



# HCT CO., LTD.

## CERTIFICATE OF COMPLIANCE FCC Certification

<b>Applicant Name:</b> LG Electronics MobileComm U.S.A., Inc.	<b>Date of Issue:</b> April 03, 2014
<b>Address:</b> 1000 Sylvan Avenue, Englewood Cliffs NJ 07632	<b>Test Site/Location:</b> HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majangmyeon, Icheon-si, Gyeonggi-do, Korea
	<b>Report No.:</b> HCT-R-1403-F067-1
	<b>HCT FRN:</b> 0005866421

<b>FCC ID</b>	<b>: ZNFD280N</b>
<b>APPLICANT</b>	<b>: LG Electronics MobileComm U.S.A., Inc.</b>

<b>FCC Model(s):</b>	LG-D280n
<b>Additional FCC Model(s):</b>	LGD280n, D280n
<b>EUT Type:</b>	GSM Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), NFC, VoIP, Hotspot support
<b>RF Output Field Strength</b>	10.54 dBuV/m
<b>Frequency of Operation:</b>	13.56028 MHz
<b>Modulation type</b>	ASK
<b>FCC Classification:</b>	Low Power Communication Device – Transmitter
<b>FCC Rule Part(s):</b>	FCC Part 15.225 Subpart C

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**

This report only responds to the tested sample and may not be reproduced, except in full, without written approval of the HCT Co., Ltd.

<b>FCC PT.15.225 TEST REPORT</b>	<b>FCC CERTIFICATION REPORT</b>		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
<b>Test Report No.</b> HCT-R-1403-F067-1	<b>Date of Issue:</b> April 03, 2014	<b>EUT Type:</b> GSM Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), NFC, VoIP, Hotspot support	<b>FCC ID:</b> ZNFD280N



# Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1403-F067	March 31, 2014	- First Approval Report
HCT-R-1403-F067-1	April 03, 2014	- Retest the frequency tolerance .

<b>FCC PT.15.225 TEST REPORT</b>	<b>FCC CERTIFICATION REPORT</b>		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
<b>Test Report No.</b> HCT-R-1403-F067-1	<b>Date of Issue:</b> April 03, 2014	<b>EUT Type:</b> GSM Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), NFC, VoIP, Hotspot support	<b>FCC ID:</b> ZNFD280N

# Table of Contents

1. GENERAL INFORMATION .....	4
2. EUT DESCRIPTION .....	4
3. TEST METHODOLOGY .....	5
3.1 EUT CONFIGURATION .....	5
3.2 EUT EXERCISE .....	5
3.3 GENERAL TEST PROCEDURES .....	5
3.4 DESCRIPTION OF TEST MODES .....	5
3.5 STANDARDS .....	6
4. INSTRUMENT CALIBRATION.....	7
5. FACILITIES AND ACCREDITATIONS .....	7
5.1 FACILITIES .....	7
5.2 EQUIPMENT .....	7
6. ANTENNA REQUIREMENTS .....	7
7. TEST SUMMARY .....	8
8. RADIATED EMISSION MEASUREMENT .....	9
8.1. RADIATED EMISSION 9 kHz – 30 MHz .....	10
8.2. RADIATED EMISSION 30 MHz – 1000 MHz .....	13
9. EMISSION BANDWIDTH PLOT.....	14
10. FREQUENCY TOLERANCE .....	15
11. POWERLINE CONDUCTE EMISSIONS.....	16
12. LIST OF TEST EQUIPMENT .....	25
12.1. LIST OF TEST EQUIPMENT(Conducted Test) .....	25
12.2. LIST OF TEST EQUIPMENT(Radiated Test).....	26

FCC PT.15.225 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R-1403-F067-1	Date of Issue: April 03, 2014	EUT Type: GSM Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), NFC, VoIP, Hotspot support		FCC ID: ZNFD280N



## 1. GENERAL INFORMATION

**Applicant:** LG Electronics MobileComm U.S.A., Inc.  
**Address:** 1000 Sylvan Avenue, Englewood Cliffs NJ 07632  
**FCC ID:** ZNFD280N  
**EUT Type:** GSM Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz\_HT20), NFC, VoIP, Hotspot support  
**Model name(s):** LG-D280n  
**Additional Model name(s):** LGD280n, D280n  
**Date(s) of Tests:** February 21, 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)  
**Applicant:** LG Electronics MobileComm U.S.A., Inc.

## 2. EUT DESCRIPTION

<b>Product</b>	GSM Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), NFC, VoIP, Hotspot support
<b>FCC Model Name</b>	LG-D280n
<b>Additional FCC Model Name</b>	LGD280n, D280n
<b>Power Supply</b>	DC 3.8 V
<b>Battery Type</b>	Li-ion Battery(Standard)
<b>Frequency of Operation</b>	13.56028 MHz
<b>Transmit Power</b>	10.54 dBuV/m
<b>Modulation Type</b>	ASK
<b>Antenna Specification</b>	Manufacturer: AT&C Co., LTD. Antenna type: FPCB Antenna

<b>FCC PT.15.225 TEST REPORT</b>	<b>FCC CERTIFICATION REPORT</b>		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
<b>Test Report No.</b> HCT-R-1403-F067-1	<b>Date of Issue:</b> April 03, 2014	<b>EUT Type:</b> GSM Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), NFC, VoIP, Hotspot support	<b>FCC ID:</b> ZNFD280N



### 3. TEST METHODOLOGY

The measurement procedure described in the American National Standard for Testing Unlicensed Wireless Devices(ANSI C63.10-2009).

#### 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 15.225 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 6.2 of ANSI C63.10. (Version :2009) 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 6.3 of ANSI C63.10. (Version: 2009).

#### 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.

FCC PT.15.225 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R-1403-F067-1	Date of Issue: April 03, 2014	EUT Type: GSM Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), NFC, VoIP, Hotspot support		FCC ID: ZNFD280N



### 3.5 STANDARDS

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance With  
FCC Part 15.Subpart C

Regulation	Measurement standard	Range
Title 47 of the CFR:2012, Part 15 Subpart (c), Clause 15.225(a)	ANSI C63.10:2009	13.553MHz to 13.567MHz
Title 47 of the CFR:2012, Part 15 Subpart (c), Clause 15.225(d)	ANSI C63.10:2009	outside of the 13.110-14.010 MHz band
Title 47 of the CFR:2012, Part 15 Subpart (c), Clause 15.209	ANSI C63.10:2009	9kHz to 30MHz
Title 47 of the CFR:2012, Part 15 Subpart (c), Clause 15.209	ANSI C63.10:2009	30MHz to 1GHz
Title 47 of the CFR:2012, Part 15 Subpart (c), Clause 15.207	ANSI C63.10:2009	150kHz to 30MHz
Title 47 of the CFR:2012, Part 15 Subpart (c), Clause 15.225(e)	ANSI C63.10:2009	0.01% of nominal
Title 47 of the CFR:2012, Part 15 Subpart (c), Clause 15.215(c)	ANSI C63.10:2009	-



## 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 10 m semi anechoic chamber used to collect the Conducted and Radiated data is located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea. Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4. Detailed description of test facilities 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 loop, 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

FCC PT.15.225 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R-1403-F067-1	Date of Issue: April 03, 2014	EUT Type: GSM Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), NFC, VoIP, Hotspot support		FCC ID: ZNFD280N



## 7. TEST SUMMARY

The results in this report apply only to sample tested

Regulation	Test Type	Range	Result
Title 47 of the CFR:2012, Part 15 Subpart (c), Clause 15.225(a)	Radiated Electric Field Emissions	13.553MHz to 13.567MHz	Pass
Title 47 of the CFR:2012, Part 15 Subpart (c), Clause 15.225(b)	Radiated Electric Field Emissions	13.410MHz to 13.553MHz and 13.567MHz to 13.710MHz	Pass
Title 47 of the CFR:2012, Part 15 Subpart (c), Clause 15.225(c)	Radiated Electric Field Emissions	13.110 MHz to 13.410 MHz and 13.710 MHz to 14.010 MHz	Pass
Title 47 of the CFR:2012, Part 15 Subpart (c), Clause 15.209 (d)	Radiated Electric Field Emissions	9kHz to 30MHz	Pass
Title 47 of the CFR:2012, Part 15 Subpart (c), Clause 15.209	Radiated Electric Field Emissions	30MHz to 1GHz	Pass
Title 47 of the CFR:2012, Part 15 Subpart (c), Clause 15.207	AC power conducted emissions	150kHz to 30MHz	Pass
Title 47 of the CFR:2012, Part 15 Subpart (c), Clause 15.225(e)	Frequency Stability	0.01% of nominal	Pass
Title 47 of the CFR:2012, Part 15 Subpart (c), Clause 15.215(c)	20 dB Bandwidth	-	Pass

<b>FCC PT.15.225 TEST REPORT</b>		<b>FCC CERTIFICATION REPORT</b>		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
<b>Test Report No.</b> HCT-R-1403-F067-1	<b>Date of Issue:</b> April 03, 2014	<b>EUT Type:</b> GSM Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), NFC, VoIP, Hotspot support		<b>FCC ID:</b> ZNFD280N



## 8. RADIATED EMISSION MEASUREMENT

### Requirement(s): 15.209, 15.225

Except as provided elsewhere in this paragraph the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

**Minimum Standard: FCC Part 15.225 / 15.209**

Rule Part	Frequency (MHz)	Limit
Part 15.209	0.009 ~ 0.490	2400/F(kHz)uV/m@300
	0.490 ~1.705	24000/F(kHz)uV/m@30
	1.705 ~ 30	30 uV/m@30
	30 ~ 88	100 ** uV/m@3m
	88 ~ 216	150 ** uV/m@3m
	216 ~ 960	200 ** uV/m@3m
	Above 960	500 uV/m@3m

\*\* 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.

### 15.225 Operation within the band 13.110 – 14.010 MHz.

(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter (= 84 dBuV/m) at 30 meters.

(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter (=50.5dBuV/m) at 30 meters.

(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter (=40.5 dBuV/m) at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

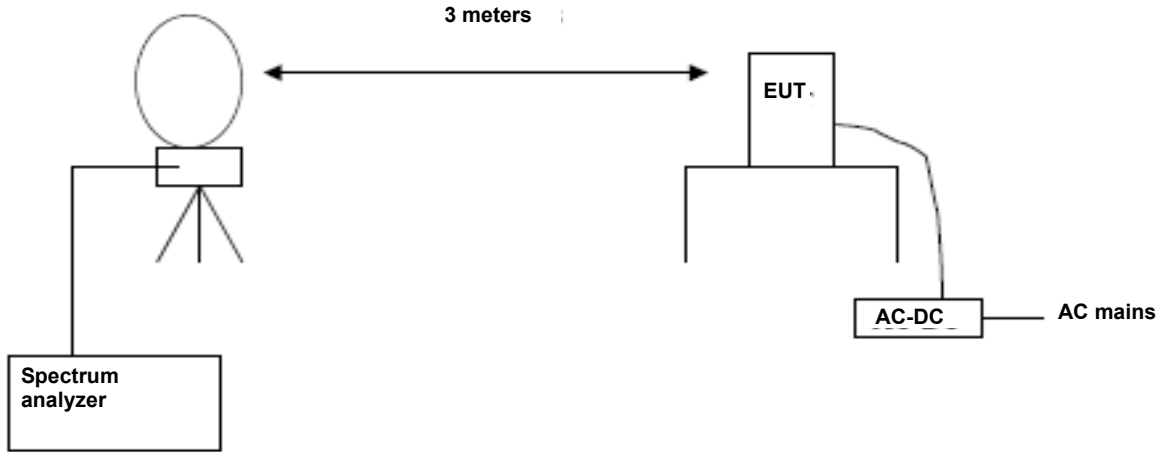
(e) The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

(f) In the case of radio frequency powered tags designed to operate with a device authorized under this section, the tag may be approved with the device or be considered as a separate device subject to its own authorization. Powered tags approved with a device under a single application shall be labeled with the same identification number as the device.

<b>FCC PT.15.225 TEST REPORT</b>		<b>FCC CERTIFICATION REPORT</b>		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R-1403-F067-1	Date of Issue: April 03, 2014	EUT Type: GSM Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), NFC, VoIP, Hotspot support		FCC ID: ZNFD280N

## 8.1. RADIATED EMISSION 9 kHz – 30 MHz

### Test Set-up



### Test Procedure

The EUT was placed on a non-conductive table located on a large open test site. The loop antenna was placed at a location 3m from the EUT. Radiated emissions were measured with the loop antenna both parallel and perpendicular to the plane of the EUT loop antenna and with x, y, z planes in EUT.

The limit is converted from microvolts/meter to decibel microvolts/meter. Sample Calculation:

Corrected Amplitude = Raw Amplitude(dB $\mu$ V/m) + ACF(dB) + Cable Loss(dB) – Distance Correction Factor

The spectrum analyzer is set to:

Frequency Range = 9 kHz ~ 1GHz

RBW = 9 kHz (9 kHz ~ 30MHz)  
= 120 kHz (30 MHz ~ 1 GHz)

Trace Mode = max hold

Detector Mode = peak / Quasi-peak

Sweep time = auto

FCC PT.15.225 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R-1403-F067-1	Date of Issue: April 03, 2014	EUT Type: GSM Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), NFC, VoIP, Hotspot support		FCC ID: ZNFD280N



## Test Results

13.553 MHz-13.567 MHz						
Frequency (MHz)	Read Level (dBuV)@3m	Ant.Factor+Cable Loss (dB/m)	Distance Correction (dB)	Result Level (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.56028	30.96(H)*	19.58	-40	10.54	84	73.46
13.56028	26.86(V)*	19.58	-40	6.44	84	77.56

13.410 MHz-13.553 MHz and 13.567 MHz-13.710 MHz						
Frequency (MHz)	Read Level (dBuV)@3m	Ant.Factor+Cable Loss (dB/m)	Distance Correction (dB)	Result Level (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.5530	18.28	19.58	-40	-2.14	50.47	52.61
13.5670	20.55	19.58	-40	0.13	50.47	50.34

13.110 MHz – 13.410 MHz and 13.710 MHz-14.010 MHz						
Frequency (MHz)	Read Level (dBuV)@3m	Ant.Factor+Cable Loss (dB/m)	Distance Correction (dB)	Result Level (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.2726	13.80	19.58	-40	-6.62	40.51	47.13
13.9200	14.60	19.58	-40	-5.82	40.51	46.33

9 kHz -30 MHz						
Frequency (MHz)	Read Level (dBuV)@3m	Ant.Factor+Cable Loss (dB/m)	Distance Correction (dB)	Result Level (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
7.6337	21.35	19.58	-40	0.93	29.54	28.61
24.4674	19.05	18.58	-40	-2.37	29.54	31.91
27.1519	19.05	18.58	-40	-2.37	29.54	31.91
27.1200	18.21	18.58	-40	-3.21	29.54	32.75

FCC PT.15.225 TEST REPORT		FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>	
Test Report No. HCT-R-1403-F067-1	Date of Issue: April 03, 2014	EUT Type: GSM Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), NFC, VoIP, Hotspot support			FCC ID: ZNFD280N	



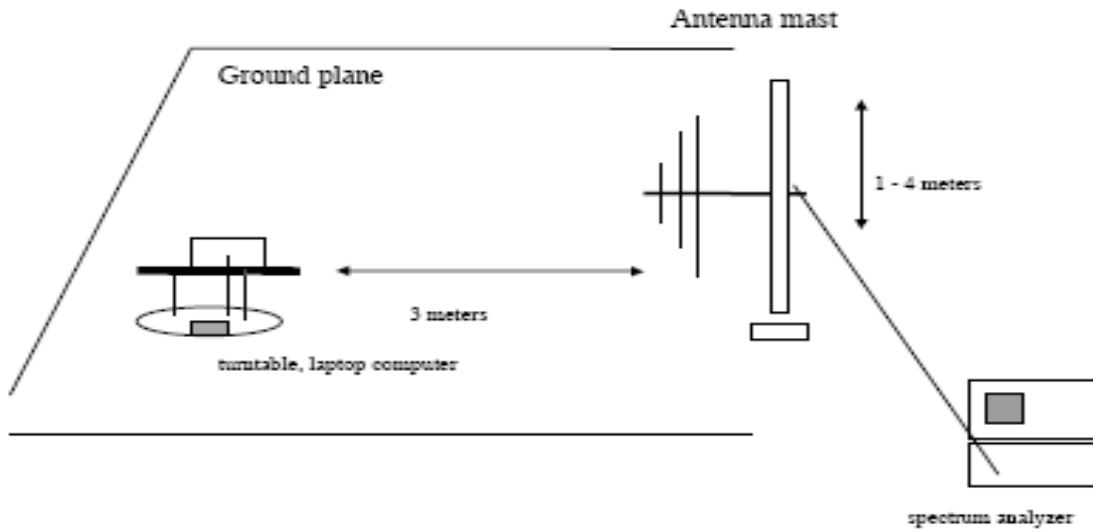
Note :

1. Distance Correction Below 30MHz =  $40\log(3m/30m) = - 40 \text{ dB}$   
Measurement Distance : 3 m (Below 30 MHz)
2. Factor = Antenna Factor + Cable Loss
3. Result Level = Read Level + Factor + Distance Correction
4. Margin = Limit – Result Level
5. We have done x, y, z planes in EUT
6. Antenna rotated about its vertical/horizontal axis for maximum response at each azimuth position around the EUT.
7. Worst case of operating mode is type A, analog mode and 106 kbps.

<b>FCC PT.15.225 TEST REPORT</b>	<b>FCC CERTIFICATION REPORT</b>		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
<b>Test Report No.</b> HCT-R-1403-F067-1	<b>Date of Issue:</b> April 03, 2014	<b>EUT Type:</b> GSM Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), NFC, VoIP, Hotspot support	<b>FCC ID:</b> ZNFD280N

## 8.2. RADIATED EMISSION 30 MHz – 1000 MHz

### Test Set-up



Test Procedures: Radiated emissions were measured according to ANSI C63.10.

The EUT was set to transmit at the highest output power.

The EUT was set 3 meter away from the measuring antenna.

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB $\mu$ V	dB/m	dB	(H/V)	dB $\mu$ V/m	dB $\mu$ V/m	dB
33.80	20.31	12.00	0.97	H	33.28	40.0	6.72
39.64	20.18	12.64	1.04	H	33.86	40.0	6.14
51.64	21.64	13.23	1.17	V	36.04	40.0	3.96
86.66	22.94	8.61	1.53	H	33.08	40.0	6.92
150.94	23.12	12.75	1.89	H	37.76	43.5	5.74
175.22	21.18	12.05	2.22	V	35.45	43.5	8.05

### Remark

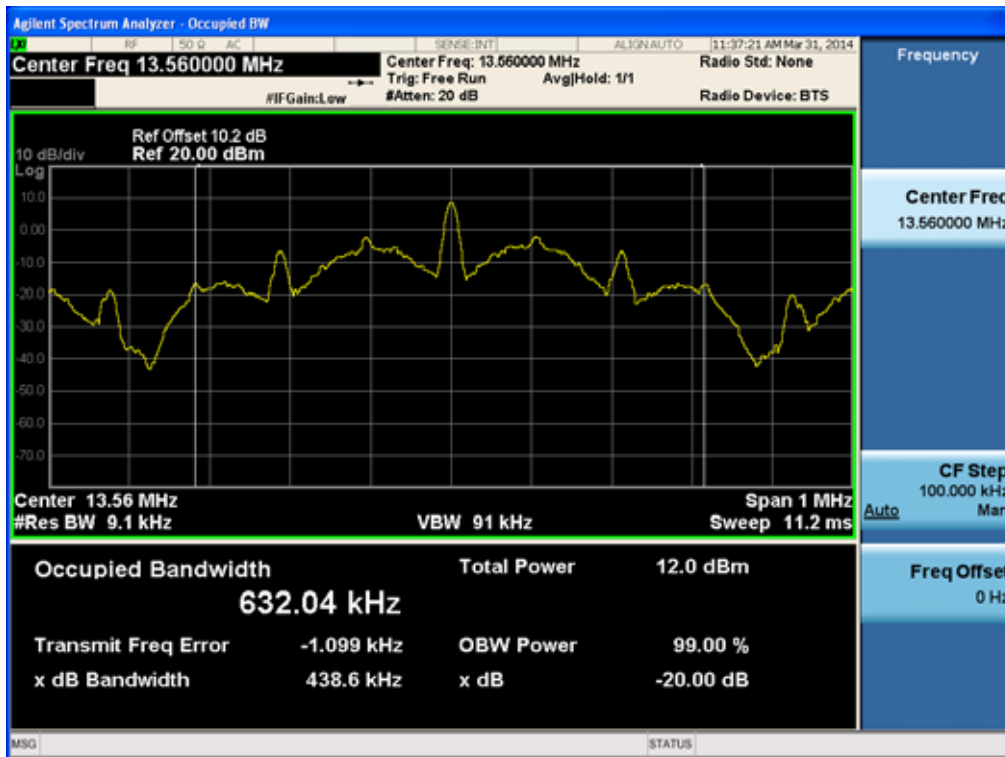
1. Result Level = Read Level + (Antenna Factor+ Cable Loss)
2. Margin = Limit – Result Level

## 9. EMISSION BANDWIDTH PLOT.

### Requirement(s):

Test Set-up: The EUT was connected to a spectrum analyzer.

Test Procedure: The 20 dB bandwidth was measured by using a spectrum analyzer.



FCC PT.15.225 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R-1403-F067-1	Date of Issue: April 03, 2014	EUT Type: GSM Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), NFC, VoIP, Hotspot support		FCC ID: ZNFD280N

## 10. FREQUENCY TOLERANCE

Procedure: Part 15.225, ANSI 63.10

If required, the operating or transmitting frequency of an intentional radiator should be measured in accordance with the following procedure to ensure that the device operates outside certain precluded frequency bands and within the frequency range. No modulation needs to be supplied to the intentional radiator during these tests, unless modulation is required to produce an output, e.g., single-sideband suppressed carrier transmitters.

The frequency stability of the transmitter is measured by:

- a) Temperature: The temperature is varied from -20°C to + 50°C using an environmental chamber.
- b) For battery operated equipment, the equipment tests shall be performed using a new battery.

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency.

Measurement Result:

VOLTAGE	POWER	Temperature	Frequency	Frequency Error
(%)		(°C)	(MHz)	(Hz)
100%	3.8 V	-20	13.560359	79
100%		-10	13.560340	60
100%		0	13.560317	37
100%		10	13.560304	24
100%		20	13.560280	0
100%		30	13.560255	-25
100%		40	13.560219	-61
100%		50	13.560198	-82
115%		4.37	20	13.560306
Batt. Endpoint	3.23	20	13.560293	13

## 11. POWERLINE CONDUCTE EMISSIONS

### LIMIT

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 microvolt (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB $\mu$ V)	
	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. The EUT is the device with a detachable antenna operating below 30 MHz.
  - For unterminated the Antenna, the AC line conducted tests are performed with the antenna connected
  - For terminated the Antenna, the AC line conducted tests are performed with a dummy load connected to the EUT antenna output terminal.





**Test Plots**  
**Unterminate the Antenna**  
**Conducted Emissions (Line 1)**

EMI Auto Test(2)

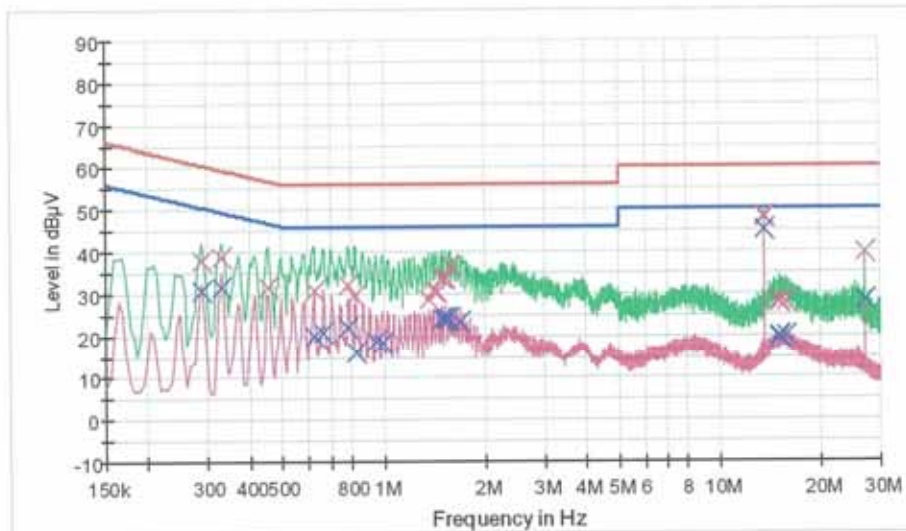
1 / 2

## HCT TEST Report

### Common Information

EUT: LG-D280n  
 Manufacturer: LG  
 Test Site: SHIELD ROOM  
 Operating Conditions: NFC MODE (UNTERMINATED)  
 Operator Name: JC SHIN

FCC CLASS B



— FCC CLASS B\_CPK      — FCC CLASS B\_AV  
— Preview Result 2\_AVG      X Final Result 1\_CPK      X Preview Result 1\_P1K  
— Final Result 2\_CAV

### Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.289500	37.7	9.000	Off	L1	9.7	22.8	60.5
0.330000	38.7	9.000	Off	L1	9.7	20.8	59.5
0.456000	31.5	9.000	Off	L1	9.7	25.3	56.8
0.621500	30.8	9.000	Off	L1	9.8	25.2	56.0
0.783500	32.1	9.000	Off	L1	9.8	23.9	56.0
0.824000	29.3	9.000	Off	L1	9.8	26.7	56.0
1.364000	28.7	9.000	Off	L1	9.8	27.3	56.0
1.404500	30.9	9.000	Off	L1	9.8	25.1	56.0
1.436000	30.2	9.000	Off	L1	9.8	25.8	56.0
1.485500	33.8	9.000	Off	L1	9.8	22.2	56.0
1.526000	33.6	9.000	Off	L1	9.8	22.4	56.0
1.575500	36.5	9.000	Off	L1	9.8	19.5	56.0
13.559000	48.2	9.000	Off	L1	10.6	11.8	60.0
13.590500	48.1	9.000	Off	L1	10.6	11.9	60.0
15.012500	27.9	9.000	Off	L1	10.7	32.1	60.0
15.066500	28.4	9.000	Off	L1	10.7	31.6	60.0

3/31/2014

1:48:33

FCC PT.15.225 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R-1403-F067-1	Date of Issue: April 03, 2014	EUT Type: GSM Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), NFC, VoIP, Hotspot support		FCC ID: ZNFD280N

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
15.732500	27.9	9.000	Off	L1	10.7	32.1	60.0
27.122000	39.4	9.000	Off	L1	11.3	20.6	60.0

**Final Result 2**

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.289500	30.6	9.000	Off	L1	9.7	19.9	50.5
0.330000	31.4	9.000	Off	L1	9.7	18.1	49.5
0.621500	20.0	9.000	Off	L1	9.8	26.0	46.0
0.662000	20.6	9.000	Off	L1	9.8	25.4	46.0
0.783500	22.0	9.000	Off	L1	9.8	24.0	46.0
0.828500	15.9	9.000	Off	L1	9.8	30.1	46.0
0.950000	18.5	9.000	Off	L1	9.8	27.5	46.0
0.990500	18.0	9.000	Off	L1	9.8	28.0	46.0
1.485500	24.1	9.000	Off	L1	9.8	21.9	46.0
1.526000	23.9	9.000	Off	L1	9.8	22.1	46.0
1.566500	24.1	9.000	Off	L1	9.8	21.9	46.0
1.692500	23.1	9.000	Off	L1	9.8	22.9	46.0
13.559000	45.1	9.000	Off	L1	10.6	4.9	50.0
13.590500	45.0	9.000	Off	L1	10.6	5.0	50.0
15.012500	19.5	9.000	Off	L1	10.7	30.5	50.0
15.066500	20.0	9.000	Off	L1	10.7	30.0	50.0
15.732500	19.8	9.000	Off	L1	10.7	30.2	50.0
27.122000	28.1	9.000	Off	L1	11.3	21.9	50.0

# Conducted Emissions (Line 2)

EMI Auto Test(2)

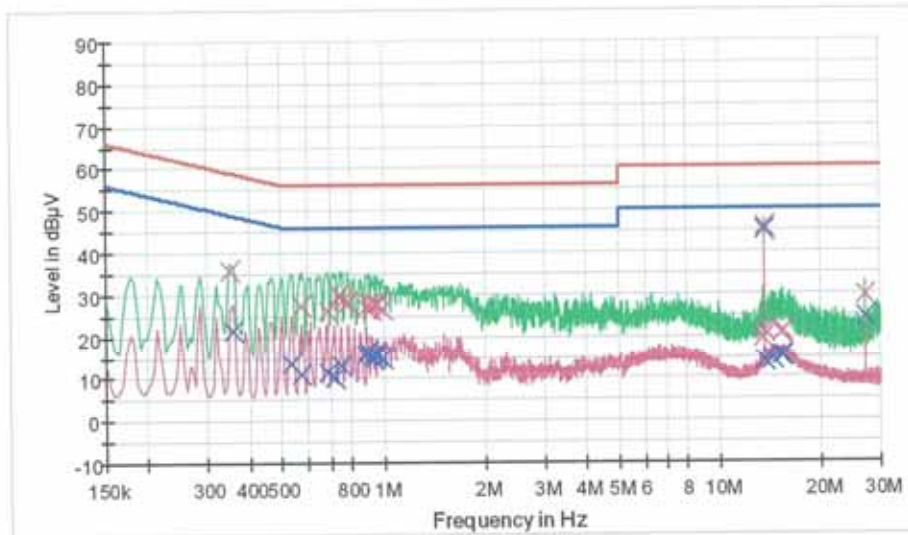
1 / 2

## HCT TEST Report

### Common Information

EUT: LG-D280n  
 Manufacturer: LG  
 Test Site: SHIELD ROOM  
 Operating Conditions: NFC MODE (UNTERMINATED)  
 Operator Name: JC SHIN

FCC CLASS B



— FCCCLASS B\_GP     
 — FCCCLASS B\_AV     
 — Preview Result 1-CPK  
— Preview Result 2-AVG     
 X Final Result 1-CPK     
 X Final Result 2-CAV

### Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.352500	35.7	9.000	Off	N	9.7	23.2	58.9
0.572000	27.4	9.000	Off	N	9.8	28.6	56.0
0.694500	26.3	9.000	Off	N	9.8	29.7	56.0
0.743000	30.0	9.000	Off	N	9.8	26.0	56.0
0.756500	28.6	9.000	Off	N	9.8	27.4	56.0
0.779000	28.4	9.000	Off	N	9.8	27.6	56.0
0.891500	27.1	9.000	Off	N	9.8	28.9	56.0
0.905000	27.9	9.000	Off	N	9.8	28.1	56.0
0.918500	26.6	9.000	Off	N	9.8	29.4	56.0
0.936500	27.9	9.000	Off	N	9.8	28.1	56.0
0.959000	27.7	9.000	Off	N	9.8	28.3	56.0
0.990500	26.5	9.000	Off	N	9.8	29.5	56.0
13.496000	19.2	9.000	Off	N	10.6	40.8	60.0
13.559000	46.1	9.000	Off	N	10.6	13.9	60.0
13.631000	21.0	9.000	Off	N	10.6	39.0	60.0
15.260000	20.8	9.000	Off	N	10.7	39.2	60.0

3/31/2014

2:24:15

FCC PT.15.225 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R-1403-F067-1	Date of Issue: April 03, 2014	EUT Type: GSM Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), NFC, VoIP, Hotspot support		FCC ID: ZNFD280N

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
15.431000	20.9	9.000	Off	N	10.7	39.1	60.0
27.117500	29.7	9.000	Off	N	11.0	30.3	60.0

**Final Result 2**

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.357000	21.7	9.000	Off	N	9.7	27.1	48.8
0.536000	13.7	9.000	Off	N	9.8	32.3	46.0
0.572000	11.2	9.000	Off	N	9.8	34.8	46.0
0.680000	11.3	9.000	Off	N	9.8	34.7	46.0
0.716000	10.2	9.000	Off	N	9.8	35.8	46.0
0.747500	13.1	9.000	Off	N	9.8	32.9	46.0
0.891500	15.6	9.000	Off	N	9.8	30.4	46.0
0.900500	16.4	9.000	Off	N	9.8	29.6	46.0
0.923000	15.4	9.000	Off	N	9.8	30.6	46.0
0.941000	14.6	9.000	Off	N	9.8	31.4	46.0
0.954500	15.6	9.000	Off	N	9.8	30.4	46.0
0.990500	14.6	9.000	Off	N	9.8	31.4	46.0
13.559000	45.0	9.000	Off	N	10.6	5.0	50.0
13.631000	13.9	9.000	Off	N	10.6	36.1	50.0
14.301500	14.4	9.000	Off	N	10.6	35.6	50.0
15.260000	15.3	9.000	Off	N	10.7	34.7	50.0
15.431000	15.1	9.000	Off	N	10.7	34.9	50.0
27.122000	24.4	9.000	Off	N	11.0	25.6	50.0

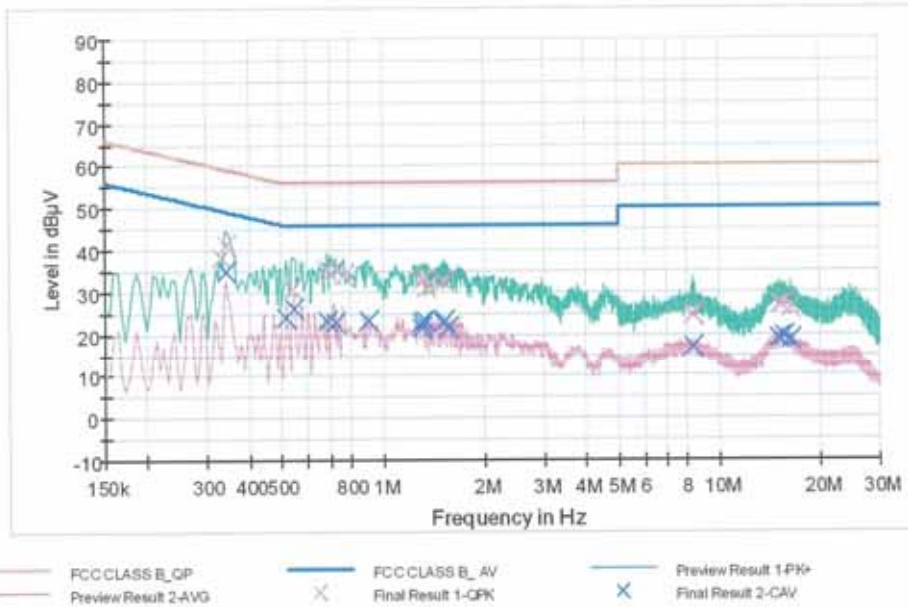
**Terminate the Antenna  
Conducted Emissions (Line 1)**

## HCT TEST Report

### Common Information

EUT: LG-D280n  
 Manufacturer: LG  
 Test Site: SHIELD ROOM  
 Operating Conditions: NFC MODE (TERMINATED)  
 Operator Name: JC SHIN

FCC CLASS B



### Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.330000	38.3	9.000	Off	L1	9.7	21.2	59.5
0.343500	41.5	9.000	Off	L1	9.7	17.6	59.1
0.540500	30.8	9.000	Off	L1	9.8	25.2	56.0
0.684500	35.3	9.000	Off	L1	9.8	20.7	56.0
0.698000	34.7	9.000	Off	L1	9.8	21.3	56.0
0.765500	34.2	9.000	Off	L1	9.8	21.8	56.0
1.296500	32.8	9.000	Off	L1	9.8	23.2	56.0
1.310000	32.8	9.000	Off	L1	9.8	23.2	56.0
1.328000	33.1	9.000	Off	L1	9.8	22.9	56.0
1.346000	31.1	9.000	Off	L1	9.8	24.9	56.0
1.503500	32.7	9.000	Off	L1	9.8	23.3	56.0
1.526000	32.4	9.000	Off	L1	9.8	23.6	56.0
8.357000	24.7	9.000	Off	L1	10.3	35.3	60.0
8.379500	24.5	9.000	Off	L1	10.3	35.5	60.0
15.008000	26.9	9.000	Off	L1	10.7	33.1	60.0
15.314000	27.2	9.000	Off	L1	10.7	32.8	60.0

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
16.232000	26.2	9.000	Off	L1	10.8	33.8	60.0
16.241000	26.1	9.000	Off	L1	10.8	33.9	60.0

**Final Result 2**

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.343500	34.9	9.000	Off	L1	9.7	14.2	49.1
0.518000	24.2	9.000	Off	L1	9.8	21.8	46.0
0.545000	26.0	9.000	Off	L1	9.8	20.0	46.0
0.684500	23.0	9.000	Off	L1	9.8	23.0	46.0
0.725000	23.0	9.000	Off	L1	9.8	23.0	46.0
0.905000	23.1	9.000	Off	L1	9.8	22.9	46.0
1.296500	22.9	9.000	Off	L1	9.8	23.1	46.0
1.310000	21.3	9.000	Off	L1	9.8	24.7	46.0
1.328000	23.1	9.000	Off	L1	9.8	22.9	46.0
1.508000	22.8	9.000	Off	L1	9.8	23.2	46.0
1.535000	23.2	9.000	Off	L1	9.8	22.8	46.0
1.557500	21.6	9.000	Off	L1	9.8	24.4	46.0
8.357000	16.9	9.000	Off	L1	10.3	33.1	50.0
8.379500	16.8	9.000	Off	L1	10.3	33.2	50.0
15.903500	19.0	9.000	Off	L1	10.7	31.0	50.0
15.093500	19.2	9.000	Off	L1	10.7	30.8	50.0
15.498500	19.2	9.000	Off	L1	10.7	30.8	50.0
16.232000	18.4	9.000	Off	L1	10.8	31.6	50.0

# Conducted Emissions (Line 2)

EMI Auto Test(2)

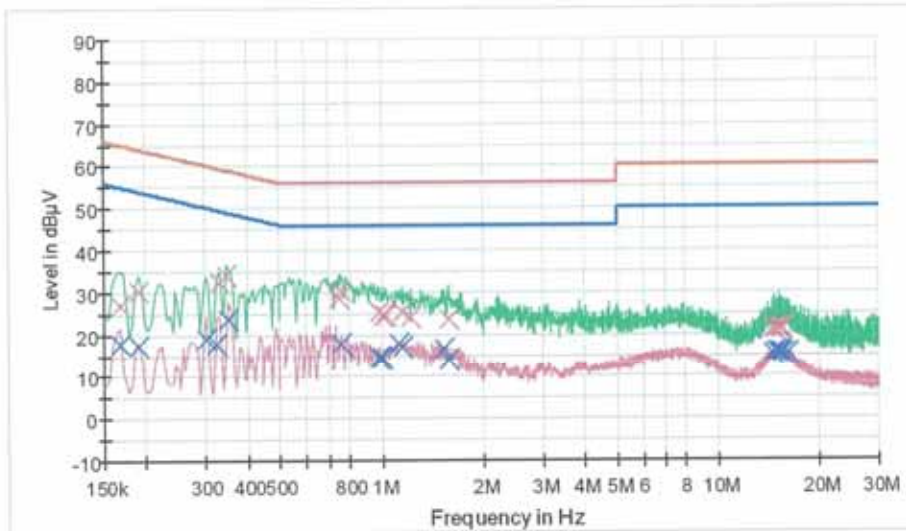
1 / 2

## HCT TEST Report

### Common Information

EUT: LG-D280n  
 Manufacturer: LG  
 Test Site: SHIELD ROOM  
 Operating Conditions: NFC MODE (TERMINATED)  
 Operator Name: JC SHIN

FCC CLASS B



— FCCCLASS\_B\_OP     
 — FCCCLASS\_B\_AV     
 — Preview Result 1-PK  
— Preview Result 2-AVG     
 x Final Result 1-CPK     
 x Final Result 2-CAV

### Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.168000	26.9	9.000	Off	N	9.7	38.2	65.1
0.190500	30.2	9.000	Off	N	9.7	33.8	64.0
0.330000	32.6	9.000	Off	N	9.7	26.9	59.5
0.348000	34.3	9.000	Off	N	9.7	24.7	59.0
0.747500	28.5	9.000	Off	N	9.8	27.5	56.0
0.756500	30.3	9.000	Off	N	9.8	25.7	56.0
0.977000	25.2	9.000	Off	N	9.8	30.8	56.0
1.004000	24.5	9.000	Off	N	9.8	31.5	56.0
1.031000	24.4	9.000	Off	N	9.8	31.6	56.0
1.152500	25.4	9.000	Off	N	9.8	30.6	56.0
1.220000	23.9	9.000	Off	N	9.8	32.1	56.0
1.575500	23.7	9.000	Off	N	9.8	32.3	56.0
14.585000	21.0	9.000	Off	N	10.6	39.0	60.0
14.733500	21.0	9.000	Off	N	10.6	39.0	60.0
15.219500	21.2	9.000	Off	N	10.7	38.8	60.0
15.228500	21.3	9.000	Off	N	10.7	38.7	60.0

3/31/2014

1:13:10

FCC PT.15.225 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R-1403-F067-1	Date of Issue: April 03, 2014	EUT Type: GSM Phone with Bluetooth4.0, WIFI802.11 b/g/n(2.4GHz_HT20), NFC, VoIP, Hotspot support	FCC ID: ZNFD280N	

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
15.323000	21.3	9.000	Off	N	10.7	38.7	60.0
15.552500	21.1	9.000	Off	N	10.7	38.9	60.0

**Final Result 2**

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.168000	17.6	9.000	Off	N	9.7	37.5	55.1
0.190500	17.5	9.000	Off	N	9.7	36.5	54.0
0.303000	19.2	9.000	Off	N	9.7	31.0	50.2
0.328500	17.9	9.000	Off	N	9.7	31.7	49.6
0.352500	23.7	9.000	Off	N	9.7	25.2	48.9
0.761000	17.8	9.000	Off	N	9.8	28.2	46.0
0.977000	14.5	9.000	Off	N	9.8	31.5	46.0
1.004000	14.2	9.000	Off	N	9.8	31.8	46.0
1.130000	17.7	9.000	Off	N	9.8	28.3	46.0
1.152500	16.8	9.000	Off	N	9.8	29.2	46.0
1.535000	16.4	9.000	Off	N	9.8	29.6	46.0
1.575500	14.0	9.000	Off	N	9.8	32.0	46.0
14.585000	15.2	9.000	Off	N	10.6	34.8	50.0
14.841500	15.5	9.000	Off	N	10.6	34.5	50.0
15.219500	15.8	9.000	Off	N	10.7	34.2	50.0
15.323000	15.7	9.000	Off	N	10.7	34.3	50.0
15.552500	15.4	9.000	Off	N	10.7	34.6	50.0
16.106000	15.0	9.000	Off	N	10.7	35.0	50.0



## 12. LIST OF TEST EQUIPMENT

### 12.1. LIST OF TEST EQUIPMENT(Conducted Test)

Manufacturer	Model / Equipment	Calibration Interval	Calibration Due	Serial No.
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
WEINSCHL	2-3 / Attenuator(3 dB)	Annual	10/28/2014	BR0617

## 12.2. LIST OF TEST EQUIPMENT(Radiated Test)

Manufacturer	Model / Equipment	Calibration Interval	Calibration Due	Serial No.
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