

EMC TEST REPORT

Project No.	LBE091979	Revision No.	NONE		
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	2009.06.26			
EUT Equipment Under Test	Kind of product	CCTV Monitor			
	Model No.	SMT-1723P			
		Variant Model No.	NONE		
	Manufacturer	Tianjin Communication & Broadcasting Group Electronics Science & Technology Co., Ltd 35Xinye 6th Avenue, the West Zone of TEDA, Tianjin P.R.CHINA 300462			
Applied Standards		EN61000-6-4:2001			
		EN61000-3-2:2006			
		EN61000-3-3:1995+A1:2001+A2:2005			
		EN50130-4:1995+A1:1998			
Issue date		2009.07.07			
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 : Hyun Jeong Jang 		Reviewed by : 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. 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 SEC EMC Laboratory.					
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1. Summary of test results

1.1 Emission

The EUT has been tested according to the following specifications:

Applied	Test type	Applied standard	Result	Remarks
☒	Conducted Disturbance (Mains Port)	EN61000-6-4:2001	Complied	Minimum margin is 14.1 dB at 0.174 MHz
☒	Radiated Disturbance		Complied	Minimum margin is 7.0 dB at 81.194 MHz
☒	Harmonics current	EN61000-3-2:2006	N/A	The power of EUT is below 75W
☒	Voltage fluctuation & Flicker	EN61000-3-3:1995+ A1:2001+A2:2005	Complied	Meets the Requirements

1.2 Immunity

The EUT has been tested according to the following specifications:

Applied	Test type	Applied standard	Performance Criterion	
			Result	Specification
☒	Electrostatic discharge	EN61000-4-2:1995	A ☒ B ☐ C ☐	B
☒	Radiated, radio-frequency, electromagnetic field	EN61000-4-3:1995	A ☐ B ☒ C ☐	C
☒	Electrical fast transient/burst	EN61000-4-4:1995	A ☒ B ☐ C ☐	B
☒	Surge	EN61000-4-5:1995	A ☒ B ☐ C ☐	B
☒	Radio-frequency conducted	EN61000-4-6:1996	A ☐ B ☒ C ☐	C
☒	Voltage dips, short interruptions and voltage variations	EN61000-4-11:1994	A ☒ B ☐ C ☐	B : 30%,60%, 100%Reduction A : Voltage 10% Up Voltage 15% Down
			A ☒ B ☐ C ☐	
			A ☒ B ☐ C ☐	
☐	Power-frequency magnetic field	EN61000-4-8:1993	A ☐ B ☐ C ☐	A

2. General Information

2.1 Test facility

The SEC EMC Laboratory 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 SEC EMC Laboratory is operated as testing laboratory in accordance with the requirements of ISO/IEC 17025:2005.

2.2 Accreditation and listing

Laboratory Qualifications		Remarks
	KOLAS(Korea Laboratory Accreditation Scheme)	Accredited : 124
	Korea Communications Commission Radio Research Agency	Accredited : KR0004
	FCC(Federal Communications Commission)	Accredited : KR0004
	National Voluntary Laboratory Accreditation Program	Lab Code: 200623-0
	Norges Elektriske Materiellkontroll	Accredited : ELA 195
	VCCI (Voluntary Control Council for Interference by Information Technology Equipment)	C-2421,R-2224
	China Quality Certification Center	5-053, 5-054
	TUV Rhineland	H9354285
	GOST(GOSTSTANDART)	ROSTEST
	Elektrotechnický Zkušební Ústav	Reg. No.: 001
	IC(Industry Canada)	Assigned Code: 5871

3. Test Setup configuration

3.1 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	Cable Type
CCTV Monitor	SMT-1723P	-	Samsung	-
AC adapter	ADP-5412VE	DBC01719	Samsung	-
CCTV Camera (A)	SCC-B5223P	ZAPV6V1S400008P	Samsung	-
AC adapter (A)	DAD12050DKA	-	Samsung	-
CCTV Camera (B)	SCC-B2335P	-	Samsung	-
AC adapter (B)	YK-12060K	-	Samsung	-
Digital Video Recorder	SHR-6042	-	Samsung	-
Ac adapter (Digital Video Recorder)	ADP-5412VE	DBC600803	Samsung	-

3.2 EUT operating mode

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

Operating Mode 1	CCTV Monitoring (Video A)
Operating Mode 2	CCTV Monitoring (Video B)
Operating Mode 3	DVR Monitoring (Standby)

3.3 Details of Sampling

Customer selected, single unit.

3.4 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	To	Length[m]	Ferrite Core. [Y/N]
1	Power (EUT)	AC adapter	1.8	N
2	Video out A	From CCTV Camera	0.5	N
3	Video out B	From CCTV Camera	0.5	N
4	S-Video 1	Cable	0.8	N
5	S-Video 2	Cable	0.8	N
6	VGA	From CCTV EUT	1.0	N
7	Audio In	1 k Ω Termination	-	-
8	Power (Camera A)	AC adapter	1.8	N
9	Power (Camera B)	AC adapter	1.8	N
10	Power (DVR)	AC adapter	1.8	N

3.5 EUT Description

The following features describe EUT represented by this report:

Model Name		SMT-1723	SMT-1923
Sales Area		World Wide	
Broadcasting System		NTSC/PAL System	
Panel	Inch	17"	19"
	Display Type	SXGA a-Si TFT LCD	
	Resolution (HxV)	1280 X 1024	
	Brightness(cd/m2)	300	
	Contrast	1000:1	
	Response Time	5msec	
	Viewing Angle Degree	80/80/80/80	
	Active Display Area	337.92mm(H) x 270.336mm(V)	376.32mm(H) x 301.056mm(V)
	Pixel Pitch(mm)	0.264mm(H) x 0.264mm(V)	0.294mm(H) x 0.294mm(V)
Picture	Scan System	Progressive	
	CVBS Resolution	NTSC:600TVL PAL:620TVL	
	A/D bits	10 bits	
	Scanning frequency	Horizontal: 30 kHz – 81 kHz, Vertical: 56 Hz – 75 Hz	
	Color System	NTSC 3.58/PAL	
	Screen Mode	4:3	
	3D Comb Filter	Yes	
	Noise Reduction	Yes	
	PIP/PBP	Yes/Yes	
	Freeze	Yes	
Video	Under Scan	Yes	
	Composite	2CH input, 1.0Vp-p, 75Ω terminated, Loop Through out, BNC Type	
	S-Video	1CH input(Y/C), Loop Through out	
Audio	VGA	1CH input	
		2Channel input, 2W Stereo, RCA Type	
OSD	Language	12 Language (Eng/Chn/Fre/Ger/Spa/Ita/Por/Dut/Swe/Rus/Kor/Jpn)	
HAS Stand	Lift	0 ~ 100mm	
	Tilt	-5° ~ 25°	
	Swivel	-165° ~ +165°	
Dimensions(WxDxH)	Net	371.0mm x 219.8mm x 367.6mm (Lowest)	412.0mm x 219.8mm x 398.5mm (Lowest)
		371.0mm x 219.8mm x 467.6mm (Highest)	412.0mm x 219.8mm x 498.5mm (Highest)
Weight	Net Weight	5.9Kg	6.8Kg
Electric Performance	Power Supply	DC 12V	DC 12V
	Power Consumption	42W	42W
Operating condition	Temperature	0°C – +40°C	
	Humidity	20% – 90% (non-condensation)	

3.6 Performance Criteria

Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion B

After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

3.7 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.)

3.7.1 Emission

Test type			Measurement uncertainty (C.L. 95%, k = 2)
Conducted Disturbance	Main terminal		± 3.5 dB
Radiated Disturbance	Horizontal	30 to 300 MHz	± 4.77 dB
		300 to 1 GHz	± 5.00 dB
	Vertical	30 to 300 MHz	± 5.03 dB
		300 to 1 GHz	± 5.03 dB
Harmonics current			7.5 %
Voltage fluctuation & Flicker			5.8 %

4. Results of individual test

4.1 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 Clause 9.

Limits for conducted disturbance at the mains ports of class A ITE

Frequency range Limits MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	79	66
0,50 to 30	73	60
NOTE The lower limit shall apply at the transition frequency		

Limits for conducted disturbance at the mains ports of class B ITE

Frequency range Limits MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	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.		

4.1.1 Test instrumentation

Test instrumentation used in the Conducted disturbance test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Field strength meter	ESCI	R&S	100370	2009-05-07	12
L.I.S.N	ENV216	R&S	100456	2008-09-12	12
L.I.S.N	ESH3-Z5	R&S	100261	2009-04-03	12

4.1.2 Photograph of the test Configuration

(Front)



4.1.3 Test results

Operating condition	CCTV Monitoring (Video A)					
Test date	2009-07-01		Test engineer		Hyun Jeong Jang	
Climate condition	Ambient temperature	24.6℃	Relative humidity	53%	Atmospheric Pressure	99.8KPa
	Test place	Shielded Room #1				
Note	* QP : Quasi-peak, AV: Average * Result = Level(QP or AV) + Corr. (LISN Insertion loss + Cable loss) * Margin = Limit - Level					

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

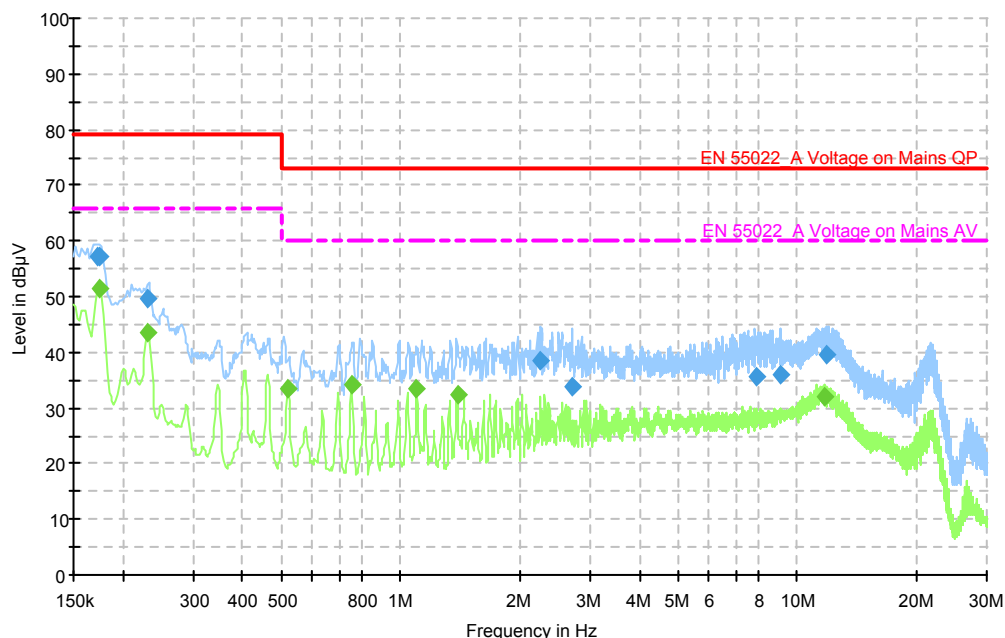
Subrange 1
 Frequency Range: 150kHz - 30MHz
 Receiver: ESCI 3
 Transducer: ENV216 / Receiver-2-Line-LISN ENV216

Scan Setup: EN55022_A_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
150kHz - 30MHz	QuasiPeak; Average	9kHz	15s	ESCI 3

EN55022_A with ENV 2-Line-LISN



Final Measurement Detector 1

Frequency (MHz)	Quasi Peak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.172 500	57.0	L1	9.6	22.0	79.0
0.174 500	57.0	L1	9.6	22.0	79.0
0.231 500	49.5	N	9.6	29.5	79.0
2.260 500	38.5	L1	9.7	34.5	73.0
2.692 500	34.0	L1	9.7	39.0	73.0
7.840 500	35.8	N	9.8	37.2	73.0
9.038 500	35.9	N	9.9	37.1	73.0
11.870 500	39.7	L1	9.9	33.3	73.0

Final Measurement Detector 2

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.173 500	51.5	L1	9.6	14.5	66.0
0.230 500	43.6	N	9.6	22.4	66.0
0.520 500	33.5	N	9.6	26.5	60.0
0.751 500	34.3	N	9.6	25.7	60.0
1.097 500	33.5	N	9.6	26.5	60.0
1.388 500	32.4	N	9.7	27.6	60.0
11.663 500	31.9	N	9.9	28.1	60.0

Operating condition	CCTV Monitoring (Video B)					
Test date	2009-07-01		Test engineer		Hyun Jeong Jang	
Climate condition	Ambient temperature	24.6℃	Relative humidity	53%	Atmospheric Pressure	99.8KPa
Test place	Shielded Room #1					
Note	* QP : Quasi-peak, AV: Average * Result = Level(QP or AV) + Corr. (LISN Insertion loss + Cable loss) * Margin = Limit - Level					

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

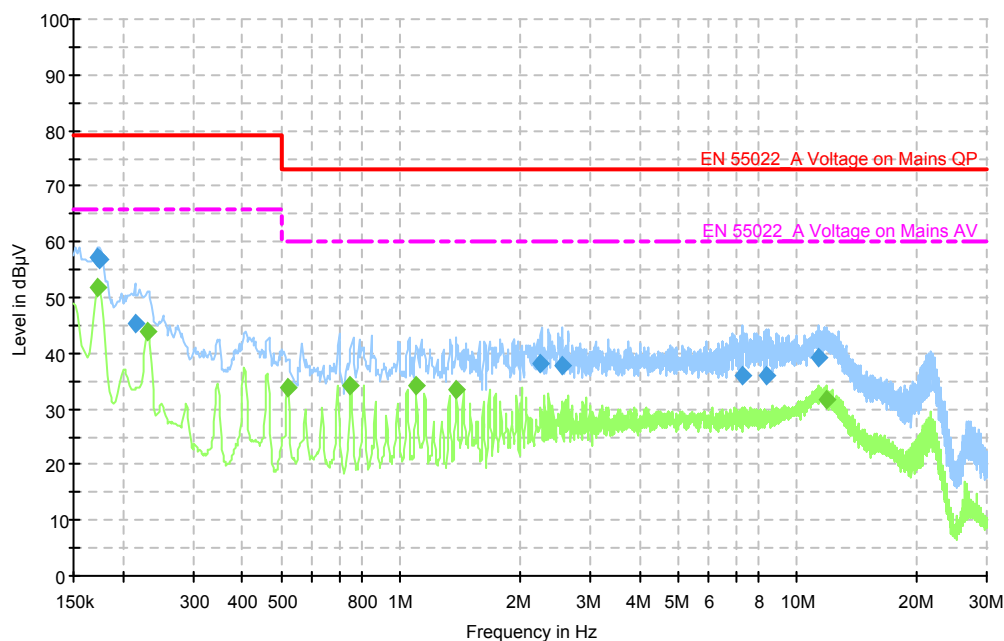
Subrange 1
 Frequency Range: 150kHz - 30MHz
 Receiver: ESCI 3
 Transducer: ENV216 / Receiver-2-Line-LISN ENV216

Scan Setup: EN55022_A_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
150kHz - 30MHz	QuasiPeak; Average	9kHz	15s	ESCI 3

EN55022_A with ENV 2-Line-LISN



Final Measurement Detector 1

Frequency (MHz)	Quasi Peak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.172 500	57.2	L1	9.6	21.8	79.0
0.174 500	56.7	L1	9.6	22.3	79.0
0.215 500	45.4	N	9.6	33.6	79.0
2.256 500	38.0	L1	9.7	35.0	73.0
2.541 500	37.9	L1	9.7	35.1	73.0
7.251 500	35.8	N	9.8	37.2	73.0
8.363 500	35.9	L1	9.8	37.1	73.0
11.313 500	39.3	L1	9.9	33.7	73.0

Final Measurement Detector 2

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.172 500	51.8	N	9.6	14.2	66.0
0.231 500	43.8	N	9.6	22.2	66.0
0.518 500	33.9	N	9.6	26.1	60.0
0.749 500	34.2	N	9.6	25.8	60.0
1.094 500	34.0	N	9.6	26.0	60.0
1.382 500	33.4	N	9.7	26.6	60.0
11.899 500	31.6	N	9.9	28.4	60.0

Operating condition	DVR Monitoring (Standby)					
Test date	2009-07-01		Test engineer		Hyun Jeong Jang	
Climate condition	Ambient temperature	24.6℃	Relative humidity	53%	Atmospheric Pressure	99.8KPa
Test place	Shielded Room #1					
Note	* QP : Quasi-peak, AV: Average * Result = Level(QP or AV) + Corr. (LISN Insertion loss + Cable loss) * Margin = Limit - Level					

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

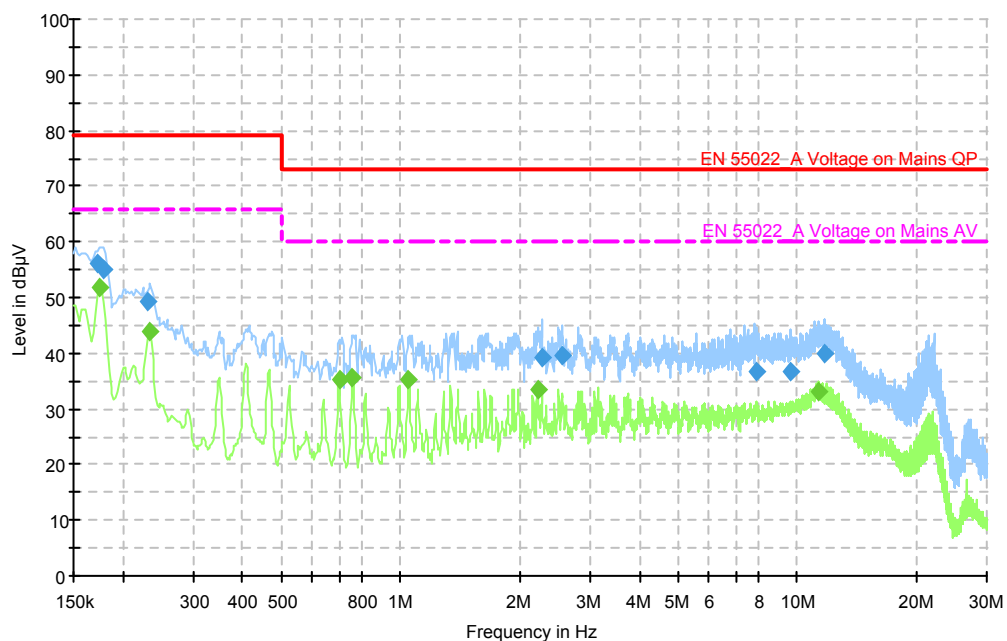
Subrange 1
 Frequency Range: 150kHz - 30MHz
 Receiver: ESCI 3
 Transducer: ENV216 / Receiver-2-Line-LISN ENV216

Scan Setup: EN55022_A_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
150kHz - 30MHz	QuasiPeak; Average	9kHz	15s	ESCI 3

EN55022_A with ENV 2-Line-LISN



Final Measurement Detector 1

Frequency (MHz)	Quasi Peak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.172 500	56.1	N	9.6	22.9	79.0
0.178 500	54.9	L1	9.6	24.1	79.0
0.231 500	49.4	N	9.6	29.6	79.0
2.264 500	39.2	L1	9.7	33.8	73.0
2.551 500	39.5	L1	9.7	33.5	73.0
7.843 500	36.5	N	9.8	36.5	73.0
9.615 500	36.7	L1	9.9	36.3	73.0
11.695 500	39.9	L1	9.9	33.1	73.0

Final Measurement Detector 2

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.174 500	51.9	N	9.6	14.1	66.0
0.233 500	44.0	N	9.6	22.0	66.0
0.699 500	35.4	N	9.6	24.6	60.0
0.757 500	35.5	N	9.6	24.5	60.0
1.047 500	35.2	N	9.6	24.8	60.0
2.212 500	33.6	L1	9.7	26.4	60.0
11.257 500	32.9	N	9.9	27.1	60.0

4.2 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 meters and elevated between 1 and 4 meters. Both vertical and horizontal antenna polarizations were measured.

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

Frequency range Limits MHz	Quasi-peak Limits dB dB($\mu\text{V}/\text{m}$)	
	Class A	Class B
30 to 230	40	30
230 to 30	47	37

NOTE 1 The lower limit shall apply at the transition frequency

NOTE 2 Additional provisions may be required for cases where interference occurs.

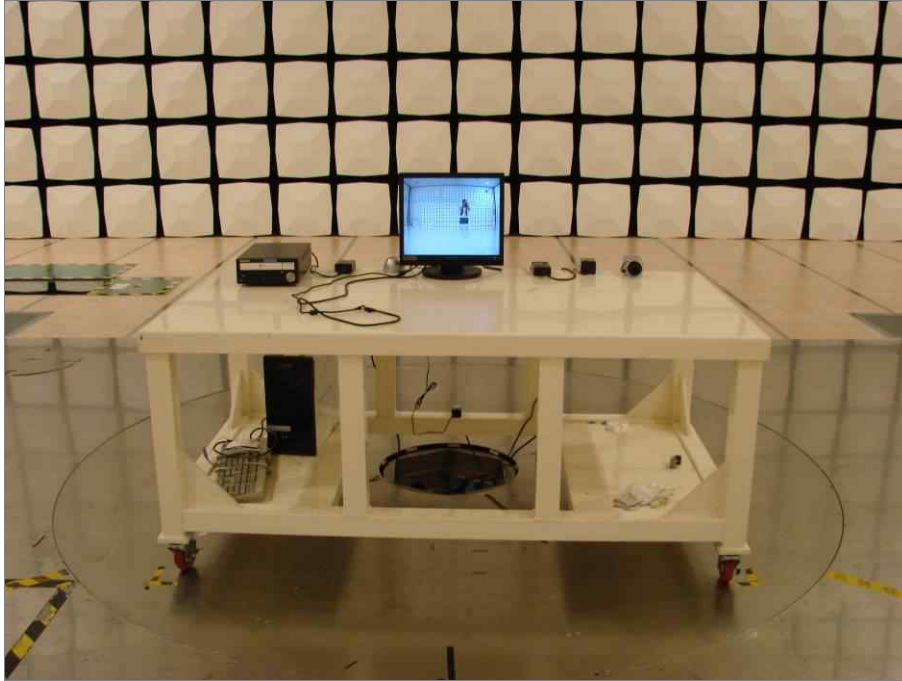
4.2.1 Test instrumentation

Test instrumentation used in the Radiated disturbance was as follows:

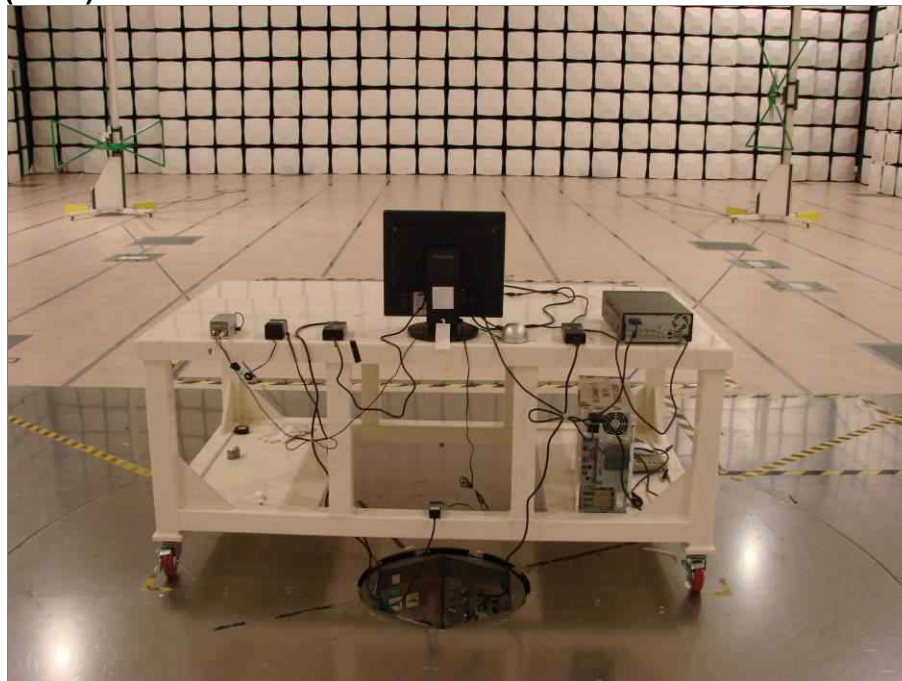
Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Bi-con Antenna	CBL6112D	SCHAFFNER	22603	2009-04-23	24
Bi-con Antenna	CBL6112D	SCHAFFNER	22601	2009-04-23	24
EMI Receiver	ESIB-26	R&S	100288	2009-05-07	12
EMI Receiver	ESIB-26	R&S	832692/002	2009-04-17	12
AMPLIFIER	310N	SONOMA	251674	2009-05-20	12
AMPLIFIER	310N	SONOMA	186467	2009-05-20	12
Ant Mast	MA4000	INN CO	-	N/A	N/A
Ant Mast	MA4000	INN CO	-	N/A	N/A
Mast Controller	CO2000	INN CO	CO2000/212/9700305/L	N/A	N/A
Mast Controller	CO2000	INN CO	CO2000/187/9271204/L	N/A	N/A
Test software	EP5/RE	TOYO	VER 3.1.20	N/A	N/A
RF Selector	NS4900	TOYO	-	N/A	N/A

4.2.2 Photograph of the test Configuration

(Front)

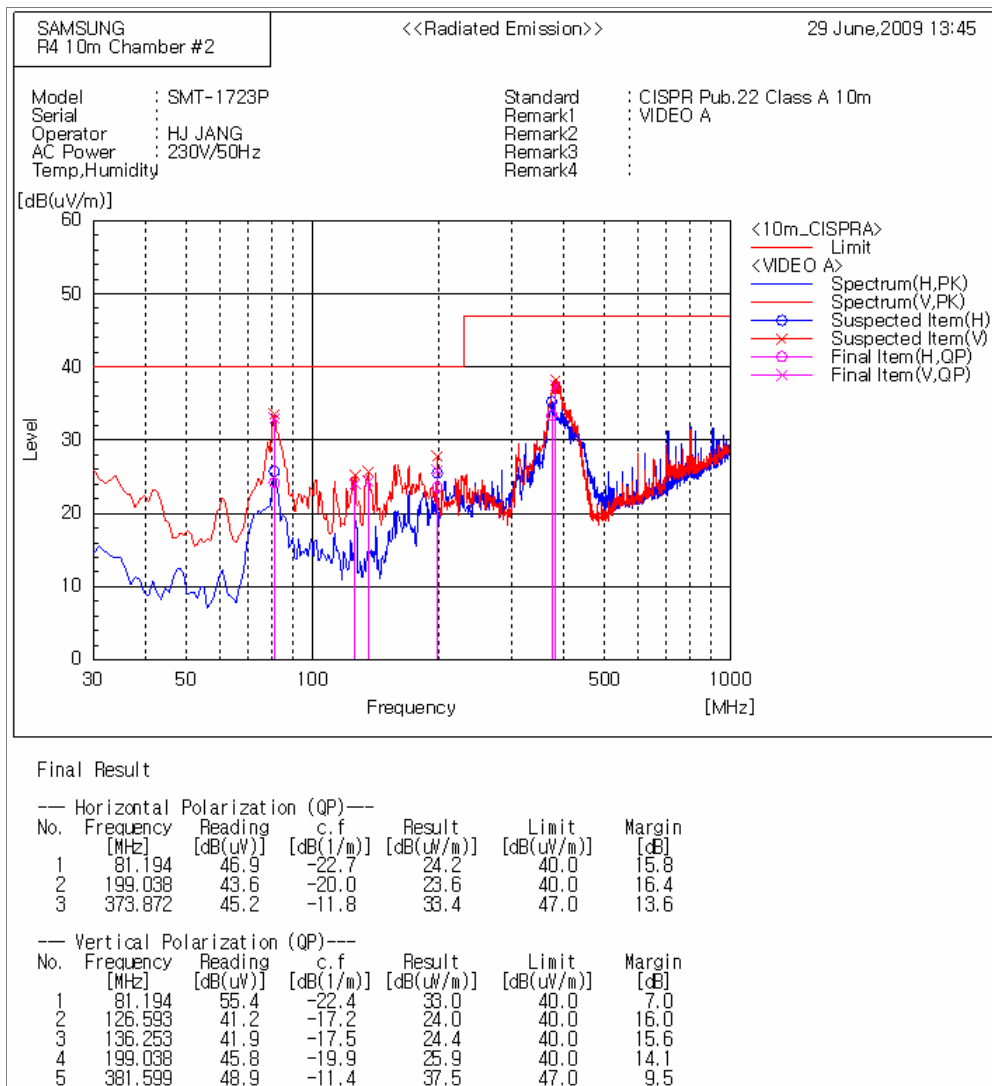


(Rear)

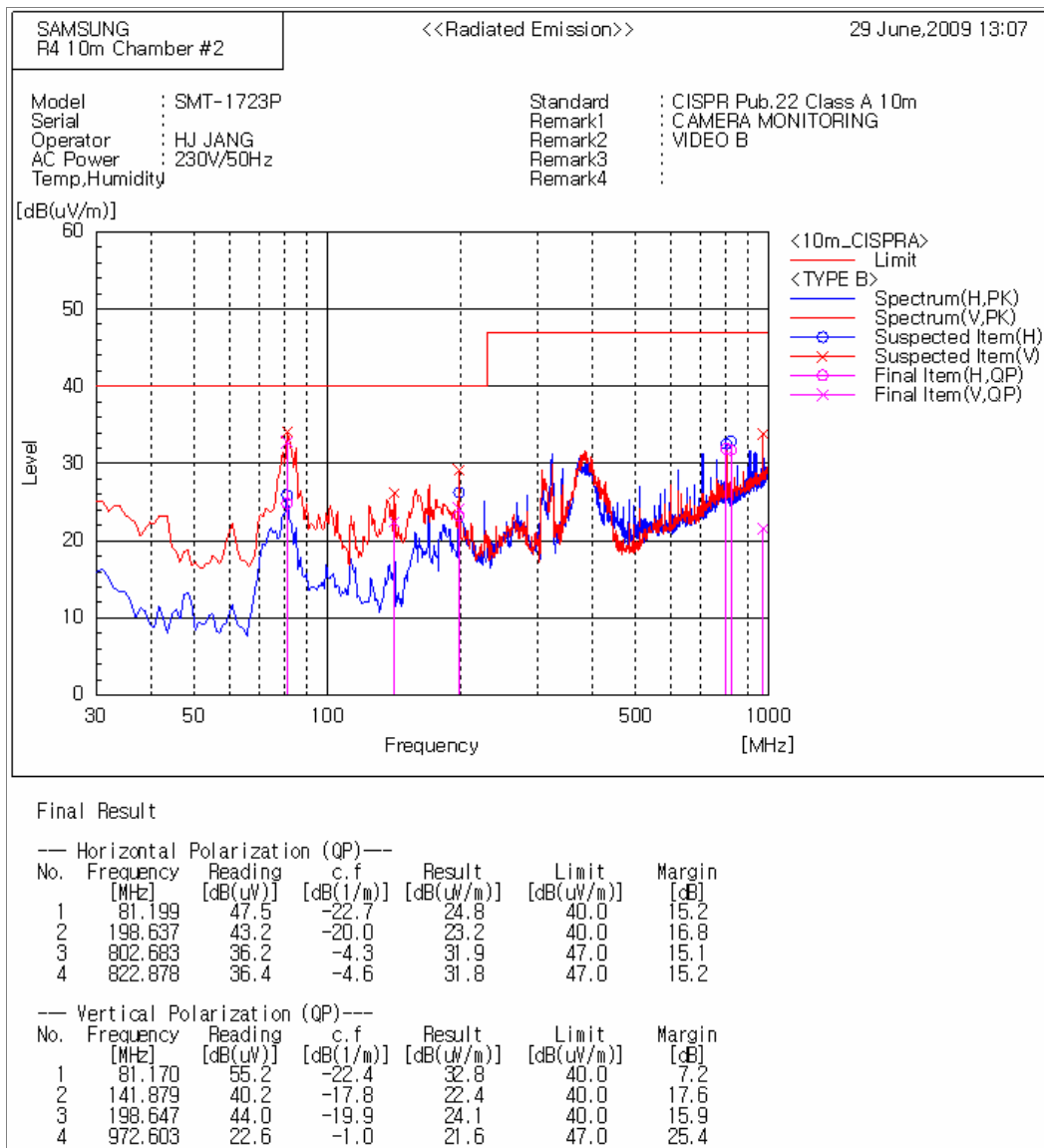


4.2.3 Test results

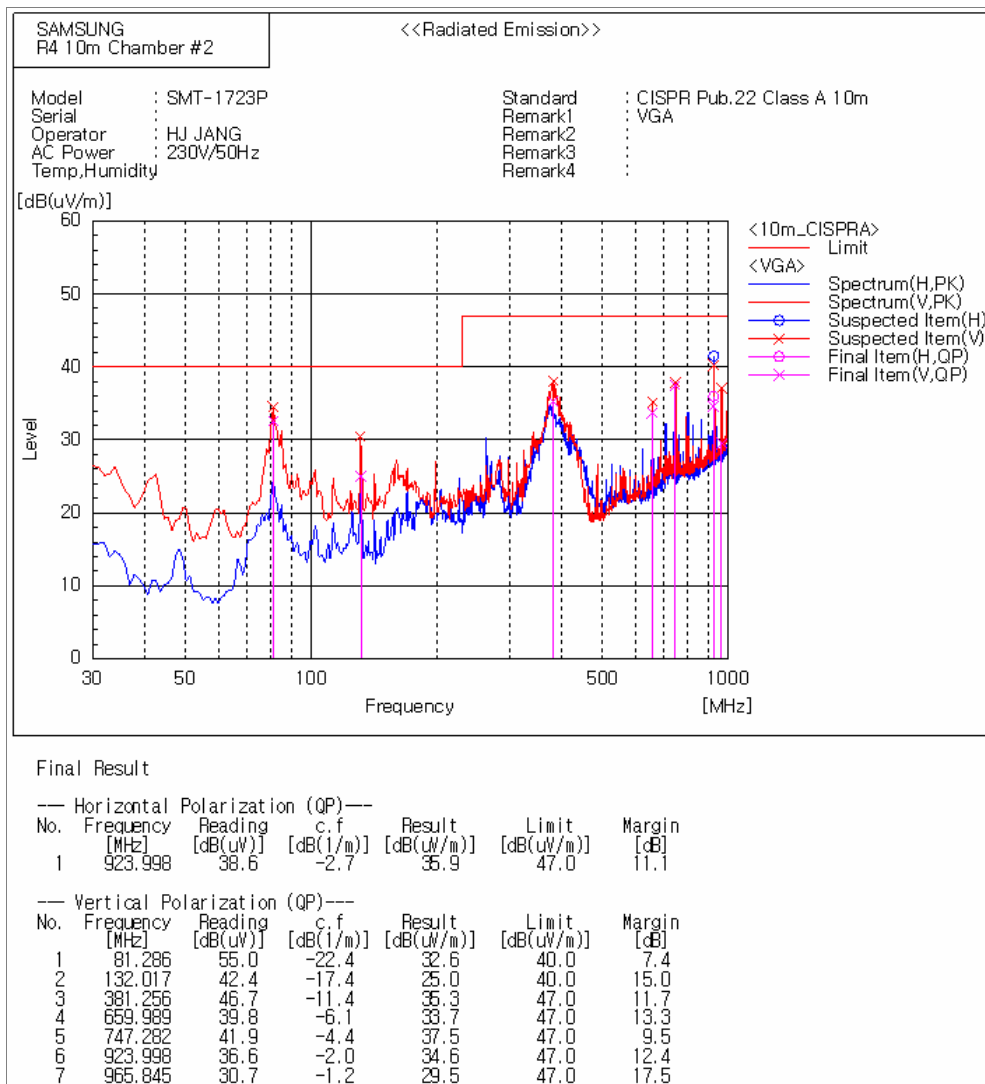
Operating condition	CCTV Monitoring (Video A)					
Test date	2009-06-29		Test engineer		Hyun Jeong Jang	
Climate condition	Ambient temperature	22.1 °C	Relative humidity	43%	Atmospheric Pressure	100.1KPa
Test place	10m Semi-Anechoic Chamber					
Note	* Test distance : 10 m * Result = Reading + c.f (Antenna factor + Cable loss- Amp Gain) * Margin = Limit – Result					



Operating condition	CCTV Monitoring (Video B)					
Test date	2009-06-29		Test engineer		Hyun Jeong Jang	
Climate condition	Ambient temperature	22.1 °C	Relative humidity	63%	Atmospheric Pressure	100.1KPa
Test place	10m Semi-Anechoic Chamber					
Note	* Test distance : 10 m * Result = Reading + c.f (Antenna factor + Cable loss- Amp Gain) * Margin = Limit – Result					



Operating condition	DVR Monitoring (Standby)					
Test date	2009-06-29		Test engineer		Hyun Jeong Jang	
Climate condition	Ambient temperature	22.1 °C	Relative humidity	63%	Atmospheric Pressure	100.1KPa
Test place	10m Semi-Anechoic Chamber					
Note	* Test distance : 10 m * Result = Reading + c.f (Antenna factor + Cable loss- Amp Gain) * Margin = Limit – Result					



4.3 Harmonics current

The EUT operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.

The power consumption, steady state harmonic currents were measured in the tested operating mode(s). The EUT measured in accordance with the test conditions described in Annex C (C.10).

Limits for Class A equipment

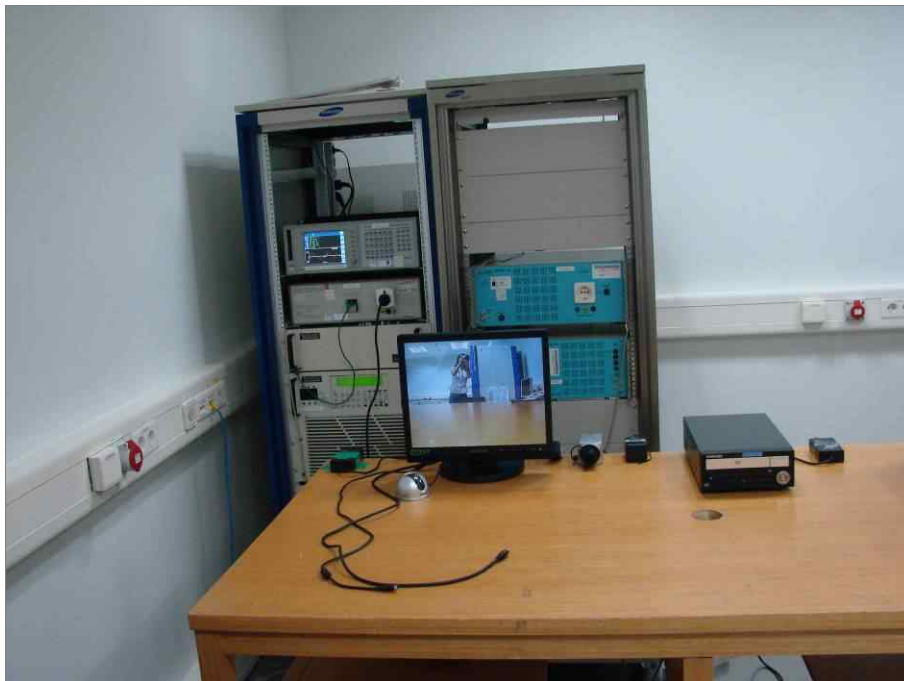
Harmonic order	Maximum permissible harmonic current
n	A
Odd Harmonics	
3	2,30
5	1,14
7	0,77
9	0,40
11	0,30
13	0,21
$15 \leq n \leq 39$	0,15 15/n
Even harmonics	
2	1,08
4	0,43
6	0,30
$8 \leq n \leq 40$	0,23 8/n

4.3.1 Test instrumentation

Test instrumentation used in the Harmonics current test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Power Analyzer	PM6000	Voltech	100006700167	2008-11-11	12
IEC Network	555	ZIMMER	IB10/9466	N/A	N/A

4.3.2 Photograph of the test Configuration





Project No. : LBE091979

CCTV Monitor SMT-1723P



4.3.3 Test results

Operating condition	CCTV Monitoring (Video A)					
Test date	2009-07-02		Test engineer		Hyun Jeong Jang	
Climate condition	Ambient temperature	24.7 °C	Relative humidity	40%	Atmospheric Pressure	99.8KPa
Test place	Shielded Room #3					

Product:	CCTV MONITOR	2009 Jul 02 2:13pm
Serial no:	None	Page 1 of 1
Description:		
Test Date:	2009 Jul 02 10:38am	
Result Name:	HAR	
Type of Test:	EN61000:2006 Harmonics inc. interharmonics to EN61000-4-7:2002	
Limits:	Class A	
Power Analyzer:	Voltech PM6000 SN: 100006700167 Firmware version: v1.20.06RC3	
Channel(s):	1. SN: 090015500508, 25 Adjusted Date: 22 JUL 2007. 2. SN: 090015500521, 25 Adjusted Date: 23 JUL 2007.	
	3. SN: 090015500543, 25 Adjusted Date: 5 AUG 2007. 4. SN: None Adjusted Date: None	
	5. SN: None Adjusted Date: None 6. SN: None Adjusted Date: None	
Shunt(s):	1. SN: 091024300502, 4 Adjusted Date: 14 JUL 2007. 2. SN: 091024300503, 4 Adjusted Date: 14 JUL 2007.	
	3. SN: 091024300504, 4 Adjusted Date: 14 JUL 2007. 4. SN: None Adjusted Date: None	
	5. SN: None Adjusted Date: None 6. SN: None Adjusted Date: None	
AC Source:	Mains / Manual Source	
Harmonic Results	Notes:	
Against Chosen Limits:	Exceeds 200% of limit	
	POHC limit exceeded	
	Voltage Crest Factor outside permitted limits	
	Minimum power is greater than maximum	
	Power out of allowed range	
N/A		
Test Parameter Details	User Entered	Measured
Operating Frequency:	50	49.9840
Operating Voltage:	230	230.2894
Specified Power:	28.0000	28.5509
Fundamental Current:	0.0000	0.1299
Power Factor:	0.0000	0.3482
Average Input Current:		0.3529
Maximum POHC:		0.1195
POHC Limit:		0.0120
Maximum THC:		0.3316
Minimum Power:	75	
Class Multiplier:	1.0000	
Test Duration:	00:02:30	

* This EUT doesn't need to be tested because the power of EUT is below 75 W.

4.4 Voltage fluctuation & Flicker

The EUT operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.

During the flicker measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes.

Limits of voltage fluctuations and flicker at the supply terminals

short-term flicker indicator, Pst	the relative steady-state voltage change, dc	the value of $d(t)$ during a voltage change, $d(t) > 3.3\%$	the maximum relative voltage change, d_{max}
1.0	3.3 %	500 ms	4 %

4.4.1 Test instrumentation

Test instrumentation used in the Voltage fluctuation & Flicker test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Power Analyzer	PM6000	Voltech	100006700167	2008-11-11	12
IEC Network	555	ZIMMER	IB10/9466	N/A	N/A

4.4.2 Photograph of the test Configuration

Is Same the Harmonic current test photograph.



Project No. : LBE091979

CCTV Monitor SMT-1723P



4.4.3 Test results

Operating condition	CCTV Monitoring (Video A)					
Test date	2009-07-02		Test engineer		Hyun Jeong Jang	
Climate condition	Ambient temperature	24.7 °C	Relative humidity	40%	Atmospheric Pressure	99.8KPa
Test place	Shielded Room #3					

Product:	CCTV MONITOR	2009 Jul 02 2:13pm
Serial no:	None	Page 1 of 1
Description:		
Result Name:	FLI_VIDEO A	
Voltech IEC61000-3 Windows Software 1.10.04RC5	Test Date:	2009 Jul 02 10:55am
Type of Test:	Flickermeter Test - Table	
Power Analyzer:	Voltech PM6000 SN: 100006700167 Firmware Version: v1.20.06RC3	
	Channel(s):	
	1. SN: 090015500508, 25 Adjusted Date: 22 JUL 2007. 2. SN: 090015500521, 25 Adjusted Date: 23 JUL 2007.	
	3. SN: 090015500543, 25 Adjusted Date: 5 AUG 2007. 4. SN:None Adjusted Date:None	
	5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None	
	Shunt(s):	
	1. SN: 091024300502, 4 Adjusted Date: 14 JUL 2007. 2. SN: 091024300503, 4 Adjusted Date: 14 JUL 2007.	
	3. SN: 091024300504, 4 Adjusted Date: 14 JUL 2007. 4. SN:None Adjusted Date:None	
	5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None	
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	6.000	500
Reading 1	0.140	0.002	0.224	0



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CCTV Monitor SMT-1723P



Operating condition	CCTV Monitoring (Video B)					
Test date	2009-07-02		Test engineer		Hyun Jeong Jang	
Climate condition	Ambient temperature	24.7 °C	Relative humidity	40%	Atmospheric Pressure	99.8KPa
Test place	Shielded Room #3					

Product:	CCTV MONITOR	2009 Jul 02 2:13pm
Serial no:	None	Page 1 of 1
Description:		
Result Name:	FL_VIDEO B	
Voltech IEC61000-3 Windows Software 1.10.04RC5		Test Date: 2009 Jul 02 11:12am
Type of Test:	Flickermeter Test - Table	
Power Analyzer:	Voltech PM6000 SN: 100006700167 Firmware Version: v1.20.06RC3	
	Channel(s):	
	1. SN: 090015500508, 25 Adjusted Date: 22 JUL 2007. 2. SN: 090015500521, 25 Adjusted Date: 23 JUL 2007.	
	3. SN: 090015500543, 25 Adjusted Date: 5 AUG 2007. 4. SN:None Adjusted Date:None	
	5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None	
	Shunt(s):	
	1. SN: 091024300502, 4 Adjusted Date: 14 JUL 2007. 2. SN: 091024300503, 4 Adjusted Date: 14 JUL 2007.	
	3. SN: 091024300504, 4 Adjusted Date: 14 JUL 2007. 4. SN:None Adjusted Date:None	
	5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None	
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	6.000	500
Reading 1	0.089	0.002	0.230	0



Project No. : LBE091979

CCTV Monitor SMT-1723P



Operating condition	DVR Monitoring (Standby)					
Test date	2009-07-02		Test engineer		Hyun Jeong Jang	
Climate condition	Ambient temperature	24.7 °C	Relative humidity	40%	Atmospheric Pressure	99.8KPa
Test place	Shielded Room #3					

Product:	CCTV MONITOR	2009 Jul 02 2:13pm
Serial no:	None	Page 1 of 1
Description:		
Result Name:	FLI_VGA	
Voltech IEC61000-3 Windows Software 1.10.04RC5		Test Date: 2009 Jul 02 11:38am
Type of Test:	Flickermeter Test - Table	
Power Analyzer:	Voltech PM6000 SN: 100006700167 Firmware Version: v1.20.06RC3	
	Channel(s):	
	1. SN: 090015500508, 25 Adjusted Date: 22 JUL 2007. 2. SN: 090015500521, 25 Adjusted Date: 23 JUL 2007.	
	3. SN: 090015500543, 25 Adjusted Date: 5 AUG 2007. 4. SN:None Adjusted Date:None	
	5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None	
	Shunt(s):	
	1. SN: 091024300502, 4 Adjusted Date: 14 JUL 2007. 2. SN: 091024300503, 4 Adjusted Date: 14 JUL 2007.	
	3. SN: 091024300504, 4 Adjusted Date: 14 JUL 2007. 4. SN:None Adjusted Date:None	
	5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None	
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	6.000	500
Reading 1	0.142	0.002	0.197	0

4.5 Electrostatic discharge

Contact discharges to the conductive surfaces and coupling planes:

The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points are subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane.

The remaining three test points are each receive at least 50 direct contact discharges.

If no direct contact test points are available, then at least 200 indirect discharges be applied in the indirect mode. Test is performed at a maximum repetition rate of one discharge per second.

Air discharges at slots and apertures and insulating surfaces:

On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur.

Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user.

A minimum of 10 single air discharges shall be applied to the selected test point for each such area. The EUT was tested with all I/O ports exercised. Test results are listed below.

The basic test procedure was in accordance with IEC 61000-4-2.

Performance criteria

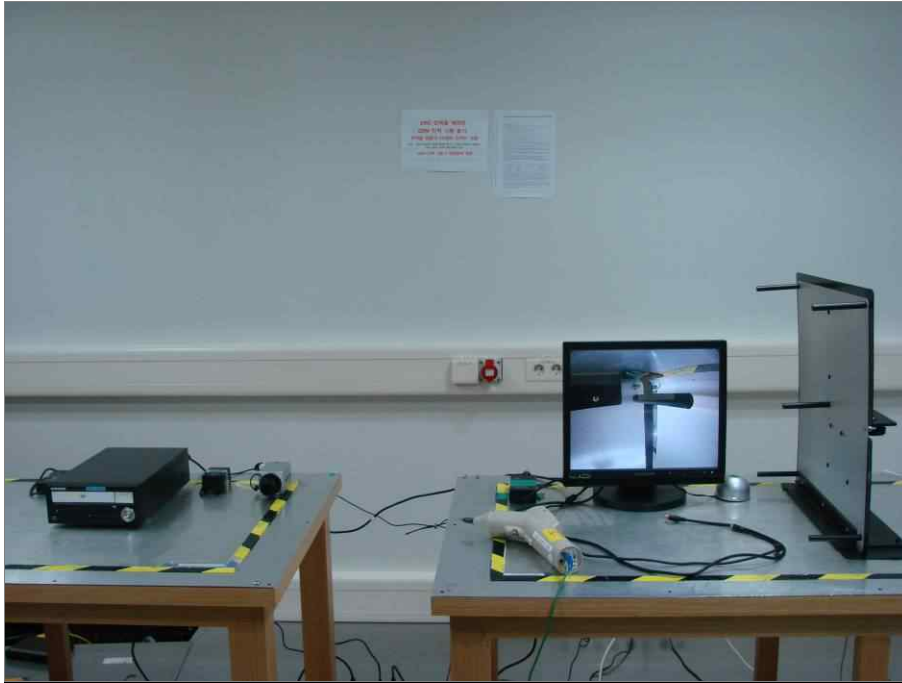
Application of discharge	Test specification (kV)	Performance criteria
Contact discharge	6	B
Air Discharge	8	B

4.5.1 Test instrumentation

Test instrumentation used in the Electrostatic discharge test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
ESD Simulator	ESD3000	EMC Partner	365	2008-07-23	12
Vertical Plane	VCP-1	Thermo Keytek	-	-	-

4.5.2 Photograph of the test Configuration



4.5.3 Test results

Operating condition	CCTV Monitoring (Video A)				
Test date	2009-07-02		Test engineer		Hyun Jeong Jang
Climate condition	Ambient temperature	24.3℃	Relative humidity	42%	Atmospheric Pressure 100.9KPa
Test place	Shielded Room #3				

Test Method	No	Applied Point	Discharge Method	Test Level(KV)	Observation [Note No.]	Test Result
Indirect	-	HCP	Contact	±2☒ ±4☒ ±6☒	Note 1☒ 2☐	A☒ B☐ C☐
		VCP	Contact	±2☒ ±4☒ ±6☒	Note 1☒ 2☐	A☒ B☐ C☐
Direct	1	Panel	Air	±2☒ ±4☒ ±8☒	Note 1☒ 2☐	A☒ B☐ C☐
Direct	2	Video In/Out	Contact	±2☒ ±4☒ ±6☒	Note 1☒ 2☐	A☒ B☐ C☐
Direct	3	S-Video	Contact	±2☒ ±4☒ ±6☒	Note 1☒ 2☐	A☒ B☐ C☐
Direct	4	Buttons	Air	±2☒ ±4☒ ±8☒	Note 1☒ 2☐	A☒ B☐ C☐
Direct	5	VGA	Air	±2☒ ±4☒ ±8☒	Note 1☒ 2☐	A☒ B☐ C☐
			Contact	±2☒ ±4☒ ±6☒	Note 1☒ 2☐	A☒ B☐ C☐
Direct	6	Power	Air	±2☒ ±4☒ ±8☒	Note 1☒ 2☐	A☒ B☐ C☐
			Contact	±2☒ ±4☒ ±6☒	Note 1☒ 2☐	A☒ B☐ C☐
Direct	7	Audio In	Contact	±2☒ ±4☒ ±6☒	Note 1☒ 2☐	A☒ B☐ C☐

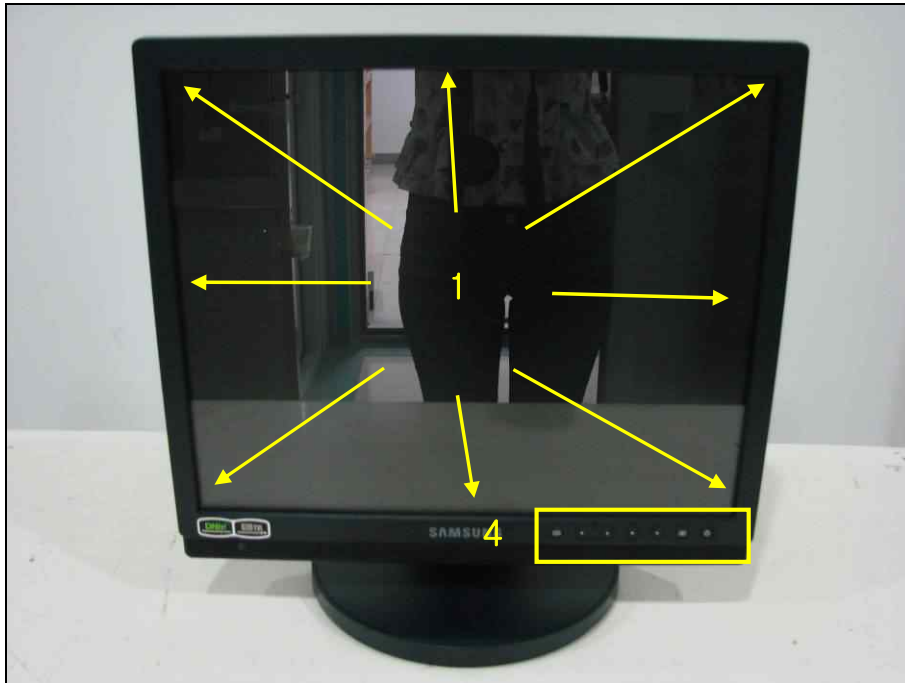
NOTE

1. There was no change compared with initial operation during the test.
2. While the electrostatic discharge tests, malfunction appeared in normal operate, but self-recoverable after the test.

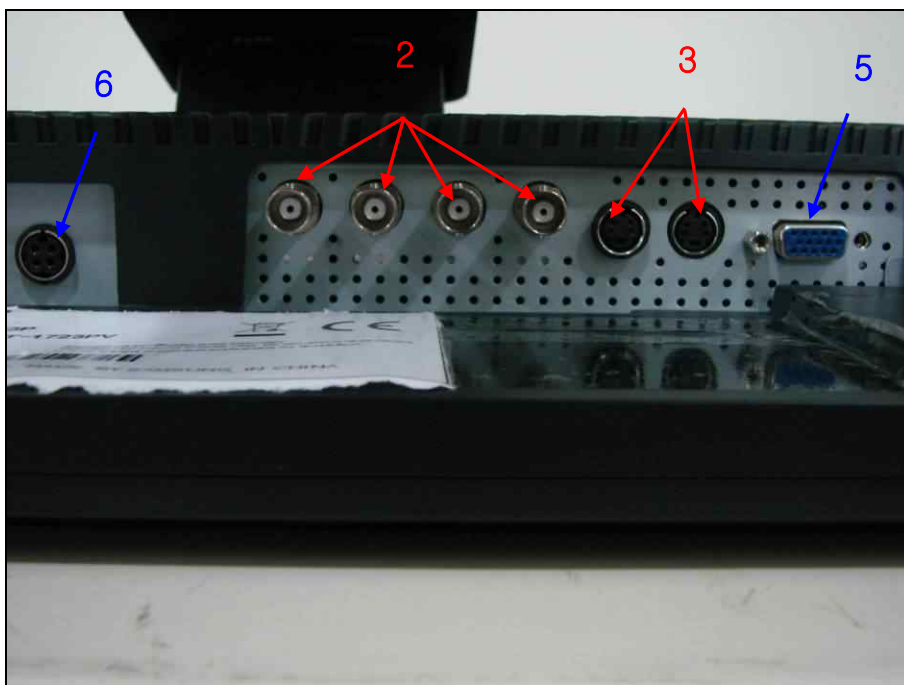
4.5.4 Tested points

■ Air discharge points	■ Contact discharge points	■ Air/Contact discharge points
--	---	--

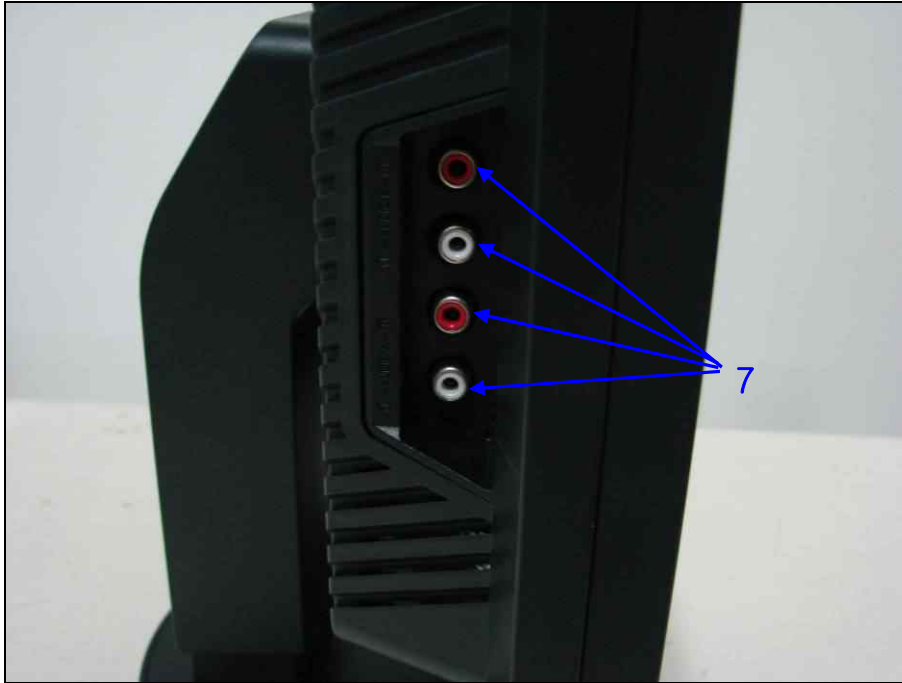
■ Front



■ Bottom



■ Side



4.6 Radiated, radio-frequency, electromagnetic field

The test was performed with the EUT exposed to both vertically and horizontally polarized fields. on each of the four sides.

The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond. The basic test procedure was in accordance with IEC 61000-4-3.

Performance criteria

Test range [MHz]	Test specification	Performance criteria	Remarks
80~2000	10V/m 80% AM (1KHz)	C	The test level specified is prior to modulation
	10V/m 80% PM (1KHz)		
	3V/m 80% AM (1KHz)	B	The test level specified is prior to modulation
	3V/m 80% PM (1KHz)		
	1V/m 80% AM (1KHz)	A	The test level specified is prior to modulation
	1V/m 80% PM (1KHz)		

4.6.1 Test conditions

Test condition in the Radiated, radio-frequency, and electromagnetic field test was as follows:

1. Representative operating conditions of EUT		CCTV Monitoring
2. Type of the EUT	☒ Table-top	☐ a combination of the two
	☐ Floor-standing	a height above the ground plane; ☐ 0.1 m ☐ 0.8 m
3. Type of test facility		3m Fully anechoic chamber
4. Position of the radiating antennas		a distance of 3 meters from the EUT
5. Type of antennas		Log-periodic
6. Frequency sweep rate		1.5 x 10 ⁻³ decades/s
7. Dwell time and frequency steps		Dwell time : 3 s, Step size : 1 %
8. Applied test level		1V/m, 3V/m, 10V/m

4.6.2 Test instrumentation

Test instrumentation used in the Radiated, radio-frequency, and electromagnetic field test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				date	Interval
10V Insertion Unit	URV5-Z2	R&S	100241	2009-05-07	12
10V Insertion Unit	URV5-Z2	R&S	100240	2009-05-07	12
Signal Generator	SML03	R&S	101297	2009-01-12	12
Mill volt Meter	NRVD	R&S	100243	2009-05-07	12
Antenna	AT1080	AR	310700	N/A	N/A
Antenna Master	TP1000A	AR	311200	N/A	N/A
Amplifier	250W1000A	AR	312241	N/A	N/A
Amplifier	60SIG3	AR	311853	N/A	N/A
Relay Switching Unit	TS-RSP	R&S	N/A	N/A	N/A

4.6.2 Photograph of the test Configuration



4.6.3 Test results

Operating condition	CCTV Monitoring					
Test date	2009-07-07		Test engineer		Hyun Jeong Jang	
Climate condition	Ambient temperature	20.9℃	Relative humidity	65%	Atmospheric Pressure	100.5KPa
Test place	3m Fully Anechoic Chamber					

Frequency [MHz]	Test Level [V/m]	Table Azimuth [degree]	Polarity	Observation	Test Result
80~2000	10V/m 80% AM	0	Horizontal	See Note 1	A ☐ B ☒ C ☐
			Vertical		A ☐ B ☒ C ☐
80~2000	10V/m 80% AM	90	Horizontal		A ☐ B ☒ C ☐
			Vertical		A ☐ B ☒ C ☐
80~2000	10V/m 80% AM	180	Horizontal		A ☐ B ☒ C ☐
			Vertical		A ☐ B ☒ C ☐
80~2000	10V/m 80% AM	270	Horizontal		A ☐ B ☒ C ☐
			Vertical		A ☐ B ☒ C ☐

Frequency [MHz]	Test Level [V/m]	Table Azimuth [degree]	Polarity	Observation	Test Result
80~2000	3V/m 80% AM	0	Horizontal	See Note 2	A ☐ B ☒ C ☐
			Vertical		A ☐ B ☒ C ☐
80~2000	3V/m 80% AM	90	Horizontal		A ☐ B ☒ C ☐
			Vertical		A ☐ B ☒ C ☐
80~2000	3V/m 80% AM	180	Horizontal		A ☐ B ☒ C ☐
			Vertical		A ☐ B ☒ C ☐
80~2000	3V/m 80% AM	270	Horizontal		A ☐ B ☒ C ☐
			Vertical		A ☐ B ☒ C ☐

Frequency [MHz]	Test Level [V/m]	Table Azimuth [degree]	Polarity	Observation	Test Result
80~2000	1V/m 80% AM	0	Horizontal	See Note 2	A ☒ B ☐ C ☐
			Vertical		A ☒ B ☐ C ☐
80~2000	1V/m 80% AM	90	Horizontal		A ☒ B ☐ C ☐
			Vertical		A ☒ B ☐ C ☐
80~2000	1V/m 80% AM	180	Horizontal		A ☒ B ☐ C ☐
			Vertical		A ☒ B ☐ C ☐
80~2000	1V/m 80% AM	270	Horizontal		A ☒ B ☐ C ☐
			Vertical		A ☒ B ☐ C ☐

Frequency [MHz]	Test Level [V/m]	Table Azimuth [degree]	Polarity	Observation	Test Result
80~2000	10V/m 80% PM	0	Horizontal	See Note 1	A ☐ B ☒ C ☐
			Vertical		A ☐ B ☒ C ☐
80~2000	10V/m 80% PM	90	Horizontal		A ☐ B ☒ C ☐
			Vertical		A ☐ B ☒ C ☐
80~2000	10V/m 80% PM	180	Horizontal		A ☐ B ☒ C ☐
			Vertical		A ☐ B ☒ C ☐
80~2000	10V/m 80% PM	270	Horizontal		A ☐ B ☒ C ☐
			Vertical		A ☐ B ☒ C ☐

Frequency [MHz]	Test Level [V/m]	Table Azimuth [degree]	Polarity	Observation	Test Result
80~2000	3V/m 80% PM	0	Horizontal	See Note 2	A ☐ B ☒ C ☐
			Vertical		A ☐ B ☒ C ☐
80~2000	3V/m 80% PM	90	Horizontal		A ☐ B ☒ C ☐
			Vertical		A ☐ B ☒ C ☐
80~2000	3V/m 80% PM	180	Horizontal		A ☐ B ☒ C ☐
			Vertical		A ☐ B ☒ C ☐
80~2000	3V/m 80% PM	270	Horizontal		A ☐ B ☒ C ☐
			Vertical		A ☐ B ☒ C ☐

Frequency [MHz]	Test Level [V/m]	Table Azimuth [degree]	Polarity	Observation	Test Result
80~2000	1V/m 80% PM	0	Horizontal	See Note 2	A ☒ B ☐ C ☐
			Vertical		A ☒ B ☐ C ☐
80~2000	1V/m 80% PM	90	Horizontal		A ☒ B ☐ C ☐
			Vertical		A ☒ B ☐ C ☐
80~2000	1V/m 80% PM	180	Horizontal		A ☒ B ☐ C ☐
			Vertical		A ☒ B ☐ C ☐
80~2000	1V/m 80% PM	270	Horizontal		A ☒ B ☐ C ☐
			Vertical		A ☒ B ☐ C ☐

Note

- EUT was turned off during the test, and recovered by operator's handling.
- There was no change compared with initial operation during the test.

4.7 Electrical fast transient/burst

■ Test on power supply ports and on protective earth terminals

Stationary, floor-mounted equipment

The test voltage applied between a reference ground plane and each of the power supply terminals, a.c. or d.c., and on the terminal for the protective or function earth on the cabinet of the EUT.

The EFT/B-generator shall be located on the reference plane.

The length of the "hot wire" from the coaxial output of the EFT/B-generator to the terminals on the EUT is not exceeding 1 m. This connection was unshielded but well insulated.

All other connections of the EUT are in accordance with its functional requirements.

Non-stationary mounted EUT, connected to the mains supply by flexible cord and plugs

The test voltage is applied between each of the power supply conductors and the protective earth at the power supply outlet to which the EUT is to be connected.

■ Test on I/O and communication ports

As far as possible, the capacitive coupling clamp is used for coupling the test voltage into the lines.

However, if the clamp cannot be used due to mechanical problems (size, cable routing) in the cabling, it may be replaced by a tape or a conductive foil enveloping the lines under test. The capacitance of this coupling arrangement with foil or tape is equivalent to that of the standard coupling clamp.

In other cases, it is useful to couple the EFT/B-generator to the terminals of the lines via discrete 100 pF capacitors instead of the distributed capacitance of the clamp or of the foil or tape arrangement.

All tests carried out in shielded room.

The EUT was tested with all I/O ports exercised. Test results are listed below.

Performance criteria

Applied conditions	Test specification	Performance criteria
Open-circuit output test voltage		B
a.c. power ports	2 kV(Peak)	
signal and telecommunication ports	1 kV(Peak)	
d.c. power ports	1 kV(Peak)	
Wave shape of the pulse	5/50 Tr/Th ns	
Repetition Frequency	5 kHz	

4.7.1 Test conditions

Test condition in the Electrical fast transient/burst immunity test was as follows:

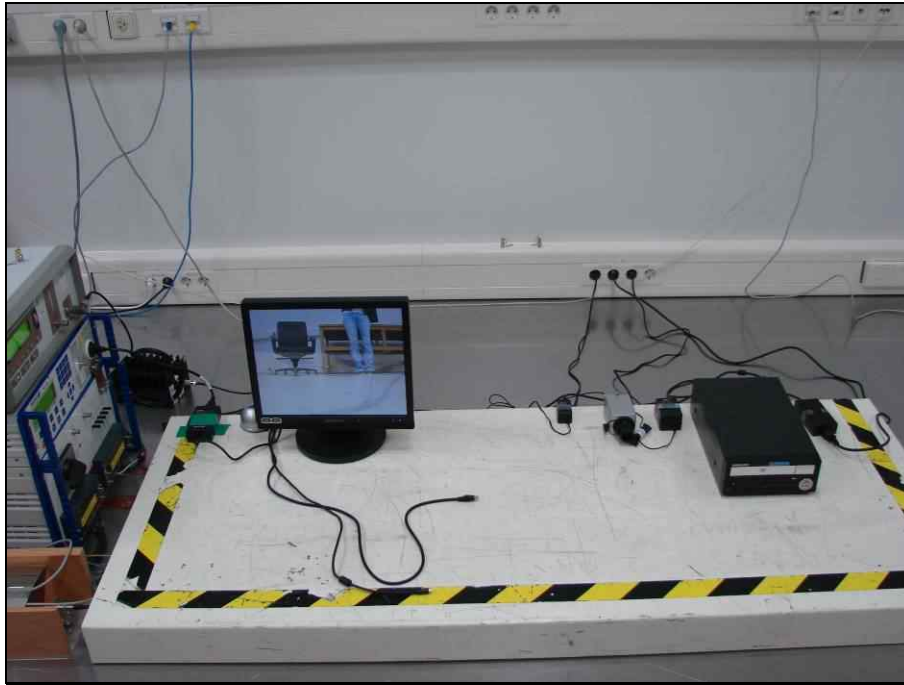
1. Representative operating conditions of the EUT		CCTV Monitoring
2. the Type of the EUT	☒ Stationary, floor-mounted equipment	
	☐ Non-stationary mounted EUT	
3. the type of test facility		Shielded Room #2
4. Test level		☐ 0.5 kV ☐ 1 kV ☒ 2 kV
5. Polarity of the test voltage		☒ Positive ☒ Negative
6. Duration of the test		18 min
7. EUT's ports to be tested	a.c. power ports	☐ Live ☐ Neutral ☐ Live + Neutral ☐ Live + PE ☐ Neutral + PE ☒ Live + Neutral + PE
	Others ports	☐ I/O ports ☐ Communication ports ☐ d.c. power ports

4.7.2 Test instrumentation

Test instrumentation used in the Electrical fast transient/burst test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
EFT/Burst Generator	PEFT 4010	HAEFELY	152608	2008-09-26	12
3 Phases CDN 690V/100A	FP-EFT 100M	HAEFELY	152635	2008-09-26	12

4.7.3 Photograph of the test Configuration



4.7.4 Test results

Operating condition	CCTV Monitoring					
Test date	2009-07-06		Test engineer		Hyun Jeong Jang	
Climate condition	Ambient temperature	23.7 °C	Relative humidity	66%	Atmospheric Pressure	101.0KPa
Test place	Shielded Room #2					

Test Point		Polarity	Test Level (kV)	Phase wave Shapes & Repetitions	Observation [Note No.]	Test Result
a.c. power ports	Live	+/-	2	5/50ns, 5kHz	Note 1 ☐ 2 ☐	A ☐ B ☐
	Neutral	+/-	2	5/50ns, 5kHz	Note 1 ☐ 2 ☐	A ☐ B ☐
	PE (Ground)	+/-	2	5/50ns, 5kHz	Note 1 ☐ 2 ☐	A ☐ B ☐
	Live + PE	+/-	2	5/50ns, 5kHz	Note 1 ☐ 2 ☐	A ☐ B ☐
	Neutral + PE	+/-	2	5/50ns, 5kHz	Note 1 ☐ 2 ☐	A ☐ B ☐
	Live + Neutral	+/-	2	5/50ns, 5kHz	Note 1 ☐ 2 ☐	A ☐ B ☐
	Live + Neutral + PE	+/-	2	5/50ns, 5kHz	Note 1 ☒ 2 ☐	A ☒ B ☐

NOTE

1. There was no change compared with initial operation during the test.
2. The transmission of data was stopped during the test, but self-recoverable after the test.

4.8 Surge

The basic test procedure was in accordance with IEC 61000-4-5.

Performance criteria

Applied conditions	Test specification	Performance criteria
Combination wave a.c. power ports signal and telecommunication ports d.c. power ports	Line to Line 0.5,1 kV(Peak) ① Line to earth 0.5,1,2 kV(Peak) ① Line to ground 0.5,1kV(Peak) ② 0.5,1 kV(Peak) ③	B
Waveform parameter Open-circuit voltage Short-circuit current	1.2/50 Tr/Th μ s 8/20 Tr/Th μ s	

- ① Applicable only to ports which according to the manufacturer's specification may connect directly to outdoor cables. Where normal functioning cannot be achieved because of the impact of the CDN on the EUT, no test shall be required.
- ② When the manufacturer specifies protection measures and it is impractical to simulate these measures during the tests, then the applied test levels shall be reduced to 0,5 kV and 1 kV.
- ③ Applicable only to ports which according to the manufacturer's specification may connect directly to outdoor cables.

4.8.1 Test instrumentation

Test instrumentation used in the Surge test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Surge Tester	PSURGE 8000	HAEFELY	152602	N/A	N/A
Surge Impulse Module	PIM 100	HAEFELY	152288	2008-09-30	12
Coupling Decoupling Network	PCD 120	HAEFELY	148918	N/A	N/A
Coupling Decoupling Network	FP-SURGE 100M	HAEFELY	152636	N/A	N/A
Impulse Module	PIM 120	HAEFELY	150663	2008-08-06	12

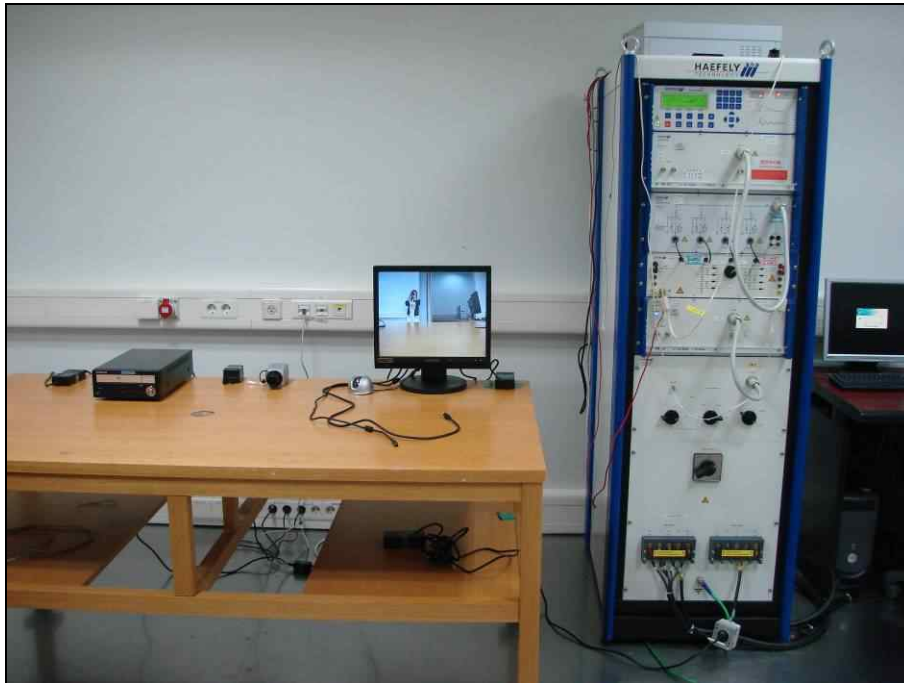
4.8.2 Test conditions

Test condition in the Surge immunity test was as follows:

1. Representative operating conditions of the EUT		CCTV Monitoring
2. Type of LINE	☒ EUT power supply	
	☐ unshielded asymmetrically operated interconnection lines	
	☐ unshielded symmetrically operated interconnection / telecommunication lines	
	☐ shielded lines	
	☐ potential differences	
3. the type of test facility		Shielded Room #3
4. Test level		☐ 0.5 kV ☒ 1 kV ☐ 2 kV
5. Polarity of the surge		☒ Positive ☒ Negative
6. Number of test(at selected points)		40
7. Repetition rate		60 sec

8. EUT's ports to be tested	a.c. power ports	☒ Live + Neutral ☒ Live + PE ☒ Neutral + PE
	others ports	☐ I/O ports ☐ Communication ports ☐ d.c. power ports

4.8.3 Photograph of the test Configuration



4.8.4 Test results

Operating condition	CCTV Monitoring					
Test date	2009-07-03		Test engineer		Hyun Jeong Jang	
Climate condition	Ambient temperature	24.3℃	Relative humidity	41%	Atmospheric Pressure	100.5KPa
Test place	Shielded Room #3					

Port	Mode	Voltage (kV)	Phase wave Shape (μs)	Angle (degrees)	Repetition time (s)	Pol.	No. of pulse	Result
L - N	1	0.5	1.2/50(8/20)	0	60	+	5	A
L - N	1	0.5	1.2/50(8/20)	0	60	-	5	A
L - N	1	0.5	1.2/50(8/20)	90	60	+	5	A
L - N	1	0.5	1.2/50(8/20)	90	60	-	5	A
L - N	1	0.5	1.2/50(8/20)	180	60	+	5	A
L - N	1	0.5	1.2/50(8/20)	180	60	-	5	A
L - N	1	0.5	1.2/50(8/20)	270	60	+	5	A
L - N	1	0.5	1.2/50(8/20)	270	60	-	5	A
L - N	1	1.0	1.2/50(8/20)	0	60	+	5	A
L - N	1	1.0	1.2/50(8/20)	0	60	-	5	A
L - N	1	1.0	1.2/50(8/20)	90	60	+	5	A
L - N	1	1.0	1.2/50(8/20)	90	60	-	5	A
L - N	1	1.0	1.2/50(8/20)	180	60	+	5	A
L - N	1	1.0	1.2/50(8/20)	180	60	-	5	A
L - N	1	1.0	1.2/50(8/20)	270	60	+	5	A
L - N	1	1.0	1.2/50(8/20)	270	60	-	5	A

Port	Mode	Voltage (kV)	Phase wave Shape (μs)	Angle (degrees)	Repetition time (s)	Pol.	No. of pulse	Result
L - G	1	0.5	1.2/50(8/20)	0	60	+	5	A
L - G	1	0.5	1.2/50(8/20)	0	60	-	5	A
L - G	1	0.5	1.2/50(8/20)	90	60	+	5	A
L - G	1	0.5	1.2/50(8/20)	90	60	-	5	A
L - G	1	0.5	1.2/50(8/20)	180	60	+	5	A
L - G	1	0.5	1.2/50(8/20)	180	60	-	5	A
L - G	1	0.5	1.2/50(8/20)	270	60	+	5	A
L - G	1	0.5	1.2/50(8/20)	270	60	-	5	A
L - G	1	1.0	1.2/50(8/20)	0	60	+	5	A
L - G	1	1.0	1.2/50(8/20)	0	60	-	5	A
L - G	1	1.0	1.2/50(8/20)	90	60	+	5	A
L - G	1	1.0	1.2/50(8/20)	90	60	-	5	A
L - G	1	1.0	1.2/50(8/20)	180	60	+	5	A
L - G	1	1.0	1.2/50(8/20)	180	60	-	5	A
L - G	1	1.0	1.2/50(8/20)	270	60	+	5	A
L - G	1	1.0	1.2/50(8/20)	270	60	-	5	A
L - G	1	2.0	1.2/50(8/20)	0	60	+	5	A
L - G	1	2.0	1.2/50(8/20)	0	60	-	5	A
L - G	1	2.0	1.2/50(8/20)	90	60	+	5	A
L - G	1	2.0	1.2/50(8/20)	90	60	-	5	A
L - G	1	2.0	1.2/50(8/20)	180	60	+	5	A
L - G	1	2.0	1.2/50(8/20)	180	60	-	5	A
L - G	1	2.0	1.2/50(8/20)	270	60	+	5	A
L - G	1	2.0	1.2/50(8/20)	270	60	-	5	A



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Port	Mode	Voltage (kV)	Phase wave Shape (μs)	Angle (degrees)	Repetition time (s)	Pol.	No. of pulse	Result
N - G	1	0.5	1.2/50(8/20)	0	60	+	5	A
N - G	1	0.5	1.2/50(8/20)	0	60	-	5	A
N - G	1	0.5	1.2/50(8/20)	90	60	+	5	A
N - G	1	0.5	1.2/50(8/20)	90	60	-	5	A
N - G	1	0.5	1.2/50(8/20)	180	60	+	5	A
N - G	1	0.5	1.2/50(8/20)	180	60	-	5	A
N - G	1	0.5	1.2/50(8/20)	270	60	+	5	A
N - G	1	0.5	1.2/50(8/20)	270	60	-	5	A
N - G	1	1.0	1.2/50(8/20)	0	60	+	5	A
N - G	1	1.0	1.2/50(8/20)	0	60	-	5	A
N - G	1	1.0	1.2/50(8/20)	90	60	+	5	A
N - G	1	1.0	1.2/50(8/20)	90	60	-	5	A
N - G	1	1.0	1.2/50(8/20)	180	60	+	5	A
N - G	1	1.0	1.2/50(8/20)	180	60	-	5	A
N - G	1	1.0	1.2/50(8/20)	270	60	+	5	A
N - G	1	1.0	1.2/50(8/20)	270	60	-	5	A
N - G	1	2.0	1.2/50(8/20)	0	60	+	5	A
N - G	1	2.0	1.2/50(8/20)	0	60	-	5	A
N - G	1	2.0	1.2/50(8/20)	90	60	+	5	A
N - G	1	2.0	1.2/50(8/20)	90	60	-	5	A
N - G	1	2.0	1.2/50(8/20)	180	60	+	5	A
N - G	1	2.0	1.2/50(8/20)	180	60	-	5	A
N - G	1	2.0	1.2/50(8/20)	270	60	+	5	A
N - G	1	2.0	1.2/50(8/20)	270	60	-	5	A
TEL	1	0.5	1.2/50(8/20)	-	60	+	5	N/A
TEL	1	0.5	1.2/50(8/20)	-	60	-	5	N/A
TEL	1	1	1.2/50(8/20)	-	60	+	5	N/A
TEL	1	1	1.2/50(8/20)	-	60	-	5	N/A

4.9 Conducted disturbances, induced by radio-frequency fields

The test was performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.

Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility. Test results are listed below.

The basic test procedure was in accordance with IEC 61000-4-6.

Performance criteria

Test range [MHz]	Test specification	Performance criteria	Remarks
0.15~100	10V/m 80% AM (1KHz)	C	See 1) , 2)
	10V/m 80% PM (1KHz)		
	3V/m 80% AM (1KHz)	B	See 1) , 2)
	3V/m 80% PM (1KHz)		
	1V/m 80% AM (1KHz)	A	See 1) , 2)
	1V/m 80% PM (1KHz)		
1) The frequency range is scanned as specified. However, when specified in Annex A, an additional comprehensive functional test shall be carried out at a limited number of frequencies. The selected frequencies for conducted tests are: 0,2; 1; 7,1; 13,56; 21; 27,12 and 40,68 MHz ($\pm 1\%$). 2) Applicable only to cables which according to the manufacturer's specification supports communication on cable lengths greater than 3m.			

4.9.1 Test conditions

Test condition in the Radiated, radio-frequency, and electromagnetic field test was as follows:

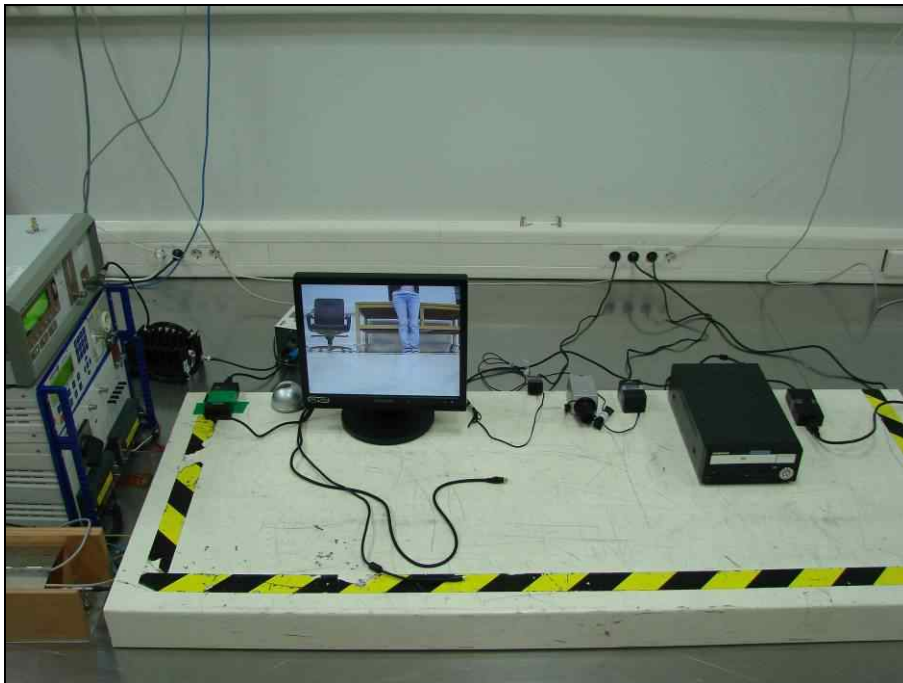
1. Representative operating conditions of EUT		CCTV Monitoring
2. Type of EUT' unit	☒ Single ☐ Multiple	
3. Type of test facility used	Shielded room#2	
4. Frequency range of application the test	0.15 ~ 100 MHz	
5. Frequency sweep rate	1.5 x 10 ⁻³ decades/s	
6. Dwell time and frequency steps	Dwell time : 3 s, Step size : 1 %	
7. Applied test level	1 V/m , 3 V/m, 10 V/m	

4.9.2 Test instrumentation

Test instrumentation used in the Conducted disturbances, induced by radio-frequency fields test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				date	Interval (Month)
RF - Generator	NSG2070	Schaffner	1118	2009-06-16	12
Attenuator	150-SA-MFN-06	Bird	0613	2008-10-24	12
Test Software	Win 2070	Schaffner	V01.05	N/A	N/A
Coupling Decoupling Network	CDN M016	Schaffner	20574	2009-02-26	12

4.9.3 Photograph of the test Configuration



4.9.4 Test results

Operating condition	CCTV Monitoring					
Test date	2009-07-06		Test engineer		Hyun Jeong Jang	
Climate condition	Ambient temperature	24.4℃	Relative humidity	54%	Atmospheric Pressure	100.7KPa
Test place	Shielded Room #2					

Frequency (MHz)	Field Strength (Vr.m.s.)	Injection Method	Inject Points (Cable length)	Observation [Note No.]	Test Result
0.15 ~ 100	1V/m 80% AM	CDN-M3	AC power line(1.8m)	Note 1 ☒ 2 ☐	A ☒ B ☐ C ☐
	1V/m 80% AM	CDN-T4	LAN (10m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	1V/m 80% AM	CDN-T2	Telephone (10m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	1V/m 80% AM	CLAMP	DC (1.8m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	1V/m 80% AM	CLAMP	Printer (2m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	1V/m 80% AM	CLAMP	VGA (1.8m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐

Frequency (MHz)	Field Strength (Vr.m.s.)	Injection Method	Inject Points (Cable length)	Observation [Note No.]	Test Result
0.15 ~ 100	3V/m 80% AM	CDN-M3	AC power line(1.8m)	Note 1 ☒ 2 ☐	A ☒ B ☐ C ☐
	3V/m 80% AM	CDN-T4	LAN (10m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	3V/m 80% AM	CDN-T2	Telephone (10m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	3V/m 80% AM	CLAMP	DC (1.8m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	3V/m 80% AM	CLAMP	Printer (2m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	3V/m 80% AM	CLAMP	VGA (1.8m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐

Frequency (MHz)	Field Strength (Vr.m.s.)	Injection Method	Inject Points (Cable length)	Observation [Note No.]	Test Result
0.15 ~ 100	10V/m 80% AM	CDN-M3	AC power line(1.8m)	Note 1 ☐ 2 ☒	A ☐ B ☒ C ☐
	10V/m 80% AM	CDN-T4	LAN (10m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	10V/m 80% AM	CDN-T2	Telephone (10m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	10V/m 80% AM	CLAMP	DC (1.8m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	10V/m 80% AM	CLAMP	Printer (2m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	10V/m 80% AM	CLAMP	VGA (1.8m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐

Frequency (MHz)	Field Strength (Vr.m.s.)	Injection Method	Inject Points (Cable length)	Observation [Note No.]	Test Result
0.15 ~ 100	1V/m 80% PM	CDN-M3	AC power line(1.8m)	Note 1 ☒ 2 ☐	A ☒ B ☐ C ☐
	1V/m 80% PM	CDN-T4	LAN (10m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	1V/m 80% PM	CDN-T2	Telephone (10m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	1V/m 80% PM	CLAMP	DC (1.8m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	1V/m 80% PM	CLAMP	Printer (2m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	1V/m 80% PM	CLAMP	VGA (1.8m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐

Frequency (MHz)	Field Strength (Vr.m.s.)	Injection Method	Inject Points (Cable length)	Observation [Note No.]	Test Result
0.15 ~ 100	3V/m 80% PM	CDN-M3	AC power line(1.8m)	Note 1 ☒ 2 ☐	A ☒ B ☐ C ☐
	3V/m 80% PM	CDN-T4	LAN (10m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	3V/m 80% PM	CDN-T2	Telephone (10m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	3V/m 80% PM	CLAMP	DC (1.8m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	3V/m 80% PM	CLAMP	Printer (2m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	3V/m 80% PM	CLAMP	VGA (1.8m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐

Frequency (MHz)	Field Strength (Vr.m.s.)	Injection Method	Inject Points (Cable length)	Observation [Note No.]	Test Result
0.15 ~ 100	10V/m 80% PM	CDN-M3	AC power line(1.8m)	Note 1 ☐ 2 ☒	A ☐ B ☒ C ☐
	10V/m 80% PM	CDN-T4	LAN (10m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	10V/m 80% PM	CDN-T2	Telephone (10m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	10V/m 80% PM	CLAMP	DC (1.8m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	10V/m 80% PM	CLAMP	Printer (2m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐
	10V/m 80% PM	CLAMP	VGA (1.8m)	Note 1 ☐ 2 ☐	A ☐ B ☐ C ☐

NOTE

1. There was no change compared with initial operation during the test.
2. The transmission of data from modem port stopped during the test, but self-recoverable after the test. This permissive loss of performance is specified by the manufacturer, and this phenomenon will be put as a clear statement in the User's Manual to avoid misunderstanding.

4.10 Voltage dips, short interruptions and voltage variations

The EUT is tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10 s minimum (between each test event).

Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform. The basic test procedure was in accordance with IEC 61000-4-11.

Performance criteria

Environmental phenomenon	Test specification	Units	Performance criteria	Remarks
Voltage dips	30 0.5;1;5;10	% reduction periods	B	See NOTE
	60 0.5;1;5;10		B	
	100 0.5;1;5		B	
Voltage variations	10% Up 15% Down		A	
[NOTE] Changes to occur at 0 degree crossover point of the voltage waveform.				

4.10.1 Test instrumentation

Test instrumentation used in the Voltage dips, short interruptions and voltage variations test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				date	Interval (Month)
Voltage Dip & Interruption	☐ PFS 503	EM TEST	PFS503/63A -0513100236	2007-06-16	12
	☒ PLINE 1610	HAEFELY	083690-21	2008-09-30	12

4.10.2 Photograph of the test Configuration



4.10.3 Test results

Operating condition	CCTV Monitoring					
Test date	2009-07-06		Test engineer		Hyun Jeong Jang	
Climate condition	Ambient temperature	23.7 °C	Relative humidity	46%	Atmospheric Pressure	101.0KPa
Test place	Shielded Room #2					

Voltage Dips/ Interference

Test Voltage	Period	Number of Applications	Angle [Degrees]	Observation [Note No.]	Test Result
Reduction 30%	0.5	10	0, 180	Note 1 ☒ 2 ☐	A ☒ B ☐ C ☐
	1	10	0	Note 1 ☒ 2 ☐	A ☒ B ☐ C ☐
	5	10	0	Note 1 ☒ 2 ☐	A ☒ B ☐ C ☐
	10	10	0	Note 1 ☒ 2 ☐	A ☒ B ☐ C ☐
Reduction 60%	0.5	10	0, 180	Note 1 ☒ 2 ☐	A ☒ B ☐ C ☐
	1	10	0	Note 1 ☒ 2 ☐	A ☒ B ☐ C ☐
	5	10	0	Note 1 ☒ 2 ☐	A ☒ B ☐ C ☐
	10	10	0	Note 1 ☒ 2 ☐	A ☒ B ☐ C ☐
Reduction 100%	0.5	10	0,180	Note 1 ☒ 2 ☐	A ☒ B ☐ C ☐
	1	10	0	Note 1 ☒ 2 ☐	A ☒ B ☐ C ☐
	5	10	0	Note 1 ☒ 2 ☐	A ☒ B ☐ C ☐

Voltage Variations

Test Voltage	Time for decreasing voltage	Time at reduced voltage	Time at increasing voltage	Observation [Note No.]	Test Result
10% UP	2s	2s	2s	Note 1 ☒ 2 ☐	A ☒ B ☐ C ☐
15% DOWN	2s	2s	2s	Note 1 ☒ 2 ☐	A ☒ B ☐ C ☐

NOTE

- There was no change compared with initial operation during the test.
- While The Voltage Dip & Interruption tests, malfunction appeared in normal operate, but self-recoverable after the test.

Appendix – EUT photography

Front



Rear

