EMC TEST REPORT

Samsung Electronics Co., Ltd. 416 Maetan 3-Dong, Yeongtong-Gu, Suwon-Si,Gyeonggi-Do, 443-742 Korea (Tel: 82 31 277 7752, Fax: 82 31 277 7753)	Project No. : LBE062421 Page (1)/(24)	KOREA LABORATORY ACCREDITATION SCHEME KOLAS TESTING NO. 124

1. Applicant

◦ Name of organization : Samsung Electronics Co., Ltd.

◦ Address : 416 Maetan 3-Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, 443-742 Korea

2. Purpose for the report : Approval for EMC

3. Kind of product : PLAIN PAPER FAX (Model name : AC205L/AC122L/DSm520pfl)

4. Date of test : 2006. 07. 25 ~ 2006. 07. 31

5. Applied standard : FCC Part 15:2003 Subpart B

6. Test result : **PASS**

The equipment under test has found to be compliant with the applied standards.

(Refer to the attached test result for more detail.)

7. FCC ID : A3LSCX4720F

Tested by	Reviewed by
Name : Tae Young, Jang	Name : No Cheon ParK

This report is the test result about the sphere accredited by KOLAS which signed the Mutual Recognition Arrangement of International Laboratory Accreditation Cooperation.

2006. 08. 07

Samsung Electronics Co., Ltd.
Chief of CS Management Center

TEST RESULT

Test Report No.	:	LBE062421
Applicant / Address	:	Samsung Electronics Co., Ltd. 416 Maetan 3-Dong, Yeongtong-Gu,Suwon-Si,Gyeonggi-Do 443-742 Korea
Manufacture / Address	:	SAMSUNG ELECTRONICS (SHANDONG) DIGITAL PRINTING CO.,LTD. #264209,Samsung Road,Weihi Hi-Tech IDZ Shandong Province CHINA
EUT	:	1. Product name : PLAIN PAPER FAX 2. Model name : AC205L/AC122L/DSm520pfl 3. Brand name : Samsung
Test Method	:	**ANSI C 63.4:2003**
Test Result	:	**PASS** The equipment under test has found to be compliant with the applied standards
Test Lab.	:	CS Management Center, Samsung Electronics Co., Ltd.
Tested by	:	Tae Young Jang
Reviewed by	:	No Cheon Park
Date of Issue	:	2006. 08. 07

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1. General information

1.1 Basic information related product

Applicant	Samsung Electronics Co., Ltd.
Model name	AC205L/AC122L/DSm520pfl
Applicant address	416 Maetan 3-Dong, Yeongtong-Gu,Suwon-Si,Gyeonggi-Do 443-742 Korea
Contact person	Sangsu, ROH
Kind of product	PLAIN PAPER FAX
Manufacturer	SAMSUNG ELECTRONICS (SHANDONG) DIGITAL PRINTING CO.,LTD #264209,Samsung Road,Weihi Hi-Tech IDZ Shandong Province CHINA
Rated power	AC 120 V, 60 Hz
New / Alternative / Permissive change information	Permissive change : Add to Model Name/ Memory

1.2 Detail Information related product

1.2.1 Specification

Item	Description
Automatic document feeder	Up to 50 sheets (20 lb, 75 g/m^2)
ADF document size	Width: 142 to 216 mm (5.6 to 8.5 inches) Length: 148 to 356 mm (5.8 to 14 inches)
Paper input capacity	Paper tray (standard Tray 1 and optional Tray 2): 250 sheets (weight: 75 g/m^2, 20 lb) Multipurpose tray: 50 sheets for plain paper (weight: 75 g/m^2, 20 lb), 5 sheets for card stock, labels, transparencies, and envelopes
Paper output capacity	Front output tray: 150 sheets (face down) Rear output slot: 1 sheet (face up)
Paper type	Paper tray: Plain paper (60 ~ 90 g/m^2, 16 ~ 24 lb) Multipurpose tray: Plain paper, Transparencies, Labels, Card, Post card, Envelopes (60 ~ 120 g/m^2, 16 ~ 32 lb)
Consumables	1-piece toner cartridge system
Power requirements	100 - 127 VAC, 50/60 Hz, 5.0 A 220 - 240 VAC, 50/60 Hz, 2.6 A
Power consumption	Sleep mode: 30 W Average: 400 W
Noise*	Standby mode: Less than 39 dBA Printing: Less than 54 dBA Copy: Less than 55 dBA
Warm-up time	Less than 42 seconds
Operating conditions	Temperature: 50 ºF to 89 ºF (10 ºC to 32 ºC) Humidity: 20 % to 80 % RH
LCD	16 characters x 2 lines
Toner cartridge life**	5,000 or 3,500 pages at ISO/IEC 19752 5% coverage (ships with 3,500 pages Start Toner Cartridge)
SET dimension (W x D x H)	450 x 435 x 457 mm
Weight	Net: 17 Kg (including consumables) Gross: 21 Kg (including consumables, accessories and package)
Package weight	Paper: 2.8 Kg Plastic: 0.7 Kg
Duty cycle (Monthly)	Up to 15,000 pages

1.3 Operating mode and condition

The system was configured for testing in typical fashion use. Cables were attached to each of the available I/O Ports. Where applicable, peripherals were attached to the I/O cables. The mode of operation utilized for testing was selected to best simulate typical EUT use.

- USB Printing mode

- Copy mode

- Test Voltage : 120 V, 60 Hz

1.4 Equipment modifications

No equipment modifications were required.

1.5 Test procedure

1.5.1 Conducted emission

EUT was placed on a platform nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The rear of tabletop was located 40 cm to the vertical conducting ground plane.
The rear of EUT, including peripherals was aligned and flush with rear of tabletop.
All other surfaces of tabletop was at least 80 cm from any other grounded conducting surface.
I/O cables and AC cables that were connected to the peripherals were bundled in center.
They were folded back and forth forming a bindle 30 cm to 40 cm long and were handed at a 40 cm height to the ground plane.
Each EUT current-carrying power lead, except the ground(safety) lead, were individually connected through a LISN to the input power source.
All unused 50 ohm connectors of the LISN were resistively terminated in 50 ohm when not connected to the measuring equipment.

Frequency Band [MHz]	Instrument	Detector	Resolution Bandwidth	Video Bandwidth
0.15 to 30	EMI Receiver	Quasi-Peak	9 kHz	-
		Average	9 kHz	-

1.5.2 Radiated emission

EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The rear of EUT, including peripherals was aligned and flush with rear of tabletop. The I/O cables that were connected to the peripherals were bundle in center.
They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged 40 cm height to the ground plane.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane and the trun table azimuth was varied to obtain the maximum signal strength

The system configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found.
The spectrum was scanned from 30 to 1 000 MHz using biconiLog antenna.

Also, the EMI Receiver was scanned from 1 000 to 2 000 MHz using linearly polarization Double ridge horn antennas were used. The explanation of measuring instrument setup when Respective function is used in any frequency band is as following;

Frequency Band [MHz]	Instrument	Detector	Resolution Bandwidth	Video Bandwidth
30 to 1 000	EMI Receiver	Quasi-Peak	120 kHz	-
Above 1 000	EMI Receiver	Peak	1 MHz	1 MHz

1.6 Test configuration

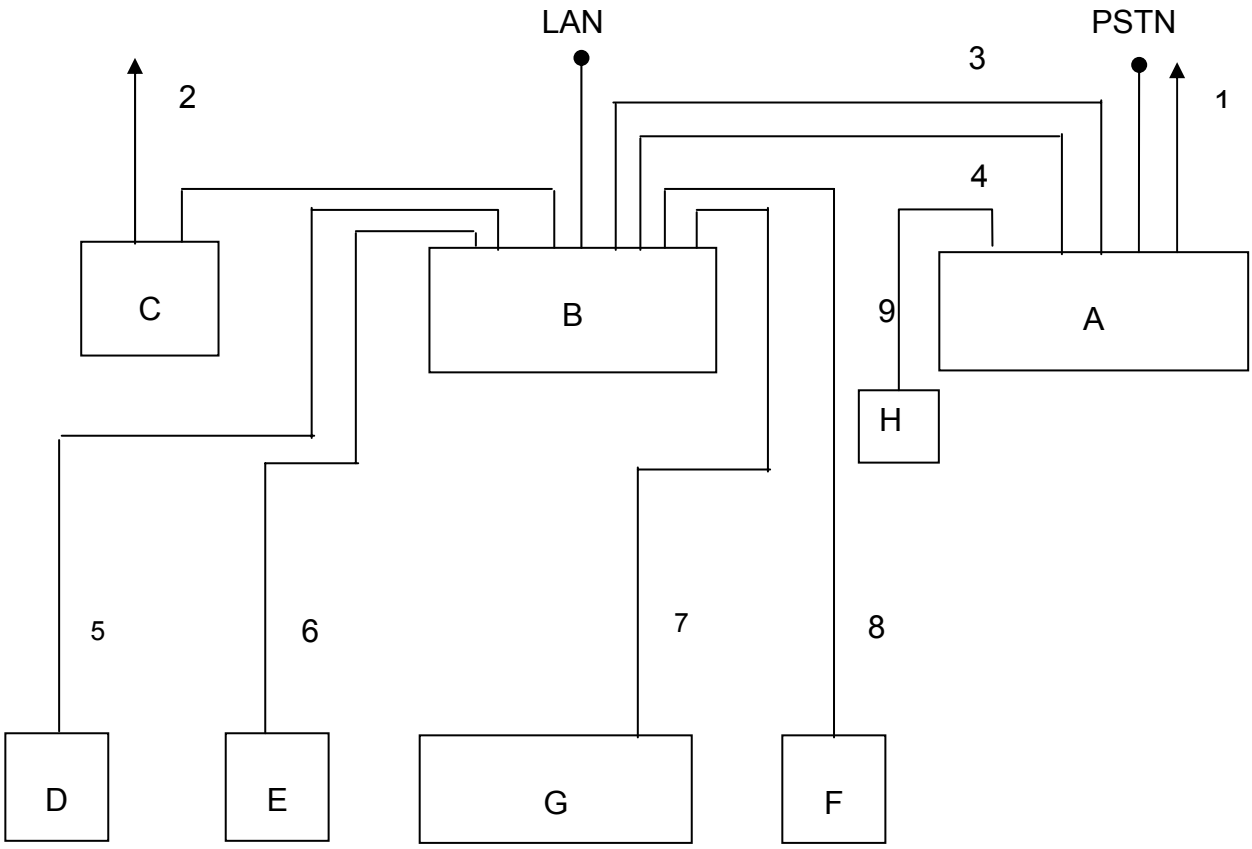
1.6.1 Used EUT and peripherals

Seq	Device	Model Name	Serial #	Maker	Note
A	Printer	AC205/AC122/DSm520pfl	K9969000482	Samsung	EUT
B	Notebook PC	PP03L	TW-049102-70161-23K-JOV7	Dell	DOC
C	AC Adaptor	ADP-90FB	-	-	-
D	Serial Mouse	37964	0988578	Microsoft	DOC
E	USB Mouse	M-UR69	LNA23802315	Logitech	DOC
F	PS/2 Mouse	M-SBF69	HCA42401791	Logitech	DOC
G	PS/2 Keyboard	SEM-A17K	04MW-0010432	Samsung	DOC
H	Phone	SP-F209K1	-	YounTae DongHeong Elec.	-

1.6.2 Used cable description

No	Connect Cable	Length [m]	Shielded [Y/N]	Remark
1	Power	1.7	No	For printer
2	Power	1.7	No	For pc
3	Parallel	1.8	Yes	From printer to pc
4	USB	1.8	Yes	From printer to pc
5	Serial	1.8	No	From pc to mouse
6	USB	1.8	No	From pc to mouse
7	PS/2	1.8	No	From pc to keyboard
8	PS/2	1.8	No	From pc to mouse
9	Tel	1.8	No	From Printer to phone

1.6.3 Block diagram



1.7 Applied Standards

Test standard	Test method
FCC Part 15:2003 Subpart B	ANSI C63.4:2003

1.8 Test Facility

1.8.1 General information

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR 22, 16-1, 16-2.

This EMC Testing Lab. is accredited by Korea Laboratory Accreditation Scheme(KOLAS) which signed the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for the above test item(s) and test method(s).

This Lab. is operated as testing laboratory in accordance with the requirements of ISO/IEC 17025:1998.

1.8.2 Accreditation and listing

1.8.3 Measurement uncertainty

(According to CISPR 16-4 and Lab. 34)

Test item		Measurement uncertainty
Conducted emission		± 3.3 dB
Radiated emission	Horizontal	± 4.0 dB
	Vertical	± 4.4 dB

2. Summary of test results

Result : PASS

The equipment under test(EUT) has been found to comply with the applied standards.

Section of the product standard		Applied standard	Test result
3.1	Conducted Emission	FCC Part 15:2003 Subpart B	Complied
3.2	Radiated Emission	FCC Part 15:2003 Subpart B	Complied

3. Description of individual tests

3.1 Conducted emission

3.1.1 Test information

Test engineer	Tae Young Jang
Test date	July 31, 2006
Climate condition	Ambient temperature : 26.1 ℃, Relative humidity : 61 % Atmospheric pressure 100.5 kPa
Test place	Shielded room # 1

3.1.2 Test equipment

Equipment	Model name	Manufacturer	Serial no.	Calibration	
				Date	Interval (Month)
EMI TEST RECEIVER	ESCI	100086	R&S	2006-03-28	12
L.I.S.N	ENV216	R&S	100117	2005-08-18	12
L.I.S.N	ESH3-Z5	R&S	831887/004	2006-03-28	12
Test Software	EMC 32	R&S	Ver 4.40.0	N/A	N/A

EUT Test Setup

The EUT was set up as per normal use on a wooden table, 0.4 m from a vertical ground reference plane, At least 0.8 m from other conduction surfaces and 0.8 m from the LISN.
See photo.

Test Result

Measurement Results	Pass The measured emission of the EUT has found to be below the specified limits.

3.1.3 Test data and graph

- Operating mode : COPY Mode

Test Information

EUT Name:	AC205LAC122LDSM520PFL
Serial Number:	
Test Description:	
Operating Conditions:	Copy
Operator Name:	
Comment:	

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

Subrange 1

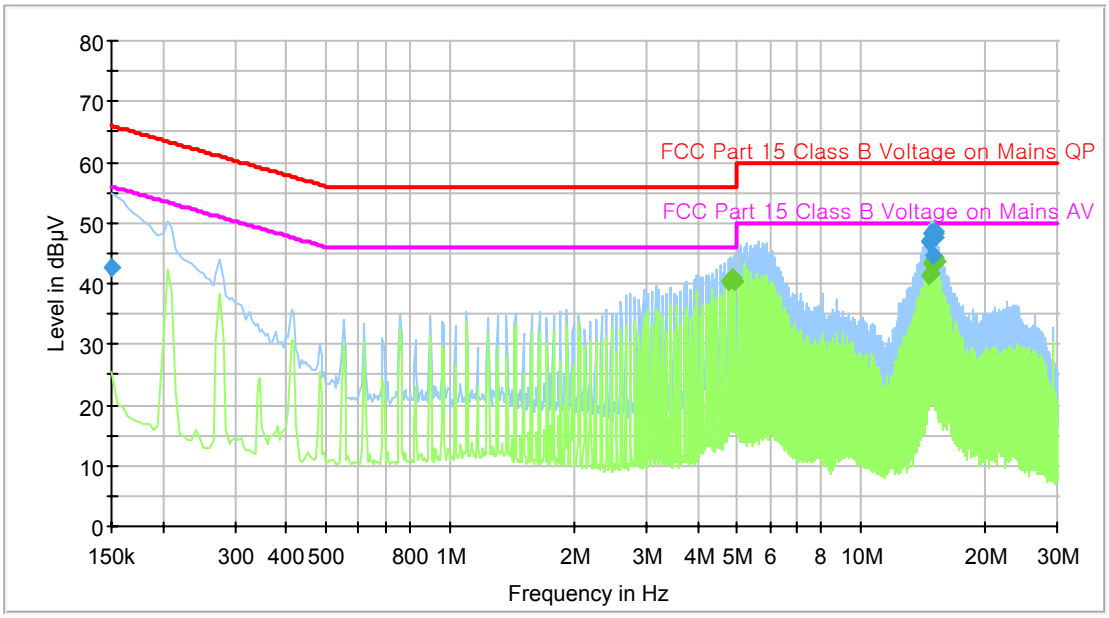
Frequency Range:	150kHz - 30MHz
Receiver:	ESCI 3
Transducer:	ENV216 / Receiver-2-Line-LISN ENV216

Scan Setup: FCC Part 15 Class B_2-Line-LISN fin [EMI conducted]

Hardware Setup:	Voltage with 2-Line-LISN
Level Unit:	dB µ V

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
150kHz - 30MHz	QuasiPeak; Average	9kHz	15s	ESCI 3

FCC Part 15 Class _B with 2-Line-LISN



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.150 000	42.6	L1	9.6	23.4	66.0
14.631 500	47.0	N	10.0	13.0	60.0
14.701 500	46.9	N	10.0	13.1	60.0
14.767 500	47.4	N	10.0	12.6	60.0
14.836 500	48.4	N	10.0	11.6	60.0
14.905 500	48.3	N	10.0	11.7	60.0
14.975 500	44.8	L1	10.0	15.2	60.0
15.043 500	48.7	N	10.0	11.3	60.0
15.112 500	48.3	N	10.0	11.7	60.0
15.181 500	47.6	N	10.0	12.4	60.0

Final Measurement Detector 2

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
4.739 500	40.4	N	9.8	5.6	46.0
4.877 500	40.9	N	9.8	5.1	46.0
4.946 500	40.2	L1	9.7	5.8	46.0
14.701 500	41.2	N	10.0	8.8	50.0
14.769 500	41.7	N	10.0	8.3	50.0
14.837 500	43.2	N	10.0	6.8	50.0
14.974 500	43.9	N	10.0	6.1	50.0
15.043 500	44.3	N	10.0	5.7	50.0
15.250 500	43.5	N	10.0	6.5	50.0

- Operating mode : USB Mode

Test Information

EUT Name:	AC205L/AC122L/DSM520PFL
Serial Number:	
Test Description:	
Operating Conditions:	USB
Operator Name:	
Comment:	

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

Subrange 1

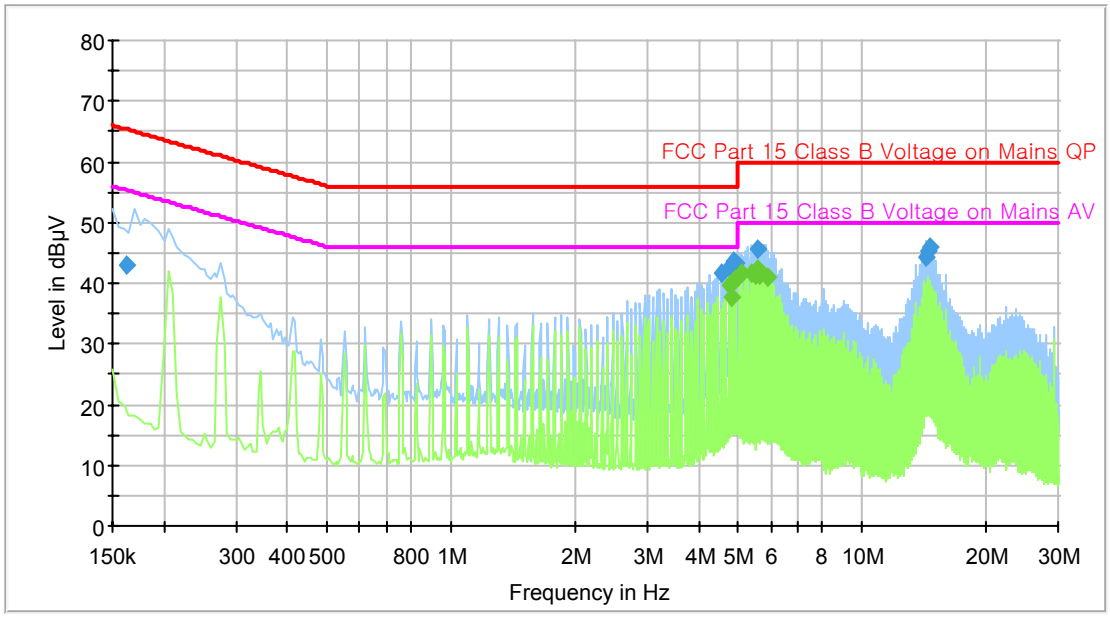
Frequency Range:	150kHz - 30MHz
Receiver:	ESCI 3
Transducer:	ENV216 / Receiver-2-Line-LISN ENV216

Scan Setup: FCC Part 15 Class B_2-Line-LISN fin [EMI conducted]

Hardware Setup:	Voltage with 2-Line-LISN
Level Unit:	dB µ V

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
150kHz - 30MHz	QuasiPeak; Average	9kHz	15s	ESCI 3

FCC Part 15 Class _B with 2-Line-LISN



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.162 500	43.1	L1	9.6	22.2	65.3
4.534 500	41.7	L1	9.7	14.3	56.0
4.739 500	42.6	N	9.8	13.4	56.0
4.877 500	43.5	L1	9.7	12.5	56.0
4.947 500	43.2	N	9.8	12.8	56.0
5.564 500	45.7	L1	9.8	14.3	60.0
14.289 500	44.4	N	10.0	15.6	60.0
14.426 500	45.3	N	10.0	14.7	60.0
14.632 500	46.0	N	10.0	14.0	60.0

Final Measurement Detector 2

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
4.740 500	39.6	L1	9.7	6.4	46.0
4.811 500	37.6	N	9.8	8.4	46.0
4.877 500	40.4	L1	9.7	5.6	46.0
4.947 500	40.6	L1	9.7	5.4	46.0
5.085 500	41.7	L1	9.7	8.3	50.0
5.358 500	41.8	N	9.8	8.2	50.0
5.496 500	41.3	L1	9.8	8.7	50.0
5.565 500	42.4	N	9.8	7.6	50.0
5.635 500	41.3	L1	9.8	8.7	50.0
5.907 500	41.0	N	9.8	9.0	50.0

3.2 Radiated emission

3.2.1 Test information

Test engineer	Sang Kyu, Seo
Test date	Jule 25, 2006
Climate condition	Ambient temperature : 23.4 ℃, Relative humidity : 51 % Atmospheric pressure 101.0 kPa
Test place	10 m Semi-anechoic Chamber

3.2.2 Test equipment

Equipment	Model name	Manufacturer	Serial no.	Calibration	
				Date	Interval
EMI Test Receiver	ESI-26	R&S	100287	2006-03-05	12
Ant. Mast	MA4000	inn-co	-	N/A	N/A
Ant. Mast	MA4000	inn-co	-	N/A	N/A
Mast Controller	CO2000	inn-co	-	N/A	N/A
Amplifier	310N	SONOMA	251674	2006-03-14	12
Amplifier	310N	SONOMA	251677	2006-03-06	12
RF Selector	NS4900	TOYO	-	N/A	N/A
Bi-log Antenna	CBL6141A	SCHAFFNER	4266	2006-05-23	12
Bi-log Antenna	CBL6141A	SCHAFFNER	4268	2006-05-03	12

EUT Test Setup

EUT set up in semi-anechoic chamber. EUT positioned at 10 m from antenna in center of table.

All ports terminated into characteristic loads.

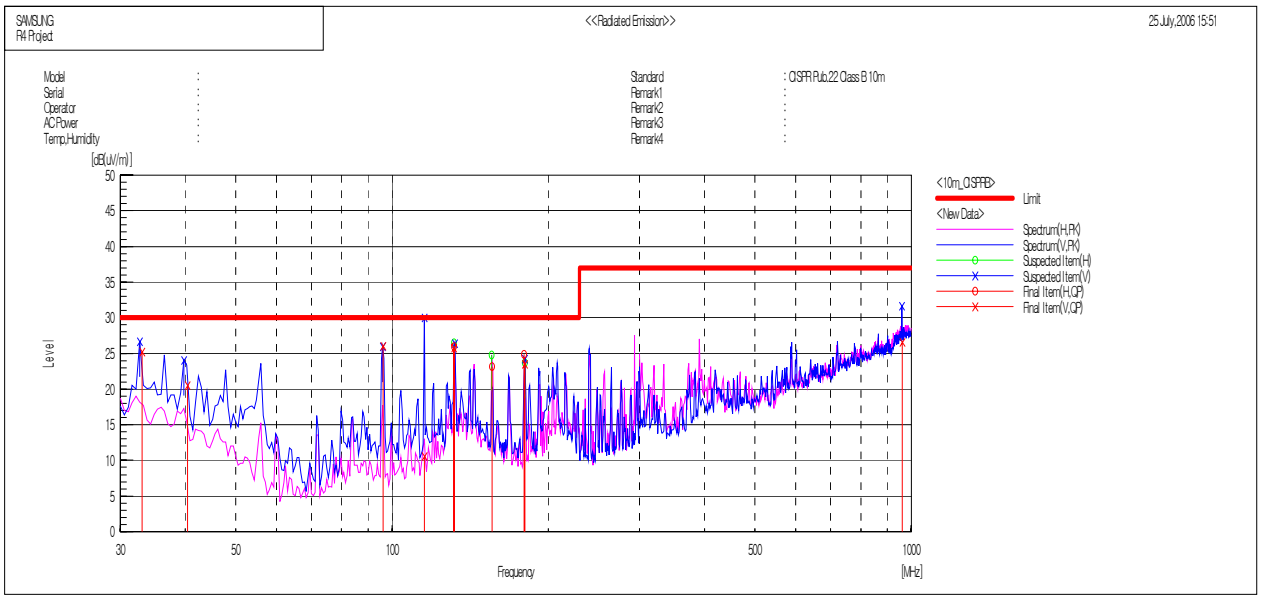
Test Result

Measurement Results	Pass The measured emission of the EUT has found to be below the specified limits.

3.2.3 Test data and graph

The initial step in collecting radiated data was to perform a peak scan over the measurement range using a receiver. All modes of operation were investigated and the worst-case emissions were reported. All other emissions are non-significant

■ Operating Mode : Copy



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	33.033	V	35.5	-10.2	25.3	30.0	4.7	100.0	269.9	
2	40.381	V	32.6	-12.1	20.5	30.0	9.5	400.0	291.5	
3	96.145	V	45.6	-19.6	26.0	30.0	4.0	100.0	151.5	
4	115.634	V	28.2	-17.6	10.6	30.0	19.4	200.0	13.9	
5	131.786	H	42.6	-16.6	26.0	30.0	4.0	400.0	97.3	
6	131.715	V	42.3	-16.5	25.8	30.0	4.2	100.0	303.5	
7	156.042	H	39.8	-16.7	23.1	30.0	6.9	400.0	137.8	
8	180.191	V	41.4	-17.9	23.5	30.0	6.5	100.0	265.4	
9	179.596	H	42.9	-18.0	24.9	30.0	5.1	400.0	252.2	
10	961.234	V	25.2	1.4	26.6	37.0	10.4	200.0	45.6	

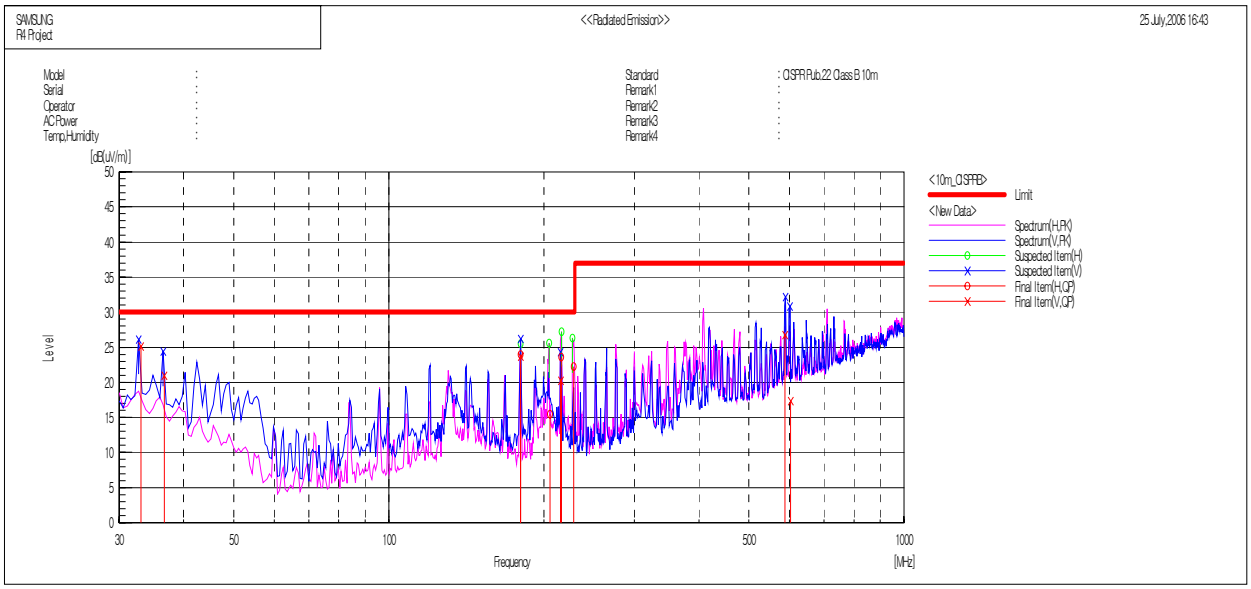
* Receiving antenna mode : Horizontal, Vertical

* Test distance : 10 m (Semi Anechoic Chamber)

* Result = Reading + c.f (Antenna factor + Cable loss- Amp Gain)

* Margin = Limit – Reading

■ Operating Mode: USB Pinting



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	33.038	V	35.4	-10.2	25.2	30.0	4.8	100.0	298.4	
2	36.696	V	31.9	-11.0	20.9	30.0	9.1	100.0	189.5	
3	180.229	V	41.6	-17.9	23.7	30.0	6.3	100.0	266.4	
4	180.196	H	42.0	-18.0	24.0	30.0	6.0	400.0	254.1	
5	205.589	H	32.3	-16.8	15.5	30.0	14.5	400.0	168.4	
6	215.897	V	35.9	-15.7	20.2	30.0	9.8	100.0	197.8	
7	216.227	H	38.9	-15.3	23.6	30.0	6.4	400.0	142.6	
8	228.493	H	37.9	-15.6	22.3	30.0	7.7	400.0	105.8	
9	588.228	V	32.7	-6.0	26.7	37.0	10.3	300.0	359.3	
10	602.312	V	23.2	-5.8	17.4	37.0	19.6	300.0	350.5	

* Receiving antenna mode : Horizontal, Vertical

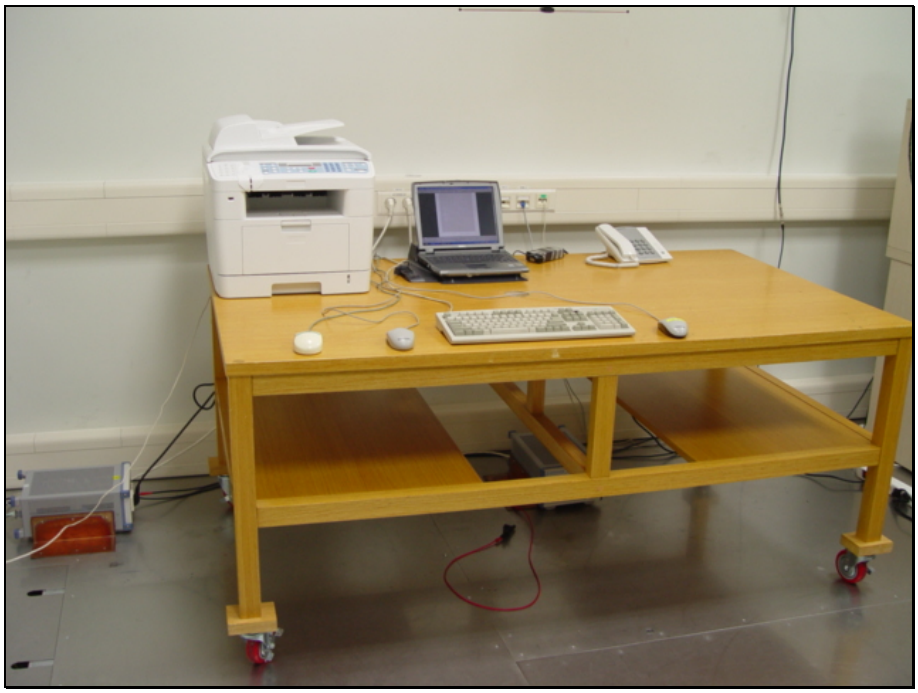
* Test distance : 10 m (Semi Anechoic Chamber)

* Result = Reading + c.f (Antenna factor + Cable loss- Amp Gain)

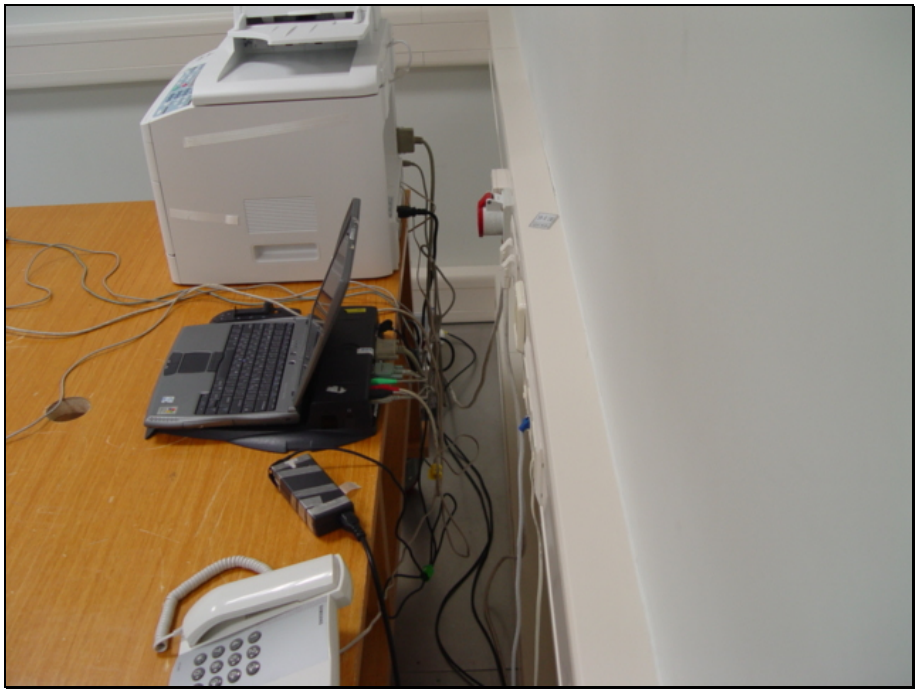
* Margin = Limit – Reading

4. Appendix

4.1 Test photography



Picture 1. Conducted Emission (Front)



Picture 2. Conducted Emission (Rear)

Picture 3. Radiated emission (Front)

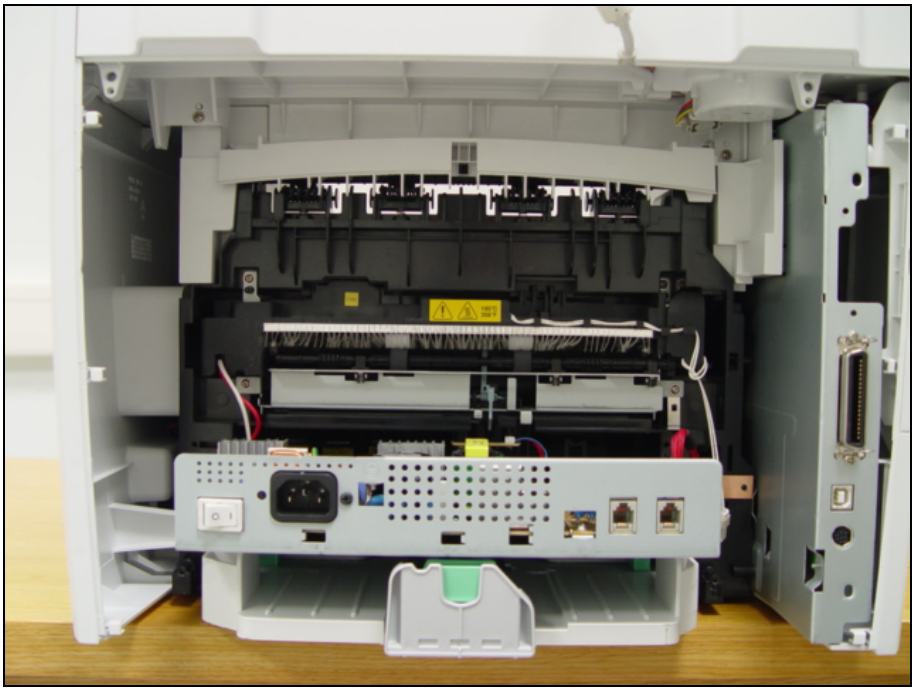
Picture 4. Radiated emission (Rear)

4.2 EUT photography

Picture 5. EUT (Front)

Picture 6. EUT (Rear)

Picture 7. EUT (Top)



Picture 8. Internal