



KES Co., Ltd.

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Test report No.:
KES-E1-17T0193
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EMC TEST REPORT For IC

Test Report No. : KES-E1-17T0193
Date of Issue : Mar. 02, 2017
Product name : DVR
Model/Type No. : HRD-1642N
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 : Feb, 13, 2017
Test date : Feb, 20, 2017
Test Results : ☒ In Compliance ☐ Not in Compliance

Tested by

Young Suk, Song
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Mar, 02 2017	KES-E1-17T0193	Issued

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1.0 General Product Description

Main Specifications of EUT are:

HRD-1642		
Video	Inputs	16channel BNC : AHD(-4MP), TVI(-2MP), CVI(-2MP), NTSC/PAL
	Resolution	2560x1440, 1920 x 1080, 1280 x 720, 960 x 480, 704 x 480 / 960 x 576, 704 x 576
Live	Frame rate	480fps, 400fps
	Resolution	2560x1440, 1920 x 1080, 1280 x 720, 960 x 480, 704 x 480 / 960 x 576, 704 x 576
	Multi Screen display	1/4/7/9/13/16/AVPIP/Sequence
Performance		
Operating System	Embedded	Linux
Recording	Compression	H.264, Wisestream
		NTSC : Up to 240fps@4MP / PAL : Up to 200fps@4MP
	Record Rate(Analog)	-
		NTSC : Up to 480fps@1920 x 1080 / PAL : Up to 400fps@1920 x 1080
		NTSC: Up to 480fps @ 1280 x 720, 928x480, 704x480, 704x240, 352x240
		PAL: Up to 400fps @ 1280 x 720, 928x576, 704x576, 704x288, 352x288
	Mode	Manual, Schedule (Continuous/Event), Event(Pre/Post), Time lapse (1~30 fps(N), 1~25fps(P))
	Event	Video Loss, Motion(Level 1~10), Alarm Input(16), Tampering(Level Low/Medium, High)
Search & Playback	Overwrite modes	Continuous
	Pre-alarm	Up to 30 sec (5, 10, 20, 30 Sec)
	Post-Alarm	Up to 6 hour (5, 10, 20, 30 sec, 1.3.5, 10, 20 min, 1, 2, 3, 4, 5, 6 hour)
	Search mode	Date/time, Event, Back up, POC(SD Signal only), Motion (* All Search Included Preview Function)
	Playback function	Fast Forward/Backward (x2,x4,x8,x16,x32,x64) * Backward Play with I-frame Only, Slow Forward/Backward (x1/2,x1/4,x1/8) Step Forward/Backward * Backward Play with I-frame Only
Network(IPv4)	Simultaneous playback	16CH(Local Monitor, CMS)
	Transmission speed	Record(Main) Stream) 4MP : 15fps/CH, 1080p/720p/WD1/4CIF/CIF : 30fps/CH(N), 25fps/CH(P)
	Transmission Bandwidth	Network(Sub) Stream) WD1/4CIF : 12fps/CH, 2CIF/CIF/QVGA/QCIF : 30fps/CH(N), 25fps/CH(P)
	Bandwidth control	Up to 64Mbps
	Stream	Selectable
	Remote users Maximum	Record Stream and Network Stream Selectable (at monitoring Viewer)
	Protocol support	Search(3)/Live Unicast(10)/Live Multicast(20)
	Web Browser	TCP/IP, DHCP, PPPoE, SMTP, RTP, HTTP, DNS, RTSP, SNMP, SUNAPI 2017.07
Smart phone	Viewer Software	Windows OS : Internet Explorer 8, 9, 10, Firefox 3.6 or higher, Chrome 12 or higher Mac OS : Safari 5 or higher, Firefox 3.6 or higher
	Platform	SSM, Webviewer, SmartViewer, IPOUS mobile viewer, WiseNet Mobile (~7. 2017)
	Protocol support	Android, iOS
	Control	RTP, RTSP, HTTP, CGI(SUNAPI 2017.07)
	Remote users Maximum	Live(8ch) : Multi-Profile Support Playback(1ch)
Storage	Internal	Search (3), Live Unicast (10), Multicast (20)
	External (e-SATA Interface)	Up to 8 SATA HDDs (0~8TB HDD)
	File Format (Back-up)	e-SATA, USB(for Backup)
Security	BU(DVR Player), SEC(Include Player), AVI	
	Password Protection	1 Admin, 10 Group, 10 User per 1 Group
Data Authentication		Watermark
Easy Configuration		P2P (TUTK) (~7. 2017)
Interface		
Monitors	VGA	1 VGA (1920x1080, 1280x1024, 1280x720)
	HDMI	1 HDMI (4K(3840 x 2160), 2K(2560 x 1440), 1920x1080, 1280x1024, 1280x720)
	Composite(Spot)	BNC(1CH) * Included OSD On Screen, Multi mode Support
	Loop Outputs	-
Audio	Inputs/Output	16CH line in (Built in 4CH, Option : Audio Extension Cable) 1CH line out
	Compression	G.711
	Sampling rate	8KHz
Alarm	Inputs/Outputs	Terminal 16 Inputs (NO/NC) / Terminal 4 relay Outputs (NO/NC), Rating : 30V DC/2A, 250V AC/0.25A
	Remote notification	Notification via e-mail
Connections	Ethernet	Notification via e-mail
	Serial Interface	1 RJ45 10/100/1000 Base-T
	USB	RS-485(Full Duplex) for PTZ, Samsung System Keyboard
	e-SATA	1 ports/USB 3.0, Rear), 1 ports/USB 2.0, Front)
	Application Support	2 External SATA ports
	Protocol support(RS-485)	Mouse, Remote Controller SPC-2000/7000 (RS-485 protocol)TBD
	Protocol support(Coaxial)	Samsung-E/Samsung-T/Pelco-D/Pelco-P/Panasonic/ Phillips/ AD/ DIAMOND/ ERNA/ KALATEL/ VCL TRIVICON/ ELMO/GE
		NTSC/PAL : Pelco-C (Coaxtron)
General		AHD : ACP(AHD Coax Protocol)
Electrical		
Environmental	Input Voltage/Current	100 ~ 240 VAC ±10%; 50/60 Hz
	Power consumption	smgs 250w
Mechanical	Operating Temperature/Humidity	+0°C to +40°C (+32°F to +104°F) / 20% to 85% RH
	Dimension (W x H x D)	W440 x H68 x D384.8(17.32" x 3.46" x 15.14")
Lauguage	Weight (with hard disks)	5.665kg
	GUI	English, French, German, Spanish, Italian, Russian, Polish, Czech, Turkish, Netherlands Portuguese, Swedish, Danish, Rumania, Serbia, Croatia, Hungary, Greek, Finnish, Norwegian, Korean, Japanese, Chinese(Traditional), Thai, Taiwanese(25 Language)
	Web Browser	English, French, German, Italian, Spanish, Russian, Turkish, Polish, Dutch, Swedish, Czech, Portuguese, Danish, Rumanian, Serbian, Croatian, Hungarian, Greek, Norwegian, Finnish, Korean, Chinese(Simplified), Japanese, Thai



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 ☐ 230 Vac ☒ 120 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
DVR	HRD-1642N	-	Hanwha Techwin (Tianjin) Co.,Ltd	E.U.T
Mouse 1	MOEIUOA	PMX-MMOEIUA	PRIMAX ELECTRONICS LTD.	-
Remote Controller	EP10-000329A	-	Samsung Techwin (Sta)	-
HDD	WD10PURX	WCC4J7TS2NSC	WD Purple	1TB
Switching Power Supply	FSP250-50GUB	-	FSP	-

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1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
MONITOR 1	W2261VT	005NDCRDV451	LG Electronics NanJing Display Co., Ltd	-
MONITOR 2	S24E370DL	0NTWHTPH200179Y	Samsung Electronics Co., Ltd	-
MONITOR 2 Adaptor	A3514_FPN	CN07BN4400832ASK2 8GCTR235 R.D	POWERNET Technologies Crop.	-
MONITOR 3	SMT-2232	C95V67VF900025B	Weiha Daewoo Electronics Co., Ltd.	-
Notebook	X56K	HN11N5151FJ0045W	HANSUNG	-
Notebook Adaptor	A12-120P1A	F180271552011758	CHICONY POWER TECHNOLOGY CO.,LTD.	-
CAMERA	SDC-8440BC	-	Hanwha Techwin (Tianjin) Co.,Ltd	-
CAMERA AC/ DC Adapter	EO-1210	-	EO Electronics	-
Speaker	BR-100A	-	Britz International Co., Ltd.	-
Microphone 1	CMK-303	-	CAMAC	-
Microphone 2	CMK-303	-	CAMAC	-
Mouse 2	SMB-400	0DJM010118	SEJIN ELECTRON INC.	-
External hard disk drives	MDY-US2528	-	Q-DRIVER	-
Alarm 1	-	-	-	-
Alarm 2	-	-	-	-

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1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I / O Port	Description	I / O Port	Length	Shield
DVR (E.U.T)	RJ 45	Notebook	RJ 45	3.0	U
	D-SUB	MONITOR 1	D-SUB	1.5	S
	HDMI	MONITOR 2	HDMI	1.5	S
	BNC	MONITOR 3	BNC	3.0	S
	BNC	CAMERA	BNC	10	S
	Audio out	Speaker	Audio in	1.4	U
	Audio in	Microphone 1	Audio out	1.2	U
	Audio in	Microphone 2	Audio out	1.7	U
	USB	Mouse 1	USB	1.2	U
	RS 232	Mouse 2	RS 232	1.4	U
	e sata	External hard disk drives	e sata	0.15	U
	2 Pin	Alarm 1	2 Pin	3.0	U
	2 Pin	Alarm 2	2 Pin	3.0	U

* Unshielded = U, Shielded = S



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1.7 EUT Operating Mode(s)

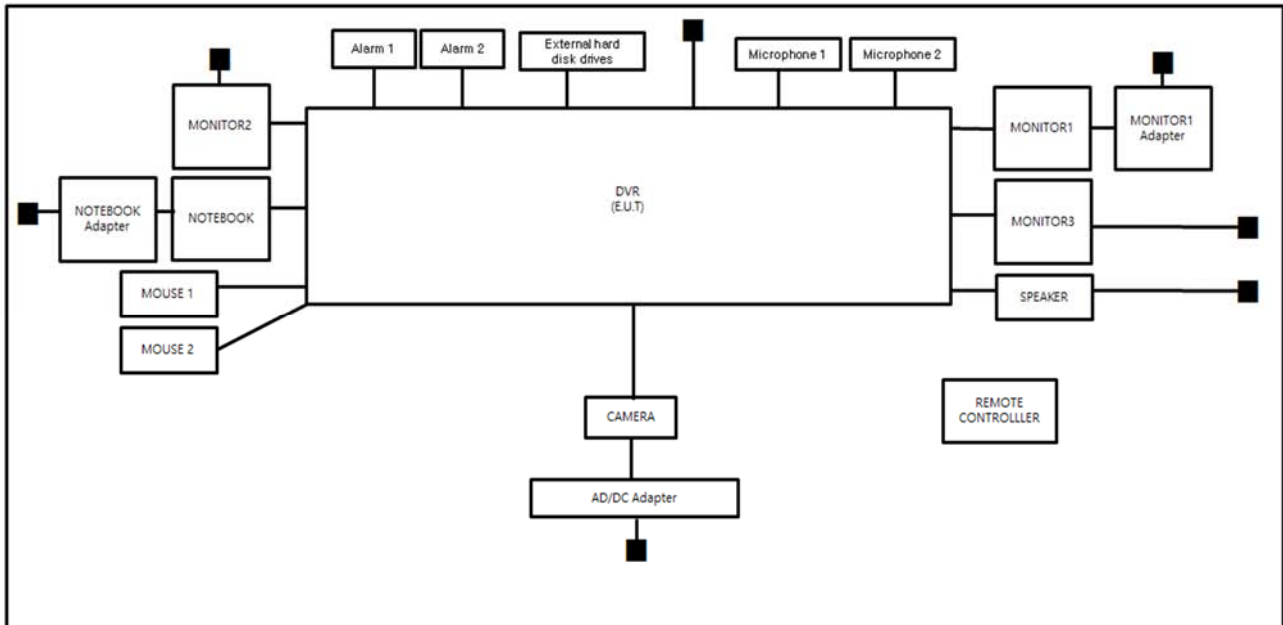
Test mode	operating
AC 230 V	E.U.T Monitoring, Ping test, 1 kHz

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

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1.8 Configuration

■ AC Main
□ DC Main



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1.9 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.

1.10 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 22.

1.11 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)	



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

☐ Class A

☐ Class B

☐ EN 55024:2010 +A1:2015

☐ EN 50130-4:2011 +A1:2014

☐ EN 61000-3-2:2014

☐ EN 61000-3-3:2013

☐ EN 61326-1:2013



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-
- | | | |
|--|---|----------------------------------|
| ☐ 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 | | |

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2.1 Conducted Emissions Mains Power Ports

Test Date

Feb, 20, 2017

Test Location

Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test Receiver	ESR3	R & S	101783	05, 03, 2017
☒	LISN	ENV216	R & S	101137	02, 03, 2018
☒	LISN	ENV216	R & S	101786	05, 02, 2017
☒	PULSE LIMITER	ESH3-Z2	R & S	101914	12, 13, 2017
☒	Shield Room #3	-	SEMITEC	-	-
☒	EMI Test S/W	EMC32	R & S	9.12.00	-

Test Conditions

Temperature: 20,9 °C
Relative Humidity: 40,4 %

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 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Feb, 20, 2017

Test Location

☐ Open Area Test Site #1 ☒ Open Area Test Site #2

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test Receiver	ESR3	R & S	101781	05, 03, 2017
☒	Trilog-Broadband Antenna	VULB 9163	SCHWARZBECK	715	04, 14, 2018
☒	Open Area Test Site	-	KES	-	-
☒	Antenna Mast	-	DAEIL EMC	-	-
☒	Turn Table	-	DAEIL EMC	-	-
☒	EMI Test S/W	-	-	-	-

Test Conditions

Temperature: 2,1 °C
Relative Humidity: 42,0 %

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

Remarks

See Appendix A for test data.

2.3 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Feb, 20, 2017

Test Location

Semi Anechoic Chamber #2

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	Log-Periodic Antenna	STLP 9149	SCHWARZBECK	9149-255	05, 17, 2018
☒	EMI Test Receiver	ESU26	R & S	100552	04, 24, 2017
☒	Broadband Coaxial Preamplifier	BBV 9718	Schwarzbeck Mess - Elektronik	9718-246	10, 14, 2017
☒	Semi Anechoic Chamber #2	-	SEMITEC	-	-
☒	Antenna Mast	-	AUDIX	-	-
☒	Turn Table	-	AUDIX	-	-
☒	EMI Test S/W	e3	AUDIX	8.083b	-

Test Conditions

Temperature: 20,9 °C

Relative Humidity: 40,4 %

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

Remarks

See Appendix A for test data.



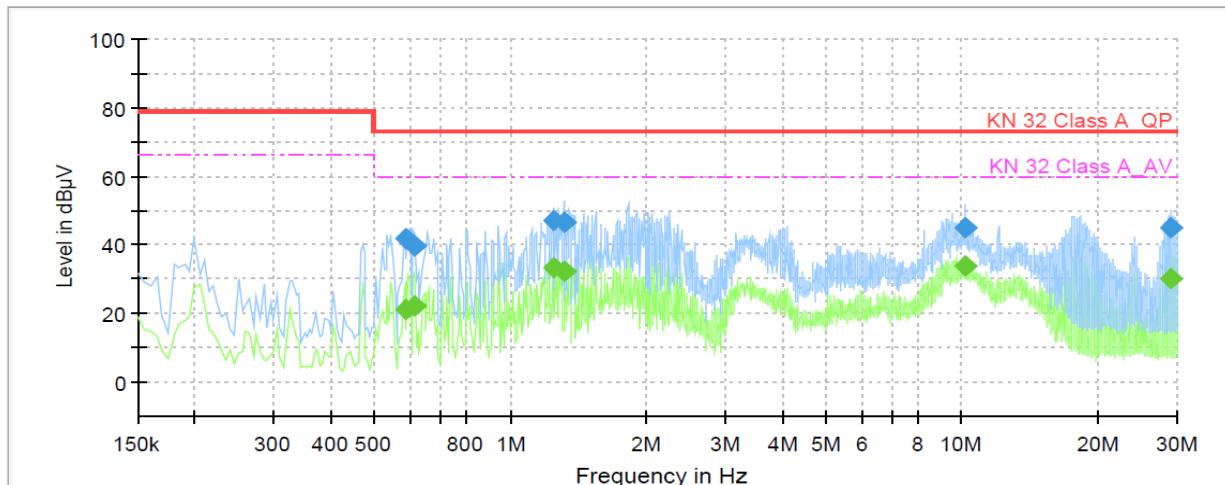
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

Common Information

Test Description: Conducted Emission
Model No.: HRD-1642N
Mode
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.585000	---	21.36	60.00	38.64	1000.0	9.000	L1	20.5
0.585000	41.68	---	73.00	31.32	1000.0	9.000	L1	20.5
0.615000	---	22.36	60.00	37.64	1000.0	9.000	L1	20.4
0.615000	39.97	---	73.00	33.03	1000.0	9.000	L1	20.4
1.250000	---	33.58	60.00	26.42	1000.0	9.000	L1	20.0
1.250000	47.25	---	73.00	25.75	1000.0	9.000	L1	20.0
1.315000	---	32.08	60.00	27.92	1000.0	9.000	L1	20.0
1.315000	46.84	---	73.00	26.16	1000.0	9.000	L1	20.0
10.160000	---	33.67	60.00	26.33	1000.0	9.000	L1	19.9
10.160000	44.87	---	73.00	28.13	1000.0	9.000	L1	19.9
29.050000	---	30.39	60.00	29.61	1000.0	9.000	L1	20.3
29.050000	45.22	---	73.00	27.78	1000.0	9.000	L1	20.3

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

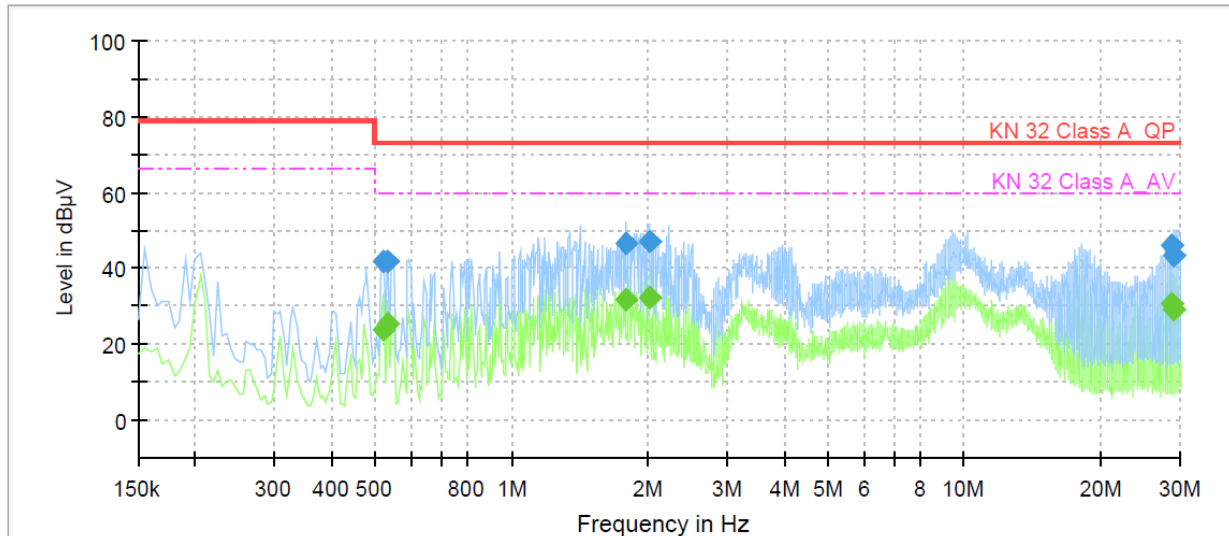
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

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[NEUTRAL]

Common Information

Test Description: Conducted Emission
Model No.: HRD-1642N
Mode
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.520000	---	23.66	60.00	36.34	1000.0	9.000	N	20.5
0.520000	41.82	---	73.00	31.18	1000.0	9.000	N	20.5
0.530000	---	25.59	60.00	34.41	1000.0	9.000	N	20.5
0.530000	42.09	---	73.00	30.91	1000.0	9.000	N	20.5
1.790000	---	31.94	60.00	28.06	1000.0	9.000	N	19.9
1.790000	46.64	---	73.00	26.36	1000.0	9.000	N	19.9
2.025000	---	32.38	60.00	27.62	1000.0	9.000	N	19.8
2.025000	47.09	---	73.00	25.91	1000.0	9.000	N	19.8
28.855000	---	30.64	60.00	29.36	1000.0	9.000	N	20.3
28.855000	46.15	---	73.00	26.85	1000.0	9.000	N	20.3
29.040000	---	28.97	60.00	31.03	1000.0	9.000	N	20.3
29.040000	43.55	---	73.00	29.45	1000.0	9.000	N	20.3

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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



Radiated Electric Field Emissions(Below 1 GHz)

Frequency	Amplitude	ANT	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin [dB]
[MHz]	[dB μ V]	Polar. (H/V)	[m]	ANT. [dB/m]	Cable [dB]	[dB μ V/m]	[dB μ V/m]	
152.37	10.25	V	1.52	8.28	3.05	21.58	40.00	18.42
253.25	12.52	H	2.33	12.61	4.18	29.31	47.00	17.69
320.26	11.36	H	1.58	13.84	4.73	29.93	47.00	17.07
371.59	13.22	V	3.01	14.95	5.08	33.25	47.00	13.75
373.25	11.21	H	2.25	14.99	5.10	31.30	47.00	15.70
519.34	14.89	H	1.69	17.68	6.28	38.85	47.00	8.15
593.53	15.24	V	2.95	19.14	6.78	41.16	47.00	5.84
668.21	11.25	V	1.39	19.56	7.33	38.14	47.00	8.86

* H : Horizontal, V : Vertical

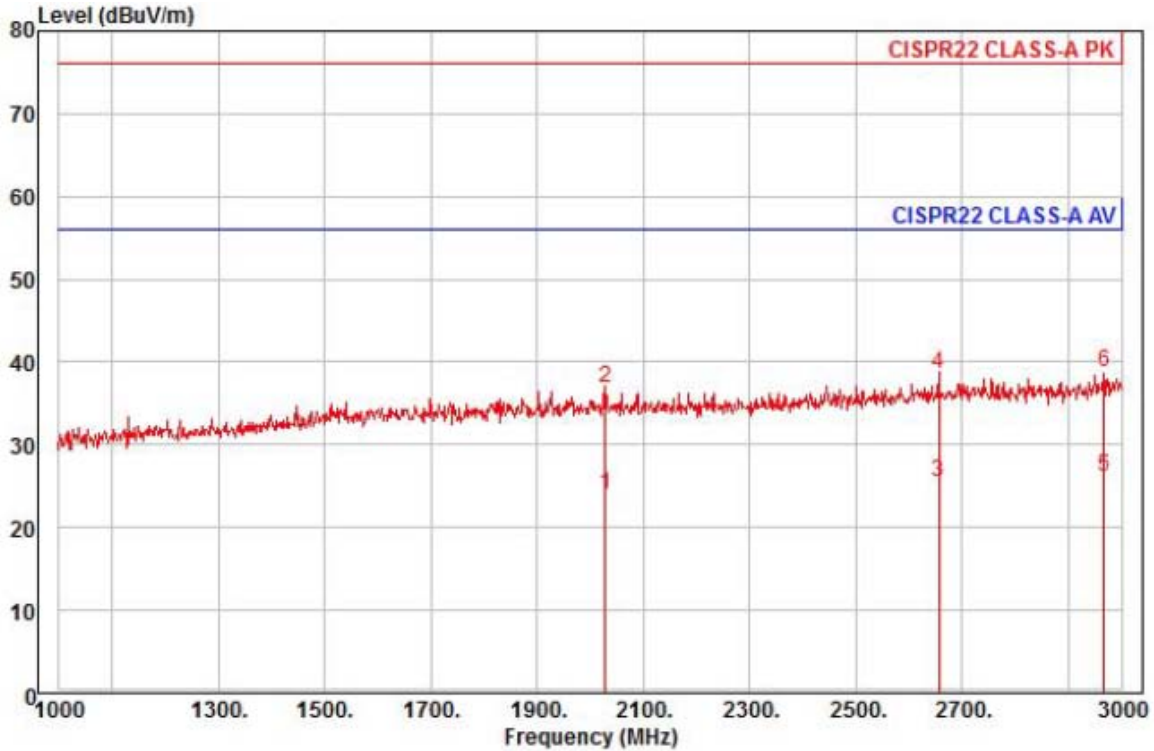
◆ Calculation

Corrected Amplitude [dB μ V] = Amplitude[dB μ V] + Correction Factor [dB]

Corrected Amplitude : The Final Value, Amplitude : Reading Value,

Correction Factor : ANT FACTOR + Cable loss

Radiated Electric Field Emissions(Above 1 GHz)



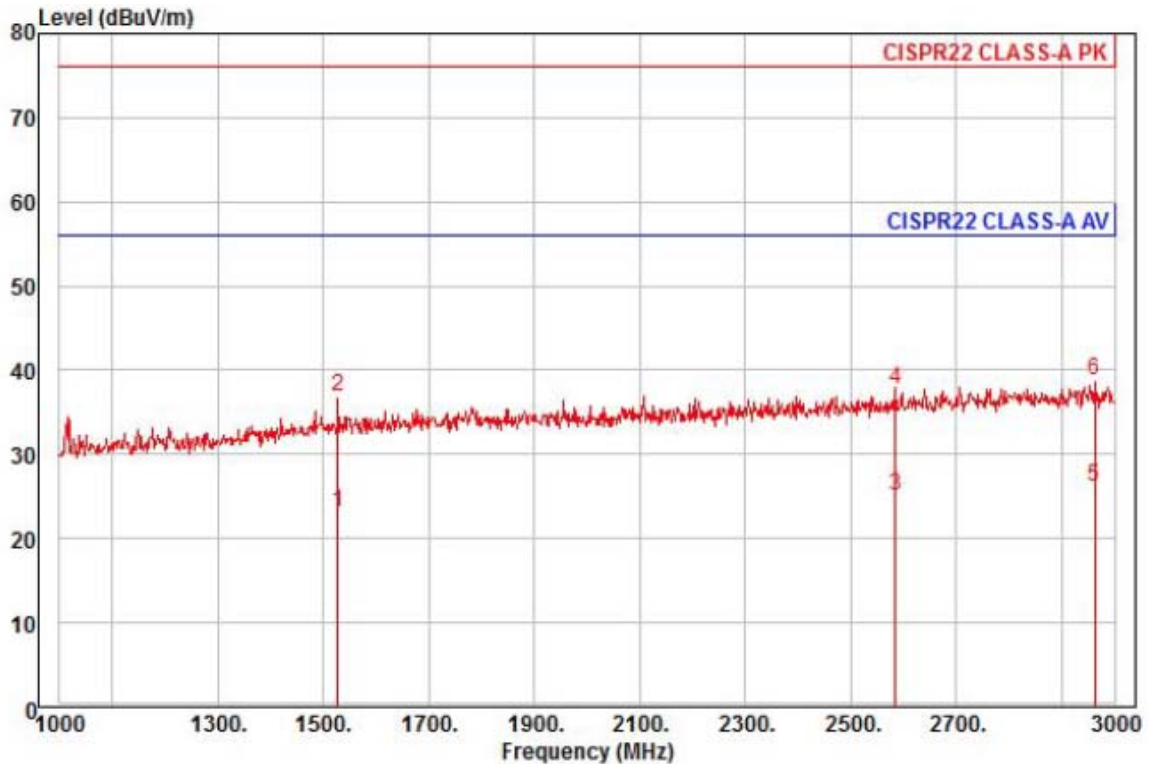
Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(9149-255,2016-05-17) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HRD-1642N
Mode :
Memo : 1 ~ 3 GHz

	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	2028.00	28.20	25.71	9.40	39.41	191	56.00	-32.10	horizontal Average
2	2028.00	41.08	25.71	9.40	39.41	191	76.00	-39.22	horizontal Peak
3	2656.00	26.06	28.26	10.88	39.71	46	56.00	-30.51	horizontal Average
4	2656.00	39.15	28.26	10.88	39.71	46	76.00	-37.42	horizontal Peak
5 pp	2968.00	24.92	29.65	11.62	40.07	128	56.00	-29.88	horizontal Average
6 pk	2968.00	37.69	29.65	11.62	40.07	128	76.00	-37.11	horizontal Peak

◆ Calculation

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

Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor



Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(9149-255,2016-05-17) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HRD-1642N
Mode :
Memo : 1 ~ 3 GHz

	Read Freq	Ant 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	1528.00	30.30	23.91	8.10	39.19	348	56.00	-32.88	vertical	Average
2	1528.00	43.93	23.91	8.10	39.19	348	76.00	-39.25	vertical	Peak
3	2586.00	26.13	27.95	10.71	39.63	218	56.00	-30.84	vertical	Average
4	2586.00	38.64	27.95	10.71	39.63	218	76.00	-38.33	vertical	Peak
5 pp	2962.00	24.96	29.62	11.61	40.07	138	56.00	-29.88	vertical	Average
6 pk	2962.00	37.60	29.62	11.61	40.07	138	76.00	-37.24	vertical	Peak

◆ Calculation

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

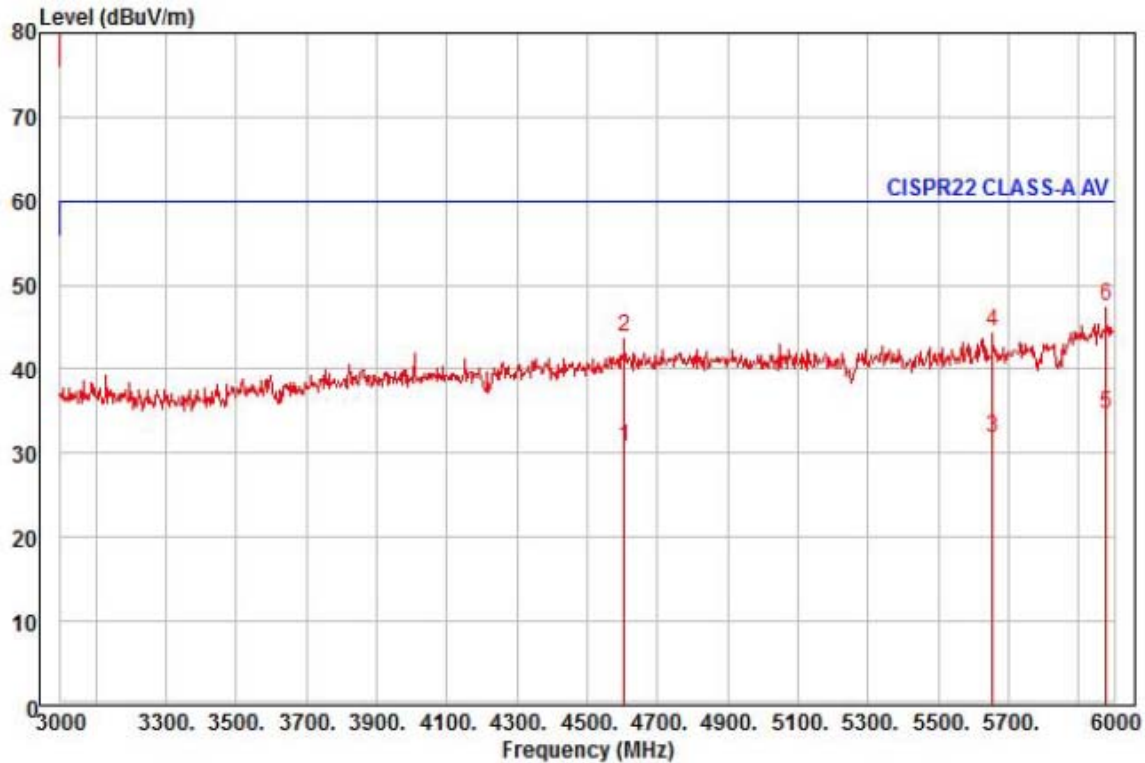
Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor



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Test report No.:
KES-E1-17T0193
Page (21) of (32)



Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(9149-255,2016-05-17) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HRD-1642N
Mode :
Memo : 3 ~ 6 GHz

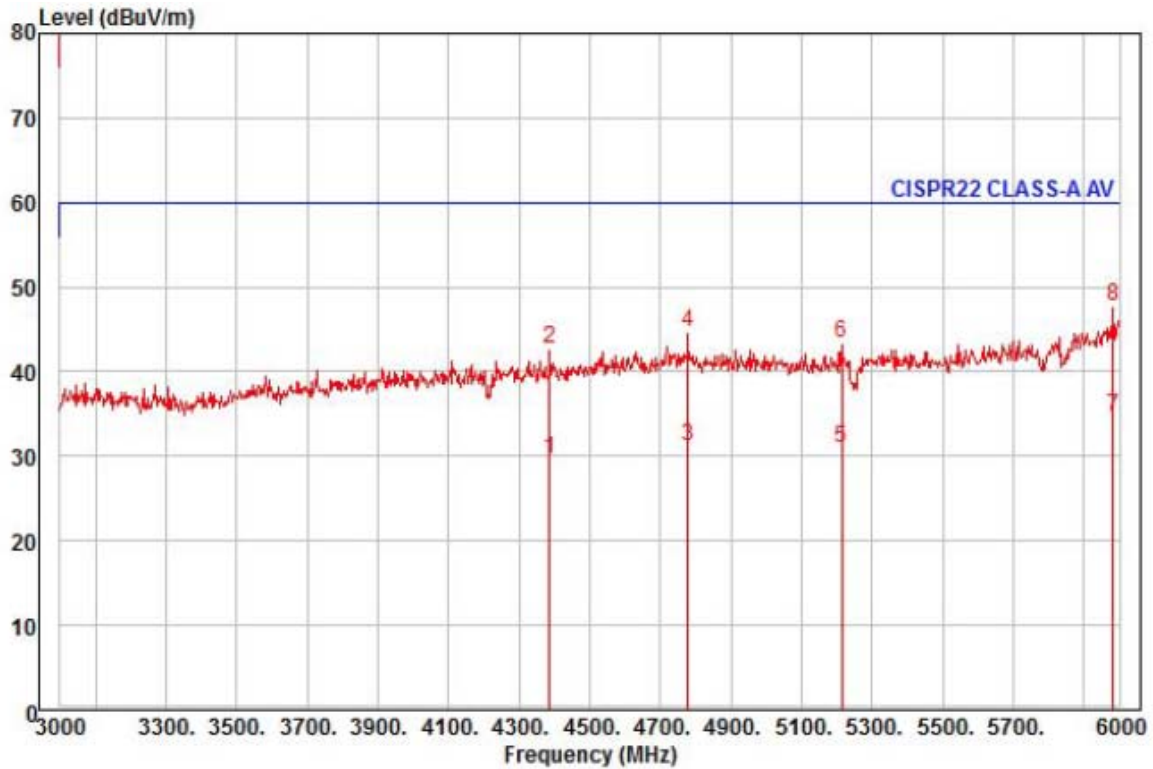
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	4605.00	23.91	32.89	14.67	40.67	213	60.00	-29.20	horizontal	Average
2	4605.00	36.95	32.89	14.67	40.67	213	80.00	-36.16	horizontal	Peak
3	5655.00	21.87	34.47	16.44	40.89	34	60.00	-28.11	horizontal	Average
4	5655.00	34.40	34.47	16.44	40.89	34	80.00	-35.58	horizontal	Peak
5 pp	5979.00	21.73	36.42	17.03	40.46	81	60.00	-25.28	horizontal	Average
6 pk	5979.00	34.44	36.42	17.03	40.46	81	80.00	-32.57	horizontal	Peak

◆ Calculation

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

Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(9149-255,2016-05-17) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HRD-1642N
Mode :
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	4386.00	23.70	32.48	14.25	40.75	64	60.00	-30.32	vertical	Average
2	4386.00	36.80	32.48	14.25	40.75	64	80.00	-37.22	vertical	Peak
3	4779.00	23.57	33.04	15.05	40.49	275	60.00	-28.83	vertical	Average
4	4779.00	37.03	33.04	15.05	40.49	275	80.00	-35.37	vertical	Peak
5	5214.00	22.40	33.36	15.73	40.63	302	60.00	-29.14	vertical	Average
6	5214.00	34.84	33.36	15.73	40.63	302	80.00	-36.70	vertical	Peak
7 pp	5982.00	21.74	36.44	17.04	40.45	266	60.00	-25.23	vertical	Average
8 pk	5982.00	34.69	36.44	17.04	40.45	266	80.00	-32.28	vertical	Peak

◆ Calculation

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

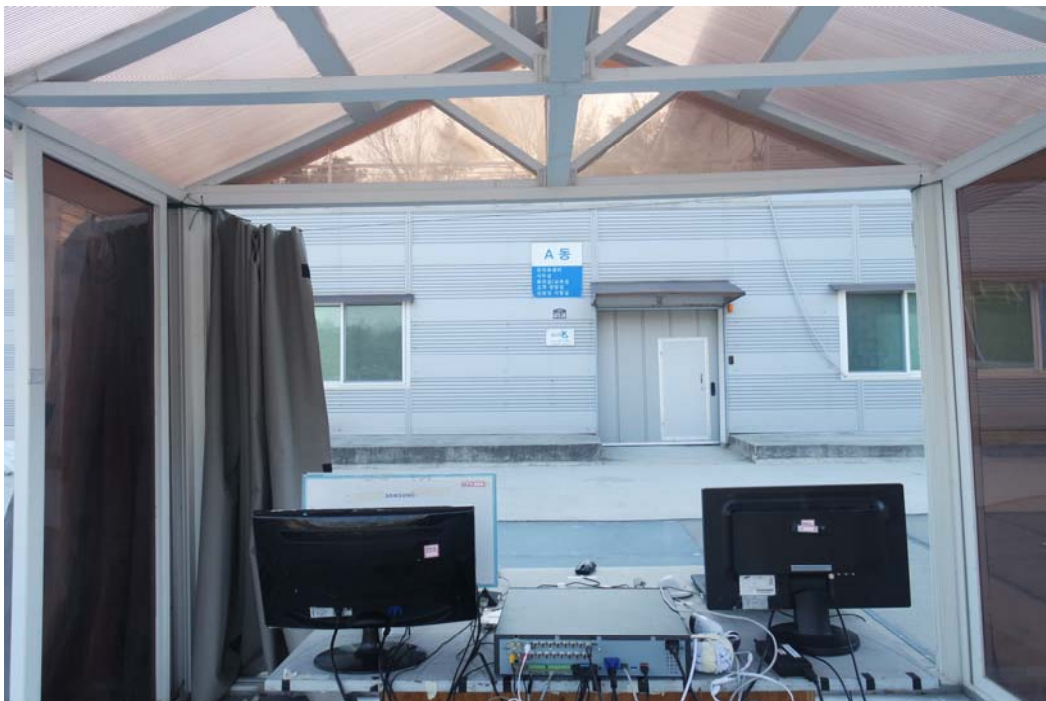
Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor

Test Setup Photos and Configuration Conducted Voltage Emissions



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Radiated Electric Field Emissions(Below 1 GHz)



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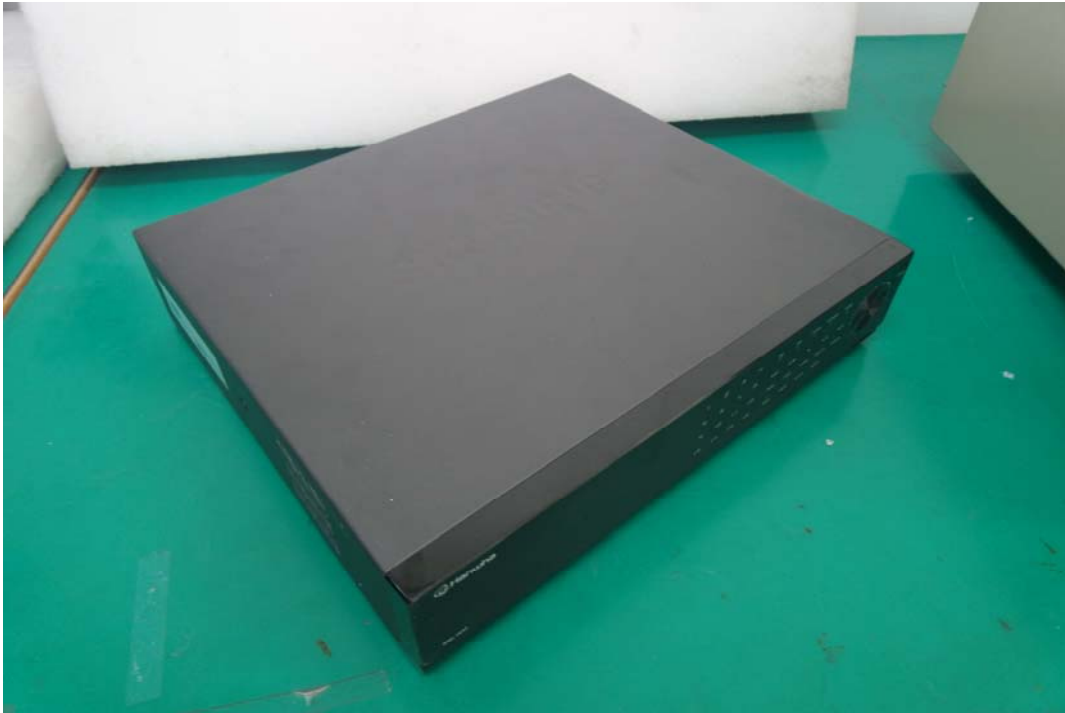
Radiated Electric Field Emissions(Above 1 GHz)



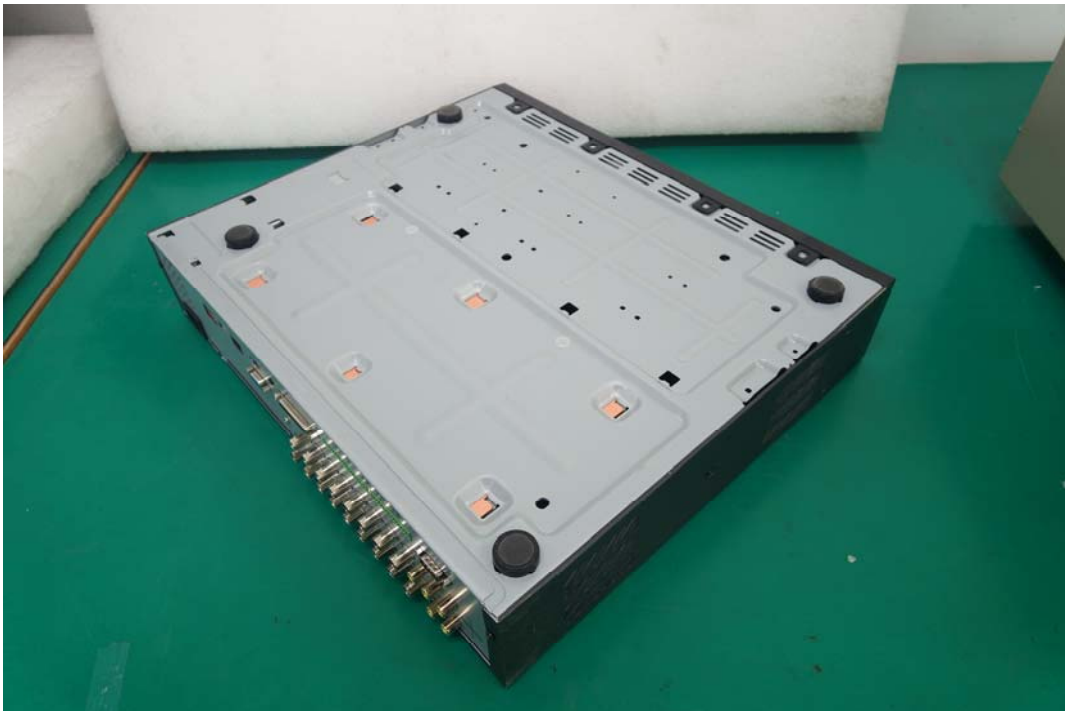
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EUT External Photographs

(Top)



(Bottom)



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EUT Internal Photographs

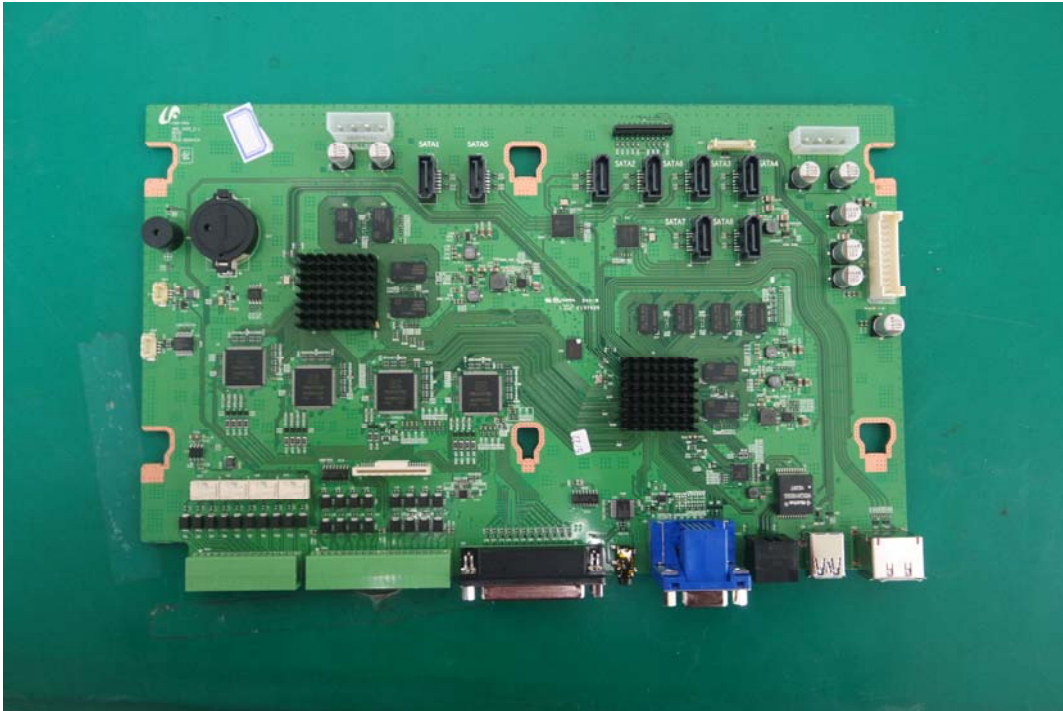
(Internal View)



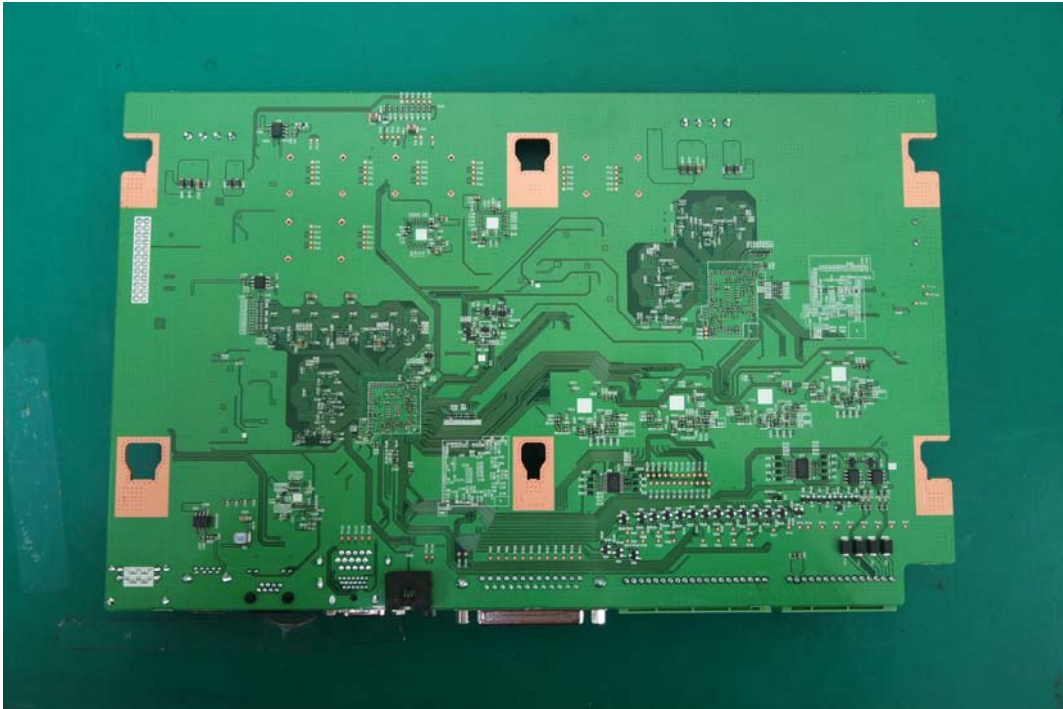
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EUT Internal View – Main Board

(Top)



(Bottom)



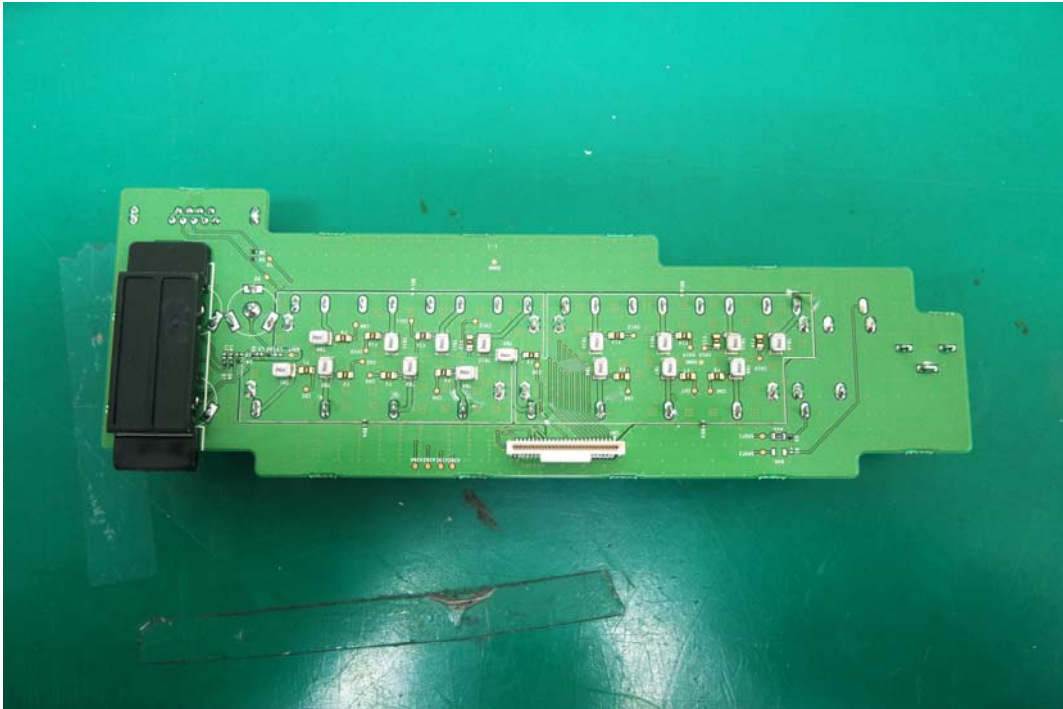
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EUT Internal View – Board 1

(Top)



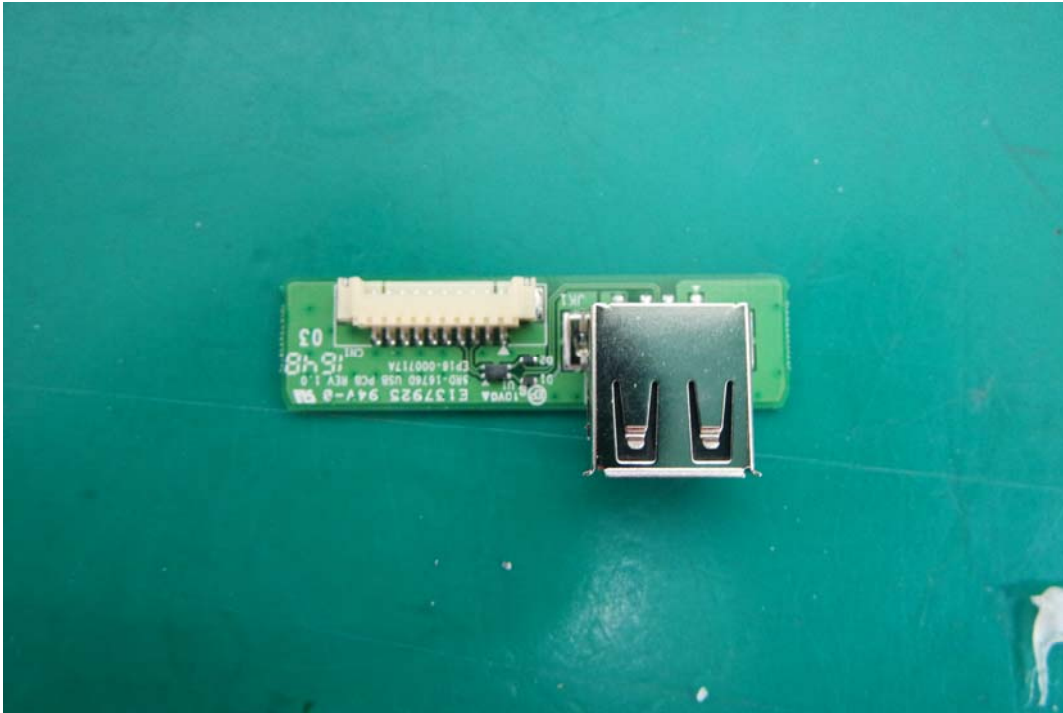
(Bottom)



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EUT Internal View – Board 2

(Top)



(Bottom)



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EUT Internal View – Board 3

(Top)



(Bottom)

Label Photographs



CAN ICES-3 (A)/NMB-3(A)

[LABEL VIEW]