Declaration of Conformity

SAMSUNG TECHWIN

CE

Type of equipment:	**CCTV Camera**
Brand Name /Trade Mark:	**SAMSUNG**
Type designation /model:	**SCO-5083RP**
Applicant:	**SAMSUNG TECHWIN CO., LTD.**

In accordance with the following Directives:

2004/108/EC	The Electromagnetic Compatibility Directive

Including amendments by the CE Marking Directive 93/68/EEC

2011/65/EU	Restriction of the use of certain hazardous substances in electrical and electronic equipment (recast)

The following harmonized European standards or technical specifications have been applied:

EN 55022:2010	Limits and methods of measurement of radio disturbance characteristics of information technology equipment
EN 50581:2012	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
EN 50130-4:2011	Product family standard: Immunity requirements for components of fire, intruder and social alarm systems
EN 61000-3-3:2008	Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current <=16 A per phase and not subject to conditional connection
EN 61000-4-2:2009	Electrostatic discharge immunity test
EN 61000-4-3:2006+A2:2010	Radiated, radio-frequency, electromagnetic field immunity test
EN 61000-4-4:2012	Electrical fast transient/burst immunity test
EN 61000-4-5:2006	Surge immunity test
EN 61000-4-6:2009	Immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-11:2004	Voltage dips, short interruptions and voltage variations immunity tests

The CE Marking on the products and/or their packaging signifies that SAMSUNG TECHWIN CO., LTD. holds the reference technical file available to the European Union authorities.

Place and date of issue: 84, Jeongdong-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Korea / August 25, 2014

Authorized Signatory: Name : Jei Soon, Kang

Title : Principal Research Engineer

Signature :

EMC TEST REPORT

Test report No	:	**EMC-CE-5094**
Type of Equipment	:	**CCTV Camera**
Model Name	:	**SCO-5083RP**
Applicant	:	**Samsung Techwin Co., Ltd.** **84, Jeongdong-ro, Seongsan-gu, Changwon-si,** **Gyeongsangnam-do, Korea**
Manufacturer #1	:	**Samsung Techwin Co., Ltd.** **84, Jeongdong-ro, Seongsan-gu, Changwon-si,** **Gyeongsangnam-do, Korea**
Manufacturer #2	:	**TIANJIN SAMSUNG TECHWIN** **OPTO-ELECTRONIC CO., LTD** **No.11 Weiliu Road. Micro-Electronic Industrial** **Park Jingang Road Tianjin 300385, China**
Test standards	:	**EN 55022:2010, Class A** **EN 50130-4:2011** **EN 61000-3-3:2008**
Testing Laboratory	:	**EMC Compliance Ltd.**
Test result	:	**Complied**

This product complies with the requirements of the EMC Directive 2004/108/ EC.
The results in this report apply only to the sample tested.
This test report shall not be reproduced, except in full, without the written approval of EMC compliance Laboratory.

Date of receipt: 2014. 08. 18

Date of testing: 2014. 08. 18 ~ 08. 24

Issued date: 2014. 08. 25

Tested by: HWANG, SUN-BIN

Approved by: YEOM, HAN-SEOK

Contents

1. Applicant information

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Manufacturer#2: TIANJIN SAMSUNG TECHWIN OPTO-ELECTRONIC CO., LTD
Address: No.11 Weiliu Road. Micro-Electronic Industrial Park
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2. Laboratory information

Address

EMC compliance Ltd.

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-390, Korea

Telephone Number: 82 31 336 9919

Facsimile Number: 82 505 299 8311

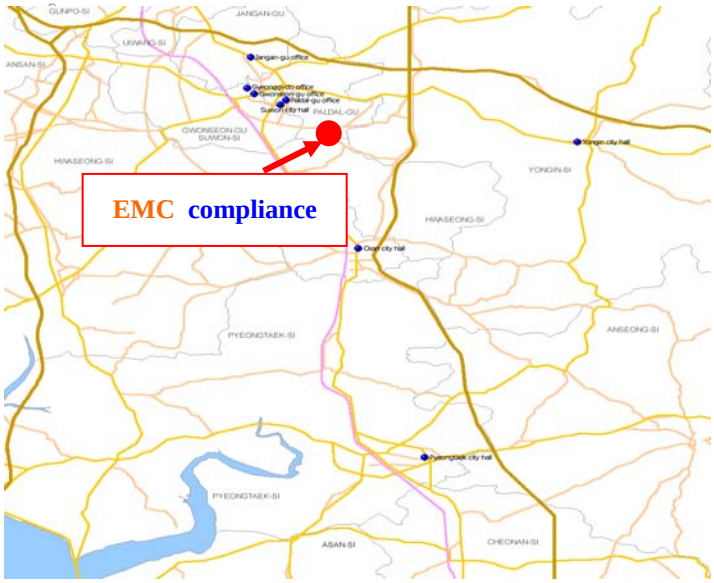
FCC CAB.: KR0040

VCCI Registration No. : R-3327, G-198, C-3706, T-1849

Industry Canada Registration No. : 8035A

KOLAS NO.: 231

SITE MAP



3. Test system configuration

3.1 Operation environment

		Temperature	Humidity	Pressure
Chamber(10 m)	:	25.3 ~ 25.4 °C	47.3 ~ 48.1 % R.H.	-
Shielded room(CE)	:	26.5 °C	60.6 % R.H.	-
Shielded room(ESD)	:	21.0 °C	53.9 % R.H.	99.8 kPa

Test site

These testing items were performed following locations;

Test item	Test site
Conducted Emission	Shielded Room
Radiated Emission	10 m Chamber
Harmonics current	Immunity area
Voltage fluctuations and flickers	Immunity area
Electrostatic discharge	Shielded Room
Radiated RF immunity	Fully anechoic chamber (3 m)
Electric Fast Transient/BURST	Shielded Room
Surge	Shielded Room
Conducted RF immunity	Shielded Room
Voltage dip/interruption	Shielded Room
Mains supply voltage variations	Shielded Room

3.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC.
The factors contributing to uncertainties are test receiver, cable loss, antenna factor calibration, Antenna directivity, antenna factor variation with height, antenna phase center variation, antenna frequency interpolation, measurement distance variation, site imperfection, mismatch, and system repeatability. Based on CISPR 16-4-2, the measurement uncertainty level with a 95 % confidence level was applied.

Conducted emission measurement (C.L: Approx 95 %, k = 2)		
Shielded Room (CE#1)	9 ㎑ ~ 150 ㎑: ± 3.75 dB 150 ㎑ ~ 30 ㎒: ± 3.36 dB	
Shielded Room (CE#2)	9 ㎑ ~ 150 ㎑: ± 3.79 dB 150 ㎑ ~ 30 ㎒: ± 3.42 dB	
Radiated Emission measurement (C.L: Approx 95 %, k = 2)		
10 m Chamber (#F4)	30 ㎒ ~ 300 ㎒	3 m: + 4.87 dB, - 4.99 dB 10 m: + 4.86 dB, - 4.98 dB
	300 ㎒ ~ 1 000 ㎒	3 m: + 5.04 dB, - 5.14 dB 10 m: + 4.91 dB, - 5.02 dB
	1 ㎓ ~ 6 ㎓	3 m: + 6.03 dB, - 6.06 dB
10 m Chamber (#F2)	30 ㎒ ~ 300 ㎒	3 m: + 4.94 dB, - 5.06 dB 10 m: + 4.93 dB, - 5.05 dB
	300 ㎒ ~ 1 000 ㎒	3 m: + 4.97 dB, - 5.08 dB 10 m: + 4.84 dB, - 4.96 dB
	1 ㎓ ~ 6 ㎓	3 m: + 6.03 dB, - 6.05 dB
Radio Frequency Electromagnetic Fields (C.L: Approx 95 %, k = 2)		
± 1.82 dB		
Disturbance power Electromagnetic Fields (C.L: Approx 95 %, k = 2)		
± 3.30 dB		

4. Description of E.U.T.

4.1 General information

	SCO-5083RN	SCO-5083RP
Video		
Imaging Device	1/3" 1.3M CMOS	
Total Pixels	1312(H) x 1069(V)	
Effective Pixels	1305(H) x 1049(V)	
Scanning System	Progressive Scan	
Synchronization	Internal	
Frequency	H : 15.734KHz / V : 59.94Hz	H : 15.625KHz / V : 50Hz
Horizontal Resolution	Color : 1000 TVL B/W : 1000 TVL	
Min. Illumination	Color : 0.05Lux (F1.4, 50IRE), 0.001Lux (1sec, F1.4, 50IRE) 0.02Lux (F1.4, 30IRE), 0.0006Lux (1sec, F1.4, 30IRE) B/W : 0Lux (IR LED On)	
S / N Ratio	52dB (AGC off, Weight on)	
Video Output	CVBS : 1.0 Vp-p / 75Ω composite	
Lens Type		
Focal Length (Zoom Ratio)	3~10mm (YTOT)	
Max. Aperture Ratio	F1.4	
Angular Field of View	H: 82.0°(Wide)~26.5°(Tele), V: 59.7°(Wide)~19.9°(Tele)	
Min. Object Distance	0.5m	
Focus Control	Manual	
Lens Type	DC Auto Iris	
Mount Type	Board Type	
Operational		
On Screen Display	Multi-language Support(17) English, Chinese, Korean, Japanese, German, Italian, French, Spanish, Russian, Czech, Polish, Romanian, Serbian, Swedish, Danish, Turkish, Portuguese	
Camera Title	Off / On (Displayed 15 characters)	
Day & Night	Auto (ICR) / External / Color / B/W	
Backlight Compensation	Off / User BLC / HLC / WDR	
Wide Dynamic Range	120dB	
Contrast Enhancement	SSDR (Off / On)	
Digital Noise Reduction	SSNR4 (Off / On)	
Defog	AUTO / MANUAL / OFF	
Purple Fringe Reduction	Purple Fringe Reduction (Off / Low / Middle / High)	
Digital Image Stabilization	Off / On	
Tampering	Off / On	
Motion Detection	Off / On	
Intelligent Video	Fence, Apear_Disappear, Counting (Off / On)	
Privacy Masking	Off / On (24 programmable zones with 4points polygonal masking)	
Gain Control	Off / Low / Middle / High	
White Balance	ATW / Outdoor / Indoor / Manual / AWC / Mercury (1,800K° ~ 10,500K°)	
Electronic Shutter Speed	1 sec ~ 1/12,000 sec	
Digital Zoom	Off / On (1x ~ 16x)	
Reverse	Off / H-Rev / V-Rev / HV-Rev	
Profile	Basic, Day & Night, Backlight, ITS, Indoor, User	
Alarm	1 Out	
Communication	Coaxial Control (SPC-300 Compatible), RS-485	
Protocol	Coax : Pelco-C (Coaxitron) RS-485: Samsung-T, Samsung-E, Pelco-D, Pelco-P, Panasonic, Bosch, Honeywell, Vicon, AD, GE	
IR Distance	50m	

Environmental	
Operating Temperature / Humidity	-10°C ~ +55°C (+14°F ~ +131°F) / Less than 90% RH
Ingress Protection	IP66
Vandal Resistance	IK10
Electrical	
Input Voltage/Current	Dual (24VAC±10% & 12VDC±10%)
Power Consumption	9.2W
Mechanical	
Color / Material	Dark Gray / ALDC
Dimension (WxHxD)	273 mm * Ø 80 mm
Weight	1.3Kg

4.2 Product description

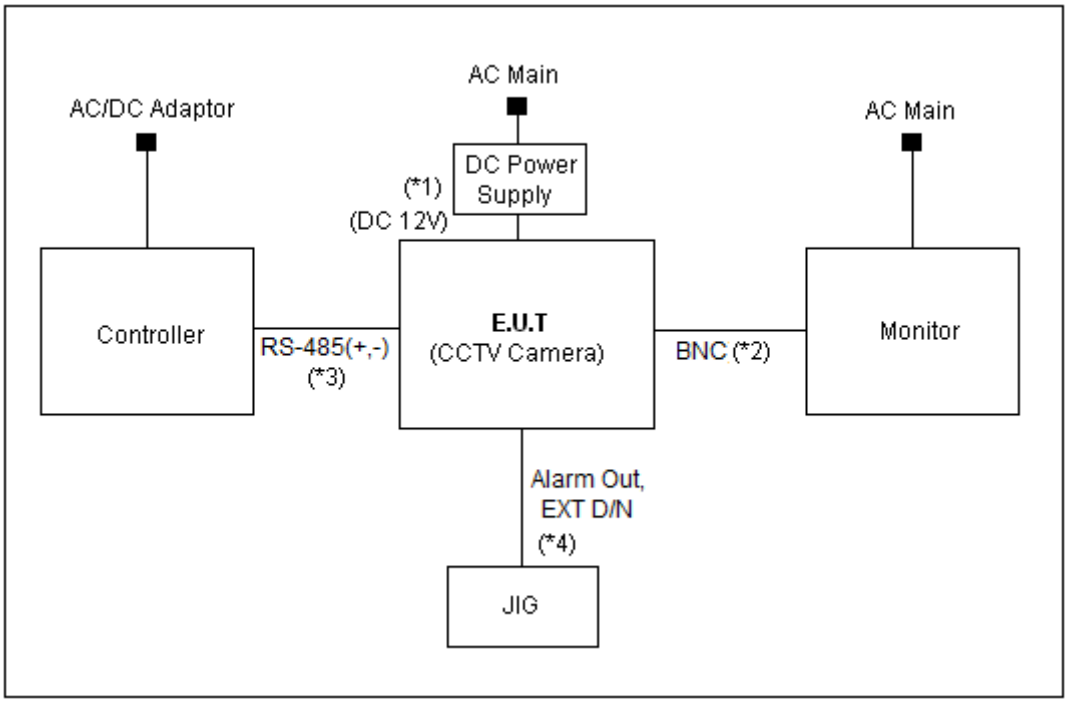
Type of product	CCTV Camera
Model name (Basic)	SCO-5083RP
Model name (Variant)	-
Difference	-
Trade name	-
Serial no	Engineering Sample
Testing voltage	DC 12 Ⅴ, AC 24 Ⅴ
Product rating	DC 12 Ⅴ, AC 24 Ⅴ
Internal clock frequency	Above 108 ㎒
Note	* AC/AC adaptor was not provided by the manufacturer.

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
Monitor	SMT-2231P	YDQ03VDBB02500H	SAMSUNG
Controller	SCC-1000	EW089028913	SAMSUNG
JIG	-	-	-
DC Power Supply	E3633A	MY40004392	Agilent
AC/AC Adaptor	STA-220	-	Dream Electronics

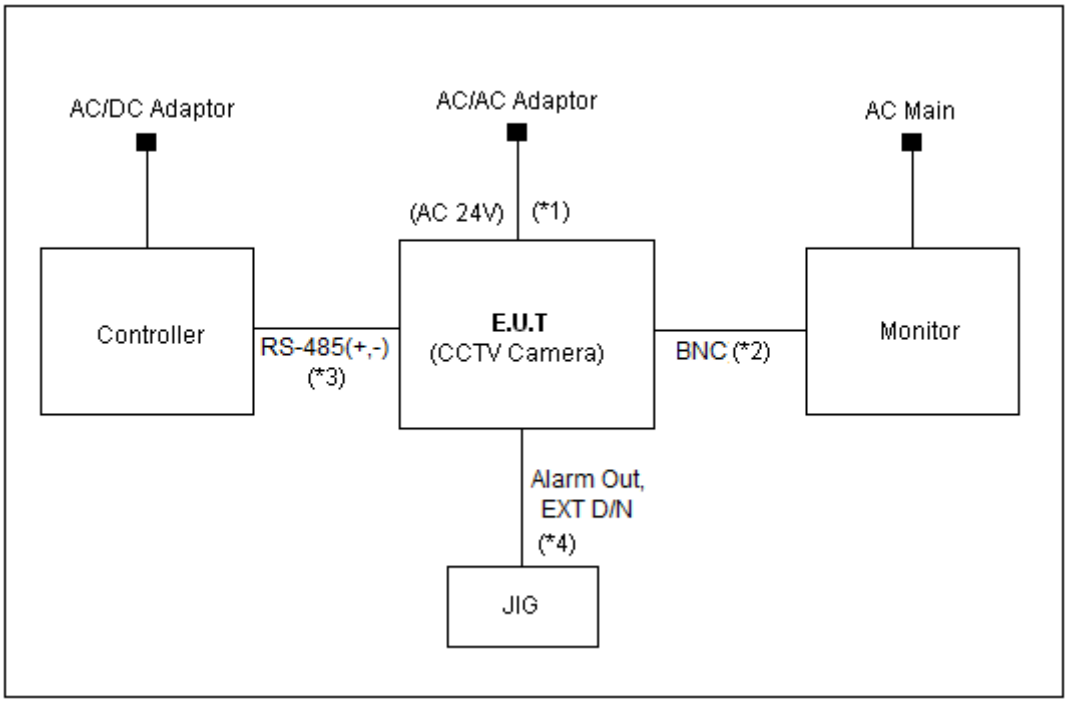
4.4 Test configuration

#1- DC 12V



Note	Start		End		Cable		
*	Name	I/O port	Name	I/O port	Length (m)	Spec.	Cable
1	**EUT** (CCTV Camera)	Power	DC Power Supply	Power	1.5	Non-Shield	-
2		BNC	Monitor	BNC	3.0	Shield	Out-door
3		RS-485(+,-)	Controller	RS-485(+,-)	3.0	Non-Shield	Out-door
4		Alarm Out, EXT D/N	JIG	Alarm In, EXT D/N	3.0	Non-Shield	Out-door

#2- AC 24V



Note	Start		End		Cable		
*	Name	I/O port	Name	I/O port	Length (m)	Spec.	Cable
1	**EUT** (CCTV Camera)	Power	AC/AC Adaptor	Power	1.5	Non-Shield	-
2		BNC	Monitor	BNC	3.0	Shield	Out-door
3		RS-485(+,-)	Controller	RS-485(+,-)	3.0	Non-Shield	Out-door
4		Alarm Out, EXT D/N	JIG	Alarm In, EXT D/N	3.0	Non-Shield	Out-door

4.5 Operating conditions

The EUT was configured as normal intended use.

Test mode	Normal operating
1	Check the video output monitoring test.
	RS-485 test.
	Alarm, EXT D/N test.

* Note: 2 types of powers are available for the product, that are DC 12 Ⅴ, AC 24 Ⅴ.
Therefore, tests were performed for 2 different types of powers.

5. Summary of test results

5.1 Summary of EMI emission test results

Applied	Test items	Test method	Result
☒	Conducted Emission	EN 55022:2010	Complied
☒	Radiated Emission	EN 55022:2010	Complied
☐	Harmonics current	EN 61000-3-2:2006+A1:2009+A2:2009	N/A
☒	Voltage fluctuations and flickers	EN 61000-3-3:2008	Complied

5.2 Summary of immunity test results

Applied	Test items	Test method	Result
*** EN 50130-4:2011**			
☒	Electrostatic discharge	EN 61000-4-2:2009	Complied
☒	Radiated RF immunity	EN 61000-4-3:2006+A2:2010	Complied
☒	Electric Fast Transient/BURST	EN 61000-4-4: 2012	Complied
☒	Surge	EN 61000-4-5:2006	Complied
☒	Conducted RF immunity	EN 61000-4-6:2009	Complied
☒	Voltage dip/interruption	EN 61000-4-11:2004	Complied
☐	Mains supply voltage variations	EN 50130-4:2011	N/A

5.3 Performance criteria

The variety and the diversity of the apparatus within the scope of this document makes it difficult to define precise criteria for the evaluation of the immunity test results.
If as a result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe then the apparatus shall be deemed to have failed the test.
A functional description and a definition of performance by the manufacture and noted in the test report, based on the following criteria:

Electrostatic discharge

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing which could be interpreted by associated equipment as a change,

Radiated electromagnetic fields

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing which could be interpreted by associated equipment as a change, and no such
Flickering of indicators occurs at a field strength of 3 V/m. For components of CCTV systems, where the picture is allowed at 10 V/m, providing.

(a) there is no permanent damage or change to EUT
(e.g. no corruption of memory or changes to programmable setting etc.)
(b) at 3 V/m, any deterioration of the picture is so minor that the system could still be used; and
(c) there is no observable deterioration of the picture at 1 V/m.

Fast transient burst / slow high energy voltage surge

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing
That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as

Conducted RF immunity

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing
That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change,
and no such flickering of indicators oeuvres at U = 130 dBμV.
For component of CCTV systems, where the status is monitored by observing the TV picture,
then deterioration of the picture is allowed at U = 140 dBμV, providing:

(a) there is no permanent damage or change to the EUT
(e.g. no corruption of memory or changes to programmable settings etc.)
(b) at U = 130 dBμV, any deterioration of the picture is so minor that the system could still be used; and
(c) there in no observable deterioration of the picture at U = 120 dBμV.

Voltage dip/interruption / Voltage variation

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test, after the conditioning.

6. Test results

6.1 Conducted Emission

Test specification	EN 55022:2010, Section 5, Class A		
Testing voltage	230 V, 50 Hz (From AC/AC Adaptor)		
Test facility	Shielded room (CE#1)		
Date	2014. 08. 24		
Temperature (°C)	26.5 °C	Humidity (% R.H.)	60.6 % R.H.
Remarks	Complied		

6.1.1 Limits of conducted emission measurement

☒ AC main

Frequency [㎒]	Class A (dB(㎶))		Class B (dB(㎶))	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	79	66	66 ~ 56 *	56 ~ 46*
0.5 ~ 5	73	60	56	46
5 ~ 30	73	60	60	50

*The limit decreases linearly with the logarithm of frequency.

☐ Telecommunication

Frequency [㎒]	Class A Voltage Limits (dB(㎶))		Current Limits (dB(㎂))	
	Quasi-Peak	Average	Quasi-Peak	Average
0.15 ~ 0.5	97 to 87	84 to 74	53 to 43	40 to 30
0.5 ~ 30	87	74	43	30
Frequency [㎒]	Class B Limits (dB(㎶))		Current Limits (dB(㎂))	
	Quasi-Peak	Average	Quasi-Peak	Average
0.15 ~ 0.5	84 to 74	74 to 64	40 to 30	30 to 20
0.5 ~ 30	74	64	30	20

* The limits decrease linearly with the logarithm of the frequency in the range 0.15 ㎒ to 0.5 ㎒

* The current and voltage disturbance limits are derived for use with an impedance stabilization Network (ISN) which presents a common mode (asymmetric mode) impedance of 150 Ω to the telecommunication port under test (conversion factor is 20 $\log_{10}$ 150/I = 44 dB).

6.1.2 Measurement procedure

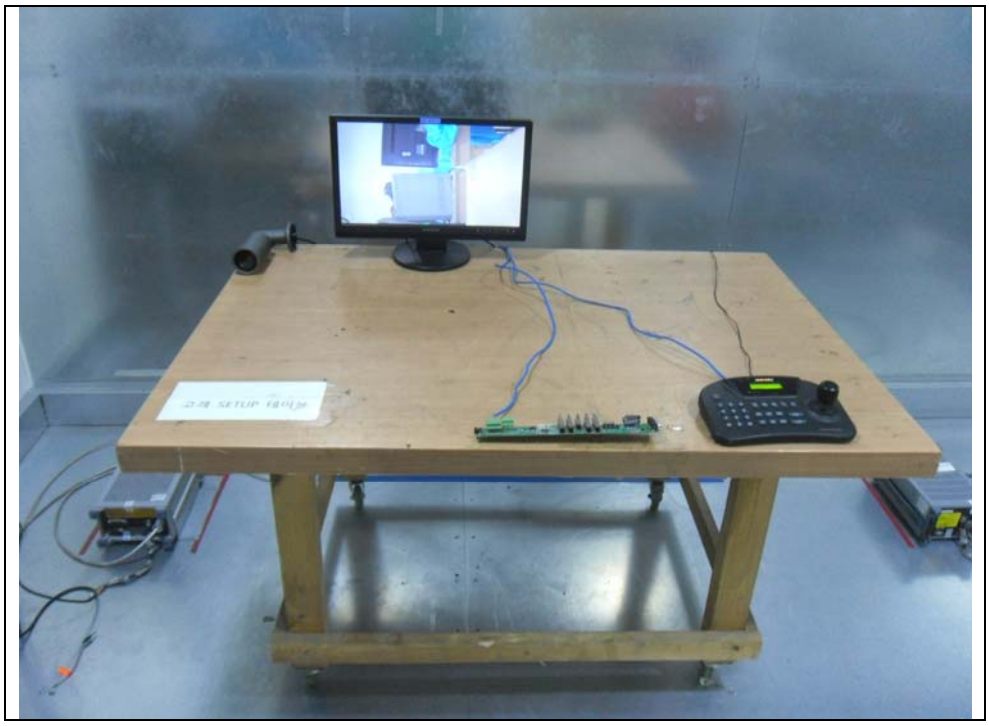
The measurements were performed in a shielded room. EUT was setup as shown in photograph and placed on a non-metallic table height of 0.8 m above the reference ground plane. The rear of table was located 0.4 m to the vertical conducted plane. EUT was power through the LISN, which was bonded to the ground plane. The LISN power was filtered. Each EUT power lead, except ground (safety) lead was individually connected through a LISN to input power source. EUT signal cables that hung closer than 0.4 m to the Horizontal metal ground 0.3 m ~ 0.4 m long. The power cord was bundles in the center. All peripheral equipment was powered from a sub LISN. The LISN and ISN were positioned 0.8 m from the EUT. Peak and Average detection were used in preliminary testing and Quasi-peak and Average detections were used at final measurement.
Both lines of power cord, hot and neutral, were measured.

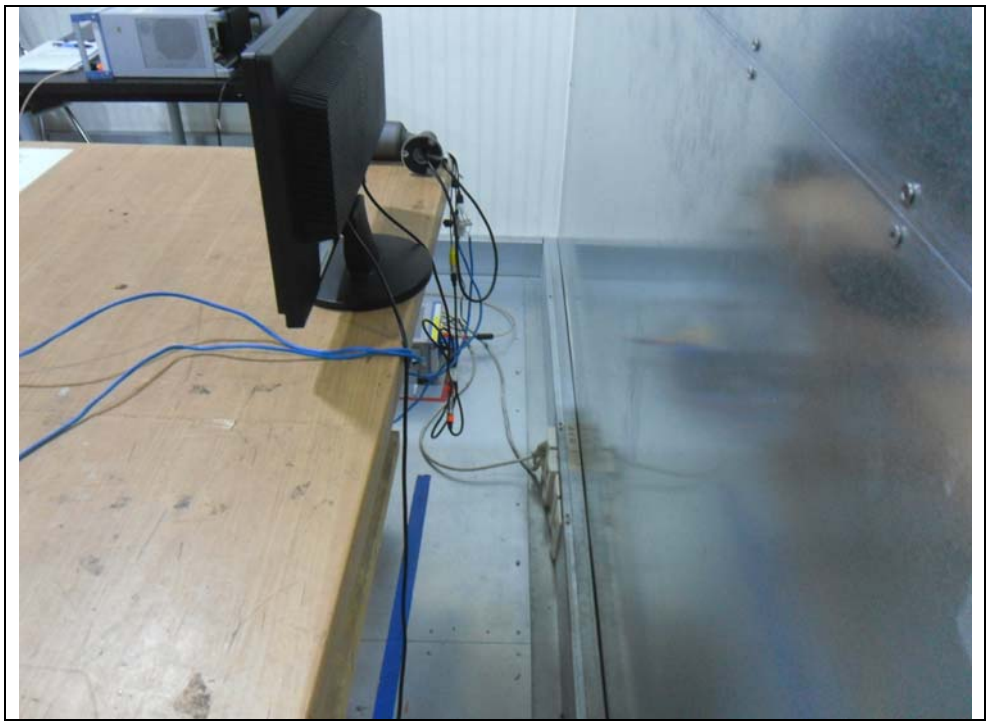
6.1.3 Used equipments

Equipment	Model	Serial No.	Makers	Next Cal. Date	Used
Test Receiver	ESCI7	100732	R&S	2015.01.27	☐
Test Receiver	ESCI	100001	R&S	2015.07.14	☐
Test Receiver	ESCI	100710	R&S	2014.10.28	☒
TWO-LINE V-NETWORK	ENV216	101358	R&S	2014.10.01	☒
TWO-LINE V-NETWORK	ESH3-Z5	100267	R&S	2015.06.24	☒
8-WIRE ISN	NTFM 8158 CAT5	CAT5-8158-0071	SCHWARZBECK	2015.03.21	☐
8-WIRE ISN	NTFM 8158 CAT3	CAT3-8158-0020	SCHWARZBECK	2015.03.07	☐

6.1.4 Photographs of test setup

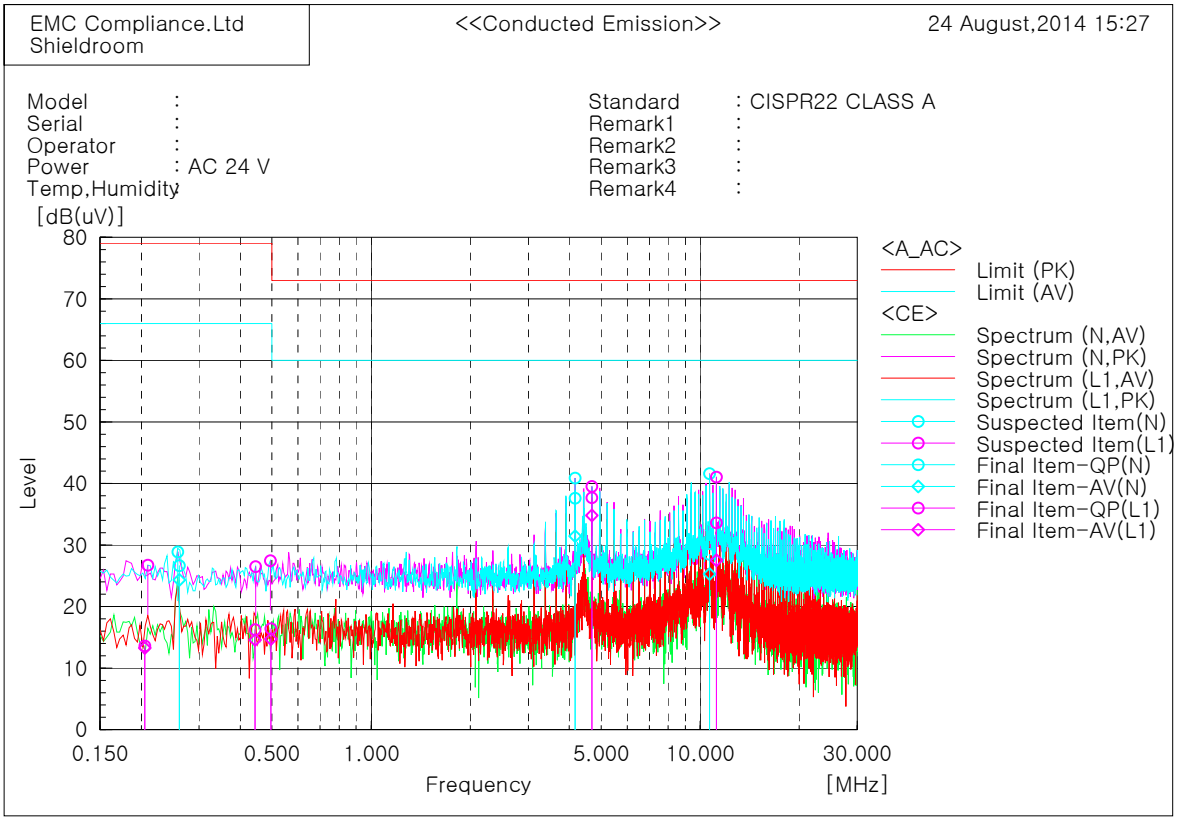
* AC Main(#2-AC 24V)





6.1.5 Conducted emission measurement result

* AC Main (SCO-5083RP)_#2-AC 24V



Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading AV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result AV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin AV [dB]
1	0.26113	16.9	14.6	9.8	26.7	24.4	79.0	66.0	52.3	41.6
2	4.17293	27.9	21.7	9.7	37.6	31.4	73.0	60.0	35.4	28.6
3	10.68366	18.7	15.5	9.8	28.5	25.3	73.0	60.0	44.5	34.7

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading AV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result AV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin AV [dB]
1	0.20538	3.5	3.2	10.1	13.6	13.3	79.0	66.0	65.4	52.7
2	0.4446	6.1	4.5	10.1	16.2	14.6	79.0	66.0	62.8	51.4
3	0.49495	6.3	4.6	10.1	16.4	14.7	79.0	66.0	62.6	51.3
4	4.6921	28.0	25.1	9.7	37.7	34.8	73.0	60.0	35.3	25.2
5	11.20901	23.8	17.7	9.8	33.6	27.5	73.0	60.0	39.4	32.5

6.2 Radiated Emission

Test specification	EN 55022:2010, Class A		
Testing voltage	DC 12 V, AC 24 V		
Test facility	10 m Chamber (#F2)		
Test distance	10 m, 3 m		
Date	2014. 08. 18 ~ 19		
Temperature (°C)	25.3 ~ 25.4 °C	Humidity (% R.H.)	47.3 ~ 48.1 % R.H.
Remarks	Complied		

6.2.1 Limits of radiated emission measurement

☒ Limits below 1 GHz

Frequency [MHz]	Class A (dB(μV/m)) @ 10 m	Class B (dB(μV/m)) @ 10 m
30 ~ 230	40	30
230 ~ 1 000	47	37

☒ Limits above 1 GHz

Frequency [GHz]	Class A @ 3 m		Class B @ 3 m	
	Average limit (dB(μV/m))	Peak limit (dB(μV/m))	Average limit (dB(μV/m))	Peak limit (dB(μV/m))
1 ~ 3	56	76	50	70
3 ~ 6	60	80	54	74
Note - The lower limit applies at the transition frequency.				

6.2.2 Measurement procedure

The test was done at a 10 m chamber with a quasi-peak detector. EUT was placed on a non-metallic table height of 0.8 m above the reference ground plane. Cables were folded back and forth forming a bundle 0.3 m to 0.4 m long and were hanged at a 0.4 m height to the ground plane.
Cables connected to EUT were fixed to cause maximum emission. 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 to obtain the maximum signal strength.

6.2.3 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
Test Receiver	ESCI7	100732	R&S	2015.01.27	☐
Test Receiver	ESCI	100001	R&S	2015.07.14	☐
Test Receiver	ESCI	100710	R&S	2014.10.28	☐
Test Receiver	ESR	101078	R&S	2015.02.24	☒
Bi-Log Antenna	VULB9168	583	SCHWARZBECK	2016.06.19	☒
Amplifier	310N	293004	SONOMA INSTRUMENT	2014.10.31	☒
3 dB Attenuator	8491B	22981	HP	2015.03.04	☒
Antenna Mast	MA4000-EP	303	Innco Systems	-	☒
Turn Table	DT2000S-1t	079	Innco Systems	-	☒
Preamplifier	8449B	3008A02343	AGILENT	2014.10.31	☒
Horn ANT	3115	00155772	ETS	2015.02.26	☒
Spectrum Analyzer	E4407B	US39010142	AGILENT	2014.10.21	☐

6.2.4 Sample calculation

The field strength is calculated adding the antenna Factor, cable loss and, Antenna pad adding, subtracting the amplifier gain from the measured reading.

The sample calculation is as follow:

Result = M.R + C.F(A.F + C.L +3 dB Att – A.G)

M.R = Meter Reading

C.F = Correction Factor

A.F = Antenna Factor

C.L = Cable Loss

A.G= Amplifier Gain

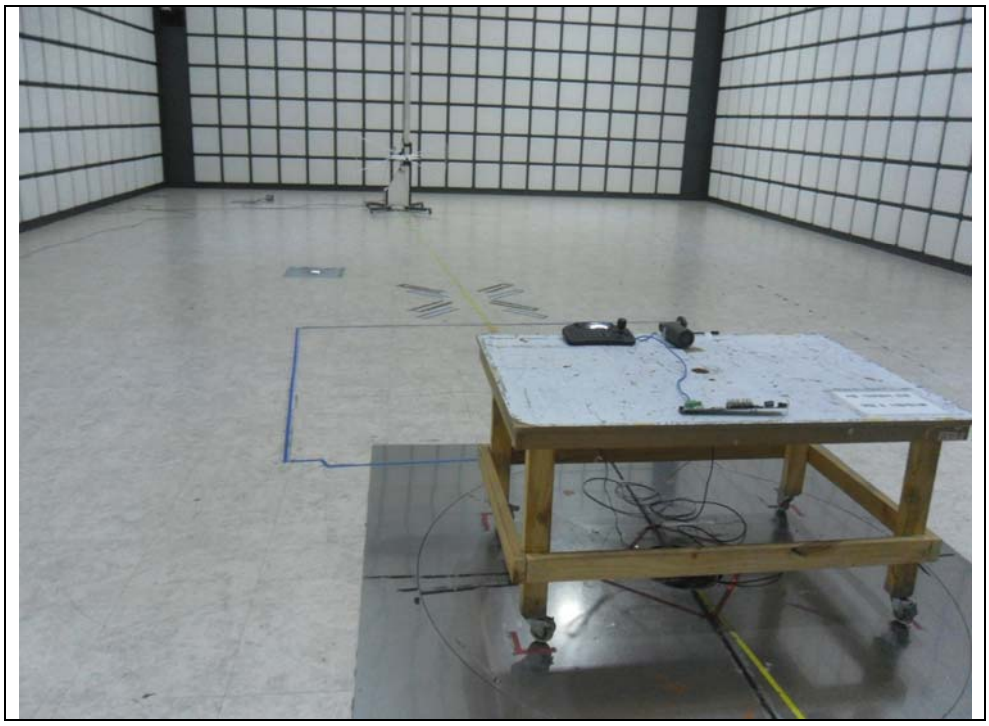
3 dB Att = 3 dB Attenuator

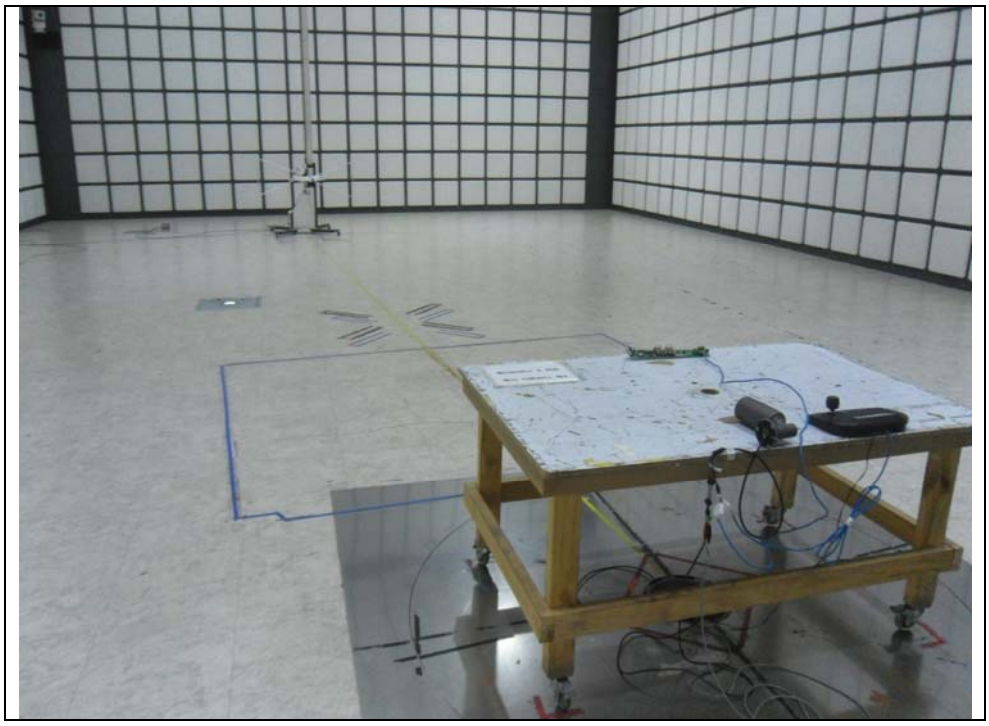
If M.R is 30 dB, A.F 12 dB, C.L 5 dB, 3 dB, A.G 35 dB

The result is 12 + 5 + 3 – 35 = 15 dB(μV/m)

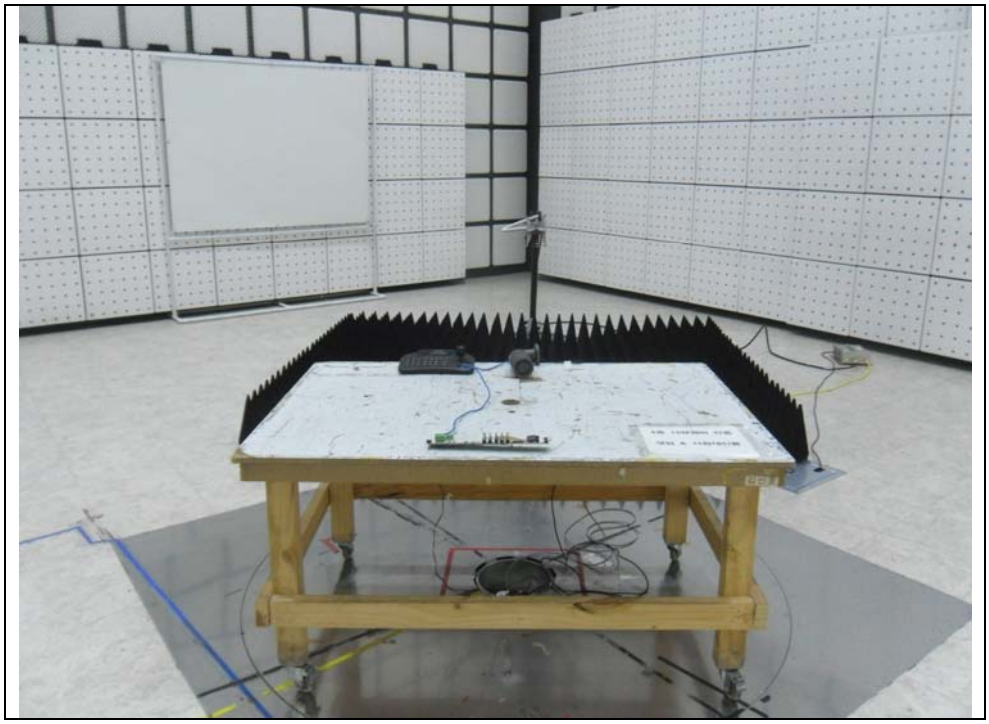
6.2.5 Photographs of test setup

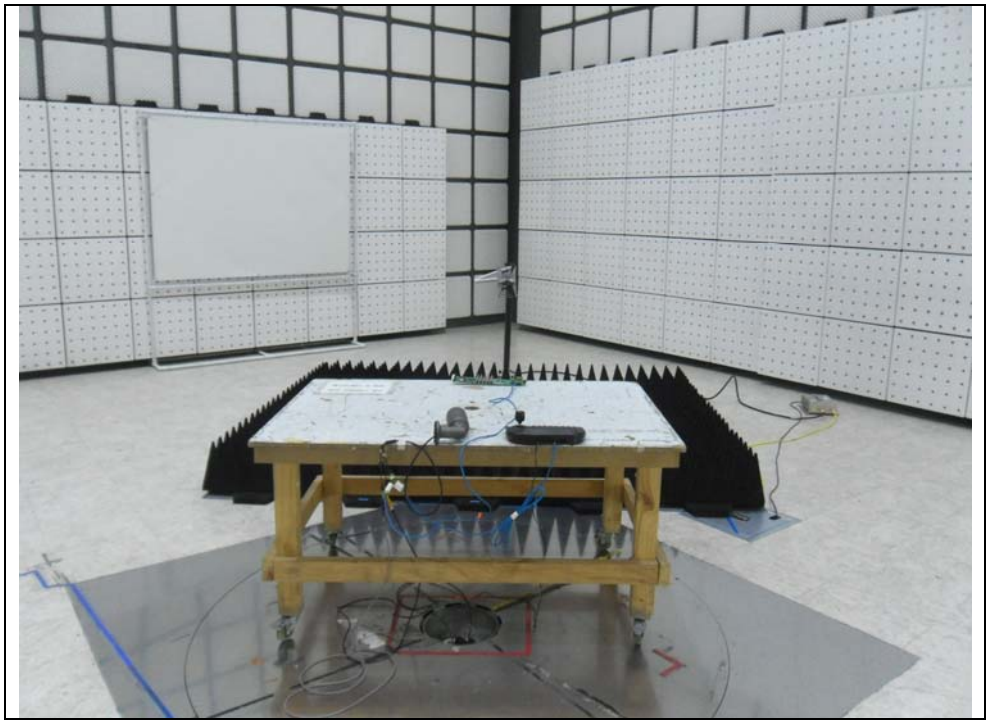
* 30 ㎒ ~ 1 ㎓ (#1-DC 12V)



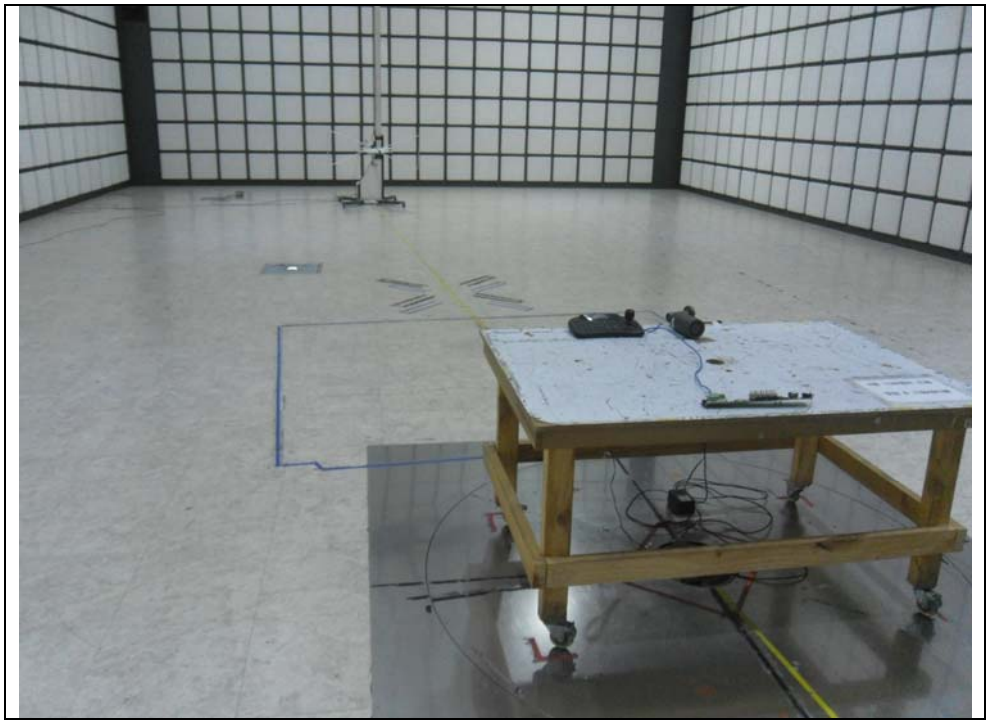


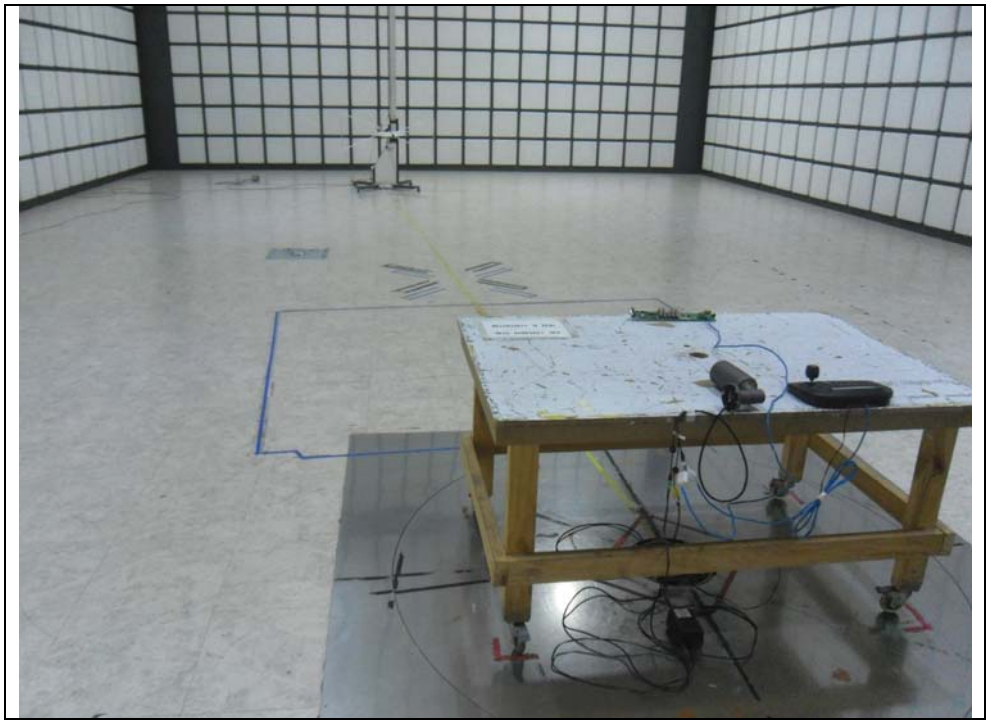
* 1 ㎓ ~ 6 ㎓ (#1-DC 12V)



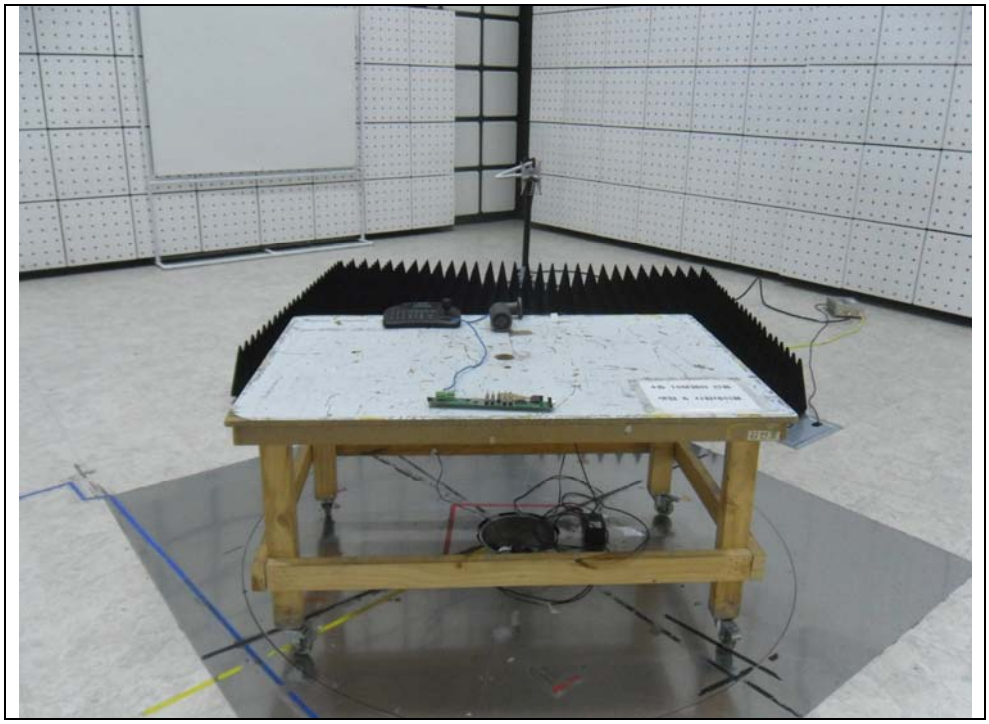


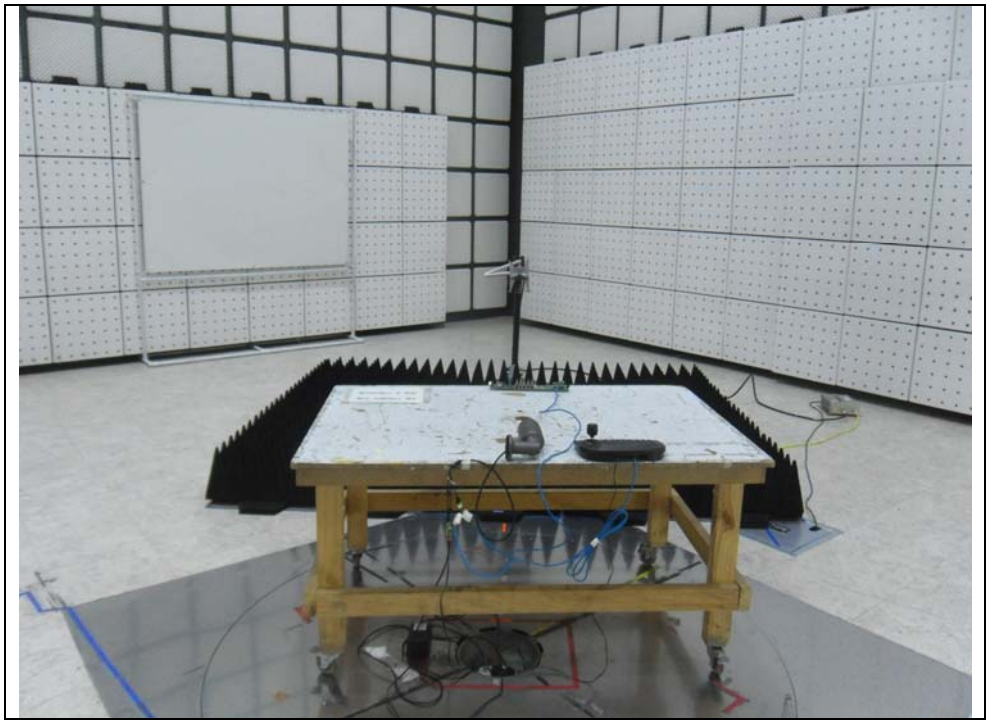
* 30 ㎒ ~ 1 ㎓ (#2-AC 24V)





* 1 ㎓ ~ 6 ㎓ (#2-AC 24V)

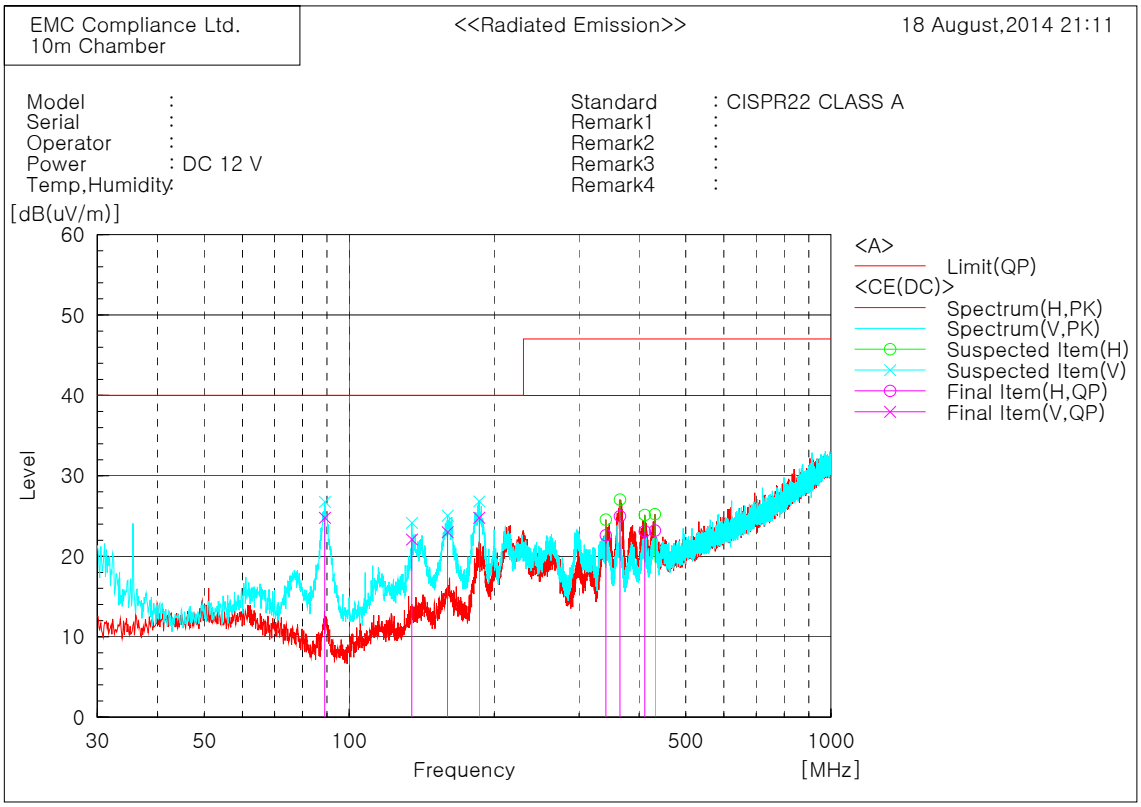




6.2.6 Radiated emission measurement result

*** Graph and Data**

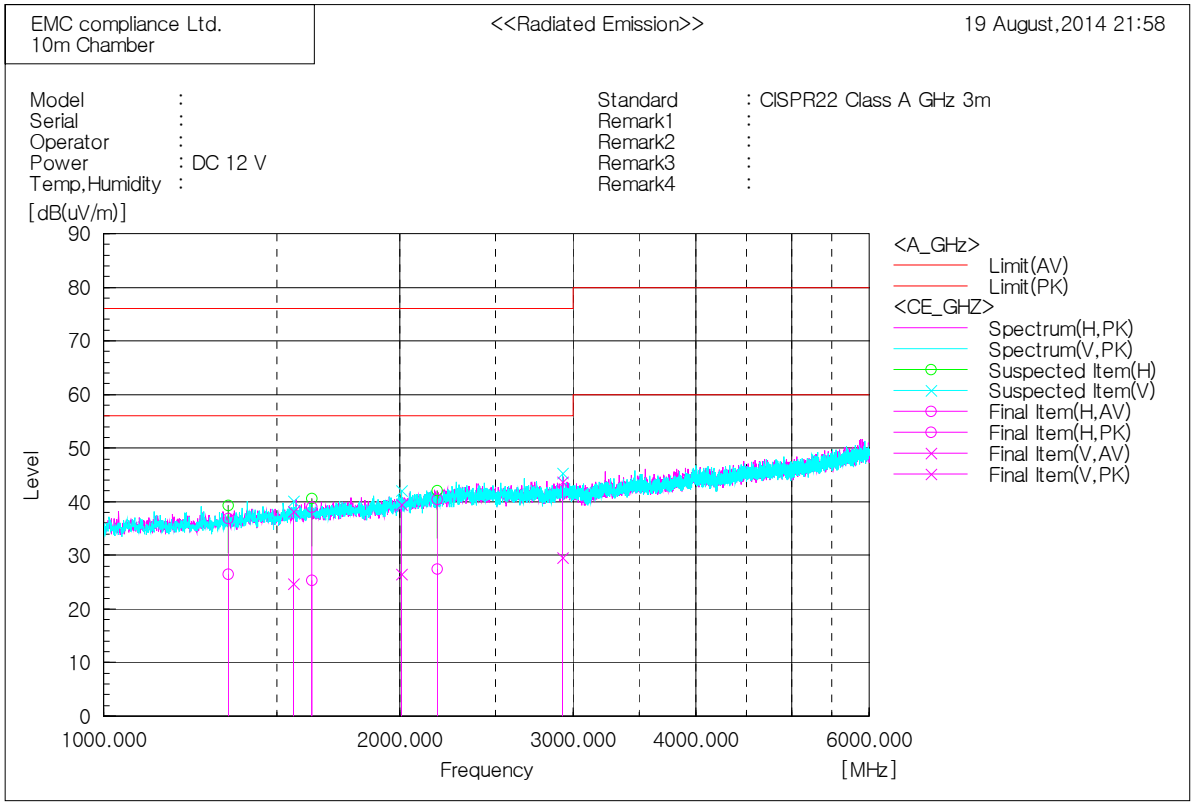
* 30 ㎒ ~ 1 ㎓ (SCO-5083RP)_#1- DC 12V



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	89.049	V	43.2	-18.4	24.8	40.0	15.2	100.0	41.3
2	135.003	V	35.5	-13.4	22.1	40.0	17.9	100.0	357.8
3	160.101	V	34.9	-11.9	23.0	40.0	17.0	100.0	339.5
4	186.049	V	38.5	-13.7	24.8	40.0	15.2	100.0	353.9
5	341.006	H	31.5	-8.9	22.6	47.0	24.4	400.0	81.3
6	365.135	H	33.2	-8.2	25.0	47.0	22.0	400.0	60.2
7	411.089	H	30.0	-6.9	23.1	47.0	23.9	100.0	247.8
8	431.459	H	29.5	-6.3	23.2	47.0	23.8	100.0	265.9

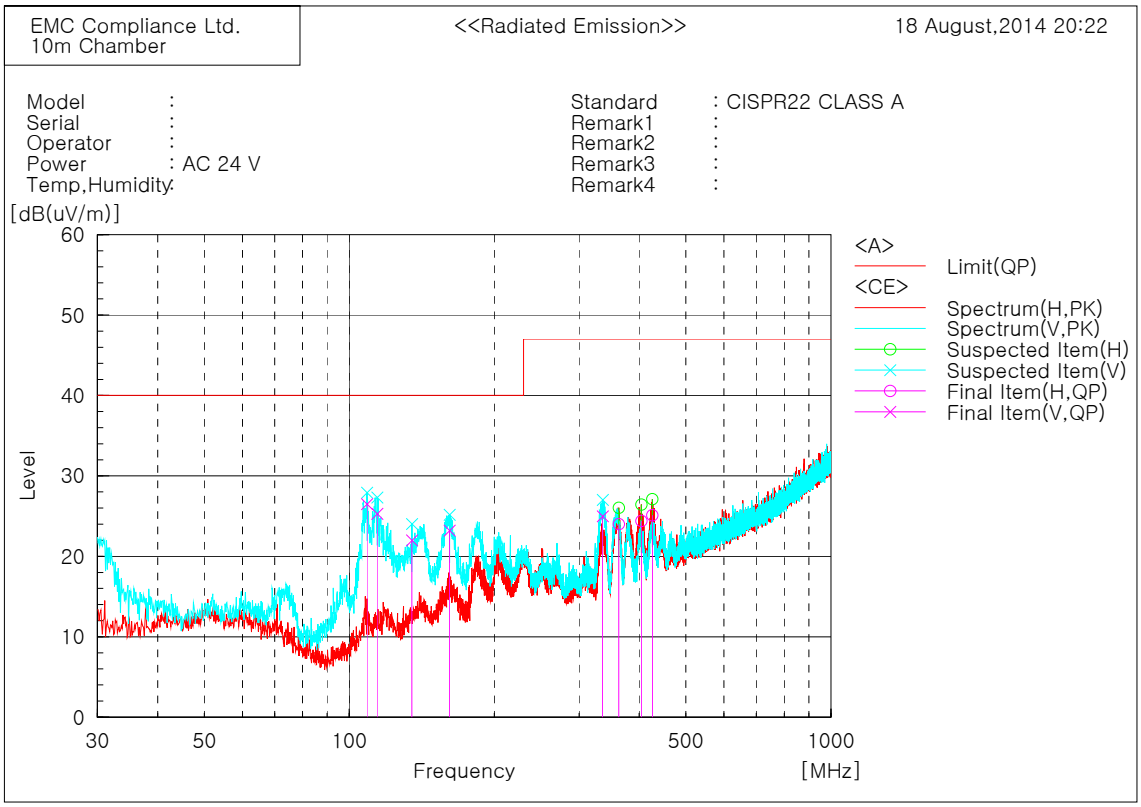
* 1 ㎓ ~ 6 ㎓ (SCO-5083RP)_#1- DC 12V



Final Result

No.	Frequency [MHz]	(P)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	c.f [dB(1/m)]	Result AV [dB(uV/m)]	Result PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]
1	1339.375	H	31.3	41.8	-4.9	26.4	36.9	56.0	76.0	29.6	39.1	100.0	36.7
2	1558.750	V	28.2	41.7	-3.5	24.7	38.2	56.0	76.0	31.3	37.8	100.0	253.5
3	1628.750	H	28.3	42.0	-3.0	25.3	39.0	56.0	76.0	30.7	37.0	100.0	157.0
4	2009.375	V	27.2	40.1	-0.7	26.5	39.4	56.0	76.0	29.5	36.6	100.0	225.7
5	2183.750	H	27.1	40.1	0.3	27.4	40.4	56.0	76.0	28.6	35.6	100.0	33.1
6	2928.750	V	28.4	42.5	1.2	29.6	43.7	56.0	76.0	26.4	32.3	100.0	122.1

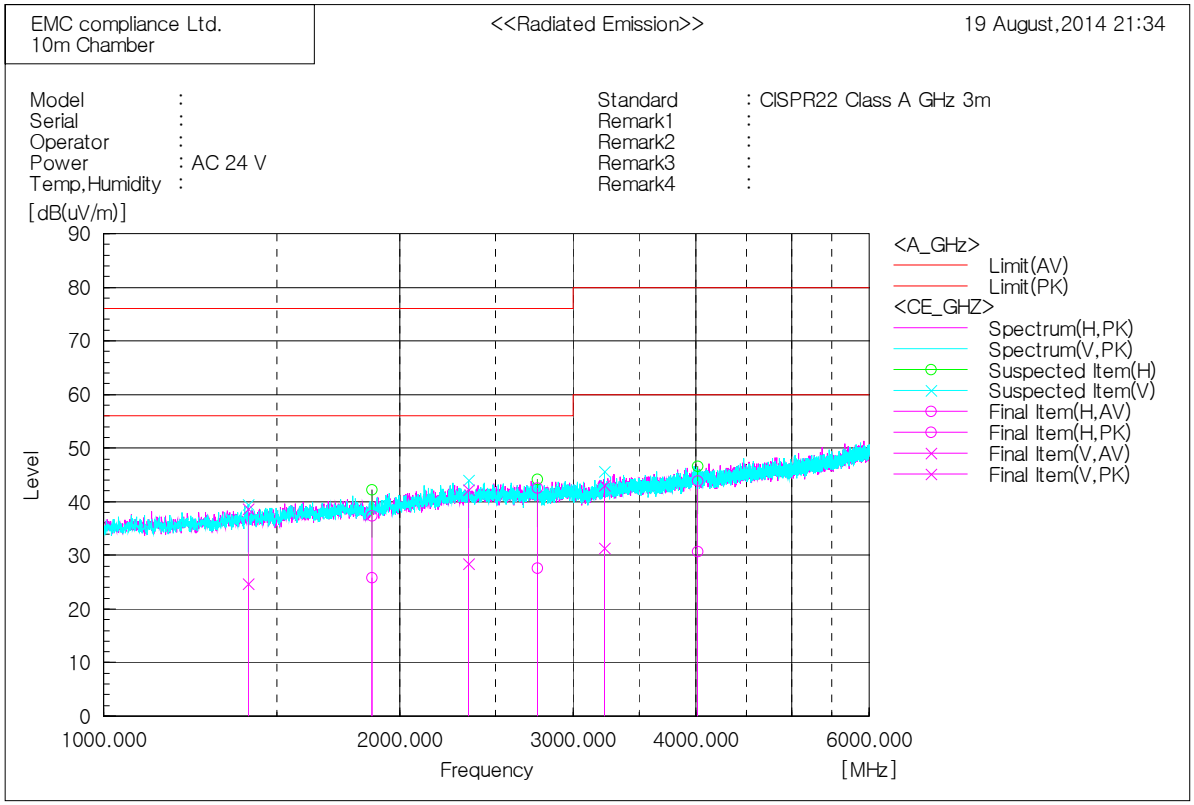
* 30 ㎒ ~ 1 ㎓ (SCO-5083RP)_#2-AC 24V



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	108.813	V	42.1	-15.6	26.5	40.0	13.5	100.0	18.0
2	114.269	V	40.2	-14.9	25.3	40.0	14.7	100.0	81.4
3	135.003	V	35.4	-13.4	22.0	40.0	18.0	100.0	7.6
4	161.556	V	35.2	-12.0	23.2	40.0	16.8	100.0	305.0
5	335.914	V	34.1	-9.1	25.0	47.0	22.0	100.0	231.0
6	362.831	H	32.2	-8.2	24.0	47.0	23.0	400.0	70.5
7	403.935	H	31.5	-7.1	24.4	47.0	22.6	400.0	76.5
8	425.639	H	31.6	-6.5	25.1	47.0	21.9	100.0	269.6

* 1 ㎓ ~ 6 ㎓ (SCO-5083RP)_#2-AC 24V



Final Result

No.	Frequency [MHz]	(P)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	c.f [dB(1/m)]	Result AV [dB(uV/m)]	Result PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]
1	1401.250	V	29.2	43.1	-4.5	24.7	38.6	56.0	76.0	31.3	37.4	100.0	118.5
2	1875.000	H	27.3	38.9	-1.5	25.8	37.4	56.0	76.0	30.2	38.6	100.0	191.8
3	2348.750	V	27.4	41.2	1.1	28.5	42.3	56.0	76.0	27.5	33.7	100.0	224.7
4	2760.625	H	26.5	41.4	1.1	27.6	42.5	56.0	76.0	28.4	33.5	100.0	328.1
5	3230.625	V	29.2	40.9	2.2	31.4	43.1	60.0	80.0	28.6	36.9	100.0	78.0
6	4016.250	H	25.3	38.4	5.4	30.7	43.8	60.0	80.0	29.3	36.2	100.0	30.0

6.3 Flicker

Test specification	EN 61000-3-3:2008				
Testing voltage	230 V, 50 Hz (From AC/AC Adaptor)				
Test facility	Immunity area				
Date	2014. 08. 22				
Temperature(°C)	25.8 °C	Humidity (% R.H.)	46.5 % R.H.	Pressure (kPa)	100.4 kPa
Remarks	Complied				

6.3.1 Measurement procedure

EUT was connected to the power analyzer system.

Measurement was performed to obtain the desired flicker parameters.

The measuring time depends on which parameters are to be measured.

P_{lt} = 2 h

P_{st} = 10 min

Controls and automatic programs shall be set to produce the most unfavorable sequence of voltage changes, using only those combinations of controls and programs are mentioned by the manufacturer in the instruction manual.

6.3.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Harmonics/Flicker meter	5001x-CTS -400-413	54984	C.I.	2015.04.17	☒

6.3.3 Photographs of test setup

(#2-AC 24V)

6.3.4 Measurement result

(#2-AC 24V)

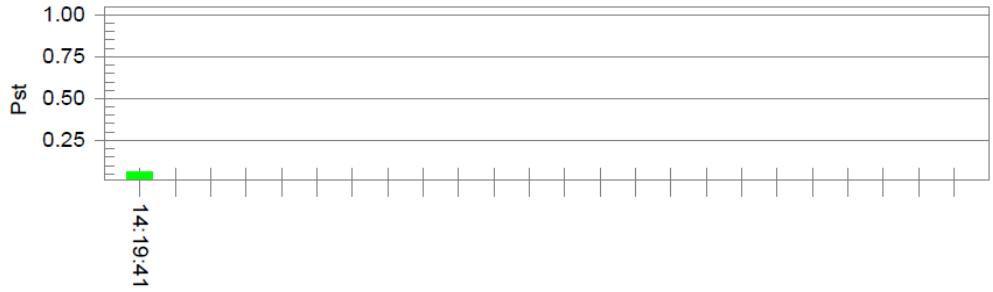
Flicker Test Summary per EN/IEC61000-3-3 (Run time)

EUT: SCO-5083RP
Test category: All parameters (European limits)
Test date: 2014-08-22 Start time: 오후 2:09:22 End time: 오후 2:19:42
Test duration (min): 10 Data file name: F-000297.cts_data
Comment: Comments
Customer: Samsung Techwin Co., Ltd.

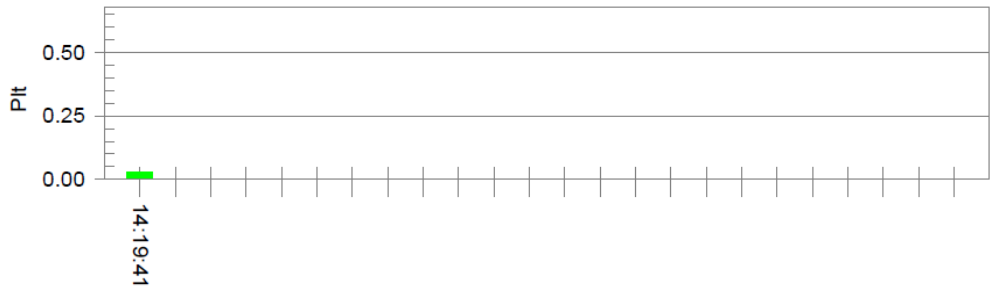
Tested by: Test Operator
Test Margin: 100

Test Result: Pass Status: Test Completed

Pst$_i$ and limit line European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	229.53			
Highest dt (%):	0.00	Test limit (%):	3.30	Pass
Time(mS) > dt:	0.0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.00	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.064	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.028	Test limit:	0.650	Pass

6.4 Electrostatic Discharge

Test specification	EN 61000-4-2:2009				
Test level	☒ Contact: ± 6 kV ☒ Air: ± 2 kV, ± 4 kV, ± 8 kV ☐ HCP: ± 2 kV, ± 4 kV, ± 6 kV ☒ VCP: ± 2 kV, ± 4 kV, ± 6 kV				
Discharge impedance	330 Ω / 150 pF				
Number of discharge (Each polarity)	☒ Contact: 10 ☒ Air: 10 ☒ HCP / VCP: 10				
Interval between discharges	1 s				
Testing voltage	DC 12 V, AC 24 V				
Test facility	Shielded room				
Date	2014. 08. 21				
Temperature(°C)	21.0 °C	Humidity (% R.H.)	53.9 % R.H.	Pressure (kPa)	99.8 kPa
Remarks	Complied - There was no change of operation status during above testing.				

6.4.1 Measurement procedure

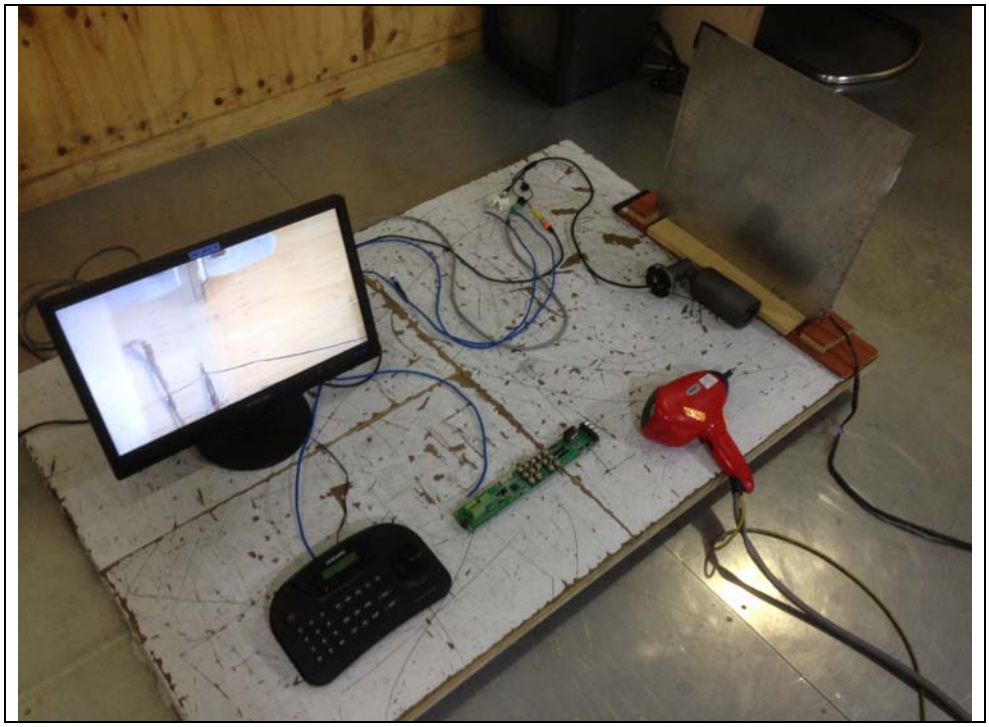
A ground reference plane was located on the floor, and connected to earth via a low Impedance connection. The return cable of the ESD generator was connected to the reference plane.
In case of floor standing equipment, EUT was placed on the reference plane on 0.1 m of insulating Support. In case of table top equipment, EUT was placed on a wooden table 0.8 m above the reference grounded floor. A horizontal coupling plane (HCP) was placed on the table, and Connected to the reference plane via a 470 kΩ resistor located in each end (0.5 mm insulating support between EUT and HCP). In both cases a vertical coupling plane(VCP) OF 0.5 X 0.5 m was located 0.1 m from the EUT's sides. The VCP was connected to the reference plane in the same matter as the HCP.

6.4.2 Used equipments

Equipment	Model No.	Serial No.	Makers	Next Cal. Date	Used
ESD Tester	PESD-1600	H011 309	HAEFELY	2015.06.30	☐
ESD Tester	NSG 437	182	TESEQ	2015.01.04	☒
HCP	-	-	-	-	☐
VCP	-	-	-	-	☒

6.4.3 Photographs of test setup

(#1-DC 12 V, #2-AC 24 V)



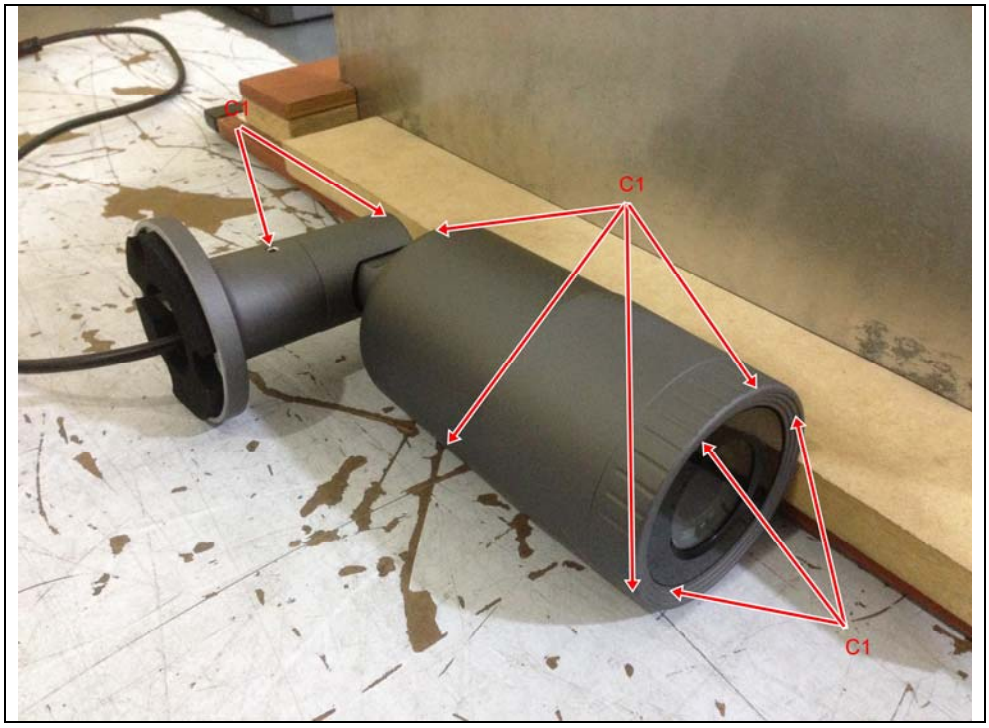
6.4.4 Measurement result

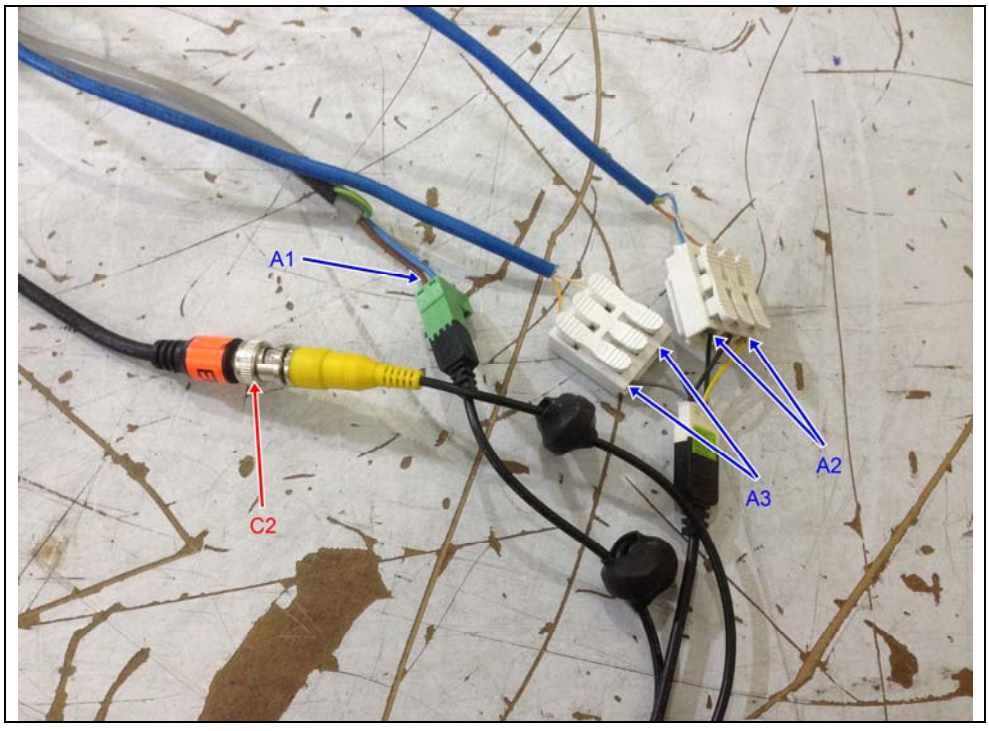
Electrostatic Discharge (Test Point)

Air discharge →

Contact discharge →

(#1-DC 12 V, #2-AC 24 V)





(#1-DC 12 V, #2-AC 24 V)

HCP/VCP discharge

Location(EUT)	Applied level (±)	Result
HCP (All 4 sides)	-	-
VCP (All 4 sides)	± 2 kV, ± 4 kV, ± 6 kV	Complied

Contact discharge

Location(EUT)		Applied level (±)	Result
C1	Screw	± 6 kV	Complied
C2	BNC Port	± 6 kV	Complied

Air discharge

Location(EUT)		Applied level (±)	Result
A1	Power Port	± 2 kV, ± 4 kV, ± 8 kV	Complied
A2	RS-485(+,-) Port	± 2 kV, ± 4 kV, ± 8 kV	Complied
A3	Alarm Out, EXT D/N Port	± 2 kV, ± 4 kV, ± 8 kV	Complied

6.5 Radio Frequency Electromagnetic Fields

Test specification	EN 61000-4-3:2006+A2:2010				
Tested frequency	80 ㎒ ~ 1 ㎓, 1 ㎓ ~ 2 ㎓, 2 ㎓ ~ 2.7 ㎓				
Test level & Modulation	1 V/m, 3 V/m, 10 V/m, 80 % Amplitude Modulation (1 ㎑) 1 V/m, 3 V/m, 10 V/m, Pulse Modulation (1 ㎐ (0.5 s ON: 0.5 s OFF))				
Frequency Step	log 1 % step				
Dwell time	3 s				
Distance	3 m from EUT to tip of antenna				
Testing Voltage	DC 12 V, AC 24 V				
Test facility	Fully anechoic chamber (3 m)				
Date	2014. 08. 24				
Temperature(°C)	25.7 °C	Humidity (% R.H.)	45.5 % R.H.	Pressure (㎪)	100.4 ㎪
Remarks	Complied - There was no change of operation status during above testing.				

6.5.1 Measurement procedure

The test was performed at 3 m full anechoic chamber.

For floor standing equipment, the EUT was standing on the floor.

For tabletop equipment, the EUT was located on a wooden table 0.8 m above the floor.

The EUT was tested all sides, horizontal and vertical polarization.

6.5.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Power meter	PM2002	302852	AR	2015.02.07	☒
Power sensor	PH2000	303224	AR	2015.02.07	☒
Power sensor	PH2000	311217	AR	2015.02.07	☒
Directional coupler	DC6180	303976	AR	2015.02.06	☒
Directional coupler	DC7144M1	320279	AR	2015.02.06	☒
Signal generator	E4421B	GB40052295	AGILENT	2015.02.06	☒
Broadband Amplifier	BBA100	100996-1	R&S	2015.02.06	☒
Amplifier	60S1G3M2	320444	AR	2015.04.02	☒
Log Periodic Dipole Antenna	LPDA-0803	-	ETS	-	☒
Isotropic Probe	HI-6105	156301	ETS-LINDGREN	2015.07.18	☒
Antenna master	-	-	ETS	-	☒

6.5.3 Photographs of test setup

#1-DC 12V

#2-AC 24V

6.5.4 Measurement result

(#1-DC 12 Ⅴ, #2-AC 24 Ⅴ)

Location(EUT)	Antenna polarization	Result
Front side	Horizontal	Complied
	Vertical	Complied
Rear side	Horizontal	Complied
	Vertical	Complied
Left side	Horizontal	Complied
	Vertical	Complied
Right side	Horizontal	Complied
	Vertical	Complied

6.6 Electric Fast Transient/BURST

Test specification	EN 61000-4-4:2012				
Coupling	☒ DC 12 V, AC 24 V ☒ Signal/Control: Clamp ☐ Telecommunication: Clamp				
Test level	☒ DC 12 V, AC 24 V: ± 1 kV Peak ☒ Signal/Control: ± 1 kV Peak ☐ Telecommunication: ± 1 kV Peak				
Repetition frequency	100 ㎑, Tr/Th = 5 / 50 ns				
Coupling time (Minimum)	60 s				
Testing Voltage	DC 12 V, AC 24 V				
Test facility	Shielded room				
Date	2014. 08. 22				
Temperature(°C)	22.3 °C	Humidity (% R.H.)	64.4 % R.H.	Pressure (㎪)	100.5 ㎪
Remarks	Complied - There was no change of operation status during above testing.				

6.6.1 Measurement procedure

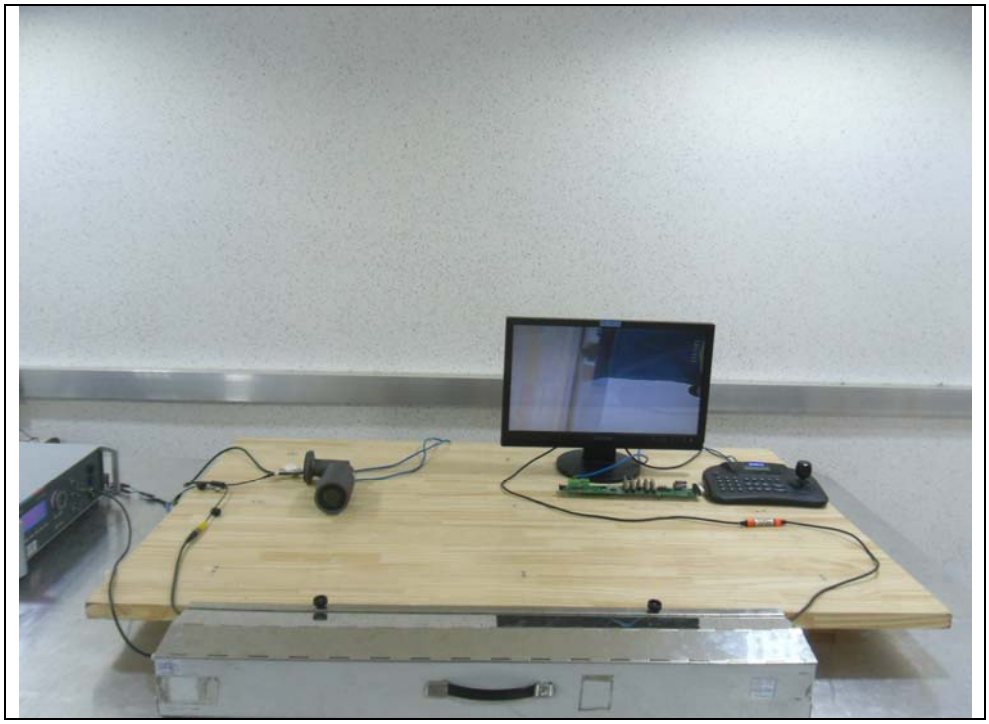
A ground reference plane was located on the floor.
EFT generator was connected to reference ground plane via low impedance connection.
For floor standing equipment, EUT was placed on a 0.1 m wooden table.
For tabletop equipment, EUT was placed on a 0.1 m above the ground reference plane.
Test generator and coupling/decoupling network was placed on, and bounded to, the ground reference plane. When using the coupling clamp, the minimum distance between the coupling plates and all other conductive surfaces, except the ground reference plane beneath the coupling clamp, Shall be 0.5 m.

6.6.2 Used equipments

Equipment	Model No.	Serial No.	Makers	Next Cal. date	Used
Ultra compact simulator	UCS500N	V1238113636	EM TEST	2015.02.22	☒
Capacitive coupling clamp	HFK	P1411132494	EM TEST	2015.04.21	☒

6.6.3 Photographs of test setup

(#1-DC 12 Ⅴ, #2-AC 24 Ⅴ)



6.6.4 Measurement result

* DC/AC Line

Coupling point	(+)	(-)	Result
DC 12 V	+ 1 kV	- 1 kV	Complied
AC 24 V	+ 1 kV	- 1 kV	Complied

* Signal/Control (#1-DC 12 V,#2- AC 24 V)

Coupling point	(+)	(-)	Result
BNC	+ 1 kV	- 1 kV	Complied
RS-485(+,-)	+ 1 kV	- 1 kV	Complied
Alarm Out, EXT D/N	+ 1 kV	- 1 kV	Complied

* Telecommunication

Coupling point	(+)	(-)	Result
-	-	-	-

6.7 Surge

Test specification	EN 61000-4-5:2006				
Coupling	☒ DC 12 V, AC 24 V: CDN ☒ Signal/Control: Direct, CDN				
Test level	☒ DC 12 V, AC 24 V: ± 0.5 kV, ± 1 kV ☒ Signal/Control: ± 0.5 kV, ± 1 kV				
Coupling Impedance	☐ Differential mode: 18 μF ☒ 40 Ω + 0.5 μF		☐ Common mode: 10 Ω + 9 μF ☒ Direct		
Surge pulse shape	Tr/Th = 1.2 / 50 μs				
Number of surge	5				
Coupling time	1 min				
Testing Voltage	DC 12 V, AC 24 V				
Test facility	Shielded room				
Date	2014. 08. 22				
Temperature(°C)	22.3 °C	Humidity (% R.H.)	64.4 % R.H.	Pressure (kPa)	100.5 kPa
Remarks	Complied - There was no change of operation status during above testing.				

6.7.1 Measurement procedure

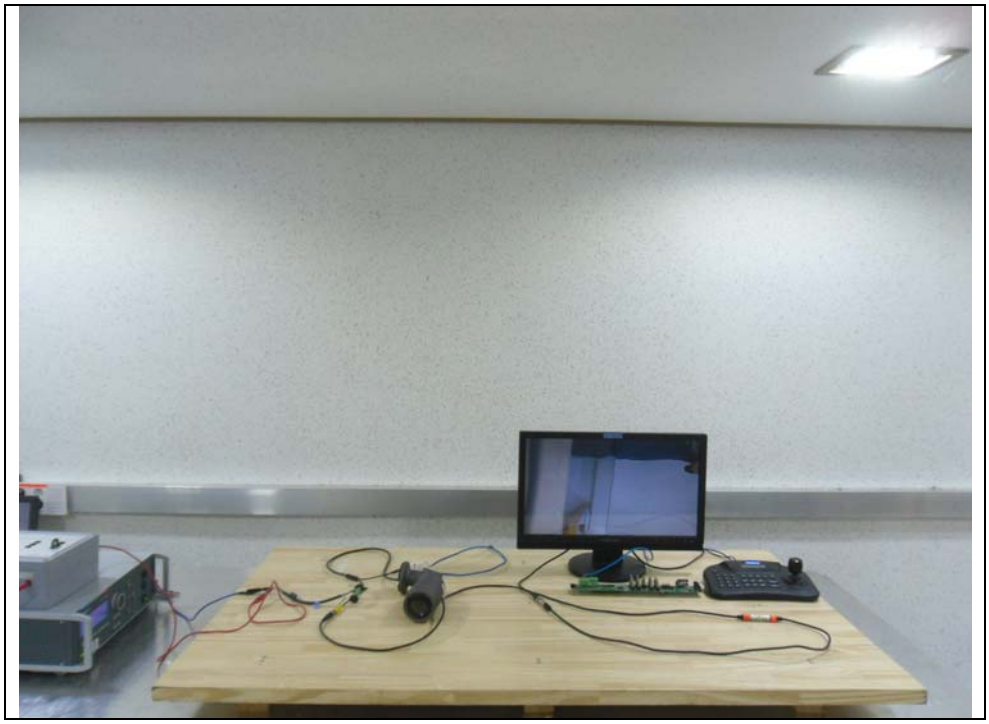
A ground reference plane was located on the floor. SURGE generator was connected to reference ground plane via low impedance connection. For floor standing equipment & table top equipment, EUT was placed on a wooden table.

6.7.2 Used equipments

Equipment	Model No.	Serial No.	Makers	Next Cal. date	Used
Ultra compact simulator	UCS500N	V1238113636	EM TEST	2015.02.22	☒
CDN	CNV 504 N1	P1407131800	EM TEST	2015.04.21	☒

6.7.3 Photographs of test setup

(#1-DC 12 V, #2-AC 24 V)



6.7.4 Measurement result

* DC/AC Line

Coupling point	(+)	(-)	Result
DC 12 V	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Complied
AC 24 V	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Complied

* Signal/Control (#1-DC 12 V,#2- AC 24 V)

Coupling point	(+)	(-)	Result
BNC	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Complied
RS-485(+,-)	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Complied
Alarm Out, EXT D/N	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Complied

6.8 Conducted Immunity

Test specification	EN 61000-4-6:2009				
Tested frequency	0.15 ㎒ ~ 100 ㎒				
Test level & Modulation	1 V, 3 V, 10 V, 80 % Amplitude Modulation (1 ㎑) 1 V, 3 V, 10 V, Pulse Modulation (1 Hz (0.5 s ON: 0.5 s OFF))				
Frequency Step	log 1 % step				
Dwell time	3 s				
Coupling method	☒ DC 12 V, AC 24 V: CDN(M2) ☒ Signal/Control: CDN(S1/75), Clamp ☐ Telecommunication: Clamp				
Testing Voltage	DC 12 V, AC 24 V				
Test facility	Shielded room				
Date	2014. 08. 21				
Temperature(°C)	25.6 °C	Humidity (% R.H)	54.2 % R.H	Pressure(㎪)	100.5 ㎪
Remarks	Complied - There was no change of operation status during above testing.				

6.8.1 Measurement procedure

A ground reference plane was located on the floor.

The test was performed on a ground reference plane on a 0.1 m wooden table. This test were Performed using CDN for mains, clamp for signal and injection probe. The frequency range was swept from 0.15 ㎒ to 100 ㎒. This frequency range was Modulated with 1 ㎑ sine wave at 80 %.

The signal generators provided the modulated frequency at a 1 % step size.

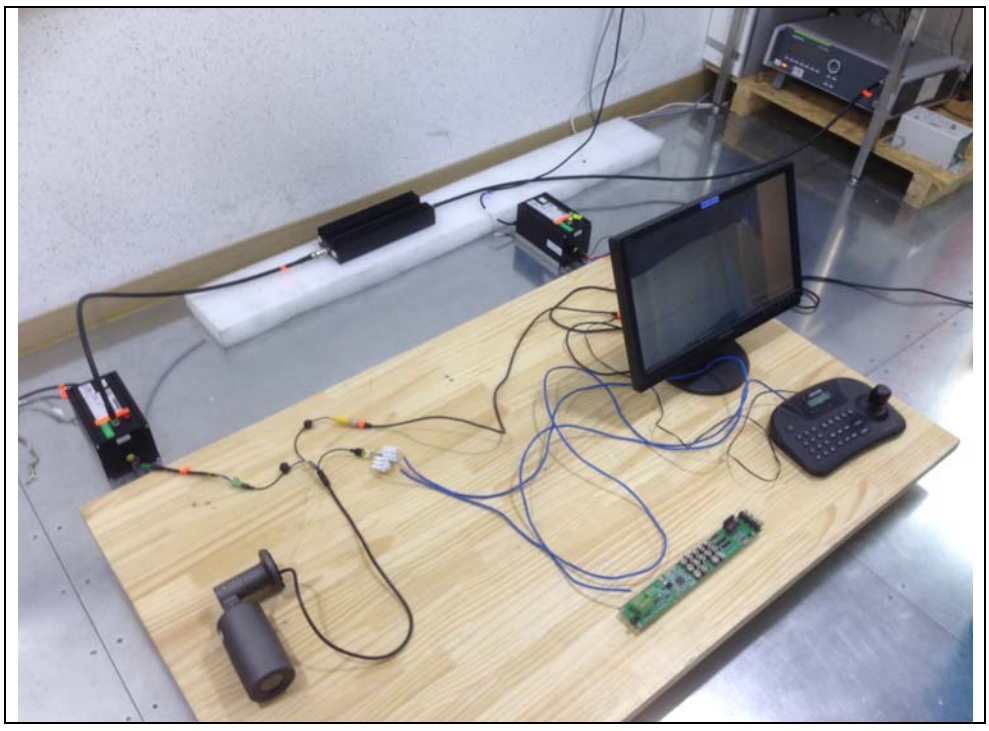
The power and all network cable, I/O cables longer than 3 m length were tested.

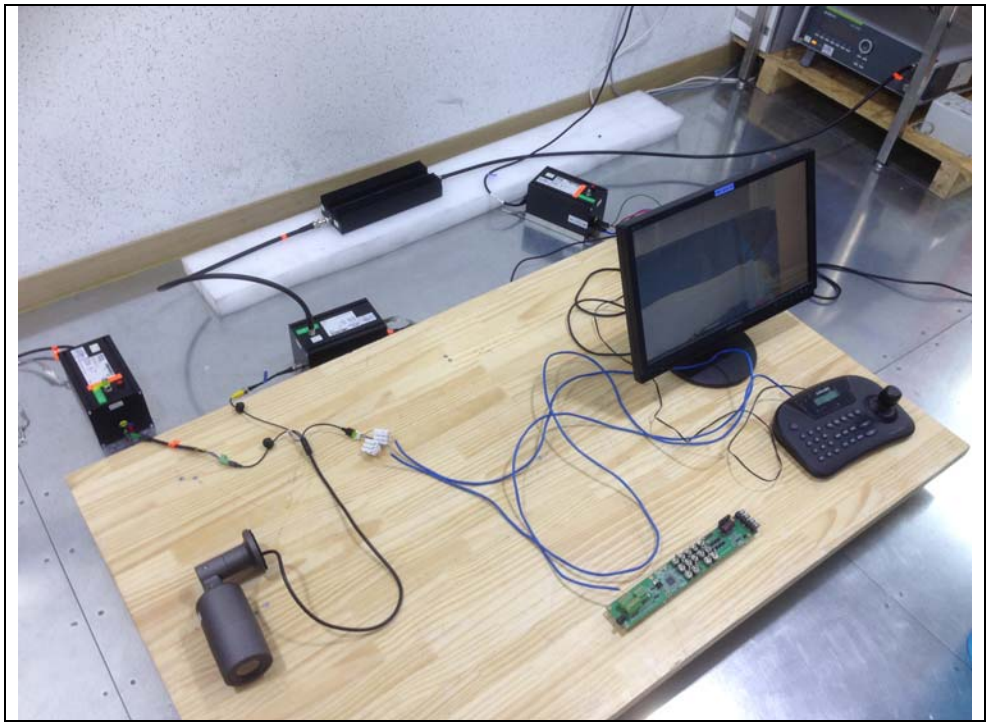
6.8.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Continuous Wave Simulator	CWS500N1.4	P1409132195	EM TEST	2015.05.13	☒
CDN	CDN M2/M3	P1402128649	EM TEST	2015.05.10	☒
CDN	CDN M2/M3	P1402128648	EM TEST	2015.05.10	☒
Attenuator	ATT6/80	P1402129094	EM TEST	2015.05.10	☒
Electromagnetic Injection Clamp	EM101	36197	Liithi	2015.05.13	☒
CDN	CDN S1-75	P1404129801	EM TEST	2015.05.10	☒
CDN	CDN-T8-RJ45	P1404129872	EM TEST	2015.05.10	☐

6.8.3 Photographs of test setup

(#1-DC 12 V,#2- AC 24 V)





6.8.4 Measurement result

* DC/AC Line

Coupling point	Coupling method	Result
DC 12 Ⅴ	CDN(M2)	Complied
AC 24 Ⅴ	CDN(M2)	Complied

* Signal/Control (#1-DC 12 Ⅴ,#2- AC 24 Ⅴ)

Coupling point	Coupling method	Result
BNC	CDN(S1/75)	Complied
RS-485(+,-)	Clamp	Complied
Alarm Out, EXT D/N	Clamp	Complied

* Telecommunication

Coupling point	Coupling method	Result
-	-	-

6.9 Dips and Interruptions

Test specification	EN 61000-4-11:2004				
Number of dips	3 T				
Duration	10 s				
Phase	Zero crossing (0 °)				
Testing Voltage	230 Ⅴ, 50 ㎐ (From AC/AC Adaptor)				
Test facility	Shielded room				
Date	2014. 08. 22				
Temperature(°C)	22.3 °C	Humidity (% R.H.)	64.4 % R.H.	Pressure (㎪)	100.5 ㎪
Remarks	Complied				

6.9.1 Measurement procedure

The dips/interruption test is only applicable to AC mains.

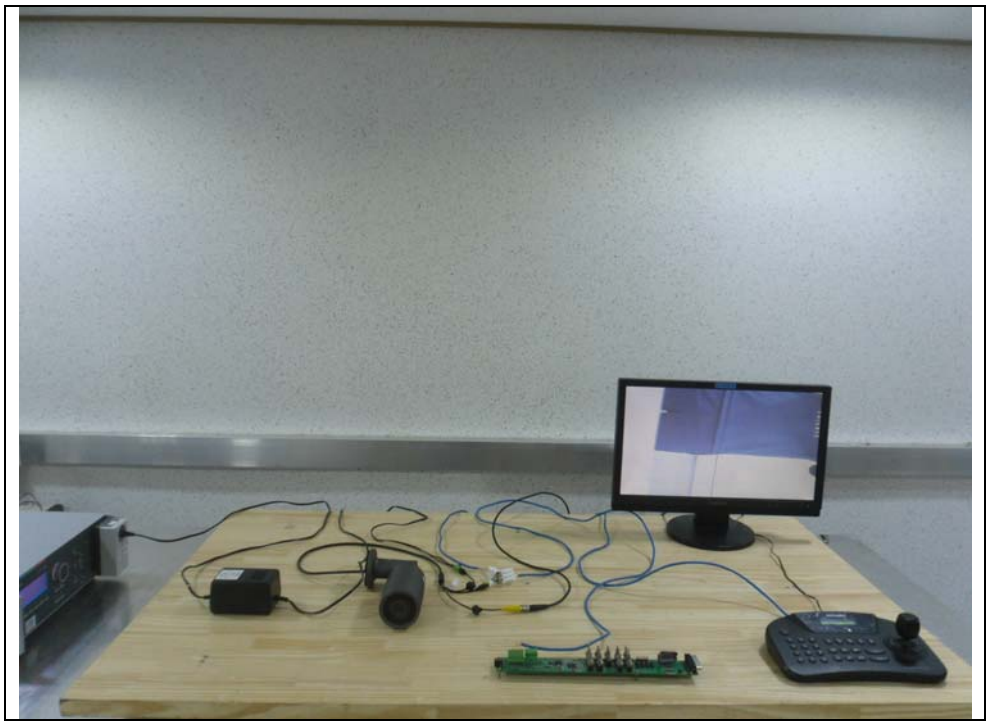
The dips/interruptions were applied at zero crossing.

6.9.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Ultra compact simulator	UCS500N	V1238113636	EM TEST	2015.02.22	☒

6.9.3 Photographs of test setup

(#2- AC 24 Ⅴ)



6.9.4 Measurement result

* 230 Ⅴ, 50 ㎐ (From AC/AC Adaptor)

Test Level (%UT)	Dip/Int. (%UT)	Duration /Period	Phase (°)	Count number	Result
80 %	20%	250 Period(1)	0	3T	Complied
70 %	30 %	25Period	0	3T	Complied
40 %	60 %	10 Period	0	3T	Complied
0%	100 %	250 Period(2)	0	3T	Note*

Comment:

- There was no change of operation status during above testing. (250 Period(1), 25 Period, 10 Period)
- Note* (250 Period(2))

The power of EUT is off during the test. After the test, EUT is getting back to normal operation.

It fully recorded using ancillary Power source equipment to content with Manufacturer`s set up manual.

During the 250 period power loss, in accordance with the standard, a UPS was used to maintain full operation of the unit.

7. E.U.T. photographs

Front View

Rear View

Left View

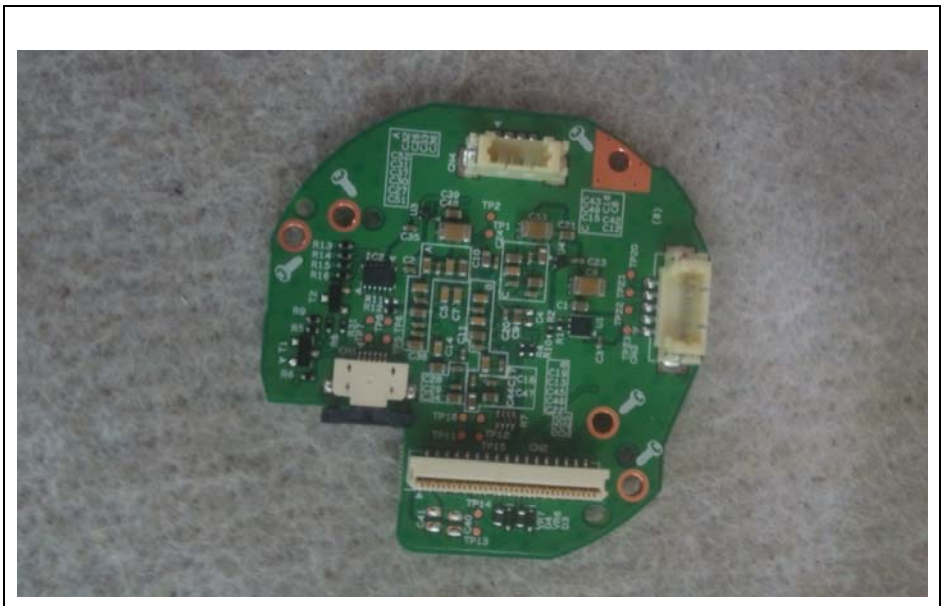
Right View

Top View

Bottom View

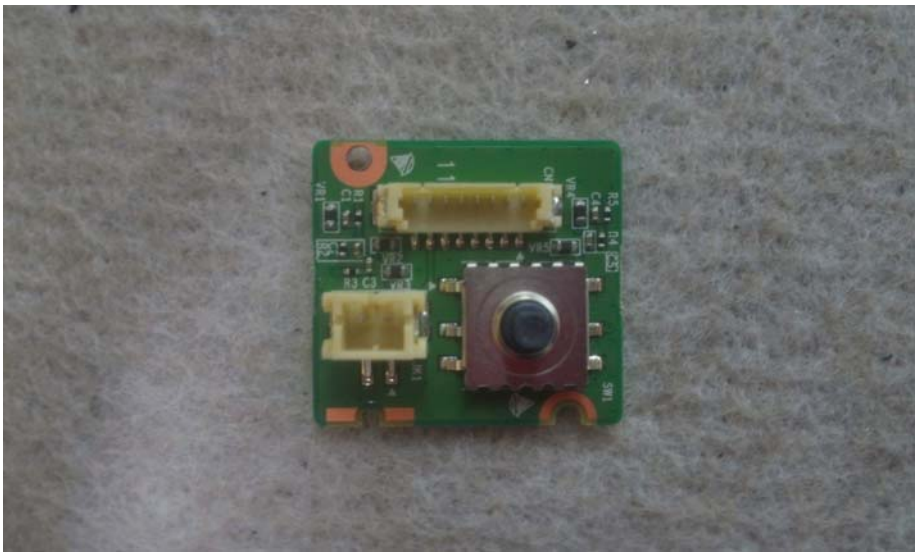
Inside

CCD Board



IR Board

Control Board



SUB Board

SMPS Board