RF TEST REPORT

Test item	:	Cellular/PCS GSM/GPRS/EDGE & Cellular HSDPA Phone with Bluetooth and WLAN
Model No.	:	LG-E510f, E510f, LGE510f, LG-E510F, E510F, LGE510F
Order No.	:	1106-00821
Date of receipt	:	2011-06-11
Test duration	:	2011-06-24 ~ 2011-06-29
Date of issue	:	2011-07-19
Use of report	:	FCC Original Grant

Applicant : LG Electronics, Inc.
60-39, Gasan-dong, Gumchon-gu, Seoul, 153-023, Korea

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	Manager W.J. Lee

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1. GENERAL INFORMATION

Applicant	:	LG Electronics Inc.
Address	:	60-39, Gasan-dong, Gumchon-gu, Seoul, 153-023, Korea
FCC ID	:	BEJE510F
EUT	:	Cellular/PCS GSM/GPRS/EDGE & Cellular HSDPA Phone with Bluetooth and WLAN
Model	:	LG-E510f
Additional Model(s)	:	E510f, LGE510f, LG-E510F, E510F, LGE510F
Data of Test	:	2011-06-24 ~ 2011-06-29
Contact person	:	Hyeon Kyun, Kim

2. EUT DESCRIPTION

Product	Cellular/PCS GSM/GPRS/EDGE & Cellular HSDPA Phone with Bluetooth and WLAN
Model Name	LG-E510f, E510f, LGE510f, LG-E510F, E510F, LGE510F
Power Supply	DC 3.7V
Battery type	Standard Battery: li-ion Battery
Frequency Range	2412 ~ 2462MHz
Max. RF Output Power	802.11b: 17.96dBm 802.11g: 24.62dBm 802.11n (HT20): 23.94dBm
Modulation Type	802.11b: DSSS(CCK, DQPSK, DBPSK) 802.11g: OFDM(64QAM, QPSK, BPSK) 802.11n (HT20): OFDM(64QAM, 16QAM, QPSK, BPSK)
Antenna Specification	Internal Antenna Gain: -1.538dBi

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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)

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.

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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

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7. TEST RESULT

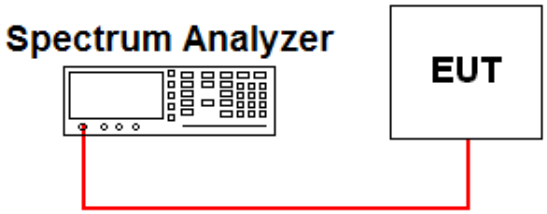
7.1 6dB Bandwidth Measurement (802.11b/g/n HT20)

Test Requirments 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: 100 KHz

SPAN: 50 MHz

▣ **TEST RESULTS: Comply**

Test Mode	Data Rate	Tested Channel	Test Results [MHz]
802.11b	11Mbps	Lowest	6.696
		Middle	6.628
		Highest	7.143
802.11g	6Mbps	Lowest	14.011
		Middle	15.147
		Highest	15.128
802.11n HT20	MCS 0	Lowest	15.094
		Middle	15.119
		Highest	15.124

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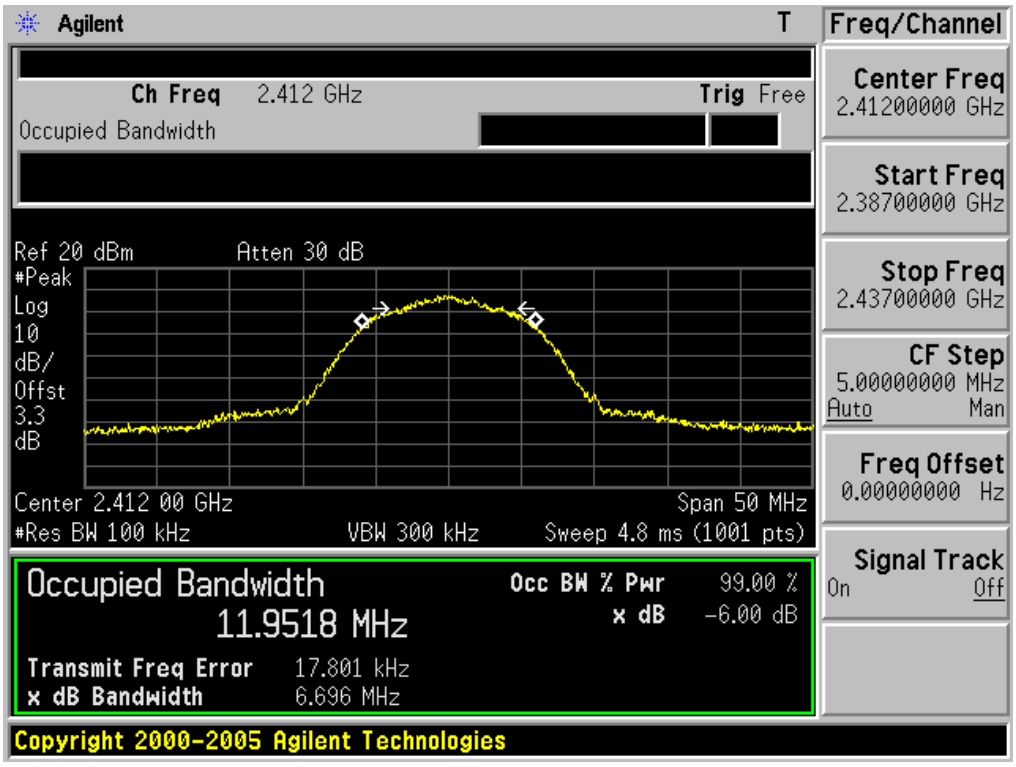
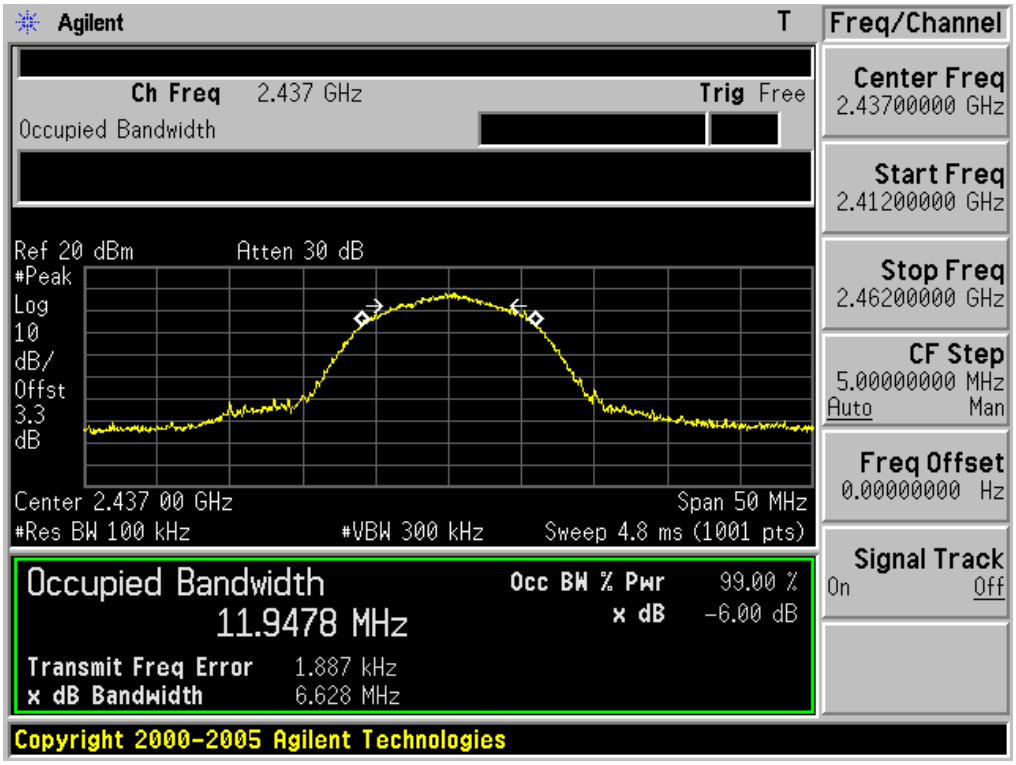
▣ RESULT PLOTS

6 dB Bandwidth ***Lowest Channel*** & Modulation: ***802.11b***



6 dB Bandwidth ***Middle Channel*** & Modulation: ***802.11b***



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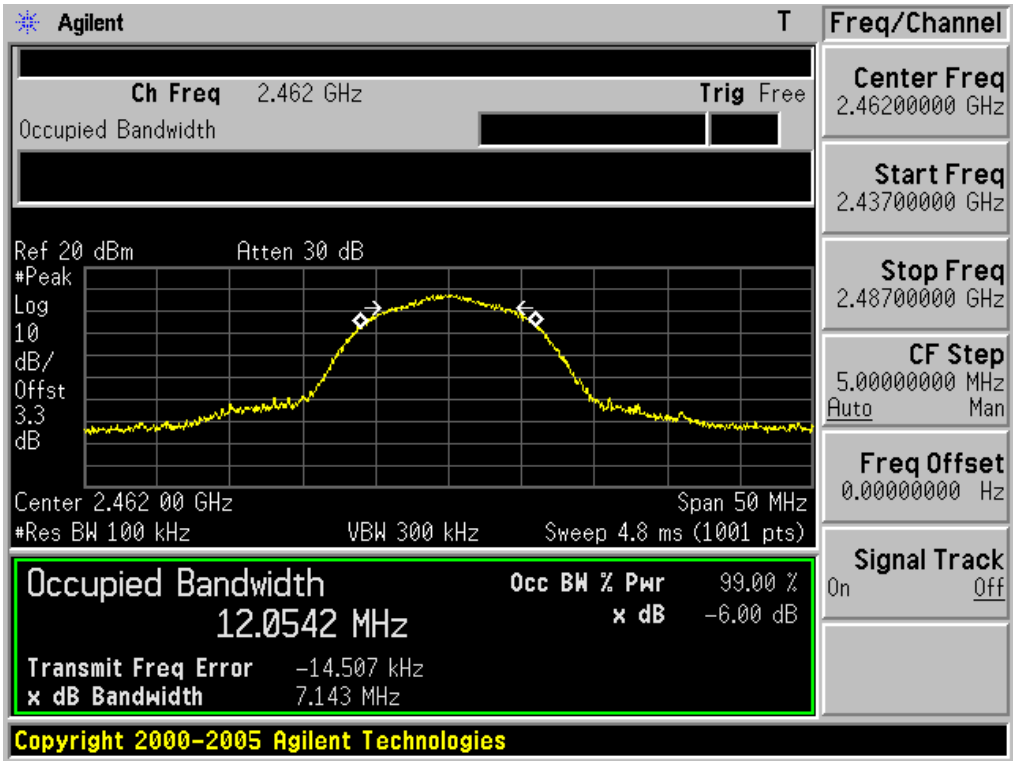
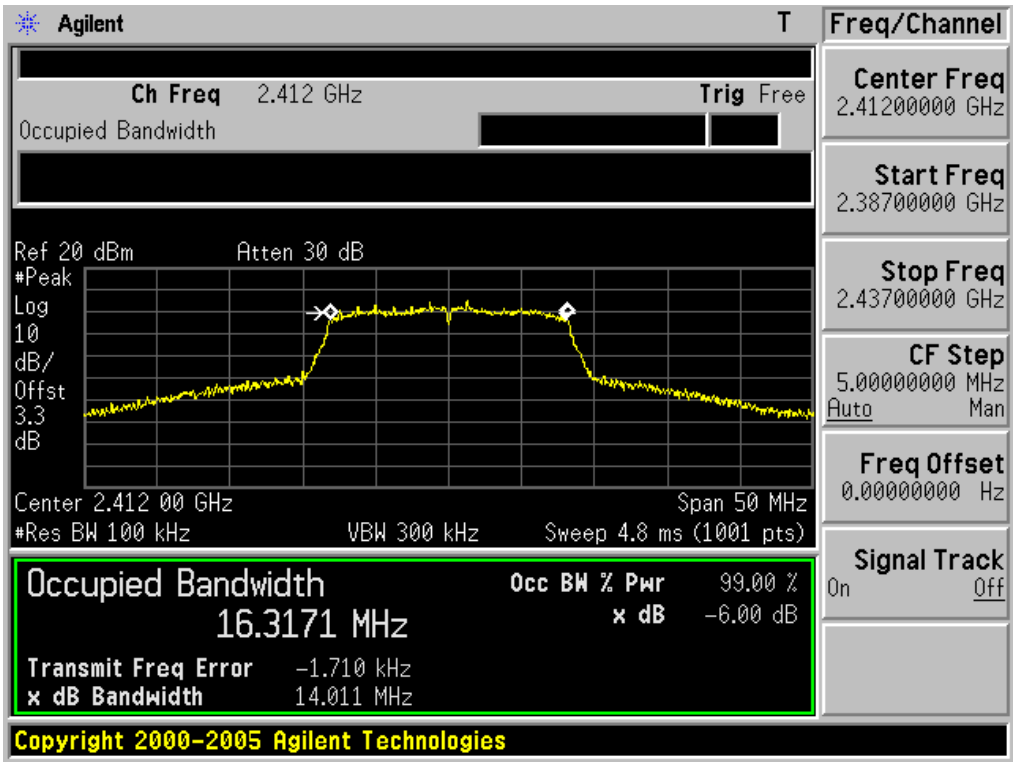
6 dB Bandwidth ***Highest Channel*** & Modulation: ***802.11b***



6 dB Bandwidth ***Lowest Channel*** & Modulation: ***802.11g***



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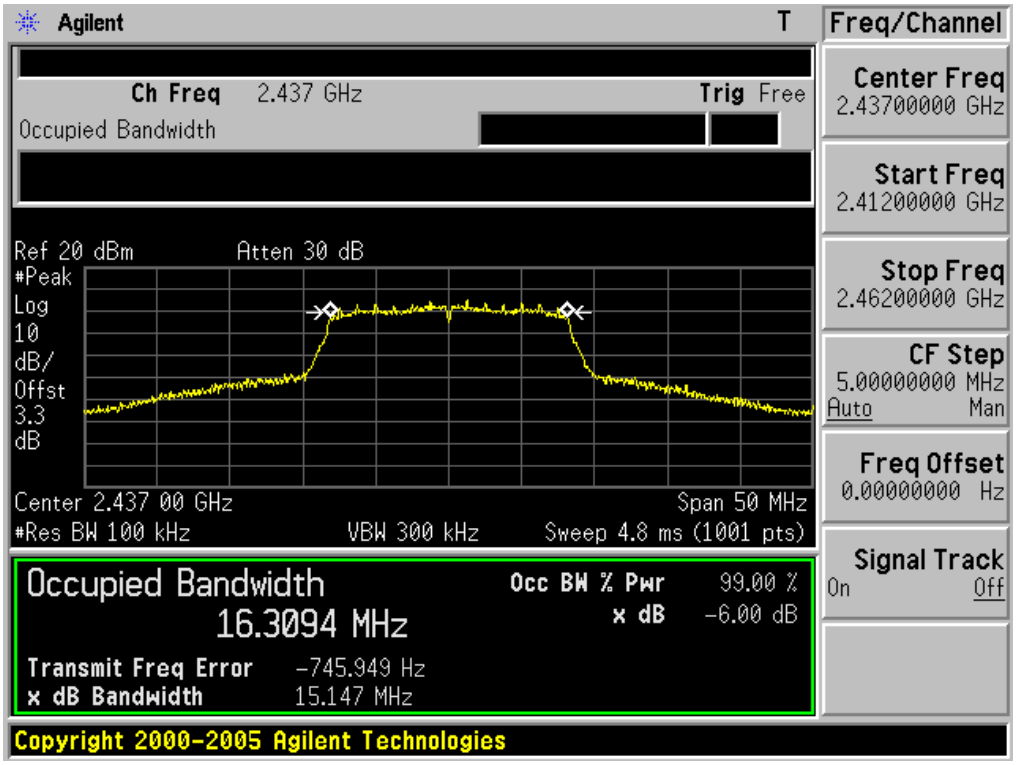
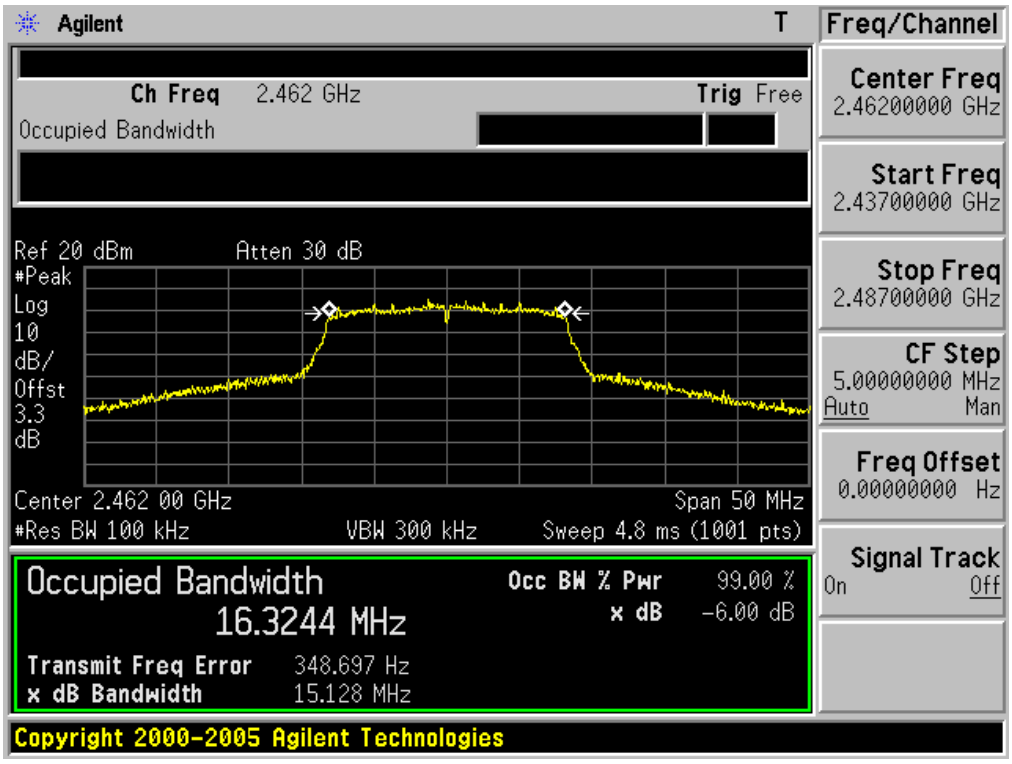
6 dB Bandwidth ***Middle Channel*** & Modulation: ***802.11g***



6 dB Bandwidth ***Highest Channel*** & Modulation: ***802.11g***



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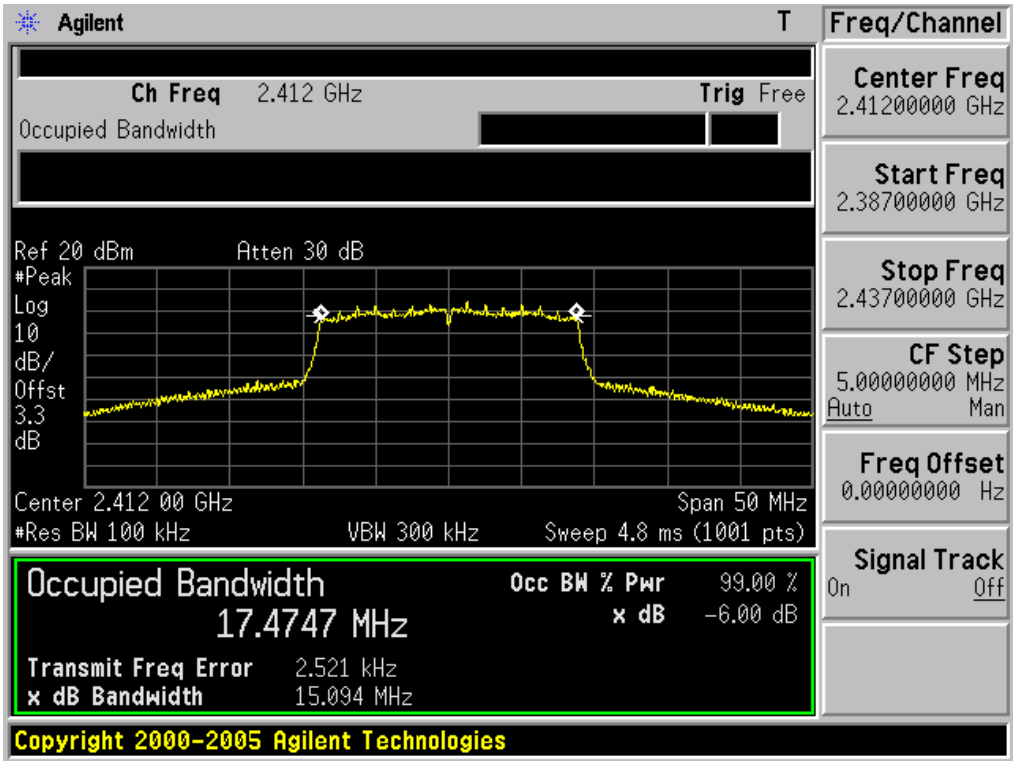
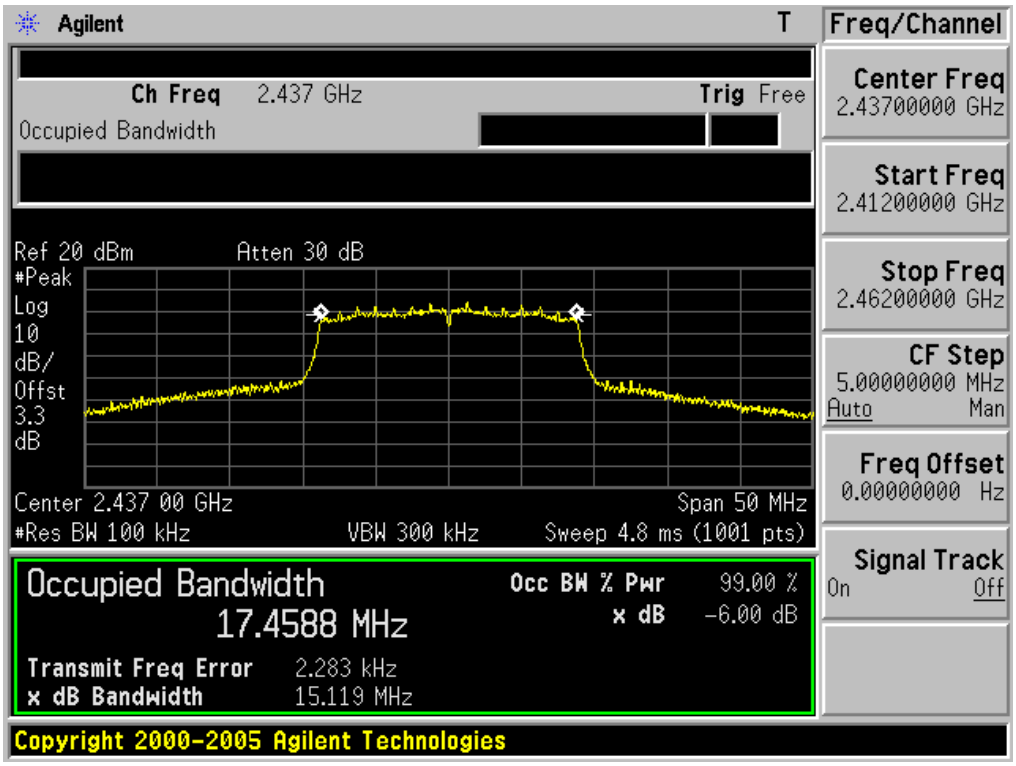
6 dB Bandwidth ***Lowest Channel*** & Modulation: ***802.11n (HT20)***



6 dB Bandwidth ***Middle Channel*** & Modulation: ***802.11n (HT20)***



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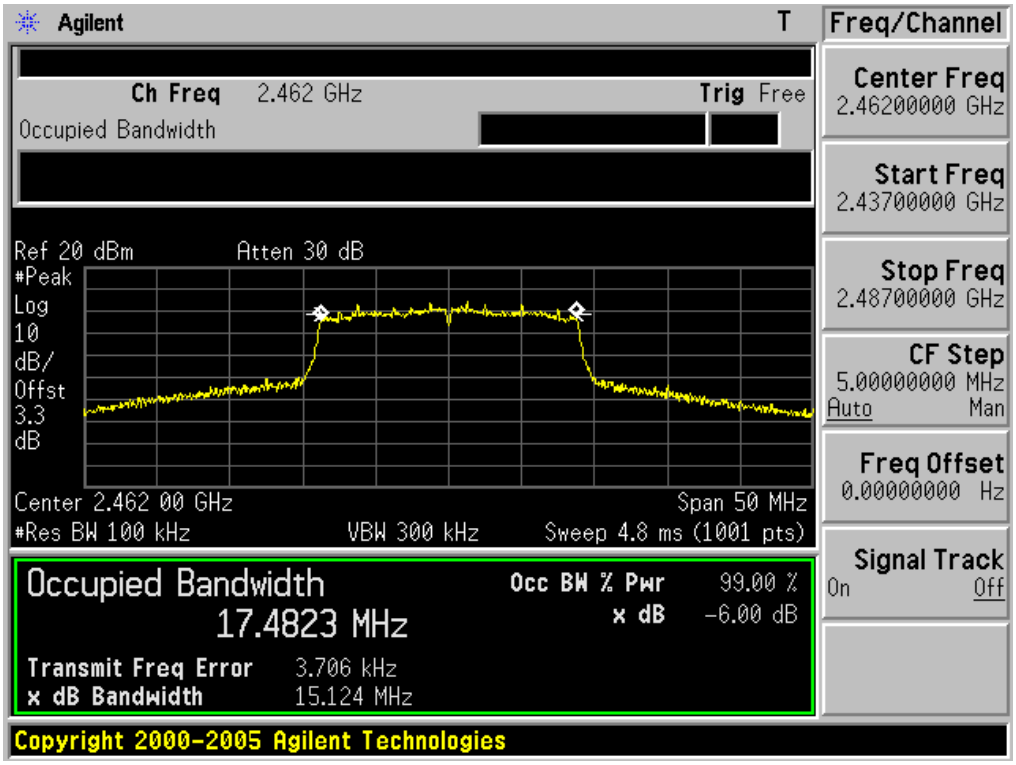
6 dB Bandwidth ***Highest Channel*** & Modulation: ***802.11n (HT20)***



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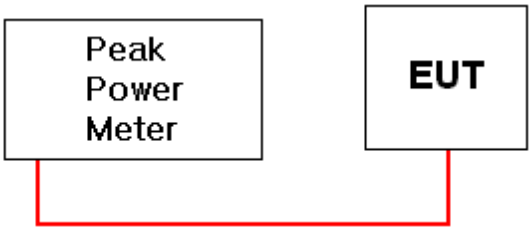
7.2 Peak Output Power

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)

▣ TEST RESULTS: Comply

Test Mode	Data Rate	Tested Channel	Peak Output Power	
			dBm	W
802.11b	11Mbps	Lowest	17.73	0.059
		Middle	17.74	0.059
		Highest	17.96	0.063
802.11g	6Mbps	Lowest	24.36	0.273
		Middle	24.49	0.281
		Highest	24.62	0.290
802.11n (HT20)	MCS 0	Lowest	23.59	0.228
		Middle	23.81	0.240
		Highest	23.94	0.248

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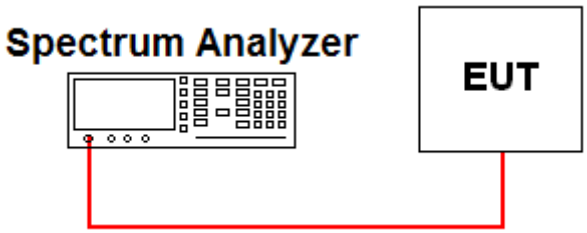
7.3 Power Spectral Density (802.11b/g/n HT20)

Test Requirments 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	11Mbps	Lowest	-6.30
		Middle	**-6.06**
		Highest	-6.35
802.11g	6Mbps	Lowest	-8.47
		Middle	-8.29
		Highest	**-8.09**
802.11n (HT20)	MCS 0	Lowest	-8.34
		Middle	-9.42
		Highest	**-8.08**

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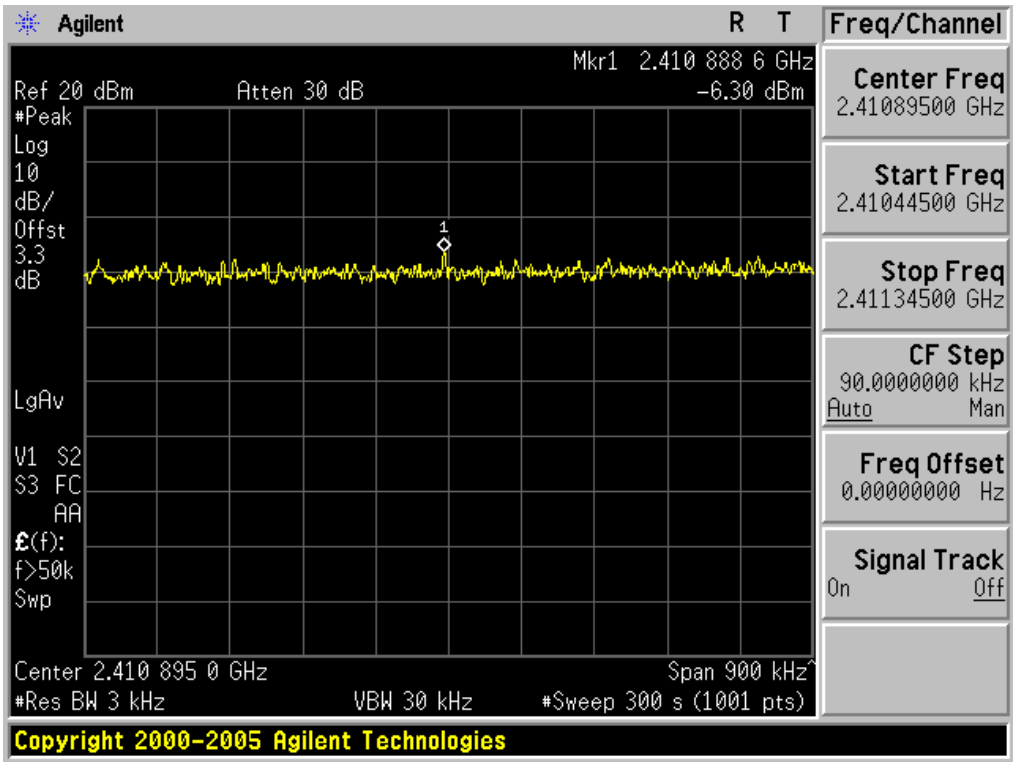
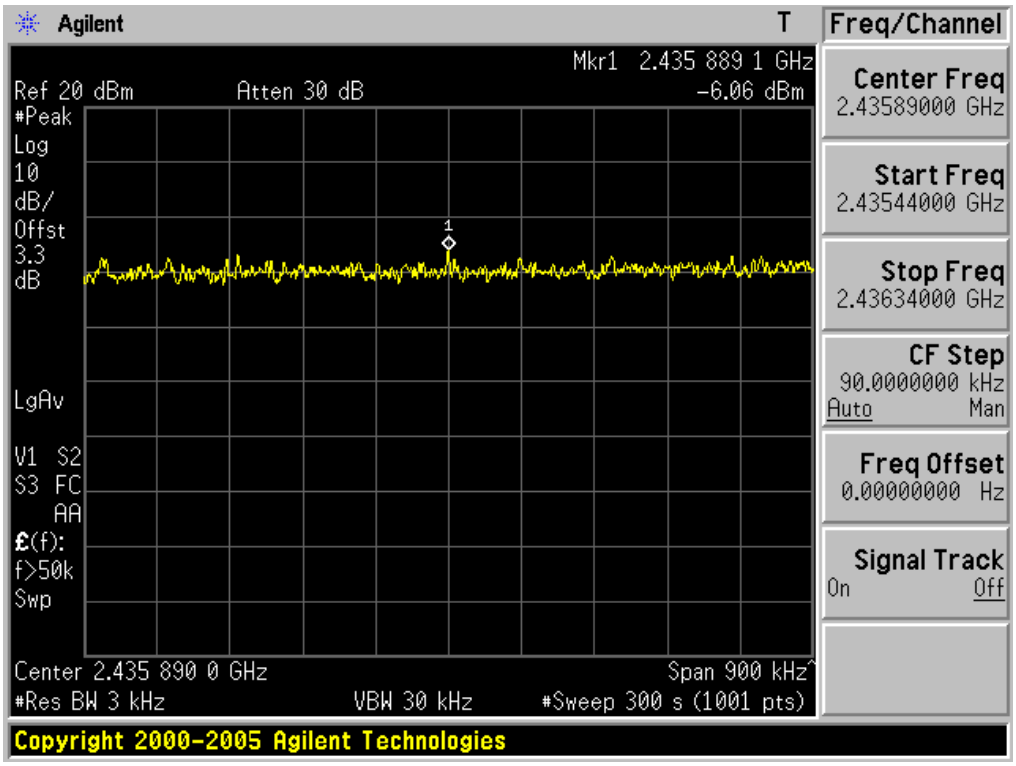
▣ RESULT PLOTS

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



Power Spectral Density ***Middle Channel*** & Modulation: ***802.11b***



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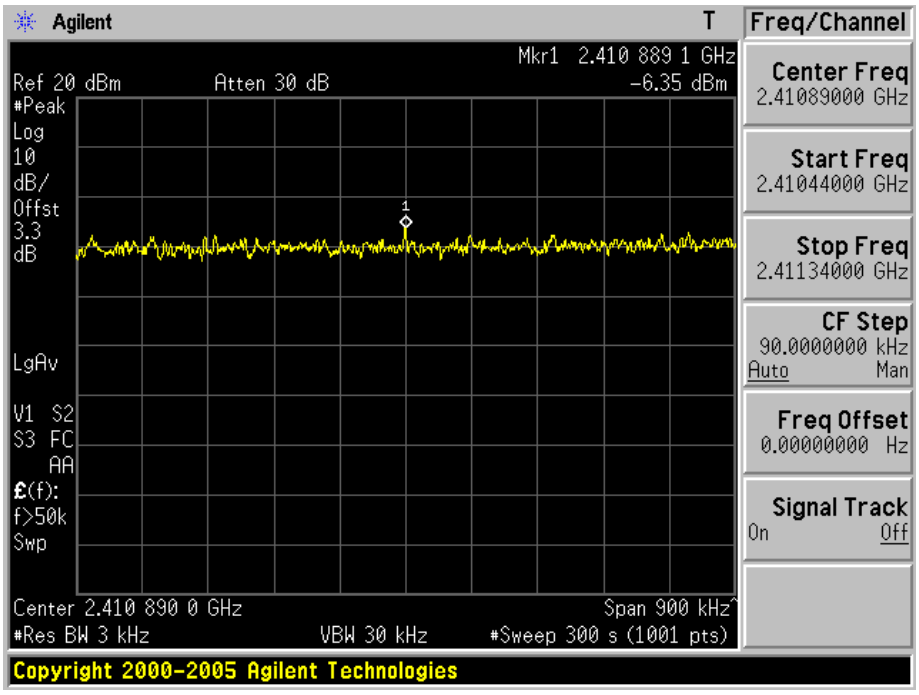
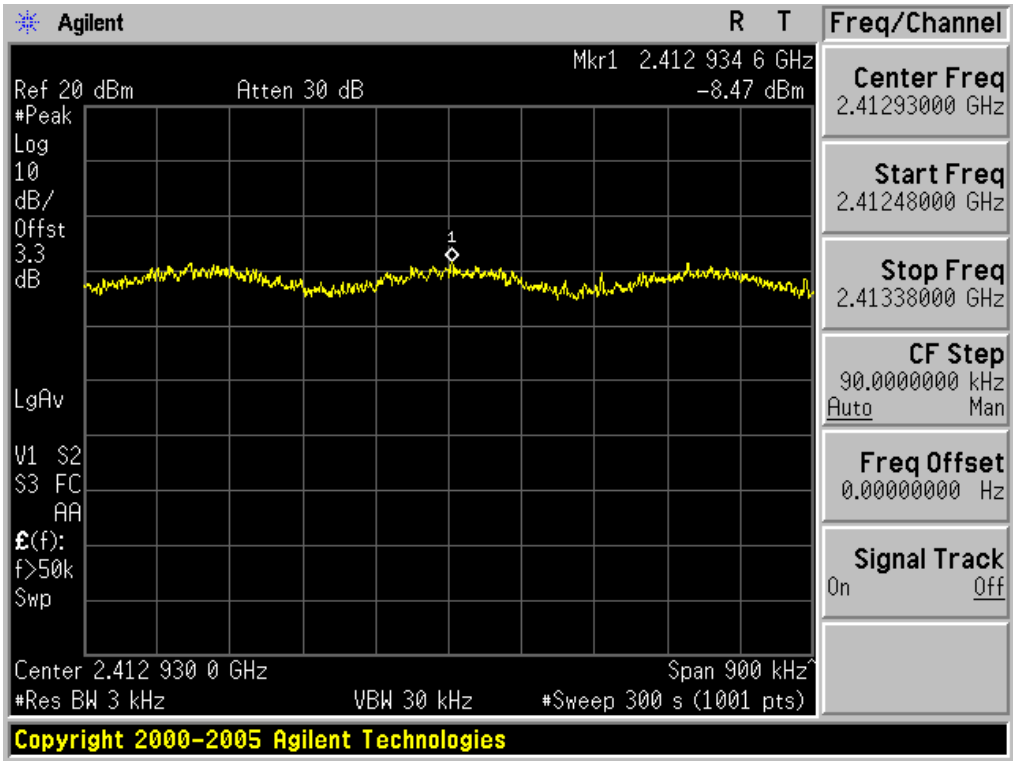
Power Spectral Density ***Highest Channel*** & Modulation: ***802.11b***



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



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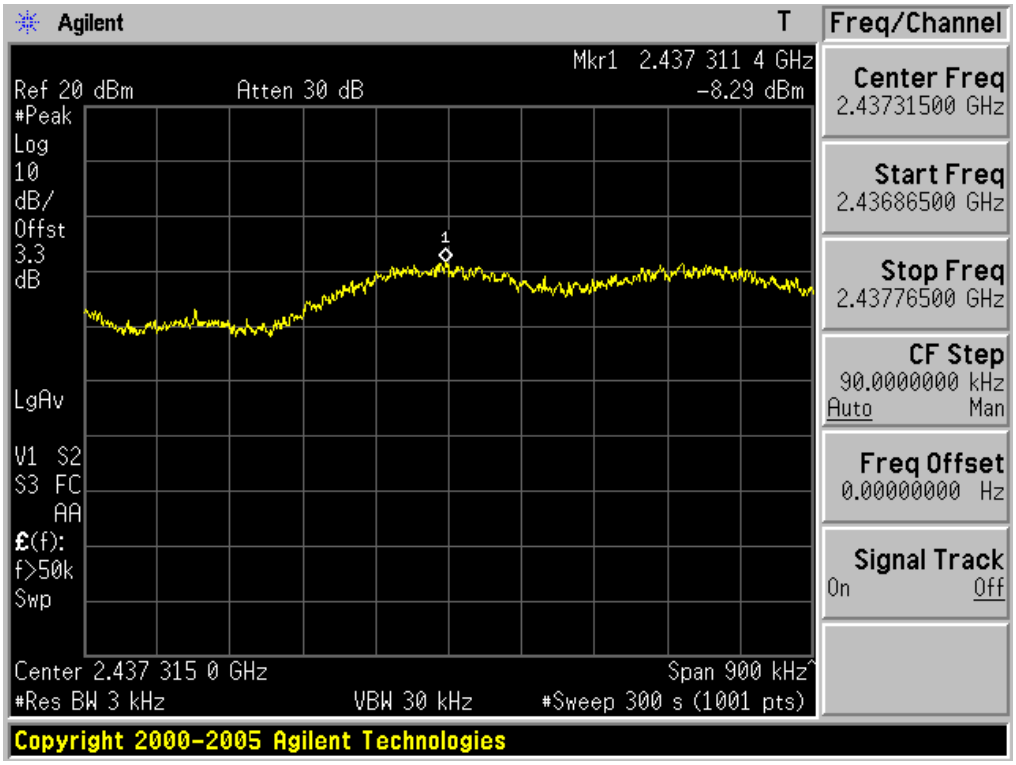
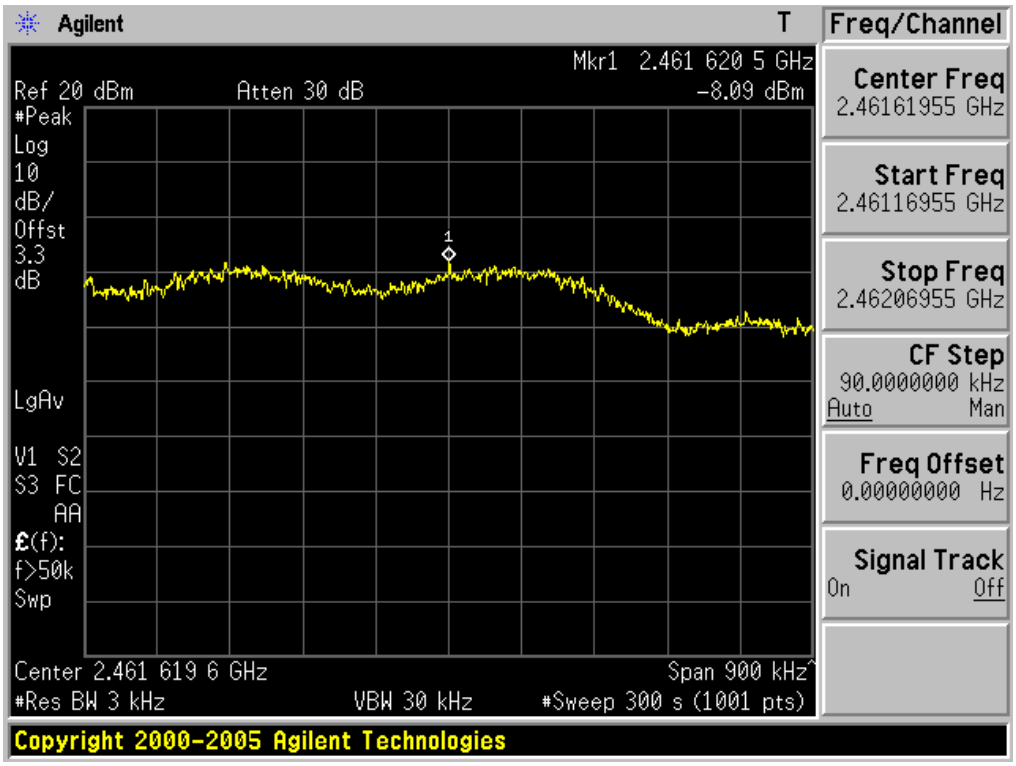
Power Spectral Density ***Middle Channel*** & Modulation: ***802.11g***



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



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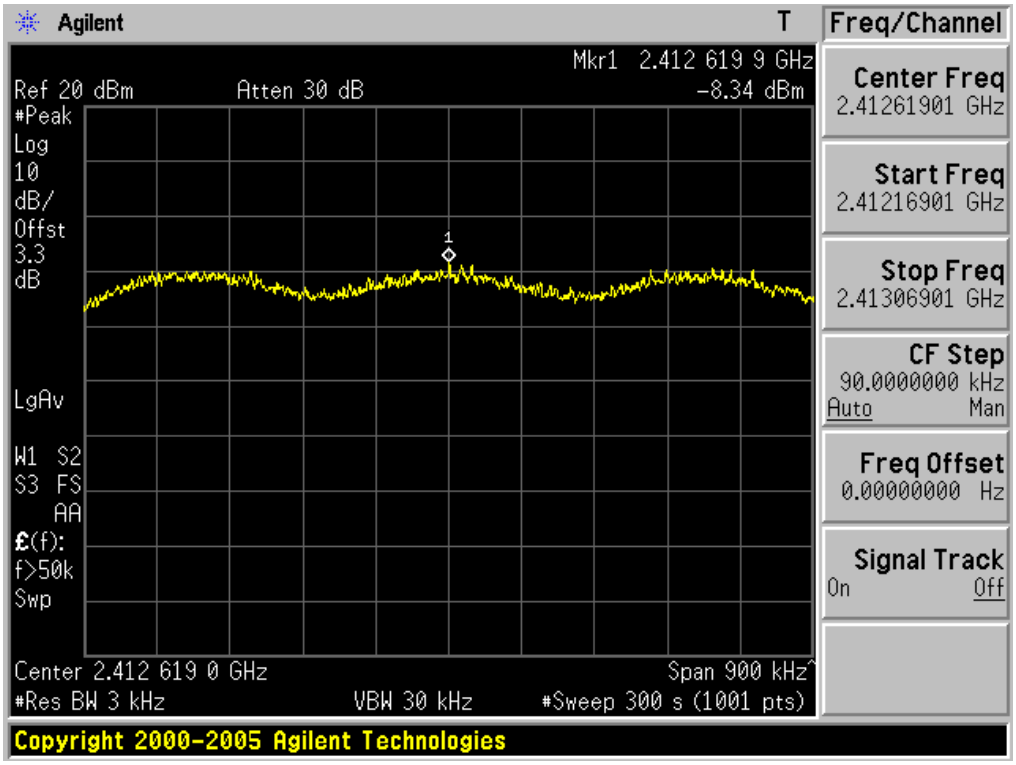
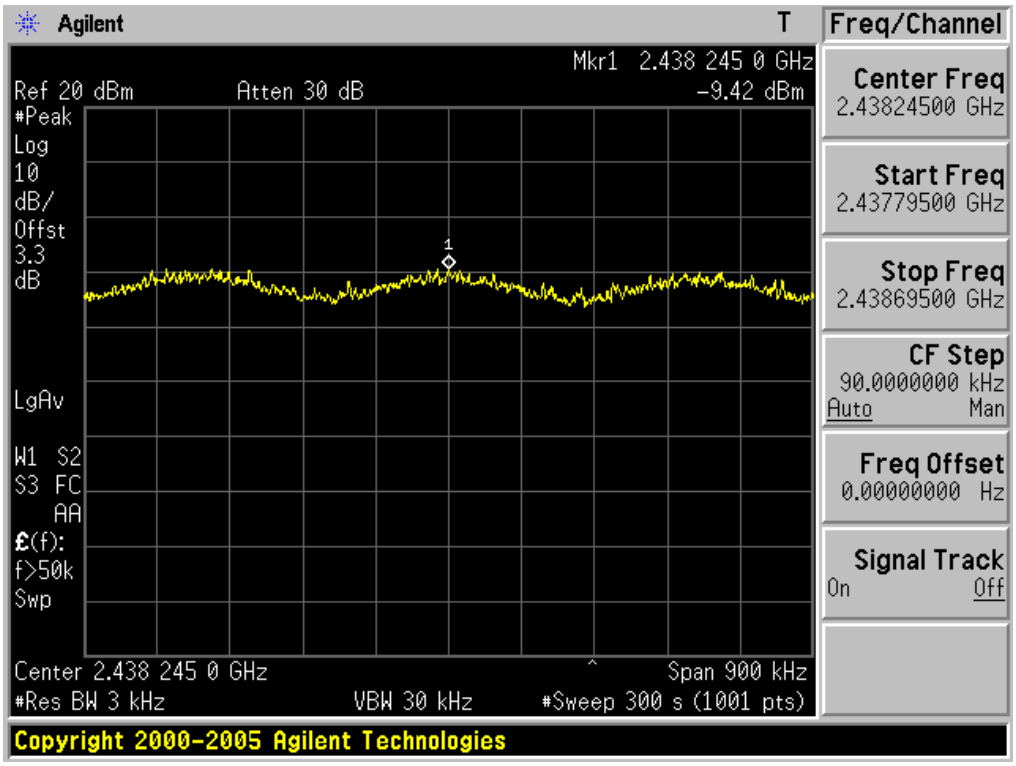
Power Spectral Density ***Lowest Channel*** & Modulation: ***802.11n (HT20)***



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



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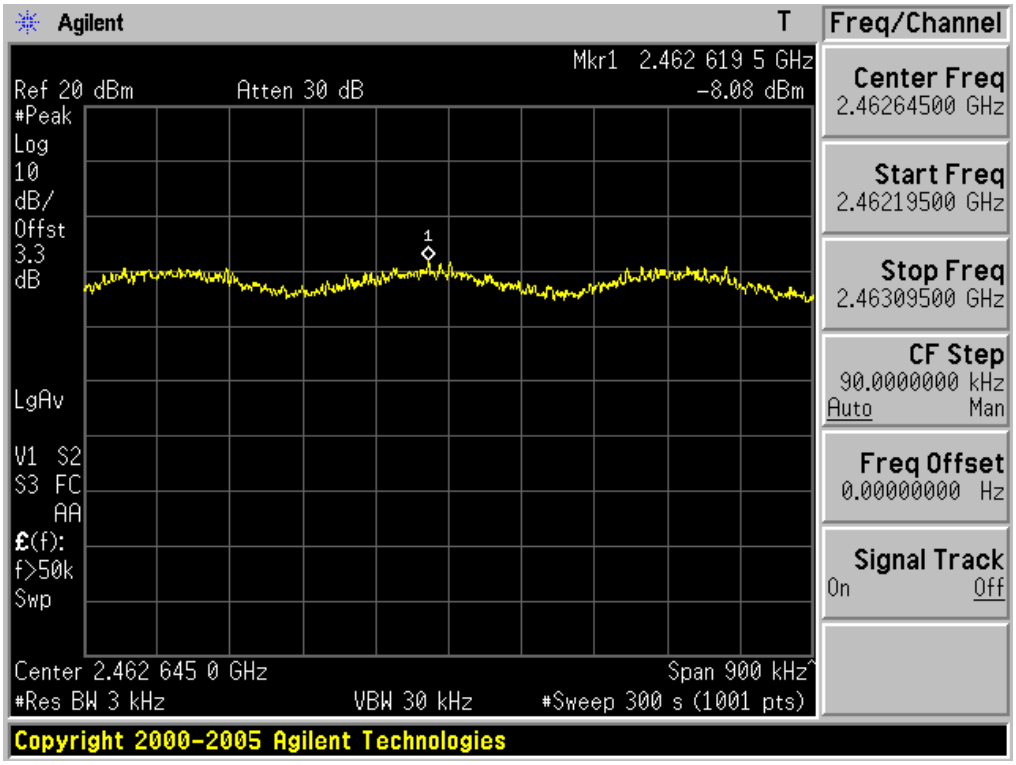
Power Spectral Density ***Highest Channel*** & Modulation: ***802.11n (HT20)***



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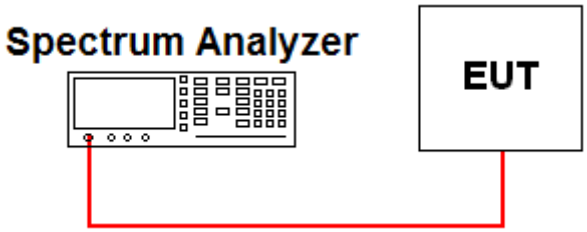
7.4 Out of Band Emissions at the Band Edge/ Conducted Spurious Emissions

Test Requirments 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.
he resolution bandwidth is set to 100 kHz and the video bandwidth is set to 100 kHz.
The spectrum from 30 MHz to 10th harmonics is investigated with the transmitter set to the lowst, middle, and highest channels.

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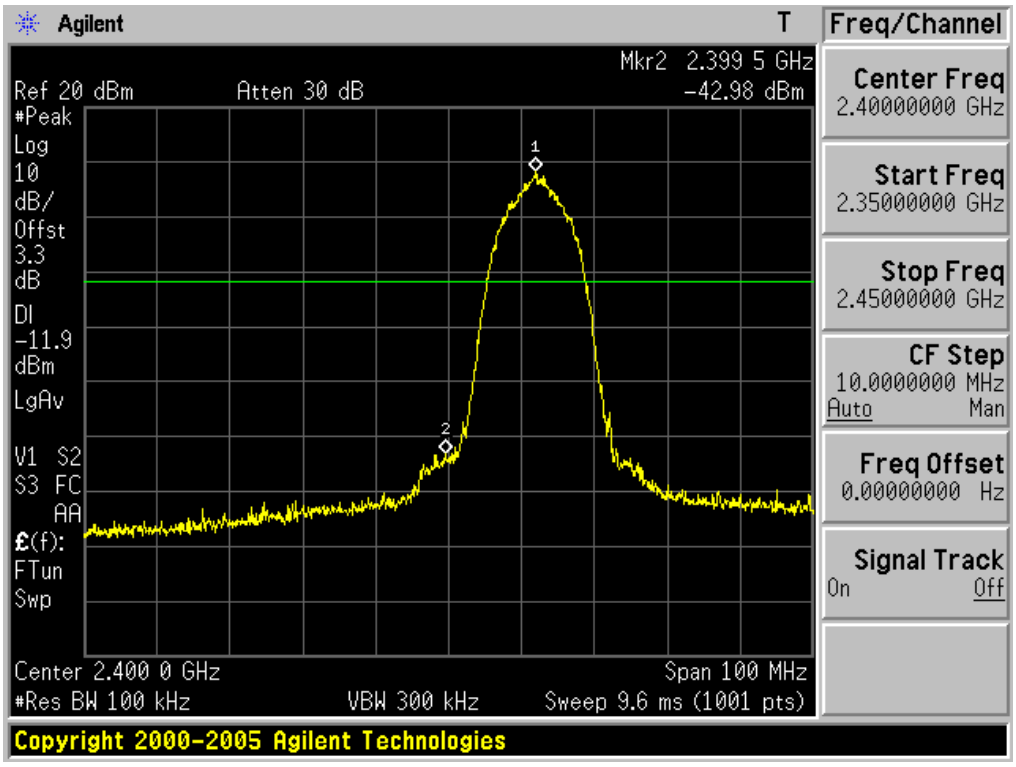
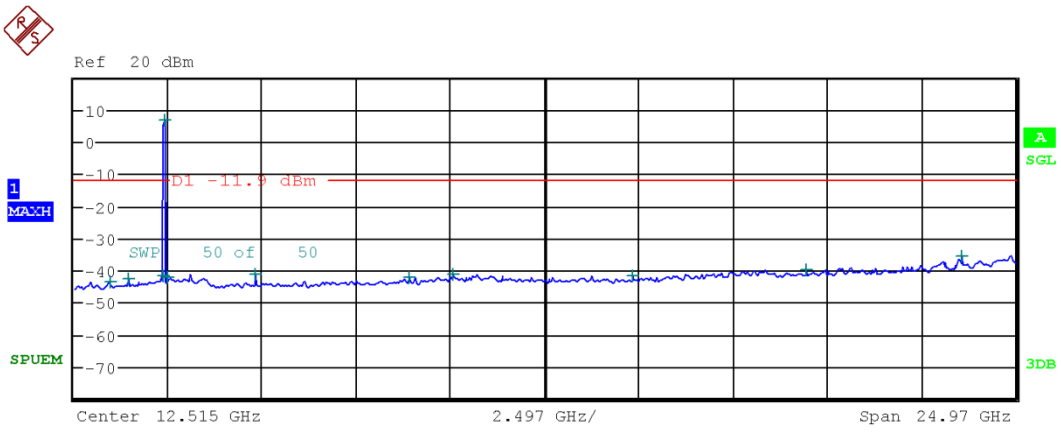
▣ RESULT PLOTS

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	977.690000 M	-43.50	-200.00
1.000 G	2.000 G	100.00 k	1.484000 G	-42.48	-200.00
2.000 G	2.400 G	100.00 k	2.397040 G	-41.53	-200.00
2.400 G	2.483 G	100.00 k	2.411794 G	6.52	-200.00
2.483 G	3.000 G	100.00 k	2.494140 G	-42.10	-200.00
3.000 G	6.000 G	100.00 k	4.824000 G	-41.12	-200.00
6.000 G	9.000 G	100.00 k	8.897333 G	-42.32	-200.00
9.000 G	12.000 G	100.00 k	10.072333 G	-41.14	-200.00
12.000 G	15.000 G	100.00 k	14.850667 G	-41.59	-200.00
15.000 G	20.000 G	100.00 k	19.456667 G	-39.78	-200.00
20.000 G	25.000 G	100.00 k	23.542222 G	-35.46	-200.00

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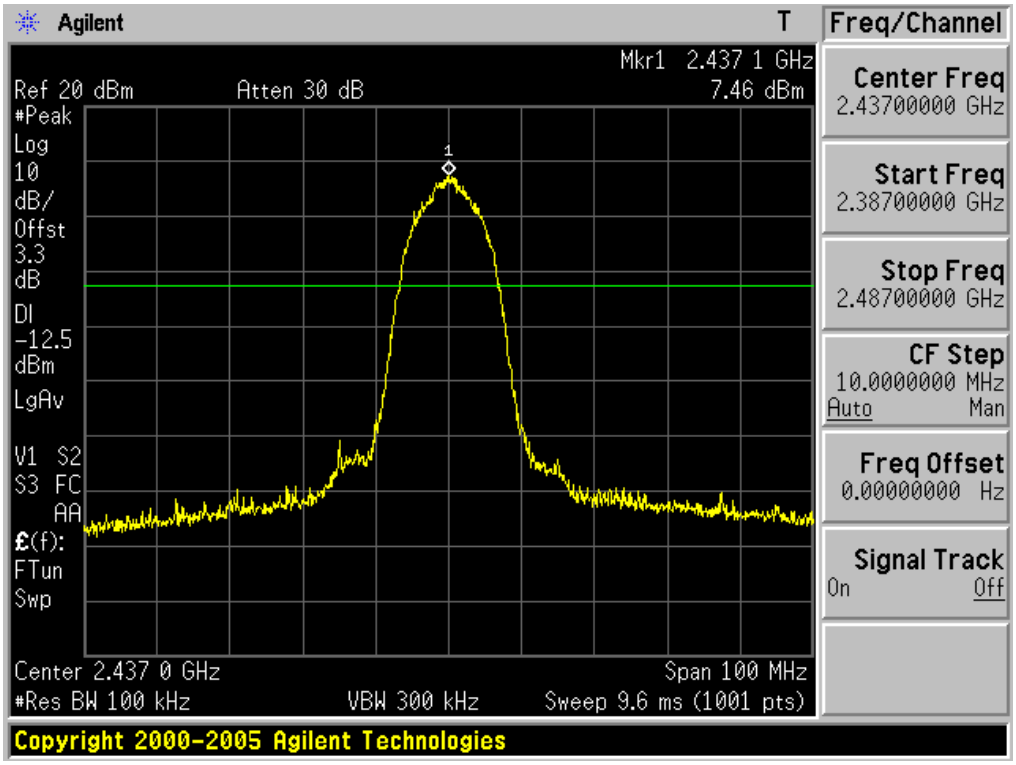
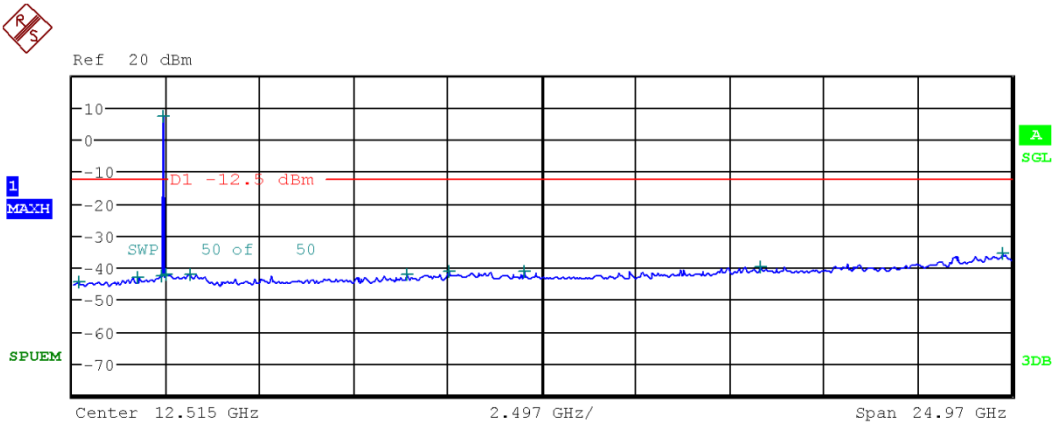
Low Band-edge ***Middle Channel*** & Modulation: ***802.11b***



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	196.840000 M	-44.53	-200.00
1.000 G	2.000 G	100.00 k	1.770000 G	-43.10	-200.00
2.000 G	2.400 G	100.00 k	2.382360 G	-42.70	-200.00
2.400 G	2.483 G	100.00 k	2.436531 G	7.01	-200.00
2.483 G	3.000 G	100.00 k	2.493468 G	-42.43	-200.00
3.000 G	6.000 G	100.00 k	3.157667 G	-42.23	-200.00
6.000 G	9.000 G	100.00 k	8.902667 G	-42.27	-200.00
9.000 G	12.000 G	100.00 k	10.024667 G	-41.47	-200.00
12.000 G	15.000 G	100.00 k	12.037333 G	-41.26	-200.00
15.000 G	20.000 G	100.00 k	18.300000 G	-40.00	-200.00
20.000 G	25.000 G	100.00 k	24.747222 G	-35.56	-200.00

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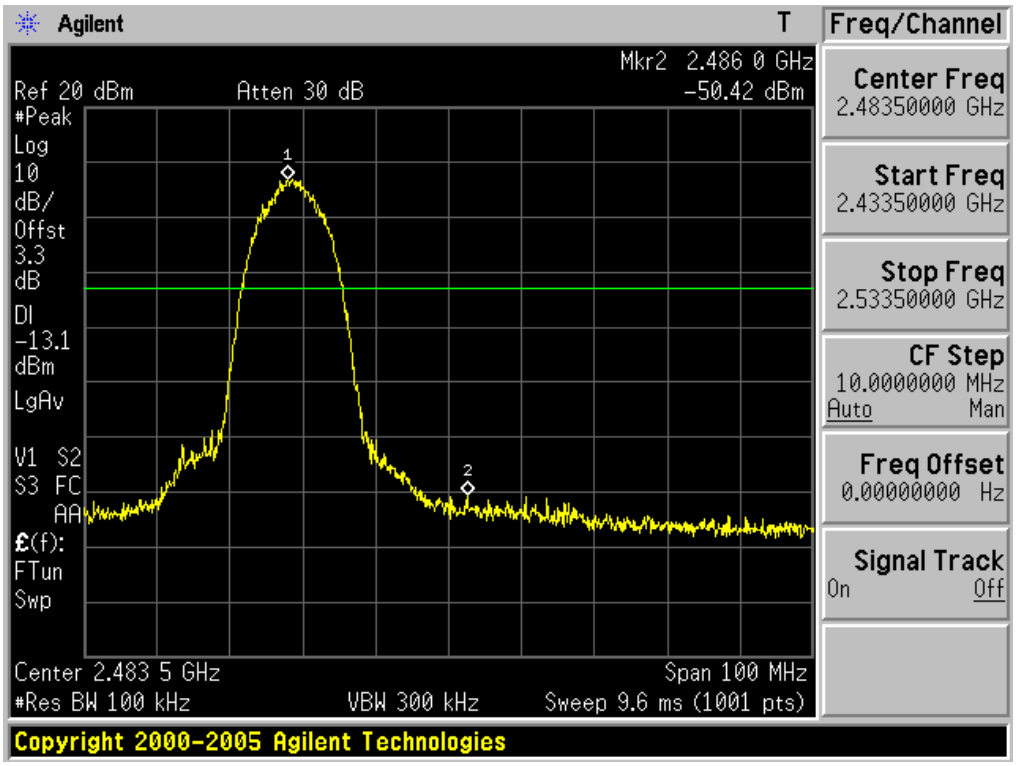
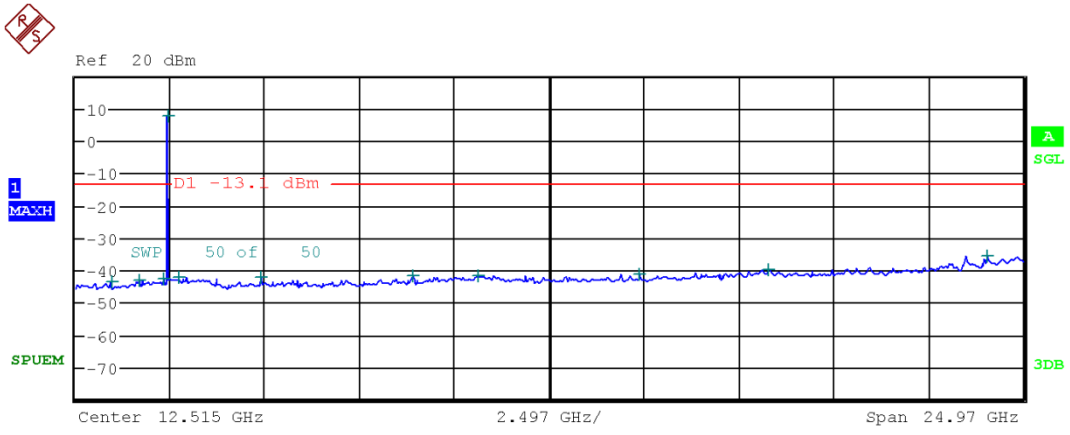
Low Band-edge ***Highest Channel*** & Modulation: ***802.11b***



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



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	100.00 k	982.540000 M	-43.69	-200.00
1.000 G	2.000 G	100.00 k	1.695000 G	-43.30	-200.00
2.000 G	2.400 G	100.00 k	2.345040 G	-42.73	-200.00
2.400 G	2.483 G	100.00 k	2.462249 G	7.53	-200.00
2.483 G	3.000 G	100.00 k	2.749652 G	-42.22	-200.00
3.000 G	6.000 G	100.00 k	4.924000 G	-41.99	-200.00
6.000 G	9.000 G	100.00 k	8.931000 G	-41.97	-200.00
9.000 G	12.000 G	100.00 k	10.634333 G	-41.61	-200.00
12.000 G	15.000 G	100.00 k	14.858000 G	-41.41	-200.00
15.000 G	20.000 G	100.00 k	18.269444 G	-39.90	-200.00
20.000 G	25.000 G	100.00 k	24.021111 G	-35.65	-200.00

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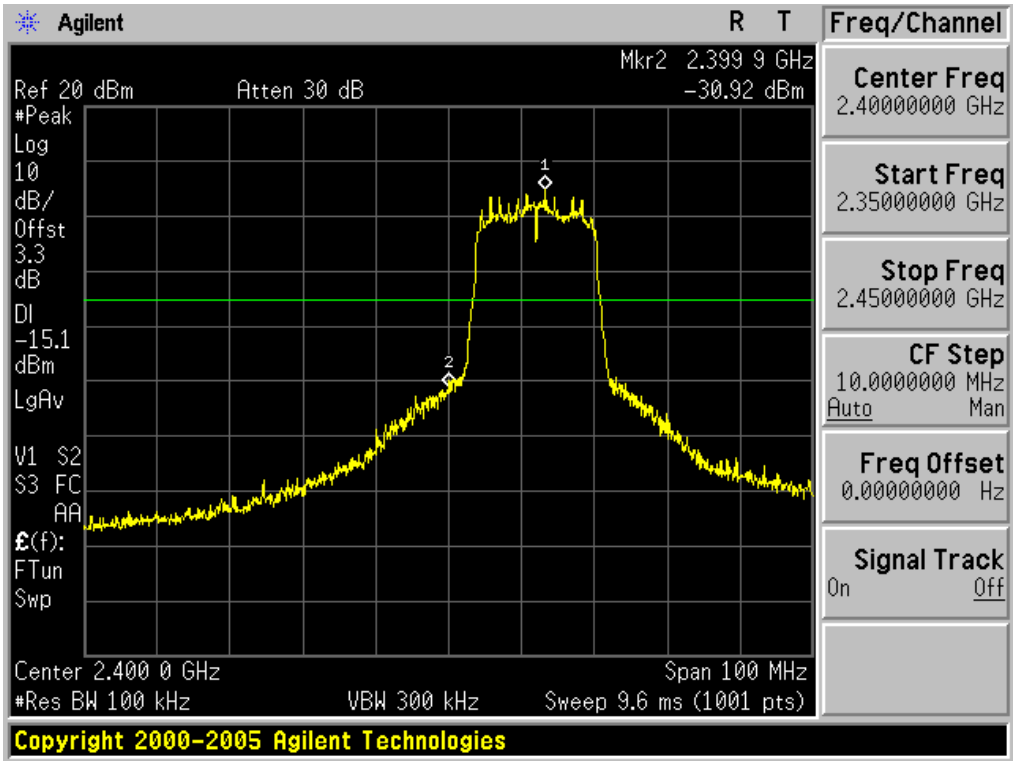
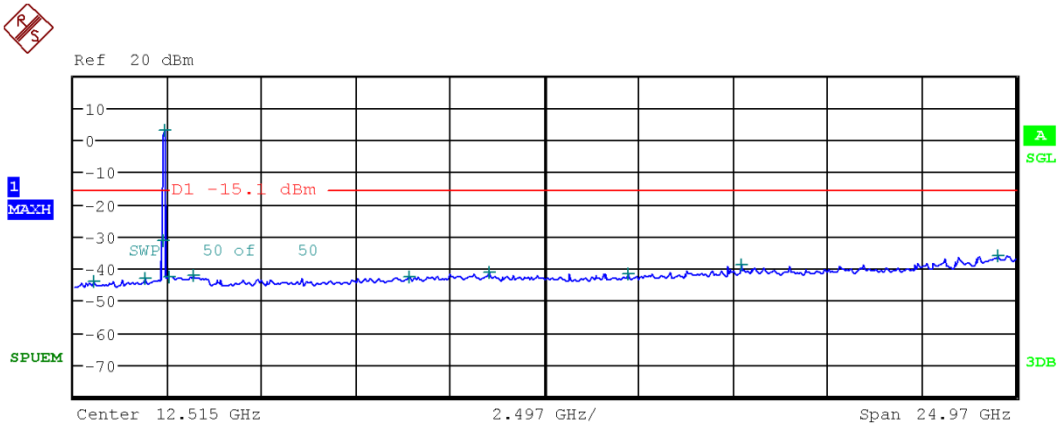
Low Band-edge ***Lowest Channel*** & Modulation: ***802.11g***



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	557.680000 M	-44.22	-200.00
1.000 G	2.000 G	100.00 k	1.891000 G	-43.23	-200.00
2.000 G	2.400 G	100.00 k	2.399160 G	-31.22	-200.00
2.400 G	2.483 G	100.00 k	2.413297 G	2.83	-200.00
2.483 G	3.000 G	100.00 k	2.564539 G	-42.51	-200.00
3.000 G	6.000 G	100.00 k	3.173333 G	-42.21	-200.00
6.000 G	9.000 G	100.00 k	8.918000 G	-42.62	-200.00
9.000 G	12.000 G	100.00 k	11.048667 G	-41.39	-200.00
12.000 G	15.000 G	100.00 k	14.729333 G	-41.87	-200.00
15.000 G	20.000 G	100.00 k	17.702778 G	-39.02	-200.00
20.000 G	25.000 G	100.00 k	24.512778 G	-36.00	-200.00

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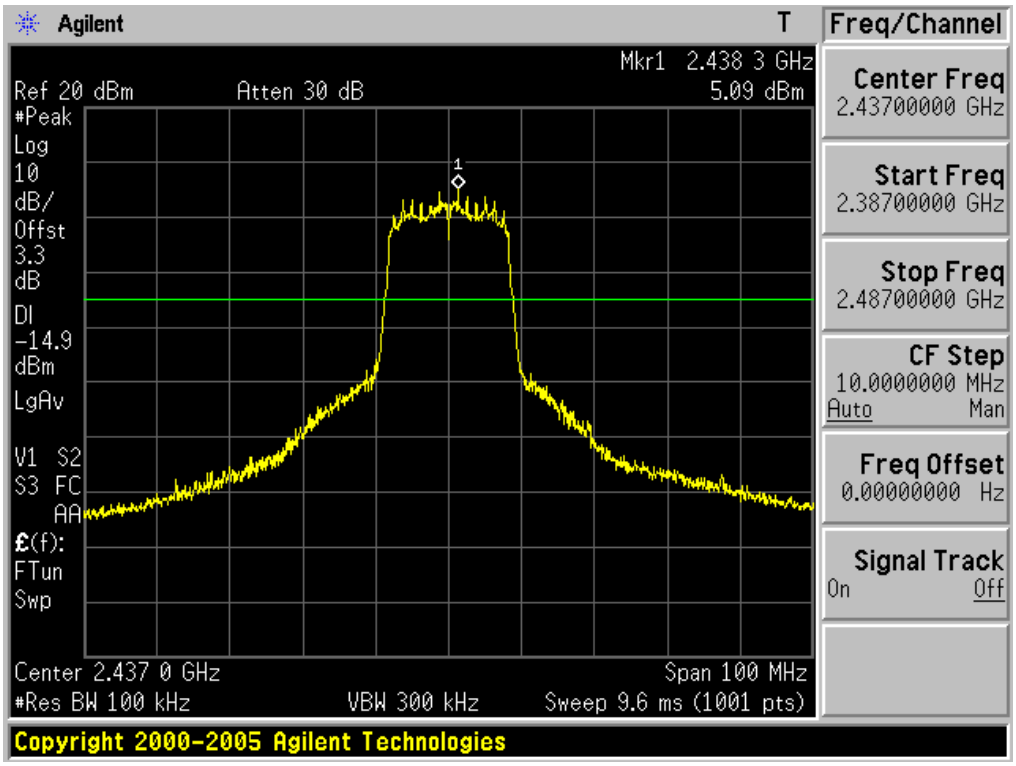
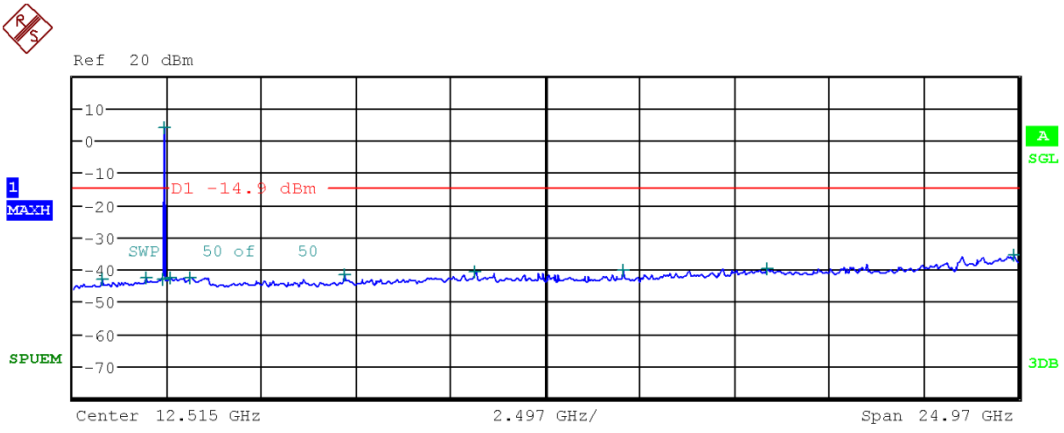
Low Band-edge ***Middle Channel*** & Modulation: ***802.11g***



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



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	100.00 k	784.660000 M	-43.29	-200.00
1.000 G	2.000 G	100.00 k	1.961000 G	-42.56	-200.00
2.000 G	2.400 G	100.00 k	2.399120 G	-42.92	-200.00
2.400 G	2.483 G	100.00 k	2.435738 G	3.77	-200.00
2.483 G	3.000 G	100.00 k	2.571512 G	-42.55	-200.00
3.000 G	6.000 G	100.00 k	3.118333 G	-42.55	-200.00
6.000 G	9.000 G	100.00 k	7.179667 G	-41.87	-200.00
9.000 G	12.000 G	100.00 k	10.654000 G	-40.78	-200.00
12.000 G	15.000 G	100.00 k	14.574000 G	-40.48	-200.00
15.000 G	20.000 G	100.00 k	18.345556 G	-40.02	-200.00
20.000 G	25.000 G	100.00 k	24.876667 G	-35.62	-200.00

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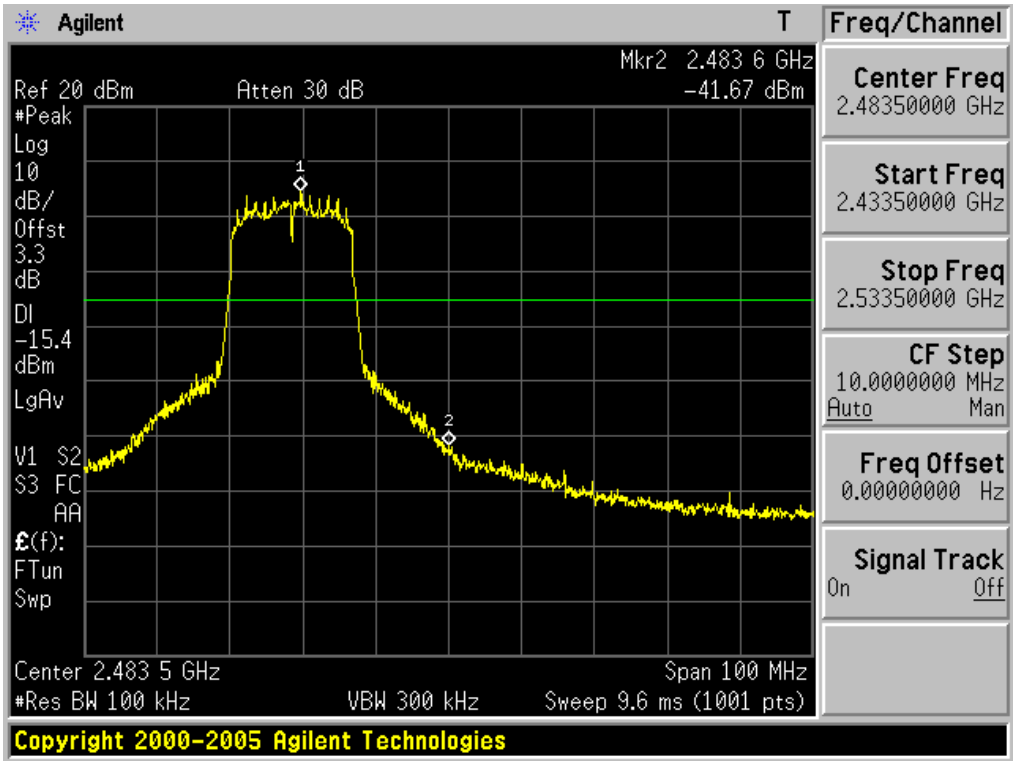
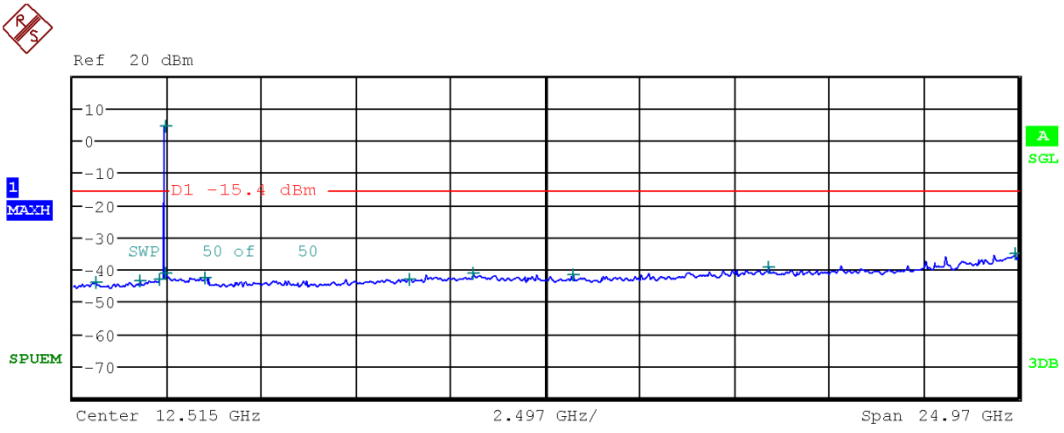
Low Band-edge ***Highest Channel*** & Modulation: ***802.11g***



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	634.310000 M	-44.13	-200.00
1.000 G	2.000 G	100.00 k	1.807000 G	-43.55	-200.00
2.000 G	2.400 G	100.00 k	2.300360 G	-42.91	-200.00
2.400 G	2.483 G	100.00 k	2.463272 G	4.33	-200.00
2.483 G	3.000 G	100.00 k	2.483810 G	-41.27	-200.00
3.000 G	6.000 G	100.00 k	3.526333 G	-42.55	-200.00
6.000 G	9.000 G	100.00 k	8.932333 G	-43.07	-200.00
9.000 G	12.000 G	100.00 k	10.587667 G	-41.46	-200.00
12.000 G	15.000 G	100.00 k	13.239000 G	-41.63	-200.00
15.000 G	20.000 G	100.00 k	18.394444 G	-39.60	-200.00
20.000 G	25.000 G	100.00 k	24.904444 G	-34.97	-200.00

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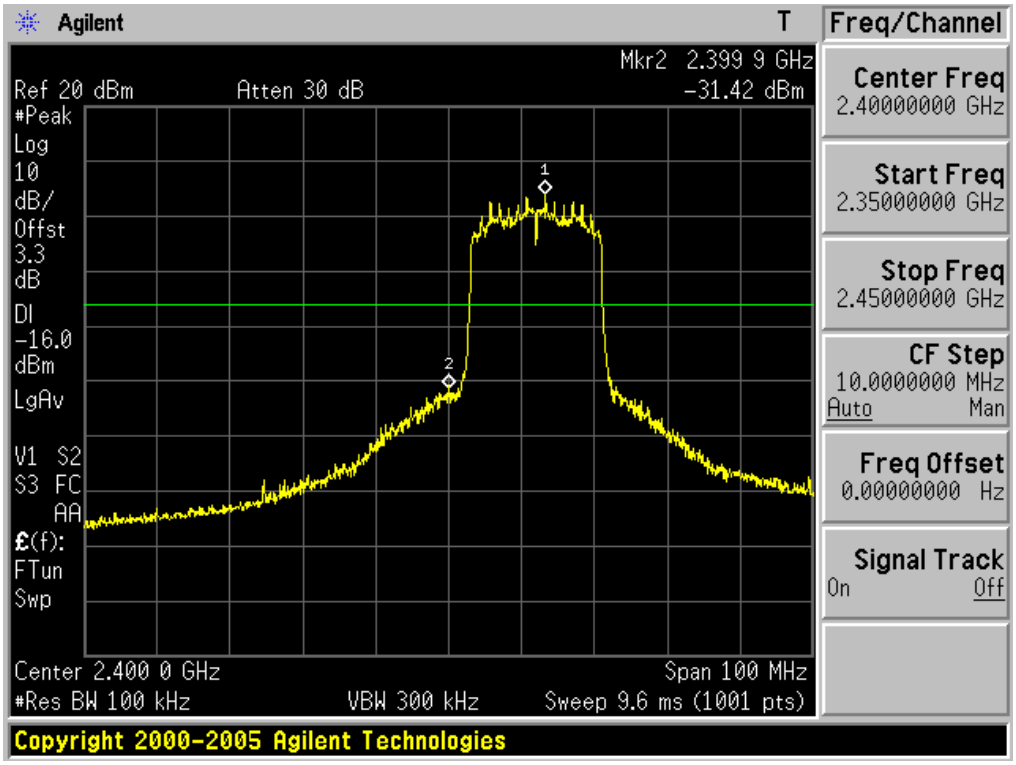
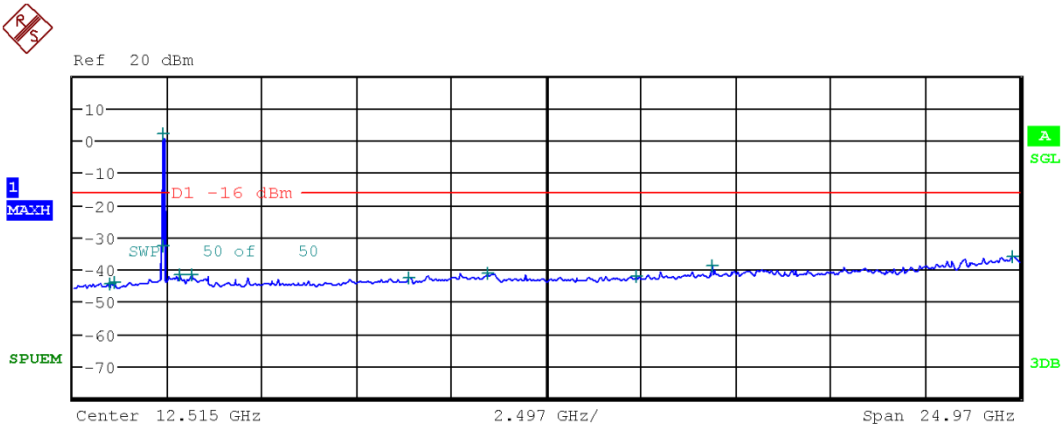
Low Band-edge ***Lowest Channel*** & Modulation: ***802.11n (HT20)***



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	983.510000 M	-44.32	-200.00
1.000 G	2.000 G	100.00 k	1.096000 G	-44.08	-200.00
2.000 G	2.400 G	100.00 k	2.399480 G	-32.79	-200.00
2.400 G	2.483 G	100.00 k	2.410751 G	1.99	-200.00
2.483 G	3.000 G	100.00 k	2.832034 G	-41.52	-200.00
3.000 G	6.000 G	100.00 k	3.144333 G	-41.80	-200.00
6.000 G	9.000 G	100.00 k	8.893333 G	-42.74	-200.00
9.000 G	12.000 G	100.00 k	10.968000 G	-41.38	-200.00
12.000 G	15.000 G	100.00 k	14.893333 G	-42.13	-200.00
15.000 G	20.000 G	100.00 k	16.864444 G	-39.12	-200.00
20.000 G	25.000 G	100.00 k	24.804444 G	-36.14	-200.00

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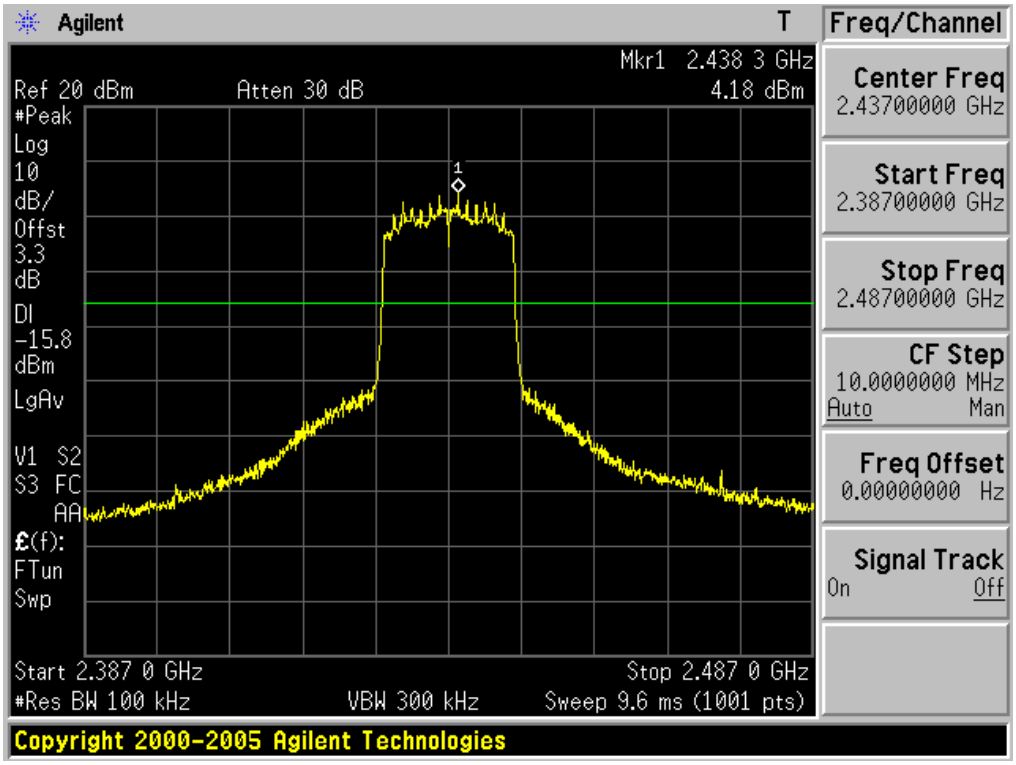
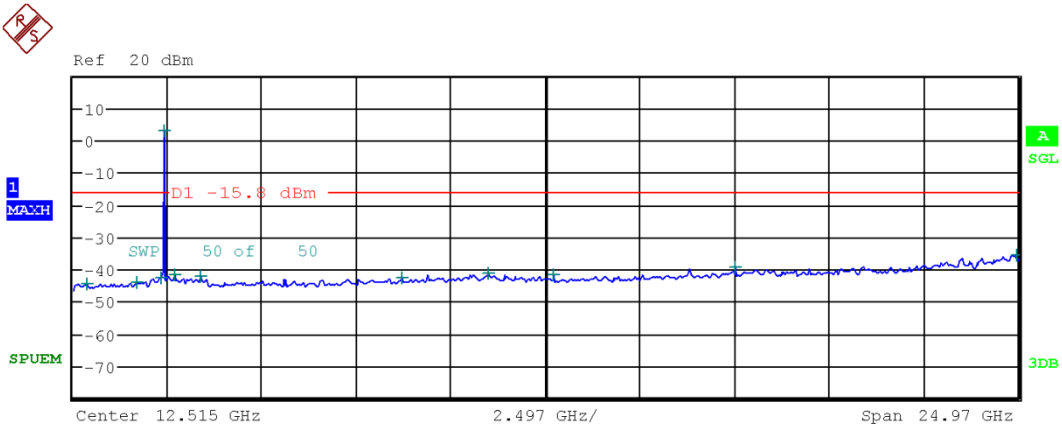
Low Band-edge ***Middle Channel*** & Modulation: ***802.11n (HT20)***



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	405.390000 M	-44.51	-200.00
1.000 G	2.000 G	100.00 k	1.697000 G	-43.97	-200.00
2.000 G	2.400 G	100.00 k	2.339600 G	-42.63	-200.00
2.400 G	2.483 G	100.00 k	2.438285 G	3.03	-200.00
2.483 G	3.000 G	100.00 k	2.701360 G	-41.69	-200.00
3.000 G	6.000 G	100.00 k	3.374000 G	-42.19	-200.00
6.000 G	9.000 G	100.00 k	8.713000 G	-42.89	-200.00
9.000 G	12.000 G	100.00 k	10.985333 G	-41.34	-200.00
12.000 G	15.000 G	100.00 k	12.729333 G	-41.72	-200.00
15.000 G	20.000 G	100.00 k	17.503333 G	-39.46	-200.00
20.000 G	25.000 G	100.00 k	24.969444 G	-35.49	-200.00

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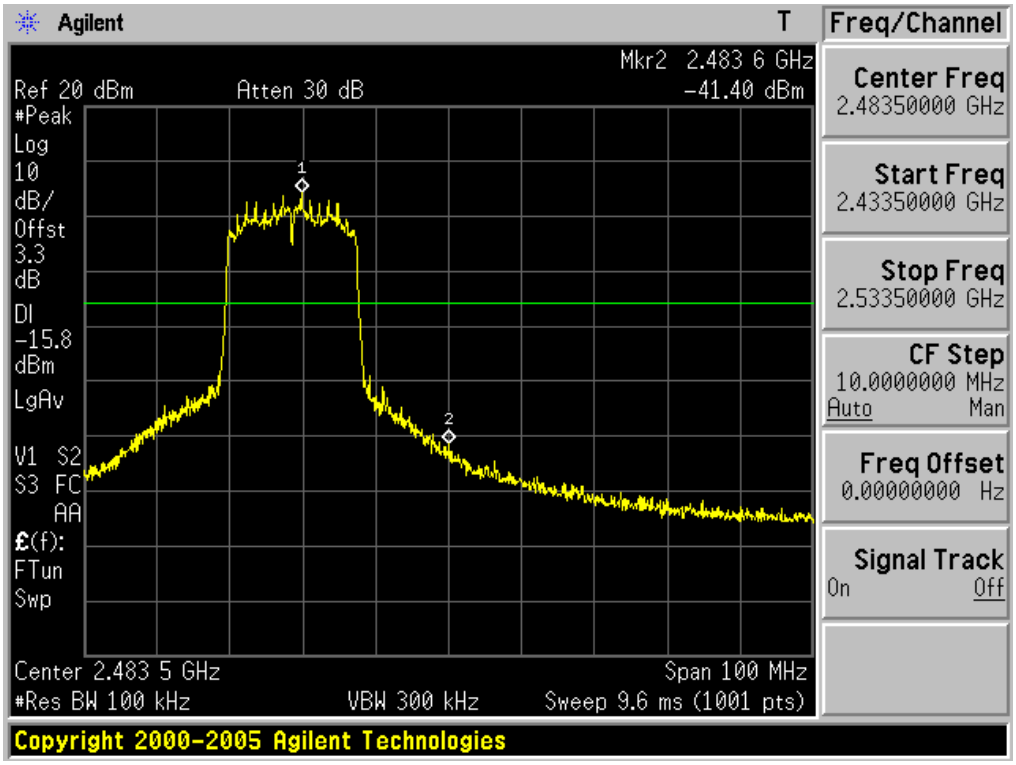
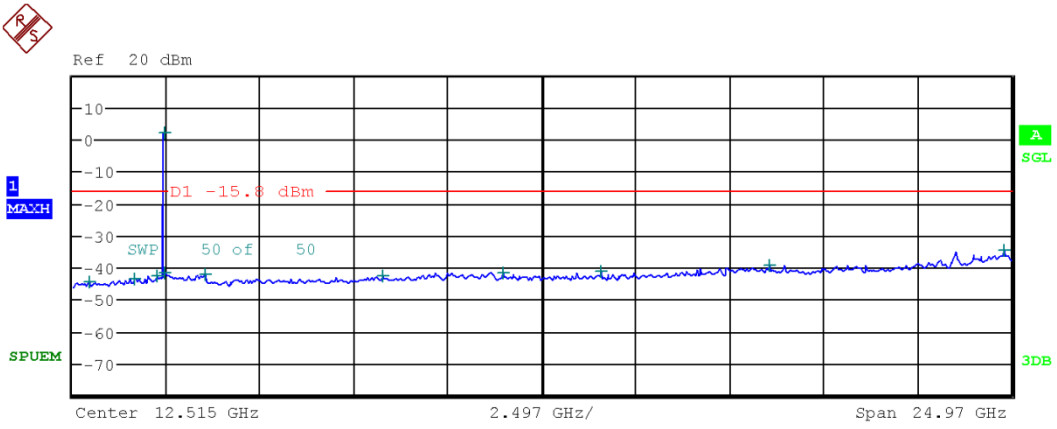
Low Band-edge ***Highest Channel*** & Modulation: ***802.11n (HT20)***



Conducted Spurious Emissions ***Highest 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	460.680000 M	-44.66	-200.00
1.000 G	2.000 G	100.00 k	1.676000 G	-43.40	-200.00
2.000 G	2.400 G	100.00 k	2.289200 G	-42.47	-200.00
2.400 G	2.483 G	100.00 k	2.464504 G	2.09	-200.00
2.483 G	3.000 G	100.00 k	2.484791 G	-41.58	-200.00
3.000 G	6.000 G	100.00 k	3.535333 G	-42.33	-200.00
6.000 G	9.000 G	100.00 k	8.281000 G	-42.52	-200.00
9.000 G	12.000 G	100.00 k	11.462667 G	-41.61	-200.00
12.000 G	15.000 G	100.00 k	14.077000 G	-41.25	-200.00
15.000 G	20.000 G	100.00 k	18.572778 G	-39.18	-200.00
20.000 G	25.000 G	100.00 k	24.816667 G	-34.89	-200.00

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7.5 Radiated Measurement.

Test Requirments 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.

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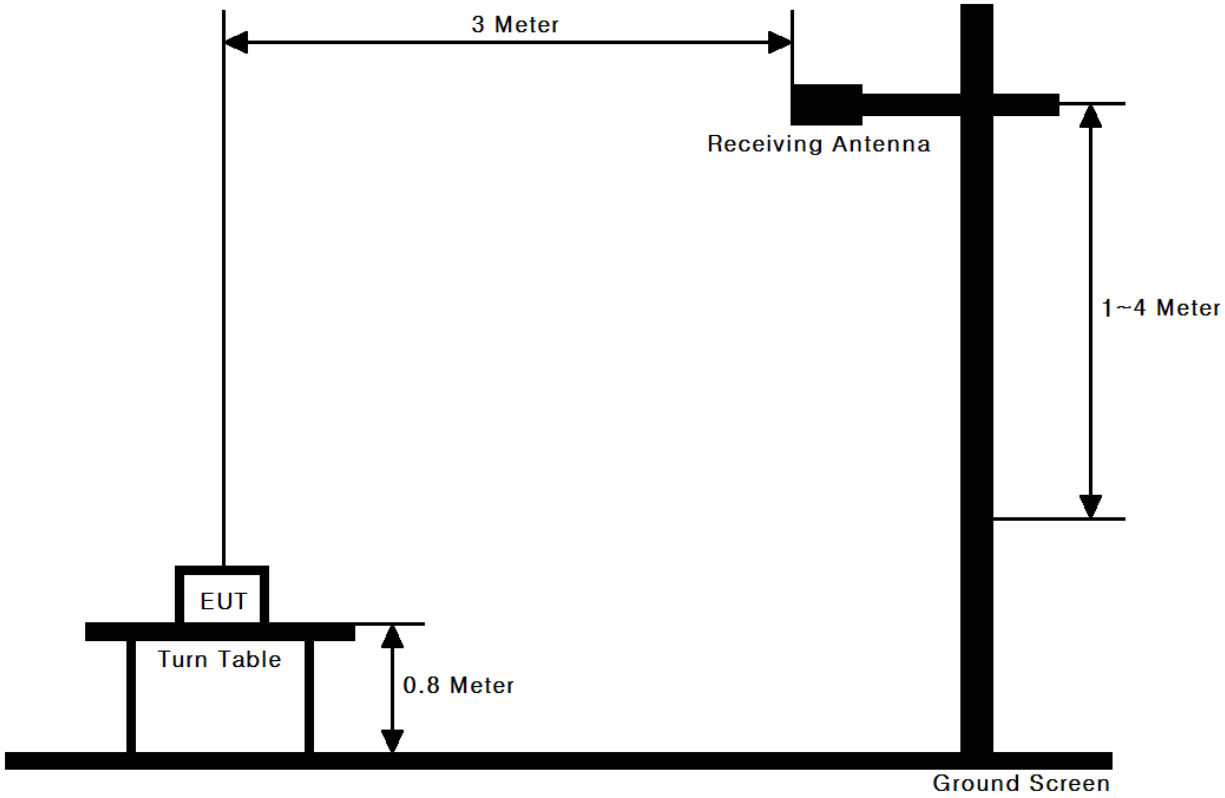
Test Configuration



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.

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TEST RESULTS

30MHz ~ 25GHz Data(*802.11b & 11Mbps*)

▪ 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)
2387.280	H	Y	PK	55.47	-10.26	45.21	74.00	28.79
2387.040	H	Y	AV	44.09	-10.26	33.83	54.00	20.17
4823.978	H	Z	PK	55.45	-1.47	53.98	74.00	20.02
4824.056	H	Z	AV	49.87	-1.47	48.40	54.00	5.60
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

▪ 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)
4873.928	H	Z	PK	55.67	-0.93	54.74	74.00	19.26
4874.048	H	Z	AV	50.56	-0.93	49.63	54.00	4.37
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

▪ 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)
2484.360	H	Y	PK	53.25	-10.26	42.99	74.00	31.01
2484.320	H	Y	AV	42.68	-10.26	32.42	54.00	21.58
4924.068	H	Z	PK	55.60	-0.40	55.20	74.00	18.80
4924.028	H	Z	AV	50.43	-0.40	50.03	54.00	3.97
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

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,

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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	59.47	-10.26	49.21	74.00	24.79
2390.000	H	Y	AV	44.79	-10.26	34.53	54.00	19.47
4824.000	H	Z	PK	53.31	-1.47	51.84	74.00	22.16
4824.100	H	Z	AV	40.73	-1.47	39.26	54.00	14.74
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

▪ 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)
4874.260	H	Z	PK	53.27	-0.93	52.34	74.00	21.66
4874.230	H	Z	AV	39.71	-0.93	38.78	54.00	15.22
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

▪ 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)
2483.500	H	Y	PK	60.76	-10.26	50.50	74.00	23.50
2483.500	H	Y	AV	43.84	-10.26	33.58	54.00	20.42
4923.810	H	Z	PK	53.83	-0.40	53.43	74.00	20.57
4923.260	H	Z	AV	40.03	-0.40	39.63	54.00	14.37
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

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,

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30MHz ~ 25GHz Data(*802.11n (HT20) & MCS 0*)

▪ 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)
2388.560	H	Y	PK	58.90	-11.07	47.83	74.00	26.17
2390.000	H	Y	AV	43.31	-10.26	33.05	54.00	20.95
4823.280	V	Y	PK	51.42	-1.47	49.95	74.00	24.05
4823.730	V	Y	AV	31.60	-1.47	30.13	54.00	23.87
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

▪ 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	V	Y	PK	52.93	-0.93	52.00	74.00	22.00
4874.010	V	Y	AV	39.10	-0.93	38.17	54.00	15.83
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

▪ 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)
2483.750	H	Y	PK	60.68	-10.26	50.42	74.00	23.58
2483.500	H	Y	AV	45.20	-10.26	34.94	54.00	19.06
4924.080	V	Y	PK	52.58	-0.40	52.18	74.00	21.82
4923.900	V	Y	AV	38.68	-0.40	38.28	54.00	15.72
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

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,

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7.6 POWERLINE CONDUCTED EMISSIONS

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

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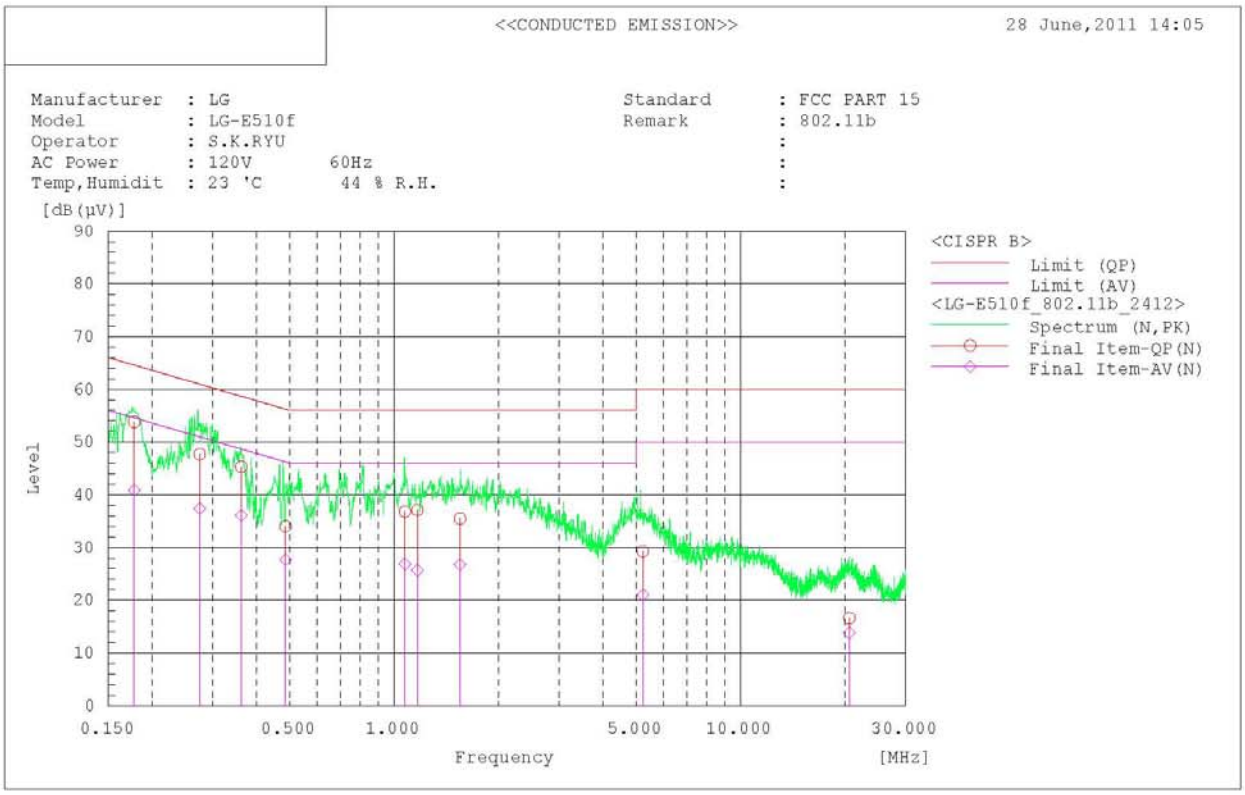
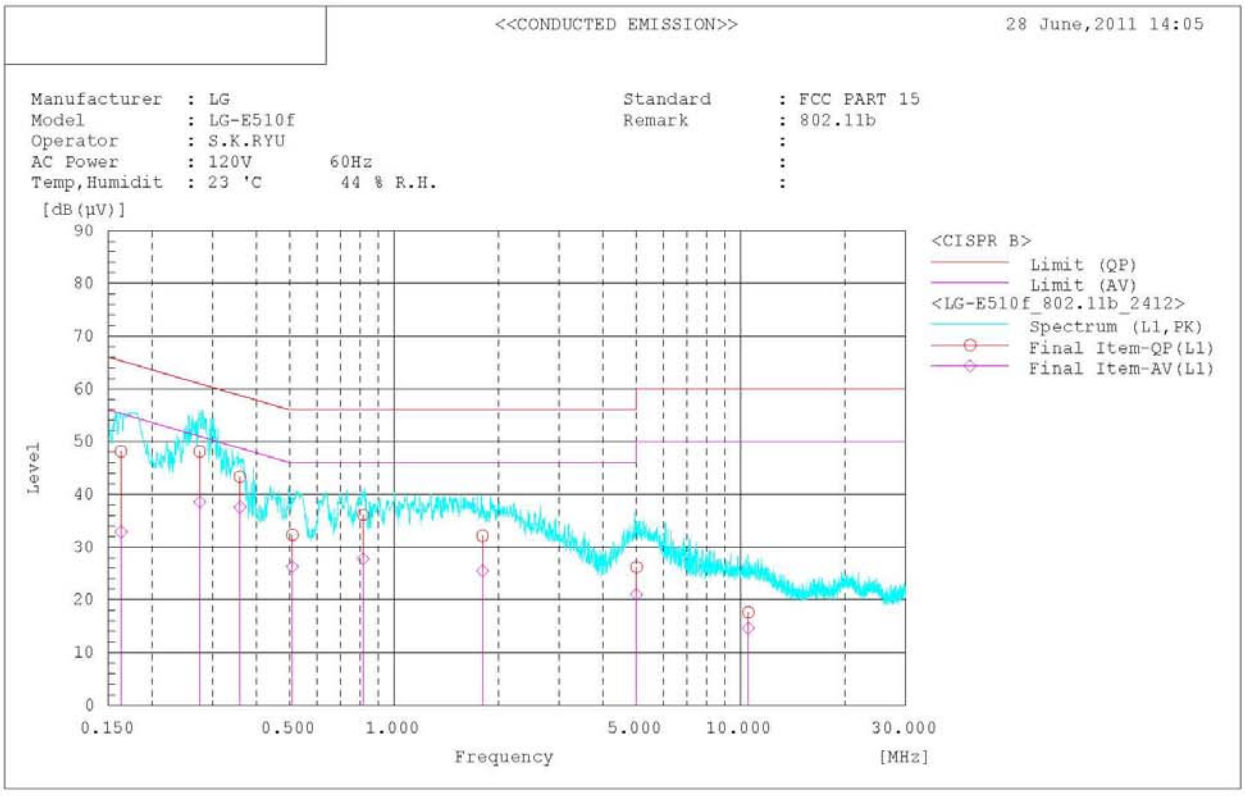
▣ RESULT PLOTS

AC Line Conducted Emissions (Graph)

Test Mode: 802.11b & 11Mbps





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AC Line Conducted Emissions (List)

Test Mode: 802.11b & 11Mbps

<<CONDUCTED EMISSION>>

28 June,2011 14:05

Standard : FCC PART 15
Manufacturer : LG
Model : LG-E510f
Operator : S.K.RYU
AC Power : 120V 60Hz
Temp,Humidit : 23 'C 44 % R.H.
Remark : 802.11b

Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]	Remark
1	0.178	53.7	40.8	0.1	53.8	40.9	64.6	54.6	10.8	13.7	
2	0.275	47.6	37.3	0.1	47.7	37.4	61.0	51.0	13.3	13.6	
3	0.362	45.2	36.0	0.1	45.3	36.1	58.7	48.7	13.4	12.6	
4	0.486	33.9	27.6	0.1	34.0	27.7	56.2	46.2	22.2	18.5	
5	1.075	36.7	26.8	0.1	36.8	26.9	56.0	46.0	19.2	19.1	
6	1.168	37.0	25.6	0.1	37.1	25.7	56.0	46.0	18.9	20.3	
7	1.551	35.3	26.6	0.2	35.5	26.8	56.0	46.0	20.5	19.2	
8	5.222	28.9	20.6	0.4	29.3	21.0	60.0	50.0	30.7	29.0	
9	20.606	15.4	12.6	1.2	16.6	13.8	60.0	50.0	43.4	36.2	

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]	Remark
1	0.163	47.8	32.6	0.3	48.1	32.9	65.3	55.3	17.2	22.4	
2	0.275	47.8	38.3	0.3	48.1	38.6	61.0	51.0	12.9	12.4	
3	0.359	43.0	37.3	0.3	43.3	37.6	58.8	48.8	15.5	11.2	
4	0.815	35.8	27.5	0.3	36.1	27.8	56.0	46.0	19.9	18.2	
5	1.802	31.8	25.2	0.3	32.1	25.5	56.0	46.0	23.9	20.5	
6	5.013	25.7	20.5	0.5	26.2	21.0	60.0	50.0	33.8	29.0	
7	10.532	16.9	13.9	0.7	17.6	14.6	60.0	50.0	42.4	35.4	
8	0.509	32.0	26.0	0.3	32.3	26.3	56.0	46.0	23.7	19.7	

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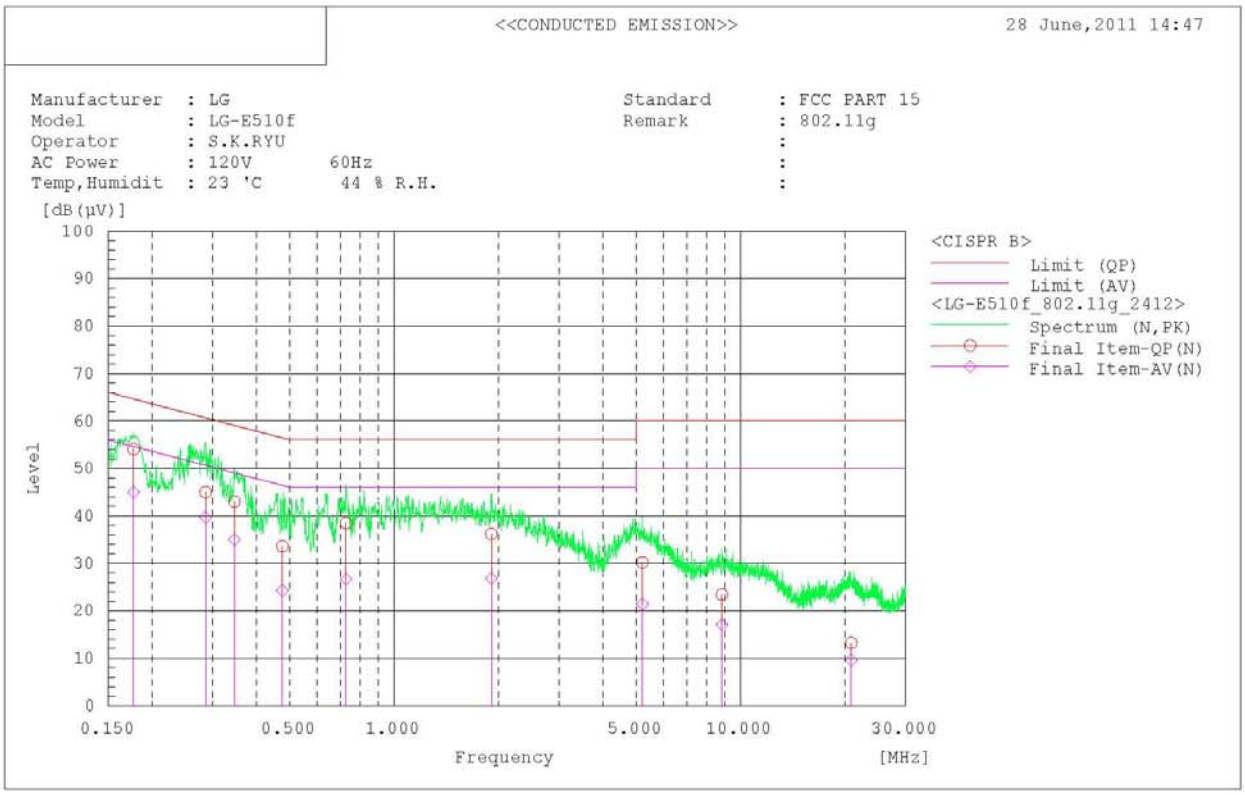
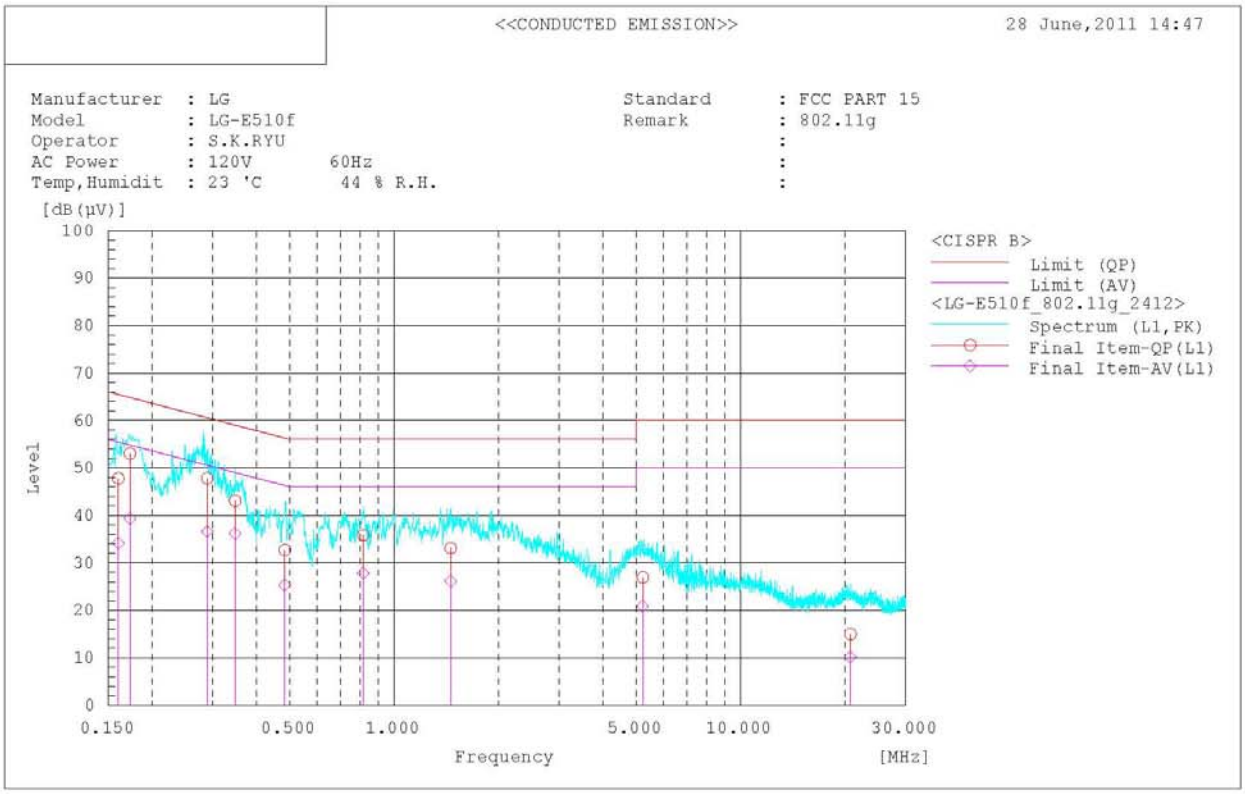
AC Line Conducted Emissions (Graph)

Test Mode: 802.11g & 6Mbps





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AC Line Conducted Emissions (List)

Test Mode: 802.11g & 6Mbps

<<CONDUCTED EMISSION>>

28 June,2011 14:47

Standard : FCC PART 15
Manufacturer : LG
Model : LG-E510f
Operator : S.K.RYU
AC Power : 120V 60Hz
Temp,Humidit : 23 'C 44 % R.H.
Remark : 802.11g

Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]	Remark
1	0.177	54.0	44.9	0.1	54.1	45.0	64.6	54.6	10.5	9.6	
2	0.286	44.9	39.6	0.1	45.0	39.7	60.6	50.6	15.6	10.9	
3	0.346	42.9	34.9	0.1	43.0	35.0	59.1	49.1	16.1	14.1	
4	0.476	33.5	24.2	0.1	33.6	24.3	56.4	46.4	22.8	22.1	
5	0.727	38.4	26.6	0.1	38.5	26.7	56.0	46.0	17.5	19.3	
6	1.911	36.0	26.6	0.2	36.2	26.8	56.0	46.0	19.8	19.2	
7	5.209	29.8	21.0	0.4	30.2	21.4	60.0	50.0	29.8	28.6	
8	8.839	22.9	16.6	0.5	23.4	17.1	60.0	50.0	36.6	32.9	
9	20.858	11.9	8.3	1.3	13.2	9.6	60.0	50.0	46.8	40.4	

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]	Remark
1	0.160	47.5	33.9	0.3	47.8	34.2	65.5	55.5	17.7	21.3	
2	0.173	52.7	39.1	0.3	53.0	39.4	64.8	54.8	11.8	15.4	
3	0.289	47.5	36.3	0.3	47.8	36.6	60.6	50.6	12.8	14.0	
4	0.348	42.8	35.9	0.3	43.1	36.2	59.0	49.0	15.9	12.8	
5	0.484	32.4	25.0	0.3	32.7	25.3	56.3	46.3	23.6	21.0	
6	0.815	35.5	27.5	0.3	35.8	27.8	56.0	46.0	20.2	18.2	
7	1.456	32.8	25.8	0.3	33.1	26.1	56.0	46.0	22.9	19.9	
8	5.224	26.4	20.4	0.5	26.9	20.9	60.0	50.0	33.1	29.1	
9	20.752	13.8	8.9	1.2	15.0	10.1	60.0	50.0	45.0	39.9	

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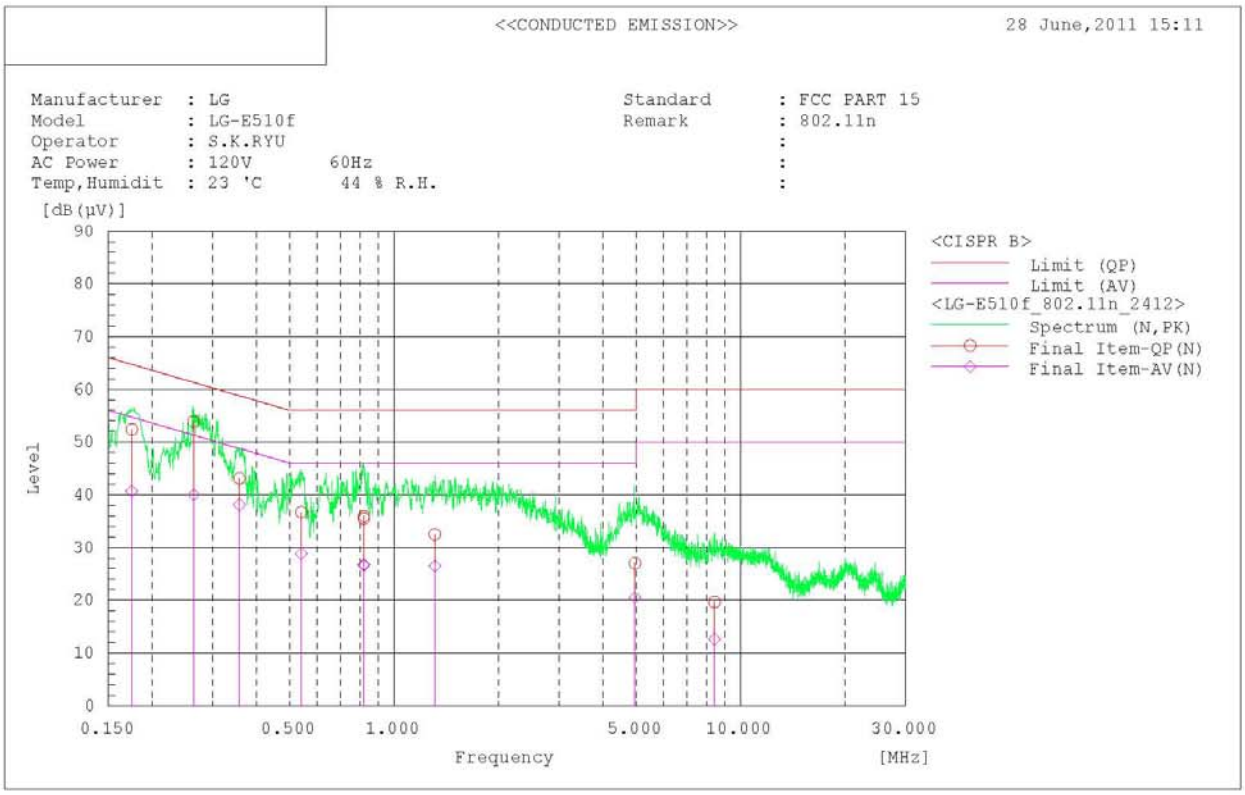
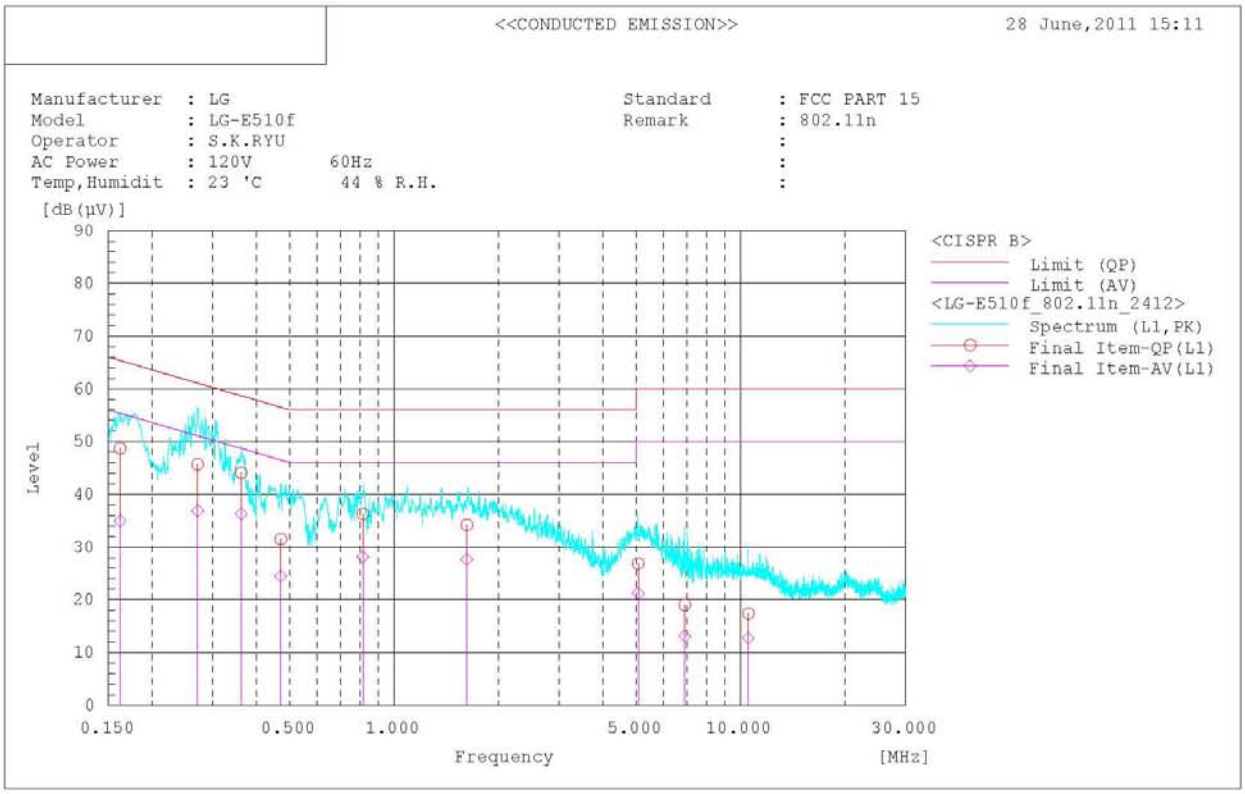
AC Line Conducted Emissions (Graph)

Test Mode: 802.11n HT20 & MCS 0





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AC Line Conducted Emissions (List)

Test Mode: 802.11n HT20 & MCS0

<<CONDUCTED EMISSION>>

28 June,2011 15:11

Standard : FCC PART 15
Manufacturer : LG
Model : LG-E510f
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 QP [dB(μV)]	Reading AV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]	Remark
1	0.175	52.3	40.6	0.1	52.4	40.7	64.7	54.7	12.3	14.0	
2	0.264	53.8	39.9	0.1	53.9	40.0	61.3	51.3	7.4	11.3	
3	0.358	43.0	38.0	0.1	43.1	38.1	58.8	48.8	15.7	10.7	
4	0.540	36.6	28.7	0.1	36.7	28.8	56.0	46.0	19.3	17.2	
5	0.818	35.4	26.6	0.1	35.5	26.7	56.0	46.0	20.5	19.3	
6	0.818	35.8	26.6	0.1	35.9	26.7	56.0	46.0	20.1	19.3	
7	1.311	32.4	26.4	0.1	32.5	26.5	56.0	46.0	23.5	19.5	
8	4.960	26.7	20.2	0.3	27.0	20.5	56.0	46.0	29.0	25.5	
9	8.411	19.2	12.1	0.5	19.7	12.6	60.0	50.0	40.3	37.4	

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]	Remark
1	0.162	48.4	34.6	0.3	48.7	34.9	65.4	55.4	16.7	20.5	
2	0.271	45.4	36.6	0.3	45.7	36.9	61.1	51.1	15.4	14.2	
3	0.362	43.8	36.0	0.3	44.1	36.3	58.7	48.7	14.6	12.4	
4	0.471	31.2	24.2	0.3	31.5	24.5	56.5	46.5	25.0	22.0	
5	0.813	36.0	27.8	0.3	36.3	28.1	56.0	46.0	19.7	17.9	
6	1.623	33.9	27.3	0.3	34.2	27.6	56.0	46.0	21.8	18.4	
7	5.064	26.4	20.7	0.5	26.9	21.2	60.0	50.0	33.1	28.8	
8	6.907	18.5	12.6	0.5	19.0	13.1	60.0	50.0	41.0	36.9	
9	10.538	16.7	12.0	0.7	17.4	12.7	60.0	50.0	42.6	37.3	

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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	10/09/30	11/09/30	MY45304199
Spectrum Analyzer	Rohde Schwarz	FSQ26	11/01/11	12/01/11	200445
Spectrum Analyzer	Agilent	N9020A	11/01/07	12/01/07	MY49100833
Peak Power meter	Rohde Schwarz	NRP-Z81	11/06/04	12/06/04	1137.9009.02-101001
Power Splitter	Anritsu	K241B	10/10/05	11/10/05	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
Bluetooth Tester	TESCOM	TC-3000B	11/07/01	12/07/01	3000B000268
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
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 (25dB)	Agilent	8447D	11/03/07	12/03/07	2944A10144
Amplifier (30dB)	Agilent	8449B	11/03/07	12/03/07	3008A01590
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

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