

FCC/IC DTS REPORT

FCC/IC Certification

Applicant Name:
LG Electronics Inc.**Address:**
222, LG-ro Jinwi-myeon, Pyeongtaek-si,
451-713 Gyeonggi-do, South Korea**Date of Issue:**

December 15, 2015

Test Site/Location:

HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-R-1512-F020**HCT FRN:** 0005866421**IC Recognition No.:** 5944A-5

FCC ID:	BEJ-WC1NP6
IC:	2703H-WC1NP6
APPLICANT:	LG Electronics Inc.

FCC/IC Model(s): WC1NP6**EUT Type:** RF Module**Max. RF Output Power:**

Mode	Ant.0(SISO)	Ant.1(SISO)	Ant.0 & 1 (MIMO)
802.11b	16.38 dBm	16.00 dBm	19.19 dBm
802.11g	14.80 dBm	13.93 dBm	17.39 dBm
802.11n_20 MHz BW	14.79 dBm	13.79 dBm	17.31 dBm

Frequency Range: 2412 MHz - 2462 MHz (2.4 GHz Band)**Modulation type:** CCK/DSSS/OFDM**FCC Classification:** Digital Transmission System(DTS)**FCC Rule Part(s):** Part 15.247**IC Rule Part(s):** RSS-247 Issue 1 (May 2015) , RSS-GEN Issue 4(November 2014)

Engineering Statement:

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

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



Report prepared by
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Approved by
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Manager of RF Team

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1512-F020	December 15, 2015	- First Approval Report

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1. GENERAL INFORMATION

Applicant: LG Electronics Inc.
Address: 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, 451-713 Gyeonggi-do, South Korea
FCC ID: BEJ-WC1NP6
IC: 2703H-WC1NP6
EUT Type: RF Module
FCC/IC Model name(s): WC1NP6
Date(s) of Tests: November 12, 2015 ~ December 03, 2015
Place of Tests: HCT Co., Ltd.
 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea
 (IC Recognition No. : 5944A-5)

2. EUT DESCRIPTION

FCC/IC Model Name	WC1NP6	
EUT Type	RF Module	
Power Supply	DC 3.3 V	
Frequency Range	TX: 2412 MHz ~ 2462 MHz RX: 2412 MHz ~ 2462 MHz	
Max. RF Output Power	Ant.0	Wi-Fi 802.11b(16.38 dBm) / Wi-Fi 802.11g (14.80dBm) / Wi-Fi 802.11n_20MHz BW (14.79dBm)/
	Ant.1	Wi-Fi 802.11b(16.00dBm) / Wi-Fi 802.11g (13.93 dBm) / Wi-Fi 802.11n_20MHz BW (13.79 dBm)/
	Ant.0 & 1	Wi-Fi 802.11b(19.19dBm) / Wi-Fi 802.11g (17.39dBm) / Wi-Fi 802.11n_20MHz BW (17.31dBm)/
Modulation Type	DSSS/CCK(802.11b), OFDM(802.11g, 802.11n)	
Antenna Specification	Manufacturer: INPAQ Antenna type: PCB ANTENNA Peak Gain : cf. Section 6	

2.1 EUT OPERATING MODE

▣ Operating mode

Mode	Operating Mode	Operating Ant.
802.11b/g/n	SISO	Ant 0
		Ant 1
802.11g/n	MIMO	Ant 0 & 1

Note : In case of radiation test, we have done all test case. We attached the result of Ant0 for 802.11b SISO mode. And in case of 802.11g/n mode, we attached the results of only MIMO(CDD) mode. Because worst case is MIMO(CDD) for 802.11g/n mode and Ant0(SISO) for 802.11b mode.

3. TEST METHODOLOGY

FCC KDB 558074 D01 DTS Meas Guidance v03r03 dated June 09, 2015 entitled “Guidance for Performing Compliance Measurements on Digital Transmission Systems(DTS) and the measurement procedure described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) Operating Under §15.247” 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 15.247 under the FCC Rules Part 15 Subpart C / the RSS-GEN issue 4, RSS-247 issue 1.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

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

Conducted Antenna Terminal

See Section from 9.1 to 9.2.(KDB 558074)

3.4 DESCRIPTION OF TEST MODES

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

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

4. INSTRUMENT CALIBRATION

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

Especially, all antenna for measurement is calibrated in accordance with the requirements of C64.5 (latest edition).

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 07, 2015 (Registration Number: 90661) / June 22, 2015 (IC Registration Number: 5944A-5)

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 / RSS-GEN(Issue 4) Section 8.3.

“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 / RSS-GEN(Issue 4) Section 8.3

▣ Directional Gain Calculations

- If any transmit signals are correlated with each other(802.11g/n),

$$\text{Directional gain} = 10 \cdot \log\left[\frac{10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20}}{N}\right] \text{ dBi}$$

- If all transmit signals are completely uncorrelated with each other(802.11n)

$$\text{Directional gain} = 10 \cdot \log\left[\frac{10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}}{N}\right] \text{ dBi}$$

▣ Antenna Gain

2.4 GHz Band

Antenna Gain	802.11b/g/n	Ant 0	3.62 dBi
		Ant 1	3.09 dBi
		Ant 0 & Ant 1	6.37 dBi

7. SUMMARY TEST OF RESULTS

7.1 FCC Part

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§15.247(a)(2)	> 500 kHz	CONDUCTED	PASS
Conducted Maximum Peak Output Power	§15.247(b)(3)	< 1 Watt		PASS
Power Spectral Density	§15.247(e)	< 8 dBm / 3 kHz Band		PASS
Band Edge(Out of Band Emissions)	§15.247(d)	Conducted > 20 dBc		PASS
AC Power line Conducted Emissions	§15.207	cf. Section 8.7		PASS
Radiated Spurious Emissions	§15.205, 15.209	cf. Section 8.6.1	RADIATED	PASS
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 8.6.2		PASS

7.2 IC Part

Test Description	IC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	RSS-247, 5.2	> 500 kHz	CONDUCTED	PASS
99% Bandwidth	RSS-GEN, 4.6.1	NA		NA
Conducted Maximum Peak Output Power And e.i.r.p.	RSS-247, 5.4.4	< 1 Watt <4 Watt(e.i.r.p.)		PASS
Power Spectral Density	RSS-247, 5.2	< 8 dBm / 3 kHz Band		PASS
Band Edge(Out of Band Emissions)	RSS-247, 5.5	Conducted > 20 dBc		PASS
AC Power line Conducted Emissions	RSS-GEN, 8.8	RSS-GEN section 8.8 table 3		PASS
Radiated Spurious Emissions	RSS-GEN, 8.9	RSS-GEN section 8.9 table 4, 5	RADIATED	PASS
Receiver Spurious Emissions	RSS-GEN, 5 RSS-GEN, 7.1.2	RSS-GEN section 7.1.2 table 2		PASS
Radiated Restricted Band Edge	RSS-GEN, 8.10	RSS-GEN section 8.10 table 6		PASS

8. TEST RESULT

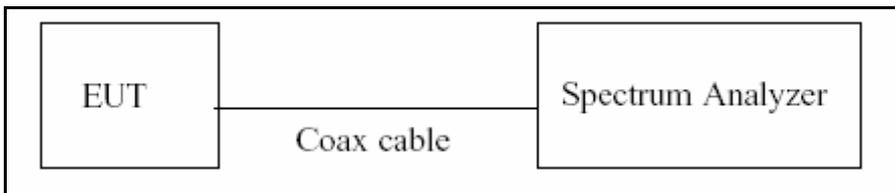
8.1 DUTY CYCLE

■ TEST PROCEDURE

According to KDB 558074)6)b), issued 06/09/2015)

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

■ TEST CONFIGURATION



■ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. We tested according to the zero-span measurement method, 6.0)b) in KDB 558074(issued 06/09/2015)

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

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

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

■ Duty Cycle Factor

Mode	Data Rate	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
b	1 Mbps	12.420	13.050	0.95172414	0.215
	2 Mbps	6.210	6.540	0.94954128	0.225
	5.5 Mbps	2.320	2.440	0.95081967	0.219
	11 Mbps	1.210	1.270	0.95275591	0.210
g	6 Mbs	2.060	2.170	0.94930876	0.226
	9 Mbs	1.385	1.455	0.95189003	0.214
	12 Mbs	1.045	1.095	0.95433790	0.203
	18 Mbs	0.705	0.740	0.95270270	0.210
	24 Mbs	0.532	0.559	0.95169946	0.215
	36 Mbs	0.364	0.389	0.93573265	0.288
	48 Mbs	0.276	0.300	0.92000000	0.362
	54 Mbs	0.248	0.272	0.91176471	0.401
n_ 20MHz BW	MCS Index 0	1.920	2.020	0.95049505	0.221
	MCS Index 1	0.980	1.030	0.95145631	0.216
	MCS Index 2	0.665	0.700	0.95000000	0.223
	MCS Index 3	0.505	0.530	0.95283019	0.210
	MCS Index 4	0.352	0.376	0.93617021	0.286
	MCS Index 5	0.272	0.297	0.91582492	0.382
	MCS Index 6	0.248	0.272	0.91176471	0.401
	MCS Index 7	0.228	0.252	0.90476190	0.435

Note : Duty Cycle Factor = 10*log(1/Duty Cycle). where, Duty Cycle = T_{on} / T_{total}

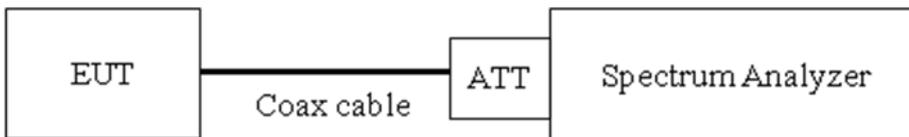
8.2 6dB BANDWIDTH

Test Requirements and limit, §15.247(a)(2) / RSS-247(Issue 1) Section 5.2.

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies.

The minimum permissible 6dB bandwidth is 500 kHz.

■ TEST CONFIGURATION



■ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to (Procedure 8.1 in KDB 558074, issued 06/09/2015)

RBW = 100 kHz

VBW \geq 3 x RBW

Detector = Peak

Trace mode = max hold

Sweep = auto couple

Allow the trace to stabilize

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

■ TEST RESULTS_Ant.0

■ TEST RESULTS

Conducted 6dB Bandwidth Measurements for 802.11b

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	9.060	0.500	Pass
2437	6	9.054	0.500	Pass
2462	11	8.628	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	16.390	0.500	Pass
2437	6	16.400	0.500	Pass
2462	11	16.390	0.500	Pass

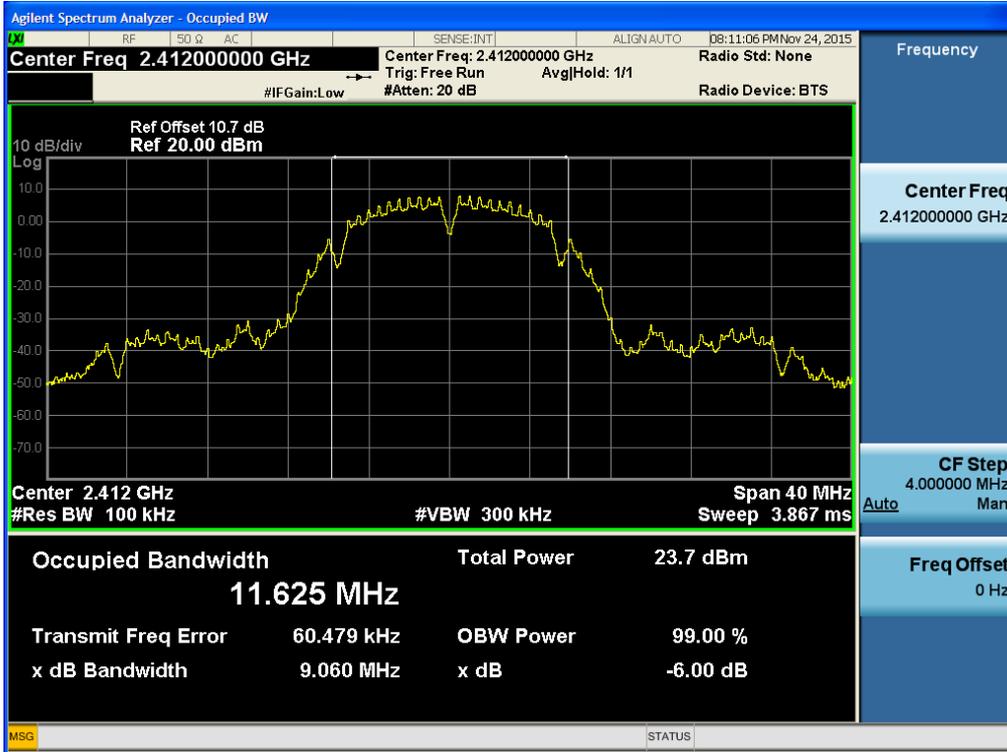
Conducted 6dB Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	17.630	0.500	Pass
2437	6	17.630	0.500	Pass
2462	11	17.610	0.500	Pass

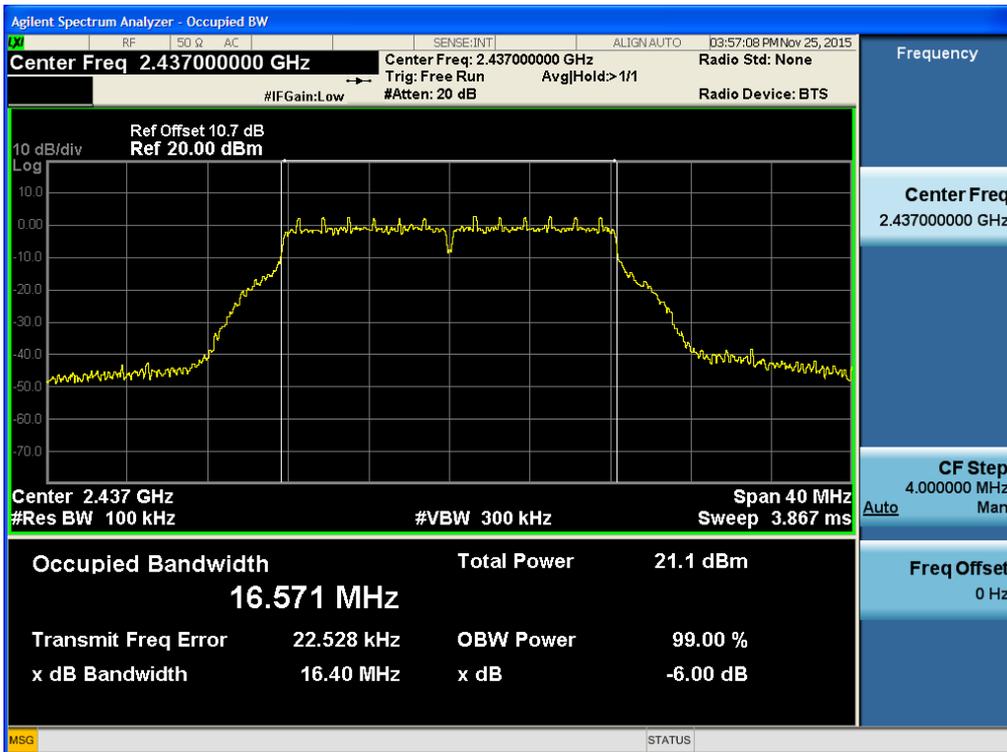
Note : In order to simplify the report, attached plots were only the most wide 6 dB BW channel.

RESULT PLOTS_Ant.0

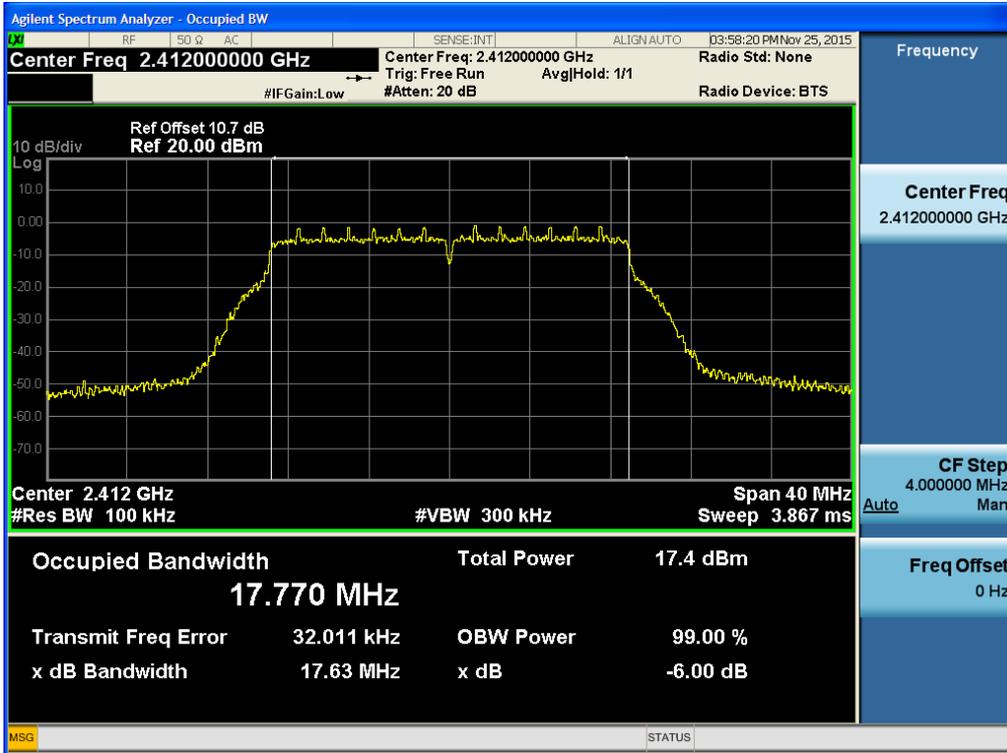
6dB Bandwidth plot (802.11b-CH 1)



6dB Bandwidth plot (802.11g-CH 6)



6dB Bandwidth plot (802.11n_20 MHz BW-CH 1)



■ TEST RESULTS_Ant.1

Conducted 6dB Bandwidth Measurements for 802.11b

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	9.118	0.500	Pass
2437	6	9.110	0.500	Pass
2462	11	9.103	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	16.390	0.500	Pass
2437	6	16.400	0.500	Pass
2462	11	16.400	0.500	Pass

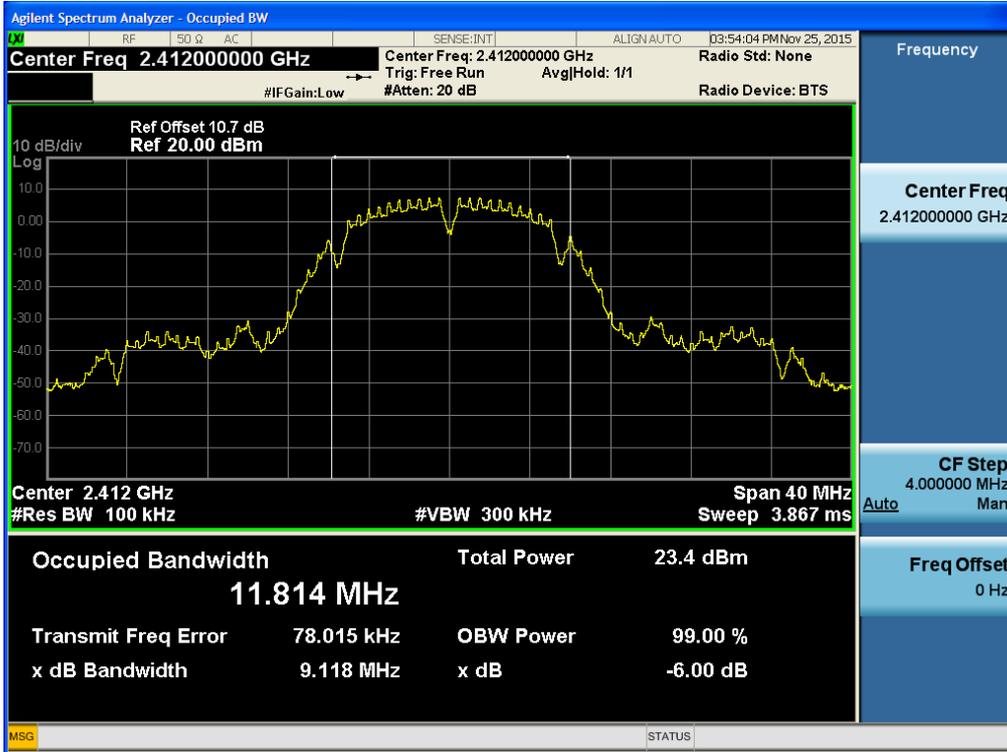
Conducted 6dB Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	17.630	0.500	Pass
2437	6	17.620	0.500	Pass
2462	11	17.620	0.500	Pass

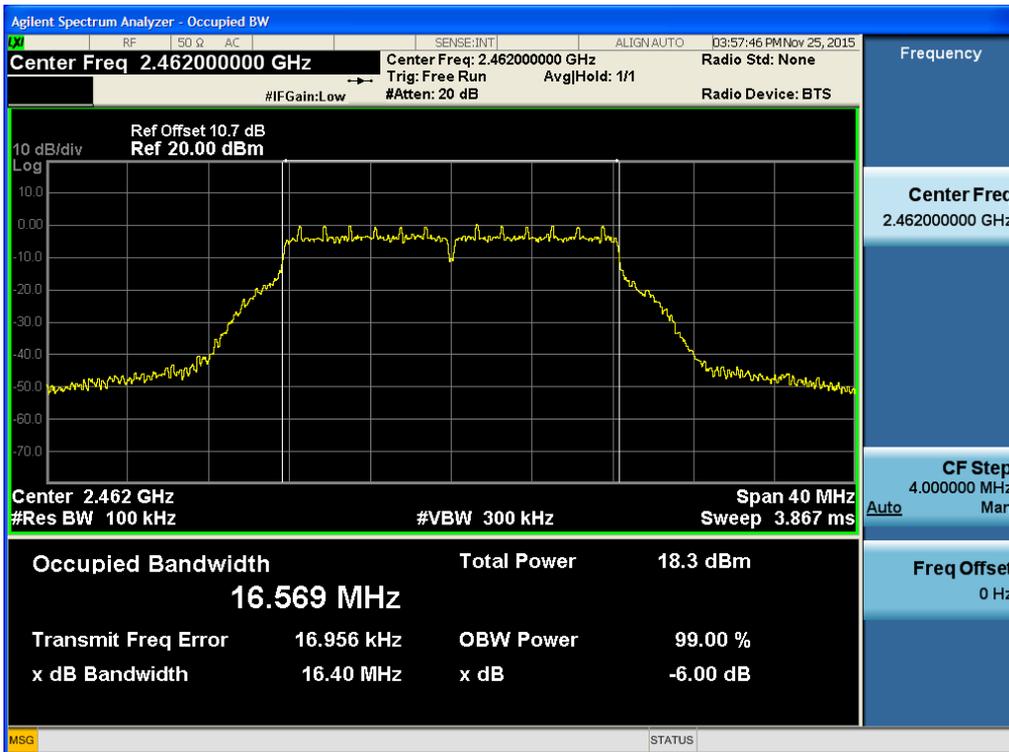
Note : In order to simplify the report, attached plots were only the most wide 6 dB BW channel.

RESULT PLOTS_Ant.1

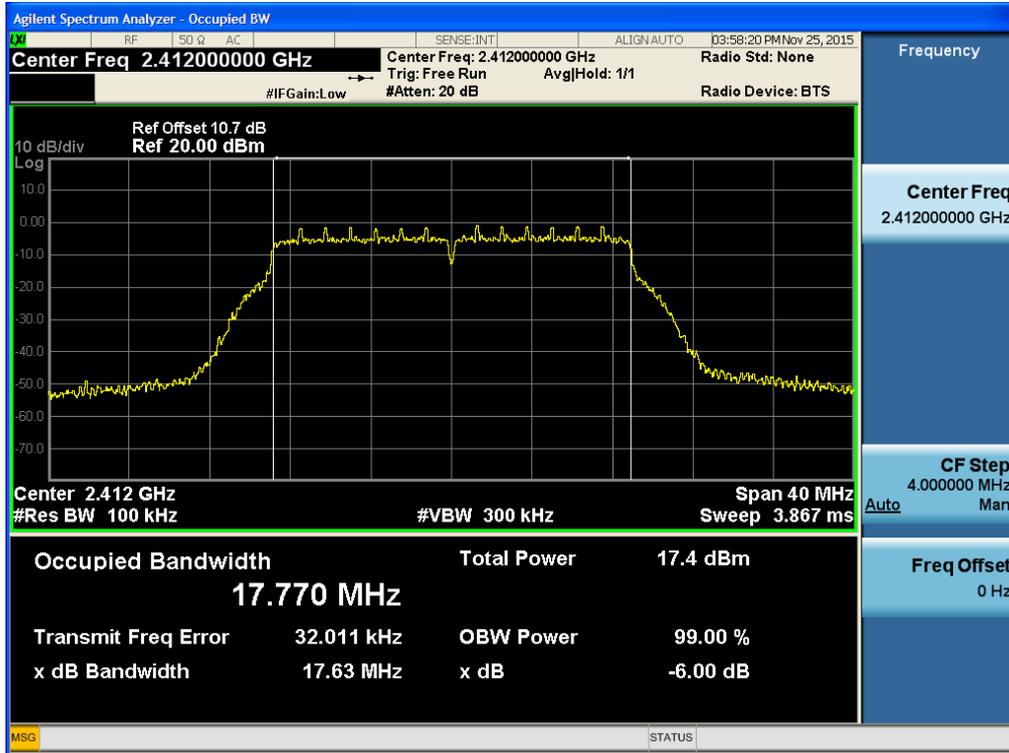
6dB Bandwidth plot (802.11b-CH 1)



6dB Bandwidth plot (802.11g-CH 6)



6dB Bandwidth plot (802.11n_20 MHz BW-CH 1)

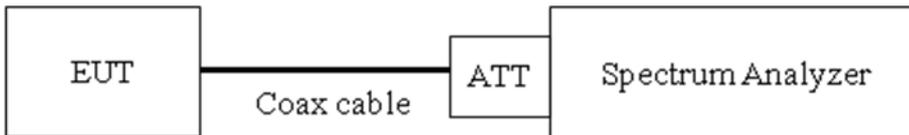


8.3 99% BANDWIDTH (802.11b/g/n)

Limit

The 99 % bandwidth is used to determine the conducted power limits.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer.

RBW = 1% ~ 5% of the occupied bandwidth

VBW = 3 x RBW

Detector = Peak

Trace mode = max hold

Sweep = auto couple

Allow the trace to stabilize

Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

■ TEST RESULTS_ Ant.0

2.4 GHz Band

Conducted 99% Bandwidth Measurements for 802.11b

802.11b Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
2412	1	11.625
2437	6	11.584
2462	11	11.558

Conducted 99% Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
2412	1	16.564
2437	6	16.567
2462	11	16.565

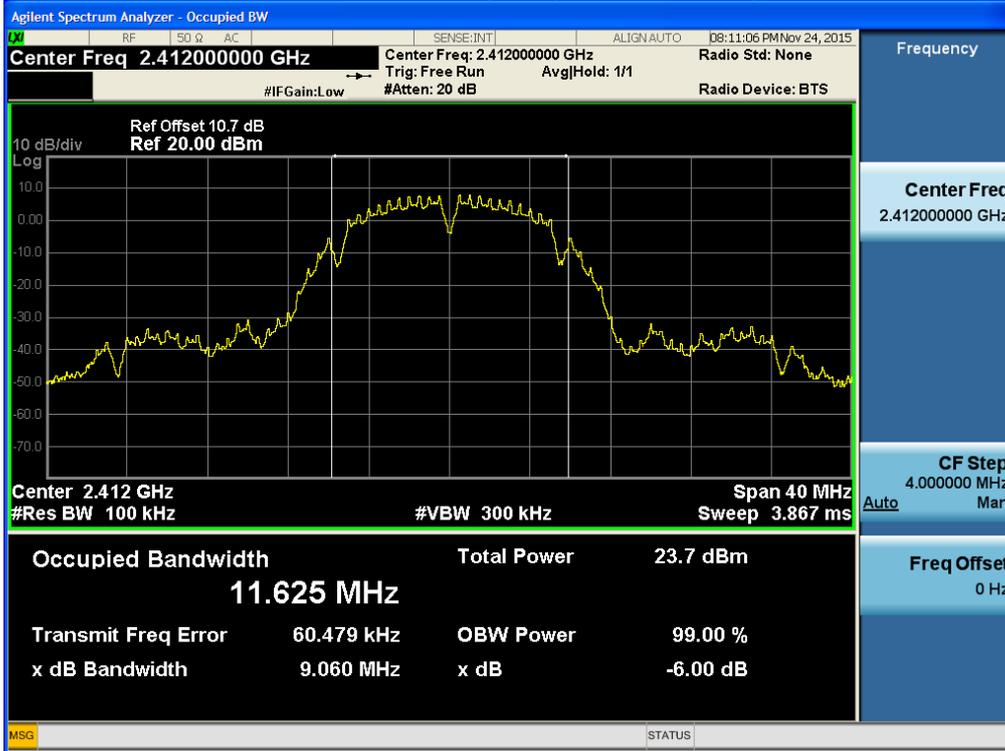
Conducted 99% Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
2412	1	17.767
2437	6	17.777
2462	11	17.777

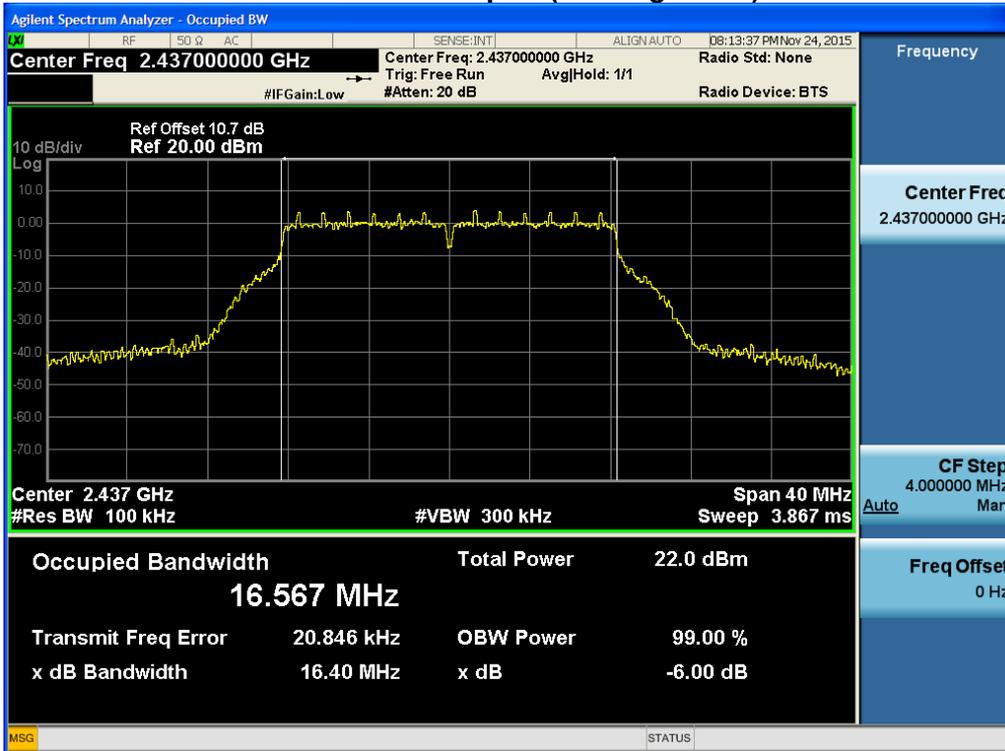
▣ RESULT PLOTS_ Ant.0

2.4 GHz Band

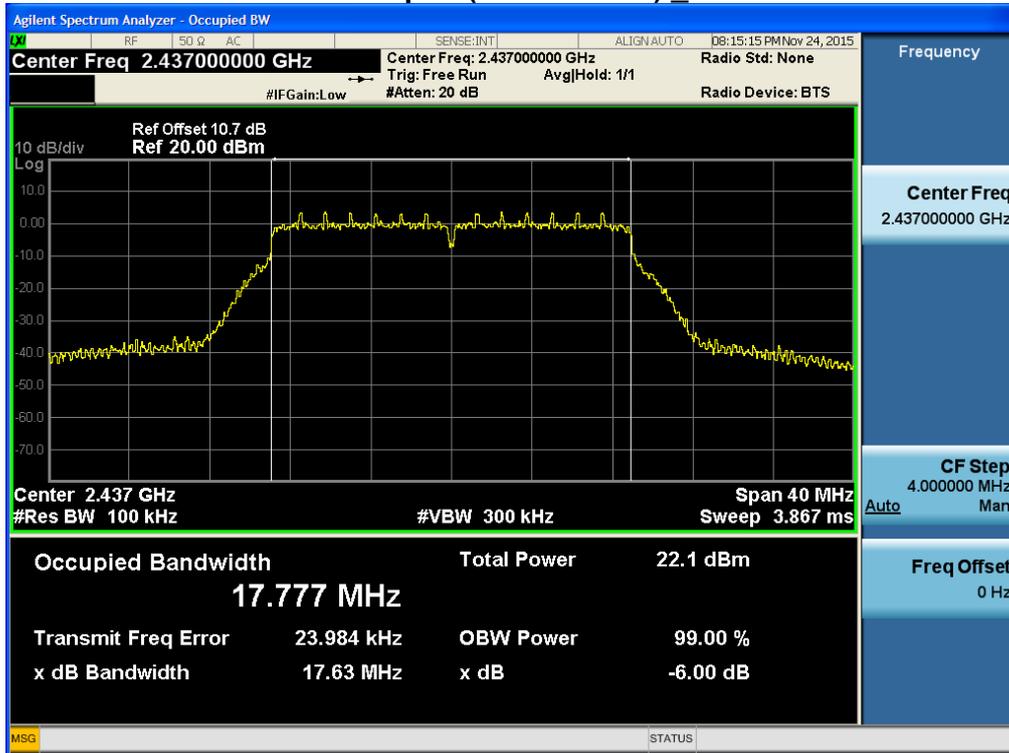
99% Bandwidth plot (802.11b- CH 1)



99% Bandwidth plot (802.11g- CH 6)



99% Bandwidth plot (802.11n-CH6) 20 MHz BW



■ TEST RESULTS_ Ant.1

2.4 GHz Band

Conducted 99% Bandwidth Measurements for 802.11b

802.11b Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
2412	1	11.814
2437	6	11.757
2462	11	11.800

Conducted 99% Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
2412	1	16.567
2437	6	16.571
2462	11	16.569

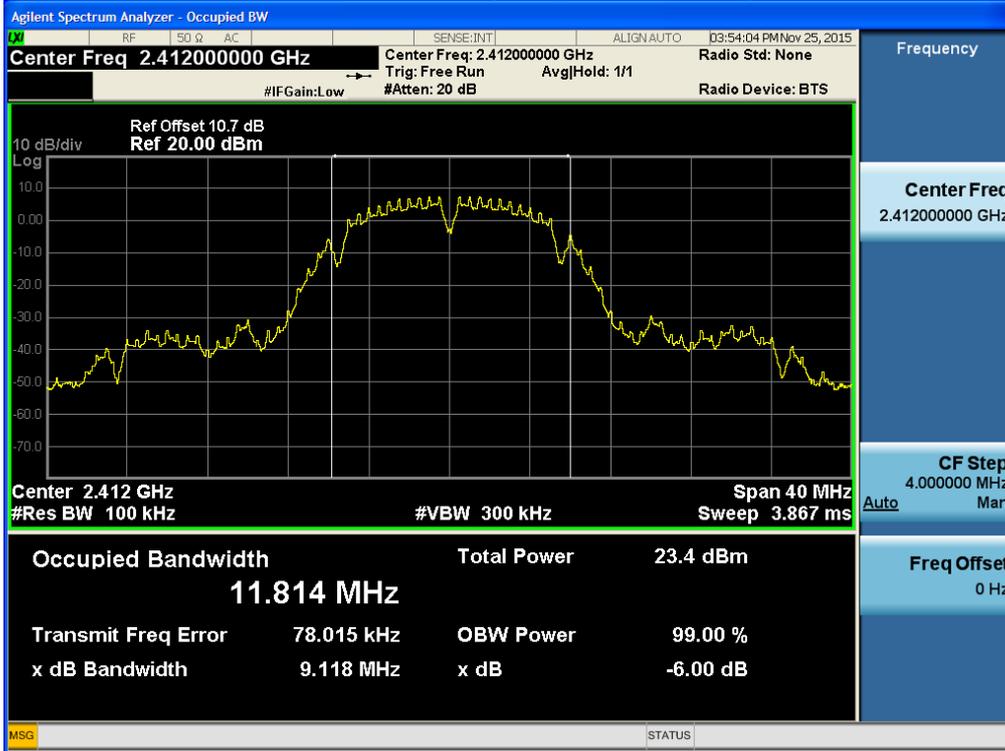
Conducted 99% Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
2412	1	17.770
2437	6	17.761
2462	11	17.773

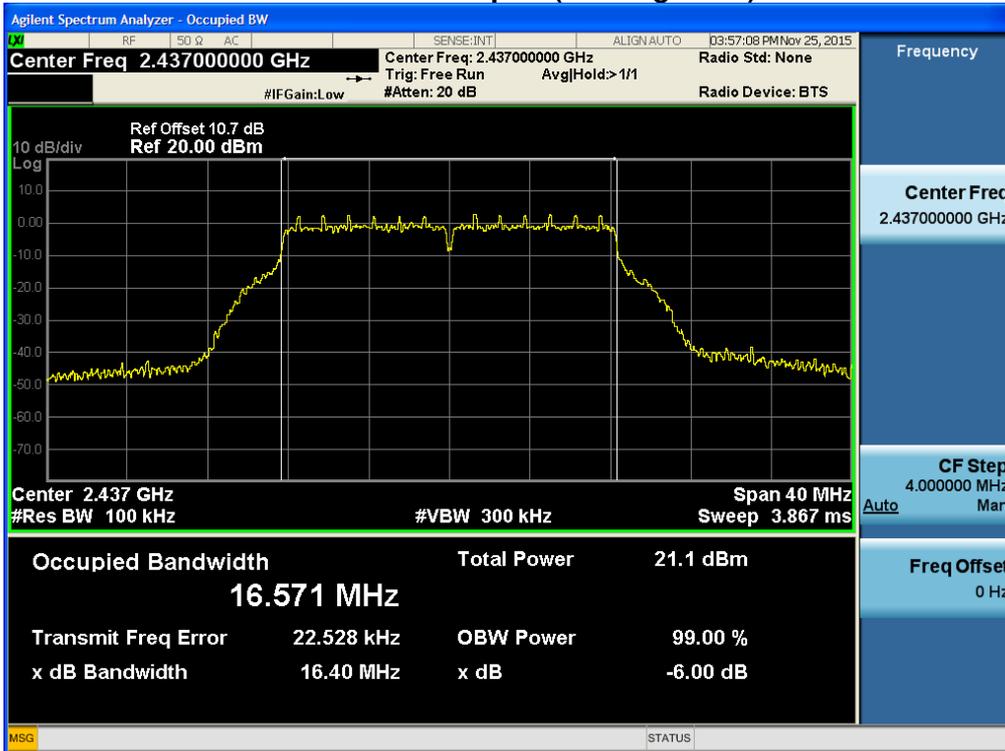
▣ RESULT PLOTS_ Ant.1

2.4 GHz Band

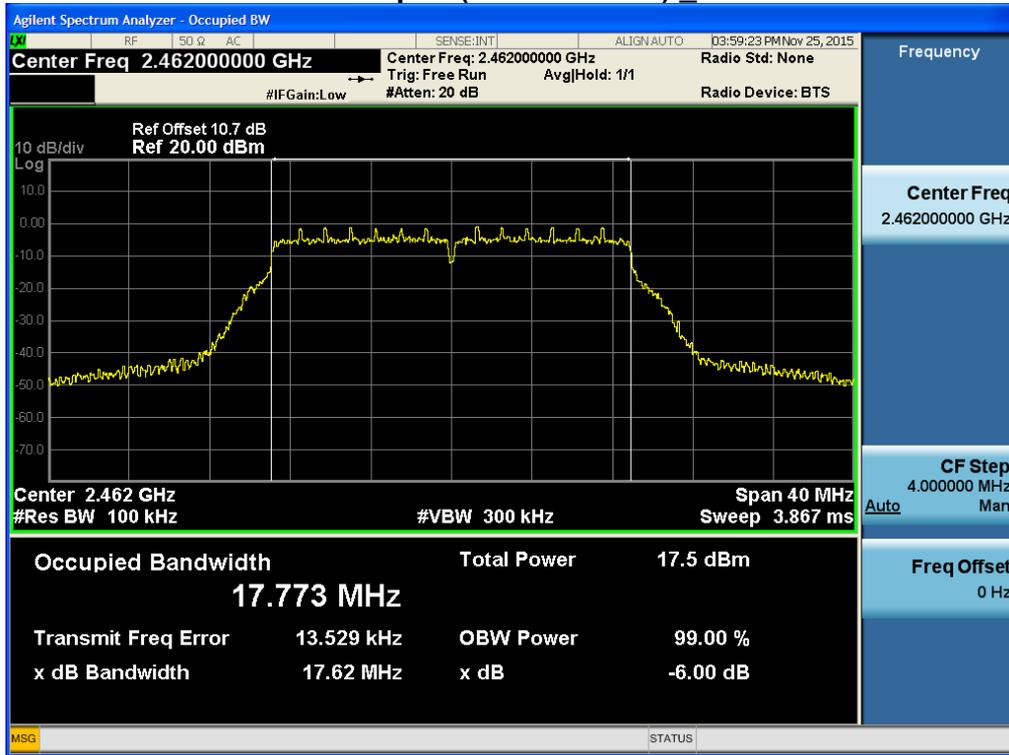
99% Bandwidth plot (802.11b-CH 1)



99% Bandwidth plot (802.11g-CH 6)



99% Bandwidth plot (802.11n-CH11) _20 MHz BW



8.4 OUTPUT POWER (802.11b/g/n)

Test Requirements and limit, §15.247(b)(3) / RSS-247(Issue 1) Section 5.4.4.

The transmitter output is connected to the input of an RF power sensor. Measurement is made using a broadband power meter capable of making peak and average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

The maximum permissible conducted output power is 1 Watt.

■ Limit(CDD)

1. Maximum Conducted Output Power(for FCC & IC)

Operating Mode	Band	Mode	Ant. Port	Ant. Gain (dBi)	Limit (dBm)
SISO	2.4 GHz	802.11b/g/n	0	3.62	30
			1	3.09	30
MIMO(2 TX)		802.11g/n	0 & 1	6.37	29.63

Note : 1. If all antenna gains are not equal,

$$\text{Directional gain} = 10 \cdot \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N] \text{ dBi}$$

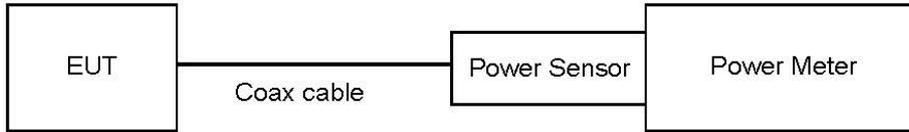
(according to KDB662911 D01 v02r01)

2. Limit is calculated by antenna gain.

2. Maximum EIRP(for IC) : 4 W

Note : Limit for conducted output power was already applied according to antenna gain. Therefore, if conducted power is pass, EIRP is also pass. So, we attached only conducted power table.

■ **TEST CONFIGURATION(20 MHz BW)**



■ **TEST PROCEDURE(20 MHz BW)**

- Peak Power (Procedure 9.1.2 in KDB 558074, issued 06/09/2015)
 1. Measure the peak power of the transmitter.
- Average Power (Procedure 9.2.3.1 in KDB 558074, issued 06/09/2015)
 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 2.4 GHz range that was rounded off to the closest tenth dB. So, 10.7 dB is offset for 2.4 GHz Band.

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

Band	Frequency(MHz)	Loss(dB)
2.4 GHz	2412	10.65
	2437	10.65
	2462	10.66

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

2.4 GHz Band

▣ TEST RESULTS-Average

▣ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	1 Mbps	16.02	0.215	16.23	30
		2 Mbps	16.06	0.225	16.28	30
		5.5 Mbps	16.00	0.219	16.22	30
		11 Mbps	16.17	0.210	16.38	30
2437	6	1 Mbps	14.71	0.215	14.92	30
		2 Mbps	14.95	0.225	15.17	30
		5.5 Mbps	14.93	0.219	15.15	30
		11 Mbps	14.91	0.210	15.12	30
2462	11	1 Mbps	15.69	0.215	15.90	30
		2 Mbps	15.93	0.225	16.15	30
		5.5 Mbps	15.86	0.219	16.08	30
		11 Mbps	15.94	0.210	16.15	30

■ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	1 Mbps	15.63	0.225	15.85	30
		2 Mbps	15.76	0.225	15.98	30
		5.5 Mbps	15.80	0.201	16.00	30
		11 Mbps	15.76	0.211	15.97	30
2437	6	1 Mbps	13.90	0.225	14.12	30
		2 Mbps	13.89	0.225	14.11	30
		5.5 Mbps	13.93	0.201	14.13	30
		11 Mbps	13.95	0.211	14.16	30
2462	11	1 Mbps	15.18	0.225	15.40	30
		2 Mbps	15.45	0.225	15.67	30
		5.5 Mbps	15.13	0.201	15.33	30
		11 Mbps	15.40	0.211	15.61	30

■ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate (Mbps)	Sum Power of Ant.0 & 1 (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	1 Mbps	19.06	29.63
		2 Mbps	19.15	29.63
		5.5 Mbps	19.12	29.63
		11 Mbps	19.19	29.63
2437	6	1 Mbps	17.54	29.63
		2 Mbps	17.67	29.63
		5.5 Mbps	17.67	29.63
		11 Mbps	17.66	29.63
2462	11	1 Mbps	18.67	29.63
		2 Mbps	18.93	29.63
		5.5 Mbps	18.72	29.63
		11 Mbps	18.90	29.63

■ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	6 Mbps	11.08	0.226	11.31	30
		9 Mbps	11.16	0.214	11.37	30
		12 Mbps	11.15	0.203	11.35	30
		18 Mbps	11.18	0.210	11.39	30
		24 Mbps	11.45	0.215	11.67	30
		36 Mbps	11.40	0.288	11.69	30
		48 Mbps	11.39	0.362	11.75	30
		54 Mbps	11.24	0.401	11.64	30
2437	6	6 Mbps	14.27	0.226	14.50	30
		9 Mbps	14.19	0.214	14.40	30
		12 Mbps	14.22	0.203	14.42	30
		18 Mbps	14.25	0.210	14.46	30
		24 Mbps	14.52	0.215	14.74	30
		36 Mbps	14.41	0.288	14.70	30
		48 Mbps	14.44	0.362	14.80	30
		54 Mbps	14.32	0.401	14.72	30
2462	11	6 Mbps	11.20	0.226	11.43	30
		9 Mbps	11.07	0.214	11.28	30
		12 Mbps	11.18	0.203	11.38	30
		18 Mbps	11.22	0.210	11.43	30
		24 Mbps	11.45	0.215	11.67	30
		36 Mbps	11.35	0.288	11.64	30
		48 Mbps	11.40	0.362	11.76	30
		54 Mbps	11.26	0.401	11.66	30

■ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	6 Mbps	10.67	0.222	10.89	30
		9 Mbps	10.62	0.220	10.84	30
		12 Mbps	10.66	0.207	10.87	30
		18 Mbps	10.62	0.216	10.84	30
		24 Mbps	10.88	0.215	11.10	30
		36 Mbps	10.75	0.288	11.04	30
		48 Mbps	10.81	0.362	11.17	30
		54 Mbps	10.70	0.401	11.10	30
2437	6	6 Mbps	13.14	0.222	13.36	30
		9 Mbps	13.24	0.220	13.46	30
		12 Mbps	13.20	0.207	13.41	30
		18 Mbps	13.23	0.216	13.45	30
		24 Mbps	13.42	0.215	13.64	30
		36 Mbps	13.52	0.288	13.81	30
		48 Mbps	13.57	0.362	13.93	30
		54 Mbps	13.25	0.401	13.65	30
2462	11	6 Mbps	10.50	0.222	10.72	30
		9 Mbps	10.49	0.220	10.71	30
		12 Mbps	10.53	0.207	10.74	30
		18 Mbps	10.55	0.216	10.77	30
		24 Mbps	10.86	0.215	11.08	30
		36 Mbps	10.76	0.288	11.05	30
		48 Mbps	10.78	0.362	11.14	30
		54 Mbps	10.59	0.401	10.99	30

■ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Sum Power of Ant.0 & 1 (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6 Mbps	14.11	29.63
		9 Mbps	14.12	29.63
		12 Mbps	14.12	29.63
		18 Mbps	14.13	29.63
		24 Mbps	14.40	29.63
		36 Mbps	14.38	29.63
		48 Mbps	14.48	29.63
		54 Mbps	14.38	29.63
2437	6	6 Mbps	16.96	29.63
		9 Mbps	16.95	29.63
		12 Mbps	16.94	29.63
		18 Mbps	16.98	29.63
		24 Mbps	17.22	29.63
		36 Mbps	17.28	29.63
		48 Mbps	17.39	29.63
		54 Mbps	17.21	29.63
2462	11	6 Mbps	14.09	29.63
		9 Mbps	14.01	29.63
		12 Mbps	14.08	29.63
		18 Mbps	14.12	29.63
		24 Mbps	14.39	29.63
		36 Mbps	14.36	29.63
		48 Mbps	14.47	29.63
		54 Mbps	14.34	29.63

■ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11n Mode) _20 MHz BW

802.11n Mode		MCS Index	Measured Power(dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	0	10.05	0.221	10.27	30
		1	9.93	0.216	10.15	30
		2	9.91	0.223	10.13	30
		3	10.33	0.210	10.54	30
		4	10.16	0.286	10.45	30
		5	10.09	0.382	10.47	30
		6	10.31	0.401	10.71	30
		7	10.22	0.435	10.65	30
2437	6	0	14.05	0.221	14.27	30
		1	14.19	0.216	14.41	30
		2	14.13	0.223	14.35	30
		3	14.58	0.210	14.79	30
		4	14.48	0.286	14.77	30
		5	14.41	0.382	14.79	30
		6	14.31	0.401	14.71	30
		7	14.36	0.435	14.79	30
2462	11	0	9.70	0.221	9.92	30
		1	9.95	0.216	10.17	30
		2	9.98	0.223	10.20	30
		3	10.36	0.210	10.57	30
		4	10.27	0.286	10.56	30
		5	10.23	0.382	10.61	30
		6	10.16	0.401	10.56	30
		7	10.12	0.435	10.55	30

■ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11n Mode) _20 MHz BW

802.11n Mode		MCS Index	Measured Power(dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	0	9.60	0.221	9.82	30
		1	9.61	0.216	9.83	30
		2	9.52	0.223	9.74	30
		3	9.99	0.209	10.20	30
		4	9.91	0.287	10.20	30
		5	9.83	0.369	10.20	30
		6	9.79	0.420	10.21	30
		7	9.75	0.452	10.20	30
2437	6	0	13.13	0.221	13.35	30
		1	13.22	0.216	13.44	30
		2	13.29	0.223	13.51	30
		3	13.48	0.209	13.69	30
		4	13.33	0.287	13.62	30
		5	13.28	0.369	13.65	30
		6	13.23	0.420	13.65	30
		7	13.34	0.452	13.79	30
2462	11	0	9.61	0.221	9.83	30
		1	9.60	0.216	9.82	30
		2	9.65	0.223	9.87	30
		3	9.88	0.209	10.09	30
		4	9.90	0.287	10.19	30
		5	9.86	0.369	10.23	30
		6	9.85	0.420	10.27	30
		7	9.70	0.452	10.15	30

■ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11n Mode) _20 MHz BW

802.11n Mode		MCS Index	Sum Power of Ant.0 & 1 (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	0	13.06	29.63
		1	13.00	29.63
		2	12.95	29.63
		3	13.38	29.63
		4	13.34	29.63
		5	13.35	29.63
		6	13.47	29.63
		7	13.44	29.63
2437	6	0	16.83	29.63
		1	16.95	29.63
		2	16.95	29.63
		3	17.27	29.63
		4	17.22	29.63
		5	17.25	29.63
		6	17.21	29.63
		7	17.31	29.63
2462	11	0	12.89	29.63
		1	13.01	29.63
		2	13.05	29.63
		3	13.34	29.63
		4	13.39	29.63
		5	13.43	29.63
		6	13.43	29.63
		7	13.36	29.63

8.4 POWER SPECTRAL DENSITY (802.11b/g/n)

Test Requirements and limit, §15.247(e) / RSS-247(Issue 1) Section 5.2.

The peak power spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

Minimum Standard – the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

■ **Limit**

Operating Mode	Band	Mode	Ant. Port	Ant. Gain (dBi)	Limit (dBm)
SISO	2.4 GHz	802.11b/g/n	0	3.62	8
			1	3.09	8
MIMO(2 TX)		802.11g/n	0 & 1	6.37	7.63

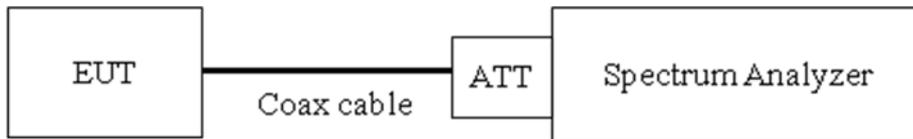
Note : 1. If all antenna gains are not equal,

$$\text{Directional gain} = 10 \cdot \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N] \text{ dBi}$$

(according to KDB662911 D01 v02r01)

2. Limit is calculated by antenna gain.

■ **TEST CONFIGURATION**



■ **TEST PROCEDURE**

We tested according to Procedure 10.2 in KDB 558074, issued 06/09/2015

The spectrum analyzer is set to :

Set analyzer center frequency to DTS channel center frequency.

Span = 1.5 times the DTS channel bandwidth.

RBW = 3 kHz ≤ RBW ≤ 100 kHz.

VBW ≥ 3 x RBW.

Sweep = auto couple

Detector = peak

Trace Mode = max hold

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

■ **Sample Calculation**

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

Output Power = -5 dBm + 10 dB + 0.8 dB = 5.8 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 2.4 GHz range that was rounded off to the closest tenth dB. So, 10.7 dB is offset for 2.4 GHz Band.

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

Band	Frequency(MHz)	Loss(dB)
2.4 GHz	2412	10.65
	2437	10.65
	2462	10.66

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

■ TEST RESULTS_Ant.0

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result		
			PSD (dBm)	Limit (dBm)	Pass/Fail
2412	1	802.11b	-6.199	8	Pass
2437	6		-7.562		Pass
2462	11		-6.727		Pass
2412	1	802.11g	-14.365		Pass
2437	6		-11.295		Pass
2462	11		-13.982		Pass
2412	1	802.11n 20MHz BW	-15.104		Pass
2437	6		-10.297		Pass
2462	11		-14.627		Pass

■ TEST RESULTS_Ant.1

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result		
			PSD (dBm)	Limit (dBm)	Pass/Fail
2412	1	802.11b	-6.423	8	Pass
2437	6		-7.487		Pass
2462	11		-6.703		Pass
2412	1	802.11g	-14.562		Pass
2437	6		-12.176		Pass
2462	11		-14.004		Pass
2412	1	802.11n 20MHz BW	-14.961		Pass
2437	6		-11.089		Pass
2462	11		-14.802		Pass

■ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Power Density Measurements

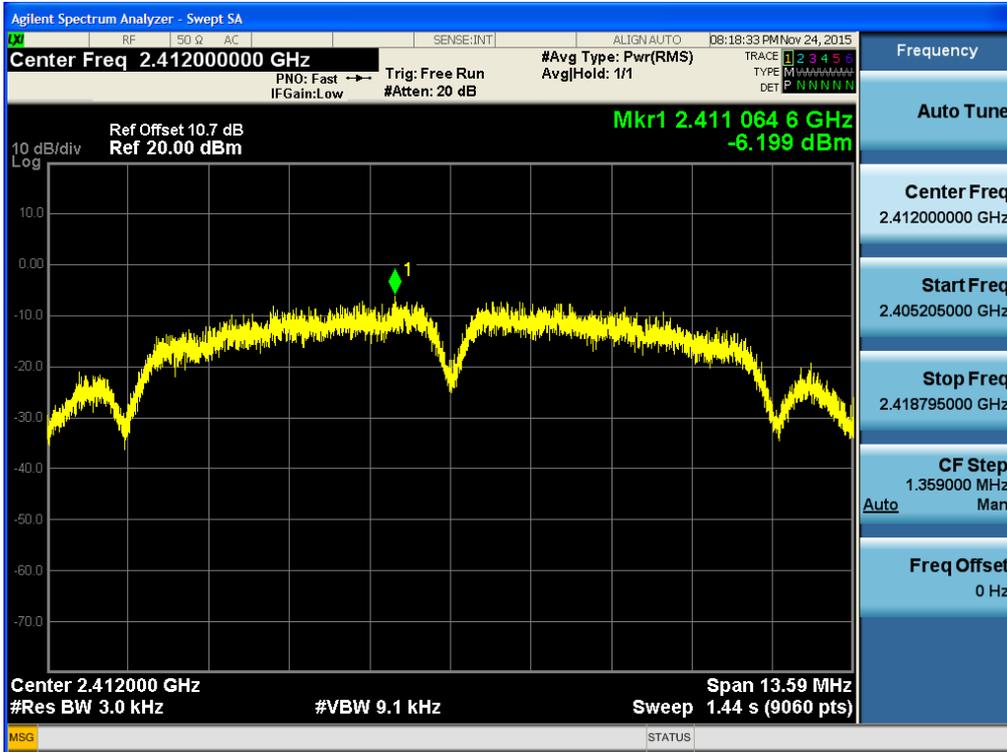
Frequency (MHz)	Channel No.	Mode	Test Result		
			PSD (dBm)	Limit (dBm)	Pass/Fail
2412	1	802.11g	-11.453	7.63	Pass
2437	6		-8.714		Pass
2462	11		-10.983		Pass
2412	1	802.11n 20MHz BW	-12.022		Pass
2437	6		-7.674		Pass
2462	11		-11.704		Pass

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

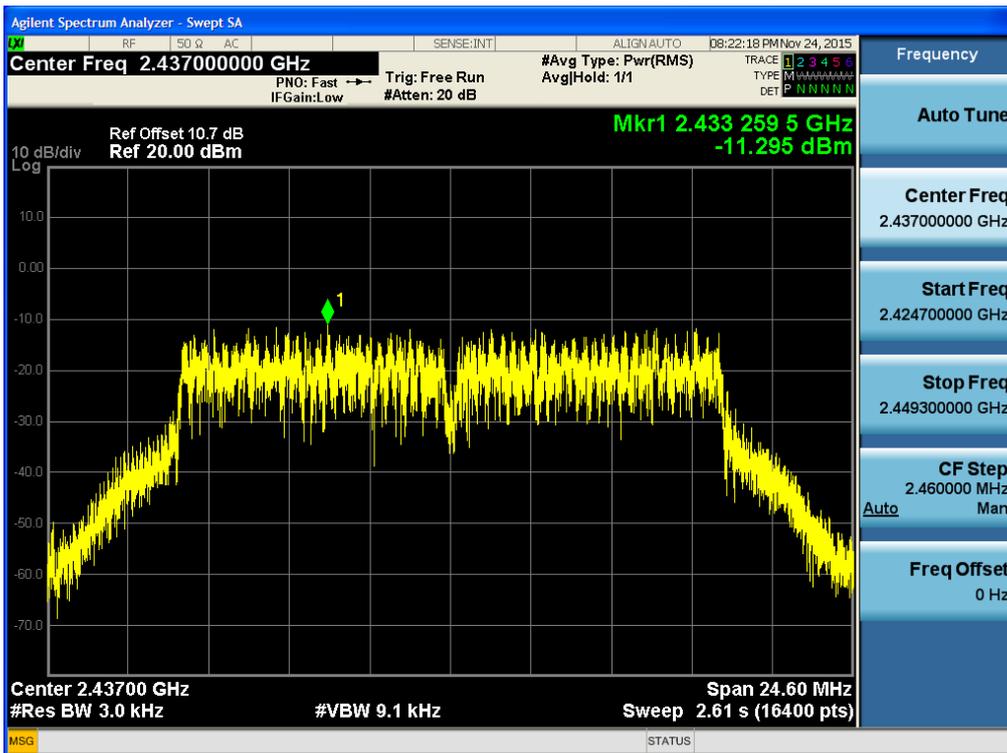
▣ RESULT PLOTS_Ant.0

2.4 GHz Band

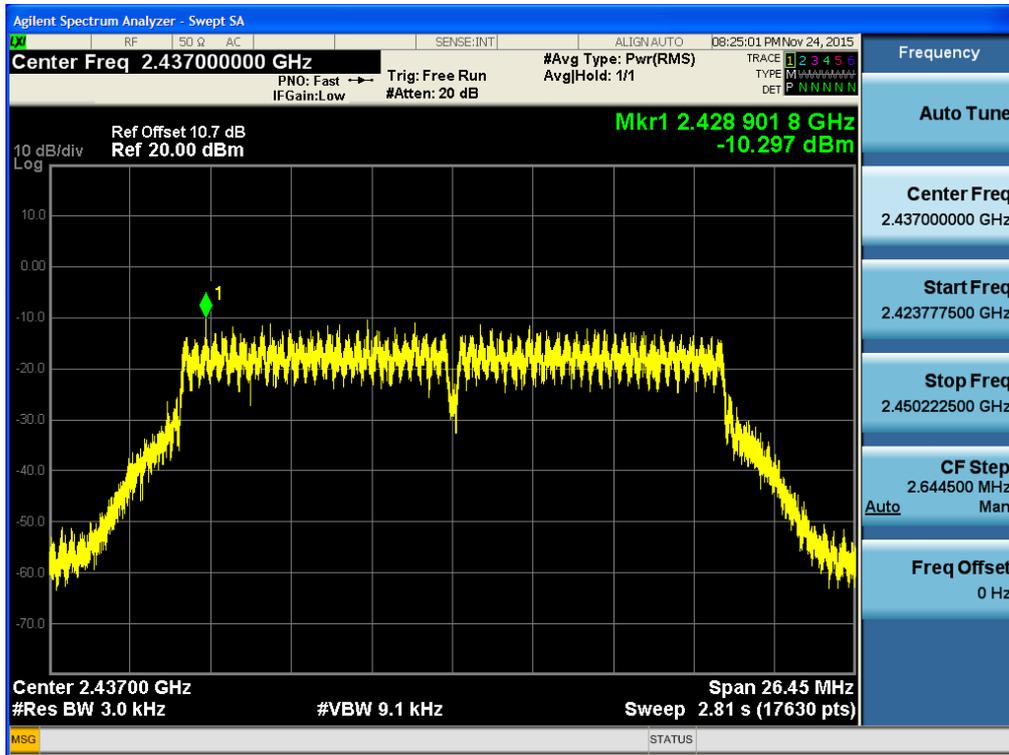
Power Spectral Density (802.11b-CH 1)



Power Spectral Density (802.11g-CH 6)



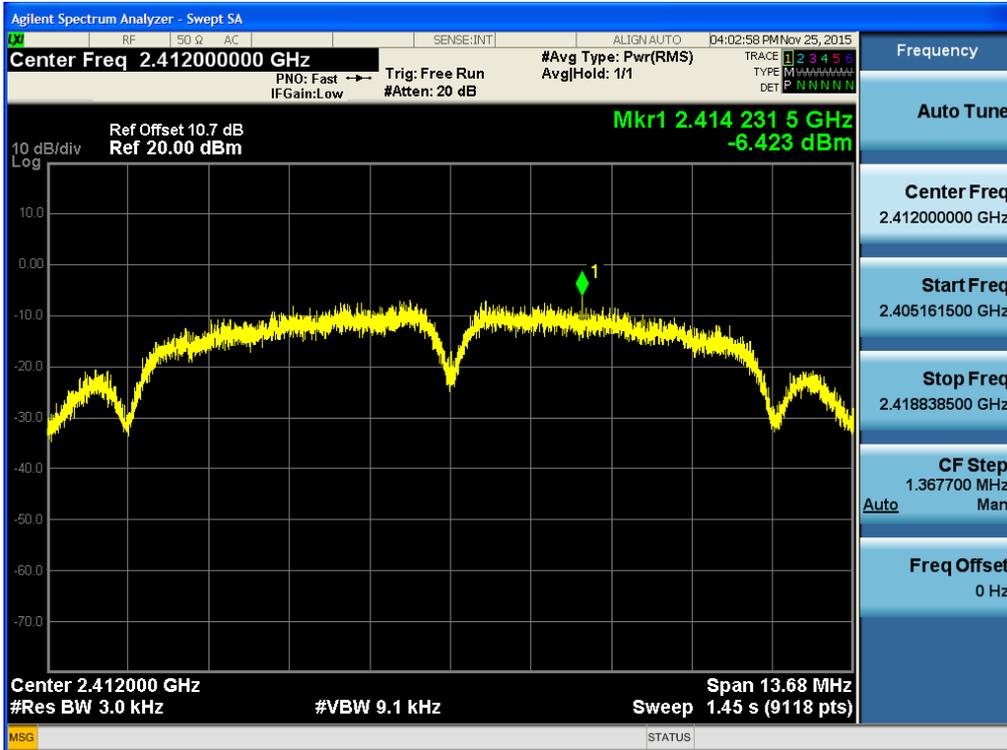
Power Spectral Density (802.11n-CH 6) _ 20 MHz BW



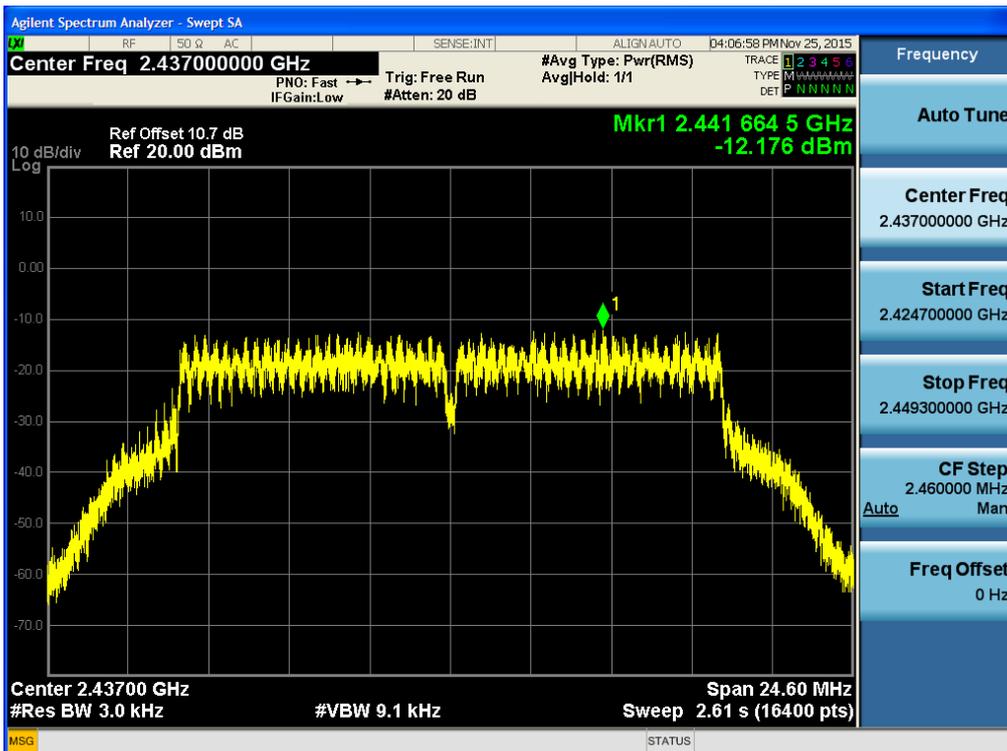
▣ RESULT PLOTS_Ant.1

2.4 GHz Band

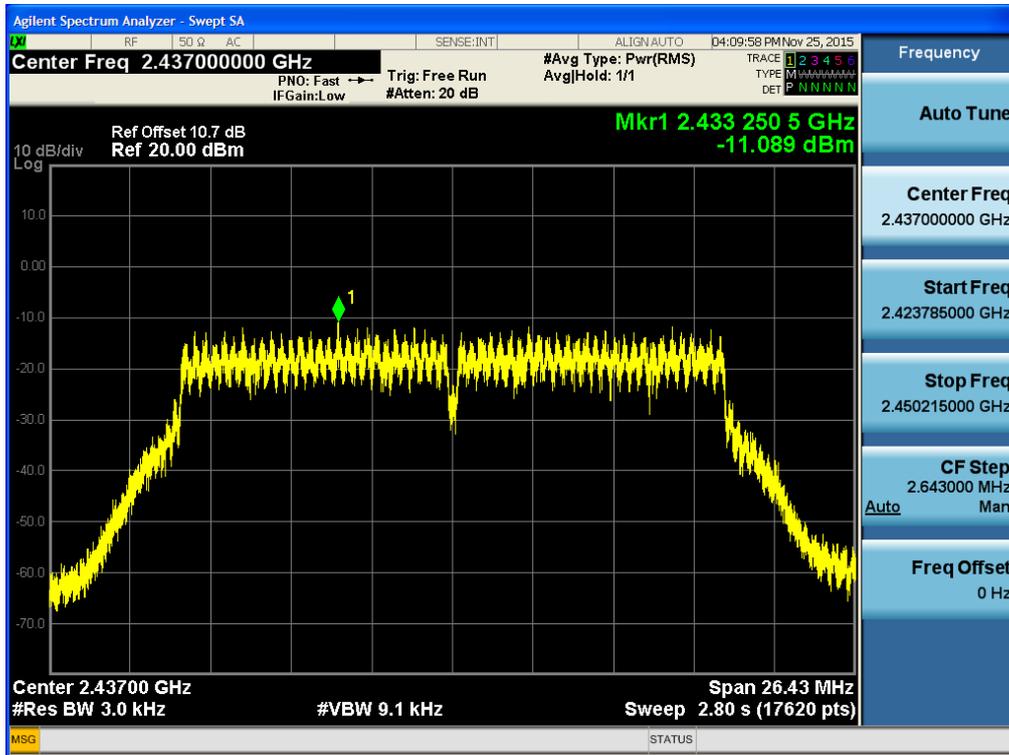
Power Spectral Density (802.11b-CH 1)



Power Spectral Density (802.11g-CH 6)

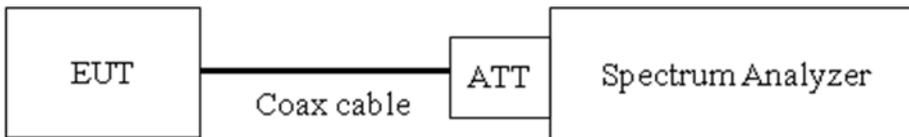


Power Spectral Density (802.11n-CH 6) _ 20 MHz BW



8.5 OUT OF BAND EMISSIONS AT THE BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS**Test Requirements and limit, §15.247(d) / RSS-247(Issue 1) Section 5.5.**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section / Section 5.4.4, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) / RSS-Gen is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit : 20 dBc**■ TEST CONFIGURATION****■ TEST PROCEDURE**

The transmitter output is connected to the spectrum analyzer. (Procedure 11.0 in KDB 558074, issued 06/09/2015)

RBW = 100 kHz

VBW \geq 3 x RBW

Set span to encompass the spectrum to be examined

Detector = Peak

Trace Mode = max hold

Sweep time = auto couple

Ensure that the number of measurement points \geq Span/RBW

Allow trace to fully stabilize.

Use peak marker function to determine the maximum amplitude level.

Measurements are made over the 30 MHz to 10th harmonic range with the transmitter set to the lowest, middle, and highest channels.

Note :

1. The band edge 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 2.4 GHz range that was rounded off to the closest tenth dB. So, 10.7 dB is offset for 2.4 GHz Band. Actual value of loss for the attenuator and cable combination is below table.

Band	Frequency(MHz)	Loss(dB)
2.4 GHz	2412	10.65
	2437	10.65
	2462	10.66

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

4. In case of conducted spurious emissions test, please check factors blow table.
5. In order to simplify the report, attached plots were only the worst case channel.

■ FACTORS FOR FREQUENCY

Freq(MHz)	Factor(dB)
30	11.30
100	9.83
200	10.19
300	10.13
400	10.23
500	10.25
600	10.32
700	10.35
800	10.35
900	10.34
1000	10.39
2000	10.64
2400*	10.65
2500*	10.67
3000	10.68
4000	10.89
5000	11.07
6000	11.06
7000	11.35
8000	11.32
9000	11.48
10000	11.56

11000	11.56
12000	11.68
13000	11.83
14000	11.90
15000	11.98
16000	12.04
17000	12.02
18000	12.08
19000	12.07
20000	12.14
21000	12.17
22000	12.31
23000	12.60
24000	12.34
25000	12.53

Note : 1. ** is fundamental frequency range.
2. Factor = Cable loss + Attenuator loss

RESULT PLOTS_Ant.0

BandEdge (802.11b-CH1)



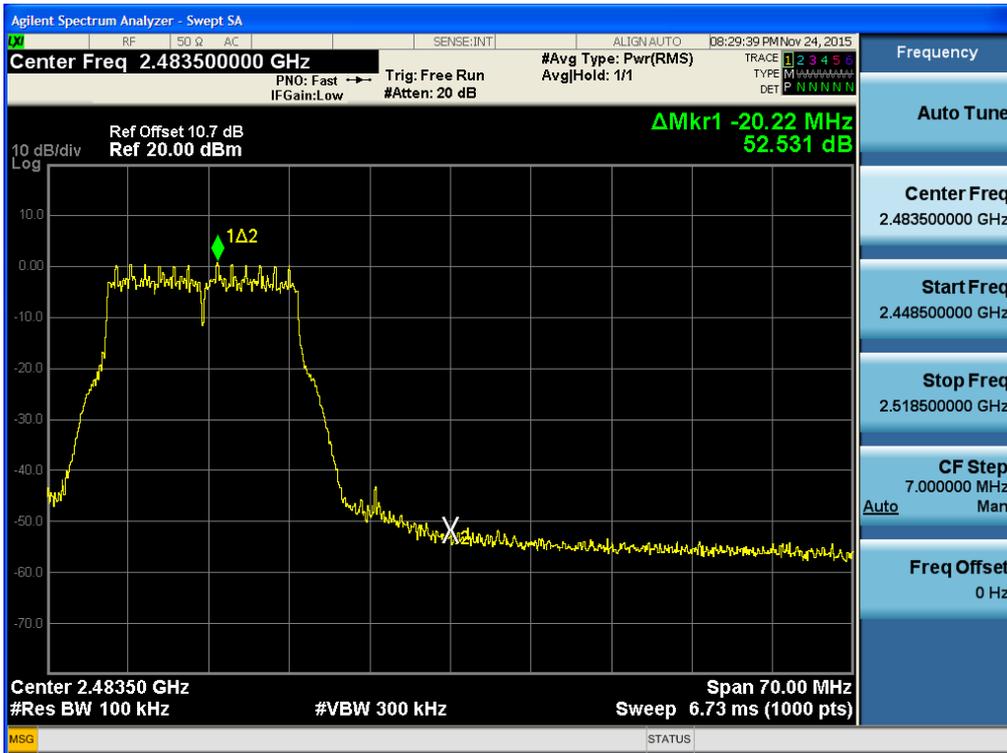
BandEdge (802.11b-CH11)



BandEdge (802.11g-CH1)



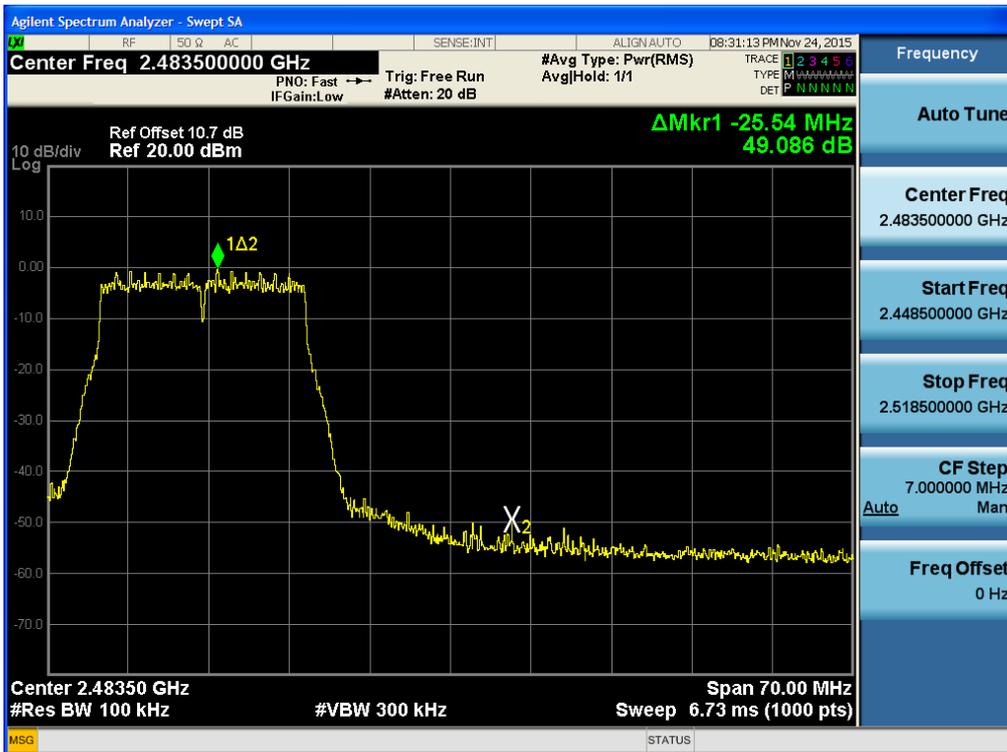
BandEdge (802.11g-CH11)



Band Edge (802.11n_20MHz-CH1)



Band Edge (802.11n_20MHz-CH11)

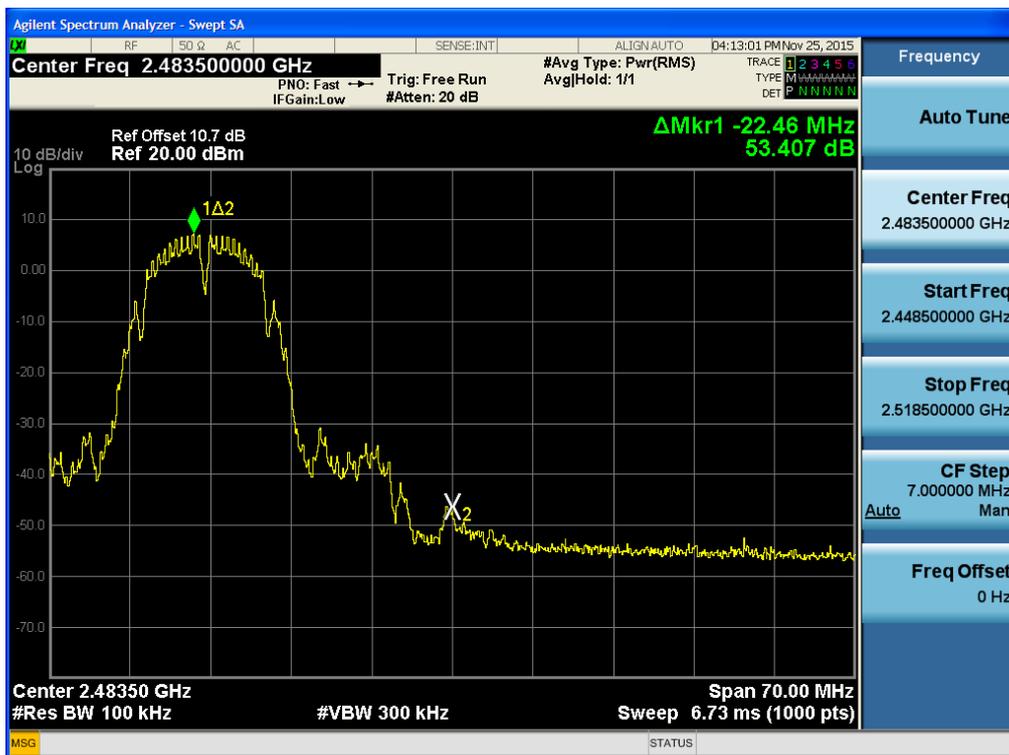


RESULT PLOTS_Ant.1

BandEdge (802.11b-CH1)



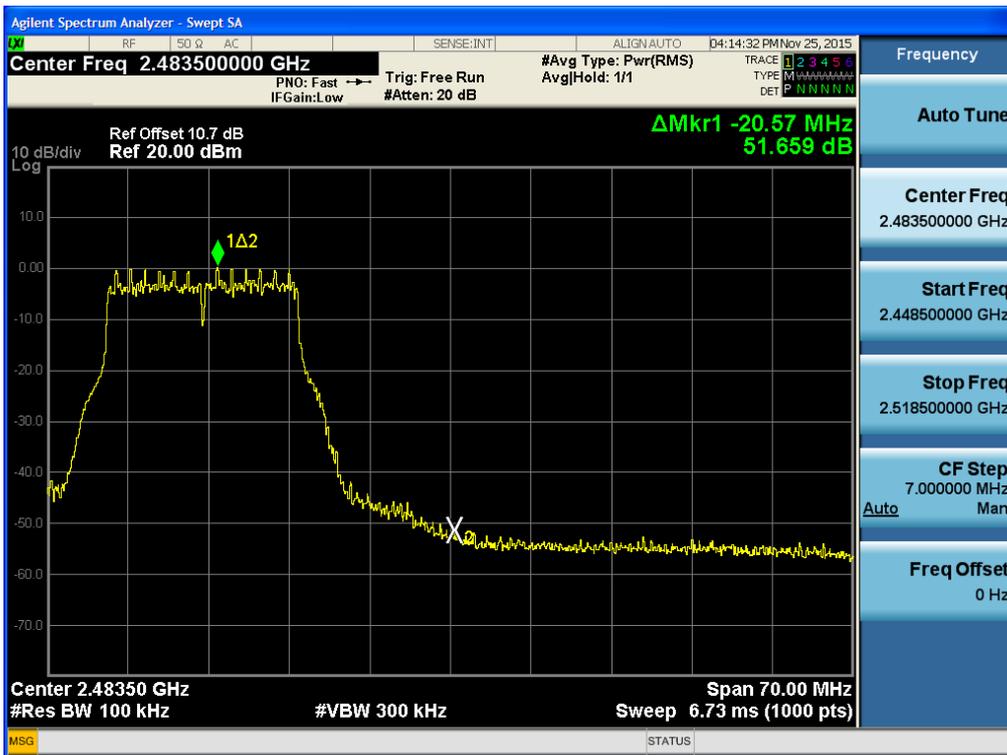
BandEdge (802.11b-CH11)



BandEdge (802.11g-CH1)



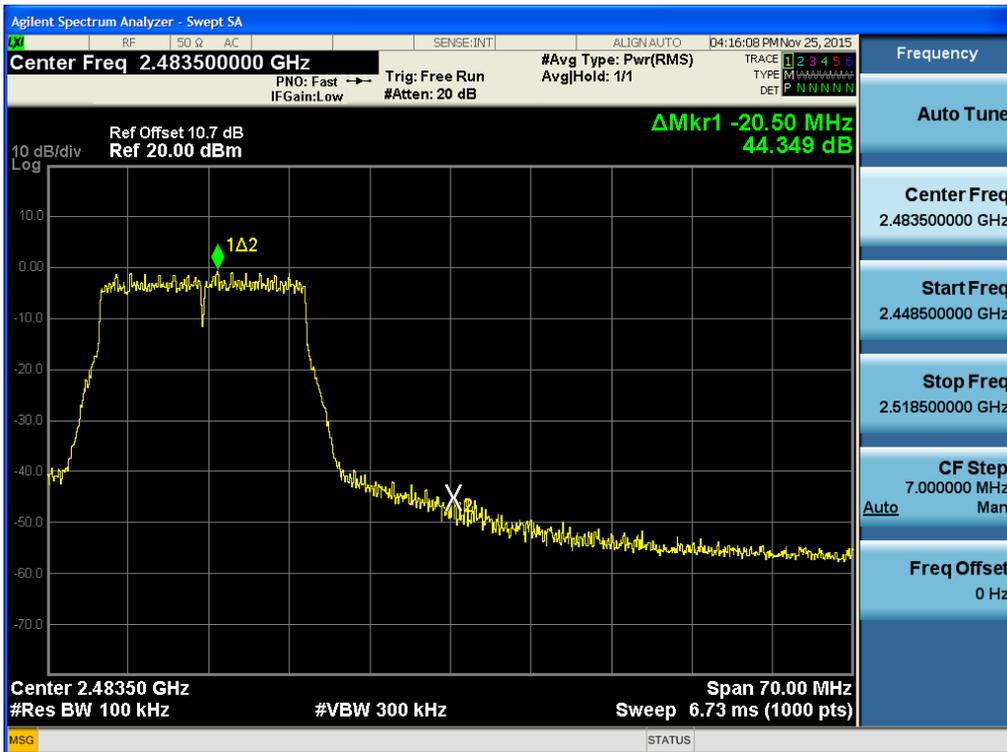
BandEdge (802.11g-CH11)



Band Edge (802.11n_20MHz-CH1)



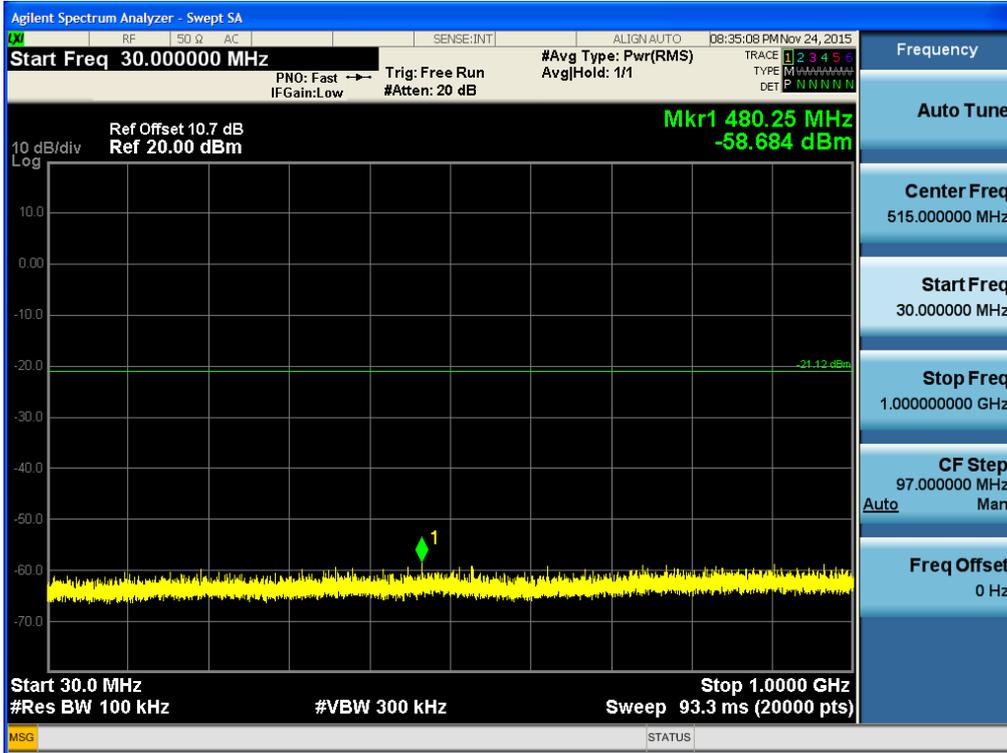
Band Edge (802.11n_20MHz-CH11)



Ant.0

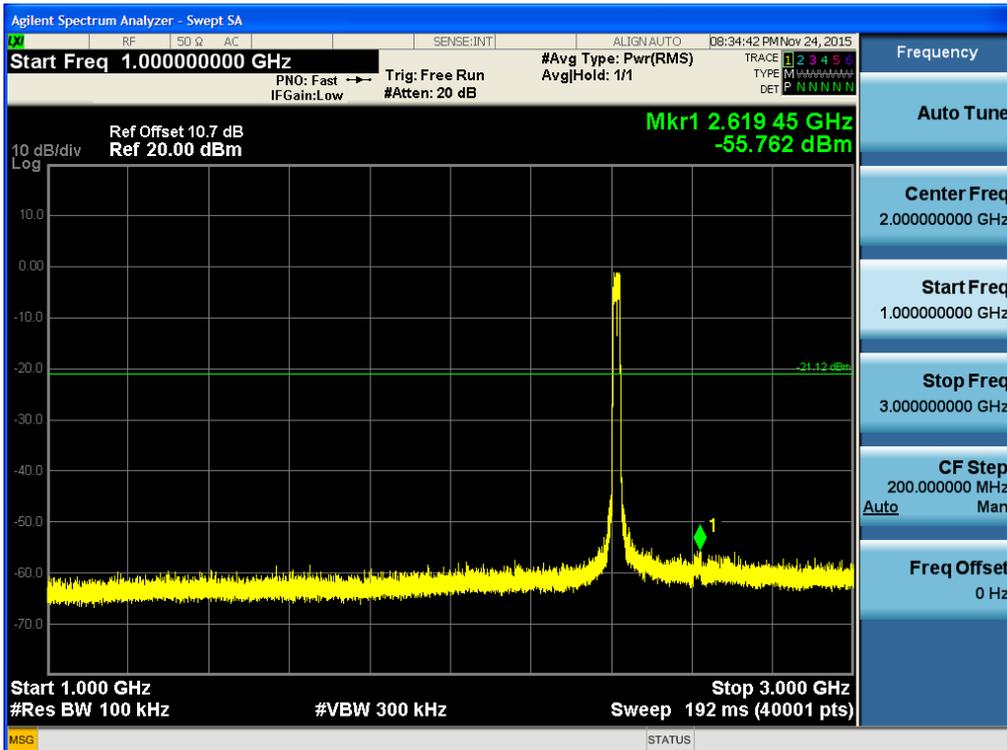
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11b_Ch.1)



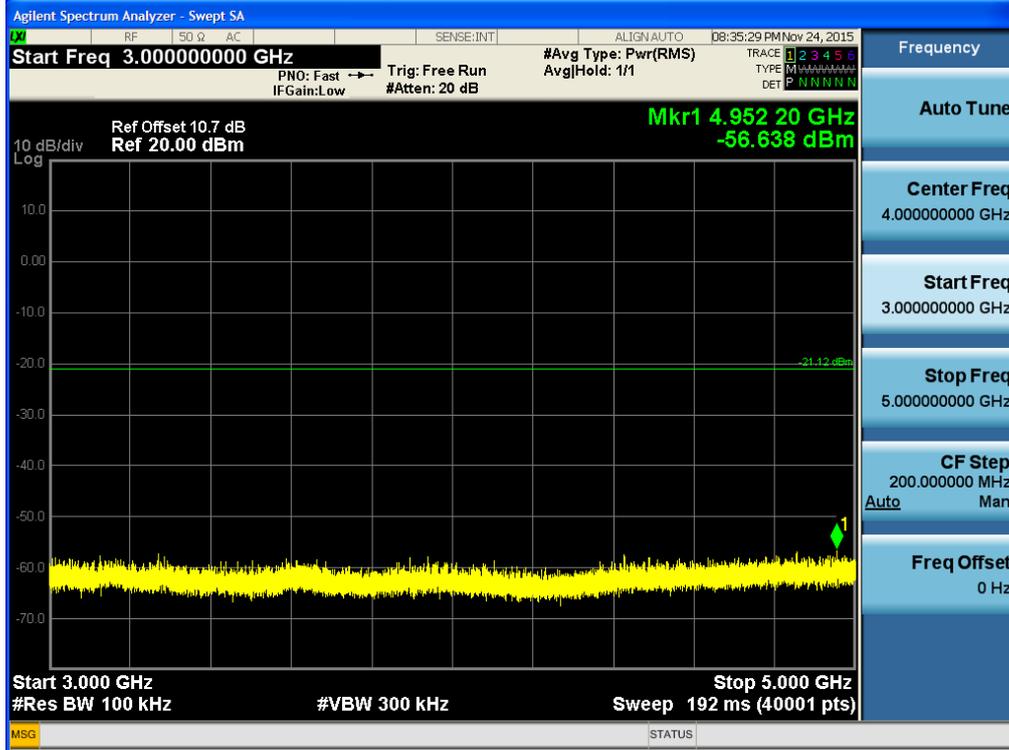
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11b_Ch.1)



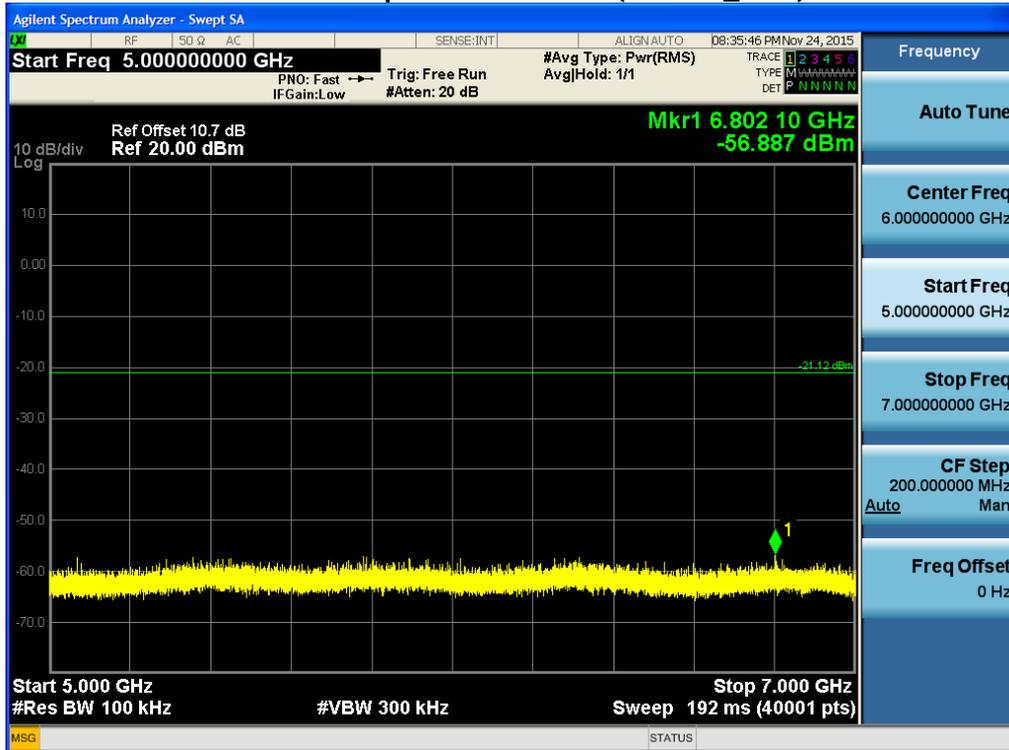
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11b_Ch.1)



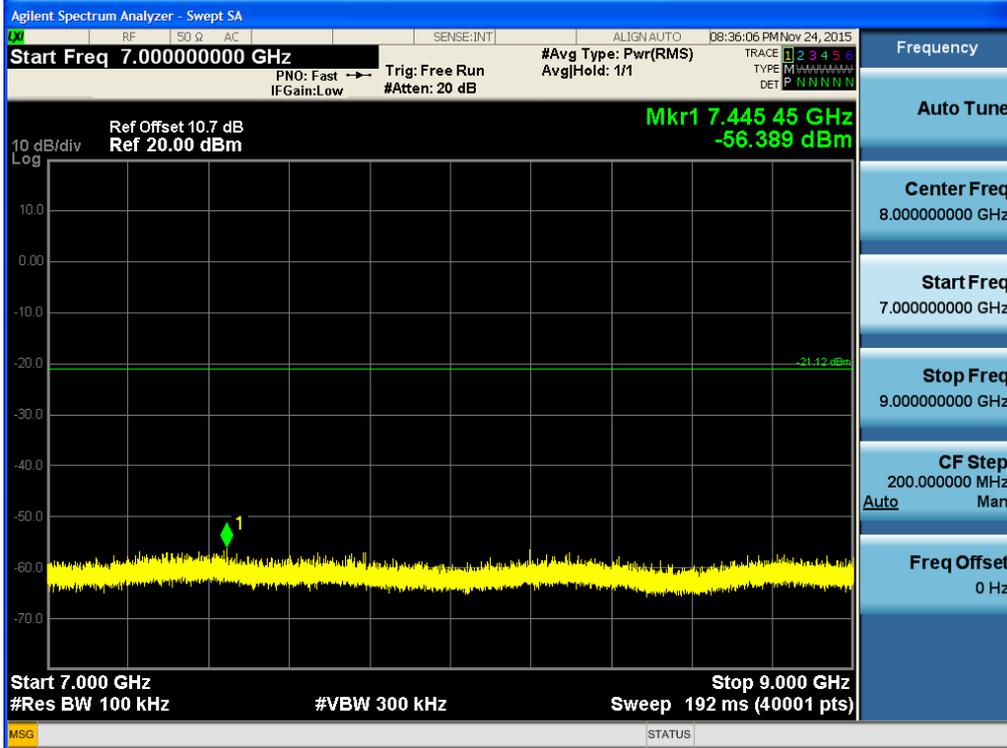
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11b_Ch.1)



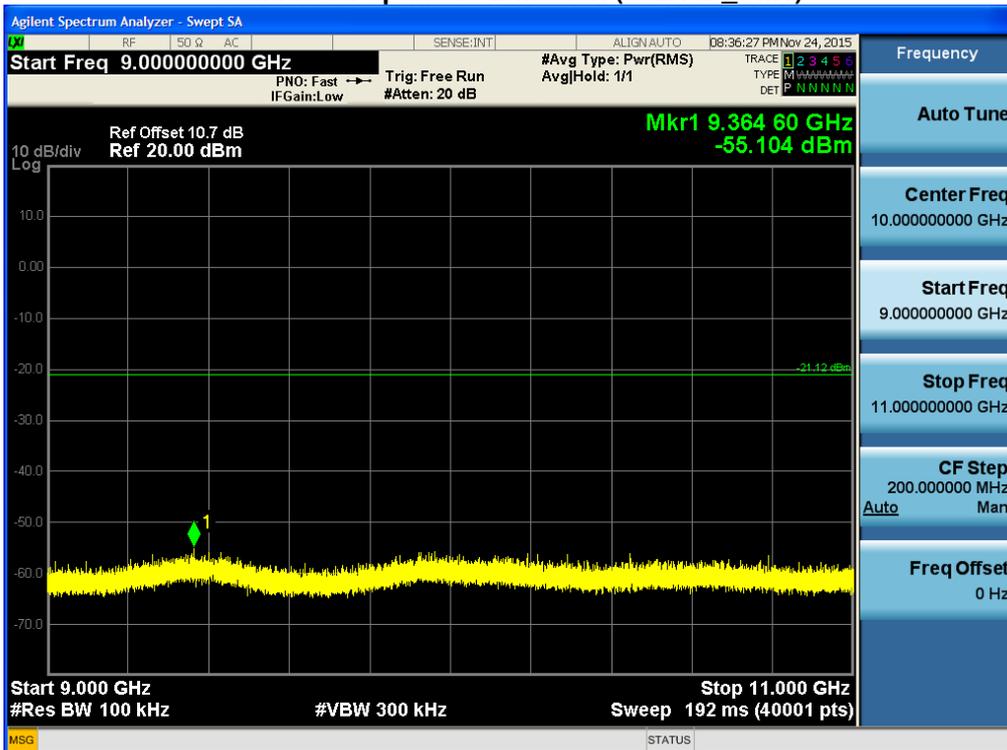
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11b_Ch.1)



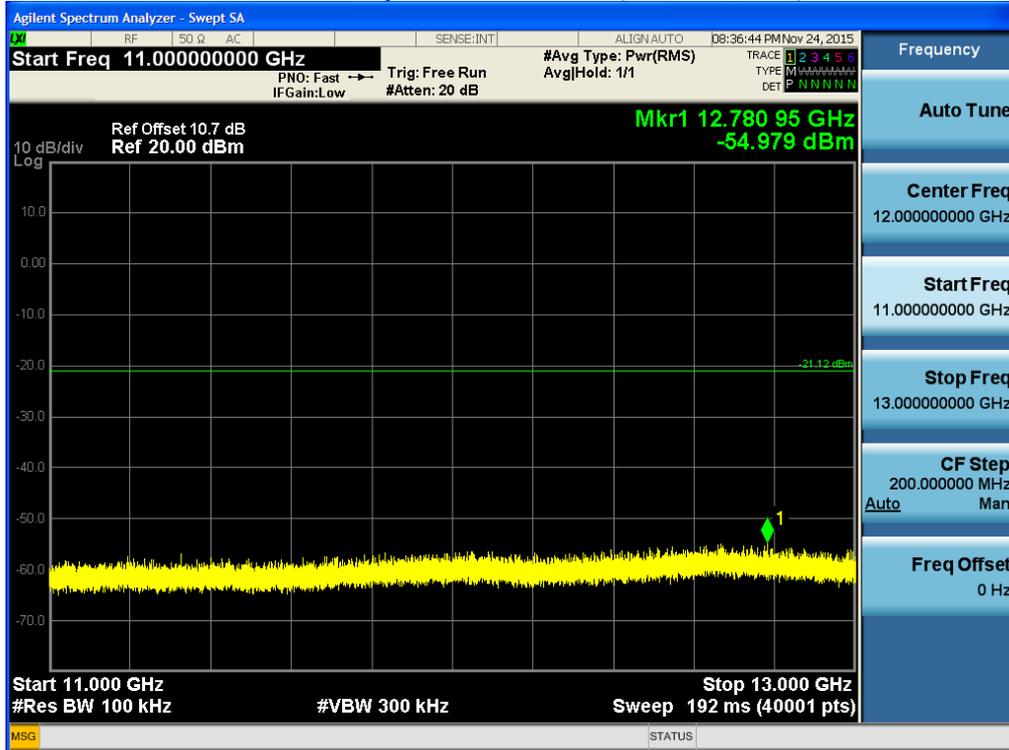
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11b_Ch.1)



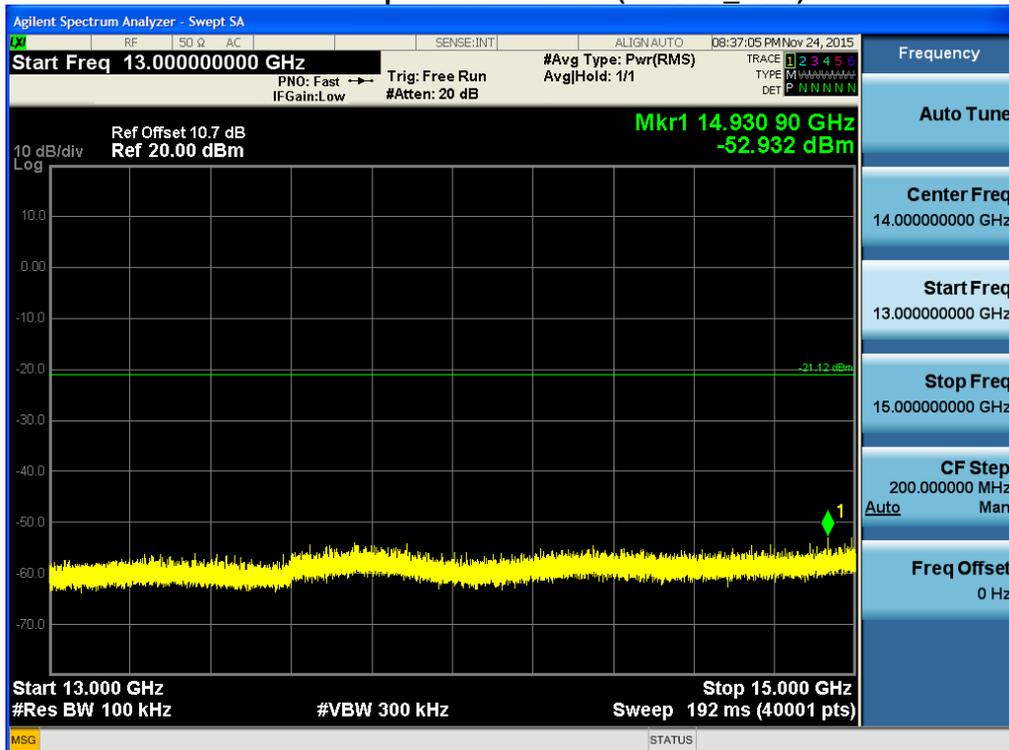
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11b_Ch.1)



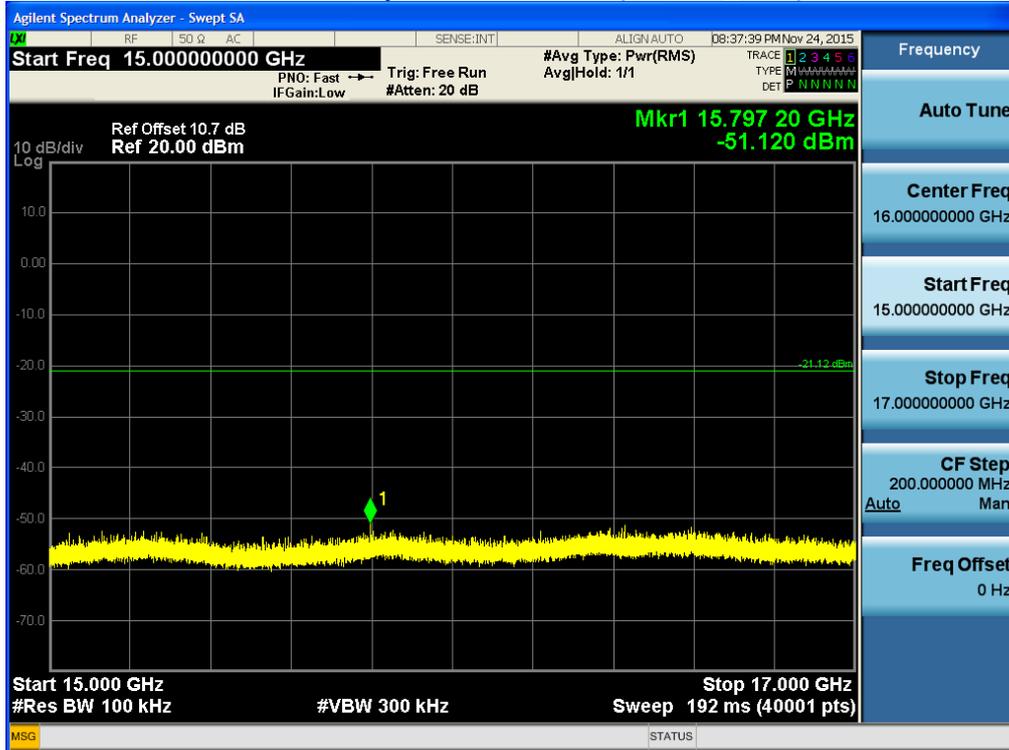
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11b_Ch.1)



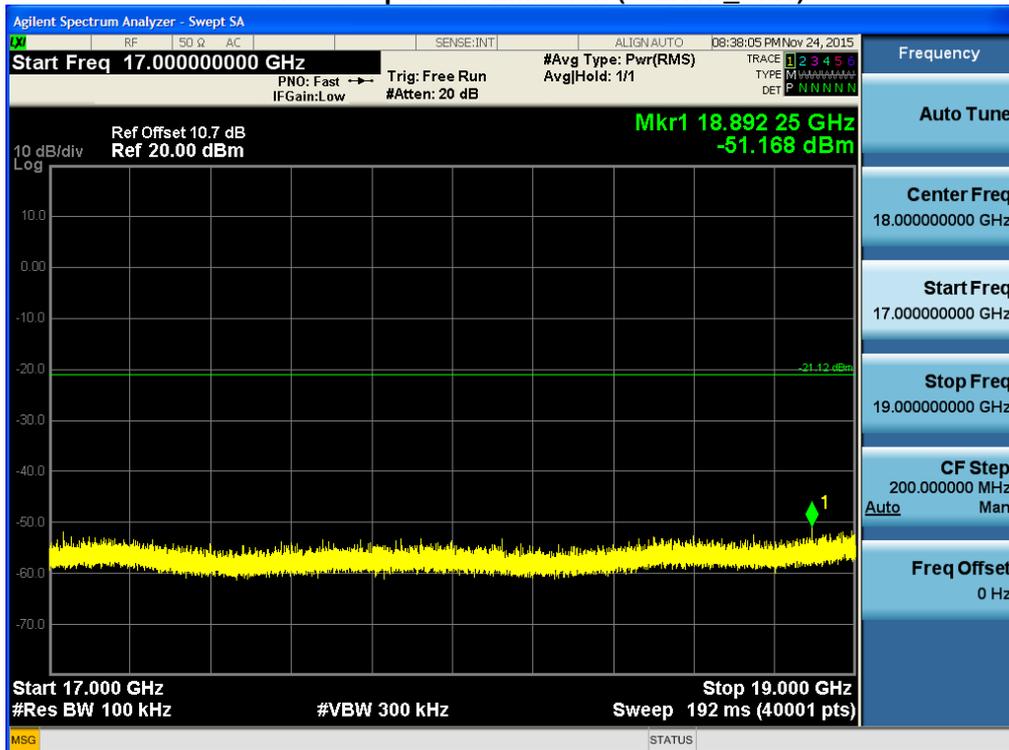
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11b_Ch.1)



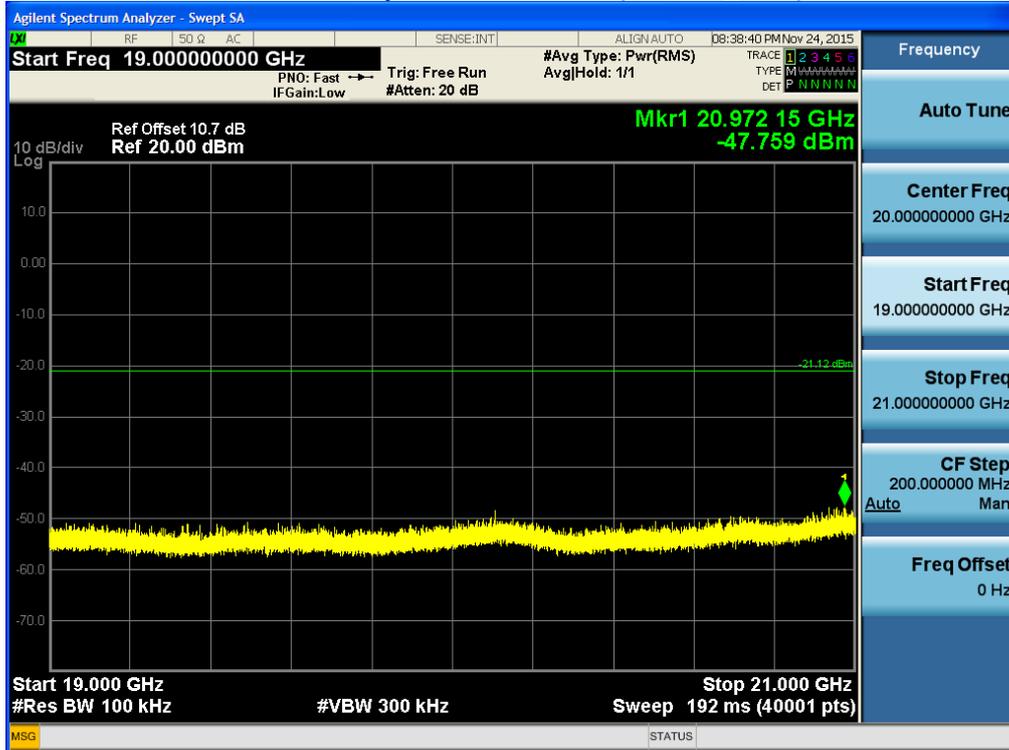
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11b_Ch.1)



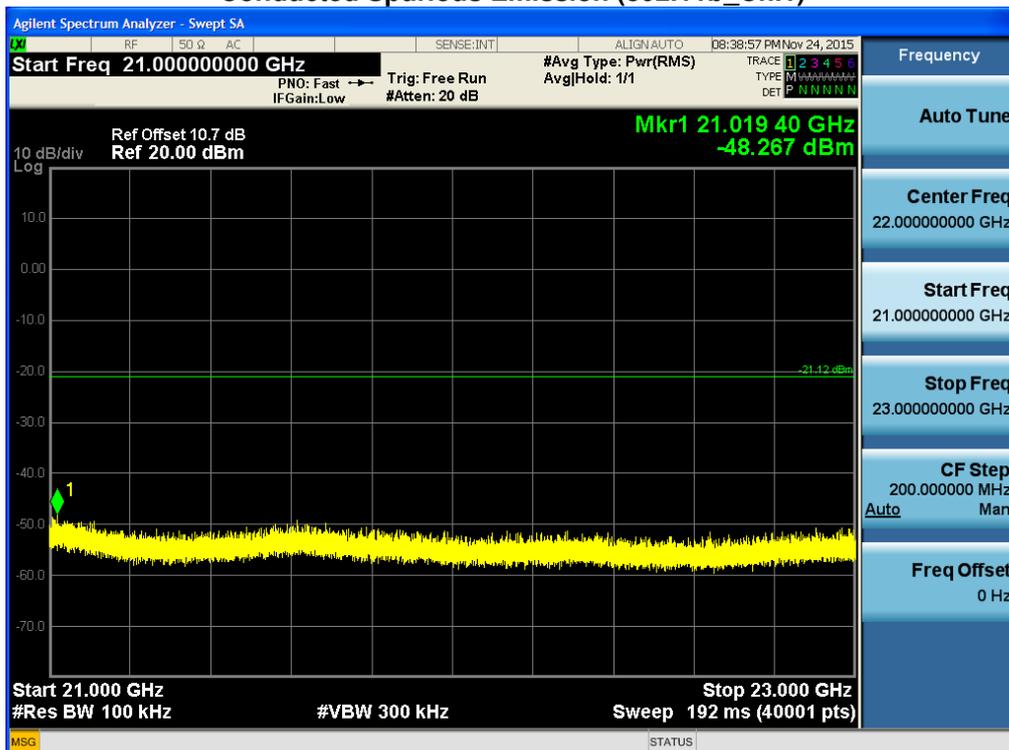
19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11b_Ch.1)



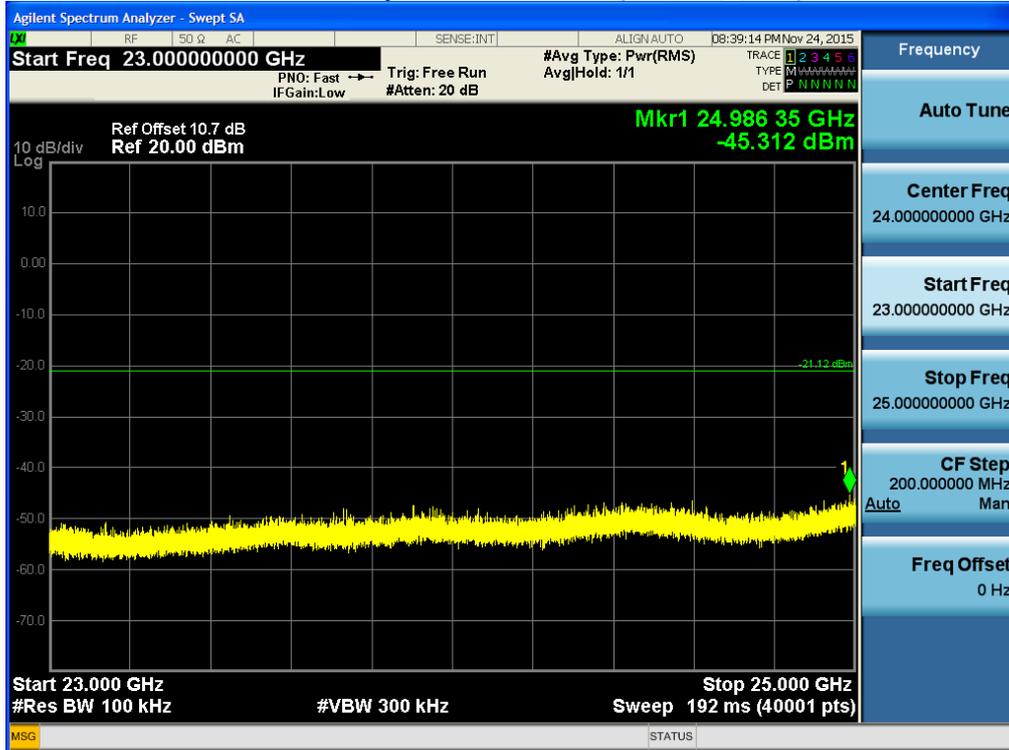
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11b_Ch.1)



23 GHz ~ 25 GHz

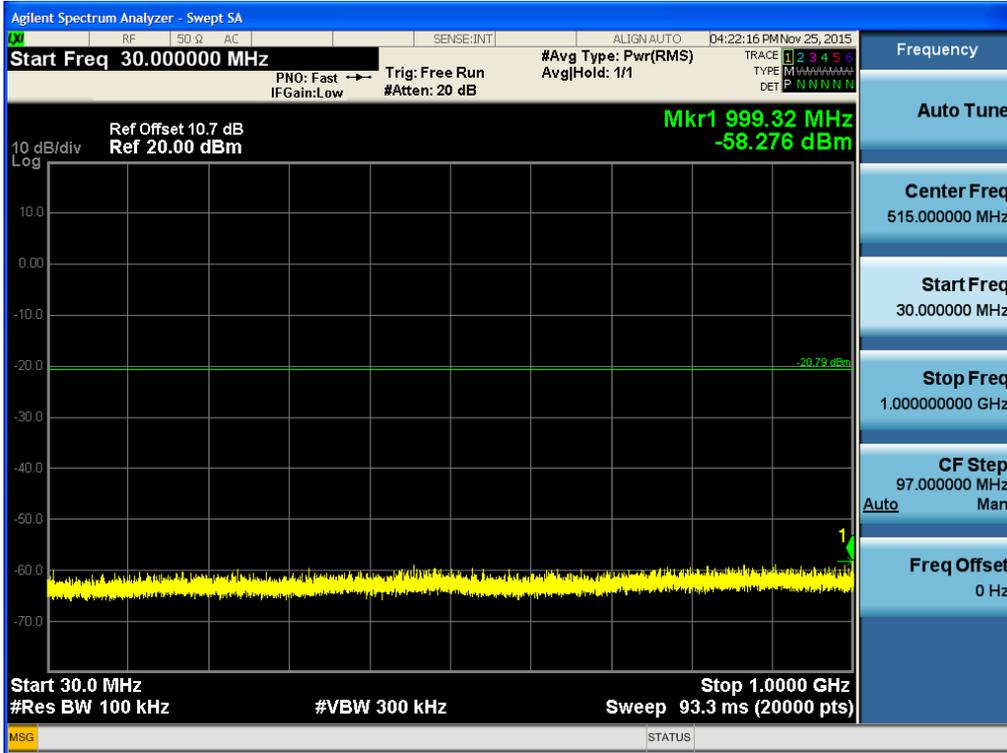
Conducted Spurious Emission (802.11b_Ch.1)



Ant.1

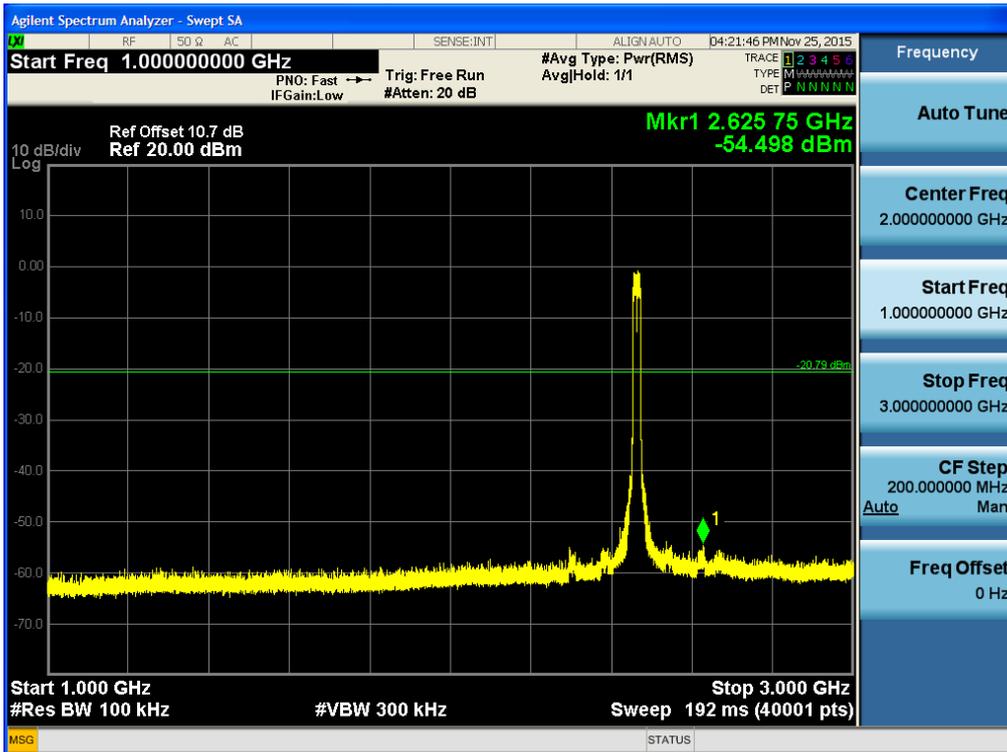
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11b_Ch.1)



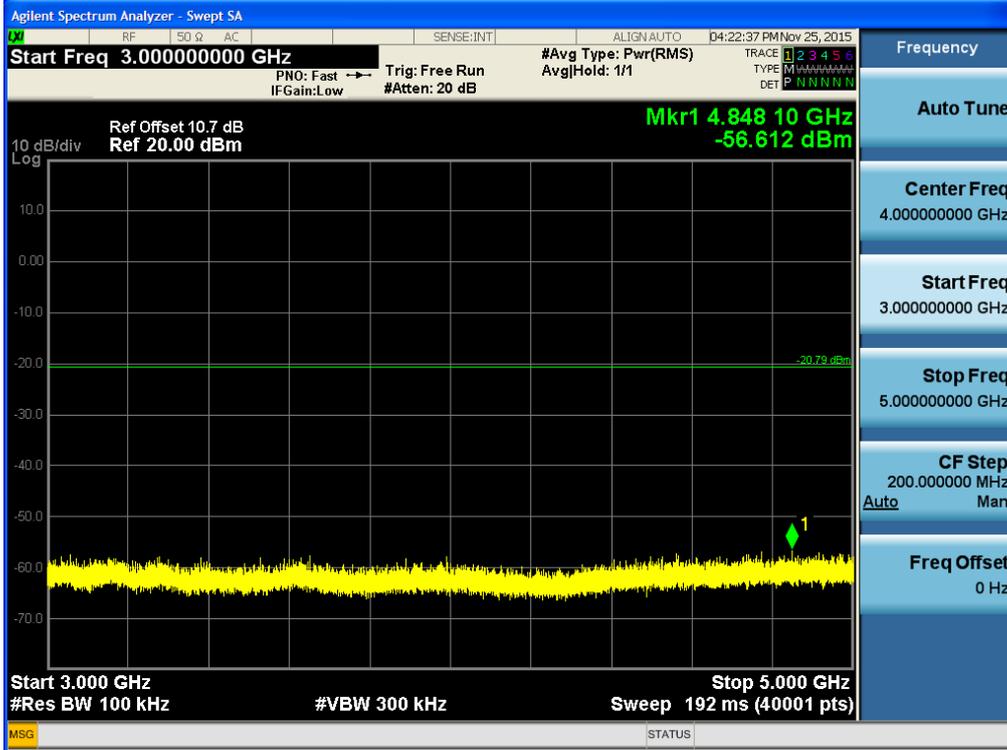
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11b_Ch.1)



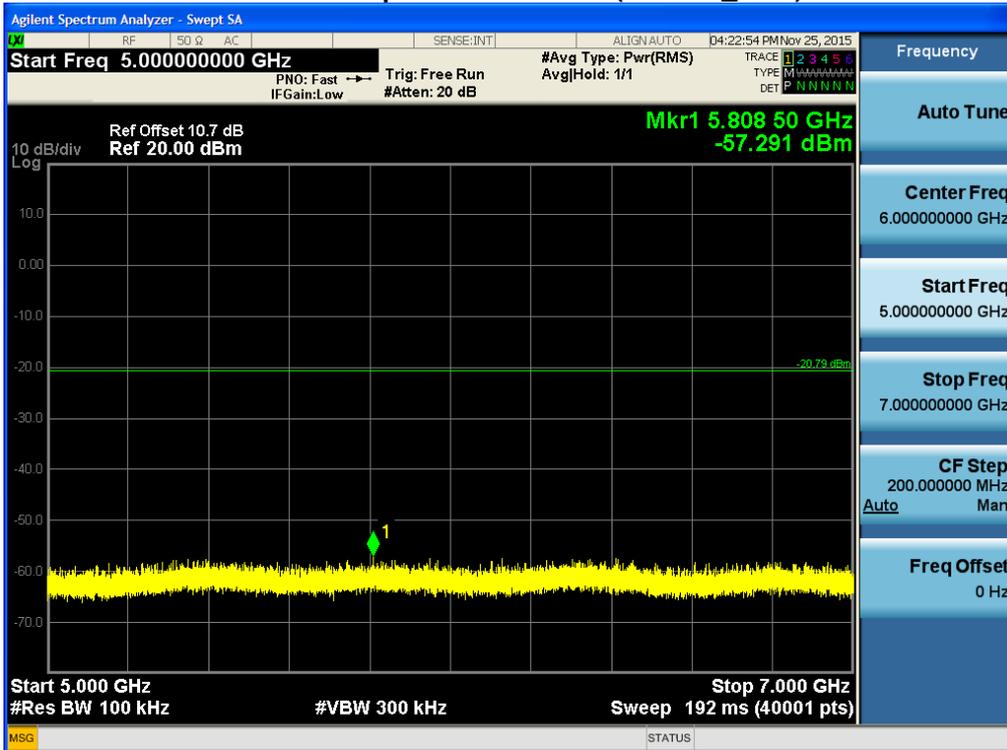
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11b_Ch.1)



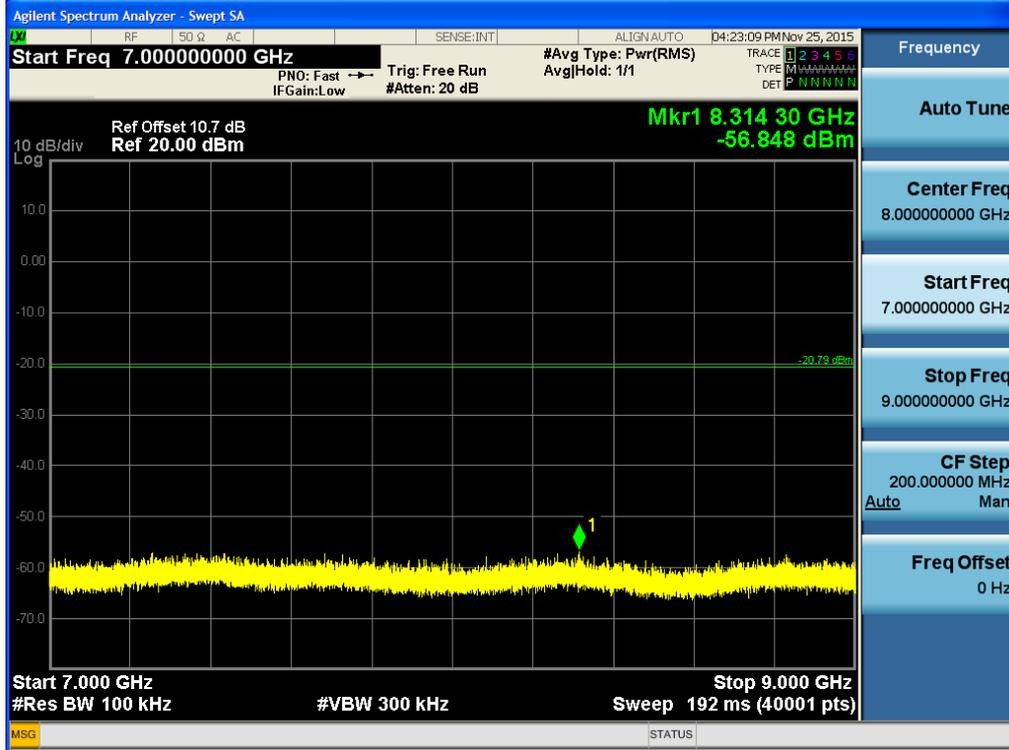
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11b_Ch.1)



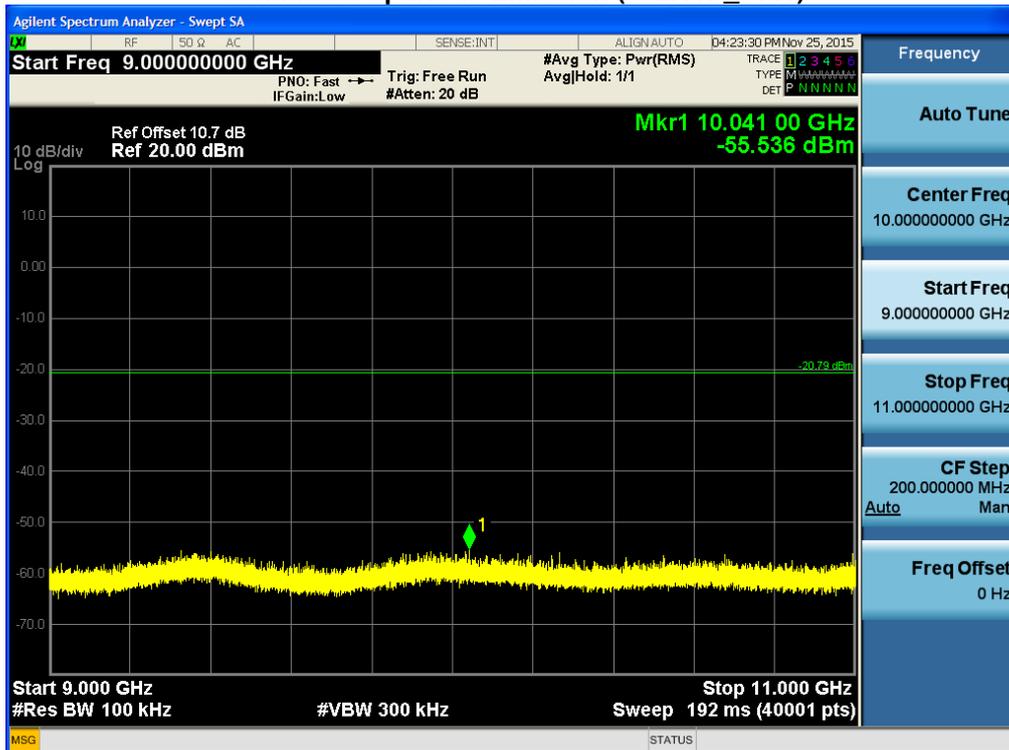
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11b_Ch.1)



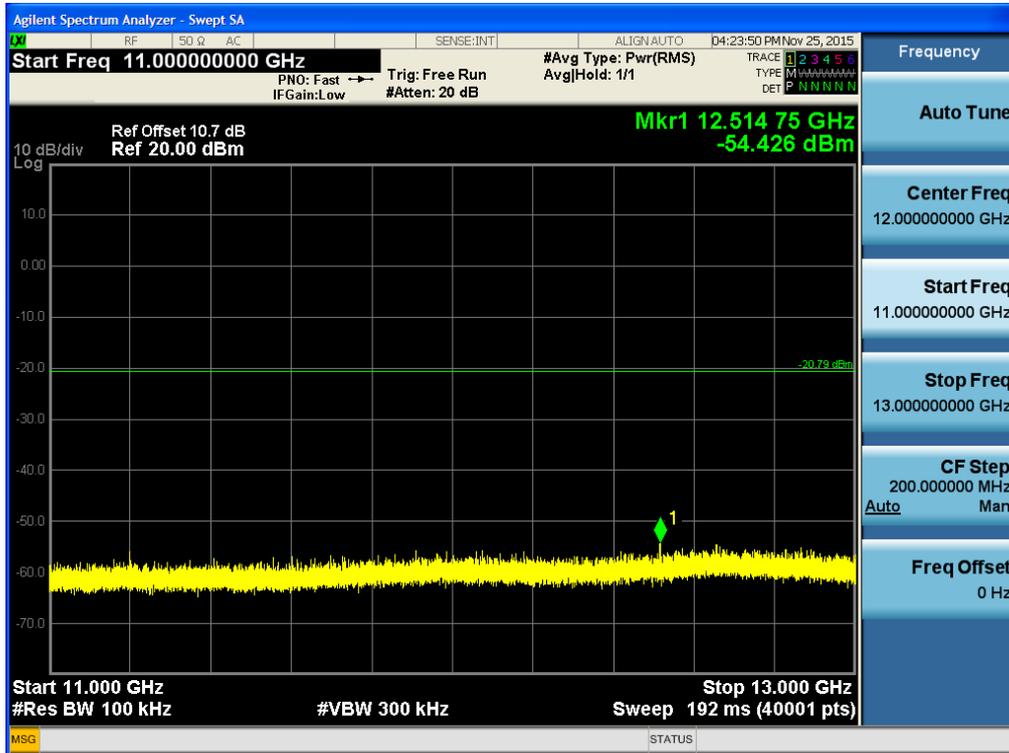
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11b_Ch.1)



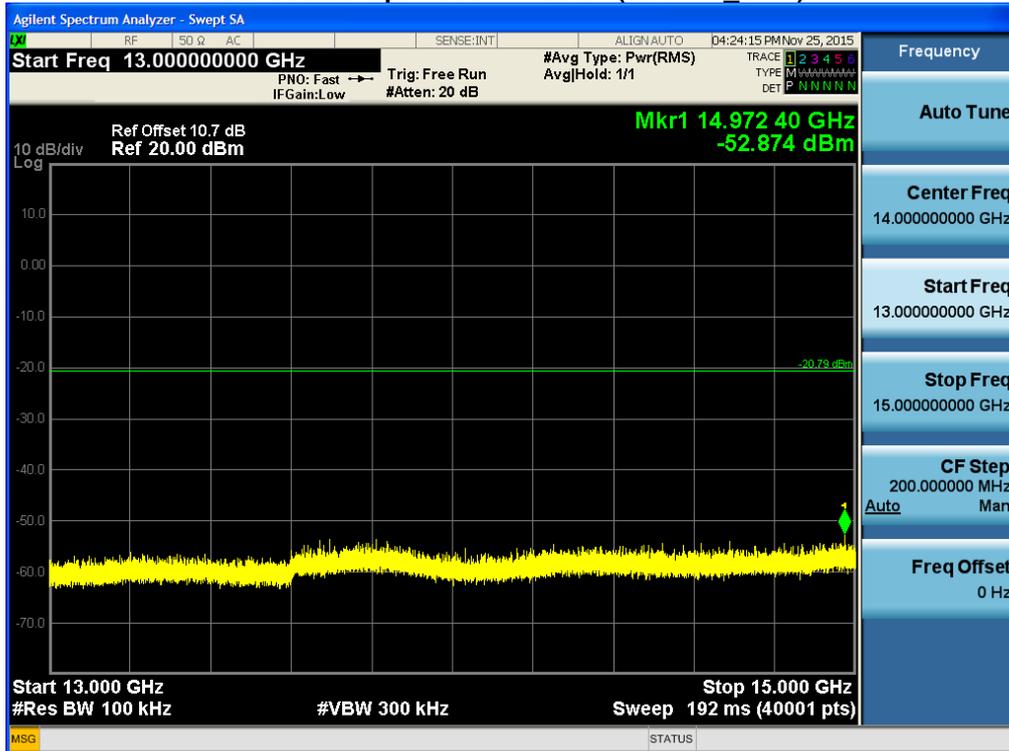
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11b_Ch.1)



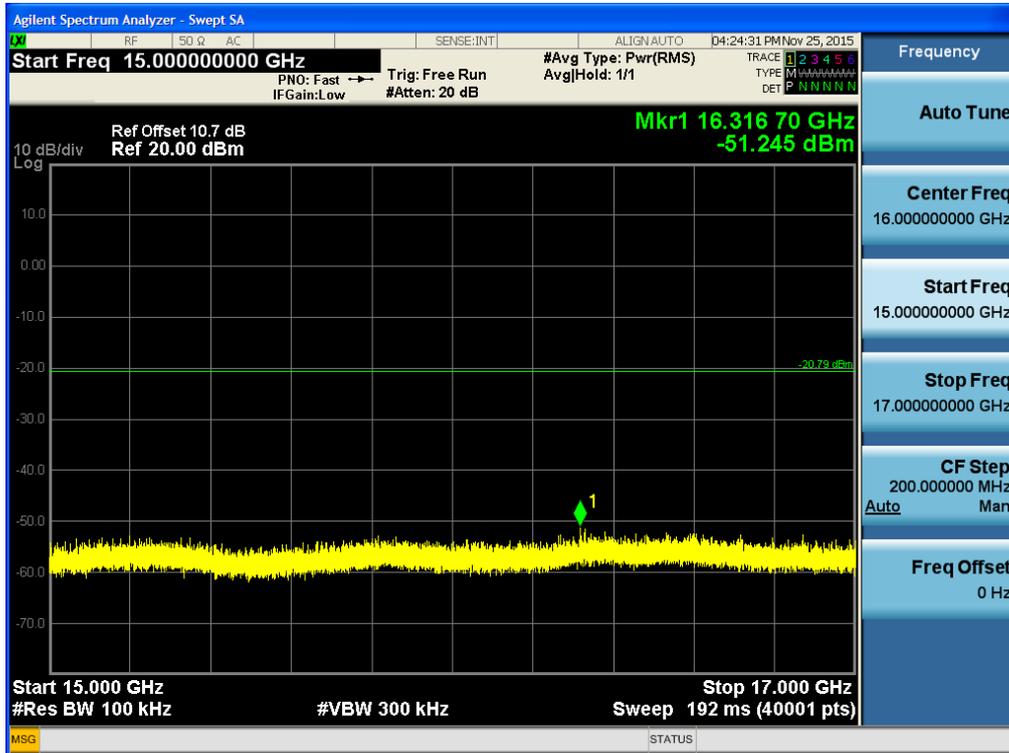
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11b_Ch.1)



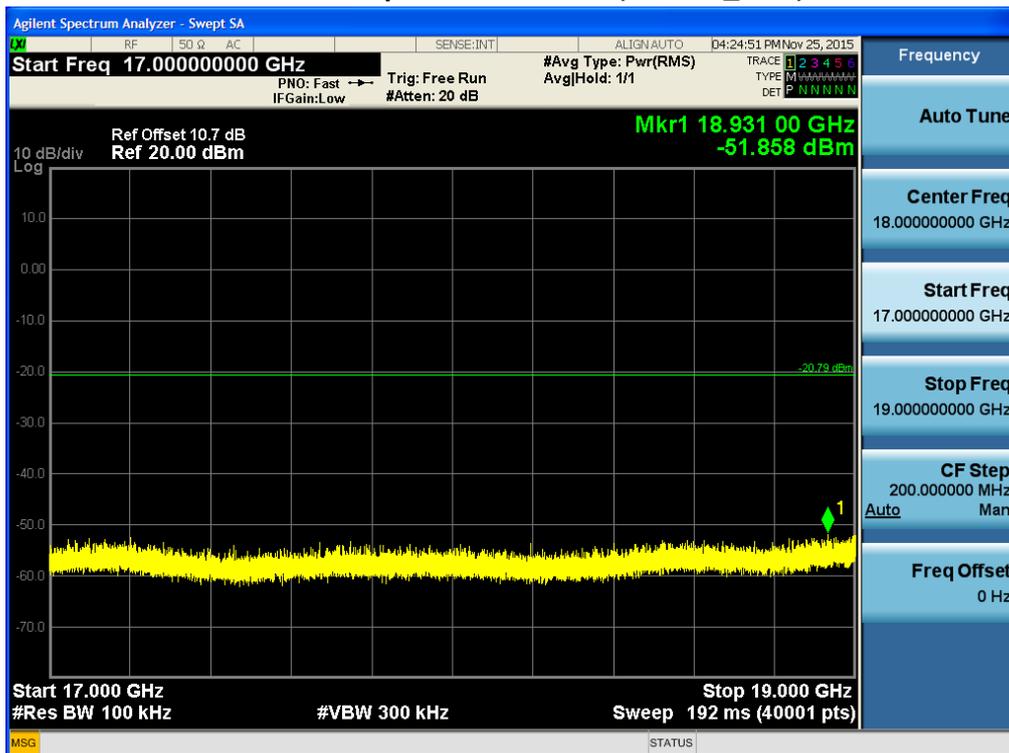
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11b_Ch.1)



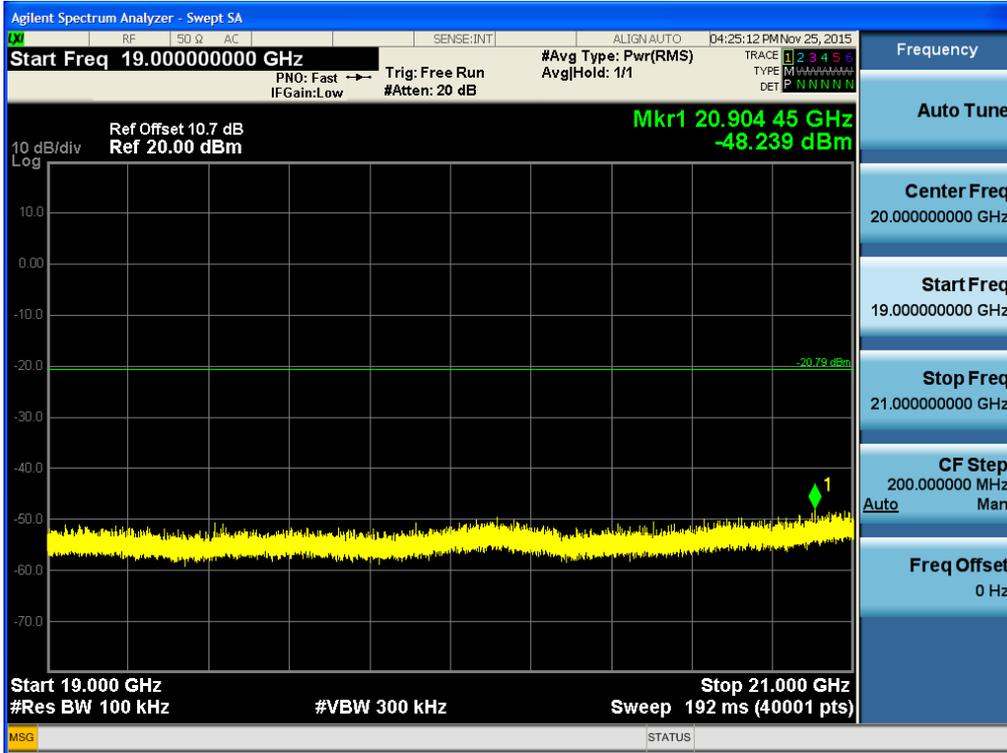
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11b_Ch.1)



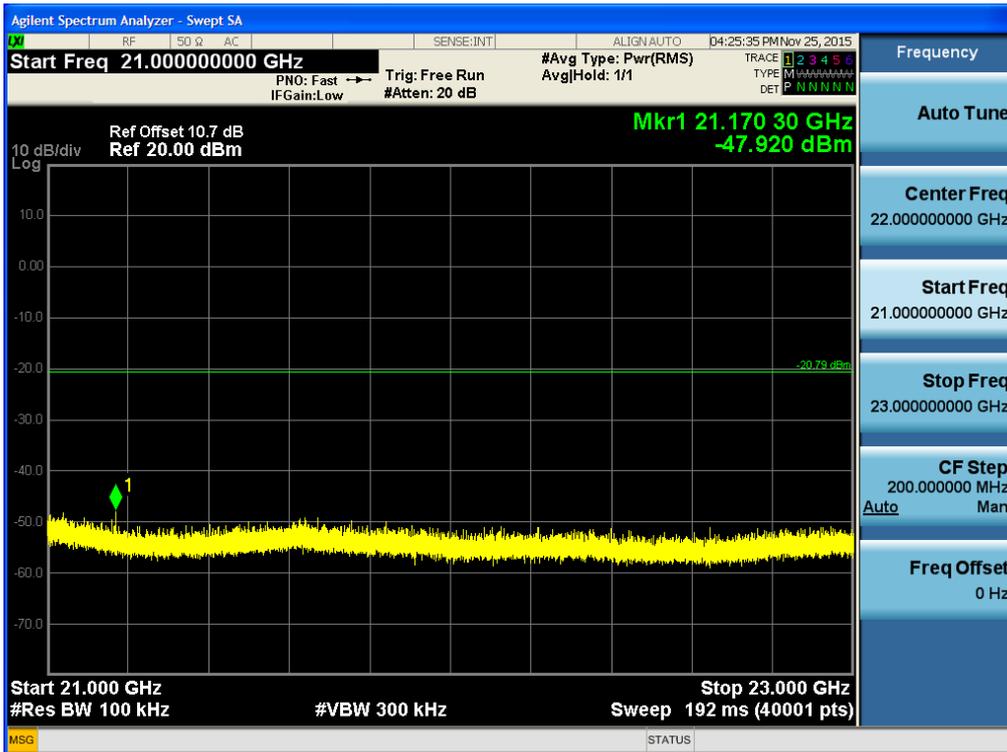
19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11b_Ch.1)



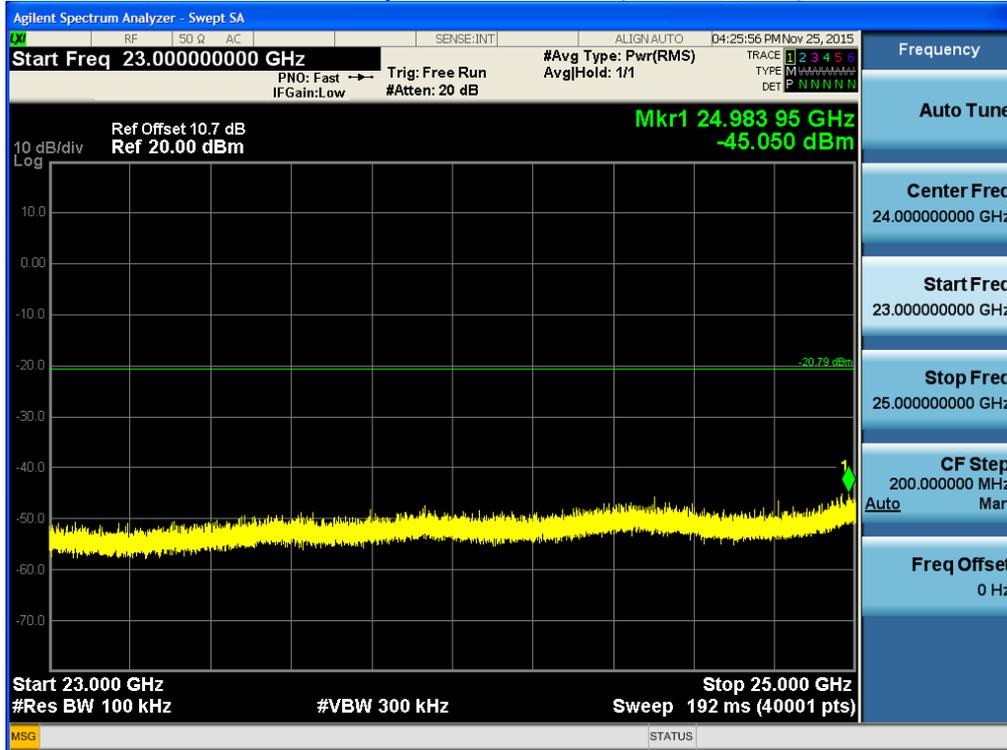
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11b_Ch.1)



23 GHz ~ 25 GHz

Conducted Spurious Emission (802.11b_Ch.1)



8.6 RADIATED MEASUREMENT.

8.6.1 RADIATED SPURIOUS EMISSIONS.

Test Requirements and limit, §15.205, §15.209 / RSS-GEN(Issue 4) Section 8.9.

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

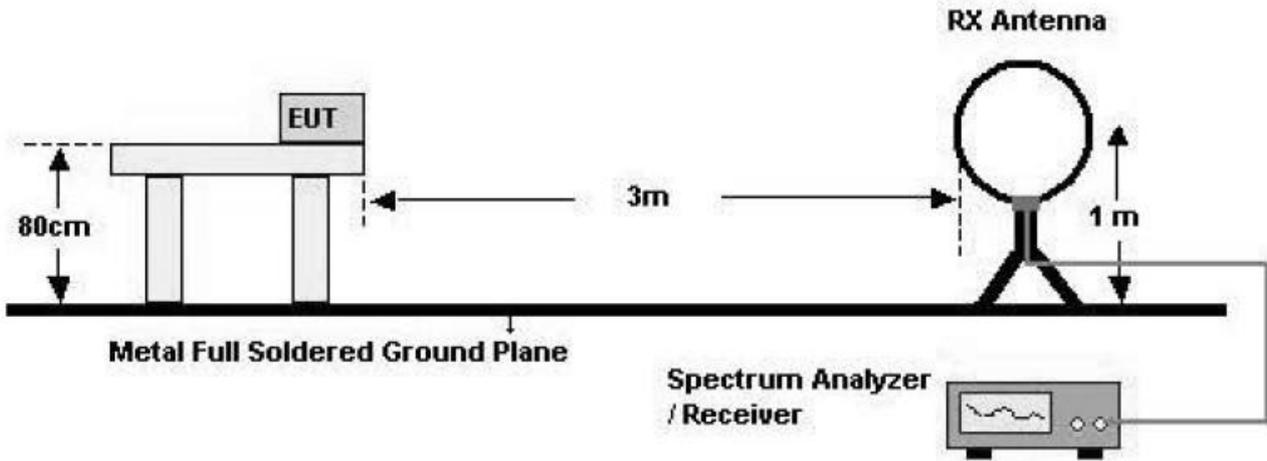
■ Test case

Mode	Operating Mode	Operating Ant.
802.11b/g/n	SISO	Ant 0
		Ant 1
802.11g/n	MIMO	Ant 0 & 1

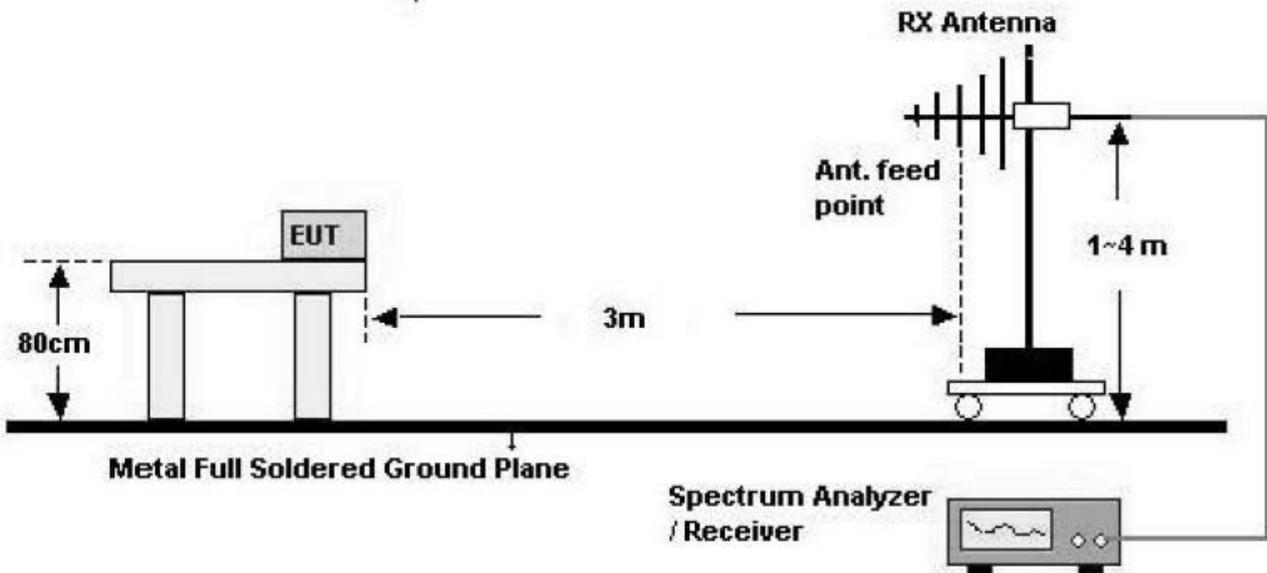
Note : In case of radiation test, we have done all test case. Worst case is Ant 0 & 1 for 802.11b/g/n.
 And in case of 802.11b, worst case is only Ant 0. So, we attached the results of only worst case.

Test Configuration

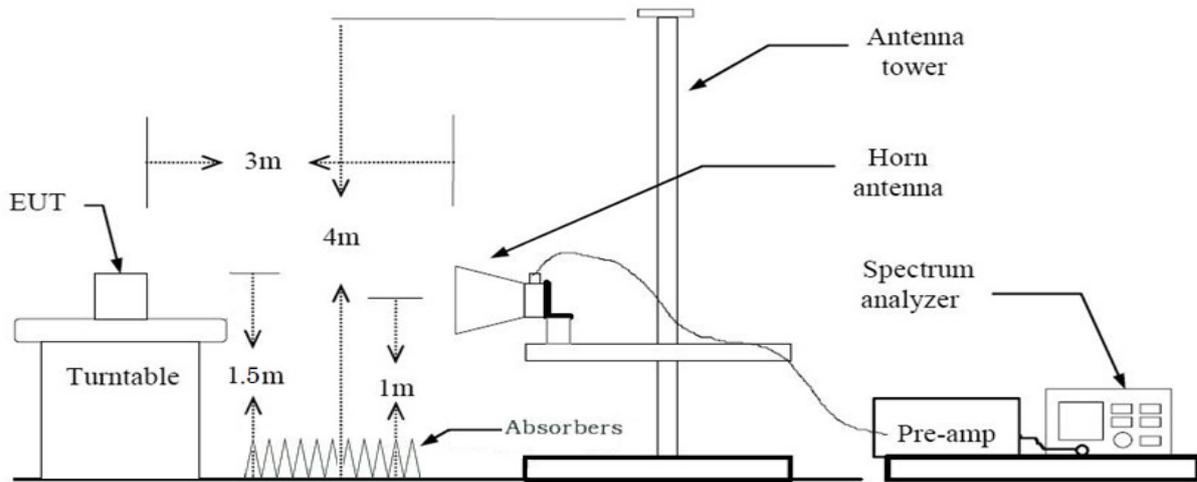
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE USED

Method 12.1 in KDB 558074, issued 06/09/2015

Spectrum Setting

- Peak

Peak emission levels are measured by setting the instrument as follows:

RBW = cf. Table 1.

VBW $\geq 3 \times$ RBW.

Detector = Peak.

Sweep time = auto.

Trace mode = max hold.

Allow sweeps to continue until the trace stabilizes.

(Note that the required measurement time may be longer for low duty cycle applications).

Table 1 —RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

- Average (duty cycle \geq 98%)

Set RBW = 1 MHz

Set VBW \geq 3 x RBW

Detector = RMS

Averaging type = power (i.e., RMS).

Sweep time = auto.

Trace mode = average (at least 100 traces).

- Average (duty cycle < 98%, duty cycle variations are less than $\pm 2\%$)

Set RBW = 1 MHz

Set VBW \geq 3 x RBW

Detector = RMS.

Averaging type = power (i.e., RMS).

Sweep time = auto.

Trace mode = average (at least 100 traces).

A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.

- Average (duty cycle < 98%, duty cycle variations exceed $\pm 2\%$)

Set RBW = 1 MHz

Set VBW \geq 1/T. (at least 100 times less than the resolution bandwidth, but no less than 10 Hz.)

Select spectrum analyzer linear display mode.

Detector = Peak.

Sweep time = auto.

Trace mode = max hold.

Note :

1. We are performed the RSE and radiated band edge using standard radiated method.

2. The duty cycle factor for 802.11 b/g/n_20MHz

Mode	Worst Data rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)	VBW(1/T) (Hz)
b	1	12.420	13.080	94.95	0.225	81
g	6	2.064	2.172	95.03	0.222	484
n_20MHz	MCS Index 0	1.920	2.020	95.05	0.221	521

TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

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

Notes:

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

TEST RESULTS**Below 1 GHz****Operation Mode:** Normal Mode

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

Notes:

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

Above 1 GHz

Operation Mode: 802.11 b
 Transfer Rate: 1 Mbps
 Operating Frequency 2412
 Channel No. 01 Ch

Frequency [MHz]	Reading dBuV	A.F.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4824	49.84	-2.83	V	47.01	73.98	26.97	PK
4824	41.15	-2.83	V	38.32	53.98	15.66	AV
7236	46.23	6.74	V	52.97	73.98	21.01	PK
7236	36.02	6.74	V	42.76	53.98	11.22	AV
4824	49.53	-2.83	H	46.70	73.98	27.28	PK
4824	40.21	-2.83	H	37.38	53.98	16.60	AV
7236	46.83	6.74	H	53.57	73.98	20.41	PK
7236	37.21	6.74	H	43.95	53.98	10.03	AV

Operation Mode: 802.11 g
 Transfer Rate: 6 Mbps
 Operating Frequency 2412
 Channel No. 01 Ch

Frequency [MHz]	Reading dBuV	A.F.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4824	49.30	-2.83	V	46.47	73.98	27.51	PK
4824	36.63	-2.83	V	33.80	53.98	20.18	AV
7236	46.84	6.74	V	53.58	73.98	20.40	PK
7236	35.71	6.74	V	42.45	53.98	11.53	AV
4824	49.18	-2.83	H	46.35	73.98	27.63	PK
4824	36.54	-2.83	H	33.71	53.98	20.27	AV
7236	47.80	6.74	H	54.54	73.98	19.44	PK
7236	36.79	6.74	H	43.53	53.98	10.45	AV

Operation Mode: 802.11 n_20MHz
 Transfer MCS Index 0
 Operating Frequency 2412
 Channel No. 01 Ch

Frequency [MHz]	Reading dBuV	A.F.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4824	49.27	-2.83	V	46.44	73.98	27.54	PK
4824	36.61	-2.83	V	33.78	53.98	20.20	AV
7236	45.82	6.74	V	52.56	73.98	21.42	PK
7236	35.44	6.74	V	42.18	53.98	11.80	AV
4824	49.12	-2.83	H	46.29	73.98	27.69	PK
4824	36.50	-2.83	H	33.67	53.98	20.31	AV
7236	46.68	6.74	H	53.42	73.98	20.56	PK
7236	36.91	6.74	H	43.65	53.98	10.33	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 802.11b/g/n mode and all data rate. Worst data rate is the lowest data of each mode.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode: 802.11 b
 Transfer Rate: 1 Mbps
 Operating Frequency: 2437
 Channel No.: 06 Ch

Frequency [MHz]	Reading dBuV	A.F.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4874	49.85	-2.61	V	47.24	73.98	26.74	PK
4874	39.70	-2.61	V	37.09	53.98	16.89	AV
7311	46.88	6.17	V	53.05	73.98	20.93	PK
7311	35.42	6.17	V	41.59	53.98	12.39	AV
4874	49.24	-2.61	H	46.63	73.98	27.35	PK
4874	38.93	-2.61	H	36.32	53.98	17.66	AV
7311	47.73	6.17	H	53.90	73.98	20.08	PK
7311	36.90	6.17	H	43.07	53.98	10.91	AV

Operation Mode: 802.11 g
 Transfer Rate: 6 Mbps
 Operating Frequency: 2437
 Channel No.: 06 Ch

Frequency [MHz]	Reading dBuV	A.F.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4874	50.60	-2.61	V	47.99	73.98	25.99	PK
4874	38.25	-2.61	V	35.64	53.98	18.34	AV
7311	46.37	6.17	V	52.54	73.98	21.44	PK
7311	35.84	6.17	V	42.01	53.98	11.97	AV
4874	50.58	-2.61	H	47.97	73.98	26.01	PK
4874	38.19	-2.61	H	35.58	53.98	18.40	AV
7311	47.21	6.17	H	53.38	73.98	20.60	PK
7311	36.77	6.17	H	42.94	53.98	11.04	AV

Operation Mode: 802.11 n_20MHz
 Transfer MCS Index 0
 Operating Frequency 2437
 Channel No. 06 Ch

Frequency [MHz]	Reading dBuV	A.F.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4874	50.77	-2.61	V	48.16	73.98	25.82	PK
4874	38.43	-2.61	V	35.82	53.98	18.16	AV
7311	46.21	6.17	V	52.38	73.98	21.60	PK
7311	35.84	6.17	V	42.01	53.98	11.97	AV
4874	50.69	-2.61	H	48.08	73.98	25.90	PK
4874	38.38	-2.61	H	35.77	53.98	18.21	AV
7311	47.12	6.17	H	53.29	73.98	20.69	PK
7311	37.05	6.17	H	43.22	53.98	10.76	AV

Notes:

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

Operation Mode: 802.11 b
 Transfer Rate: 1 Mbps
 Operating Frequency: 2462
 Channel No.: 11 Ch

Frequency [MHz]	Reading dBuV	A.F.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4924	49.88	-2.42	V	47.46	73.98	26.52	PK
4924	40.35	-2.42	V	37.93	53.98	16.05	AV
7386	45.02	6.33	V	51.35	73.98	22.63	PK
7386	34.34	6.33	V	40.67	53.98	13.31	AV
4924	49.17	-2.42	H	46.75	73.98	27.23	PK
4924	39.52	-2.42	H	37.10	53.98	16.88	AV
7386	46.04	6.33	H	52.37	73.98	21.61	PK
7386	35.70	6.33	H	42.03	53.98	11.95	AV

Operation Mode: 802.11 g
 Transfer Rate: 6 Mbps
 Operating Frequency: 2462
 Channel No.: 11 Ch

Frequency [MHz]	Reading dBuV	A.F.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4924	49.05	-2.42	V	46.63	73.98	27.35	PK
4924	36.90	-2.42	V	34.48	53.98	19.50	AV
7386	45.68	6.33	V	52.01	73.98	21.97	PK
7386	34.84	6.33	V	41.17	53.98	12.81	AV
4924	49.00	-2.42	H	46.58	73.98	27.40	PK
4924	36.78	-2.42	H	34.36	53.98	19.62	AV
7386	46.74	6.33	H	53.07	73.98	20.91	PK
7386	36.04	6.33	H	42.37	53.98	11.61	AV

Operation Mode: 802.11 n_20MHz
 Transfer MCS Index 0
 Operating Frequency 2462
 Channel No. 11 Ch

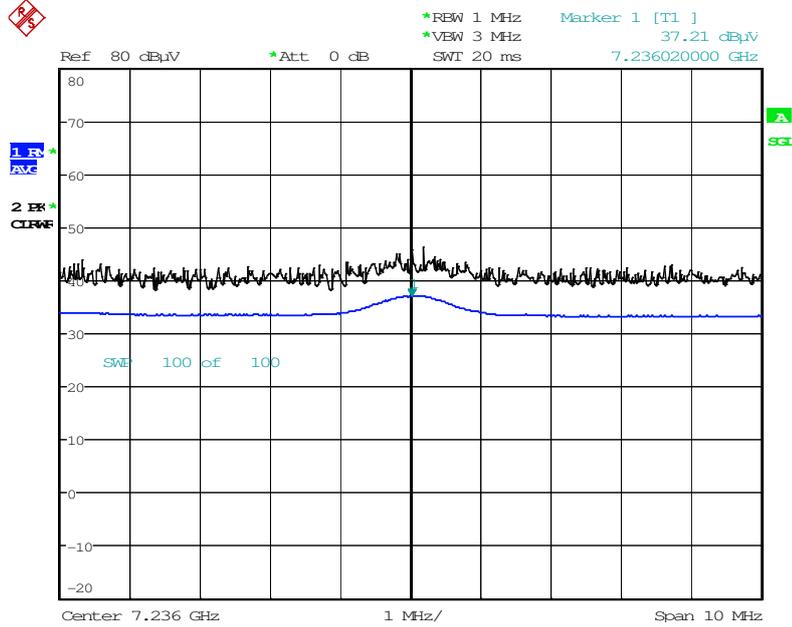
Frequency [MHz]	Reading dBuV	A.F.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4924	49.16	-2.42	V	46.74	73.98	27.24	PK
4924	36.93	-2.42	V	34.51	53.98	19.47	AV
7386	45.81	6.33	V	52.14	73.98	21.84	PK
7386	34.97	6.33	V	41.30	53.98	12.68	AV
4924	49.11	-2.42	H	46.69	73.98	27.29	PK
4924	36.88	-2.42	H	34.46	53.98	19.52	AV
7386	46.78	6.33	H	53.11	73.98	20.87	PK
7386	36.10	6.33	H	42.43	53.98	11.55	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 802.11b/g/n mode and all data rate. Worst data rate is the lowest data of each mode.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

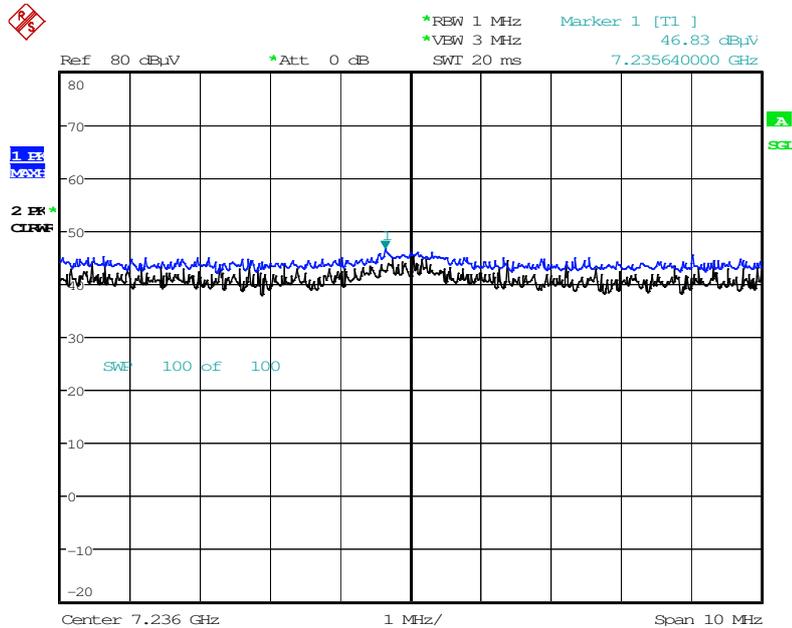
■ RESULT PLOTS

Radiated Spurious Emissions plot – Average Reading (802.11b, Ch.1 3rd Harmonic)



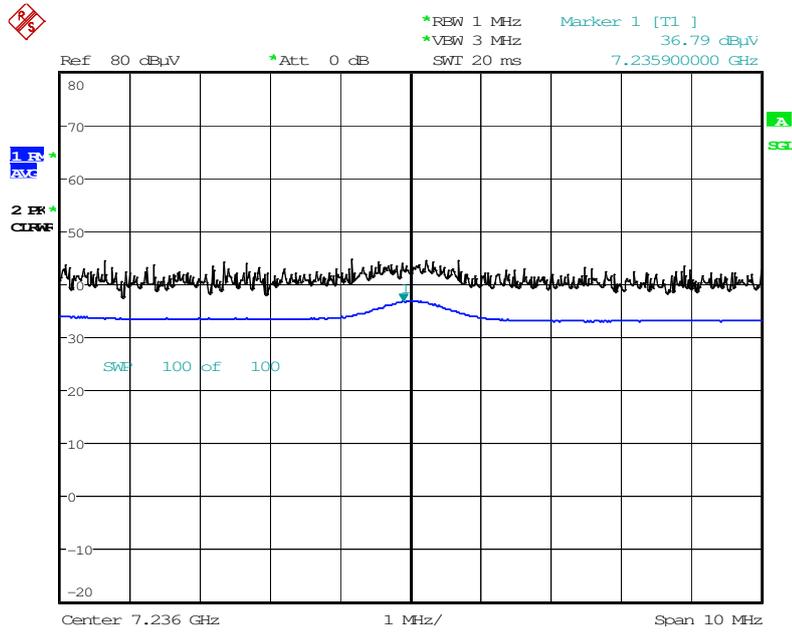
Date: 13.NOV.2015 00:30:12

Radiated Spurious Emissions plot – Peak Reading (802.11b, Ch.1 3rd Harmonic)



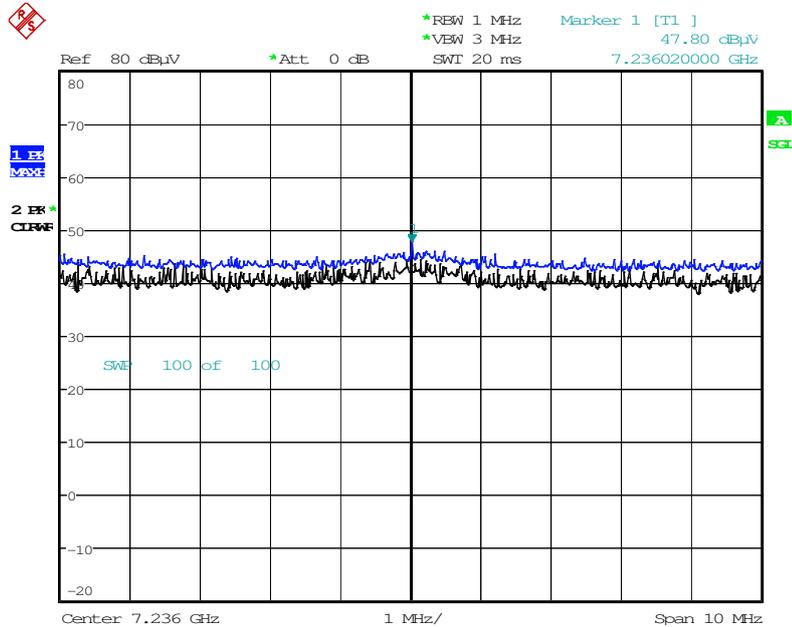
Date: 13.NOV.2015 00:35:47

Radiated Spurious Emissions plot – Average Reading (802.11g, Ch.1 3rd Harmonic)



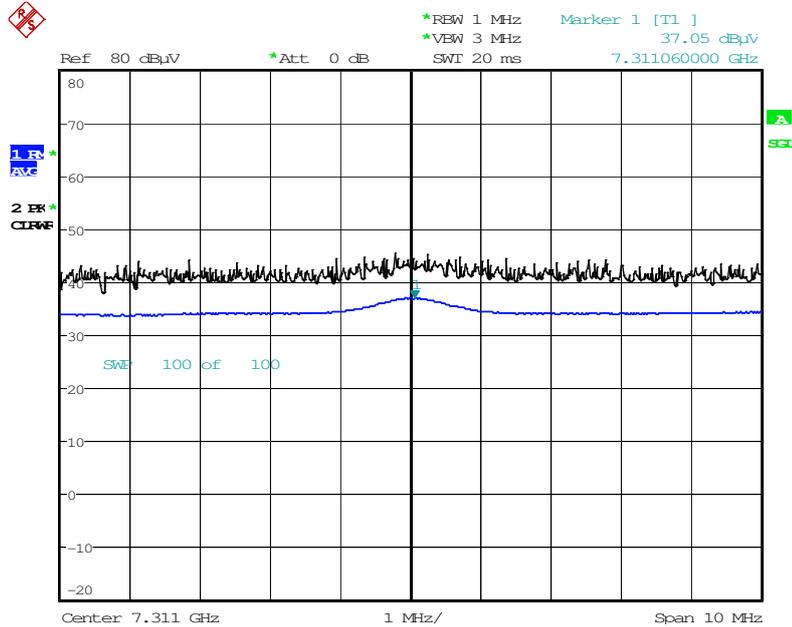
Date: 13.NOV.2015 00:58:03

Radiated Spurious Emissions plot – Peak Reading (802.11g, Ch.1 3rd Harmonic)



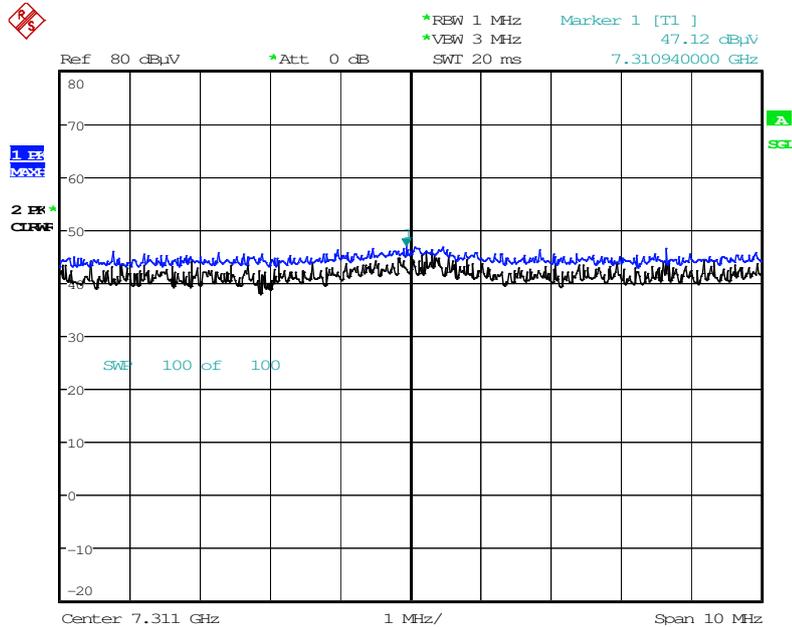
Date: 13.NOV.2015 00:58:44

Radiated Spurious Emissions plot – Average Reading (802.11n_20MHz, Ch.6 3rd Harmonic)



Date: 13.NOV.2015 00:42:35

Radiated Spurious Emissions plot – Peak Reading (802.11n_20MHz, Ch.6 3rd Harmonic)



Date: 13.NOV.2015 00:42:58

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

8.6.2 RADIATED RESTRICTED BAND EDGES

Test Requirements and limit, §15.247(d) §15.205, §15.209 / RSS-GEN(Issue 4) Section 8.10

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)).

Operation Mode: 802.11g
 Transfer Rate: 6 Mbps
 Operating Frequency 2412 MHz, 2462 MHz
 Channel No. 01 Ch, 11 Ch

Frequency [MHz]	Reading dBuV	A.F.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	28.05	31.31	H	59.36	73.98	14.62	PK
2390.0	15.15	31.31	H	46.46	53.98	7.52	AV
2390.0	26.03	31.31	V	57.34	73.98	16.64	PK
2390.0	14.50	31.31	V	45.81	53.98	8.17	AV
2483.5	29.60	31.37	H	60.97	73.98	13.01	PK
2483.5	15.90	31.37	H	47.27	53.98	6.71	AV
2483.5	29.54	31.37	V	60.91	73.98	13.07	PK
2483.5	15.84	31.37	V	47.21	53.98	6.77	AV

Operation Mode: 802.11b
 Transfer Rate: 1 Mbps
 Operating Frequency: 2412 MHz, 2462 MHz
 Channel No.: 01 Ch, 11 Ch

Frequency [MHz]	Reading dBuV	A.F.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	25.26	31.31	H	56.57	73.98	17.41	PK
2390.0	13.87	31.31	H	45.18	53.98	8.80	AV
2390.0	25.23	31.31	V	56.54	73.98	17.44	PK
2390.0	13.80	31.31	V	45.11	53.98	8.87	AV
2483.5	25.00	31.37	H	56.37	73.98	17.61	PK
2483.5	13.10	31.37	H	44.47	53.98	9.51	AV
2483.5	24.89	31.37	V	56.26	73.98	17.72	PK
2483.5	13.02	31.37	V	44.39	53.98	9.59	AV

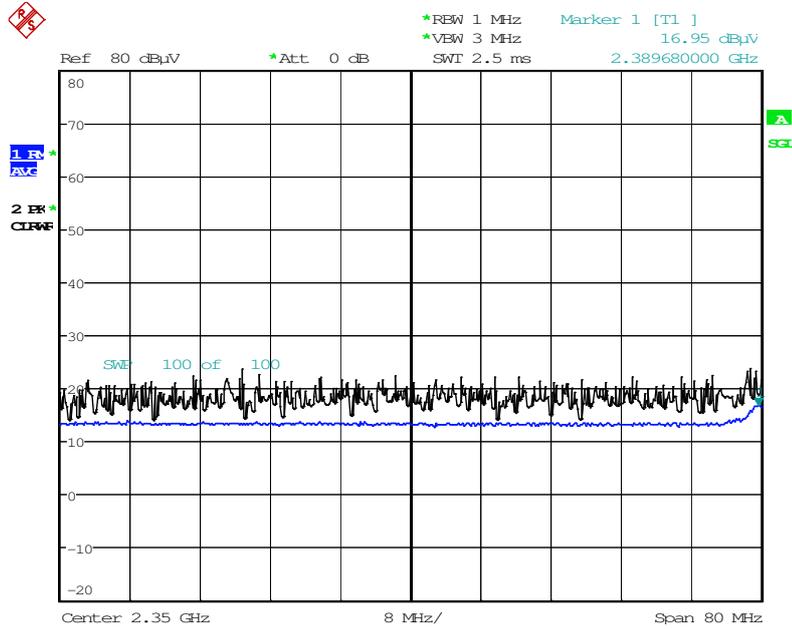
Operation Mode: 802.11n_20MHz BW
 Transfer MCS Index: 0
 Operating Frequency: 2412 MHz, 2462 MHz
 Channel No.: 01 Ch, 11 Ch

Frequency [MHz]	Reading dBuV	A.F.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	30.32	31.31	H	61.63	73.98	12.35	PK
2390.0	16.95	31.31	H	48.26	53.98	5.72	AV
2390.0	28.44	31.31	V	59.75	73.98	14.23	PK
2390.0	16.20	31.31	V	47.51	53.98	6.47	AV
2483.5	28.18	31.37	H	59.55	73.98	14.43	PK
2483.5	15.30	31.37	H	46.67	53.98	7.31	AV
2483.5	27.44	31.37	V	58.81	73.98	15.17	PK
2483.5	14.50	31.37	V	45.87	53.98	8.11	AV

Notes:

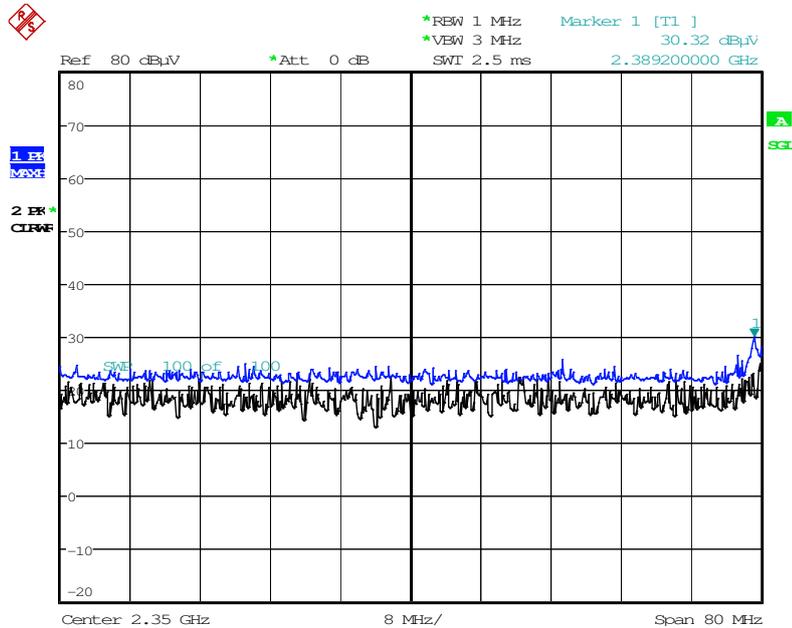
1. Total = Reading Value + Antenna Factor + Cable Loss
2. We have done 802.11b/g/n mode and all data rate. Worst data rate is the lowest data of each mode.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Radiated Restricted Band Edges plot – Average Reading (802.11n_20MHz, Ch.1)



Date: 12.NOV.2015 06:12:57

Radiated Restricted Band Edges plot – Peak Reading (802.11n_20MHz, Ch.1)



Date: 12.NOV.2015 06:12:13

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

8.6.3 RECEIVER SPURIOUS EMISSIONS

IC Rule(s) RSS-GEN
Test Requirements: Below 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
MHz	dB μ V	dB / m	dB	(H/V)	dB μ V/m	dB μ V/m	dB
222.19	15.29	10.80	1.27	H	27.36	46	18.64
629.28	15.69	20.50	1.96	V	38.15	46	7.85
823.87	15.32	23.90	2.38	H	41.60	46	4.40

Above 1 GHz

Frequency	Reading	Ant. factor+Cable loss- Amp Gain	Ant. POL	Total	Limit	Margin	Detect
MHz	dB μ V	dB	(H/V)	dB μ V/m	dB μ V/m	dB	mode
1717	50.99	-12.78	V	38.21	73.98	35.77	PK
3725	51.53	-7.21	H	44.32	73.98	29.66	PK
6130	48.27	4.02	V	52.29	73.98	21.69	PK

Note : The result using peak detect mode is lower than average limit. So, there is no data for average detect mode.

8.7 POWERLINE CONDUCTED EMISSIONS

Test Requirements and limit, §15.207 / RSS-GEN(Issue 4) Section 8.8

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 ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.

Sample Calculation

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

■ **RESULT PLOTS**

Conducted Emissions (Line 1)

WLAN 2.4G N

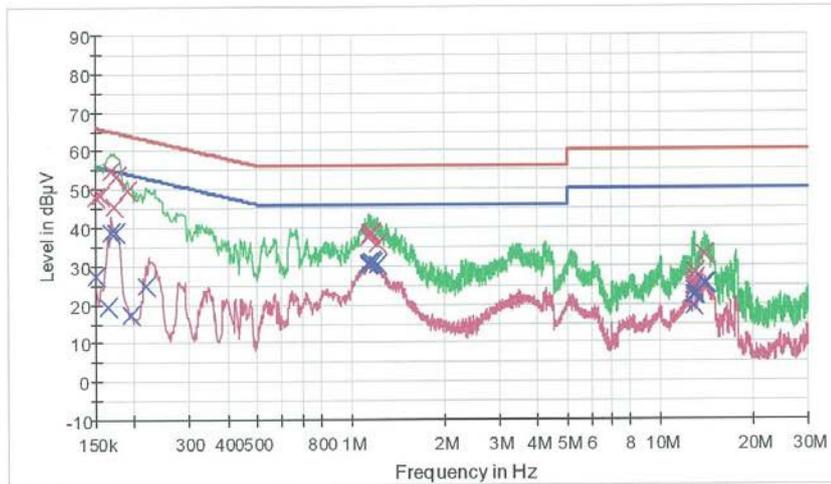
1 / 2

HCT TEST Report

Common Information

EUT: WC1NP6
 Manufacturer: LG
 Test Site: SHIELD ROOM
 Operating Conditions: WLAN MODE_2.4G
 Operator Name: KS KANG

FCC CLASS B



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

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	48.1	9.000	Off	N	9.6	17.9	66.0
0.156000	48.4	9.000	Off	N	9.6	17.3	65.7
0.168000	54.5	9.000	Off	N	9.6	10.6	65.1
0.172000	45.3	9.000	Off	N	9.6	19.6	64.9
0.176000	53.2	9.000	Off	N	9.6	11.5	64.7
0.190000	49.5	9.000	Off	N	9.6	14.5	64.0
1.142000	37.5	9.000	Off	N	9.7	18.5	56.0
1.146000	38.1	9.000	Off	N	9.7	17.9	56.0
1.154000	37.8	9.000	Off	N	9.7	18.2	56.0
1.158000	38.1	9.000	Off	N	9.7	17.9	56.0
1.164000	38.7	9.000	Off	N	9.7	17.3	56.0
1.214000	35.9	9.000	Off	N	9.7	20.1	56.0
12.794000	24.7	9.000	Off	N	10.1	35.3	60.0
12.808000	24.9	9.000	Off	N	10.1	35.1	60.0
12.906000	25.6	9.000	Off	N	10.1	34.4	60.0
12.938000	28.1	9.000	Off	N	10.1	31.9	60.0

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WLAN 2.4G N

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Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
13.004000	26.5	9.000	Off	N	10.1	33.5	60.0
13.920000	32.7	9.000	Off	N	10.1	27.3	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	27.4	9.000	Off	N	9.6	28.6	56.0
0.164000	19.6	9.000	Off	N	9.6	35.7	55.3
0.168000	38.8	9.000	Off	N	9.6	16.3	55.1
0.174000	38.6	9.000	Off	N	9.6	16.2	54.8
0.194000	17.5	9.000	Off	N	9.6	36.4	53.9
0.218000	24.8	9.000	Off	N	9.6	28.1	52.9
1.138000	30.8	9.000	Off	N	9.7	15.2	46.0
1.142000	30.5	9.000	Off	N	9.7	15.5	46.0
1.146000	30.7	9.000	Off	N	9.7	15.4	46.0
1.168000	31.1	9.000	Off	N	9.7	14.9	46.0
1.174000	30.9	9.000	Off	N	9.7	15.1	46.0
1.214000	30.4	9.000	Off	N	9.7	15.6	46.0
12.808000	23.5	9.000	Off	N	10.1	26.5	50.0
12.856000	19.3	9.000	Off	N	10.1	30.7	50.0
12.906000	22.3	9.000	Off	N	10.1	27.7	50.0
12.938000	22.2	9.000	Off	N	10.1	27.8	50.0
13.950000	25.4	9.000	Off	N	10.1	24.6	50.0
13.984000	25.3	9.000	Off	N	10.1	24.7	50.0

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Conducted Emissions (Line 2)

WLAN 2.4G L1

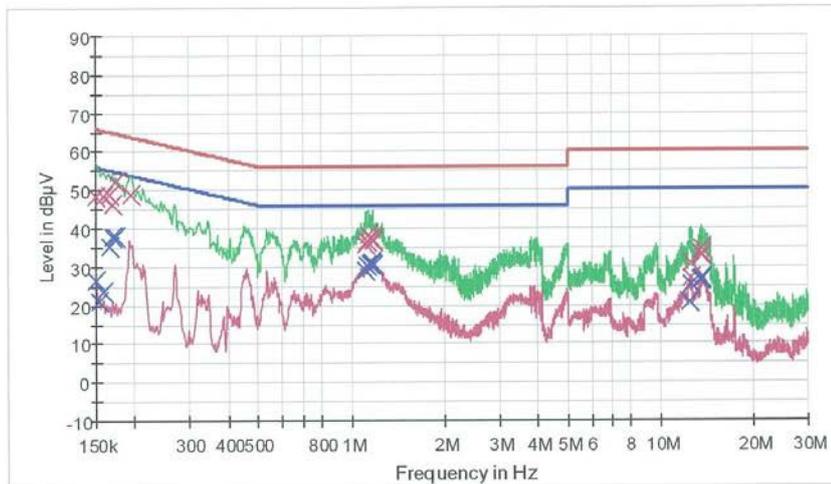
1 / 2

HCT TEST Report

Common Information

EUT: WC1NP6
 Manufacturer: LG
 Test Site: SHIELD ROOM
 Operating Conditions: WLAN MODE_2.4G
 Operator Name: KS KANG

FCC CLASS B



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

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	48.5	9.000	Off	L1	9.6	17.5	66.0
0.158000	48.6	9.000	Off	L1	9.6	17.0	65.6
0.166000	48.7	9.000	Off	L1	9.6	16.5	65.2
0.170000	46.1	9.000	Off	L1	9.6	18.9	65.0
0.174000	52.3	9.000	Off	L1	9.6	12.5	64.8
0.194000	48.9	9.000	Off	L1	9.6	15.0	63.9
1.112000	35.7	9.000	Off	L1	9.7	20.3	56.0
1.128000	36.6	9.000	Off	L1	9.7	19.4	56.0
1.136000	38.2	9.000	Off	L1	9.7	17.8	56.0
1.160000	37.5	9.000	Off	L1	9.7	18.5	56.0
1.176000	36.6	9.000	Off	L1	9.7	19.4	56.0
1.180000	36.9	9.000	Off	L1	9.7	19.1	56.0
12.506000	26.9	9.000	Off	L1	10.0	33.1	60.0
12.588000	30.7	9.000	Off	L1	10.1	29.3	60.0
13.554000	32.8	9.000	Off	L1	10.1	27.2	60.0
13.570000	33.2	9.000	Off	L1	10.1	26.8	60.0

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WLAN 2.4G L1

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Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
13.616000	34.4	9.000	Off	L1	10.1	25.6	60.0
13.638000	33.1	9.000	Off	L1	10.1	26.9	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	26.7	9.000	Off	L1	9.6	29.3	56.0
0.154000	21.0	9.000	Off	L1	9.6	34.8	55.8
0.158000	23.6	9.000	Off	L1	9.6	32.0	55.6
0.166000	35.3	9.000	Off	L1	9.6	19.9	55.2
0.170000	38.1	9.000	Off	L1	9.6	16.9	55.0
0.174000	38.0	9.000	Off	L1	9.6	16.8	54.8
1.110000	29.3	9.000	Off	L1	9.7	16.7	46.0
1.128000	30.2	9.000	Off	L1	9.7	15.8	46.0
1.154000	30.7	9.000	Off	L1	9.7	15.3	46.0
1.160000	30.8	9.000	Off	L1	9.7	15.2	46.0
1.164000	31.2	9.000	Off	L1	9.7	14.8	46.0
1.180000	30.5	9.000	Off	L1	9.7	15.5	46.0
12.382000	20.7	9.000	Off	L1	10.0	29.3	50.0
12.506000	25.1	9.000	Off	L1	10.0	24.9	50.0
13.480000	26.6	9.000	Off	L1	10.1	23.4	50.0
13.566000	26.9	9.000	Off	L1	10.1	23.1	50.0
13.602000	26.5	9.000	Off	L1	10.1	23.5	50.0
13.638000	26.5	9.000	Off	L1	10.1	23.5	50.0

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9. LIST OF TEST EQUIPMENT

9.1 LIST OF TEST EQUIPMENT(Conducted Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216/ LISN	01/13/2015	Annual	100073
Agilent	E4440A/ Spectrum Analyzer	03/18/2015	Annual	US45303008
Agilent	N9020A / SIGNAL ANALYZER	06/30/2015	Annual	MY51110085
Agilent	N9020A / SIGNAL ANALYZER	07/02/2015	Annual	MY50510304
Agilent	N1911A/Power Meter	07/09/2015	Annual	MY45100523
Agilent	N1921A /POWER SENSOR	07/09/2015	Annual	MY45241059
Agilent	87300B/Directional Coupler	12/08/2014	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	06/15/2015	Annual	5001
Hewlett Packard	E3632A / DC POWER SUPPLY	03/11/2015	Annual	KR75303962
Agilent	8493C / Attenuator(10 dB)	07/21/2015	Annual	07560

9.2 LIST OF TEST EQUIPMENT(Radiated Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Schwarzbeck	VULB 9160/ TRILOG Antenna	10/10/2014	Biennial	3368
HD	MA240/ Antenna Position Tower	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	12
Schwarzbeck	BBHA 9120D/ Horn Antenna	05/07/2015	Biennial	937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	04/30/2015	Biennial	BBHA9170124
Rohde & Schwarz	FSP / Spectrum Analyzer	01/22/2015	Annual	839117/011
Wainwright Instrument	WHF3.0/18G-10EF / High Pass Filter	06/29/2015	Annual	8
Wainwright Instrument	WRCJ2400/2483.5-2370/2520-60/14SS / Band Reject Filter	06/15/2015	Annual	1
Rohde & Schwarz	LOOP ANTENNA	09/03/2014	Biennial	1513-175
CERNEX	CBL18265035 / POWER AMP	07/27/2015	Annual	22966
CERNEX	CBL06185030 / POWER AMP	07/21/2015	Annual	22965
CERNEX	CBLU1183540 / POWER AMP	07/21/2015	Annual	22964