

TEST REPORT

of

FCC Part 22 Subpart H and Part 24 Subpart E
(Class II Permissive Change)
FCC ID : VV7-MBMF3507G-2

Equipment Under Test : Notebook PC
Model Name : LGX11
Serial No. : 20090114_LJD1
Applicant : LG Electronics Inc.
Manufacturer : MICRO-STAR INT'L Co., Ltd.
Date of Test(s) : 2009-01-15 ~ 2009-01-19
Date of Issue : 2009-01-20

In the configuration tested, the EUT complied with the standards specified above.

Tested By:



Date

2009-01-20

Geoffrey Do

Approved By



Date

2009-01-20

Charles Kim

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1. General information

1.1 Testing laboratory

SGS Testing Korea Co., Ltd.

Wireless Div. 2FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040

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1.2 Details of applicant

Applicant : LG Electronics Inc.

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1.3. Description of EUT

Kind of Product	Notebook PC
Model Name	LGX11
Serial Number	20090114_LJD1
2G/3G Module FCC ID	VV7-MBMF3507G-2
WLAN Module FCC ID	TX2-RTL8187SE
Bluetooth Module FCC ID	I4L-MS6837D1
Power Supply	AC 110 V(Battery : DC 11.1 V)
Output Power GSM 850 / GMSK :	Cond. : 32.90 dBm Peak // 32.80 dBm AVG // E.R.P : 27.93 dBm
Output Power GSM 1900 / GMSK :	Cond. : 29.80 dBm Peak // 29.70 dBm AVG // E.I.R.P : 28.04 dBm
Output Power WCDMA 850 / HSUPA :	Cond. : 27.12 dBm Peak // 23.16 dBm AVG // E.R.P : 19.93 dBm
Output Power WCDMA 1900 / HSUPA :	Cond. : 27.16 dBm Peak // 22.75 dBm AVG // E.I.R.P : 23.61 dBm
Frequency Range	GSM : 824.2 MHz ~ 848.8 MHz and 1850.2 MHz ~ 1909.8 MHz
	WCDMA : 826.4 MHz ~ 846.6 MHz and 1852.4 MHz ~ 1907.6 MHz
	2412 MHz ~ 2462 MHz (11b/g)
	2402 MHz ~ 2480 MHz (Bluetooth)
Modulation Technique	GSM/WCDMA : GMSK, 8PSK, QPSK
	11b : DSSS (CCK, BPSK, QPSK), 11g : OFDM (BPSK, QPSK, 16QAM, 64QAM)
	Bluetooth : GFKS, $\pi/4$ DQPSK 8DPSK
Number of Channels	GSM 850(125), GSM 1900(300), WCDMA 850(103), WCDMA 1900 (103)
	11b(11), 11g(11), Bluetooth(79)

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1.4. Description of test mode

Band	Mode	Frequency (MHz)	Peak output power (dBm)	Average output power (dBm)
GSM 850	GMSK	824.2	32.90	32.80
		836.4	32.80	32.60
		848.8	32.80	32.60
GSM 850	8PSK	824.2	32.90	27.90
		836.4	30.80	27.60
		848.8	30.90	27.60
GSM 1900	GMSK	1850.2	29.30	29.20
		1880.0	29.80	29.70
		1909.8	29.20	29.10
GSM 1900	8PSK	1850.2	27.60	26.30
		1880.0	27.80	26.80
		1909.8	27.60	26.10

GSM (850 / 1900)

We found out the test mode with the highest power level after we analyze all the data rates. So we chosen GSM/GMSK (worst case) as a representative.

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Band	Mode	Frequency (MHz)	Peak output power (dBm)	Average output power (dBm)
WCDMA V	RMC	826.4	25.95	23.09
		836.0	26.45	23.61
		846.6	26.06	23.39
WCDMA V (HSDPA)	Sub-test 1	826.4	26.02	23.28
		836.0	26.20	23.60
		846.6	25.87	23.17
	Sub-test 2	826.4	26.06	22.56
		836.0	26.48	22.83
		846.6	26.20	22.65
	Sub-test 3	826.4	26.38	22.57
		836.0	26.63	22.87
		846.6	26.24	22.53
	Sub-test 4	826.4	26.21	22.66
		836.0	26.48	22.87
		846.6	25.98	22.57
WCDMA V (HSUPA)	Sub-test 1	826.4	26.66	22.99
		836.0	27.12	23.16
		846.6	26.65	23.07
	Sub-test 2	826.4	26.23	21.42
		836.0	26.77	21.85
		846.6	26.91	21.22
	Sub-test 3	826.4	26.03	21.84
		836.0	25.89	21.82
		846.6	26.93	21.65
	Sub-test 4	826.4	26.17	21.87
		836.0	26.48	21.74
		846.6	26.15	21.77
	Sub-test 5	826.4	26.38	22.83
		836.0	26.37	22.93
		846.6	26.00	22.71

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Band	Mode	Frequency (MHz)	Peak output power (dBm)	Average output power (dBm)
WCDMA II	RMC	1852.4	25.71	22.95
		1880.0	25.51	22.35
		1907.6	25.18	22.59
WCDMA II (HSDPA)	Sub-test 1	1852.4	26.04	23.03
		1880.0	25.93	22.83
		1907.6	25.55	23.12
	Sub-test 2	1852.4	26.07	22.72
		1880.0	25.91	22.53
		1907.6	26.28	22.87
	Sub-test 3	1852.4	26.48	22.43
		1880.0	26.06	22.31
		1907.6	25.98	22.38
	Sub-test 4	1852.4	26.65	22.51
		1880.0	26.43	22.46
		1907.6	26.19	22.50
WCDMA II (HSUPA)	Sub-test 1	1852.4	27.16	22.74
		1880.0	27.05	22.67
		1907.6	26.65	22.75
	Sub-test 2	1852.4	26.48	22.05
		1880.0	26.61	22.09
		1907.6	26.31	21.87
	Sub-test 3	1852.4	26.43	21.89
		1880.0	26.51	22.09
		1907.6	26.14	22.17
	Sub-test 4	1852.4	26.34	22.35
		1880.0	26.49	22.39
		1907.6	26.42	22.29
	Sub-test 5	1852.4	26.68	22.63
		1880.0	26.33	22.34
		1907.6	26.09	22.71

WCDMA (850 / 1900)

We found out the test mode with the highest power level after we analyze all the data rates. So we chosen HSUPA (worst case) as a representative.

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1.5. Test equipment list

Equipment	Manufacturer	Model	Cal Due.
Signal Generator	Agilent	E4438C	May 09, 2009
Spectrum Analyzer	H.P.	8565E	Oct. 01, 2009
Spectrum Analyzer	Agilent	E4440A	May 09, 2009
CMU200	R&S	109495	Oct. 02, 2009
Attenuator	Agilent	8494B	May 09, 2009
Preamplifier	H.P.	8447F	Sep. 03, 2009
Preamplifier	R&S	SCU_F0118_G35_ AFS42 SCC(F)	Aug. 25, 2009
Band Reject Filter	Wainwright	WRCG824/849-814/85960/10SS	May 09, 2009
High Pass Filter	Wainwright	WHK3.0/18G-10SS	Oct. 01, 2009
Ultra Broadband Antenna	R&S	HL562	Oct. 02, 2009
Horn Antenna	R&S	HF 906	Nov. 13, 2009
Horn Antenna	Electro-Metrics	RGA-60	Jul. 13, 2009
Communication Antenna	AR	AT 4002	N.C.R
Dipole Antenna	VHAP/UHAP	975/958	Oct. 26, 2009
Anechoic Chamber	SY Corporation	L x W x H (6.5 m x 3.5 m x 3.5 m)	Feb. 15, 2009

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1.6. Summary of test results

The EUT has been tested according to the following specifications:

Applied standard : FCC Part 22 Subpart H and Part 24 Subpart E		
Standard section	Test item	Result
22.913(a) 24.232(c)	RF radiated output power	Complied
22.917(a) 24.238(a)	Spurious radiated emission	Complied

1.7. Test report revision

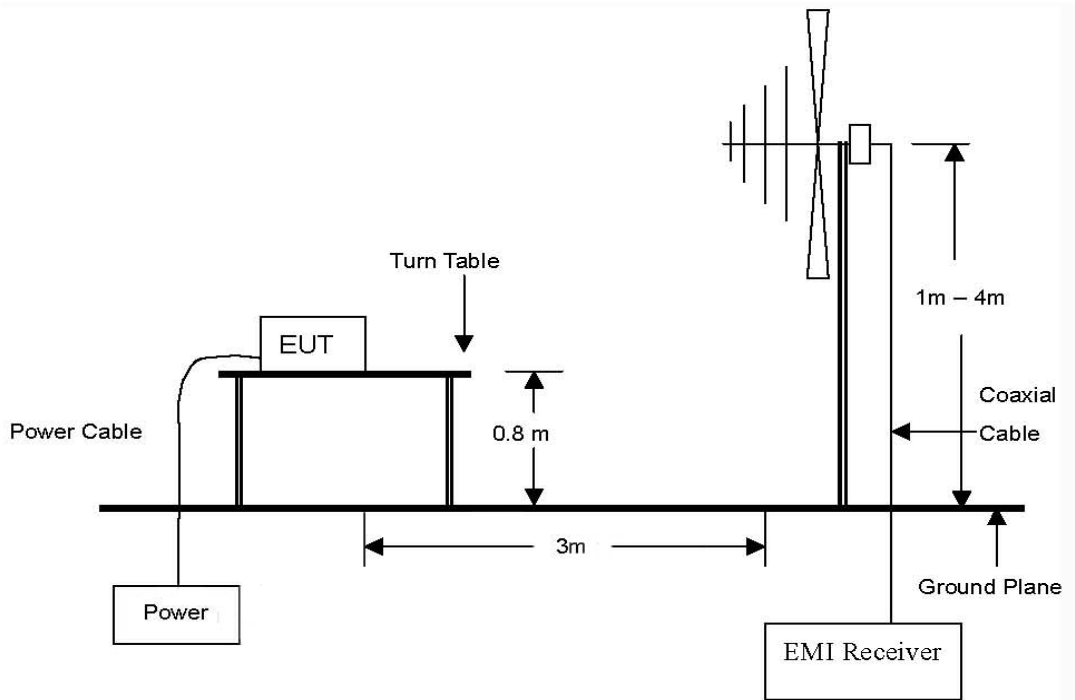
Revision	Report number	Description
0	F690501/RF-RTL002872	Initial

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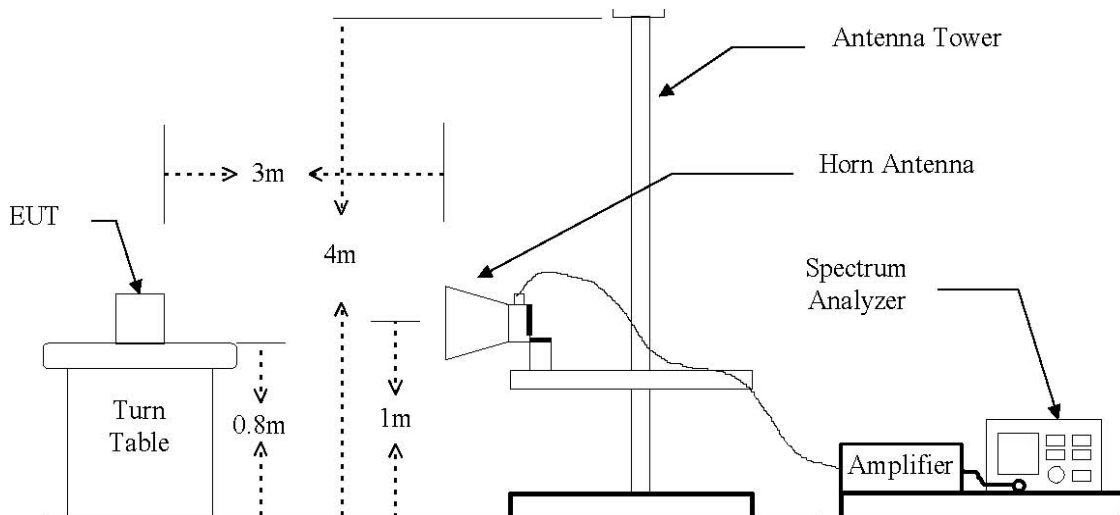
2. RF radiated output power & spurious radiated emission

2.1. Test setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.

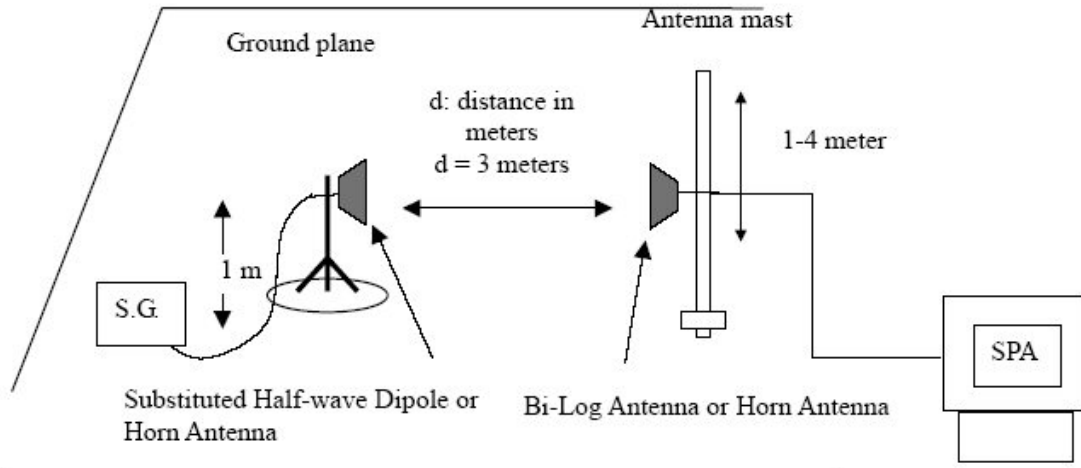


The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 18 GHz Emissions.



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The diagram below shows the test setup for substituted method



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2.2. Limit

FCC §22.913(a), the ERP of mobile transmitters must not exceed 7 watts. FCC §24.232(b) Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

2.3. Test procedure : Based on ANSI/TIA 603C: 2004

1. On a test site, the EUT shall be placed at 80cm height on a turn table, and in the position closest to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3m from EUT to correspond to the fundamental frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. During the measurement of the EUT, the resolution bandwidth was to 1 MHz and the average bandwidth was set to 1 MHz.
5. The transmitter shall be switched on, the measuring receiver shall be tuned to the frequency of the transmitter under test.
6. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
7. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
8. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
9. The maximum signal level detected by the measuring receiver shall be noted.
10. The EUT was replaced by half-wave dipole (824~849 MHz) or horn antenna (1850 ~1910 MHz) connected to a signal generator.
11. In necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
12. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
13. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, which is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
14. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
15. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

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2.4. Test result for RF output power

Ambient temperature : 21 °C
 Relative humidity : 43 % R.H.

Test mode: GSM 850 (GSM)

Frequency (MHz)	Ant. Pol. (H/V)	Cable loss (dB)	S.G level + Amp. (dBm)	Ant. gain (dBd)	E.R.P.	
					(dBm)	(mW)
824.2	H	0.62	38.99	-10.44	27.93	620.87
824.2	V	0.62	36.30	-10.44	25.24	334.20
836.4	H	0.64	38.05	-10.45	26.96	496.59
836.4	V	0.64	37.80	-10.45	26.71	468.81
848.8	H	0.56	37.38	-10.53	26.29	425.60
848.8	V	0.56	38.77	-10.53	27.68	586.14

Test mode: GSM1900 (GSM)

Frequency (MHz)	Ant. Pol. (H/V)	Cable loss (dB)	S.G level + Amp. (dBm)	Ant. gain (dBi)	E.I.R.P.	
					(dBm)	(mW)
1850.2	H	0.99	17.95	8.79	25.75	375.84
1850.2	V	0.99	20.24	8.79	28.04	636.80
1880.0	H	0.97	16.25	8.90	24.18	261.82
1880.0	V	0.97	19.70	8.90	27.63	579.43
1909.8	H	1.14	17.18	9.00	25.04	319.15
1909.8	V	1.14	18.21	9.00	26.07	404.58

Test mode: UMTS 850(HSUPA)

Frequency (MHz)	Ant. Pol. (H/V)	Cable loss (dB)	S.G level + Amp. (dBm)	Ant. gain (dBd)	E.R.P.	
					(dBm)	(mW)
826.4	H	0.62	30.67	-10.44	19.61	91.41
826.4	V	0.62	29.02	-10.44	17.96	62.52
836.0	H	0.64	29.71	-10.45	18.62	72.78
836.0	V	0.64	29.08	-10.45	17.99	62.95
846.6	H	0.56	31.02	-10.53	19.93	98.40
846.6	V	0.56	30.76	-10.53	19.67	92.68

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Test mode: UMTS 1900(HSUPA)

Frequency (MHz)	Ant. Pol. (H/V)	Cable loss (dB)	S.G level + Amp. (dBm)	Ant. gain (dBi)	E.I.R.P.	
					(dBm)	(mW)
1852.4	H	0.99	12.77	8.79	20.57	114.02
1852.4	V	0.99	15.40	8.79	23.20	208.93
1880.0	H	0.97	12.25	8.90	20.18	104.23
1880.0	V	0.97	15.68	8.90	23.61	229.61
1907.6	H	1.14	13.76	9.00	21.62	145.21
1907.6	V	1.14	15.17	9.00	23.03	200.91

Remark:

$E.R.P. \ \& \ E.I.R.P = Cable \ loss(dB) + [S.G \ level + Amp.](dBm) + Ant. \ gain \ (dBd/dBi)$

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2.5. Test result for spurious radiated emission

Ambient temperature : 21 °C
 Relative humidity : 43 % R.H.

Test mode: GSM 850 (GSM)

Frequency (MHz)	Ant. Pol. (H/V)	Cable loss (dB)	S.G level (dBm)	Ant. gain (dBd)	E.R.P (dBm)	Limit (dBm)	Margin (dB)
Low Channel(824.2 MHz)							
1648.4	H	1.03	-60.38	5.93	-55.48	-13.00	42.48
1648.4	V	1.03	-61.01	5.93	-56.11	-13.00	43.11
Middle Channel(836.4 MHz)							
1672.8	H	0.98	-59.75	5.95	-54.78	-13.00	41.78
1672.8	V	0.98	-59.99	5.95	-55.02	-13.00	42.02
High Channel(848.8 MHz)							
1697.6	H	0.91	-58.81	6.10	-53.62	-13.00	40.62
1697.6	V	0.91	-58.47	6.10	-53.28	-13.00	40.28

Test mode: GSM1900 (GSM)

Frequency (MHz)	Ant. Pol. (H/V)	Cable loss (dB)	S.G level (dBm)	Ant. gain (dBi)	E.I.R.P (dBm)	Limit (dBm)	Margin (dB)
Low Channel(1850.2 MHz)							
3700.4	H	2.37	-52.94	11.20	-44.11	-13.00	31.11
3700.4	V	2.37	-51.14	11.20	-42.31	-13.00	29.31
Middle Channel(1880.0 MHz)							
3760.0	H	2.33	-53.01	11.25	-44.09	-13.00	31.09
3760.0	V	2.33	-51.42	11.25	-42.50	-13.00	29.50
High Channel(1909.8 MHz)							
3819.6	H	2.36	-52.40	11.31	-43.45	-13.00	30.45
3819.6	V	2.36	-51.14	11.31	-42.19	-13.00	29.19

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Test mode: UMTS 850(HSUPA)

Frequency (MHz)	Ant. Pol. (H/V)	Cable loss (dB)	S.G level (dBm)	Ant. gain (dBd)	E.R.P (dBm)	Limit (dBm)	Margin (dB)
Low Channel(826.4 MHz)							
1652.8	H	1.03	-62.59	5.93	-57.69	-13.00	44.69
1652.8	V	1.03	-62.97	5.93	-58.07	-13.00	45.07
Middle Channel(836.0 MHz)							
1672.0	H	0.98	-61.39	5.95	-56.42	-13.00	43.42
1672.0	V	0.98	-62.75	5.95	-57.78	-13.00	44.78
High Channel(846.6 MHz)							
1693.2	H	0.91	-60.52	6.10	-55.33	-13.00	42.33
1693.2	V	0.91	-61.03	6.10	-55.84	-13.00	42.84

Test mode: UMTS 1900(HSUPA)

Frequency (MHz)	Ant. Pol. (H/V)	Cable loss (dB)	S.G level (dBm)	Ant. gain (dBi)	E.I.R.P (dBm)	Limit (dBm)	Margin (dB)
Low Channel(1852.4 MHz)							
3704.8	H	2.37	-48.97	11.20	-40.14	-13.00	27.14
3704.8	V	2.37	-51.41	11.20	-42.58	-13.00	29.58
Middle Channel(1880.0 MHz)							
3760.0	H	2.33	-48.68	11.25	-39.76	-13.00	26.76
3760.0	V	2.33	-51.17	11.25	-42.25	-13.00	29.25
High Channel(1907.6 MHz)							
3815.2	H	2.36	-48.24	11.31	-39.29	-13.00	26.29
3815.2	V	2.36	-50.80	11.31	-41.85	-13.00	28.85

Remark:

1. $E.R.P. \ \& \ E.I.R.P = \text{Cable loss}(\text{dB}) + [\text{S.G level} + \text{Amp.}](\text{dBm}) + \text{Ant. gain} (\text{dBd/dBi})$
2. No more harmonic above 3rd harmonic for all channel.

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Test setup photo of EUT

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Photo of E.R.P(E.I.R.P)

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