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## EMC TEST REPORT

Dates of Tests: December 23, 2020 – January 03, 2021

Test Report S/N: LR500122101B

Test Site : LTA Co., Ltd.

Model No.

**XRN-6410RB2**

APPLICANT

**Hanwha Techwin Co., Ltd.**

**Equipment Name** : NVR  
**Manufacturer** : HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.  
**Model name** : XRN-6410RB2  
**Additional Model name** : XRN-3210RB2  
**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** : January 06, 2021

This test report is issued under the authority of:

The test was supervised by:

Young Kyu Shin, Technical Manager

Chan Bum Kim, 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.

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 TESTING NVLAP LAB CODE 200723-0

## Revision history

Revision	Date of issue	Test report No.	Description
0	06.01.2021	LR500122101B	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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 Telephone : +82-31-323-6008  
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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-6410RB2  
Additional Model name : XRN-3210RB2  
Additional Model is different number of channels.  
Serial number : Identification  
Date of receipt : December 21, 2020  
EUT condition : Pre-production, not damaged  
Interface Ports : AC IN, LAN #1 ~ #3, USB #1 ~ #4, HDMI #1 ~ #2, Audio OUT, Alarm IN / OUT  
Power rating : AC 230 V, 50 Hz

### 2-3 Modification

-NONE

### 2-4 Model Specification

-NONE

### 2-5 Test conditions

Temp. / Humid. / Pressure : (20 - 24) °C / (35 - 42) % R.H. / (100 – 101) kPa  
Tested Model : XRN-6410RB2  
Test mode : Operating mode  
Test 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>
NVR	XRN-6410RB2	N/A	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD. D-TECH CO.,LTD.	-
Mouse	MOKJUO	N/A	N/A	-
<b>ACCESSORY</b>				
<b>Equipment Name</b>	<b>Model Name</b>	<b>Serial No.</b>	<b>Manufacturer</b>	<b>Remarks</b>
Keyboard	KUB-1407	N/A	SHANGHAI RONGTENG ELECTRON TECHNOLOGICAL CO.,LTD	-
Network Camera	QNV-6083R	N/A	Hanwha Techwin Co., Ltd.	-
PoE Injector	SFC501G	N/A	N/A	-
Monitor	24BK550Y	N/A	LG Electronics Nanjing New Technology Co.,Ltd	2 EA
Smart Phone	G4	N/A	LG	-
Notebook	P56	NKW650RB 0006B02606	HANSUNG	-
HUB	SW1600-mini	N/A	IpTIME	-
Earphone	N/A	N/A	N/A	-
Alarm	N/A	N/A	N/A	-
USB Memory Stick	N/A	N/A	N/A	2 EA
HDD #1	WD40PURX-64NN96Y0	N/A	Western Digital	3 EA
HDD #2	WD20PURX-64P6ZY0	N/A	Western Digital	-

**2-7 Cable List**

Cable List						
From		To		Length (m)	Shielding	
Type	I/O Port	Type	I/O Port		Cable	backshell
EUT	AC IN	AC Power Source	3 Pin AC Line	1.6	NO	Plastic
	LAN #1	PoE Injector	LAN	3.0	NO	Plastic
	LAN #2	HUB	LAN	3.0	NO	Plastic
	LAN #3	HUB	LAN	3.0	NO	Plastic
	USB #1	Mouse	USB	1.5	NO	Plastic
	USB #2	Keyboard	USB	1.5	NO	Plastic
	USB #3	USB Memory Stick #1	USB	-	-	-
	USB #4	USB Memory Stick #2	USB	-	-	-
	HDMI #1	Monitor #1	HDMI	1.4	NO	Plastic
	HDMI #2	Monitor #2	HDMI	1.4	NO	Plastic
	Audio OUT	Earphone	-	1.5	NO	Plastic
	Alarm IN / OUT	Alarm	Alarm IN / OUT	1.0	NO	Plastic
	HDD Slot #1	HDD #1	-	-	-	-
	HDD Slot #2	HDD #1	-	-	-	-
	HDD Slot #3	HDD #1	-	-	-	-
	HDD Slot #4	HDD #2	-	-	-	-
PoE Injector	LAN	Network Camera	LAN	3.0	NO	Plastic
	AC IN	AC Power Source	3 Pin AC Line	1.2	NO	Plastic
HUB	LAN	Notebook	LAN	1.0	NO	Plastic
Network Camera	Audio IN	Smart Phone	-	1.4	NO	Plastic
Notebook	DC IN	Battery	DC OUT	-	-	-
HUB	AC IN	AC Power Source	3 Pin AC Line	1.6	NO	Plastic
Monitor#1	AC IN	AC Power Source	3 Pin AC Line	1.5	NO	Plastic
Monitor#2	AC IN	AC Power Source	3 Pin AC Line	1.5	NO	Plastic

### 3. Test Report

#### 3.1 Summary of tests

Reference	Parameter	Status (note)
<b>I. Emission</b>		
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 <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 EN61000-3-2 (Harmonic current emissions) for the XRN-6410RB2 because equipment whose rated power is less or equal 75 W don't need to be tested.



## 3.2 EMISSION

### 3.2.1 Conducted Emissions

#### Definition:

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

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

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

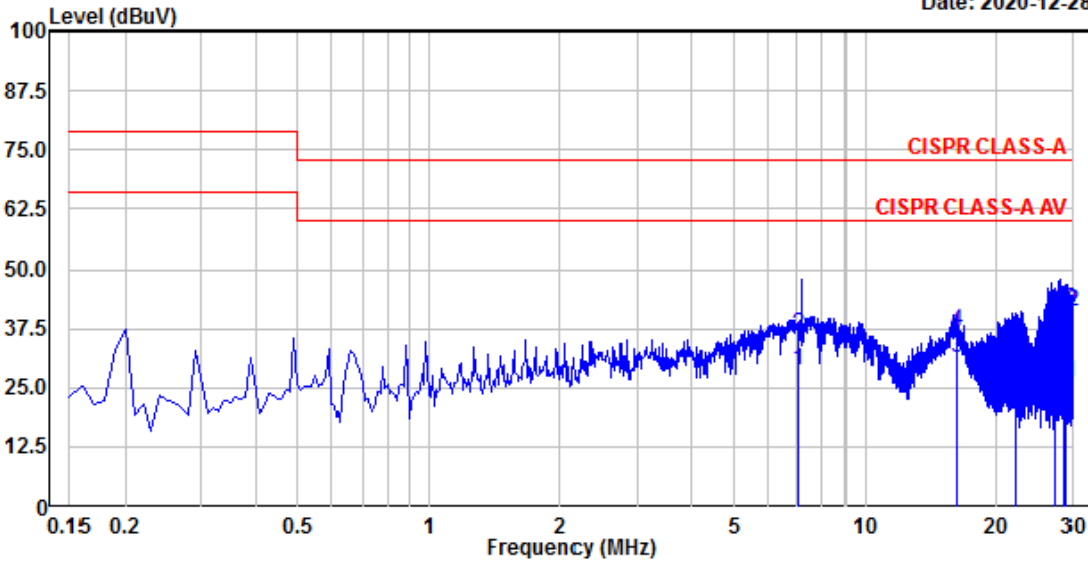
Conducted Emissions (LINE)



4, Songjuro 236 Beon-gil, Yangji-myeon  
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EUT /Model No. : XRN-6410RB2	Phase : Line
Test Mode : Operating mode	Test Power : 230 V / 50 Hz
Temp./ Humi. : 21 'C / 38 % R.H.	Test Engineer : KIM C B

Date: 2020-12-28



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.	7.052	16.40	9.00	19.72	36.12	28.72	73.00	60.00	36.88	31.28	Line
4.	16.229	16.97	11.35	19.92	36.89	31.27	73.00	60.00	36.11	28.73	Line
6.	22.110	14.56	1.05	20.01	34.57	21.06	73.00	60.00	38.43	38.94	Line
8.	27.256	19.28	5.30	20.09	39.37	25.39	73.00	60.00	33.63	34.61	Line
10.	28.627	21.26	7.13	20.11	41.37	27.24	73.00	60.00	31.63	32.76	Line
12.	28.878	20.98	6.06	20.11	41.09	26.17	73.00	60.00	31.91	33.83	Line

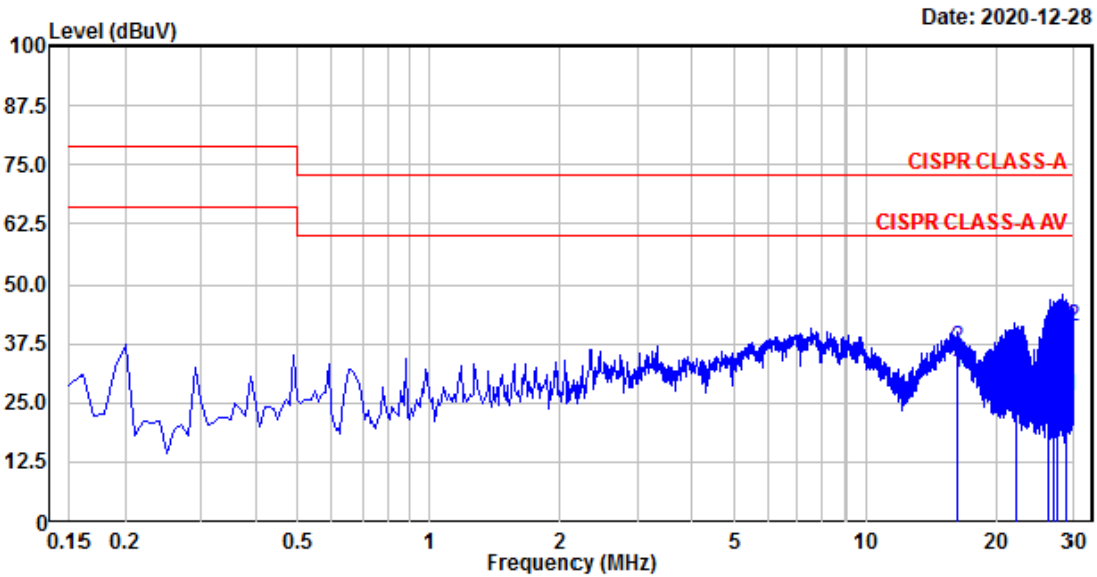
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

Conducted Emissions (NEUTRAL)



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EUT /Model No. : XRN-6410RB2	Phase : Neutral
Test Mode : Operating mode	Test Power : 230 V / 50 Hz
Temp./ Humi. : 21 'C / 38 % R.H.	Test Engineer : KIM C B



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.	16.228	16.65	11.20	19.95	36.60	31.15	73.00	60.00	36.40	28.85	neutral
4.	22.210	14.57	2.26	20.07	34.64	22.33	73.00	60.00	38.36	37.67	neutral
6.	26.434	16.24	3.76	20.15	36.39	23.91	73.00	60.00	36.61	36.09	neutral
8.	27.022	17.22	5.27	20.16	37.38	25.43	73.00	60.00	35.62	34.57	neutral
10.	27.667	19.00	4.40	20.17	39.17	24.57	73.00	60.00	33.83	35.43	neutral
12.	28.915	21.02	6.03	20.20	41.22	26.23	73.00	60.00	31.78	33.77	neutral

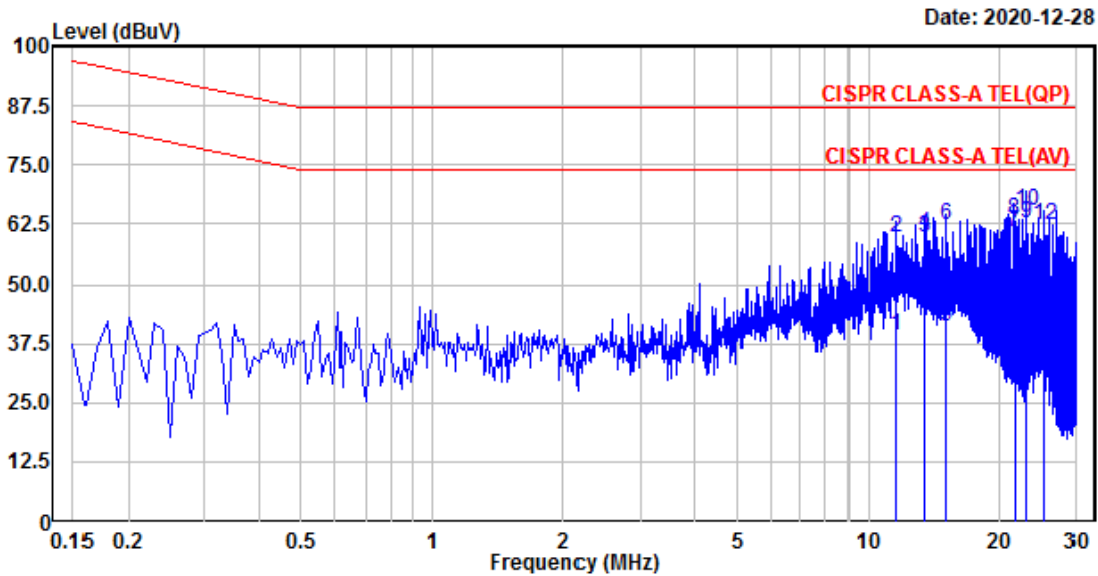
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

Conducted Emissions (TEL\_10 M) / Operating mode LAN #1



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EUT /Model No. : XRN-6410RB2	Phase : TEL_10M
Test Mode : Operating mode LAN#1	Test Power : 230 V / 50 Hz
Temp./ Humi. : 21 'C / 38 % R.H.	Test Engineer : KIM C B



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.	11.541	40.25	19.90	19.42	59.67	39.32	87.00	74.00	27.33	34.68	Line
4.	13.419	40.91	39.98	19.47	60.38	59.45	87.00	74.00	26.62	14.55	Line
6.	15.021	42.58	21.49	19.52	62.10	41.01	87.00	74.00	24.90	32.99	Line
8.	21.664	43.61	41.10	19.83	63.44	60.93	87.00	74.00	23.56	13.07	Line
10.	23.128	45.21	42.68	19.90	65.11	62.58	87.00	74.00	21.89	11.42	Line
12.	25.342	42.09	16.75	20.02	62.11	36.77	87.00	74.00	24.89	37.23	Line

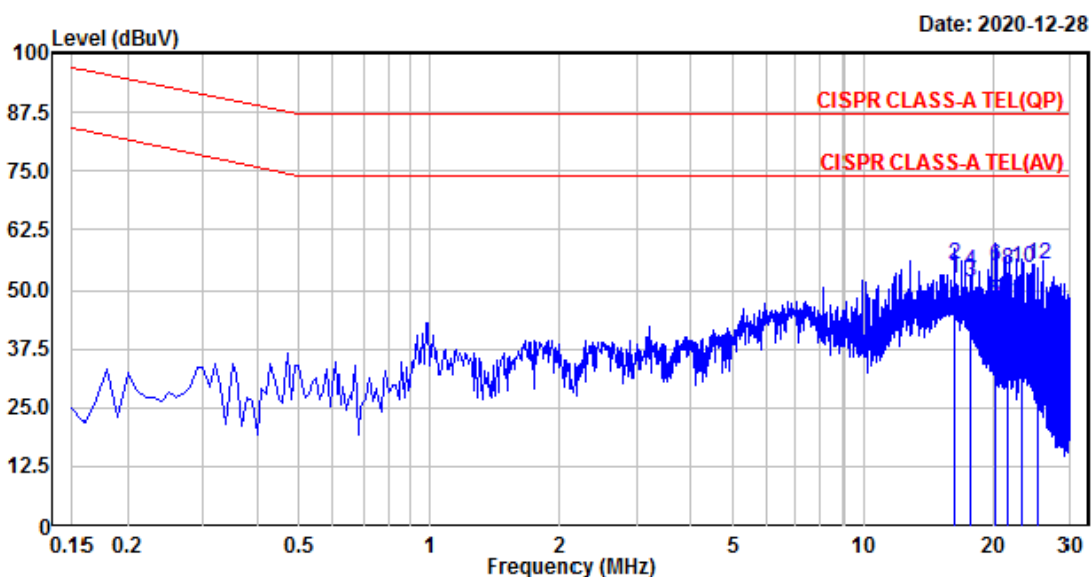
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

Conducted Emissions (TEL\_100 M) / Operating mode LAN #1



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EUT /Model No. : XRN-6410RB2	Phase : TEL_100M
Test Mode : Operating mode LAN#1	Test Power : 230 V / 50 Hz
Temp./ Humi. : 21 'C / 38 % R.H.	Test Engineer : KIM C B



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.	16.229	35.60	33.14	19.37	54.97	52.51	87.00	74.00	32.03	21.49	Line
4.	17.694	34.25	32.18	19.41	53.66	51.59	87.00	74.00	33.34	22.41	Line
6.	20.258	35.22	28.05	19.50	54.72	47.55	87.00	74.00	32.28	26.45	Line
8.	21.661	34.44	27.06	19.57	54.01	46.63	87.00	74.00	32.99	27.37	Line
10.	23.324	34.86	11.39	19.64	54.50	31.03	87.00	74.00	32.50	42.97	Line
12.	25.342	35.52	12.60	19.74	55.26	32.34	87.00	74.00	31.74	41.66	Line

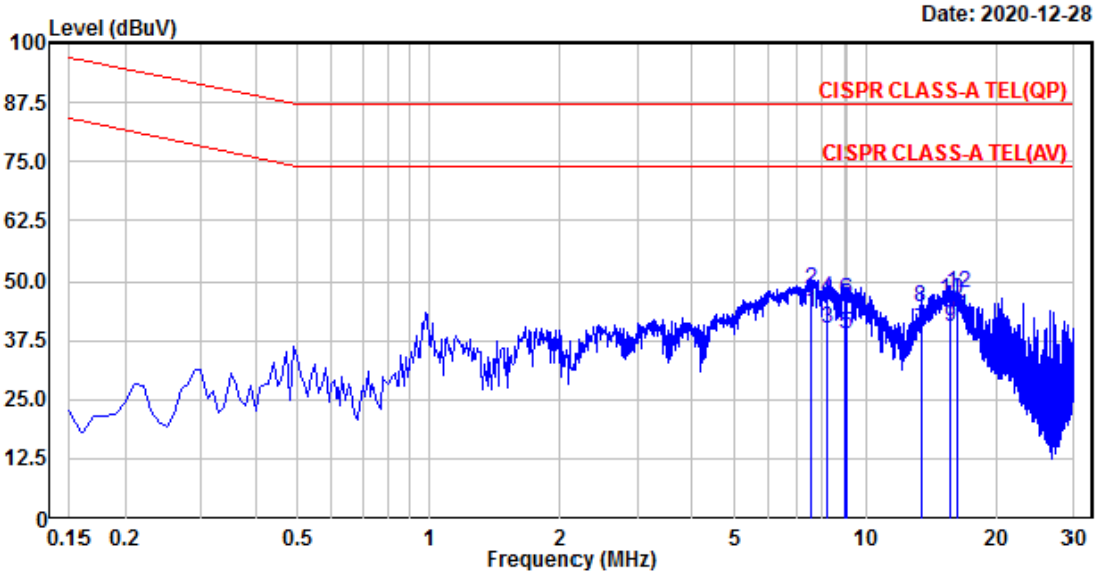
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

Conducted Emissions (TEL\_1000 M) / Operating mode LAN #1



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EUT /Model No. : XRN-6410RB2	Phase : TEL_1000M
Test Mode : Operating mode LAN#1	Test Power : 230 V / 50 Hz
Temp./ Humi. : 21 'C / 38 % R.H.	Test Engineer : KIM C B



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.	7.529	29.13	23.97	19.28	48.41	43.25	87.00	74.00	38.59	30.75	Line
4.	8.229	27.20	20.75	19.30	46.50	40.05	87.00	74.00	40.50	33.95	Line
6.	9.011	26.57	19.43	19.31	45.88	38.74	87.00	74.00	41.12	35.26	Line
8.	13.359	25.09	20.18	19.40	44.49	39.58	87.00	74.00	42.51	34.42	Line
10.	15.558	26.65	21.07	19.45	46.10	40.52	87.00	74.00	40.90	33.48	Line
12.	16.230	28.15	23.06	19.47	47.62	42.53	87.00	74.00	39.38	31.47	Line

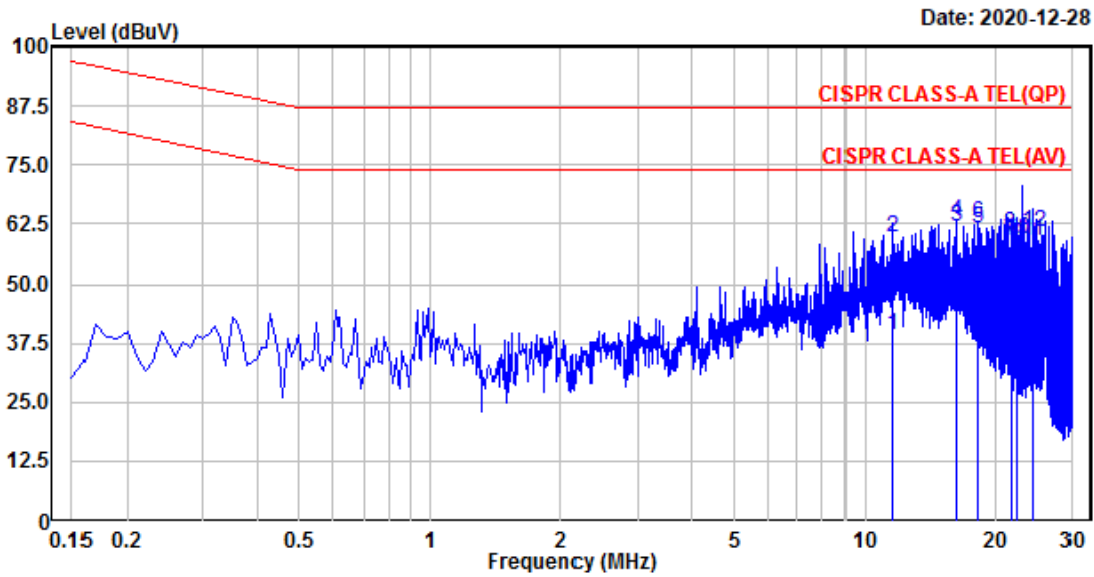
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

Conducted Emissions (TEL\_10 M) / Operating mode LAN #2



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EUT /Model No. : XRN-6410RB2	Phase : TEL_10M
Test Mode : Operating mode LAN#2	Test Power : 230 V / 50 Hz
Temp./ Humi. : 21 'C / 38 % R.H.	Test Engineer : KIM C B



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.	11.541	40.24	19.74	19.42	59.66	39.16	87.00	74.00	27.34	34.84	Line
4.	16.229	43.32	42.21	19.57	62.89	61.78	87.00	74.00	24.11	12.22	Line
6.	18.243	43.00	41.83	19.65	62.65	61.48	87.00	74.00	24.35	12.52	Line
8.	21.667	40.60	39.19	19.83	60.43	59.02	87.00	74.00	26.57	14.98	Line
10.	22.459	39.34	38.22	19.87	59.21	58.09	87.00	74.00	27.79	15.91	Line
12.	24.350	40.83	38.83	19.97	60.80	58.80	87.00	74.00	26.20	15.20	Line

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

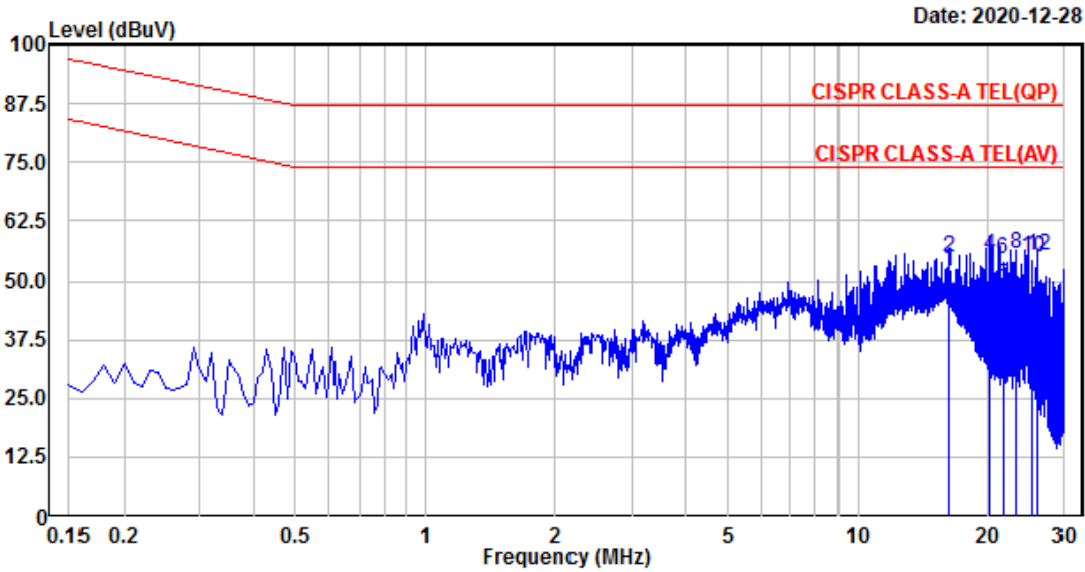


Conducted Emissions (TEL\_100 M) / Operating mode LAN #2



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EUT /Model No. : XRN-6410RB2	Phase : TEL_100M
Test Mode : Operating mode LAN#2	Test Power : 230 V / 50 Hz
Temp./ Humi. : 21 'C / 38 % R.H.	Test Engineer : KIM C B



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.	16.229	35.30	32.76	19.37	54.67	52.13	87.00	74.00	32.33	21.87	Line
4.	20.257	35.53	25.61	19.50	55.03	45.11	87.00	74.00	31.97	28.89	Line
6.	21.665	34.70	29.44	19.57	54.27	49.01	87.00	74.00	32.73	24.99	Line
8.	23.328	35.91	11.97	19.64	55.55	31.61	87.00	74.00	31.45	42.39	Line
10.	25.343	34.99	12.35	19.74	54.73	32.09	87.00	74.00	32.27	41.91	Line
12.	26.013	35.34	12.33	19.78	55.12	32.11	87.00	74.00	31.88	41.89	Line

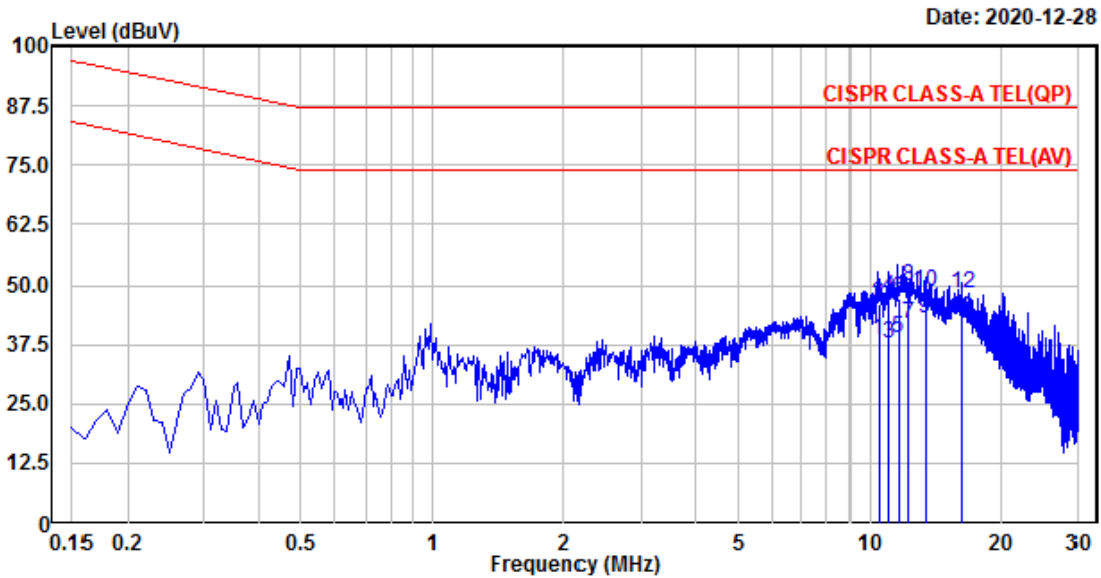
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

Conducted Emissions (TEL\_1000 M) / Operating mode LAN #2



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EUT /Model No. : XRN-6410RB2	Phase : TEL_1000M
Test Mode : Operating mode LAN#2	Test Power : 230 V / 50 Hz
Temp./ Humi. : 21 'C / 38 % R.H.	Test Engineer : KIM C B



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.	10.441	26.95	19.46	19.21	46.16	38.67	87.00	74.00	40.84	35.33	Line
4.	10.991	28.51	18.50	19.22	47.73	37.72	87.00	74.00	39.27	36.28	Line
6.	11.587	28.03	19.49	19.25	47.28	38.74	87.00	74.00	39.72	35.26	Line
8.	12.198	30.39	22.51	19.25	49.64	41.76	87.00	74.00	37.36	32.24	Line
10.	13.357	29.50	23.71	19.28	48.78	42.99	87.00	74.00	38.22	31.01	Line
12.	16.229	28.84	24.08	19.37	48.21	43.45	87.00	74.00	38.79	30.55	Line

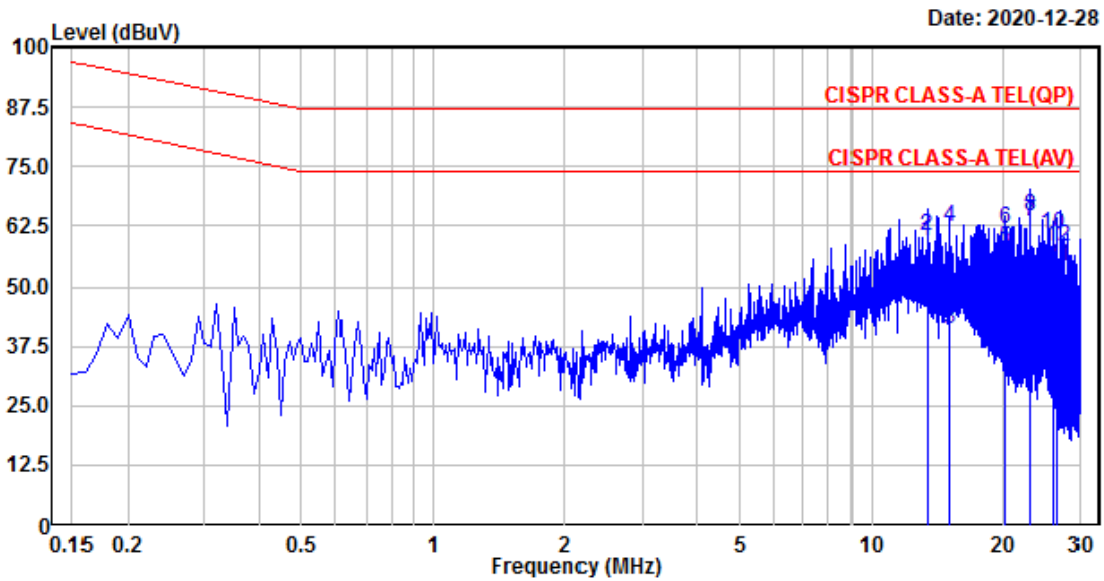
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

Conducted Emissions (TEL\_10 M) / Operating mode LAN #3



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EUT /Model No. : XRN-6410RB2	Phase : TEL_10M
Test Mode : Operating mode LAN#3	Test Power : 230 V / 50 Hz
Temp./ Humi. : 21 'C / 38 % R.H.	Test Engineer : KIM C B



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.	13.358	40.85	39.95	19.47	60.32	59.42	87.00	74.00	26.68	14.58	Line
4.	15.021	42.56	21.62	19.52	62.08	41.14	87.00	74.00	24.92	32.86	Line
6.	20.257	42.19	38.07	19.74	61.93	57.81	87.00	74.00	25.07	16.19	Line
8.	23.130	44.81	43.39	19.90	64.71	63.29	87.00	74.00	22.29	10.71	Line
10.	25.952	40.65	15.06	20.06	60.71	35.12	87.00	74.00	26.29	38.88	Line
12.	26.606	38.07	33.80	20.10	58.17	53.90	87.00	74.00	28.83	20.10	Line

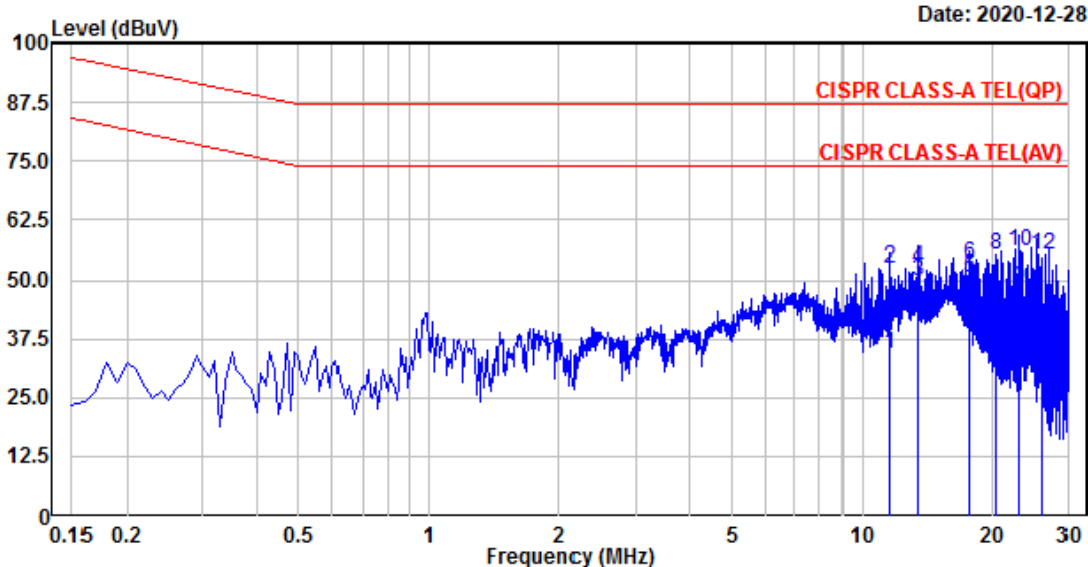
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

Conducted Emissions (TEL\_100 M) / Operating mode LAN #3



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EUT /Model No. : XRN-6410RB2	Phase : TEL_100M
Test Mode : Operating mode LAN#3	Test Power : 230 V / 50 Hz
Temp./ Humi. : 21 'C / 38 % R.H.	Test Engineer : KIM C B



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.	11.541	33.03	15.12	19.24	52.27	34.36	87.00	74.00	34.73	39.64	Line
4.	13.419	33.01	30.67	19.28	52.29	49.95	87.00	74.00	34.71	24.05	Line
6.	17.693	33.68	31.10	19.41	53.09	50.51	87.00	74.00	33.91	23.49	Line
8.	20.456	35.62	11.98	19.52	55.14	31.50	87.00	74.00	31.86	42.50	Line
10.	23.126	36.28	28.81	19.64	55.92	48.45	87.00	74.00	31.08	25.55	Line
12.	26.013	35.23	12.17	19.78	55.01	31.95	87.00	74.00	31.99	42.05	Line

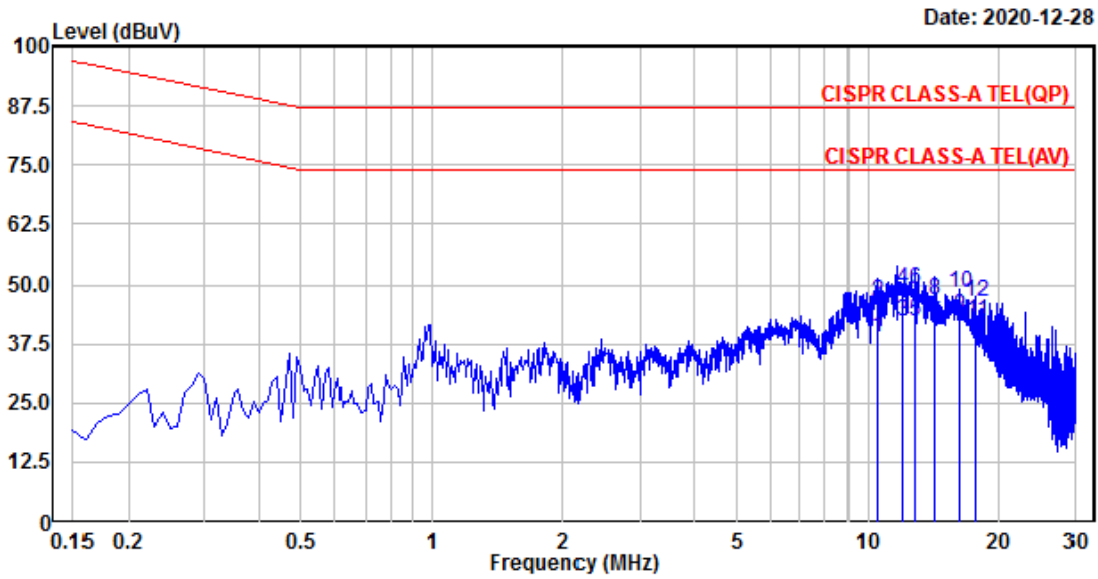
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

Conducted Emissions (TEL\_1000 M) / Operating mode LAN #3



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EUT /Model No. : XRN-6410RB2	Phase : TEL_1000M
Test Mode : Operating mode LAN#3	Test Power : 230 V / 50 Hz
Temp./ Humi. : 21 'C / 38 % R.H.	Test Engineer : KIM C B



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.	10.442	27.11	19.53	19.21	46.32	38.74	87.00	74.00	40.68	35.26	Line
4.	11.954	29.85	23.10	19.25	49.10	42.35	87.00	74.00	37.90	31.65	Line
6.	12.810	29.92	23.16	19.27	49.19	42.43	87.00	74.00	37.81	31.57	Line
8.	14.213	27.44	22.63	19.31	46.75	41.94	87.00	74.00	40.25	32.06	Line
10.	16.229	28.89	24.14	19.37	48.26	43.51	87.00	74.00	38.74	30.49	Line
12.	17.695	26.93	22.75	19.41	46.34	42.16	87.00	74.00	40.66	31.84	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	: 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.  
(The highest internal source of an EUT : higher than 108 MHz)

**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

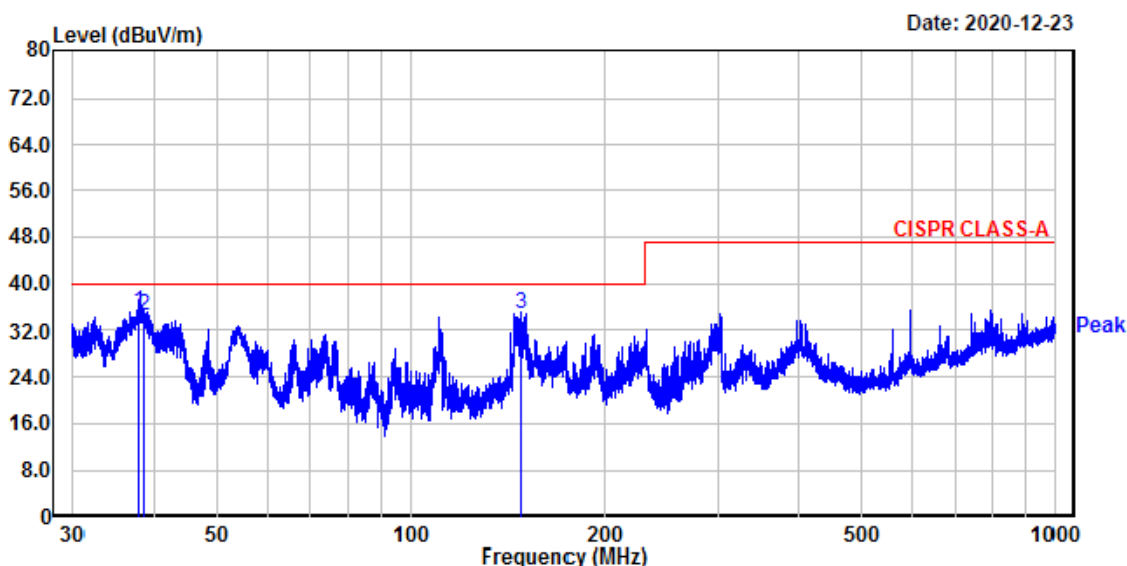
NOTE: The lower limit applies at the transition frequency.

Radiated Emissions (Below 1 GHz) / V



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EUT/Model No.:	XRN-6410RB2	Temp/Humi:	21 'C / 35 % R.H.
Test Mode	: Operating mode	Tested by:	KIM C B
Power	: 230 V / 50 Hz		



No.	Freq MHz	Reading dB $\mu$ V	C.F dB	Result QP dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Height cm	Angle deg	Polarity
1.	37.76	50.20	-15.23	34.97	40.00	5.03	162	336	vertical
2.	38.50	49.69	-15.14	34.55	40.00	5.45	192	321	vertical
3.	148.18	47.90	-13.10	34.80	40.00	5.20	110	299	vertical

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

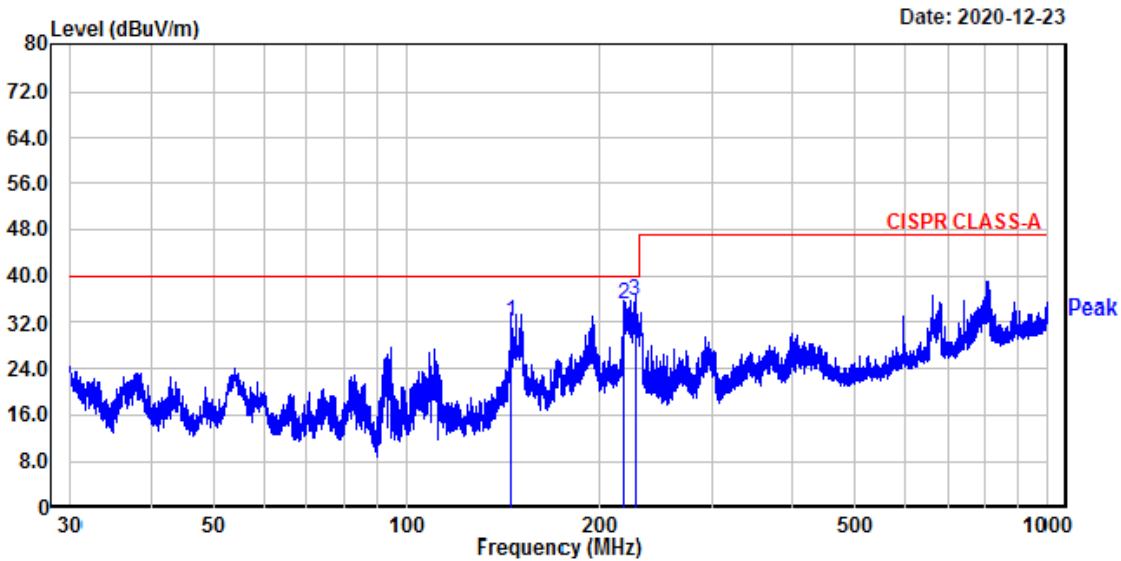


Radiated Emissions (Below 1 GHz) / H



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EUT/Model No.: XRN-6410RB2                      Temp/Humi: 21 'C / 35 % R.H.  
 -----  
 Test Mode : Operating mode                      Tested by: KIM C B  
 -----  
 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.	146.18	45.21	-13.23	31.98	40.00	8.02	328	150	horizontal
2.	218.21	50.40	-15.49	34.91	40.00	5.09	324	332	horizontal
3.	226.89	51.10	-15.39	35.71	40.00	4.29	370	306	horizontal

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - 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 mode	:	Operating mode
Rated power	:	57.390 W
Result	:	<b>Not Applicable</b>

**Measurement Data:**

- We did not test EN61000-3-2 (Harmonic Current Emission) for the XRN-6410RB2 because equipment whose rated power is less or equal 75 W don't need to be tested.

## Harmonic Current Emission

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	<b>IEC61000-3-2:2014</b>		
<b>Fluctuating Harmonics</b>			
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	Harwha Techwin Co., Ltd.		
Model	XRN-6410RB2		
Serial	N/A		
Impedance Network ID	N/A		
Test Conditions			
	User Entered	Measured	
Rated Voltage	N/A	230.792V	
Rated Current	N/A	450.668mA	
Rated Frequency	N/A	50.000Hz	
Rated Power	N/A	57.390W	
Additional Test Information			
Measured Power Factor	0.5516		
Max Current THD	110.22%		
Average THC	298.001mA		
Max Power	67.734W		
Max F.Current	319.461mA		
Average F.Current	276.717mA		
Minimum Current	100A		
Test Duration	2.5 minutes		
Additional Test Details			
Operator	KIM C B		
Lab Name	N/A		
Location	N/A		
Notes			
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 IEC61000-3-2:2014 standard declares that no Harmonic current limits are specified for equipment with a rated power of 75W or less.

### 3.2.4 Voltage Fluctuations and Flicker

**Definition:**

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

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

Test method : EN 61000-3-3:2013



Test mode : Operating mode

Result : **Complies**

**Measurement Data:**

- Refer to the Next page

## Voltage Fluctuations and Flicker

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		<b>IEC61000-3-3:2013 Ed.3.0</b>			
		<b>Flickermeter</b>			
<b>Instrument Details</b>					
Instrument Model	PPA5511				
Serial Number	162-04957				
Firmware Version	2.179				
N4L Calibration Date	18th September 2017				
Instrument Version	Standard				
<b>Test Settings</b>					
Class	Voltage				
Mode	Normal (4.0%)				
Minimum Current	10A				
PST	10.0 minutes				
PLT	12 PSTs				
<b>Equipment Under Test</b>					
Brand	Hanwha Techwin Co., Ltd.				
Model	XRN-6410RB2				
Serial	N/A				
Impedance Network ID	N/A				
<b>Test Conditions</b>					
	<b>User Entered</b>		<b>Measured</b>		
Rated Voltage	N/A		230.793V		
Rated Current	N/A		N/A		
Rated Frequency	N/A		50.000Hz		
Rated Power	N/A		N/A		
D max	0.1154% (Limit: 4.0%)				
T max	0.0000 s (Limit: 0.5 s)				
DC max	0.0044% (Limit: 3.3%)				
<b>Additional Test Details</b>					
Operator	KIM C B				
Lab Name	N/A				
Location	N/A				
Notes					
Signature					
<b>Results</b>	<b>Phase1: PASS</b>				

30th December 2020 - 17:55:18		Ph:1 Page 2/2		IECSoft v2_6				
IEC61000-3-3:2013 Ed.3.0 Flickermeter								
Instrument Details								
Instrument Model	PPA5511							
Instrument Serial	162-04957							
Instrument Firmware	2.179							
Equipment Under Test								
Brand	Hanwha Techwin Co., Ltd.							
Model	XRN-6410RB2							
Serial	N/A							
Flicker Test Results								
PST no.	Status	DC (%)	Dmax (%)	Tmax (s)	PST	PST Lim	PLT	PLT Lim
1	Phase1: PASS	0.00442	0.10843	0.00000	0.08226	1.00000	0.08226	N/A
2	Phase1: PASS	0.00442	0.11542	0.00000	0.08226	1.00000	0.08226	N/A
3	Phase1: PASS	0.00442	0.11542	0.00000	0.08226	1.00000	0.08226	N/A
4	Phase1: PASS	0.00442	0.11542	0.00000	0.08226	1.00000	0.08226	N/A
5	Phase1: PASS	0.00442	0.11542	0.00000	0.08226	1.00000	0.08226	N/A
6	Phase1: PASS	0.00442	0.11542	0.00000	0.08226	1.00000	0.08226	N/A
7	Phase1: PASS	0.00442	0.11542	0.00000	0.08226	1.00000	0.08226	N/A
8	Phase1: PASS	0.00442	0.11542	0.00000	0.08226	1.00000	0.08226	N/A
9	Phase1: PASS	0.00442	0.11542	0.00000	0.08226	1.00000	0.08226	N/A
10	Phase1: PASS	0.00442	0.11542	0.00000	0.08226	1.00000	0.08226	N/A
11	Phase1: PASS	0.00442	0.11542	0.00000	0.08226	1.00000	0.08226	N/A
12	Phase1: PASS	0.00442	0.11542	0.00000	0.08226	1.00000	0.08226	0.65000

### 3.3 IMMUNITY

#### 3.3.1 Electrostatic Discharge

**Definition:**

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

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

Test date	:	2020. 12. 24.
Test method	:	EN 61000-4-2 :2009
Temperature / Humidity / Pressure	:	21 °C / 40 % R.H. / 100 kPa
Discharge Impedance	:	(330 ± 10 %) Ω / (150 ± 10 %) pF
Type of Discharge (air discharge)	:	±2 kV, ±4 kV, ±8 kV
Type of Discharge (contact discharge)	:	±6 kV
Number of discharges at each point	:	10 of each polarity
Discharge Repetition on Rate	:	1 / sec
Test mode	:	Operating mode
Result	:	<b>Complies</b>

**Measurement Data:**

**ESD Test Point and Result**

**1-1. Indirect Discharge**

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

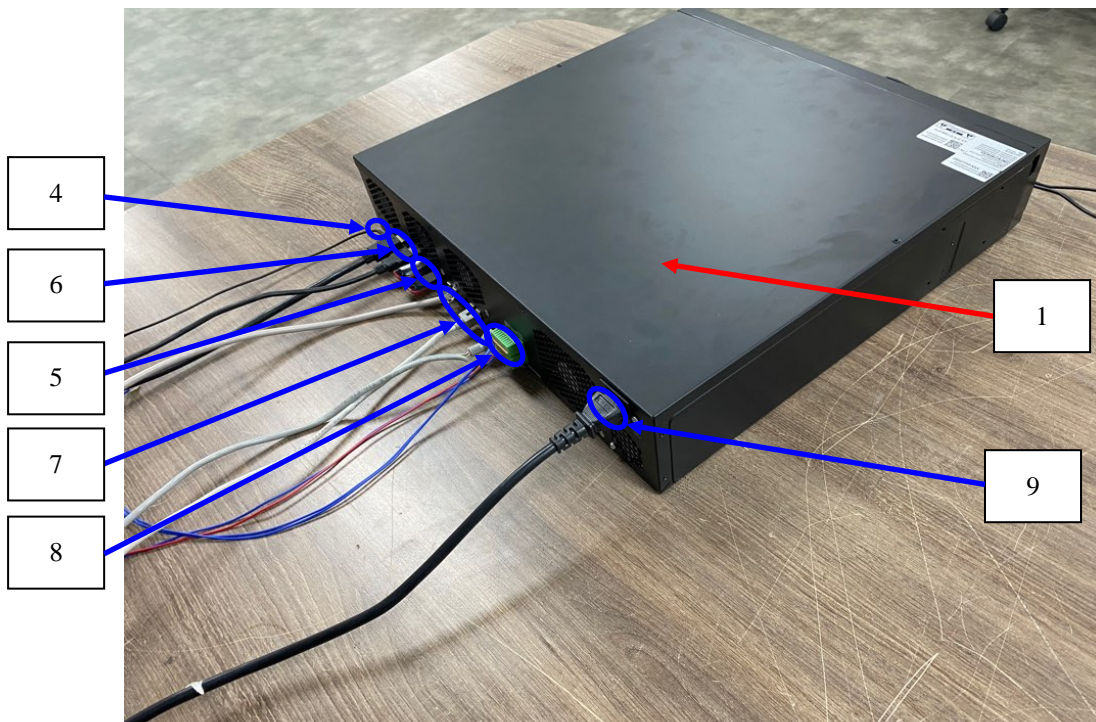
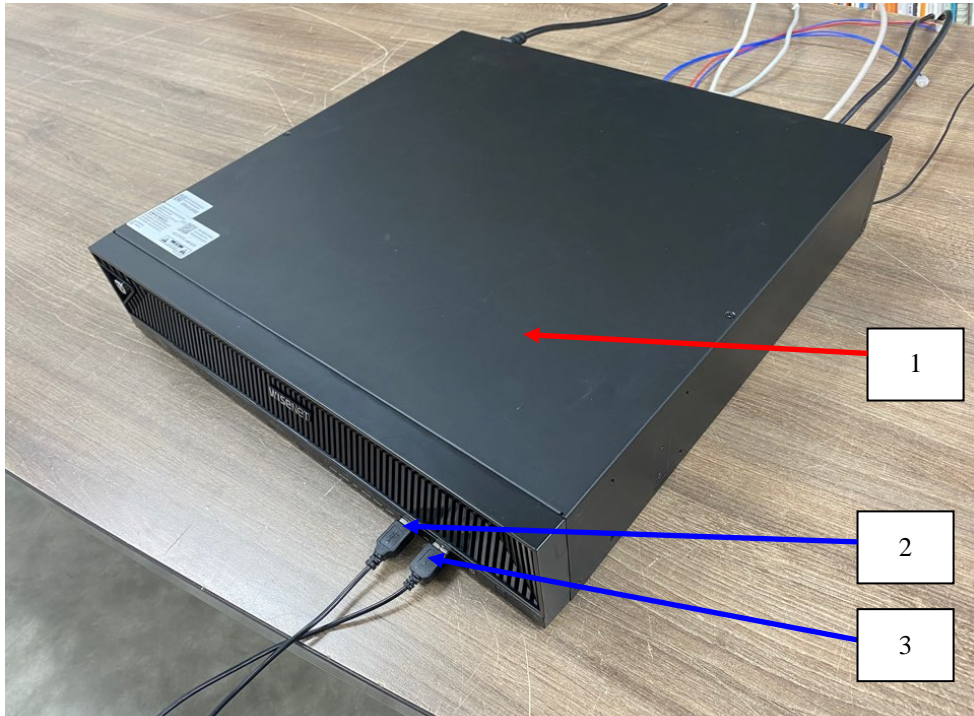
**1-2. Direct Discharge**

No.	Position	Kind of Discharge	Result	Remarks
1	Enclosure	Contact	Complies	No reaction recognized
2	Mouse	Air	Complies	No reaction recognized
3	Keyboard	Air	Complies	No reaction recognized
4	Earphone	Air	Complies	No reaction recognized
5	USB Memory Stick	Air	Complies	No reaction recognized
6	HDMI	Air	Complies	No reaction recognized
7	LAN	Air	Complies	No reaction recognized
8	Alarm	Air	Complies	No reaction recognized
9	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	:	2021. 01. 03.
Test method	:	EN 61000-4-3:2006/A1:2008/A2:2010
Temperature / Humidity / Pressure	:	22 °C / 39 % 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	:	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	:	2020. 12. 29.
Test method	:	EN 61000-4-4:2012
Temperature / Humidity / Pressure	:	24 °C / 42 % R.H. / 101 kPa
Cable length	:	> 3 m
Test level	:	2.0 kV (AC power input port) 1.0 kV (Signal port)
Polarity	:	Negative/ positive
Repetition frequency	:	100 kHz
Test mode	:	Operating mode
Result	:	<b>Complies</b>

#### 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	±1 kV	Complies	No reaction recognized
LAN #2	±1 kV	Complies	No reaction recognized
LAN #3	±1 kV	Complies	No reaction recognized
Audio OUT	±1 kV	Complies	No reaction recognized
Alarm IN	±1 kV	Complies	No reaction recognized
Alarm OUT	±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. 12. 29.
Test method	:	EN 61000-4-5:2014/A1:2017
Temperature / Humidity / Pressure	:	23 °C / 40 % R.H. / 101 kPa
Test level	:	±0.5 kV, ±1 kV (line to line) ±0.5 kV, ±1 kV, ±2 kV (line to ground), ±0.5 kV, ±1 kV (signal line)
Polarity	:	Negative/ positive
Wave shape	:	1.2/ 50 µs pulse
Number of surges	:	5 (at each phase)
Test mode	:	Operating mode
Result	:	<b>Complies</b>

- Refer to the Next page

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

Signal Line	level	Result	Remark
LAN #1	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized
LAN #2	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized
LAN #3	$\pm(0.5, 1.0)$ kV	Complies	No reaction recognized
Audio OUT	$\pm(0.5, 1.0)$ 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	:	2020. 12. 31.
Test method	:	EN 61000-4-6:2014/AC:2015
Temperature / Humidity / Pressure	:	22 °C / 39 % R.H. / 100 kPa
Frequency range	:	0.15 MHz – 100 MHz
Test level	:	10 Vrms unmodulated
Amplitude Modulation	:	AM, 80 %, 1 kHz Sinusoidal PM, 1 Hz (0.5s ON : 0.5s OFF)
Step size	:	1 % of fundamental.
Test mode	:	Operating mode
Result	:	<b>Complies</b>

#### Measurement Data:

Power Port	Result	Remarks
Power	Complies	No reaction recognized

Signal Port	Result	Remarks
LAN #1	Complies	No reaction recognized
LAN #2	Complies	No reaction recognized
LAN #3	Complies	No reaction recognized
Audio OUT	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	:	2020. 12. 29.
Test method	:	EN 61000-4-11:2004/A1:2017
Temperature / Humidity / Pressure	:	23 °C / 39 % R.H. / 101 kPa
Ut	:	230 Vac
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 without 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. 12. 29.
Test method	:	EN 61000-4-11:2004/A1:2017
Temperature / Humidity / Pressure	:	23 °C / 39 % R.H. / 101 kPa
Supply Voltage maximum	:	$U_{nom} + 10 \%$
Supply Voltage minimum	:	$U_{nom} - 15 \%$
Ut	:	230 Vac
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
$U_{nom}$	+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
<input checked="" type="checkbox"/>	EMI TEST Receiver	ESR	Rohde & Schwarz	101499	2021.07.02	1 year
<input checked="" type="checkbox"/>	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	100710	2021.03.16	1 year
<input checked="" type="checkbox"/>	ISN	ISN T800	TESEQ	27109	2021.09.07	1 year
<input checked="" type="checkbox"/>	ISN	ENY81-CA6	Rohde & Schwarz	101565	2021.09.07	1 year
<input checked="" type="checkbox"/>	ISN	ISN S8	Schwarzbeck	79	2021.09.04	1 year
<input type="checkbox"/>	CURRENT PROBE	EZ-17	Rohde & Schwarz	100508	2021.09.03	1 year
<input type="checkbox"/>	CDN	TSCDN-C1-BNC-75	F.C.C	07004	2021.05.08	1 year
<input type="checkbox"/>	LISN	ESH3-Z6	Rohde & Schwarz	100378	2021.09.03	1 year
<input type="checkbox"/>	LISN	ESH3-Z6	Rohde & Schwarz	101468	2021.09.03	1 year
<input checked="" type="checkbox"/>	LISN(main)	ENV216	Rohde & Schwarz	100408	2021.09.04	1 year
<input checked="" type="checkbox"/>	LISN(sub)	LT32C/10	AFJ	32031518210	2021.09.03	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	ESU	Rohde & Schwarz	100092	2021.09.03	1 year
<input checked="" type="checkbox"/>	Amplifier (25 dB)	8447D	HP	2944A07684	2021.11.10	1 year
<input checked="" type="checkbox"/>	BILOG Antenna	VULB 9168	SCHWARZBECK	775	2021.03.26 (KOLAS)	2 year
<input type="checkbox"/>	BILOG Antenna	VULB 9168	SCHWARZBECK	775	2021.11.12 (RRA)	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	ESU	Rohde & Schwarz	100092	2021.09.03	1 year
<input checked="" type="checkbox"/>	Amplifier	8449B	Agilent	3008A02126	2021.03.17	1 year
<input type="checkbox"/>	Amplifier	PAM-840A	COM-POWER	461314	2021.03.16	1 year
<input type="checkbox"/>	HORN ANTENNA	3116B	ETS	133350	2022.05.12	2 year
<input type="checkbox"/>	HORN ANTENNA	3116B	ETS	81109	2022.05.12	2 year
<input checked="" type="checkbox"/>	HORN ANTENNA	3115	ETS	114105	2021.09.17 (KOLAS)	2 year
<input type="checkbox"/>	HORN ANTENNA	3115	ETS	114105	2021.11.11 (RRA)	2 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	2021.09.07	1 year
<input checked="" type="checkbox"/>	Reference Impedance Network	ES4152	NF Corp.	9074424	2021.09.07	1 year

**Electrostatic Discharge**

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
<input checked="" type="checkbox"/>	ESD Simulator	ESS-2000	NOISEKEN	8000C03241	2021.09.07	1 year
<input checked="" type="checkbox"/>	ESD GUN	TC-815R	NOISEKEN	ESS0382069	2021.09.07	1 year

**RF Electromagnetic Field**

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
<input checked="" type="checkbox"/>	Signal Generator	E4432B	Agilent	MY41310632	2021.03.16	1 year
<input checked="" type="checkbox"/>	Power Meter	E4419B	Agilent	GB38410133	2021.03.16	1 year
<input checked="" type="checkbox"/>	Power Sensor	E9300A	Agilent	MY41497992	2021.03.16	1 year
<input checked="" type="checkbox"/>	Power Sensor	E9300A	Agilent	MY41497618	2021.03.16	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	-	-

**Electrical Fast Transients**

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
<input checked="" type="checkbox"/>	Compact Generator	Compact NX	EMTEST	P1725200196	2021.09.03	1 year
<input checked="" type="checkbox"/>	AC Power Source	Variac NX	EMTEST	P1745207276	2021.09.03	1 year
<input checked="" type="checkbox"/>	Capacitive Coupling Clamp	CCI	EMTEST	P1744207071	2021.09.03	1 year

**Surges**

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
<input checked="" type="checkbox"/>	Compact Generator	Compact NX	EMTEST	P1725200196	2021.09.03	1 year
<input checked="" type="checkbox"/>	AC Power Source	Variac NX	EMTEST	P1745207276	2021.09.03	1 year
<input checked="" type="checkbox"/>	CDN	CNV 508T5	EMTEST	P1742204978	2021.09.04	1 year
<input type="checkbox"/>	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
<input checked="" type="checkbox"/>	Signal generator	SML03	R&S	103026/0013	2021.03.16	1 year
<input checked="" type="checkbox"/>	POWER METER	NRVD	R&S	101689	2021.03.16	1 year
<input checked="" type="checkbox"/>	POWER Sensor	URV5-Z2	R&S	100755	2021.03.16	1 year
<input checked="" type="checkbox"/>	POWER Sensor	URV5-Z2	R&S	100756	2021.03.16	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	2021.03.17	1 year
<input type="checkbox"/>	CDN (M1)	TSCDN-M1-16A	F.C.C	07004	2021.09.04	1 year
<input type="checkbox"/>	CDN (M2)	TSCDN-M2-16A	F.C.C	07008	2021.09.04	1 year
<input type="checkbox"/>	CDN (M2)	TSCDN-M2-16A	F.C.C	07009	2021.03.16	1 year
<input checked="" type="checkbox"/>	CDN (M3)	TSCDN-M3-16A	F.C.C	07016	2021.03.16	1 year
<input checked="" type="checkbox"/>	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
<input checked="" type="checkbox"/>	Compact Generator	Compact NX	EMTEST	P1725200196	2021.09.03	1 year
<input checked="" type="checkbox"/>	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
<input checked="" type="checkbox"/>	Compact Generator	Compact NX	EMTEST	P1725200196	2021.09.03	1 year
<input checked="" type="checkbox"/>	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

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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**Conducted Emissions (TEL)**

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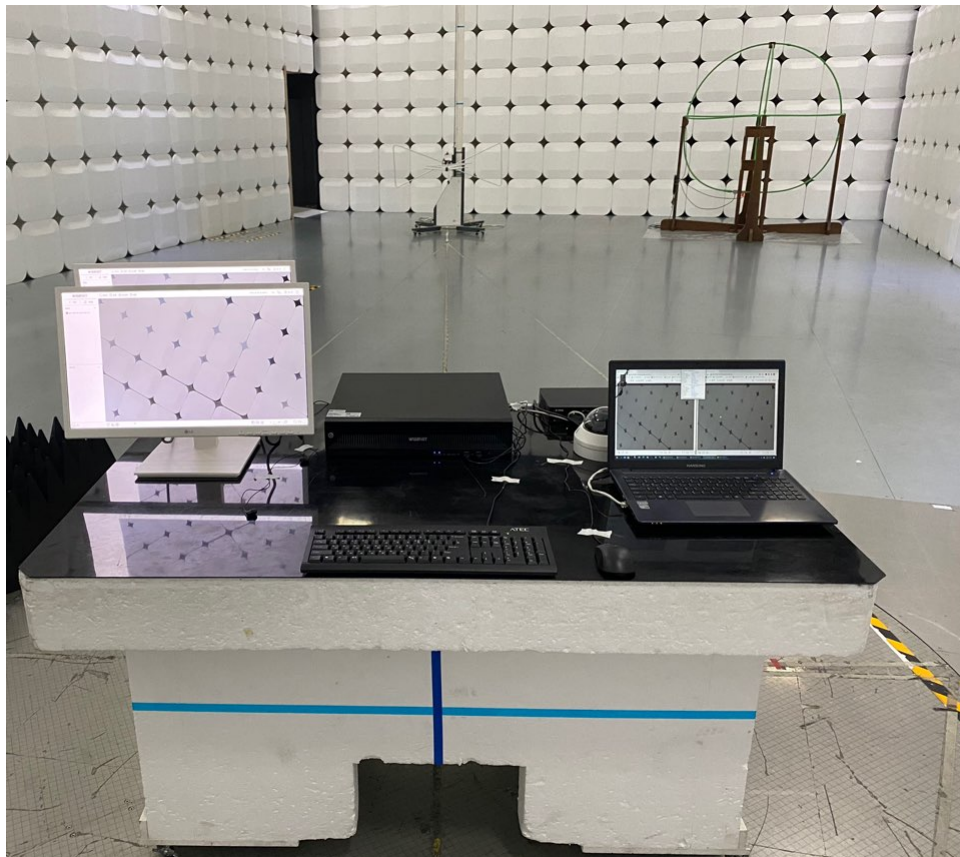
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**Radiated Emissions - Below 1 GHz**

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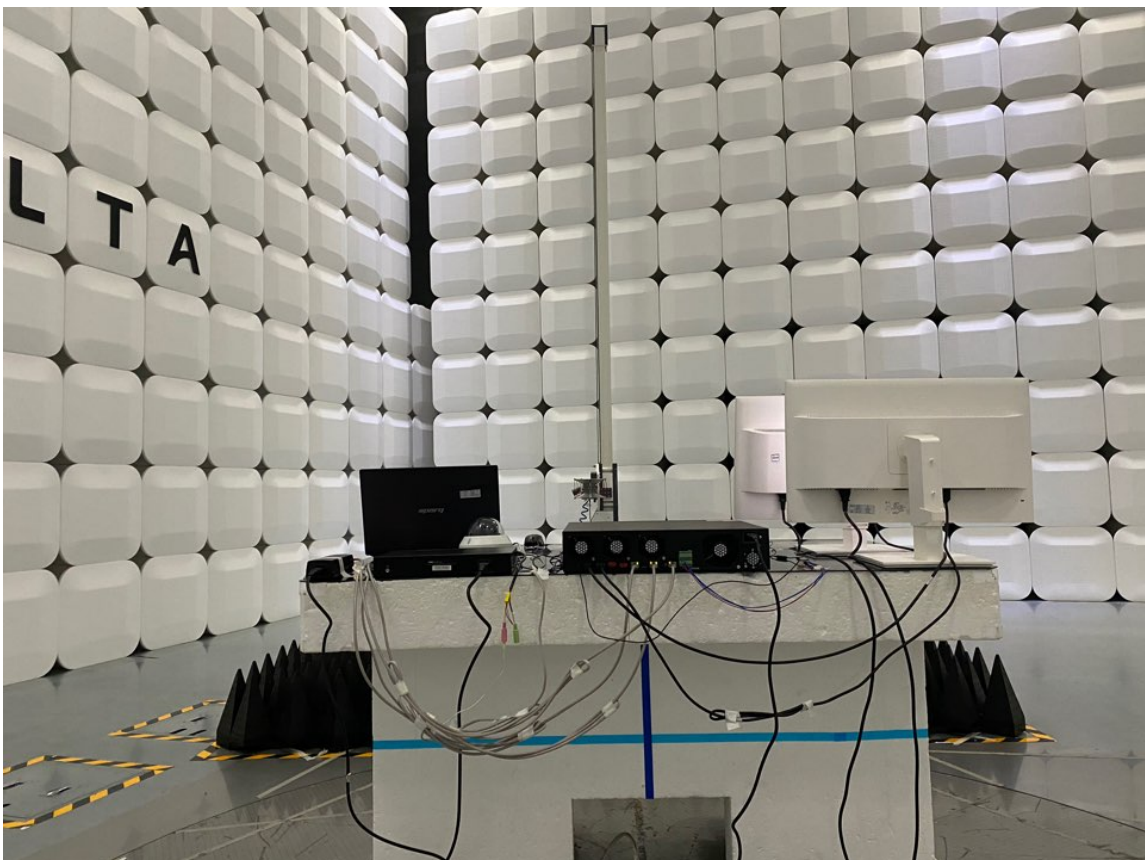
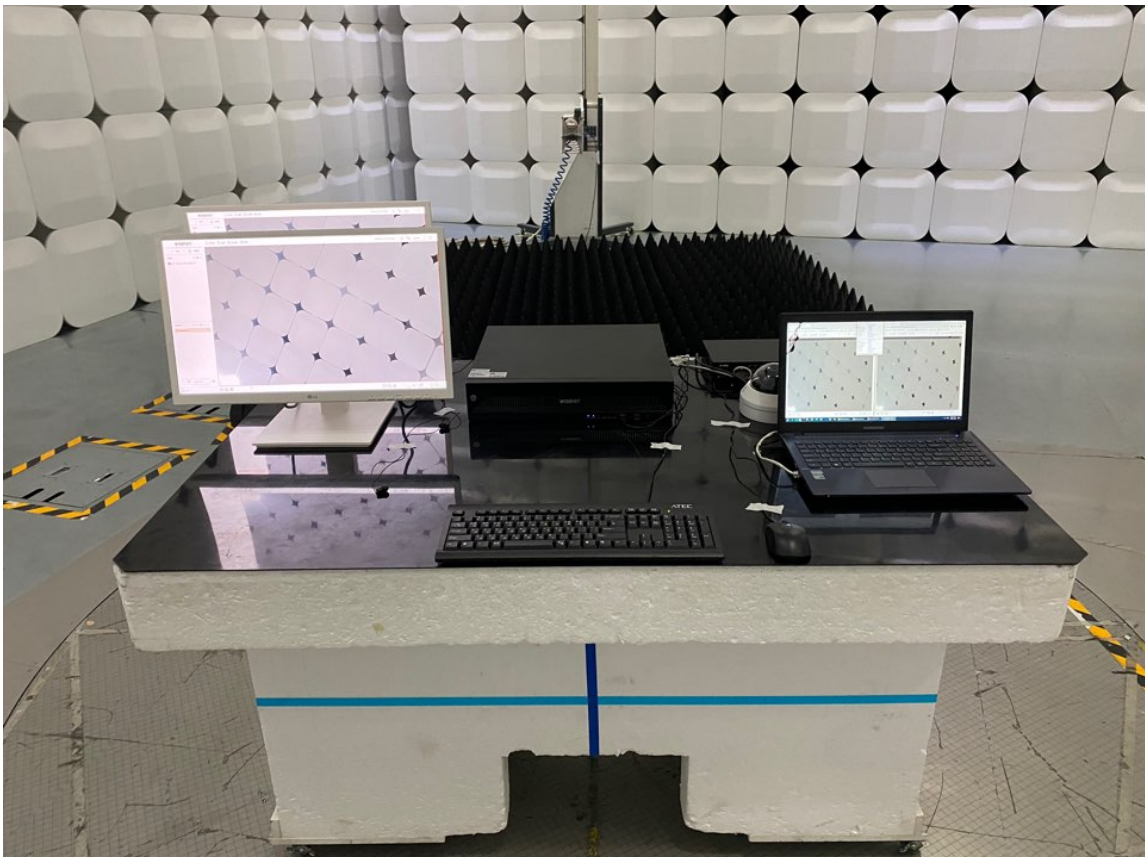
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**Radiated Emissions - Above 1GHz**

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

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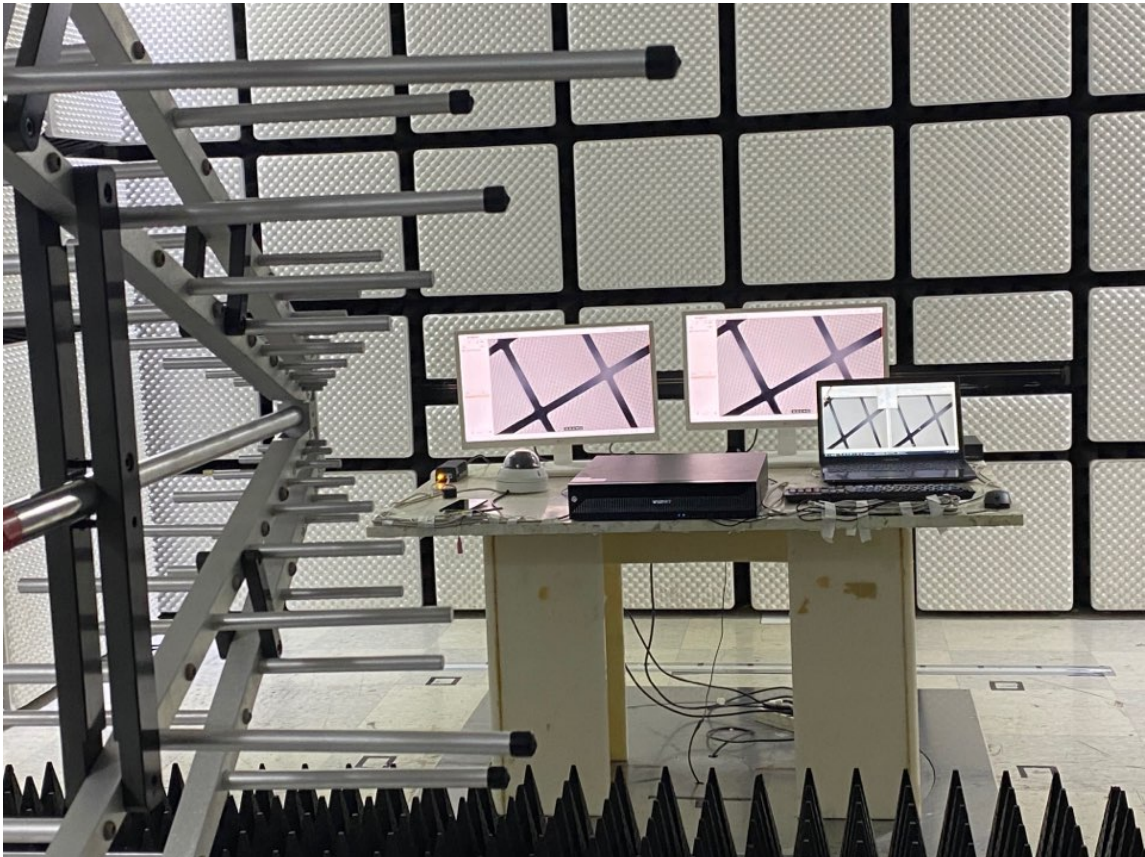
**Electrostatic Discharge**



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**RF Electromagnetic Field**

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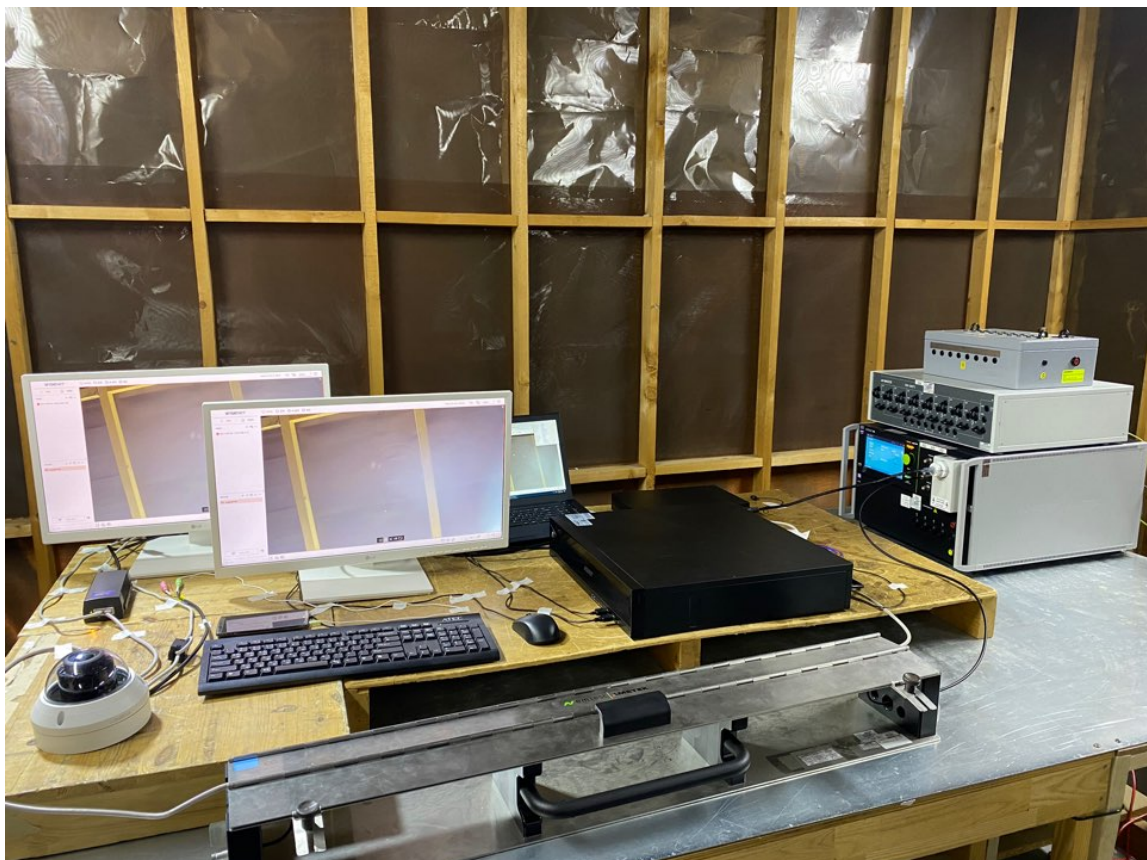
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**Electrical Fast Transients**

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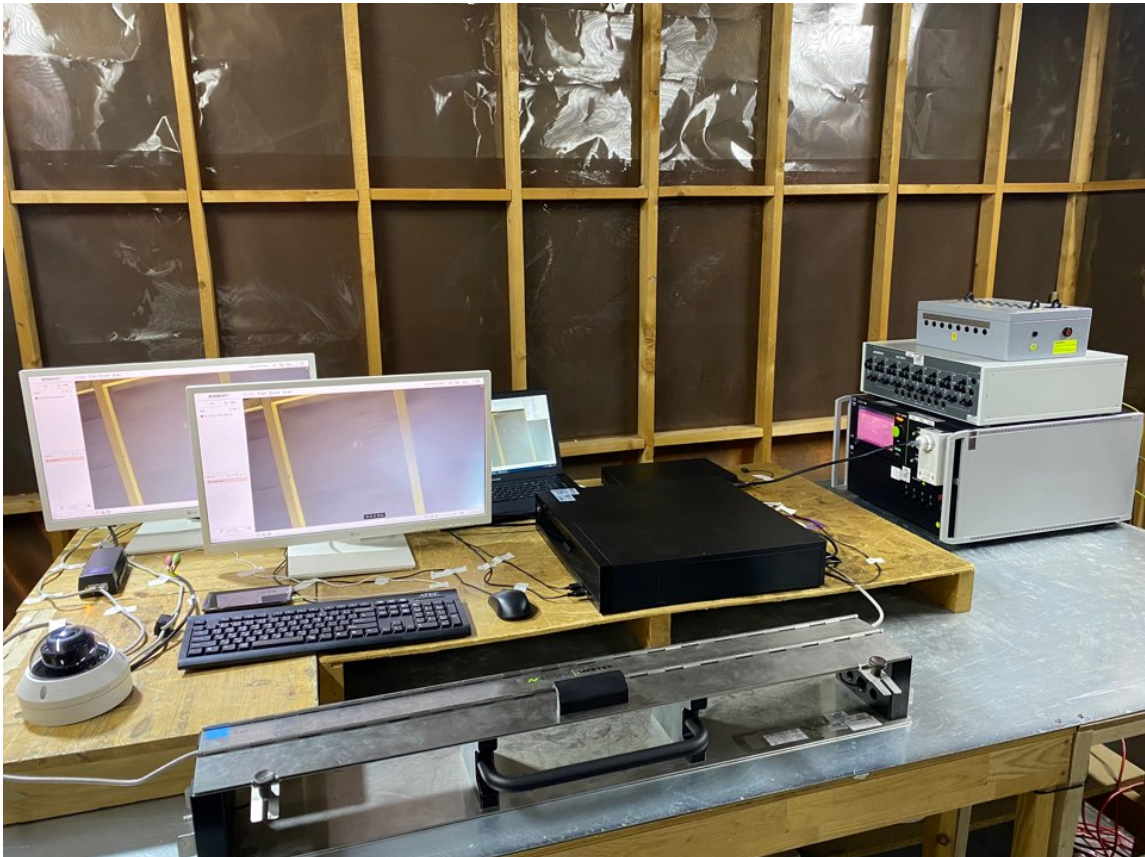
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## Surges

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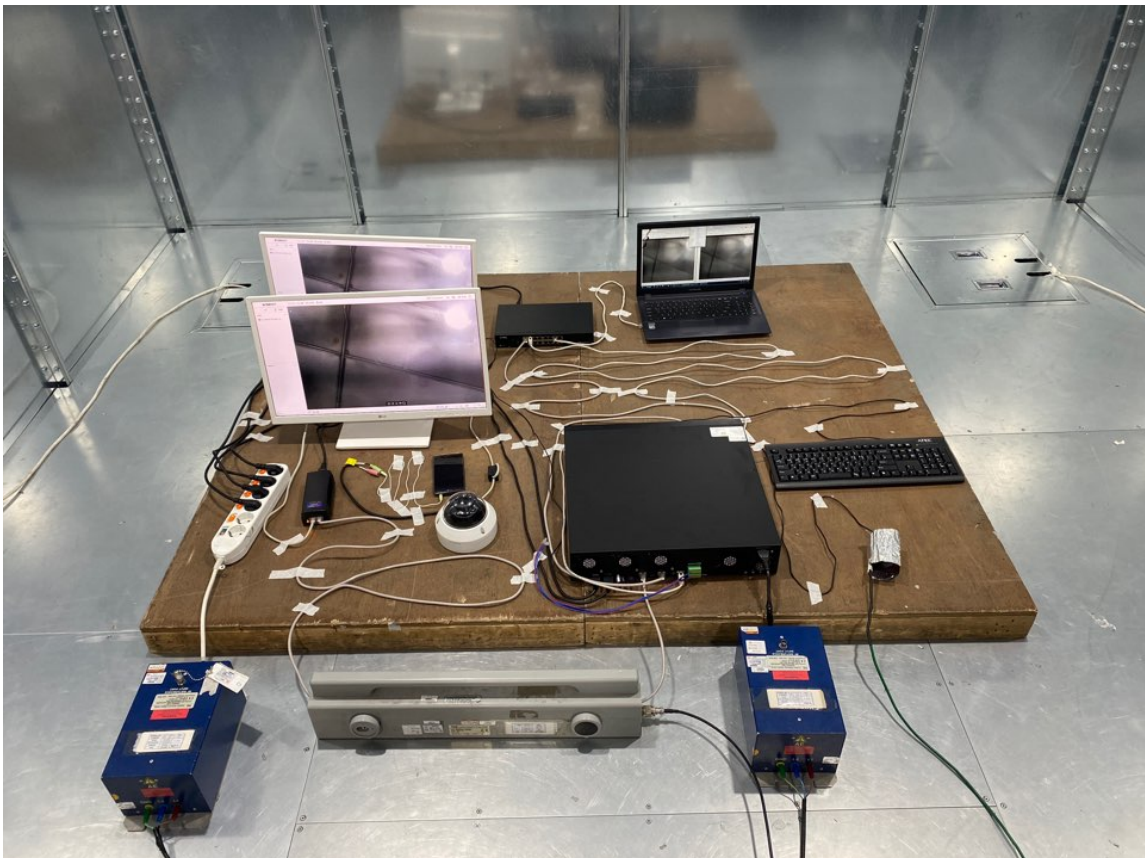
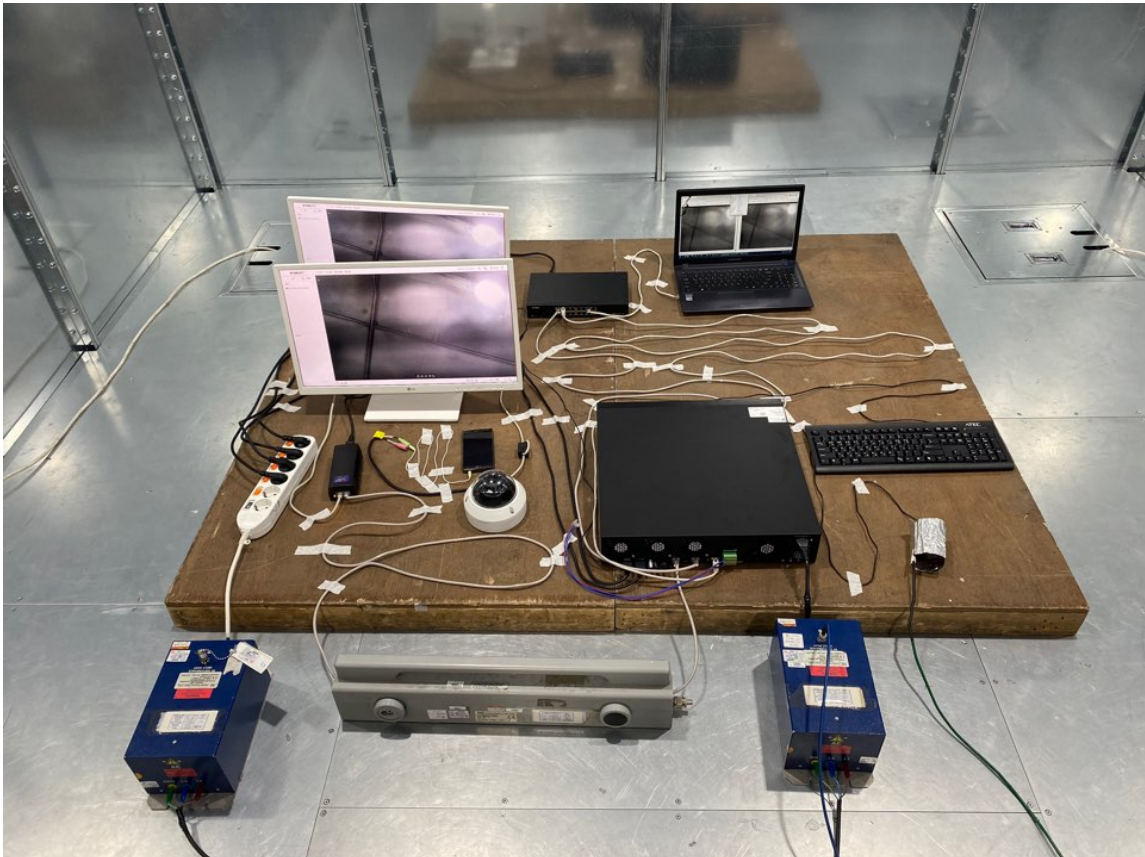
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**Conducted Disturbances, Induced by Radio-Frequency Fields**

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**Main supply voltage (dips, variations) short interruptions**

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**EUT**

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**EUT**

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