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EMC TEST REPORT

Dates of Tests: July 28 - 29, 2023

Test Report S/N: LR500122307I

Test Site : LTA Co., Ltd.

Model No.

ARN-810S

APPLICANT

Hanwha Vision Co., Ltd

Equipment Name : Network Video Recorder
Manufacturer : Hanwha Vision Co., Ltd
Model name : ARN-810S
Test Device Serial No.: Identification
Rule Part(s) : AS/NZS CISPR 32:2015
CISPR 32 Ed2.0

Date of issue : August 10, 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.

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	10.07.2023	LR500122307I	Initial
1	10.08.2023	LR500122308S	Change the adapter



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1. General information's

1-1 Test Performed

Company name : **LTA Co., Ltd**
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Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “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	2023-09-10	VCCI registration
		T-12416	2023-09-10	
		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 : +82-70-7147-8361

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
 Category : Network Video Recorder
 Model name : ARN-810S
 Serial number : Identification
 Date of receipt : July 24, 2023
 EUT condition : Pre-production, not damaged
 Interface Ports : NETWORK 1 LAN #1~LAN #8, NETWORK 2, USB #1, #2, HDMI, GND, DC IN
 Power rating : DC 54 V, 1.2 A

2-3 Modification

-NONE

2-4 Test conditions

Temp. / Humid. : (23 - 24) °C / (54 - 56) % R.H.
 Tested Model : ARN-810S
 Test mode : Operating mode
 Test Voltage : AC 240 V, 50 Hz

2-5 List of EUT and ACCESSORY

EUT				
Equipment Name	Model Name	Serial No.	Manufacturer	Remarks
Network Video Recorder	ARN-810S	N/A	HANWHA VISION VIETNAM COMPANY LIMITED D-TECH CO., LTD.	-
Mouse	MOKJUO	02T05870	Primax Electronics Ltd.	-
ADAPTER	FSP090-AWAN3	N/A	Zhonghan Electronics (Shenzhen) Co., Ltd.	-
ACCESSORY				
Equipment Name	Model Name	Serial No.	Manufacturer	Remarks
LAN HUB	SW1600-mini	N/A	IpTIME	-
IP CAMERA	SNV-6012MP	C9386V2D70000 WR	SAMSUNG	-
USB MEMORY STICK	SDCZ50-016G	N/A	SANDISK	-
NOTEBOOK	ELITE BOOK	N/A	HP	-
MONITOR	N/A	N/A	ATEC	-

2-6 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
	NETWORK 1 LAN #1	IP CAMERA	LAN	3.0	NO
	NETOWRK 1 LAN #2~#8	LAN HUB	LAN #1~#7	1.0	NO
	HDMI	MONITOR	HDMI	1.0	YES
	USB #1	MOUSE	USB	1.0	NO
	USB #2	USB MEMORY STICK	-	-	NO
	GND	GND	-	1.0	NO
	NETWORK 2	NOTEBOOK	LAN	3.0	NO
ADAPTER	AC IN	AC POWER SOURCE	3 PIN AC LINE	1.0	NO
MONITOR	AC IN	AC POWER SOURCE	3 PIN AC LINE	1.0	NO

3. Test Report

3.1 Summary of tests

Parameter	Applied Standard	Status
I. Emission		
Conducted Emissions	AS/NZS CISPR 32:2015	C
Radiated Emissions	AS/NZS CISPR 32:2015	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.



4. Test Items

4-1 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/Telecommunication ports.

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

Test method	: AS/NZS CISPR 32:2015
Measurement Frequency range	: 150 kHz - 30 MHz
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 Factor

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.

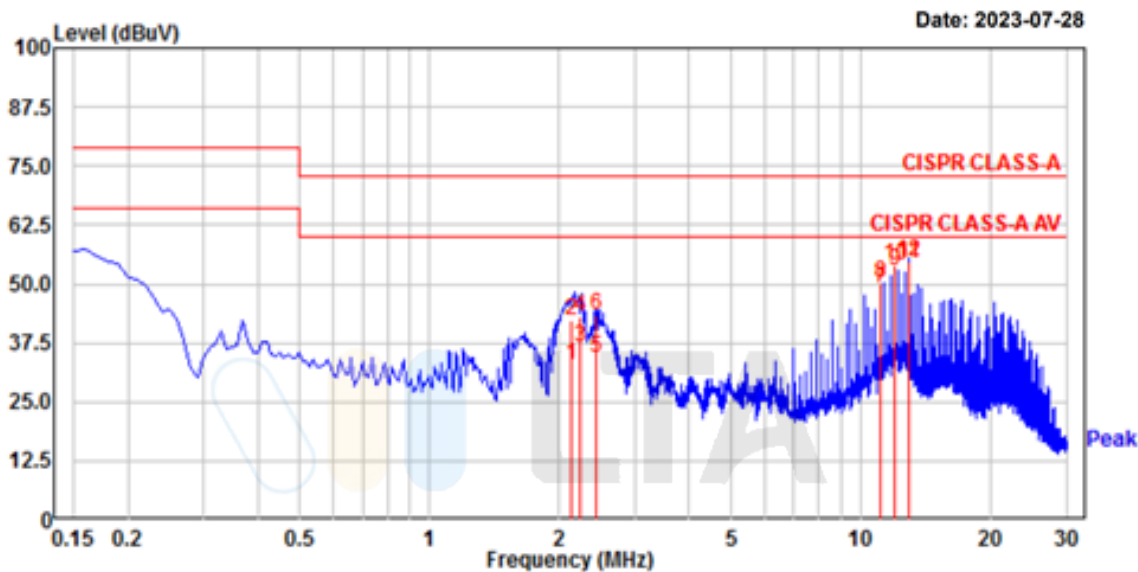
Note 2: The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150 Ω to the telecommunication port under test (conversion factor is $20 \log_{10} 150/I = 44$ dB)

Conducted Emissions (LINE)



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Project No.	: 230724-0156	Phase	: LINE
Test Mode	: Operating	Test Power	: AC 240 V / 50 Hz
Temp./ Humi.	: 23 'C / 54 % 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.	2.133	22.74	13.38	19.55	42.29	32.93	73.00	60.00	30.71	27.07	Line
4.	2.226	23.59	17.03	19.56	43.15	36.59	73.00	60.00	29.85	23.41	Line
6.	2.438	23.92	14.60	19.56	43.48	34.16	73.00	60.00	29.52	25.84	Line
8.	11.063	30.40	29.32	19.85	50.25	49.17	73.00	60.00	22.75	10.83	Line
10.	11.966	34.01	32.89	19.88	53.89	52.77	73.00	60.00	19.11	7.23	Line
12.	12.869	34.85	34.47	19.90	54.75	54.37	73.00	60.00	18.25	5.63	Line

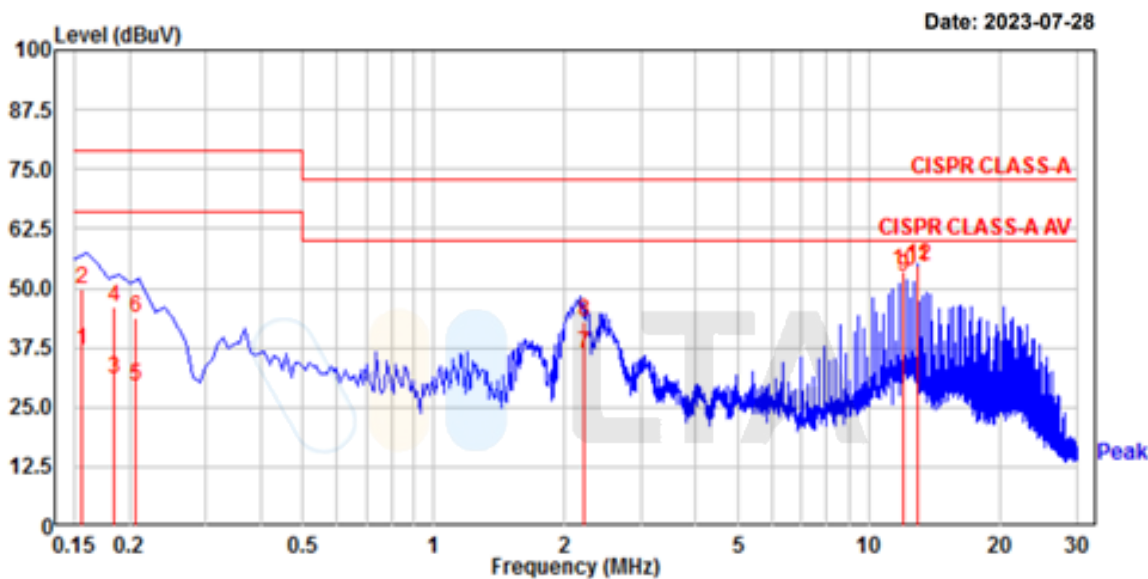
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

Conducted Emissions (NEUTRAL)



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Project No.	: 230724-0156	Phase	: NEUTRAL
Test Mode	: Operating	Test Power	: AC 240 V / 50 Hz
Temp./ Humi.	: 23 'C / 54 % 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.	0.156	30.22	17.45	19.41	49.63	36.86	79.00	66.00	29.37	29.14	neutral
4.	0.185	26.73	11.68	19.41	46.14	31.09	79.00	66.00	32.86	34.91	neutral
6.	0.207	24.19	9.90	19.42	43.61	29.32	79.00	66.00	35.39	36.68	neutral
8.	2.205	23.36	16.70	19.52	42.88	36.22	73.00	60.00	30.12	23.78	neutral
10.	11.966	33.89	32.72	19.87	53.76	52.59	73.00	60.00	19.24	7.41	neutral
12.	12.869	34.87	34.47	19.89	54.76	54.36	73.00	60.00	18.24	5.64	neutral

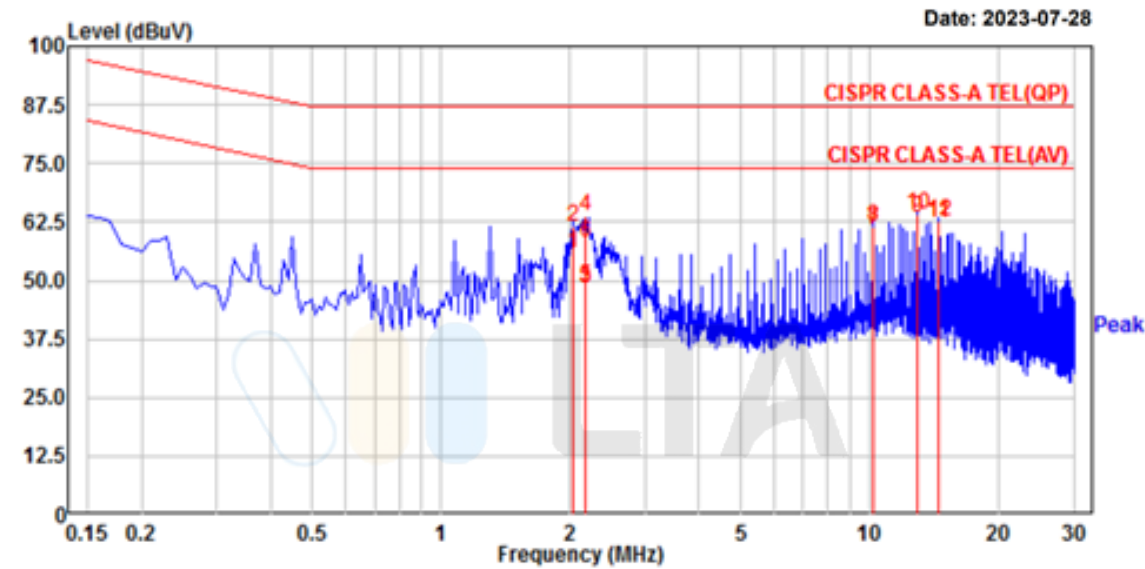
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

Conducted Emissions (TEL_1000 M) #1



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Project No.	: 230724-0156	Phase	: TEL_1000M #1
Test Mode	: Operating	Test Power	: AC 240 V / 50 Hz
Temp./ Humi.	: 23 'C / 54 % 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.	2.030	42.08	36.50	19.31	61.39	55.81	87.00	74.00	25.61	18.19	Line
4.	2.164	44.46	29.12	19.31	63.77	48.43	87.00	74.00	23.23	25.57	Line
6.	2.174	38.81	29.37	19.31	58.12	48.68	87.00	74.00	28.88	25.32	Line
8.	10.160	41.86	41.45	19.49	61.35	60.94	87.00	74.00	25.65	13.06	Line
10.	12.870	44.59	43.92	19.54	64.13	63.46	87.00	74.00	22.87	10.54	Line
12.	14.450	42.90	42.61	19.58	62.48	62.19	87.00	74.00	24.52	11.81	Line

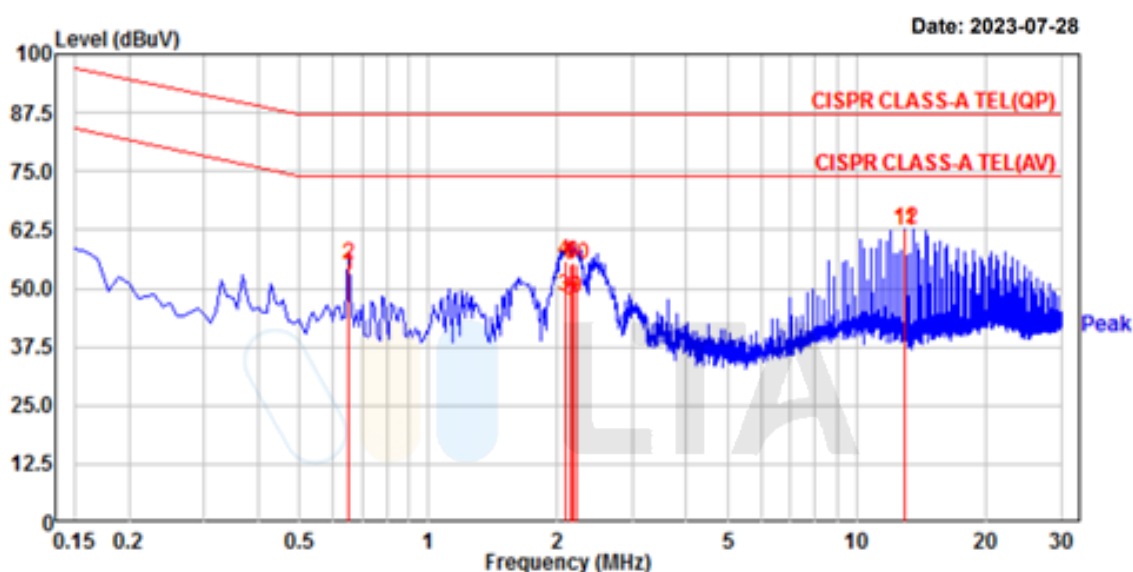
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

Conducted Emissions (TEL_1000 M) / #2



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Project No.	: 230724-0156	Phase	: TEL_1000M #2
Test Mode	: Operating	Test Power	: AC 240 V / 50 Hz
Temp./ Humi.	: 23 'C / 54 % 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.	0.650	35.79	33.50	19.37	55.16	52.87	87.00	74.00	31.84	21.13	Line
4.	2.082	36.48	29.15	19.31	55.79	48.46	87.00	74.00	31.21	25.54	Line
6.	2.142	35.69	28.07	19.31	55.00	47.38	87.00	74.00	32.00	26.62	Line
8.	2.177	36.03	27.33	19.31	55.34	46.64	87.00	74.00	31.66	27.36	Line
10.	2.223	35.90	28.72	19.32	55.22	48.04	87.00	74.00	31.78	25.96	Line
12.	12.870	43.21	42.89	19.54	62.75	62.43	87.00	74.00	24.25	11.57	Line

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

4-2 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	: AS/NZS CISPR 32:2015
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 only 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 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) / H

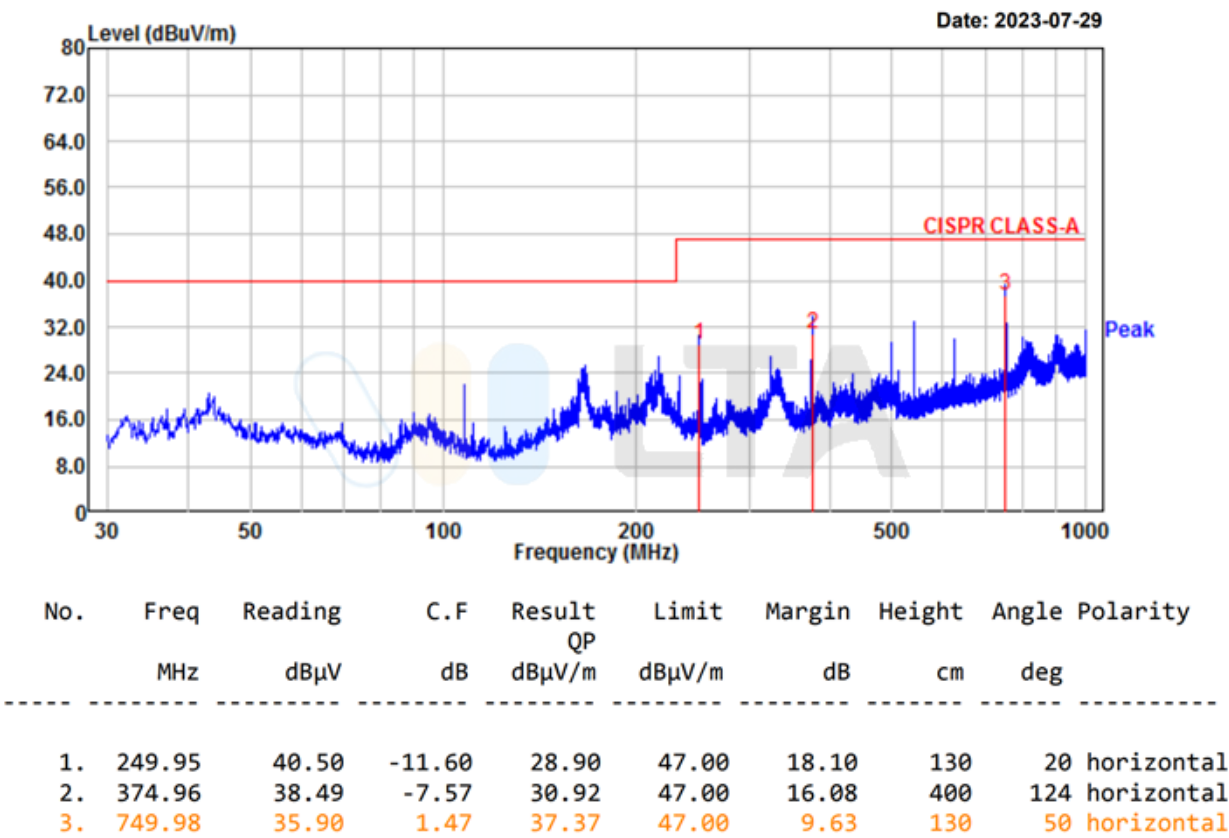


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Project No. : 230724-0156 Temp/Humi: 24 'C / 56 % R.H.

Test Mode : Operating Tested by: AHN H Y

Power : AC 240 V / 50 Hz



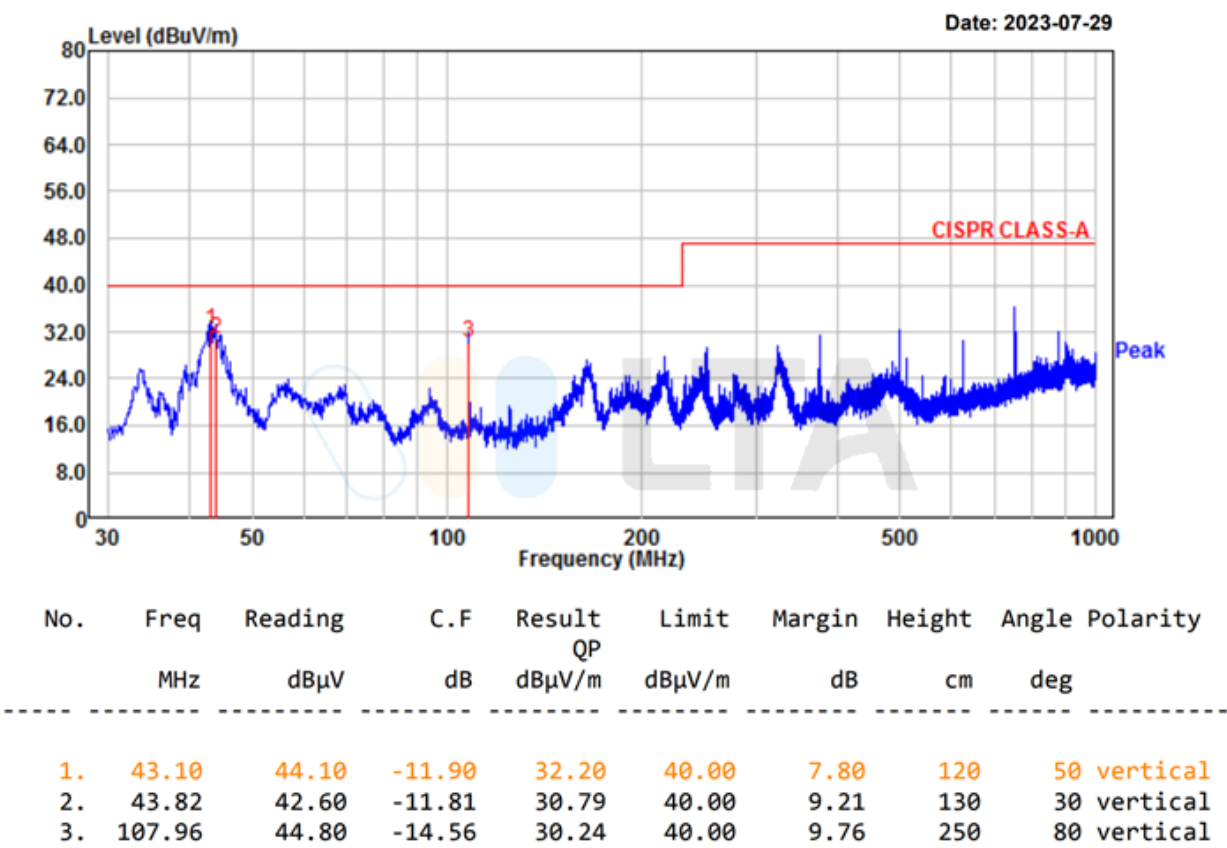
Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Below 1 GHz) / V



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Project No.	: 230724-0156	Temp/Humi:	24 'C / 56 % R.H.
Test Mode	: Operating	Tested by:	AHN H Y
Power	: AC 240 V / 50 Hz		



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

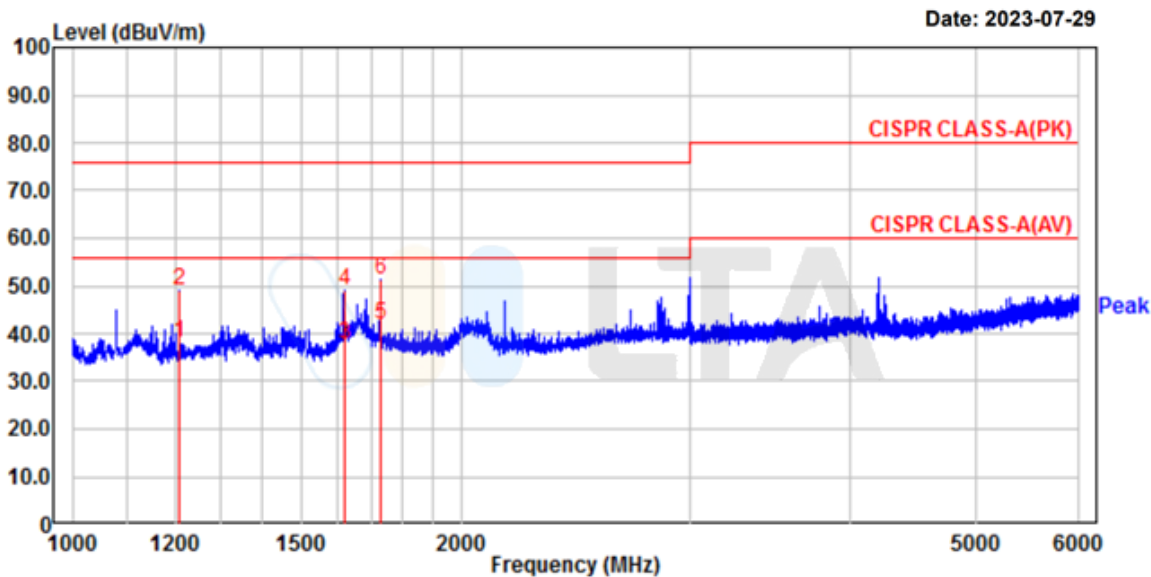
Radiated Emissions

(Above 1 GHz) / H



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Project No.	: 230724-0156	Temp/Humi:	24 'C / 56 % R.H.
Test Mode	: Operating	Tested by:	AHN H Y
Power	: AC 240 V / 50 Hz	Measure distance :	3.8 m



No.	Freq MHz	RD		C.F	Result		Limit		Margin		Height		Angle deg	Polarity
		PK dBμV	AV dBμV		PK dBμV	AV dBμV	PK dBμV	AV dBμV	PK dB	AV dB	cm	deg		
2.	1207.50	53.27	42.50	-4.38	48.89	38.12	76.00	56.00	27.11	17.88	100	350	horizontal	
4.	1620.00	52.02	40.59	-2.84	49.18	37.75	76.00	56.00	26.82	18.25	100	38	horizontal	
6.	1728.13	53.68	44.20	-2.41	51.27	41.79	76.00	56.00	24.73	14.21	100	56	horizontal	

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

(Above 1 GHz) / V



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Project No. : 230724-0156

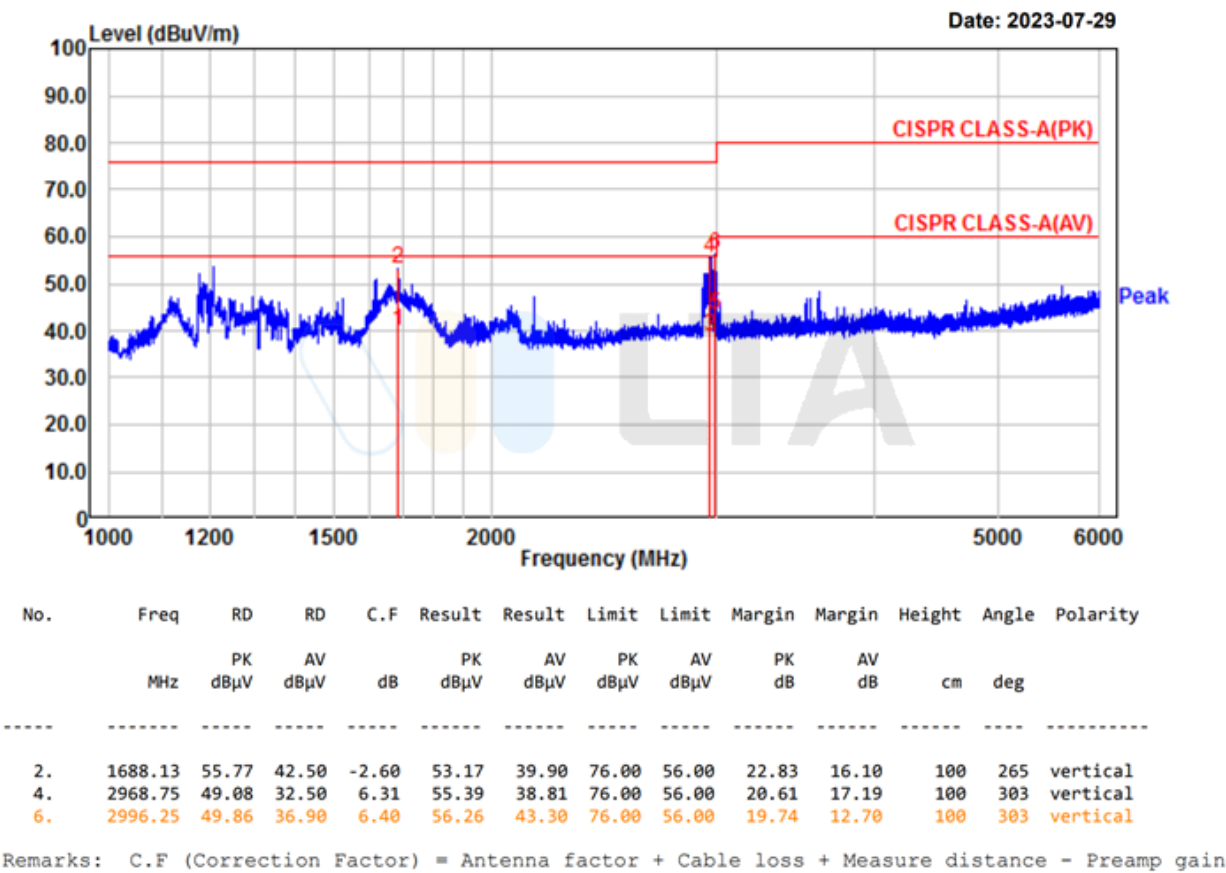
Temp/Humi: 24 'C / 56 % R.H.

Test Mode : Operating

Tested by: AHN H Y

Power : AC 240 V / 50 Hz

Measure distance : 3.8 m



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	2024.03.13	1 year
☒	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	100710	2024.03.13	1 year
☐	ISN	ISN T800	TESEQ	27109	2023.08.31	1 year
☒	ISN	ENY81-CA6	Rohde & Schwarz	101565	2023.08.31	1 year
☐	ISN	ISN S8	Schwarzbeck	79	2023.08.29	1 year
☐	CURRENT PROBE	EZ-17	Rohde & Schwarz	100508	2023.08.30	1 year
☐	CDN	TSCDN-C1-BNC-75	F.C.C	07004	2024.03.13	1 year
☐	LISN	ESH3-Z6	Rohde & Schwarz	100378	2023.08.29	1 year
☐	LISN	ESH3-Z6	Rohde & Schwarz	101468	2023.08.29	1 year
☒	LISN(main)	ENV216	Rohde & Schwarz	100408	2023.08.29	1 year
☒	LISN(sub)	LT32C/10	AFJ	32031518210	2023.08.29	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	2023.08.29	1 year
☒	Amplifier	8447D	HP	1937A03453	2023.11.29	1 year
☒	BILOG Antenna	VULB 9168	SCHWARZBECK	749	2025.03.29	2 year
☒	TEST PROGRAM	e3 20181212a (V9)	AUDIX	-	-	-

Radiated Emissions – Above 1 GHz

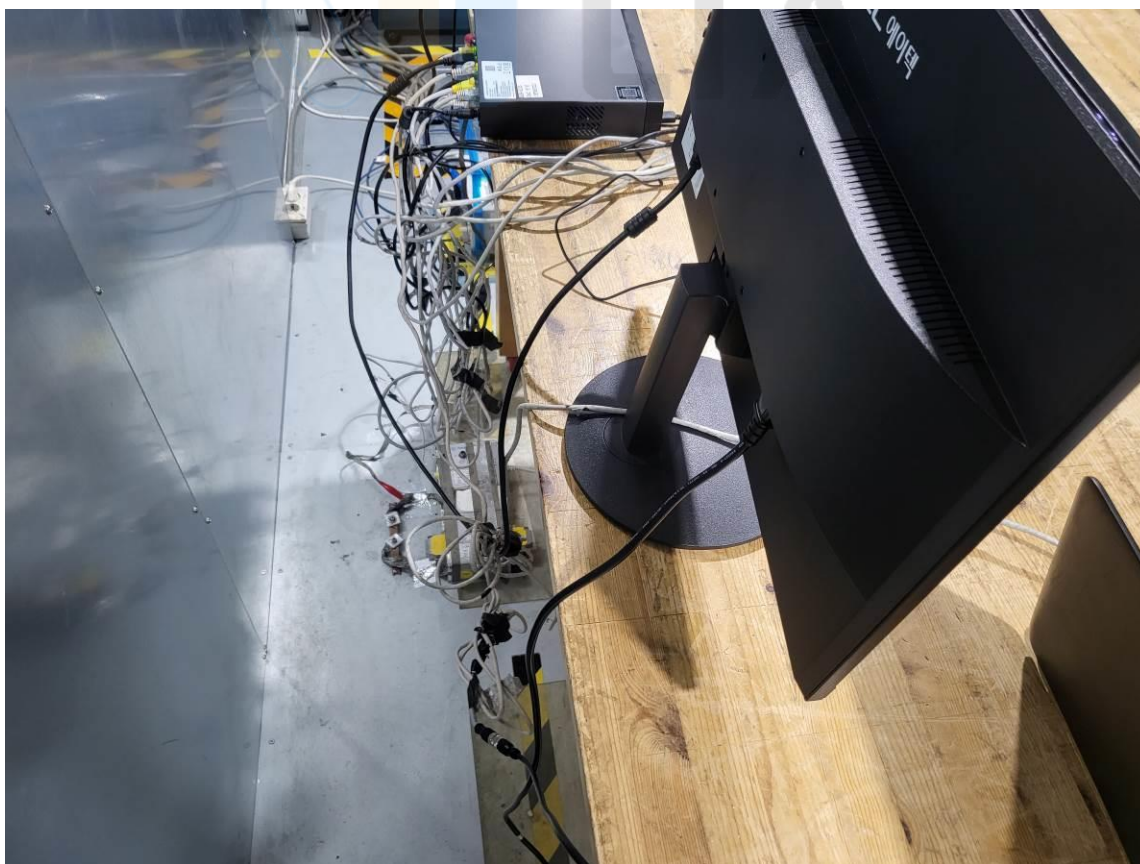
	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	EMI TEST Receiver	ESCI7	Rohde & Schwarz	100772	2023.08.29	1 year
☐	EMI TEST Receiver	ESU	Rohde & Schwarz	100092	2023.08.29	1 year
☒	Amplifier	8449B	Agilent	3008A02126	2024.03.14	1 year
☐	Amplifier	PAM-840A	COM-POWER	461314	2024.03.15	1 year
☐	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	2024.04.20	2 year
☒	TEST PROGRAM	e3 20181212a (V9)	AUDIX	-	-	-

APPENDIX B

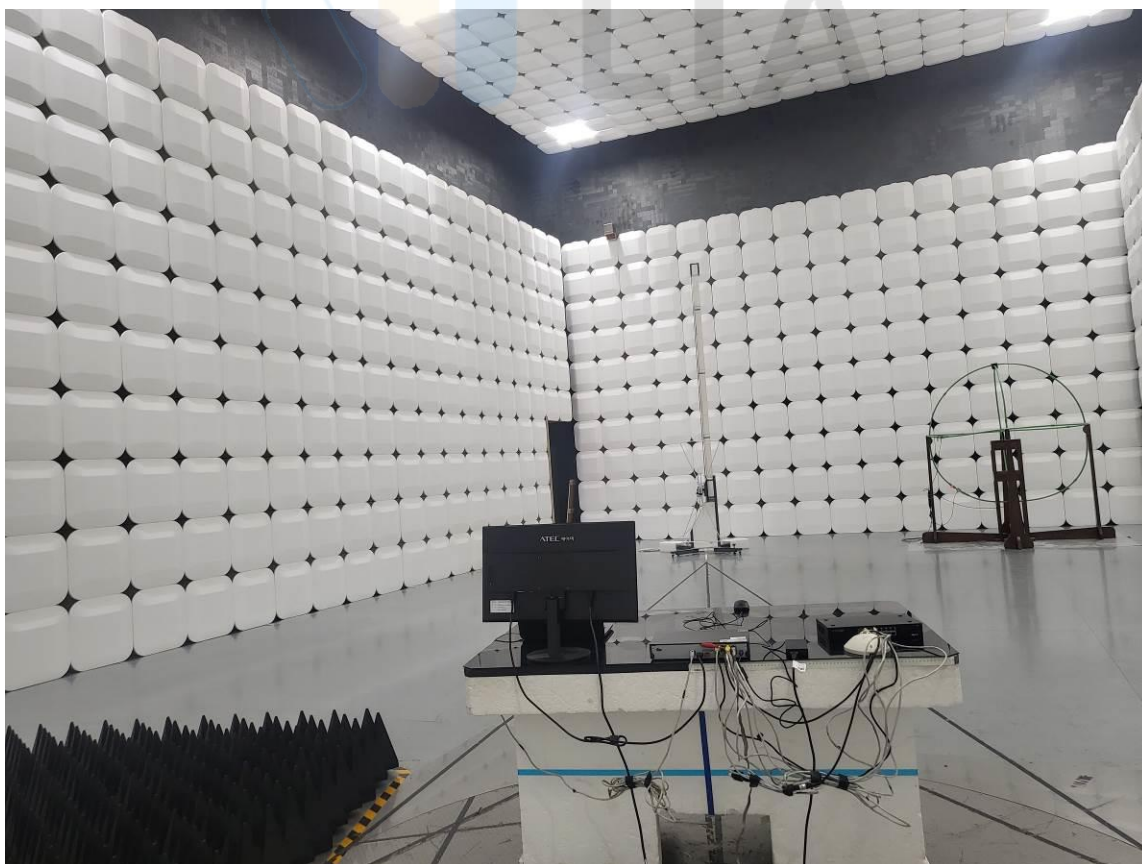
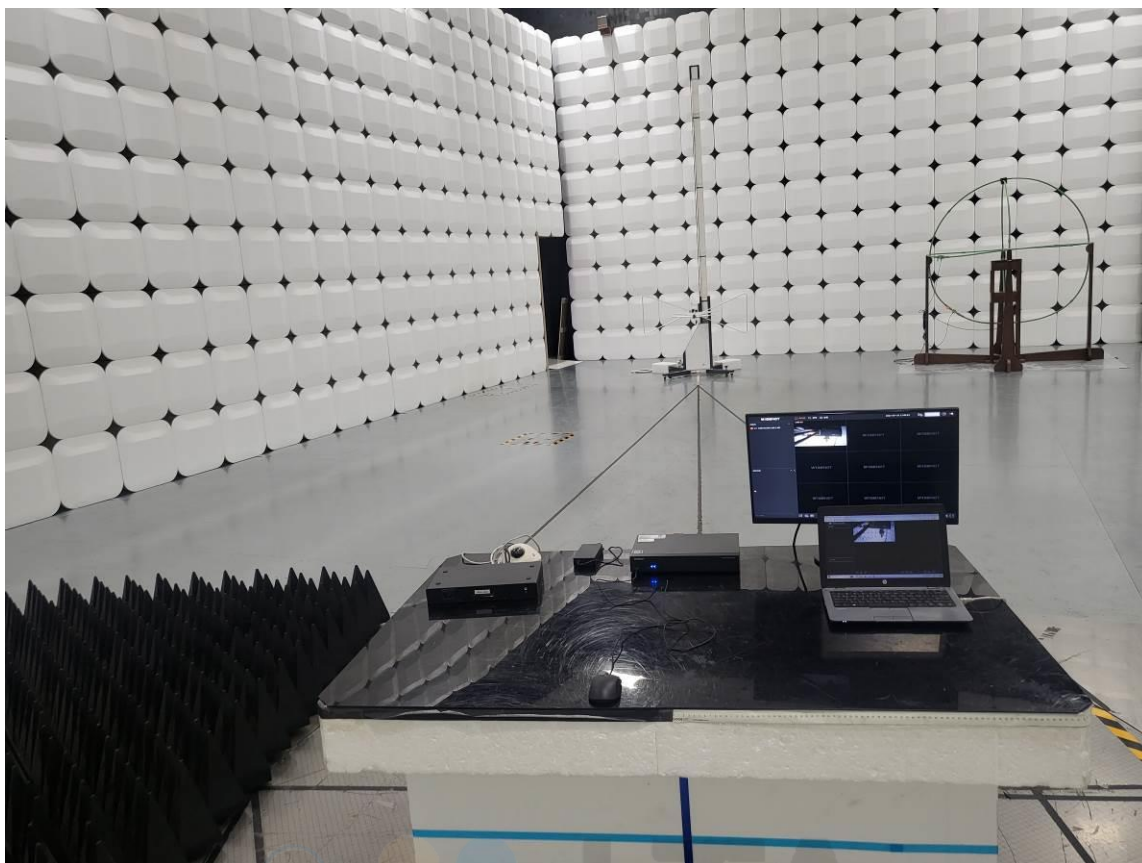
PHOTOGRAPHS



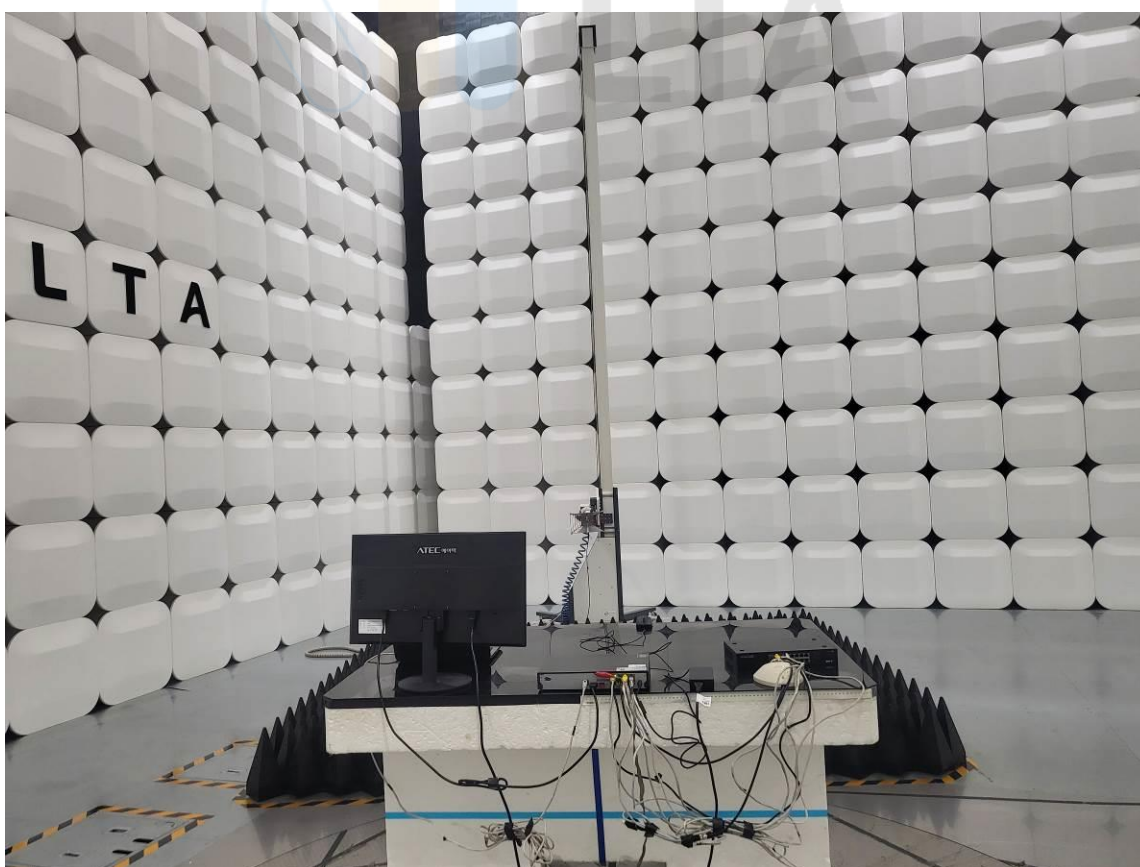
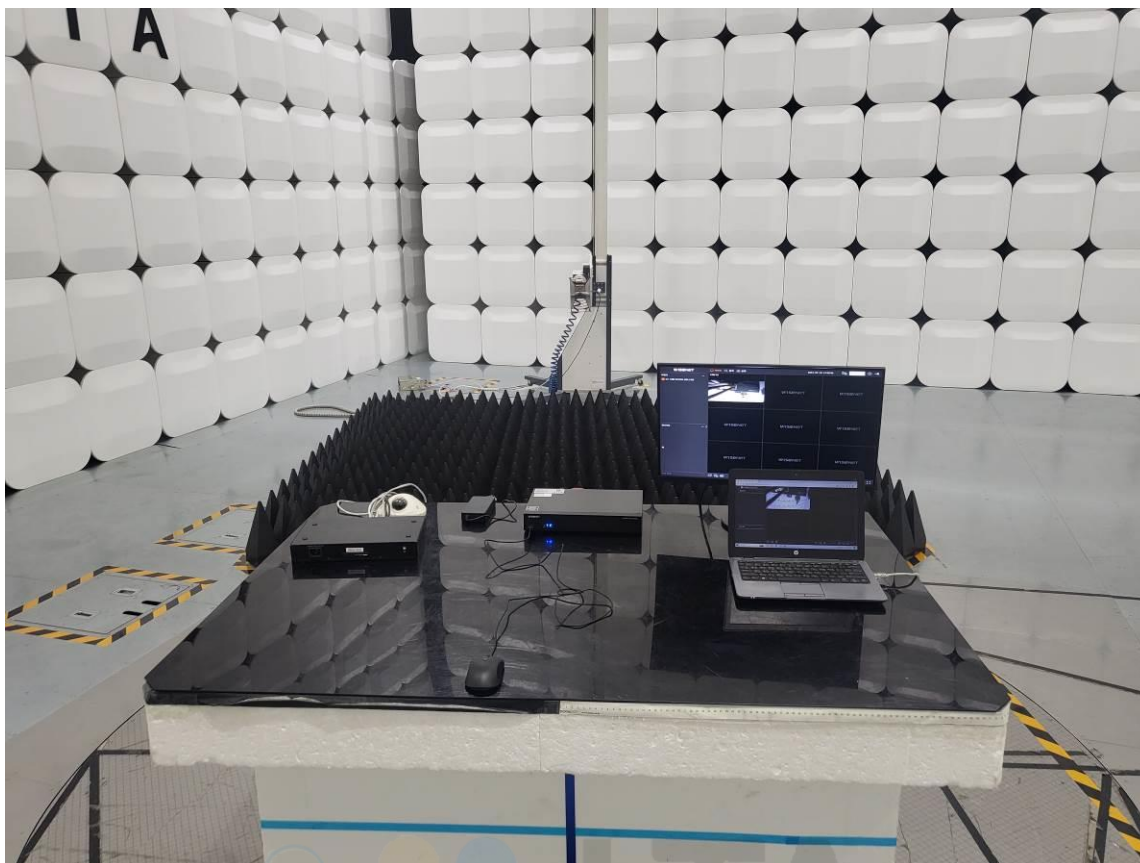
Conducted Emissions



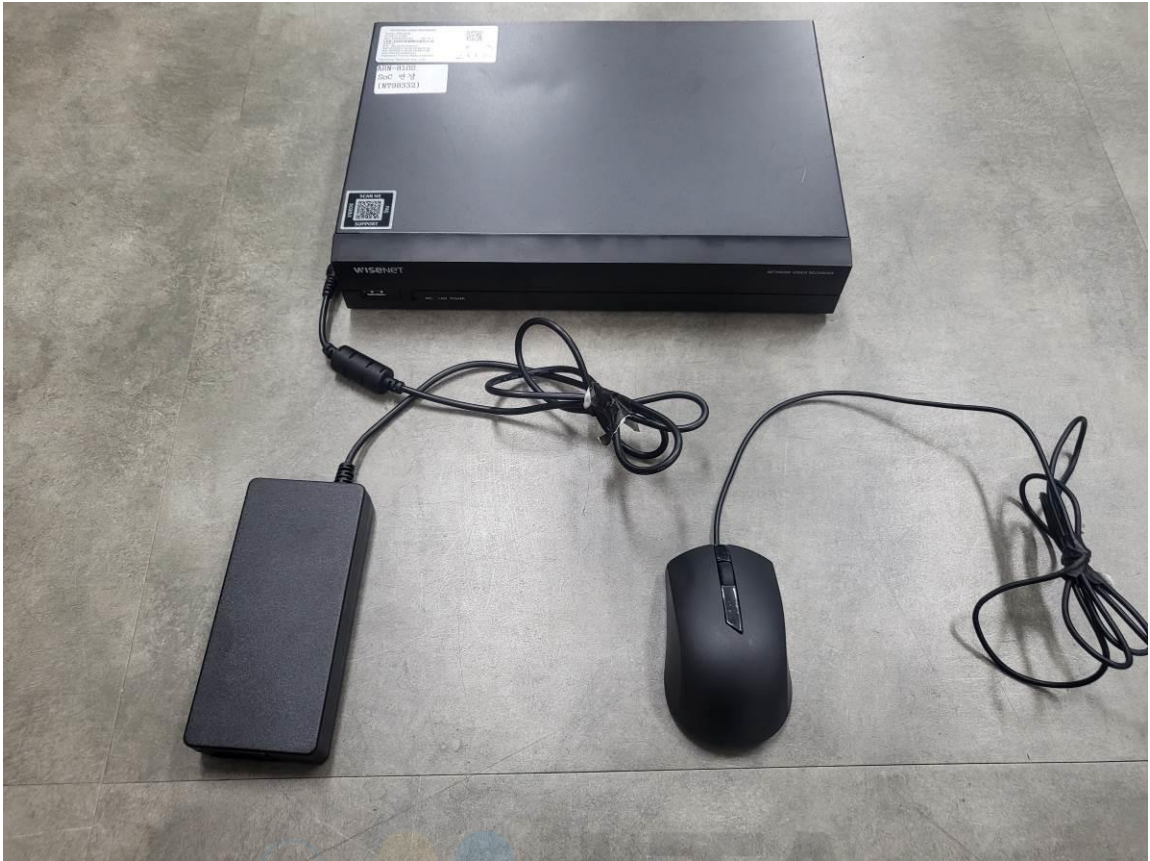
Radiated Emissions - Below 1 GHz



Radiated Emissions - Above 1 GHz



EUT



EUT

