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FCC Test Report

FCC ID : BEJA230

Applicant : LG Electronics Inc.

Model Number : LG-A230

Additional Model(s) : A230, LG-A235, A235

Manufacturer : LG Electronics Inc.

ANSI C 63.4:2003

Test Standard : FCC Part 15 Subpart B

(Type of Device : Class B Computing Device Peripheral (JBP))

Date of Tests : February 23 ~ 26, 2011

Date of Issue : March 02, 2011

Tested by : M.J.SONG/Manager

Reviewed by : Y.K.SHIN/Manager

A handwritten signature in black ink, appearing to be "M.J. Song", written over a horizontal line.

A handwritten signature in black ink, appearing to be "Y.K. Shin", written over a horizontal line.

This test result only responds to the tested sample.

It is not allowed to copy this report even partly without the allowance of the test laboratory.

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1. General Remarks

This Report describes the emission characteristics of the tested product.

If the product will be used with additional equipment other than those mentioned in this report or if the tested product will be used against the manufacture's specifications, the compliance with the relevant standards for the system has to be ensured.

2. Test Laboratory

Digital EMC Co., Ltd. has been accredited / filed / authorized by the agencies listed in the following table;

Certificate	Nation	Agency	Code	Mark
Accreditation	Korea	KOLAS	393	ISO/IEC 17025
Site Filing	USA	FCC	101842	Test Facility list & NSA Data
	Japan	VCCI	C-1427 R-1364, R-3385 T-1442	Test Facility list & NSA Data
Certification	Korea	KCC	KR0034	Test Facility list & NSA Data
	Germany	TUV	ROK1028C	ISO/IEC 17025

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competents of calibration and testing laboratory".

DIGITAL EMC CO., LTD.

Address: 683-3, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080

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3. General Information of EUT

3.1 Product Description

Equipment Under Test (E.U.T) is Cellular/PCS GSM/GPRS Phone with Bluetooth and EDGE RX

Model: LG-A230 manufactured by LG Electronics Inc. Its basic purpose is used for communications.

3.2 Product Information

Model No.	LG-A230
Add Model No.	A230, LG-A235, A235
EUT Type	Cellular/PCS GSM/GPRS Phone with Bluetooth and EDGE RX
Serial No	NONE
FCC ID	BEJA230
Type of Sample Tested	Pre-Production
High Frequency	208MHz
Supplied Power for Test	AC120V, 60Hz
Applicant	LG Electronics Inc. 60-39, Gasan-dong, Gumchon-gu, Seoul, 153-023, Korea
TX Frequency	824.20 MHz to 848.80 MHz (GSM850) 1850.20 MHz to 1909.80 MHz (GSM1900)
RX Frequency	869.20 MHz to 893.80 MHz (GSM850) 1930.20 MHz to 1989.80 MHz (GSM1900)
Date of Receipt of Sample	2011-02-21

Related Submittal(s) / Grant(s)

Original submittal only.

4. Test Summary

4.1 Summary of tests

The applied standards to evaluate the compliance of requirements is 47CFR Part 15, Subpart B and the measurement procedures specified in ANSI C63.4 are performed.

Test Items	Applied Standards	Status
Emission		
Conducted Emission	FCC Part 15 Subpart B	C
Radiated Emission	FCC Part 15 Subpart B	C
Note 1: C=Conform NC=Not Conform NT=Not Tested NA=Not Applicable		

5. Test Set-up and operation mode

5.1 Principle of Configuration Selection

Emission : The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

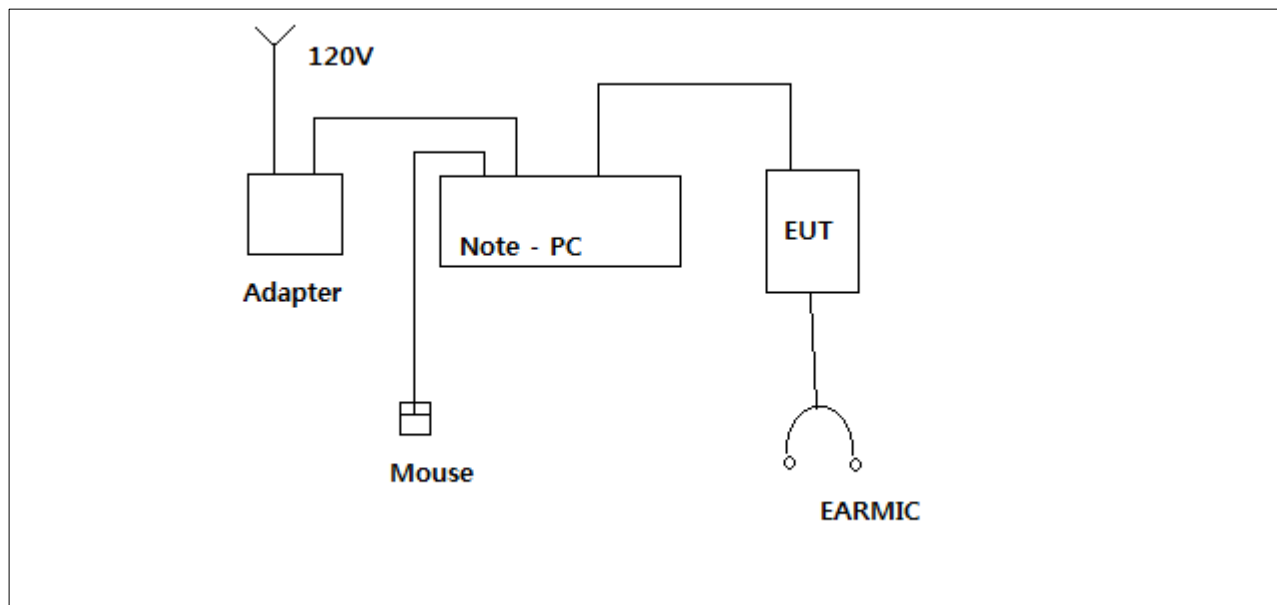
5.2 Test Operation Mode

- PC link mode(The measurement was made of the maximized by: Write/Delete the “H” pattern mode; data exchange speed; moving the cable)

5.3 Support Equipment Used

Unit	Model No.	Serial No.	Manufacturer	CABLE			Backshell	FCC ID
				Connect type	Length (m)	shield		
NOTE PC	LGX14	F022040	LG	USB	1.0	Shield	Plastic	DOC
				DC POWER	1.6	Shield	Plastic	
				USB	1.4	Shield	Plastic	
ADAPTER	ADP-40PH	6T1094	DELTA ELECTRONICS,INC.	AC POWER	1.2	Shield	Plastic	-
MOUSE	OMS3CB	OMS3CBGGD RT	SAMSUNG ELECTRO-MECHANICS	USB	1.4	Shield	Plastic	DOC
EarMic	N/A	N/A	LG	Stereo	1.2	Shield	Plastic	DOC

(Configuration of Tested System)



6. Test Results : Emission

6.1 Conducted Emission

RESULT : COMPLY

6.1.1 Measurement Procedure

In the range of 0.15MHz to 30MHz, the conducted emission was measured and set-up was made accordance with **ANSI C63.4:2003**.

If the EUT is table top equipment, it was placed on a wooden table with a height of 0.8m above the reference ground plane and 0.4m from the conducting wall of the shielded room.

Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15m above the reference ground plane.

Connect the EUT's power source lines to the appropriate power mains / peripherals through the LISN. All the other peripherals are connected to the 2nd LISN, if any.

Unused measuring port of the LISN was resistively terminated by 50 ohm terminator.

The measuring port of the LISN for EUT was connected to spectrum analyzer.

Using TOYO conducted emission test software, the emissions were scanned from 150KHz to 30MHz with peak detector mode.

After scanning over the frequency range, suspected emissions were selected to perform final measurement. When performing final measurement, the receiver was used which has Quasi-Peak detector and Average detector.

By varying the configuration of the test sample and the cable routing it was attempted to maximize the emission.

For further description of the configuration refer to the picture of the test set-up.

6.1.2 List of Test and Measurement Instruments

Name of Instrument	Model No.	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
Spectrum Analyzer	8594E	3710A03993	H.P	2011.02.16	2012.02.16
RFI/Field intensity Meter	KNM-2402	4N-170-3	KYORITSU	2010.07.02	2011.07.02
LISN	KNW-407	8-317-8	KYORITSU	2011.01.11	2012.01.12
LISN	KNW-242	8-654-15	KYORITSU	2010.07.02	2011.07.02
50 ohm Terminator	CT-01	N/A	TME	2011.01.11	2012.01.11

6.1.3 Limit for Conducted Emission

(1) Conducted Emission at mains ports of class A

Frequency range (MHz)	Limits dB(μ V)	
	Quasi-peak	Average
0.15 to 0.50	79	66
0.50 to 30	73	60
Note The lower limit shall apply at the transition frequencies.		

(2) Conducted Emission at mains ports of class B

Frequency range (MHz)	Limits dB(μ 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
Note 1 The lower limit shall apply at the transition frequencies.		
Note 2 The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.		

6.1.4 Test Result

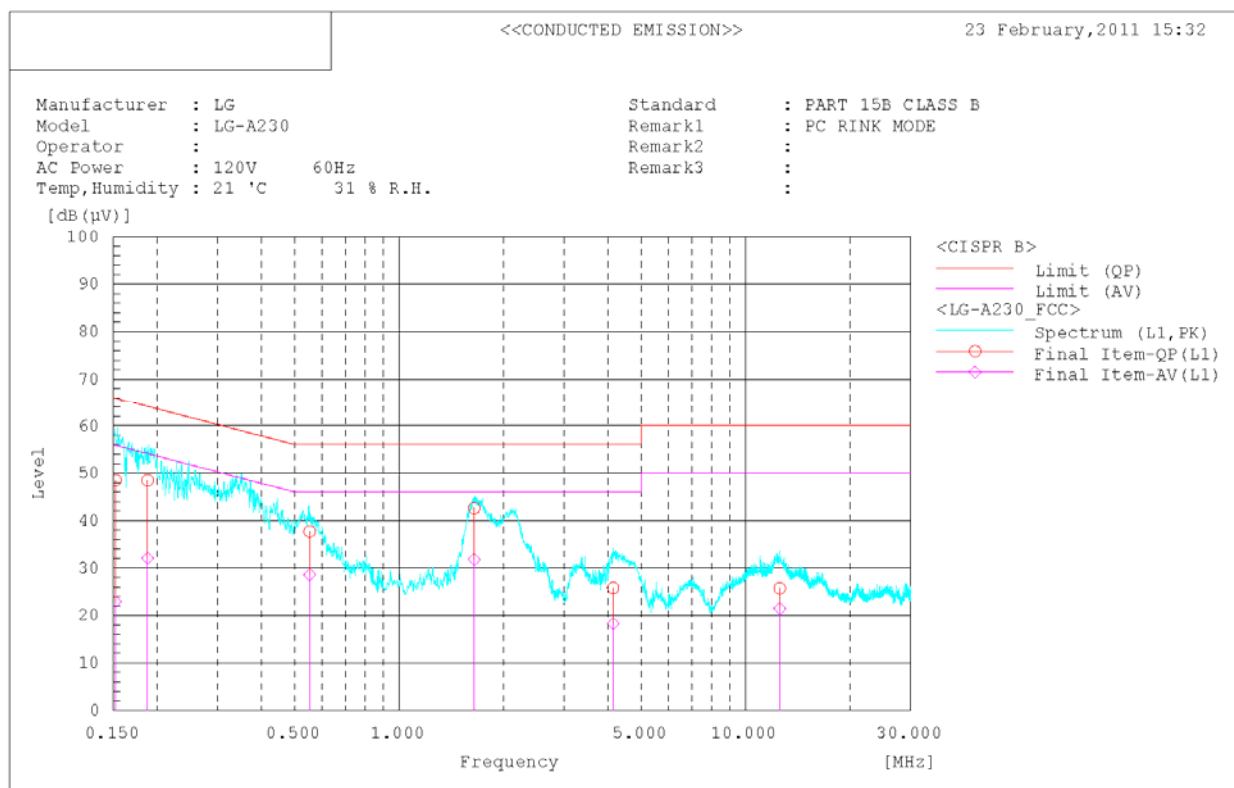
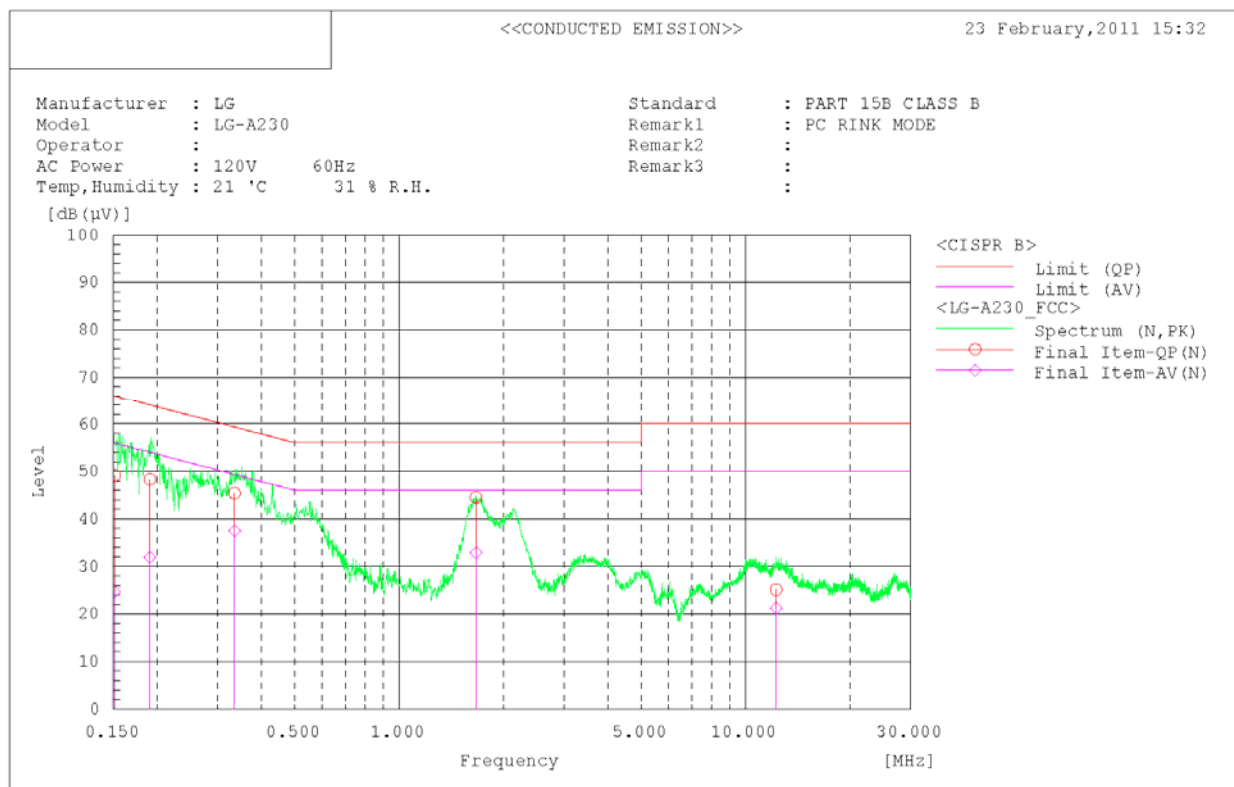
Test date	February 23, 2011
Ambient Temperature	21
Relative Humidity	31 % R.H.

Result : For the measurement data, see next page.

- Note) 1. Emission Level = Reading Value + Correction Factor.
 2. Correction Factor = Cable Loss + Insertion Loss of LISN
 3. Margin = Limit - Emission level
 4. Passed by 11.5 dB

Power Line Conducted Emissions			FCC PART 15b Class B		
Frequency (MHz)	Amplitude (dB μ V)	Conductor	Detector	Limit (dB μ V)	Margin (dB)
1,668	44.5	N	Quasi-Peak	56.0	11.5
1,649	42.6	L1	Quasi-Peak	56.0	13.2

Test Result



```

*****
<<CONDUCTED EMISSION>>
23 February, 2011 15:32

Standard      : PART 15B CLASS B
Manufacturer  : LG
Model         : LG-A230
Operator      :
AC Power      : 120V      60Hz
Temp, Humidity : 21 °C      31 % R.H.
Remark1       : PC RINK MODE
Remark2       :
Remark3       :
*****
Final Result

--- N Phase ---
No.  Frequency  Reading  Reading  c.f  Result  Result  Limit  Limit  Margin  Margin  Remark
      [MHz]     [dB(μV)] [dB(μV)] [dB]  [dB(μV)] [dB(μV)] [dB(μV)] [dB(μV)] [dB]  [dB]
1     0.151     49.0     24.6    0.1   49.1     24.7   65.9   55.9    16.8   31.2
2     0.191     48.2     31.8    0.1   48.3     31.9   64.0   54.0    15.7   22.1
3     0.335     45.3     37.4    0.1   45.4     37.5   59.3   49.3    13.9   11.8
4     1.668     44.3     32.7    0.2   44.5     32.9   56.0   46.0    11.5   13.1
5    12.250     24.4     20.5    0.7   25.1     21.2   60.0   50.0    34.9   28.8

--- L1 Phase ---
No.  Frequency  Reading  Reading  c.f  Result  Result  Limit  Limit  Margin  Margin  Remark
      [MHz]     [dB(μV)] [dB(μV)] [dB]  [dB(μV)] [dB(μV)] [dB(μV)] [dB(μV)] [dB]  [dB]
1     0.152     48.2     22.6    0.3   48.5     22.9   65.9   55.9    17.4   33.0
2     0.188     48.2     31.5    0.3   48.5     32.1   64.1   54.1    15.6   22.0
3     0.552     37.4     28.3    0.3   37.7     28.6   56.0   46.0    18.3   17.4
4     1.649     42.3     31.5    0.3   42.6     31.8   56.0   46.0    13.4   14.2
5     4.151     25.3     17.8    0.5   25.8     18.3   56.0   46.0    30.2   27.7
6    12.552     24.9     20.6    0.8   25.7     21.4   60.0   50.0    34.3   28.6

```

6.2 Radiated Emission

RESULT : COMPLY

6.2.1 Measurement Procedure

The radiated emission was measured and set-up was made accordance with **ANSI C63.4:2003**.

If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8m above the reference ground plane and 3m away from the interference receiving antenna in the **10m semi-anechoic chamber**.

Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15m above the reference ground plane.

Rotate the EUT from 0° to 360° and position the receiving antenna at heights from 1 to 4m above the reference ground plane continuously to determine associated with higher emission levels and record them.

The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report.

For below 1GHz frequency range, Quasi-Peak detector with 120kHz RBW was used.

Also Peak and Average detector with 1MHz RBW were used for above 1GHz frequency range.

For further description of the configuration refer to the picture of the test set-up.

6.2.2 List of Test and Measurement Instruments

Radiated Emission (10m Chamber)					
Name of Instrument	Model No.	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
EMI Test Receiver	ESU	100014	R&S	2011.01.20	2012.01.20
Bilog Antenna	CBL6112B	2737	SCHAFFNER	2010.07.14	2011.07.14
Horn Antenna	BBHA9120A	322	SCHWARZBECK	2010.04.13	2011.04.13
Amplifier(22dB)	8447E	2945A02865	H/P	2011.01.11	2012.01.11
Low Noise Preamplifier	MLA-00108-B02-36	1518831	TSJ	2011.01.11	2012.01.11
Controller	5905A	N/A	TOKIN	-	-
ANT.master	N/A	N/A	TOKIN	-	-

6.2.3 Limit of Radiated Emission

- The test frequency range of Radiated Emission measurements are listed below.

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40GHz, whichever is lower

(1) Limit for Radiated Emission below 1000MHz

Frequency range (MHz)	Class A Equipment (10m distance)	Class B Equipment (3m distance)
	Quasi-peak limits (dB μ V/m)	Quasi-peak limits (dB μ V/m)
30 to 88	39.1	40
88 to 216	43.5	43.5
216 to 960	46.4	46
960 to 1000	49.5	54
Note 1 The lower limit shall apply at the transition frequency. Note 2 Additional provisions may be required for cases where interference occurs. Note 3 According to 15.109(g), as an alternative to the radiated emission limit shown above, digital devices may be shown to comply with the standards(CISPR), Pub. 22 shown as below.		
30 to 230	40	30
230 to 1000	47	37

(2) Limits for Radiated Emission in the frequency range 1000 - 2000MHz at a measuring distance of 10m

Frequency (GHz)	Class A Equipment		Class B Equipment	
	peak (dB μ V/m)	peak (dB μ V/m)	peak (dB μ V/m)	Average (dB μ V/m)
1 to 2	69.5	49.5	63.5	43.5

(3) Limits for Radiated Emission above 1000MHz at a measuring distance of 3m

Frequency (GHz)	Class A Equipment		Class B Equipment	
	peak (dB μ V/m)	peak (dB μ V/m)	peak (dB μ V/m)	Average (dB μ V/m)
1 to 40	80	60	74	54

6.2.4 Test Result

Test date	February 26, 2011
Ambient Temperature	18
Relative Humidity	45 % R.H.

Result : For the measurement data, see next page

Note) 1. Emission Level = Reading Value + Correction Factor.

2. Correction Factor = Cable loss - Amp gain + Antenna Factor

3. Margin = Limit - Emission level

Frequency [MHz]	Pol.	Reading [dB μ V]	C.F. [dB(1/m)]	Result [dB(μ V/m)]	Limit [dB(μ V/m)]	Margin [dB]
137.190	V	40.7	-10.6	30.1	43.5	13.4

Radiated emission Test Data

Test Result

- 30MHz-1GHz



RADIATED EMISSION

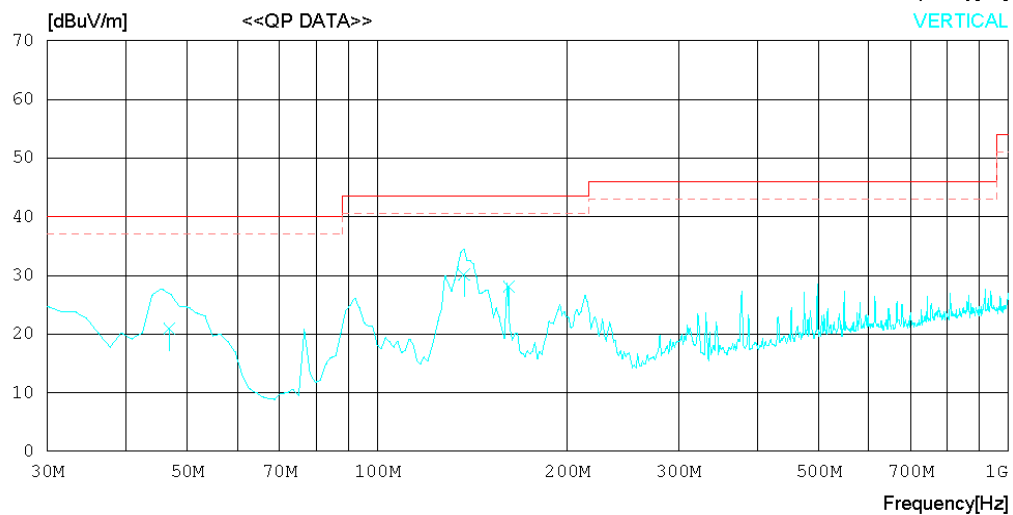
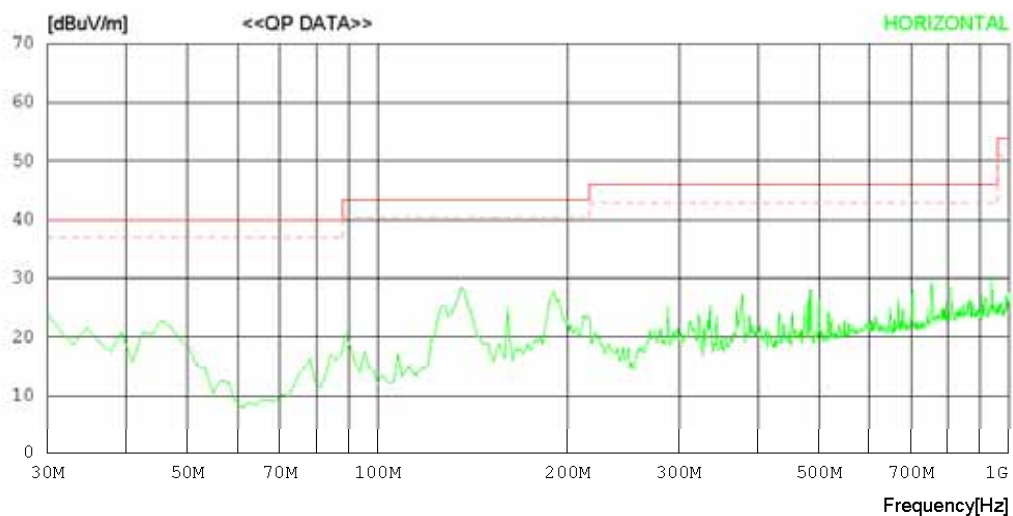
Date : 2011-02-26

Model Name : LG-A230
Model No. :
Serial No. :
Test Condition :

Reference No. :
Power Supply : 120V 60Hz
Temp/Humi : 18 °C 45 % R.H.
Operator :

Memo :

LIMIT : FCC Part15 Subpart B Class B (3m)
MARGIN: 3 dB



RADIATED EMISSION

Date : 2011-02-26

Model Name	:	LG-A230	Reference No.	:	
Model No.	:		Power Supply	:	120V 60Hz
Serial No.	:		Temp/Humi	:	18°C 45 % R.H.
Test Condition	:		Operator	:	
Memo	:				

LIMIT : FCC Part15 Subpart B Class B (3m)
MARGIN: 3 dB

No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	QP [dBuV]	FACTOR [dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Vertical -----										
1	46.858	30.2	12.4	0.9	22.6	20.9	40.0	19.1	257	135
2	137.190	40.7	11.1	1.3	23.0	30.1	43.5	13.4	122	233
3	161.542	39.6	10.2	1.4	23.1	28.1	43.5	15.4	113	101

- 1GHz - 3GHz_PEAK



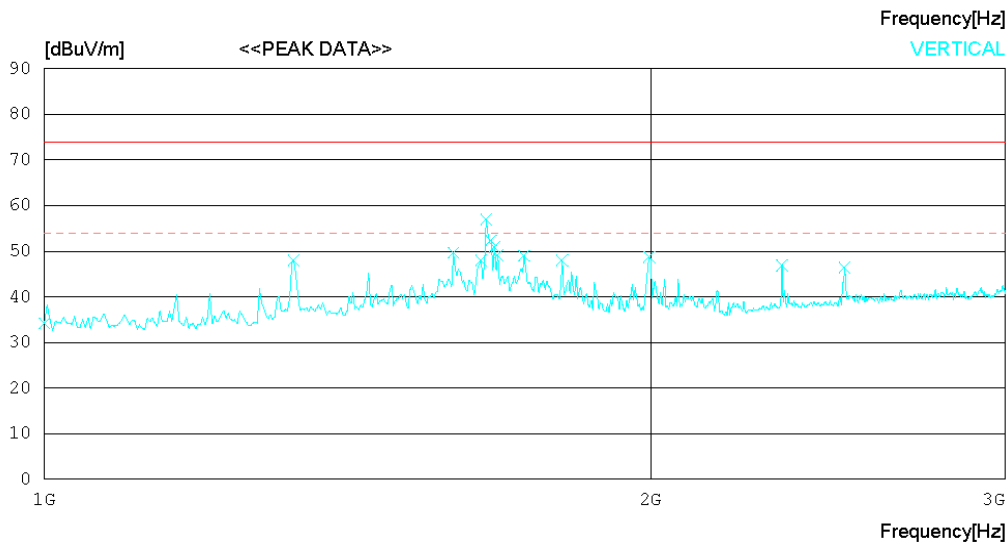
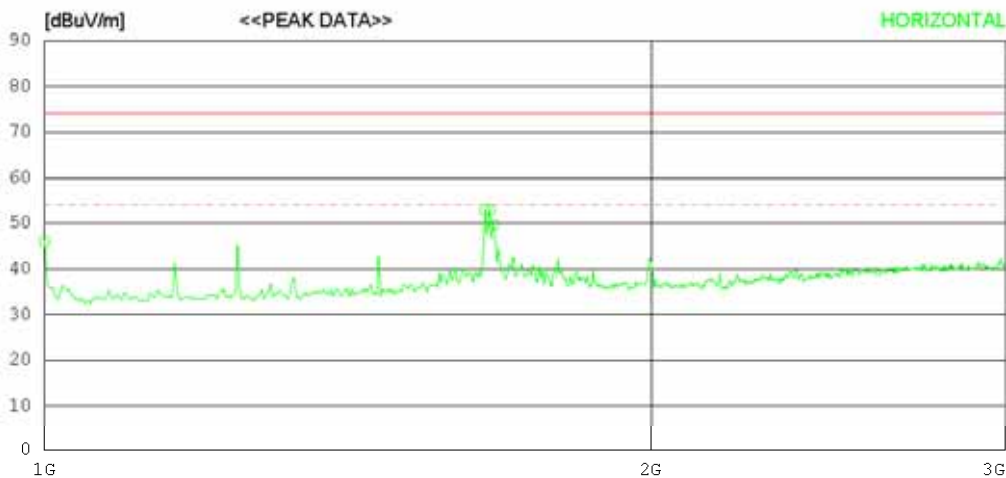
RADIATED EMISSION

Date : 2011-02-26

Model Name	: LG-A230	Reference No.	:
Model No.	:	Power Supply	: 120V 60Hz
Serial No.	:	Temp/Humi	: 18 °C 45 % R.H.
Test Condition	:	Operator	:

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Peak)
FCC Part15 Subpart.B Class B (3m) - 18G(Avg)



RADIATED EMISSION

Date : 2011-02-26

Model Name	:	LG-A230	Reference No.	:	
Model No.	:		Power Supply	:	120V 60Hz
Serial No.	:		Temp/Humi	:	18°C 45 % R.H.
Test Condition	:		Operator	:	

Memo :

LIMIT : FCC Part15 Subpart B Class B (3m) - 18G(Peak)
FCC Part15 Subpart B Class B (3m) - 18G(Avg)

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	1000.000	59.5	23.6	4.8	41.8	46.1	74.0	27.9	100	358
2	1653.836	63.4	25.2	6.3	41.9	53.0	74.0	21	100	358
3	1663.452	63.3	25.2	6.3	41.9	52.9	74.0	21.1	100	358
4	1669.862	60.1	25.2	6.3	41.9	49.7	74.0	24.3	100	358
----- Vertical -----										
5	1000.000	47.6	23.6	4.8	41.8	34.2	74.0	39.8	100	1
6	1330.124	59.7	24.6	5.6	41.9	48.0	74.0	26	100	84
7	1596.145	60.2	25.2	6.2	41.9	49.7	74.0	24.3	100	1
8	1647.426	58.4	25.2	6.3	41.9	48.0	74.0	26	100	225
9	1657.042	67.4	25.2	6.3	41.9	57.0	74.0	17	100	205
10	1666.657	62.8	25.2	6.3	41.9	52.4	74.0	21.6	100	191
11	1673.067	61.3	25.2	6.3	41.9	50.9	74.0	23.1	100	1
12	1679.477	59.6	25.2	6.3	41.9	49.2	74.0	24.8	100	1
13	1730.758	59.3	25.2	6.4	41.9	49.0	74.0	25	100	1
14	1807.680	58.2	25.2	6.6	42.0	48.0	74.0	26	100	1
15	1996.780	58.5	25.2	7.0	42.0	48.7	74.0	25.3	100	289
16	2323.698	54.8	26.6	7.5	42.0	46.9	74.0	27.1	100	272
17	2496.772	53.5	27.3	7.7	42.0	46.5	74.0	27.5	100	1

- 1GHz - 3GHz_AV



RADIATED EMISSION

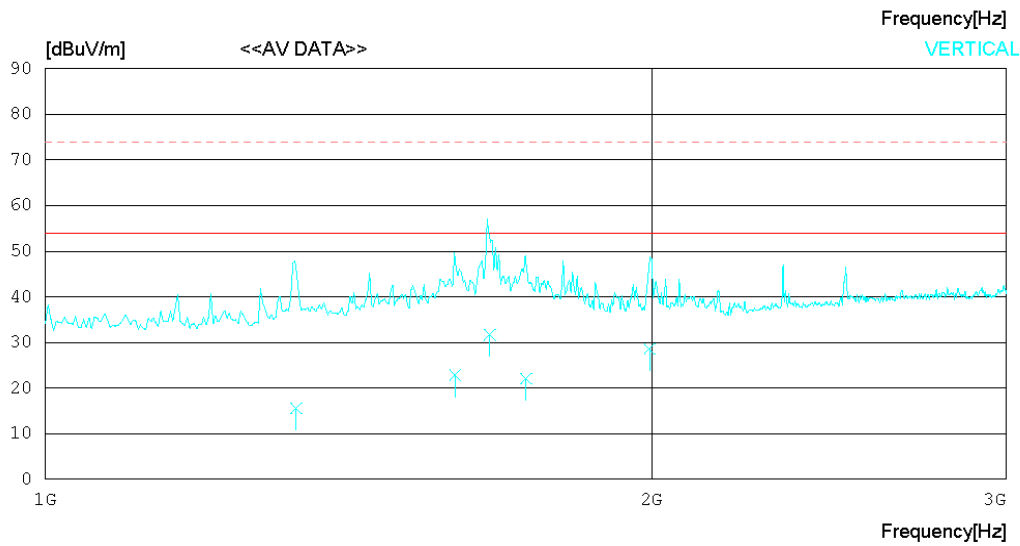
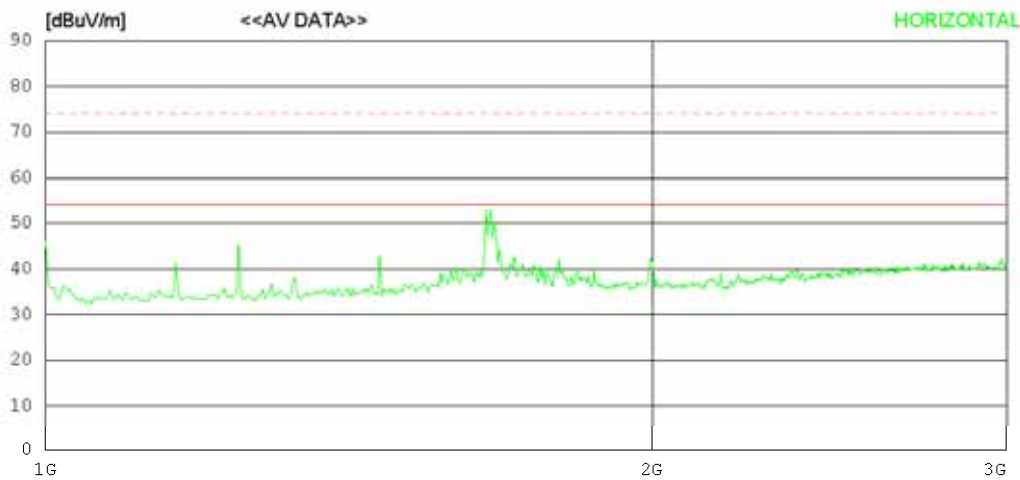
Date : 2011-02-26

Model Name : LG-A230
Model No. :
Serial No. :
Test Condition :

Reference No. :
Power Supply : 120V 60Hz
Temp/Humi : 18 °C 45 % R.H.
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Avg)
FCC Part15 Subpart.B Class B (3m) - 18G(Peak)



RADIATED EMISSION

Date : 2011-02-26

Model Name	:	LG-A230	Reference No.	:	
Model No.	:		Power Supply	:	120V 60Hz
Serial No.	:		Temp/Humi	:	18°C 45 % R.H.
Test Condition	:		Operator	:	
Memo	:				

LIMIT : FCC Part15 Subpart B Class B (3m) - 18G(Avg)
 FCC Part15 Subpart B Class B (3m) - 18G(Peak)

No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	AV	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
		[dBuV]	[dB]							
----- Vertical -----										
1	1332.058	27.3	24.6	5.6	41.9	15.6	54.0	38.4	100	84
2	1597.871	33.4	25.2	6.2	41.9	22.9	54.0	31.1	100	1
3	1662.179	42.1	25.2	6.3	41.9	31.7	54.0	22.3	100	205
4	1732.245	32.4	25.2	6.4	41.9	22.1	54.0	31.9	100	1
5	1995.679	38.4	25.2	7.0	42.0	28.6	54.0	25.4	100	289