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EMC TEST REPORT

Dates of Tests: May 26 – June 05, 2020
Test Report S/N: LR500122006N
Test Site : LTA Co., Ltd.

Model No.

XRN-6410DB4

APPLICANT

Hanwha Techwin Co., Ltd.

Equipment Name : NVR
Manufacturer : Hanwha Techwin(Tianjin) Co., Ltd.
Model name : XRN-6410DB4
Test Device Serial No.: Identification
Directive : Electromagnetic Compatibility Directive 2014/30/EU
Rule Part(s) : EN 55032:2015/AC:2016-07
EN 50130-4:2011/A1:2014
EN 61000-3-2:2014
EN 61000-3-3:2013
Data of reissue : June 08, 2020

This test report is issued under the authority of:

The test was supervised by:

Young Kyu Shin, Technical Manager

Jae Hoon Kim, Test Engineer

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TESTING NVLAP LAB CODE 200723-0

Revision history

Revision	Date of issue	Test report No.	Description
0	08.06.2020	LR500122006N	Initial

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1. General information's

1-1 Test Performed

Company name : **LTA Co., Ltd**
 Address : 4, Songju-ro 236beon-gil, Yangji-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, 17159, Korea
 Web site : <http://www.ltalab.com>
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Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which “General requirements for the competents of calibration and testing laboratory”.

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2020-09-30	ECT accredited Lab.
RRA	KOREA	KR0049	-	RRA accredited Lab.
	U.S.A		2021-04-11	
	CANADA		2021-06-16	
	VIETNAM		2021-04-12	
VCCI	JAPAN	C-14948	2023-09-10	VCCI registration
		T-12416	2023-09-10	
		R-14483	2023-10-15	
		G-10847	2021-12-13	
KOLAS	KOREA	KT551	2021-08-20	KOLAS accredited Lab.

2. Information's about test item

2-1 Client / Manufacturer

Company name : Hanwha Techwin Co., Ltd.
 Address : 6, Pangyo-ro 319 Beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do, 13488, KOREA
 Telephone /Facsimile : +82-70-7147-8753(http://hanhwa-security.com)

Factory #1

Company name : Hanwha Techwin(Tianjin) Co., Ltd.
 Address : No.11 Weiliu Rd, Micro-Electronic Industrial Park, TEDA, Tianjin, 300385, People's Republic of China

Factory #2

Company name : HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.
 Address : Lot O-2, Que Vo Industrial Zone extended area ,Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam

Factory #3

Company name : D-TECH CO.,LTD.
 Address : 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi-do, Korea (Suwon Industrial Complex)

2-2 Equipment Under Test (EUT)

Class : A
 Category : NVR
 Model name : XRN-6410DB4
 Serial number : Identification
 Date of receipt : May 14, 2020
 EUT condition : Pre-production, not damaged
 Interface Ports : AC IN #1 ~ #2, HDD Slot #1 ~ #4, USB Type A #1 ~ #4, Network #1 ~ #3, HDMI #1 ~ #2, AUDIO OUT, Terminal Block #1 ~ #2
 Console Port is unused port.
 Power rating : AC 230 V, 50 Hz

2-3 Modification

-NONE

2-4 Test conditions

Temp. / Humid. / Pressure : (21 - 25) °C / (36 - 46) % R.H. / (100.1 – 100.4) kPa
 Tested Model : XRN-6410DB4
 Test mode : Operating mode
 Test Voltage : AC 230 V, 50 Hz

2-5 List of EUT and ACCESSORY

EUT				
Equipment Name	Model Name	Serial No.	Manufacturer	Remarks
NVR	XRN-6410DB4	N/A	Hanwha Techwin(Tianjin) Co., Ltd. HANWHA TECHWIN SECURITY VIETNAM CO.,LTD. D-TECH CO.,LTD.	-
Mouse	MOKJUO	02T05870	Primax Electronics Ltd.	-
ACCESSORY				
Equipment Name	Model Name	Serial No.	Manufacturer	Remarks
NETWORK CAMERA	QNO-6032R	ZMQZ70G0GM3 0000CA	HANWHA TECHWIN CO.,LTD.	-
Notebook	1EK14PA#AB1	5CD7150WPK	HP	-
Monitor #1	24BK550Y	902NTFA7P563	LG Electronics Nanjing New Technology Co., Ltd	-
Monitor #2	24BK550Y	902NTSU7P406	LG Electronics Nanjing New Technology Co., Ltd	-
Smart Phone	SM-G610L	R59J800TCZW	SAMSUNG	-
USB Memory Stick #1	SDCZ50-008G	N/A	SANDISK	8 GB
USB Memory Stick #2	SDCZ73	N/A	SANDISK	16 GB
USB Memory Stick #3	SDCZ73	N/A	SANDISK	16 GB
Switching Hub	IPTIMEH608	N/A	EFM-Networks	-
Power Adapter	DCP015 A050600K	E239 19070513965	ZION (VIETNAM) Co., LTD	-
Speaker	N/A	N/A	N/A	-
PoE Injector	PSE305	N/A	CT Links	-
HDD #1	WDC WD40PURX-64	N/A	Western Digital	4 TB
HDD #2	WDC WD40PURX-64	N/A	Western Digital	4 TB
HDD #3	ST4000VX007- 2DT1	N/A	SEAGATE	4 TB
HDD #4	ST4000VX007- 2DT1	N/A	SEAGATE	4 TB
ALARM Test Board	N/A	N/A	N/A	-

2-6 Cable List

Cable List						
From		To		Length (m)	Shielding	
Type	I/O Port	Type	I/O Port		Cable	backshell
EUT	AC IN #1	AC Power Source	3 Pin AC Line	1.5	NO	Plastic
	AC IN #2	AC Power Source	3 Pin AC Line	1.5	NO	Plastic
	HDD Slot #1	HDD #1	-	-	-	-
	HDD Slot #2	HDD #2	-	-	-	-
	HDD Slot #3	HDD #3	-	-	-	-
	HDD Slot #4	HDD #4	-	-	-	-
	USB Type A #1	Mouse	USB	1.1	NO	Plastic
	USB Type A #2	USB Memory Stick #1	-	-	-	-
	USB Type A #3	USB Memory Stick #2	-	-	-	-
	USB Type A #4	USB Memory Stick #3	-	-	-	-
	Network #1	PoE Injector	DATA IN	10.4	NO	Plastic
	Network #2	Switching Hub	LAN #1	10.2	NO	Plastic
	Network #3	Switching Hub	LAN #2	10.2	NO	Plastic
	HDMI #1	Monitor #1	HDMI	0.9	YES	Plastic
	HDMI #2	Monitor #2	HDMI	0.8	YES	Plastic
	AUDIO OUT	Speaker	AUDIO IN	3.2	NO	Plastic
	Terminal Block #1	ALARM Test Board	ALARM IN	0.1	NO	Plastic
	Terminal Block #2	ALARM Test Board	ALARM OUT	0.1	NO	Plastic
PoE Injector	AC IN	AC Power Source	3 Pin AC Line	1.6	NO	Plastic
	DATA OUT	NETWORK CAMERA	PoE	3.2	NO	Plastic
Switching Hub	LAN #3	Notebook	LAN	1.2	NO	Plastic
	DC IN	Power Adapter	DC OUT	1.6	NO	Plastic
Power Adapter	AC IN	AC Power Source	2 Pin AC Line	-	-	Plastic
Monitor #1	AC IN	AC Power Source	3 Pin AC Line	1.2	NO	Plastic
Monitor #2	AC IN	AC Power Source	3 Pin AC Line	1.5	NO	Plastic
NETWORK CAMERA	AUDIO IN	Smart Phone	AUX	1.3	NO	Plastic
ALARM Test Board	USB Type B	Notebook	USB Type A	1.4	NO	Plastic

※ The test Photographs are based on Operating mode (Pwr #1).

3. Test Report

3.1 Summary of tests

Reference	Parameter	Status (note)
I. Emission		
Conducted Emissions	EN 55032:2015/AC:2016-07	C
Radiated Emissions	EN 55032:2015/AC:2016-07	C
Harmonic Current Emission	EN 61000-3-2:2014	NA ^{Note 3}
Voltage Fluctuations and Flicker	EN 61000-3-3:2013	C
II. Immunity		
EN 50130-4:2011/A1:2014		
Electrostatic Discharge	EN 61000-4-2:2009	C
RF Electromagnetic Field	EN 61000-4-3:2006/A1:2008/A2:2010	C
Electrical Fast Transients	EN 61000-4-4:2012	C
Surges	EN 61000-4-5:2014/A1:2017	C
Conducted Disturbances, Induced by Radio-Frequency Fields	EN 61000-4-6:2014/AC:2015	C
Voltage dips and Interruptions	EN 61000-4-11:2004/A1:2017	C
Main supply voltage variations	EN 50130-4:2011/A1:2014	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

Note 3: We did not test EN61000-3-2 (Harmonic current emissions) for the XRN-6410DB4 because equipment whose rated power is less or equal 75 W don't need to be tested.

3.2 EMISSION

3.2.1 Conducted Emissions

Definition:

The test assesses the ability of the EUT to limit its internal noise from being present on the AC mains Power In/Output ports.

We were performed the test according to LTA procedure LTA-QI-04.

Measurement Frequency range	: 150 kHz – 30 MHz
Test method	: EN 55032:2015/AC:2016-07
Measurement RBW	: 9 kHz
Test mode	: Operating mode
Result	: Complies

Measurement Data:

- Refer to the Next page (Maximum emission configuration)

A sample calculation:

COR. F (correction factor)= LISN Insertion loss + Cable loss + Pulse Limiter Factors

Emission Level= meter reading + COR.F

Limits for conducted disturbance at the mains ports of class A ITE

Frequency Range	Quasi-peak	Average
(0.15 – 0.5) MHz	79 dB μ V	66 dB μ V
(0.5 – 30) MHz	73 dB μ V	60 dB μ V

Note: The limits will decrease with the frequency logarithmically within 0.15 MHz to 0.5 MHz

Limits for conducted disturbance at the mains ports of class B ITE

Frequency Range	Quasi-peak	Average
(0.15 – 0.5) MHz	(66 – 56) dB μ V	(56 - 46) dB μ V
(0.5 – 5) MHz	56 dB μ V	46 dB μ V
(5 – 30) MHz	60 dB μ V	50 dB μ V

Note: The limits will decrease with the frequency logarithmically within 0.15 MHz to 0.5 MHz

Limits of conducted common mode (asymmetric mode) disturbance at telecommunication ports in the frequency range 0.15 MHz to 30 MHz for class A equipment

Frequency Range	Voltage limits		Current limits	
	Quasi-peak	Average	Quasi-peak	Average
(0.15 – 0.5) MHz	(97 – 87) dB μ V	(84 – 74) dB μ V	(53 – 43) dB μ V	(40 – 30) dB μ V
(0.5 – 30) MHz	87 dB μ V	74 dB μ V	43 dB μ V	30 dB μ V

Note 1: The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Note 2: The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150 Ω to the telecommunication port under test (conversion factor is $20 \log_{10} 150/I = 44$ dB)

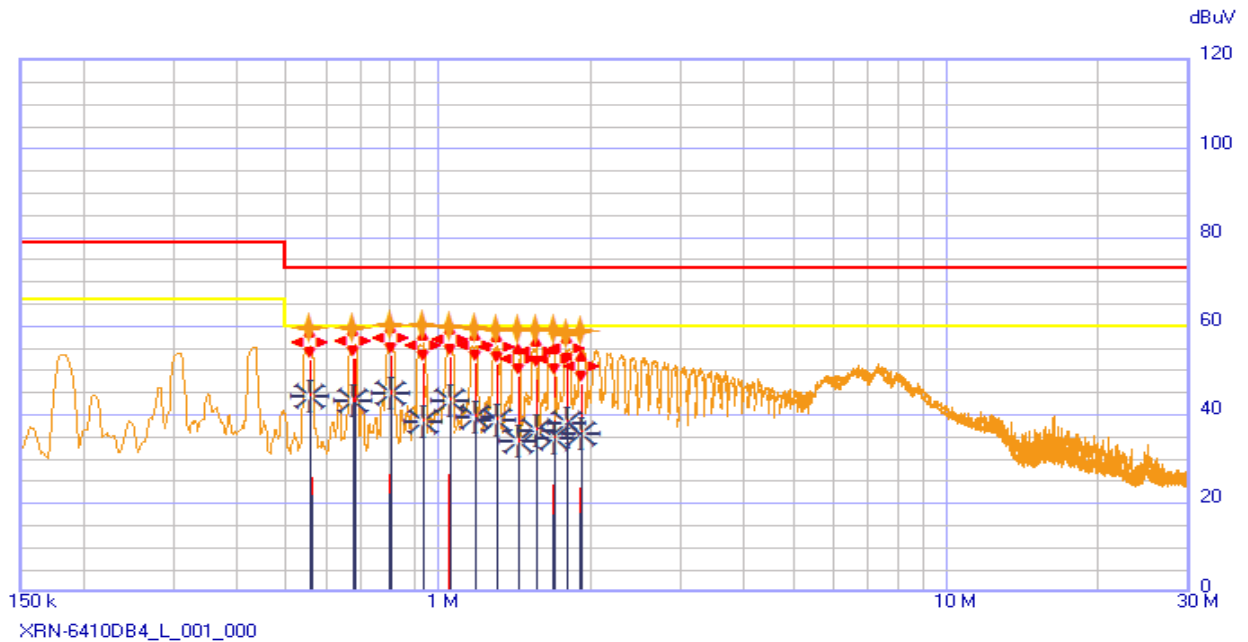
Limits of conducted common mode (asymmetric mode) disturbance at telecommunication ports in the frequency range 0.15 MHz to 30 MHz for class B equipment

Frequency Range	Voltage limits		Current limits	
	Quasi-peak	Average	Quasi-peak	Average
(0.15 – 0.5) MHz	(84 – 74) dB μ V	(74 – 64) dB μ V	(40 – 30) dB μ V	(30 – 20) dB μ V
(0.5 – 30) MHz	74 dB μ V	64 dB μ V	30 dB μ V	20 dB μ V

Note 1: The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Note 2: The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150 Ω to the telecommunication port under test (conversion factor is $20 \log_{10} 150/I = 44$ dB)

Conducted Emissions (LINE) / Operating mode (Pwr #1)



	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	P Q C CISPR A_QP CISPR A_AV	1500 ms	9 kHz	10	ON	ON	...	L1

Pulse Limiter ON
Ancillary = General

Limits:

CISPR A_QP
CISPR A_AV

Factors:
ENV216#2_191015_L
CE_CL_200109

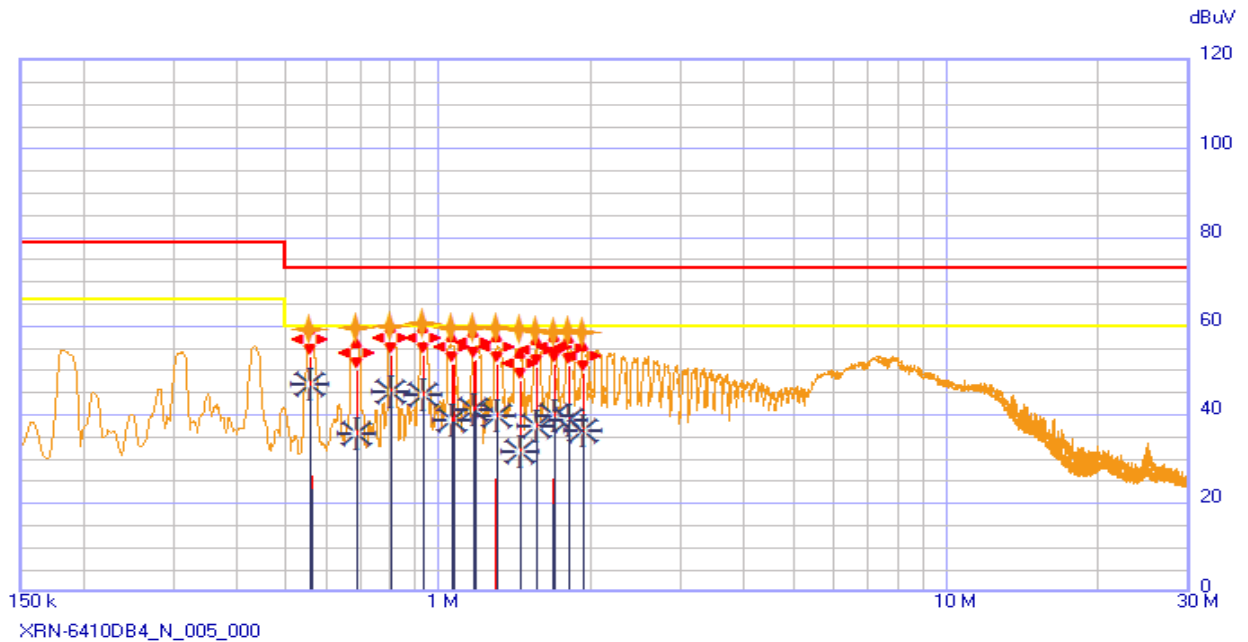
Peak
QPeak
C-Avg

EUT / Model No. : XRN-6410DB4
Test mode : Operating mode(Pwr #1)
Temp./ Humi : 24 °C / 46 %
Date : 2020-05-28

Phase : Line
Test Power : 230 V / 50 Hz
Test Engineer : KIM J H

No.	Frequency [MHz]	RD QP [dBμV]	RD AV [dBμV]	C.F [dB]	Result QP [dBμV]	Result AV [dBμV]	Limit QP [dBμV]	Limit AV [dBμV]	Margin QP [dB]	Margin AV [dB]
1	0.559	42.72	34.40	9.58	52.30	43.98	73.00	60.00	20.70	16.02
2	0.684	42.85	33.13	9.58	52.43	42.71	73.00	60.00	20.57	17.29
3	0.802	43.56	34.94	9.58	53.14	44.52	73.00	60.00	19.86	15.48
4	0.935	41.85	28.63	9.58	51.43	38.21	73.00	60.00	21.57	21.79
5	1.052	43.12	33.36	9.58	52.70	42.94	73.00	60.00	20.30	17.06
6	1.183	41.78	29.57	9.59	51.37	39.16	73.00	60.00	21.63	20.84
7	1.307	41.43	29.04	9.59	51.02	38.63	73.00	60.00	21.98	21.37
8	1.436	39.02	24.11	9.59	48.61	33.70	73.00	60.00	24.39	26.30
9	1.557	40.57	26.54	9.60	50.17	36.14	73.00	60.00	22.83	23.86
10	1.686	38.68	24.91	9.60	48.28	34.51	73.00	60.00	24.72	25.49
11	1.794	41.19	28.34	9.61	50.80	37.95	73.00	60.00	22.20	22.05
12	1.901	37.28	25.89	9.62	46.90	35.51	73.00	60.00	26.10	24.49

Conducted Emissions (NEUTRAL) / Operating mode (Pwr #1)



	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	P Q C CISPR A_QP CISPR A_AV	1500 ms	9 kHz	10	ON	ON	...	N

Pulse Limiter ON
Ancillary = General

Limits:

CISPR A_QP
CISPR A_AV

Factors:
ENV216#2_191015_N
CE_CL_200109

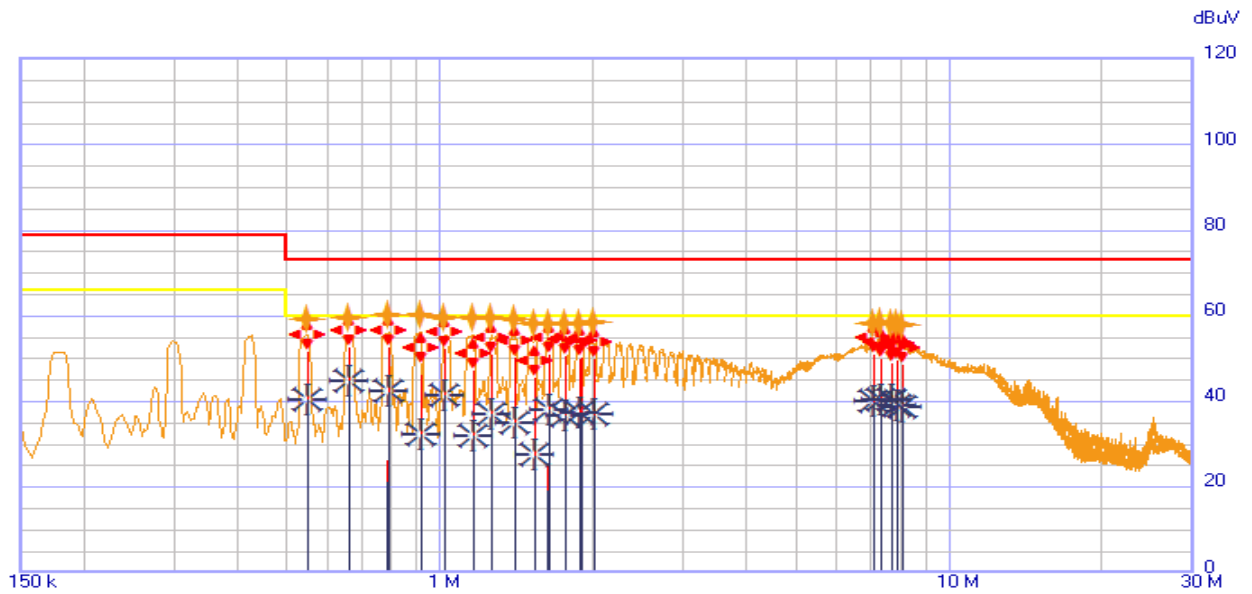
Peak
QPeak
C-Avg

EUT / Model No. : XRN-6410DB4
Test mode : Operating mode(Pwr #1)
Temp./ Humi : 24 °C / 46 %
Date : 2020-05-28

Phase : Neutral
Test Power : 230 V / 50 Hz
Test Engineer : KIM J H

No.	Frequency [MHz]	RD QP [dBμV]	RD AV [dBμV]	C.F [dB]	Result QP [dBμV]	Result AV [dBμV]	Limit QP [dBμV]	Limit AV [dBμV]	Margin QP [dB]	Margin AV [dB]
1	0.559	43.41	36.90	9.57	52.98	46.47	73.00	60.00	20.02	13.53
2	0.692	40.06	25.81	9.58	49.64	35.39	73.00	60.00	23.36	24.61
3	0.808	43.56	35.34	9.58	53.14	44.92	73.00	60.00	19.86	15.08
4	0.935	43.68	34.56	9.58	53.26	44.14	73.00	60.00	19.74	15.86
5	1.066	41.61	28.82	9.58	51.19	38.40	73.00	60.00	21.81	21.60
6	1.179	42.47	31.28	9.59	52.06	40.87	73.00	60.00	20.94	19.13
7	1.301	41.56	29.86	9.59	51.15	39.45	73.00	60.00	21.85	20.55
8	1.447	37.79	21.91	9.59	47.38	31.50	73.00	60.00	25.62	28.50
9	1.565	40.97	27.48	9.60	50.57	37.08	73.00	60.00	22.43	22.92
10	1.684	41.51	29.80	9.60	51.11	39.40	73.00	60.00	21.89	20.60
11	1.804	41.24	28.93	9.60	50.84	38.53	73.00	60.00	22.16	21.47
12	1.921	39.64	26.41	9.61	49.25	36.02	73.00	60.00	23.75	23.98

Conducted Emissions (LINE) / Operating mode (Pwr #2)



	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	P Q C CISPR A_QP CISPR A_AV	1500 ms	9 kHz	10	ON	ON	...	L1

Pulse Limiter ON
Ancillary = General

Limits:
CISPR A_QP
CISPR A_AV

Factors:
ENV216#2_191015_L
CE_CL_200109

Peak
QPeak
C-Avg

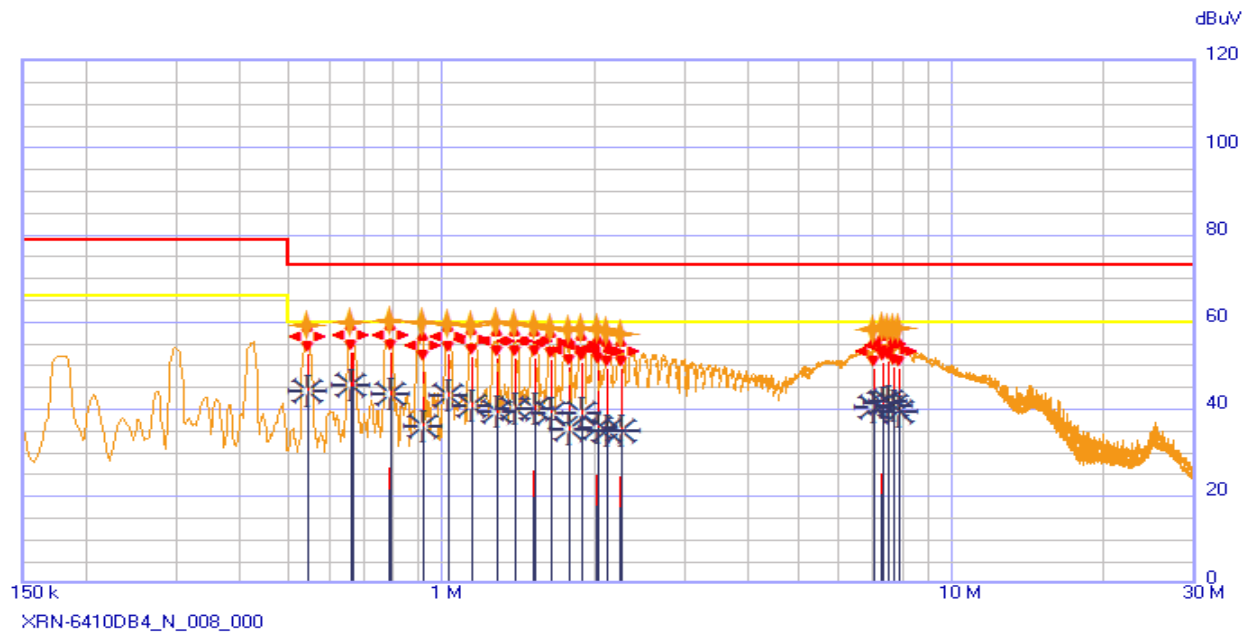
EUT / Model No. : XRN-6410DB4
Test mode : Operating mode(Pwr #2)
Temp./ Humi : 24 °C / 46 %
Date : 2020-05-28

Phase : Line
Test Power : 230 V / 50 Hz
Test Engineer : KIM J H

No.	Frequency [MHz]	RD QP [dB/μV]	RD AV [dB/μV]	C.F [dB]	Result QP [dB/μV]	Result AV [dB/μV]	Limit QP [dB/μV]	Limit AV [dB/μV]	Margin QP [dB]	Margin AV [dB]
1	0.549	41.96	30.63	9.57	51.53	40.20	73.00	60.00	21.47	19.80
2	0.663	43.08	35.07	9.58	52.66	44.65	73.00	60.00	20.34	15.35
3	0.790	43.08	32.47	9.58	52.66	42.05	73.00	60.00	20.34	17.95
4	0.919	38.80	22.49	9.58	48.38	32.07	73.00	60.00	24.62	27.93
5	1.023	42.72	31.66	9.58	52.30	41.24	73.00	60.00	20.70	18.76
6	1.164	37.54	22.26	9.58	47.12	31.84	73.00	60.00	25.88	28.16
7	1.258	41.09	27.33	9.59	50.68	36.92	73.00	60.00	22.32	23.08
8	1.404	40.50	25.21	9.59	50.09	34.80	73.00	60.00	22.91	25.20
9	1.532	35.94	17.63	9.60	45.54	27.23	73.00	60.00	27.46	32.77
10	1.631	41.05	28.37	9.60	50.65	37.97	73.00	60.00	22.35	22.03

No.	Frequency [MHz]	RD QP [dB/ μ V]	RD AV [dB/ μ V]	C.F [dB]	Result QP [dB/ μ V]	Result AV [dB/ μ V]	Limit QP [dB/ μ V]	Limit AV [dB/ μ V]	Margin QP [dB]	Margin AV [dB]
11	1.759	40.77	26.86	9.61	50.38	36.47	73.00	60.00	22.62	23.53
12	1.886	40.47	27.37	9.62	50.09	36.99	73.00	60.00	22.91	23.01
13	2.005	40.24	27.15	9.62	49.86	36.77	73.00	60.00	23.14	23.23
14	7.105	41.17	30.00	9.71	50.88	39.71	73.00	60.00	22.12	20.29
15	7.314	40.03	30.54	9.71	49.74	40.25	73.00	60.00	23.26	19.75
16	7.674	39.07	30.37	9.71	48.78	40.08	73.00	60.00	24.22	19.92
17	7.907	39.79	29.20	9.71	49.50	38.91	73.00	60.00	23.50	21.09
18	8.060	38.60	28.85	9.71	48.31	38.56	73.00	60.00	24.69	21.44

Conducted Emissions (NEUTRAL) / Operating mode (Pwr #2)



	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	P Q C CISPR A_QP CISPR A_AV	1500 ms	9 kHz	10	ON	ON	...	N

Pulse Limiter ON
Ancillary = General

Limits:
CISPR A_QP
CISPR A_AV

Factors:
ENV216#2_191015_N
CE_CL_200109

Peak
QPeak
C-Avg

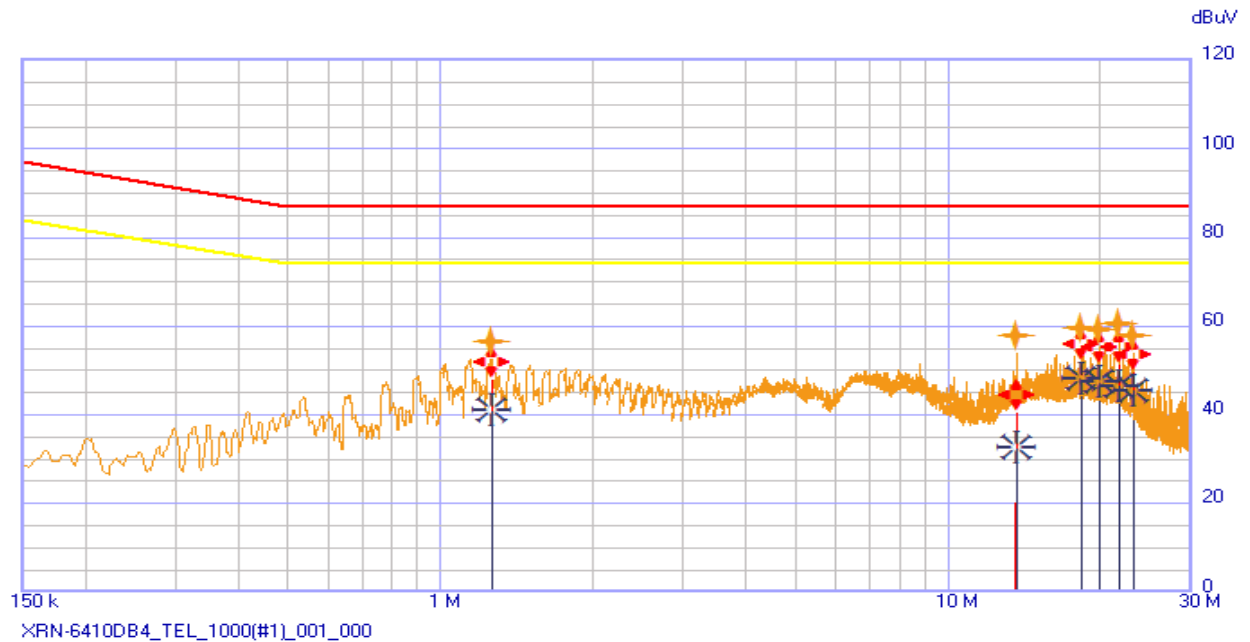
EUT / Model No. : XRN-6410DB4
Test mode : Operating mode(Pwr #2)
Temp./ Humi : 24 °C / 46 %
Date : 2020-05-28

Phase : Neutral
Test Power : 230 V / 50 Hz
Test Engineer : KIM J H

No.	Frequency [MHz]	RD QP [dBμV]	RD AV [dBμV]	C.F [dB]	Result QP [dBμV]	Result AV [dBμV]	Limit QP [dBμV]	Limit AV [dBμV]	Margin QP [dB]	Margin AV [dB]
1	0.547	42.90	34.43	9.56	52.46	43.99	73.00	60.00	20.54	16.01
2	0.665	43.26	35.59	9.58	52.84	45.17	73.00	60.00	20.16	14.83
3	0.790	43.30	33.47	9.58	52.88	43.05	73.00	60.00	20.12	16.95
4	0.917	41.02	26.21	9.58	50.60	35.79	73.00	60.00	22.40	24.21
5	1.029	42.87	33.27	9.58	52.45	42.85	73.00	60.00	20.55	17.15
6	1.146	42.10	30.91	9.58	51.68	40.49	73.00	60.00	21.32	19.51
7	1.279	41.89	29.47	9.59	51.48	39.06	73.00	60.00	21.52	20.94
8	1.389	41.77	30.16	9.59	51.36	39.75	73.00	60.00	21.64	20.25
9	1.514	41.77	30.22	9.60	51.37	39.82	73.00	60.00	21.63	20.18
10	1.637	41.41	29.29	9.60	51.01	38.89	73.00	60.00	21.99	21.11

No.	Frequency [MHz]	RD QP [dB/μV]	RD AV [dB/μV]	C.F [dB]	Result QP [dB/μV]	Result AV [dB/μV]	Limit QP [dB/μV]	Limit AV [dB/μV]	Margin QP [dB]	Margin AV [dB]
11	1.772	39.70	25.45	9.60	49.30	35.05	73.00	60.00	23.70	24.95
12	1.882	40.95	29.11	9.61	50.56	38.72	73.00	60.00	22.44	21.28
13	2.011	40.03	25.84	9.61	49.64	35.45	73.00	60.00	23.36	24.55
14	2.113	39.64	25.30	9.61	49.25	34.91	73.00	60.00	23.75	25.09
15	2.240	39.41	25.12	9.61	49.02	34.73	73.00	60.00	23.98	25.27
16	7.031	39.34	30.31	9.71	49.05	40.02	73.00	60.00	23.95	19.98
17	7.289	40.71	31.41	9.71	50.42	41.12	73.00	60.00	22.58	18.88
18	7.483	40.98	31.95	9.71	50.69	41.66	73.00	60.00	22.31	18.34
19	7.696	39.82	30.79	9.72	49.54	40.51	73.00	60.00	23.46	19.49
20	7.845	39.56	29.53	9.72	49.28	39.25	73.00	60.00	23.72	20.75

Conducted Emissions (TEL_1000 M) / LAN #1



	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	P Q C CISPR_A_TEL_()	1500 ms	9 kHz	10	ON	ON	...	L1

Pulse Limiter ON
Ancillary = General

Limits:
CISPR_A_TEL_QP
CISPR_A_TEL_AV

Factors:
ENY81-CA6_190910
CE_CL_200109

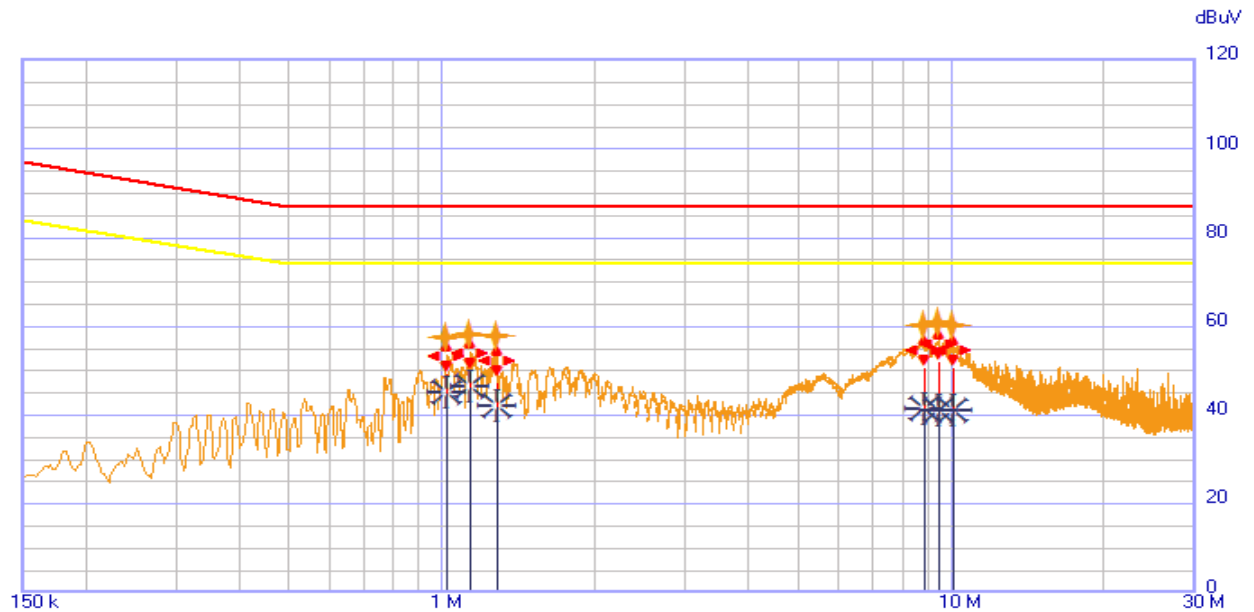
Peak
QPeak
C-Avg

EUT / Model No. : XRN-6410DB4
Test mode : Operating mode
Temp./ Humi : 25 °C / 42 %
Date : 2020-05-28

Phase : TEL_1000M (#1)
Test Power : 230 V / 50 Hz
Test Engineer : KIM J H

No.	Frequency [MHz]	RD QP [dB μ V]	RD AV [dB μ V]	C.F [dB]	Result QP [dB μ V]	Result AV [dB μ V]	Limit QP [dB μ V]	Limit AV [dB μ V]	Margin QP [dB]	Margin AV [dB]
1	1.256	38.34	31.20	9.48	47.82	40.68	87.00	74.00	39.18	33.32
2	13.559	30.74	22.83	9.52	40.26	32.35	87.00	74.00	46.74	41.65
3	18.244	42.20	38.24	9.57	51.77	47.81	87.00	74.00	35.23	26.19
4	19.710	41.49	37.51	9.59	51.08	47.10	87.00	74.00	35.92	26.90
5	21.663	41.50	36.66	9.60	51.10	46.26	87.00	74.00	35.90	27.74
6	23.128	39.90	35.75	9.63	49.53	45.38	87.00	74.00	37.47	28.62

Conducted Emissions (TEL_1000 M) / LAN #2



	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	P Q C CISPR_A_TEL_1000	1500 ms	9 kHz	10	ON	ON	---	L1

Pulse Limiter ON
Ancillary = General

Limits:
CISPR_A_TEL_QP
CISPR_A_TEL_AV

Factors:
ENY81-CA6_190910
CE_CL_200109

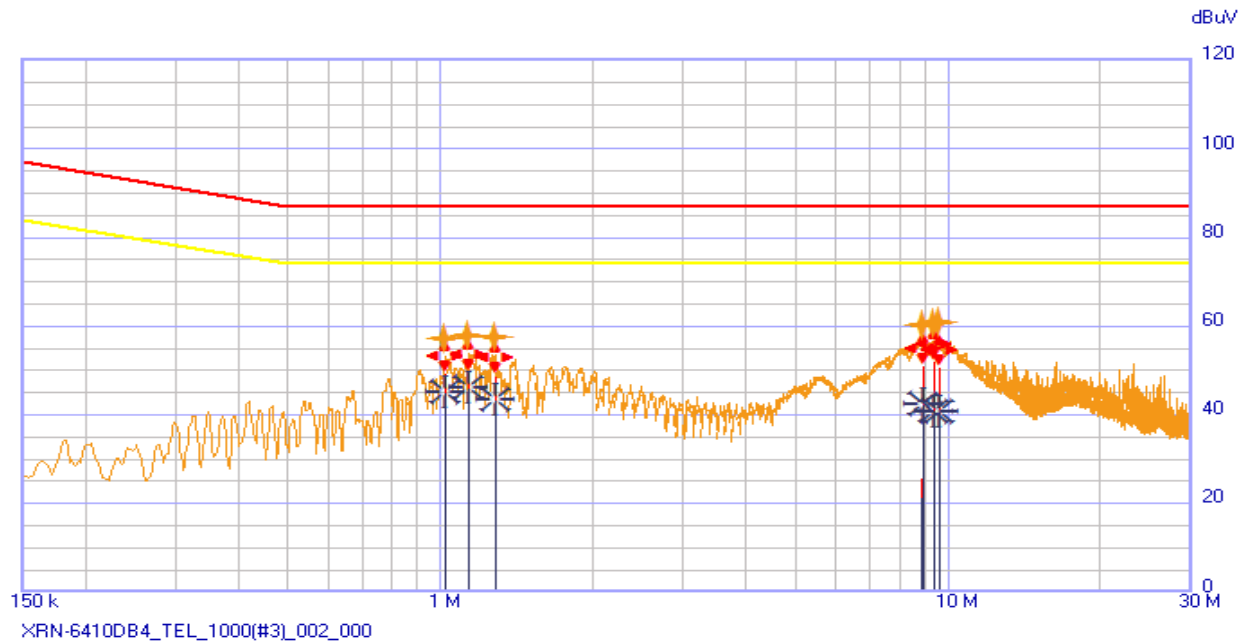
Peak
QPeak
C-Avg

EUT / Model No. : XRN-6410DB4
Test mode : Operating mode
Temp./ Humi : 25 °C / 42 %
Date : 2020-05-28

Phase : TEL_1000M (#2)
Test Power : 230 V / 50 Hz
Test Engineer : KIM J H

No.	Frequency [MHz]	RD QP [dBμV]	RD AV [dBμV]	C.F [dB]	Result QP [dBμV]	Result AV [dBμV]	Limit QP [dBμV]	Limit AV [dBμV]	Margin QP [dB]	Margin AV [dB]
1	1.025	39.68	35.29	9.50	49.18	44.79	87.00	74.00	37.82	29.21
2	1.140	40.46	36.62	9.49	49.95	46.11	87.00	74.00	37.05	27.89
3	1.277	38.71	32.25	9.48	48.19	41.73	87.00	74.00	38.81	32.27
4	8.809	41.16	31.84	9.47	50.63	41.31	87.00	74.00	36.37	32.69
5	9.387	42.34	31.31	9.47	51.81	40.78	87.00	74.00	35.19	33.22
6	10.062	41.03	31.37	9.48	50.51	40.85	87.00	74.00	36.49	33.15

Conducted Emissions (TEL_1000 M) / LAN #3



	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	P Q C CISPR_A_TEL_1000	1500 ms	9 kHz	10	ON	ON	...	L1

Pulse Limiter ON
Ancillary = General

Limits:
CISPR_A_TEL_QP
CISPR_A_TEL_AV

Factors:
ENY81-CA6_190910
CE_CL_200109

Peak
QPeak
C-Avg

EUT / Model No. : XRN-6410DB4
Test mode : Operating mode
Temp./ Humi : 25 °C / 42 %
Date : 2020-05-28

Phase : TEL_1000M (#3)
Test Power : 230 V / 50 Hz
Test Engineer : KIM J H

No.	Frequency [MHz]	RD QP [dB μ V]	RD AV [dB μ V]	C.F [dB]	Result QP [dB μ V]	Result AV [dB μ V]	Limit QP [dB μ V]	Limit AV [dB μ V]	Margin QP [dB]	Margin AV [dB]
1	1.025	39.49	35.24	9.50	48.99	44.74	87.00	74.00	38.01	29.26
2	1.140	40.06	36.41	9.49	49.55	45.90	87.00	74.00	37.45	28.10
3	1.283	39.45	33.57	9.48	48.93	43.05	87.00	74.00	38.07	30.95
4	8.880	41.41	32.58	9.47	50.88	42.05	87.00	74.00	36.12	31.95
5	9.361	42.48	30.96	9.47	51.95	40.43	87.00	74.00	35.05	33.57
6	9.573	41.00	30.90	9.48	50.48	40.38	87.00	74.00	36.52	33.62

3.2.2 Radiated Emissions

Definition:

The test assesses the ability of ancillary equipment to limit their internal noise from being radiated from the enclosure.
We were performed the test according to LTA procedure LTA-QI-04.

Test method	: EN 55032:2015/AC:2016-07
Measuring Distance	: 10 m below 1 GHz / 3 m above 1 GHz
Measurement Frequency range	: 30 MHz – 6 000 MHz
Measurement RBW	: 120 kHz @ 10 m / 1 MHz @ 3 m
Test mode	: Operating mode
Result	: Complies

Measurement Data:

- Refer to the Next page (Maximum emission configuration)
- The highest internal source of an EUT is higher than 108 MHz, the measurement shall be made up to 6 GHz.
(The highest internal source of an EUT : 3.1 GHz)

A sample calculation:

COR. F (correction factor)= Antenna factor + Cable loss- Amp.gain- Distance correction

Emission Level= meter reading + COR.F

Limit of 10 m below 1 GHz

CLASS A

Frequency Range	Quasi-peak
(30 – 230) MHz	40 dB μ V/m
(230 – 1 000) MHz	47 dB μ V/m

CLASS B

Frequency Range	Quasi-peak
(30 – 230) MHz	30 dB μ V/m
(230 – 1 000) MHz	37 dB μ V/m

Limit of 3m above 1 GHz

CLASS A

Frequency Range	Average Limit @ 3m (dB μ V/m)	Peak limit @ 3m (dB μ V/m)
(1 000 – 3 000) MHz	56	76
(3 000 – 6 000) MHz	60	80

NOTE: The lower limit applies at the transition frequency.

CLASS B

Frequency Range	Average Limit @ 3m (dB μ V/m)	Peak limit @ 3m (dB μ V/m)
(1 000 – 3 000) MHz	50	70
(3 000 – 6 000) MHz	54	74

NOTE: The lower limit applies at the transition frequency.

Radiated Emissions (Below 1 GHz) / V



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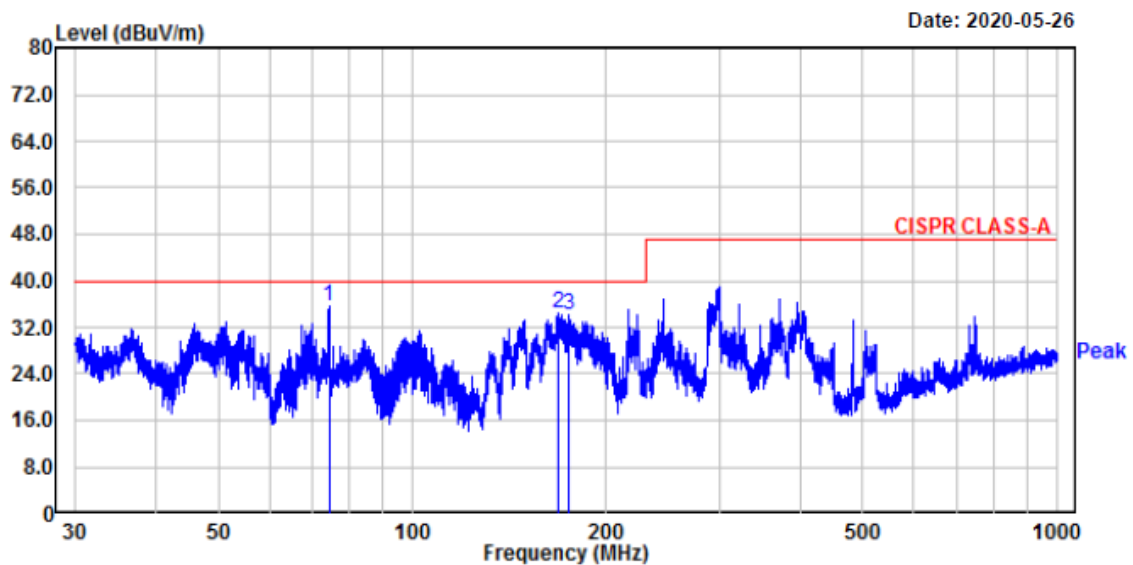
EUT/Model No.: XRN-6410DB4

Temp/Humi: 22 'C / 37 % R.H.

Test Mode : Operating mode

Tested by: KIM J H

Power : 230 V / 50 Hz



No.	Freq MHz	Reading dBμV	C.F dB	Result QP dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Polarity
1.	74.23	51.68	-15.94	35.74	40.00	4.26	100	270	vertical
2.	168.12	46.76	-12.41	34.35	40.00	5.65	100	328	vertical
3.	175.34	47.06	-12.84	34.22	40.00	5.78	100	3	vertical

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Below 1 GHz) / H



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Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
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www.ltalab.com

EUT/Model No.: XRN-6410DB4

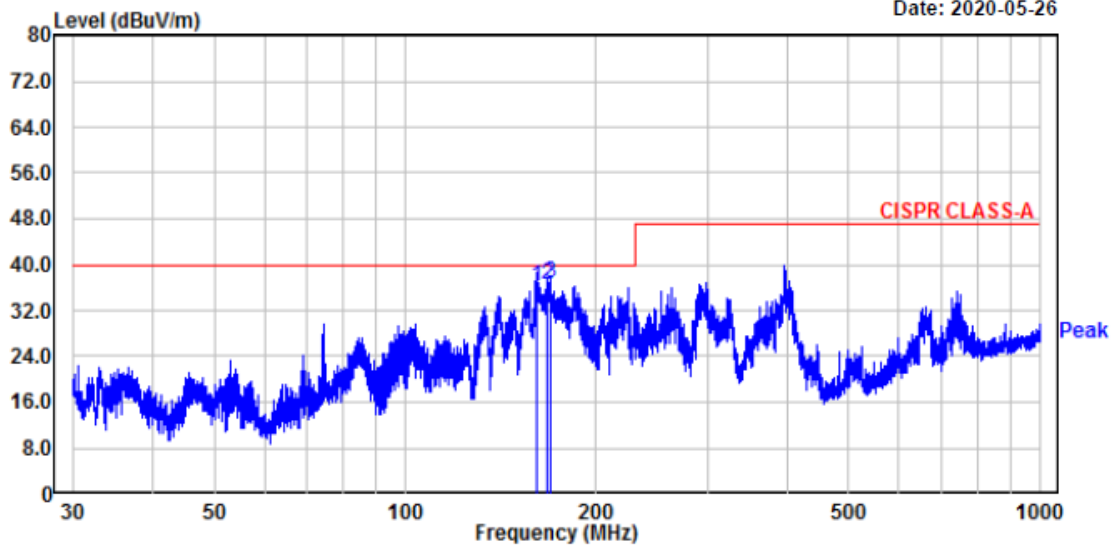
Temp/Humi: 22 'C / 37 % R.H.

Test Mode : Operating mode

Tested by: KIM J H

Power : 230 V / 50 Hz

Date: 2020-05-26



No.	Freq MHz	Reading dBμV	C.F dB	Result QP dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Polarity
1.	160.91	48.20	-12.11	36.09	40.00	3.91	400	32	horizontal
2.	167.16	49.00	-12.34	36.66	40.00	3.34	400	357	horizontal
3.	169.23	49.20	-12.42	36.78	40.00	3.22	385	357	horizontal

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions

(Above 1 GHz) / V

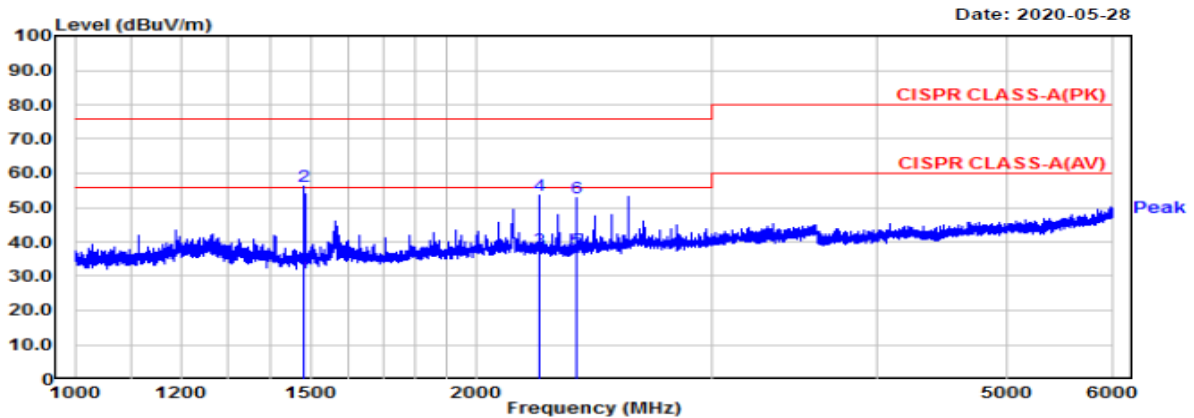
EUT/Model No.: XRN-6410DB4

Temp/Humi: 21 'C / 36 % R.H.

Test Mode : Operating mode

Tested by: KIM J H

Power : 230 V / 50 Hz



(Above 1 GHz) / H

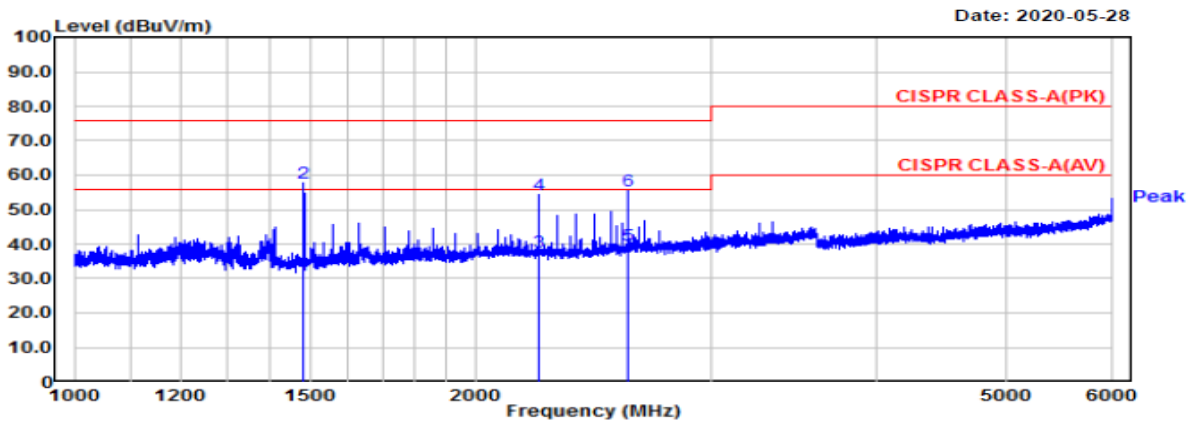
EUT/Model No.: XRN-6410DB4

Temp/Humi: 21 'C / 36 % R.H.

Test Mode : Operating mode

Tested by: KIM J H

Power : 230 V / 50 Hz



Manufacture : Hanwha Techwin(Tianjin) Co., Ltd.

Test Date

Temp.:
[°C]Humidity:
[%]Distance
(m)

Model : XRN-6410DB4

2020-05-28

21.00

36.00

3.8

TEST mode : Operating mode

Frequency MHz	Reading(PK) dBuV	Reading(AV) dBuV	C.F dB	Result(PK) dBuV/m	Result(AV) dBuV/m	Limit(PK) dBuV/m	Limit(AV) dBuV/m	Margin(PK) dB	Margin(AV) dB	Height cm	Angle deg	Polarity H/V
1484.84	64.37	37.35	-4.45	59.92	32.90	76.00	56.00	16.08	23.10	100	256	H
2227.58	55.42	39.15	0.79	56.21	39.94	76.00	56.00	19.79	16.06	100	42	H
2599.27	54.75	38.95	2.60	57.35	41.55	76.00	56.00	18.65	14.45	100	214	H
1484.84	62.56	37.45	-4.45	58.11	33.00	76.00	56.00	17.89	23.00	100	106	V
2227.58	54.82	38.85	0.79	55.61	39.64	76.00	56.00	20.39	16.36	100	96	V
2376.00	54.09	39.26	0.69	54.78	39.95	76.00	56.00	21.22	16.05	100	116	V

3.2.3 Harmonic Current Emission

Definition:

This part deals with the Limitation of harmonic currents injected into the public supply system.

We were performed the test according to LTA procedure LTA-QI-04.

Test method	: EN 61000-3-2:2014
Test mode	: Operating mode
Rated power	: 26.587 W (MODE : Operating mode (Pwr #1)) 25.901 W (MODE : Operating mode (Pwr #2))
Result	: Not Applicable

Measurement Data:

- We did not test EN61000-3-2 (Harmonic Current Emission) for the XRN-6410DB4 because equipment whose rated power is less or equal 75 W don't need to be tested..

Harmonic Current Emission / Operating mode (Pwr #1)

26th May 2020 - 13:22:02		Page 1/1	IECSoft v2_6
		IEC61000-3-2:2014 Fluctuating Harmonics	
Instrument Details			
Instrument Model	PPA5511		
Serial Number	162-04957		
Firmware Version	2.179		
N4L Calibration Date	18th September 2017		
Instrument Version	Standard		
Test Settings			
Class	Class A		
Mode	Measured		
Equipment Under Test			
Brand	Hanwha Techwin Co., Ltd.		
Model	XRN-6410DB4		
Serial	N/A		
Impedance Network ID	N/A		
Test Conditions			
	User Entered	Measured	
Rated Voltage	N/A	230.814V	
Rated Current	N/A	249.220mA	
Rated Frequency	N/A	50.000Hz	
Rated Power	N/A	26.587W	
Additional Test Information			
Measured Power Factor	0.4621		
Max Current THD	0.00%		
Average THC	62.379mA		
Max Power	29.721W		
Max F.Current	246.092mA		
Average F.Current	234.113mA		
Minimum Current	100A		
Test Duration	2.5 minutes		
Additional Test Details			
Operator	KIM J H		
Lab Name	N/A		
Location	N/A		
Notes			
Signature			
Results	Test - N/A. Rated Power < 75W		

Test not applicable

With the exception of lighting equipment section 7 of the IEC61000-3-2:2014 standard declares that no Harmonic current limits are specified for equipment with a rated power of 75W or less.

Harmonic Current Emission / Operating mode (Pwr #2)

26th May 2020 - 15:30:08		Page 1/1	IECSoft v2_6
		IEC61000-3-2:2014 Fluctuating Harmonics	
Instrument Details			
Instrument Model	PPA5511		
Serial Number	162-04957		
Firmware Version	2.179		
N4L Calibration Date	18th September 2017		
Instrument Version	Standard		
Test Settings			
Class	Class A		
Mode	Measured		
Equipment Under Test			
Brand	Hanwha Techwin Co., Ltd.		
Model	XRN-6410DB4		
Serial	N/A		
Impedance Network ID	N/A		
Test Conditions			
	User Entered	Measured	
Rated Voltage	N/A	230.813V	
Rated Current	N/A	245.766mA	
Rated Frequency	N/A	50.000Hz	
Rated Power	N/A	25.901W	
Additional Test Information			
Measured Power Factor	0.4566		
Max Current THD	0.00%		
Average THC	61.937mA		
Max Power	26.199W		
Max F.Current	232.293mA		
Average F.Current	231.168mA		
Minimum Current	100A		
Test Duration	2.5 minutes		
Additional Test Details			
Operator	KIM J H		
Lab Name	N/A		
Location	N/A		
Notes			
Signature			
Results	Test - N/A. Rated Power < 75W		

Test not applicable

With the exception of lighting equipment section 7 of the IEC61000-3-2:2014 standard declares that no Harmonic current limits are specified for equipment with a rated power of 75W or less.

3.2.4 Voltage Fluctuations and Flicker

Definition:

This section is concerned with the limitation of voltage fluctuations and flicker impressed on the public low-voltage system.

We were performed the test according to LTA procedure LTA-QI-04.

Test method : EN 61000-3-3:2013

Test mode : Operating mode

Result : **Complies**

Measurement Data:

- Refer to the Next page

Voltage Fluctuations and Flicker / Operating mode (Pwr #1)

26th May 2020 - 13:26:40		Page 1/2	IECSoft v2_6
		IEC61000-3-3:2013 Ed.3.0 Flickermeter	
Instrument Details			
Instrument Model	PPA5511		
Serial Number	162-04957		
Firmware Version	2.179		
N4L Calibration Date	18th September 2017		
Instrument Version	Standard		
Test Settings			
Class	Voltage		
Mode	Normal (4.0%)		
Minimum Current	10A		
PST	10 minutes		
PLT	12 PSTs		
Equipment Under Test			
Brand	Hanwha Techwin Co., Ltd.		
Model	XRN-6410DB4		
Serial	N/A		
Impedance Network ID	N/A		
Test Conditions			
	User Entered	Measured	
Rated Voltage	N/A	230.842V	
Rated Current	N/A	N/A	
Rated Frequency	N/A	50.000Hz	
Rated Power	N/A	N/A	
D max	0.1461% (Limit: 4.0%)		
T max	0.0000 s (Limit: 0.5 s)		
DC max	0.0067% (Limit: 3.3%)		
Additional Test Details			
Operator	KIM J H		
Lab Name	N/A		
Location	N/A		
Notes			
Signature			
Results	Phase1: PASS		

26th May 2020 - 13:26:40			Ph:1 Page 2/2			IECSoft v2_6		
IEC61000-3-3:2013 Ed.3.0 Flickermeter								
Instrument Details								
Instrument Model			PPA5511					
Instrument Serial			162-04957					
Instrument Firmware			2.179					
Equipment Under Test								
Brand			Hanwha Techwin Co., Ltd.					
Model			XRN-6410DB4					
Serial			N/A					
Flicker Test Results								
PST no.	Status	DC (%)	Dmax (%)	Tmax (s)	PST	PST Lim	PLT	PLT Lim
1	Phase1: PASS	0.00672	0.07518	0.00000	0.08226	1.00000	0.08226	N/A
2	Phase1: PASS	0.00672	0.07518	0.00000	0.08226	1.00000	0.08226	N/A
3	Phase1: PASS	0.00672	0.07518	0.00000	0.08226	1.00000	0.08226	N/A
4	Phase1: PASS	0.00672	0.14607	0.00000	0.08226	1.00000	0.08226	N/A
5	Phase1: PASS	0.00672	0.14607	0.00000	0.08226	1.00000	0.08226	N/A
6	Phase1: PASS	0.00672	0.14607	0.00000	0.08226	1.00000	0.08226	N/A
7	Phase1: PASS	0.00672	0.14607	0.00000	0.08226	1.00000	0.08226	N/A
8	Phase1: PASS	0.00672	0.14607	0.00000	0.08226	1.00000	0.08226	N/A
9	Phase1: PASS	0.00672	0.14607	0.00000	0.08226	1.00000	0.08226	N/A
10	Phase1: PASS	0.00672	0.14607	0.00000	0.08226	1.00000	0.08226	N/A
11	Phase1: PASS	0.00672	0.14607	0.00000	0.08226	1.00000	0.08226	N/A
12	Phase1: PASS	0.00672	0.14607	0.00000	0.08226	1.00000	0.08226	0.65000

Voltage Fluctuations and Flicker / Operating mode (Pwr #2)

26th May 2020 - 15:35:52		Page 1/2	IECSoft v2_6
		IEC61000-3-3:2013 Ed.3.0 Flickermeter	
Instrument Details			
Instrument Model	PPA5511		
Serial Number	162-04957		
Firmware Version	2.179		
N4L Calibration Date	18th September 2017		
Instrument Version	Standard		
Test Settings			
Class	Voltage		
Mode	Normal (4.0%)		
Minimum Current	10A		
PST	10 minutes		
PLT	12 PSTs		
Equipment Under Test			
Brand	Hanwha Techwin Co., Ltd.		
Model	XRN-6410DB4		
Serial	N/A		
Impedance Network ID	N/A		
Test Conditions			
	User Entered	Measured	
Rated Voltage	N/A	230.835V	
Rated Current	N/A	N/A	
Rated Frequency	N/A	50.000Hz	
Rated Power	N/A	N/A	
D max	0.0737% (Limit: 4.0%)		
T max	0.0000 s (Limit: 0.5 s)		
DC max	0.0190% (Limit: 3.3%)		
Additional Test Details			
Operator	KIM J H		
Lab Name	N/A		
Location	N/A		
Notes			
Signature			
Results	Phase1: PASS		

26th May 2020 - 15:35:52		Ph:1 Page 2/2		IECSoft v2_6				
IEC61000-3-3:2013 Ed.3.0 Flickermeter								
Instrument Details								
Instrument Model		PPA5511						
Instrument Serial		162-04957						
Instrument Firmware		2.179						
Equipment Under Test								
Brand		Hanwha Techwin Co., Ltd.						
Model		XRN-6410DB4						
Serial		N/A						
Flicker Test Results								
PST no.	Status	DC (%)	Dmax (%)	Tmax (s)	PST	PST Lim	PLT	PLT Lim
1	Phase1: PASS	0.01898	0.05368	0.00000	0.08226	1.00000	0.08226	N/A
2	Phase1: PASS	0.01898	0.06141	0.00000	0.08226	1.00000	0.08226	N/A
3	Phase1: PASS	0.01898	0.06766	0.00000	0.08226	1.00000	0.08226	N/A
4	Phase1: PASS	0.01898	0.06766	0.00000	0.08226	1.00000	0.08226	N/A
5	Phase1: PASS	0.01898	0.06766	0.00000	0.08226	1.00000	0.08226	N/A
6	Phase1: PASS	0.01898	0.06766	0.00000	0.08226	1.00000	0.08226	N/A
7	Phase1: PASS	0.01898	0.07368	0.00000	0.08226	1.00000	0.08226	N/A
8	Phase1: PASS	0.01898	0.07368	0.00000	0.08226	1.00000	0.08226	N/A
9	Phase1: PASS	0.01898	0.07368	0.00000	0.08226	1.00000	0.08226	N/A
10	Phase1: PASS	0.01898	0.07368	0.00000	0.08226	1.00000	0.08226	N/A
11	Phase1: PASS	0.01898	0.07368	0.00000	0.08226	1.00000	0.08226	N/A
12	Phase1: PASS	0.01898	0.07368	0.00000	0.08226	1.00000	0.08226	0.65000

3.3 IMMUNITY

3.3.1 Electrostatic Discharge

Definition:

The test assesses the ability of the EUT to operate as intended in the event of an electrostatic discharge.

We were performed the test according to LTA procedure LTA-QI-04.

Test date	: 2020. 05. 29.
Test method	: EN 61000-4-2 :2009
Temperature / Humidity / Pressure	: 24 °C / 38 % R.H. / 100.3 kPa
Discharge Impedance	: $(330 \pm 10 \%) \Omega$ / $(150 \pm 10 \%) \text{ pF}$
Type of Discharge (air discharge)	: $\pm 2 \text{ kV}$, $\pm 4 \text{ kV}$, $\pm 8 \text{ kV}$
Type of Discharge (contact discharge)	: $\pm 6 \text{ kV}$
Number of discharges at each point	: 10 of each polarity
Discharge Repetition on Rate	: 1 / sec
Test mode	: Operating mode
Result	: Complies

Measurement Data:

- Refer to the Next page

1-1. Indirect Discharge

No.	Position	Kind of Discharge	Results	Remarks
1	HCP	Contact	Complies	No reaction recognized
2	VCP	Contact	Complies	No reaction recognized

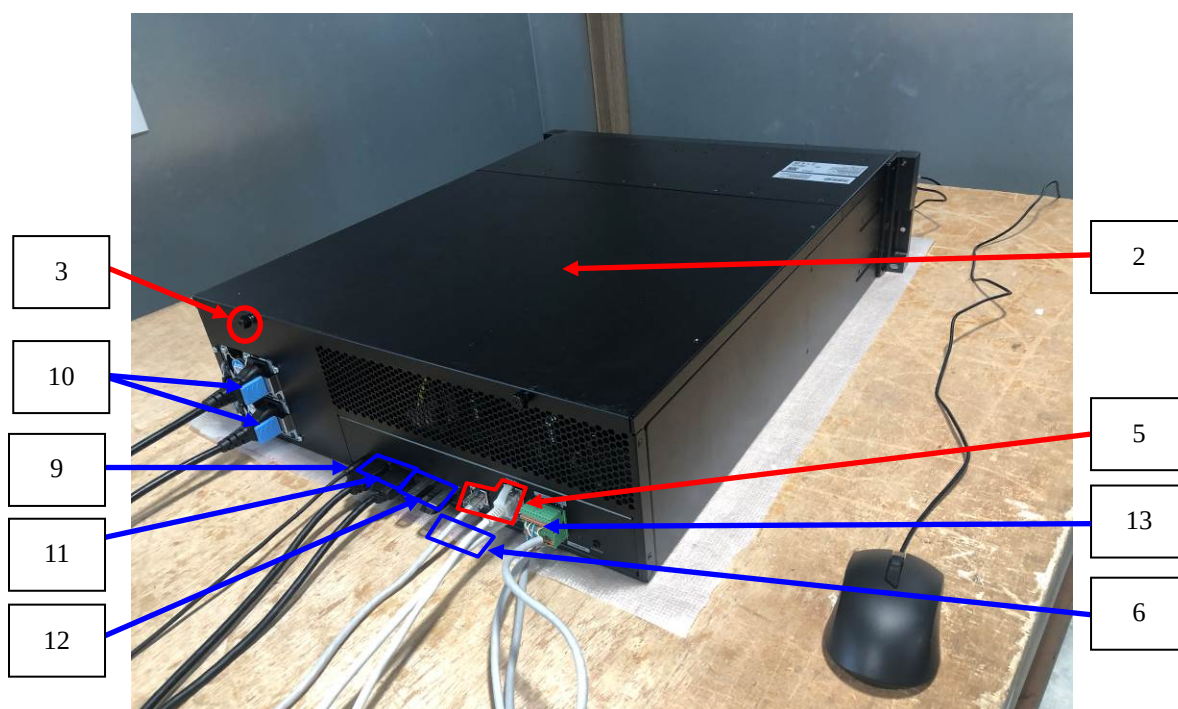
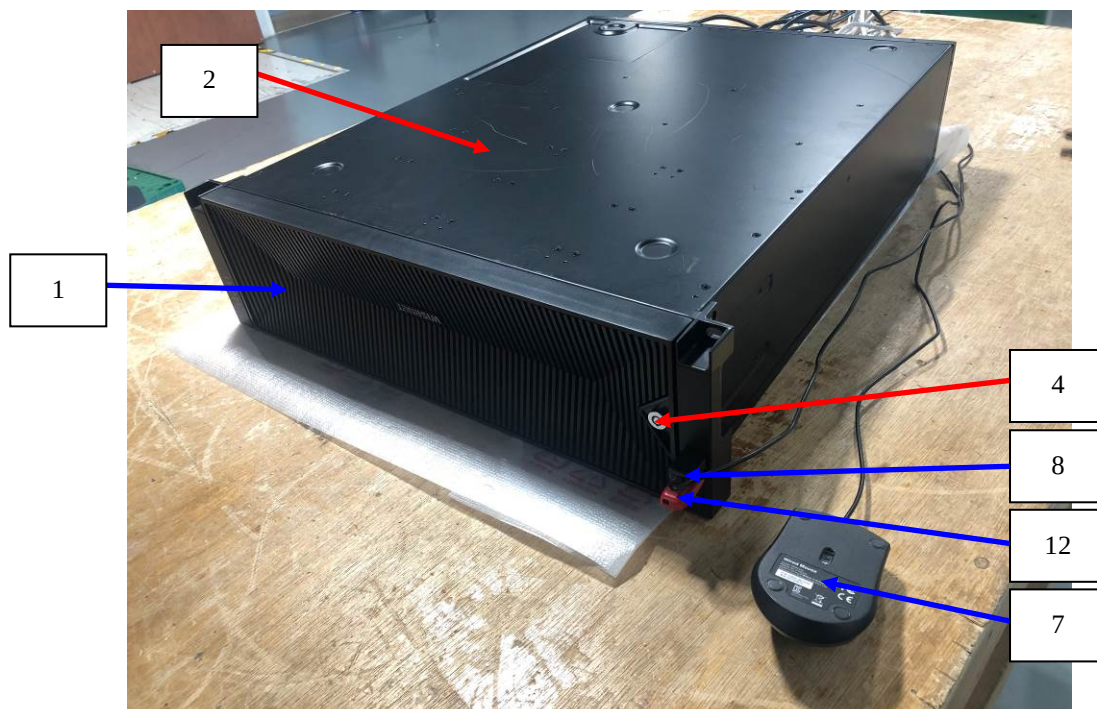
1-2. Direct Discharge

No.	Position	Kind of Discharge	Result	Remarks
1	Enclosure #1	Air	Complies	No reaction recognized
2	Enclosure #2	Contact	Complies	No reaction recognized
3	Screw	Contact	Complies	No reaction recognized
4	Key Hole	Contact	Complies	No reaction recognized
5	Network #1	Contact	Complies	No reaction recognized
6	Network #2	Air	Complies	No reaction recognized
7	Mouse	Air	Complies	No reaction recognized
8	USB Type A	Air	Complies	No reaction recognized
9	AUDIO OUT	Air	Complies	No reaction recognized
10	AC IN	Air	Complies	No reaction recognized
11	HDMI	Air	Complies	No reaction recognized
12	USB Memory Stick	Air	Complies	No reaction recognized
13	Terminal Block	Air	Complies	No reaction recognized

ESD TEST POINT

[Air discharge]

[Contact discharge]



3.3.2 RF Electromagnetic Field

Definition:

The test assesses the ability of the EUT to operate as intended in the presence of a radio frequency electromagnetic field disturbance.

We were performed the test according to LTA procedure LTA-QI-04.

Test date	:	2020. 06. 05.
Test method	:	EN 61000-4-3:2006/A1:2008/A2:2010
Temperature / Humidity / Pressure	:	23 °C / 36 % R.H. / 100.1 kPa
Frequency range	:	80 MHz to 2,700 MHz
Test level	:	10 V/m (measured unmodulated)
Amplitude Modulation	:	AM, 80 %, 1 kHz Sinusoidal PM, 1 Hz (0.5s ON : 0.5s OFF)
Step size	:	1 % of fundamental
Dwell Time	:	3 s
Test mode	:	Operating mode
Result	:	Complies

Measurement Data:

Port	Side	Result	Remarks
Horizontal	Front	Complies	No reaction recognized
	Left	Complies	No reaction recognized
	Rear	Complies	No reaction recognized
	Right	Complies	No reaction recognized
Vertical	Front	Complies	No reaction recognized
	Left	Complies	No reaction recognized
	Rear	Complies	No reaction recognized
	Right	Complies	No reaction recognized

Audio Port	Result	Remarks
AUDIO OUT	Complies	No reaction recognized

3.3.3 Electrical Fast Transients

Definition:

The test assesses the ability of the EUT to operate as intended in the event of fast transients presence on one of the input/output ports.

We were performed the test according to LTA procedure LTA-QI-04.

Test date	:	2020. 06. 01.
Test method	:	EN 61000-4-4:2012
Temperature / Humidity / Pressure	:	23 °C / 37 % R.H. / 100.2 kPa
Cable length	:	> 3 m
Test level	:	2.0 kV (AC power input port) 1.0 kV (Signal port)
Polarity	:	Negative/ positive
Repetition frequency	:	100 kHz
Test mode	:	Operating mode
Result	:	Complies

Measurement Data:

MODE : Operating mode (Pwr #1)

Power Line	Test level	Result	Remarks
L – N – PE	±2 kV	Complies	No reaction recognized

Signal Line	Test level	Result	Remarks
NETWORK #1	±1 kV	Complies	No reaction recognized
NETWORK #2	±1 kV	Complies	No reaction recognized
NETWORK #3	±1 kV	Complies	No reaction recognized
Terminal Block #1	±1 kV	Complies	No reaction recognized
Terminal Block #2	±1 kV	Complies	No reaction recognized

MODE : Operating mode (Pwr #2)

Power Line	Test level	Result	Remarks
L – N – PE	±2 kV	Complies	No reaction recognized

Signal Line	Test level	Result	Remarks
NETWORK #1	±1 kV	Complies	No reaction recognized
NETWORK #2	±1 kV	Complies	No reaction recognized
NETWORK #3	±1 kV	Complies	No reaction recognized
Terminal Block #1	±1 kV	Complies	No reaction recognized
Terminal Block #2	±1 kV	Complies	No reaction recognized

※ Results are complies in each test mode.

3.3.4 Surges

Definition:

The test assesses the ability of the EUT to operate as intended in the event of surge presence on the AC main power input ports.

We were performed the test according to LTA procedure LTA-QI-04.

Test date	:	2020. 06. 01.
Test method	:	EN 61000-4-5:2014/A1:2017
Temperature / Humidity / Pressure	:	24 °C / 38 % R.H. / 100.2 kPa
Test level	:	±0.5 kV, ±1 kV (line to line) ±0.5 kV, ±1 kV, ±2 kV (line to ground), ±0.5 kV, ±1 kV (signal line)
Polarity	:	Negative/ positive
Wave shape	:	1.2/ 50 µs pulse
Number of surges	:	5 (at each phase)
Test mode	:	Operating mode
Result	:	Complies

Measurement Data:

MODE : Operating mode (Pwr #1)

Phase	Line	level	Result	Remark
0°	Line(L) to Line(N)	±(0.5, 1.0) kV	Complies	No reaction recognized
	Line(L) to ground(PE)	±(0.5, 1.0, 2.0) kV	Complies	No reaction recognized
	Line(N) to ground(PE)	±(0.5, 1.0, 2.0) kV	Complies	No reaction recognized
90°	Line(L) to Line(N)	±(0.5, 1.0) kV	Complies	No reaction recognized
	Line(L) to ground(PE)	±(0.5, 1.0, 2.0) kV	Complies	No reaction recognized
	Line(N) to ground(PE)	±(0.5, 1.0, 2.0) kV	Complies	No reaction recognized
180°	Line(L) to Line(N)	±(0.5, 1.0) kV	Complies	No reaction recognized
	Line(L) to ground(PE)	±(0.5, 1.0, 2.0) kV	Complies	No reaction recognized
	Line(N) to ground(PE)	±(0.5, 1.0, 2.0) kV	Complies	No reaction recognized
270°	Line(L) to Line(N)	±(0.5, 1.0) kV	Complies	No reaction recognized
	Line(L) to ground(PE)	±(0.5, 1.0, 2.0) kV	Complies	No reaction recognized
	Line(N) to ground(PE)	±(0.5, 1.0, 2.0) kV	Complies	No reaction recognized

Signal Line	level	Result	Remark
NETWORK #1	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized
NETWORK #2	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized
NETWORK #3	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized
Terminal Block #1	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized
Terminal Block #2	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized

MODE : Operating mode (Pwr #2)

Phase	Line	level	Result	Remark
0°	Line(L) to Line(N)	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized
	Line(L) to ground(PE)	$\pm(0.5, 1.0, 2.0)$ kV	Complies	No reaction recognized
	Line(N) to ground(PE)	$\pm(0.5, 1.0, 2.0)$ kV	Complies	No reaction recognized
90°	Line(L) to Line(N)	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized
	Line(L) to ground(PE)	$\pm(0.5, 1.0, 2.0)$ kV	Complies	No reaction recognized
	Line(N) to ground(PE)	$\pm(0.5, 1.0, 2.0)$ kV	Complies	No reaction recognized
180°	Line(L) to Line(N)	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized
	Line(L) to ground(PE)	$\pm(0.5, 1.0, 2.0)$ kV	Complies	No reaction recognized
	Line(N) to ground(PE)	$\pm(0.5, 1.0, 2.0)$ kV	Complies	No reaction recognized
270°	Line(L) to Line(N)	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized
	Line(L) to ground(PE)	$\pm(0.5, 1.0, 2.0)$ kV	Complies	No reaction recognized
	Line(N) to ground(PE)	$\pm(0.5, 1.0, 2.0)$ kV	Complies	No reaction recognized

Signal Line	level	Result	Remark
NETWORK #1	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized
NETWORK #2	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized
NETWORK #3	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized
Terminal Block #1	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized
Terminal Block #2	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized

※ Results are complies in each test mode.

3.3.5 Conducted Disturbances, Induced by Radio-Frequency Fields

Definition:

The test assesses the ability of the EUT to operate as intended in the presence of a radio frequency electromagnetic disturbance on the input/output ports.

We were performed the test according to LTA procedure LTA-QI-04.

Test mode	Test date	Temperature / Humidity / Pressure
Power Port	2020. 06. 03.	24 °C / 39 % R.H. / 100.4 kPa
Signal Port	2020. 06. 04.	23 °C / 37 % R.H. / 100.2 kPa

Test method	: EN 61000-4-6:2014/AC:2015
Frequency range	: 0.15 MHz – 100 MHz
Test level	: 10 Vrms unmodulated
Amplitude Modulation	: AM, 80 %, 1 kHz Sinusoidal PM, 1 Hz (0.5s ON : 0.5s OFF)
Step size	: 1 % of fundamental.
Test mode	: Operating mode
Result	: Complies

Measurement Data:

MODE : Operating mode (Pwr #1)

Power Port	Result	Remarks
Power	Complies	No reaction recognized

Signal Port	Result	Remarks
NETWORK #1	Complies	No reaction recognized
NETWORK #2	Complies	No reaction recognized
NETWORK #3	Complies	No reaction recognized
Terminal Block #1	Complies	No reaction recognized
Terminal Block #2	Complies	No reaction recognized

Audio Port	Result	Remarks
AUDIO OUT	Complies	No reaction recognized

MODE : Operating mode (Pwr #2)

Power Port	Result	Remarks
Power	Complies	No reaction recognized

Signal Port	Result	Remarks
NETWORK #1	Complies	No reaction recognized
NETWORK #2	Complies	No reaction recognized
NETWORK #3	Complies	No reaction recognized
Terminal Block #1	Complies	No reaction recognized
Terminal Block #2	Complies	No reaction recognized

Audio Port	Result	Remarks
AUDIO OUT	Complies	No reaction recognized

※ Results are complies in each test mode.

3.3.6 Voltage dips and Interruptions

Definition:

The test assesses the ability of the EUT to operate as intended in the event of voltage dips and interruptions present on the AC mains power input ports.

We were performed the test according to LTA procedure LTA-QI-04.

Test date : 2020. 06. 01.
 Test method : EN 61000-4-11:2004/A1:2017
 Temperature / Humidity / Pressure : 24 °C / 39 % R.H. / 100.2 kPa
 Ut : 230 Vac
 Test mode : Operating mode
 Result : **Complies**

Measurement Data:

MODE : Operating mode (Pwr #1)

Test Level %Ut	Voltage droop and interruptions %Ut	Duration of Reduction (period)	Result	Remarks
80	20	250	Complies	No reaction recognized
70	30	25	Complies	No reaction recognized
40	60	10	Complies	No reaction recognized
0	100	250	Complies	No reaction recognized

MODE : Operating mode (Pwr #2)

Test Level %Ut	Voltage droop and interruptions %Ut	Duration of Reduction (period)	Result	Remarks
80	20	250	Complies	No reaction recognized
70	30	25	Complies	No reaction recognized
40	60	10	Complies	No reaction recognized
0	100	250	Complies	No reaction recognized

※ Results are complies in each test mode.

3.3.7 Mains supply voltage variations

Definition:

The test assesses the ability of the EUT to operate as intended in the event of voltage variations present on the AC mains power input ports.

We were performed the test according to LTA procedure LTA-QI-04.

Test date	:	2020. 06. 01.
Test method	:	EN 61000-4-11:2004/A1:2017
Temperature / Humidity / Pressure	:	24 °C / 39 % R.H. / 100.2 kPa
Supply Voltage maximum	:	$U_{nom} + 10 \%$
Supply Voltage minimum	:	$U_{nom} - 15 \%$
U_t	:	230 Vac
Test mode	:	Operating mode
Result	:	Complies

Measurement Data:

U_{nom} = Nominal mains voltage. Where provision is made to adapt the equipment to suit a number of nominal supply voltages (e.g. by transformer tap changing), the above conditioning severity shall be applied for each nominal voltage, with the equipment suitably adapted. For equipment which is claimed to be suitable for a range of nominal mains voltages (e.g. 220/240 V) without adaptation, $U_{max} = (\text{Maximum } U_{nom}) + 10 \%$, and $U_{min} = (\text{Minimum } U_{nom}) - 15 \%$. In any case the range of U_{nom} must include the European nominal mains voltage of 230 V.

2 Mains supply voltage variations

MODE : Operating mode (Pwr #1)

Test LevelCondition		Test Level (V)	Result	Remarks
U_{nom}	+10%	253	Complies	No reaction recognized
U_{nom}	-15%	195.5	Complies	No reaction recognized

MODE : Operating mode (Pwr #2)

Test LevelCondition		Test Level (V)	Result	Remarks
U_{nom}	+10%	253	Complies	No reaction recognized
U_{nom}	-15%	195.5	Complies	No reaction recognized

※ Results are complies in each test mode.

APPENDIX A

TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment are identified by the Test Laboratory.

Conducted Emissions

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	EMI TEST Receiver	PMM9010F	NARDA	020WW40106	2021.03.16	1 year
☒	LISN(main)	ENV216	Rohde & Schwarz	100408	2020.10.15	1 year
☒	LISN(sub)	KNW-407	Kyoritsu	8-1430-1	2020.09.06	1 year
☒	ISN	ENY81-CA6	Rohde & Schwarz	101565	2020.09.09	1 year
☒	TEST PROGRAM	PMM Emission Suite Rel. 2.33	NARDA	-	-	-

Radiated Emissions – Below 1 GHz

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	EMI TEST Receiver	ESU	Rohde & Schwarz	100092	2020.09.05	1 year
☒	Amplifier (25 dB)	8447D	HP	2944A07684	2021.03.16	1 year
☒	BILOG Antenna	VULB 9168	SCHWARZBECK	775	2021.03.26 (KOLAS)	2 year
☐	BILOG Antenna	VULB 9168	SCHWARZBECK	775	2021.11.12 (RRA)	2 year
☒	TEST PROGRAM	e3 20181212a (V9)	AUDIX	-	-	-

Radiated Emissions – Above 1 GHz

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	EMI TEST Receiver	ESU	Rohde & Schwarz	100092	2020.09.05	1 year
☒	Amplifier	8449B	HP	3008A00671	2020.09.05	1 year
☐	Amplifier	PAM-840A	COM-POWER	461314	2021.03.16	1 year
☐	HORN ANTENNA	3116B	ETS	133350	2022.05.12	2 year
☐	HORN ANTENNA	3116B	ETS	81109	2022.05.12	2 year
☒	HORN ANTENNA	3115	ETS	114105	2021.09.17 (KOLAS)	2 year
☐	HORN ANTENNA	3115	ETS	114105	2021.11.11 (RRA)	2 year
☒	TEST PROGRAM	e3 20181212a (V9)	AUDIX	-	-	-

Harmonic Current Emission / Voltage Fluctuations and Flicker

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Precision Power Analyzer	PPA5511	Newtons4th Ltd	162-04957	2020.09.16	1 year
☒	Reference Impedance Network	ES4152	NF Corp.	9074424	2020.09.09	1 year

Electrostatic Discharge

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	ESD Simulator	ESS-2000	NOISEKEN	8000C03241	2020.09.09	1 year
☒	ESD GUN	TC-815R	NOISEKEN	ESS0382069	2020.09.09	1 year

RF Electromagnetic Field

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Signal Generator	E4432B	Agilent	MY41310632	2021.03.16	1 year
☒	Power Meter	E4419B	Agilent	GB38410133	2021.03.16	1 year
☒	Power Sensor	E9300A	Agilent	MY41497992	2021.03.16	1 year
☒	Power Sensor	E9300A	Agilent	MY41497618	2021.03.16	1 year
☒	RF POWER AMPLIFIER	ITA0300KL-300	INFINITECH	0300KL 1507 001	-	-
☒	RF POWER AMPLIFIER	ITA2000KL-120	INFINITECH	200KL 1507 001	-	-
☒	RF POWER AMPLIFIER	ITA4500KL-70	INFINITECH	4500KL 1507 001	-	-
☒	RF POWER AMPLIFIER	ITA0750KL-300	INFINITECH	0750KL 1507 001	-	-
☒	Log.-Per.Antenna (80 MHz ~ 3 GHz)	K9128	RAPA	NONE	-	-
☐	Signal Generator	E4438C	Agilent	MY42080843	2020.09.06	1 year
☐	HORN ANTENNA	BBHA 9120 A	SCHWARZBECK	BBHA 9120 A 481	-	-
☒	Sound Acoustic Tester	TST-1000	TESTEK	150065-A	2020.09.09	1 year
☐	Microphone	MP201	BSWA	530147	2020.10.20	1 year

Electrical Fast Transients

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Compact Generator	Compact NX	EMTEST	P1725200196	2020.10.31	1 year
☒	AC Power Source	Variac NX	EMTEST	P1745207276	2020.10.31	1 year
☒	Capacitive Coupling Clamp	CCI	EMTEST	P1744207071	2020.10.31	1 year

Surges

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Compact Generator	Compact NX	EMTEST	P1725200196	2020.10.31	1 year
☒	AC Power Source	Variac NX	EMTEST	P1745207276	2020.10.31	1 year
☒	CDN	CNV 508T5	EMTEST	P1742204978	2020.10.31	1 year
☐	CDN	CNV 508N1	EMTEST	P1742204940	2020.10.31	1 year

Conducted Disturbances, Induced by Radio-Frequency Fields

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Signal generator	SML03	R&S	103026/0013	2021.03.16	1 year
☒	POWER METER	NRVD	R&S	101689	2021.03.16	1 year
☒	POWER Sensor	URV5-Z2	R&S	100755	2021.03.16	1 year
☒	POWER Sensor	URV5-Z2	R&S	100756	2021.03.16	1 year
☒	RF Power Amplifier	FLL75A	FRANKONIA	1033	-	-
☒	EM INJECTION CLAMP	TSIC-23	F.C.C	529	2021.03.17	1 year
☐	CDN (M1)	TSCDN-M1-16A	F.C.C	07004	2020.09.06	1 year
☒	CDN (M2)	TSCDN-M2-16A	F.C.C	07008	2020.09.06	1 year
☐	CDN (M2)	TSCDN-M2-16A	F.C.C	07009	2021.03.16	1 year
☒	CDN (M3)	TSCDN-M3-16A	F.C.C	07016	2021.03.16	1 year
☒	CDN (M3)	TSCDN-M3-16A	F.C.C	07017	2020.09.06	1 year
☒	Sound Acoustic Tester	TST-1000	TESTEK	150065-A	2020.09.09	1 year
☐	Microphone	MP201	BSWA	530147	2020.10.20	1 year

Voltage dips and Interruptions

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Compact Generator	Compact NX	EMTEST	P1725200196	2020.10.31	1 year
☒	AC Power Source	Variac NX	EMTEST	P1745207276	2020.10.31	1 year

Mains supply voltage variations

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Compact Generator	Compact NX	EMTEST	P1725200196	2020.10.31	1 year
☒	AC Power Source	Variac NX	EMTEST	P1745207276	2020.10.31	1 year

APPENDIX B

PERFORMANCE CRITERIA

Performance criteria

The variety and the diversity of the apparatus within the scope of this document makes it difficult to define precise criteria for the evaluation of the immunity test results.

If as a result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe then the apparatus shall be deemed to have failed the test.

A functional description and a definition of performance by the manufacture and noted in the test report, based on the following criteria:

Electrostatic discharge

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test (see Clause 6), after the conditioning.

Radiated electromagnetic fields

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change, and no such flickering of indicators occurs at a field strength of 3 V/m.

For components of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at 10 V/m, providing.

(a) there is no permanent damage or change to the EUT

(e.g. no corruption of memory or changes to programmable setting etc.)

(b) at 3 V/m, any deterioration of the picture is so minor that the system could still be used; and

(c) there is no observable deterioration of the picture at 1 V/m.

The EUT shall meet the acceptance criteria for the functional test(see Clause 6), after the conditioning.

Fast transient burst / slow high energy voltage surge

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of the bursts is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test (see Clause 6), after the conditioning.

Slow high energy voltage surge

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of the surges is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test (see Clause 6), after the conditioning.

Conducted RF immunity

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change, and no such flickering of indicators occurs at $U_0 = 130 \text{ dB}\mu\text{V}$.

For components of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at $U_0 = 140 \text{ dB}\mu\text{V}$, providing

(a) there is no permanent damage or change to the EUT

(e.g. no corruption of memory or changes to programmable settings, etc.)

(b) at $U_0 = 130 \text{ dB}\mu\text{V}$, any deterioration of the picture is so minor that the system could still be used, and

(c) there is no observable deterioration of the picture at $U_0 = 120 \text{ dB}\mu\text{V}$.

The EUT shall meet the acceptance criteria for the functional test(see Clause 6), after the conditioning.

Voltage dip/interruption

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test(see Clause 6), after the conditioning.

It is permitted to use ancillary equipment (e.g. A UPS) to meet the requirements of this clause. This shall be detailed in the test report and the manufacturer's installation manual.

Signaling a mains fault during the 100 % voltage reduction test is permitted.

Mains supply voltage variations

There shall be no damage, malfunction or change of status due to the different supply voltage conditions. The EUT shall meet the acceptance criteria for the functional test(see Clause 6), during the conditioning.

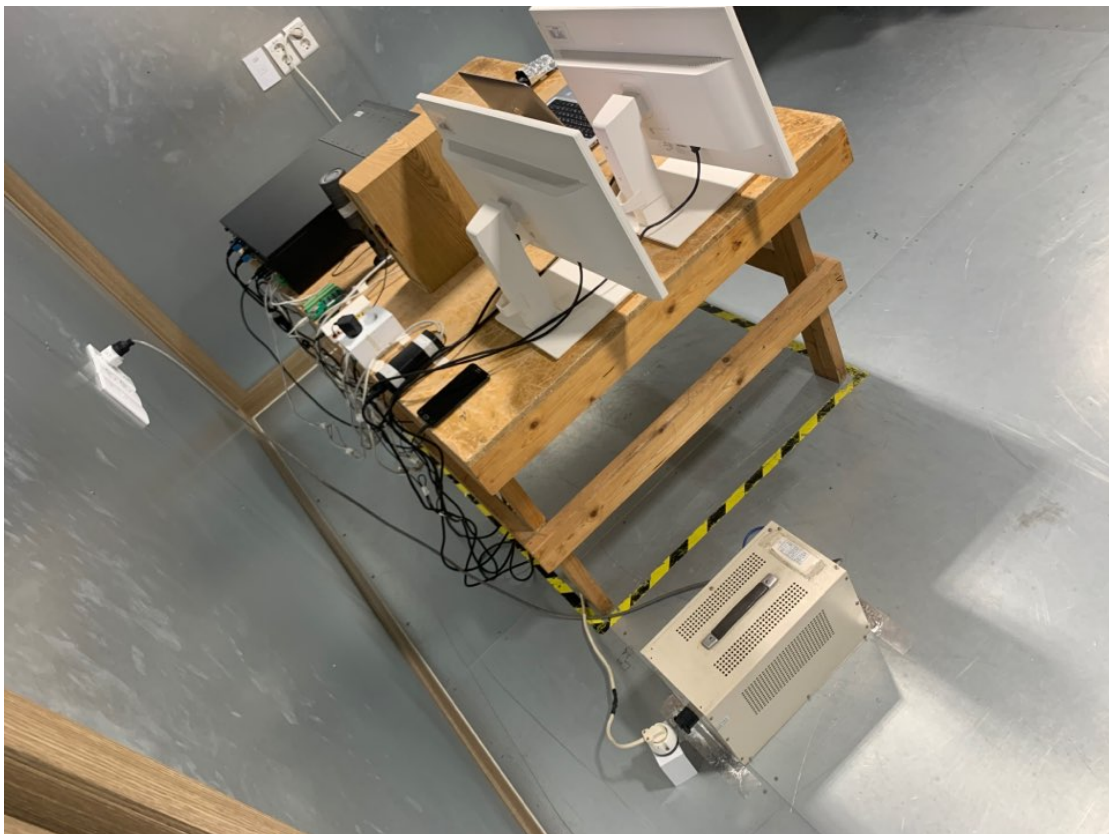
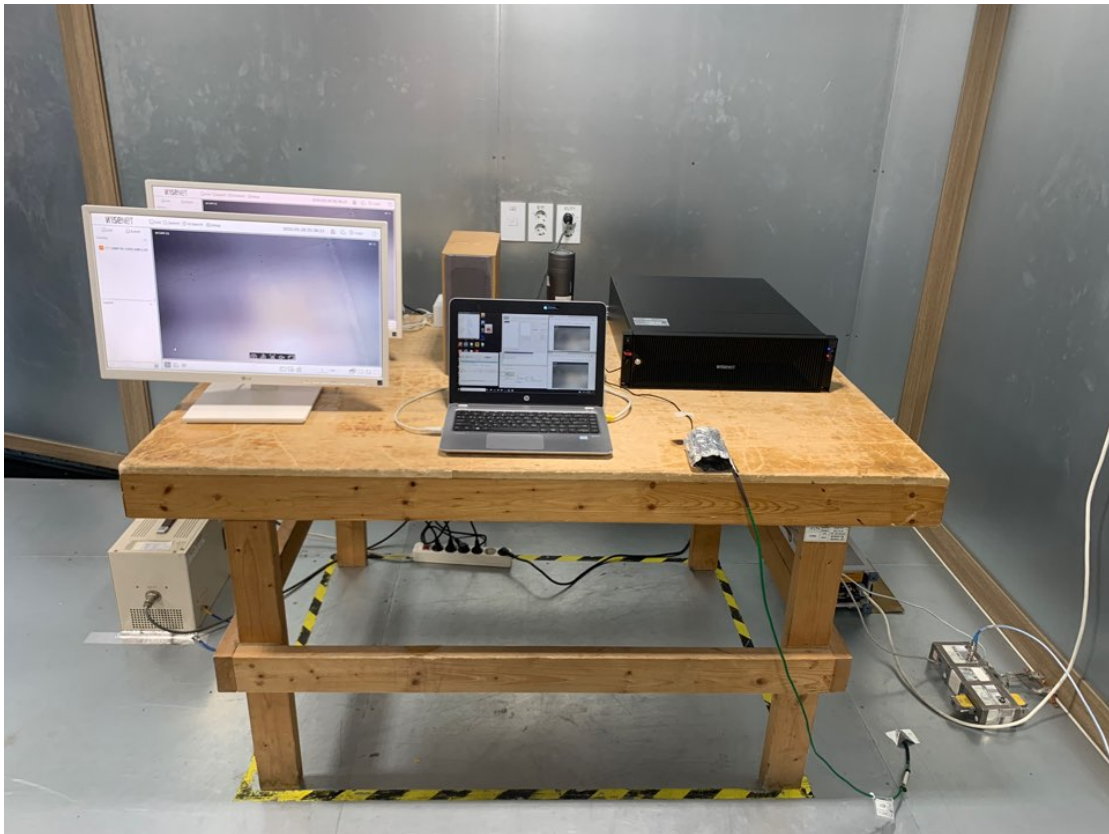
APPENDIX C

PHOTOGRAPHS

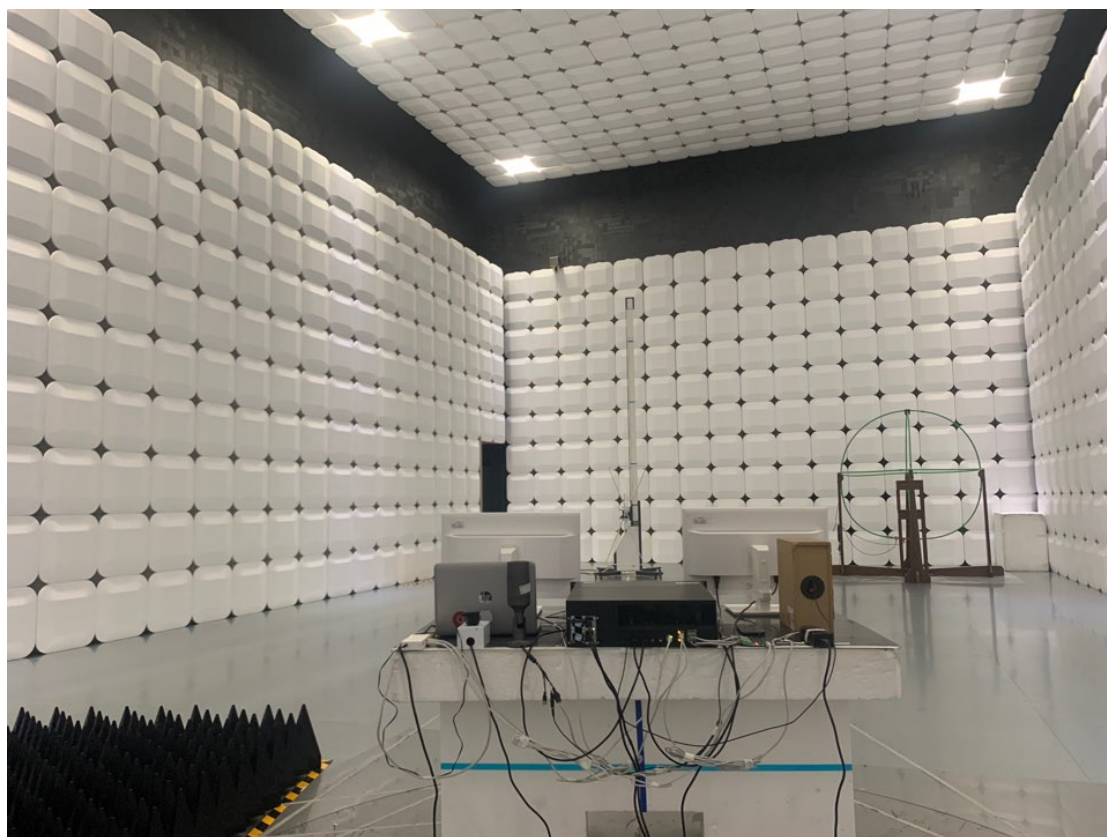
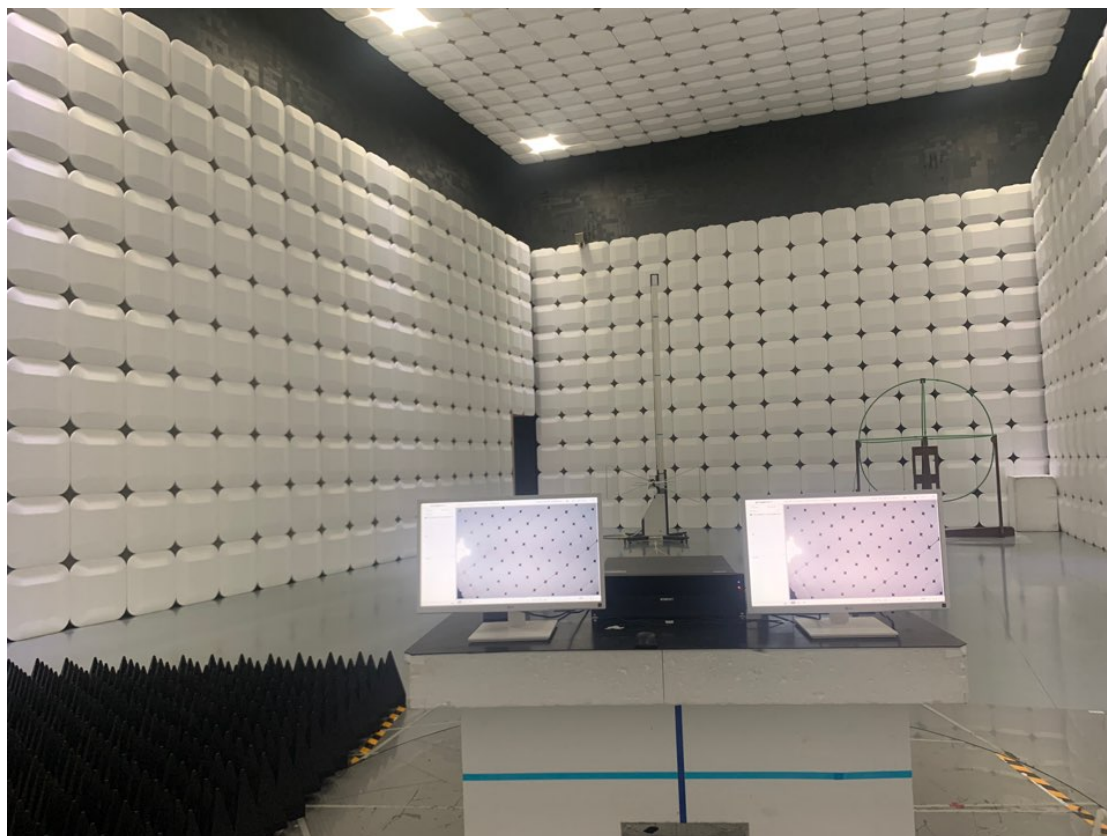
Conducted Emissions



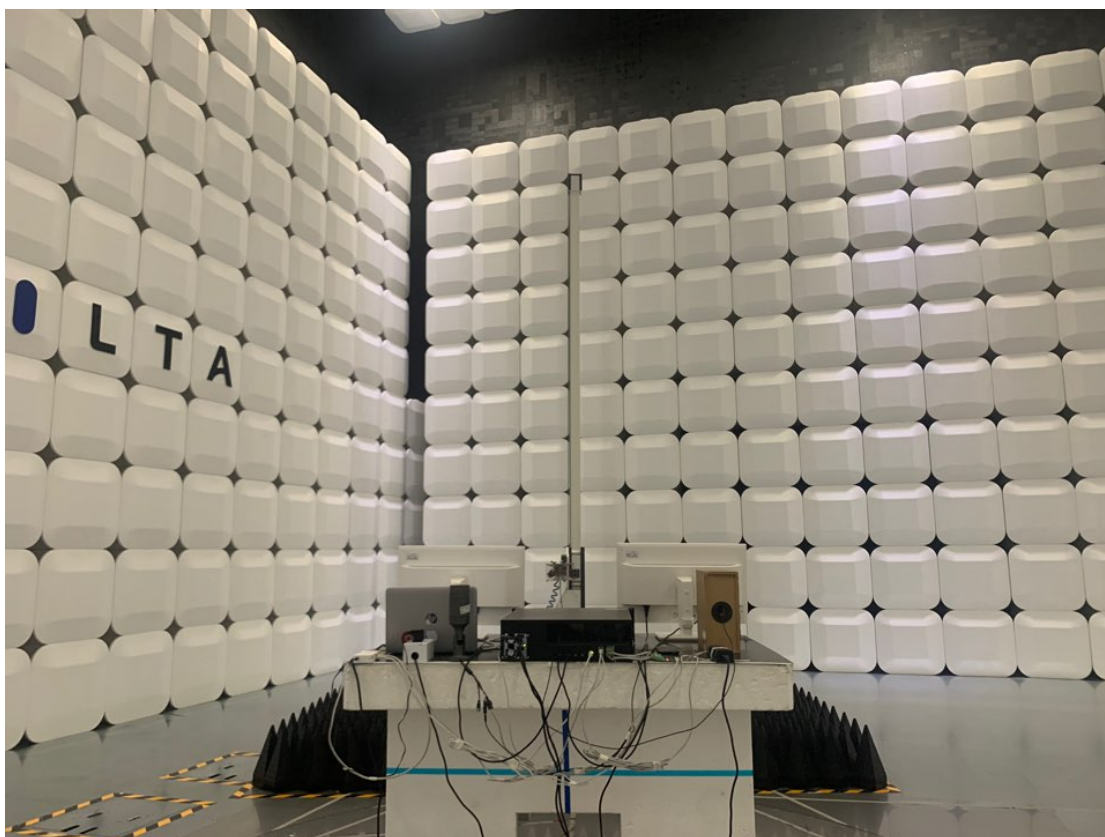
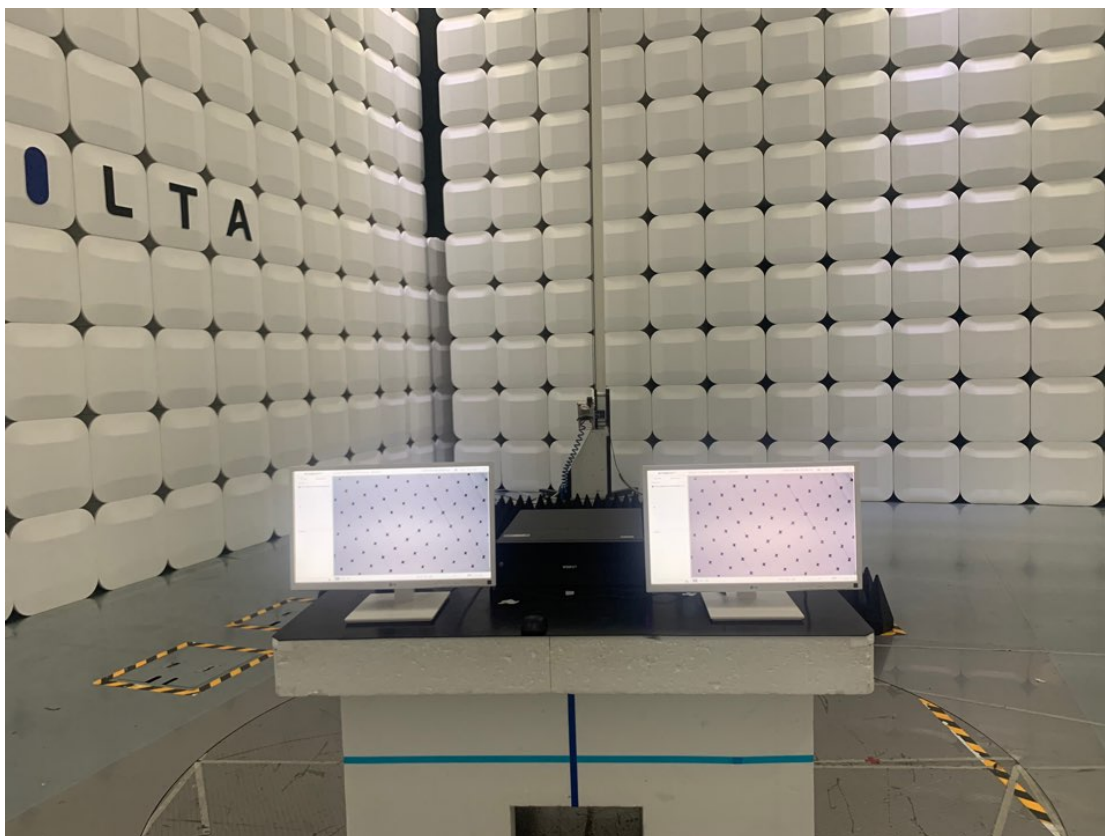
Conducted Emissions (TEL)



Radiated Emissions - Below 1 GHz



Radiated Emissions - Above 1GHz



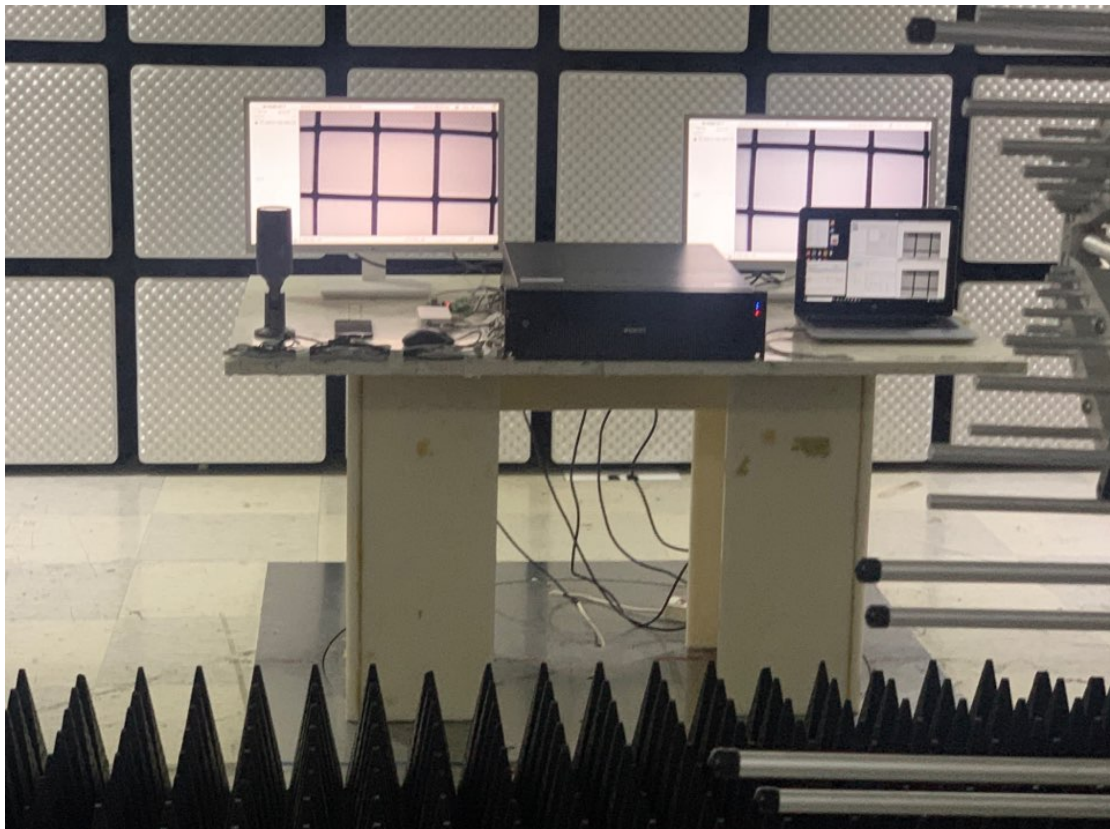
Harmonic Current Emission / Voltage Fluctuations and Flicker



Electrostatic Discharge



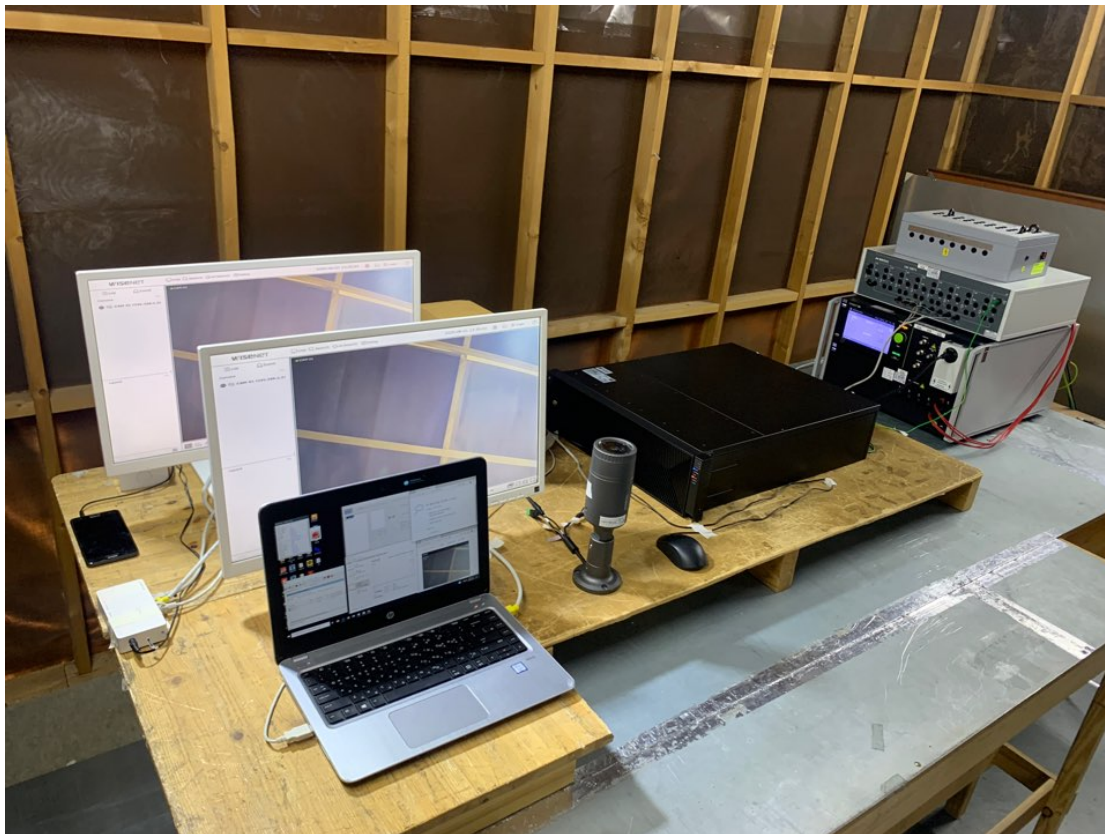
RF Electromagnetic Field



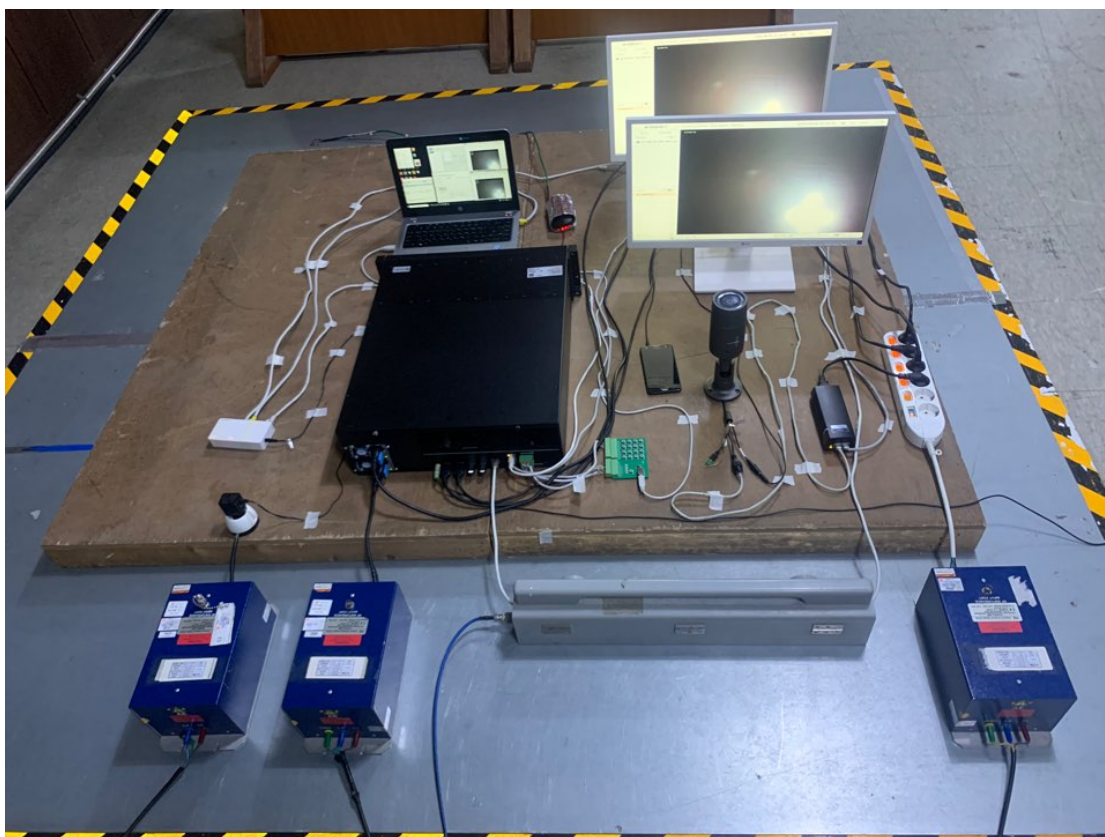
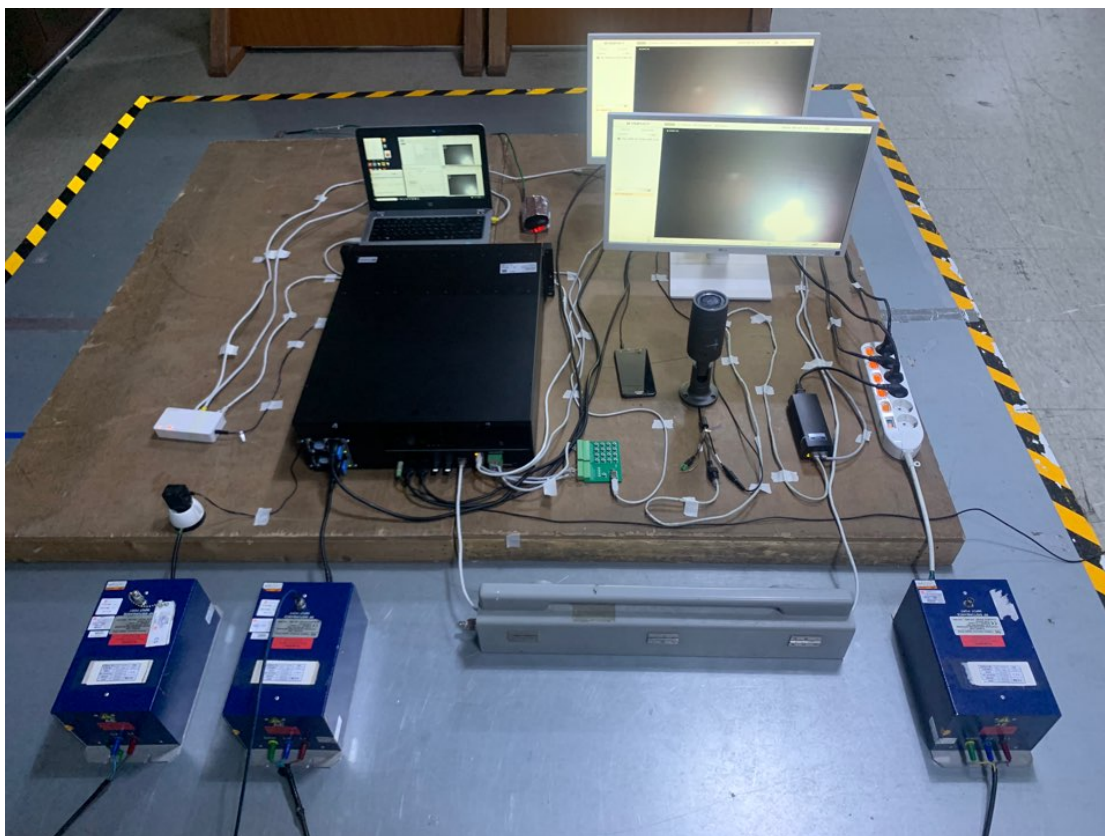
Electrical Fast Transients



Surges



Conducted Disturbances, Induced by Radio-Frequency Fields



Main supply voltage (dips, variations) short interruptions



EUT



EUT

