

# RF TEST REPORT

Test item : Cellular/PCS GSM/GPRS/WCDMA/HSDPA phone  
with Bluetooth & WLAN  
Model No. : LG-E400g, E400g, LGE400g, LG-E400G, LGE400G  
Order No. : 1201-00012  
Date of receipt : 2012-01-04  
Test duration : 2012-01-05 ~ 2012-03-02  
Date of issue : 2012-03-06  
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

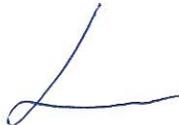
Test specification : FCC Part 15 Subpart C 247

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:



Engineer  
S.K.Ryu

Witnessed by:

N/A

Reviewed by:



Technical Director  
Harvey Sung

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## 1. GENERAL INFORMATION

**Applicant** : LG Electronics MobileComm U.S.A., Inc.  
**Address** : 10101 Old Grove Road., San Diego, CA 92131  
**FCC ID** : ZNFE400G  
**EUT** : Cellular/PCS GSM/GPRS/WCDMA/HSDPA phone with Bluetooth & WLAN  
**Model** : LG-E400g  
**Additional Model(s)** : E400g, LGE400g, LG-E400G, LGE400G  
**Data of Test** : 2012-01-05 ~ 2012-03-02  
**Contact person** : Cheol Goo Lee

## 2. EUT DESCRIPTION

<b>Product</b>	Cellular/PCS GSM/GPRS/WCDMA/HSDPA phone with Bluetooth &WLAN
<b>Model Name</b>	LG-E400g, E400g, LGE400g, LG-E400G, LGE400G ※ 5 models are same mechanical, electrical and functional. ※ The only difference is the model name, which are changed for marketing purpose.
<b>Power Supply</b>	DC 3.7V
<b>Battery type</b>	Standard Battery: Lithium Ion Battery
<b>Frequency Range</b>	2412 ~ 2462MHz
<b>Max. RF Output Power</b>	802.11b: 19.16dBm 802.11g: 23.09dBm 802.11n (HT20): 22.98dBm
<b>Modulation Type</b>	802.11b: DSSS(CCK, DQPSK, DBPSK) 802.11g: OFDM(64QAM, QPSK, BPSK) 802.11n (HT20): OFDM(64QAM, 16QAM, QPSK, BPSK)
<b>Antenna Specification</b>	Internal Antenna Peak Gain: -0.676 dBi

### 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

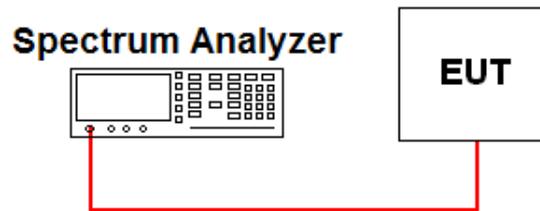
### 7.1 6dB Bandwidth Measurement (802.11b/g/n (HT20))

#### 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

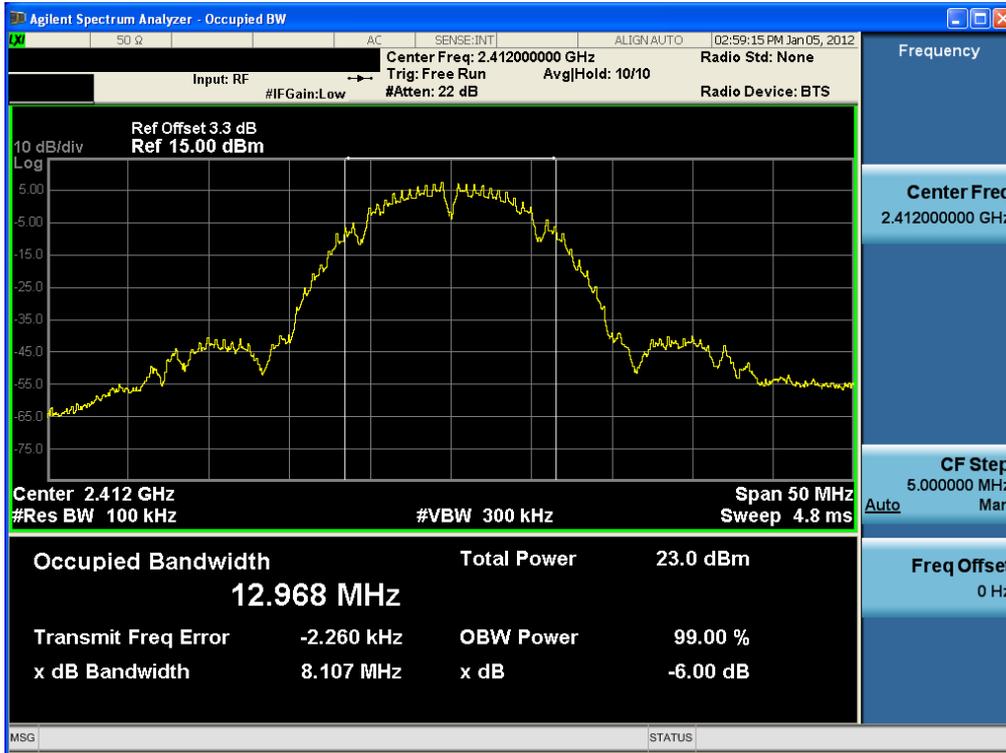
#### ■ TEST RESULTS: **Comply**

Test Mode	Data Rate	Tested Channel	Test Results [MHz]
802.11b	1Mbps	Lowest	8.107
		Middle	8.116
		Highest	8.115
802.11g	6Mbps	Lowest	15.820
		Middle	16.380
		Highest	15.200
802.11n HT20	MCS 3	Lowest	16.410
		Middle	17.370
		Highest	16.320

RESULT PLOTS

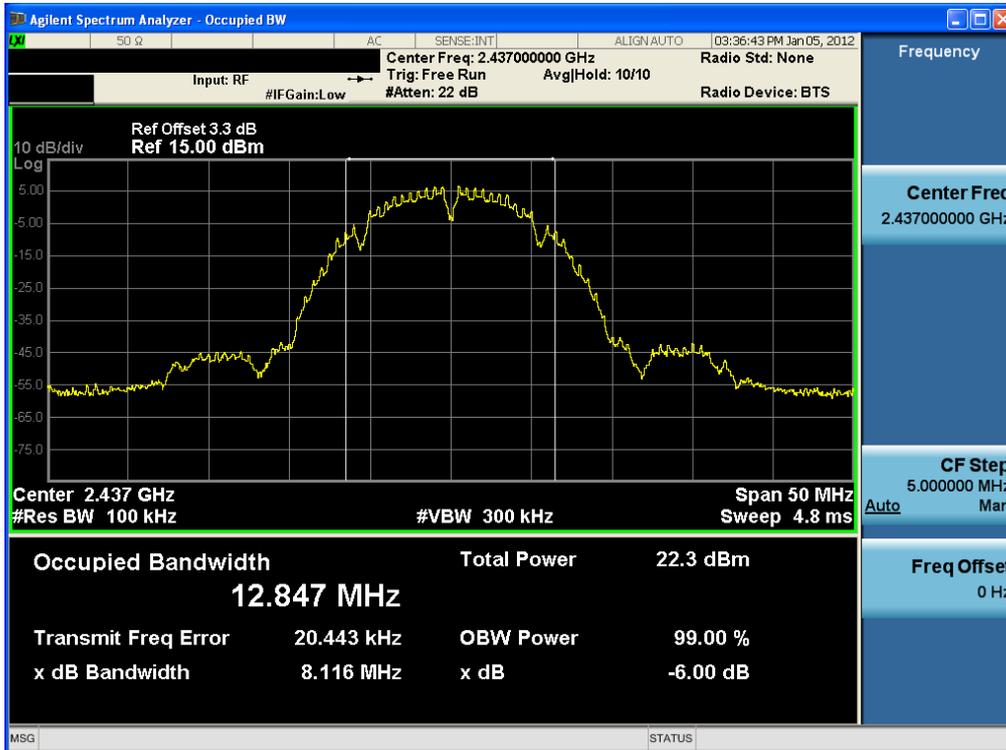
6 dB Bandwidth

Lowest Channel & Modulation: 802.11b



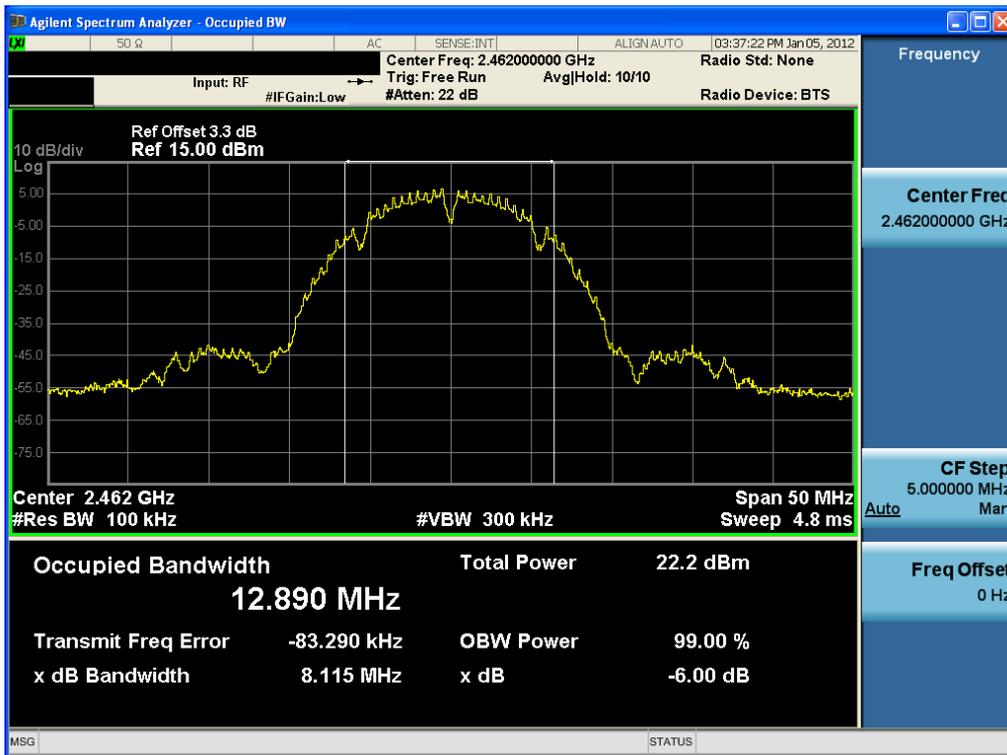
6 dB Bandwidth

Middle Channel & Modulation: 802.11b



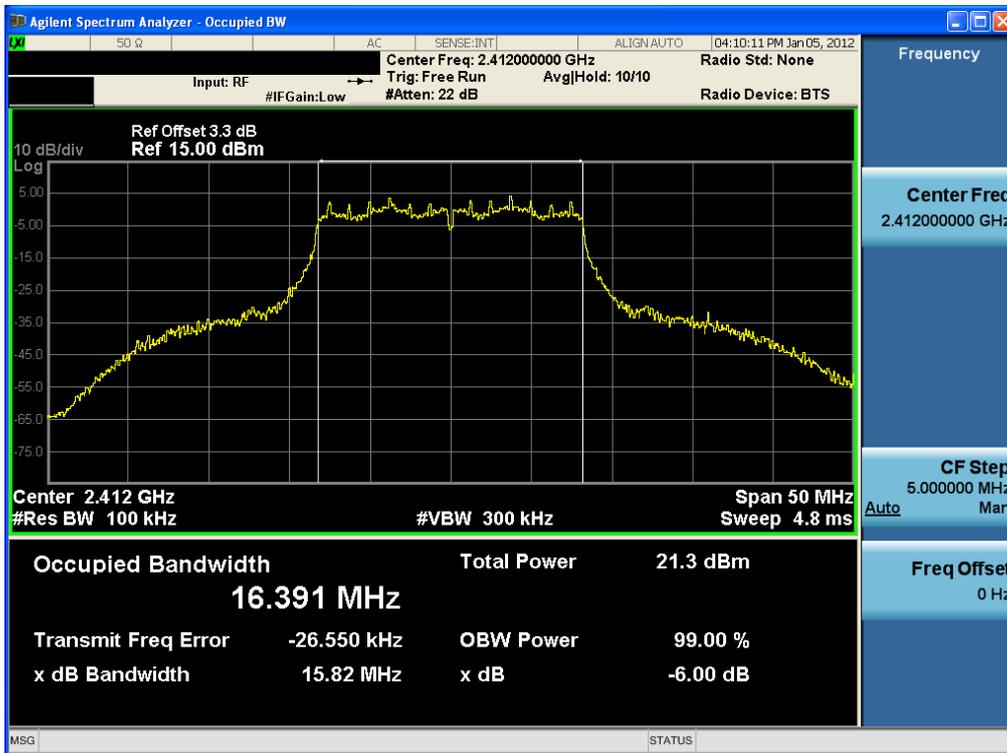
6 dB Bandwidth

Highest Channel & Modulation: 802.11b



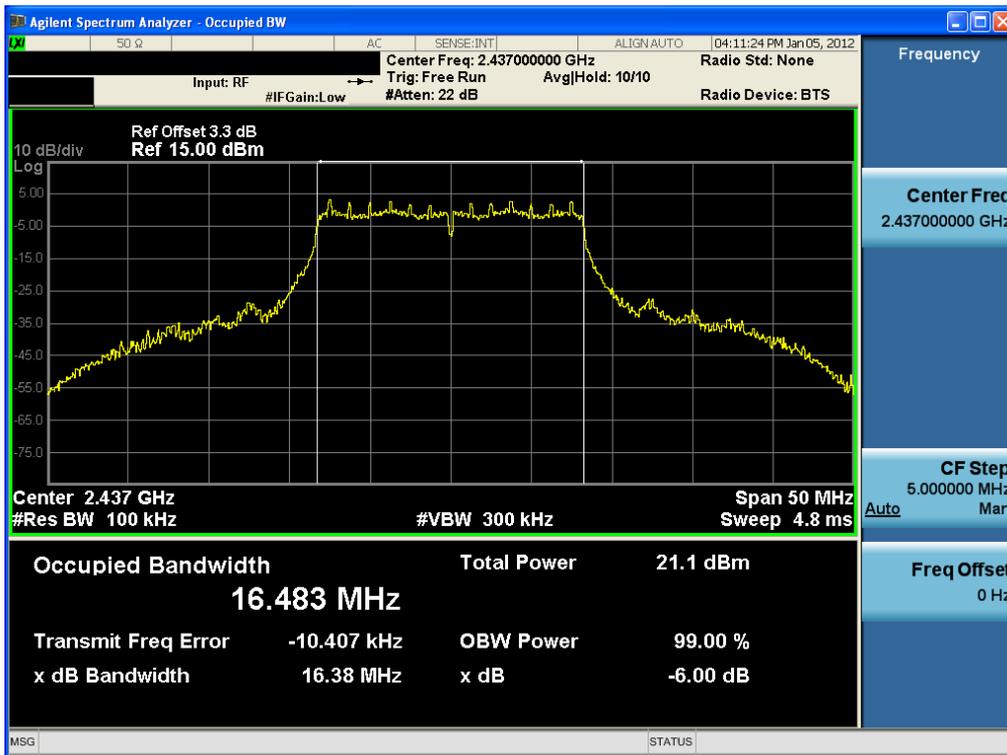
6 dB Bandwidth

Lowest Channel & Modulation: 802.11g



6 dB Bandwidth

Middle Channel & Modulation: 802.11g



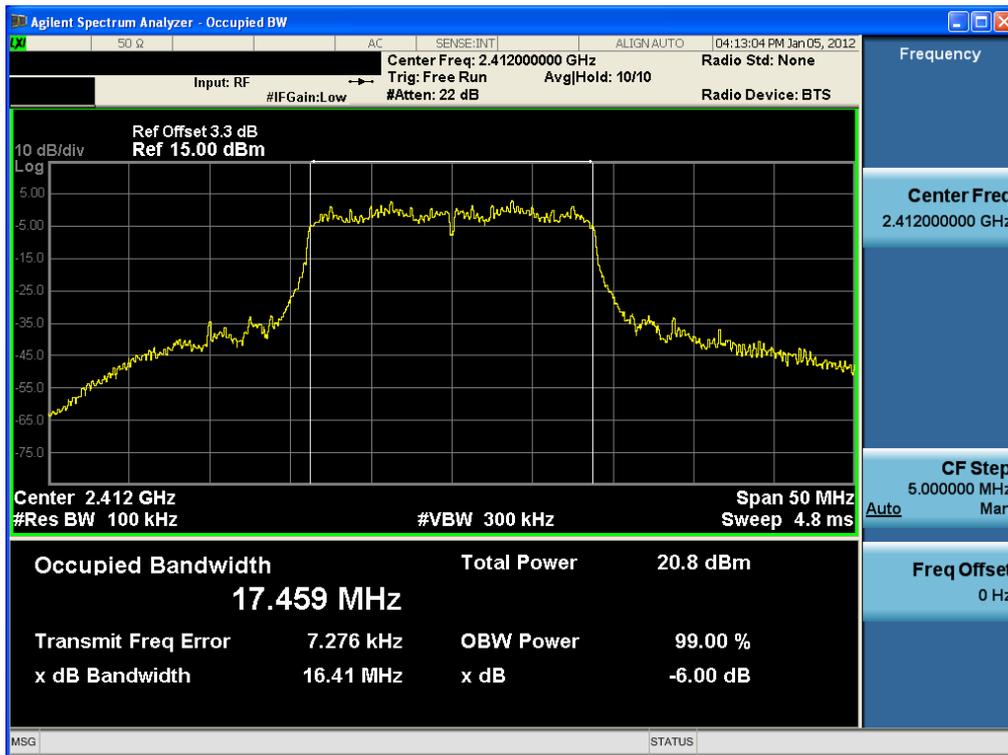
6 dB Bandwidth

Highest Channel & Modulation: 802.11g



6 dB Bandwidth

Lowest Channel & Modulation: 802.11n (HT20)



6 dB Bandwidth

Middle Channel & Modulation: 802.11n (HT20)



6 dB Bandwidth

***Highest Channel*** & Modulation: ***802.11n (HT20)***



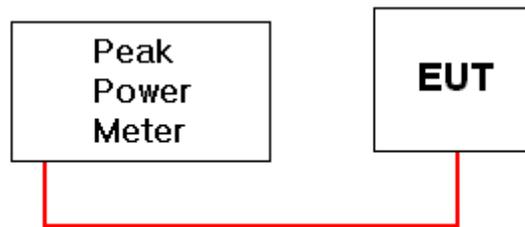
## 7.2 Peak Output Power

### 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 a peak power meter.

#### ■ TEST RESULTS: **Comply**

Test Mode	Data Rate	Tested Channel	Peak Output Power	
			dBm	W
802.11b	1Mbps	Lowest	19.16	0.082
		Middle	18.84	0.077
		Highest	18.67	0.074
802.11g	6Mbps	Lowest	23.09	0.204
		Middle	22.78	0.190
		Highest	22.62	0.183
802.11n (HT20)	MCS 3	Lowest	22.98	0.199
		Middle	22.54	0.179
		Highest	21.99	0.158

#### **Note.**

1. Sample Calculation.

Peak Output Power = Power Meter Reading + Cable Loss

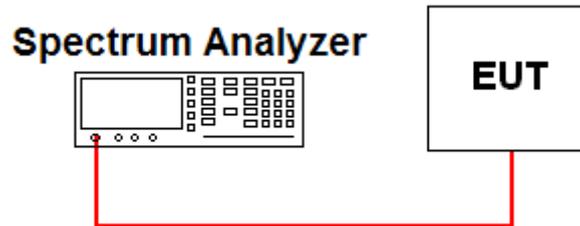
### 7.3 Power Spectral Density (802.11b/g/n (HT20))

#### 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**

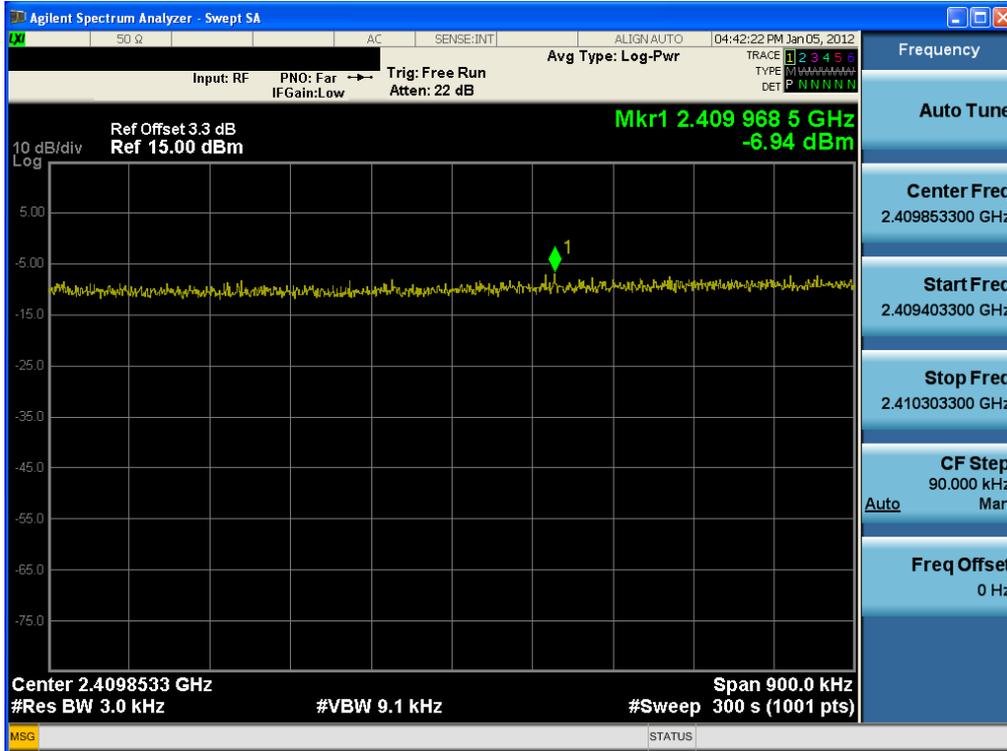
Test Mode	Data Rate	Frequency [MHz]	Test Results [dBm]
802.11b	1Mbps	Lowest	-6.94
		Middle	<b>-6.16</b>
		Highest	-6.92
802.11g	6Mbps	Lowest	-9.72
		Middle	<b>-9.22</b>
		Highest	-10.78
802.11n (HT20)	MCS 3	Lowest	<b>-10.84</b>
		Middle	-11.94
		Highest	-11.86

**Note.**

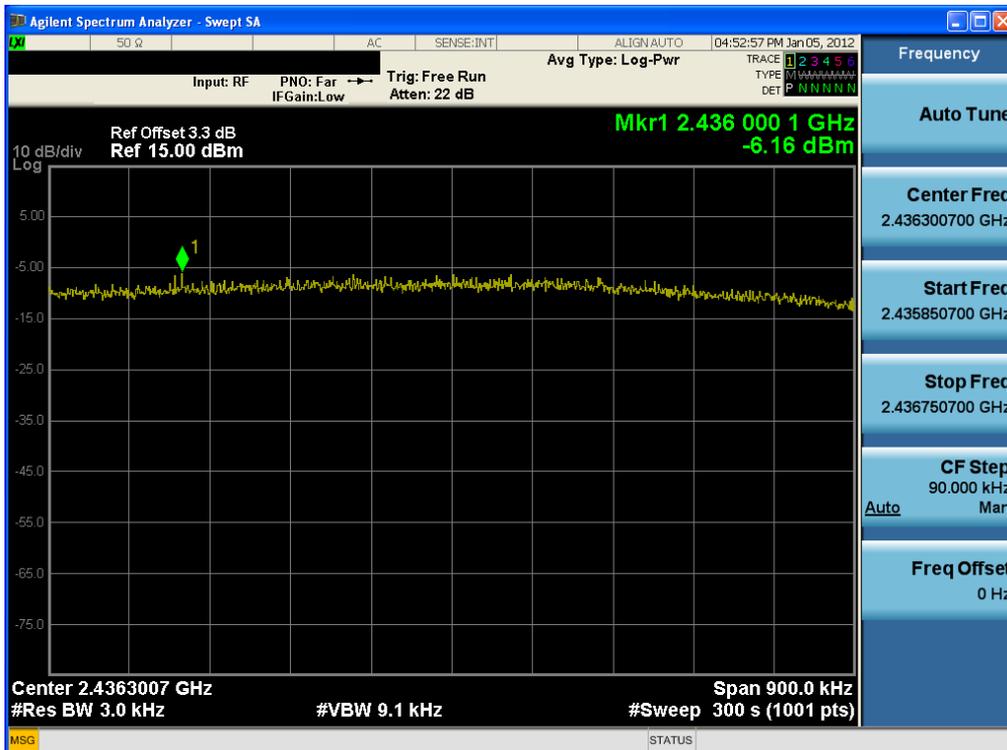
- Sample Calculation.  
 Peak Output Power = Spectrum Analyzer Reading + Cable Loss

RESULT PLOTS

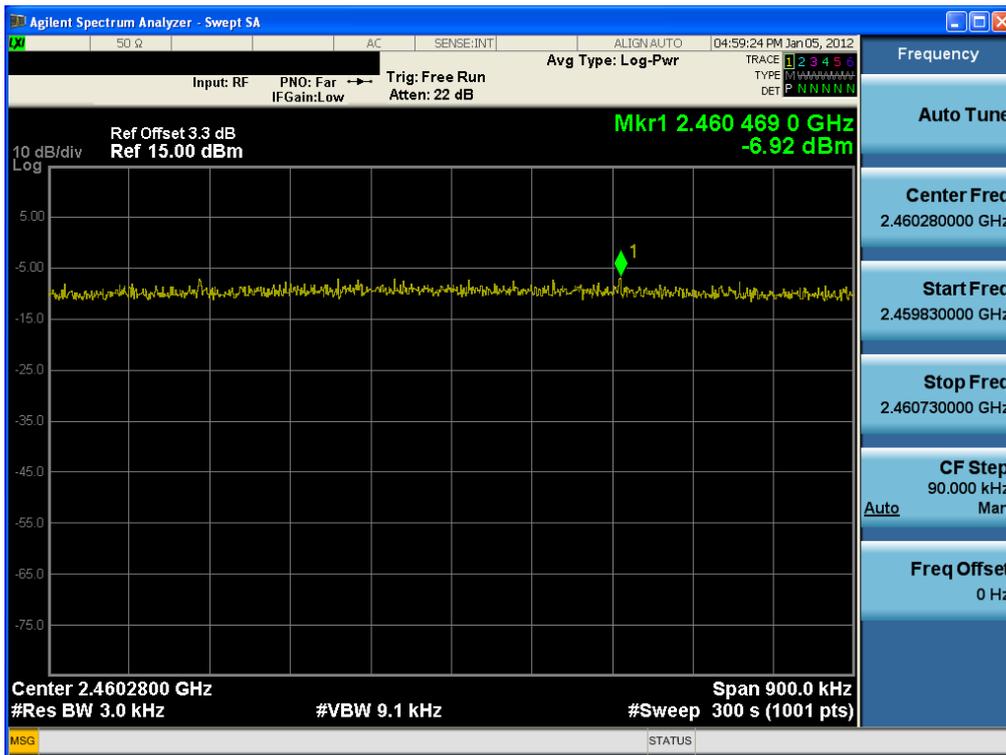
Power Spectral Density Lowest Channel & Modulation: 802.11b



Power Spectral Density Middle Channel & Modulation: 802.11b



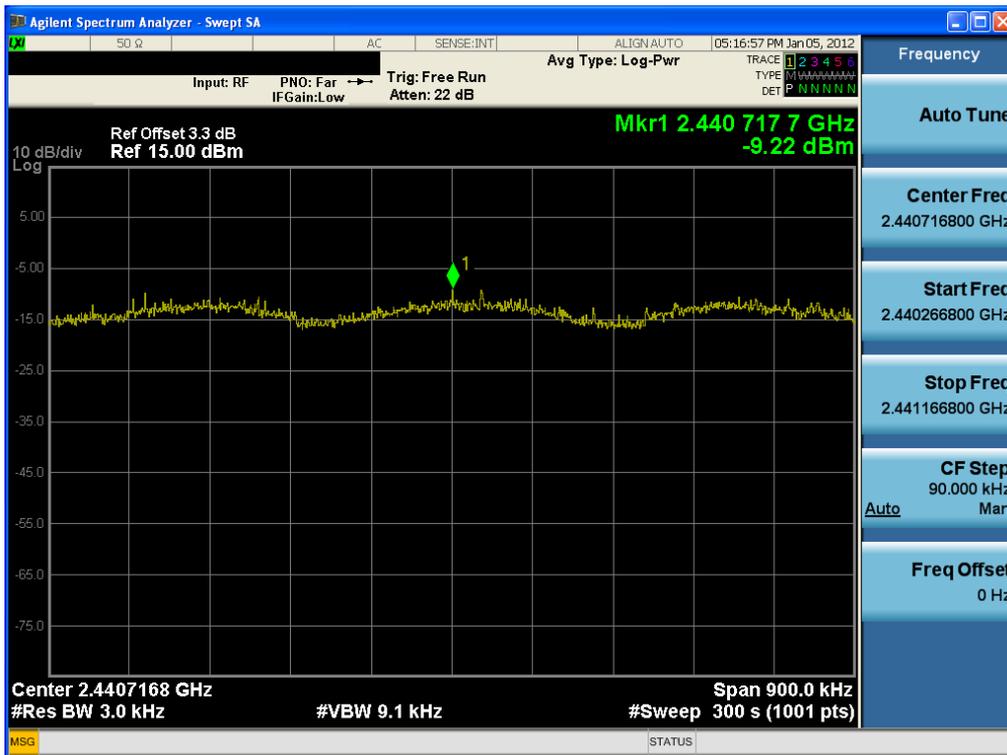
Power Spectral Density Highest Channel & Modulation: 802.11b



Power Spectral Density Lowest Channel & Modulation: 802.11g



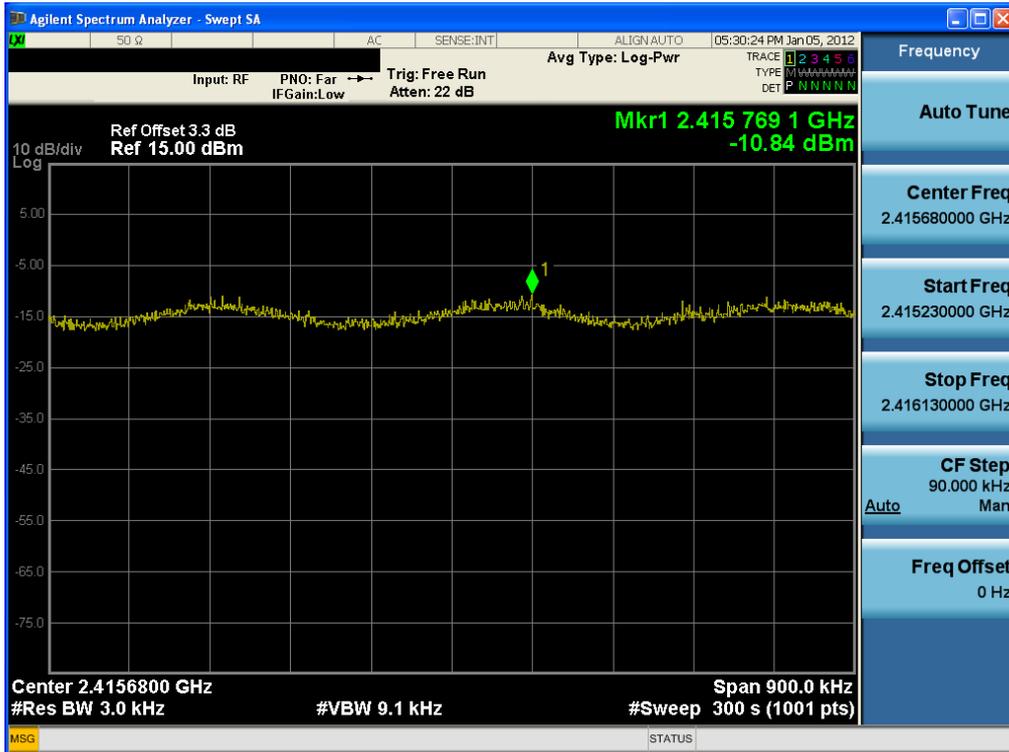
Power Spectral Density Middle Channel & Modulation: 802.11g



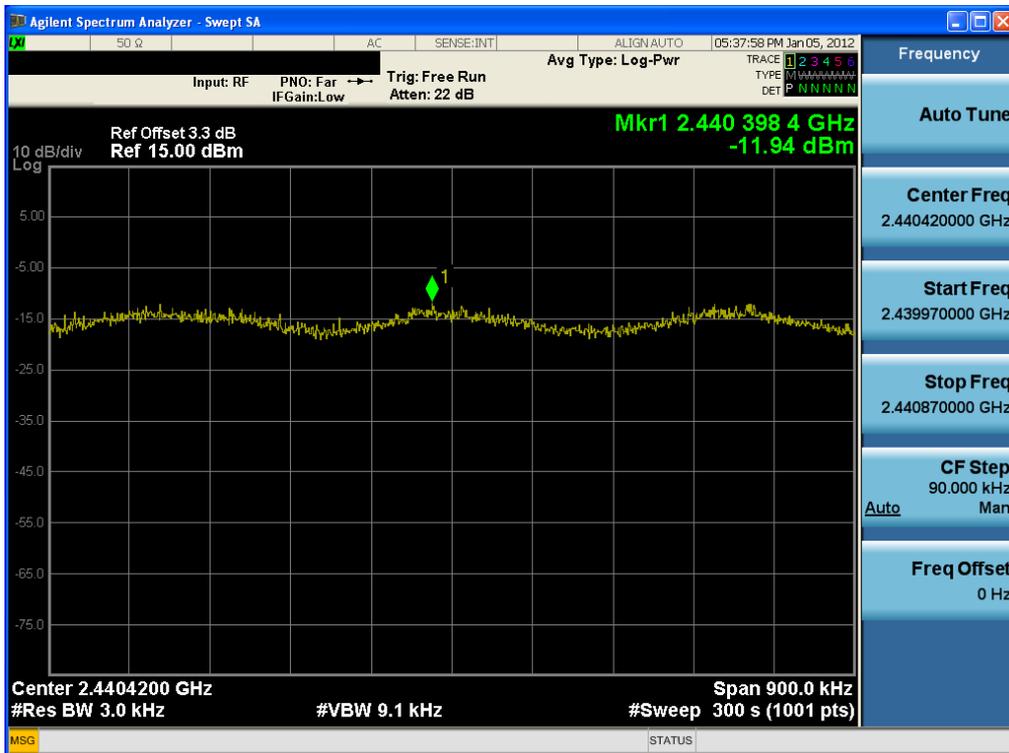
Power Spectral Density Highest Channel & Modulation: 802.11g



Power Spectral Density Lowest Channel & Modulation: 802.11n (HT20)



Power Spectral Density Middle Channel & Modulation: 802.11n (HT20)



Power Spectral Density Highest Channel & Modulation: 802.11n (HT20)

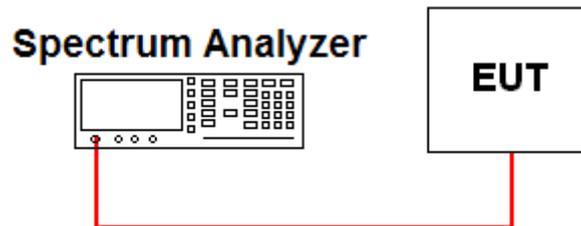


## 7.4 Out of Band Emissions at the Band Edge/ Conducted Spurious Emissions

### 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.

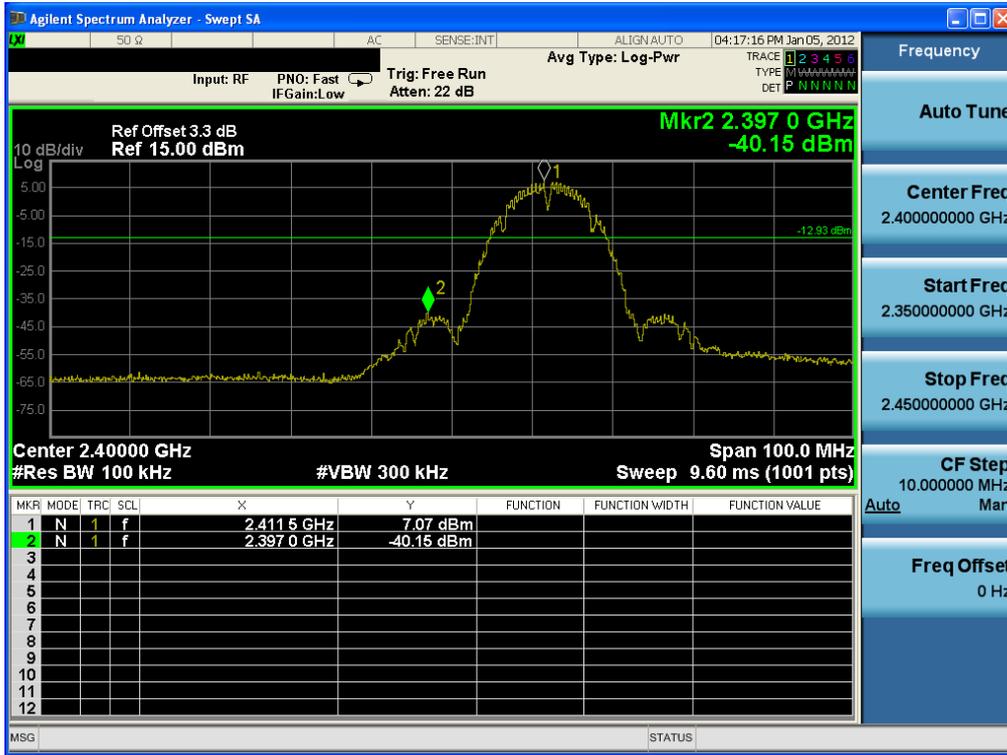
The resolution bandwidth is set to 100 kHz and the video bandwidth is set to 300 kHz.

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

RESULT PLOTS

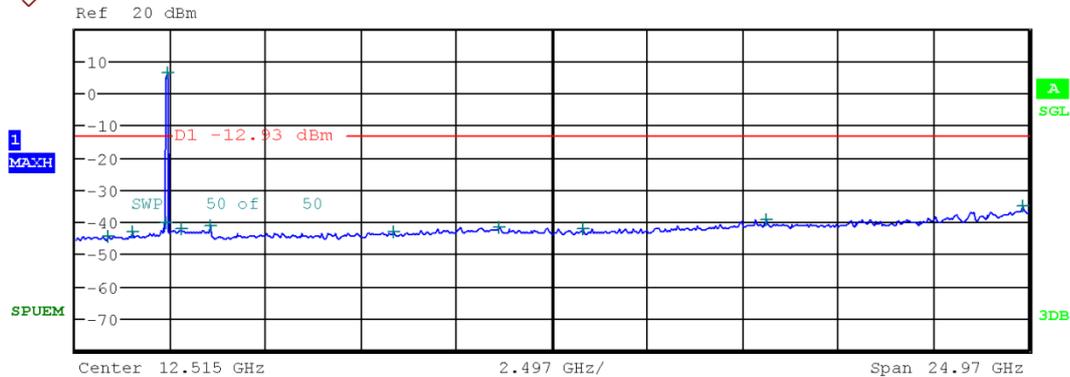
Low Band-edge

Lowest Channel & Modulation: 802.11b



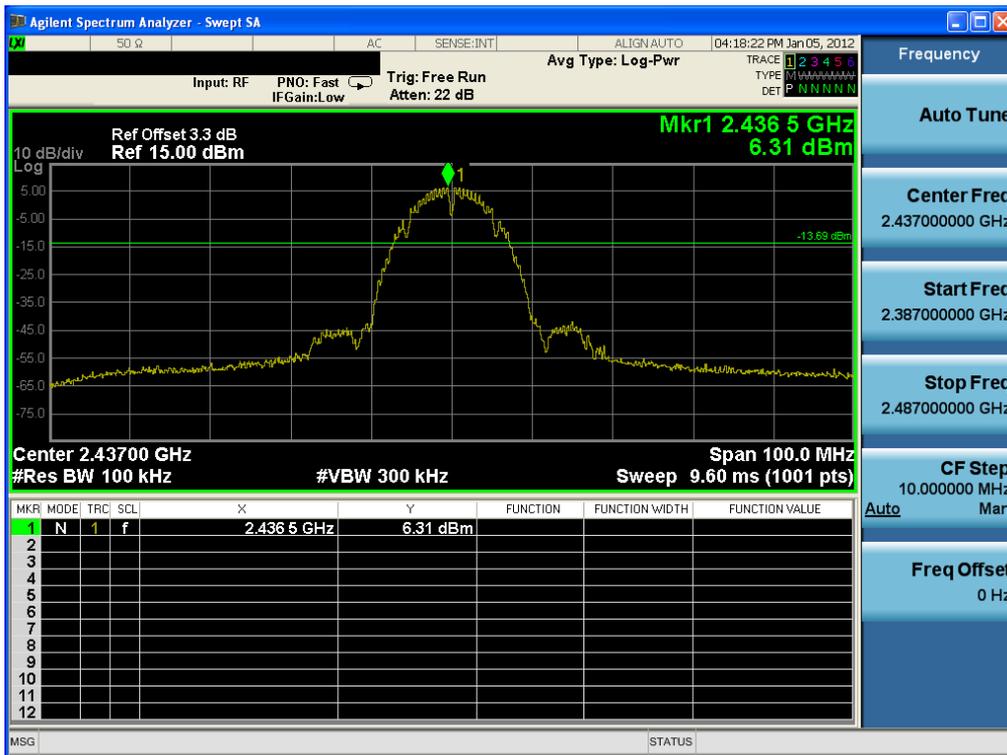
Conducted Spurious Emissions

Lowest Channel & Modulation: 802.11b

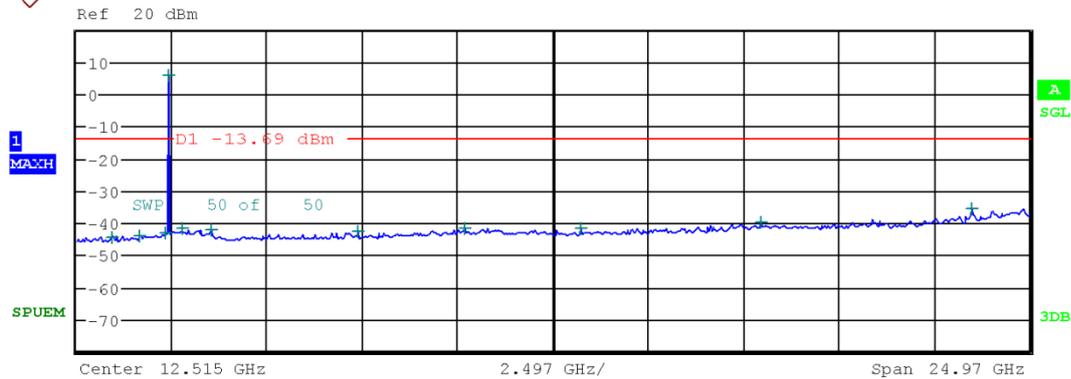


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	851.590000 M	-44.51	-200.00
1.000 G	2.000 G	100.00 k	1.509000 G	-43.36	-200.00
2.000 G	2.400 G	100.00 k	2.397600 G	-40.11	-200.00
2.400 G	2.483 G	100.00 k	2.411481 G	6.37	-200.00
2.483 G	3.000 G	100.00 k	2.800063 G	-41.99	-200.00
3.000 G	6.000 G	100.00 k	3.570333 G	-41.09	-200.00
6.000 G	9.000 G	100.00 k	8.342667 G	-43.09	-200.00
9.000 G	12.000 G	100.00 k	11.112667 G	-41.88	-200.00
12.000 G	15.000 G	100.00 k	13.330000 G	-42.00	-200.00
15.000 G	20.000 G	100.00 k	18.111111 G	-39.40	-200.00
20.000 G	25.000 G	100.00 k	24.842778 G	-35.24	-200.00

Reference for limit **Middle Channel** & Modulation: **802.11b**



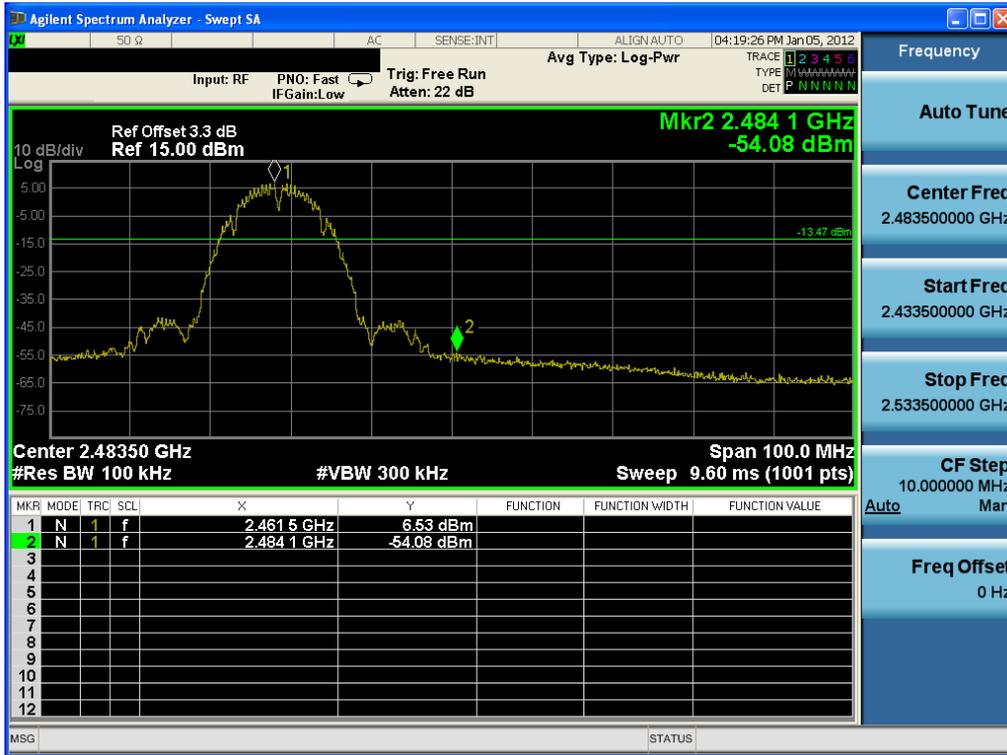
Conducted Spurious Emissions **Middle Channel** & Modulation: **802.11b**



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	946.650000 M	-44.71	-200.00
1.000 G	2.000 G	100.00 k	1.682000 G	-43.97	-200.00
2.000 G	2.400 G	100.00 k	2.353680 G	-43.25	-200.00
2.400 G	2.483 G	100.00 k	2.435989 G	5.81	-200.00
2.483 G	3.000 G	100.00 k	2.784155 G	-41.76	-200.00
3.000 G	6.000 G	100.00 k	3.535333 G	-42.00	-200.00
6.000 G	9.000 G	100.00 k	7.389000 G	-42.86	-200.00
9.000 G	12.000 G	100.00 k	10.187000 G	-41.91	-200.00
12.000 G	15.000 G	100.00 k	13.231333 G	-41.87	-200.00
15.000 G	20.000 G	100.00 k	17.973889 G	-39.99	-200.00
20.000 G	25.000 G	100.00 k	23.473889 G	-35.49	-200.00

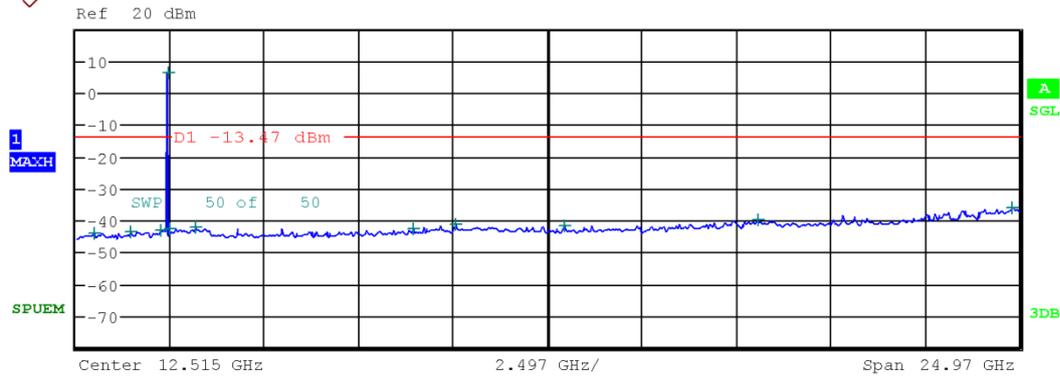
High Band-edge

Highest Channel & Modulation: 802.11b



Conducted Spurious Emissions

Highest Channel & Modulation: 802.11b



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	498.510000 M	-44.07	-200.00
1.000 G	2.000 G	100.00 k	1.462000 G	-43.64	-200.00
2.000 G	2.400 G	100.00 k	2.261800 G	-43.24	-200.00
2.400 G	2.483 G	100.00 k	2.461477 G	5.94	-200.00
2.483 G	3.000 G	100.00 k	2.519552 G	-42.64	-200.00
3.000 G	6.000 G	100.00 k	3.174333 G	-42.04	-200.00
6.000 G	9.000 G	100.00 k	8.936000 G	-42.61	-200.00
9.000 G	12.000 G	100.00 k	10.082667 G	-41.42	-200.00
12.000 G	15.000 G	100.00 k	12.960333 G	-41.85	-200.00
15.000 G	20.000 G	100.00 k	18.068333 G	-39.97	-200.00
20.000 G	25.000 G	100.00 k	24.813889 G	-35.98	-200.00

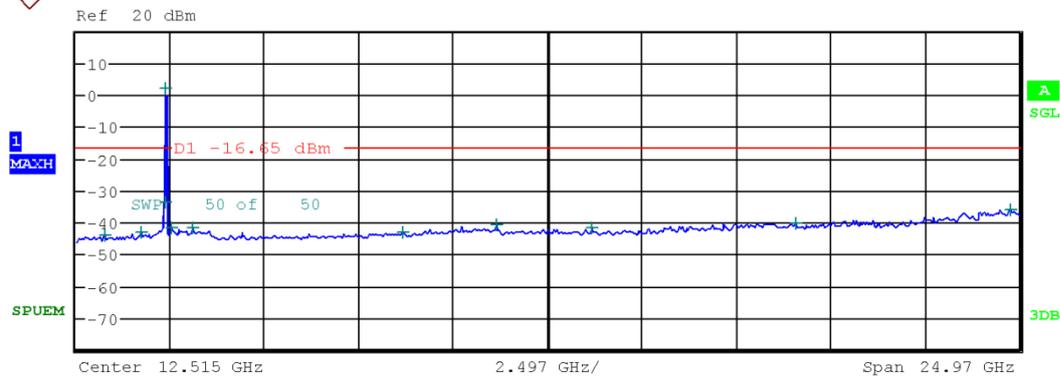
Low Band-edge

Lowest Channel & Modulation: 802.11g



Conducted Spurious Emissions

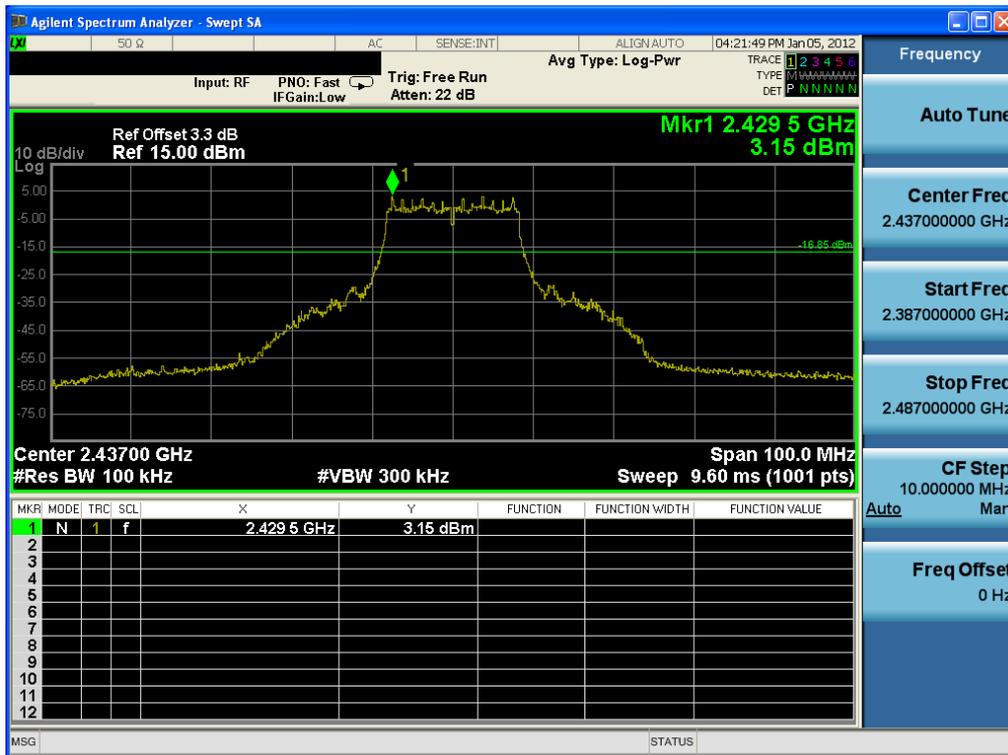
Lowest Channel & Modulation: 802.11g



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	783.690000 M	-44.31	-200.00
1.000 G	2.000 G	100.00 k	1.750000 G	-43.17	-200.00
2.000 G	2.400 G	100.00 k	2.399480 G	-33.58	-200.00
2.400 G	2.483 G	100.00 k	2.408183 G	1.84	-200.00
2.483 G	3.000 G	100.00 k	2.547804 G	-41.53	-200.00
3.000 G	6.000 G	100.00 k	3.125333 G	-41.68	-200.00
6.000 G	9.000 G	100.00 k	8.655333 G	-43.11	-200.00
9.000 G	12.000 G	100.00 k	11.135333 G	-40.63	-200.00
12.000 G	15.000 G	100.00 k	13.678667 G	-41.74	-200.00
15.000 G	20.000 G	100.00 k	19.059444 G	-40.22	-200.00
20.000 G	25.000 G	100.00 k	24.766111 G	-36.09	-200.00

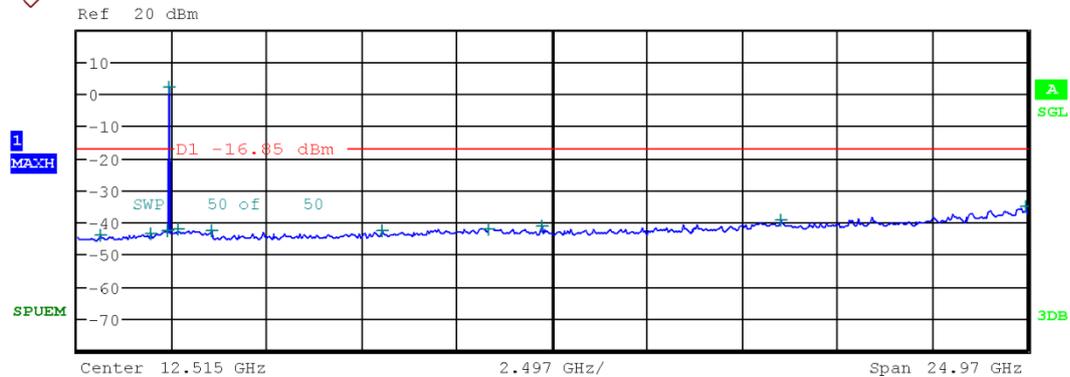
Reference for limit

**Middle Channel** & Modulation: **802.11g**



Conducted Spurious Emissions

**Middle Channel** & Modulation: **802.11g**



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	631.400000 M	-43.91	-200.00
1.000 G	2.000 G	100.00 k	1.959000 G	-43.80	-200.00
2.000 G	2.400 G	100.00 k	2.397360 G	-42.82	-200.00
2.400 G	2.483 G	100.00 k	2.440727 G	1.83	-200.00
2.483 G	3.000 G	100.00 k	2.669285 G	-42.34	-200.00
3.000 G	6.000 G	100.00 k	3.556333 G	-42.69	-200.00
6.000 G	9.000 G	100.00 k	8.045333 G	-42.64	-200.00
9.000 G	12.000 G	100.00 k	10.817000 G	-41.99	-200.00
12.000 G	15.000 G	100.00 k	12.246000 G	-41.39	-200.00
15.000 G	20.000 G	100.00 k	18.531667 G	-39.53	-200.00
20.000 G	25.000 G	100.00 k	24.967778 G	-35.18	-200.00

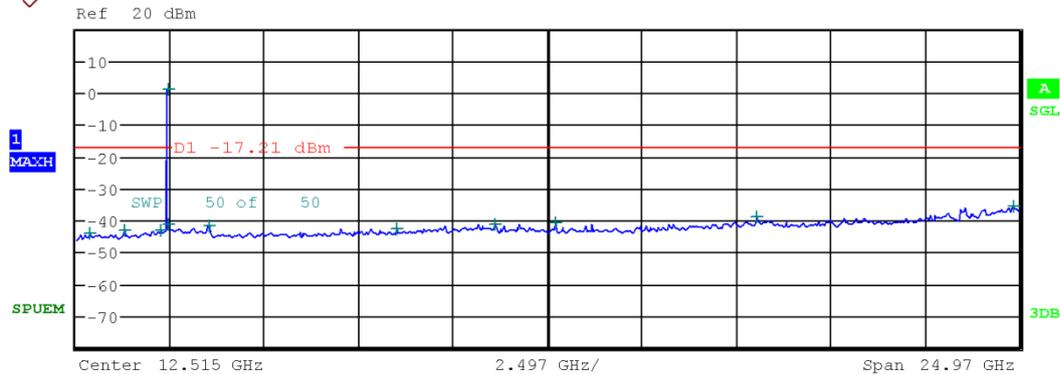
High Band-edge

Highest Channel & Modulation: 802.11g



Conducted Spurious Emissions

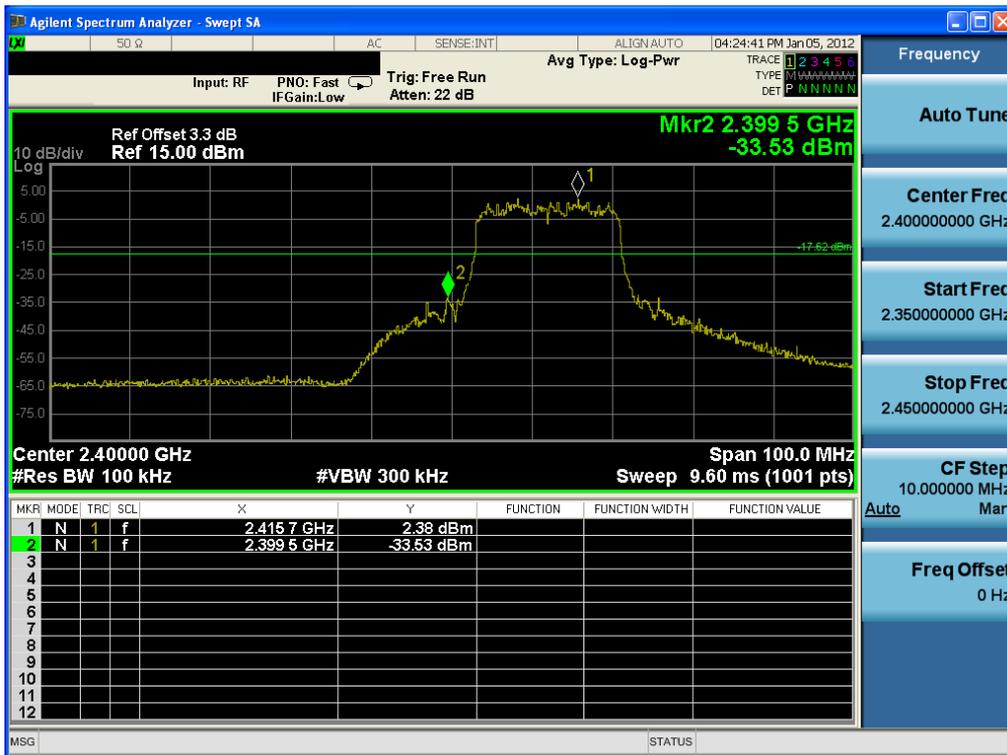
Highest Channel & Modulation: 802.11g



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	399.570000 M	-44.27	-200.00
1.000 G	2.000 G	100.00 k	1.299000 G	-43.36	-200.00
2.000 G	2.400 G	100.00 k	2.267120 G	-42.95	-200.00
2.400 G	2.483 G	100.00 k	2.457010 G	0.81	-200.00
2.483 G	3.000 G	100.00 k	2.490266 G	-41.50	-200.00
3.000 G	6.000 G	100.00 k	3.536000 G	-41.88	-200.00
6.000 G	9.000 G	100.00 k	8.524667 G	-42.55	-200.00
9.000 G	12.000 G	100.00 k	11.095000 G	-41.23	-200.00
12.000 G	15.000 G	100.00 k	12.699000 G	-40.90	-200.00
15.000 G	20.000 G	100.00 k	18.027778 G	-38.95	-200.00
20.000 G	25.000 G	100.00 k	24.822778 G	-35.85	-200.00

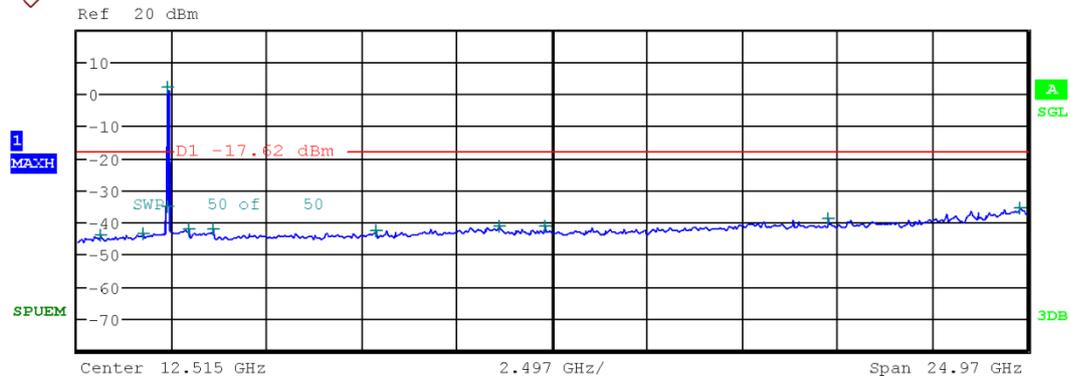
Low Band-edge

Lowest Channel & Modulation: 802.11n (HT20)



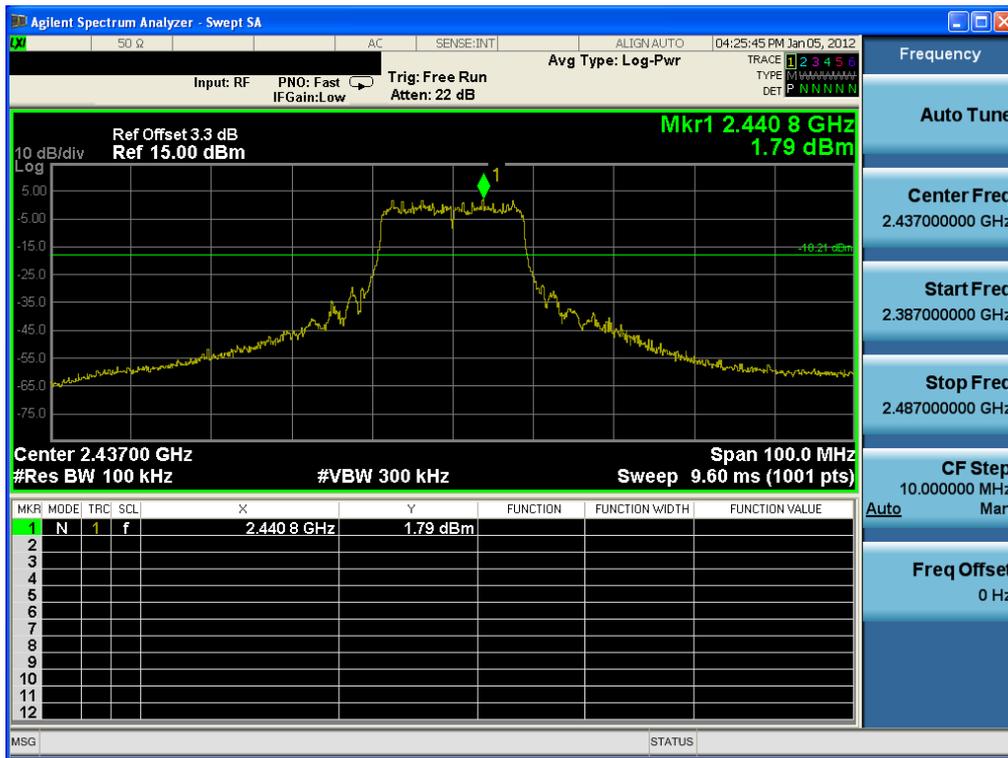
Conducted Spurious Emissions

Lowest Channel & Modulation: 802.11n (HT20)

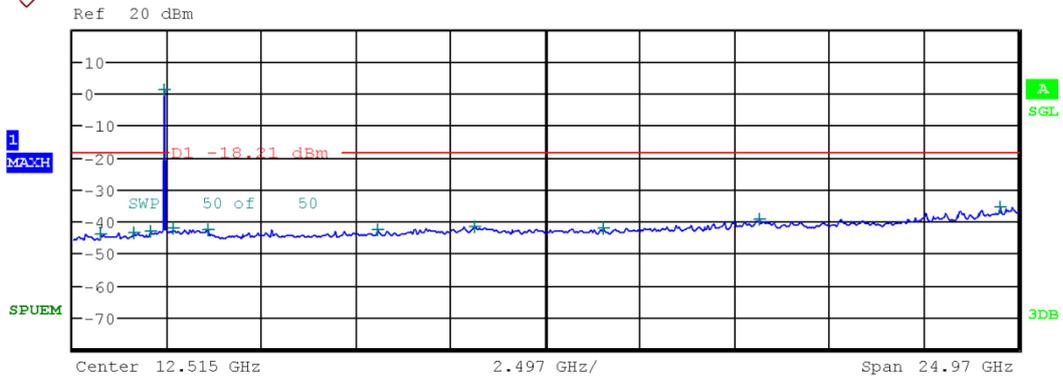


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	614.910000 M	-44.23	-200.00
1.000 G	2.000 G	100.00 k	1.737000 G	-43.84	-200.00
2.000 G	2.400 G	100.00 k	2.399800 G	-35.34	-200.00
2.400 G	2.483 G	100.00 k	2.408204 G	1.78	-200.00
2.483 G	3.000 G	100.00 k	2.952999 G	-42.38	-200.00
3.000 G	6.000 G	100.00 k	3.578000 G	-42.39	-200.00
6.000 G	9.000 G	100.00 k	7.860000 G	-42.75	-200.00
9.000 G	12.000 G	100.00 k	11.133000 G	-41.16	-200.00
12.000 G	15.000 G	100.00 k	12.326667 G	-41.34	-200.00
15.000 G	20.000 G	100.00 k	19.746667 G	-38.84	-200.00
20.000 G	25.000 G	100.00 k	24.788333 G	-35.84	-200.00

Reference for limit Middle Channel & Modulation: 802.11n (HT20)



Conducted Spurious Emissions Middle Channel & Modulation: 802.11n (HT20)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	765.260000 M	-43.85	-200.00
1.000 G	2.000 G	100.00 k	1.623000 G	-43.50	-200.00
2.000 G	2.400 G	100.00 k	2.086600 G	-43.03	-200.00
2.400 G	2.483 G	100.00 k	2.440748 G	1.20	-200.00
2.483 G	3.000 G	100.00 k	2.653067 G	-42.04	-200.00
3.000 G	6.000 G	100.00 k	3.597000 G	-42.65	-200.00
6.000 G	9.000 G	100.00 k	8.055000 G	-42.86	-200.00
9.000 G	12.000 G	100.00 k	10.629333 G	-41.68	-200.00
12.000 G	15.000 G	100.00 k	14.034000 G	-42.22	-200.00
15.000 G	20.000 G	100.00 k	18.156667 G	-39.62	-200.00
20.000 G	25.000 G	100.00 k	24.504444 G	-35.56	-200.00

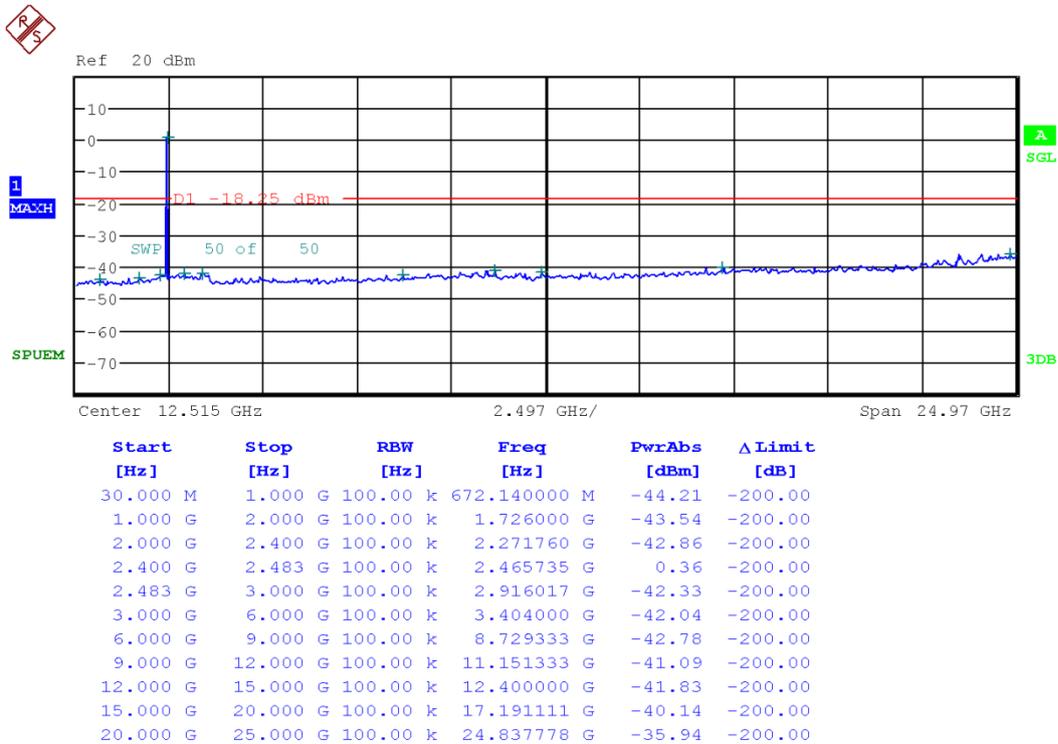
High Band-edge

Highest Channel & Modulation: 802.11n (HT20)



Conducted Spurious Emissions

Highest Channel & Modulation: 802.11n (HT20)



## 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

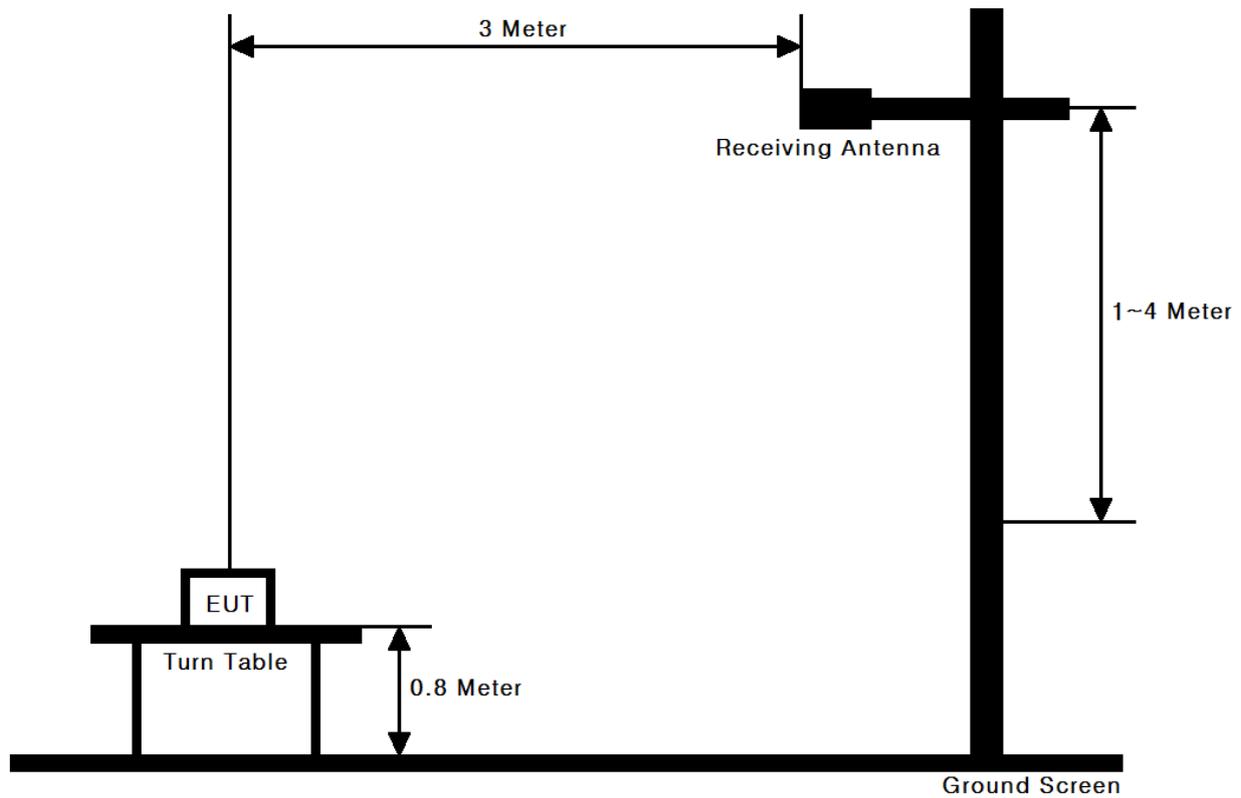
\*\* Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, 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)
2385.680	H	Y	PK	50.88	-3.75	47.13	74.00	26.87
2390.000	H	Y	AV	37.83	-3.75	34.08	54.00	19.92
4824.039	H	Y	PK	44.85	5.89	50.74	74.00	23.26
4823.922	H	Y	AV	33.32	5.89	39.21	54.00	14.79
-	-	-	-	-	-	-	-	-

## ▪ 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)
4873.690	H	Y	PK	44.87	4.86	49.73	74.00	24.27
4874.060	H	Y	AV	32.07	4.86	36.93	54.00	17.07
-	-	-	-	-	-	-	-	-

## ▪ 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)
2484.276	H	Y	PK	55.11	-3.75	51.36	74.00	22.64
2483.665	H	Y	AV	42.72	-3.75	38.97	54.00	15.03
4924.245	H	Y	PK	44.13	6.34	50.47	74.00	23.53
4924.025	H	Y	AV	32.63	6.34	38.97	54.00	15.03
-	-	-	-	-	-	-	-	-

**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	69.35	-3.75	65.60	74.00	8.40
2390.000	H	Y	AV	47.07	-3.75	43.32	54.00	10.68
4824.610	H	Y	PK	44.43	5.89	50.32	74.00	23.68
4823.865	H	Y	AV	31.37	5.89	37.26	54.00	16.74
-	-	-	-	-	-	-	-	-

## ▪ 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)
4873.730	H	Y	PK	43.76	4.86	48.62	74.00	25.38
4874.040	H	Y	AV	31.62	4.86	36.48	54.00	17.52
-	-	-	-	-	-	-	-	-

## ▪ 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)
2483.649	H	Y	PK	70.94	-3.75	67.19	74.00	6.81
2483.500	H	Y	AV	48.19	-3.75	44.44	54.00	9.56
4924.025	H	Y	PK	44.14	6.34	50.48	74.00	23.52
4924.020	H	Y	AV	31.45	6.34	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.

Margin = Limit – Result /      Result = Reading + T.F /      T.F = AF + CL – AG  
Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain

**30MHz ~ 25GHz Data(802.11n (HT20) & MCS 3)**

## ▪ 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	69.23	-3.75	65.48	74.00	8.52
2390.000	H	Y	AV	47.22	-3.75	43.47	54.00	10.53
4823.770	H	Y	PK	44.54	5.89	50.43	74.00	23.57
4823.800	H	Y	AV	31.44	5.89	37.33	54.00	16.67
-	-	-	-	-	-	-	-	-

## ▪ 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)
4874.025	H	Y	PK	44.14	4.86	49.00	74.00	25.00
4874.020	H	Y	AV	31.45	4.86	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)
2484.474	H	Y	PK	66.37	-3.75	62.62	74.00	11.38
2483.500	H	Y	AV	45.21	-3.75	41.46	54.00	12.54
4924.860	H	Y	PK	44.80	6.34	51.14	74.00	22.86
4924.015	H	Y	AV	31.15	6.34	37.49	54.00	16.51
-	-	-	-	-	-	-	-	-

**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.

Margin = Limit – Result /      Result = Reading + T.F /      T.F = AF + CL – 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.

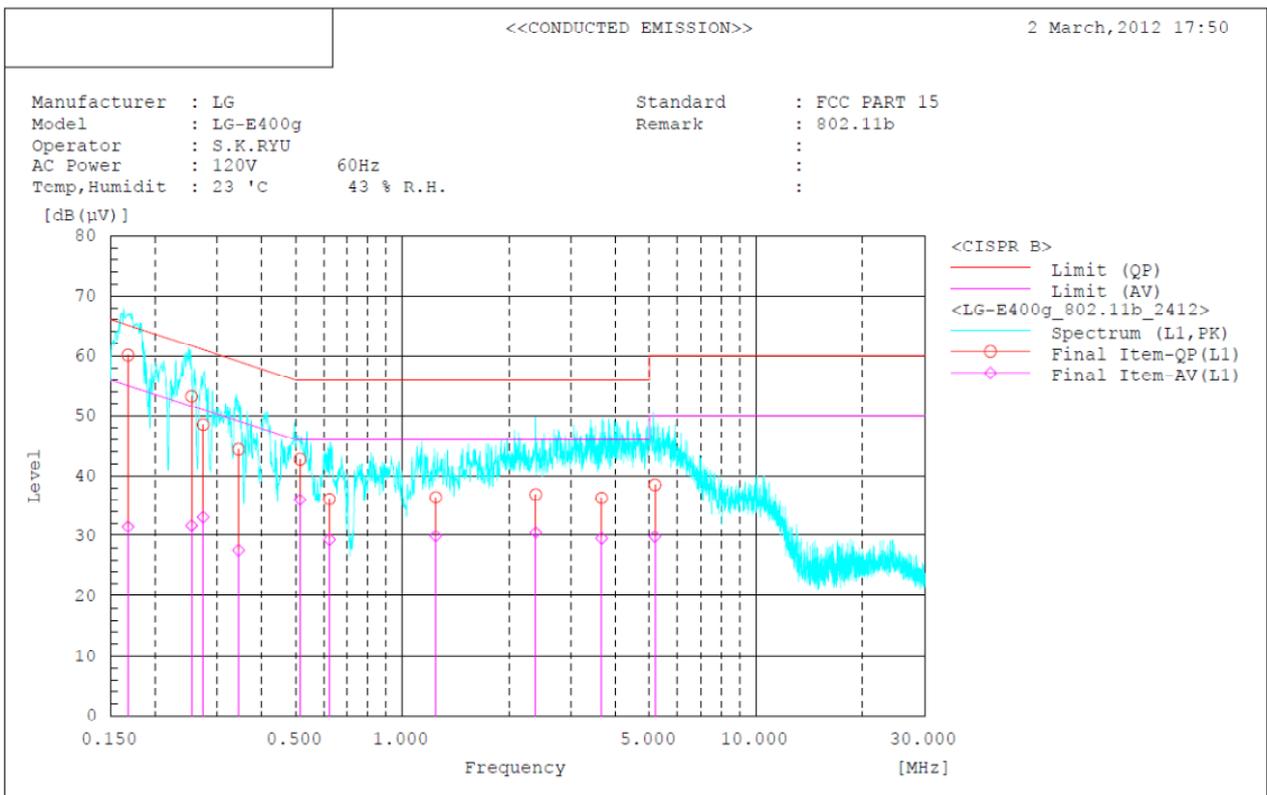
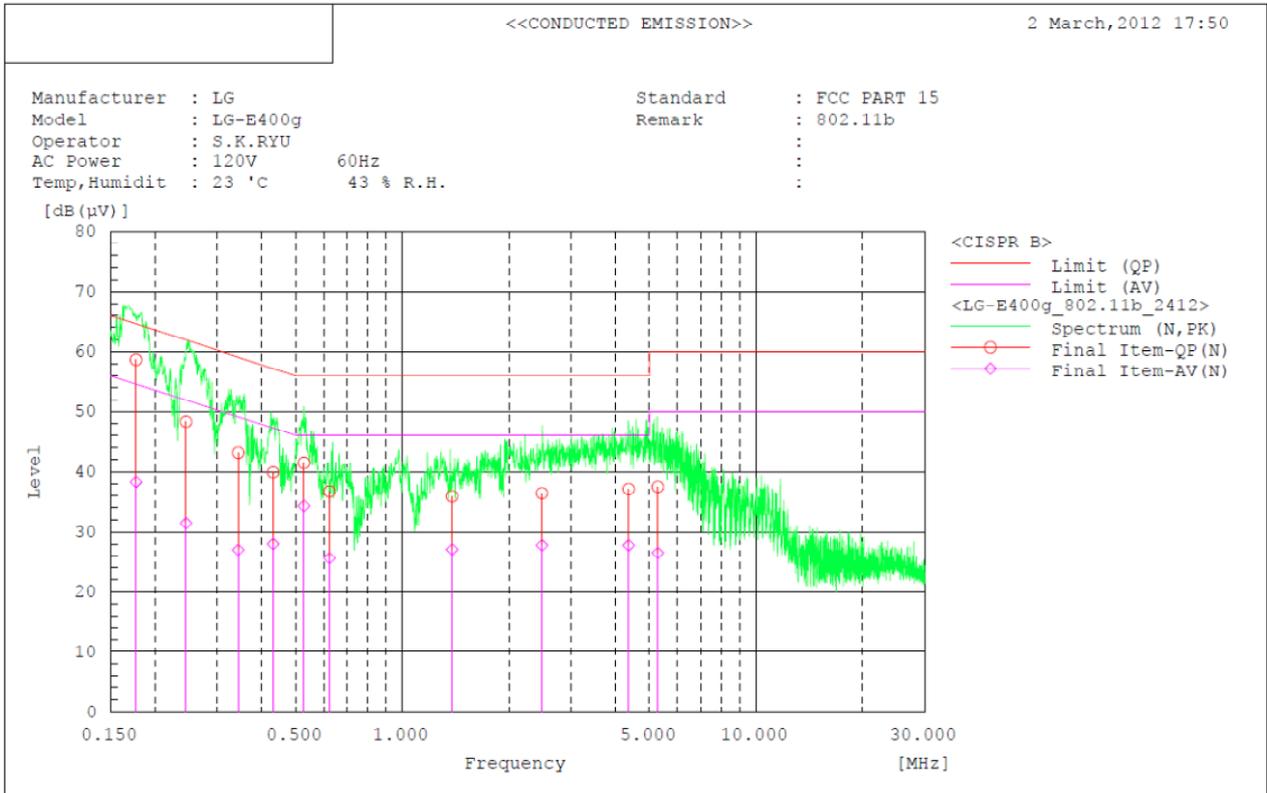
### TEST PROCEDURE

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>>

2 March, 2012 17:50

Standard : FCC PART 15  
 Manufacturer : LG  
 Model : LG-E400g  
 Operator : S.K.RIU  
 AC Power : 120V 60Hz  
 Temp, Humidit : 23 °C 43 % R.H.  
 Remark : 802.11b  
 :  
 :  
 :

Final Result

--- N Phase ---

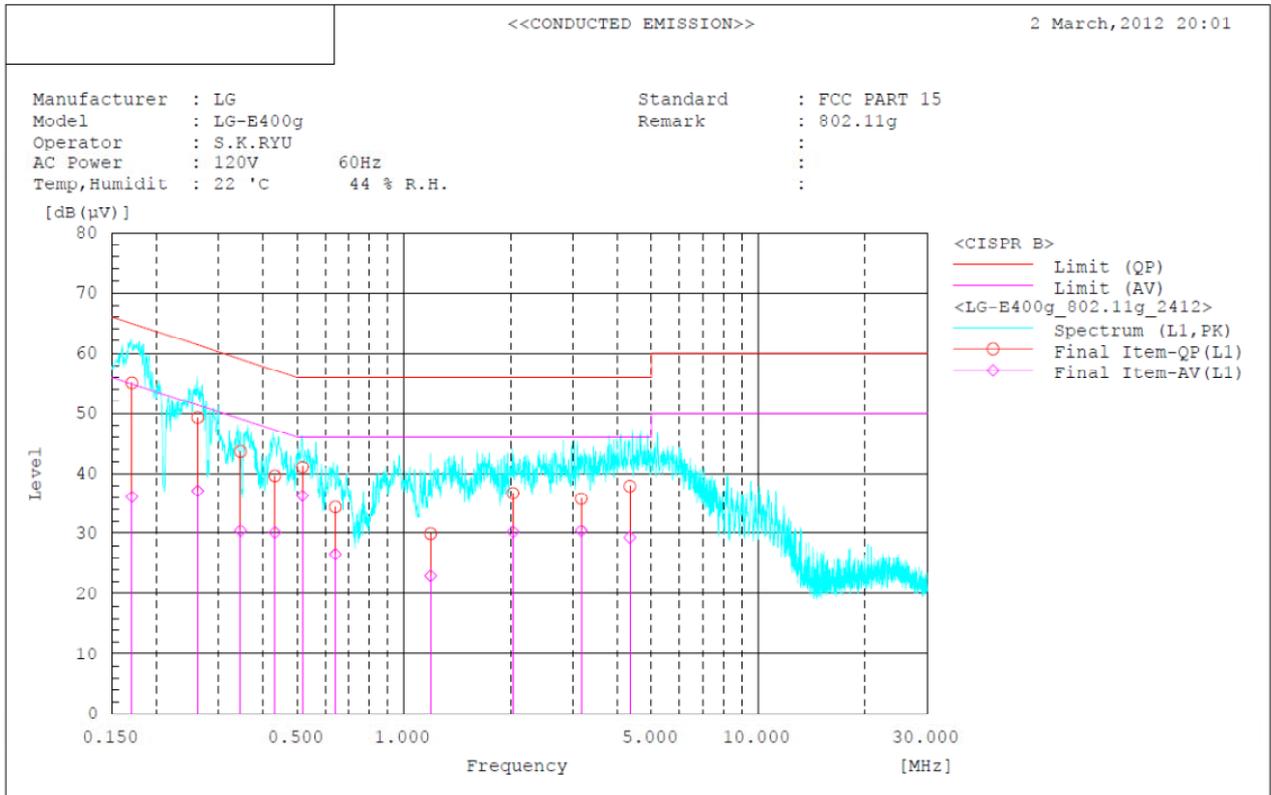
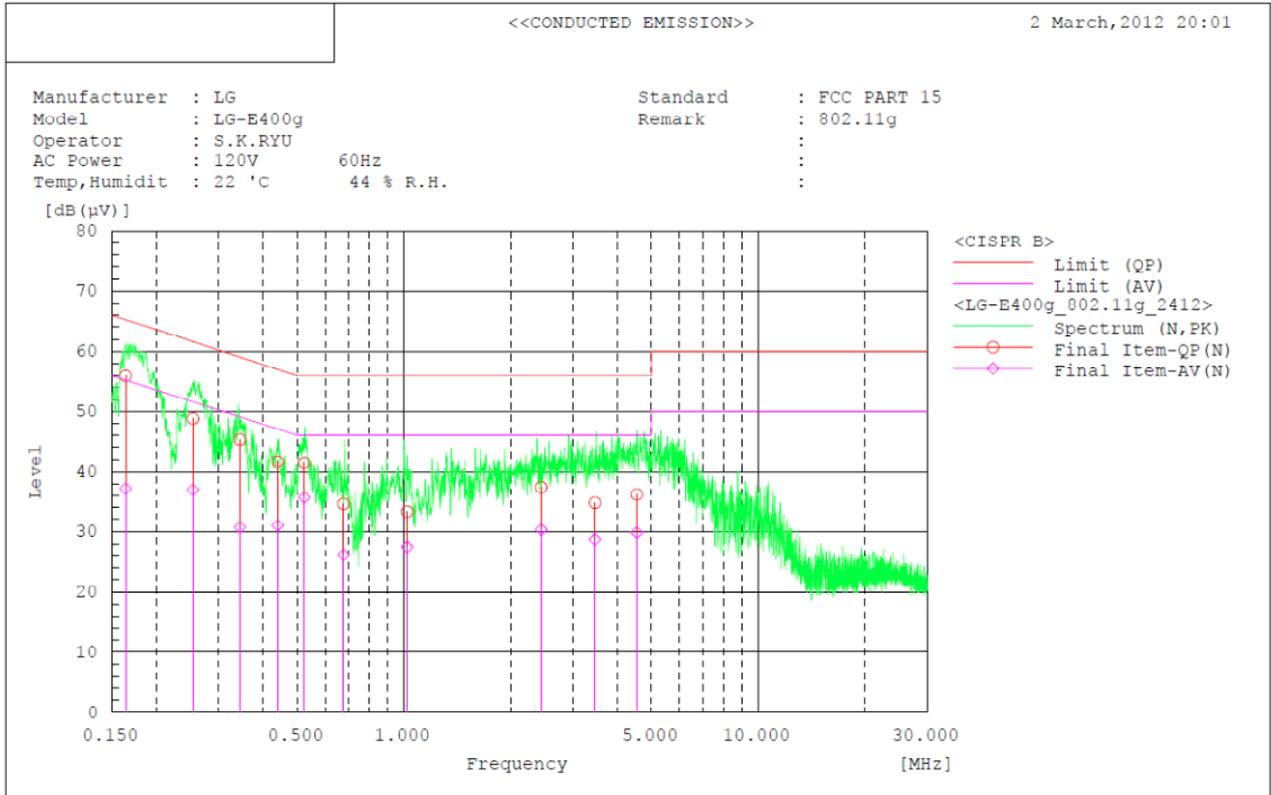
No.	Frequency [MHz]	Reading		c.f [dB]	Result		Limit		Margin		Remark
		QP [dB(μV)]	AV [dB(μV)]		QP [dB(μV)]	AV [dB(μV)]	QP [dB(μV)]	AV [dB(μV)]	QP [dB]	AV [dB]	
1	0.177	58.6	38.2	0.1	58.7	38.3	64.6	54.6	5.9	16.3	
2	0.245	48.2	31.4	0.1	48.3	31.5	61.9	51.9	13.6	20.4	
3	0.344	43.1	26.9	0.1	43.2	27.0	59.1	49.1	15.9	22.1	
4	0.432	39.8	27.9	0.1	39.9	28.0	57.2	47.2	17.3	19.2	
5	0.528	41.4	34.2	0.1	41.5	34.3	56.0	46.0	14.5	11.7	
6	0.624	36.6	25.5	0.1	36.7	25.6	56.0	46.0	19.3	20.4	
7	1.384	35.7	26.9	0.2	35.9	27.1	56.0	46.0	20.1	18.9	
8	2.483	36.2	27.6	0.2	36.4	27.8	56.0	46.0	19.6	18.2	
9	4.368	36.8	27.5	0.3	37.1	27.8	56.0	46.0	18.9	18.2	
10	5.278	37.2	26.2	0.3	37.5	26.5	60.0	50.0	22.5	23.5	

--- L1 Phase ---

No.	Frequency [MHz]	Reading		c.f [dB]	Result		Limit		Margin		Remark
		QP [dB(μV)]	AV [dB(μV)]		QP [dB(μV)]	AV [dB(μV)]	QP [dB(μV)]	AV [dB(μV)]	QP [dB]	AV [dB]	
1	0.168	59.9	31.3	0.2	60.1	31.5	65.1	55.1	5.0	23.6	
2	0.254	53.1	31.5	0.2	53.3	31.7	61.6	51.6	8.3	19.9	
3	0.274	48.3	32.9	0.2	48.5	33.1	61.0	51.0	12.5	17.9	
4	0.345	44.2	27.4	0.2	44.4	27.6	59.1	49.1	14.7	21.5	
5	0.515	42.6	35.8	0.2	42.8	36.0	56.0	46.0	13.2	10.0	
6	0.623	35.9	29.1	0.2	36.1	29.3	56.0	46.0	19.9	16.7	
7	1.245	36.2	29.7	0.2	36.4	29.9	56.0	46.0	19.6	16.1	
8	2.385	36.6	30.2	0.3	36.9	30.5	56.0	46.0	19.1	15.5	
9	3.664	35.9	29.1	0.4	36.3	29.5	56.0	46.0	19.7	16.5	
10	5.181	38.1	29.4	0.4	38.5	29.8	60.0	50.0	21.5	20.2	

### AC Line Conducted Emissions (Graph)

Test Mode: 802.11g & 6Mbps



**AC Line Conducted Emissions (List)**

Test Mode: 802.11g & 6Mbps

<<CONDUCTED EMISSION>>

2 March, 2012 20:01

Standard : FCC PART 15  
 Manufacturer : LG  
 Model : LG-E400g  
 Operator : S.K.RYU  
 AC Power : 120V 60Hz  
 Temp, Humidit : 22 °C 44 % R.H.  
 Remark : 802.11g  
 :  
 :

Final Result

--- N Phase ---

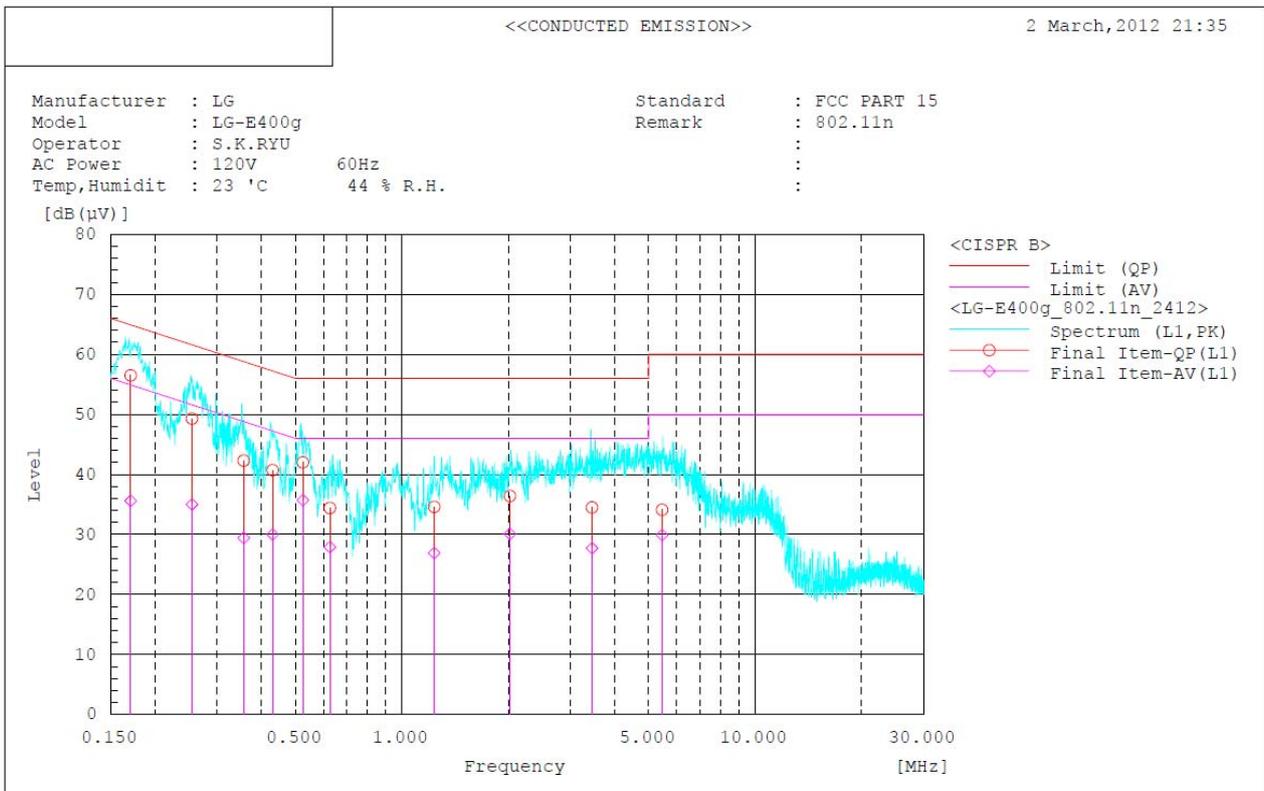
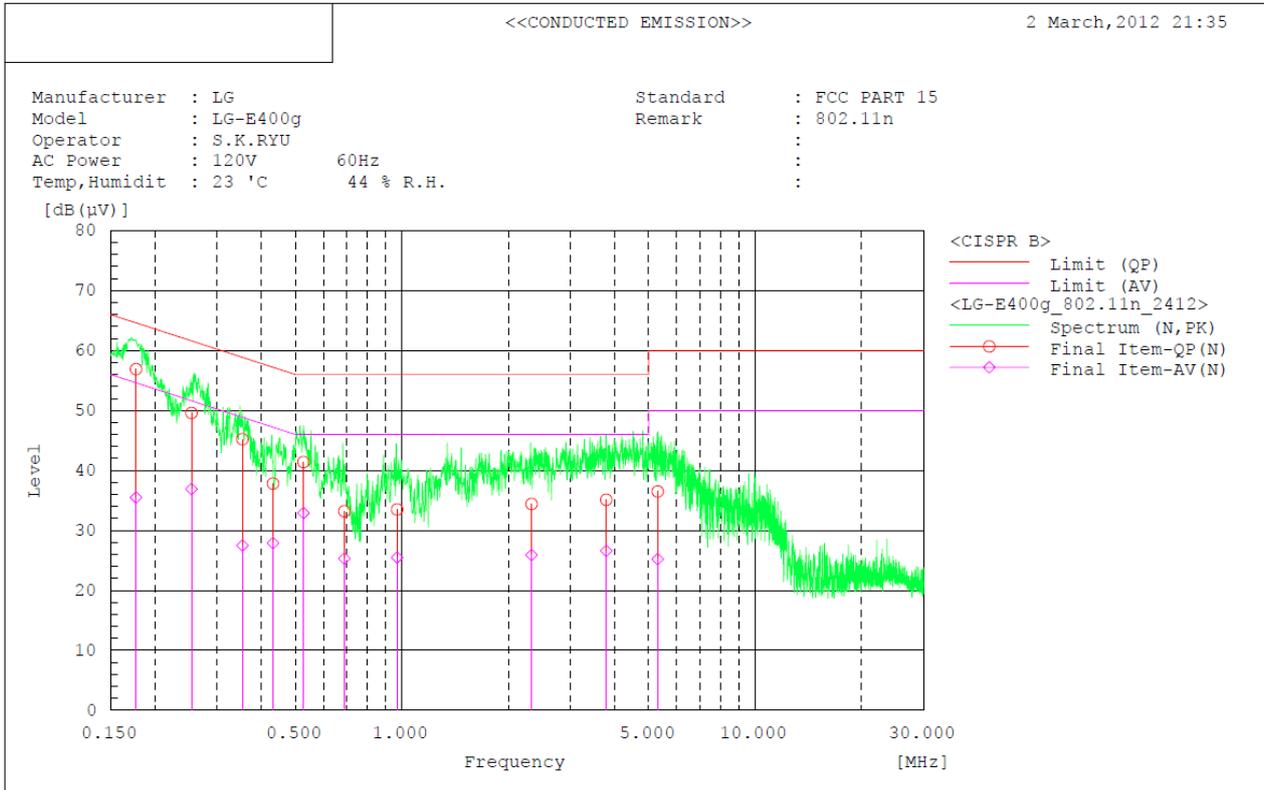
No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB(µV)]	[dB(µV)]	[dB]	[dB(µV)]	[dB(µV)]	[dB(µV)]	[dB(µV)]	[dB]	[dB]	
1	0.164	55.9	37.1	0.1	56.0	37.2	65.3	55.3	9.3	18.1	
2	0.254	48.7	36.9	0.1	48.8	37.0	61.6	51.6	12.8	14.6	
3	0.345	45.2	30.6	0.1	45.3	30.7	59.1	49.1	13.8	18.4	
4	0.441	41.6	30.9	0.1	41.7	31.0	57.0	47.0	15.3	16.0	
5	0.524	41.4	35.6	0.1	41.5	35.7	56.0	46.0	14.5	10.3	
6	0.676	34.5	26.1	0.1	34.6	26.2	56.0	46.0	21.4	19.8	
7	1.022	33.2	27.4	0.1	33.3	27.5	56.0	46.0	22.7	18.5	
8	2.440	37.2	30.1	0.2	37.4	30.3	56.0	46.0	18.6	15.7	
9	3.464	34.6	28.5	0.2	34.8	28.7	56.0	46.0	21.2	17.3	
10	4.542	35.9	29.5	0.3	36.2	29.8	56.0	46.0	19.8	16.2	

--- 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]	[dB(µV)]	[dB(µV)]	[dB(µV)]	[dB(µV)]	[dB]	[dB]	
1	0.171	54.9	35.9	0.2	55.1	36.1	64.9	54.9	9.8	18.8	
2	0.262	49.1	36.9	0.2	49.3	37.1	61.4	51.4	12.1	14.3	
3	0.346	43.5	30.2	0.2	43.7	30.4	59.1	49.1	15.4	18.7	
4	0.433	39.4	29.9	0.2	39.6	30.1	57.2	47.2	17.6	17.1	
5	0.518	40.9	36.1	0.2	41.1	36.3	56.0	46.0	14.9	9.7	
6	0.641	34.2	26.4	0.2	34.4	26.6	56.0	46.0	21.6	19.4	
7	1.190	29.7	22.8	0.2	29.9	23.0	56.0	46.0	26.1	23.0	
8	2.032	36.4	29.9	0.3	36.7	30.2	56.0	46.0	19.3	15.8	
9	3.167	35.5	30.1	0.3	35.8	30.4	56.0	46.0	20.2	15.6	
10	4.342	37.5	28.9	0.4	37.9	29.3	56.0	46.0	18.1	16.7	

### AC Line Conducted Emissions (Graph)

Test Mode: 802.11n HT20 & MCS 3



**AC Line Conducted Emissions (List)**

Test Mode: 802.11n HT20 & MCS3

<<CONDUCTED EMISSION>>

2 March, 2012 21:35

Standard : FCC PART 15  
 Manufacturer : LG  
 Model : LG-E400g  
 Operator : S.K.RYU  
 AC Power : 120V 60Hz  
 Temp, Humidit : 23 °C 44 % R.H.  
 Remark : 802.11n  
 :  
 :  
 :

Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading		c.f [dB]	Result		Limit		Margin		Remark
		QP [dB(μV)]	AV [dB(μV)]		QP [dB(μV)]	AV [dB(μV)]	QP [dB(μV)]	AV [dB(μV)]	QP [dB]	AV [dB]	
1	0.177	56.8	35.4	0.1	56.9	35.5	64.6	54.6	7.7	19.1	
2	0.254	49.5	36.8	0.1	49.6	36.9	61.6	51.6	12.0	14.7	
3	0.354	45.1	27.4	0.1	45.2	27.5	58.9	48.9	13.7	21.4	
4	0.432	37.7	27.8	0.1	37.8	27.9	57.2	47.2	19.4	19.3	
5	0.527	41.3	32.8	0.1	41.4	32.9	56.0	46.0	14.6	13.1	
6	0.688	33.1	25.2	0.1	33.2	25.3	56.0	46.0	22.8	20.7	
7	0.970	33.4	25.4	0.1	33.5	25.5	56.0	46.0	22.5	20.5	
8	2.330	34.2	25.7	0.2	34.4	25.9	56.0	46.0	21.6	20.1	
9	3.792	34.9	26.4	0.2	35.1	26.6	56.0	46.0	20.9	19.4	
10	5.300	36.2	24.9	0.3	36.5	25.2	60.0	50.0	23.5	24.8	

--- L1 Phase ---

No.	Frequency [MHz]	Reading		c.f [dB]	Result		Limit		Margin		Remark
		QP [dB(μV)]	AV [dB(μV)]		QP [dB(μV)]	AV [dB(μV)]	QP [dB(μV)]	AV [dB(μV)]	QP [dB]	AV [dB]	
1	0.171	56.3	35.4	0.2	56.5	35.6	64.9	54.9	8.4	19.3	
2	0.255	49.1	34.8	0.2	49.3	35.0	61.6	51.6	12.3	16.6	
3	0.357	42.1	28.2	0.2	42.3	29.4	58.8	48.8	16.5	19.4	
4	0.431	40.5	29.8	0.2	40.7	30.0	57.2	47.2	16.5	17.2	
5	0.525	41.8	35.5	0.2	42.0	35.7	56.0	46.0	14.0	10.3	
6	0.626	34.2	27.7	0.2	34.4	27.9	56.0	46.0	21.6	18.1	
7	1.236	34.4	26.7	0.2	34.6	26.9	56.0	46.0	21.4	19.1	
8	2.024	36.1	29.8	0.3	36.4	30.1	56.0	46.0	19.6	15.9	
9	3.454	34.2	27.4	0.3	34.5	27.7	56.0	46.0	21.5	18.3	
10	5.452	33.6	29.4	0.5	34.1	29.9	60.0	50.0	25.9	20.1	

**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	12/01/09	13/01/09	200445
Spectrum Analyzer	Agilent	N9020A	12/01/09	13/01/09	MY49100833
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	12/01/09	13/01/09	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	12/01/13	13/01/13	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	12/01/09	13/01/09	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	12/01/09	13/01/09	100014
Spectrum Analyzer(CE)	H.P	8591E	11/03/07	12/03/07	3649A05889
LISN	Kyoritsu	KNW-407	12/01/09	13/01/09	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	12/01/09	13/01/09	N/A
RFI/FIELD Intensity Meter	Kyoritsu	KNM-2402	11/07/02	12/07/02	4N-170-3