

EMC TEST REPORT




Project No.	LBE20125898	Issue No.	03	
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	December 13, 2012		
EUT	Type of device	Class B personal computers and peripherals		
	Equipment authorization	<input type="checkbox"/> Declaration of Conformity <input checked="" type="checkbox"/> Certification <input type="checkbox"/> Verification		
	FCC ID	A3LSLM2875FW		
	Kind of product	Mono Laser MFP Xpress M2875FW		
	Model No.	Variant Model No.	Xpress M2675N / Xpress M2670N / Xpress M2676N Xpress M2675F Xpress M2675FD / Xpress M2670FD Xpress M2675FN / Xpress M2670FN Xpress M2875ND / Xpress M2876ND Xpress M2875FD / Xpress M2876FD / Xpress M2870FD Xpress M2875FW / Xpress M2870FW	
	Manufacturer	1)SAMSUNG ELECTRONICS (SHANDONG) DIGITAL PRINTING CO.,LTD. #264209,Samsung Road,Weihi Hi-Tech IDZ Shandong Province CHINA. 2)SAMSUNG ELECTRONICS SUZHOU COMPUTER CO.,LTD.(SESC) No.198, Fangzhou Road, Suzhou Industrial Park Jiangsu Province,China. 3)Weihai Intops Electronics Co., Ltd. Keji Road 268-1,Weihai city,Shandong Province,China. 4)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	December 17, 2012 ~ December 18, 2012			
Issue date	December 26, 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 : Sang Kyu Seo		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.				
				
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1. Report information

1.1 Revision history

No.	Revised detailed information
Issue 03	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
<input checked="" type="checkbox"/>	Conducted Disturbance (Mains Port)	FCC Part 15 Subpart B / ANSI C63.4-2009	Complied
<input checked="" type="checkbox"/>	Radiated Disturbance		Complied

3. General Information

3.1 Test facility

The CS & Environment center 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 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 MFP	Xpress M2875FW	-	Samsung	EUT
B	PC	NT-NS310P1-PS1	AZSR93CB100003E	Samsung	DoC
C	Adapter (For PC)	AD-4019P	CNBA440027AB	LITE-ON	DoC
D	USB Memory	Verbatim	-	-	DoC
E	USB Memory	AXIS 2.0	-	-	DoC
F	Telephone	SP-F209	-	Samsung	DoC
G	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	Network printing
Operating Mode 2	ADF copy printing
Operating Mode 3	Scan to PC
Operating Mode 4	Fax Tx

4.3 Details of Sampling

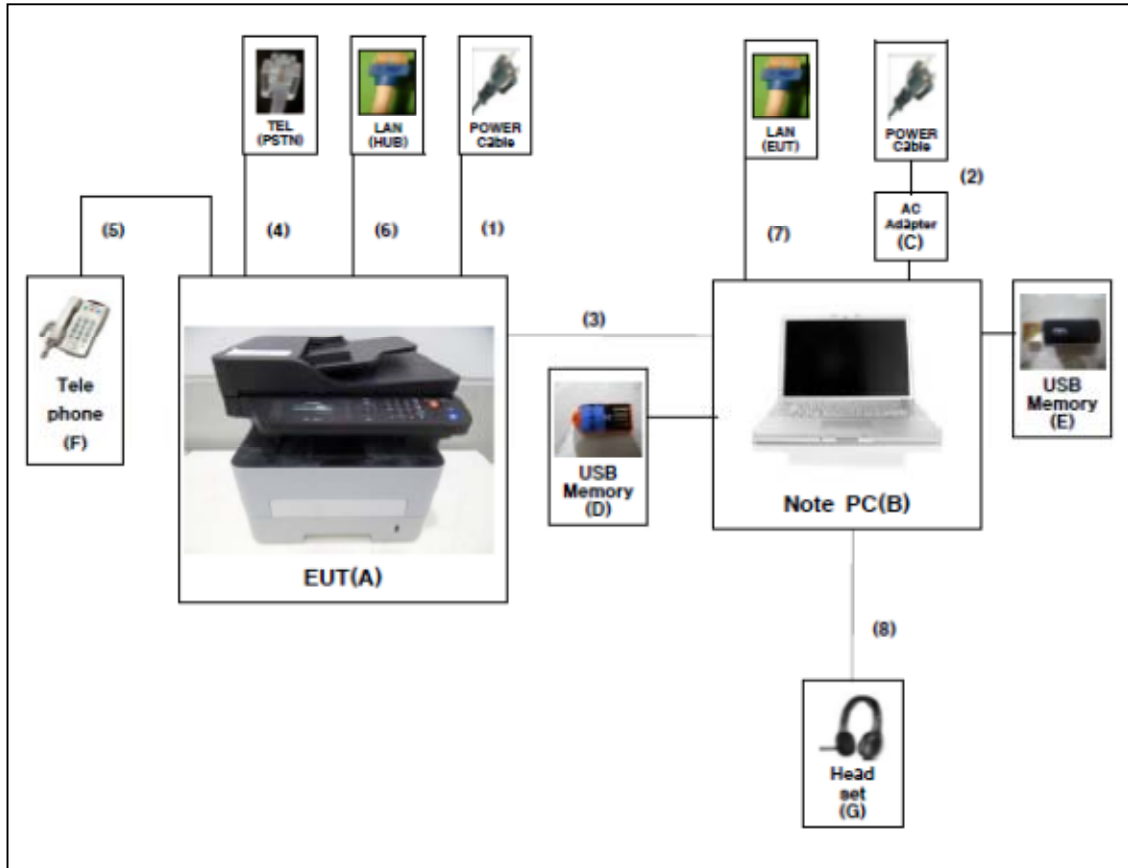
Customer selected, single unit.

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	1.8	No	For EUT
2	Power	1.8	No	For PC
3	USB	2.0	Yes	From EUT to PC
4	Tel	2.0	No	From EUT to PSTN
5	Tel	3.0	No	From EUT to Telephone
6	LAN	2.0	No	From EUT to HUB
7	LAN	2.0	No	From PC to HUB
8	Audio	1.8	No	From PC to Headset

4.5 Test arrangement



4.6 EUT Description

The following features describe EUT represented by this report:

Item	Specification and Description
Processor	A1500 (600MHZ)
Standard System memory	128MB DDR3 on all configurations (Default)
Resolution	max 1200 x 1200 dpi
Speed	Xpress-M287**** series : 28ppm Xpress-M267**** series : 26ppm
Paper Handling	Paper Tray(standard) 250 Sheets Bypass Tray 1 Sheets
Power Rating	AC 110 ~ 127V, 5.5A, 50/60Hz
Power Consumption	Power save mode : Less than 1.6W (Wi-Fi DIRECT ON : Less than 2.4W) Stand by mode : 50 Watts Printing simplex : 400 Watts
Printer Language	PCL6 / PCL5e / SPL
Interfaces	USB2.0, Network, Wi-Fi
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, Platen Scan, Platen Copy, ADF Scan, ADF Copy, Fax Tx, Fax Rx, Wi-Fi
Intended Class for Emissions	Class B

4.7 Clock Frequencies

Kind of Clocks	Frequency[MHz]	Kind of Clocks	Frequency[MHz]
CPU internal	600	DDR3	384
Video	16.277	Main source	12
USB device	12	ETHERNET	25
RTC	32.768 kHz	-	-

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 Pacific 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 (30 MHz ~ 1 GHz)	Horizontal	4.18 dB
	Vertical	4.47 dB
Radiated Disturbance (1 GHz ~ 6 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 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.

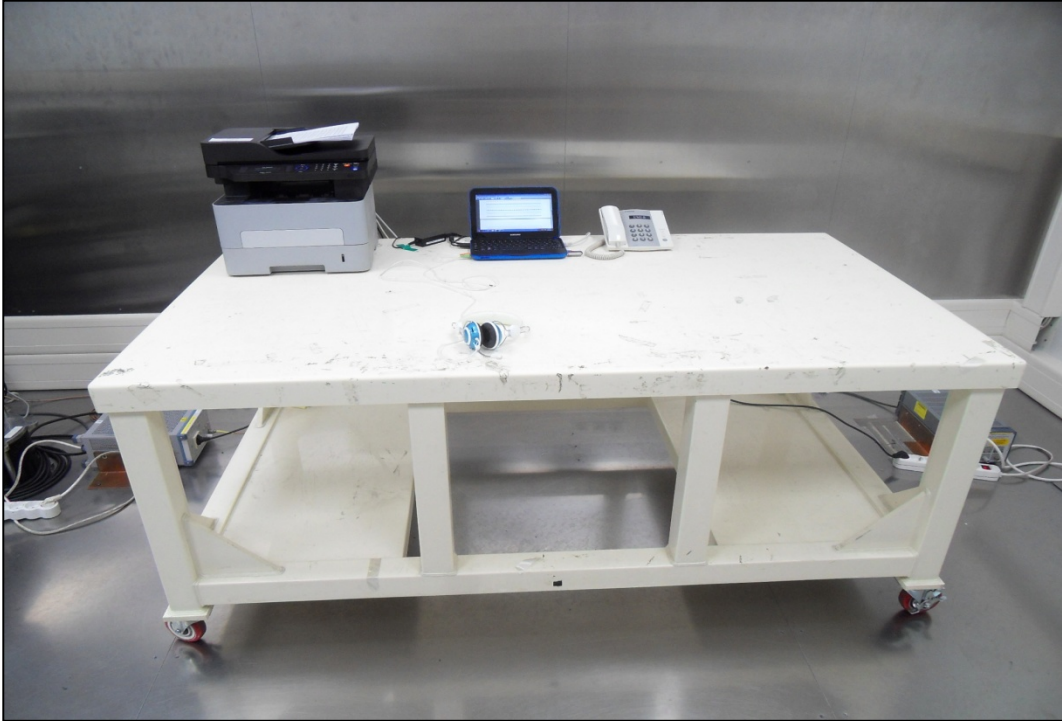
5.1.1 Test instrumentation

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

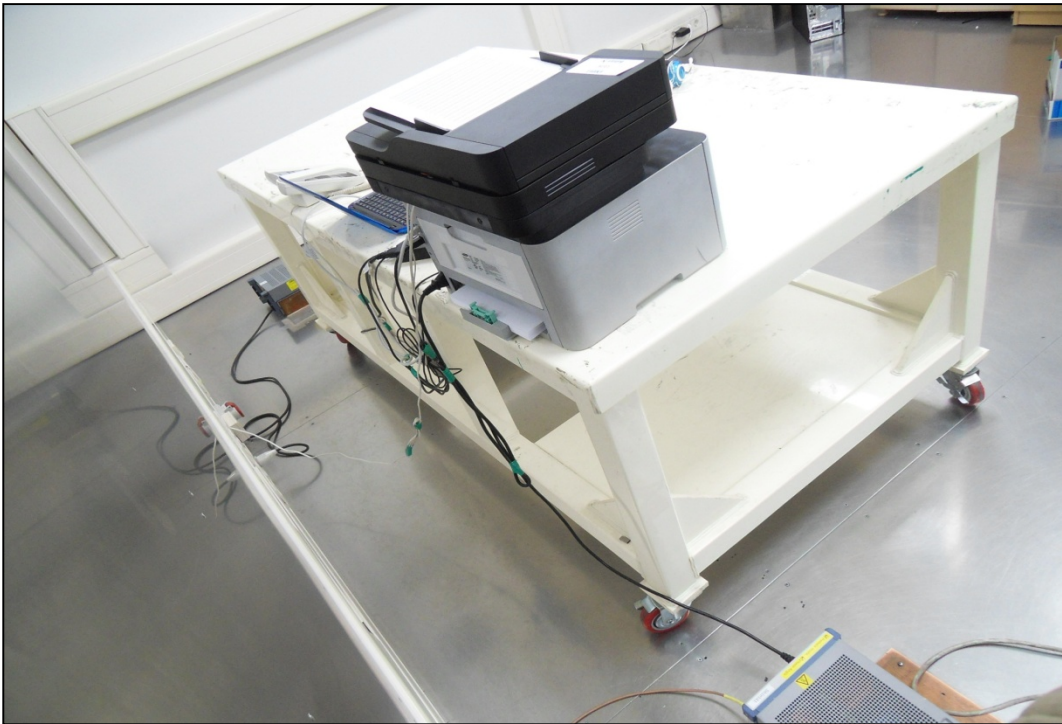
5.1.2 Temperature and humidity condition

Test date	December 17, 2012	Test engineer		Sang Kyu Seo	
Climate condition	Ambient temperature	23.6 °C	Relative humidity		32 %
	Atmospheric pressure	101.6 kPa			
Test place	Shielded Room #1				

5.1.3 Photograph of Test Setup



Front



Rear

5.1.4 Test results (mains port)

- Operating Mode 1.
- Network Printing (Dong Yang SMPS)

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

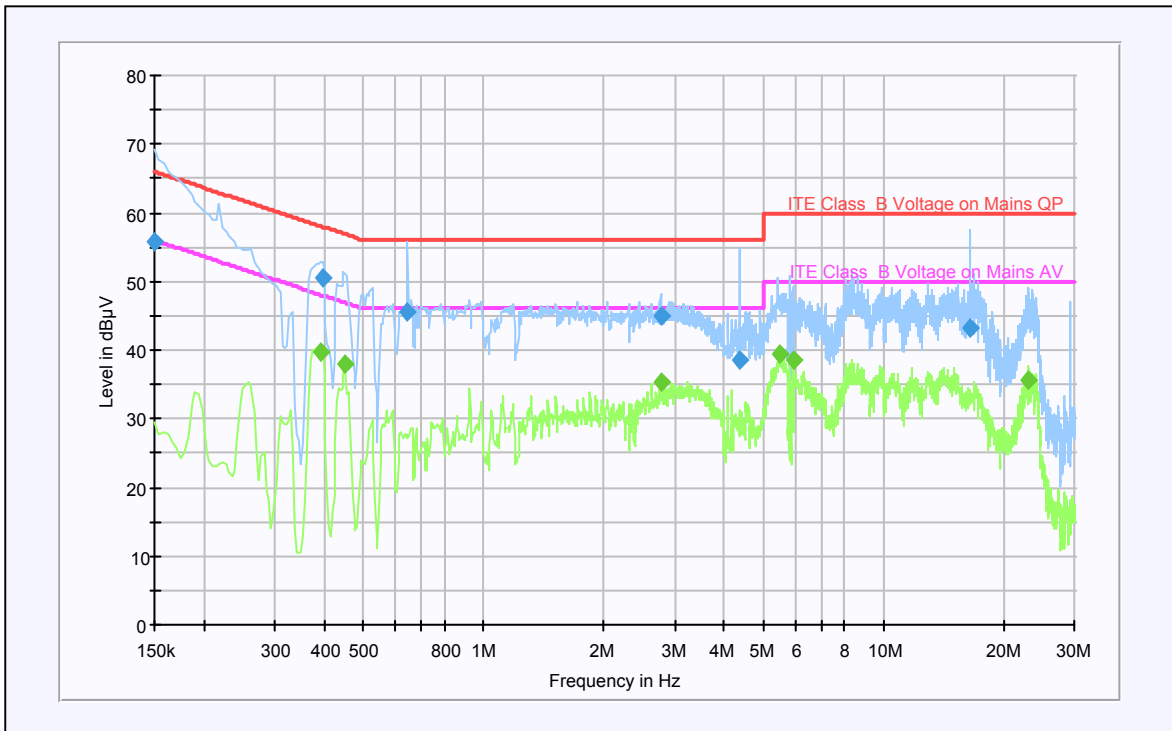
Subrange 1
 Frequency Range: 150 kHz – 30 MHz
 Receiver: ESIB
 Transducer: ENV216 / Receiver-2-Line-LISN ENV216

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 (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.150 000	55.8	N	10.4	10.2	66.0
0.394 000	50.5	L1	10.1	7.5	58.0
0.646 000	45.7	L1	10.1	10.3	56.0
2.768 000	44.9	N	9.8	11.1	56.0
4.384 000	38.5	N	9.8	17.5	56.0
16.472 000	43.1	N	10.1	16.9	60.0

Average final measurement results table

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.390 000	39.6	N	10.1	8.5	48.1
0.450 000	37.9	N	10.1	9.0	46.9
2.768 000	35.2	L1	9.8	10.8	46.0
5.528 000	39.4	L1	9.8	10.6	50.0
5.928 000	38.6	L1	9.8	11.4	50.0
23.072 000	35.7	L1	10.2	14.3	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)

■ **Operating Mode 2.**

- **ADF copy printing (Dong Yang SMPS)**

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

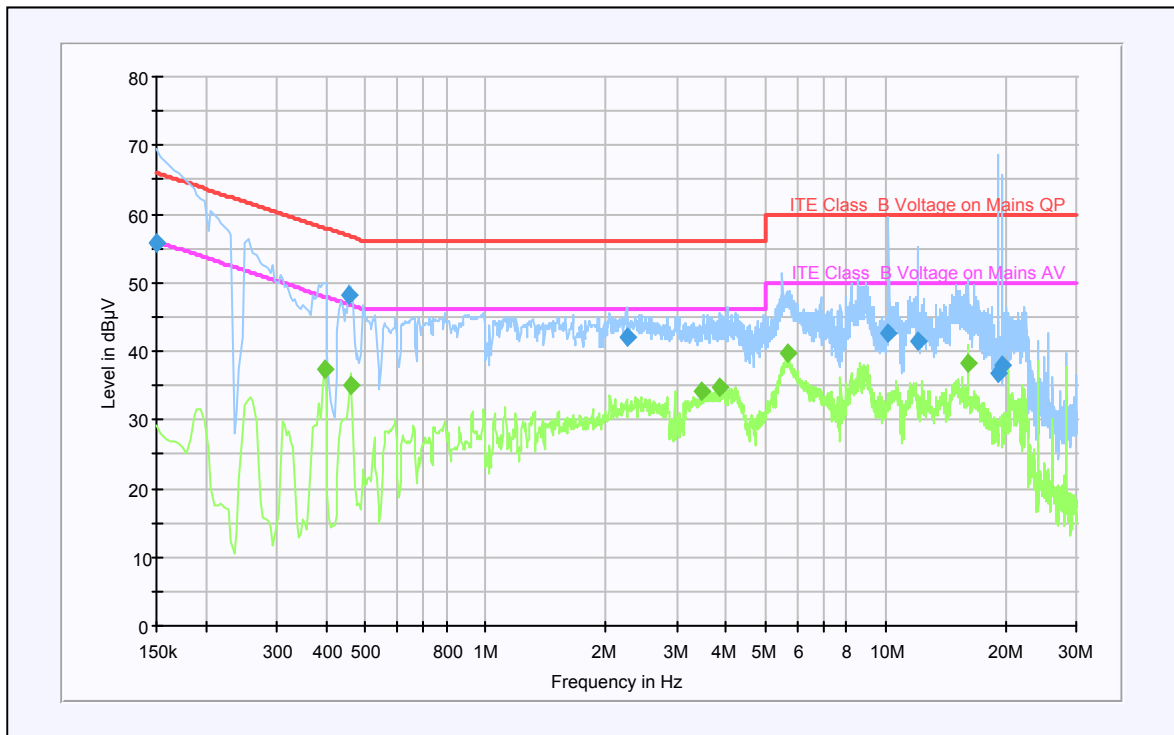
Subrange 1
 Frequency Range: 150 kHz – 30 MHz
 Receiver: ESIB
 Transducer: ENV216 / Receiver-2-Line-LISN ENV216

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 (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.150 000	55.8	L1	10.4	10.2	66.0
0.454 000	48.3	L1	10.1	8.5	56.8
2.248 000	42.2	N	9.8	13.8	56.0
10.192 000	42.5	N	9.9	17.5	60.0
12.052 000	41.5	N	10.0	18.5	60.0
19.156 000	36.9	N	10.2	23.1	60.0
19.672 000	38.1	N	10.2	21.9	60.0

Average final measurement results table

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.394 000	37.4	L1	10.1	10.6	48.0
0.458 000	35.1	N	10.1	11.6	46.7
3.468 000	34.2	N	9.8	11.8	46.0
3.832 000	34.7	L1	9.8	11.3	46.0
5.660 000	39.7	N	9.8	10.3	50.0
16.128 000	38.3	N	10.1	11.7	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)



- ADF copy printing (SD SMPS)

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

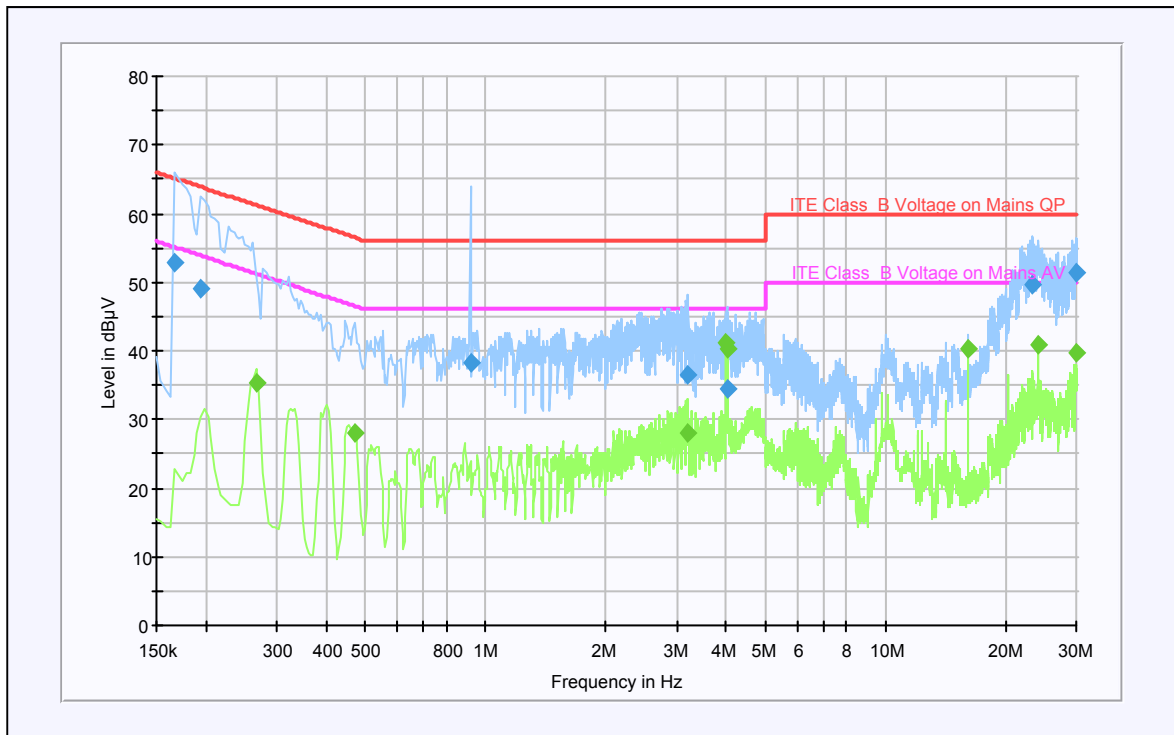
Subrange 1
 Frequency Range: 150 kHz – 30 MHz
 Receiver: ESIB
 Transducer: ENV216 / Receiver-2-Line-LISN ENV216

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 (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.266 000	35.2	N	10.0	16.0	51.2
0.470 000	28.1	N	10.1	18.4	46.5
3.208 000	28.1	N	9.8	17.9	46.0
4.000 000	41.1	N	9.8	4.9	46.0
4.032 000	40.4	L1	9.8	5.6	46.0
16.128 000	40.3	L1	10.1	9.7	50.0
24.192 000	40.8	L1	10.3	9.2	50.0
29.864 000	39.8	L1	10.4	10.2	50.0

Average final measurement results table

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.266 000	35.2	N	10.0	16.0	51.2
0.470 000	28.1	N	10.1	18.4	46.5
3.208 000	28.1	N	9.8	17.9	46.0
4.000 000	41.1	N	9.8	4.9	46.0
4.032 000	40.4	L1	9.8	5.6	46.0
16.128 000	40.3	L1	10.1	9.7	50.0
24.192 000	40.8	L1	10.3	9.2	50.0
29.864 000	39.8	L1	10.4	10.2	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)



■ **Operating Mode 3.**

- Scan to PC (SD SMPS)

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

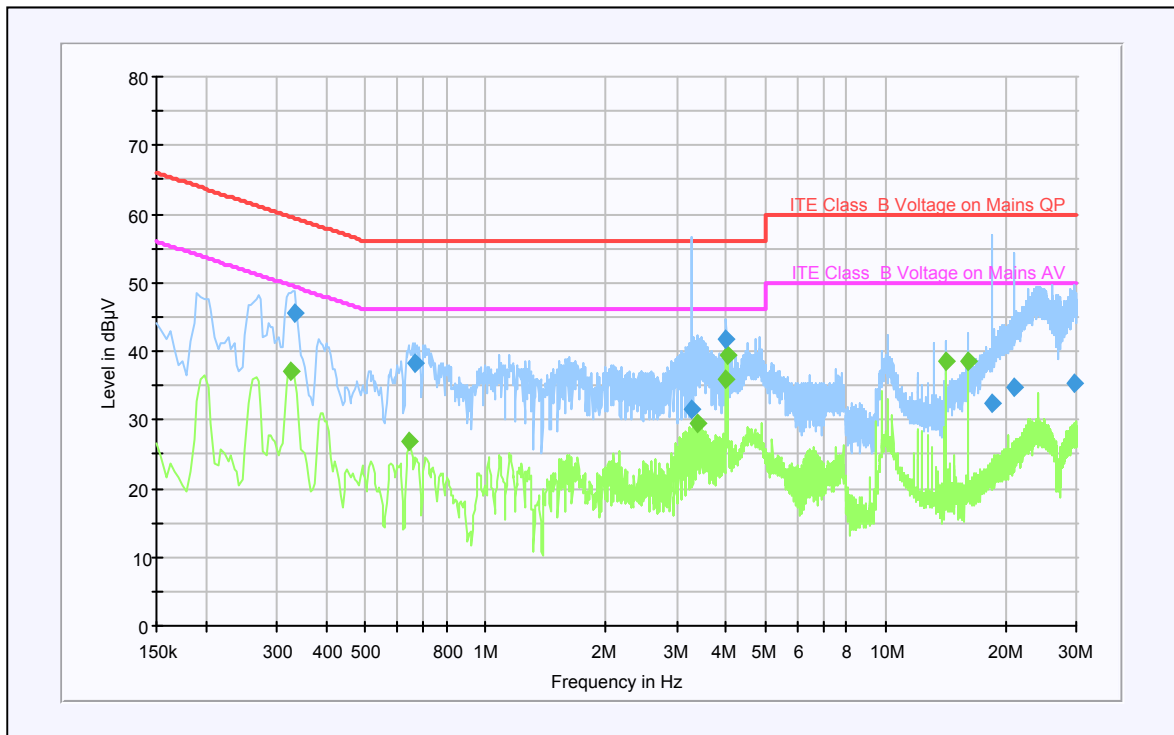
Subrange 1
 Frequency Range: 150 kHz – 30 MHz
 Receiver: ESIB
 Transducer: ENV216 / Receiver-2-Line-LISN ENV216

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 (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.334 000	45.6	L1	10.1	13.8	59.4
0.662 000	38.4	L1	10.1	17.6	56.0
3.256 000	31.6	N	9.8	24.4	56.0
4.000 000	41.7	L1	9.8	14.3	56.0
18.540 000	32.4	L1	10.1	27.6	60.0
21.076 000	34.8	L1	10.2	25.2	60.0
29.792 000	35.2	L1	10.4	24.8	60.0

Average final measurement results table

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.326 000	37.1	L1	10.1	12.5	49.6
0.642 000	27.0	N	10.1	19.0	46.0
3.400 000	29.5	N	9.8	16.5	46.0
4.000 000	35.9	N	9.8	10.1	46.0
4.032 000	39.5	N	9.8	6.5	46.0
14.128 000	38.7	L1	10.0	11.3	50.0
16.128 000	38.4	L1	10.1	11.6	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)

■ **Operating Mode 4.**

- FAX TX (Dong Yang SMPS)

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

Subrange 1

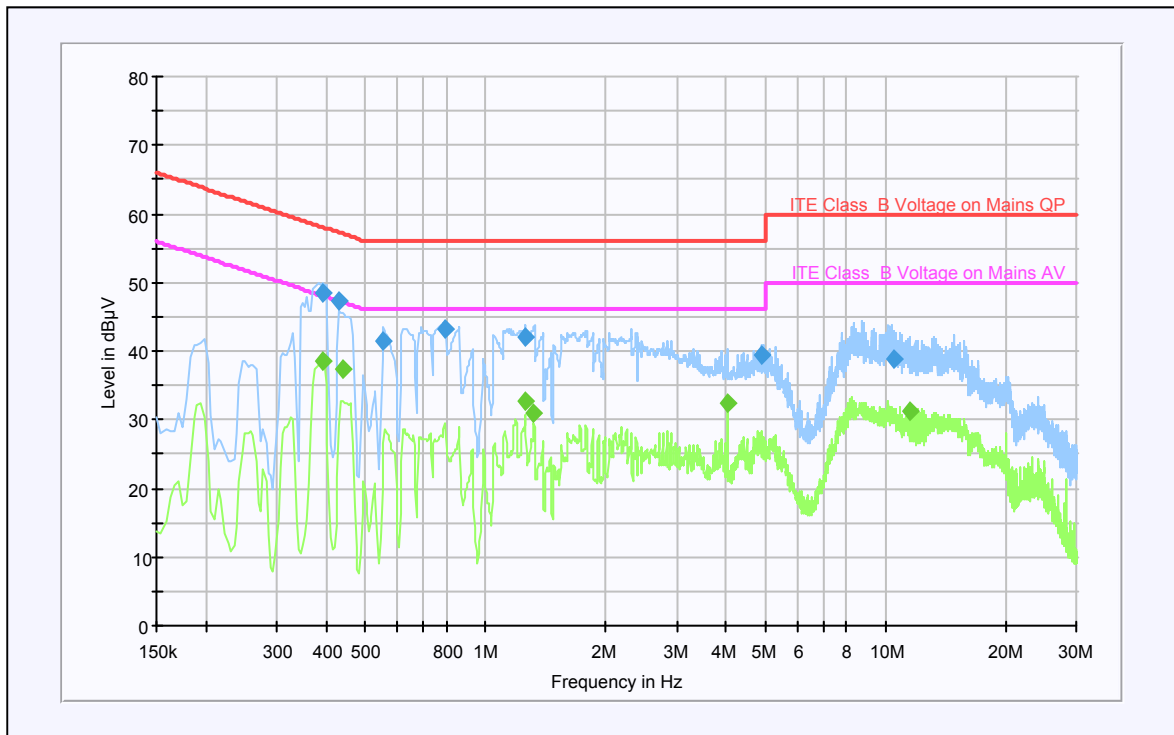
Frequency Range: 150 kHz – 30 MHz
 Receiver: ESIB
 Transducer: ENV216 / Receiver-2-Line-LISN ENV216

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 (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.390 000	48.5	L1	10.1	9.6	58.1
0.430 000	47.3	N	10.1	10.0	57.3
0.554 000	41.6	L1	10.1	14.4	56.0
0.794 000	43.1	N	10.0	12.9	56.0
1.256 000	41.9	N	9.9	14.1	56.0
4.896 000	39.4	N	9.8	16.6	56.0
10.460 000	38.9	N	9.9	21.1	60.0

Average final measurement results table

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.390 000	38.4	N	10.1	9.7	48.1
0.438 000	37.4	N	10.1	9.7	47.1
1.256 000	32.7	N	9.9	13.3	46.0
1.320 000	31.0	L1	9.9	15.0	46.0
4.032 000	32.4	L1	9.8	13.6	46.0
11.512 000	31.3	N	10.0	18.7	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)

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 μ 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 5 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(μ V/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 an average detector.

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

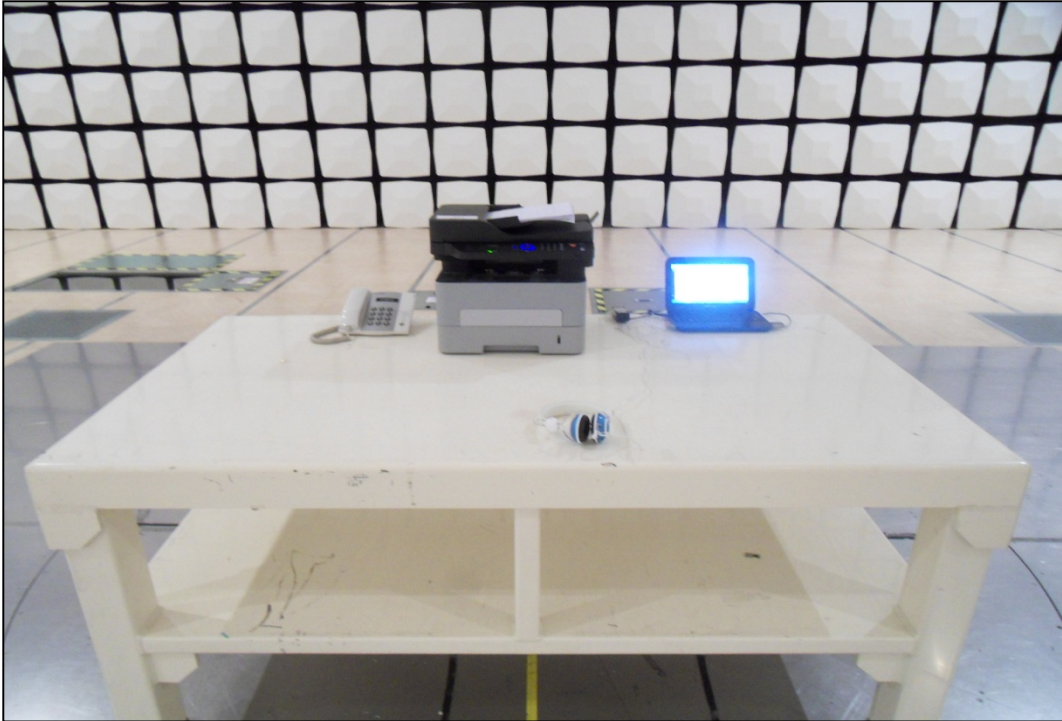
5.2.1 Test instrumentation

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Bilog Antenna	Schaffner	CBL6112D	22248	2012-02-16	24
Bilog Antenna	Schaffner	CBL6112D	22604	2012-04-19	24
Test receiver	R&S	ESCI	100368	2012-07-23	12
Test Receiver	R&S	ESCI	100136	2012-05-09	12
Horn Antenna	R&S	HF907	100165	2011-06-09	24
Test receiver	R&S	ESIB-26	100287	2012-04-30	12
Pre-Amplifier	R&S	SCU 18	10001	2012-05-11	12
Amplifier	Sonoma	310N	251673	2011-12-19	12
Amplifier	Sonoma	310N	251675	2012-01-31	12
RF Selector	TOYO	NS4900	-	-	-
Ant. Mast	inn-co	MA4000	-	-	-
Ant. Mast	inn-co	MA4000	-	-	-
Ant. Mast	inn-co	MA2000	-	-	-
Mast Controller	inn-co	CO2000	CO2000/544/2 3341109/L	-	-
Test Software	TOYO	EP5/RE	Ver 5.3.7	-	-

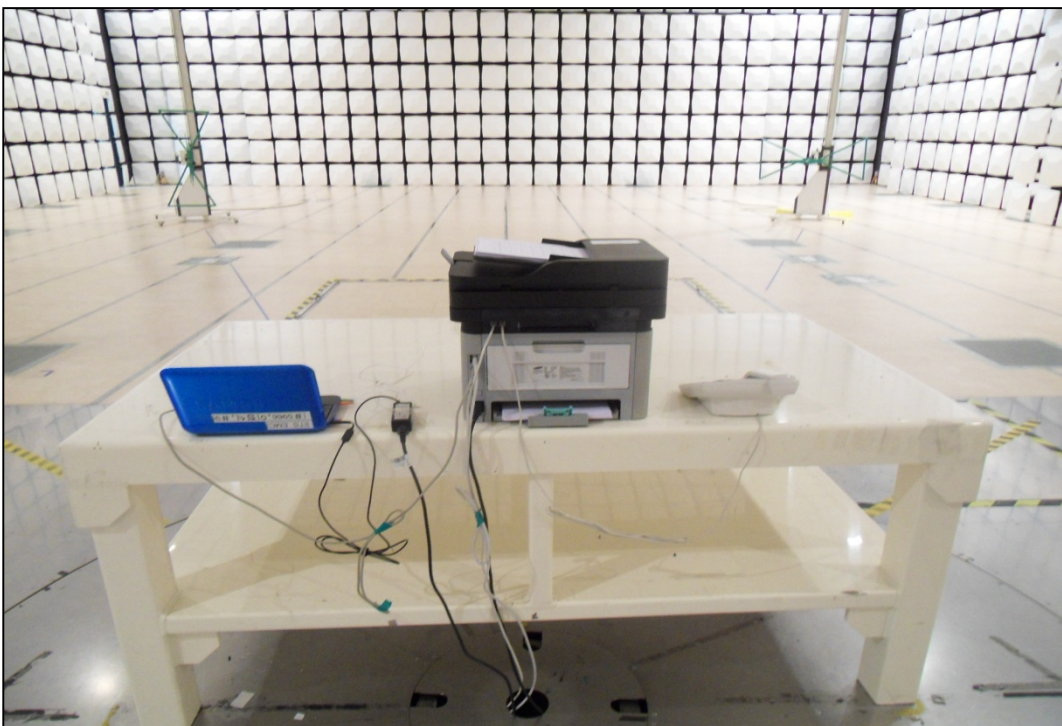
5.2.2 Temperature and humidity condition

Test date	December 17, 2012 ~ December 18, 2012	Test engineer	Sang Kyu Seo		
Climate condition	Ambient temperature	24.5 °C	Relative humidity	32.0 %	
	Atmospheric pressure	100.6 kPa	-		
Test place	10 m Semi-Anechoic Chamber				

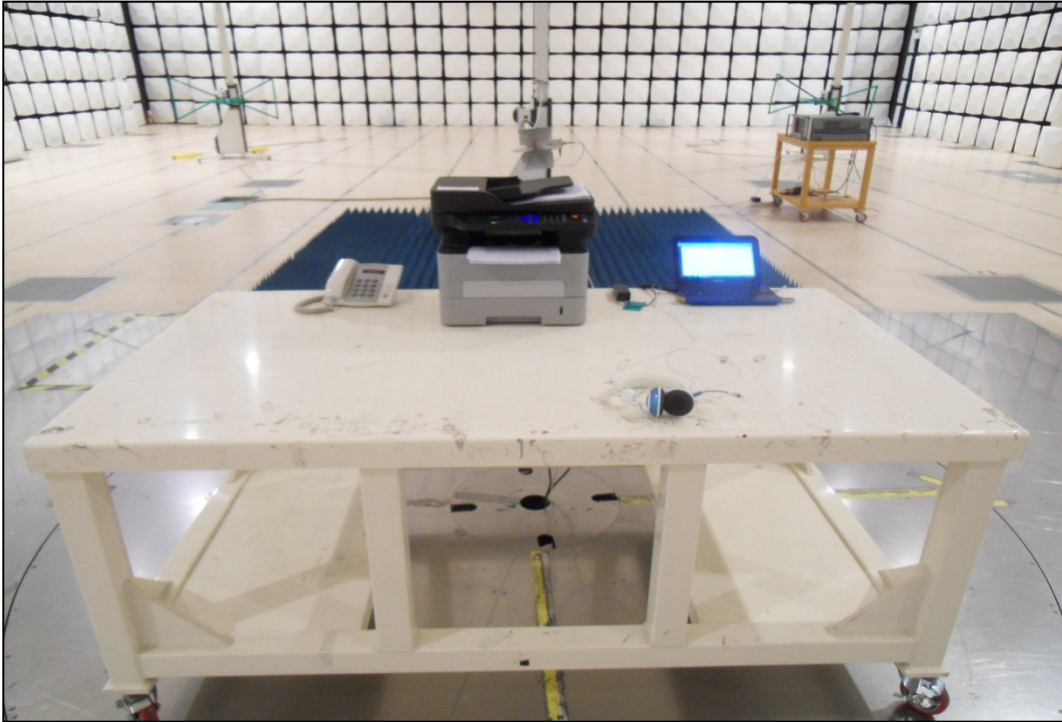
5.2.3 Photograph of Test Setup



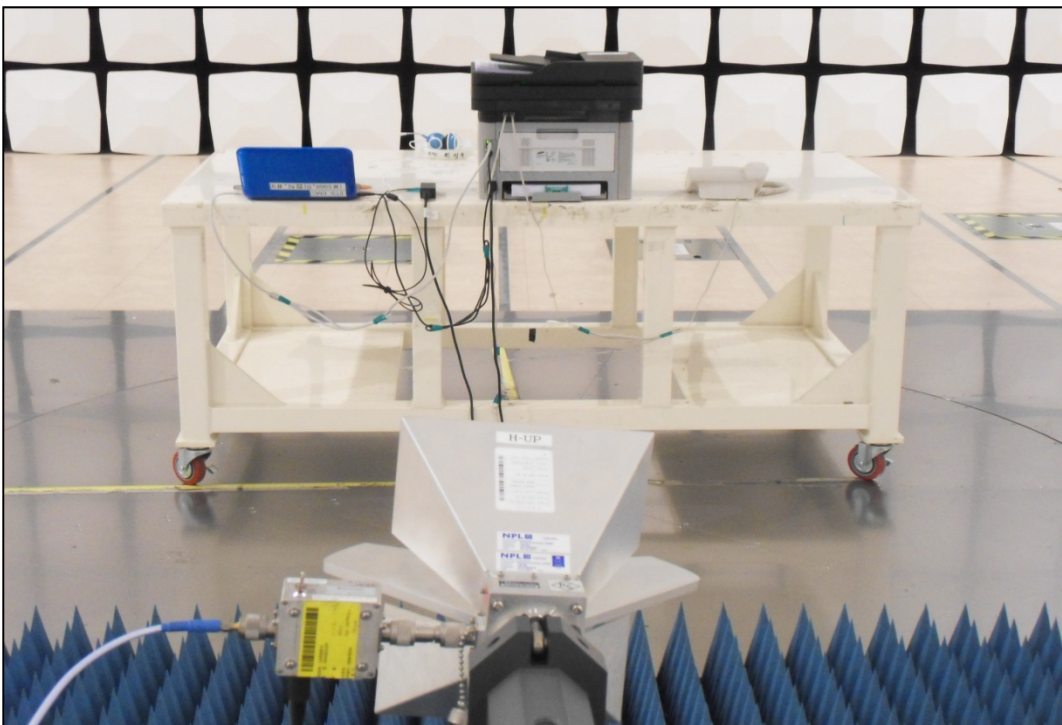
Front (Below 1GHz)



Rear (Below 1GHz)



Front (above 1GHz)



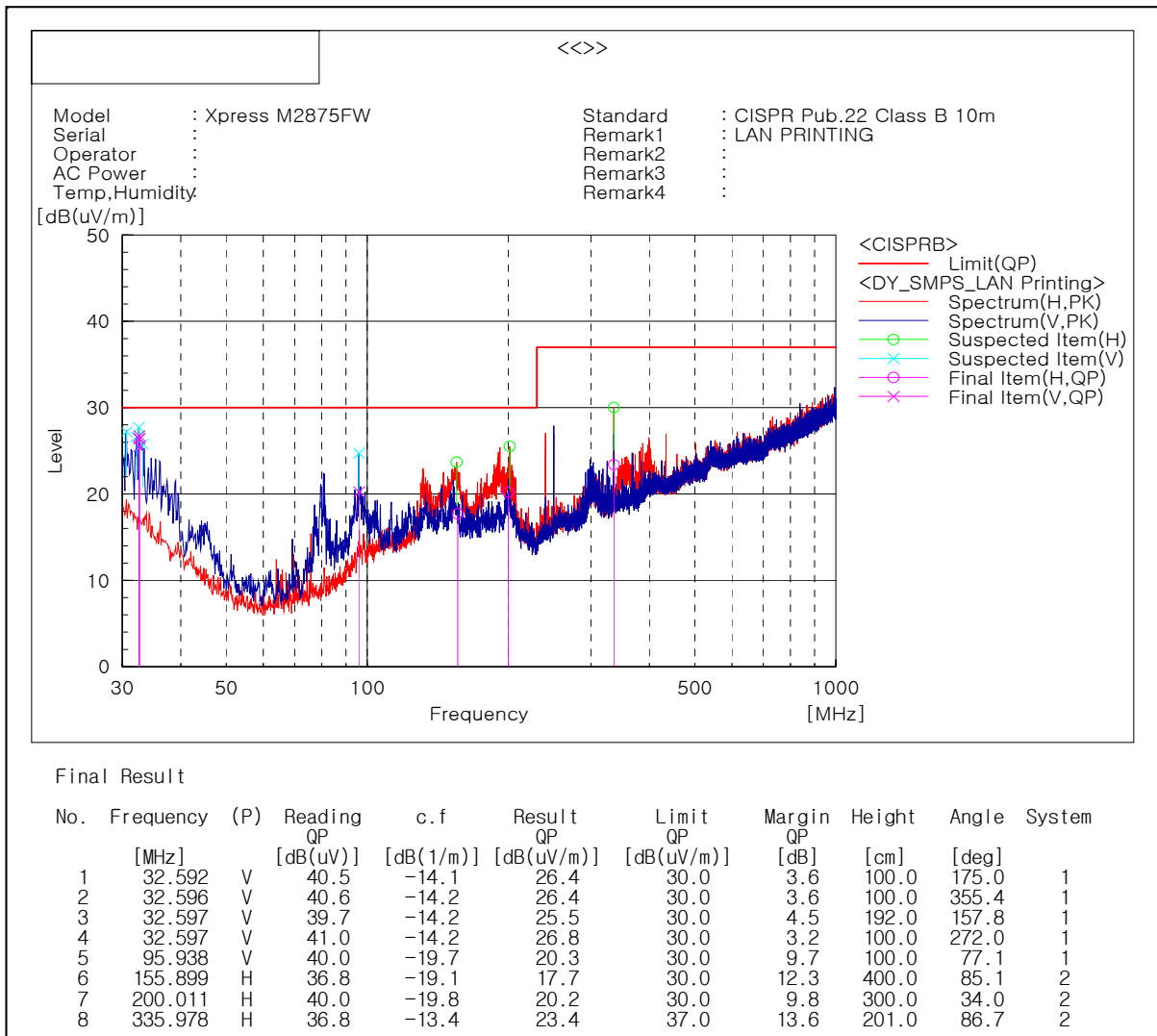
Rear (above 1GHz)

5.2.4 Test results

5.2.4.1 30 MHz to 1GHz test results

- Operating Mode 1.
- Network Printing (Dong Yang SMPS)

Test Graph and Results



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)

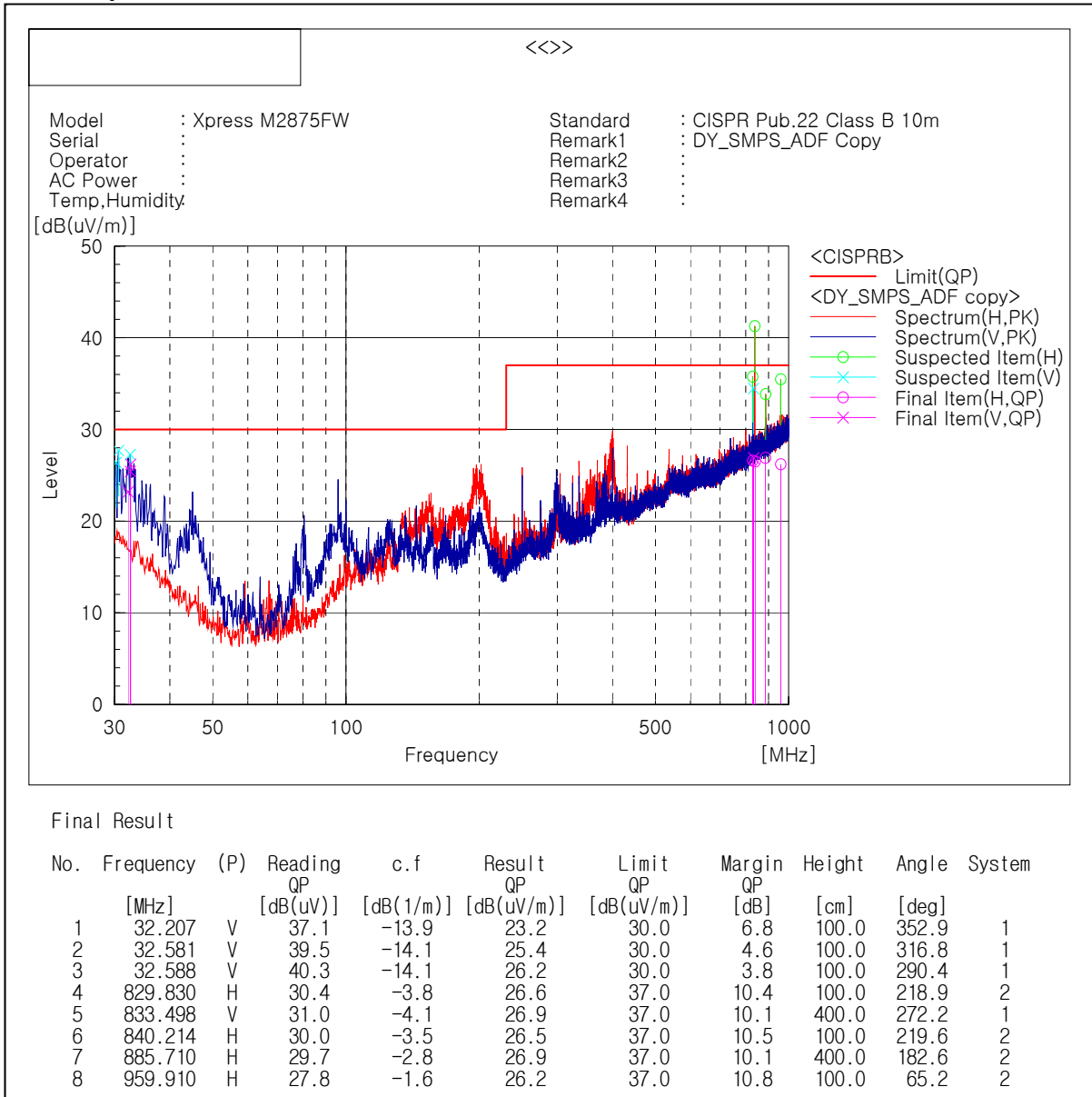
Margin QP (Quasi-Peak) = Limit - Level QP



■ Operating Mode 2.

- ADF copy printing (Dong Yang SMPS)

Test Graph and Results



Note) Receiving antenna polarization : Horizontal and/or Vertical

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

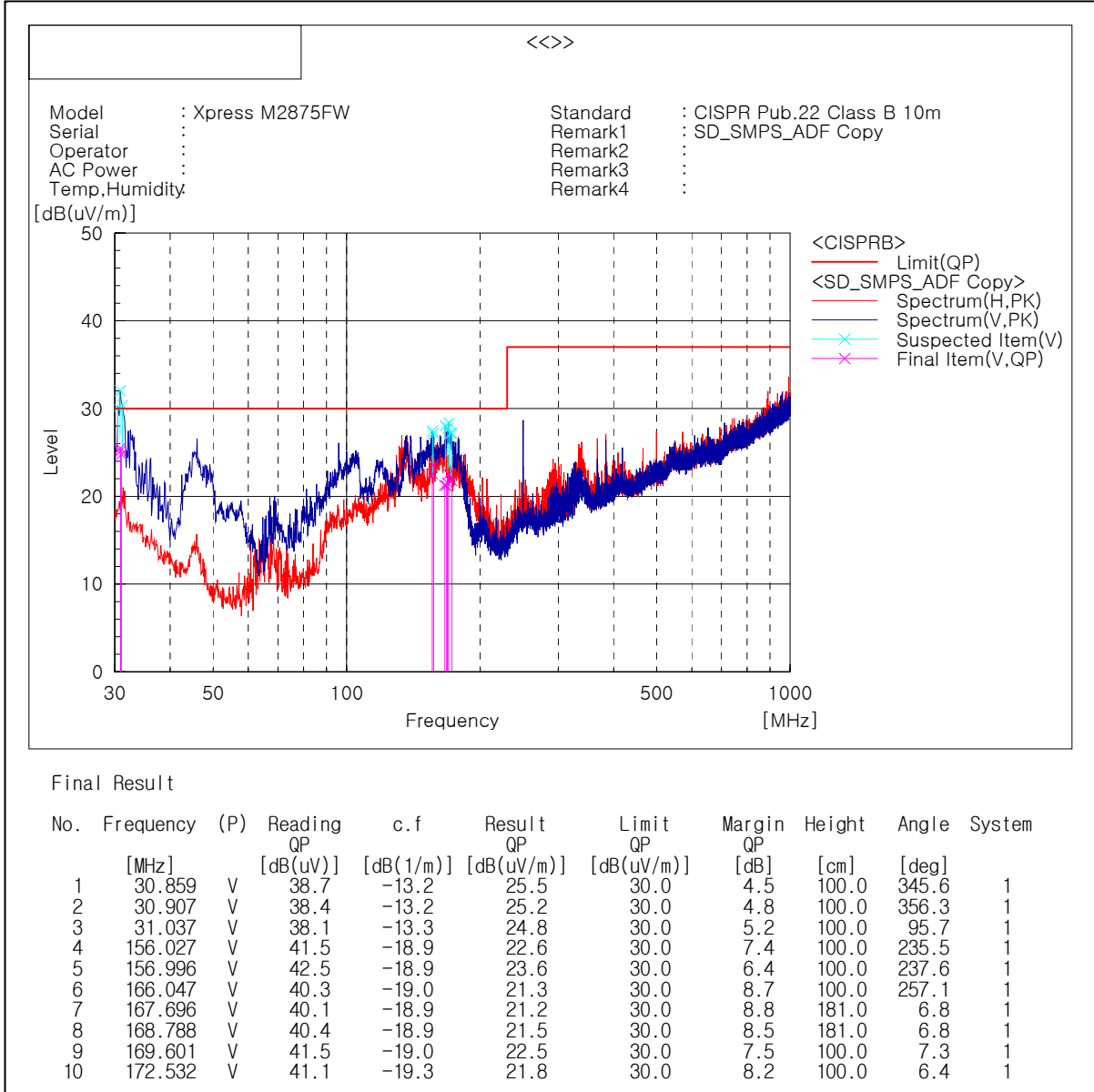
Level QP (Quasi-Peak) = Reading QP + Factor (Antenna Factor + Cable Loss - Amp. Gain)

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



- ADF copy printing (SD SMPS)

Test Graph and Results



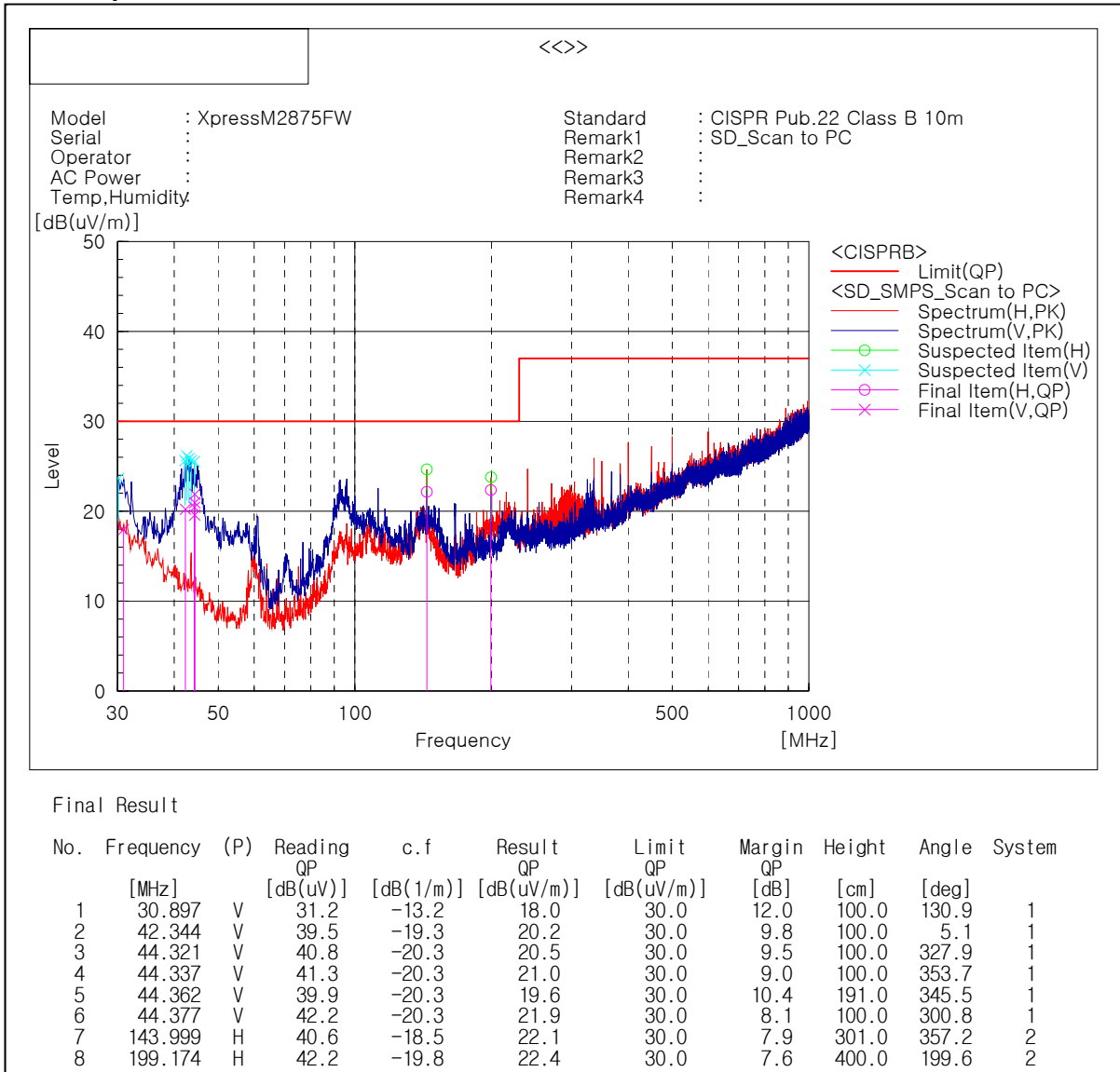
Note) Receiving antenna polarization : Horizontal and/or Vertical
 Test Distance : 10 m, Antenna Height : 1 m to 4 m
 Level QP (Quasi-Peak) = Reading QP + Factor (Antenna Factor + Cable Loss - Amp. Gain)
 Margin QP (Quasi-Peak) = Limit - Level QP



■ Operating Mode 3.

- Scan to PC (SD SMPS)

Test Graph and Results



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)

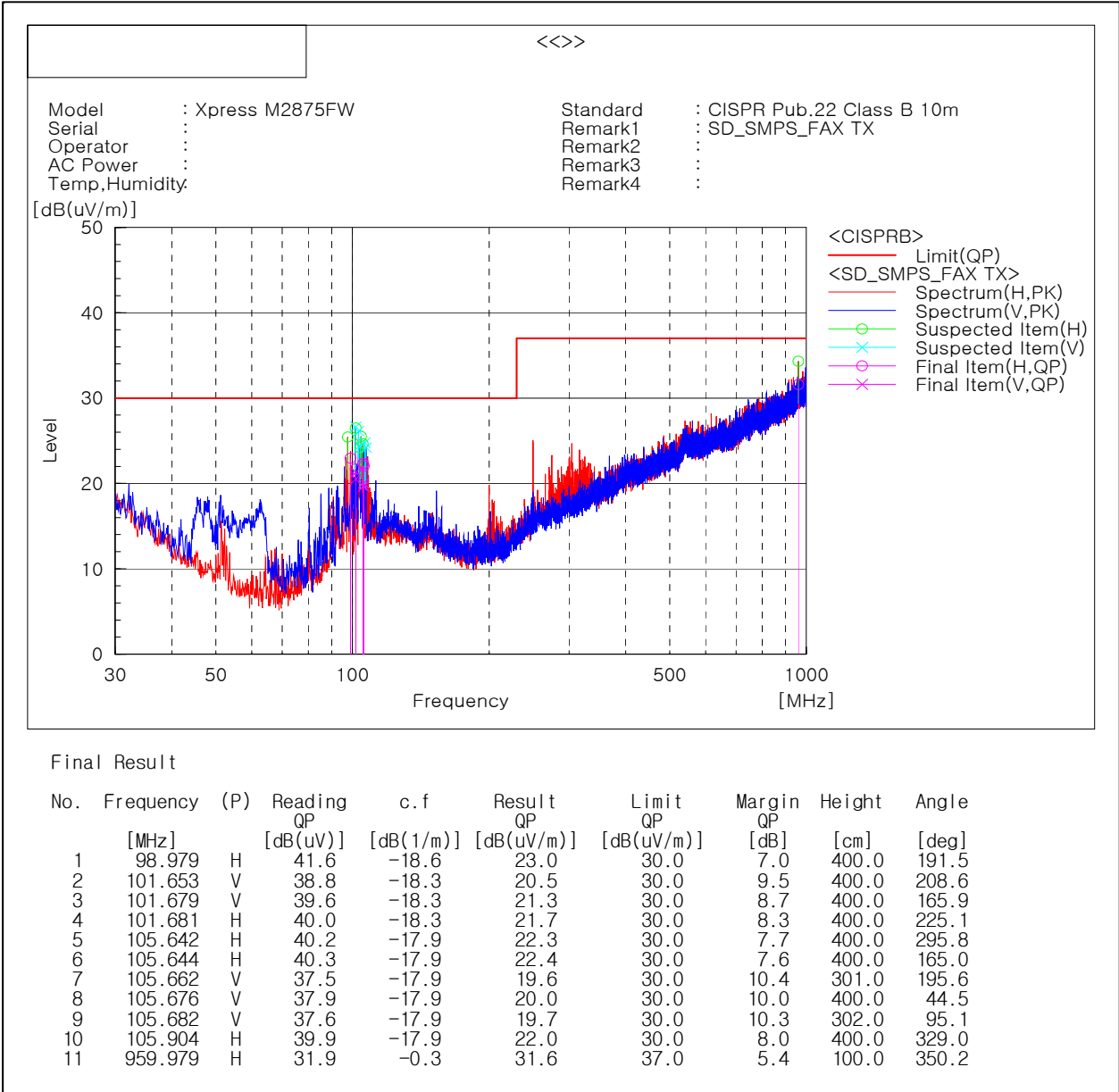
Margin QP (Quasi-Peak) = Limit - Level QP



■ Operating Mode 4.

- FAX TX (Dong Yang SMPS)

Test Graph and Results



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)

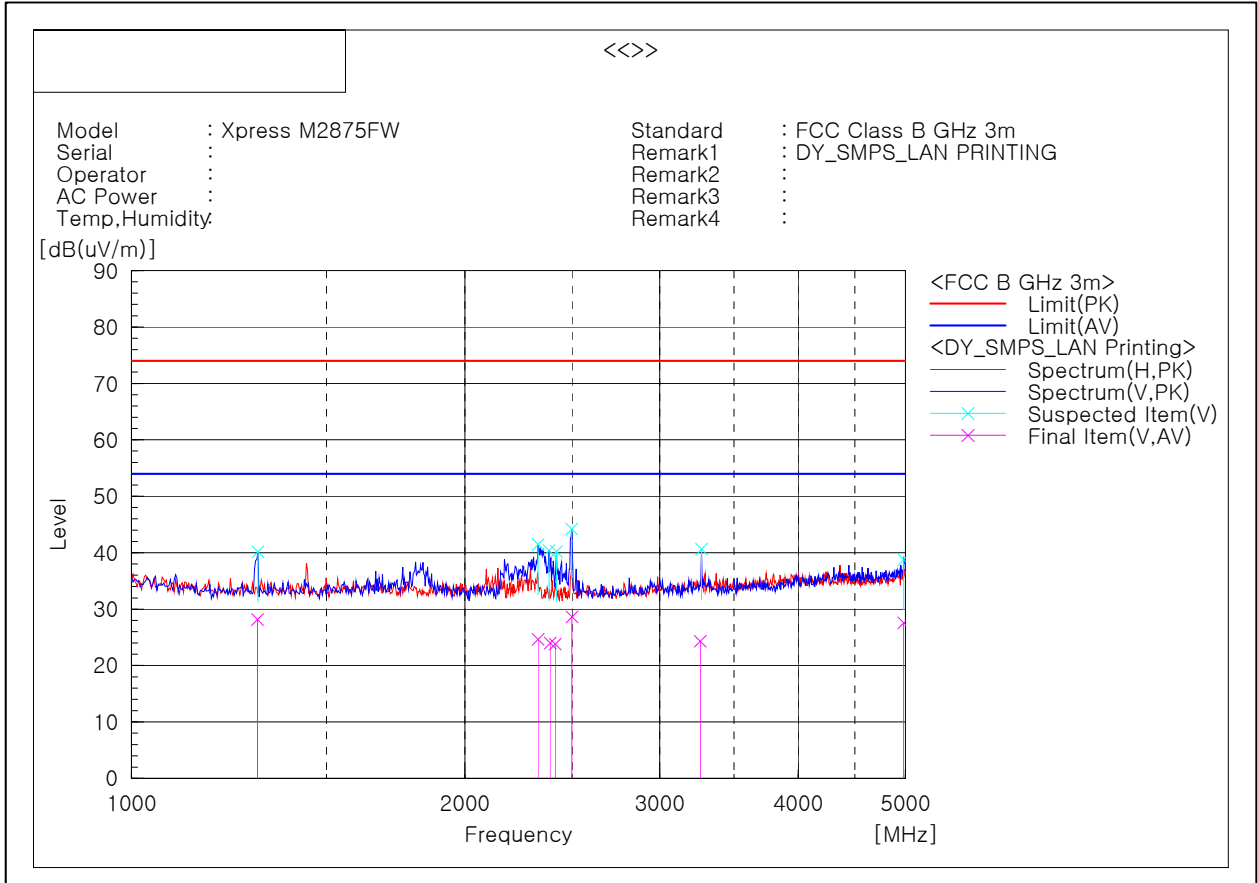
Margin QP (Quasi-Peak) = Limit - Level QP

5.2.4.2 1 GHz to 5 GHz test results

■ Operating Mode 1.

- Network Printing (Dong Yang SMPS)

Test 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]
1300.601	V	52.4	-12.2	40.2	74	33.8	110	2.5
2328.657	V	49.4	-7.9	41.5	74	32.5	110	24.4
2382.766	V	48.3	-7.9	40.4	74	33.6	110	2.5
2418.838	V	48.0	-7.8	40.2	74	33.8	110	295.2
2496.994	V	51.8	-7.6	44.2	74	29.8	110	328.6
3271.543	V	45.6	-4.9	40.7	74	33.3	105	291.6
4979.960	V	39.1	-0.3	38.8	74	35.2	105	189.9

Average Measurement

Frequency [MHz]	POL	Reading AV [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Limit [dB(uV/m)]	MarginAV [dB]	Height [cm]	Angle [deg]
1298.903	V	40.4	-12.2	28.2	54	25.8	112	358.6
2328.161	V	32.6	-7.9	24.7	54	29.3	109	23.6
2388.402	V	31.9	-7.9	24.0	54	30.0	112	358.6
2413.022	V	31.7	-7.9	23.8	54	30.2	108	293.6
2498.602	V	36.3	-7.6	28.7	54	25.3	109	328.6
3261.949	V	29.2	-4.9	24.3	54	29.7	103	291.1
4980.186	V	27.8	-0.2	27.6	54	26.4	107	186.1

Note) 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)

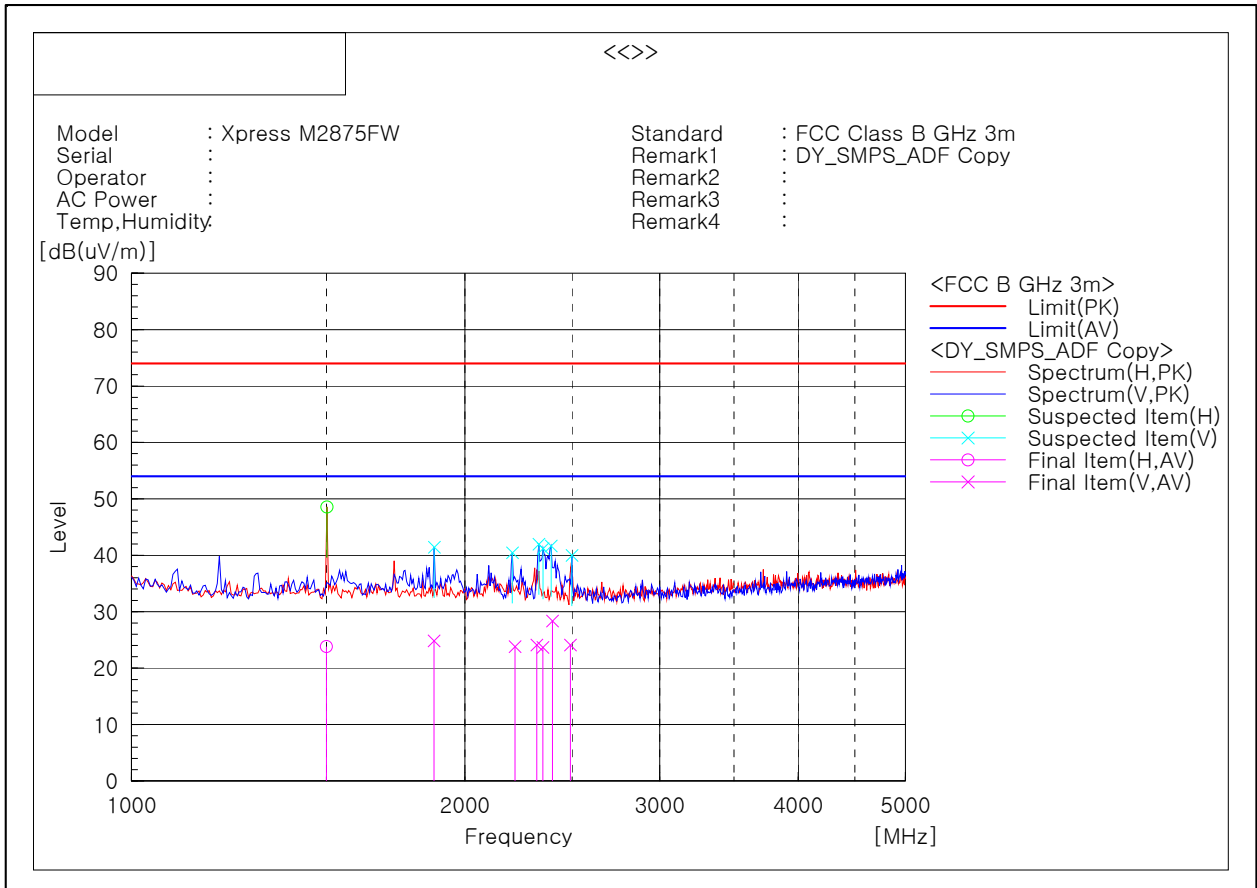
Margin AV (Average) = Limit – Level AV (Average)



■ Operating Mode 2.

- ADF copy printing (Dong Yang SMPS)

Test 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]
1501.002	H	59.5	-11.0	48.5	74	25.5	111	327.5
1876.754	V	50.5	-9.1	41.4	74	32.6	105	182.6
2207.415	V	48.5	-8.0	40.5	74	33.5	105	317.7
2332.665	V	49.9	-7.9	42.0	74	32.0	105	25
2352.706	V	49.1	-7.9	41.2	74	32.8	105	149.2
2392.786	V	49.5	-7.9	41.6	74	32.4	105	149.2
2497.996	V	47.6	-7.6	40.0	74	34.0	105	216.5

Average Measurement

Frequency [MHz]	POL	Reading AV [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Limit [dB(uV/m)]	MarginAV [dB]	Height [cm]	Angle [deg]
1500.001	H	34.8	-11.0	23.8	54	30.2	114	60.9
1875.927	V	33.9	-9.1	24.8	54	29.2	105	181.6
2219.564	V	31.8	-8.0	23.8	54	30.2	105	317.1
2321.969	V	32.0	-7.9	24.1	54	29.9	105	24.6
2352.030	V	31.6	-7.9	23.7	54	30.3	105	150.2
2399.976	V	36.3	-7.9	28.4	54	25.6	105	150.2
2491.007	V	31.8	-7.7	24.1	54	29.9	105	220.2

Note) 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)

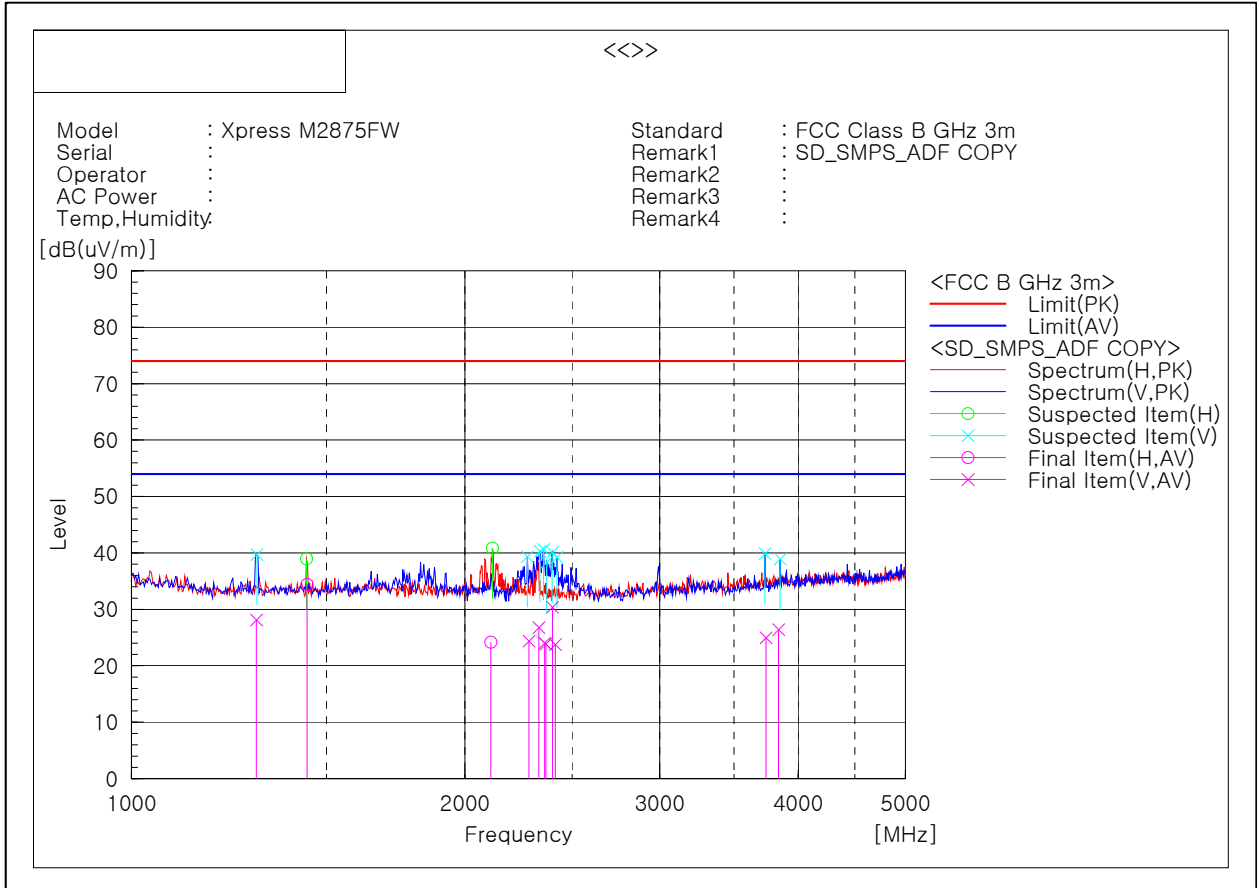
Margin PK (Peak) = Limit – Level PK (Peak)

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



- ADF copy printing (SD SMPS)

Test 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]
1297.595	V	51.9	-12.2	39.7	74	34.3	108	204.3
1438.878	H	50.5	-11.5	39.0	74	35.0	108	134.3
2118.237	H	49.0	-8.2	40.8	74	33.2	108	350.4
2277.555	V	47.4	-8.0	39.4	74	34.6	108	204.3
2337.675	V	48.2	-7.9	40.3	74	33.7	108	204.3
2355.712	V	48.6	-7.9	40.7	74	33.3	108	170.4
2370.742	V	46.2	-7.9	38.3	74	35.7	108	204.3
2397.796	V	48	-7.9	40.1	74	33.9	108	339.5
2421.844	V	47	-7.8	39.2	74	34.8	108	339.5

Average Measurement

Frequency [MHz]	POL	Reading AV [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Limit [dB(uV/m)]	MarginAV [dB]	Height [cm]	Angle [deg]
1296.318	V	40.3	-12.2	28.1	54	25.9	108	205.7
1439.975	H	45.9	-11.5	34.4	54	19.6	108	130.5
2111.008	H	32.4	-8.2	24.2	54	29.8	108	353
2284.995	V	32.4	-8.0	24.4	54	29.6	108	200.5
2332.640	V	34.7	-7.9	26.8	54	27.2	108	205.5
2360.326	V	32.0	-7.9	24.1	54	29.9	108	170.5
2366.789	V	31.8	-7.9	23.9	54	30.1	108	200.5
2399.976	V	38.3	-7.9	30.4	54	23.6	108	340.5
2414.525	V	31.6	-7.8	23.8	54	30.2	108	340.5

Note) 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)

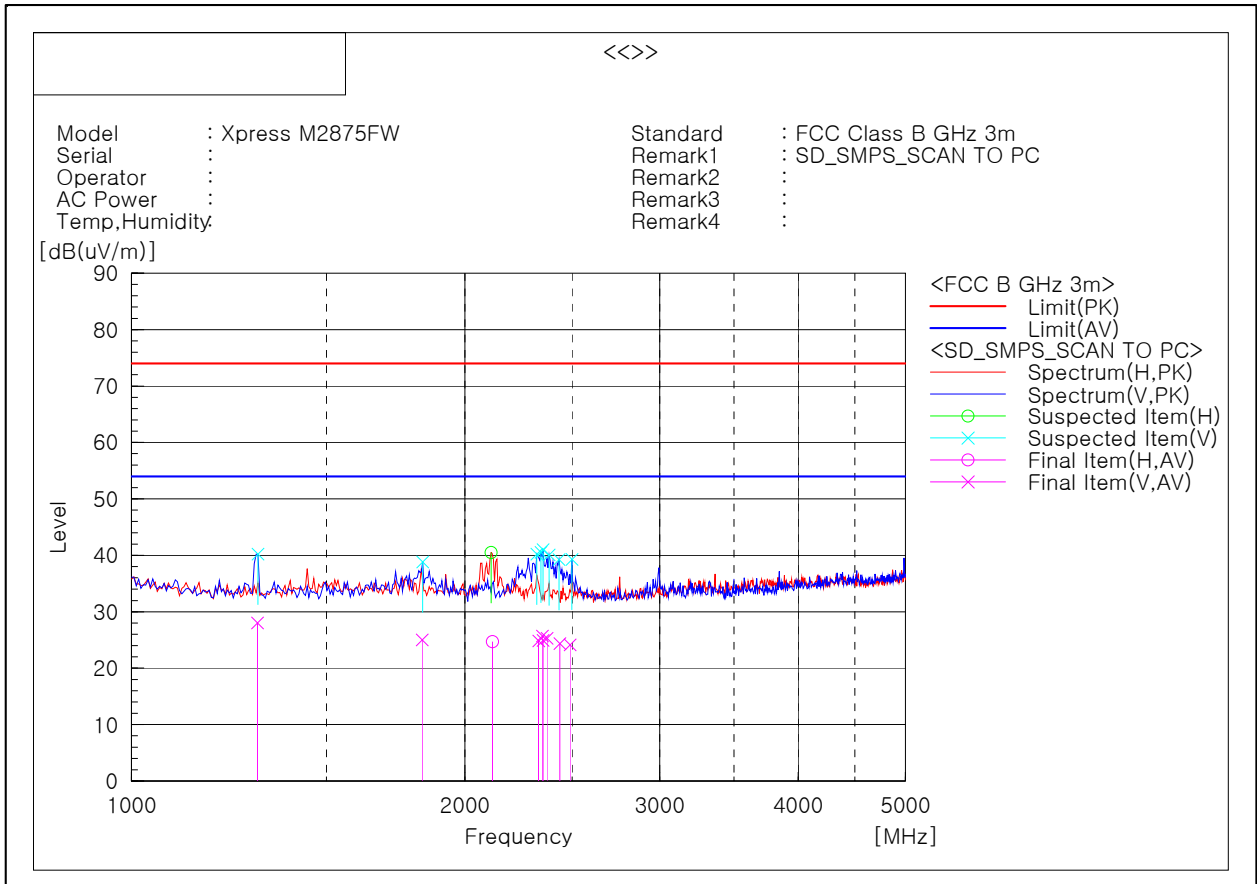
Margin AV (Average) = Limit – Level AV (Average)



■ Operating Mode 3.

- Scan to PC (SD SMPS)

Test Results



Peak Measurement

Frequency [MHz]	POL	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level PK [dB(uV/m)]	Lin [dB(uV/m)]	j in PK [dB]	Height [cm]	Angle [deg]
1300.601	V	52.4	-12.2	40.2	74	13.8	107	270.9
1831.663	V	48.2	-9.4	38.8	74	15.2	107	0.2
2112.225	H	48.7	-8.2	40.5	74	13.5	112	90.7
2322.645	V	48.1	-7.9	40.2	74	13.8	107	101.9
2342.686	V	48.5	-7.9	40.6	74	13.4	107	203.1
2352.706	V	48.9	-7.9	41.0	74	13.0	107	203.1
2382.766	V	48.0	-7.9	40.1	74	13.9	107	0.2

Average Measurement

Frequency [MHz]	POL	Reading AV [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Limit [dB(uV/m)]	MarginAV [dB]	Height [cm]	Angle [deg]
1299.073	V	40.2	-12.2	28.0	54	26.0	107	270.2
1829.985	V	34.4	-9.4	25.0	54	29.0	107	0.2
2117.511	H	32.9	-8.2	24.7	54	29.3	114	90.2
2331.037	V	32.7	-7.9	24.8	54	29.2	105	105.2
2348.974	V	33.6	-7.9	25.7	54	28.3	110	205.2
2353.483	V	32.8	-7.9	24.9	54	29.1	103	200.2
2371.769	V	33.2	-7.9	25.3	54	28.7	111	0.2
2436.298	V	32.2	-7.8	24.4	54	29.6	105	205.2
2488.602	V	31.8	-7.7	24.1	54	29.9	108	340.2

Note) 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)

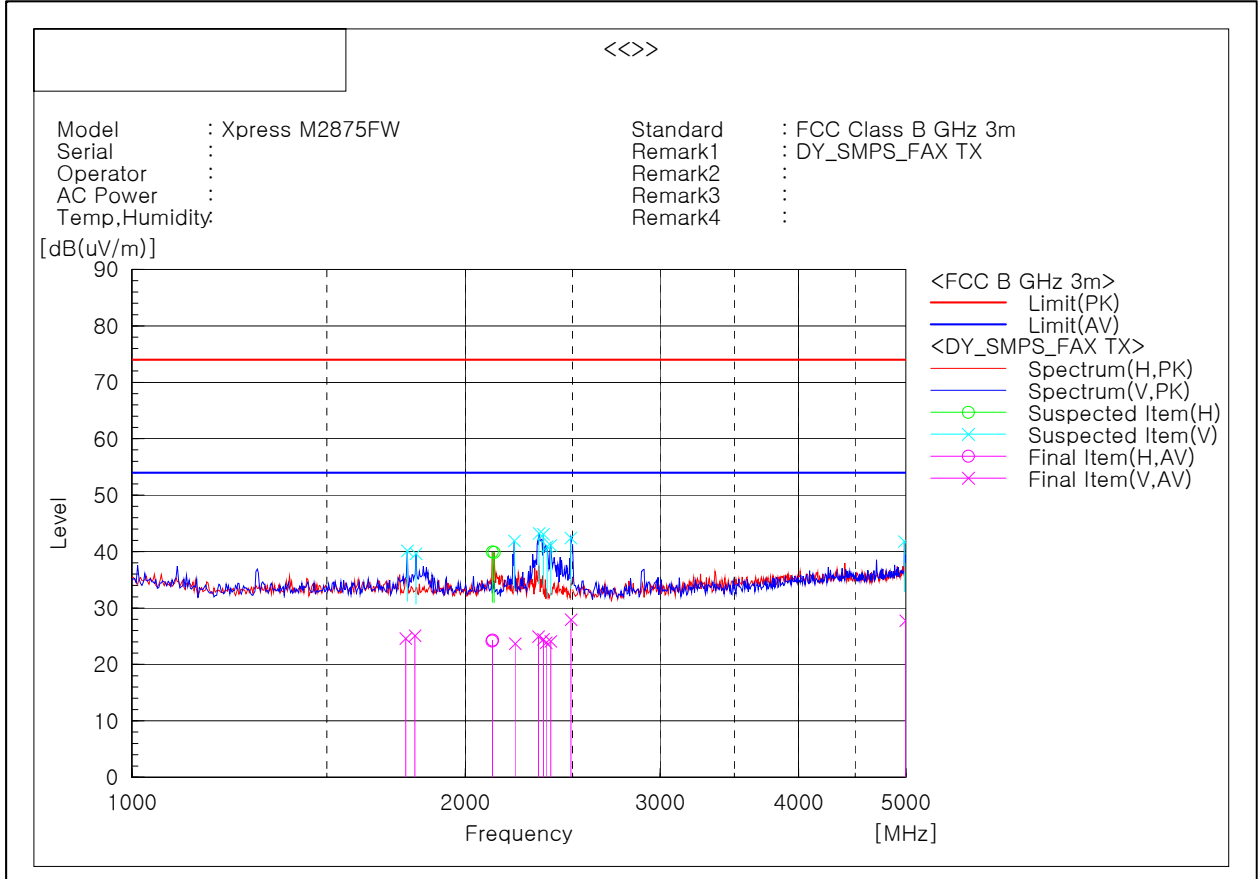
Margin AV (Average) = Limit – Level AV (Average)



■ Operating Mode 4.

- FAX TX (Dong Yang SMPS)

Test 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]
1772.545	V	49.8	-9.7	40.1	74	33.9	108	68.1
1805.611	V	49.1	-9.5	39.6	74	34.4	108	168.8
2115.231	H	48.1	-8.2	39.9	74	34.1	108	70
2124.249	H	48.1	-8.2	39.9	74	34.1	108	137.9
2214.429	V	49.9	-8.0	41.9	74	32.1	108	303.4
2331.663	V	51.2	-7.9	43.3	74	30.7	108	168.8
2352.706	V	51.0	-7.9	43.1	74	30.9	108	168.8
2370.742	V	48.8	-7.9	40.9	74	33.1	108	34.2
2388.778	V	49.0	-7.9	41.1	74	32.9	108	337.9
2490.982	V	50.1	-7.7	42.4	74	31.6	108	303.4
4984.97	V	42.0	-0.2	41.8	74	32.2	108	328.1

Average Measurement

Frequency [MHz]	POL	Reading AV [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Limit [dB(uV/m)]	MarginAV [dB]	Height [cm]	Angle [deg]
1767.360	V	34.3	-9.7	24.6	54	29.4	108	68.7
1800.816	V	34.7	-9.6	25.1	54	28.9	108	165.1
2115.066	H	32.3	-8.2	24.1	54	29.9	108	69.9
2117.380	H	32.5	-8.2	24.3	54	29.7	108	139.9
2218.021	V	31.7	-8	23.7	54	30.3	108	304.3
2329.183	V	32.8	-7.9	24.9	54	29.1	108	169.3
2353.503	V	32.4	-7.9	24.5	54	29.5	108	169.3
2366.489	V	31.8	-7.9	23.9	54	30.1	108	34.3
2389.695	V	32.0	-7.9	24.1	54	29.9	108	340.9
2492.049	V	35.6	-7.7	27.9	54	26.1	108	304.3
4996.518	V	27.9	-0.1	27.8	54	26.2	108	329.3

Note) 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



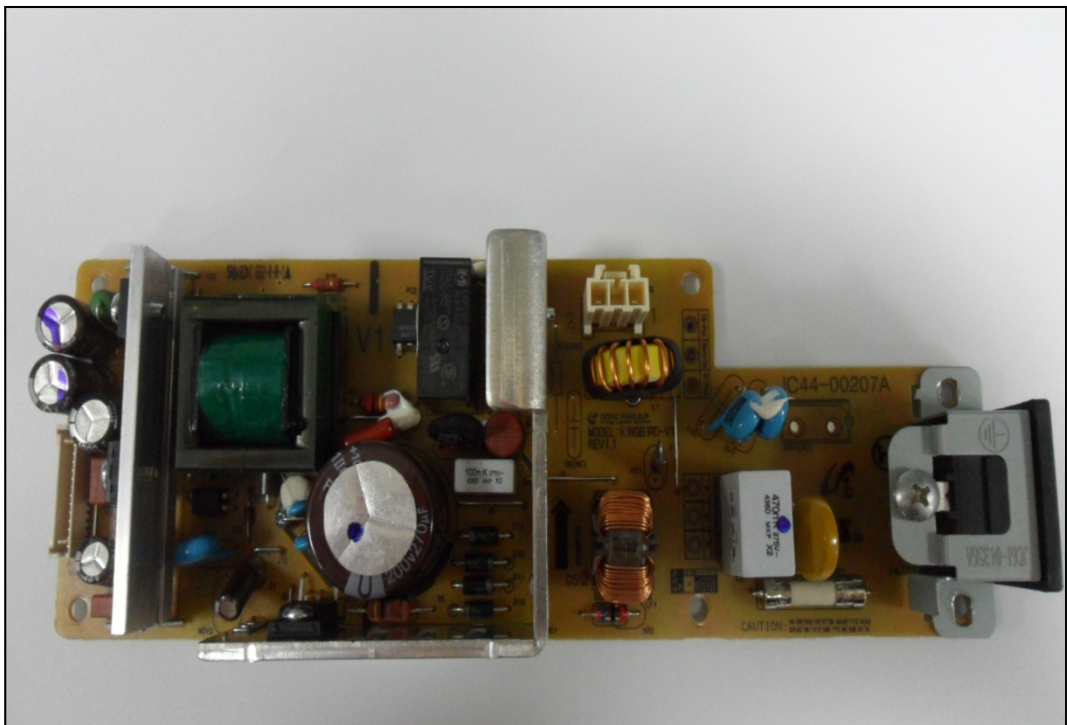
Front View



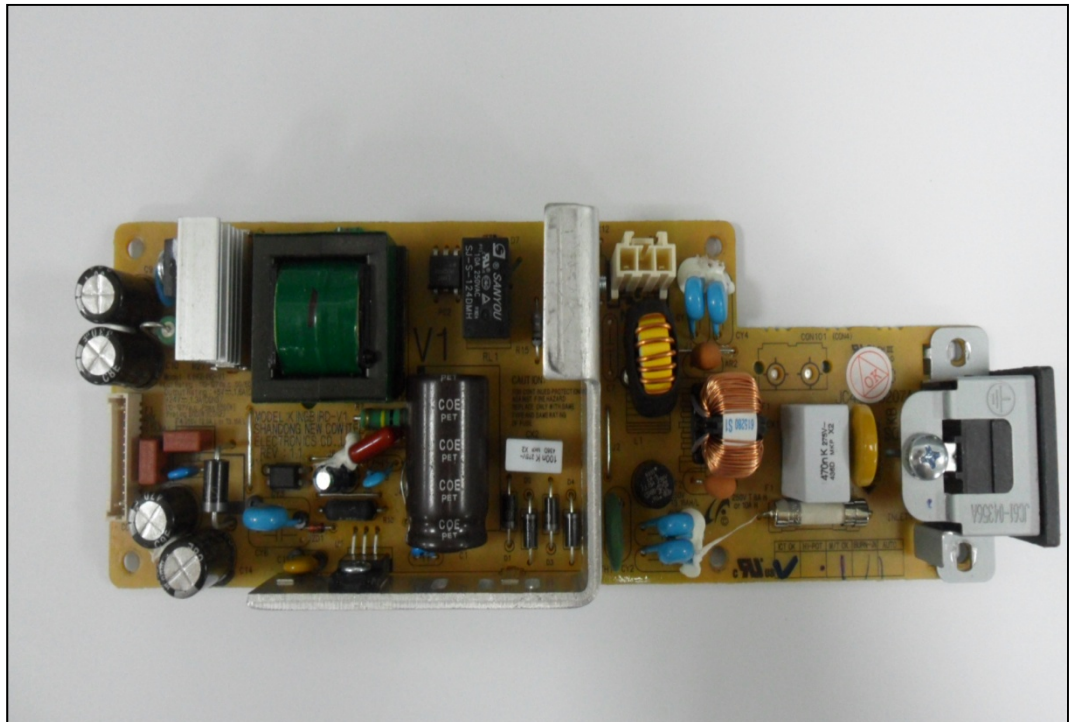
Rear View & Label location



Inside View(Right)



Inside View(Dong Yang SMPS)



Inside View(SD SMPS)



Label