LG Electronics

EMC TEST REPORT

CERTIFICATE OF COMPLIANCE
FCC Part 15B Certification

Applicant Name :
LG Electronics Inc.

Date of Testing :
Jun. 20 ~ 21, 2009

Test Site/Location :
Mobile Company Certification Laboratory
60-39, Kasan-dong, Keumchun-ku, Seoul Korea

Test Report Serial No :
MCCL-01-09-090

FCC ID : BEJAX310
APPLICANT： LG Electronics Inc

EUT Type	**Cellular/PCS CDMA Phone with Bluetooth**
Model :	**AX310**
FCC Rule part(s) :	**FCC Part15 Subpart B**
FCC Classification :	**FCC Class B Digital Device (JBP)**
Test Procedure :	**ANSI C63.4-2003**

The device bearing the trade name and model specified above, has been shown to comply with the Applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003.(See Test Report). These measurements were performed with no deviation from the standards.

I authorize and attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

KOREA LABORATORY ACCREDITATION SCHEME KOLAS TESTING NO. 306

Approved by:

E.S. Park /Technical Manager
MCCL

Tested by:

G. K. Seo / Test Engineer
MCCL

Note: The result in this test report apply only to the sample tested.

LG Electronics

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MEASUREMENT REPORT

FCC Part 15B – Unintentional Radiators

General Information

APPLICANT:	LG Electronics Inc.
APPLICANT ADDRESS	60-39, Kasan-dong, Keumchun-ku, Seoul Korea
TEST SITE : TEST SITE ADDRESS:	Mobile Commmunication Certification Laboratory 60-39, Kasan-dong, Keumchun-ku, Seoul Korea
FCC Rule Part(S) :	FCC Part 15 Subpart B
FCC ID	BEJAX310
Test Device Serial No.:	N/A ☐ Production ■ Pre-Production ☐ Engineering
FCC CLASSIFICATION	FCC Class B Digital Device (JBP)
Date of Receipt of EUT :	Jun. 15, 2009

Test Methodology

Both conducted and radiated measurements were taken using the methods and procedures described in ANSI C63.4-2003. Radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1. INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

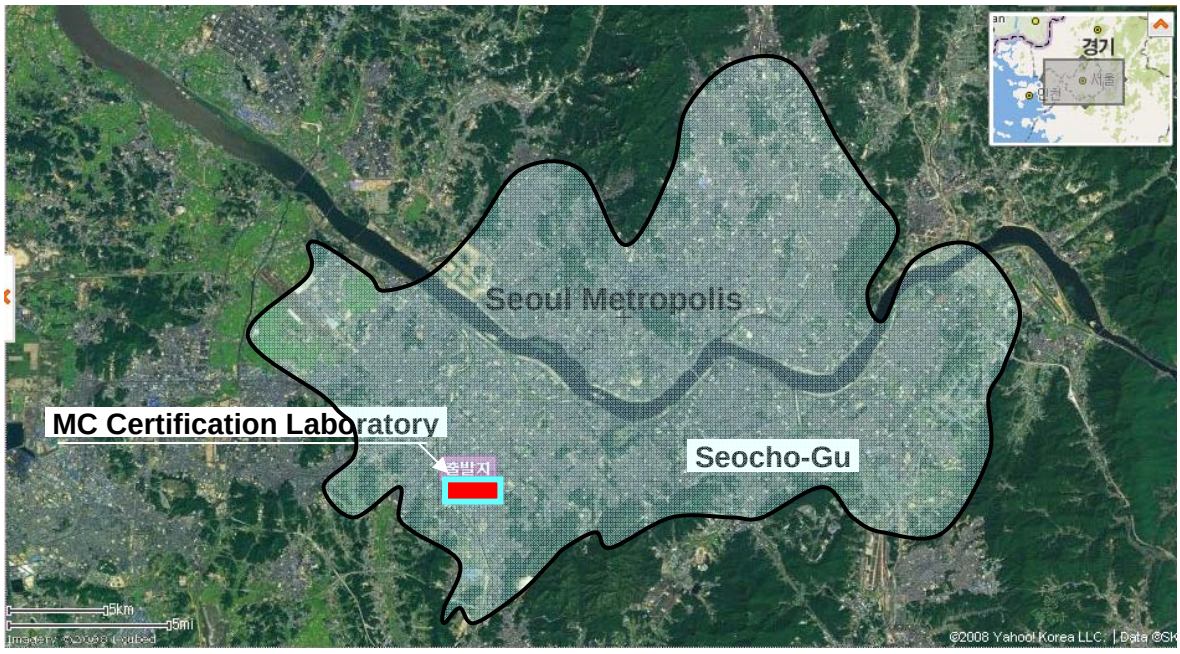
1.2 MCCL Test Location

MC Certification Laboratory is located in the west-south of Seoul Metropolis.

It takes about 1 hour from Incheon International Airport to MC Certification by car.(37miles)

The coordinates are 37 28 36.69” N latitude and 126 53 17.69” E longitude.

Address : 60-39, Kasan-dong, Kumchon-gu, Seoul, Korea



2. PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LGE Cellular/PCS CDMA Phone with Bluetooth FCC ID: BEJAX310.** The test data contained in this report pertains only to the emissions due to the digital circuitry of the EUT.

Manufacturer/Base Model	FCC ID	Description
LGE/Model: AX310	BEJAX310	Cellular/PCS CDMA Phone with Bluetooth

Table 2-1. EUT Equipment Description

2.2 Operation Mode

The LGE Cellular/PCS CDMA Phone with Bluetooth
FCC ID: BEJAX310 was tested with a NOTEBOOK connected via USB interface port. For more information please see Section 7.0 for test data and Sections 9.0 and 10.0 for the Test setup photographs.

2.3 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

2.4 Labeling Requirements

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase.
However, when the device is so small wherein placement of the label with specified statement is not practical, only the trade name and FCC ID must be displayed on the device per Section 15.19(b)(2)

Please see attachment for FCC ID label and label location.

3. DESCRIPTION OF TEST

3.1 Evaluation Procedure

The measurement procedure described in the American National Standard for Methods of Measurement of Radio-Noise Emission form Low-Voltage Electrical and Electronic Equipment in The Range of 9kHz to 40GHz(ANSI C63.4-2003) was used in the measurement of the
LGE Cellular/PCS CDMA Phone with Bluetooth
FCC ID: BEJAX310.

Deviation from measurement procedure……..None

3.2 Conducted Emissions

The line-conducted facility is located inside a shielded enclosure, manufactured by DAEHAN Shield Engineering. The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-5. A 1m×1.5m wooden table 80cm high is placed 40cm away from the Vertical wall And 1.5m away from the sidewall of the shielded room. Rohde-Schwarz Model ENV216(10kHz-30MHz) 50 Ω/50 μ H Line-Impedance Stabilization Network (LISN) is Bonded to the shielded Room. The EUT is powered from the LISN and the support equipment is powered from the R&S LISN. Power to the LISN is filtered by a high-current high-current high-insertion loss Ray Proof Power line filter (100dB 14Hz-10GHz). The Purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the shielded enclosure. All electrical cables are shielded by braided tinned copper zipper tubing with an inner diameter of 1/2.
If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the R&S LISN. The LISN schematic diagram is shown. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling(serpentine fashion). Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the EMI test receiver to determine the frequency producing the maximum EME from the EUT.

The EMI test receiver was scanned from 150kHz to 30MHz with a EMI test receiver. The detector function was set to CISPR quasi-peak and average mode. The bandwidth of the analyzer was set to 10kHz. The EUT,support equipment, and interconnecting cables were arranged and manipulated to Maximize each EME emission. Each emission was maximized by: switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet but and the computer aux AC outlet.if applicable; whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in the test setup photographs. Each EME reported was calibrated using the Rohed&Schwarz SMR40(10MHz~40GHz) Signal Generator.

3.3 Radiated Emissions

Preliminary Measurements were made indoors at 1-meter using broadband antennas, broadband amplifiers, and EMI test receiver to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, and turntable azimuth with respect to the antenna was noted for each frequency found. The EMI test receiver was scanned from 30 to 1000MHz using a bio-log antenna. Above 1 GHz, linearly Polarized double ridge horn antennas were used.

Final measurements were made indoors at 3-meter test range using Dipole antennas or horn antennas. The test equipment was placed on a wooden and plastic bench situated on a 1.5m ×2m Area adjacent to the measurement area. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The detector function was set to CISPR quasi-peak mode and the bandwidth of the spectrum analyzer was set to CISPR quasi-peak mode and the bandwidth of the spectrum analyzer was set to 100kHz for frequencies above 1GHz. Above 1GHz the detector function was set to average mode (RBW =1MHz,VBW = 10Hz)

The half-wave dipole antenna was tuned to the frequency found during preliminary radiated measurements. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of an 0.8-meter high non-metallic 0.8 × 1.2 meter table. The EUT, support, maximize each EME emission. The turntable containing the system was rotated and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in the test setup photographs. Each EME reported was calibrated using the Rohed&Schwarz SMR40 (10MHz~40GHz) Signal Generator.

4. SAMPLE CALCULATIONS

4.1 Conducted Emission Measurement Sample Calculation

@ 20.3 MHz

Class B limit = 60.0dBμV(Quasi-peak limit)
Reading = 49.2dBμV(calibrated quasi-peak level)

Margin = 49.2 -60.0 = -10.8 dB
= 10.8 dB below limit

4.2 Radiated Emission Measurement Sample Calculation

@ 53.3 MHz

Class B limit = 100μV/m = 40.0 dBμV/m
Reading = 21.6μV/m (quasi-peak level)

Antenna Factor + Cable Loss = 4..7 dB/m
Margin = 21.6 -40.0 = -18.4 dB
= 18.4 dB below limit

Note:

Level [dBμV] = 20 log $_{10}$(Level[μV/m]
Level [dBμV] = Level[dBm] + 107

5. TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

Type	Maker	Model	Serial num.	Cal. Date	Cal. Date DUE
Test receiver	R&S	ESIB7	100314	Mar.05,09	Mar.05,10
Test receiver	R&S	ESIB7	100315	Mar.05,09	Mar.05,10
Test receiver	R&S	ESIB40	100290	Mar.05,09	Mar.05,10
LISN	R&S	ENV216	100245	Jun.22,09	Jun.22,10
LISN	R&S	ENV216	100220	Jun.22,09	Jun.22,10
Log-periodic antenna	S/B	VUSLP 9111	295	Nov.24,08	Nov.24,09
Billog antenna	S/B	CBL6112D	22245	Apr.13,09	Apr.13,10
Billog antenna	S/B	CBL6112D	22249	Apr.13,09	Apr.13,10
Precision Dipole antenna	S/B	VHAP	1114	Nov.24,08	Nov.24,09
Precision Dipole antenna	S/B	UHAP	1095	Nov.25,08	Nov.25,09
Amplifier	Sonoma	310N	261720	Mar.06,09	Mar.06,10
Horn Antenna	S/B	BBHA9120D	112834	Mar.02,09	Mar.02,10

6. ENVIRONMENTAL CONDITIONS

The temperature is controlled within range of 15 ℃ to 35 ℃
The relative humidity is controlled within range of 30 % to 60 %.
The atmospheric pressure is controlled within the range 86 - 106kPa (860 - 1060mbar).

7. TEST DATA

7.1 Summary

Test Date(s): Jun. 20 ~ 21, 2009
Test Engineer: G. K. Seo

FCC Part 15 Section	Description	Result
15.107	Conducted Emissions	PASS
15.109	Radiated Emissions	PASS

Table 7-1 Summary of Test Results

7.2 Test Support Equipment.

1	**LGE Data Link Cable**	**Model: N/A** **1.2m Shielded USB Data Cable**	**S/N: N/A**
2	**LG Notebook PC** **LG AC Adapter**	**Model:LGX11 (Doc)** **Model:0225A2040** **1.78m Unshielded AC Power cord** **1.92m Unshielded AC Power cord with ferrite bead on notebook end**	**S/N:809MSSTU013049** **S/N:A30836229065**
3	**USB Software Driver**	**LGE Mobile USB Serial Port**	**Version: 4.9.4.0**
4	**LG USB Mouse**	**Model: M-UAE96 (DoC)**	**S/N : HC7360G02NB**

Note: See test setup photographs for actual system test setup.

7.3 Radiated Measurement Data:

Freq. [MHz]	Reading QP [dB(uV/m)]	C.F (dB/m)	Pol	Height [m]	Degrees	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]
311.86	51.4	- 12.9	H	1.0	0.5	38.5	46.0	7.5
366.29	52.8	- 11.6	H	1.0	113.0	41.2	46.0	4.8
449.88	47.7	- 9.9	H	1.5	253.5	37.8	46.0	8.2
519.86	46.0	- 8.2	V	1.0	248.2	37.8	46.0	8.2
830.88	40.6	- 2.4	V	1.0	220.3	38.2	46.0	7.8
898.91	39.7	- 0.5	V	1.0	220.3	39.2	46.0	6.8

***C.F (Conversion Factor): Amp Gain + Cable loss + Antenna Factor**

Table 7-2 Radiated Measurements at 3-meters

NOTES:

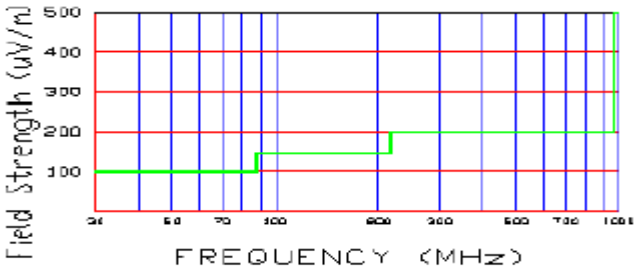


Figure 7-1. 3 Meter Limits

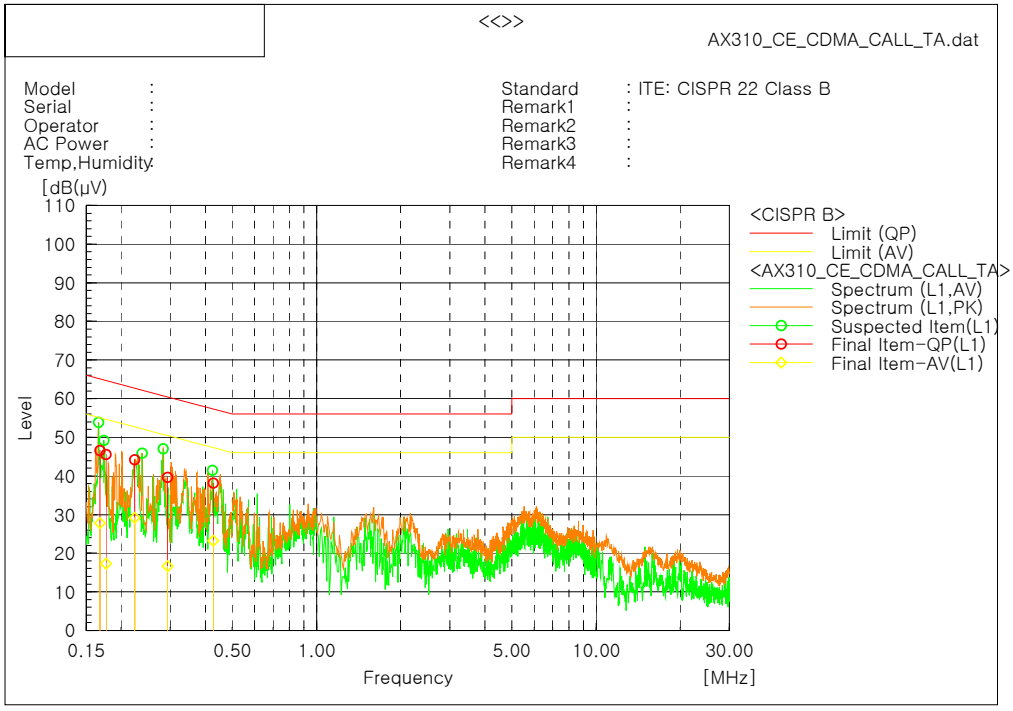
1. All modes of operation were investigated and worst-case emissions are reported.
2. Radiated Emissions were measured from 300MHz – 1000MHz.
3. The radiated limits are shown on Figure 7-1 Above 960MHz the limit is 500μV/m.
4. **Measurement uncertainty**
   Radiated emissions measurements,
   Biconical antenna (30 MHz ~ 300 MHz): + 4.52 dB / - 4.60dB.
   Log periodic antenna (300 MHz ~ 1000 MHz): + 3.96dB / -3.98 dB.
   Biconi-Log Antenna 30 MHz – 1000 MHz: + 4.49 dB / - 4.57dB.

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT in the above mentioned way.
The measurement uncertainty was given with a confidence of 95 %.

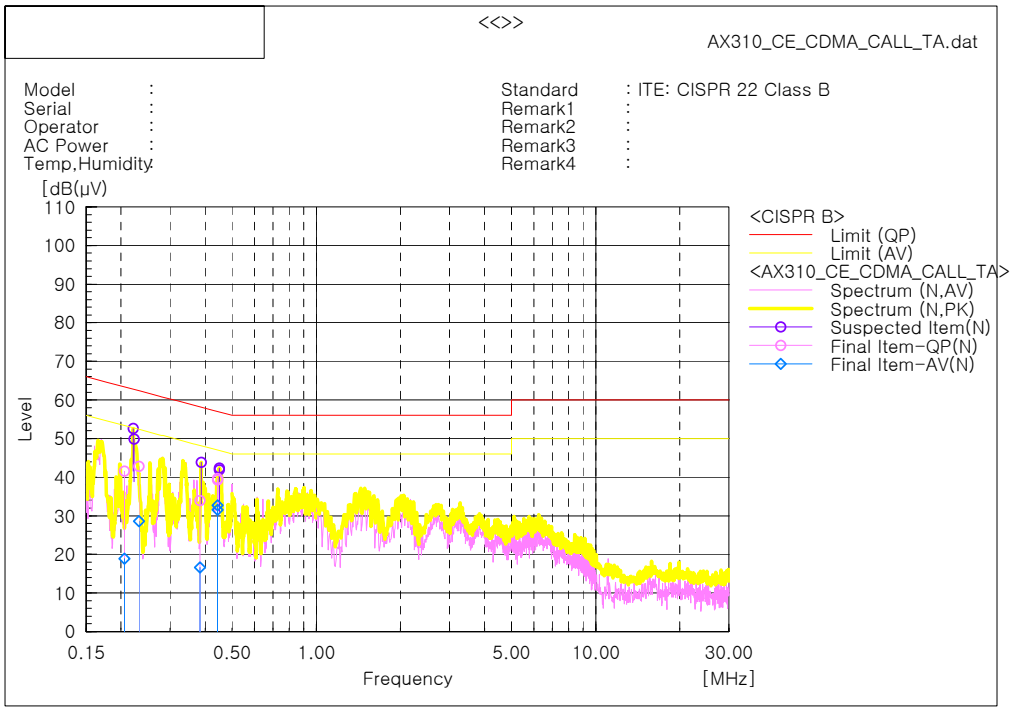
1. Measurements made using CISPR quasi-peak mode.Above 1GHz, peak detector function mode Is used with a resolution bandwidth of 1MHz and a video bandwidth of 1MHz. The peak level complies with the average limit peak mode is used with linearly polarized horn antenna and low-loss microwave cable.

7.4 Line Conducted Measurement Data:

▣ Line A (Phase)



▣ Line B (Neutral)



Plot 7-1. Line-Conducted Test Plot.

Notes:

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.107 of the Title 47 CFR.
3. Line A = Phase; Line B = Neutral

Line Conducted Measurement Data

Freq. [MHz]	Line	Level QP [dB(uV)]	Level AV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin AV [dB]
0.1680	A	46.6	27.7	65.1	55.1	18.5	27.4
0.2233	A	44.1	29.2	62.7	52.7	18.6	23.5
0.2926	A	39.6	16.6	60.4	50.4	20.8	33.8
0.4272	A	38.2	23.2	57.3	47.3	19.1	24.1
0.2312	B	42.8	28.6	62.4	52.4	19.6	23.8
0.3827	B	33.9	16.6	58.2	48.2	24.3	31.6
0.4425	B	39.3	31.5	57.0	47.0	17.7	15.5
0.4437	B	39.6	32.7	57.0	47.0	17.4	14.3

Table 7-3. Line-Conducted Test Data

Notes:

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.107 of the title 47 CFR.
3. Line A = Phase; Line B = Neutral
4. **Measurement uncertainty**
   Conducted emissions measurements,
   Mains terminal disturbance voltage, quasi-peak & average detection: + 2.68 dB / - 2.68 dB.

   The measurement uncertainty describes the overall uncertainty of the given measured value During the operation of the EUT in above mention way. Measurement uncertainty is calculated in accordance with LAB 34.The measurement uncertainty is given with a confidence of 95 %.

8. CONCLUSION

The data collected relate only to the item(s) tested and show that the **LGE Cellular/PCS CDMA Phone with Bluetooth FCC ID:BEJAX310** has been tested to comply with the requirements specified in §15.107 and § 15.109 of the FCC Rules.