EMC TEST REPORT

Test Report No.	:	KES-EM-21T1104
Date of Issue	:	Nov. 22, 2021
Product name	:	Network Video Recorder
Model/Type No.	:	QRN-430S
Variant Model	:	ARN-410S
Applicant	:	Hanwha Techwin Co., Ltd.
Applicant Address	:	6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea
Manufacturer	:	1. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD. 2. D-TECH CO.,LTD.
Manufacturer Address	:	1. Lot O-2, Que Vo Industrial Zone extended area, Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam 2. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do, Korea (Suwon Industrial Complex)
Equipment authorization	:	**Supplier's Declaration of Conformity**
Date of Receipt	:	Oct. 27, 2021
Test date	:	Nov. 03, 2021 ~ Nov. 04, 2021
Test Results	:	☒ **In Compliance** ☐ **Not in Compliance**

Tested by

김 세 헌

Se Heon, Kim
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

This test report is not related to KS Q ISO/IEC 17025 and KOLAS.

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Nov. 22, 2021	KES-EM-21T1104	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Display		
Network camera	Inputs	Max. 4CH
	Resolution	8MP ~ CIF
	Protocols	SUNAPI, ONVIF
Decoding	Local Display	HDMI
	Resolution	[Local Monitor] 8M(30fps), 1080p(120fps), 720P(120fps), D1(120fps)
Performance		
Record	Compression	H.265, H.264, MJPEG
	Recording Bandwidth	Max. 40Mbps
	Resolution	8MP ~ CIF
	Mode	Normal, Dual Stream, Schedule(Continuous/Event), Event (Pre/Post), Bookmark
	Event Trigger	Alarm Input, Video Loss, Camera Event(Sensor, MD, Video Analytics, Defocus, Audio), Dynamic Event
	Event Action	e-Mail, Event Push, PTZ Preset, Alarm Out, Buzzer, Monitor Out
Search & Play	Playback Bandwidth	Max. 32Mbps
	User	Max. 4 Users (Local 1, Remote 3)
	Simultaneous playback	Max. 16CH(Local 4CH, Remote 4CH per user)
	Fisheye Dewarping	CMS
Storage	Supported HDD	Up to 6TB
	HDD Slot	SATA 1ea(Max. 6TB)
Backup	File backup	BU/Exe(GUI), JPG/AVI(Network)
	Function	Multi channel(Up to 4CH) Play, Date-Time/Title display
Functions		
Camera Setup	Item	IP address, Add profile edit, Bitrate, Compression, GOP, Quality, Camera MD setup (4, 8 point polygon) Camera video setup (Simple focus, Brightness/Contrast, Flip/Mirror, IRIS, WDR, D&N, SSNR, Shutter, SSDR, DIS), Fisheye Dewarping Mode, Hallway View Setup, Camera Webpage
PTZ	Control	Via GUI, Webviewer
Smart phone	Support Model	iOS, Android
	Protocol Support	RTP, RTSP, HTTP, CGI(SUNAPI)
	Control	Live 4CH(Multi-Profile Support), Playback 4CH
	Max. Remote Users	Search(3), Live Unicast(10)
Redundancy	Failover	N+1
	ARB	Support
Easy configuration		P2P(QR code)
Interface		
HDMI		**1EA 3840x2160 30Hz**

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Ethernet		PoE RJ-45(LAN, 10/100) 4 ea ,RJ-45 1ea (WAN, 10/100)
USB		2EA(Front 1 x USB 2.0, Rear 1 x USB 2.0)
Power inlet		DC Adaptor
System		
System Control		Mouse, Web
Language		English, French, German, Italian, Spanish, Russian, Turkish, Polish, Dutch, Swedish, Czech, Portuguese, Danish, Rumanian, Serbian, Croatian, Hungarian, Greek, Norwegian, Finnish, Korean, Chinese, Japanese, Thai, Vietnamese
Environmental		
Operating Temperature		0°C to +40°C(32°F to 104°F)
Operating Humidity		20% ~ 85% RH
Electrical		
Power Input		100 ~ 240 VAC ±10%; 50/60 Hz
Power Consumption		Max 52W(1HDD, PoE On)
PoE Budget		35W
Mechanical		
Color / Material		Black / Metal
Dimension (WxHxD)		300.0 x 47.1 x 208.4 mm (11.81 x 1.85 x 8.20 inch)
Weight		1.03Kg (2.27lb)
Network		
Protocol		IPv4, IPv6, TCP/IP, UDP/IP, RTP (UDP), RTP (TCP), RTSP, NTP, HTTP, DHCP (Server, Client), SMTP, ICMP, IGMP, ARP, DNS, DDNS, uPnP, HTTPS, SNMP, ONVIF (Profile-S), SUNAPI(Server, Client)
DDNS		Hanwha DDNS
Transmission Bandwidth		Max. 50Mbps
Audio	Input/Output	4 CH(network)
	Compression	G.711, G.726, AAC(16/48KHz)
	Audio Communication	2-Way
Max Remote Users		Search(3), Live Unicast(10), Multicast(20)
Security		IP address filtering, User access Log, 802.1x, Encryption Device certificate(Hanwha Techwin Root CA), Signed firmware
Viewer Software		WAVE, SSM, Webviewer, Smart Viewer, Wisenet mobile Support CGI(SUNAPI) for integration to 3'rd party VMS

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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.

☒ AC 120 V, 60 Hz

1.2 Variant Model Differences

Addition of derivative models for place of sale management

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
Network Video Recorder	QRN-430S	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	EUT
Mouse	MOKJUO	-	Primax Electronics Ltd.	EUT
Adaptor	FSP065-DWAN3	-	Zhonghan Electronics(Shenzhen) Co.,Ltd	EUT
HDD	ST2000VX003	-	SEAGATE	EUT, 2 TB

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1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Camera1	QND-6080R	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	-
Camera2	XNV-6012	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	-
Camera3	SND-L6013RP	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	-
Camera4	SND-L6013P	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	-
Notebook	P98F004	21599158359	DELL INC.	-
Notebook Adaptor	LA240PM190	-	LITE-ON TECHNOLOGY(CHANGZHOU)CO.,LTD.	-
Monitor	27TN600S	005KKJCK0532	LG Electronics	-
Monitor Adaptor	LCAP21C	-	LG Electronics	-
USB Memory	-	-	Transcend	-

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1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	**I/O Port**	**Description**	**I/O Port**	**Length**	**Shield**
Network Video Recorder (EUT)	DC Jack	Adaptor (EUT)	DC Jack	1.1	U
	USB	Mouse (EUT)	USB	1.5	U
	LAN	Notebook	LAN	3.0	U
	PoE	Camera1	PoE	3.0	U
	PoE	Camera2	PoE	3.0	U
	PoE	Camera3	PoE	3.0	U
	PoE	Camera4	PoE	3.0	U
	HDMI	Monitor	HDMI	1.5	S
	USB	USB Memory	USB	-	-
	External Ground	Ground	External Ground	2.0	U
Monitor	DC Jack	Monitor Adaptor	DC Jack	1.0	U
Notebook	DC Jack	Notebook Adaptor	DC Jack	1.2	U

* Unshielded=U, Shielded=S

* Unshielded=U, Shielded=S

1.7 EUT Operating Mode(s)

Test Mode	operating
Operation	the test was conducted while checking the camera video output from the laptop and making sure that they operate normally while performing a ping test.

EUT Test operating S/W		
Name	**Version**	**Manufacture Company**
Web Viewer	-	Hanwha Techwin Co., Ltd.

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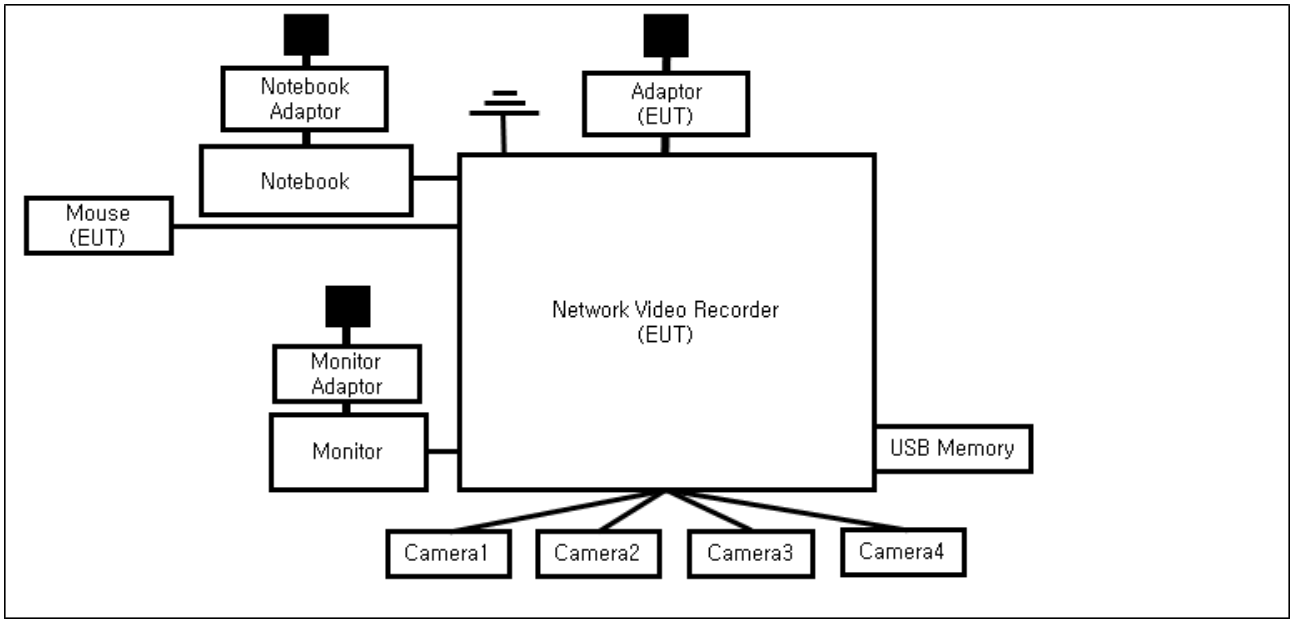
1.8 Configuration

■ AC Main
□ DC Main



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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 C63.4a-2017 and CISPR 16-1-4:2019

1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	**RRA**	EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	KR0100
International	**KOLAS**	EMI (3 m & 10 m Semi-Anechoic Chamber , and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	KT489
USA	**FCC**	3 m & 10 m Semi-Anechoic Chamber, 10 m Open Area and Conducted test site to perform FCC Part 15/18 measurements.	KR0100
Canada	**ISED**	3 m & 10 m Semi-Anechoic Chamber and Conducted test site	23298-1
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-20056, C-20036, T-20040, G-20057
Europe	**TÜV SÜD**	EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	CARAT 001633 0004

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2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **47 CFR Part 15, Subpart B**

☐ CISPR 22:2009 +A1:2010	☐ Class A	☐ Class B
☒ ANSI C63.4a-2017	☒ Class A	☐ Class B

☒ **IC Regulation ICES-003 Issue 7**

☐ CAN/CSA-CISPR 32:17	☐ Class A	☐ Class B
☒ ANSI C63.4a-2017	☒ Class A	☐ Class B

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2.1 Conducted Emissions at Mains Power Ports

Test Date
Nov. 03, 2021

Test Location
Electro wave Shieldroom #6

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	01, 15, 2022
☒	LISN	ENV216	R & S	101787	12, 29, 2021
☒	LISN	ESH2-Z5	R & S	100450	12, 29, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 29, 2021

Test Conditions
Temperature: (22,4 ± 0,0) ℃
Relative Humidity: (44,0 ± 0,0) % R.H.

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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2.2 Radiated Electric Field Emissions(Below 1 ㎓)

Test Date
Nov. 03, 2021

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, 01, 2022
☒	AMPLIFIER	SCU 01	R & S	100603	11, 25, 2021
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	12, 08, 2022
☒	ATTENUATOR	8491A	HP	32173	03, 10, 2022

Test Conditions
Temperature: (23,0 ± 0,1) ℃
Relative Humidity: (44,7 ± 0,1) % R.H.

Frequency Range of Measurement
30 ㎒ to 1 ㎓

Instrument Settings
IF Band Width: 120 ㎑

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(Above 1 ㎓)

Test Date
Nov. 04, 2021

Test Location
SEMI ANECHOIC CHAMBER #5

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.120	-
☒	EMI TEST RECEIVER	ESU26	Rohde & Schwarz	100552	04, 01, 2022
☒	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	12, 14, 2021
☒	PREAMPLIFIER	8449B	HP	3008A00538	06, 21, 2022

Test Conditions
Temperature: (23,2 ± 0,2) ℃
Relative Humidity: (44,7 ± 0,3) % R.H.

Frequency Range of Measurement
1 ㎓ to 5 ㎓

Instrument Settings
IF Band Width: 1 ㎒

Test Results
The requirements are:
☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
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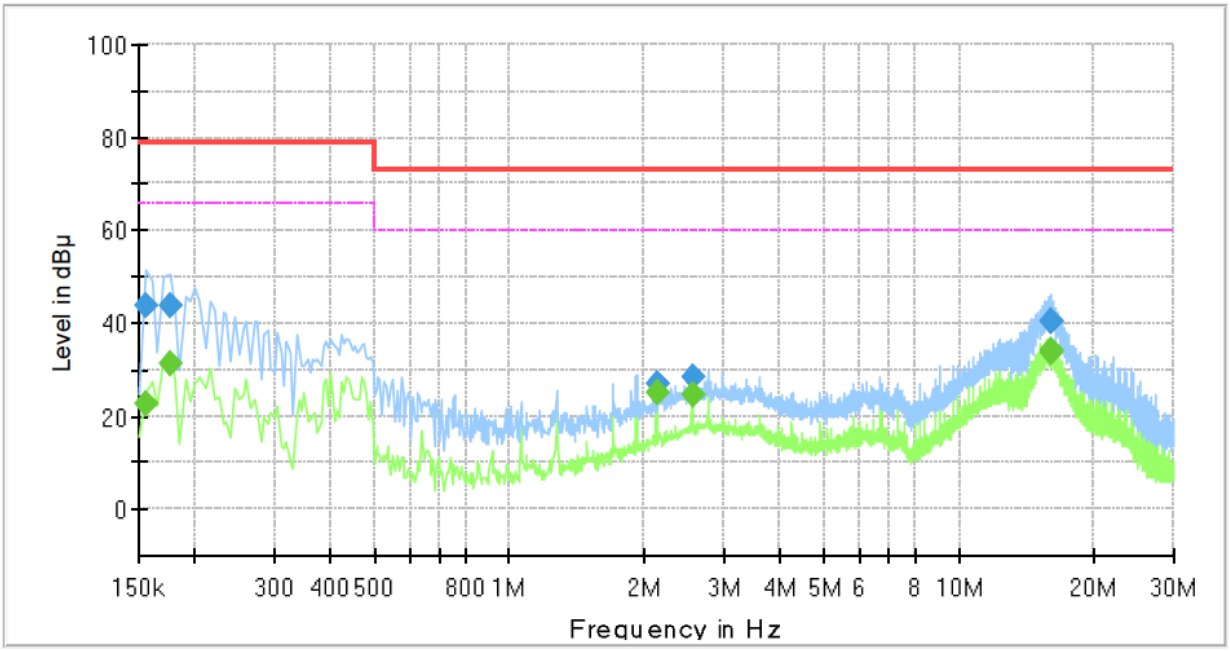
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

HOT LINE

Common Information

Test Description:	Conducted Emission
Model No.:	QRN-430S
Phase:	L1
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	---	22.79	66.00	43.21	1000.0	9.000	L1	19.5
0.155000	43.91	---	79.00	35.09	1000.0	9.000	L1	19.5
0.175000	---	31.40	66.00	34.60	1000.0	9.000	L1	19.5
0.175000	43.66	---	79.00	35.34	1000.0	9.000	L1	19.5
2.125000	---	24.83	60.00	35.17	1000.0	9.000	L1	20.3
2.125000	27.13	---	73.00	45.87	1000.0	9.000	L1	20.3
2.550000	---	24.37	60.00	35.63	1000.0	9.000	L1	20.3
2.550000	28.37	---	73.00	44.63	1000.0	9.000	L1	20.3
16.005000	---	34.11	60.00	25.89	1000.0	9.000	L1	19.9
16.005000	40.62	---	73.00	32.38	1000.0	9.000	L1	19.9
16.065000	---	33.93	60.00	26.07	1000.0	9.000	L1	19.9
16.065000	40.23	---	73.00	32.77	1000.0	9.000	L1	19.9

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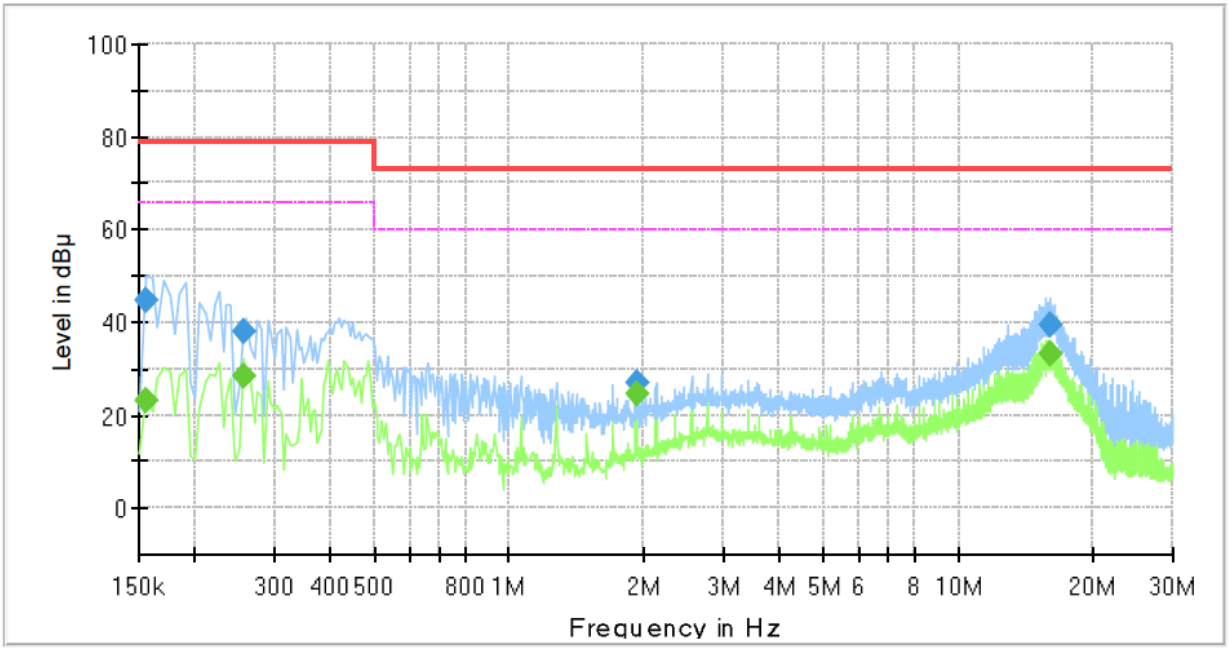
NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	QRN-430S
Phase:	N
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	---	23.13	66.00	42.87	1000.0	9.000	N	19.4
0.155000	44.75	---	79.00	34.25	1000.0	9.000	N	19.4
0.255000	---	28.25	66.00	37.75	1000.0	9.000	N	19.5
0.255000	38.25	---	79.00	40.75	1000.0	9.000	N	19.5
1.915000	---	24.54	60.00	35.46	1000.0	9.000	N	20.3
1.915000	27.06	---	73.00	45.94	1000.0	9.000	N	20.3
16.005000	---	33.45	60.00	26.55	1000.0	9.000	N	19.9
16.005000	39.69	---	73.00	33.31	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))

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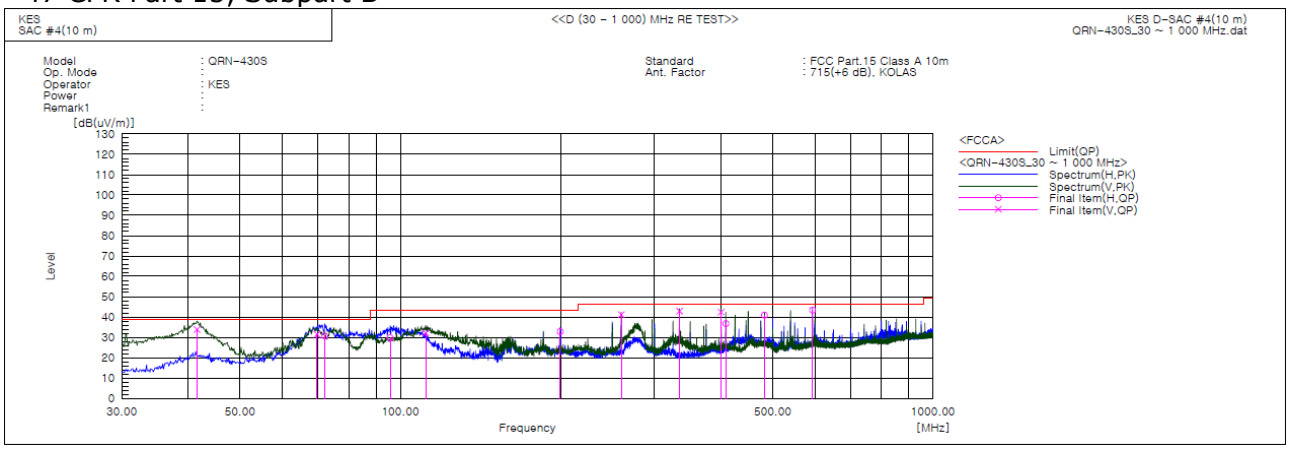
Radiated Electric Field Emissions(Below 1 ㎓)

- 47 CFR Part 15, Subpart B



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	41.519	V	56.1	-22.2	33.9	39.0	5.1	114.0	49.0	
2	69.770	V	56.3	-24.8	31.5	39.0	7.5	123.0	271.0	
3	72.195	H	56.5	-25.8	30.7	39.0	8.3	360.0	66.0	
4	95.718	H	53.2	-23.4	29.8	43.5	13.7	354.0	157.0	
5	111.601	V	54.6	-22.4	32.2	43.5	11.3	125.0	309.0	
6	199.629	H	53.6	-20.8	32.8	43.5	10.7	397.0	285.0	
7	259.890	V	60.1	-18.9	41.2	46.5	5.3	144.0	184.0	
8	334.095	V	58.8	-15.9	42.9	46.5	3.6	128.0	151.0	
9	400.055	V	56.8	-14.3	42.5	46.5	4.0	142.0	230.0	
10	408.421	H	50.9	-14.1	36.8	46.5	9.7	396.0	244.0	
11	482.626	H	53.1	-12.2	40.9	46.5	5.6	387.0	312.0	
12	594.055	H	52.0	-8.6	43.4	46.5	3.1	359.0	334.0	

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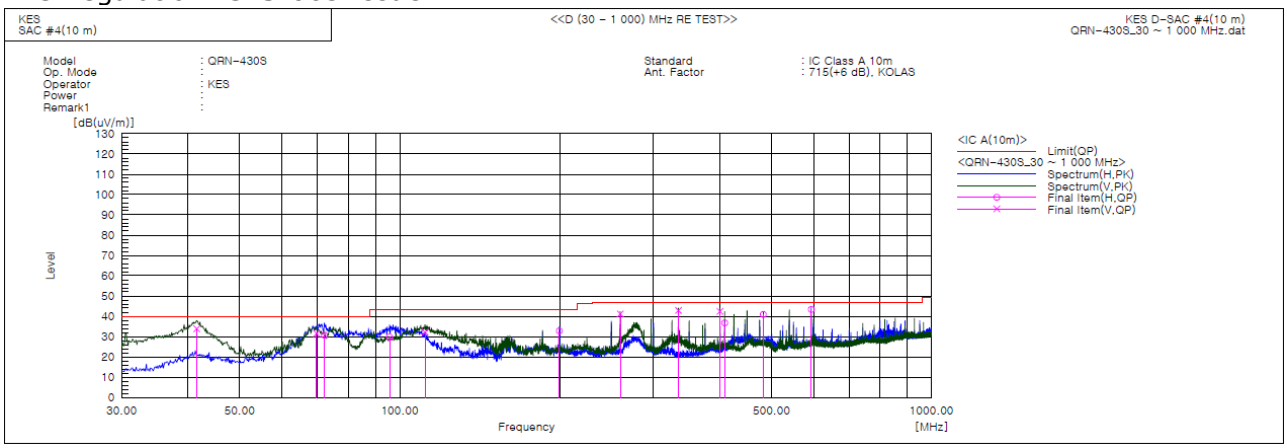
- IC Regulation ICES-003 Issue 7



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	41.519	V	56.1	-22.2	33.9	40.0	6.1	114.0	49.0	
2	69.770	V	56.3	-24.8	31.5	40.0	8.5	123.0	271.0	
3	72.195	H	56.5	-25.8	30.7	40.0	9.3	360.0	66.0	
4	95.718	H	53.2	-23.4	29.8	43.5	13.7	354.0	157.0	
5	111.601	V	54.6	-22.4	32.2	43.5	11.3	125.0	309.0	
6	199.629	H	53.6	-20.8	32.8	43.5	10.7	397.0	285.0	
7	259.890	V	60.1	-18.9	41.2	47.0	5.8	144.0	184.0	
8	334.095	V	58.8	-15.9	42.9	47.0	4.1	128.0	151.0	
9	400.055	V	56.8	-14.3	42.5	47.0	4.5	142.0	230.0	
10	408.421	H	50.9	-14.1	36.8	47.0	10.2	396.0	244.0	
11	482.626	H	53.1	-12.2	40.9	47.0	6.1	387.0	312.0	
12	594.055	H	52.0	-8.6	43.4	47.0	3.6	359.0	334.0	

♦ Calculation – SAC #4(10 m)
Result(QP) [dB(㎶/m)] = (Reading(QP)[dB(㎶)] + c.f[dB(1/m)]
Margin(QP)[dB] = Limit[dB(㎶/m)] - Result(QP) [dB(㎶/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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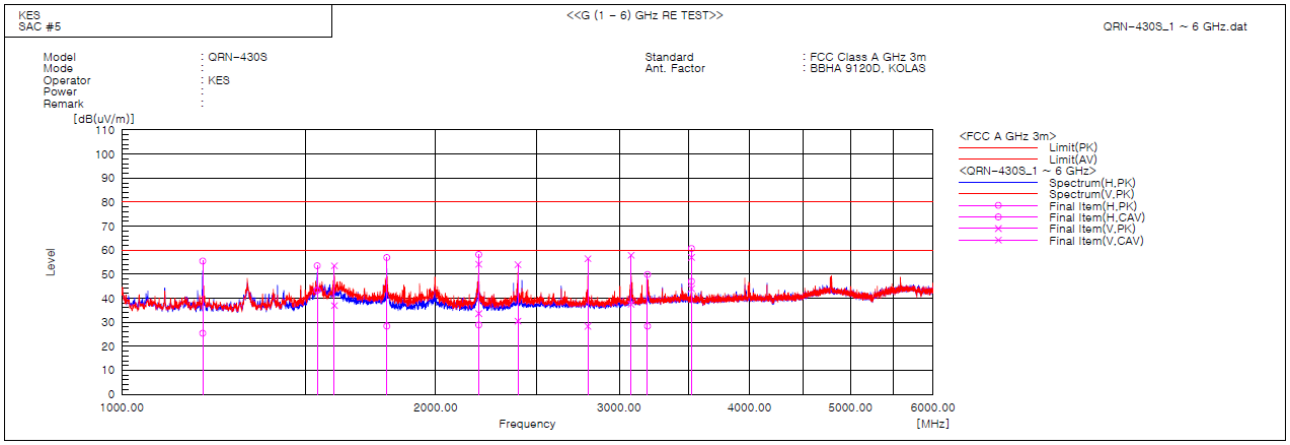
Radiated Electric Field Emissions(Above 1 ㎓)



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	1195.625	H	62.4	32.4	-6.9	55.5	25.5	80.0	60.0	24.5	34.5	117.7	245.4	
2	1540.000	H	58.7	48.5	-5.2	53.5	43.3	80.0	60.0	26.5	16.7	99.9	186.5	
3	1599.375	V	58.5	41.8	-4.9	53.6	36.9	80.0	60.0	26.4	23.1	115.8	218.9	
4	1795.625	H	61.1	32.5	-4.1	57.0	28.4	80.0	60.0	23.0	31.6	108.4	230.8	
5	2199.375	H	61.0	31.7	-2.8	58.2	28.9	80.0	60.0	21.8	31.1	108.6	327.0	
6	2199.375	V	57.0	36.4	-2.8	54.2	33.6	80.0	60.0	25.8	26.4	254.3	145.9	
7	2398.750	V	56.1	32.6	-2.1	54.0	30.5	80.0	60.0	26.0	29.5	133.5	208.0	
8	2799.375	V	56.7	28.6	-0.3	56.4	28.3	80.0	60.0	23.6	31.7	99.8	253.8	
9	3080.000	V	57.5	37.1	0.4	57.9	37.5	80.0	60.0	22.1	22.5	111.3	230.4	
10	3193.125	H	49.2	27.7	0.7	49.9	28.4	80.0	60.0	30.1	31.6	101.4	348.2	
11	3520.000	H	59.8	46.1	0.9	60.7	47.0	80.0	60.0	19.3	13.0	102.2	139.8	
12	3520.000	V	56.1	43.2	0.9	57.0	44.1	80.0	60.0	23.0	15.9	100.2	170.9	

♦ Calculation

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

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

Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value

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

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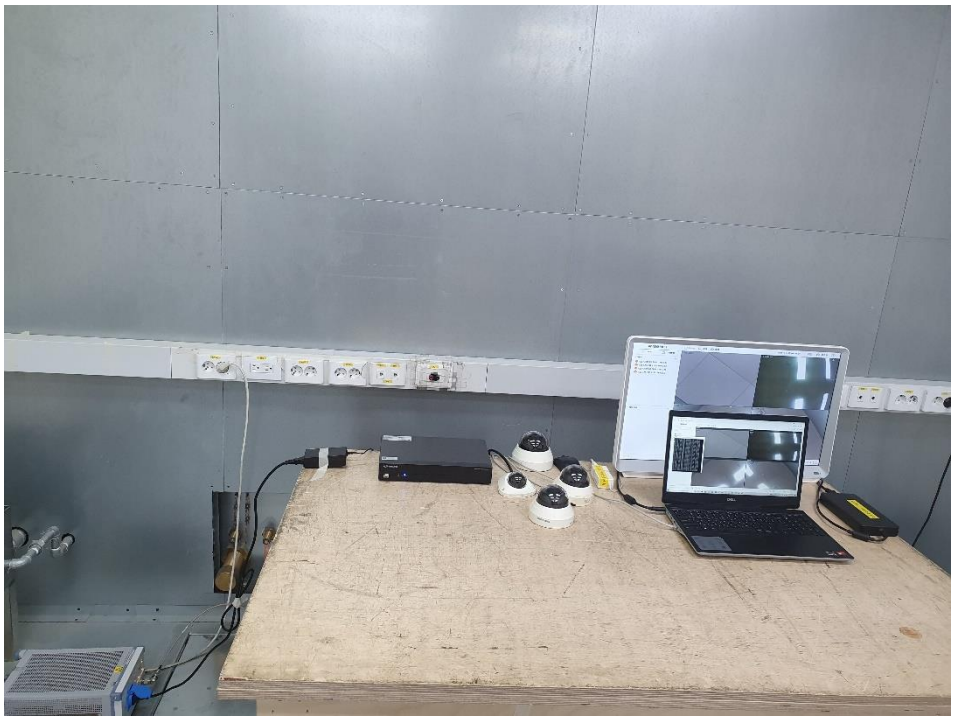
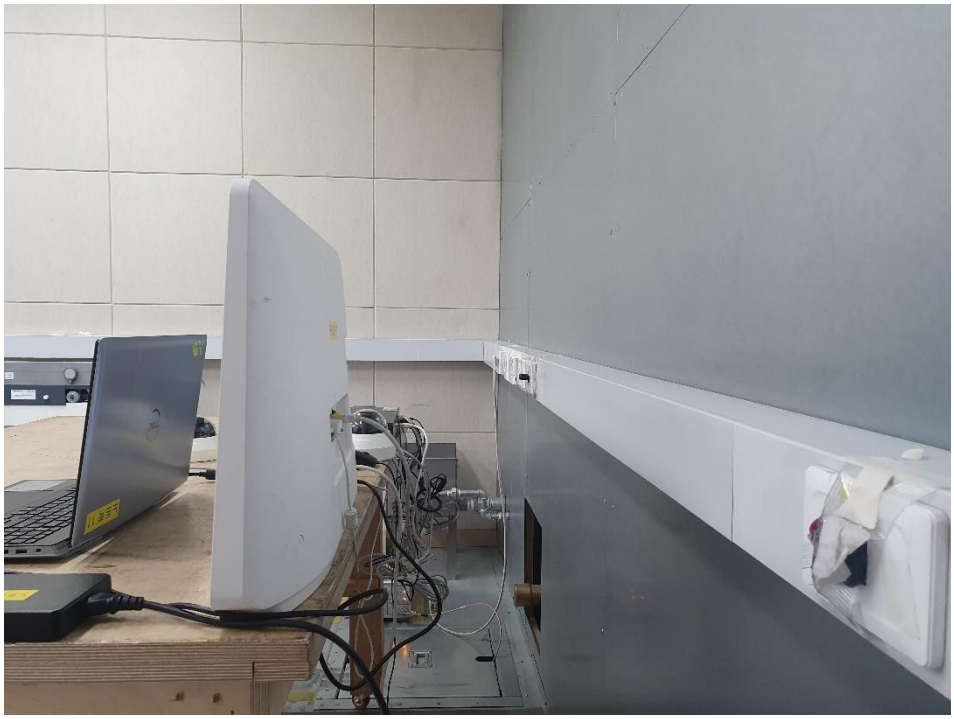
Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports





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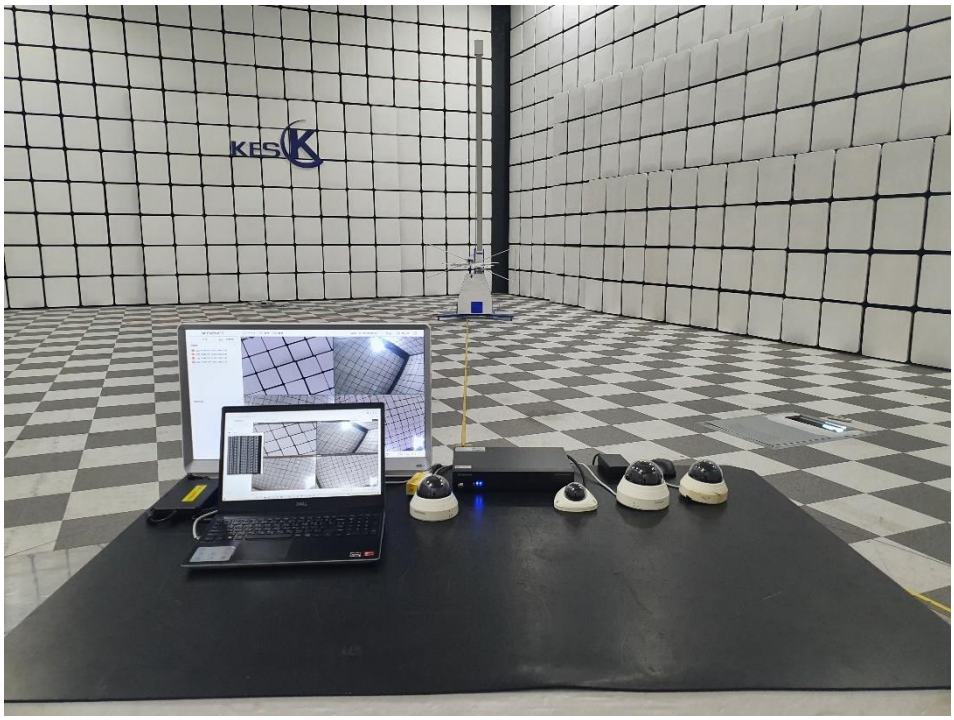
Radiated Electric Field Emissions(Below 1 ㎓)



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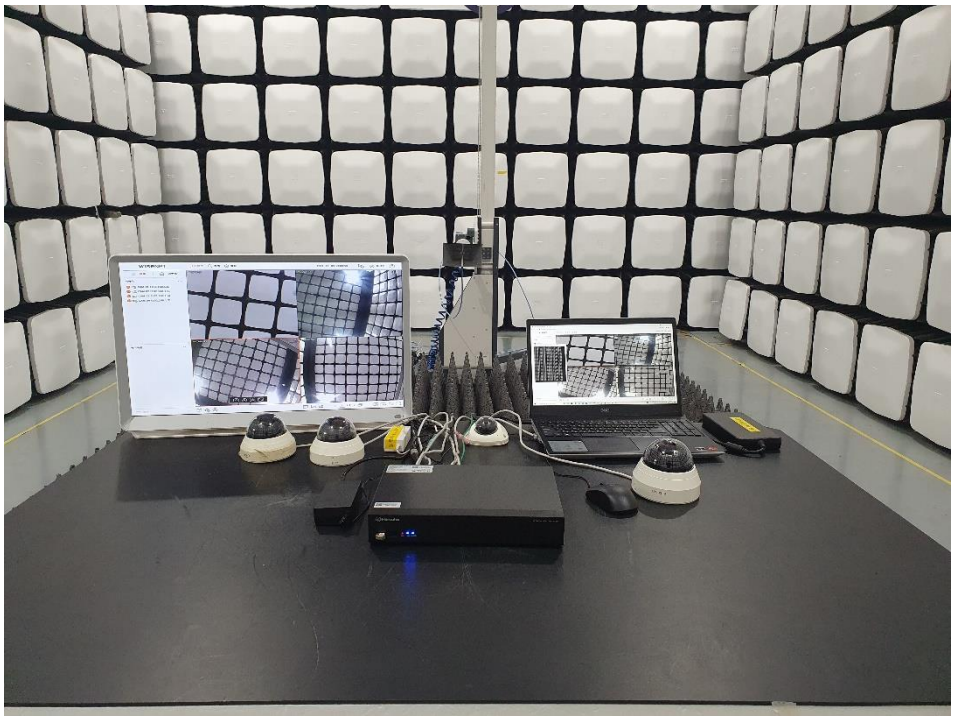
Radiated Electric Field Emissions(Above 1 ㎓)



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EUT External Photographs

(Top)

(Bottom)

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EUT Internal Photographs

(Internal View)

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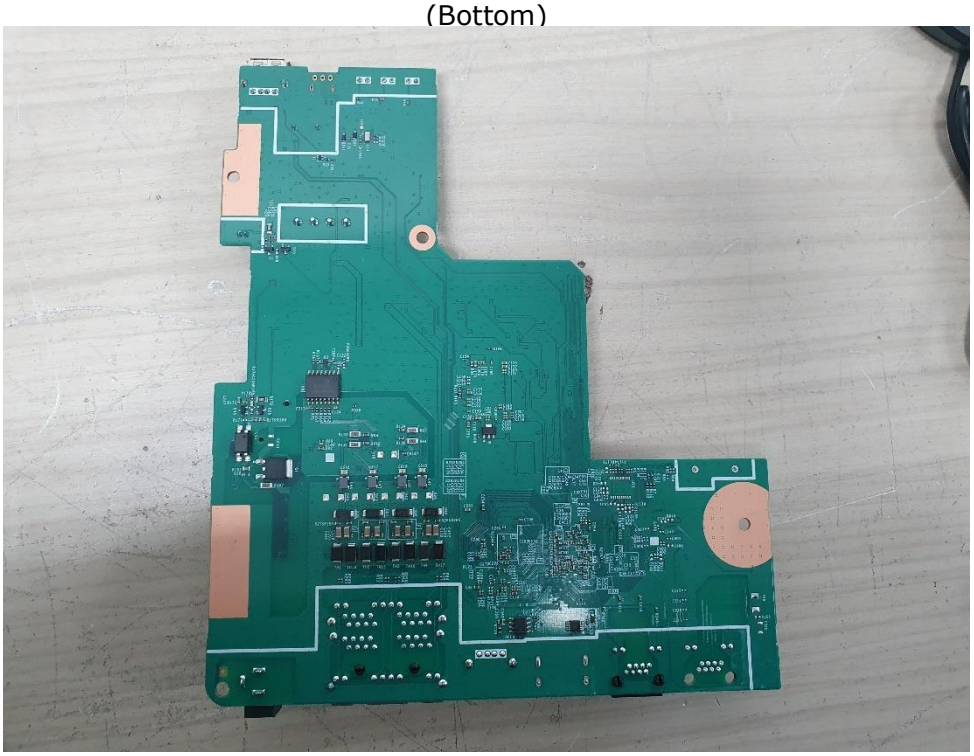
EUT Internal View – Board

(Top)

(Bottom)



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EUT Internal View – Mouse

EUT Internal View – Adaptor

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EUT Internal View – HDD

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Label Photographs

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

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
(1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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