

EMC TEST REPORT

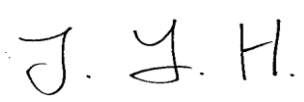
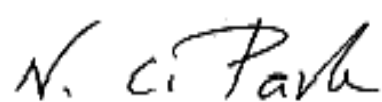

Project No.	LBE20100373	Issue No.	3
Applicant	Name of organization	Samsung Electronics Co., Ltd.	
	Address	416 Maetan 3-Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do 443-742 Korea	
	Date of application	October 1, 2010	
EUT	Type of device	Class B digital devices, peripherals	
	Equipment authorization	<input type="checkbox"/> Declaration of Conformity <input checked="" type="checkbox"/> Certification <input type="checkbox"/> Verification	
	FCC ID	A3LML3310ND	
	Kind of product	Mono Laser Printer	
	Model No.	ML-3310ND	
		Variant Model No.	ML-3310D, ML-3312ND, ML-3312D
	Manufacturer	1) Samsung Electronics Co., Ltd. 259, Gongdan-Dong, Gumi-City, Gyeongsangbuk-Do, Korea 730-030 2) Samsung Electronics (Shandong) Digital Printing Co., Ltd. 264209, Samsung Road, Weihai Hi-Tech. IDZ, Shandong Province, P.R.China 3) Weihai Shin Heung Digital Electronics Co., Ltd. 98, Samsung Road, Weihai Hi-Tech. IDZ, Shandong Province, P.R.China 4) Intops : Intops (Weihai) Electronics Co., Ltd., Keji Road-268-1 , Weihai Hi-Tech, Industries Development Zone Shandong Province , CHINA	
Applied Standards	FCC Part 15, Subpart B / ANSI C63.4-2003 ICES-003 issue 4		
Test Period	October 1, 2010 ~ October 4, 2010		
Issue date	October 5, 2010		
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	
			
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 CS & Environment Centre.			
			
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
<input checked="" type="checkbox"/>	Conducted Disturbance (Mains Port)	FCC Part 15 Subpart B ICES-003 issue 4	Complied	Meets Class B Limit
<input checked="" type="checkbox"/>	Radiated Disturbance		Complied	Meets Class B Limit

2. General Information

2.1 Test facility

The CS & Environment Centre 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 CS & Environment Centre is operated as EMC testing laboratory in accordance with the requirements of ISO/IEC 17025:2005.

3. Test Setup configuration

3.1 Test Peripherals

The cables used for these peripherals are either permanently attached by the peripheral manufacturer or coupled with an assigned cable as defined below.

The following is a listing of the EUT and peripherals utilized during the performance of EMC test:

Description	Model No.	Serial No.	Manufacturer	FCC ID and/or DoC
Mono Laser Printer	ML-3310ND	-	Samsung	A3LML3310ND
Note book Computer	D410	JP-0NC428-71761-54J-D01C	DELL	DoC
Adapter	LA65NS1-00	CN-0YD637-71615-83C-0A0A	DELL	-
USB Mouse	M-UV69a	HCA45203099	LOGITECH	DoC
Headset	Axis-202	-	Labtrec	DoC

3.2 EUT operating mode

To achieve compliance applied standard specification, the following mode(s) were made during compliance testing:

Operating Mode 1	Standby Mode
Operating Mode 2	Network Simplex Printing Mode
Operating Mode 3	USB Duplex Printing Mode
Operating Mode 4	LPT & USB 2.0 Duplex Printing Mode

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
USB	1.8	Yes	EUT to Notebook PC
Power	1.8	No	For Note PC
USB	0.4	Yes	EUT to USB Mouse
Headset	1.6	No	From PC to Headset
LAN	5.0	No	From EUT to hub

3.5 EUT Description

The following features describe EUT represented by this report:

Item	Specification	Remarks
Processor	JUPITER5 (375Mhz)	-
Standard System memory	64MB DDR2 SDRAM	-
Resolution	True 600x600dpi (Addressible 1200dpi support)	-
Copy Quality mode	N.A	-
Paper Handling	Paper Tray(standard) 250 Sheets Paper Tray(Optional) 520 sheets Bypass Tray 3310ND 50 sheets, 3310D 1 Sheet	-
Power Rating	110~127 VAC, 6.5A, 50/60 Hz	-
Power Consumption	Power save mode : 3.5 Watts Printing mode: MAX. 550 Watts	-
Printer Language	GDI	-
PC Interfaces	USB2.0, NW	-
OS compatibility	Windows 2000/XP(32/64bits)/Vista(32/64bits)/2003 Server(32/64bits)/2008 Server(32/64bits)/7(32/64bit)/2008 Server R2 Various Linux OS: Fedora Core 4, 5, 6 Fedora 7, 8, 9, 10, 11, 12 RedHat Enterprise Linux WS 4, 5 SuSE 10.0, 10.1 openSuSE 10.2, 10.3, 11.0, 11.1, 11.2 SuSE Linux Enterprise Desktop 10, 11 Debian 4.0, 5.0 Ubuntu 5.04, 5.10, 6.04, 6.10, 7.04, 7.10, 8.04, 8.10, 9.04, 9.10 Mandriva 2005LE, 2006, 2007, 2007.1, 2008, 2008.1, 2009, 2009.1 Mac OS 10.3 ~ 10.6	-
Modes of Operation	USB Printing, , 1200dpi Printing, Network Printing(ND only)	-
Intended Class for Emissions	Class B	-

3.6 Clock Frequencies

Kind of Clocks	Frequency [MHz]	Kind of Clocks	Frequency [MHz]
Main Source	12	Video	19.623
CPU Internal	375	DDR2 SDRAM	166
USB Device	12	CIS	4.16

3.7 Test configuration and condition

Item	Model Name	P/N	Manufacturer
Main Board	PBA_MAIN_33	REV 0.3	Samsung
SMPS	PSPN-Type2-V1	REV 0.7	DONG YANG E&P
	PSPN-Type2-V1	X5	LITE-ON
HVPS	Magpie HVPS	REV 1.0	DONG YANG E&P, SYS HITEK
Toner Cartridge	MLT-D205L(5K) MLT-D205S(2K)	-	Samsung
SCF	ML-S3710A	-	Samsung

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

Three different types of SMPS, LITEON, Dongyang and Suntronics were applied during testing. Each SMPS was installed for testing, tested and reported.

- Configuration 1 : LITEON SMPS was applied. (Mains SMPS)
- Configuration 2 : Dongyang SMPS was applied.

- Test Voltage : AC 120 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	Main terminal	3.00 dB
Radiated Disturbance (30MHz ~ 1GHz)	Horizontal	4.95 dB
	Vertical	4.99 dB
Radiated Disturbance (1GHz ~ 6GHz)	Horizontal	3.32 dB
	Vertical	3.32 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 the mains ports of class A ITE

Frequency range Limits MHz	Resolution Bandwidth	Limits dB(μ V)	
		Quasi-peak	Average
0,15 to 0,50	9 kHz	79	66
0,50 to 30	9 kHz	73	60

NOTE The lower limit shall apply at the transition frequency

Limits for conducted disturbance at the mains ports of class B ITE

Frequency range Limits MHz	Resolution Bandwidth	Limits dB(μ V)	
		Quasi-peak	Average
0,15 to 0,50	9 kHz	66 to 56	56 to 46
0,50 to 5	9 kHz	56	46
5 to 30	9 kHz	60	50

NOTE 1 The lower limit shall apply at the transition frequency
 NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.

4.1.1 Test instrumentation

Test instrumentation	Manufacturer	Model name	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Test Receiver	R&S	ESCI	100086	2009-11-19	12
Two-Line V-Network	R&S	ENV216	100117	2009-11-11	12
Two-Line V-Network	R&S	ENV216	100116	2010-07-05	12
Test software	EMC32	R&S	Ver 4.40.0	N/A	N/A

4.1.2 Temperature and humidity condition

Test date	October 1, 2010	Test engineer	Young Hun Cheong
Test place	Shielded Room #1		

4.1.3 Photograph of Test Setup



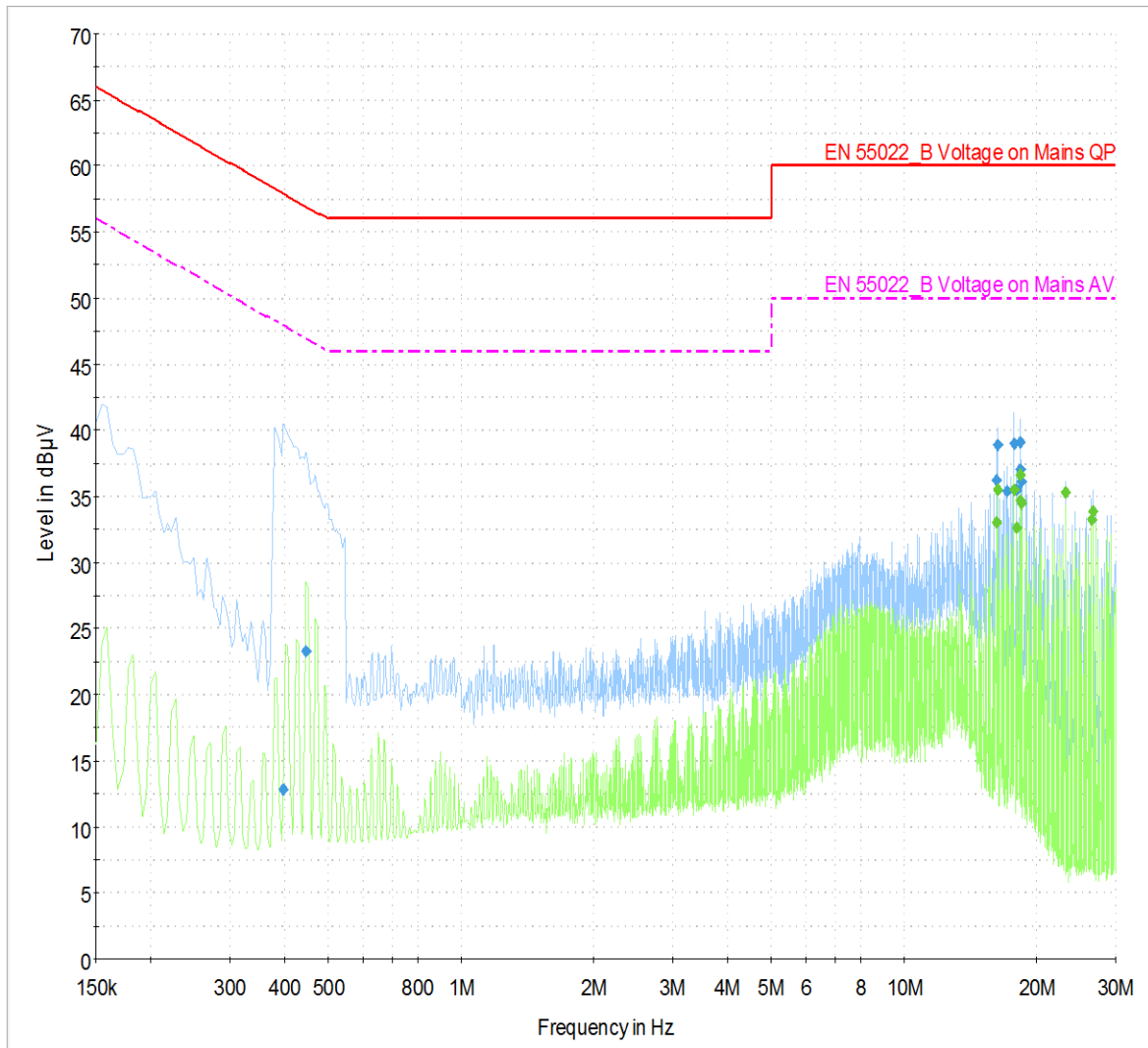
Front



Rear

4.1.4 Test results (mains port)

- Configuration 1 : Standby Mode



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)

Quasi-peak final measurement results table

Frequency [MHz]	Quasi-Peak [dBuV]	Bandwidth [kHz]	Line	Factor [dB]	Margin [dB]	Limit [dBuV]
0.398	12.9	9.0	N	9.7	45.0	57.9
0.447	23.3	9.0	N	9.7	33.6	56.9
16.165	36.3	9.0	L1	10.0	23.7	60.0
16.228	38.9	9.0	L1	10.0	21.1	60.0
17.083	35.4	9.0	L1	10.0	24.6	60.0
17.695	39.0	9.0	L1	10.0	21.0	60.0
17.938	35.5	9.0	L1	10.0	24.5	60.0
18.244	39.1	9.0	L1	10.0	20.9	60.0
18.303	37.0	9.0	L1	10.0	23.0	60.0
18.366	36.1	9.0	N	10.0	23.9	60.0

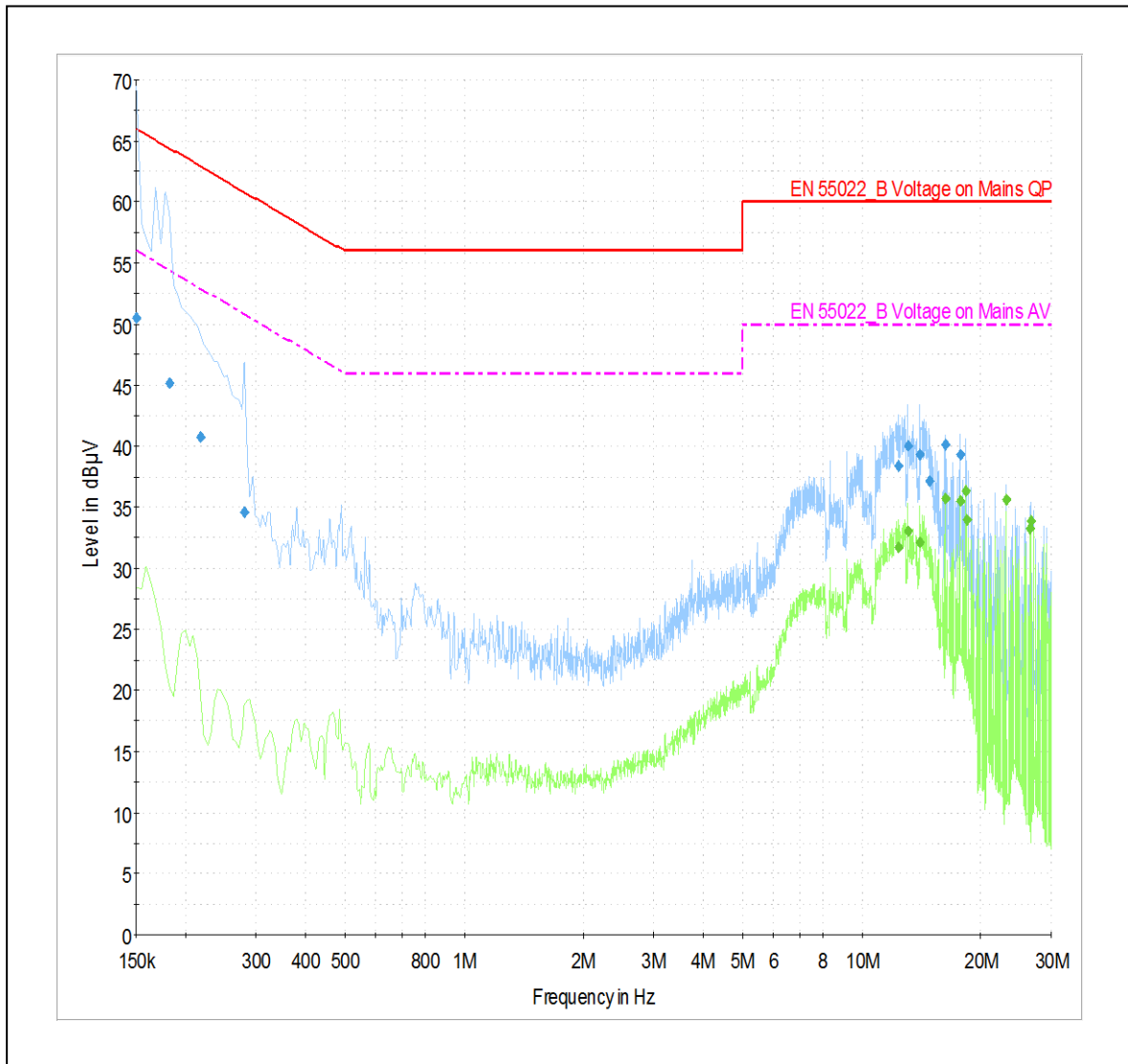
Average final measurement results table

Frequency [MHz]	Average [dBuV]	Bandwidth [kHz]	Line	Factor [dB]	Margin [dB]	Limit [dBuV]
16.165	33.1	9.0	L1	10.0	16.9	50.0
16.228	35.5	9.0	L1	10.0	14.5	50.0
17.695	35.5	9.0	L1	10.0	14.5	50.0
17.938	32.7	9.0	L1	10.0	17.3	50.0
18.244	36.7	9.0	L1	10.0	13.3	50.0
18.303	34.7	9.0	L1	10.0	15.3	50.0
18.366	34.5	9.0	L1	10.0	15.5	50.0
23.127	35.3	9.0	L1	10.1	14.7	50.0
26.488	33.2	9.0	L1	10.1	16.8	50.0
26.610	33.9	9.0	L1	10.1	16.1	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)

- Configuration 1 : Network Simplex Printing Mode



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)

Quasi-peak final measurement results table

Frequency [MHz]	Quasi-Peak [dBuV]	Bandwidth [kHz]	Line	Factor [dB]	Margin [dB]	Limit [dBuV]
0.150	50.5	9.0	L1	9.7	15.5	66.0
0.182	45.1	9.0	N	9.7	19.3	64.4
0.218	40.7	9.0	N	9.7	22.2	62.9
0.281	34.6	9.0	N	9.7	26.2	60.8
12.349	38.4	9.0	L1	9.9	21.6	60.0
13.119	40.0	9.0	L1	9.9	20.0	60.0
13.992	39.3	9.0	L1	9.9	20.7	60.0
14.824	37.1	9.0	L1	9.9	22.9	60.0
16.228	40.2	9.0	L1	10.0	19.8	60.0
17.695	39.3	9.0	L1	10.0	20.7	60.0

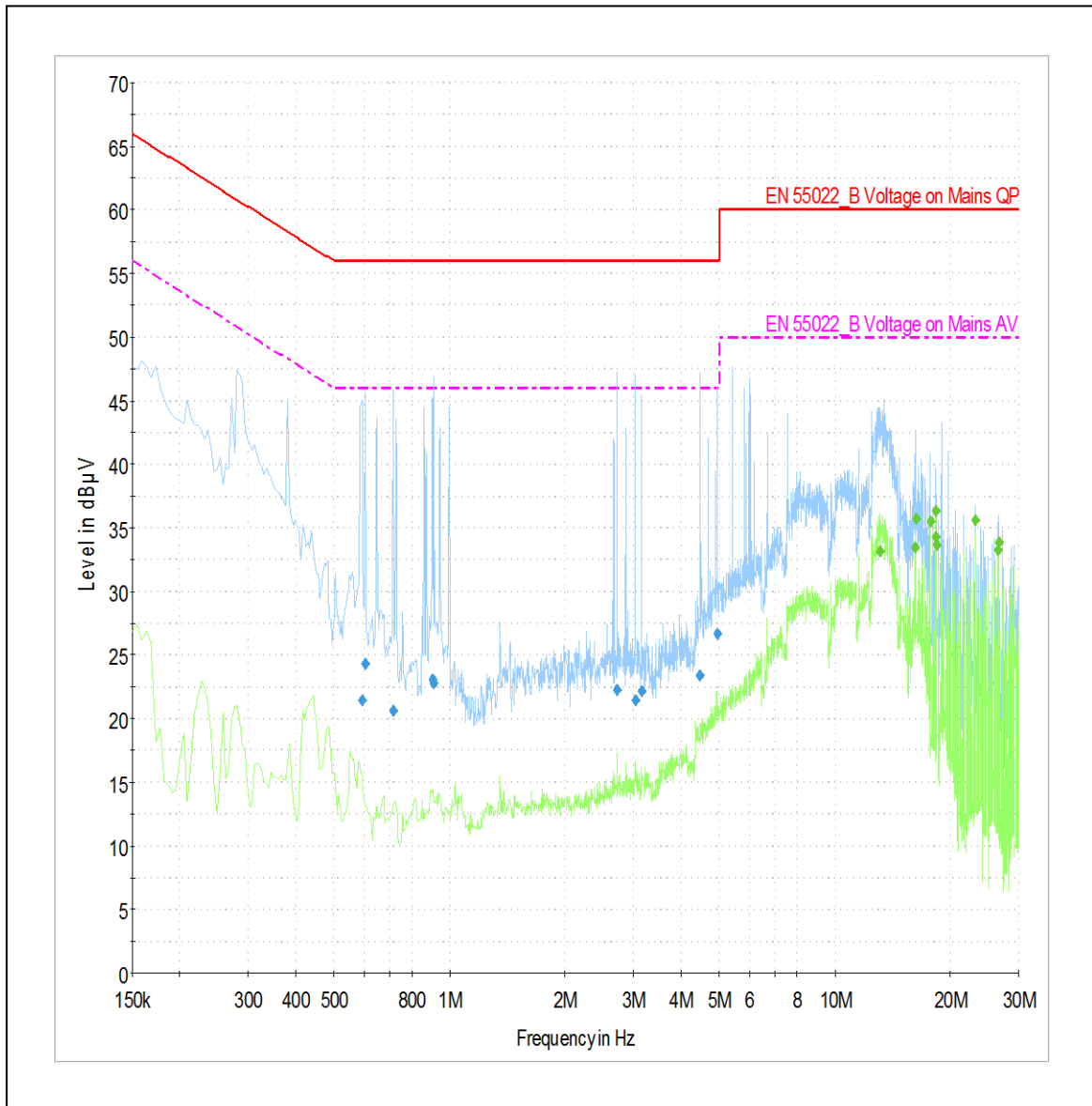
Average final measurement results table

Frequency [MHz]	Average [dBuV]	Bandwidth [kHz]	Line	Factor [dB]	Margin [dB]	Limit [dBuV]
12.349	31.7	9.0	L1	9.9	18.3	50.0
13.119	33.1	9.0	L1	9.9	16.9	50.0
13.987	32.1	9.0	L1	9.9	17.9	50.0
16.228	35.7	9.0	L1	10.0	14.3	50.0
17.695	35.5	9.0	L1	10.0	14.5	50.0
18.244	36.3	9.0	L1	10.0	13.7	50.0
18.366	34.0	9.0	L1	10.0	16.0	50.0
23.127	35.6	9.0	L1	10.1	14.4	50.0
26.488	33.3	9.0	L1	10.1	16.7	50.0
26.610	33.9	9.0	L1	10.1	16.1	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)

- Configuration 1 : USB Duplex Printing Mode



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)

Quasi-peak final measurement results table

Frequency [MHz]	Quasi-Peak [dBuV]	Bandwidth [kHz]	Line	Factor [dB]	Margin [dB]	Limit [dBuV]
0.591	21.4	9.0	N	9.7	34.6	56.0
0.605	24.4	9.0	L1	9.7	31.6	56.0
0.713	20.6	9.0	N	9.7	35.4	56.0
0.902	23.1	9.0	L1	9.7	32.9	56.0
0.911	22.8	9.0	L1	9.7	33.2	56.0
2.719	22.3	9.0	L1	9.7	33.7	56.0
3.034	21.5	9.0	L1	9.7	34.5	56.0
3.151	22.2	9.0	L1	9.7	33.8	56.0
4.470	23.4	9.0	L1	9.7	32.6	56.0
4.947	26.6	9.0	N	9.7	29.4	56.0

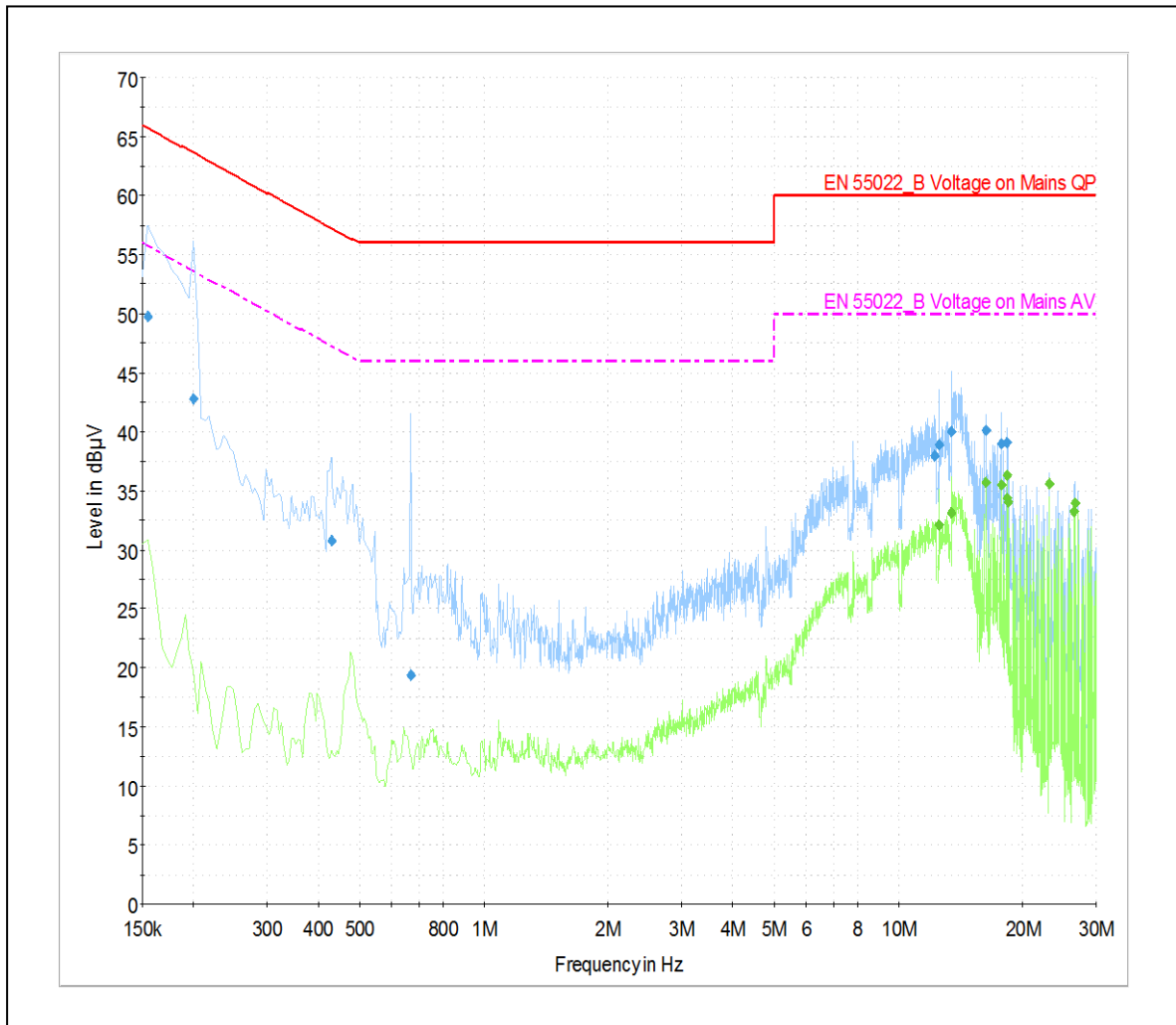
Average final measurement results table

Frequency [MHz]	Average [dBuV]	Bandwidth [kHz]	Line	Factor [dB]	Margin [dB]	Limit [dBuV]
13.056	33.2	9.0	L1	9.9	16.8	50.0
16.165	33.5	9.0	L1	10.0	16.5	50.0
16.228	35.7	9.0	L1	10.0	14.3	50.0
17.695	35.5	9.0	L1	10.0	14.5	50.0
18.244	36.3	9.0	L1	10.0	13.7	50.0
18.303	34.3	9.0	L1	10.0	15.7	50.0
18.366	33.7	9.0	N	10.0	16.3	50.0
23.127	35.6	9.0	L1	10.1	14.4	50.0
26.488	33.3	9.0	L1	10.1	16.7	50.0
26.610	33.9	9.0	L1	10.1	16.1	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)

- Configuration 1 : LPT & USB 2.0 Duplex Printing Mode



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)

Quasi-peak final measurement results table

Frequency [MHz]	Quasi-Peak [dBuV]	Bandwidth [kHz]	Line	Factor [dB]	Margin [dB]	Limit [dBuV]
0.155	49.8	9.0	L1	9.7	16.0	65.8
0.200	42.8	9.0	N	9.7	20.8	63.6
0.429	30.8	9.0	L1	9.7	26.5	57.3
0.668	19.4	9.0	N	9.7	36.6	56.0
12.214	38.0	9.0	L1	9.9	22.0	60.0
12.561	38.9	9.0	L1	9.9	21.1	60.0
13.443	40.0	9.0	L1	9.9	20.0	60.0
16.228	40.2	9.0	L1	10.0	19.8	60.0
17.695	39.0	9.0	N	10.0	21.0	60.0
18.244	39.1	9.0	L1	10.0	20.9	60.0

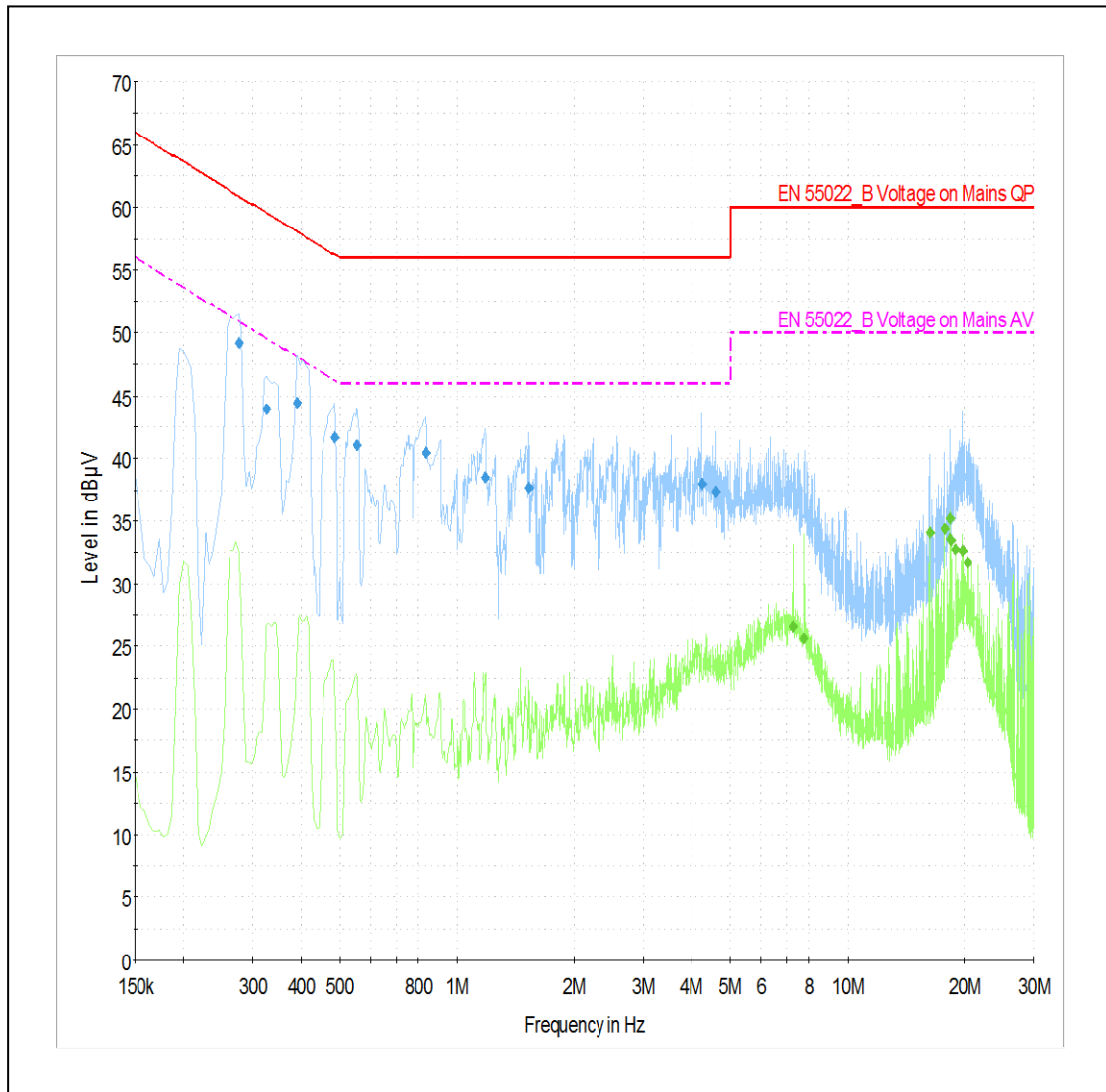
Average final measurement results table

Frequency [MHz]	Average [dBuV]	Bandwidth [kHz]	Line	Factor [dB]	Margin [dB]	Limit [dBuV]
12.561	32.1	9.0	L1	9.9	17.9	50.0
13.438	33.1	9.0	L1	9.9	16.9	50.0
16.228	35.7	9.0	L1	10.0	14.3	50.0
17.695	35.5	9.0	L1	10.0	14.5	50.0
18.244	36.4	9.0	L1	10.0	13.6	50.0
18.303	34.4	9.0	L1	10.0	15.6	50.0
18.366	34.1	9.0	L1	10.0	15.9	50.0
23.127	35.6	9.0	L1	10.1	14.4	50.0
26.488	33.3	9.0	L1	10.1	16.7	50.0
26.610	33.9	9.0	L1	10.1	16.1	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)

- Configuration 2 : Standby Mode



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)

Quasi-peak final measurement results table

Frequency [MHz]	Quasi-Peak [dBuV]	Bandwidth [kHz]	Line	Factor [dB]	Margin [dB]	Limit [dBuV]
0.276	49.2	9.0	L1	9.7	11.7	60.9
0.326	43.9	9.0	L1	9.7	15.7	59.6
0.389	44.4	9.0	L1	9.7	13.7	58.1
0.488	41.6	9.0	L1	9.7	14.6	56.2
0.555	41.1	9.0	L1	9.7	14.9	56.0
0.834	40.4	9.0	L1	9.7	15.6	56.0
1.176	38.5	9.0	L1	9.7	17.5	56.0
1.527	37.7	9.0	L1	9.7	18.3	56.0
4.249	38.0	9.0	L1	9.7	18.0	56.0
4.596	37.4	9.0	L1	9.7	18.6	56.0

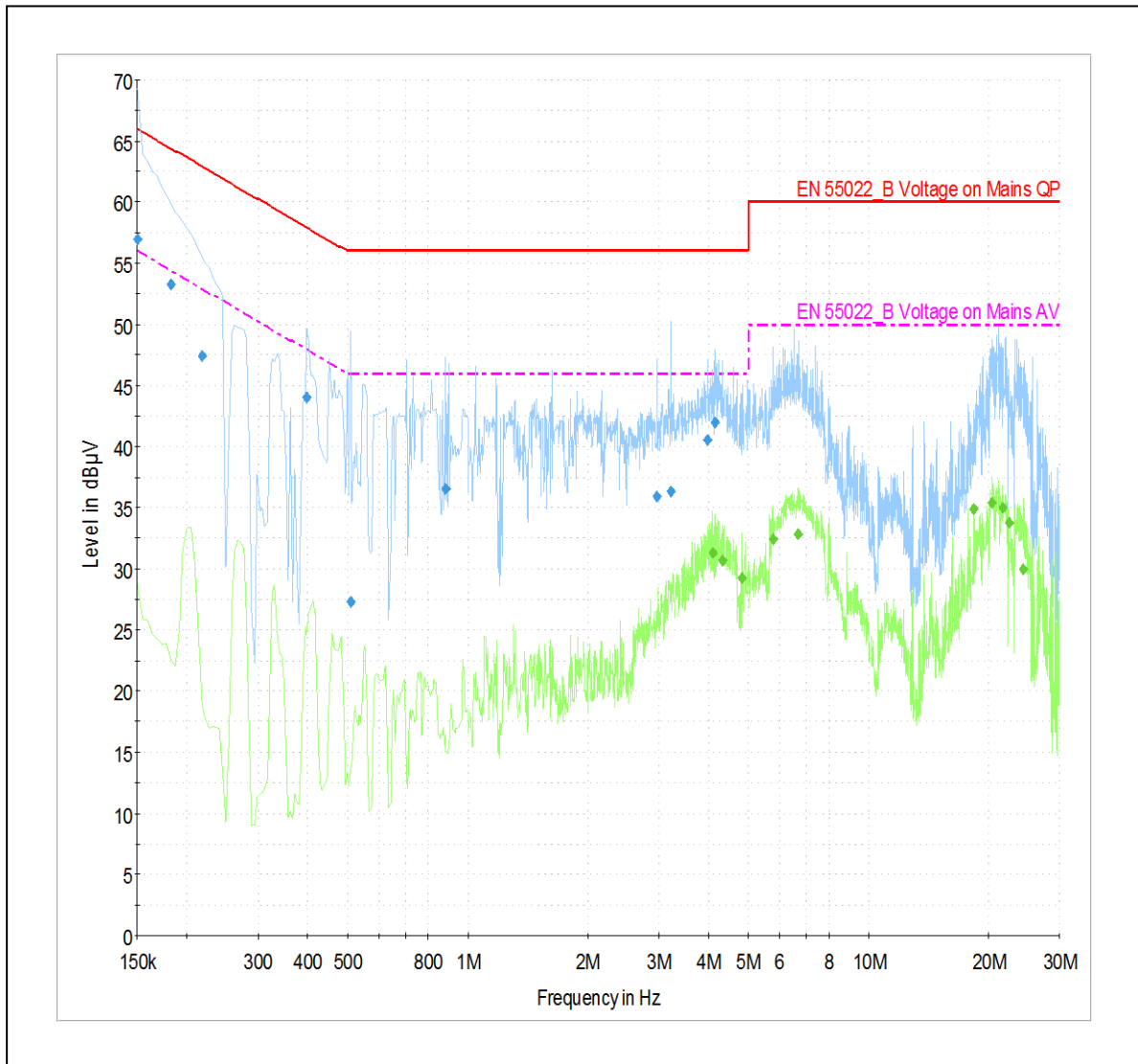
Average final measurement results table

Frequency [MHz]	Average [dBuV]	Bandwidth [kHz]	Line	Factor [dB]	Margin [dB]	Limit [dBuV]
7.255	26.6	9.0	N	9.7	23.4	50.0
7.755	25.7	9.0	N	9.7	24.3	50.0
16.228	34.0	9.0	L1	10.0	16.0	50.0
17.695	34.4	9.0	L1	10.0	15.6	50.0
18.244	35.2	9.0	L1	10.0	14.8	50.0
18.303	33.6	9.0	L1	10.0	16.4	50.0
18.366	33.4	9.0	L1	10.0	16.6	50.0
18.915	32.8	9.0	L1	10.0	17.2	50.0
19.711	32.6	9.0	L1	10.0	17.4	50.0
20.256	31.7	9.0	L1	10.0	18.3	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)

- Configuration 2 : USB 2.0 Duplex Printing Mode



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)

Quasi-peak final measurement results table

Frequency [MHz]	Quasi-Peak [dBuV]	Bandwidth [kHz]	Line	Factor [dB]	Margin [dB]	Limit [dBuV]
0.150	57.0	9.0	L1	9.7	9.0	66.0
0.182	53.3	9.0	L1	9.7	11.1	64.4
0.218	47.4	9.0	L1	9.7	15.5	62.9
0.398	44.0	9.0	L1	9.7	13.9	57.9
0.510	27.3	9.0	N	9.7	28.7	56.0
0.879	36.5	9.0	L1	9.7	19.5	56.0
2.962	35.9	9.0	N	9.7	20.1	56.0
3.214	36.3	9.0	N	9.7	19.7	56.0
3.975	40.5	9.0	L1	9.7	15.5	56.0
4.150	42.0	9.0	L1	9.7	14.0	56.0

Average final measurement results table

Frequency [MHz]	Average [dBuV]	Bandwidth [kHz]	Line	Factor [dB]	Margin [dB]	Limit [dBuV]
4.096	31.3	9.0	L1	9.7	14.7	46.0
4.317	30.7	9.0	L1	9.7	15.3	46.0
4.839	29.3	9.0	N	9.7	16.7	46.0
5.766	32.5	9.0	L1	9.7	17.5	50.0
6.679	32.8	9.0	L1	9.7	17.2	50.0
18.244	34.9	9.0	N	10.0	15.1	50.0
20.260	35.4	9.0	L1	10.0	14.6	50.0
21.660	35.0	9.0	N	10.1	15.0	50.0
22.456	33.8	9.0	L1	10.1	16.2	50.0
24.373	29.9	9.0	L1	10.1	20.1	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	Resolution Bandwidth	Quasi-peak Limits dB dB($\mu\text{V}/\text{m}$)	
		Class A	Class B
30 to 230	120 kHz	40	30
230 to 1000	120 kHz	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.

Peak measurements were made over the changeable frequency range 1GHz to 40GHz in accordance with internal maximum operating frequency at a measurement distance of 3m for the following antenna and turntable arrangements:

Antenna Height (Cm)	Antenna Polarisation	Turntable position (degrees)
100	Horizontal, Vertical	Continuous

Limits for Class A equipment at a measurement distance of 3 m

Frequency range Limits MHz	Quasi-peak Limits dB(μ V/m)	Average Limits dB(μ V/m)
1 to 3	76	56
3 to 6	80	60

NOTE The lower limit shall apply at the transition frequency

Limits for Class B equipment at a measurement distance of 3 m

Frequency range Limits MHz	Quasi-peak Limits dB(μ V/m)	Average Limits dB(μ V/m)
1 to 3	70	50
3 to 6	74	54

NOTE The lower limit shall apply at the transition frequency

Antenna height was adjusted to 100cm to be parallel from EUT to antenna centre. Measurements within 20dB of the limit were then maximized by adjusting turntable position. Final measurements were made using a average detector.

Results checked manually; and points close to the limit line were re-measured.

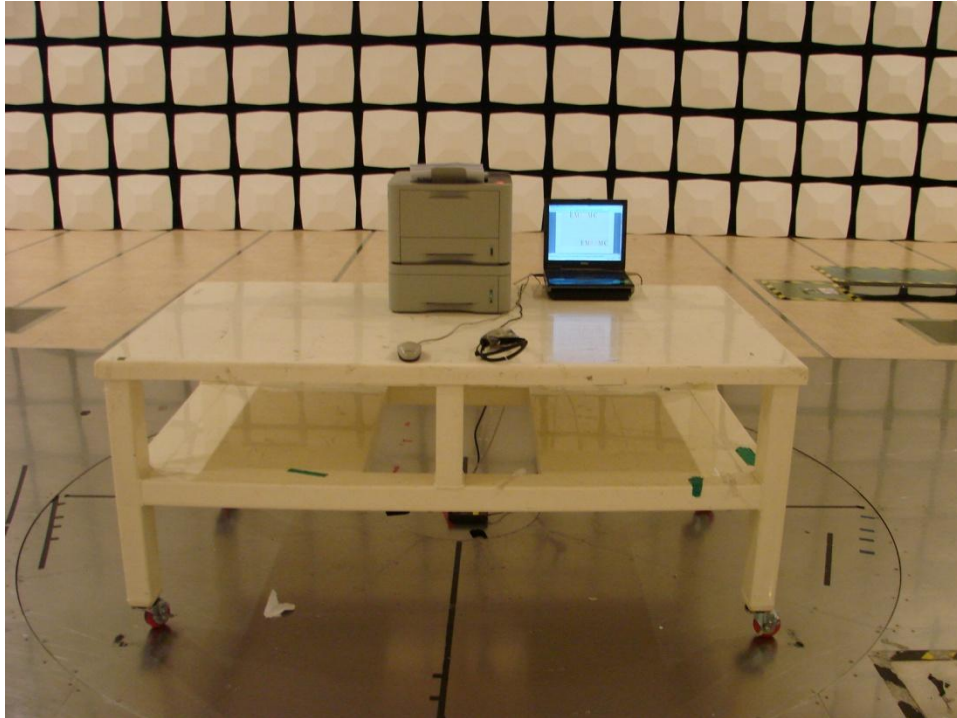
4.2.1 Test instrumentation

Test instrumentation	Manufacturer	Model name	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Bilog Antenna	Schaffner	CBL6112D	22602	2010-04-21	24
Bilog Antenna	Schaffner	CBL6112D	22604	2010-04-21	24
Horn Antenna	R&S	HF907	100016	2009-04-27	24
Test Receiver	R&S	ESIB-26	100147	2010-08-17	12
Test Receiver	R&S	ESIB-26	100288	2010-06-04	12
Amplifier	Sonoma	310N	185861	2010-01-28	12
Amplifier	Sonoma	310N	251676	2010-01-28	12
Amplifier	R&S	SCU_F018_G35_ASF42_CNN(F)	10001	2010-04-19	12
Antenna Mast	INN CO	MA4000	-	N/A	N/A
Antenna Mast	INN CO	MA4000	-	N/A	N/A
Antenna Mast	INN CO	MA2000	-	N/A	N/A
Mast Controller	INN CO	CO2000	-	N/A	N/A
Test software	TOYO	EP5/RE	VER 3.1.20	N/A	N/A
RF Selector	TOYO	NS4900	-	N/A	N/A

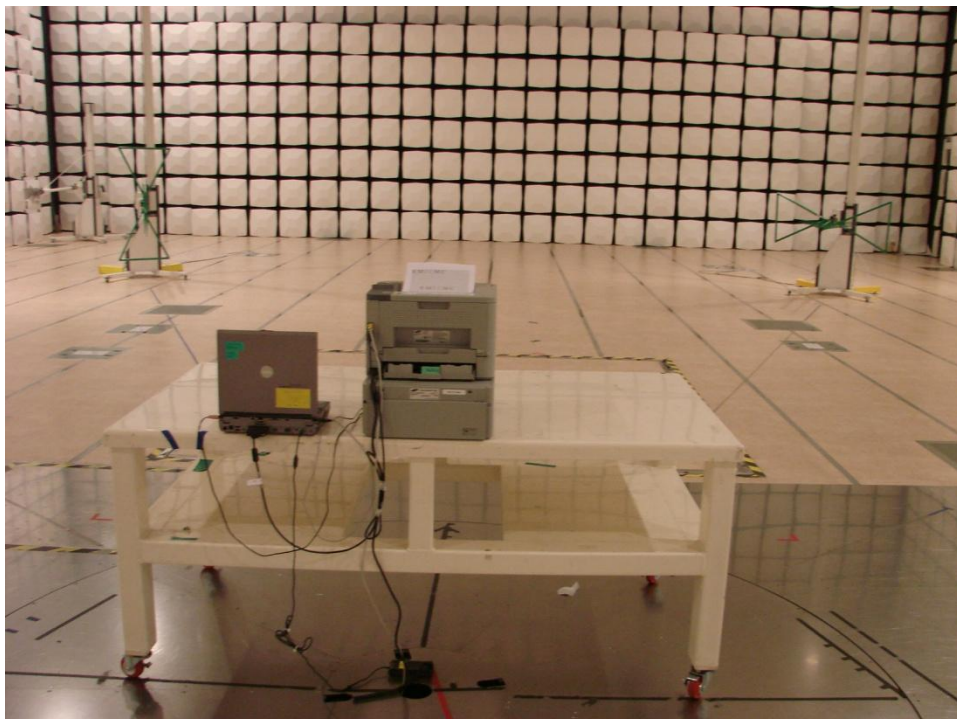
4.2.2 Temperature and humidity condition

Test date	October 1, 2010 ~ October 4, 2010	Test engineer	Young Hun Cheong
Test place	Semi-Anechoic Chamber		

4.2.3 Photograph of Test Setup(30 ~ 1 GHz)

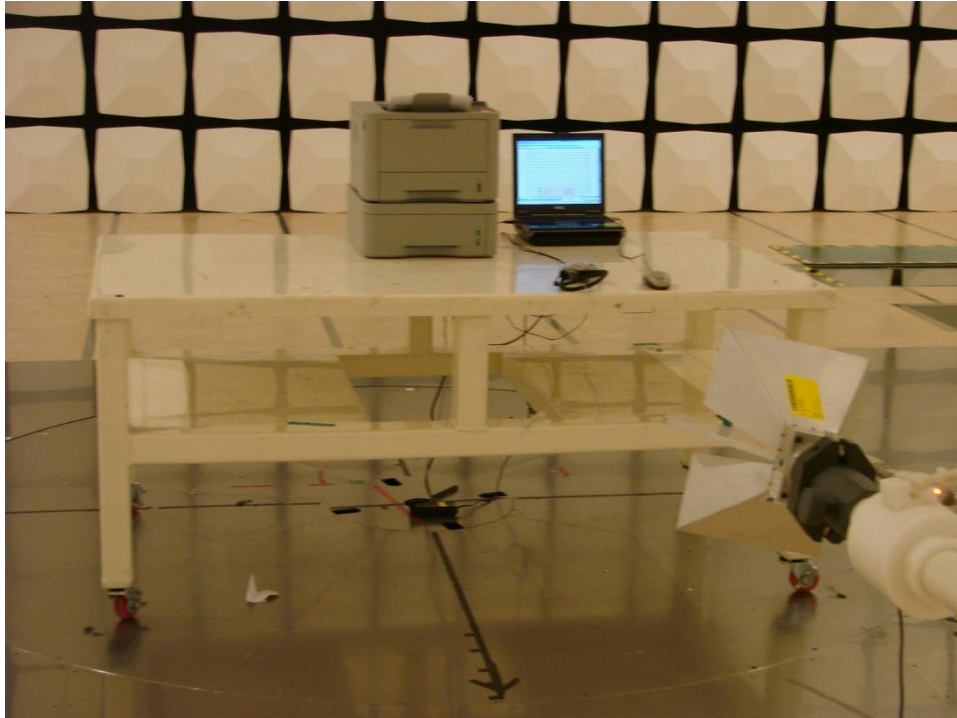


Front

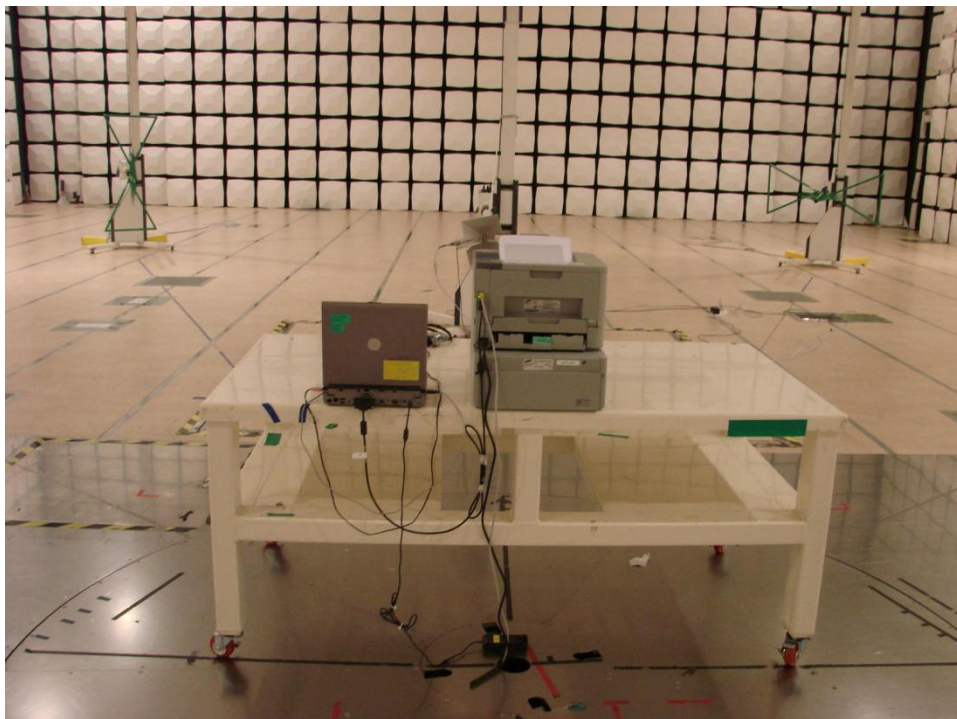


Rear

4.2.4 Photograph of Test Setup(1 ~ 2 GHz)



Front



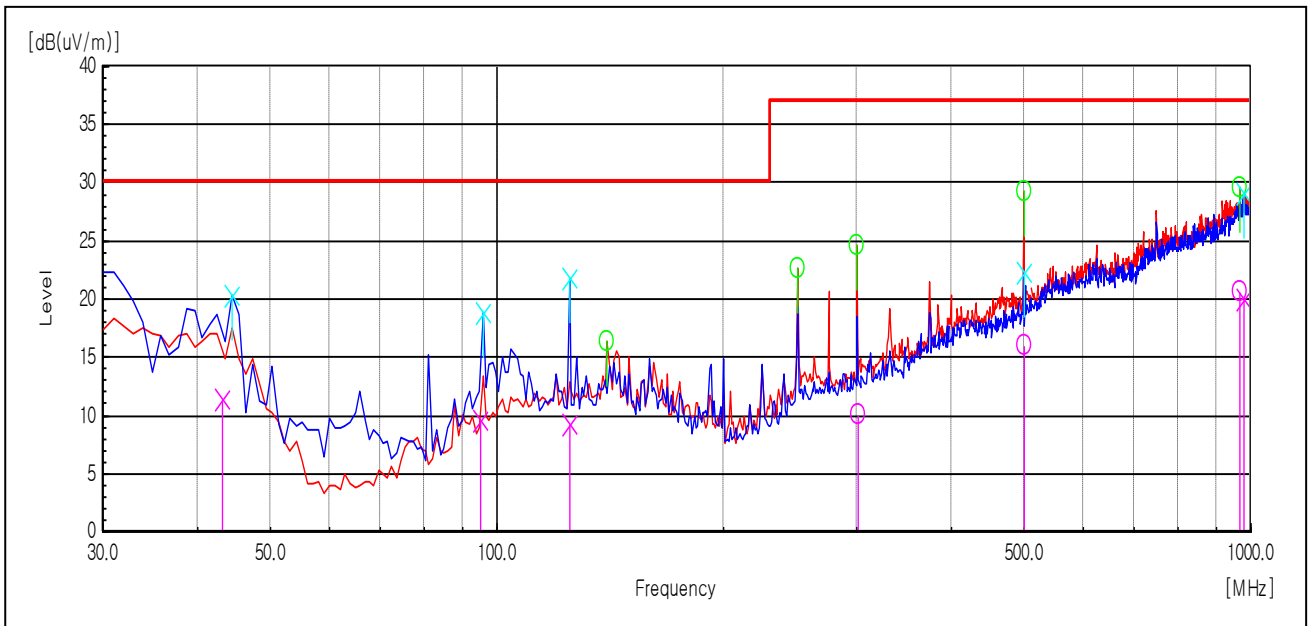
Rear

4.2.5 Test results

4.2.5.1 Below 1GHz results

- Configuration 1 : Standby Mode

Test Graph and Results



Frequency [MHz]	(P)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
43.211	V	31.5	-20.1	11.4	30.0	18.6	248.0	135.8
94.877	V	29.8	-20.2	9.6	30.0	20.4	134.0	388.5
124.661	V	26.8	-17.6	9.2	30.0	20.8	108.0	36.9
301.210	H	24.7	-14.6	10.1	37.0	26.9	221.0	268.7
500.841	H	24.7	-8.6	16.1	37.0	20.9	198.0	66.8
966.123	H	21.7	-1.0	20.7	37.0	16.3	142.0	2.5
977.988	V	20.8	-0.8	20.0	37.0	17.0	314.0	187.4

Note) Receiving antenna polarization : Horizontal and/or Vertical

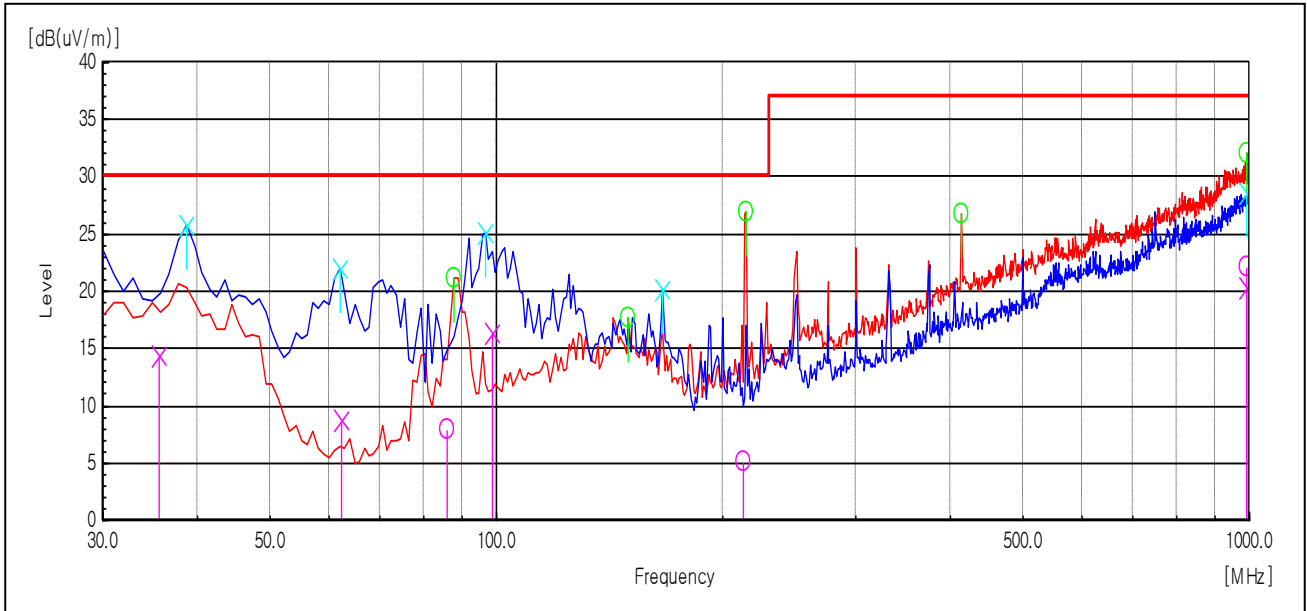
Test Distance : 10m, Antenna Height : 1 to 4 meters

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

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

- Configuration 1 : Network Simplex Printing Mode

Test Graph and Results



Frequency [MHz]	(P)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
35.688	V	29.8	-15.4	14.4	30.0	15.6	221.0	216.8
62.358	V	33.8	-25.0	8.8	30.0	21.2	288.0	345.8
86.122	H	30.0	-22.0	8.0	30.0	22.0	308.0	101.5
98.642	V	35.8	-19.4	16.4	30.0	13.6	167.0	20.8
213.059	H	24.6	-19.6	5.0	30.0	25.0	150.0	228.9
990.648	H	22.8	-0.7	22.1	37.0	14.9	133.0	80.9
991.844	V	20.8	-0.5	20.3	37.0	16.7	387.0	348.7

Note) Receiving antenna polarization : Horizontal and/or Vertical

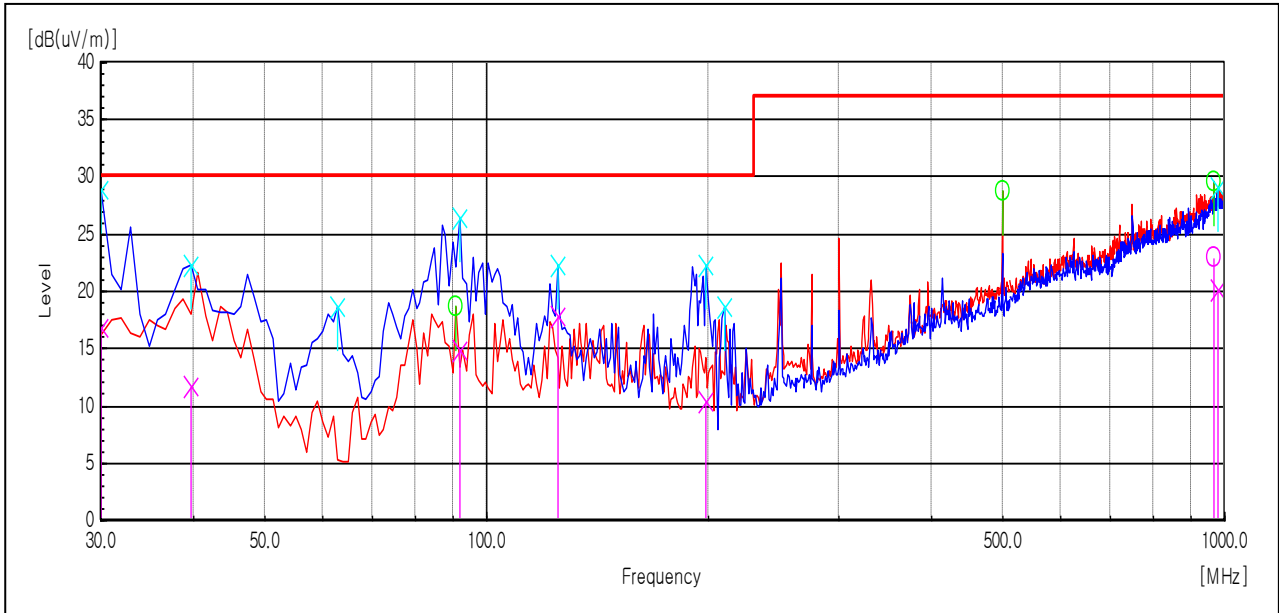
Test Distance : 10m, Antenna Height : 1 to 4 meters

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

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

- Configuration 1 : USB Duplex Printing Mode

Test Graph and Results



Frequency [MHz]	(P)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
30.000	V	26.8	-10.0	16.8	30.0	13.2	369.0	58.3
39.659	V	30.0	-18.3	11.7	30.0	18.3	278.0	198.6
91.820	V	35.8	-20.9	14.9	30.0	15.1	124.0	78.9
124.661	V	35.4	-17.6	17.8	30.0	12.2	169.0	40.6
198.072	V	30.0	-19.6	10.4	30.0	19.6	169.0	312.5
966.750	H	23.9	-1.0	22.9	37.0	14.1	123.0	3.9
977.507	V	20.9	-0.8	20.1	37.0	16.9	369.0	130.5

Note) Receiving antenna polarization : Horizontal and/or Vertical

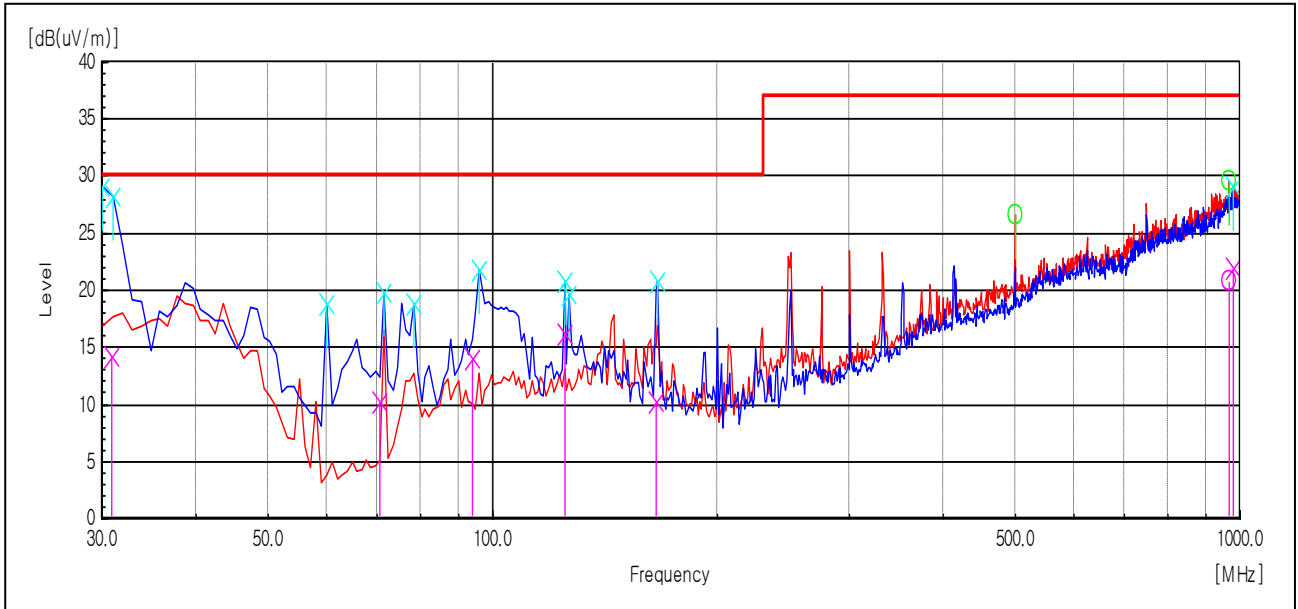
Test Distance : 10m, Antenna Height : 1 to 4 meters

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

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

- Configuration 1 : LPT & USB 2.0 Duplex Printing Mode

Test Graph and Results



Frequency [MHz]	(P)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
30.922	V	25.1	-10.9	14.2	30.0	15.8	351.0	247.3
70.522	V	34.8	-24.5	10.3	30.0	19.7	198.0	255.8
94.065	V	34.5	-20.4	14.1	30.0	15.9	188.0	369.0
124.661	V	33.8	-17.6	16.2	30.0	13.8	132.0	15.8
165.348	V	29.8	-19.6	10.2	30.0	19.8	109.0	135.8
965.822	H	21.9	-1.0	20.9	37.0	16.1	180.0	16.9
977.899	V	22.8	-0.8	22.0	37.0	15.0	308.0	199.8

Note) Receiving antenna polarization : Horizontal and/or Vertical

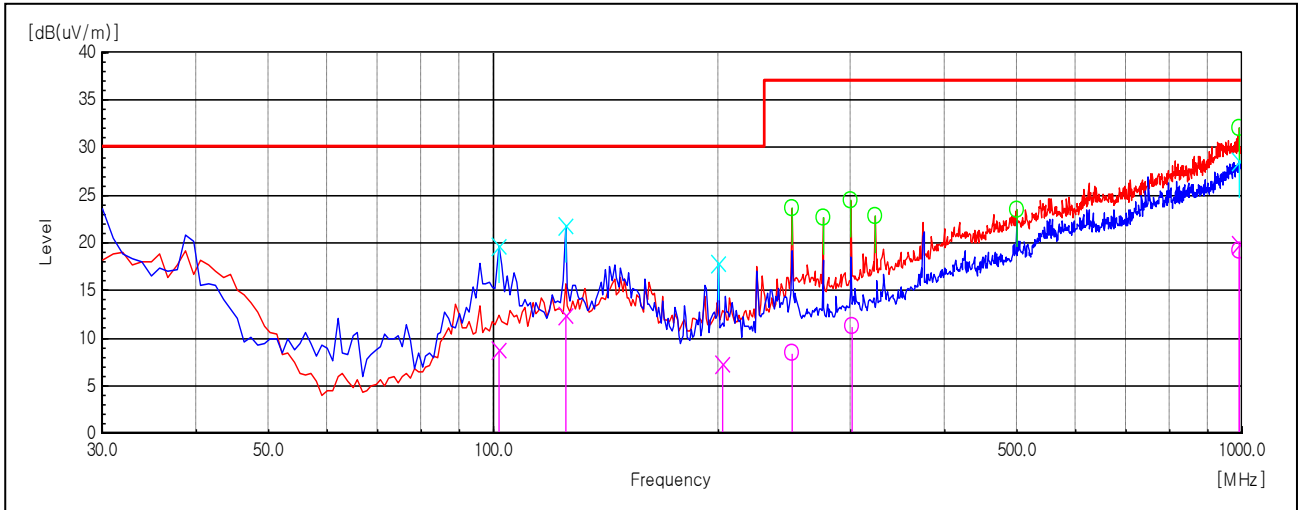
Test Distance : 10m, Antenna Height : 1 to 4 meters

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

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

- Configuration 2 : Standby Mode

Test Graph and Results



Frequency [MHz]	(P)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
101.645	V	27.7	-18.9	8.8	30.0	21.2	288.0	10.7
124.661	V	30.0	-17.6	12.4	30.0	17.6	110.0	89.5
201.877	V	26.8	-19.5	7.3	30.0	22.7	110.0	310.5
250.999	H	23.7	-15.3	8.4	37.0	28.6	308.0	98.7
301.255	H	25.8	-14.6	11.2	37.0	25.8	320.0	78.4
992.455	V	20.4	-0.5	19.9	37.0	17.1	377.0	350.0
992.488	H	19.8	-0.7	19.1	37.0	17.9	127.0	78.4

Note) Receiving antenna polarization : Horizontal and/or Vertical

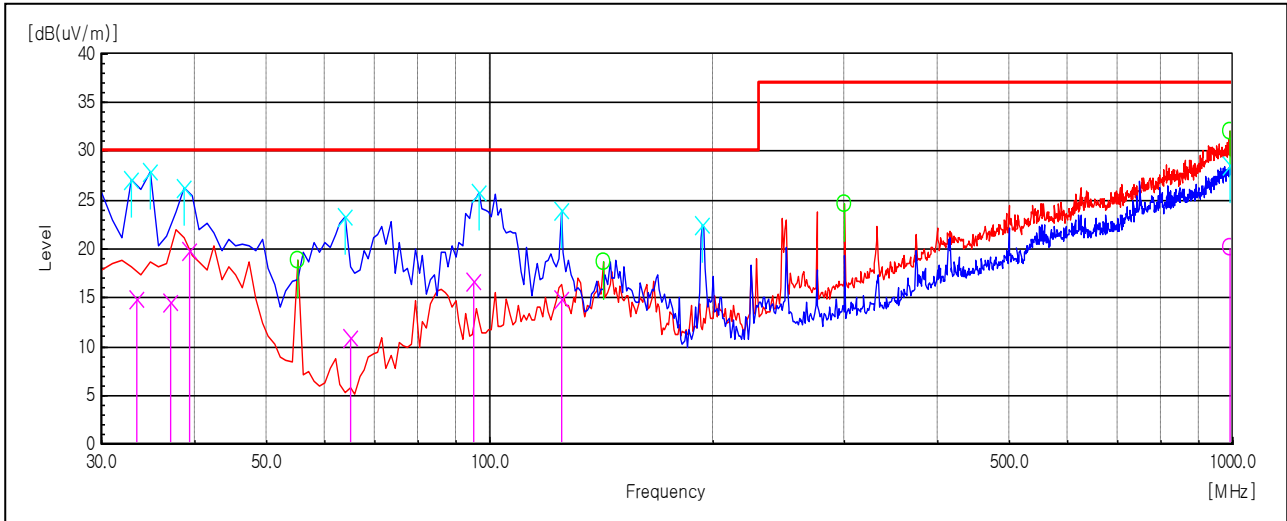
Test Distance : 10m, Antenna Height : 1 to 4 meters

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

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

- Configuration 2 : USB 2.0 Duplex Printing Mode

Test Graph and Results



Frequency [MHz]	(P)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
33.453	V	28.3	-13.4	14.9	30.0	15.1	251.0	352.3
37.104	V	31.1	-16.5	14.6	30.0	15.4	151.0	350.3
39.355	V	37.9	-18.1	19.8	30.0	10.2	251.0	3.3
64.877	V	35.8	-24.9	10.9	30.0	19.1	187.0	40.8
94.954	V	36.9	-20.2	16.7	30.0	13.3	150.0	66.8
124.661	V	32.5	-17.6	14.9	30.0	15.1	107.0	36.9
992.348	H	20.9	-0.7	20.2	37.0	16.8	134.0	78.5

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

4.2.5.2 Above 1GHz results(1 ~ 2GHz)

- Configuration 1 : Standby Mode

Peak Measurement

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]
1062.12	H	70.9	-14.9	56.0	74.0	18.0	100.0	0.4
1062.12	V	59.9	-14.9	45.0	74.0	29.0	100.0	4.9

Average Measurement

Frequency [MHz]	POL	Reading AV [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Limit [dB(uV/m)]	Margin AV [dB]	Height [cm]	Angle [deg]
1063.46	H	38.7	-14.9	23.8	54.0	30.2	100.0	0.3
1063.64	V	23.0	-14.9	8.1	54.0	45.9	100.0	4.3

Note1) Any emissions that do NOT exceed average limit were not tested with average detector mode.

Note2) Receiving antenna polarization : Horizontal and Vertical

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

Level AV (Average) = Reading AV (Average) + Factor(Antenna Factor + Cable Loss - Amp. Gain)

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

Margin AV (Average) = Limit – Level AV (Average)

- **Configuration 1 : Network Simplex Printing Mode**

Peak Measurement

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]
1066.13	H	70.5	-14.8	55.7	74.0	18.3	100.0	15.8
1066.13	V	61.6	-14.8	46.8	74.0	27.2	100.0	57.7
1412.83	H	56.6	-11.8	44.8	74.0	29.2	100.0	15.8
1877.76	V	54.3	-7.8	46.5	74.0	27.5	100.0	10.9
1909.82	H	53.8	-7.5	46.3	74.0	27.7	100.0	0.4

Average Measurement

Frequency [MHz]	POL	Reading AV [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Limit [dB(uV/m)]	Margin AV [dB]	Height [cm]	Angle [deg]
1064.22	H	35.9	-14.9	21.0	54.0	33.0	100.0	15.1
1064.32	V	26.7	-14.9	11.8	54.0	42.2	100.0	57.1
1416.10	H	18.8	-11.8	7.0	54.0	47.0	100.0	16.4
1879.65	V	13.2	-7.7	5.5	54.0	48.5	100.0	11.4
1910.23	H	13.4	-7.5	5.9	54.0	48.1	100.0	1.1

Note1) Any emissions that do NOT exceed average limit were not tested with average detector mode.

Note2) Receiving antenna polarization : Horizontal and Vertical

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

Level AV (Average) = Reading AV (Average) + Factor(Antenna Factor + Cable Loss - Amp. Gain)

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

Margin AV (Average) = Limit – Level AV (Average)

- **Configuration 1 : USB Duplex Printing Mode**

Peak Measurement

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]
1062.12	H	69.9	-14.9	55.0	74.0	19.0	100.0	0.3
1062.12	V	60.4	-14.9	45.5	74.0	28.5	100.0	41.5
1414.83	H	56.1	-11.8	44.3	74.0	29.7	100.0	359.6
1865.73	H	52.1	-7.9	44.2	74.0	29.8	100.0	4.1
1935.87	H	57.1	-7.3	49.8	74.0	24.2	100.0	158.2

Average Measurement

Frequency [MHz]	POL	Reading AV [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Limit [dB(uV/m)]	Margin AV [dB]	Height [cm]	Angle [deg]
1064.18	H	38.8	-14.9	23.9	54.0	30.1	100.0	0.3
1064.46	V	27.1	-14.9	12.2	54.0	41.8	100.0	41.1
1416.04	H	28.8	-11.8	17.0	54.0	37.0	100.0	358.9
1862.22	H	22.9	-7.9	15.0	54.0	39.0	100.0	4.6
1934.58	H	13.7	-7.3	6.4	54.0	47.6	100.0	157.7

Note1) Any emissions that do NOT exceed average limit were not tested with average detector mode.

Note2) Receiving antenna polarization : Horizontal and Vertical

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

Level AV (Average) = Reading AV (Average) + Factor(Antenna Factor + Cable Loss - Amp. Gain)

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

Margin AV (Average) = Limit – Level AV (Average)

- **Configuration 1 : LPT & USB 2.0 Duplex Printing Mode**

Peak Measurement

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]
1062.12	H	71.5	-14.9	56.6	74.0	17.4	100.0	4.5
1062.12	V	62.7	-14.9	47.8	74.0	26.2	100.0	57.2

Average Measurement

Frequency [MHz]	POL	Reading AV [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Limit [dB(uV/m)]	Margin AV [dB]	Height [cm]	Angle [deg]
1064.00	H	37.1	-14.9	22.2	54.0	31.8	100.0	3.9
1064.34	V	26.8	-14.9	11.9	54.0	42.1	100.0	56.5

Note1) Any emissions that do NOT exceed average limit were not tested with average detector mode.

Note2) Receiving antenna polarization : Horizontal and Vertical

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

Level AV (Average) = Reading AV (Average) + Factor(Antenna Factor + Cable Loss - Amp. Gain)

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

Margin AV (Average) = Limit – Level AV (Average)

- **Configuration 2 : Standby Mode**

Peak Measurement

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]
1026.05	H	60.5	-15.2	45.3	74.0	28.7	100.0	15.3
1062.12	V	60.0	-14.9	45.1	74.0	28.9	100.0	57.4
1064.13	H	72.0	-14.9	57.1	74.0	16.9	100.0	0.6
1416.83	H	56.0	-11.8	44.2	74.0	29.8	100.0	4.5
1861.72	H	52.1	-7.9	44.2	74.0	29.8	100.0	4.5

Average Measurement

Frequency [MHz]	POL	Reading AV [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Limit [dB(uV/m)]	Margin AV [dB]	Height [cm]	Angle [deg]
1031.01	H	24.0	-15.1	8.9	54.0	45.1	100.0	14.6
1064.08	V	28.2	-14.9	13.3	54.0	40.7	100.0	56.9
1064.72	H	38.6	-14.9	23.7	54.0	30.3	100.0	1.2
1415.86	H	24.5	-11.8	12.7	54.0	41.3	100.0	3.8
1859.95	H	18.2	-7.9	10.3	54.0	43.7	100.0	3.8

Note1) Any emissions that do NOT exceed average limit were not tested with average detector mode.

Note2) Receiving antenna polarization : Horizontal and Vertical

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

Level AV (Average) = Reading AV (Average) + Factor(Antenna Factor + Cable Loss - Amp. Gain)

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

Margin AV (Average) = Limit – Level AV (Average)

- **Configuration 2 : USB 2.0 Duplex Printing Mode**

Peak Measurement

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]
1064.13	H	71.6	-14.9	56.7	74.0	17.3	100.0	4.4
1064.13	V	61.3	-14.9	46.4	74.0	27.6	100.0	57.1

Average Measurement

Frequency [MHz]	POL	Reading AV [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Limit [dB(uV/m)]	Margin AV [dB]	Height [cm]	Angle [deg]
1064.12	H	39.1	-14.9	24.2	54.0	29.8	100.0	4.0
1064.64	V	27.9	-14.9	13.0	54.0	41.0	100.0	56.6

Note1) Any emissions that do NOT exceed average limit were not tested with average detector mode.

Note2) Receiving antenna polarization : Horizontal and Vertical

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

Level AV (Average) = Reading AV (Average) + Factor(Antenna Factor + Cable Loss - Amp. Gain)

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

Margin AV (Average) = Limit – Level AV (Average)

Appendix – EUT photography



Front View



Rear View



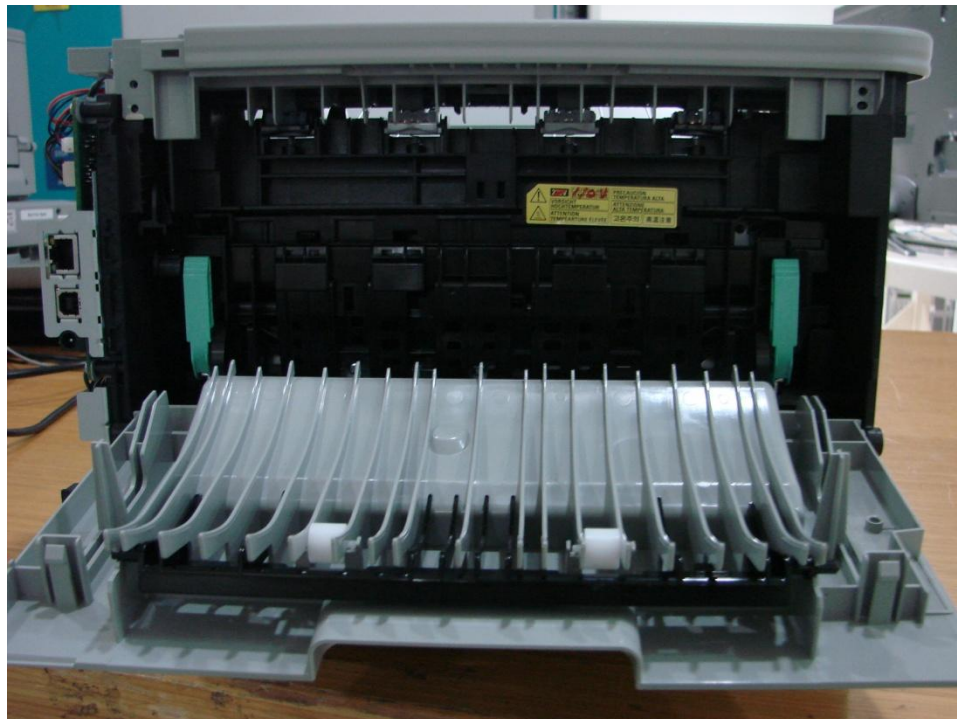
Left View



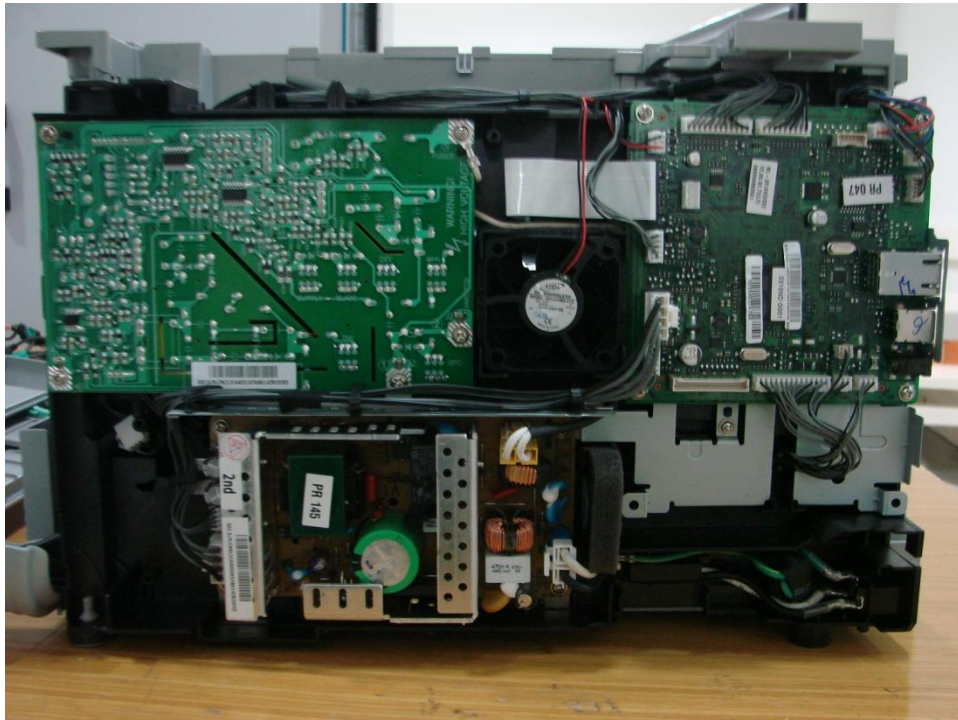
Right View



Inside View – Front



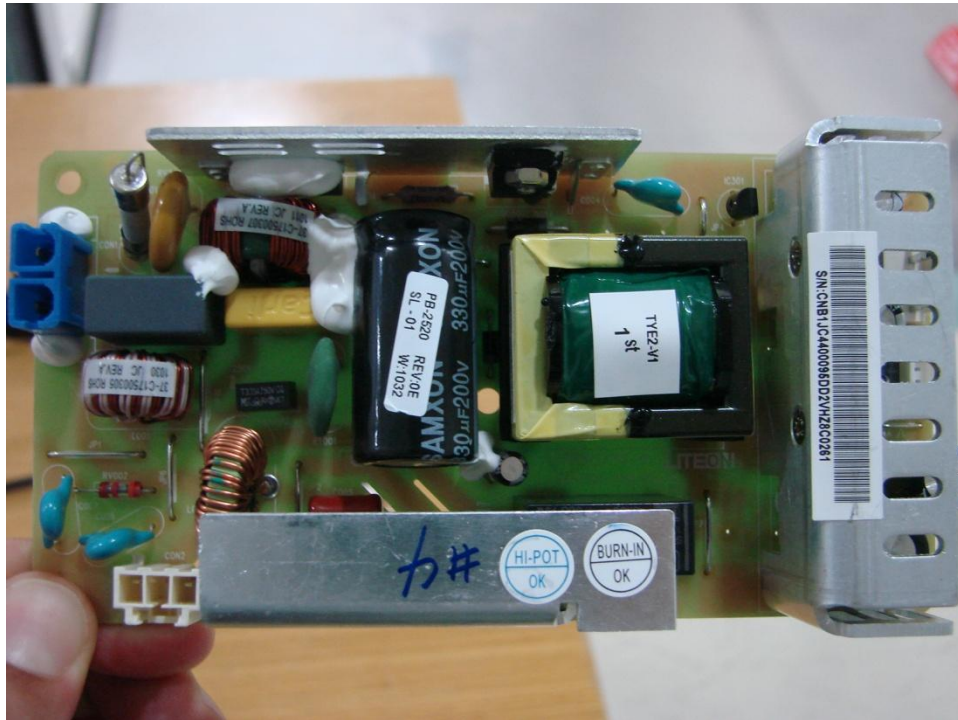
Inside View – Rear



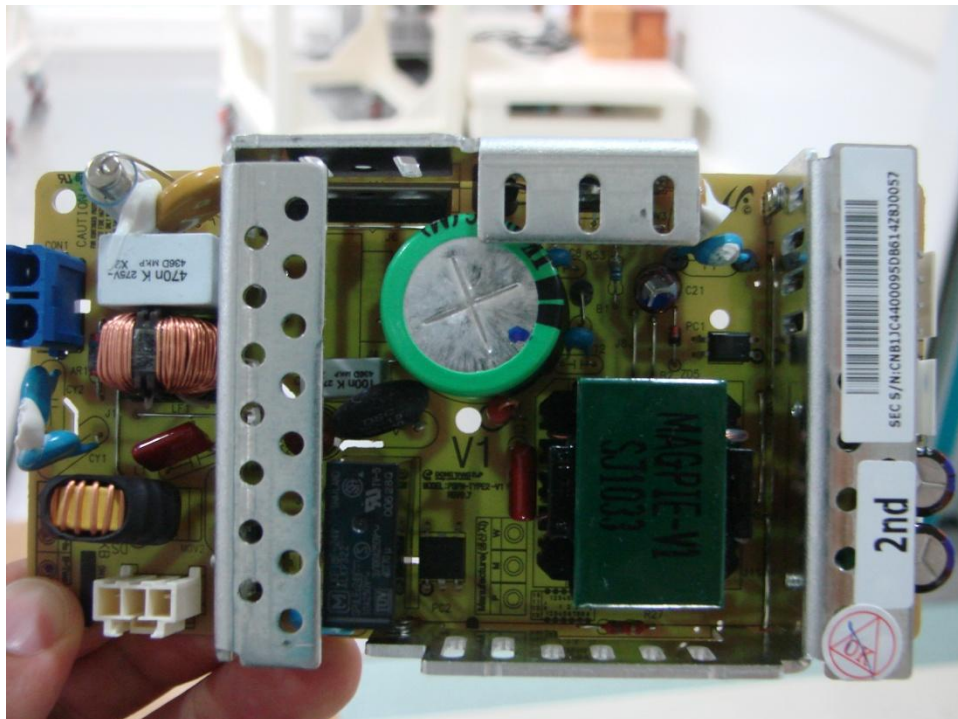
Inside View – Left



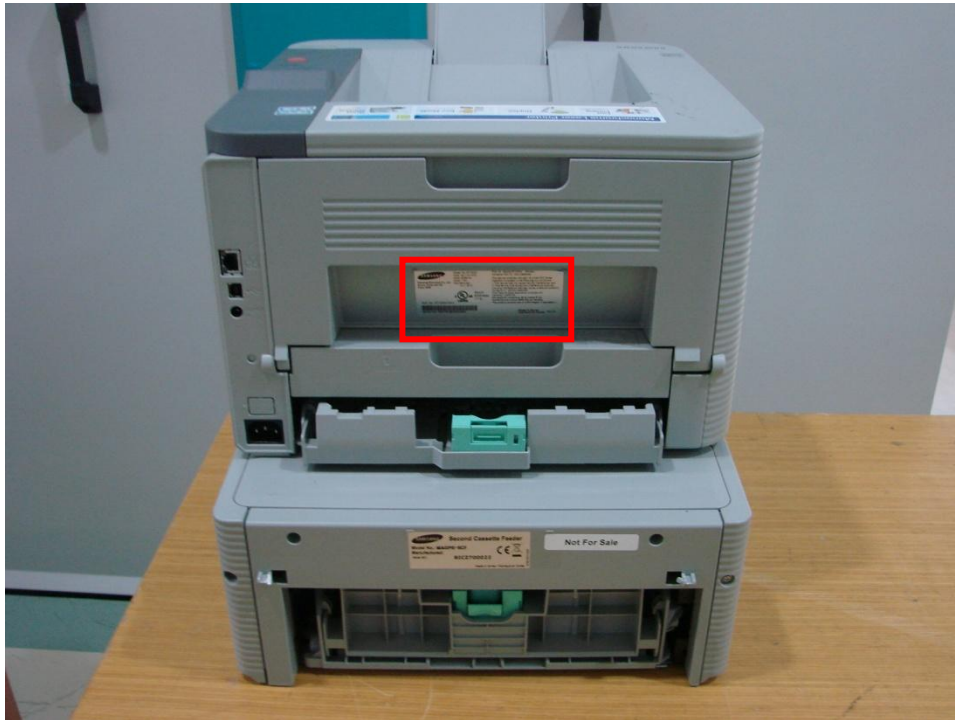
Inside View – Right



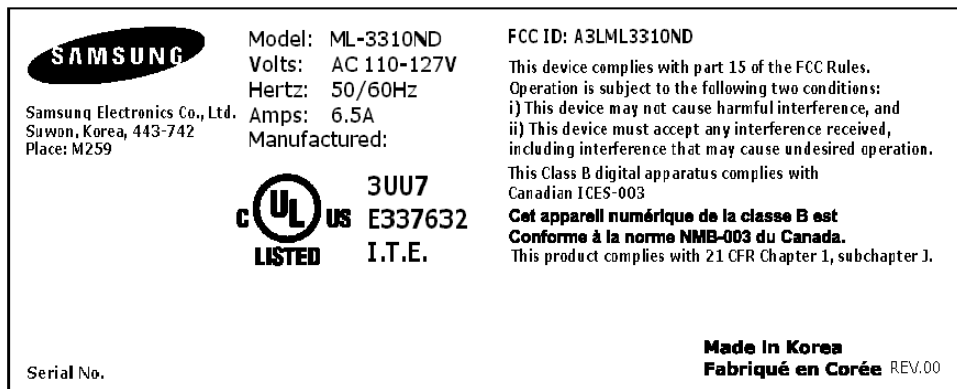
LITEON SMPS



Dongyang SMPS



Label Location



Label