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EMC TEST REPORT

Dates of Tests: December 24 - 26, 2019

Test Report S/N: LR500122001A

Test Site : LTA Co., Ltd.

Model No.

HCZ-6321

APPLICANT

Hanwha Techwin Co., Ltd.

Equipment Name : CCTV CAMERA
Manufacturer : HANWHA TECHWIN(TIANJIN) CO., LTD
Model name : HCZ-6321
Test Device Serial No.: : Identification
Rule Part(s) : VCCI-CISPR 32:2016

Date of issue : January 06, 2020

This test report is issued under the authority of:

The test was supervised by:

Young Kyu Shin, Technical Manager

Joo Hyung Cho, 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	06.01.2020	LR500172001A	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 is the “General requirements for the competents of calibration and testing laboratory”.

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2020-09-30	ECT accredited Lab.
RRA	KOREA	KR0049	-	EMC accredited Lab.
FCC	U.S.A	649054	2021-04-11	FCC CAB
VCCI	JAPAN	C-4948,	2020-09-10	VCCI registration
		T-2416,	2020-09-10	
		R-4483(10 m),	2020-10-15	
		G-10847	2022-06-13	
IC	CANADA	5799A	2021-06-16	IC filing
KOLAS	KOREA	NO.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(TIANJIN) CO., LTD
 Address : No.11 Weiliu Rd, Micro-Electronic Industrial Park, TEDA, Tianjin, 300385, People's Republic of China

Factory #2

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 #3

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 : CCTV CAMERA
 Model name : HCZ-6321
 Serial number : Identification
 Date of receipt : December 20, 2019
 EUT condition : Pre-production, not damaged
 Interface Ports : DC IN, AHD, CVBS, RS485, GND
 Power rating : DC 12 V

2-3 Modification

-NONE

2-4 Test conditions

Temp. / Humid. / Pressure : (21 - 22) °C / (36 - 41) % R.H.
 Tested Model : HCZ-6321
 Test mode : Camera mode
 Test Voltage : AC 100 V, 60 Hz

2-5 EUT

Equipment	Model No.	Serial No.	Manufacturer
CCTV CAMERA	HCZ-6321	N/A	HANWHA TECHWIN(TIANJIN) CO., LTD HANWHA TECHWIN SECURITY VIETNAM CO.,LTD. D-TECH CO.,LTD.

2-6 Accessory

Equipment	Model No.	Serial No.	Manufacturer
Adapter	KPL-060F-VI	N/A	CHANNEL WELL TECHNOLOGY
SDI Monitor	PRM-501A	N/A	POSTIUM
SDI Monitor Adapter	PA-1061-0	N/A	LITEON
Monitor	2407HDT LED	N/A	Samwha Display
Monitor Adapter	N/A	N/A	N/A
Notebook	N16Q2	NXGRYSJ001730 0B5F77500	Acer
Notebook Adapter	PA-1650-86	N/A	Acer

2-7 Cable List

From		To		Length (m)	Shielding	
Type	I/O Port	Type	I/O Port		Cable	backshell
EUT	DC IN	Adapter	DC OUT	1.0	NO	Plastic
	RS485	Notebook	USB	3.0	NO	Plastic
	CVBS	SDI Monitor	BNC	3.0	NO	Plastic
	AHD	Monitor	Compornent	3.0	NO	Plastic
	GND	GND	GND	3.0	NO	Plastic
Adapter	AC IN	AC Power Source	3 Pin AC Line	1.5	NO	Plastic
Notebook	DC IN	Notebook Adapter	DC OUT	1.2	NO	Plastic
Notebook Adapter	AC IN	AC Power Source	3 Pin AC Line	1.1	NO	Plastic
Monitor	DC IN	Monitor Adapter	DC OUT	1.0	NO	Plastic
Monitor Adapter	AC IN	AC Power Source	3 Pin AC Line	1.5	NO	Plastic
SDI Monitor	DC IN	SDI Monitor Adapter	DC OUT	1.3	NO	Plastic
SDI Monitor Adapter	AC IN	AC Power Source	3 Pin AC Line	1.2	NO	Plastic

3. Test Report

3.1 Summary of tests

Parameter	Applied Standard	Status
I. Emission		
Conducted Emissions	VCCI-CISPR 32:2016	C
Conducted Emissions at telecommunication ports	VCCI-CISPR 32:2016	NA
Radiated Emissions	VCCI-CISPR 32:2016	C
Radiated Emissions at above 1 GHz	VCCI-CISPR 32:2016	C

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

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

4. EMISSION

4.1 Conducted Emissions

Definition:

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

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

Test method	: VCCI-CISPR 32:2016
Measurement Frequency range	: 150 kHz - 30 MHz
Measurement RBW	: 9 kHz
Test mode	: Camera mode
Result	: Complies

Measurement Data:

- Refer to the Next page (Maximum emission configuration)

A sample calculation:

COR. F (correction factor)= LISN Insertion loss + Cable loss + Pulse Limiter Factor

Emission Level= meter reading + COR.F

Limits for conducted disturbance at the mains ports of class A ITE

Frequency Range	Quasi-peak	Average
(0.15 - 0.5) MHz	79 dBuV	66 dBuV
(0.5 – 30) MHz	73 dBuV	60 dBuV

Note: The limits will decrease with the frequency logarithmically within 0.15MHz to 0.5MHz

Limits for conducted disturbance at the mains ports of class B ITE

Frequency Range	Quasi-peak	Average
(0.15 – 0.5) MHz	(66 – 56) dBuV	(56 - 46) dBuV
(0.5 – 5) MHz	56 dBuV	46 dBuV
(5 – 30) MHz	60 dBuV	50 dBuV

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) dBuV	(84 – 74) dBuV	(53 – 43) dBuV	(40 – 30) dBuV
(0.5 – 30) MHz	87 dBuV	74 dBuV	43 dBuV	30 dBuV

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 150Ω 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) dBuV	(74 – 64) dBuV	(40 – 30) dBuV	(30 – 20) dBuV
(0.5 – 30) MHz	74 dBuV	64 dBuV	30 dBuV	20 dBuV

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 150Ω to the telecommunication port under test (conversion factor is $20 \log_{10} 150/I = 44$ dB)

Conducted Emissions (LINE)



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EUT /Model No. : HCZ-6321

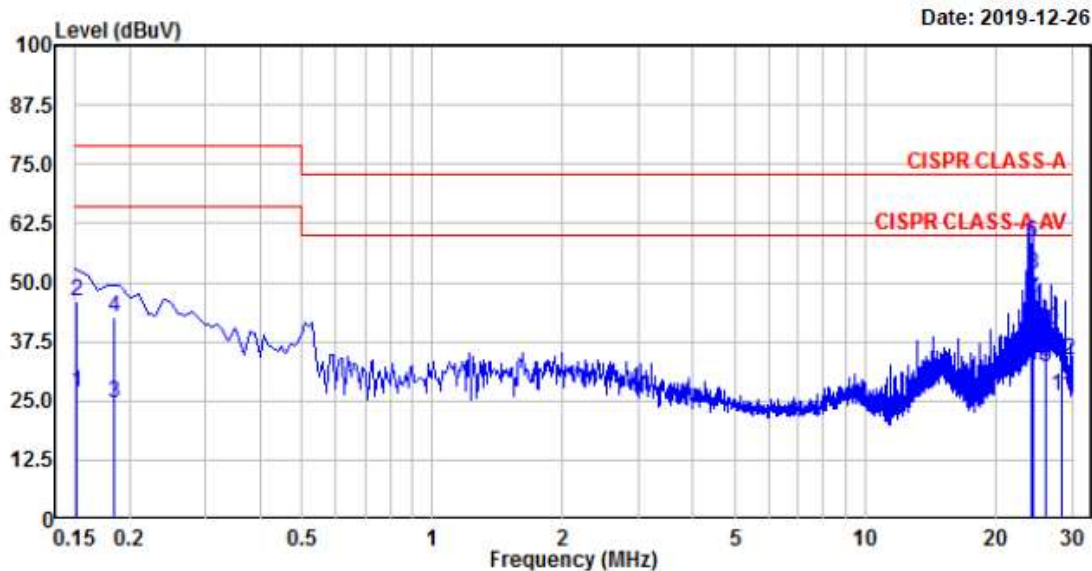
Phase : Line

Test Mode : Camera mode

Test Power : 100 V / 60 Hz

Temp./ Humi. : 21 'C / 36 % R.H.

Test Engineer : CHO J 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.	0.151	26.59	7.52	19.43	46.02	26.95	79.00	66.00	32.98	39.05	Line
4.	0.185	23.28	5.22	19.44	42.72	24.66	79.00	66.00	36.28	41.34	Line
6.	24.215	38.39	26.10	19.96	58.35	46.06	73.00	60.00	14.65	13.94	Line
8.	24.452	31.75	26.46	19.96	51.71	46.42	73.00	60.00	21.29	13.58	Line
10.	26.105	19.91	12.04	19.99	39.90	32.03	73.00	60.00	33.10	27.97	Line
12.	28.299	13.60	6.21	20.01	33.61	26.22	73.00	60.00	39.39	33.78	Line

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



Conducted Emissions (NEUTRAL)

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EUT /Model No. : HCZ-6321

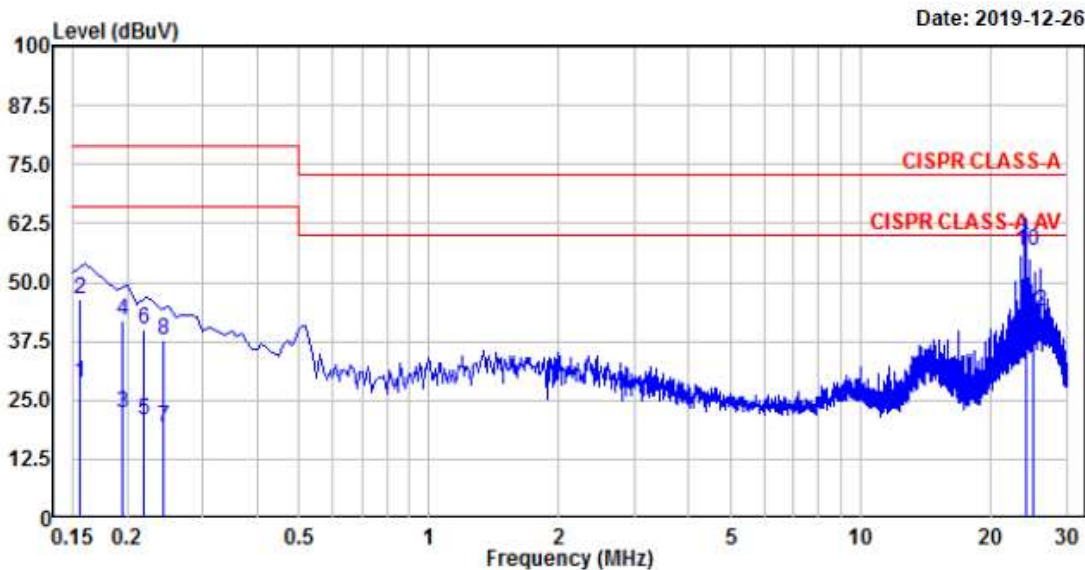
Phase : Neutral

Test Mode : Camera mode

Test Power : 100 V / 60 Hz

Temp./ Humi. : 21 °C / 36 % R.H.

Test Engineer : CHO J 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.	0.155	26.81	9.21	19.49	46.30	28.70	79.00	66.00	32.70	37.30	neutral
4.	0.196	22.40	2.76	19.49	41.89	22.25	79.00	66.00	37.11	43.75	neutral
6.	0.218	20.62	1.18	19.49	40.11	20.67	79.00	66.00	38.89	45.33	neutral
8.	0.243	18.34	-0.34	19.49	37.83	19.15	79.00	66.00	41.17	46.85	neutral
10.	24.213	36.51	23.07	20.04	56.55	43.11	73.00	60.00	16.45	16.89	neutral
12.	25.194	23.70	13.81	20.05	43.75	33.86	73.00	60.00	29.25	26.14	neutral

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

4.2 Radiated Emissions

Definition:

The test assesses the ability of ancillary equipment to limit their internal noise from being radiated from the enclosure.

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

Test method	: VCCI-CISPR 32:2016
Measuring Distance	: 10 m for below 1 GHz / 3 m for above 1 GHz
Measurement Frequency range	: 30 MHz – 6 000 MHz
Measurement RBW	: 120 kHz @ 10 m / 1 MHz @ 3 m
Test mode	: Camera mode
Result	: Complies

Measurement Data:

- Refer to the Next page (Maximum emission configuration)
- The highest internal source of an EUT is higher than 108 MHz, the measurement shall only be made up to 6 GHz.
(The highest internal source of an EUT : higher than 108 MHz)

A sample calculation:

$COR.F \text{ (correction factor)} = \text{Antenna factor} + \text{Cable loss} - \text{Amp.gain} - \text{Distance correction}$

$\text{Emission Level} = \text{meter reading} + COR.F$

Limit of 10 m for below 1 GHz

CLASS A

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

CLASS B

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

Limit of 3m for 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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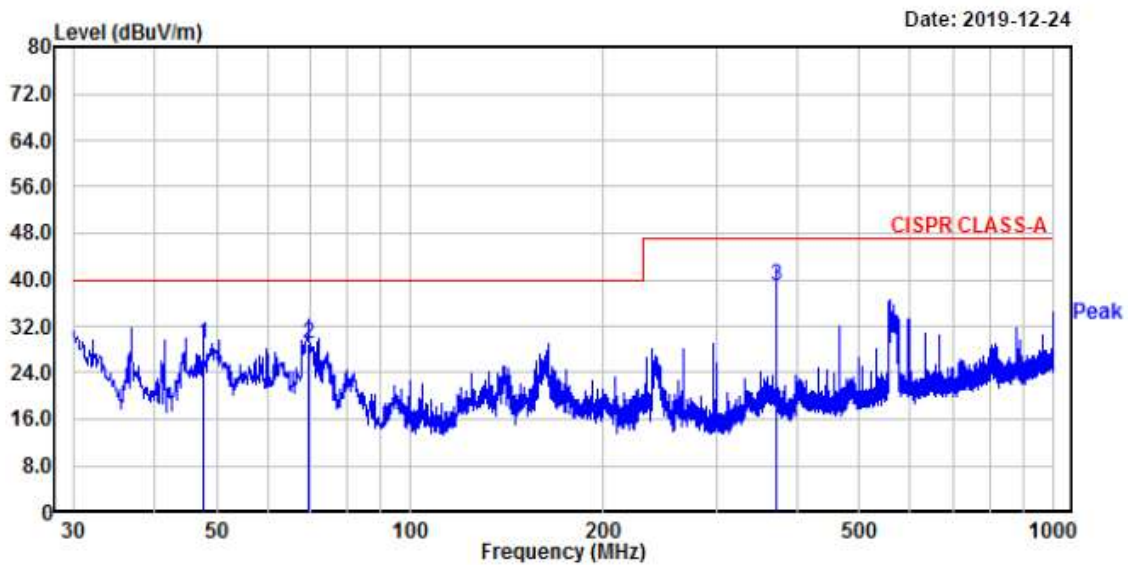
EUT/Model No.: HCZ-6321

Temp/Humi: 22 °C / 41 % R.H.

Test Mode : Camera mode

Tested by: CHO J H

Power : 100 V / 60 Hz



No.	Freq MHz	Reading dBμV	C.F dB	Result QP dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Polarity
1.	47.70	42.17	-13.31	28.86	40.00	11.14	100	137	vertical
2.	69.41	44.42	-15.30	29.12	40.00	10.88	103	231	vertical
3.	371.20	48.45	-9.46	38.99	47.00	8.01	124	44	vertical

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

Radiated Emissions (Below 1 GHz) / H



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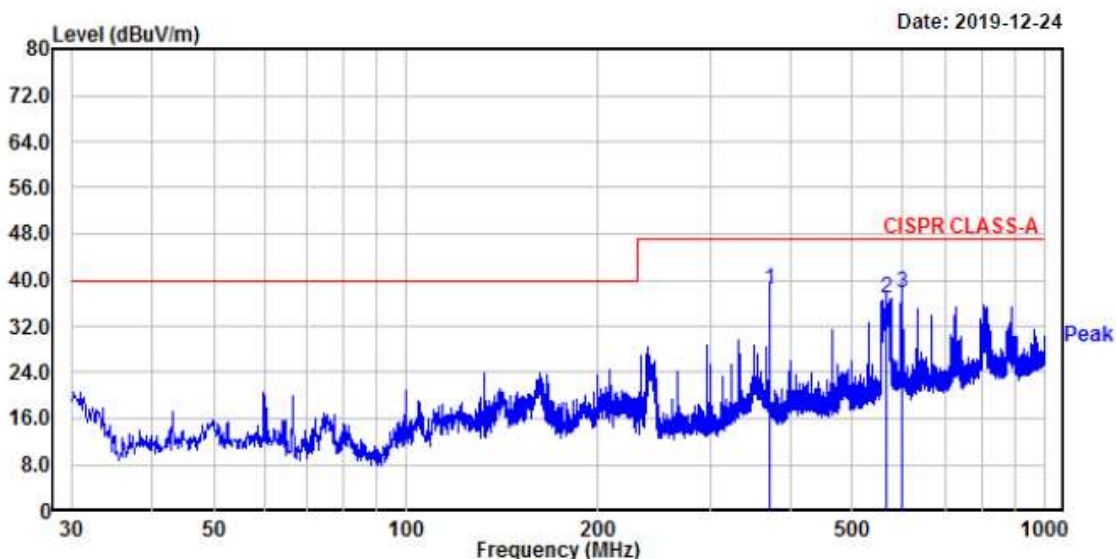
EUT/Model No.: HCZ-6321

Temp/Humi: 22 'C / 41 % R.H.

Test Mode : Camera mode

Tested by: CHO J H

Power : 100 V / 60 Hz



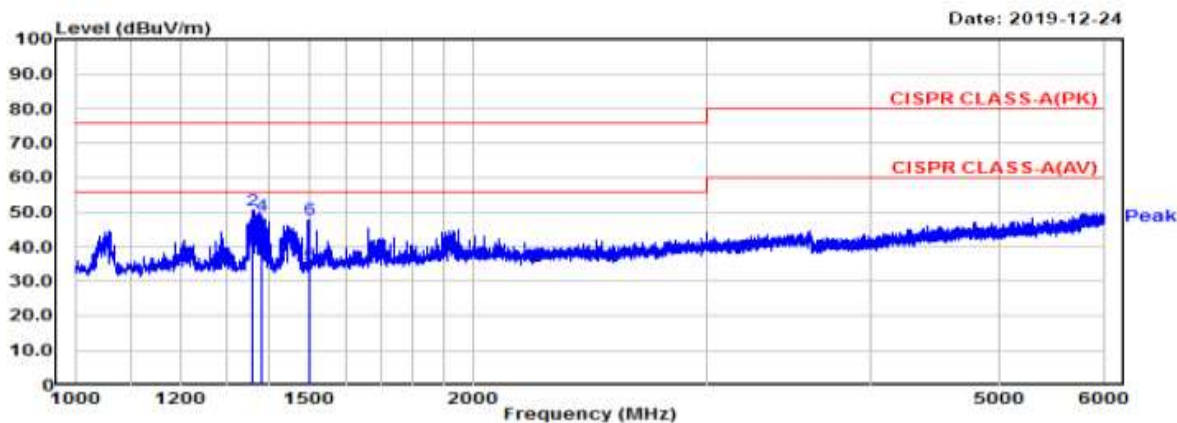
No.	Freq MHz	Reading dBuV	C.F dB	Result QP dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
1.	371.20	47.91	-9.46	38.45	47.00	8.55	400	135	horizontal
2.	565.56	42.27	-5.52	36.75	47.00	10.25	154	135	horizontal
3.	598.78	42.31	-4.66	37.65	47.00	9.35	121	360	horizontal

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

Radiated Emissions

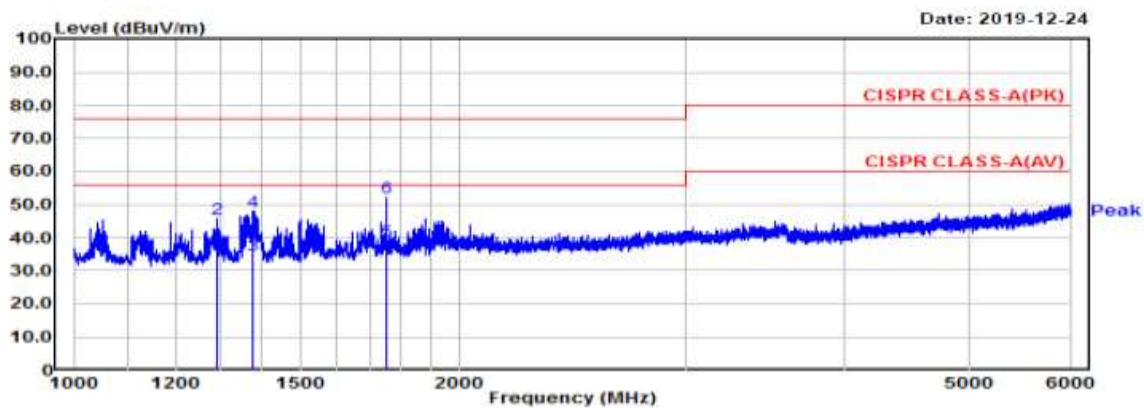
(ABOVE 1 GHz) / V

EUT/Model No.: HCZ-6321 Temp/Humi: 22 °C / 41 % R.H.
 Test Mode : Camera mode Tested by: CHO J H
 Power : 100 V / 60 Hz



(ABOVE 1 GHz) / H

EUT/Model No.: HCZ-6321 Temp/Humi: 22 °C / 41 % R.H.
 Test Mode : Camera mode Tested by: CHO J H
 Power : 100 V / 60 Hz



Manufacture : HANWHA TECHWIN(TIANJIN)
 CO., LTD

Model : HCZ-6321

TEST mode : Camera mode

Test Date
 2019-12-24

Temp.: [°C] 22.00
 Humidity : [%] 41.00
 Distance (m) 3.8

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
1291.88	39.84	39.84	-5.01	34.83	34.83	76.00	56.00	41.17	21.17	100	165	H
1377.50	41.40	41.40	-4.50	36.90	36.90	76.00	56.00	39.10	19.10	100	60	H
1752.50	42.29	42.29	-1.33	40.96	40.96	76.00	56.00	35.04	15.04	100	210	H
1361.25	57.29	43.29	-4.59	52.70	38.70	76.00	56.00	23.30	17.30	100	118	V
1382.50	55.66	42.66	-4.48	51.18	38.18	76.00	56.00	24.82	17.82	100	105	V
1500.00	53.71	40.71	-3.78	49.93	36.93	76.00	56.00	26.07	19.07	100	144	V

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	2020.07.04	1 year
☒	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	100710	2020.03.16	1 year
☐	LISN	ESH3-Z6	Rohde & Schwarz	100378	2020.09.05	1 year
☐	LISN	ESH3-Z6	Rohde & Schwarz	101468	2020.09.05	1 year
☒	LISN(main)	ENV216	Rohde & Schwarz	101222	2020.09.06	1 year
☒	LISN(sub)	LT32C/10	AFJ	32031518210	2020.09.05	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	2020.09.05	1 year
☒	Amplifier (25 dB)	8447D	HP	2944A07684	2020.03.16	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	2020.09.05	1 year
☒	Amplifier	8449B	HP	3008A00671	2020.09.05	1 year
☐	Amplifier	PAM-840A	COM-POWER	461314	2020.03.18	2 year
☐	HORN ANTENNA	3116B	ETS	133350	2020.05.10	2 year
☐	HORN ANTENNA	3116B	ETS	81109	2020.05.10	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	-	-	-

APPENDIX B

PHOTOGRAPHS

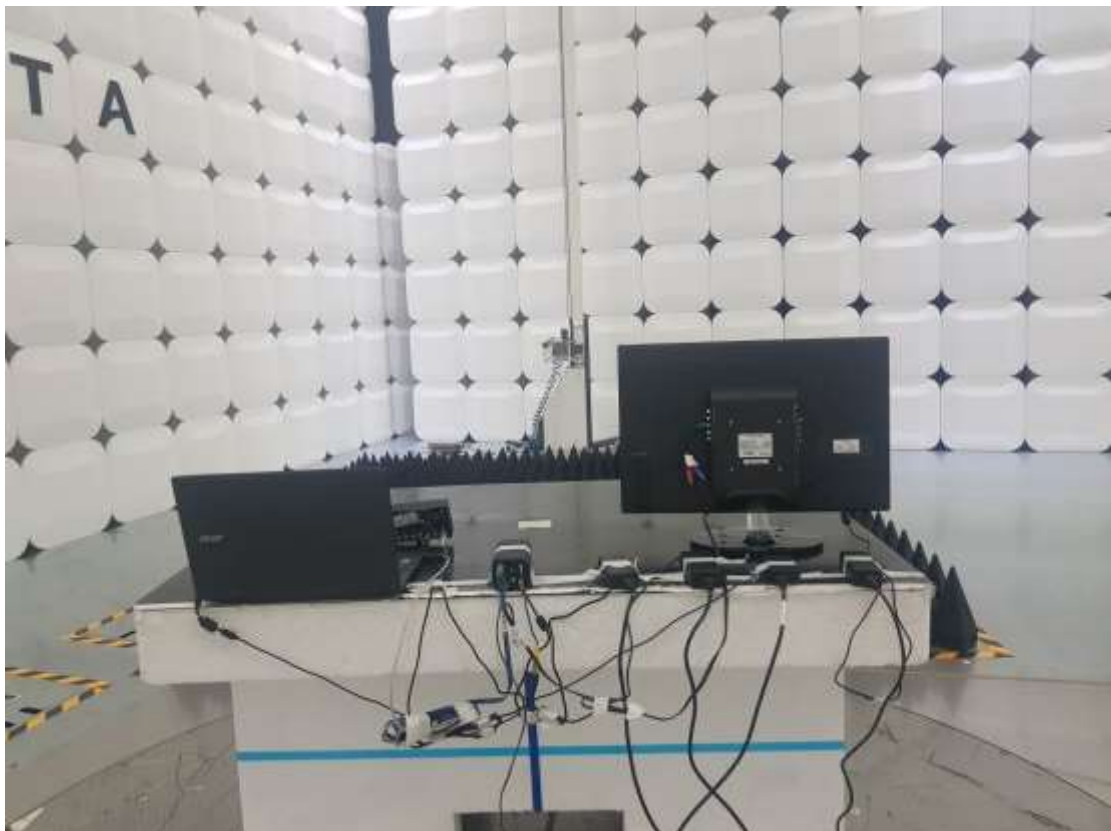
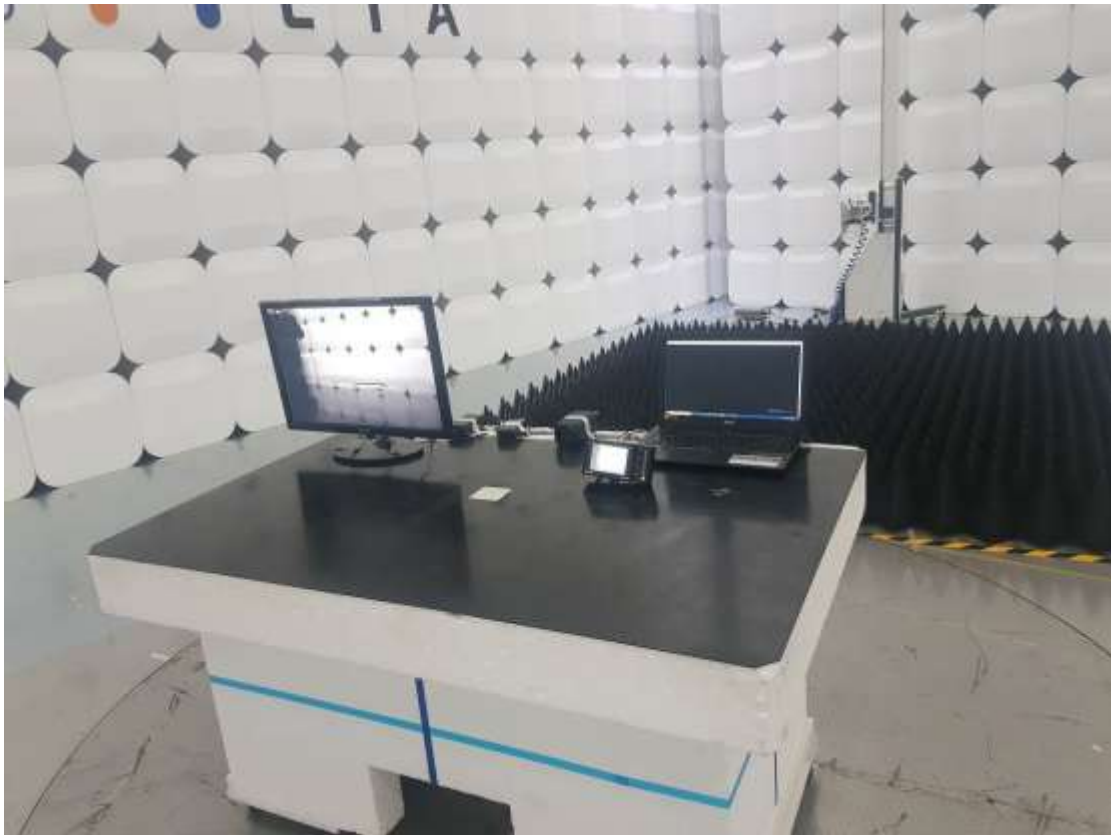
Conducted Emissions



Radiated Emissions (Below 1GHz)



Radiated Emissions (Above 1GHz)



EUT



EUT

