

EMC TEST REPORT

Project No.	LBE20150353	Issue No.	1
Applicant	Name of organization	Samsung Electronics Co., Ltd.	
	Address	Samsung Electronics Co., Ltd. 19 Chapin Rd., Building D, Pine Brook, New Jersey, United States 07058	
	Date of application	January 14, 2015	
EUT	Type of device	Class B personal computers and peripherals	
	Equipment authorization	☐ Declaration of Conformity ☒ Certification ☐ Verification	
	FCC ID	A3LSLM4030ND	
	Kind of product	Printer	
	Model No.	ProXpress M4030ND	
	Variant Model No.	SL-M4030ND	
	Manufacturer	Samsung Electronics Co., Ltd. (Maetan-dong) 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-742, Korea	
Applied Standards		47 CFR Part 15, Subpart B / ANSI C63.4-2009	
		ICES-003 Issue 5	
Test Period		January 15, 2015 ~ January 19, 2015	
Issue date		April 03, 2015	
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 : Min Gon Kim 		Reviewed by : 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 Electronics Co Ltd, CS & Environment Center (Maetan dong) 129, Samsung-ro, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do 443-742, Korea			

Table of contents

1. Report information

- 1.1 Revision history
- 1.2 Sample calculation

2. Summary of test results

- 2.1 Emission

3. General Information

- 3.1 Test facility

4. Test configuration

- 4.1 Test Peripherals
- 4.2 EUT operating mode
- 4.3 Details of Sampling
- 4.4 Used cable description
- 4.5 Test arrangement
- 4.6 EUT Description
- 4.7 Clock Frequencies
- 4.8 Test configuration and condition
- 4.9 Measurement uncertainty

5. Result of individual tests

- 5.1 Conducted disturbance
- 5.2 Radiated disturbance

Appendix – EUT photographs

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 (example)

1.2.1 Conducted disturbance (at 10 MHz)

- 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)

- 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)	47 CFR Part 15, Subpart B / ANSI C63.4-2009 (☐ Class A, ☒ Class B)	Complied
☒	Radiated Disturbance		Complied

- Note : These results are deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference – Causing Equipment Regulations

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:

Description	Model No.	Serial No.	Manufacturer	Fcc ID / DoC
Printer	ProXpress M4030ND	-	Samsung	A3LSLM4030ND
D/T PC	ZCP30	Z41698DY700026X	Samsung	DoC
LCD Monitor	UE19D4000	PV421101103020F	Samsung	DoC
PS/2 Keyboard	SKG-2000PB	Z5A3485	Samsung	DoC
Headset	-	-	Actto	DoC
Serial Mouse	-	-	RadioShack	DoC
USB Memory	16 GB USB	-	Transcend	DoC
USB Memory	16 GB USB	-	Transcend	DoC
NFC/Wi-Fi Kit	SL-NWE001X	-	Samsung	Option
SCF	SL-SCF4000	-	Samsung	Option

4.2 EUT operating mode

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

Operating Mode 1 (Test mode)	Standby & LAN Ping Test
Operating Mode 2 (Test mode)	USB Printing
Operating Mode 3 (Test mode)	Network Printing

4.3 Details of Sampling

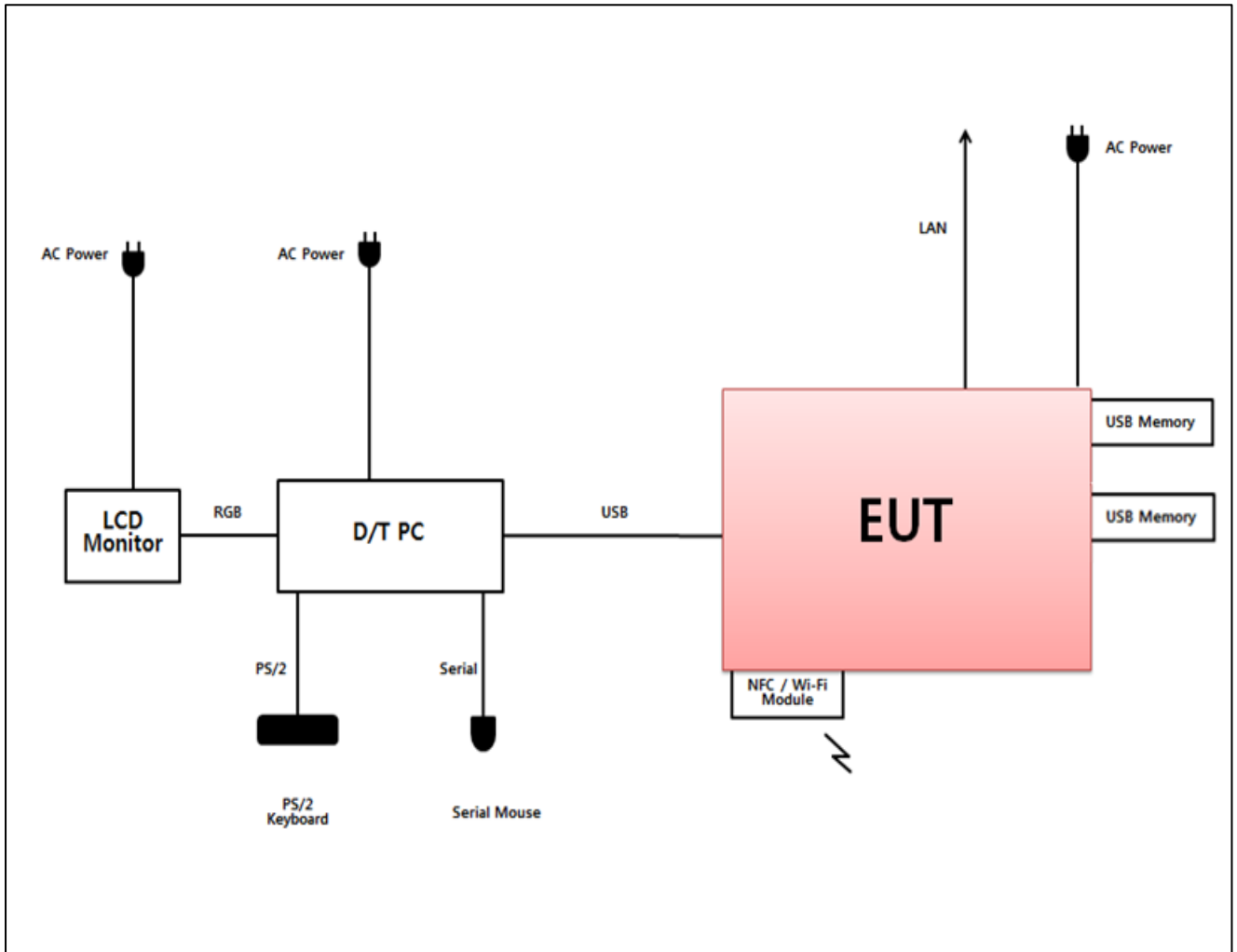
Customer selected, single unit.

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;

Connected cable	Length [m]	Shielded [Y/N]	Number of Ferrite Core	Note
Power	1.8	No	-	For EUT
Power	1.8	No	-	For Computer
USB	1.8	Yes	-	From EUT to PC
Serial(RS232)	1.5	No	-	From PC to Serial Mouse
PS/2	1.5	No	-	From PC to PS/2 Keyboard
LAN(Cat 5e)	2.0	No	-	From EUT to Local Area Network

4.5 Test Arrangement



4.6 EUT Description

The following features describe EUT represented by this report:

Item	Specification and Description
Processor	1 GHz Dual CPU
Standard System memory	Standard 256MB (Max 2GB)
Resolution	True 600x600dpi (Addressable 1 200dpi support)
Speed	40 ppm (Mono)
Power Rating	110 VAC ~ 127 VAC, 7A, 50/60 Hz
Power Consumption	Power Save : 1.4 Watts Standby : 60 Watts Printing : 750 Watts
Interfaces	Hi-Speed USB 2.0, Gigabit Ethernet, Direct USB, Wi-Fi, Wi-Fi Direct
Modes of Operation	Standby, USB Printing, Network Printing

4.7 Clock Frequencies

Kind of Clocks	Frequency[MHz]	Kind of Clocks	Frequency[MHz]
Main CPU	1 000	UI CPU Internal	12
Ethernet	125	DDR3	660

4.8 Test configuration and condition

Item	Model Name	P/N	Manufacturer
SMPS	PSPN2-TYPE3R-V1	JC44-00222B	Samsung electronic

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.

The EUT was connected to a remote PC through the Ethernet port with Unshielded Twisted Pair Ethernet cable.

Power source for the EUT operating was supplied by CVCF made by the Pacific Corp.

- 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.)

Test type		Measurement uncertainty (C.L. 95 %, k = 2)
Conducted disturbance	Main terminal (ENV216)	± 3.12 dB
Radiated Disturbance (Below 1 GHz)	Horizontal	± 4.90 dB
	Vertical	± 4.65 dB
Radiated Disturbance (Above 1 GHz)	Horizontal	± 5.45 dB
	Vertical	± 5.43 dB

5. Results of individual test

5.1 Conducted disturbance

Both conducted lines are measured in Quasi-Peak and CISPR-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

Limits for conducted disturbance at the mains ports					
Frequency range Limits(MHz)	Resolution Bandwidth(kHz)	Limits of Class A, dB(μV)		Limits of Class B, dB(μV)	
		Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.50	9	79	66	66 ~ 56	56 ~ 46
0.50 ~ 5	9	73	60	56	46
5 ~ 30	9			60	50
NOTE 1 The lower limit shall apply at the transition frequency					
NOTE 2 The Class B limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.					

If the reading on the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 seconds at each measurement frequency, the highest reading shall be recorded, with the exception of any brief isolated high reading (which shall be ignored).

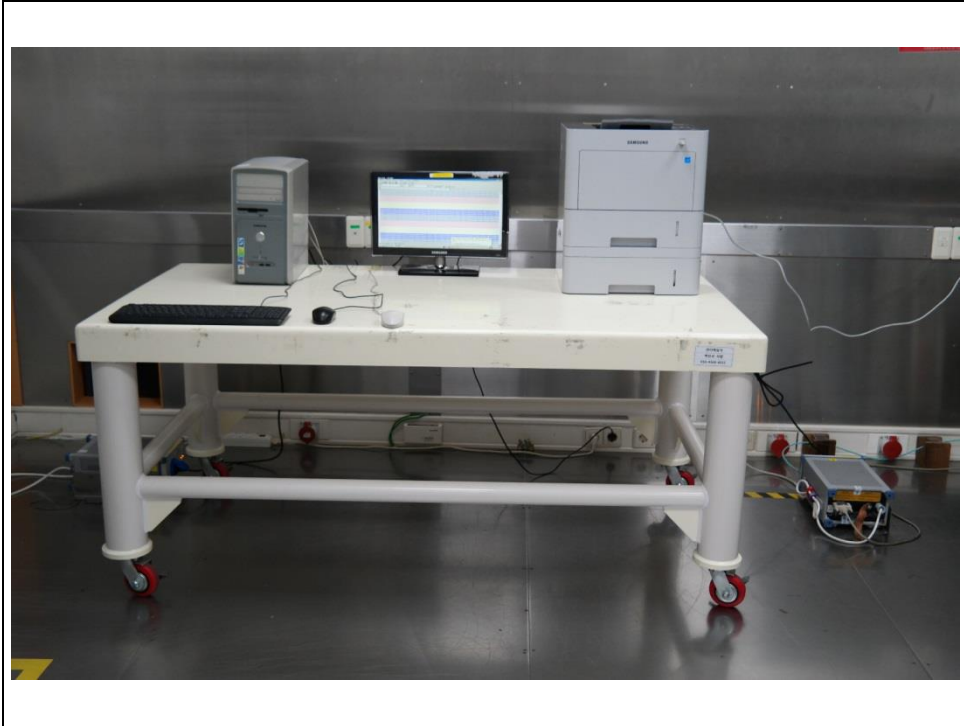
5.1.1 Test instrumentation

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
EMI TEST RECEIVER	ESIB-26	R&S	100291	2014-12-08	12
Two-Line V-Network	ENV216	R&S	101369	2014-11-17	12
Two-Line V-Network	ENV216	R&S	101366	2014-07-24	12
Test Software	EMC32	R&S	Ver 8.53.0	-	-

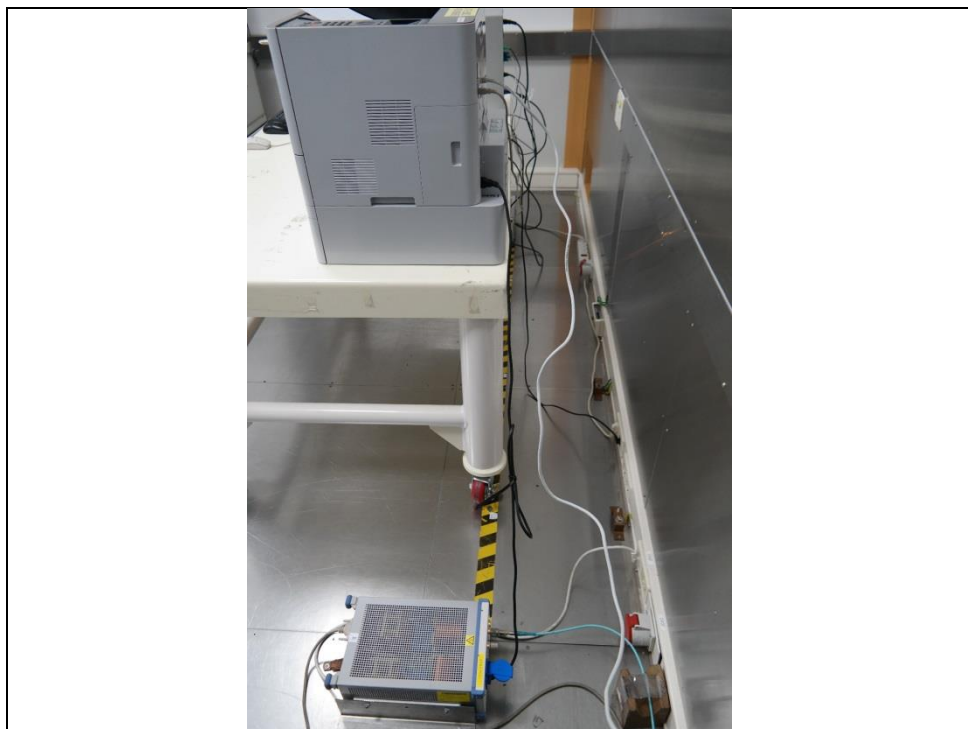
5.1.2 Temperature and humidity condition

Test date	January 19, 2015	Test engineer	Min Gon Kim
Climate condition	Ambient temperature	22.8 °C	Relative humidity
	Atmospheric pressure	101.6 kPa	36 %
Test place	Shielded Room #8		

5.1.3 Photograph of Test Setup



Front

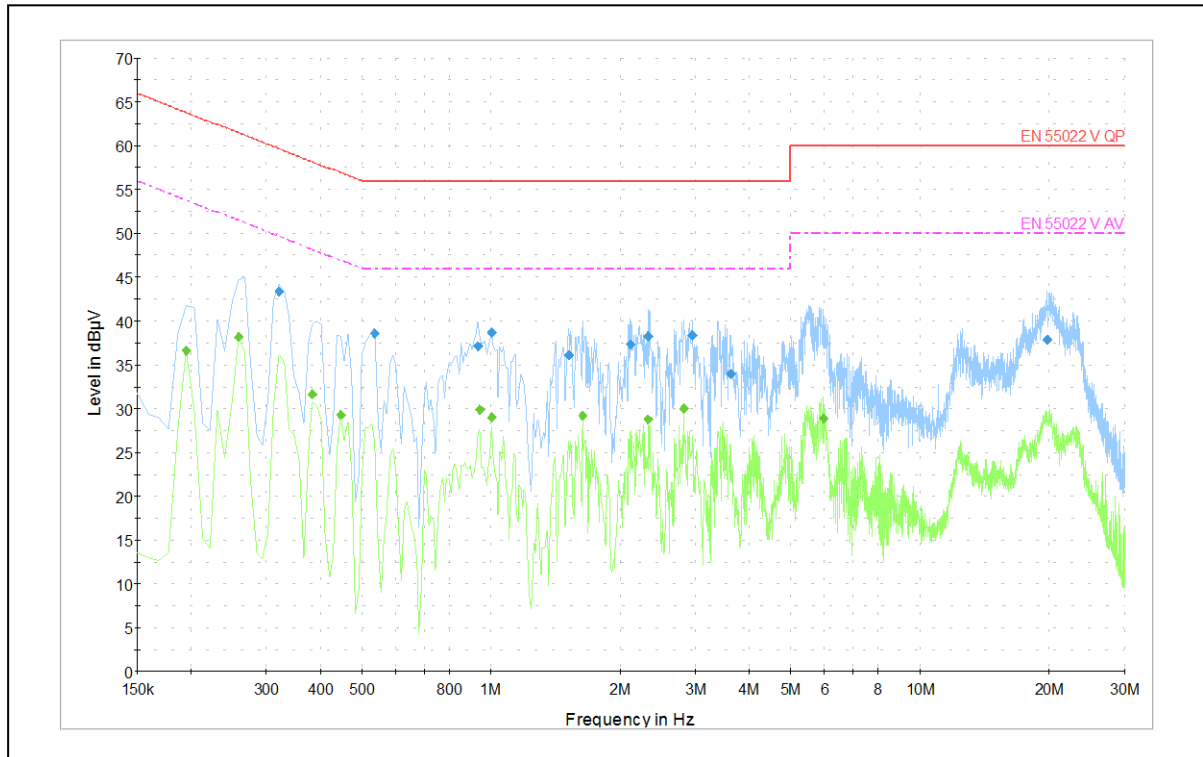


Rear

5.1.4 Test results (mains port)

- Operating Mode 1

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 C/Average)

Quasi-peak final measurement results table

Frequency (MHz)	Level ¹⁾ Quasi-Peak (dBμV)	Line ²⁾	Factor ³⁾ (dB)	Margin ⁴⁾ (dB)	Limit (dBμV)
0.321	43.3	L1	9.8	16.4	59.7
0.537	38.6	L1	9.9	17.4	56.0
0.933	37.1	L1	9.8	18.9	56.0
1.005	38.7	N	9.8	17.3	56.0
1.518	36.2	L1	9.8	19.8	56.0
2.112	37.3	N	9.7	18.7	56.0
2.328	38.3	N	9.7	17.7	56.0
2.949	38.3	N	9.7	17.7	56.0
3.624	33.9	N	9.8	22.1	56.0
19.797	37.9	L1	9.8	22.1	60.0

C/Average final measurement results table

Frequency (MHz)	Level ¹⁾ C/Average (dBμV)	Line ²⁾	Factor ³⁾ (dB)	Margin ⁴⁾ (dB)	Limit (dBμV)
0.195	36.7	N	10.0	17.1	53.8
0.258	38.1	N	9.7	13.4	51.5
0.384	31.6	N	9.9	16.5	48.2
0.447	29.3	L1	9.9	17.6	46.9
0.942	29.9	N	9.8	16.1	46.0
1.005	29.0	L1	9.8	17.0	46.0
1.635	29.2	N	9.8	16.8	46.0
2.328	28.7	N	9.7	17.3	46.0
2.814	30.0	N	9.7	16.0	46.0
5.955	28.9	L1	9.8	21.1	50.0

Note1) Level (Quasi-Peak and/or C/Average) = Meter Reading + Factor

Note2) Line = Polarity of input power (Live or Neutral)

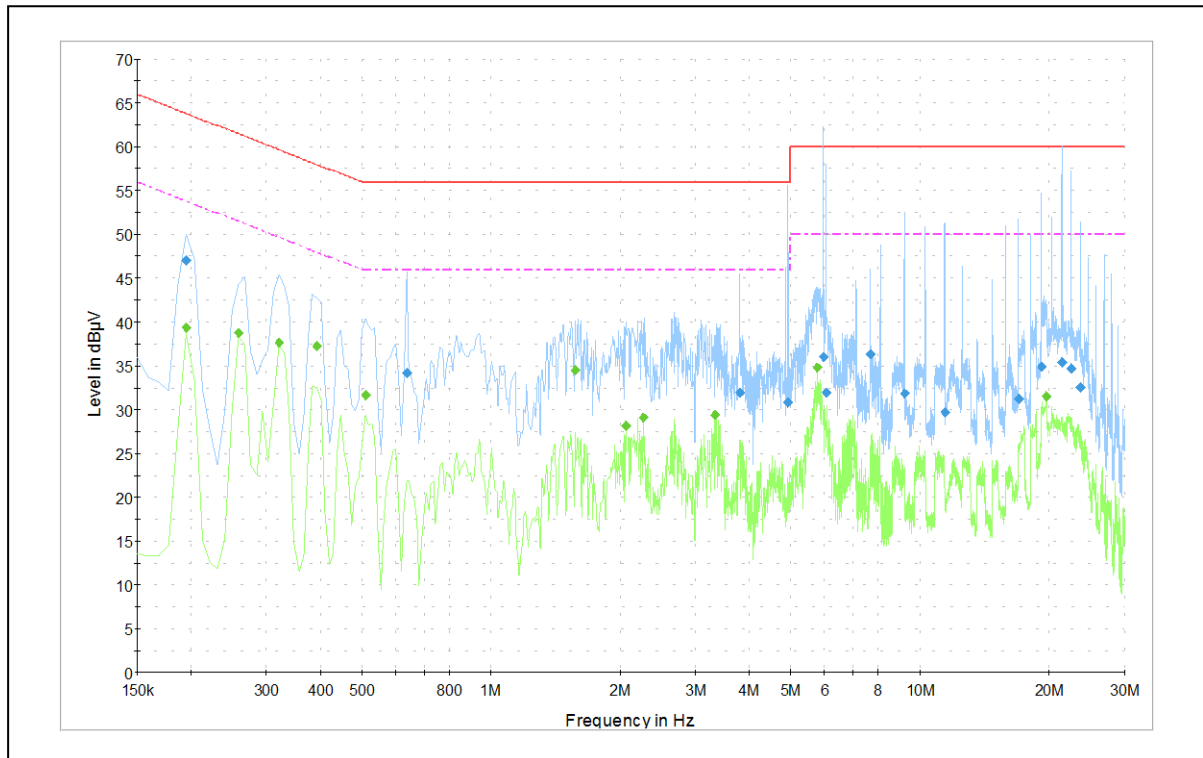
N : Abbreviation of Neutral Polarity, L1 : Abbreviation of Live Polarity,

Note3) Factor = LISN Insertion Loss + Cable Loss

Note4) Margin = Limit – Level (Quasi-Peak and/or C/Average)

- Operating Mode 2

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 C/Average)

Quasi-peak final measurement results table

Frequency (MHz)	Level ¹⁾ Quasi-Peak (dBμV)	Line ²⁾	Factor ³⁾ (dB)	Margin ⁴⁾ (dB)	Limit (dBμV)
0.195	47.1	L1	10.0	16.8	63.8
0.636	34.2	L1	9.9	21.8	56.0
3.804	31.9	N	9.8	24.1	56.0
4.929	30.8	N	9.8	25.2	56.0
5.955	36.0	L1	9.8	24.0	60.0
6.054	31.9	L1	9.8	28.1	60.0
7.665	36.3	L1	9.8	23.7	60.0
9.195	31.8	N	9.8	28.2	60.0
11.445	29.7	N	9.8	30.3	60.0
16.998	31.2	L1	9.8	28.8	60.0
19.212	34.9	N	10.0	25.1	60.0
21.444	35.4	L1	9.8	24.6	60.0
22.533	34.7	N	10.0	25.3	60.0
23.631	32.5	L1	9.8	27.5	60.0

C/Average final measurement results table

Frequency (MHz)	Level ¹⁾ C/Average (dBμV)	Line ²⁾	Factor ³⁾ (dB)	Margin ⁴⁾ (dB)	Limit (dBμV)
0.195	39.4	N	10.0	14.4	53.8
0.258	38.8	N	9.7	12.7	51.5
0.321	37.6	L1	9.8	12.0	49.7
0.393	37.2	N	9.9	10.8	48.0
0.510	31.7	N	10.0	14.3	46.0
1.572	34.5	L1	9.8	11.5	46.0
2.067	28.2	L1	9.7	17.8	46.0
2.265	29.0	N	9.7	17.0	46.0
3.336	29.4	L1	9.7	16.6	46.0
5.766	34.8	L1	9.8	15.2	50.0
19.743	31.5	L1	9.8	18.5	50.0

Note1) Level (Quasi-Peak and/or C/Average) = Meter Reading + Factor

Note2) Line = Polarity of input power (Live or Neutral)

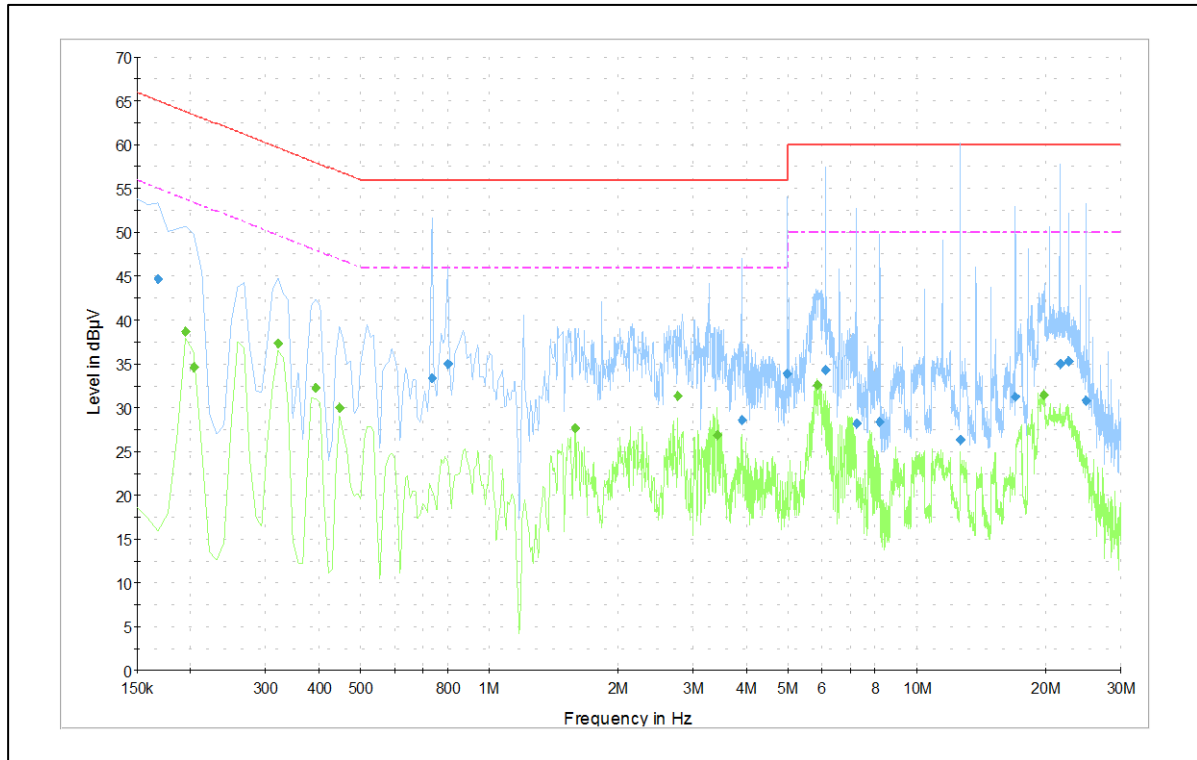
N : Abbreviation of Neutral Polarity, L1 : Abbreviation of Live Polarity,

Note3) Factor = LISN Insertion Loss + Cable Loss

Note4) Margin = Limit – Level (Quasi-Peak and/or C/Average)

- Operating Mode 3

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 C/Average)

Quasi-peak final measurement results table

Frequency (MHz)	Level ¹⁾ Quasi-Peak (dBμV)	Line ²⁾	Factor ³⁾ (dB)	Margin ⁴⁾ (dB)	Limit (dBμV)
0.168	44.7	L1	9.9	20.4	65.1
0.735	33.4	N	9.9	22.6	56.0
0.798	35.0	N	9.9	21.0	56.0
3.894	28.5	N	9.8	27.5	56.0
4.983	33.8	N	9.8	22.2	56.0
6.117	34.3	L1	9.8	25.7	60.0
7.224	28.2	N	9.8	31.8	60.0
8.169	28.4	L1	9.8	31.6	60.0
12.624	26.3	N	9.9	33.7	60.0
17.043	31.3	L1	9.8	28.7	60.0
21.606	35.0	N	10.0	25.0	60.0
22.632	35.3	L1	9.8	24.7	60.0
24.837	30.8	N	10.0	29.2	60.0

C/Average final measurement results table

Frequency (MHz)	Level ¹⁾ C/Average (dBμV)	Line ²⁾	Factor ³⁾ (dB)	Margin ⁴⁾ (dB)	Limit (dBμV)
0.195	38.7	L1	10.0	15.2	53.8
0.204	34.6	L1	10.0	18.8	53.4
0.321	37.4	N	9.8	12.3	49.7
0.393	32.2	L1	9.9	15.8	48.0
0.447	30.0	N	9.9	17.0	46.9
1.590	27.6	N	9.8	18.4	46.0
2.760	31.3	L1	9.7	14.7	46.0
3.408	26.8	L1	9.7	19.2	46.0
5.847	32.6	N	9.8	17.4	50.0
19.806	31.4	L1	9.8	18.6	50.0

Note1) Level (Quasi-Peak and/or C/Average) = Meter Reading + Factor

Note2) Line = Polarity of input power (Live or Neutral)

N : Abbreviation of Neutral Polarity, L1 : Abbreviation of Live Polarity,

Note3) Factor = LISN Insertion Loss + Cable Loss

Note4) Margin = Limit – Level (Quasi-Peak and/or C/Average)

5.2 Radiated disturbance

Of those disturbances above ($L - 20$ 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.

Below 1 GHz, peak detector function mode for prescan was used with resolution bandwidth of 120 kHz and a video bandwidth of 300 kHz and sweep method.

The sweep time for prescan set below 200 ms up and final measurement with quasi-peak detector evaluated for suspected frequencies points, which are detected from prescan measurement.

Final measurements consisted of 3 steps.

First step, frequency fine tuning to find exact disturbance frequency.

Second step, rechecking to search for maximum height and azimuth for interference from EUT

In final step, there are conducted measuring with quasi-peak detector for points which are detected from 1st step & 2nd step.

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

Frequency range Limits MHz	Resolution Bandwidth	Limit values dB(μV/m)	
		Class A (a distance of 10 meters)	Class B (a distance of 3 meters)
30 to 88	120 kHz	39	40
88 to 216	120 kHz	43.5	43.5
216 to 960	120 kHz	46	46
Above 960	120 kHz	49.5	54

Peak measurements were made over the changeable frequency range 1 GHz to 40 GHz or 5th 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 1 GHz radiated disturbance of ITE at a measuring distance of 3 m

Class	Limits - dB(μV/m)	
	Peak	C/Average
A	80	60
B	74	54
Average limit 500, $20 \log 500 = 53.979 \text{ dB} \approx 54 \text{ dB}$		

Measurements within 20 dB of the limit were then maximized by adjusting turntable position. Final measurements were made using a C/Average detector.

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

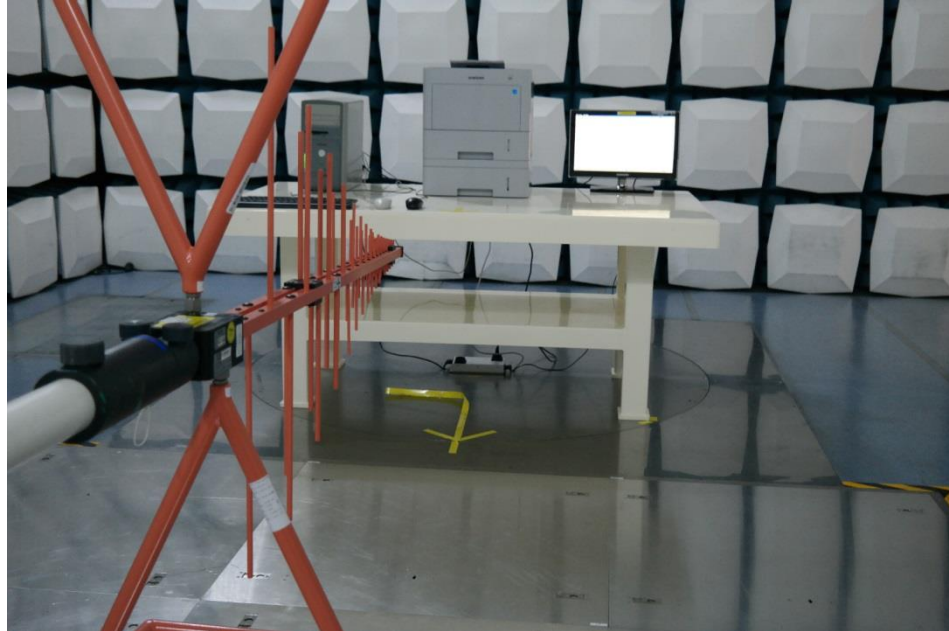
5.2.1 Test instrumentation

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
EMI Test Receiver	ESI-26	R&S	100010	2014-09-29	12
BILOG Antenna	CBL 6143A	TESEQ	30262	2013-05-16	24
Preamplifier	310N	SONOMA	282362	2014-11-10	12
Preamplifier	SCU 18	R&S	1522002	2014-02-20	12
Double-Ridged Waveguide Horn Antenna	HF906	R&S	100028	2014-10-24	24
Test Software	EP5/RE	TOYO	Ver 5.70.10	-	-

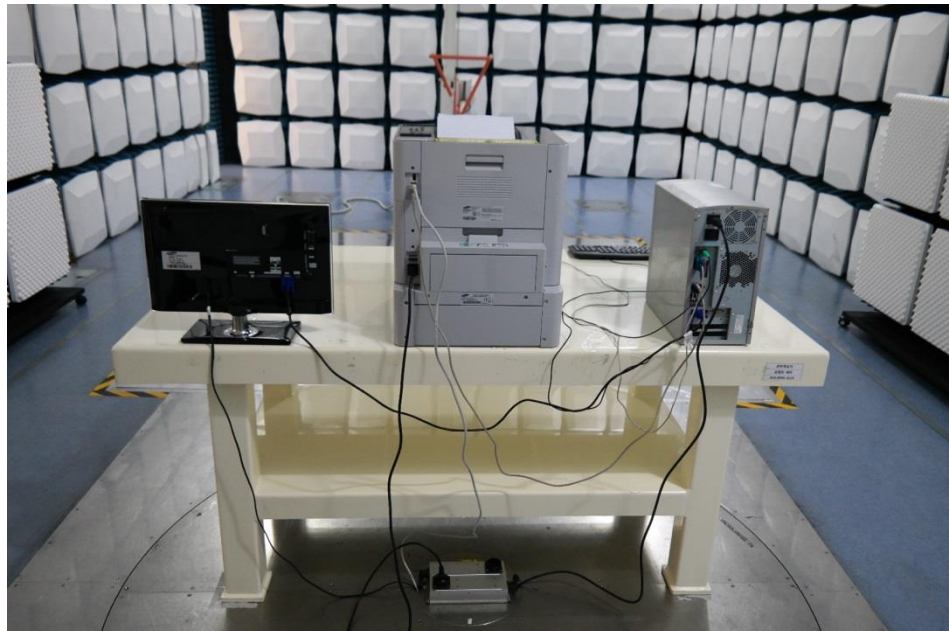
5.2.2 Temperature and humidity condition

Test date	January 15, 2015	Test engineer	Min Gon Kim	
Climate condition	Ambient temperature	23.6 ℃	Relative humidity	35 %
	Atmospheric pressure	101.6 kPa		
Test place	3 m Semi-Anechoic Chamber			

5.2.3.1 Photograph of Test Setup (30 MHz ~ 1 000 MHz)

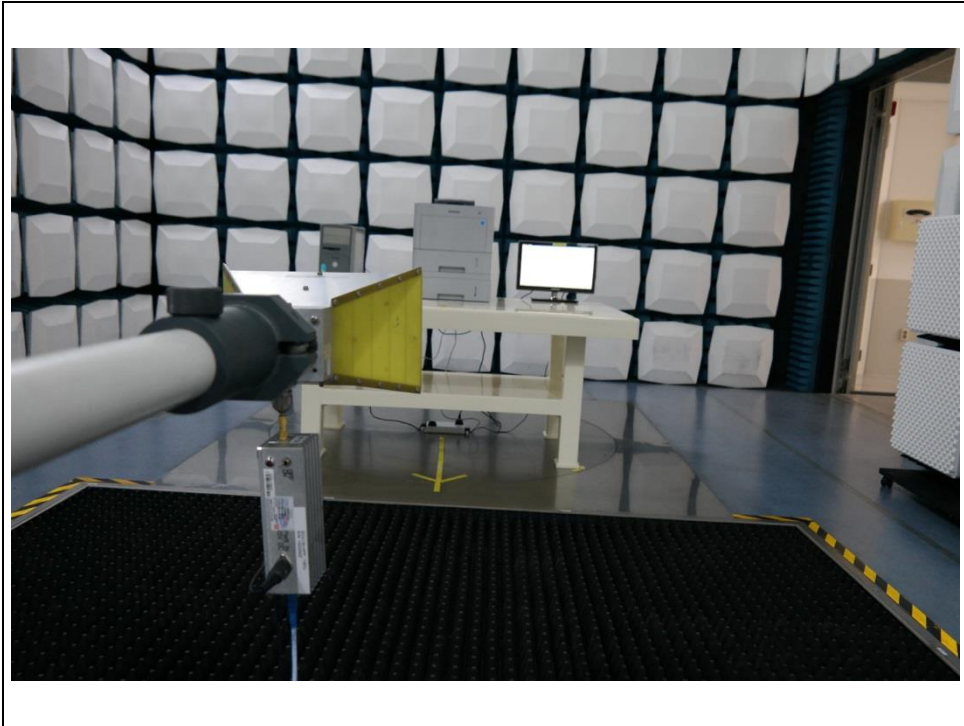


Front

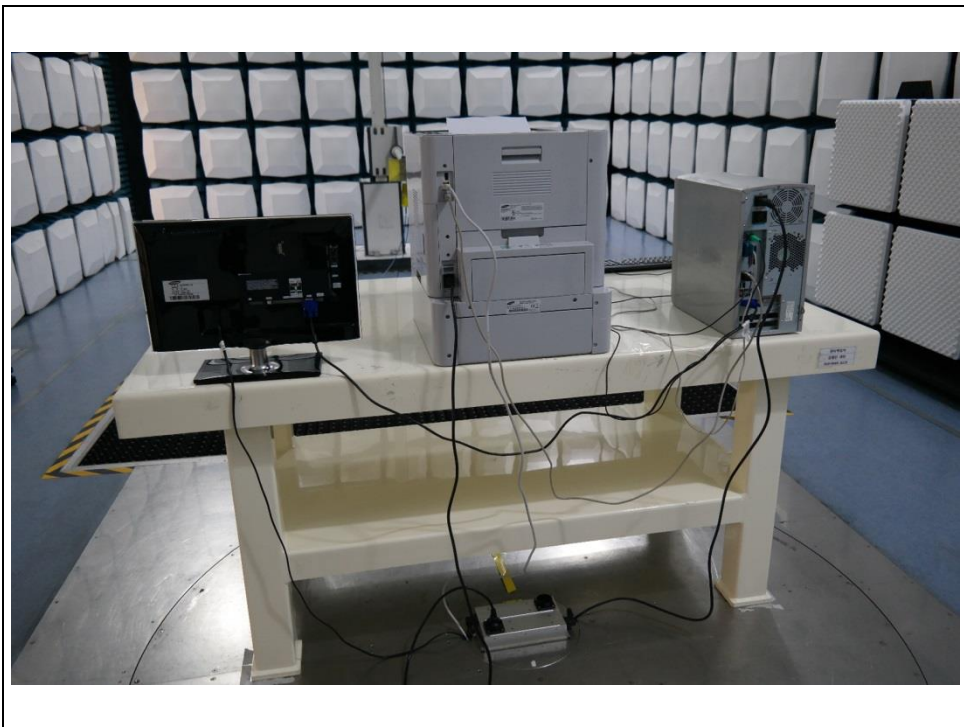


Rear

5.2.3.2 Photograph of Test Setup (Above 1 GHz)



Front

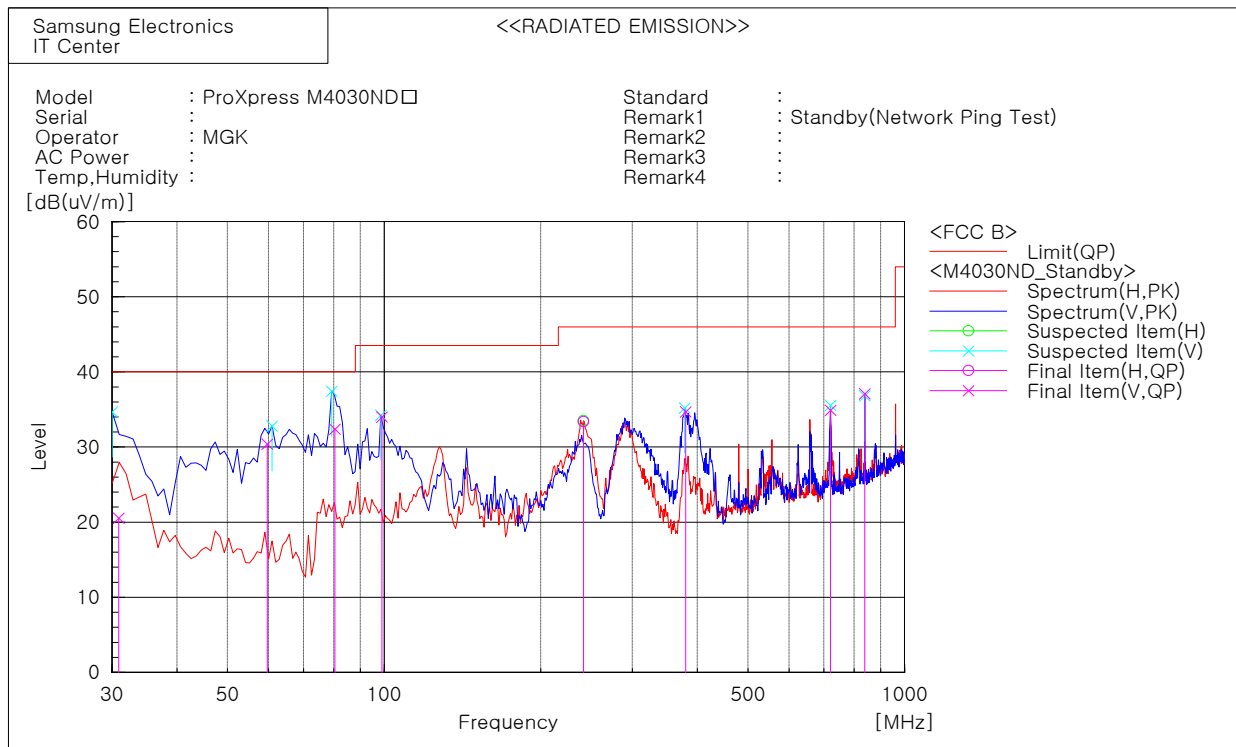


Rear

5.2.4 Test results

5.2.4.1 30 MHz ~ 1 000 MHz results

- Operating Mode 1



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]
1	30.889	V	33.8	-13.3	20.5	40.0	19.5	155.0	223.0
2	59.611	V	50.4	-20.0	30.4	40.0	9.6	100.0	31.0
3	80.407	V	55.2	-22.8	32.4	40.0	7.6	126.0	65.0
4	99.021	V	53.8	-19.8	34.0	43.5	9.5	103.0	327.0
5	241.525	H	50.5	-17.1	33.4	46.0	12.6	200.0	309.0
6	379.817	V	48.1	-13.4	34.7	46.0	11.3	119.0	90.0
7	720.456	V	42.8	-7.9	34.9	46.0	11.1	159.0	85.0
8	838.202	V	43.5	-6.4	37.1	46.0	8.9	228.0	12.0

Note1) (P) : Abbreviation of Antenna Polarity

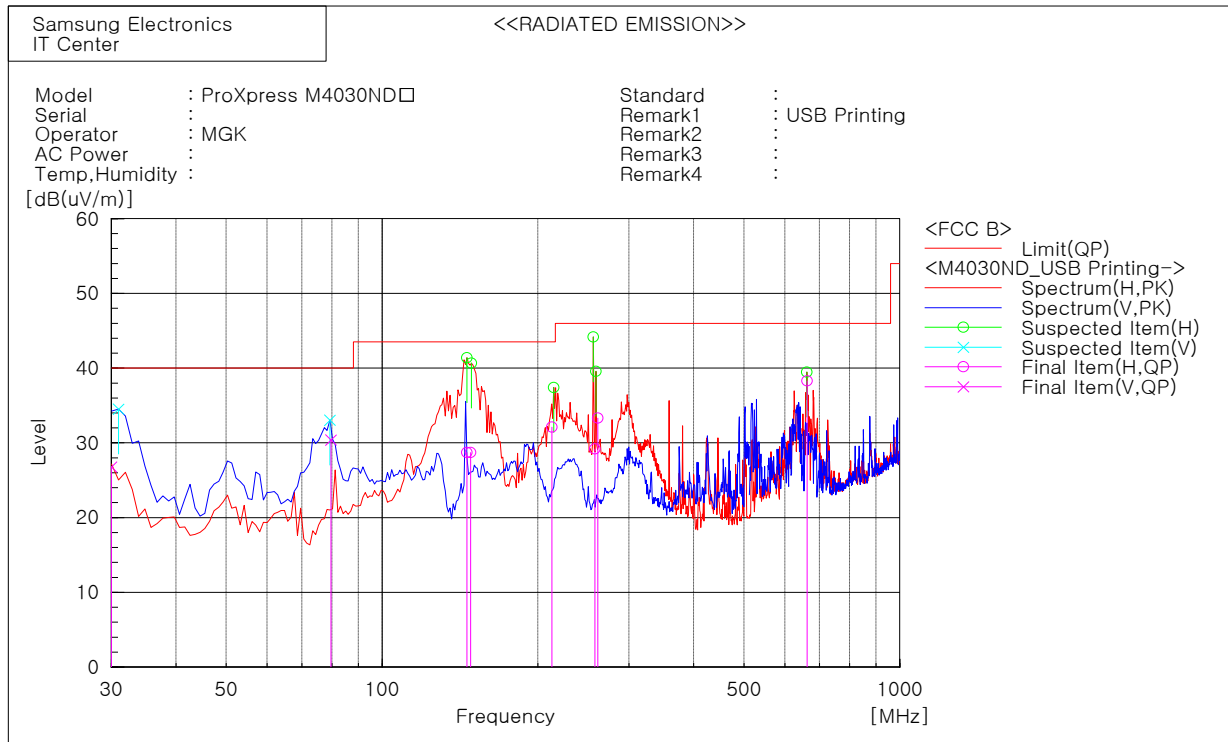
Note2) Reading QP : Received raw Quasi-peak signal

Note3) c.f = Factor = Antenna factor + Cable loss – Amplifier gain

Note4) Result QP = Level QP = Reading QP + Factor, Real signal Quasi-peak level

Note5) Margin QP = Limit – Level QP

QP : Abbreviation of Quasi-peak

- Operating Mode 2

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]
1	30.000	V	39.7	-12.9	26.8	40.0	13.2	124.0	208.0
2	79.712	V	53.2	-22.8	30.4	40.0	9.6	129.0	265.0
3	145.878	H	46.5	-17.8	28.7	43.5	14.8	198.0	133.0
4	148.293	H	46.6	-17.9	28.7	43.5	14.8	198.0	71.0
5	212.798	H	49.7	-17.6	32.1	43.5	11.4	118.0	107.0
6	257.714	H	46.2	-17.0	29.2	46.0	16.8	117.0	316.0
7	261.181	H	50.3	-17.0	33.3	46.0	12.7	108.0	312.0
8	662.111	H	46.9	-8.6	38.3	46.0	7.7	113.0	131.0

Note1) (P) : Abbreviation of Antenna Polarity

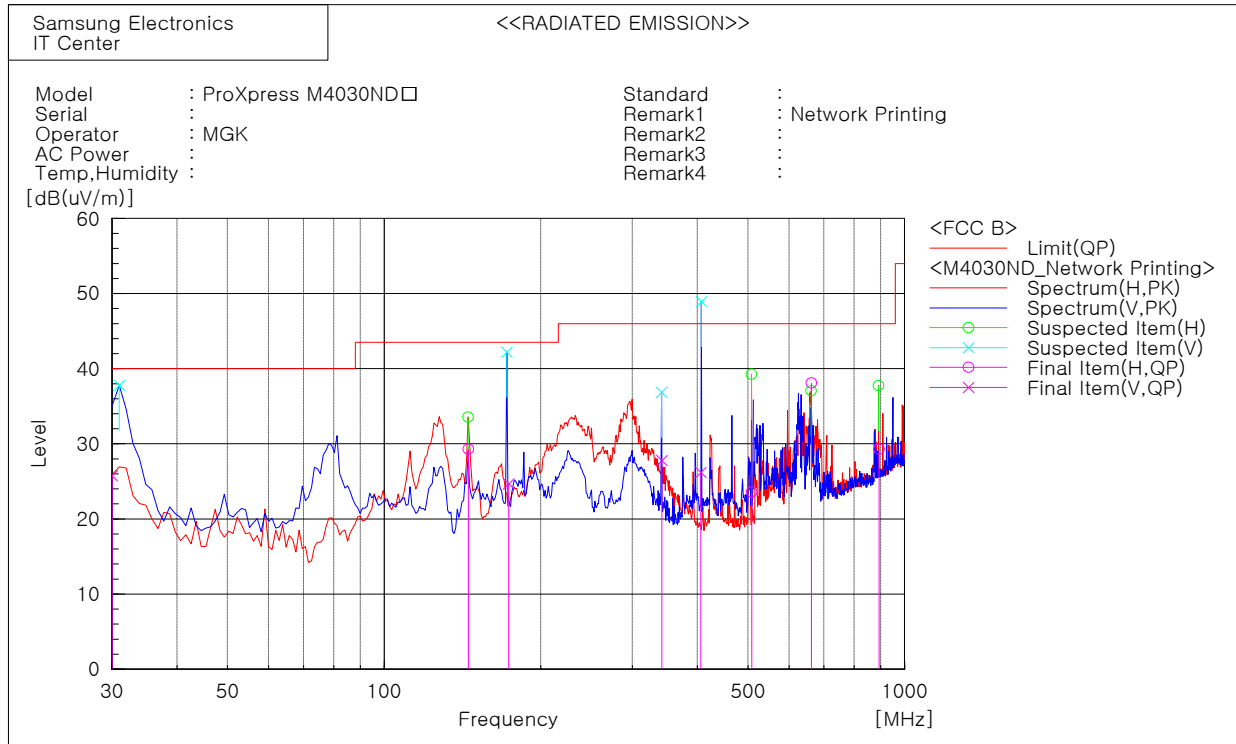
Note2) Reading QP : Received raw Quasi-peak signal

Note3) c.f = Factor = Antenna factor + Cable loss – Amplifier gain

Note4) Result QP = Level QP = Reading QP + Factor, Real signal Quasi-peak level

Note5) Margin QP = Limit – Level QP

QP : Abbreviation of Quasi-peak

- Operating Mode 3**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]
1	30.000	V	38.7	-12.9	25.8	40.0	14.2	101.0	201.0
2	145.197	H	47.0	-17.7	29.3	43.5	14.2	250.0	100.0
3	173.571	V	44.2	-19.5	24.7	43.5	18.8	198.0	345.0
4	341.537	V	43.1	-15.3	27.8	46.0	18.2	198.0	29.0
5	406.158	V	39.0	-12.8	26.2	46.0	19.8	216.0	16.0
6	508.267	H	34.4	-10.8	23.6	46.0	22.4	362.0	249.0
7	662.043	H	46.7	-8.6	38.1	46.0	7.9	110.0	131.0
8	893.134	H	34.5	-5.2	29.3	46.0	16.7	249.0	278.0

Note1) (P) : Abbreviation of Antenna Polarity

Note2) Reading QP : Received raw Quasi-peak signal

Note3) c.f = Factor = Antenna factor + Cable loss – Amplifier gain

Note4) Result QP = Level QP = Reading QP + Factor, Real signal Quasi-peak level

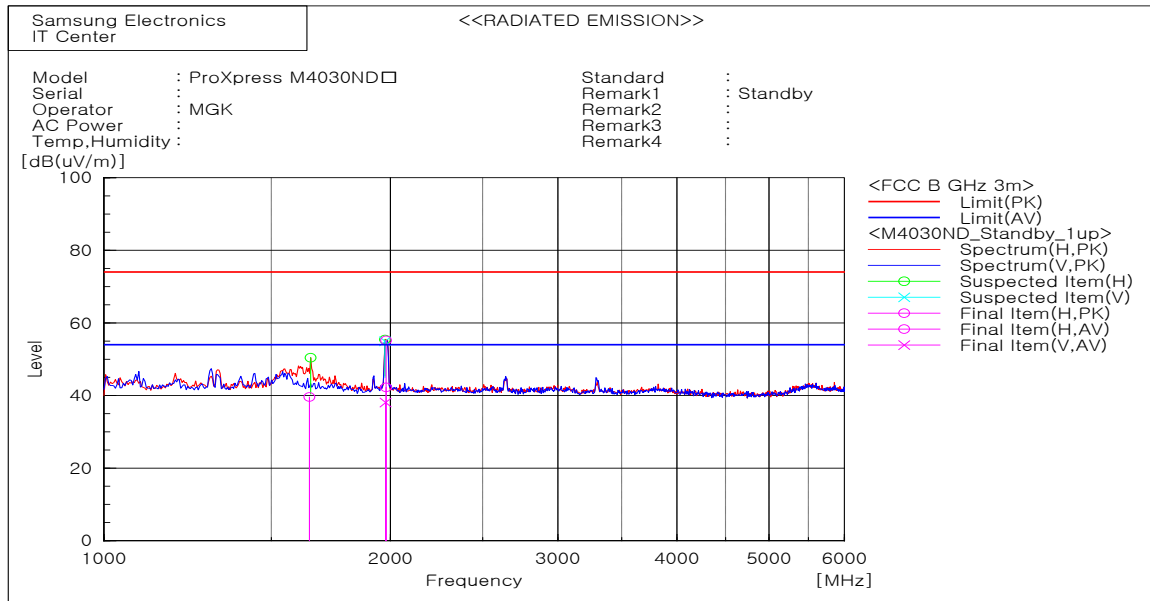
Note5) Margin QP = Limit – Level QP

QP : Abbreviation of Quasi-peak

5.2.4.2 Above 1 GHz results

- Operating Mode 1

Test Graph and Results



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]
1 649.299	H	61.4	-11.0	50.4	74.0	23.6	148.0	141.0
1 973.948	H	64.5	-9.1	55.4	74.0	18.6	148.0	88.0
1 973.948	V	64.0	-9.1	54.9	74.0	19.1	101.0	75.0

C/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]
1 644.449	H	50.6	-11.0	39.6	54.0	14.4	136.0	141.0
1 976.673	V	47.2	-9.1	38.1	54.0	15.9	168.0	88.0
1 979.600	H	51.2	-9.0	42.2	54.0	11.8	172.0	88.0

Note1) Receiving antenna polarization : Horizontal and Vertical

Note2) Level PK (Peak) = Reading PK (Peak) + Factor(Antenna Factor + Cable Loss - Amp. Gain)

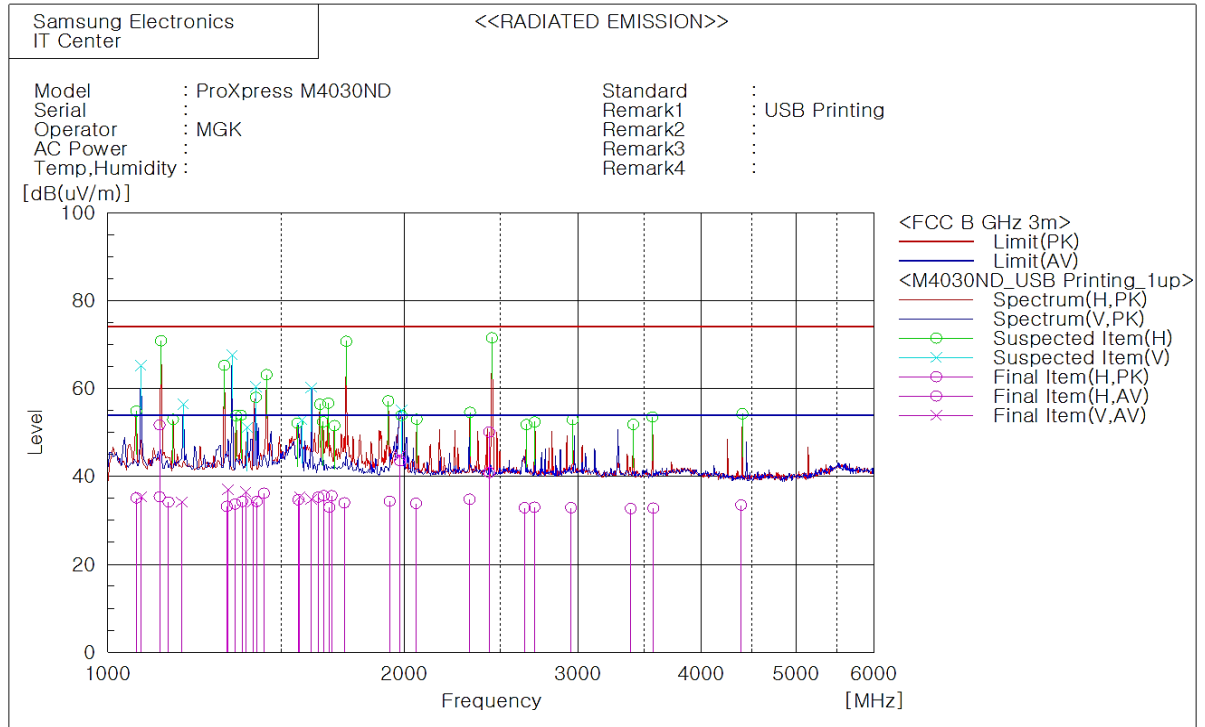
Level AV (C/Average) = Reading AV (C/Average) + Factor(Antenna Factor + Cable Loss - Amp. Gain)

Note3) Margin PK (Peak) = Limit – Level PK (Peak)

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

- Operating Mode 2

Test Graph and Results



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]
1 068.136	H	68.5	-13.7	54.8	74.0	19.2	126.0	87.0
1 080.160	V	78.9	-13.6	65.3	74.0	8.7	105.0	220.0
1 132.265	H	84.4	-13.5	70.9	74.0	3.1	100.0	24.0
1 164.329	H	66.3	-13.3	53.0	74.0	21.0	102.0	335.0
1 192.385	V	69.8	-13.3	56.5	74.0	17.5	100.0	226.0
1 312.625	H	78.1	-12.8	65.3	74.0	8.7	115.0	78.0
1 336.673	V	80.3	-12.7	67.6	74.0	6.4	102.0	82.0
1 348.697	H	66.4	-12.6	53.8	74.0	20.2	100.0	285.0
1 364.730	H	66.5	-12.6	53.9	74.0	20.1	103.0	81.0
1 384.770	V	63.6	-12.5	51.1	74.0	22.9	102.0	119.0
1 412.826	V	72.8	-12.4	60.4	74.0	13.6	109.0	213.0
1 412.826	H	70.4	-12.4	58.0	74.0	16.0	100.0	348.0
1 448.898	H	75.4	-12.2	63.2	74.0	10.8	115.0	115.0
1 557.114	H	63.6	-11.5	52.1	74.0	21.9	110.0	339.0
1 573.146	V	64.3	-11.4	52.9	74.0	21.1	159.0	50.0
1 609.218	V	71.4	-11.2	60.2	74.0	13.8	189.0	210.0
1 641.283	H	67.4	-11.0	56.4	74.0	17.6	100.0	320.0
1 653.307	H	63.3	-10.9	52.4	74.0	21.6	106.0	137.0
1 673.347	H	67.5	-10.8	56.7	74.0	17.3	102.0	269.0
1 697.395	H	62.2	-10.6	51.6	74.0	22.4	102.0	125.0
1 745.491	H	81.0	-10.3	70.7	74.0	3.3	168.0	96.0
1 925.852	H	66.5	-9.3	57.2	74.0	16.8	100.0	34.0
1 985.972	V	64.1	-9.0	55.1	74.0	18.9	205.0	75.0
1 985.972	H	62.9	-9.0	53.9	74.0	20.1	206.0	90.0
2 058.116	H	61.8	-8.8	53.0	74.0	21.0	100.0	81.0
2 330.661	H	62.9	-8.3	54.6	74.0	19.4	118.0	81.0
2 450.902	H	79.0	-8.1	70.9	74.0	3.1	107.0	49.0
2 659.319	H	59.2	-7.4	51.8	74.0	22.2	102.0	100.0
2 711.423	H	59.5	-7.1	52.4	74.0	21.6	289.0	1.0
2 963.928	H	58.5	-5.6	52.9	74.0	21.1	103.0	323.0
3 414.830	H	55.9	-4.1	51.8	74.0	22.2	108.0	65.0
3 571.142	H	57.2	-3.7	53.5	74.0	20.5	111.0	166.0
4 406.814	H	57.5	-3.2	54.3	74.0	19.7	107.0	257.0

C/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]
1 069.339	H	48.8	-13.7	35.1	54.0	18.9	139.0	87.0
1 080.040	V	49.0	-13.6	35.4	54.0	18.6	105.0	220.0
1 128.357	H	48.9	-13.5	35.4	54.0	18.6	104.0	73.0
1 152.025	H	47.6	-13.4	34.2	54.0	19.8	101.0	335.0
1 187.896	V	47.5	-13.3	34.2	54.0	19.8	100.0	225.0
1 320.080	H	46.0	-12.8	33.2	54.0	20.8	119.0	78.0
1 323.887	V	49.8	-12.8	37.0	54.0	17.0	102.0	82.0
1 346.372	H	46.4	-12.7	33.7	54.0	20.3	101.0	284.0
1 368.137	H	46.9	-12.6	34.3	54.0	19.7	105.0	81.0
1 380.041	V	49.0	-12.5	36.5	54.0	17.5	108.0	119.0
1 403.728	V	46.7	-12.4	34.3	54.0	19.7	115.0	213.0
1 415.992	H	46.6	-12.3	34.3	54.0	19.7	100.0	348.0
1 440.000	H	48.4	-12.2	36.2	54.0	17.8	189.0	114.0
1 560.240	H	46.2	-11.5	34.7	54.0	19.3	116.0	339.0
1 565.451	V	46.9	-11.5	35.4	54.0	18.6	184.0	51.0
1 607.975	V	46.0	-11.2	34.8	54.0	19.2	189.0	210.0
1 635.151	H	46.3	-11.0	35.3	54.0	18.7	107.0	320.0
1 655.912	H	46.5	-10.9	35.6	54.0	18.4	109.0	136.0
1 677.916	H	43.8	-10.8	33.0	54.0	21.0	102.0	269.0
1 686.734	H	46.3	-10.7	35.6	54.0	18.4	106.0	124.0
1 737.715	H	44.4	-10.4	34.0	54.0	20.0	177.0	73.0
1 931.583	H	43.6	-9.2	34.4	54.0	19.6	100.0	35.0
1 977.395	V	53.7	-9.1	44.6	54.0	9.4	236.0	76.0
1 979.319	H	52.6	-9.0	43.6	54.0	10.4	206.0	89.0
2 055.030	H	42.7	-8.8	33.9	54.0	20.1	101.0	82.0
2 329.178	H	43.1	-8.3	34.8	54.0	19.2	118.0	81.0
2 438.217	H	49.1	-8.2	40.9	54.0	13.1	109.0	73.0
2 649.139	H	40.3	-7.4	32.9	54.0	21.1	104.0	99.0
2 709.699	H	40.1	-7.1	33.0	54.0	21.0	270.0	1.0
2 952.104	H	38.6	-5.7	32.9	54.0	21.1	103.0	324.0
3 394.269	H	36.9	-4.2	32.7	54.0	21.3	104.0	65.0
3 578.717	H	36.5	-3.7	32.8	54.0	21.2	116.0	167.0
4 393.468	H	36.6	-3.1	33.5	54.0	20.5	109.0	256.0

Note1) Receiving antenna polarization : Horizontal and Vertical

Note2) Level PK (Peak) = Reading PK (Peak) + Factor(Antenna Factor + Cable Loss - Amp. Gain)

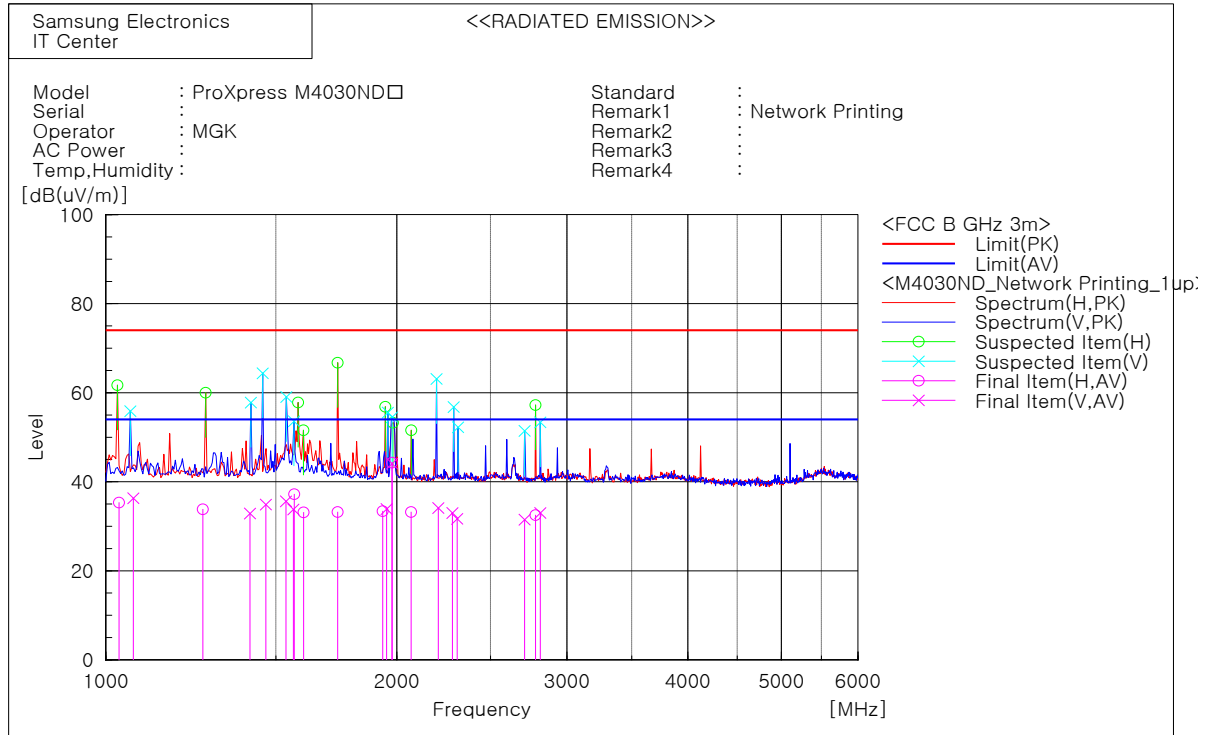
Level AV (C/Average) = Reading AV (C/Average) + Factor(Antenna Factor + Cable Loss - Amp. Gain)

Note3) Margin PK (Peak) = Limit – Level PK (Peak)

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

- Operating Mode 3

Test Graph and Results



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]
1 028.056	H	75.5	-13.8	61.7	74.0	12.3	108.0	8.0
1 060.120	V	69.6	-13.7	55.9	74.0	18.1	103.0	74.0
1 268.537	H	73.0	-13.0	60.0	74.0	14.0	100.0	203.0
1 412.826	V	70.2	-12.4	57.8	74.0	16.2	106.0	8.0
1 452.906	V	76.5	-12.1	64.4	74.0	9.6	108.0	202.0
1 537.074	V	70.8	-11.7	59.1	74.0	14.9	198.0	108.0
1 565.130	V	65.1	-11.5	53.6	74.0	20.4	147.0	324.0
1 581.162	H	69.2	-11.4	57.8	74.0	16.2	206.0	74.0
1 601.202	H	62.9	-11.3	51.6	74.0	22.4	208.0	241.0
1 737.475	H	77.1	-10.4	66.7	74.0	7.3	103.0	291.0
1 945.892	H	66.0	-9.2	56.8	74.0	17.2	101.0	8.0
1 957.916	V	64.7	-9.1	55.6	74.0	18.4	100.0	296.0
1 977.956	V	63.6	-9.1	54.5	74.0	19.5	158.0	86.0
1 981.964	H	62.2	-9.0	53.2	74.0	20.8	222.0	93.0
2 070.140	H	60.4	-8.8	51.6	74.0	22.4	100.0	8.0
2 198.397	V	71.6	-8.5	63.1	74.0	10.9	206.0	33.0
2 290.581	V	65.2	-8.4	56.8	74.0	17.2	184.0	118.0
2 314.629	V	60.7	-8.4	52.3	74.0	21.7	147.0	149.0
2 711.423	V	58.5	-7.1	51.4	74.0	22.6	162.0	65.0
2 783.567	H	63.9	-6.7	57.2	74.0	16.8	101.0	121.0
2 815.631	V	59.9	-6.5	53.4	74.0	20.6	103.0	8.0

C/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]
1 031.863	H	49.1	-13.8	35.3	54.0	18.7	107.0	7.0
1 067.815	V	50.0	-13.7	36.3	54.0	17.7	205.0	74.0
1 260.080	H	46.8	-13.0	33.8	54.0	20.2	100.0	202.0
1 410.020	V	45.3	-12.4	32.9	54.0	21.1	106.0	8.0
1 464.008	V	47.0	-12.1	34.9	54.0	19.1	189.0	202.0
1 536.392	V	47.3	-11.7	35.6	54.0	18.4	185.0	108.0
1 563.406	V	45.3	-11.5	33.8	54.0	20.2	165.0	324.0
1 567.054	H	48.7	-11.5	37.2	54.0	16.8	206.0	75.0
1 602.124	H	44.4	-11.3	33.1	54.0	20.9	221.0	240.0
1 737.234	H	43.6	-10.4	33.2	54.0	20.8	106.0	291.0
1 934.349	H	42.6	-9.2	33.4	54.0	20.6	101.0	9.0
1 951.824	V	43.1	-9.2	33.9	54.0	20.1	103.0	297.0
1 977.274	V	53.2	-9.1	44.1	54.0	9.9	165.0	87.0
1 977.394	H	53.4	-9.1	44.3	54.0	9.7	230.0	93.0
2 069.218	H	42.0	-8.8	33.2	54.0	20.8	101.0	9.0
2 208.177	V	42.6	-8.5	34.1	54.0	19.9	215.0	33.0
2 283.887	V	41.4	-8.4	33.0	54.0	21.0	192.0	118.0
2 309.619	V	40.1	-8.4	31.7	54.0	22.3	153.0	149.0
2 711.985	V	38.6	-7.1	31.5	54.0	22.5	178.0	66.0
2 783.848	H	39.2	-6.7	32.5	54.0	21.5	102.0	120.0
2 815.471	V	39.5	-6.5	33.0	54.0	21.0	103.0	9.0

Note1) Receiving antenna polarization : Horizontal and Vertical

Note2) Level PK (Peak) = Reading PK (Peak) + Factor(Antenna Factor + Cable Loss - Amp. Gain)

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

Note3) Margin PK (Peak) = Limit – Level PK (Peak)

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

Appendix – EUT photography



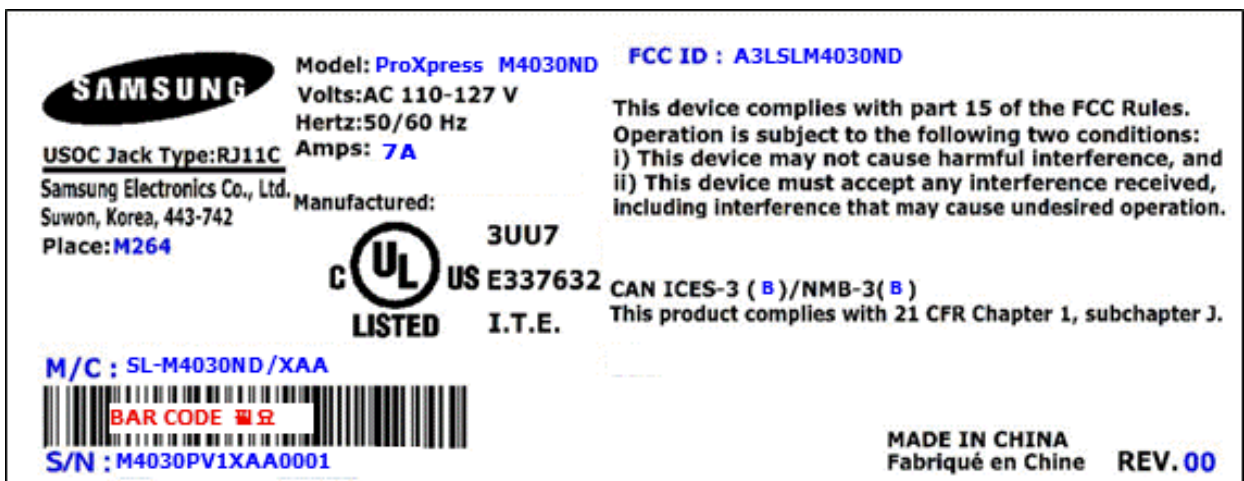
Front View



Rear View & Label Location



Inside View



Label