

**KES Co., Ltd.**

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Report No.:
KES-E1-19T0785
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EMC TEST REPORT

Test Report No. : KES-E1-19T0785
Date of Issue : Dec. 10, 2019
Product name : NVR
Model/Type No. : LRN-410S
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. 04, 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.

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Dec. 10, 2019	KES-E1-19T0785	Issued

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1.0 General Product Description

Main Specifications of EUT are:

		LRN-410S	Functions	
Performance			Item	IP address, Add profile edit, Bitrate, Compression, GOP, Quality, Camera MD setup, Wisestream, Dynamic GOV/FPS, VA Setup
Record	Compression	H.265, H.264, MJPEG		Camera video setup (Simple focus, Brightness/Contrast, Flip/Mirror, IRIS, WDR, D&N, SSNR, Shutter, SDR, DIS), Fisheye Dewarping Mode, Hallway View Setup, Camera Webpage
	Record Rate(Analog)			
	Recording Bandwidth	Max. 30Mbps		
	Resolution	5MP ~ CIF		
	Mode	Normal, Schedule(Continuous/Event), Event (Pre/Post), Dual track Recording	PTZ	Control
	Event Trigger	Alarm Input, Video Loss, Camera Event(Alarm, MD, Video Analytics, Defocus)	Smart phone	Support Model
Search & Play	Event Action	e-Mail, PTZ Preset, Buzzer, Monitor Out		Protocol Support
	Playback Bandwidth	Max. 32Mbps(4CH simultaneously)		Control
	User	Max. 4 Users (Local 1, Remote 3)		Max. Remote Users
	Simultaneous playback	Max. 4CH(Local Monitor, Network)	Redundancy	Failover
Storage	Fisheye Dewarping	WEB / CMS / Mobile		ARB
	Supported HDD	Up to 6TB	Easy configuration	P2P(QR code)
	HDD Slot	SATA 1ea(Max. 6TB)	Coaxial Control	
	External		Interface	
Backup	RAID		HDMI	1EA
	File backup	BU/Exe(GUI), JPG/AVI(Network)	VGA	
	Function	Multi channel(Upto 4CH) Play, Date-Time/Title display	Audio	
			Ethernet	RJ-45(10/100BASE-T) x 1 RJ-45(PoE+) x 4
Network			Alarm	
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)	USB	2EA(Front 1, Rear 1)
			Power inlet	
			System	
			System Control	Mouse, IR remote, Web
DDNS		Wisenet DDNS	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. 20Mbps	Environmental	
Audio	Input/Output	4CH(network)	Operating Temperature	0°C to +40°C(32°F to 104°F)
	Compression	G.711, G.726, AAC(16/48KHz)	Operating Humidity	20% ~ 85% RH
	Audio Communication	2-Way	Electrical	
Max Remote Users		Search(3), Live Unicast(10), Multicast(20)	Power Input	54VDC / 1.20A
		HTTPS(SSL) Login Authentication	Power Consumption	Max. 55.7W(1HDD, PoE on) Max. 12.7W(1HDD, PoE off)
		Digest Login Authentication	PoE Budget	Max. 35W
		IP Address Filtering	Mechanical	
Security		User access log	Color / Material	Black / Metal
		802.1X Authentication(EAP-TLS, EAP-LEAP)	Dimension (WxHxD)	W300.0 x H47.1 x D208.4 mm (11.8" x 1.85" x 8.2") (1U)
		Device Certificate(Hanwha Techwin Root CA)	Weight	0.99Kg (2.18lb)
Viewer Software		SSM, Webviewer, Smart Viewer, Wisenet mobile Support SDK/CGI(SUNAPI) for integration to 3rd 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.

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-410S	-	HANWHA TECHWIN (TIANJIN) CO., LTD	EUT
NVR Adaptor	FSP065-DWAN3	-	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	3 EA
Network Camera 2	SNV-6012MP	-	HANWHA TECHWIN (TIANJIN) CO., LTD	-
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 2	RJ-45 5	0.3	U
	USB Slot	Mouse	USB	1.2	U
	USB Slot	USB Memory	USB	-	U

* Unshielded=U, Shielded=S

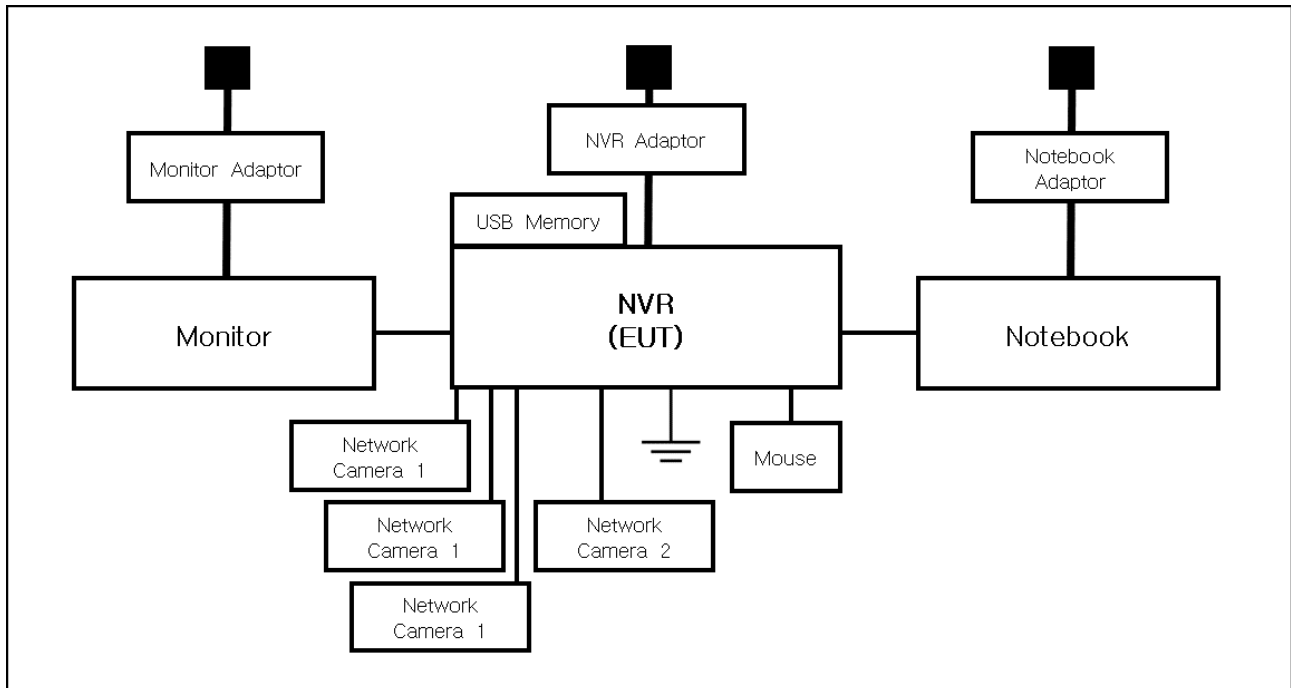
1.7 EUT Operating Mode(s)

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

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. 04, 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: 21,4 °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.

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2.2 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Dec. 04, 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: 21,9 °C
Relative Humidity: 49,9 % 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

RemarksSee Appendix A for test data.

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2.3 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Dec. 04, 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: 22,1 °C
Relative Humidity: 50,3 % 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.



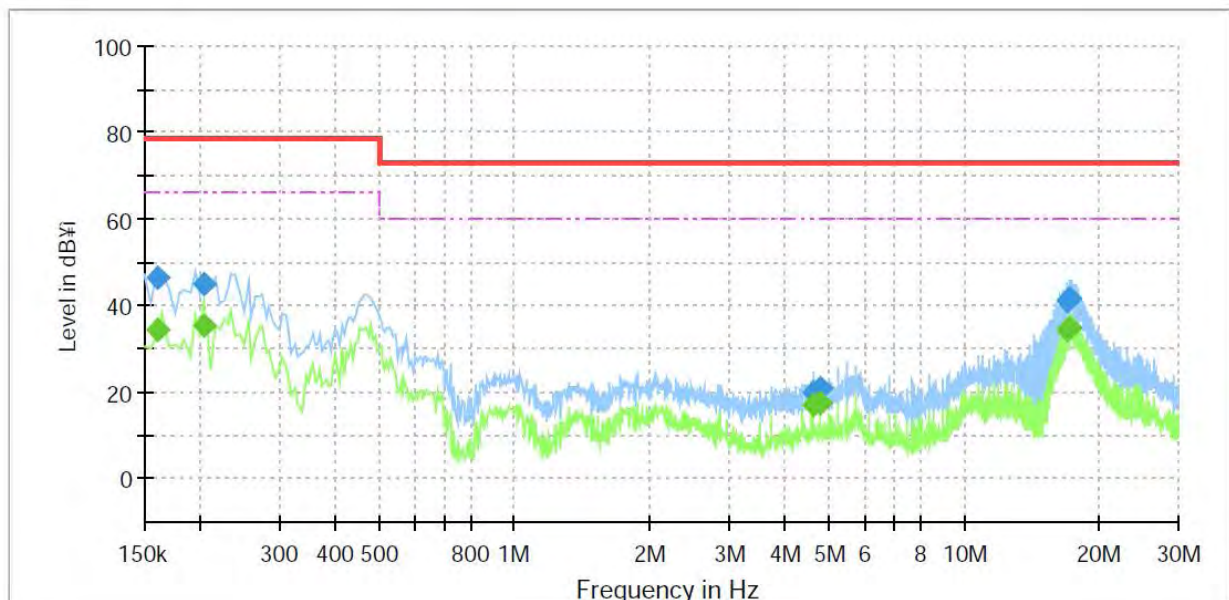
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

HOT LINE

Common Information

Test Description: Conducted Emission
Model No.: LRN-410S
Phase: L1
Mode:
Operator Name: KES



Final Result

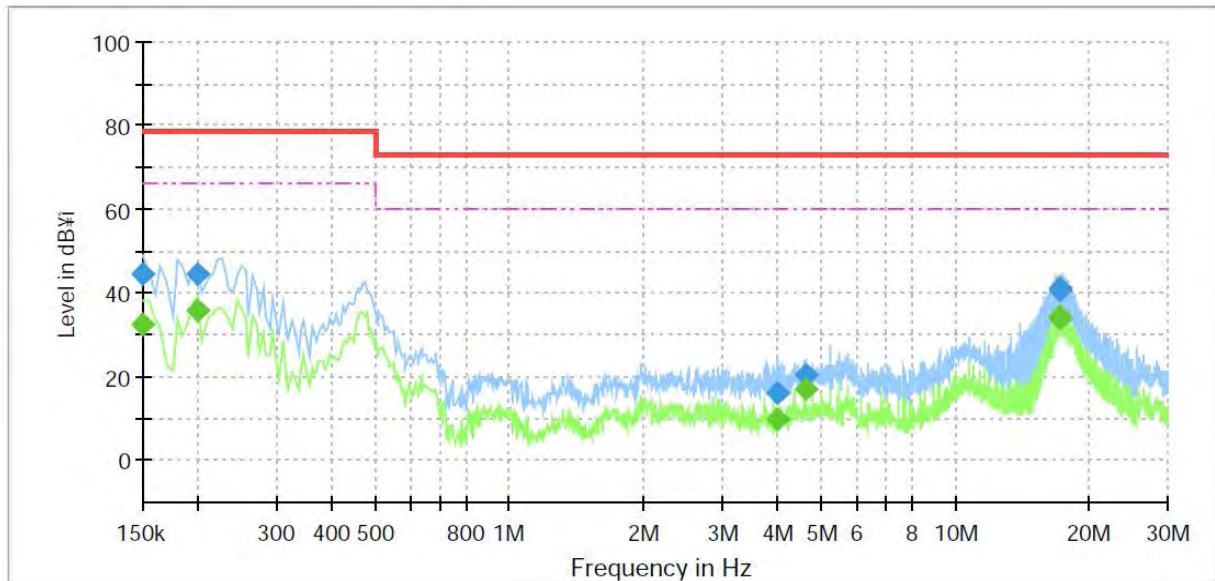
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	34.15	66.00	31.85	1000.0	9.000	L1	19.5
0.160000	46.28	---	79.00	32.72	1000.0	9.000	L1	19.5
0.205000	---	35.23	66.00	30.77	1000.0	9.000	L1	19.5
0.205000	45.08	---	79.00	33.92	1000.0	9.000	L1	19.5
4.610000	---	16.85	60.00	43.15	1000.0	9.000	L1	19.7
4.610000	19.95	---	73.00	53.05	1000.0	9.000	L1	19.7
4.810000	---	17.39	60.00	42.61	1000.0	9.000	L1	19.7
4.810000	20.82	---	73.00	52.18	1000.0	9.000	L1	19.7
17.015000	---	34.33	60.00	25.67	1000.0	9.000	L1	20.3
17.015000	41.26	---	73.00	31.74	1000.0	9.000	L1	20.3
17.190000	---	34.98	60.00	25.02	1000.0	9.000	L1	20.3
17.190000	41.73	---	73.00	31.27	1000.0	9.000	L1	20.3

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NEUTRAL LINE

Common Information

Test Description: Conducted Emission
 Model No.: LRN-410S
 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)
0.150000	---	32.46	66.00	33.54	1000.0	9.000	N	19.5
0.150000	44.28	---	79.00	34.72	1000.0	9.000	N	19.5
0.200000	---	35.92	66.00	30.08	1000.0	9.000	N	19.5
0.200000	44.70	---	79.00	34.30	1000.0	9.000	N	19.5
3.995000	---	9.91	60.00	50.09	1000.0	9.000	N	19.8
3.995000	16.01	---	73.00	56.99	1000.0	9.000	N	19.8
4.610000	---	16.95	60.00	43.05	1000.0	9.000	N	19.7
4.610000	20.39	---	73.00	52.61	1000.0	9.000	N	19.7
17.070000	---	33.86	60.00	26.14	1000.0	9.000	N	20.3
17.070000	40.70	---	73.00	32.30	1000.0	9.000	N	20.3
17.215000	---	34.18	60.00	25.82	1000.0	9.000	N	20.3
17.215000	40.99	---	73.00	32.01	1000.0	9.000	N	20.3

◆ Calculation

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

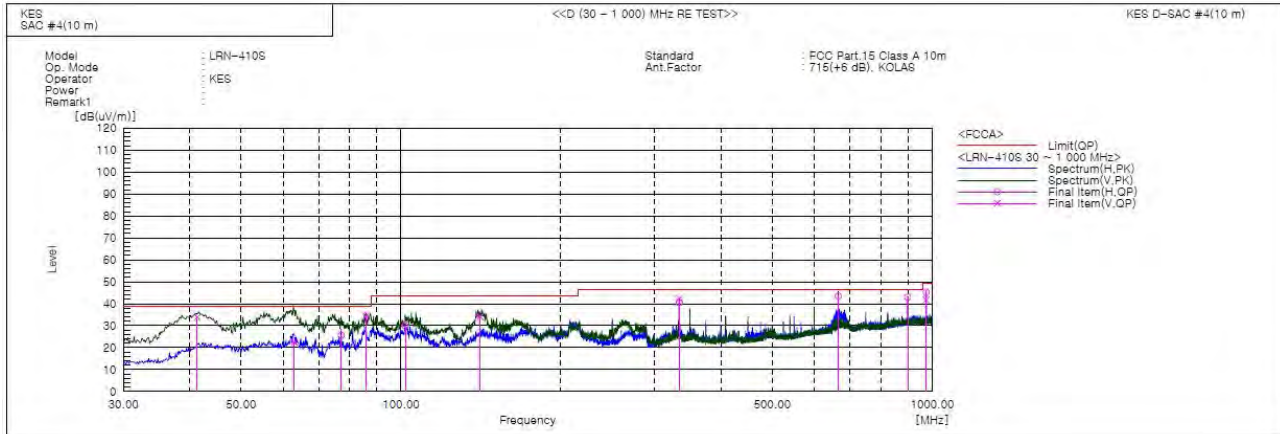
QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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



Radiated Electric Field Emissions(Below 1 GHz)



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	41.369	V	56.3	-22.4	33.9	39.0	5.1	100.0	128.0	
2	63.021	V	45.4	-23.0	22.4	39.0	16.6	100.0	269.0	
3	77.190	H	52.8	-27.2	25.6	39.0	13.4	399.0	169.0	
4	86.049	V	60.4	-25.9	34.5	39.0	4.5	106.0	88.0	
5	101.883	H	52.3	-22.4	29.9	43.5	13.6	389.0	229.0	
6	140.958	V	60.1	-26.0	34.1	43.5	9.4	128.0	142.0	
7	334.120	V	58.9	-16.7	42.2	46.5	4.3	133.0	203.0	
8	334.133	H	57.2	-16.7	40.5	46.5	6.0	388.0	58.0	
9	666.002	H	52.5	-9.1	43.4	46.5	3.1	364.0	76.0	
10	899.940	H	48.6	-5.6	43.0	46.5	3.5	371.0	163.0	
11	974.919	V	47.0	-5.2	41.8	49.5	7.7	168.0	117.0	
12	974.935	H	50.4	-5.2	45.2	49.5	4.3	349.0	126.0	

◆ 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



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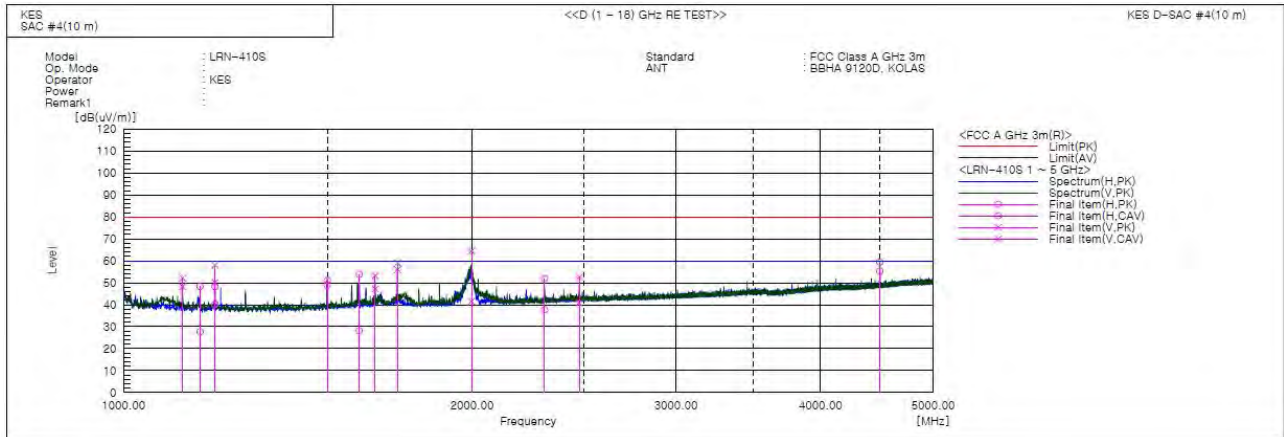
3701, 40, Simin-daero 365beon-gil,
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Report No.:

KES-E1-19T0785

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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	1124.880	V	57.6	53.6	-5.4	52.2	48.2	80.0	60.0	27.8	11.8	132.0	208.0	
2	1164.685	H	53.5	32.8	-5.1	48.4	27.7	80.0	60.0	31.6	32.3	381.0	91.0	
3	1199.950	V	62.8	55.0	-4.9	57.9	50.1	80.0	60.0	22.1	9.9	128.0	202.0	
4	1199.950	H	53.2	45.2	-4.9	48.3	40.3	80.0	60.0	31.7	19.7	338.0	267.0	
5	1499.885	H	54.0	51.8	-2.9	51.1	48.9	80.0	60.0	28.9	11.1	294.0	220.0	
6	1598.435	H	56.1	30.4	-2.3	53.8	28.1	80.0	60.0	26.2	31.9	371.0	330.0	
7	1649.915	V	55.4	49.4	-2.1	53.3	47.3	80.0	60.0	26.7	12.7	211.0	143.0	
8	1724.905	V	60.8	57.7	-1.7	59.1	56.0	80.0	60.0	20.9	4.0	185.0	134.0	
9	1997.885	V	64.9	42.0	-0.5	64.4	41.5	80.0	60.0	15.6	18.5	166.0	309.0	
10	2310.095	H	51.0	36.8	0.9	51.9	37.7	80.0	60.0	28.1	22.3	304.0	206.0	
11	2474.765	V	50.9	39.1	1.7	52.6	40.8	80.0	60.0	27.4	19.2	241.0	172.0	
12	4499.975	H	49.8	45.7	9.6	59.4	55.3	80.0	60.0	20.6	4.7	320.0	182.0	

◆ 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)]

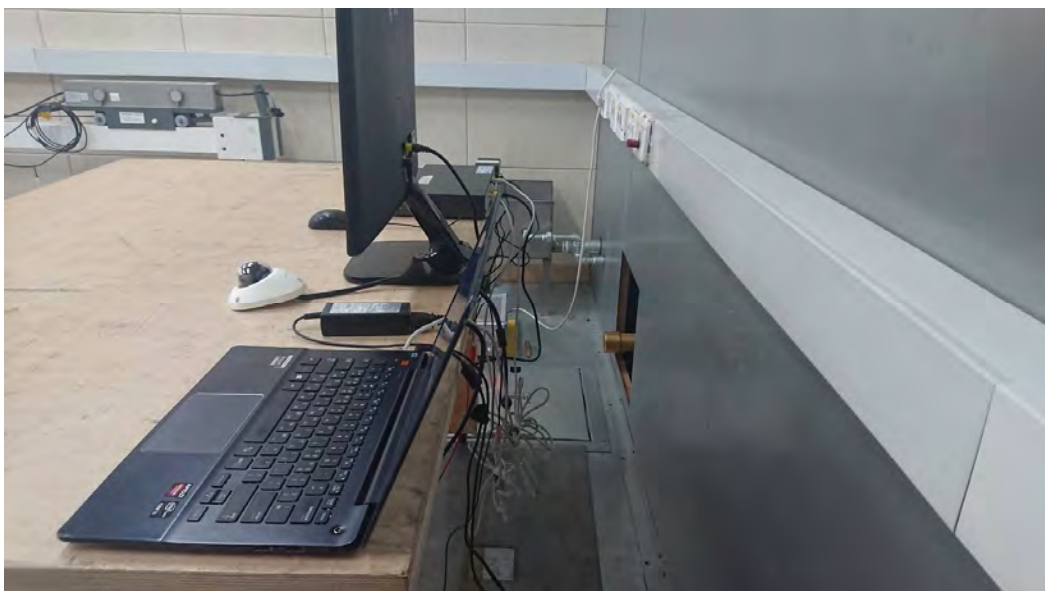
Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value

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

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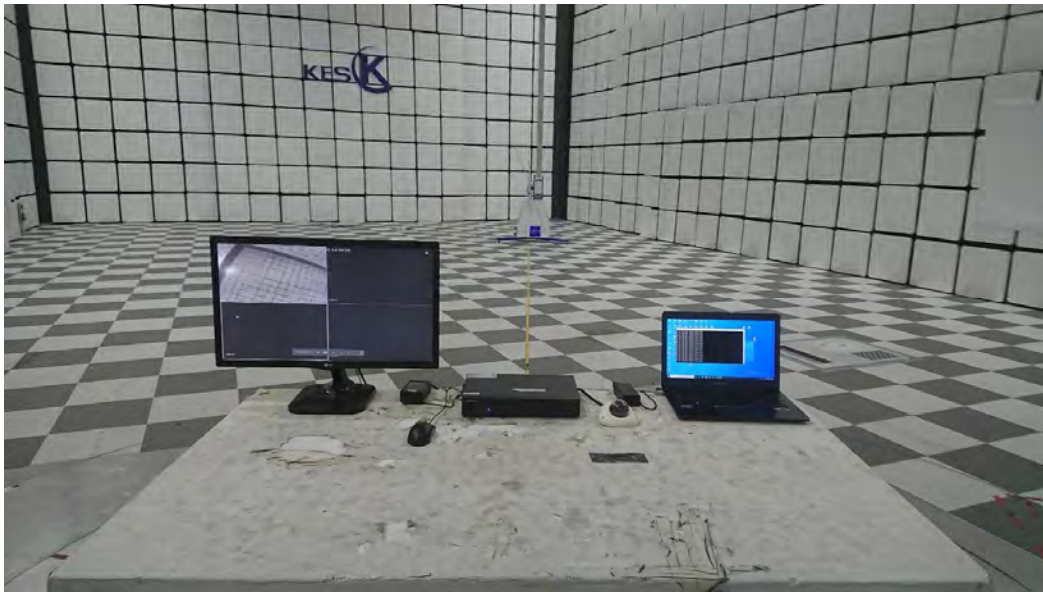
Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports



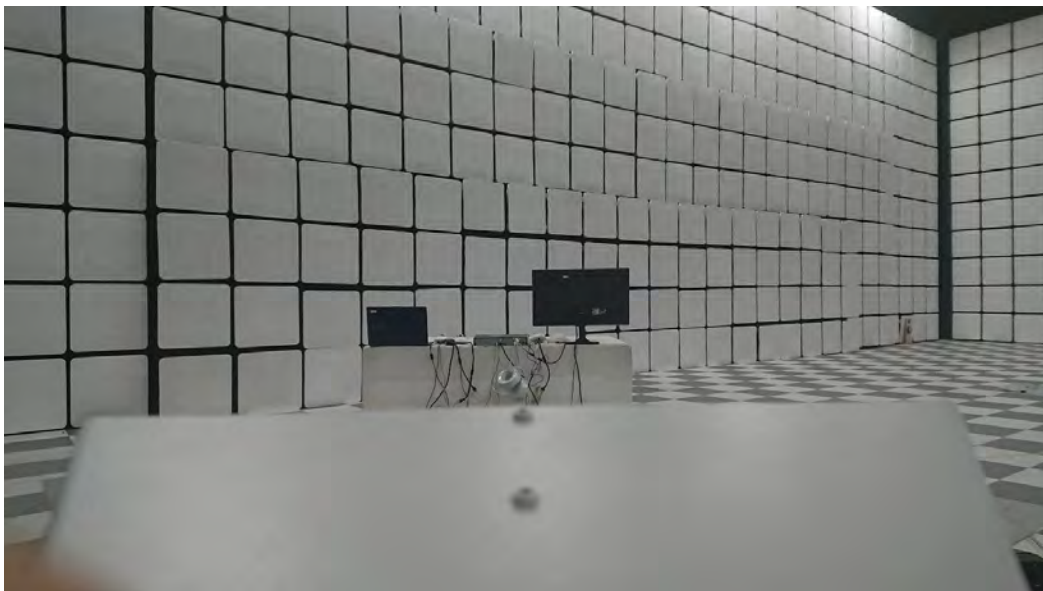
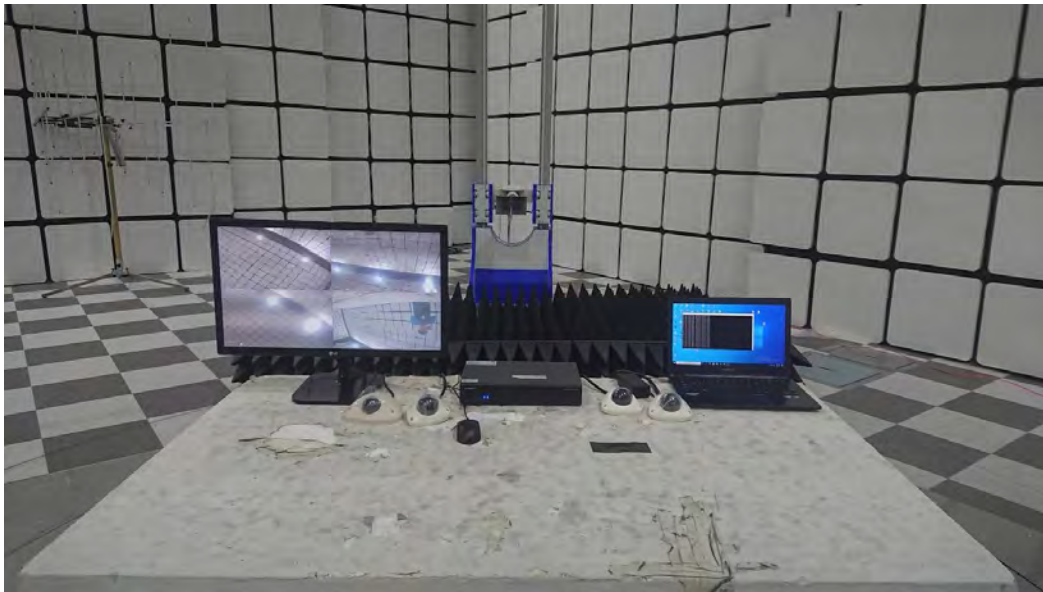
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Radiated Electric Field Emissions(Below 1 GHz)



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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)



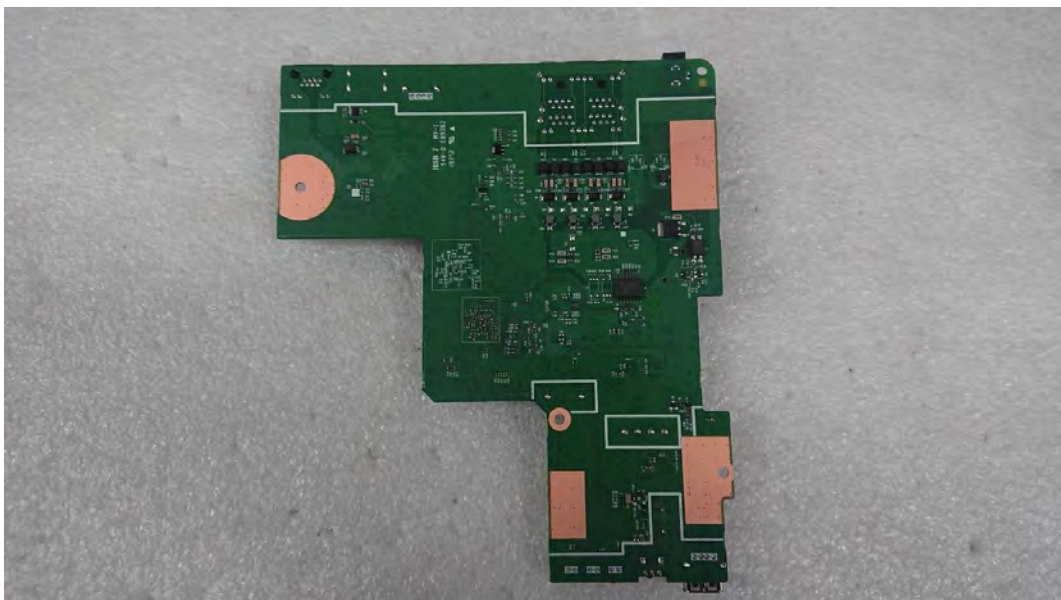
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EUT Internal View – Main Board

(Top)

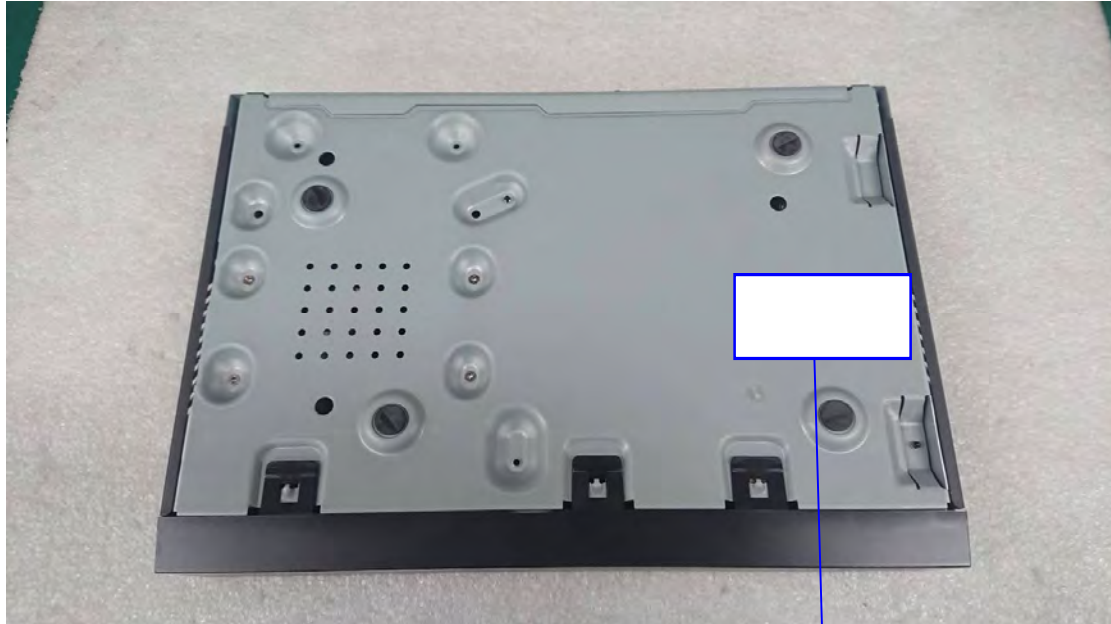


(Bottom)



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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.