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

REPORT

FCC Certification

Applicant Name:
Shin heung precision co. Ltd

Address:
Suite 706, JEI Platz, Gasan-dong, Geumcheon-gu,
Seoul, 153-792, Korea

Date of Issue:
December 17, 2014
Test Site/Location:
HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea
Report No.: HCT-R-1412-F039
HCT FRN: 0005866421

FCC ID	**: O8HSHR-1000**
APPLICANT	**: Shin heung precision co,. Ltd**

FCC Model(s):	SHR-1000
EUT Type:	Industrial PDA
Max. RF Output Power(Average):	Wi-Fi 802.11a (5180~5240) (10.46 dBm)/ Wi-Fi 802.11a (5260~5320) (8.57 dBm)/ Wi-Fi 802.11a (5500~5700) (6.40 dBm)/ Wi-Fi 802.11a (5745~5825) (8.79 dBm) Wi-Fi 802.11n_20 MHz BW (5180~5240) (7.60 dBm)/ Wi-Fi 802.11n_20 MHz BW(5260~5320)(6.89 dBm)/ Wi-Fi 802.11n_20 MHz BW(5500~5700)(4.36 dBm)/ Wi-Fi 802.11n_20 MHz BW(5745~5825)(4.12 dBm)/
Frequency Range:	20 MHz BW: 5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2A)/ 5500 MHz - 5700 MHz (UNII 2C)/ 5745 MHz - 5825 MHz (UNII 3)
Modulation type	OFDM
FCC Classification:	Unlicensed National Information Infrastructure(UNII)
FCC Rule Part(s):	Part 15.407

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
: Jong Seok Lee
Test engineer of RF Team

Approved by
: Chang Seok Choi
Manager of RF Team

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

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1412-F039	December 17, 2014	- First Approval Report

Table of Contents

1. GENERAL INFORMATION

Applicant:	Shin heung precision co.,Ltd.
Address:	Suite 706, JEI Platz, Gasan-dong, Geumcheon-gu, Seoul, 153-792, Korea
FCC ID:	O8HSHR-1000
EUT Type:	Industrial PDA
Model name(s):	SHR-1000
Date(s) of Tests:	December 05, 2014 ~ December 14, 2014
Place of Tests:	HCT Co., Ltd. 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea. (IC Recognition No. : 5944A-3)

2. EUT DESCRIPTION

EUT Type	Industrial PDA	
FCC Model Name	SHR-1000	
Power Supply	DC 3.7 V	
Battery type	Li-ion Battery(Standard)	
Frequency Range	TX_20 MHz BW:	5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2A)/ 5500 MHz - 5700 MHz (UNII 2C)/ 5745 MHz - 5825 MHz (UNII 3)
	RX_20 MHz BW:	5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2A)/ 5500 MHz - 5700 MHz (UNII 2C)/ 5745 MHz - 5825 MHz (UNII 3)
Max. RF Output Power:	Wi-Fi 802.11a (5180~5240) (10.46 dBm)/ Wi-Fi 802.11a (5260~5320) (8.57 dBm)/ Wi-Fi 802.11a (5500~5700) (6.40 dBm)/ Wi-Fi 802.11a (5745~5825) (8.79 dBm) Wi-Fi 802.11n_20 MHz BW (5180~5240) (7.60 dBm)/ Wi-Fi 802.11n_20 MHz BW(5260~5320)(6.89 dBm)/ Wi-Fi 802.11n_20 MHz BW(5500~5700)(4.36 dBm)/ Wi-Fi 802.11n_20 MHz BW(5745~5825)(4.12 dBm)/	
Modulation Type	OFDM(802.11a, 802.11n)	
Antenna Specification	Manufacturer: PLATEL Corporation Antenna type:INTERNAL Antenna Peak Gain : 0.81 dBi (5180~5240 UNII1 BAND)/-0.01 dBi (5260~5320 UNII2A BAND) 1.32 dBi (5500~5620 UNII2C BAND)/-6.61 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 for Testing Unlicensed Wireless Devices(ANSI C63.4-2003) 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 13.1.4.1 of ANSI C63.4. (Version :2003) 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. 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 13.1.4.1 of ANSI C63.4. (Version: 2003)

Conducted Antenna Terminal

See Section from 8.1 to 8.4.(KDB 789033)

3.4 DESCRIPTION OF TEST MODES

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

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

4. INSTRUMENT CALIBRATION

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

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2003) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated February 28, 2014 (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:

“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

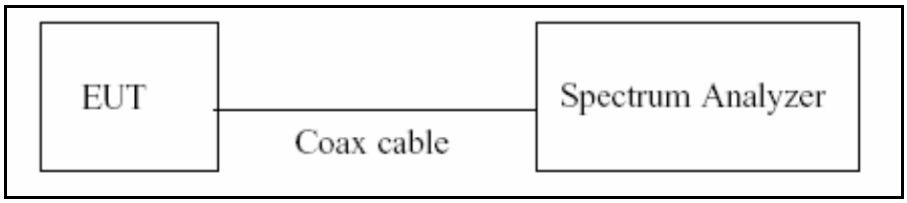
Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
TRANSMITTER MODE(TX)			CONDUCTED	
26dB Bandwidth	§15.407 (for Power Measurement)	N/A		PASS
6 dB Bandwidth	§15.407(e)	>500 kHz (5725-5850 MHz)		
Maximum Conducted Output Power	§15.407(a)(1)	< 250 mW (5150-5250 MHz) < 250 mW (5250-5350 MHz) < 250 mW (5470-5725 MHz) <1 W (5725-5850 MHz) Whichever power is less		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)(1), (2), (3)	<-27 dBm/ MHz EIRP (5150-5250 MHz, 5470-5725 MHz) <-17 dBm/MHz EIRP within 5715-5725 MHz and 5850-5860 MHz, <-27 dBm/MHz EIRP outside 5715-5850 MHz(UNII3)	RADIATED	PASS
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	15.205, 15.407(b)(1), (5), (6)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		PASS

8. TEST RESULT

8.1 DUTY CYCLE

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

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. We tested according to the zero-span measurement method, (B.2 in KDB 789033 D02, issued 06/06/2014)
The largest availble value of RBW is 8 MHz and VBW is 50 MHz. The zero-span method of measuring duty cycle shall not be used if T ≤ 6.25 microseconds. (50/6.25 = 8)
The zero-span method was used becaure all measured T data are > 6.25 microseconds and both RBW and VBW are > 50/*T*.

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

▣ **Duty Cycle Factor**

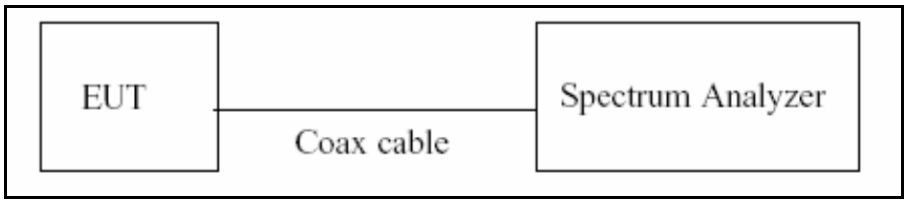
Mode	Data Rate (Mbps)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11a	6	2.056	2.158	0.95273401	0.210
	9	1.383	1.484	0.93194070	0.306
	12	1.042	1.146	0.90924956	0.413
	18	0.702	0.803	0.87422167	0.584
	24	0.531	0.631	0.84152139	0.749
	36	0.362	0.463	0.78185745	1.069
	48	0.275	0.376	0.73138298	1.359
	54	0.247	0.348	0.70977011	1.489
802.11n_20 MHz BW	6.5	1.726	1.830	0.94316940	0.254
	13	0.883	0.989	0.89282103	0.492
	19.5	0.597	0.700	0.85285714	0.691
	26	0.458	0.560	0.81785714	0.873
	39	0.320	0.420	0.76190476	1.181
	52	0.248	0.348	0.71264368	1.471
	58.5	0.226	0.326	0.69325153	1.591
	65	0.209	0.309	0.67637540	1.698

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

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

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

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

▣ TEST RESULTS

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	25.067	N/A	Pass
5200	40	24.186	N/A	Pass
5240	48	20.987	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	20.072	N/A	Pass
5300	60	21.098	N/A	Pass
5320	64	19.986	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	20.988	N/A	Pass
5600	120	20.318	N/A	Pass
5700	140	21.252	N/A	Pass

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	15.110	0.5	Pass
5785	157	15.090	0.5	Pass
5825	165	13.910	0.5	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	22.006	N/A	Pass
5200	40	21.650	N/A	Pass
5240	48	21.801	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	21.189	N/A	Pass
5300	60	20.948	N/A	Pass
5320	64	20.822	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	21.342	N/A	Pass
5600	120	21.787	N/A	Pass
5700	140	21.353	N/A	Pass

Conducted 6 dB Bandwidth Measurements for 802.11n

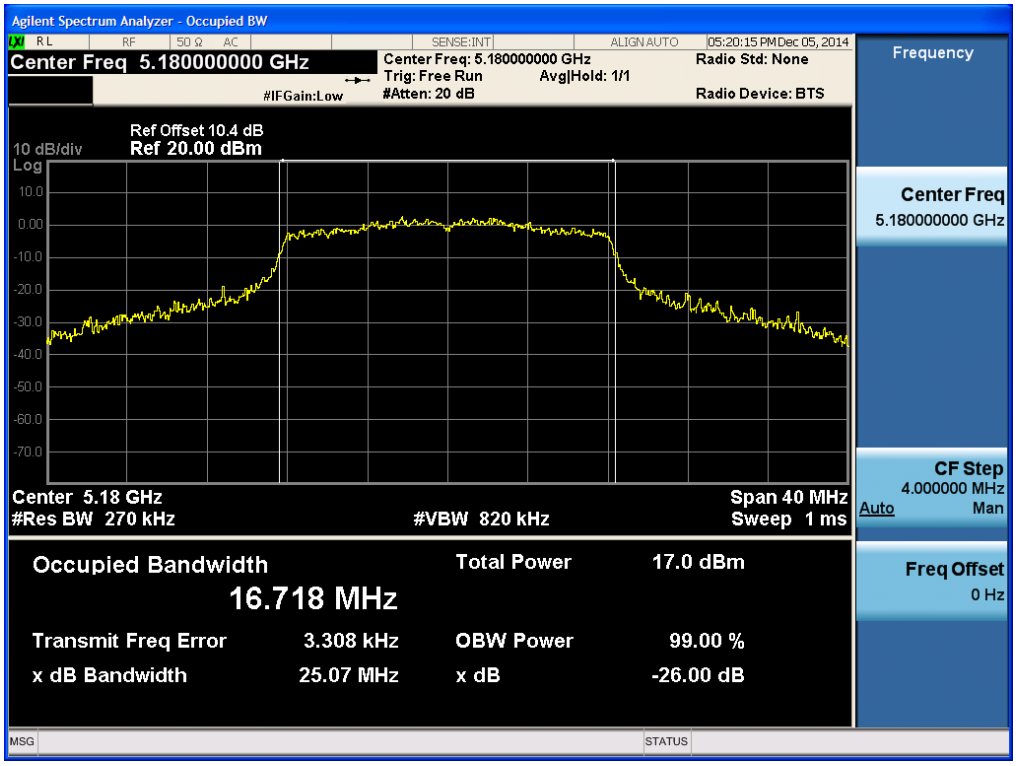
802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.130	0.5	Pass
5785	157	15.160	0.5	Pass
5825	165	15.130	0.5	Pass

Note :

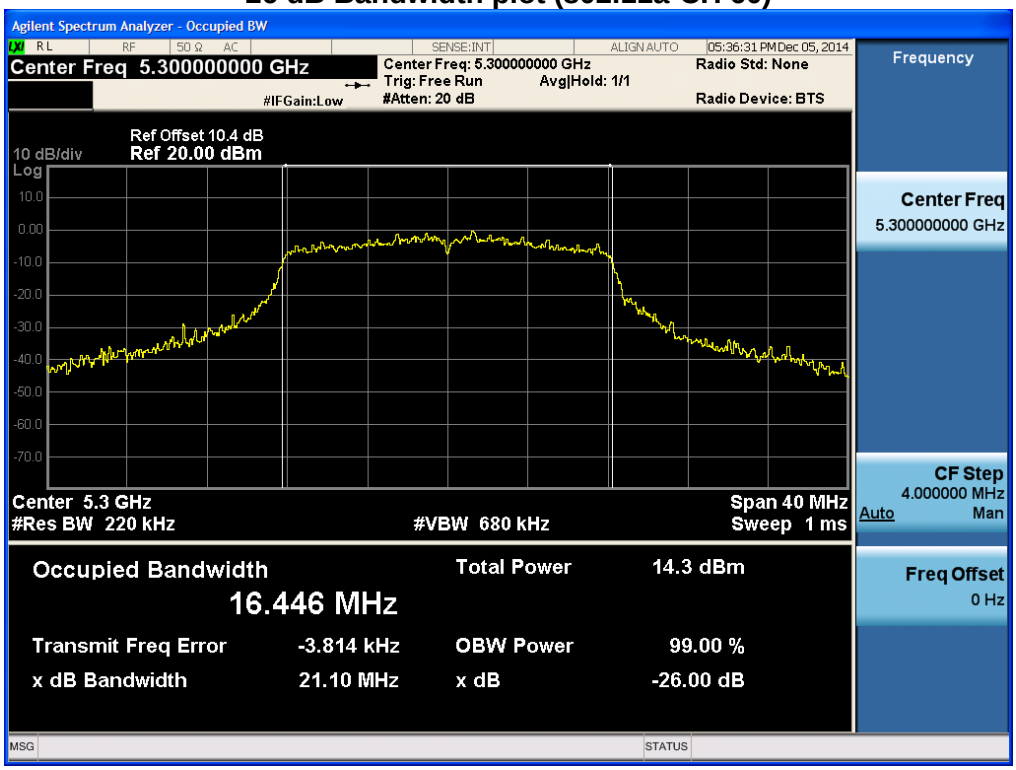
1. **In order to simplify the report, attached plots were only the most wide channel.**

▣ RESULT PLOTS

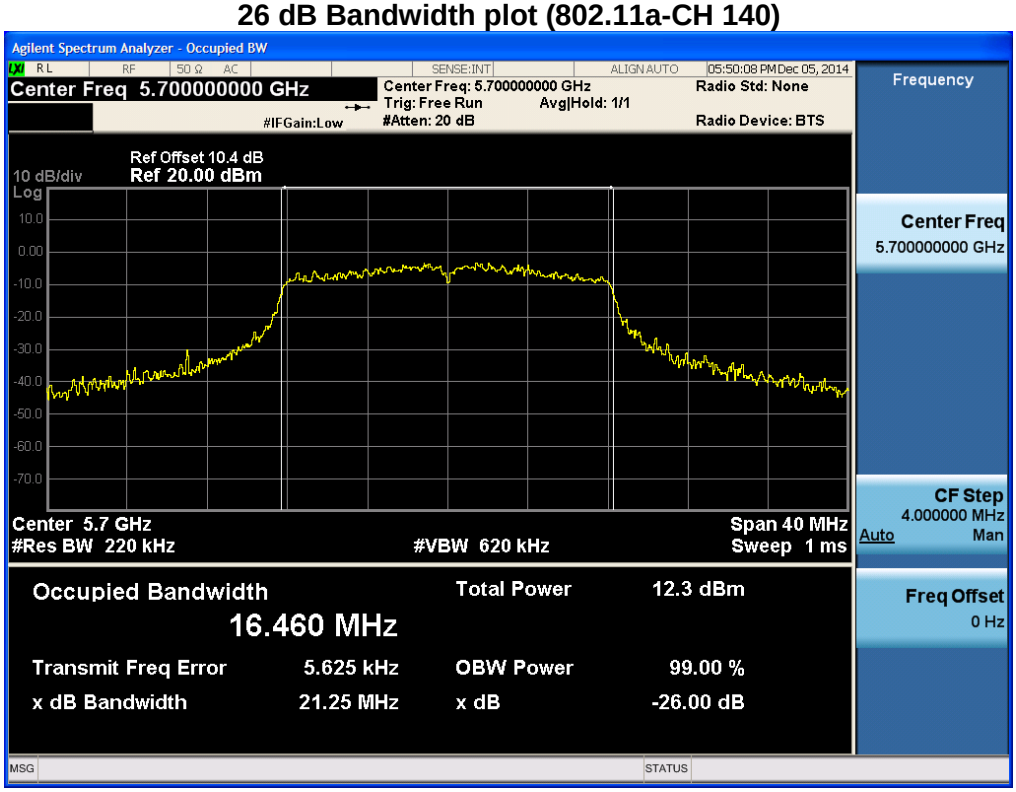
26 dB Bandwidth plot (802.11a-CH 36)



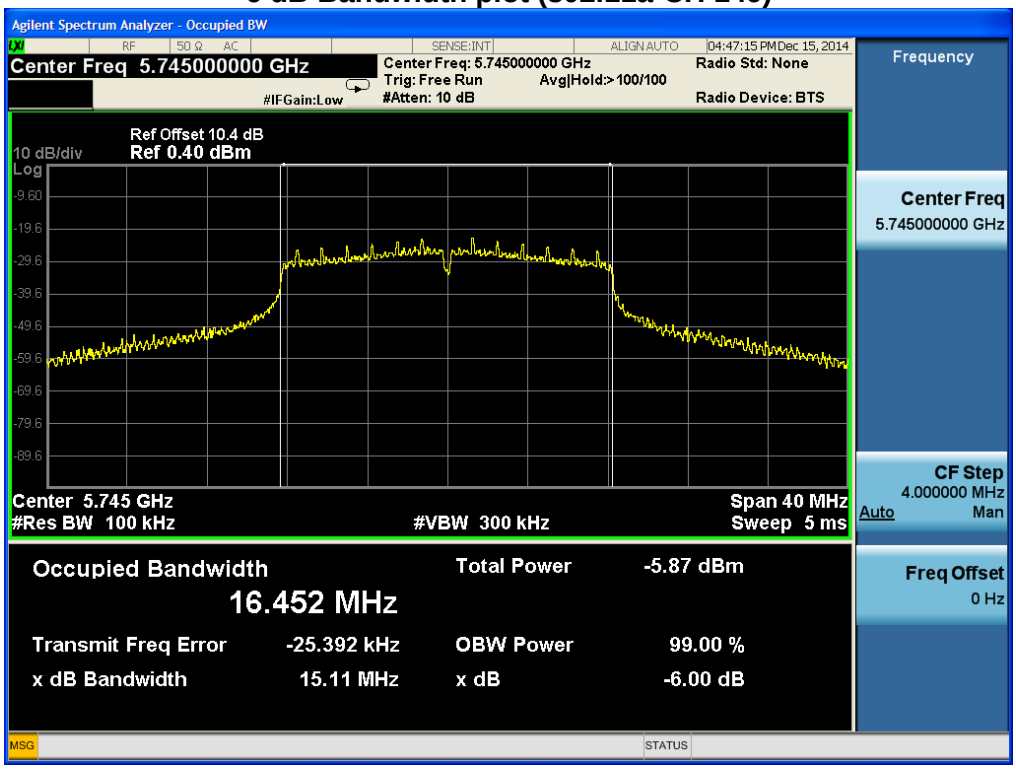
26 dB Bandwidth plot (802.11a-CH 60)



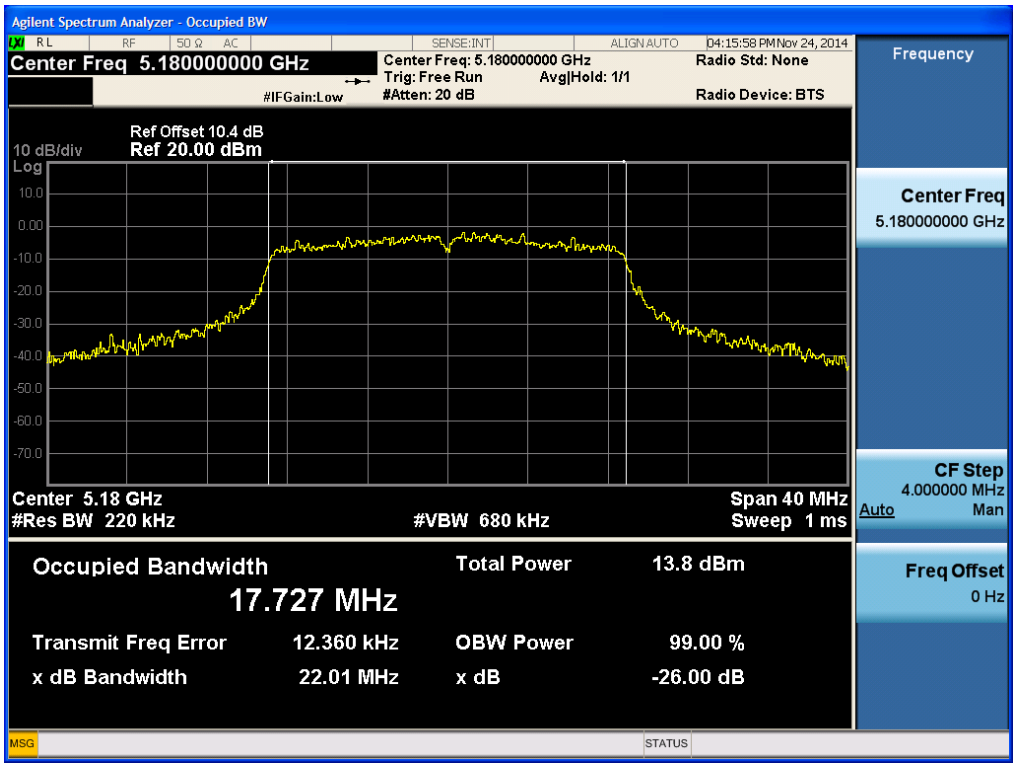
26 dB Bandwidth plot (802.11a-CH 140)



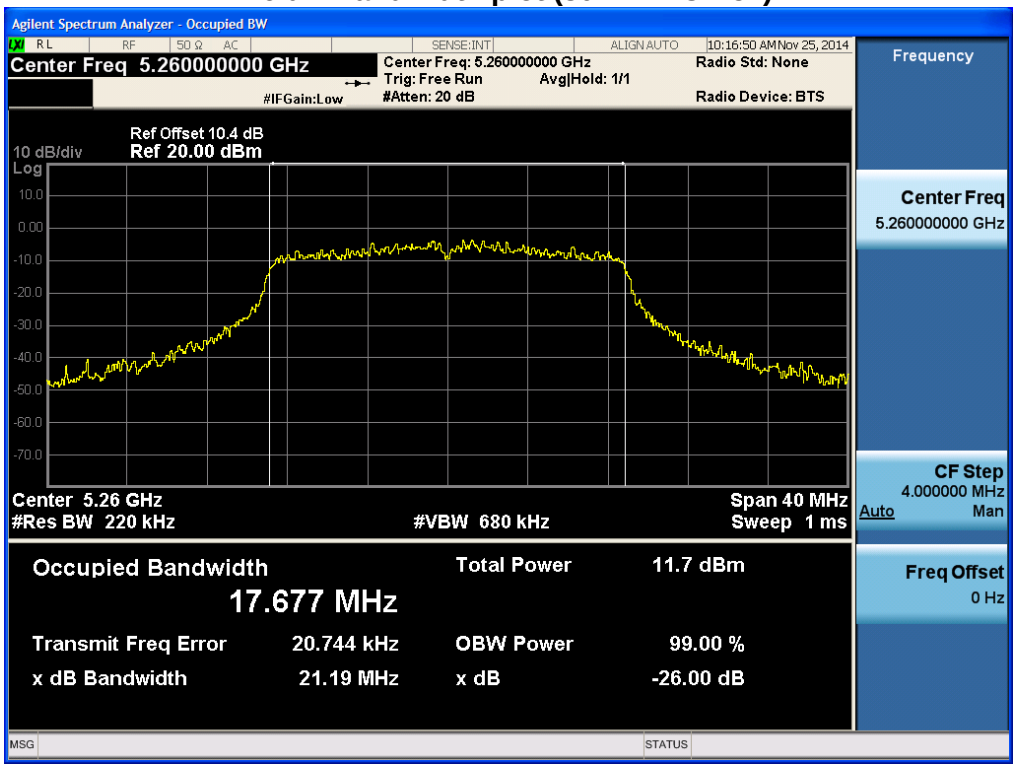
6 dB Bandwidth plot (802.11a-CH 149)



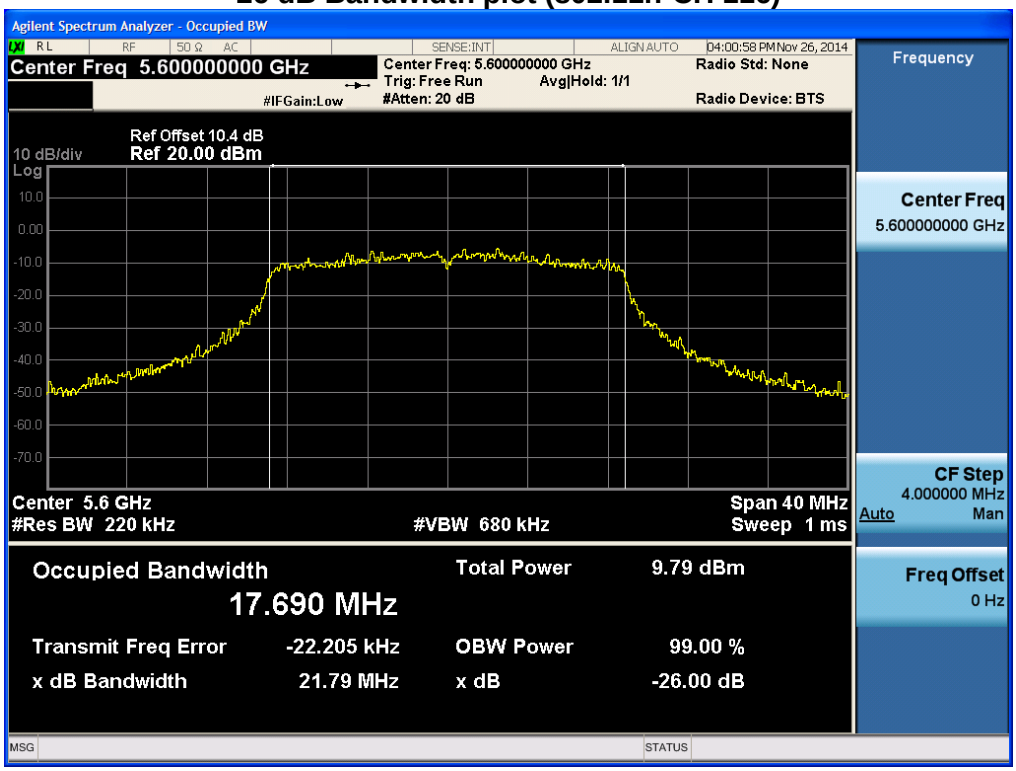
26 dB Bandwidth plot (802.11n-CH 36)



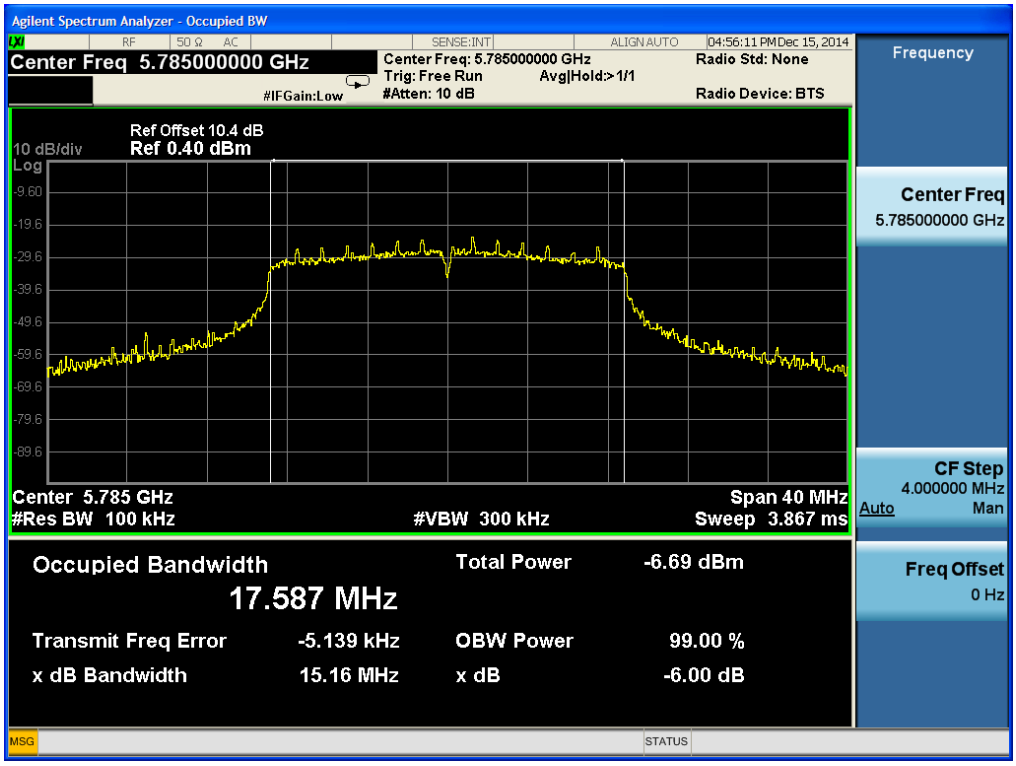
26 dB Bandwidth plot (802.11n-CH 52)



26 dB Bandwidth plot (802.11n-CH 116)



6 dB Bandwidth plot (802.11n-CH 157)



8.3 OUTPUT POWER MEASUREMENT

Test Requirements and limit, §15.407(a)(1) & RSS-210

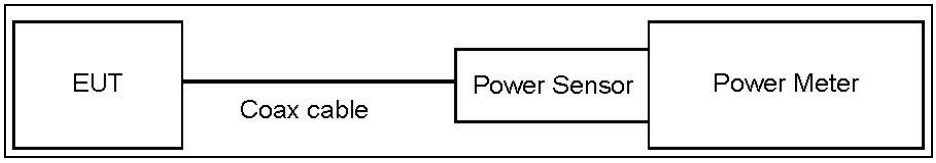
A transmitter antenna terminal of EUT is connected to the input of a Power meter or Spectrum Analyzer .Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies.

▣ Limit

1. Maximum Conducted Output Power :

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	10.4

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

▣ TEST RESULTS

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

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.					
5180	36	6	10.08	0.210	10.29	23.98
		9	10.09	0.306	10.39	23.98
		12	9.93	0.413	10.35	23.98
		18	9.70	0.584	10.28	23.98
		24	9.71	0.749	10.46	23.98
		36	9.38	1.069	10.45	23.98
		48	6.25	1.359	7.61	23.98
		54	6.19	1.489	7.68	23.98
5200	40	6	9.47	0.210	9.68	23.98
		9	9.36	0.306	9.66	23.98
		12	9.32	0.413	9.73	23.98
		18	9.14	0.584	9.73	23.98
		24	9.00	0.749	9.75	23.98
		36	8.92	1.069	9.99	23.98
		48	5.55	1.359	6.91	23.98
		54	5.43	1.489	6.92	23.98
5240	48	6	8.79	0.210	9.00	23.98
		9	8.61	0.306	8.92	23.98
		12	8.47	0.413	8.89	23.98
		18	8.29	0.584	8.88	23.98
		24	8.14	0.749	8.89	23.98
		36	7.92	1.069	8.99	23.98
		48	4.69	1.359	6.05	23.98
		54	4.61	1.489	6.10	23.98

Conducted Output Power Measurements (802.11a 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	8.31	0.210	8.52	23.98
		9	8.23	0.306	8.53	23.98
		12	8.15	0.413	8.57	23.98
		18	7.94	0.584	8.52	23.98
		24	7.76	0.749	8.51	23.98
		36	7.42	1.069	8.49	23.98
		48	4.26	1.359	5.62	23.98
		54	4.15	1.489	5.64	23.98
5300	60	6	7.53	0.210	7.74	23.98
		9	7.40	0.306	7.71	23.98
		12	7.30	0.413	7.71	23.98
		18	7.16	0.584	7.74	23.98
		24	7.01	0.749	7.76	23.98
		36	6.60	1.069	7.67	23.98
		48	3.38	1.359	4.74	23.98
		54	3.31	1.489	4.80	23.98
5320	64	6	7.11	0.210	7.32	23.98
		9	6.96	0.306	7.27	23.98
		12	6.97	0.413	7.39	23.98
		18	6.70	0.584	7.28	23.98
		24	6.46	0.749	7.21	23.98
		36	6.30	1.069	7.37	23.98
		48	3.00	1.359	4.36	23.98
		54	2.89	1.489	4.38	23.98

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

802.11a Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5500	100	6	6.13	0.210	6.34	23.98
		9	5.94	0.306	6.25	23.98
		12	5.94	0.413	6.35	23.98
		18	5.71	0.584	6.29	23.98
		24	5.56	0.749	6.31	23.98
		36	5.26	1.069	6.33	23.98
		48	1.96	1.359	3.32	23.98
		54	1.84	1.489	3.33	23.98
5600	120	6	6.10	0.210	6.31	23.98
		9	6.05	0.306	6.35	23.98
		12	5.97	0.413	6.38	23.98
		18	5.81	0.584	6.40	23.98
		24	5.58	0.749	6.33	23.98
		36	5.21	1.069	6.28	23.98
		48	1.94	1.359	3.30	23.98
		54	1.82	1.489	3.31	23.98
5700	140	6	5.64	0.210	5.85	23.98
		9	5.60	0.306	5.91	23.98
		12	5.51	0.413	5.93	23.98
		18	5.39	0.584	5.97	23.98
		24	5.23	0.749	5.97	23.98
		36	4.82	1.069	5.89	23.98
		48	1.11	1.359	2.47	23.98
		54	1.04	1.489	2.53	23.98

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

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.					
5745	149	6	7.94	0.210	8.15	30
		9	7.79	0.306	8.09	30
		12	7.73	0.413	8.15	30
		18	7.71	0.584	8.29	30
		24	7.41	0.749	8.16	30
		36	7.13	1.069	8.19	30
		48	3.34	1.359	4.70	30
		54	3.29	1.489	4.78	30
5785	157	6	8.14	0.210	8.35	30
		9	8.03	0.306	8.34	30
		12	7.94	0.413	8.36	30
		18	7.76	0.584	8.35	30
		24	7.67	0.749	8.42	30
		36	7.20	1.069	8.27	30
		48	3.72	1.359	5.08	30
		54	3.41	1.489	4.90	30
5825	165	6	8.58	0.210	8.79	30
		9	8.33	0.306	8.64	30
		12	8.27	0.413	8.68	30
		18	8.15	0.584	8.73	30
		24	7.94	0.749	8.69	30
		36	7.69	1.069	8.76	30
		48	3.96	1.359	5.32	30
		54	3.94	1.489	5.43	30

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

802.11n Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	6.5	7.22	0.254	7.47	23.98
		13	7.11	0.492	7.60	23.98
		19.5	6.70	0.691	7.39	23.98
		26	6.62	0.873	7.50	23.98
		39	6.29	1.181	7.47	23.98
		52	6.05	1.471	7.52	23.98
		58.5	3.10	1.591	4.69	23.98
		65	2.81	1.698	4.51	23.98
5200	40	6.5	6.42	0.254	6.67	23.98
		13	6.31	0.492	6.80	23.98
		19.5	6.14	0.691	6.84	23.98
		26	5.95	0.873	6.82	23.98
		39	5.64	1.181	6.82	23.98
		52	5.44	1.471	6.91	23.98
		58.5	2.36	1.591	3.95	23.98
		65	2.14	1.698	3.84	23.98
5240	48	6.5	5.36	0.254	5.61	23.98
		13	5.14	0.492	5.64	23.98
		19.5	5.06	0.691	5.75	23.98
		26	4.63	0.873	5.50	23.98
		39	6.00	1.181	7.18	23.98
		52	5.59	1.471	7.06	23.98
		58.5	2.46	1.591	4.05	23.98
		65	2.44	1.698	4.14	23.98

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

802.11n Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5260	52	6.5	4.69	0.254	4.95	23.98
		13	3.49	0.492	3.98	23.98
		19.5	3.31	0.691	4.00	23.98
		26	3.15	0.873	4.02	23.98
		39	2.87	1.181	4.06	23.98
		52	5.42	1.471	6.89	23.98
		58.5	2.22	1.591	3.81	23.98
		65	1.99	1.698	3.69	23.98
5300	60	6.5	5.69	0.254	5.95	23.98
		13	5.57	0.492	6.06	23.98
		19.5	5.32	0.691	6.01	23.98
		26	5.14	0.873	6.01	23.98
		39	4.82	1.181	6.01	23.98
		52	4.64	1.471	6.11	23.98
		58.5	1.46	1.591	3.05	23.98
		65	1.44	1.698	3.14	23.98
5320	64	6.5	5.37	0.254	5.62	23.98
		13	5.25	0.492	5.74	23.98
		19.5	5.00	0.691	5.70	23.98
		26	4.74	0.873	5.61	23.98
		39	4.46	1.181	5.64	23.98
		52	4.12	1.471	5.60	23.98
		58.5	1.15	1.591	2.75	23.98
		65	1.11	1.698	2.80	23.98

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

802.11n Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5500	100	6.5	3.82	0.25	4.08	23.98
		13	3.76	0.49	4.25	23.98
		19.5	3.67	0.69	4.36	23.98
		26	3.29	0.87	4.16	23.98
		39	3.05	1.18	4.23	23.98
		52	2.71	1.47	4.18	23.98
		58.5	-0.01	1.59	1.58	23.98
		65	-0.19	1.70	1.51	23.98
5600	120	6.5	3.00	0.25	3.25	23.98
		13	2.72	0.49	3.21	23.98
		19.5	2.48	0.69	3.17	23.98
		26	2.43	0.87	3.30	23.98
		39	2.15	1.18	3.33	23.98
		52	1.90	1.47	3.37	23.98
		58.5	-1.03	1.59	0.56	23.98
		65	-1.04	1.70	0.66	23.98
5700	140	6.5	1.90	0.25	2.15	23.98
		13	1.81	0.49	2.31	23.98
		19.5	1.41	0.69	2.11	23.98
		26	1.23	0.87	2.10	23.98
		39	0.76	1.18	1.94	23.98
		52	0.44	1.47	1.91	23.98
		58.5	-2.40	1.59	-0.81	23.98
		65	-2.50	1.70	-0.81	23.98

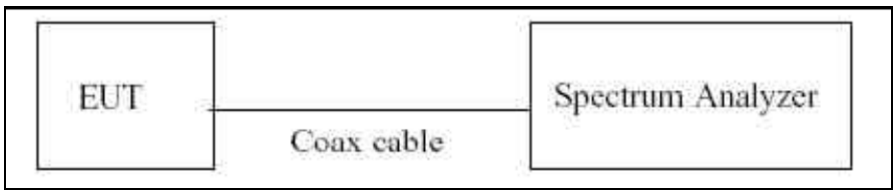
Conducted Output Power Measurements (802.11n Mode: 5745~5825)

802.11n Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5745	149	6.5	2.72	0.254	2.98	30
		13	2.59	0.492	3.08	30
		19.5	2.28	0.691	2.97	30
		26	2.08	0.873	2.96	30
		39	1.85	1.181	3.03	30
		52	1.68	1.471	3.15	30
		58.5	-1.91	1.591	-0.32	30
		65	-2.01	1.698	-0.31	30
5785	157	6.5	3.02	0.254	3.27	30
		13	2.94	0.492	3.43	30
		19.5	2.57	0.691	3.26	30
		26	2.49	0.873	3.37	30
		39	2.28	1.181	3.46	30
		52	2.01	1.471	3.48	30
		58.5	-1.27	1.591	0.32	30
		65	-1.40	1.698	0.30	30
5825	165	6.5	3.78	0.254	4.04	30
		13	3.54	0.492	4.03	30
		19.5	3.37	0.691	4.06	30
		26	3.24	0.873	4.11	30
		39	2.93	1.181	4.11	30
		52	2.65	1.471	4.12	30
		58.5	-0.90	1.591	0.69	30
		65	-0.71	1.698	0.98	30

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.

▣ 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	10.4

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

▣ TEST RESULTS

Conducted Power Density Measurements

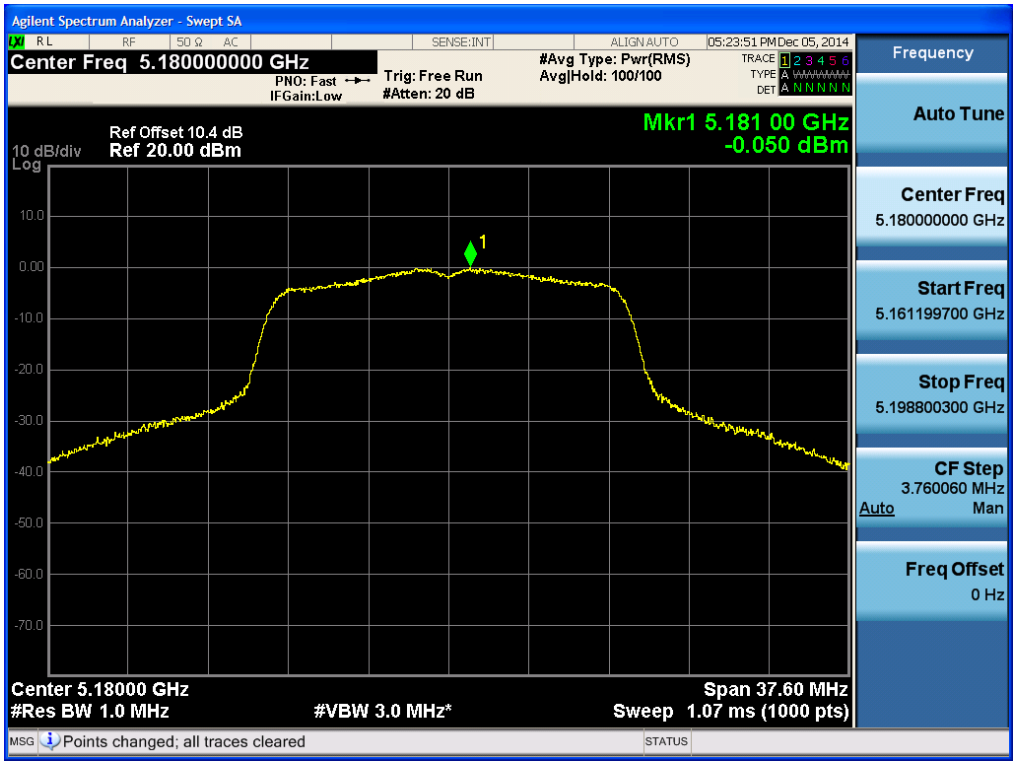
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5180	36	802.11a	-0.050	0.749	0.699	11	Pass
5200	40		-0.441	1.069	0.628	11	Pass
5240	48		-0.889	0.210	-0.679	11	Pass
5260	52	802.11a	-1.345	0.413	-0.932	11	Pass
5300	60		-2.617	0.749	-1.868	11	Pass
5320	64		-3.010	0.413	-2.597	11	Pass
5500	100	802.11a	-3.902	0.413	-3.489	11	Pass
5600	120		-4.211	0.584	-3.627	11	Pass
5700	140		-4.388	0.749	-3.639	11	Pass
5745	149	802.11a	3.569	0.584	4.153	30	Pass
5785	157		4.580	0.749	5.329	30	Pass
5825	165		4.073	0.210	4.283	30	Pass

Conducted Power Density Measurements

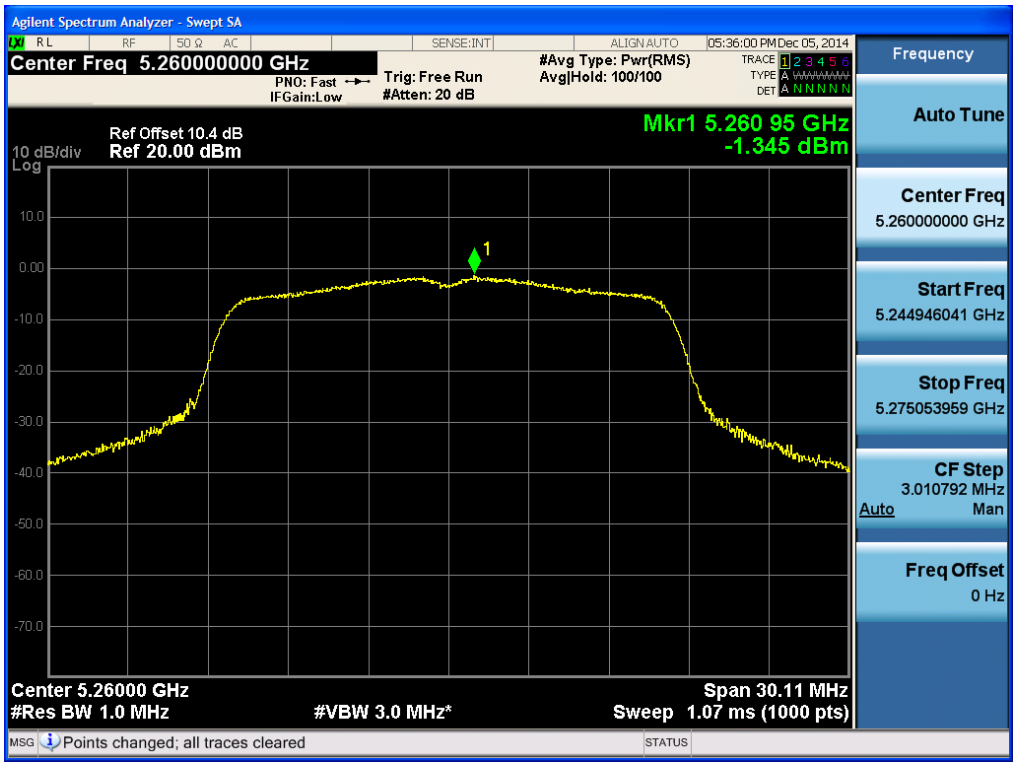
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5180	36	802.11n 20MHz BW	-2.828	0.492	-2.336	4	Pass
5200	40		-4.603	1.471	-3.132	4	Pass
5240	48		-4.146	1.181	-2.965	4	Pass
5260	52	802.11n 20MHz BW	-4.709	1.471	-3.238	11	Pass
5300	60		-5.143	1.471	-3.672	11	Pass
5320	64		-4.770	0.492	-4.278	11	Pass
5500	100	802.11n 20MHz BW	-6.606	0.691	-5.915	11	Pass
5600	120		-7.622	1.471	-6.151	11	Pass
5700	140		-8.819	0.492	-8.327	11	Pass
5745	149	802.11n 20MHz BW	-0.594	1.471	0.877	8	Pass
5785	157		0.000	1.471	1.471	8	Pass
5825	165		0.051	1.471	1.522	8	Pass

▣ RESULT PLOTS

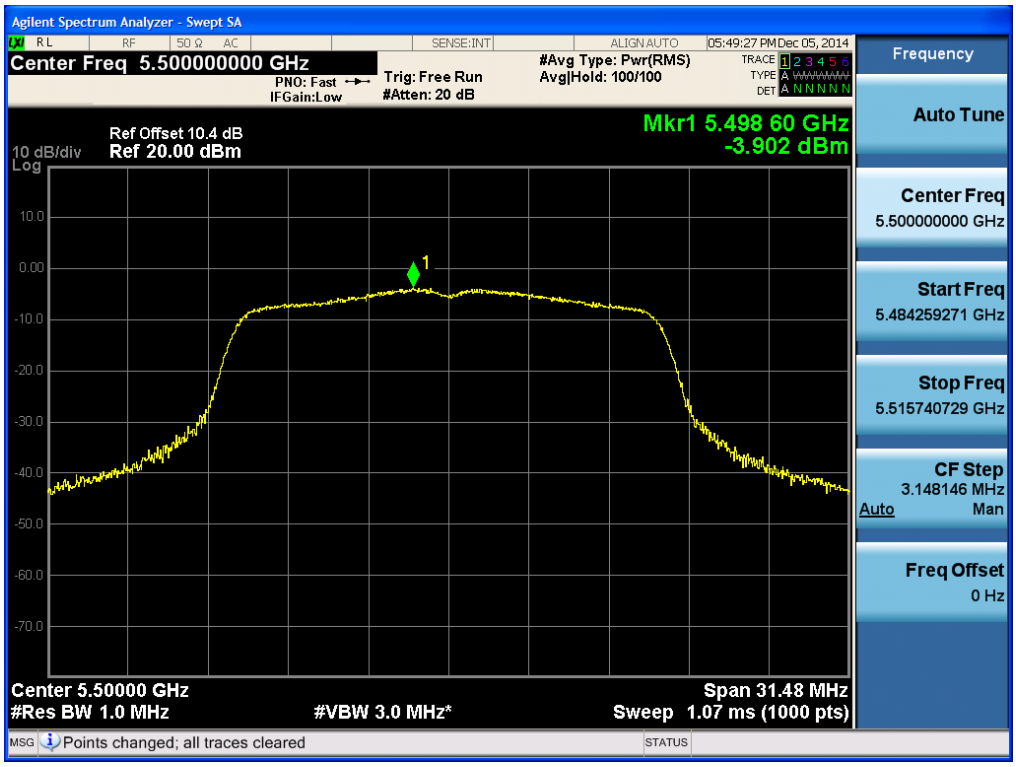
Power Spectral Density (802.11a-CH 36)



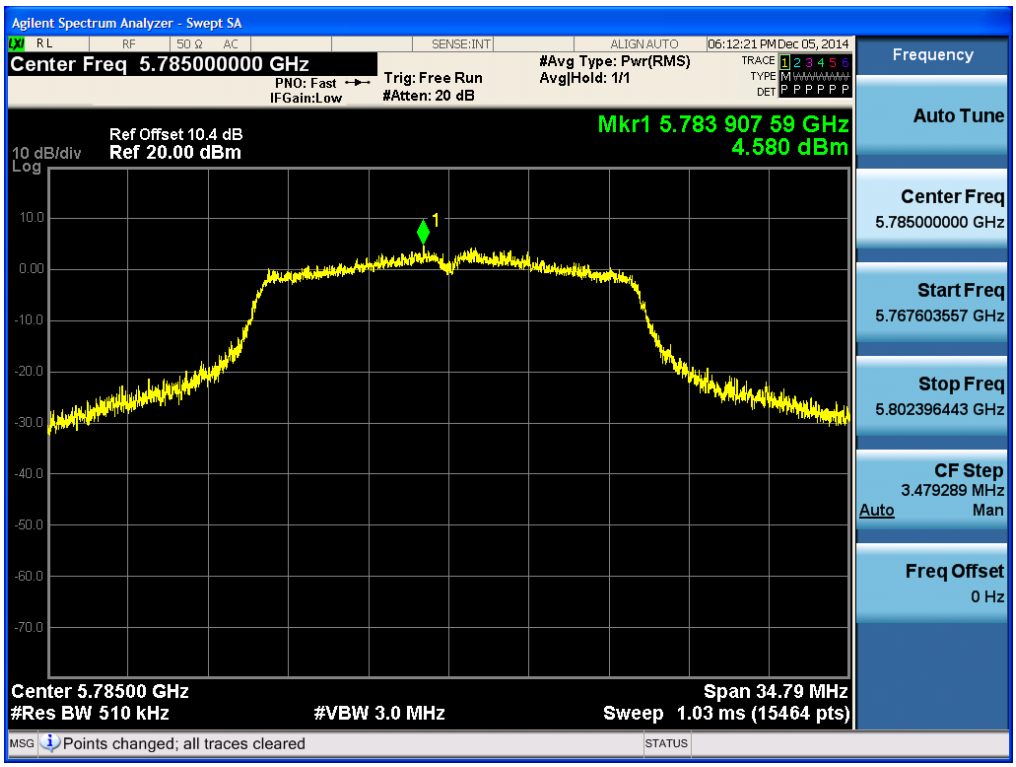
Power Spectral Density (802.11a-CH 52)



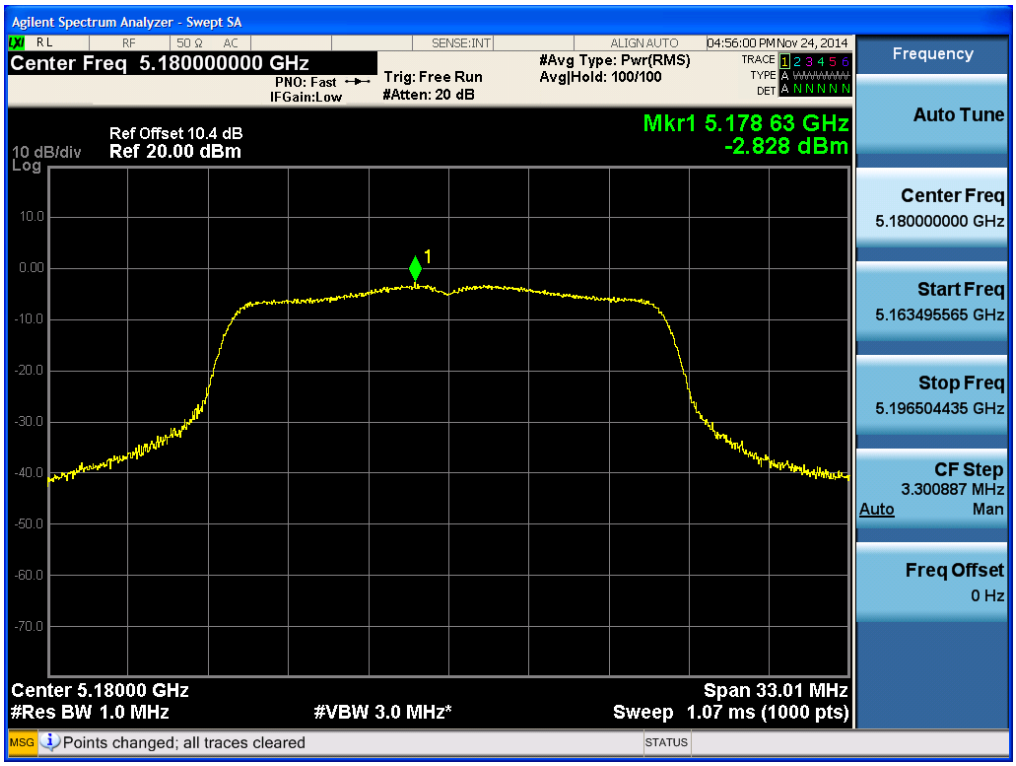
Power Spectral Density (802.11a-CH 100)



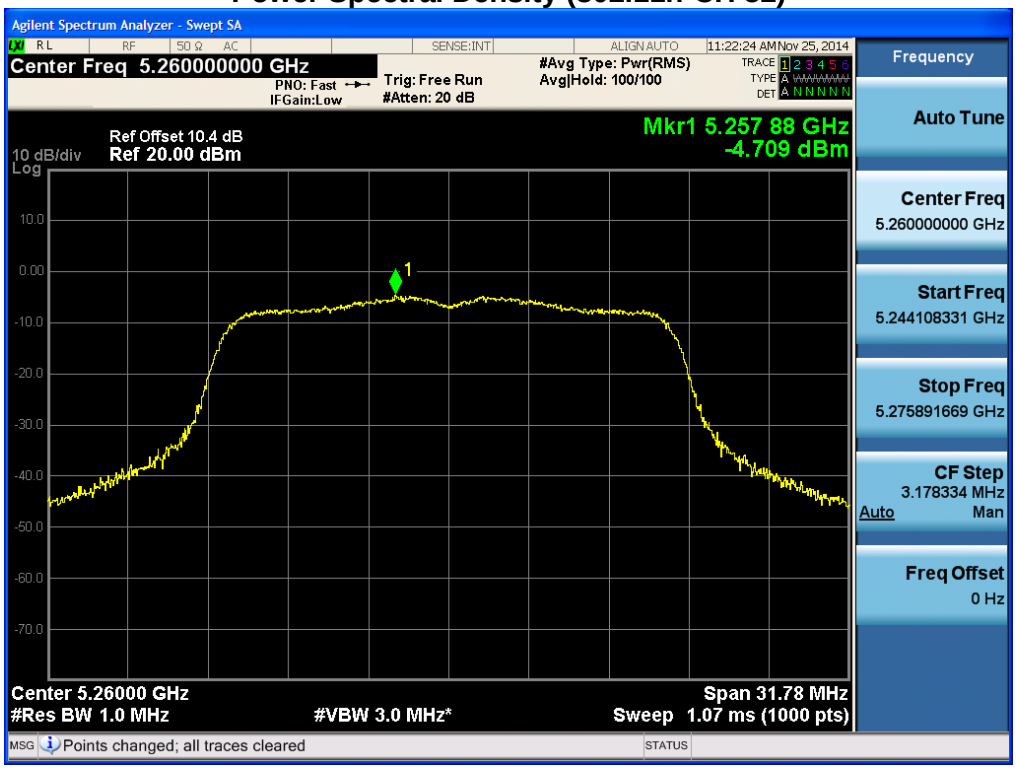
Power Spectral Density (802.11 a-CH 157)



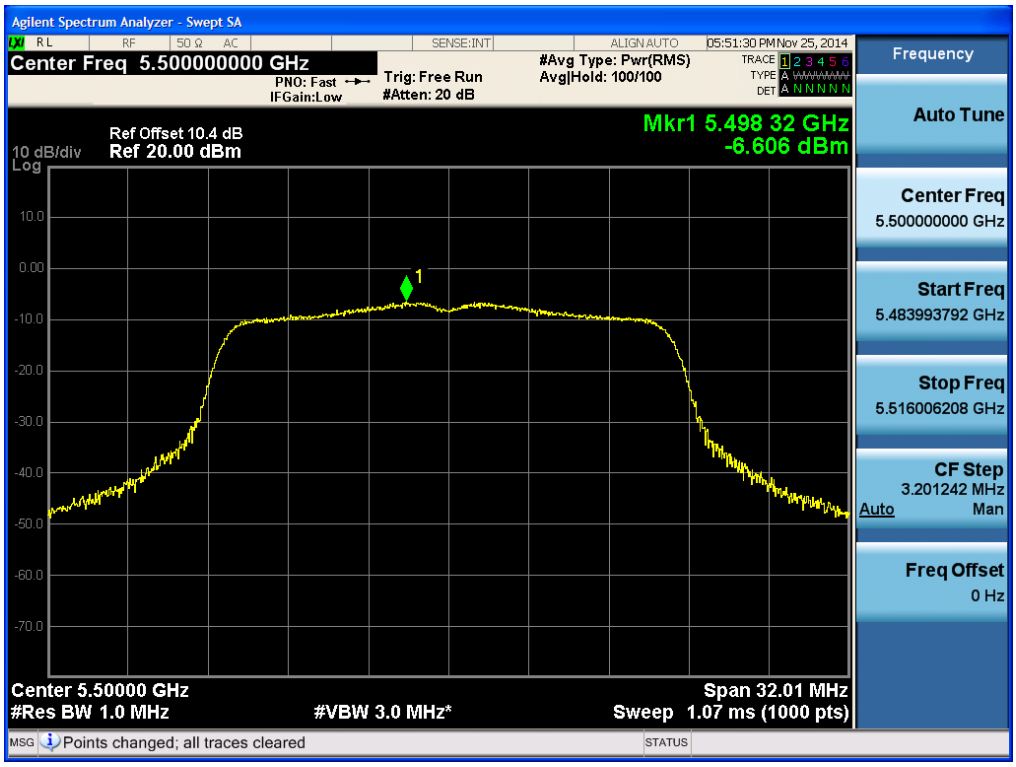
Power Spectral Density (802.11n-CH 36)



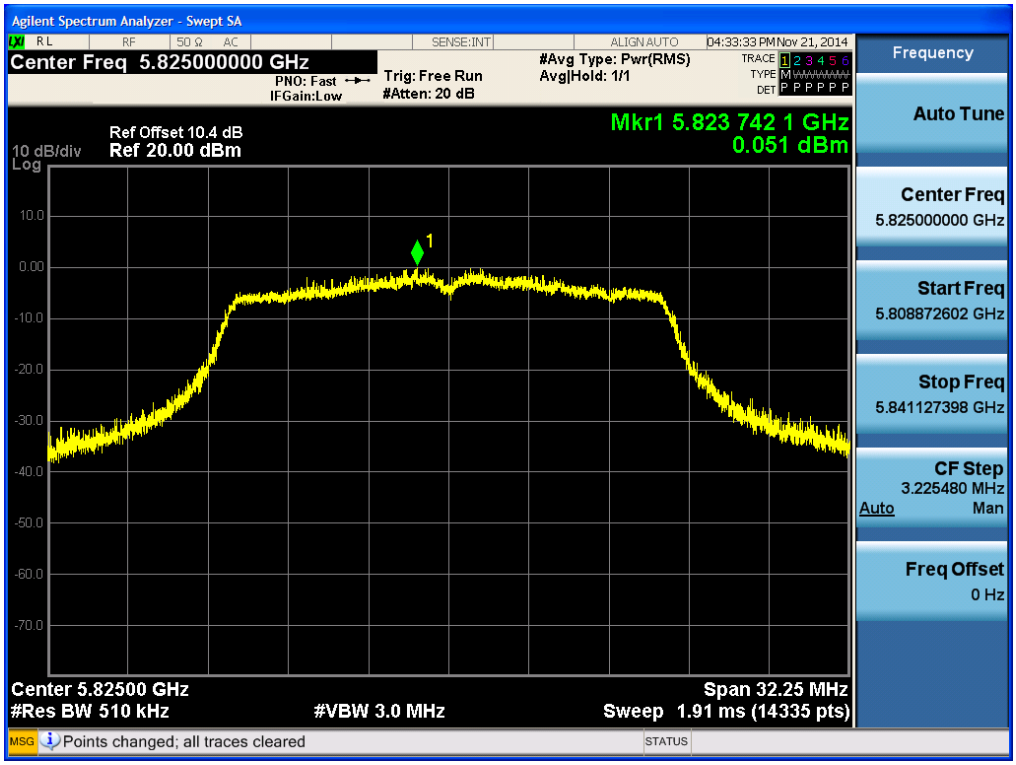
Power Spectral Density (802.11n-CH 52)



Power Spectral Density (802.11n-CH 100)



Power Spectral Density (802.11n-CH 165)



8.5 FREQUENCY STABILITY.

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

20 MHz BW

OPERATING BAND: UNII Band 1

OPERATING FREQUENCY: 5,180,000,000 Hz

CHANNEL: 36

REFERENCE VOLTAGE: 3.7 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.70	+20(Ref)	5179987.50	-12.50
100%		-30	5179968.50	-31.50
100%		-20	5179971.90	-28.10
100%		-10	5179975.40	-24.60
100%		0	5179980.90	-19.10
100%		10	5179984.20	-15.80
100%		30	5179991.10	-8.90
100%		40	5179996.59	-3.41
100%		50	5180001.23	1.23
115%	4.26	20	5180000.00	0
Batt. Endpoint	3.50	20	5180000.00	0

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: 3.7 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.70	+20(Ref)	5259983.50	-16.50
100%		-30	5259964.90	-35.10
100%		-20	5259968.40	-31.6
100%		-10	5259972.10	-27.9
100%		0	5259976.50	-23.5
100%		+10	5259980.20	-19.8
100%		+30	5259987.90	-12.1
100%		+40	5259991.40	-8.6
100%		+50	5259995.80	-4.20
115%	4.26	+20	5260000.00	0
Batt. Endpoint	3.50	+20	5260000.00	0

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: 3.7 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.70	+20(Ref)	5499984.50	-15.50
100%		-30	5499967.90	-32.10
100%		-20	5499971.30	-28.7
100%		-10	5499974.60	-25.4
100%		0	5499977.90	-22.1
100%		+10	5499981.10	-18.9
100%		+30	5499988.60	-11.4
100%		+40	5499992.40	-7.6
100%		+50	5499996.80	-3.20
115%	4.26	+20	5500000.00	0
Batt. Endpoint	3.50	+20	5500000.00	0

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: 3.7 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.70	+20(Ref)	5744982.50	-17.50
100%		-30	5744965.40	-34.60
100%		-20	5744968.90	-31.1
100%		-10	5744972.10	-27.9
100%		0	5744975.70	-24.3
100%		+10	5744979.00	-21
100%		+30	5744986.80	-13.2
100%		+40	5744990.20	-9.8
100%		+50	5744994.40	-5.60
115%	4.26	+20	5745000.00	0
Batt. Endpoint	3.50	+20	5745000.00	0

Note:

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

8.6 RADIATED MEASUREMENT

8.6.1 RADIATED SPURIOUS EMISSIONS.

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

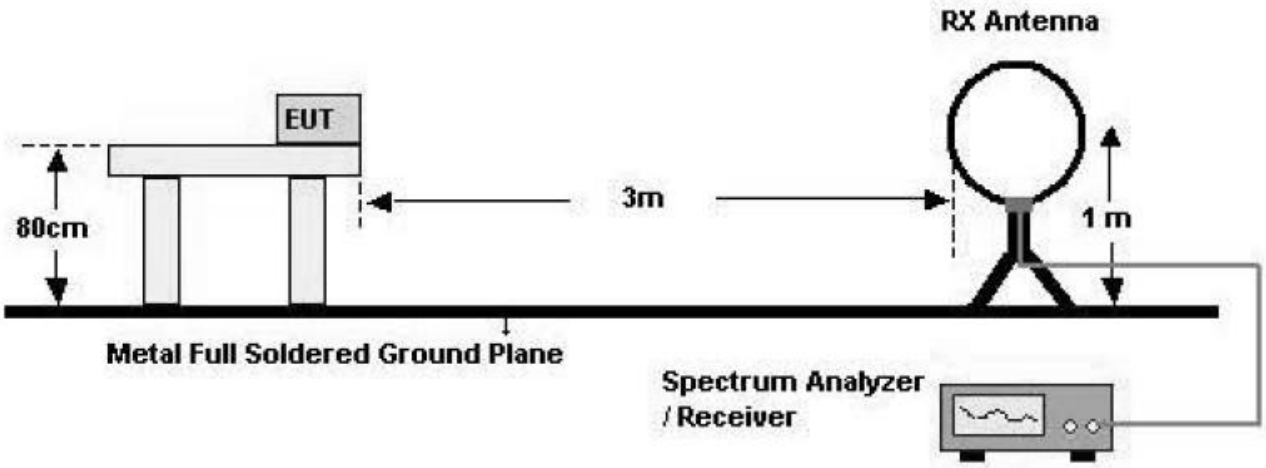
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

▣ §15.407, KDB 789033 D02

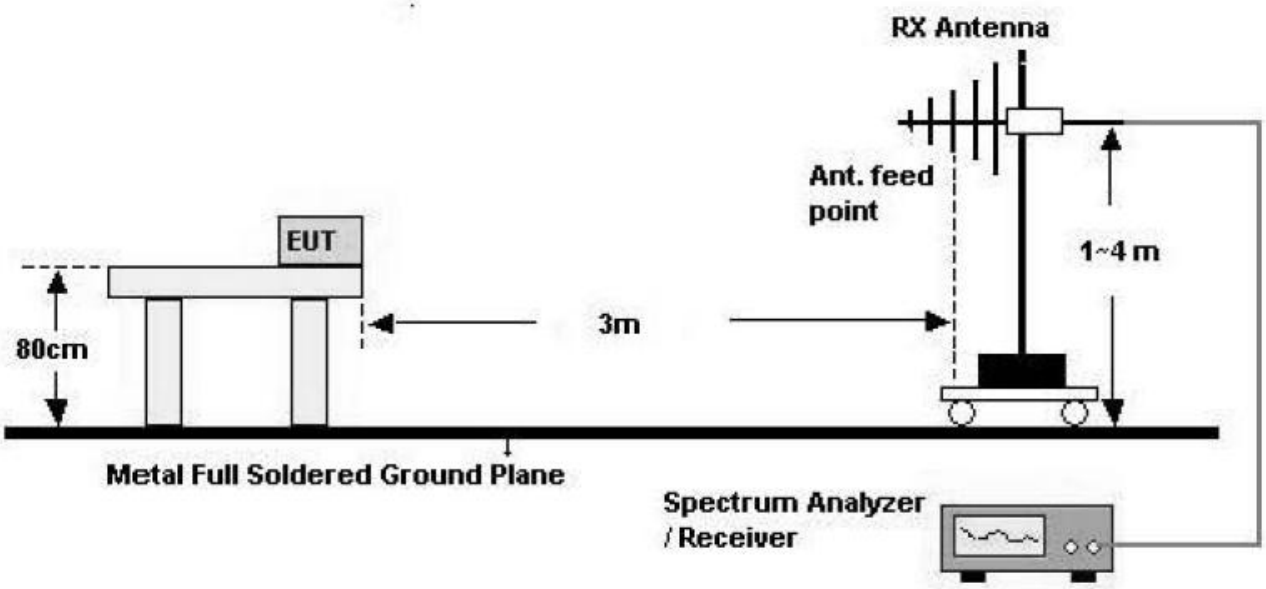
All harmonics that do not lie in a restricted band are subject to a peak limit of -27 dBm/MHz. At a distance of 3 meters the field strength limit in dBμV/m can be determined by adding a “conversion” factor of 95.2 dB to the EIRP limit of -27 dBm/MHz to obtain the limit for out of band spurious emissions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

Test Configuration

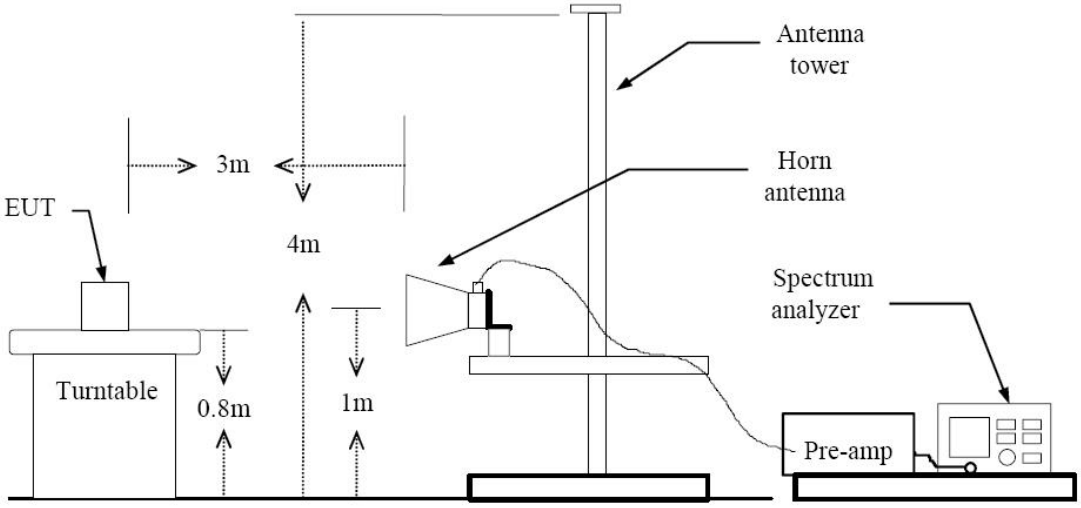
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE USED

ANSI C63.4(2003)

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

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

. Spectrum setting:

- Peak.

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

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

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

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

Note :

1. We used the case 2 for 802.11a/n_20 mode to perform the average filed strength measurements.
2. The actual setting value of VBW for 802.11a/n_20

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**	**2.056**	**2.158**	**95.27**	**486**	**1000**
n_20	**6.5**	**1.726**	**1.830**	**94.32**	**579**	**1000**

TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
㎒	dB㎶	dB /m	dB	(H/V)	dB㎶/m	dB㎶/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
㎒	dB㎶	dB /m	dB	(H/V)	dB㎶/m	dB㎶/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
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	62.45	-6.51	V	55.94	68.20	12.26	PK
15540	63.85	-6.42	V	57.43	73.98	16.55	PK
15540	50.43	-6.42	V	44.01	53.98	9.97	AV
10360	62.93	-6.51	H	56.42	68.20	11.78	PK
15540	64.97	-6.42	H	58.55	73.98	15.43	PK
15540	50.81	-6.42	H	44.39	53.98	9.59	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. 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
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	62.52	-6.49	V	56.03	68.20	12.17	PK
15600	63.69	-7.15	V	56.54	73.98	17.44	PK
15600	50.65	-7.15	V	43.50	53.98	10.48	AV
10400	62.42	-6.49	H	55.93	68.20	12.27	PK
15600	63.99	-7.15	H	56.84	73.98	17.14	PK
15600	50.69	-7.15	H	43.54	53.98	10.44	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
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	63.02	-6.96	V	56.06	68.20	12.14	PK
15720	63.86	-6.62	V	57.24	73.98	16.74	PK
15720	50.73	-6.62	V	44.11	53.98	9.87	AV
10480	63.32	-6.96	H	56.36	68.20	11.84	PK
15720	64.00	-6.96	H	57.04	73.98	16.94	PK
15720	50.88	-6.62	H	44.26	53.98	9.72	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 Rate:	6.5 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	62.37	-6.51	V	55.86	68.20	12.34	PK
15540	63.52	-6.42	V	57.10	73.98	16.88	PK
15540	50.28	-6.42	V	43.86	53.98	10.12	AV
10360	62.54	-6.51	H	56.03	68.20	12.17	PK
15540	64.54	-6.42	H	58.12	73.98	15.86	PK
15540	50.42	-6.42	H	44.00	53.98	9.98	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 6.5 Mbps 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 Rate:	6.5 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	62.42	-6.49	V	55.93	68.20	12.27	PK
15600	63.47	-7.15	V	56.32	73.98	17.66	PK
15600	50.61	-7.15	V	43.46	53.98	10.52	AV
10400	62.17	-6.49	H	55.68	68.20	12.52	PK
15600	63.76	-7.15	H	56.61	73.98	17.37	PK
15600	50.48	-7.15	H	43.33	53.98	10.65	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_20 MHz BW. Worst case is 6.5 Mbps 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 Rate:	6.5 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	63.14	-6.96	V	56.18	68.20	12.02	PK
15720	63.94	-6.62	V	57.32	73.98	16.66	PK
15720	50.72	-6.62	V	44.10	53.98	9.88	AV
10480	63.28	-6.96	H	56.32	68.20	11.88	PK
15720	64.12	-6.96	H	57.16	73.98	16.82	PK
15720	50.76	-6.62	H	44.14	53.98	9.84	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 6.5 Mbps 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 a
Transfer Rate:	6 Mbps
Operating Frequency	5260 MHz
Channel No.	52 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10520	63.02	-6.52	V	56.50	68.20	11.70	PK
15780	64.56	-6.67	V	57.89	73.98	16.09	PK
15780	51.32	-6.67	V	44.65	53.98	9.33	AV
10520	63.21	-6.52	H	56.69	68.20	11.51	PK
15780	64.77	-6.67	H	58.10	73.98	15.88	PK
15780	51.48	-6.67	H	44.81	53.98	9.17	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
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	64.05	-6.72	V	57.33	73.98	16.65	PK
10600	49.43	-6.72	V	42.71	53.98	11.27	AV
15900	64.53	-7.00	V	57.53	73.98	16.45	PK
15900	51.07	-7.00	V	44.07	53.98	9.91	AV
10600	64.11	-6.72	H	57.39	73.98	16.59	PK
10600	49.54	-6.72	H	42.82	53.98	11.16	AV
15900	64.79	-7.00	H	57.79	73.98	16.19	PK
15900	51.23	-7.00	H	44.23	53.98	9.75	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. 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
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	62.42	-6.43	V	55.99	73.98	17.99	PK
10640	49.15	-6.43	V	42.72	53.98	11.26	AV
15960	63.83	-6.93	V	56.90	73.98	17.08	PK
15960	50.59	-6.93	V	43.66	53.98	10.32	AV
10640	62.86	-6.43	H	56.43	73.98	17.55	PK
10640	49.31	-6.43	H	42.88	53.98	11.10	AV
15960	64.01	-6.93	H	57.08	73.98	16.90	PK
15960	50.95	-6.93	H	44.02	53.98	9.96	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 Rate:	6.5 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	62.68	-6.52	V	56.16	68.20	12.04	PK
15780	63.88	-6.67	V	57.21	73.98	16.77	PK
15780	50.69	-6.67	V	44.02	53.98	9.96	AV
10520	63.15	-6.52	H	56.63	68.20	11.57	PK
15780	64.05	-6.67	H	57.38	73.98	16.60	PK
15780	50.48	-6.67	H	43.81	53.98	10.17	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 6.5 Mbps 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 Rate:	6.5 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	63.48	-6.72	V	56.76	73.98	17.22	PK
10600	49.86	-6.72	V	43.14	53.98	10.84	AV
15900	63.86	-7.00	V	56.86	73.98	17.12	PK
15900	50.79	-7.00	V	43.79	53.98	10.19	AV
10600	63.94	-6.72	H	57.22	73.98	16.76	PK
10600	49.99	-6.72	H	43.27	53.98	10.71	AV
15900	63.74	-7.00	H	56.74	73.98	17.24	PK
15900	51.04	-7.00	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_20 MHz BW. Worst case is 6.5 Mbps 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 Rate:	6.5 Mbps
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10640	63.94	-6.43	V	57.51	73.98	16.47	PK
10640	49.97	-6.43	V	43.54	53.98	10.44	AV
15960	63.96	-6.93	V	57.03	73.98	16.95	PK
15960	50.69	-6.93	V	43.76	53.98	10.22	AV
10640	64.18	-6.43	H	57.75	73.98	16.23	PK
10640	50.15	-6.43	H	43.72	53.98	10.26	AV
15960	63.95	-6.93	H	57.02	73.98	16.96	PK
15960	50.79	-6.93	H	43.86	53.98	10.12	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 6.5 Mbps 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 a
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	63.05	-5.06	V	57.99	73.98	15.99	PK
11000	49.56	-5.06	V	44.50	53.98	9.48	AV
16500	64.01	-4.35	V	59.66	68.20	8.54	PK
11000	63.31	-5.06	H	58.25	73.98	15.73	PK
11000	49.83	-5.06	H	44.77	53.98	9.21	AV
16500	64.22	-4.35	H	59.87	68.20	8.33	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
Transfer Rate:	6 Mbps
Operating Frequency	5600 MHz
Channel No.	120 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11200	62.47	-6.05	V	56.42	73.98	17.56	PK
11200	49.27	-6.05	V	43.22	53.98	10.76	AV
16800	63.48	-2.56	V	60.92	68.20	7.28	PK
11200	62.73	-6.05	H	56.68	73.98	17.30	PK
11200	49.63	-6.05	H	43.58	53.98	10.40	AV
16800	63.68	-2.56	H	61.12	68.20	7.08	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
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	62.71	-6.08	V	56.63	73.98	17.35	PK
11400	49.27	-6.08	V	43.19	53.98	10.79	AV
17100	62.59	-0.85	V	61.74	68.20	6.46	PK
11400	62.84	-6.08	H	56.76	73.98	17.22	PK
11400	49.68	-6.08	H	43.60	53.98	10.38	AV
17100	62.92	-0.85	H	62.07	68.20	6.13	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 Rate:	6.5 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	63.45	-5.06	V	58.39	73.98	15.59	PK
11000	46.55	-5.06	V	41.49	53.98	12.49	AV
16500	63.94	-4.35	V	59.59	68.20	8.61	PK
11000	63.72	-5.06	H	58.66	73.98	15.32	PK
11000	49.68	-5.06	H	44.62	53.98	9.36	AV
16500	64.17	-4.35	H	59.82	68.20	8.38	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_20 MHz BW. Worst case is 6.5 Mbps 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 Rate:	6.5 Mbps
Operating Frequency	5600 MHz
Channel No.	120 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11200	62.17	-6.05	V	56.12	73.98	17.86	PK
11200	49.12	-6.05	V	43.07	53.98	10.91	AV
16800	63.18	-2.56	V	60.62	68.20	7.58	PK
11200	62.42	-6.05	H	56.37	73.98	17.61	PK
11200	49.57	-6.05	H	43.52	53.98	10.46	AV
16800	63.66	-2.56	H	61.10	68.20	7.10	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 6.5 Mbps 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 Rate:	6.5 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	62.44	-6.08	V	56.36	73.98	17.62	PK
11400	49.56	-6.08	V	43.48	53.98	10.50	AV
17100	62.76	-0.85	V	61.91	68.20	6.29	PK
11400	62.94	-6.08	H	56.86	73.98	17.12	PK
11400	49.45	-6.08	H	43.37	53.98	10.61	AV
17100	62.92	-0.85	H	62.07	68.20	6.13	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 6.5 Mbps 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 a
Transfer Rate:	6 Mbps
Operating Frequency	5745 MHz
Channel No.	149 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11490	63.44	-6.10	V	57.34	73.98	16.64	PK
11490	49.16	-6.10	V	43.06	53.98	10.92	AV
11490	63.58	-6.10	H	57.48	73.98	16.50	PK
11490	49.60	-6.10	H	43.50	53.98	10.48	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. 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
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	62.69	-5.57	V	57.12	73.98	16.86	PK
11570	49.51	-5.57	V	43.94	53.98	10.04	AV
11570	63.04	-5.57	H	57.47	73.98	16.51	PK
11570	49.79	-5.57	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 802.11a. 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
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	62.99	-6.63	V	56.36	73.98	17.62	PK
11650	49.77	-6.63	V	43.14	53.98	10.84	AV
11650	63.11	-6.63	H	56.48	73.98	17.50	PK
11650	49.79	-6.63	H	43.16	53.98	10.82	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 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:	802.11n_20 MHz BW
Transfer Rate:	6.5Mbps
Operating Frequency	5745 MHz
Channel No.	149 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11490	63.38	-6.10	V	57.28	73.98	16.70	PK
11490	49.04	-6.10	V	42.94	53.98	11.04	AV
11490	63.70	-6.10	H	57.60	73.98	16.38	PK
11490	49.77	-6.10	H	43.67	53.98	10.31	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 6.5 Mbps 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:	802.11n_20 MHz BW
Transfer Rate:	6.5 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	62.42	-5.57	V	56.85	73.98	17.13	PK
11570	49.07	-5.57	V	43.50	53.98	10.48	AV
11570	63.01	-5.57	H	57.44	73.98	16.54	PK
11570	49.48	-5.57	H	43.91	53.98	10.07	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 6.5 Mbps 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:	802.11n_20MHz BW
Transfer Rate:	6.5 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	63.14	-6.63	V	56.51	73.98	17.47	PK
11650	49.27	-6.63	V	42.64	53.98	11.34	AV
11650	63.28	-6.63	H	56.65	73.98	17.33	PK
11650	49.56	-6.63	H	42.93	53.98	11.05	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. Worst case is 6.5 Mbps in 802.11n_20MHz
6. We have done x, y, z planes in EUT and horizontal and verti

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
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	57.77	8.79	H	66.56	73.98	7.42	PK
5150	40.74	8.79	H	49.53	53.98	4.45	AV
5150	54.83	8.79	V	63.62	73.98	10.36	PK
5150	40.03	8.79	V	48.82	53.98	5.16	AV

Band :	UNII 1
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 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	55.97	8.79	H	64.76	73.98	9.22	PK
5150	40.46	8.79	H	49.25	53.98	4.73	AV
5150	54.26	8.79	V	63.05	73.98	10.93	PK
5150	40.13	8.79	V	48.92	53.98	5.06	AV

Band :	UNII 2A
Operation Mode:	802.11 a
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	53.88	9.28	H	63.16	73.98	10.82	PK
5350	38.29	9.28	H	47.57	53.98	6.41	AV
5350	52.11	9.28	V	61.39	73.98	12.59	PK
5350	37.02	9.28	V	46.3	53.98	7.68	AV

Band :	UNII 2A
Operation Mode:	802.11 n_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	54.69	9.28	H	63.97	73.98	10.01	PK
5350	38.08	9.28	H	47.36	53.98	6.62	AV
5350	53.86	9.28	V	63.14	73.98	10.84	PK
5350	37.56	9.28	V	46.84	53.98	7.14	AV

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

Frequency [MHz]	Reading DBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	50.43	10.08	H	60.51	73.98	13.47	PK
5460	38.35	10.08	H	48.43	53.98	5.55	AV
5470	53.17	9.95	H	63.12	68.20	5.08	PK
5460	49.15	10.08	V	59.23	73.98	14.75	PK
5460	37.22	10.08	V	47.3	53.98	6.68	AV
5470	51.75	9.95	V	61.7	68.20	6.50	PK

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

Frequency [MHz]	Reading DBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5725	52.86	11.37	H	64.23	68.20	3.97	PK
5725	53.03	11.37	V	64.4	68.20	3.80	PK

Band :	UNII 2C
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6 Mbps
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Reading DBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	50.66	10.08	H	60.74	73.98	13.24	PK
5460	37.71	10.08	H	47.79	53.98	6.19	AV
5470	36.76	9.95	H	46.71	68.20	21.49	PK
5460	49.81	10.08	V	59.89	73.98	14.09	PK
5460	37.12	10.08	V	47.2	53.98	6.78	AV
5470	36.07	9.95	V	46.02	68.20	22.18	PK

Band :	UNII 2C
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5700 MHz
Channel No.	140 Ch

Frequency [MHz]	Reading DBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5725	49.18	11.37	H	60.55	68.20	7.65	PK
5725	48.27	11.37	V	59.64	68.20	8.56	PK

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

Frequency [MHz]	Reading DBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5725	62.06	11.37	H	73.43	78.20	4.77	PK
5725	58.86	11.37	V	70.23	78.20	7.97	PK
5715	51.60	11.37	H	62.97	68.20	5.23	PK
5715	47.99	11.37	V	59.36	68.20	8.84	PK

Band :	UNII 3
Operation Mode:	802.11 a
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	63.41	11.37	H	74.78	78.20	3.42	PK
5850	60.79	11.37	V	72.16	78.20	6.04	PK
5860	50.97	11.37	H	62.34	68.20	5.86	PK
5860	49.32	11.37	V	60.69	68.20	7.51	PK

Band :	UNII 3
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5745 MHz
Channel No.	149 Ch

Frequency [MHz]	Reading DBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5725	61.82	11.37	H	73.19	78.20	5.01	PK
5725	58.08	11.37	V	69.45	78.20	8.75	PK
5715	53.77	11.37	H	65.14	68.20	3.06	PK
5715	50.12	11.37	V	61.49	68.20	6.71	PK

Band :	UNII 3
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 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	61.48	11.37	H	72.85	78.20	5.35	PK
5850	58.99	11.37	V	70.36	78.20	7.84	PK
5860	51.19	11.37	H	62.56	68.20	5.64	PK
5860	48.84	11.37	V	60.21	68.20	7.99	PK

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.
5. We are performed the AC Power Line Conducted Emission test for 24 Mbps, Ch.36 and 802.11a mode in UNII 1. Because 802.11a mode in UNII 1 is worst case.

▣ RESULT PLOTS

Conducted Emissions (Line 1)

UNII H 1 / 2

HCT TEST Report

Common Information

EUT:	SHR-1000
Manufacturer:	SINHEUNG
Test Site:	SHIELD ROOM
Operating Conditions:	WLAN MODE(5G)
Operator Name:	JS LEE

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.162000	37.0	9.000	Off	L1	9.6	28.4	65.4
0.222000	40.5	9.000	Off	L1	9.6	22.2	62.7
0.226000	43.4	9.000	Off	L1	9.6	19.2	62.6
0.234000	40.6	9.000	Off	L1	9.7	21.7	62.3
0.238000	38.5	9.000	Off	L1	9.7	23.7	62.2
0.242000	37.6	9.000	Off	L1	9.7	24.4	62.0
1.170000	36.9	9.000	Off	L1	9.7	19.1	56.0
1.190000	38.5	9.000	Off	L1	9.7	17.5	56.0
1.210000	39.5	9.000	Off	L1	9.7	16.5	56.0
1.226000	39.1	9.000	Off	L1	9.7	16.9	56.0
1.242000	39.0	9.000	Off	L1	9.7	17.0	56.0
1.386000	36.8	9.000	Off	L1	9.7	19.2	56.0
15.684000	31.3	9.000	Off	L1	10.3	28.7	60.0
15.690000	31.5	9.000	Off	L1	10.3	28.5	60.0
15.806000	32.6	9.000	Off	L1	10.3	27.4	60.0
15.922000	35.3	9.000	Off	L1	10.3	24.7	60.0

12/4/2014 7:16:35

UNII H 2 / 2

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
15.926000	37.6	9.000	Off	L1	10.3	22.4	60.0
16.044000	34.3	9.000	Off	L1	10.3	25.7	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.152000	28.5	9.000	Off	L1	9.6	27.4	55.9
0.160000	28.3	9.000	Off	L1	9.6	27.2	55.5
0.164000	26.5	9.000	Off	L1	9.6	28.8	55.3
0.238000	32.0	9.000	Off	L1	9.7	20.2	52.2
0.250000	27.2	9.000	Off	L1	9.7	24.6	51.8
0.260000	23.2	9.000	Off	L1	9.7	28.2	51.4
1.182000	31.8	9.000	Off	L1	9.7	14.2	46.0
1.190000	32.7	9.000	Off	L1	9.7	13.3	46.0
1.202000	32.9	9.000	Off	L1	9.7	13.1	46.0
1.234000	33.0	9.000	Off	L1	9.7	13.0	46.0
1.242000	33.3	9.000	Off	L1	9.7	12.7	46.0
1.386000	31.1	9.000	Off	L1	9.7	14.9	46.0
15.328000	24.7	9.000	Off	L1	10.3	25.3	50.0
15.686000	26.6	9.000	Off	L1	10.3	23.4	50.0
15.806000	27.3	9.000	Off	L1	10.3	22.7	50.0
15.924000	34.6	9.000	Off	L1	10.3	15.4	50.0
16.042000	34.4	9.000	Off	L1	10.3	15.6	50.0
16.162000	25.2	9.000	Off	L1	10.3	24.8	50.0

12/4/2014 7:16:35

Conducted Emissions (Line 2)

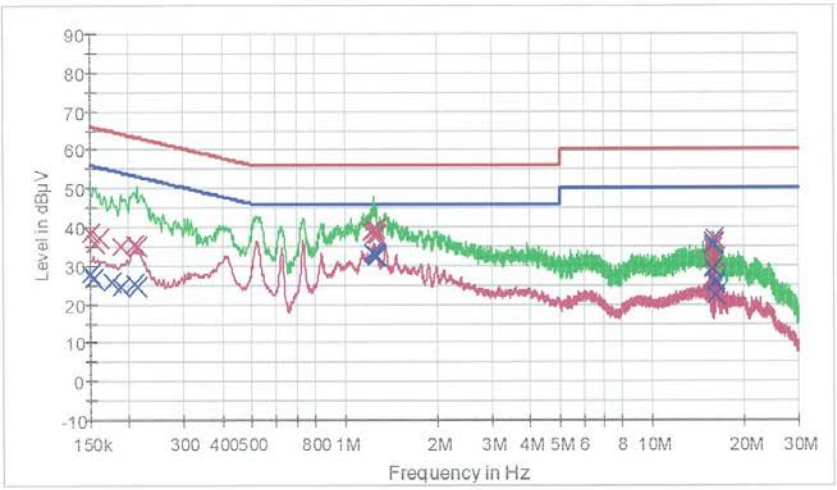
UNII N 1 / 2

HCT TEST Report

Common Information

EUT:	SHR-1000
Manufacturer:	SINHEUNG
Test Site:	SHIELD ROOM
Operating Conditions:	WLAN MODE(5G)
Operator Name:	JS LEE

FCC CLASS B



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	38.3	9.000	Off	N	9.6	27.7	66.0
0.156000	35.7	9.000	Off	N	9.6	30.0	65.7
0.160000	37.1	9.000	Off	N	9.6	28.4	65.5
0.188000	34.8	9.000	Off	N	9.7	29.3	64.1
0.208000	35.3	9.000	Off	N	9.7	28.0	63.3
0.212000	35.2	9.000	Off	N	9.7	27.9	63.1
1.224000	38.7	9.000	Off	N	9.7	17.3	56.0
1.240000	39.2	9.000	Off	N	9.7	16.8	56.0
1.244000	39.0	9.000	Off	N	9.7	17.0	56.0
1.248000	37.9	9.000	Off	N	9.7	18.1	56.0
1.258000	39.4	9.000	Off	N	9.8	16.6	56.0
1.268000	38.1	9.000	Off	N	9.8	17.9	56.0
15.564000	31.6	9.000	Off	N	10.2	28.4	60.0
15.670000	29.6	9.000	Off	N	10.2	30.4	60.0
15.686000	34.5	9.000	Off	N	10.2	25.5	60.0
15.806000	36.3	9.000	Off	N	10.2	23.7	60.0

12/4/2014 7:08:28

UNII N 2 / 2

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
15.928000	36.9	9.000	Off	N	10.2	23.1	60.0
16.052000	**31.8**	**9.000**	**Off**	**N**	**10.2**	**28.2**	**60.0**

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	27.9	9.000	Off	N	9.6	28.1	56.0
0.154000	26.5	9.000	Off	N	9.6	29.3	55.8
0.176000	25.6	9.000	Off	N	9.7	29.1	54.7
0.188000	24.3	9.000	Off	N	9.7	29.8	54.1
0.208000	25.2	9.000	Off	N	9.7	28.1	53.3
0.212000	24.5	9.000	Off	N	9.7	28.6	53.1
1.226000	33.5	9.000	Off	N	9.7	12.6	46.0
1.238000	33.3	9.000	Off	N	9.7	12.7	46.0
1.252000	33.0	9.000	Off	N	9.8	13.0	46.0
1.256000	32.7	9.000	Off	N	9.8	13.3	46.0
1.262000	32.3	9.000	Off	N	9.8	13.7	46.0
1.268000	32.6	9.000	Off	N	9.8	13.4	46.0
15.684000	29.0	9.000	Off	N	10.2	21.0	50.0
15.806000	35.6	9.000	Off	N	10.2	14.4	50.0
15.928000	36.0	9.000	Off	N	10.2	14.0	50.0
16.052000	26.1	9.000	Off	N	10.2	23.9	50.0
16.174000	25.2	9.000	Off	N	10.2	24.8	50.0
16.186000	**22.6**	**9.000**	**Off**	**N**	**10.2**	**27.4**	**50.0**

12/4/2014 7:08:28

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	01/29/2014	Annual	100073
Agilent	E4440A/ Spectrum Analyzer	04/09/2014	Annual	US45303008
Agilent	N9020A/ SIGNAL ANALYZER	05/23/2014	Annual	MY51110063
Agilent	N1911A/Power Meter	01/24/2014	Annual	MY45100523
Agilent	N1921A /POWER SENSOR	07/09/2014	Annual	MY45241059
Agilent	87300B/Directional Coupler	12/18/2013	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	01/27/2014	Annual	10545
ITECH	IT6720 / DC POWER SUPPLY	11/04/2014	Annual	010002156287001199
TESCOM	TC-3000C / BLUETOOTH TESTER	04/11/2014	Annual	3000C000276
Rohde & Schwarz	CBT / BLUETOOTH TESTER	05/07/2014	Annual	100422
Agilent	8493C / Attenuator(10 dB)	07/21/2014	Annual	76649

9.2 LIST OF TEST EQUIPMENT(Radiated Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Schwarzbeck	VULB 9160/ TRILOG Antenna	12/17/2012	Biennial	3150
Rohde & Schwarz	ESCI / EMI TEST RECEIVER	01/24/2014	Annual	100584
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
Rohde & Schwarz	SCU-18/ Signal Conditioning Unit	09/04/2014	Annual	10094
CERNEX	CBL18265035 / POWER AMP	07/23/2014	Annual	22966
CERNEX	CBL26405040 / POWER AMP	04/04/2014	Annual	19660
Schwarzbeck	BBHA 9120D/ Horn Antenna	07/05/2013	Biennial	1151
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	07/05/2013	Biennial	BBHA9170541
Rohde & Schwarz	FSP / Spectrum Analyzer	01/24/2014	Annual	839117/011
Wainwright Instrument	WHF3.0/18G-10EF / High Pass Filter	02/03/2014	Annual	F6
Wainwright Instrument	WHNX6.0/26.5G-6SS / High Pass Filter	04/09/2014	Annual	1
Wainwright Instrument	WHNX7.0/18G-8SS / High Pass Filter	04/04/2014	Annual	29
Wainwright Instrument	WRCJ2400/2483.5-2370/2520-60/14SS / Band Reject Filter	06/17/2014	Annual	1
TESCOM	TC-3000C / BLUETOOTH TESTER	04/11/2014	Annual	3000C000276
Rohde & Schwarz	CBT / BLUETOOTH TESTER	05/07/2014	Annual	100422
Rohde & Schwarz	LOOP ANTENNA	09/03/2014	Biennial	1513-175
CERNEX	CBL06185030 / POWER AMP	07/21/2014	Annual	22965
CERNEX	CBLU1183540 / POWER AMP	07/21/2014	Annual	22964