



EMC TEST REPORT For VCCI

Test Report No. : KES-E1-17T0165
Date of Issue : Feb, 27, 2017
Product name : DVR
Model/Type No. : HRD-842N
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

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KES-E1-17T0165
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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Feb, 27, 2017	KES-E1-17T0165	Issued

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1.0 General Product Description

Main Specifications of EUT are:

HRD-842		
Video	Inputs	8channel BNC : AHD(-4MP), TVI(-2MP), CVI(-2MP), NTSC/PAL
Live	Resolution	2560x1440, 1920 x 1080, 1280 x 720, 960 x 480, 704 x 480 / 960 x 576, 704 x 576
	Frame rate	240fps, 200fps
	Resolution	2560x1440, 1920 x 1080, 1280 x 720, 960 x 480, 704 x 480 / 960 x 576, 704 x 576
Performance	Multi Screen display	1/4/7/9/PIP/Sequence
	Operating System	Linux
	Compression	H.264, Wisestream
Recording		NTSC : Up to 120fps@4MP / PAL : Up to 100fps@4MP
		-
	Record Rate(Analog)	NTSC : Up to 240fps@1920 x 1080 / PAL : Up to 200fps@1920 x 1080
		NTSC: Up to 240fps @ 1280 x 720, 928x480, 704x480, 704x240, 352x240 PAL: Up to 200fps @ 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)
	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, POS(SD Signal only), Motion (※ All Search Included Preview Function)
Search & Playback	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
	Simultaneous playback	8CH(Local Monitor, CMS)
Network(IPv4)	Transmission speed	Record(Main) Stream) 4MP : 15fps/CH, 1080p/720p/WD1/4CIF/CIF : 30fps/CH(N), 25fps/CH(P) Network(Sub) Stream) WD1/4CIF : 12fps/CH, 2CIF/CIF/QVGA/QCIF : 30fps/CH(N), 25fps/CH(P)
	Transmission Bandwidth	Up to 64Mbps
	Bandwidth control	Selectable
	Stream	Record Stream and Network Stream Selectable (at monitoring Viewer)
	Remote users Maximum	Search(3)/Live Unicast(10)/Live Multicast(20)
	Protocol support	TCP/IP, DHCP, PPPoE, SMTP, NTP, HTTP, DDNS, RTP, RTSP, SNMP, (SUNAPI 2017.07)
	Web Browser	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
	Viewer Software	SSM, Webviewer, SmartViewer, iPOLIS mobile viewer, WiseNet Mobile (~7. 2017)
	Platform	Android, iOS
	Protocol support	RTSP, RTSP, HTTP, CGI(SUNAPI 2017.07)
Smart phone	Control	Live(8ch) : Multi-Profile Support Playback(1ch)
	Remote users Maximum	Search (3), Live Unicast (10), Multicast (20)
	Internal	Up to 4 SATA HDDs (0~8TB HDD)
Storage	External (e-SATA Interface)	e-SATA, USB(for Backup)
	File Format (Back-up)	BU(DVR Player), SEC(Include Player), AVI
	Security	1 Admin, 10 Group, 10 User per 1 Group
Easy Configuration	Easy Configuration	Watermark
	Interface	P2P (TUTK) (~7. 2017)
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
Audio	Loop Outputs	-
	Inputs/Output	8CH line in (Built in 4CH, Option : Audio Extension Cable) 1CH line out
	Compression	G.711
Alarm	Sampling rate	8KHz
	Inputs/Outputs	Terminal 8 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	1 RJ45 10/100/1000 Base-T
	Serial interface	RS-485(Full Duplex) for PTZ, Samsung System Keyboard
	USB	1 ports/USB 3.0, Rear), 1 ports/USB 2.0, Front)
	e-SATA	2 External SATA ports
	Application Support	Mouse, Remote Controller, SPC-2000 (RS-485 protocol)
	Protocol support(RS-485)	Samsung-E/Samsung-T/Peeco-D/Peeco-P/Panasonic/ Phillips/ ADI/ DIAMOND/ ERNA/ KALATEL/ VCL TP/VICON/ ELMO/GE
	Protocol support(Coaxial)	NTSC/PAL : Pelco-C (Coaxtron) AHD : ACP(AHD Coax Protocol)
General	Input Voltage/Current	100 ~ 240 VAC ±10%; 50/60 Hz
	Power consumption	Max. 25W (1x2T HDD)
	Operating Temperature/Humidity	+0°C to +40°C (+32°F to +104°F) / 20% to 85% RH
Environmental	Dimension (W x H x D)	W440 x H88 x D384.8(17.32" x 3.46" x 15.14")
Mechanical	Weight (with hard disks)	5.665kg
Language	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 ☒ 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
DVR	HRD-842N	-	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	1 TB
Switching Power Supply	FSP250-50GUB	-	FSP	-



1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
MONITOR 1	W2261VT	0NTWHTPH200179Y	LG Electronics NanJing Display Co., Ltd	-
MONITOR 1 Adaptor	S24E370DL	CN07BN4400832ASK2 8GCTR235 R.D	Samsung Electronics Co., Ltd	-
MONITOR 2	A3514_FPN	005NDCRDV451	POWERNET Technologies Crop.	-
MONITOR 3	SMT-2232	C95V67VF900025B	Weihai 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	-	-	-	-



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
	HDMI	MONITOR 1	HDMI	1.5	S
	D-SUB	MONITOR 2	D-SUB	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)

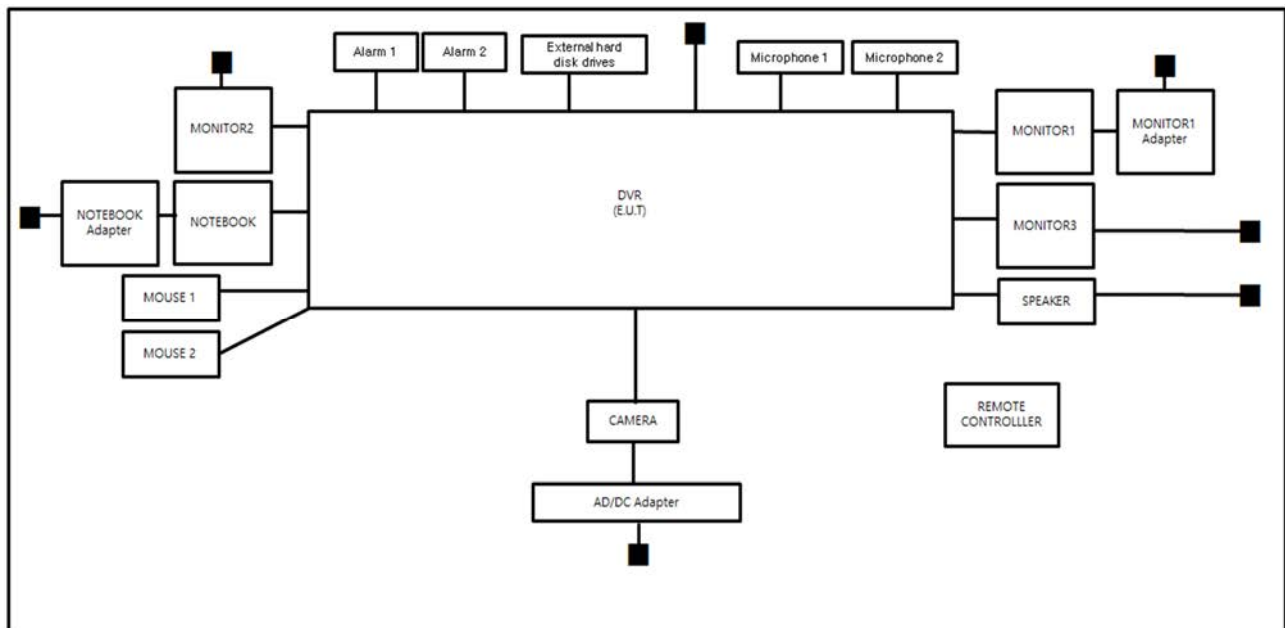
Test mode	operating
AC 230 V	E.U.T Monitoring, Ping test, 1 kHz

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 Conducted Emissions at Telecommunication 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
☒	8-Wire ISN CAT3	CAT3 8158	Schwarzbeck Mess	8158-0019	04, 01, 2017
☒	8-Wire ISN CAT5	CAT5 8158	Schwarzbeck Mess	8158-0030	04, 01, 2017
☐	8-Wire ISN CAT6	NTFM 8158	Schwarzbeck Mess	8158-0029	08, 11, 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.

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2.3 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	ESU26	R & S	100551	04, 18, 2017
☒	Trilog-Broadband ANT	VULB 9163	Schwarzbeck	715	04, 14, 2018
☒	OATS	-	KES	-	-
☒	Antenna Mast	1070/1080	EMCO	-	-
☒	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.



2.4 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.

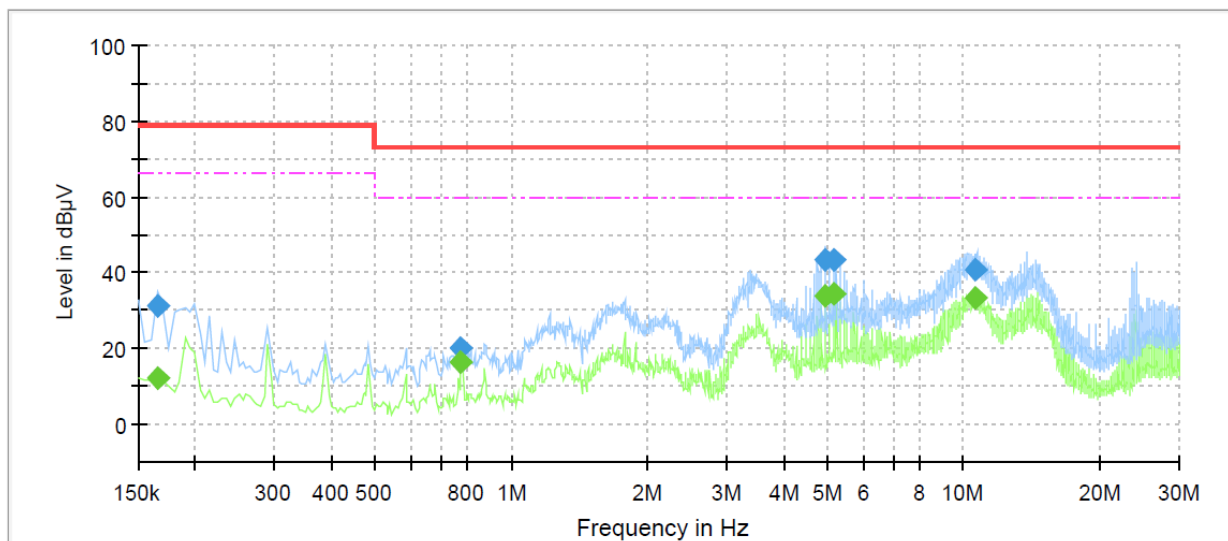
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

Common Information

Test Description: Conducted Emission
Model No.: HRD-842N
Mode
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.165000	---	12.27	66.00	53.73	1000.0	9.000	L1	21.0
0.165000	31.28	---	79.00	47.72	1000.0	9.000	L1	21.0
0.775000	---	16.66	60.00	43.34	1000.0	9.000	L1	20.3
0.775000	20.15	---	73.00	52.85	1000.0	9.000	L1	20.3
4.955000	---	33.64	60.00	26.36	1000.0	9.000	L1	19.7
4.955000	43.39	---	73.00	29.61	1000.0	9.000	L1	19.7
5.150000	---	34.43	60.00	25.57	1000.0	9.000	L1	19.8
5.150000	43.18	---	73.00	29.82	1000.0	9.000	L1	19.8
10.630000	---	33.27	60.00	26.73	1000.0	9.000	L1	19.9
10.630000	40.85	---	73.00	32.15	1000.0	9.000	L1	19.9

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

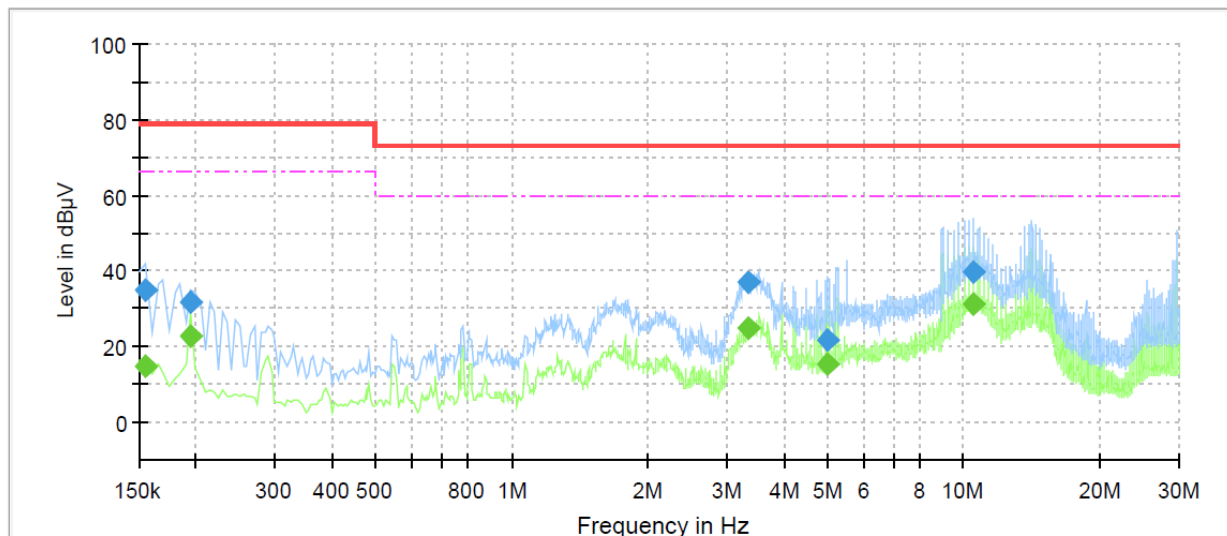
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))



[NEUTRAL]

Common Information

Test Description: Conducted Emission
Model No.: HRD-842N
Mode
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.155000	---	14.71	66.00	51.29	1000.0	9.000	N	21.0
0.155000	34.77	---	79.00	44.23	1000.0	9.000	N	21.0
0.195000	---	22.68	66.00	43.32	1000.0	9.000	N	20.8
0.195000	31.95	---	79.00	47.05	1000.0	9.000	N	20.8
3.330000	---	24.72	60.00	35.28	1000.0	9.000	N	19.7
3.330000	37.08	---	73.00	35.92	1000.0	9.000	N	19.7
4.995000	---	15.45	60.00	44.55	1000.0	9.000	N	19.7
4.995000	21.66	---	73.00	51.34	1000.0	9.000	N	19.7
10.545000	---	31.14	60.00	28.86	1000.0	9.000	N	19.9
10.545000	39.66	---	73.00	33.34	1000.0	9.000	N	19.9

◆ 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))

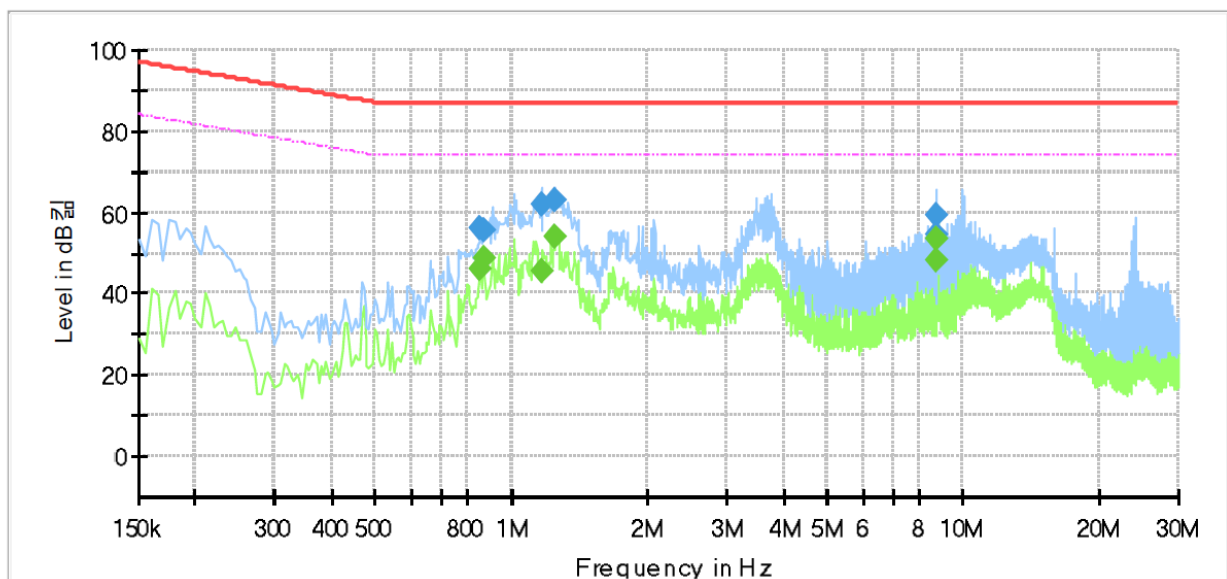


Conducted Emissions at Telecommunication Ports

[10 Mbps]

Common Information

Test Description: Telecommunication Emission
Model No.: HRD-842N
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)
0.855000	---	46.17	74.00	27.83	1000.0	9.000	Single Line	20.5
0.855000	56.19	---	87.00	30.81	1000.0	9.000	Single Line	20.5
0.870000	---	48.79	74.00	25.21	1000.0	9.000	Single Line	20.5
0.870000	55.54	---	87.00	31.46	1000.0	9.000	Single Line	20.5
1.165000	---	45.73	74.00	28.27	1000.0	9.000	Single Line	20.3
1.165000	61.81	---	87.00	25.19	1000.0	9.000	Single Line	20.3
1.250000	---	54.00	74.00	20.00	1000.0	9.000	Single Line	20.2
1.250000	63.16	---	87.00	23.84	1000.0	9.000	Single Line	20.2
8.750000	---	53.70	74.00	20.30	1000.0	9.000	Single Line	19.9
8.750000	59.26	---	87.00	27.74	1000.0	9.000	Single Line	19.9
8.755000	---	48.03	74.00	25.97	1000.0	9.000	Single Line	19.9
8.755000	54.44	---	87.00	32.56	1000.0	9.000	Single Line	19.9

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

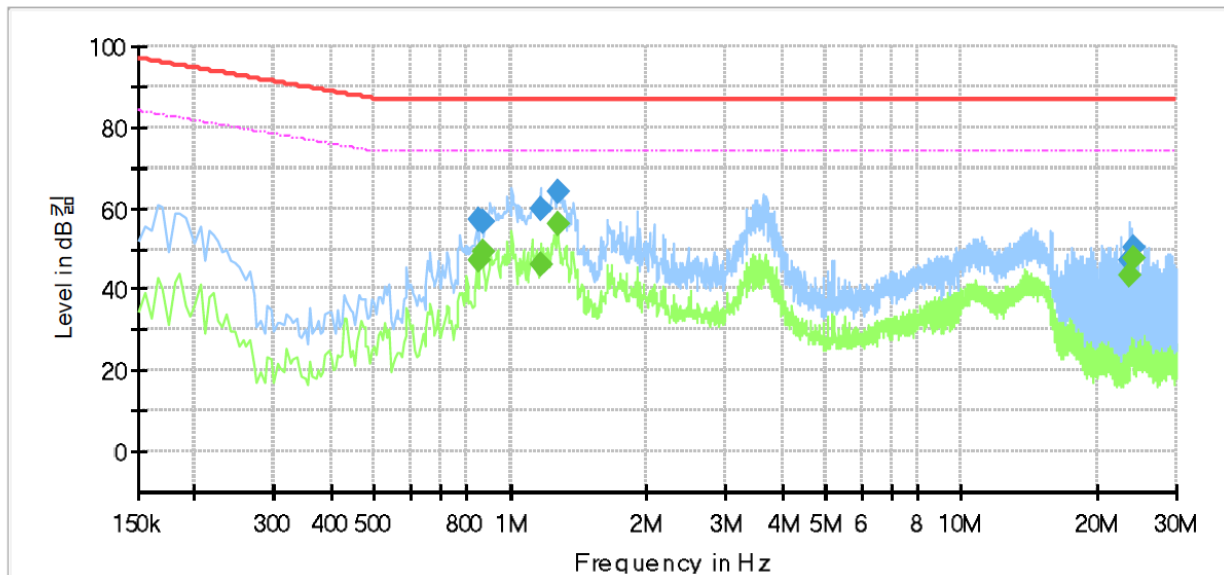
Corr. : Correction values (ISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))



[100 Mbps]

Common Information

Test Description: Telecommunication Emission
Model No.: HRD-842N
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)
0.855000	---	46.93	74.00	27.07	1000.0	9.000	Single Line	20.0
0.855000	56.97	---	87.00	30.03	1000.0	9.000	Single Line	20.0
0.870000	---	49.14	74.00	24.86	1000.0	9.000	Single Line	20.0
0.870000	56.39	---	87.00	30.61	1000.0	9.000	Single Line	20.0
1.165000	---	45.92	74.00	28.08	1000.0	9.000	Single Line	19.8
1.165000	59.89	---	87.00	27.11	1000.0	9.000	Single Line	19.8
1.270000	---	56.19	74.00	17.81	1000.0	9.000	Single Line	19.7
1.270000	64.05	---	87.00	22.95	1000.0	9.000	Single Line	19.7
23.610000	---	43.67	74.00	30.33	1000.0	9.000	Single Line	19.6
23.610000	47.13	---	87.00	39.87	1000.0	9.000	Single Line	19.6
24.050000	---	47.90	74.00	26.10	1000.0	9.000	Single Line	19.6
24.050000	50.55	---	87.00	36.45	1000.0	9.000	Single Line	19.6

◆ 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 (ISN 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
[MHz]	[dB μ V]	Polar. (H/V)	[m]	ANT. [dB/m]	Cable [dB]	[dB μ V/m]	[dB μ V/m]	[dB]
149.33	10.00	H	2.68	8.19	2.79	20.98	40.00	19.02
253.00	13.03	V	3.37	12.60	3.72	29.35	47.00	17.65
372.61	11.93	H	3.15	14.98	4.41	31.32	47.00	15.68
446.93	14.03	H	2.17	16.38	5.08	35.49	47.00	11.51
594.31	14.10	V	2.68	19.16	5.83	39.09	47.00	7.91
632.17	9.96	V	1.84	19.41	5.96	35.33	47.00	11.67

* H : Horizontal, V : Vertical

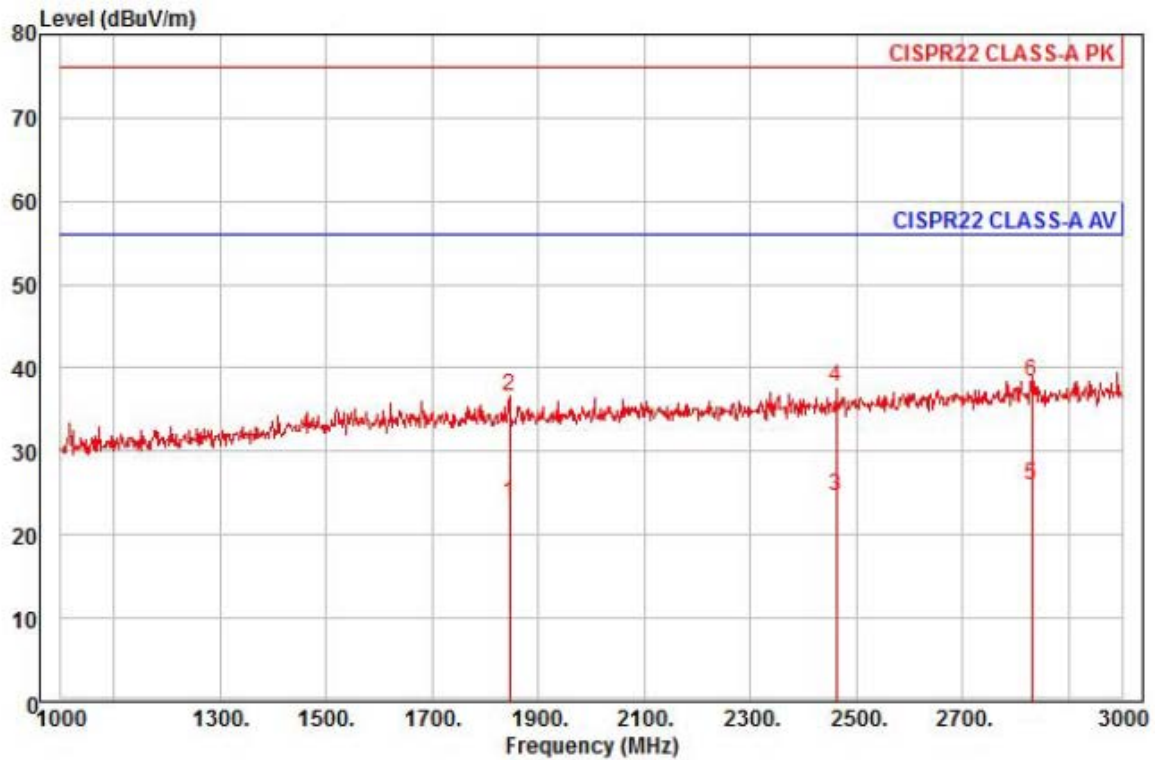
◆ Calculation

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

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

Correction Factor : ANT FACTOR + Cable loss

Radiated Electric Field Emissions(Above 1 GHz)



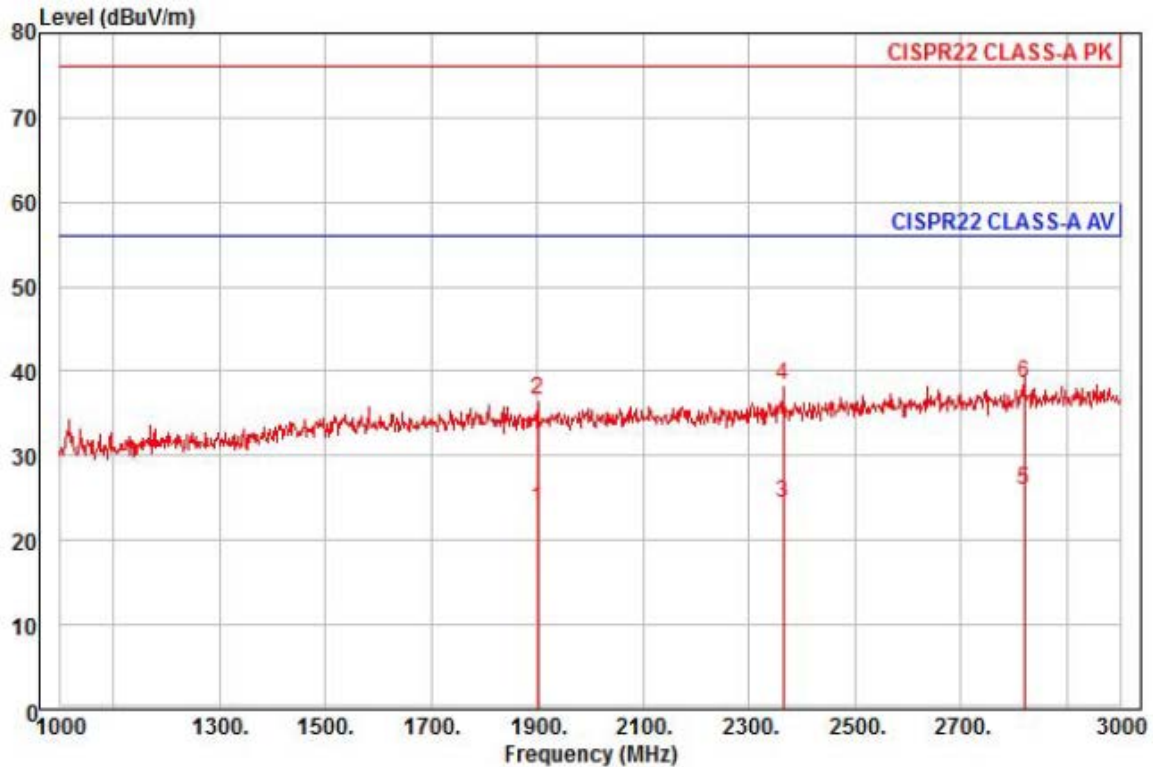
Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(9149-255,2016-05-17) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HRD-842N
Mode :
Memo : 1 ~ 3 GHz

	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	1846.00	29.15	25.05	8.94	39.34	214	56.00	-32.20	horizontal	Average
2	1846.00	42.02	25.05	8.94	39.34	214	76.00	-39.33	horizontal	Peak
3	2462.00	26.31	27.42	10.45	39.49	247	56.00	-31.31	horizontal	Average
4	2462.00	39.25	27.42	10.45	39.49	247	76.00	-38.37	horizontal	Peak
5 pp	2830.00	25.48	29.04	11.30	39.91	142	56.00	-30.09	horizontal	Average
6 pk	2830.00	38.02	29.04	11.30	39.91	142	76.00	-37.55	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



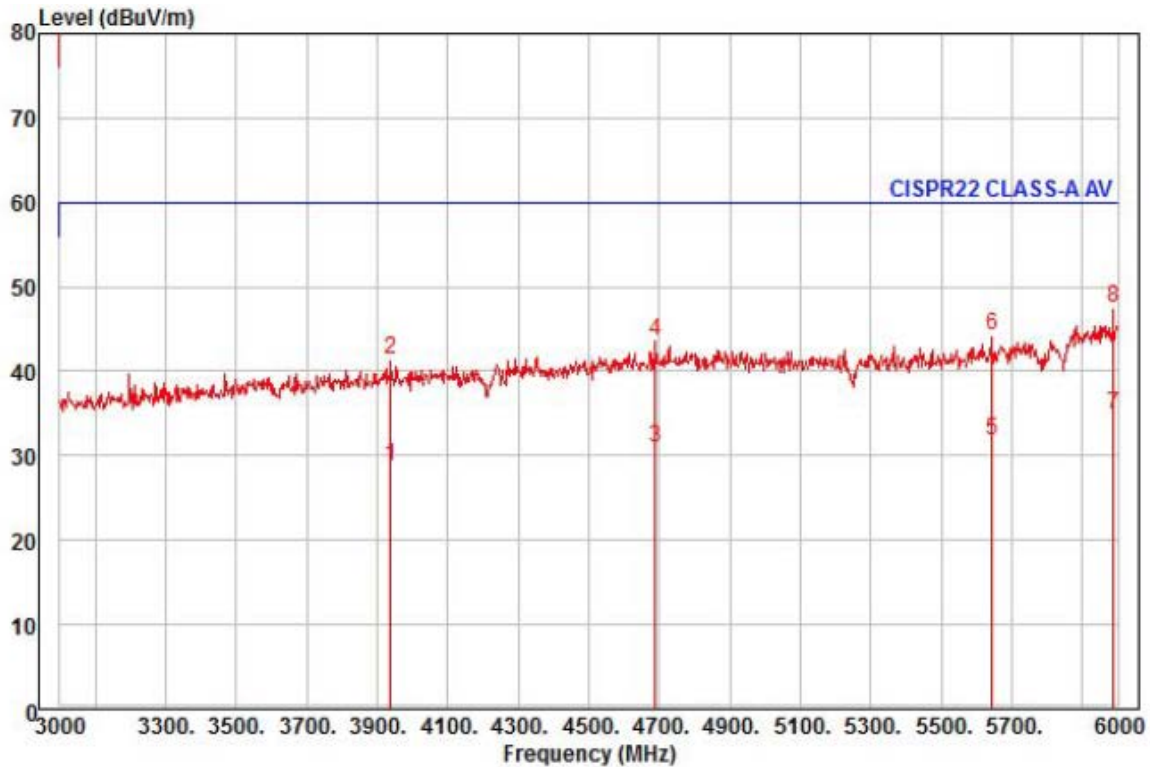
Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(9149-255,2016-05-17) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HRD-842N
Mode :
Memo : 1 ~ 3 GHz

	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	1902.00	28.77	25.25	9.09	39.36	270	56.00	-32.25	vertical	Average
2	1902.00	41.71	25.25	9.09	39.36	270	76.00	-39.31	vertical	Peak
3	2364.00	26.62	27.03	10.23	39.42	281	56.00	-31.54	vertical	Average
4	2364.00	40.52	27.03	10.23	39.42	281	76.00	-37.64	vertical	Peak
5 pp	2820.00	25.46	28.99	11.28	39.90	84	56.00	-30.17	vertical	Average
6 pk	2820.00	38.28	28.99	11.28	39.90	84	76.00	-37.35	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



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-842N
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	3939.00	24.69	31.26	13.45	40.72	322	60.00	-31.32	horizontal	Average
2	3939.00	37.43	31.26	13.45	40.72	322	80.00	-38.58	horizontal	Peak
3	4689.00	23.64	32.96	14.85	40.58	248	60.00	-29.13	horizontal	Average
4	4689.00	36.43	32.96	14.85	40.58	248	80.00	-36.34	horizontal	Peak
5	5643.00	21.96	34.40	16.42	40.91	282	60.00	-28.13	horizontal	Average
6	5643.00	34.45	34.40	16.42	40.91	282	80.00	-35.64	horizontal	Peak
7 pp	5988.00	21.73	36.48	17.05	40.45	197	60.00	-25.19	horizontal	Average
8 pk	5988.00	34.55	36.48	17.05	40.45	197	80.00	-32.37	horizontal	Peak

◆ Calculation

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

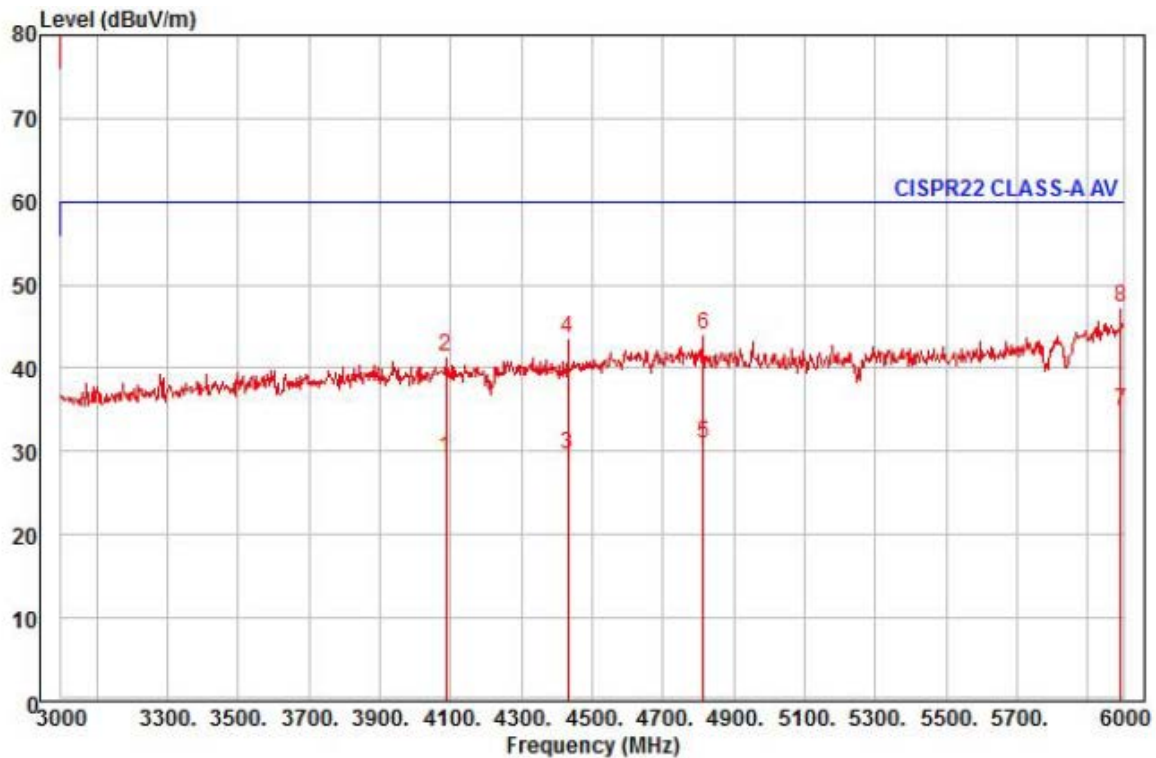
Over Limit : Margin Value, Read Level : Reading Value, Ant Factor : Ant Factor,
Cable Loss : Cable loss, Preamp Factor : Preamp Factor



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www.kes.co.kr

Test report No.:
KES-E1-17T0165
Page (25) of (35)



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-842N
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	4086.00	24.46	31.63	13.73	40.71	260	60.00	-30.89	vertical	Average
2	4086.00	36.87	31.63	13.73	40.71	260	80.00	-38.48	vertical	Peak
3	4431.00	23.57	32.61	14.33	40.76	247	60.00	-30.25	vertical	Average
4	4431.00	37.36	32.61	14.33	40.76	247	80.00	-36.46	vertical	Peak
5	4815.00	23.19	33.07	15.11	40.46	186	60.00	-29.09	vertical	Average
6	4815.00	36.30	33.07	15.11	40.46	186	80.00	-35.98	vertical	Peak
7 pp	5994.00	21.80	36.51	17.06	40.44	166	60.00	-25.07	vertical	Average
8 pk	5994.00	34.26	36.51	17.06	40.44	166	80.00	-32.61	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 Setup Photos and Configuration

Conducted Voltage Emissions



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Conducted Telecommunication Emissions



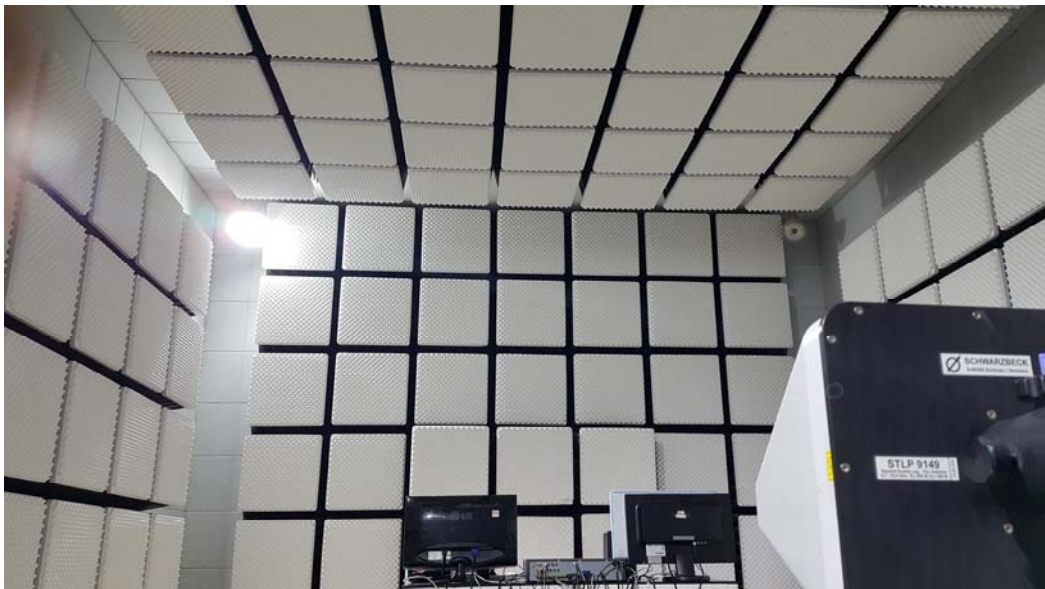
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Radiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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EUT External Photographs

(Top)



(Bottom)



EUT Internal Photographs

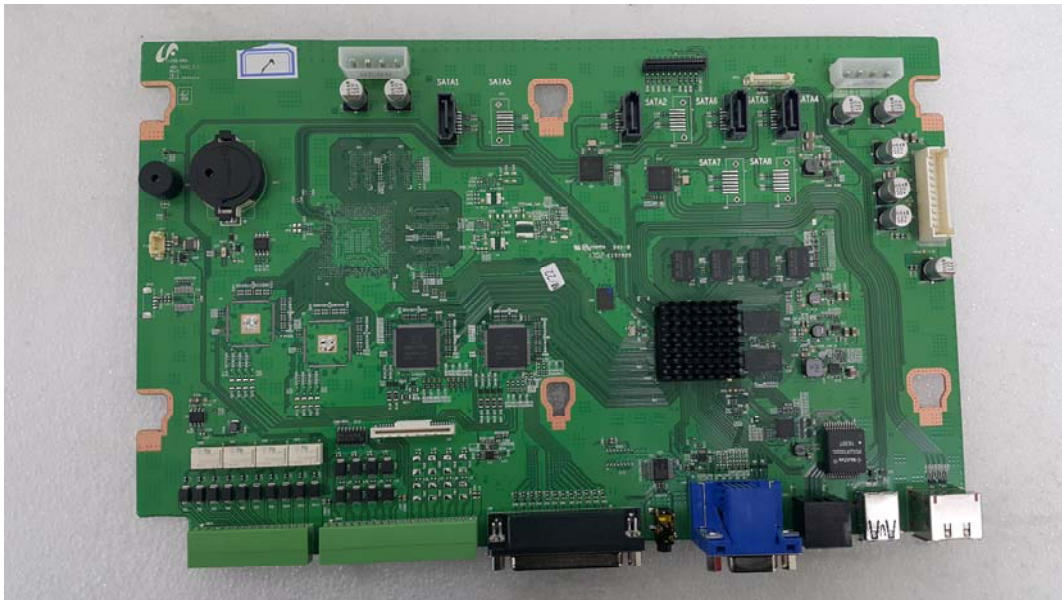
(Internal View)



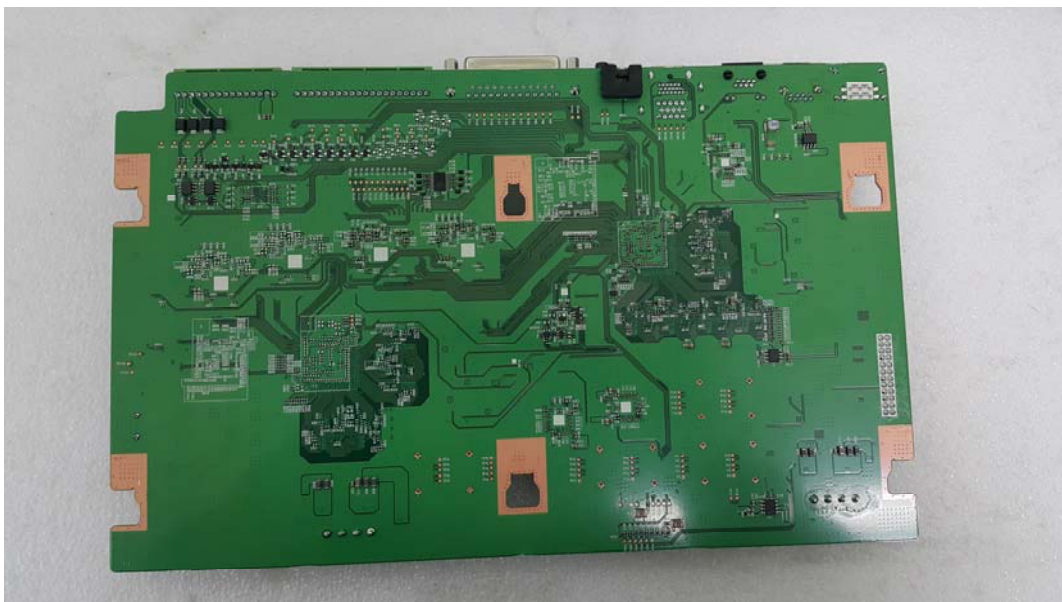
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EUT Internal View – Main Board

(Top)



(Bottom)



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EUT Internal View – Board 1

(Top)



(Bottom)

EUT Internal View – board 2

(Top)



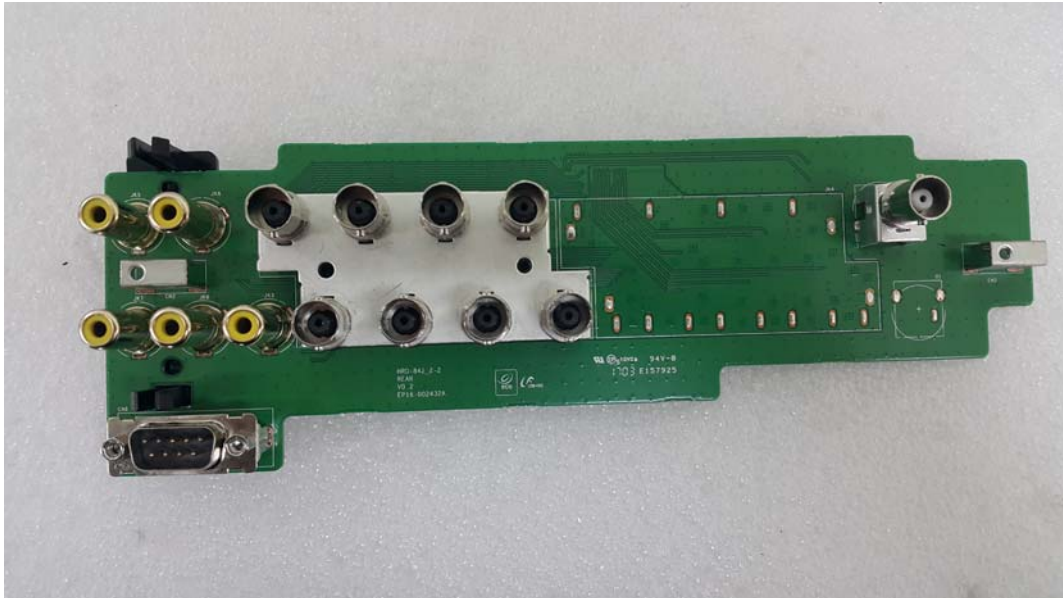
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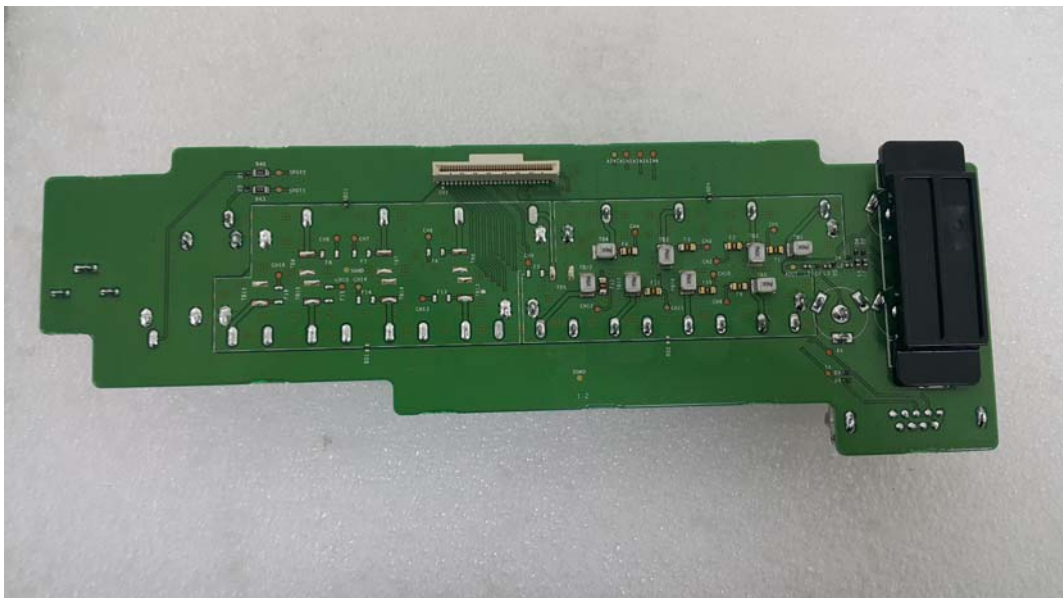
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EUT Internal View – board 3

(Top)



(Bottom)



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