

DECLARATION OF CONFORMITY

We; Samsung Techwin Co., Ltd.

DECLARE UNDER OUR SOLE RESPONSIBILITY THAT THE PRODUCT;

Report No: KES-E1-15T0135

Type of equipment: NETWORK CAMERA

Model Name: SNO-8081RP

Applicant: Samsung Techwin Co., Ltd.

Address: 84, Jeongdong-ro, Seongsan-gu, Changwon-si,
Gyeongsangnam-do, Korea

Manufacturer : TIANJIN SAMSUNG TECHWIN OPTO-ELECTRONIC
CO., LTD.

Address: No.11 Weiliu Rd, Micro-Electronic Industrial
Park, TEDA, Tianjin, 300385, People's Republic
of China

Test standards : AS/NZS CISPR22:2009+A1:2010

Classification: C-Tick

The above equipment was tested by EMC compliance Testing Laboratory for with the requirements of C-tick Rules and Regulations. The results of testing in this report apply to the product / system which was tested only.

APR. 28. 2015
(Date of issue)

(Name and signature of authorized person)



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AS/NZS EMI Test Report

Test Report No. : KES-E1-15T0135
Date of Issue : 04. 28. 2015
Description of Product : NETWORK CAMERA
Model No. : SNO-8081RP
Variant Model : -
Applicant : Samsung Techwin Co., Ltd.
Address : 84, Jeongdong-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Korea
Manufacturer : TIANJIN SAMSUNG TECHWIN OPTO-ELECTRONIC CO., LTD.
Address : No.11 Weiliu Rd, Micro-Electronic Industrial Park, TEDA, Tianjin, 300385, People's Republic of China
Applicable Regulation : AS/NZS CISPR22:2009 + A1:2010

Date of Receipt : 04. 02. 2015
Test Date : 04. 15. 2015 - 04. 17. 2015

Tested by:

Hyo Jin, Kim
Test Engineer

Reviewed by:

Dong Hun, Jang
Technical Manager



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Revision history

Revision	Date of issue	Test report No.	Description
-	04. 28. 2015	KES-E1-15T0135	Initial

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1. General Information

1.1 Introduction

The EMI Test Report for CE Declaration of Conformity is prepared on behalf of named applicant in accordance with the EMC Directive(2004/108/EC) of the European Economic Community. The test results reported in this document relate only to the item that was tested.

All radiated emission, conducted emission measurements required by the EMC Directive were performed manually at KES Co., Ltd. (here in after called KES), 473-29, Gayeo-ro, Yeoju-si, Gyeonggi-do, Korea

The radiated emission measurements performed on 10 meter, Open Area Test Site, test range maintained by KES. Complete ANSI63.4;2009 description and site attenuation measurement data records are maintained at the test facility and have been placed on file with the Federal Communications Commission.

The KES EMC test facilities in and Yeoju-si are designated testing laboratory according to ISO/IEC 17025 by Radio Research Agency(RRA), Korea Communication Commission.



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1.2 Product Description for Equipment Under Test (EUT)

Samsung Techwin Co., Ltd., NETWORK CAMERA, Model No: SNO-8081RP or the "E.U.T". as referred to in this report is base model.

Main Specifications of EUT are:

Video	
Imaging Device	1/1.8"6MCMOS
Total Pixels	3096(H) x 2094(V)
Effective Pixels	2616(H)x1976(V)
Scanning System	Progressive Scan
Min. Illumination	5MMode Color:0.3Lux(1/30sec,F1.3,50IRE),0.005Lux(2sec,F1.3,50IRE) Color:0.12Lux(1/30sec,F1.3,30IRE),0.002Lux(2sec,F1.3,30IRE) 2MMode Color:0.30Lux(1/30sec,F1.3,50IRE),0.005Lux(2sec,F1.3,50IRE) Color:0.12Lux(1/30sec,F1.3,30IRE),0.002Lux(2sec,F1.3,30IRE) 0Lux(IRLEDOn)
S / N Ratio	50dB
Video Out	CVBS:1.0Vp-p/75Ωcomposite,704x480(N),704x576(P),forinstallation -DIPconnectortype
Lens	
Focal Length (Zoom Ratio)	3.93~9.4mm (2.4x) Motorized Varifocal
Max. Aperture Ratio	F1.3
Angular Field of View	H:93.4°(Wide)~39.2°(Tele) / V : 68.1°(Wide)~29.3°(Tele)
Min. Object Distance	0.5m(1.64ft)
Focus Control	SimpleFocus(MotorizedV/F)/Manual - Remote control via network (Manual, Simple Focus)
Lens Type	DC Auto Iris, support P-Iris mode
Mount Type	Board-in type
LDC(Lens Distortion Correction)	Off/On (Level Adjustment : 1 ~ 5)
Pan / Tilt / Rotate	
Pan Range	-
Pan Speed	-
Tilt Range	-
Tilt Speed	-
Rotate Range	-
Sequence	-
Preset Accuracy	-
Azimuth	-
Auto Tracking	-
Operational	
IR LED	2 ea
Viewable Length	30m, SmartIR
Camera Title	Off / On (Displayed up to 15 characters)
Day & Night	Auto (ICR) / Color / B/W / External / Schedule
Backlight Compensation	Off/BLC/WDR
Wide Dynamic Range	120dB
Contrast Enhancement	SSDR(SamsungSuperDynamicRange) (Off / On)
Digital Noise Reduction	SSNR (2D+3D Noise Filter) (Off / On)
Digital Image Stabilization	미지원
Defog	미지원
Motion Detection	Off / On(4ea, Rectangle)
Privacy Masking	Off/On(6ea,Rectangle) - Color : Gray, Green, Red, Blue, Black, White
Gain Control	Off / Low / Medium / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor (included Mercury & Sodium)
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2 ~ 1/12,000sec)
Digital Zoom	미지원

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Rotate Image	Flip:On/Off Mirror: On/Off Hallway:90°/270°
Intelligent Video Analytics	Tampering,AudioDetection - with Metadata
Alarm I/O	Input1ea/Output1ea
Remote Control Interface	미지원
RS-485 Protocol	미지원
Alarm Triggers	AlarmInput,MotionDetection,Tampering,AudioDetection, NetworkDisconnect
Alarm events	•FileuploadviaFTP,E-Mail •NotificationviaE-Mail •localstorage(SD/SDHC)recordingatNetwork disconnected •Externaloutput
Audio In	Selectable(MicIN/LineIN), Supplyvoltage:2.5VDC(4mA),Inputimpedance:approx.2KOhm
Audio out	Lineout(3.5mmstereominijack), Max output level: 1 Vrms
Network	
Ethernet	RJ-45(10/100BASE-T)
Video Compression Format	H.265:Main H.264(MPEG-4Part10/AVC):Main/Baseline MotionJPEG
Resolution	5MMode 2592x1944/1920x1080/1600x1200/1280x1024/1280x960/1280x720/1024x768/800x600/720x576/720x480/640x480/320x240 2MMode 1920x1080/1280x1024/1280x960/1280x720/1024x768/800x600/720x576/720x480/640x480/320x240 ※ Mode변경시재부팅사양
Max. Framerate	5MMode H.264/H.265:30fpsinallresolutions MJPEG:morethan800x600 : 1 fps, equal or less than 800x600 : 15fps 2MMode H.264/H.265:60fpsinallresolutions MJPEG:morethan800x600 : 1 fps, equal or less than 800x600 : 15fps
Smart Codec	Manual Mode (area-based : 4EA)
Video Quality Adjustment	H.264/H.265:CompressionLevel,TargetBitrateLevelControl MJPEG:QualityLevelControl
Bitrate Control Method	H.264/H.265:CBRorVBR, MotionJPEG:VBR
Streaming Capability	MultipleStreaming(Upto3Profiles) - Total 3 Stream at the same time (including Recording Stream) * H.264 & H.265프로파일동시전송
Audio Compression Format	G.711u-law/G.726Selectable G.726(ADPCM)8KHz,G.7118KHz G.726:16Kbps,24Kbps,32Kbps,40Kbps
Audio Communication	Bi-directional (2-Way)
IP	IPv4, IPv6
Protocol	TCP/IP,UDP/IP,RTP(UDP),RTP(TCP),RTCP,RTSP,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)LoginAuthentication DigestLoginAuthentication IPAddressFiltering UseraccessLog 802.1XAuthentication(EAP-TLS,EAP-LEAP)
Streaming Method	Unicast / Multicast
Max. User Access	10 users at Unicast Mode
Edge Storage	SD/SDHC/SDXC(upto128G) -motionImagesrecordedintheSD/SDHC/SDXCmemorycardcanbedownloaded. -cameracandetectautomaticallywhenthememoryisconnected -memorystatusdisplay(normal/error/active/formatting/lock) NAS(NetworkAttachedStorage) LocalPCforInstantRecording
Application Programming Interface	ONVIFProfiles SUNAPI(HTTPAPI) SVNP SAMSUNGTECHWINOpenPlatform
Webpage Language	English,French,German,Spanish,Italian,Chinese, Russian,Japanese,Swedish,Denish,Portuguese,Turkish,Polish,Czech,Rumanian,Serbian,Dutch,Croatia,Hungary,Greek
Web Viewer	SupportedOS:WindowsXP/VISTA/7/8.1orHigher,MACOSX10.7orHigher SupportedBrowser:MicrosoftInternetExplorer(Ver.8~11)orHigher Mozilla Firefox (Ver. 9~19) or Higher , Google Chrome (Ver. 15~25) or Higher,

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	Apple Safari (Ver. 6.0.2(Mac OS X 10.8, 10.7 only), 5.1.7) * Mac OS X only
Central Management Software	SmartViewer, SSM
Pixel Counter	support
Image Logo	미지원
Web Viewer Help	support(영문only)
Environmental	
Operating Temperature / Humidity	-40°C ~ +55°C(+14°F ~ +131°F) / Less than 90% RH * Start up should be done at above -35°C
Storage Temperature / Humidity	-30°C ~ +60°C (-22°F ~ +140°F) / Less than 90% RH
Ingress Protection	IP66
Vandal Resistance	IK10
Electrical	
Input Voltage / Current	24V AC, 12V DC, PoE(IEEE802.3af class3)
Power Consumption	최대 10W/11.5W(12VDC, 히터미사용시/사용시) 최대 11.5W/12.95W(PoE, 히터미사용시/사용시) 최대 12W/13.5W(24VAC, 히터미사용시/사용시)
Mechanical	
Color / Material	DARK GRAY / ALUMINIUM
Dimension (WxHxD)	82.4*87*312.6(withbracket) 82.4*87*178(withoutbracket)
Weight	1500g

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1.3 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	SNO-8081RP	-	TIANJIN SAMSUNG TECHWIN OPTO-ELECTRONIC CO., LTD.	EUT

1.4 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
PoE Adapter	FSD-804PS(V3)	-	PLANET Technology Corp.	-
Notebook	LG15N54	410NZET022292	LG Electronics Inc.,	-
AC/DC Adapter	ADP-90WH B	84ZW19F1557	DELTA ELECTRONICS(JIANGSU) LTD.	-
ALARM ZIG	-	-	-	-
Headset	RHS-2000	-	ROYCHE	-

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1.5 External I/O Cabling

- AC, DC Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA	Audio In	Headset	Audio Out	1.8	Unshielded
	Audio Out	Headset	Audio In	1.8	Unshielded
	RJ-45	Notebook	RJ-45	3.0	Unshielded
	ALARM	ALARM ZIG	ALARM	3.0	Unshielded

- POE Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA	Audio In	Headset	Audio Out	1.8	Unshielded
	Audio Out	Headset	Audio In	1.8	Unshielded
	RJ-45	POE Adapter	RJ-45	3.0	Unshielded
	ALARM	ALARM ZIG	ALARM	3.0	Unshielded
POE Adapter	RJ-45	Notebook	RJ-45	1.0	Unshielded

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1.6 Special Accessories

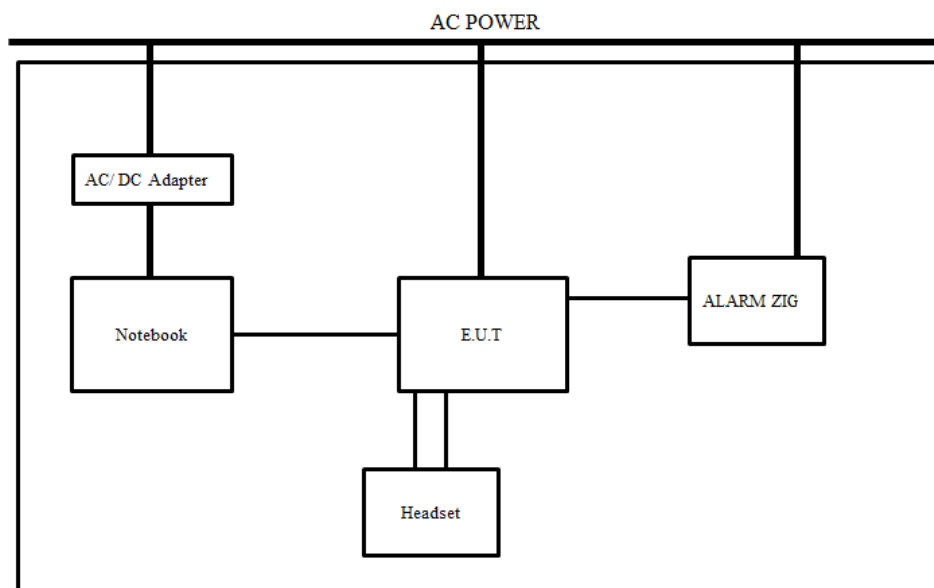
As shown in section 1.8, all interface cables used for compliance testing are shielded as normally supplied or by use respective component manufacturers.

1.7 EUT Modifications

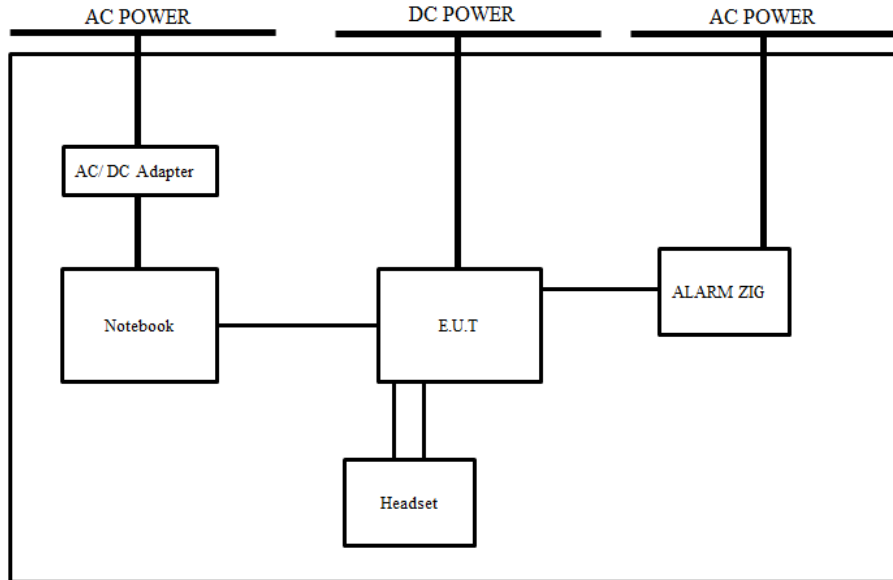
No modifications were made to the EUT in order to achieve and maintain compliance to the standards described in this report.

1.8 Configuration of Test System

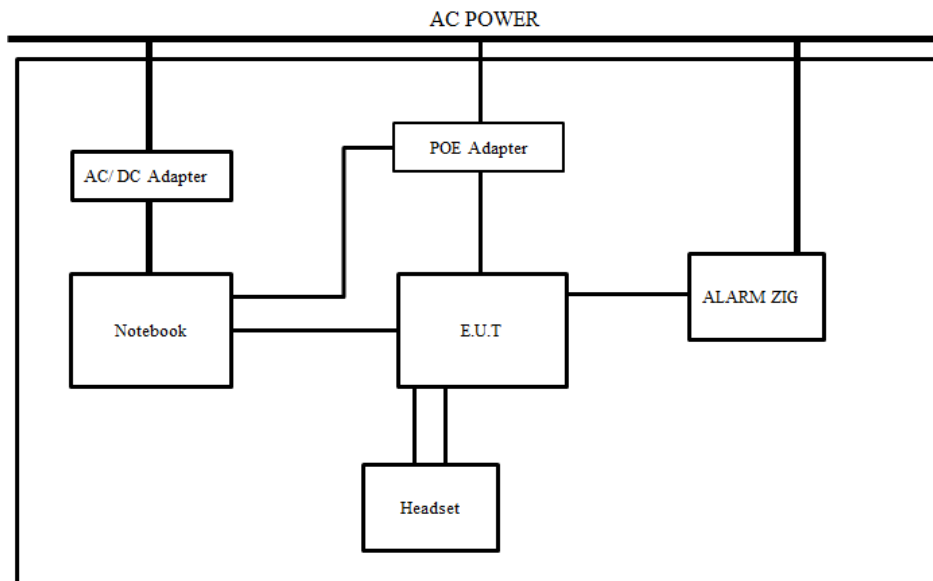
- AC Mode



- DC Mode



- POE Mode



1.9 Operating condition

※ Test Operating Mode

- Ping test
- web view monitoring
- Alarm test

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2. Test standards and results

Specifications	Description	Test Point	Remark
CISPR22, Class A	Conducted Emission	AC Input Port	C
CISPR22, Class A	Radiated Emission	Enclosure	C

Note : C=Complies N/C=Not Complies N/T=Not Tested N/A=Not Applicable

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3. Test Performed

3.1 Conducted Emission Measurements

3.1.1 Test Description

The power line conducted emission measurements were performed in a shielded enclosure. The EUT was placed on a wooden table, 80 centimeters height above the floor. Power was fed to the EUT through a 50 ohm/ 50 micro henry Line Impedance Stabilization Network (LISN). The ground plane that was electrically bonded to the shield room ground system and all power lines entering the shield room were filtered.

3.1.2 Test Equipments

Description	Manufacturer	Model Number	Serial Number	Cal. Due
EMI Receiver/Signal Analyzer	Narda S.T.S / PMM	PMM 9010F	020WW31006	04. 01. 2016
LISN	R&S	ENV216	101137	02. 10. 2016
LISN	EMCO	3810/2	2228	-
8-Wire ISN CAT3	Schwarzbeck Mess	CAT3 8158	8158-0019	04. 02. 2016
8-Wire ISN CAT5	Schwarzbeck Mess	NTFM 8158	8158-0030	04. 02. 2016
8-Wire ISN CAT6	Schwarzbeck Mess	NTFM 8158	8158-0029	08. 15. 2015
Electro wave Shieldroom	SEMITEC	-	-	-

3.1.3 Test Environments

Ambient Temperatures : see the data
Relative Humidity : see the data

3.1.4 Test Limits

Frequency (MHz)	CISPR Publication 22			
	Class B		Class A	
	QP	AV	QP	AV
0.15 to 0.50	66 to 56	56 to 46	79	66
0.50 to 5.00	56	46	73	60
5.00 to 30.00	60	50	73	60

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- Telecommunication

Frequency (MHz)	CISPR 22(Voltage)			
	Class B (dB μ V)		Class A (dB μ V)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 to 0.50	84.0 to 74.0	74.0 to 64.0	97.0 to 87.0	84.0 to 74.0
0.50 to 30.00	74.0	64.0	87.0	74.0

Frequency (MHz)	CISPR 22(Current)			
	Class B (dB μ A)		Class A (dB μ A)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 to 0.50	40.0 to 30.0	30.0 to 20.0	53.0 to 43.0	40.0 to 30.0
0.50 to 30.00	30.0	20.0	43.0	30.0

3.1.5 Test Procedure

The conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable). The analyzer's 6 dB bandwidth was set to 9 kHz. The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. If the conducted emission exceed the average limit with the instrument set to the quasi-peak mode, the measurements are made in the average mode. The emission spectrum was scanned from 150 kHz to 30 MHz. The highest emission amplitudes relative to the appropriate limits were measured and have been recorded. Quasi-peak readings are distinguished with a "QP".

The conducted emission test was performed with the EUT exercise program loaded, and the emissions were scanned between 150 kHz to 30 MHz on the HOT side and NEUTRAL side, herein referred to as H and N, respectively.

3.1.6 Test Results

According to the data in section 2.1.7, the EUT complied with the CISPR22 standards.



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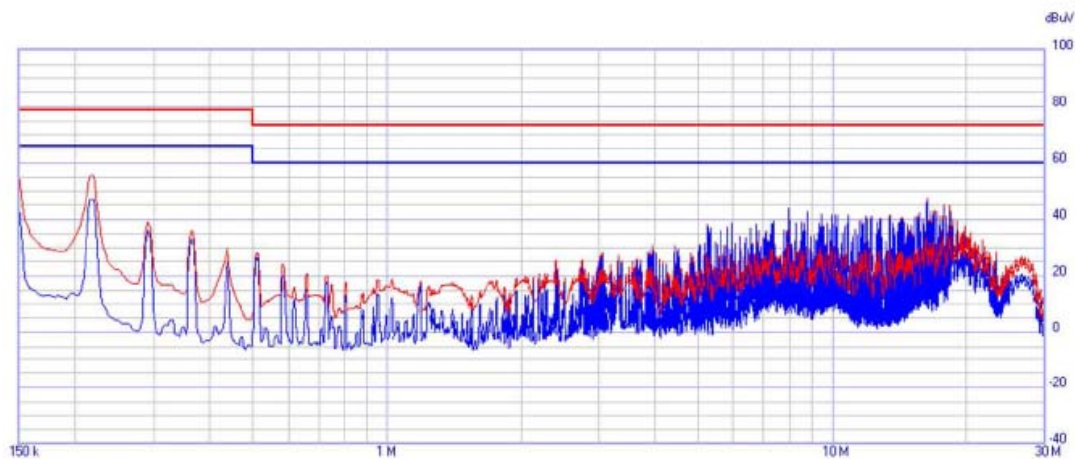
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3.1.7 Test Data

- AC Mode

Temperature: 18.1 °C Humidity: 42.5 % R.H. Test Date: 04. 15. 2015 Tested by: Hyo Jin, Kim

Polarization: HOT



	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	P Q C 022ap-a 022av-a	1500 ms	9 kHz	0	ON	ON	...	...

Ancillary - General

Limits:
022ap-a
022av-a

Factors:

1LISN_L1(150210)
CABLELOSS(141122)

QPeak:

C-Avg:

Frequency [MHz]	Q-Peak [dBμV]	Limit [dBμV]	Margin [dB]	C-Avg [dBμV]	Limit [dBμV]	Margin [dB]	Factor (LISN) [dB]	Factor (Cable Loss) [dB]
0.150	56.100	79.000	-22.900	45.400	66.000	-20.600	9.650	0.020
0.154	40.090	79.000	-38.910	18.720	66.000	-47.280	9.650	0.020
0.217	55.660	79.000	-23.340	47.390	66.000	-18.610	9.650	0.030
0.291	39.110	79.000	-39.890	35.870	66.000	-30.130	9.650	0.030
7.958	43.850	73.000	-29.150	43.450	60.000	-16.550	9.710	0.260
16.269	47.700	73.000	-25.300	46.890	60.000	-13.110	9.900	0.270
17.708	45.360	73.000	-27.640	43.880	60.000	-16.120	9.940	0.240
18.281	44.630	73.000	-28.370	42.600	60.000	-17.400	9.950	0.230

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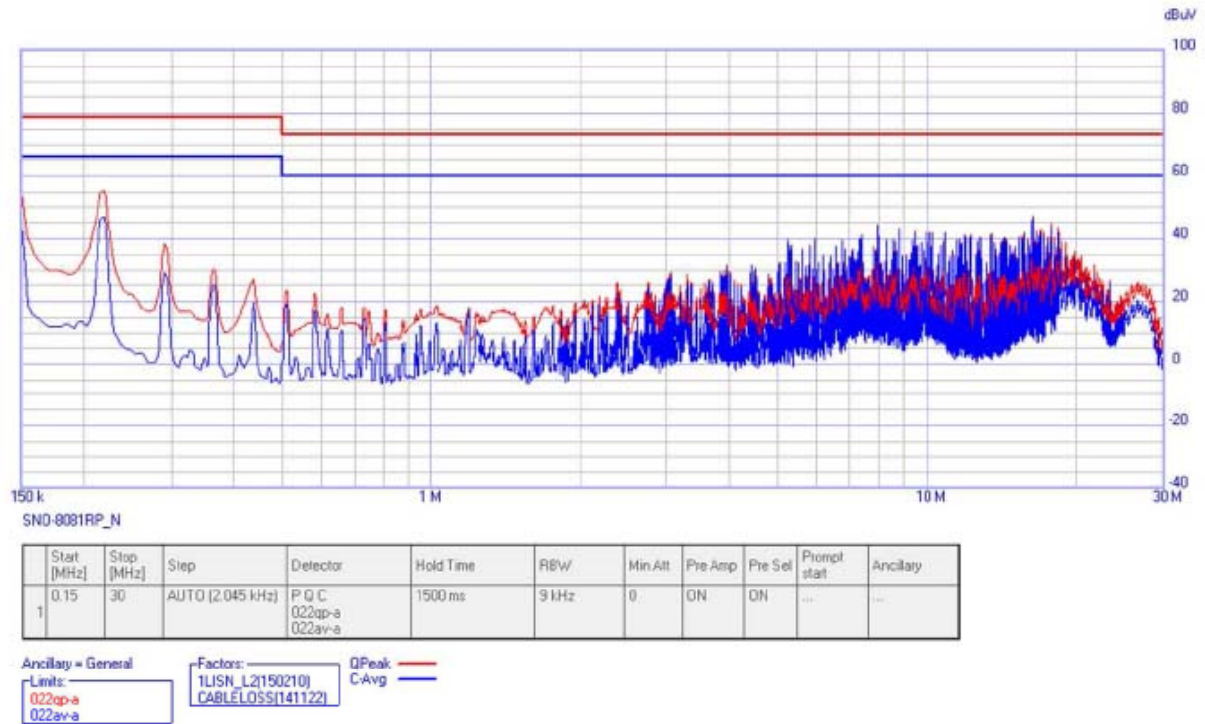


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Polarization: NEUTRAL



Frequency [MHz]	Q-Peak [dBμV]	Limit [dBμV]	Margin [dB]	C-Avg [dBμV]	Limit [dBμV]	Margin [dB]	Factor (LISN) [dB]	Factor (Cable Loss) [dB]
0.150	55.020	79.000	-23.980	45.280	66.000	-20.720	9.650	0.020
0.154	40.190	79.000	-38.810	18.490	66.000	-47.510	9.650	0.020
0.217	55.350	79.000	-23.650	46.930	66.000	-19.070	9.650	0.030
0.291	38.230	79.000	-40.770	29.170	66.000	-36.830	9.650	0.030
7.958	44.590	73.000	-28.410	44.250	60.000	-15.750	9.710	0.260
16.269	47.370	73.000	-25.630	46.600	60.000	-13.400	9.900	0.270
17.708	44.910	73.000	-28.090	43.270	60.000	-16.730	9.940	0.240
18.281	43.800	73.000	-29.200	41.900	60.000	-18.100	9.950	0.230

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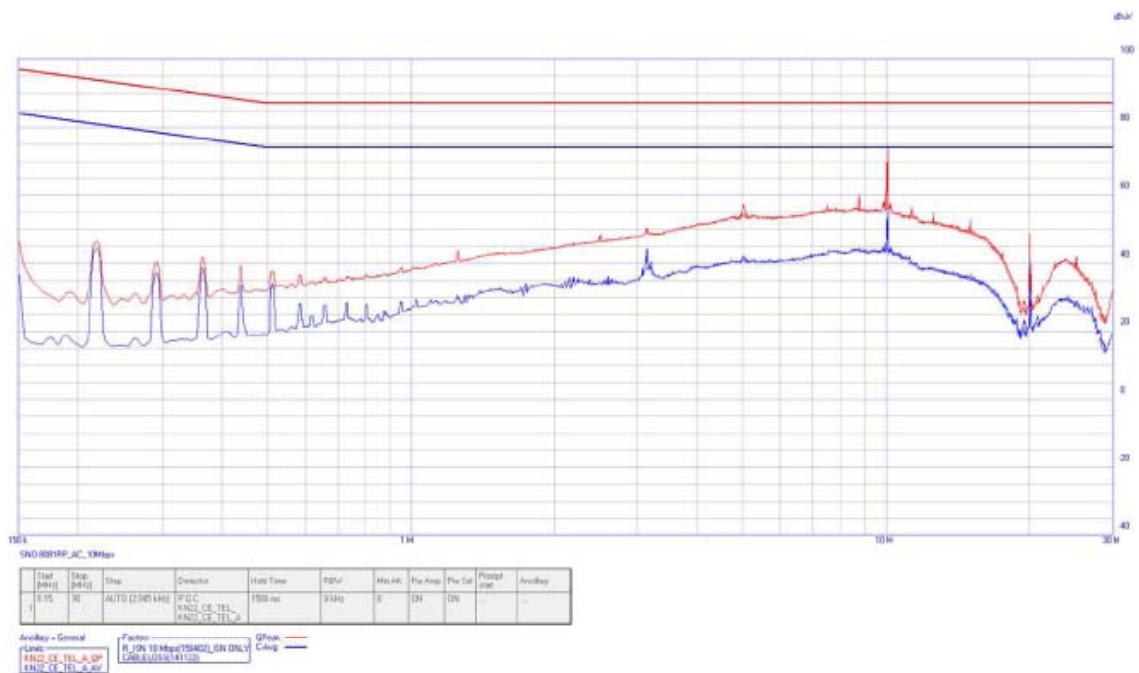
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- Telecommunication

- AC Mode

Temperature: 18.1 °C Humidity: 42.5 % R.H. Test Date: 04. 15. 2015 Tested by: Hyo Jin, Kim

[10 Mbps]

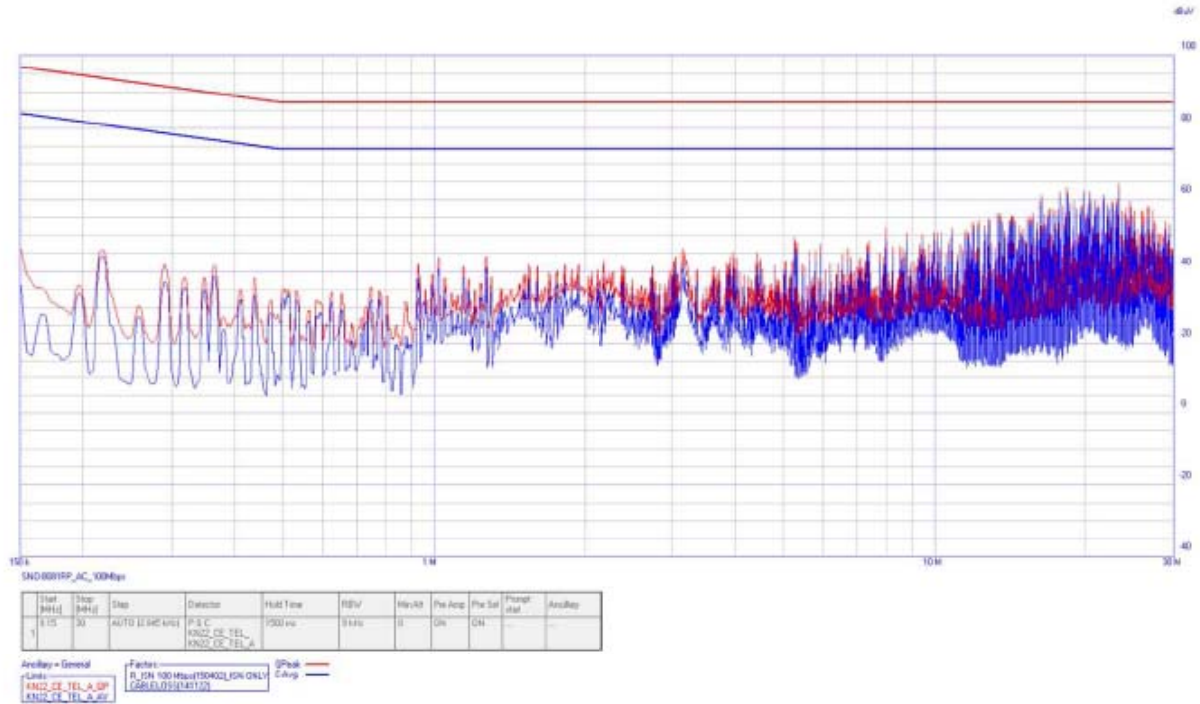


Frequency [MHz]	Q-Peak [dBμV]	Limit [dBμV]	Margin [dB]	C-Avg [dBμV]	Limit [dBμV]	Margin [dB]	Factor (ISN) [dB]	Factor (Cable Loss) [dB]
0.150	47.020	97.000	-49.980	47.020	84.000	-36.980	10.290	0.020
0.217	46.320	93.910	-47.590	46.320	80.910	-34.590	10.210	0.030
0.365	41.910	89.620	-47.710	41.910	76.620	-34.710	10.100	0.030
4.420	52.530	87.000	-34.470	52.530	74.000	-21.470	9.830	0.160
5.019	57.290	87.000	-29.710	57.290	74.000	-16.710	9.830	0.180
8.753	60.000	87.000	-27.000	60.000	74.000	-14.000	9.830	0.280
10.046	74.580	87.000	-12.420	74.580	74.000	0.580	9.830	0.280

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[100 Mbps]



Frequency [MHz]	Q-Peak [dBμV]	Limit [dBμV]	Margin [dB]	C-Avg [dBμV]	Limit [dBμV]	Margin [dB]	Factor (ISN) [dB]	Factor (Cable Loss) [dB]
0.217	45.900	93.910	-48.010	45.900	80.910	-35.010	9.710	0.030
0.289	41.800	91.550	-49.750	41.800	78.550	-36.750	9.650	0.030
0.365	41.680	89.620	-47.940	41.680	76.620	-34.940	9.610	0.030
17.708	62.110	87.000	-24.890	62.110	74.000	-11.890	9.340	0.240
18.281	63.250	87.000	-23.750	63.250	74.000	-10.750	9.340	0.230
19.792	62.350	87.000	-24.650	62.350	74.000	-11.650	9.340	0.210
23.203	64.350	87.000	-22.650	64.350	74.000	-9.650	9.350	0.240



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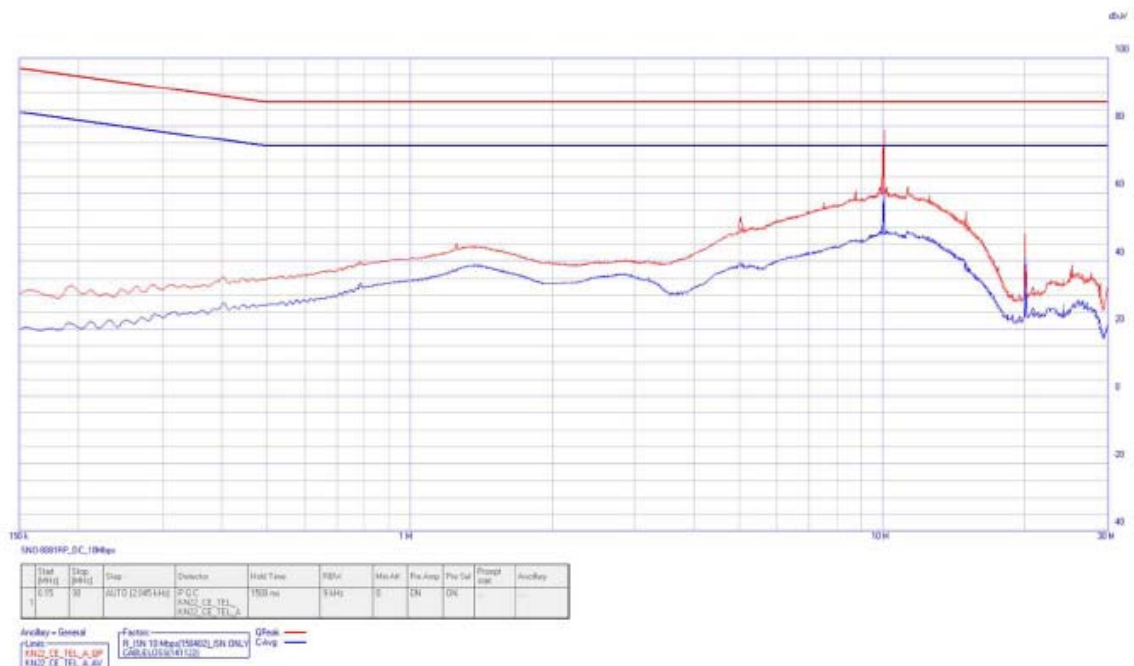
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- DC Mode

Temperature: 18.1 °C Humidity: 42.5 % R.H. Test Date: 04. 15. 2015 Tested by: Hyo Jin, Kim

[10 Mbps]



Frequency [MHz]	Q-Peak [dBμV]	Limit [dBμV]	Margin [dB]	C-Avg [dBμV]	Limit [dBμV]	Margin [dB]	Factor (ISN) [dB]	Factor (Cable Loss) [dB]
5.019	53.010	87.000	-33.990	53.010	74.000	-20.990	9.830	0.180
7.508	57.500	87.000	-29.500	57.500	74.000	-16.500	9.830	0.250
9.888	61.700	87.000	-25.300	61.700	74.000	-12.300	9.830	0.280
10.046	78.840	87.000	-8.160	78.840	74.000	4.840	9.830	0.280

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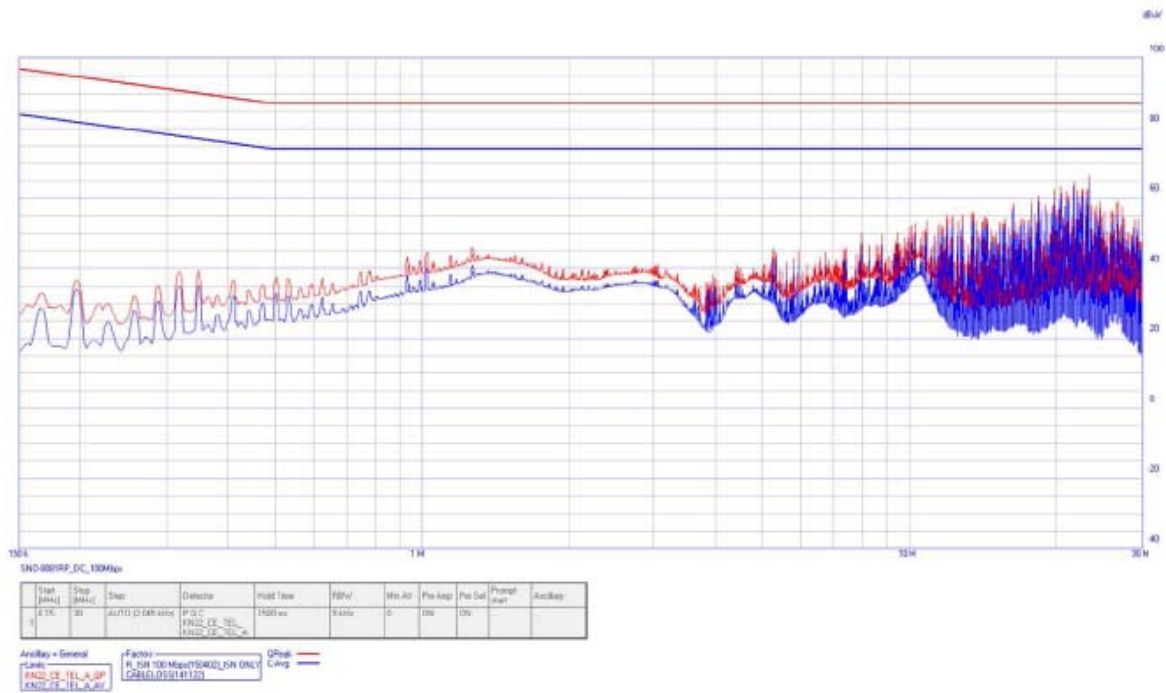


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[100 Mbps]



Frequency [MHz]	Q-Peak [dBμV]	Limit [dBμV]	Margin [dB]	C-Avg [dBμV]	Limit [dBμV]	Margin [dB]	Factor (ISN) [dB]	Factor (Cable Loss) [dB]
0.500	37.110	87.010	-49.900	37.110	74.010	-36.900	9.550	0.030
20.324	63.290	87.000	-23.710	63.290	74.000	-10.710	9.340	0.200
21.774	64.800	87.000	-22.200	64.800	74.000	-9.200	9.340	0.210
22.477	62.710	87.000	-24.290	62.710	74.000	-11.290	9.340	0.210
23.203	66.480	87.000	-20.520	66.480	74.000	-7.520	9.350	0.240

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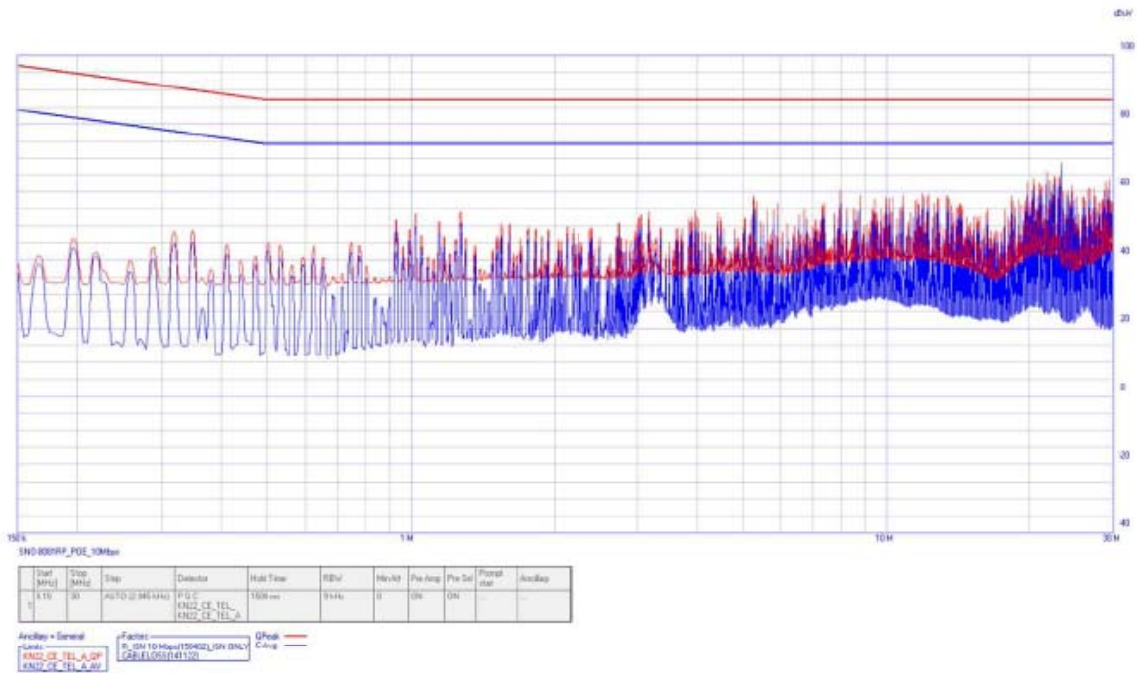
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- POE Mode

Temperature: 18.1 °C Humidity: 42.5 % R.H. Test Date: 04. 15. 2015 Tested by: Hyo Jin, Kim
[10 Mbps]

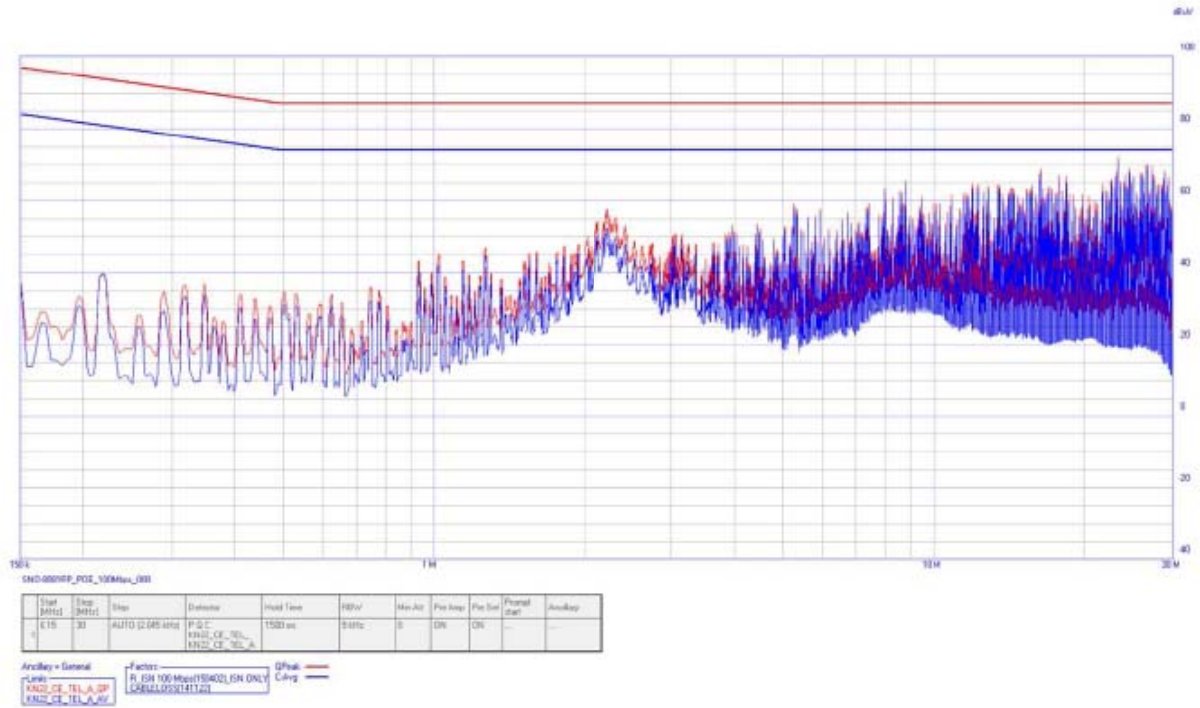


Frequency [MHz]	Q-Peak [dBμV]	Limit [dBμV]	Margin [dB]	C-Avg [dBμV]	Limit [dBμV]	Margin [dB]	Factor (ISN) [dB]	Factor (Cable Loss) [dB]
0.197	46.220	94.730	-48.510	46.220	81.730	-35.510	10.220	0.030
0.318	48.240	90.770	-42.530	48.240	77.770	-29.530	10.130	0.030
0.350	48.500	89.950	-41.450	48.500	76.950	-28.450	10.110	0.030
0.500	44.640	87.010	-42.370	44.640	74.010	-29.370	10.050	0.030
20.324	63.970	87.000	-23.030	63.970	74.000	-10.030	9.870	0.200
21.774	65.960	87.000	-21.040	65.960	74.000	-8.040	9.880	0.210
22.477	64.530	87.000	-22.470	64.530	74.000	-9.470	9.880	0.210
23.203	68.510	87.000	-18.490	68.510	74.000	-5.490	9.880	0.240

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[100 Mbps]



Frequency [MHz]	Q-Peak [dBμV]	Limit [dBμV]	Margin [dB]	C-Avg [dBμV]	Limit [dBμV]	Margin [dB]	Factor (ISN) [dB]	Factor (Cable Loss) [dB]
23.203	72.170	87.000	-14.830	72.170	74.000	-1.830	9.880	0.240
24.465	68.990	87.000	-18.010	68.990	74.000	-5.010	9.890	0.330
26.629	70.030	87.000	-16.970	70.030	74.000	-3.970	9.890	0.370
27.199	69.440	87.000	-17.560	69.440	74.000	-4.560	9.890	0.380

3.2 Radiated Emission Measurements

3.2.1 Test Description

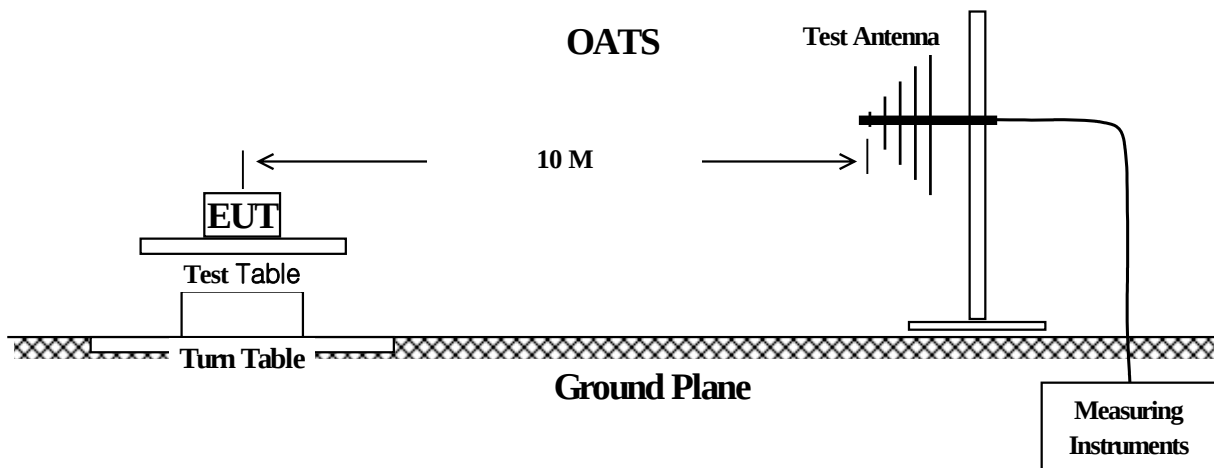
The radiated emissions measurements were performed on the ten-meter, open-field test site. The EUT was placed on a nonconductive turntable approximately 0.8 meters above the ground plane.

The frequency spectrum from 30 MHz to 1 000 MHz and 1 000 MHz to 6 000 MHz was scanned and maximum emission levels at each frequency recorded.

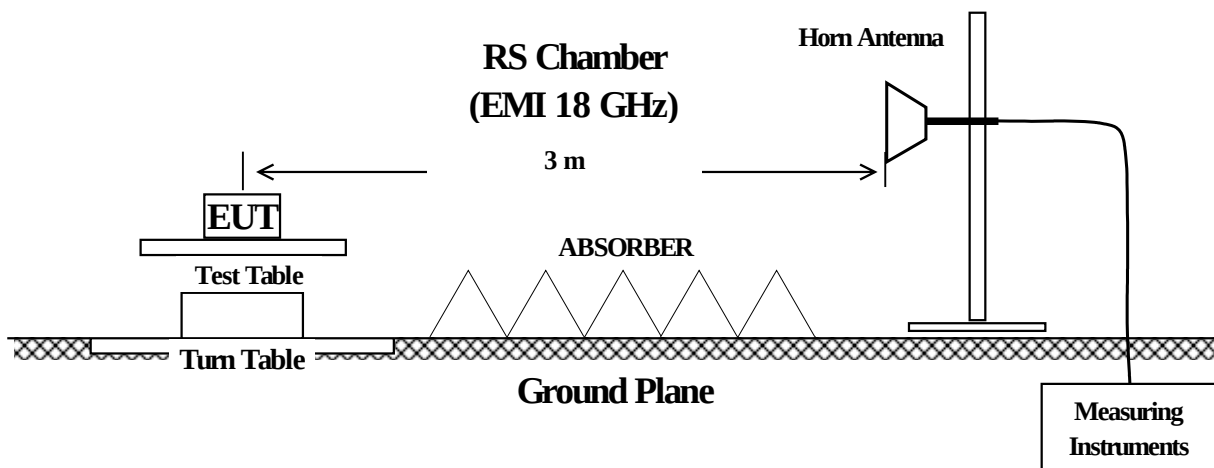
The system was rotated 360°, and the antenna was varied in the height between 1.0 and 4.0 meters in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

- above 1 GHz : Antenna height is fixed to 1.0 m

* Below 1 GHz



* Above 1 GHz



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3.2.2 Test Equipments

Description	Manufacturer	Model Number	Serial Number	Cal. Due
EMI TEST Receiver	R & S	ESVS10	826008/014	04. 01. 2016
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-385	05. 09. 2015
OATS	KES	-	-	-
Antenna Mast	DAEIL EMC	-	-	-
Turn Table	DAEIL EMC	-	-	-
EMI TEST Receiver	R & S	ESR7	101190	08. 13. 2015
PREAMPLIFIER	8449B	H.P	3008A00538	07. 23. 2015
Double Ridged Horn Antenna	A-H-SYSTEM,INC	SAS-571	414	02. 09. 2017
RS Chamber (EMI 18GHz)	SEMITEC	-	-	-
Antenna Mast	AUDIX	-	-	-
Turn Table	AUDIX	-	-	-

3.2.3 Test Environments

Temperatures : see the data
Humidity : see the data

3.2.4 Test Limits*** Below 1 GHz**

Frequency (MHz)	CISPR Publication 22	
	Class B	Class A
	Quasi-peak dB(uV/m)	Quasi-peak dB(uV/m)
0,15 to 30	Under consideration	Under consideration
30 to 230	30	40
230 to 1 000	37	47

*** Above 1 GHz**

Frequency (MHz)	CISPR Publication 22			
	Class B @ 3 m (dB μ V/m)		Class A @ 3 m (dB μ V/m)	
	PK	AV	PK	AV
1 000 to 3 000	70	50	76	56
3 000 to 6 000	74	54	80	60

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3.2.5 Test Procedure

Before final measurements of radiated emission were made on the OATS, the EUT was scanned in semi-anechoic chamber in order to determine its emission spectrum signature. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emission in amplitude, direction and frequency. This process was repeated during final radiated emission measurements on the OATS range, at each frequency, in order to ensure that maximum emissions amplitudes were attained.

The radiated emission test was performed with EUT exercise program loaded, and the emissions were scanned between 30 MHz to 1 000 MHz and 1 000 MHz to 6 000 MHz using the spectrum analyzer. The spectrum analyzer's 6 dB bandwidth was set to 120 kHz(1 MHz), and the analyzer was operated in the CISPR quasi-peak (Peak) detection mode.

Measurements were taken using both HORIZONTAL and VERTICAL antenna polarization, herein referred to as H and V, respectively.

Field Strength Calculation

The Field Strength (FS) is calculated by adding the Antenna Factor (AF) and Cable Factor (CF) and Amplifier Gain(AG) from the Measured Reading (MR). The basic equation with a sample calculation is as follows:

$$* \text{ Below 1 GHz : FS(dB}\mu\text{V/m)} = \text{MR(dB}\mu\text{V)} + [\text{AF(dB/m)} + \text{CF(dB)}]$$

$$* \text{ Above 1 GHz : FS(dB}\mu\text{V/m)} = \text{MR(dB}\mu\text{V)} + [\text{AF(dB/m)} + \text{CF(dB)}] - \text{AG}$$



3.2.6 Test Results

According to the data in section 3.2.7, the EUT complied with the CISPR22 standards.

3.2.7 Test Data

* Below 1 GHz

- AC Mode

Temperature: 11.0 °C Humidity: 64.0 % R.H. Test Date: 04. 16. 2015 Tested by: Hyo Jin, Kim

Frequency (MHz)	Amplitude (dB μ V/m)	Antenna		Correction Factor		Corrected Amplitude (dB μ V/m)	Applicable Limit (dB μ V/m)	Margin (dB)
		Polar. (H/V)	Height (m)	Ant. (dB)	Cable (dB)			
51.327	17.500	V	1.000	13.570	1.640	32.710	40.000	7.290
61.043	16.800	V	1.000	12.970	1.820	31.590	40.000	8.410
74.621	14.000	V	1.000	10.470	2.030	26.500	40.000	13.500
189.080	12.700	H	3.050	10.880	3.320	26.900	40.000	13.100
243.407	15.200	H	2.880	11.500	3.810	30.510	47.000	16.490
297.723	17.300	H	2.510	13.320	4.360	34.980	47.000	12.020

- DC Mode

Temperature: 11.0 °C Humidity: 64.0 % R.H. Test Date: 04. 16. 2015 Tested by: Hyo Jin, Kim

Frequency (MHz)	Amplitude (dB μ V/m)	Antenna		Correction Factor		Corrected Amplitude (dB μ V/m)	Applicable Limit (dB μ V/m)	Margin (dB)
		Polar. (H/V)	Height (m)	Ant. (dB)	Cable (dB)			
52.310	14.300	V	1.000	13.520	1.660	29.480	40.000	10.520
74.622	14.700	V	1.000	10.470	2.030	27.200	40.000	12.800
189.082	12.800	H	3.100	10.880	3.320	27.000	40.000	13.000
270.562	14.100	H	2.650	12.430	4.080	30.610	47.000	16.390
297.727	14.400	H	2.370	13.320	4.360	32.080	47.000	14.920
513.067	12.600	V	2.050	17.990	5.990	36.580	47.000	10.420

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- POE Mode

Temperature: 11.0 °C Humidity: 64.0 % R.H. Test Date: 04. 16. 2015 Tested by: Hyo Jin, Kim

Frequency (MHz)	Amplitude (dB μ V/m)	Antenna		Correction Factor		Corrected Amplitude (dB μ V/m)	Applicable Limit (dB μ V/m)	Margin (dB)
		Polar. (H/V)	Height (m)	Ant. (dB)	Cable (dB)			
51.343	19.700	V	1.000	13.570	1.640	34.910	40.000	5.090
189.081	11.800	H	4.000	10.880	3.320	26.000	40.000	14.000
243.401	12.900	H	3.210	11.500	3.810	28.210	47.000	18.790
270.560	14.100	H	3.030	12.430	4.080	30.610	47.000	16.390
297.725	17.500	H	2.870	13.320	4.360	35.180	47.000	11.820
513.063	12.900	V	2.530	17.990	5.990	36.880	47.000	10.120

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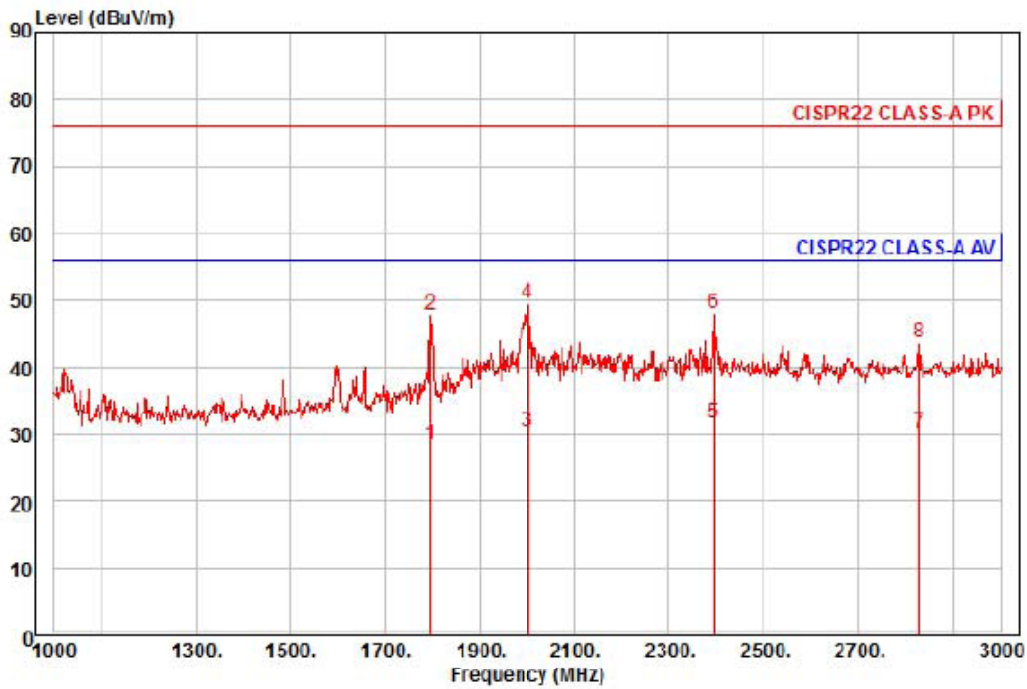
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* Above 1 GHz

- AC Mode

Temperature: 19.7 °C Humidity: 40.3 % R.H. Test Date: 04.17. 2015 Tested by: Hyo Jin, Kim



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN-414(15.02.09) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NETWORK CAMERA
Model : SNO-8081RP
Mode : AC
Memo : 1 ~ 3 GHz

	Read	Ant	Cable	Preamp	TPos	Limit	Over		
Freq	Level	Factor	Loss	Factor		Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1796.00	29.08	26.88	7.37	34.87	4	56.00	-27.54	horizontal Average
2	1796.00	48.46	26.88	7.37	34.87	4	76.00	-28.16	horizontal Peak
3	2002.00	28.80	28.16	7.86	34.53	176	56.00	-25.71	horizontal Average
4 pk	2002.00	48.00	28.16	7.86	34.53	176	76.00	-26.51	horizontal Peak
5 pp	2396.00	27.96	29.31	8.69	34.26	217	56.00	-24.30	horizontal Average
6	2396.00	44.29	29.31	8.69	34.26	217	76.00	-27.97	horizontal Peak
7	2828.00	24.49	30.13	9.60	33.96	348	56.00	-25.74	horizontal Average
8	2828.00	37.80	30.13	9.60	33.96	348	76.00	-32.43	horizontal Peak

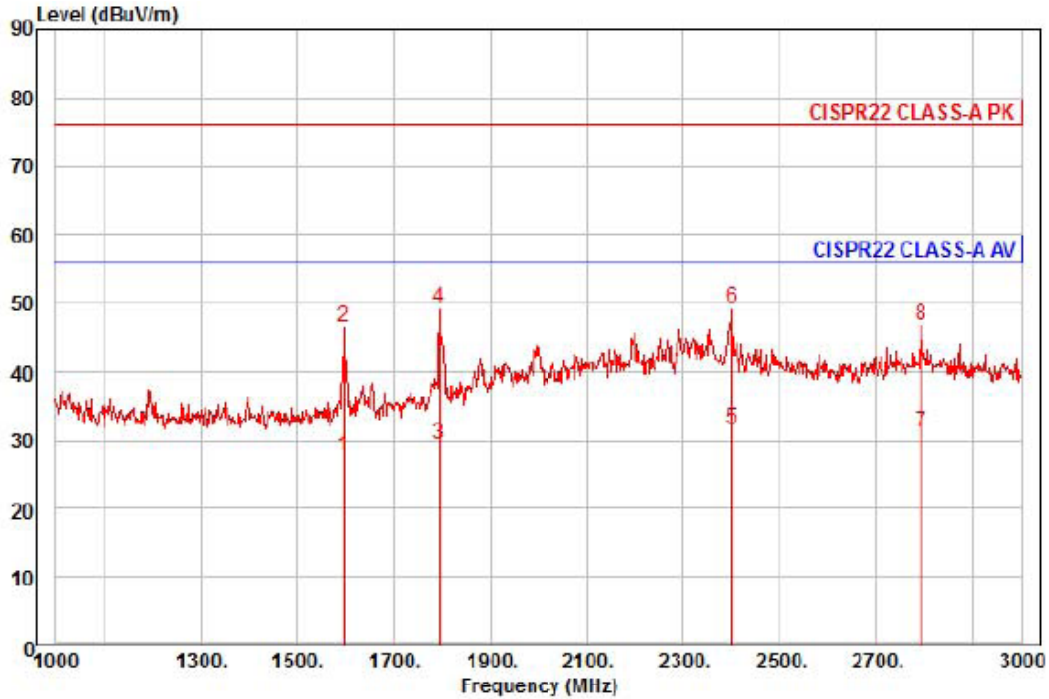
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Test report No.:
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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN-414(15.02.09) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NETWORK CAMERA
Model : SNO-8081RP
Mode : AC
Memo : 1 ~ 3 GHz

	Read	Ant	Cable	Preamp	TPos	Limit	Over		
Freq	Level	Factor	Loss	Factor		Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1596.00	30.28	25.63	6.88	35.20	203	56.00	-28.41	vertical	Average
1596.00	49.37	25.63	6.88	35.20	203	76.00	-29.32	vertical	Peak
1794.00	30.12	26.86	7.36	34.87	171	56.00	-26.53	vertical	Average
1794.00	50.00	26.86	7.36	34.87	171	76.00	-26.65	vertical	Peak
2400.00	27.77	29.33	8.70	34.25	108	56.00	-24.45	vertical	Average
2400.00	45.40	29.33	8.70	34.25	108	76.00	-26.82	vertical	Peak
2794.00	25.45	30.08	9.53	33.98	166	56.00	-24.92	vertical	Average
2794.00	41.21	30.08	9.53	33.98	166	76.00	-29.16	vertical	Peak

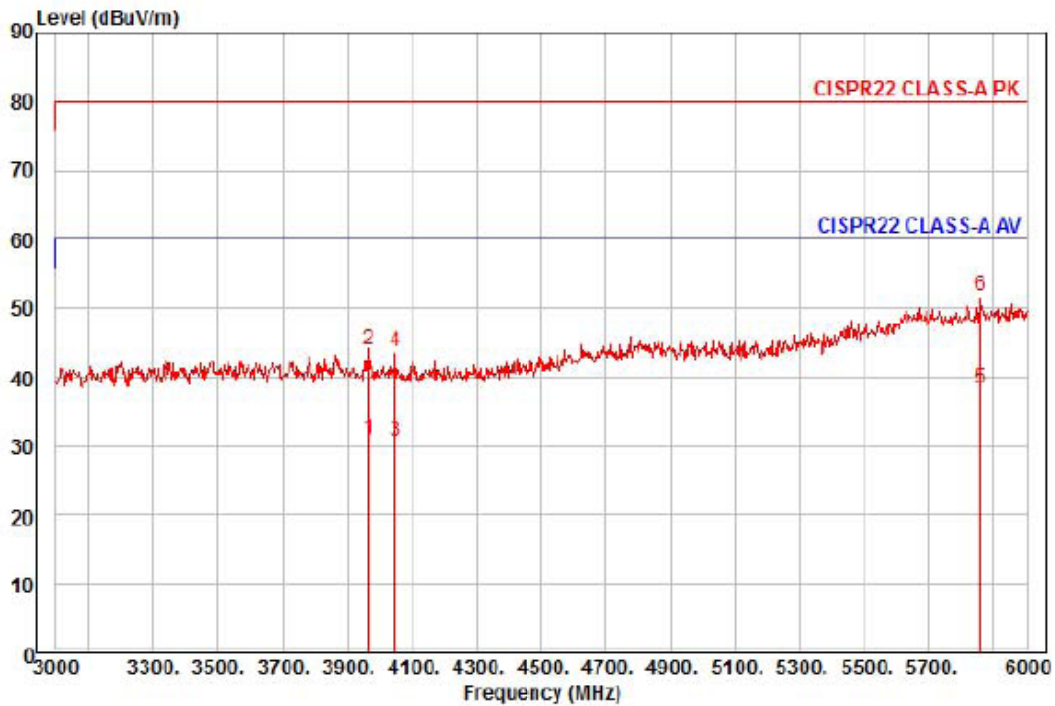
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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN-414(15.02.09) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NETWORK CAMERA
Model : SNO-8081RP
Mode : AC
Memo : 3 ~ 6 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3963.00	22.60	31.83	11.46	34.93	151	60.00	-29.04	horizontal	Average
2	3963.00	35.65	31.83	11.46	34.93	151	80.00	-35.99	horizontal	Peak
3	4047.00	22.07	31.92	11.60	34.89	153	60.00	-29.30	horizontal	Average
4	4047.00	34.96	31.92	11.60	34.89	153	80.00	-36.41	horizontal	Peak
5 pp	5859.00	19.88	34.71	17.01	33.33	53	60.00	-21.73	horizontal	Average
6 pk	5859.00	33.41	34.71	17.01	33.33	53	80.00	-28.20	horizontal	Peak

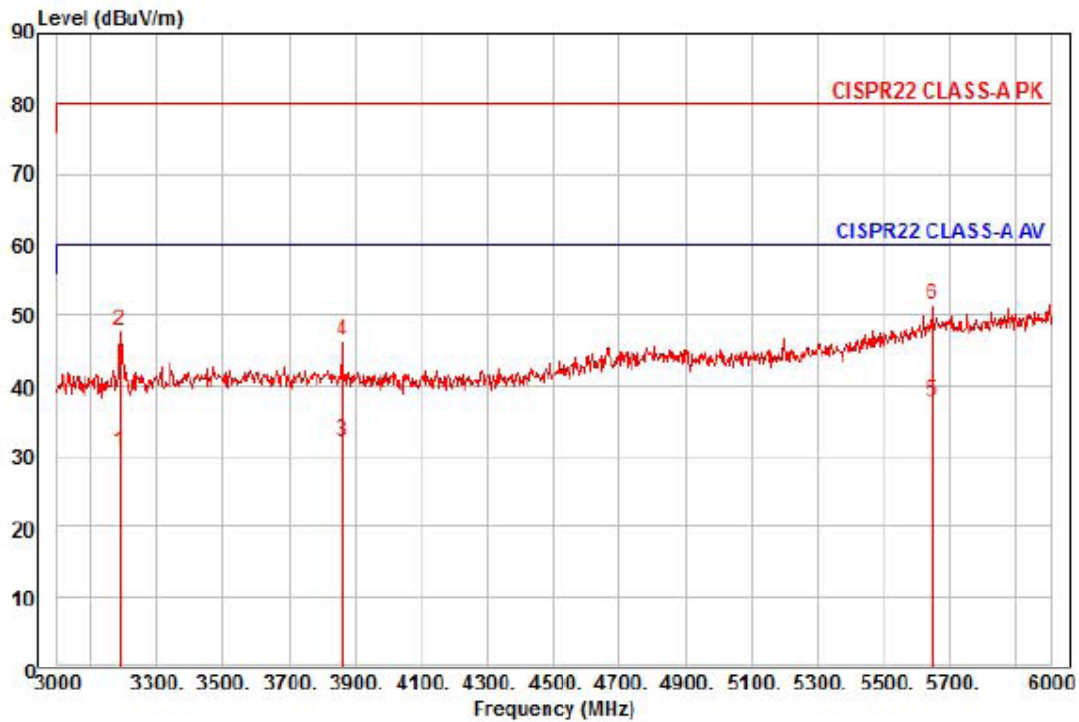
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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN-414(15.02.09) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NETWORK CAMERA
Model : SNO-8081RP
Mode : AC
Memo : 3 ~ 6 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3189.00	23.92	30.62	10.25	34.05	118	60.00	-29.26	vertical	Average
2	3189.00	40.94	30.62	10.25	34.05	118	80.00	-32.24	vertical	Peak
3	3861.00	23.90	31.65	11.30	34.81	207	60.00	-27.96	vertical	Average
4	3861.00	38.29	31.65	11.30	34.81	207	80.00	-33.57	vertical	Peak
5 pp	5646.00	20.82	34.08	16.06	33.30	306	60.00	-22.34	vertical	Average
6 pk	5646.00	34.70	34.08	16.06	33.30	306	80.00	-28.46	vertical	Peak

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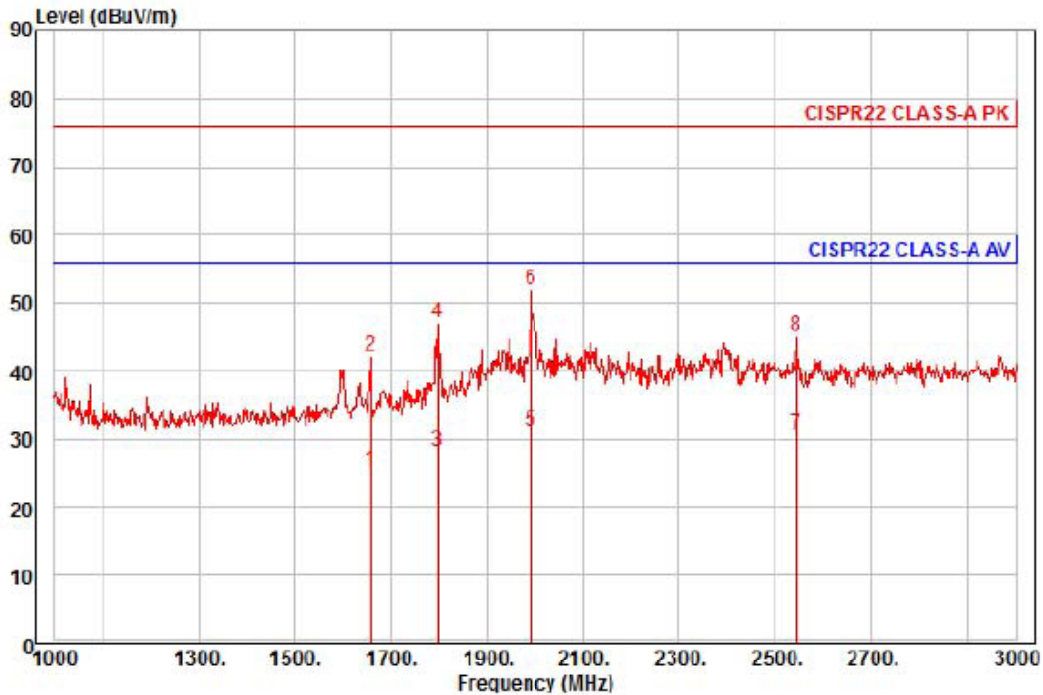
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Test report No.:
KES-E1-15T0135
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- DC Mode

Temperature: 19.7 °C Humidity: 40.3 % R.H. Test Date: 04.17. 2015 Tested by: Hyo Jin, Kim



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN-414(15.02.09) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NETWORK CAMERA
Model : SNO-8081RP
Mode : DC
Memo : 1 ~ 3 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamplifier Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1658.00	27.26	26.02	7.03	35.10	309	56.00	-30.79	horizontal	Average
2	1658.00	44.25	26.02	7.03	35.10	309	76.00	-33.80	horizontal	Peak
3	1798.00	28.78	26.89	7.37	34.87	240	56.00	-27.83	horizontal	Average
4	1798.00	47.66	26.89	7.37	34.87	240	76.00	-28.95	horizontal	Peak
5 av	1992.00	29.80	28.10	7.84	34.54	147	56.00	-24.80	horizontal	Average
6 pp	1992.00	50.63	28.10	7.84	34.54	147	76.00	-23.97	horizontal	Peak
7	2546.00	25.99	29.69	9.01	34.15	166	56.00	-25.46	horizontal	Average
8	2546.00	40.66	29.69	9.01	34.15	166	76.00	-30.79	horizontal	Peak

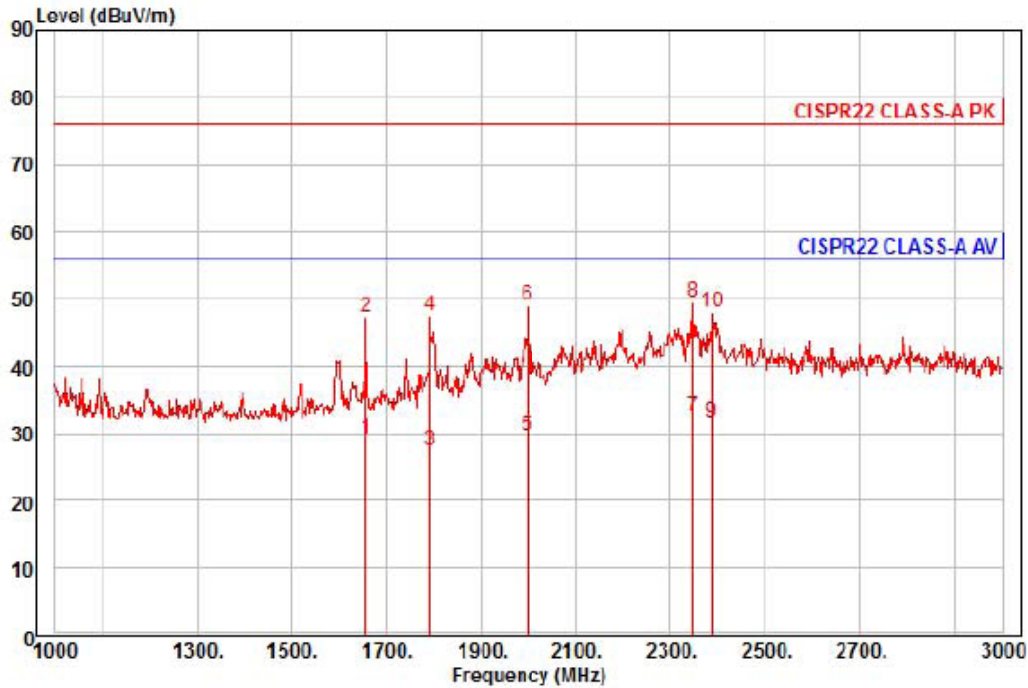
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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN-414(15.02.09) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NETWORK CAMERA
Model : SNO-8081RP
Mode : DC
Memo : 1 ~ 3 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1656.00	31.26	26.00	7.03	35.10	250	56.00	-26.81	vertical	Average
2	1656.00	49.50	26.00	7.03	35.10	250	76.00	-28.57	vertical	Peak
3	1792.00	28.10	26.85	7.36	34.88	154	56.00	-28.57	vertical	Average
4	1792.00	48.35	26.85	7.36	34.88	154	76.00	-28.32	vertical	Peak
5	2000.00	28.17	28.15	7.86	34.53	28	56.00	-26.35	vertical	Average
6	2000.00	47.61	28.15	7.86	34.53	28	76.00	-26.91	vertical	Peak
7 pp	2348.00	29.03	29.17	8.59	34.29	118	56.00	-23.50	vertical	Average
8 pk	2348.00	46.11	29.17	8.59	34.29	118	76.00	-26.42	vertical	Peak
9	2388.00	27.90	29.29	8.67	34.26	123	56.00	-24.40	vertical	Average
10	2388.00	44.47	29.29	8.67	34.26	123	76.00	-27.83	vertical	Peak

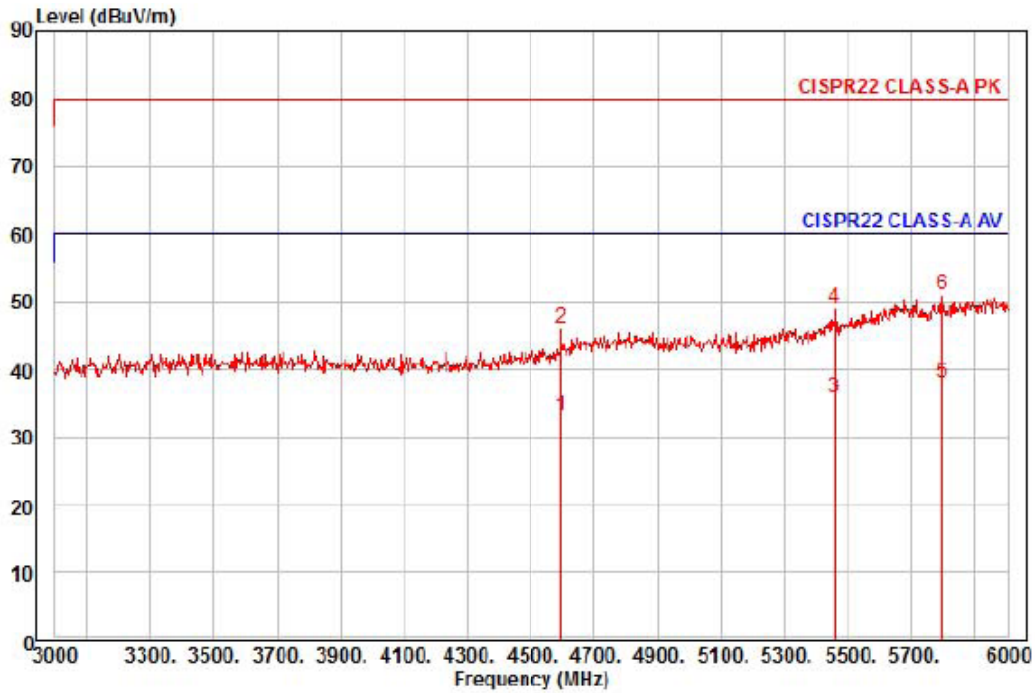
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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN-414(15.02.09) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NETWORK CAMERA
Model : SNO-8081RP
Mode : DC
Memo : 3 ~ 6 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	4596.00	22.22	32.42	12.50	33.92	51	60.00	-26.78	horizontal	Average
2	4596.00	35.02	32.42	12.50	33.92	51	80.00	-33.98	horizontal	Peak
3	5460.00	20.09	33.67	15.23	33.27	14	60.00	-24.28	horizontal	Average
4	5460.00	33.39	33.67	15.23	33.27	14	80.00	-30.98	horizontal	Peak
5 pp	5796.00	20.17	34.52	16.73	33.32	266	60.00	-21.90	horizontal	Average
6 pk	5796.00	33.00	34.52	16.73	33.32	266	80.00	-29.07	horizontal	Peak

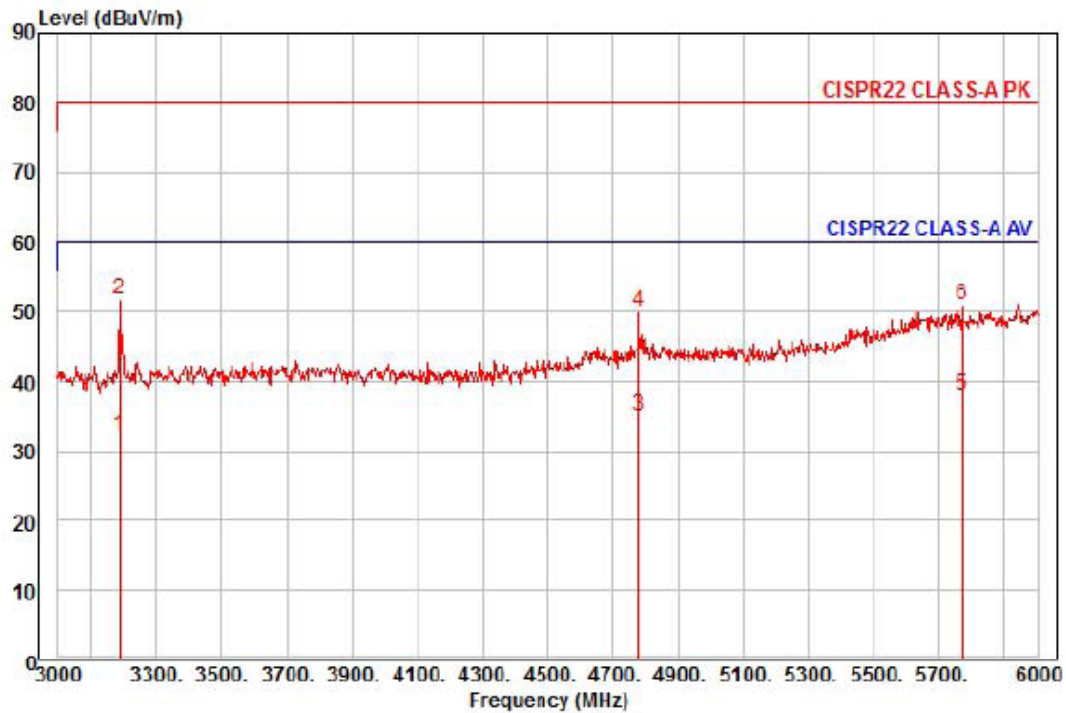
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Test report No.:
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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN-414(15.02.09) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NETWORK CAMERA
Model : SNO-8081RP
Mode : DC
Memo : 3 ~ 6 GHz

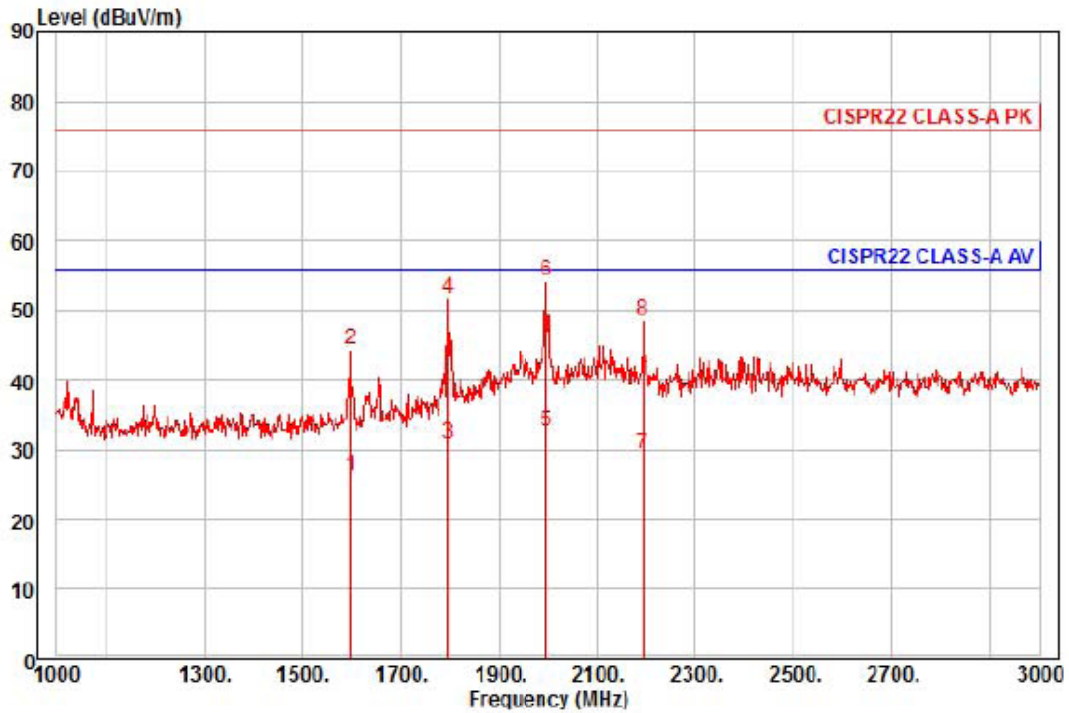
	Freq	Read	Ant	Cable	Preamp	TPos	Limit	Over		
	MHz	Level	Factor	Loss	Factor	deg	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3189.00	25.28	30.62	10.25	34.05	209	60.00	-27.90	vertical	Average
2 pk	3189.00	45.03	30.62	10.25	34.05	209	80.00	-28.15	vertical	Peak
3	4779.00	22.75	33.10	12.81	33.60	171	60.00	-24.94	vertical	Average
4	4779.00	37.70	33.10	12.81	33.60	171	80.00	-29.99	vertical	Peak
5 pp	5772.00	20.19	34.45	16.62	33.32	306	60.00	-22.06	vertical	Average
6	5772.00	33.18	34.45	16.62	33.32	306	80.00	-29.07	vertical	Peak

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- POE Mode

Temperature: 19.7 °C Humidity: 40.3 % R.H. Test Date: 04.17. 2015 Tested by: Hyo Jin, Kim



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN-414(15.02.09) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NETWORK CAMERA
Model : SNO-8081RP
Mode : POE
Memo : 1 ~ 3 GHz

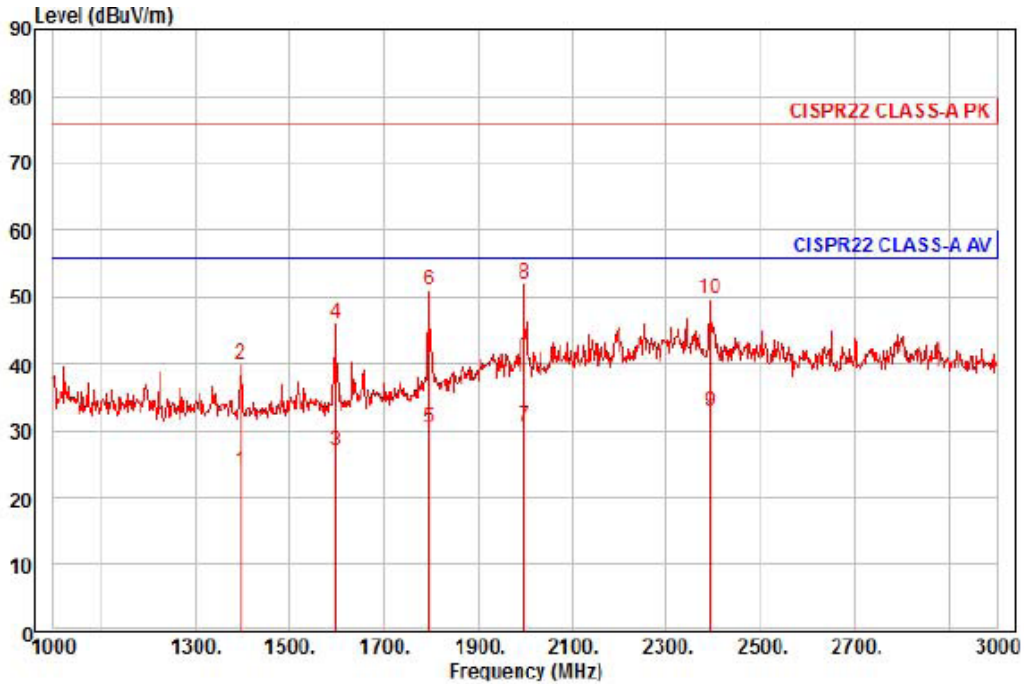
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1598.00	29.01	25.64	6.89	35.20	360	56.00	-29.66	horizontal	Average
2	1598.00	47.06	25.64	6.89	35.20	360	76.00	-31.61	horizontal	Peak
3	1796.00	31.58	26.88	7.37	34.87	219	56.00	-25.04	horizontal	Average
4	1796.00	52.26	26.88	7.37	34.87	219	76.00	-24.36	horizontal	Peak
5 av	1998.00	31.05	28.14	7.86	34.53	216	56.00	-23.48	horizontal	Average
6 pp	1998.00	52.62	28.14	7.86	34.53	216	76.00	-21.91	horizontal	Peak
7	2194.00	26.84	28.72	8.27	34.40	137	56.00	-26.57	horizontal	Average
8	2194.00	46.02	28.72	8.27	34.40	137	76.00	-27.39	horizontal	Peak



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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN-414(15.02.09) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NETWORK CAMERA
Model : SNO-8081RP
Mode : POE
Memo : 1 ~ 3 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1398.00	28.30	24.79	6.40	35.54	271	56.00	-32.05	vertical	Average
2	1398.00	44.28	24.79	6.40	35.54	271	76.00	-36.07	vertical	Peak
3	1598.00	29.69	25.64	6.89	35.20	205	56.00	-28.98	vertical	Average
4	1598.00	48.71	25.64	6.89	35.20	205	76.00	-29.96	vertical	Peak
5	1796.00	31.12	26.88	7.37	34.87	170	56.00	-25.50	vertical	Average
6	1796.00	51.53	26.88	7.37	34.87	170	76.00	-25.09	vertical	Peak
7	1998.00	29.13	28.14	7.86	34.53	197	56.00	-25.40	vertical	Average
8 pk	1998.00	50.48	28.14	7.86	34.53	197	76.00	-24.05	vertical	Peak
9 pp	2394.00	29.17	29.31	8.69	34.26	101	56.00	-23.09	vertical	Average
10	2394.00	45.95	29.31	8.69	34.26	101	76.00	-26.31	vertical	Peak

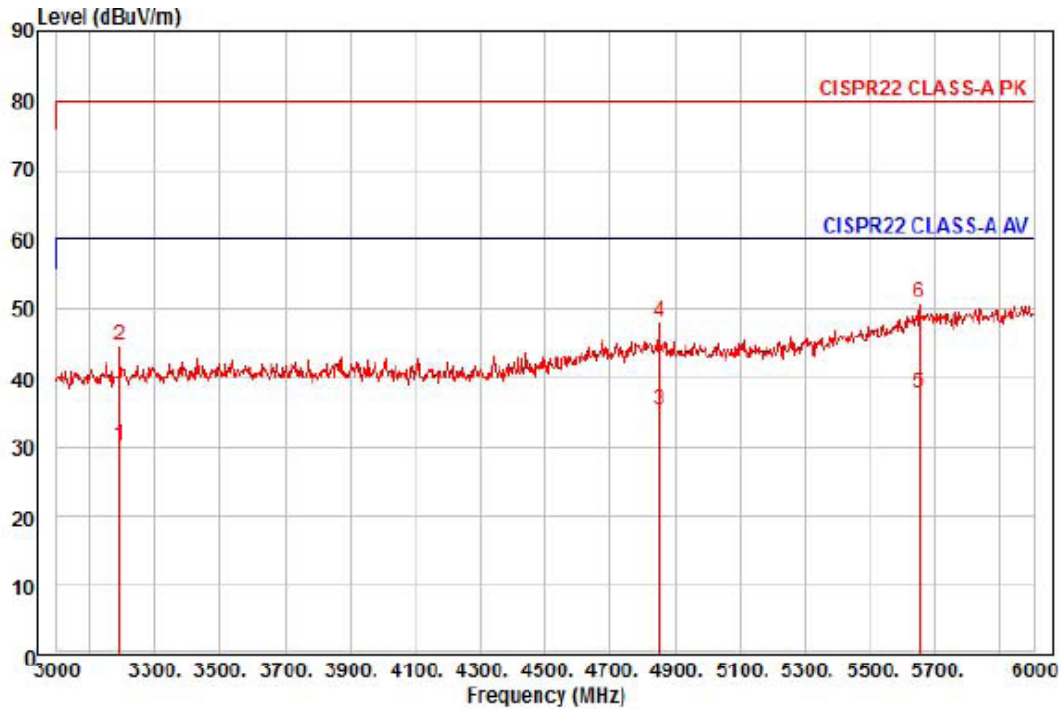
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Test report No.:
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Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN-414(15.02.09) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NETWORK CAMERA
Model : SNO-8081RP
Mode : POE
Memo : 3 ~ 6 GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preampl Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3192.00	23.35	30.63	10.26	34.06	186	60.00	-29.82	horizontal	Average
2	3192.00	37.92	30.63	10.26	34.06	186	80.00	-35.25	horizontal	Peak
3	4851.00	22.45	33.36	12.92	33.47	152	60.00	-24.74	horizontal	Average
4	4851.00	35.17	33.36	12.92	33.47	152	80.00	-32.02	horizontal	Peak
5 pp	5652.00	20.80	34.10	16.08	33.30	134	60.00	-22.32	horizontal	Average
6 pk	5652.00	33.95	34.10	16.08	33.30	134	80.00	-29.17	horizontal	Peak

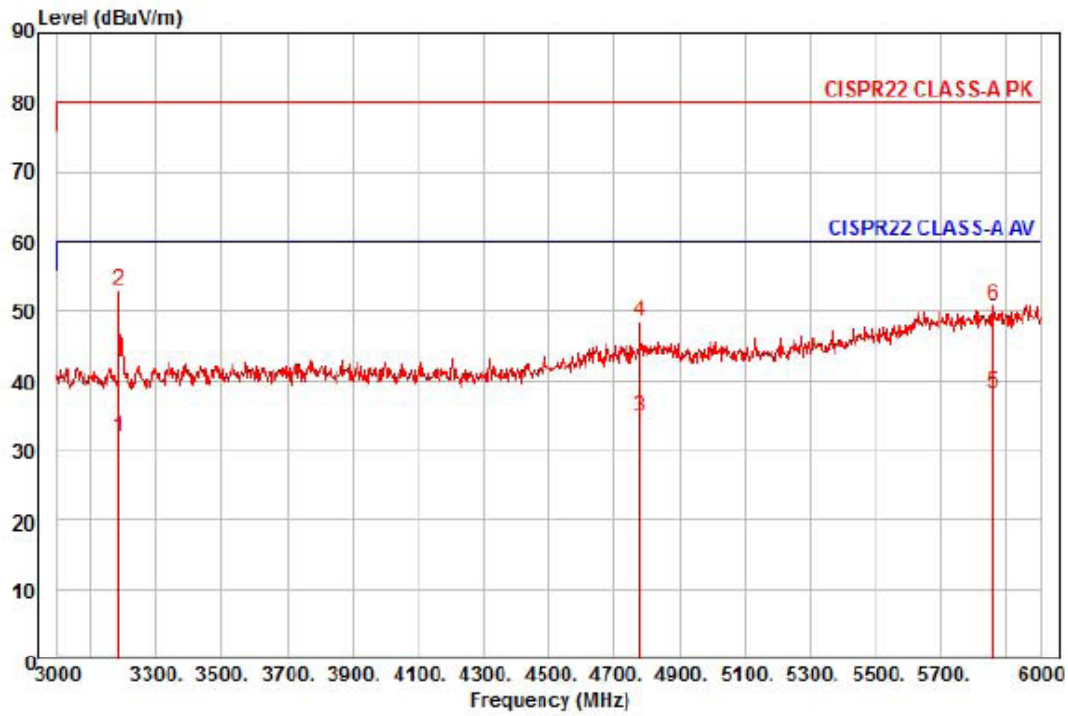
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Page (39) of (57)



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN-414(15.02.09) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NETWORK CAMERA
Model : SNO-8081RP
Mode : POE
Memo : 3 ~ 6 GHz

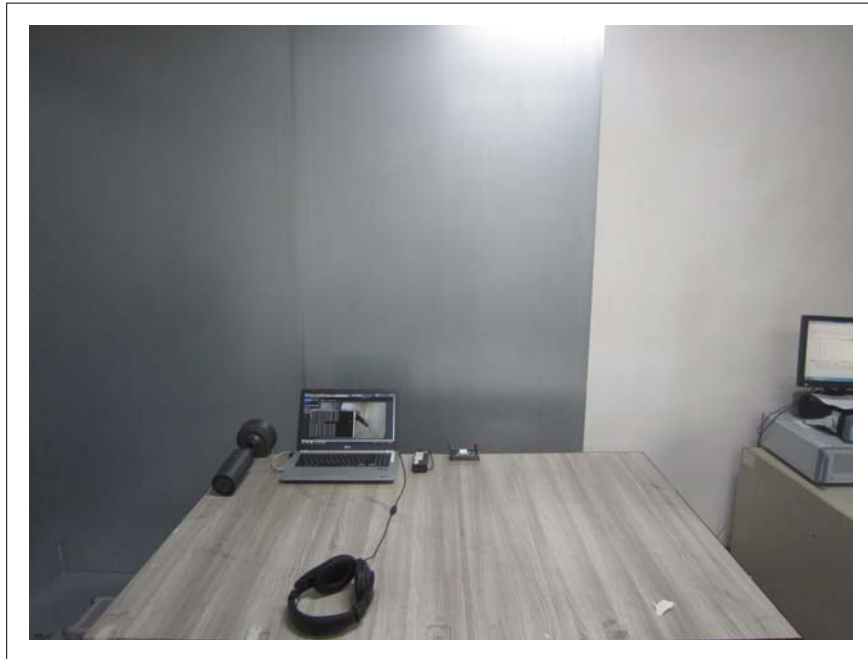
	Freq	Read	Ant	Cable	Preamp	TPos	Limit	Over		
	MHz	Level	Factor	Loss	Factor		Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3186.00	25.10	30.62	10.25	34.05	223	60.00	-28.00	vertical	Average
2 pk	3186.00	46.23	30.62	10.25	34.05	223	80.00	-26.95	vertical	Peak
3	4779.00	22.59	33.10	12.81	33.60	338	60.00	-25.10	vertical	Average
4	4779.00	36.28	33.10	12.81	33.60	338	80.00	-31.41	vertical	Peak
5 pp	5859.00	19.87	34.71	17.01	33.33	161	60.00	-21.74	vertical	Average
6	5859.00	32.39	34.71	17.01	33.33	161	80.00	-29.22	vertical	Peak

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4. Test Setup Photographs

4.1 Conducted Emission

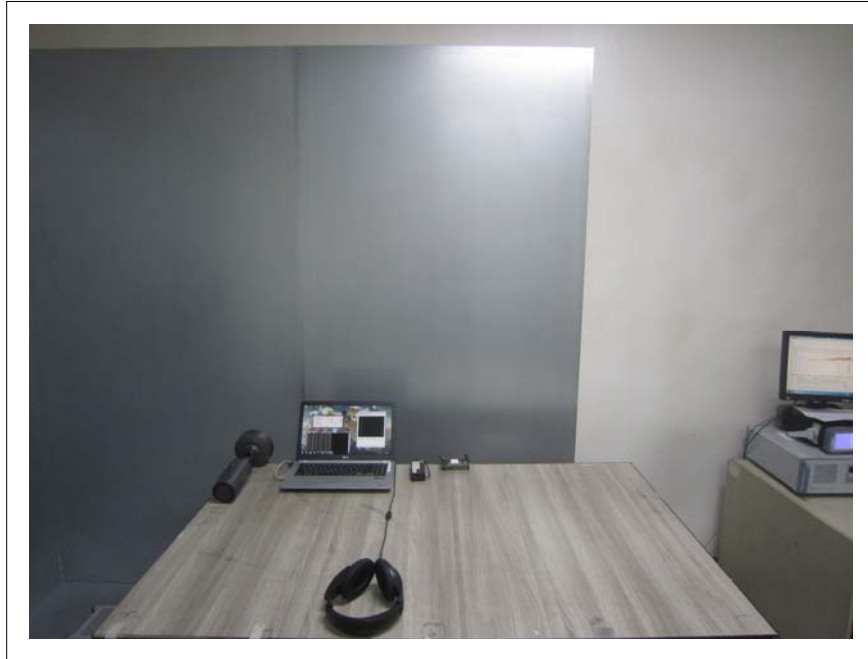
- AC Mode



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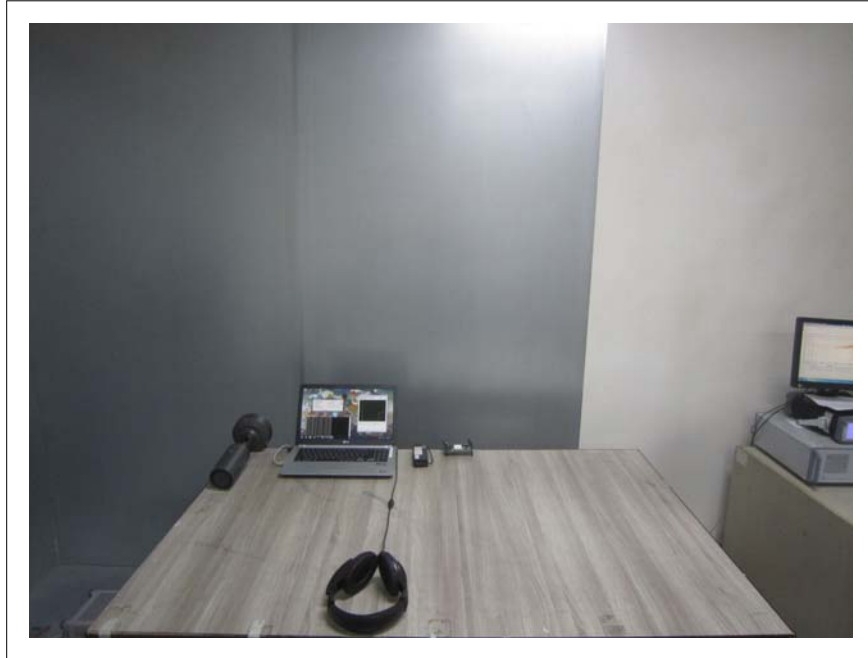
- Telecommunication Emission

-AC Mode



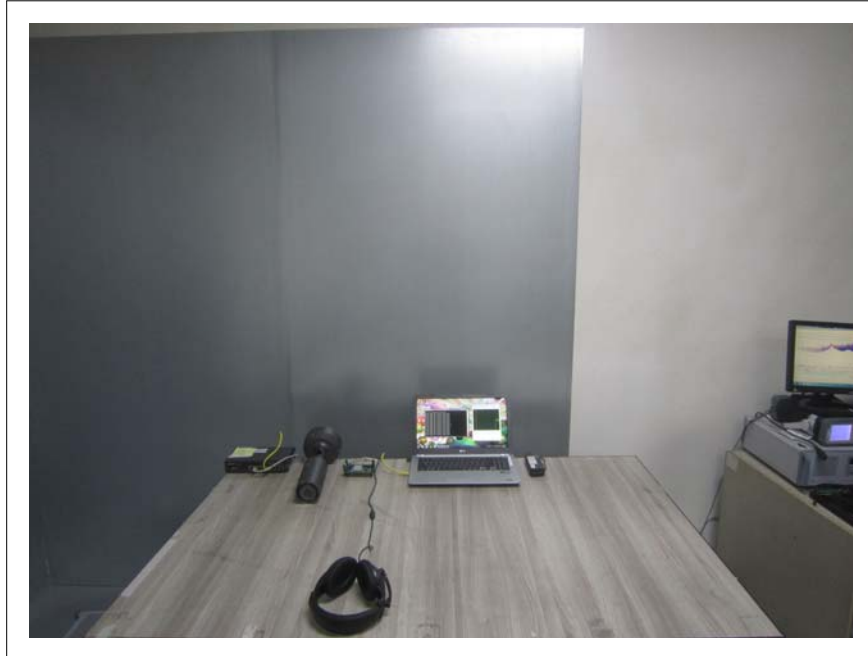
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-DC Mode



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-POE Mode



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4.2 Radiated Emission

* Blow 1 GHz

-AC Mode



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-DC Mode



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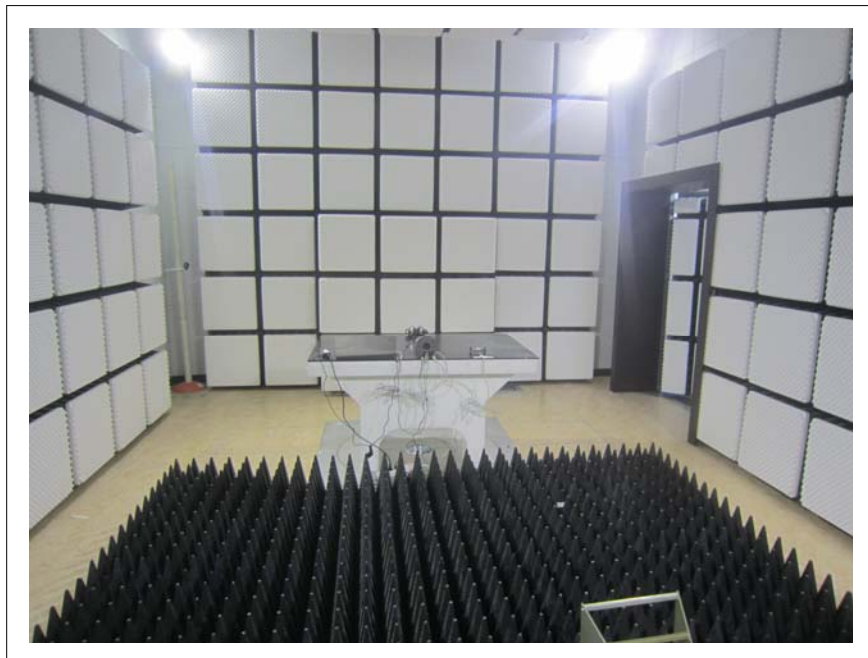
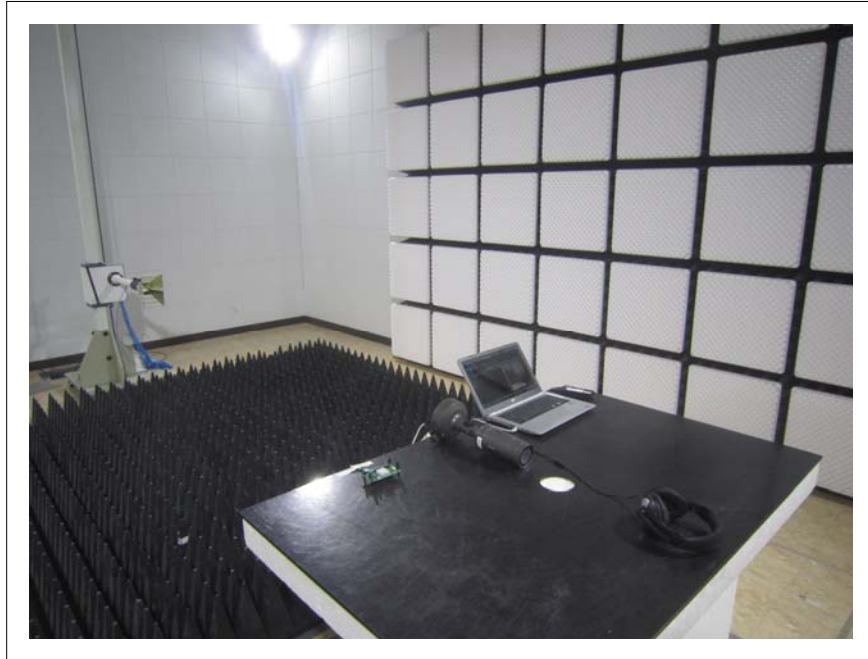
-POE Mode



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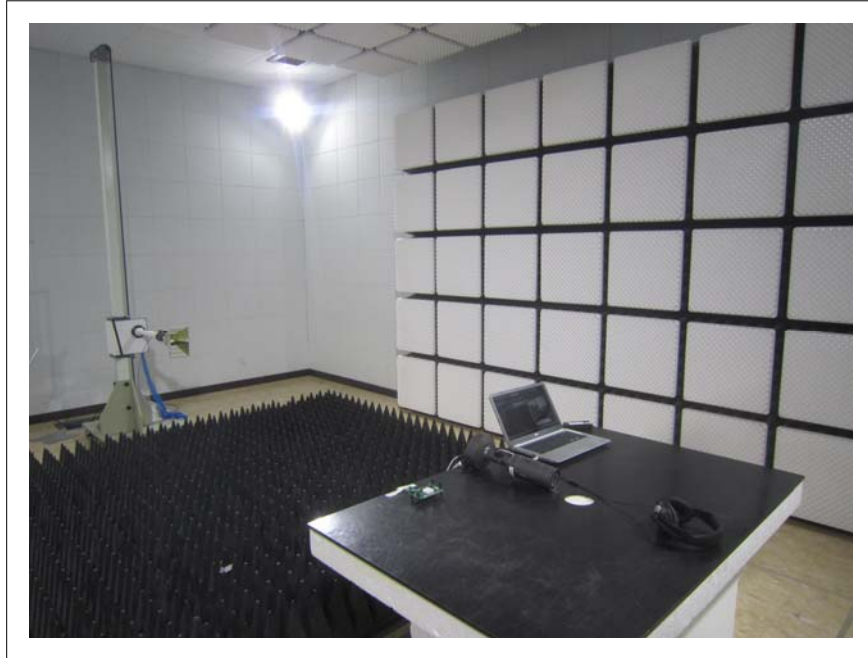
*** Above 1 GHz**

-AC Mode



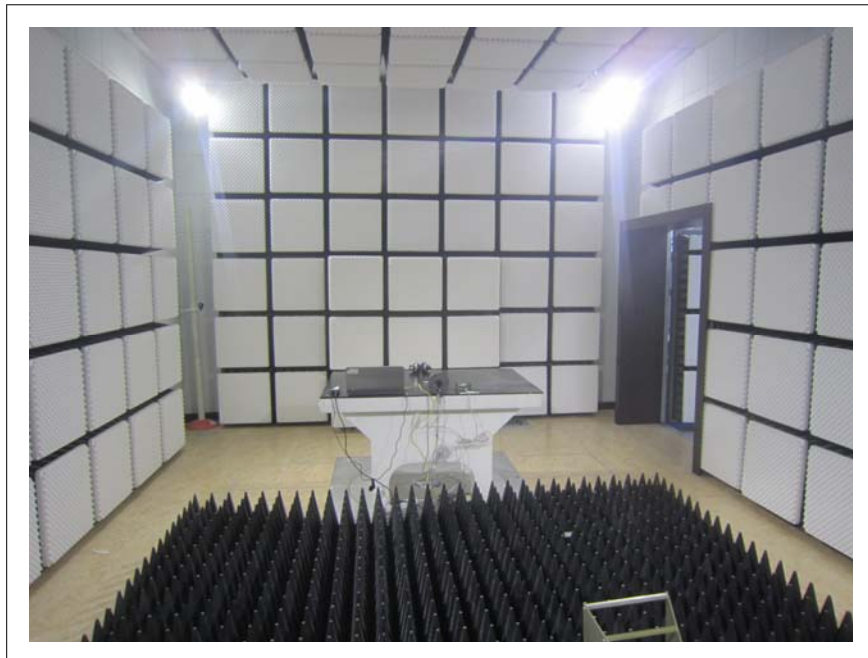
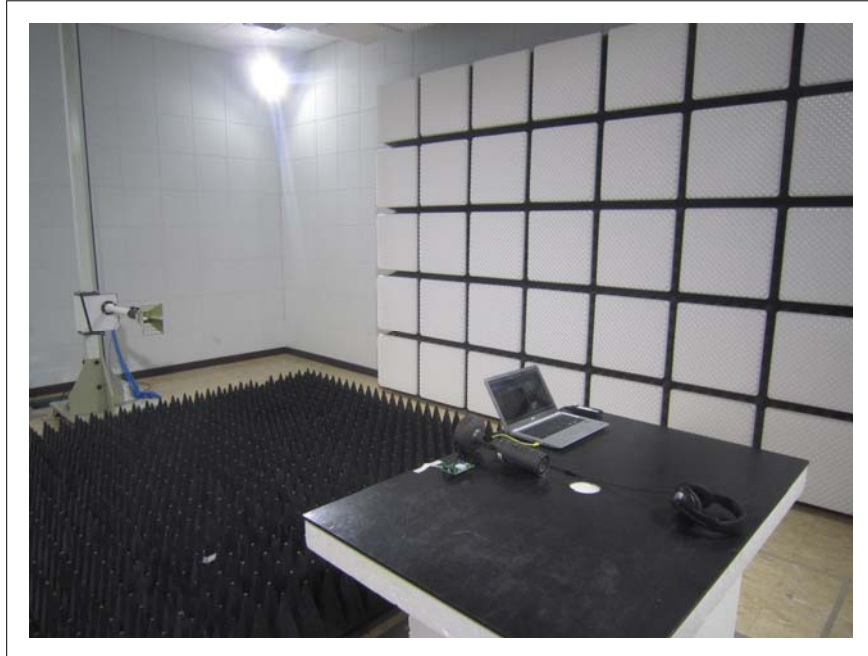
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-DC Mode



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-POE Mode



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5. External Photographs



[FRONT VIEW]



[REAR VIEW]

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6. Internal Photographs



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E.U.T: Internal View(Top) - Main Board



E.U.T: Internal View(Bottom) - Main Board



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E.U.T: Internal View(Top) - Power Board



E.U.T: Internal View(Bottom) - Power Board



E.U.T: Internal View(Top) - Lens Board



E.U.T: Internal View(Bottom) - Lens Board



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