

EMC TEST REPORT

Project No.	LBE20125894		Issue No.	0	
Applicant	Name of organization		Samsung Electronics Co., Ltd.		
	Address		(Maetan dong) 129, Samsung-ro, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do 443-742 Korea		
	Date of application		December 12, 2012		
EUT	Type of device		Class B personal computers and peripherals		
	Equipment authorization		☐ Declaration of Conformity ☒ Certification ☐ Verification		
	FCC ID		A3LSLM2825DW		
	Kind of product		Mono Laser Printer		
	Model No.		Xpress M2825DW		
			Variant Model No. Xpress M2625 / Xpress M2626 / Xpress M2620 Xpress M2625D / Xpress M2626D / Xpress M2620D Xpress M2825ND / Xpress M2826ND / Xpress M2820ND Xpress M2825DW / Xpress M2820DW / Xpress M2620ND		
	Manufacturer		SAMSUNG ELECTRONICS (SHANDONG) DIGITAL PRINTING CO.,LTD. #264209,Samsung Road,Weihi Hi-Tech IDZ Shandong Province CHINA.		
SAMSUNG ELECTRONICS SUZHOU COMPUTER CO.,LTD.(SESC) NO. 198, Fangzhou Road, Suzhou Industrial Park Jiangsu Province,China. Weihai Intops Electronics Co., Ltd. Keji Road 268-1,Weihai city,Shandong Province,China. Weihai Shin Heung Digital Electronics Co., Ltd. 98, Samsung Road, Weihai Hi-Tech. IDZ, Shandong Province, P.R.China					
Applied Standards			FCC Part 15, Subpart B / ANSI C63.4-2009		
Test Period			November 20, 2012 ~ November 26, 2012		
Issue date			December 14, 2012		

Test result : Complied

The equipment under test has found to be compliant with the applied standards.
 The result is not applied the uncertainty concept.
 This mean that the result is applied the original (standard) limit.
 (Refer to the attached test result for more detail.)

Tested by : Sung Wook Choi

S.W.Choi

Reviewed by : Tae Young Jang

Tae Young Jang

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 center.

SAMSUNG

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1. Report information

1.1 Revision history

No.	Revised detailed information
Issue 0	There are no revisions and this version is basic test report.

1.2 Sample calculation

1.2.1 Conducted disturbance (at 10 MHz)

- Class B limit = 60 dB μ V (Quasi-peak limit)
- Level (50 dB μ V) = Meter Reading (40.2 dB μ V) + factor (9.8 dB, AMN factor 9.7 dB + Cable loss 0.1 dB)
- Margin (10 dB) = Limit (60 dB μ V) – Level (50 dB μ V) = 10 dB below limit

1.2.2 Radiated disturbance (at 100 MHz)

- Class B limit = 30 dB μ V/m at 10 m
- Level (20 dB μ V/m)
= Meter Reading (40 dB μ V) + factor (- 20 dB (1/m), antenna factor + cable loss – amplifier gain)
- Margin (10 dB) = Limit (30 dB μ V/m) – Level (20 dB μ V/m) = 10 dB below limit

2. Summary of test results

2.1 Emission

The EUT has been tested according to the following specifications:

Applied	Test type	Applied standard	Result
☒	Conducted Disturbance (Mains Port)	FCC Part 15 Subpart B / ANSI C63.4-2009	Complied
☒	Radiated Disturbance		Complied

3. General Information

3.1 Test facility

The CS & Environment center is located on Samsung Electronics Co., Ltd. at (Maetan dong) 129, Samsung-ro, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do 443-742 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 center is operated as testing laboratory in accordance with the requirements of ISO/IEC 17025:2005.

4. Test Setup configuration

4.1 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:

Seq	Description	Model No.	Serial No.	Manufacturer	Fcc ID / DoC
A	Mono Laser Printer	Xpress M2825DW	-	Samsung	A3LSPWB4319S
B	PC	NP300E5Q	HJ9L93UB700024P	Samsung	DoC
C	Adapter (For PC)	AD-9019S	CNBA4400215ABZ049C B7144	Delta	-
D	USB Memory	128M	-	Memorive	DoC
E	Headset	-	-	Actto	DoC

4.2 EUT operating mode

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

Operating Mode 1	USB printing
Operating Mode 2	Network printing

4.3 Details of Sampling

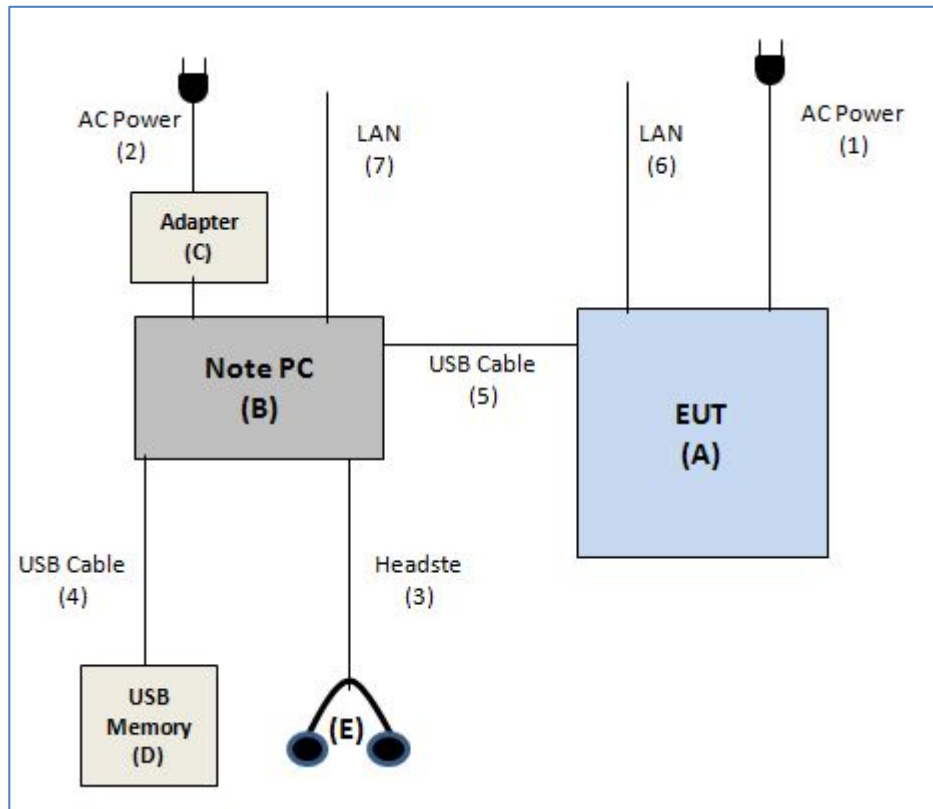
Customer selected, single unit.

4.4 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;

No.	Connected cable	Length [m]	Shielded [Y/N]	Note
1	Power	1.5	No	For EUT
2	Power	1.8	No	For PC
3	Headset	2.0	No	For EUT
4	USB	0.3	Yes	From EUT to USB Memory
5	USB	1.0	Yes	From EUT to PC
6	LAN	2.0	Yes	From EUT to HUB
7	LAN	2.0	Yes	From PC to HUB

4.5 Test arrangement



4.6 EUT Description

The following features describe EUT represented by this report:

Item	Specification and Description
SMPS	Shandong new cowitel (All in one toner cartridge & Separate toner cartridge)
Processor	A1500 (600MHz)
Standard System memory	128MB DDR3 on all configurations (Default)
Resolution	max 1200 x 1200 dpi
Speed	Xpress M262**** series 26ppm Xpress M282**** series 28ppm
Paper Handling	Paper Tray(standard) 250Sheets Bypass Tray 1 Sheets
Power Rating	AC 110-127V 4.9A, 50/60 Hz
Power Consumption	Power save mode : 1.3 Watts (Wifi Direct on less than 1.8Watts) Stand by mode : 45 Watts Printing simplex : 400 Watts
Printer Language	PCL6 / PCL5e / SPL
Interfaces	USB2.0, Network, Wifi
OS compatibility	Windows 95/98/2000/NT4.0/Win-ME/XP/Longhorn/XP 64bit/ Citrix MAC OS 8, 9, X 10.2, X 10.3 & Higher Unix/Linux
Modes of Operation	USB Printing, Network Printing , Wifi Printing
Intended Class for Emissions	Class B

4.7 Clock Frequencies

Kind of Clocks	Frequency[MHz]	Kind of Clocks	Frequency[MHz]
CPU internal clock	600	DDR3 clock	384
Video clock	16.277	Main source clock	12
USB device clock	12	Ethernet	25

4.8 Test configuration and condition

Item	Model Name	P/N	Manufacturer
Main Board	KINGBIRD-N/BATIAN-N	REV 0.3	Samsung
SMPS	KINGBIRD-V1	REV 1.1	SHANDONG NEW COWITEL
	KINGBIRD-V1	REV 1.1	DONG YANG E&P
HVPS	KINGBIRD HVPS	REV 1.3	Dongyang E&P, Sungho
Toner Cartridge	MLT-D115S	All in one toner cartridge	Samsung
	MLT-D115L	All in one toner cartridge	
	MLT-D116S	Separate toner cartridge	
	MLT-D116L	Separate toner cartridge	
Imaging Unit	MLT-R116	Separate opc unit	Samsung
Memory	DDR3	K4B1G1646G-BCH9	Samsung
		NT5CB64M16DP-CF	NANYA

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. The mode of operation utilized for testing was selected to best simulate typical EUT use. Power source for the EUT operating was supplied by CVCF made by the Voltech Corp.

Two different types of SMPS, Dongyang, Shandong new cowitel were applied during testing. Each SMPS was installed for testing, tested and reported.

- Configuration 1 : Dongyang E&P SMPS was applied.
- Configuration 2 : Shandong new cowitel SMPS was applied.

- Test Voltage : AC 120 V, 60 Hz

4.9 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.)

4.9.1 Emission

Test type		Measurement uncertainty (C.L. 95 %, k = 2)
Conducted disturbance	Main terminal	2.90 dB
Radiated Disturbance (Below 1 GHz)	Horizontal	4.18 dB
	Vertical	4.47 dB
Radiated Disturbance (Above 1 GHz)	Horizontal	3.06 dB
	Vertical	3.03 dB

5. Results of individual test

5.1 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 B ITE

Frequency range Limits MHz	Resolution Bandwidth	Limits dB(μV)	
		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.			

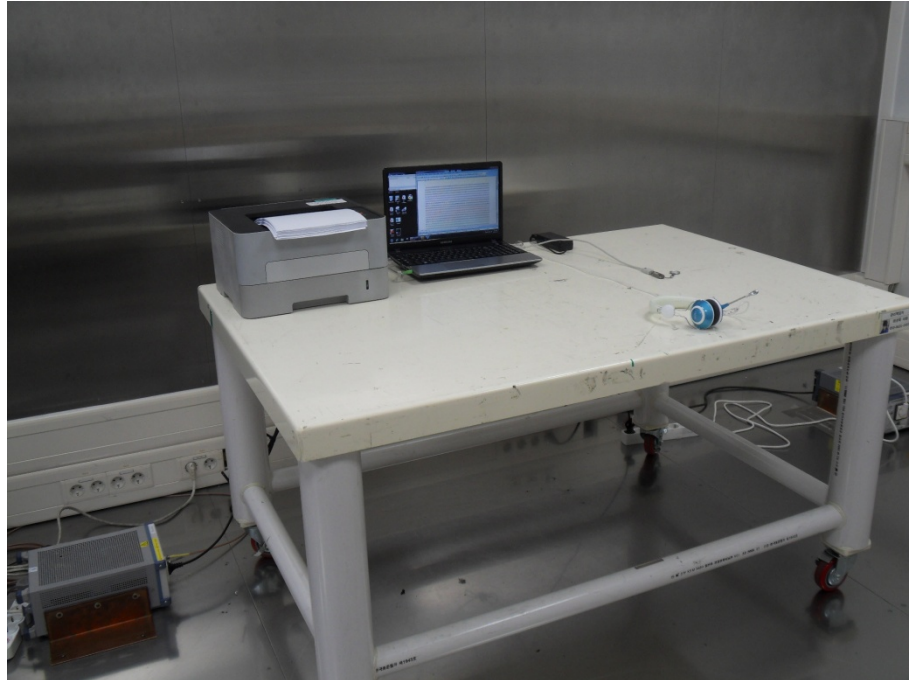
5.1.1 Test instrumentation

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Measuring receiver	ESIB 26	R&S	100288	2012-04-30	12
Artificial mains network	ENV216	R&S	100116	2012-10-31	12
Artificial mains network	ESH3-Z5	R&S	847265/028	2012-05-31	12
Test Software	EMC32	R&S	Ver 5.20.2	-	-

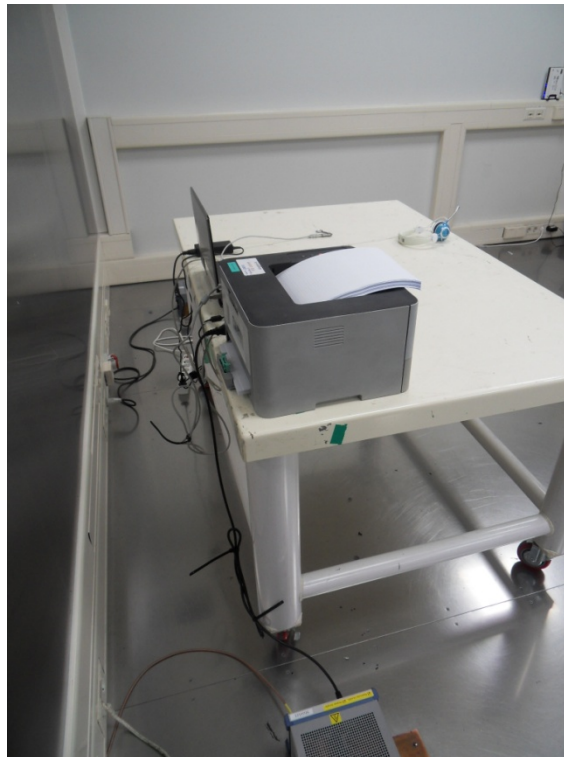
5.1.2 Temperature and humidity condition

Test date	November 26, 2012	Test engineer		Sung Wook Choi	
Climate condition	Ambient temperature	24.5 °C	Relative humidity		23 %
	Atmospheric pressure	101.0 kPa			
Test place	Shielded Room #1				

5.1.3 Photograph of Test Setup



Front



Rear

5.1.4 Test results (mains port)

- Configuration 1 : USB printing (All in one toner cartridge)

Hardware Setup: Voltage with ENV 2-Line-LISN - [EMI conducted]

Subrange 1

Frequency Range: 150 kHz – 30 MHz

Receiver: ESIB

Transducer: ENV216 / Receiver-2-Line-LISN ENV216

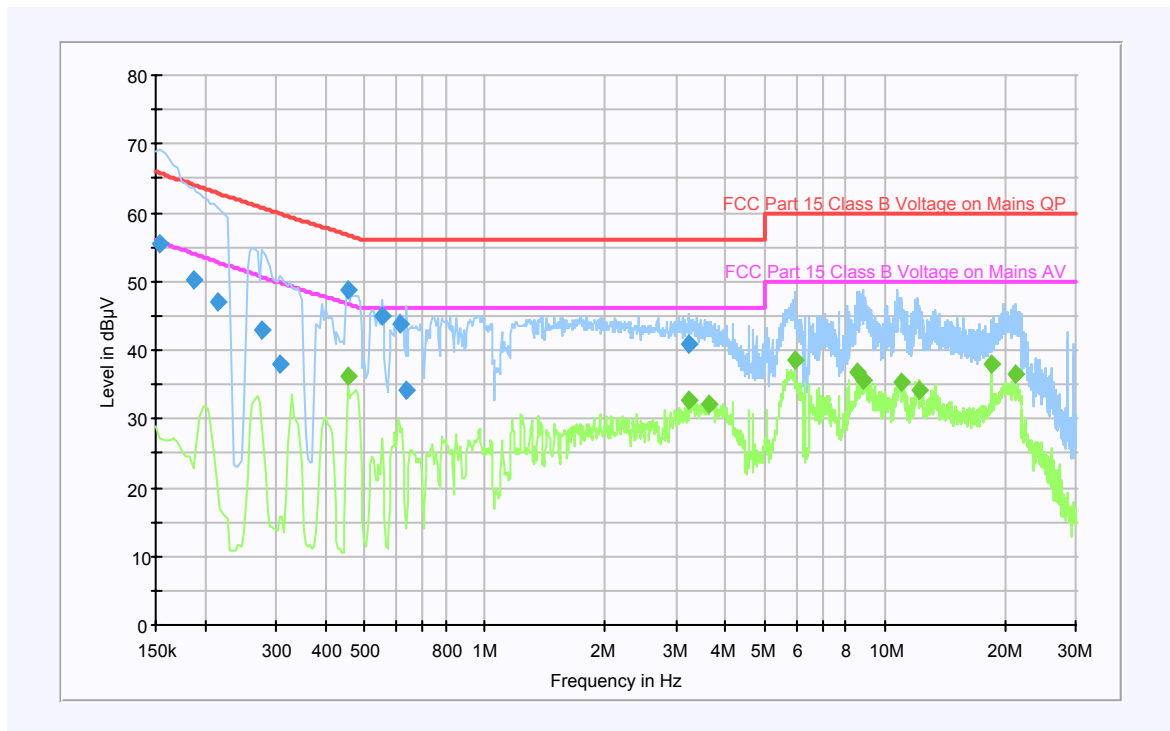
Scan Setup: B_ENV 2-Line-LISN fin [EMI conducted]

Hardware Setup: Voltage with ENV 2-Line-LISN

Level Unit: dB μ V

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
150 kHz – 30 MHz	Quasi Peak; Average	9 kHz	15 s	ESIB

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)

Quasi-peak final measurement results table

Frequency (MHz)	Quasi-Peak [dBμV]	Line	Corr. (dB)	Margin (dB)	Limit [dBμV]
0.154	55.5	L1	10.0	10.3	65.8
0.186	50.3	L1	10.2	13.8	64.1
0.214	47.0	L1	10.0	15.9	62.9
0.278	42.8	N	10.0	17.9	60.7
0.306	37.9	N	10.1	22.0	59.9
0.454	48.8	N	10.1	7.9	56.7
0.550	44.9	N	10.1	11.1	56.0
0.610	43.8	L1	10.1	12.2	56.0
0.638	34.1	N	10.1	21.9	56.0
3.244	41.0	N	9.8	15.0	56.0

Average final measurement results table

Frequency (MHz)	Average [dBμV]	Line	Corr. (dB)	Margin (dB)	Limit [dBμV]
0.454	36.2	L1	10.1	10.5	46.7
3.236	32.6	L1	9.8	13.4	46.0
3.616	32.1	N	9.8	13.9	46.0
5.936	38.4	L1	9.8	11.6	50.0
8.536	36.7	L1	9.9	13.3	50.0
8.804	35.6	N	9.9	14.4	50.0
10.972	35.3	N	9.9	14.7	50.0
12.208	34.2	L1	10.0	15.8	50.0
18.432	37.8	N	10.2	12.2	50.0
21.244	36.4	N	10.3	13.6	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 printing (Separate toner cartridge)

Hardware Setup: Voltage with ENV 2-Line-LISN - [EMI conducted]

Subrange 1

Frequency Range: 150 kHz – 30 MHz

Receiver: ESIB

Transducer: ENV216 / Receiver-2-Line-LISN ENV216

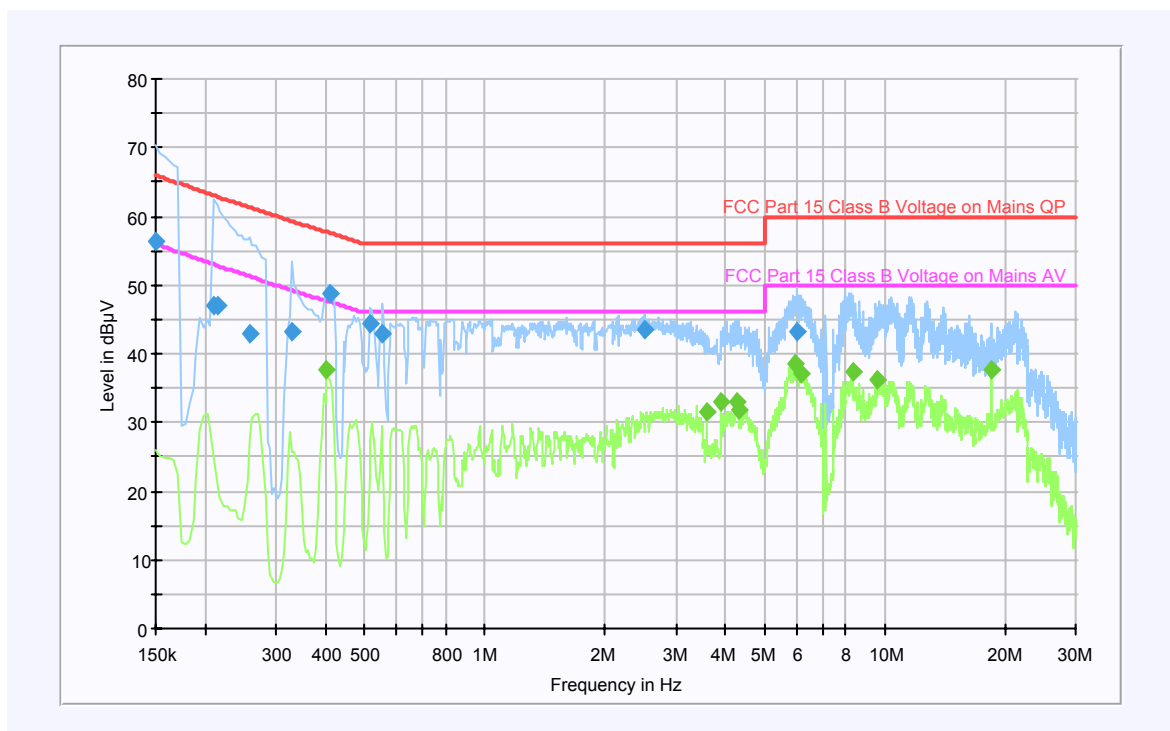
Scan Setup: B_ENV 2-Line-LISN fin [EMI conducted]

Hardware Setup: Voltage with ENV 2-Line-LISN

Level Unit: dB μ V

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
150 kHz – 30 MHz	Quasi Peak; Average	9 kHz	15 s	ESIB

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)

Quasi-peak final measurement results table

Frequency (MHz)	Quasi-Peak [dBμV]	Line	Corr. (dB)	Margin (dB)	Limit [dBμV]
0.150	56.3	L1	10.4	9.7	66.0
0.210	47.0	L1	10.0	16.0	63.0
0.214	47.1	L1	10.0	15.8	62.9
0.258	42.9	L1	10.0	18.4	61.3
0.330	43.3	N	10.1	16.0	59.3
0.410	48.7	N	10.1	8.8	57.5
0.518	44.4	L1	10.1	11.6	56.0
0.554	42.9	N	10.1	13.1	56.0
2.496	43.4	N	9.8	12.6	56.0
6.032	43.2	L1	9.8	16.8	60.0

Average final measurement results table

Frequency (MHz)	Average [dBμV]	Line	Corr. (dB)	Margin (dB)	Limit [dBμV]
0.402	37.7	L1	10.1	10.0	47.7
3.600	31.6	N	9.8	14.4	46.0
3.884	32.9	L1	9.8	13.1	46.0
4.268	33.0	L1	9.8	13.0	46.0
4.308	32.0	N	9.8	14.0	46.0
5.976	38.4	L1	9.8	11.6	50.0
6.204	37.0	N	9.8	13.0	50.0
8.284	37.4	L1	9.9	12.6	50.0
9.572	36.3	L1	9.9	13.7	50.0
18.432	37.6	N	10.2	12.4	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 printing (All in one toner cartridge)**Hardware Setup: Voltage with ENV 2-Line-LISN - [EMI conducted]**

Subrange 1

Frequency Range: 150 kHz – 30 MHz

Receiver: ESIB

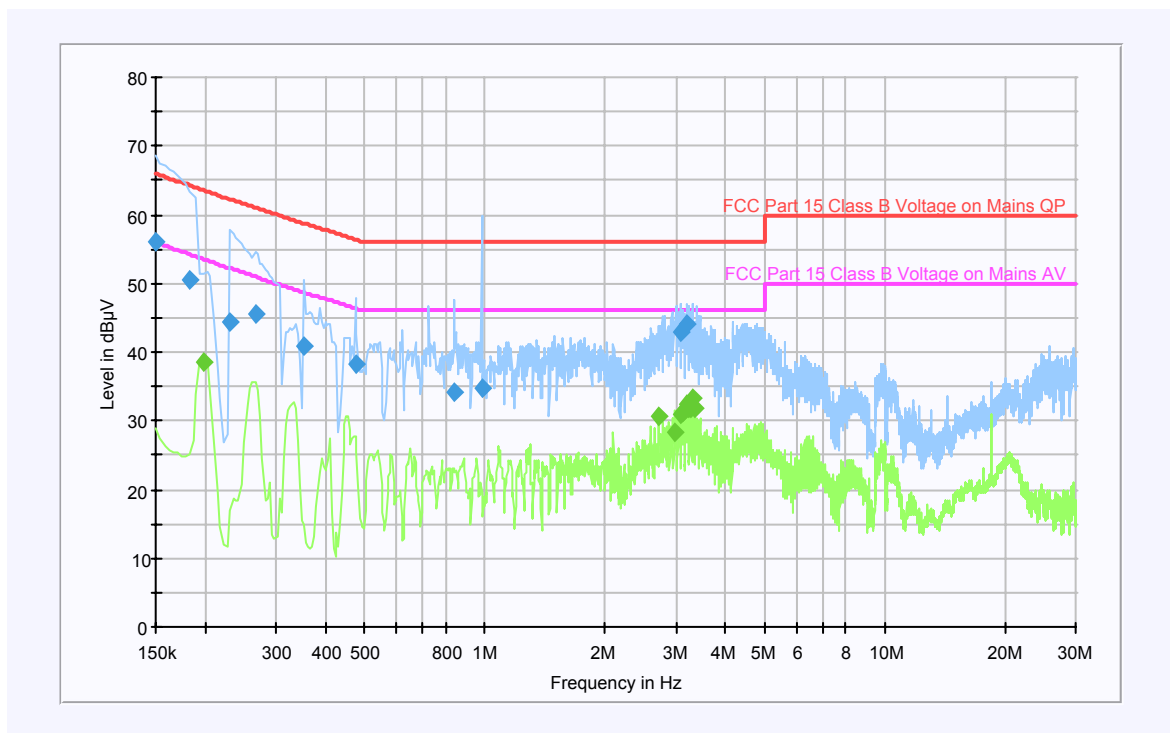
Transducer: ENV216 / Receiver-2-Line-LISN ENV216

Scan Setup: B_ENV 2-Line-LISN fin [EMI conducted]

Hardware Setup: Voltage with ENV 2-Line-LISN

Level Unit: dB μ V

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
150 kHz – 30 MHz	Quasi Peak; Average	9 kHz	15 s	ESIB

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)

Quasi-peak final measurement results table

Frequency (MHz)	Quasi-Peak [dBμV]	Line	Corr. (dB)	Margin (dB)	Limit [dBμV]
0.150	56.1	L1	10.4	9.9	66.0
0.182	50.6	L1	10.2	13.7	64.3
0.230	44.4	L1	10.0	17.9	62.3
0.266	45.6	N	10.0	15.4	61.0
0.354	40.9	L1	10.1	17.8	58.7
0.474	38.4	N	10.1	18.0	56.4
0.838	34.1	N	10.0	21.9	56.0
0.982	34.6	L1	9.9	21.4	56.0
3.080	42.9	L1	9.8	13.1	56.0
3.212	44.1	L1	9.8	11.9	56.0

Average final measurement results table

Frequency (MHz)	Average [dBμV]	Line	Corr. (dB)	Margin (dB)	Limit [dBμV]
0.198	38.5	N	10.0	15.0	53.5
2.720	30.7	N	9.8	15.3	46.0
2.988	28.2	L1	9.8	17.8	46.0
3.080	31.0	N	9.8	15.0	46.0
3.140	31.3	N	9.8	14.7	46.0
3.208	32.5	N	9.8	13.5	46.0
3.244	31.8	N	9.8	14.2	46.0
3.276	31.8	N	9.8	14.2	46.0
3.308	33.3	N	9.8	12.7	46.0
3.340	31.8	N	9.8	14.2	46.0

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 : Network printing (Separate toner cartridge)

Hardware Setup: Voltage with ENV 2-Line-LISN - [EMI conducted]

Subrange 1

Frequency Range: 150 kHz – 30 MHz

Receiver: ESIB

Transducer: ENV216 / Receiver-2-Line-LISN ENV216

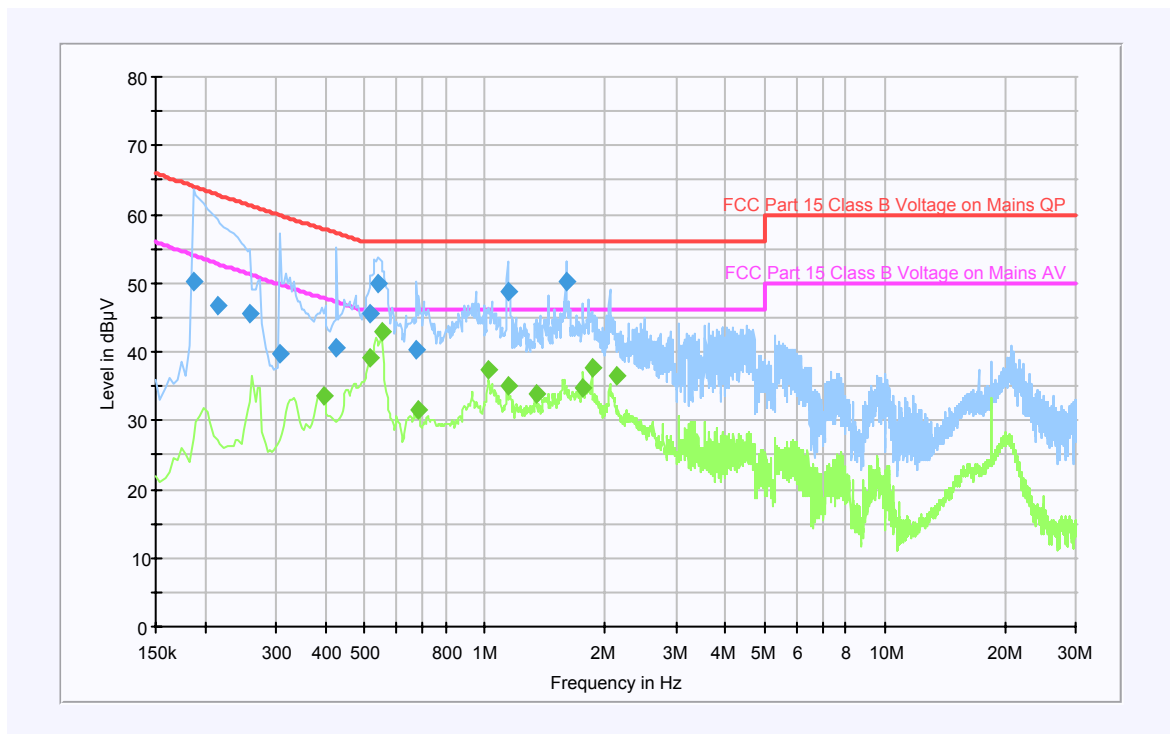
Scan Setup: B_ENV 2-Line-LISN fin [EMI conducted]

Hardware Setup: Voltage with ENV 2-Line-LISN

Level Unit: dB μ V

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
150 kHz – 30 MHz	Quasi Peak; Average	9 kHz	15 s	ESIB

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)

Quasi-peak final measurement results table

Frequency (MHz)	Quasi-Peak [dBμV]	Line	Corr. (dB)	Margin (dB)	Limit [dBμV]
0.186	50.3	L1	10.2	13.8	64.1
0.214	46.6	L1	10.0	16.3	62.9
0.258	45.4	N	10.0	15.9	61.3
0.306	39.7	L1	10.1	20.2	59.9
0.426	40.6	L1	10.1	16.6	57.2
0.514	45.5	N	10.1	10.5	56.0
0.538	49.8	N	10.1	6.2	56.0
0.674	40.2	N	10.1	15.8	56.0
1.140	48.7	N	9.9	7.3	56.0
1.596	50.2	N	9.9	5.8	56.0

Average final measurement results table

Frequency (MHz)	Average [dBμV]	Line	Corr. (dB)	Margin (dB)	Limit [dBμV]
0.394	33.5	N	10.1	14.3	47.8
0.514	39.0	N	10.1	7.0	46.0
0.550	43.0	L1	10.1	3.0	46.0
0.682	31.5	N	10.1	14.5	46.0
1.024	37.5	N	9.9	8.5	46.0
1.140	35.1	N	9.9	10.9	46.0
1.344	34.0	N	9.9	12.0	46.0
1.760	34.6	N	9.8	11.4	46.0
1.852	37.6	N	9.8	8.4	46.0
2.128	36.5	N	9.8	9.5	46.0

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)

5.2 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 m and elevated between 1 m and 4 m.

Both vertical and horizontal antenna polarizations were measured.

Above GHz, peak detector function mode was used with resolution bandwidth of 1 MHz and a video bandwidth of 1 MHz.

If the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.

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

Frequency range Limits MHz	Resolution Bandwidth	Quasi-peak Limits dB($\mu\text{V/m}$)
		Class B
30 to 230	120 kHz	30
230 to 1000	120 kHz	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 1 GHz to 6 GHz in accordance with internal maximum operating frequency at a measurement distance of 3 m for the following antenna and turntable arrangements:

Antenna Height (cm)	Antenna Polarisation	Turntable position (degrees)
100 ~ 400	Horizontal, Vertical	Continuous

Above 1 GHz, peak detector function mode is used with a resolution bandwidth of 1 MHz and a video bandwidth of 1 MHz.

Limits for above 1GHz radiated disturbance of ITE at a measuring distance of 3 m

Class	Limits - dB(μV/m)	
	Peak	Average
B	74	54
Average limit 500, $20 \log 500 = 53.979 \text{ dB} \approx 54 \text{ dB}$		

Antenna height was adjusted to maximum radiated position to be parallel from EUT to antenna centre.

Measurements within 20 dB 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.

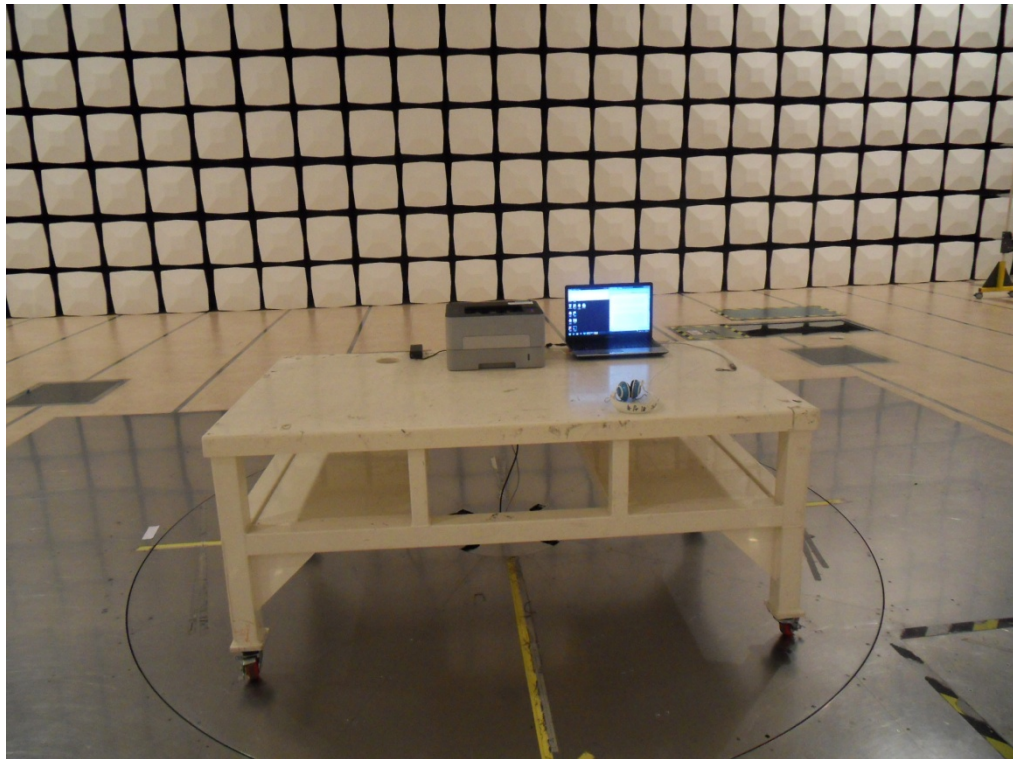
5.2.1 Test instrumentation

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Bi-log Antenna	CBL6112D(30M Hz~2GHz)	Schaffner	22248	2012-02-16	24
Bi-log Antenna	CBL6112D(30M Hz~2GHz)	Schaffner	22604	2012-04-19	24
Test receiver	ESCI(9kHz~3G Hz)	R&S	100368	2012-07-23	12
Test Receiver	ESCI(9kHz~3G Hz)	R&S	100136	2012-05-09	12
Horn Antenna	HF907(0.8~18G Hz)	R&S	100165	2011-06-09	24
Test receiver	ESIB26	R&S	100287	2012-04-30	12
Pre-Amplifier	SCU 18	R&S	10001	2012-05-11	12
Amplifier	310N(9kHz~1G Hz)	Sonoma	251673	2011-12-19	12
Amplifier	310N(9kHz~1G Hz)	Sonoma	251675	2012-01-31	12
Humidity & Temperature Meter	MHB-382SD	Lutron	59778	2012-09-05	12
RF Selector	NS4900	TOYO	-	-	-
Ant. Mast	MA4000	inn-co	-	-	-
Ant. Mast	MA4000	inn-co	-	-	-
Ant. Mast	MA2000	inn-co	-	-	-
Mast Controller	CO2000	inn-co	CO2000/544/2 3341109/L	-	-
Test Software	EP5/RE	TOYO	Ver 5.3.7	-	-

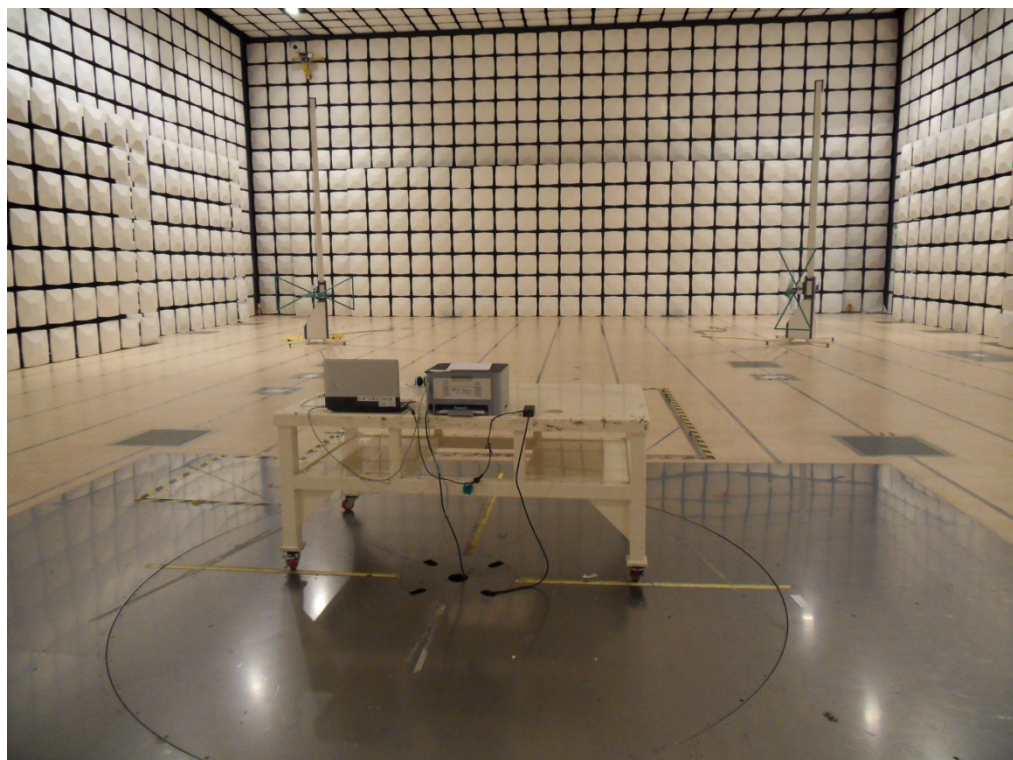
5.2.2 Temperature and humidity condition

Test date	November 20, 2012 ~ November 23, 2012	Test engineer		Sung Wook Choi	
Climate condition	Ambient temperature	25.0 °C	Relative humidity		27.1 %
	Atmospheric pressure	101.9 kPa			
Test place	10 m Semi-Anechoic Chamber				

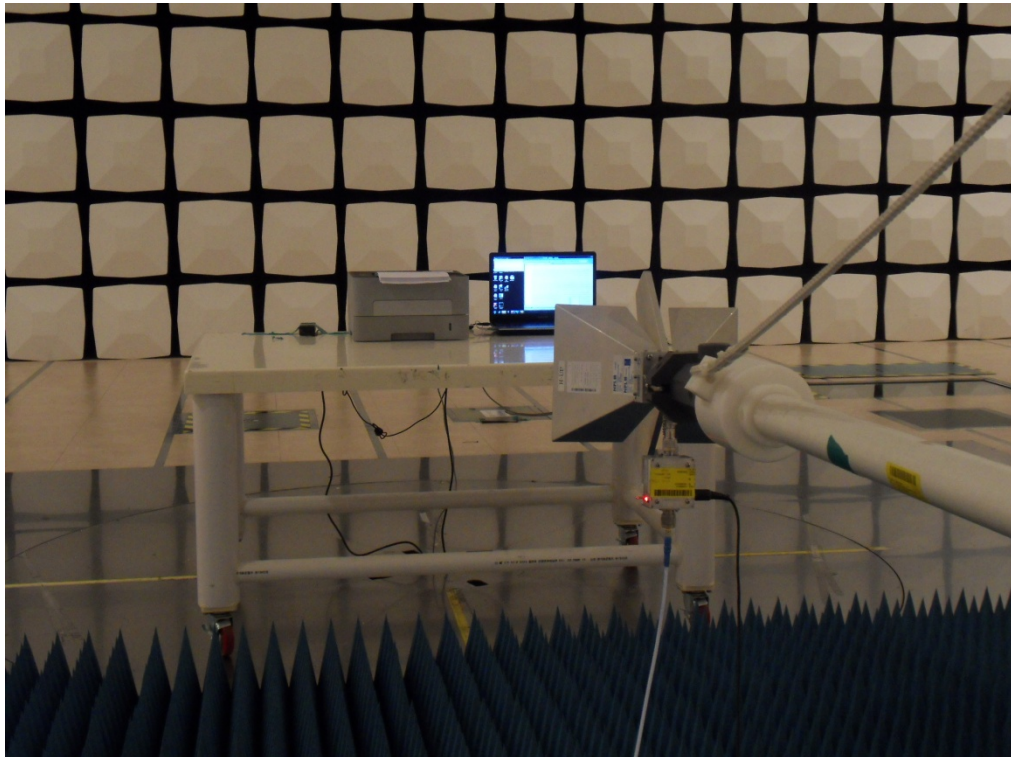
5.2.3 Photograph of Test Setup



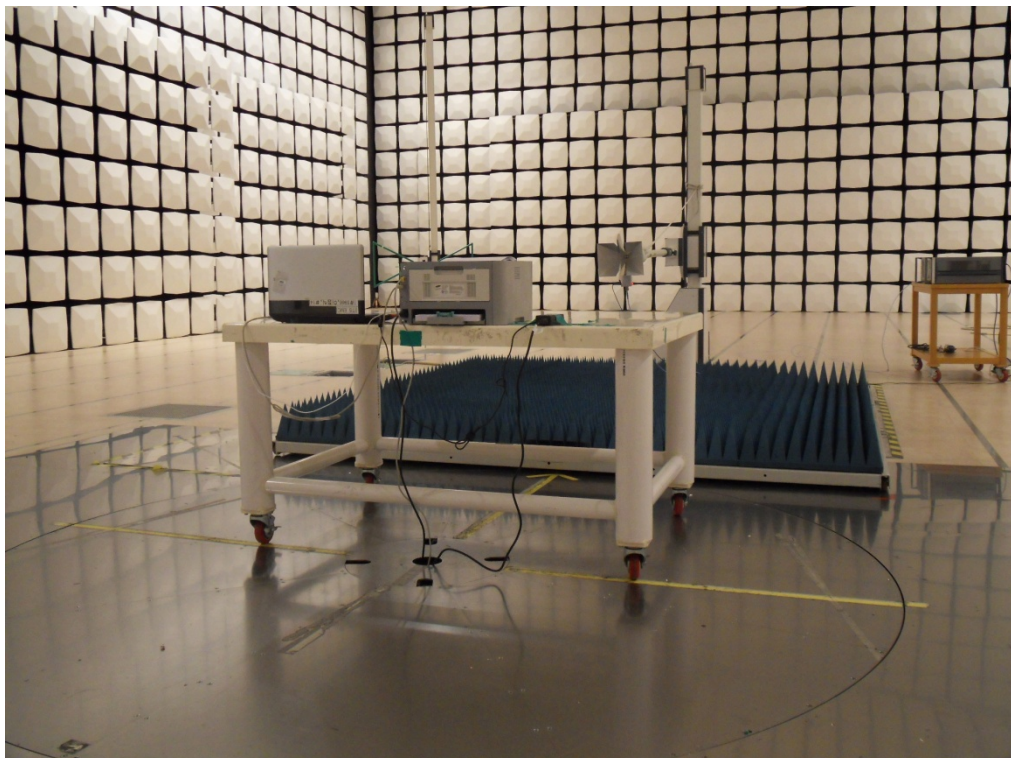
Front (Below 1GHz)



Rear (Below 1GHz)



Front (above 1GHz)



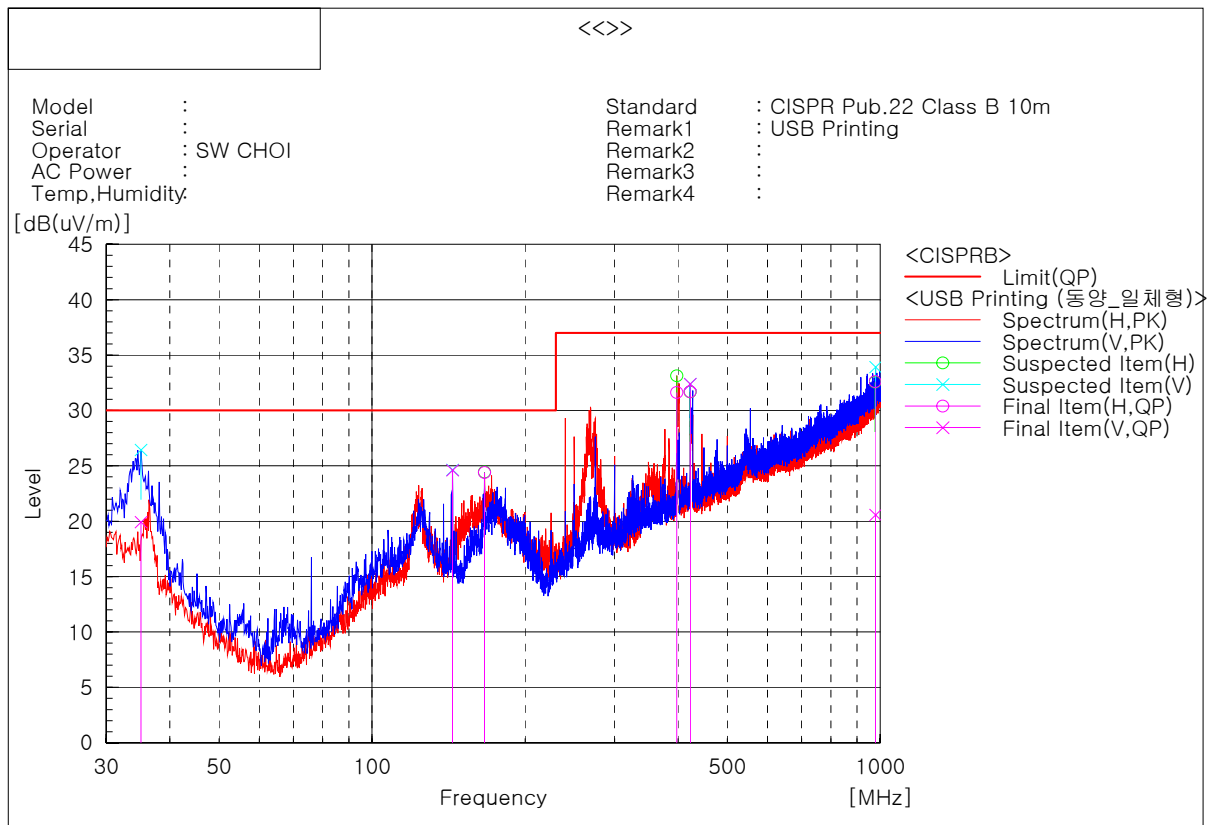
Rear (above 1GHz)

5.2.4 Test results

5.2.4.1 30 MHz to 1GHz test results

- Configuration 1 : USB printing (All in one toner cartridge)

Test Graph and Results



Final Result

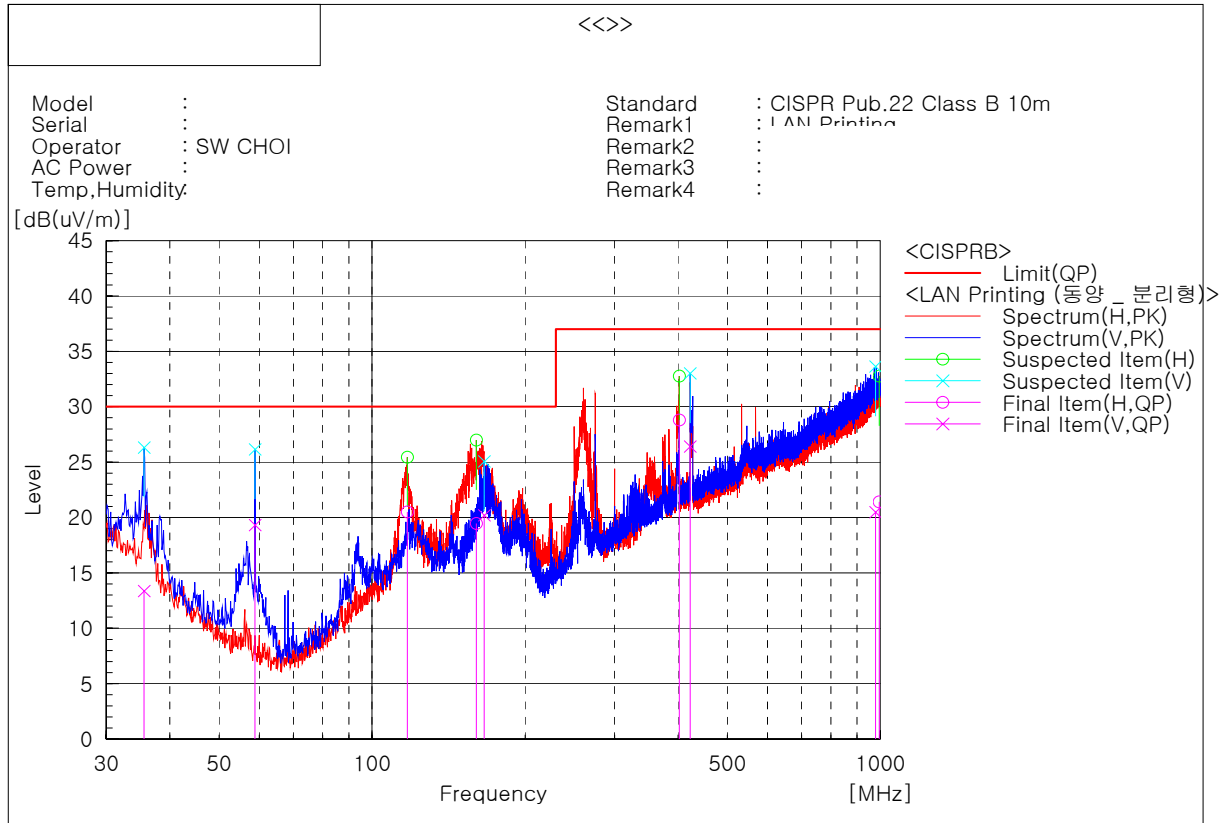
No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	System
1	979.024	V	20.7	-0.1	20.6	37.0	16.4	184.0	354.8	1
2	397.751	H	42.1	-10.5	31.6	37.0	5.4	217.0	297.0	2
3	35.093	V	35.7	-15.8	19.9	30.0	10.1	232.0	257.8	1
4	977.084	H	33.0	-0.4	32.6	37.0	4.4	400.0	19.9	2
5	422.608	V	42.1	-9.7	32.4	37.0	4.6	100.0	103.9	1
6	422.608	H	41.3	-9.6	31.7	37.0	5.3	200.0	139.9	2
7	143.975	V	42.5	-17.9	24.6	30.0	5.4	100.0	1.8	1
8	166.528	H	42.7	-18.3	24.4	30.0	5.6	299.0	357.4	2

Note) Receiving antenna polarization : Horizontal and/or Vertical

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

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

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

- Configuration 1 : Network printing (Separate toner cartridge)**Test Graph and Results****Final Result**

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	System
1	978.781	V	20.6	-0.1	20.5	37.0	16.5	300.0	200.6	1
2	160.465	H	37.8	-18.3	19.5	30.0	10.5	384.0	237.6	2
3	35.578	V	29.5	-16.1	13.4	30.0	16.6	232.0	227.2	1
4	402.238	H	39.1	-10.3	28.8	37.0	8.2	203.0	335.6	2
5	58.858	V	43.8	-24.5	19.3	30.0	10.7	195.0	263.6	1
6	422.729	V	36.1	-9.7	26.4	37.0	10.6	400.0	120.3	1
7	995.635	H	21.5	-0.1	21.4	37.0	15.6	400.0	352.9	2
8	117.300	H	37.2	-16.7	20.5	30.0	9.5	400.0	296.2	2
9	166.164	V	39.0	-18.8	20.2	30.0	9.8	100.0	47.5	1

Note) Receiving antenna polarization : Horizontal and/or Vertical

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

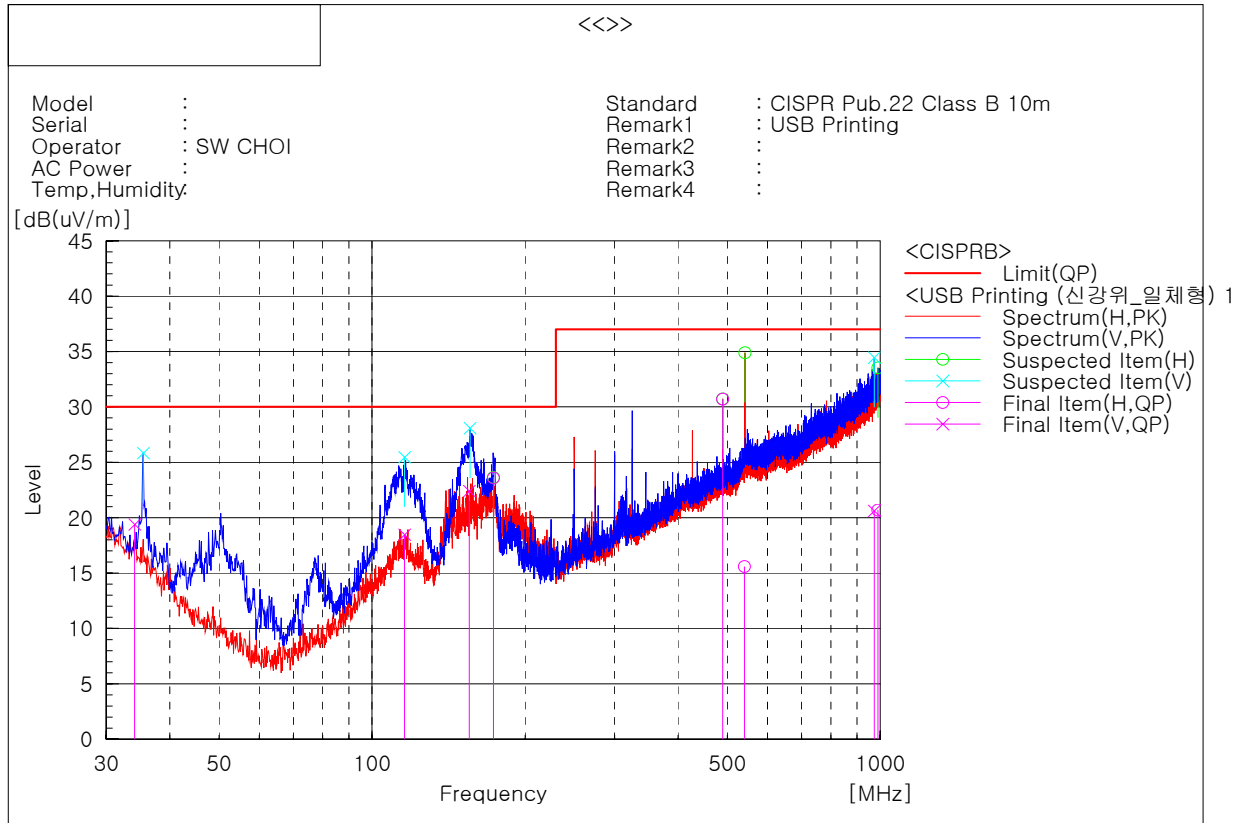
Level QP (Quasi-Peak) = Reading QP + Factor (Antenna Factor + Cable Loss - Amp. Gain)

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

- **Configuration 2 : USB printing (All in one toner cartridge)**

-

Test Graph and Results



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	System
1	34.105	V	34.7	-15.3	19.4	30.0	10.6	105.0	1.8	1
2	155.448	V	41.0	-18.6	22.4	30.0	7.6	100.0	321.2	1
3	540.393	H	22.2	-6.6	15.6	37.0	21.4	201.0	6.2	2
4	973.567	V	20.7	-0.1	20.6	37.0	16.4	104.0	335.2	1
5	988.845	H	20.9	-0.2	20.7	37.0	16.3	342.0	221.7	2
6	115.850	V	35.6	-17.1	18.5	30.0	11.5	100.0	345.8	1
7	173.318	H	42.3	-18.7	23.6	30.0	6.4	301.0	137.7	2
8	489.780	H	39.2	-8.5	30.7	37.0	6.3	301.0	344.7	2

Note) Receiving antenna polarization : Horizontal and/or Vertical

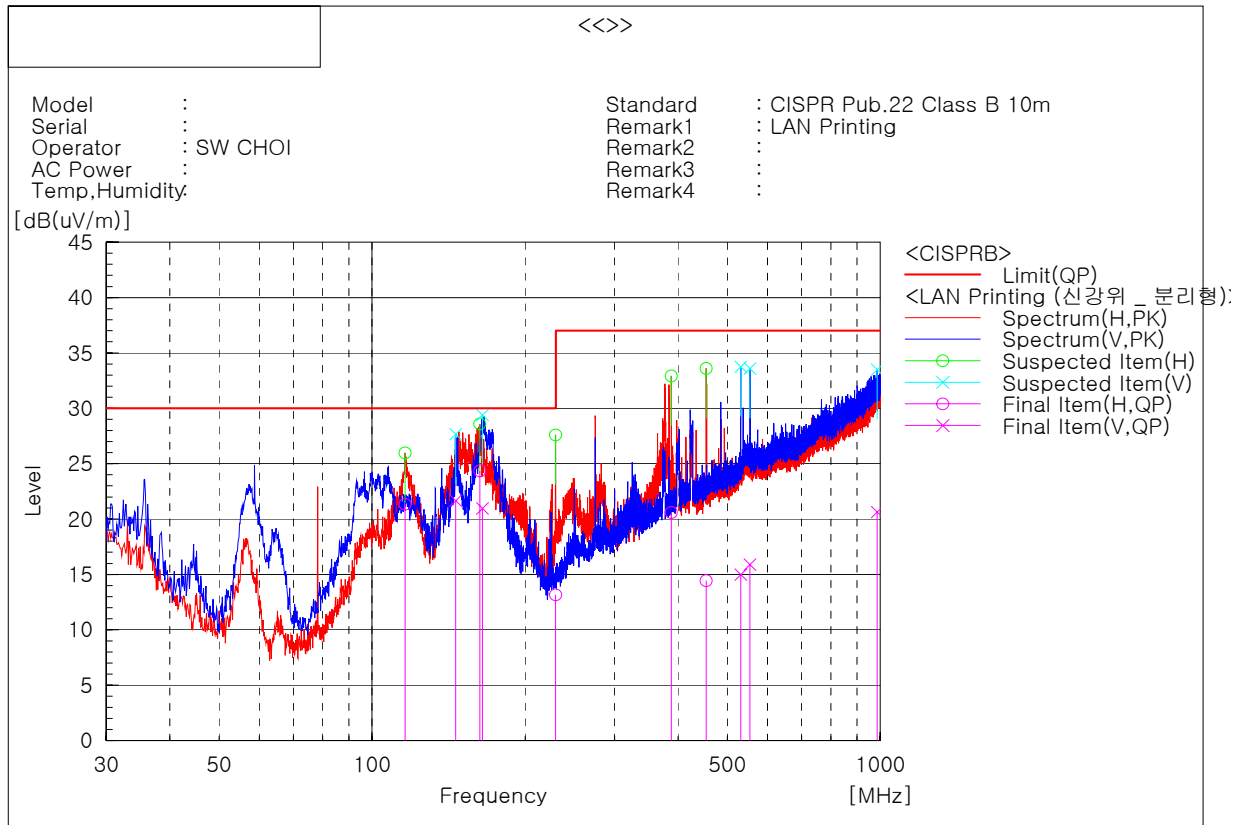
Test Distance : 10 m, Antenna Height : 1 m to 4 m

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

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

- Configuration 2 : Network printing (Separate toner cartridge)

Test Graph and Results



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	System
1	164.951	V	39.8	-18.8	21.0	30.0	9.0	240.0	266.8	1
2	162.890	H	42.6	-18.2	24.4	30.0	5.6	392.0	303.4	2
3	146.036	V	39.6	-17.9	21.7	30.0	8.3	115.0	280.1	1
4	229.578	H	30.6	-17.4	13.2	30.0	16.8	294.0	355.5	2
5	531.248	V	22.4	-7.4	15.0	37.0	22.0	369.0	354.3	1
6	454.254	H	23.4	-9.0	14.4	37.0	22.6	202.0	354.3	2
7	554.285	V	22.4	-6.5	15.9	37.0	21.1	381.0	10.1	1
8	116.088	H	38.0	-16.7	21.3	30.0	8.7	395.0	359.5	2
9	986.177	V	20.6	0.0	20.6	37.0	16.4	340.0	3.0	1
10	388.051	H	31.4	-10.8	20.6	37.0	16.4	211.0	356.1	2

Note) Receiving antenna polarization : Horizontal and/or Vertical

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

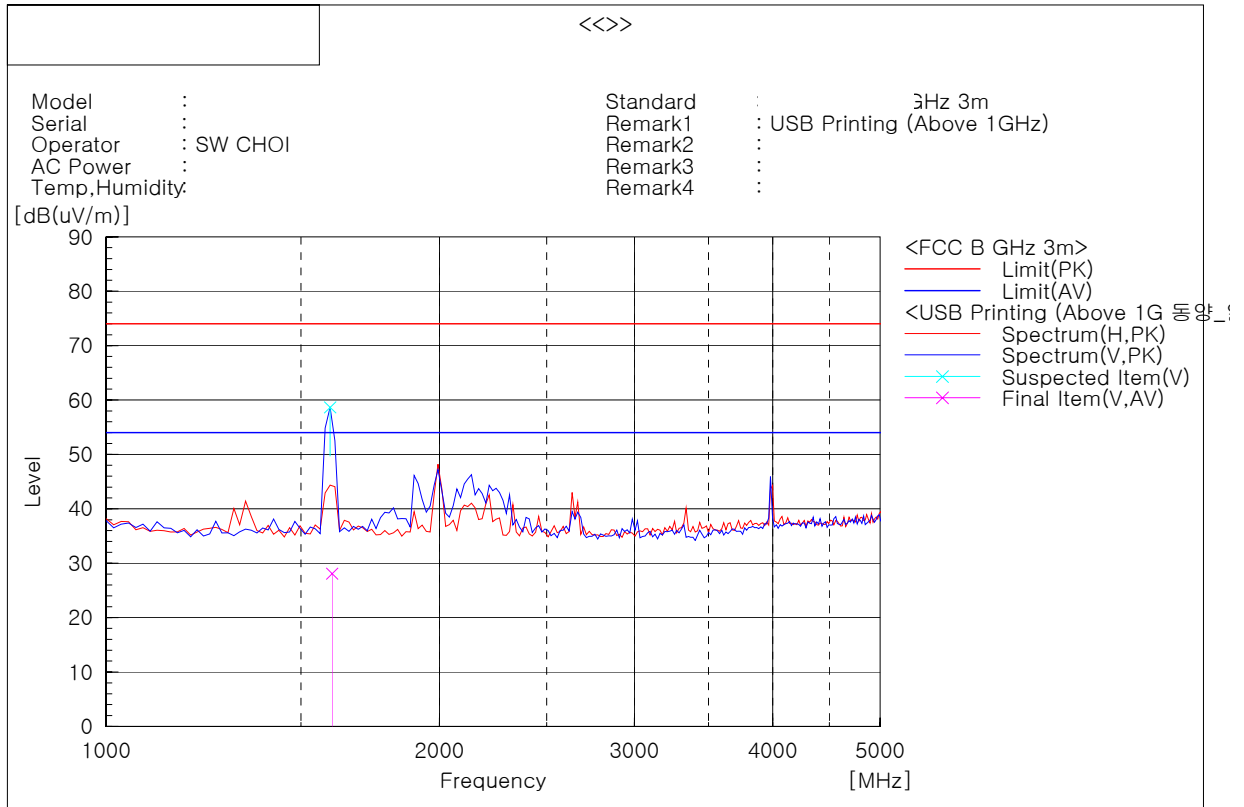
Level QP (Quasi-Peak) = Reading QP + Factor (Antenna Factor + Cable Loss - Amp. Gain)

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

5.2.4.2 1 GHz to 5 GHz test results

- Configuration 1 : USB printing (All in one toner cartridge)

Test Results



Peak Measurement

Frequency [MHz]	POL	Reading PK [dB(μV)]	Factor [dB(1/m)]	Level PK [dB(μV/m)]	Limit [dB(μV/m)]	Margin PK [dB]	Height [cm]	Angle [deg]
1593.186	V	69.0	-10.3	58.7	74.0	15.3	109.0	6.3

Average Measurement

Frequency [MHz]	POL	Reading AV [dB(μV)]	Factor [dB(1/m)]	Level AV [dB(μV/m)]	Limit [dB(μV/m)]	Margin AV [dB]	Height [cm]	Angle [deg]
1600.080	V	38.3	-10.2	28.1	54.0	25.9	109.0	350.2

Note 1) Representative operating modes were selected by customer and any emissions that do NOT exceed Average limit were not tested with average detector mode.

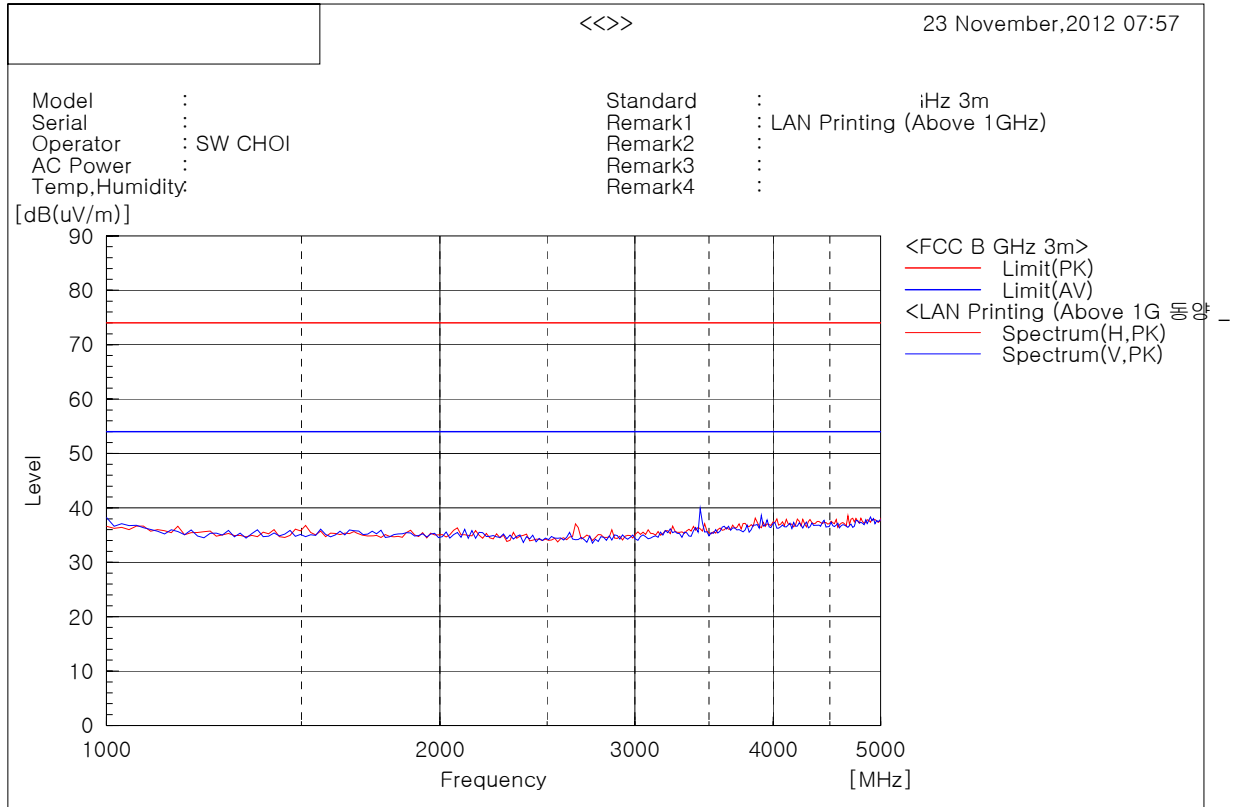
Note 2) Receiving antenna polarization : Horizontal and Vertical

Level PK (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 printing (Separate toner cartridge)**Test Results**

Note 1) Representative operating modes were selected by customer and any emissions that do NOT exceed Average limit were not tested with average detector mode.

Note 2) Receiving antenna polarization : Horizontal and Vertical

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

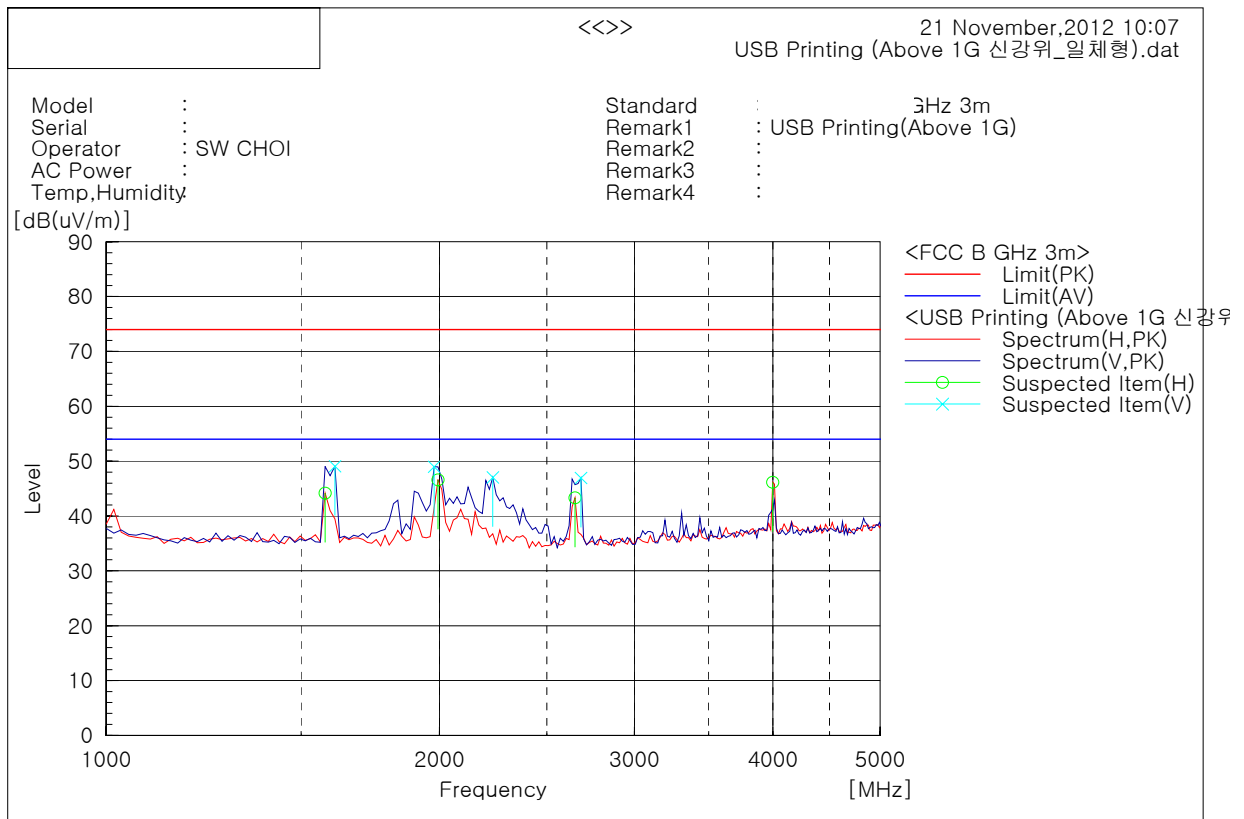
Level AV (Average) = Reading AV (Average) + Factor (Antenna Factor + Cable Loss - Amp. Gain)

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

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

- Configuration 2 : USB printing (All in one toner cartridge)

Test Results



Note 1) Representative operating modes were selected by customer and any emissions that do NOT exceed Average limit were not tested with average detector mode.

Note 2) Receiving antenna polarization : Horizontal and Vertical

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

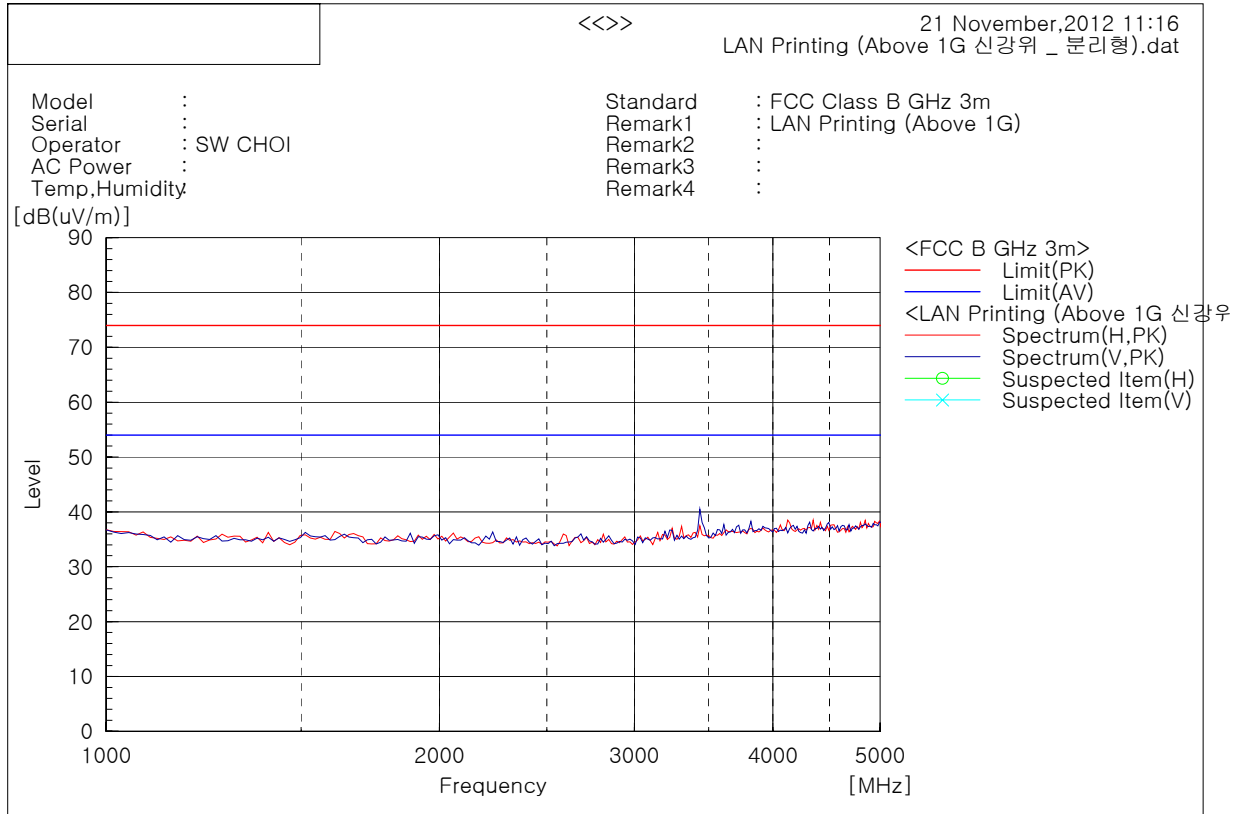
Level AV (Average) = Reading AV (Average) + Factor (Antenna Factor + Cable Loss - Amp. Gain)

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

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

- Configuration 2 : Network printing (Separate toner cartridge)

Test Results



Note 1) Representative operating modes were selected by customer and any emissions that do NOT exceed Average limit were not tested with average detector mode.

Note 2) Receiving antenna polarization : Horizontal and Vertical

Level PK (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



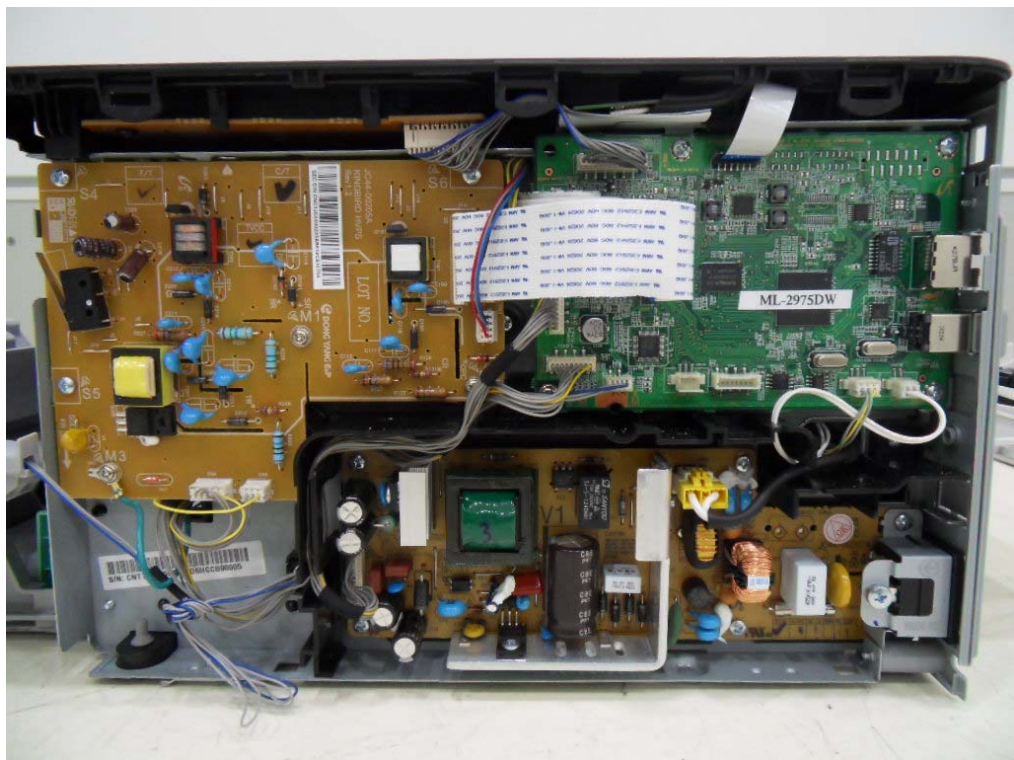
Front View



Rear View & Label location



Inside View(Front)



Inside View(Right side)



Inside View(Rear)



Label