



243 Jubug-ri, Yangji-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do 449-822, Korea
 Tel: +82-31-323-6008 Fax: +82-31-323-6010
<http://www.ltalab.com>

EMC TEST REPORT

Dates of Tests: July 13 - 23, 2018
 Test Report S/N: LR500121807AH
 Test Site : LTA Co., Ltd.

Model No.

AL-1112

APPLICANT

IDIS CO., LTD.

Equipment Name : Alarm Box
 Manufacturer : IDIS CO., LTD.
 Model name : AL-1112
 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 : July 24, 2018

This test report is issued under the authority of:

The test was supervised by:

Young Kyu Shin, Technical Manager

Young Ho, Bang, 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.



NVLAP LAB CODE 200723-0

Revision	Date of issue	Test report No.	Description
0	24.07.2018	LR500121807AH	Initial

TABLE OF CONTENTS

1. General information's	4
2. Information's about test item	5
3. Test Report	8
3.1 Summary of tests	8
3.2 EMISSION	9
3.2.1 Conducted emissions	9
3.2.2 Radiated Emission	21
3.2.3 Harmonic Current (AC power input port)	32
3.2.4 Voltage Variation and Flicking (AC power input port).....	35
3.3 IMMUNITY	40
3.3.1 Electrostatic Discharge	40
3.3.2 RF Electromagnetic Field	42
3.3.3 Electrical fast transients	44
3.3.4 Surge	45
3.3.5 Conducted disturbances, induced by radio-frequency fields	46
3.3.6 Mains supply voltage dips, short interruptions	47
3.3.7 Mains supply voltage variations	48
APPENDIX A TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS.....	49
APPENDIX B PERFORMANCE CRITERIA	53
APPENDIX C PHOTOGRAPHS	56

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>
 E-mail : chahn@ltalab.com
 Telephone : +82-31-323-6008
 Facsimile : +82-31-323-6010

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	2018-09-30	ECT accredited Lab.
RRA	KOREA	KR0049	-	EMC accredited Lab.
FCC	U.S.A	649054	2019-04-13	FCC CAB
VCCI	JAPAN	C-4948,	2020-09-10	VCCI registration
		T-2416,	2020-09-10	
		R-4483(10 m),	2020-10-15	
		G-847	2018-12-13	
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 : Alarm Box
Model name : AL-1112
Serial number : Identification
Date of receipt : June 28, 2018
EUT condition : Pre-production, not damaged
Interface ports : POWER IN, LAN, Alarm IN/OUT, DC OUT
Power rating : AC 24 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 - 27) °C / (35 - 59) % R.H. / (100 - 101) kPa
Tested Model : AL-1112
Test mode : Operating mode (AC), Operating mode (DC), Operating mode (PoE)
Power supply : AC 230 V, 50 Hz

2-5 EUT

Equipment	Model No.	Serial No.	Manufacturer
Alarm Box	AL-1112	N/A	IDIS CO., LTD.

2-6 Accessory / Operating mode (AC)

Equipment	Model No.	Serial No.	Manufacturer
Notebook	P56	N/A	HANSUNG
AC Adapter	BLA24300SKA	N/A	DREAM ELEC
Electronic Load	EL-400NS	N/A	DAE GIL

/ Operating mode (DC)

Equipment	Model No.	Serial No.	Manufacturer
Notebook	P56	N/A	HANSUNG
DC Adapter	DZ010LL120100K	N/A	GUANDONG KEERDA ELECTRONICS CO., LTD
Electronic Load	EL-400NS	N/A	DAE GIL

/ Operating mode (PoE)

Equipment	Model No.	Serial No.	Manufacturer
Notebook	P56	N/A	HANSUNG
PoE Adapter	PSE	N/A	N/A
Electronic Load	EL-400NS	N/A	DAE GIL

2-7 Cable List / Operating mode (AC)

From		To		Length (m)	Shielding	
Type	I/O Port	Type	I/O Port		Cable	backshell
EUT	POWER IN	AC Adapter	AC OUT	1.0	NO	Plastic
	Alarm IN	EUT	Alarm OUT	0.1	NO	Plastic
	LAN	Notebook	LAN	3.0	NO	Plastic
	DC OUT	Electronic Load	DC IN	0.5	NO	Plastic
Electronic Load	AC IN	AC Power Source	3 Pin AC Line	1.5	NO	Plastic

/ Operating mode (DC)

From		To		Length (m)	Shielding	
Type	I/O Port	Type	I/O Port		Cable	backshell
EUT	POWER IN	DC Adapter	DC OUT	1.0	NO	Plastic
	Alarm IN	EUT	Alarm OUT	0.1	NO	Plastic
	LAN	Notebook	LAN	3.0	NO	Plastic
	DC OUT	Electronic Load	DC IN	0.5	NO	Plastic
Electronic Load	AC IN	AC Power Source	3 Pin AC Line	1.5	NO	Plastic

/ Operating mode (PoE)

From		To		Length (m)	Shielding	
Type	I/O Port	Type	I/O Port		Cable	backshell
EUT	LAN	PoE Adapter	LAN	1.0	NO	Plastic
	Alarm IN	EUT	Alarm OUT	0.1	NO	Plastic
	DC OUT	Electronic Load	DC IN	0.5	NO	Plastic
Electronic Load	AC IN	AC Power Source	3 Pin AC Line	1.5	NO	Plastic
PoE Adapter	AC IN	AC Power Source	3 Pin AC Line	1.5	NO	Plastic
Notebook	LAN	PoE Adapter	LAN	1.0	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	C
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	C
RF common mode	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 AL-1112 because equipment whose rated power is less or equal 75W 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
Measurement RBW	: 9 kHz
Test mode	: Operating mode (AC), Operating mode (DC), Operating mode (PoE)
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 (LINE) / Operating mode (AC)



4, Songjuro 236 Beon-gil, Yangji-myeon
Cheoin-gu, Youngin-si, Gyeonggi-do
449-822 Korea
Tel:+82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. : AL-1112

Phase : LINE

Test Mode : Operating mode(AC)

Test Power : 230 / 50

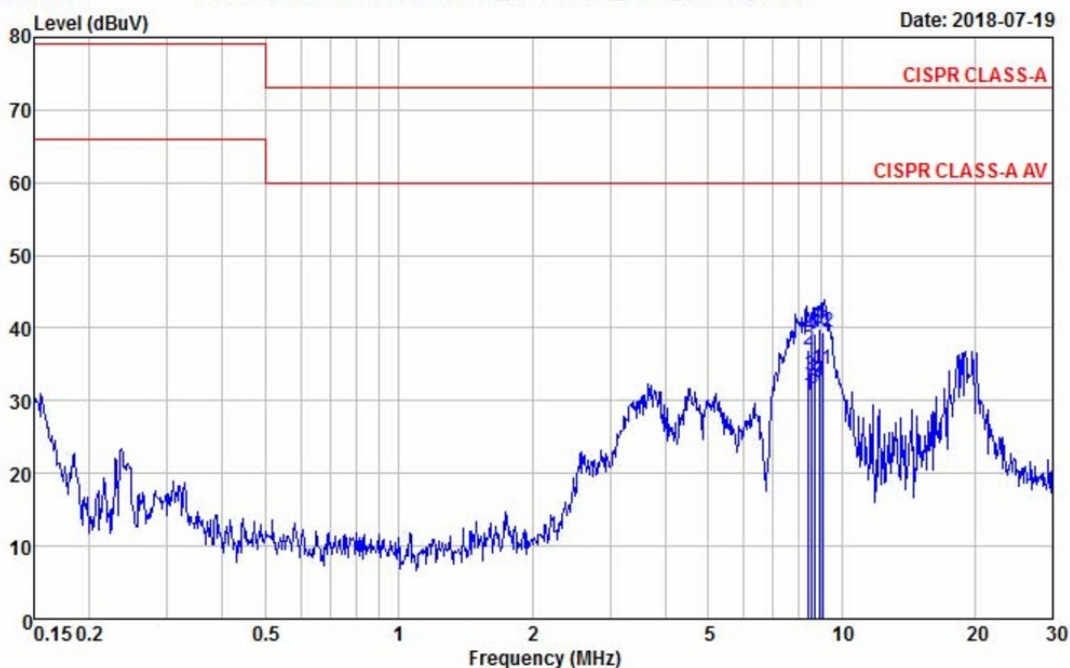
Temp. / Humi. : 25 / 52

Test Engineer : BANG Y H

Data: 1525

File: D:\Conducted Data\2018\LTA_Conduction_2018_7.EM6 (1546)

Date: 2018-07-19



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV		QP	AV	QP	AV	QP	AV
	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
8.435	17.50	11.25	19.55	37.05	30.80	73.00	60.00	35.95	29.20
8.537	19.52	13.93	19.55	39.07	33.48	73.00	60.00	33.93	26.52
8.692	19.73	12.19	19.55	39.28	31.74	73.00	60.00	33.72	28.26
8.900	20.42	13.25	19.55	39.97	32.80	73.00	60.00	33.03	27.20
8.905	20.03	13.08	19.55	39.58	32.63	73.00	60.00	33.42	27.37
9.068	19.80	14.69	19.55	39.35	34.24	73.00	60.00	33.65	25.76

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

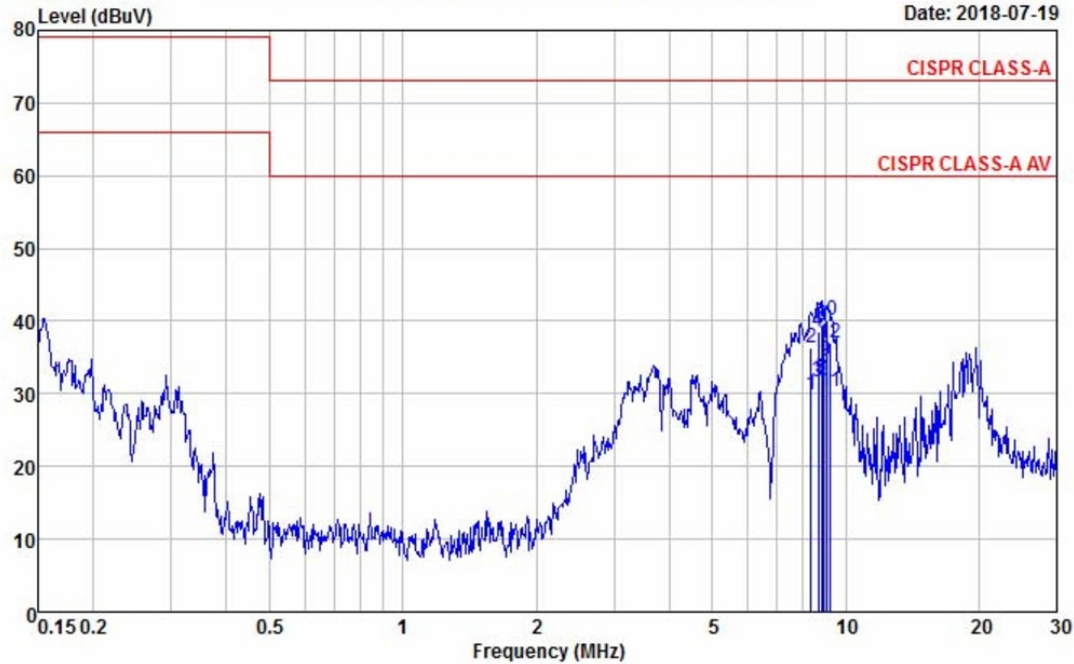
Conducted emissions (NEUTRAL) / Operating mode (AC)



4, Songjuro 236 Beon-gil, Yangji-myeon
Cheoin-gu, Youngin-si, Gyeonggi-do
449-822 Korea
Tel:+82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. : AL-1112	Phase : NEUTRAL
Test Mode : Operating mode(AC)	Test Power : 230 / 50
Temp. / Humi. : 25 / 52	Test Engineer : BANG Y H

Data: 1522 File: D:\Conducted Data\2018\LTA_Conduction_2018_7.EM6 (1546) Date: 2018-07-19



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV		QP	AV	QP	AV	QP	AV
	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
8.366	16.71	10.42	19.52	36.23	29.94	73.00	60.00	36.77	30.06
8.669	18.99	12.01	19.55	38.54	31.56	73.00	60.00	34.46	28.44
8.837	19.66	12.61	19.55	39.21	32.16	73.00	60.00	33.79	27.84
8.905	19.88	12.28	19.55	39.43	31.83	73.00	60.00	33.57	28.17
9.070	20.54	14.89	19.55	40.09	34.44	73.00	60.00	32.91	25.56
9.242	17.34	10.77	19.55	36.89	30.32	73.00	60.00	36.11	29.68

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

Conducted emissions (LINE) / Operating mode (DC)



4, Songjuro 236 Beon-gil, Yangji-myeon
Cheoin-gu, Youngin-si, Gyeonggi-do
449-822 Korea
Tel:+82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. : AL-1112

Phase : LINE

Test Mode : Operating mode(DC)

Test Power : 230 / 50

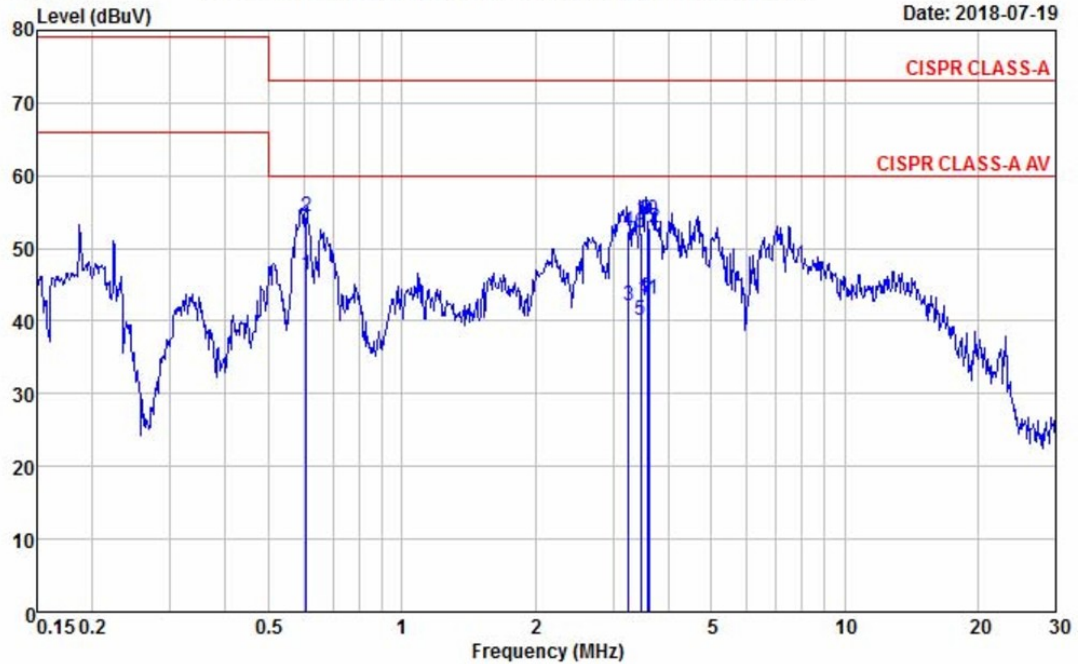
Temp. / Humi. : 25 / 52

Test Engineer : BANG Y H

Data: 1540

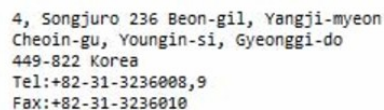
File: D:\Conducted Data\2018\LTA_Conduction_2018_7.EM6 (1546)

Date: 2018-07-19



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV		QP	AV	QP	AV	QP	AV
	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.609	34.88	26.95	19.43	54.31	46.38	73.00	60.00	18.69	13.62
3.249	33.03	22.73	19.45	52.48	42.18	73.00	60.00	20.52	17.82
3.471	32.63	20.57	19.46	52.09	40.03	73.00	60.00	20.91	19.97
3.578	34.44	23.37	19.46	53.90	42.83	73.00	60.00	19.10	17.17
3.581	34.51	23.86	19.46	53.97	43.32	73.00	60.00	19.03	16.68
3.608	33.34	23.56	19.46	52.80	43.02	73.00	60.00	20.20	16.98

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



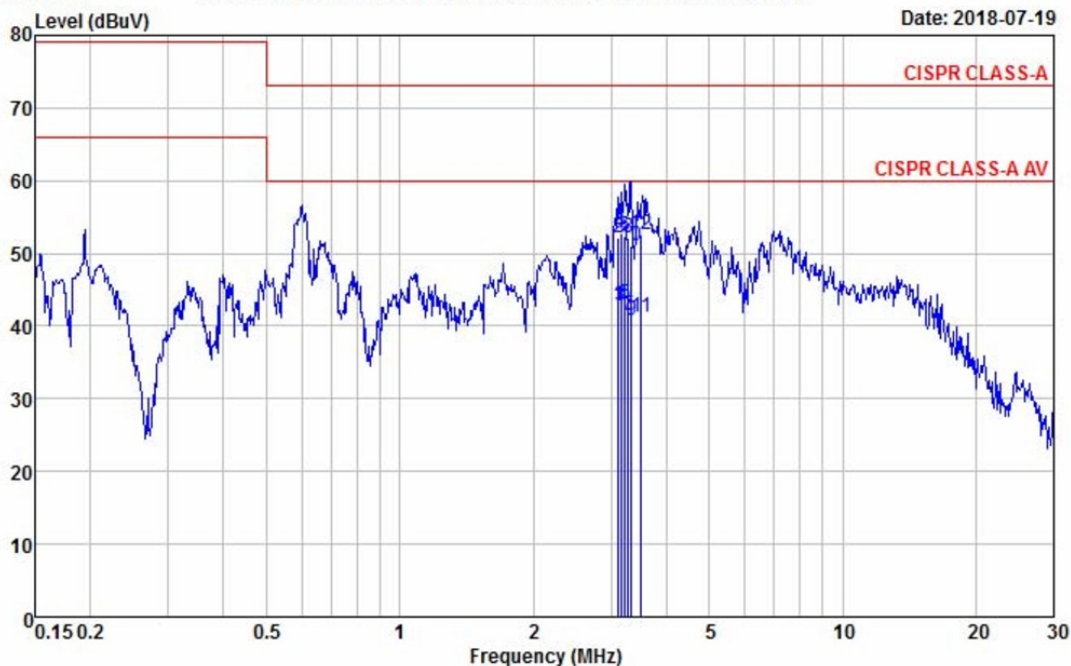
Phase : NEUTRAL

Test Power : 230 / 50

Test Engineer : BANG Y H

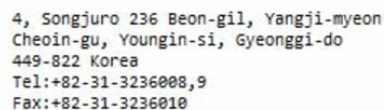
File: D:\Conducted Data\2018\LTA Conduction 2018 7.EM6 (1546)

Date: 2018-07-19



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
	QP	AV		QP	AV	QP	AV	QP	AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
3.114	32.81	23.29	19.45	52.26	42.74	73.00	60.00	20.74	17.26
3.152	33.27	23.41	19.45	52.72	42.86	73.00	60.00	20.28	17.14
3.231	32.84	23.48	19.44	52.28	42.92	73.00	60.00	20.72	17.08
3.285	32.77	21.98	19.44	52.21	41.42	73.00	60.00	20.79	18.58
3.337	31.58	21.34	19.44	51.02	40.78	73.00	60.00	21.98	19.22
3.505	33.15	21.88	19.45	52.60	41.33	73.00	60.00	20.40	18.67

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



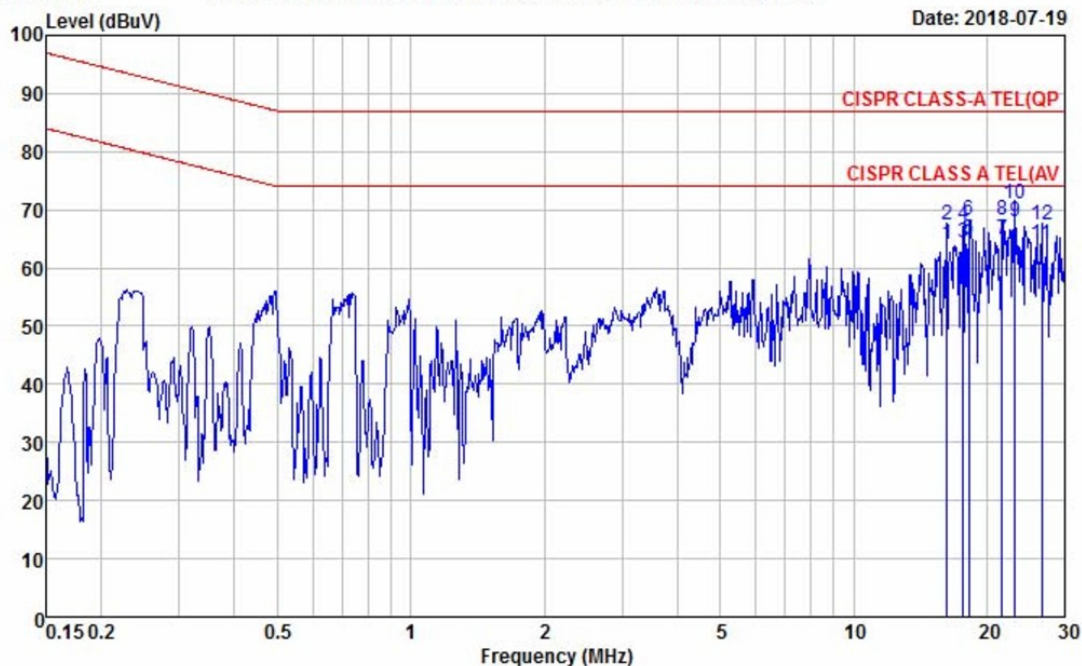
Phase : TEL_10M

Test Power : 230 / 50

Test Engineer : BANG Y H

File: D:\Conducted Data\2018\LTA Conduction 2018 7.EM6 (1561)

Date: 2018-07-19



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
	QP	AV		QP	AV	QP	AV	QP	AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
16.228	47.48	44.23	19.84	67.32	64.07	87.00	74.00	19.68	9.93
17.694	47.64	44.31	19.90	67.54	64.21	87.00	74.00	19.46	9.79
18.243	48.39	44.97	19.91	68.30	64.88	87.00	74.00	18.70	9.12
21.662	48.16	44.97	20.02	68.18	64.99	87.00	74.00	18.82	9.01
23.128	51.11	47.93	20.05	71.16	67.98	87.00	74.00	15.84	6.02
26.609	47.29	43.97	20.17	67.46	64.14	87.00	74.00	19.54	9.86

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

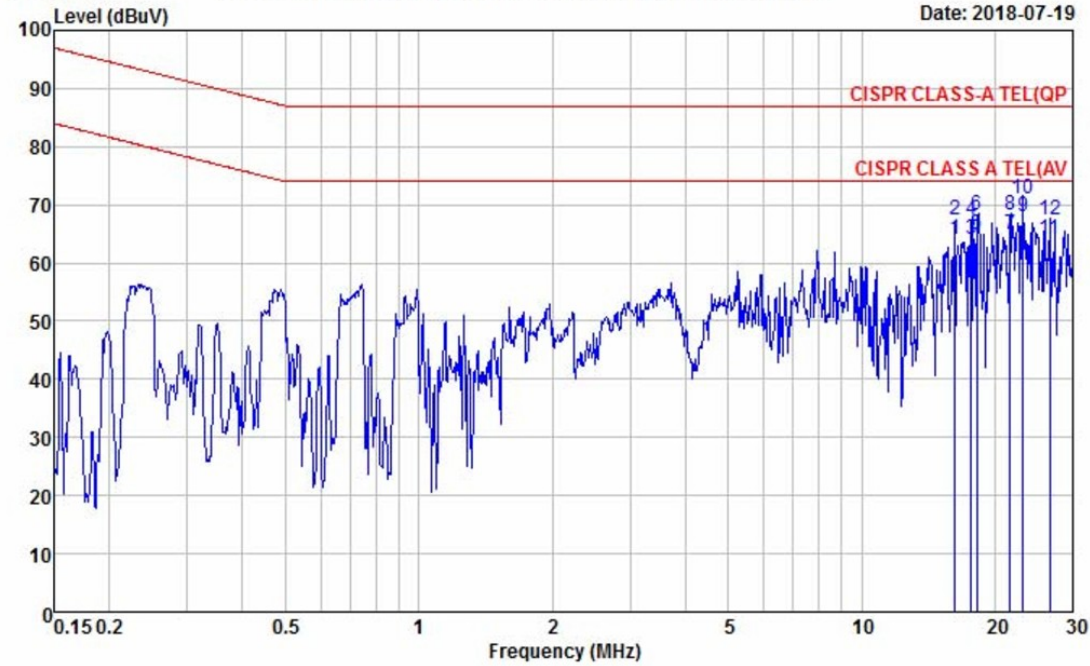
Conducted emissions (TEL_100 M) / Operating mode (AC)



4, Songjuro 236 Beon-gil, Yangji-myeon
Cheoin-gu, Youngin-si, Gyeonggi-do
449-822 Korea
Tel:+82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. : AL-1112	Phase : TEL_100M
Test Mode : Operating mode(AC)	Test Power : 230 / 50
Temp. / Humi. : 25 / 52	Test Engineer : BANG Y H

Data: 1561 File: D:\Conducted Data\2018\LTA_Conduction_2018_7.EM6 (1561) Date: 2018-07-19



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
16.228	47.47	44.20	19.82	67.29	64.02	87.00	74.00	19.71	9.98
17.694	47.62	44.28	19.87	67.49	64.15	87.00	74.00	19.51	9.85
18.243	48.36	45.08	19.88	68.24	64.96	87.00	74.00	18.76	9.04
21.662	48.16	44.84	19.97	68.13	64.81	87.00	74.00	18.87	9.19
23.128	51.10	47.87	20.00	71.10	67.87	87.00	74.00	15.90	6.13
26.609	47.28	44.00	20.10	67.38	64.10	87.00	74.00	19.62	9.90

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

Conducted emissions (TEL_10 M) / Operating mode (DC)



4, Songjuro 236 Beon-gil, Yangji-myeon
Cheoin-gu, Youngin-si, Gyeonggi-do
449-822 Korea
Tel:+82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. : AL-1112

Phase : TEL_10M

Test Mode : Operating mode(DC)

Test Power : 230 / 50

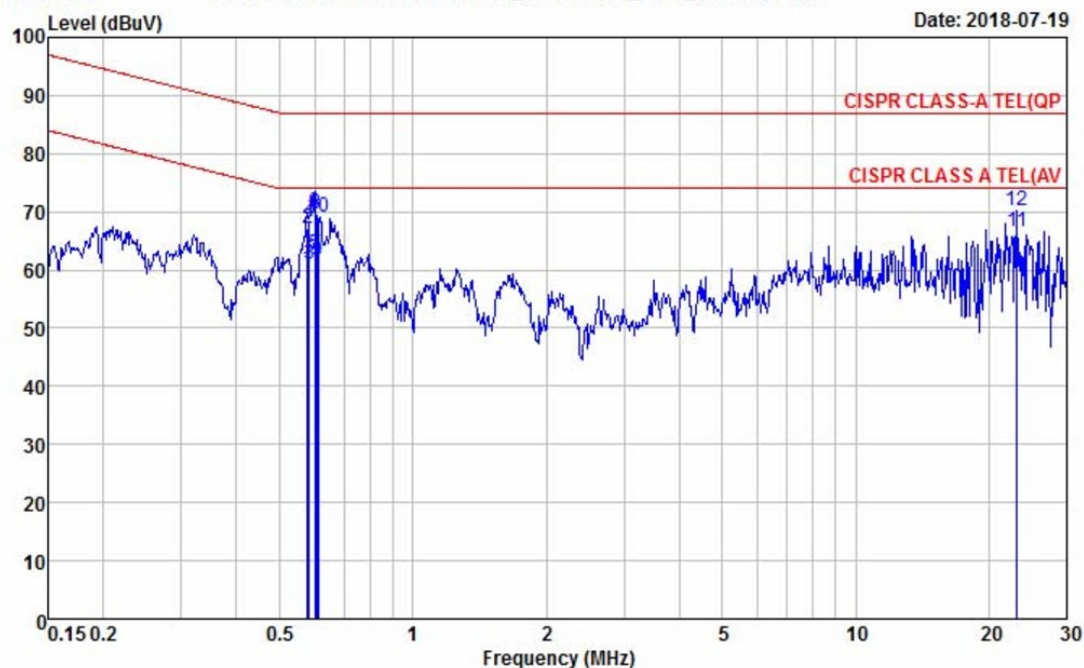
Temp. / Humi. : 25 / 52

Test Engineer : BANG Y H

Data: 1570

File: D:\Conducted Data\2018\LTA_Conduction_2018_7.EM6 (1573)

Date: 2018-07-19



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV		QP	AV	QP	AV	QP	AV
	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.579	47.60	40.58	19.66	67.26	60.24	87.00	74.00	19.74	13.76
0.584	48.53	41.43	19.66	68.19	61.09	87.00	74.00	18.81	12.91
0.601	50.25	43.09	19.65	69.90	62.74	87.00	74.00	17.10	11.26
0.606	50.12	43.05	19.65	69.77	62.70	87.00	74.00	17.23	11.30
0.611	49.46	41.95	19.64	69.10	61.59	87.00	74.00	17.90	12.41
23.128	50.08	46.48	20.05	70.13	66.53	87.00	74.00	16.87	7.47

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

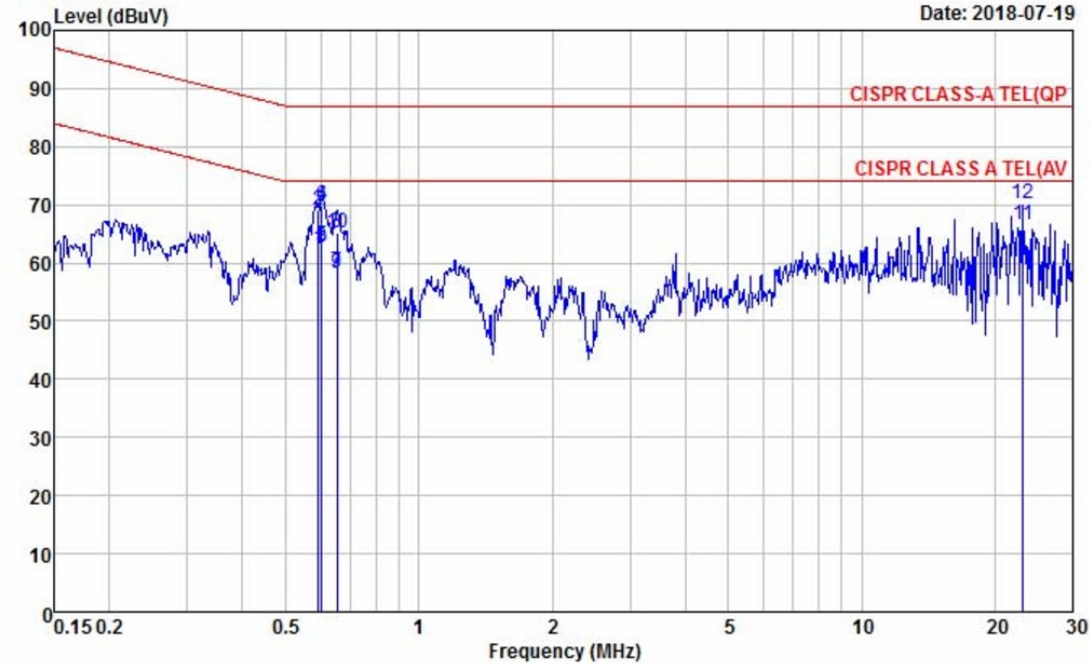
Conducted emissions (TEL_100 M) / Operating mode (DC)



4, Songjuro 236 Beon-gil, Yangji-myeon
Cheoin-gu, Youngin-si, Gyeonggi-do
449-822 Korea
Tel:+82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. : AL-1112	Phase : TEL_100M
Test Mode : Operating mode(DC)	Test Power : 230 / 50
Temp. / Humi. : 25 / 52	Test Engineer : BANG Y H

Data: 1573 File: D:\Conducted Data\2018\LTA_Conduction_2018_7.EM6 (1573) Date: 2018-07-19



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV		QP	AV	QP	AV	QP	AV
	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.593	49.57	42.88	19.63	69.20	62.51	87.00	74.00	17.80	11.49
0.603	50.18	43.09	19.63	69.81	62.72	87.00	74.00	17.19	11.28
0.605	50.21	43.19	19.63	69.84	62.82	87.00	74.00	17.16	11.18
0.653	45.53	38.78	19.61	65.14	58.39	87.00	74.00	21.86	15.61
0.653	45.52	38.73	19.61	65.13	58.34	87.00	74.00	21.87	15.66
23.128	50.08	46.58	20.00	70.08	66.58	87.00	74.00	16.92	7.42

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

Conducted emissions (TEL_10 M) / Operating mode (PoE)



4, Songjuro 236 Beon-gil, Yangji-myeon
Cheoin-gu, Youngin-si, Gyeonggi-do
449-822 Korea
Tel:+82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. : AL-1112

Phase : TEL_10M

Test Mode : Operating mode(PoE)

Test Power : 230 / 50

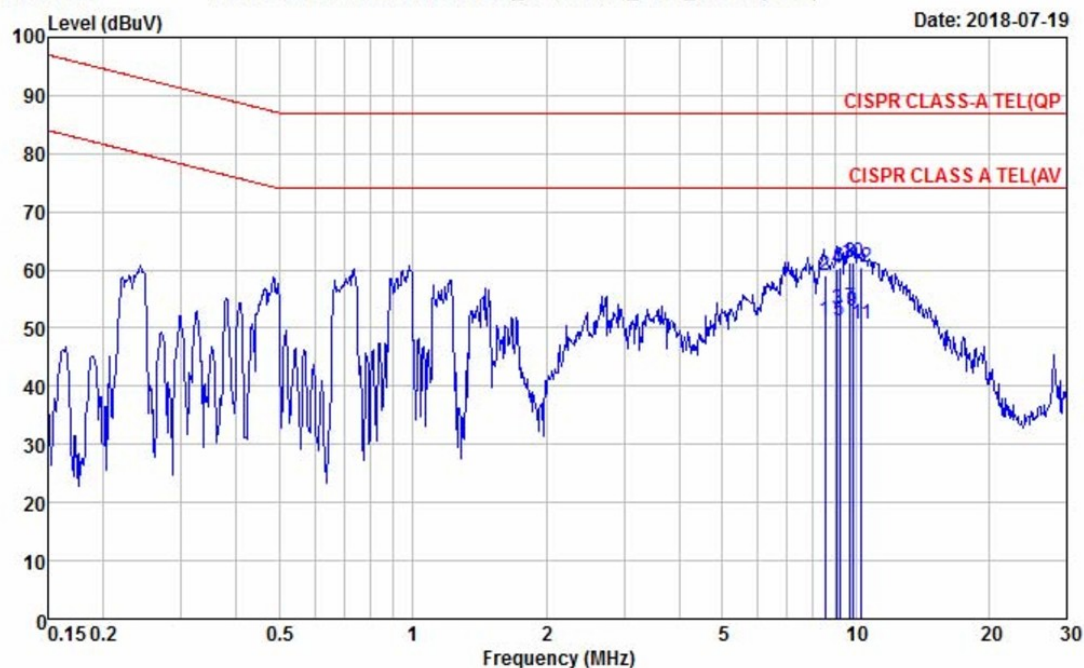
Temp. / Humi. : 25 / 52

Test Engineer : BANG Y H

Data: 1582

File: D:\Conducted Data\2018\LTA_Conduction_2018_7.EM6 (1582)

Date: 2018-07-19



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV		QP	AV	QP	AV	QP	AV
	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
8.518	39.47	31.65	19.65	59.12	51.30	87.00	74.00	27.88	22.70
9.083	40.60	33.50	19.66	60.26	53.16	87.00	74.00	26.74	20.84
9.219	40.72	31.48	19.67	60.39	51.15	87.00	74.00	26.61	22.85
9.732	41.64	33.80	19.68	61.32	53.48	87.00	74.00	25.68	20.52
9.853	41.62	33.28	19.68	61.30	52.96	87.00	74.00	25.70	21.04
10.297	40.82	31.12	19.69	60.51	50.81	87.00	74.00	26.49	23.19

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

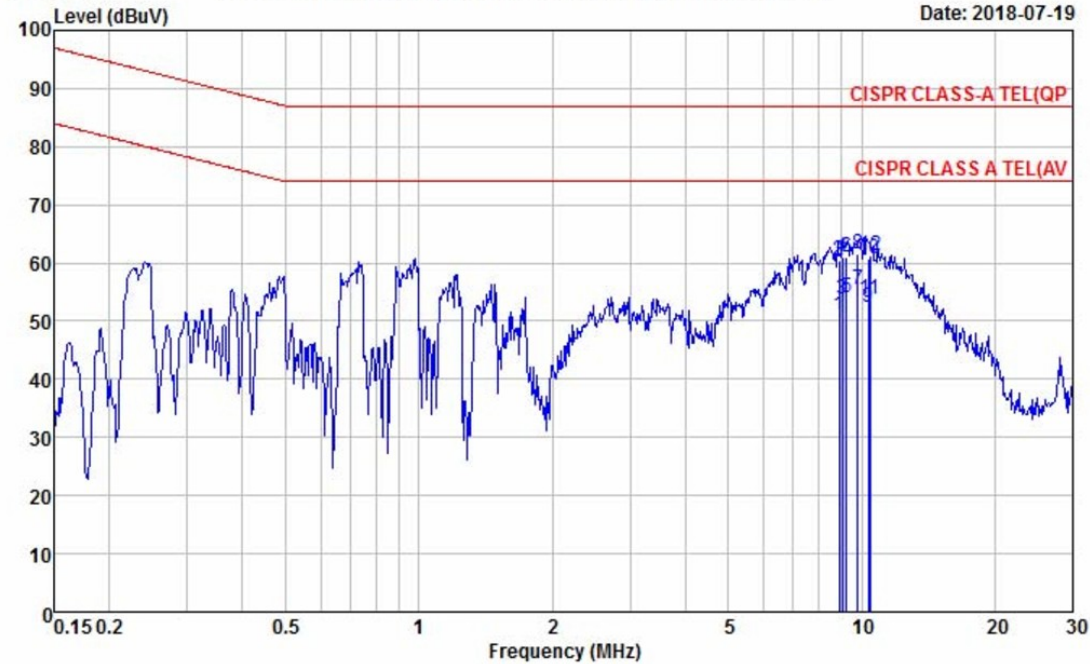
Conducted emissions (TEL_100 M) / Operating mode (PoE)



4, Songjuro 236 Beon-gil, Yangji-myeon
Cheoin-gu, Youngin-si, Gyeonggi-do
449-822 Korea
Tel:+82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. : AL-1112	Phase : TEL_100M
Test Mode : Operating mode(PoE)	Test Power : 230 / 50
Temp. / Humi. : 25 / 52	Test Engineer : BANG Y H

Data: 1585 File: D:\Conducted Data\2018\LTA_Conduction_2018_7.EM6 (1585) Date: 2018-07-19



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV		QP	AV	QP	AV	QP	AV
	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
8.909	40.92	31.26	19.65	60.57	50.91	87.00	74.00	26.43	23.09
9.067	41.32	34.06	19.65	60.97	53.71	87.00	74.00	26.03	20.29
9.236	41.32	34.28	19.66	60.98	53.94	87.00	74.00	26.02	20.06
9.803	41.98	35.66	19.67	61.65	55.33	87.00	74.00	25.35	18.67
10.353	41.03	32.78	19.68	60.71	52.46	87.00	74.00	26.29	21.54
10.451	41.52	34.15	19.68	61.20	53.83	87.00	74.00	25.80	20.17

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	: Operating mode (AC), Operating mode (DC), Operating mode (PoE)
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 : 1.2 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 (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 Emission (Below 1 GHz) / V _ Operating mode (AC)



4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: AL-1112

Temp/Humi: 23 / 49

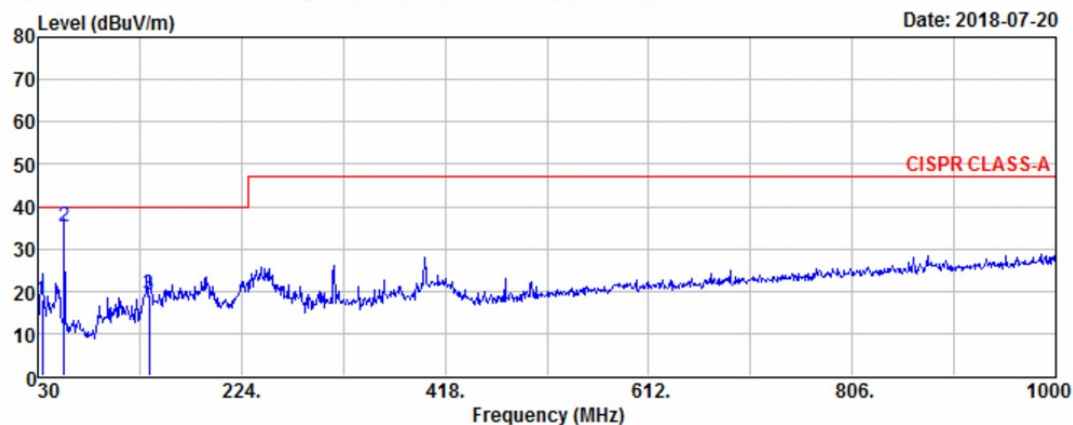
Test Mode : Operating mode(AC)

Tested by: BANG Y H

Data: 1321

File: C:\Program Files (x86)\e3\1807-1.EM6 (1325)

Date: 2018-07-20



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
33.88	37.44	-19.57	17.87	40.00	22.13	100	24	VERTICAL
55.22	53.88	-18.66	35.22	40.00	4.78	100	6	VERTICAL
135.73	36.53	-17.44	19.09	40.00	20.91	100	54	VERTICAL

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

Radiated Emission (Below 1 GHz) / H _ Operating mode (AC)



4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: AL-1112

Temp/Humi: 23 / 49

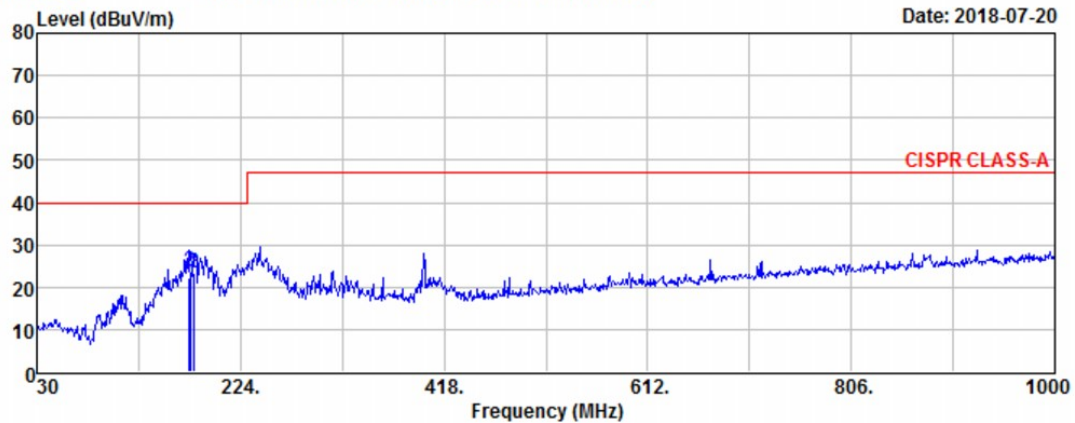
Test Mode : Operating mode(AC)

Tested by: BANG Y H

Data: 1320

File: C:\Program Files (x86)\e3\1807-1.EM6 (1325)

Date: 2018-07-20



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
174.53	39.84	-17.60	22.24	40.00	17.76	218	44	HORIZONTAL
176.47	41.56	-17.80	23.76	40.00	16.24	217	97	HORIZONTAL
180.35	41.63	-18.22	23.41	40.00	16.59	216	84	HORIZONTAL

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

Radiated Emission (Below 1 GHz) / V _ Operating mode (DC)



4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: AL-1112

Temp/Humi: 23 / 49

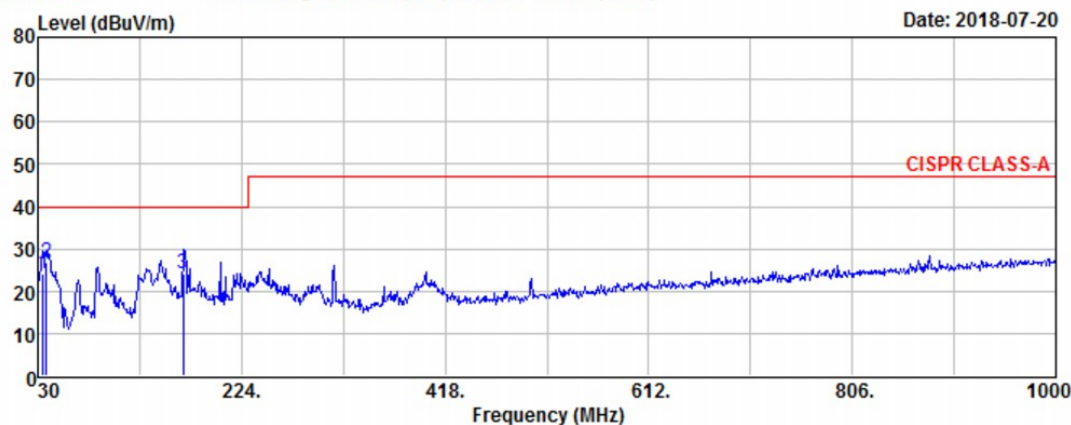
Test Mode : Operating mode

Tested by: BANG Y H

Data: 1289

File: C:\Program Files (x86)\e3\1807-1.EM6 (1289)

Date: 2018-07-20



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
34.85	43.56	-19.48	24.08	40.00	15.92	100	64	VERTICAL
37.76	45.82	-19.20	26.62	40.00	13.38	100	12	VERTICAL
168.71	41.14	-17.13	24.01	40.00	15.99	105	11	VERTICAL

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

Radiated Emission (Below 1 GHz) / H _ Operating mode (DC)



4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: AL-1112

Temp/Humi: 23 / 49

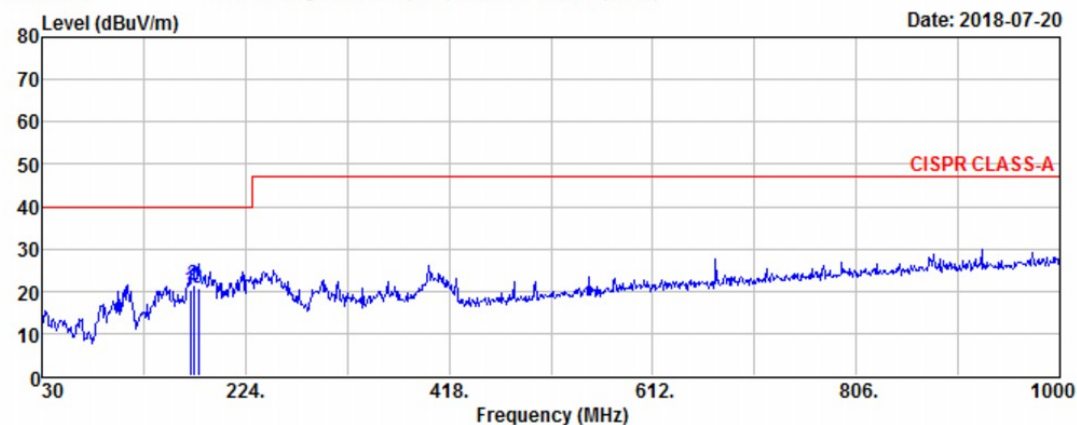
Test Mode : Operating mode(DC)

Tested by: BANG Y H

Data: 1288

File: C:\Program Files (x86)\e3\1807-1.EM6 (1288)

Date: 2018-07-20



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
171.62	37.63	-17.33	20.30	40.00	19.70	216	74	HORIZONTAL
174.53	38.90	-17.60	21.30	40.00	18.70	211	141	HORIZONTAL
179.38	38.60	-18.11	20.49	40.00	19.51	216	84	HORIZONTAL

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

Radiated Emission (Below 1 GHz) / V _ Operating mode (PoE)



4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: AL-1112

Temp/Humi: 23 / 49

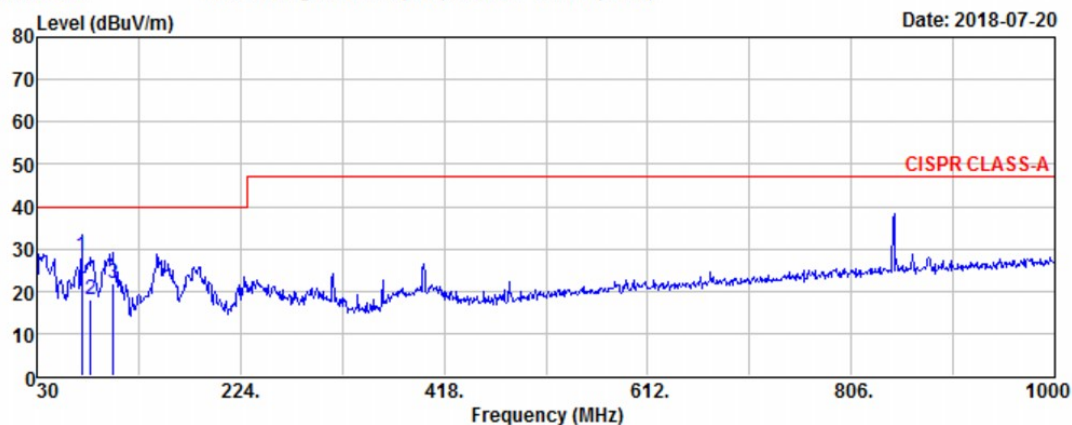
Test Mode : Operating mode(PoE)

Tested by: BANG Y H

Data: 1304

File: C:\Program Files (x86)\e3\1807-1.EM6 (1308)

Date: 2018-07-20



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
72.68	49.44	-21.07	28.37	40.00	11.63	100	2	VERTICAL
81.41	40.94	-22.94	18.00	40.00	22.00	100	360	VERTICAL
102.75	42.27	-20.53	21.74	40.00	18.26	100	64	VERTICAL

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

Radiated Emission (Below 1 GHz) / H _ Operating mode (PoE)



4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: AL-1112

Temp/Humi: 23 / 49

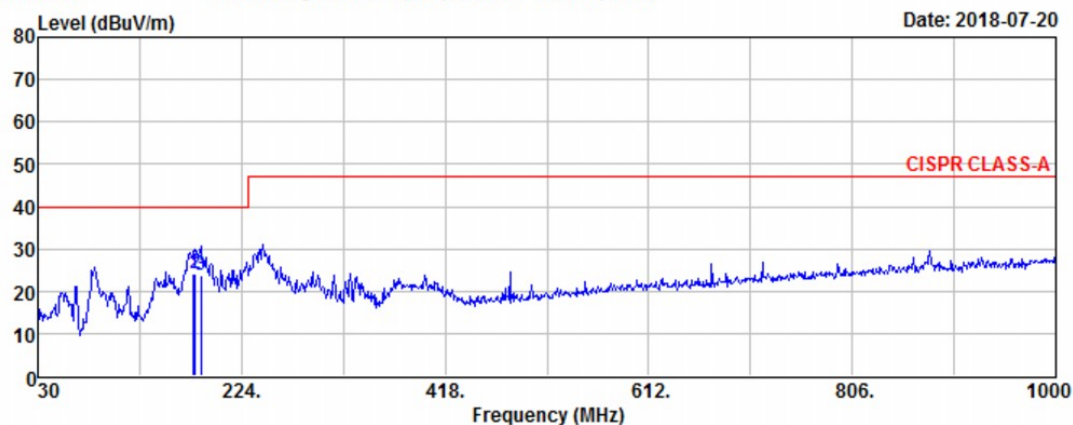
Test Mode : Operating mode(PoE)

Tested by: BANG Y H

Data: 1303

File: C:\Program Files (x86)\e3\1807-1.EM6 (1308)

Date: 2018-07-20



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
178.41	42.24	-18.01	24.23	40.00	15.77	215	44	HORIZONTAL
180.35	42.28	-18.22	24.06	40.00	15.94	168	48	HORIZONTAL
185.20	42.42	-18.74	23.68	40.00	16.32	184	87	HORIZONTAL

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

Radiated Emission (Above 1 GHz) / Operating mode (AC)

EUT/Model No.: AL-1112

Temp/Humi: 23 / 49

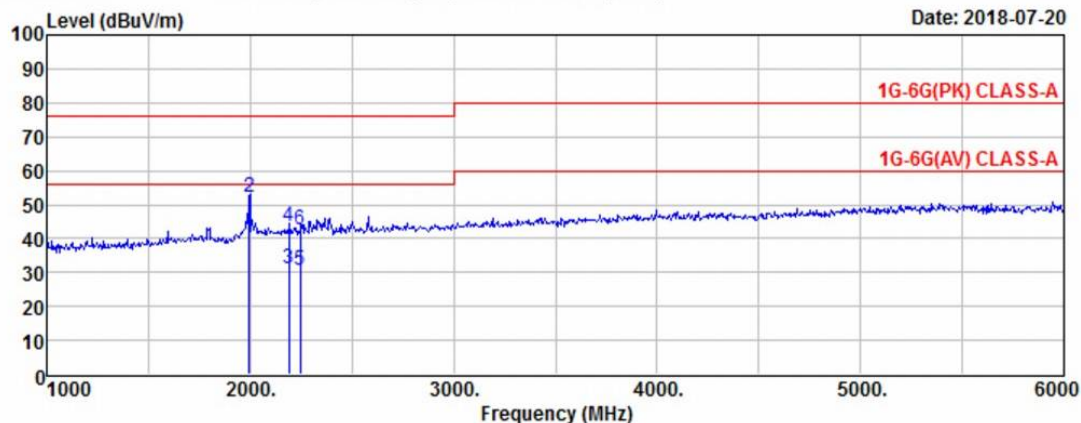
Test Mode : Operating mode(AC)

Tested by: BANG Y H

Data: 1332

File: C:\Program Files (x86)\e3\1807-1.EM6 (1334)

Date: 2018-07-20



EUT/Model No.: AL-1112

Temp/Humi: 23 / 49

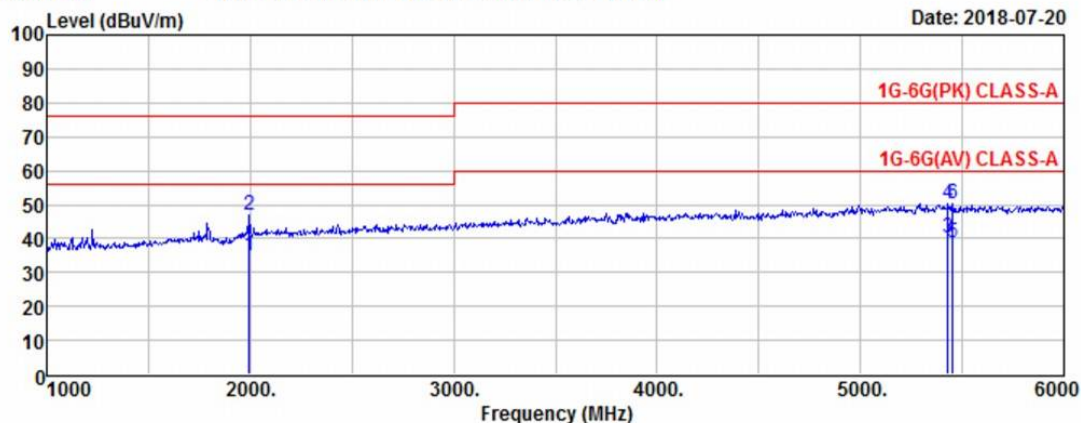
Test Mode : Operating mode(AC)

Tested by: BANG Y H

Data: 1331

File: C:\Program Files (x86)\e3\1807-1.EM6 (1334)

Date: 2018-07-20



Manufacture : IDIS CO., LTD.

Test Date

Temp.: Humidity Distance

[°C]

: [%]

(m)

Model : AL-1112

2018-07-20

23

49

3.8

TEST mode : Operating mode(AC)

Ver Data: 1332

Hor Data: 1331

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
1995.0	47.1	35.0	1.78	48.91	36.80	76.0	56.0	27.09	19.20	100	57	H
5430.0	36.4	26.3	15.82	52.26	42.10	80.0	60.0	27.74	17.90	100	43	H
5455.0	36.4	24.9	15.86	52.27	40.80	80.0	60.0	27.73	19.20	100	64	H
1995.0	52.5	40.3	1.78	54.23	42.07	76.0	56.0	21.77	13.93	100	87	V
2190.0	42.9	30.6	2.55	45.41	33.15	76.0	56.0	30.59	22.85	100	17	V
2245.0	41.8	29.8	2.68	44.45	32.45	76.0	56.0	31.55	23.55	100	14	V

Radiated Emission (Above 1 GHz) / Operating mode (DC)

EUT/Model No.: AL-1112

Temp/Humi: 23 / 49

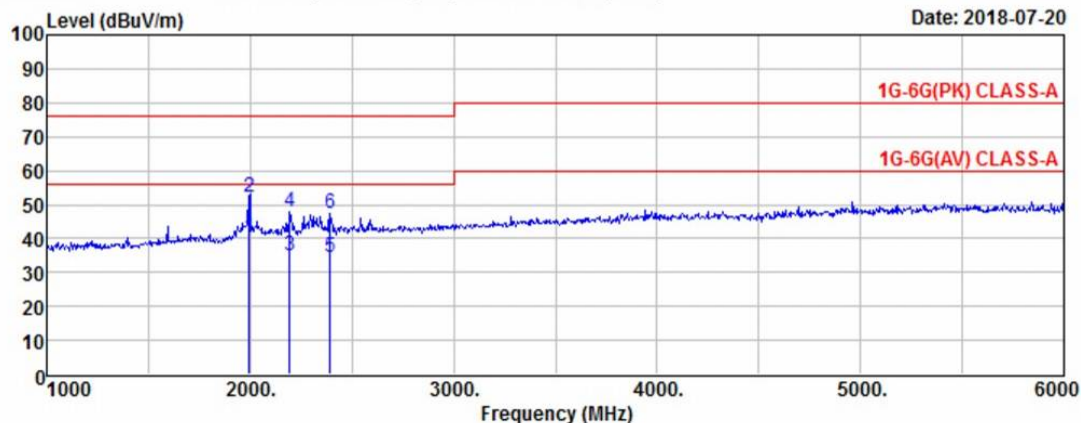
Test Mode : Operating mode(DC)

Tested by: BANG Y H

Data: 1296

File: C:\Program Files (x86)\e3\1807-1.EM6 (1297)

Date: 2018-07-20



EUT/Model No.: AL-1112

Temp/Humi: 23 / 49

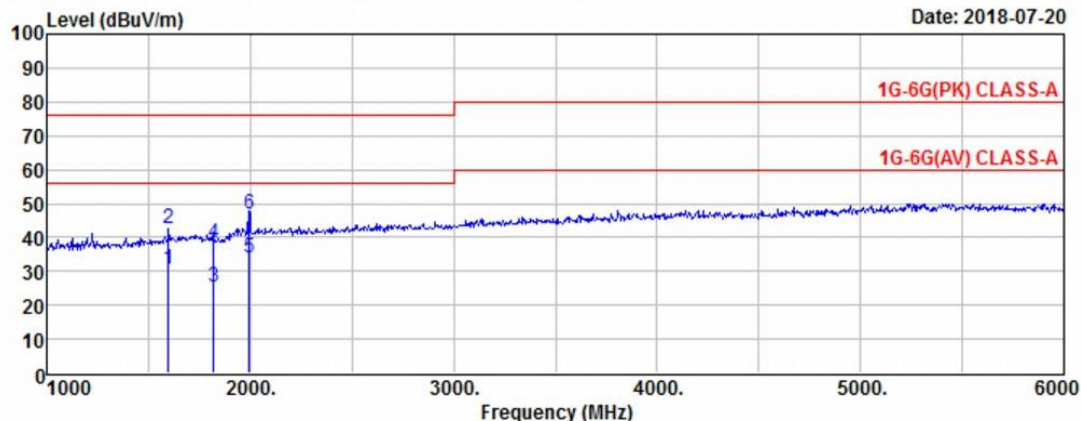
Test Mode : Operating mode(DC)

Tested by: BANG Y H

Data: 1297

File: C:\Program Files (x86)\e3\1807-1.EM6 (1297)

Date: 2018-07-20



Manufacture : IDIS CO., LTD.

Test Date

Temp.: Humidity Distance

[°C] : [%] (m)

Model : AL-1112

2018-07-20

23

49

3.8

TEST mode : Operating mode(DC)

Ver Data: 1296

Hor Data: 1297

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
1600.0	46.7	34.4	-1.80	44.86	32.64	76.0	56.0	31.14	23.36	100	164	H
1820.0	40.0	27.0	0.52	40.49	27.56	76.0	56.0	35.51	28.44	100	57	H
1995.0	47.3	34.3	1.78	49.11	36.08	76.0	56.0	26.89	19.92	100	14	H
1995.0	52.6	40.3	1.78	54.41	42.07	76.0	56.0	21.59	13.93	100	47	V
2195.0	47.3	34.3	2.54	49.88	36.84	76.0	56.0	26.12	19.16	100	164	V
2395.0	45.8	32.5	3.75	49.51	36.29	76.0	56.0	26.49	19.71	100	14	V

Radiated Emission (Above 1 GHz) / Operating mode (PoE)

EUT/Model No.: AL-1112

Temp/Humi: 23 / 49

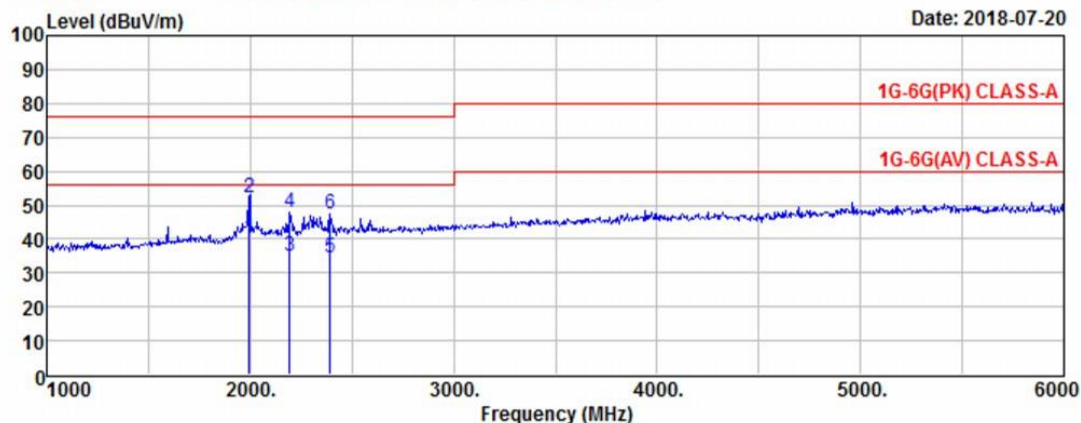
Test Mode : Operating mode(DC)

Tested by: BANG Y H

Data: 1296

File: C:\Program Files (x86)\e3\1807-1.EM6 (1297)

Date: 2018-07-20



EUT/Model No.: AL-1112

Temp/Humi: 23 / 49

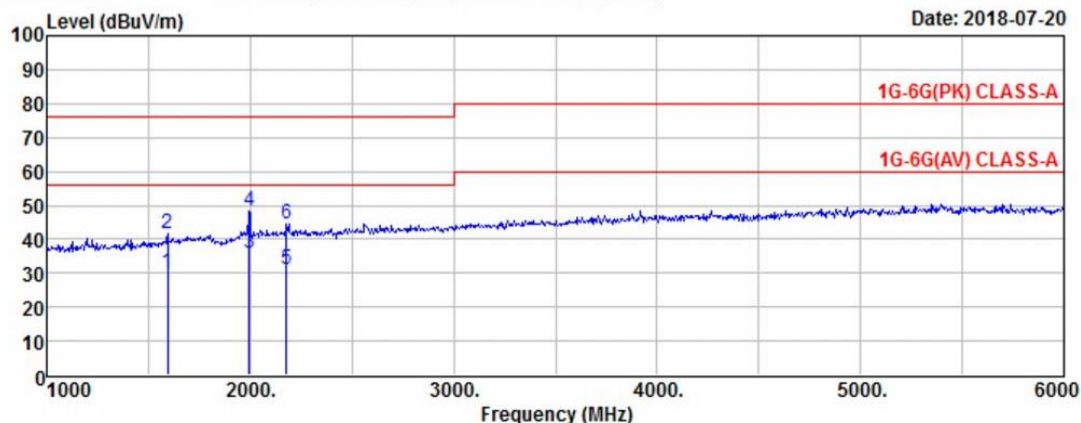
Test Mode : Operating mode(PoE)

Tested by: BANG Y H

Data: 1312

File: C:\Program Files (x86)\e3\1807-1.EM6 (1315)

Date: 2018-07-20



Manufacture : IDIS CO., LTD.

Test Date

Temp.: Humidity Distance

[°C] : [%] (m)

2018-07-20

23

49

3.8

Model : AL-1112

TEST mode : Operating mode(POE)

Ver Data: 1296

Hor Data: 1312

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
1595.0	45.7	34.1	-1.82	43.89	32.24	76.0	56.0	32.11	23.76	100	54	H
1995.0	48.7	36.3	1.78	50.50	38.07	76.0	56.0	25.50	17.93	100	14	H
2180.0	44.0	30.6	2.56	46.53	33.11	76.0	56.0	29.47	22.89	100	164	H
1795.0	43.7	30.5	0.34	44.08	30.85	76.0	56.0	31.92	25.15	100	54	V
1995.0	53.7	41.3	1.78	55.43	43.07	76.0	56.0	20.57	12.93	100	14	V
2190.0	46.4	34.3	2.55	48.91	36.81	76.0	56.0	27.09	19.19	100	164	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	: Operating mode (AC), Operating mode (DC)
Rated power	: 8.870 W (Operating mode (AC)) 5.414 W (Operating mode (DC))
Result	: Not Applicable

Measurement Data:

- We did not test EN61000-3-2 (Harmonic current emissions) for the AL-1112 because equipment whose rated power is less or equal 75W don't need to be tested.

Harmonic Current (AC power input port) / Operating mode (AC)

23rd July 2018 - 09:41:25		Page 1/1	IECSoft v2_5a
 BSEN61000-3-2:2014 Fluctuating Harmonics			
Instrument Details			
Instrument Model	PPA5511		
Serial Number	162-04957		
Firmware Version	2.168		
N4L Calibration Date	18th September 2017		
Instrument Version	Standard		
Test Settings			
Class	Class A		
Mode	Measured		
Equipment Under Test			
Brand	IDIS CO., LTD.		
Model	AL-1112		
Serial	N/A		
Impedance Network ID	N/A		
Test Conditions			
	User Entered	Measured	
Rated Voltage	N/A	230.943V	
Rated Current	N/A	76.566mA	
Rated Frequency	N/A	50.000Hz	
Rated Power	N/A	8.870W	
Additional Test Information			
Measured Power Factor	0.502		
Max Current THD	65.05%		
Max THC	44.638mA		
Max Power	8.951W		
Max F.Current	69.909mA		
Average F.Current	69.144mA		
Minimum Current	100A		
Test Duration	2.5 minutes		
Additional Test Details			
Operator	N/A		
Lab Name	N/A		
Location	N/A		
Notes			
Signature			
Results	Test - N/A. Rated Power < 75W		

Test not applicable

With the exception of lighting equipment section 7 of the BSEN61000-3-2:2014 standard declares that no Harmonic current limits are specified for equipment with a rated power of

Harmonic Current (AC power input port) / Operating mode (DC)

23rd July 2018 - 10:04:25		Page 1/1	IECSoft v2_5a
		BSEN61000-3-2:2014 Fluctuating Harmonics	
Instrument Details			
Instrument Model	PPA5511		
Serial Number	162-04957		
Firmware Version	2.168		
N4L Calibration Date	18th September 2017		
Instrument Version	Standard		
Test Settings			
Class	Class A		
Mode	Measured		
Equipment Under Test			
Brand	IDIS CO., LTD.		
Model	AL-1112		
Serial	N/A		
Impedance Network ID	N/A		
Test Conditions			
	User Entered	Measured	
Rated Voltage	N/A	230.952V	
Rated Current	N/A	56.160mA	
Rated Frequency	N/A	50.000Hz	
Rated Power	N/A	5.414W	
Additional Test Information			
Measured Power Factor	0.417		
Max Current THD	312.99%		
Max THC	60.217mA		
Max Power	5.539W		
Max F.Current	24.529mA		
Average F.Current	23.540mA		
Minimum Current	100A		
Test Duration	2.5 minutes		
Additional Test Details			
Operator	N/A		
Lab Name	N/A		
Location	N/A		
Notes			
Signature			
Results	Test - N/A. Rated Power < 75W		

Test not applicable

With the exception of lighting equipment section 7 of the BSEN61000-3-2:2014 standard declares that no Harmonic current limits are specified for equipment with a rated power of

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	: Operating mode (AC), Operating mode (DC)
Result	: Complies

Measurement Data:

- Refer to the Next page

Voltage Variation and Flicking (AC power input port) / Operating mode (AC)

23rd July 2018 - 09:48:20		Page 1/2	IECSoft v2_5a
		IEC61000-3-3:2013 Ed.3.0 Flickermeter	
Instrument Details			
Instrument Model	PPA5511		
Serial Number	162-04957		
Firmware Version	2.168		
N4L Calibration Date	18th September 2017		
Instrument Version	Standard		
Test Settings			
Class	Voltage		
Mode	Normal (4%)		
Minimum Current	10A		
PST	10.00 minutes		
PLT	1 PSTs		
Equipment Under Test			
Brand	IDIS CO., LTD.		
Model	AL-1112		
Serial	N/A		
Impedance Network ID	N/A		
Test Conditions			
	User Entered	Measured	
Rated Voltage	N/A	230.931V	
Rated Current	N/A	N/A	
Rated Frequency	N/A	50.000Hz	
Rated Power	N/A	N/A	
D max	0.0628% (Limit: 4.0%)		
T max	0.0000 s (Limit: 0.5 s)		
DC max	0.0081% (Limit: 3.3%)		
Additional Test Details			
Operator	N/A		
Lab Name	N/A		
Location	N/A		
Notes			
Signature			
Results	Phase1: PASS		

23rd July 2018 - 09:48:20			Ph:1 Page 2/2			IECSoft v2_5a		
IEC61000-3-3:2013 Ed.3.0 Flickermeter								
Instrument Details								
Instrument Model			PPA5511					
Instrument Serial			162-04957					
Instrument Firmware			2.168					
Equipment Under Test								
Brand			IDIS CO., LTD.					
Model			AL-1112					
Serial			N/A					
Flicker Test Results								
PST no.	Status	DC (%)	Dmax (%)	Tmax (s)	PST	PST Lim	PLT	PLT Lim
1	Phase1: PASS	0.008	0.06281	0	0.082	1.00	0.082	0.65

Voltage Variation and Flicking (AC power input port) / Operating mode (DC)

23rd July 2018 - 10:27:57		Page 1/2	IECSoft v2_5a
		IEC61000-3-3:2013 Ed.3.0 Flickermeter	
Instrument Details			
Instrument Model	PPA5511		
Serial Number	162-04957		
Firmware Version	2.168		
N4L Calibration Date	18th September 2017		
Instrument Version	Standard		
Test Settings			
Class	Voltage		
Mode	Normal (4%)		
Minimum Current	10A		
PST	10.00 minutes		
PLT	1 PSTs		
Equipment Under Test			
Brand	IDIS CO., LTD.		
Model	AL-1112		
Serial	N/A		
Impedance Network ID	N/A		
Test Conditions			
	User Entered	Measured	
Rated Voltage	N/A	230.958V	
Rated Current	N/A	N/A	
Rated Frequency	N/A	50.000Hz	
Rated Power	N/A	N/A	
D max	0.0724% (Limit: 4.0%)		
T max	0.0000 s (Limit: 0.5 s)		
DC max	0.0021% (Limit: 3.3%)		
Additional Test Details			
Operator	N/A		
Lab Name	N/A		
Location	N/A		
Notes			
Signature			
Results	Phase1: PASS		

23rd July 2018 - 10:27:57			Ph:1 Page 2/2			IECSoft v2_5a		
IEC61000-3-3:2013 Ed.3.0 Flickermeter								
Instrument Details								
Instrument Model		PPA5511						
Instrument Serial		162-04957						
Instrument Firmware		2.168						
Equipment Under Test								
Brand		IDIS CO., LTD.						
Model		AL-1112						
Serial		N/A						
Flicker Test Results								
PST no.	Status	DC (%)	Dmax (%)	Tmax (s)	PST	PST Lim	PLT	PLT Lim
1	Phase1: PASS	0.002	0.07236	0	0.082	1.00	0.082	0.65

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	: 2018.07.13.
Test method	: EN 61000-4-2 :2009
Temperature / Humidity / Pressure	: 24 °C / 59 % R.H. / 100 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	: Operating mode (AC), Operating mode (DC), Operating mode (PoE)
Result	: Complies

Measurement Data:

- Refer to the Next page

MODE : Operating mode (AC), Operating mode (DC), Operating mode (PoE))

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

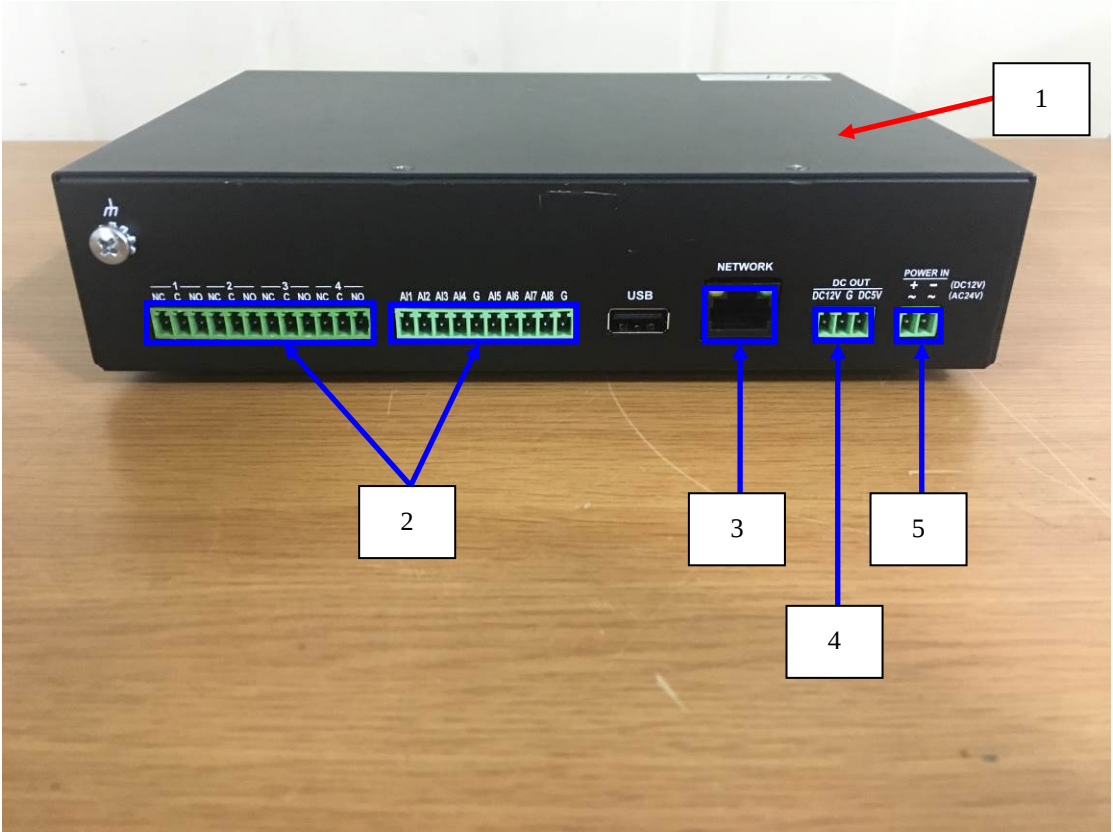
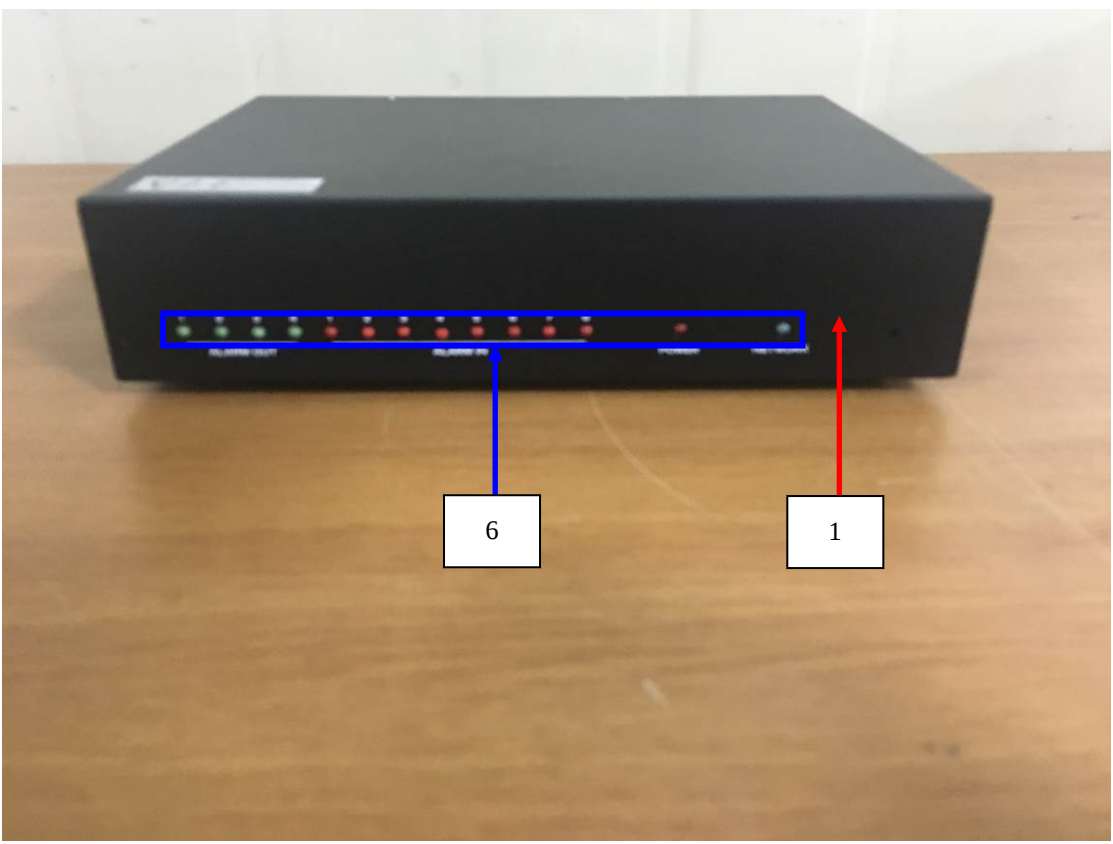
1-2. Direct Discharge

No.	Position	Kind of Discharge	Result	Remarks
1	Enclosure	Contact	Complies (A)	No reaction recognized
2	Alarm IN/OUT	Air	Complies (A)	No reaction recognized
3	LAN	Air	Complies (A)	No reaction recognized
4	DC OUT	Air	Complies (A)	No reaction recognized
5	POWER IN	Air	Complies (A)	No reaction recognized
6	LED	Air	Complies (A)	No reaction recognized

※ Results are complies in each test mode.

- ← 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	:	2018.07.15.
Test method	:	EN 61000-4-3:2006/A1:2008/A2:2010
Temperature / Humidity / Pressure	:	26 °C / 50 % 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 (AC), Operating mode (DC), Operating mode (PoE)
Result	:	Complies

Measurement Data:

MODE : Operating mode (AC)

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

MODE : Operating mode (DC)

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

MODE : Operating mode (PoE)

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

※ Results are complies in each test mode.

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	:	2018.07.16.
Test method	:	EN 61000-4-4:2012
Temperature / Humidity / Pressure	:	27 °C / 35 % R.H. / 100 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 (AC), Operating mode (DC), Operating mode (PoE)
Result	:	Complies

Measurement Data:

MODE : Operating mode (AC)

AC power Line	Test level	Result	Remarks
L – N	± 2 kV	Complies (A)	No reaction recognized

Signal Line	Test level	Result	Remarks
LAN	± 1 kV	Complies (A)	No reaction recognized

MODE : Operating mode (DC)

AC power Line	Test level	Result	Remarks
L – N	± 2 kV	Complies (A)	No reaction recognized

Signal Line	Test level	Result	Remarks
LAN	± 1 kV	Complies (A)	No reaction recognized

MODE : Operating mode (PoE)

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

※ Results are complies in each test mode.

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	:	2018.07.17.
Test method	:	EN 61000-4-5:2014
Temperature / Humidity / Pressure	:	27 °C / 40 % R.H. / 100 kPa
Test level	:	± 0.5 kV, ±1 kV (line to line) ± 0.5 kV, ± 1 kV, ± 2 kV (line to ground), ± 0.5 kV, ± 1 kV (signal line)
Polarity	:	Negative/ positive
Wave shape	:	1.2/ 50 µs pulse
Number of surges	:	5 (at each phase)
Test mode		Operating mode (AC), Operating mode (DC)
Result	:	Complies

Measurement Data:

MODE : Operating mode (AC)

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

MODE : Operating mode (DC)

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

※ Results are complies in each test mode.

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	:	2018.07.18.
Test method	:	EN 61000-4-6:2014/AC:2015
Temperature / Humidity / Pressure	:	27 °C / 50 % R.H. / 100 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	:	Operating mode (AC), Operating mode (DC), Operating mode (PoE)
Result	:	Complies

Measurement Data:

MODE : Operating mode (AC)

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

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

MODE : Operating mode (DC)

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

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

MODE : Operating mode (PoE)

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

※ Results are complies in each test mode.

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	:	2018.07.20.
Test method	:	EN 61000-4-11:2004/A1:2017
Temperature / Humidity / Pressure	:	24 °C / 50 % R.H. / 101 kPa
Ut	:	230 Vac
Test mode	:	Operating mode (AC), Operating mode (DC)
Result	:	Complies

Measurement Data:

MODE : Operating mode (AC)

Test Level %Ut	Voltage droop and interruptions %Ut	Duration of Reduction (period)	Result	Remarks
80	20	250	Complies (A)	No reaction recognized
70	30	25	Complies (A)	No reaction recognized
40	60	10	Complies (A)	No reaction recognized
0	100	250	Complies (B)	EUT OFF during the test. Automatic replay without user's control. After the test, EUT was operated normally.

MODE : Operating mode (DC)

Test Level %Ut	Voltage droop and interruptions %Ut	Duration of Reduction (period)	Result	Remarks
80	20	250	Complies (A)	No reaction recognized
70	30	25	Complies (A)	No reaction recognized
40	60	10	Complies (A)	No reaction recognized
0	100	250	Complies (B)	EUT OFF during the test. Automatic replay without user's control. After the test, EUT was operated normally.

※ Results are complies in each test mode.

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	:	2018.07.20.
Test method	:	EN 50130-4:2011/A1:2014
Temperature / Humidity / Pressure	:	24 °C / 50 % R.H. / 101 kPa
Supply Voltage maximum	:	$U_{nom} + 10 \%$
Supply Voltage minimum	:	$U_{nom} - 15 \%$
Ut	:	230 Vac
Test mode	:	Operating mode (AC), Operating mode (DC)
Result	:	Complies

Measurement Data:

U_{nom} = Nominal mains voltage. Where provision is made to adapt the equipment to suit a number of nominal supply voltages (e.g. by transformer tap changing), the above conditioning severity shall be applied for each nominal voltage, with the equipment suitably adapted. For equipment which is claimed to be suitable for a range of nominal mains voltages (e.g. 220/240 V) without adaptation, $U_{max} = (\text{Maximum } U_{nom}) + 10 \%$, and $U_{min} = (\text{Minimum } U_{nom}) - 15 \%$. In any case the range of U_{nom} must include the European nominal mains voltage of 230 V.

2 Mains supply voltage variations

MODE : Operating mode (AC)

230 V, 50 Hz

Test LevelCondition		Test Level (V)	Result	Remarks
Unom	+10%	253	Complies (A)	No reaction recognized
Unom	-15%	195.5	Complies (A)	No reaction recognized

MODE : Operating mode (DC)

230 V, 50 Hz

Test LevelCondition		Test Level (V)	Result	Remarks
Unom	+10%	253	Complies (A)	No reaction recognized
Unom	-15%	195.5	Complies (A)	No reaction recognized

※ Results are complies in each test mode.

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	2019.07.11	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	-	-	-

Harmonic Current / Voltage Variation and Flicking

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Precision Power Analyzer	PPA551	Newtons4th Ltd	162-04957	2018.09.18	1 year
☒	Reference Impedance Network	ES4152	NF Corp.	9074424	2018.09.07	1 year

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 MHz ~ 3 GHz)	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

Surge

	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
☐	CDN	CNV508N1	EMTEST	P1623180335	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

Mains supply voltage dips, short interruptions

	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

Mains supply voltage variations

	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

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 / 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

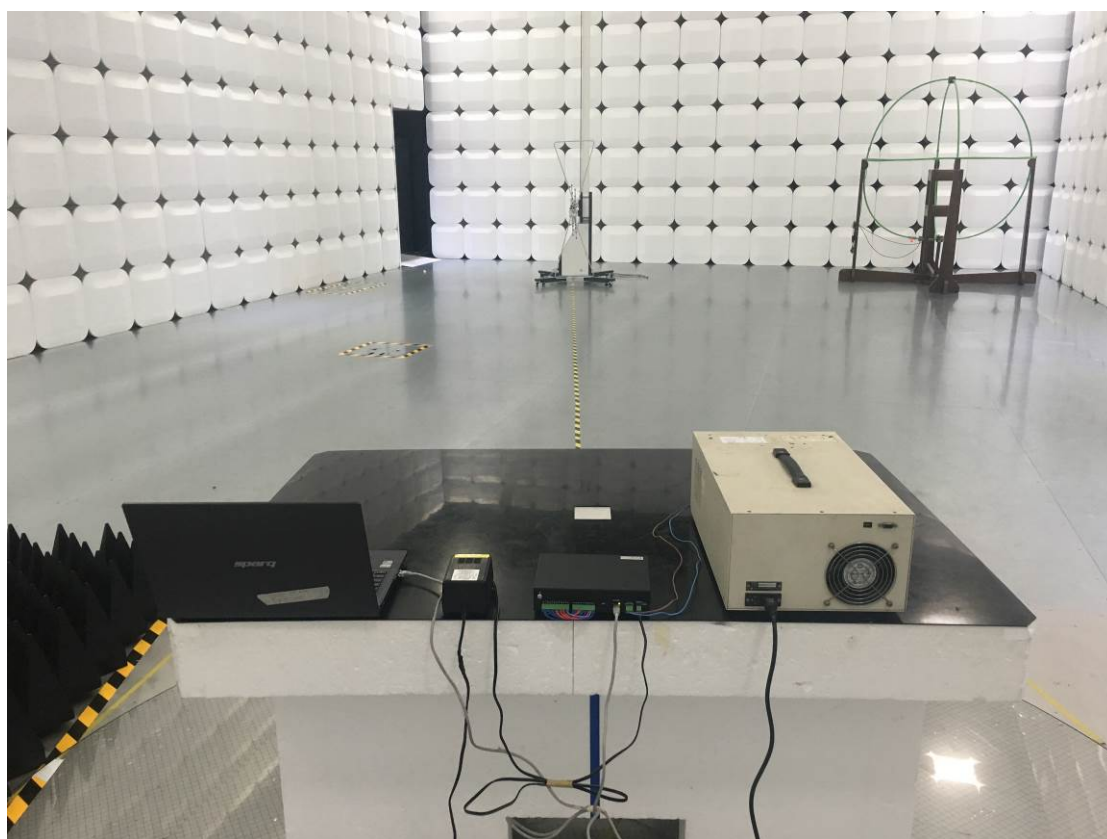
Conducted emission (Maximum emission configuration)



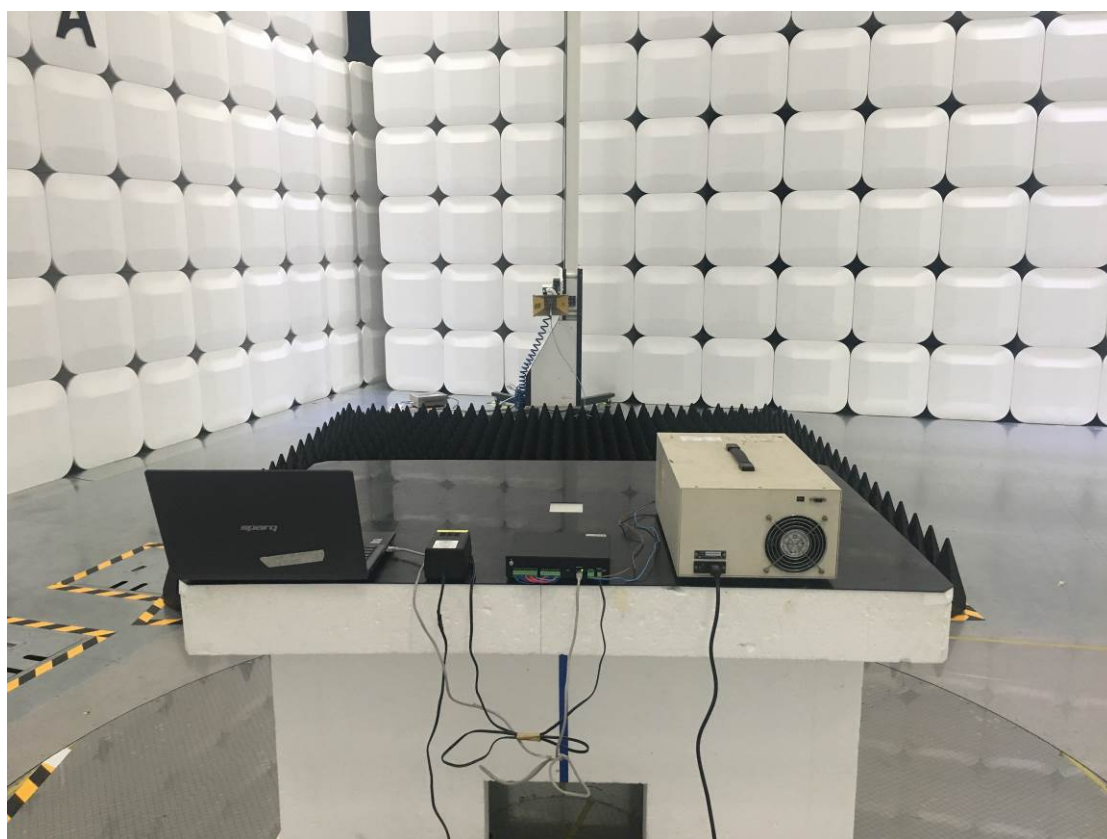
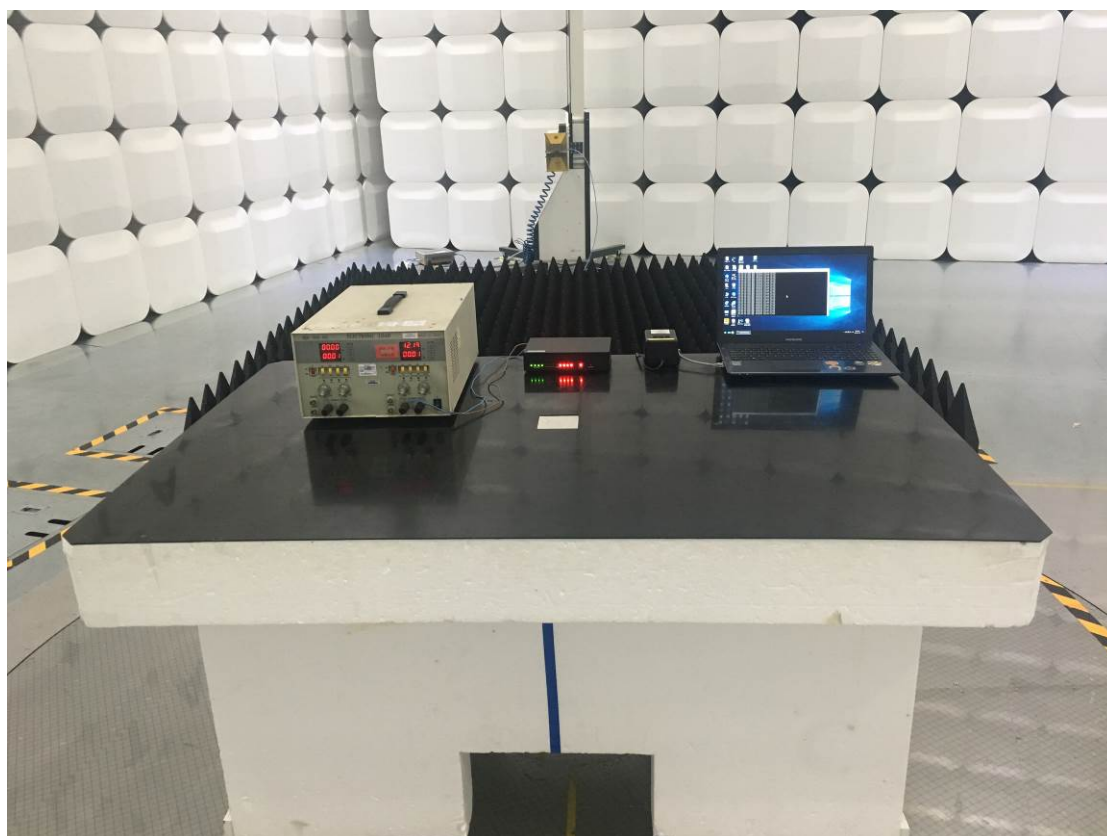
Conducted emission (Maximum emission configuration) _ TEL



Radiated emission (Maximum emission configuration)-Below 1 GHz



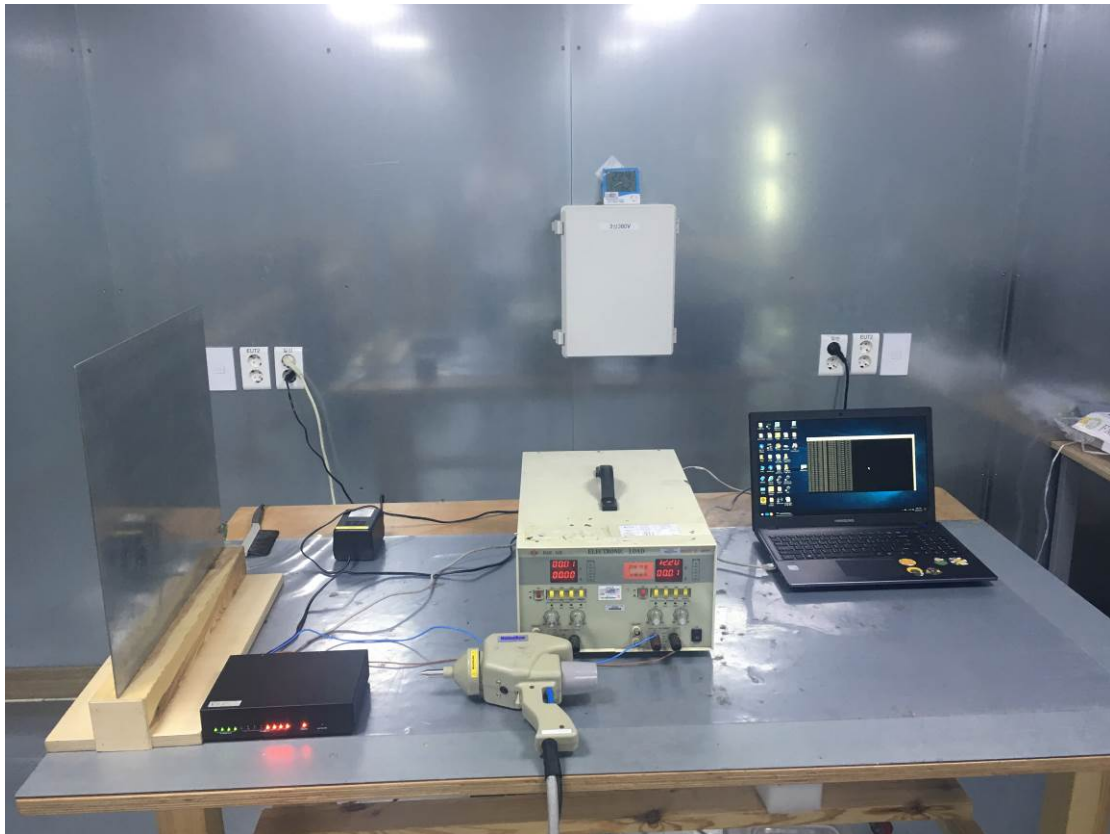
Radiated emission (Maximum emission configuration) – Above 1GHz



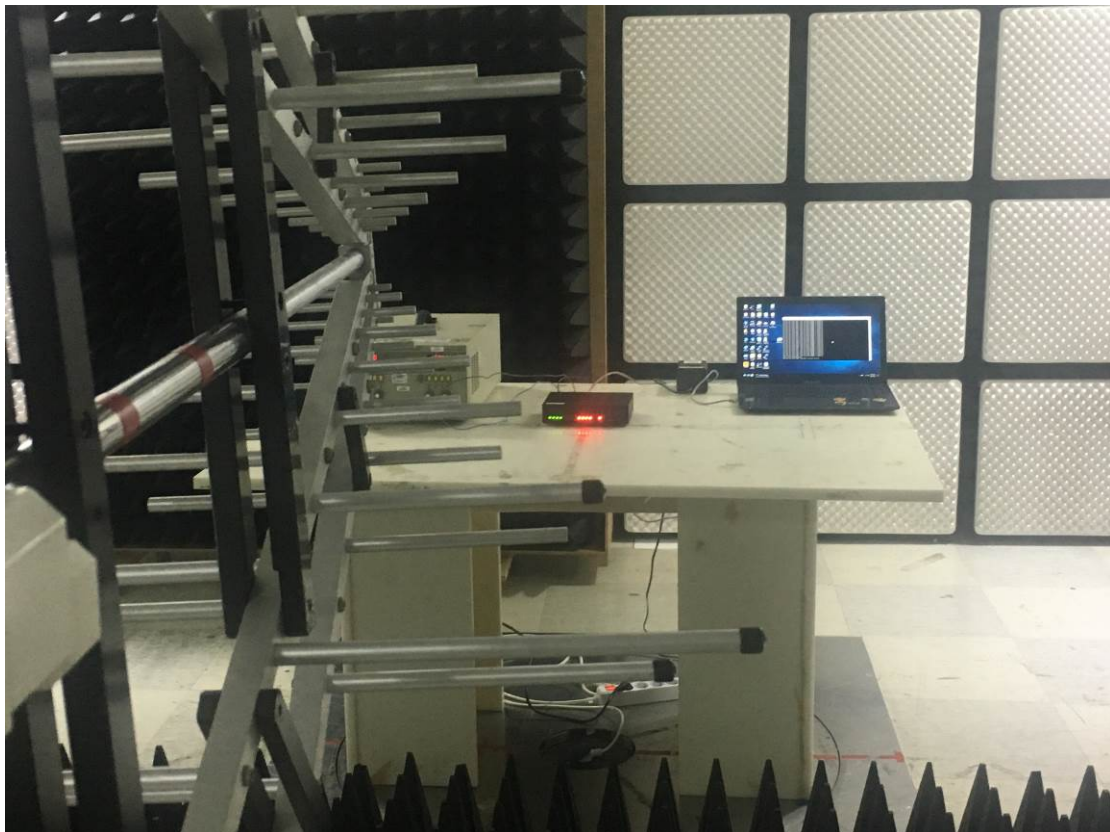
Harmonic Current / Voltage Variation and Flicking



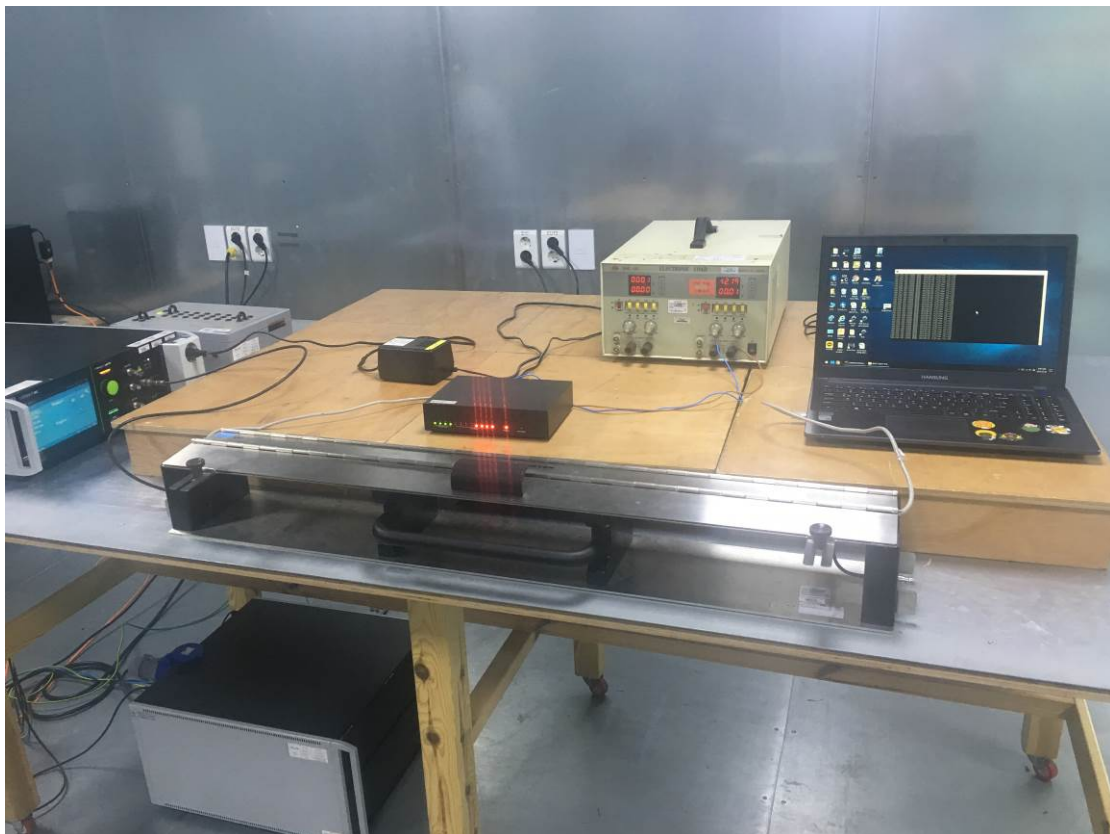
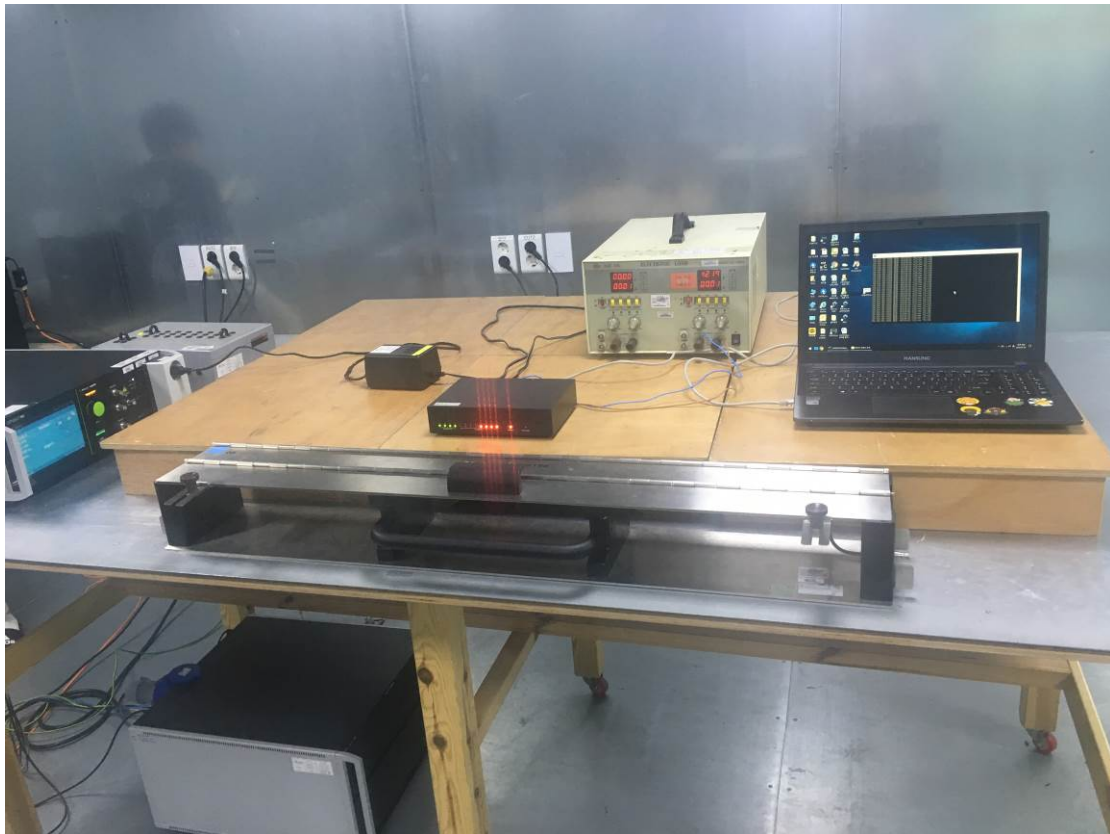
Electrostatic discharge



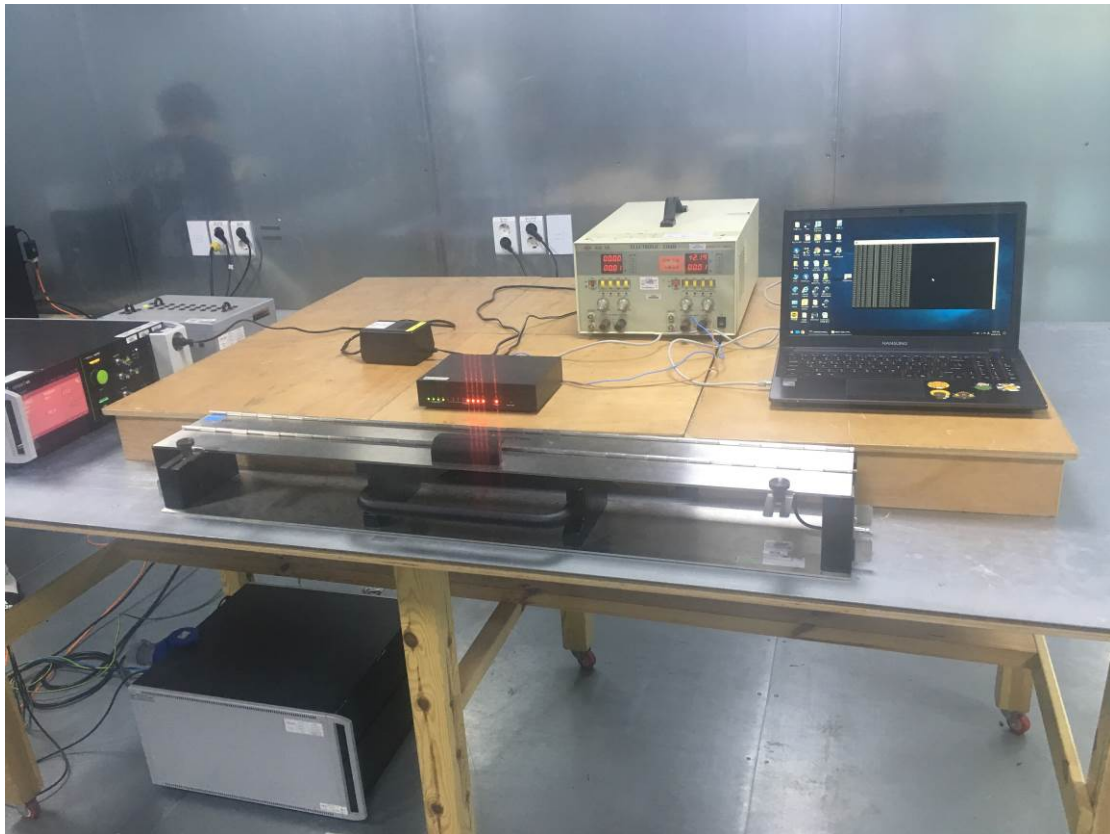
RF Electromagnetic Field



Electrical fast transients



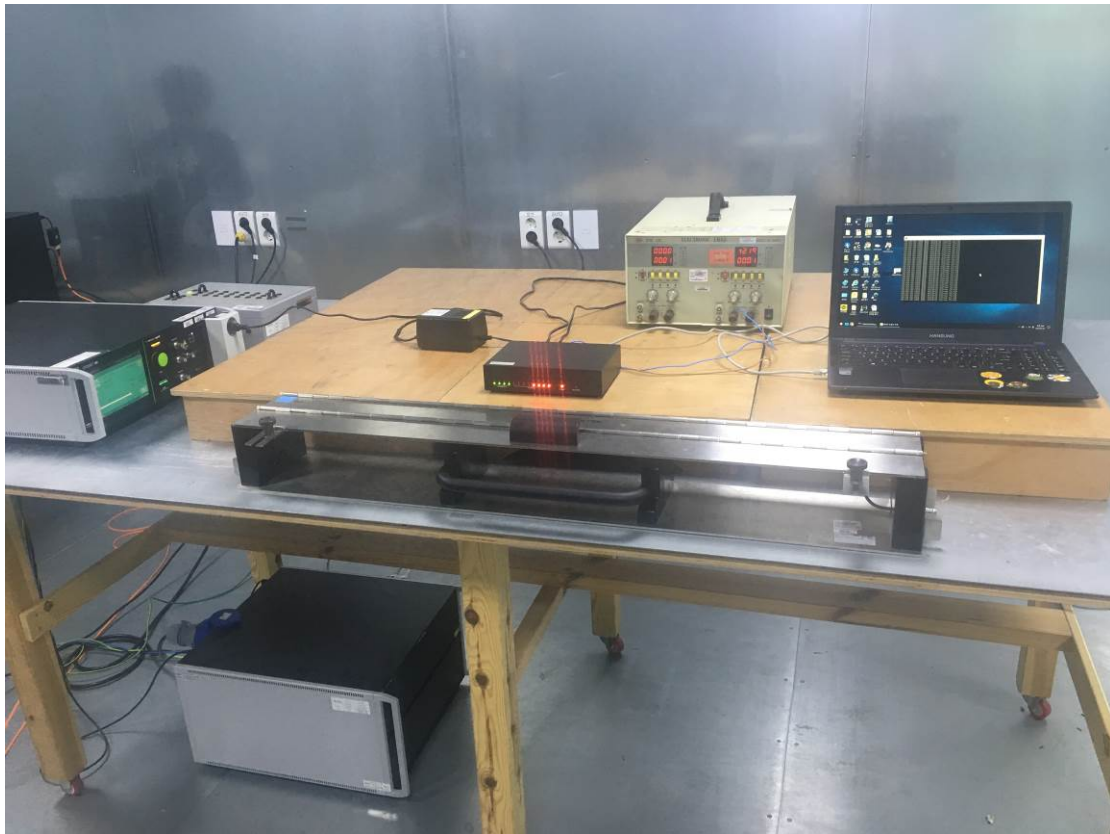
Surge



Conducted Disturbances, Induced by Radio-Frequency Fields



Main supply voltage dips, short interruptions



EUT



EUT

