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EMC TEST REPORT

Dates of Tests: July 01 – 05, 2022
Test Report S/N: LR500122207F
Test Site : LTA Co., Ltd.

Model No.

PRN-6410B4

APPLICANT

Hanwha Vision Co., Ltd

Equipment Name : NVR
Manufacturer : Hanwha Vision Co., Ltd
Model Name : PRN-6410B4
Additional Model Name : PRN-6400B4, PRN-6405B4
Test Device Serial No.: : Identification
Directive : Electromagnetic Compatibility Directive 2014/30/EU,
Regulations 2016/1091
Rule Part(s) : EN 55032:2015/A11:2020
EN 50130-4:2011/A1:2014
EN 61000-3-2:2014
EN 61000-3-3:2013
Data of reissue : March 03, 2023

This test report is issued under the authority of:

The test was supervised by:

Young Kyu Shin, Technical Manager

Hyun Young Ahn, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

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



Revision history

Revision	Date of issue	Test report No.	Description
0	08.06.2020	LR500122006L	Initial
1	21.12.2020	LR500122012AI	Technology change by CPU, RAM
2	06.04.2021	LR500122104N	Add Additional Model (PRN-6400B4, PRN-6405B4)
3	16.12.2021	LR500122112V	Delete the country of manufacture (China) and change the PCB. (using with the PCB that has not changed)
4	11.07.2022	LR500122207F	change the PCB. (using with the PCB that has not changed)
5	03.03.2023	LR500122303C	Change company name and manufacturer name

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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	2022-09-30	ECT accredited Lab.
	KOREA		-	
RRA	U.S.A	KR0049	2023-04-08	RRA accredited Lab.
	CANADA		2022-10-18	
		C-14948	2023-09-10	
VCCI	JAPAN	T-12416	2023-09-10	VCCI registration
		R-14483	2023-10-15	
		G-10847	2024-12-13	
KOLAS	KOREA	KT551	2025-10-12	KOLAS accredited Lab.

2. Information's about test item

2-1 Client/ Manufacturer

Company name : Hanwha Vision 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 VISION VIETNAM COMPANY LIMITED
 Address : Lot O-2, Que Vo Industrial Zone extended area ,Nam Son commune, Bac Ninh city,Bac Ninh province, Vietnam

Factory #2

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
 Equipment Name : NVR
 Model name : PRN-6410B4
 Additional Model Name : PRN-6400B4 , PRN-6405B4
 PRN-6400B4 has deleted FR Function (SW Function).
 PRN-6405B4 has deleted FR, LPR Function (SW Function).
 Serial number : Identification
 Date of receipt : June 21, 2022
 EUT condition : Pre-production
 Interface ports : AC IN, USB #1 ~ #4, HDMI #1 ~ #2, AUDIO OUT, ALARM IN, ALARM OUT, NETWORK #1 ~ #3
 NETWORK #1 ~ #2 are the same ports.
 Console Port is unused port.
 Power rating : AC 230 V, 50 Hz

2-3 Modification

- NONE.

2-4 Model Specification

- NONE

2-5 Test conditions

Temp. / Humid. / Pressure : (22 - 24) °C / (39 - 49) % R.H. / 100 kPa
 Tested Model : PRN-6410B4
 Test mode : Operating mode
 Tested Voltage : AC 230 V, 50 Hz

2-6 List of EUT and ACCESSORY

EUT				
Equipment Name	Model Name	Serial No.	Manufacturer	Remarks
NVR	PRN-6410B4	N/A	HANWHA VISION VIETNAM COMPANY LIMITED D-TECH CO.,LTD.	-
MOUSE	MOKJUO	N/A	Primax Electronics Ltd.	-
ACCESSORY				
Equipment Name	Model Name	Serial No.	Manufacturer	Remarks
KEYBOARD	Y-U0009	N/A	Logitech Co.,Ltd	-
NOTEBOOK	ELITEBOOK219	N/A	HP	-
POE INJECTOR	IpTIME PoE408	N/A	IpTIME	-
POE INJECTOR ADAPTER	ANY480A5C-NI	N/A	Wendent Any Electronics Co.,Ltd	-
USB MEMORY STICK	SDCZ50-016G	N/A	Sandisk	2 EA
HEAD PHONE	SHS-150V/W	N/A	SAMSUNG	-
NETWORK CAMERA #1	QND-6070RNC	N/A	HANHWA TECHWIN CO., LTD.	-
NETWORK CAMERA #2	LND-6032R	N/A	HANHWA TECHWIN CO., LTD.	-
ALARM ZIG #1	DS-360	N/A	Daemyung Electronics Co., Ltd	-
ALARM ZIG #2	N/A	N/A	N/A	-
MOBILE PHONE	SM930K	N/A	SAMSUNG	-
MONITOR #1	6230VP	73010478A2 20371	Lien Fong(Wujiang) Electronics Co.,Ltd	-
MONITOR #2	P2018H	N/A	DELL	-

2-7 Cable List

Cable List						
From		To		Length	Shielding	
Type	I/O Port	Type	I/O Port	(m)	Cable	backshell
EUT	AC IN	AC POWER SOURCE	3 PIN AC LINE	1.0	NO	Plastic
	NETWORK #1	NOTEBOOK	LAN	3.0	NO	Plastic
	NETWORK #2	POE INJECTOR	LAN #1	3.0	NO	Plastic
	NETWORK #3	POE INJECTOR	LAN #2	3.0	NO	Plastic
	AUDIO OUT	HEAD PHONE	AUDIO IN	1.0	NO	Plastic
	ALARM IN	ALARM ZIG #2	ALARM OUT	3.0	NO	Plastic
	ALARM OUT	ALARM ZIG #1	ALARM IN	3.0	NO	Plastic
	HDMI #1	MONITOR #1	HDMI	1.0	YES	Plastic
	HDMI #2	MONITOR #2	HDMI	1.0	YES	Plastic
	USB #1	MOUSE	USB	1.0	NO	Plastic
	USB #2	KEY BOARD	USB	1.0	NO	Plastic
	USB #3	USB MEMORY STICK #1	-	-	-	-
	USB #4	USB MEMORY STICK #2	-	-	-	-
POE INJECTOR	DC IN	POE INJECTOR ADAPTER	DC OUT	1.0	NO	Plastic
	LAN #3	NETWORK CAMERA #1	LAN	3.0	NO	Plastic
	LAN #4	NETWORK CAMERA #2	LAN	3.0	NO	Plastic
POE INJECTOR ADAPTER	AC IN	AC POWER SOURCE	2 PIN AC LINE	0.8	NO	Plastic
MONITOR #1	AC IN	AC POWER SOURCE	3 PIN AC LINE	1.0	NO	Plastic
MONITOR #2	AC IN	AC POWER SOURCE	3 PIN AC LINE	1.0	NO	Plastic
MOBILE PHONE	-	-	-	-	-	-

3. Test Report

3.1 Summary of tests

Reference	Parameter	Status (note)
I. Emission		
Conducted Emissions	EN 55032:2015/A11:2020	C
Radiated Emissions	EN 55032:2015/A11:2020	C
Harmonic Current Emission	EN 61000-3-2:2014	C
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.

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/A11:2020
Measurement RBW	: 9 kHz
Test Location	: Shielded Room
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)



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449-822 Korea
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EUT /Model No. : PRN-6410B4

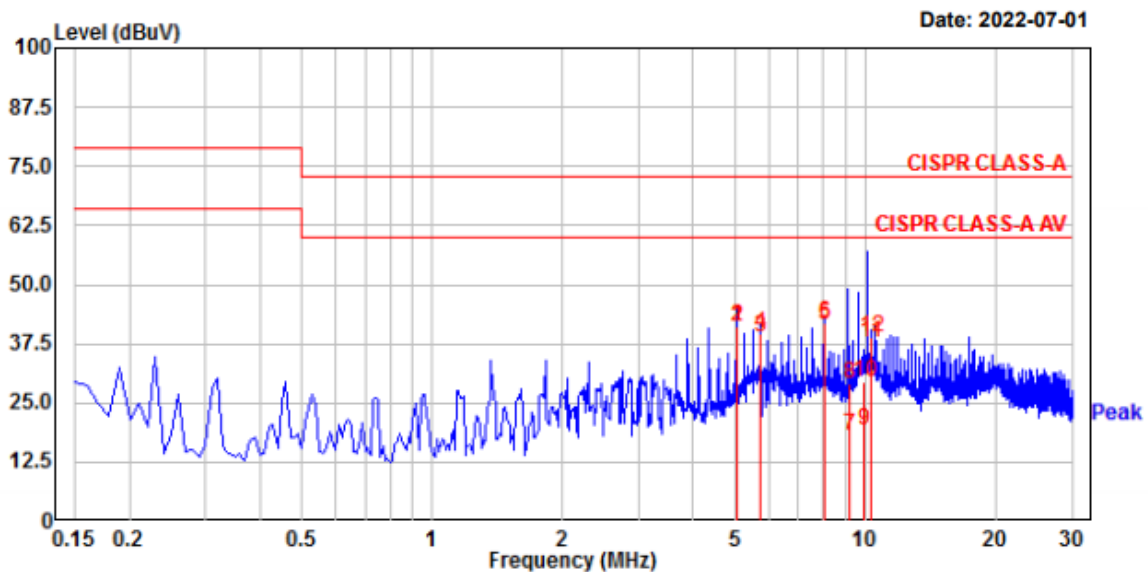
Phase : LINE

Test Mode : Operating mode

Test Power : 230 V / 50 Hz

Temp./ Humi. : 23 'C / 49 % R.H

Test Engineer : AHN H Y



No.	Freq 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	Phase
2.	5.034	21.57	21.43	19.62	41.19	41.05	73.00	60.00	31.81	18.95	Line
4.	5.720	19.82	19.25	19.64	39.46	38.89	73.00	60.00	33.54	21.11	Line
6.	8.008	22.12	21.80	19.75	41.87	41.55	73.00	60.00	31.13	18.45	Line
8.	9.203	9.20	-1.74	19.78	28.98	18.04	73.00	60.00	44.02	41.96	Line
10.	9.898	9.55	-0.51	19.78	29.33	19.27	73.00	60.00	43.67	40.73	Line
12.	10.296	19.10	17.77	19.79	38.89	37.56	73.00	60.00	34.11	22.44	Line

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter



Conducted Emissions (NEUTRAL)

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EUT /Model No. : PRN-6410B4

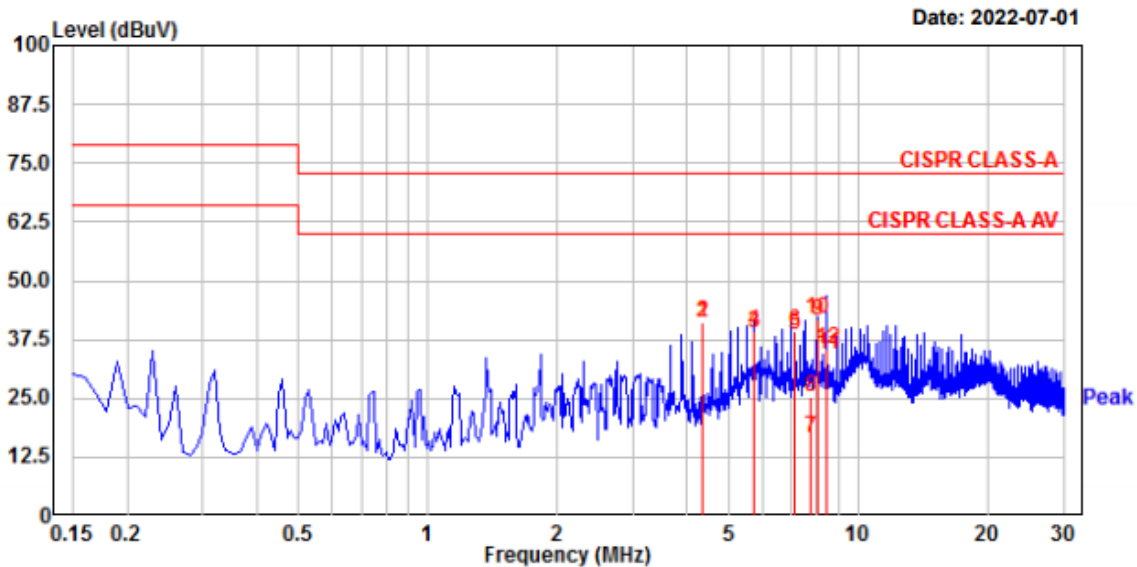
Phase : NEUTRAL

Test Mode : Operating mode

Test Power : 230 V / 50 Hz

Temp./ Humi. : 23 'C / 49 % R.H

Test Engineer : AHN H Y



No.	Freq MHz	RD QP dBuV	RD AV dBuV	C.F dB	Result QP dBuV	Result AV dBuV	Limit QP dBuV	Limit AV dBuV	Margin QP dB	Margin AV dB	Phase
2.	4.347	21.53	21.45	19.63	41.16	41.08	73.00	60.00	31.84	18.92	neutral
4.	5.721	19.53	19.04	19.67	39.20	38.71	73.00	60.00	33.80	21.29	neutral
6.	7.094	19.37	18.91	19.73	39.10	38.64	73.00	60.00	33.90	21.36	neutral
8.	7.719	5.56	-3.11	19.78	25.34	16.67	73.00	60.00	47.66	43.33	neutral
10.	8.008	22.06	21.69	19.79	41.85	41.48	73.00	60.00	31.15	18.52	neutral
12.	8.466	15.70	14.65	19.81	35.51	34.46	73.00	60.00	37.49	25.54	neutral

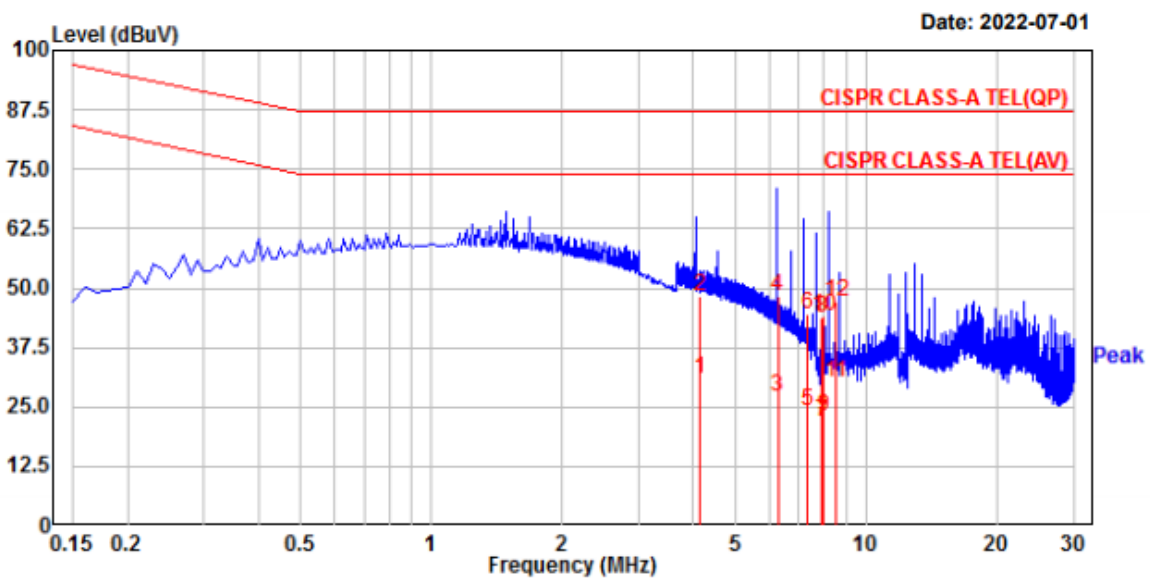
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

Conducted Emissions (TEL_10 M) / Operating mode (NETWORK #1)



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EUT /Model No. : PRN-6410B4	Phase : TEL_10M (NETWORK #1)
Test Mode : Operating mode	Test Power : 230 V / 50 Hz
Temp./ Humi. : 23 'C / 49 % R.H	Test Engineer : AHN H Y



No.	Freq 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	Phase
2.	4.134	28.80	11.42	19.50	48.30	30.92	87.00	74.00	38.70	43.08	Line
4.	6.255	28.89	7.77	19.56	48.45	27.33	87.00	74.00	38.55	46.67	Line
6.	7.333	24.90	4.39	19.59	44.49	23.98	87.00	74.00	42.51	50.02	Line
8.	7.882	24.29	2.39	19.61	43.90	22.00	87.00	74.00	43.10	52.00	Line
10.	7.976	24.52	3.21	19.62	44.14	22.83	87.00	74.00	42.86	51.17	Line
12.	8.506	27.36	10.54	19.64	47.00	30.18	87.00	74.00	40.00	43.82	Line

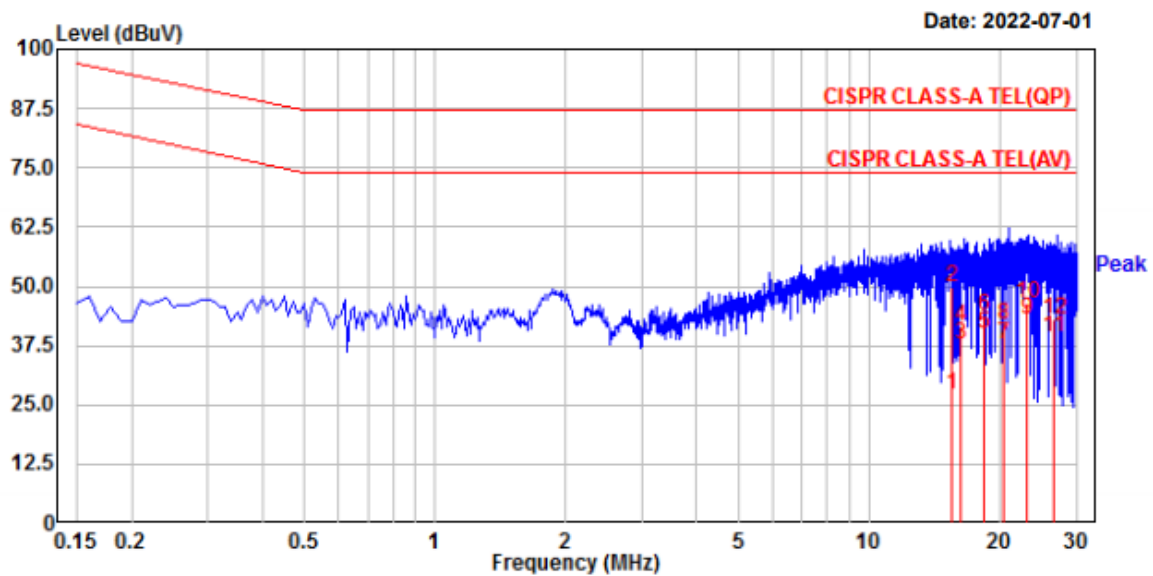
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

Conducted Emissions (TEL_1000 M) / Operating mode (NETWORK #1)



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EUT /Model No. : PRN-6410B4	Phase : TEL_1000M (NETWORK #1)
Test Mode : Operating mode	Test Power : 230 V / 50 Hz
Temp./ Humi. : 23 'C / 49 % R.H	Test Engineer : AHN H Y



No.	Freq 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	Phase
2.	15.487	30.19	7.75	19.54	49.73	27.29	87.00	74.00	37.27	46.71	Line
4.	16.227	21.94	18.28	19.56	41.50	37.84	87.00	74.00	45.50	36.16	Line
6.	18.365	24.24	20.27	19.59	43.83	39.86	87.00	74.00	43.17	34.14	Line
8.	20.320	22.15	18.28	19.63	41.78	37.91	87.00	74.00	45.22	36.09	Line
10.	23.127	26.73	23.16	19.69	46.42	42.85	87.00	74.00	40.58	31.15	Line
12.	26.487	23.25	19.44	19.76	43.01	39.20	87.00	74.00	43.99	34.80	Line

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

Conducted Emissions (TEL_10 M) / Operating mode (NETWORK #3)



4, Songjuro 236 Beon-gil, Yangji-myeon
Cheoin-gu, Youngin-si, Gyeonggi-do
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EUT /Model No. : PRN-6410B4

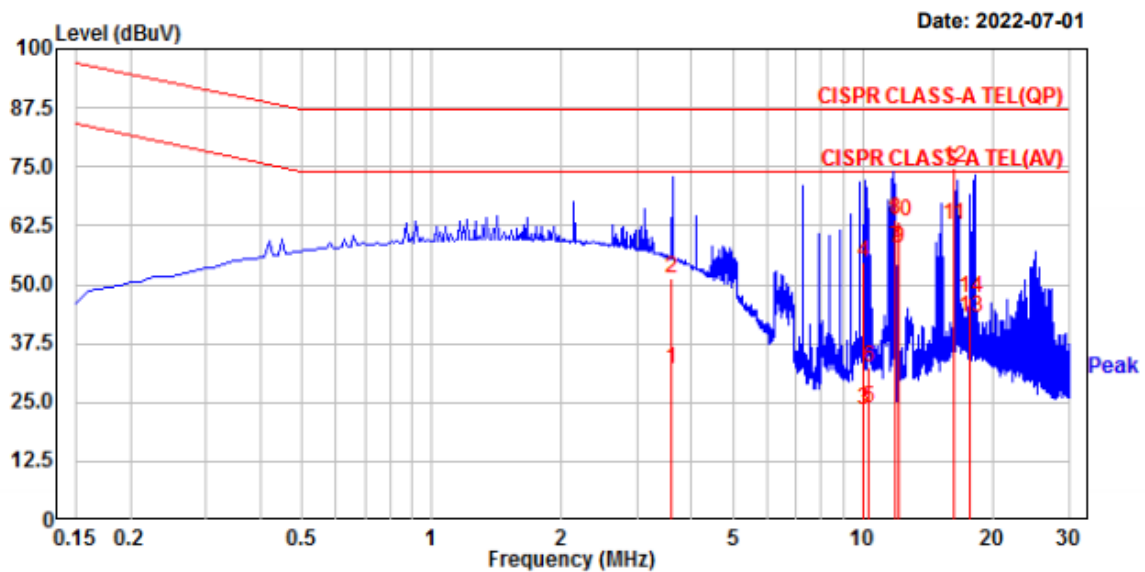
Phase : TEL_10M (NETWORK #3)

Test Mode : Operating mode

Test Power : 230 V / 50 Hz

Temp./ Humi. : 23 'C / 49 % R.H

Test Engineer : AHN H Y



No.	Freq 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	Phase
2.	3.581	31.69	12.69	19.51	51.20	32.20	87.00	74.00	35.80	41.80	Line
4.	9.991	34.88	3.64	19.65	54.53	23.29	87.00	74.00	32.47	50.71	Line
6.	10.286	12.86	4.28	19.66	32.52	23.94	87.00	74.00	54.48	50.06	Line
8.	11.903	43.89	38.13	19.70	63.59	57.83	87.00	74.00	23.41	16.17	Line
10.	12.081	43.85	38.08	19.71	63.56	57.79	87.00	74.00	23.44	16.21	Line
12.	16.228	54.92	42.89	19.84	74.76	62.73	87.00	74.00	12.24	11.27	Line
14.	17.694	27.21	22.96	19.89	47.10	42.85	87.00	74.00	39.90	31.15	Line

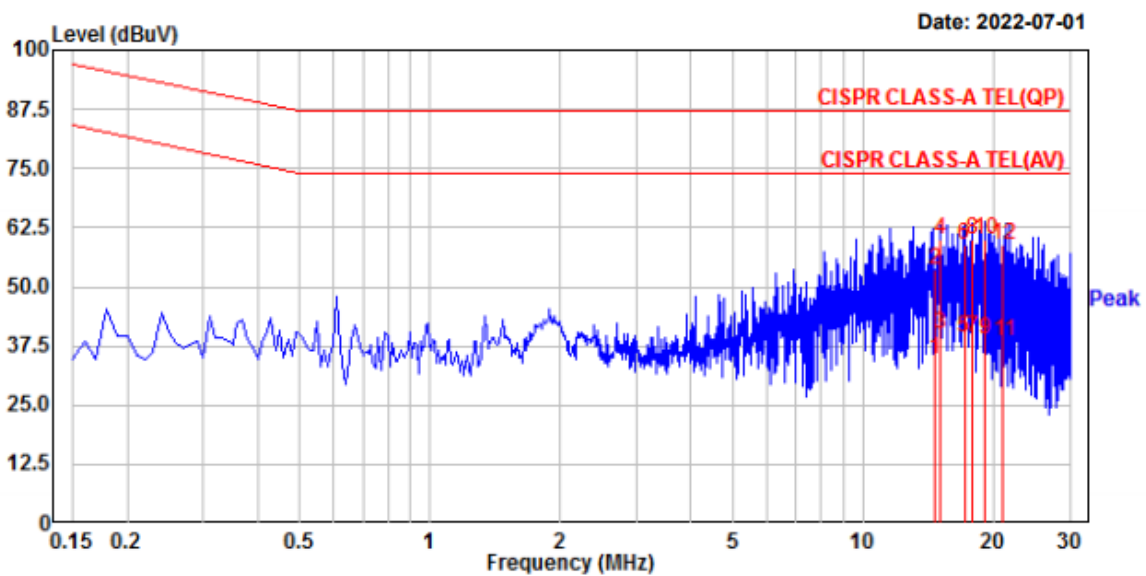
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

Conducted Emissions (TEL_1000 M) / Operating mode (NETWORK #3)



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Cheoin-gu, Youngin-si, Gyeonggi-do
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Tel:+82-31-3236008,9
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EUT /Model No. : PRN-6410B4	Phase : TEL_1000M (NETWORK #3)
Test Mode : Operating mode	Test Power : 230 V / 50 Hz
Temp./ Humi. : 23 'C / 49 % R.H	Test Engineer : AHN H Y



No.	Freq 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	Phase
2.	14.594	34.10	15.17	19.53	53.63	34.70	87.00	74.00	33.37	39.30	Line
4.	15.081	40.44	20.28	19.54	59.98	39.82	87.00	74.00	27.02	34.18	Line
6.	17.097	39.19	19.64	19.57	58.76	39.21	87.00	74.00	28.24	34.79	Line
8.	17.891	40.43	19.77	19.59	60.02	39.36	87.00	74.00	26.98	34.64	Line
10.	19.052	40.21	19.31	19.61	59.82	38.92	87.00	74.00	27.18	35.08	Line
12.	21.006	39.35	18.69	19.65	59.00	38.34	87.00	74.00	28.00	35.66	Line

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

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/A11:2020
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 Location	: 10 m Chamber
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 : 4 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



4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
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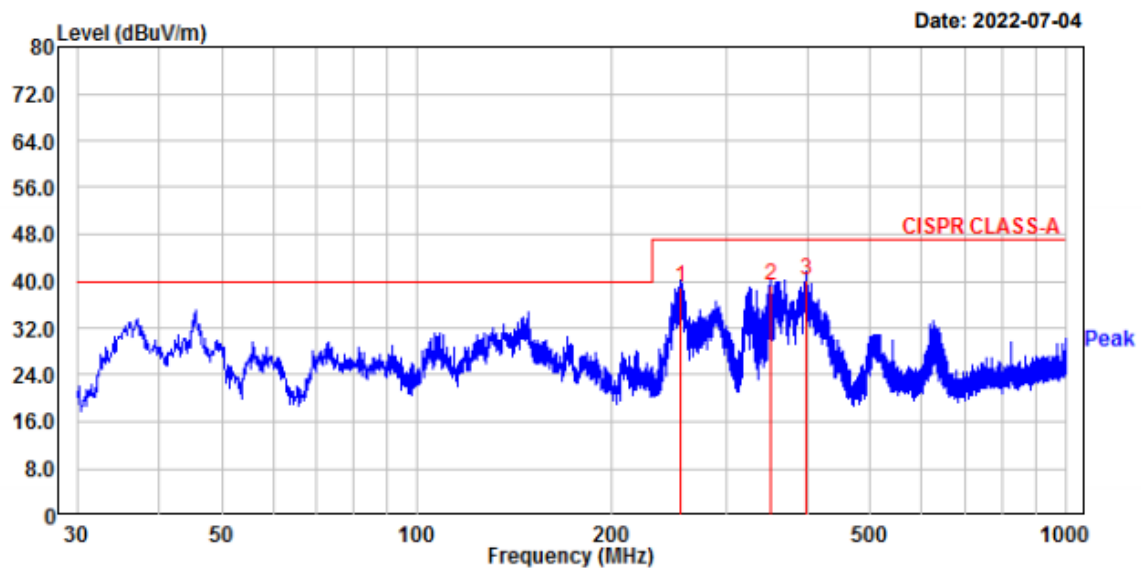
EUT/Model No.: PRN-6410B4

Temp/Humi: 22 'C / 47 % R.H.

Test Mode : Operating mode

Tested by: AHN H Y

Power : 230 V / 50 Hz



No.	Freq MHz	Reading dBuV	C.F dB	Result QP dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
1.	254.80	49.80	-10.92	38.88	47.00	8.12	250	80	vertical
2.	351.43	46.70	-7.53	39.17	47.00	7.83	110	40	vertical
3.	396.78	45.89	-5.77	40.12	47.00	6.88	350	80	vertical

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

Radiated Emissions (Below 1 GHz) / H



4, Songjuro 236Beon-gil, yanggi-myeon,
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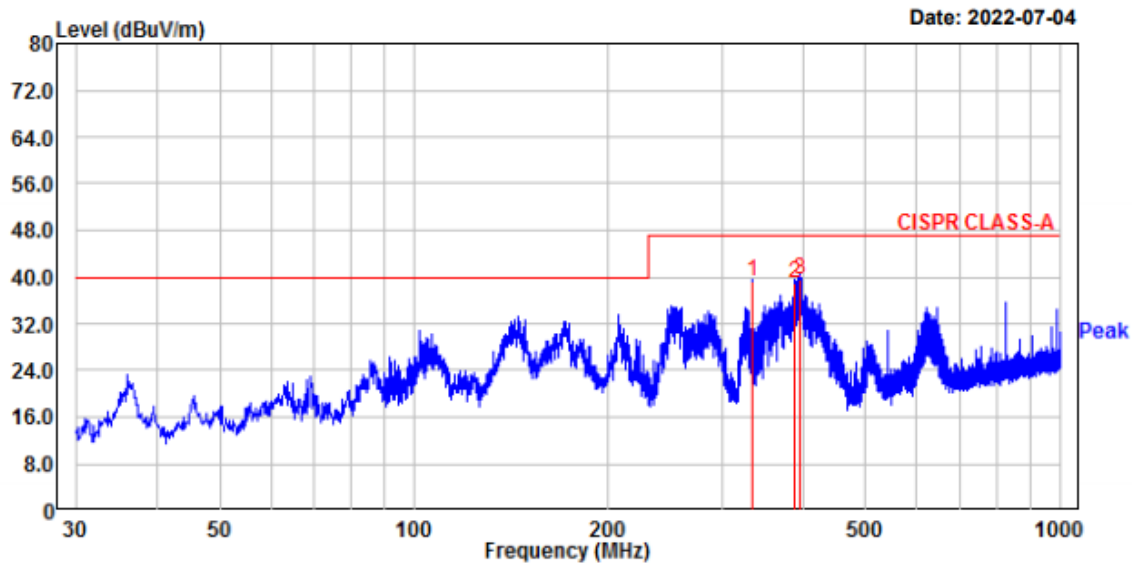
EUT/Model No.: PRN-6410B4

Temp/Humi: 22 'C / 47 % R.H.

Test Mode : Operating mode

Tested by: AHN H Y

Power : 230 V / 50 Hz



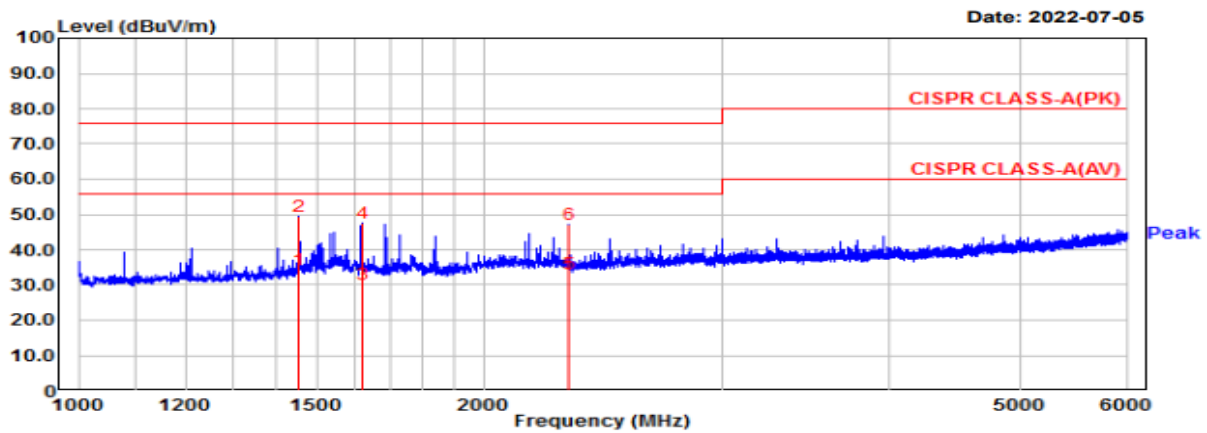
No.	Freq MHz	Reading dBuV	C.F dB	Result QP dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
1.	334.10	46.87	-7.75	39.12	47.00	7.88	220	50	horizontal
2.	387.81	44.90	-6.02	38.88	47.00	8.12	310	70	horizontal
3.	394.48	45.40	-5.85	39.55	47.00	7.45	280	9	horizontal

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

Radiated Emissions

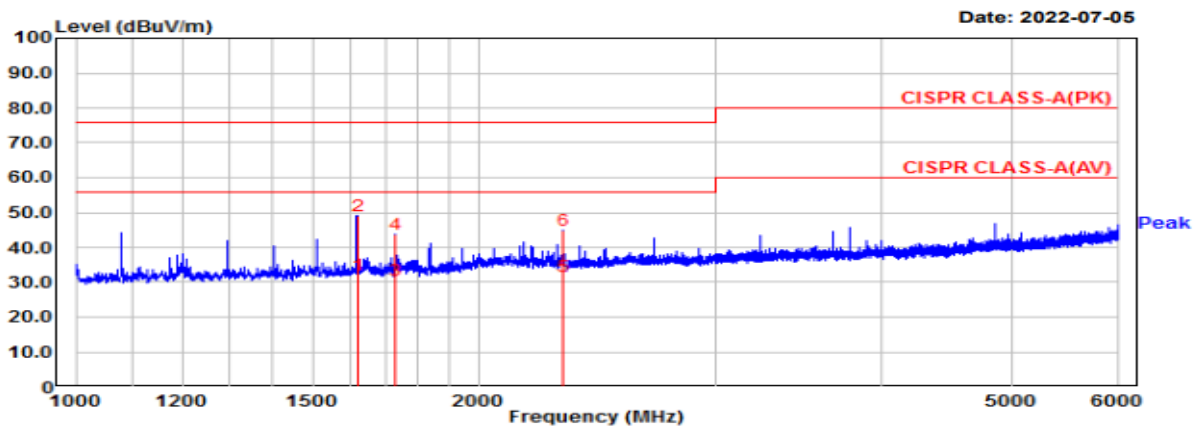
(Above 1 GHz) / V

EUT/Model No.: PRN-6410B4 Temp/Humi: 22 °C / 47 % R.H.
 Test Mode : Operating mode Tested by: AHN H Y
 Power : 230 V / 50 Hz



(Above 1 GHz) / H

EUT/Model No.: PRN-6410B4 Temp/Humi: 22 °C / 47 % R.H.
 Test Mode : Operating mode Tested by: AHN H Y
 Power : 230 V / 50 Hz



Manufacture : HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.

Test Date

Temp.:
[°C]Humidity:
[%]Distance
(m)

Model : PRN-6410B4

2022.07.05

22.00

47.00

3.6

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
1620.00	54.44	37.38	-3.85	50.59	33.53	76.00	56.00	25.41	22.47	100	161	H
1727.50	48.62	35.47	-3.24	45.38	32.23	76.00	56.00	30.62	23.77	100	176	H
2309.38	46.20	32.98	0.39	46.59	33.37	76.00	56.00	29.41	22.63	100	76	H
1456.88	55.42	40.18	-4.26	51.16	35.92	76.00	56.00	24.84	20.08	100	269	V
1620.00	52.92	35.47	-3.85	49.07	31.62	76.00	56.00	26.93	24.38	100	144	V
2310.00	48.43	34.38	0.40	48.83	34.78	76.00	56.00	27.17	21.22	100	1	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 Location	: Shielded Room
Test mode	: Operating mode
Rated power	: 77.558 W
Result	: Complies

Measurement Data:

- Refer to the Next page

Harmonic Current Emission

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		BS EN 61000-3-2:2014			
Fluctuating Harmonics					
Instrument Details					
Instrument Model	PPA5511				
Serial Number	162-04957				
Firmware Version	2.185				
N4L Calibration Date	18th September 2017				
Instrument Version	Standard				
Test Settings					
Class	Class A				
Mode	Operating				
Equipment Under Test					
Brand	Hanhwa Techwin Co., Ltd				
Model	PRN-6410B4				
Serial	N/A				
Impedance Network ID	N/A				
Test Conditions					
	User Entered		Measured		
Rated Voltage	N/A		230.056V		
Rated Current	N/A		434.060mA		
Rated Frequency	N/A		50.000Hz		
Rated Power	N/A		77.558W		
Additional Test Information					
Measured Power Factor	0.777				
Max Current THD	19.66%				
Average THC	81.021mA				
Max Power	79.835W				
Max F.Current	425.458mA				
Average F.Current	417.483mA				
Minimum Current	100A				
Test Duration	2.5 minutes				
Additional Test Details					
Operator	AHN H Y				
Lab Name	N/A				
Location	N/A				
Notes	24 °C 44 % R.H.				
Signature					
Results	Phase 1: PASS				

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BSEN61000-3-2:2014 Fluctuating Harmonics							
Instrument Details							
Instrument Model		PPA5511					
Instrument Serial		162-04957					
Instrument Firmware		2.185					
Equipment Under Test							
Brand		Hanhwa Techwin Co., Ltd					
Model		PRN-6410B4					
Serial		N/A					
Harmonic Difference							
Harmonic	Lowest		Highest		Limit		Status
	Average (A)	Test #	Average (A)	Test #	Allowance (A)	Difference (A)	
2	7.076m	1	7.147m	2	0.054	0.00007	PASS
3	61.662m	2	61.797m	1	0.115	0.000135	PASS
4	5.737m	1	5.756m	2	0.0215	0.000018	PASS
5	31.696m	1	31.753m	2	0.057	0.000058	PASS
6	5.673m	1	5.743m	2	0.015	0.00007	PASS
7	18.088m	1	18.238m	2	0.0385	0.00015	PASS
8	5.494m	1	5.581m	2	0.0115	0.000087	PASS
9	11.440m	1	11.515m	2	0.02	0.000075	PASS
10	5.359m	1	5.434m	2	0.0092	0.000075	PASS
11	9.492m	2	9.634m	1	0.0165	0.000142	PASS
12	5.252m	2	5.274m	1	0.007667	0.000022	PASS
13	8.301m	2	8.317m	1	0.0105	0.000016	PASS
14	5.168m	1	5.203m	2	0.006571	0.000035	PASS
15	7.483m	2	7.516m	1	0.0075	0.000033	PASS
16	5.175m	2	5.207m	1	0.00575	0.000033	PASS
17	6.996m	2	7.036m	1	0.006618	0.000039	PASS
18	5.141m	2	5.199m	1	0.005111	0.000058	PASS
19	6.386m	1	6.415m	2	0.005921	0.000029	PASS
20	5.180m	2	5.181m	1	0.0046	0.000001	PASS
21	6.501m	1	6.539m	2	0.005357	0.000038	PASS
22	5.243m	1	5.258m	2	0.004182	0.000015	PASS
23	6.493m	1	6.502m	2	0.004891	0.000009	PASS
24	5.232m	2	5.277m	1	0.003833	0.000045	PASS
25	6.179m	2	6.214m	1	0.0045	0.000035	PASS
26	5.283m	2	5.292m	1	0.003538	0.000009	PASS
27	6.010m	1	6.014m	2	0.004167	0.000005	PASS
28	5.218m	1	5.296m	2	0.003286	0.000079	PASS
29	6.031m	2	6.126m	1	0.003879	0.000095	PASS
30	5.242m	2	5.309m	1	0.003067	0.000068	PASS
31	6.198m	2	6.251m	1	0.003629	0.000054	PASS
32	5.269m	1	5.358m	2	0.002875	0.000089	PASS
33	6.150m	2	6.220m	1	0.003409	0.000071	PASS
34	5.264m	1	5.340m	2	0.002706	0.000076	PASS
35	5.939m	1	6.028m	2	0.003214	0.000009	PASS
36	5.242m	2	5.294m	1	0.002556	0.000052	PASS
37	5.666m	2	5.719m	1	0.003041	0.000053	PASS
38	5.241m	1	5.267m	2	0.002421	0.000026	PASS
39	5.718m	2	5.742m	1	0.002885	0.000024	PASS
40	5.220m	2	5.325m	1	0.0023	0.000105	PASS
Key:							
5.000m*	For values lower than the min limit (5mA or 0.6% of the Input Current), min limit is used						
Ignored	Since both values are less than 5mA or 0.6% of the Input Current this harmonic is ignored						
Good	The difference is less than 50% of the allowance						
OK	The difference is between 50% of the allowance and 75% of the allowance						
Poor	The difference is between 75% of the allowance and 100% of the allowance						
Fail	The difference has exceeded the allowance						

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BS EN 61000-3-2:2014 Fluctuating Harmonics							
Instrument Details							
Instrument Model		PPA5511					
Instrument Serial		162-04957					
Instrument Firmware		2.185					
Equipment Under Test							
Brand		Hanhwa Techwin Co. Ltd					
Model		PRN-6410B4					
Serial		N/A					
Extra Test Information							
Current THDG		19.21%					
	Average	Peak	Limit				
THC	80.969mA	83.106mA	N/A				
POHC	19.388mA	20.078mA	251.375mA				
Voltage Crest Factor	1.414	1.793	N/A				
Current Crest Factor	2.152	32.307	N/A				
Harmonics Results 1/2							
Harmonic	Status	Avg (A)	Avg L(A)	Avg %ofL	Peak (A)	Peak L(A)	Peak %ofL
1	PASS	0.41747	No Limit	N/A	0.42546	No Limit	N/A
2	PASS	0.00708	1.08	0.655223	0.00811	1.62	0.500696
3	PASS	0.0618	2.3	2.68681	0.06416	3.45	1.85957
4	PASS	0.00574	0.43	1.33423	0.00642	0.645	0.995208
5	PASS	0.0317	1.14	2.78032	0.03273	1.71	1.91378
6	PASS	0.00567	0.3	1.89095	0.00633	0.45	1.40625
7	PASS	0.01809	0.77	2.34905	0.01941	1.155	1.68031
8	PASS	0.00549	0.23	2.38874	0.00627	0.345	1.8165
9	PASS	0.01144	0.4	2.86008	0.01226	0.6	2.04386
10	PASS	0.00536	0.184	2.91272	0.00594	0.276	2.15057
11	PASS	0.00963	0.33	2.91945	0.01039	0.495	2.09874
12	PASS	0.00527	0.15333	3.4397	0.00583	0.23	2.53543
13	PASS	0.00832	0.21	3.96038	0.00914	0.315	2.90247
14	PASS	0.00517	0.13143	3.93214	0.00584	0.19714	2.96283
15	PASS	0.00752	0.15	5.01063	0.00817	0.225	3.62983
16	PASS	0.00521	0.115	4.52812	0.00588	0.1725	3.41116
17	PASS	0.00704	0.13235	5.31602	0.00782	0.19853	3.9378
18	PASS	0.0052	0.10222	5.08588	0.00577	0.15333	3.76188
19	PASS	0.00639	0.11842	5.3928	0.00706	0.17763	3.97306
20	PASS	0.00518	0.092	5.63165	0.00577	0.138	4.18115
21	PASS	0.0065	0.10714	6.06781	0.00713	0.16071	4.43463
22	PASS	0.00524	0.08364	6.26888	0.00601	0.12546	4.79288
23	PASS	0.00649	0.09783	6.63748	0.00712	0.14674	4.84934
24	PASS	0.00528	0.07667	6.88332	0.00589	0.115	5.11782
25	PASS	0.00621	0.09	6.90449	0.00686	0.135	5.08163
26	PASS	0.00529	0.07077	7.47792	0.00621	0.10615	5.84549
27	PASS	0.00601	0.08333	7.21156	0.00674	0.125	5.39154
28	PASS	0.00522	0.06571	7.9401	0.00581	0.09857	5.89885
29	PASS	0.00613	0.07759	7.89554	0.00674	0.11638	5.79516
30	PASS	0.00531	0.06133	8.65679	0.0058	0.092	6.30078
31	PASS	0.00625	0.07258	8.61314	0.00697	0.10887	6.40353
32	PASS	0.00527	0.0575	9.16334	0.00581	0.08625	6.73349
33	PASS	0.00622	0.06818	9.12332	0.00693	0.10227	6.77942
34	PASS	0.00526	0.05412	9.72699	0.00589	0.08118	7.25738
35	PASS	0.00594	0.06429	9.23831	0.00665	0.09643	6.89974
36	PASS	0.00529	0.05111	10.3587	0.0059	0.07667	7.69679
37	PASS	0.00572	0.06081	9.40397	0.0065	0.09122	7.13018
38	PASS	0.00524	0.04842	10.8236	0.00591	0.07263	8.13224
39	PASS	0.00574	0.05769	9.95205	0.00641	0.08654	7.40179
40	PASS	0.00532	0.046	11.576	0.00605	0.069	8.76415

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BS EN 61000-3-2:2014 Fluctuating Harmonics							
Instrument Details							
Instrument Model		PPA5511					
Instrument Serial		162-04957					
Instrument Firmware		2.185					
Equipment Under Test							
Brand		Hanhwa Techwin Co. Ltd					
Model		PRN-6410B4					
Serial		N/A					
Extra Test Information							
Current THDG		19.43%					
		Average		Peak		Limit	
THC		80.913mA		82.979mA		N/A	
POHC		19.330mA		20.056mA		251.375mA	
Voltage Crest Factor		1.415		1.693		N/A	
Current Crest Factor		2.356		31.358		N/A	
Harmonics Results 2/2							
Harmonic	Status	Avg (A)	Avg L(A)	Avg %ofL	Peak (A)	Peak L(A)	Peak %ofL
1	PASS	0.4175	No Limit	N/A	0.42313	No Limit	N/A
2	PASS	0.00715	1.08	0.661738	0.00822	1.62	0.507293
3	PASS	0.06166	2.3	2.68094	0.06367	3.45	1.84553
4	PASS	0.00576	0.43	1.33852	0.00648	0.645	1.00449
5	PASS	0.03175	1.14	2.78537	0.03303	1.71	1.93156
6	PASS	0.00574	0.3	1.91443	0.00656	0.45	1.4571
7	PASS	0.01824	0.77	2.36853	0.01901	1.155	1.64594
8	PASS	0.00558	0.23	2.42648	0.00628	0.345	1.81917
9	PASS	0.01151	0.4	2.87872	0.01224	0.6	2.04077
10	PASS	0.00543	0.184	2.95348	0.00605	0.276	2.19079
11	PASS	0.00949	0.33	2.87639	0.01022	0.495	2.0643
12	PASS	0.00525	0.15333	3.42505	0.00589	0.23	2.55958
13	PASS	0.0083	0.21	3.95287	0.0092	0.315	2.92125
14	PASS	0.0052	0.13143	3.95899	0.00578	0.19714	2.92952
15	PASS	0.00748	0.15	4.98858	0.00843	0.225	3.74483
16	PASS	0.00517	0.115	4.49967	0.0058	0.1725	3.36363
17	PASS	0.007	0.13235	5.28621	0.00774	0.19853	3.89997
18	PASS	0.00514	0.10222	5.02877	0.00578	0.15333	3.77035
19	PASS	0.00642	0.11842	5.41735	0.00717	0.17763	4.0344
20	PASS	0.00518	0.092	5.6303	0.00575	0.138	4.16606
21	PASS	0.00654	0.10714	6.10326	0.00722	0.16071	4.49337
22	PASS	0.00526	0.08364	6.28641	0.00582	0.12546	4.63519
23	PASS	0.0065	0.09783	6.64622	0.00731	0.14674	4.98411
24	PASS	0.00523	0.07667	6.8243	0.00594	0.115	5.16089
25	PASS	0.00618	0.09	6.86527	0.00689	0.135	5.10049
26	PASS	0.00528	0.07077	7.46487	0.00611	0.10615	5.75535
27	PASS	0.00601	0.08333	7.21723	0.00681	0.125	5.44991
28	PASS	0.0053	0.06571	8.05982	0.00588	0.09857	5.96642
29	PASS	0.00603	0.07759	7.77363	0.00658	0.11638	5.65555
30	PASS	0.00524	0.06133	8.5463	0.0061	0.092	6.63518
31	PASS	0.0062	0.07258	8.53916	0.00697	0.10887	6.40269
32	PASS	0.00536	0.0575	9.31828	0.00594	0.08625	6.88656
33	PASS	0.00615	0.06818	9.0199	0.00688	0.10227	6.72938
34	PASS	0.00534	0.05412	9.86696	0.0061	0.08118	7.51485
35	PASS	0.00603	0.06429	9.37756	0.00703	0.09643	7.2922
36	PASS	0.00524	0.05111	10.257	0.0058	0.07667	7.57158
37	PASS	0.00567	0.06081	9.31702	0.00628	0.09122	6.881
38	PASS	0.00527	0.04842	10.8767	0.00584	0.07263	8.03498
39	PASS	0.00572	0.05769	9.91065	0.00637	0.08654	7.35575
40	PASS	0.00522	0.046	11.3486	0.0058	0.069	8.39964

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BS EN 61000-3-2:2014 Fluctuating Harmonics				
Instrument Details				
Instrument Model	PPA5511			
Instrument Serial	162-04957			
Instrument Firmware	2.185			
Equipment Under Test				
Brand	Hanhwa Techwin Co., Ltd			
Model	PRN-6410B4			
Serial	N/A			
Extra Test Information				
Voltage THDS	0.09%			
Source Results 1/2				
Harmonic	Status	Peak (V)	Average (V)	Limit (V)
1	PASS	230.04	230.02	No Limit
2	PASS	0.13339	0.12621	0.46011
3	PASS	0.05028	0.043215	2.070496
4	PASS	0.030063	0.024074	0.46011
5	PASS	0.030897	0.025436	0.920221
6	PASS	0.029897	0.022941	0.46011
7	PASS	0.027565	0.02252	0.690165
8	PASS	0.02785	0.022626	0.46011
9	PASS	0.02874	0.022989	0.46011
10	PASS	0.028527	0.022913	0.46011
11	PASS	0.02765	0.02273	0.230055
12	PASS	0.027543	0.022739	0.230055
13	PASS	0.028245	0.023246	0.230055
14	PASS	0.027893	0.022161	0.230055
15	PASS	0.030997	0.024779	0.230055
16	PASS	0.028186	0.02267	0.230055
17	PASS	0.02877	0.023867	0.230055
18	PASS	0.031479	0.022425	0.230055
19	PASS	0.029405	0.02464	0.230055
20	PASS	0.027755	0.022742	0.230055
21	PASS	0.028685	0.022937	0.230055
22	PASS	0.027332	0.022769	0.230055
23	PASS	0.03021	0.024251	0.230055
24	PASS	0.027657	0.022753	0.230055
25	PASS	0.02788	0.023035	0.230055
26	PASS	0.028586	0.023027	0.230055
27	PASS	0.028665	0.02323	0.230055
28	PASS	0.029271	0.022948	0.230055
29	PASS	0.029806	0.023059	0.230055
30	PASS	0.027421	0.023006	0.230055
31	PASS	0.029554	0.023312	0.230055
32	PASS	0.027076	0.022405	0.230055
33	PASS	0.028839	0.023228	0.230055
34	PASS	0.028515	0.022711	0.230055
35	PASS	0.02847	0.023005	0.230055
36	PASS	0.028485	0.022842	0.230055
37	PASS	0.028699	0.023477	0.230055
38	PASS	0.027899	0.022525	0.230055
39	PASS	0.027409	0.022899	0.230055
40	PASS	0.028442	0.023113	0.230055

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BS EN 61000-3-2:2014 Fluctuating Harmonics				
Instrument Details				
Instrument Model	PPA5511			
Instrument Serial	162-04957			
Instrument Firmware	2.185			
Equipment Under Test				
Brand	Hanhwa Techwin Co., Ltd			
Model	PRN-6410B4			
Serial	N/A			
Extra Test Information				
Voltage THDS	0.09%			
Source Results 2/2				
Harmonic	Status	Peak (V)	Average (V)	Limit (V)
1	PASS	230.04	230.02	No Limit
2	PASS	0.13358	0.12595	0.460114
3	PASS	0.049863	0.042447	2.070513
4	PASS	0.031398	0.024268	0.460114
5	PASS	0.02956	0.024348	0.920228
6	PASS	0.02847	0.022924	0.460114
7	PASS	0.027648	0.022619	0.690171
8	PASS	0.027219	0.022764	0.460114
9	PASS	0.030284	0.02233	0.460114
10	PASS	0.026747	0.022702	0.460114
11	PASS	0.02753	0.023161	0.230057
12	PASS	0.028354	0.02342	0.230057
13	PASS	0.02689	0.022466	0.230057
14	PASS	0.027326	0.022675	0.230057
15	PASS	0.03008	0.024184	0.230057
16	PASS	0.028963	0.023571	0.230057
17	PASS	0.029553	0.02339	0.230057
18	PASS	0.030183	0.023419	0.230057
19	PASS	0.030842	0.025107	0.230057
20	PASS	0.027673	0.022821	0.230057
21	PASS	0.028167	0.022854	0.230057
22	PASS	0.027619	0.022382	0.230057
23	PASS	0.029587	0.024513	0.230057
24	PASS	0.027381	0.023081	0.230057
25	PASS	0.027858	0.022503	0.230057
26	PASS	0.028063	0.023286	0.230057
27	PASS	0.028159	0.023284	0.230057
28	PASS	0.029187	0.022558	0.230057
29	PASS	0.028926	0.02273	0.230057
30	PASS	0.028018	0.022762	0.230057
31	PASS	0.028786	0.023884	0.230057
32	PASS	0.028456	0.022735	0.230057
33	PASS	0.027798	0.022417	0.230057
34	PASS	0.027462	0.022685	0.230057
35	PASS	0.029403	0.02338	0.230057
36	PASS	0.027821	0.02281	0.230057
37	PASS	0.028314	0.023409	0.230057
38	PASS	0.029307	0.022761	0.230057
39	PASS	0.029241	0.023257	0.230057
40	PASS	0.0281	0.023092	0.230057

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 Location	: Shielded Room
Test mode	: Operating mode
Result	: Complies

Measurement Data:

- Refer to the Next page

Voltage Fluctuations and Flicker

01st July 2022 - 19:20:03		Ph:1 Page 1/2		IECSoft v2.7	
		BS EN 61000-3-11:2013 Flickermeter			
Instrument Details					
Instrument Model	PPA5511				
Serial Number	162-04957				
Firmware Version	2.185				
N4L Calibration Date	18th September 2017				
Instrument Version	Standard				
Test Settings					
Class	Voltage				
Mode	Operating (4.0%)				
Minimum Current	10A				
PST	10 minutes				
PLT	12 PSTs				
Equipment Under Test					
Brand	Hanhwa Techwin Co., Ltd				
Model	PRN-6410B4				
Serial	N/A				
Impedance Network ID	N/A				
Test Conditions					
	User Entered		Measured		
Rated Voltage	N/A		230.055V		
Rated Current	N/A		N/A		
Rated Frequency	N/A		50.000Hz		
Rated Power	N/A		N/A		
D max	0.1296% (Limit: 4.0%)				
T max	0.0000 s (Limit: 0.5 s)				
DC max	0.0015% (Limit: 3.3%)				
Additional Test Details					
Operator	AHN H Y				
Lab Name	N/A				
Location	N/A				
Notes	24 °C 44 % R.H.				
Signature					
Results	Phase1: PASS				

01st July 2022 - 19:20:03		Ph:1 Page 2/2			IECSoft v2.7			
BS EN 61000-3-3:2013 Flickermeter								
Instrument Details								
Instrument Model		PPA5511						
Instrument Serial		162-04957						
Instrument Firmware		2.185						
Equipment Under Test								
Brand		Hanhwa Techwin Co. Ltd						
Model		PRN-6410B4						
Serial		N/A						
Flicker Test Results								
PST no.	Status	DC (%)	Dmax (%)	Tmax (s)	PST	PST Lim	PLT	PLT Lim
1	Phase1: PASS	0.00148	0.10804	0.00000	0.08226	1.00000	0.08226	N/A
2	Phase1: PASS	0.00148	0.11084	0.00000	0.08226	1.00000	0.08226	N/A
3	Phase1: PASS	0.00148	0.11084	0.00000	0.08226	1.00000	0.08226	N/A
4	Phase1: PASS	0.00148	0.12957	0.00000	0.08226	1.00000	0.08226	N/A
5	Phase1: PASS	0.00148	0.12957	0.00000	0.08226	1.00000	0.08226	N/A
6	Phase1: PASS	0.00148	0.12957	0.00000	0.08226	1.00000	0.08226	N/A
7	Phase1: PASS	0.00148	0.12957	0.00000	0.08226	1.00000	0.08226	N/A
8	Phase1: PASS	0.00148	0.12957	0.00000	0.08226	1.00000	0.08226	N/A
9	Phase1: PASS	0.00148	0.12957	0.00000	0.08226	1.00000	0.08226	N/A
10	Phase1: PASS	0.00148	0.12957	0.00000	0.08226	1.00000	0.08226	N/A
11	Phase1: PASS	0.00148	0.12957	0.00000	0.08226	1.00000	0.08226	N/A
12	Phase1: PASS	0.00148	0.12957	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	: 2022. 07. 01.
Test method	: EN 61000-4-2 :2009
Temperature / Humidity / Pressure	: 23 °C / 39 % R.H. / 100 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 Location	: Shielded Room
Test mode	: Operating mode
Result	: Complies

Measurement Data:

- Refer to the Next page

ESD Test Point and Result**1-1. Indirect Discharge**

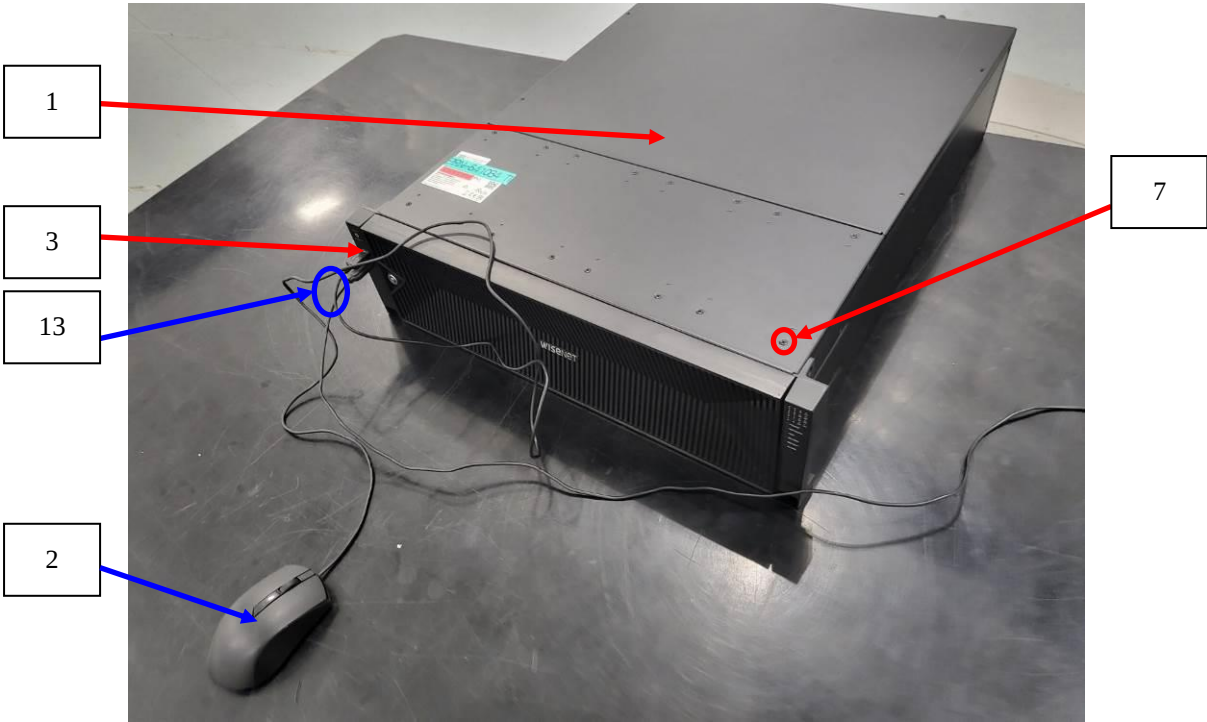
No.	Position	Kind of Discharge	Results	Remarks
1	HCP	Contact	Complies	No reaction recognized
2	VCP	Contact	Complies	No reaction recognized

1-2. Direct Discharge

No.	Position	Kind of Discharge	Result	Remarks
1	ENCLOSURE	Contact	Complies	No reaction recognized
2	MOUSE	Air	Complies	No reaction recognized
3	USB Port	Contact	Complies	No reaction recognized
4	AC IN	Air	Complies	No reaction recognized
5	BUTTON	Air	Complies	No reaction recognized
6	AUDIO OUT	Air	Complies	No reaction recognized
7	SCREW	Contact	Complies	No reaction recognized
8	ALARM IN,OUT	Air	Complies	No reaction recognized
9	NETWORK	Air	Complies	No reaction recognized
10	USB MEMORY STICK	Air	Complies	No reaction recognized
11	HDMI	Air	Complies	No reaction recognized
12	HDMI PORT	Contact	Complies	No reaction recognized
13	USB Cable	Air	Complies	No reaction recognized

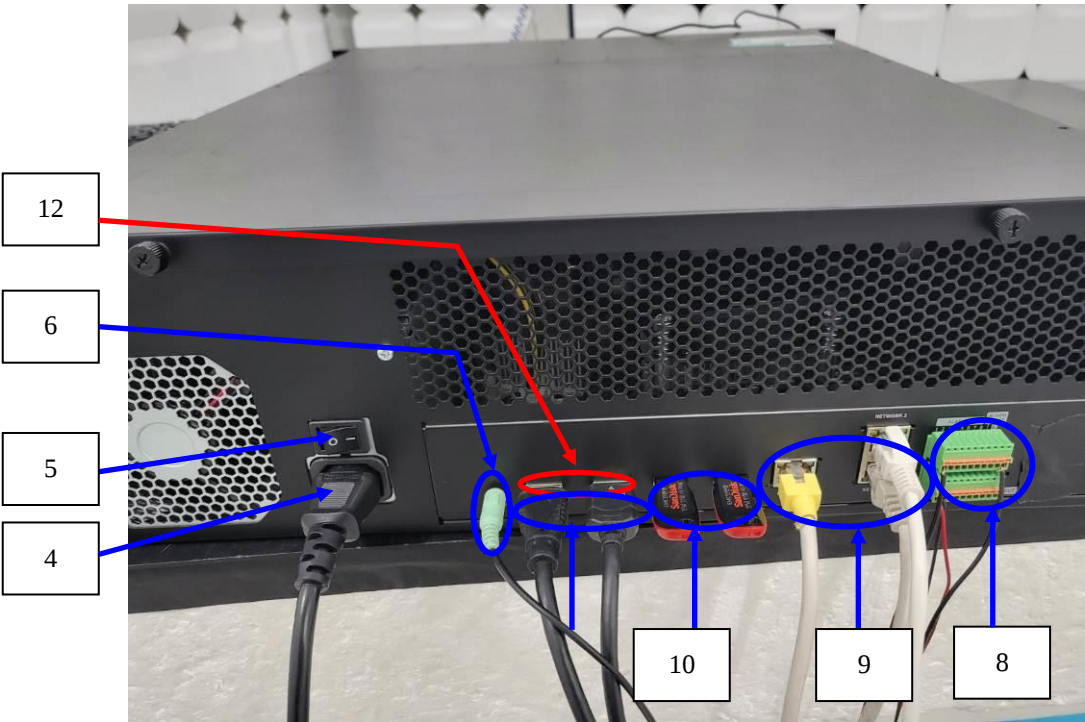
ESD TEST POINT

[Air discharge]
[Contact discharge]



[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	: 2022. 07. 05.
Test method	: EN 61000-4-3:2006/A1:2008/A2:2010
Temperature / Humidity / Pressure	: 24 °C / 46 % R.H. / 100 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 Location	: 3 m Chamber
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

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	: 2022. 07. 04.
Test method	: EN 61000-4-5:2014/A1:2017
Temperature / Humidity / Pressure	: 23 °C / 46 % R.H. / 100 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 μ s pulse
Number of surges	: 5 (at each phase)
Test Location	: Shielded Room
Test mode	: Operating mode
Result	: Complies

Measurement Data:

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
ALARM IN	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized
ALARM OUT	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized
AUDIO OUT	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized

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 date	: 2022. 07. 05.
Test method	: EN 61000-4-6:2014/AC:2015
Temperature / Humidity / Pressure	: 24 °C / 46 % R.H. / 100 kPa
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 Location	: Shielded Room
Test mode	: Operating mode
Result	: Complies

Measurement Data:

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
ALARM IN	Complies	No reaction recognized
ALARM OUT	Complies	No reaction recognized
AUDIO OUT	Complies	No reaction recognized

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	: 2022. 07. 04.
Test method	: EN 61000-4-11:2004/A1:2017
Temperature / Humidity / Pressure	: 24 °C / 40 % R.H. / 100 kPa
Ut	: 230 Vac
Test Location	: Shielded Room
Test mode	: Operating mode
Result	: Complies

Measurement Data:

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	EUT was turned off during the test. Re-operation by user's control. After the test, EUT was normally operated.

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	: 2022. 07. 04.
Test method	: EN 50130-4:2011/A1:2014
Temperature / Humidity / Pressure	: 24 °C / 40 % R.H. / 100 kPa
Supply Voltage maximum	: $U_{nom} + 10 \%$
Supply Voltage minimum	: $U_{nom} - 15 \%$
Ut	: 230 Vac
Test Location	: Shielded Room
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.

Mains supply voltage variations

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

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	ESR	Rohde & Schwarz	101499	2023.03.14	1 year
☒	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	100710	2023.03.14	1 year
☒	ISN	ISN T800	TESEQ	27109	2022.09.06	1 year
☒	ISN	ENY81-CA6	Rohde & Schwarz	101565	2022.09.06	1 year
☐	ISN	ISN S8	Schwarzbeck	79	2022.09.02	1 year
☐	CURRENT PROBE	EZ-17	Rohde & Schwarz	100508	2022.09.02	1 year
☐	CDN	TSCDN-C1-BNC-75	F.C.C	07004	2023.03.14	1 year
☐	LISN	ESH3-Z6	Rohde & Schwarz	100378	2022.09.02	1 year
☐	LISN	ESH3-Z6	Rohde & Schwarz	101468	2022.09.02	1 year
☒	LISN(main)	ENV216	Rohde & Schwarz	100408	2022.09.02	1 year
☒	LISN(sub)	LT32C/10	AFJ	32031518210	2022.09.02	1 year
☒	TEST PROGRAM	e3_ce 20181212a (V9)	AUDIX	-	-	-

Radiated Emissions – Below 1 GHz

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	EMI TEST Receiver	ESCI7	Rohde & Schwarz	100772	2022.09.02	1 year
☒	Amplifier	8447D	HP	1937A03453	2022.11.30	1 year
☒	BILOG Antenna	VULB 9168	SCHWARZBECK	775	2023.03.22	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	ESCI7	Rohde & Schwarz	100772	2022.09.02	1 year
☐	EMI TEST Receiver	ESU	Rohde & Schwarz	100092	2022.09.02	1 year
☒	Amplifier	8449B	Agilent	3008A02126	2023.03.14	1 year
☐	Amplifier	PAM-840A	COM-POWER	461314	2023.03.17	1 year
☐	HORN ANTENNA	3116B	ETS	133350	2024.03.22	2 year
☐	HORN ANTENNA	3116B	ETS	81109	2024.04.25	2 year
☒	HORN ANTENNA	3115	ETS	114105	2023.05.12	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	2022.09.06	1 year
☒	Reference Impedance Network	ES4152	NF Corp.	9074424	2022.09.14	1 year

Electrostatic Discharge

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	ESD Simulator	ESS-2000	NOISEKEN	8000C03241	2022.09.09	1 year
☒	ESD GUN	TC-815R	NOISEKEN	ESS0382069	2022.09.09	1 year

RF Electromagnetic Field

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Signal Generator	E4432B	Agilent	MY41310673	2022.09.02	1 year
☒	Power Meter	E4419B	Agilent	GB38410133	2023.03.15	1 year
☒	Power Sensor	E9300A	Agilent	MY41497992	2023.03.15	1 year
☒	Power Sensor	E9300A	Agilent	MY41497618	2023.03.15	1 year
☒	WIDE BAND HIGH POWER AMPLIFIER	ITA0300KL-500	INFINITECH	0300KL 20 09 001	-	-
☒	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	-	-

Electrical Fast Transients

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Compact Generator	Compact NX	EMTEST	P1725200196	2022.09.02	1 year
☒	AC Power Source	Variac NX	EMTEST	P1745207276	2022.09.02	1 year
☒	Capacitive Coupling Clamp	CCI	EMTEST	P1744207071	2022.09.02	1 year

Surges

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Compact Generator	Compact NX	EMTEST	P1725200196	2022.09.02	1 year
☒	AC Power Source	Variac NX	EMTEST	P1745207276	2022.09.02	1 year
☒	CDN	CNV 508T5	EMTEST	P1742204978	2022.09.03	1 year
☐	CDN	CNV 508N1	EMTEST	P1742204940	2022.09.03	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	2023.03.15	1 year
☒	POWER METER	NRVD	R&S	101689	2023.03.15	1 year
☒	POWER Sensor	URV5-Z2	R&S	100755	2023.03.15	1 year
☒	POWER Sensor	URV5-Z2	R&S	100756	2023.03.15	1 year
☒	RF Power Amplifier	FLL75A	FRANKONIA	1033	-	-
☒	EM INJECTION CLAMP	TSIC-23	F.C.C	529	2023.03.17	1 year
☐	CDN (M1)	TSCDN-M1-16A	F.C.C	07004	2022.09.02	1 year
☐	CDN (M2)	TSCDN-M2-16A	F.C.C	07008	2022.09.02	1 year
☐	CDN (M2)	TSCDN-M2-16A	F.C.C	07009	2023.03.14	1 year
☒	CDN (M3)	TSCDN-M3-16A	F.C.C	07016	2023.03.14	1 year
☒	CDN (M3)	TSCDN-M3-16A	F.C.C	07017	2022.09.02	1 year

Voltage dips and Interruptions

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Compact Generator	Compact NX	EMTEST	P1725200196	2022.09.02	1 year
☒	AC Power Source	Variac NX	EMTEST	P1745207276	2022.09.02	1 year

Mains supply voltage variations

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Compact Generator	Compact NX	EMTEST	P1725200196	2022.09.02	1 year
☒	AC Power Source	Variac NX	EMTEST	P1745207276	2022.09.02	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

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.

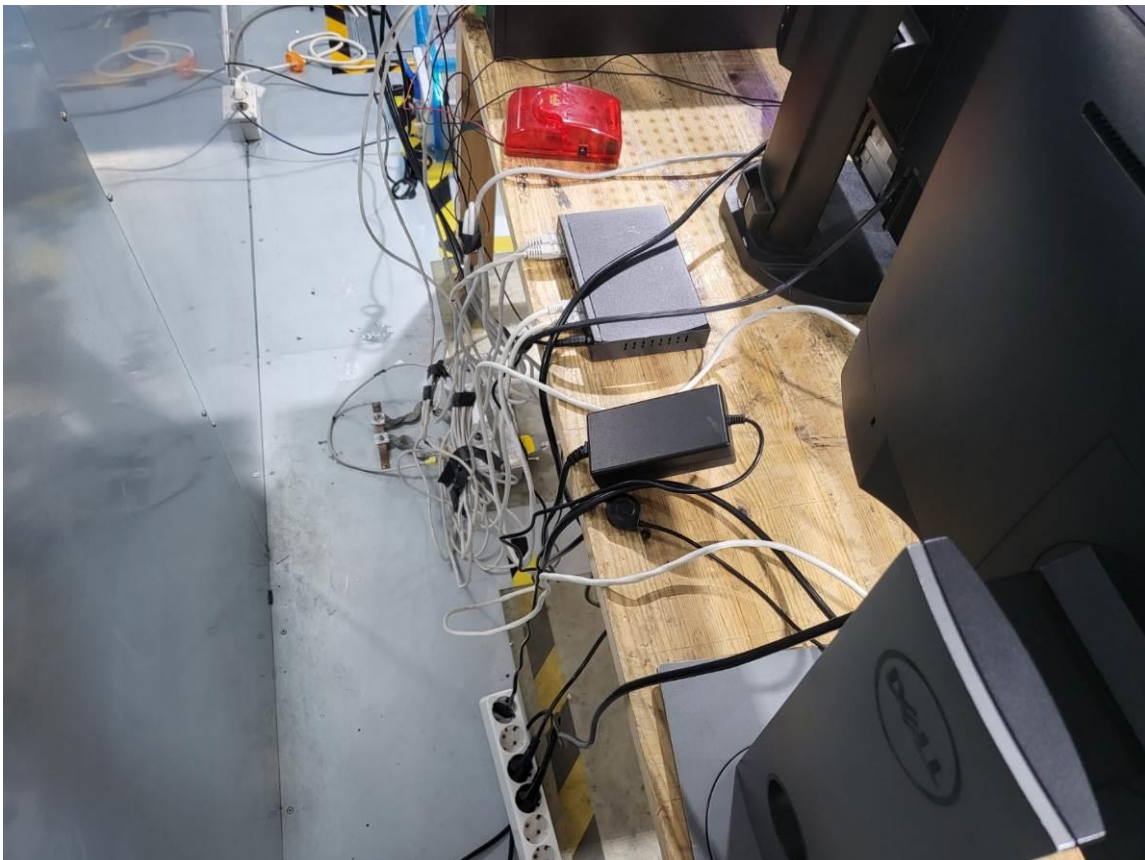
Mains supply voltage variations

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.

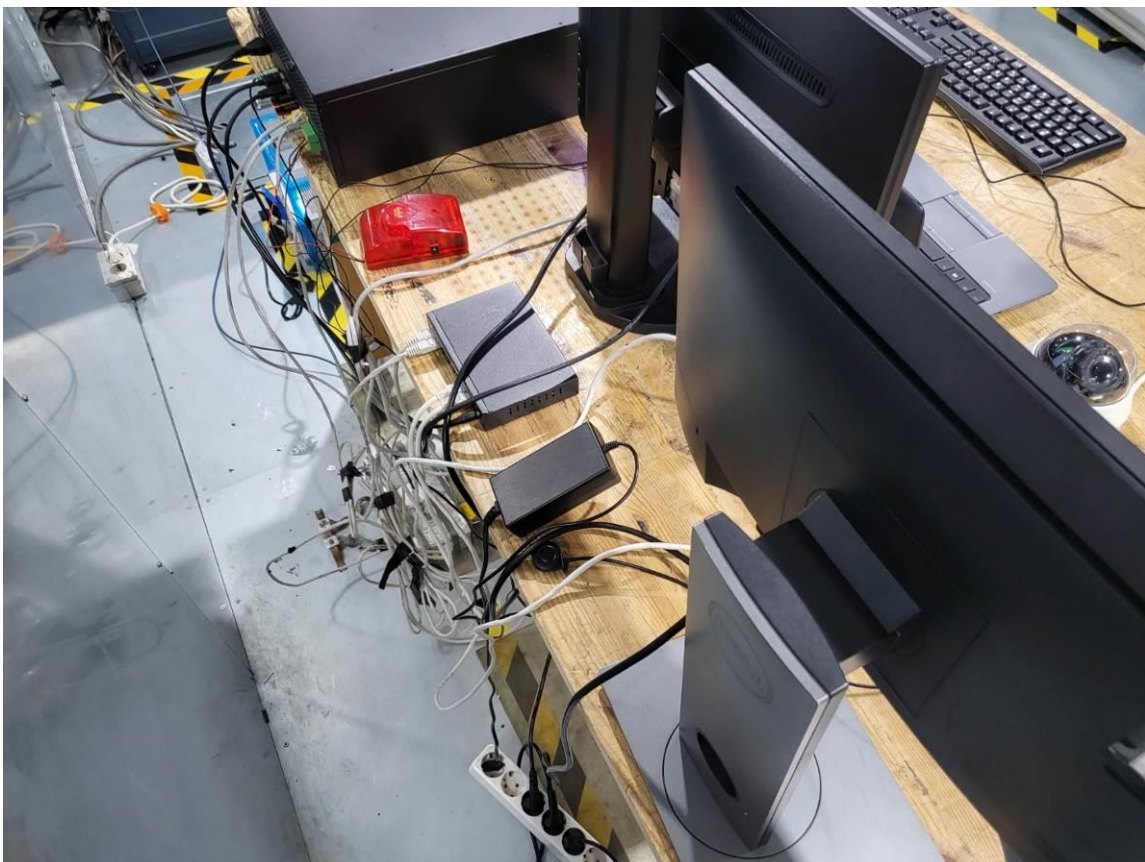
APPENDIX C

PHOTOGRAPHS

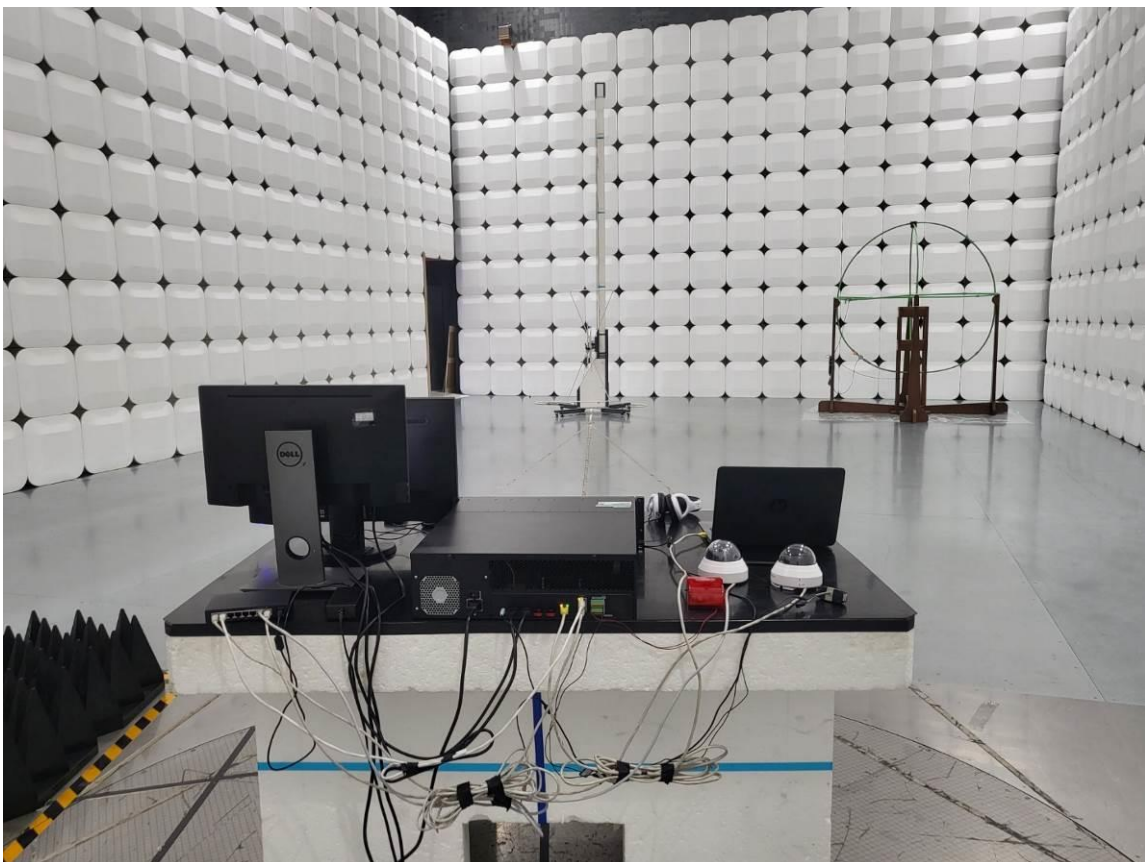
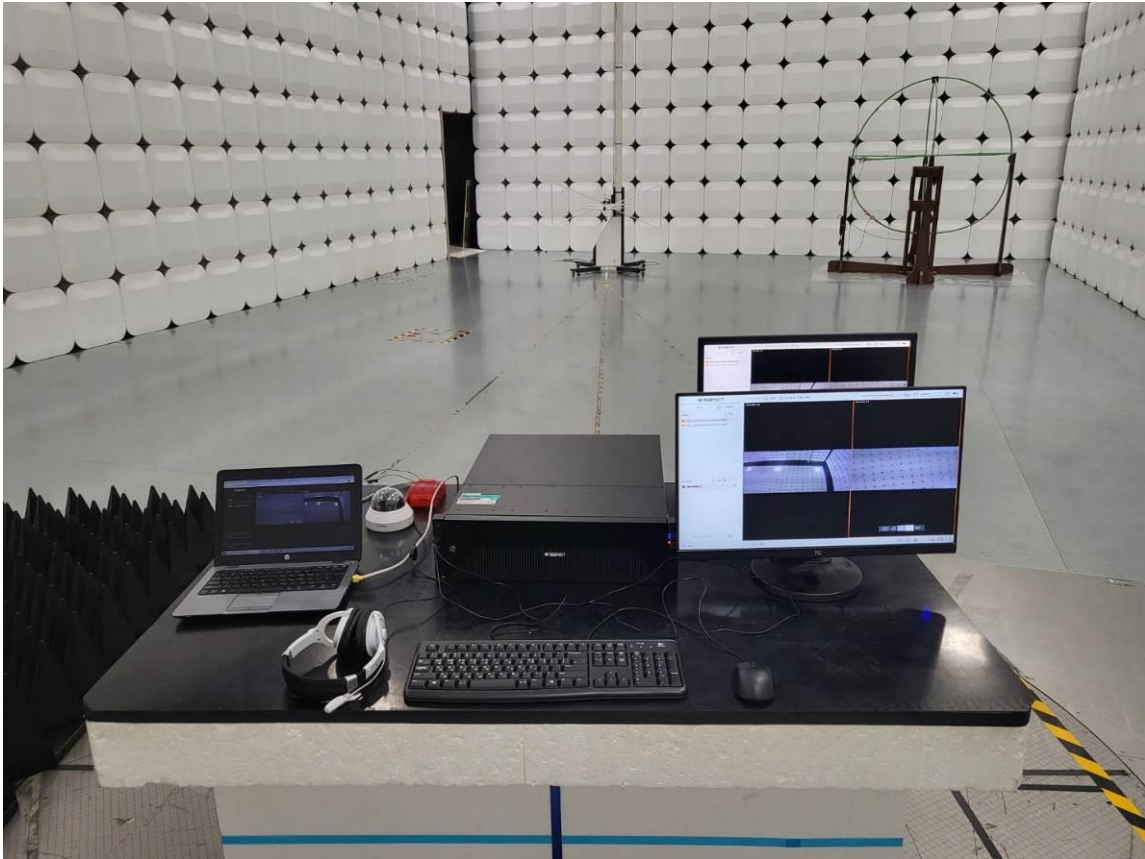
Conducted Emissions



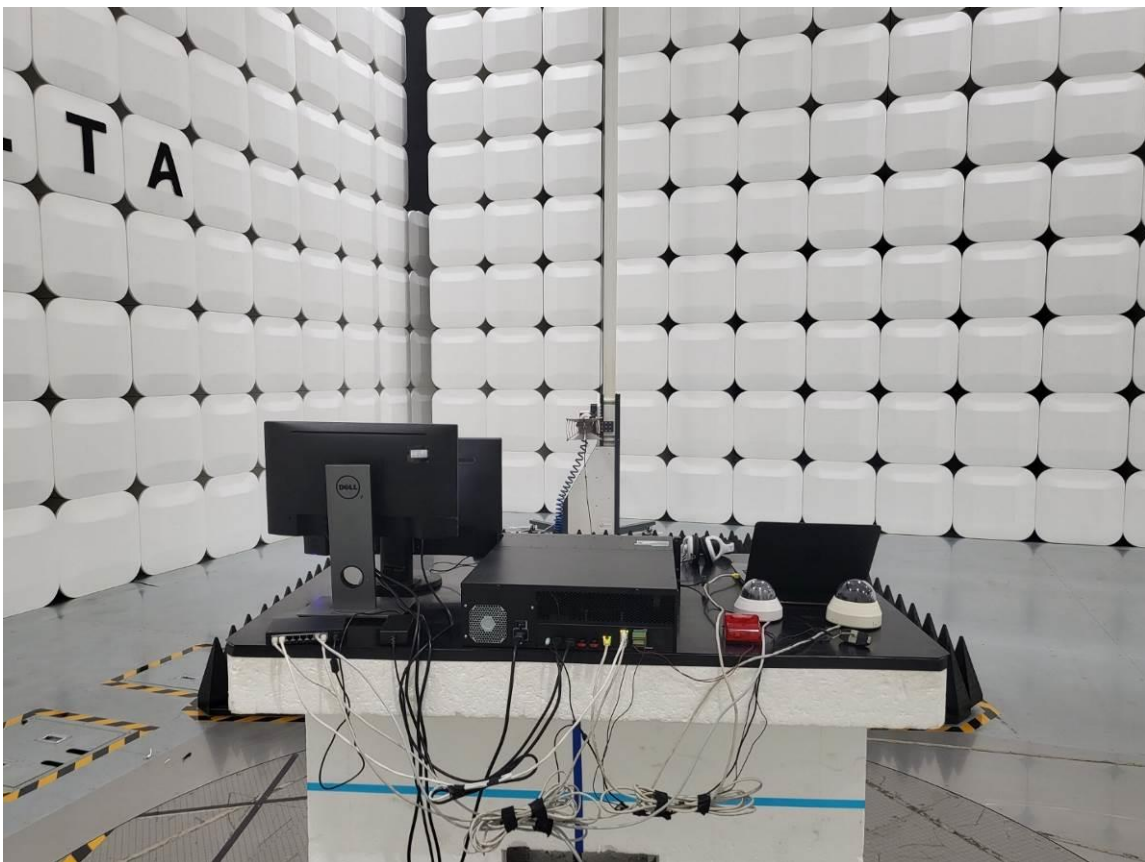
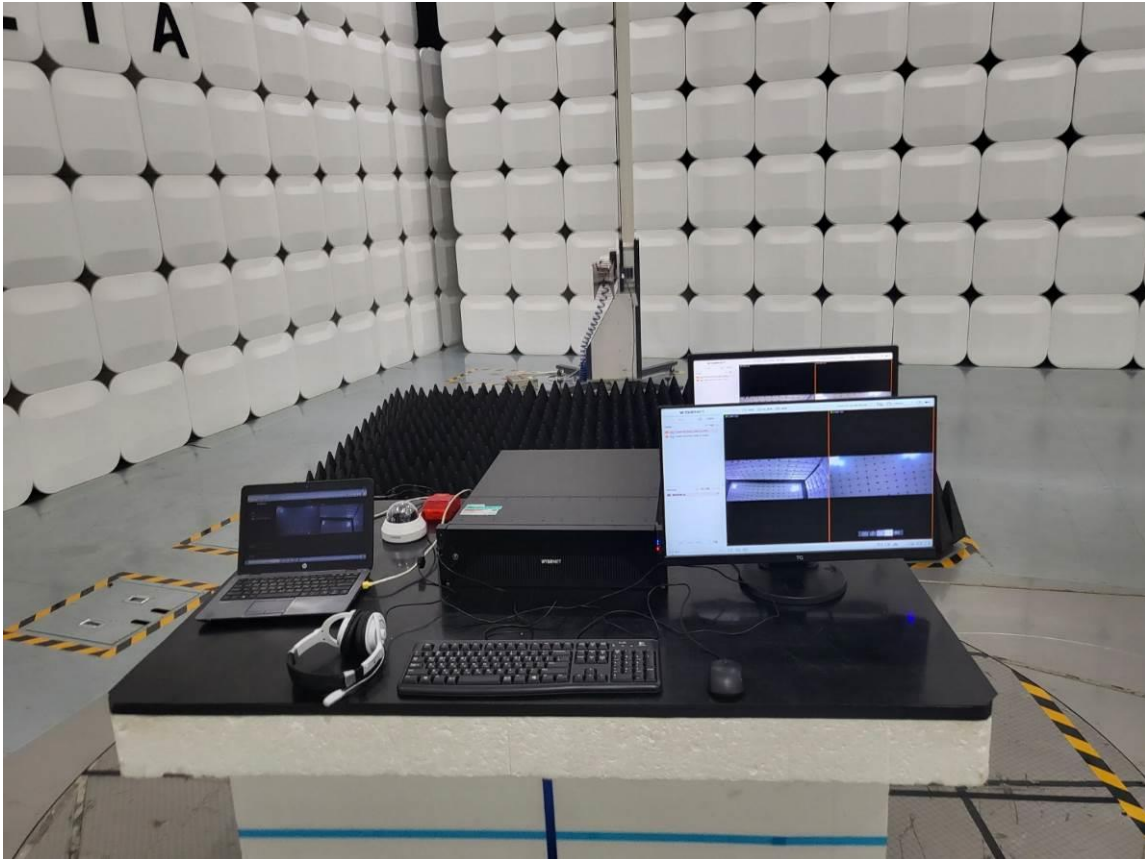
Conducted Emissions (TEL)



Radiated Emissions - Below 1 GHz



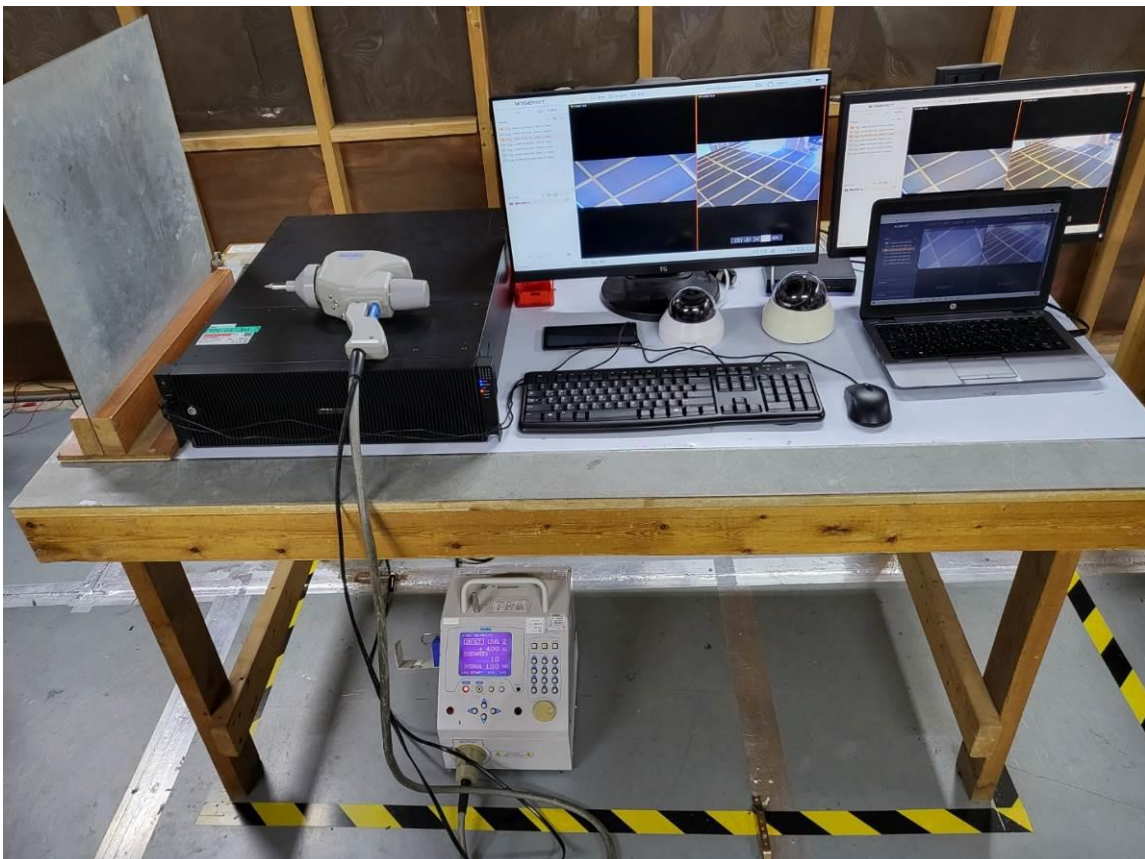
Radiated Emissions - Above 1GHz



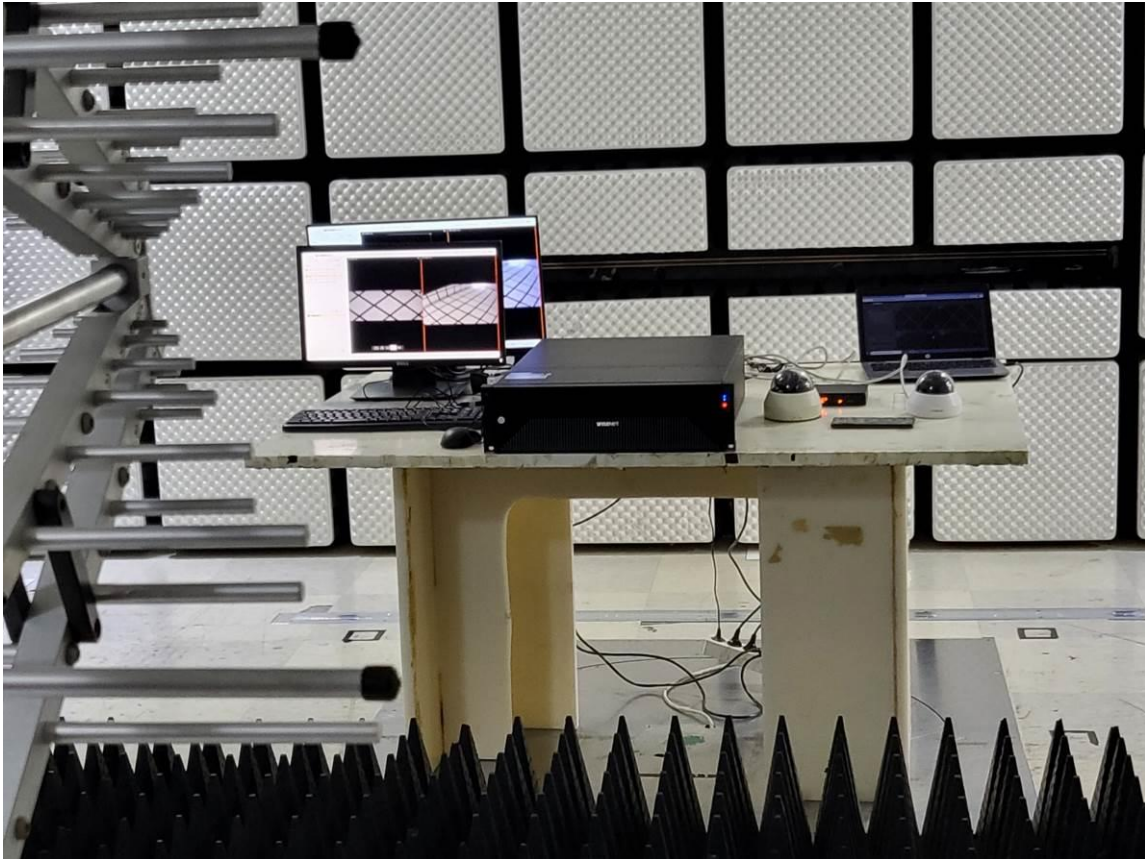
Harmonic Current Emission / Voltage Fluctuations and Flicker



Electrostatic Discharge



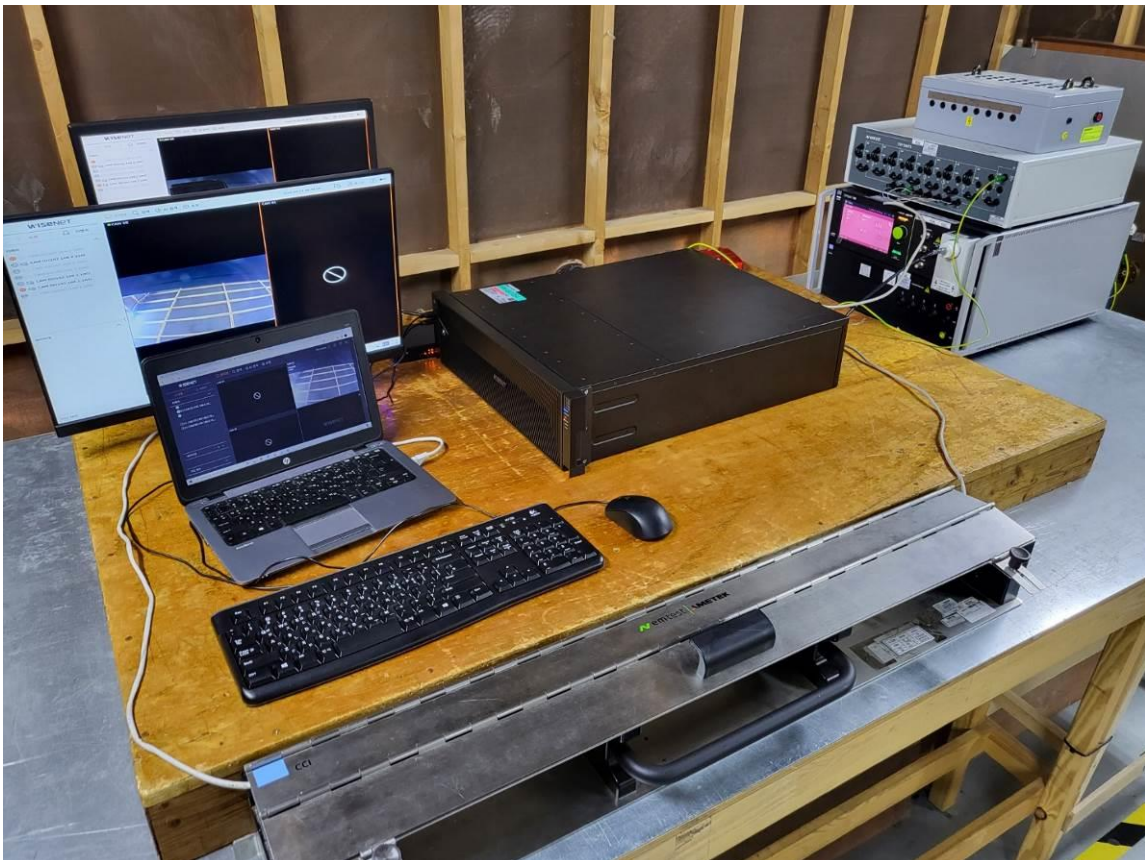
RF Electromagnetic Field



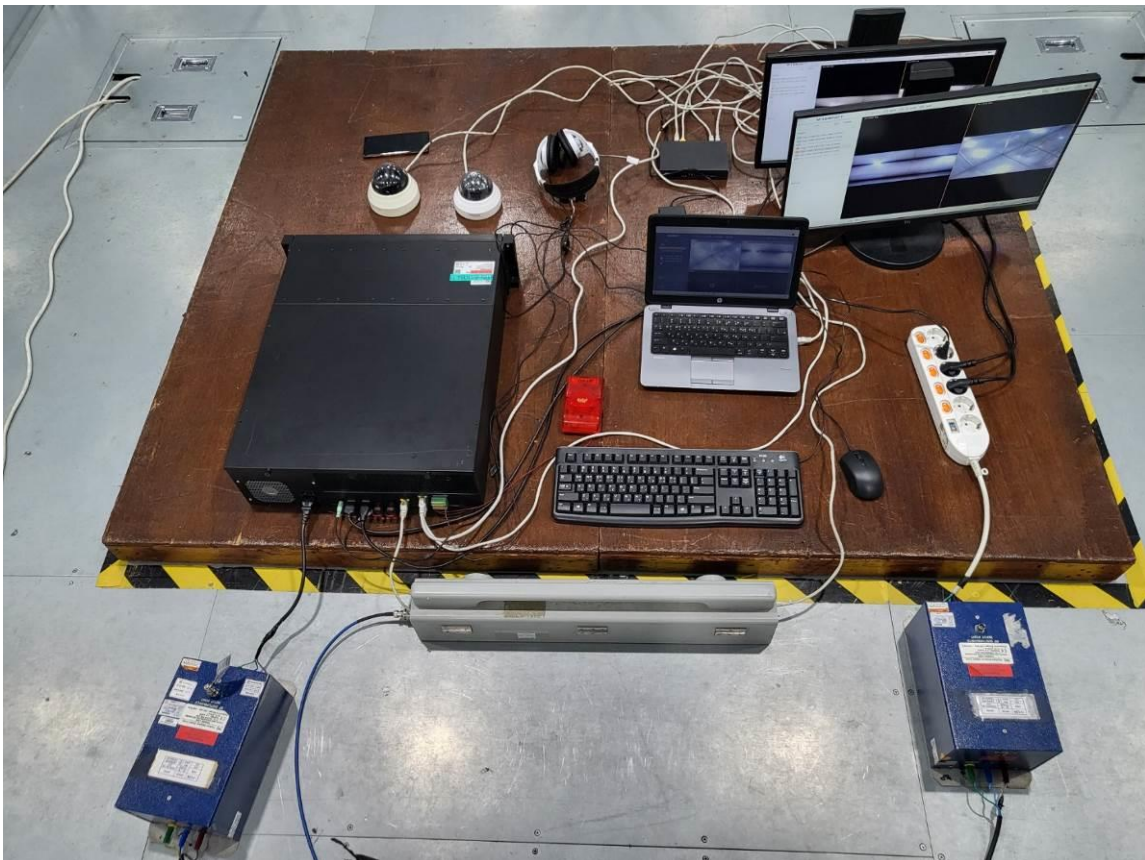
Electrical Fast Transients



Surges



Conducted Disturbances, Induced by Radio-Frequency Fields



Main supply voltage (dips, variations) short interruptions



EUT



EUT

