

RF TEST REPORT

Test item : Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN
Model No. : LG-E400, E400, LGE400
Order No. : 1111-01610
Date of receipt : 2011-11-28
Test duration : 2011-12-12 ~ 2011-12-20
Date of issue : 2011-12-20
Use of report : FCC Original Grant

Applicant : LG Electronics MobileComm U.S.A., Inc.
10101 Old Grove Road., San Diego, CA 92131

Test laboratory : Digital EMC Co., Ltd.
683-3, Yubang-Dong, Cheoin-Gu, Yongin-Si, Kyunggi-Do, 449-080, Korea

Test specification : FCC Part 15 Subpart C 247
Test environment : See appended test report
Test result : ☒ Pass ☐ Fail

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose. This test report shall not be reproduced except in full, without the written approval of DIGITAL EMC CO., LTD.

Tested by:

Witnessed by:

Reviewed by:



Engineer
S.K.Ryu

N/A



Technical Director
Harvey Sung

Table of Contents

1. GENERAL INFORMATION	3
2. EUT DESCRIPTION	3
3. TEST METHODOLOGY	4
3.1 EUT CONFIGURATION	4
3.2 EUT EXERCISE	4
3.3 GENERAL TEST PROCEDURES	4
3.4 DESCRIPTION OF TEST MODES	4
4. INSTRUMENT CALIBRATION	5
5. FACILITIES AND ACCREDITATIONS	5
5.1 FACILITIES	5
5.2 EQUIPMENT	5
6. ANTENNA REQUIREMENTS	5
7. TEST RESULT	6
7.1 6dB Bandwidth Measurement (802.11b/g/n)	6
7.2 Peak Output Power	12
7.3 Power Spectral Density (802.11b/g/n)	13
7.4 Out of Band Emissions at the Band Edge/ Conducted Spurious Emissions	19
7.5 Radiated Measurement.	29
7.6 POWERLINE CONDUCTED EMISSIONS	34
8. LIST OF TEST EQUIPMENT	41

1. GENERAL INFORMATION

Applicant : LG Electronics MobileComm U.S.A., Inc.
Address : 10101 Old Grove Road., San Diego, CA 92131
FCC ID : ZNFE400
EUT : Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN
Model : LG-E400
Additional Model(s) : E400, LGE400
Data of Test : 2011-12-12 ~ 2011-12-20
Contact person : Yun Jin Cho

2. EUT DESCRIPTION

Product	Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN
Model Name	LG-E400, E400, LGE400 ※ Three models are same mechanical, electrical and functional. ※ The only difference is the model name, which are changed for marketing purpose.
Power Supply	DC 3.7V
Battery type	Standard Battery: Li-Ion Battery
Frequency Range	2412 ~ 2462MHz
Max. RF Output Power	802.11b: 19.13 dBm 802.11g: 23.04 dBm 802.11n: 22.92 dBm
Modulation Type	802.11b: DSSS(CCK, DQPSK, DBPSK) 802.11g: OFDM(64QAM, QPSK, BPSK) 802.11n: OFDM(64QAM, QPSK, BPSK)
Antenna Specification	Internal Antenna Gain: -0.676 dBi (PK)

3. TEST METHODOLOGY

The measurement procedure described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz(ANSI C63.4-2003) and KDB 558074 (Measurement of Digital Transmission Systems Operating under Section 15.247)

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.

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)

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 10m Chamber and conducted measurement facility used to collect the radiated data are located at the 683-3, Yubang-Dong, Yongin-Si, Gyunggi-Do, 449-080, South Korea. The site is constructed in conformance with the requirements.

- 10m Chamber registration Number: 678747

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. TEST RESULT

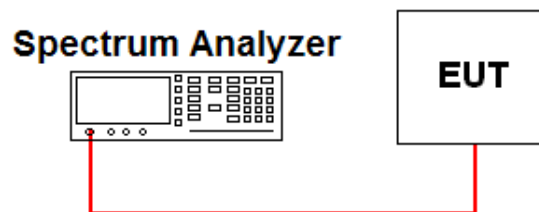
7.1 6dB Bandwidth Measurement (802.11b/g/n)

Test Requirements and limit, §15.247(d)

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

RBW: 100 KHz

VBW: 300 KHz

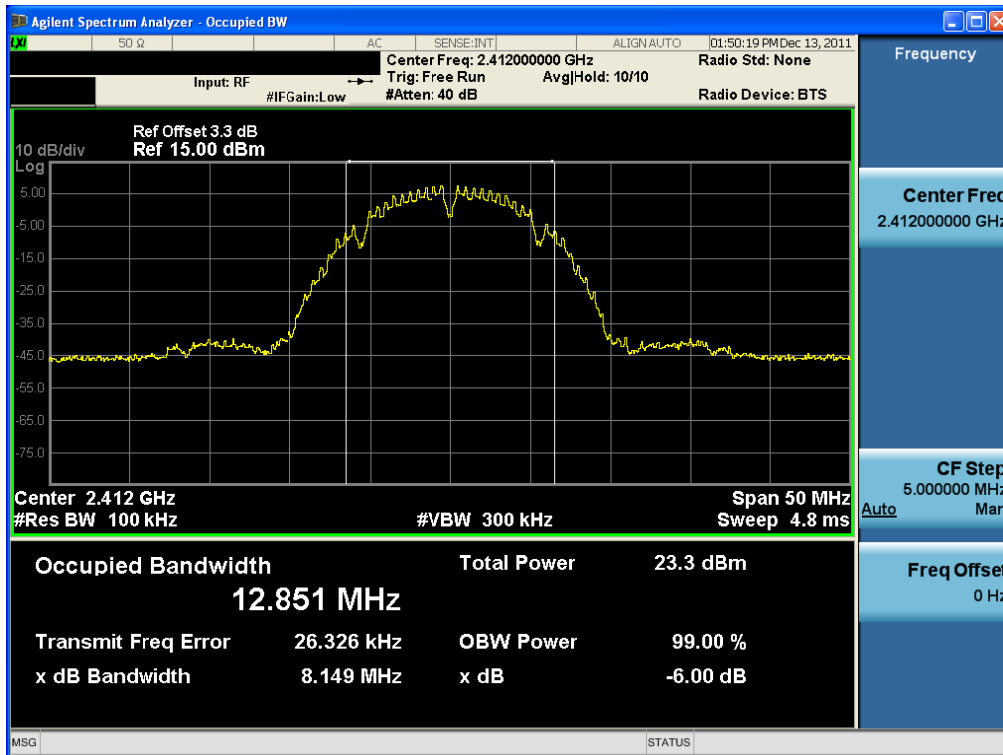
SPAN: 50 MHz

■ TEST RESULTS: **Comply**

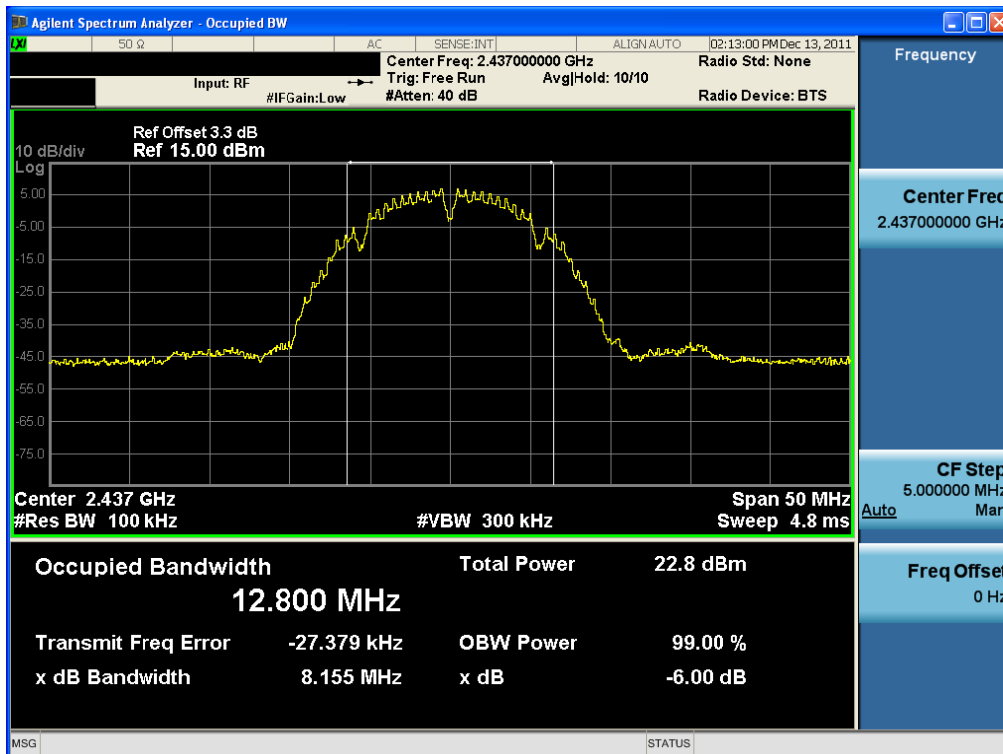
Test Mode	Data Rate	Tested Channel	Test Results [MHz]
802.11b	1Mbps	Lowest	8.149
		Middle	8.155
		Highest	8.090
802.11g	6Mbps	Lowest	16.020
		Middle	16.420
		Highest	15.540
802.11n	MCS 6	Lowest	16.930
		Middle	17.640
		Highest	16.430

■ RESULT PLOTS

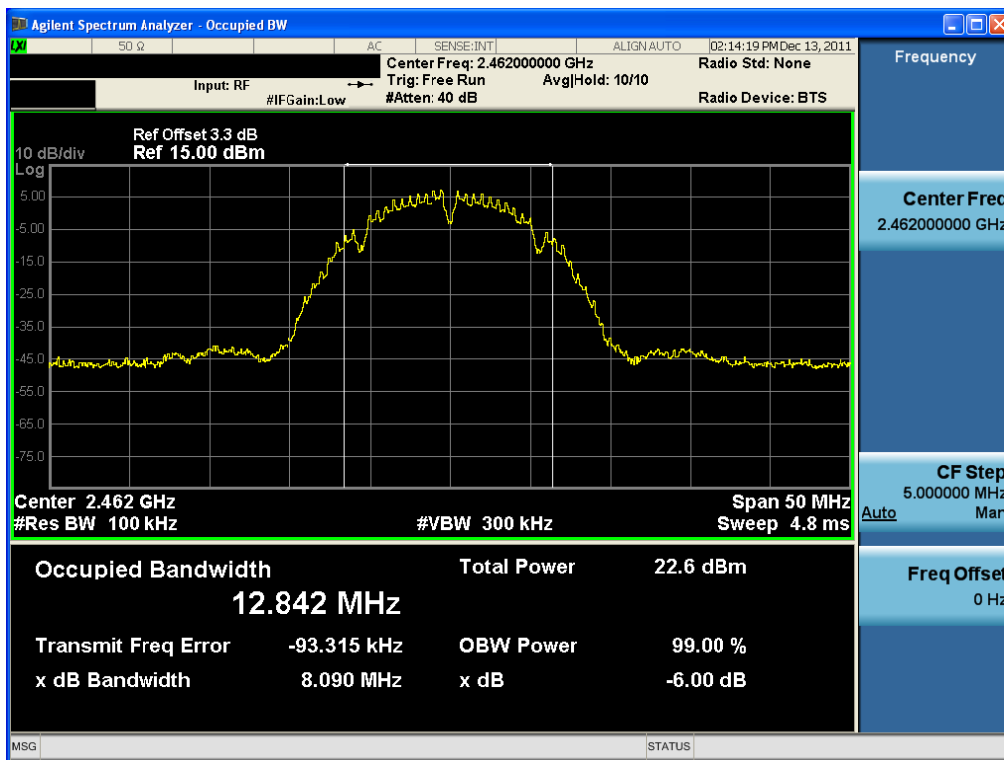
6 dB Bandwidth

Lowest Channel & Modulation: 802.11b

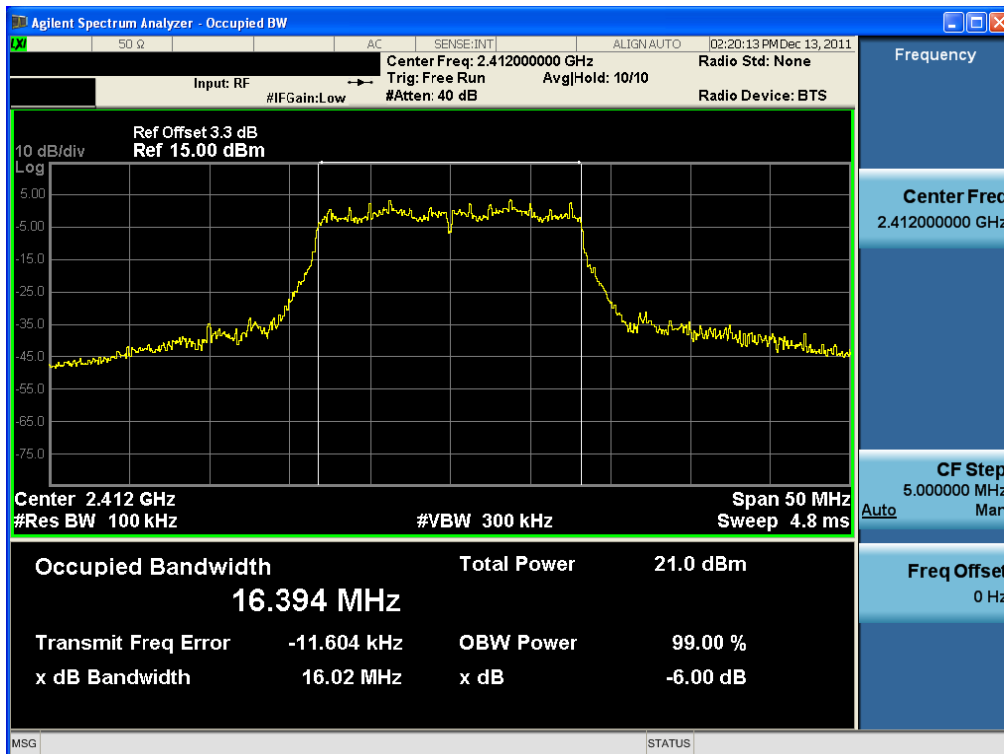
6 dB Bandwidth

Middle Channel & Modulation: 802.11b

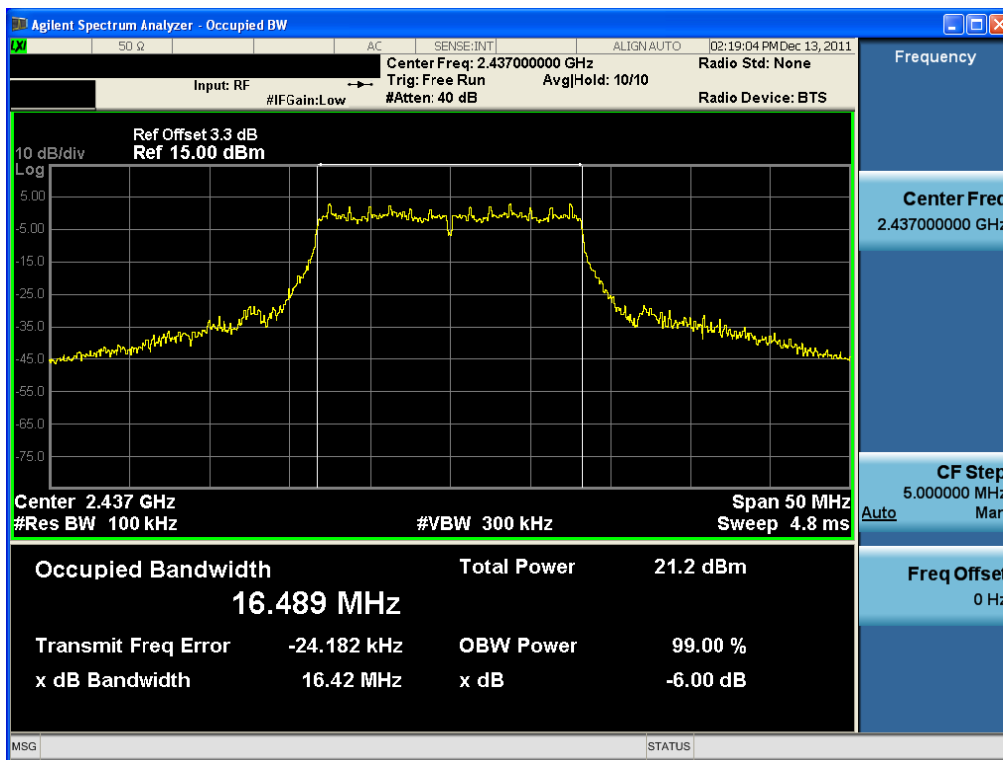
6 dB Bandwidth

Highest Channel & Modulation: 802.11b

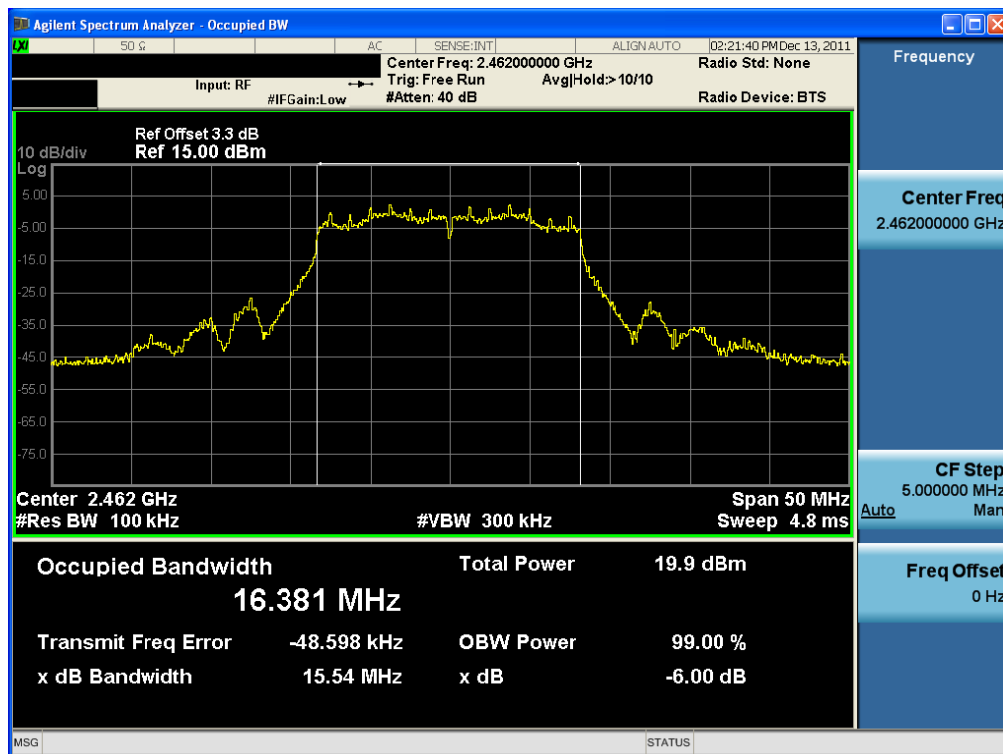
6 dB Bandwidth

Lowest Channel & Modulation: 802.11g

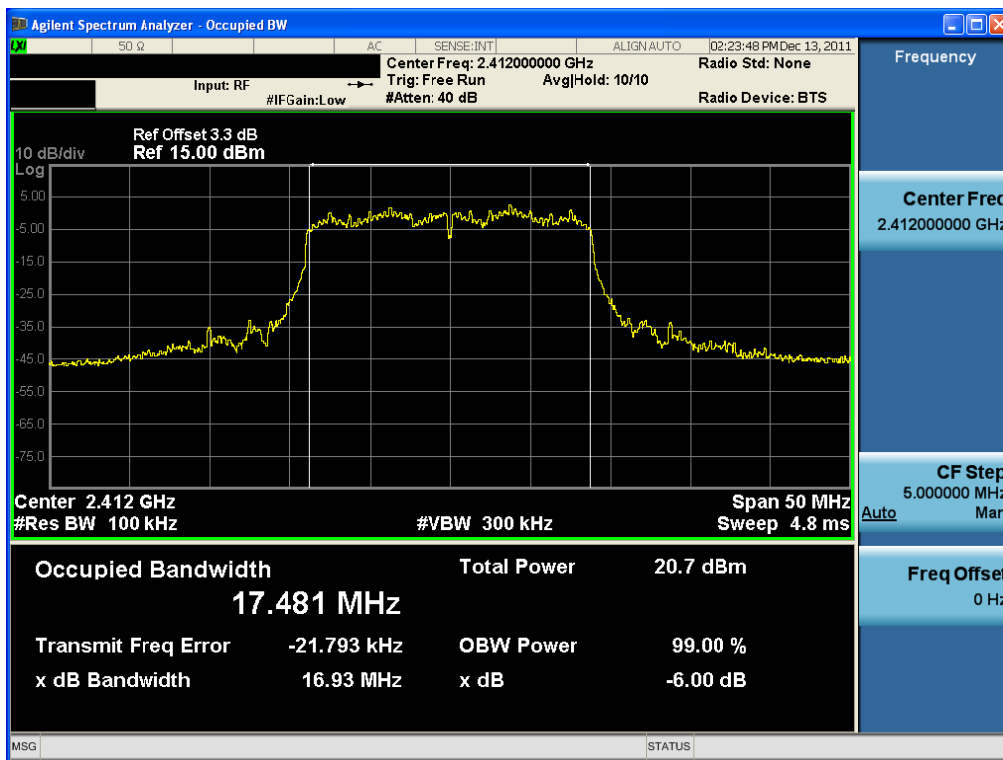
6 dB Bandwidth

Middle Channel & Modulation: 802.11g

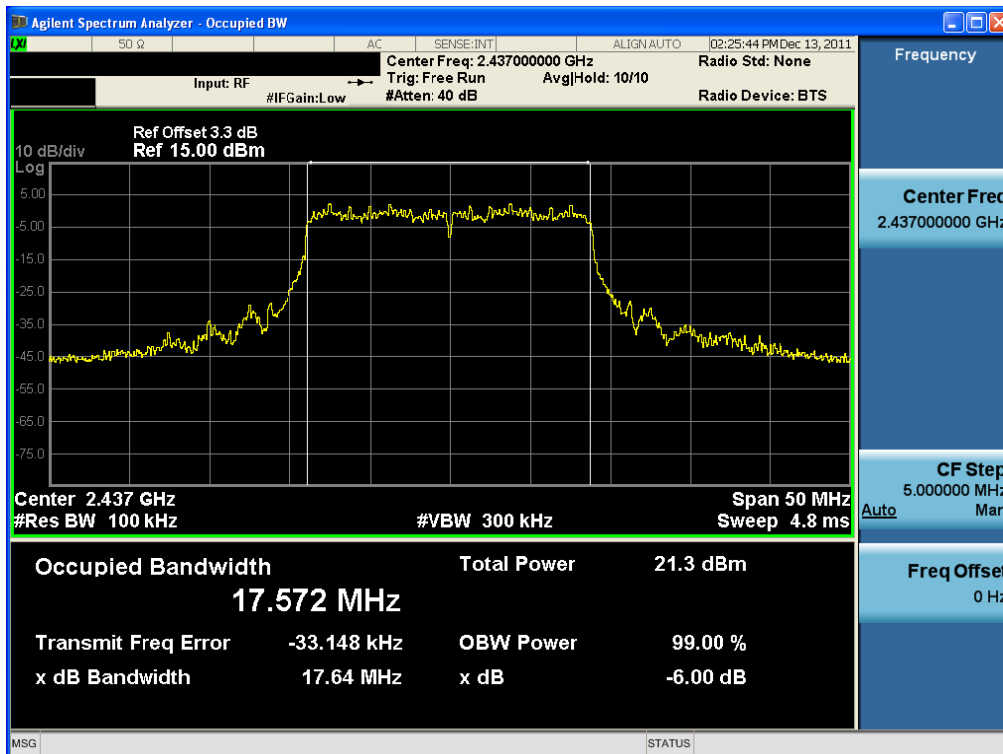
6 dB Bandwidth

Highest Channel & Modulation: 802.11g

6 dB Bandwidth

Lowest Channel & Modulation: 802.11n

6 dB Bandwidth

Middle Channel & Modulation: 802.11n

6 dB Bandwidth Highest Channel & Modulation: 802.11n



7.2 Peak Output Power

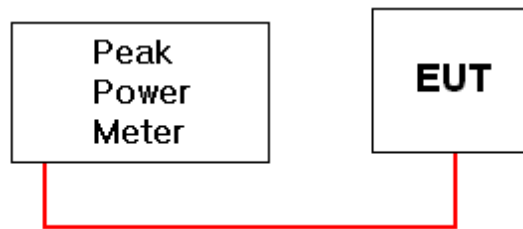
Test Requirements and limit, §15.247(d)

A transmitter antenna terminal of EUT is connected to the input of a RF power sensor.

Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies.

The maximum permissible conducted output power is 1 Watt.

■ TEST CONFIGURATION



Note: Tests were performed all possible data rates and the worst cases were recorded.

■ TEST CONFIGURATION:

This test item was performed according to Power Output Option 1 in Measurement of Digital Transmission Systems Operating under Section 15.247(March 23, 2005)

This test item was performed using peak power meter.

■ TEST RESULTS: **Comply**

Test Mode	Data Rate	Tested Channel	Peak Output Power	
			dBm	W
802.11b	1Mbps	Lowest	19.13	0.082
		Middle	18.73	0.075
		Highest	18.55	0.072
802.11g	6Mbps	Lowest	23.04	0.201
		Middle	22.82	0.191
		Highest	21.89	0.155
802.11n	MCS 6	Lowest	22.92	0.196
		Middle	22.89	0.195
		Highest	22.67	0.185

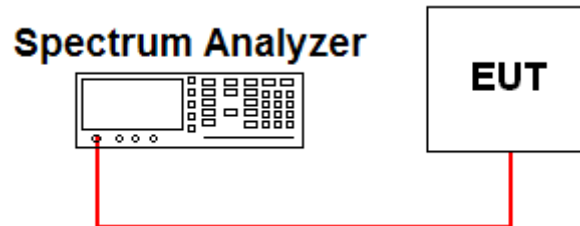
7.3 Power Spectral Density (802.11b/g/n)

Test requirements and limit, §15.247(d)

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.

Minimum Standard – The transmitter power density average over 1-second interval shall not be greater than 8dBm in any 3kHz BW.

■ TEST CONFIGURATION



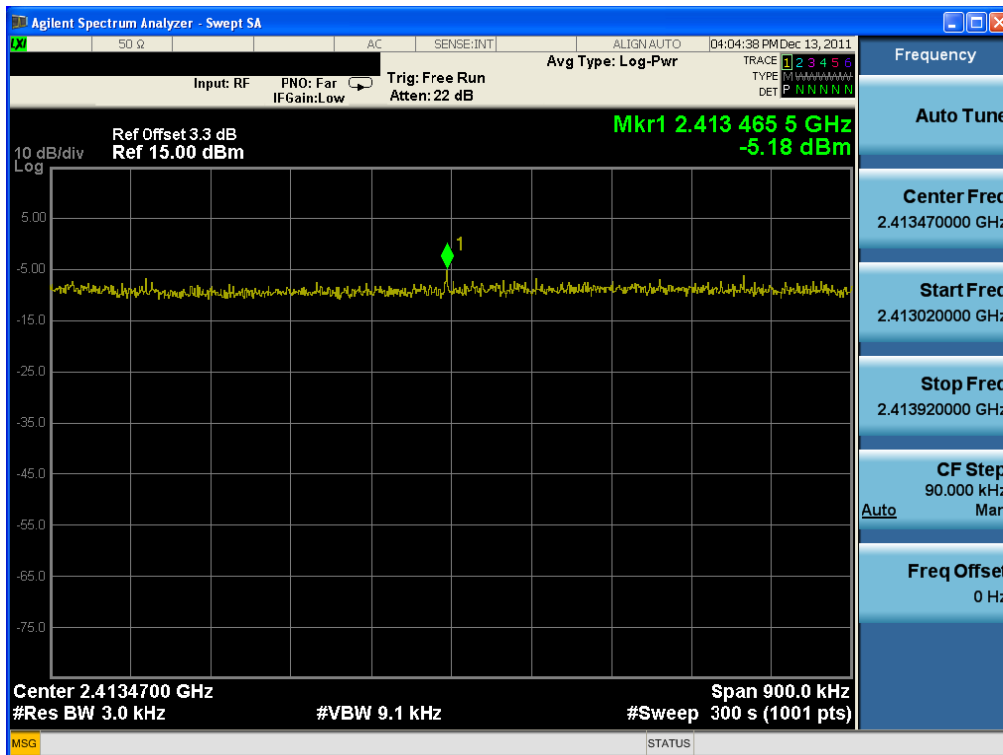
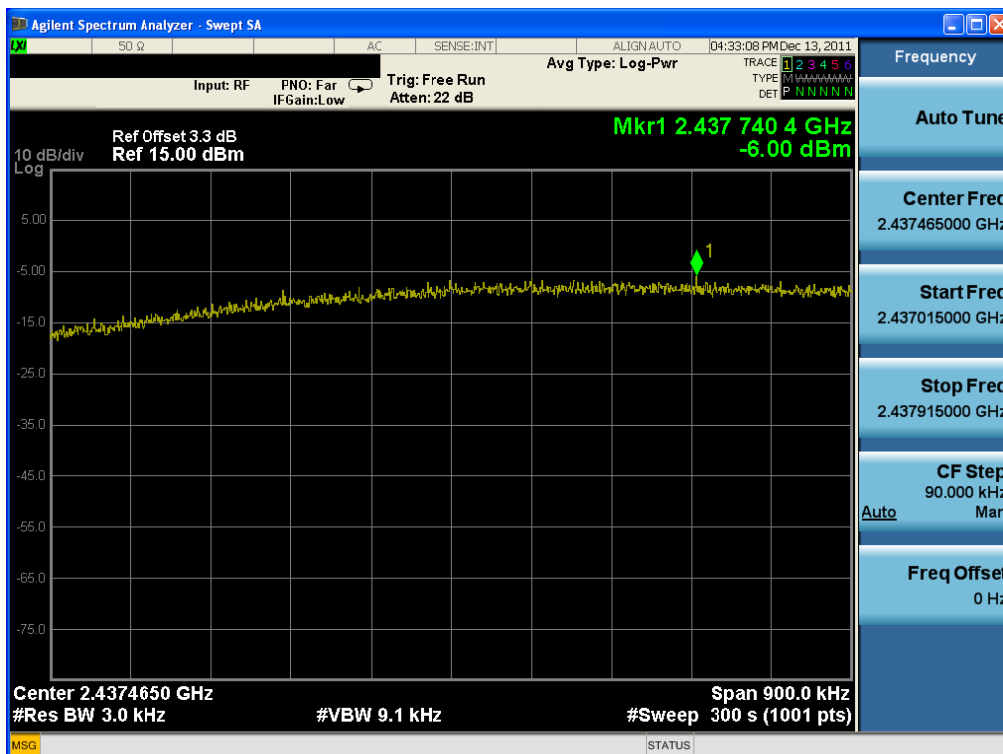
■ TEST PROCEDURE:

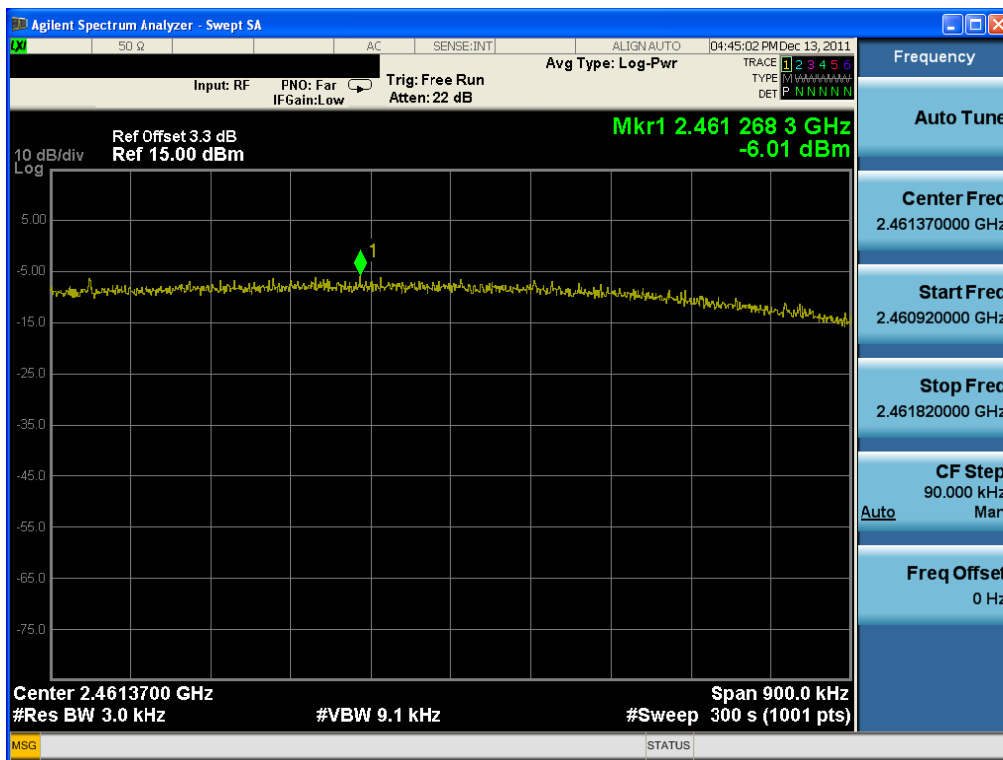
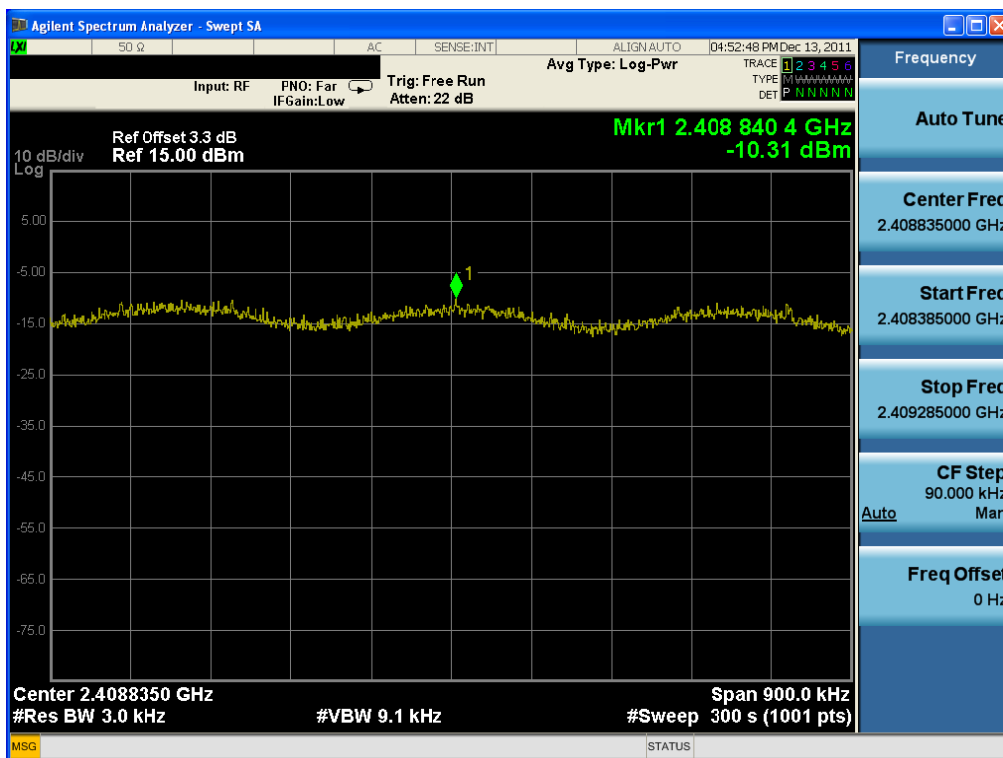
This test item was performed according to PSD Option 2 in Measurement of Digital Transmission Systems Operating under Section 15.247(March 23, 2005)

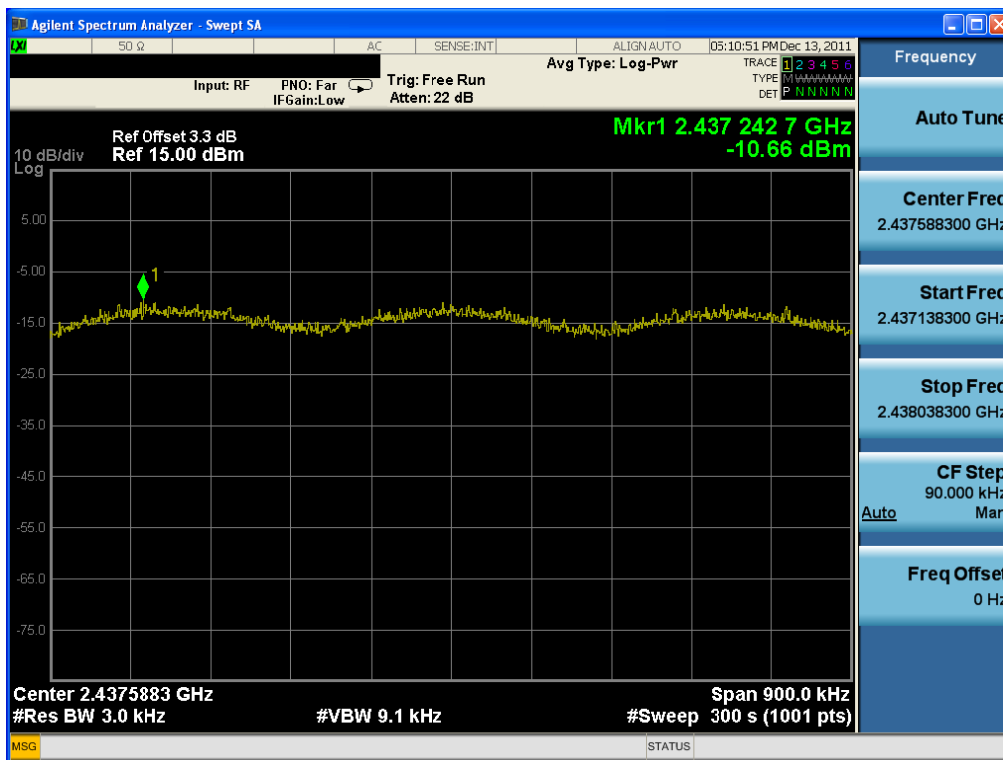
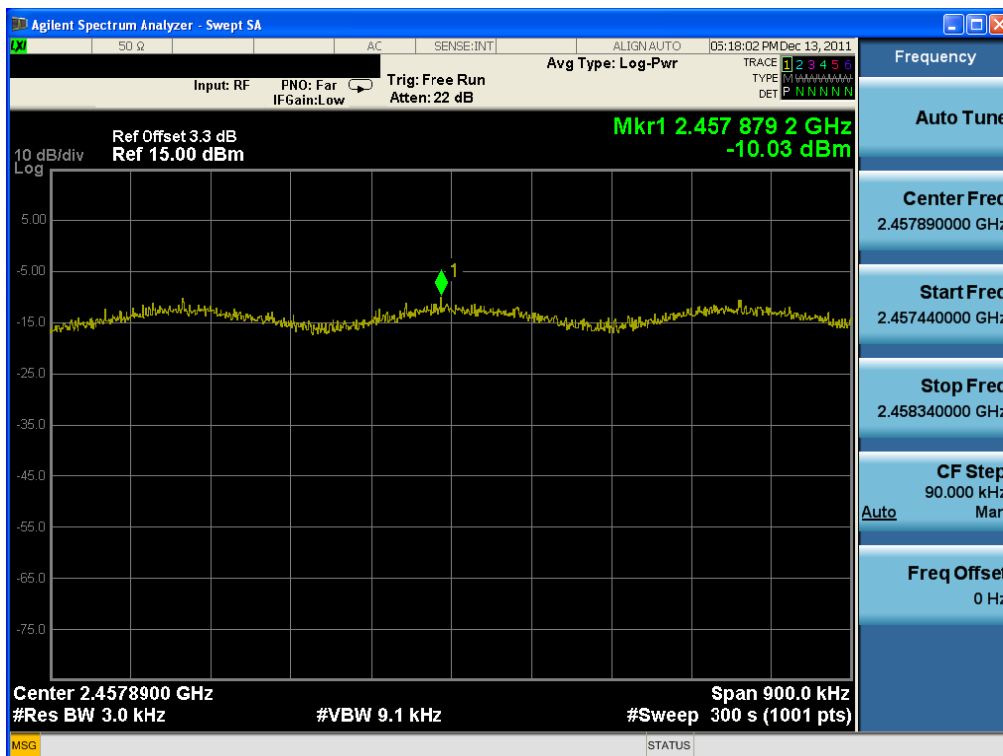
■ TEST RESULTS: **Comply**

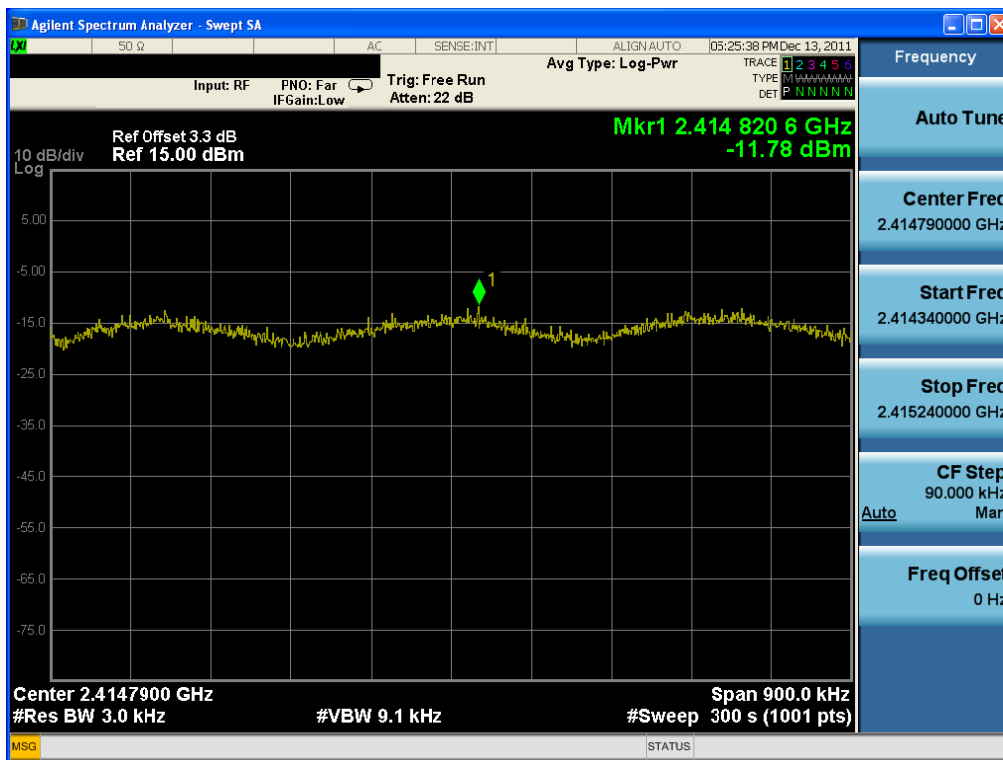
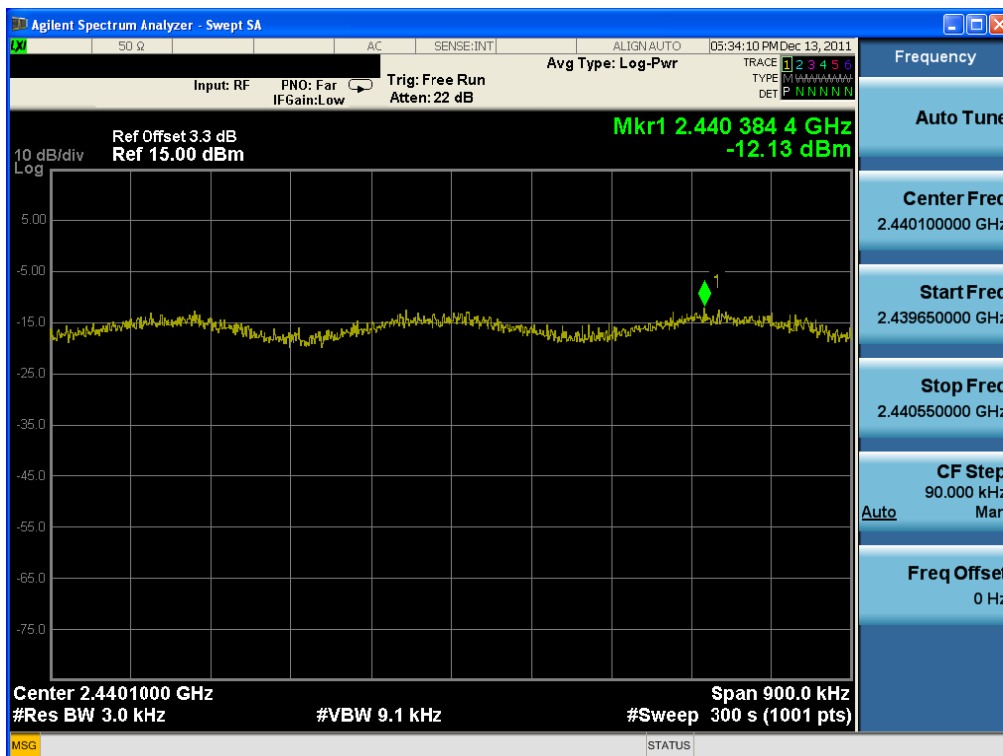
Test Mode	Data Rate	Frequency [MHz]	Test Results [dBm]
802.11b	1Mbps	Lowest	-5.18
		Middle	-6.00
		Highest	-6.01
802.11g	6Mbps	Lowest	-10.31
		Middle	-10.66
		Highest	-10.03
802.11n	MCS 6	Lowest	-11.78
		Middle	-12.13
		Highest	-11.59

■ RESULT PLOTS

Power Spectral Density Lowest Channel & Modulation: 802.11bPower Spectral Density Middle Channel & Modulation: 802.11b

Power Spectral Density **Highest Channel** & Modulation: **802.11b****Power Spectral Density** **Lowest Channel** & Modulation: **802.11g**

Power Spectral Density **Middle Channel** & Modulation: **802.11g****Power Spectral Density** **Highest Channel** & Modulation: **802.11g**

Power Spectral Density **Lowest Channel** & Modulation: **802.11n****Power Spectral Density** **Middle Channel** & Modulation: **802.11n**

Agilent Spectrum Analyzer - Swept SA

50 Ω AC SENSE:INT ALIGN: AUTO 05:52:23 PM Dec 13, 2011

Input: RF PNO: Far IF Gain: Low Trig: Free Run Atten: 22 dB Avg Type: Log-Pwr

TRACE 1 2 3 4 5 6
TYPE FFFFFFFF
DET P N N N N N

Ref Offset 3.3 dB
Ref 15.00 dBm

Mkr1 2.458 484 8 GHz
-11.59 dBm

10 dB/div
Log

The spectrum analyzer display shows a noisy baseline across the frequency range. A marker is placed at 2.4584848 GHz, indicating a signal level of -11.59 dBm. The y-axis represents power in dBm, ranging from -75.0 to 5.00. The x-axis represents frequency in GHz, ranging from 2.457790000 to 2.458240000. The display includes various settings such as Input: RF, PNO: Far, IF Gain: Low, Trig: Free Run, Atten: 22 dB, and Avg Type: Log-Pwr. The center frequency is 2.4582400 GHz, the span is 900.0 kHz, the resolution bandwidth is 3.0 kHz, and the video bandwidth is 9.1 kHz. The sweep time is 300 seconds, resulting in 1001 points.

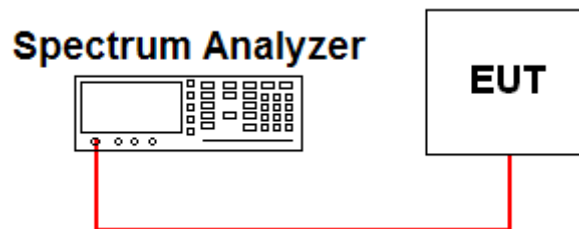
Center 2.4582400 GHz
#Res BW 3.0 kHz
#VBW 9.1 kHz
Span 900.0 kHz
#Sweep 300 s (1001 pts)

7.4 Out of Band Emissions at the Band Edge/ Conducted Spurious Emissions

Test Requirements and limit, §15.247(d)

§15.247 (c) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB 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 §15.209(a) 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)).

■ TEST CONFIGURATION



■ TEST PROCEDURE

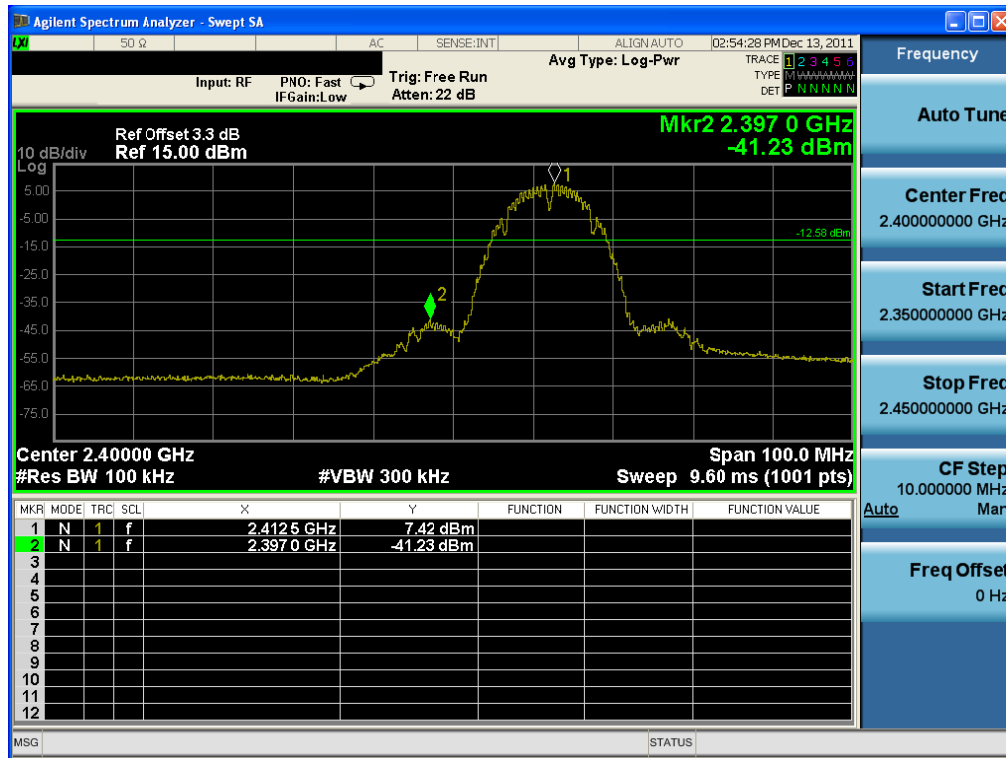
The transmitter output is connected to a spectrum analyzer.

The resolution bandwidth is set to 100 kHz and the video bandwidth is set to 300 kHz.

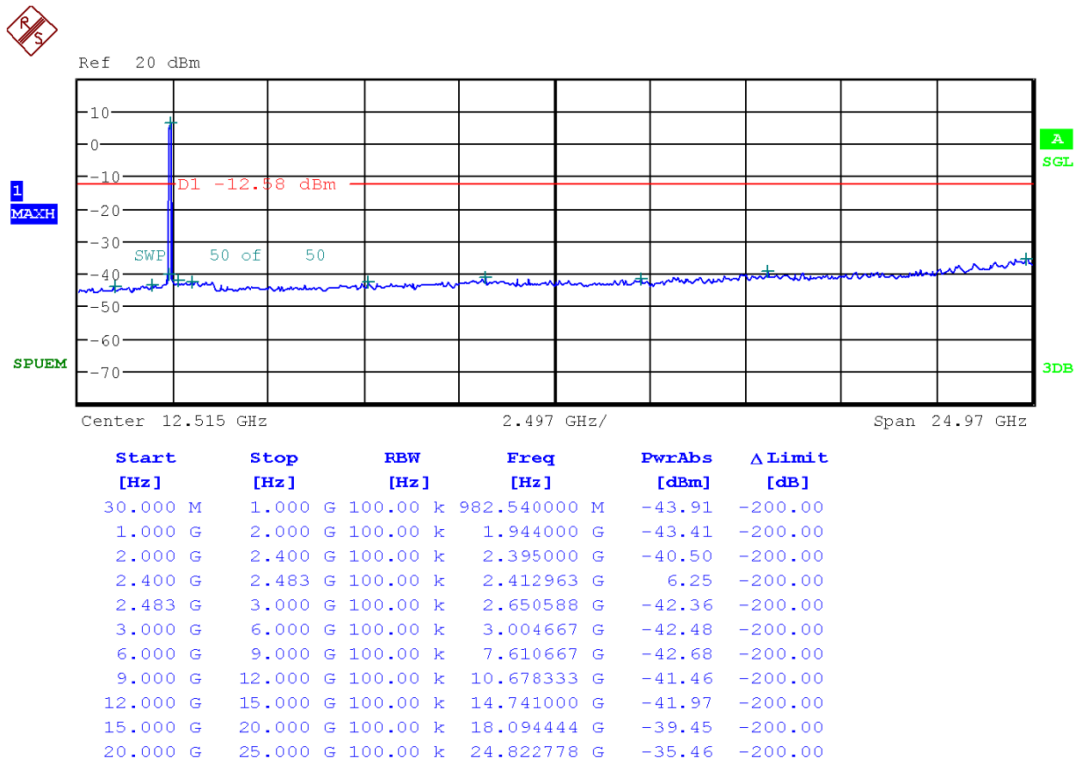
The spectrum from 30 MHz to 10th harmonics is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULT PLOTS

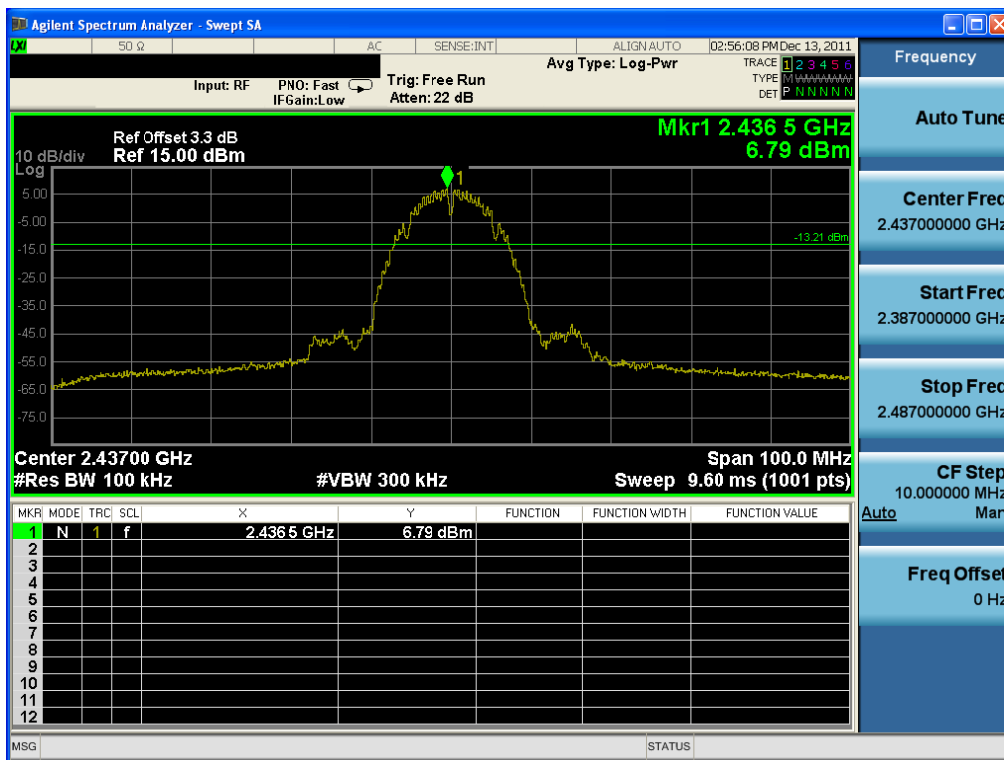
Low Band-edge

Lowest Channel & Modulation: 802.11b

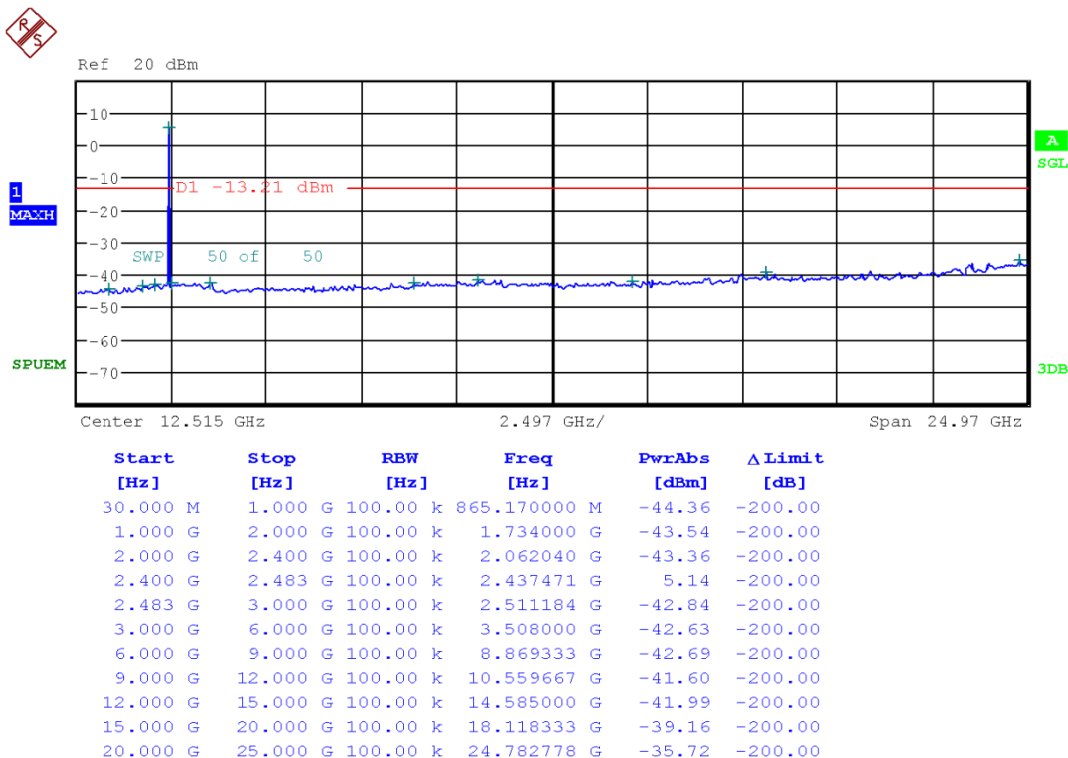
Conducted Spurious Emissions

Lowest Channel & Modulation: 802.11b

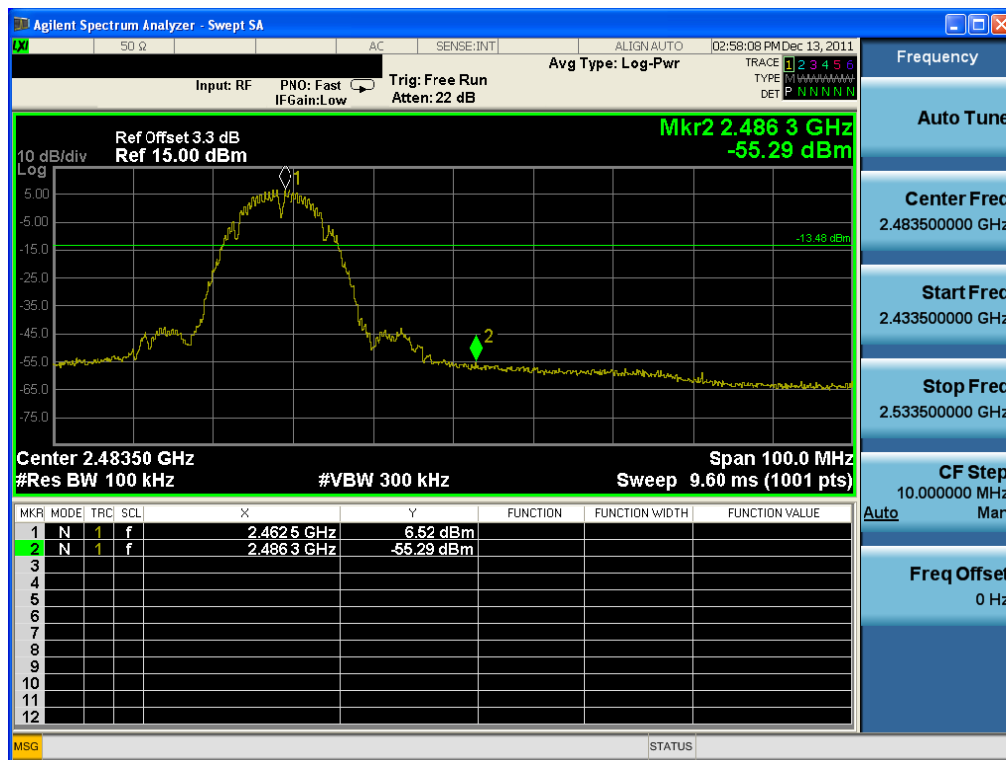
Reference for limit

Middle Channel & Modulation: 802.11b

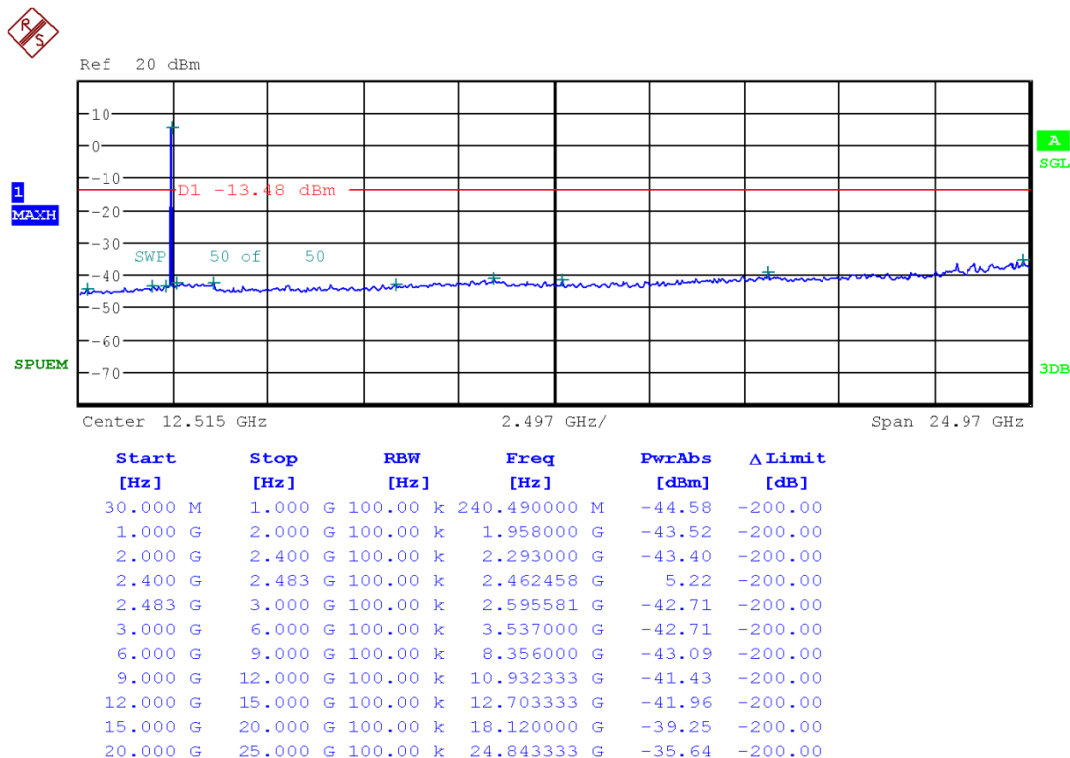
Conducted Spurious Emissions

Middle Channel & Modulation: 802.11b

High Band-edge

Highest Channel & Modulation: 802.11b

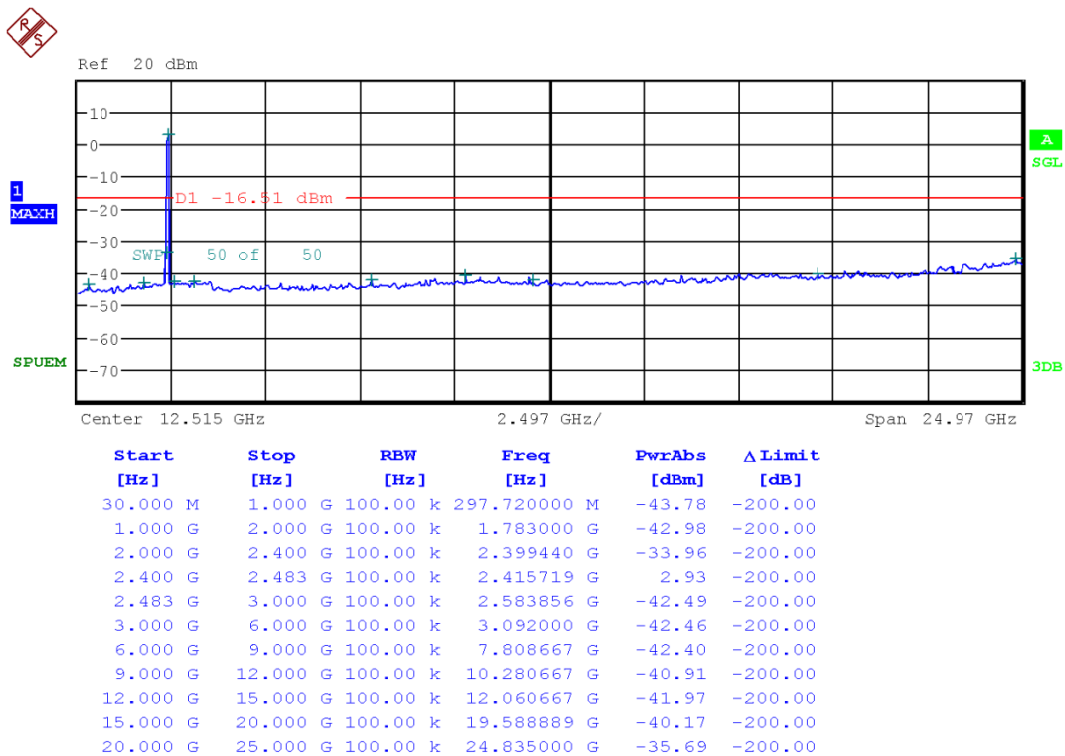
Conducted Spurious Emissions

Highest Channel & Modulation: 802.11b

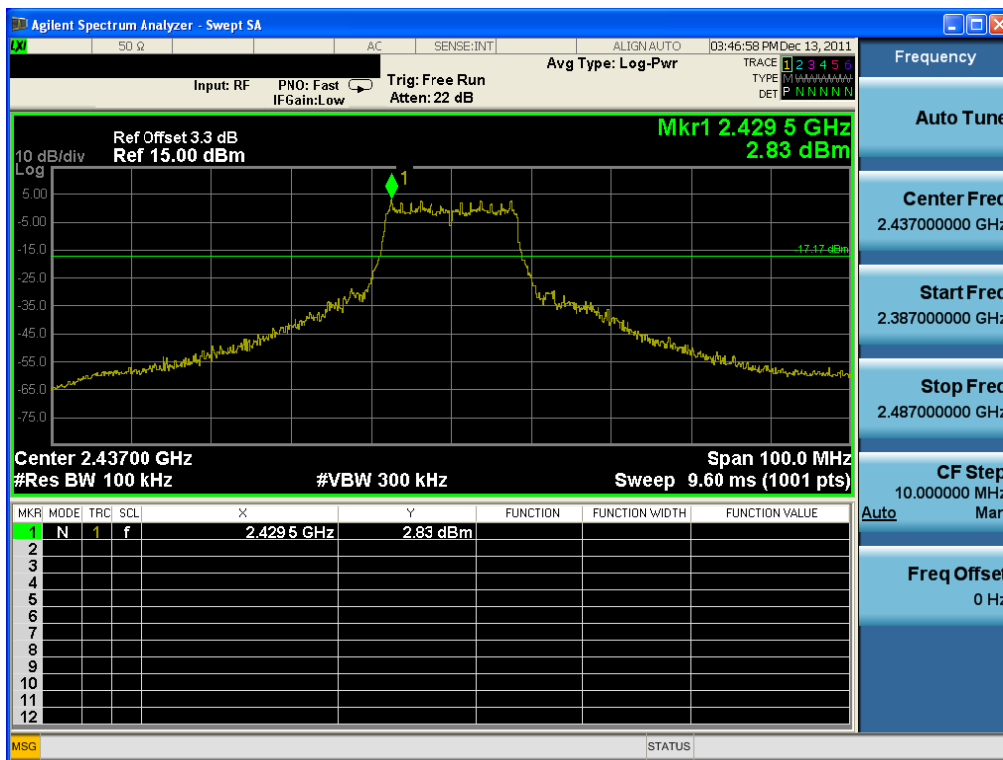
Low Band-edge

Lowest Channel & Modulation: 802.11g

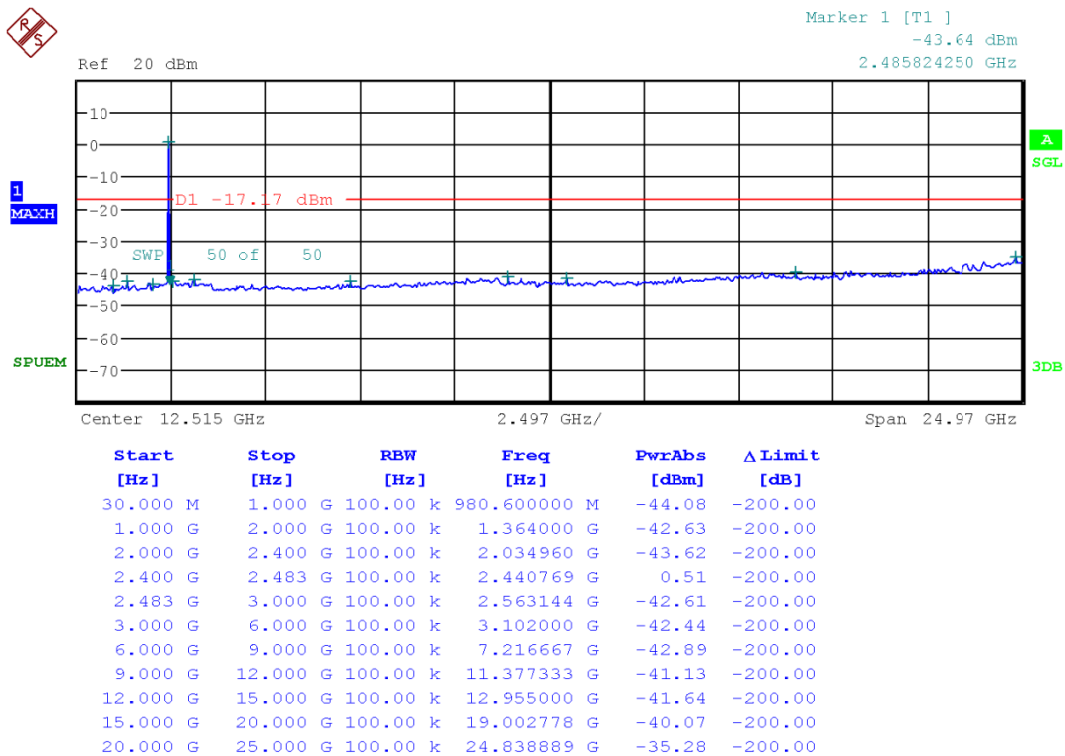
Conducted Spurious Emissions

Lowest Channel & Modulation: 802.11g

Reference for limit

Middle Channel & Modulation: 802.11g

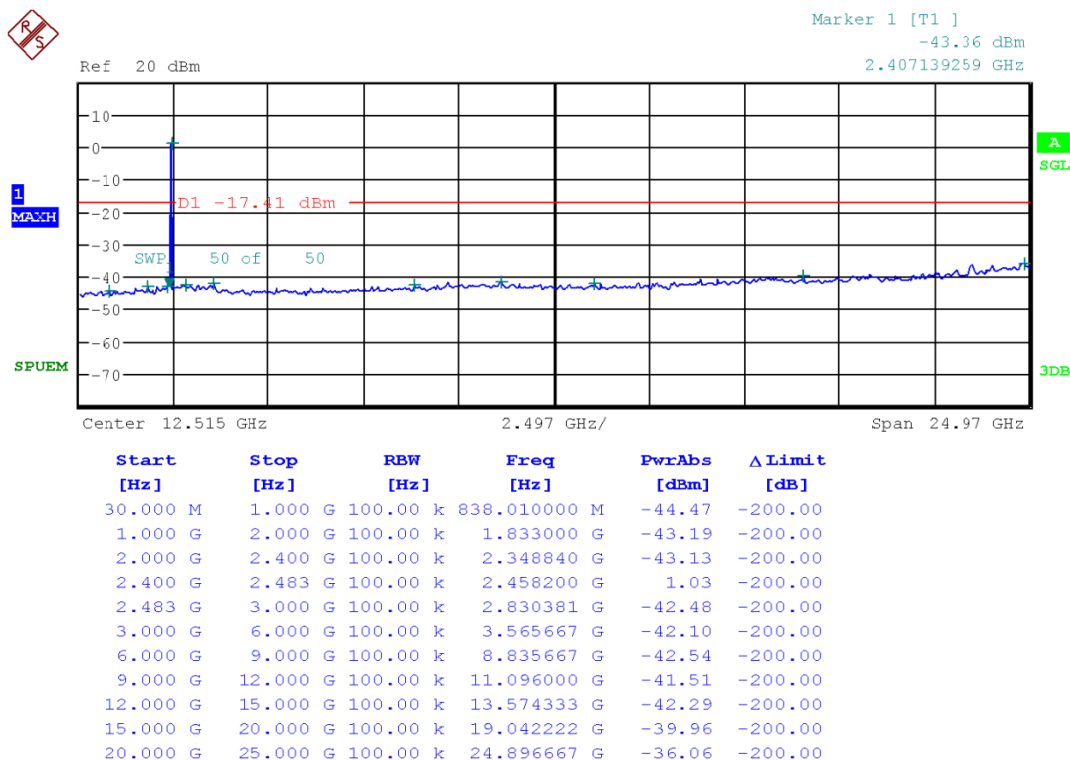
Conducted Spurious Emissions

Middle Channel & Modulation: 802.11g

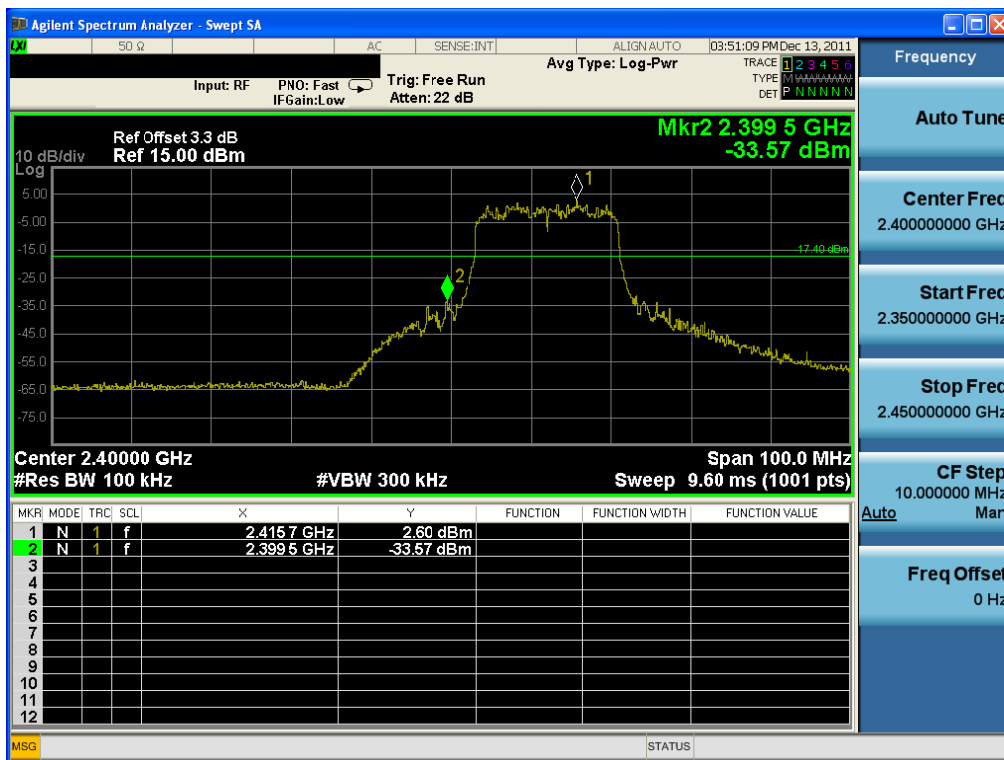
High Band-edge

Highest Channel & Modulation: 802.11g

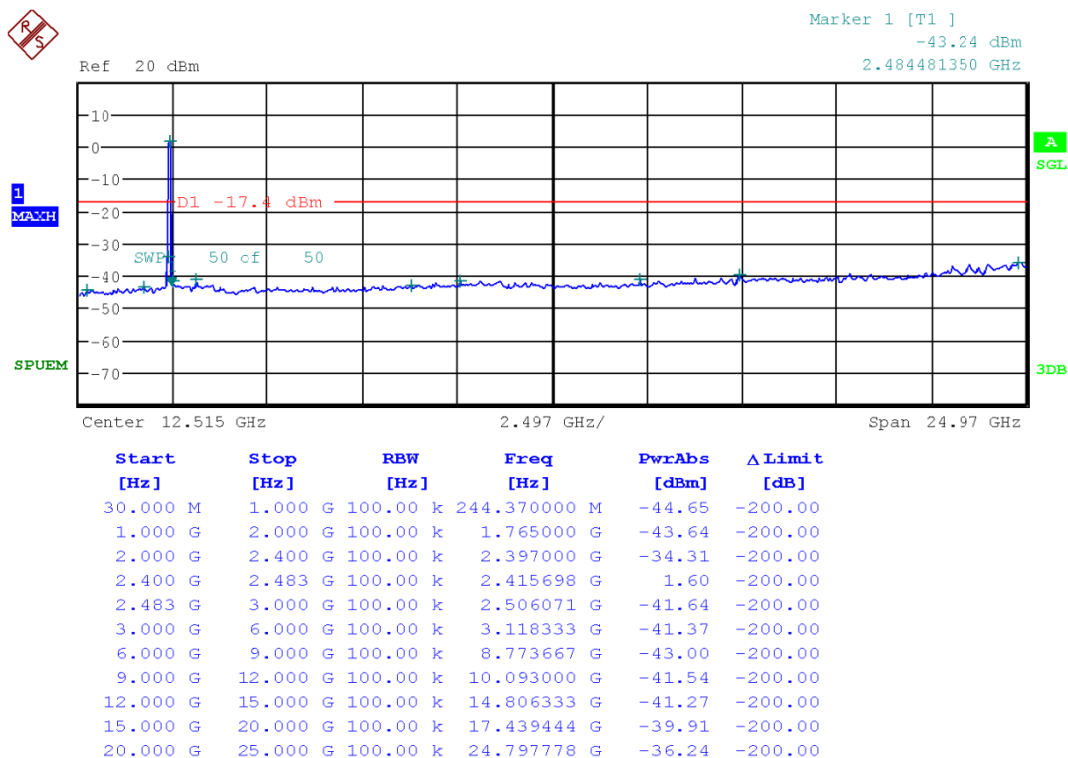
Conducted Spurious Emissions

Highest Channel & Modulation: 802.11g

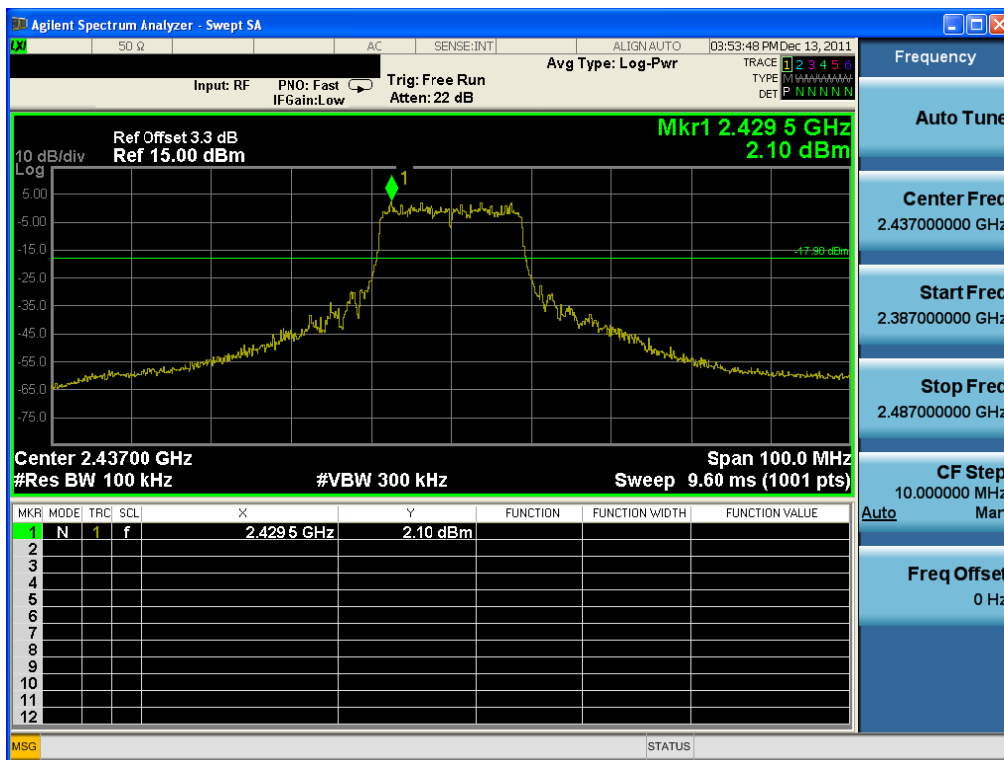
Low Band-edge

Lowest Channel & Modulation: 802.11n

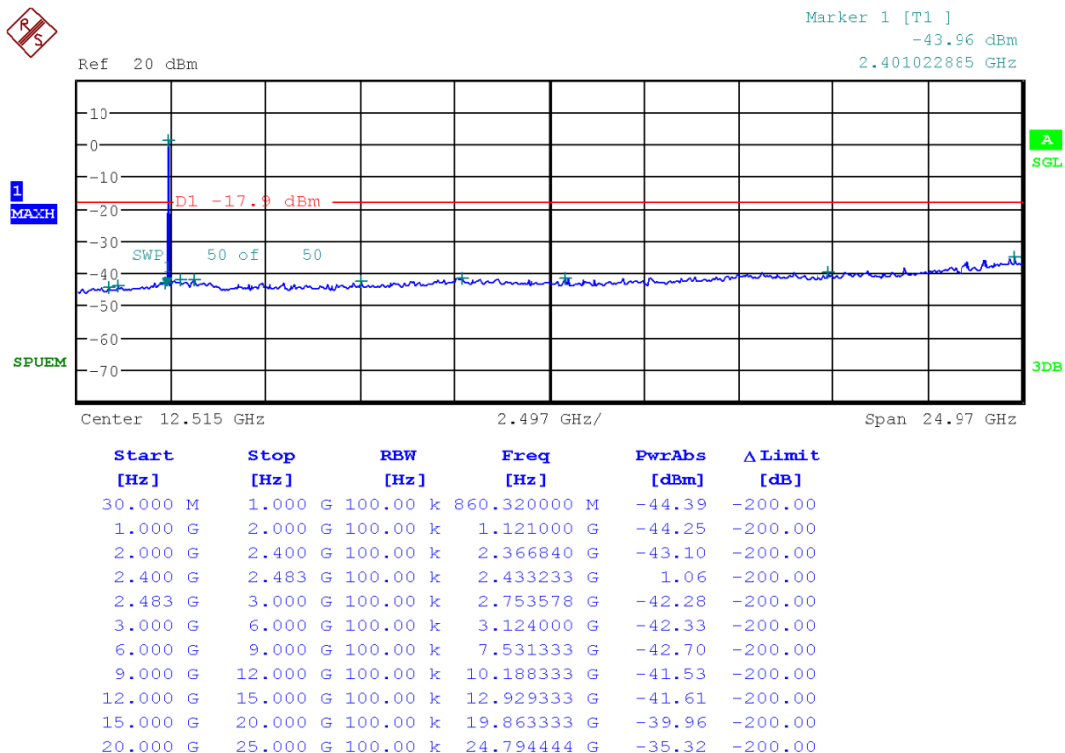
Conducted Spurious Emissions

Lowest Channel & Modulation: 802.11n

Reference for limit

Middle Channel & Modulation: 802.11n

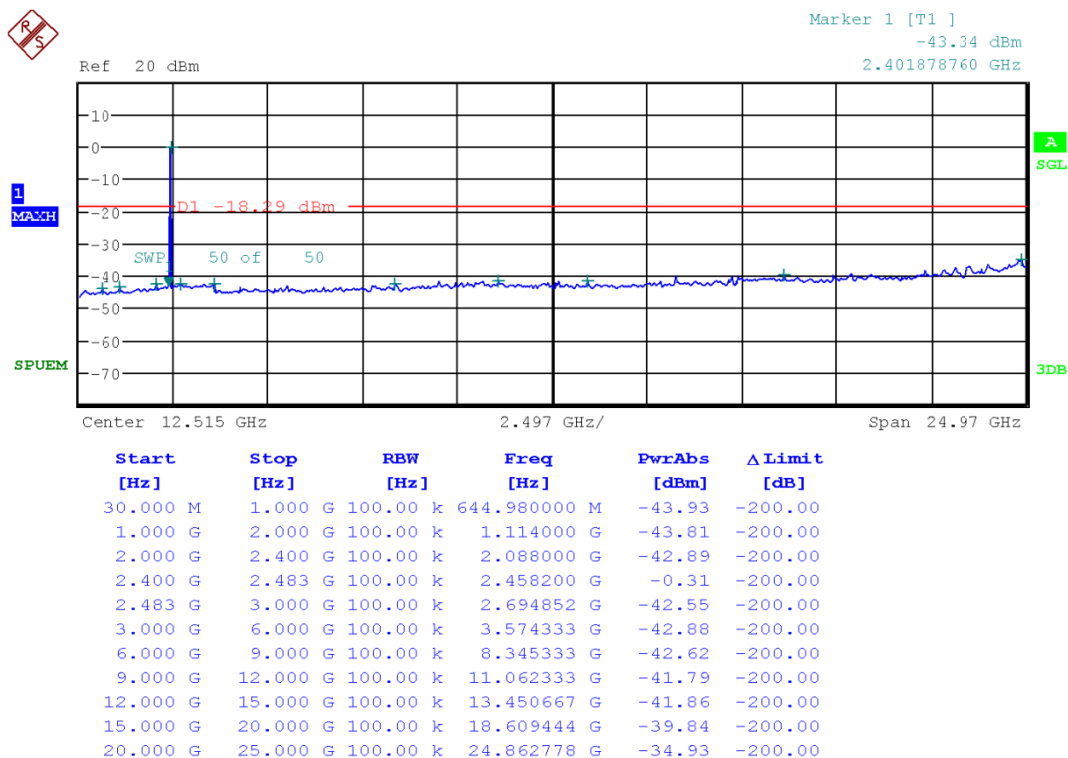
Conducted Spurious Emissions

Middle Channel & Modulation: 802.11n

High Band-edge

Highest Channel & Modulation: 802.11n

Conducted Spurious Emissions

Highest Channel & Modulation: 802.11n

7.5 Radiated Measurement.

Test Requirements and limit, §15.247(d)

1. In any 100kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a) and (b), then the 15.209(a) limit in the table below has to be followed

▪ FCC Part 15.209(a) and (b)

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

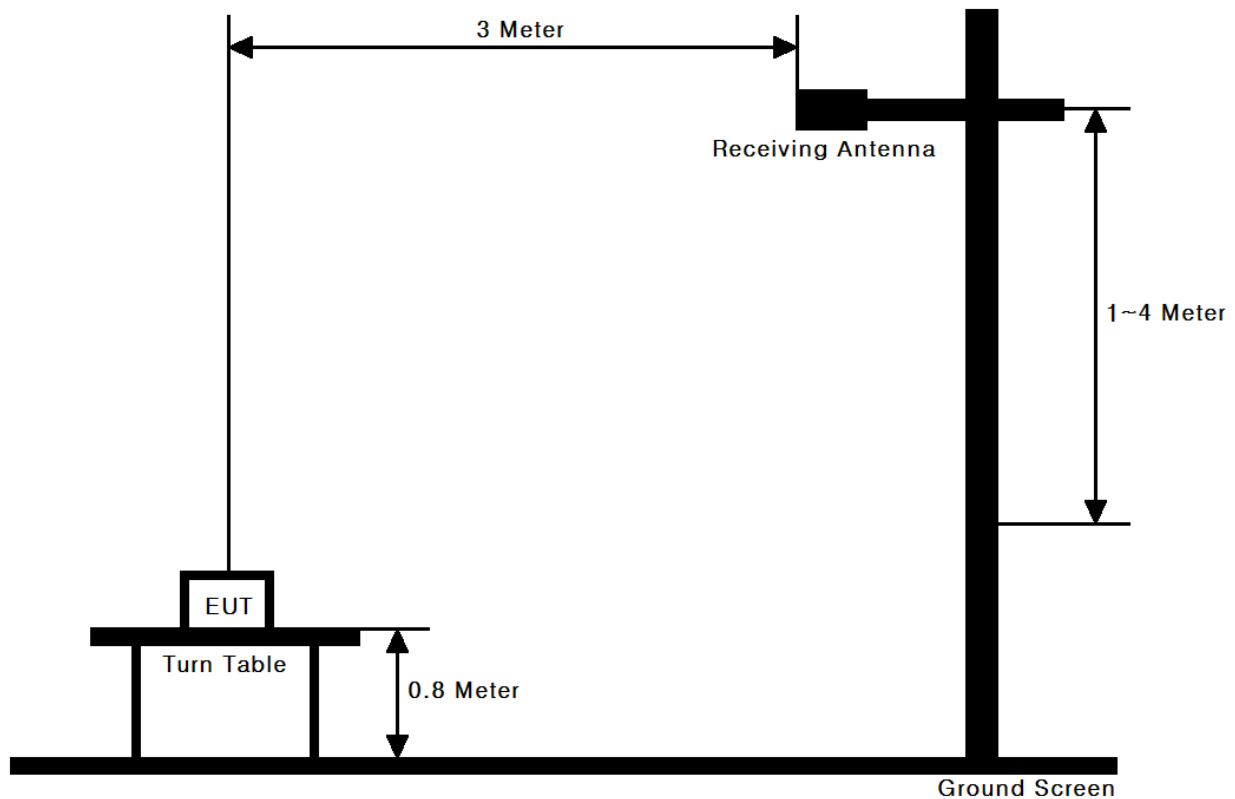
** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

▪ FCC Part 15.205 (a): Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	3600 ~ 4400	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	4.5 ~ 5.15	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~	149.9 ~ 150.05	1645.5 ~ 1646.5	5.35 ~ 5.46	17.7 ~ 21.4
4.125 ~ 4.128	12.52025	156.52475 ~	1660 ~ 1710	7.25 ~ 7.75	22.01 ~ 23.12
4.17725 ~ 4.17775	12.57675 ~	156.52525	1718.8 ~ 1722.2	8.025 ~ 8.5	23.6 ~ 24.0
4.20725 ~ 4.20775	12.57725	156.7 ~ 156.9	2200 ~ 2300	9.0 ~ 9.2	31.2 ~ 31.8
6.215 ~ 6.218	13.36 ~ 13.41	162.0125 ~ 167.17	2310 ~ 2390	9.3 ~ 9.5	36.43 ~ 36.5
6.26775 ~ 6.26825	16.42 ~ 16.423	167.72 ~ 173.2	2483.5 ~ 2500	10.6 ~ 12.7	Above 38.6
6.31175 ~ 6.31225	16.69475 ~	240 ~ 285	2655 ~ 2900	13.25 ~ 13.4	
8.291 ~ 8.294	16.69525	322 ~ 335.4	3260 ~ 3267		
8.362 ~ 8.366	16.80425 ~	399.90 ~ 410	3332 ~ 3339		
8.37625 ~ 8.38675	16.80475	608 ~ 614	3345.8 ~ 3358		
	25.5 ~ 25.67	960 ~ 1240			
	37.5 ~ 38.25				
	73 ~ 74.6				
	74.8 ~ 75.2				

▪ **FCC Part 15.205(b):** The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

Test Configuration



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8 m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

TEST RESULTS**30MHz ~ 25GHz Data(802.11b & 1Mbps)**▪ **Lowest Channel**

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2344.400	V	Z	PK	50.40	-5.40	45.00	74.00	29.00
2338.960	V	Z	AV	37.23	-5.40	31.83	54.00	22.17
4825.400	V	X	PK	44.92	4.77	49.69	74.00	24.31
4827.490	V	X	AV	32.01	4.77	36.78	54.00	17.22
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

▪ **Middle Channel**

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4871.860	V	X	PK	44.94	3.99	48.93	74.00	25.07
4881.040	V	X	AV	32.31	3.99	36.30	54.00	17.70
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

▪ **Highest Channel**

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2487.210	V	Z	PK	49.93	-5.40	44.53	74.00	29.47
2483.550	V	Z	AV	36.77	-5.40	31.37	54.00	22.63
4922.060	V	X	PK	44.57	5.73	50.30	74.00	23.70
4921.620	V	X	AV	32.06	5.73	37.79	54.00	16.21
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were reported greater than listed emissions above table.
2. Above listed point data is the worst case data.
3. Sample Calculation.

$$\text{Margin} = \text{Limit} - \text{Result} \quad / \quad \text{Result} = \text{Reading} + \text{T.F} \quad / \quad \text{T.F} = \text{AF} + \text{CL} - \text{AG}$$

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

30MHz ~ 25GHz Data(802.11g & 6Mbps)

▪ Lowest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2390.000	H	Y	PK	71.43	-5.40	66.03	74.00	7.97
2390.000	H	Y	AV	49.50	-5.40	44.10	54.00	9.90
4813.550	V	X	PK	44.28	4.77	49.05	74.00	24.95
4845.300	V	X	AV	32.13	4.77	36.90	54.00	17.11
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

▪ Middle Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4869.820	V	X	PK	45.44	3.99	49.43	74.00	24.57
4878.280	V	X	AV	32.32	3.99	36.31	54.00	17.69
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

▪ Highest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2483.580	H	Y	PK	69.70	-5.40	64.30	74.00	9.70
2483.500	H	Y	AV	50.91	-5.40	45.51	54.00	8.49
4918.600	V	X	PK	44.47	5.73	50.20	74.00	23.80
4923.800	V	X	AV	32.06	5.73	37.79	54.00	16.21
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were reported greater than listed emissions above table.
2. Above listed point data is the worst case data.
3. Sample Calculation.

$$\text{Margin} = \text{Limit} - \text{Result} \quad / \quad \text{Result} = \text{Reading} + \text{T.F} \quad / \quad \text{T.F} = \text{AF} + \text{CL} - \text{AG}$$

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

30MHz ~ 25GHz Data(802.11n & MCS 6)

▪ Lowest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2389.760	H	Y	PK	65.84	-5.40	60.44	74.00	13.56
2390.000	H	Y	AV	45.47	-5.40	40.07	54.00	13.93
4825.680	V	X	PK	46.08	4.77	50.85	74.00	23.15
4831.900	V	X	AV	32.02	4.77	36.79	54.00	17.21
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

▪ Middle Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4879.420	V	X	PK	44.38	3.99	48.37	74.00	25.63
4879.720	V	X	AV	32.34	3.99	36.33	54.00	17.67
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

▪ Highest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2483.847	H	Y	PK	68.63	-5.40	63.23	74.00	10.77
2483.500	H	Y	AV	47.11	-5.40	41.71	54.00	12.29
4921.580	V	X	PK	45.44	5.73	51.17	74.00	22.83
4917.940	V	X	AV	32.06	5.73	37.79	54.00	16.21
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were reported greater than listed emissions above table.
2. Above listed point data is the worst case data.
3. Sample Calculation.

$$\text{Margin} = \text{Limit} - \text{Result} \quad / \quad \text{Result} = \text{Reading} + \text{T.F} \quad / \quad \text{T.F} = \text{AF} + \text{CL} - \text{AG}$$

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

7.6 POWERLINE CONDUCTED EMISSIONS

Test Requirements and limit, §15.247(d)

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)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

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.

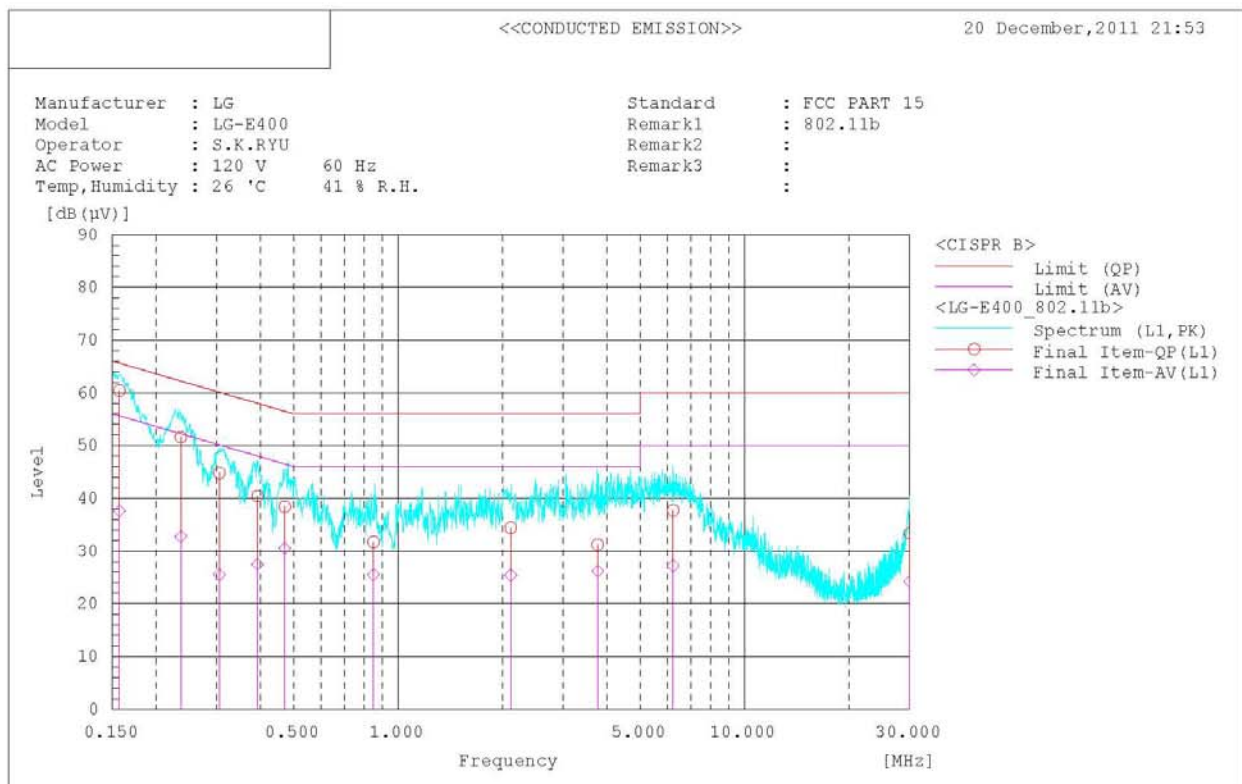
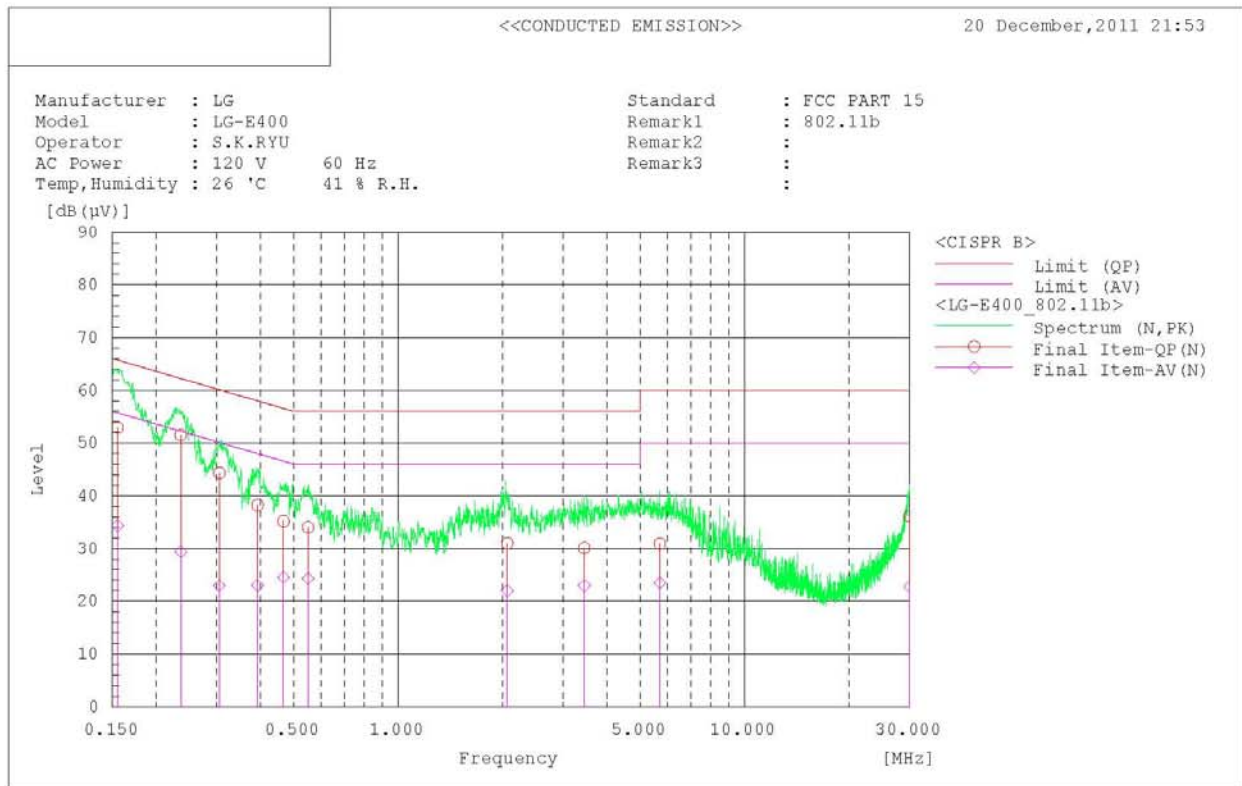
TEST PROCEDURE

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.

■ RESULT PLOTS

AC Line Conducted Emissions (Graph)

Test Mode: 802.11b & 1Mbps



AC Line Conducted Emissions (List)

Test Mode: 802.11b & 1Mbps

<<CONDUCTED EMISSION>>

20 December, 2011 21:53

Standard : FCC PART 15
 Manufacturer : LG
 Model : LG-E400
 Operator : S.K.RYU
 AC Power : 120 V 60 Hz
 Temp, Humidity : 26 °C 41 % R.H.
 Remark1 : 802.11b
 Remark2 :
 Remark3 :

Final Result

--- N Phase ---

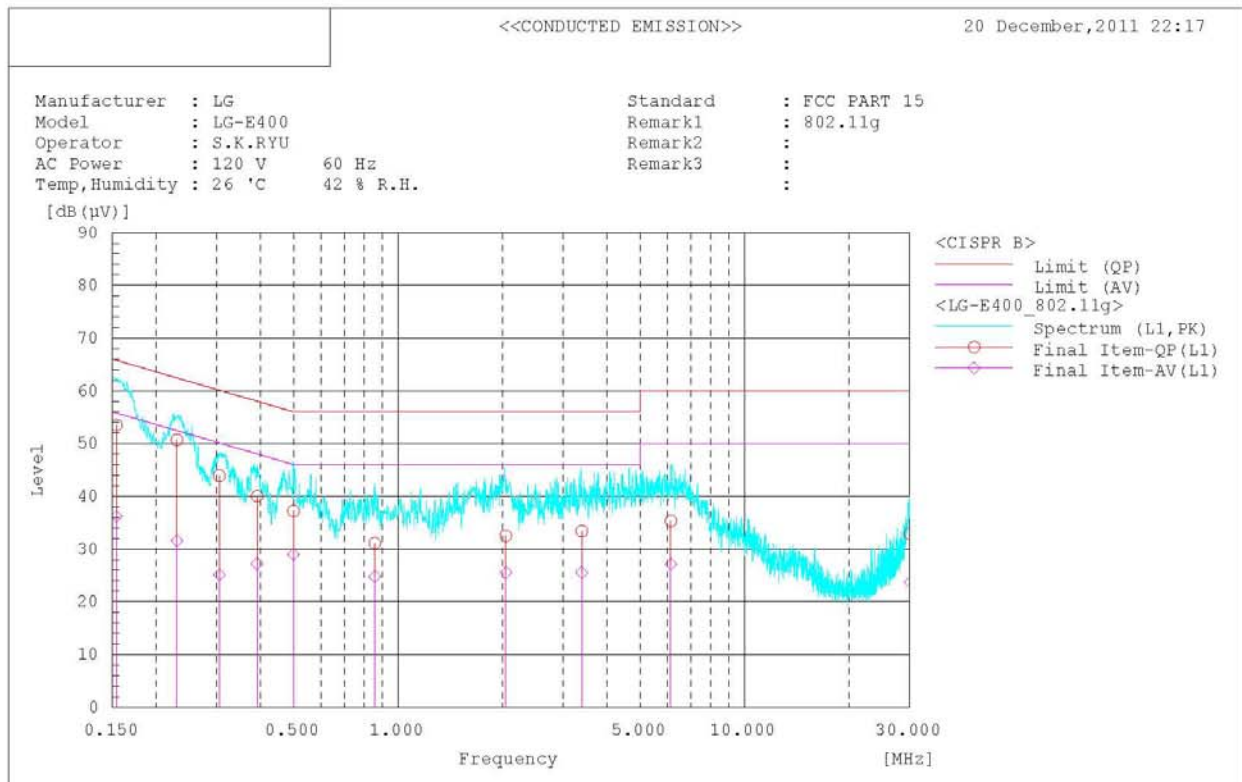
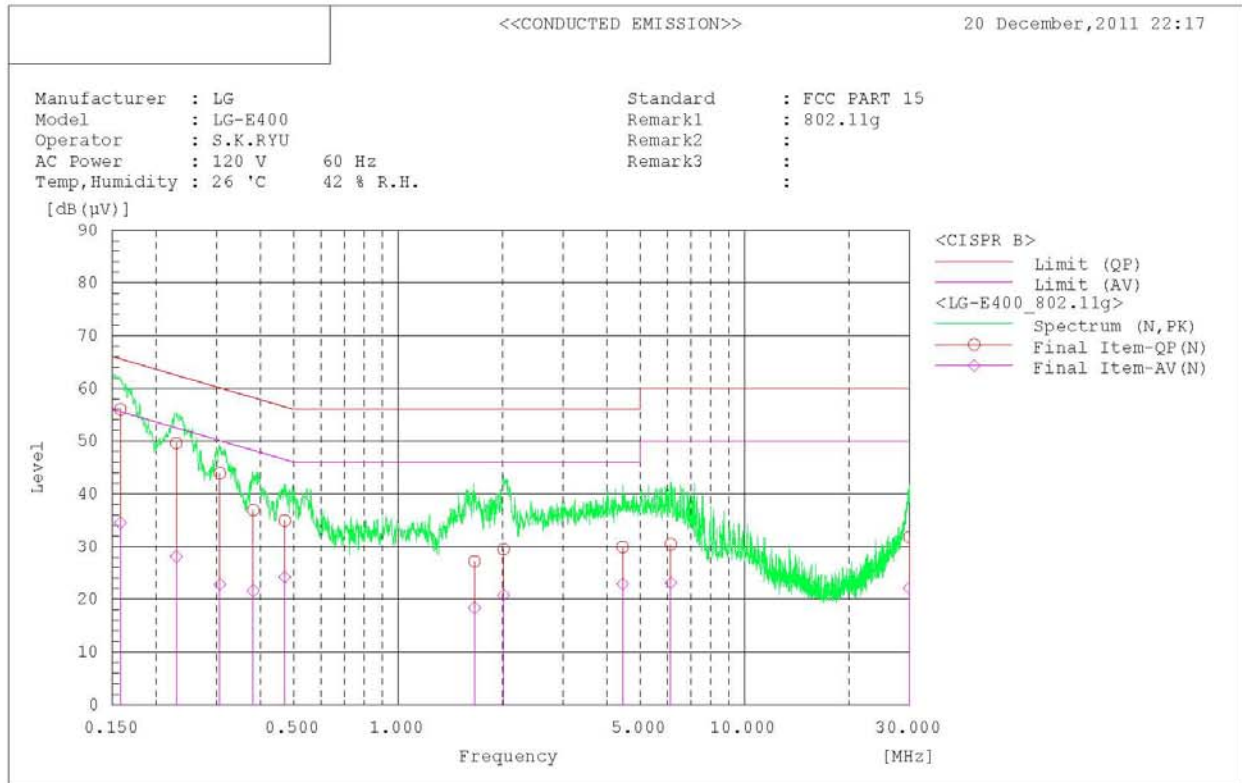
No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB (μV)]	[dB (μV)]		[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB]	[dB]	
1	0.155	52.8	34.2	0.1	52.9	34.3	65.7	55.7	12.8	21.4	
2	0.236	51.4	29.3	0.1	51.5	29.4	62.2	52.2	10.7	22.8	
3	0.305	44.2	22.9	0.1	44.3	23.0	60.1	50.1	15.8	27.1	
4	0.393	38.1	22.9	0.1	38.2	23.0	58.0	48.0	19.8	25.0	
5	0.467	35.1	24.5	0.1	35.2	24.6	56.6	46.6	21.4	22.0	
6	0.550	33.9	24.2	0.1	34.0	24.3	56.0	46.0	22.0	21.7	
7	2.066	30.8	21.8	0.2	31.0	22.0	56.0	46.0	25.0	24.0	
8	3.447	29.9	22.8	0.2	30.1	23.0	56.0	46.0	25.9	23.0	
9	5.697	30.6	23.2	0.3	30.9	23.5	60.0	50.0	29.1	26.5	
10	29.928	34.5	21.2	1.6	36.1	22.8	60.0	50.0	23.9	27.2	

--- Ll Phase ---

No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB (μV)]	[dB (μV)]		[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB]	[dB]	
1	0.157	60.2	37.4	0.2	60.4	37.6	65.6	55.6	5.2	18.0	
2	0.236	51.4	32.6	0.2	51.6	32.8	62.2	52.2	10.6	19.4	
3	0.305	44.6	25.3	0.2	44.8	25.5	60.1	50.1	15.3	24.6	
4	0.393	40.2	27.3	0.2	40.4	27.5	58.0	48.0	17.6	20.5	
5	0.471	38.2	30.3	0.2	38.4	30.5	56.5	46.5	18.1	16.0	
6	0.850	31.5	25.3	0.2	31.7	25.5	56.0	46.0	24.3	20.5	
7	2.116	34.1	25.1	0.3	34.4	25.4	56.0	46.0	21.6	20.6	
8	3.768	30.8	25.8	0.4	31.2	26.2	56.0	46.0	24.8	19.8	
9	6.218	37.2	26.7	0.5	37.7	27.2	60.0	50.0	22.3	22.8	
10	29.979	31.7	22.6	1.6	33.3	24.2	60.0	50.0	26.7	25.8	

AC Line Conducted Emissions (Graph)

Test Mode: 802.11g & 6Mbps



AC Line Conducted Emissions (List)

Test Mode: 802.11g & 6Mbps

<<CONDUCTED EMISSION>>

20 December, 2011 22:17

Standard : FCC PART 15
 Manufacturer : LG
 Model : LG-E400
 Operator : S.K.RYU
 AC Power : 120 V 60 Hz
 Temp, Humidity : 26 °C 42 % R.H.
 Remark1 : 802.11g
 Remark2 :
 Remark3 :

Final Result

--- N Phase ---

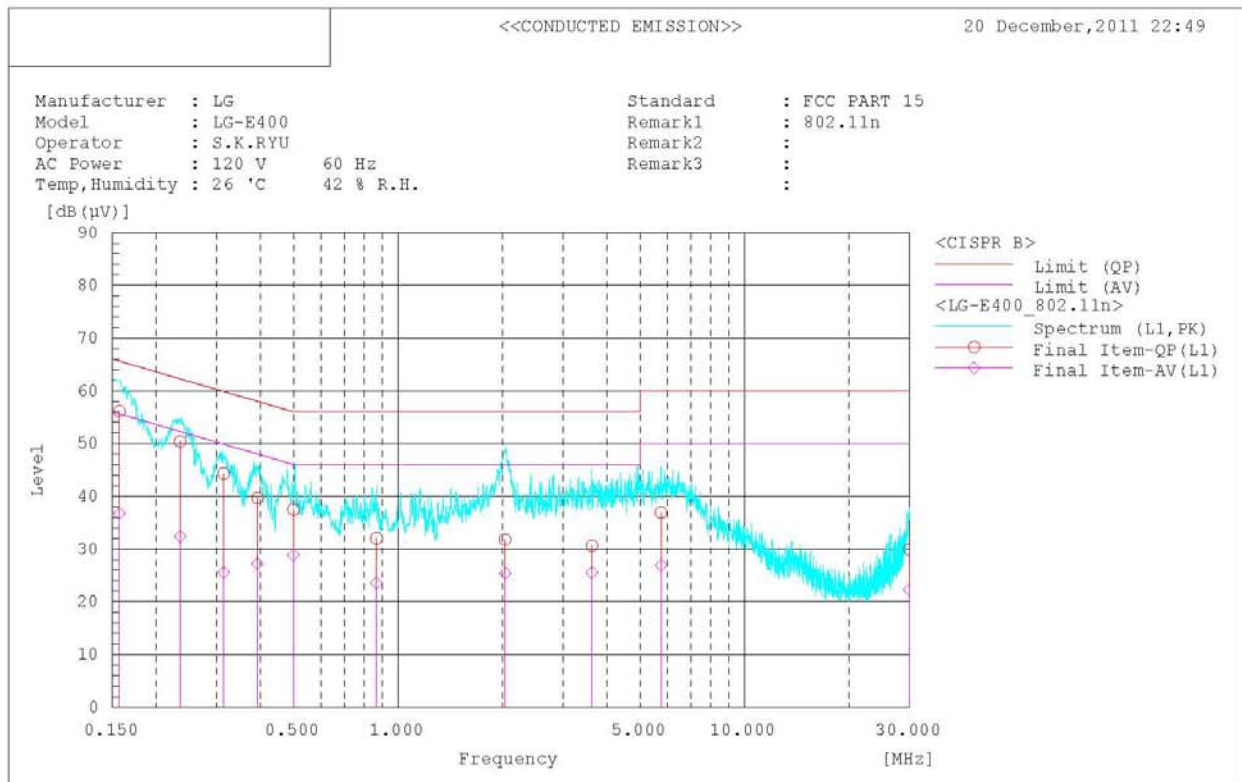
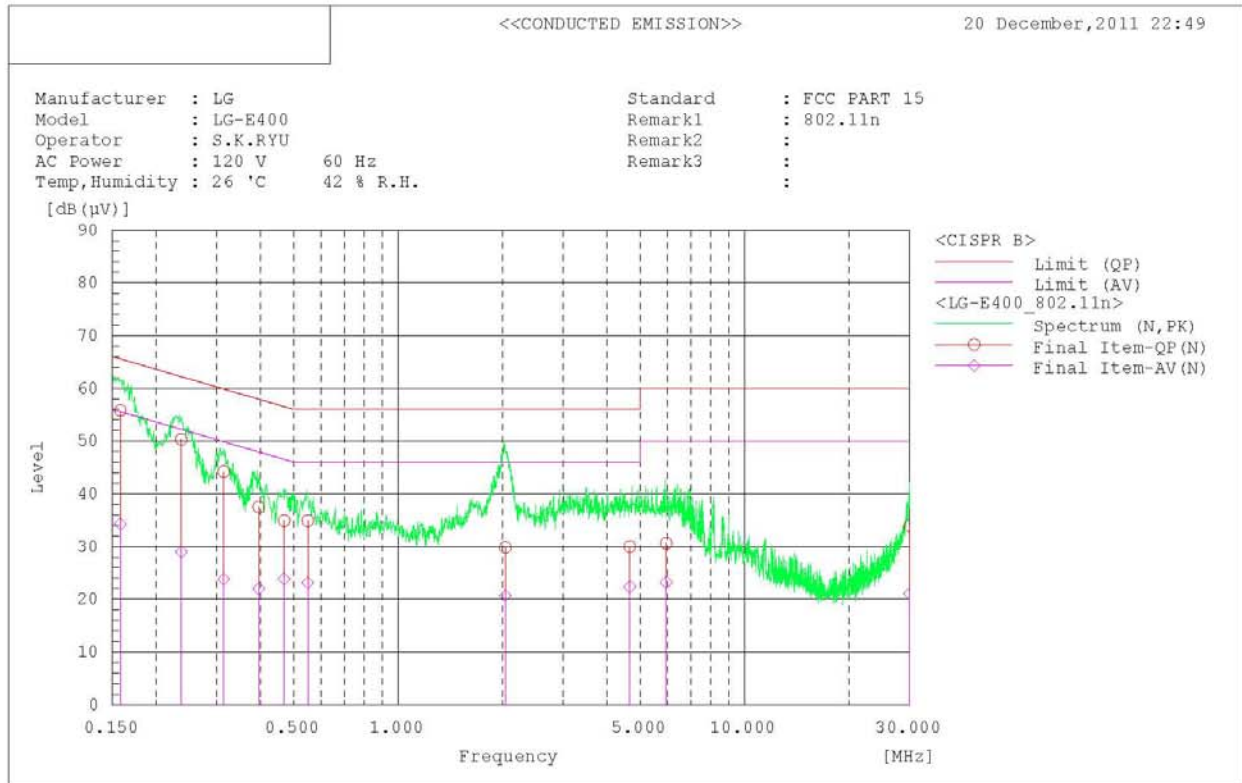
No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB (μV)]	[dB (μV)]		[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB]	[dB]	
1	0.158	55.9	34.4	0.1	56.0	34.5	65.6	55.6	9.6	21.1	
2	0.229	49.5	28.0	0.1	49.6	28.1	62.5	52.5	12.9	24.4	
3	0.306	43.8	22.7	0.1	43.9	22.8	60.1	50.1	16.2	27.3	
4	0.382	36.8	21.5	0.1	36.9	21.6	58.2	48.2	21.3	26.6	
5	0.471	34.8	24.1	0.1	34.9	24.2	56.5	46.5	21.6	22.3	
6	1.662	27.0	18.2	0.2	27.2	18.4	56.0	46.0	28.8	27.6	
7	2.016	29.3	20.6	0.2	29.5	20.8	56.0	46.0	26.5	25.2	
8	4.450	29.6	22.6	0.3	29.9	22.9	56.0	46.0	26.1	23.1	
9	6.126	30.0	22.7	0.4	30.4	23.1	60.0	50.0	29.6	26.9	
10	29.930	30.2	20.5	1.6	31.8	22.1	60.0	50.0	28.2	27.9	

--- L1 Phase ---

No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB (μV)]	[dB (μV)]		[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB]	[dB]	
1	0.154	53.3	36.0	0.2	53.5	36.2	65.8	55.8	12.3	19.6	
2	0.230	50.5	31.4	0.2	50.7	31.6	62.4	52.4	11.7	20.8	
3	0.305	43.7	24.9	0.2	43.9	25.1	60.1	50.1	16.2	25.0	
4	0.392	39.8	27.0	0.2	40.0	27.2	58.0	48.0	18.0	20.8	
5	0.499	37.0	28.8	0.2	37.2	29.0	56.0	46.0	18.8	17.0	
6	0.857	30.9	24.6	0.2	31.1	24.8	56.0	46.0	24.9	21.2	
7	2.046	32.2	25.2	0.3	32.5	25.5	56.0	46.0	23.5	20.5	
8	3.391	33.1	25.2	0.3	33.4	25.5	56.0	46.0	22.6	20.5	
9	6.129	34.8	26.6	0.5	35.3	27.1	60.0	50.0	24.7	22.9	
10	29.991	31.3	22.1	1.6	32.9	23.7	60.0	50.0	27.1	26.3	

AC Line Conducted Emissions (Graph)

Test Mode: 802.11n & MCS 6



AC Line Conducted Emissions (List)

Test Mode: 802.11n & MCS 6

<<CONDUCTED EMISSION>>

20 December, 2011 22:49

Standard : FCC PART 15
Manufacturer : LG
Model : LG-E400
Operator : S.K.RYU
AC Power : 120 V 60 Hz
Temp, Humidity : 26 °C 42 % R.H.
Remark1 : 802.11n
Remark2 :
Remark3 :

Final Result

--- N Phase ---

No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB (μV)]	[dB (μV)]		[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB]	[dB]	
1	0.158	55.7	34.2	0.1	55.8	34.3	65.6	55.6	9.8	21.3	
2	0.237	50.2	28.9	0.1	50.3	29.0	62.2	52.2	11.9	23.2	
3	0.314	44.1	23.7	0.1	44.2	23.8	59.9	49.9	15.7	26.1	
4	0.396	37.4	21.9	0.1	37.5	22.0	57.9	47.9	20.4	25.9	
5	0.469	34.8	23.8	0.1	34.9	23.9	56.5	46.5	21.6	22.6	
6	0.549	34.8	23.0	0.1	34.9	23.1	56.0	46.0	21.1	22.9	
7	2.039	29.6	20.5	0.2	29.8	20.7	56.0	46.0	26.2	25.3	
8	4.663	29.7	22.1	0.3	30.0	22.4	56.0	46.0	26.0	23.6	
9	5.946	30.2	22.8	0.4	30.6	23.2	60.0	50.0	29.4	26.8	
10	29.945	32.3	19.5	1.6	33.9	21.1	60.0	50.0	26.1	28.9	

--- Ll Phase ---

No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB (μV)]	[dB (μV)]		[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB]	[dB]	
1	0.157	55.9	36.6	0.2	56.1	36.8	65.6	55.6	9.5	18.8	
2	0.235	50.2	32.2	0.2	50.4	32.4	62.3	52.3	11.9	19.9	
3	0.314	44.1	25.4	0.2	44.3	25.6	59.9	49.9	15.6	24.3	
4	0.393	39.5	27.0	0.2	39.7	27.2	58.0	48.0	18.3	20.8	
5	0.499	37.3	28.7	0.2	37.5	28.9	56.0	46.0	18.5	17.1	
6	0.866	31.8	23.4	0.2	32.0	23.6	56.0	46.0	24.0	22.4	
7	2.036	31.5	25.1	0.3	31.8	25.4	56.0	46.0	24.2	20.6	
8	3.628	30.2	25.1	0.4	30.6	25.5	56.0	46.0	25.4	20.5	
9	5.743	36.4	26.4	0.5	36.9	26.9	60.0	50.0	23.1	23.1	
10	29.892	28.3	20.6	1.6	29.9	22.2	60.0	50.0	30.1	27.8	

8. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent	E4440A	11/09/30	12/09/30	MY45304199
Spectrum Analyzer	Rohde Schwarz	FSQ26	11/01/11	12/01/11	200445
Spectrum Analyzer	Agilent	N9020A	11/01/07	12/01/07	MY49100833
Power Splitter	Anritsu	K241B	11/09/30	12/09/30	020611
Digital Multimeter	H.P	34401A	11/03/07	12/03/07	3146A13475, US36122178
Signal Generator	Rohde Schwarz	SMR20	11/03/08	12/03/08	101251
Vector Signal Generator	Rohde Schwarz	SMJ100A	11/01/11	12/01/11	100148
Virtual Power Meter(S/W)	Rohde Schwarz	R&S Power Viewer Plus	-	-	V 4.1.0
Power SENSOR	Rohde Schwarz	NRP-Z81	11/06/04	12/06/04	1137.9009.02-101001-EA
Thermo hygrometer	BODYCOM	BJ5478	11/01/13	12/01/13	090205-2
DC Power Supply	HP	6622A	11/03/07	12/03/07	3448A03760
High-pass filter	Wainwright	WHNX3.0	N/A	N/A	9
BICONICAL ANT.	Schwarzbeck	VHA 9103	10/12/21	12/12/21	91031946
LOG-PERIODIC ANT.	Schwarzbeck	UHALP9108A	10/07/07	12/07/07	590
BILOG ANTENNA	SCHAFFNER	CBL6112B	10/07/14	12/07/14	2737
HORN ANT	ETS	3115	11/03/22	12/03/22	6419
HORN ANT	A.H.Systems	SAS-574	11/03/25	13/03/25	154
Amplifier (22dB)	H.P	8447E	11/01/11	12/01/11	2945A02865
Amplifier (25dB)	Agilent	8447D	11/03/07	12/03/07	2944A10144
Amplifier (30dB)	Agilent	8449B	11/03/07	12/03/07	3008A01590
Attenuator(10dB)	WEINSCHEL	23-10-34	11/09/30	12/09/30	BP4386
EMI TEST RECEIVER	R&S	ESU	11/01/20	12/01/20	100014
Spectrum Analyzer(CE)	H.P	8591E	11/03/07	12/03/07	3649A05889
LISN	Kyoritsu	KNW-407	11/01/11	12/01/11	8-317-8
LISN	Kyoritsu	KNW-242	11/07/02	12/07/02	8-654-15
CVCF	NF Electronic	4420	11/03/08	12/03/08	304935/337980
50 ohm Terminator	HME	CT-01	11/01/11	12/01/11	N/A
RFI/FIELD Intensity Meter	Kyoritsu	KNM-2402	11/07/02	12/07/02	4N-170-3