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EMC TEST REPORT

Dates of Tests: October 29 – November 04, 2020

Test Report S/N: LR500122011J

Test Site : LTA Co., Ltd.

Model No.

XRN-1620B2

APPLICANT

Hanwha Techwin Co., Ltd.

Equipment Name : NVR
 Manufacturer : HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.
 Model name : XRN-1620B2
 Test Device Serial No.: Identification
 Directive : Electromagnetic Compatibility Directive 2014/30/EU
 Rule Part(s) : EN 55032:2015/AC:2016-07
 EN 50130-4:2011/A1:2014
 EN 61000-3-2:2014
 EN 61000-3-3:2013
 Data of reissue : November 06, 2020

This test report is issued under the authority of:

The test was supervised by:

Young Kyu Shin, Technical Manager

Yu Hyeon Nam, 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.



Revision history

Revision	Date of issue	Test report No.	Description
0	06.11.2020	LR500122011J	Initial

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1. General information's

1-1 Test Performed

Company name : **LTA Co., Ltd**
 Address : 4, Songju-ro 236beon-gil, Yangji-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, 17159, Korea
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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	2021-09-30	ECT accredited Lab.
RRA	KOREA	KR0049	-	RRA accredited Lab.
	U.S.A		2021-04-11	
	CANADA		2021-06-16	
	VIETNAM		2021-04-12	
VCCI	JAPAN	C-14948	2023-09-10	VCCI registration
		T-12416	2023-09-10	
		R-14483	2023-10-15	
		G-10847	2021-12-13	
KOLAS	KOREA	KT551	2021-08-20	KOLAS accredited Lab.

2. Information's about test item

2-1 Client / Manufacturer

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

Factory #1

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

Factory #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 : NVR
Model name : XRN-1620B2
Serial number : Identification
Date of receipt : October 13, 2020
EUT condition : Pre-production, not damaged
Interface Ports : AC IN, USB(3EA), AUDIO OUT, VGA OUT, HDMI, ALARM IN, ALARM
OUT, ALARM GROUND, NETWORK 1, NETWORK 2
Power rating : AC 230 V, 50 Hz

2-3 Modification

-NONE

2-4 Test conditions

Temp. / Humid. / Pressure : (20 - 23) °C / (35 - 45) % R.H. / (100 – 100.2) kPa
Tested Model : XRN-1620B2
Test mode : REC mode
Test Voltage : AC 230 V, 50 Hz

2-6 List of EUT and ACCESSORY

EUT				
Equipment Name	Model Name	Serial No.	Manufacturer	Remarks
NVR	XRN-1620B2	N/A	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD. D-TECH CO.,LTD.	-
Mouse	MOKJUO	08F03755	Primax Electronics Ltd.	-
ACCESSORY				
Equipment Name	Model Name	Serial No.	Manufacturer	Remarks
PoE Injector	SFC501G	N/A	Soltech Infonet Co., Ltd.	-
JIG board	MR9-V-0	N/A	N/A	-
Ear Phone	N/A	N/A	N/A	-
Notebook PC	H57	HKN650DU0007G00 276	HANSUNG	-
Notebook PC Adapter	A10-090P3A	F180261621014661	Chicony	-
Network Camera	QND-8021	N/A	HANWHA TECHWIN CO.,LTD	-
Monitor #1	24BK550YW	902NTSU7P406	LG	-
Monitor #2	24BK550YW	902NTLE7P384	LG	-
USB Memory Stick #1	N/A	N/A	N/A	8 GB
USB Memory Stick #2	N/A	N/A	N/A	8 GB
HDD	SC HA500	WCC7K5JKX30E	Westem Digital	4 TB

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	1.2	NO	Plastic
	USB	Mouse	USB	1.0	NO	Plastic
	USB	USB Memory Stick #1	USB	-	-	Plastic
	USB	USB Memory Stick #2	USB	-	-	Plastic
	AUDIO OUT	Ear Phone	AUX	0.9	NO	Plastic
	NETWORK 1	PoE Injector	DATA IN	1.0	NO	Plastic
	NETWORK 2	Notebook PC	LAN	1.2	NO	Plastic
	VGA OUT	Monitor #1	VGA	1.2	YES	Plastic
	HDMI	Monitor #2	HDMI	1.1	YES	Plastic
	ALARM IN	JIG board	ALARM OUT	0.4	NO	Plastic
	ALARM OUT	JIG board	ALARM IN	0.4	NO	Plastic
	ALARM GROUND	JIG board	ALARM GROUND	0.4	NO	Plastic
PoE Injector	AC IN	AC Power Source	3 Pin AC Line	1.1	NO	Plastic
	P+D/OUT	Network Camera	LAN	1.0	NO	Plastic
Notebook PC	DC IN	Notebook PC Adapter	DC OUT	1.1	NO	Plastic
Notebook PC Adapter	AC IN	AC Power Source	3 Pin AC Line	1.0	NO	Plastic
Monitor #1	AC IN	AC Power Source	3 Pin AC Line	1.1	NO	Plastic
Monitor #2	AC IN	AC Power Source	3 Pin AC Line	1.3	NO	Plastic
HDD	DC IN	EUT	DC OUT	0.3	NO	Plastic
	SATA	EUT	SATA	0.3	NO	Plastic

3. Test Report

3.1 Summary of tests

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

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

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

Note 3: We did not test EN61000-3-2 (Harmonic current emissions) for the XRN-1620B2 because equipment whose rated power is less or equal 75 W don't need to be tested.

3.2 EMISSION

3.2.1 Conducted Emissions

Definition:

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

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

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



4, Songjuro 236 Beon-gil, Yangji-myeon
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449-822 Korea
Tel:+82-31-3236008,9
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EUT /Model No. : XRN-1620B2

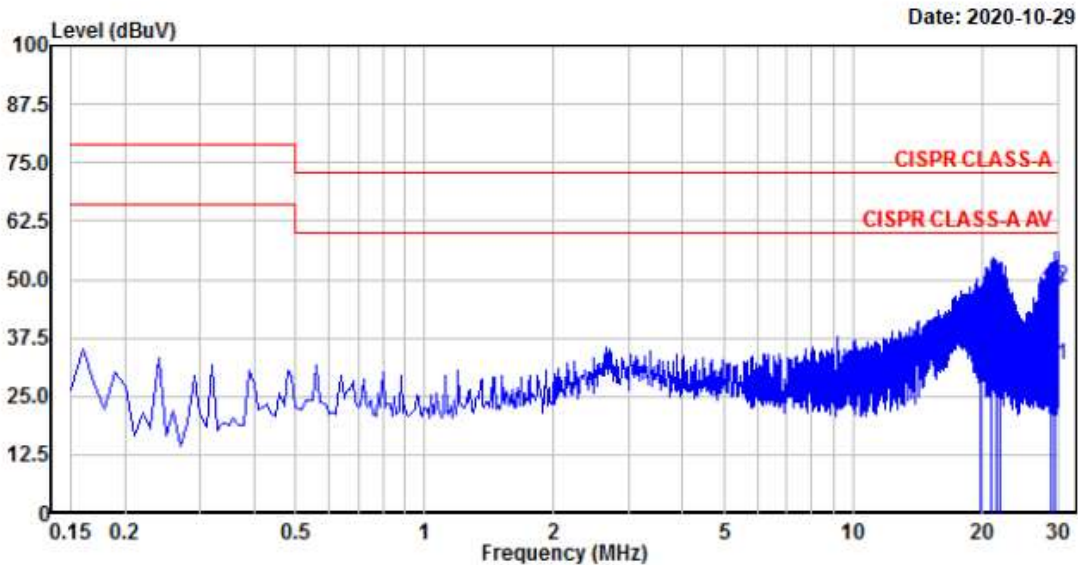
Phase : Line

Test Mode : REC mode

Test Power : 230 V / 50 Hz

Temp./ Humi. : 23 °C / 43 % R.H.

Test Engineer : NAM Y H



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.	19.884	22.85	12.33	20.04	42.89	32.37	73.00	60.00	30.11	27.63	Line
4.	20.922	26.71	11.80	20.05	46.76	31.85	73.00	60.00	26.24	28.15	Line
6.	21.543	26.86	11.82	20.07	46.93	31.89	73.00	60.00	26.07	28.11	Line
8.	22.029	26.72	10.28	20.07	46.79	30.35	73.00	60.00	26.21	29.65	Line
10.	28.996	27.53	11.55	20.16	47.69	31.71	73.00	60.00	25.31	28.29	Line
12.	29.558	28.11	11.59	20.18	48.29	31.77	73.00	60.00	24.71	28.23	Line

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

Conducted Emissions (NEUTRAL)



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EUT /Model No. : XRN-1620B2

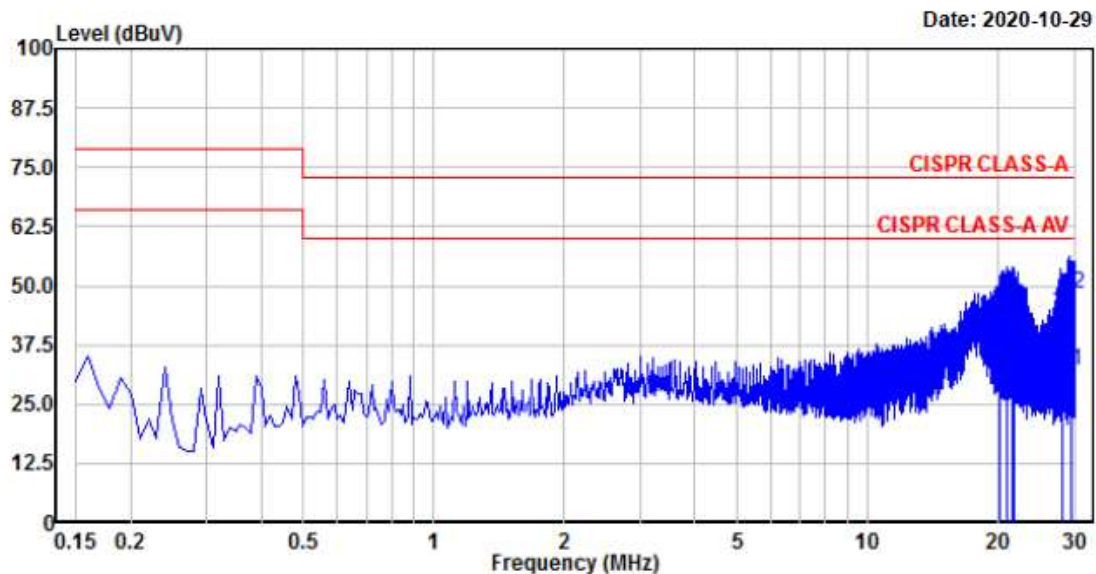
Phase : Neutral

Test Mode : REC mode

Test Power : 230 V / 50 Hz

Temp./ Humi. : 23 'C / 43 % R.H.

Test Engineer : NAM Y H



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.	20.259	23.86	13.44	20.08	43.94	33.52	73.00	60.00	29.06	26.48	neutral
4.	20.987	26.09	9.88	20.09	46.18	29.97	73.00	60.00	26.82	30.03	neutral
6.	21.484	26.77	11.42	20.12	46.89	31.54	73.00	60.00	26.11	28.46	neutral
8.	21.776	26.63	13.47	20.12	46.75	33.59	73.00	60.00	26.25	26.41	neutral
10.	28.036	24.13	8.44	20.23	44.36	28.67	73.00	60.00	28.64	31.33	neutral
12.	29.372	28.13	11.63	20.27	48.40	31.90	73.00	60.00	24.60	28.10	neutral

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

Conducted Emissions (TEL_10 M) / LAN #1



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EUT /Model No. : XRN-1620B2

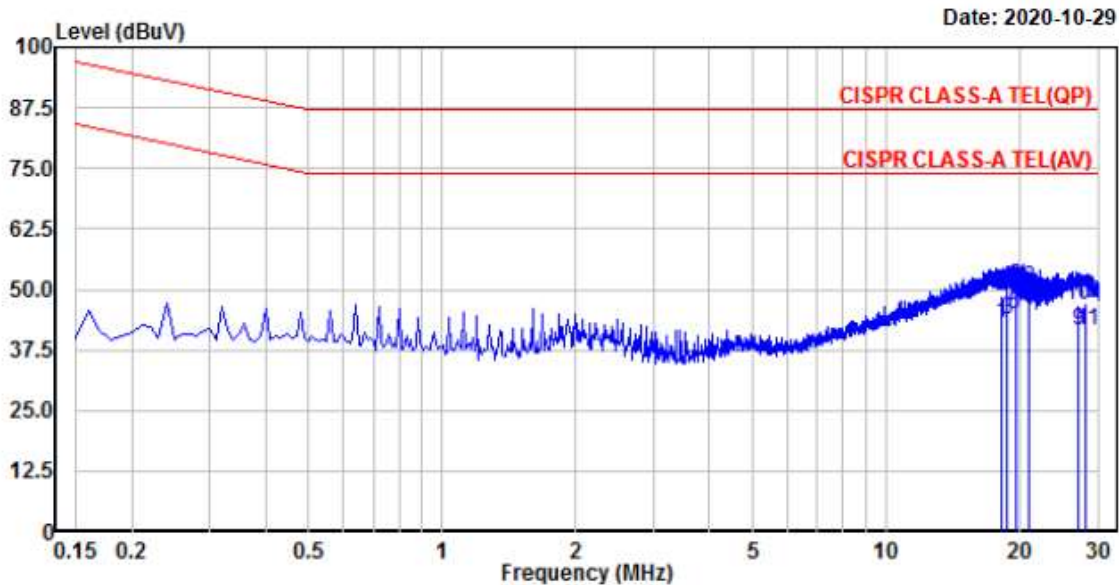
Phase : TEL_10M

Test Mode : REC mode (LAN #1)

Test Power : 230 V / 50 Hz

Temp./ Humi. : 23 °C / 43 % R.H.

Test Engineer : NAM Y H



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.	18.125	28.99	23.34	19.71	48.70	43.05	87.00	74.00	38.30	30.95	Line
4.	18.636	30.02	24.00	19.74	49.76	43.74	87.00	74.00	37.24	30.26	Line
6.	19.519	30.85	25.15	19.78	50.63	44.93	87.00	74.00	36.37	29.07	Line
8.	20.936	30.41	26.92	19.84	50.25	46.76	87.00	74.00	36.75	27.24	Line
10.	26.961	26.73	21.16	20.19	46.92	41.35	87.00	74.00	40.08	32.65	Line
12.	28.168	26.96	21.08	20.26	47.22	41.34	87.00	74.00	39.78	32.66	Line

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

Conducted Emissions (TEL_1000 M) / LAN #1



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EUT /Model No. : XRN-1620B2

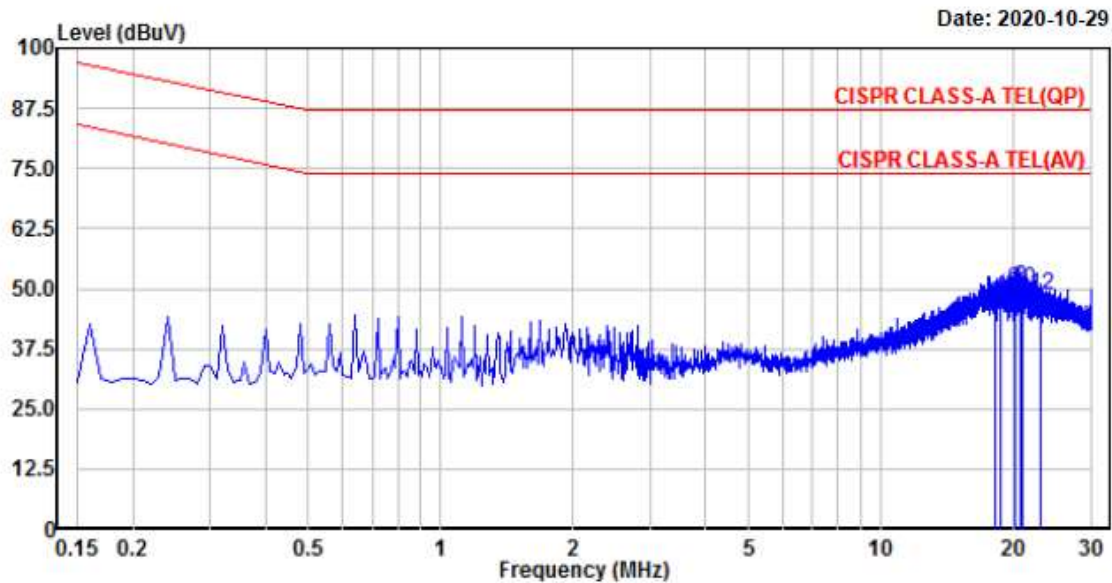
Phase : TEL_1000M

Test Mode : REC mode (LAN #1)

Test Power : 230 V / 50 Hz

Temp./ Humi. : 23 °C / 43 % R.H.

Test Engineer : NAM Y H



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.	18.136	27.14	22.23	19.56	46.70	41.79	87.00	74.00	40.30	32.21	Line
4.	18.700	28.65	24.90	19.58	48.23	44.48	87.00	74.00	38.77	29.52	Line
6.	20.086	30.22	26.84	19.60	49.82	46.44	87.00	74.00	37.18	27.56	Line
8.	20.762	30.67	27.14	19.62	50.29	46.76	87.00	74.00	36.71	27.24	Line
10.	20.936	30.13	26.96	19.62	49.75	46.58	87.00	74.00	37.25	27.42	Line
12.	23.068	29.17	24.08	19.67	48.84	43.75	87.00	74.00	38.16	30.25	Line

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

Conducted Emissions (TEL_10 M) / LAN #2



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EUT /Model No. : XRN-1620B2

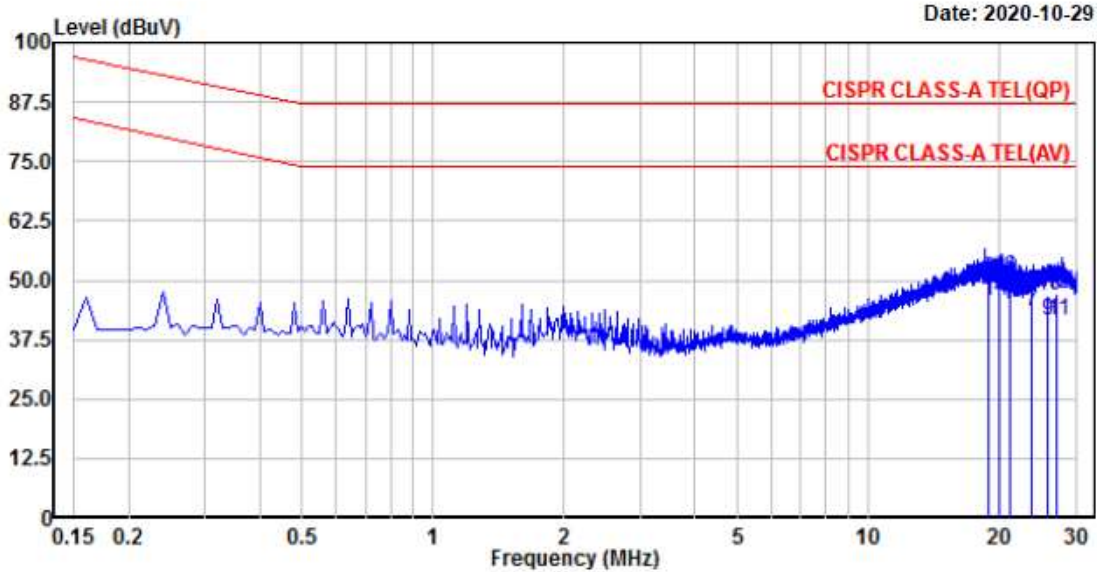
Phase : TEL_10M

Test Mode : REC mode (LAN #2)

Test Power : 230 V / 50 Hz

Temp./ Humi. : 23 'C / 43 % R.H.

Test Engineer : NAM Y H



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.	18.868	30.39	25.73	19.75	50.14	45.48	87.00	74.00	36.86	28.52	Line
4.	19.918	31.21	27.09	19.79	51.00	46.88	87.00	74.00	36.00	27.12	Line
6.	21.099	30.59	26.78	19.85	50.44	46.63	87.00	74.00	36.56	27.37	Line
8.	23.768	27.68	23.32	20.00	47.68	43.32	87.00	74.00	39.32	30.68	Line
10.	25.740	26.85	21.21	20.11	46.96	41.32	87.00	74.00	40.04	32.68	Line
12.	27.124	26.89	21.21	20.19	47.08	41.40	87.00	74.00	39.92	32.60	Line

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

Conducted Emissions (TEL_1000 M) / LAN #2



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EUT /Model No. : XRN-1620B2

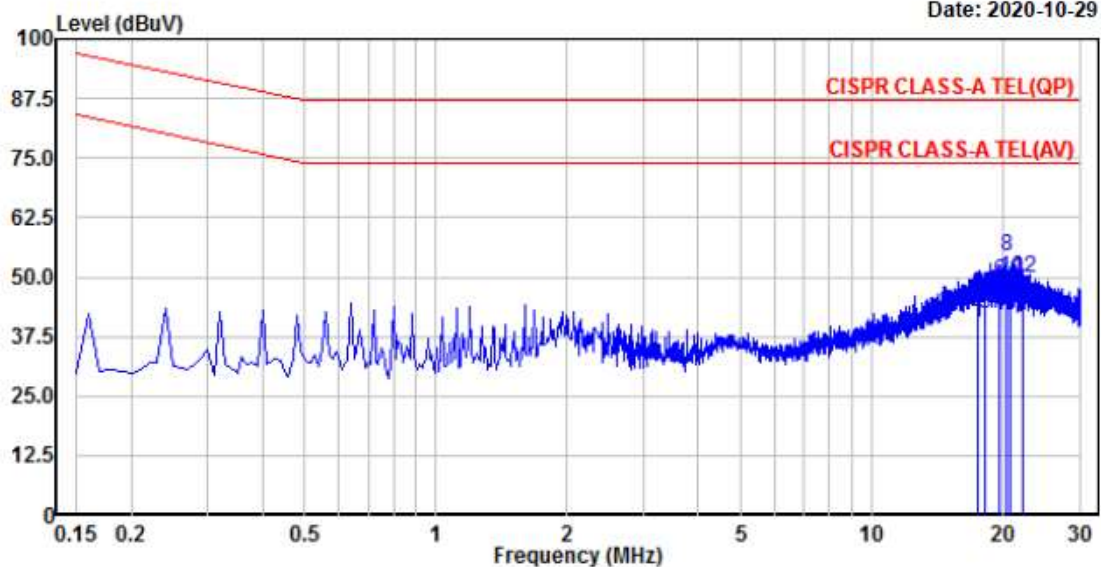
Phase : TEL_1000M

Test Mode : REC mode (LAN #2)

Test Power : 230 V / 50 Hz

Temp./ Humi. : 23 'C / 43 % R.H.

Test Engineer : NAM Y H



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.	17.489	26.79	20.70	19.55	46.34	40.25	87.00	74.00	40.66	33.75	Line
4.	18.200	26.85	22.58	19.56	46.41	42.14	87.00	74.00	40.59	31.86	Line
6.	19.581	29.60	25.89	19.60	49.20	45.49	87.00	74.00	37.80	28.51	Line
8.	20.421	34.89	27.08	19.60	54.49	46.68	87.00	74.00	32.51	27.32	Line
10.	20.760	30.31	27.04	19.62	49.93	46.66	87.00	74.00	37.07	27.34	Line
12.	22.182	30.24	24.82	19.65	49.89	44.47	87.00	74.00	37.11	29.53	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/AC:2016-07
Measuring Distance	: 10 m below 1 GHz / 3 m above 1 GHz
Measurement Frequency range	: 30 MHz – 6 000 MHz
Measurement RBW	: 120 kHz @ 10 m / 1 MHz @ 3 m
Test mode	: REC 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 : 1.8 GHz)

A sample calculation:

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

Emission Level= meter reading + COR.F

Limit of 10 m below 1 GHz

CLASS A

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

CLASS B

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

Limit of 3m above 1 GHz

CLASS A

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

NOTE: The lower limit applies at the transition frequency.

CLASS B

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

NOTE: The lower limit applies at the transition frequency.

Radiated Emissions (Below 1 GHz) / V



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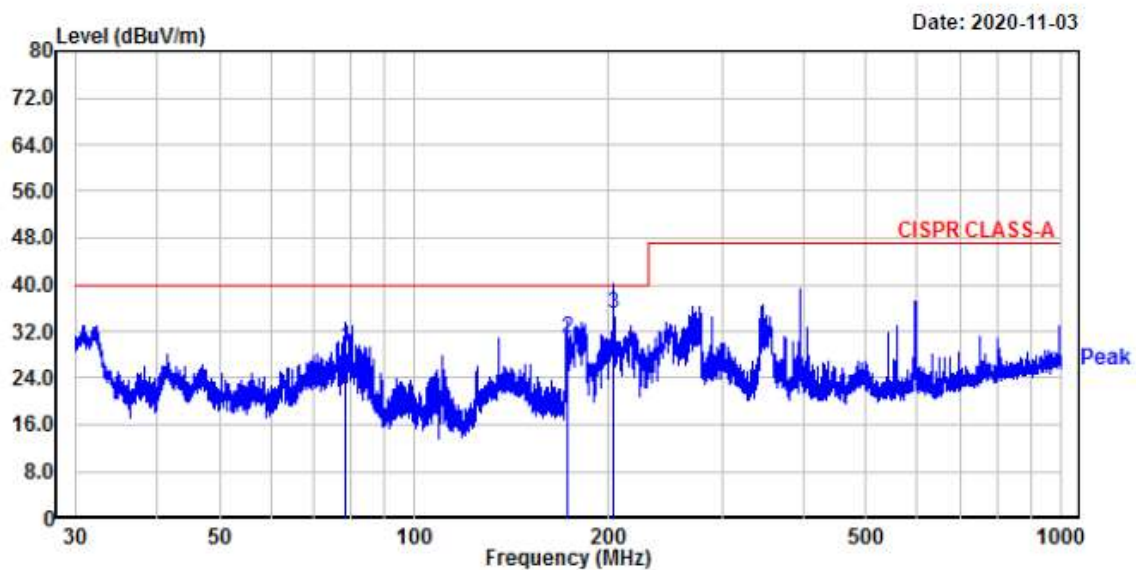
EUT/Model No.: XRN-1620B2

Temp/Humi: 21 'C / 43 % R.H.

Test Mode : REC mode

Tested by: NAM Y H

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.	78.28	46.20	-16.81	29.39	40.00	10.61	152	350	vertical
2.	172.45	43.42	-12.59	30.83	40.00	9.17	129	245	vertical
3.	203.34	49.71	-14.80	34.91	40.00	5.09	152	13	vertical

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

Radiated Emissions (Below 1 GHz) / H



4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
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Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: XRN-1620B2

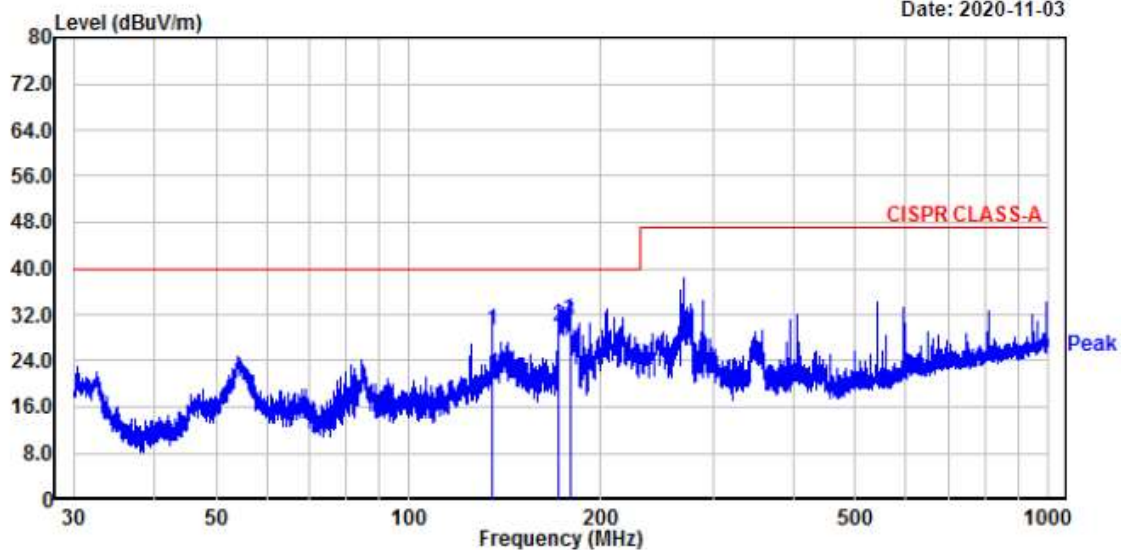
Temp/Humi: 21 'C / 43 % R.H.

Test Mode : REC mode

Tested by: NAM Y H

Power : 230 V / 50 Hz

Date: 2020-11-03



No.	Freq MHz	Reading dBμV	C.F dB	Result QP dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Polarity
1.	135.03	42.67	-13.25	29.42	40.00	10.58	385	258	horizontal
2.	172.07	42.43	-12.56	29.87	40.00	10.13	371	16	horizontal
3.	178.76	44.10	-13.24	30.86	40.00	9.14	380	20	horizontal

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

Radiated Emissions

(Above 1 GHz) / V

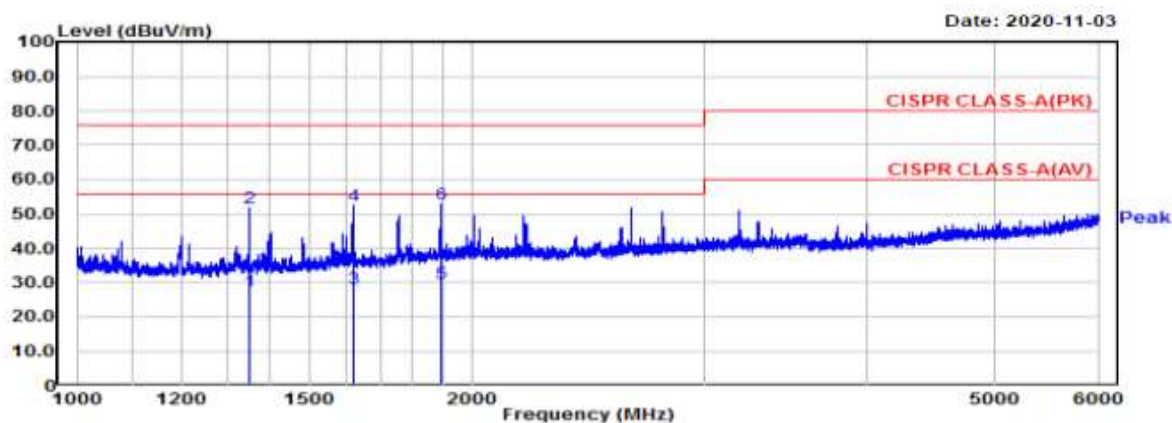
EUT/Model No.: XRN-1620B2

Temp/Humi: 21 °C / 43 % R.H.

Test Mode : REC mode

Tested by: NAM Y H

Power : 230 V / 50 Hz



(Above 1 GHz) / H

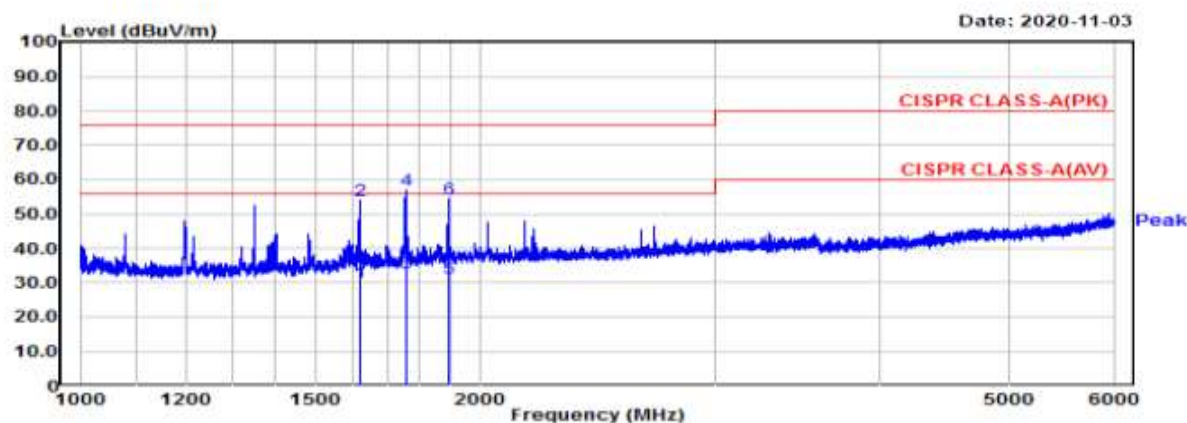
EUT/Model No.: XRN-1620B2

Temp/Humi: 21 °C / 43 % R.H.

Test Mode : REC mode

Tested by: NAM Y H

Power : 230 V / 50 Hz



Manufacture : HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.
D-TECH CO.,LTD.

Test Date	Temp.: [°C]	Humidity: [%]	Distance (m)
2020-11-03	21.00	43.00	3.8

Model : XRN-1620B2
TEST mode : REC 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
1620.37	59.49	35.49	-3.34	56.15	32.15	76.00	56.00	19.85	23.85	100	117	H
1755.25	61.82	37.82	-2.89	58.93	34.93	76.00	56.00	17.07	21.07	100	136	H
1889.90	57.92	34.92	-1.49	56.43	33.43	76.00	56.00	19.57	22.57	100	127	H
1350.02	58.54	34.54	-4.78	53.76	29.76	76.00	56.00	22.24	26.24	100	217	V
1620.37	57.69	33.69	-3.34	54.35	30.35	76.00	56.00	21.65	25.65	100	138	V
1889.90	56.19	33.19	-1.49	54.70	31.70	76.00	56.00	21.30	24.30	100	153	V

3.2.3 Harmonic Current Emission

Definition:

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

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

Test method	: EN 61000-3-2:2014
Test mode	: REC mode
Rated power	: 24.679 W
Result	: Not Applicable

Measurement Data:

- We did not test EN61000-3-2 (Harmonic Current Emission) for the XRN-1620B2 because equipment whose rated power is less or equal 75 W don't need to be tested.

Harmonic Current Emission

03th November 2020 - 08:45:13		Page 1/1	IECSoft v2_6
		IEC61000-3-2:2014 Fluctuating Harmonics	
Instrument Details			
Instrument Model	PPA5511		
Serial Number	162-04957		
Firmware Version	2.179		
N4L Calibration Date	18th September 2017		
Instrument Version	Standard		
Test Settings			
Class	Class A		
Mode	Measured		
Equipment Under Test			
Brand	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.		
Model	XRN-1620B2		
Serial	N/A		
Impedance Network ID	N/A		
Test Conditions			
	User Entered	Measured	
Rated Voltage	N/A	230.980V	
Rated Current	N/A	303.587mA	
Rated Frequency	N/A	50.000Hz	
Rated Power	N/A	24.679W	
Additional Test Information			
Measured Power Factor	0.3519		
Max Current THD	149.91%		
Average THC	204.946mA		
Max Power	25.279W		
Max F.Current	145.387mA		
Average F.Current	140.214mA		
Minimum Current	100A		
Test Duration	2.5 minutes		
Additional Test Details			
Operator	NAM Y H		
Lab Name	N/A		
Location	N/A		
Notes			
Signature			
Results	Test - N/A. Invalid DUT		

Test not applicable

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

3.2.4 Voltage Fluctuations and Flicker

Definition:

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

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

Test method : EN 61000-3-3:2013

Test mode : REC mode

Result : **Complies**

Measurement Data:

- Refer to the Next page

Voltage Fluctuations and Flicker

03th November 2020 - 11:10:36		Page 1/2	IECSoft v2_6
		IEC61000-3-3:2013 Ed.3.0 Flickermeter	
Instrument Details			
Instrument Model	PPA5511		
Serial Number	162-04957		
Firmware Version	2.179		
N4L Calibration Date	18th September 2017		
Instrument Version	Standard		
Test Settings			
Class	Voltage		
Mode	Normal (4.0%)		
Minimum Current	10A		
PST	10 minutes		
PLT	12 PSTs		
Equipment Under Test			
Brand	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.		
Model	XRN-1620B2		
Serial	N/A		
Impedance Network ID	N/A		
Test Conditions			
	User Entered	Measured	
Rated Voltage	N/A	230.979V	
Rated Current	N/A	N/A	
Rated Frequency	N/A	50.000Hz	
Rated Power	N/A	N/A	
D max	0.1517% (Limit: 4.0%)		
T max	0.0000 s (Limit: 0.5 s)		
DC max	0.0104% (Limit: 3.3%)		
Additional Test Details			
Operator	NAM Y H		
Lab Name	N/A		
Location	N/A		
Notes			
Signature			
Results	Phase1: PASS		

03th November 2020 - 11:10:36				Ph:1 Page 2/2		IECSoft v2_6		
IEC61000-3-3:2013 Ed.3.0 Flickermeter								
Instrument Details								
Instrument Model		PPA5511						
Instrument Serial		162-04957						
Instrument Firmware		2.179						
Equipment Under Test								
Brand		HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.						
Model		XRN-1620B2						
Serial		N/A						
Flicker Test Results								
PST no.	Status	DC (%)	Dmax (%)	Tmax (s)	PST	PST Lim	PLT	PLT Lim
1	Phase1: PASS	0.01044	0.13685	0.00000	0.13087	1.00000	0.13087	N/A
2	Phase1: PASS	0.01044	0.13685	0.00000	0.12773	1.00000	0.12931	N/A
3	Phase1: PASS	0.01044	0.13685	0.00000	0.12991	1.00000	0.12951	N/A
4	Phase1: PASS	0.01044	0.13685	0.00000	0.13653	1.00000	0.13134	N/A
5	Phase1: PASS	0.01044	0.15171	0.00000	0.13345	1.00000	0.13177	N/A
6	Phase1: PASS	0.01044	0.15171	0.00000	0.13361	1.00000	0.13208	N/A
7	Phase1: PASS	0.01044	0.15171	0.00000	0.13719	1.00000	0.13283	N/A
8	Phase1: PASS	0.01044	0.15171	0.00000	0.12916	1.00000	0.13239	N/A
9	Phase1: PASS	0.01044	0.15171	0.00000	0.13429	1.00000	0.13260	N/A
10	Phase1: PASS	0.01044	0.15171	0.00000	0.13791	1.00000	0.13315	N/A
11	Phase1: PASS	0.01044	0.15171	0.00000	0.13285	1.00000	0.13312	N/A
12	Phase1: PASS	0.01044	0.15171	0.00000	0.13441	1.00000	0.13323	0.65000

3.3 IMMUNITY

3.3.1 Electrostatic Discharge

Definition:

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

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

Test date	: 2020. 11. 03.
Test method	: EN 61000-4-2 :2009
Temperature / Humidity / Pressure	: 22 °C / 38 % R.H. / 100.1 kPa
Discharge Impedance	: $(330 \pm 10 \%) \Omega$ / $(150 \pm 10 \%) \text{ pF}$
Type of Discharge (air discharge)	: $\pm 2 \text{ kV}$, $\pm 4 \text{ kV}$, $\pm 8 \text{ kV}$
Type of Discharge (contact discharge)	: $\pm 6 \text{ kV}$
Number of discharges at each point	: 10 of each polarity
Discharge Repetition on Rate	: 1 / sec
Test mode	: REC mode
Result	: Complies

Measurement Data:
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

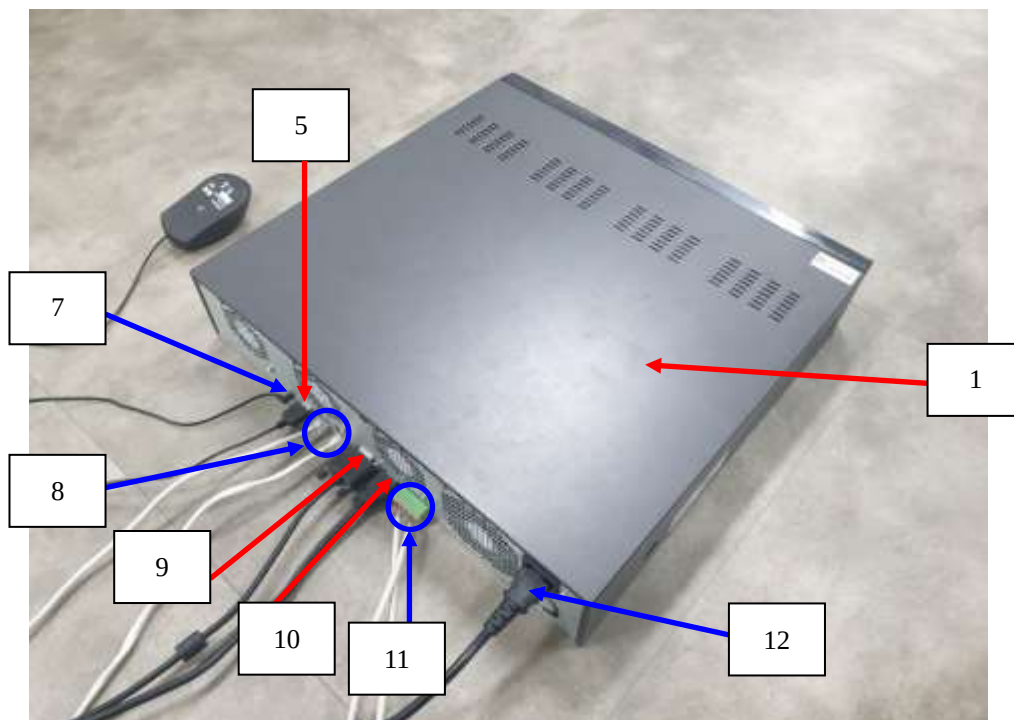
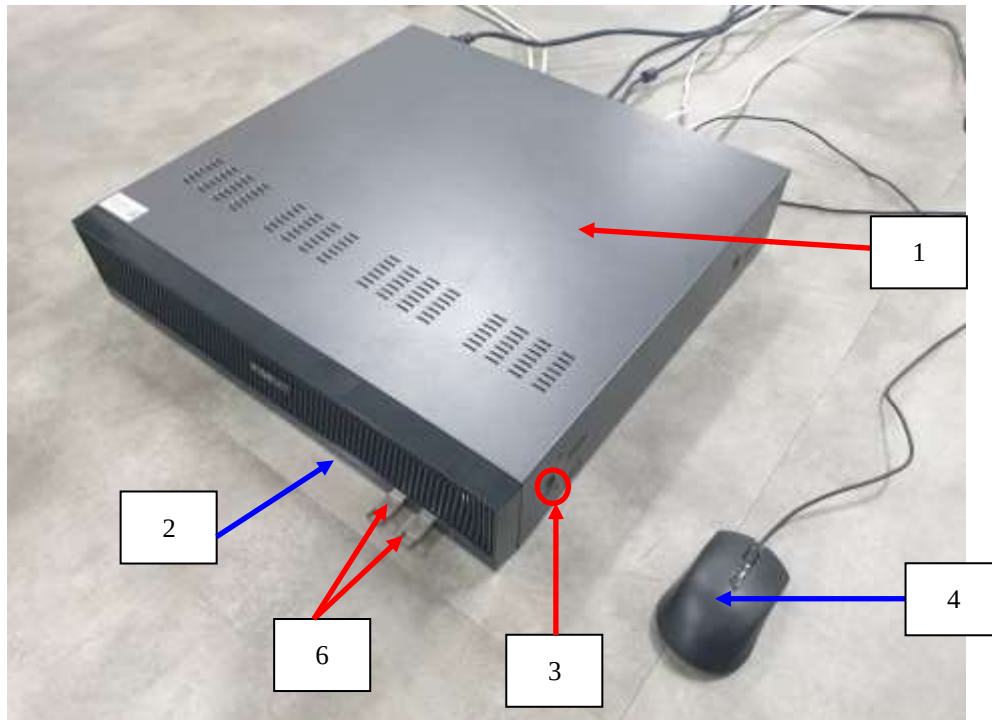
1-2. Direct Discharge

No.	Position	Kind of Discharge	Result	Remarks
1	Enclosure	Contact	Complies	No reaction recognized
2	LED	Air	Complies	No reaction recognized
3	Screw	Contact	Complies	No reaction recognized
4	Mouse #1	Air	Complies	No reaction recognized
5	Mouse #2	Contact	Complies	No reaction recognized
6	USB Memory Stick	Contact	Complies	No reaction recognized
7	AUDIO OUT	Air	Complies	No reaction recognized
8	NETWORK	Air	Complies	No reaction recognized
9	VGA	Contact	Complies	No reaction recognized
10	HDMI	Contact	Complies	No reaction recognized
11	ALARM IN, ALARM OUT, ALARM GROUND	Air	Complies	No reaction recognized
12	AC IN	Air	Complies	No reaction recognized

ESD TEST POINT

[Air discharge]

[Contact discharge]



3.3.2 RF Electromagnetic Field

Definition:

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

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

Test date	:	2020. 11. 04.
Test method	:	EN 61000-4-3:2006/A1:2008/A2:2010
Temperature / Humidity / Pressure	:	21 °C / 36 % 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 mode	:	REC 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

The test assesses the ability of the EUT to operate as intended in the event of fast transients presence on one of the

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

Measurement Data:

Signal Line	Test level	Result	Remarks
NETWORK 1	±1 kV	Complies	No reaction recognized
NETWORK 2	±1 kV	Complies	No reaction recognized
ALARM IN	±1 kV	Complies	No reaction recognized
ALARM OUT	±1 kV	Complies	No reaction recognized
ALARM GROUND	±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	:	2020. 11. 03.
Test method	:	EN 61000-4-5:2014/A1:2017
Temperature / Humidity / Pressure	:	20 °C / 35 % 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 µs pulse
Number of surges	:	5 (at each phase)
Test mode	:	REC mode
Result	:	Complies

Measurement Data:

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

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	:	2020. 11. 03.
Test method	:	EN 61000-4-6:2014/AC:2015
Temperature / Humidity / Pressure	:	21 °C / 37 % R.H. / 100.2 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 mode	:	REC 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
ALARM GROUND	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	:	2020. 11. 03.
Test method	:	EN 61000-4-11:2004/A1:2017
Temperature / Humidity / Pressure	:	22 °C / 40 % R.H. / 100.1 kPa
Ut	:	230 Vac
Test mode	:	REC 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 about 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	:	2020. 11. 03.
Test method	:	EN 61000-4-11:2004/A1:2017
Temperature / Humidity / Pressure	:	22 °C / 40 % R.H. / 100.1 kPa
Supply Voltage maximum	:	$U_{nom} + 10 \%$
Supply Voltage minimum	:	$U_{nom} - 15 \%$
U_t	:	230 Vac
Test mode	:	REC 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	2021.07.02	1 year
☒	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	100710	2021.03.16	1 year
☐	ISN	ISN T800	TESEQ	27109	2021.09.07	1 year
☒	ISN	ENY81-CA6	Rohde & Schwarz	101565	2021.09.07	1 year
☒	ISN	ISN S8	Schwarzbeck	79	2021.09.04	1 year
☐	CURRENT PROBE	EZ-17	Rohde & Schwarz	100508	2021.09.03	1 year
☐	CDN	TSCDN-C1-BNC-75	F.C.C	07004	2021.05.08	1 year
☐	LISN	ESH3-Z6	Rohde & Schwarz	100378	2021.09.03	1 year
☐	LISN	ESH3-Z6	Rohde & Schwarz	101468	2021.09.03	1 year
☒	LISN(main)	ENV216	Rohde & Schwarz	100408	2021.09.04	1 year
☒	LISN(sub)	LT32C/10	AFJ	32031518210	2021.09.03	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	ESU	Rohde & Schwarz	100092	2021.09.03	1 year
☒	Amplifier (25 dB)	8447D	HP	2944A07684	2021.03.16	1 year
☒	BILOG Antenna	VULB 9168	SCHWARZBECK	775	2021.03.26 (KOLAS)	2 year
☐	BILOG Antenna	VULB 9168	SCHWARZBECK	775	2021.11.12 (RRA)	2 year
☒	TEST PROGRAM	e3 20181212a (V9)	AUDIX	-	-	-

Radiated Emissions – Above 1 GHz

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	EMI TEST Receiver	ESU	Rohde & Schwarz	100092	2021.09.03	1 year
☒	Amplifier	8449B	Agilent	3008A02126	2021.03.17	1 year
☐	Amplifier	PAM-840A	COM-POWER	461314	2021.03.16	1 year
☐	HORN ANTENNA	3116B	ETS	133350	2022.05.12	2 year
☐	HORN ANTENNA	3116B	ETS	81109	2022.05.12	2 year
☒	HORN ANTENNA	3115	ETS	114105	2021.09.17 (KOLAS)	2 year
☐	HORN ANTENNA	3115	ETS	114105	2021.11.11 (RRA)	2 year
☒	TEST PROGRAM	e3 20181212a (V9)	AUDIX	-	-	-

Harmonic Current Emission / Voltage Fluctuations and Flicker

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Precision Power Analyzer	PPA5511	Newtons4th Ltd	162-04957	2021.09.07	1 year
☒	Reference Impedance Network	ES4152	NF Corp.	9074424	2021.09.07	1 year

Electrostatic Discharge

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	ESD Simulator	ESS-2000	NOISEKEN	8000C03241	2021.09.07	1 year
☒	ESD GUN	TC-815R	NOISEKEN	ESS0382069	2021.09.07	1 year

RF Electromagnetic Field

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Signal Generator	E4432B	Agilent	MY41310632	2021.03.16	1 year
☒	Power Meter	E4419B	Agilent	GB38410133	2021.03.16	1 year
☒	Power Sensor	E9300A	Agilent	MY41497992	2021.03.16	1 year
☒	Power Sensor	E9300A	Agilent	MY41497618	2021.03.16	1 year
☒	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	2021.09.03	1 year
☒	AC Power Source	Variac NX	EMTEST	P1745207276	2021.09.03	1 year
☒	Capacitive Coupling Clamp	CCI	EMTEST	P1744207071	2021.09.03	1 year

Surges

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Compact Generator	Compact NX	EMTEST	P1725200196	2021.09.03	1 year
☒	AC Power Source	Variac NX	EMTEST	P1745207276	2021.09.03	1 year
☐	CDN	CNV 508T5	EMTEST	P1742204978	2021.09.04	1 year
☐	CDN	CNV 508N1	EMTEST	P1742204940	2021.09.04	1 year

Conducted Disturbances, Induced by Radio-Frequency Fields

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Signal generator	SML03	R&S	103026/0013	2021.03.16	1 year
☒	POWER METER	NRVD	R&S	101689	2021.03.16	1 year
☒	POWER Sensor	URV5-Z2	R&S	100755	2021.03.16	1 year
☒	POWER Sensor	URV5-Z2	R&S	100756	2021.03.16	1 year
☒	RF Power Amplifier	FLL75A	FRANKONIA	1033	-	-
☒	EM INJECTION CLAMP	TSIC-23	F.C.C	529	2021.03.17	1 year
☐	CDN (M1)	TSCDN-M1-16A	F.C.C	07004	2021.09.04	1 year
☐	CDN (M2)	TSCDN-M2-16A	F.C.C	07008	2021.09.04	1 year
☐	CDN (M2)	TSCDN-M2-16A	F.C.C	07009	2021.03.16	1 year
☒	CDN (M3)	TSCDN-M3-16A	F.C.C	07016	2021.03.16	1 year
☒	CDN (M3)	TSCDN-M3-16A	F.C.C	07017	2021.09.04	1 year

Voltage dips and Interruptions

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Compact Generator	Compact NX	EMTEST	P1725200196	2021.09.03	1 year
☒	AC Power Source	Variac NX	EMTEST	P1745207276	2021.09.03	1 year

Mains supply voltage variations

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Compact Generator	Compact NX	EMTEST	P1725200196	2021.09.03	1 year
☒	AC Power Source	Variac NX	EMTEST	P1745207276	2021.09.03	1 year

APPENDIX B

PERFORMANCE CRITERIA

Performance criteria

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

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

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

Electrostatic discharge

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

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

Radiated electromagnetic fields

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

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

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

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

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

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

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

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

Fast transient burst / slow high energy voltage surge

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

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

Slow high energy voltage surge

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

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

Conducted RF immunity

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

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

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

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

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

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

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

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

Voltage dip/interruption

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

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

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

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

Mains supply voltage variations

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

APPENDIX C

PHOTOGRAPHS

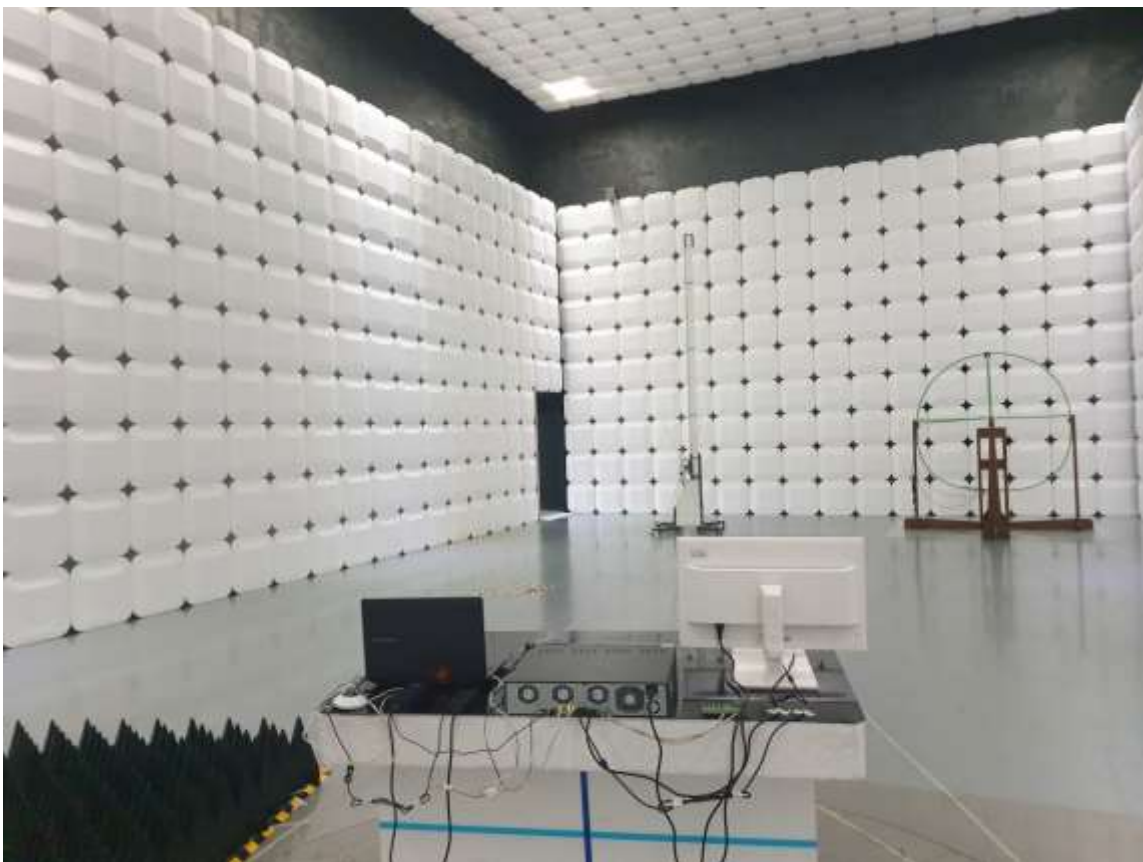
Conducted Emissions



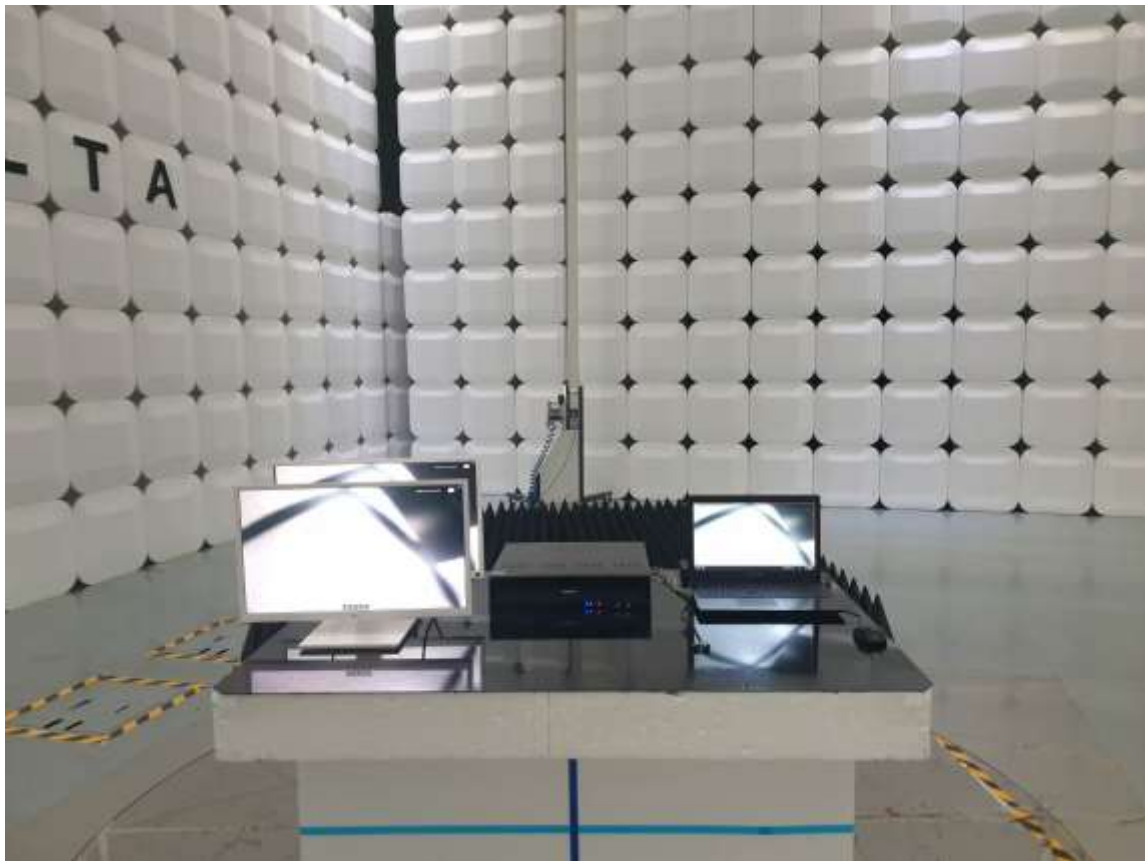
Conducted Emissions (TEL)



Radiated Emissions - Below 1 GHz



Radiated Emissions - Above 1 GHz



Harmonic Current Emission



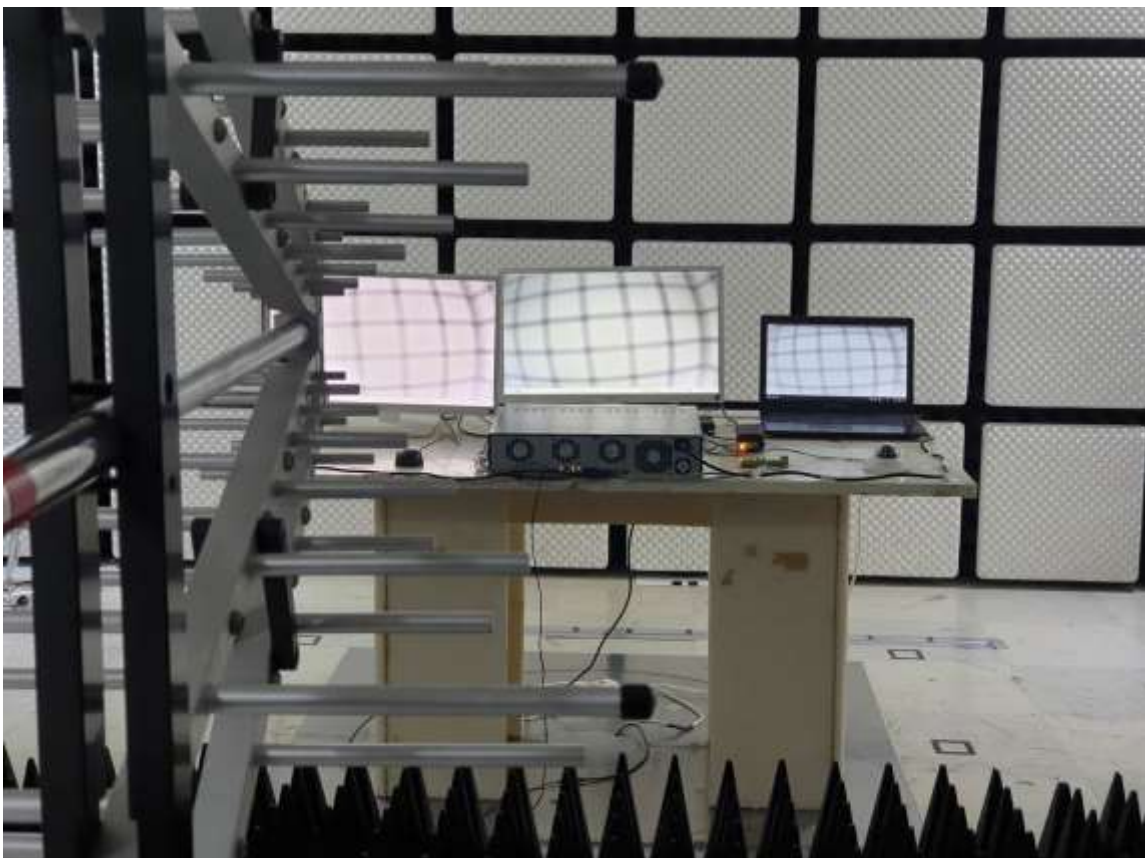
Voltage Fluctuations and Flicker



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

