.492	0.594	0.82828283	0.818
	24	0.372	0.474	0.78481013	1.052
	36	0.255	0.357	0.71428571	1.461
	48	0.194	0.297	0.65319865	1.850
	54	0.180	0.282	0.63829787	1.950
802.11n_20 MHz BW	MCS 0	1.338	1.440	0.92916667	0.319
	MCS 1	0.687	0.789	0.87072243	0.601
	MCS 2	0.474	0.576	0.82291667	0.846
	MCS 3	0.363	0.465	0.78064516	1.075
	MCS 4	0.255	0.357	0.71428571	1.461
	MCS 5	0.200	0.302	0.66225166	1.790
	MCS 6	0.184	0.285	0.64561404	1.900
	MCS 7	0.167	0.268	0.62313433	2.054
802.11n_40 MHz BW	MCS 0	0.663	0.765	0.86666667	0.621
	MCS 1	0.352	0.453	0.77704194	1.096
	MCS 2	0.246	0.348	0.70689655	1.506
	MCS 3	0.196	0.297	0.65993266	1.805
	MCS 4	0.144	0.245	0.58775510	2.308
	MCS 5	0.116	0.217	0.53456221	2.720
	MCS 6	0.108	0.209	0.51674641	2.867
	MCS 7	0.100	0.201	0.49751244	3.032

8.2 EMISSION BANDWIDTH AND MINIMUM EMISSION BANDWIDTH MEASUREMENT

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

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

■ TEST CONFIGURATION



■ TEST PROCEDURE (26dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

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

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

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

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

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

The transmitter output is connected to the Spectrum Analyzer.

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

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

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

■ TEST RESULTS for 802.11a_20 MHz BW

Conducted 26 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	20.940	N/A	Pass
5200	40	21.116	N/A	Pass
5240	48	20.983	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	21.114	N/A	Pass
5300	60	21.088	N/A	Pass
5320	64	20.911	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11a

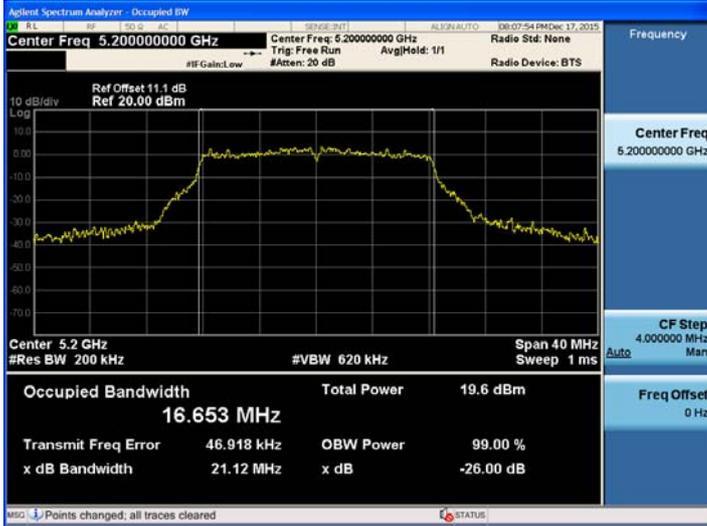
802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	21.206	N/A	Pass
5580	116	20.939	N/A	Pass
5720	144	21.096	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11a

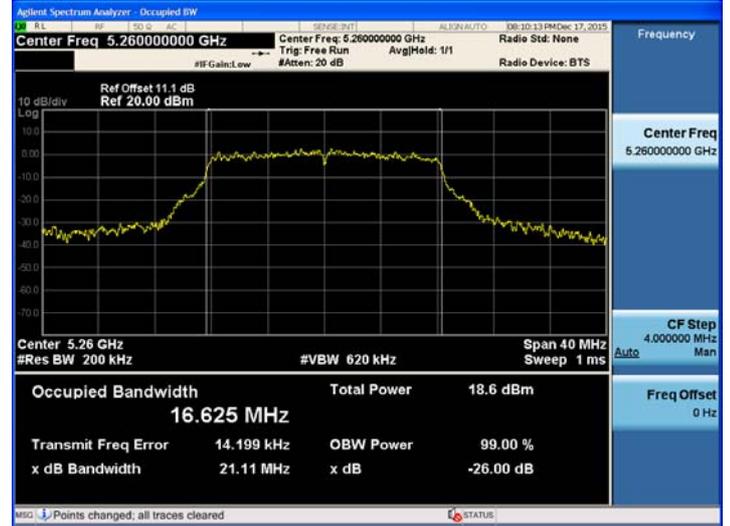
802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	21.117	N/A	Pass
5785	157	21.199	N/A	Pass
5825	165	20.893	N/A	Pass

☐ TEST Plot for 802.11a_20MHz BW

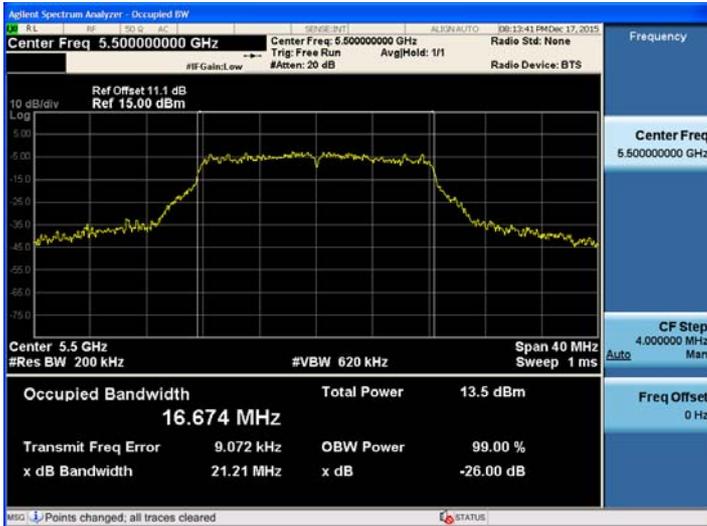
802.11a UNII 1 BAND 26dB Bandwidth (CH40)



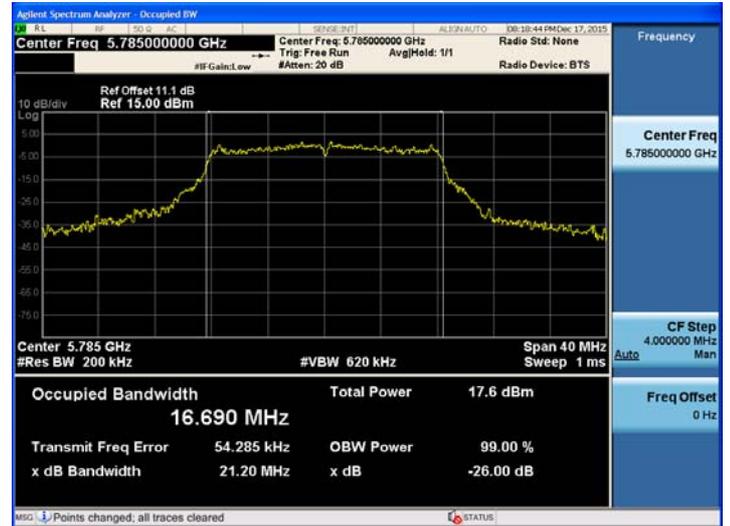
802.11a UNII 2A BAND 26dB Bandwidth (CH 52)



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



802.11a UNII 3 BAND 26dB Bandwidth (CH157)



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	21.313	N/A	Pass
5200	40	21.499	N/A	Pass
5240	48	21.244	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	21.315	N/A	Pass
5300	60	21.317	N/A	Pass
5320	64	21.529	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n 20M BW

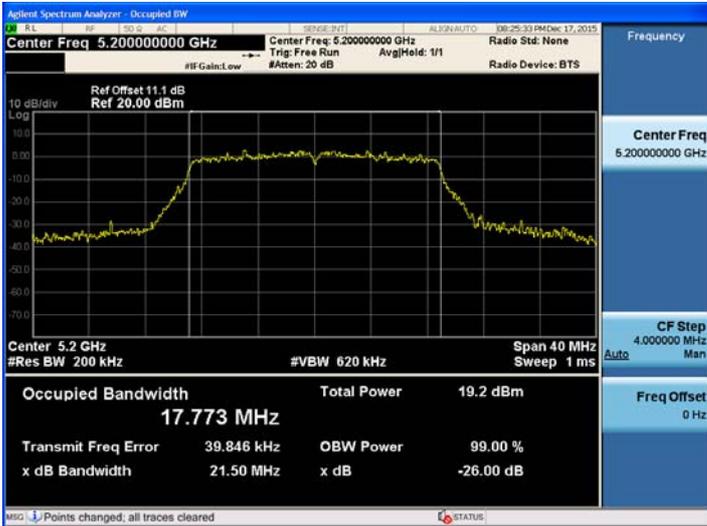
802.11n(20MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	22.957	N/A	Pass
5580	116	21.309	N/A	Pass
5720	144	21.393	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n 20M BW

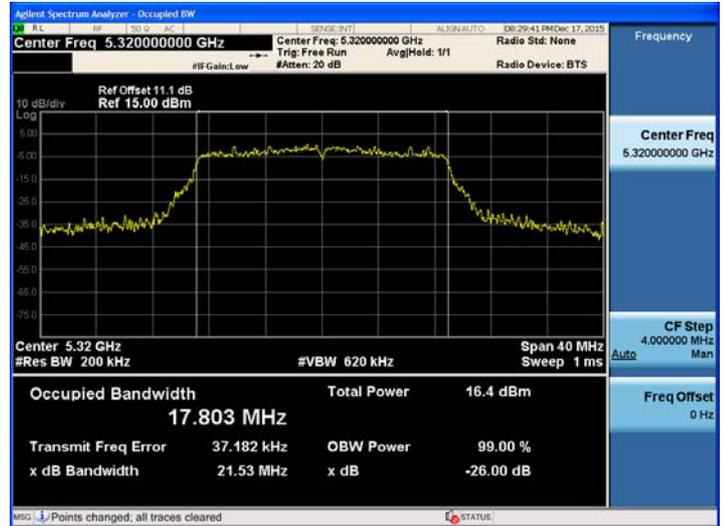
802.11n(20MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	21.980	N/A	Pass
5785	157	21.298	N/A	Pass
5825	165	21.839	N/A	Pass

TEST Plot for 802.11n_20MHz BW

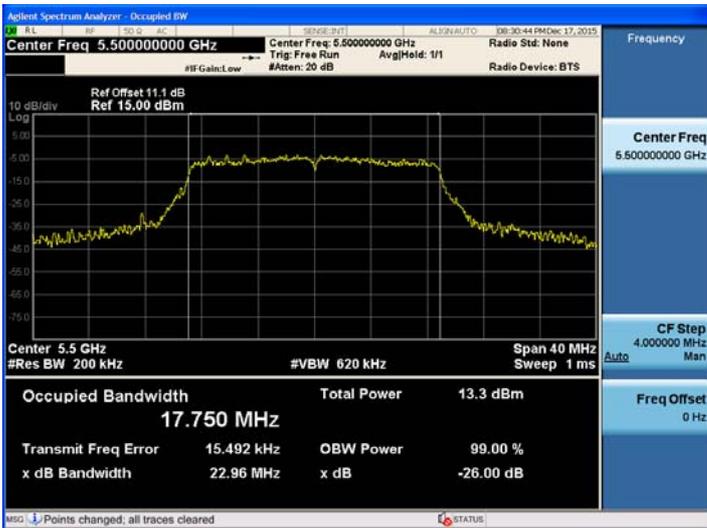
802.11n_20 MHz BW UNII 1 BAND 26dB Bandwidth(CH 40)



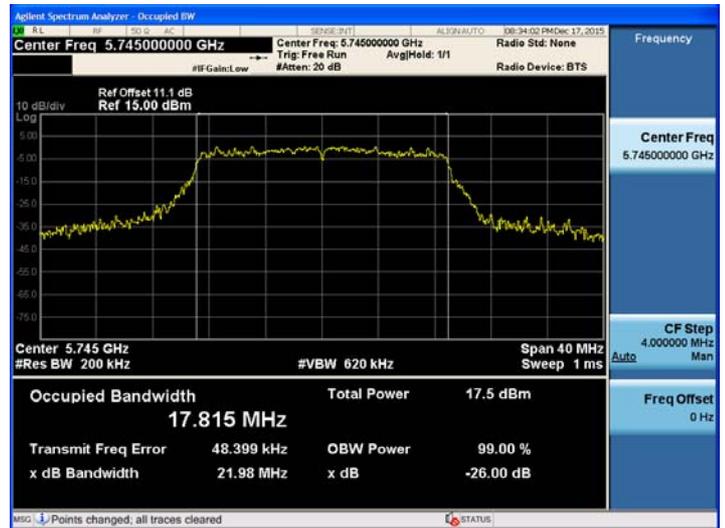
802.11n_20 MHz BW UNII 2A BAND 26dB Bandwidth(CH 64)



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



802.11n_20 MHz BW 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_40MHz BW

Conducted 26 dB Bandwidth Measurements for 802.11n_40 M BW

802.11n(40MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5190	38	39.871	N/A	Pass
5230	46	39.582	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	43.298	N/A	Pass
5310	62	39.607	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_40 M BW

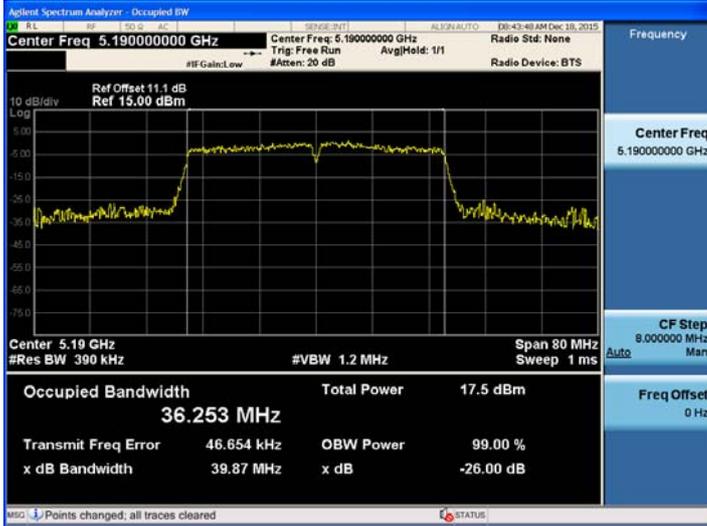
802.11n(40MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5510	102	39.547	N/A	Pass
5550	110	39.530	N/A	Pass
5710	142	39.574	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_40 M BW

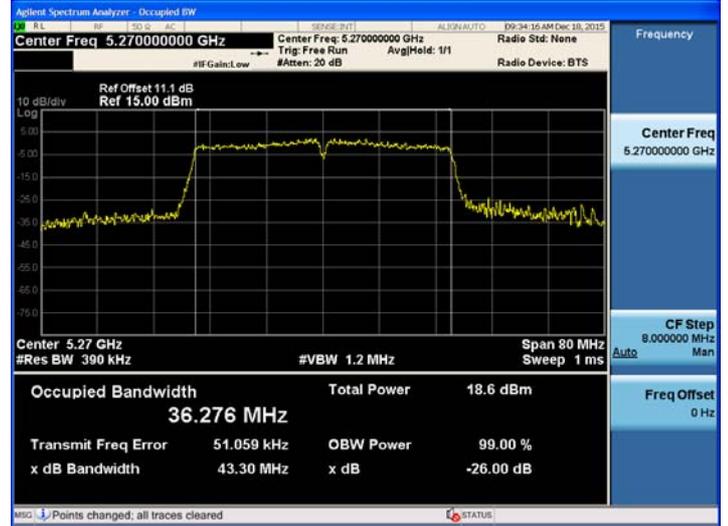
802.11n(40MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	39.596	N/A	Pass
5795	159	39.939	N/A	Pass

TEST Plot for 802.11n_40MHz BW

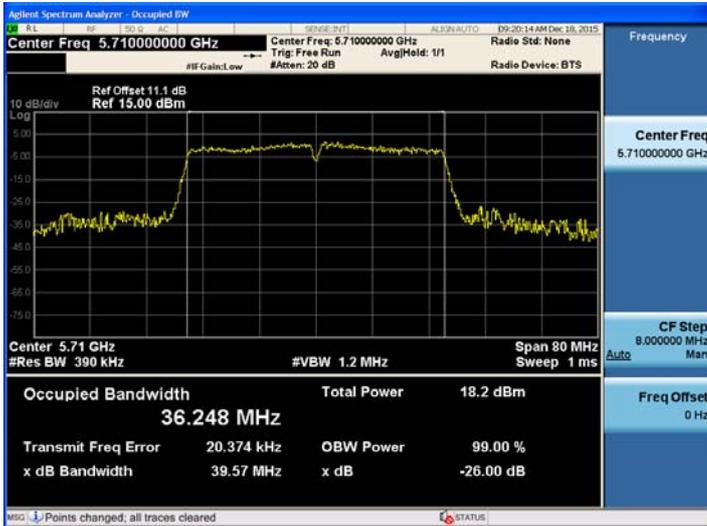
802.11n_40 MHz BW UNII 1 BAND 26dB Bandwidth(CH 38)



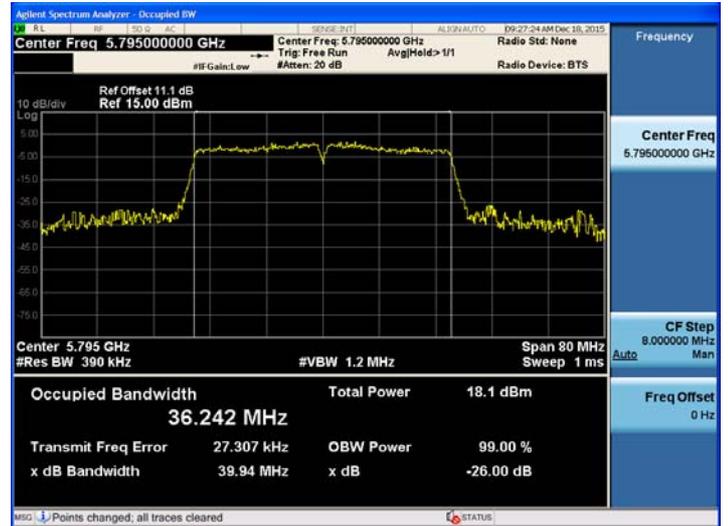
802.11n_40 MHz BW UNII 2A BAND 26dB Bandwidth (CH 54)



802.11n_40 MHz BW UNII 2C BAND 26dB Bandwidth(CH 142)



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.

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	16.114	0.5	Pass
5785	157	16.305	0.5	Pass
5825	165	16.343	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	17.564	0.5	Pass
5785	157	17.088	0.5	Pass
5825	165	17.068	0.5	Pass

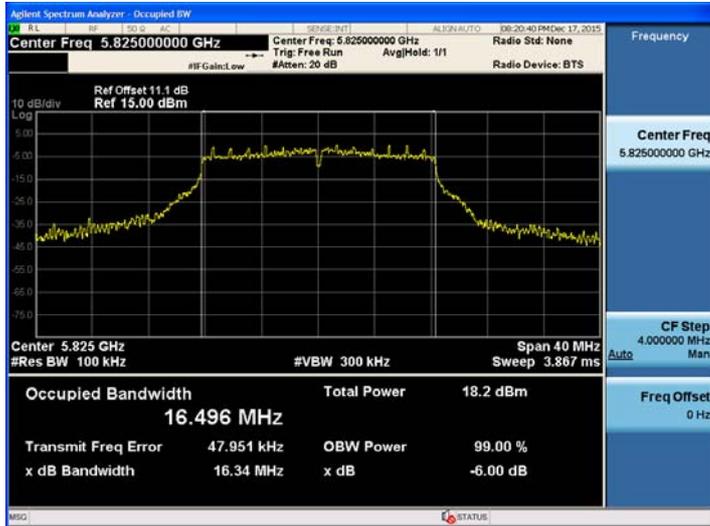
■ TEST RESULTS for 802.11n _40MHz BW

Conducted 6 dB Bandwidth Measurements for 802.11n_40MHz BW

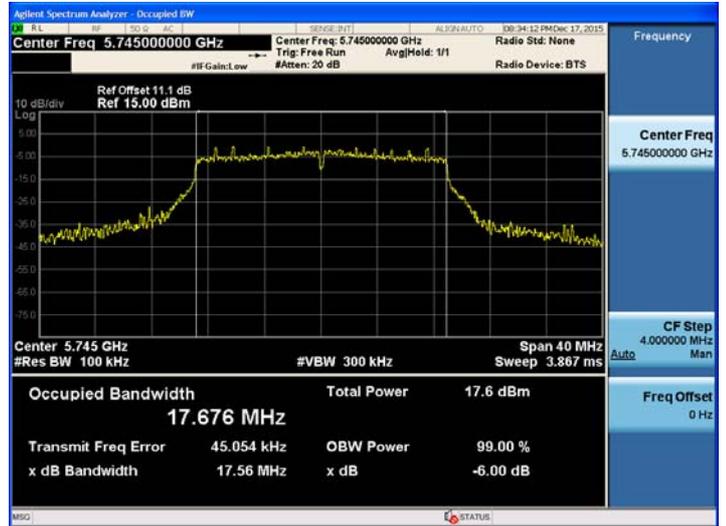
802.11n(40MHz) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.483	0.5	Pass
5795	159	36.075	0.5	Pass

☐ TEST Plot

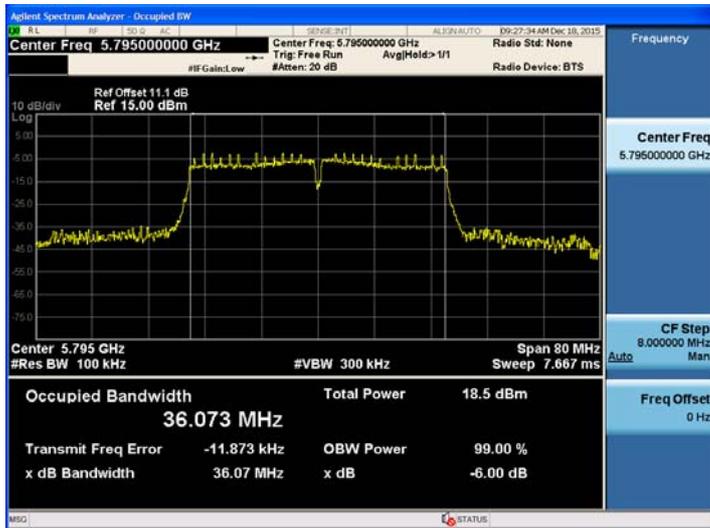
802.11a UNII 3 BAND 6dB Bandwidth (CH.165)



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



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



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

■ Straddle channels TEST RESULTS

Conducted Bandwidth Measurements for 802.11a/n_20MHz BW (UNII 2C Band)

Mode	Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
802.11a	5720	144	15.24	N/A	Pass
802.11n			15.80	N/A	Pass

Conducted Bandwidth Measurements for 802.11a/n_20MHz BW (UNII 3 Band)

Mode	Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
802.11a	5720	144	5.08	N/A	Pass
802.11n			5.68	N/A	Pass

☐ Straddle channels TEST Plot for 802.11a/n_20MHz BW

802.11a CH.144 Bandwidth



802.11n_20MHz BW CH.144 Bandwidth



■ **Straddle channels TEST RESULTS**

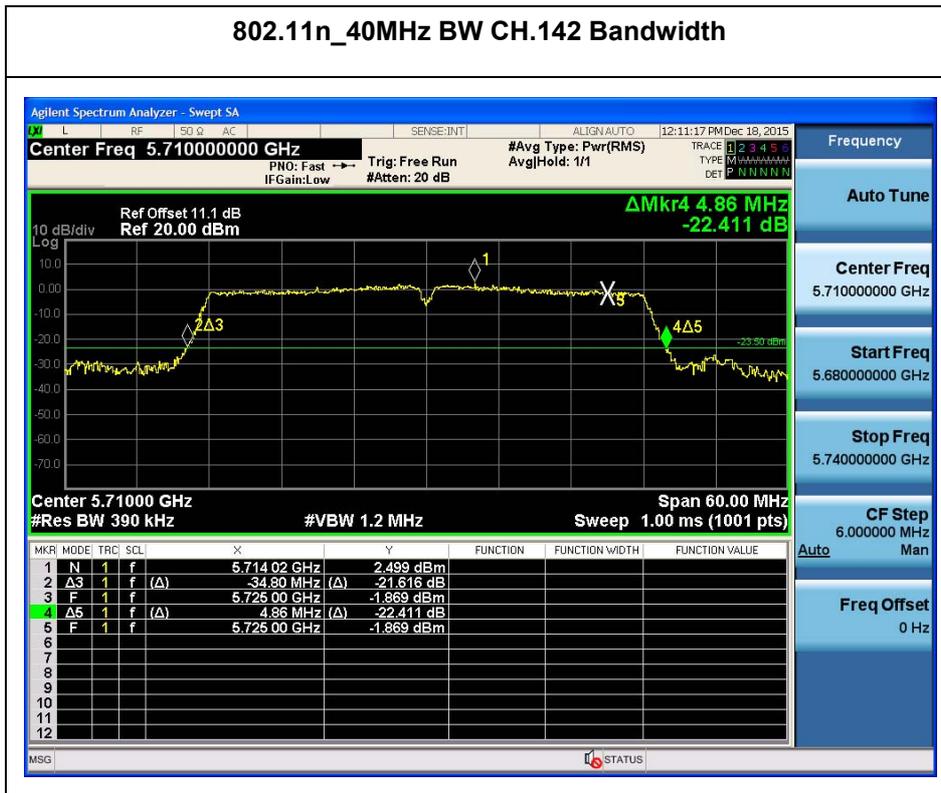
Conducted Bandwidth Measurements for 802.11n_40MHz BW (UNII 2C Band)

Mode	Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
802.11n	5710	142	34.80	N/A	Pass

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

Mode	Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
802.11n	5710	142	4.86	N/A	Pass

■ **Straddle channels TEST Plot for 802.11n_40MHz BW**



8.3 OUTPUT POWER MEASUREMENT

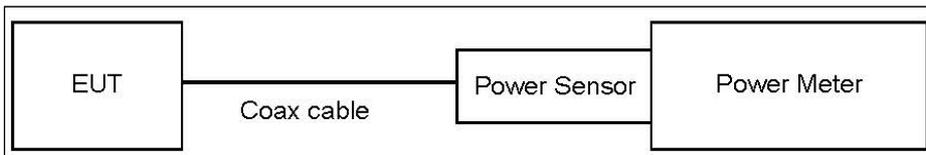
Test Requirements and limit, §15.407(a)(1)

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

■ Limit

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

■ TEST CONFIGURATION(20 MHz BW)



■ TEST PROCEDURE(20 MHz BW)

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

Note :

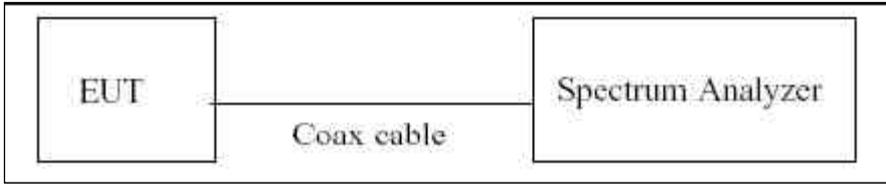
1. Actual value of loss for the attenuator and cable combination is below table.

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

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

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

■ **TEST CONFIGURATION(40 MHz BW)**



■ **TEST PROCEDURE(40 MHz BW)**

▪ Average Power

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

The Spectrum Analyzer is set to

1. Measure the duty cycle.
2. Set span to encompass the 26 dB EBW of the signal.
3. RBW = 1 MHz.
4. VBW ≥ 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	12.79	0.30	13.09	23.98
		9	12.56	0.44	13.00	23.98
		12	12.45	0.57	13.02	23.98
		18	12.22	0.82	13.04	23.98
		24	11.92	1.05	12.97	23.98
		36	11.42	1.46	12.88	23.98
		48	11.10	1.85	12.95	23.98
		54	10.94	1.95	12.89	23.98
5200	40	6	12.51	0.30	12.81	23.98
		9	12.34	0.44	12.78	23.98
		12	12.26	0.57	12.83	23.98
		18	12.05	0.82	12.87	23.98
		24	11.79	1.05	12.84	23.98
		36	11.43	1.46	12.89	23.98
		48	11.17	1.85	13.02	23.98
		54	11.01	1.95	12.96	23.98
5240	48	6	12.48	0.30	12.78	23.98
		9	12.35	0.44	12.79	23.98
		12	12.23	0.57	12.80	23.98
		18	12.02	0.82	12.84	23.98
		24	11.74	1.05	12.79	23.98
		36	11.16	1.46	12.62	23.98
		48	10.95	1.85	12.80	23.98
		54	10.79	1.95	12.74	23.98

802.11a _20MHz BW (UNII 2A)

■ TEST RESULTS

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

802.11a Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5260	52	6	12.51	0.30	12.81	23.98
		9	12.41	0.44	12.85	23.98
		12	12.31	0.57	12.88	23.98
		18	12.07	0.82	12.89	23.98
		24	11.76	1.05	12.81	23.98
		36	11.41	1.46	12.87	23.98
		48	10.96	1.85	12.81	23.98
		54	10.78	1.95	12.73	23.98
5300	60	6	12.44	0.30	12.74	23.98
		9	12.27	0.44	12.71	23.98
		12	12.13	0.57	12.70	23.98
		18	11.91	0.82	12.73	23.98
		24	11.66	1.05	12.71	23.98
		36	11.28	1.46	12.74	23.98
		48	10.86	1.85	12.71	23.98
		54	10.74	1.95	12.69	23.98
5320	64	6	12.38	0.30	12.68	23.98
		9	12.20	0.44	12.64	23.98
		12	12.13	0.57	12.70	23.98
		18	11.73	0.82	12.55	23.98
		24	11.47	1.05	12.52	23.98
		36	11.06	1.46	12.52	23.98
		48	10.81	1.85	12.66	23.98
		54	10.68	1.95	12.63	23.98

802.11a _20MHz BW (UNII 2C)

■ TEST RESULTS

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

802.11a Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5500	100	6	11.85	0.30	12.15	23.98
		9	11.80	0.44	12.24	23.98
		12	11.71	0.57	12.28	23.98
		18	11.45	0.82	12.27	23.98
		24	11.20	1.05	12.25	23.98
		36	10.63	1.46	12.09	23.98
		48	10.46	1.85	12.31	23.98
		54	10.31	1.95	12.26	23.98
5580	116	6	12.04	0.30	12.34	23.98
		9	11.82	0.44	12.26	23.98
		12	11.74	0.57	12.31	23.98
		18	11.55	0.82	12.37	23.98
		24	11.27	1.05	12.32	23.98
		36	10.77	1.46	12.23	23.98
		48	10.58	1.85	12.43	23.98
		54	10.43	1.95	12.38	23.98
5720	144	6	12.23	0.30	12.53	23.98
		9	12.08	0.44	12.52	23.98
		12	12.06	0.57	12.63	23.98
		18	11.80	0.82	12.62	23.98
		24	11.36	1.05	12.41	23.98
		36	11.02	1.46	12.48	23.98
		48	10.65	1.85	12.50	23.98
		54	10.71	1.95	12.66	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	12.60	0.30	12.90	30
		9	12.25	0.44	12.69	30
		12	12.17	0.57	12.74	30
		18	11.97	0.82	12.79	30
		24	11.74	1.05	12.79	30
		36	11.27	1.46	12.73	30
		48	11.03	1.85	12.88	30
		54	10.89	1.95	12.84	30
5785	157	6	12.54	0.30	12.84	30
		9	12.38	0.44	12.82	30
		12	12.26	0.57	12.83	30
		18	12.05	0.82	12.87	30
		24	11.66	1.05	12.71	30
		36	11.25	1.46	12.71	30
		48	11.05	1.85	12.90	30
		54	10.89	1.95	12.84	30
5825	165	6	12.56	0.30	12.86	30
		9	12.36	0.44	12.80	30
		12	12.37	0.57	12.94	30
		18	12.02	0.82	12.84	30
		24	11.79	1.05	12.84	30
		36	11.25	1.46	12.71	30
		48	11.00	1.85	12.85	30
		54	10.84	1.95	12.79	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	12.31	0.32	12.63	23.98
		1	12.02	0.60	12.62	23.98
		2	11.82	0.85	12.67	23.98
		3	11.40	1.08	12.48	23.98
		4	11.05	1.46	12.51	23.98
		5	10.78	1.79	12.57	23.98
		6	10.69	1.90	12.59	23.98
		7	10.58	2.05	12.63	23.98
5200	40	0	12.29	0.32	12.61	23.98
		1	12.00	0.60	12.60	23.98
		2	11.79	0.85	12.64	23.98
		3	11.41	1.08	12.49	23.98
		4	11.25	1.46	12.71	23.98
		5	10.72	1.79	12.51	23.98
		6	10.65	1.90	12.55	23.98
		7	10.54	2.05	12.59	23.98
5240	48	0	12.10	0.32	12.42	23.98
		1	11.81	0.60	12.41	23.98
		2	11.61	0.85	12.46	23.98
		3	11.43	1.08	12.51	23.98
		4	11.10	1.46	12.56	23.98
		5	10.61	1.79	12.40	23.98
		6	10.56	1.90	12.46	23.98
		7	10.40	2.05	12.45	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	12.15	0.32	12.47	23.98
		1	11.87	0.60	12.47	23.98
		2	11.65	0.85	12.50	23.98
		3	11.45	1.08	12.53	23.98
		4	11.15	1.46	12.61	23.98
		5	10.64	1.79	12.43	23.98
		6	10.53	1.90	12.43	23.98
		7	10.42	2.05	12.47	23.98
5300	60	0	12.03	0.32	12.35	23.98
		1	11.76	0.60	12.36	23.98
		2	11.50	0.85	12.35	23.98
		3	11.37	1.08	12.45	23.98
		4	10.83	1.46	12.29	23.98
		5	10.54	1.79	12.33	23.98
		6	10.46	1.90	12.36	23.98
		7	10.35	2.05	12.40	23.98
5320	64	0	12.06	0.32	12.38	23.98
		1	11.76	0.60	12.36	23.98
		2	11.54	0.85	12.39	23.98
		3	11.15	1.08	12.23	23.98
		4	10.84	1.46	12.30	23.98
		5	10.56	1.79	12.35	23.98
		6	10.47	1.90	12.37	23.98
		7	10.32	2.05	12.37	23.98

802.11n _20MHz BW (UNII 2C)

■ TEST RESULTS

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

802.11n(20MHz) Mode		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	11.52	0.32	11.84	23.98
		1	11.32	0.60	11.92	23.98
		2	11.10	0.85	11.95	23.98
		3	10.72	1.08	11.80	23.98
		4	10.44	1.46	11.90	23.98
		5	10.16	1.79	11.95	23.98
		6	10.06	1.90	11.96	23.98
		7	9.96	2.05	12.01	23.98
5580	116	0	11.65	0.32	11.97	23.98
		1	11.42	0.60	12.02	23.98
		2	11.21	0.85	12.06	23.98
		3	11.00	1.08	12.08	23.98
		4	10.62	1.46	12.08	23.98
		5	10.14	1.79	11.93	23.98
		6	10.05	1.90	11.95	23.98
		7	9.96	2.05	12.01	23.98
5720	144	0	11.91	0.32	12.23	23.98
		1	11.58	0.60	12.18	23.98
		2	11.32	0.85	12.17	23.98
		3	10.99	1.08	12.07	23.98
		4	10.70	1.46	12.16	23.98
		5	10.41	1.79	12.20	23.98
		6	10.31	1.90	12.21	23.98
		7	10.24	2.05	12.29	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	12.17	0.32	12.49	30
		1	11.89	0.60	12.49	30
		2	11.52	0.85	12.37	30
		3	11.49	1.08	12.57	30
		4	11.06	1.46	12.52	30
		5	10.79	1.79	12.58	30
		6	10.53	1.90	12.43	30
		7	10.37	2.05	12.42	30
5785	157	0	12.15	0.32	12.47	30
		1	11.90	0.60	12.50	30
		2	11.70	0.85	12.55	30
		3	11.39	1.08	12.47	30
		4	11.10	1.46	12.56	30
		5	10.85	1.79	12.64	30
		6	10.57	1.90	12.47	30
		7	10.46	2.05	12.51	30
5825	165	0	12.22	0.32	12.54	30
		1	11.90	0.60	12.50	30
		2	11.73	0.85	12.58	30
		3	11.45	1.08	12.53	30
		4	11.06	1.46	12.52	30
		5	10.82	1.79	12.61	30
		6	10.55	1.90	12.45	30
		7	10.45	2.05	12.50	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	11.66	0.62	12.28	23.98
		1	11.23	1.10	12.32	23.98
		2	10.88	1.51	12.39	23.98
		3	10.46	1.81	12.26	23.98
		4	10.04	2.31	12.35	23.98
		5	9.54	2.72	12.26	23.98
		6	9.43	2.87	12.30	23.98
		7	9.35	3.03	12.38	23.98
5230	46	0	11.23	0.62	11.85	23.98
		1	10.74	1.10	11.84	23.98
		2	10.24	1.51	11.74	23.98
		3	9.92	1.81	11.72	23.98
		4	9.53	2.31	11.84	23.98
		5	9.19	2.72	11.91	23.98
		6	8.84	2.87	11.70	23.98
		7	8.78	3.03	11.82	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	11.12	0.62	11.74	23.98
		1	10.68	1.10	11.77	23.98
		2	10.30	1.51	11.81	23.98
		3	9.93	1.81	11.74	23.98
		4	9.44	2.31	11.75	23.98
		5	9.04	2.72	11.76	23.98
		6	8.98	2.87	11.85	23.98
		7	8.74	3.03	11.77	23.98
5310	62	0	10.94	0.62	11.57	23.98
		1	10.64	1.10	11.73	23.98
		2	10.23	1.51	11.74	23.98
		3	9.99	1.81	11.79	23.98
		4	9.41	2.31	11.72	23.98
		5	9.05	2.72	11.77	23.98
		6	8.98	2.87	11.85	23.98
		7	8.76	3.03	11.79	23.98

802.11n _40MHz BW (UNII 2C)

■ TEST RESULTS

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

802.11n(40MHz) Mode		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	9.98	0.62	10.60	23.98
		1	9.52	1.10	10.61	23.98
		2	9.23	1.51	10.74	23.98
		3	8.76	1.81	10.56	23.98
		4	8.32	2.31	10.63	23.98
		5	7.97	2.72	10.69	23.98
		6	7.87	2.87	10.74	23.98
		7	7.62	3.03	10.65	23.98
5550	110	0	10.41	0.62	11.03	23.98
		1	9.93	1.10	11.03	23.98
		2	9.66	1.51	11.17	23.98
		3	9.13	1.81	10.94	23.98
		4	8.76	2.31	11.07	23.98
		5	8.26	2.72	10.98	23.98
		6	8.09	2.87	10.96	23.98
		7	7.93	3.03	10.96	23.98
5710	142	0	11.16	0.62	11.79	23.98
		1	10.65	1.10	11.75	23.98
		2	10.19	1.51	11.70	23.98
		3	9.97	1.81	11.77	23.98
		4	9.34	2.31	11.65	23.98
		5	8.99	2.72	11.71	23.98
		6	8.90	2.87	11.77	23.98
		7	8.64	3.03	11.67	23.98

802.11n_40MHz BW (UNII 3)

■ TEST RESULTS

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

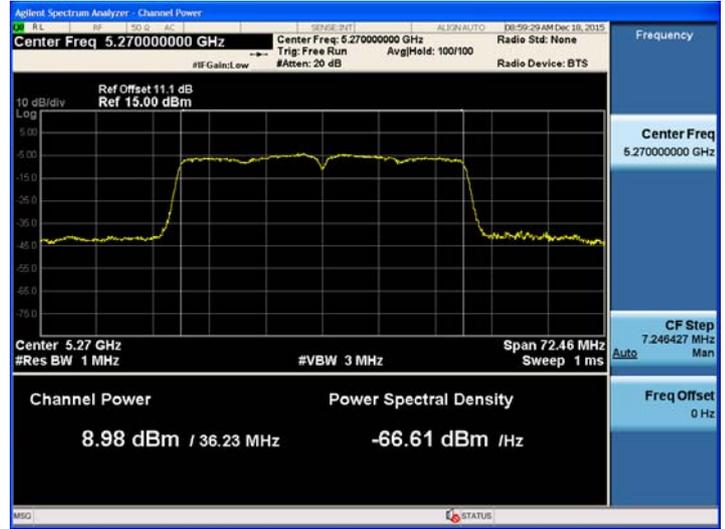
802.11n(40MHz) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5755	151	0	11.21	0.62	11.83	30
		1	10.60	1.10	11.69	30
		2	10.34	1.51	11.84	30
		3	10.07	1.81	11.88	30
		4	9.46	2.31	11.76	30
		5	9.14	2.72	11.86	30
		6	8.91	2.87	11.78	30
		7	8.81	3.03	11.84	30
5795	159	0	10.85	0.62	11.47	30
		1	10.48	1.10	11.58	30
		2	10.03	1.51	11.53	30
		3	9.61	1.81	11.42	30
		4	9.24	2.31	11.55	30
		5	8.69	2.72	11.41	30
		6	8.70	2.87	11.57	30
		7	8.47	3.03	11.50	30

▣ TEST Plot for 802.11n_40MHz BW

**802.11n_40 MHz BW UNII 1 BAND Average Power
(5190 MHz ~5230 MHz) CH 38 MCS2**



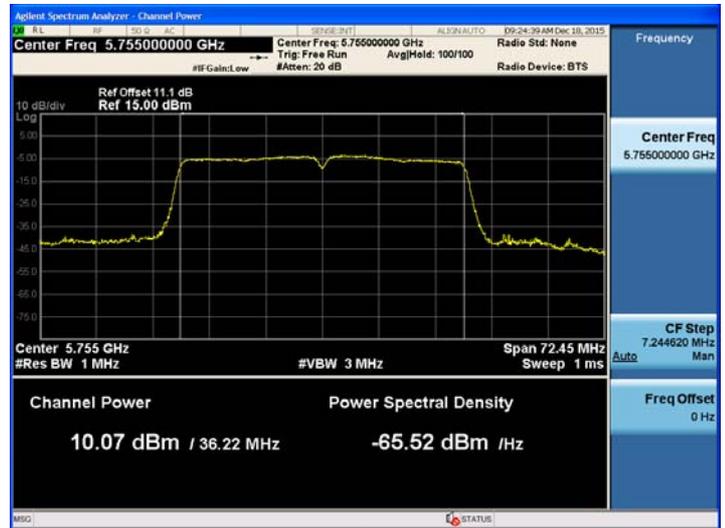
**802.11n_40 MHz BW UNII 2A BAND Average Power
(5270 MHz ~5310 MHz) CH 54 MCS6**



**802.11n_40 MHz BW UNII 2C BAND Average Power
(5510 MHz ~5710 MHz) CH 142 MCS0**



**802.11n_40 MHz BW UNII 3 BAND Average Power
(5755 MHz ~5795 MHz) CH 151 MCS3**



■ **Straddle channels TEST RESULTS**

Conducted Output Power Measurements (802.11a/n _20M Mode: UNII 2C Band 5720MHz)

Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11a	5720	144	11.99	1.95	13.94	23.98
802.11n			11.42	2.05	13.47	23.98

Conducted Output Power Measurements (802.11a/n _20M Mode: UNII 3 Band 5720MHz)

Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11a	5720	144	4.51	1.95	6.46	30.00
802.11n			4.47	2.05	6.52	30.00

☐ Straddle channels TEST Plot for 802.11a/n_20MHz BW

802.11a UNII 2C Band Average Power CH.144



802.11a UNII 3 Band Average Power CH.144



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



802.11n_20MHz BW UNII 3 Band Average Power CH.144



▣ Straddle channels TEST RESULTS

Conducted Output Power Measurements (802.11n_40M Mode: UNII 2C Band 5710MHz)

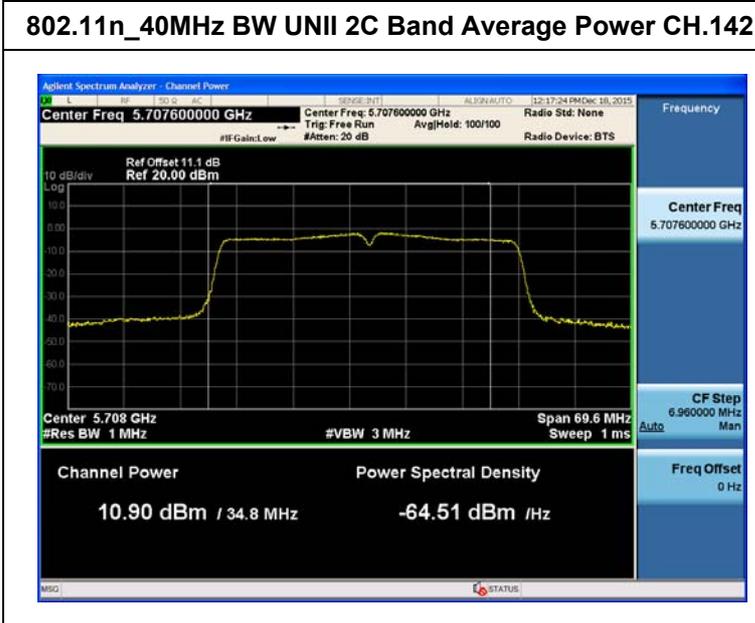
Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11n	5710	142	10.90	0.62	11.52	23.98

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

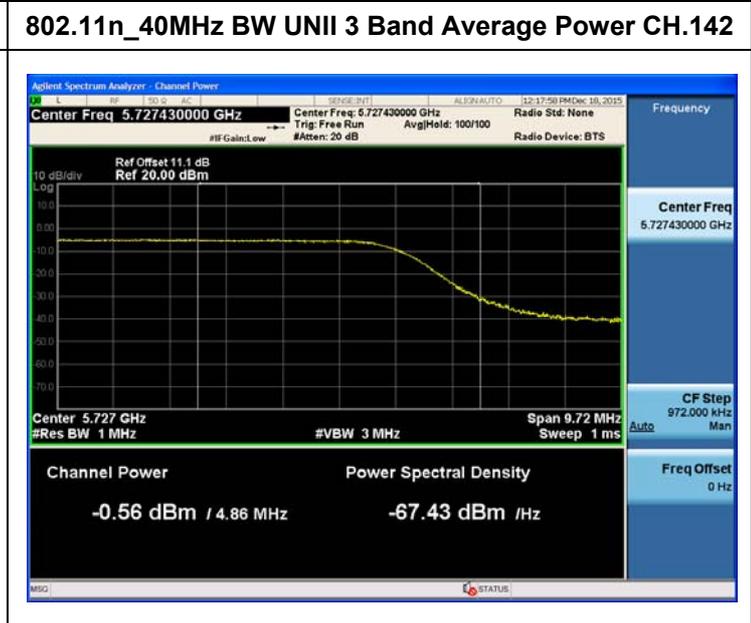
Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11n	5710	142	-0.56	0.62	0.06	30.00

▣ Straddle channels TEST Plot for 802.11n_40MHz BW

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



802.11n_40MHz BW UNII 3 Band Average Power CH.142



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.

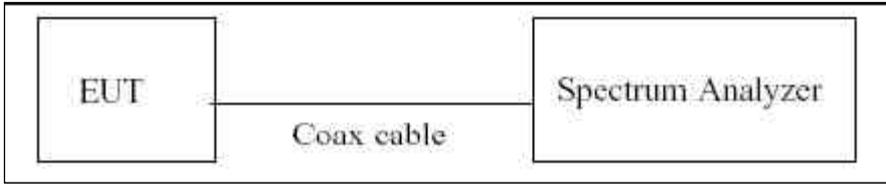
■ Limit(CDD)

Power Spectral Density

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

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

■ TEST CONFIGURATION



■ TEST PROCEDURE

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

The spectrum analyzer is set to :

1. Set span to encompass the entire emission bandwidth(EBW) of the signal.
2. RBW = 1 MHz(510 kHz for UNII 3)
3. VBW ≥ 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

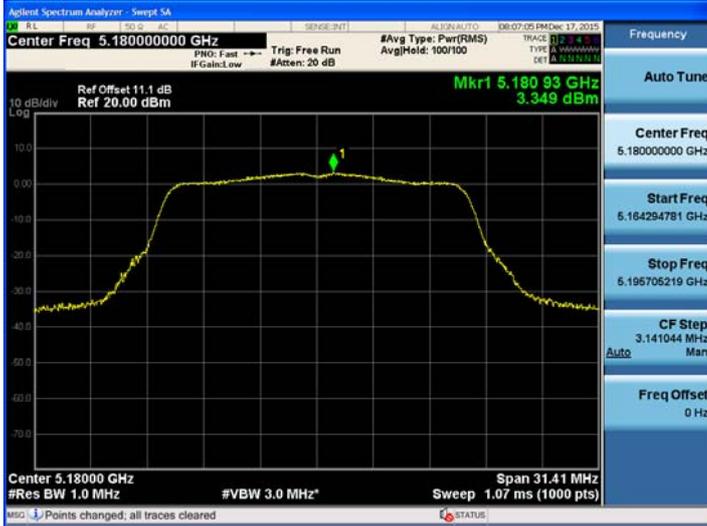
■ TEST RESULTS

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	3.349	0.300	3.649	11	Pass
5200	40		1.586	1.850	3.436		Pass
5240	48		1.639	0.818	2.457		Pass
5260	52		1.278	0.818	2.096	11	Pass
5300	60		-0.536	1.461	0.925		Pass
5320	64		-0.171	0.573	0.402		Pass
5500	100		-4.999	1.850	-3.149	11	Pass
5580	116		-3.701	1.850	-1.851		Pass
5720	144		-0.524	1.950	1.426		Pass
5745	149		-2.032	0.300	-1.732	30	Pass
5785	157		-2.891	1.850	-1.041		Pass
5825	165		-1.399	0.573	-0.826		Pass

TEST Plot for 802.11a 20MHz BW

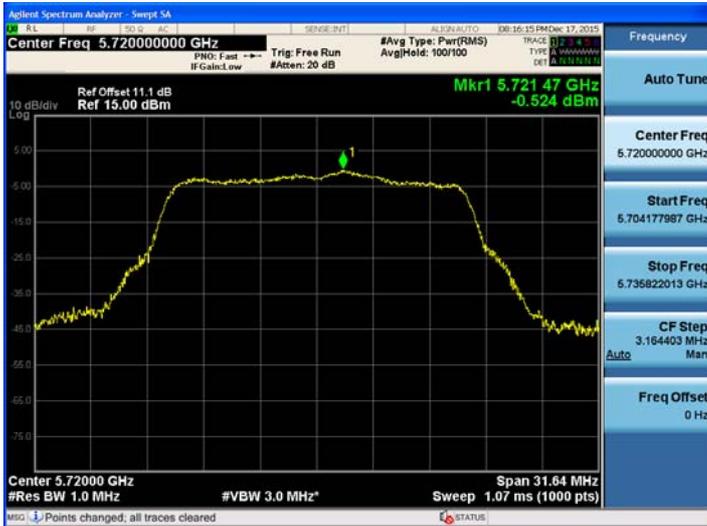
802.11a_20MHz BW UNII 1 BAND PSD CH 36



802.11a_20MHz BW UNII 2A BAND PSD CH 52



802.11a_20MHz BW UNII 2C BAND PSD CH 144



802.1a_20MHz BW UNII 3 BAND PSD CH 165



■802.11n_20MHz BW

■ TEST RESULTS

Conducted Power Density Measurements

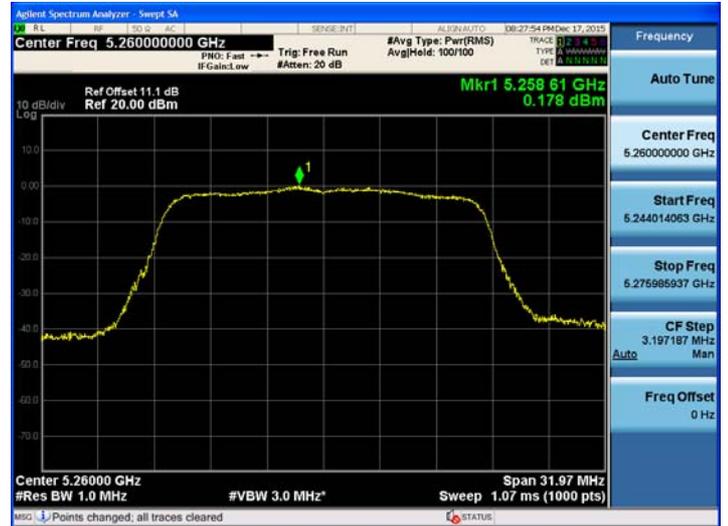
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5180	36	802.11n 20M BW	1.999	0.846	2.845	11	Pass
5200	40		1.010	1.461	2.471		Pass
5240	48		0.242	1.461	1.703		Pass
5260	52		0.178	1.461	1.639	11	Pass
5300	60		-1.035	1.075	0.040		Pass
5320	64		-0.730	0.846	0.116		Pass
5500	100		-5.769	2.054	-3.715	11	Pass
5580	116		-3.535	1.461	-2.074		Pass
5720	144		-1.914	2.054	0.140		Pass
5745	149		-3.774	1.790	-1.984	30	Pass
5785	157		-3.389	1.790	-1.599		Pass
5825	165		-3.159	1.790	-1.369		Pass

TEST Plot for 802.11n 20MHz BW

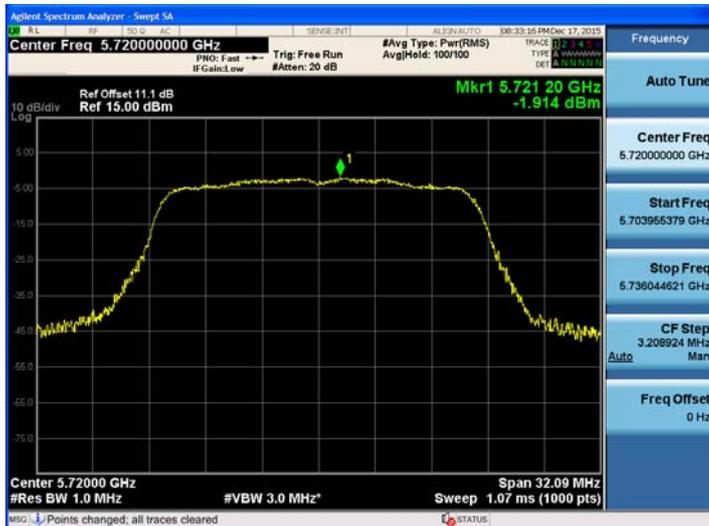
802.11n_20MHz BW UNII 1 BAND PSD CH 36



802.11n_20MHz BW UNII 2A BAND PSD CH 52



802.11n_20MHz BW UNII 2C BAND PSD CH 144



802.11n_20MHz BW UNII 3 BAND PSD CH 165



■ 802.11n_40MHz BW

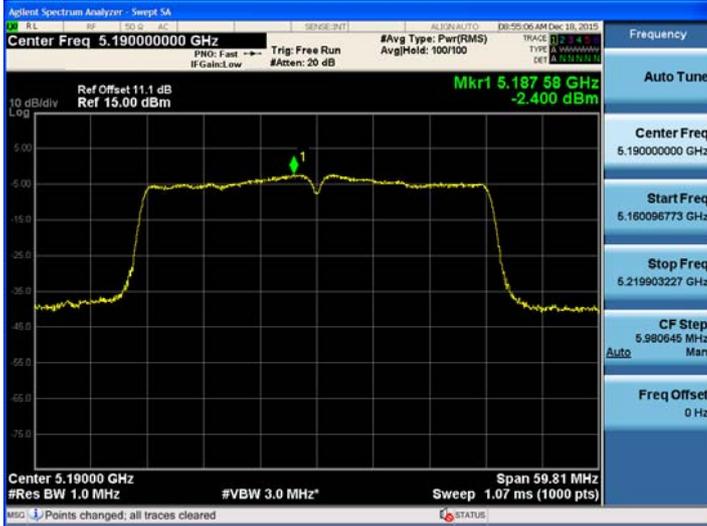
■ TEST RESULTS

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	-2.400	1.506	-0.894	11	Pass
5230	46		-4.238	2.720	-1.518		Pass
5270	54		-3.712	2.867	-0.845	11	Pass
5310	62		-4.207	2.867	-1.340		Pass
5510	102		-4.033	1.506	-2.527	11	Pass
5550	110		-3.537	1.506	-2.031		Pass
5710	142		-2.307	0.621	-1.686		Pass
5755	151		-5.983	1.805	-4.178	30	Pass
5795	159		-6.157	1.096	-5.061		Pass

TEST Plot for 802.11n 40MHz BW

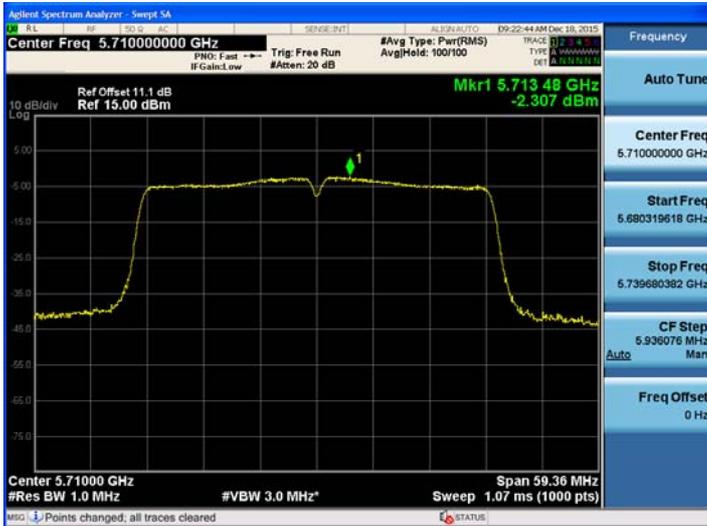
802.11n_40MHz BW UNII 1 BAND PSD CH 38



802.11n_40MHz BW UNII 2A BAND PSD CH 54



802.11n_40MHz BW UNII 2C BAND PSD CH 142



802.11n_40MHz BW UNII 3 BAND PSD CH 151



▣ **Straddle channels TEST RESULTS**

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

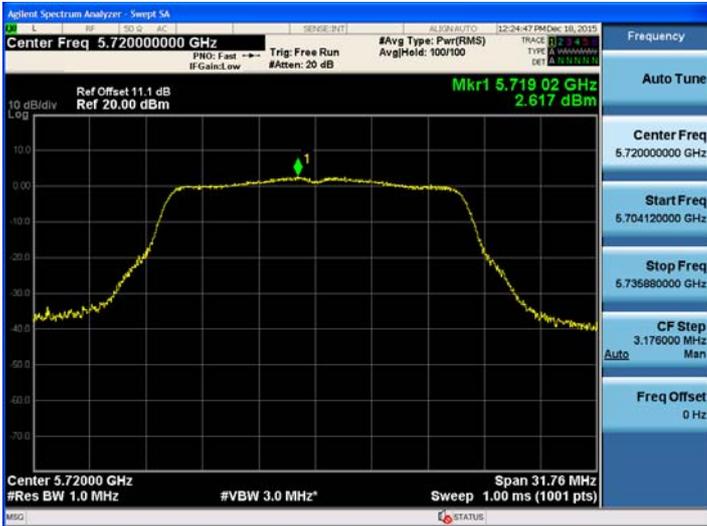
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5720	144	802.11a	2.617	1.95	4.567	11	Pass
		802.11n	1.851	2.05	3.901		Pass

Conducted Power Density Measurements (UNII 3 Band 5720MHz)

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5720	144	802.11a	-2.819	1.95	-0.869	30	Pass
		802.11n	-3.739	2.05	-1.689		Pass

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

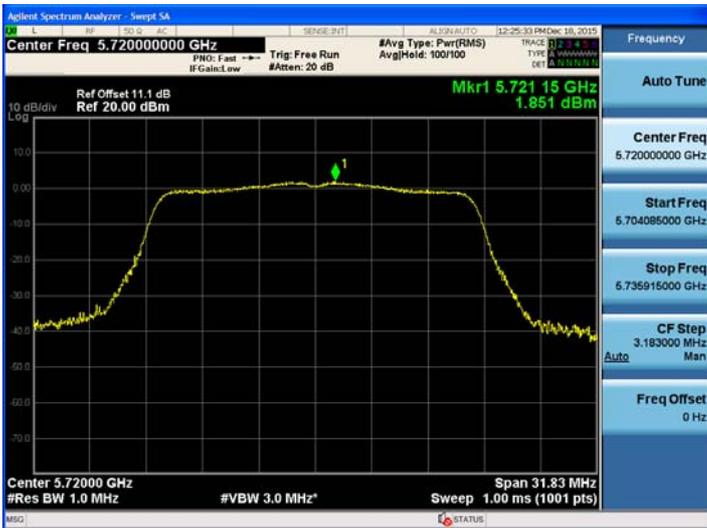
802.11a UNII 2C Band PSD CH.144



802.11a UNII 3 Band PSD CH.144



802.11n_20MHz BW UNII 2C Band PSD CH.144



802.11n_20MHz BW UNII 3 Band PSD CH.144



■ **Straddle channels TEST RESULTS**

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

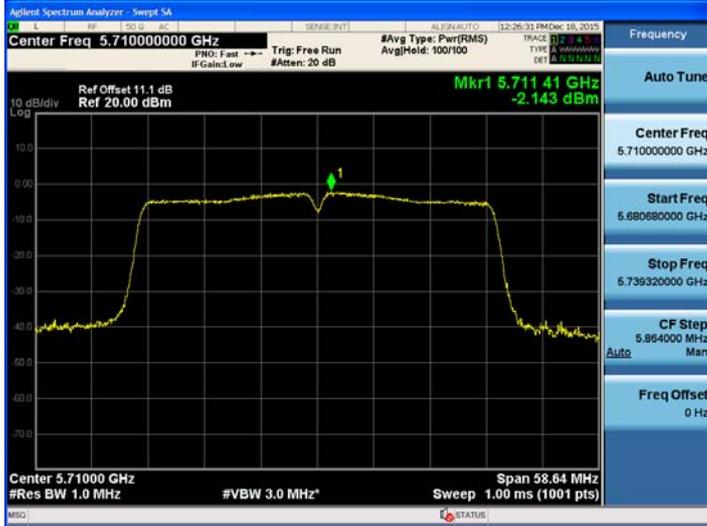
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5710	142	802.11n	-2.143	1.805	-0.338	11	Pass

Conducted Power Density Measurements (UNII 3 Band 5710MHz)

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5710	142	802.11n	-8.005	1.096	-6.909	30	Pass

▣ Straddle channels TEST Plot for 802.11n_40MHz BW

802.11n_40MHz BW UNII 2C Band PSD CH.142



802.11n_40MHz BW UNII 3 Band PSD CH.142



8.5 FREQUENCY STABILITY.

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

20 MHz BW

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5180012.88	12.88
100%		-30	5179985.71	-14.29
100%		-20	5179988.74	-11.26
100%		-10	5179991.36	-8.64
100%		0	5179997.16	-2.84
100%		+10	5180007.81	7.81
100%		+30	5180015.26	15.26
100%		+40	5180017.48	17.48
100%		+50	5180021.03	21.03
Batt. Endpoint	2.75	+20	5180020.61	20.61

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5260014.91	14.91
100%		-30	5259985.79	-14.21
100%		-20	5259986.80	-13.2
100%		-10	5259991.94	-8.06
100%		0	5259994.59	-5.41
100%		+10	5260006.35	6.35
100%		+30	5260015.06	15.06
100%		+40	5260018.46	18.46
100%		+50	5260020.74	20.74
Batt. Endpoint	2.75	+20	5260019.87	19.87

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5500018.11	18.11
100%		-30	5499984.40	-15.60
100%		-20	5499986.79	-13.21
100%		-10	5499991.07	-8.93
100%		0	5499995.19	-4.81
100%		+10	5500009.48	9.48
100%		+30	5500020.15	20.15
100%		+40	5500024.56	24.56
100%		+50	5500028.51	28.51
Batt. Endpoint	2.75	+20	5500018.11	18.11

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5745022.08	22.08
100%		-30	5744975.49	-24.51
100%		-20	5744981.35	-18.65
100%		-10	5744988.06	-11.94
100%		0	5744997.06	-2.94
100%		+10	5745010.57	10.57
100%		+30	5745025.08	25.08
100%		+40	5745029.20	29.2
100%		+50	5745030.18	30.18
Batt. Endpoint	2.75	+20	5745031.86	31.86

Note:

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

40 MHz BW

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5190004.51	4.51
100%		-30	5189988.74	-11.26
100%		-20	5189991.54	-8.46
100%		-10	5189994.52	-5.48
100%		0	5189999.44	-0.56
100%		+10	5189997.06	-2.94
100%		+30	5190008.18	8.18
100%		+40	5190009.62	9.62
100%		+50	5190011.26	11.26
Batt. Endpoint		2.75	+20	5190011.00

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5270005.26	5.26
100%		-30	5269984.54	-15.46
100%		-20	5269986.31	-13.69
100%		-10	5269988.52	-11.48
100%		0	5269995.42	-4.58
100%		+10	5270001.43	1.43
100%		+30	5270008.12	8.12
100%		+40	5270014.08	14.08
100%		+50	5270016.51	16.51
Batt. Endpoint	2.75	+20	5270005.26	5.26

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5510004.28	4.28
100%		-30	5509986.44	-13.56
100%		-20	5509990.44	-9.56
100%		-10	5509995.13	-4.87
100%		0	5509999.44	-0.56
100%		+10	5510002.64	2.64
100%		+30	5510008.07	8.07
100%		+40	5510012.61	12.61
100%		+50	5510014.32	14.32
Batt. Endpoint	2.75	+20	5510014.94	14.94

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5755007.43	7.43
100%		-30	5754984.84	-15.16
100%		-20	5754990.40	-9.6
100%		-10	5754995.39	-4.61
100%		0	5755001.84	1.84
100%		+10	5755004.36	4.36
100%		+30	5755010.02	10.02
100%		+40	5755012.49	12.49
100%		+50	5755013.67	13.67
Batt. Endpoint	2.75	+20	5755015.28	15.28

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

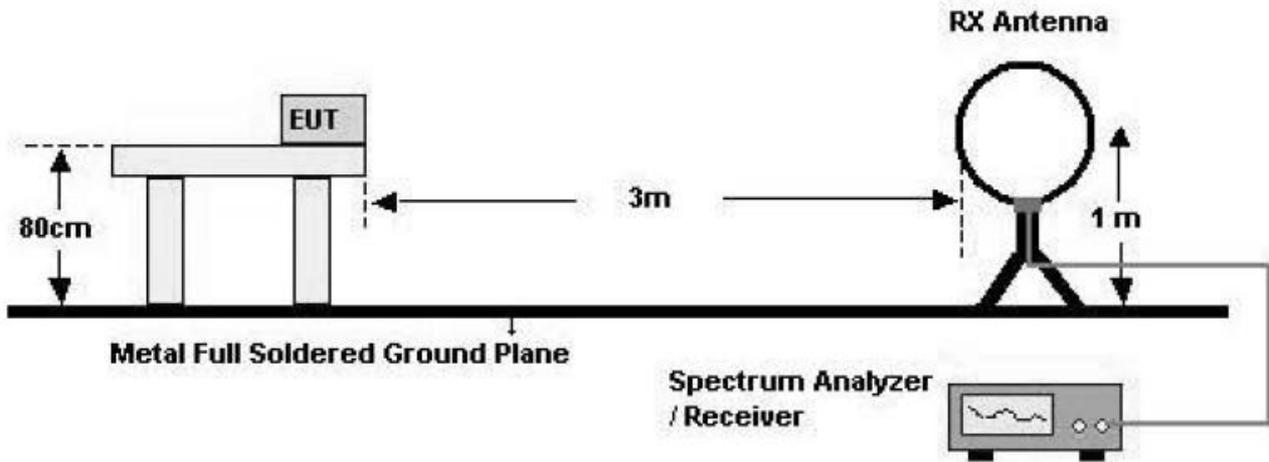
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

■ §15.407, KDB 789033 D02

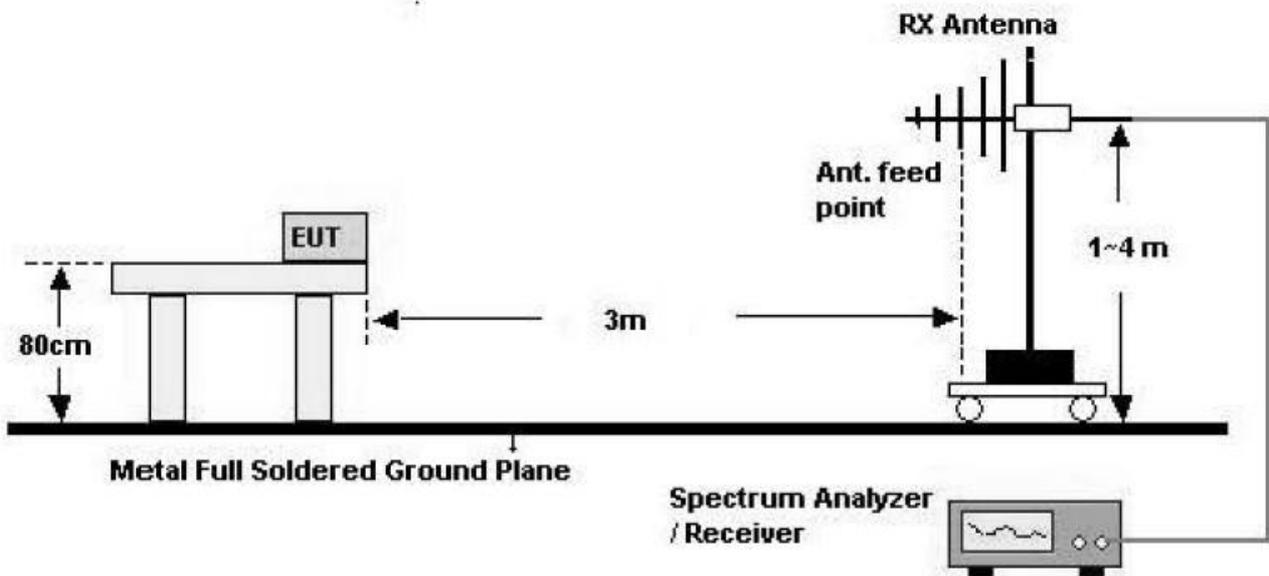
All harmonics that do not lie in a restricted band are subject to a peak limit of -27 dBm/MHz. At a distance of 3 meters the field strength limit in dBµV/m can be determined by adding a “conversion” factor of 95.2 dB to the EIRP limit of -27 dBm/MHz to obtain the limit for out of band spurious emissions of 68.2 dBµV/m. Especially, 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.

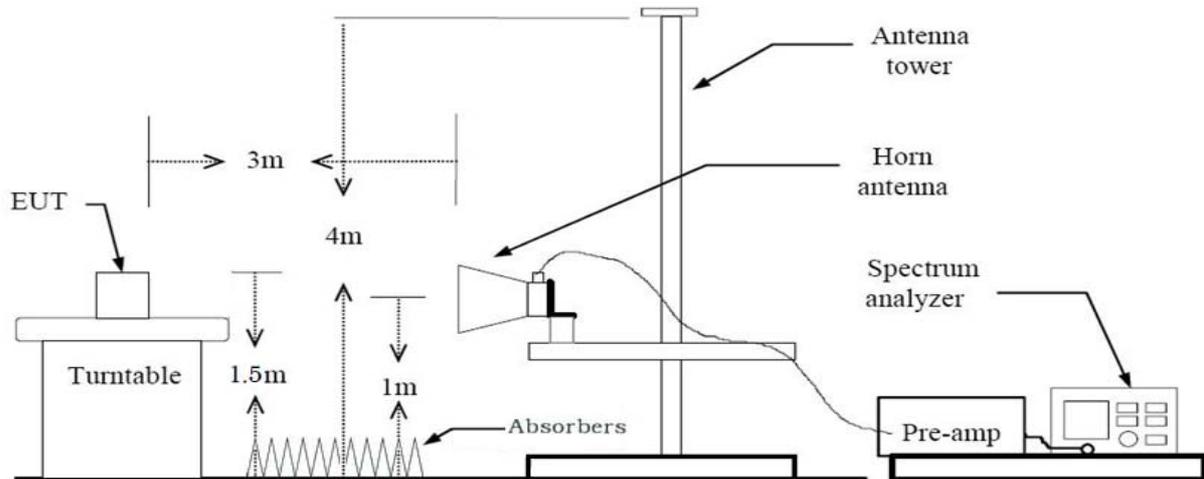
Test Configuration

Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz**TEST PROCEDURE USED**

ANSI C63.10:2013

Method G)5) in KDB 789033, issued 06/06/2014 (Peak)

Method G)6)d) in KDB 789033, issued 06/06/2014 (Average)

. Spectrum setting:

- Peak.

1. RBW = 1 MHz

2. VBW \geq 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 \geq 98 percent, set $VBW \leq RBW/100$ (i.e., 10 kHz) but not less than 10 Hz.2.2. If the EUT duty cycle is $<$ 98 percent, set $VBW \geq 1/T$, 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 minimum 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/ac_20, n/ac_40, ac_80 mode to perform the average field strength measurements.
2. The actual setting value of VBW for 802.11a/n/ac_20, n/ac_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	1.428	1.530	93.33	700	1000
n_20	MCS 0	1.338	1.440	92.92	747	1000
n_40	MCS 0	0.663	0.765	86.67	1508	3000

TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB μ V	dB /m	dB	(H/V)	dB μ V/m	dB μ V/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	dB μ V	dB /m	dB	(H/V)	dB μ V/m	dB μ V/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	64.40	-2.21	V	62.19	68.20	6.01	PK
15540	62.73	-1.95	V	60.78	73.98	13.20	PK
15540	47.89	-1.95	V	45.94	53.98	8.04	AV
10360	63.18	-2.21	H	60.97	68.20	7.23	PK
15540	61.25	-1.95	H	59.30	73.98	14.68	PK
15540	46.11	-1.95	H	44.16	53.98	9.82	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 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	61.17	-2.16	V	59.01	68.20	9.19	PK
15600	59.14	-2.51	V	56.63	73.98	17.35	PK
15600	45.20	-2.51	V	42.69	53.98	11.29	AV
10400	60.38	-2.16	H	58.22	68.20	9.98	PK
15600	58.67	-2.51	H	56.16	73.98	17.82	PK
15600	44.87	-2.51	H	42.36	53.98	11.62	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 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	59.60	-2.59	V	57.01	68.20	11.19	PK
15720	59.92	-1.62	V	58.30	73.98	15.68	PK
15720	46.26	-1.62	V	44.64	53.98	9.34	AV
10480	59.14	-2.59	H	56.55	68.20	11.65	PK
15720	59.18	-1.62	H	57.56	73.98	16.42	PK
15720	45.41	-1.62	H	43.79	53.98	10.19	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	65.50	-2.21	V	63.29	68.20	4.91	PK
15540	62.11	-1.95	V	60.16	73.98	13.82	PK
15540	47.42	-1.95	V	45.47	53.98	8.51	AV
10360	64.84	-2.21	H	62.63	68.20	5.57	PK
15540	61.79	-1.95	H	59.84	73.98	14.14	PK
15540	46.89	-1.95	H	44.94	53.98	9.04	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	63.37	-2.16	V	61.21	68.20	6.99	PK
15600	59.31	-2.51	V	56.80	73.98	17.18	PK
15600	45.20	-2.51	V	42.69	53.98	11.29	AV
10400	62.89	-2.16	H	60.73	68.20	7.47	PK
15600	59.11	-2.51	H	56.60	73.98	17.38	PK
15600	44.93	-2.51	H	42.42	53.98	11.56	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	59.83	-2.59	V	57.24	68.20	10.96	PK
15720	60.28	-1.62	V	58.66	73.98	15.32	PK
15720	46.20	-1.62	V	44.58	53.98	9.40	AV
10480	59.71	-2.59	H	57.12	68.20	11.08	PK
15720	59.94	-1.62	H	58.32	73.98	15.66	PK
15720	45.84	-1.62	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_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	60.42	-2.51	V	57.91	68.20	10.29	PK
15570	59.29	-2.14	V	57.15	73.98	16.83	PK
15570	44.73	-2.14	V	42.59	53.98	11.39	AV
10380	60.18	-2.51	H	57.67	68.20	10.53	PK
15570	59.17	-2.14	H	57.03	73.98	16.95	PK
15570	44.61	-2.14	H	42.47	53.98	11.51	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	58.72	-2.28	V	56.44	68.20	11.76	PK
15690	59.51	-1.92	V	57.59	73.98	16.39	PK
15690	45.23	-1.92	V	43.31	53.98	10.67	AV
10460	58.59	-2.28	H	56.31	68.20	11.89	PK
15690	59.37	-1.92	H	57.45	73.98	16.53	PK
15690	45.11	-1.92	H	43.19	53.98	10.79	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: 802.11 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	59.84	-2.51	V	57.33	68.20	10.87	PK
15780	58.82	-2.14	V	56.68	73.98	17.30	PK
15780	43.73	-2.14	V	41.59	53.98	12.39	AV
10520	59.21	-2.51	H	56.70	68.20	11.50	PK
15780	58.54	-2.14	H	56.40	73.98	17.58	PK
15780	43.24	-2.14	H	41.10	53.98	12.88	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	59.02	-2.45	V	56.57	73.98	17.41	PK
10600	45.58	-2.45	V	43.13	53.98	10.85	AV
15900	59.39	-1.99	V	57.40	73.98	16.58	PK
15900	46.05	-1.99	V	44.06	53.98	9.92	AV
10600	58.65	-2.45	H	56.20	73.98	17.78	PK
10600	45.31	-2.45	H	42.86	53.98	11.12	AV
15900	58.89	-1.99	H	56.90	73.98	17.08	PK
15900	45.67	-1.99	H	43.68	53.98	10.30	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	58.32	-2.17	V	56.15	73.98	17.83	PK
10640	45.06	-2.17	V	42.89	53.98	11.09	AV
15960	58.95	-1.69	V	57.26	73.98	16.72	PK
15960	45.50	-1.69	V	43.81	53.98	10.17	AV
10640	57.91	-2.17	H	55.74	73.98	18.24	PK
10640	44.67	-2.17	H	42.50	53.98	11.48	AV
15960	58.66	-1.69	H	56.97	73.98	17.01	PK
15960	45.14	-1.69	H	43.45	53.98	10.53	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	59.87	-2.51	V	57.36	68.20	10.84	PK
15780	58.21	-2.14	V	56.07	73.98	17.91	PK
15780	43.70	-2.14	V	41.56	53.98	12.42	AV
10520	59.48	-2.51	H	56.97	68.20	11.23	PK
15780	57.79	-2.14	H	55.65	73.98	18.33	PK
15780	43.24	-2.14	H	41.10	53.98	12.88	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	59.65	-2.45	V	57.20	73.98	16.78	PK
10600	45.64	-2.45	V	43.19	53.98	10.79	AV
15900	59.79	-1.99	V	57.80	73.98	16.18	PK
15900	46.07	-1.99	V	44.08	53.98	9.90	AV
10600	59.44	-2.45	H	56.99	73.98	16.99	PK
10600	45.32	-2.45	H	42.87	53.98	11.11	AV
15900	59.55	-1.99	H	57.56	73.98	16.42	PK
15900	45.63	-1.99	H	43.64	53.98	10.34	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	58.27	-2.17	V	56.10	73.98	17.88	PK
10640	45.02	-2.17	V	42.85	53.98	11.13	AV
15960	58.79	-1.69	V	57.10	73.98	16.88	PK
15960	45.43	-1.69	V	43.74	53.98	10.24	AV
10640	58.01	-2.17	H	55.84	73.98	18.14	PK
10640	44.67	-2.17	H	42.50	53.98	11.48	AV
15960	58.51	-1.69	H	56.82	73.98	17.16	PK
15960	45.27	-1.69	H	43.58	53.98	10.40	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	58.80	-2.53	V	56.27	68.20	11.93	PK
15810	58.42	-2.09	V	56.33	73.98	17.65	PK
15810	45.00	-2.09	V	42.91	53.98	11.07	AV
10540	58.67	-2.53	H	56.14	68.20	12.06	PK
15810	58.28	-2.09	H	56.19	73.98	17.79	PK
15810	44.77	-2.09	H	42.68	53.98	11.30	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	58.69	-2.19	V	56.50	73.98	17.48	PK
10620	45.31	-2.19	V	43.12	53.98	10.86	AV
15930	59.17	-1.80	V	57.37	73.98	16.61	PK
15930	45.98	-1.80	V	44.18	53.98	9.80	AV
10620	58.54	-2.19	H	56.35	73.98	17.63	PK
10620	45.17	-2.19	H	42.98	53.98	11.00	AV
15930	59.03	-1.80	H	57.23	73.98	16.75	PK
15930	45.84	-1.80	H	44.04	53.98	9.94	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 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	58.14	-2.13	V	56.01	73.98	17.97	PK
11000	44.66	-2.13	V	42.53	53.98	11.45	AV
16500	58.42	0.36	V	58.78	68.20	9.42	PK
11000	58.02	-2.13	H	55.89	73.98	18.09	PK
11000	44.56	-2.13	H	42.43	53.98	11.55	AV
16500	58.39	0.36	H	58.75	68.20	9.45	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	58.85	-1.75	V	57.10	73.98	16.88	PK
11160	45.25	-1.75	V	43.50	53.98	10.48	AV
16740	58.69	1.34	V	60.03	68.20	8.17	PK
11160	58.77	-1.75	H	57.02	73.98	16.96	PK
11160	45.17	-1.75	H	43.42	53.98	10.56	AV
16740	58.61	1.34	H	59.95	68.20	8.25	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	60.11	-2.57	V	57.54	73.98	16.44	PK
11400	45.82	-2.57	V	43.25	53.98	10.73	AV
17100	58.99	2.74	V	61.73	68.20	6.47	PK
11400	60.03	-2.57	H	57.46	73.98	16.52	PK
11400	45.74	-2.57	H	43.17	53.98	10.81	AV
17100	58.93	2.74	H	61.67	68.20	6.53	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	58.03	-2.13	V	55.90	73.98	18.08	PK
11000	44.58	-2.13	V	42.45	53.98	11.53	AV
16500	58.37	0.36	V	58.73	68.20	9.47	PK
11000	57.91	-2.13	H	55.78	73.98	18.20	PK
11000	44.48	-2.13	H	42.35	53.98	11.63	AV
16500	58.28	0.36	H	58.64	68.20	9.56	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	58.79	-1.75	V	57.04	73.98	16.94	PK
11160	45.21	-1.75	V	43.46	53.98	10.52	AV
16740	58.56	1.34	V	59.90	68.20	8.30	PK
11160	58.70	-1.75	H	56.95	73.98	17.03	PK
11160	45.17	-1.75	H	43.42	53.98	10.56	AV
16740	58.50	1.34	H	59.84	68.20	8.36	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 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	60.01	-2.57	V	57.44	73.98	16.54	PK
11400	45.77	-2.57	V	43.20	53.98	10.78	AV
17100	58.81	2.74	V	61.55	68.20	6.65	PK
11400	59.93	-2.57	H	57.36	73.98	16.62	PK
11400	45.71	-2.57	H	43.14	53.98	10.84	AV
17100	58.74	2.74	H	61.48	68.20	6.72	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	58.84	-2.07	V	56.77	73.98	17.21	PK
11020	44.63	-2.07	V	42.56	53.98	11.42	AV
16530	59.21	0.77	V	59.98	68.20	8.22	PK
11020	58.69	-2.07	H	56.62	73.98	17.36	PK
11020	44.57	-2.07	H	42.50	53.98	11.48	AV
16530	59.17	0.77	H	59.94	68.20	8.26	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	58.67	-2.26	V	56.41	73.98	17.57	PK
11180	44.85	-2.26	V	42.59	53.98	11.39	AV
16770	58.41	1.90	V	60.31	68.20	7.89	PK
11180	58.59	-2.26	H	56.33	73.98	17.65	PK
11180	44.78	-2.26	H	42.52	53.98	11.46	AV
16770	58.27	1.90	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_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	58.36	-1.94	V	56.42	73.98	17.56	PK
11340	44.78	-1.94	V	42.84	53.98	11.14	AV
17010	59.41	2.66	V	62.07	68.20	6.13	PK
11340	58.18	-1.94	H	56.24	73.98	17.74	PK
11340	44.71	-1.94	H	42.77	53.98	11.21	AV
17010	59.29	2.66	H	61.95	68.20	6.25	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: 802.11 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	59.58	-1.70	V	57.88	73.98	16.10	PK
11490	45.18	-1.70	V	43.48	53.98	10.50	AV
17235	59.23	2.52	V	61.75	68.20	6.45	PK
11490	59.44	-1.70	H	57.74	73.98	16.24	PK
11490	45.11	-1.70	H	43.41	53.98	10.57	AV
17235	59.18	2.52	H	61.70	68.20	6.50	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	58.07	-2.08	V	55.99	73.98	17.99	PK
11570	44.47	-2.08	V	42.39	53.98	11.59	AV
17355	58.56	2.67	V	61.23	68.20	6.97	PK
11570	58.01	-2.08	H	55.93	73.98	18.05	PK
11570	44.39	-2.08	H	42.31	53.98	11.67	AV
17355	58.49	2.67	H	61.16	68.20	7.04	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 802.11a. 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	58.82	-2.36	V	56.46	73.98	17.52	PK
11650	45.01	-2.36	V	42.65	53.98	11.33	AV
17475	59.97	3.81	V	63.78	68.20	4.42	PK
11650	58.67	-2.36	H	56.31	73.98	17.67	PK
11650	44.96	-2.36	H	42.60	53.98	11.38	AV
17475	59.81	3.81	H	63.62	68.20	4.58	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 802.11a. 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	59.41	-1.70	V	57.71	73.98	16.27	PK
11490	45.11	-1.70	V	43.41	53.98	10.57	AV
17235	59.18	2.52	V	61.70	68.20	6.50	PK
11490	59.28	-1.70	H	57.58	73.98	16.40	PK
11490	45.03	-1.70	H	43.33	53.98	10.65	AV
17235	59.11	2.52	H	61.63	68.20	6.57	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	58.04	-2.08	V	55.96	73.98	18.02	PK
11570	44.44	-2.08	V	42.36	53.98	11.62	AV
17355	58.52	2.67	V	61.19	68.20	7.01	PK
11570	57.91	-2.08	H	55.83	73.98	18.15	PK
11570	44.37	-2.08	H	42.29	53.98	11.69	AV
17355	58.44	2.67	H	61.11	68.20	7.09	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	58.76	-2.36	V	56.40	73.98	17.58	PK
11650	44.93	-2.36	V	42.57	53.98	11.41	AV
17475	59.94	3.81	V	63.75	68.20	4.45	PK
11650	58.71	-2.36	H	56.35	73.98	17.63	PK
11650	44.87	-2.36	H	42.51	53.98	11.47	AV
17475	59.83	3.81	H	63.64	68.20	4.56	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	58.82	-1.79	V	57.03	73.98	16.95	PK
11510	45.35	-1.79	V	43.56	53.98	10.42	AV
17265	59.29	3.16	V	62.45	68.20	5.75	PK
11510	58.71	-1.79	H	56.92	73.98	17.06	PK
11510	45.30	-1.79	H	43.51	53.98	10.47	AV
17265	59.11	3.16	H	62.27	68.20	5.93	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

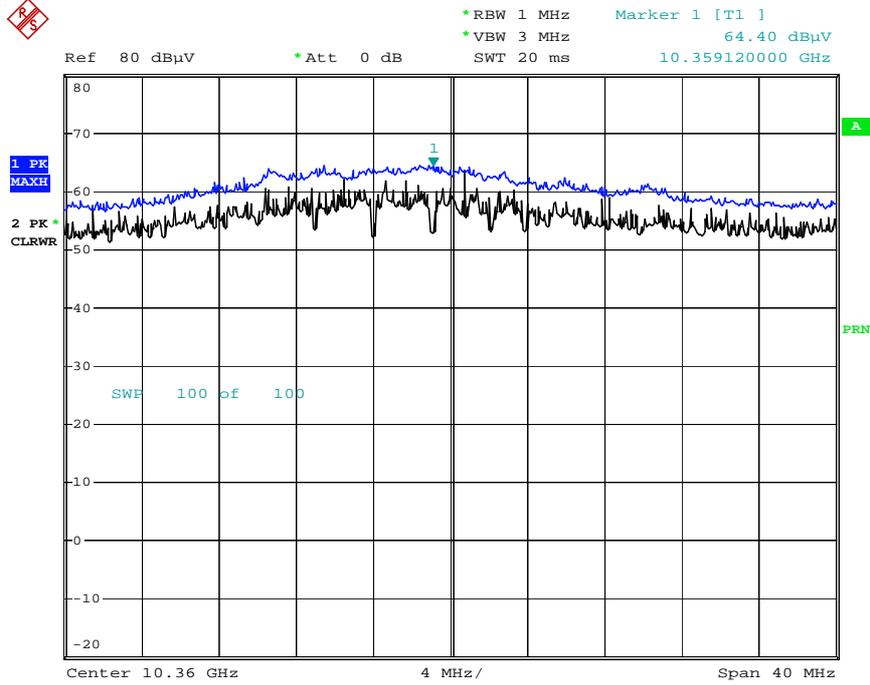
Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11590	58.63	-2.20	V	56.43	73.98	17.55	PK
11590	44.76	-2.20	V	42.56	53.98	11.42	AV
17385	58.56	3.26	V	61.82	68.20	6.38	PK
11590	58.51	-2.20	H	56.31	73.98	17.67	PK
11590	44.65	-2.20	H	42.45	53.98	11.53	AV
17385	58.41	3.26	H	61.67	68.20	6.53	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.

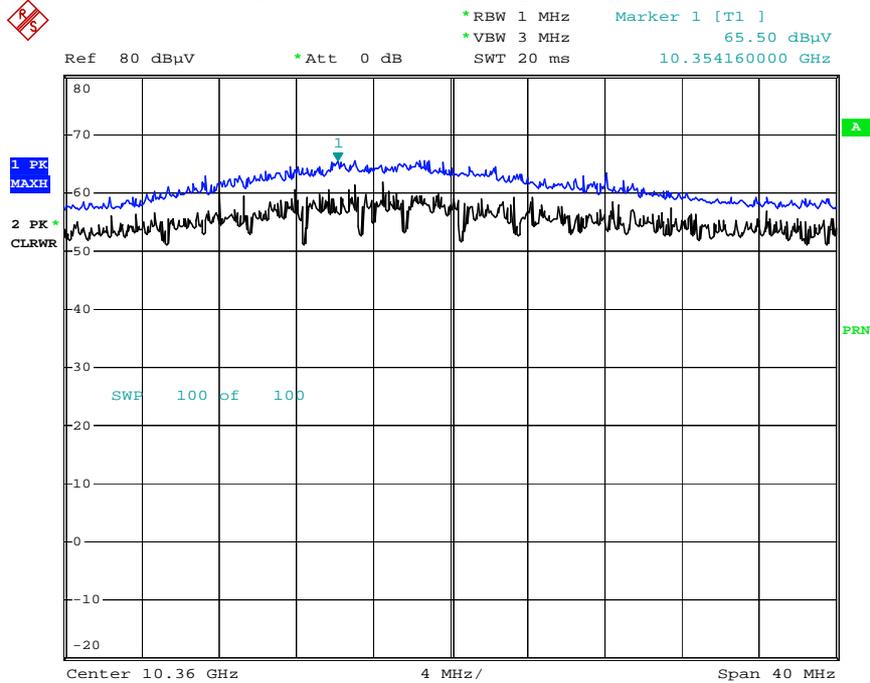
■ **RESULT PLOTS**

Radiated Spurious Emissions plot – Peak Reading (802.11a_20M, Ch.36 2nd Harmonic)



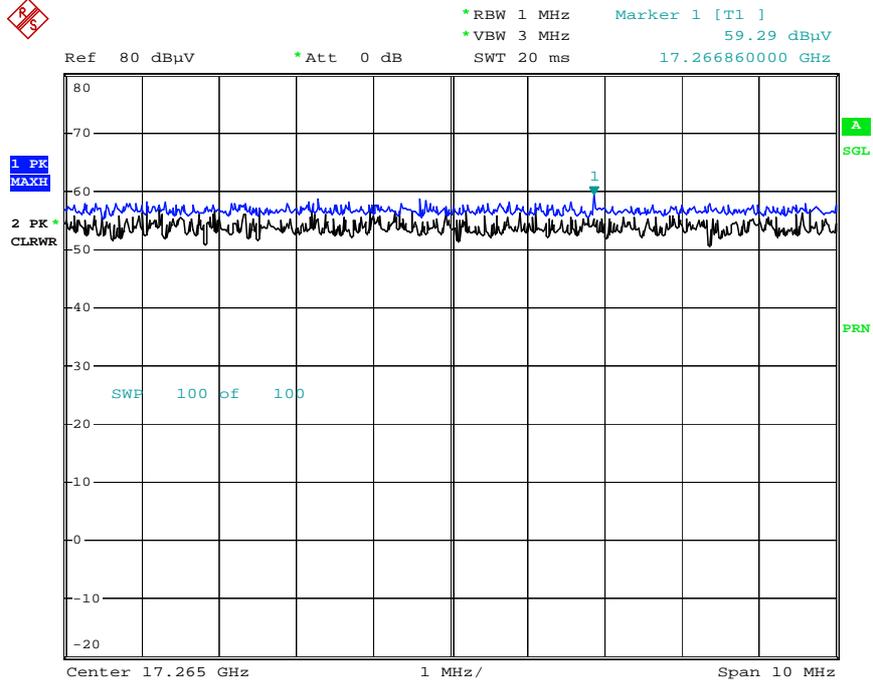
Date: 15.DEC.2015 11:17:13

Radiated Spurious Emissions plot – Peak Reading (802.11a_20M, Ch.36 2nd Harmonic)



Date: 15.DEC.2015 11:14:36

Radiated Spurious Emissions plot – Peak Reading (802.11n_40M, Ch.151 3rd Harmonic)



Date: 15.DEC.2015 10:52:09

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	64.42	3.13	H	67.55	73.98	6.43	PK
5150	45.17	3.13	H	48.3	53.98	5.68	AV
5150	63.84	3.13	V	66.97	73.98	7.01	PK
5150	44.54	3.13	V	47.67	53.98	6.31	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	65.45	3.13	H	68.58	73.98	5.40	PK
5150	44.55	3.13	H	47.68	53.98	6.30	AV
5150	65.31	3.13	V	68.44	73.98	5.54	PK
5150	44.32	3.13	V	47.45	53.98	6.53	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	66.74	3.13	H	69.87	73.98	4.11	PK
5150	46.51	3.13	H	49.64	53.98	4.34	AV
5150	66.17	3.13	V	69.3	73.98	4.68	PK
5150	46.34	3.13	V	49.47	53.98	4.51	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	64.70	3.24	H	67.94	73.98	6.04	PK
5350	42.94	3.24	H	46.18	53.98	7.80	AV
5350	64.38	3.24	V	67.62	73.98	6.36	PK
5350	42.54	3.24	V	45.78	53.98	8.20	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	65.61	3.24	H	68.85	73.98	5.13	PK
5350	42.30	3.24	H	45.54	53.98	8.44	AV
5350	65.43	3.24	V	68.67	73.98	5.31	PK
5350	42.18	3.24	V	45.42	53.98	8.56	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	61.78	3.24	H	65.02	73.98	8.96	PK
5350	43.17	3.24	H	46.41	53.98	7.57	AV
5350	61.57	3.24	V	64.81	73.98	9.17	PK
5350	43.11	3.24	V	46.35	53.98	7.63	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	54.57	3.59	H	58.16	73.98	15.82	PK
5460	41.32	3.59	H	44.91	53.98	9.07	AV
5470	60.58	3.56	H	64.14	68.20	4.06	PK
5460	54.34	3.59	V	57.93	73.98	16.05	PK
5460	41.21	3.59	V	44.8	53.98	9.18	AV
5470	60.18	3.56	V	63.74	68.20	4.46	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	54.46	3.59	H	58.05	73.98	15.93	PK
5460	41.37	3.59	H	44.96	53.98	9.02	AV
#5470	63.07	3.56	H	66.63	73.98	7.35	PK
#5470	42.06	3.56	H	45.62	53.98	8.36	AV
5460	54.38	3.59	V	57.97	73.98	16.01	PK
5460	41.29	3.59	V	44.88	53.98	9.10	AV
#5470	62.54	3.56	V	66.1	73.98	7.88	PK
#5470	41.97	3.56	H	45.53	53.98	8.45	AV

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	58.40	3.59	H	61.99	73.98	11.99	PK
5460	41.06	3.59	H	44.65	53.98	9.33	AV
#5470	61.63	3.56	H	65.19	68.20	3.01	PK
5460	58.22	3.59	V	61.81	73.98	12.17	PK
5460	41.01	3.59	V	44.6	53.98	9.38	AV
#5470	61.41	3.56	V	64.97	68.20	3.23	PK

Notes: The mark '#' is tested according to II.G.2.c in KDB 789033 D02, issued 06/06/2014

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 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	61.39	4.40	H	65.79	78.20	12.41	PK
*5850	61.17	4.40	V	65.57	78.20	12.63	PK
*5860	54.45	4.42	H	58.87	68.20	9.33	PK
*5860	54.29	4.42	V	58.71	68.20	9.49	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	63.40	4.40	H	67.80	78.20	10.40	PK
*5850	63.18	4.40	V	67.58	78.20	10.62	PK
*5860	55.98	4.42	H	60.40	68.20	7.80	PK
*5860	55.76	4.42	V	60.18	68.20	8.02	PK

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

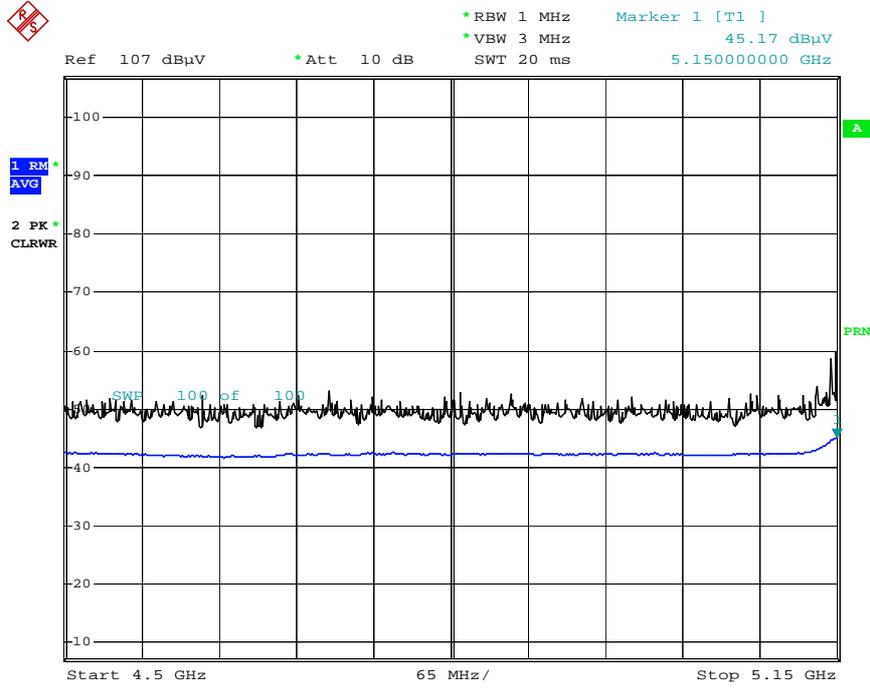
Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
*5850	56.57	4.40	H	60.97	78.20	17.23	PK
*5850	56.43	4.40	V	60.83	78.20	17.37	PK
*5860	54.19	4.42	H	58.61	68.20	9.59	PK
*5860	54.02	4.42	V	58.44	68.20	9.76	PK

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)

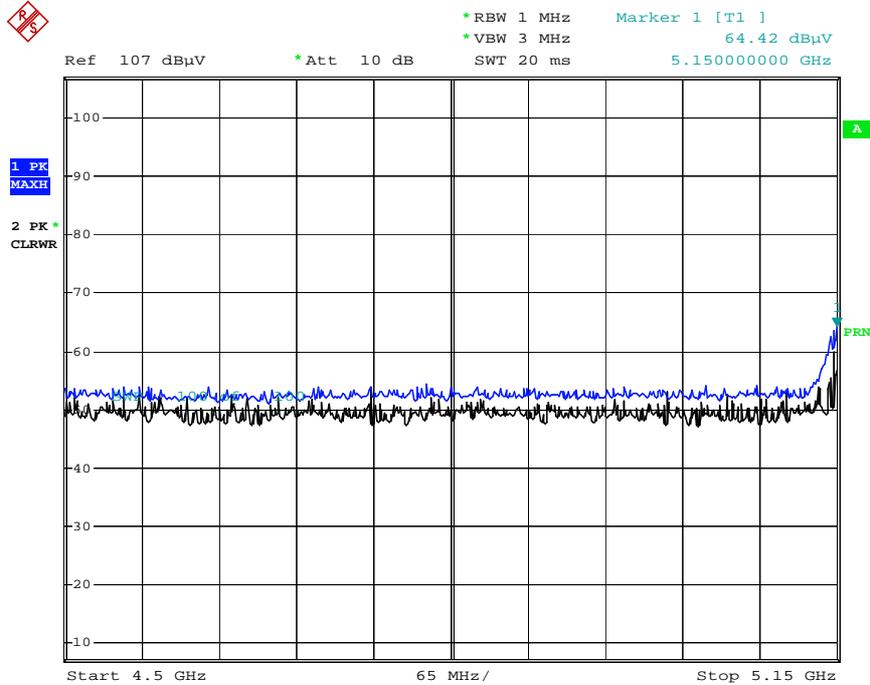
■ **RESULT PLOTS**

Radiated Restricted Band Edges plot – Average Reading (802.11a_20M, Ch.36)



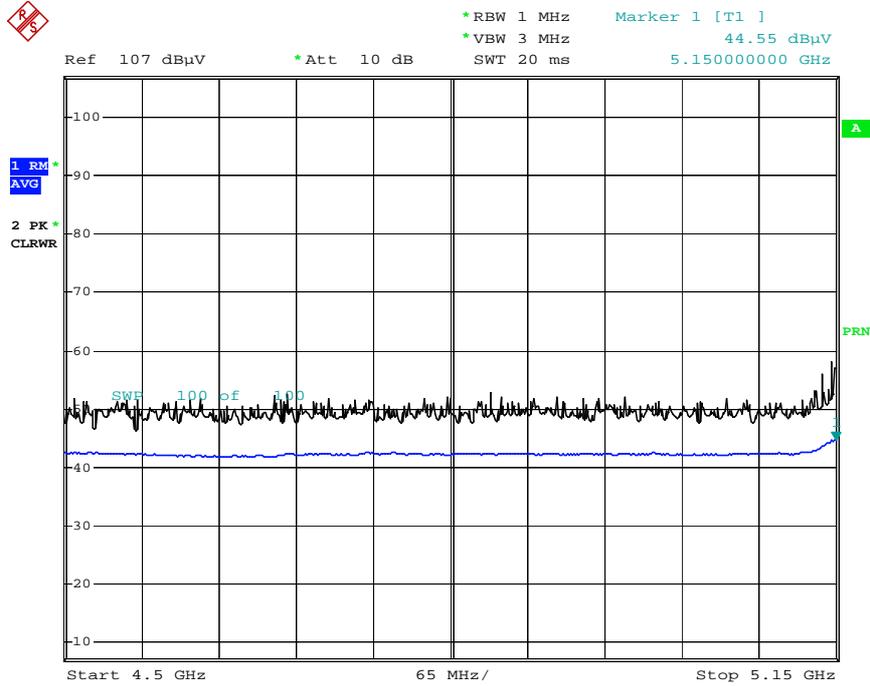
Date: 14.DEC.2015 11:12:55

Radiated Restricted Band Edges plot – Peak Reading (802.11a_20M, Ch.36)



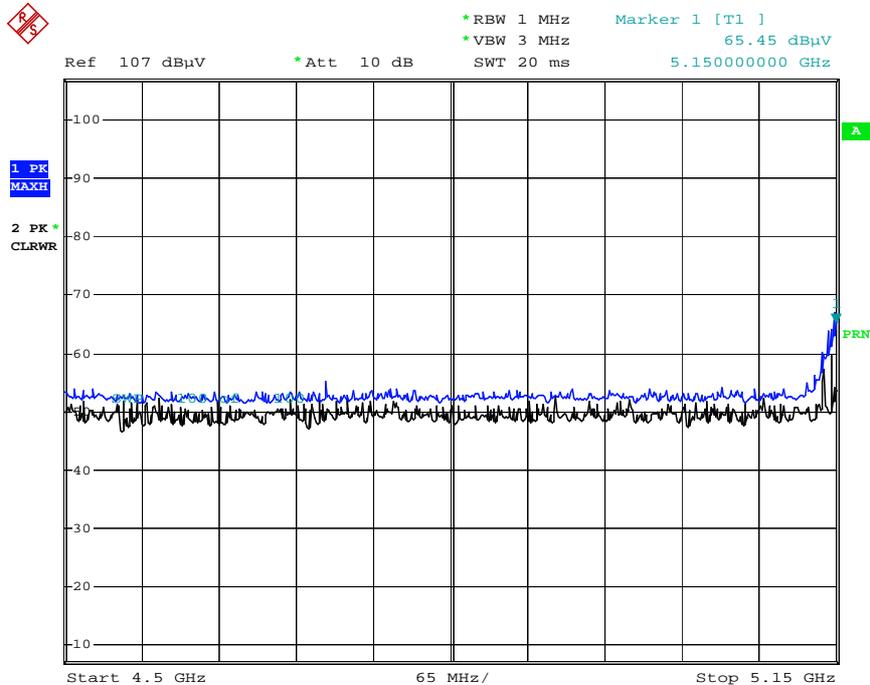
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Radiated Restricted Band Edges plot – Average Reading (802.11n_20M, Ch.36)



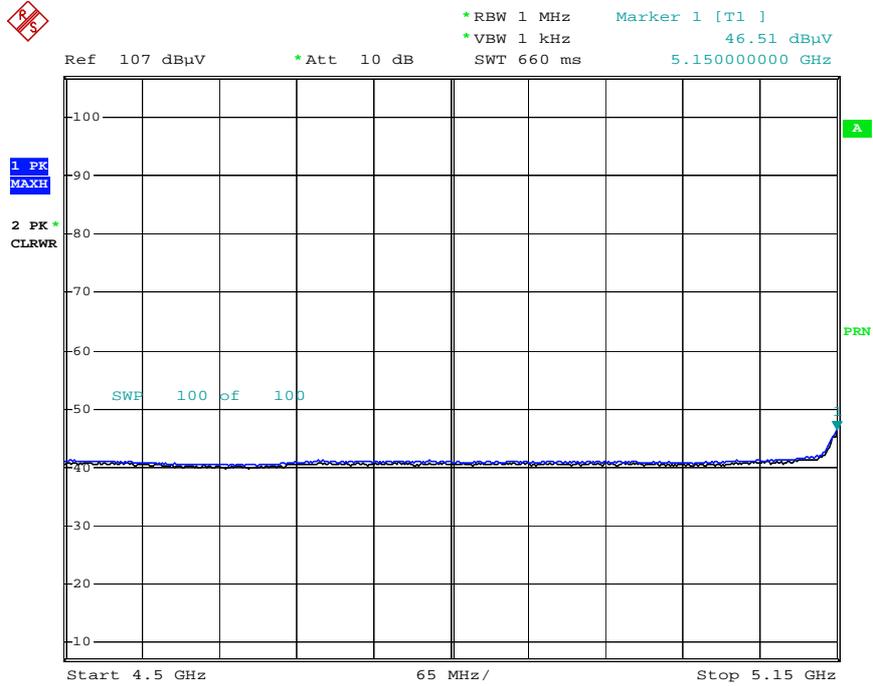
Date: 14.DEC.2015 11:16:53

Radiated Restricted Band Edges plot – Peak Reading (802.11n_20M, Ch.36)



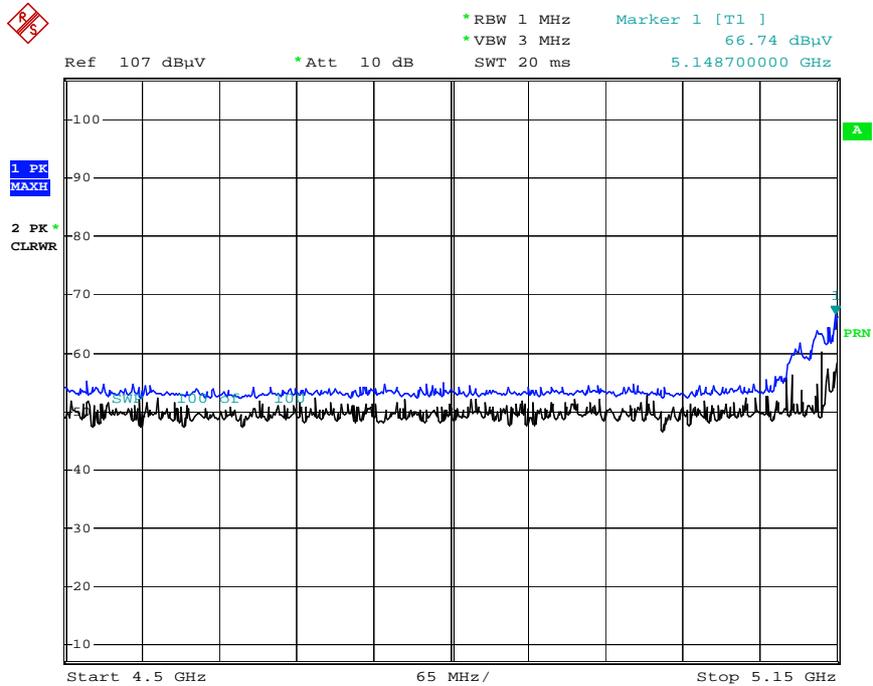
Date: 14.DEC.2015 11:17:25

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



Date: 15.DEC.2015 13:10:50

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



Date: 15.DEC.2015 13:08:56

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)

EMI Auto Test(13)

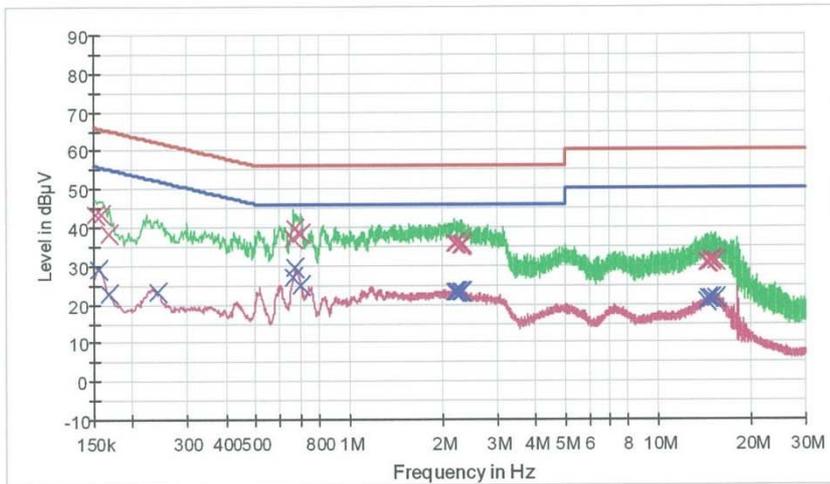
1 / 2

HCT TEST Report

Common Information

EUT: SM-A510FD
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: WLAN MODE _ 5G
 Operator Name: KS KANG

FCC CLASS B



— FCC CLASS B_QP — FCC CLASS B_AV — Preview Result 1-PK*
 — Preview Result 2-AVG × Final Result 1-QPK × Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.152000	43.3	9.000	Off	N	9.6	22.6	65.9
0.158000	43.4	9.000	Off	N	9.6	22.2	65.6
0.168000	38.1	9.000	Off	N	9.6	27.0	65.1
0.662000	36.9	9.000	Off	N	9.6	19.1	56.0
0.670000	39.7	9.000	Off	N	9.6	16.3	56.0
0.698000	38.5	9.000	Off	N	9.6	17.5	56.0
2.198000	35.6	9.000	Off	N	9.7	20.4	56.0
2.232000	35.9	9.000	Off	N	9.7	20.1	56.0
2.308000	35.5	9.000	Off	N	9.7	20.5	56.0
2.312000	35.5	9.000	Off	N	9.7	20.5	56.0
2.316000	35.7	9.000	Off	N	9.7	20.3	56.0
2.324000	35.5	9.000	Off	N	9.7	20.5	56.0
14.388000	30.9	9.000	Off	N	10.1	29.1	60.0
14.442000	30.8	9.000	Off	N	10.1	29.2	60.0
14.554000	30.9	9.000	Off	N	10.1	29.1	60.0
14.814000	31.1	9.000	Off	N	10.1	28.9	60.0

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EMI Auto Test(13)

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Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
14.946000	31.6	9.000	Off	N	10.1	28.4	60.0
15.330000	31.0	9.000	Off	N	10.1	29.0	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.156000	29.1	9.000	Off	N	9.6	26.6	55.7
0.168000	22.9	9.000	Off	N	9.6	32.2	55.1
0.240000	23.2	9.000	Off	N	9.6	28.9	52.1
0.662000	27.1	9.000	Off	N	9.6	18.9	46.0
0.672000	29.6	9.000	Off	N	9.6	16.4	46.0
0.702000	24.8	9.000	Off	N	9.7	21.2	46.0
2.184000	23.0	9.000	Off	N	9.7	23.0	46.0
2.232000	23.3	9.000	Off	N	9.7	22.7	46.0
2.252000	23.1	9.000	Off	N	9.7	22.9	46.0
2.308000	23.1	9.000	Off	N	9.7	22.9	46.0
2.312000	23.0	9.000	Off	N	9.7	23.0	46.0
2.316000	23.0	9.000	Off	N	9.7	23.0	46.0
14.388000	20.9	9.000	Off	N	10.1	29.1	50.0
14.584000	21.4	9.000	Off	N	10.1	28.6	50.0
14.588000	21.4	9.000	Off	N	10.1	28.6	50.0
14.814000	21.6	9.000	Off	N	10.1	28.4	50.0
14.904000	21.4	9.000	Off	N	10.1	28.6	50.0
15.330000	21.6	9.000	Off	N	10.1	28.4	50.0

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Conducted Emissions (Line 2)

EMI Auto Test(13)

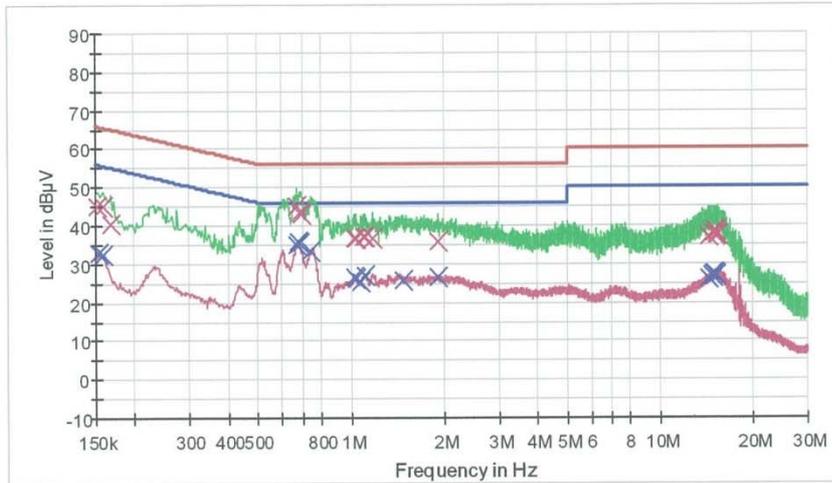
1 / 2

HCT TEST Report

Common Information

EUT: SM-A510FD
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: WLAN MODE _ 5G
 Operator Name: KS KANG

FCC CLASS B



— FCCCLASS B_QP — FCCCLASS B_AV — Preview Result 1-PK+
— Preview Result 2-AVG X Final Result 1-QPK X Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.152000	45.0	9.000	Off	L1	9.6	20.9	65.9
0.158000	45.1	9.000	Off	L1	9.6	20.5	65.6
0.168000	40.4	9.000	Off	L1	9.6	24.7	65.1
0.668000	44.9	9.000	Off	L1	9.7	11.1	56.0
0.680000	43.5	9.000	Off	L1	9.7	12.5	56.0
0.692000	43.0	9.000	Off	L1	9.7	13.0	56.0
1.024000	36.8	9.000	Off	L1	9.7	19.2	56.0
1.040000	36.7	9.000	Off	L1	9.7	19.3	56.0
1.094000	37.0	9.000	Off	L1	9.7	19.0	56.0
1.114000	37.2	9.000	Off	L1	9.7	18.8	56.0
1.182000	36.8	9.000	Off	L1	9.7	19.2	56.0
1.910000	36.0	9.000	Off	L1	9.7	20.0	56.0
14.344000	37.0	9.000	Off	L1	10.1	23.0	60.0
14.870000	38.1	9.000	Off	L1	10.1	21.9	60.0
15.028000	38.6	9.000	Off	L1	10.1	21.4	60.0
15.198000	38.1	9.000	Off	L1	10.1	21.9	60.0

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Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
15.272000	37.6	9.000	Off	L1	10.1	22.4	60.0
15.364000	37.6	9.000	Off	L1	10.1	22.4	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154000	32.9	9.000	Off	L1	9.6	22.9	55.8
0.158000	32.5	9.000	Off	L1	9.6	23.1	55.6
0.668000	35.0	9.000	Off	L1	9.7	11.0	46.0
0.676000	35.7	9.000	Off	L1	9.7	10.3	46.0
0.684000	35.2	9.000	Off	L1	9.7	10.8	46.0
0.742000	33.4	9.000	Off	L1	9.7	12.6	46.0
1.024000	26.6	9.000	Off	L1	9.7	19.4	46.0
1.040000	26.2	9.000	Off	L1	9.7	19.8	46.0
1.074000	25.2	9.000	Off	L1	9.7	20.8	46.0
1.108000	26.9	9.000	Off	L1	9.7	19.1	46.0
1.476000	25.9	9.000	Off	L1	9.7	20.1	46.0
1.910000	26.5	9.000	Off	L1	9.7	19.5	46.0
14.344000	26.1	9.000	Off	L1	10.1	23.9	50.0
14.722000	26.9	9.000	Off	L1	10.1	23.1	50.0
14.870000	27.2	9.000	Off	L1	10.1	22.8	50.0
14.932000	26.7	9.000	Off	L1	10.1	23.3	50.0
15.028000	27.5	9.000	Off	L1	10.1	22.5	50.0
15.198000	27.2	9.000	Off	L1	10.1	22.8	50.0

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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	01/13/2015	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

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	01/22/2015	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	08/03/2015	Annual	5
Wainwright Instrument	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	01/29/2015	Annual	2
Wainwright Instrument	WRCJ2400/2483.5-2370/2520-60/14SS / Band Reject Filter	06/15/2015	Annual	1
Rohde & Schwarz	LOOP ANTENNA	09/03/2014	Biennial	1513-175
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