



Declaration of Conformity



Type of equipment: Network Camera
Brand Name /Trade Mark: SAMSUNG
Type designation /model: SNP-5321HP
Variant model: SNP-L5233HP
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+AC:2011	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 61000-3-2:2014	Limits for harmonic current emissions
EN 61000-3-3:2013	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 61000-4-5:2014	Surge immunity test
EN 61000-4-6:2014	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 / February 09, 2015

Authorized Signatory: Name : Jei Soon, Kang
Title : Principal Research Engineer
Signature :

EMC TEST REPORT

Test report No : EMC-CE-E5391
Type of Equipment : Network Camera
Model Name : SNP-5321HP
Variant Model Name : SNP-L5233HP
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+AC:2011, Class A
EN 50130-4:2011
EN 61000-3-2:2014
EN 61000-3-3:2013
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.

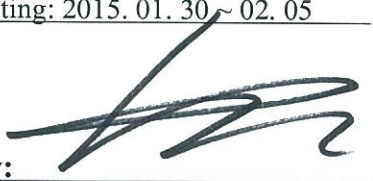
This test report shall not be reproduced, except in full, without the written approval of EMC compliance Laboratory.

Date of receipt: 2015. 01. 26

Date of testing: 2015. 01. 30 ~ 02. 05

Issued date: 2015. 02. 09

Tested by:



LYU, JUNG-GIL

Approved by:



BEAK, JEONG-SOO

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1. Applicant information

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Contact name: **Kang Jei Soon**

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Manufacturer#2: TIANJIN SAMSUNG TECHWIN OPTO-ELECTRONIC CO., LTD
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Jingang Road Tianjin 300385, China

2. Laboratory information

Address

EMC compliance Ltd.

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

Telephone Number: 82 70 5008 1021

Facsimile Number: 82 505 299 8311

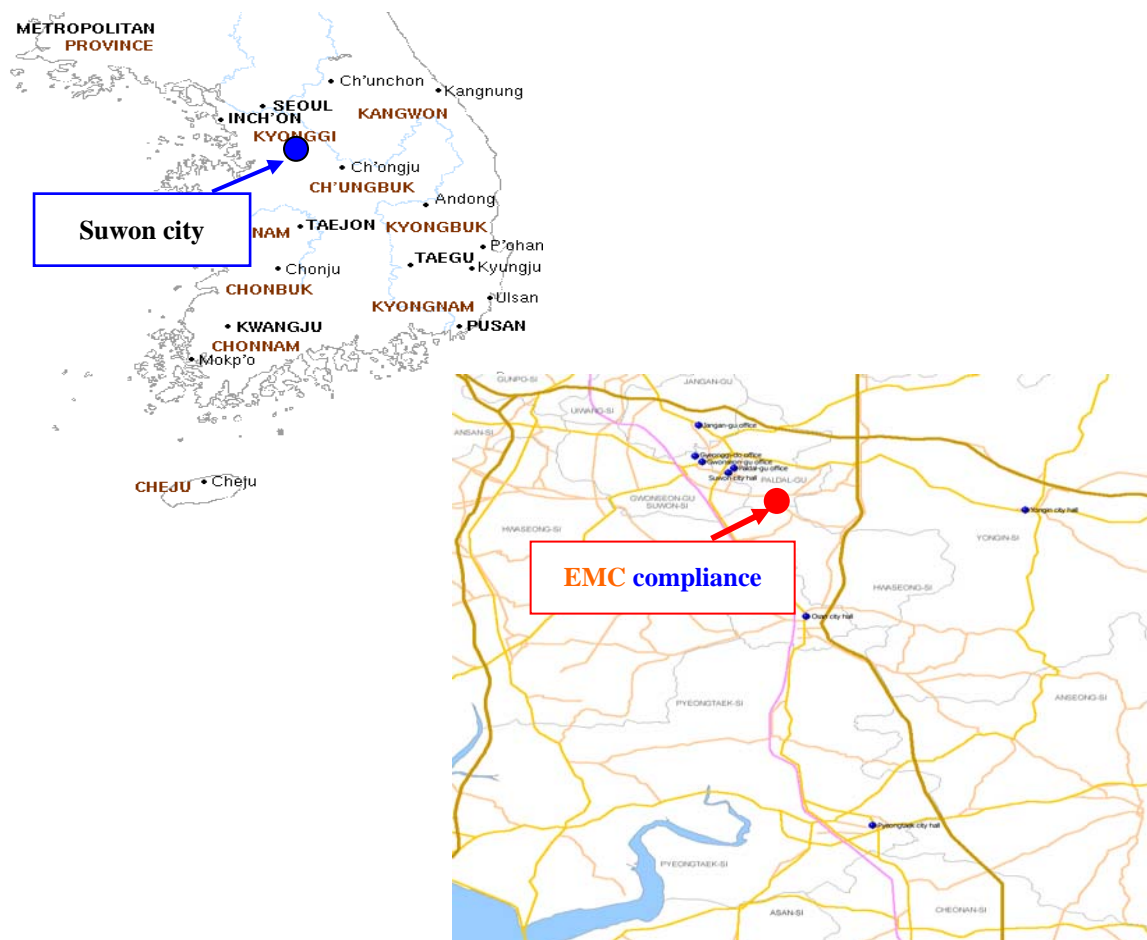
FCC Site Designation No: KR0040, FCC Site Registration No: 687132

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)	: 20.6 °C	18.4 % R.H.	-
Shielded room(CE)	: 22.7 °C	14.8 % R.H.	-
Shielded room(ESD)	: 23.1 °C	42.3 % R.H.	102.5 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 kHz ~ 150 kHz: ± 3.75 dB	
	150 kHz ~ 30 MHz: ± 3.36 dB	
Shielded Room (CE#2)	9 kHz ~ 150 kHz: ± 3.79 dB	
	150 kHz ~ 30 MHz: ± 3.42 dB	
Radiated Emission measurement (C.L: Approx 95 %, k = 2)		
10 m Chamber (#F4)	30 MHz ~ 300 MHz	3 m: + 5.20 dB, - 5.31 dB 10 m: + 5.19 dB, - 5.30 dB
	300 MHz ~ 1 000 MHz	3 m: + 6.56 dB, - 6.65 dB 10 m: + 6.45 dB, - 6.64 dB
	1 GHz ~ 6 GHz	3 m: + 6.70 dB, - 6.81 dB
10 m Chamber (#F2)	30 MHz ~ 300 MHz	3 m: + 5.21 dB, - 5.32 dB 10 m: + 5.20 dB, - 5.31 dB
	300 MHz ~ 1 000 MHz	3 m: + 5.82 dB, - 5.91 dB 10 m: + 5.69 dB, - 5.91 dB
	1 GHz ~ 6 GHz	3 m: + 6.28 dB, - 6.30 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

Video	SNP-5321	SNP-5321H
Imaging Device	1/3" Progressive Scan CMOS	
Total Pixels	1,312(H) x 1,069(V), 1.40M	
Effective Pixels	1,305(H) x 1,049(V), 1.37M	
Scanning System	Progressive	
Min. Illumination	Color : 0.2 Lux (1/30sec, F1.6, 50IRE, AGC High), 0.005 Lux (2sec, F1.6, 50IRE, AGC High) B/W : 0.02 Lux (1/30sec, F1.6, 50IRE AGC High), 0.0005 Lux(2sec, F1.6, 50IRE, AGC High) Color : 0.1 Lux (1/30sec, F1.6, 30IRE), 0.0025 Lux (2sec, F1.6, 30IRE) B/W : 0.01 Lux (1/30sec, F1.6, 30IRE), 0.00025 Lux (2sec, F1.6, 30IRE)	
S / N Ratio	50dB	
Video Out	CVBS : 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P), for installation	
Lens	SNP-5321	SNP-5321H
Focal Length (Zoom Ratio)	4.44~142.6mm(Optical 32X)	
Max. Aperture Ratio	1.6 (Wide) ~ 4.4 (Tele)	
Angular Field of View	H : 62.8°(Wide) ~ 2.23°(Tele) / V : 36.80°(Wide) ~ 1.26°(Tele)	
Min. Object Distance	Wide 1.5m ,Tele 2m	Wide 1.5m ,Tele19m
Focus Control	Auto / Manual / One Push	
Lens Type	DC Auto Iris	
Mount Type	Board-in type	
Pan/Tilt/Rotate		
Pan Range	360° Endless	
Pan Speed	Preset : 700°/sec, Manual : 0.024°/sec ~120°/sec	
Tilt Range	210°(-15° ~195°)	
Tilt Speed	Preset : 700°/sec, Manual : 0.024°/sec ~120°/sec	
Sequence	Preset (255 ea), Swing, Group (6 ea), Trace, Tour (1 ea), Auto Run, Schedule	
Preset Accuracy	±0.2°	
Azimuth	Yes (E/W/S/N/NE/NW/SE/SW)	
Operational		
Camera Title	Off / On (Displayed up to 45 characters)	
Day & Night	Auto (ICR) / Color / B/W	
Backlight Compensation	Off / BLC	
Wide Dynamic Range	120dB	
Contrast Enhancement	SSDR (Samsung Super Dynamic Range) (Off / On)	
Digital Noise Reduction	SSNRIII (2D+3D Noise Filter) (Off / On)	
Digital Image Stabilization	Off / On	
Defog	Auto/Manual/Off	
Motion Detection	Off / On (4ea Rectangle zone)	
Privacy Masking	Off / On (32 Zones of Rectangle zone) with Zoom Threshold Mosaic option	
Gain Control	Off / Low / Middle / High	
White Balance	ATW / AWC / Manual / Indoor / Outdoor / Mercury	
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2 ~ 1/12,000sec)	
Digital Zoom	16x	
Image Rotation	Flip : On/Off Mirror : On/Off	
Intelligent Video Analytics	Tampering, Virtual Line, Enter/Exit, Appear / Disappear, Audio Detection, Face Detection	
Serial Interface	RS-485 - Samsung-T/E, Pelco-D/P, Panasonic, Bosch, AD, GE, Vicon, Honeywell	
Alarm I/O	Input 4ea / Output 2ea (Relay)	
Alarm Triggers	Motion detection, Tampering, Audio Detection, Face Detecton Video Analytics, Alarm Input, Network Disconnection	
Alarm events	File upload via FTP and E-Mail Notification via E-Mail, TCP and HTTP local storage(SD/SDHC/SDXC) or NAS recording at Network disconnected & Event (Alarm Triggers) External output	
Audio In	Selectable (Mic IN/Line IN) Supply voltage: 2.5VDC(4mA), Input impedance: approx. 2K Ohm	
Audio out	Line out (3.5mm mono jack), Max output level: 1 Vrms	

Network		
Ethernet	RJ-45 (10/100BASE-T)	
Video Compression Format	H.264 (MPEG-4 Part 10/AVC), Motion JPEG	
Resolution	1920x1080 / 1280x1024 /1280x960 / 1280x720 / 1024x768 /800x600 / 800x450 / 720x576/ 640x480 / 640x360 / 320x240 / 320x180	
Max. Framerate	H.264 : Max 60fps at all resolutions Motion JPEG : 1920x1080 / 1280x1024 /1280x960 / 1280x720 / 1024x768 : Max. 15 fps 800x600/800x450/720x576/640x480/640x360/320x240/320x180 : Max. 30fps	
Smart Codec	O	
Video Quality Adjustment	H.264 : Compression Level, Target Bitrate Level Control MJPEG : Quality Level Control	
Bitrate Control Method	H.264 : CBR or VBR, Motion JPEG : VBR	
Streaming Capability	Multiple Streaming (Up to 10 Profiles)	
Audio Compression Format	G.711 u-law /G.726 Selectable G.726 (ADPCM) 8KHz, G.711 8KHz G.726 : 16Kbps, 24Kbps, 32Kbps, 40Kbps	
Audio Communication	Bi-directional	
IP	IPv4, IPv6	
Protocol	TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP,RTSP, NTP, HTTP, HTTPS, SSL, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour	
Security	HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access Log 802.1x Authentication	
Streaming Method	Unicast / Multicast	
Max. User Access	15 users at Unicast Mode	
Edge Storage	SD/SDHC/SDXC slot for supporting memory card - motion Images recorded in the SD/SDHC/SDXC memory card can be downloaded. NAS(Network Attached Storage)	
Application Programming In	ONVIF Profile S SUNAPI (HTTP API) SVNP 1.2 Samsung Camera Application Platform	
Webpage Language	English, French, German, Spanish, Italian, Chinese, Russian, Japanese, Swedish, Denish, Portuguese, Turkish, Polish, Czech, Rumanian, Serbian, Dutch, Croatia, Hungary, Greek, Finnish, Norwegan	
Web Viewer	Supported OS : Windows XP / VISTA / 7 / 8, MAC OS X 10.7 Supported Browser : Microsoft Internet Explorer (Ver. 8~11), Mozilla Firefox (Ver. 9~19), Google Chrome (Ver. 15~25), Apple Safari (Ver. 6.0.2(Mac OS X 10.8, 10.7 Only), 5.1.7) * Mac OS X Only	
Central Management Softwa	SmartViewer, SSM	
Environmental	SNP-5321	SNP-5321H
Operating Temperature / Humidity	-10°C ~ +55°C(+14°F ~ +131°F) / Less than 90% RH	AC24V : -50°C ~ +55°C (-58°F ~ +131°F) / Less than 90% RH PoE+ : -30°C ~ +55°C (-22°F ~ +131°F) / Less than 90% RH
Storage Temperature / Humidity	-30°C ~ +60°C (-22°F ~ +140°F) / Less than 90% RH	-30°C ~ +60°C (-22°F ~ +140°F) / Less than 90% RH
Ingress Protection	-	IP66
Vandal Resistance	SHP-3701H : IK10 housing	IK10
Electrical	SNP-5321	SNP-5321H
Input Voltage / Current	AC24V±10%,PoE+(IEEE802.3at,Class4)	
Power Consumption	20W MAX	PoE+ : 25W Max (AC24V HEATER OFF & PoE HEATER ON), AC 24V : 65W Max (AC24V HEATER ON & PoE HEATER ON)
Mechanical	SNP-5321	SNP-5321H
Color / Material	Ivory / Plastic + Metal	
Dimension (WxHxD)	Ø152.0 x H218.0 mm	Ø223.4 x H293.6 mm
Weight	1.8kg	3.2kg

4.2 Product description

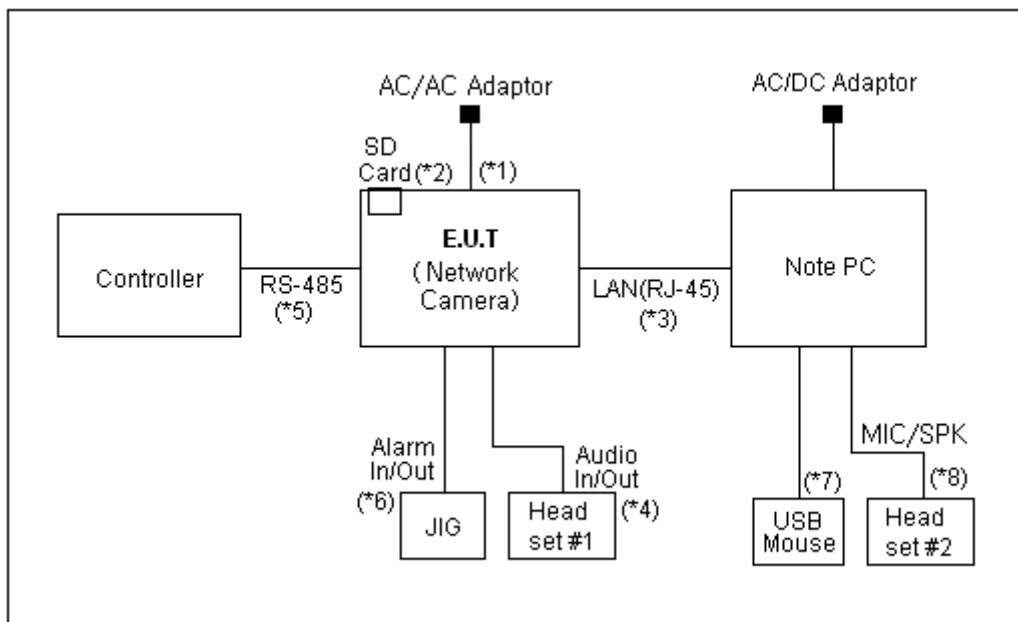
Type of product	Network Camera
Model name (Basic)	SNP-5321HP
Model name (Variant)	SNP-L5233HP
Difference	Buyer model name
Trade name	-
Serial no	-
Testing voltage	230 V, 50 Hz, PoE
Product rating	* AC/AC Adaptor (DLA24300SKA) Input: AC 100 ~ 240 V, 50/60 Hz, 0.4 A Output: AC 24 V, 3.0 A * PoE
Internal clock frequency	500 MHz
Note	* AC/AC adaptor was provided by the manufacturer. * PoE Switch was not provided by the manufacturer.

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
Note PC	PSLQ0K-02N005	2A047151Q	TOSHIBA
USB Mouse	1088	8165906050950	Microsoft
Headset #1	SHS-250V	-	SAMSUNG
Headset #2	SHS-250V	-	SAMSUNG
Controller	SCC-1000	EW089028913	SAMSUNG
JIG	-	-	-
SD Card	-	-	-
PoE Switch	FS108P	1DL20C3L00542	NETGEAR

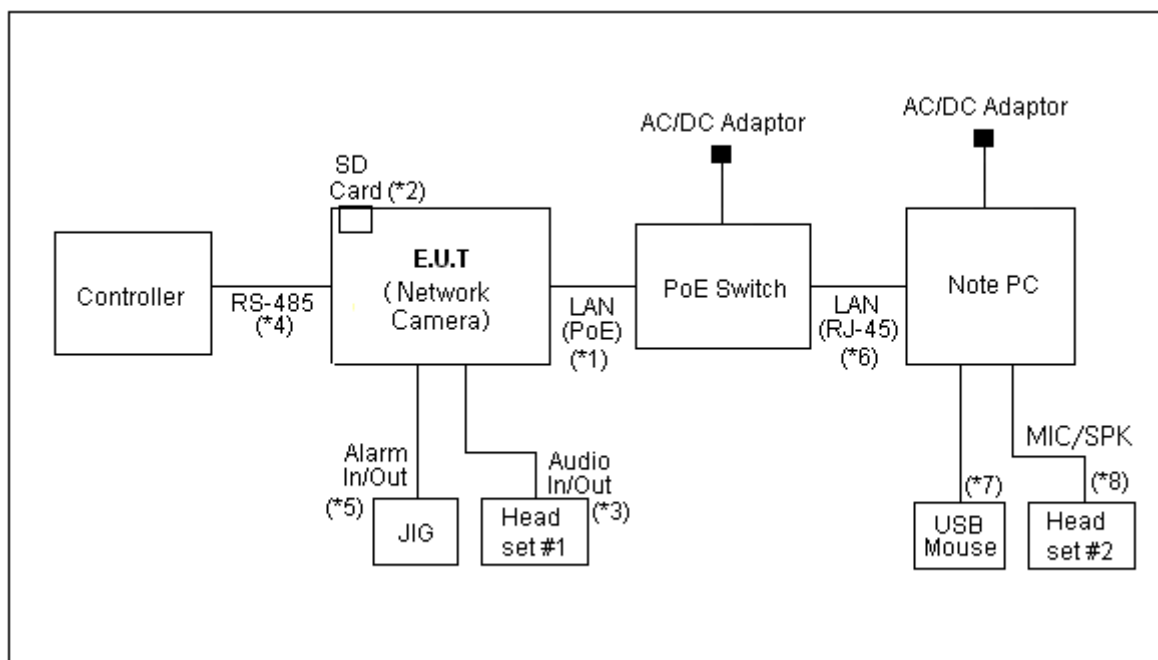
4.4 Test configuration

#1- AC/AC Adaptor



Note	Start		End		Cable		
	Name	I/O port	Name	I/O port	Length (m)	Spec.	Cable
1	EUT (Network Camera)	Power	AC/AC Adaptor	Power	1.5	Non-Shield	-
2		SD Card	SD Card	SD Card	Direct	-	-
3		LAN(RJ-45)	Note PC	LAN(RJ-45)	3.0	Non-Shield	Out-door
4		Audio In/Out	Headset #1	Audio In/Out	3.0	Non-Shield	Out-door
5		RS-485	Controller	RS-485	3.0	Non-Shield	Out-door
6		Alarm In/Out	JIG	Alarm In/Out	3.0	Non-Shield	Out-door
7	Note PC	USB	USB Mouse	USB	1.6	Shield	-
8		MIC/SPK	Headset #2	MIC/SPK	2.0	Non-Shield	-

#2- PoE



* Power supplied from PoE Switch

Note	Start		End		Cable		
	Name	I/O port	Name	I/O port	Length (m)	Spec.	Cable
1	EUT (Network Camera)	LAN(PoE)	PoE Switch	LAN(PoE)	1.5	Non-Shield	-
2		SD Card	SD Card	SD Card	Direct	-	-
3		Audio In/Out	Headset #1	Audio In/Out	3.0	Non-Shield	Out-door
4		RS-485	Controller	RS-485	3.0	Non-Shield	Out-door
5		Alarm In/Out	JIG	Alarm In/Out	3.0	Non-Shield	Out-door
6	Note PC	LAN(RJ-45)	PoE Switch	LAN(RJ-45)	3.0	Non-Shield	-
7		USB	USB Mouse	USB	1.6	Shield	-
8		MIC/SPK	Headset #2	MIC/SPK	2.0	Non-Shield	-

4.5 Operating conditions

The EUT was configured as normal intended use.

Test mode	Normal operating
1	Web viewer monitoring test
	Ping test.
	Alarm In/Out test.
	Audio In/Out test.
	RS-485 test.

* Note: 2 types of powers are available for the product, that are AC/AC Adaptor(AC 24 V), PoE.

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
<input checked="" type="checkbox"/>	Conducted Emission	EN55022:2010+AC:2011	Complied
<input checked="" type="checkbox"/>	Radiated Emission	EN55022:2010+AC:2011	Complied
<input checked="" type="checkbox"/>	Harmonics current	EN 61000-3-2:2014	Complied
<input checked="" type="checkbox"/>	Voltage fluctuations and flickers	EN 61000-3-3:2013	Complied

5.2 Summary of immunity test results

Applied	Test items	Test method	Result
* EN 50130-4:2011			
<input checked="" type="checkbox"/>	Electrostatic discharge	EN 61000-4-2:2009	Complied
<input checked="" type="checkbox"/>	Radiated RF immunity	EN 61000-4-3:2006+A2:2010	Complied
<input checked="" type="checkbox"/>	Electric Fast Transient/BURST	EN 61000-4-4:2012	Complied
<input checked="" type="checkbox"/>	Surge	EN 61000-4-5:2014	Complied
<input checked="" type="checkbox"/>	Conducted RF immunity	EN 61000-4-6:2014	Complied
<input checked="" type="checkbox"/>	Voltage dip/interruption	EN 61000-4-11:2004	Complied
<input checked="" type="checkbox"/>	Mains supply voltage variations	EN 50130-4:2011	Complied

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 occurs at $U = 130 \text{ dB}\mu\text{V}$.

For component of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at $U = 140 \text{ dB}\mu\text{V}$, 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 $U = 130 \text{ dB}\mu\text{V}$, 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 $U = 120 \text{ dB}\mu\text{V}$.

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	EN55022:2010+AC:2011, Class A		
Testing voltage	230 V, 50 Hz, PoE		
Test facility	Shielded room (CE#1)		
Date	2015. 02. 02		
Temperature (°C)	22.7 °C	Humidity (% R.H.)	14.8 % R.H.
Remarks	Complied		

6.1.1 Limits of conducted emission measurement

☒ AC main

Frequency [MHz]	Class A (dB(μ V))		Class B (dB(μ V))	
	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 [MHz]	Class A Voltage Limits (dB(μ V))		Current Limits (dB(μ A))	
	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 [MHz]	Class B Limits (dB(μ V))		Current Limits (dB(μ A))	
	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 MHz to 0.5 MHz

* 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

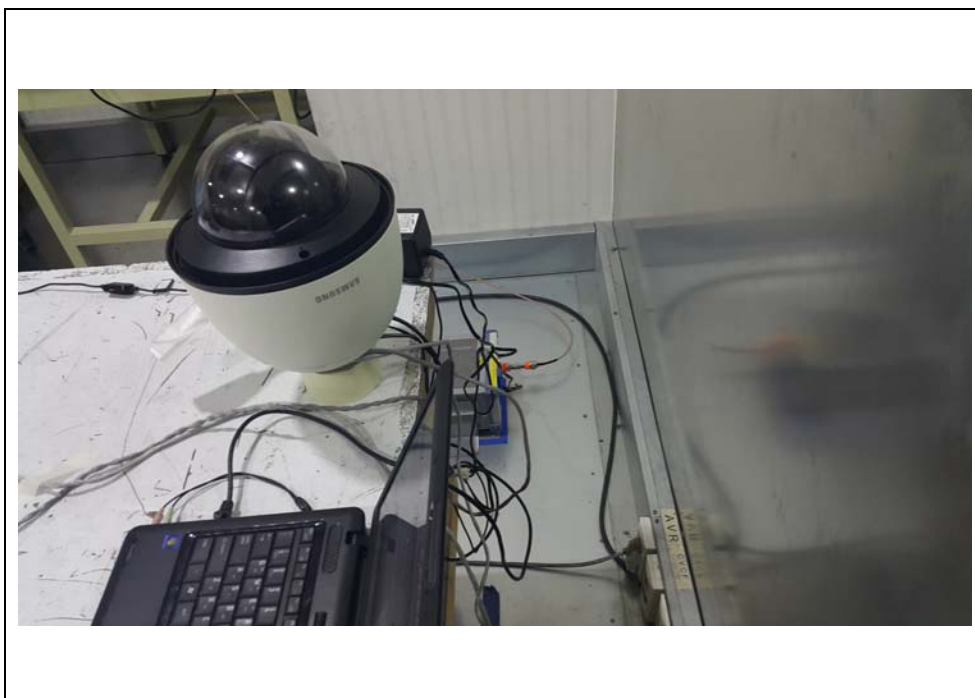
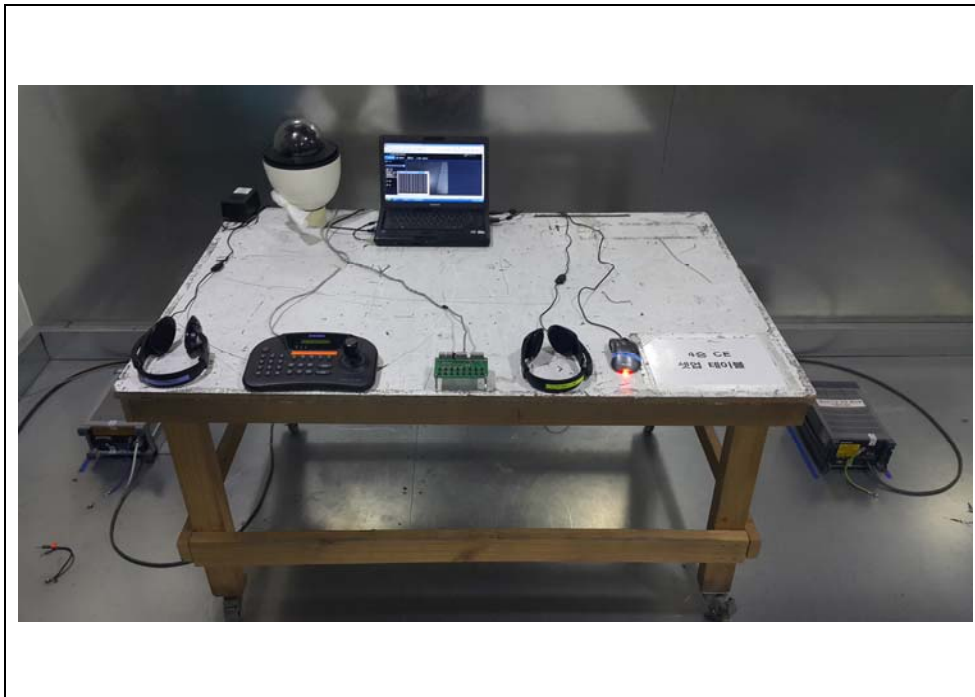
The measurements were performed in a shielded room. EUT was setup as shown in photograph and placed on a non-metallic table height of 0.8 m above the reference ground plane. The rear of table was located 0.4 m to the vertical conducted plane. EUT was power through the LISN, which was bonded to the ground 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	2016.01.20	<input type="checkbox"/>
Test Receiver	ESCI	100001	R&S	2015.07.14	<input checked="" type="checkbox"/>
Test Receiver	ESCI	100710	R&S	2015.10.13	<input type="checkbox"/>
TWO-LINE V-NETWORK	ENV216	101358	R&S	2015.10.02	<input checked="" type="checkbox"/>
TWO-LINE V-NETWORK	ESH3-Z5	100267	R&S	2015.06.24	<input checked="" type="checkbox"/>
8-WIRE ISN	NTFM 8158 CAT5	CAT5-8158-0028	SCHWARZBECK	2015.03.07	<input checked="" type="checkbox"/>
8-WIRE ISN	NTFM 8158 CAT3	CAT3-8158-0020	SCHWARZBECK	2015.03.07	<input type="checkbox"/>

6.1.4 Photographs of test setup

* AC Main (#1- AC/AC Adaptor)



* Telecommunication

#1- AC/AC Adaptor

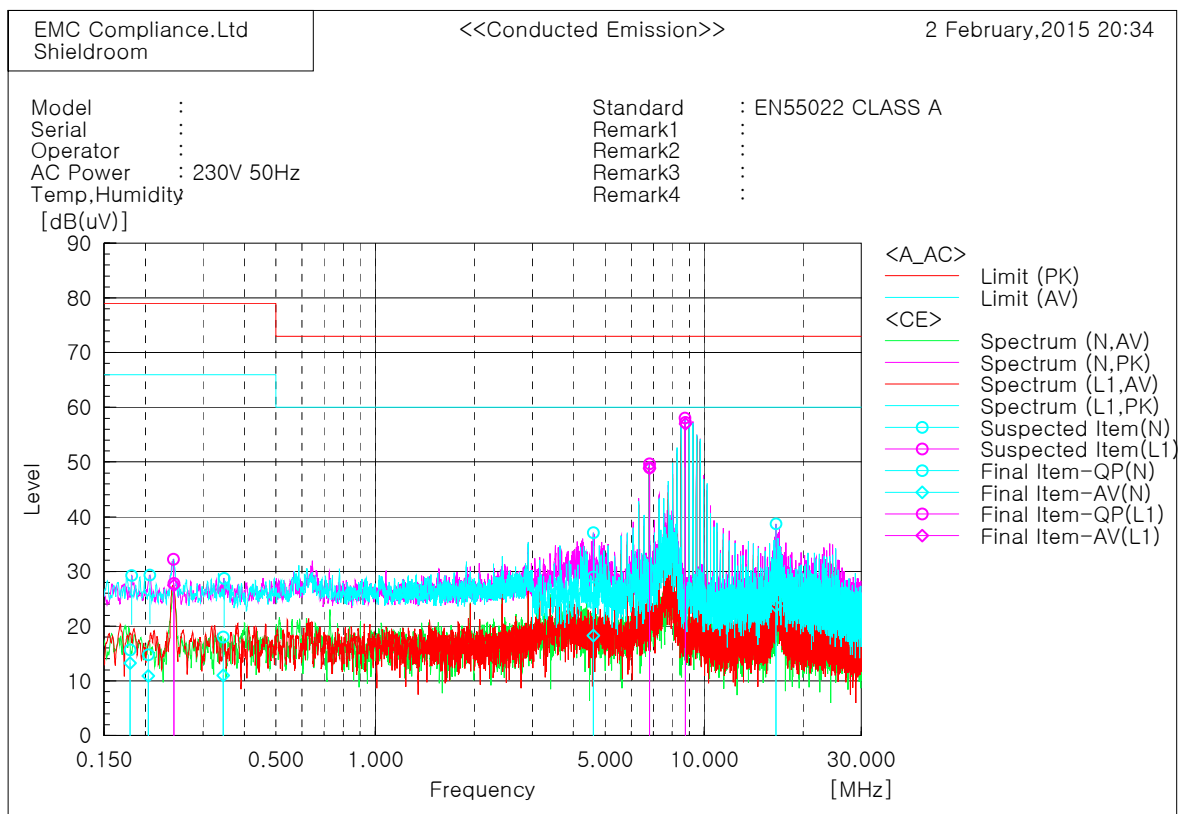


#2- PoE



6.1.5 Conducted emission measurement result

*AC Main (SNP-5321HP)_#1- AC/AC Adaptor

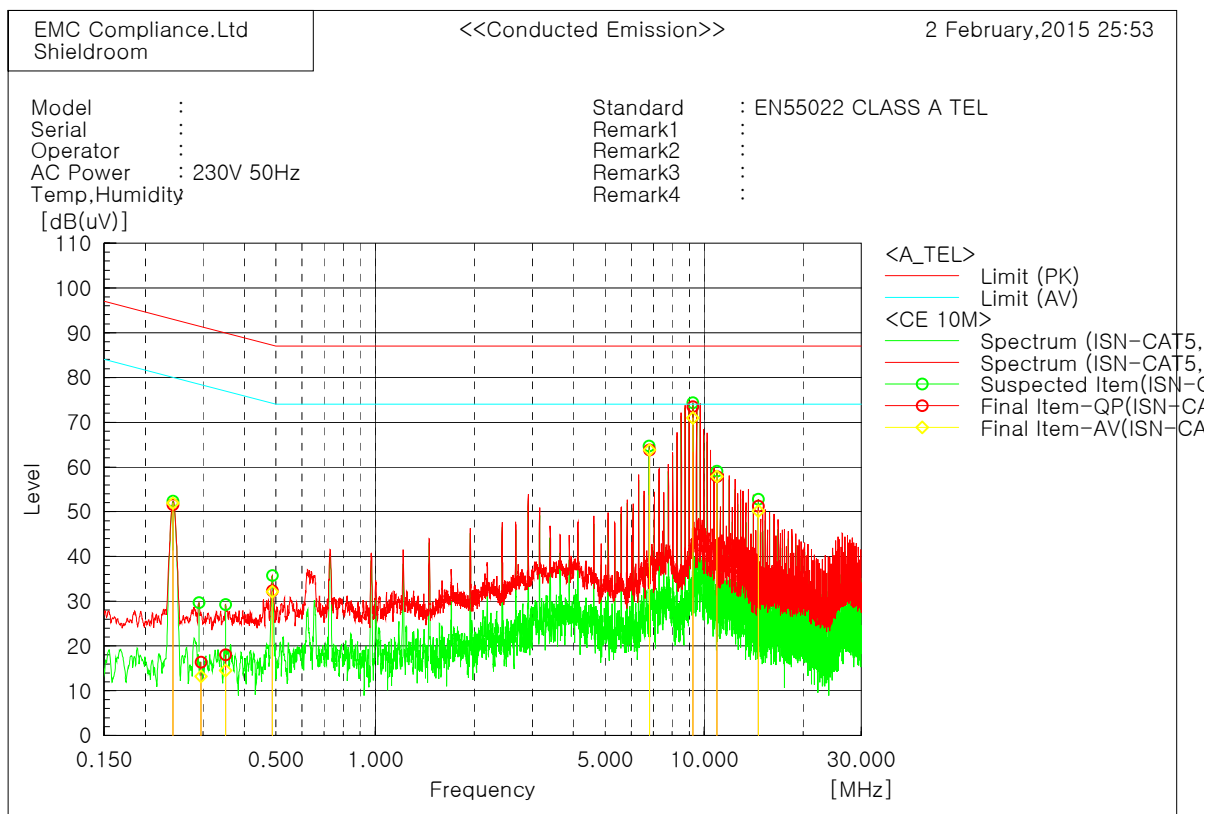


Final Result

--- N Phase ---											
No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]	Remark
1	0.18026	5.8	3.5	9.8	15.6	13.3	79.0	66.0	63.4	52.7	
2	0.20436	4.8	1.0	9.9	14.7	10.9	79.0	66.0	64.3	55.1	
3	0.3452	8.2	1.2	9.8	18.0	11.0	79.0	66.0	61.0	55.0	
4	4.60266	19.3	8.6	9.7	29.0	18.3	73.0	60.0	44.0	41.7	
5	16.54382	19.6	13.7	9.9	29.5	23.6	73.0	60.0	43.5	36.4	
--- L1 Phase ---											
No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]	Remark
1	0.24434	18.2	17.9	9.6	27.8	27.5	79.0	66.0	51.2	38.5	
2	6.80881	39.2	39.1	9.8	49.0	48.9	73.0	60.0	24.0	11.1	
3	8.75624	47.4	47.2	9.8	57.2	57.0	73.0	60.0	15.8	3.0	

* Telecommunication port

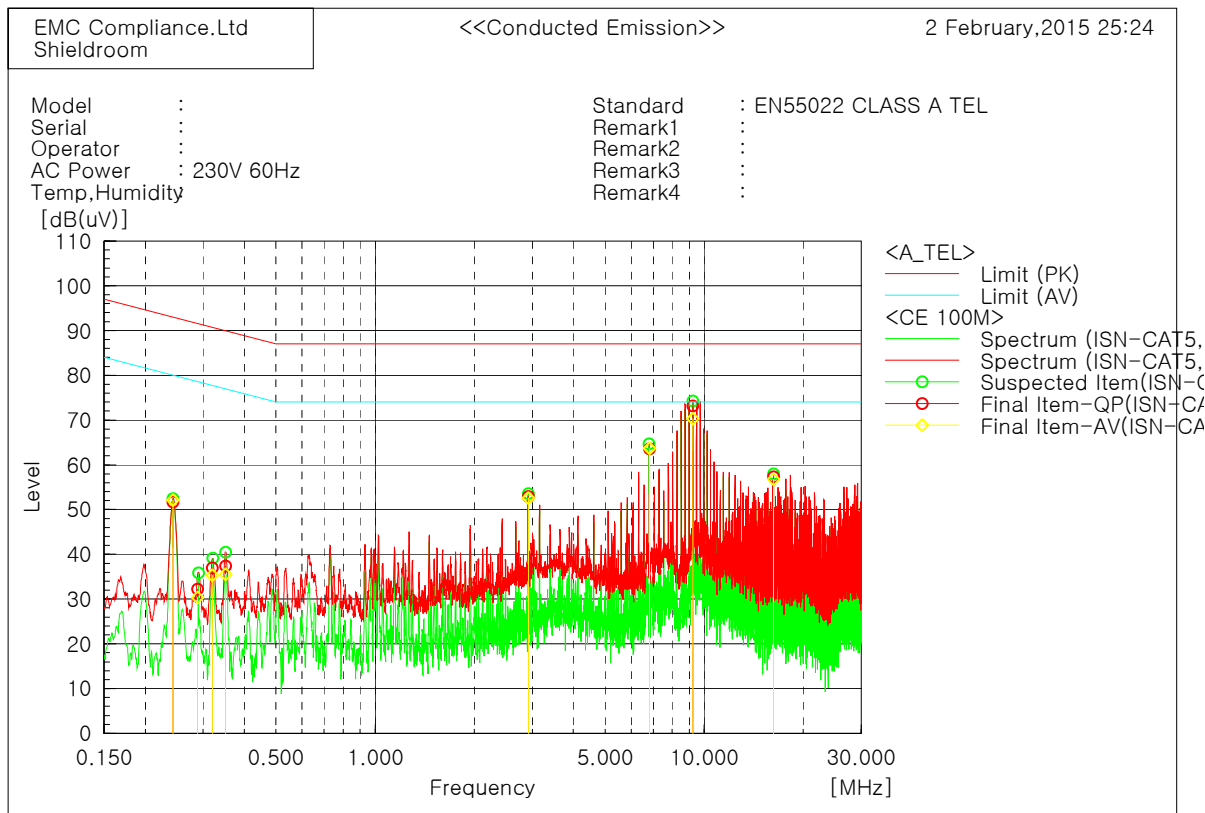
* LCL 65 dB (LAN(RJ-45) Port_10 Mbps) (SNP-5321HP)_ #1- AC/AC Adaptor



Final Result

ISN-CAT5 Phase											
No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]	Remark
1	0.24266	41.6	42.0	9.9	51.5	51.9	93.0	80.0	41.5	28.1	
2	0.29559	6.5	3.3	9.9	16.4	13.2	91.4	78.4	75.0	65.2	
3	0.35086	8.1	4.7	9.9	18.0	14.6	89.9	76.9	71.9	62.3	
4	0.48648	22.5	22.3	9.8	32.3	32.1	87.2	74.2	54.9	42.1	
5	6.80978	54.2	54.2	9.6	63.8	63.8	87.0	74.0	23.2	10.2	
6	9.24343	63.9	61.3	9.6	73.5	70.9	87.0	74.0	13.5	3.1	
7	10.94591	48.3	48.3	9.6	57.9	57.9	87.0	74.0	29.1	16.1	
8	14.59447	41.6	40.5	9.7	51.3	50.2	87.0	74.0	35.7	23.8	

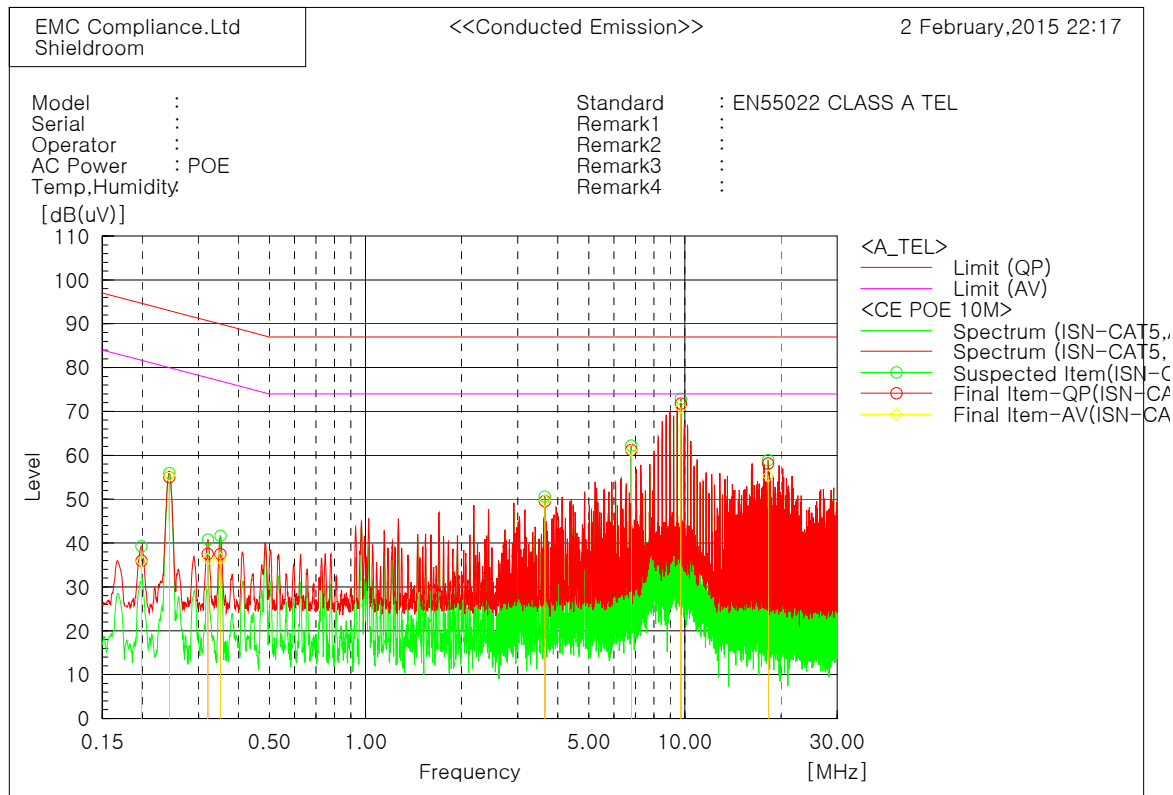
* LCL 65 dB (LAN(RJ-45) Port_100 Mbps) (SNP-5321HP) _#1- AC/AC Adaptor



Final Result

ISN-CAT5 Phase											
No.	Frequency	Reading QP	Reading CAV	c.f	Result QP	Result CAV	Limit QP	Limit AV	Margin QP	Margin CAV	Remark
	[MHz]	[dB(uV)]	[dB(uV)]	[dB]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB]	[dB]	
1	0.24314	41.8	42.2	9.9	51.7	52.1	93.0	80.0	41.3	27.9	
2	0.28881	22.3	20.4	9.9	32.2	30.3	91.6	78.6	59.4	48.3	
3	0.31955	27.0	25.5	9.9	36.9	35.4	90.7	77.7	53.8	42.3	
4	0.35126	27.5	25.7	9.9	37.4	35.6	89.9	76.9	52.5	41.3	
5	2.91828	43.2	42.9	9.7	52.9	52.6	87.0	74.0	34.1	21.4	
6	6.81053	54.0	54.1	9.6	63.6	63.7	87.0	74.0	23.4	10.3	
7	9.24199	63.6	60.7	9.6	73.2	70.3	87.0	74.0	13.8	3.7	
8	16.22859	47.6	47.0	9.7	57.3	56.7	87.0	74.0	29.7	17.3	

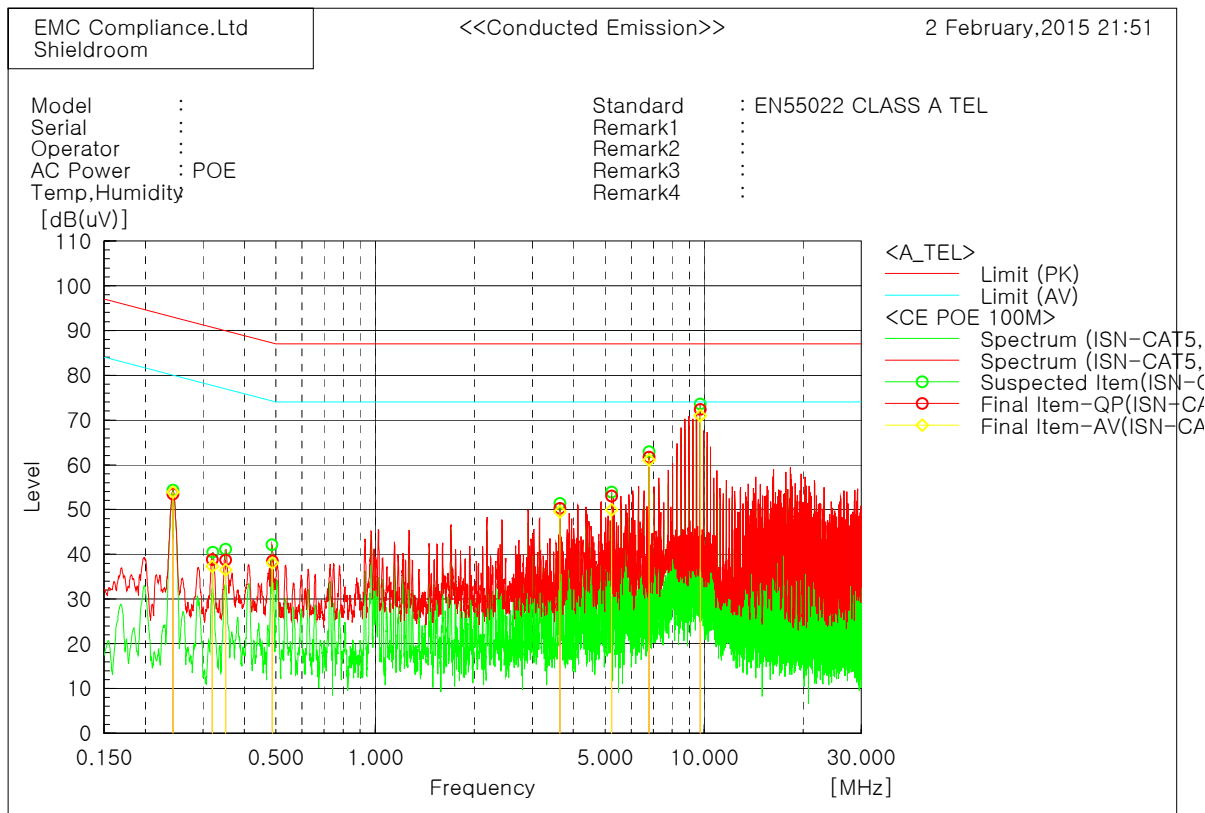
LAN Port (LCL 65 dB)_10 Mbps (SNP-5321HP)_#2- PoE



Final Result

ISN-CAT5 Phase										
No.	Frequency	Reading QP	Reading CAV	c.f	Result QP	Result CAV	Limit QP	Limit AV	Margin QP	Margin CAV
	[MHz]	[dB(uV)]	[dB(uV)]	[dB]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB]	[dB]
1	0.1991	26.0	25.9	10.0	36.0	35.9	94.6	81.6	58.6	45.7
2	0.24288	45.1	45.5	9.9	55.0	55.4	93.0	80.0	38.0	24.6
3	0.32045	27.6	26.5	9.9	37.5	36.4	90.7	77.7	53.2	41.3
4	0.35094	27.6	26.6	9.9	37.5	36.5	89.9	76.9	52.4	40.4
5	3.64363	39.9	40.0	9.7	49.6	49.7	87.0	74.0	37.4	24.3
6	6.79981	51.6	51.5	9.6	61.2	61.1	87.0	74.0	25.8	12.9
7	9.71466	62.2	61.3	9.6	71.8	70.9	87.0	74.0	15.2	3.1
8	18.24314	48.4	45.6	9.7	58.1	55.3	87.0	74.0	28.9	18.7

LAN Port (LCL 65 dB)_100 Mbps (SNP-5321HP)_#2- PoE



Final Result

ISN-CAT5 Phase											
No.	Frequency	Reading QP	Reading CAV	c.f	Result QP	Result CAV	Limit QP	Limit AV	Margin QP	Margin CAV	Remark
	[MHz]	[dB(uV)]	[dB(uV)]	[dB]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB]	[dB]	
1	0.24309	43.6	43.9	9.9	53.5	53.8	93.0	80.0	39.5	26.2	
2	0.32047	29.0	27.4	9.9	38.9	37.3	90.7	77.7	51.8	40.4	
3	0.35088	28.8	26.6	9.9	38.7	36.5	89.9	76.9	51.2	40.4	
4	0.4878	28.7	28.2	9.8	38.5	38.0	87.2	74.2	48.7	36.2	
5	3.64596	40.6	39.8	9.7	50.3	49.5	87.0	74.0	36.7	24.5	
6	5.23618	43.4	40.3	9.6	53.0	49.9	87.0	74.0	34.0	24.1	
7	6.8038	52.1	51.4	9.6	61.7	61.0	87.0	74.0	25.3	13.0	
8	9.72003	62.8	61.3	9.6	72.4	70.9	87.0	74.0	14.6	3.1	

6.2 Radiated Emission

Test specification	EN55022:2010+AC:2011, Class A		
Testing voltage	230 V, 50 Hz, PoE		
Test facility	10 m Chamber (#F2)		
Test distance	10 m, 3 m		
Date	2015. 01. 30		
Temperature (°C)	20.6 °C	Humidity (% R.H.)	18.4 % 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	2016.01.20	<input checked="" type="checkbox"/>
Test Receiver	ESCI	100001	R&S	2015.07.14	<input type="checkbox"/>
Test Receiver	ESCI	100710	R&S	2015.10.13	<input type="checkbox"/>
Test Receiver	ESR	101078	R&S	2015.02.24	<input type="checkbox"/>
Bi-Log Antenna	VULB 9168	440	SCHWARZBECK	2016.08.28	<input checked="" type="checkbox"/>
Amplifier	310N	284608	SONOMA INSTRUMENT	2015.04.16	<input checked="" type="checkbox"/>
3 dB Attenuator	8491B	22981	HP	2015.03.04	<input checked="" type="checkbox"/>
Antenna Mast	MA4000-EP	303	Innco Systems	-	<input checked="" type="checkbox"/>
Turn Table	DT2000S-1t	079	Innco Systems	-	<input checked="" type="checkbox"/>
Preamplifier	8449B	3008A02343	AGILENT	2015.10.13	<input checked="" type="checkbox"/>
Horn ANT	3115	00086706	ETS	2015.09.01	<input checked="" type="checkbox"/>
Spectrum Analyzer	E4407B	US39010142	AGILENT	2015.10.13	<input type="checkbox"/>

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:

$$\text{Result} = \text{M.R} + \text{C.F}(\text{A.F} + \text{C.L} + 3 \text{ dB Att} - \text{A.G})$$

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

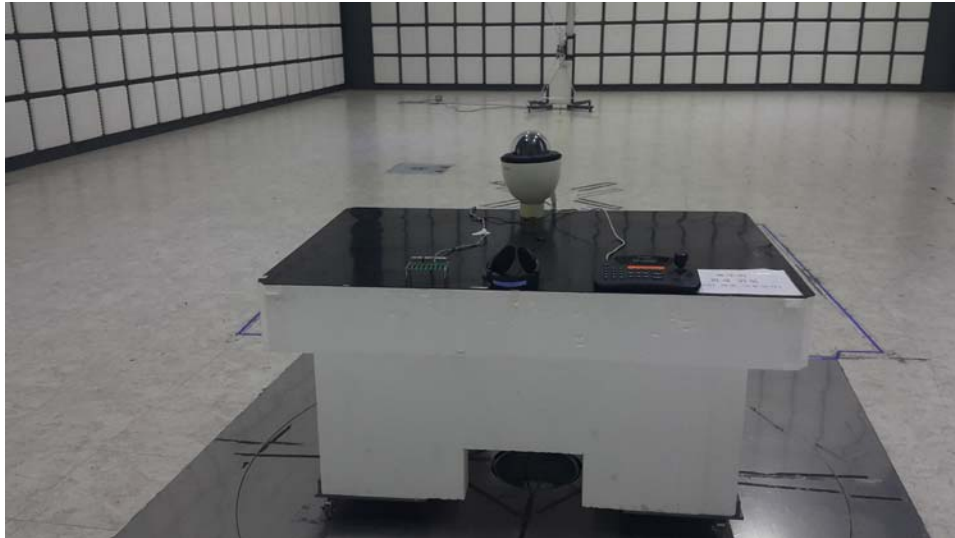
If M.R is 30 dB, A.F 12 dB, C.L 5 dB, 3 dB, A.G 35 dB

The result is

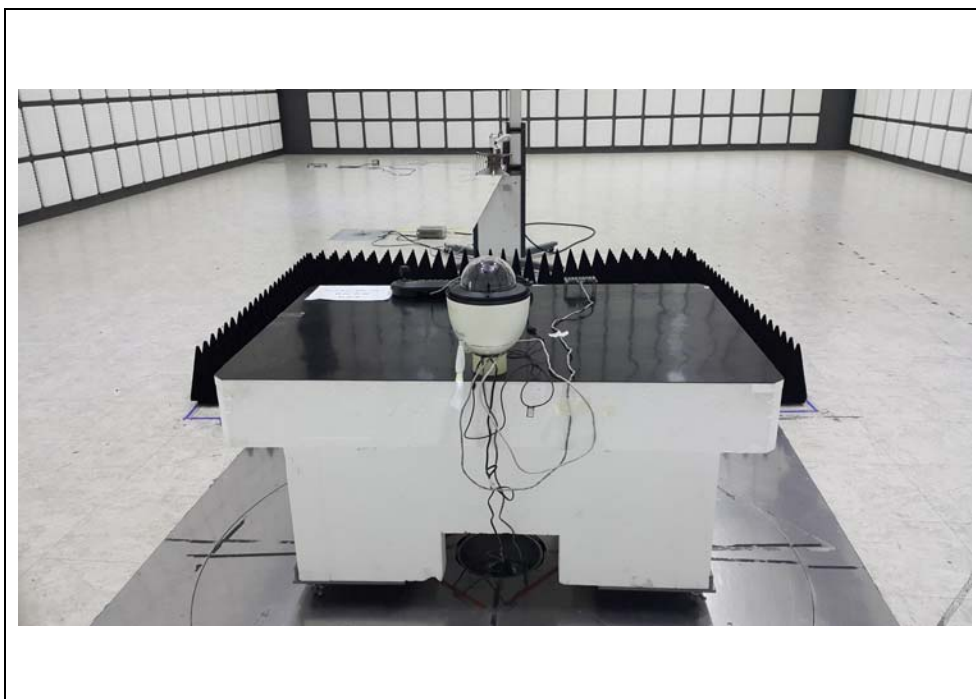
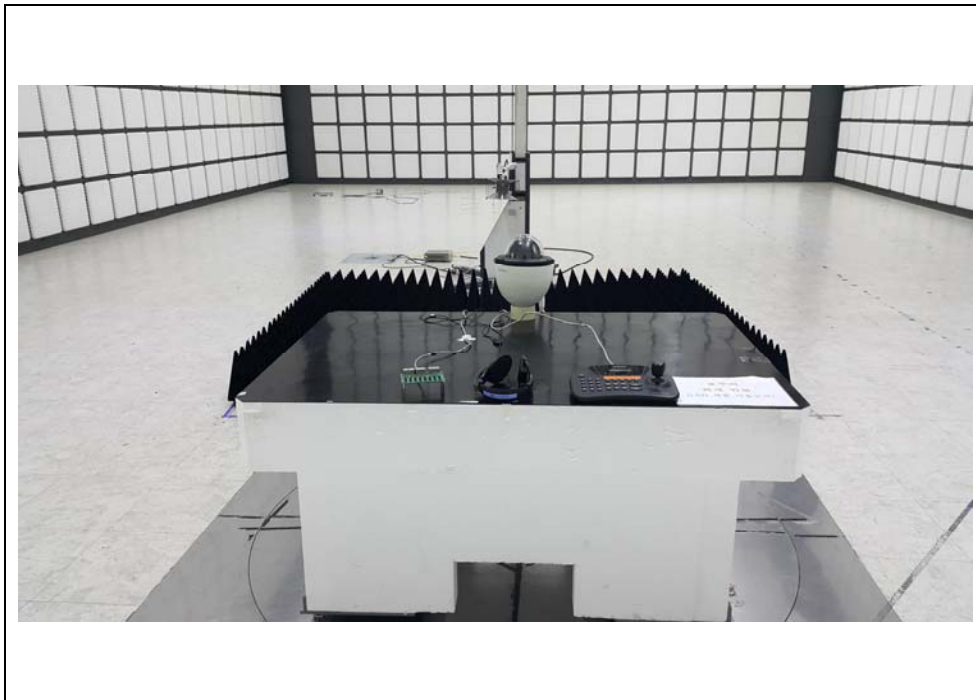
$$30 + 12 + 5 + 3 - 35 = 15 \text{ dB}(\mu\text{V/m})$$

6.2.5 Photographs of test setup

* 30 MHz ~ 1 GHz (#1- AC/AC Adaptor)



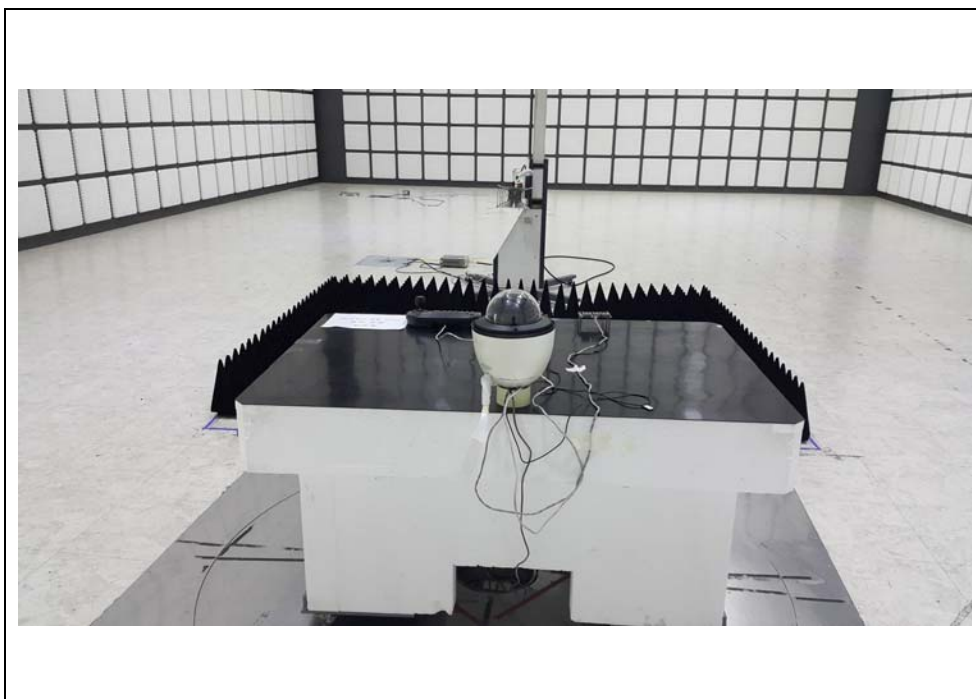
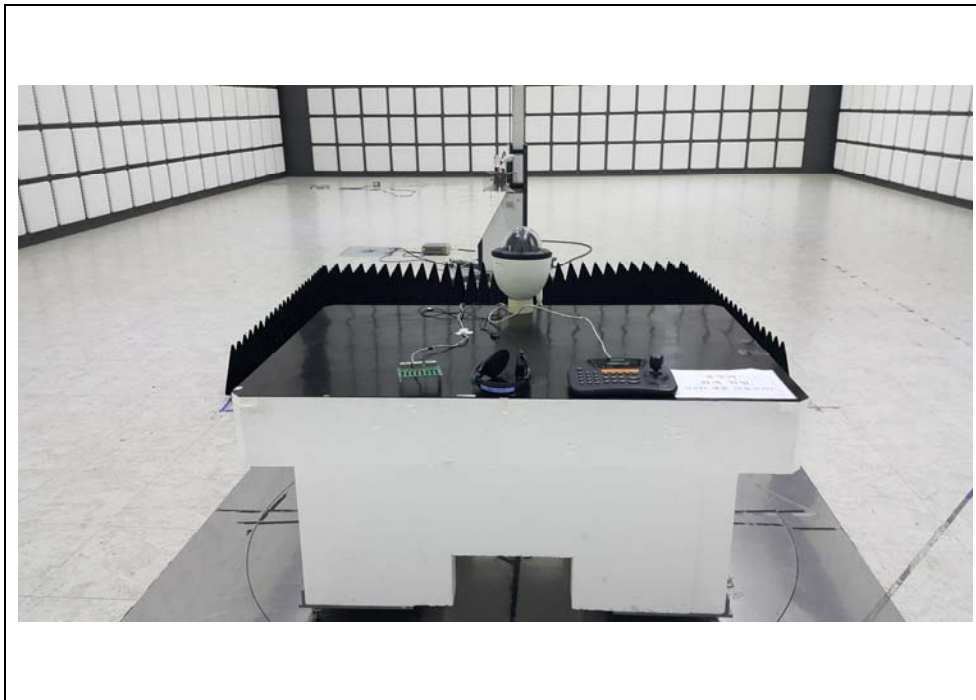
* 1 GHz ~ 6 GHz (#1- AC/AC Adaptor)



* 30 MHz ~ 1 GHz (#2- PoE)



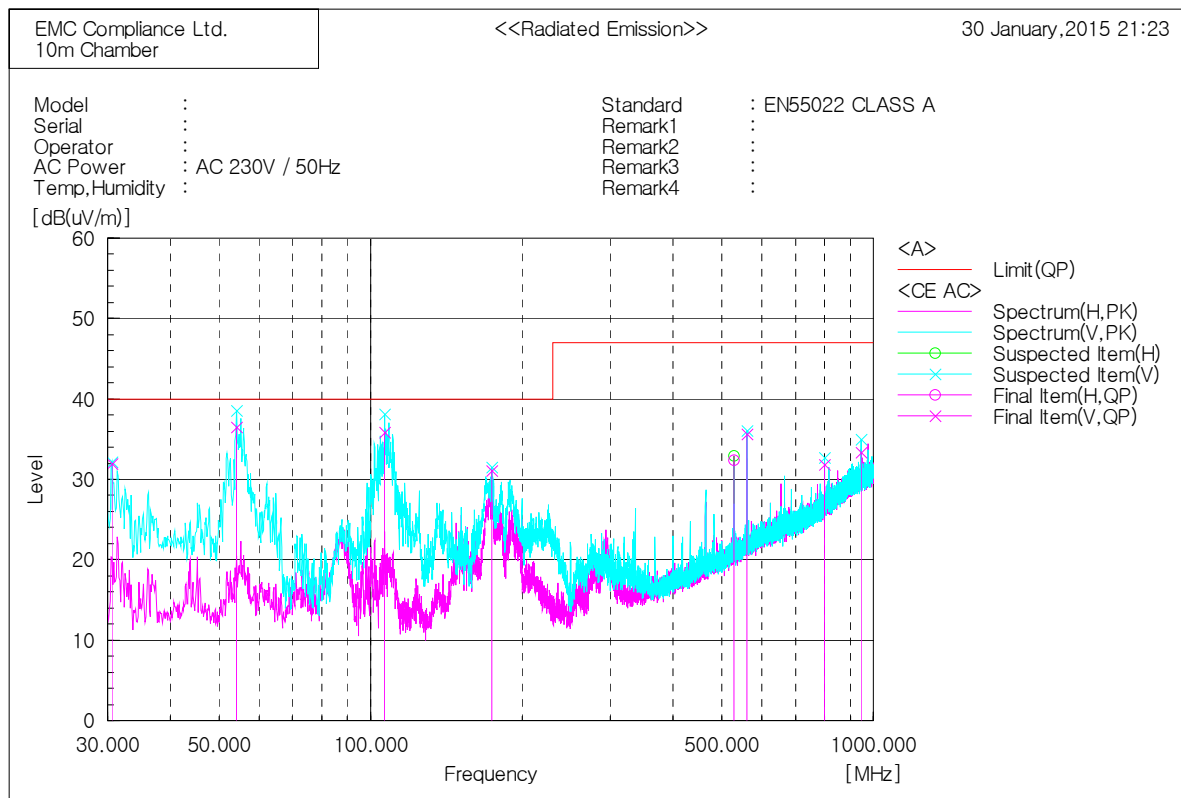
* 1 GHz ~ 6 GHz (#2- PoE)



6.2.6 Radiated emission measurement result

* Graph and Data

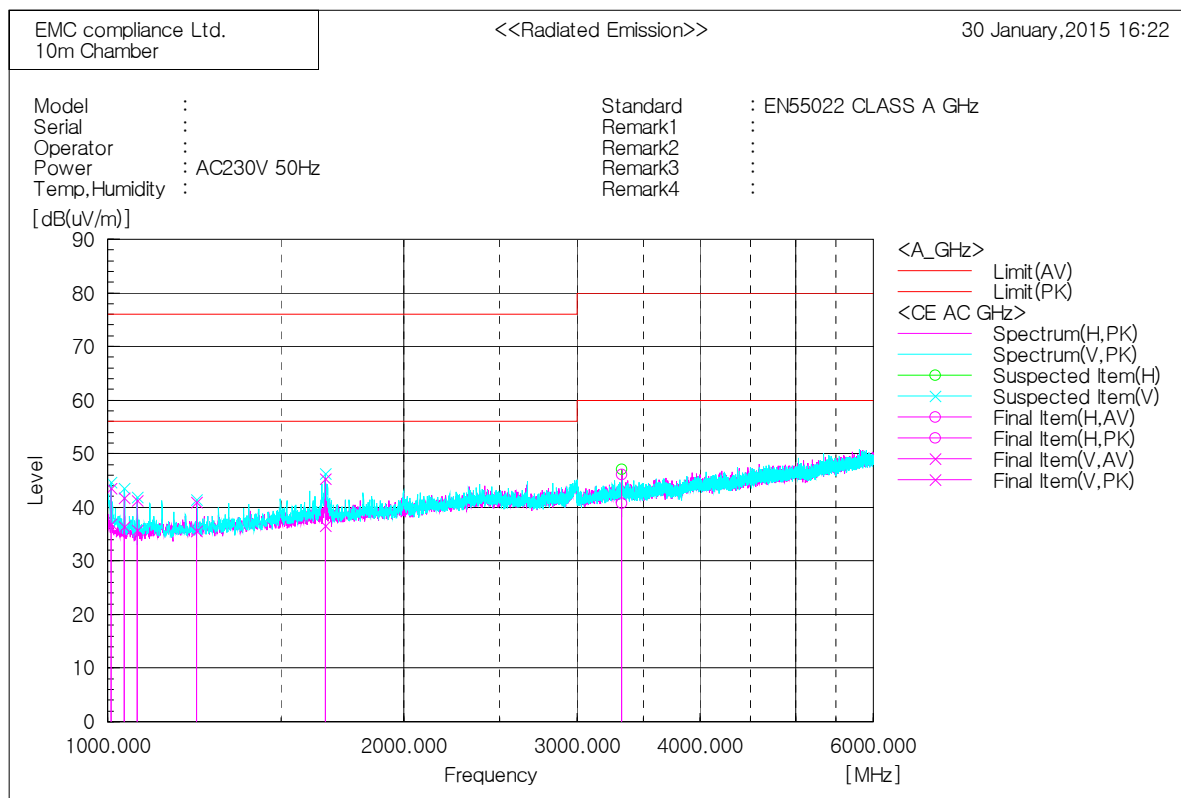
* 30 MHz ~ 1 GHz (SNP-5321HP) _#1-AC/AC Adaptor



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	30.606	V	46.5	-14.5	32.0	40.0	8.0	200.0	132.2
2	54.129	V	49.5	-13.0	36.5	40.0	3.5	100.0	257.4
3	106.630	V	51.6	-15.8	35.8	40.0	4.2	400.0	353.6
4	174.166	V	43.5	-12.4	31.1	40.0	8.9	100.0	284.5
5	528.095	H	35.6	-3.2	32.4	47.0	14.6	400.0	37.5
6	559.984	V	37.8	-2.2	35.6	47.0	11.4	300.0	236.3
7	800.059	V	29.2	2.6	31.8	47.0	15.2	400.0	114.9
8	944.104	V	27.9	5.5	33.4	47.0	13.6	100.0	270.9

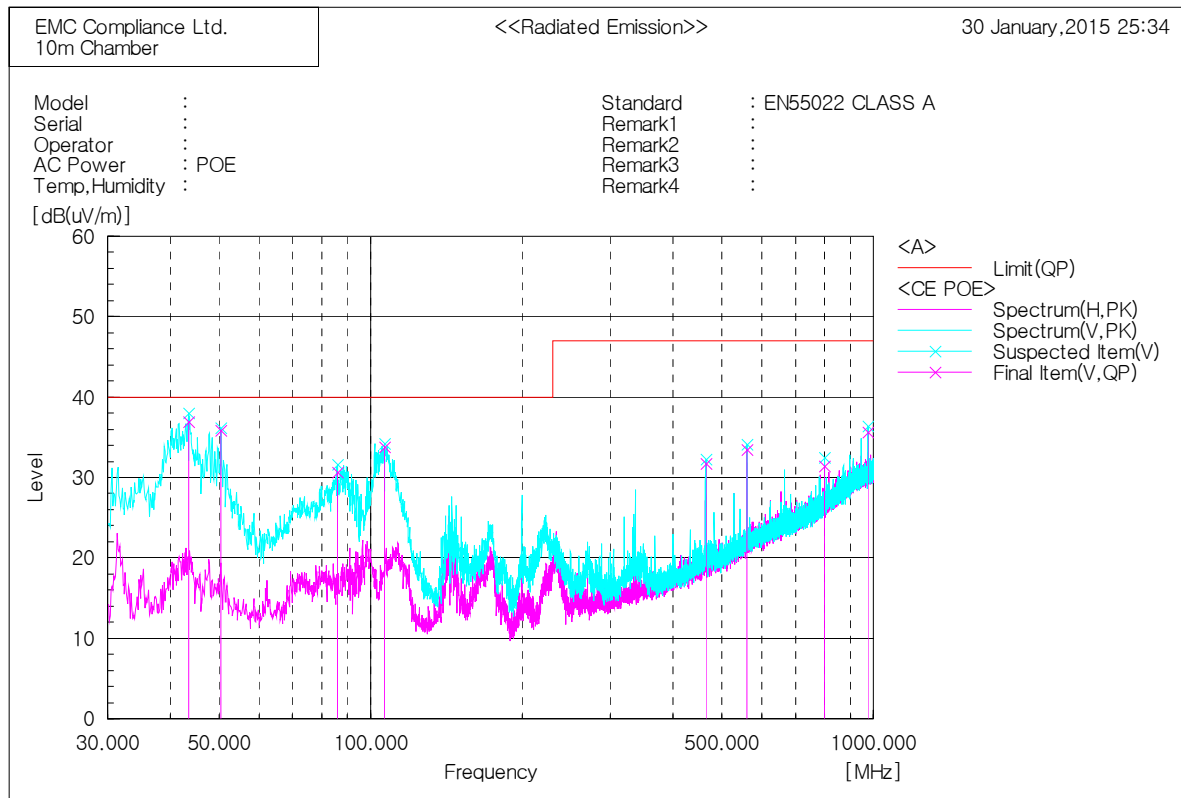
* 1 GHz ~ 6 GHz (SNP-5321HP) _#1-AC/AC Adaptor



Final Result

No.	Frequency [MHz]	(P)	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]
1	1008.125	V	44.5	51.2	-7.7	36.8	43.5	56.0	76.0	19.2	32.5	100.0	231.1
2	1040.000	V	43.9	49.2	-7.5	36.4	41.7	56.0	76.0	19.6	34.3	100.0	63.0
3	1071.875	V	43.1	48.6	-7.3	35.8	41.3	56.0	76.0	20.2	34.7	100.0	63.0
4	1231.875	V	41.9	47.3	-6.3	35.6	41.0	56.0	76.0	20.4	35.0	100.0	11.9
5	1665.000	V	40.3	49.1	-3.7	36.6	45.4	56.0	76.0	19.4	30.6	100.0	59.9
6	3331.250	H	39.2	44.6	1.6	40.8	46.2	60.0	80.0	19.2	33.8	100.0	329.7

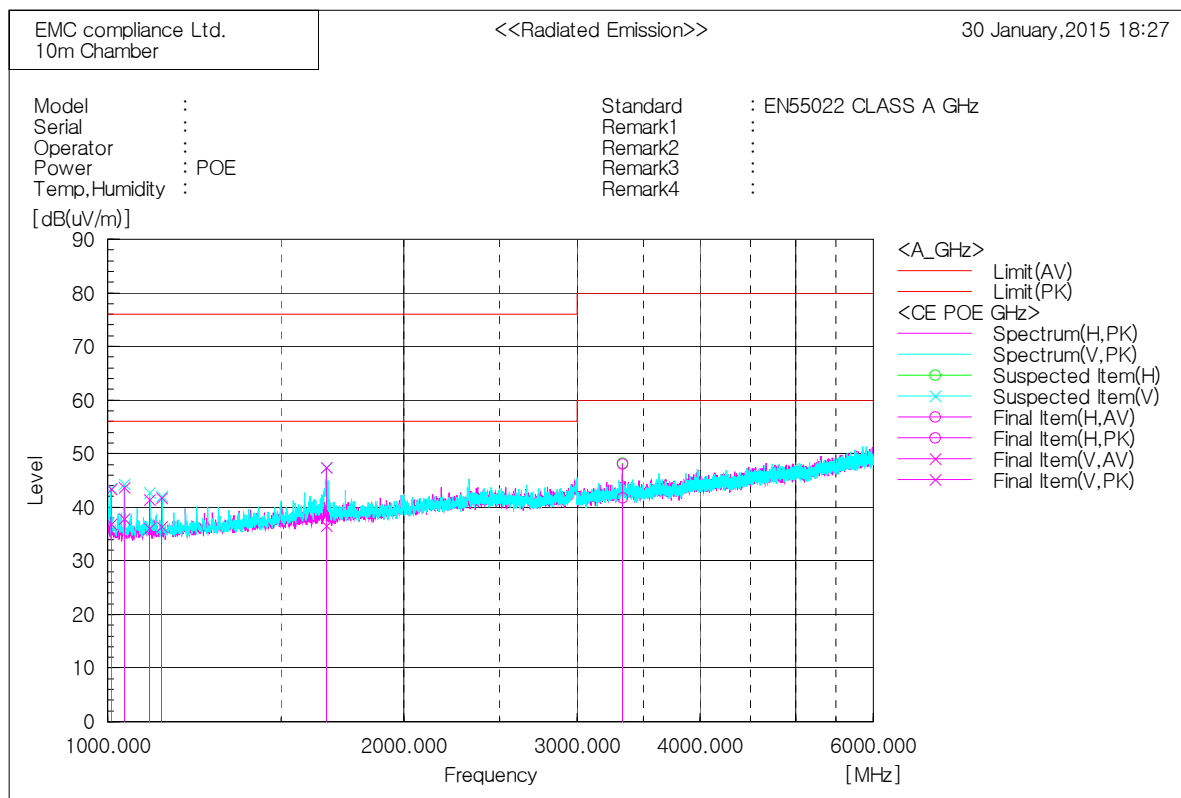
* 30 MHz ~ 1 GHz (SNP-5321HP) _#2- PoE



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	43.459	V	50.1	-13.2	36.9	40.0	3.1	400.0	261.3
2	50.370	V	48.7	-12.9	35.8	40.0	4.2	100.0	257.3
3	86.018	V	48.6	-17.9	30.7	40.0	9.3	100.0	163.9
4	106.509	V	49.6	-15.8	33.8	40.0	6.2	100.0	163.9
5	464.075	V	36.7	-5.0	31.7	47.0	15.3	400.0	219.1
6	560.105	V	35.7	-2.2	33.5	47.0	13.5	100.0	313.0
7	800.180	V	28.8	2.6	31.4	47.0	15.6	400.0	11.8
8	976.114	V	29.5	6.1	35.6	47.0	11.4	100.0	52.2

* 1 GHz ~ 6 GHz (SNP-5321HP) _#2- PoE



Final Result

No.	Frequency [MHz]	(P)	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]
1	1007.500	V	44.6	51.1	-7.8	36.8	43.3	56.0	76.0	19.2	32.7	100.0	222.1
2	1040.000	V	45.4	51.2	-7.5	37.9	43.7	56.0	76.0	18.1	32.3	100.0	158.6
3	1103.750	V	43.2	48.6	-7.1	36.1	41.5	56.0	76.0	19.9	34.5	100.0	48.3
4	1135.625	V	43.3	48.6	-6.9	36.4	41.7	56.0	76.0	19.6	34.3	100.0	58.8
5	1668.125	V	40.3	51.1	-3.7	36.6	47.4	56.0	76.0	19.4	28.6	100.0	45.2
6	3333.125	H	40.2	46.5	1.6	41.8	48.1	60.0	80.0	18.2	31.9	100.0	142.6

6.3 Harmonics

Test specification	EN 61000-3-2:2014				
Testing voltage	230 V, 50 Hz				
Test facility	Immunity area				
Date	2015. 02. 03				
Temperature(°C)	22.8 °C	Humidity (% R.H.)	16.2 % R.H.	Pressure (kPa)	102.5 kPa
Remarks	Complied				

6.3.1 Measurement procedure

The equipment is supplied in series with shunt(s) Rm or current transformer(s) from a source having the same nominal voltage and frequency as the rated supply voltage and frequency of the equipment. Measurements shall be made under normal load, or conditions for adequate heat discharge, and under normal operating conditions. User's operation controls or automatic programmers shall be set to produce the maximum harmonic component, for each successive harmonic component in turn. For the purpose of harmonic current limitation, equipment is classified as follows :

Class A : Equipment not specified in one of the three other Classes shall be considered as Class A equipment.

- Balanced three-phase equipment;
- Household appliances excluding equipment identified as Class D;
- Tools excluding portable tools;
- Dimmers for incandescent lamps;
- Audio equipment.

Class B : Portable tools; Arc welding equipment which is not professional equipment.

Class C : Lighting equipment.

Class D : Equipment having a specified power according to 6.2.2 less than or equal to 600 w, of the following types:

- Personal computers and personal computer monitors;
- Television receivers.

6.3.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
DIGITAL POWER ANALYZER	DPA500N	P1303109855	EM TEST	2015.08.27	<input checked="" type="checkbox"/>

6.3.3 Photographs of test setup

#1-AC/AC Adaptor



6.3.4 Measurement result

(#1-AC/AC Adaptor)

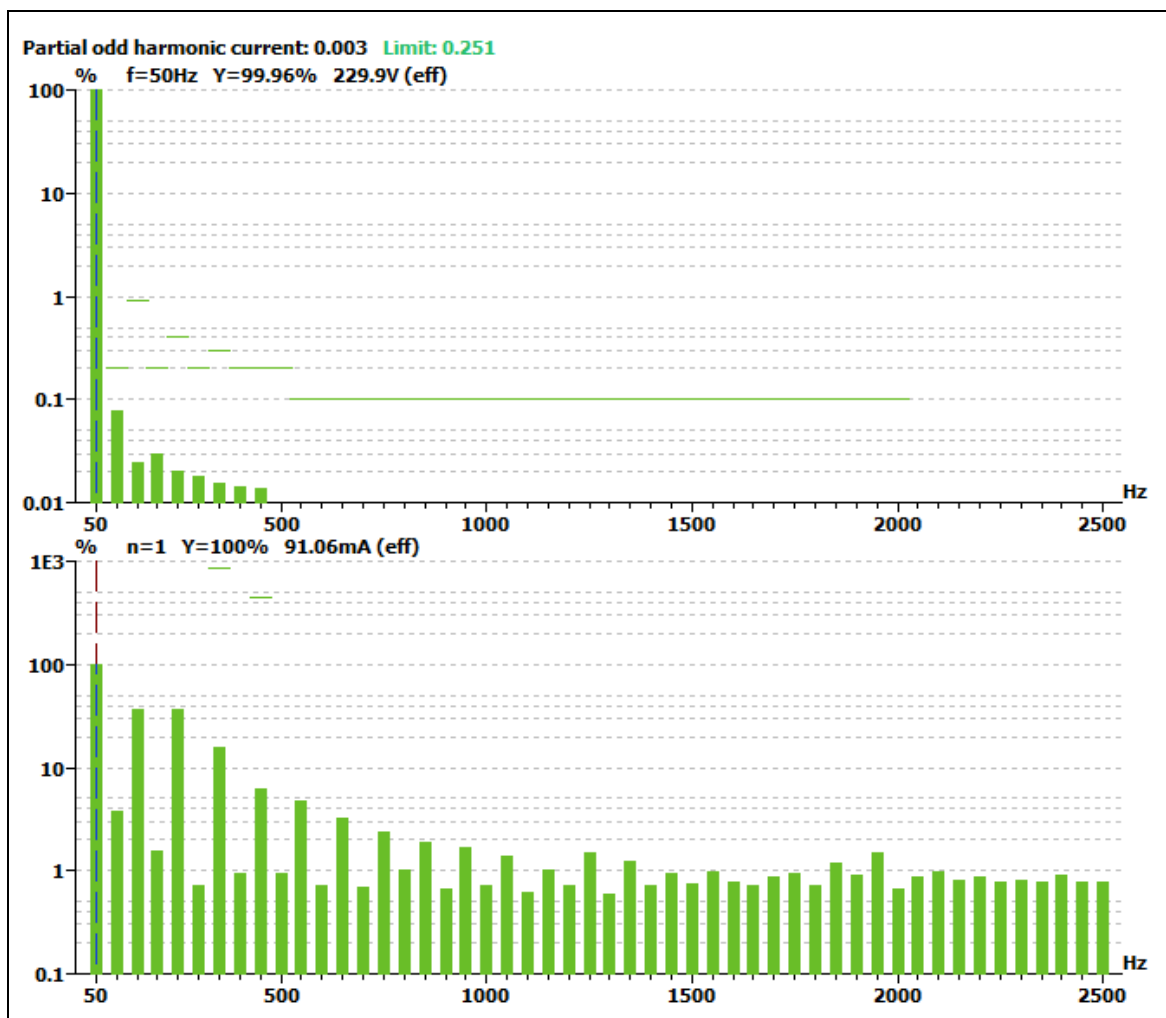
Date of test:	8:12 3.Feb 2015
Measurement file name:	Harmonics_3_2_Ed4.rsd
Tester:	RJK
Standard used:	EN/IEC 61000-3-2 Ed.4 Quasi-stationary Equipment class A <= 200% of the limit
Observation time:	130s
Windows width:	10 periods - (EN/IEC 61000-4-7 Edition 2002 + A1:2008)
Customer:	Samsung Techwin Co., Ltd.
E. U. T.:	SNP-5321HP

E. U. T. Result

Harmonic(s) > 200%:	
Order (n):	None
Harmonic(s) with average > 90%:	
Order (n):	None
Harmonic(s) between 150% and 200% during more than 10% of the test time or max. 10min:	
Order (n):	None

Power Source Result

First dataset out of limit:	
DS (time):	None
Harmonic(s) out of limit:	
Order (n):	None



Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	90.877E-3			
2	3.265E-3			PASS
3	32.973E-3	1.593	2.07	PASS
4	1.431E-3			PASS
5	33.527E-3	3.268	1.03	PASS
6	699.399E-6			PASS
7	14.110E-3	2.036	693.00E-3	PASS
8	832.070E-6			PASS
9	5.605E-3	1.557	360.00E-3	PASS
10	904.462E-6			PASS
11	4.156E-3			PASS
12	632.992E-6			PASS
13	3.255E-3			PASS
14	637.363E-6			PASS
15	2.024E-3			PASS
16	1.034E-3			PASS
17	1.628E-3			PASS
18	914.440E-6			PASS
19	1.515E-3			PASS
20	734.174E-6			PASS
21	1.140E-3			PASS
22	599.760E-6			PASS
23	943.893E-6			PASS
24	712.223E-6			PASS
25	1.170E-3			PASS
26	756.273E-6			PASS
27	983.997E-6			PASS
28	641.202E-6			PASS
29	796.318E-6			PASS
30	757.567E-6			PASS
31	984.267E-6			PASS
32	659.084E-6			PASS
33	733.130E-6			PASS
34	730.395E-6			PASS
35	892.766E-6			PASS
36	697.011E-6			PASS
37	1.011E-3			PASS
38	704.173E-6			PASS
39	1.052E-3			PASS
40	662.780E-6			PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	91.094E-3			
2	3.699E-3			PASS
3	33.233E-3	0.722	4.60	PASS
4	1.568E-3			PASS
5	33.809E-3	1.483	2.28	PASS
6	1.154E-3			PASS
7	14.647E-3	0.951	1.54	PASS
8	990.189E-6			PASS
9	5.780E-3	0.722	800.00E-3	PASS
10	1.048E-3			PASS
11	4.352E-3			PASS
12	741.872E-6			PASS
13	3.811E-3			PASS
14	714.485E-6			PASS
15	2.236E-3			PASS
16	1.242E-3			PASS
17	1.939E-3			PASS
18	1.276E-3			PASS
19	1.692E-3			PASS
20	944.901E-6			PASS
21	1.460E-3			PASS
22	718.949E-6			PASS
23	1.254E-3			PASS
24	822.700E-6			PASS
25	1.402E-3			PASS
26	922.330E-6			PASS
27	1.199E-3			PASS
28	692.800E-6			PASS
29	1.006E-3			PASS
30	872.614E-6			PASS
31	1.166E-3			PASS
32	875.692E-6			PASS
33	1.031E-3			PASS
34	1.063E-3			PASS
35	1.070E-3			PASS
36	789.035E-6			PASS
37	1.210E-3			PASS
38	918.902E-6			PASS
39	1.410E-3			PASS
40	815.925E-6			PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

Maximum harmonic voltage results

Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	229.92	99.966		
2	186.45E-3	0.081	0.2	PASS
3	62.30E-3	0.027	0.9	PASS
4	72.43E-3	0.031	0.2	PASS
5	56.32E-3	0.024	0.4	PASS
6	51.04E-3	0.022	0.2	PASS
7	40.69E-3	0.018	0.3	PASS
8	39.68E-3	0.017	0.2	PASS
9	39.26E-3	0.017	0.2	PASS
10	30.69E-3	0.013	0.2	PASS
11	31.24E-3	0.014	0.1	PASS
12	28.01E-3	0.012	0.1	PASS
13	24.01E-3	0.010	0.1	PASS
14	22.48E-3	0.010	0.1	PASS
15	26.04E-3	0.011	0.1	PASS
16	19.55E-3	0.008	0.1	PASS
17	18.26E-3	0.008	0.1	PASS
18	19.44E-3	0.008	0.1	PASS
19	17.71E-3	0.008	0.1	PASS
20	17.64E-3	0.008	0.1	PASS
21	21.75E-3	0.009	0.1	PASS
22	20.96E-3	0.009	0.1	PASS
23	15.31E-3	0.007	0.1	PASS
24	17.18E-3	0.007	0.1	PASS
25	13.97E-3	0.006	0.1	PASS
26	14.10E-3	0.006	0.1	PASS
27	18.15E-3	0.008	0.1	PASS
28	14.69E-3	0.006	0.1	PASS
29	18.65E-3	0.008	0.1	PASS
30	18.41E-3	0.008	0.1	PASS
31	14.45E-3	0.006	0.1	PASS
32	14.61E-3	0.006	0.1	PASS
33	13.13E-3	0.006	0.1	PASS
34	14.90E-3	0.006	0.1	PASS
35	17.27E-3	0.008	0.1	PASS
36	12.62E-3	0.005	0.1	PASS
37	21.78E-3	0.009	0.1	PASS
38	12.50E-3	0.005	0.1	PASS
39	14.14E-3	0.006	0.1	PASS
40	13.49E-3	0.006	0.1	PASS

6.4 Flicker

Test specification	EN 61000-3-3:2013				
Testing voltage	230 V, 50 Hz				
Test facility	Immunity area				
Date	2015. 02. 03				
Temperature(°C)	22.8 °C	Humidity (% R.H.)	16.2 % R.H.	Pressure (kPa)	102.5 kPa
Remarks	Complied				

6.4.1 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.

$$P_{lt} = 2 \text{ h}$$

$$P_{st} = 10 \text{ min}$$

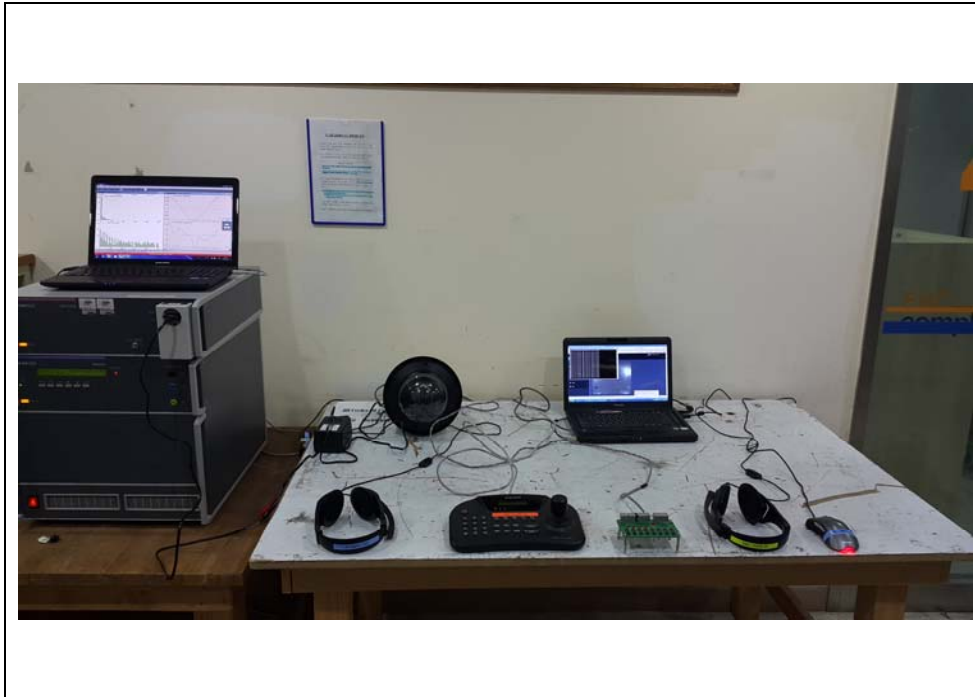
Controls and automatic programs shall be set to produce the most unfavorable sequence of voltage changes, using only those combinations of controls and programs are mentioned by the manufacturer in the instruction manual.

6.4.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
DIGITAL POWER ANALYZER	DPA500N	P1303109855	EM TEST	2015.08.27	<input checked="" type="checkbox"/>

6.4.3 Photographs of test setup

#1-AC/AC Adaptor



6.4.4 Measurement result

(#1-AC/AC Adaptor)

Date of test:	19:17 3.Feb 2015
Tester:	RJK
Standard used:	EN/IEC 61000-3-3 Ed.3 Flicker
Short time (Pst):	10 min
Observation time:	10 min (1 Flicker measurement)
Flickermeter:	230V / 50Hz according IEC 61000-4-15 Ed.2
Flicker Impedance:	Zref (IEC 60725)
Customer:	Samsung Techwin Co., Ltd.
E. U. T.:	SNP-5321HP

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.00	PASS
dmax [%]	0.361	4.00	PASS
dt [s]	0.000	0.20	PASS

6.5 Electrostatic Discharge

Test specification	EN 61000-4-2:2009				
Test level	<input checked="" type="checkbox"/> Contact: ± 6 kV <input checked="" type="checkbox"/> Air: ± 2 kV, ± 4 kV, ± 8 kV <input type="checkbox"/> HCP: ± 2 kV, ± 4 kV, ± 6 kV <input checked="" type="checkbox"/> VCP: ± 2 kV, ± 4 kV, ± 6 kV				
Discharge impedance	330 Ω / 150 pF				
Number of discharge (Each polarity)	<input checked="" type="checkbox"/> Contact: 10 <input checked="" type="checkbox"/> Air: 10 <input checked="" type="checkbox"/> HCP / VCP: 10				
Interval between discharges	1 s				
Testing voltage	230 V, 50 Hz, PoE				
Test facility	Shielded room				
Date	2015. 02. 05				
Temperature(°C)	23.1 °C	Humidity (% R.H.)	42.3 % R.H.	Pressure (kPa)	102.5 kPa
Remarks	Complied - There was no change of operation status during above testing.				

6.5.1 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 k Ω 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.

6.5.2 Used equipments

Equipment	Model No.	Serial No.	Makers	Next Cal. Date	Used
ESD Tester	PESD-1600	H011 309	HAEFELY	2015.06.30	<input checked="" type="checkbox"/>
ESD Tester	NSG 437	182	TESEQ	2015.04.09	<input type="checkbox"/>
HCP	-	-	-	-	<input type="checkbox"/>
VCP	-	-	-	-	<input checked="" type="checkbox"/>

6.5.3 Photographs of test setup

#1- AC/AC Adaptor



#2- PoE

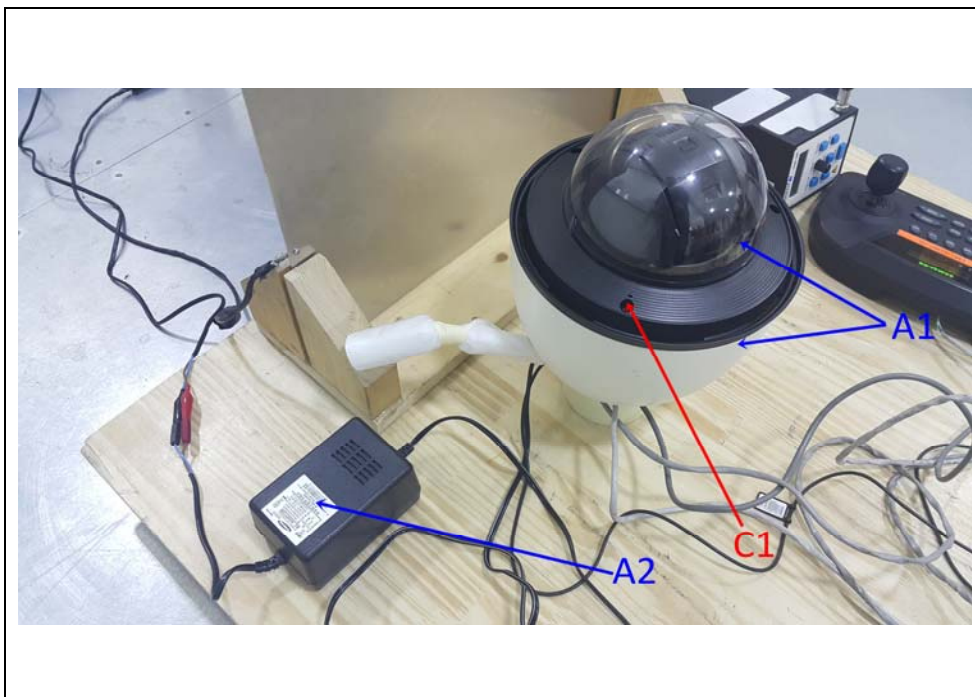
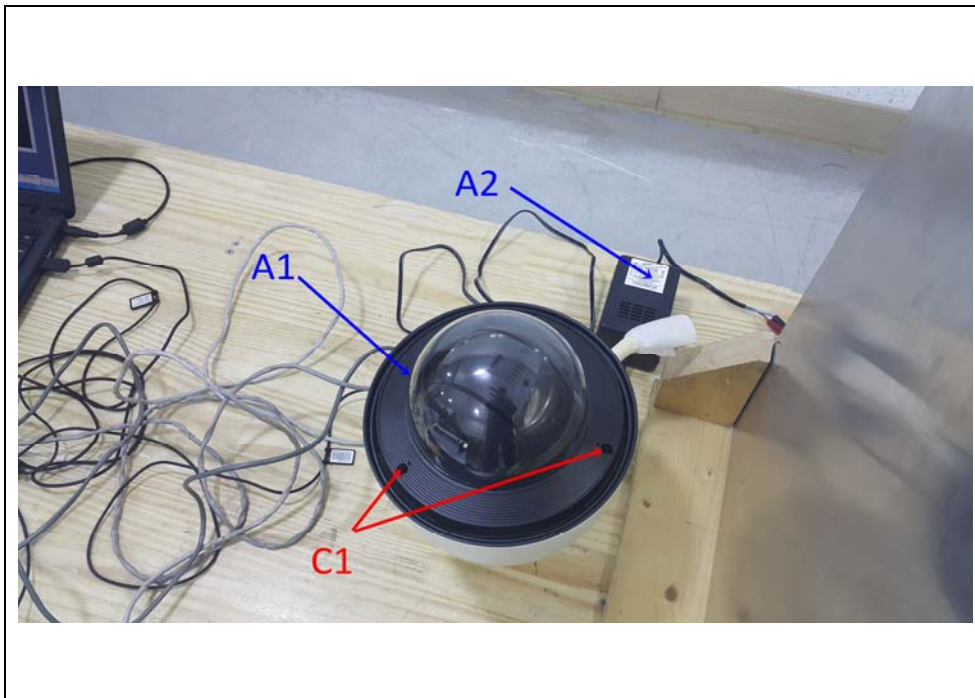


6.5.4 Measurement result

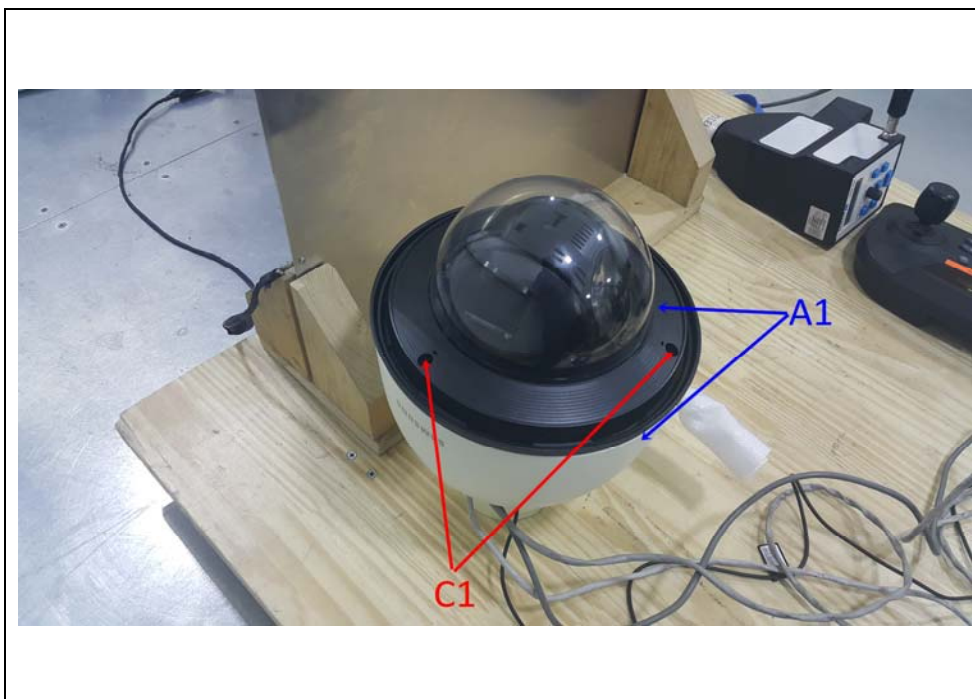
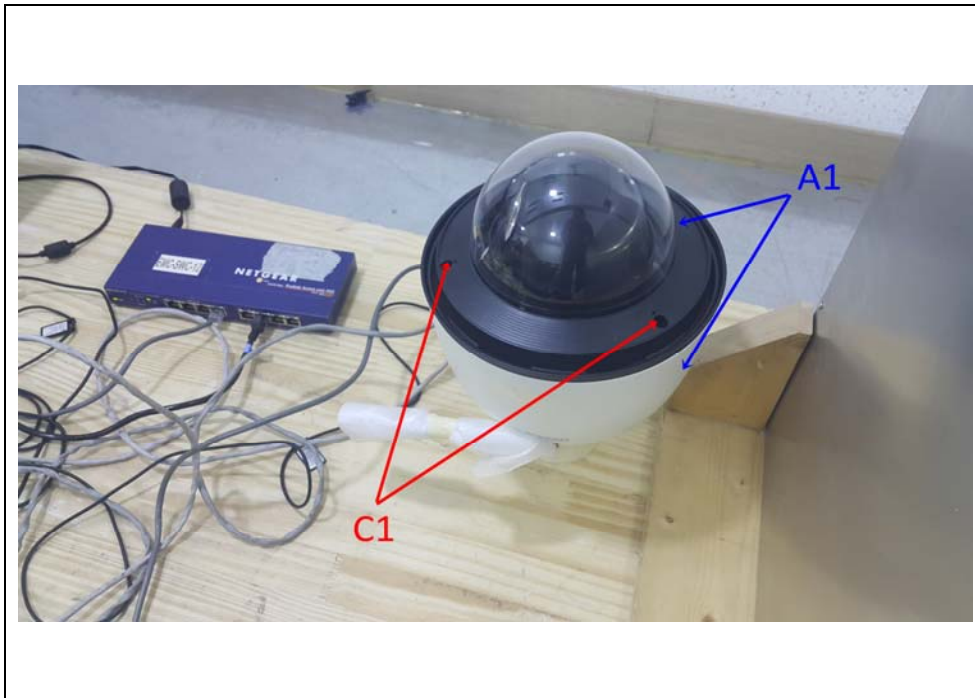
Electrostatic Discharge (Test Point)

Air discharge	→
Contact discharge	→

#1- AC/AC Adaptor



#2- PoE



(#1- AC/AC Adaptor, #2- PoE)

HCP/VCP discharge

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

Contact discharge

Location(EUT)		Applied level (\pm)	Result
C1	Screw	± 6 kV	Complied

Air discharge

Location(EUT)		Applied level (\pm)	Result
A1	Enclosure(Case)	± 2 kV, ± 4 kV, ± 8 kV	Complied
A2	Adaptor_Enclosure(Case)	± 2 kV, ± 4 kV, ± 8 kV	Complied

6.6 Radio Frequency Electromagnetic Fields

Test specification	EN 61000-4-3:2006+A2:2010				
Tested frequency	80 MHz ~ 1 GHz, 1 GHz ~ 2.7 GHz				
Test level & Modulation	1 V/m, 3 V/m, 10 V/m, 80 % Amplitude Modulation (1 kHz) 1 V/m, 3 V/m, 10 V/m, Pulse Modulation (1 Hz (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	230 V, 50 Hz, PoE				
Test facility	Fully anechoic chamber (3 m)				
Date	2015. 02. 03				
Temperature(°C)	21.1 °C	Humidity (% R.H.)	18.9 % R.H.	Pressure (kPa)	102.6 kPa
Remarks	Complied - There was no change of operation status during above testing.				

6.6.1 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.

6.6.2 Used equipments

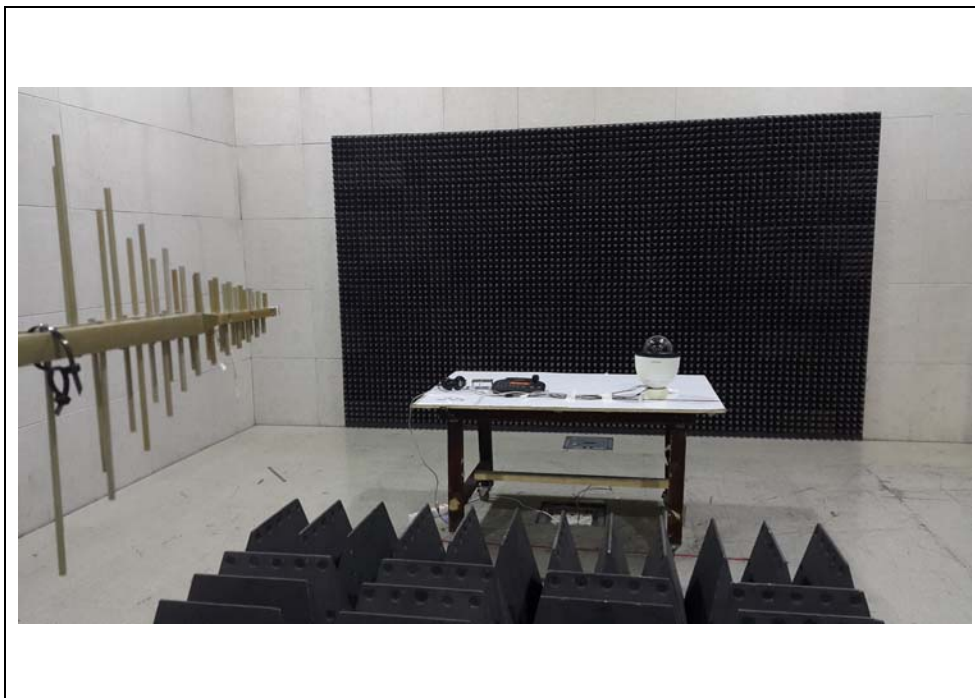
Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Power meter	PM2002	302852	AR	2015.09.23	<input checked="" type="checkbox"/>
Power sensor	PH2000	303224	AR	2015.09.23	<input checked="" type="checkbox"/>
Power sensor	PH2000	311217	AR	2015.09.23	<input checked="" type="checkbox"/>
Directional coupler	DC6180	303976	AR	2015.09.23	<input checked="" type="checkbox"/>
Directional coupler	DC7144M1	320279	AR	2015.09.23	<input checked="" type="checkbox"/>
Signal generator	E4421B	GB40052295	AGILENT	2015.09.23	<input checked="" type="checkbox"/>
Broadband Amplifier	BBA100	100996-1	R&S	2015.02.06	<input checked="" type="checkbox"/>
Amplifier	60S1G3M2	320444	AR	2015.04.02	<input checked="" type="checkbox"/>
Log Periodic Dipole Antenna	LPDA-0803	-	ETS	-	<input checked="" type="checkbox"/>
Isotropic Probe	HI-6105	156301	ETS-LINDGREN	2015.07.18	<input checked="" type="checkbox"/>
Antenna master	-	-	ETS	-	<input checked="" type="checkbox"/>

6.6.3 Photographs of test setup

#1- AC/AC Adaptor



#2- PoE



6.6.4 Measurement result

(#1- AC/AC Adaptor, #2- PoE)

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

6.7 Electric Fast Transient/BURST

Test specification	EN 61000-4-4:2012				
Coupling	<input checked="" type="checkbox"/> AC main <input checked="" type="checkbox"/> Signal/Control: Clamp <input checked="" type="checkbox"/> Telecommunication: Clamp				
Test level	<input checked="" type="checkbox"/> AC main: ± 1 kV Peak <input checked="" type="checkbox"/> Signal/Control: ± 1 kV Peak <input checked="" type="checkbox"/> Telecommunication: ± 1 kV Peak				
Repetition frequency	100 kHz, Tr/Th = 5 / 50 ns				
Coupling time (Minimum)	60 s				
Testing Voltage	230 V, 50 Hz, PoE				
Test facility	Shielded room				
Date	2015. 02. 04				
Temperature(°C)	22.3 °C	Humidity (% R.H.)	19.4 % R.H.	Pressure (kPa)	102.6 kPa
Remarks	Complied - There was no change of operation status during above testing.				

6.7.1 Measurement procedure

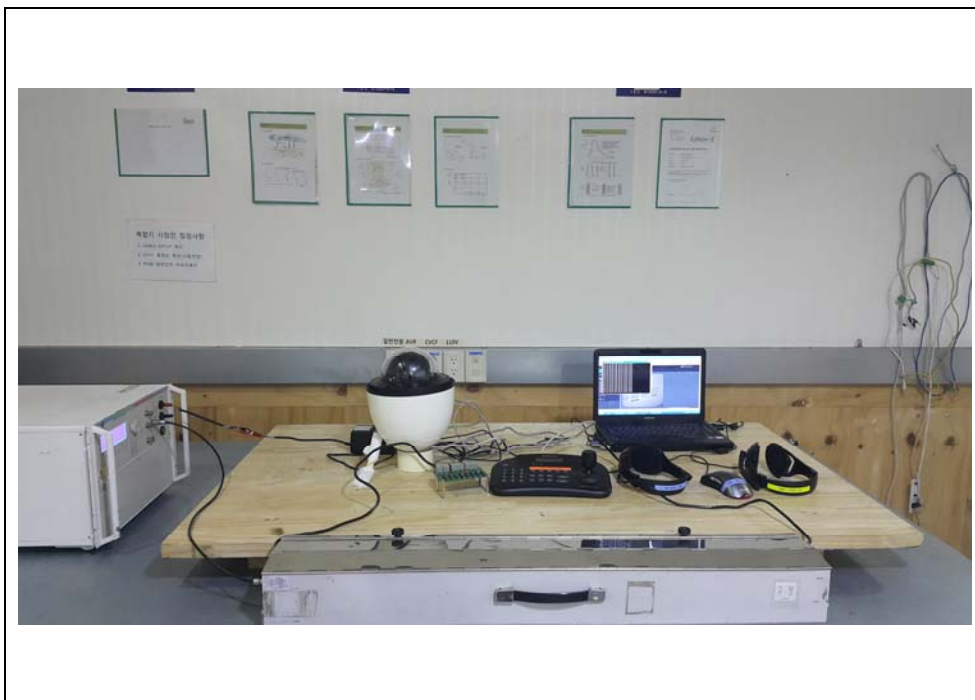
A ground reference plane was located on the floor.
 EFT generator was connected to reference ground plane via low impedance connection.
 For floor standing equipment, EUT was placed on a 0.1 m wooden table.
 For tabletop equipment, EUT was placed on a 0.1 m above the ground reference plane.
 Test generator 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.

6.7.2 Used equipments

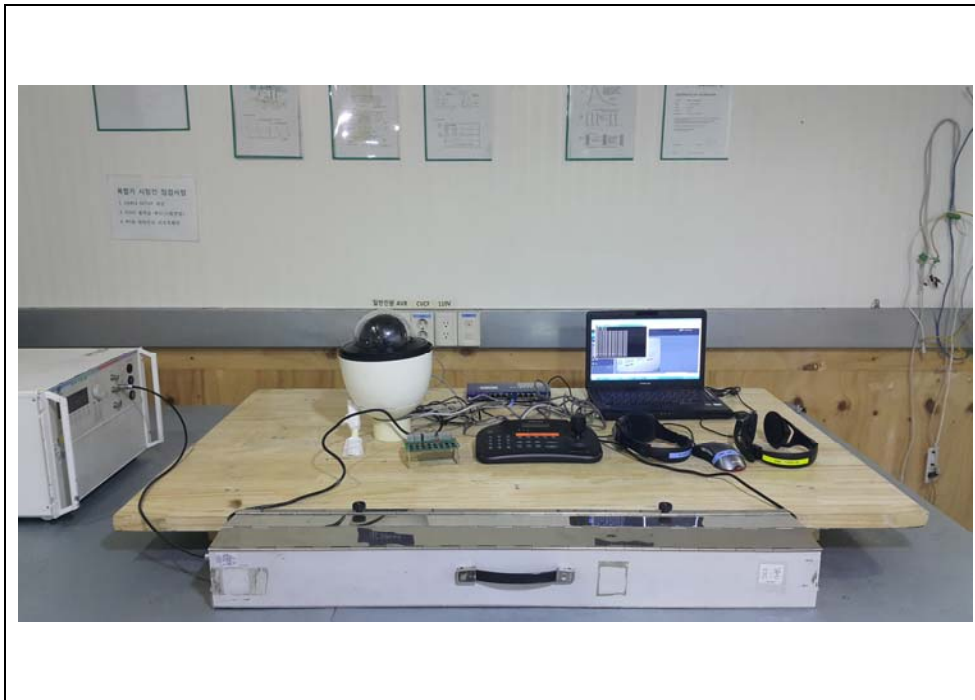
Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Ultra compact simulator	UCS 500-M	V0545100858	EM TEST	2015.07.04	<input type="checkbox"/>
Ultra compact simulator	UCS500M	0701-03	EM TEST	2015.06.03	<input checked="" type="checkbox"/>
Capacitive coupling clamp	-	0001	EM TEST	2015.09.30	<input checked="" type="checkbox"/>

6.7.3 Photographs of test setup

#1- AC/AC Adaptor



#2- PoE



6.7.4 Measurement result

* AC main (#1- AC/AC Adaptor)

Coupling point	(+)	(-)	Result
L+N	+ 1 kV	- 1 kV	Complied

* Signal/Control (#1- AC/AC Adaptor, #2- PoE)

Coupling point	(+)	(-)	Result
RS-485	+ 1 kV	- 1 kV	Complied
Audio In/Out	+ 1 kV	- 1 kV	Complied
Alarm In/Out	+ 1 kV	- 1 kV	Complied

* Telecommunication (#1- AC/AC Adaptor, #2- PoE)

Coupling point	(+)	(-)	Result
LAN(RJ-45)	+ 1 kV	- 1 kV	Complied
LAN(PoE)	+ 1 kV	- 1 kV	Complied

6.8 Surge

Test specification	EN 61000-4-5:2014				
Coupling	<input checked="" type="checkbox"/> AC main: Direct <input checked="" type="checkbox"/> Signal/Control: CDN <input checked="" type="checkbox"/> Telecommunication: CDN				
Test level	<input checked="" type="checkbox"/> AC main: <input checked="" type="checkbox"/> Differential mode: $\pm 0.5 \text{ kV}, \pm 1 \text{ kV}$ <input type="checkbox"/> Common mode: $\pm 0.5 \text{ kV}, \pm 1 \text{ kV}, \pm 2 \text{ kV}$ <input checked="" type="checkbox"/> Signal/Control: $\pm 0.5 \text{ kV}, \pm 1 \text{ kV}$ <input checked="" type="checkbox"/> Telecommunication: $\pm 0.5 \text{ kV}, \pm 1 \text{ kV}$				
Coupling Impedance	<input checked="" type="checkbox"/> Differential mode: $18 \mu\text{F}$ <input type="checkbox"/> Common mode: $10 \Omega + 9 \mu\text{F}$ <input checked="" type="checkbox"/> $40 \Omega + 0.5 \mu\text{F}$ <input type="checkbox"/> Direct				
Surge pulse shape	Tr/Th = 1.2 / 50 μs				
Angles	0 °, 90 °, 180 °, 270 °				
Number of surge	5				
Coupling time	1 min				
Testing Voltage	230 V, 50 Hz, PoE				
Test facility	Shielded room				
Date	2015. 02. 04				
Temperature(°C)	22.3 °C	Humidity (% R.H.)	19.4 % R.H.	Pressure (kPa)	102.6 kPa
Remarks	Complied - There was no change of operation status during above testing.				

6.8.1 Measurement procedure

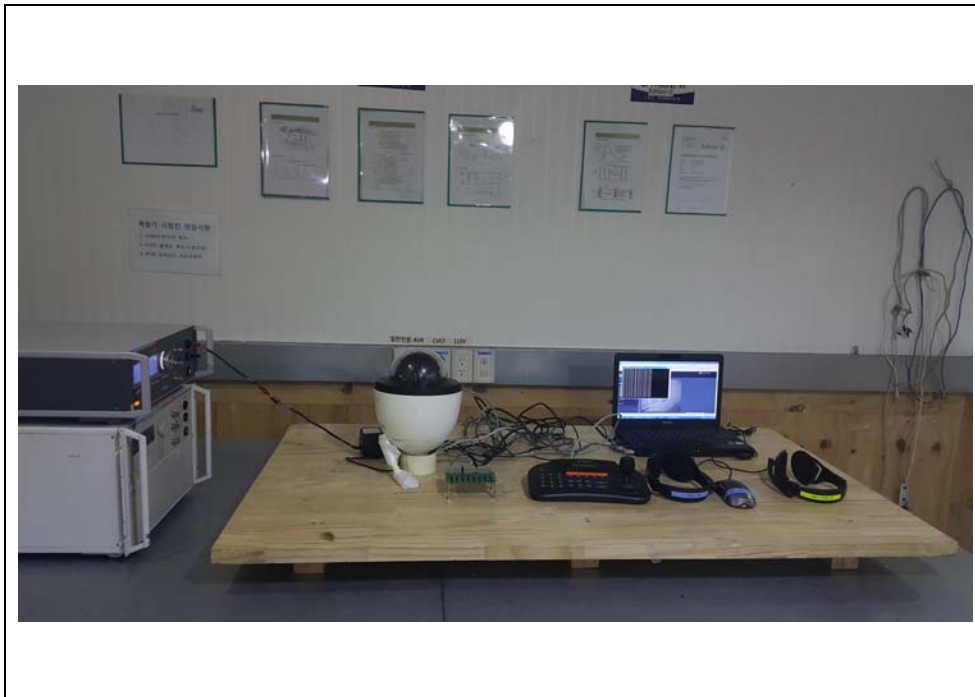
A ground reference plane was located on the floor. SURGE generator was connected to reference ground plane via low impedance connection. For floor standing equipment & table top equipment, EUT was placed on a wooden table.

6.8.2 Used equipments

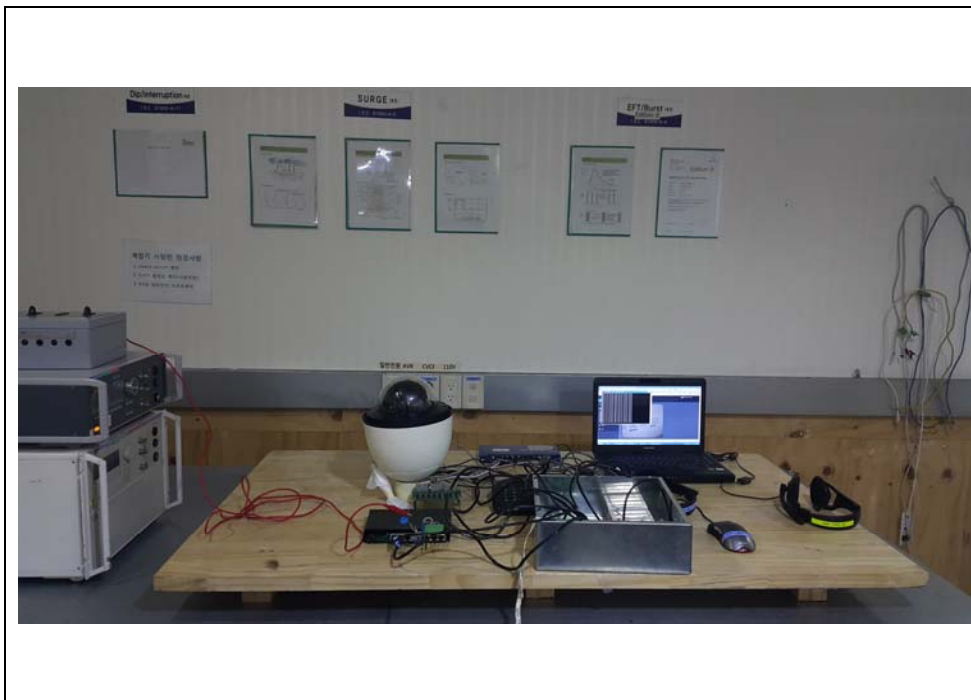
Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Ultra compact simulator	UCS 500-M	V0545100858	EM TEST	2015.07.04	<input type="checkbox"/>
Ultra compact simulator	UCS500M	0701-03	EM TEST	2015.06.03	<input type="checkbox"/>
Ultra compact simulator	UCS 500N5V	P1429136861	EM TEST	2016.01.07	<input checked="" type="checkbox"/>
CDN	CNV 508 N1	V1108108861	EM TEST	2015.09.30	<input checked="" type="checkbox"/>

6.8.3 Photographs of test setup

#1- AC/DC Adaptor



#2- PoE



6.8.4 Measurement result

* AC main (#1- AC/AC Adaptor)

Coupling point	(+)	(-)	Result
L-N	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Complied

* Signal/Control(#1-AC/AC Adaptor, #2- PoE)

Coupling point	(+)	(-)	Result
RS-485	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Complied
Audio In/Out	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Complied
Alarm In/Out	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Complied

* Telecommunication(#1-AC/AC Adaptor, #2- PoE)

Coupling point	(+)	(-)	Result
LAN(RJ-45)	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Complied
LAN(PoE)	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Complied

6.9 Conducted Immunity

Test specification	EN 61000-4-6:2014				
Tested frequency	0.15 MHz ~ 100 MHz				
Test level & Modulation	1 V, 3 V, 10 V, 80 % Amplitude Modulation (1 kHz) 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	<input checked="" type="checkbox"/> AC main: CDN(M2) <input checked="" type="checkbox"/> Signal/Control: Clamp <input checked="" type="checkbox"/> Telecommunication: CDN(T8-RJ45)				
Testing Voltage	230 V, 50 Hz, PoE				
Test facility	Shielded room				
Date	2015. 02. 05				
Temperature(°C)	23.1 °C	Humidity (% R.H.)	42.3 % R.H.	Pressure (kPa)	102.5 kPa
Remarks	Complied - There was no change of operation status during above testing.				

6.9.1 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 MHz to 100 MHz. This frequency range was Modulated with 1 kHz 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.



#2- PoE



6.9.4 Measurement result

* AC main (#1-AC/AC Adaptor)

Coupling point	Coupling method	Result
AC/AC Adaptor	CDN(M2)	Complied

* Signal/Control (#1-AC/AC Adaptor, #2- PoE)

Coupling point	Coupling method	Result
RS-485	Clamp	Complied
Audio In/Out	Clamp	Complied
Alarm In/Out	Clamp	Complied

* Telecommunication (#1-AC/AC Adaptor, #2- PoE)

Coupling point	Coupling method	Result
LAN(RJ-45)	CDN(T8-RJ45)	Complied
LAN(PoE)	CDN(T8-RJ45)	Complied

6.10 Dips and Interruptions

Test specification	EN 61000-4-11:2004				
Number of dips	3 T				
Duration	10 s				
Phase	Zero crossing (0 °)				
Testing Voltage	100 V, 50/60 Hz / 240 V, 50/60 Hz				
Test facility	Shielded room				
Test Date	2015. 02. 04				
Temperature (°C)	23.1 °C	Humidity (% R.H)	42.3 % R.H	Pressure (kPa)	102.5 kPa
Remarks	Complied				

6.10.1 Measurement procedure

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

The dips/interruptions were applied at zero crossing.

6.10.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Ultra compact simulator	UCS 500-M	V0545100858	EM TEST	2015.07.04	<input type="checkbox"/>
Ultra compact simulator	UCS500M	0701-03	EM TEST	2015.06.03	<input checked="" type="checkbox"/>

6.10.3 Photographs of test setup

#1-AC/AC Adaptor



6.10.4 Measurement result

* 100 V, 50/60 Hz / 240 V, 50/60 Hz (#1- AC/AC Adaptor)

Test Level (%UT)	Dip/Int. (%UT)	Duration /Period	Phase (°)	Count number	Result
80 %	20%	250/300 Period ⁽¹⁾	0	3T	Complied
70 %	30 %	25/30 Period	0	3T	Complied
40 %	60 %	10/12 Period	0	3T	Complied
0%	100 %	250/300 Period ⁽²⁾	0	3T	Note*

Comment:

- There was no change of operation status during above testing.

(250/300 Period ⁽¹⁾, 25/30Period, 10/12 Period)

- Note* (250/300 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.

6.11 Mains supply voltage variations

Test specification	EN 50130-4:2011				
Supply voltage	$U_{nom} + 10 \%$, $U_{nom} - 15 \%$				
Testing Voltage	100 V, 50/60 Hz / 240 V, 50/60 Hz				
Test Date	2015. 02. 04				
Temperature (°C)	22.3 °C	Humidity (% R.H)	19.4 % R.H	Pressure (kPa)	102.6 kPa
Remarks	Complied - There was no change of operation status during above testing.				

6.11.1 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Ultra compact simulator	UCS 500-M	V0545100858	EM TEST	2015.07.04	<input type="checkbox"/>
Ultra compact simulator	UCS500M	0701-03	EM TEST	2015.06.03	<input checked="" type="checkbox"/>

6.11.2 Measurement result

* 100 V, 50/60 Hz (#1-AC/AC Adaptor)

Supply voltage		Result
+ 10 %	110 V	Complied
- 15 %	85 V	Complied

* 240 V, 50/60 Hz (#1-AC/AC Adaptor)

Supply voltage		Result
+ 10 %	264 V	Complied
- 15 %	204 V	Complied

Comment:

- There was no change of operation status during above testing.

(#1-AC/AC Adaptor)

7. E.U.T. photographs

Front View



Rear View



Left View



Right View



Top View



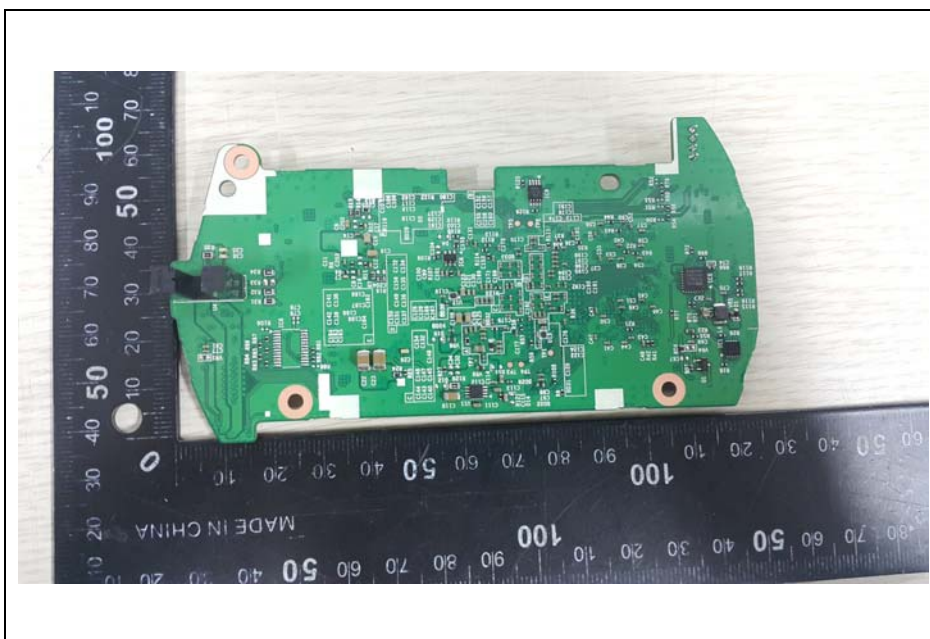
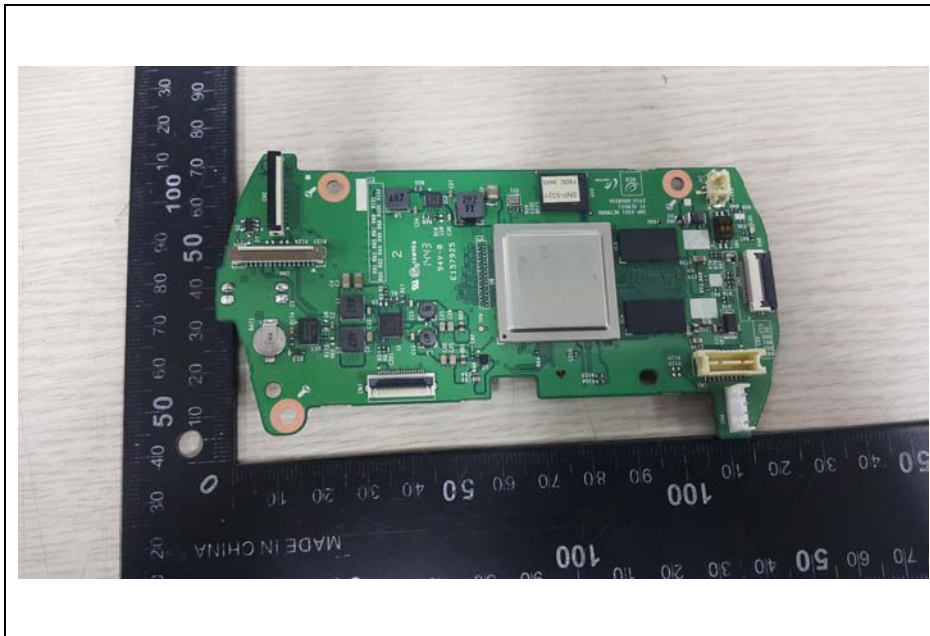
Bottom View



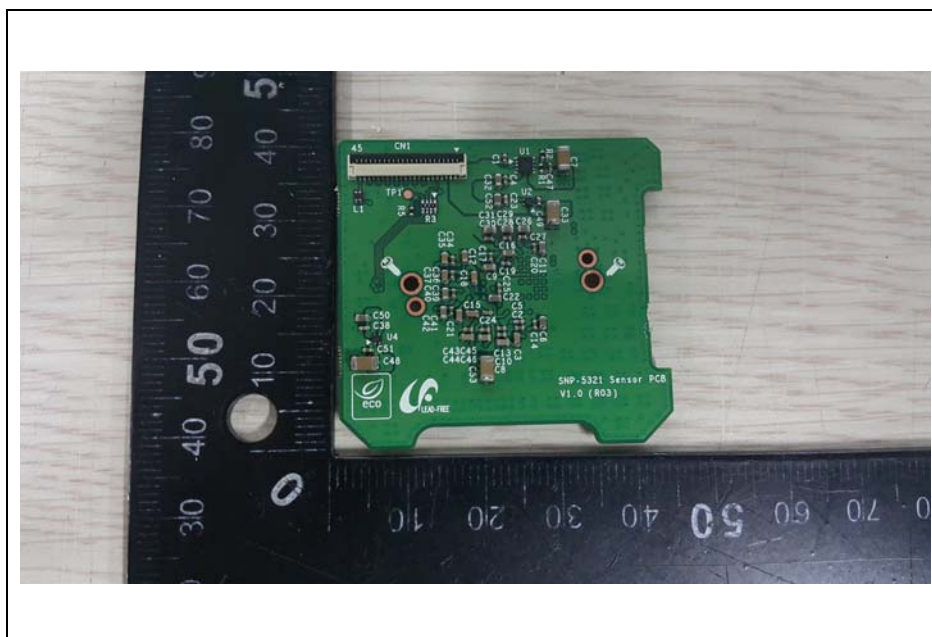
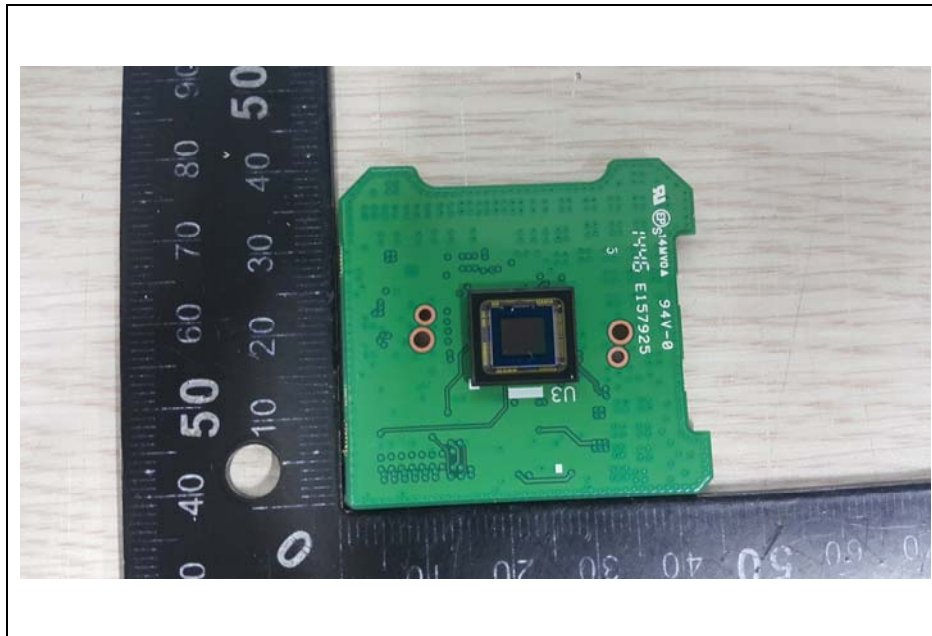
Inside



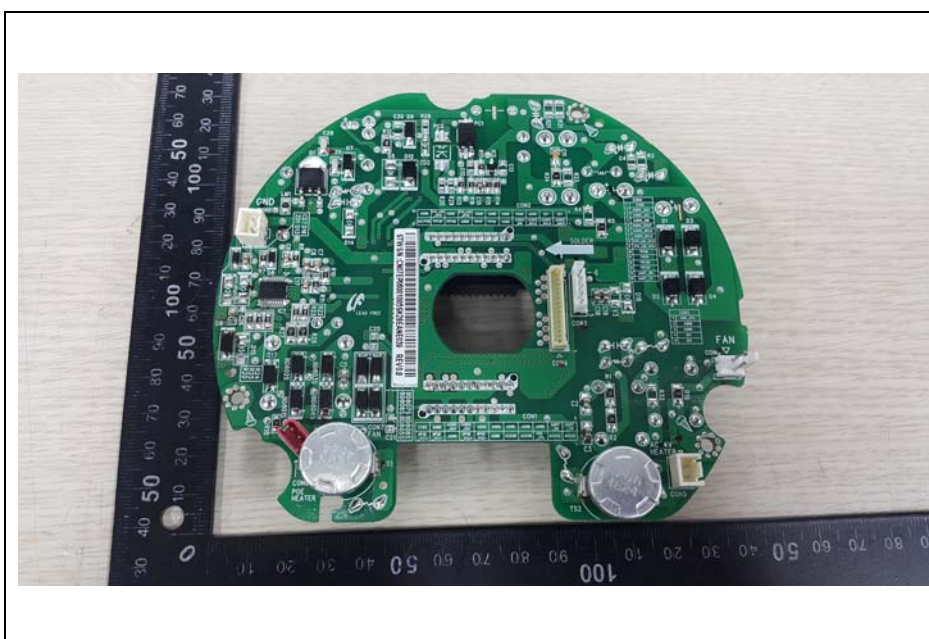
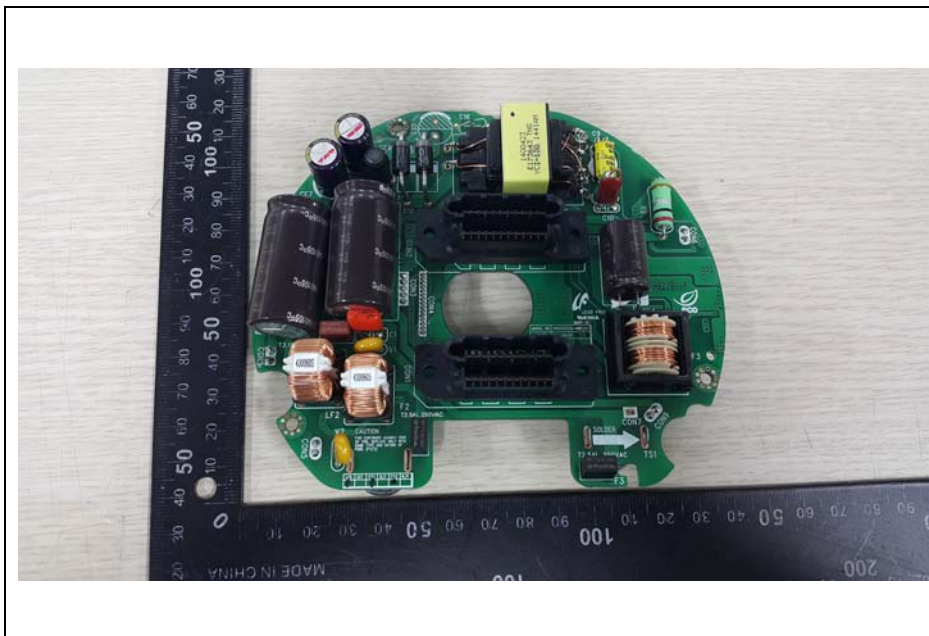
Main Board



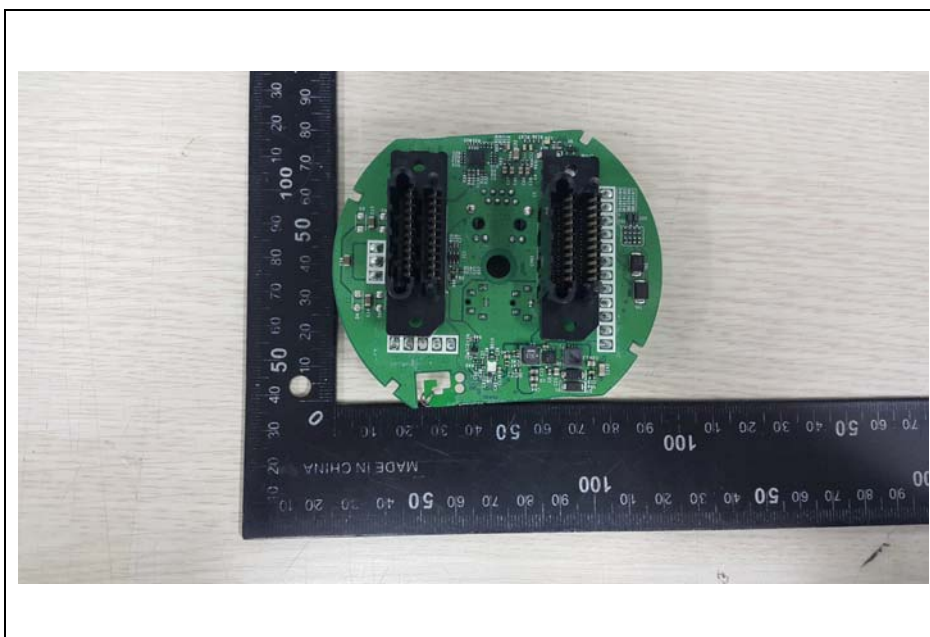
CCD Board



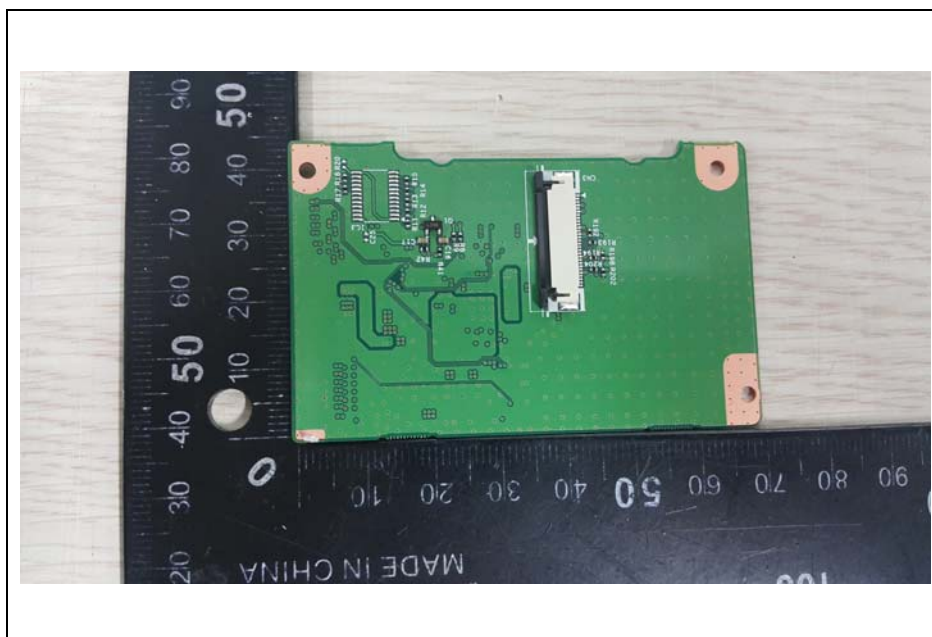
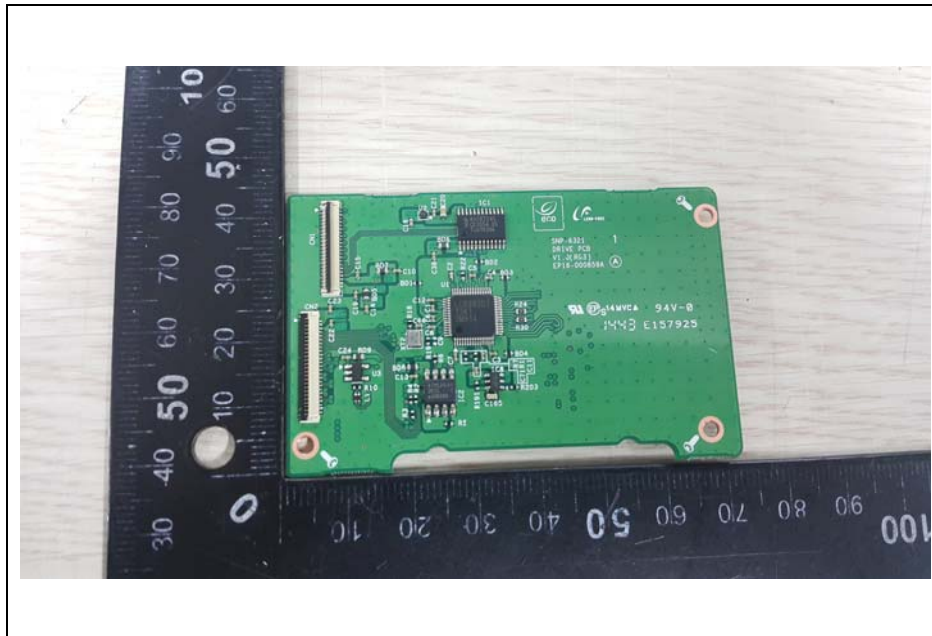
Power Board



SUB Board #1



SUB Board #2



AC/AC Adaptor

