



EMC TEST REPORT For IC

Test Report No. : KES-E1-17T0522
Date of Issue : Aug. 14, 2017
Product name : DVR
Model/Type No. : HRD-1641N
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 : Jul. 10, 2017
Test date : Aug. 04, 2017 – Aug. 05, 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.

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Aug. 14, 2017	KES-E1-17T0522	Issued

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1.0 General Product Description

Main Specifications of EUT are:

HRD-1641		
Video	Inputs	16channel BNC : AHD(2MP, 4MP), HDTV(Only 2MP), HDCVI(Only 2MP), NTSC/PAL
	Resolution	2560x1440, 1920 x 1080, 960 x 480, 704 x 480 / 960 x 576, 704 x 576
Live	Frame rate	480fps, 400fps
	Resolution	2560x1440, 1920 x 1080, 960 x 480, 704 x 480 / 960 x 576, 704 x 576
	Multi Screen display	1/4/7/9/13/16/16A/PIP/Sequence
Performance		
Operating System	Embedded	Linux
Recording	Compression	H.264, Wisestream
	Record Rate(Analog)	NTSC : Up to 240fps@4MP / PAL : Up to 200fps@4MP
		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
	Mode	PAL: Up to 400fps @ 1280 x 720, 928x576, 704x576, 704x288, 352x288
		Manual, Schedule (Continuous/Event), Event(Pre/Post), Time lapse (1~30 fps(N), 1~25fps(P))
	Event	Video Loss, Motion(Level 1~10), Alarm, 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 & Playback	Search mode	Date/time, Event, Back up, 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)
	Simultaneous playback	Step Forward/Backward * Backward Play with I-frame Only
Network(IPv4)	Transmission speed	16CH(Local Monitor, CMS)
		Record(Main) Stream) 4MP : 15fps/CH, 1080p/720p/WD1/4CIF/2CIF/CIF : 30fps/CH(N),
	Transmission Bandwidth	25fps/CH(P)
		Network(Sub) Stream) WD1/4CIF : 12fps/CH, 2CIF/CIF/QVGA/QCUF : 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,NTTP,HTTP,DDNS,RTP,RTSP,SNMP
		Windows OS : Internet Explorer 8, 9, 10, Firefox 3.6 or higher, Chrome 12 or higher
Smart phone	Viewer Software	Mac OS : Safari 5 or higher, Firefox 3.6 or higher
	Platform	SSM, Webviewer, SmartViewer, iPOLIS mobile viewer
	Protocol support	Android, iOS
	Control	RTP, RTSP, HTTP,
Storage	Internal	Live(8ch) : Multi-Profile Support
		Playback(1ch)
	External (e-SATA Interface)	Remote users Maximum
		Search (3), Live Unicast (10), Multicast (20)
Security	File Format (Back-up)	Up to 2 SATA HDDs (0~6TB HDD)
	Password Protection	e-SATA, USB(for Backup)
	Data Authentication	BU(DVR Player), SEC(Include Player), AVI
	Easy Configuration	1 Admin, 10 Group, 10 User per 1 Group
Interface	Monitors	Watermark
		N/A
	Audio	VGA
		1 VGA (1920x1080, 1280x1024, 1280x720)
Alarm	Inputs/Outputs	HDMI
		1 HDMI (4K(3840 x 2160), 2K(2560 x 1440), 1920x1080, 1280x1024, 1280x720)
	Compression	Composite(Spot)
		BNC(1CH) * Included OSD On Screen, Multi mode Support
Connections	Ethernet	N/A
		Loop Outputs
	USB	Inputs/Output
		4CH line in / 1CH line out
General	Electrical	G.711
		Compression
	Environmental	Sampling rate
		8KHz
Language	GUI	Terminal 16 Inputs (NO/NC) / Terminal 4 relay Outputs (NO/NC), Rating : 30V DC/2A, 250V AC/0.25A
		Notification via e-mail
	Web Browser	Ethernet
		1 RJ45 10/100/1000 Base-T
Mechanical	Dimension (W x H x D)	Serial interface
		RS-485(Half Duplex) for PTZ, Samsung System Keyboard
	Weight (no hard disks)	USB
		1 ports(USB 3.0, Rear), 2 ports(USB 2.0, Front)
Language	e-SATA	1 External SATA ports
		Application Support
	Protocol support(RS-485)	Mouse, IR Remocon
		Samsung-E/Samsung-T/Pelco-D/Pelco-p/Panasonic/ Phillips/ AD/ DIAMOND/ ERNA/ KALATEL/ VCL TP/VICON/ ELMO/GE
Language	Protocol support(Coaxial)	NTSC/PAL : Pelco-C (Coaxitron)
		AHD : ACR(AHD Coax Protocol)
	General	
Electrical	Input Voltage/Current	DC12V Adaptor(100~250V AC $\pm$ 10% , 50/60Hz)
		Max. 52W
	Power consumption	
Environmental	Operating Temperature/Humidity	+0°C to +40°C (+32°F to +104°F) / 20% to 85% RH
	Mechanical	Dimension (W x H x D)
		W370.0x H44.0 x D320(14.57" x 1.73" x 12.6")
Language	Weight (no hard disks)	Approx. 2.328kg
	GUI	English, French, German, Spanish, Italian, Russian, Polish, Czech, Turkish, Netherlands
		Portuguese, Swedish, Danish, Rumania, Serbia, Croatia, Hungary, Greek, Finnish, Norwegian,
Language	Web Browser	Korean, Japanese, Chinese(Traditional), Thai, Chinese(Simplified)(25 Language)
		* For Korean Model : Korean
	Web Browser	English, French, German, Spanish, Italian, Russian, Polish, Czech, Turkish, Netherlands
		Portuguese, Swedish, Danish, Rumania, Serbia, Croatia, Hungary, Greek, Finnish, Norwegian,
Language	Web Browser	Korean, Japanese, Chinese(Traditional), Thai, Chinese(Simplified)(25 Language)
		* For Korean Model : Korean
	Web Browser	

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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 ☐ 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-1641N	-	Hanwha Techwin (Tianjin) Co.,Ltd.	E.U.T
DVR ADAPTOR	FSP060-DIBAN2	H00000212	Zhonghan Electronics (Shenzhen) Co., Ltd.	-
HDD	WD40PURX-64N960	WCC7K5PX74R4	WD	4 TB
IR REMOTE CONTROL	EP10-000331A	-	-	-
MOUSE	MOKJUO	-	Primax Electronics Ltd.	-



1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
MONITOR 1	LT23C350	009MHYCH106388P	SAMSUNG	-
MONITOR 1 ADAPTOR	A4514_DSM	CN07BN4400721ASE 38GCOY0XS	Samsung Electro- Mechanics Co.,Ltd	-
MONITOR 2	S24E370DL	0NTWHTPH200179Y	SAMSUNG	-
MONITOR 2 ADAPTOR	A3514_FPN	CN07BN4400832ASK 28GCTR235 R.D	POWERNET Technologies Crop.	-
MONITOR 3	SMT-2232	C95V67VF900038B	Weihai Daewoo Electronics Co., Ltd.	-
CCTV CAMERA	SDH-C74041-CAM	-	SMASUNG	-
CCTV CAMERA ADAPTOR	FSP060-DIBAN2	H00000195	Zhonghan Electronics (Shenzhen) Co., Ltd.	-
CONTROLLER	SPC-1010	C50E67WG10100F	SamSung Techwin Co.,Ltd	-
CONTROLLER ADAPTOR	RS-AB1000	-	Dongguan Jinhua sheng Power Technology Co.,Ltd	-
SPEAKER	BR10000A CUVE	-	BEIJING EDIFIER HI- TECH GROUP.	-
MIC	CMK-303	-	CAMAC	-
ALARM 1	-	-	-	-
ALARM 2	-	-	-	-
USB 3.0 Memory	-	-	-	16 GB
Notebook	X56K	HN11N5151FJ0045W	HANSUNG	-
Notebook ADAPTOR	A12-120P1A	F180271552011758	CHICONY POWER TECHNOLOGY CO.,LTD.	-
SSD Memory	SSD320	B12734-0373	Transcend	64 GB

1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
DVR (E.U.T)	D-SUB	MONITOR 1	D-SUB	1.4	S
	HDMI	MONITOR 2	HDMI	1.4	S
	BNC	MONITOR 3	BNC	2.5	S
	BNC	CCTV CAMERA	BNC	10.0	S
	2 Pin	CONTROLLER	2 Pin	3.2	U
	Audio Out	SPEAKER	Audio Out	1.2	U
	Audio IN	MIC	Audio IN	1.2	U
	3 Pin	ALARM 1	3 Pin	3.2	U
	3 Pin	ALARM 2	3 Pin	3.6	U
	USB 3.0	USB 3.0 Memory	USB 3.0	-	-
	RJ-45	Notebook	RJ-45	5.2	U
	e-SATA	SSD Memory	e-SATA	0.5	U
	USB 2.0	MOUSE	USB 2.0	1.5	U

* Unshielded = U, Shielded = S

1.7 EUT Operating Mode(s)

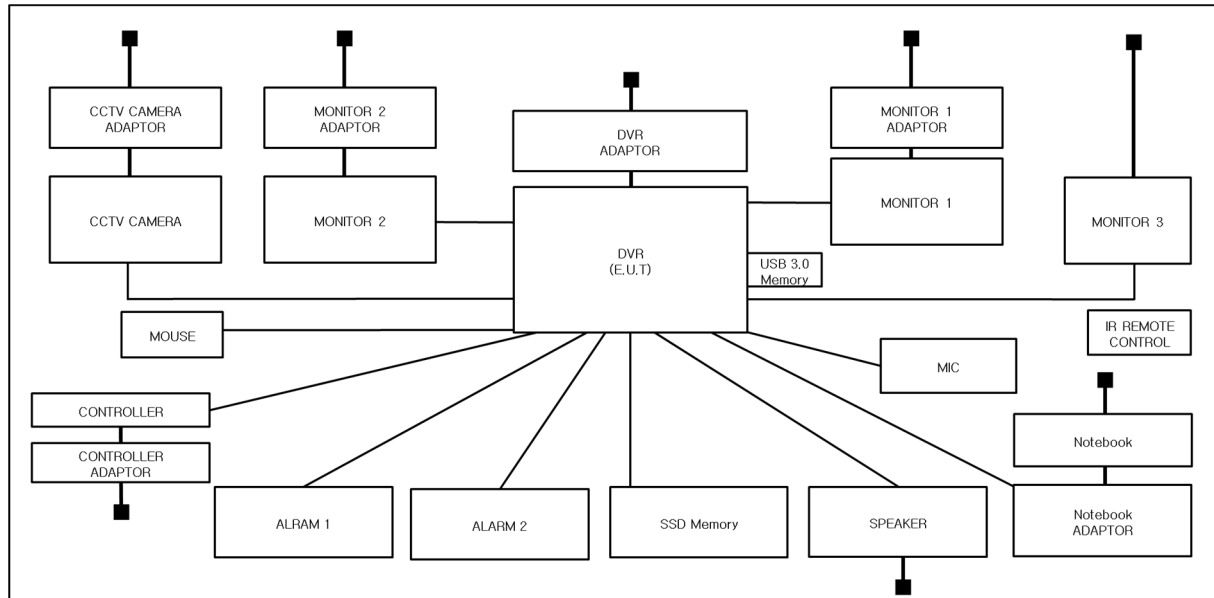
operating	
1. Check the output of the camera images on the monitor 2. Check the video output of the camera via the laptop and ping test.	

E.U.T Test operating S/W		
Name	Version	Manufacture Company
-	-	-

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1.8 Configuration

■ AC Main
□ DC Main



1.9 Remarks when standards applied

- N/A

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, Yeoju-si, Gyeonggi-do, 12658, Korea. The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22.

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.	 R-4308, C-4798, T-2311, G-914
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

Aug. 04, 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	12, 13, 2017

Test Conditions

Temperature: 23,5 °C
Relative Humidity: 45,1 %

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

Aug. 05, 2017

Test Location

☒ OPEN AREA TEST SITE #2 ☐ SAC #4(10 m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☐	EMI Test S/W	-	-	-	-
☒	EMI TEST RECEIVER	ESVS10	R & S	826008/014	04, 18, 2018
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	714	11, 28, 2018

Test Conditions

Temperature: 32,1 °C

Relative Humidity: 57,0 %

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

Aug. 05, 2017

Test Location

SEMI ANECHOIC CHAMBER #2

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	e3	AUDIX	8.083b	-
☒	EMI TEST RECEIVER	ESU26	R & S	100552	04, 19, 2018
☒	PREAMPLIFIER	8449B	AGILENT	3008A01729	05, 31, 2018
☒	LOG-PERIODIC ANTENNA	STLP 9149	SCHWARZBECK	9149-255	05, 17, 2018

Test Conditions

Temperature: 23,7 °C

Relative Humidity: 42,3 %

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.

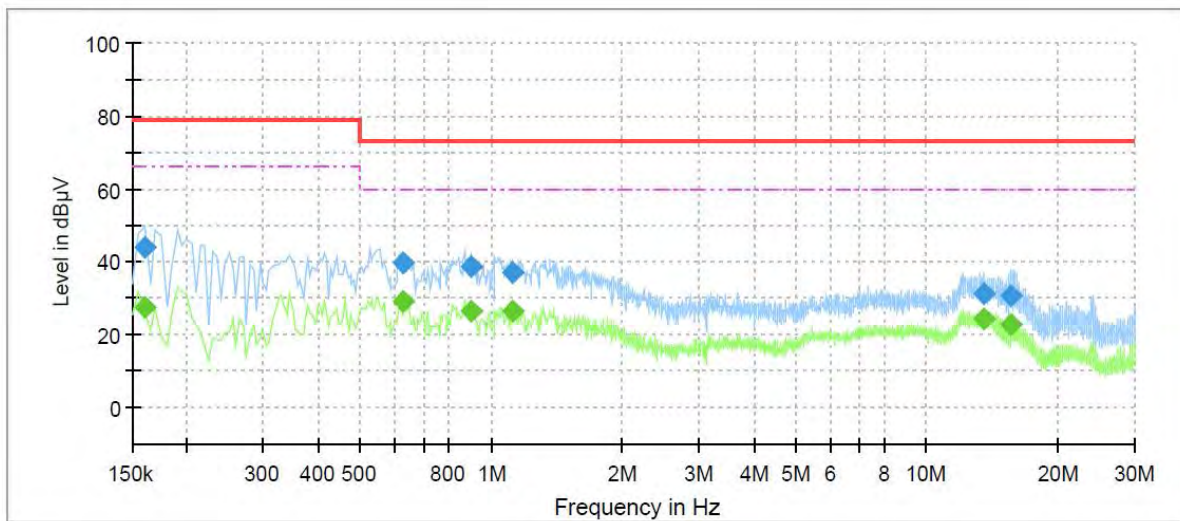
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

Common Information

Test Description: Conducted Emission
Model No.: HRD-1641N
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)
0.160000	---	27.61	66.00	38.39	1000.0	9.000	L1	19.4
0.160000	43.93	---	79.00	35.07	1000.0	9.000	L1	19.4
0.630000	---	29.25	60.00	30.75	1000.0	9.000	L1	19.6
0.630000	39.60	---	73.00	33.40	1000.0	9.000	L1	19.6
0.895000	---	26.68	60.00	33.32	1000.0	9.000	L1	19.8
0.895000	38.64	---	73.00	34.36	1000.0	9.000	L1	19.8
1.125000	---	26.39	60.00	33.61	1000.0	9.000	L1	19.8
1.125000	37.14	---	73.00	35.86	1000.0	9.000	L1	19.8
13.545000	---	24.55	60.00	35.45	1000.0	9.000	L1	19.8
13.545000	31.00	---	73.00	42.00	1000.0	9.000	L1	19.8
15.540000	---	22.83	60.00	37.17	1000.0	9.000	L1	20.0
15.540000	30.75	---	73.00	42.25	1000.0	9.000	L1	20.0

Calculation

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

QuasiPeak / CAverage : The Final Value

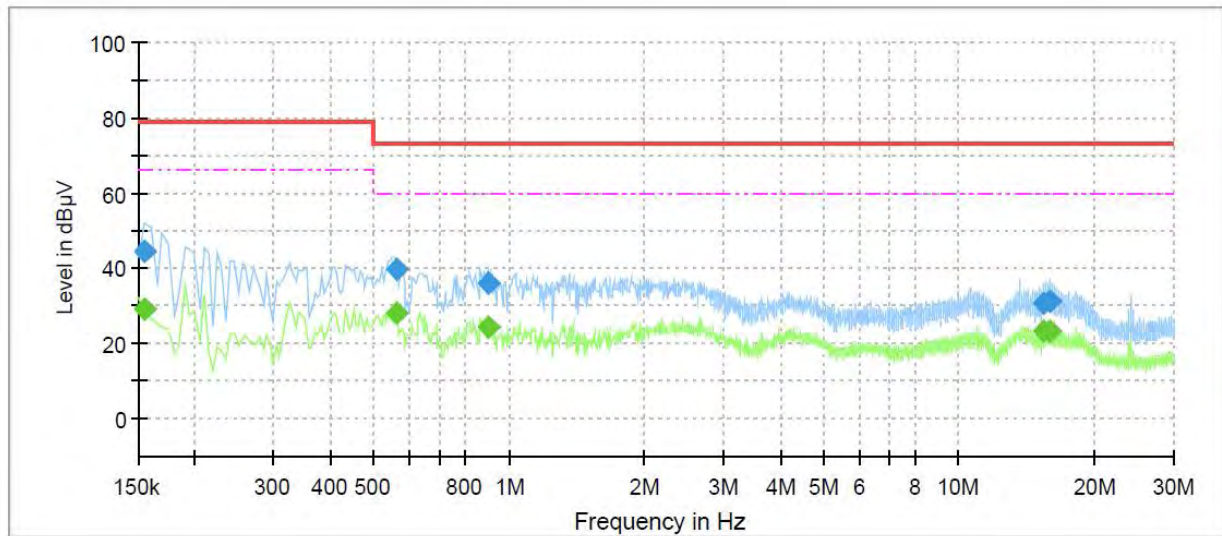
Reading Value : Not shown in the table.

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

[NEUTRAL]

Common Information

Test Description: Conducted Emission
Model No.: HRD-1641N
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)
0.155000	---	29.17	66.00	36.83	1000.0	9.000	N	19.4
0.155000	44.45	---	79.00	34.55	1000.0	9.000	N	19.4
0.565000	---	28.03	60.00	31.97	1000.0	9.000	N	19.6
0.565000	39.55	---	73.00	33.45	1000.0	9.000	N	19.6
0.895000	---	24.20	60.00	35.80	1000.0	9.000	N	19.8
0.895000	36.19	---	73.00	36.81	1000.0	9.000	N	19.8
15.355000	---	23.22	60.00	36.78	1000.0	9.000	N	20.0
15.355000	30.75	---	73.00	42.25	1000.0	9.000	N	20.0
15.980000	---	23.37	60.00	36.63	1000.0	9.000	N	20.0
15.980000	31.19	---	73.00	41.81	1000.0	9.000	N	20.0

◆ 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]	
148.41	23.10	H	3.71	7.83	2.78	33.71	40.00	6.29
148.43	22.40	V	1.00	7.83	2.78	33.01	40.00	6.99
297.03	18.10	H	4.00	13.36	4.08	35.54	47.00	11.46
371.12	21.00	H	3.95	14.98	4.39	40.37	47.00	6.63
371.14	21.90	V	1.00	14.98	4.39	41.27	47.00	5.73
445.40	16.90	V	2.13	16.40	5.07	38.37	47.00	8.63

* H : Horizontal, V : Vertical

◆ Calculation

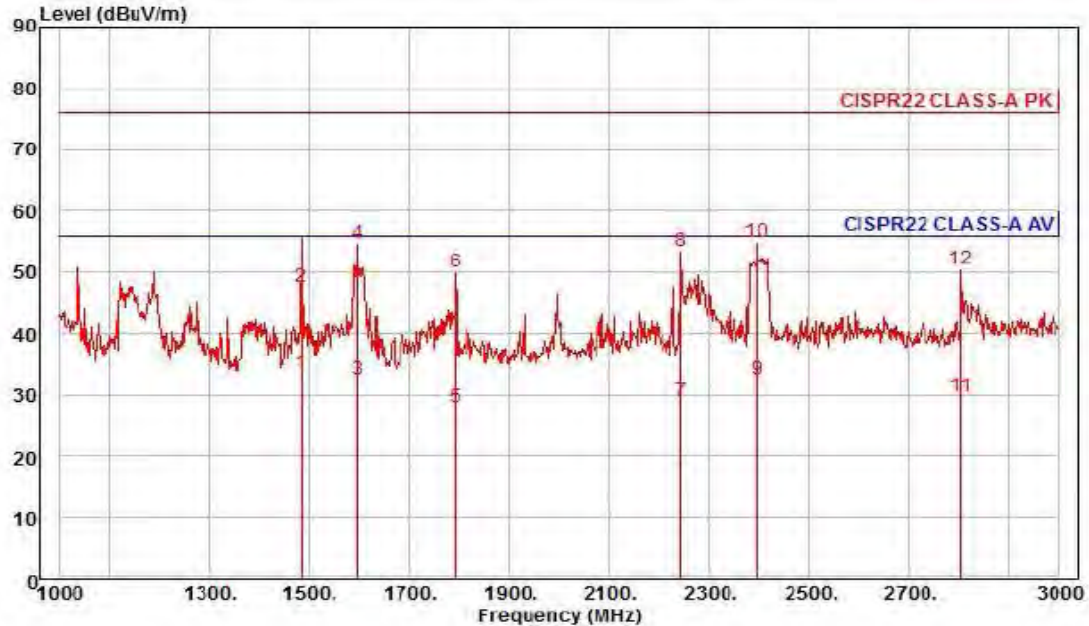
Result(QP) [dB(μ V/m)] = (Reading(QP)[dB(μ V)] + c.f[dB(1/m)])

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

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

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

Radiated Electric Field Emissions(Above 1 GHz)



Site : chamber
Condition: CISPR22 CLASS-A PK 3m STLP9149(RRA CAL 2017-05-18) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HRD-1641N
Mode :
Memo :

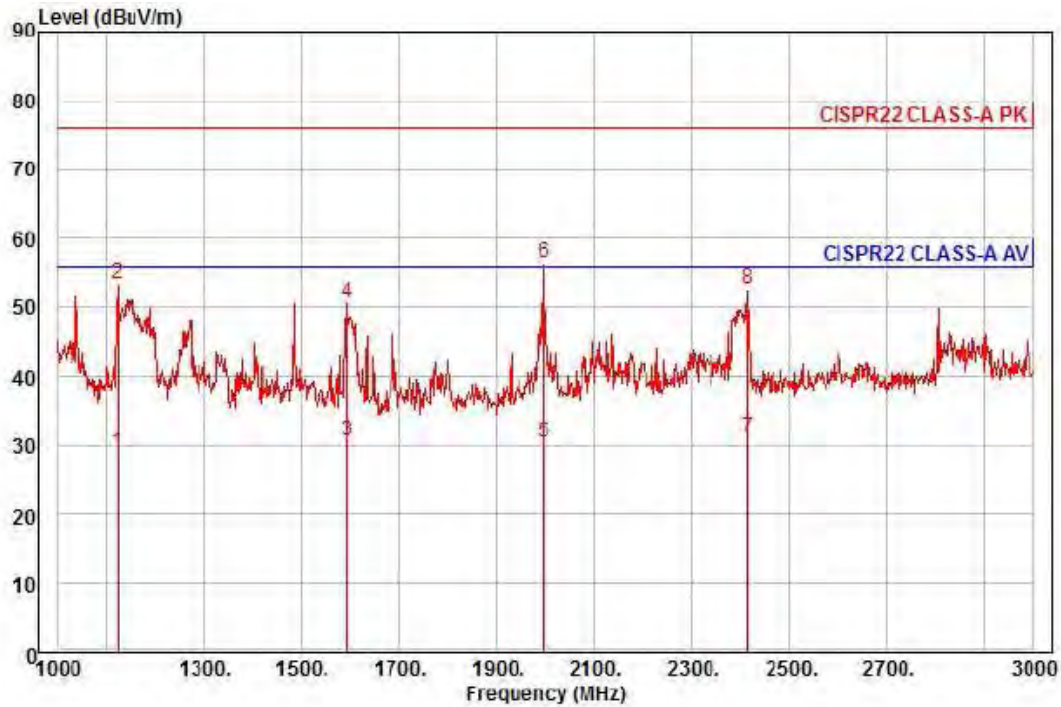
		Read	Ant	Cable	Preamp	TPos	Limit	Over		
	Freq	Level	Factor	Loss	Factor		Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	av	1484.00	37.07	23.97	8.17	35.63	49	56.00	-22.42	horizontal Average
2		1484.00	51.18	23.97	8.17	35.63	49	76.00	-28.31	horizontal Peak
3		1598.00	35.32	24.41	8.50	35.53	325	56.00	-23.30	horizontal Average
4		1598.00	57.39	24.41	8.50	35.53	325	76.00	-21.23	horizontal Peak
5		1792.00	29.07	25.18	9.07	35.36	57	56.00	-28.04	horizontal Average
6		1792.00	51.23	25.18	9.07	35.36	57	76.00	-25.88	horizontal Peak
7		2244.00	27.31	26.75	10.23	35.27	57	56.00	-26.98	horizontal Average
8		2244.00	51.79	26.75	10.23	35.27	57	76.00	-22.50	horizontal Peak
9		2398.00	30.09	27.22	10.59	35.33	336	56.00	-23.43	horizontal Average
10	pp	2398.00	52.47	27.22	10.59	35.33	336	76.00	-21.05	horizontal Peak
11		2804.00	24.68	28.87	11.62	35.48	55	56.00	-26.31	horizontal Average
12		2804.00	45.45	28.87	11.62	35.48	55	76.00	-25.54	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, 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(RRA CAL 2017-05-18) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HRD-1641N
Mode :
Memo :

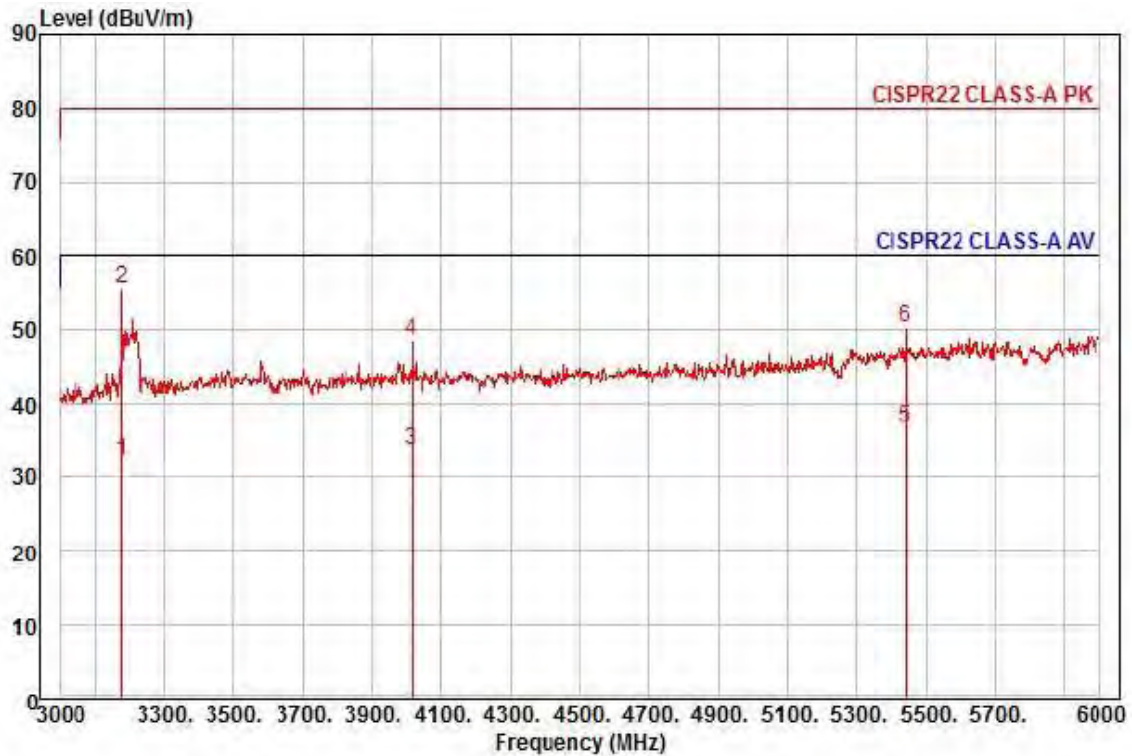
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1122.00	34.98	22.87	7.03	35.95	187	56.00	-27.07	vertical	Average
2	1122.00	59.46	22.87	7.03	35.95	187	76.00	-22.59	vertical	Peak
3	1594.00	33.41	24.39	8.49	35.53	312	56.00	-25.24	vertical	Average
4	1594.00	53.42	24.39	8.49	35.53	312	76.00	-25.23	vertical	Peak
5	1998.00	30.04	26.00	9.64	35.17	1	56.00	-25.49	vertical	Average
6 pp	1998.00	55.87	26.00	9.64	35.17	1	76.00	-19.66	vertical	Peak
7 av	2414.00	28.55	27.27	10.63	35.33	341	56.00	-24.88	vertical	Average
8	2414.00	50.10	27.27	10.63	35.33	341	76.00	-23.33	vertical	Peak

◆ Calculation

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

Over Limit : Margin, 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(RRA CAL 2017-05-18) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HRD-1641N
Mode :
Memo :

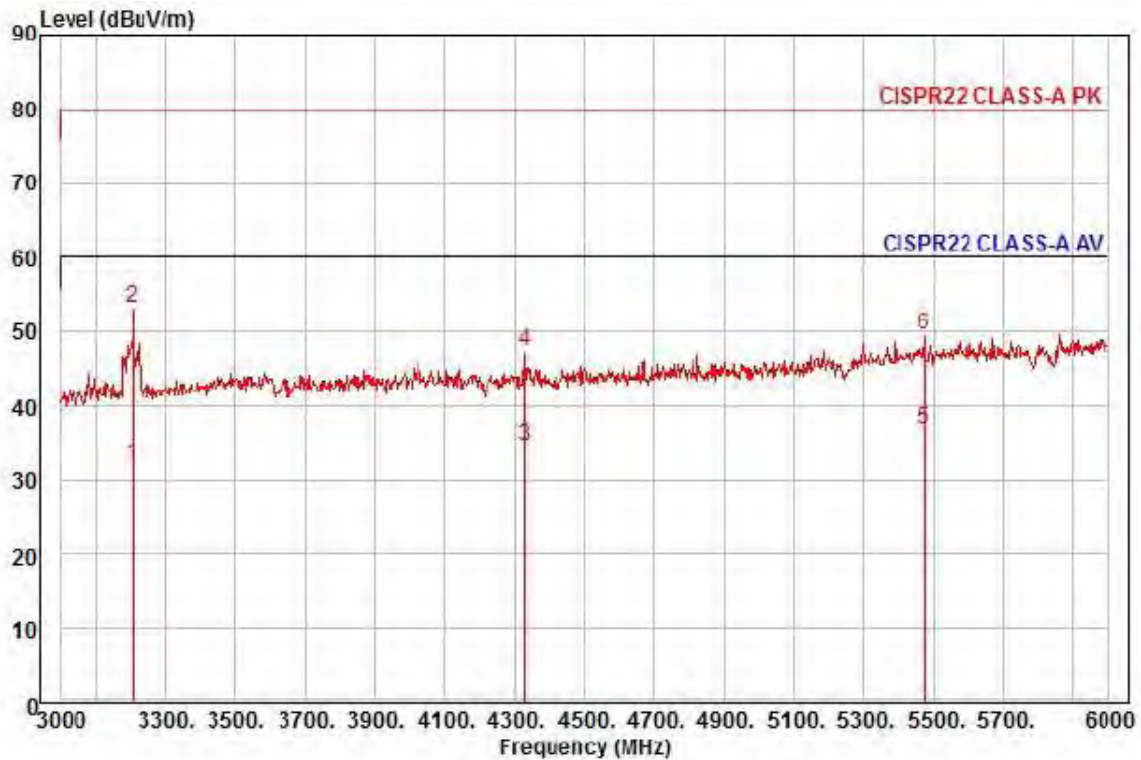
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3177.00	24.68	30.24	12.60	35.51	336	60.00	-27.99	horizontal	Average
2 pk	3177.00	48.26	30.24	12.60	35.51	336	80.00	-24.41	horizontal	Peak
3	4014.00	22.31	32.50	14.09	35.28	316	60.00	-26.38	horizontal	Average
4	4014.00	37.37	32.50	14.09	35.28	316	80.00	-31.32	horizontal	Peak
5 pp	5442.00	20.76	35.14	16.52	35.66	44	60.00	-23.24	horizontal	Average
6	5442.00	34.26	35.14	16.52	35.66	44	80.00	-29.74	horizontal	Peak

◆ Calculation

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

Over Limit : Margin, 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(RRA CAL 2017-05-18) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : HRD-1641N
Mode :
Memo :

	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	3204.00	24.68	30.32	12.67	35.50	0	60.00	-27.83	vertical	Average
2 pk	3204.00	45.70	30.32	12.67	35.50	0	80.00	-26.81	vertical	Peak
3	4329.00	22.79	32.41	14.66	35.40	334	60.00	-25.54	vertical	Average
4	4329.00	35.74	32.41	14.66	35.40	334	80.00	-32.59	vertical	Peak
5 pp	5475.00	20.70	35.27	16.57	35.66	224	60.00	-23.12	vertical	Average
6	5475.00	33.47	35.27	16.57	35.66	224	80.00	-30.35	vertical	Peak

◆ Calculation

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

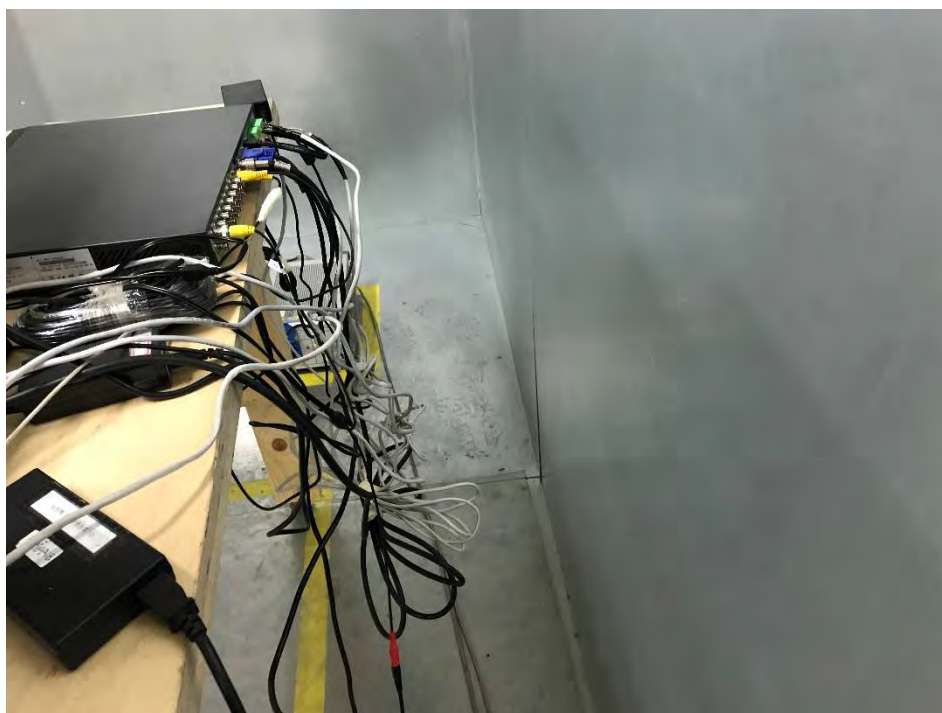
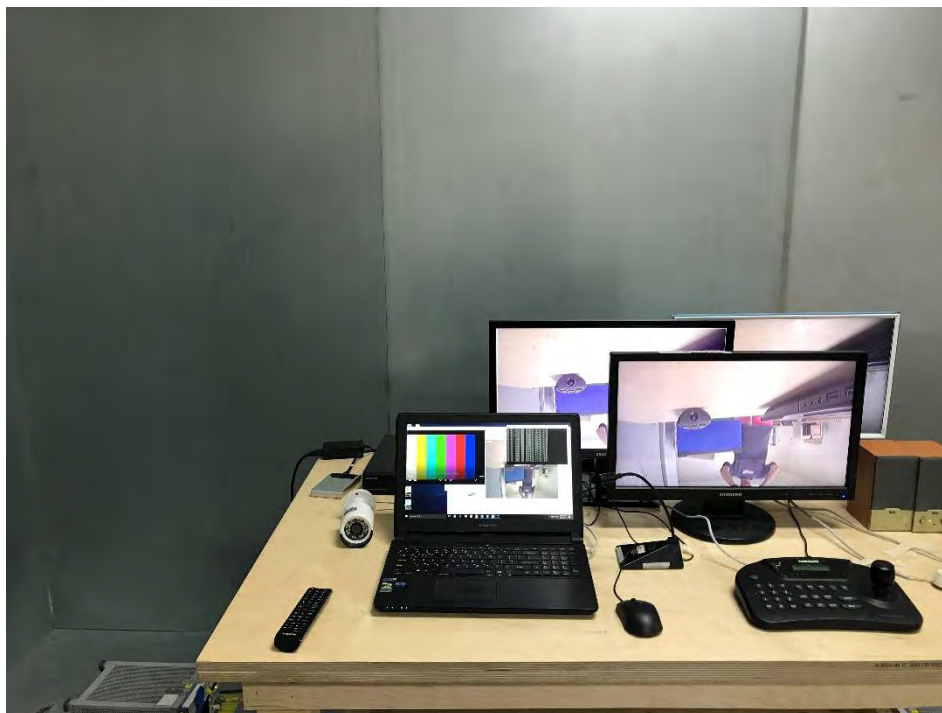
Over Limit : Margin, Read Level : Reading value, Ant Factor : ANT Factor,

Cable Loss : Cable loss, Preamp Factor : Preamp Factor

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Test Setup Photos and Configuration

Conducted Voltage Emissions



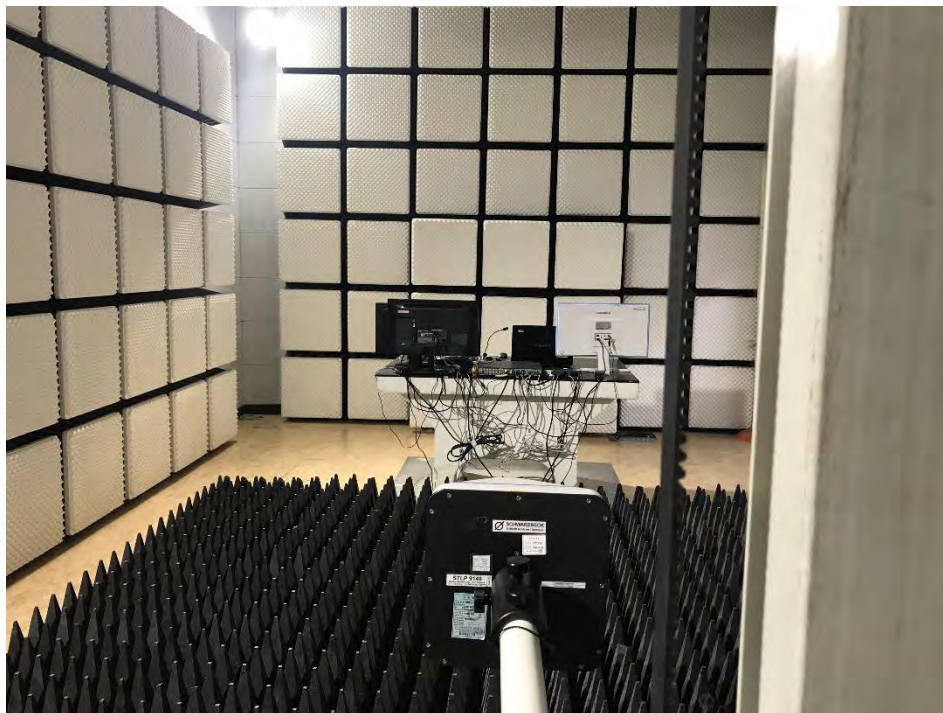
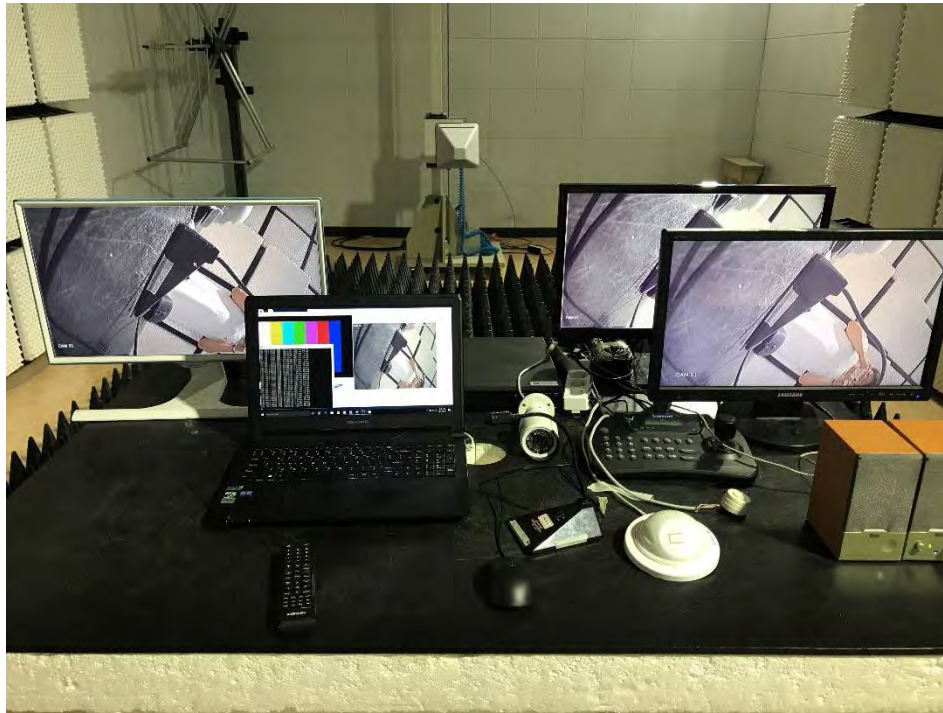
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Radiated Electric Field Emissions(Below 1 GHz)



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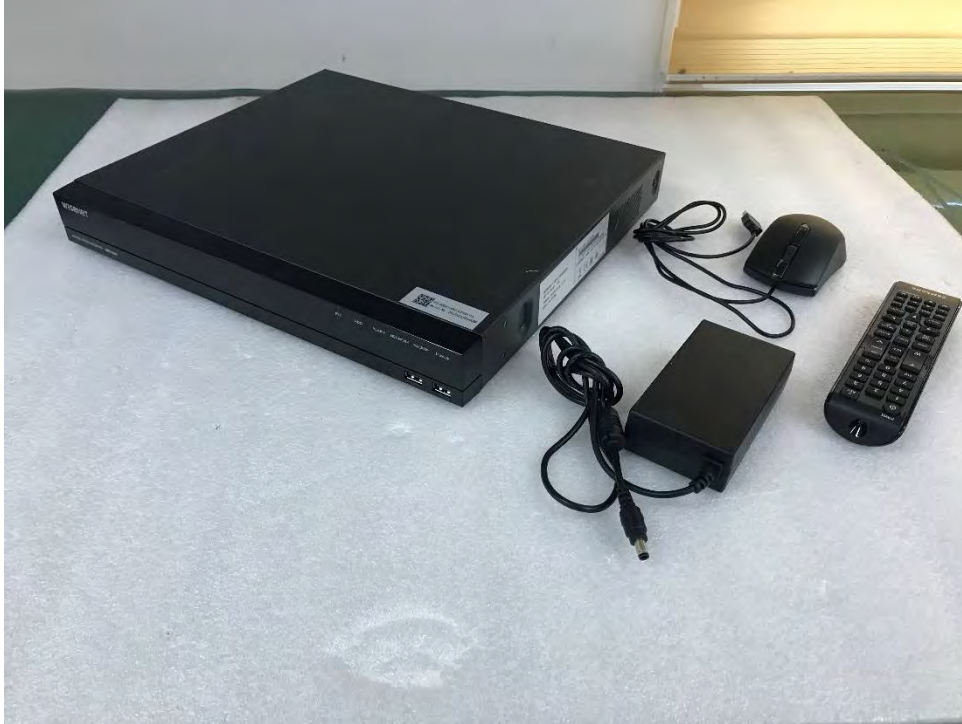
Radiated Electric Field Emissions(Above 1 GHz)



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EUT External Photographs

(Top)



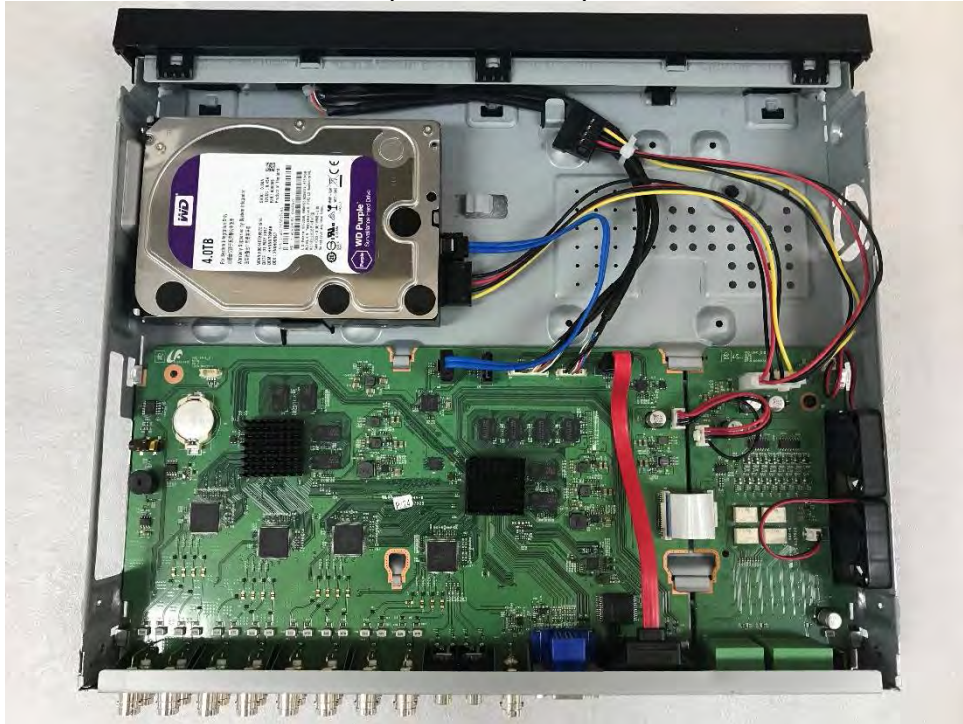
(Bottom)



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EUT Internal Photographs

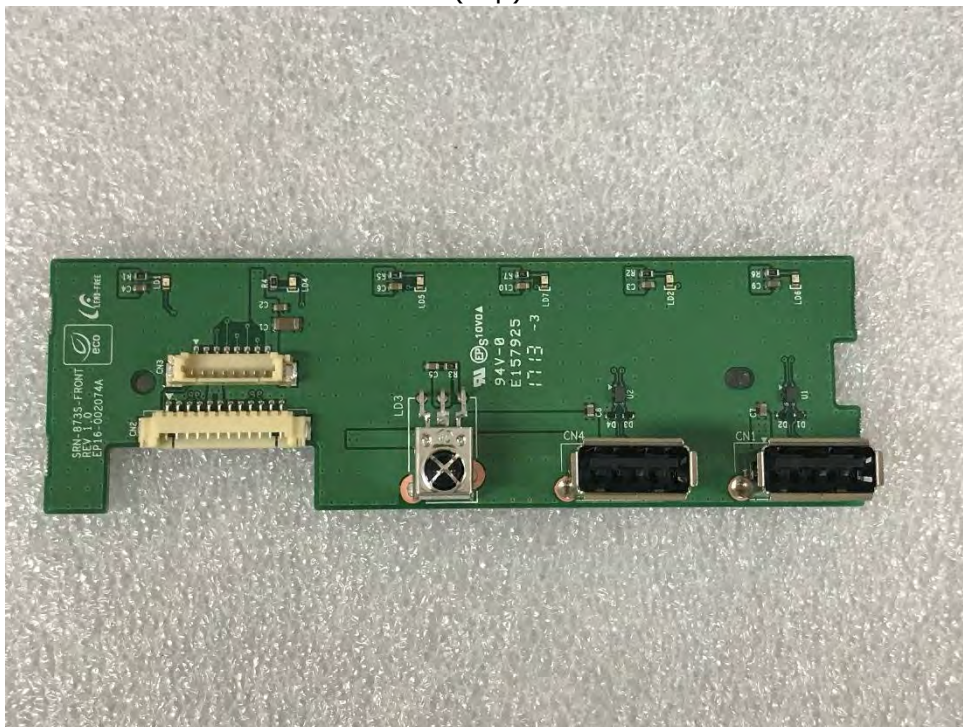
(Internal View)



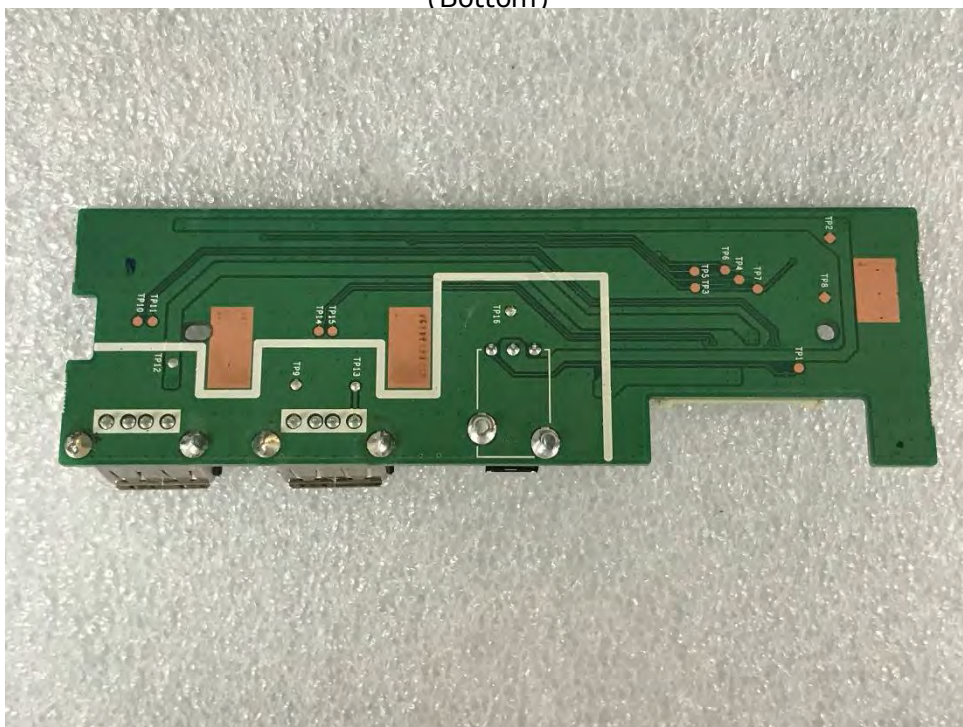
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EUT Internal View – Board 1

(Top)



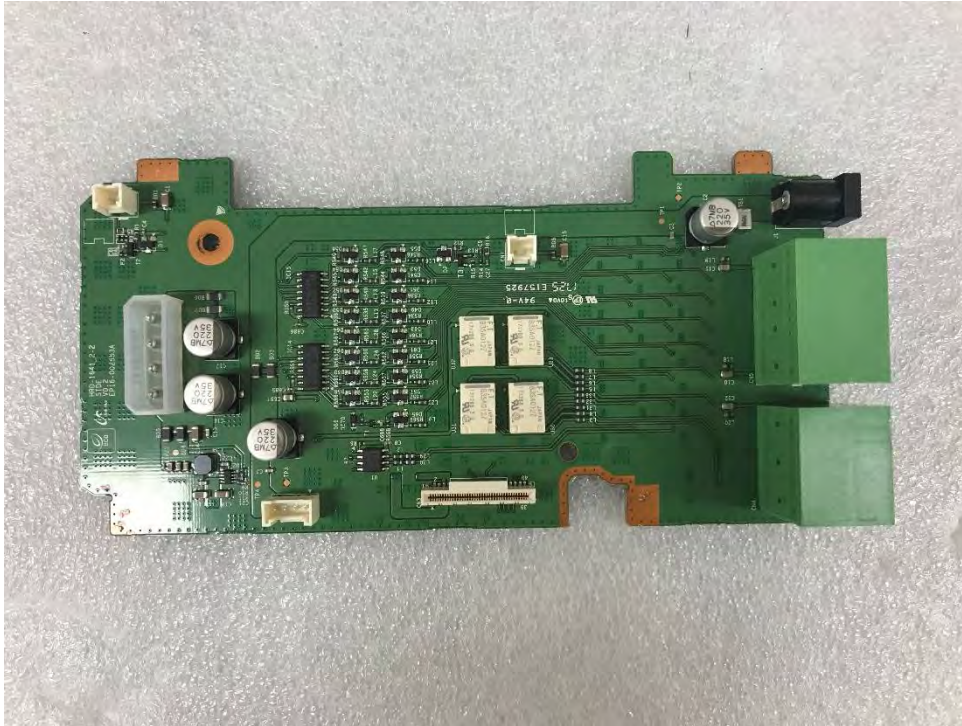
(Bottom)



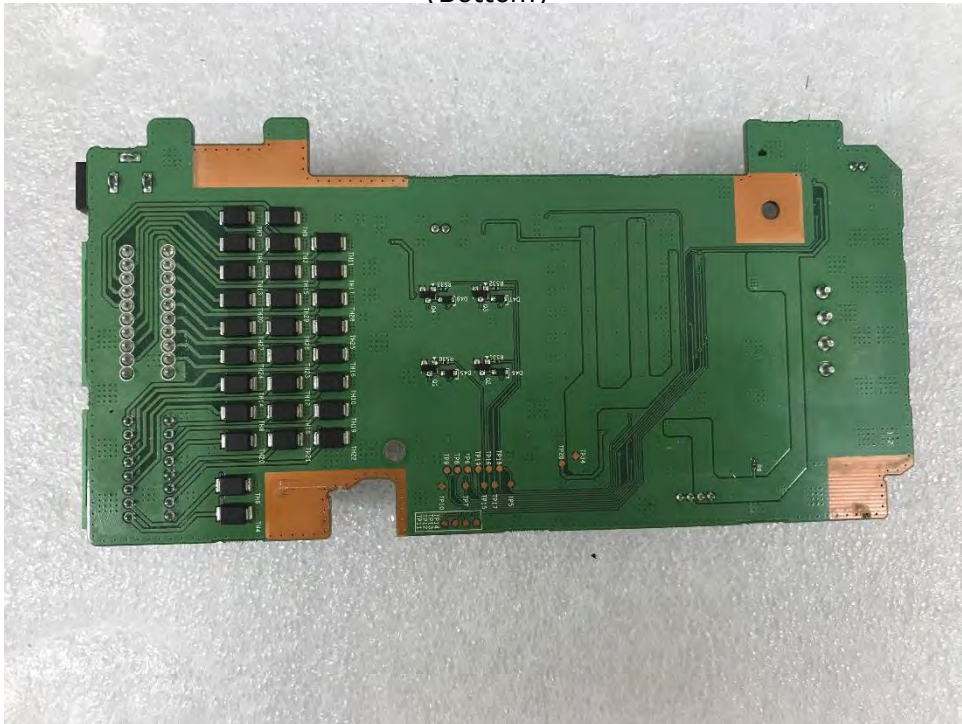
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EUT Internal View – Board 2

(Top)



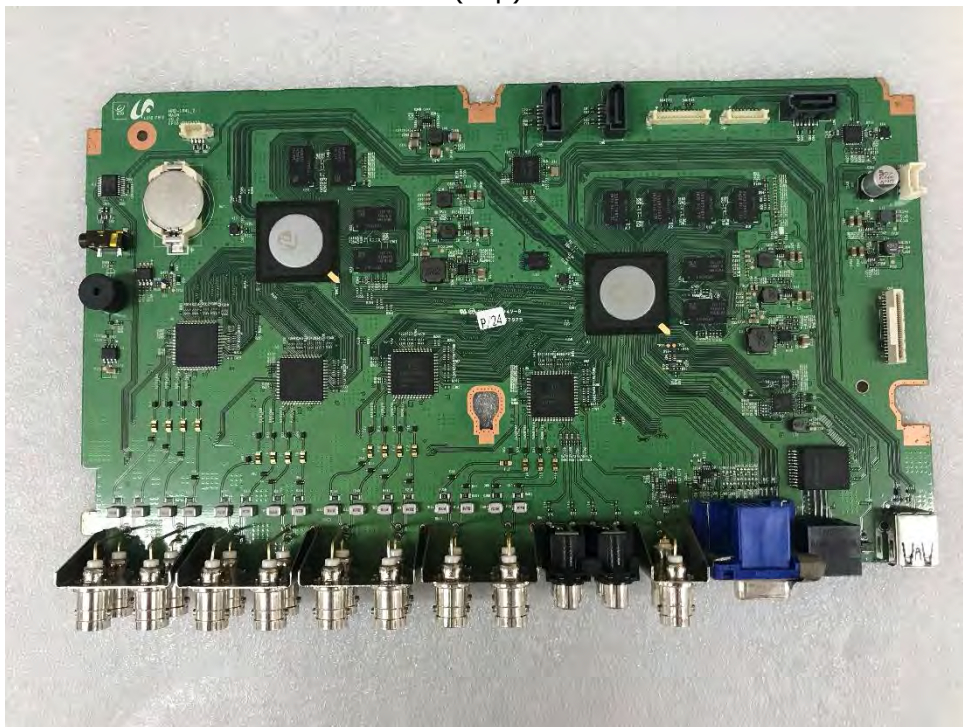
(Bottom)



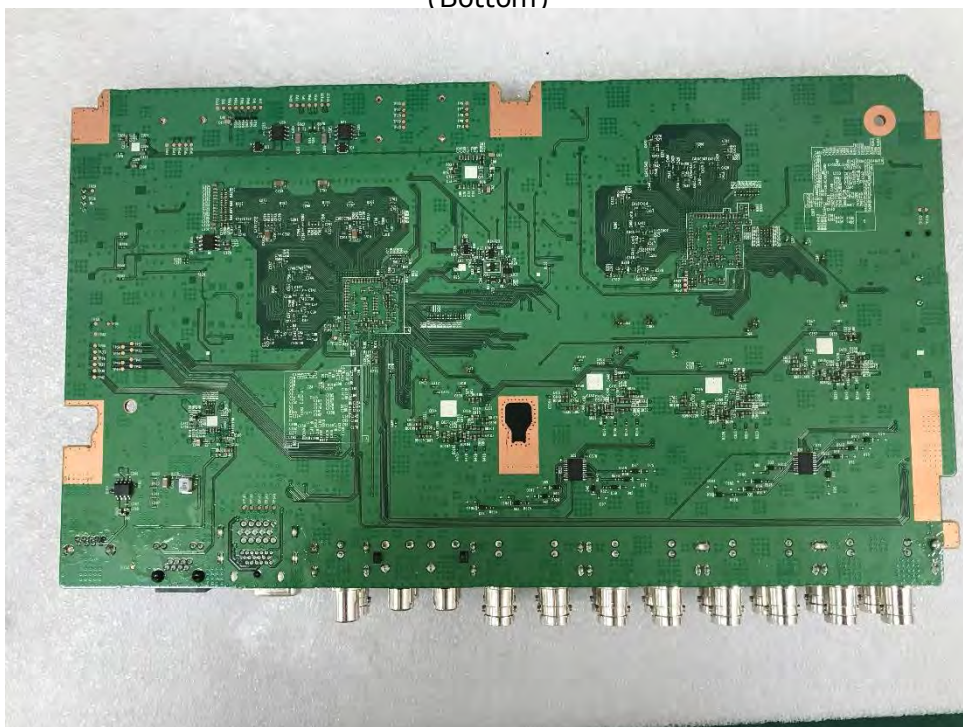
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EUT Internal View – Board 3

(Top)

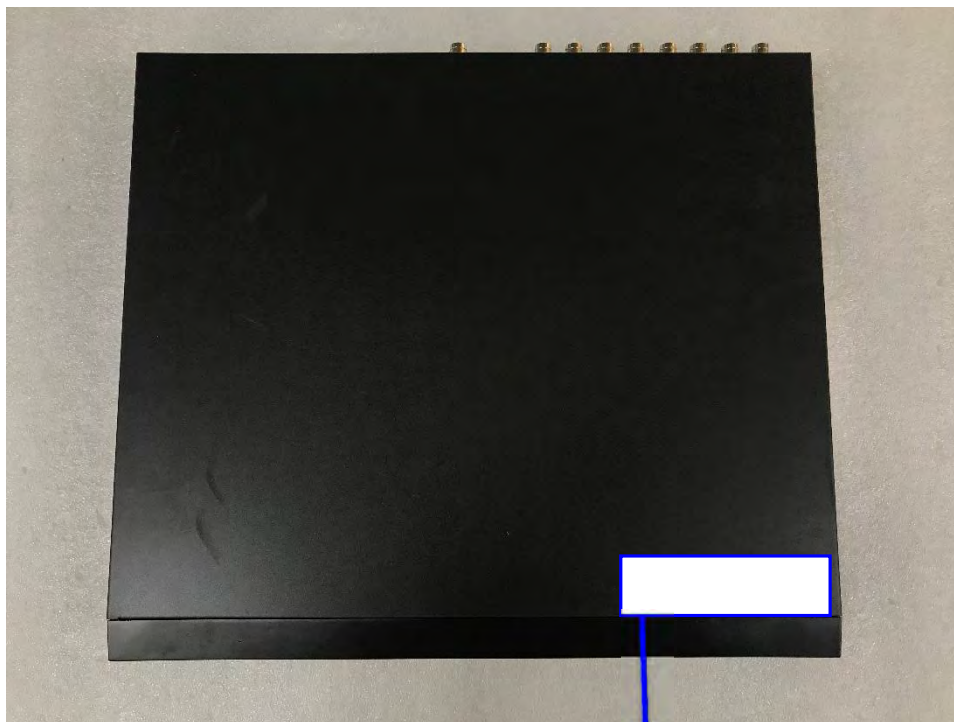


(Bottom)



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Label Photographs



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

[LABEL VIEW]