

# HCT CO., LTD.

# **CERTIFICATE OF COMPLIANCE**

#### **FCC Certification**

Applicant Name: LG Electronics MobileComm U.S.A., Inc.		Date of Issue: April 02, 2014 Test Site/Location:	
Address: 1000 Sylvan Avenue, Englewood Cliffs NJ 07632		HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea <b>Report No.:</b> HCT-R-1404-F004	
		HCT FRN: 0005866421	
FCC ID	: ZNFD380		
APPLICANT	: LG Electronic	s MobileComm U.S.A., Inc.	
FCC Model(s):	LG-D380		
Additional FCC Model(s):	LGD380, D380		
EUT Type:	GSM/WCDMA Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), VoIP, Hotspot suppor		
Max. RF Output Power:	Wi-Fi 802.11b(20.34 dB)	m) / Wi-Fi 802.11g (20.07 dBm) / Wi-Fi 802.11n (18.43 dBm)	
Frequency Range:	2412 MHz - 2462 MHz (	2.4 GHz Band)	
Modulation type	CCK/DSSS/OFDM		
FCC Classification:	Digital Transmission Sys	stem(DTS)	
FCC Rule Part(s):	Part 15.247		

Engineering Statement:

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

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

Report prepared by : Kyoung Houn Seo Test Engineer of RF Team

Approved ⁄by : Chang Seok Choi Manager of RF Team

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# **Version**

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1404-F004	April 02, 2014	- First Approval Report

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EUT Type:	GSM/WCDMA Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), VoIP, Hotspot support
Model name(s):	LG-D380
Additional Model name(s):	LGD380, D380
Date(s) of Tests:	March 13, 2014 ~ March 28, 2014
Place of Tests:	HCT Co., Ltd. 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea. (IC Recognition No. : 5944A-3)

# 2. EUT DESCRIPTION

EUT Type	GSM/WC	GSM/WCDMA Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), VoIP, Hotspot support	
FCC Model Name	LG-D380		
Additional FCC Model Name	LGD380,	LGD380, D380	
Power Supply	DC 3.8 V		
Battery type	Li-ion Bat	tery(Standard)	
Frequency Range	TX: 2412	TX: 2412 MHz ~ 2462 MHz	
	RX: 2412	RX: 2412 MHz ~ 2462 MHz	
Max. RF Output Power	Peak Wi-Fi 802.11b(20.34 dBm) / Wi-Fi 802.11g (20.07 dBm) / Wi-Fi 802.11n (18.43 dBm)		
	Average Wi-Fi 802.11b (14.52 dBm) / Wi-Fi 802.11g (11.67 dBm) / Wi-Fi 802.11n (10.16 dBm)		
Modulation Type	DSSS/CCK(802.11b), OFDM(802.11g, 802.11n)		
Antenna Specification	Manufacturer: Ace Technology		
	Antenna type: Planar Inverted F Antenna		
	Peak Gai	n : -1.42 dBi	

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# **3. TEST METHODOLOGY**

FCC KDB 558074 D01 DTS Meas Guidance v03r01 dated April 09, 2013 entitled "Guidance for Performing Compliance Measurements on Digital Transmission Systems(DTS) and the measurement procedure described in the American National Standard for Testing Unlicensed Wireless Devices(ANSI C63.4-2003) Operating Under §15.247" were used in the measurement.

# **3.1 EUT CONFIGURATION**

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

# **3.2 EUT EXERCISE**

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

# **3.3 GENERAL TEST PROCEDURES**

#### **Conducted Emissions**

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version :2003) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

#### **Radiated Emissions**

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version: 2003)

#### **Conducted Antenna Terminal**

See Section from 9.1 to 9.2.(KDB 558074)

# **3.4 DESCRIPTION OF TEST MODES**

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

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

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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 SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2003) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated February 28, 2014 (Registration Number: 90661)

# **5.2 EQUIPMENT**

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

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#### 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. SUMMARY TEST OF RESULTS

Test Description	FCC Part Section(s) Test Limit		Test Condition	Test Result
6 dB Bandwidth	§15.247(a)(2)	> 500 kHz		PASS
Conducted Maximum Peak Output Power	§15.247(b)(3)	< 1 Watt		PASS
Power Spectral Density	§15.247(e)	< 8 dBm / 3 kHz Band	CONDUCTED	PASS
Band Edge(Out of Band Emissions)	§15.247(d)	Conducted > 20 dBc		PASS
AC Power line Conducted Emissions	§15.207	cf. Section 8.6		PASS
Radiated Spurious Emissions	§15.205, 15.209	cf. Section 8.5.1	RADIATED	PASS
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 8.5.2	RADIATED	PASS

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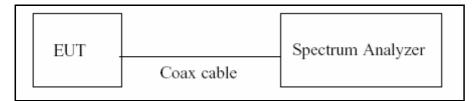


#### **TEST PROCEDURE**

#### According to KDB 558074)6)b), issued 04/09/2013)

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

# **TEST CONFIGURATION**



# **TEST PROCEDURE**

The transmitter output is connected to the Spectrum Analyzer. We tested accroding to the zerospan measurement method, 6.0)b) in KDB 558074( issued 04/09/2013)

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

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

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

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# **Duty Cycle Factor**

Mode	Data Rate	T <sub>on</sub>	T <sub>total</sub>	Duty Cycle	Duty Cycle Factor (dB)
	1 Mbps	<sup>(ms)</sup>	(ms) 12.300	0.99268293	0.032
h	2 Mbps	6.210	6.330	0.98104265	0.083
b	5.5 Mbps	2.385	2.475	0.96363636	0.161
	11 Mbps	1.281	1.379	0.92893401	0.320
	6 Mbs	2.019	2.124	0.95056497	0.220
	9 Mbs	1.350	1.460	0.92465753	0.340
	12 Mbs	1.020	1.130	0.90265487	0.445
-	18 Mbs	0.685	0.790	0.86708861	0.619
g	24 Mbs	0.522	0.627	0.83253589	0.796
	36 Mbs	0.348	0.453	0.76821192	1.145
	48 Mbs	0.270	0.370	0.72972973	1.368
	54 Mbs	0.242	0.341	0.70967742	1.489
	6.5 Mbs	1.868	1.981	0.94295810	0.255
	13 Mbs	0.945	1.050	0.9000000	0.458
	19.5 Mbs	0.630	0.740	0.85135135	0.699
-	26 Mbs	0.480	0.579	0.82901554	0.814
n	39 Mbs	0.333	0.440	0.75681818	1.210
	52 Mbs	0.252	0.357	0.70588235	1.513
	58.5 Mbs	0.222	0.324	0.68518519	1.642
	65 Mbs	0.212	0.310	0.68387097	1.650

Note : Duty Cycle Factor =  $10*\log(1/Duty Cycle)$ . where, Duty Cycle = T<sub>on</sub> / T<sub>total</sub>

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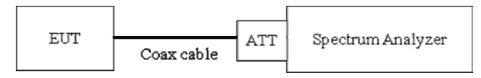
# 8.2 6dB BANDWIDTH (802.11b/g/n)

# Test Requirements and limit, §15.247(a)(2)

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

The minimum permissible 6dB bandwidth is 500 kHz.

# **TEST CONFIGURATION**



#### **TEST PROCEDURE**

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to (Page 5 in KDB 558074, issued 04/09/2013)

RBW = 100 kHz VBW ≥ 3 x RBW Detector = Peak Trace mode = max hold Sweep = auto couple Allow the trace to stabilize

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

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802.11b Mode		Measured Bandwidth	Minimum Bandwidth		
Frequency [MHz]	Channel No.	[MHz]	[MHz]	Pass / Fail	
2412	1	8.078	0.500	Pass	
2437	6	8.105	0.500	Pass	
2462	11	8.119	0.500	Pass	

#### Conducted 6dB Bandwidth Measurements for 802.11b

#### Conducted 6dB Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth	Minimum Bandwidth		
Frequency [MHz]	Channel No.	[MHz]	[MHz]	Pass / Fail	
2412	1	16.43	0.500	Pass	
2437	6	16.45	0.500	Pass	
2462	11	16.44	0.500	Pass	

#### Conducted 6dB Bandwidth Measurements for 802.11n\_20 MHz BW

802.11n Mode		Measured Bandwidth	Minimum Bandwidth		
Frequency [MHz]	Channel No.	[MHz]	[MHz]	Pass / Fail	
2412	1	17.64	0.500	Pass	
2437	6	17.66	0.500	Pass	
2462	11	17.66	0.500	Pass	

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

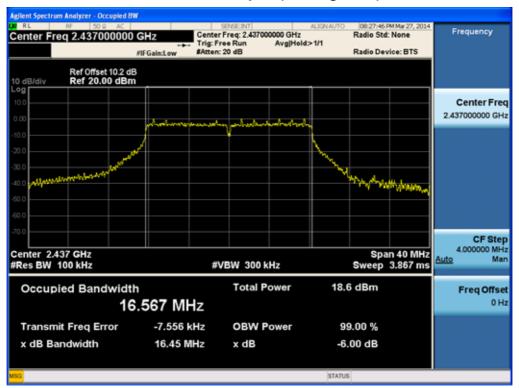
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#### lent Spectrum Analyzer - Occu ied BW RL M Mar 27, 2014 Center Freq: 2.462000000 GHz Trig: Free Run Avg|Hold #Atten: 20 dB Frequency Radio Std: None Center Freq 2.462000000 GHz Avg|Hold: 1/1 Radio Device: BTS #IFGain:Low Ref Offset 10.2 dB Ref 20.00 dBm 10 dB - 09 **Г** Center Freq meny man 2.462000000 GHz manun Mw -CF Step 4.000000 MHz Man Center 2.462 GHz #Res BW 100 kHz Span 40 MHz Sweep 3.867 ms Auto #VBW 300 kHz Occupied Bandwidth Total Power 22.0 dBm Freq Offset 0 Hz 12.873 MHz 19.793 kHz OBW Power Transmit Freq Error 99.00 % x dB Bandwidth 8.119 MHz x dB -6.00 dB Points changed; all traces cleared STATUS

#### 6dB Bandwidth plot (802.11b-CH 11)

6dB Bandwidth plot (802.11g-CH 6)



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Transmi x dB Bar	t Freq Error ndwidth	-7.710   17.66 N		BW Power dB		9.00 % .00 dB		

# 6dB Bandwidth plot (802.11n-CH 11)

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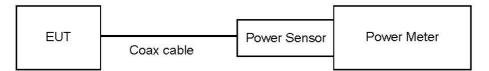
# 8.3 OUTPUT POWER (802.11b/g/n)

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

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

### The maximum permissible conducted output power is 1 Watt.

# **TEST CONFIGURATION**



# **TEST PROCEDURE**

- Peak Power (Procedure 9.1.3 in KDB 558074, issued 04/09/2013)
  - 1. Measure the peak power of the transmitter.
- Average Power ( Procedure 9.2.3.1 in KDB 558074, issued 04/09/2013)
  - 1. Measure the duty cycle.
  - 2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
  - 3. Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

#### Note :

1. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. So, 10.2 dB is offset for 2.4 GHz Band.

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

Band	Frequency(MHz)	Loss(dB)
2.4 GHz	2412	10.21
	2437	10.24
	2462	10.24

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

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# TEST RESULTS-Peak

802.11b	Mode	Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
		1 Mbps	16.24	30
2412	1	2 Mbps	16.39	30
2412	Ĩ	5.5 Mbps	17.77	30
		11 Mbps	19.60	30
	6	1 Mbps	16.97	30
0407		2 Mbps	17.19	30
2437		5.5 Mbps	18.50	30
		11 Mbps	20.34	30
	11	1 Mbps	16.97	30
2462		2 Mbps	17.16	30
		5.5 Mbps	18.37	30
		11 Mbps	20.29	30

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#### Conducted Output Power Measurements (802.11g Mode)

802.11g		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
		6 Mbps	18.80	30
		9 Mbps	18.91	30
		12 Mbps	18.73	30
2412	1	18 Mbps	18.77	30
2412	1	24 Mbps	19.31	30
		36 Mbps	19.18	30
		48 Mbps	19.33	30
		54 Mbps	19.33	30
		6 Mbps	19.63	30
	6	9 Mbps	19.63	30
		12 Mbps	19.46	30
2437		18 Mbps	19.47	30
2437		24 Mbps	20.01	30
		36 Mbps	19.99	30
		48 Mbps	20.03	30
		54 Mbps	20.06	30
		6 Mbps	19.61	30
		9 Mbps	19.65	30
		12 Mbps	19.42	30
2462	11	18 Mbps	19.50	30
	11	24 Mbps	19.99	30
		36 Mbps	19.99	30
		48 Mbps	19.99	30
		54 Mbps	20.07	30

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# Conducted Output Power Measurements (802.11n Mode)

802.11n		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
		6.5 Mbps	18.01	30
		13 Mbps	17.86	30
		19.5 Mbps	17.87	30
0440		26 Mbps	18.35	30
2412	1	39 Mbps	18.36	30
		52 Mbps	18.41	30
		58.5 Mbps	18.43	30
		65 Mbps	18.39	30
		6.5 Mbps	17.91	30
	6	13 Mbps	17.82	30
		19.5 Mbps	17.79	30
2437		26 Mbps	18.28	30
2437		39 Mbps	18.26	30
		52 Mbps	18.33	30
		58.5 Mbps	18.34	30
		65 Mbps	18.27	30
		6.5 Mbps	17.85	30
		13 Mbps	17.70	30
		19.5 Mbps	17.64	30
2462	44	26 Mbps	18.05	30
	11	39 Mbps	18.16	30
		52 Mbps	18.22	30
		58.5 Mbps	18.27	30
		65 Mbps	18.19	30

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# TEST RESULTS-Average

202 11h	802.11b Mode Measured Measured Measured						
Frequency [MHz]	Channel No.	Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Power(dBm) + Duty Cycle Factor	Limit (dBm)	
		1 Mbps	13.69	0.032	13.73	30	
2442		2 Mbps	13.61	0.083	13.69	30	
2412	1	5.5 Mbps	13.51	0.161	13.67	30	
		11 Mbps	13.48	0.320	13.80	30	
	6	1 Mbps	14.49	0.032	14.52	30	
0.407		2 Mbps	14.36	0.083	14.44	30	
2437		5.5 Mbps	14.24	0.161	14.40	30	
		11 Mbps	14.17	0.320	14.49	30	
		1 Mbps	14.43	0.032	14.47	30	
2462	11	2 Mbps	14.30	0.083	14.39	30	
		5.5 Mbps	14.12	0.161	14.28	30	
		11 Mbps	14.06	0.320	14.38	30	

# Conducted Output Power Measurements (802.11b Mode)

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# Conducted Output Power Measurements (802.11g Mode)

802.11g N	Node				Measured	
Frequency [MHz]	Channel No.	Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Power(dBm) + Duty Cycle Factor	Limit (dBm)
		6 Mbps	10.56	0.220	10.78	30
		9 Mbps	10.57	0.340	10.91	30
		12 Mbps	10.51	0.445	10.95	30
2412	1	18 Mbps	10.36	0.619	10.98	30
2412	•	24 Mbps	10.15	0.796	10.95	30
		36 Mbps	9.92	1.145	11.07	30
		48 Mbps	9.56	1.368	10.93	30
		54 Mbps	9.46	1.489	10.95	30
	6	6 Mbps	11.29	0.220	11.51	30
		9 Mbps	11.25	0.340	11.59	30
		12 Mbps	11.20	0.445	11.65	30
2437		18 Mbps	11.04	0.619	11.66	30
2437		24 Mbps	10.84	0.796	11.63	30
		36 Mbps	10.52	1.145	11.67	30
		48 Mbps	10.25	1.368	11.62	30
		54 Mbps	10.09	1.489	11.58	30
		6 Mbps	11.28	0.220	11.50	30
		9 Mbps	11.21	0.340	11.55	30
2462		12 Mbps	11.12	0.445	11.56	30
	11	18 Mbps	10.94	0.619	11.56	30
		24 Mbps	10.80	0.796	11.60	30
		36 Mbps	10.50	1.145	11.65	30
		48 Mbps	10.25	1.368	11.62	30
		54 Mbps	10.13	1.489	11.62	30

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# Conducted Output Power Measurements (802.11n Mode)

802.11n M	Node	•			Measured	
Frequency [MHz]	Channel No.	Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Power(dBm) + Duty Cycle Factor	Limit (dBm)
		6.5 Mbps	9.76	0.255	10.01	30
		13 Mbps	9.56	0.458	10.02	30
		19.5 Mbps	9.40	0.699	10.10	30
2412	1	26 Mbps	9.18	0.814	10.00	30
2412	•	39 Mbps	8.92	1.210	10.13	30
		52 Mbps	8.65	1.513	10.16	30
		58.5 Mbps	8.50	1.642	10.14	30
		65 Mbps	8.42	1.650	10.07	30
		6.5 Mbps	9.60	0.255	9.86	30
	6	13 Mbps	9.40	0.458	9.86	30
		19.5 Mbps	9.25	0.699	9.95	30
2437		26 Mbps	9.09	0.814	9.90	30
2437		39 Mbps	8.78	1.210	9.99	30
		52 Mbps	8.46	1.513	9.97	30
		58.5 Mbps	8.32	1.642	9.96	30
		65 Mbps	8.26	1.650	9.92	30
		6.5 Mbps	9.45	0.255	9.71	30
		13 Mbps	9.29	0.458	9.75	30
		19.5 Mbps	9.16	0.699	9.86	30
2462		26 Mbps	9.03	0.814	9.85	30
	11	39 Mbps	8.67	1.210	9.88	30
		52 Mbps	8.37	1.513	9.88	30
		58.5 Mbps	8.27	1.642	9.91	30
		65 Mbps	8.12	1.650	9.77	30

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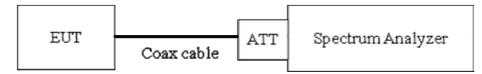
# 8.4 POWER SPECTRAL DENSITY (802.11b/g/n)

### Test Requirements and limit, §15.247(e)

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

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

# **TEST CONFIGURATION**



# **TEST PROCEDURE**

We tested according to Procedure 10.2 in KDB 558074, issued 04/09/2013

The spectrum analyzer is set to :

Set analyzer center frequency to DTS channel center frequency.

Span = 1.5 times the DTS channel bandwidth.

 $RBW = 3 kHz \le RBW \le 100 kHz.$ 

VBW  $\geq$  3 x RBW.

Sweep = auto couple

Detector = peak

Trace Mode = max hold

Allow trace to fully stabilize.

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

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

#### **Sample Calculation**

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

Output Power = -5 dBm + 10 dB + 0.8 dB = 5.8 dBm

Note :

- 1. Spectrum reading values are not plot data. The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
- 2. Spectrum offset = Attenuator loss + Cable loss
- 3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. So, 10.2 dB is offset for 2.4 GHz Band.

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

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Band Frequency(MHz)		Loss(dB)
	2412	10.21
2.4 GHz	2437	10.24
	2462	10.24

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

#### **TEST RESULTS**

Frequency	Eregueney Chennel		Test Result			
(MHz)	Frequency Channel (MHz) No.	Mode	PSD (dBm)	Limit (dBm)	Pass/Fail	
2412	1		-8.793	8	Pass	
2437	6	802.11b	-8.292	8	Pass	
2462	11		-8.564	8	Pass	
2412	1		-14.656	8	Pass	
2437	6	802.11g	-13.954	8	Pass	
2462	11		-13.825	8	Pass	
2412	1		-15.988	8	Pass	
2437	6	802.11n	-16.148	8	Pass	
2462	11		-16.436	8	Pass	

#### **Conducted Power Density Measurements**

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

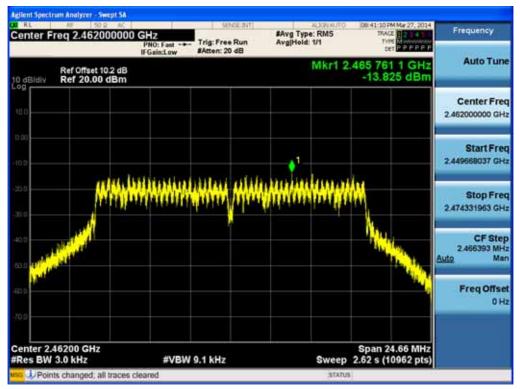
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Center Freg 2.43700000	CHA	SENGLINT]	#Avg Type: RMS	07:53:57 PM Mar 27, 2014 TRACE 02000	Frequency
enter Fred 2.43700000	PNO: Wide IFGain:Low	Trig: Free Run #Atten: 20 dB	Avg Hold: 1/1	type Munumun tet P P F P P P	
Ref Offset 10.2 dB			Mkr1 2	.437 301 6 GHz -8.292 dBm	Auto Tuni
100					Center Fre 2.437000000 GH
10.00					Start Fre 2.430921274 GH
					Stop Fre 2.443078726 GH
40.0					CF Ste 1.215745 MH Auto Ma
£0,					Freq Offse 0 H
70.0 Center 2.437000 GHz				Span 12.16 MHz	
Res BW 3.0 kHz	#VBW	9.1 kHz	Sweep	1.29 s (5403 pts)	

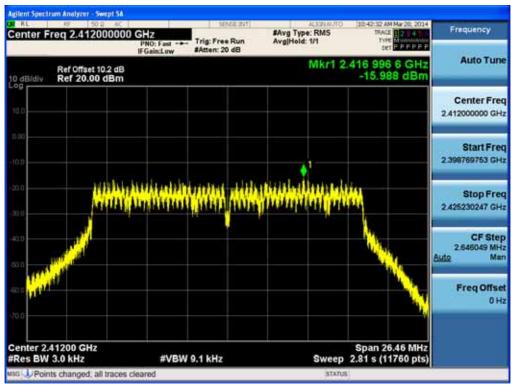
#### Power Spectral Density (802.11b-CH 6)

#### Power Spectral Density (802.11g-CH 11)



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#### Power Spectral Density (802.11n-CH 1)

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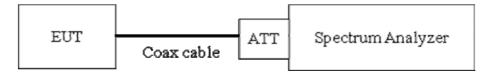


# 8.5 OUT OF BAND EMISSIONS AT THE BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS Test Requirements and limit, §15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. 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 § 15.205(c)).

#### Limit : 20 dBc

#### **TEST CONFIGURATION**



#### **TEST PROCEDURE**

The transmitter output is connected to the spectrum analyzer. (Procedure 11.0 in KDB 558074, issued 04/09/2013)

RBW = 100 kHz

VBW ≥ 3 x RBW

Set span to encompass the spectrum to be examined

Detector = Peak

Trace Mode = max hold

Sweep time = auto couple

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

Allow trace to fully stabilize.

Use peak marker function to determine the maximum amplitude level.

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

Note :

- 1. The band edge results in plot is already including the actual values of loss for the attenuator and cable combination.
- 2. Spectrum offset = Attenuator loss + Cable loss
- 3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. So, 10.2 dB is

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offset for 2.4 GHz Band. Actual value of loss for the attenuator and cable combination is below table.

Band	Frequency(MHz)	Loss(dB)
	2412	10.21
2.4 GHz	2437	10.24
	2462	10.24

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

4. In case of conducted spurious emissions test, please check factors blow table.

5. In order to simplify the report, attached plots were only the worst case channel.

Freq(MHz)	Factor(dB)
30	9.95
100	10.01
200	10.03
300	10.04
400	10.05
500	10.04
600	10.03
700	10.09
800	10.10
900	10.08
1000	10.11
2000	10.25
2400*	10.19
2500*	10.26
3000	10.27
4000	10.22
5000	10.48
5700*	10.42
5800*	10.48
6000	10.48
7000	10.57
8000	10.45
9000	10.50
10000	10.64
11000	10.69
12000	10.75

#### FACTORS FOR FREQUENCY

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10.92
11.90
11.00
11.03
10.93
10.96
10.85
12.11
11.17
10.99
11.12
11.10
11.42

Note : 1. '\*' is fundamental frequency range.

2. Factor = Cable loss + Attenuator loss

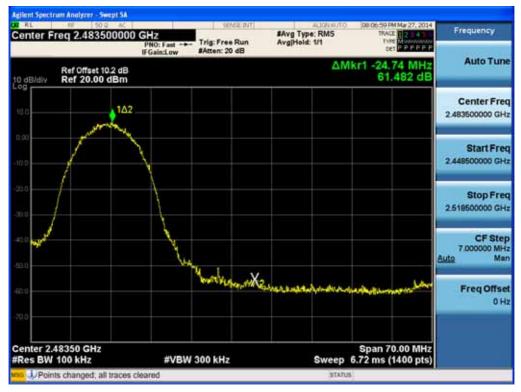
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#### BandEdge (802.11b-CH1)

#### BandEdge (802.11b-CH11)



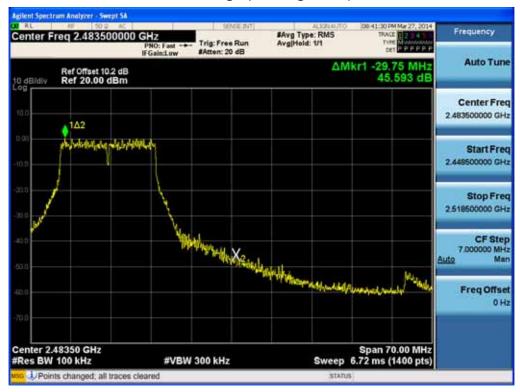
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#### nt Spectrum Analyzer - Swept SA RL Frequency #Avg Type: RMS Avg|Hold: 1/1 Center Freq 2.400000000 GHz PNO: Fast ++-IFGain:Low #Atten: 20 dB tet PPPPP Auto Tune ΔMkr1 17.84 MHz 32.938 dB Ref Offset 10.2 dB Ref 20.00 dBm 10 dB/div Center Freq 2.40000000 GHz ndentisianian palastas Start Freq 2.375000000 GHz Stop Freq 2.425000000 GHz a former of the tradition of the second CF Step 5.000000 MHz Man Auto **Freq Offset** 0 Hz Span 50.00 MHz Sweep 4.80 ms (1000 pts) Center 2.40000 GHz #Res BW 100 kHz #VBW 300 kHz Points changed, all traces cleared

# BandEdge (802.11g-CH1)

#### BandEdge (802.11g-CH11)



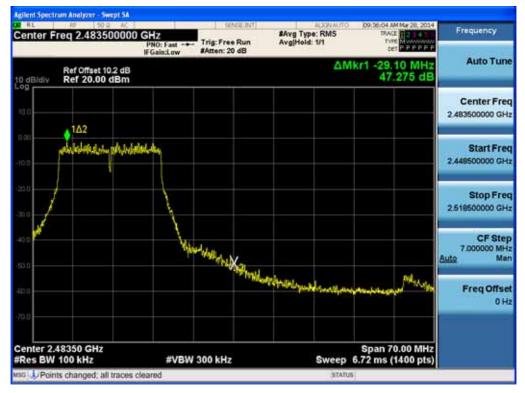
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# Band Edge (802.11n-CH1)



#### Band Edge (802.11n-CH11)



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#### gilent Spectrum Analyzer - Swept SA Center Freq 515.000000 MHz PNO: Fast +++ IFGain:Low Atten: 20 dB 54 AM Mar 28, 2014 Frequency #Avg Type: RMS Avg[Hold: 1/1 type North PPEPPP Auto Tune Mkr1 694.14 MHz -59.010 dBm Ref Offset 10.2 dB Ref 20.00 dBm to dB/di Center Freq 515.000000 MHz Start Freq 30.000000 MHz Stop Freq 1.00000000 GHz CF Step 97.000000 MHz to Man Auto 1 ¢ **Freq Offset** 0 Hz Stop 1.0000 GHz Sweep 93.3 ms (20000 pts) Start 30.0 MHz #Res BW 100 kHz #VBW 300 kHz Uppoints changed; all traces cleared

#### Conducted Spurious Emission (802.11b\_Ch.6\_11 Mbps)

#### 1 GHz ~ 3 GHz

Center Freg 2.000000000	CHA	SENGE INT	#Avg Type: R		9:37:40 AM1 TRACE	Gr 20, 2014	Frequency
enter Freq 2.00000000	PNO: Fast Tr	ig: Free Run ten: 20 dB	Avg Hold: 1/1		TYPE	PFPPP	distance of the
Ref Offset 10.2 dB				Mkr1 2	.660 7 -56.418		Auto Tune
100							Center Free 2.000000000 GH
10.0						140 de-	Start Free 1.000000000 GH
20 0							Stop Fre 3.000000000 GH
40.0							CF Ste 200.000000 MH Auto Ma
and the second s							Freq Offse 0 H
700 Start 1.000 GHz Res BW 100 kHz	#VBW 30			veep 192	Stop 3.0	00 GHz	

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2 RL NF 50.2 AC		SPACINT	OTLANDER	09:38:08 AM Mar 28, 2014	
Center Freq 4.00000000	PNO: Fast ++- IFGain:Low	Trig: Free Run Atten: 20 dB	#Avg Type: RMS Avg[Hold: 1/1	TRACE 2 14 3	Frequency
Ref Offset 10.2 dB			Mki	1 3.257 45 GHz -57.798 dBm	Auto Tune
10.0					Center Freq 4.00000000 GHz
10.0					Start Freq 3.000000000 GHz
310					Stop Freq 5.00000000 GHz
40.0					CF Step 200.000000 MHz <u>Auto</u> Man
in a subdition of the second second second		and the second		A second second second second second	Freq Offset 0 Hz
Start 3.000 GHz #Res BW 100 kHz	#VBW 3	300 kHz	Sweep	Stop 5.000 GHz 192 ms (40001 pts)	

#### 5 GHz ~ 7 GHz

Center F	req 6.00000000	PN0: Fast	Trig: Free Run Atten: 20 dB	#Avg Type: RMS Avg[Held: 1/1		Frequency
0 dB/div	Ref Offset 10.2 dB Ref 20.00 dBm				4kr1 5.476 45 GHz -57.150 dBm	Auto Tune
10.0						Center Free 6.000000000 GH
10.9					-14 B7 alt=	Start Fre 5.000000000 GH
200 200						Stop Fre 7.000000000 GH
10.0 53.0		_				CF Ste 200.000000 MH <u>Auto</u> Ma
1110 AND 110						Freq Offse 0 H
tart 5.00 Res BW		#VB\	V 300 kHz	Swe	Stop 7.000 GHz p 192 ms (40001 pts)	

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Center Freq 8.00000000 GHz	SEMELENT	#Avg Type: RMS	09:38:36 AM Mar 28, 2014 TRACE	Frequency
PN0: Faintler FGaintle		AvgiHold: 1/1	type Monorodow tet P P F P P P	
Ref Offset 10.2 dB		Mkr	1 7.538 55 GHz -57.954 dBm	Auto Tune
10.0				Center Fred 8.000000000 GHz
0.0			3100	Start Free 7.000000000 GH
50				Stop Free 9.000000000 GH
0.0				CF Step 200.000000 MH Auto Mar
				Freq Offset 0 Hb
70.0 Start 7.000 GHz #Res BW 100 kHz #	VBW 300 kHz		Stop 9.000 GHz 92 ms (40001 pts)	

#### 9 GHz ~ 11 GHz

enter Freq 10.00000000	PN0: Fast +++ Trig: Free Run	#Avg Type: RMS Avg[Hold: 1/1	09:30:50 AM Mar 20, 2014 TRACE 2 4 4 TWE MULTINE CONTRACT 2014	Frequency
Ref Offset 10.2 dB 0 dB/div Ref 20.00 dBm	IFGain:Low Atten: 20 dB		10.580 25 GHz -58.651 dBm	Auto Tune
				Center Free 10.000000000 GH
100 			14 87 des	Start Fre 9.000000000 GH
no				Stop Fre 11.000000000 GH
80.0				CF Ste 200.000000 MH Auto Ma
	a nga ngang sang sang sang sang sang san		a All and the speed sector The same of the sector sector	Freq Offse 0 H
tart 9.000 GHz Res BW 100 kHz	#VBW 300 kHz	Sweep	Stop 11.000 GHz 92 ms (40001 pts)	

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RL NF 502 AC		SENSEINT	OTLANDER	09:39:04 AM Mar 20, 2014	-
Center Freq 12.0000000	PNO: Fast	Trig: Free Run Atten: 20 dB	#Avg Type: RMS Avg Held: 1/1	TRACE 2 4	Frequency
to dB/div Ref 20.00 dBm			Mkr1	11.964 55 GHz -57.407 dBm	Auto Tune
10.0					Center Freq 12.000000000 GHz
10.0				14 87 des	Start Freq 11.000000000 GHz
330					Stop Freq 13.000000000 GHz
42.7					CF Step 200.000000 MHz Auto Man
				ten fi förstar förstär klassen Storagen stör förstandet som	Freq Offset 0 Hz
Start 11.000 GHz #Res BW 100 kHz	#VBW 3	100 kHz	Sween	Stop 13.000 GHz 92 ms (40001 pts)	

#### 13 GHz ~ 15 GHz

	Frequency	09:39:18 AM Mar 20; 2014	OTUNINCIA		SENGE INT		NF: 50-Q AC	RL
100 dB/dl/v     Ref 20.00 dBm     -55.944 dBm       100	decent of the second	TYPE MUNICIPAL E	/pe: KM5 ld: 1/1	Avg		PNO: Fast +++	14.000000000	enter Fr
	Auto Tune	14.934 90 GHz -55.944 dBm	Mkr1				ef Offset 10.2 dB ef 20.00 dBm	0 dB/div
	Center Fred 14.000000000 GH;							
2010	Start Fred 13.00000000 GH;	-14 <u>1</u> 7 dp-						
	Stop Free 15.000000000 GH							
	CF Step 200.000000 MH Auto Mar							
	Freq Offse 0 H	a para ng mang ng mangang ng mang ng m Ng mang ng mang	int of district Indiana	and book	da Matanan Kasaran	in a literation in the second	and the second second	STOCK!
Start 13.000 GHz Stop 15.000 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 192 ms (40001 pts)		Stop 15.000 GHz 92 ms (40001 pts)	Sweep 1		00 kHz	#VBW 3		Start 13.0

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RL #F 50.2 MC			09:39:32 AM Mar 20, 2014	Frequency
	2 5: Fast Trig: Free Run in:Low Atten: 20 dB	#Avg Type: RM5 Avg Hold: 1/1	TRACE	in the second second
Ref Offset 10.2 dB		Mkr1	16.812 35 GHz -53.917 dBm	Auto Tune
100				Center Freq 16.00000000 GHz
10.9			148° 45-	Start Freq 15.00000000 GHz
30.0				Stop Freq 17.000000000 GHz
40.0			1	CF Step 200.000000 MHz Auto Man
		an de historie de historie Angele an de historie de historie Angele an de historie de h		Freq Offset 0 Hz
Start 15.000 GHz #Res BW 100 kHz	#VBW 300 kHz	Sween	Stop 17.000 GHz 192 ms (40001 pts)	

#### 17 GHz ~ 19 GHz

Center F	req 18.00000000	0 GHz	SENGLINT]	#Avg Type: RMS	TRACE DESIGN	Frequency
		PNO: Fast	Trig: Free Run Atten: 20 dB	Avg Hold: 1/1	type A	<ul> <li>Contraction of the second secon</li></ul>
0 dB/div	Ref Offset 10.2 dB Ref 20.00 dBm			Mk	r1 18.596 70 GH: -54.760 dBn	
10.0						Center Free 18.00000000 GH
10.0					-1487.48	Start Fre 17.000000000 GH
2010						Stop Fre 19.00000000 GH
40.0 50.0					1	CF Ste 200.000000 MH Auto Ma
and <mark>Havis</mark> 172.0	ling a side of definition Name and a side of the same		naisekunistisa ike, kuna Netera Protestana ang		entron e la teleficie Anteres i presenta d'in	Freq Offse 0 H
art 17.0	000 GHz 100 kHz	#VBW	300 kHz	Sweet	Stop 19.000 GH 192 ms (40001 pts	

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	rum Analyzer - Swept SA					
Center F	req 20.00000000	0 GHz PNO: Fast	Trig: Free Run Atten: 20 dB	#Avg Type: RMS Avg Hold: 1/1	09-40:00 AM Mw 28, 2014 TRACE 2 2 4 4 TYPE MOTO tet P P F P P P	Frequency
t0 dB/div	Ref Offset 10.2 dB Ref 20.00 dBm	a dame da		Mkr	20.841 75 GHz -52.698 dBm	Auto Tune
100						Center Freq 20.000000000 GHz
-10.0						Start Freq 19.00000000 GHz
-200						Stop Freq 21.00000000 GHz
-40.0					61	CF Step 200.000000 MHz Auto Man
-02 () -70 ()	n an dir si china di shi shi shi shi shi shi shi shi shi sh	handinatorni da Isponistva – stela	te en estadour anti-			Freq Offset 0 Hz
Start 19.0 #Res BW		#VBW	300 kHz	Sweep	Stop 21.000 GHz 192 ms (40001 pts)	
ust Poin	ts changed; all traces of	cleared		STATU		

## Conducted Spurious Emission (802.11b\_Ch.6\_11 Mbps)

#### 21 GHz ~ 23 GHz

#### Conducted Spurious Emission (802.11b\_Ch.6\_11 Mbps)

	req 22.000000	PNO: Fast +++	rig: Free Run Atten: 20 dB	#Avg Type: RMS Avg Hold: 1/1	0 09:40:14 AM My 20, 2014 TRACE 2 4 5 TYPE NYME NYME AND AND A	Frequency
0 dB/div	Ref Offset 10.2 dB Ref 20.00 dBm			Mkr	1 21.722 60 GHz -50.695 dBm	Auto Tune
100						Center Free 22.000000000 GH
10.0					3497 das	Start Free 21.00000000 GH
200						Stop Free 23.00000000 GH
40.0		• <sup>1</sup>		Constructed Station		CF Step 200.000000 MH Auto Mar
60.0 <mark>- 19.000 70.0 </mark>	Sector (Constraint) Sector (Constraint)			A DE LA CALCELLA DE L		Freq Offse 0 H
Start 21.0 Res BW		#VBW 3	00 kHz	Sweep	Stop 23.000 GHz 192 ms (40001 pts)	

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#### Igilent Spectrum Analyzer - Swept SA 09:40:28 AM My 28, 2014 94/42 8 20 4 1/1/2 8 4 RL Center Freq 24.00000000 GHz PRO: Fast +++ IFGain:Low Frequency #Avg Type: RMS Avg|Hold: 1/1 Auto Tune Mkr1 24.882 05 GHz -50.000 dBm Ref Offset 10.2 dB Ref 20.00 dBm t0 dB/div Center Freq 24.00000000 GHz Start Freq 23.00000000 GHz Stop Freq 25.00000000 GHz CF Step 200.000000 MHz to Man 0 Auto Freq Offset 0 Hz Stop 25.000 GHz Sweep 192 ms (40001 pts) Start 23.000 GHz #Res BW 100 kHz #VBW 300 kHz st 🜙 Points changed; all traces cleared

#### Conducted Spurious Emission (802.11b\_Ch.6\_11 Mbps)

FCC PT.15.247 TEST REPORT		www.hct.co.kr				
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# 8.6 RADIATED MEASUREMENT. 8.6.1 RADIATED SPURIOUS EMISSIONS.

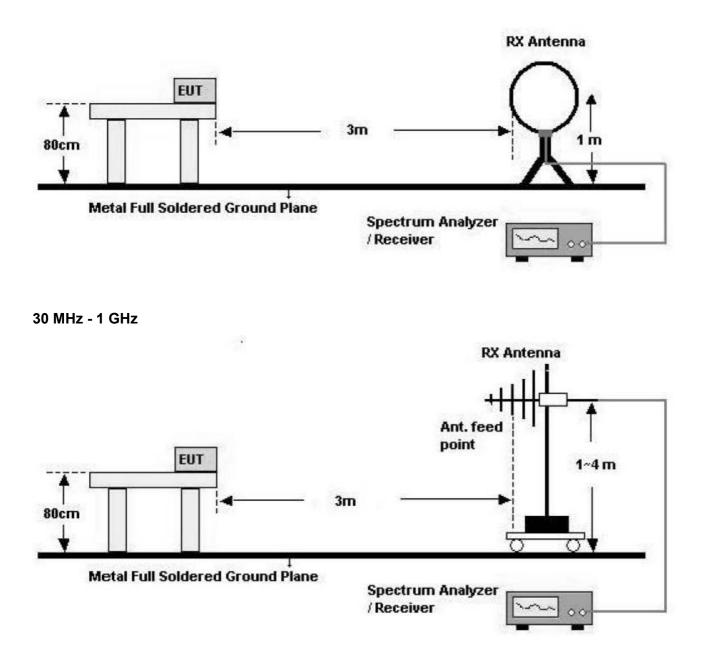
Test Requirements and limit, §15.205, §15.209

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

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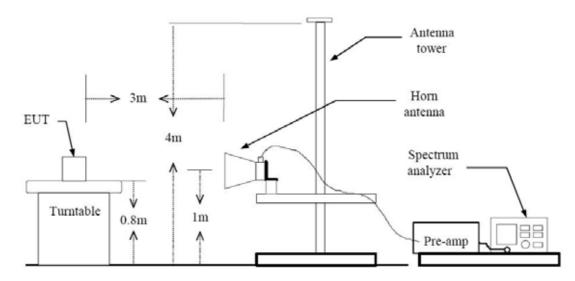


#### Below 30 MHz



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#### **TEST PROCEDURE USED**

Method 12.1 in KDB 558074, issued 04/09/2013

Spectrum Setting

- Peak

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

RBW = cf. Table 1.

VBW  $\geq$  3 x RBW.

Detector = Peak.

Sweep time = auto.

Trace mode = max hold.

Allow sweeps to continue until the trace stabilizes.

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

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

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- Average Set RBW = 1 MHz

Set VBW  $\geq$  1/T.( at least 100 times less than the resolution bandwidth, but no less than 10 Hz.) Select spectrum analyzer linear display mode.

Detector = Peak.

Sweep time = auto.

Trace mode = max hold.

#### Note :

- 1. We are performed the RSE and radiated band edge using standard radiated method.
- 2. The actual setting value of VBW for 802.11 b/g/n  $\,$

Mode	Worst Data rate (Mbps)	T <sub>on</sub> (ms)	T <sub>total</sub> (ms)	Duty Cycle (%)	VBW(1/T) (Hz)	The actual setting value of VBW (Hz)
b	1	12.210	12.300	99.268	82	1000
g	6	2.019	2.124	95.056	495	1000
n	6.5	1.868	1.981	94.296	535	1000

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	÷				



#### 9 kHz – 30MHz

#### Operation Mode: Normal Mode

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

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

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#### Below 1 GHz

#### Operation Mode: Normal Mode

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

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

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

Frequency	Reading	AN.+CL-AMP G	ANT. POL	Total	Limit	Margin	
[MHz]	dBuV	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Detect
4824	54.34	-4.25	V	50.09	73.98	23.89	PK
4824	45.83	-4.25	V	41.58	53.98	12.40	AV
7236	52.68	5.21	V	57.89	73.98	16.09	PK
7236	38.10	5.21	V	43.31	53.98	10.67	AV
4824	53.73	-4.25	Н	49.48	73.98	24.50	PK
4824	43.50	-4.25	Н	39.25	53.98	14.73	AV
7236	52.02	5.21	Н	57.23	73.98	16.75	PK
7236	37.99	5.21	Н	43.20	53.98	10.78	AV

Operation Mode: Transfer Rate: Operating Frequency Channel No.

802.11 g	
6 Mbps	
2412	
01 Ch	

Frequency	Reading	AN.+CL-AMP G	ANT. POL	Total	Limit	Margin	
[MHz]	dBuV	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Detect
4824	52.58	-4.25	V	48.33	73.98	25.65	PK
4824	38.70	-4.25	V	34.45	53.98	19.53	AV
7236	52.64	5.21	V	57.85	73.98	16.13	PK
7236	38.11	5.21	V	43.32	53.98	10.66	AV
4824	52.17	-4.25	Н	47.92	73.98	26.06	PK
4824	38.33	-4.25	Н	34.08	53.98	19.90	AV
7236	51.69	5.21	Н	56.90	73.98	17.08	PK
7236	38.02	5.21	Н	43.23	53.98	10.75	AV

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Operation Mode:	802.11 n
Transfer Rate:	6.5 Mbps
Operating Frequency	2412
Channel No.	01 Ch

Frequency	Reading	AN.+CL-AMP G	ANT. POL	Total	Limit	Margin	
[MHz]	dBuV	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Detect
4824	53.05	-4.25	V	48.80	73.98	25.18	PK
4824	38.53	-4.25	V	34.28	53.98	19.70	AV
7236	52.34	5.21	V	57.55	73.98	16.43	PK
7236	38.10	5.21	V	43.31	53.98	10.67	AV
4824	52.15	-4.25	Н	47.90	73.98	26.08	PK
4824	38.31	-4.25	Н	34.06	53.98	19.92	AV
7236	51.86	5.21	Н	57.07	73.98	16.91	PK
7236	38.09	5.21	Н	43.30	53.98	10.68	AV

#### Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

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

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

Frequency	Reading	AN.+CL-AMP G	ANT. POL	Total	Limit	Margin	
[MHz]	dBuV	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Detect
4874	54.19	-3.93	V	50.26	73.98	23.72	PK
4874	45.29	-3.93	V	41.36	53.98	12.62	AV
7311	51.90	4.97	V	56.87	73.98	17.11	PK
7311	38.12	4.97	V	43.09	53.98	10.89	AV
4874	52.57	-3.93	Н	48.64	73.98	25.34	PK
4874	41.46	-3.93	Н	37.53	53.98	16.45	AV
7311	51.84	4.97	Н	56.81	73.98	17.17	PK
7311	38.09	4.97	Н	43.06	53.98	10.92	AV

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

Frequency	Reading	AN.+CL-AMP G	ANT. POL	Total	Limit	Margin	
[MHz]	dBuV	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Detect
4874	52.16	-3.93	V	48.23	73.98	25.75	PK
4874	37.93	-3.93	V	34.00	53.98	19.98	AV
7311	51.85	4.97	V	56.82	73.98	17.16	PK
7311	38.14	4.97	V	43.11	53.98	10.87	AV
4874	51.68	-3.93	Н	47.75	73.98	26.23	PK
4874	37.89	-3.93	Н	33.96	53.98	20.02	AV
7311	51.65	4.97	Н	56.62	73.98	17.36	PK
7311	38.12	4.97	Н	43.09	53.98	10.89	AV

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Operation Mode:	802.11 n
Transfer Rate:	6.5 Mbps
Operating Frequency	2437
Channel No.	06 Ch

Frequency	Reading	AN.+CL-AMP G	ANT. POL	Total	Limit	Margin	
[MHz]	dBuV	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Detect
4874	51.96	-3.93	V	48.03	73.98	25.95	PK
4874	37.83	-3.93	V	33.90	53.98	20.08	AV
7311	52.32	4.97	V	57.29	73.98	16.69	PK
7311	38.17	4.97	V	43.14	53.98	10.84	AV
4874	51.77	-3.93	Н	47.84	73.98	26.14	PK
4874	37.77	-3.93	Н	33.84	53.98	20.14	AV
7311	51.83	4.97	Н	56.80	73.98	17.18	PK
7311	38.09	4.97	Н	43.06	53.98	10.92	AV

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

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

Frequency	Reading	AN.+CL-AMP G	ANT. POL	Total	Limit	Margin	
[MHz]	dBuV	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Detect
4924	51.23	-3.75	V	47.48	73.98	26.50	PK
4924	37.61	-3.75	V	33.86	53.98	20.12	AV
7386	52.40	5.60	V	58.00	73.98	15.98	PK
7386	38.76	5.60	V	44.36	53.98	9.62	AV
4924	51.78	-3.75	Н	48.03	73.98	25.95	PK
4924	37.84	-3.75	Н	34.09	53.98	19.89	AV
7386	52.37	5.60	Н	57.97	73.98	16.01	PK
7386	38.63	5.60	Н	44.23	53.98	9.75	AV

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

Frequency	Reading	AN.+CL-AMP G	ANT. POL	Total	Limit	Margin	
[MHz]	dBuV	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Detect
4924	51.50	-3.75	V	47.75	73.98	26.23	PK
4924	37.66	-3.75	V	33.91	53.98	20.07	AV
7386	52.55	5.60	V	58.15	73.98	15.83	PK
7386	38.68	5.60	V	44.28	53.98	9.70	AV
4924	51.32	-3.75	Н	47.57	73.98	26.41	PK
4924	37.62	-3.75	Н	33.87	53.98	20.11	AV
7386	52.28	5.60	Н	57.88	73.98	16.10	PK
7386	38.66	5.60	Н	44.26	53.98	9.72	AV

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Operation Mode:	802.11 n	
Transfer Rate:	6.5 Mbps	
Operating Frequency	2462	
Channel No.	11 Ch	

Frequency	Reading	AN.+CL-AMP G	ANT. POL	Total	Limit	Margin	
[MHz]	dBuV	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Detect
4924	51.25	-3.75	V	47.50	73.98	26.48	PK
4924	37.60	-3.75	V	33.85	53.98	20.13	AV
7386	52.51	5.60	V	58.11	73.98	15.87	PK
7386	38.69	5.60	V	44.29	53.98	9.69	AV
4924	51.06	-3.75	Н	47.31	73.98	26.67	PK
4924	37.55	-3.75	Н	33.80	53.98	20.18	AV
7386	52.44	5.60	Н	58.04	73.98	15.94	PK
7386	38.65	5.60	Н	44.25	53.98	9.73	AV

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

FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT	www.hct.co.kr
Test Report No.	Date of Issue:	EUT Type:	FCC ID:
HCT-R-1404-F004	April 02, 2014	GSM/WCDMA Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), VoIP, Hotspot support	ZNFD380
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#### 8.6.2 RADIATED RESTRICTED BAND EDGES

#### Test Requirements and limit, §15.247(d) §15.205, §15.209

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a) (See section 15.205(c)).

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

Frequency	Reading	AN.+CL	ANT. POL	Total	Limit	Margin	
[MHz]	dBuV	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Detect
2390.0	24.94	33.90	Н	58.84	73.98	15.14	PK
2390.0	11.78	33.90	Н	45.68	53.98	8.30	AV
2390.0	24.63	33.90	V	58.53	73.98	15.45	PK
2390.0	11.70	33.90	V	45.60	53.98	8.38	AV
2483.5	29.13	33.99	Н	63.12	73.98	10.86	PK
2483.5	12.22	33.99	Н	46.21	53.98	7.77	AV
2483.5	25.01	33.99	V	59.00	73.98	14.98	PK
2483.5	11.52	33.99	V	45.51	53.98	8.47	AV

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Test Report No.	Date of Issue:	EUT Type:	FCC ID:
HCT-R-1404-F004	April 02, 2014	GSM/WCDMA Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), VoIP, Hotspot support	ZNFD380



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

Frequency	Reading	AN.+CL	ANT. POL	Total	Limit	Margin	
[MHz]	dBuV	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Detect
2390.0	25.01	33.90	Н	58.91	73.98	15.07	PK
2390.0	11.64	33.90	Н	45.54	53.98	8.44	AV
2390.0	24.93	33.90	V	58.83	73.98	15.15	PK
2390.0	11.68	33.90	V	45.58	53.98	8.40	AV
2483.5	24.74	33.99	Н	58.73	73.98	15.25	PK
2483.5	11.49	33.99	Н	45.48	53.98	8.50	AV
2483.5	25.63	33.99	V	59.62	73.98	14.36	PK
2483.5	11.43	33.99	V	45.42	53.98	8.56	AV

Operation Mode: Transfer Rate: Operating Frequency Channel No. 802.11n 6.5 Mbps 2412 MHz, 2462 MHz 01 Ch, 11 Ch

Frequency	Reading	AN.+CL	ANT. POL	Total	Limit	Margin	
[MHz]	dBuV	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Detect
2390.0	24.93	33.90	Н	58.83	73.98	15.15	PK
2390.0	11.77	33.90	Н	45.67	53.98	8.31	AV
2390.0	24.67	33.90	V	58.57	73.98	15.41	PK
2390.0	11.75	33.90	V	45.65	53.98	8.33	AV
2483.5	28.13	33.99	Н	62.12	73.98	11.86	PK
2483.5	12.39	33.99	Н	46.38	53.98	7.60	AV
2483.5	25.00	33.99	V	58.99	73.98	14.99	PK
2483.5	11.39	33.99	V	45.38	53.98	8.60	AV

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

FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		
Test Report No. HCT-R-1404-F004	Date of Issue: April 02, 2014	EUT Type: GSM/WCDMA Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), VoIP, Hotspot support	FCC ID: ZNFD380	
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### **8.7 POWERLINE CONDUCTED EMISSIONS**

### Test Requirements and limit, §15.207

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

	Limits (dBµV)			
Frequency Range (MHz)	Quasi-peak	Average		
0.15 to 0.50	66 to 56	56 to 46		
0.50 to 5	56	46		
5 to 30	60	50		

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

#### **Test Configuration**

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

#### **TEST PROCEDURE**

- 1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
- 2. The EUT is connected via LISN to a test power supply.
- 3. The measurement results are obtained as described below:
- 4. Detectors Quasi Peak and Average Detector.
- 5. We are performed the AC Power Line Conducted Emission test for 11 Mbps, Ch.6 and 802.11b. Because 802.11b mode is worst case.

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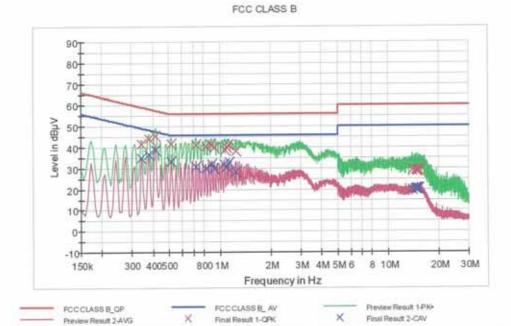


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# HCT TEST Report

#### **Common Information**

EUT: Manufacturer: Test Site: Operating Conditions: Operator Name: LG-D380 LG SHIELD ROOM WLAN MODE JC SHIN



#### **Final Result 1**

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.343500	41.7	9.000	Off	L1	9.7	17.4	59.1
0.379500	44.4	9.000	Off	L1	9.7	13.9	58,3
0,415500	45.6	9.000	110	L1	9.7	11.9	57.5
0.513500	41.9	9.000	Off	L1	9.8	14.1	56.0
0.720500	41.3	9,000	Off	L1	9.8	14.7	56.0
0.828500	40.3	9.000	Off	L1	9.8	15.7	56.0
0,891500	41.3	9.000	Off	L1	9.8	14.7	56.0
0.932000	40.2	9.000	Off	L1	9.8	15.8	56.0
1.071500	38.8	9.000	Off	L1	9.8	17,2	56.0
1,103000	40.1	9.000	Off	L1	9,8	15.9	56.0
1,130000	41.5	9.000	Off	L1	9.8	14.5	56.0
1.242500	38.4	9,000	Off	L1	9.8	17.6	56.0
13.815500	29.0	9,000	Off	L1	10.6	31.0	60.0
14,544500	29.1	9.000	Off	L1	10.7	30.9	60.0
14.697500	29.3	9.000	Off	L1	10.7	30.7	60.0
14,891000	29.0	9,000	Off	L1	10.7	31.0	60.0

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HCT-R-1404-F004	April 02, 2014	GSM/WCDMA Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), VoIP, Hotspot support	ZNFD380



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
14,940500	28.5	9.000	110	L1	10.7	31.5	60,0
15,260000	28.9	9.000	Off	L1	10.7	31.1	60.0

#### Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.343500	34.8	9,000	011	L1	9.7	14.3	49.1
0.379500	36.8	9,000	tto	L1	9.7	11.5	48,3
0.415500	38.8	9,000	Off	L1	9.7	8.7	47.5
0.518000	33.5	9.000	Off	L1	9,8	12.5	46.0
0.725000	30.8	9,000	Off	L1	9.8	15,2	46.0
0.828500	29.9	9,000	Off	L1	9.8	16.1	46.0
0.896000	31.8	9,000	Off	L1	9.8	14.2	45.0
0.932000	29.9	9,000	Off	L1	9.8	16.1	46.0
1.067000	32.1	9.000	Off	L1	9.8	13.9	46.0
1.103000	30.9	9.000	Off	L1	9.8	15.1	46.0
1.134500	33.0	9,000	Off	L1	9.8	13.0	46.0
1.242500	28.1	9,000	ott	L1	9.8	17.9	46.0
13.815500	19.6	9,000	Off	L1	10.6	30.4	50.0
14.544500	20.2	9.000	110	L1	10.7	29.8	50.0
14.630000	20.3	9,000	Off	L1	10.7	29.7	50.0
14.697500	20.4	9.000	Off	L1	10.7	29.6	50.0
14.940500	20,1	9.000	Off	L1	10.7	29.9	50.0
15.260000	20.1	9,000	Off	L1	10.7	29,9	50.0

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FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT	www.hct.co.kr
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HCT-R-1404-F004	April 02, 2014	GSM/WCDMA Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), VoIP, Hotspot support	ZNFD380
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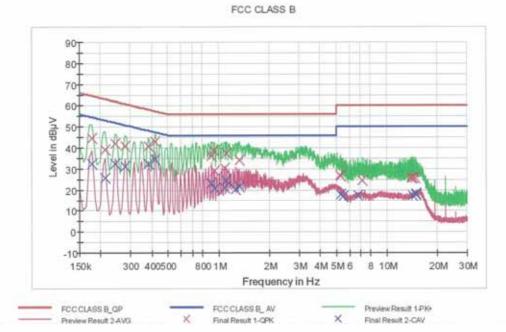


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# **HCT TEST Report**

#### **Common Information**

EUT: Manufacturer: Test Site: Operating Conditions: Operator Name: LG-D380 LG SHIELD ROOM WLAN MODE JC SHIN



#### **Final Result 1**

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.177000	44.7	9.000	Off	N	9.7	19.9	64.6
0.213000	39.2	9,000	Off	N	9.7	23.9	63.1
0.244500	42.1	9.000	Off	N	9.7	19.8	61.9
0.280500	40.7	9.000	Off	N	9.7	20.1	60,8
0.384000	41.0	9.000	011	N	9.8	17.2	58.3
0.420000	42.9	9,000	Off	N	9.8	14.5	57.4
0.909500	36.3	9,000	110	N	9.8	19.7	56,0
0.941000	38.9	9.000	Off	N	9.8	17.1	56.0
0.950000	29.2	9.000	Off	N	9.8	26.8	56.
1.089500	30.3	9.000	Off	N	9.8	25.7	56,0
1.116500	37.4	9.000	Off	N	9.8	18.6	56.
1.328000	34.0	9,000	Off	N	9.8	22.0	56.0
5.243000	27.2	9,000	Off	N	10.1	32.8	60.
5.333000	26.5	9.000	Off	N	10.1	33.5	60.0
7.133000	24.5	9,000	Off	N	10.2	35.5	60.0
13.856000	25.6	9.000	Off	N	10.6	34.4	60.0

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HCT-R-1404-F004	April 02, 2014	GSM/WCDMA Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), VoIP, Hotspot support	ZNFD380



Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
14.279000	25.6	9.000	Off	N	10.6	34.4	60.0
14.621000	25.8	9.000	Off	N	10,6	34.2	60.0

#### **Final Result 2**

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.177000	32.5	9,000	Off	N	9.7	22.1	54.6
0.213000	25.8	9.000	Off	N	9.7	27.3	53.1
0.244500	32.5	9.000	Off	N	9.7	19.4	51.9
0.280500	31.1	9.000	011	N	9.7	19.7	50,8
0.384000	32.6	9,000	Off	N	9.8	15.6	48.2
0.420000	34.4	9.000	Off	N	9.8	13.0	47.4
0.909500	23.0	9.000	Off	N	9.8	23.0	46.0
0.945500	20.8	9.000	0ff	N	9,8	25.2	46.0
1.085000	21.2	9.000	Off	N	9.8	24.8	46.0
1.116500	24.3	9.000	Off	N	9,8	21.7	46.0
1.260500	20.4	9,000	110	N	9.8	25.6	46.0
1.328000	21.5	9.000	110	N	9.8	24.5	46.0
5.333000	17.8	9.000	tto	N	10.1	32.2	50.0
5,495000	17.0	9,000	110	N	10.1	33.0	50.0
6.696500	17.2	9,000	tho	N	10.2	32.8	50.0
14.279000	17.2	9,000	11O	N	10.6	32.8	50.0
14.886500	18.0	9,000	Off	N	10.6	32.0	50.0
14.913500	17.8	9,000	tto	N	10.6	32.2	50.0

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FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT			
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# 9. LIST OF TEST EQUIPMENT 9.1 LIST OF TEST EQUIPMENT(Conducted Test)

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

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### 9.2 LIST OF TEST EQUIPMENT(Radiated Test)

NA	Medal / Emission	Calibration	Calibration	Serial No.	
Manufacturer	Model / Equipment	Interval	Due		
Schwarzbeck	VULB 9160/ TRILOG Antenna	Biennial	12/17/2014	3150	
Rohde & Schwarz	ESCI / EMI TEST RECEIVER	Annual	01/24/2015	100584	
HD	MA240/ Antenna Position Tower	N/A	N/A	556	
EMCO	1050/ Turn Table	N/A	N/A	114	
HD GmbH	HD 100/ Controller	N/A	N/A	13	
HD GmbH	KMS 560/ SlideBar	N/A	N/A	12	
Rohde & Schwarz	SCU-18/ Signal Conditioning Unit	Annual	09/10/2014	10094	
CERNEX	CBL18265035 / POWER AMP	Annual	07/24/2014	22966	
CERNEX	CBL26405040 / POWER AMP	Annual	04/16/2014	19660	
Schwarzbeck	BBHA 9120D/ Horn Antenna	Biennial	07/05/2015	1151	
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	Biennial	10/30/2014	BBHA9170124	
Rohde & Schwarz	FSP / Spectrum Analyzer	Annual	01/24/2015	839117/011	
Wainwright Instrument	WHF3.0/18G-10EF / High Pass Filter	Annual	02/03/2015	F6	
Wainwright Instrument	WHNX6.0/26.5G-6SS / High Pass Filter	Annual	04/16/2014	1	
Wainwright Instrument	WHNX7.0/18G-8SS / High Pass Filter	Annual	04/16/2014	29	
Wainwright Instrument	WRCJ2400/2483.5-2370/2520-60/14SS / Band Reject Filter	Annual	06/24/2014	1	
TESCOM	TC-3000C / BLUETOOTH TESTER	Annual	04/24/2014	3000C000276	
Rohde & Schwarz	CBT / BLUETOOTH TESTER	Annual	04/25/2014	100422	
Rohde & Schwarz	LOOP ANTENNA	Biennial	08/14/2014	100179	
CERNEX	CBL06185030 / POWER AMP	Annual	07/24/2014	22965	
CERNEX	CBLU1183540 / POWER AMP	Annual	07/24/2014	22964	

FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT	www.hct.co.kr
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