

VERIFICATION OF FCC PART 15 COMPLIANCE

*KES hereby verify that the subject product complies with all the
electromagnetic emission specified in the FCC Rule Part 15*

Product Description:

NETWORK VIDEO RECORDER

Model/Brand Name:

XRN-1610SN

Variant Model:

-

FCC Rule Part(s):

FCC 47CFR Part 15 Subpart B Class A
Part 15.107(b) & Part 15.109(b)

FCC Procedure:

Verification

Applicant Name:

Hanwha Techwin Co., Ltd.

Applicant Address:

1204, Changwon-daero, Seongsan-gu, Chang
won-si, Gyeongsangnam-do

Manufacturer Name:

Tianjin Samsung Techwin Opto-Electronic
Co., Ltd.

Manufacturer Address:

No.11 Weiliu Rd, Micro-Electronic Industrial
Park, TEDA, Tianjin, 300385, People's Republic
of China

Test Report Reference No.:

KES-E1-16T0273

NETWORK VIDEO RECORDER, Model XRN-1610SN has been tested in accordance with the measurement procedures specified in FCC 47CFR Part 15 Subpart B class A and has been shown to be complied with the electromagnetic emission limits specified in FCC Rule Part 15 Subpart B class A. A testing of the sample product has been valid for the sample tested based on the reference test report, KES-E1-16T0273

Date of Issue: 05. 21. 2016

Dong Hun, Jang

Technical Manager

Signature:



KES.Co., Ltd.

C-3701, 40, Simin-daero 365beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 431-716, Korea

Tel: +82-31-425-6200 // Fax: +82-31-424-0450



EMC TEST REPORT For FCC

Test Report No. : KES-E1-16T0273

Date of Issue : Jun. 21, 2016

Product name : NETWORK VIDEO RECORDER

Model/Type No. : XRN-1610SN

Variant Model : -

Applicant : Hanwha Techwin Co., Ltd.

Applicant Address : 1204, Changwon-daero, Seongsan-gu, Changwon-si,
Gyeongsangnam-do, Korea

Manufacturer : Tianjin Samsung Techwin Opto-Electronic Co., Ltd.

Manufacturer Address : No.11 Weiliu Rd, Micro-Electronic Industrial Park, TEDA,
Tianjin, 300385, People's Republic of China

Equipment authorization : ☐ Declaration of Conformity
☒ Verification
☐ Certification

Date of Receipt : Jun. 02, 2016

Test date : Jun. 13, 2016 ~ Jun. 14, 2016

Test Results : ☒ In Compliance ☐ Not in Compliance

Tested by

Yung Suk, Song
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

**KES Co., Ltd.**

C-3701, Simin-daero 365-40,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Test report No.:
KES-E1-16T0273
Page (2) of (32)

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Jun. 21, 2016	KES-E1-16T0273	Issued

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd. This document Jun be altered or revised by KES Co., Ltd. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by KES Co., Ltd. will constitute fraud and shall nullify the document.

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.



TABLE OF CONTENTS

1.0	General Product Description.....	4
1.1	Test Voltage & Frequency	5
1.2	Variant Model Differences.....	5
1.3	Device Modifications	5
1.4	Equipment Under Test.....	5
1.5	Support Equipments	6
1.6	External I/O Cabling	7
1.7	EUT Operating Mode(s)	7
1.8	Configuration.....	8
1.9	Calibration Details of Equipment Used for Measurement	9
1.10	Test Facility	9
1.11	Laboratory Accreditations and Listings	9
2.0	Test Regulations.....	10
2.1	Conducted Emissionsat Mains Power Ports.....	12
2.2	Radiated Electric Field Emissions(Below 1 GHz)	13
2.3	Radiated Electric Field Emissions(Above 1 GHz)	14
APPENDIX A – TEST DATA.....		15
Conducted Emissions at Mains Power Ports.....		15
Radiated Electric Field Emissions(Below 1 GHz)		17
Radiated Electric Field Emissions(Above 1 GHz)		18
Test Setup Photos and Configuration		22
Conducted Voltage Emissions		22
Radiated Electric Field Emissions(Below 1 GHz)		23
Radiated Electric Field Emissions(Above 1 GHz)		24
EUT External Photographs		25
EUT Internal Photographs		26



1.0 General Product Description

Main Specifications of EUT are:

Model		XRN-1610S	
Display			
Network Camera	Inputs	Max. 16CH	
	Resolution	CIF ~ 12MP	
	Fish-Eye Devarping	N/A (processed on Web / CMS)	
	Protocols	Samsung, ONVIF	
Live	Local Display	1x HDMI / 1x VGA Dual Monitor	
	Multi-Channel Display	[Local Monitor] 1 / 4 / 8 / 9 / 13 / 16 / Auto Sequence [Web] 1 / 4 / 9 / 16 / Auto Sequence	
	Performance	[Local Monitor] 12MP (30fps) 8MP (120fps) 5MP (180fps), 3MP (240fps), 2MP (480fps), 720p (480fps), D1 (480fps) [Web] 5MP (30fps), 3MP (60fps), 2MP (120fps), 720p (240fps), D1 (480fps)	
Performance			
Operating System	Embedded	Linux	
Record	Compression	H.265, H.264, MJPEG	
	Recording Bandwidth	128Mbps	
	Resolution	CIF ~ 12MP	
	Type	Manual, Schedule(Continuous Event), Event (PrePost)	
	Event Trigger	- Alarm Input(8) - Video Loss - Camera Event(Sensor, MD, Video Analytics) - VA Event(Tampering, Enter/Exit, Passing/Virtual-Line, Appearing/Disappearing, Face Detection, Audio Detection) - Defocus Camera Event	
		Event Action	
e-Mail, PTZ Preset, Alarm Out, Buzzer, Monitor Out			
Search & Play	Playback Bandwidth	32Mbps (16ch simultaneously)	
	Performance	Max. 3 Users (Remote 3)	
	Mode	Date & Time(Calendar) Event Log list Text Search(POS, ANPR)	
	Simultaneous playback	Up to 16CH (Local, Network)	
	Resolution	CIF ~ 12MP	
	Fish-Eye Devarping	N/A (processed on Web / CMS)	
	Playback Control	Fast Stop, Forward Backward, Move one step up/down	
	Storage	Default Built-in	0TB ~ 8TB (TBD, dependent on region)
Internal		4 SATA	
Hot Swap		N/A	
External(DAS)		1 e-SATA	
External(NAS, iSCSI)		iSCSI	
Max Capacity		Internal (32TB=4x8TB)	
RAID		N/A	
Backup	File backup	BU/EXE/USB, JPG/AVI/Web, CMS)	
	Function	Max. 16CH Play, Date-Time/Title display	
Sensor	IO	8/4 (NO 3EA, NC/NC 1EA)	
Audio	Input	16CH (network)	
	Compression	G.711, G.726, AAC(16/48KHz)	
	Audio Communication	2-Way (pass-through between camera and SSM)	

Network			
Protocol	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)		
ODNS	Pols DDNS		
Transmission Bandwidth	Max. 256Mbps (iSCSI off) (128Mbps, iSCSI on)		
Max Remote Users	Search(3) / Live unicast(10) / Live multicast(20)		
IP Version	IPv4/v6		
Security	User access Log IP Filtering 802.1x Encryption(ID/PW, Recording, Transmission, Backup)		
	Language	GUI	(1) English, (2) French, (3) German, (4) Italian, (5) Spanish, (6) Russian, (7) Turkish, (8) Polish, (9) Dutch, (10) Swedish, (11) Czech, (12) Portuguese, (13) Danish, (14) Rumanian, (15) Serbian, (16) Croatian, (17) Hungarian, (18) Greek, (19) Norwegian, (20) Finnish, (21) Korean, (22) Chinese, (23) Japanese, (24) Thai
Web		(1) English, (2) French, (3) German, (4) Italian, (5) Spanish, (6) Russian, (7) Turkish, (8) Polish, (9) Dutch, (10) Swedish, (11) Czech, (12) Portuguese, (13) Danish, (14) Rumanian, (15) Serbian, (16) Croatian, (17) Hungarian, (18) Greek, (19) Norwegian, (20) Finnish, (21) Korean, (22) Chinese, (23) Japanese	
OS	Supported OS : Windows XP(service pack 2 or above), Vista, 7, 8, 10, Mac OS X(10.7 or above)		
Web Browser	Non-plugin Webviewer Supported Browser: Google Chrome 47, MS Edge 20 WMF : 1CH LIVE(800X600), SETUP		
	Plug-in Webviewer Supported Browser: MS Explore 11, Mozilla Firefox 43, Apple Safari 9 * Mac OS X only		
Viewer Software	Type	SSM, Webviewer, Smart Viewer, iPols Mobile	
	CMS Support	Support SDK/CGI(SUNAPI)	
Smart phone	Support Model	I-Phone, Android	
	Protocol Support	RTP, RTSP, HTTP, CGI(SUNAPI)	
	Control	Live(16ch) : Multi-Profile Support Playback(1ch, Max 2MP)	
	Max. Remote Users	Search (3), Live Unicast (10), Multicast (20)	
Functions			
Camera Setup	Register	1) PnP mode 2) Manual mode	
	Setup items	(1) IP Address, Add Profile Edit, Bitrate, Compression, GOP, Quality (2) Camera Event Setup - MD - VA : Tampering, Enter/Exit, Passing/Virtual-Line), Appearing/Disappearing, Face Detection, Audio Detection) (3) Video Setup(Simple Focus, Brightness/Contrast, Flip/Mirror, IRIS, WDR, D&N, SSNR, Shutter, SSCR, DIS) (4) Fisheye Devarping, Halfway View Setup, Camera Webpage	
Camera Control	PoE	1) Monitor PoE Power consumption 2) On/Off Control for each PoE camera 3) Remote Reset for each PoE camera	
	Time Sync	NTP Time Protocol for PoE Camera (Time sync based on NTP time)	
Easy Configuration		Setup Wizard (Language, Date/Time, Network, Auto Camera Configuration) * selectable between PnP and Manual mode	

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.



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 ☐ 100 Vac ☐ 110 Vac ☒ 120 Vac ☐ PoE ☐ 12 Vdc
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
NETWORK VIDEO RECORDER	XRN-1610SN	-	Tianjin Samsung Techwin Opto-Electronic Co.,Ltd.	E.U.T
Mouse	-	-	-	-
HDD	WD10PURX	WCC4J4EX436	WD	-
POWER	DPS-280AB-6 A	HIED1609002094	Delta Electronics Power(Dongguan) Co., Ltd.	-

**KES Co., Ltd.**

C-3701, Simin-daero 365-40,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Test report No.:
KES-EI-16T0273
Page (6) of (32)

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Monitor 1	LS23C340	ZXPCHTMF B01032M	SAMSUNG	-
Monitor adapter 1	A2514_DPN	CN07BN4400591 BSK28F6NF841	11ssan Elecom(shen yang) Co., Ltd	-
Monitor 2	SMT-2232	C95V67VF90002 5B	Weihai Daewoo Electronics Co., Ltd.	-
Notebook	LG15N54	410NZET022292	LG	-
Adapter	ADP-90WH B	84ZW19F1557	DELTA ELECTRONICS(JIANGSU) LTD.	-
Camera	SND-L6013RN	-	SAMSUNG TECHWIN CO.,LTD.	-
Speaker	-	-	MASS	-
Alarm 1	SIP-1201DD DO	C53R67JZ301878 L	SAMSUNG TECHWIN CO.,LTD.	-
Alarm 2	SIE-0001 DO	C54167JB601268 F	SAMSUNG TECHWIN CO.,LTD.	-
External HDD	MDT-US2528	-	-	-
3.0 USB Memory	-	-	Transcend	16GB

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK VIDEO RECORDER (E.U.T)	RJ-45	Notebook	RJ-45	3.0	U
	D-SUB	Monitor 1	D-SUB	1.5	S
	HDMI	Monitor 2	HDMI	1.7	S
	Audio Out	Speaker	Audio OUT	1.2	U
	USB	Mouse	USB	1.2	U
	RJ-45	Camera	RJ-45	4.0	S
	Alarm IN	Alarm 1	Alarm IN	3.0	U
	Alarm OUT	Alarm 2	Alarm OUT	3.0	U
	e-SATA	External HDD	e-SATA	0.5	U
	3.0 USB	3.0 USB Memory	3.0 USB	-	-

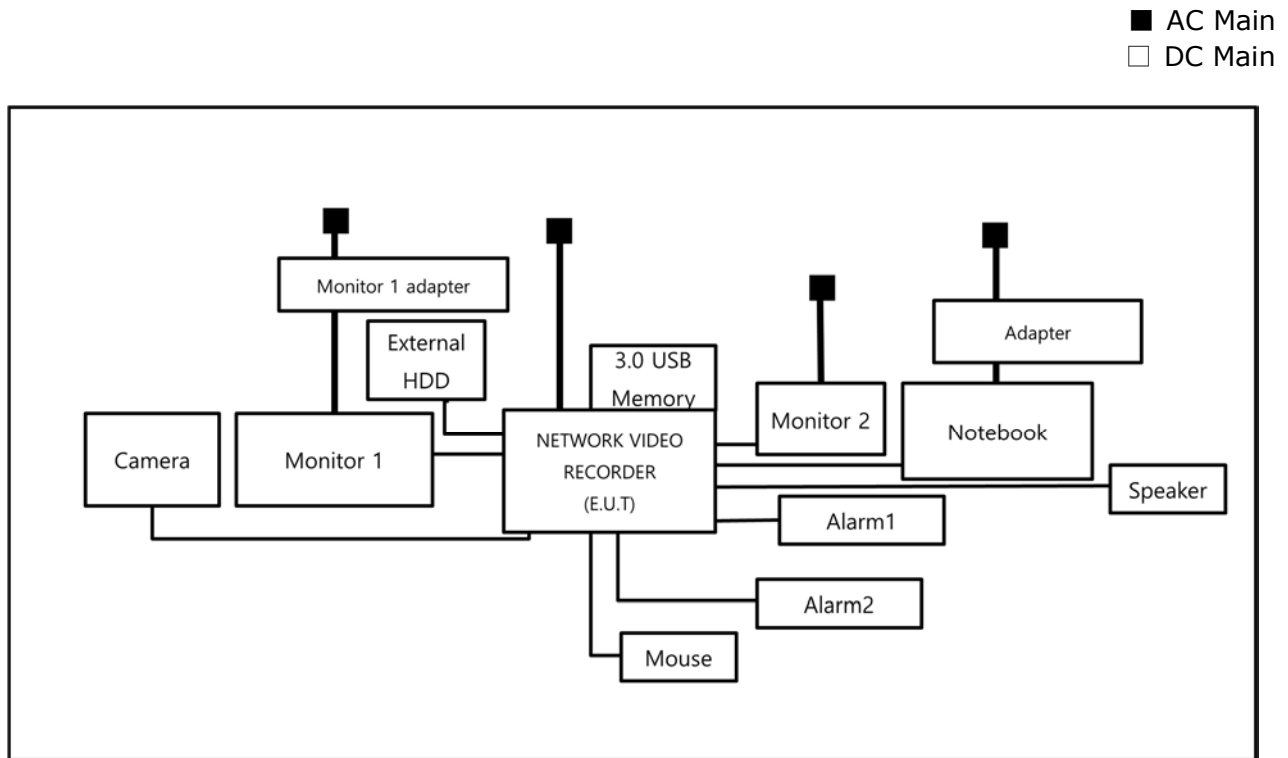
* Unshielded=U, Shielded=S

1.7 EUT Operating Mode(s)

Equipment under test was operated during the measurement under the following conditions:

Test mode	Normal operating
OP	Tested by checking the movement whether it works well or not, with executing Ping test in a Notebook and outputting an image to a monitor after arrangement E.U.T with peripheral device as follows.

1.8 Configuration



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 473-29 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 55022:2010

☐ 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

☐ VCCI V-3 / 2013.04

☐ Class A

☐ Class B

☐ AS/NZS CISPR22:2009 +A1:2010

☐ Class A

☐ Class B

☒ 47 CFR Part 15, Subpart B / ANSI C63.4-2009 ☒ Class A

☐ Class B

☐ IC Regulation ICES-003 : 2012
/ ANSI C63.4-2014

☐ Class A

☐ Class B

☐ CISPR 22:2009 +A1:2010

☐ Class A

☐ Class B



KES Co., Ltd.

C-3701, Simin-daero 365-40,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Test report No.:
KES-E1-16T0273
Page (11) of (32)

☐ **R&TTE- Directive 1999/5/EC**

☐ 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

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.



2.1 Conducted Emissions at Mains Power Ports

Test Date

Jun. 13, 2016

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, 04, 2017
☒	LISN	ENV216	R&S	101786	05, 02, 2017
☒	Electro wave Shieldroom	-	SEMITEC	-	-

Test Conditions

Temperature: 27,8 °C

Relative Humidity: 50,1 %

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

Jun. 13, 2016

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	ESR3	R&S	101781	05, 03, 2017
☒	Trilog-Broadband ANT	VULB 9163	SCHWARZBECK	9163-715	04, 14, 2018
☒	Open Area Test Site	-	KES	-	-
☒	Antenna Mast	1070/1080	EMCO	-	-
☒	Turn Table	-	DAEIL EMC	-	-

Test Conditions

Temperature: 28,1 °C

Relative Humidity: 68,0 %

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

Jun. 14, 2016

Test Location

Semi Anchoic Chamber #2

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test Receiver	ESU26	R&S	100551	04, 18, 2017
☒	Broadband Coaxial Preamplifier	BBV 9718	Schwarzbeck Mess - Elektronik	9718-246	10, 23, 2016
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	05, 07, 2017
☒	Semi Anchoic Chamber #2	-	SEMITEC	-	-
☒	Antenna Mast	-	AUDIX	-	-
☒	Turn Table	-	AUDIX	-	-

Test Conditions

Temperature: 29,2 °C
Relative Humidity: 51,5 %

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.

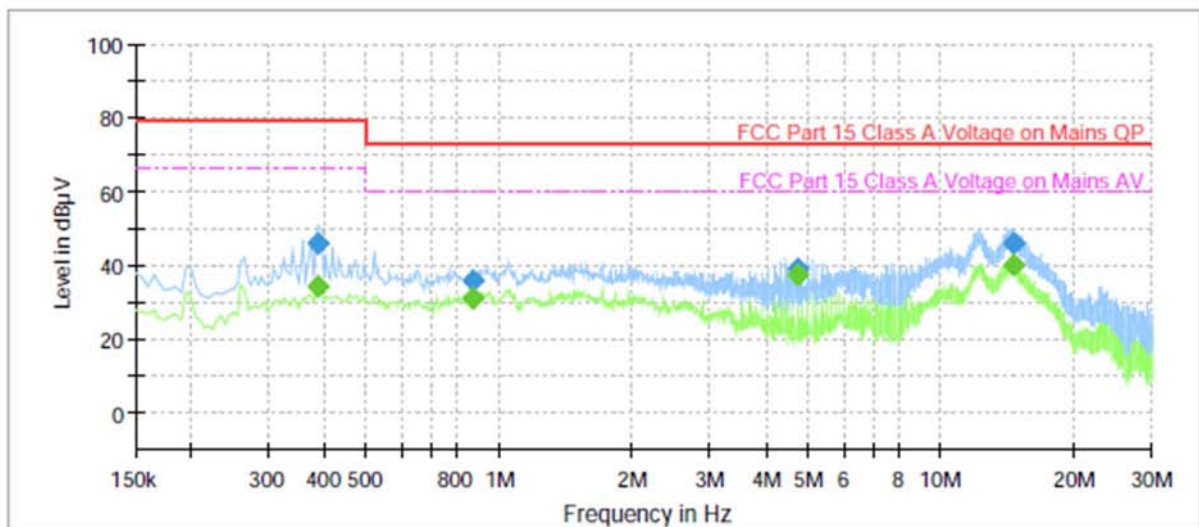
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

Common Information

Test Description: Conducted Emission
Model No.: XRN-1610SN
Mode
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.390000	---	34.28	66.00	31.72	1000.0	9.000	L1	9.7
0.390000	46.27	---	79.00	32.73	1000.0	9.000	L1	9.7
0.870000	---	31.24	60.00	28.76	1000.0	9.000	L1	9.7
0.870000	35.83	---	73.00	37.17	1000.0	9.000	L1	9.7
4.720000	---	37.79	60.00	22.21	1000.0	9.000	L1	9.8
4.720000	39.42	---	73.00	33.58	1000.0	9.000	L1	9.8
14.570000	---	40.39	60.00	19.61	1000.0	9.000	L1	10.0
14.570000	46.02	---	73.00	26.98	1000.0	9.000	L1	10.0



KES Co., Ltd.

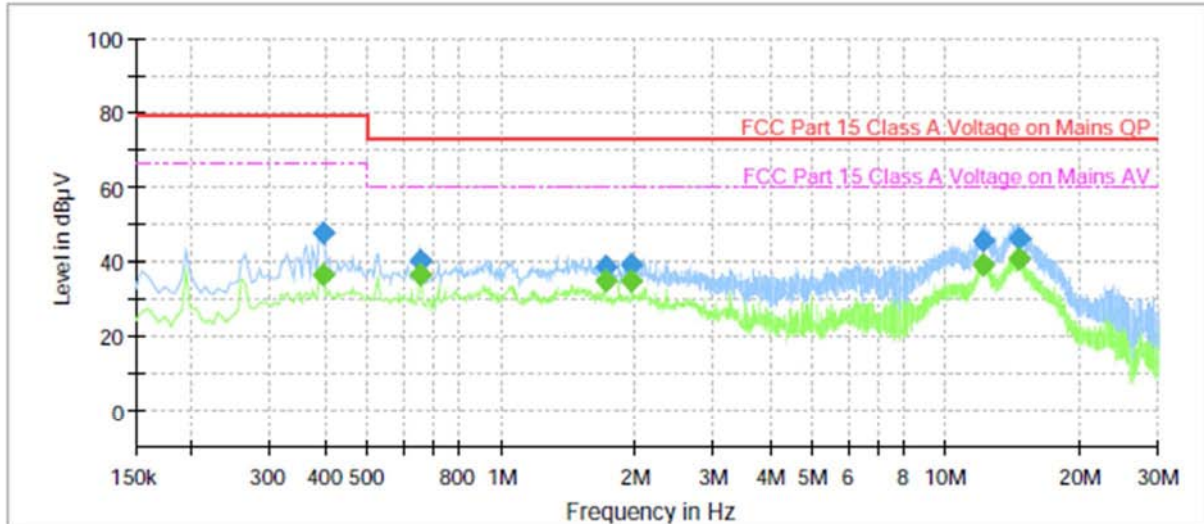
C-3701, Simin-daero 365-40,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Test report No.:
KES-E1-16T0273
Page (16) of (32)

[NEUTRAL]

Common Information

Test Description: Conducted Emission
Model No.: XRN-1610SN
Mode
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.395000	---	36.73	66.00	29.27	1000.0	9.000	N	9.6
0.395000	47.75	---	79.00	31.25	1000.0	9.000	N	9.6
0.655000	---	36.80	60.00	23.20	1000.0	9.000	N	9.7
0.655000	40.42	---	73.00	32.58	1000.0	9.000	N	9.7
1.705000	---	34.75	60.00	25.25	1000.0	9.000	N	9.7
1.705000	38.87	---	73.00	34.13	1000.0	9.000	N	9.7
1.965000	---	34.69	60.00	25.31	1000.0	9.000	N	9.7
1.965000	39.14	---	73.00	33.86	1000.0	9.000	N	9.7
12.165000	---	39.41	60.00	20.59	1000.0	9.000	N	10.0
12.165000	45.69	---	73.00	27.31	1000.0	9.000	N	10.0
14.630000	---	40.54	60.00	19.46	1000.0	9.000	N	10.1
14.630000	46.02	---	73.00	26.98	1000.0	9.000	N	10.1

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

**KES Co., Ltd.**

C-3701, Simin-daero 365-40,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Test report No.:
KES-E1-16T0273
Page (17) of (32)

Radiated Electric Field Emissions(Below 1 GHz)

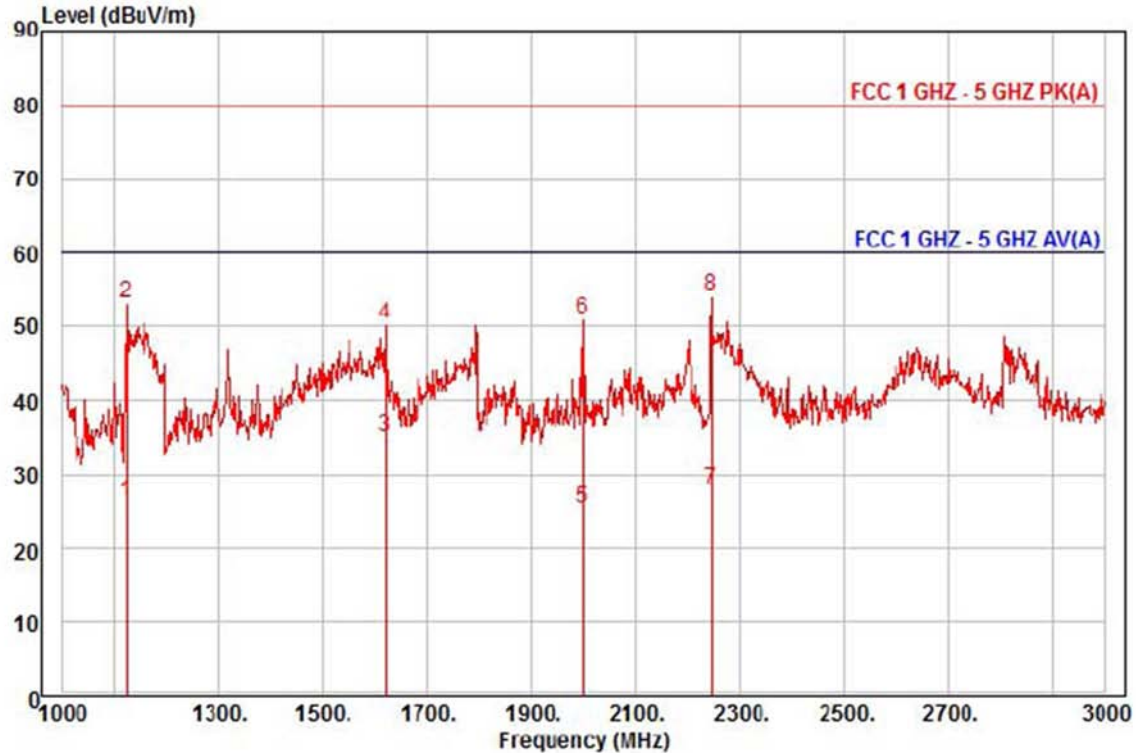
Frequency	Amplitude	ANT	ANT. Height	Correction Factor		Corrected Amplitude	Applicable Limit	Margin
[MHz]	[dB μ V]	Polar. (H/V)	[m]	ANT. [dB/m]	Cable [dB]	[dB μ V/m]	[dB μ V/m]	[dB]
149.18	16.31	V	1.00	8.19	2.46	26.96	43.50	16.54
250.36	15.52	H	4.00	12.56	3.33	31.41	46.40	14.99
325.52	12.44	V	1.00	13.95	3.80	30.19	46.40	16.21
350.12	16.48	H	4.00	14.49	3.89	34.86	46.40	11.54
446.83	11.90	V	1.00	16.38	4.56	32.84	46.40	13.56
475.25	12.10	H	4.00	16.87	4.77	33.74	46.40	12.66

* H : Horizontal, V : Vertical

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.



Radiated Electric Field Emissions(Above 1 GHz)



Site : chamber

Condition: FCC 1 GHZ - 5 GHZ PK(A) 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto

Project :

Model : XRN-1610SN

Mode :

Memo :

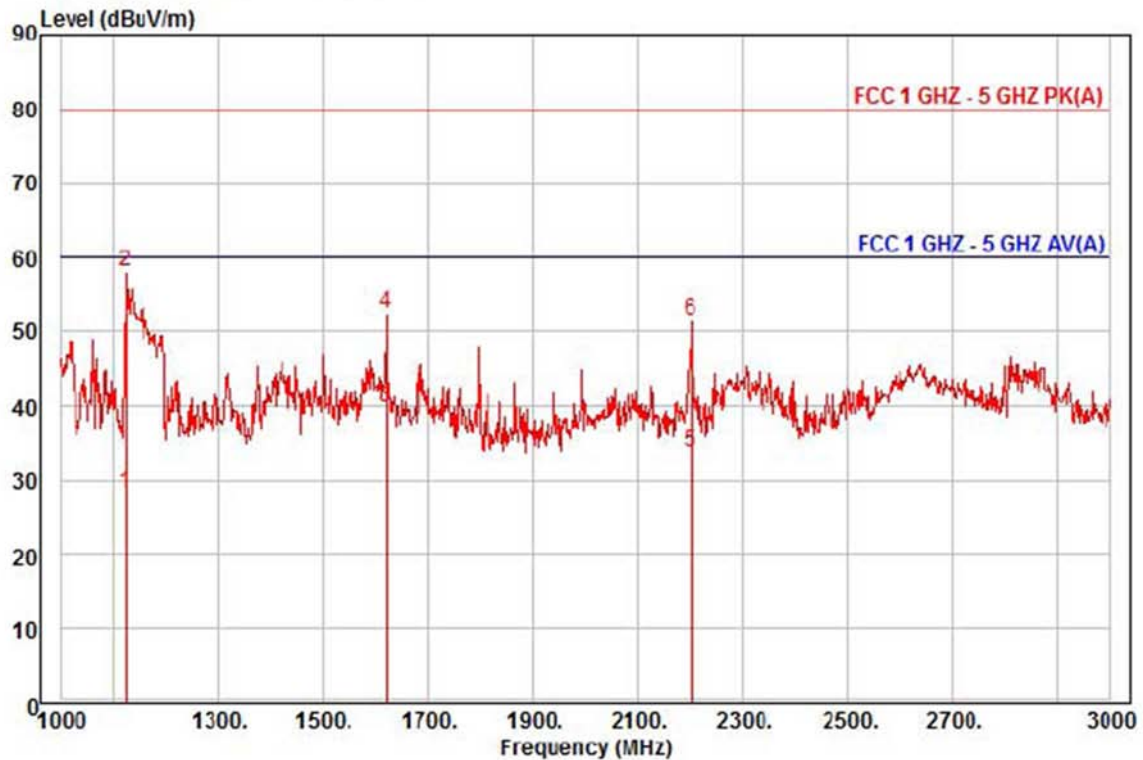
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1122.00	35.14	24.39	6.86	40.06	348	60.00	-33.67	horizontal	Average
2	1122.00	61.94	24.39	6.86	40.06	348	80.00	-26.87	horizontal	Peak
3 pp	1620.00	40.09	26.37	8.31	39.82	21	60.00	-25.05	horizontal	Average
4	1620.00	55.49	26.37	8.31	39.82	21	80.00	-29.65	horizontal	Peak
5	2000.00	27.95	27.88	9.35	39.63	150	60.00	-34.45	horizontal	Average
6	2000.00	53.32	27.88	9.35	39.63	150	80.00	-29.08	horizontal	Peak
7	2246.00	29.42	28.48	9.73	39.77	77	60.00	-32.14	horizontal	Average
8 pk	2246.00	55.79	28.48	9.73	39.77	77	80.00	-25.77	horizontal	Peak



KES Co., Ltd.

C-3701, Simin-daero 365-40,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

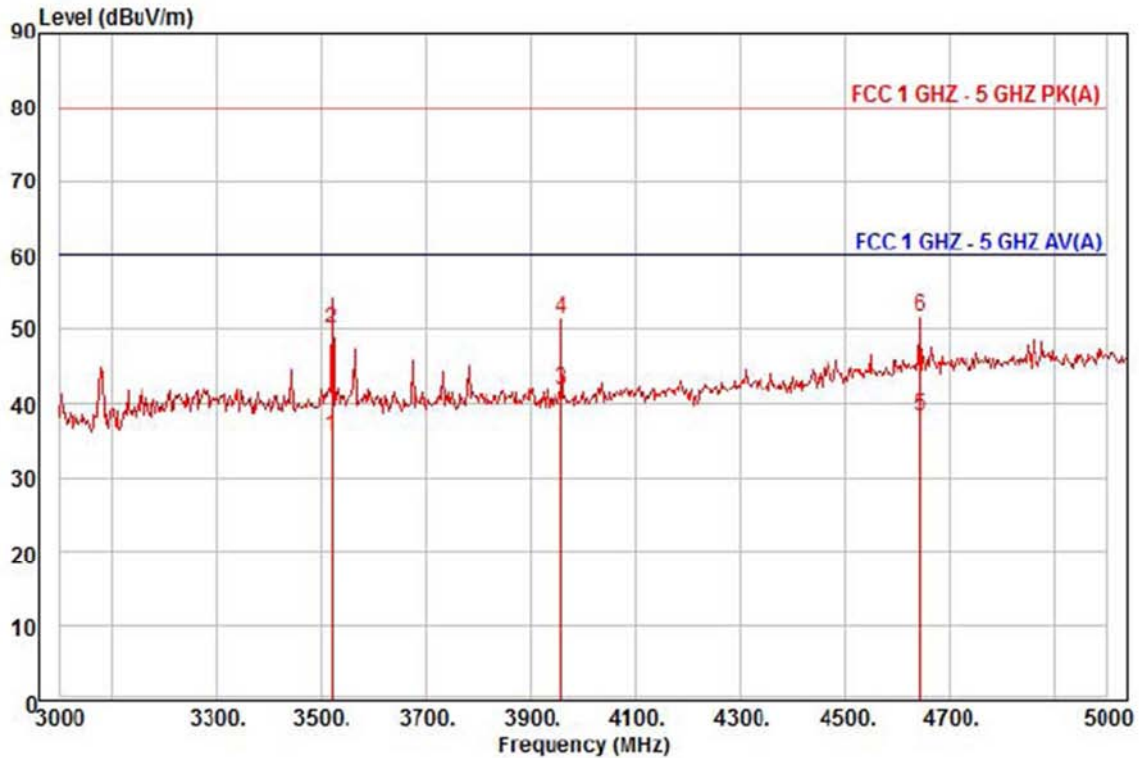
Test report No.:
KES-E1-16T0273
Page (19) of (32)



Site : chamber
Condition: FCC 1 GHZ - 5 GHZ PK(A) 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XRN-1610SN
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	37.01	24.39	6.86	40.06	21	60.00	-31.80	vertical	Average
2 pk	1122.00	66.96	24.39	6.86	40.06	21	80.00	-21.85	vertical	Peak
3 pp	1620.00	44.88	26.37	8.31	39.82	55	60.00	-20.26	vertical	Average
4	1620.00	57.57	26.37	8.31	39.82	55	80.00	-27.57	vertical	Peak
5	2200.00	35.59	28.37	9.66	39.75	59	60.00	-26.13	vertical	Average
6	2200.00	53.15	28.37	9.66	39.75	59	80.00	-28.57	vertical	Peak

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.



Site : chamber
Condition: FCC 1 GHZ - 5 GHZ PK(A) 3m HORN781(2015.05.07) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XRN-1610SN
Mode :
Memo :

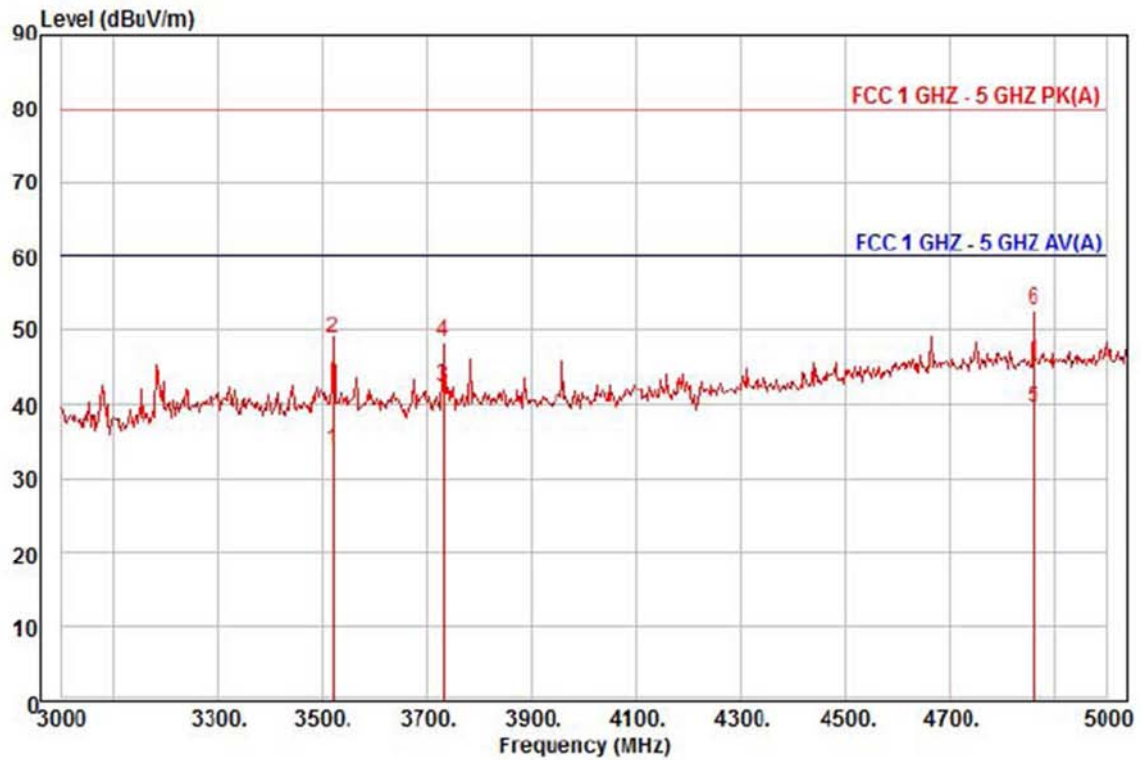
	Freq	Read Level	Ant Factor	Cable Loss	Preamplifier Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3519.00	32.08	31.20	12.55	40.31	346	60.00	-24.48	horizontal	Average
2	3519.00	46.48	31.20	12.55	40.31	346	80.00	-30.08	horizontal	Peak
3 pp	3960.00	36.88	31.94	13.43	40.40	342	60.00	-18.15	horizontal	Average
4	3960.00	46.52	31.94	13.43	40.40	342	80.00	-28.51	horizontal	Peak
5	4644.00	28.22	35.69	14.69	40.41	15	60.00	-21.81	horizontal	Average
6 pk	4644.00	41.87	35.69	14.69	40.41	15	80.00	-28.16	horizontal	Peak



KES Co., Ltd.

C-3701, Simin-daero 365-40,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Test report No.:
KES-E1-16T0273
Page (21) of (32)



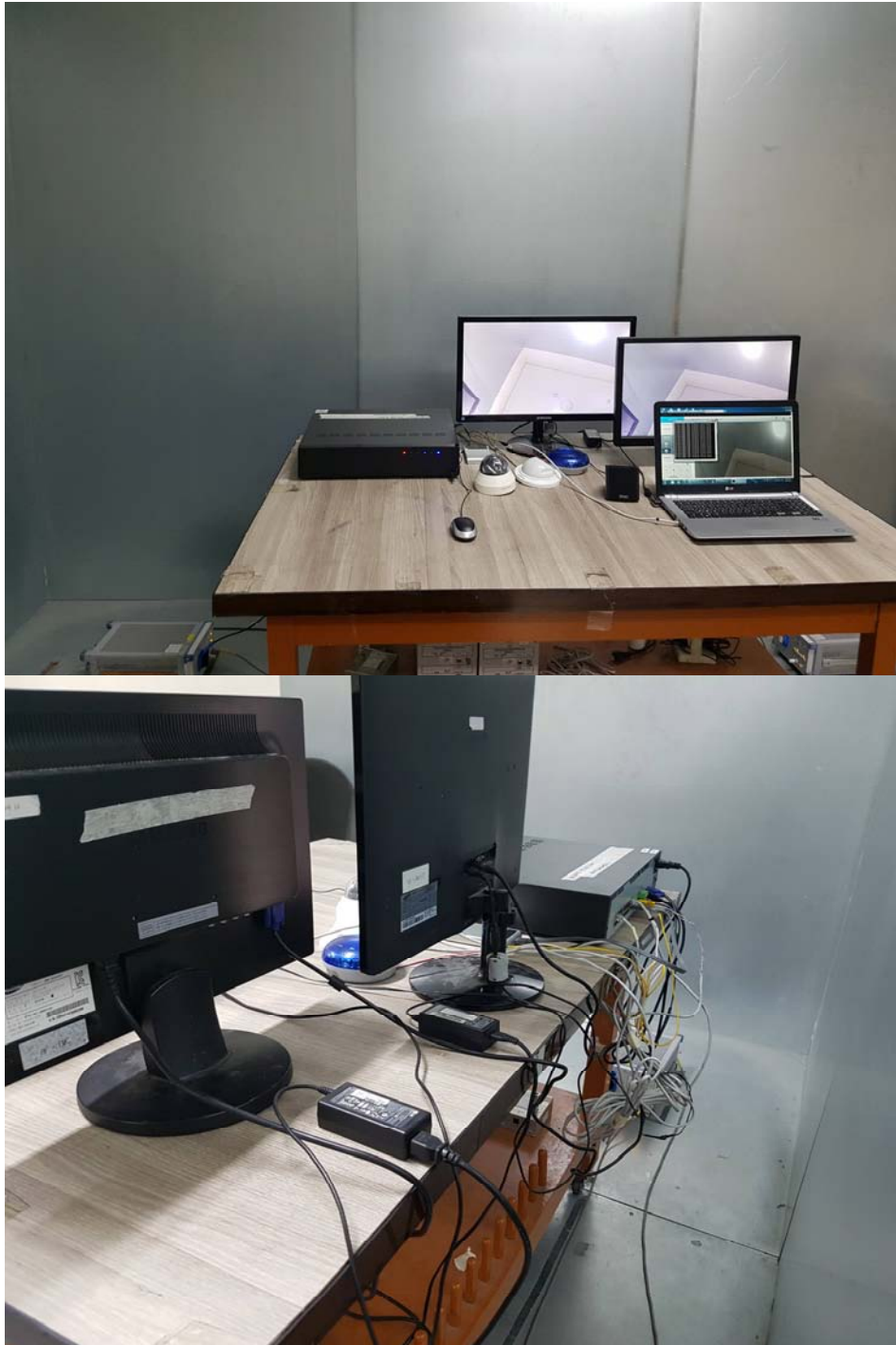
Site : chamber
Condition: FCC 1 GHZ - 5 GHZ PK(A) 3m HORN781(2015.05.07) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project :
Model : XRN-1610SN
Mode :
Memo :

	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	3519.00	30.33	31.20	12.55	40.31	233	60.00	-26.23	vertical	Average
2	3519.00	45.32	31.20	12.55	40.31	233	80.00	-31.24	vertical	Peak
3 pp	3732.00	38.25	31.56	12.97	40.36	24	60.00	-17.58	vertical	Average
4	3732.00	44.09	31.56	12.97	40.36	24	80.00	-31.74	vertical	Peak
5	4860.00	27.82	36.92	15.08	40.41	151	60.00	-20.59	vertical	Average
6 pk	4860.00	41.07	36.92	15.08	40.41	151	80.00	-27.34	vertical	Peak

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Test Setup Photos and Configuration

Conducted Voltage Emissions



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Radiated Electric Field Emissions(Below 1 GHz)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Radiated Electric Field Emissions(Above 1 GHz)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

EUT External Photographs

(Top)



(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

EUT Internal Photographs

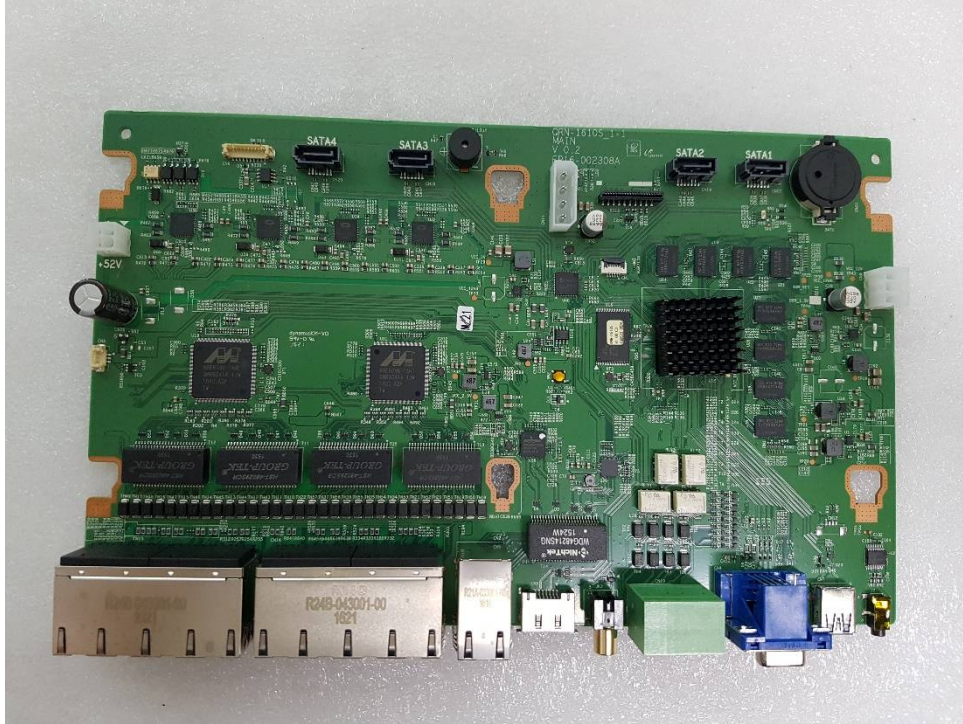
(Internal View)



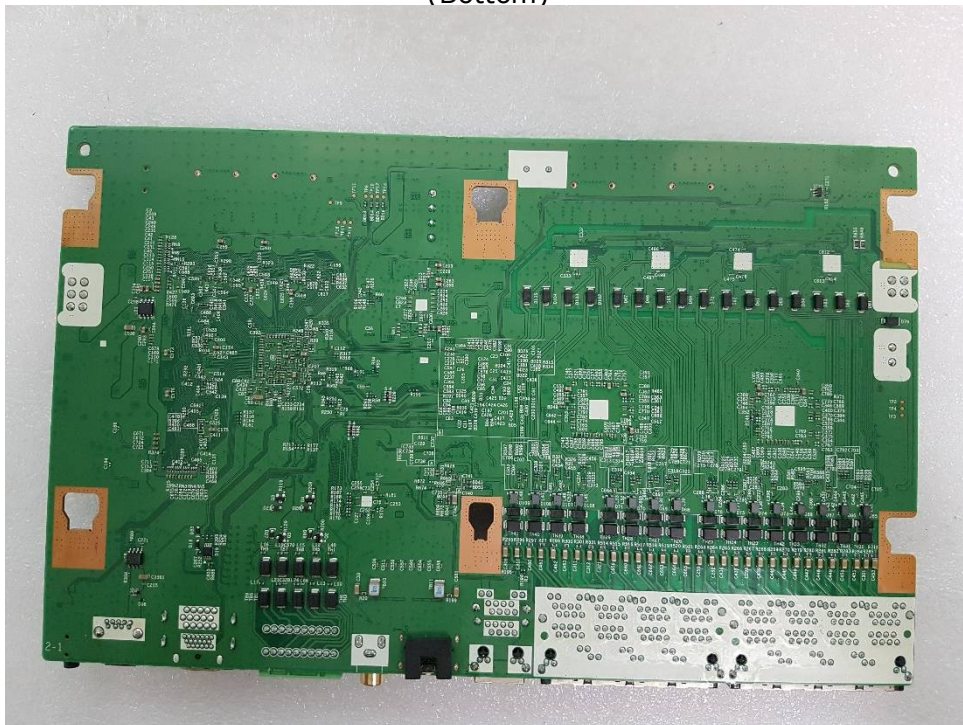
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Main Board EUT Internal View – Board 1

(Top)



(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Main Board EUT Internal View – Board 2

(Top)



(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Main Board EUT Internal View – Board 3

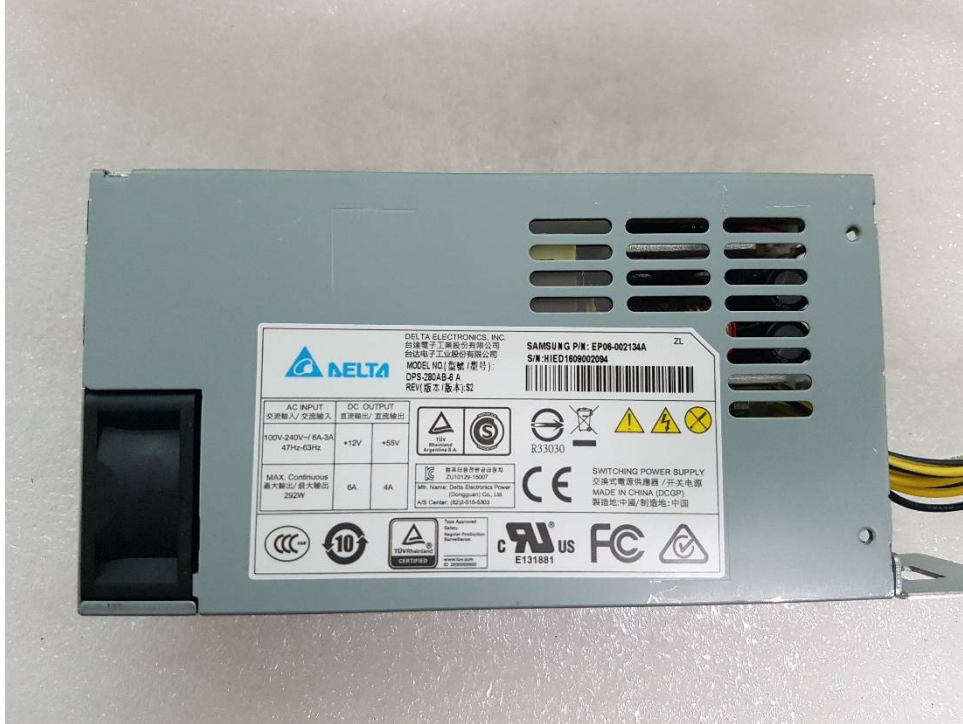
(Top)



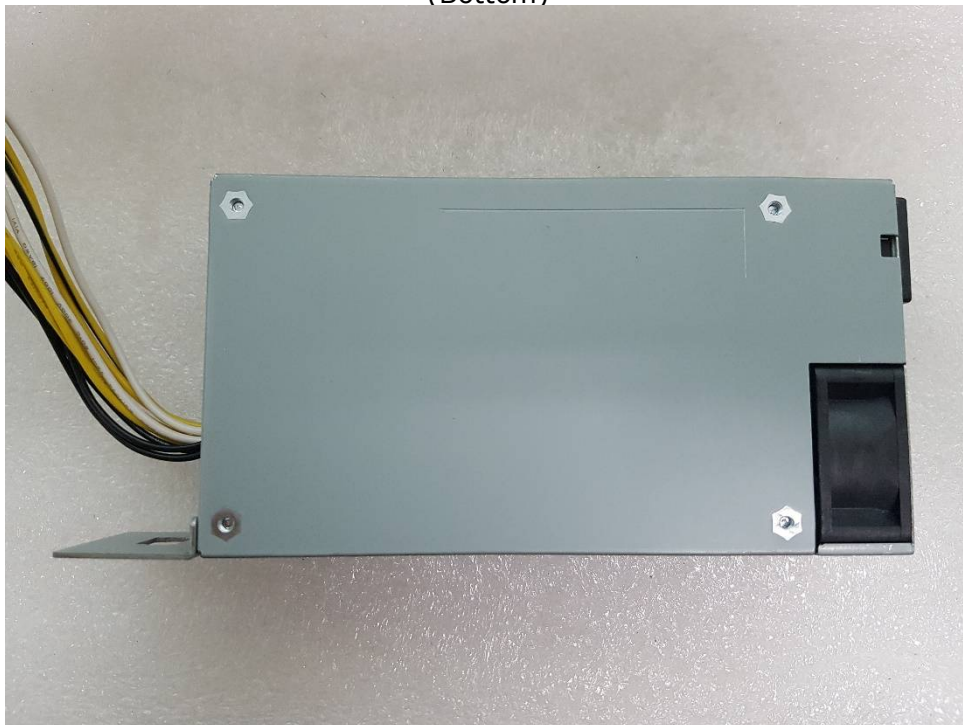
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Main Board EUT Internal View – Power

(Top)



(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Main Board EUT Internal View – HDD

(Top)

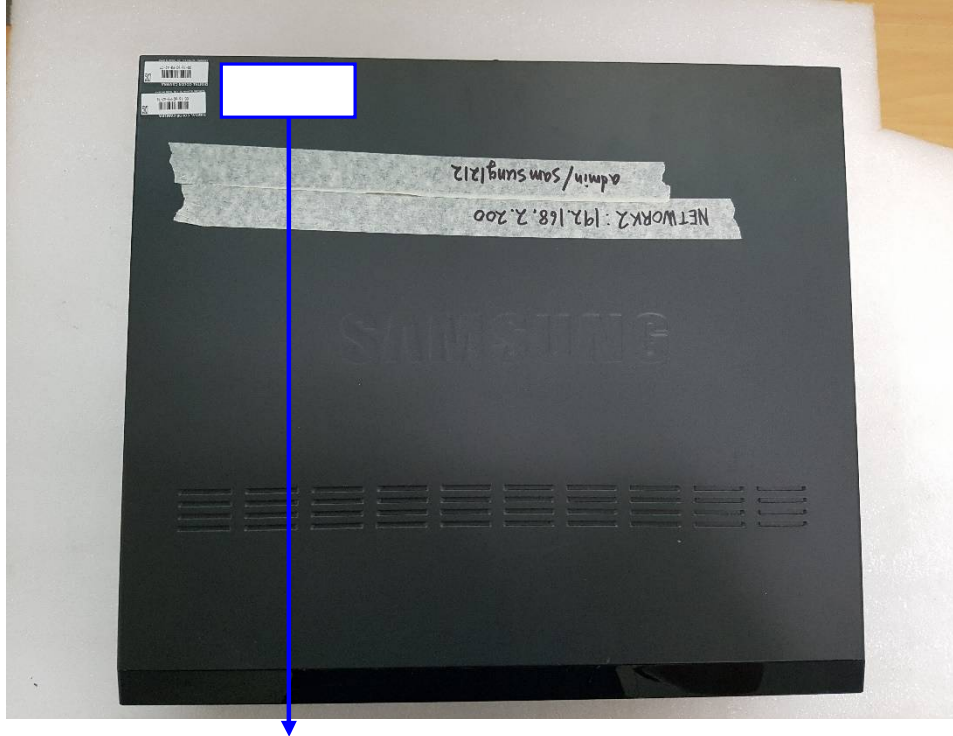


(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Label Photographs



This device complies with part 15 of the FCC Rules. Operation in 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.