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## EMC TEST REPORT

Dates of Tests: November 14 – 16, 2023

Project No: 231102-0012

Test Site : LTA Co., Ltd.

Model No.

**AIB-800**

APPLICANT

**Hanwha Vision Co., Ltd**

**Equipment Name** : AI BOX  
**Manufacturer** : Hanwha Vision Co., Ltd  
**Model name** : AIB-800  
**Additional Model name** : -  
**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 issue** : November 23, 2023

This test report is issued under the authority of:

The test was supervised by:

Young Kyu Shin, Technical Manager

Min Su Han, 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.

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	31.10.2023	LR500122310O	Initial
1	23.11.2023	LR500122311U	Add gasket tape

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## 1. General information's

### 1-1 Test Performed

Company name : **LTA Co., Ltd**  
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 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
RRA	KOREA		-	RRA accredited Lab.
	U.S.A	KR0049	2025-03-29	
	CANADA		2024-08-15	
VCCI	JAPAN	C-14948	2026-09-10	VCCI registration
		T-12416	2026-09-10	
		R-14483	2026-10-15	
		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 : +82-10-2667-4196 / +82-70-7147-8361

### 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 : AI BOX  
 Model name : AIB-800  
 Additional Model name : -  
 Serial number : Identification  
 Date of receipt : November 02, 2023  
 EUT condition : Pre-production  
 Interface Ports : DC IN, LAN, ALARM IN, ALARM OUT, GROUND  
 Power rating : AC 230 V, 50 Hz

### 2-3 Modification

- gasket tape inside / Material: gasket tape (model name: N/A, manufacturer: N/A, number: 1 EA)

### 2-4 Model Specification

- The console port, USB port of the device to be tested is a port for administrators and is excluded from the test item.

### 2-5 Test conditions

Temp. / Humid. / Pressure : (20 – 23) °C / (40 – 45) % R.H. / (100.9) kPa  
 Tested Model : AIB-800  
 Test mode : Operating mode  
 Tested Voltage : AC 230 V, 50 Hz

**2-6 List of EUT and ACCESSORY**

<b>EUT</b>				
<b>Equipment Name</b>	<b>Model Name</b>	<b>Serial No.</b>	<b>Manufacturer</b>	<b>Remarks</b>
<b>AI BOX</b>	<b>AIB-800</b>	<b>ZTZC70GWA0000J H</b>	<b>HANWHA VISION VIETNAM COMPANY LIMITED D-TECH CO.,LTD.</b>	<b>EUT</b>
<b>Adapter</b>	<b>KPL-048F-VI</b>	<b>N/A</b>	<b>Channel Well Technology(Guangzhou) Co.,Ltd.</b>	<b>EUT</b>
<b>ACCESSORY</b>				
<b>Equipment Name</b>	<b>Model Name</b>	<b>Serial No.</b>	<b>Manufacturer</b>	<b>Remarks</b>
<b>MONITOR</b>	<b>AM24MB</b>	<b>N/A</b>	<b>ATEC</b>	<b>-</b>
<b>Mouse</b>	<b>MOKJUO</b>	<b>34O04812</b>	<b>Primax Electronics Ltd.</b>	<b>-</b>
<b>ALARM JIG #1</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-</b>
<b>ALARM JIG #2</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-</b>
<b>IP Camera</b>	<b>LND-6032R</b>	<b>ZNDJ6V4M90000C M</b>	<b>HANWHA TECHWIN CO.,LTD.</b>	<b>-</b>
<b>NVR</b>	<b>XRN-1620S/TE</b>	<b>ZSV66V4T90002JB</b>	<b>HANWHA VISION VIETNAM COMPANY LIMITED D-TECH CO.,LTD.</b>	<b>-</b>

**2-7 Cable List**

Cable List					
From		To		Length (m)	Shield
Type	I/O Port	Type	I/O Port		
EUT	DC IN	Adapter	DC OUT	1.0	NO
	LAN	NVR	LAN #1	3.0	NO
	ALARM IN	ALARM ZIG #1	-	1.0	NO
	ALARM OUT	ALARM ZIG #2	-	1.0	NO
	GROUND	GROUND	GROUND	1.4	NO
Adapter	AC IN	AC POWER SOURCE	AC OUT	1.9	NO
NVR	AC IN	AC POWER SOURCE	AC OUT	2.0	NO
	LAN #2	IP Camera	LAN	3.0	NO
	HDMI	MONITOR	HDMI	1.4	YES
	USB	Mouse	-	1.0	NO
MONITOR	AC IN	AC POWER SOURCE	AC OUT	1.6	NO

### 3. Test Report

#### 3.1 Summary of tests

Reference	Parameter	Status (note)
<b>I. Emission</b>		
Conducted Emissions	EN 55032:2015/A11:2020	C
Radiated Emissions	EN 55032:2015/A11:2020	C
Harmonic Current Emission	EN 61000-3-2:2014	NA <sup>Note 3</sup>
Voltage Fluctuations and Flicker	EN 61000-3-3:2013	C
<b>II. Immunity (EN 50130-4:2011/A1:2014)</b>		
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 EN 61000-3-2 (Harmonic current emissions) for the AIB-800 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/A11:2020
Measurement RBW	: 9 kHz
Test Location	: Shielded Room
Test mode	: Operating mode
Result	: <b>Complies</b>

#### 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 $\mu$ V	66 dB $\mu$ V
(0.5 – 30) MHz	73 dB $\mu$ V	60 dB $\mu$ 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 $\mu$ V	(56 - 46) dB $\mu$ V
(0.5 – 5) MHz	56 dB $\mu$ V	46 dB $\mu$ V
(5 – 30) MHz	60 dB $\mu$ V	50 dB $\mu$ 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 $\mu$ V	(84 – 74) dB $\mu$ V	(53 – 43) dB $\mu$ V	(40 – 30) dB $\mu$ V
(0.5 – 30) MHz	87 dB $\mu$ V	74 dB $\mu$ V	43 dB $\mu$ V	30 dB $\mu$ 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  $\Omega$  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 $\mu$ V	(74 – 64) dB $\mu$ V	(40 – 30) dB $\mu$ V	(30 – 20) dB $\mu$ V
(0.5 – 30) MHz	74 dB $\mu$ V	64 dB $\mu$ V	30 dB $\mu$ V	20 dB $\mu$ V

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

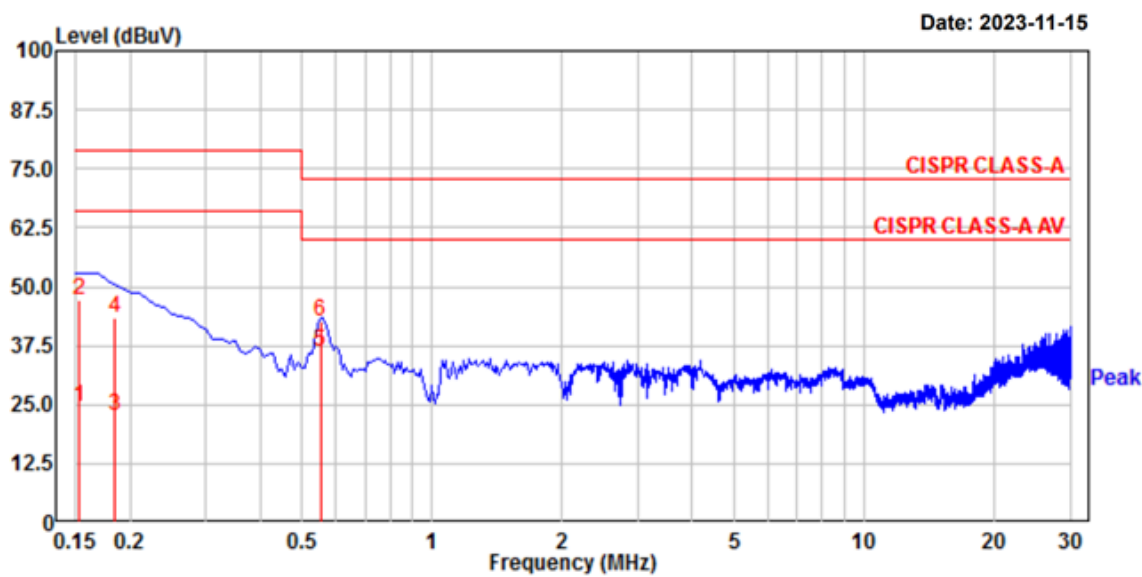
Note 2: The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150  $\Omega$  to the telecommunication port under test (conversion factor is  $20 \log_{10} 150/I = 44$  dB)

Conducted Emissions (LINE)



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Project No.	: 231102-0012	Phase	: Line
Test Mode	: Operating	Test Power	: AC 230 V / 50 Hz
Temp./ Humi.	: 20 'C / 40 % R.H.	Test Engineer	: HAN M S



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.	0.152	27.85	5.15	19.41	47.26	24.56	79.00	66.00	31.74	41.44	Line
4.	0.184	23.98	3.06	19.41	43.39	22.47	79.00	66.00	35.61	43.53	Line
6.	0.552	23.37	16.87	19.44	42.81	36.31	73.00	60.00	30.19	23.69	Line

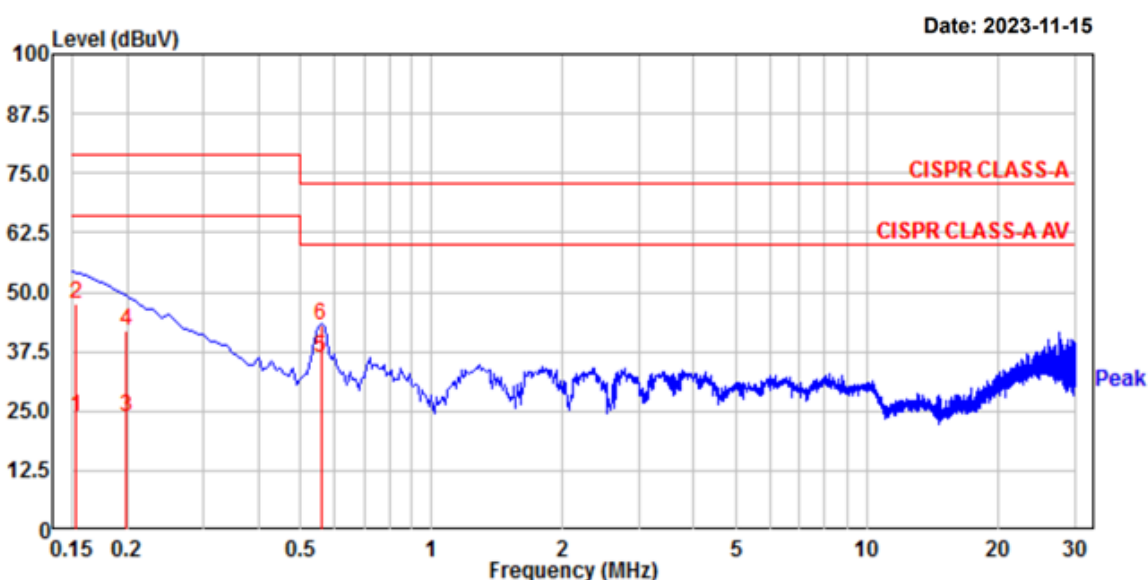
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

## Conducted Emissions (NEUTRAL)



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Project No.	: 231102-0012	Phase	: Neutral
Test Mode	: Operating	Test Power	: AC 230 V / 50 Hz
Temp./ Humi.	: 20 'C / 40 % R.H.	Test Engineer	: HAN M S



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.	0.153	28.09	4.55	19.40	47.49	23.95	79.00	66.00	31.51	42.05	neutral
4.	0.199	22.63	4.40	19.40	42.03	23.80	79.00	66.00	36.97	42.20	neutral
6.	0.557	23.47	16.66	19.43	42.90	36.09	73.00	60.00	30.10	23.91	neutral

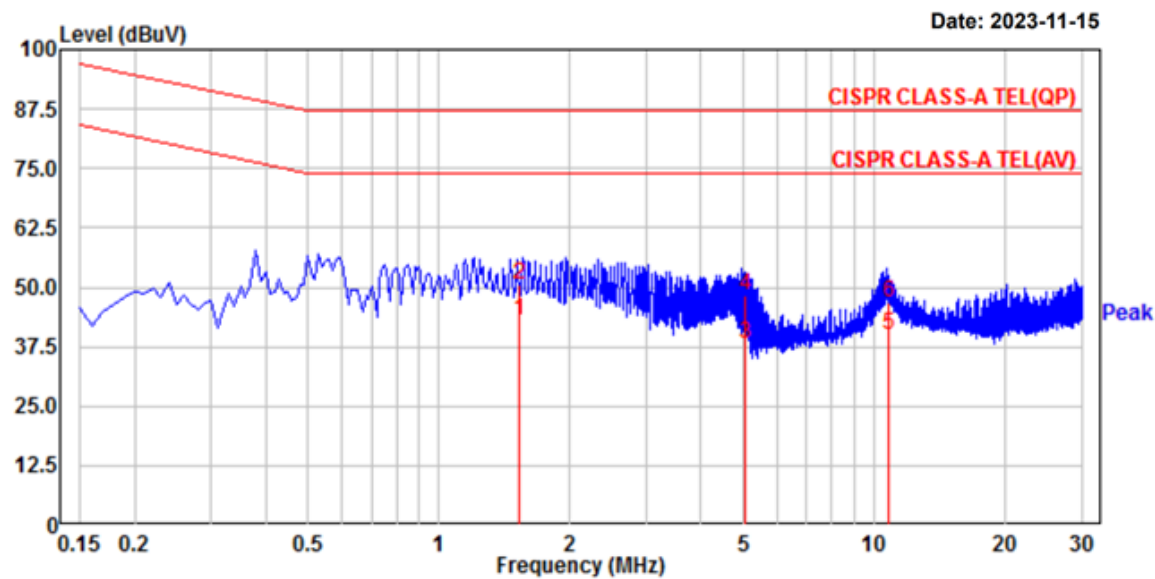
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

Conducted Emissions (TEL\_1000 M)



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Project No.	: 231102-0012	Phase	: TEL_1000M
Test Mode	: Operating	Test Power	: AC 220 V / 60 Hz
Temp./ Humi.	: 20 'C / 40 % R.H.	Test Engineer	: HAN M S



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.	1.533	31.51	23.72	19.23	50.74	42.95	87.00	74.00	36.26	31.05	Line
4.	5.032	28.88	18.98	19.26	48.14	38.24	87.00	74.00	38.86	35.76	Line
6.	10.821	27.34	20.64	19.42	46.76	40.06	87.00	74.00	40.24	33.94	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	: <b>Complies</b>

**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.

**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 $\mu$ V/m
(230 – 1 000) MHz	47 dB $\mu$ V/m

CLASS B

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

Limit of 3m above 1 GHz

CLASS A

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

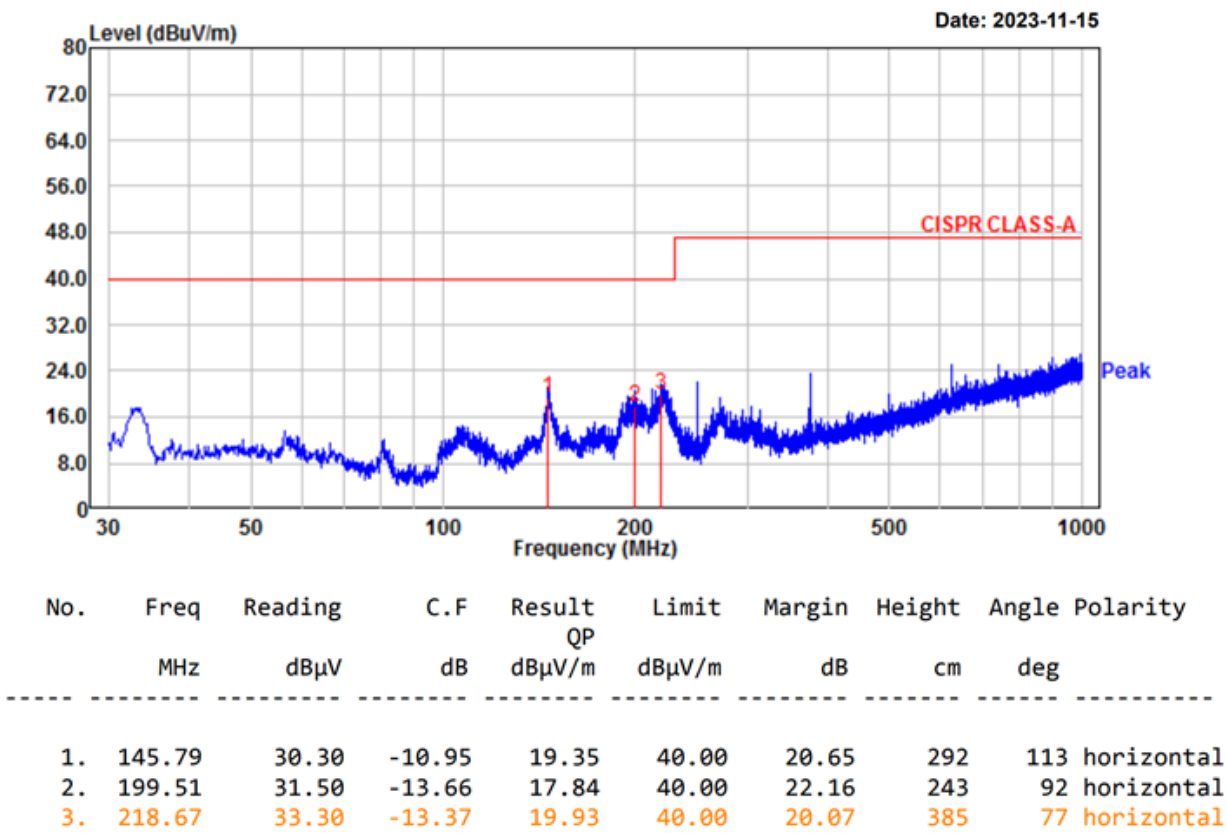
NOTE: The lower limit applies at the transition frequency.

Radiated Emissions (Below 1 GHz) / H



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Project No. : 231102-0012                      Temp/Humi: 21 'C / 45 % R.H.  
-----  
Test Mode : Operating                      Tested by: HAN M S  
-----  
Power : AC 230 V / 50 Hz  
-----



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



## Radiated Emissions (Below 1 GHz) / V



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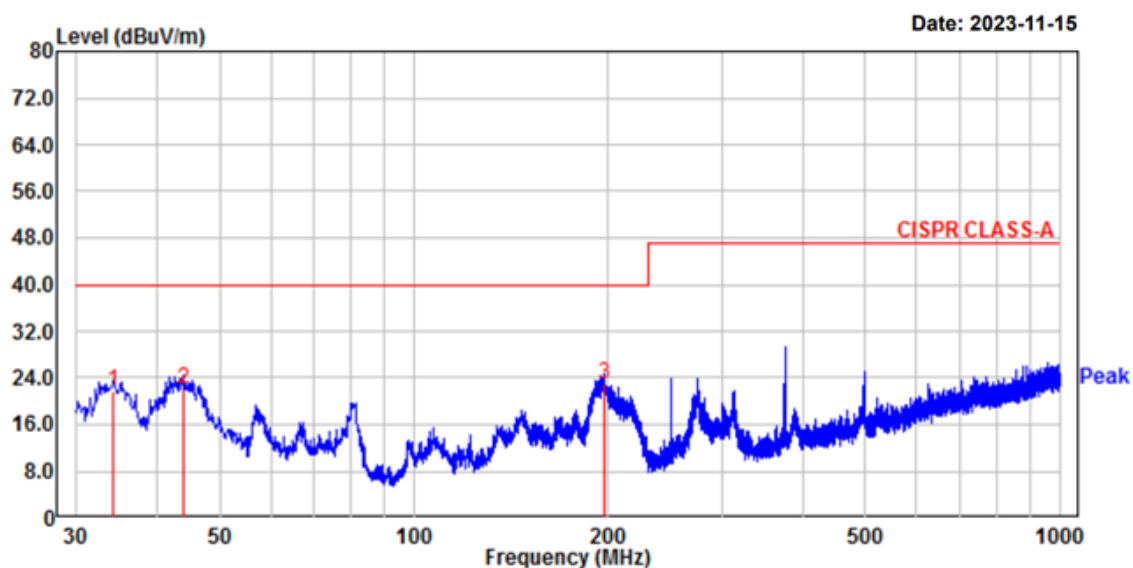
Project No. : 231102-0012

Temp/Humi: 21 'C / 45 % R.H.

Test Mode : Operating

Tested by: HAN M S

Power : AC 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.	34.24	34.90	-13.17	21.73	40.00	18.27	103	307	vertical
2.	43.82	34.00	-11.97	22.03	40.00	17.97	130	6	vertical
3.	196.60	36.30	-13.50	22.80	40.00	17.20	113	6	vertical

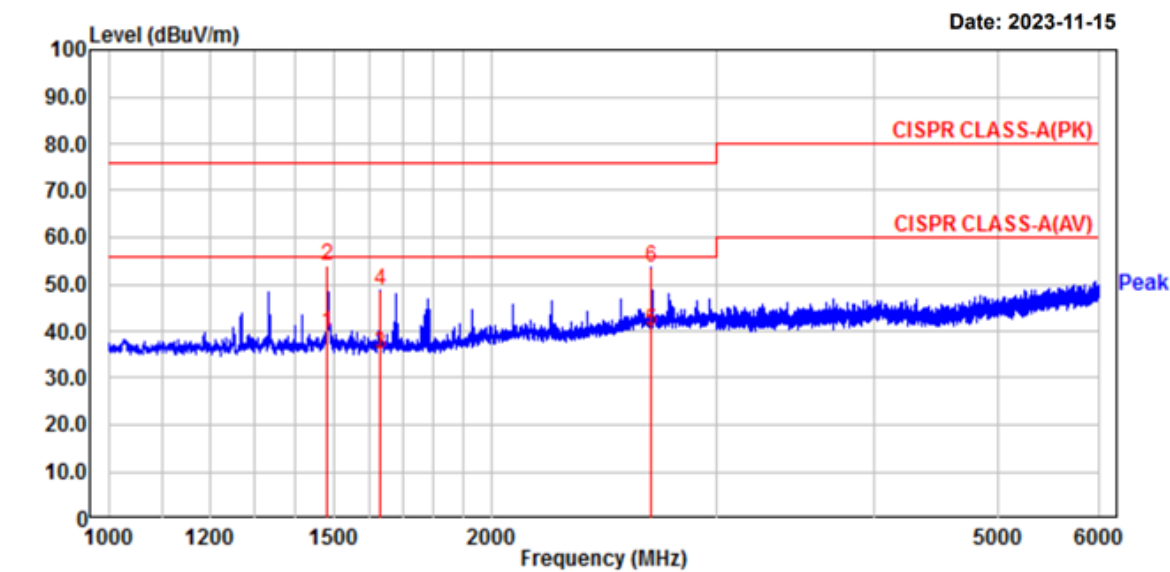
Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Above 1 GHz) / H



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Project No.	: 231102-0012	Temp/Humi:	21 'C / 45 % R.H.
Test Mode	: Operating	Tested by:	HAN M S
Power	: AC 230 V / 50 Hz	Measure distance :	4.3 m



No.	Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin	Height	Angle	Polarity
	MHz	PK	AV	dB	PK	AV	PK	AV	PK	AV	cm	deg	
2.	1482.50	55.79	41.39	-1.95	53.84	39.44	76.00	56.00	22.16	16.56	100	196	horizontal
4.	1631.88	50.30	36.70	-1.72	48.58	34.98	76.00	56.00	27.42	21.02	100	10	horizontal
6.	2670.00	47.21	33.91	6.26	53.47	40.17	76.00	56.00	22.53	15.83	100	154	horizontal

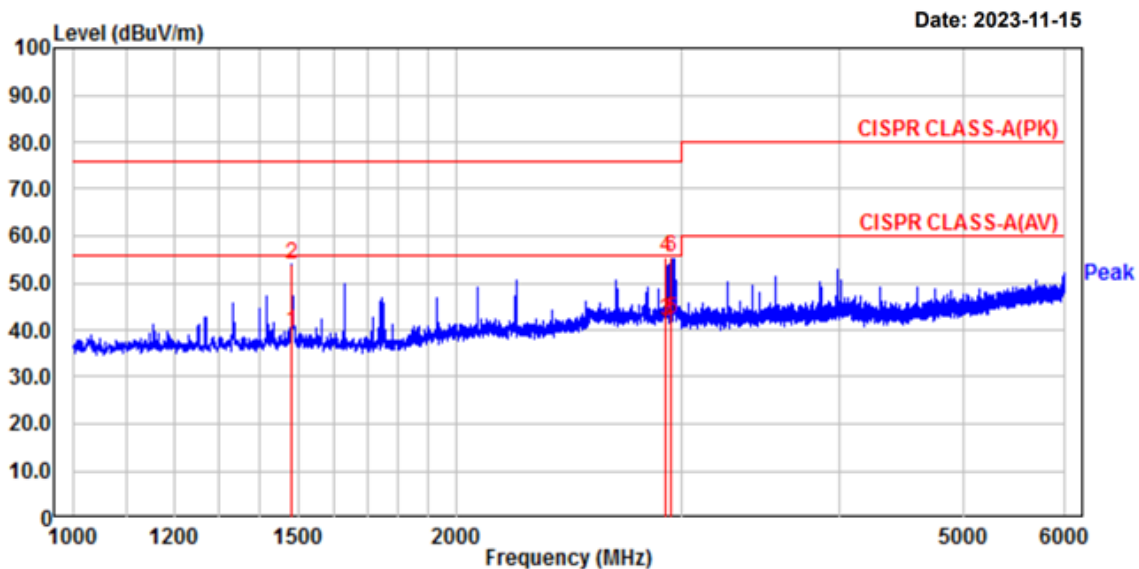
Remarks: C.F (Correction Factor) = Antenna factor + Cable loss + Measure distance - Preamp gain

## Radiated Emissions (Above 1 GHz) / V



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Project No. : 231102-0012 Temp/Humi: 21 'C / 45 % R.H.  
-----  
Test Mode : Operating Tested by: HAN M S  
-----  
Power : AC 230 V / 50 Hz Measure distance : 4.3 m  
-----



No.	Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin	Height	Angle	Polarity
	MHz	PK	AV	dB	PK	AV	PK	AV	PK	AV	cm	deg	
		dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB			
2.	1483.13	55.90	41.60	-1.95	53.95	39.65	76.00	56.00	22.05	16.35	100	218	vertical
4.	2921.88	48.20	34.90	7.13	55.33	42.03	76.00	56.00	20.67	13.97	100	37	vertical
6.	2950.00	48.00	35.10	7.33	55.33	42.43	76.00	56.00	20.67	13.57	100	299	vertical

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

### 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	: 14.438 W
Result	: <b>Not Applicable</b>

**Measurement Data:**

- We did not test EN IEC 61000-3-2 (Harmonic Current Emission) for the AIB-800 because equipment whose rated power is less or equal 75 W don't need to be tested.

## Harmonic Current Emission

15th November 2023 - 16:34:46		Ph:1 Page 1/1		IECSoft v2.7	
		<b>BS EN 61000-3-2:2014</b>			
<b>Fluctuating Harmonics</b>					
<b>Instrument Details</b>					
Instrument Model	PPA5511				
Serial Number	162-04957				
Firmware Version	2.185				
N4L Calibration Date	18th September 2017				
Instrument Version	Standard				
<b>Test Settings</b>					
Class	Class A				
Mode	Operating				
<b>Equipment Under Test</b>					
Brand	Hanwha Vision Co., Ltd.				
Model	AIB-800				
Serial	N/A				
Impedance Network ID	N/A				
<b>Test Conditions</b>					
	<b>User Entered</b>		<b>Measured</b>		
Rated Voltage	N/A		230.862V		
Rated Current	N/A		212.931mA		
Rated Frequency	N/A		50.000Hz		
Rated Power	N/A		14.438W		
<b>Additional Test Information</b>					
Measured Power Factor	0.2937				
Max Current THD	298.33%				
Average THC	201.675mA				
Max Power	15.194W				
Max F.Current	71.144mA				
Average F.Current	68.381mA				
Minimum Current	100A				
Test Duration	2.5 minutes				
<b>Additional Test Details</b>					
Operator	HAN M S				
Lab Name	N/A				
Location	N/A				
Notes	22 °C 42 % R.H.				
Signature					
<b>Results</b>	<b>Test - N/A. Rated Power &lt; 75W</b>				

Test not applicable

With the exception of lighting equipment section 7 of the BS EN 61000-3-2:2014 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 Location	: Shielded Room
Test mode	: Operating mode
Result	: <b>Complies</b>

**Measurement Data:**

- Refer to the Next page

## Voltage Fluctuations and Flicker

15th November 2023 - 16:42:02		Ph:1 Page 1/2		IECSoft v2_7	
		<b>BS EN 61000-3-3:2013</b>			
<b>Flickermeter</b>					
<b>Instrument Details</b>					
Instrument Model	PPA5511				
Serial Number	162-04957				
Firmware Version	2.185				
N4L Calibration Date	18th September 2017				
Instrument Version	Standard				
<b>Test Settings</b>					
Class	Voltage				
Mode	Operating (4.0%)				
Minimum Current	10A				
PST	10 minutes				
PLT	12 PSTs				
<b>Equipment Under Test</b>					
Brand	Hanwha Vision Co., Ltd.				
Model	AIB-800				
Serial	N/A				
Impedance Network ID	N/A				
<b>Test Conditions</b>					
	<b>User Entered</b>		<b>Measured</b>		
Rated Voltage	N/A		230.869V		
Rated Current	N/A		N/A		
Rated Frequency	N/A		50.000Hz		
Rated Power	N/A		N/A		
D max	0.0720% (Limit: 4.0%)				
T max	0.0000 s (Limit: 0.5 s)				
DC max	0.0067% (Limit: 3.3%)				
<b>Additional Test Details</b>					
Operator	HAN M S				
Lab Name	N/A				
Location	N/A				
Notes	22 °C 42 % R.H.				
Signature					
<b>Results</b>	<b>Phase1: PASS</b>				

15th November 2023 - 16:42:02				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		Hanwha Vision Co., Ltd.						
Model		AIB-800						
Serial		N/A						
Flicker Test Results								
PST no.	Status	DC (%)	Dmax (%)	Tmax (s)	PST	PST Lim	PLT	PLT Lim
1	Phase1: NO RESULTS	0.00670	0.07139	0.00000	0.08226	1.00000	0.08226	N/A
2	Phase1: PASS	0.00670	0.07139	0.00000	0.08226	1.00000	0.08226	N/A
3	Phase1: PASS	0.00670	0.07139	0.00000	0.08226	1.00000	0.08226	N/A
4	Phase1: PASS	0.00670	0.07139	0.00000	0.08226	1.00000	0.08226	N/A
5	Phase1: PASS	0.00670	0.07139	0.00000	0.08226	1.00000	0.08226	N/A
6	Phase1: PASS	0.00670	0.07139	0.00000	0.08226	1.00000	0.08226	N/A
7	Phase1: PASS	0.00670	0.07139	0.00000	0.08226	1.00000	0.08226	N/A
8	Phase1: PASS	0.00670	0.07139	0.00000	0.08226	1.00000	0.08226	N/A
9	Phase1: PASS	0.00670	0.07139	0.00000	0.08226	1.00000	0.08226	N/A
10	Phase1: PASS	0.00670	0.07139	0.00000	0.08226	1.00000	0.08226	N/A
11	Phase1: PASS	0.00670	0.07139	0.00000	0.08226	1.00000	0.08226	N/A
12	Phase1: PASS	0.00670	0.07203	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	: 2023. 11. 16.
Test method	: EN 61000-4-2 :2009
Temperature / Humidity / Pressure	: 22 °C / 43 % R.H. / 100.9 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	: <b>Complies</b>

**Measurement Data:**
**ESD Test Point and Result**
**1. Indirect Discharge**

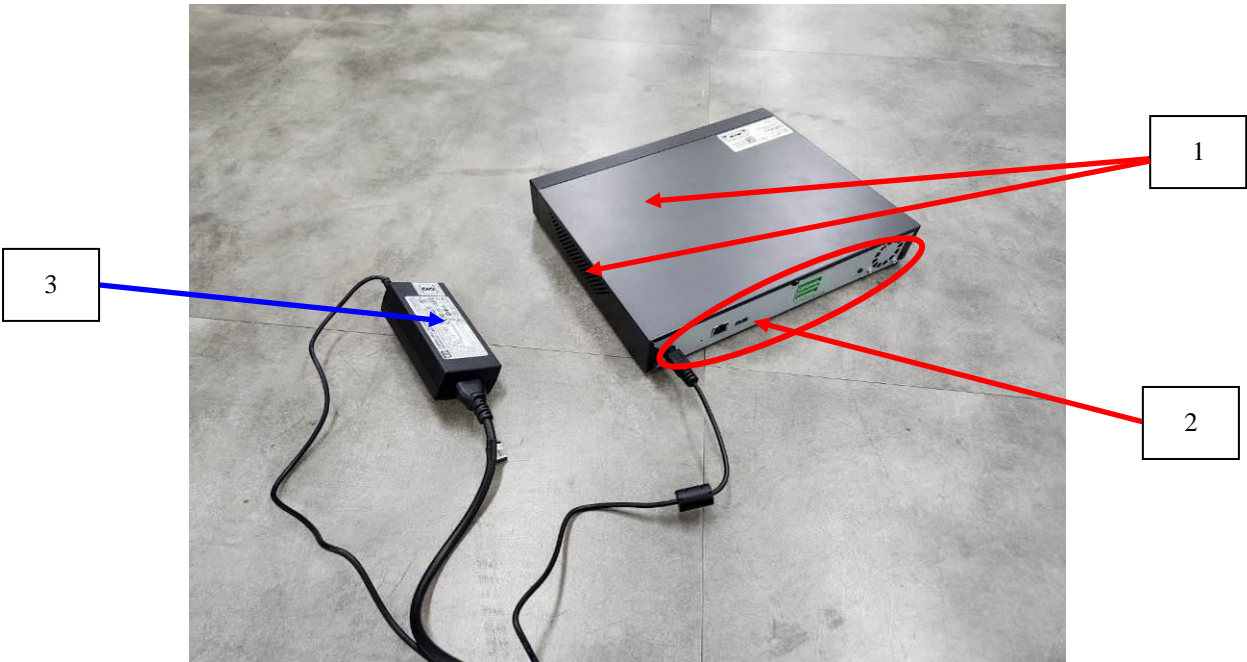
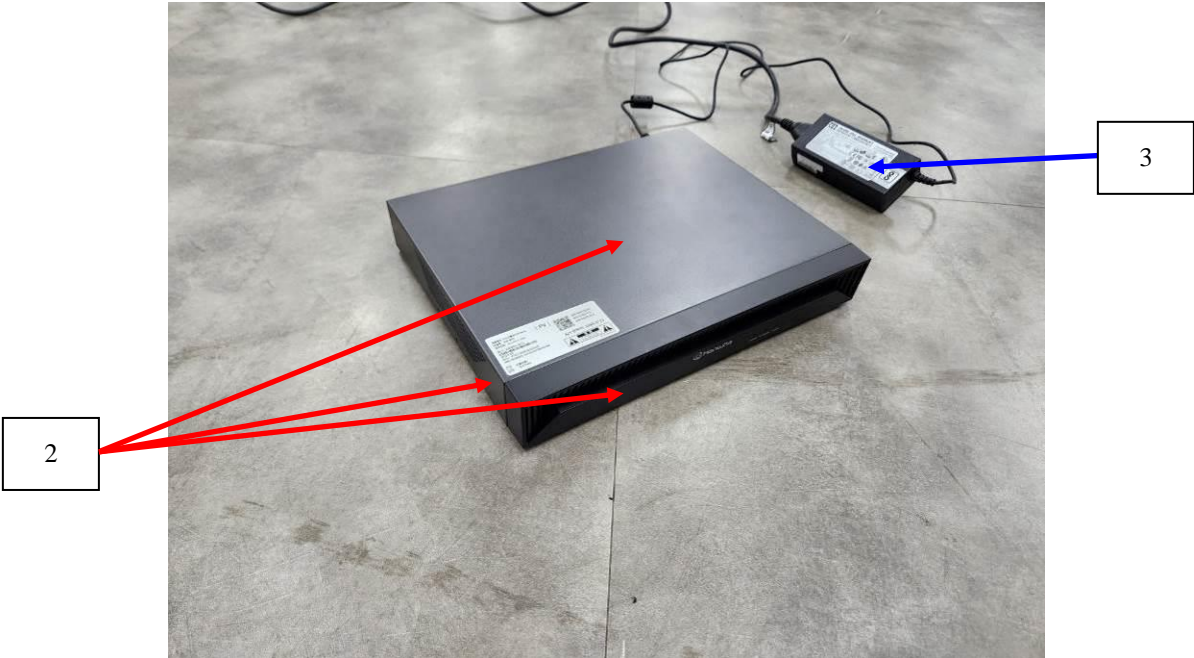
No.	Position	Kind of Discharge	Results	Remarks
1	HCP	Contact	Complies	No reaction recognized
2	VCP	Contact	Complies	No reaction recognized

**2. Direct Discharge**

Position No.	Position	Kind of Discharge	Result	Remarks
1	Enclosure	Contact	Complies	No reaction recognized
2	Port	Contact	Complies	No reaction recognized
3	ADAPTER	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	: 2023. 11. 16
Test method	: EN 61000-4-3:2006/A1:2008/A2:2010
Temperature / Humidity	: 23 °C / 41 % R.H.
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	: <b>Complies</b>

**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

### 3.3.3 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 : 2023. 11. 16  
Test method : EN 61000-4-4:2012  
Temperature / Humidity : 21 °C / 41 % R.H.  
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 Location : Shielded Room  
Test mode : Operating mode  
Result : **Complies**

**Measurement Data:**

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

Signal Line	Test level	Result	Remarks
LAN	±1 kV	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	: 2023. 11. 16
Test method	: EN 61000-4-5:2014/A1:2017
Temperature / Humidity	: 20 °C / 43 % R.H.
Test level	: $\pm 0.5$ kV, $\pm 1$ kV (line to line), $\pm 0.5$ kV, $\pm 1$ kV, $\pm 2$ kV (line to ground)
Polarity	: Negative/ positive
Wave shape	: 1.2/ 50 $\mu$ s pulse
Number of surges	: 5 (at each phase)
Test Location	: Shielded Room
Test mode	: Operating mode
Result	: <b>Complies</b>

#### 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	Test level	Result	Remarks
LAN	$\pm(0.5, 1.0)$ 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

### 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	: 2023. 11. 14.
Test method	: EN 61000-4-6:2014/AC:2015
Temperature / Humidity	: 23 °C / 45 % R.H.
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	: <b>Complies</b>

#### Measurement Data:

Power Port	Result	Remarks
Power	Complies	No reaction recognized

Signal Port	Result	Remarks
LAN	Complies	No reaction recognized
ALARM IN	Complies	No reaction recognized
ALARM 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	: 2023. 11. 16
Test method	: EN 61000-4-11:2004/A1:2017
Temperature / Humidity	: 21 °C / 44 % R.H.
Ut	: 230 Vac
Test Location	: Shielded Room
Test mode	: Operating mode
Result	: <b>Complies</b>

**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	: 2023. 11. 16.
Test method	: EN 61000-4-11:2004/A1:2017
Temperature / Humidity	: 21 °C / 44 % R.H.
Supply Voltage maximum	: $U_{nom} + 10 \%$
Supply Voltage minimum	: $U_{nom} - 15 \%$
Ut	: 230 Vac
Test Location	: Shielded Room
Test mode	: Operating mode
Result	: <b>Complies</b>

#### 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
Unom	+10%	253	Complies	No reaction recognized
Unom	-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
<input checked="" type="checkbox"/>	EMI TEST Receiver	ESR	Rohde & Schwarz	101499	2024.03.13	1 year
<input checked="" type="checkbox"/>	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	100710	2024.03.13	1 year
<input type="checkbox"/>	ISN	ISN T800	TESEQ	27109	2024.08.17	1 year
<input checked="" type="checkbox"/>	ISN	ENY81-CA6	Rohde & Schwarz	101565	2024.08.17	1 year
<input type="checkbox"/>	ISN	ISN S8	Schwarzbeck	79	2024.08.17	1 year
<input type="checkbox"/>	CURRENT PROBE	EZ-17	Rohde & Schwarz	100508	2024.08.23	1 year
<input type="checkbox"/>	CDN	TSCDN-C1-BNC-75	F.C.C	07004	2024.03.13	1 year
<input type="checkbox"/>	LISN	ESH3-Z6	Rohde & Schwarz	100378	2024.08.22	1 year
<input type="checkbox"/>	LISN	ESH3-Z6	Rohde & Schwarz	101468	2024.08.22	1 year
<input checked="" type="checkbox"/>	LISN(main)	ENV216	Rohde & Schwarz	102872	2024.09.07	1 year
<input checked="" type="checkbox"/>	LISN(sub)	LT32C/10	AFJ	32031518210	2024.08.22	1 year
<input checked="" type="checkbox"/>	TEST PROGRAM	e3_ce 20181212a (V9)	AUDIX	-	-	-

#### Radiated Emissions – Below 1 GHz

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
<input checked="" type="checkbox"/>	EMI TEST Receiver	ESCI7	Rohde & Schwarz	100772	2024.08.22	1 year
<input checked="" type="checkbox"/>	Amplifier	8447D	HP	1937A03453	2024.08.22	1 year
<input checked="" type="checkbox"/>	BILOG Antenna	VULB 9168	SCHWARZBECK	749	2025.03.29	2 year
<input checked="" type="checkbox"/>	TEST PROGRAM	e3 20181212a (V9)	AUDIX	-	-	-

#### Radiated Emissions – Above 1 GHz

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
<input checked="" type="checkbox"/>	EMI TEST Receiver	ESCI7	Rohde & Schwarz	100772	2024.08.22	1 year
<input type="checkbox"/>	EMI TEST Receiver	ESU	Rohde & Schwarz	100092	2024.08.22	1 year
<input checked="" type="checkbox"/>	Amplifier	8449B	Agilent	3008A02126	2024.03.14	1 year
<input type="checkbox"/>	Amplifier	PAM-840A	COM-POWER	461314	2024.03.15	1 year
<input type="checkbox"/>	HORN ANTENNA	3116B	ETS	133350	2024.03.22	1 year
<input type="checkbox"/>	HORN ANTENNA	3116B	ETS	81109	2024.04.25	1 year
<input checked="" type="checkbox"/>	HORN ANTENNA	3115	ETS	114105	2024.04.20	1 year
<input checked="" type="checkbox"/>	TEST PROGRAM	e3 20181212a (V9)	AUDIX	-	-	-

**Harmonic Current Emission / Voltage Fluctuations and Flicker**

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
<input checked="" type="checkbox"/>	Precision Power Analyzer	PPA5511	Newtons4th Ltd	162-04957	2024.08.18	1 year
<input checked="" type="checkbox"/>	Reference Impedance Network	ES4152	NF Corp.	9074424	2024.08.18	1 year

**Electrostatic Discharge**

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
<input checked="" type="checkbox"/>	ESD Simulator	ESS-2000	NOISEKEN	8000C03241	2024.08.22	1 year
<input checked="" type="checkbox"/>	ESD GUN	TC-815R	NOISEKEN	ESS0382069	2024.08.22	1 year

**RF Electromagnetic Field**

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
<input checked="" type="checkbox"/>	Signal Generator	E4432B	Agilent	MY41310673	2024.08.22	1 year
<input checked="" type="checkbox"/>	Power Meter	E4419B	Agilent	GB38410133	2024.03.14	1 year
<input checked="" type="checkbox"/>	Power Sensor	E9300A	Agilent	MY41497992	2024.03.14	1 year
<input checked="" type="checkbox"/>	Power Sensor	E9300A	Agilent	MY41497618	2024.03.14	1 year
<input checked="" type="checkbox"/>	WIDE BAND HIGH POWER AMPLIFIER	ITA0300KL-500	INFINITECH	0300KL 20 09 001	-	-
<input checked="" type="checkbox"/>	RF POWER AMPLIFIER	ITA2000KL-120	INFINITECH	200KL 1507 001	-	-
<input checked="" type="checkbox"/>	RF POWER AMPLIFIER	ITA4500KL-70	INFINITECH	4500KL 1507 001	-	-
<input checked="" type="checkbox"/>	RF POWER AMPLIFIER	ITA0750KL-300	INFINITECH	0750KL 1507 001	-	-
<input checked="" type="checkbox"/>	Log.-Per. Antenna (80 MHz ~ 3 GHz)	K9128	RAPA	NONE	-	-
<input checked="" type="checkbox"/>	Signal Generator	E4438C	Agilent	MY42080843	2024.08.22	-
<input checked="" type="checkbox"/>	HORN ANTENNA	BBHA 9120 A	SCHWARZBECK	BBHA 9120 A 481	-	-

**Electrical Fast Transients**

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
<input checked="" type="checkbox"/>	Compact Generator	Compact NX	EMTEST	P1725200196	2024.08.23	1 year
<input checked="" type="checkbox"/>	AC Power Source	Variac NX	EMTEST	P1745207276	2024.08.23	1 year
<input checked="" type="checkbox"/>	Capacitive Coupling Clamp	CCI	EMTEST	P1744207071	2024.08.23	1 year

**Surges**

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
<input checked="" type="checkbox"/>	Compact Generator	Compact NX	EMTEST	P1725200196	2024.08.23	1 year
<input checked="" type="checkbox"/>	AC Power Source	Variac NX	EMTEST	P1745207276	2024.08.23	1 year
<input checked="" type="checkbox"/>	CDN	CNV 508T5	EMTEST	P1742204940	2024.08.23	1 year
<input type="checkbox"/>	CDN	CNV 508N1	EMTEST	P1742204940	2024.08.23	1 year

**Conducted Disturbances, Induced by Radio-Frequency Fields**

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
<input checked="" type="checkbox"/>	Signal generator	SML03	R&S	103026/0013	2024.03.14	1 year
<input checked="" type="checkbox"/>	POWER METER	NRVD	R&S	101689	2024.03.14	1 year
<input checked="" type="checkbox"/>	POWER Sensor	URV5-Z2	R&S	100755	2024.03.14	1 year
<input checked="" type="checkbox"/>	POWER Sensor	URV5-Z2	R&S	100756	2024.03.14	1 year
<input checked="" type="checkbox"/>	RF Power Amplifier	FLL75A	FRANKONIA	1033	-	-
<input checked="" type="checkbox"/>	EM INJECTION CLAMP	TSIC-23	F.C.C	529	2024.03.16	1 year
<input type="checkbox"/>	CDN (M1)	TSCDN-M1-16A	F.C.C	07004	2024.08.22	1 year
<input type="checkbox"/>	CDN (M2)	TSCDN-M2-16A	F.C.C	07008	2024.08.22	1 year
<input type="checkbox"/>	CDN (M2)	TSCDN-M2-16A	F.C.C	07009	2024.03.13	1 year
<input checked="" type="checkbox"/>	CDN (M3)	TSCDN-M3-16A	F.C.C	07016	2024.03.13	1 year
<input checked="" type="checkbox"/>	CDN (M3)	TSCDN-M3-16A	F.C.C	07017	2024.08.22	1 year

**Voltage dips and Interruptions**

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
<input checked="" type="checkbox"/>	Compact Generator	Compact NX	EMTEST	P1725200196	2024.08.23	1 year
<input checked="" type="checkbox"/>	AC Power Source	Variac NX	EMTEST	P1745207276	2024.08.23	1 year

**Mains supply voltage variations**

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
<input checked="" type="checkbox"/>	Multifunctional AC/DC Power source	NetWave 3.1-230	EMTEST	P2119252057	2024.08.22	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**

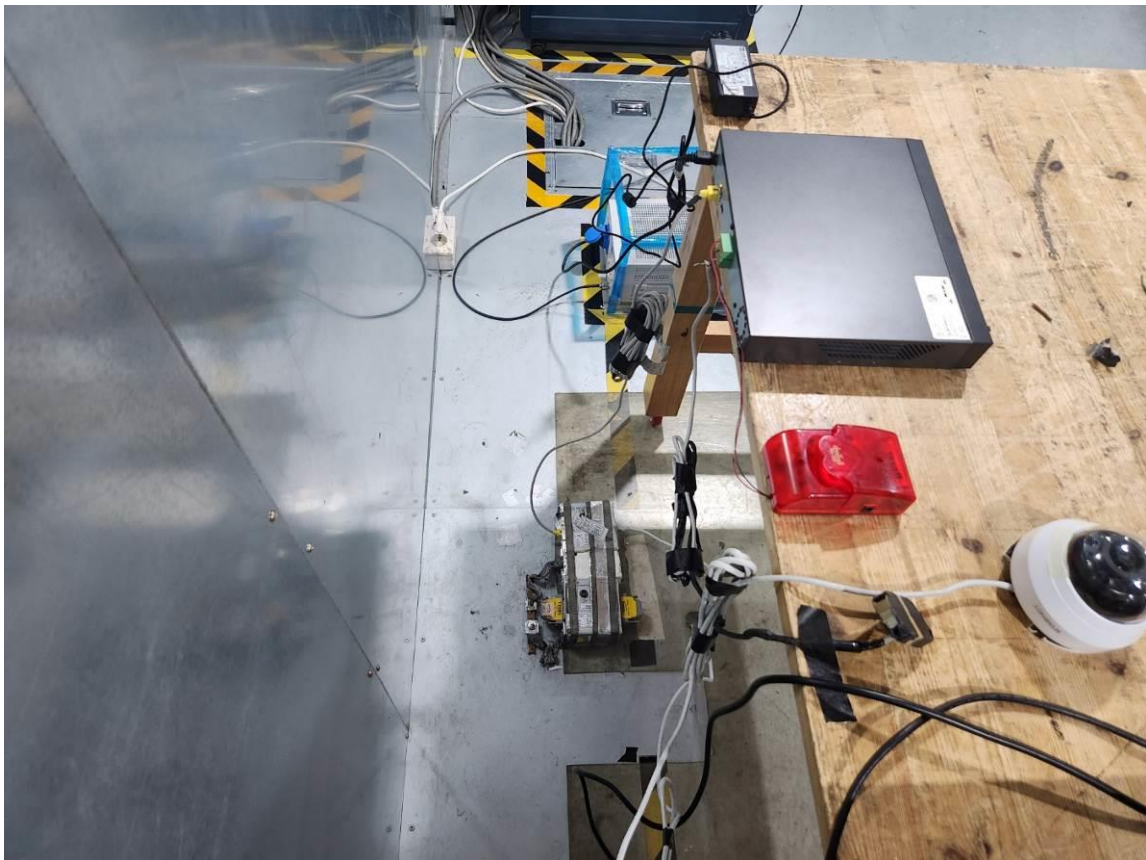
**PHOTOGRAPHS**



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## Conducted Emissions

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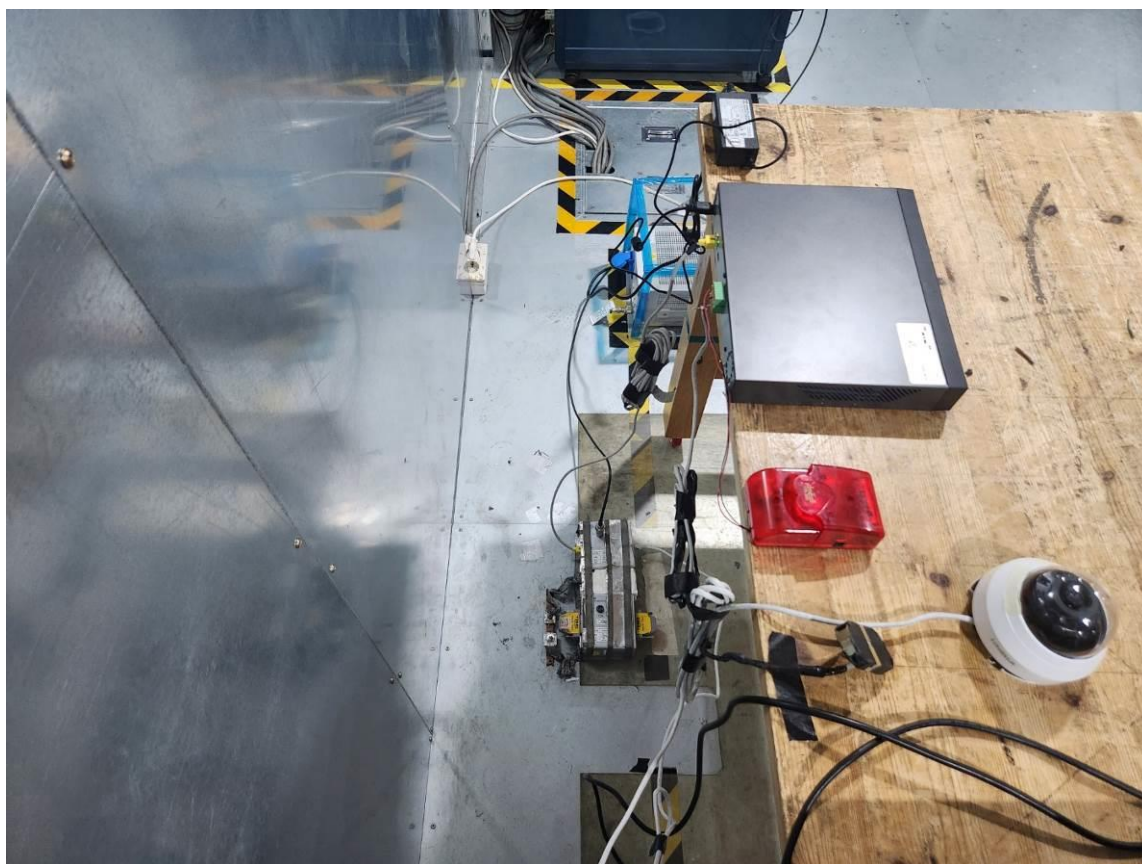




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## Conducted Emissions (TEL)

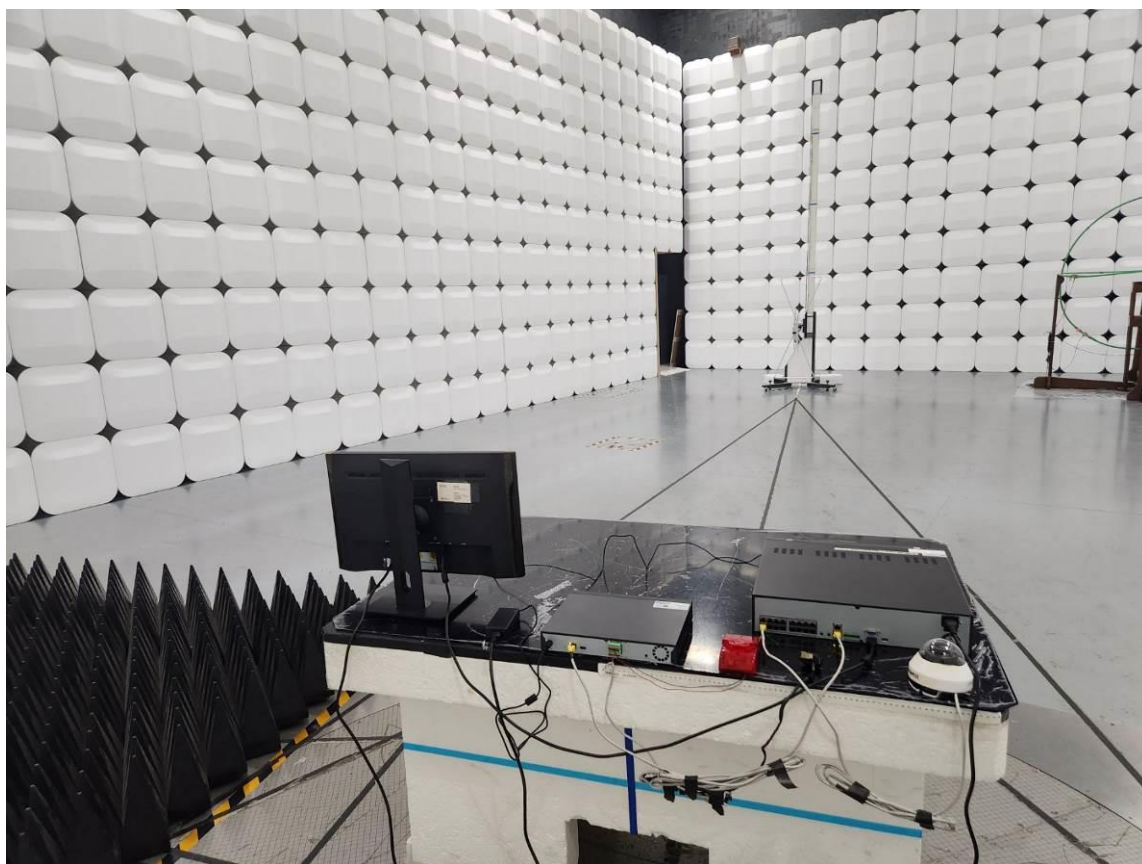
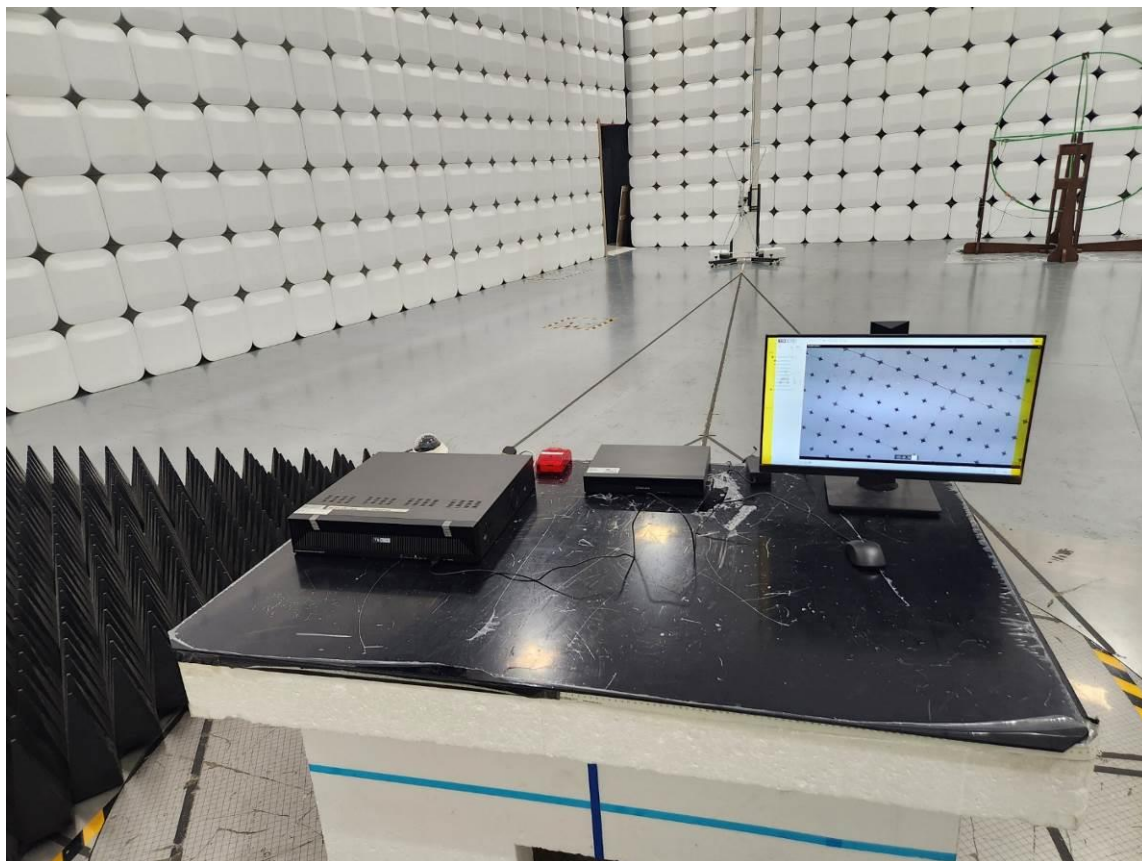
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## Radiated Emissions - Below 1 GHz

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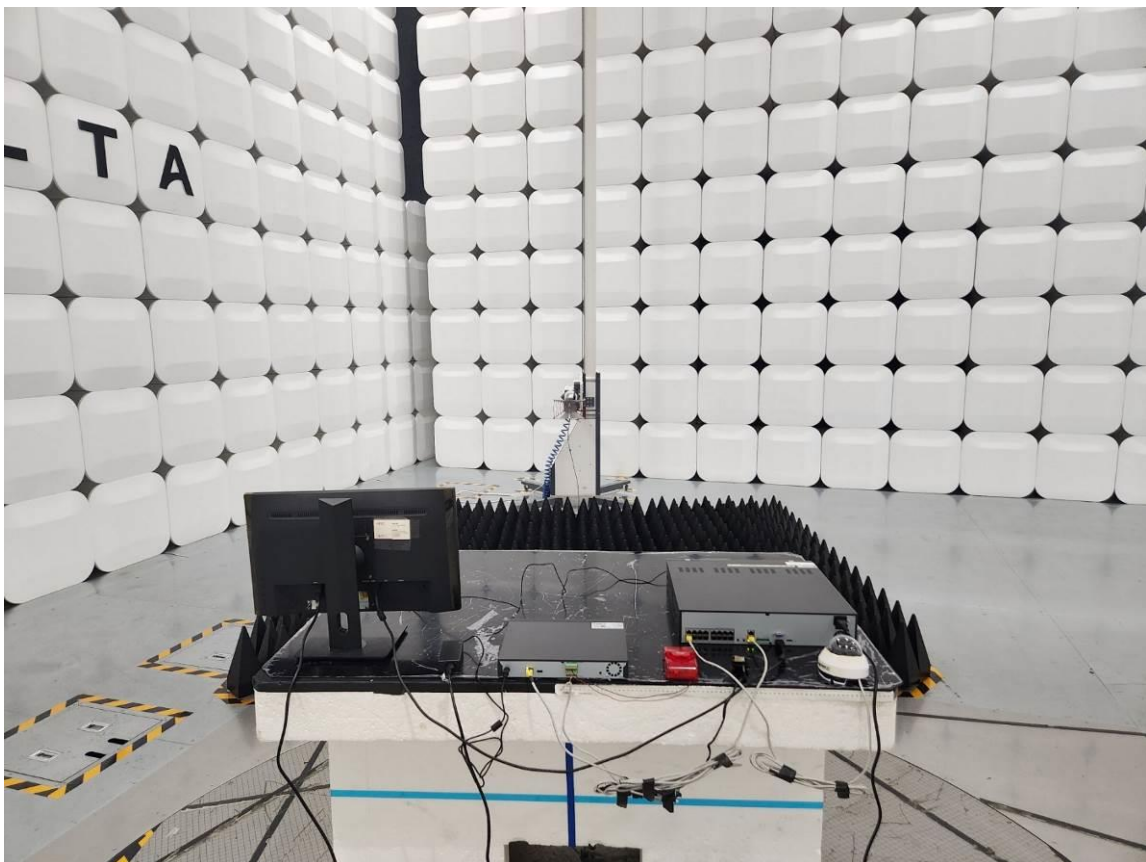
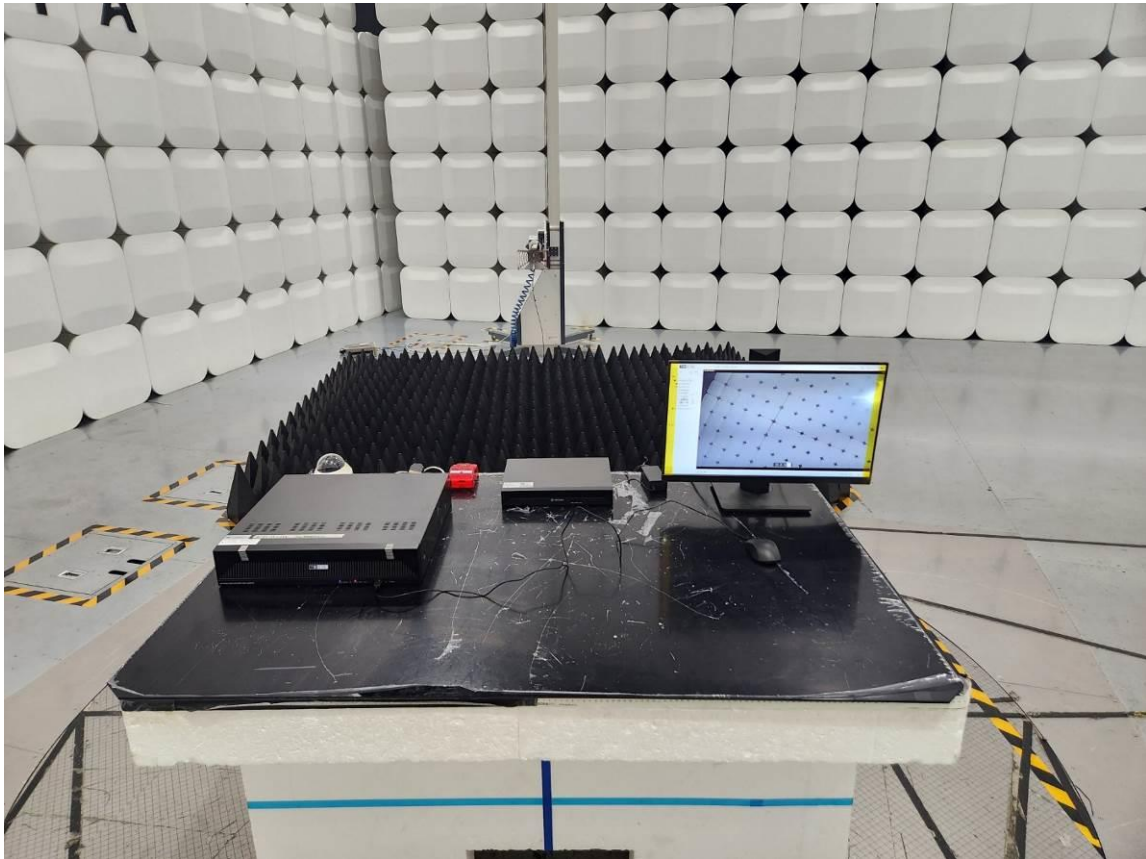




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## Radiated Emissions - Above 1 GHz

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## Harmonic Current Emission / Voltage Fluctuations and Flicker

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## Electrostatic Discharge

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## RF Electromagnetic Field

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## Electrical Fast Transients

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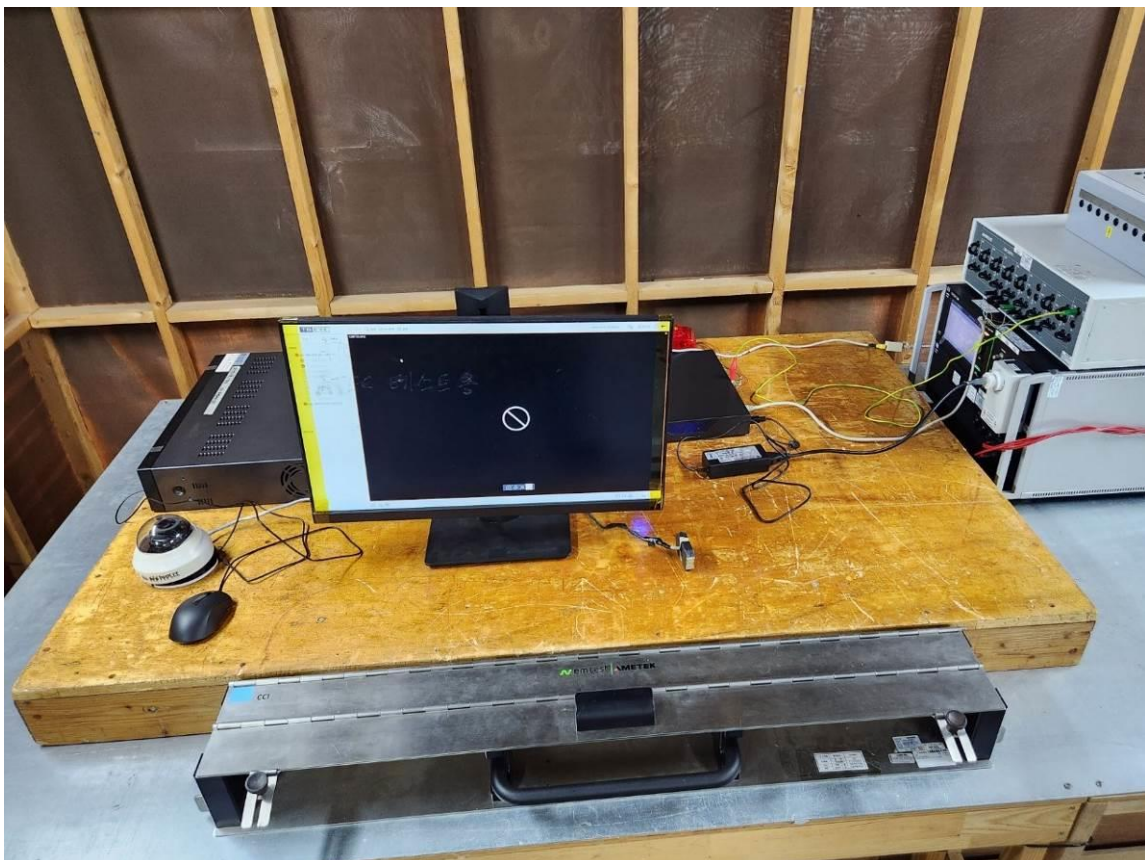




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## Surges

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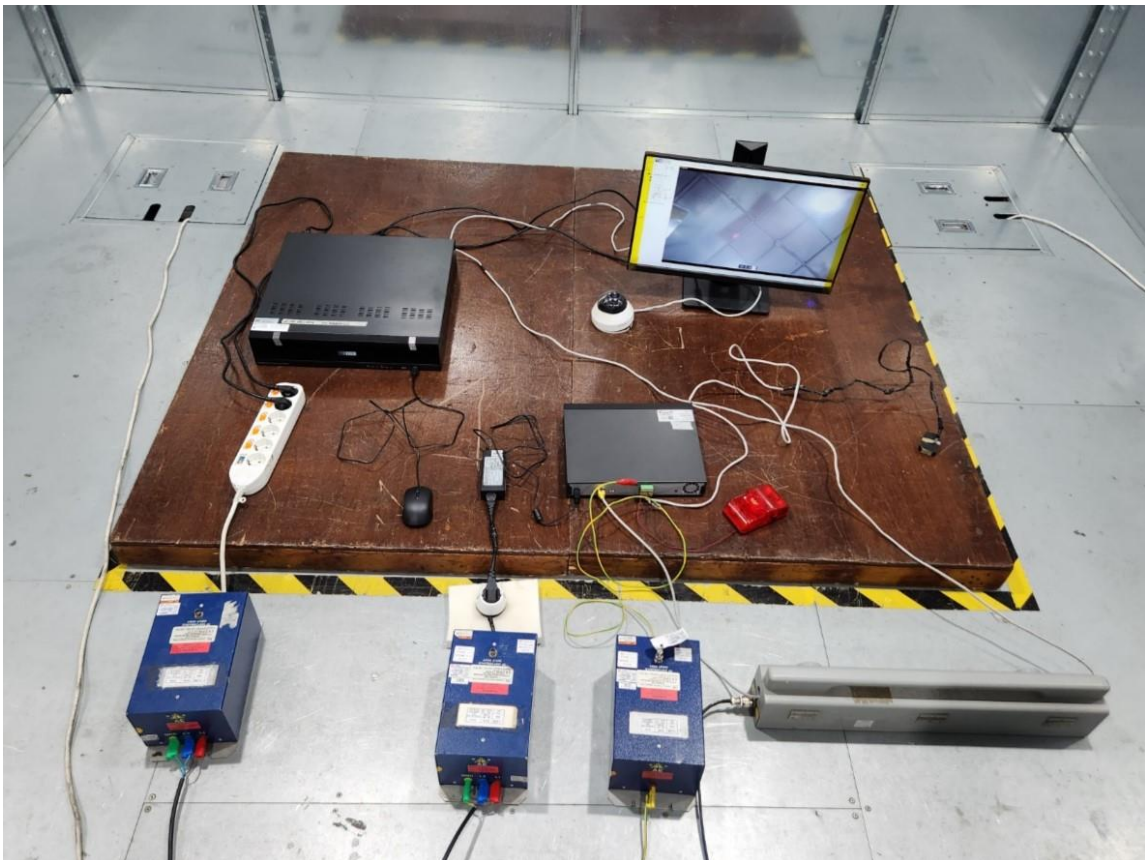
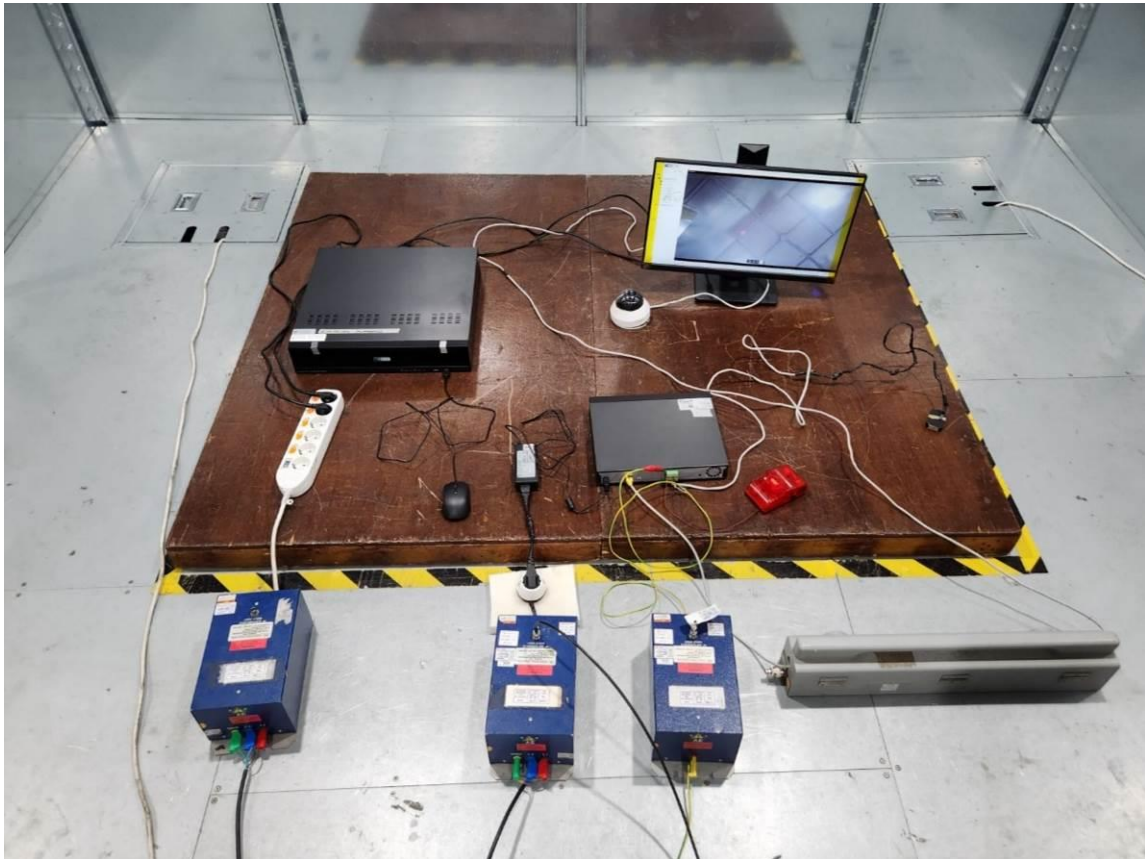




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## Conducted Disturbances, Induced by Radio-Frequency Fields

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## Voltage dips and short interruptions

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## Main supply Voltage Variation

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## EUT

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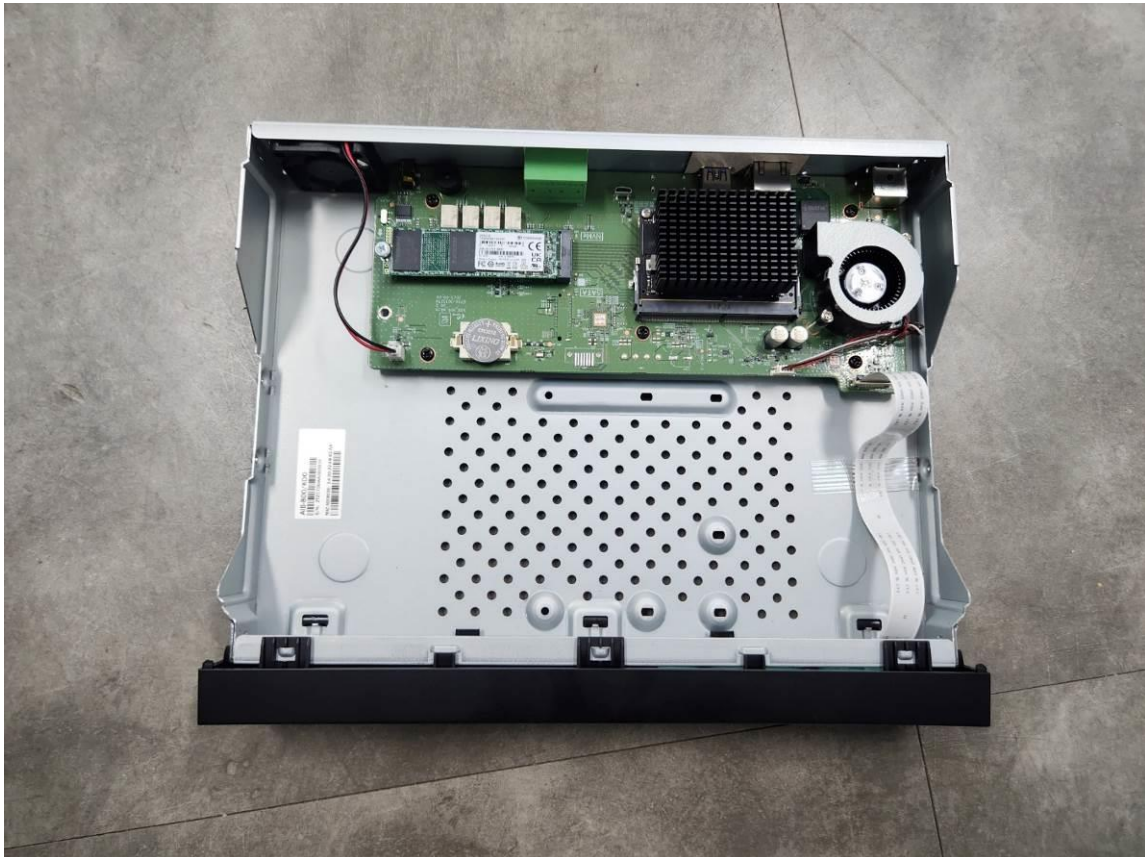




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## EUT

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## Modification

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