



EMC TEST REPORT

Test Report No. : KES-E1-19T0795
Date of Issue : Dec. 15, 2019
Product name : NVR
Model/Type No. : LRN-810S
Variant Mode : -
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 (TIANJIN) CO.,LTD.
2. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.
3. D-TECH CO.,LTD.
Manufacturer Address : 1. No.11 Weiliu Rd, Micro-Electronic Industrial Park, TEDA, Tianjin,
300385, People's Republic of China
2. Lot O-2, Que Vo Industrial Zone extended area,
Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam
3. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi-do,
Korea (Suwon Industrial Complex)
Equipment authorization : **Supplier's Declaration of Conformity**
Date of Receipt : Nov. 19, 2019
Test date : Dec. 06, 2019
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Dong In, 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.

**KES Co., Ltd.**

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Dec. 15, 2019	KES-E1-19T0795	Issued

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1.0 General Product Description

Main Specifications of EUT are:

		LRN-810S	Functions		
Performance					
Record	Compression	H.265, H.264, MJPEG		Item	IP address, Add profile edit, Bitrate, Compression, GOP, Quality, Camera MD setup, Wisestream, Dynamic GOV/FPS, VA Setup 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
	Record Rate(Analog)				
	Recording Bandwidth	Max. 50Mbps			
	Resolution	5MP ~ CIF			
	Mode	Normal, Schedule(Continuous/Event), Event (Pre/Post), Dual track Recording			
	Event Trigger	Alarm Input, Video Loss, Camera Event(Alarm, MD, Video Analytics, Defocus)			
Search & Play	Event Action	e-Mail, PTZ Preset, Buzzer, Monitor Out	PTZ	Control	Via GUI, Webviewer
	Playback Bandwidth	Max. 32Mbps(8CH simultaneously)	Smart phone	Support Model	iOS, Android
	User	Max. 4 Users (Local 1, Remote 3)		Protocol Support	RTP, RTSP, HTTP, HTTPS, CGI(SUNAPI)
	Simultaneous playback	Max. 8CH(Local Monitor, Network)		Control	Live(Multi-Profile Support), Playback Search(3), Live Unicast(10)
	Storage	Fisheye Dewarping	WEB / CMS / Mobile	Redundancy	Max. Remote Users
Supported HDD		Up to 6TB	Failover		
HDD Slot		SATA 1ea(Max. 6TB)	Easy configuration	ARB	Support
External					P2P(QR code)
Backup	RAID		Coaxial Control		
	File backup	BU/Exe(GUI), JPG/AVI(Network)	Interface		
	Function	Multi channel(Upto 8CH) Play, Date-Time/Title display	HDMI	1EA	
Network			VGA		
Protocol		IPv4, IPv6, TCP/IP, UDP/IP, RTP (UDP), RTP (TCP), RTSP, NTP, HTTP, DHCP (Server, Client), PPPoE, SMTP, ICMP, IGMP, ARP, DNS, DDNS, uPnP, HTTPS, SNMP, ONVIF (Profile-S), SUNAPI(Server, Client)	Audio		
			Ethernet	RJ-45(10/100/1000BASE-T) x 1 RJ-45(PoE+) x 8	
			Alarm		
			USB	2EA(Front 1, Rear 1)	
			Power inlet		
			System		
DDNS		Wisenet DDNS	System Control	Mouse, IR remocon, 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	
Transmission Bandwidth		Max. 30Mbps			
Audio	Input/Output	8CH(network)			
	Compression	G.711, G.726, AAC(16/48KHz)			
	Audio Communication	2-Way			
Max Remote Users		Search(3), Live Unicast(10), Multicast(20)	Environmental		
Security		HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access log 802.1X Authentication(EAP-TLS, EAP-LEAP) Device Certificate(Hanwha Techwin Root CA)	Operating Temperature		0°C to +40°C(32°F to 104°F)
			Operating Humidity		20% ~ 85% RH
			Electrical		
			Power Input		54VDC / 1.67A
			Power Consumption		Max. 936.2W(1HDD, PoE on) Max. 14.1W(1HDD, PoE off)
			PoE Budget		Max. 65W
			Mechanical		
			Color / Material		Black / Metal
Viewer Software		SSM, Webviewer, Smart Viewer, Wisenet mobile Support SDK/CGI(SUNAPI) for integration to 3'rd party VMS	Dimension (WxHxD)		W300.0 x H47.1 x D208.4 mm (11.8" x 1.85" x 8.2") (1U)
			Weight		1.01Kg (2.23lb)

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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
NVR	LRN-810S	-	HANWHA TECHWIN (TIANJIN) CO., LTD	EUT
NVR Adaptor	FSP090-AWAN2	-	FSP TECHNOLOGY INC.	-

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Notebook	NT730U3E	JJRE91CF200065A	SAMSUNG	-
Notebook Adaptor	PA-1600-66	AD-6019P	LITEON	-
Monitor	24M47VQ	702NTQDA3604	LG	-
Monitor Adaptor	ADS-40FSG-19 19025GPG-1	EAY62768621	Shenzhen Honor Electronic Co., Ltd.	-
Network Camera 1	QNV-6023R	-	HANWHA TECHWIN (TIANJIN) CO., LTD	4 EA
Network Camera 2	SNV-6012MP	-	HANWHA TECHWIN (TIANJIN) CO., LTD	4 EA
Mouse	-	-	-	-
USB Memory	-	-	Transcend	16G



1.6 External I / O Cabling

Start		END		Cable Spec.	
Description	I / O Port	Description	I / O Port	Length	Shield
NVR (EUT)	RJ-45 1	Notebook	RJ-45 1	3.0	U
	HDMI	Monitor	HDMI	1.4	S
	RJ-45 2	Network Camera 1	RJ-45 2	3.0	U
	RJ-45 3	Network Camera 1	RJ-45 3	3.0	U
	RJ-45 4	Network Camera 1	RJ-45 4	3.0	U
	RJ-45 5	Network Camera 1	RJ-45 5	3.0	U
	RJ-45 6	Network Camera 2	RJ-45 6	3.0	U
	RJ-45 7	Network Camera 2	RJ-45 7	3.0	U
	RJ-45 8	Network Camera 2	RJ-45 8	3.0	U
	RJ-45 9	Network Camera 2	RJ-45 9	0.3	U
	USB Slot	Mouse	USB	1.2	U
	USB Slot	USB Memory	USB	-	U

* Unshielded=U, Shielded=S

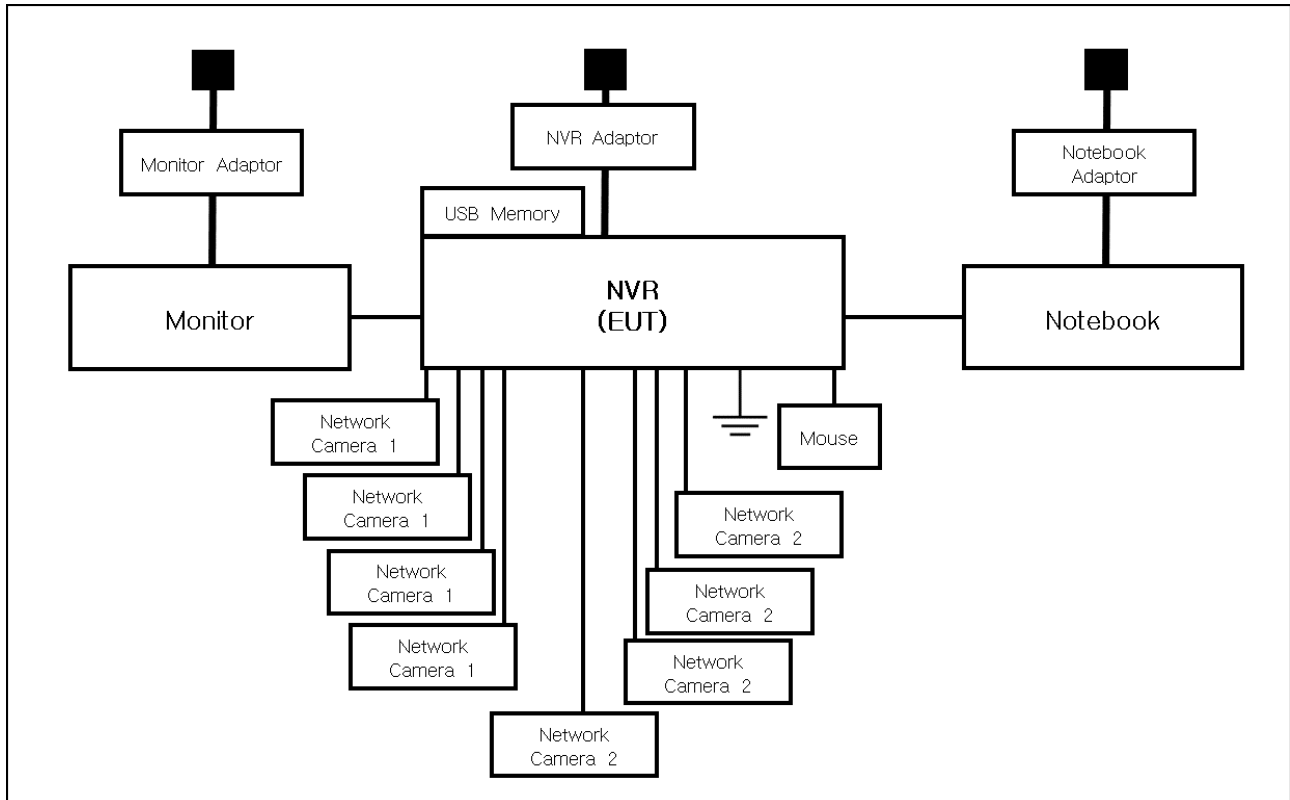
1.7 EUT Operating Mode(s)

Test mode	operating
Operate	Monitoring EUT, Ping Test

EUT Test operating S / W		
Name	Version	Manufacture Company
-	-	-

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, Yeosu-si, Gyeonggi-do, 12658, Korea. The sites are constructed in conformance with the requirements of ANSI C63.4:2014 and CISPR 16-1-4:2012

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 0003

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2.0 Test Regulations

The emissions tests were performed according to following regulations:

☐ **EMC – Directive 2014/30/EU**

☐ EN 61000-6-3:2011

☐ EN 61000-6-1:2007

☐ EN 61000-6-4:2007 +A1:2011

☐ EN 61000-6-2:2005

☐ EN 55011:2007 +A1:2010

☐ Group 1
☐ Class A

☐ Group 2
☐ Class B

☐ EN 55014-1:2006 +A2:2011

☐ EN 55014-2:1997 +A2:2008

☐ EN 55015:2013

☐ EN 55032:2015

☐ Class A

☐ Class B

☐ EN 55024:2010

☐ 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-CISPR 32:2016 | ☐ Class A | ☐ Class B |
| ☐ AS/NZS CISPR32:2015 | ☐ Class A | ☐ Class B |
| ☒ 47 CFR Part 15, Subpart B | | |
| ☐ CISPR 22:2009 +A1:2010 | ☐ Class A | ☐ Class B |
| ☒ ANSI C63.4-2014 | ☒ Class A | ☐ Class B |
| ☒ IC Regulation ICES-003 : 2016 | | |
| ☐ CAN/CSA CISPR 22-10 | ☐ Class A | ☐ Class B |
| ☒ ANSI C63.4-2014 | ☒ Class A | ☐ Class B |
| ☐ 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 at Mains Power Ports

Test Date

Dec. 06, 2019

Test Location

Electro wave Shieldroom

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	101781	04, 22, 2020
☒	LISN	ENV216	R & S	101787	01, 04, 2020
☒	LISN	ESH2-Z5	R & S	100450	04, 22, 2020
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 25, 2020

Test Conditions

Temperature: 21,9 °C
Relative Humidity: 49,6 % R.H.

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

Dec. 06, 2019

Test Location

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

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, 09, 2020
☒	AMPLIFIER	SCU 01	R & S	100603	11, 25, 2020
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 29, 2020
☒	ATTENUATOR	8491A	HP	32173	03, 11, 2020

Test Conditions

Temperature: 21,8 °C
Relative Humidity: 50,5 % R.H.

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

Dec. 06, 2019

Test Location

SEMI ANECHOIC CHAMBER #4(10 m)

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, 09, 2020
☒	PREAMPLIFIER	8449B	AGILENT	3008A01742	01, 08, 2020
☐	ATTENUATOR	8491A	HP	35496	03, 11, 2020
☒	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	03, 12, 2020

Test Conditions

Temperature: 22,4 °C
Relative Humidity: 50,2 % R.H.

Frequency Range of Measurement

1 GHz to 5 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.



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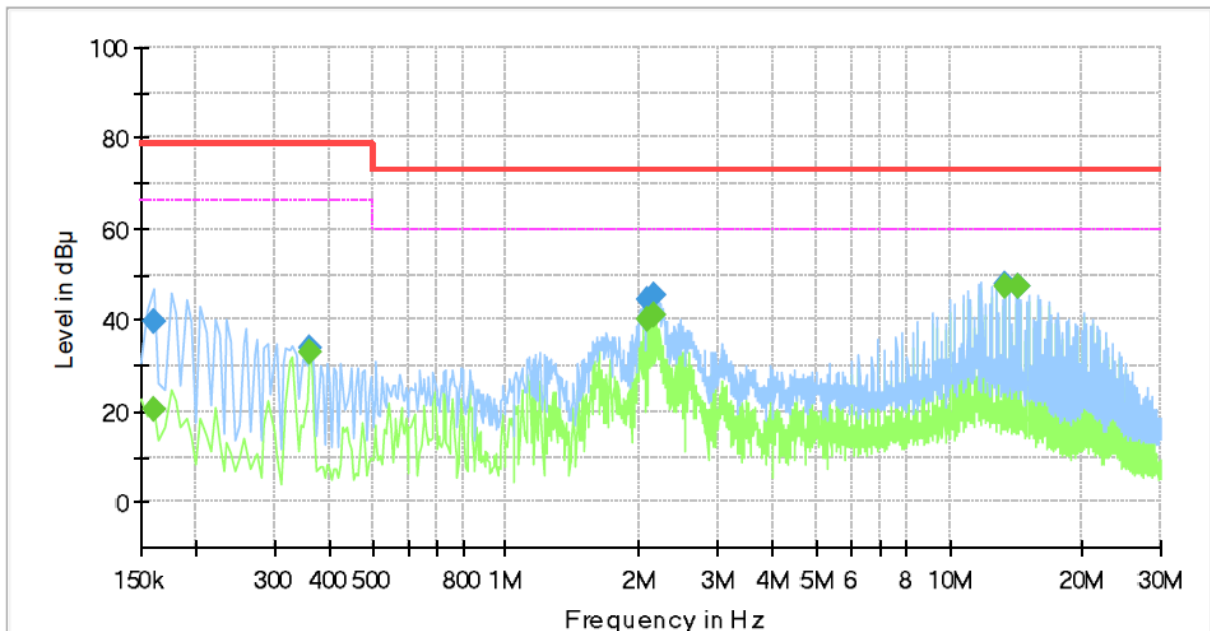
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

HOT LINE

Common Information

Test Description: Conducted Emission
Model No.: LRN-810S
Phase: L1
Mode:
Operator Name: KES



Final Result

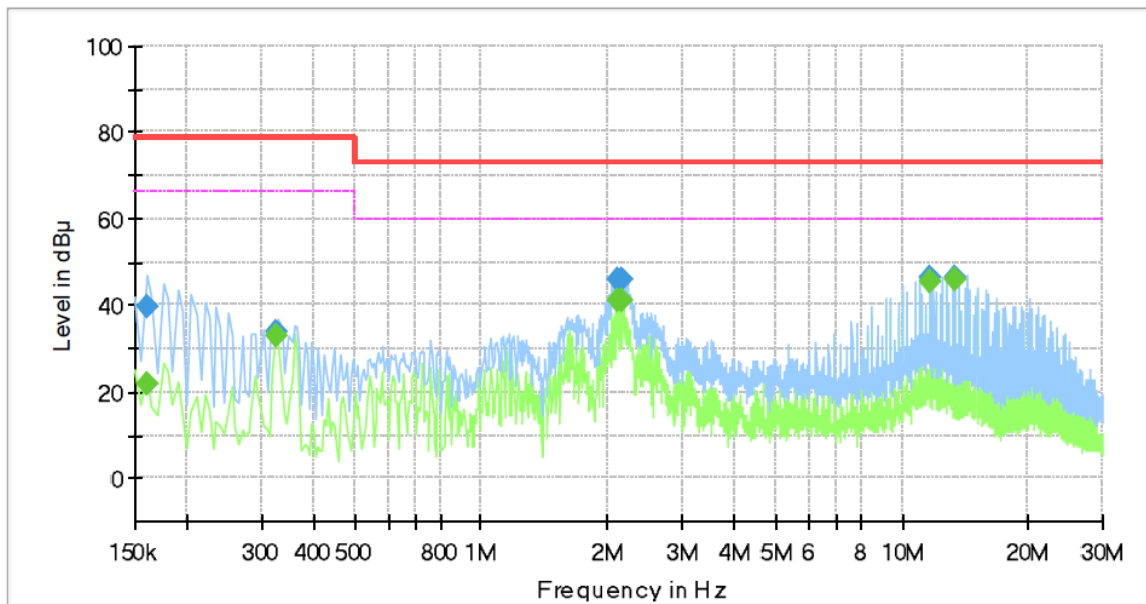
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	20.50	66.00	45.50	1000.0	9.000	L1	19.5
0.160000	39.59	---	79.00	39.41	1000.0	9.000	L1	19.5
0.360000	---	32.70	66.00	33.30	1000.0	9.000	L1	19.7
0.360000	34.11	---	79.00	44.89	1000.0	9.000	L1	19.7
2.080000	---	39.98	60.00	20.02	1000.0	9.000	L1	20.4
2.080000	44.69	---	73.00	28.31	1000.0	9.000	L1	20.4
2.150000	---	41.29	60.00	18.71	1000.0	9.000	L1	20.4
2.150000	45.64	---	73.00	27.36	1000.0	9.000	L1	20.4
13.410000	---	47.49	60.00	12.51	1000.0	9.000	L1	20.1
13.410000	47.87	---	73.00	25.13	1000.0	9.000	L1	20.1
14.305000	---	47.35	60.00	12.65	1000.0	9.000	L1	20.2
14.305000	47.49	---	73.00	25.51	1000.0	9.000	L1	20.2

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NEUTRAL LINE

Common Information

Test Description: Conducted Emission
 Model No.: LRN-810S
 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)
0.160000	---	21.84	66.00	44.16	1000.0	9.000	N	19.5
0.160000	39.65	---	79.00	39.35	1000.0	9.000	N	19.5
0.325000	---	33.14	66.00	32.86	1000.0	9.000	N	19.7
0.325000	33.96	---	79.00	45.04	1000.0	9.000	N	19.7
2.110000	---	41.37	60.00	18.63	1000.0	9.000	N	20.4
2.110000	45.98	---	73.00	27.02	1000.0	9.000	N	20.4
2.150000	---	40.96	60.00	19.04	1000.0	9.000	N	20.4
2.150000	45.76	---	73.00	27.24	1000.0	9.000	N	20.4
11.625000	---	45.50	60.00	14.50	1000.0	9.000	N	20.1
11.625000	46.49	---	73.00	26.51	1000.0	9.000	N	20.1
13.410000	---	46.20	60.00	13.80	1000.0	9.000	N	20.2
13.410000	46.67	---	73.00	26.33	1000.0	9.000	N	20.2

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

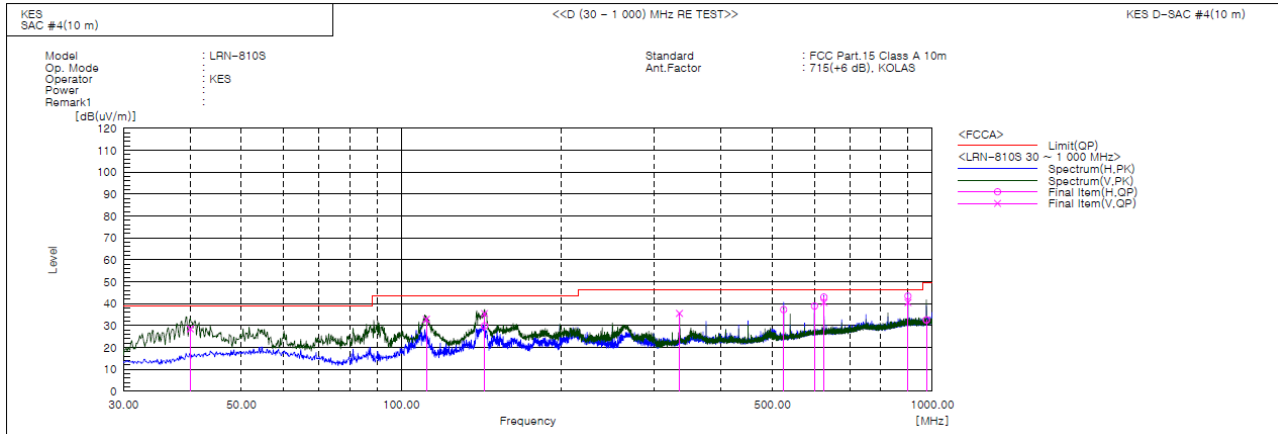
Reading Value : Not shown in the table.

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

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Radiated Electric Field Emissions(Below 1 GHz)



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	40.090	V	51.3	-22.8	28.5	39.0	10.5	100.0	148.0	
2	111.521	V	55.6	-22.7	32.9	43.5	10.6	108.0	238.0	
3	143.464	V	61.5	-26.0	35.5	43.5	8.0	114.0	89.0	
4	143.481	H	55.9	-26.0	29.9	43.5	13.6	397.0	134.0	
5	334.121	V	52.3	-16.7	35.6	46.5	10.9	125.0	174.0	
6	524.952	H	49.6	-12.3	37.3	46.5	9.2	374.0	168.0	
7	599.957	H	48.7	-9.8	38.9	46.5	7.6	374.0	218.0	
8	624.947	V	50.0	-9.5	40.5	46.5	6.0	136.0	33.0	
9	624.950	H	52.5	-9.5	43.0	46.5	3.5	374.0	336.0	
10	899.939	H	49.1	-5.6	43.5	46.5	3.0	368.0	241.0	
11	899.951	V	46.1	-5.6	40.5	46.5	6.0	153.0	137.0	
12	974.936	H	37.8	-5.2	32.6	49.5	16.9	342.0	285.0	

◆ Calculation – SAC #4(10 m)

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

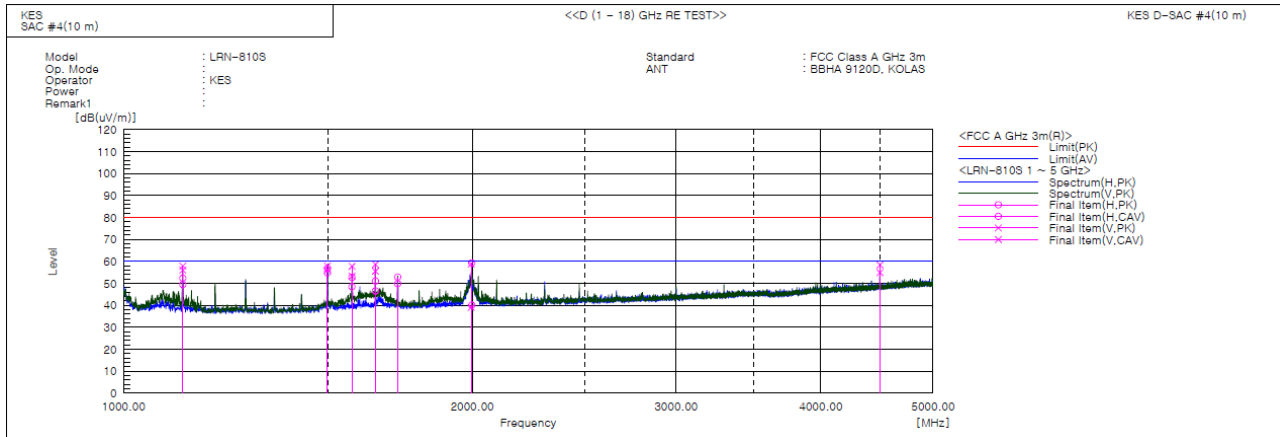
Margin(QP)[dB] = Limit[dB(μV/m)] - Result(QP) [dB(μV/m)]

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

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



Radiated Electric Field Emissions(Above 1 GHz)



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1124.910	V	63.3	61.5	-5.4	57.9	56.1	80.0	60.0	22.1	3.9	108.0	269.0	
2	1124.895	H	57.8	54.9	-5.4	52.4	49.5	80.0	60.0	27.6	10.5	233.0	182.0	
3	1499.755	V	60.8	58.9	-2.9	57.9	56.0	80.0	60.0	22.1	4.0	114.0	233.0	
4	1499.820	H	59.8	57.7	-2.9	56.9	54.8	80.0	60.0	23.1	5.2	335.0	251.0	
5	1574.815	V	60.3	55.8	-2.5	57.8	53.3	80.0	60.0	22.2	6.7	123.0	302.0	
6	1574.775	H	55.2	51.0	-2.5	52.7	48.5	80.0	60.0	27.3	11.5	371.0	256.0	
7	1649.945	V	60.8	57.7	-2.1	58.7	55.6	80.0	60.0	21.3	4.4	163.0	86.0	
8	1650.040	H	53.2	48.7	-2.1	51.1	46.6	80.0	60.0	28.9	13.4	305.0	146.0	
9	1724.800	H	54.6	51.6	-1.7	52.9	49.9	80.0	60.0	27.1	10.1	289.0	206.0	
10	1998.190	H	59.8	40.6	-0.5	59.3	40.1	80.0	60.0	20.7	19.9	333.0	142.0	
11	1996.175	V	59.3	39.6	-0.5	58.8	39.1	80.0	60.0	21.2	20.9	211.0	49.0	
12	4499.750	V	48.8	45.3	9.6	58.4	54.9	80.0	60.0	21.6	5.1	195.0	214.0	

◆ Calculation

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

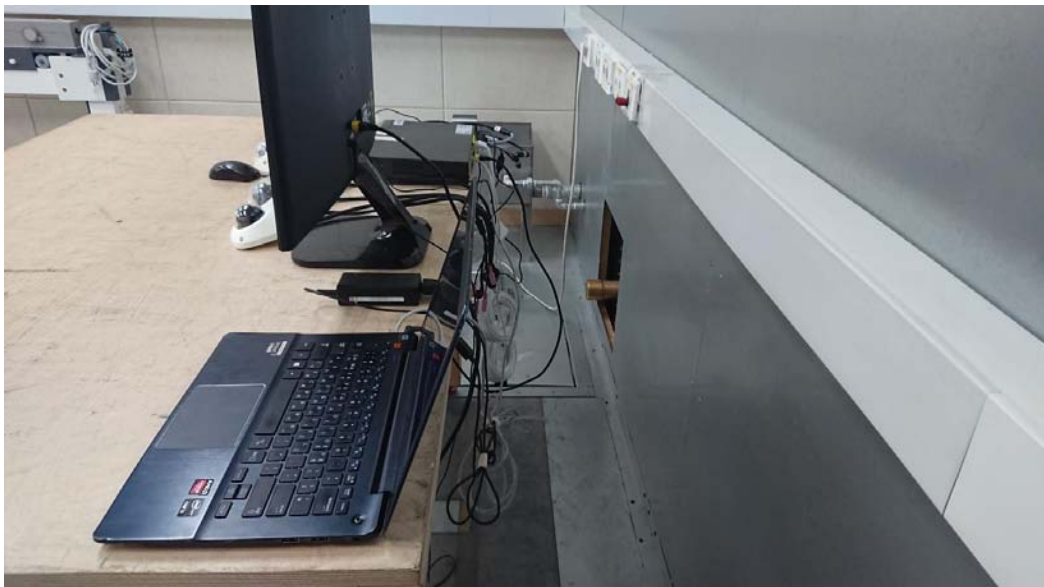
Margin(PK/CAV)[dB] = Limit[dB(uV/m)] - Result(PK/CAV) [dB(uV/m)]

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

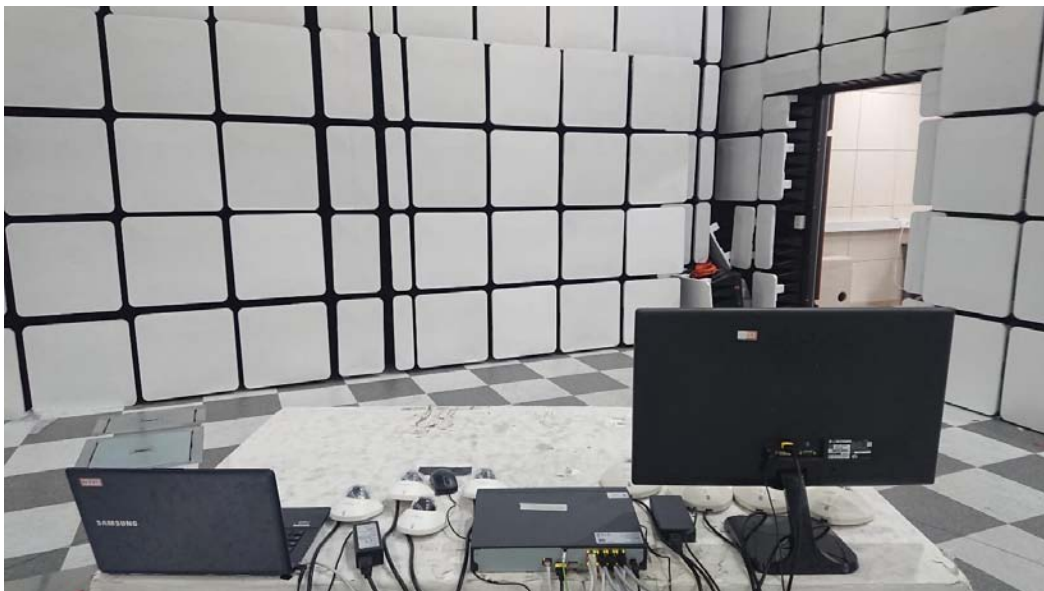
Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports



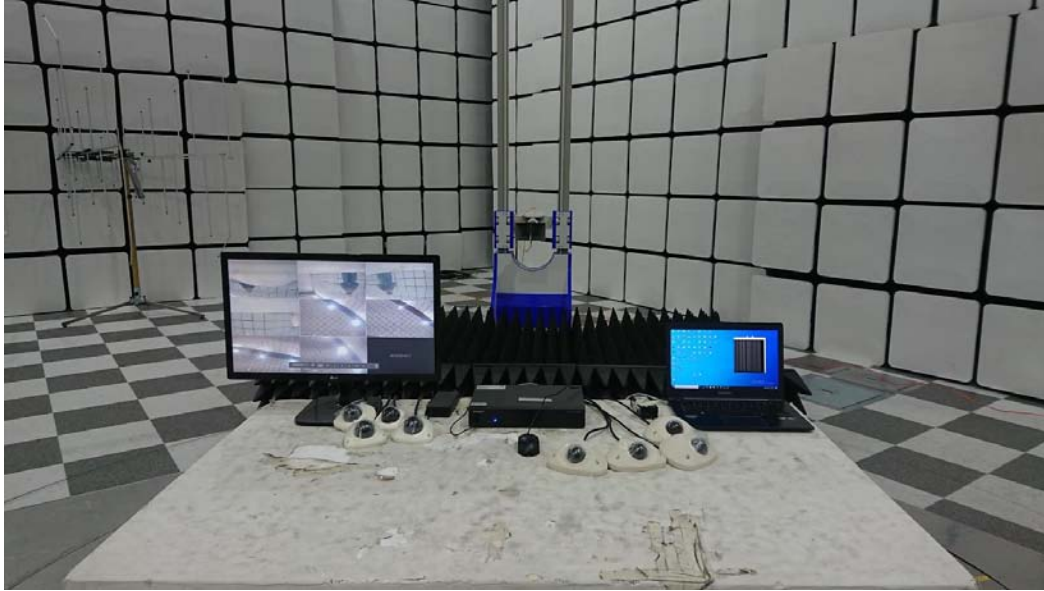
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Radiated Electric Field Emissions(Below 1 GHz)



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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)



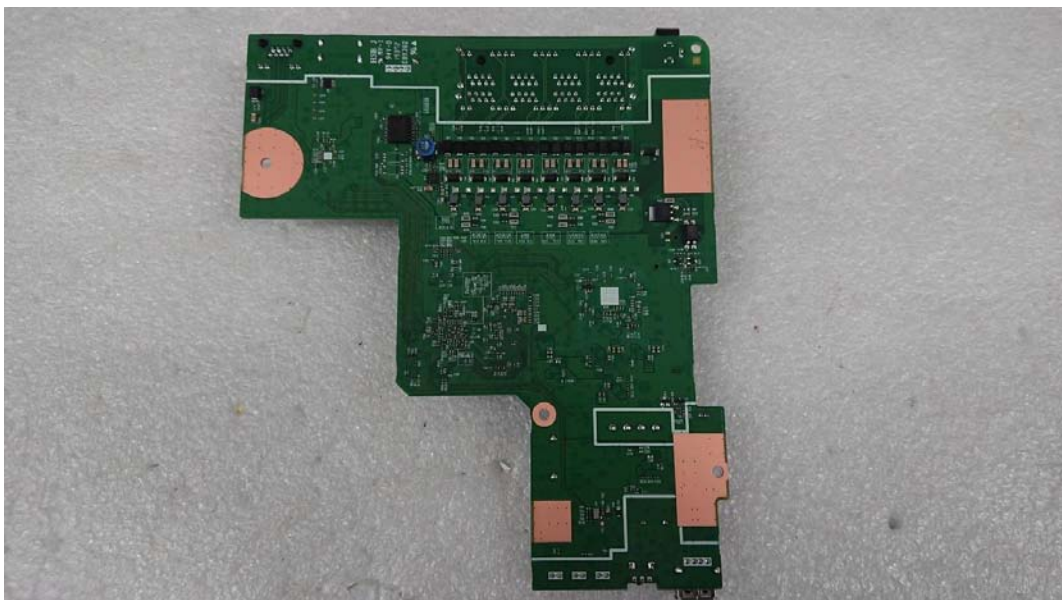
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EUT Internal View – Main Board

(Top)



(Bottom)



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EUT Internal View – HDD

(Top)



(Bottom)



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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.