

EMC TEST REPORT

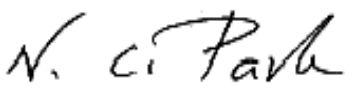
Project No.	LBE081035	Issue No.	4
Applicant	Name of organization	Samsung Electronics Co., Ltd.	
	Address	416 Maetan 3-Dong, Yeongtong-Gu, Suwon-City, Gyeonggi-Do, Korea 443-742	
	Date of application	April 7, 2008	
EUT	Type of device	Class B personal computers and peripherals	
	Equipment authorization	Certification	
	FCC ID	A3LFA05BCLX3170FN	
	Kind of product	COLOR LASER MFP	
	Model No.	CLX-3175FW	
		Variant Model No.	CLX-3175FN, CLX-3170N, CLX-3170 CLX-3175N, CLX-3175, CLX-3170FN CLX-3170FW
	Manufacturer	Samsung Electronics Co., Ltd. 259, Gongdan-Dong, Gumi-City, Gyeong-Buk, 730-030, Korea Place:M259 Samsung Electronics (Shandong) Digital Printing Co., Ltd. 264209, Samsung Road, Weihai Hi-Tech. IDZ, Shandong Province, P.R.China	
Applied Standards		FCC Part 15, Subpart B / ANSI C63.4-2003	
Test Period		April 4, 2008 ~ April 11, 2008	
Issue date		April 30, 2008	
Test result : Complied The equipment under test has found to be compliant with the applied standards. (Refer to the attached test result for more detail.)			
Tested by : Young Hun Cheong 		Reviewed by : No Cheon Park 	
This report is the test result about the sphere accredited by KOLAS which signed the Mutual Recognition Arrangement of International Laboratory Accreditation Cooperation. The test results in this report only apply to the tested sample. This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.			
 SEC EMC Laboratory 416 Maetan 3-Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, 443-742 Korea Tel: 82 31 277 7752, Fax: 82 31 277 7753			

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1. Summary of test results

1.1 Emission

The EUT has been tested according to the following specifications:

Applied	Test type	Applied standard	Result	Remarks
☒	Conducted Disturbance	FCC Part 15 Subpart B	Complied	Meets Class A Limit
☒	Radiated Disturbance		Complied	Meets Class A Limit

2. General Information

2.1 Test facility

The SEC EMC Laboratory is located on Samsung Electronics Co., Ltd. at 416 Maetan 3-Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, South Korea.

All testing are performed in Semi-anechoic chambers conforming to the site attenuation Characteristics defined by ANSI C63.4, CISPR 22, 16-1 and 16-2. and Shielded rooms.

The SEC EMC Laboratory is operated as testing laboratory in accordance with the requirements of ISO/IEC 17025:2005.

2.2 Accreditation and listing

Laboratory Qualifications		Remarks
	KOLAS(Korea Laboratory Accreditation Scheme)	Accredited : 124
	Radio Research Laboratory	Accredited : KR0004
	FCC(Federal Communications Commission)	Accredited : KR0004
	National Voluntary Laboratory Accreditation Program	Lab Code: 200623-0
	Norges Elektriske Materiellkontroll	Accredited : ELA 195
	VCCI (Voluntary Control Council for Interference by Information Technology Equipment)	C-2421,R-2224
	China Quality Certification Center	5-053, 5-054
	TUV Rhineland	H9354285
	GOST(GOSTSTANDART)	ROSTEST
	Elektrotechnický Zkušební Ústav	Reg. No.: 001
	IC(Industry Canada)	Assigned Code: 5871

3. Test configuration

3.1 Test Peripherals

The following is a listing of the EUT and supporting peripherals utilized during testing.

Description	Model No.	Serial No.	Manufacturer	FCC ID and/or DoC
COLOR LASER MFP	CLX-3175FW	-	Samsung	A3LFA05BCLX3170FN
Notebook PC	SQ20	-	Samsung	A3LNPSQ20
AC Adapter	AD-4212A	CNBA4400148ASE 383	Delta	-
Telephone	SP-F209	KKAY112943T	Samsung	Doc
USB Mouse	MS201U	69G1117	Samsung	Doc
Headset	-	-	cosy	-

3.2 EUT operating mode (worst mode)

Operating Mode 1	Wireless network printing
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3.3 Details of Sampling

- Customer selected, single unit.

3.4 Used cable description

The EUT is configured, installed, arranged and operated in a manner consistent with typical applications. Interface cables/loads/devices are connected to at least one of each type of interface port of the EUT, and where practical, each cable shall be terminated in a device typical of actual usage. The type(s) of interconnecting cables to be used and the interface port (of the EUT) to which these were connected;

Connected cable	Length [m]	Shielded [Y/N]	Note
Power	1.8	No	For EUT
Power	1.8	No	For Note PC
USB	1.8	Yes	From Note PC to the EUT From Note PC to USB Mouse
Headset	1.0	Yes	From headset to Note PC
PS/2	1.8	Yes	For PC
TEL	2.0	No	From EUT to K/P system
TEL	2.0	No	From EUT to Telephone

3.5 EUT Description

Item	Specification	Remarks
Processor	Chorus3(360MHz)	-
Standard System memory	128MB(DDR2)	-
Resolution	Up to 2400x600 dpi effective output	-
Paper Handling	Paper Tray(standard) 150 Sheets	-
Power Rating	110~127 VAC, 8A, 50/60 Hz	-
Power Consumption	Average : 350W Power save mode : Less than 17W	-
Printer Language	SPL-C	-
Interfaces	USB2.0, Ethernet 10/100 Tx Base	-
OS compatibility	Windows 2000/XP/2003/Vista Various Linux including Red Hat 8.0~9.0, Mandrake 9.2~10.1, SuSE 8.2~9.2 and Fedora Core 1~4 Mac OS 10.3 ~10.5 and Universal Mac	-
Modes of Operation	USB Printing, Network Printing, Copy ,FAX, Wireless network printing	-
Intended Class for Emissions	Class B	-

3.6 Clock Frequencies

Kind of Clocks	Frequency[MHz]	Kind of Clocks	Frequency[MHz]
Main Source	12	Video	12
CPU Internal	360	DDR2 RAM	166
USB Device	12	MAC	25
FAX	28.224	CIS (Contact Image Sensor)	4.3

3.7 Test configuration and condition

The system was configured for testing in typical fashion use. Cables were attached to each of the available I/O Ports. Where applicable, peripherals were attached to the I/O cables. All operating mode(s) selected were tested to show compliance with relevant standard for radiated disturbance below 1GHz and conducted disturbance. Radiated disturbance above 1GHz for operating mode that have minimum margin of radiated disturbance below 1GHz were tested and reported.

Power source for the EUT operation was supplied by CVCF made by the Voltech Corp.

- **Testing Voltage : AC 115 V, 60 Hz**

3.8 Measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus: (According to CISPR 16-4 and UKAS Lab 34.)

3.8.1 Emission

Test type		Measurement uncertainty (C.L. 95 %, k = 2)
Conducted disturbance	Mains Port	± 3.4 dB
Radiated disturbance	Horizontal	± 4.3 dB
	Vertical	± 5.2 dB

4. Results of individual test

4.1 Conducted disturbance

Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration.

The EUT measured in accordance with the methods described in standards.

Limits for conducted disturbance at mains ports of class A

Frequency range Limits MHz	Limits dB(μ V)	
	Quasi-peak	Average
0,15 to 0,50	79	66
0,50 to 30	73	60

Note 1: 1 μ V is regarded as 0 dB.
Note 2: If the average limit is met in the measurement with quasi-peak detector, the measurement with average detector at the same frequency is unnecessary.
Note 3: The lower limit shall apply at the transition frequency.

Limits for conducted disturbance at the mains ports of class B

Frequency range Limits 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: 1 μ V is regarded as 0 dB.
Note 2: The limits shall decreases linearly with the logarithm of the frequency in the range 150 - 500 kHz.
Note 3: If the average limit is met in the measurement with quasi-peak detector, the measurement with average detector is unnecessary.
Note 4: The lower limit shall apply at the transition frequency.

4.1.1 Test instrumentation

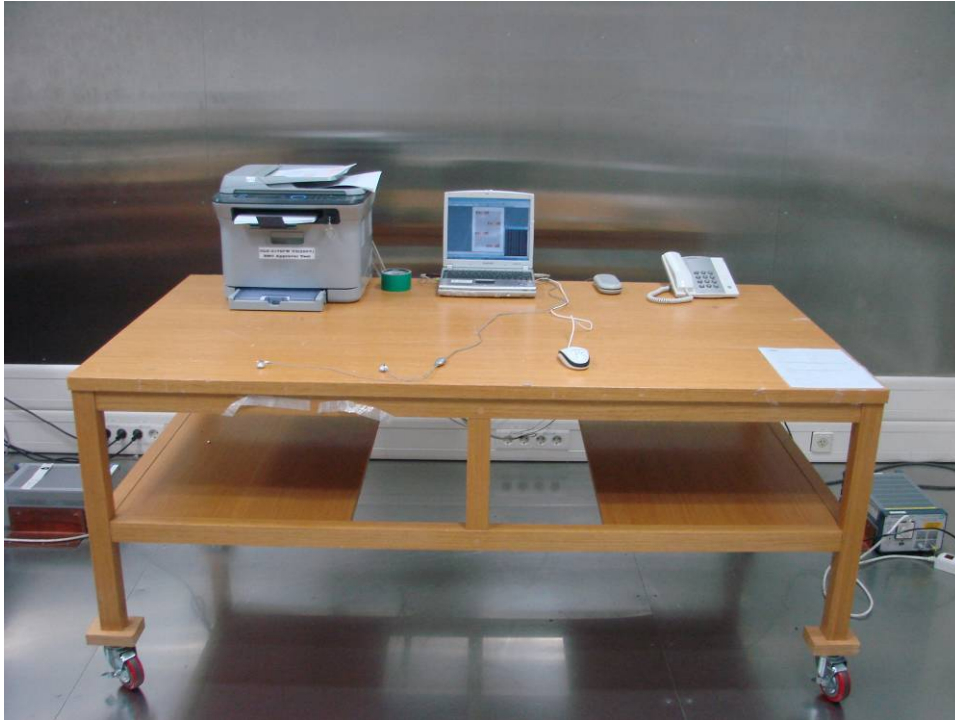
Test instrumentations used in the Conducted disturbance test were as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Measuring receiver	ESCI	R&S	100368	2007-06-01	12
Artificial mains network	ENV216	R&S	100117	2007-09-03	12
Artificial mains network	ESH3-Z5	R&S	100262	2007-09-03	12
Test software	EMC32	R&S	Ver 4.40.0	N/A	N/A

4.1.2 Temperature and humidity condition

Test date	April 11, 2008	Test engineer		Young Hun Cheong	
Climate condition	Ambient temperature	23.9 °C	Relative humidity		36 %
	Atmospheric pressure	100.1 kPa			
Test place	Shielded Room #1				

4.1.3 Photograph of Test Setup



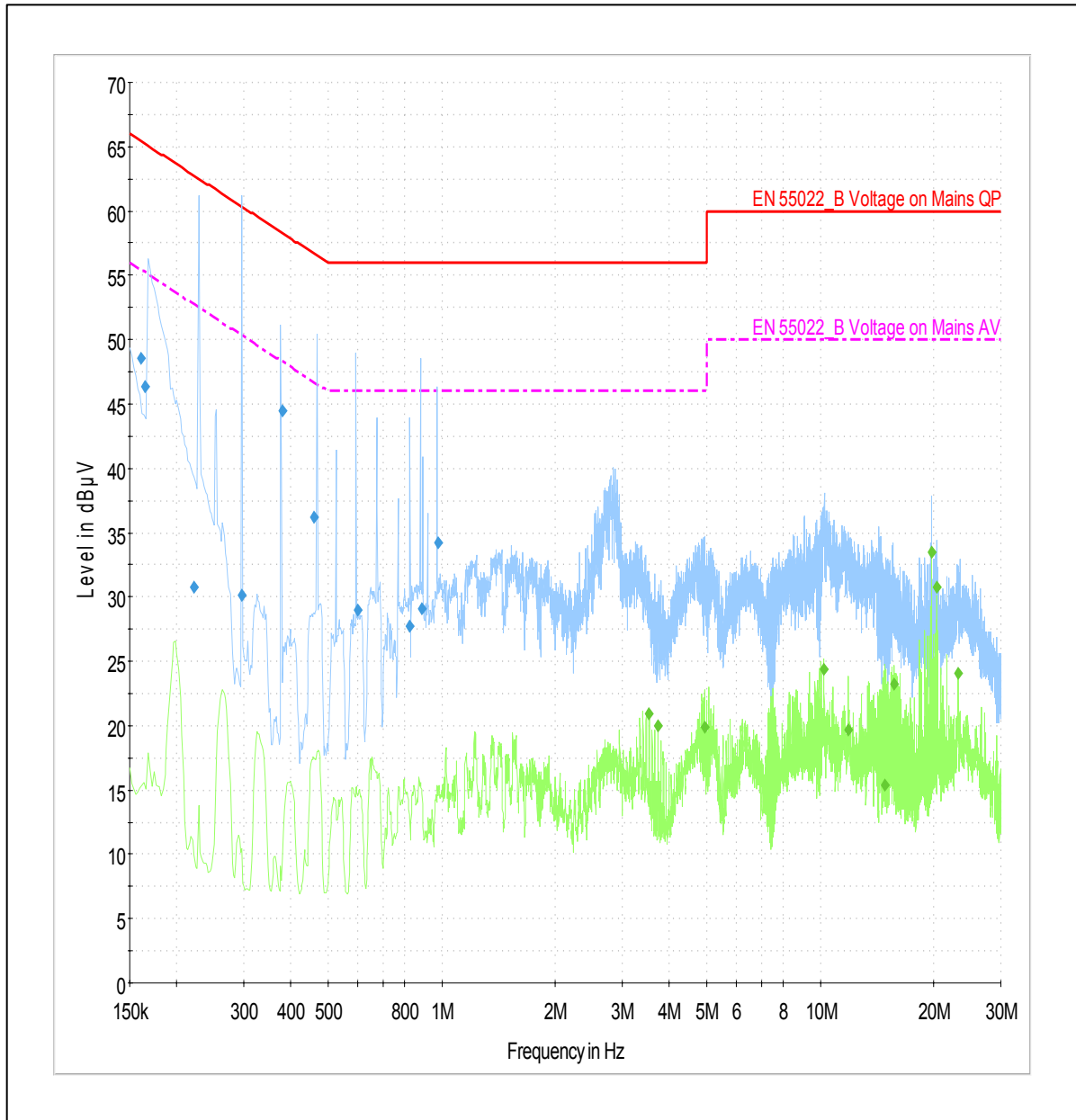
Front



Rear

4.1.4 Test results

Test Graph



Note) Two graphs measured for both Live(L1) and Neutral(N) of the LISN are combined into one graph.

Test Results (Quasi-Peak and Average)

Frequency [MHz]	Line	Bandwidth [kHz]	Factor [dB]	Quasi-Peak [dBuV]	Margin [dB]	Limit [dBuV]
0.161	L1	9.0	9.6	48.5	16.9	65.4
0.165	L1	9.0	9.6	46.3	18.9	65.2
0.222	N	9.0	9.6	30.7	32.0	62.8
0.296	L1	9.0	9.6	30.1	30.2	60.4
0.381	N	9.0	9.6	44.5	13.8	58.3
0.461	L1	9.0	9.6	36.2	20.5	56.7
0.599	L1	9.0	9.6	29.0	27.0	56.0
0.822	N	9.0	9.7	27.7	28.3	56.0
0.885	N	9.0	9.7	29.1	26.9	56.0
0.980	N	9.0	9.7	34.2	21.8	56.0

Frequency [MHz]	Line	Bandwidth [kHz]	Factor [dB]	Average [dBuV]	Margin [dB]	Limit [dBuV]
3.534	L1	9.0	9.8	20.9	25.1	46.0
3.724	N	9.0	9.8	20.0	26.0	46.0
4.944	N	9.0	9.8	19.9	26.1	46.0
10.244	N	9.0	9.9	24.4	25.6	50.0
11.822	L1	9.0	10.0	19.7	30.3	50.0
14.801	L1	9.0	10.1	15.4	34.6	50.0
15.665	N	9.0	10.1	23.3	26.7	50.0
19.709	N	9.0	10.2	33.5	16.5	50.0
20.259	N	9.0	10.2	30.8	19.2	50.0
23.129	N	9.0	10.3	24	26	50.0

Note) Level (Quasi-Peak and/or Average) = Meter Reading(Quasi-Peak and/or Average) +
Factor (LISN Insertion Loss + Cable Loss)
Margin = Limit – Level (Quasi-Peak and/or Average)

4.2 Radiated disturbance

Of those disturbances above ($L - 20\text{dB}$), where L is the limit level in logarithmic units, record at least the disturbance levels and the frequencies of the six highest disturbances.

The following data lists the significant emission frequencies, measured levels, correction factors (for antenna and cables), orientation of table, polarization and height of antenna, the corrected reading, the limit, and the amount of margin. All measurements were taken utilizing quasi-peak detection unless stated otherwise.

Measurements were performed at an antenna to EUT distance of 10 meters and elevated between 1 and 4 meters. Both vertical and horizontal antenna polarizations were measured.

Limits for radiated disturbance of ITE at a measuring distance of 10 m

Frequency range Limits MHz	Quasi-peak Limits dB dB($\mu\text{V}/\text{m}$)	
	Class A	Class B
30 to 230	40	30
230 to 1000	47	37
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: 1 $\mu\text{V}/\text{m}$ is regarded as 0 dB.		

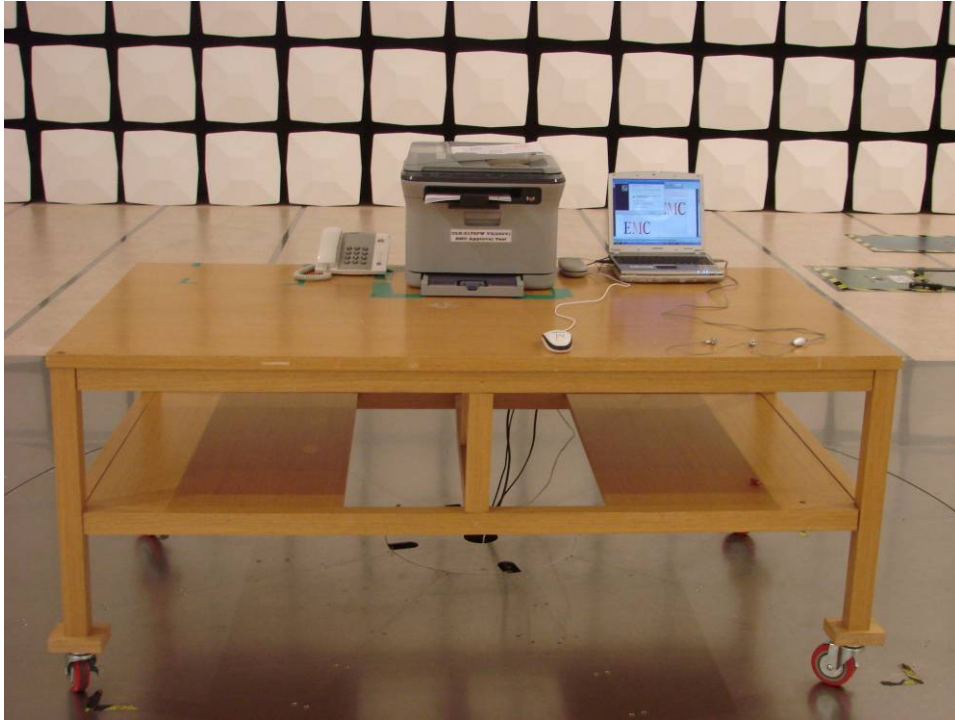
4.2.1 Test instrumentation

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Bi-con Antenna	CBL6112D	Schaffner	22602	2006-06-26	24
Bi-con Antenna	CBL6112B	Schaffner	2804	2007-04-16	24
Horn Antenna	BBHA9120B	Schwarzbeck	338	2007-07-27	12
EMI Receiver	ESIB-26	R&S	100290	2008-03-27	12
EMI Receiver	ESIB-26	R&S	100147	2007-06-15	12
Amplifier	310N	Agilent	185861	2007-12-04	12
Amplifier	310N	Agilent	251676	2008-03-13	12
Amplifier	TPA0108-40	TOYO	0433	N/A	N/A
Antenna Mast	MA4000	INN CO	-	N/A	N/A
Antenna Mast	MA4000	INN CO	-	N/A	N/A
Antenna Mast	MA2000	INN CO	-	N/A	N/A
Mast Controller	CO2000	INN CO	-	N/A	N/A
Test software	EP5/RE	TOYO	VER 3.1.20	N/A	N/A
RF Selector	NS4900	TOYO	-	N/A	N/A

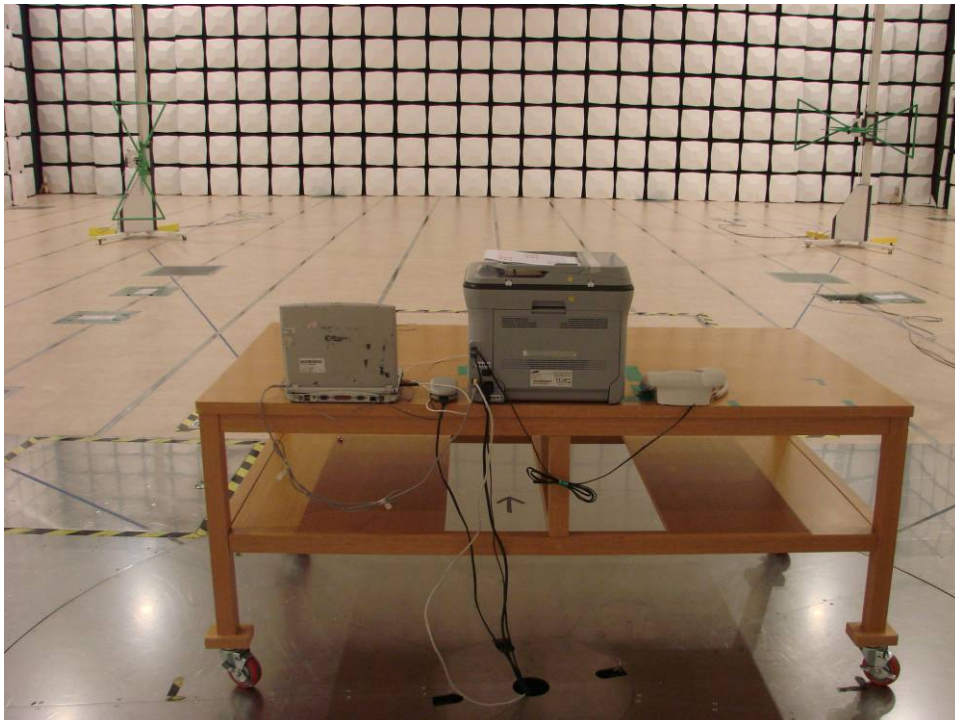
4.2.2 Temperature and humidity condition

Test date	April 4, 2008	Test engineer	Young Hun Cheong	
Climate condition	Ambient temperature	22.3 ℃	Relative humidity	32 %
	Atmospheric pressure	100.2 kPa		
Test place	Semi-Anechoic Chamber			

4.2.3 Photograph of Test setup (30 MHz ~ 1 GHz)



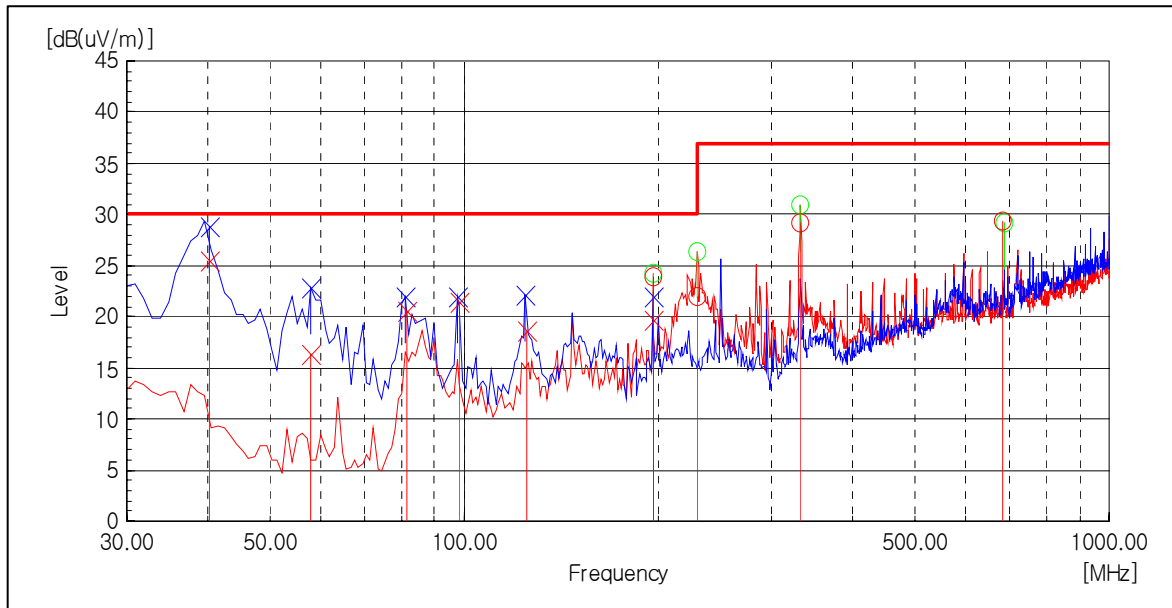
Front



Rear

4.2.4 Test results (30 MHz ~ 1 GHz)

Test Graph and Results



Frequency [MHz]	Pol.	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
40.37	V	43.8	-18.4	25.4	30	4.6	283	358.8
57.99	V	41.0	-24.6	16.4	30	13.6	135	10.3
81.47	V	43.2	-22.7	20.5	30	9.5	113	203.1
98.31	V	40.8	-19.4	21.4	30	8.6	102	236.6
125.02	V	36.2	-17.6	18.6	30	11.4	106	79.5
196.58	H	43.1	-19.2	23.9	30	6.1	398	13.5
196.60	V	39.9	-20.2	19.7	30	10.3	100	24.9
229.33	H	39.8	-17.9	21.9	30	8.1	381	233.8
331.83	H	41.9	-12.8	29.1	37	7.9	331	332.5
685.89	H	35.6	-6.2	29.4	37	7.6	124	50.2

Note) Receiving antenna polarization : Horizontal and/or Vertical

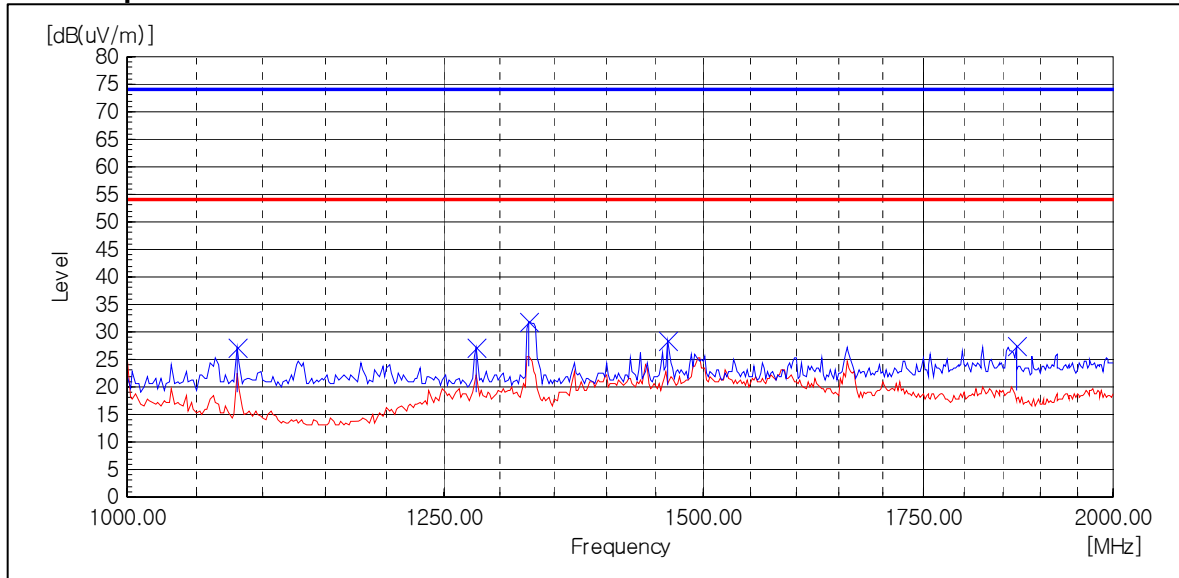
Test Distance : 10m, Antenna Height : 1 to 4 meters

Level QP(Quasi-Peak) = Reading QP + Factor(Antenna Factor + Cable Loss - Amp. Gain)

Margin QP(Quasi-Peak) = Limit - Level QP

4.2.5 Test results (1 GHz ~ 2 GHz)

Test Graph and Results



Frequency [MHz]	Pol.	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level PK [dB(uV/m)]	Limit [dB(uV/m)]	Margin PK [dB]	Height [cm]	Angle [deg]
1080.16	V	39.4	-12.2	27.2	74.0	26.8	200	61.5
1278.56	V	38.4	-11.3	27.1	74.0	26.9	200	61.5
1326.65	V	42.8	-11.0	31.8	74.0	22.2	100	41.4
1462.93	V	38.8	-10.4	28.4	74.0	25.6	100	108.4
1867.74	V	35.6	-8.2	27.4	74.0	26.6	200	61.5

Note1) Representative operating mode having minimum margin below 1GHz were selected for radiated emission measurement above 1GHz, and any emissions that do NOT exceed Average limit were not tested with average detector mode.

Note2) Receiving antenna polarization : Horizontal and Vertical

Test Distance : 3m, Antenna Height : 1 to 2 meters

Level PK(Peak) = Reading PK(Peak) + Factor(Antenna Factor + Cable Loss - Amp. Gain)

Margin PK(Peak) = Limit - Level PK(Peak)

Appendix – EUT photography



Front View



Rear View



Label Location

SAMSUNG USOC Jack Type:RJ11C Samsung Electronics Co., Ltd. Suwon, Korea, 443-742 Place:M264	Model: CLX-3175FW Volts: AC 110-127V Hertz: 50/60Hz Amps: 8A Ringer Equivalence: 1.5B Manufactured:	FCC ID: A3LFA05BCLX3170FN (Printer) FCC ID: A3LSWL-2900U (WLAN) This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: i) This device may not cause harmful interference, and ii) This device must accept any interference received, including interference that may cause undesired operation. Complies with Part 68, FCC Rules. FCC Certification No.: US: A3LFA15BCLX3170FN This product complies with 21 CFR Chapter 1, subchapter J. This Class B digital apparatus meets all requirements of the Canadian interference-Causing Equipment Regulations. Cet appareil numérique de la class B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada. This Class B digital apparatus complies with Canadian ICES-003 Cet appareil numérique de la classe "B" est Conforme à la norme NMB-003 du Canada. Canadian Certification Number (RSS-210): 649E-SWL2900U (WLAN) IC: 649E-CLX3170FN Fabrique au Chine MADE IN CHINA REV.00
Serial No.:	51Y7 E149091 I.T.E.	

Rating Label