RF TEST REPORT

Test item	:	GSM/WCDMA/LTE Phone with Bluetooth 4.0 LE, WIFI802.11b/g/n(2.4G), NFC
Model No.	:	LG-H525n, LGH525n, H525n, LG-H525J, LGH525J, H525J
Order No.	:	DTNC1502-00804
Date of receipt	:	2015-02-25
Test duration	:	2015-02-25 ~ 2015-03-11, 2015-03-17
Date of issue	:	2015-03-17
Use of report	:	FCC Original Grant

Applicant : LG Electronics MobileComm U.S.A., Inc.
1000 Sylvan Avenue, Englewood Cliffs NJ 07632

Test laboratory : DT&C Co., Ltd.
42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935

Test specification	:	FCC Part 15.225
Test environment	:	See appended test report
Test result	:	☒ Pass ☐ Fail

Tested by:

Engineer
ChulMin Kim

Reviewed by:

Technical Manager
GeunKi Son

Test Report Version

Test Report No.	Date	Description
DRTFCC1503-0040	Mar, 12. 2015	Initial issue
DRTFCC1503-0040(1)	Mar, 17. 2015	Update test plot Update H/W, S/W version

CONTENTS

1.General Information

1.1. Testing Laboratory

DT&C Co., Ltd.

FCC test site number 165783
42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935
www.dtnc.net
Telephone : + 82-31-321-2664
FAX : + 82-31-321-1664

1.2. Details of Applicant

Applicant : LG Electronics MobileComm U.S.A., Inc.
Address : 1000 Sylvan Avenue, Englewood Cliffs NJ 07632
Contact person : Jongchul LEE

1.3. Description of EUT

FCC Equipment Class	Low Power Communications Device Transmitter(DXX)
EUT	GSM/WCDMA/LTE Phone with Bluetooth 4.0 LE, WIFI802.11b/g/n(2.4G), NFC
Model Name	LG-H525n, LGH525n, H525n, LG-H525J, LGH525J, H525J ※ 6 models are same mechanical, electrical and functional. ※ The only difference is the model name, which are changed for marketing purpose.
Serial Number	Identical prototype
Hardware version	Rev.B
Software version	H525n08a
Power Supply	Li-ion Battery: DC 3.8 V AC-DC Adaptor: AC 120 V 60 Hz
Frequency Band	13.56 MHz
Modulation Type	ASK
Channel(s)	1
Antenna type	Loop Antenna

2. Information about test items

2.1 Test mode

Test mode1	Continuous transmitting mode
Test mode2	-

Note: For this test mode, a test program was supported by manufacturer.

2.2 Support equipments

Equipment	Model No.	Serial No.	Manufacturer	Note
-	-	-	-	-

2.3 Tested frequency

Channel	TX Frequency(MHz)	RX Frequency(MHz)
Lowest	13.56	13.56
Middle	-	-
Highest	-	-

2.4 Tested environment

Temperature	:	22 ~ 24 °C
Relative humidity content	:	40 ~ 44 % R.H.
Details of power supply	:	DC 3.8 V

2.5 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing
→ None

3. Antenna requirements

"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 antenna is attached to the battery cover, and antenna is coupled use the special tension. Therefore this E.U.T Complies with the requirement of §15.203

4. Test report

4.1 Summary of tests

FCC part section(s)	RSS section(s)	Parameter	Limit	Test condition	Status Note 1
2.1049	-	20 dB Bandwidth	-	Radiated	C
-	RSS-Gen [6.6]	Occupied Bandwidth	-		NA
15.225 (a)	RSS-210 [A2.6 (a)]	In-Band Emissions	15,848 μV/m @ 30 m 13.553 – 13.567 MHz		C
15.225 (b)	RSS-210 [A2.6 (b)]	In-Band Emissions	334 μV/m @ 30 m 13.410 – 13.553 MHz 13.567 – 13.710 MHz		C
15.225 (c)	RSS-210 [A2.6 (c)]	In-Band Emissions	106 μV/m @ 30 m 13.110 – 13.410 MHz 13.710 – 14.010 MHz		C
15.225 (d) 15.209	RSS-210 [A2.6 (d)]	Out-of Band Emissions	Emissions outside of the specified band (13.110-14.010 MHz) must meet the radiated limits detailed in 15.209		C
15.225 (e)	RSS-210 [A2.6]	Frequency Stability	±0.01 % of operating frequency	Temp & Humid Test Chamber	C
15.207	RSS-Gen [8.8]	AC Conducted Emissions	FCC Part 15.207	AC Line Conducted	C
15.203	RSS-Gen [6.7]	Antenna Requirements	FCC Part 15.203	-	C

Note 1: **C**=Comply **NC**=Not Comply **NT**=Not Tested **NA**=Not Applicable
Note 2: Semi anechoic chamber registration number is 165783

The sample was tested according to the following specification:
ANSI C-63.10-2013

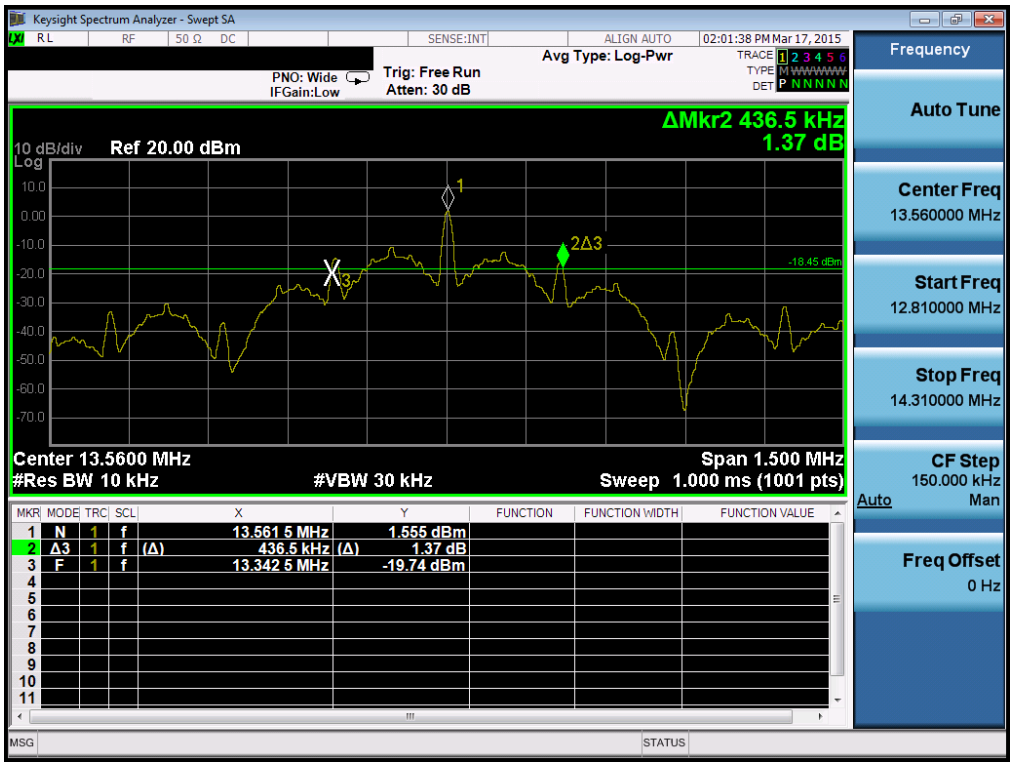
4.2 Transmitter requirements

4.2.1 20dB bandwidth

- Procedure:

The 20 dB Bandwidth is measured with a spectrum analyzer connected via a receive antenna placed near the EUT while the EUT is operating in transmission mode.

- Measurement Data: Comply



- **Minimum Standard: NA**

4.2.2 Occupied bandwidth

- Procedure:

The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
The resolution bandwidth (RBW) shall be in the range of 1 % to 5 % of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3 x RBW.

- Measurement Data: NA

- **Minimum Standard: NA**

4.2.3 In-band emissions

- Procedure:

The EUT was placed on a 0.8 m high non-conductive table inside a 10 m semi anechoic chamber. An antenna was placed at 3 m distance from the EUT Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions. A loop antenna was used for this test item.

And the loop antenna was rotated about vertical axis.

- **Measurement Data: Comply**

Tested Frequency : **13.56 MHz**

Measurement Distance : **3 Meters**

Test Frequency Band [MHz]	Freq. [MHz]	EUT Posi.	Reading Level [dBuV]	T.F	Field Strength @3 m [dBuV/m]	Field Strength @30 m [dBuV/m]	Limit [dBuV/m]	Margin [dB]
13.110 ~ 13.410	13.214	Y	7.80	20.10	27.90	-12.10	40.51	52.61
13.410 ~ 13.553	13.553	Y	23.10	20.10	43.20	3.20	50.47	47.27
13.553 ~ 13.567	13.560	Y	28.60	20.10	48.70	8.70	84.00	75.30
13.567 ~ 13.710	13.568	Y	21.60	20.10	41.70	1.70	50.47	48.77
13.710 ~ 14.010	13.997	Y	9.40	20.10	29.50	-10.50	40.51	51.01

Note 1. This test item was performed using a loop antenna.

Note 2. This test item was performed at 3 m and the data were extrapolated to the specified measurement distance of 30 m using the square of an inverse linear distance extrapolation factor (40 dB/decade) as specified in §15.31(f)2.

▪ Extrapolation Factor = 20 $\log_{10}(30/3)^2$ = 40 dB

Note 3. All data were recorded using a spectrum analyzer employing a peak detector.

If PK results were meet Quasi-peak limit, Quasi-peak measurements were omitted.

Note 4. Sample Calculation.

Margin = Limit – Field Strength @ 30 m / Field Strength @ 30 m = Field Strength @ 3 m – 40 dB

Field Strength @ 3 m = Reading + T.F / T.F = AF + CL – AG

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

- Minimum Standard: Part 15.225(a), (b), (c)& RSS-210 [A2.6(a), (b), (c)]

Frequency Band [MHz]	Limit	
	[uV/m]	[dBuV/m]
13.553-13.567	15,848	84.00
13.410-13.553 13.567-13.710	334	50.47
13.110-13.410 13.710-14.010	106	40.51

4.2.4 Out-of-band emissions

- Procedure:

The EUT was tested from 9 kHz up to the 1 GHz excluding the band 13.110-14.010 MHz. All measurements were recorded with spectrum analyzer employing a peak detector for emissions below 30 MHz. Above 30 MHz a Quasi-peak detector was used. All out-of-band emissions must not exceed the limits §15.209. A loop antenna was used for searching for emissions below 30 MHz.

- Measurement Data: Comply

Tested Frequency : **13.56 MHz**

Measurement Distance : **3 Meters**

Frequency [MHz]	EUT Posi.	ANT Pol	Reading [dBuV]	T.F [dB/m]	Distance factor	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
0.810	Y	N/A	19.3	19.10	40	-1.6	29.4	31
18.020	Z	N/A	15.1	20.20	40	-4.7	29.5	34.2
53.973	X	H	18.9	-16.00	0	2.9	40	37.1
72.033	X	H	19	-18.00	0	1	40	39
149.598	X	H	18.8	-13.80	0	5	43.5	38.5
608.940	X	V	18.2	-3.70	0	14.5	46	31.5

Note 1. All measurements were recorded using a spectrum analyzer employing a peak detector for blew 30 MHz and a Quasi-peak detector for above 30 MHz.

Note 2. Both Vertical and Horizontal polarities of the receiver antenna were evaluated with the worst case emissions being reported. For 30 MHz below the loop antenna was rotated about vertical axis.

Note 3. No other spurious and harmonic emissions were reported greater than listed emissions above table.

Note 4. Sample calculation

Margin = Limit – Field Strength

Field Strength = Reading + T.F – Distance factor

T.F = AF + CL – AG

Distance factor = 20log(Measurement distance / The measured distance)^2

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

- Minimum Standard: Part 15.209, 225(d) & RSS-210[A2.6 (d)]

▪ FCC Part 15.209(a):

Frequency [MHz]	Field Strength [uV/m]	Measurement Distance [Meters]
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	200	3

** 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, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

▪ FCC Part 15.209(b):

In the emission table above, the tighter limit applies at the band edges.

4.2.5 Frequency Stability

- Procedure:

Part 15.225 requires that devices operating in the 13.553 – 13.567 MHz shall maintain the carrier frequency within 0.01 % of the operating frequency over the temperature variation of -20 degrees to + 50 degrees C at normal supply voltage.

- Measurement Data: Comply

Operating Frequency : **13,560,000 Hz**

VOLTAGE (%)	POWER (V_{DC})	TEMP (℃)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100%	3.800	+25(ref)	13,559,981	-19	0.000139
100%		-20	13,559,934	-66	0.000485
100%		-10	13,559,933	-67	0.000496
100%		0	13,559,946	-54	0.000399
100%		+10	13,559,943	-57	0.000422
100%		+20	13,559,977	-23	0.000173
100%		+30	13,559,998	-2	0.000013
100%		+40	13,559,974	-26	0.000189
100%		+50	13,559,886	-114	0.000844
115%	4.370	+25	13,559,984	-16	0.000118
BATT.ENDPOINT	3.100	+25	13,559,976	-24	0.000177

- Minimum Standard: Part 15. 225(e) & RSS-210 [A2.6]

The frequency tolerance of the carrier signal shall be maintained within ±0.01 % of the operating frequency.

4.2.6 AC Line Conducted Emissions

- Test Requirements and limit

For an intentional radiator that 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 the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).

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

* Decreases with the logarithm of the frequency

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

Test Configuration

See test photographs 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.

- Measurement Data: Comply (refer to the next page)

Measurement Data

Results of Conducted Emission

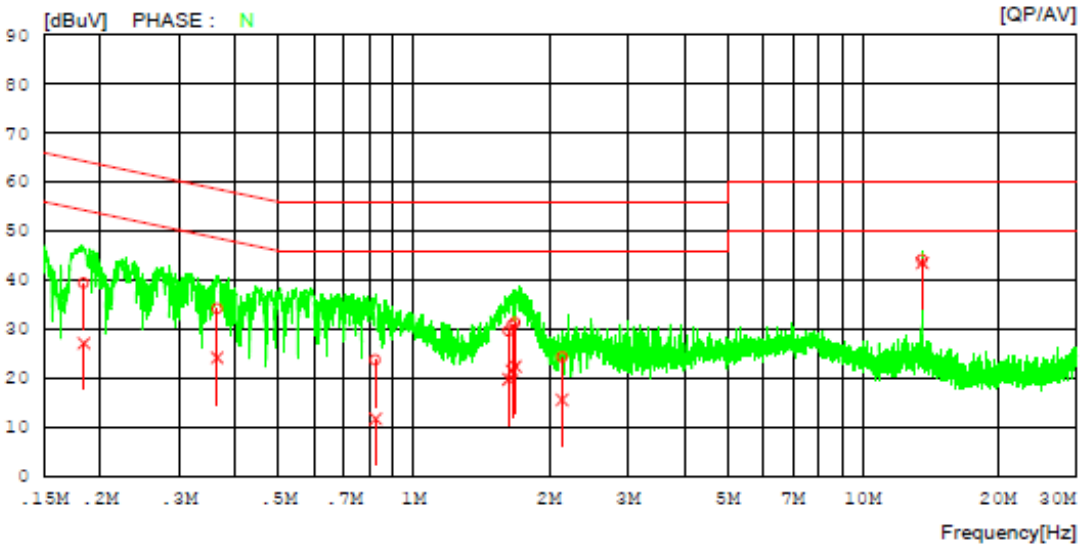
DTNC

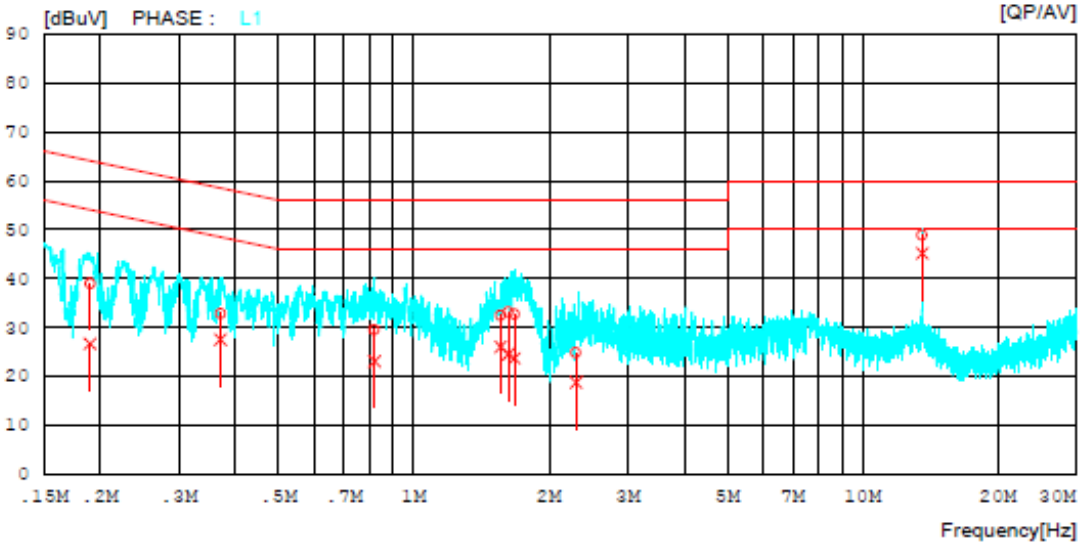
Date : 2015-03-04

Order No.	:		Referrence No.	:	
Model No.	:	LG-H525n	Power Supply	:	120V / 60Hz
Serial No.	:	Identical prototype	Temp/Humi.	:	22 'C / 42 % R.H.
Test Condition	:	NFC	Operator	:	C.M KIM

Memo : FINAL

LIMIT : CISPR22_B QP
CISPR22_B AV





Measurement Data

Results of Conducted Emission

DTNC

Date : 2015-03-04

Order No.	:		Referrence No.	:	
Model No.	:	LG-H525n	Power Supply	:	120V / 60Hz
Serial No.	:	Identical prototype	Temp/Humi.	:	22 'C / 42 % R.H.
Test Condition	:	NFC	Operator	:	C.M KIM

Memo : FINAL

LIMIT : CISPR22_B QP
CISPR22_B AV

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.18386	29.6	17.3	9.9	39.5	27.2	64.3	54.3	24.8	27.1	N
2	0.36478	24.1	14.1	10.1	34.2	24.2	58.6	48.6	24.4	24.4	N
3	0.82108	13.6	1.7	10.1	23.7	11.8	56.0	46.0	32.3	34.2	N
4	1.65640	20.7	11.5	10.1	30.8	21.6	56.0	46.0	25.2	24.4	N
5	1.62480	19.6	9.8	10.1	29.7	19.9	56.0	46.0	26.3	26.1	N
6	1.68320	21.3	12.4	10.1	31.4	22.5	56.0	46.0	24.6	23.5	N
7	2.14080	14.2	5.5	10.1	24.3	15.6	56.0	46.0	31.7	30.4	N
8	13.56040	33.7	33.0	10.5	44.2	43.5	60.0	50.0	15.8	6.5	N
9	0.18986	29.0	16.7	10.0	39.0	26.7	64.0	54.0	25.0	27.3	L1
10	0.37062	22.7	17.4	10.1	32.8	27.5	58.5	48.5	25.7	21.0	L1
11	0.81642	19.6	13.1	10.0	29.6	23.1	56.0	46.0	26.4	22.9	L1
12	1.56060	22.4	16.0	10.1	32.5	26.1	56.0	46.0	23.5	19.9	L1
13	1.62380	23.0	14.5	10.1	33.1	24.6	56.0	46.0	22.9	21.4	L1
14	1.67640	22.6	13.6	10.1	32.7	23.7	56.0	46.0	23.3	22.3	L1
15	2.29680	14.7	8.7	10.1	24.8	18.8	56.0	46.0	31.2	27.2	L1
16	13.56040	38.0	34.4	10.8	48.8	45.2	60.0	50.0	11.2	4.8	L1

APPENDIX

TEST EQUIPMENT FOR TESTS

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
MXA Signal Analyzer	Agilent	N9020A	14/03/28	15/03/28	MY50510026
Dynamic Measurement DC Source	Agilent Technologies	66332A	15/01/22	16/01/22	US37471368
Vector Signal Generator	Rohde Schwarz	SMJ100A	15/01/06	16/01/06	100148
Signal Generator	Rohde Schwarz	SMF100A	14/07/01	15/07/01	102341
Multimeter	FLUKE	17B	14/05/12	15/05/12	26030065WS
Temp &Humid Test Chamber	SJ Science	SJ-TH-S50	14/10/21	15/10/21	SJ-TH-S50-130930
Low Noise Pre Amplifier	tsj	MLA-010K01-B01-27	14/04/09	15/04/09	1844538
Loop Antenna	Schwarzbeck	FMZB1513	14/04/29	16/04/29	1513-128
TRILOG Broadband Test-Antenna(30MHz-1GHz)	Schwarzbeck	VULB 9160	14/04/30	16/04/30	3358
EMI TEST RECEIVER	R&S	ESR7	14/10/21	15/10/21	101109
Thermohygrometer	BODYCOM	BJ5478	14/05/13	15/05/13	120612-2
EMI TEST RECEIVER	R&S	ESCI	15/02/25	16/02/25	100364
FREQUENCY CONVERTER	Taejin Electronic	CVCF	14/09/11	15/09/11	ZU0033
ARTIFICIAL MAINS NETWORK	Narda S.T.S. / PMM	PMM L2-16B	14/06/26	15/06/26	000WX20305