EMC TEST REPORT

Samsung Electronics Co., Ltd. 416 Maetan 3-Dong, Yeongtong-Gu, Suwon-Si,Gyeonggi-Do, 443-742 Korea (Tel: 031 277 7752, Fax: 031 277 7753)	Project No. : LBE052974 Page (1)/(23)	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
- Date of application : 2006. 01. 02

2. Purpose for the report : Approval for EMC

3. Kind of product : DVD Camera Recorder (Model name : SC-DC165)

4. Date of test : 2005.12.20 ~ 2005.12.21

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 : A3L06RAINBOW1

Tested by	Reviewed by
Name : Young Jin, Kim	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. 01. 02

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

TEST RESULT

Test Report No.	:	LBE052974
Applicant / Address	:	Samsung Electronics Co., Ltd. 416 Maetan 3-Dong, Yeongtong-Gu,Suwon-Si,Gyeonggi-Do 443-742 Korea
Manufacture / Address	:	Samsung Electronics Co., Ltd. 416 Maetan 3-Dong, Yeongtong-Gu,Suwon-Si,Gyeonggi-Do 443-742 Korea
EUT	:	1. Product name : DVD Camera Recorder 2. Model name : SC-DC165 3. Brand name : Samsung 4. Variant model : SC-DC163, SC-DC164
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	:	Young Jin, Kim
Reviewed by	:	No Cheon Park
Date of Issue	:	2006. 01. 02

Table of contents

1. General information

1.1 Basic information related product

Applicant	Samsung Electronics Co., Ltd.
Model name	SC-DC165
Applicant address	416 Maetan 3-Dong, Yeongtong-Gu,Suwon-Si,Gyeonggi-Do 443-742 Korea
Contact person	Jei Soon, Kang
Kind of product	DVD Camera Recorder
Valiant model	SC-DC163, SC-DC164
Manufacturer	Samsung Electronics Co., Ltd. 416 Maetan 3-Dong, Yeongtong-Gu,Suwon-Si,Gyeonggi-Do 443-742 Korea
Rated power	AC 120 V, 60 Hz
New / Alternative / Permissive change information	New

1.2 Detail Information related product

1.2.1 Specification

System	
Video signal	NTSC
Picture Compression format	MPEG-2
Audio Compression format	Dolby Digital 2ch/256kbps
Recording Quality	XP (about 9Mbps), SP (about 6Mbps), LP (about 3Mbps)
Image device	CCD (Charge Coupled Device) (680k pixels)
Lens	F1.6 30x(SC-D163), 33x(SC-DC164/DC165)(Optical), 1200x(Digital) Electronic zoom lens
Filter diameter	Ø30
LCD Screen/Viewfinder	
Size/dot number	SC-DC163: 2.5inchs 112k / SC-DC164/DC165: 2.7inch 230k
LCD Screen Method	TFT LCD
Viewfinder	Color LCD
Connectors	
Video output	1Vp-p (75Ω terminated)
S-video output	Y: 1Vp-p, 75Ω, C: 0. 286Vp-p, 75Ω
Audio output	-7.5dBs (600Ω terminated)
USB output	Mini-B type connector
External Mic	Ø3.5 stereo

General	
Power source	DC 8.4V, Lithium Ion Battery Pack 7.4V
Power source type	Lithium Ion Battery Pack, Power supply (100V~240V) 50/60Hz
Power consumption (Recording)	4.5W(LCD), 4.0W(Viewfinder)
Operating temperature	0°~40°C (32°F~104°F)
Storage temperature	-20°C ~ 60°C (-4°F ~ 140°F)
External dimension	Height 3.44 inches (87.5 mm), Length 4.78 inches (121.5 mm), Width 2.36 inches (60 mm)
Weight	0.948 lb (430 g, 15.17 oz) (Except for Lithium Ion Battery Pack)
Internal MIC	Omni-directional stereo microphone
Remote control (SC-DC164/DC165 only)	Indoors: greater than 49 ft (15 m) (straight line), Outdoors: about 16.4 ft (5 m) (straight line)

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.

- External Memory : USB
- PC Camera : USB

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

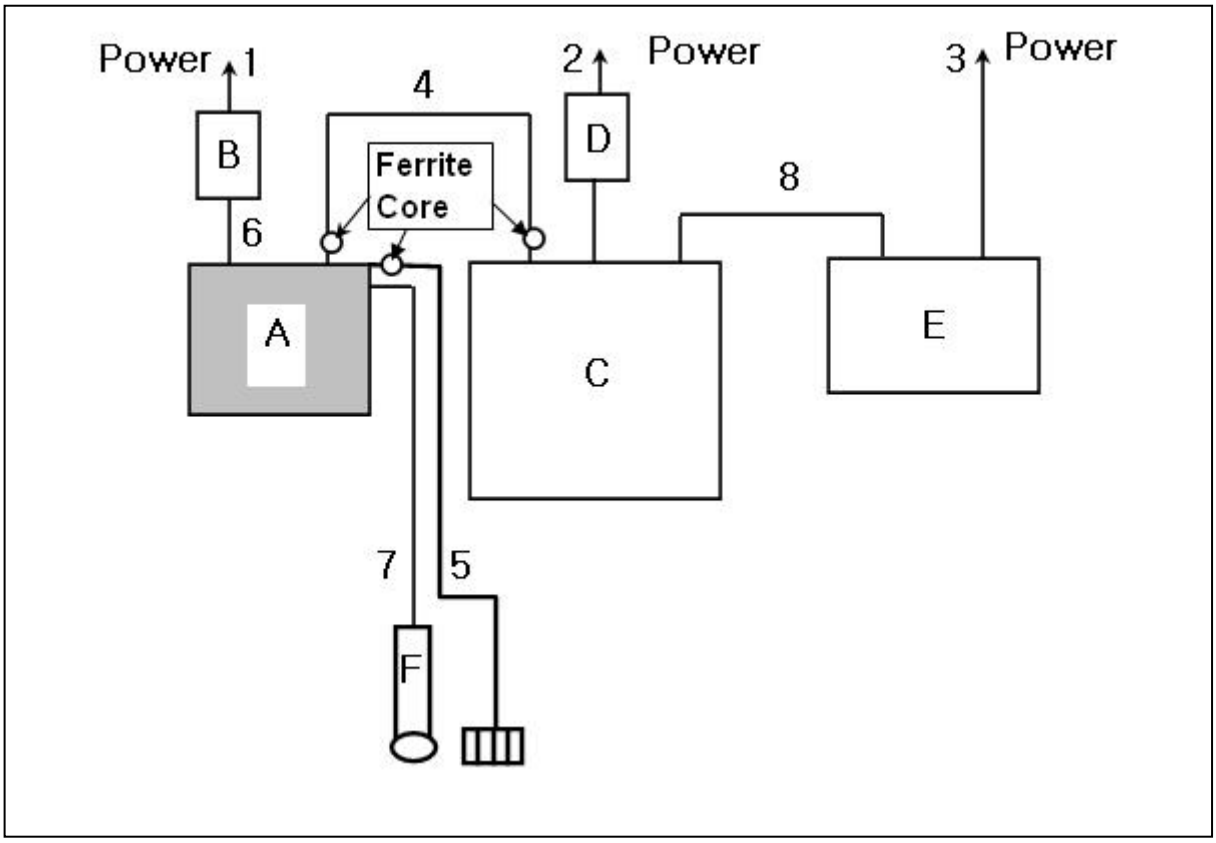
1.6.1 Used EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	Note
A	DVD Camera Recorder	SC-DC165	-	SAMSUNG	A3L06RAINBOW1
B	Adapter	AA-E8	6CAXC 62025	SAMSUNG	DoC
C	Note PC	NT-Q30	087E93CY900252K	SAMSUNG	DcC
D	Adapter(Note PC)	AD-8019	NBP001275-00	SAMSUNG	DoC
E	Printer	ML-1740	BABX820386E	SAMSUNG	A3LML-1710P
F	MIC	YMC-2521	-	SAMSUNG	DoC

1.6.2 Used cable description

No	Connect Cable	Length [m]	Shielded [Y/N]	Remark
1	Power (EUT)	1.5	No	-
2	Power (Note PC)	1.5	No	-
3	Power (Printer)	1.5	No	-
4	USB Cable	1.5	Yes	-
5	AV / S-Video Out Cable	1.5	No	Termination
6	DC In Cable	1.5	No	-
7	Mic	1.5	No	-
8	USB Cable (Printer)	1.5	Yes	-

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	Young Jin, Kim
Test date	December 21, 2005
Climate condition	Ambient temperature : 21.5 ℃, Relative humidity : 32 % Atmospheric pressure 1 013 hPa
Test place	Shielded room # 1

3.1.2 Test equipment

Equipment	Model name	Manufacturer	Serial no.	Calibration	
				Next date	Interval (Month)
Test Software	EMC 32	R&S	None	N/A	N/A
Field strength meter	ESCI	R&S	100136	2006-04-17	12
L.I.S.N	ENV216	R&S	100116	2006-09-08	12
L.I.S.N	ENV216	R&S	100107	2006-08-18	12

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 emissions of the EUT have found to be below the specified limits.

■ Operating Mode: External Memory (USB)

SAMSUNG ELECTRONICS EMC Report

Test Information

EUT Name:	SC-DC165
Serial Number:	
Test Description:	
Operating Conditions:	USB_(Mass Storage)
Operator Name:	Y,J KIM
Comment:	

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

Subrange 1

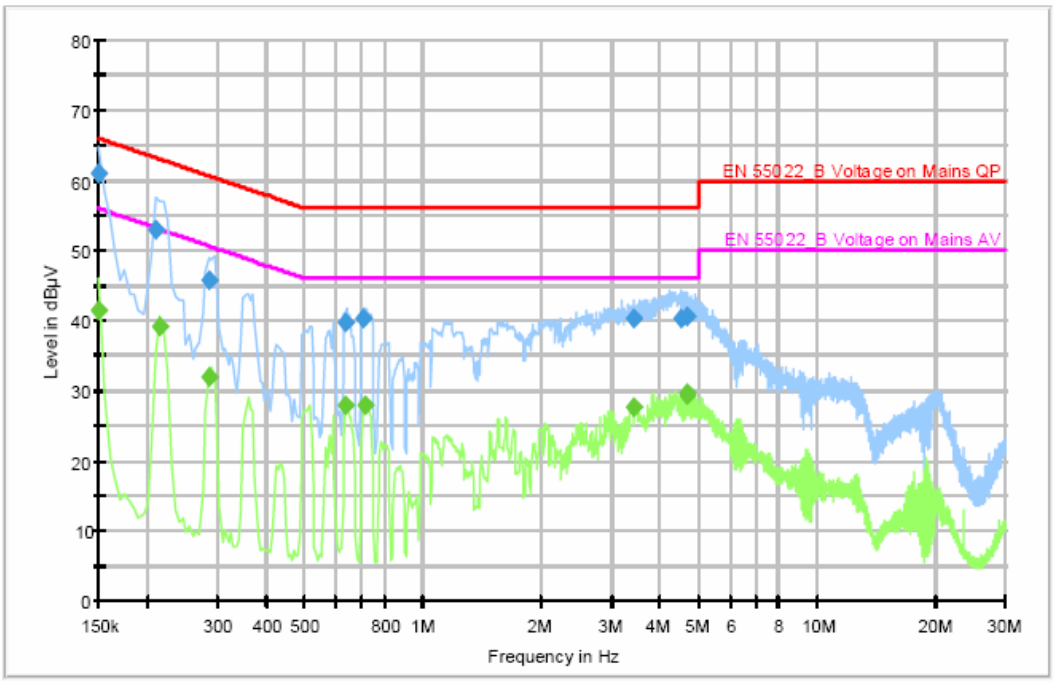
Frequency Range:	150kHz - 30MHz
Receiver:	ESCI 3
Transducer:	ENV216 / Receiver-2-Line-LISN ENV216

Scan Setup: EN55022_B_2-Line-LISN fin [EMI conducted]

Hardware Setup:	Voltage with 2-Line-LISN
Level Unit:	dBµV

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
150kHz - 30MHz	QuasiPeak; Average	9kHz	1s	ESCI 3

EN55022_B with 2-Line-LISN



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line
0.150000	61.1	1000.000	9.000	On	L1
0.210500	53.0	1000.000	9.000	On	L1
0.287500	45.9	1000.000	9.000	On	L1
0.632500	39.6	1000.000	9.000	On	N
0.707500	40.2	1000.000	9.000	On	N
3.439500	40.2	1000.000	9.000	On	N
4.530500	40.2	1000.000	9.000	On	N
4.700500	40.7	1000.000	9.000	On	N

(continuation of the "Final Measurement Detector 1" table from column 6 ...)

Frequency (MHz)	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	9.6	4.9	66.0	
0.210500	9.6	10.2	63.2	
0.287500	9.6	14.7	60.6	
0.632500	9.6	16.4	56.0	
0.707500	9.6	15.8	56.0	
3.439500	9.6	15.8	56.0	
4.530500	9.6	15.8	56.0	
4.700500	9.6	15.3	56.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line
0.150000	41.4	1000.000	9.000	On	N
0.215500	39.1	1000.000	9.000	On	N
0.286500	31.9	1000.000	9.000	On	N
0.636500	27.9	1000.000	9.000	On	N
0.712500	28.0	1000.000	9.000	On	N
3.439500	27.5	1000.000	9.000	On	N
4.684500	29.8	1000.000	9.000	On	N
4.700500	29.3	1000.000	9.000	On	N

(continuation of the "Final Measurement Detector 2" table from column 6 ...)

Frequency (MHz)	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	9.6	14.6	56.0	
0.215500	9.6	13.9	53.0	
0.286500	9.6	18.7	50.6	
0.636500	9.6	18.1	46.0	
0.712500	9.6	18.0	46.0	
3.439500	9.6	18.5	46.0	
4.684500	9.6	16.2	46.0	
4.700500	9.6	16.7	46.0	

■ Operating Mode: PC-Camera (USB)

SAMSUNG ELECTRONICS EMC Report

Test Information

EUT Name:	SC-DC165
Serial Number:	
Test Description:	
Operating Conditions:	PC-Camera
Operator Name:	Y,J KIM
Comment:	

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

Subrange 1

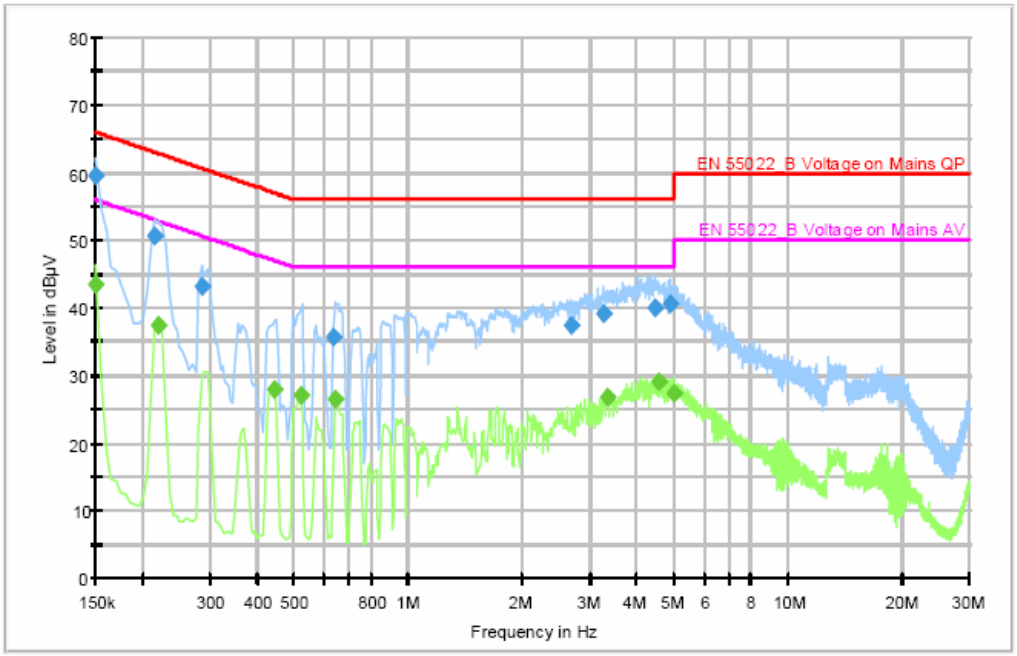
Frequency Range:	150kHz - 30MHz
Receiver:	ESCI 3
Transducer:	ENV216 / Receiver-2-Line-LISN ENV216

Scan Setup: EN55022_B_2-Line-LISN fin [EMI conducted]

Hardware Setup:	Voltage with 2-Line-LISN
Level Unit:	dBµV

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
150kHz - 30MHz	QuasiPeak; Average	9kHz	1s	ESCI 3

EN55022_B with 2-Line-LISN



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line
0.150000	59.5	1000.000	9.000	On	N
0.215500	50.6	1000.000	9.000	On	N
0.285500	43.2	1000.000	9.000	On	L1
0.636500	35.7	1000.000	9.000	On	L1
2.695500	37.5	1000.000	9.000	On	N
3.260500	39.2	1000.000	9.000	On	N
4.456500	40.1	1000.000	9.000	On	N
4.879500	40.5	1000.000	9.000	On	N

(continuation of the "Final Measurement Detector 1" table from column 6 ...)

Frequency (MHz)	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	9.6	6.5	66.0	
0.215500	9.6	12.4	63.0	
0.285500	9.6	17.4	60.7	
0.636500	9.6	20.3	56.0	
2.695500	9.6	18.5	56.0	
3.260500	9.6	16.8	56.0	
4.456500	9.6	15.9	56.0	
4.879500	9.6	15.5	56.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line
0.150000	43.5	1000.000	9.000	On	N
0.220500	37.4	1000.000	9.000	On	N
0.441500	27.9	1000.000	9.000	On	N
0.519500	27.0	1000.000	9.000	On	N
0.645500	26.6	1000.000	9.000	On	N
3.361500	26.7	1000.000	9.000	On	N
4.565500	29.0	1000.000	9.000	On	N
4.989500	27.4	1000.000	9.000	On	N

(continuation of the "Final Measurement Detector 2" table from column 6 ...)

Frequency (MHz)	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	9.6	12.5	56.0	
0.220500	9.6	15.4	52.8	
0.441500	9.6	19.1	47.0	
0.519500	9.6	19.0	46.0	
0.645500	9.6	19.4	46.0	
3.361500	9.6	19.3	46.0	
4.565500	9.6	17.0	46.0	
4.989500	9.6	18.6	46.0	

3.2 Radiated emission

3.2.1 Test information

Test engineer	Young Jin, Kim
Test date	December 20, 2005
Climate condition	Ambient temperature : 22 ℃, Relative humidity : 35 % Atmospheric pressure 1 011 hPa
Test place	10 m Semi-anechoic Chamber #2

3.2.2 Test equipment

Equipment	Model name	Manufacturer	Serial no.	Calibration	
				Next date	Interval
Bi-con Antenna	CBL6141A	SCHAFFNER	4268	2006-05-24	12
Bi-con Antenna	CBL6141A	SCHAFFNER	4266	2006-05-24	12
EMI Receiver	ESI26	R&S	100289	2006-04-11	12
EMI Receiver	ESI26	R&S	100291	2006-04-12	12
AMPLIFIER	310N	SONOMA	251674	2006-03-08	12
AMPLIFIER	310N	SONOMA	251677	2006-03-08	12
Ant Mast	MA4000	Inn-co	-	N/A	
Ant Mast	MA4000	Inn-co	-	N/A	
Ant Mast	MA2000	Inn-co	-	N/A	
Mast Controller	CO2000	Inn-co	-	N/A	
RF Selector	NS4900	TOYO	-	N/A	

EUT Test Setup

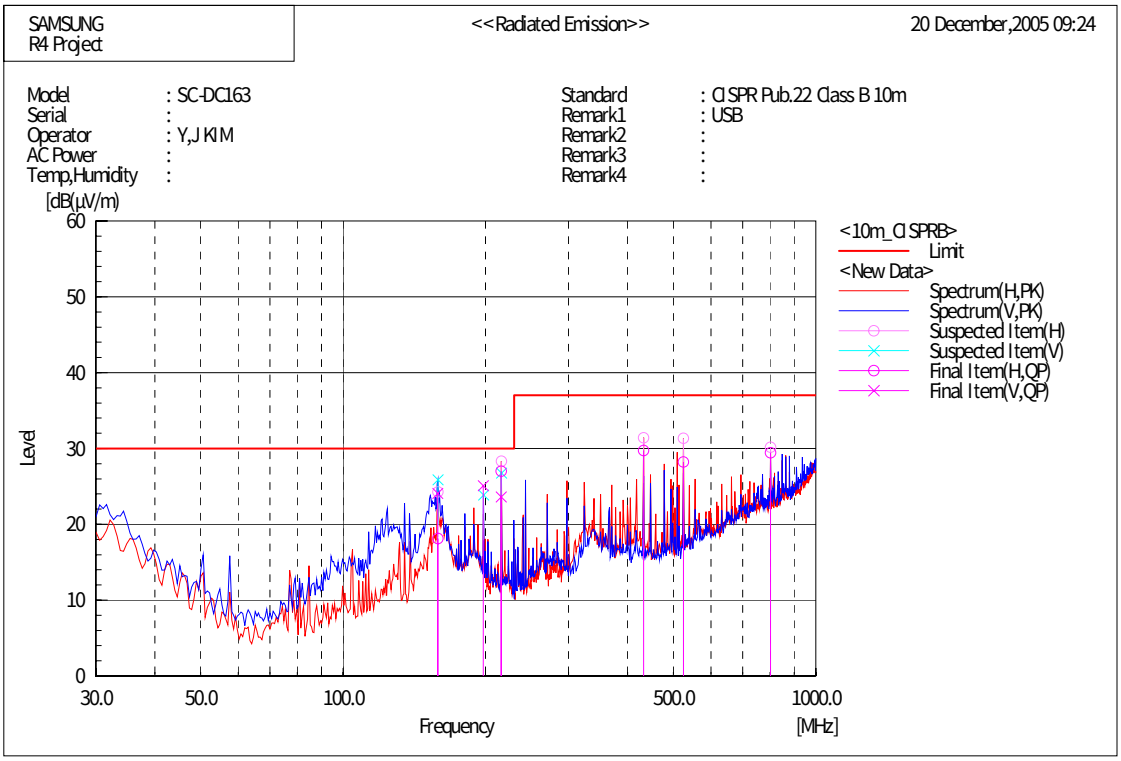
EUT set up in semi-anechoic chamber. EUT positioned at 3 m from antenna in center of table.

All ports terminated into characteristic loads.

Test Result

Measurement Results	Pass The measured emissions of the EUT have found to be below the specified limits.

■ Operating Mode: External Memory (USB)



Final Result

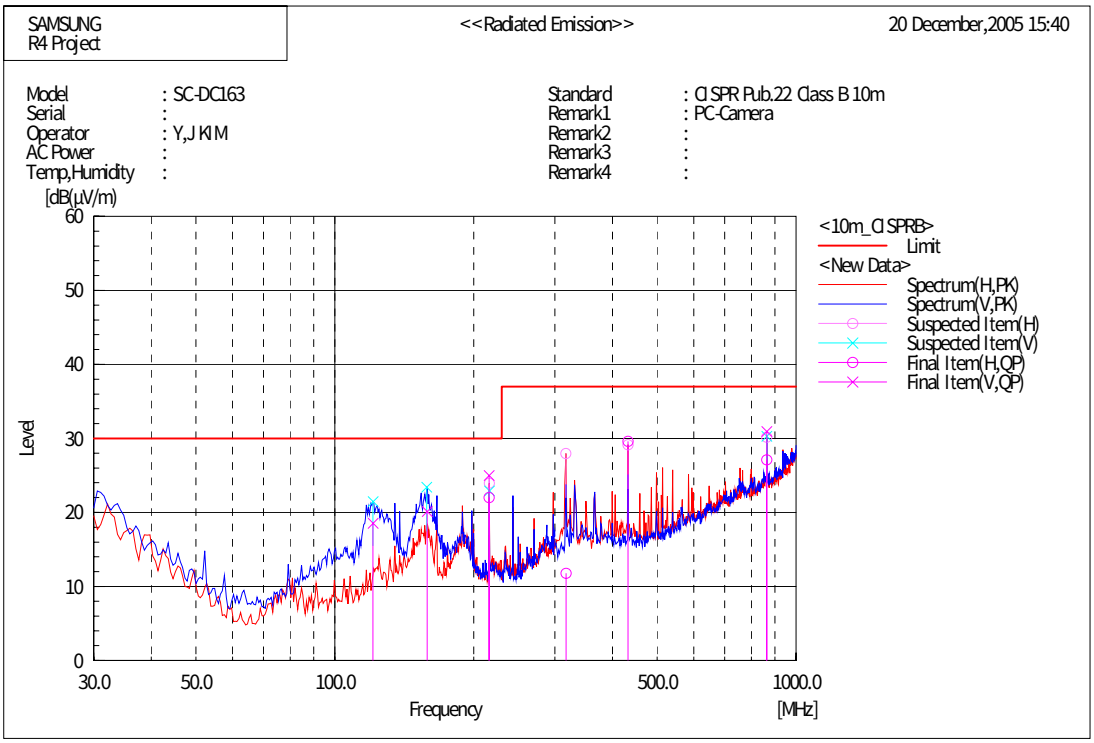
--- Horizontal Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(µV)]	c.f [dB(1/m)]	Result [dB(µV/m)]	Limit [dB(µV/m)]	Margin [dB]	Remark
1	158.710	36.2	-18.1	18.1	30.0	11.9	
2	216.011	44.4	-17.4	27.0	30.0	3.0	
3	432.025	41.7	-12.0	29.7	37.0	7.3	
4	524.596	38.6	-10.4	28.2	37.0	8.8	
5	802.324	34.4	-5.0	29.4	37.0	7.6	

--- Vertical Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(µV)]	c.f [dB(1/m)]	Result [dB(µV/m)]	Limit [dB(µV/m)]	Margin [dB]	Remark
1	158.623	41.7	-17.6	24.1	30.0	5.9	
2	198.003	43.8	-18.7	25.1	30.0	4.9	
3	215.994	40.7	-17.1	23.6	30.0	6.4	

■ Operating Mode: PC-Camera (USB)



Final Result

--- Horizontal Polarization (QP)---

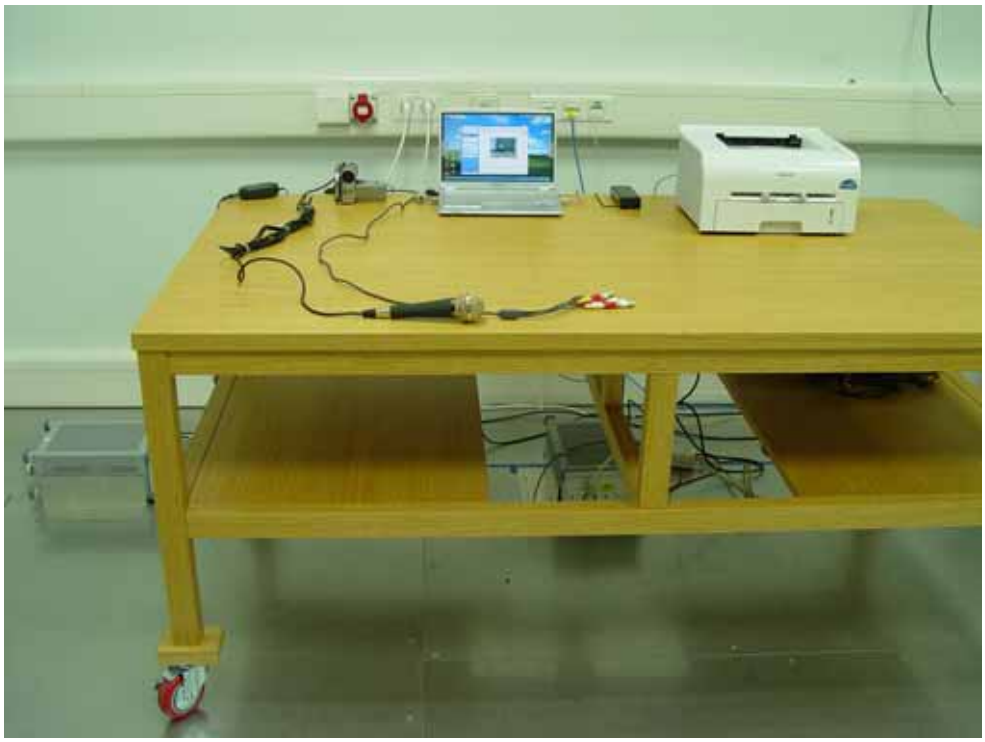
No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	216.005	39.4	-17.4	22.0	30.0	8.0	
2	317.262	27.0	-15.2	11.8	37.0	25.2	
3	432.025	41.6	-12.0	29.6	37.0	7.4	
4	864.047	30.5	-3.4	27.1	37.0	9.9	

--- Vertical Polarization (QP)---

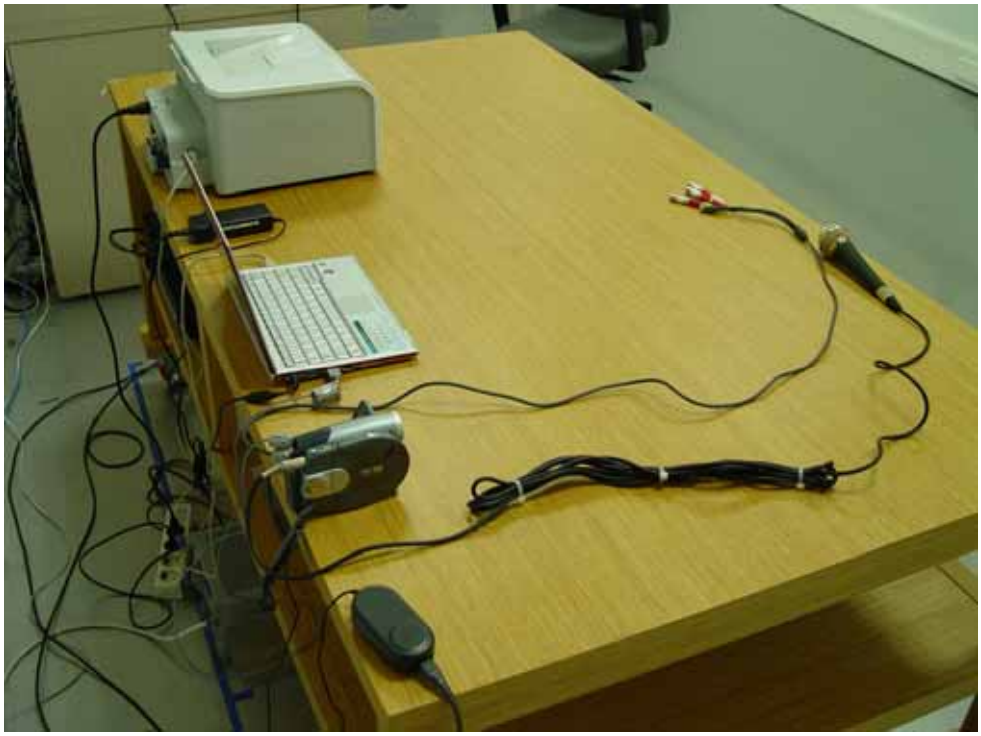
No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	120.915	36.6	-18.1	18.5	30.0	11.5	
2	158.531	37.7	-17.6	20.1	30.0	9.9	
3	216.005	42.1	-17.1	25.0	30.0	5.0	
4	864.033	33.3	-2.3	31.0	37.0	6.0	

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 (Right Side)

Picture 8. EUT (Left Side)