



EMC TEST REPORT For CE

Test Report No. : KES-E1-17T0849
Date of Issue : Dec. 21, 2017
Product name : NVR
Model/Type No. : SRN-873SP
Variant Model : -
Applicant : Hanwha Techwin Co., Ltd.
Applicant Address : 1204, Changwon-daero, Seongsan-gu, Changwon-si,
Gyeongsangnam-do, Korea
Manufacturer : Hanwha Techwin (Tianjin) Co.,Ltd.
Manufacturer Address : No.11 Weiliu Rd, Micro-Electronic Industrial
Park, TEDA, Tianjin, 300385, People's Republic of China.
Date of Receipt : Dec. 12, 2017
Test date : Dec. 18, 2017 – Dec. 20, 2017
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

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EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

This test report is not related to KOLAS.

**KES Co., Ltd.**

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Dec. 21, 2017	KES-E1-17T0849	Issued

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1.0 General Product Description

Main Specifications of E.U.T are:

Network Camera	Inputs	Max. 8CH
	Resolution	←
	Fish-Eye Dewarping	N/A
	Protocols	Samsung, ONVIF
Live	Local Display	HDMI /VGA
	Multi-Channel Display	[LocalMonitor]1/4/6/8/AutoSequence [Web]1/4/8/AutoSequence
	Performance	[LocalMonitor] 8MP(20fps) 5MP(30fps),3MP(50fps),2MP(150fps),720p(240fps),D1(240fps) [Web] 5MP(30fps),3MP(60fps),2MP(120fps),720p(240fps),D1(480fps)
	Performance	
Operating System	Embedded	Linux
Record	Compression	H.264, MJPEG
	Recording Bandwidth	64Mbps, 2MP 8camera real-time recording
	Resolution	CIF ~ 8MP
	Type	Normal, Scheduled, Event (Pre/Post)
	Event Trigger	-AlarmInput(4) -VideoLoss -CameraEvent(Alarm-In,MD,VideoAnalytics) -VAEvent(Tampering,Enter/Exit,Passing(Virtual-Line,Appearing/Disa ppearing, Face Detection, Audio Detection)
	Event Action	e-Mail, PTZ Preset, Alarm Out, Buzzer, Monitor Out
Search & Play	Playback Bandwidth	(32Mbps) Max.3Users
	Performance	32Mbps
	Mode	Date&Time(Calendar) EventLoglist SmartSearch(PlaybackSearch,UpgradeAug.'15) TextSearch(POS)
	Simultaneous playback	[LocalMonitor]Upto8CH [Web,CMS]Upto8CH
	Resolution	CIF ~ 8MP
	Fish-Eye Dewarping	N/A
	Playback Control	Fast Forward/Backward, Move one step up/down
	Default Built-In	1TB
Storage	Internal	2 SATA (Fixed)
	Hot Swap	N/A
	External(DAS)	1 e-SATA
	External(NAS, iSCSI)	N/A
	Max.Capacity	Internal (8TB=2x4TB)
	RAID	N/A
Backup	File backup	BU/EXE(USB), JPG/AVI(Web, CMS)
	Function	Max. 8CH Play, Date-Time/Title display
Sensor	I/O	4/3 (NO 2EA, NO/NC 1EA)

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Audio	Input	8CH (network)
	Compression	G.711, G.726, AAC(16/48KHz)
	Audio Communication	2-Way
Network		
Protocol		TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTSP, NTP, HTTP, DHCP(Server, Client), PPPoE, SMTP, ICMP, IGMP, ARP, DNS, DDNS, uPnP, HTTPS, SNMP, ONVIF Profile S
DDNS		Samsung iPolis DDNS
Transmission Bandwidth		Max 128Mbps
Max Remote Users		Search(3) / Live unicast(10) / Live multicast(20)
IP Version		IPv4/v6
Security		UseraccessLog IPFiltering 802.1x Encryption(ID/PW,Recording,Transmission,Backup)
Language	GUI	(1)English,(2)French,(3)German,(4)Italian,(5)Spanish,(6)Russian,(7)Turkish,(8)Polish,(9)Dutch,(10)Swedish,(11)Czech,(12)Portuguese,(13)Danish,(14)Rumanian,(15)Serbian,(16)Croatian,(17)Hungarian,(18)Greek,(19)Norwegian,(20)Finnish,(21)Korean,(22)Chinese,(23)Japanese,(24)Thai
	Web	(1)English,(2)French,(3)German,(4)Italian,(5)Spanish,(6)Russian,(7)Turkish,(8)Polish,(9)Dutch,(10)Swedish,(11)Czech,(12)Portuguese,(13)Danish,(14)Rumanian,(15)Serbian,(16)Croatian,(17)Hungarian,(18)Greek,(19)Norwegian,(20)Finnish,(21)Korean,(22)Chinese,(23)Japanese(24)Thai
OS		Supported OS : Window XP(service pack 2 or above), Vista, 7, 8, Mac OS X(10.6 or above)
Web Browser		MicrosoftInternetExplorer(최신보안및버그패치적용Ver.8~10,IE9이상권장) MozillaFirefox(Ver.19.xorabove), GoogleChrome(Ver.26.xorabove), AppleSafari(최신보안및버그패치적용Ver.6.0.3)
Viewer Software	Type	SSM, Webviewer, Smart Viewer, iPolis Mobile Viewer
	CMS Support	Support SDK/CGI(SUNAPI)
Functions		
Camera Setup	Register	1) PnP mode 2) Manual
	Setup Items	(1)IPAddress,AddProfileEdit,Bitrate,Compression,GOP,Quality (2)CameraEventSetup - MD - VA (Upgrade Aug. 2015) : Tampering, Enter/Exit, Passing(Virtual- Line), Appearing/Disappearing, Face Detection, Audio Detection) (3)VideoSetup(SimpleFocus,Brightness/Contrast,Flip/Mirror,IRIS, WDR, D&N, SSNR, Shutter, SSDR, DIS)
Camera Control	PoE	1)MonitorPoEPowerconsumption 2)On/OffControlforeachPoEcamera 3)RemoteResetforeachPoEcamera
Easy Configuration		SetupWizard (Date/Time,Network,AutoCameraConfiguration)
Backup from SD Card in camera		Upgrade(Aug. 2015)
PTZ	Control	Via GUI, Webviewer, SPC-2000
	Preset	255
Smart phone	Support Model	Android / iOS

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	Control	Live(4CH):(4DIV)CIFMonitoring (4/1DIV)1.3MPMonitoring Playback(1CH):Upto1.3MP
System Control	Control Applications	Mouse, IR Remocon, Web, SPC-2000(USB Controller)
	SSM-VM Compatibility	N/A
Indicator/Interface		
Front	Indicator	PowerStatusLED1EA HDDActionLED1EA AlarmStatusLED1EA RecordStatusLED1EA NetworkActionLED1EA BackupLED1EA
	USB	2EA (Front 2EA)
	Power Switch	N/A
Connectors	VGA	1EA
	HDMI	1EA
	Audio	Out(1 EA, RCA, Line)
	DVD	N/A
	Serial	N/A
	Ethernet	■8EA(PoE,100Mbps) - 4 hPoE when 2 PoE ports aggregated to 1 port ■1EA(WAN,1Gbps), - WAN : Uplink to CMS
	Alarm	In(4EA,TerminalBlock) Out(3EA,TerminalBlock)
	Reset	Yes (Factory Reset)
	Power Cord	Included
System		
Log	Log List	Max. 20000 (System Log, Event Log each)
Environmental		
Operating Temperature / Humidity		+0° C to +40° C
Humidity		20% - 85%
Electrical		
Power Input		100 - 240V AC
Power Consumption		Set:36W(NVRw/2xHDD) PSE:Total100W (Average12.5WpereachPoEport)
Mechanical		
Color / Material		Black / Metal
Dimension (WxHxD)		370*44*320(1U)
Weight		3.4kg
Accessories		
IR Remocon		Included
Mouse		Included
Viewer CD		Backup Viewer, Installation Manual
IB		Included
Power Cord		Included
Power Adaptor		N/A
Terminal Block		Included
Standards		
Regulation		R82(France), EN50132
Approvals	Safety	UL,KC
	EMC	CE, FCC, KCC, CCC, Gost-R

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1.1 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

Voltage ☒ 230Vac ☐ 100 Vac ☐ 24 Vac ☐ 12 Vdc ☐ PoE

Frequency ☒ 50 Hz ☐ 60 Hz ☐ Hz

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NVR	SRN-873SP	-	Hanwha Techwin (Tianjin) Co.,Ltd	E.U.T
HDD	WD20PURX- 64P6ZYO	WMC4M0H1VLJ7	WD Purple	2 TB
Power Supply	DPS-200PB-185C	-	DELTA ELECTRONICS, INC.	-



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1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Monitor 1	S23a300B	-	Samsung Electronics Co., Ltd	-
Monitor 1 Adaptor	A4514_DSM	-	SAMSUNG ELECTRONICS JAPAN Co., Ltd	-
Monitor 2	LS23C340	ZXPCHTMFA02348F	Samsung Electronics Co., Ltd	-
Monitor 2 Adaptor	A2514_DPN	CN07BN4400591BSK 28F5NK904	Samsung Electro-Mechanics Co.,Ltd	-
Notebook	NT730U3E	JJRE91CF200065A	Samsung Electronics Co., Ltd	-
Notebook Adaptor	PA-1600-66	AD-6019P	리 신(주)	-
Camera	SNP-5430P	-	Hanwha Techwin (Tianjin) Co.,Ltd.	-
Speaker	BR10000A CUVE	-	BEIJING EDIFIER HI-TECH GROUP.	-
Alarm 1	SIP-1201DD D0	-	SAMSUNG TECHWIN CO., LTD.	-
Alarm 2	-	-	-	-
External hard disk	MDY-US2528	-	Q-DRIVER	-
SSD	SSD320	B12734-0373	Transcend	64 GB
Mouse	M-U0026	1248HS021ZR8	Logitech	-

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1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NVR (E.U.T)	D-SUB	Monitor 1	D-SUB	1.7	S
	HDMI	Monitor 2	HDMI	1.6	S
	RJ-45	Notebook	RJ-45	3.0	U
	RJ-45 (PoE)	Camera	RJ-45 (PoE)	3.0	U
	RCA	Speaker	RCA	1.6	U
	Alarm Out (2 Pin)	Alarm 1	Alarm In (2 Pin)	4.0	U
	Alarm In (2 Pin)	Alarm 2	Alarm Out (2 Pin)	3.5	U
	eSATA	External hard disk	eSATA	0.3	U
	USB	Mouse	USB	1.7	U
External hard disk	SATA	SSD	SATA	-	-

* Unshielded=U, Shielded=S

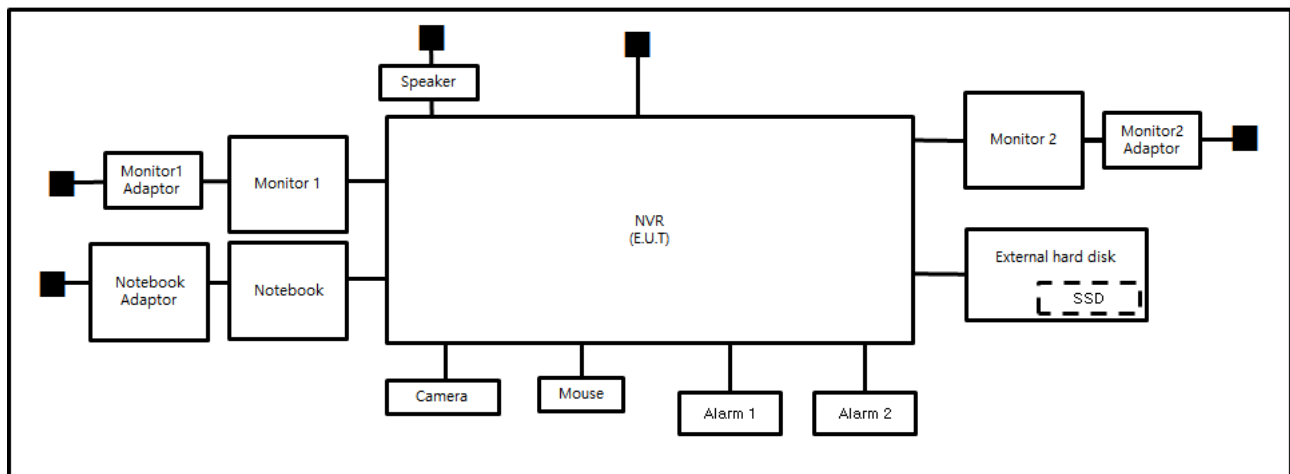
1.7 E.U.T Operating Mode(s)

operating	
230 V 50 Hz	E.U.T Monitoring, Ping Test

E.U.T Test operating S/W		
Name	Version	Manufacture Company
Webviewer	-	Hanwha Techwin Co., Ltd.

1.8 Configuration

■ AC Main
 □ DC Main



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1.9 Remarks when standards applied

- The same port is tested using only one port.

1.10 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less.

1.11 Test Facility

The measurement facility is located at 473-21 Gayeo-ro, Yeosu-si, Gyeonggi-do, 12658, Korea. The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 32.

1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3 & 10 meter Open Area Test Sites and one conducted site to perform FCC Part 15/18 measurements.	
JAPAN	VCCI	Mains Ports Conducted Interference Measurement, Telecommunication Ports Conducted Disturbance Measurement and Radiation 10 meter site, Facility for measuring radiated disturbance above 1 GHz	 R-4308, C-4798, T-2311, G-914
KOREA	MSIP	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KR0100
Canada	IC	3 & 10 meter Open Area Test Sites and one conducted site	 4769B-1
Europe	CE	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	
International	KOLAS	EMI (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	

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2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **EMC – Directive 2014/30/EU**

☐ EN 61000-6-3:2011

☐ EN 61000-6-1:2007

☐ EN 61000-6-4:2007 +A1:2011

☐ EN 61000-6-2:2005

☐ EN 55011:2007 +A1:2010

☐ Group 1
☐ Class A

☐ Group 2
☐ Class B

☐ EN 55014-1:2006 +A2:2011

☐ EN 55014-2:1997 +A2:2008

☐ EN 55015:2013

☐ EN 61547:2009

☒ EN 55032:2012/AC:2013

☒ Class A

☐ Class B

☐ EN 55024:2010 +A1:2015

☒ EN 50130-4:2011

☒ EN 61000-3-2:2014

☒ EN 61000-3-3:2013

☐ EN 61326-1:2013



-
- | | | |
|---|----------------------------------|----------------------------------|
| ☐ VCCI V-3 / 2015.04 | ☐ Class A | ☐ Class B |
| ☐ AS/NZS CISPR22:2009 +A1:2010 | ☐ Class A | ☐ Class B |
| ☐ 47 CFR Part 15, Subpart B | | |
| ☐ CISPR 22:2009 +A1:2010 | ☐ Class A | ☐ Class B |
| ☐ ANSI C63.4-2009 | | |
| ☐ IC Regulation ICES-003 : 2016 | | |
| ☐ CAN/CSA CISPR 22-10 | ☐ Class A | ☐ Class B |
| ☐ ANSI C63.4-2014 | | |
| ☐ RE- Directive 2014/53/EU | | |
| ☐ EN 301 489-1 V1.9.2 | | |
| ☐ Equipment for fixed use | | |
| ☐ Equipment for vehicular use | | |
| ☐ Equipment for portable use | | |
| ☐ EN 301 489-3 V1.6.1 | | |
| ☐ EN 301 489-17 V2.2.1 | | |
| ☐ EN 60945:2002 | | |



2.1 Conducted Emissions at Mains Power Ports

Test Date

Dec. 18, 2017

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESR3	R & S	101783	04, 27, 2018
☒	LISN	ENV216	R & S	101137	02, 03, 2018
☒	LISN	ENV216	R & S	101786	04, 27, 2018
☒	PULSE LIMITER	ESH3-Z2	R & S	101914	11, 27, 2018
☐	LISN	NNBM8124	SCHWARZBECK	8124-1002	08, 07, 2018
☐	LISN	NNBM8124	SCHWARZBECK	8124-1003	08, 07, 2018

Test Conditions

Temperature: 22,4 °C
Relative Humidity: 41,9 %

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

2.2 Conducted Emissions at Telecommunication Ports

Test Date

Dec. 18, 2017

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESR3	R & S	101783	04, 27, 2018
☒	LISN	ENV216	R & S	101137	02, 03, 2018
☒	LISN	ENV216	R & S	101786	04, 27, 2018
☒	PULSE LIMITER	ESH3-Z2	R & S	101914	11, 27, 2018
☒	8-WIRE ISN CAT3	CAT3 8158	SCHWARZBECK	8158-0019	03, 29, 2018
☒	8-WIRE ISN CAT5	CAT5 8158	SCHWARZBECK	8158-0030	03, 29, 2018
☐	8-WIRE ISN CAT6	NTFM 8158	SCHWARZBECK	8158-0029	08, 10, 2018
☐	ISN	ISN S8	SCHWARZBECK	ISN-S8-0019	05, 12, 2018

Test Conditions

Temperature: 22,4 °C
Relative Humidity: 41,9 %

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Dec. 18, 2017

Test Location☐ OPEN AREA TEST SITE #2 ☒ SEMI ANECHOIC CHAMBER #4(10m)**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	04, 18, 2018
☒	AMPLIFIER	SCU 01	R & S	100603	11, 27, 2018
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	716	11, 28, 2018

Test Conditions

Temperature: 21,9 °C

Relative Humidity: 40,6 %

Frequency Range of Measurement

30 MHz to 1 GHz

Instrument Settings

IF Band Width: 120 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

RemarksSee Appendix A for test data.

2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Dec. 19, 2017

Test Location

SEMI ANECHOIC CHAMBER #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESR7	R & S	101190	08, 07, 2018
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	05, 31, 2018
☐	ATTENUATOR	8491A	HP	32173	03, 24, 2018
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 02, 2018

Test Conditions

Temperature: 22,7 °C

Relative Humidity: 43,9 %

Frequency Range of Measurement

1 GHz to 6 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

RemarksSee Appendix A for test data.



2.5 Harmonic Current Emissions

Test Date

Dec. 18, 2017

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	dpa.control	EM TEST	5.4.11.0	-
☒	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	08, 09, 2018
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: 22,4 °C
Relative Humidity: 41,9 %

Classification of Equipment for Harmonic Current Emissions

- ☒ Class A
☐ Class B
☐ Class C(Below 25 W)
☐ Class C(Above 25 W)
☐ Class D

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.



2.6 Voltage Fluctuations and Flicker

Test Date

Dec. 18, 2017

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	dpa.control	EM TEST	5.4.11.0	-
☒	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	08, 08, 2018
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: 22,4 °C
Relative Humidity: 41,9 %

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:

EN 50130-4:2011 Alarm systems-Part 4: Electromagnetic compatibility Product family
standard: Immunity requirements for components of fire, intruder and social alarm systems

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 that is no
residual change in the EUT or any change in outputs, 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 a change.

Conducted RF immunity

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing

That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change,

and no such flickering of indicators oeuvres at $U = 130 \text{ dB}\mu\text{V}$.

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 in 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.



3.1 Electrostatic Discharge

Reference Standard

EN 61000-4-2:2009

Test Date

Dec. 19, 2017

Test Location

EMS-ESD: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	ESD SIMULATOR	ESS-2000	Noise Ken	ESS05X4620	02, 24, 2018
☒	HCP	-	Noise Ken	-	-
☒	VCP	-	Noise Ken	-	-

Test Conditions

Temperature: 23,2 °C
Relative Humidity: 44,6 %
Atmospheric Pressure: 101,0 kPa



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Test Specifications

Discharge Factor: ≥ 1 s

Discharge Impedance: 330 ohm / 150 pF

Kind of Discharge: Air, Contact (direct and indirect)

Polarity: Positive and Negative

Number of Discharge: 10 at all locations for Air discharge
10 at all locations for Contact discharge

Discharge Voltage:	Contact	Air	HCP	VCP
	☐ 2 kV	☒ 2 kV	☐ 2 kV	☐ 2 kV
	☐ 4 kV	☒ 4 kV	☐ 4 kV	☐ 4 kV
	☒ 6 kV	☐ 6 kV	☒ 6 kV	☒ 6 kV
	☐ 8 kV	☒ 8 kV	☐ 8 kV	☐ 8 kV
	☐ 15 kV	☐ 15 kV	☐ 15 kV	☐ 15 kV

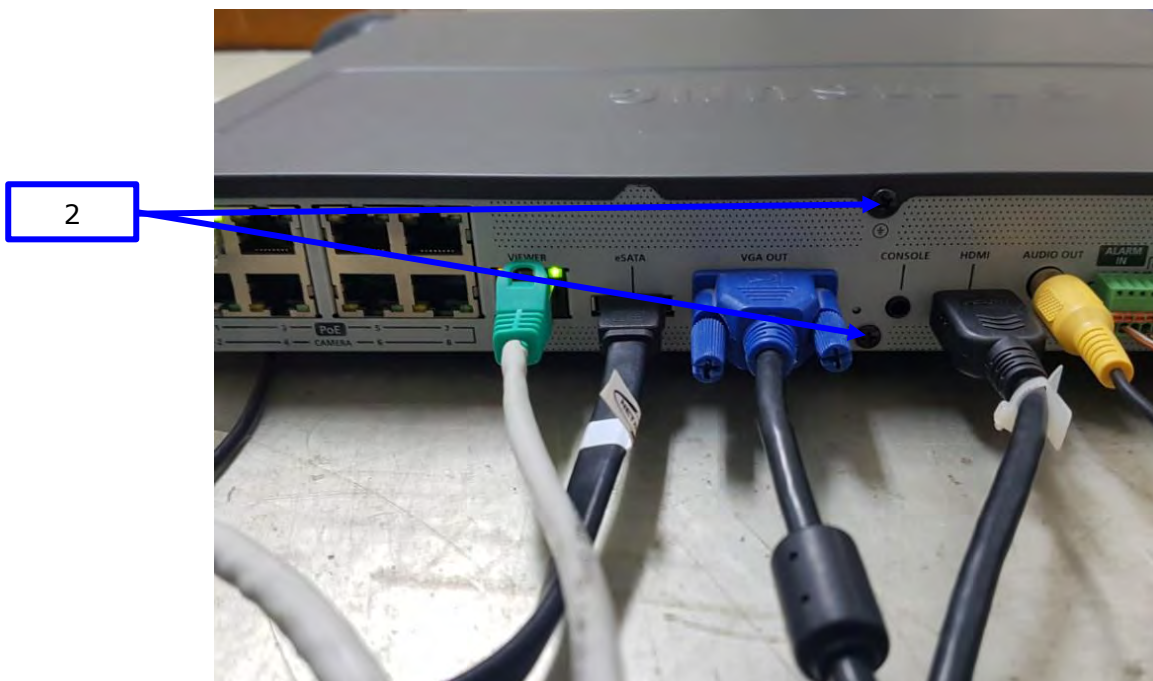
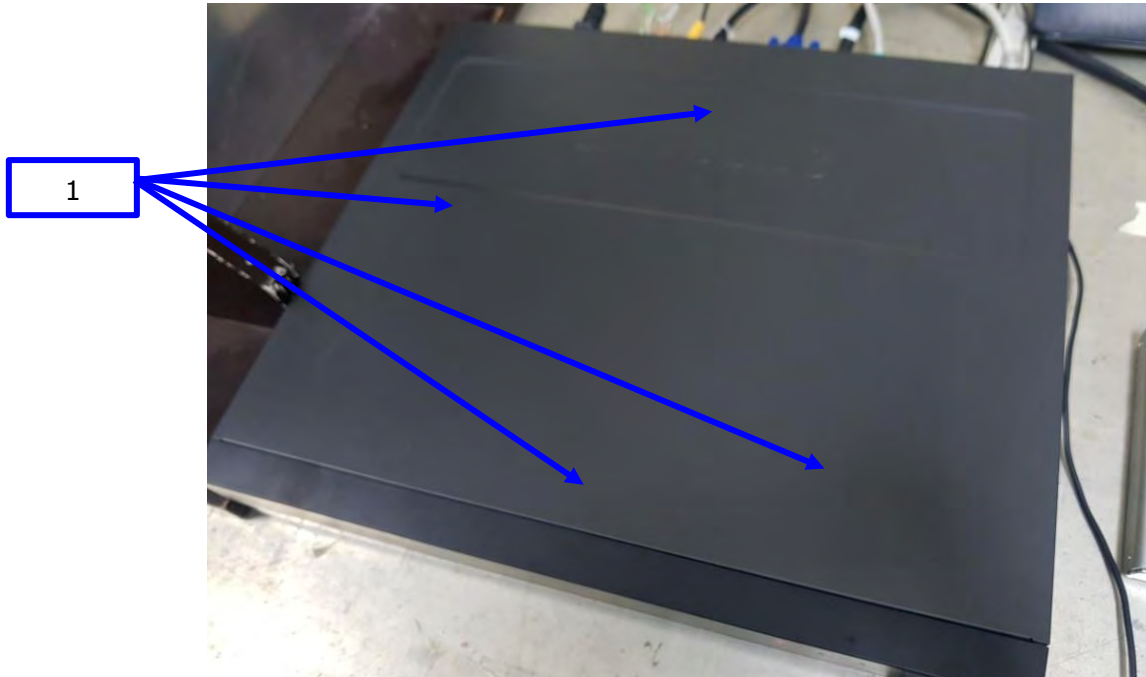
Notes: HCP: Horizontal coupling plane

VCP: Vertical coupling plane

Required Performance Criteria: ☒ Complied

Location of Discharge:

Air
Contact



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Test Data**Indirect Discharge**

No.	Test Point	Discharge Method	Observations	Remarks
1	HCP Contact	Contact Discharge	Complied	-
2	VCP Contact	Contact Discharge	Complied	-

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Surface	Contact Discharge	Complied	-
2	Screw	Contact Discharge	Complied	-

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.

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3.2 Radiated Electric Field Immunity

Reference Standard

EN 61000-4-3:2006 +A2:2010

Test Date

Dec. 19, 2017

Test Location

EMS-RS: ☐ SEMI ANECHOIC CHAMBER #2 ☒ SEMI ANECHOIC CHAMBER #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	EMC32	R & S	10.10.02	-
☒	SIGNAL GENERATOR	SMB 100A	R & S	177586	08, 07, 2018
☒	BROADBAND AMPLIFIER	BBA100	R & S	101239	08, 07, 2018
☒	BROADBAND AMPLIFIER	100S1G6M1	AR	579931	08, 07, 2018
☒	POWER METER	NRP2	R & S	103475	08, 07, 2018
☒	AVG POWER SENSOR	NRP-Z91	R & S	102526	08, 07, 2018
☒	AVG POWER SENSOR	NRP-Z91	R & S	102527	08, 07, 2018
☒	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
☒	DIRECTIONAL COUPLER	KYDC-D1070-DX40	KY TELECOM	KY150001	08, 07, 2018
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM, INC	781	05, 02, 2019

Test Conditions

Temperature: 22,7 °C
Relative Humidity: 43,9 %
Atmospheric Pressure: 100,5 kPa



Test Specifications

Antenna Polarization: Horizontal & vertical unless indicated otherwise

Antenna Distance: ☒ 3 m

Field Strength: ☐ 1 V/m ☐ 3 V/m
☒ 10 V/m

Frequency Range: ☐ 80 MHz to 1 GHz ☐ 1,4 GHz to 2,7 GHz
☒ 80 MHz to 2,7 GHz

Modulation: ☒ AM, 80 %, 1 kHz sine wave
☒ PM, 1 Hz (0,5 s ON : 0,5 s OFF)

Frequency step: ☒ 1 % step

Dwell Time: ☒ 1 s ☐ 3 s

of Sides Radiated: ☒ 4

Required Performance Criteria: ☒ Complied

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Test Data

Side Exposed	Observations	
	Horizontal	Vertical
Front	Complied	Complied
Right	Complied	Complied
Back	Complied	Complied
Left	Complied	Complied

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.

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3.3 Electrical Fast Transients/Bursts

Reference Standard

EN 61000-4-4:2012

Test Date

Dec. 20, 2017

Test Location

EMS-EFT: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	AMETEK CTS	7.1.2	-
☒	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	06, 26, 2018
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	06, 26, 2018
☒	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	070925	06, 26, 2018

Test Conditions

Temperature: 20,9 °C
Relative Humidity: 41,3 %
Atmospheric Pressure: 100,8 kPa

Test Specifications

Pulse Amplitude & Polarity: (AC Power Lines)	☐ ± 1.0 kV ☐ ± 4.0 kV	☒ ± 2.0 kV
Pulse Amplitude & Polarity: (Other supply / Signal Lines)	☐ ± 0.5 kV ☐ ± 2.0 kV	☒ ± 1.0 kV
Burst Period:	☒ 300 ms	☐ 2 s
Repetition Rate:	☐ 5 kHz	☒ 100 kHz
Duration of Test Voltage:	☒ ≥ 1 min	
Required Performance Criteria:	☒ Complied	

Test Data

☒ Input a.c. power ports – Coupling/Decoupling Network used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
L – N – PE	Complied	Complied

☐ Input d.c. power ports – Coupling/Decoupling Network used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
-	-	-

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
RS-45	Complied	Complied
Alarm In (2 Pin)	Complied	Complied
Alarm Out (2 Pin)	Complied	Complied

Note: “Blank” = Not performed

Observations:

Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.

3.4 Surge Transients

Reference Standard

EN 61000-4-5:2014

Test Date

Dec. 20, 2017

Test Location

EMS-Surge: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	AMETEK CTS	7.1.2	-
☒	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	10, 16, 2018
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	06, 26, 2018
☒	CDN	CNV 508N1	EM TEST	P1551168979	04, 26, 2018
☐	CDN	CNV 508T5	EM TEST	P1549168422	04, 26, 2018

Test Conditions

Temperature: 20,9 °C
Relative Humidity: 41,3 %
Atmospheric Pressure: 100,8 kPa



Test Specifications

AC Power Lines

Source Impedance: 12 ohm for common mode and 2 ohm for differential mode

Surge Amplitude :

Common Mode

☒ (0,5 / 1,0 / 2,0) kV

Differential Mode

☒ (0,5 / 1,0) kV

Number of Surges:

☒ 5 surges per angle

Angle:

☒ 0°, 90°, 180°, 270° (input a.c. power port)

Polarity:

☒ Positive & Negative

Repetition Rate:

☒ 1 surge per min ☐ 1 surge per 30 sec.

Required Performance Criteria: ☒ Complied

Other supply / Signal Lines

Source Impedance:

42 ohm for common mode

Surge Amplitude:

Common Mode

☒ (0,5 / 1,0) kV

Number of Surges:

☒ 5 Surges

Polarity:

☒ Positive & Negative

Repetition Rate:

☒ 1 surge per min ☐ 1 surge per 30 sec.

Required Performance Criteria: ☒ Complied

Test Data

☒ Line to Line – Differential Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L – N	Complied	Complied

☒ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L – PE	Complied	Complied
N - PE	Complied	Complied

Signal Lines

☒ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
RS-45	Complied	Complied
Alarm In (2 Pin)	Complied	Complied
Alarm Out (2 Pin)	Complied	Complied

Note: “Blank” = Not performed

Observations:
Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria.

3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6:2014

Test Date

Dec. 20, 2017

Test Location

EMS-CS: Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	icd.control	EM TEST	5.3.7	-
☒	CONTINUOUS WAVE SIMULATOR	CWS 500N1	EM TEST	V0936105119	08, 07, 2018
☒	ATTENUATOR	ATT6	EM TEST	1208-34	08, 07, 2018
☒	CDN	CDN-M2/M3N	EM TEST	0909-06	08, 07, 2018
☒	CDN	CDN T8RJ45	EM TEST	0909-09	08, 07, 2018
☒	EM INJECTION CLAMP	EM 101	Liithi	35943	02, 03, 2018

Test Conditions

Temperature: 20,9 °C
Relative Humidity: 41,3 %
Atmospheric Pressure: 100,8 kPa



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Test Specifications

Frequency range: ☒ 150 kHz to 100 MHz ☐ 150 kHz to 80 MHz

Voltage Level: ☐ 1 Vrms ☐ 3 Vrms
☒ 10 Vrms

Modulation: ☒ AM, 80 %, 1 kHz sine wave
☒ PM, 1 Hz (0,5 s ON : 0,5 s OFF)

Frequency step: ☒ 1 % step

Dwell Time: ☒ 1 s ☐ 3 s

Required Performance Criteria: ☒ Complied

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Test Data☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L - N - PE	CDN (☐ M2, ☒ M3)	Complied

☐ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
-	CDN (☐ M2, ☐ M3)	-

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
RS-45	CDN	Complied
Alarm In (2 Pin)	EM Clamp	Complied
Alarm Out (2 Pin)	EM Clamp	Complied

Notes: CDN = Coupling Decoupling Network
"blank" = Not performed

Observations:

Complied - No degradation of function

Test Results☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria**Remarks**PASS Required Performance Criteria.



3.6 Voltage Dips and Short Interruptions

Reference Standard

EN 61000-4-11:2004

Test Date

Dec. 20, 2017

Test Location

EMS-Voltage dip: Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	AMETEK CTS	7.1.2	-
☒	ULTRA COMPACT SIMULATOR	UCS 500 N5	EM TEST	V0936105120	06, 26, 2018
☒	MOTOR VARIAC	MV2616	EM TEST	V0936105123	06, 26, 2018

Test Conditions

Temperature: 20,9 °C
Relative Humidity: 41,3 %
Atmospheric Pressure: 100,8 kPa

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Test Specifications & Observations/Remarks

(Test Voltage : 230 V)

<u>Test Level</u>	<u>Duration [in period/ms (50 Hz)]</u>	<u>Results</u>
☒ 20 % dip	☒ 250 / 5000	<u>Complied</u>
☒ 30 % dip	☒ 25 / 500	<u>Complied</u>
☒ 60 % dip	☒ 10 / 200	<u>Complied</u>
☒ 100 % dip	☒ 250 / 5000	<u>Complied</u>

- Voltage variations

☒ Unom + 10 %	☒ 253.0 V (ac)	<u>Complied</u>
☒ Unom - 15 %	☒ 195.5 V (ac)	<u>Complied</u>

Observations:
Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria
☐ NOT APPLICABLE

Remarks

PASS Required Performance Criteria.

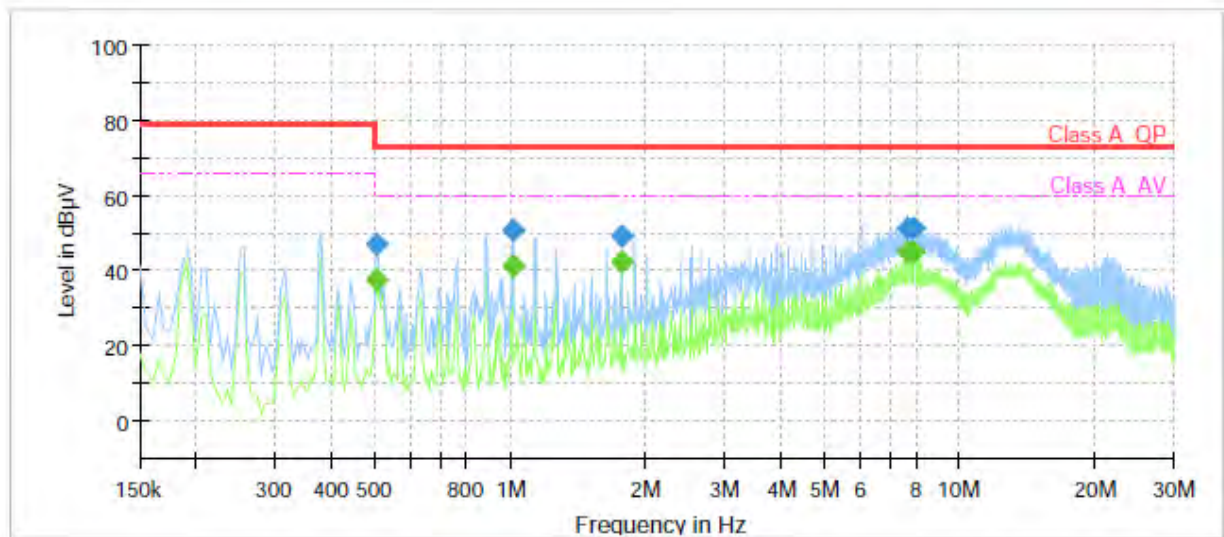
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	SRN-873SP
Mode	H
Operator Name:	KES

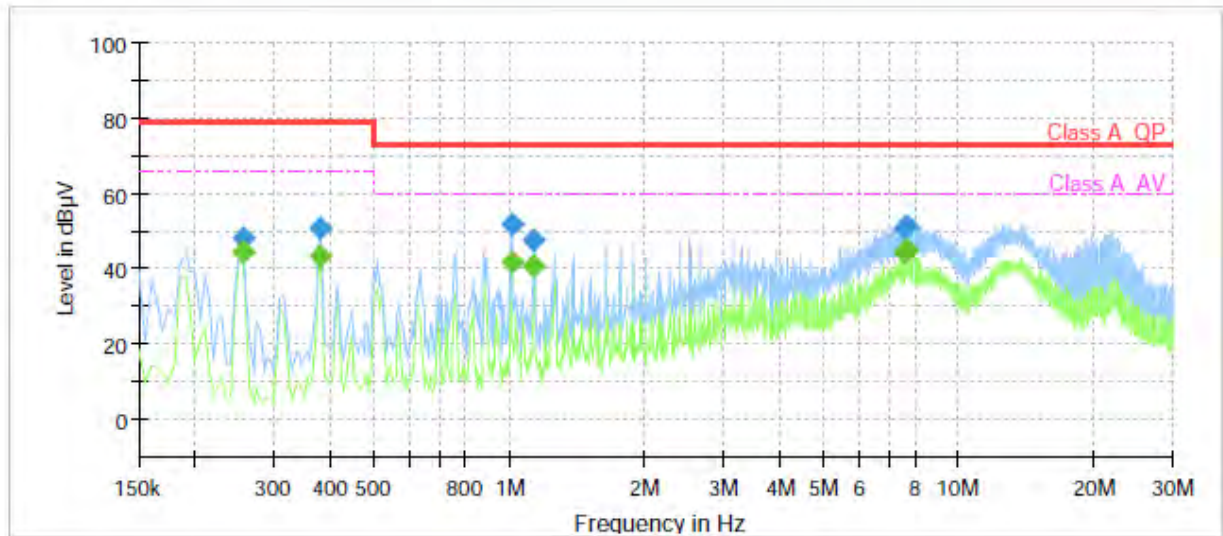


Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.505000	---	37.76	60.00	22.24	1000.0	9.000	L1	19.6
0.505000	47.28	---	73.00	25.72	1000.0	9.000	L1	19.6
1.010000	---	41.11	60.00	18.89	1000.0	9.000	L1	19.8
1.010000	50.57	---	73.00	22.43	1000.0	9.000	L1	19.8
1.770000	---	42.57	60.00	17.43	1000.0	9.000	L1	19.9
1.770000	48.97	---	73.00	24.03	1000.0	9.000	L1	19.9
7.680000	---	44.87	60.00	15.13	1000.0	9.000	L1	19.7
7.680000	51.26	---	73.00	21.74	1000.0	9.000	L1	19.7
7.885000	---	44.79	60.00	15.21	1000.0	9.000	L1	19.7
7.885000	51.35	---	73.00	21.65	1000.0	9.000	L1	19.7

[NEUTRAL]
Common Information

Test Description:	Conducted Emission
Model No.:	SRN-873SP
Mode	N
Operator Name:	KES


Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.255000	---	44.29	66.00	21.71	1000.0	9.000	N	19.5
0.255000	48.00	---	79.00	31.00	1000.0	9.000	N	19.5
0.380000	---	43.47	66.00	22.53	1000.0	9.000	N	19.5
0.380000	50.78	---	79.00	28.22	1000.0	9.000	N	19.5
1.010000	---	41.93	60.00	18.07	1000.0	9.000	N	19.8
1.010000	51.63	---	73.00	21.37	1000.0	9.000	N	19.8
1.135000	---	40.65	60.00	19.35	1000.0	9.000	N	19.8
1.135000	47.89	---	73.00	25.11	1000.0	9.000	N	19.8
7.615000	---	44.50	60.00	15.50	1000.0	9.000	N	19.7
7.615000	50.96	---	73.00	22.04	1000.0	9.000	N	19.7
7.680000	---	45.03	60.00	14.97	1000.0	9.000	N	19.7
7.680000	51.52	---	73.00	21.48	1000.0	9.000	N	19.7

◆ Calculation

$$\text{QuasiPeak [dBμV]} / \text{CAverage [dBμV]} = \text{Reading Value [dBμV]} + \text{Corr. [dB]}$$

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

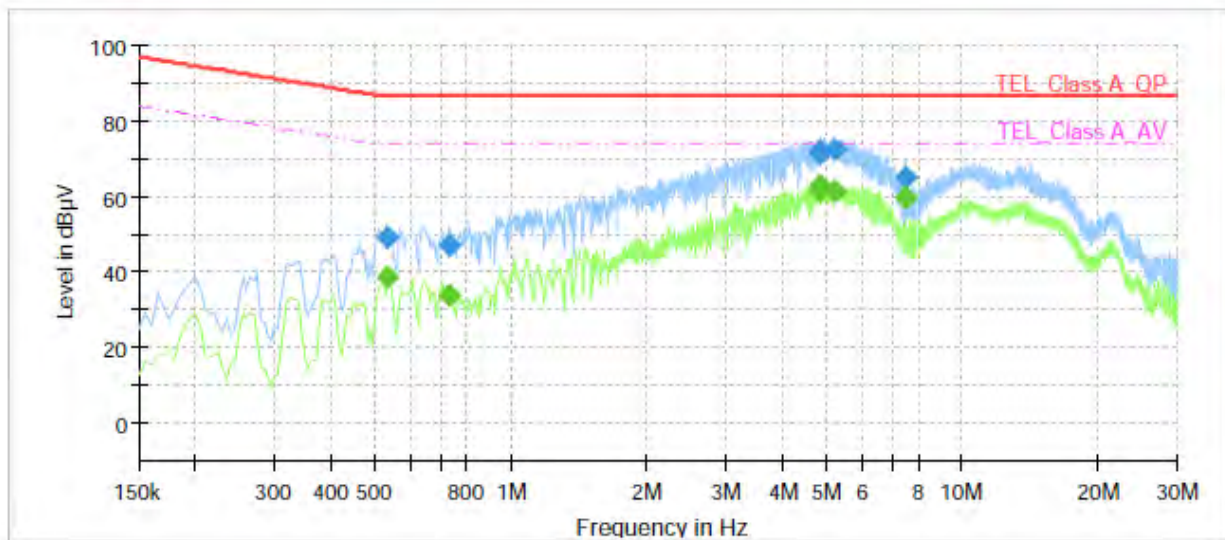
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

Conducted Emissions at Telecommunication Ports

[10 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	SRN-873SP
Mode	10 Mbps
Operator Name:	KES



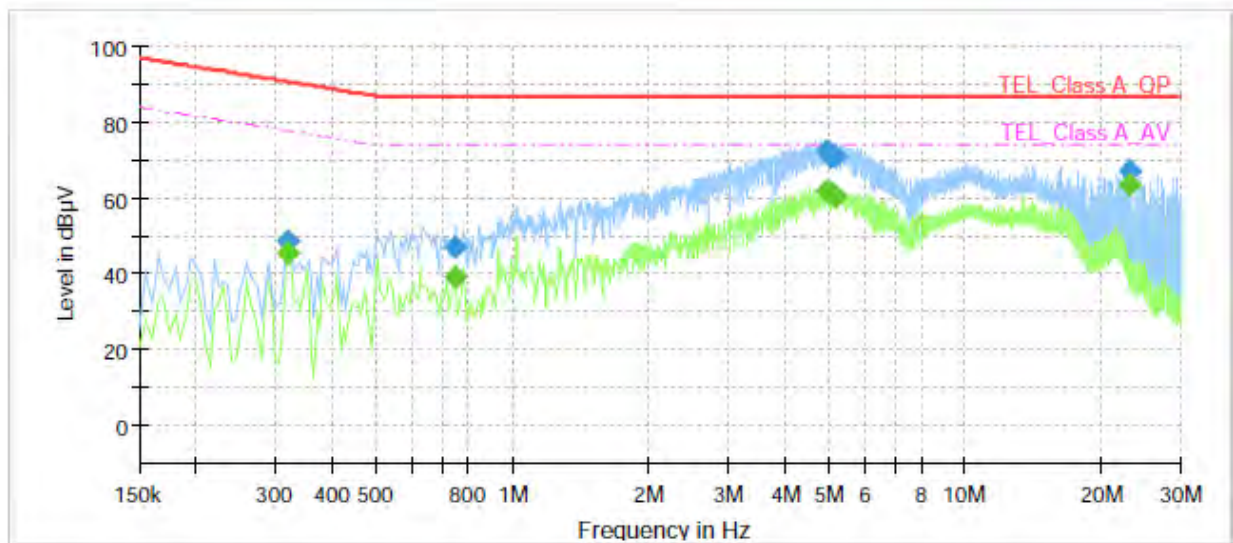
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.535000	---	38.63	74.00	35.37	1000.0	9.000	Single Line	19.9
0.535000	49.20	---	87.00	37.80	1000.0	9.000	Single Line	19.9
0.735000	---	33.85	74.00	40.15	1000.0	9.000	Single Line	19.9
0.735000	47.02	---	87.00	39.98	1000.0	9.000	Single Line	19.9
4.835000	---	62.98	74.00	11.02	1000.0	9.000	Single Line	20.0
4.835000	71.71	---	87.00	15.29	1000.0	9.000	Single Line	20.0
4.840000	---	61.65	74.00	12.35	1000.0	9.000	Single Line	20.0
4.840000	71.24	---	87.00	15.76	1000.0	9.000	Single Line	20.0
5.210000	---	61.18	74.00	12.82	1000.0	9.000	Single Line	19.9
5.210000	72.64	---	87.00	14.36	1000.0	9.000	Single Line	19.9
7.500000	---	60.02	74.00	13.98	1000.0	9.000	Single Line	19.8
7.500000	65.27	---	87.00	21.73	1000.0	9.000	Single Line	19.8

[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	SRN-873SP
Mode	100 Mbps
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.320000	---	45.37	77.71	32.34	1000.0	9.000	Single Line	19.4
0.320000	48.49	---	90.71	42.22	1000.0	9.000	Single Line	19.4
0.750000	---	39.02	74.00	34.98	1000.0	9.000	Single Line	19.4
0.750000	46.88	---	87.00	40.12	1000.0	9.000	Single Line	19.4
4.970000	---	62.16	74.00	11.84	1000.0	9.000	Single Line	19.5
4.970000	72.50	---	87.00	14.50	1000.0	9.000	Single Line	19.5
5.035000	---	61.57	74.00	12.43	1000.0	9.000	Single Line	19.5
5.035000	70.87	---	87.00	16.13	1000.0	9.000	Single Line	19.5
5.195000	---	60.60	74.00	13.40	1000.0	9.000	Single Line	19.4
5.195000	71.15	---	87.00	15.85	1000.0	9.000	Single Line	19.4
23.130000	---	63.56	74.00	10.44	1000.0	9.000	Single Line	19.4
23.130000	67.35	---	87.00	19.65	1000.0	9.000	Single Line	19.4

◆ Calculation

QuasiPeak [dBμV] / CAverage [dBμV] = Reading Value [dBμV] + Corr. [dB]

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

Corr. : Correction values (ISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

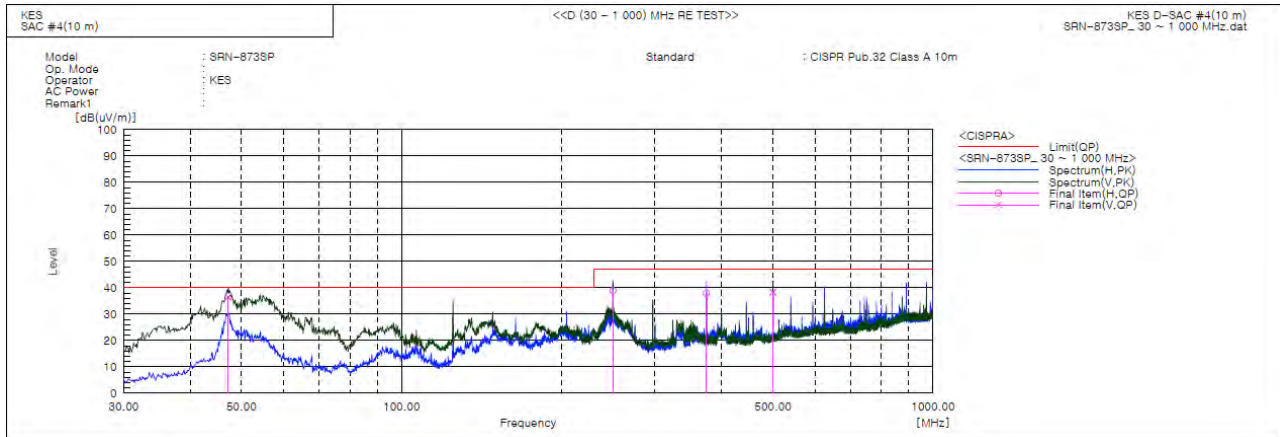


KES Co., Ltd.

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Test report No.:
KES-E1-17T0849
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Radiated Electric Field Emissions(Below 1 GHz)



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	47.218	V	64.5	-28.0	36.5	40.0	3.5	394.0	276.0	
2	249.948	H	64.3	-25.4	38.9	47.0	8.1	385.0	145.0	
3	374.956	H	59.2	-21.3	37.9	47.0	9.1	221.0	51.0	
4	499.965	V	56.1	-17.7	38.4	47.0	8.6	153.0	353.0	

◆ Calculation – SAC #4(10 m)

Result(QP) [dB(μV/m)] = (Reading(QP)[dB(μV)] + c.f[dB(1/m)])

Margin(QP)[dB] = Limit[dB(μV/m)] - Result(QP) [dB(μV/m)]

Reading(QP) : Reading value, Result(QP) : Reading value + Factor value

Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

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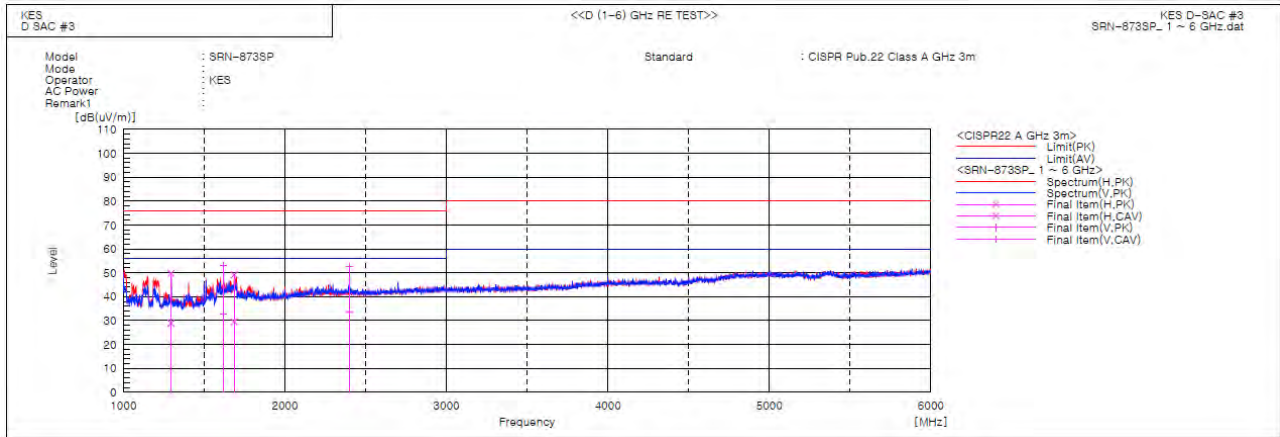


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Radiated Electric Field Emissions(Above 1 GHz)



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1295.000	H	57.6	36.7	-7.8	49.8	28.9	76.0	56.0	26.2	27.1	100.0	81.0	
2	1686.000	H	53.5	33.9	-4.3	49.2	29.6	76.0	56.0	26.8	26.4	100.0	73.0	
3	1620.000	V	58.1	37.8	-5.0	53.1	32.8	76.0	56.0	22.9	23.2	100.0	351.9	
4	2400.000	V	52.3	33.4	0.2	52.5	33.6	76.0	56.0	23.5	22.4	100.0	4.0	

◆ Calculation

Over Limit [dB] = (Read Level[dB μ V] + Ant Factor[dB/m] + Cable Loss [dB] - Preamp Factor [dB]) - Limit Line[dB μ V]

Over Limit : Margin, Read Level : Reading value, Ant Factor : ANT Factor,

Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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**Harmonic Current Emissions and Voltage Fluctuations and Flicker****Average harmonic current results**

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	113.770E-3	1.187	2.07	PASS
2	513.627E-6			PASS
3	24.576E-3			PASS
4	628.296E-6	0.709	1.03	PASS
5	7.274E-3			PASS
6	588.346E-6			PASS
7	3.197E-3			PASS
8	604.463E-6			PASS
9	3.495E-3			PASS
10	652.697E-6			PASS
11	3.046E-3			PASS
12	591.698E-6			PASS
13	1.633E-3			PASS
14	650.579E-6			PASS
15	1.756E-3			PASS
16	558.970E-6			PASS
17	2.611E-3			PASS
18	573.344E-6			PASS
19	1.451E-3			PASS
20	568.776E-6			PASS
21	1.882E-3			PASS
22	556.449E-6			PASS
23	1.673E-3			PASS
24	620.089E-6			PASS
25	1.397E-3			PASS
26	559.013E-6			PASS
27	1.343E-3			PASS
28	633.925E-6			PASS
29	1.671E-3			PASS
30	556.002E-6			PASS
31	1.878E-3			PASS
32	586.982E-6			PASS
33	1.184E-3			PASS
34	601.498E-6			PASS
35	726.300E-6			PASS
36	569.685E-6			PASS
37	843.390E-6			PASS
38	579.125E-6			PASS
39	1.151E-3			PASS
40	553.859E-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.



Test Data - Harmonics (continued)

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	114.609E-3	0.539	4.60	PASS
2	908.764E-6			
3	24.790E-3			
4	885.093E-6	0.324	2.28	PASS
5	7.390E-3			
6	643.601E-6			
7	3.347E-3	0.324	2.28	PASS
8	760.859E-6			
9	3.679E-3			
10	751.945E-6	0.324	2.28	PASS
11	3.163E-3			
12	696.218E-6			
13	2.010E-3	0.324	2.28	PASS
14	794.127E-6			
15	1.838E-3			
16	650.578E-6	0.324	2.28	PASS
17	2.716E-3			
18	679.249E-6			
19	1.535E-3	0.324	2.28	PASS
20	723.647E-6			
21	1.984E-3			
22	633.021E-6	0.324	2.28	PASS
23	1.770E-3			
24	702.942E-6			
25	1.543E-3	0.324	2.28	PASS
26	640.135E-6			
27	1.510E-3			
28	874.132E-6	0.324	2.28	PASS
29	1.764E-3			
30	620.320E-6			
31	2.066E-3	0.324	2.28	PASS
32	657.753E-6			
33	1.372E-3			
34	716.280E-6	0.324	2.28	PASS
35	855.792E-6			
36	711.526E-6			
37	976.435E-6	0.324	2.28	PASS
38	652.128E-6			
39	1.236E-3			
40	616.806E-6	0.324	2.28	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.



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Test Data - Voltage Fluctuations

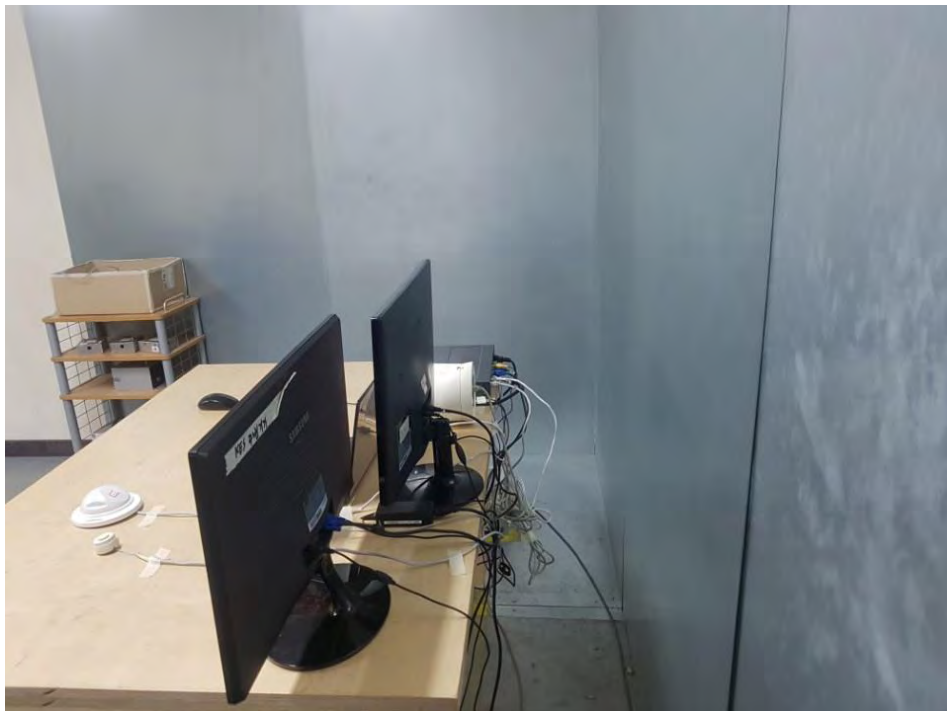
Maximum Flicker results

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.082	4.00	PASS
Tmax [s]	0.000	0.50	PASS

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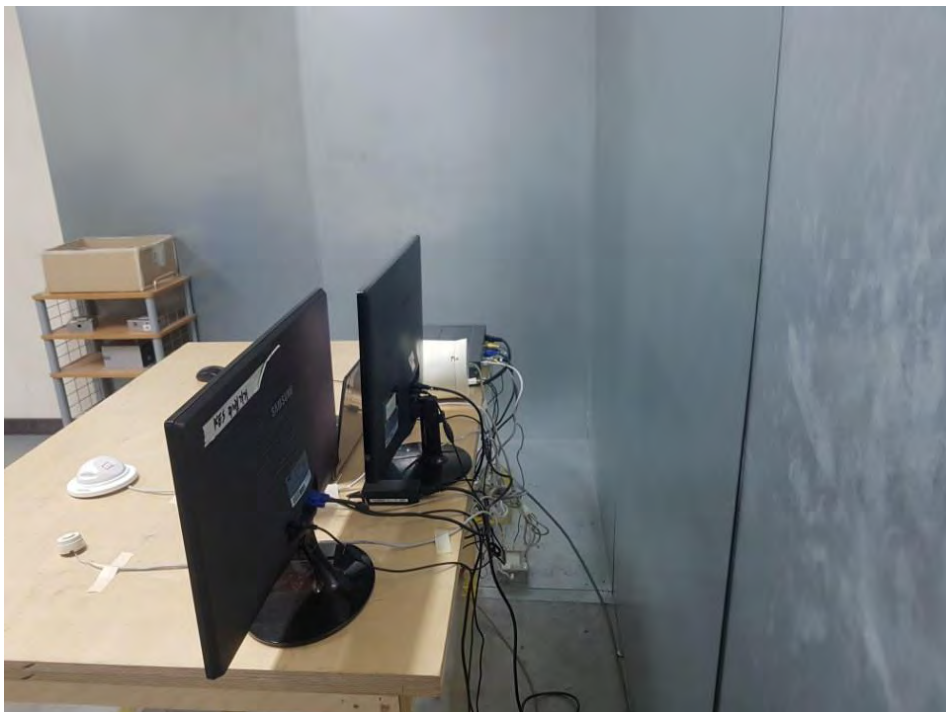
Test Setup Photos and Configuration

Conducted Voltage Emissions



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Conducted Telecommunication Emissions



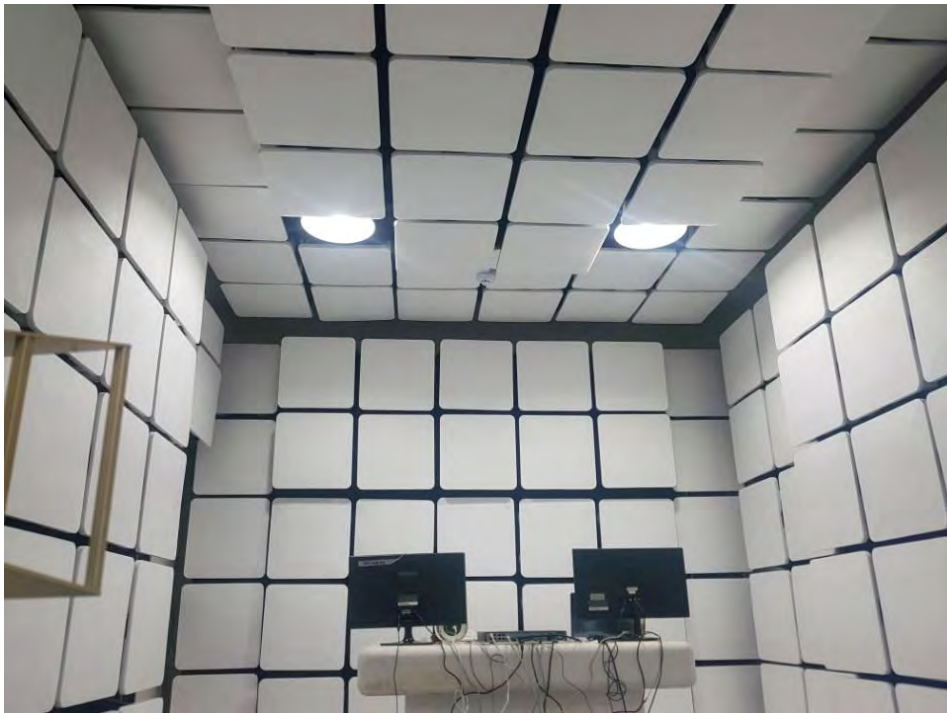
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Radiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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Harmonic Current Emissions and Voltage Fluctuations and Flicker

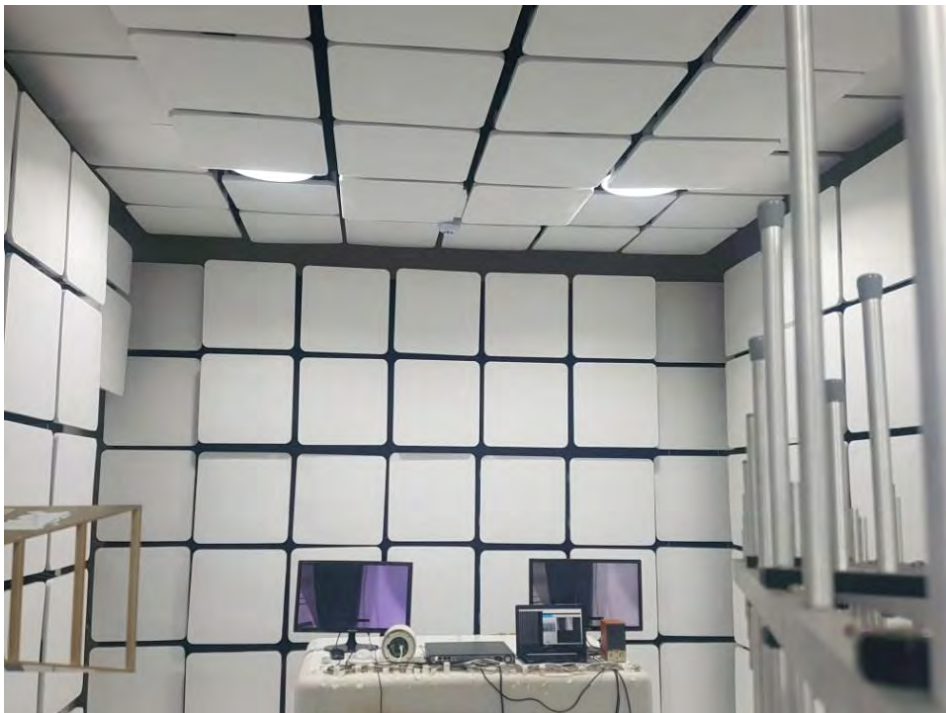


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Electrostatic Discharge

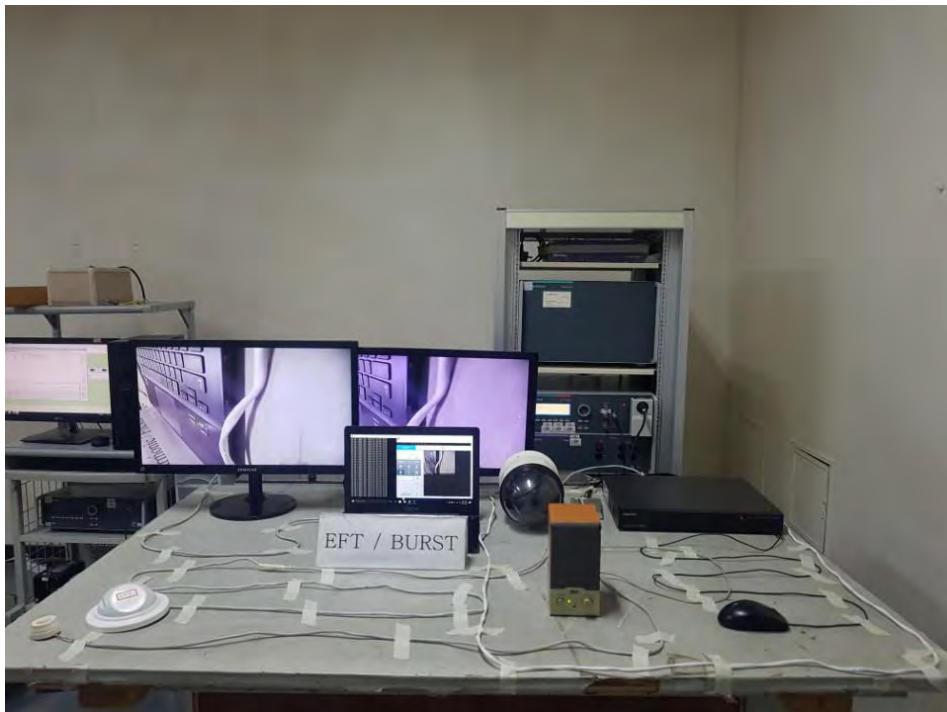


Radiated Electric Field Immunity



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Electrical Fast Transients/Bursts



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Surge Transients



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Conducted Disturbance



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Voltage Dips and Short Interruptions



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EUT External Photographs

(Top)



(Bottom)



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EUT Internal Photographs

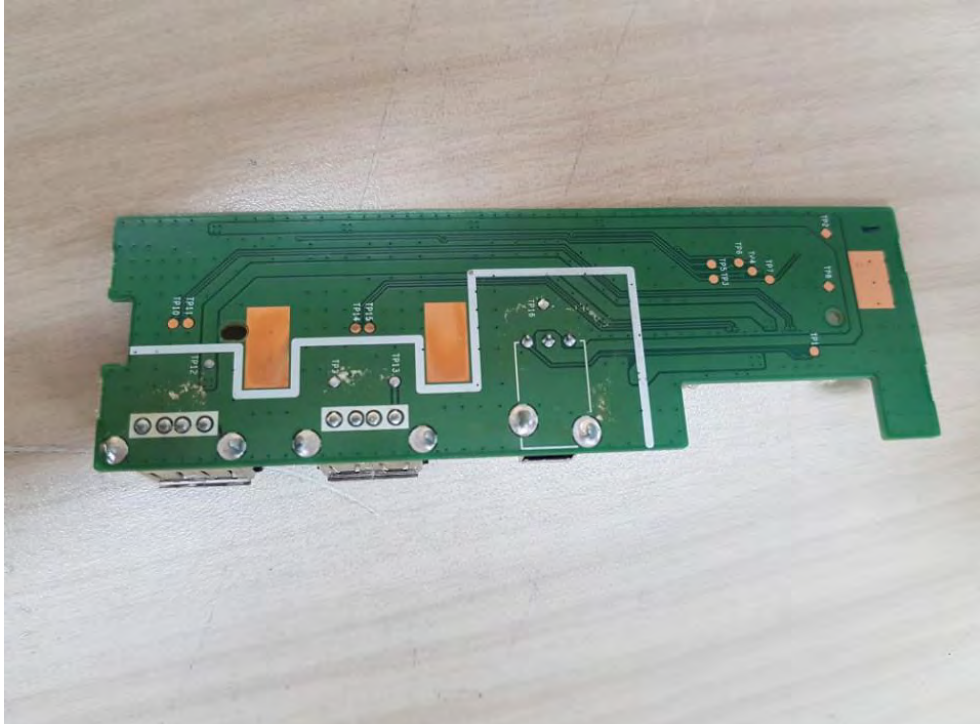
(Internal View)



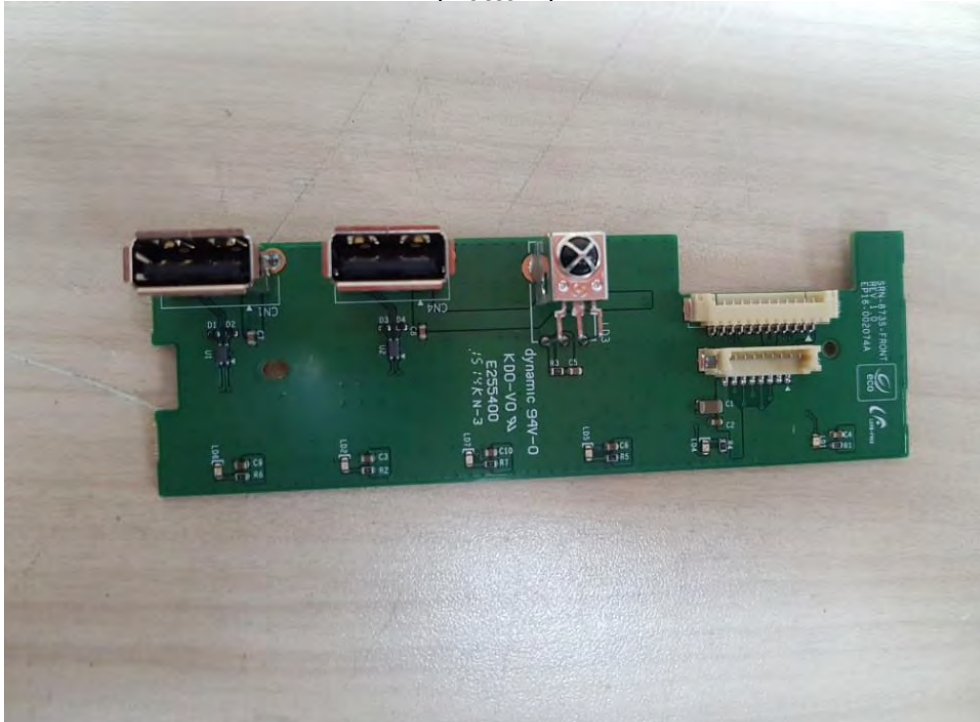
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EUT Internal View –Board 1

(Top)



(Bottom)



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EUT Internal View – Board 2

(Top)



(Bottom)



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EUT Internal View – Power

(Top)



(Bottom)



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EUT Internal View – HDD

(Top)



(Bottom)



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Label and Location



NVR

Model No : SRN-873SP

Manufacturer : Hanwha Techwin (Tianjin) Co.,Ltd.

Made in China

