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EMC TEST REPORT

Dates of Tests: April 11 - 17, 2019
Test Report S/N: LR500121904AB
Test Site : LTA Co., Ltd.

Model No.

QND-8021

APPLICANT

Hanwha Techwin Co., Ltd.

Equipment Name : NETWORK CAMERA
Manufacturer : Hanwha Techwin Co., Ltd.
Model name : QND-8021
Additional Model name : QND-8011
Test Device Serial No.: Identification
Directive : Electromagnetic Compatibility Directive 2014/30/EU
Rule Part(s) : EN 55032:2012/AC2013
EN 50130-4:2011/A1:2014

Data of reissue : April 17, 2019

This test report is issued under the authority of:

The test was supervised by:

Young Kyu Shin, Technical Manager

Joo Hyung Cho, Test Engineer

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NVLAP LAB CODE 200723-0

Revision	Date of issue	Test report No.	Description
0	17.04.2019	LR500121904AB	Initial

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1. General information's

1-1 Test Performed

Company name : **LTA Co., Ltd (KR0049)**
 Address : 4, Songju-ro 236beon-gil, Yangji-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, 17159, Korea
 Web site : <http://www.ltalab.com>
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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	2019-09-30	ECT accredited Lab.
RRA	KOREA	KR0049	-	EMC accredited Lab.
FCC	U.S.A	649054	Updating	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	2019-01-22	
IC	CANADA	5799A-2	2019-03-15	IC filing
KOLAS	KOREA	NO.551	2021-08-20	KOLAS accredited Lab.

2. Information's about test item

2-1 Client/ Manufacturer

Company name : Hanwha Techwin Co., Ltd.
 Address : 8-10, TECHNO 3-RO, YUSEONG-GU, DAEJEON, KOREA
 Telephone / Facsimile : +82-31-723-5205 / +82-31-723-5108

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 : 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

2-2 Equipment Under Test (EUT)

Class : A
 Equipment Name : NETWORK CAMERA
 Model name : QND-8021
 Additional Model name : QND-8011
 Additional Model is different only lens specification.
 Serial number : Identification
 Date of receipt : April 04, 2019
 EUT condition : Pre-production, not damaged
 Interface ports : LAN
 Power rating : DC 48 V
 Modulator : -
 Crystal/Oscillator(s) : -
 Firmware version : XXXX

2-3 Modification

-NONE

2-4 Model Specification

-NONE

2-5 Test conditions

Temp. / Humid. / Pressure : +(22 - 25) °C / (35 - 38) % R.H. / (100.0 – 100.1) kPa
 Tested Model : QND-8021
 Test mode : Play mode
 Power supply : DC 48 V

2-5 EUT

Equipment	Model No.	Serial No.	Manufacturer
NETWORK CAMERA	QND-8021	ZMME70GM400003T	Hanwha Techwin (Tianjin) Co., Ltd.

2-6 Accessory

Equipment	Model No.	Serial No.	Manufacturer
Notebook	Lenovo G500	CD24530393	Lenovo
Notebook Adapter	ADLX65NCC3A	N/A	Lenovo
POE Injector	MPSE-4803E	N/A	MOA TELECOM

2-7 Cable List

From		To		Length (m)	Shielding	
Type	I/O Port	Type	I/O Port		Cable	backshell
EUT	LAN	POE Injection	LAN	3.0	NO	Plastic
POE Injection	LAN	Notebook	LAN	3.0	NO	Plastic
	AC IN	AC Power Source	3 Pin AC Line	1.4	NO	Plastic
Notebook	DC IN	Notebook Adapter	DC OUT	1.4	NO	Plastic
Notebook Adapter	AC IN	AC Power source	3 Pin AC Line	1.0	NO	Plastic

3. Test Report

3.1 Summary of tests

Parameter	Applied Standard	Status
I. Emission		
Radiated Emission	EN 55032:2012/AC2013	C
Conducted Emission	EN 55032:2012/AC2013	C
Harmonic Current Emission	EN 61000-3-2:2014	NA ^{Note 3}
Voltage Fluctuations and Flicker	EN 61000-3-3:2013	NA ^{Note 3}
II. Immunity		
Electrostatic Discharge	EN 61000-4-2:2009	C
RF Electromagnetic field	EN 61000-4-3:2006/A1:2008/A2:2010	C
Fast Transients Common mode	EN 61000-4-4:2012	C
Surges, line to line and line to ground	EN 61000-4-5:2014/A1:2017	C
RF common mode	EN 61000-4-6:2014/AC:2015	C
Voltage dips and Interruptions	EN 61000-4-11:2004/A1:2017	NA ^{Note 3}
Main supply voltage variations	EN 50130-4:2011/A1:2014	NA ^{Note 3}

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 QND-8021 because equipment whose rated power is DC 48 V 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 55032:2012/AC2013
Measurement RBW	: 9 kHz
Test mode	: Play 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 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 (TEL_100 M)



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EUT /Model No. : QND-8021

Phase : TEL_100M

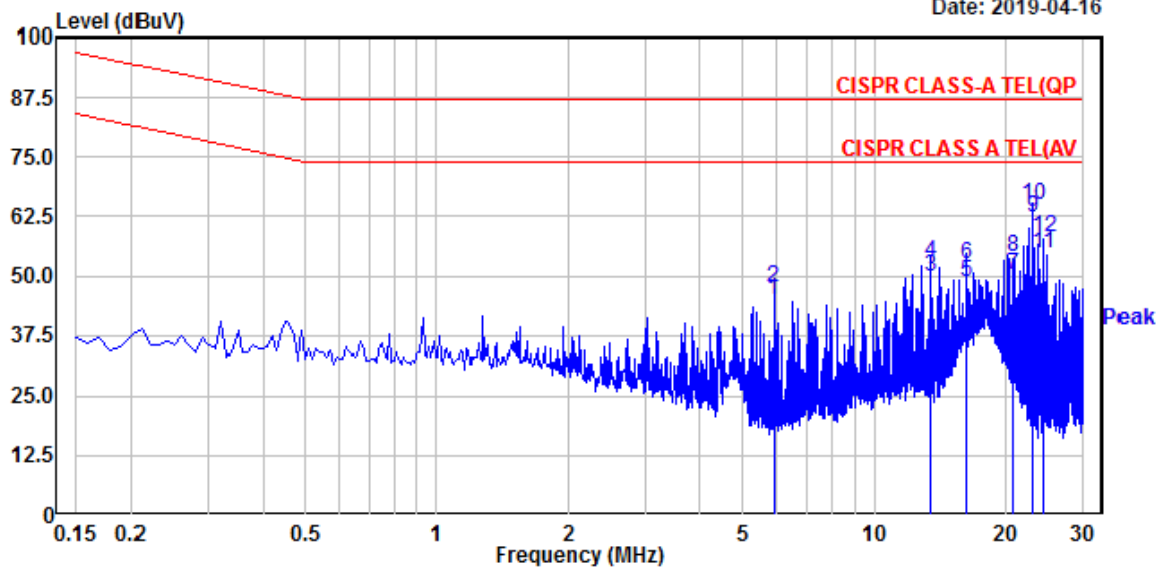
Test Mode : Play mode

Test Power : 230 / 50

Temp./ Humi. : 22°C / 35% R.H.

Test Engineer : CHO J H

Date: 2019-04-16



Trace: 1

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
5.909	28.03	25.48	19.49	47.52	44.97	87.00	74.00	39.48	29.03
13.420	33.33	29.99	19.68	53.01	49.67	87.00	74.00	33.99	24.33
16.230	32.68	28.84	19.76	52.44	48.60	87.00	74.00	34.56	25.40
20.809	34.02	30.29	19.90	53.92	50.19	87.00	74.00	33.08	23.81
23.130	44.78	42.18	19.97	64.75	62.15	87.00	74.00	22.25	11.85
24.350	37.97	34.79	20.02	57.99	54.81	87.00	74.00	29.01	19.19

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

3.2.2 Radiated Emission

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 55032:2012/AC2013
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	: Play 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 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 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 (dBμV/m)	Peak limit @ 3m (dBμV/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 (dBμV/m)	Peak limit @ 3m (dBμV/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 Emission (Below 1 GHz) / V



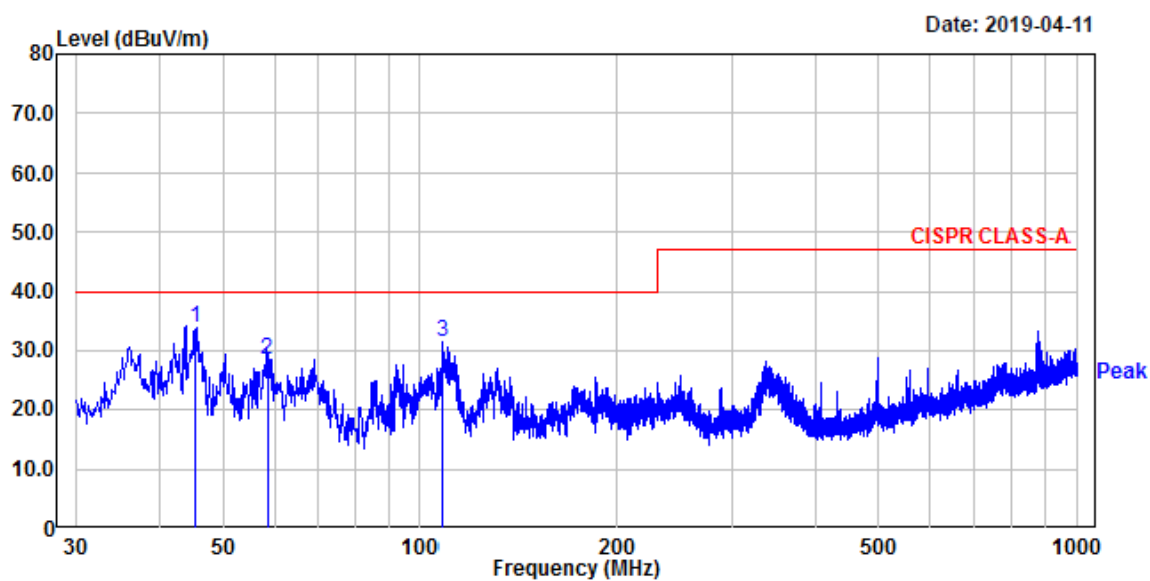
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www.ltalab.com

EUT/Model No.: QND-8021

Temp/Humi: 23 / 36

Test Mode : Play mode

Tested by: CHO J H



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
45.25	46.35	-12.63	33.72	40.00	6.28	100	30	vertical
58.49	41.18	-12.89	28.29	40.00	11.71	110	15	vertical
108.81	46.63	-15.21	31.42	40.00	8.58	140	126	vertical

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

Radiated Emission (Below 1 GHz) / H



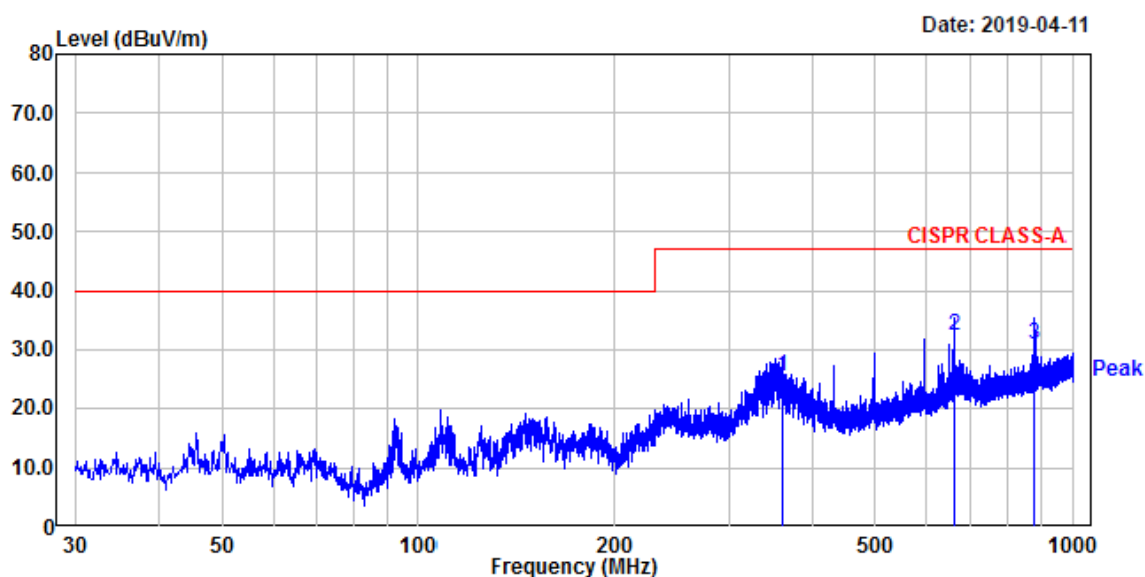
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EUT/Model No.: QND-8021

Temp/Humi: 23 / 36

Test Mode : Play mode

Tested by: CHO J H



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
360.57	34.28	-8.99	25.29	47.00	21.71	400	40	horizontal
660.04	35.43	-3.02	32.41	47.00	14.59	397	243	horizontal
879.23	30.40	0.50	30.90	47.00	16.10	400	229	horizontal

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

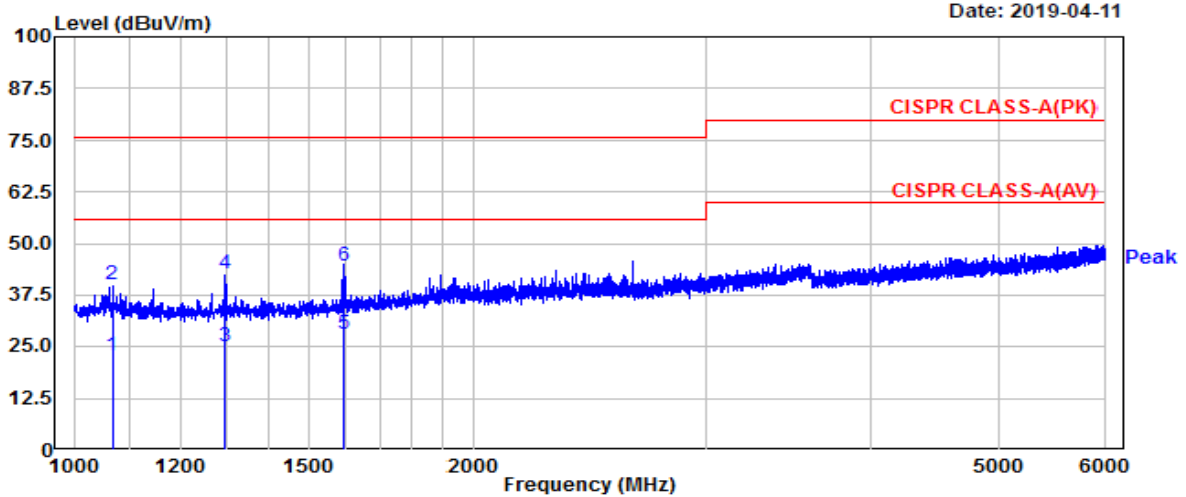
Radiated Emission (Above 1 GHz)

EUT/Model No.: QND-8021

Temp/Humi: 23 / 36

Test Mode : Play mode

Tested by: CHO J H

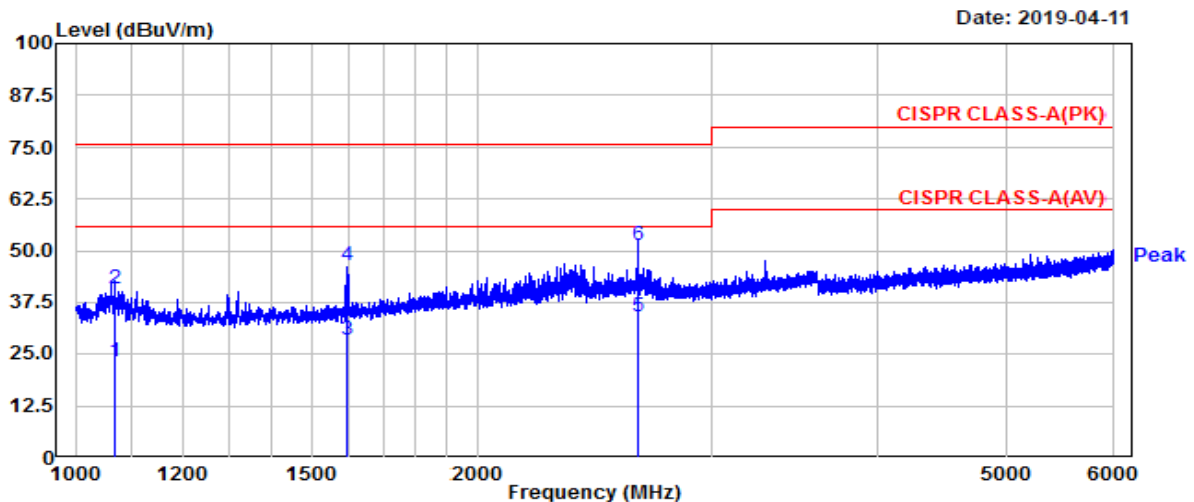


EUT/Model No.: QND-8021

Temp/Humi: 23 / 36

Test Mode : Play mode

Tested by: CHO J H



Manufacture : Hanwha Techwin Co., Ltd.

Test Date

Temp.: Humidity

[°C]

: [%]

Distance

Model : QND-8021

2019-04-11

23

36

3.8

TEST mode : Play mode

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 Hor/Ver
1067.4	49.2	31.7	-6.99	42.22	24.72	76.0	56.0	33.78	31.28	100	97	H
1296.3	50.1	32.4	-5.49	44.59	26.89	76.0	56.0	31.41	29.11	100	289	H
1598.8	50.2	33.5	-3.62	46.57	29.87	76.0	56.0	29.43	26.13	100	358	H
1068.8	49.7	32.1	-6.93	42.72	25.12	76.0	56.0	33.28	30.88	100	217	V
1597.5	51.6	33.3	-3.08	48.56	30.26	76.0	56.0	27.44	25.74	100	232	V
2639.4	50.6	33.1	2.87	53.51	36.01	76.0	56.0	22.49	19.99	100	335	V

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	: 2019.04.11.
Test method	: EN 61000-4-2 :2009
Temperature / Humidity / Pressure	: 24 °C / 38 % R.H. / 100.0 kPa
Discharge Impedance	: (330 ±10%)Ω / (150 ±10%) pF
Type of Discharge (air discharge)	: ± 2kV, ± 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	: Play mode
Result	: Complies

Measurement Data:

- Refer to the Next page

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	Air	Complies	No reaction recognized
2	Lens	Air	Complies	No reaction recognized
3	LAN	Air	Complies	No reaction recognized
4	Screw	Contact	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	:	2019.04.17.
Test method	:	EN 61000-4-3:2006/A1:2008/A2:2010
Temperature / Humidity / Pressure	:	23 °C / 37 % R.H. / 100.0 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	:	Play 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

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 : 2019.04.11.
Test method : EN 61000-4-4:2012
Temperature / Humidity / Pressure : 24 °C / 37 % R.H. / 100.0 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 : Play mode
Result : **Complies**

Measurement Data:

Signal Line	Test level	Result	Remarks
PoE	± 1 kV	Complies	No reaction recognized

3.3.4 Surge

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	:	2019.04.16.
Test method	:	EN 61000-4-5:2014/A1:2017
Temperature / Humidity / Pressure	:	25 °C / 38 % R.H. / 100.1 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	:	Play mode
Result	:	Complies

Measurement Data:

Signal Line	Test level	Result	Remarks
PoE	± 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	:	2019.04.11.
Test method	:	EN 61000-4-6:2014/AC:2015
Temperature / Humidity / Pressure	:	23 °C / 37 % R.H. / 100.0 kPa
Frequency range	:	0.15MHz – 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	:	Play mode
Result	:	Complies

Measurement Data:

Port	Test level (Vrms)	Result	Remarks
PoE	10	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	ESCI7	Rohde & Schwarz	100772	2019.09.06	1 year
☒	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	100710	2020.03.16	1 year
☒	ISN	ISN T800	TESEQ	27109	2019.09.12	1 year
☐	ISN	ENY81-CA6	Rohde & Schwarz	101565	2019.09.12	1 year
☐	CURRENT PROBE	EZ-17	Rohde & Schwarz	100508	2019.09.06	1 year
☐	LISN	ESH3-Z6	Rohde & Schwarz	100378	2019.09.07	1 year
☒	LISN	ENV216	Rohde & Schwarz	100408	2019.10.10	-
☒	LISN	LT32C/10	AFJ	32031518210	2019.09.06	1 year
☐	LISN	ESH3-Z6	Rohde & Schwarz	101468	2019.09.07	1 year
☒	TEST PROGRAM	e3_ce 20181212a (V9)	AUDIX	-	-	1 year

Radiated Emission – Below 1 GHz

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	EMI TEST Receiver	ESU	Rohde & Schwarz	100092	2019.09.06	1 year
☒	Amplifier (25 dB)	8447D	HP	2944A07684	2019.09.06	1 year
☒	BILOG Antenna	VULB9168	SCHWARZBECK	775	2020.03.16 (KOLAS)	2 year
☒	TEST PROGRAM	e3 20181212a (V9)	AUDIX	-	-	-

Radiated Emission – Above 1 GHz

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	EMI TEST Receiver	ESU	Rohde & Schwarz	100092	2019.09.06	1 year
☒	Amplifier	8449B	HP	3008A00671	2019.09.06	1 year
☒	HORN ANTENNA	3115	ETS	114105	2019.11.03 (KOLAS)	2 year
☒	TEST PROGRAM	e3 20181212a (V9)	AUDIX	-	-	-

Electrostatic Discharge

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	ESD Simulator	ESS-2000	NOISEKEN	8000C03241	2019.09.11	1 year
☒	ESD GUN	TC-815R	NOISEKEN	ESS0564361	2019.09.11	1 year

RF Electromagnetic Field

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Signal Generator	E4432B	Agilent	MY41310632	2020.03.16	1 year
☒	Power Meter	E4419B	Agilent	GB38410133	2020.03.16	1 year
☒	Power Sensor	E9300A	Agilent	MY41497992	2020.03.16	1 year
☒	Power Sensor	E9300A	Agilent	MY41497618	2020.03.16	1 year
☒	RF POWER AMPLIFIER	ITA0300KL-300	INFINITECH	0300KL 1507 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	2019.09.06	1 year
☒	AC Power Source	Variac NX	EMTEST	P1745207276	2019.09.06	1 year
☒	Capacitive Coupling Clamp	CCI	EMTEST	P1744207071	2019.09.06	1 year

Surge

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Compact Generator	Compact NX	EMTEST	P1725200196	2019.09.06	1 year
☒	AC Power Source	Variac NX	EMTEST	P1745207276	2019.09.06	1 year
☒	CDN	CNV 508T5	EMTEST	P1742204978	2019.09.07	1 year
☐	CDN	CNV 508N1	EMTEST	P1742204940	2019.09.07	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	2020.03.16	1 year
☒	POWER METER	NRVD	R&S	101689	2020.03.16	1 year
☒	POWER Sensor	URV5-Z2	R&S	100755	2020.03.16	1 year
☒	POWER Sensor	URV5-Z2	R&S	100756	2020.03.16	1 year
☒	RF Power Amplifier	FLL75A	FRANKONIA	1033	-	-
☒	EM INJECTION CLAMP	TSIC-23	F.C.C	529	2020.03.25	1 year
☐	CDN (M1)	TSCDN-M1-16A	F.C.C	07004	2020.03.16	1 year
☐	CDN (M2)	TSCDN-M2-16A	F.C.C	07008	2020.03.16	1 year
☒	CDN (M3)	TSCDN-M3-16A	F.C.C	07017	2020.03.16	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.

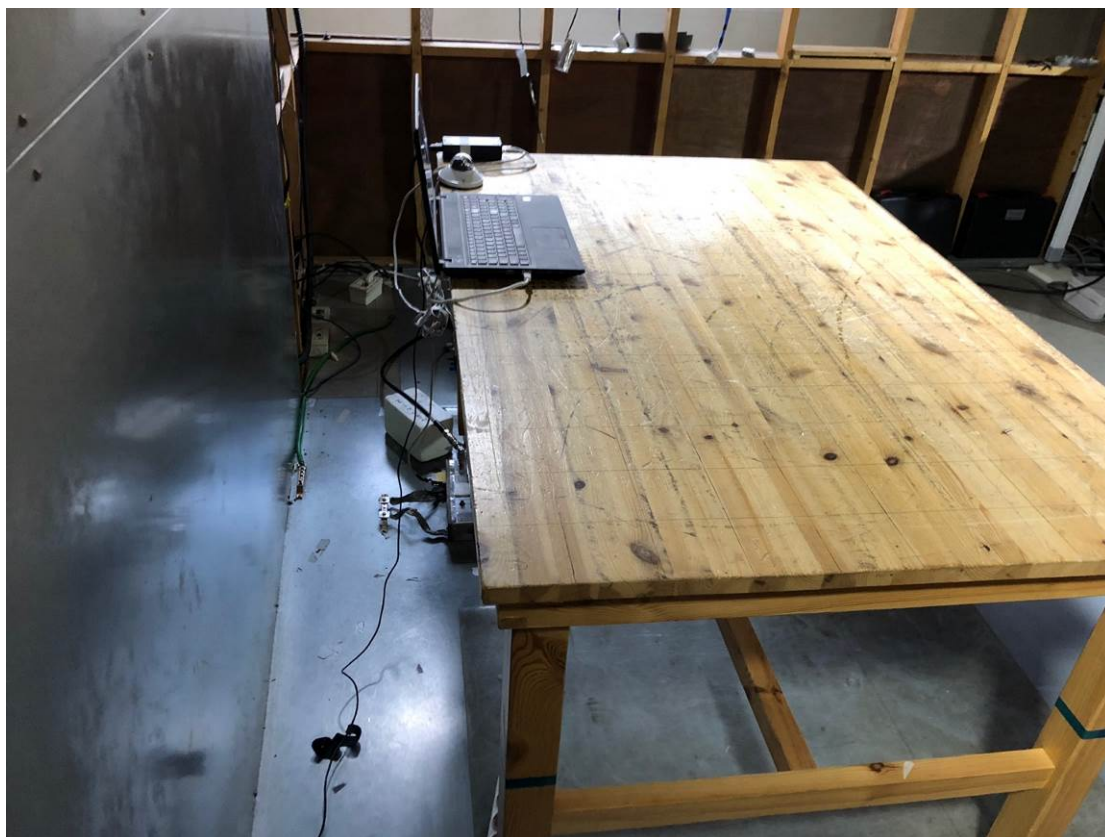
Mains supply voltage variations

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.

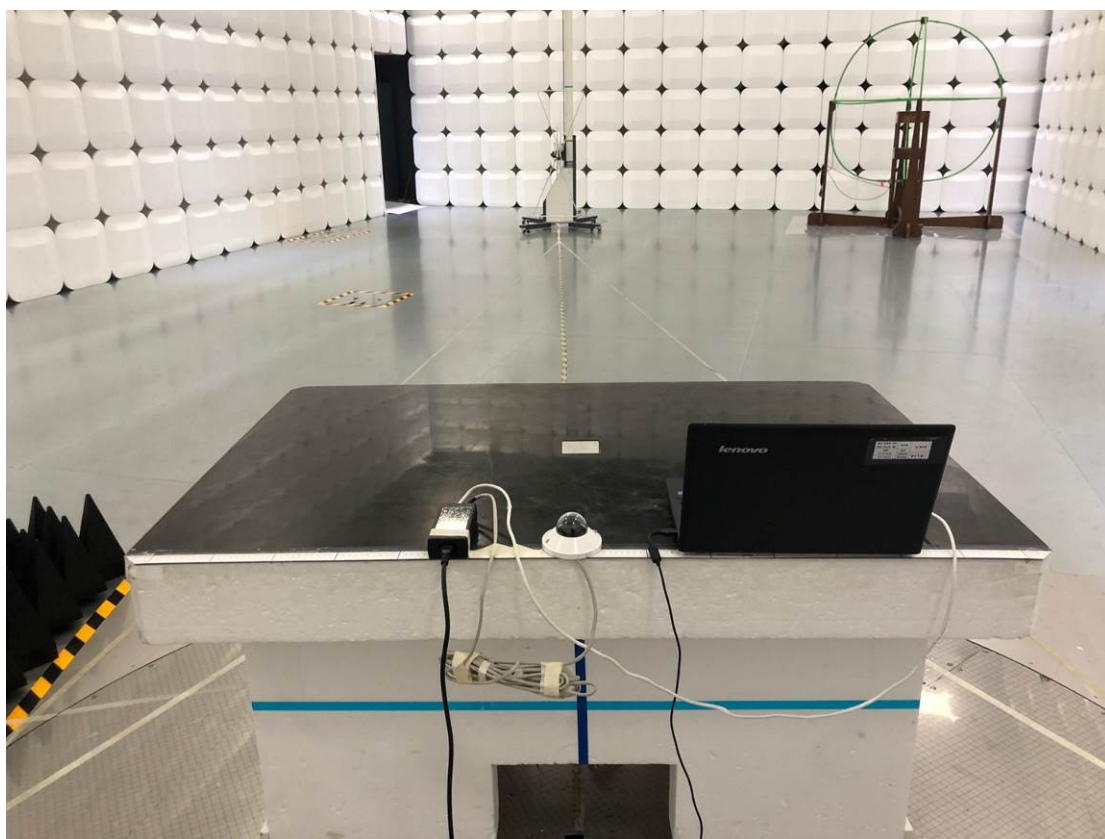
APPENDIX C

PHOTOGRAPHS

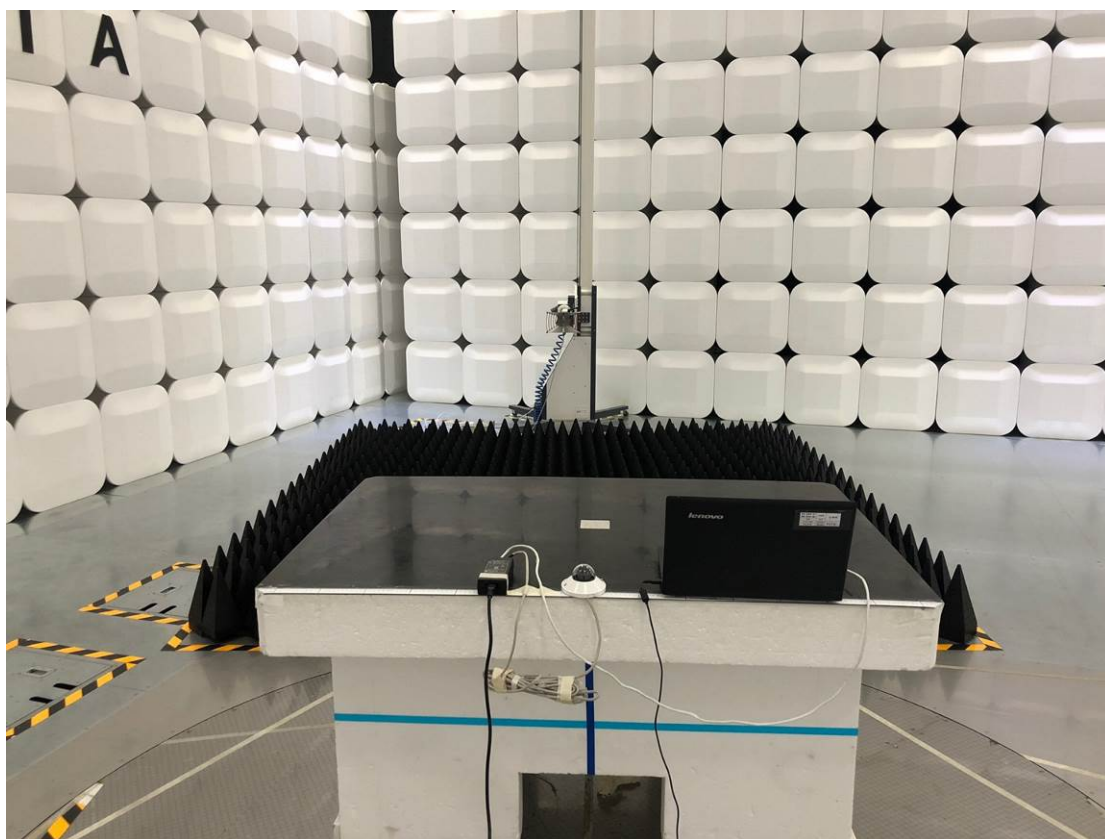
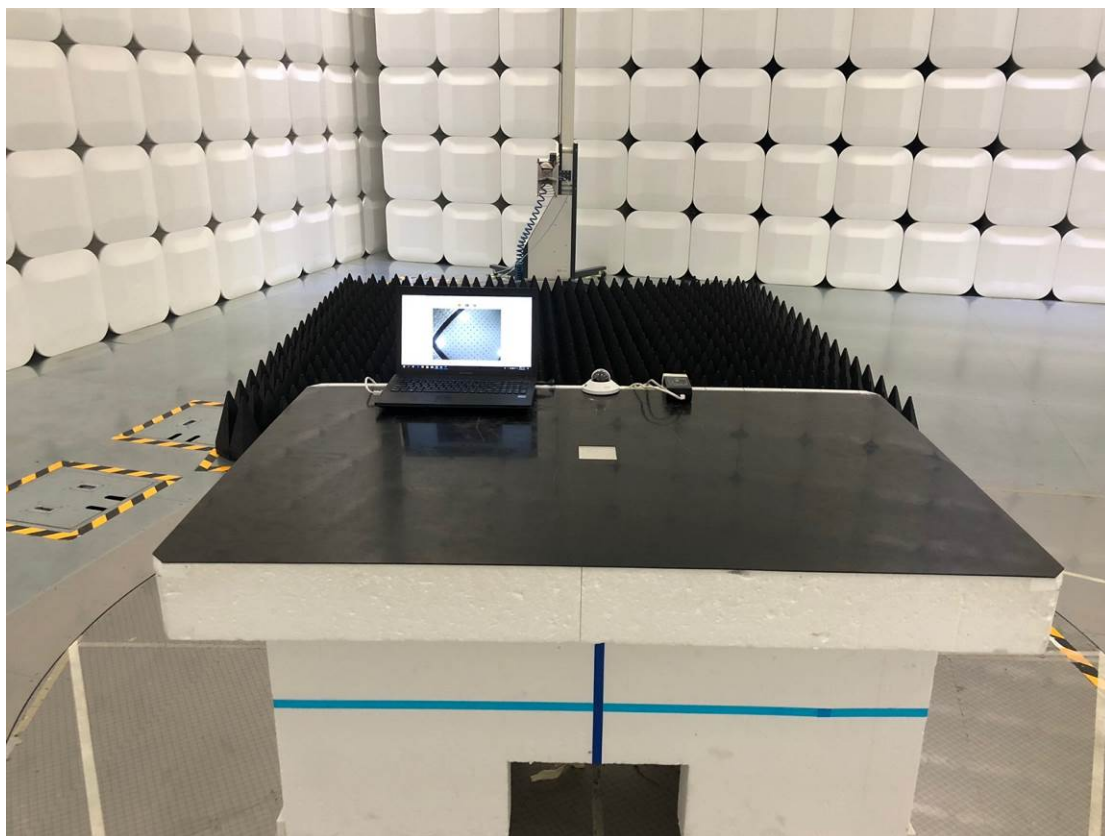
Conducted emission (Maximum emission configuration) / TEL



Radiated emission (Maximum emission configuration)-Below 1 GHz



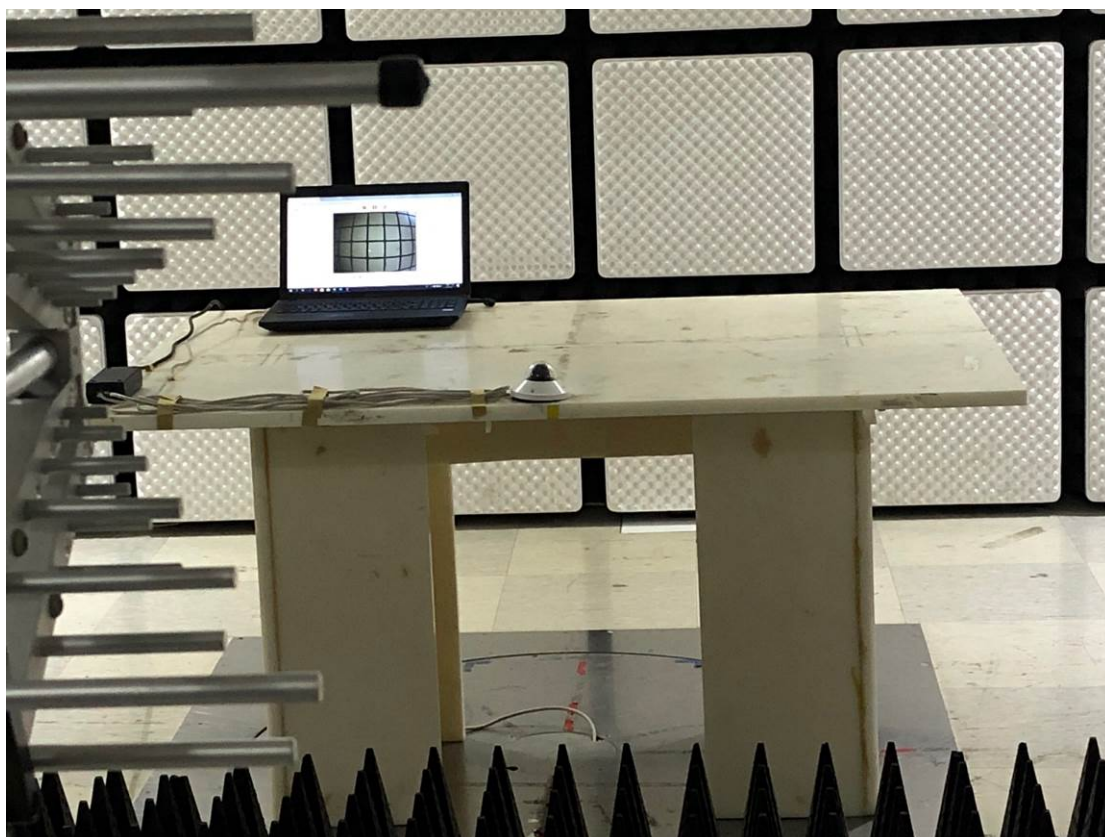
Radiated emission (Maximum emission configuration) – Above 1GHz



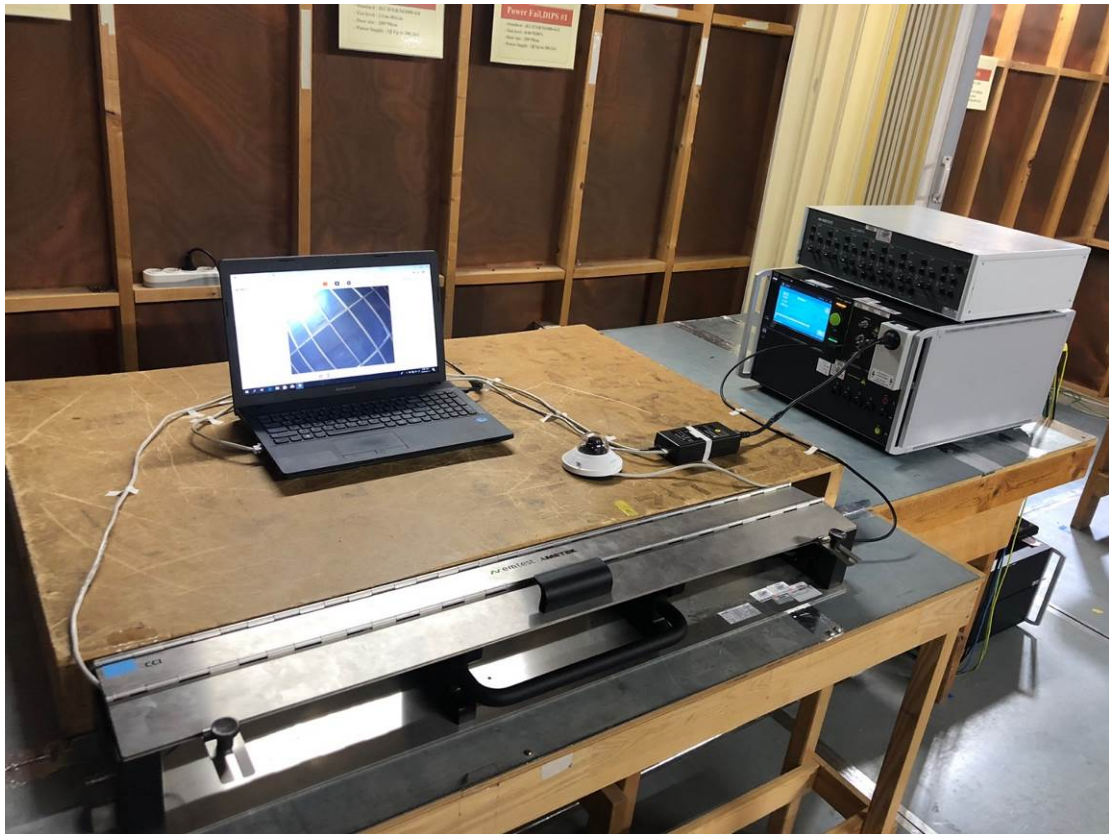
Electrostatic discharge



RF Electromagnetic Field



Electrical fast transients



Surge



Conducted Disturbances, Induced by Radio-Frequency Fields



EUT



EUT

