243 Jubug-ri, Yangji-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do 449-822, Korea
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http://www.ltalab.com

EMC TEST REPORT

Dates of Tests: June 28 – July 03, 2018
Test Report S/N: LR500121811AI
Test Site : LTA Co., Ltd.

Model No. **NC-D4212R**

APPLICANT **IDIS CO., LTD.**

Equipment Name	:	**Network Camera**
Manufacturer	:	**IDIS CO., LTD.**
Model name	:	**NC-D4212R**
Additional Model name	:	**DC-D4212R, DC-D4212R-2.8mm, DC-D4212R 4.0mm, DC-D4212R 2.8mm, NC-D4212R 2.8mm**
Test Device Serial No.:	:	**Identification**
Directive	:	**Electromagnetic Compatibility Directive 2014/30/EU**
Rule Part(s)	:	**EN 55032:2015**
		EN 50130-4:2011/A1:2014
		EN 61000-3-2:2014
		EN 61000-3-3:2013
Data of reissue	:	**November 30, 2018**

This test report is issued under the authority of:

Young Kyu Shin, Technical Manager

The test was supervised by:

Jin Ho Seo, Technical Manager

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.

NVLAP LAB CODE 200723-0

Revision	Date of issue	Test report No.	Description
0	06.07.2018	LR500121807H	Initial
1	19.10.2018	LR500121810S	Add Additional Models
2	30.11.2018	LR500121811AI	Add Additional Models (DC-D4212R 2.8mm, NC-D4212R 2.8mm)

TABLE OF CONTENTS

1. General information's

1-1 Test Performed

Company name : **LTA Co., Ltd.**

Address : 243, Jubug-ri,Yangji-Myeon,Yongin-Si, Kyunggi-Do, Korea. 449-822

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	2019-04-13	FCC CAB
VCCI	JAPAN	C-4948, T-2416, R-4483(10 m), G-847	2020-09-10 2020-09-10 2020-10-15 2018-12-13	VCCI registration
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	:	IDIS 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		IDIS CO., LTD.
Address		8-10, TECHNO 3-RO, YUSEONG-GU, DAEJEON, KOREA

2-2 Equipment Under Test (EUT)

Class	:	A
Equipment Name	:	Network Camera
Model name	:	NC-D4212R
Additional Model name	:	DC-D4212R, DC-D4212R-2.8mm, DC-D4212R 4.0mm, DC-D4212R 2.8mm, NC-D4212R 2.8mm NC-D4212R is basic model, which was tested. Additional Models are identical to NC-D4212R except for Model Name, marketing purpose.
Serial number	:	Identification
Date of receipt	:	June 12, 2018
EUT condition	:	Pre-production, not damaged
Interface ports	:	LAN
Power rating	:	DC 53 V
Modulator	:	-
Crystal/Oscillator(s)	:	-
Firmware version	:	XXXX

2-3 Modification

-NONE

2-4 Model Specification

-NONE

2-5 Test conditions

Temp. / Humid. / Pressure	:	+(23 - 25) ℃ / (49 - 50) % R.H. / (100.1) kPa
Tested Model	:	NC-D4212R
Test mode	:	Rec mode
Power supply	:	AC 230 V, 50 Hz

2-5 EUT

Equipment	Model No.	Serial No.	Manufacturer
Network Camera	**NC-D4212R**	**N/A**	**IDIS CO., LTD.**

2-6 Accessary

Equipment	Model No.	Serial No.	Manufacturer
Notebook	P56	N/A	HANSUNG
PoE Injector	NEXT-PEG4806JT	N/A	NEXT NETWORK

2-7 Cable List

From		To		Length	Shielding	
Type	**I/O Port**	**Type**	**I/O Port**	**(m)**	**Cable**	**backshell**
EUT	LAN	PoE	LAN	3.0	NO	Plastic
PoE Injector	LAN	Notebook	LAN	3.0	NO	Plastic
	AC IN	AC Power Source	3 Pin AC Line	1.5	NO	Plastic
Notebook	DC IN	Adapter	DC OUT	2.0	NO	Plastic

3. Test Report

3.1 Summary of tests

Parameter	Applied Standard	Status
I. Emission		
Radiated Emission	EN 55032:2015	C
Conducted Emission	EN 55032:2015	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	NA Note 3
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: Test was not conducted because EUT used PoE Power.

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
Measurement RBW	:	9 kHz
Test mode	:	Rec mode
Result	:	**Complies**

Measurement Data:

- Refer to the Next page (Maximum emission configuration)

A sample calculation:

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

Emission Level= meter reading + COR.F

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

Frequency Range	Quasi-peak	Average
(0.15 – 0.5) MHz	79 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_10 M)

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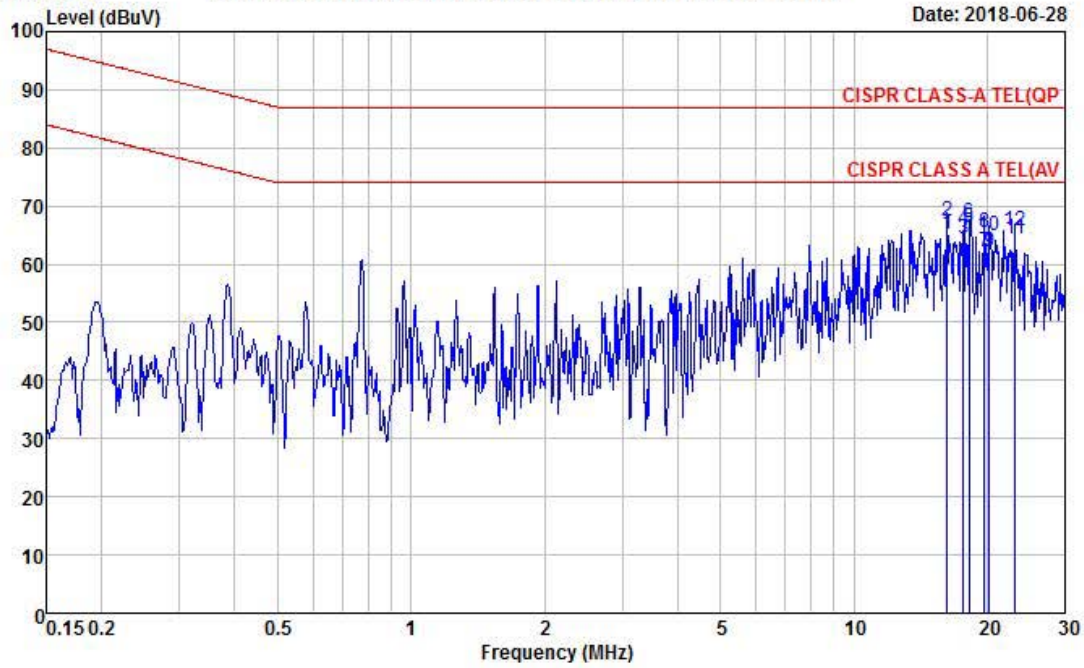
EUT / Model No. : NC-D4212R
Phase : TEL_10M
Test Mode : Rec mode
Test Power : 230 / 50
Temp. / Humi. : 25 / 50
Test Engineer : BANG Y H

Data: 1105 File: D:\Conducted Data\2018\LTA_Conduction_2018_6-1.EM6 (1106)



Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
16.228	47.62	45.32	19.75	67.37	65.07	87.00	74.00	19.63	8.93
17.694	46.28	44.44	19.80	66.08	64.24	87.00	74.00	20.92	9.76
18.243	47.46	46.35	19.81	67.27	66.16	87.00	74.00	19.73	7.84
19.709	45.50	42.31	19.86	65.36	62.17	87.00	74.00	21.64	11.83
20.259	45.03	42.29	19.88	64.91	62.17	87.00	74.00	22.09	11.83
23.128	45.70	44.48	19.94	65.64	64.42	87.00	74.00	21.36	9.58

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

Conducted emissions (TEL_100 M)

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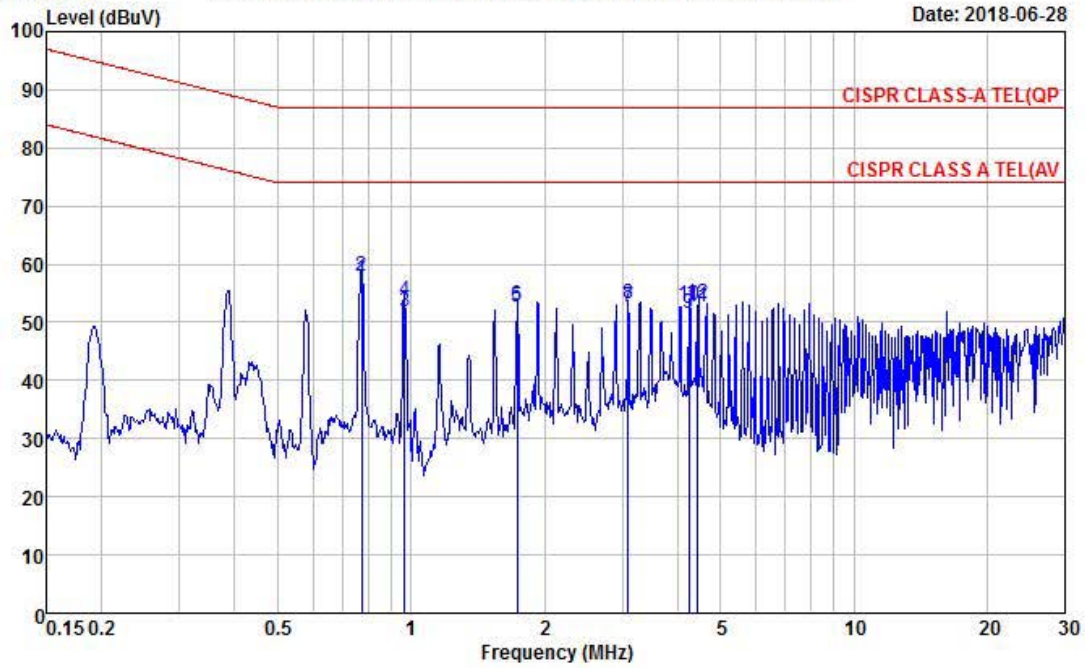
Fax:+82-31-3236010

EUT / Model No. : NC-D4212R Phase : TEL_100M
Test Mode : Rec mode Test Power : 230 / 50
Temp. / Humi. : 25 / 50 Test Engineer : BANG Y H

Data: 1106 File: D:\Conducted Data\2018\LTA_Conduction_2018_6-1.EM6 (1106)



Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.773	38.41	37.87	19.41	57.82	57.28	87.00	74.00	29.18	16.72
0.966	34.33	32.51	19.40	53.73	51.91	87.00	74.00	33.27	22.09
1.739	33.73	33.32	19.30	53.03	52.62	87.00	74.00	33.97	21.38
3.091	33.98	33.37	19.24	53.22	52.61	87.00	74.00	33.78	21.39
4.250	33.53	32.27	19.26	52.79	51.53	87.00	74.00	34.21	22.47
4.443	33.87	33.30	19.26	53.13	52.56	87.00	74.00	33.87	21.44

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 55032:2015
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	:	Rec mode
Result	:	**Complies**

Measurement Data:

- Refer to the Next page (Maximum emission configuration)

- The highest internal source of an EUT is higher than 108 MHz, the measurement shall be made up to 6 GHz.

(The highest internal source of an EUT : 6 GHz)

A sample calculation:

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

Emission Level= meter reading + COR.F

Limit of 10 m 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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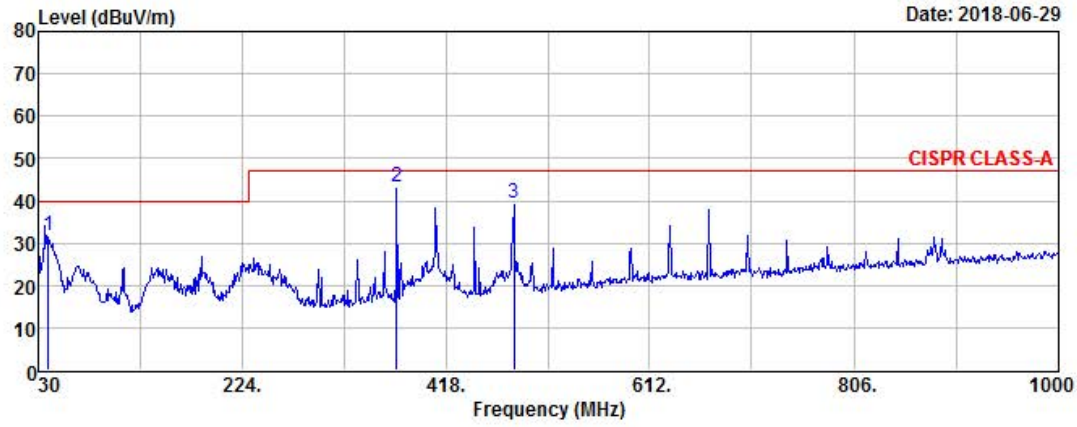
EUT/Model No.: NC-D4212R Temp/Humi: 23 / 49

Test Mode : Rec mode Tested by: BANG Y H

Data: 2800 File: C:\Program Files (x86)\e3\1806-1.EM6 (2800)



Freq	Reading	C.F	Result QP	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg	
39.80	51.50	-19.55	31.95	40.00	8.05	118	228	VERTICAL
371.25	57.00	-13.77	43.23	47.00	3.77	395	188	VERTICAL
482.64	51.10	-11.51	39.59	47.00	7.41	106	250	VERTICAL

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

Radiated Emission (Below 1 GHz) / H

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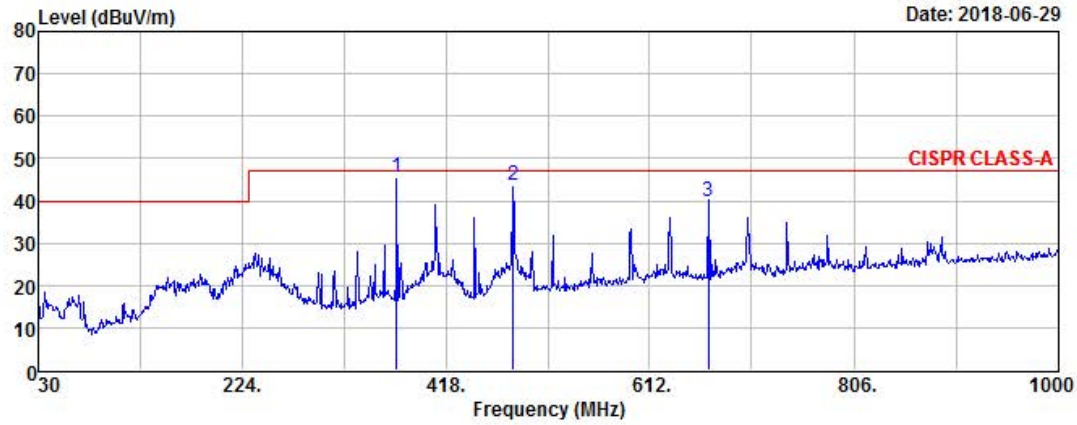
www.ltalab.com

EUT/Model No.: NC-D4212R Temp/Humi: 23 / 49

Test Mode : Rec mode Tested by: BANG Y H

Data: 2799 File: C:\Program Files (x86)\e3\1806-1.EM6 (2799)



Freq	Reading	C.F	Result QP	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg	
371.25	59.50	-13.77	45.73	47.00	1.27	258	189	HORIZONTAL
482.59	55.20	-11.51	43.69	47.00	3.31	285	278	HORIZONTAL
668.24	47.21	-7.49	39.72	47.00	7.28	154	262	HORIZONTAL

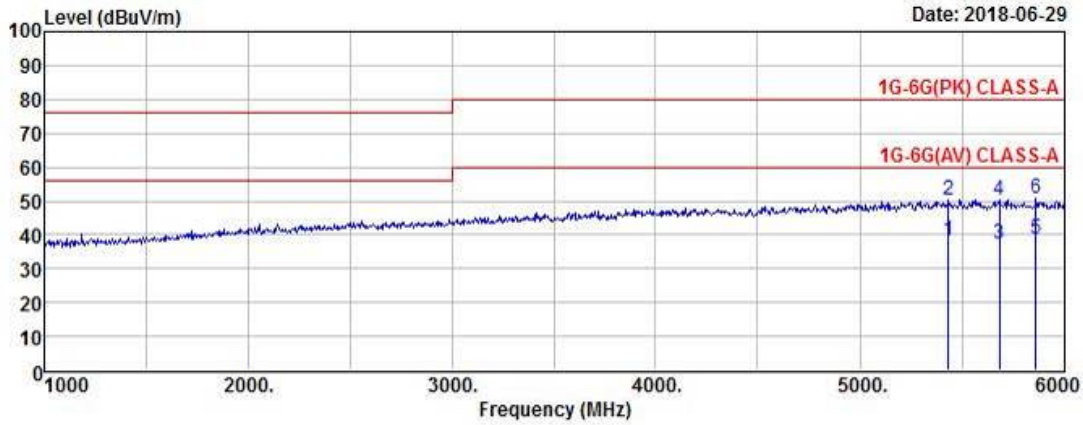
Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emission (Above 1 GHz)

EUT/Model No.: NC-D4212R Temp/Humi: 23 / 49

Test Mode : Rec mode Tested by: BANG Y H

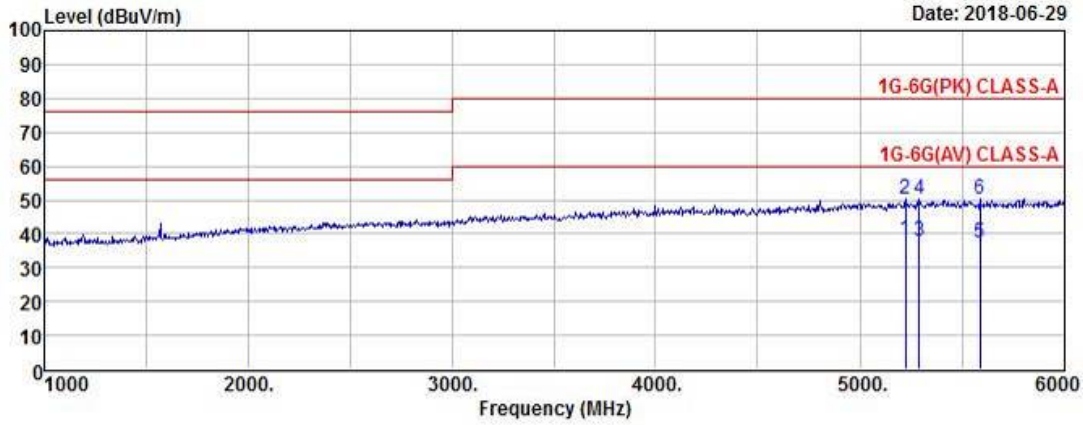
Data: 2802 File: C:\Program Files (x86)\e3\1806-1.EM6 (2802)



EUT/Model No.: NC-D4212R Temp/Humi: 23 / 49

Test Mode : Rec mode Tested by: BANG Y H

Data: 2801 File: C:\Program Files (x86)\e3\1806-1.EM6 (2801)



Manufacture : IDIS CO., LTD.

Model : NC-D4212R

TEST mode : REC mode

Ver Data: 2802 Hor Data: 2801

Test Date	Temp.: [℃]	Humidity : [%]	Distance (m)
2018-06-29	23	49	3.7

Freq.(MHz)	Reading(PK)	Reading(AV)	C.F	Result(PK)	Result(AV)	Limit(PK)	Limit(AV)	Margin(PK)	Margin(AV)	Height	Angle	Polarity
MHz	dBuV	dBuV	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	cm	deg	Hor/Ver
5220.0	36.4	24.7	15.49	51.85	40.21	80.0	60.0	28.15	19.79	100	71	H
5285.0	36.5	24.2	15.61	52.12	39.78	80.0	60.0	27.88	20.22	100	195	H
5585.0	36.2	23.0	16.01	52.17	39.00	80.0	60.0	27.83	21.00	100	335	H
5430.0	36.1	24.0	15.89	52.01	39.88	80.0	60.0	27.99	20.12	100	155	V
5680.0	36.1	23.3	16	52.06	39.28	80.0	60.0	27.94	20.72	100	322	V
5860.0	36.8	24.4	16	52.75	40.40	80.0	60.0	27.25	19.60	100	249	V

3.2.3 Harmonic Current (AC power input port)

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	:	- mode
Rated power	:	- W
Result	:	**Not Applicable**

Measurement Data:

- Test was not conducted because EUT used PoE Power.

3.2.4 Voltage Variation and Flicking (AC power input port)

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	:	- W
Result	:	**Not Applicable**

Measurement Data:

- Test was not conducted because EUT used PoE Power.

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	:	2018.06.28.
Test method	:	EN 61000-4-2 :2009
Temperature / Humidity / Pressure	:	24 ℃ / 49 % R.H. / 100.1 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	:	Rec mode
Result	:	**Complies**

Measurement Data:

- Refer to the Next page

1-1. Indirect Discharge

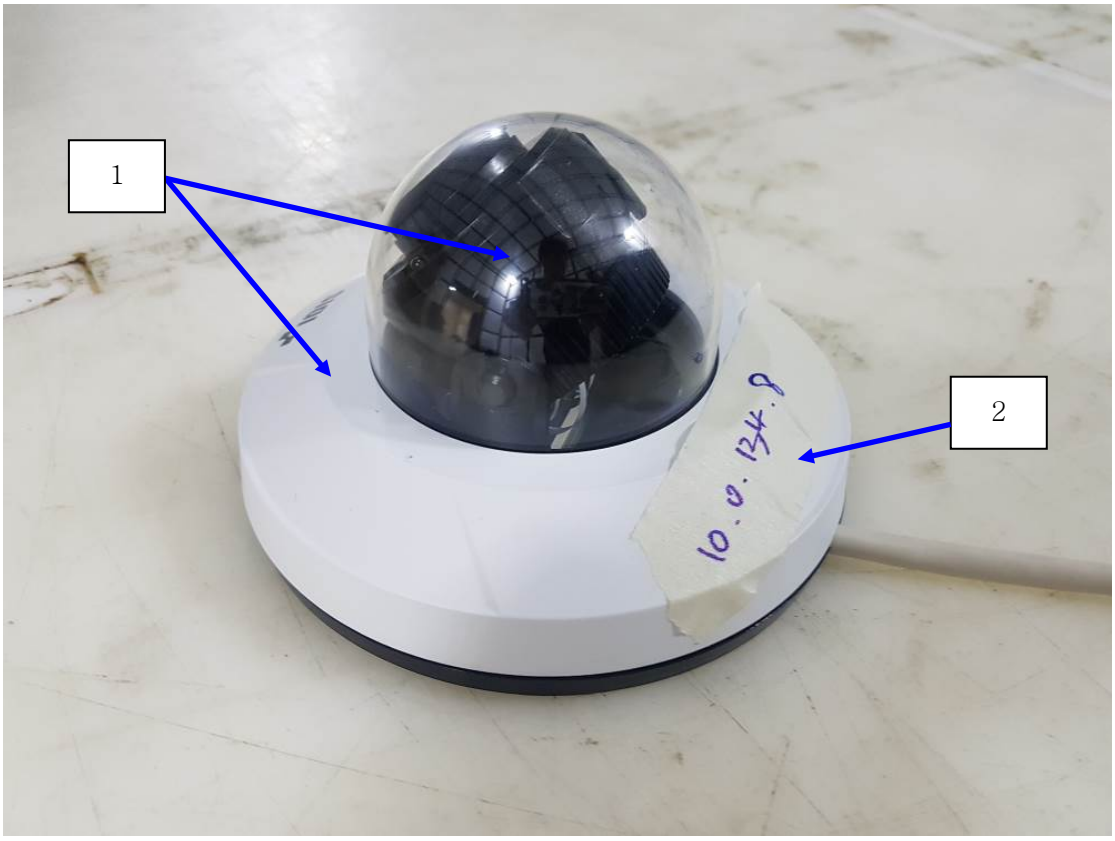
No.	Position	Kind of Discharge	Results	Remarks
1	HCP	Contact	Complies (A)	No reaction recognized
2	VCP	Contact	Complies (A)	No reaction recognized

1-2. Direct Discharge

No.	Position	Kind of Discharge	Result	Remarks
1	Enclosure	Air	Complies (A)	No reaction recognized
2	PoE	Air	Complies (A)	No reaction recognized

Air discharge
Contact discharge

ESD TEST POINT



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	:	2018.07.03.
Test method	:	EN 61000-4-3:2006/A1:2008/A2:2010
Temperature / Humidity / Pressure	:	24 ℃ / 50 % R.H. / 100.1 kPa
Frequency range	:	80 ㎒ to 2,700 ㎒
Test level	:	10 V/m (measured unmodulated)
Amplitude Modulation	:	AM, 80 %, 1 ㎑ Sinusoidal
		PM, 1 ㎐ (0.5s ON : 0.5s OFF)
Step size	:	1 % of fundamental
Dwell Time	:	3 s
Test mode	:	Rec mode
Result	:	**Complies**

Measurement Data:

Port	Side	Result	Remarks
Horizontal	Front	Complies (A)	No reaction recognized
	Left	Complies (A)	No reaction recognized
	Rear	Complies (A)	No reaction recognized
	Right	Complies (A)	No reaction recognized
Vertical	Front	Complies (A)	No reaction recognized
	Left	Complies (A)	No reaction recognized
	Rear	Complies (A)	No reaction recognized
	Right	Complies (A)	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	:	2018.06.28.
Test method	:	EN 61000-4-4:2012
Temperature / Humidity / Pressure	:	23 ℃ / 50 % R.H. / 100.1 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 ㎑
Test mode		Rec mode
Result	:	**Complies**

Measurement Data:

Signal Line	Test level	Result	Remarks
PoE	± 1 kV	Complies (A)	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	:	-
Test method	:	EN 61000-4-5:2014
Temperature / Humidity / Pressure	:	- ℃ / - % R.H. / - 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		- mode
Result	:	**Not Applicable**

Measurement Data:

Phase	Line	level	Result	Remark
-	-	-	-	-

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	:	2018.07.02.
Test method	:	EN 61000-4-6:2014/AC:2015
Temperature / Humidity / Pressure	:	24 ℃ / 50 % R.H. / 100.1 kPa
Frequency range	:	0.15㎒ – 100 ㎒
Test level	:	10 Vrms unmodulated
Amplitude Modulation	:	AM, 80 %, 1 ㎑ Sinusoidal
		PM, 1 ㎐ (0.5s ON : 0.5s OFF)
Step size	:	1 % of fundamental.
Test mode	:	Rec mode
Result	:	**Complies**

Measurement Data:

Port	Test level (Vrms)	Result	Remarks
PoE	10	Complies (A)	No reaction recognized

3.3.6 Mains supply voltage dips, short 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	:	-
Test method	:	EN 61000-4-11:2004/A1:2017
Temperature / Humidity / Pressure	:	- ℃ / - % R.H. / - kPa
Ut	:	230 Vac
Test mode	:	- mode
Result	:	**Not Applicable**

Measurement Data:

Test Level %Ut	Voltage droop and interruptions %Ut	Duration of Reduction (period)	Result	Remarks
80	20	250	-	-
70	30	25	-	-
40	60	10	-	-
0	100	250	-	-

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	:	-
Test method	:	EN 50130-4:2011/A1:2014
Temperature / Humidity / Pressure	:	- ℃ / - % R.H. / - kPa
Supply Voltage maximum	:	*U*nom + 10 %
Supply Voltage minimum		*U*nom – 15 %
Ut	:	230 Vac
Test mode	:	- mode
Result	:	**Not Applicable**

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 = (Maximum *U*nom) + 10 %, and *U*min = (Minimum *U*nom) p 15 %. In any case the range of *U*nom must include the European nominal mains voltage of 230 V.

2 **Mains supply voltage variations**

230 V, 50 Hz

Test LevelCondition		Test Level (V)	Result	Remarks
Unom	+10%	253	-	-
Unom	-15%	195.5	-	-

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	2018.07.11	1 year
☒	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	100710	2019.03.19	1 year
☐	LISN	ESH3-Z6	Rohde & Schwarz	100378	2018.09.07	1 year
☐	LISN	ESH3-Z6	Rohde & Schwarz	101468	2018.12.21	1 year
☒	LISN	ENV216	Rohde & Schwarz	100408	2018.09.07	1 year
☒	LISN	LT32C/10	AFJ	32031518210	2018.11.24	1 year
☒	TEST PROGRAM	e3_Ver: 5.5.201a	AUDIX	-	-	-
☒	ISN	ISN T800	TESEQ	27109	2019.01.23	1 year
☐	ISN	ENY81-CA6	Rohde & Schwarz	101565	2019.01.23	1 year
☐	CURRENT PROBE	EZ-17	Rohde & Schwarz	100508	2019.01.22	1 year

Radiated Emission – Below 1 GHz

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	EMI TEST Receiver	ESU	Rohde & Schwarz	100092	2018.12.21	1 year
☒	Amplifier (25 dB)	8447D	HP	2944A07684	2018.09.07	1 year
☒	TRILOG Antenna	VULB9160	SCHWARZBECK	9160-3237	2019.05.16	2 year
☒	TEST PROGRAM	e3_Ver: 6.2009-10-12a	AUDIX	-	-	-

Radiated Emission – Above 1 GHz

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	EMI TEST Receiver	ESU	Rohde & Schwarz	100092	2018.12.21	1 year
☒	Amplifier (25 dB)	8449B	HP	3008A00337	2019.03.19	1 year
☒	HORN ANTENNA	3115	ETS	00055005	2019.05.16	2 year
☒	TEST PROGRAM	e3_Ver: 6.2009-10-12a	AUDIX	-	-	-

Electrostatic Discharge

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	ESD Simulator	ESS-2000	NOISEKEN	ESS0625187	2019.03.20	1 year

RF Electromagnetic Field

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Signal Generator	E4432B	Agilent	MY41310632	2019.05.15	1 year
☒	Power Meter	E4419B	Agilent	GB38410133	2019.05.15	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 ㎒ ~3 ㎓)	K9128	RAPA	NONE	-	-

Electrical fast transients

	Item	**Model Name**	**Manufacturer**	**Serial No.**	**Next Cal.**	**Interval**
☒	Compact Generator	NX5	EMTEST	P1640185038	2019.03.19	1 year
☒	AC Power Source	Variac NX1-260-16	EMTEST	P1648188071	2019.03.19	1 year
☒	Capacitive Coupling Clamp	CCI	EMTEST	P1703190739	2019.03.19	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	2019.03.19	1 year
☒	POWER METER	NRVD	R&S	101689	2019.03.19	1 year
☒	RF Power Amplifier	FLL75A	FRANKONIA	1033	-	-
☒	EM INJECTION CLAMP	TSIC-23	F.C.C	529	2019.05.16	1 year
☐	CDN (M1)	TSCDN-M1-16A	F.C.C	07004	2018.09.07	1 year
☒	CDN (M2)	TSCDN-M2-16A	F.C.C	07008	2018.09.07	1 year
☒	CDN (M3)	TSCDN-M3-16A	F.C.C	07017	2018.09.07	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 U0 = 130 dBμV.
For components of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at U0 = 140 dBμV, 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 U0 = 130 dBμV, 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 U0 = 120 dBμV.
The EUT shall meet the acceptance criteria for the functional test(see Clause 6), after the conditioning.

Voltage dip/interruption / Voltage variation

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.

Mains supply voltage variations

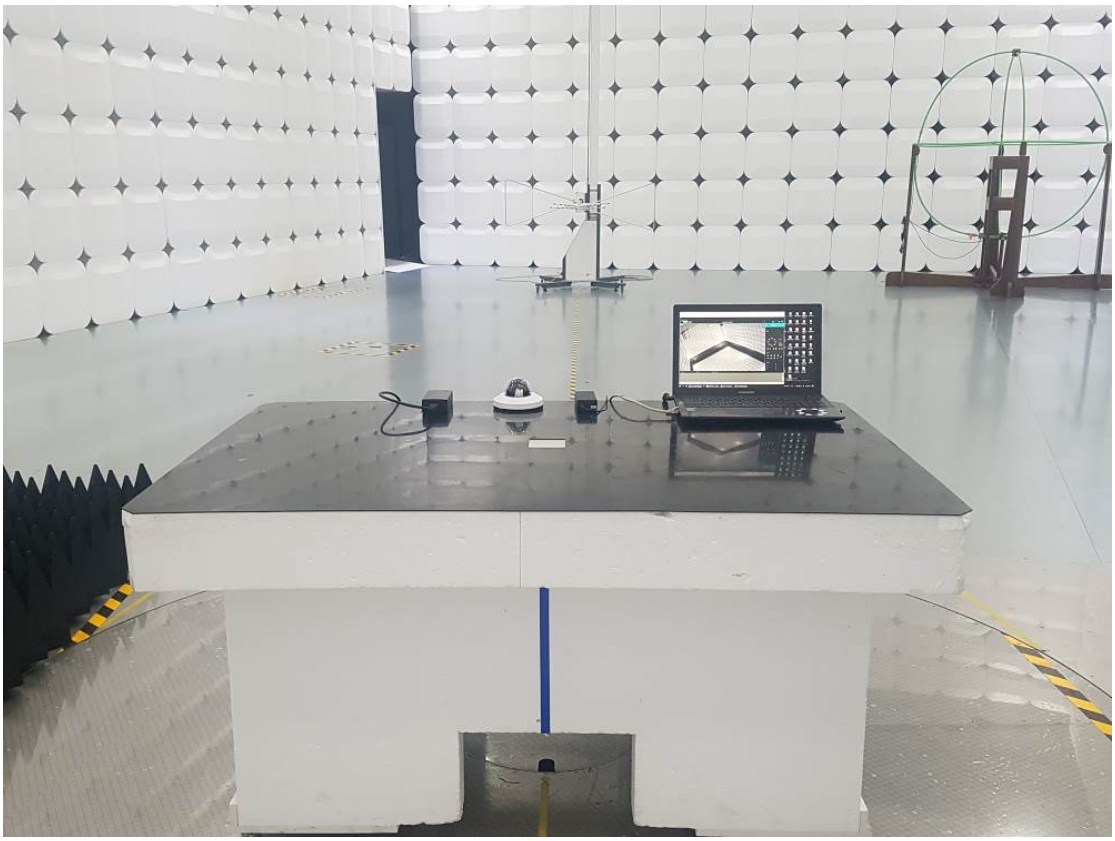
There shall be no damage, malfunction or change of status due to the different supply voltage conditions. The EUT shall meet the acceptance criteria for the functional test(see Clause 6), during the conditioning.

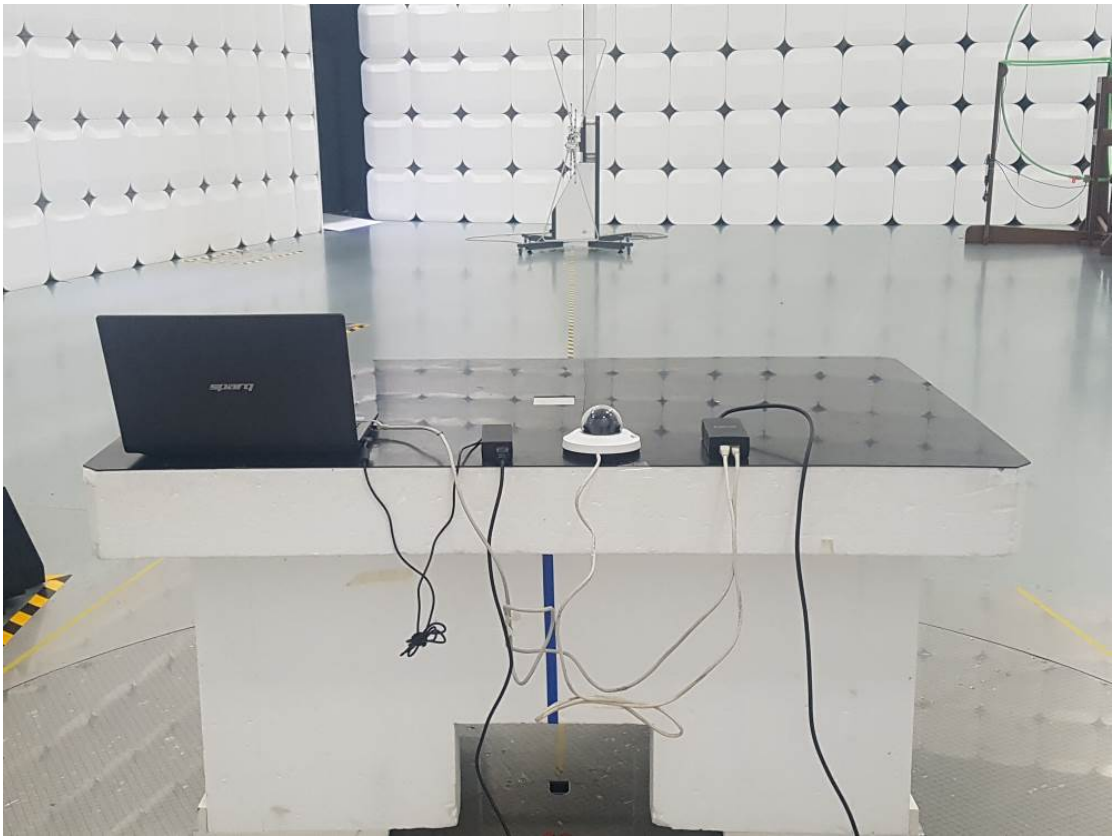
APPENDIX C

PHOTOGRAPHS

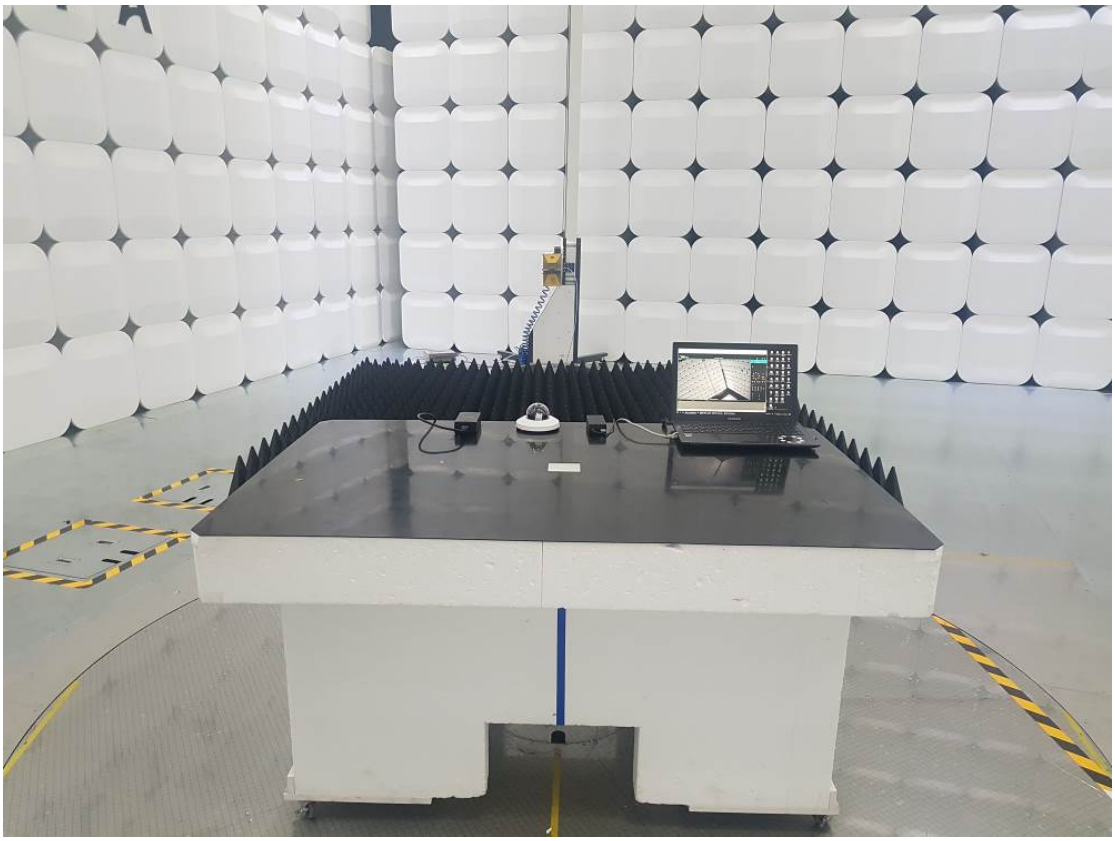
Conducted emission (Maximum emission configuration) _ TEL

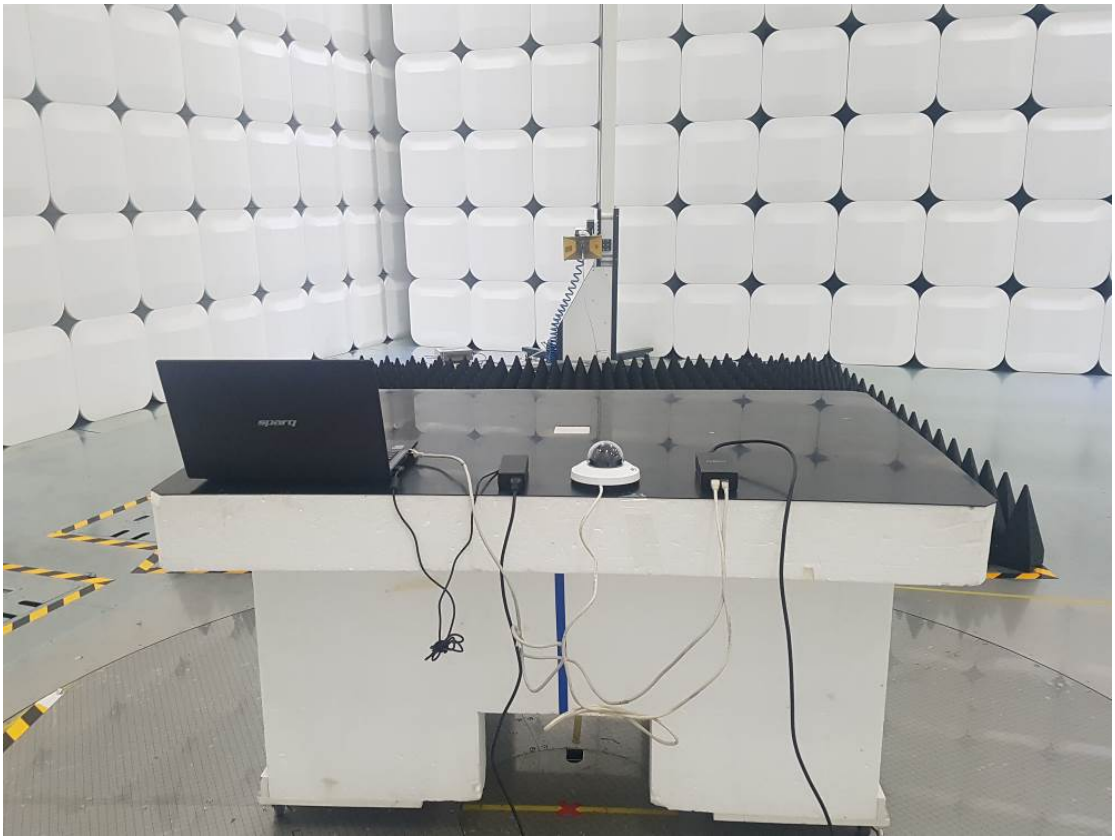
Radiated emission (Maximum emission configuration)-Below 1 GHz





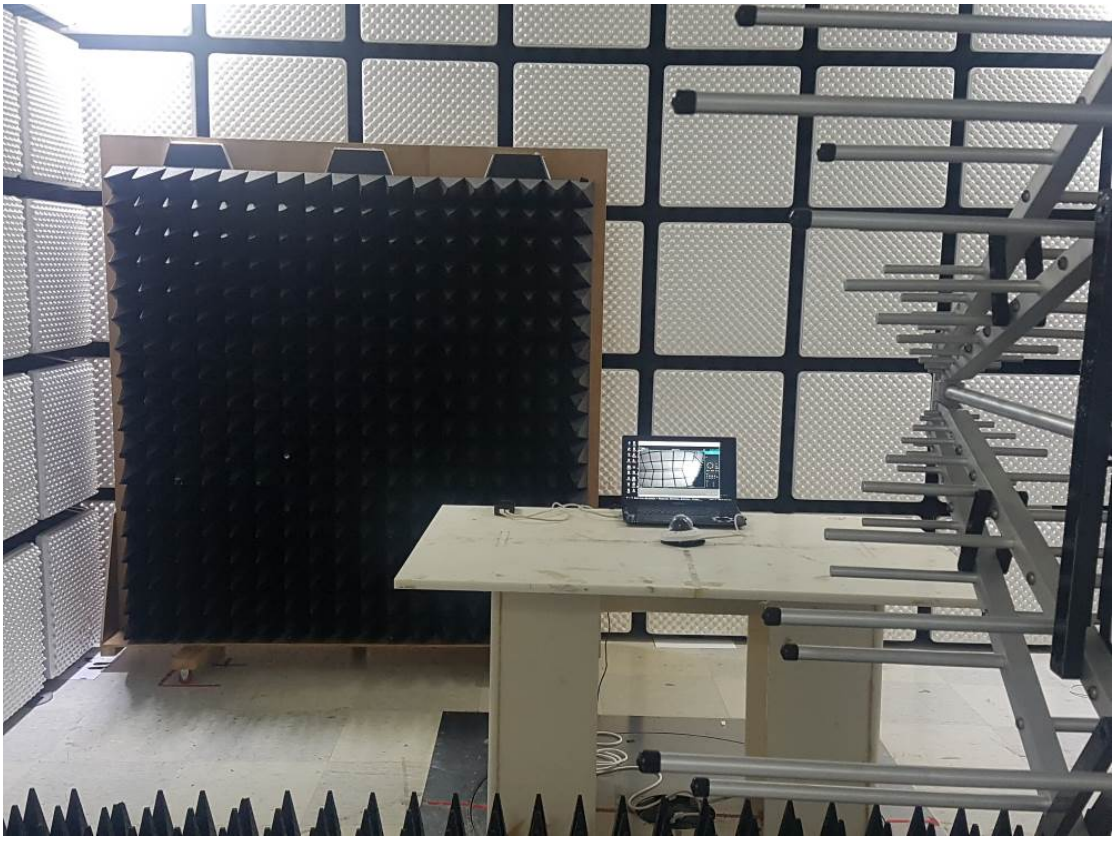
Radiated emission (Maximum emission configuration) – Above 1GHz





Electrostatic discharge

RF Electromagnetic Field



Electrical fast transients

Conducted Disturbances, Induced by Radio-Frequency Fields

EUT

EUT