HCT CO., LTD.

CERTIFICATE OF COMPLIANCE

FCC Certification

Applicant Name:
LG Electronics MobileComm U.S.A., Inc.

Address:
1000 Sylvan Avenue, Englewood Cliffs NJ 07632

Date of Issue:
April 18, 2014

Test Site/Location:
HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea

Report No.: HCT-R-1404-F015-1

HCT FRN: 0005866421

IC Recognition No.: 5944A-3

FCC ID	**: ZNFV400**
IC	**: 2703C-V400**
APPLICANT	**: LG Electronics MobileComm U.S.A., Inc.**

FCC/ IC Model(s):	LG-V400
EUT Type:	2.4/5GHz BT/WiFi Tablet
Max. RF Output Power:	Wi-Fi 802.11a (5180~5240) (8.34 dBm)/ Wi-Fi 802.11a (5260~5320) (8.04 dBm)/ Wi-Fi 802.11a (5500~5700) (7.89 dBm)/ Wi-Fi 802.11n_20 MHz BW (5180~5240) (7.56 dBm)/ Wi-Fi 802.11n_20 MHz BW(5260~5320)(7.24 dBm)/ Wi-Fi 802.11n_20 MHz BW(5500~5700)(7.35 dBm)/ Wi-Fi 802.11n_40 MHz BW(5190~5230) (7.98 dBm)/ Wi-Fi 802.11n_40 MHz BW (5270~5310) (7.81 dBm)/ Wi-Fi 802.11n_40 MHz BW (5510~5670) (7.98 dBm)
Frequency Range:	20 MHz BW: 5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2)/ 5500 MHz - 5700 MHz (UNII 2e) 40 MHz BW: 5190 MHz - 5230 MHz (UNII 1)/ 5270 MHz - 5310 MHz (UNII 2)/ 5510 MHz - 5670 MHz (UNII 2e)
Modulation type	OFDM
FCC Classification:	Unlicensed National Information Infrastructure(UNII)
FCC Rule Part(s):	Part 15.407
IC Rule :	RSS-210 , RSS-GEN

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
: Kyoung Houn Seo
Test Engineer of RF Team

Approved by
: Chang Seok Choi
Manager of RF Team

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1404-F015	April 09, 2014	- First Approval Report
HCT-R-1404-F015-1	April 18, 2014	- Revised the 20 dB BW channel frequency information. - Additional test 20 dB BW 802.11a, 802.11n,802.11n_40MHz at the highest channel in UNII Band 1. - Revised the frequency stability. - Revised the standard for receiver spurious emissions.

Table of Contents

1. GENERAL INFORMATION

Applicant:	LG Electronics MobileComm U.S.A., Inc.
Address:	1000 Sylvan Avenue, Englewood Cliffs NJ 07632
FCC ID:	ZNFV400
IC:	2703C-V400
EUT Type:	2.4/5GHz BT/WiFi Tablet
FCC/ IC Model name(s):	LG-V400
Date(s) of Tests:	March 21, 2014 ~ April 07, 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	2.4/5GHz BT/WiFi Tablet	
FCC/IC Model Name	LG-V400	
Power Supply	DC 3.8 V	
Frequency Range	TX_20 MHz BW: 40 MHz BW: RX_20 MHz BW: 40 MHz BW:	5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2)/ 5500 MHz - 5700 MHz (UNII 2e) where) Not supported 5600 MHz – 5640 MHz 5190 MHz - 5230 MHz (UNII 1)/ 5270 MHz - 5310 MHz (UNII 2)/ 5510 MHz - 5670 MHz (UNII 2e) where) Not supported 5590 MHz – 5630 MHz 5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2)/ 5500 MHz - 5700 MHz (UNII 2e) where) Not supported 5600 MHz – 5640 MHz 5190 MHz - 5230 MHz (UNII 1)/ 5270 MHz - 5310 MHz (UNII 2)/ 5510 MHz - 5670 MHz (UNII 2e) where) Not supported 5590 MHz – 5630 MHz
Max. RF Output Power:	Wi-Fi 802.11a (5180~5240) (8.34 dBm)/ Wi-Fi 802.11a (5260~5320) (8.04 dBm)/ Wi-Fi 802.11a (5500~5700) (7.89 dBm)/ Wi-Fi 802.11n_20 MHz BW (5180~5240) (7.56 dBm)/ Wi-Fi 802.11n_20 MHz BW(5260~5320)(7.24 dBm)/ Wi-Fi 802.11n_20 MHz BW(5500~5700)(7.35 dBm)/ Wi-Fi 802.11n_40 MHz BW(5190~5230) (7.98 dBm)/ Wi-Fi 802.11n_40 MHz BW (5270~5310) (7.81 dBm)/ Wi-Fi 802.11n_40 MHz BW (5510~5670) (7.98 dBm)	
Modulation Type	OFDM(802.11a, 802.11n_20 MHz, 802.11n_40 MHz)	
Antenna Specification	Manufacturer: Ace Technology Antenna type: Planar Inverted F Antenna Peak Gain : 1.11 dBi	

3. TEST METHODOLOGY

The measurement procedure described in FCC KDB 789033 D01 General UNII Test Procedures v01r03 dated April 08, 2013 entitled " Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices the American National Standard for Testing Unlicensed Wireless Devices(ANSI C63.4-2003) – Part 15, Subpart E" 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

7. SUMMARY OF TEST RESULTS

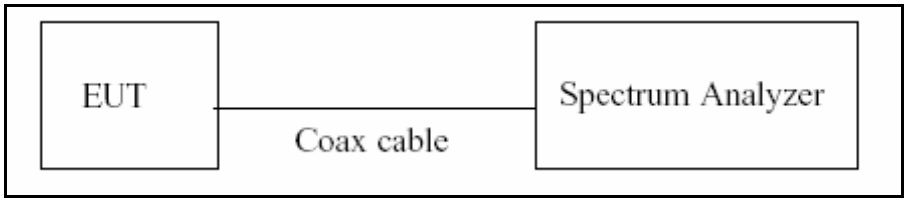
Test Description	IC Part Section(s)	FCC Part Section(s)	Test Limit	Test Condition	Test Result
26dB Bandwidth,(FCC) 99% Bandwidth(IC)	NA	NA	NA	CONDUCTED	NA
Maximum Conducted Output Power, Maximum e.i.r.p (IC)	RSS-210 [A9.2]	§15.407(a)(1)	< 4+10 log $_{10}$ (BW) dBm (5150-5250 MHz)(FCC) < 10+10 log $_{10}$ (BW) dBm (5150-5250 MHz)(IC)		PASS
Peak Power Spectral Density	RSS-210 [A9.2]	§15.407(a)(1), (5)	<4 dBm/ MHz (5150-5250)(FCC) <4 dBm/ MHz (5150-5250)(IC)		PASS
Peak Excursion	NA	§15.407(a)(6)	<13 dB/ MHz maximum difference		PASS
Frequency Stability	NA	§15.407(g)	NA		NA
AC Conducted Emissions 150 kHz-30 MHz	RSS-GEN, Section 7.2.2	15.207	<FCC 15.207 limits		NA
Undesirable Emissions	RSS-210 [A8.5]	§15.407(b)(1), (2), (3)	<-27 dBm/ MHz EIRP (5150-5350 MHz, 5470-5725 MHz)	RADIATED	PASS
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	RSS-GEN, Section 7.2.3	15.205, 5.407(b)(1), (5), (6)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		PASS
Receiver Spurious Emissions	RSS-GEN, Section 7.2.3	-	cf. Section 8.8.3		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(issued 04/08/2013)
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

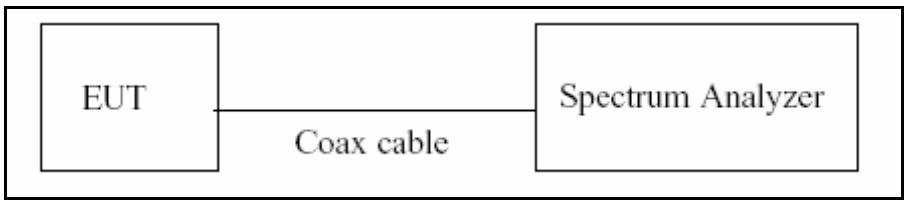
Mode	Data Rate	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor
802.11a Mode	6	2.026	2.132	0.95028143	0.221
	9	1.355	1.460	0.92808219	0.324
	12	1.020	1.125	0.90666667	0.426
	18	0.685	0.790	0.86708861	0.619
	24	0.510	0.625	0.81600000	0.883
	36	0.354	0.454	0.77973568	1.081
	48	0.270	0.368	0.73369565	1.345
	54	0.244	0.342	0.71345029	1.466
802.11n Mode 20 MHz BW	6.5	1.870	1.980	0.94444444	0.248
	13	0.945	1.050	0.90000000	0.458
	19.5	0.635	0.740	0.85810811	0.665
	26	0.489	0.588	0.83163265	0.801
	39	0.336	0.435	0.77241379	1.121
	52	0.256	0.354	0.72316384	1.408
	58.5	0.230	0.330	0.69696970	1.568
	65	0.212	0.310	0.68387097	1.650
802.11n Mode 40 MHz BW	13.5	0.910	1.020	0.89215686	0.496
	27	0.465	0.575	0.80869565	0.922
	40.5	0.314	0.424	0.74056604	1.304
	54	0.240	0.348	0.68965517	1.614
	81	0.166	0.274	0.60583942	2.176
	108	0.124	0.234	0.52991453	2.758
	121.5	0.116	0.224	0.51785714	2.858
	135	0.107	0.215	0.49767442	3.031

8.2 26 dB 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(issued 04/08/2013), 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(Page 3 in KDB 789033, issued 04/08/2013)

9. RBW = approximately 1 % of the emission bandwidth
10. VBW > RBW
11. Detector = Peak
12. Trace mode = max hold
13. Measure the maximum width of the emission that is 26 dB down from the peak 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 %.

▣ 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	21.39	N/A	Pass
5200	40	22.09	N/A	Pass
5240	48	21.84	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	21.25	N/A	Pass
5300	60	21.34	N/A	Pass
5320	64	21.76	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	21.68	N/A	Pass
5580	116	21.29	N/A	Pass
5700	140	22.04	N/A	Pass

▣ TEST RESULTS

20 MHz BW

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	21.83	N/A	Pass
5200	40	22.11	N/A	Pass
5240	48	22.39	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	22.21	N/A	Pass
5300	60	22.27	N/A	Pass
5320	64	22.03	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	21.81	N/A	Pass
5580	116	22.17	N/A	Pass
5700	140	22.53	N/A	Pass

40 MHz BW

Conducted 26 dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5190	38	42.83	N/A	Pass
5230	46	43.00	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.			
5270	54	43.96	N/A	Pass
5310	62	43.18	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.			
5510	102	42.51	N/A	Pass
5550	110	43.52	N/A	Pass
5670	134	42.67	N/A	Pass

Note :

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

▣ 20 dB BW TEST RESULTS(Additional Test)

Conducted 20 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5240	48	18.37	N/A	Pass
5260	52	19.56	N/A	Pass

Conducted 20 dB Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5240	48	19.33	N/A	Pass
5260	52	19.99	N/A	Pass

Conducted 20 dB Bandwidth Measurements for 802.11n_40 MHz BW

802.11n_40 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5230	46	37.77	N/A	Pass
5270	54	39.97	N/A	Pass

Conducted 20 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5660	132	19.17	N/A	Pass

Conducted 20 dB Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5660	132	19.79	N/A	Pass

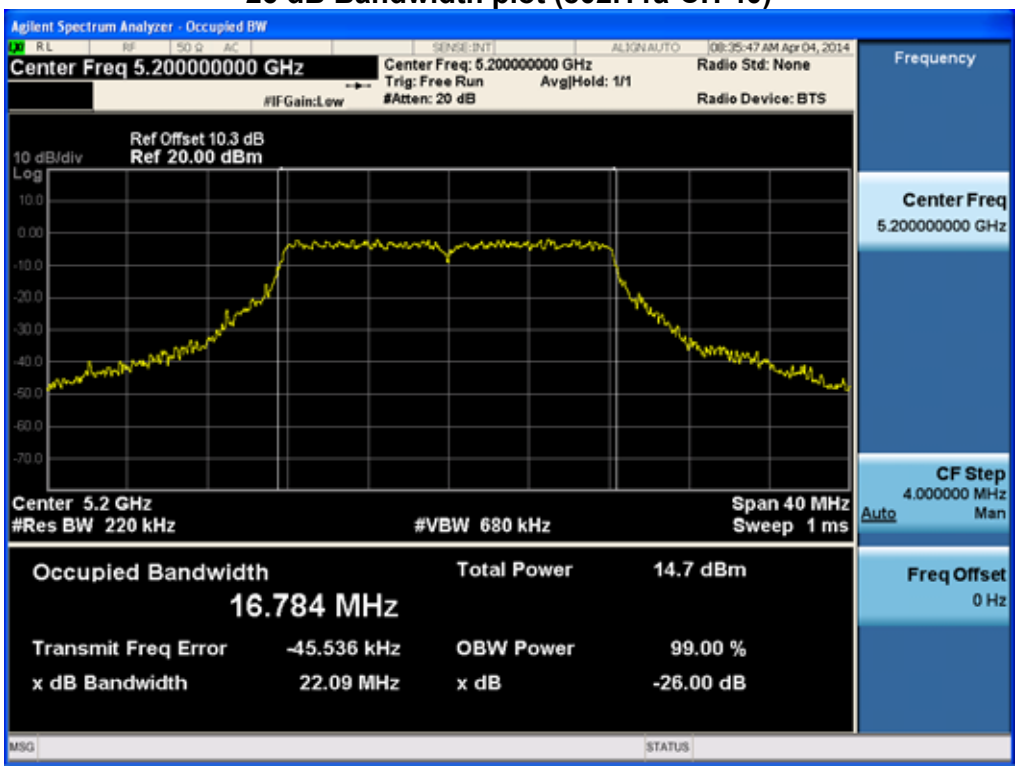
Conducted 20 dB Bandwidth Measurements for 802.11n_40 MHz BW

802.11n_40 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5670	134	38.79	N/A	Pass

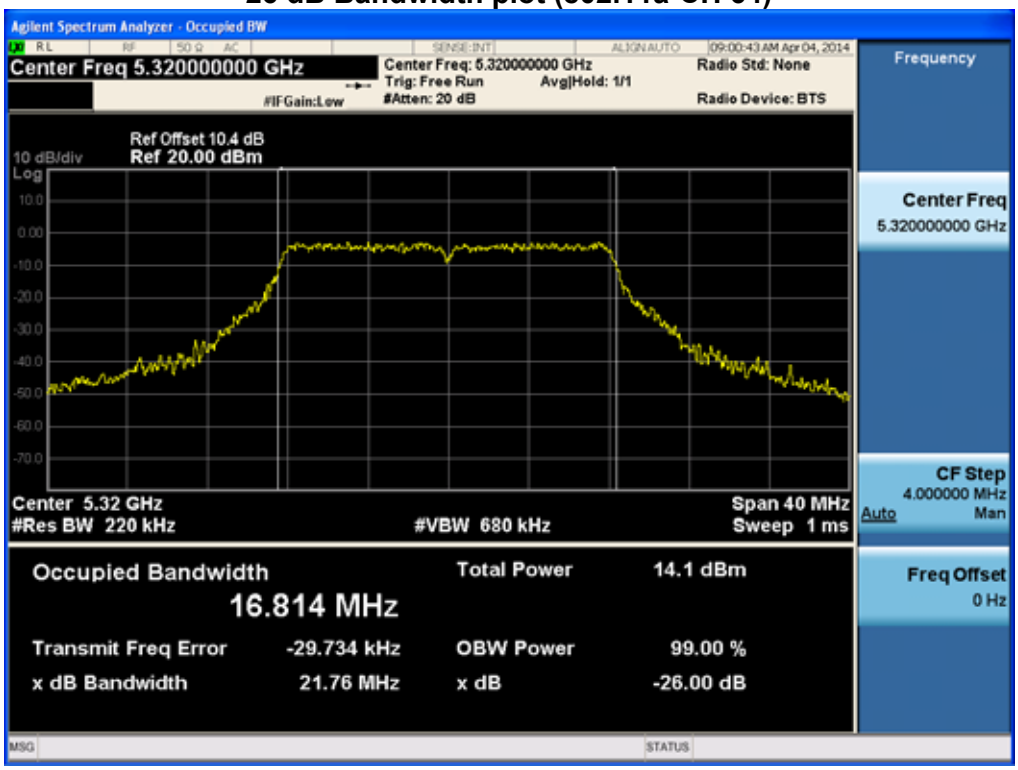
Note : We performed the 20 dB BW test for highest channel in UNII1 band and lowest channel in UNII2 band to prove that no part of the fundamental emissions of any UNII1 and UNII2 band signals lies within the each band. Also, we performed the 20 dB BW test to prove that no part of the fundamental emissions of any channel 132 and 134 signal lies within the TDWR band.

▣ RESULT PLOTS

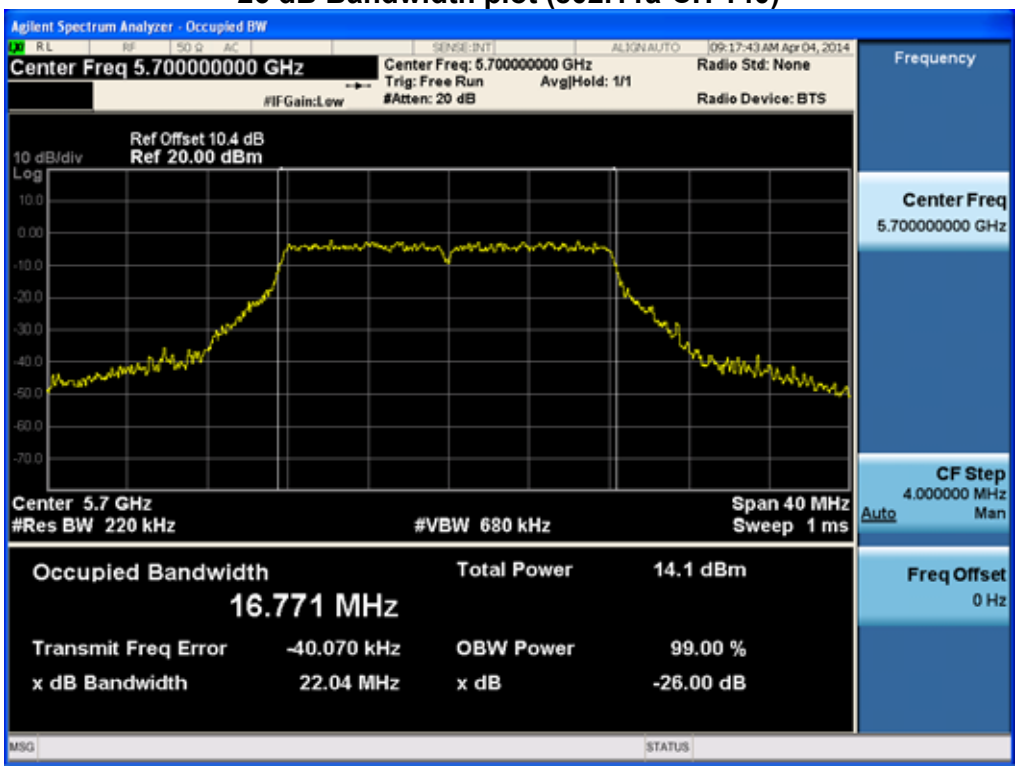
26 dB Bandwidth plot (802.11a-CH 40)



26 dB Bandwidth plot (802.11a-CH 64)

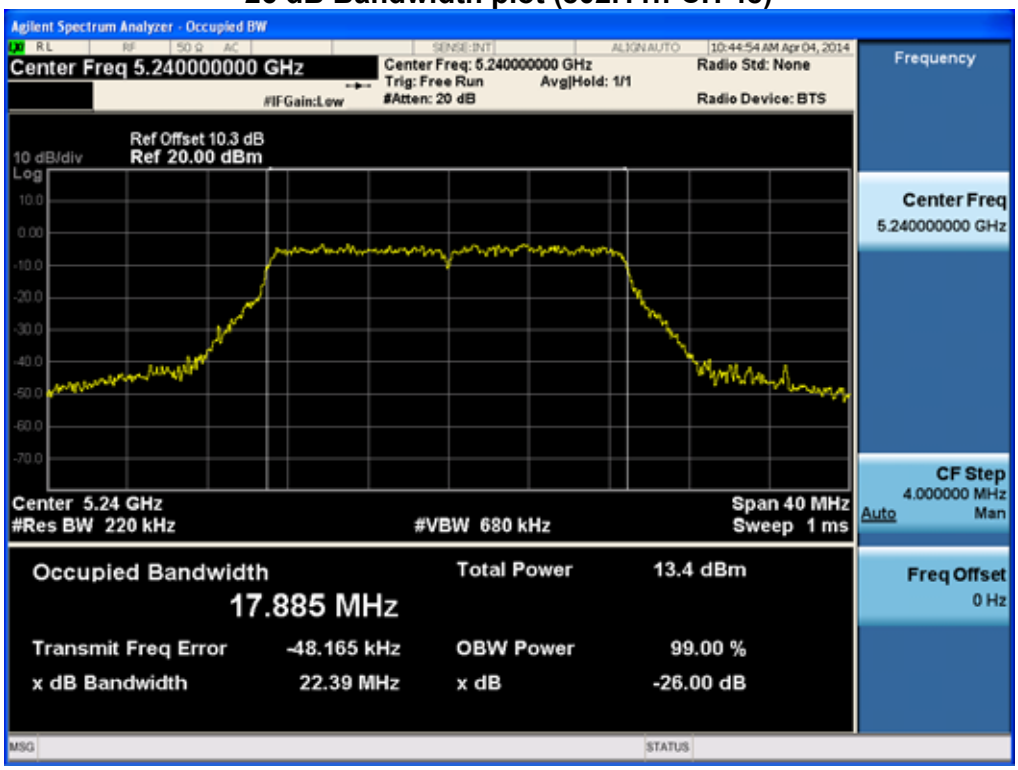


26 dB Bandwidth plot (802.11a-CH 140)

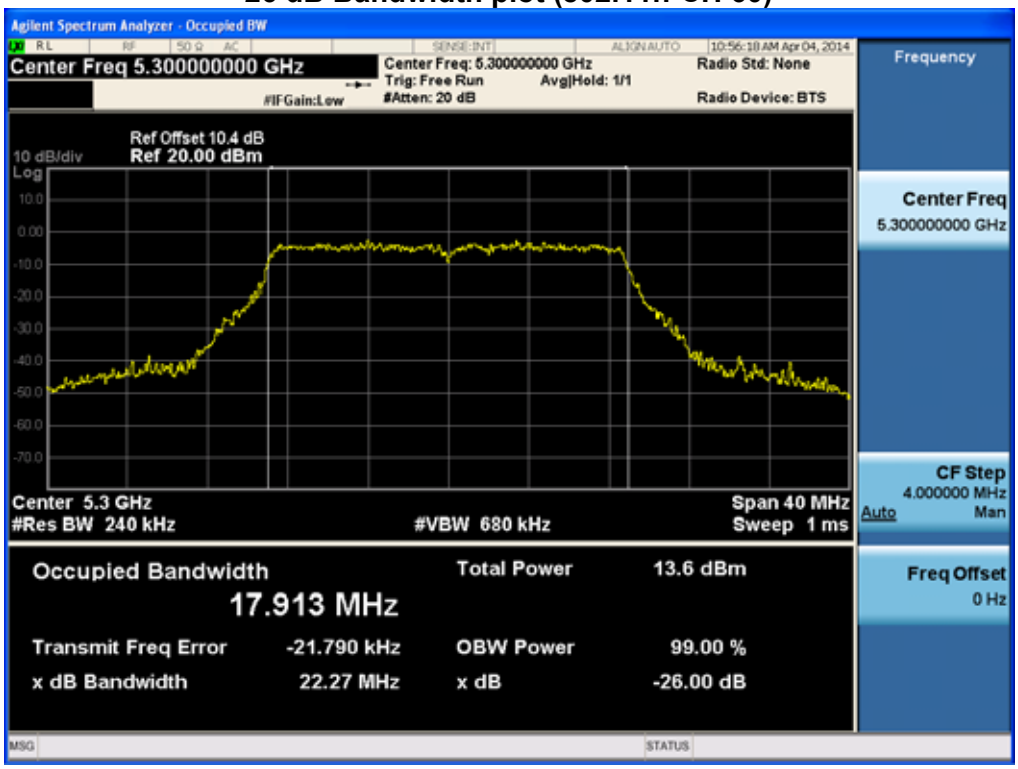


20 MHz BW

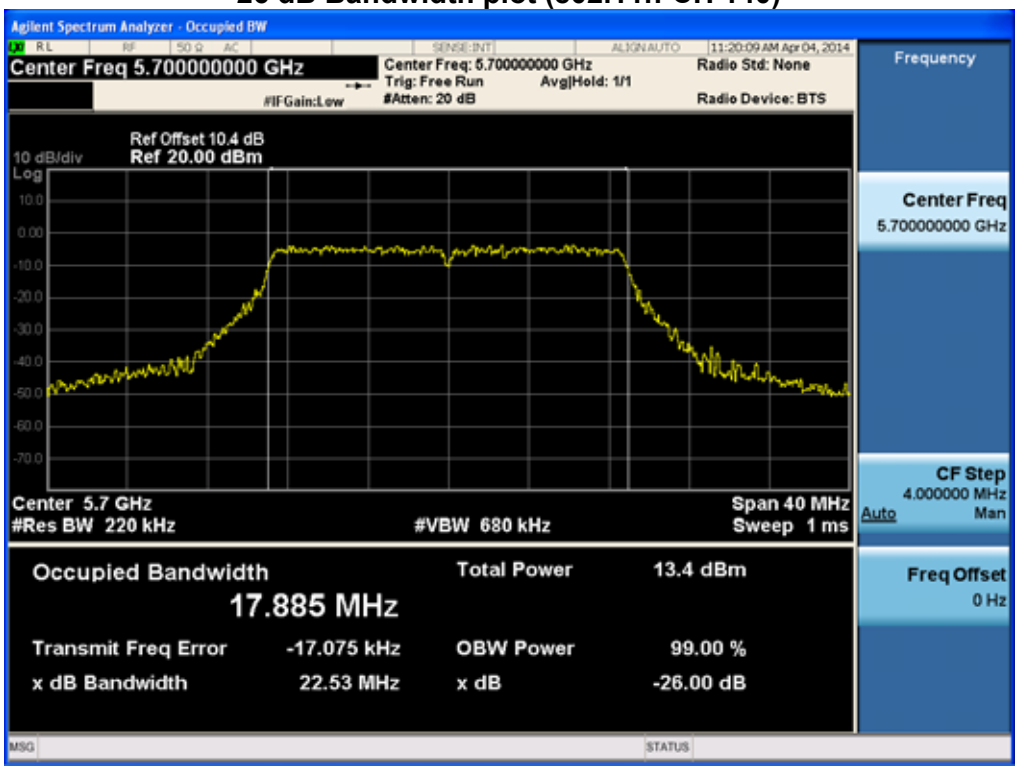
26 dB Bandwidth plot (802.11n-CH 48)



26 dB Bandwidth plot (802.11n-CH 60)

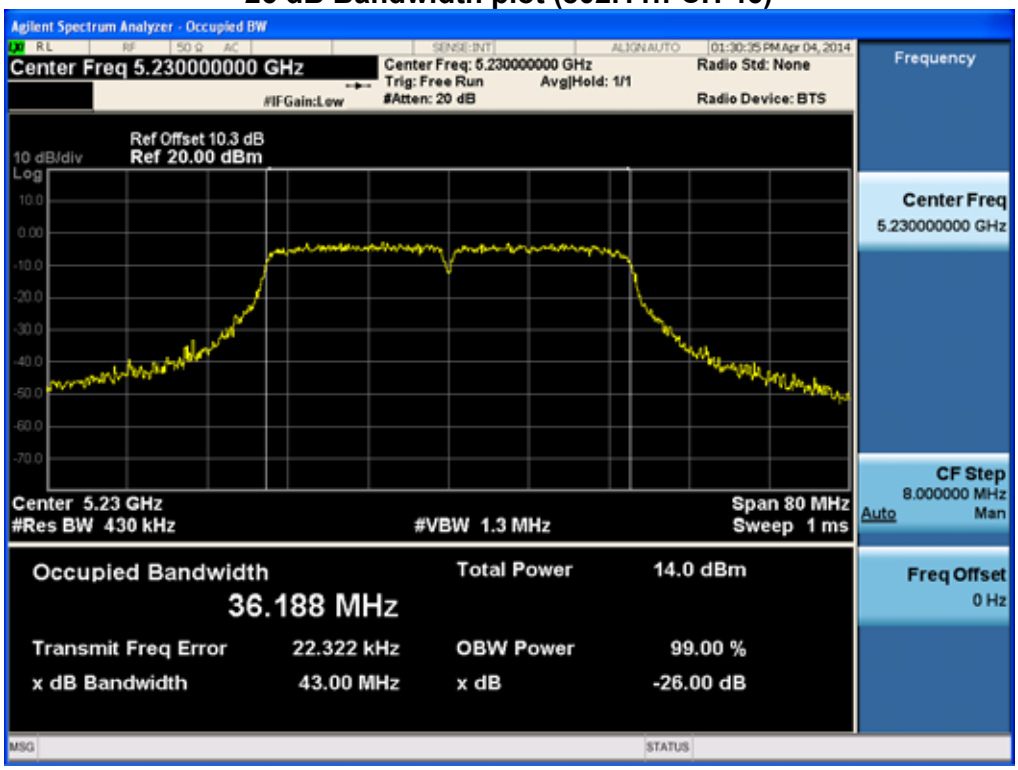


26 dB Bandwidth plot (802.11n-CH 140)

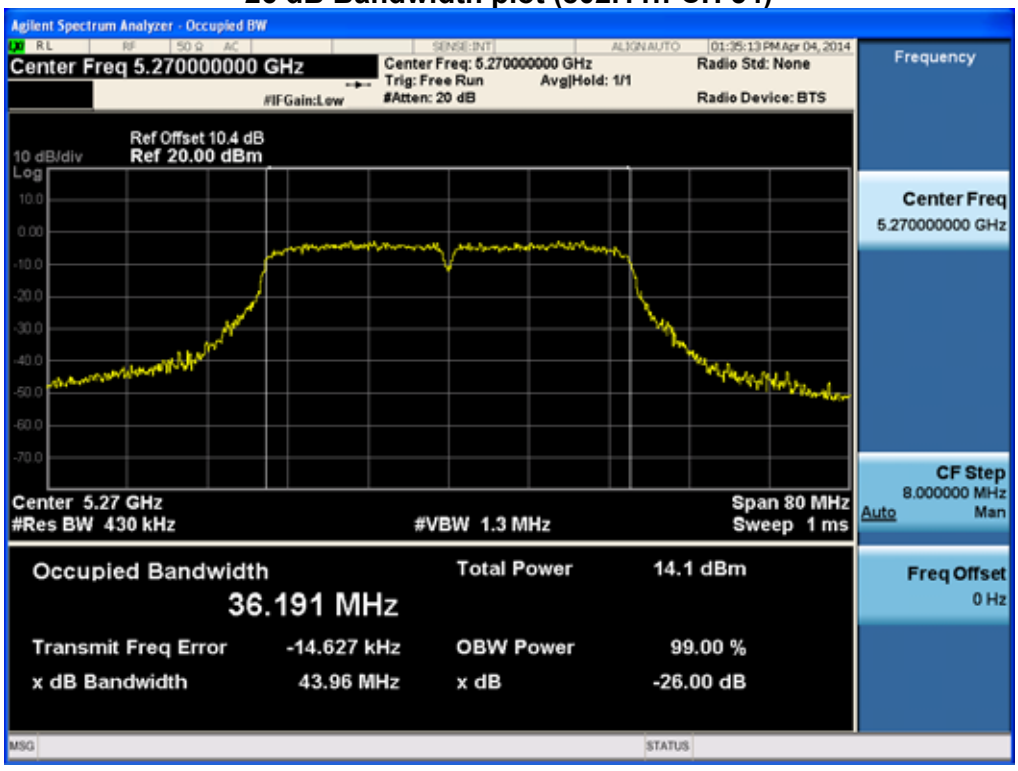


40 MHz BW

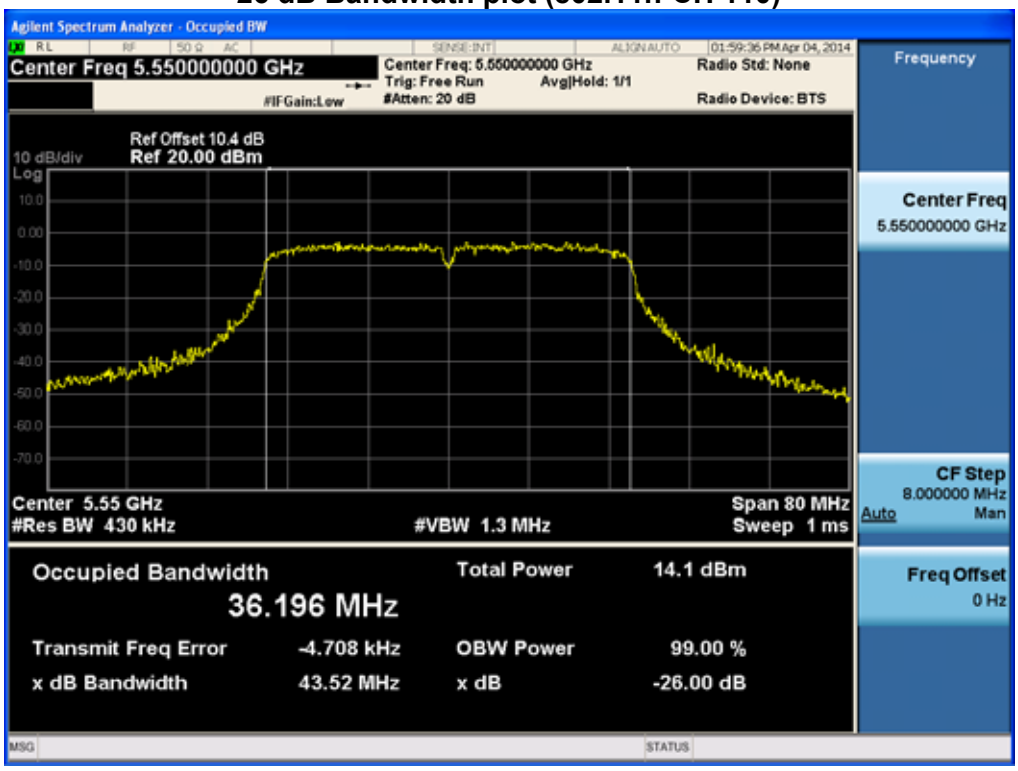
26 dB Bandwidth plot (802.11n-CH 46)



26 dB Bandwidth plot (802.11n-CH 54)



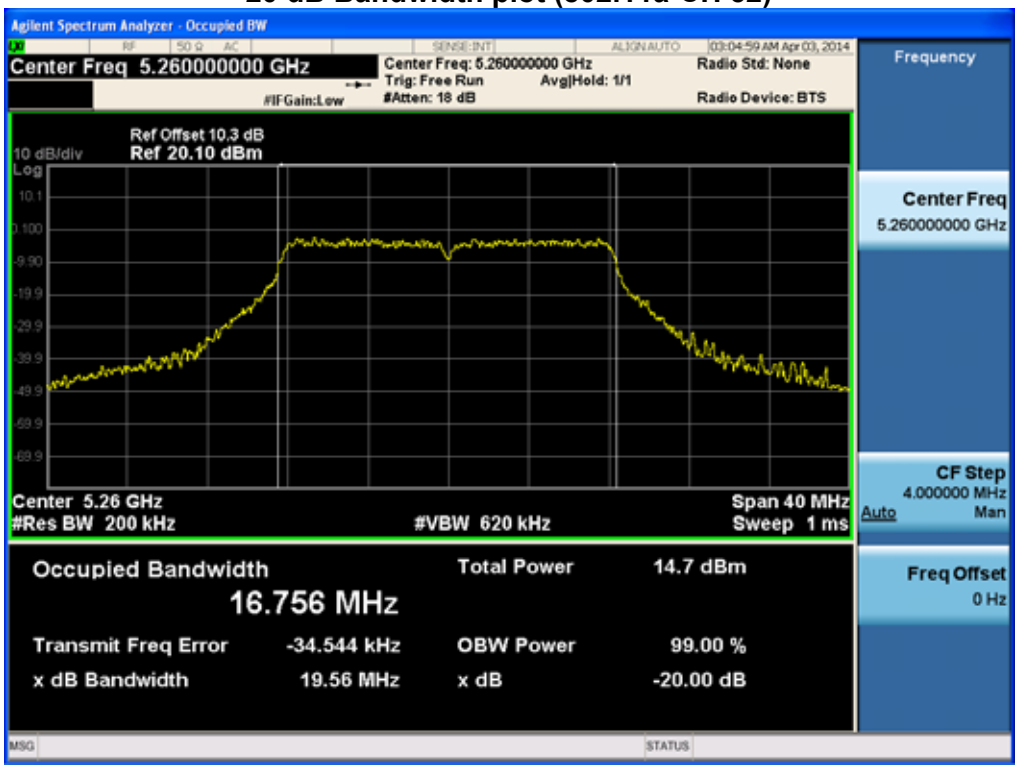
26 dB Bandwidth plot (802.11n-CH 110)



▣ RESULT PLOTS(20 dB Bandwidth)

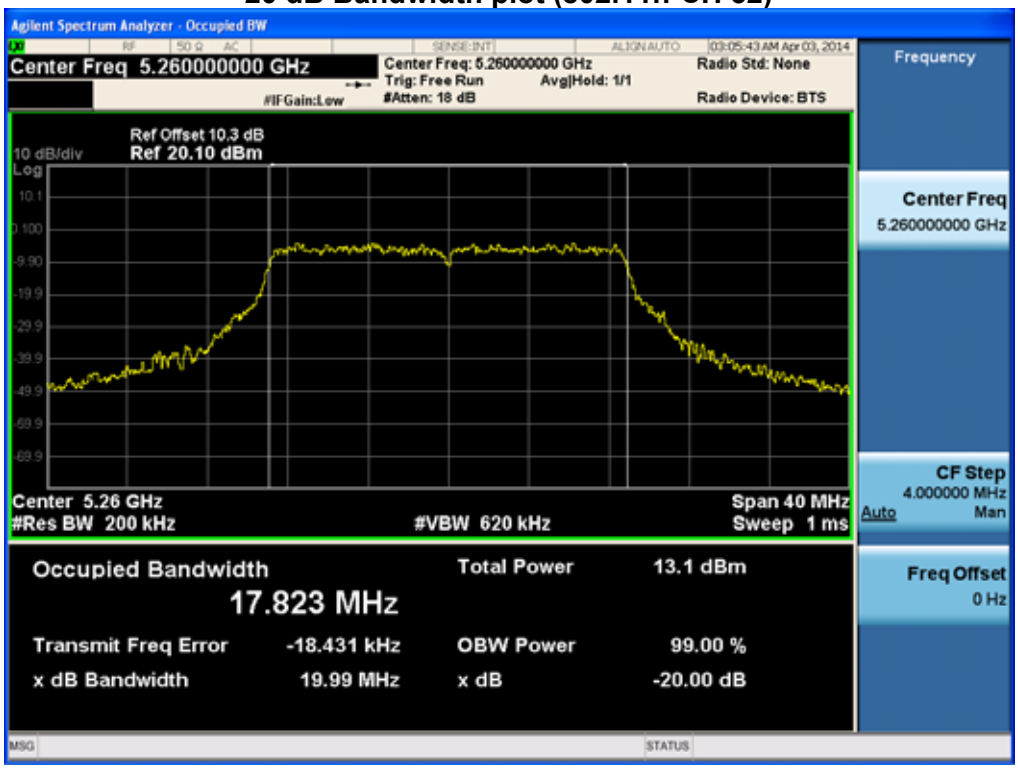
20 dB Bandwidth plot (802.11a-CH 48)

20 dB Bandwidth plot (802.11a-CH 52)



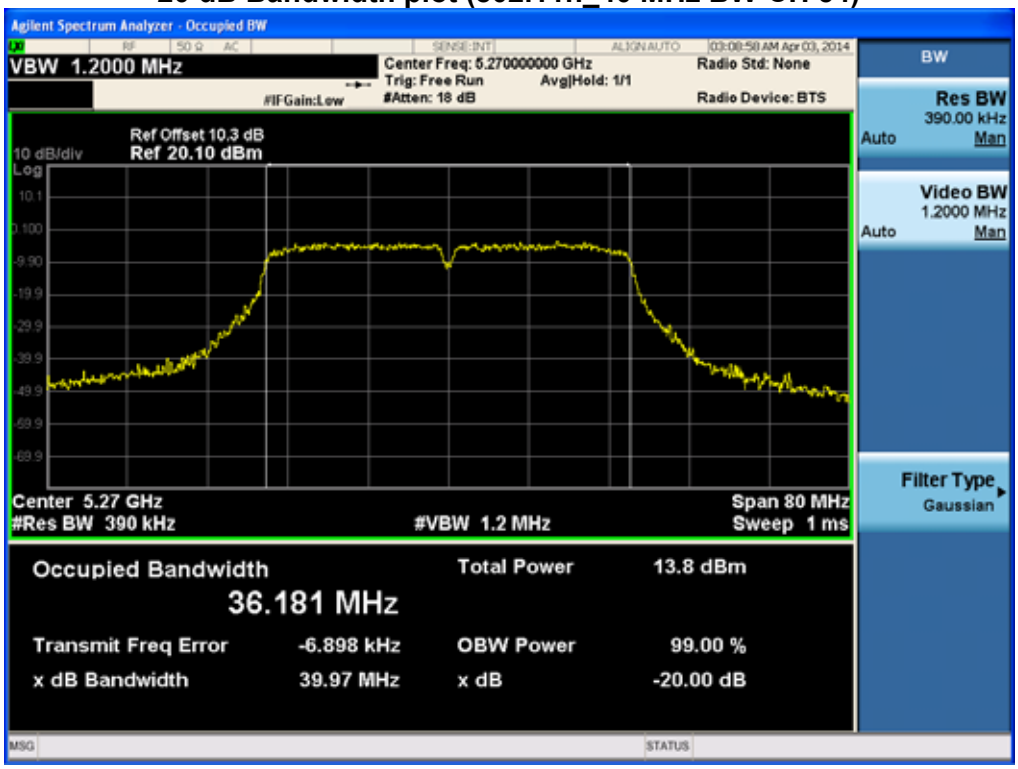
20 dB Bandwidth plot (802.11n-CH 48)

20 dB Bandwidth plot (802.11n-CH 52)

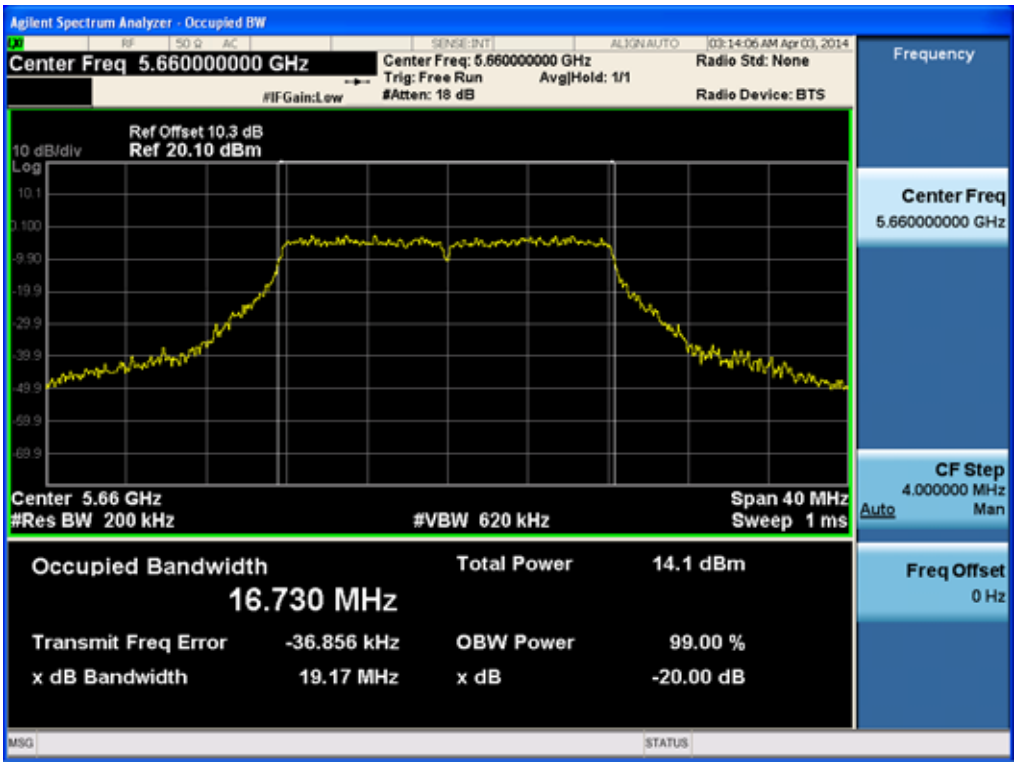


20 dB Bandwidth plot (802.11n_40 MHz BW-CH 46)

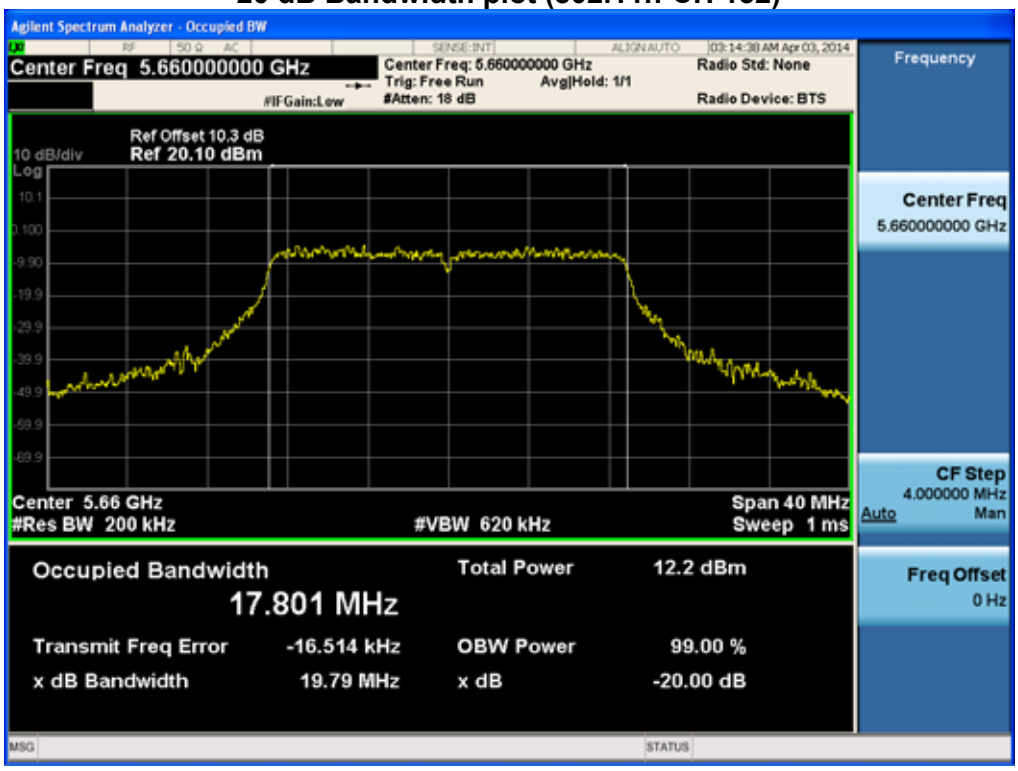
20 dB Bandwidth plot (802.11n_40 MHz BW-CH 54)



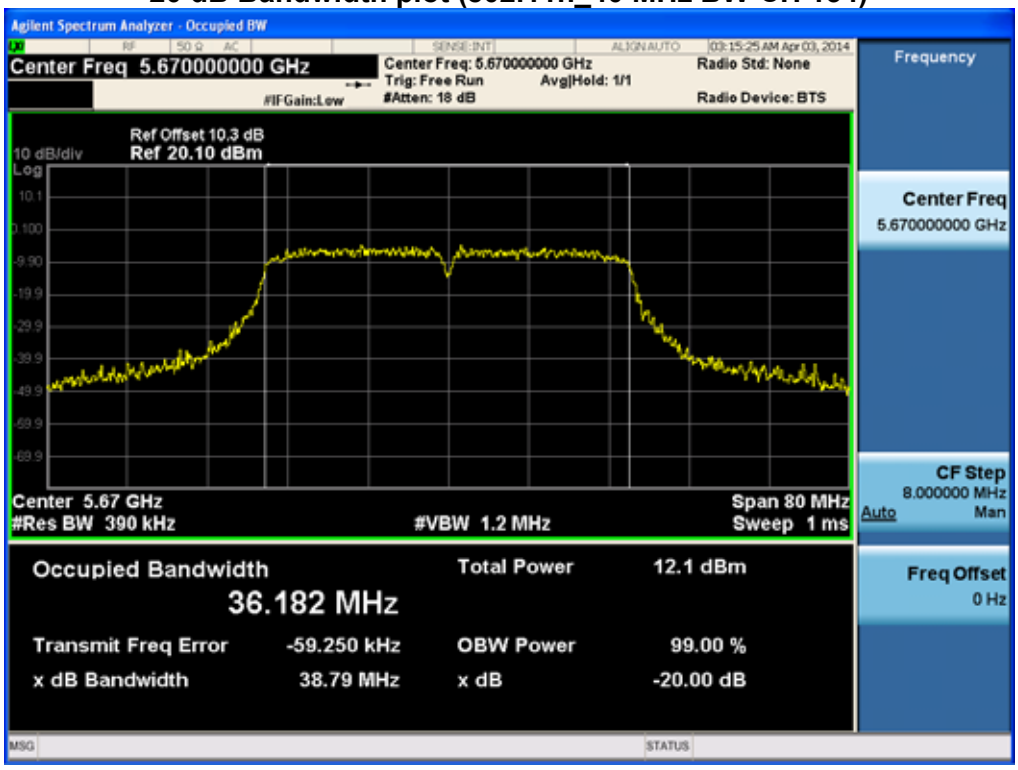
20 dB Bandwidth plot (802.11a-CH 132)



20 dB Bandwidth plot (802.11n-CH 132)



20 dB Bandwidth plot (802.11n_40 MHz BW-CH 134)



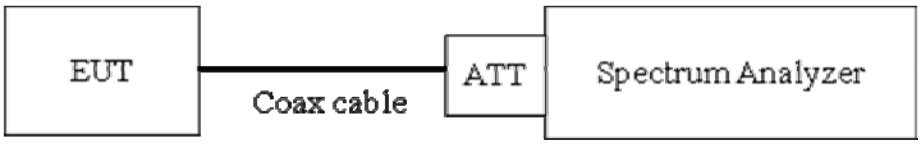
8.3 99% BANDWIDTH MEASUREMENT

limit

None; for IC reporting purposes only

The 99 % bandwidth is used to determine the conducted power limits(for IC).

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to as close to 1% of the selected span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RBW = 1% of the total span

VBW ≥ 3 x RBW

Detector = Peak

Trace mode = max hold

Sweep = auto couple

Allow the trace to stabilize

Conducted 99% Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5180	36	17.047
5200	40	16.991
5240	48	17.009
5260	52	17.065
5300	60	17.021
5320	64	17.018
5500	100	17.045
5580	116	17.055
5700	140	17.005

Conducted 99% Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5180	36	18.022
5200	40	18.056
5240	48	18.032
5260	52	18.036
5300	60	18.007
5320	64	18.046
5500	100	18.018
5580	116	18.031
5700	140	18.018

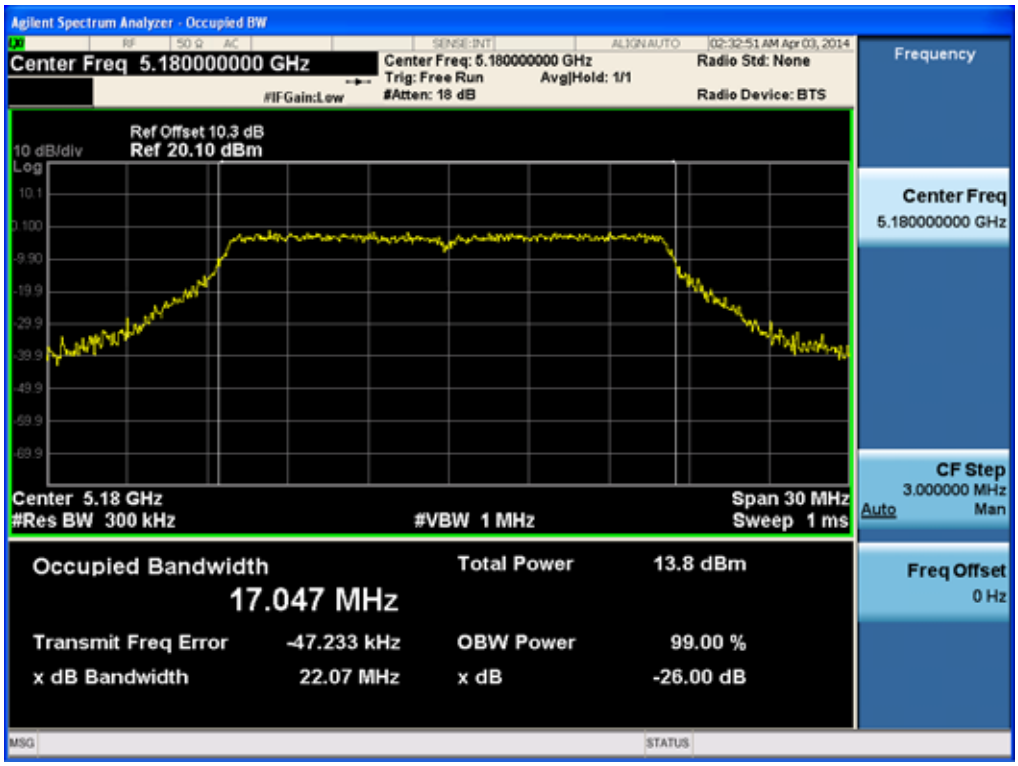
Conducted 99% Bandwidth Measurements for 802.11n_40 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5190	38	36.422
5230	46	36.560
5270	54	36.590
5310	62	36.478
5510	102	36.582
5550	110	36.671
5670	134	36.445

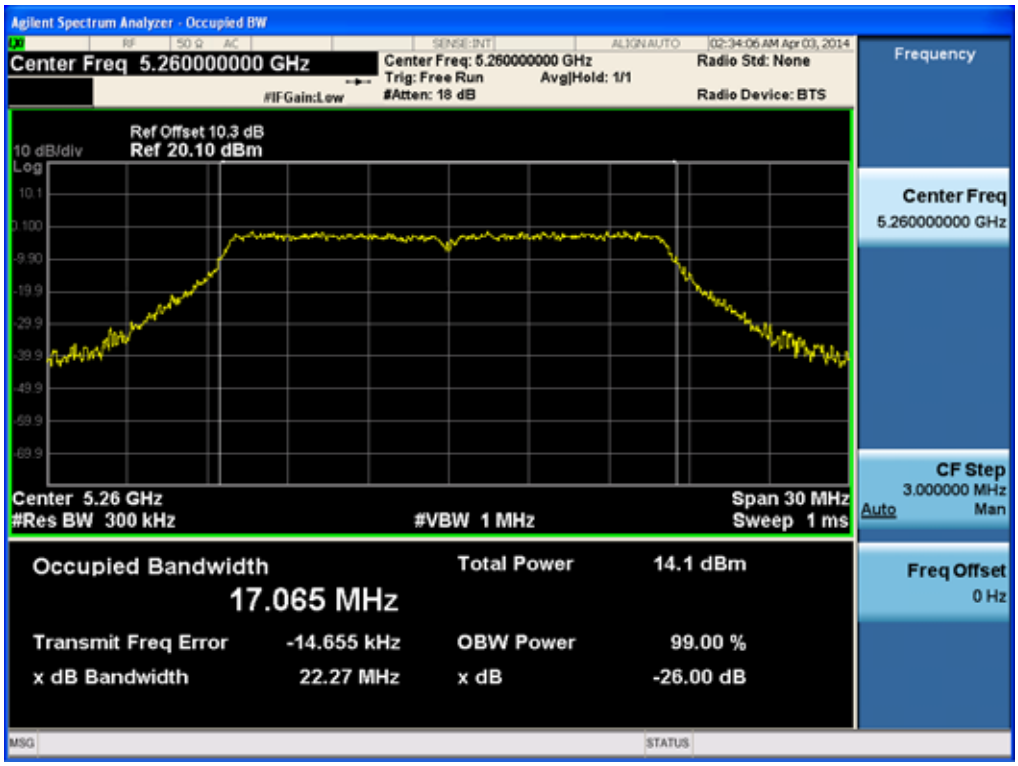
Note :

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

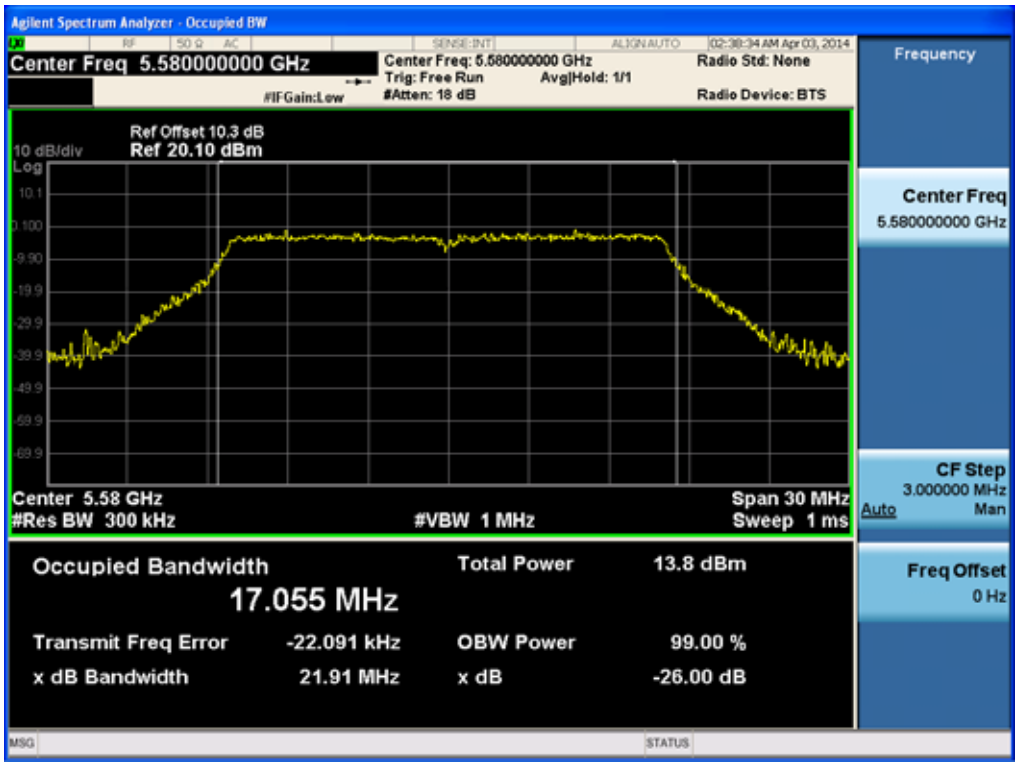
99% Bandwidth plot (802.11a-CH36)



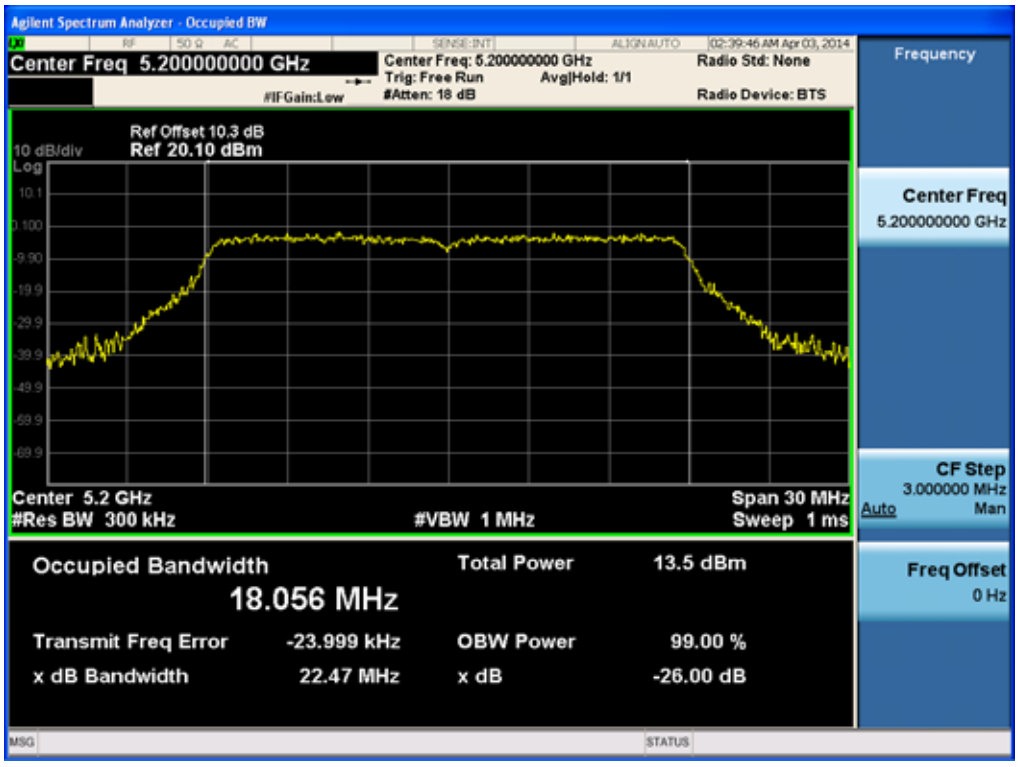
99% Bandwidth plot (802.11a-CH52)



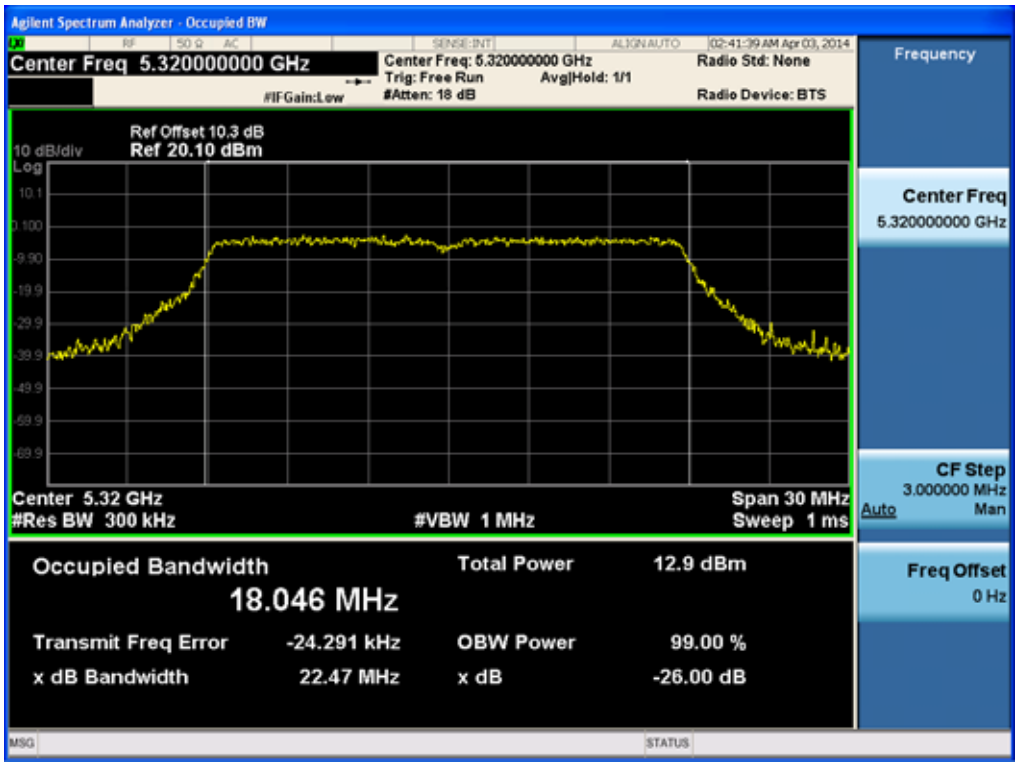
99% Bandwidth plot (802.11a-CH116)



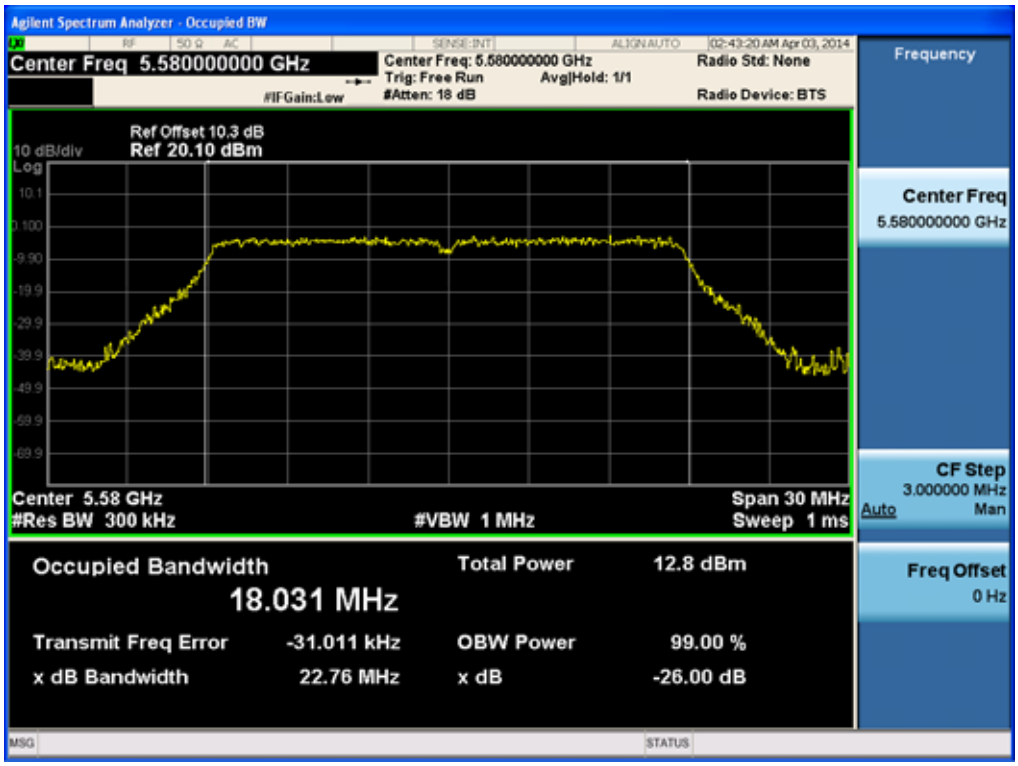
99% Bandwidth plot (802.11n-CH40)_20 MHz BW



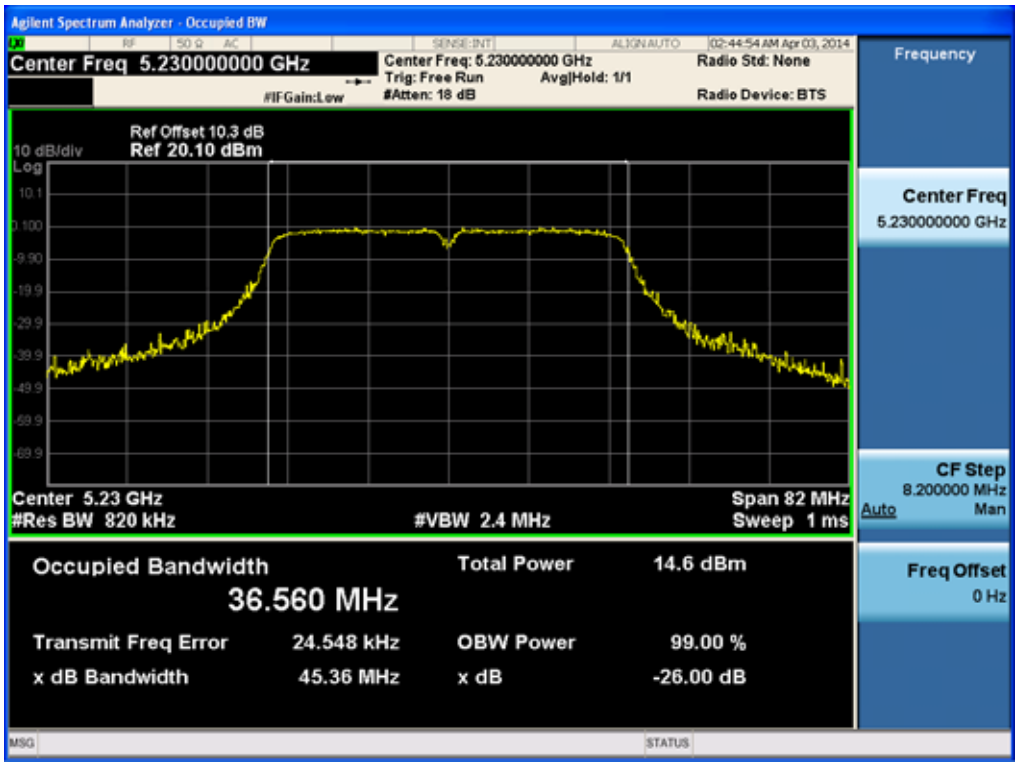
99% Bandwidth plot (802.11n-CH64)_20 MHz BW



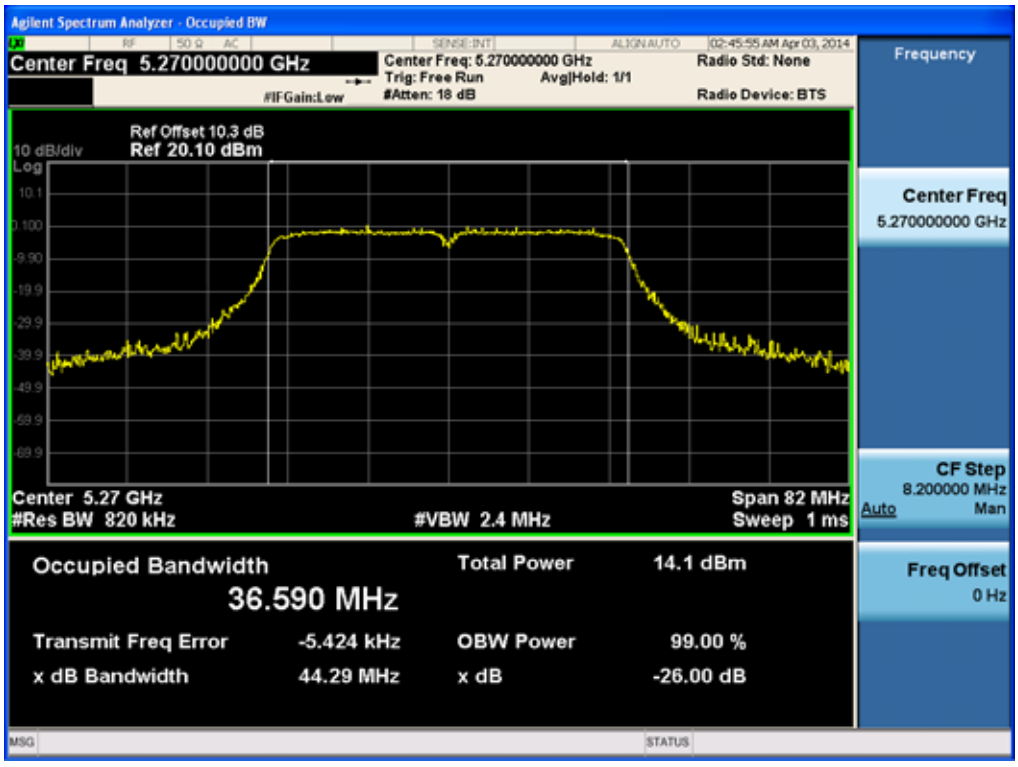
99% Bandwidth plot (802.11n-CH116)_20 MHz BW



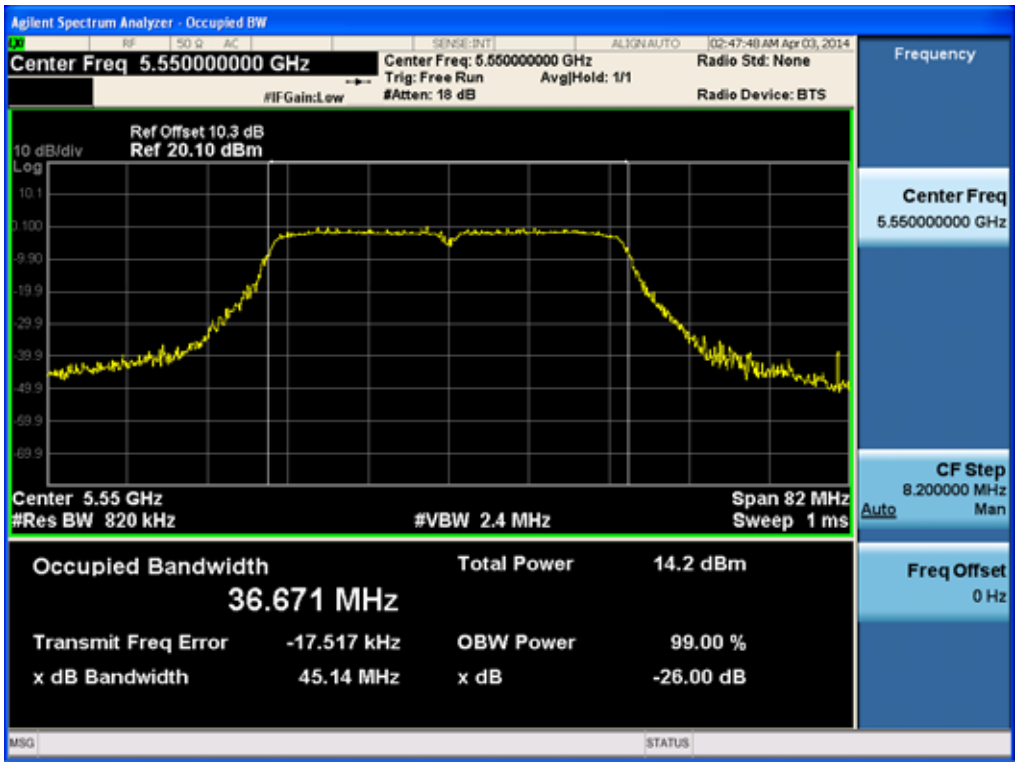
99% Bandwidth plot (802.11n-CH46)_40 MHz BW



99% Bandwidth plot (802.11n-CH54)_40 MHz BW



99% Bandwidth plot (802.11n-CH110)_40 MHz BW



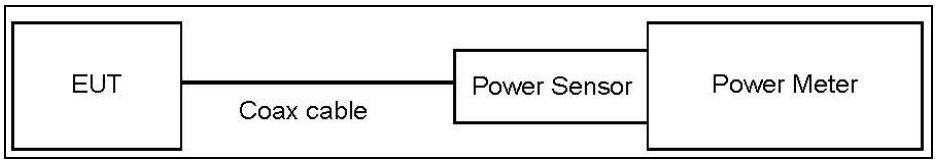
8.4 OUTPUT POWER MEASUREMENT

Test Requirements and limit, §15.247(b)(3)

A transmitter antenna terminal of EUT is connected to the input of a Spectrum Analyzer. Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies. In the 5.15 – 5.25 GHz band, the maximum permissible conducted output power is the lesser of 50 mW ((16.99 dBm) and 4 dBm + 10 log $_{10}$ (26 dB BW)
frequencies. In the 5.25 – 5.35 GHz band, the maximum permissible conducted output power is the lesser of 250 mW (23.98 dBm) and 11 dBm + 10 log $_{10}$ (26 dB BW)
frequencies. In the 5.47 – 5.725 GHz band, the maximum permissible conducted output power is the lesser of 250 mW (23.98 dBm) and 11 dBm + 10 log $_{10}$ (26 dB BW)

Limit : 802.11a_UNII-1 = 16.99 dBm
802.11n_UNII-1_20 MHz BW = 16.99 dBm
802.11n_UNII-1_40 MHz BW = 16.99 dBm
802.11a_UNII-2 = 23.98 dBm
802.11n_UNII-2_20 MHz BW = 23.98dBm
802.11n_UNII-2_40 MHz BW = 23.98 dBm
802.11a_UNII-2e = 23.98dBm
802.11n_UNII-2e_20 MHz BW = 23.98 dBm
802.11n_UNII-2e_40 MHz BW = 23.98 dBm

▣ TEST CONFIGURATION(20 MHz BW)



▣ TEST PROCEDURE(20 MHz BW)

We tested according to Method E)3)a) in KDB 789033(issued 04/08/2013).

▪ Average Power

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.

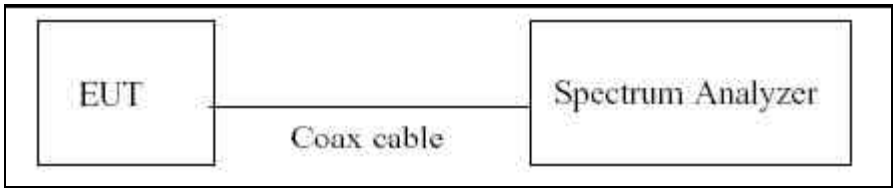
Note :

1. 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	Frequency(MHz)	Loss(dB)
UNII 1	5180	10.30
	5190	10.29
	5200	10.28
	5230	10.29
	5240	10.34
UNII 2	5260	10.37
	5270	10.38
	5300	10.40
	5310	10.39
	5320	10.39
UNII 2e	5500	10.35
	5510	10.36
	5550	10.41
	5580	10.43
	5670	10.43

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

▣ TEST CONFIGURATION(40 MHz BW)



▣ TEST PROCEDURE(40 MHz BW)

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 04/08/2013).

The Spectrum Analyzer is set to

▪ Average Power

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

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

Output Power = 10 dBm + 10 dB + 0.8 dB + 0.21 dB = 21.01 dBm

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. 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	Frequency(MHz)	Loss(dB)
UNII 1	5180	10.30
	5190	10.29
	5200	10.28
	5230	10.29
	5240	10.34
UNII 2	5260	10.37
	5270	10.38
	5300	10.40
	5310	10.39
	5320	10.39
UNII 2e	5500	10.35
	5510	10.36
	5550	10.41
	5580	10.43
	5670	10.43

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

▣ TEST RESULTS

20 MHz BW

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

802.11a Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	6	7.64	0.221	7.86	16.99
		9	7.31	0.324	7.64	16.99
		12	7.34	0.426	7.77	16.99
		18	7.18	0.619	7.80	16.99
		24	6.96	0.883	7.84	16.99
		36	6.74	1.081	7.82	16.99
		48	6.48	1.345	7.83	16.99
		54	6.12	1.466	7.58	16.99
5200	40	6	8.12	0.221	8.34	16.99
		9	7.76	0.324	8.08	16.99
		12	7.76	0.426	8.19	16.99
		18	7.46	0.619	8.08	16.99
		24	7.40	0.883	8.29	16.99
		36	7.10	1.081	8.18	16.99
		48	6.60	1.345	7.94	16.99
		54	6.43	1.466	7.90	16.99
5240	48	6	7.81	0.221	8.03	16.99
		9	7.84	0.324	8.17	16.99
		12	7.59	0.426	8.02	16.99
		18	7.44	0.619	8.06	16.99
		24	7.28	0.883	8.16	16.99
		36	6.91	1.081	7.99	16.99
		48	6.54	1.345	7.88	16.99
		54	6.50	1.466	7.96	16.99

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

802.11a Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5260	52	6	7.66	0.221	7.88	23.98
		9	7.59	0.324	7.92	23.98
		12	7.56	0.426	7.99	23.98
		18	7.24	0.619	7.86	23.98
		24	7.01	0.883	7.89	23.98
		36	6.66	1.081	7.74	23.98
		48	6.28	1.345	7.62	23.98
		54	6.33	1.466	7.79	23.98
5300	60	6	7.82	0.221	8.04	23.98
		9	7.68	0.324	8.01	23.98
		12	7.54	0.426	7.97	23.98
		18	7.42	0.619	8.04	23.98
		24	7.10	0.883	7.98	23.98
		36	6.74	1.081	7.82	23.98
		48	6.51	1.345	7.85	23.98
		54	6.40	1.466	7.87	23.98
5320	64	6	7.48	0.221	7.70	23.98
		9	7.41	0.324	7.74	23.98
		12	7.23	0.426	7.65	23.98
		18	7.12	0.619	7.74	23.98
		24	6.88	0.883	7.76	23.98
		36	6.55	1.081	7.63	23.98
		48	6.19	1.345	7.54	23.98
		54	6.06	1.466	7.52	23.98

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

802.11a Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5500	100	6	7.38	0.221	7.60	23.98
		9	7.31	0.324	7.63	23.98
		12	7.23	0.426	7.66	23.98
		18	7.08	0.619	7.69	23.98
		24	6.91	0.883	7.79	23.98
		36	6.63	1.081	7.71	23.98
		48	6.19	1.345	7.53	23.98
		54	6.11	1.466	7.58	23.98
5580	116	6	7.47	0.221	7.69	23.98
		9	7.27	0.324	7.60	23.98
		12	7.23	0.426	7.65	23.98
		18	7.02	0.619	7.64	23.98
		24	6.90	0.883	7.79	23.98
		36	6.42	1.081	7.50	23.98
		48	6.25	1.345	7.59	23.98
		54	5.93	1.466	7.40	23.98
5700	140	6	7.63	0.221	7.85	23.98
		9	7.53	0.324	7.86	23.98
		12	7.46	0.426	7.89	23.98
		18	7.26	0.619	7.88	23.98
		24	6.97	0.883	7.86	23.98
		36	6.75	1.081	7.83	23.98
		48	6.34	1.345	7.68	23.98
		54	6.31	1.466	7.78	23.98

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

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	6.5	6.64	0.248	6.89	16.99
		13	6.63	0.458	7.09	16.99
		19.5	6.29	0.665	6.95	16.99
		26	6.24	0.801	7.04	16.99
		39	5.78	1.121	6.90	16.99
		52	5.57	1.408	6.97	16.99
		58.5	5.34	1.568	6.91	16.99
		65	5.26	1.650	6.91	16.99
5200	40	6.5	7.23	0.248	7.48	16.99
		13	6.76	0.458	7.22	16.99
		19.5	6.89	0.665	7.56	16.99
		26	6.46	0.801	7.26	16.99
		39	6.20	1.121	7.32	16.99
		52	5.85	1.408	7.26	16.99
		58.5	5.72	1.568	7.28	16.99
		65	5.52	1.650	7.17	16.99
5240	48	6.5	6.76	0.248	7.01	16.99
		13	6.51	0.458	6.96	16.99
		19.5	6.39	0.665	7.05	16.99
		26	5.99	0.801	6.79	16.99
		39	5.70	1.121	6.82	16.99
		52	5.46	1.408	6.86	16.99
		58.5	5.40	1.568	6.97	16.99
		65	5.30	1.650	6.95	16.99

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

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5260	52	6.5	6.81	0.248	7.06	23.98
		13	6.53	0.458	6.99	23.98
		19.5	6.37	0.665	7.03	23.98
		26	6.27	0.801	7.07	23.98
		39	5.85	1.121	6.97	23.98
		52	5.53	1.408	6.94	23.98
		58.5	5.37	1.568	6.93	23.98
		65	5.23	1.650	6.88	23.98
5300	60	6.5	7.00	0.248	7.24	23.98
		13	6.73	0.458	7.18	23.98
		19.5	6.53	0.665	7.19	23.98
		26	6.37	0.801	7.17	23.98
		39	6.04	1.121	7.16	23.98
		52	5.75	1.408	7.15	23.98
		58.5	5.43	1.568	7.00	23.98
		65	5.51	1.650	7.16	23.98
5320	64	6.5	6.58	0.248	6.83	23.98
		13	6.38	0.458	6.84	23.98
		19.5	6.22	0.665	6.89	23.98
		26	5.99	0.801	6.79	23.98
		39	5.70	1.121	6.82	23.98
		52	5.36	1.408	6.76	23.98
		58.5	5.16	1.568	6.72	23.98
		65	5.04	1.650	6.69	23.98

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

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5500	100	6.5	6.32	0.248	6.56	23.98
		13	6.36	0.458	6.82	23.98
		19.5	6.05	0.665	6.71	23.98
		26	5.72	0.801	6.52	23.98
		39	5.53	1.121	6.65	23.98
		52	5.18	1.408	6.59	23.98
		58.5	4.98	1.568	6.55	23.98
		65	4.81	1.650	6.46	23.98
5580	116	6.5	7.10	0.248	7.35	23.98
		13	6.55	0.458	7.01	23.98
		19.5	6.39	0.665	7.05	23.98
		26	6.25	0.801	7.06	23.98
		39	5.76	1.121	6.88	23.98
		52	5.58	1.408	6.99	23.98
		58.5	5.31	1.568	6.88	23.98
		65	5.24	1.650	6.89	23.98
5700	140	6.5	6.76	0.248	7.00	23.98
		13	6.28	0.458	6.74	23.98
		19.5	6.17	0.665	6.84	23.98
		26	6.02	0.801	6.82	23.98
		39	5.73	1.121	6.85	23.98
		52	5.27	1.408	6.68	23.98
		58.5	5.09	1.568	6.66	23.98
		65	5.14	1.650	6.79	23.98

40 MHz BW

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

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	13.5	7.32	0.496	7.81	16.99
		27	7.02	0.922	7.94	16.99
		40.5	6.62	1.304	7.92	16.99
		54	6.26	1.614	7.87	16.99
		81	5.72	2.176	7.90	16.99
		108	5.18	2.758	7.94	16.99
		121.5	5.05	2.858	7.91	16.99
		135	4.95	3.031	7.98	16.99
5230	46	13.5	7.04	0.496	7.53	16.99
		27	6.57	0.922	7.49	16.99
		40.5	6.24	1.304	7.54	16.99
		54	6.00	1.614	7.61	16.99
		81	5.24	2.176	7.42	16.99
		108	4.93	2.758	7.68	16.99
		121.5	4.75	2.858	7.61	16.99
		135	4.40	3.031	7.43	16.99

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

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5270	54	13.5	7.18	0.496	7.68	23.98
		27	6.67	0.922	7.59	23.98
		40.5	6.36	1.304	7.67	23.98
		54	6.04	1.614	7.65	23.98
		81	5.33	2.176	7.51	23.98
		108	4.99	2.758	7.75	23.98
		121.5	4.68	2.858	7.54	23.98
		135	4.56	3.031	7.59	23.98
5310	62	13.5	7.09	0.496	7.59	23.98
		27	6.75	0.922	7.68	23.98
		40.5	6.51	1.304	7.81	23.98
		54	6.01	1.614	7.63	23.98
		81	5.52	2.176	7.70	23.98
		108	4.91	2.758	7.67	23.98
		121.5	4.75	2.858	7.61	23.98
		135	4.67	3.031	7.70	23.98

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

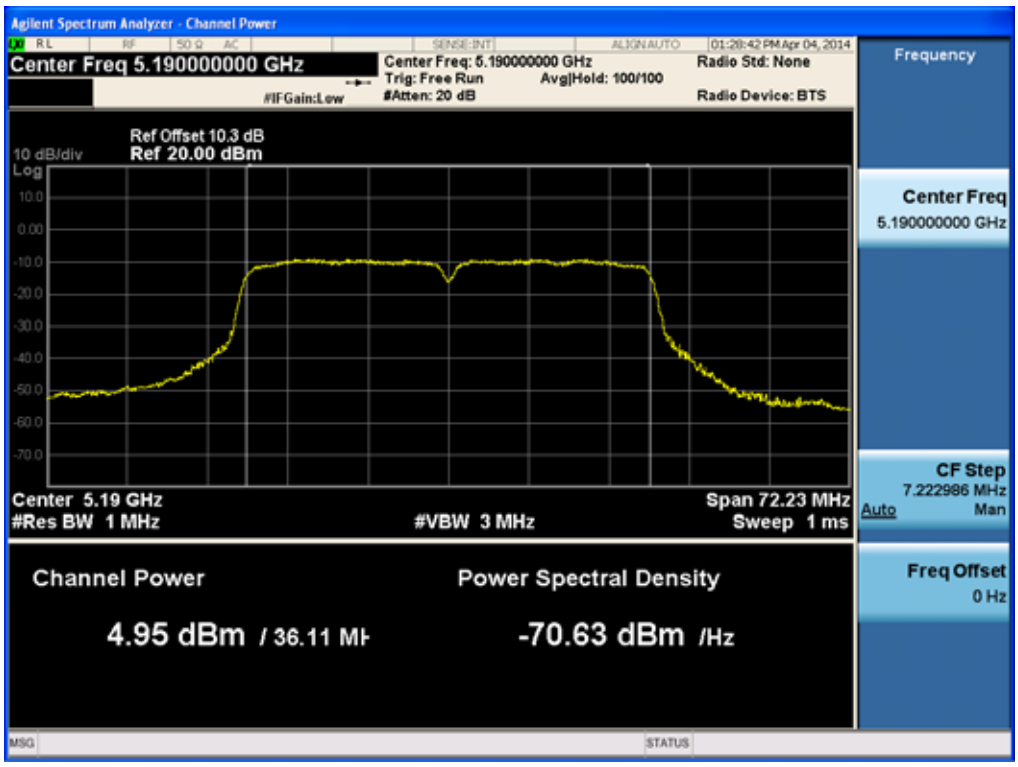
802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5510	102	13.5	7.08	0.496	7.58	23.98
		27	6.94	0.922	7.86	23.98
		40.5	6.26	1.304	7.56	23.98
		54	5.88	1.614	7.50	23.98
		81	5.43	2.176	7.61	23.98
		108	4.98	2.758	7.74	23.98
		121.5	4.65	2.858	7.50	23.98
		135	4.57	3.031	7.60	23.98
5550	110	13.5	7.34	0.496	7.84	23.98
		27	7.03	0.922	7.95	23.98
		40.5	6.67	1.304	7.98	23.98
		54	6.11	1.614	7.72	23.98
		81	5.68	2.176	7.86	23.98
		108	5.07	2.758	7.83	23.98
		121.5	4.93	2.858	7.79	23.98
		135	4.80	3.031	7.84	23.98
5670	134	13.5	6.74	0.496	7.24	23.98
		27	6.43	0.922	7.35	23.98
		40.5	6.18	1.304	7.49	23.98
		54	5.77	1.614	7.38	23.98
		81	5.23	2.176	7.40	23.98
		108	4.75	2.758	7.50	23.98
		121.5	4.45	2.858	7.31	23.98
		135	4.27	3.031	7.30	23.98

Note : In order to simplify the report, attached plots were only the highest conducted power channel.

▣ RESULT PLOTS 40 MHz BW

(5190 MHz ~5230 MHz)

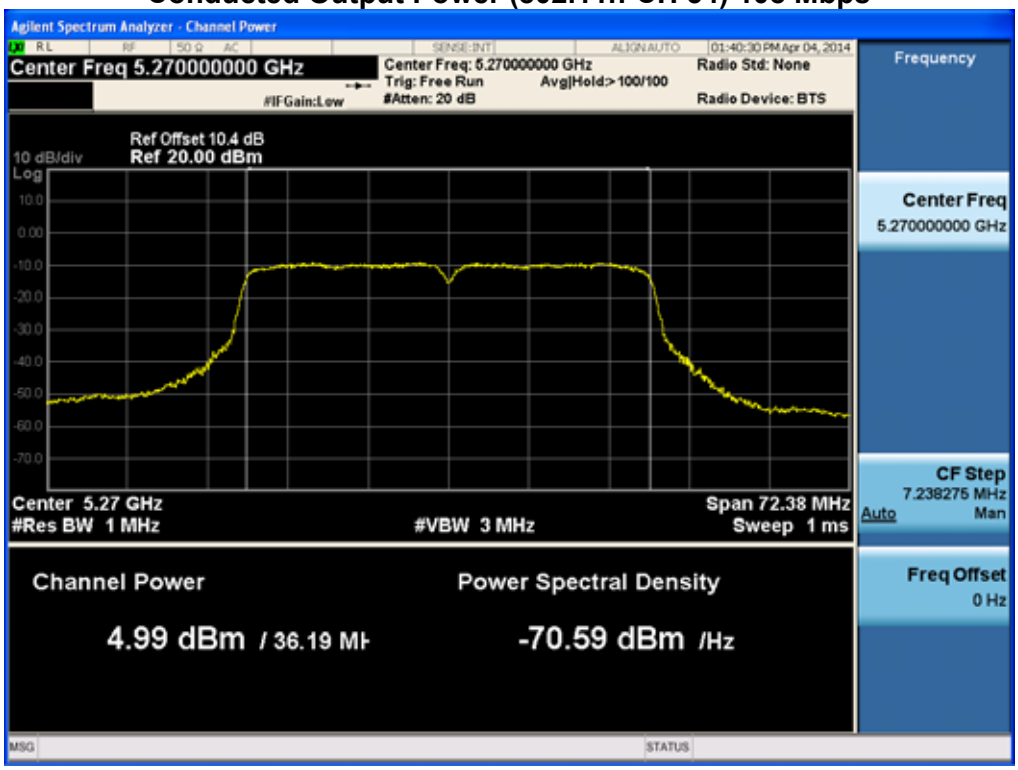
Conducted Output Power (802.11n-CH 38) 135 Mbps



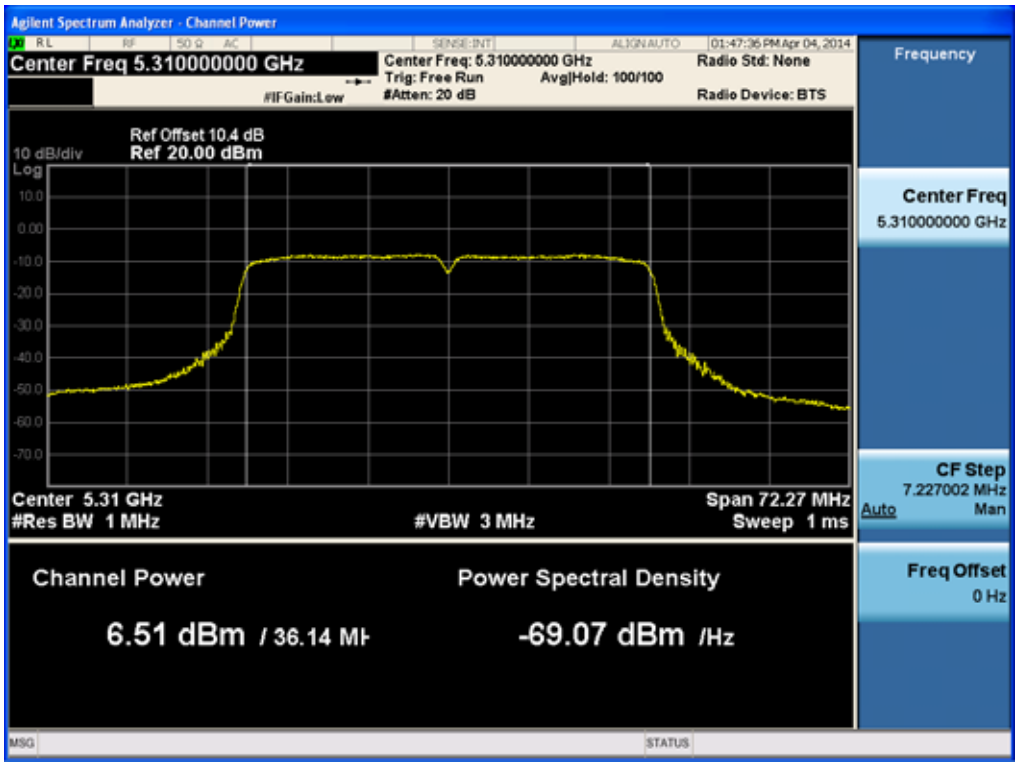
Conducted Output Power (802.11n-CH 46) 108 Mbps

(5270 MHz ~5310 MHz)

Conducted Output Power (802.11n-CH 54) 108 Mbps

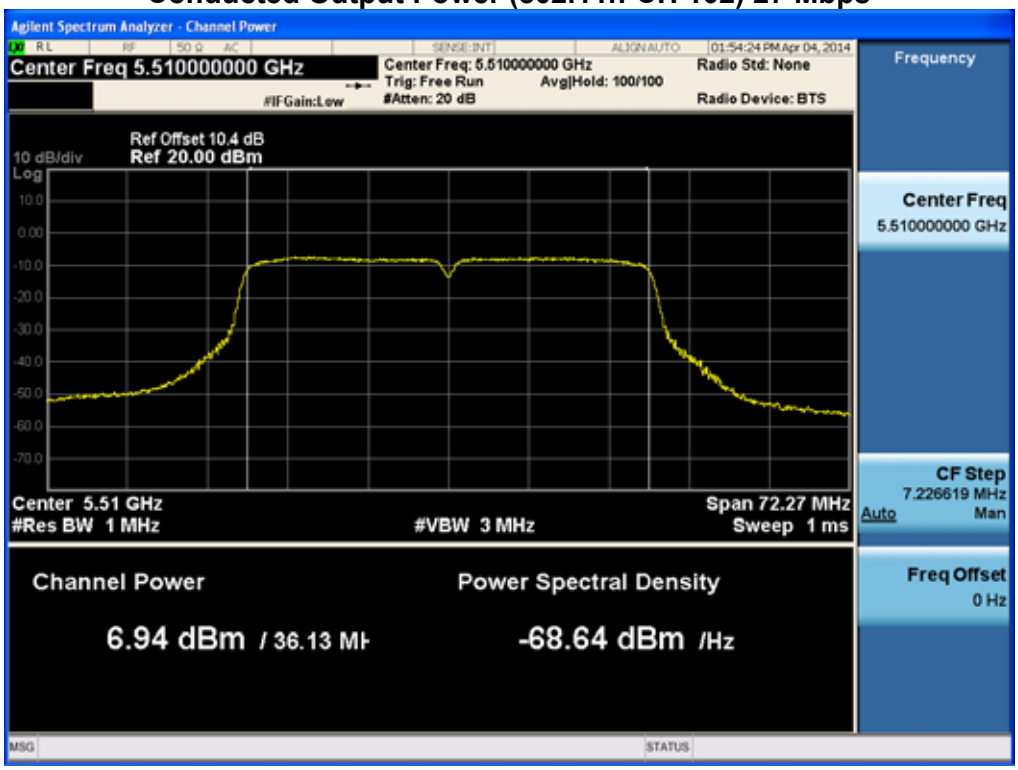


Conducted Output Power (802.11n-CH 62) 40.5 Mbps



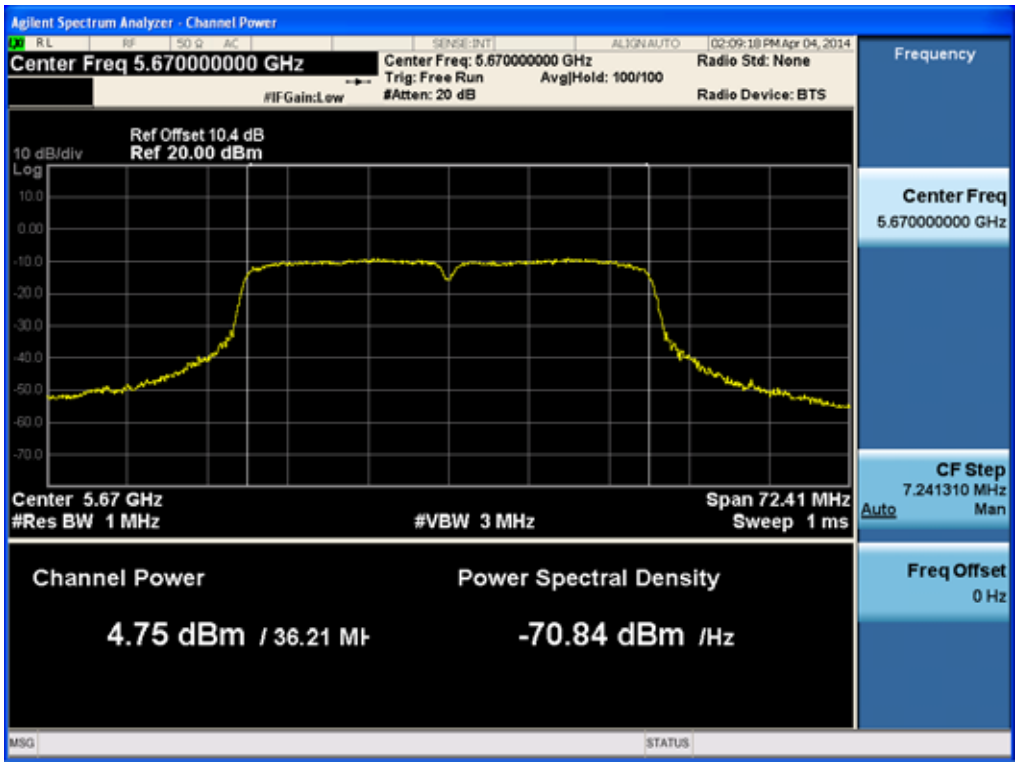
(5510 MHz ~5670 MHz)

Conducted Output Power (802.11n-CH 102) 27 Mbps



Conducted Output Power (802.11n-CH 110) 40.5 Mbps

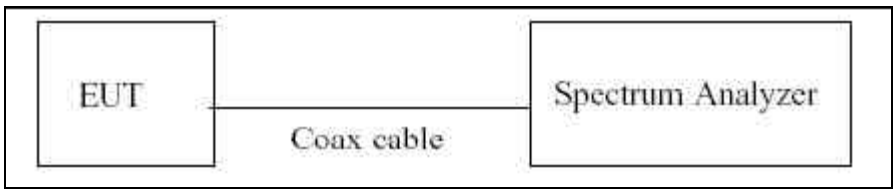
Conducted Output Power (802.11n-CH 134) 108 Mbps



8.5 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 4 dBm/ MHz in the 5.15 GHz – 5.25 GHz band and 11 dBm/ MHz in the 5.25 GHz – 5.35 GHz and 5.47 GHz – 5.725 GHz bands

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

We tested according to Method in KDB 789033(issued 04/08/2013).

The spectrum analyzer is set to :

1. Set span to encompass the entire emission bandwidth(EBW) of the signal.
2. RBW = 1 MHz.
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	Frequency(MHz)	Loss(dB)
UNII 1	5180	10.30
	5190	10.29
	5200	10.28
	5230	10.29
	5240	10.34
UNII 2	5260	10.37
	5270	10.38
	5300	10.40
	5310	10.39
	5320	10.39
UNII 2e	5500	10.35
	5510	10.36
	5550	10.41
	5580	10.43
	5670	10.43
	5700	10.30

(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	-3.358	0.221478	-3.137	4	Pass
5200	40		-3.072	0.221478	-2.851	4	Pass
5240	48		-3.171	0.324136	-2.847	4	Pass
5260	52		-3.393	0.425524	-2.967	11	Pass
5300	60		-2.940	0.221478	-2.719	11	Pass
5320	64		-3.538	0.883098	-2.655	11	Pass
5500	100		-3.457	0.883098	-2.574	11	Pass
5580	116		-3.423	0.883098	-2.540	11	Pass
5700	140		-3.255	0.425524	-2.829	11	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	-4.605	0.457575	-4.147	4	Pass
5200	40		-4.167	0.66458	-3.502	4	Pass
5240	48		-4.501	0.66458	-3.836	4	Pass
5260	52		-4.202	0.800685	-3.401	11	Pass
5300	60		-4.367	0.248236	-4.119	11	Pass
5320	64		-4.478	0.66458	-3.813	11	Pass
5500	100		-4.763	0.457575	-4.305	11	Pass
5580	116		-4.398	0.248236	-4.150	11	Pass
5700	140		-4.290	0.248236	-4.042	11	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
5190	38	802.11n 40MHz BW	-6.702	3.030547	-3.671	4	Pass
5230	46		-7.101	2.757942	-4.343	4	Pass
5270	54		-6.975	2.757942	-4.217	11	Pass
5310	62		-6.979	1.304362	-5.675	11	Pass
5510	102		-6.891	0.922149	-5.969	11	Pass
5550	110		-6.813	1.304362	-5.509	11	Pass
5670	134		-7.282	2.757942	-4.524	11	Pass

Note : In order to simplify the report, attached plots were only the highest PSD channel.

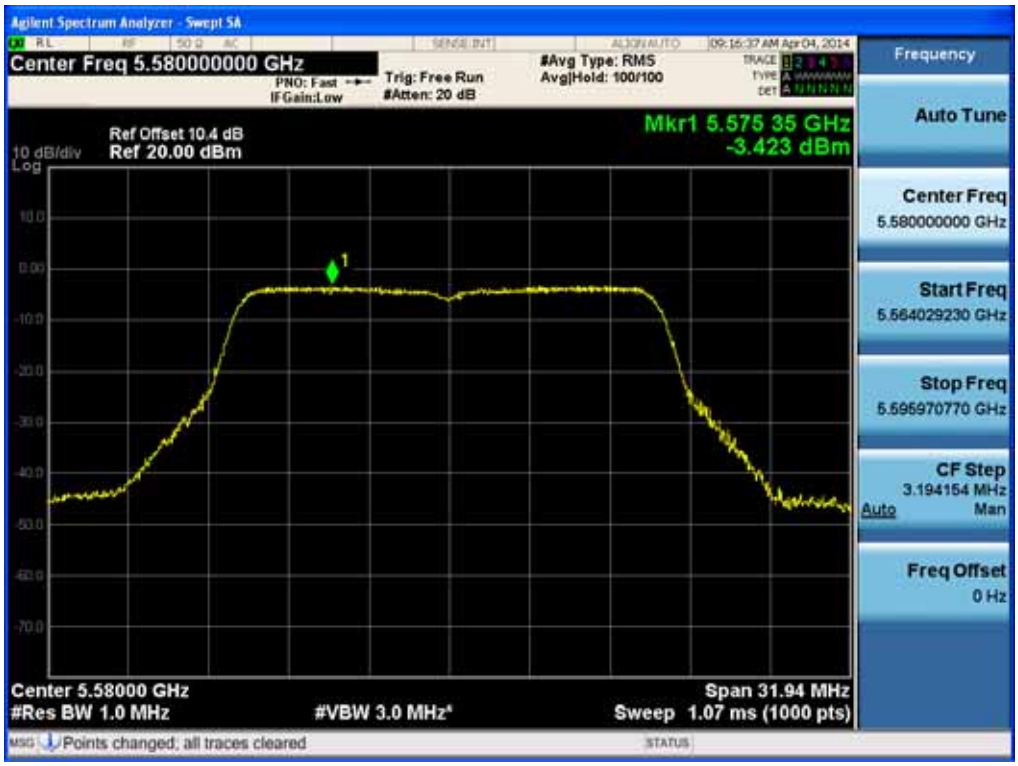
▣ RESULT PLOTS

20 MHz BW

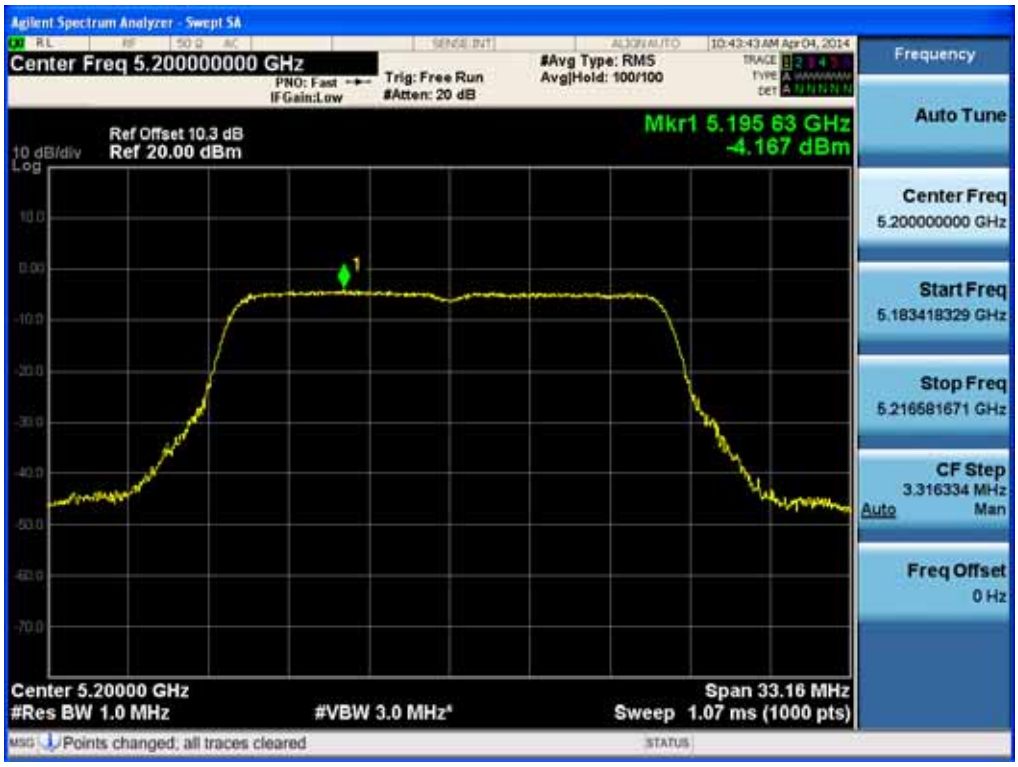
Power Spectral Density (802.11a-CH 48)

Power Spectral Density (802.11a-CH 64)

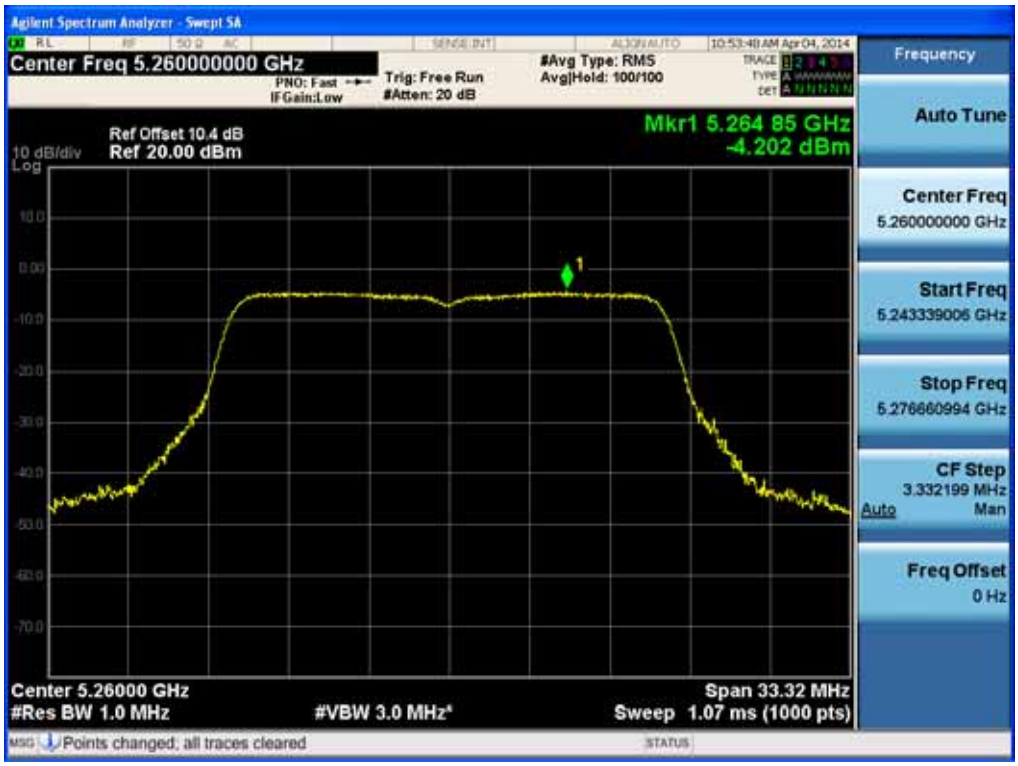
Power Spectral Density (802.11a-CH 116)



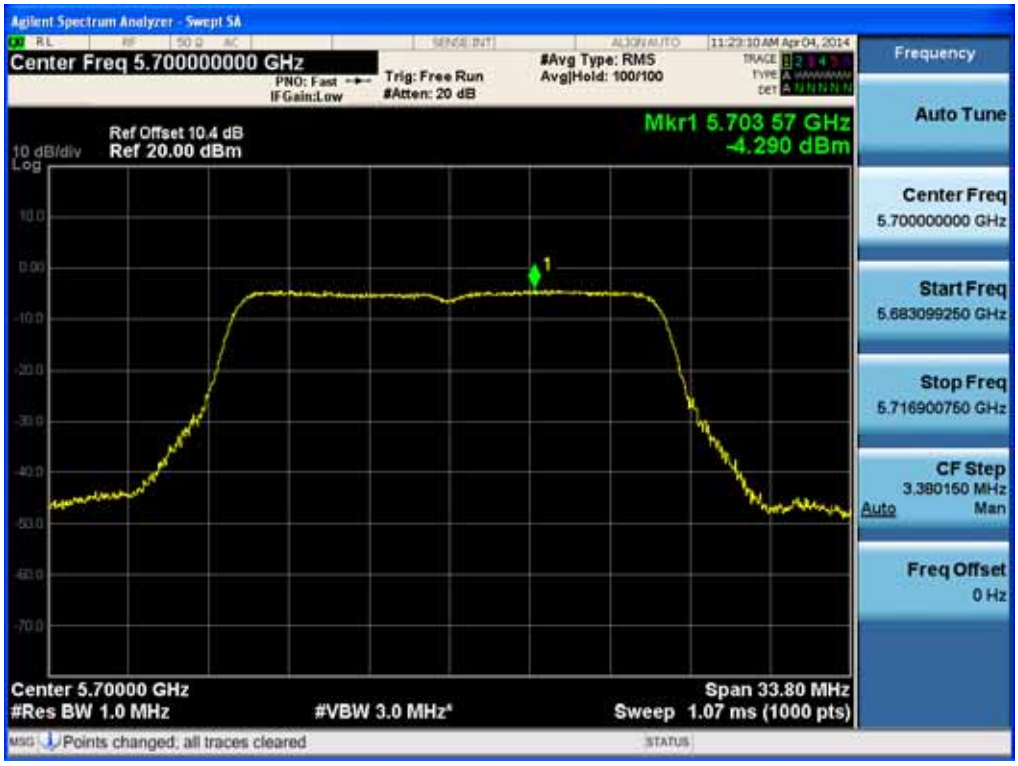
Power Spectral Density (802.11n-CH 40)



Power Spectral Density (802.11n-CH 52)

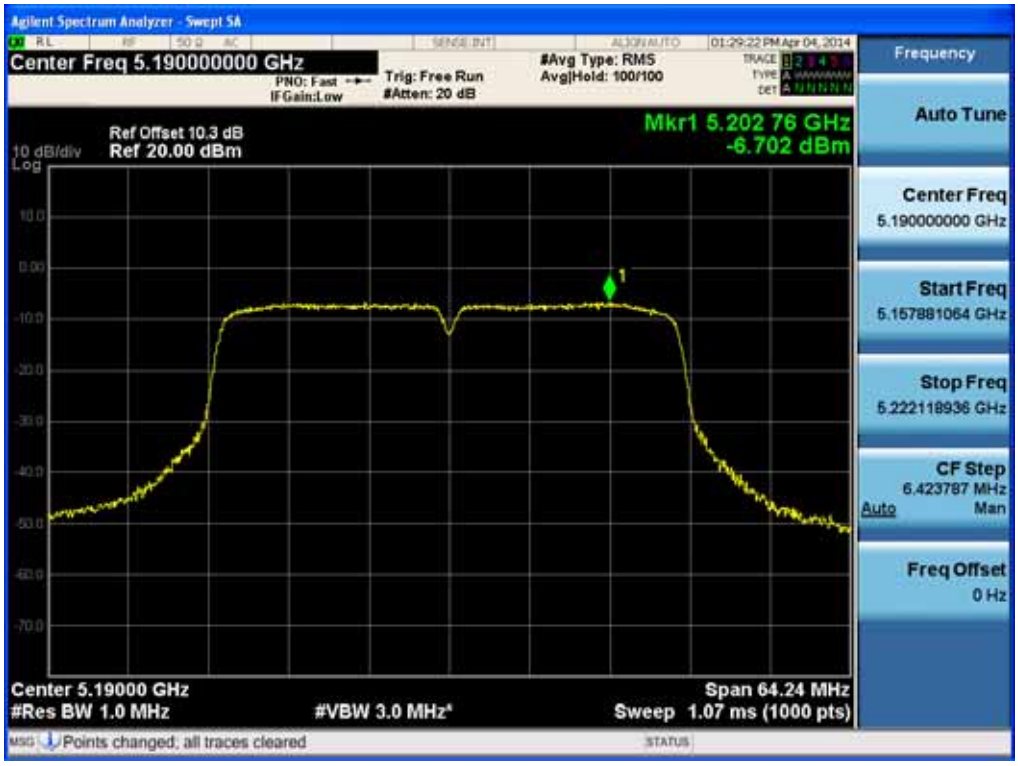


Power Spectral Density (802.11n-CH 140)

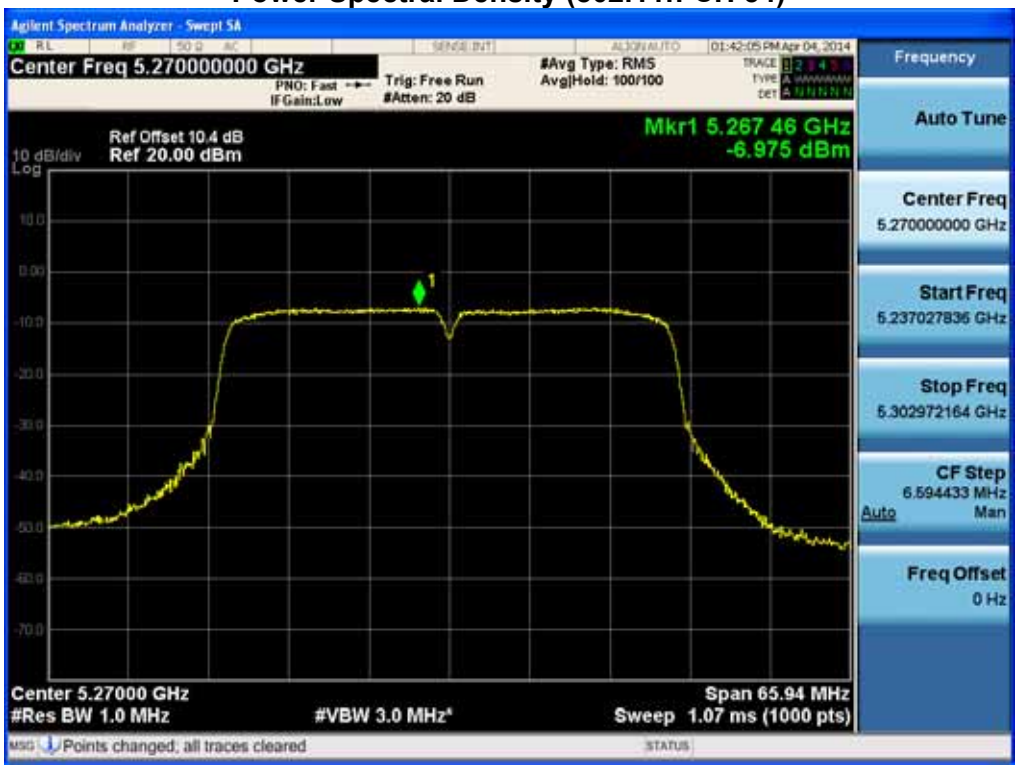


40 MHz BW

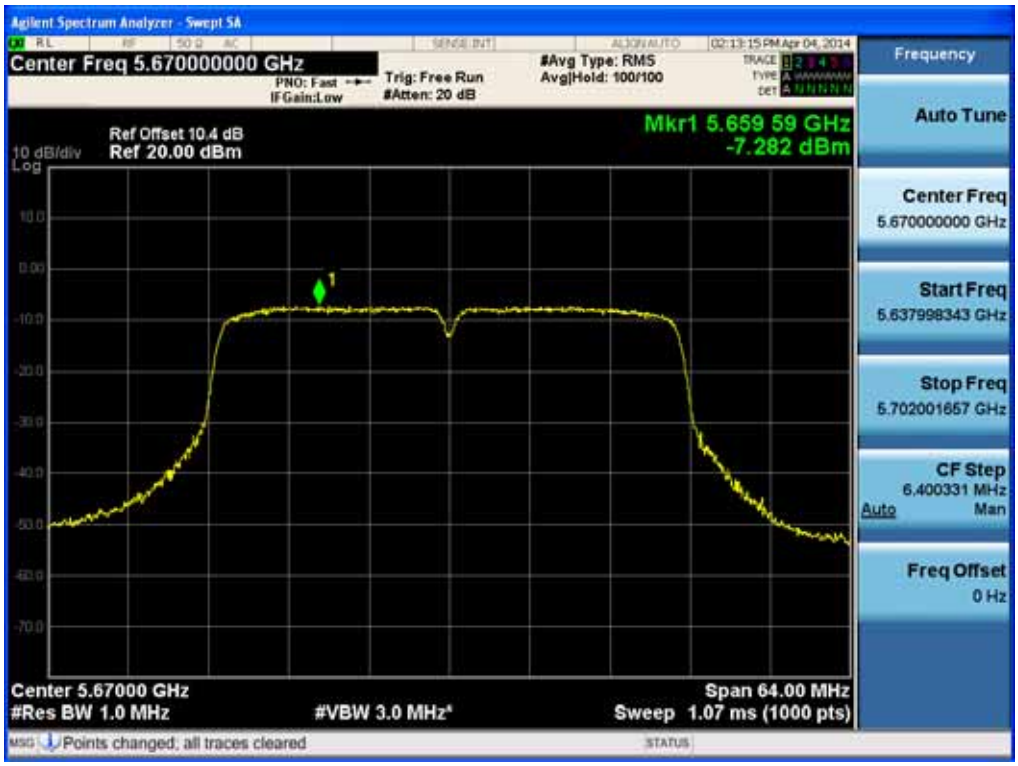
Power Spectral Density (802.11n-CH 38)



Power Spectral Density (802.11n-CH 54)



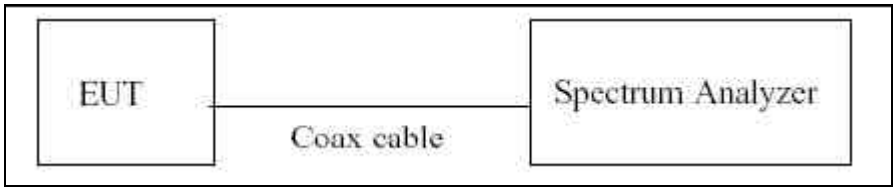
Power Spectral Density (802.11n-CH 134)



8.6 PEAK EXCURSION RATIO

The spectrum analyzer was connected to the antenna terminal while the EUT was operating in the continuous transmission mode at the appropriate center frequencies. The largest permissible difference between the modulation envelope(measured using a peak hold function) and the maximum conducted output power 13 dB/MHz.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

We tested according to KDB 789033(issued 04/08/2013).

The spectrum analyzer is set to :

1. Span = Set the span to view the entire emission bandwidth.
2. RBW = 1 MHz
3. VBW ≥ 3 MHz
4. Detector Mode = Peak
5. Trace Mode = Max hold
6. Allow the sweeps to continue until the trace stabilizes.
7. Use the peak search function to find the peak of the spectrum.
8. Use the procedure to measure the PPSD
9. Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.

Note :

1. 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.

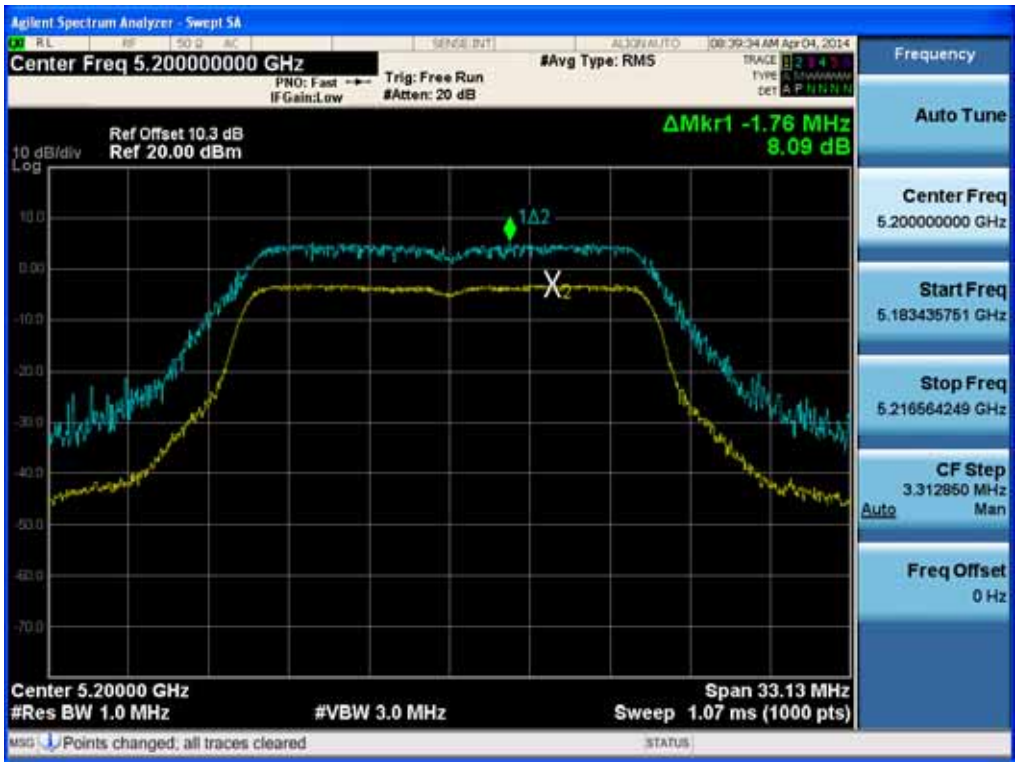
Band	Frequency(MHz)	Loss(dB)
UNII 1	5180	10.30
	5190	10.29
	5200	10.28
	5230	10.29
	5240	10.34
UNII 2	5260	10.37
	5270	10.38
	5300	10.40
	5310	10.39
	5320	10.39
UNII 2e	5500	10.35
	5510	10.36
	5550	10.41
	5580	10.43
	5670	10.43
	5700	10.30

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

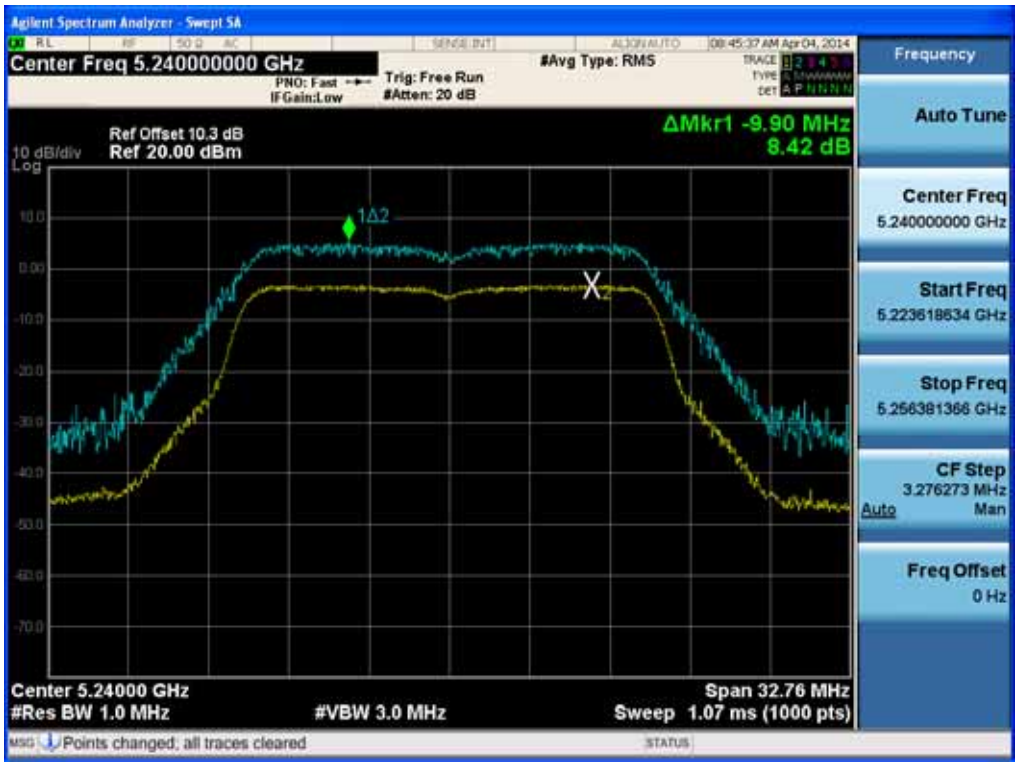
▣ RESULT PLOTS

Peak Excursion Ratio (802.11a-CH 36)

Peak Excursion Ratio (802.11a-CH 40)

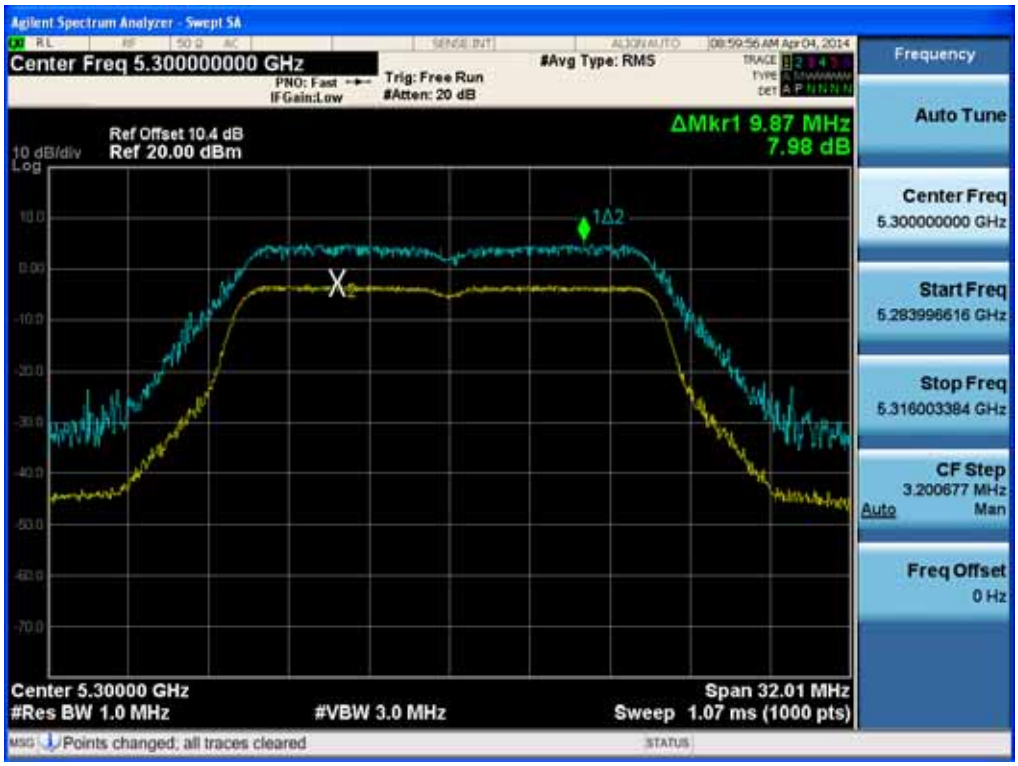


Peak Excursion Ratio (802.11a-CH 48)



Peak Excursion Ratio (802.11a-CH 52)

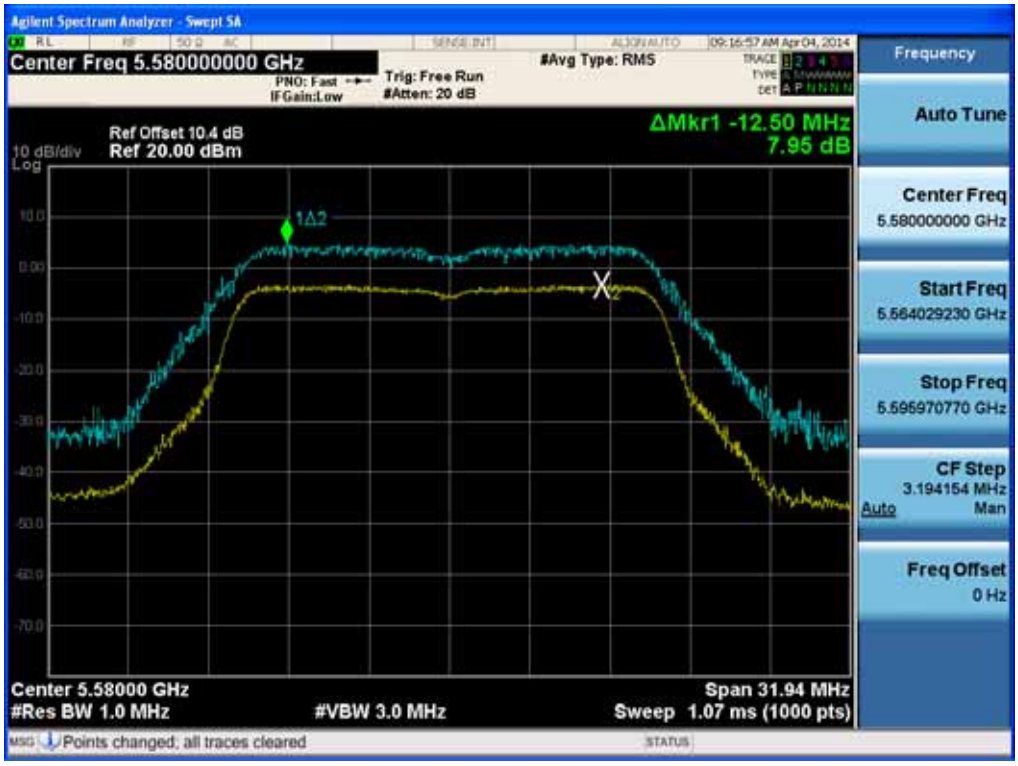
Peak Excursion Ratio (802.11a-CH 60)



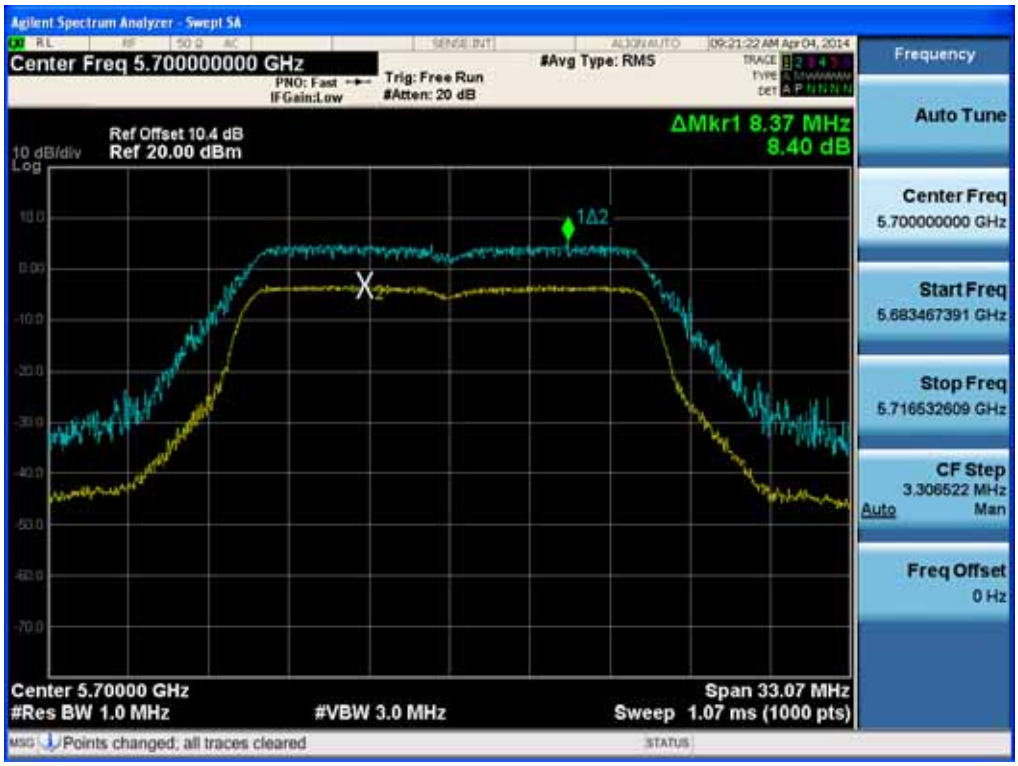
Peak Excursion Ratio (802.11a-CH 64)

Peak Excursion Ratio (802.11a-CH 100)

Peak Excursion Ratio (802.11a-CH 116)



Peak Excursion Ratio (802.11a-CH 140)

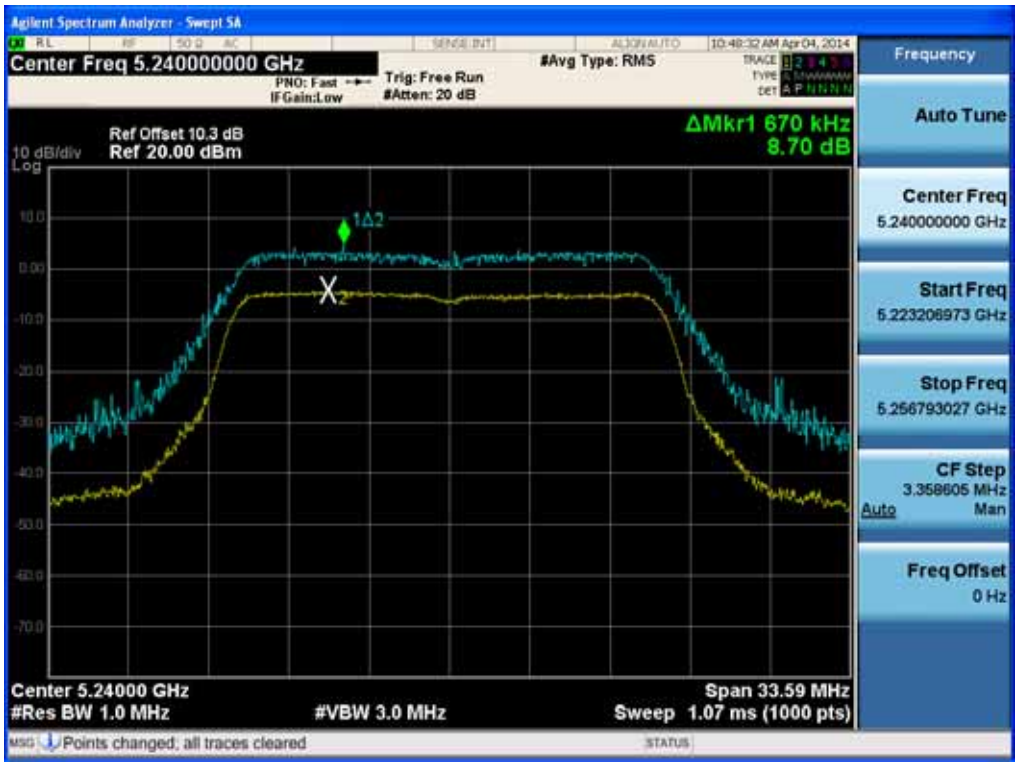


20 MHz BW

Peak Excursion Ratio (802.11n-CH 36)

Peak Excursion Ratio (802.11n-CH 40)

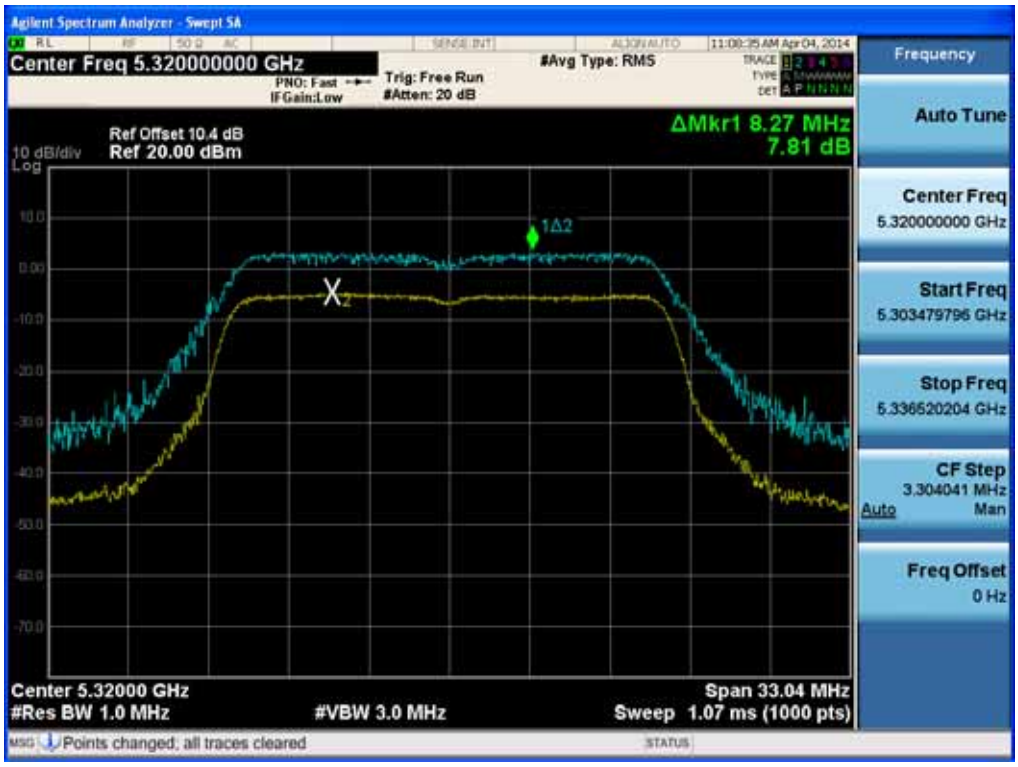
Peak Excursion Ratio (802.11n-CH 48)



Peak Excursion Ratio (802.11n-CH 52)

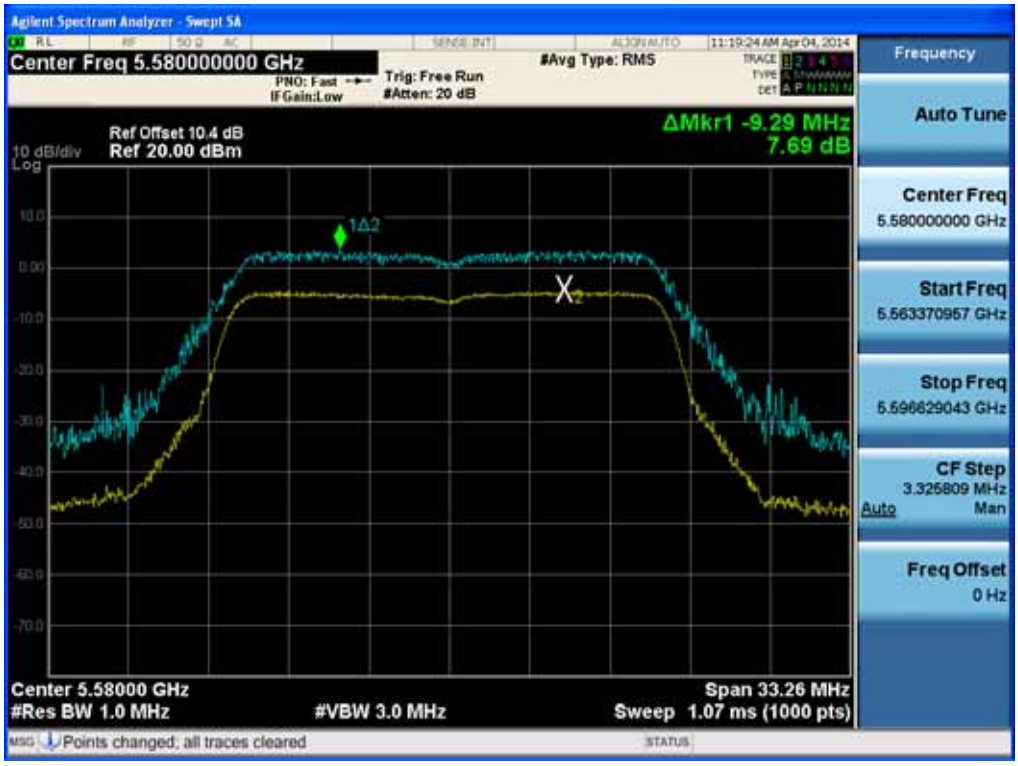
Peak Excursion Ratio (802.11n-CH 60)

Peak Excursion Ratio (802.11n-CH 64)

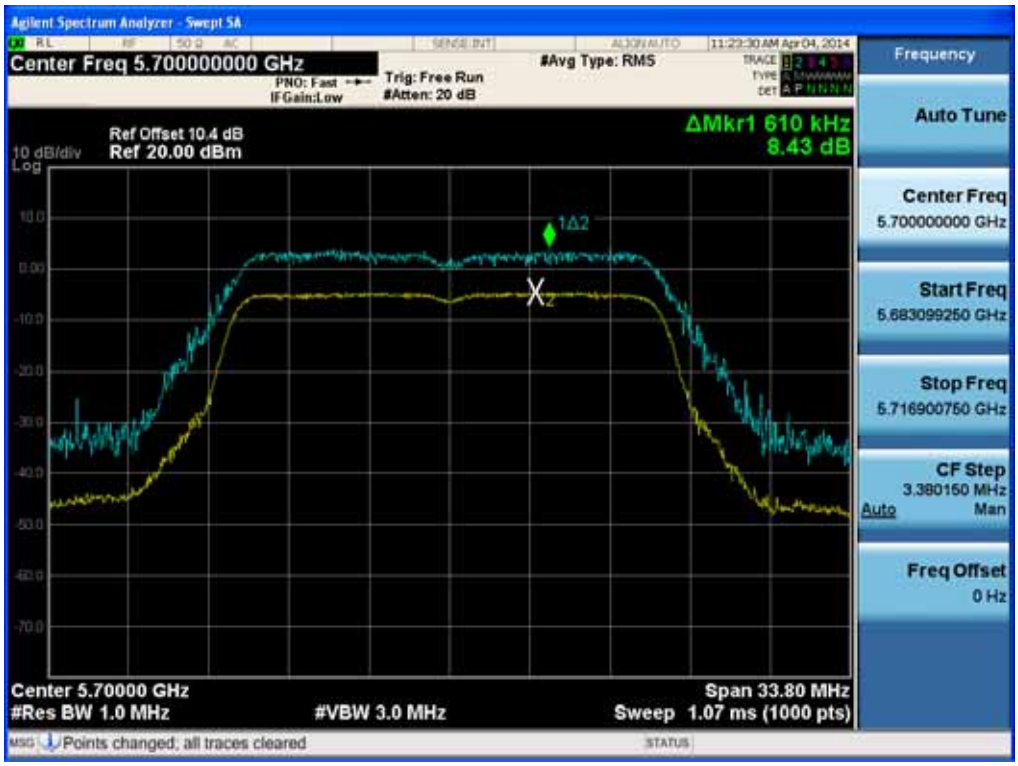


Peak Excursion Ratio (802.11n-CH 100)

Peak Excursion Ratio (802.11n-CH 116)

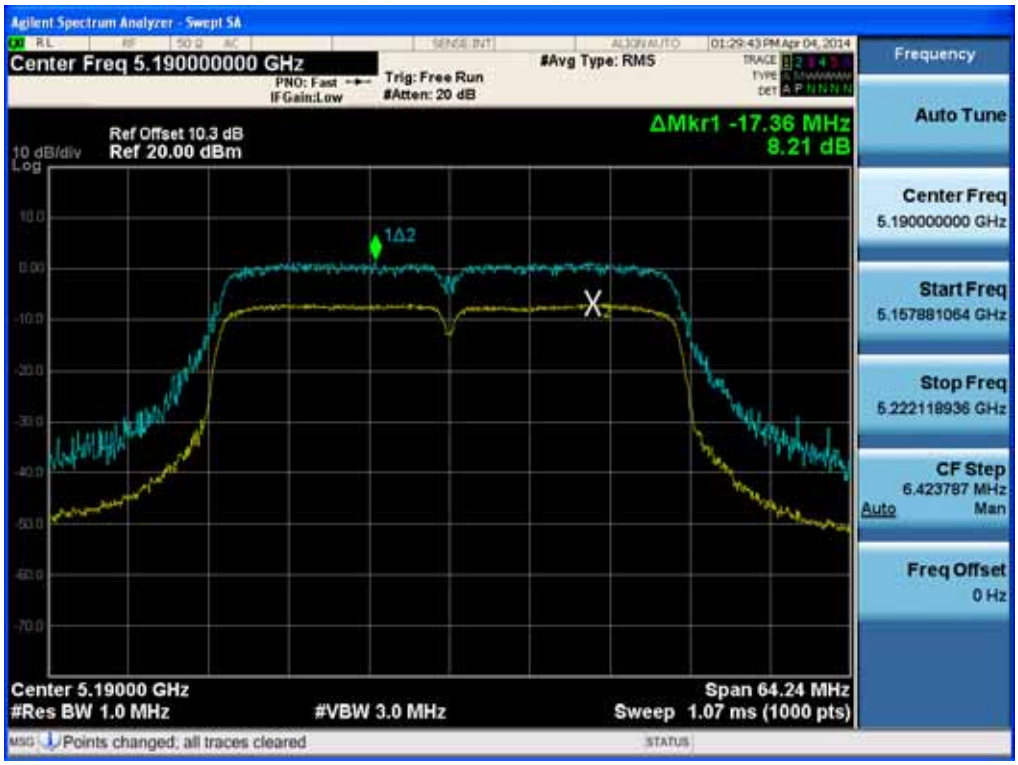


Peak Excursion Ratio (802.11n-CH 140)

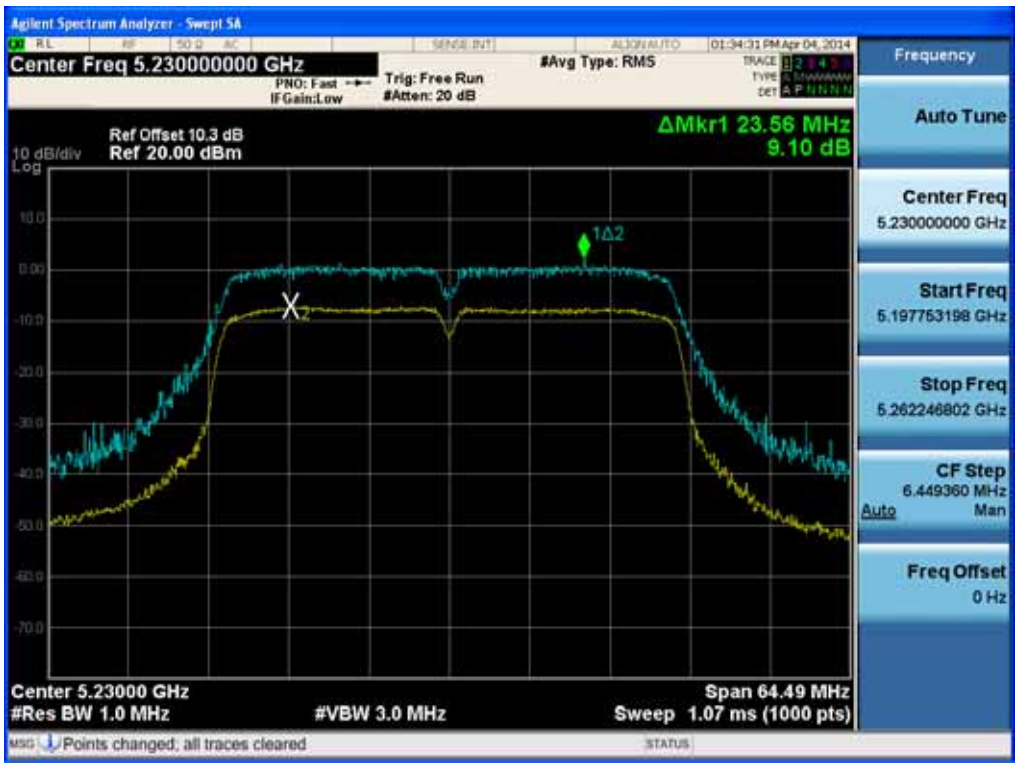


40 MHz BW

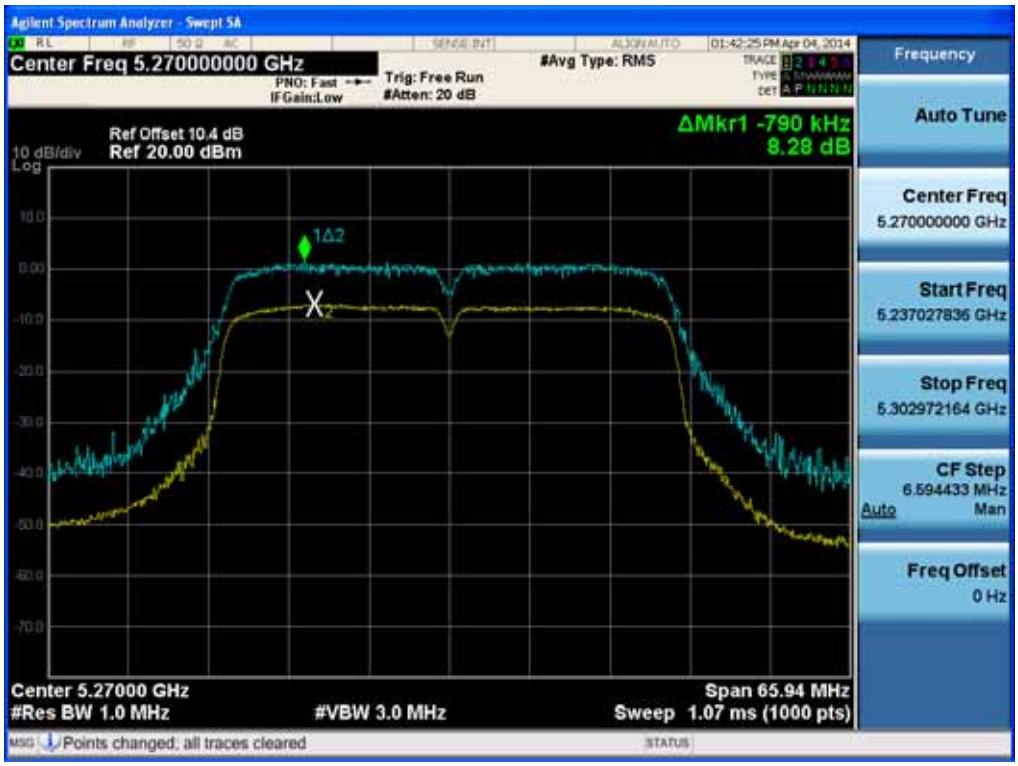
Peak Excursion Ratio (802.11n-CH 38)



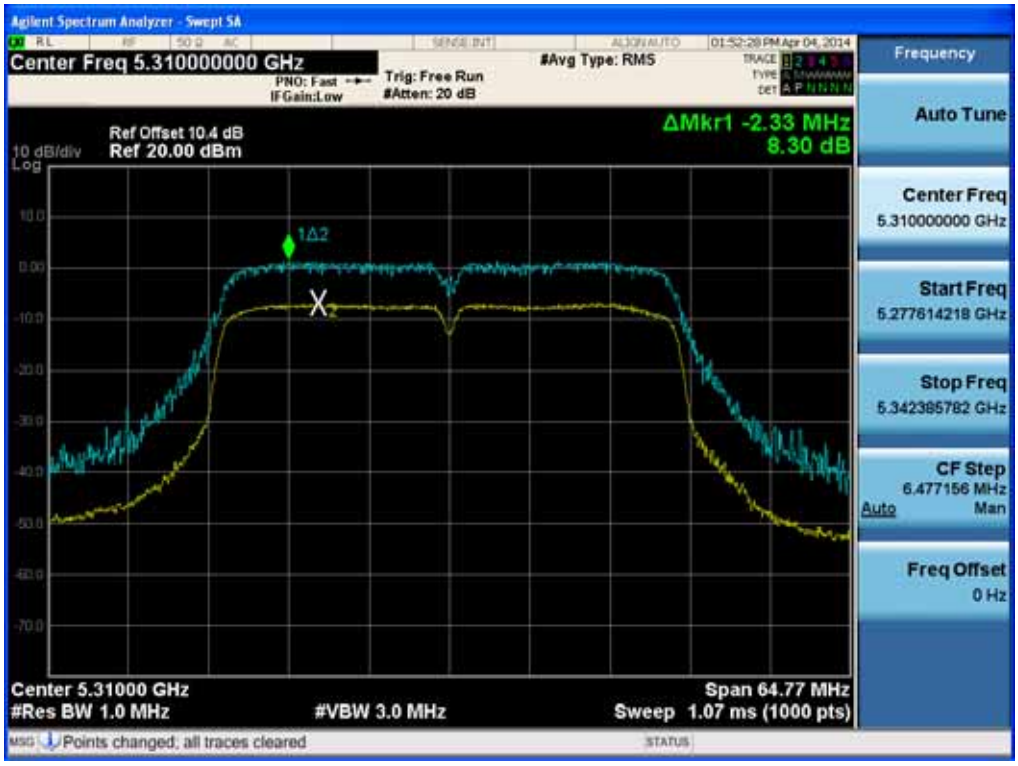
Peak Excursion Ratio (802.11n-CH 46)



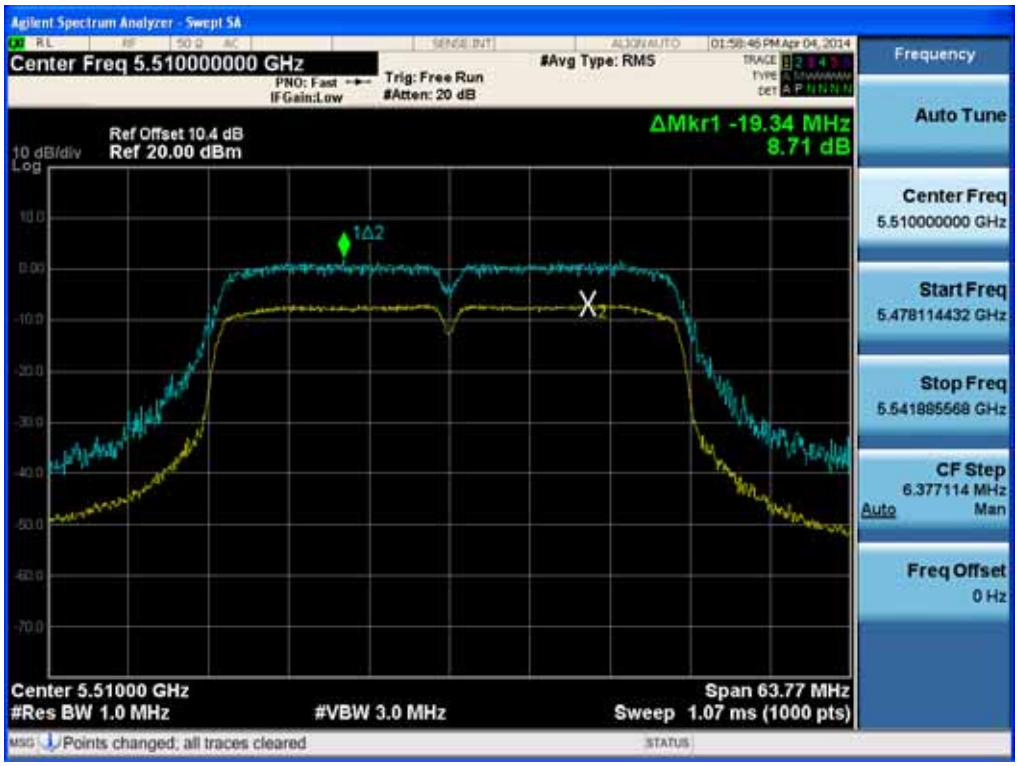
Peak Excursion Ratio (802.11n-CH 54)



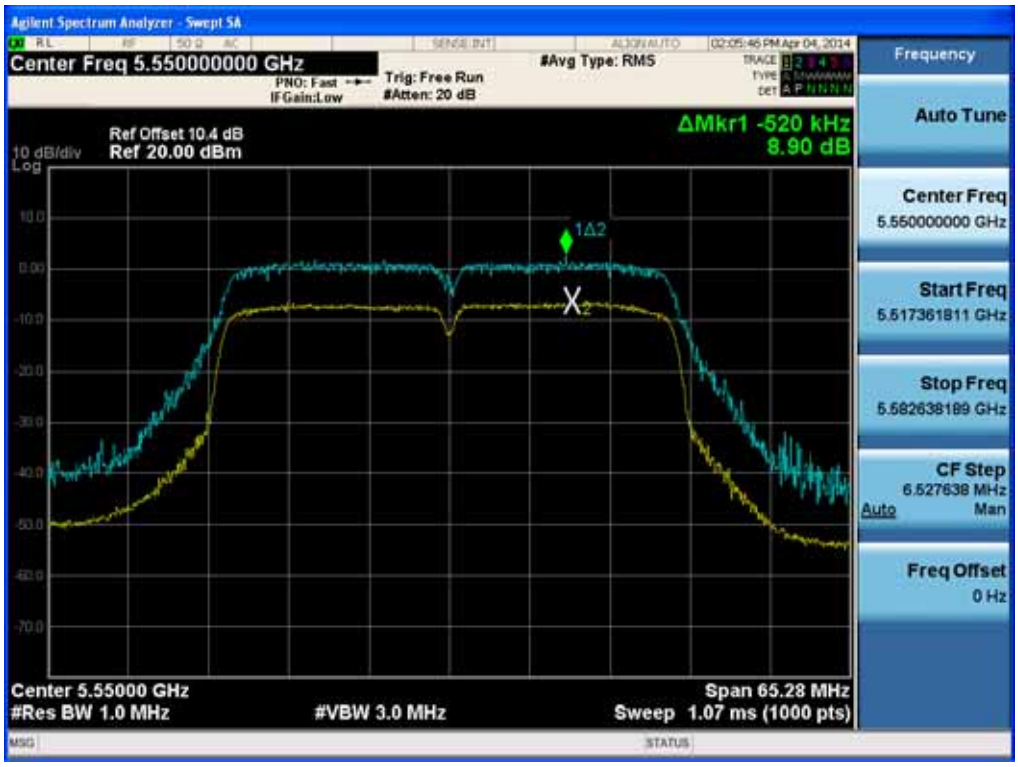
Peak Excursion Ratio (802.11n-CH 62)



Peak Excursion Ratio (802.11n-CH 102)



Peak Excursion Ratio (802.11n-CH 110)



Peak Excursion Ratio (802.11n-CH 134)

8.7 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: 3.8 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.80	+20(Ref)	5179993.46	0
100%		-30	5179959.80	-33.66
100%		-20	5179964.50	-28.96
100%		-10	5179961.90	-31.56
100%		0	5179974.40	-19.06
100%		+10	5179989.20	-4.26
100%		+30	5179997.54	4.08
100%		+40	5180001.65	8.19
100%		+50	5180012.58	19.12
115%	4.37	+20	5180011.50	18.04
Batt. Endpoint	3.23	+20	5180013.28	19.82

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 2

OPERATING FREQUENCY: 5,260,000,000 Hz

CHANNEL: 52

REFERENCE VOLTAGE: 3.8 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.80	+20(Ref)	5259991.36	0
100%		-30	5259960.72	-30.64
100%		-20	5259965.32	-26.04
100%		-10	5259962.34	-29.02
100%		0	5259979.40	-11.96
100%		+10	5259988.40	-2.96
100%		+30	5259996.46	5.10
100%		+40	5260001.18	9.82
100%		+50	5260010.50	19.14
115%	4.37	+20	5260012.51	21.15
Batt. Endpoint	3.23	+20	5260014.15	22.79

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: 5,500,000,000 Hz

CHANNEL: 100

REFERENCE VOLTAGE: 3.8 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.80	+20(Ref)	5499992.79	0
100%		-30	5499961.85	-30.94
100%		-20	5499967.42	-25.37
100%		-10	5499963.67	-29.12
100%		0	5499976.43	-16.36
100%		+10	5499990.44	-2.35
100%		+30	5499999.50	6.71
100%		+40	5500002.87	10.08
100%		+50	5500013.57	20.78
115%	4.37	+20	5500012.75	19.96
Batt. Endpoint	3.23	+20	5500015.18	22.39

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: 3.8 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.80	+20(Ref)	5189994.35	0
100%		-30	5189961.84	-32.51
100%		-20	5189968.49	-25.86
100%		-10	5189965.34	-29.01
100%		0	5189975.69	-18.66
100%		+10	5189990.83	-3.52
100%		+30	5189998.33	3.98
100%		+40	5190002.85	8.50
100%		+50	5190009.48	15.13
115%	4.37	+20	5190010.22	15.87
Batt. Endpoint	3.23	+20	5190011.94	17.59

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 2

OPERATING FREQUENCY: 5,270,000,000 Hz

CHANNEL: 54

REFERENCE VOLTAGE: 3.8 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.80	+20(Ref)	5269994.56	0
100%		-30	5269954.16	-40.40
100%		-20	5269968.49	-26.07
100%		-10	5269966.82	-27.74
100%		0	5269980.16	-14.40
100%		+10	5269987.36	-7.20
100%		+30	5269994.75	0.19
100%		+40	5270003.89	9.33
100%		+50	5270011.28	16.72
115%	4.37	+20	5270010.37	15.81
Batt. Endpoint	3.23	+20	5270012.65	18.09

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: 5,510,000,000 Hz

CHANNEL: 102

REFERENCE VOLTAGE: 3.8 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.80	+20(Ref)	5509995.62	0
100%		-30	5509963.65	-31.97
100%		-20	5509964.85	-30.77
100%		-10	5509970.15	-25.47
100%		0	5509984.36	-11.26
100%		+10	5509994.12	-1.50
100%		+30	5509998.57	2.95
100%		+40	5510002.61	6.99
100%		+50	5510012.69	17.07
115%	4.37	+20	5510010.84	15.22
Batt. Endpoint	3.23	+20	5510012.87	17.25

Note:

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

8.8 RADIATED MEASUREMENT.

8.8.1 RADIATED SPURIOUS EMISSIONS.

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

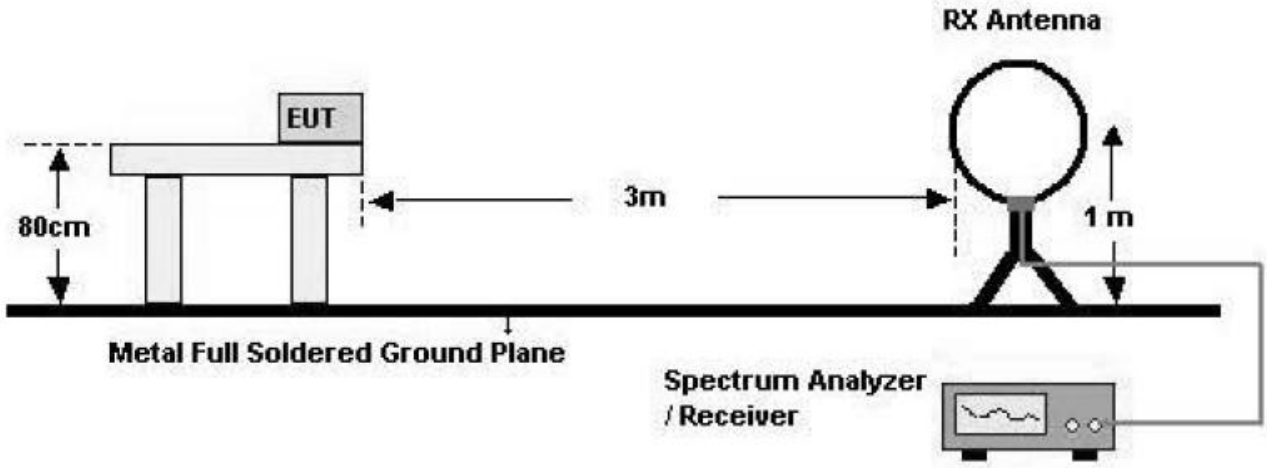
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

▣ §15.407, KDB 789033

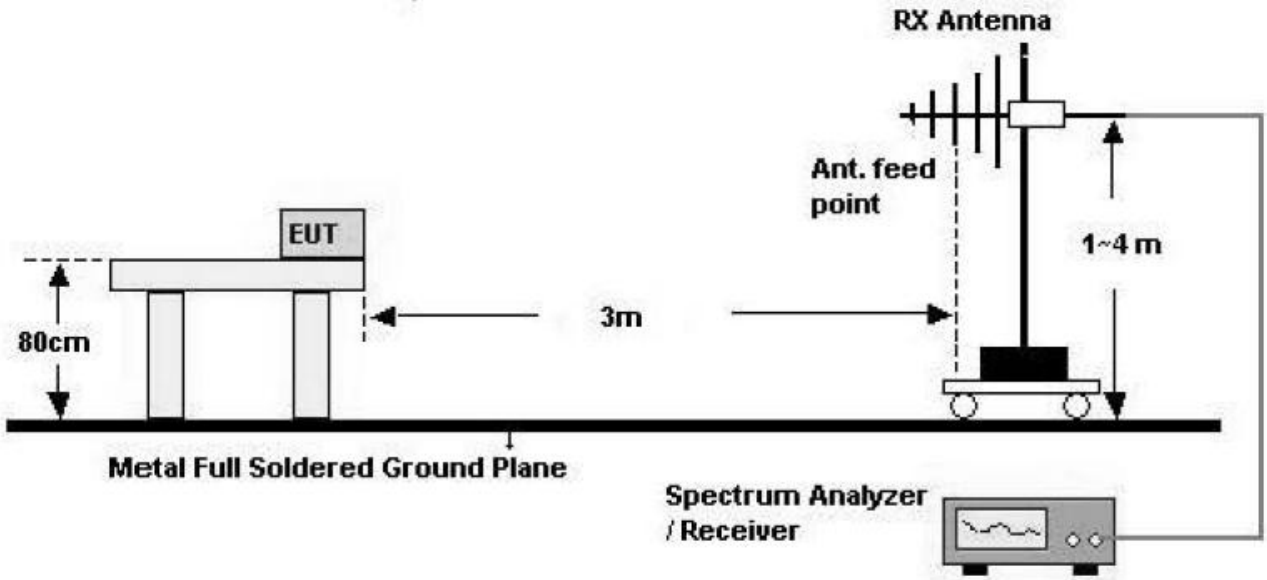
All harmonics that do not lie in a restricted band are subject to a peak limit of -27 dBm/MHz. At a distance of 3 meters the field strength limit in dBμV/m can be determined by adding a “conversion” factor of 95.2 dB to the EIRP limit of -27 dBm/MHz to obtain the limit for out of band spurious emissions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

Test Configuration

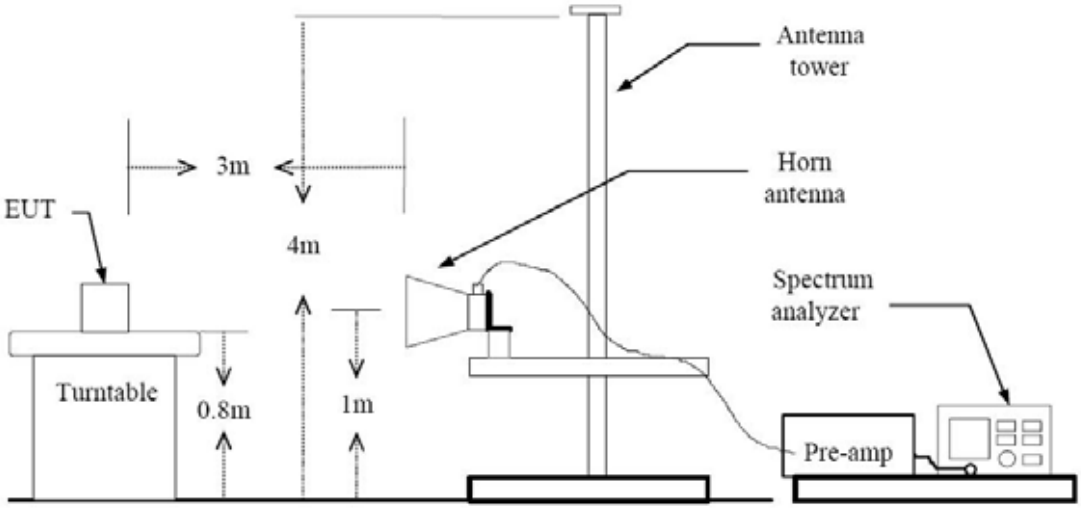
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE USED

ANSI C63.4(2003)

Method H)5) in KDB 789033, issued 04/08/2013 (Peak)

Method H)6)d) in KDB 789033, issued 04/08/2013 (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/g/n_20/n_40 mode to perform the average filed strength measurements.
2. The actual setting value of VBW for 802.11a/g/n_20/n_40

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	2.026	2.132	95.028	494	1000
n_20	6.5	1.870	1.980	94.444	535	1000
n_40	13.5	0.910	1.020	89.216	1099	3000

TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

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

Notes:

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

TEST RESULTS

Below 1 GHz

Operation Mode: Normal Mode

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

Notes:

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

Above 1 GHz

Band :	UNII 1
Operation Mode:	802.11 a
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]	Detect
10360	61.75	-6.51	V	55.24	68.20	12.96	PK
15540	64.07	-6.42	V	57.65	73.98	16.33	PK
15540	50.02	-6.42	V	43.60	53.98	10.38	AV
10360	61.71	-6.51	H	55.20	68.20	13.00	PK
15540	64.06	-6.42	H	57.64	73.98	16.34	PK
15540	50.10	-6.42	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 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]	Detect
10400	62.85	-6.49	V	56.36	68.20	11.84	PK
15600	64.10	-7.15	V	56.95	73.98	17.03	PK
15600	50.21	-7.15	V	43.06	53.98	10.92	AV
10400	62.72	-6.49	H	56.23	68.20	11.97	PK
15600	64.02	-7.15	H	56.87	73.98	17.11	PK
15600	50.03	-7.15	H	42.88	53.98	11.10	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]	Detect
10480	61.49	-6.96	V	54.53	68.20	13.67	PK
15720	63.99	-6.62	V	57.37	73.98	16.61	PK
15720	49.89	-6.62	V	43.27	53.98	10.71	AV
10480	61.66	-6.96	H	54.70	68.20	13.50	PK
15720	63.94	-6.96	H	56.98	73.98	17.00	PK
15720	49.94	-6.62	H	43.32	53.98	10.66	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]	Detect
10360	62.19	-6.51	V	55.68	68.20	12.52	PK
15540	63.86	-6.42	V	57.44	73.98	16.54	PK
15540	50.26	-6.42	V	43.84	53.98	10.14	AV
10360	62.15	-6.51	H	55.64	68.20	12.56	PK
15540	64.20	-6.42	H	57.78	73.98	16.20	PK
15540	50.09	-6.42	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 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]	Detect
10400	63.20	-6.49	V	56.71	68.20	11.49	PK
15600	62.41	-7.15	V	55.26	73.98	18.72	PK
15600	48.59	-7.15	V	41.44	53.98	12.54	AV
10400	62.78	-6.49	H	56.29	68.20	11.91	PK
15600	62.66	-7.15	H	55.51	73.98	18.47	PK
15600	48.55	-7.15	H	41.40	53.98	12.58	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]	Detect
10480	62.84	-6.96	V	55.88	68.20	12.32	PK
15720	63.05	-6.62	V	56.43	73.98	17.55	PK
15720	49.35	-6.62	V	42.73	53.98	11.25	AV
10480	62.29	-6.96	H	55.33	68.20	12.87	PK
15720	62.68	-6.96	H	55.72	73.98	18.26	PK
15720	49.28	-6.62	H	42.66	53.98	11.32	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:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
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]	Detect
10380	62.61	-5.38	V	57.23	68.20	10.97	PK
15570	63.39	-6.41	V	56.98	73.98	17.00	PK
15570	49.88	-6.41	V	43.47	53.98	10.51	AV
10380	62.90	-5.38	H	57.52	68.20	10.68	PK
15570	62.76	-6.41	H	56.35	73.98	17.63	PK
15570	50.04	-6.41	H	43.63	53.98	10.35	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_40 MHz BW. Worst case is 13.5 Mbps 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 Rate:	13.5 Mbps
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]	Detect
10460	63.24	-6.88	V	56.36	68.20	11.84	PK
15690	62.66	-6.64	V	56.02	73.98	17.96	PK
15690	49.71	-6.64	V	43.07	53.98	10.91	AV
10460	63.13	-6.88	H	56.25	68.20	11.95	PK
15690	62.51	-6.64	H	55.87	73.98	18.11	PK
15690	49.48	-6.64	H	42.84	53.98	11.14	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_40 MHz BW. Worst case is 13.5 Mbps 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 2
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]	Detect
10520	61.48	-6.52	V	54.96	68.20	13.24	PK
15780	64.11	-6.67	V	57.44	73.98	16.54	PK
15780	49.92	-6.67	V	43.25	53.98	10.73	AV
10520	61.56	-6.52	H	55.04	68.20	13.16	PK
15780	64.16	-6.67	H	57.49	73.98	16.49	PK
15780	50.01	-6.67	H	43.34	53.98	10.64	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 2
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]	Detect
10600	62.75	-6.72	V	56.03	73.98	17.95	PK
10600	49.36	-6.72	V	42.64	53.98	11.34	AV
15900	61.75	-7.00	V	54.75	73.98	19.23	PK
15900	48.19	-7.00	V	41.19	53.98	12.79	AV
10600	63.41	-6.72	H	56.69	73.98	17.29	PK
10600	49.25	-6.72	H	42.53	53.98	11.45	AV
15900	62.18	-7.00	H	55.18	73.98	18.80	PK
15900	48.33	-7.00	H	41.33	53.98	12.65	AV

Notes:

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

Band :	UNII 2
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]	Detect
10640	62.99	-6.43	V	56.56	73.98	17.42	PK
10640	49.38	-6.43	V	42.95	53.98	11.03	AV
15960	61.85	-6.93	V	54.92	73.98	19.06	PK
15960	48.22	-6.93	V	41.29	53.98	12.69	AV
10640	63.51	-6.43	H	57.08	73.98	16.90	PK
10640	49.35	-6.43	H	42.92	53.98	11.06	AV
15960	62.37	-6.93	H	55.44	73.98	18.54	PK
15960	48.28	-6.93	H	41.35	53.98	12.63	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. 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 2
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]	Detect
10520	62.18	-6.52	V	55.66	68.20	12.54	PK
15780	63.28	-6.67	V	56.61	73.98	17.37	PK
15780	49.87	-6.67	V	43.20	53.98	10.78	AV
10520	62.31	-6.52	H	55.79	68.20	12.41	PK
15780	63.87	-6.67	H	57.20	73.98	16.78	PK
15780	50.11	-6.67	H	43.44	53.98	10.54	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 2
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]	Detect
10600	63.35	-6.72	V	56.63	73.98	17.35	PK
10600	49.37	-6.72	V	42.65	53.98	11.33	AV
15900	62.84	-7.00	V	55.84	73.98	18.14	PK
15900	48.77	-7.00	V	41.77	53.98	12.21	AV
10600	63.28	-6.72	H	56.56	73.98	17.42	PK
10600	49.09	-6.72	H	42.37	53.98	11.61	AV
15900	62.69	-7.00	H	55.69	73.98	18.29	PK
15900	48.62	-7.00	H	41.62	53.98	12.36	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 2
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]	Detect
10640	62.17	-6.43	V	55.74	73.98	18.24	PK
10640	48.42	-6.43	V	41.99	53.98	11.99	AV
15960	63.49	-6.93	V	56.56	73.98	17.42	PK
15960	49.48	-6.93	V	42.55	53.98	11.43	AV
10640	62.08	-6.43	H	55.65	73.98	18.33	PK
10640	48.29	-6.43	H	41.86	53.98	12.12	AV
15960	63.69	-6.93	H	56.76	73.98	17.22	PK
15960	49.51	-6.93	H	42.58	53.98	11.40	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 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 2
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
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]	Detect
10540	62.08	-5.77	V	56.31	68.20	11.89	PK
15810	61.82	-7.47	V	54.35	73.98	19.63	PK
15810	48.58	-7.47	V	41.11	53.98	12.87	AV
10540	61.93	-5.77	H	56.16	68.20	12.04	PK
15810	61.91	-7.47	H	54.44	73.98	19.54	PK
15810	48.57	-7.47	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_40 MHz BW. Worst case is 13.5 Mbps 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 2
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
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]	Detect
10620	62.54	-6.36	V	56.18	73.98	17.80	PK
10620	48.71	-6.36	V	42.35	53.98	11.63	AV
15930	62.22	-6.77	V	55.45	73.98	18.53	PK
15930	48.94	-6.77	V	42.17	53.98	11.81	AV
10620	62.25	-6.36	H	55.89	73.98	18.09	PK
10620	48.80	-6.36	H	42.44	53.98	11.54	AV
15930	62.51	-6.77	H	55.74	73.98	18.24	PK
15930	49.24	-6.77	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 13.5 Mbps 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 2e
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]	Detect
11000	62.92	-5.06	V	57.86	73.98	16.12	PK
11000	49.89	-5.06	V	44.83	53.98	9.15	AV
16500	62.64	-4.35	V	58.29	68.20	9.91	PK
11000	63.22	-5.06	H	58.16	73.98	15.82	PK
11000	50.05	-5.06	H	44.99	53.98	8.99	AV
16500	62.37	-4.35	H	58.02	68.20	10.18	PK

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. 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 2e
Operation Mode:	802.11 a
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]	Detect
11160	61.97	-5.55	V	56.42	73.98	17.56	PK
11160	49.31	-5.55	V	43.76	53.98	10.22	AV
16740	62.49	-3.73	V	58.76	68.20	9.44	PK
11160	62.02	-5.55	H	56.47	73.98	17.51	PK
11160	49.23	-5.55	H	43.68	53.98	10.30	AV
16740	62.55	-3.73	H	58.82	68.20	9.38	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 802.11a. 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 2e
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]	Detect
11400	62.78	-6.08	V	56.70	73.98	17.28	PK
11400	49.68	-6.08	V	43.60	53.98	10.38	AV
17100	62.73	-0.85	V	61.88	68.20	6.32	PK
11400	63.05	-6.08	H	56.97	73.98	17.01	PK
11400	49.59	-6.08	H	43.51	53.98	10.47	AV
17100	62.88	-0.85	H	62.03	68.20	6.17	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 2e
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]	Detect
11000	62.95	-5.06	V	57.89	73.98	16.09	PK
11000	48.75	-5.06	V	43.69	53.98	10.29	AV
16500	62.57	-4.35	V	58.22	68.20	9.98	PK
11000	62.54	-5.06	H	57.48	73.98	16.50	PK
11000	48.62	-5.06	H	43.56	53.98	10.42	AV
16500	62.95	-4.35	H	58.60	68.20	9.60	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 2e
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 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]	Detect
11160	61.97	-5.55	V	56.42	73.98	17.56	PK
11160	48.15	-5.55	V	42.60	53.98	11.38	AV
16740	62.38	-3.73	V	58.65	68.20	9.55	PK
11160	61.84	-5.55	H	56.29	73.98	17.69	PK
11160	48.12	-5.55	H	42.57	53.98	11.41	AV
16740	62.45	-3.73	H	58.72	68.20	9.48	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 2e
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]	Detect
11400	62.26	-6.08	V	56.18	73.98	17.80	PK
11400	48.83	-6.08	V	42.75	53.98	11.23	AV
17100	63.05	-0.85	V	62.20	68.20	6.00	PK
11400	62.08	-6.08	H	56.00	73.98	17.98	PK
11400	48.68	-6.08	H	42.60	53.98	11.38	AV
17100	62.99	-0.85	H	62.14	68.20	6.06	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 2e
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
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]	Detect
11020	62.63	-5.86	V	56.77	73.98	17.21	PK
11020	48.95	-5.86	V	43.09	53.98	10.89	AV
16530	62.72	-3.75	V	58.97	68.20	9.23	PK
11020	62.94	-5.86	H	57.08	73.98	16.90	PK
11020	49.17	-5.86	H	43.31	53.98	10.67	AV
16530	62.48	-3.75	H	58.73	68.20	9.47	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 13.5 Mbps 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 2e
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
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]	Detect
11180	62.27	-6.14	V	56.13	73.98	17.85	PK
11180	48.07	-6.14	V	41.93	53.98	12.05	AV
16770	62.24	-3.11	V	59.13	68.20	9.07	PK
11180	62.52	-6.14	H	56.38	73.98	17.60	PK
11180	48.28	-6.14	H	42.14	53.98	11.84	AV
16770	61.89	-3.11	H	58.78	68.20	9.42	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 13.5 Mbps 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 2e
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
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]	Detect
11340	62.07	-5.10	V	56.97	73.98	17.01	PK
11340	48.29	-5.10	V	43.19	53.98	10.79	AV
17010	63.16	-1.27	V	61.89	68.20	6.31	PK
11340	62.15	-5.10	H	57.05	73.98	16.93	PK
11340	48.35	-5.10	H	43.25	53.98	10.73	AV
17010	62.83	-1.27	H	61.56	68.20	6.64	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 13.5 Mbps in 802.11n_40 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

8.8.2 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]	Detect
5150	49.71	8.79	H	58.50	73.98	15.48	PK
5150	36.59	8.79	H	45.38	53.98	8.60	AV
5150	49.63	8.79	V	58.42	73.98	15.56	PK
5150	37.04	8.79	V	45.83	53.98	8.15	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]	Detect
5150	49.57	8.79	H	58.36	73.98	15.62	PK
5150	36.52	8.79	H	45.31	53.98	8.67	AV
5150	49.36	8.79	V	58.15	73.98	15.83	PK
5150	36.53	8.79	V	45.32	53.98	8.66	AV

Band :	UNII 1
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
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]	Detect
5150	49.53	8.79	H	58.32	73.98	15.66	PK
5150	36.89	8.79	H	45.68	53.98	8.30	AV
5150	50.12	8.79	V	58.91	73.98	15.07	PK
5150	37.09	8.79	V	45.88	53.98	8.10	AV

Band :	UNII 2
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]	Detect
5350	48.25	9.28	H	57.53	73.98	16.45	PK
5350	35.10	9.28	H	44.38	53.98	9.60	AV
5350	49.09	9.28	V	58.37	73.98	15.61	PK
5350	35.67	9.28	V	44.95	53.98	9.03	AV

Band :	UNII 2
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]	Detect
5350	47.98	9.28	H	57.26	73.98	16.72	PK
5350	35.24	9.28	H	44.52	53.98	9.46	AV
5350	48.06	9.28	V	57.34	73.98	16.64	PK
5350	35.29	9.28	V	44.57	53.98	9.41	AV

Band :	UNII 2
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
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]	Detect
5350	48.13	9.28	H	57.41	73.98	16.57	PK
5350	35.28	9.28	H	44.56	53.98	9.42	AV
5350	48.85	9.28	V	58.13	73.98	15.85	PK
5350	35.67	9.28	V	44.95	53.98	9.03	AV

Band :	UNII 2e
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]	Detect
5460	47.91	10.08	H	57.99	73.98	15.99	PK
5460	34.63	10.08	H	44.71	53.98	9.27	AV
5470	47.74	9.95	H	57.69	68.20	10.51	PK
5460	47.05	10.08	V	57.13	73.98	16.85	PK
5460	34.28	10.08	V	44.36	53.98	9.62	AV
5470	47.28	9.95	V	57.23	68.20	10.97	PK

Band :	UNII 2e
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]	Detect
5725	47.58	11.37	H	58.95	68.20	9.25	PK
5725	47.11	11.37	V	58.48	68.20	9.72	PK

Band :	UNII 2e
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]	Detect
5460	47.69	10.08	H	57.77	73.98	16.21	PK
5460	35.18	10.08	H	45.26	53.98	8.72	AV
5470	47.57	9.95	H	57.52	68.20	10.68	PK
5460	47.26	10.08	V	57.34	73.98	16.64	PK
5460	35.05	10.08	V	45.13	53.98	8.85	AV
5470	47.38	9.95	V	57.33	68.20	10.87	PK

Band :	UNII 2e
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]	Detect
5725	47.39	1.37	H	48.76	68.20	19.44	PK
5725	47.35	1.37	V	48.72	68.20	19.48	AV

Band :	UNII 2e
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
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]	Detect
5460	47.83	10.08	H	57.91	73.98	16.07	PK
5460	35.33	10.08	H	45.41	53.98	8.57	AV
5470	52.53	9.95	H	62.48	68.20	5.72	PK
5460	47.95	10.08	V	58.03	73.98	15.95	PK
5460	35.16	10.08	V	45.24	53.98	8.74	AV
5470	50.40	9.95	V	60.35	68.20	7.85	PK

Band :	UNII 2e
Operation Mode:	802.11 n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5670 MHz
Channel No.	134 Ch

Frequency [MHz]	Reading DBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5725	47.11	1.37	H	48.48	68.20	19.72	PK
5725	47.05	1.37	V	48.42	68.20	19.78	AV

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/ac
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)

8.8.3 RECEIVER SPURIOUS EMISSIONS

IC Rule(s)	**RSS-GEN**
Test Requirements:	**Blow the table**
Operating conditions:	**Under normal test conditions**
Method of testing:	**Radiated**
S/A. Settings:	**F < 1 GHz: RBW: 120 kHz, VBW: 300 kHz (Quasi Peak)** **F > 1 GHz: RBW: 1 MHz, VBW: 1 MHz (Peak)**
Mode of operation:	**Receive**

Frequency (MHz)	Field Strength (microvolts/m at 3 meters)
30 – 88	100
88 - 216	150
216 – 960	200
Above 960	500

Operation Mode: Receive:

30 MHz ~ 1 GHz

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

Above 1 GHz

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

8.9 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 6 Mbps, Ch.40 and 802.11a mode in UNII 2e. Because 802.11a mode in UNII 2e is worst case.

▣ RESULT PLOTS

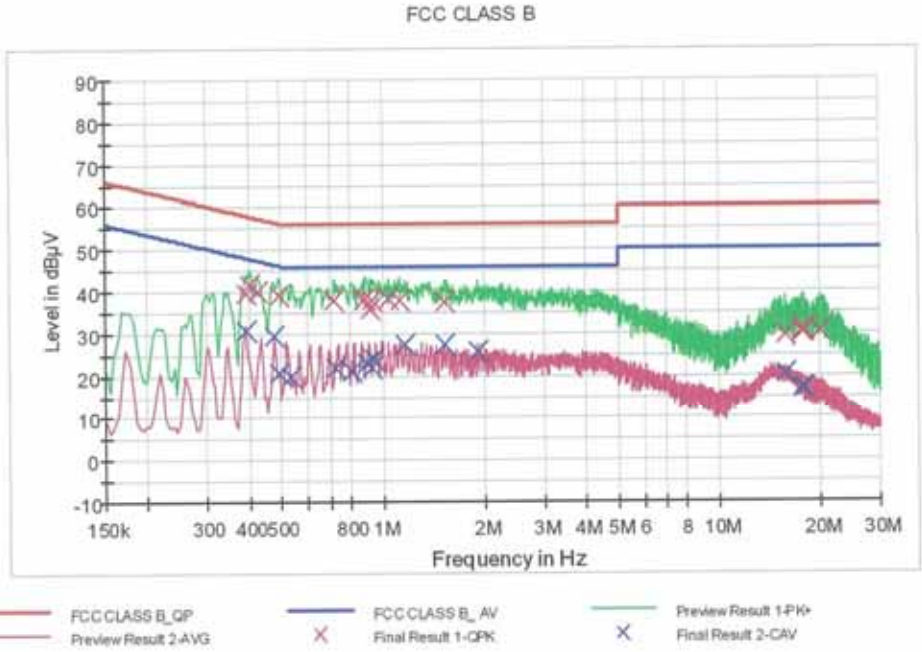
Conducted Emissions (Line 1)

EMI Auto Test(2) 1 / 2

HCT TEST Report

Common Information

EUT:	LG-V400
Manufacturer:	LG
Test Site:	SHIELD ROOM
Operating Conditions:	WLAN MODE (5 GHz)
Operator Name:	JC SHIN



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.393000	39.7	9.000	Off	L1	9.7	18.3	58.0
0.402000	41.7	9.000	Off	L1	9.7	16.1	57.8
0.424500	39.9	9.000	Off	L1	9.7	17.5	57.4
0.492000	39.3	9.000	Off	L1	9.7	16.8	56.1
0.716000	38.1	9.000	Off	L1	9.7	17.9	56.0
0.873500	37.9	9.000	Off	L1	9.7	18.1	56.0
0.891500	38.2	9.000	Off	L1	9.7	17.8	56.0
0.918500	36.0	9.000	Off	L1	9.7	20.0	56.0
0.932000	37.9	9.000	Off	L1	9.7	18.1	56.0
1.044500	38.1	9.000	Off	L1	9.7	17.9	56.0
1.121000	38.0	9.000	Off	L1	9.8	18.0	56.0
1.530500	37.5	9.000	Off	L1	9.8	18.5	56.0
15.701000	29.3	9.000	Off	L1	10.7	30.7	60.0
17.609000	30.6	9.000	Off	L1	10.8	29.4	60.0
17.636000	30.5	9.000	Off	L1	10.8	29.5	60.0
17.847500	30.5	9.000	Off	L1	10.8	29.5	60.0

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EMI Auto Test(2) 2 / 2

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
17.865500	30.7	9.000	Off	L1	10.8	29.3	60.0
19.845500	30.3	9.000	Off	L1	10.9	29.7	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.393000	30.8	9.000	Off	L1	9.7	17.2	48.0
0.478500	29.3	9.000	Off	L1	9.7	17.1	46.4
0.492000	20.8	9.000	Off	L1	9.7	25.3	46.1
0.536000	19.8	9.000	Off	L1	9.7	26.2	46.0
0.720500	22.0	9.000	Off	L1	9.7	24.0	46.0
0.810500	21.2	9.000	Off	L1	9.7	24.8	46.0
0.896000	23.2	9.000	Off	L1	9.7	22.8	46.0
0.932000	22.0	9.000	Off	L1	9.7	24.0	46.0
0.941000	24.0	9.000	Off	L1	9.7	22.0	46.0
1.170500	27.2	9.000	Off	L1	9.8	18.8	46.0
1.526000	27.5	9.000	Off	L1	9.8	18.5	46.0
1.917500	25.6	9.000	Off	L1	9.8	20.4	46.0
15.692000	20.3	9.000	Off	L1	10.7	29.7	50.0
17.609000	16.8	9.000	Off	L1	10.8	33.2	50.0
17.636000	17.0	9.000	Off	L1	10.8	33.0	50.0
17.667500	16.9	9.000	Off	L1	10.8	33.1	50.0
17.681000	16.9	9.000	Off	L1	10.8	33.1	50.0
17.847500	16.7	9.000	Off	L1	10.8	33.3	50.0

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Conducted Emissions (Line 2)

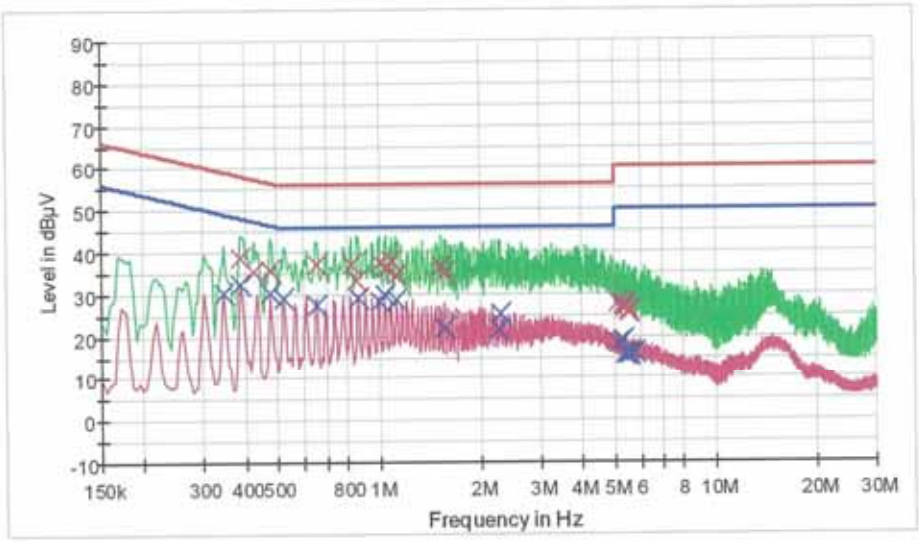
EMI Auto Test(2) 1 / 2

HCT TEST Report

Common Information

EUT:	LG-V400
Manufacturer:	LG
Test Site:	SHIELD ROOM
Operating Conditions:	WLAN MODE (5 GHz)
Operator Name:	JC SHIN

FCC CLASS B



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.388500	38.6	9.000	Off	N	9.7	19.5	58.1
0.424500	35.5	9.000	Off	N	9.7	21.9	57.4
0.474000	35.7	9.000	Off	N	9.7	20.7	56.4
0.653000	37.1	9.000	Off	N	9.7	18.9	56.0
0.828500	37.2	9.000	Off	N	9.8	18.8	56.0
0.860000	33.3	9.000	Off	N	9.8	22.7	56.0
1.004000	37.4	9.000	Off	N	9.8	18.6	56.0
1.049000	36.2	9.000	Off	N	9.8	19.8	56.0
1.089500	38.0	9.000	Off	N	9.8	18.0	56.0
1.125500	34.7	9.000	Off	N	9.8	21.3	56.0
1.526000	36.7	9.000	Off	N	9.8	19.3	56.0
1.571000	35.1	9.000	Off	N	9.8	20.9	56.0
5.139500	27.7	9.000	Off	N	10.1	32.3	60.0
5.279000	27.4	9.000	Off	N	10.1	32.6	60.0
5.342000	26.8	9.000	Off	N	10.1	33.2	60.0
5.355500	27.5	9.000	Off	N	10.1	32.5	60.0

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EMI Auto Test(2) 2 / 2

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
5.472500	25.9	9.000	Off	N	10.1	34.1	60.0
5.562500	25.6	9.000	Off	N	10.1	34.4	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.348000	30.2	9.000	Off	N	9.7	18.8	49.0
0.388500	32.3	9.000	Off	N	9.7	15.8	48.1
0.478500	30.2	9.000	Off	N	9.7	16.2	46.4
0.522500	28.9	9.000	Off	N	9.7	17.1	46.0
0.653000	27.4	9.000	Off	N	9.7	18.6	46.0
0.864500	29.1	9.000	Off	N	9.8	16.9	46.0
0.999500	28.2	9.000	Off	N	9.8	17.8	46.0
1.040000	29.8	9.000	Off	N	9.8	16.2	46.0
1.125500	28.6	9.000	Off	N	9.8	17.4	46.0
1.571000	21.9	9.000	Off	N	9.8	24.1	46.0
2.268500	21.6	9.000	Off	N	9.9	24.4	46.0
2.291000	25.2	9.000	Off	N	9.9	20.8	46.0
5.139500	18.3	9.000	Off	N	10.1	31.7	50.0
5.279000	19.0	9.000	Off	N	10.1	31.0	50.0
5.342000	15.8	9.000	Off	N	10.1	34.2	50.0
5.472500	15.5	9.000	Off	N	10.1	34.5	50.0
5.562500	15.8	9.000	Off	N	10.1	34.2	50.0
5.742500	16.2	9.000	Off	N	10.2	33.8	50.0

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9. LIST OF TEST EQUIPMENT

9.1 LIST OF TEST EQUIPMENT(Conducted Test)

Manufacturer	Model / Equipment	Calibration Interval	Calibration Due	Serial No.
Rohde & Schwarz	ENV216/ LISN	Annual	01/29/2015	100073
Agilent	E4440A/ Spectrum Analyzer	Annual	04/25/2014	US45303008
Agilent	N9020A/ SIGNAL ANALYZER	Annual	05/14/2014	MY51110063
Agilent	N1911A/Power Meter	Annual	01/24/2015	MY45100523
Agilent	N1921A /POWER SENSOR	Annual	07/11/2014	MY45241059
Hewlett Packard	11636B/Power Divider	Annual	10/22/2014	11377
Agilent	87300B/Directional Coupler	Annual	12/18/2014	3116A03621
Hewlett Packard	11667B / Power Splitter	Annual	05/29/2014	05001
DIGITAL	EP-3010 /DC POWER SUPPLY	Annual	10/29/2014	3110117
ITECH	IT6720 / DC POWER SUPPLY	Annual	11/05/2014	010002156287001199
TESCOM	TC-3000C / BLUETOOTH TESTER	Annual	04/24/2014	3000C000276
Rohde & Schwarz	CBT / BLUETOOTH TESTER	Annual	04/25/2014	100422
Agilent	8493C / Attenuator(10 dB)	Annual	07/24/2014	76649
WEINSCHEL	2-3 / Attenuator(3 dB)	Annual	10/28/2014	BR0617
NAENG YEOL CO., LTD.	NY-THR18750 / Temp & Humidity Chamber	Annual	10/30/2014	NY-200912201A

9.2 LIST OF TEST EQUIPMENT(Radiated Test)

Manufacturer	Model / Equipment	Calibration Interval	Calibration Due	Serial No.
Schwarzbeck	VULB 9160/ TRILOG Antenna	Biennial	12/17/2014	3150
Rohde & Schwarz	ESCI / EMI TEST RECEIVER	Annual	01/24/2015	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	Annual	09/10/2014	10094
CERNEX	CBL18265035 / POWER AMP	Annual	07/24/2014	22966
CERNEX	CBL26405040 / POWER AMP	Annual	04/16/2014	19660
Schwarzbeck	BBHA 9120D/ Horn Antenna	Biennial	07/05/2015	1151
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	Biennial	10/30/2014	BBHA9170124
Rohde & Schwarz	FSP / Spectrum Analyzer	Annual	01/24/2015	839117/011
Wainwright Instrument	WHF3.0/18G-10EF / High Pass Filter	Annual	02/03/2015	F6
Wainwright Instrument	WHNX6.0/26.5G-6SS / High Pass Filter	Annual	04/16/2014	1
Wainwright Instrument	WHNX7.0/18G-8SS / High Pass Filter	Annual	04/16/2014	29
Wainwright Instrument	WRCJ2400/2483.5-2370/2520-60/14SS / Band Reject Filter	Annual	06/24/2014	1
TESCOM	TC-3000C / BLUETOOTH TESTER	Annual	04/24/2014	3000C000276
Rohde & Schwarz	CBT / BLUETOOTH TESTER	Annual	04/25/2014	100422
Rohde & Schwarz	LOOP ANTENNA	Biennial	08/14/2014	100179
CERNEX	CBL06185030 / POWER AMP	Annual	07/24/2014	22965
CERNEX	CBLU1183540 / POWER AMP	Annual	07/24/2014	22964