



HCT CO., LTD.

PRODUCT COMPLIANCE DIVISION
SAN 136-1, AMI-RI, BUBAL-EUP, ICHEON-SI, KYOUNGKI-DO, 467-701, KOREA
TEL : +82 31 639 8539 FAX : +82 31 639 8525 www.hct.co.kr

EMI CERTIFICATION REPORT

Applicant:

LG Electronics Inc.

60-39, Gasan-dong, Gumchon-gu, Seoul
153-023, Korea

Date of Issue: August 16, 2010

Test Report No.: HCTE1007FE26-1

Test Site: HCT CO., LTD.

HCT FRN: 0005-8664-21

FCC ID:

BEJVS660

Rule Part(s) / Standard(s) : FCC PART 15 Subpart B / CISPR 22 Class B
Equipment Type : Cellular/PCS CDMA/EvDO Phone with Bluetooth & WLAN
Model(s) Name : VS660, LG-VS660
Port / Connector(s) : USB Data Port / Headset Port

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 if any modifications were made for compliance)

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the 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.

HCT certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862.

Report prepared by
: Dong Sup Kim
Test Engineer of EMC Tech. Part

Approved by
: Kyoung-Hee Yoon
Manager of EMC Tech. Part

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

TABLE OF CONTENTS

	PAGE
1. GENERAL INFORMATION	
1.1 Product description	3
1.2 Related submittal(s)/Grant(s)	3
1.3 Tested system details	4
1.4 Cable description	5
1.5 Noise suppression parts on cable. (I/O cable)	5
1.6 Test methodology	6
1.7 Test facility	6
1.8 Frequency Range of Radiated Measurements	6
2. SYSTEM TEST CONFIGURATION	
2.1 Configuration of tested system	7
3. PRELIMINARY TEST	
3.1 Conducted Emission test	8
3.2 Radiated Emission test	8
4. CONDUCTED AND RADIATED EMISSION TESTS SUMMARY	
4.1 Conducted Emission test	9
4.2 Radiated Emission test	14
5. FIELD STRENGTH CALCULATION	15
6. TEST EQUIPMENT	16
7. CONCLUSION	17

ATTACHMENT: TEST SETUP PHOTOGRAPHS

1. GENERAL INFORMATION

1.1 Product Description

Equipment Under Test (E.U.T) is **Cellular/PCS CDMA/EvDO Phone with Bluetooth & WLAN, Model: VS660, LG-VS660** manufactured by **LG Electronics Inc.** Its basic purpose is used for communications.

Model (s)	VS660, LG-VS660
FCC ID	BEJVS660
E.U.T Type	Cellular/PCS CDMA/EvDO Phone with Bluetooth & WLAN
TX Frequency	824.70 MHz to 848.31 MHz (CDMA 850) 1 851.25 MHz to 1 908.75 MHz (CDMA 1 900)
RX Frequency	869.70 MHz to 893.31 MHz (CDMA 850) 1 931.25 MHz to 1 988.75 MHz (CDMA 1 900)

1.2 Related Submittal(s) / Grant(s)

Original submittal only.

1.3 Tested System Details

All equipment descriptions used in the tested system (including inserted cards) are:

Device Type	Manufacturer	Model Number/ Part Number	FCC ID / DoC	Connected To
Cellular/PCS CDMA /EvDO Phone with Bluetooth & WLAN	LG	VS660	BEJVS660	Notebook PC
Notebook PC	HP	Compaq6730b	DoC	E.U.T
Notebook PC adaptor	Hipro Electronics	PPP014Y-S	-	Notebook PC
Mouse	Microsoft	Intellimouse optical USB and PS/2 compatible	DoC	Notebook PC
USB Cable	-	-	-	Notebook PC E.U.T
Headset	-	-	-	E.U.T

1.4 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
Cellular/PCS CDMA /EvDO Phone with Bluetooth & WLAN	Headset jack	-	N	(D)1.0
	USB data	Y	Y	(P,D)1.2
Notebook PC	USB (Mouse)	-	Y	(D)1.8

* The marked "(D)" means the data cable and "(P)" means the power cable.

1.5 Noise Suppression Parts on Cable. (I/O cable)

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
Cellular/PCS CDMA /EvDO Phone with Bluetooth & WLAN	Headset jack	N	-	Y	E.U.T End
	USB data	N	-	Y	Both End
Notebook PC	USB (Mouse)	Y	Notebook PC End	Y	Notebook PC End

1.6 Test Methodology

Both Conducted and Radiated testing was performed according to the procedures in ANSI C63.4/2003. Radiated testing was performed at an antenna to E.U.T distance of 3 m

1.7 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1, Maekok-ri, Hobup-myun, Ichon-si, Kyoungki-do, 467-701, KOREA. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated June 10, 2009. (Registration Number: 90661)

1.8 Frequency Range of Radiated Measurements

An unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a Radiated Emission limit is specified, up to the frequency shown in the following table

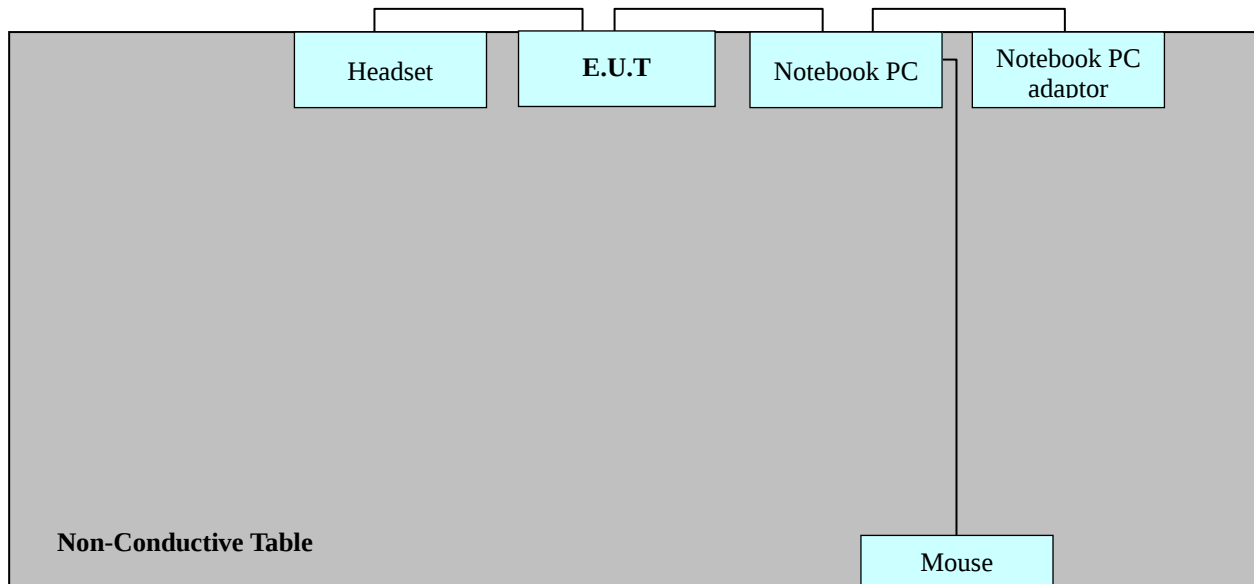
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 to 108	1 000
108 to 500	2 000
500 to 1 000	5 000
Above 1 000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

2. SYSTEM TEST CONFIGURATION

2.1 Configuration of Test System

- Power Line Conducted test : E.U.T was connected to LISN via Notebook PC adaptor.
Preliminary Power Line Conducted Emission tests were performed by using the procedure in ANSI C63.4/2003 7.2.3 to determine the worst operating conditions.
- Radiated Emission test : Preliminary Radiated Emission tests were performed by using the procedure in ANSI C63.4/2003 8.3.1.1 to determine the worst operating condition. Final Radiated Emission tests were performed at 3 m open area test site.

[Configuration of Tested System]



Power Line: 110 VAC

3. PRELIMINARY TEST

3.1 Conducted Emission Test

- Test E.U.T with Data Communication mode, after connecting all peripheral devices.

During preliminary tests, the following operating mode was investigated:

Operation Mode	The Worst Operating Condition
Data Communication	○

3. 2 Radiated Emission Test

- Test E.U.T with Data Communication mode, after connecting all peripheral devices.

During preliminary tests, the following operating mode was investigated:

Operation Mode	The Worst Operating Condition
Data Communication	○

4. CONDUCTED AND RADIATED EMISSION TEST SUMMARY

4.1 Conducted Emission Test

The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

Limit apply to	: CISPR 22 Class B
Result	: Passed by 6.9 dB
Operating condition	: Data Communication mode
Detector	: Quasi-Peak, Average (6 dB Bandwidth: 9 kHz)
Temperature	: 26.7 °C
Humidity level	: 46.8 %
Test date	: July 22, 2010

Power Line Conducted Emissions			CISPR 22 Class B		
Frequency (MHz)	Amplitude (dB μ V)	Conductor	Detector	Limit (dB μ V)	Margin (dB)
0.1500	56.9	NEUTRAL	Quasi-Peak	66.0	9.1
1.2760	44.9	HOT	Quasi-Peak	56.0	11.1
3.9840	39.1	NEUTRAL	Average	46.0	6.9
13.5200	42.9	HOT	Average	50.0	7.1

※ **NOTE:** Refer to page 10 to page 13 for details.

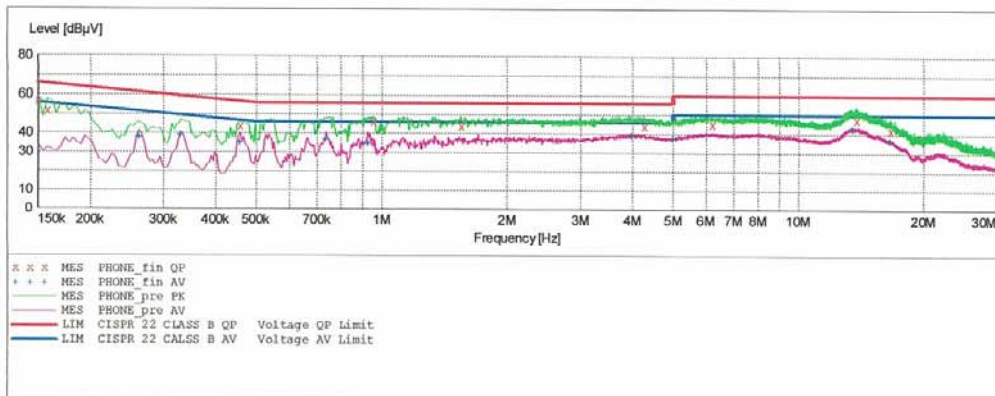
HCT

EMC

EUT: VS660
Manufacturer: LG
Operating Condition: DATA MODE
Test Site: SHIELD ROOM
Operator: DS KIM
Test Specification: CISPR22 CLASS B
Comment: N

SCAN TABLE: "CISPR22 CLASS B"

Short Description:			CISPR22 CLASS B			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
150.0 kHz	500.0 kHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3 (20100210)
			Average			
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3 (20100210)
			Average			
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3 (20100210)
			Average			



MEASUREMENT RESULT: "PHONE_fin QP"

7/22/2010 5:16PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.150001	56.90	10.1	66	9.1	---	---
0.158001	51.90	10.1	66	13.7	---	---
0.458001	43.70	10.1	57	13.0	---	---
0.956000	46.30	10.1	56	9.7	---	---
1.548000	44.00	10.1	56	12.0	---	---
4.264000	44.30	10.4	56	11.7	---	---
6.212000	45.10	10.5	60	14.9	---	---
13.792000	47.70	11.1	60	12.3	---	---
16.652000	41.90	11.4	60	18.1	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

7/22/2010 5:16PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.262001	38.00	10.0	51	13.4	---	---
0.330001	39.00	10.0	50	10.4	---	---
0.458001	35.30	10.1	47	11.5	---	---
0.736000	37.20	10.1	46	8.8	---	---
0.928000	34.90	10.1	46	11.1	---	---
3.984000	39.10	10.3	46	6.9	---	---
5.000000	37.70	10.4	46	8.3	---	---
13.496000	42.70	11.1	50	7.3	---	---
16.604000	36.50	11.4	50	13.5	---	---

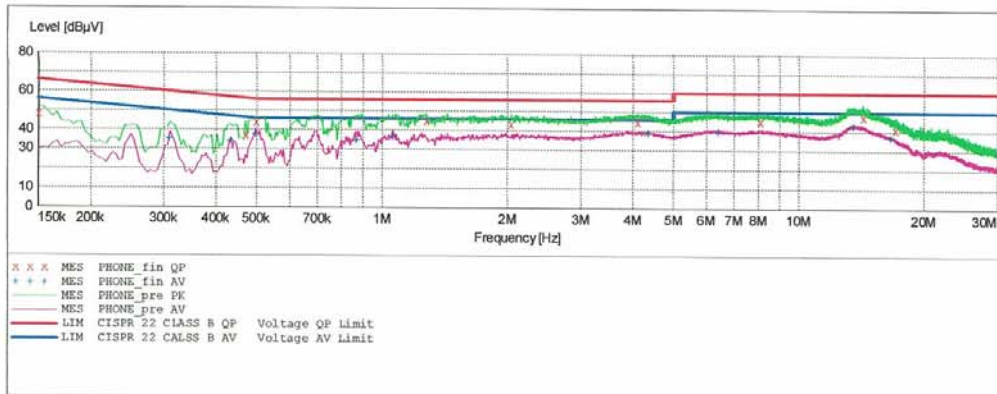
HCT

EMC

EUT: VS660
Manufacturer: LG
Operating Condition: DATA MODE
Test Site: SHIELD ROOM
Operator: DS KIM
Test Specification: CISPR22 CLASS B
Comment: H

SCAN TABLE: "CISPR22 CLASS B"

Short Description:			CISPR22 CLASS B			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
150.0 kHz	500.0 kHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3 (20100210)
			Average			
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3 (20100210)
			Average			
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3 (20100210)
			Average			



MEASUREMENT RESULT: "PHONE_fin QP"

7/22/2010 5:13PM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.150001	48.20	10.1	66	17.8	---	---
0.470001	37.40	10.1	57	19.2	---	---
0.498001	44.20	10.1	56	11.8	---	---
1.276000	44.90	10.1	56	11.1	---	---
2.040000	43.50	10.2	56	12.5	---	---
4.100000	44.60	10.4	56	11.4	---	---
8.100000	45.30	10.7	60	14.7	---	---
14.244000	47.70	11.2	60	12.3	---	---
17.048000	41.10	11.4	60	18.9	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

7/22/2010 5:13PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.310001	35.60	10.0	50	14.3	---	---
0.434001	34.10	10.1	47	13.1	---	---
0.498001	37.60	10.1	46	8.4	---	---
0.868000	34.80	10.1	46	11.2	---	---
1.064000	36.50	10.1	46	9.5	---	---
4.368000	38.80	10.4	46	7.2	---	---
6.420000	39.90	10.5	50	10.1	---	---
13.520000	42.90	11.1	50	7.1	---	---
16.648000	36.90	11.4	50	13.1	---	---

4.2 Radiated Emission Test

The following table shows the highest levels of Radiated Emissions on both polarization of horizontal and vertical.

Limit apply to	: FCC PART 15 Subpart B
Result	: Passed by 4.6 dB
Operating condition	: Data Communication mode
Detector	: Quasi-Peak (6 dB Bandwidth: 120 kHz)
Temperature	: 28.0 °C
Humidity level	: 53.0 %
Test date	: July 22, 2010

Frequency	Reading	Ant. Factor	Cable Loss	Ant. POL	Total	Limit	Margin
MHz	dB μ V	dB/m	dB	(H/V)	dB μ V/m	dB μ V/m	dB
44.6	22.3	12.4	0.7	V	35.4	40.0	4.6
90.4	24.2	8.2	1.0	V	33.4	43.5	10.1
215.2	23.3	10.4	1.6	H	35.3	43.5	8.2
288.9	21.1	12.7	1.8	H	35.6	46.0	10.4
431.5	14.5	16.1	2.2	H	32.8	46.0	13.2
480.0	16.6	17.0	2.4	V	36.0	46.0	10.0

5. FIELD STRENGTH CALCULATION

The field strength is calculated by adding the antenna factor and cable factor.
The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF$$

Where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 21.5 dB μ V is obtained. The antenna factor of 7.4 dB/m and a cable factor of 1.1 dB are added. The 30 dB μ V/m value is mathematically converted to its corresponding level in μ V/m.

$$FS = 21.5 + 7.4 + 1.1 = 30 \text{ dB}\mu\text{V/m}$$

[Radiated Emission Limits]

Frequency of Emission (MHz)	Field Strength	
	μ V/m	dB μ V/m
30 to 88	100	40.0
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

6. TEST EQUIPMENT

<u>Type</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Serial Number</u>	<u>Next CAL Date</u>
-------------	---------------------	---------------------	----------------------	----------------------

Conducted Emission

EMI Test Receiver	Rohde & Schwarz	ESCI	100033	2011.02.19
EMI Test Receiver	Rohde & Schwarz	ESU26	100214	2011.04.29
LISN	Rohde & Schwarz	ESH3-Z5	100282	2011.02.05
LISN	Rohde & Schwarz	ENV216	3560.6550.02	2011.04.06
Attenuator	Rohde & Schwarz	ESH3-Z2	357.8810.52	2010.10.30

Radiated Emission

EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	2010.10.30
EMI Test Receiver	Rohde & Schwarz	ESU26	100214	2011.04.29
Trilog Antenna	Schwarzbeck	VULB9160	9160-3150	2010.12.18
Antenna Master	HD	MA240	240/520/00	-
Turn Table	EMCO	1060	-	-
Communication Antenna	Schwarzbeck	USLP9142	9142-248	-
Base Station	Rohde & Schwarz	CMU 200	1100000802	2011.02.17
Horn Antenna	Schwarzbeck	BBHA 9120D	-	2012.04.13
RF-Amplifier	MITEQ	AMF-6D-00101800 -35.20P.PS	-	2011.05.20
Bluetooth Base Station	TESCOM	TC-3000A	-	2011.01.07

7. CONCLUSION

The data collected shows that the **LG Electronics Inc. Cellular/ PCS CDMA / EvDO Phone with Bluetooth & WLAN, Model: VS660, LG-VS660, FCC ID: BEJVS660** complies with §15.107 and §15.109 of the FCC rules.