

EMC TEST REPORT

Samsung Electronics CS Management Center

416 Maetan 3-Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do,

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1. Applicant

◦ Name : Samsung Electronics Co., Ltd. DVS Division

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

2. Purpose for the report : Approval for EMC

3. EUT

1) Product name : CCTV Camera

2) Model name : SCC-C6403P

3) Brand name : Samsung

4) Variant model : -

4. Date of test : 2006. 03. 10 ~ 2006. 03. 16

5. Applied standards : EN 61000-6-4:2001, EN50130-4: 1995 + A1:1998

EN61000-3-2: 2000, EN61000-3-3: 1995+A1:2001,

6. Report No. : LBE060599 Issue 1

7. Test result : The equipment under test has found to be compliant with the applied standards.
(Refer to the attached test result for more detail.)

Prepared by

Name : Tae Young, Jang

Handwritten signature of Tae Young, Jang in black ink.

Authorised by

Name : No Cheon, Park

Handwritten signature of No Cheon, Park in black ink.

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

2006. 03. 17

Samsung Electronics Co., Ltd.
CS Management Center

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1. General information

1.1 Operating mode and condition

The system was configured for testing in typical fashion use.

All connectors not used are terminated with resistors matching the nominal terminal impedance.

The mode of operation utilized for testing was selected to best simulate typical EUT use

1.2 EUT modifications

No EUT modifications were required.

1.3 Details Of Sampling

Client selected, single unit

1.4 Test configuration

1.4.1 Used EUT and peripherals

Item	Model No.	Serial No.	Manufacturer	Note
CCTV camera	SCC-C6403P	-	SAMSUNG	EUT
LCD TV monitor	VE20EO	ADLM32QYC00018V	SAMSUNG	
Adapter	STC-24150AK	-	SAMSUNG	For EUT

1.4.2 Used cable description

No	Connect Cable	Length [m]	Shielded [Y/N]	Remark
1	AC power	1.8	No	To the monitor

1.5 Applied standards

Test standard	Test method
EN61000-6-4: 2001	EN61000-4-2:1995
EN61000-3-2: 2000	EN61000-4-3:1996
EN61000-3-3: 1995+A1:2001	EN61000-4-4:1995
EN50130-4:1995+A1:1998	EN61000-4-5:1995
	EN61000-4-6:1996
	EN61000-4-11:1994

1.6 POWER INPUT PORTS

The following data details the supply levels at which the EUT was operated during tests.

Designation	Frequency (Hz)	Voltage (V)
Mains lead	50	230

1.7 Specification

Item	Specification
Input Voltage	AC 24 V \pm 10 % (50 Hz \pm 0.1 Hz)
Power Consumption	18 W
Broadcasting System	PAL Standard Color System
Picture Element	752 (H) X 582 (V)
Frequency	Horizontal : 15 625 Hz (INT) / 15 625 Hz (L/L) Vertical : 50 Hz (INT) / 50 Hz (L/L)
S/N Ratio	-50 dB (AGC off)
Synchronization	INT/LINE LOCK

2. Summary of test results

Result : Complied

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

Test Item		Applied Standard	Results
Electromagnetic Emission Test			
3.1	Conducted Emission	EN61000-6-4:2001	Complied
3.2	Radiated Emission	EN61000-6-4:2001	Complied
3.3	Harmonics	EN61000-3-2: 2000	Complied
3.4	Flicker	EN61000-3-3: 1995+A1	Complied
Electromagnetic Susceptibility(Immunity) Test			
3.5	ESD	EN50130-4:1995+A1:1998	Complied
3.6	Radiated Immunity	EN50130-4:1995+A1:1998	Complied
3.7	EFT	EN50130-4:1995+A1:1998	Complied
3.8	SURGE	EN50130-4:1995+A1:1998	Complied
3.9	Conducted Immunity	EN50130-4:1995+A1:1998	Complied
3.10	Voltage Dips	EN50130-4:1995+A1:1998	Complied

Performance Criteria

- A. normal performance within the specification limits
- B. temporary degradation or less of function or performance which is self-recoverable
- C. temporary degradation or less of function or performance which require operator intervention or system reset

3. Description of individual tests

3.1 Conducted emission

3.1.1 Test information

Test engineer	Tae Young, Jang
Test date	March 10, 2006
Climate condition	Ambient temperature : 22.6 , Relative humidity : 33 % Atmospheric pressure : 101.5 kPa
Test place	Shielded room # 5

3.1.2 Test equipment

Equipment	Model Name	Manufacturer	Serial No.	Calibration	
				Date	Interval(Month)
Field strength meter	ESCI	R&S	100136	2005-04-17	12
LISN	ESH3-Z5	R&S	847265/028	2005-09-08	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.



**Measurement
Results**

Complied

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

Uncertainty

3.30 dB μ V (95 % C.L, k=2)

Test Data

■ Operating Mode :

Test Information

EUT Name: SCC-C6403P
 Serial Number:
 Test Description:
 Operating Conditions:
 Operator Name: TY, JANG
 Comment:

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

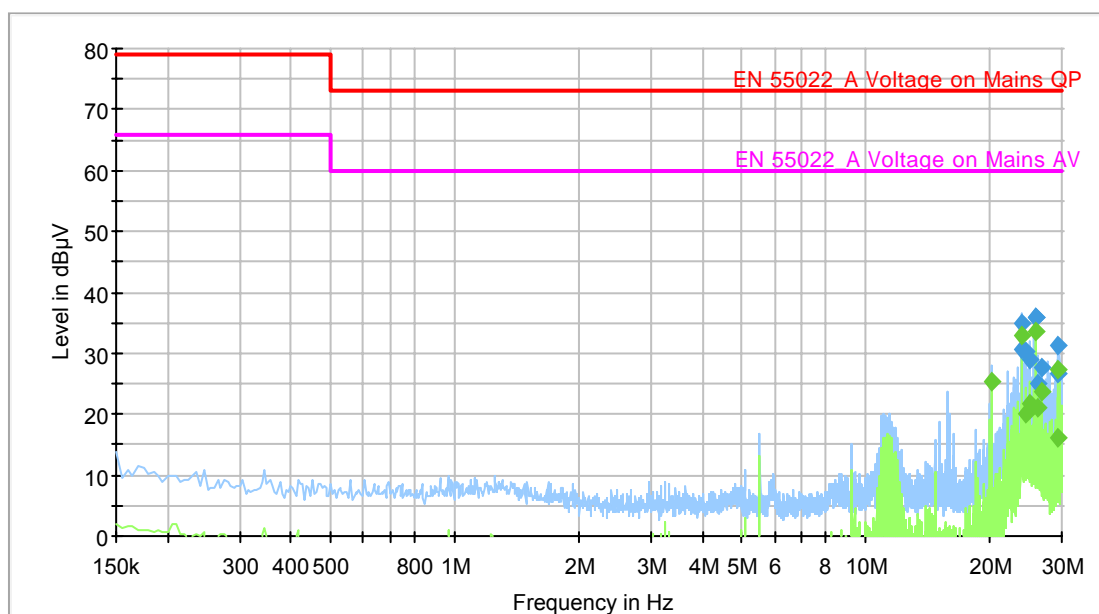
Subrange 1
 Frequency Range: 150kHz - 30MHz
 Receiver: ESCI 3
 Transducer: 2-Line-LISN ESH3-Z5 / Receiver-2-Line-LISN ENV216

Scan Setup: EN55022_A_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	10s	ESCI 3

[Graph and Data]



[Quasi Peak]

Frequency (MHz)	QuasiPeak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
23.964	34.861	L1	0.919	38.139	73.000
23.970	30.683	L1	0.919	42.317	73.000
24.603	30.196	L1	0.939	42.804	73.000
25.000	28.829	L1	0.950	44.171	73.000
25.809	36.034	L1	0.957	36.966	73.000
25.810	35.886	L1	0.957	37.114	73.000
26.167	24.930	L1	0.960	48.070	73.000
26.955	27.752	L1	0.967	45.248	73.000
29.297	26.808	L1	0.990	46.192	73.000
29.498	31.188	L1	0.992	41.812	73.000

[Average]

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
20.279	25.479	N	0.632	34.521	60.000
23.964	33.045	L1	0.919	26.955	60.000
24.602	19.945	L1	0.939	40.055	60.000
24.998	21.779	L1	0.950	38.221	60.000
25.809	33.605	L1	0.957	26.395	60.000
26.172	21.129	L1	0.960	38.871	60.000
26.956	23.830	L1	0.968	36.170	60.000
29.292	16.225	L1	0.990	43.775	60.000
29.494	27.393	L1	0.992	32.607	60.000

* QP : Quasi-peak, AV: Average

* Result = Level(QP or AV) + Trans. (LISN Insertion loss + Cable loss)

* Margin = Limit - Level

3.2 Radiated emission

3.2.1 Test information

Test engineer	Tae Young, Jang
Test date	March 10, 2006
Climate condition	Ambient temperature : 22.5 , Relative humidity : 23 % Atmospheric pressure : 102.5 kPa
Test place	10 m Semi-Anechoic Chamber #1

3.3.2 Test equipment

Equipment	Model name	Manufacturer	Serial no.	Calibration	
				Date	Interval(Month)
Bi-con Antenna	CBL6141A	SCHAFFNER	4268	2005-05-24	12
Bi-con Antenna	CBL6141A	SCHAFFNER	4266	2005-05-24	12
EMI Receiver	ESI26	R&S	100289	2005-04-11	12
EMI Receiver	ESI26	R&S	100291	2005-04-12	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	
Mast Controller	CO2000	Inn-co	-	N/A	
RF Selector	NS4900	TOYO	-	N/A	

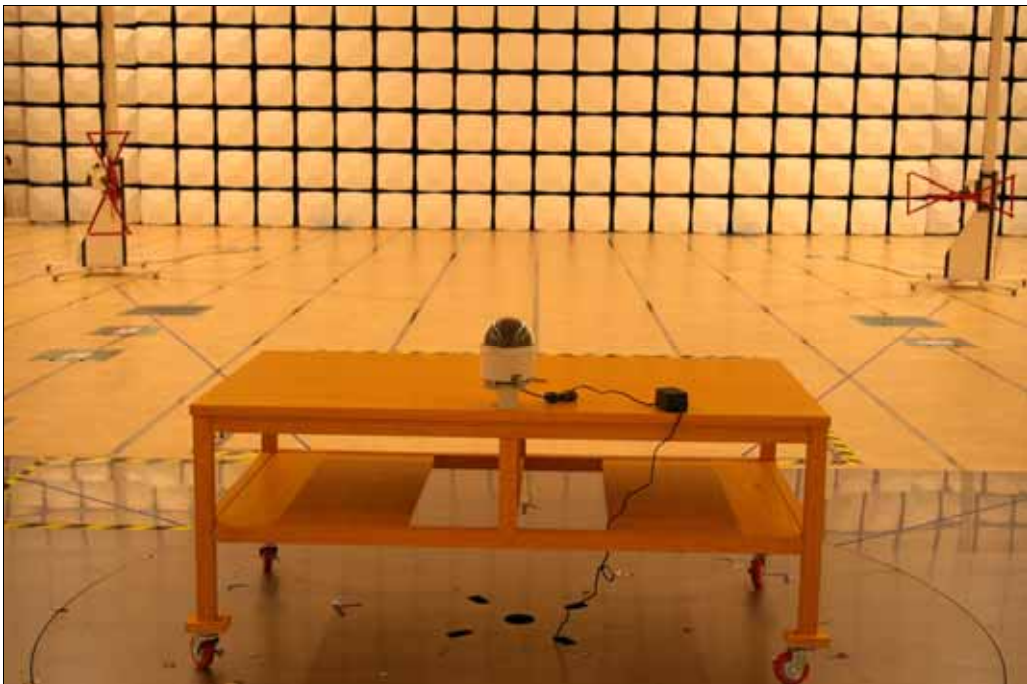
EUT Test Setup

The EUT was set up on a wooden table at least 0.8m from all metallic objects with the cables, to be tested, extended to pass through the absorbing clamp and along the length of the track.

The cables was terminated into the characteristic impedance of the port.



Front



Rear

**Measurement
Results**

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

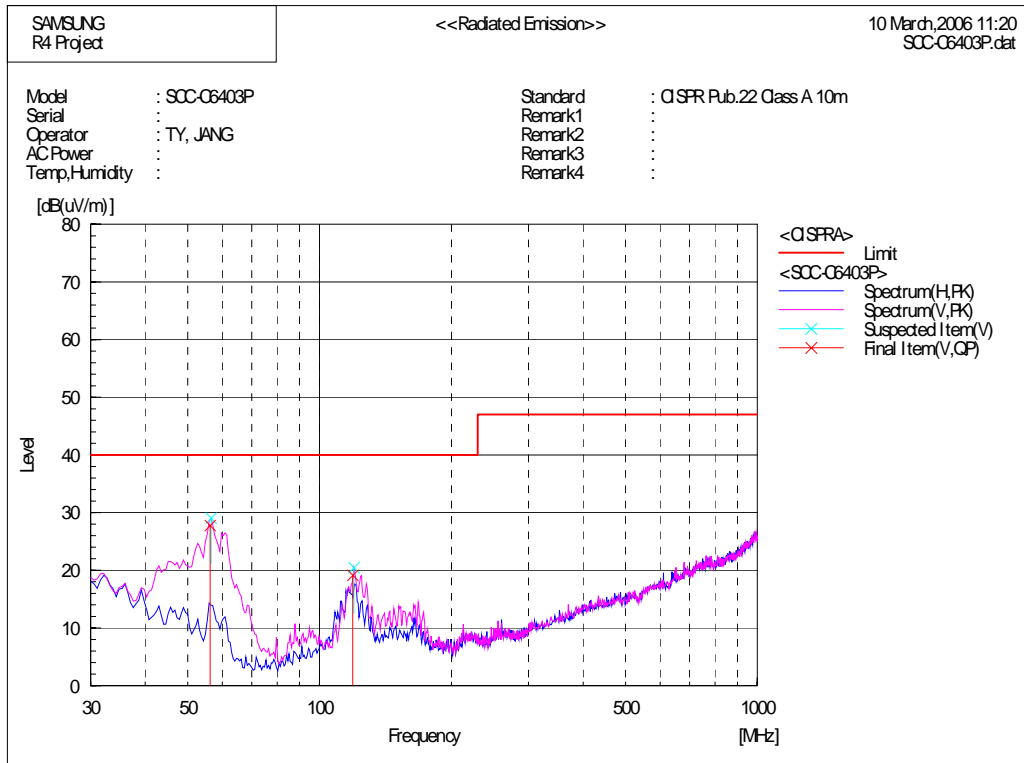
Uncertainty

(Hor) 4.20 dB μ V/m, (Ver) 4.80 dB μ V/m (95 % C.L, k=2)

Test Data

Operating Mode :

[Graph and Data]



Final Result

--- Vertical Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Remark
1	56.251	47.4	-19.6	27.8	40.0	12.2	
2	119.168	37.7	-18.5	19.2	40.0	20.8	

3.3 Harmonics

3.3.1 Test information

Test engineer	Tae Young, Jang
Test date	March 14, 2006
Climate condition	Ambient temperature : 22.8 , Relative humidity : 34 % Atmospheric pressure : 102.1 kPa
Test place	Shielded room # 3

3.3.2 Test equipment

Equipment	Model name	Manufacturer	Serial no.	Calibration	
				Date	Interval(Month)
Universal Power Analyzer	PM3000A	Voltech	AU112/9229	2005-08-05	12
Reference Impedance Network	NI2415	ZIMMER	A0412051	N/A	N/A
IEC1000-3	Release 3.11	Voltech	-	N/A	N/A

EUT Test Setup

The EUT was set up in accordance with the requirements of the applied standard.

The power consumption, steady state harmonic currents were measured in the tested operating mode(s).



Measurement Results	<p>Complied</p> <p>The measured emissions of the EUT have found to be below the specified limits.</p>
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Test Data

Operating Mode :

SCC-C6403P	
Product: CCTV CAMERA	2006 Mar 14 5:13pm
Serial no:	Page 1 of 1
Description:	
Result Name: SCC-C6403P(HARMONICS)	
Voltech IEC1000-3 Windows Software 3.13.08	Test Date: 2006 Mar 14 5:09pm
Type of Test: Steady State Harmonics Test - Table (1995)	
Power Analyzer: Voltech PM3000A v2.20 s/n 9229	
AC Source: Mains / Manual Source	
Overall Result:	
PASS	

Class	A
Class Multiplier	1
Power	13.6 W

This EUT don't need to test. Because the power of EUT is below 75 W.

3.4 Flicker

3.4.1 Test information

Test engineer	Tae Young, Jang
Test date	March 14, 2006
Climate condition	Ambient temperature : 22.8 , Relative humidity : 34 % Atmospheric pressure : 102.1 kPa
Test place	Shielded room # 3

3.4.2 Test equipment

Equipment	Model name	Manufacturer	Serial no.	Calibration	
				Date	Interval(Month)
Universal Power Analyzer	PM3000A	Voltech	AU112/9229	2005-08-05	12
Reference Impedance Network	NI2415	ZIMMER	A0412051	N/A	N/A
IEC1000-3	Release 3.11	Voltech	-	N/A	N/A

EUT Test Setup

The EUT was set up is accordance with the requirements of the applied standard.



Measurement Results	<p>Complied</p> <p>The measured emissions of the EUT have found to be below the specified limits.</p>
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Test Data

Operating Mode :

SCC-C6403P	
Product: CCTV CAMERA	2006 Mar 14 4:56pm
Serial no:	Page 1 of 1
Description:	
Result Name: SCC-C6403P(FLICKER)	
Voltech IEC1000-3 Windows Software 3.13.08	Test Date: 2006 Mar 14 3:36pm
Type of Test: Flickermeter Test - Table	
Power Analyzer: Voltech PM3000A v2.20 s/n 9229	
AC Source: Mains / Manual Source	
Overall Result:	Notes:
PASS	Measurement method - Voltage

	Pst	dc (%)	dmax (%)	d(t) > 3.3%(ms)
Limit	1.000	3.300	4.000	500
Reading 1	0.071	0.017	0.047	0

3.5 ESD

3.5.1 Test information

Test engineer	Tae Young, Jang
Test date	March 14, 2006
Climate condition	Ambient temperature : 22.1 , Relative humidity : 31 % Atmospheric pressure : 101.5 kPa
Test place	Shielded room #3

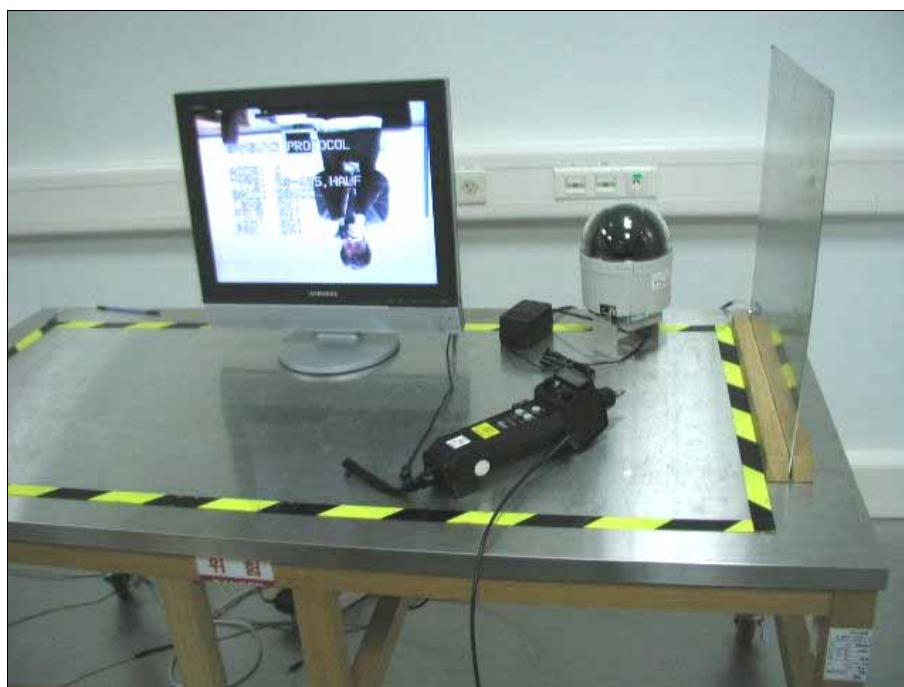
3.5.2 Test equipment

Equipment	Model name	Manufacturer	Serial no.	Calibration	
				Date	Interval(Month)
ESD Gun	MZ-15	Keytek	504173	2005-03-31	12

EUT Test Setup

The EUT was operated on a wooden table 0.8 m above the reference ground.

A HCP is lying on the table. Between the EUT and the HCP 0.5 mm is isolated base.



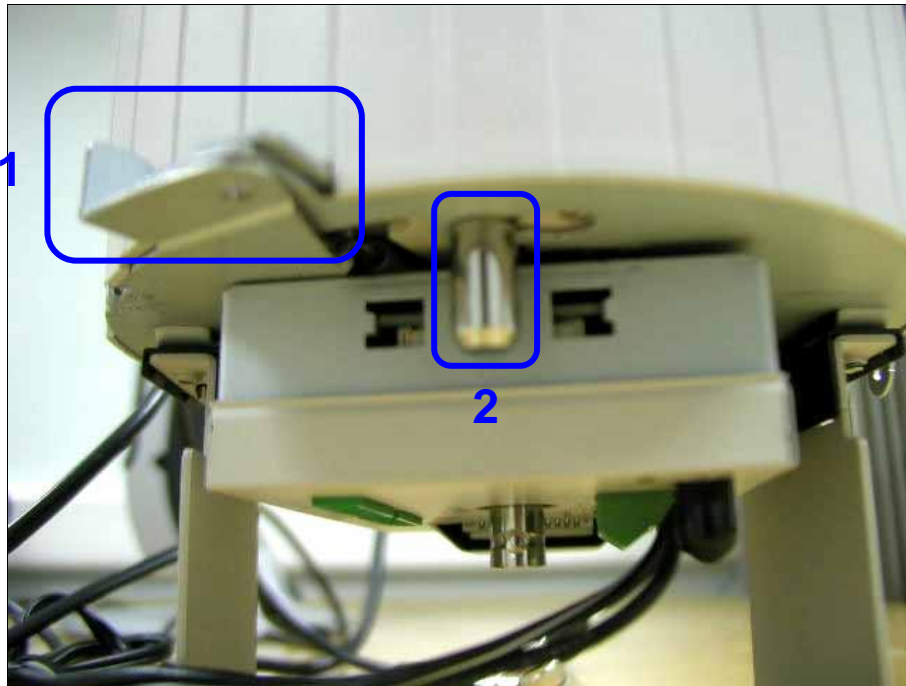
Measurement Results	<p>Complied</p> <p>No Operation errors were detected during or after the applied test.</p>
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Test Data

	No	Applied Point Name	Discharge Method	Test Level	Tested No.	Criteria	Result
Indirect		Horizontal Plane	Contact	$\pm 2 \text{ kV}/\pm 4 \text{ kV}$	100	B	A
Indirect		Vertical Plane	Contact	$\pm 2 \text{ kV}/\pm 4 \text{ kV}$	300	B	A
Direct	1	Lock panel	Contact	$\pm 2 \text{ kV}/\pm 4 \text{ kV}$	60	B	A
Direct	2	Fixed pin	Contact	$\pm 2 \text{ kV}/\pm 4 \text{ kV}$	60	B	A
Direct	3	Video out	Contact	$\pm 2 \text{ kV}/\pm 4 \text{ kV}$	40	B	A

Test Points

The red mark indicates 'air discharge method' was applied to the EUT and the blue mark indicates 'contact discharge method' was applied.



Bottom (Left)



Bottom (Right)

3.6 Radiated Immunity

3.6.1 Test information

Test engineer	Tae Young, Jang
Test date	March 15, 2006
Climate condition	Ambient temperature : 19.8 , Relative humidity : 34 % Atmospheric pressure : 101.8 kPa
Test place	3m Fully-anechoic Chamber

3.6.2 Test equipment

Equipment	Model name	Manufacturer	Serial no.	Calibration	
				Date	Interval(Month)
Amplifier	AR200W1000M7A	AR	17282	N/A	N/A
Dual Directional Coupler	DCU	R/S	316976/001	2005-11-04	12
Signal Generator	SML03	R/S	101279	2005-11-04	12
RMS/PEAK VOLTMETER	URE3	R/S	839432/032	2005-11-05	12
Power Meter	NRVD	R/S	841501/010	2005-11-05	12
Antenna	AT1080	AR	16511	N/A	N/A

EUT Test Setup

The EUT was operated on a wooden table 0.8 meter above the reference ground.

The test distance was 3 meters.



**Measurement
Results**

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

Test Data

Test Level	Freq. Range [MHz]	Modulation	Dwell Time	Test Side	Criteria		Result	
					Hor	Ver	Hor	Ver
10 V/m	80 ~ 1 000	80 % AM @ 1 kHz	3 s	Front	C	C	B	B
				Left	C	C	B	B
				Rear	C	C	B	B
				Right	C	C	B	B
3 V/m	80 ~ 1 000	80 % AM @ 1 kHz	3 s	Front	B	B	B	B
				Left	B	B	B	B
				Rear	B	B	B	B
				Right	B	B	B	B
1 V/m	80 ~ 1 000	80 % AM @ 1 kHz	3 s	Front	A	A	A	A
				Left	A	A	A	A
				Rear	A	A	A	A
				Right	A	A	A	A

Test Level	Freq. Range [MHz]	Modulation	Dwell Time	Test Side	Criteria		Result	
					Hor	Ver	Hor	Ver
10 V/m	80 ~ 1 000	PM with 1 Hz (0.5 s ON: 0.5 s OFF)	3 s	Front	C	C	B	B
				Left	C	C	B	B
				Rear	C	C	B	B
				Right	C	C	B	B
3 V/m	80 ~ 1 000	PM with 1 Hz (0.5 s ON: 0.5 s OFF)	3 s	Front	B	B	B	B
				Left	B	B	B	B
				Rear	B	B	B	B
				Right	B	B	B	B
1 V/m	80 ~ 1 000	PM with 1 Hz (0.5 s ON: 0.5 s OFF)	3 s	Front	A	A	A	A
				Left	A	A	A	A
				Rear	A	A	A	A
				Right	A	A	A	A

3.7 EFT

3.7.1 Test information

Test engineer	Tae Young, Jang
Test date	March 14, 2006
Climate condition	Ambient temperature : 22.1 , Relative humidity : 31 % Atmospheric pressure : 101.5 kPa
Test place	Shielded room # 2

3.7.2 Test equipment

Equipment	Model name	Manufacturer	Serial no.	Calibration	
				Date	Interval(Month)
EFT/Burst Test System	PEFT	HAEFELY	152608	2005-05-17	12
3 Phases CDN 690V/100A	FP-EFT 100M	HAEFELY	152635	2005-05-24	12
Test Software	Win FEAT&R	HAEFELY	Ver. 1.70	N/A	N/A

EUT Test Setup

The EUT was set up as per normal use on a wooden table 0.8 m above the ground reference plane and in accordance with the requirements of the applied standard. See photo for set up.



Measurement Results	<p>Complied</p> <p>No Operation errors were detected during or after the applied test.</p>
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Test Data

Port	Coupling	Test Level		Phase wave shape (kHz)	Polarity	Criteria	Result
		Voltage (kV)	Frequency (kHz)				
AC Port	Live	0.5	5	5/50	+/-	B	A
		1	5	5/50	+/-	B	B
		2	5	5/50	+/-	B	B
	Neutral	0.5	5	5/50	+/-	B	A
		1	5	5/50	+/-	B	B
		2	5	5/50	+/-	B	B
	Live to Neutral	0.5	5	5/50	+/-	B	A
		1	5	5/50	+/-	B	B
		2	5	5/50	+/-	B	B

3.8 Surge

3.8.1 Test information

Test engineer	Tae Young, Jang
Test date	March 14, 2006
Climate condition	Ambient temperature : 22.9 , Relative humidity : 28 % Atmospheric pressure : 101.7 kPa
Test place	Shielded room # 2

3.8.2 Test equipment

Equipment	Model name	Manufacturer	Serial no.	Calibration	
				Date	Interval(Month)
Surge 8000	PSURGE 8000	HAEFELY	152602	2006-02-10	12
Surge Impulse Module	PIM 100	HAEFELY	152288	2006-02-10	12
Coupling Decoupling Network	PCD 120	HAEFELY	148918	2005-05-24	12
Coupling Decoupling Network	FP-SURGE 100M	HAEFELY	152636	2005-05-25	12
Impulse Module	PIM 120	HAEFELY	150663	2006-02-10	12
Test Software	Win FEAT&R	HAEFELY	Ver. 1.70	N/A	N/A

EUT Test Setup

The EUT was operated on a wooden table 0.8 meter above the reference ground.



Measurement Results	<p>Complied</p> <p>No Operation errors were detected during or after the applied test.</p>
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Test Data

Port	Coupling	Test Level			Phase wave shape [us]	Polarity	Criteria	Result
		Voltage [KV]	Repetition Time	No				
AC	Line-Neutral	0.5, 1	60 s	40	1.2/50(8/20)	+/-	B	A

3.9 Conducted Immunity

3.9.1 Test information

Test engineer	Tae Young, Jang
Test date	March 16, 2006
Climate condition	Ambient temperature : 22.4 , Relative humidity : 29 % Atmospheric pressure : 101.6 kPa
Test place	Conducted Immunity Room

3.9.2 Test equipment

Equipment	Model name	Manufacturer	Serial no.	Calibration	
				Date	Interval(Month)
Amplifier	150A220	AR	17077	N/A	N/A
Dual Directional Coupler	DCU	R/S	316976/001	2005-11-04	12
Signal Generator	SML03	R/S	101279	2005-11-04	12
RMS/PEAK VOLTMETER	URE3	R/S	839432/032	2005-11-05	12
Power Meter	NRVD	R/S	841501/010	2005-11-05	12
Coupling Decoupling Network	M016	M016	20571	2005-04-26	12

EUT Test Setup

The EUT was operated on a wooden table 0.8 meter above the reference ground.



Measurement Results	<p>Complied</p> <p>No Operation errors were detected during or after the applied test.</p>
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Test Data

Port	Freq. Range	Modulation	Level	Dwell Time	Coupling	Criteria	Result
AC mains	150 kHz ~ 100 MHz	80 % AM @ 1 kHz	10 V	3 s	CDN	C	B
	150 kHz ~ 100 MHz	80 % AM @ 1 kHz	3 V	3 s	CDN	B	B
	150 kHz ~ 100 MHz	80 % AM @ 1 kHz	1 V	3 s	CDN	A	A

Port	Freq. Range	Modulation	Level	Dwell Time	Coupling	Criteria	Result
AC mains	150 kHz ~ 100 MHz	PM with 1 Hz (0.5 s ON: 0.5 s OFF)	10 V	3 s	CDN	C	B
	150 kHz ~ 100 MHz	PM with 1 Hz (0.5 s ON: 0.5 s OFF)	3 V	3 s	CDN	B	B
	150 kHz ~ 100 MHz	PM with 1 Hz (0.5 s ON: 0.5 s OFF)	1 V	3 s	CDN	A	A

3.10 Voltage Dips

3.10.1 Test information

Test engineer	Tae Young, Jang
Test date	March 14, 2006
Climate condition	Ambient temperature : 22.1 , Relative humidity : 31 % Atmospheric pressure : 101.5 kPa
Test place	Shielded room # 2

3.10.2 Test equipment

Equipment	Model name	Manufacturer	Serial no.	Calibration	
				Date	Interval(Month)
Voltage Dip & Interruption	PFS 503	EM TSET	63A-0513100236	2005-06-16	12
Test Software	ISMIEC	EM TEST	Ver. 4.05	N/A	N/A

EUT Test Setup

The EUT was operated on a wooden table 0.8 meter above the reference ground.



Measurement Results	<p>Complied</p> <p>No Operation errors were detected during or after the applied test.</p>
----------------------------	--

Test Data

Voltage Dips/Interference

Test Voltage		Number of Applications	Time between Applications	Angle (Degrees)	Criteria	Result
Reduction Level	Period					
Reduction 30 & 60 %	0.5 / 1 / 5 / 10	10	10 s	0 / 180	B/C	A
Reduction 100 %	0.5 / 1 / 5	10	10 s	0	B/C	A

Mains supply voltage variation

Voltage 10 % UP	Criteria Result	Criteria Result
15 % DOWN	A	A
Voltage	A	A

4. Appendix

4.1 EUT photography



Picture 1. EUT (Front)



Picture 2. EUT (Rear)