LTA
Laboratory for Test & Approval Co., Ltd.
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http://www.ltalab.com

EMC TEST REPORT

Dates of Tests: July 04 - 06, 2018
Test Report S/N: LR500121807L
Test Site : LTA Co., Ltd.

Model No. **HIGEN3+**

APPLICANT **KYK CO.,LTD**

Equipment name	:	**Hydrogen Water Generator**
Manufacturer	:	**KYK CO.,LTD**
Model name	:	**HIGEN3+**
Test Device Serial No.:	:	**Identification**
Directive	:	**Electromagnetic Compatibility Directive 2014/30/EU**
Rule Part(s)	:	**EN 55014-1:2006/A1:2009/A2:2011**
		EN 55014-2:2015
		EN 61000-3-2:2014
		EN 61000-3-3:2013
Data of issue	:	**July 11, 2018**

This test report is issued under the authority of:

Young Kyu Shin, Technical Manager

The test was supervised by:

Min Young Choi, 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 history

Revision	Date of issue	Test report No.	Description
0	11.07.2018	LR500121807L	Initial

TABLE OF CONTENTS

1. General information's

1-1 Test Performed

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

Address : 243 Jugub-ri, Yangji-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do 449-822, Korea

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Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competents of calibration and testing laboratory".

1-2 Accredited agencies

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

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	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, 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	:	KYK Co.,Ltd.
Address	:	555, Dunchon-daero, Jungwon-gu, Seongnam-si, Gyeonggi-do, Korea
Telephone / Facsimile	:	+82-31-777-3939

2-2 Equipment Under Test (EUT)

EMS classification	:	Category II
Equipment name	:	Hydrogen Water Generator
Model name	:	HIGEN3+
Serial number	:	Identification
Date of receipt	:	May 08, 2018
EUT condition	:	Pre-production, not damaged
Interface ports	:	AC IN
Power Source	:	AC 230 V, 50 Hz

2-3 Modification

-NONE

2-4 Model Specification

- NONE

2-5 Test conditions

Temp. / Humid. / Pressure	:	+(20 - 24) ℃ / (40 - 49) % RH / (100) kPa
Tested Model	:	HIGEN3+
Tested Mode	:	Operating mode Operating mode 1 means strong Hydrogen water mode Operating mode 2 means Ozone water mode Operating mode 3 means Purified mode Operating mode 4 means Clean mode
Power supply	:	AC 230 V, 50 Hz

2-6 EUT

Equipment name	Model No.	Serial No.	Manufacturer
Hydrogen Water Generator	**HIGEN3+**	**N/A**	**KYK CO.,LTD**

2-7 Accessory

Equipment name	Model No.	Serial No.	Manufacturer
Motor	BT-20	N/A	Phil Green

2-8 Cable List

From		To		Length	Shielding	
Type	**I/O Port**	**Type**	**I/O Port**	**(m)**	**Cable**	**backshell**
EUT	AC IN	AC Power Source	3 Pin AC Line	1.5	NO	Plastic
Motor	AC IN	AC Power Source	2 Pin AC Line	1.0	NO	Plastic

3. Test Report

3.1 Summary of tests

Parameter	Applied Standard	Status
I. Emission		
Conducted emission	EN 55014-1:2006/A1:2009/A2:2011	C
Discontinuous Disturbance Voltage	EN 55014-1:2006/A1:2009/A2:2011	C
Disturbance Power	EN 55014-1:2006/A1:2009/A2:2011	C
Radiated Emission	EN 55014-1:2006/A1:2009/A2:2011	NA
Harmonic Current emission	EN 61000-3-2:2014	NA Note 5
Voltage fluctuations and flicker	EN 61000-3-3:2013	C
II. Immunity		
Electrostatic Discharge	EN 61000-4-2:2009	C Note 3
RF Electromagnetic field (80 MHz to 1 GHz)	EN 61000-4-3:2006/A1:2008/A2:2010	C Note 3
Fast Transients Common mode	EN 61000-4-4:2012	C Note 3
Surges, line to line and line to ground	EN 61000-4-5:2014	C Note 3
RF common mode 0.15 MHz to 80 MHz	EN 61000-4-6:2014/AC:2015	NA Note 2
RF common mode 0.15 MHz to 230 MHz	EN 61000-4-6:2014/AC:2015	C Note 3
Voltage dips and Interruptions	EN 61000-4-11:2004	C Note 3

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

Note 2: The device operated by AC 230 V

Note 3: Category II

Category II apparatus shall fulfil the following requirements:
- electrostatic discharge with performance criterion B
- fast transients with performance criterion B
- injected currents up to 230 MHz with performance criterion A
- surges with performance criterion B
- voltage dips and interruptions with performance criterion C

Note 4: The data in this test report are traceable to the national or international standards.

Note 5: We did not test EN61000-3-2 (Harmonic current emissions) for the HIGEN3+ 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.

Test method	:	EN 55014-1:2006/A1:2009/A2:2011
Measurement Frequency range	:	150 kHz – 30 MHz
Measurement RBW	:	9 kHz
Test mode	:	Operating mode
Result	:	**Complies**

Measurement Data:

A sample calculation:

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

Emission Level= meter reading + COR.F

Limits

Frequency Range	At mains terminals		At load terminals and additional terminals	
	Quasi-peak	Average	Quasi-peak	Average
(0.15 – 0.05) MHz	(66 − 56) dBuV	(59 − 46) dBuV	80 dBuV	70 dBuV
(0.05 – 5) MHz	56 dBuV	46 dBuV	74 dBuV	64 dBuV
(5 – 30) MHz	60 dBuV	50 dBuV	74 dBuV	64 dBuV

Decision data for test Voltage

Test Voltage	207 Vac(-10 %)	230 Vac	253 Vac(+10 %)
Level [dBuV] at 160 kHz	23.47	23.68	23.52
Test Voltage : 230 Vac			

Conducted emissions (LINE) / Operating mode 1

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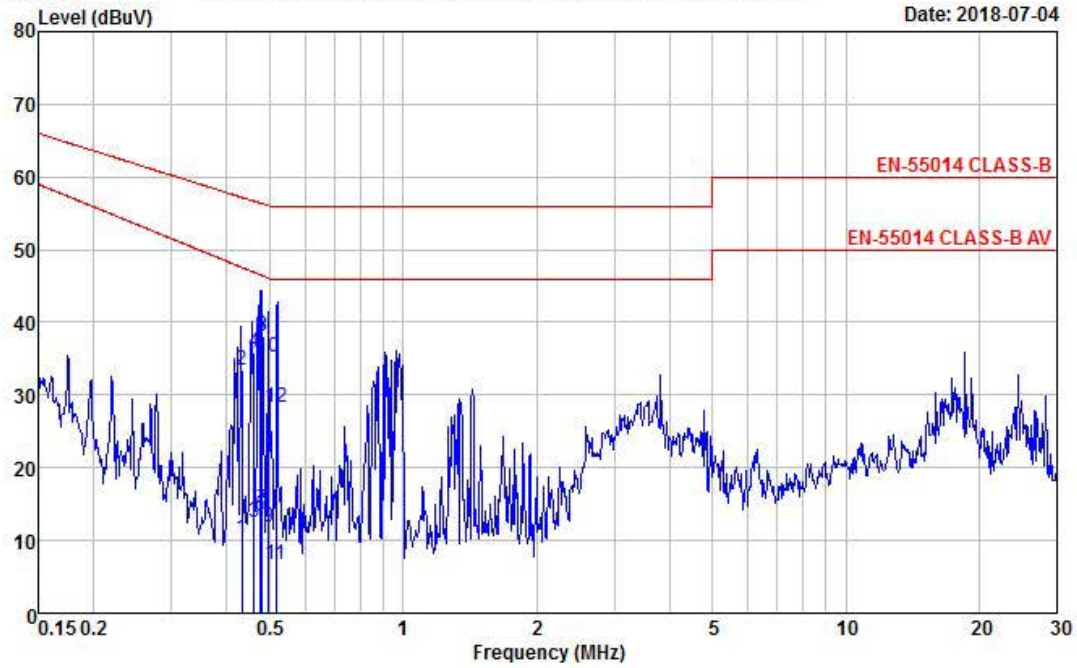
EUT / Model No. : HIGEN3+ | Phase : LINE
Test Mode : Operating mode | Test Power : 230 / 50
Temp. / Humi. : 24 / 49 | Test Engineer : CHOI M Y

Data: 149 File: D:\Conducted Data\2018\LTA_Conduction_2018_7.EM6 (170)



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
0.434	13.92	-9.29	19.44	33.36	10.15	57.19	47.54	23.83	37.39
0.460	16.36	-6.94	19.44	35.80	12.50	56.69	46.90	20.89	34.40
0.476	18.95	-6.05	19.44	38.39	13.39	56.41	46.54	18.02	33.15
0.481	18.64	-5.11	19.44	38.08	14.33	56.32	46.42	18.24	32.09
0.496	15.67	-7.71	19.44	35.11	11.73	56.06	46.08	20.95	34.35
0.516	8.88	-12.82	19.44	28.32	6.62	56.00	46.00	27.68	39.38

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

Conducted emissions (NEUTRAL) / Operating mode 1

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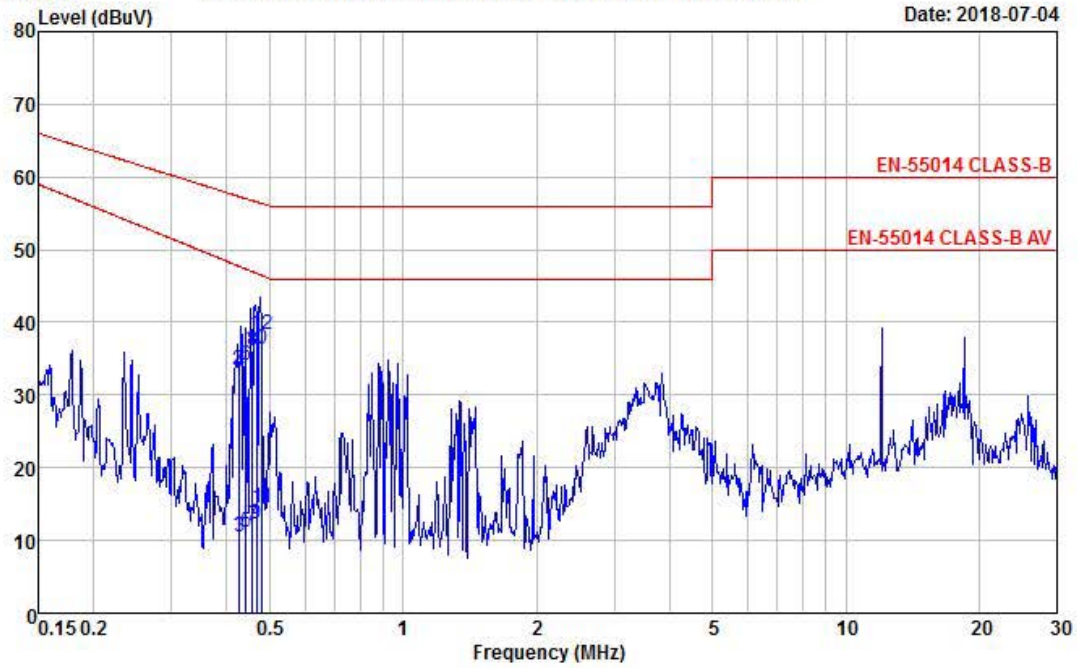
EUT / Model No. : HIGEN3+ | Phase : NEUTRAL
Test Mode : Operating mode | Test Power : 230 / 50
Temp. / Humi. : 24 / 49 | Test Engineer : CHOI M Y

Data: 152 File: D:\Conducted Data\2018\LTA_Conduction_2018_7.EM6 (170)



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
0.426	13.96	-8.75	19.42	33.38	10.67	57.33	47.72	23.95	37.05
0.427	13.71	-8.99	19.42	33.13	10.43	57.31	47.70	24.18	37.27
0.442	14.59	-8.21	19.42	34.01	11.21	57.02	47.33	23.01	36.12
0.457	16.59	-7.29	19.42	36.01	12.13	56.74	46.96	20.73	34.83
0.467	16.82	-7.12	19.42	36.24	12.30	56.57	46.74	20.33	34.44
0.481	18.85	-4.92	19.42	38.27	14.50	56.33	46.43	18.06	31.93

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

Conducted emissions (LINE) / Operating mode 2

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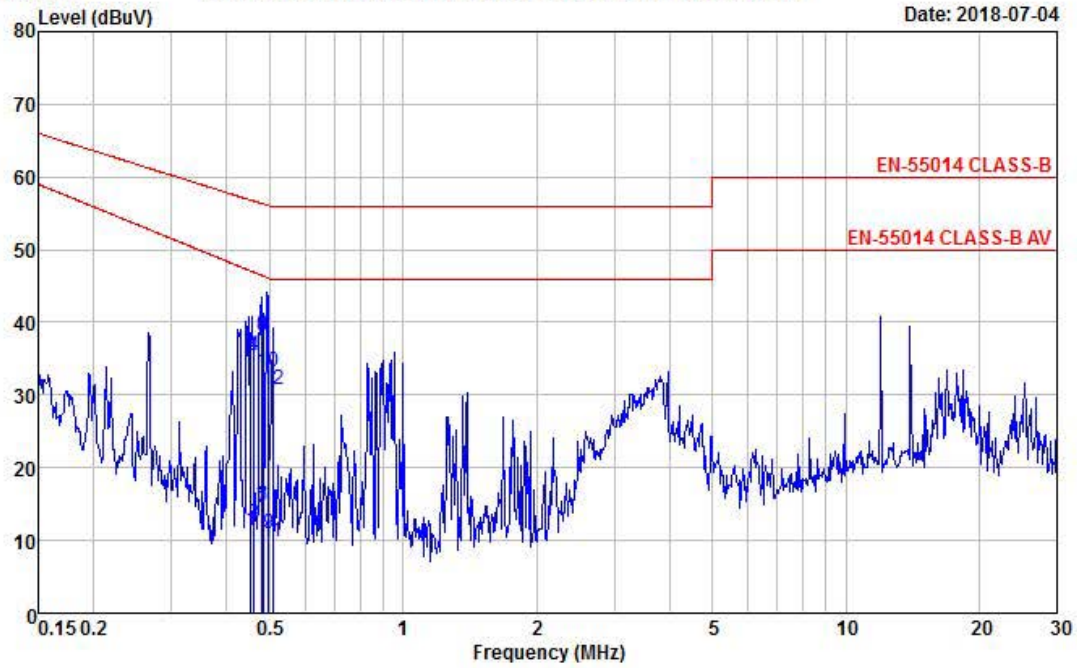
EUT / Model No. : HIGEN3+ | Phase : LINE
Test Mode : Operating mode 2 | Test Power : 230 / 50
Temp. / Humi. : 24 / 49 | Test Engineer : CHOI M Y

Data: 158 File: D:\Conducted Data\2018\LTA_Conduction_2018_7.EM6 (170)



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
0.454	16.08	-8.07	19.44	35.52	11.37	56.81	47.05	21.29	35.68
0.461	16.05	-7.21	19.44	35.49	12.23	56.68	46.89	21.19	34.66
0.481	18.85	-4.71	19.44	38.29	14.73	56.32	46.42	18.03	31.69
0.482	18.73	-4.90	19.44	38.17	14.54	56.30	46.39	18.13	31.85
0.496	13.79	-8.44	19.44	33.23	11.00	56.06	46.08	22.83	35.08
0.507	11.37	-9.63	19.44	30.81	9.81	56.00	46.00	25.19	36.19

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

Conducted emissions (NEUTRAL) / Operating mode 2

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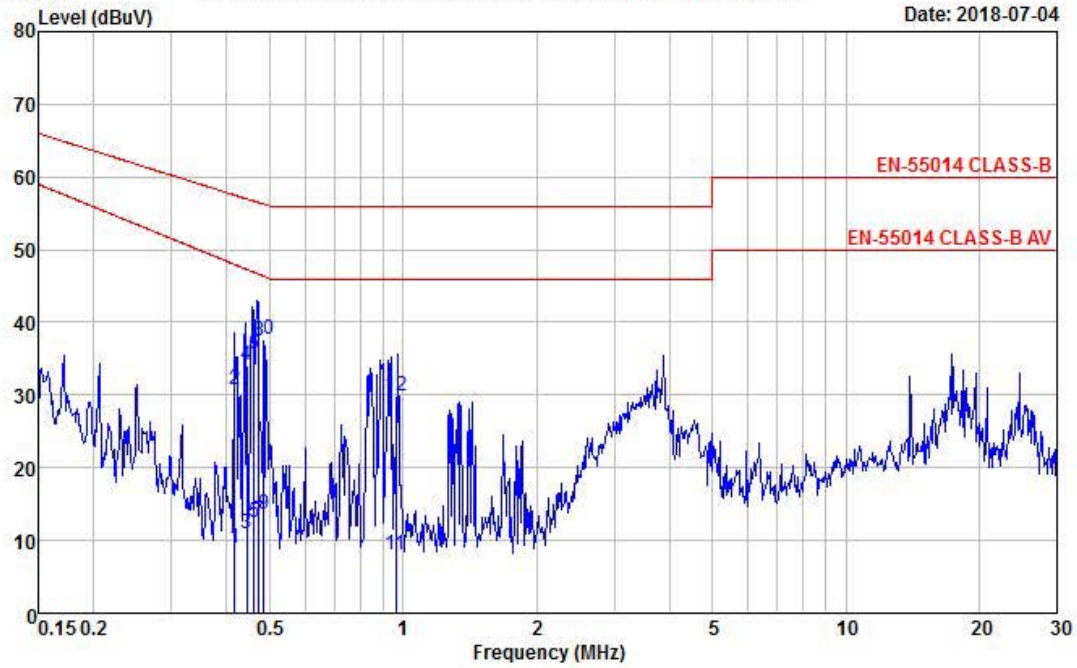
EUT / Model No. : HIGEN3+ | Phase : NEUTRAL
Test Mode : Operating mode 2 | Test Power : 230 / 50
Temp. / Humi. : 24 / 49 | Test Engineer : CHOI M Y

Data: 155 File: D:\Conducted Data\2018\LTA_Conduction_2018_7.EM6 (170)



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
0.417	11.34	-10.55	19.42	30.76	8.87	57.51	47.97	26.75	39.10
0.444	14.66	-8.43	19.42	34.08	10.99	56.98	47.28	22.90	36.29
0.461	16.14	-6.99	19.42	35.56	12.43	56.68	46.88	21.12	34.45
0.473	17.98	-6.66	19.42	37.40	12.76	56.46	46.60	19.06	33.84
0.484	18.28	-5.76	19.42	37.70	13.66	56.27	46.35	18.57	32.69
0.964	10.40	-11.34	19.44	29.84	8.10	56.00	46.00	26.16	37.90

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

Conducted emissions (LINE) / Operating mode 3

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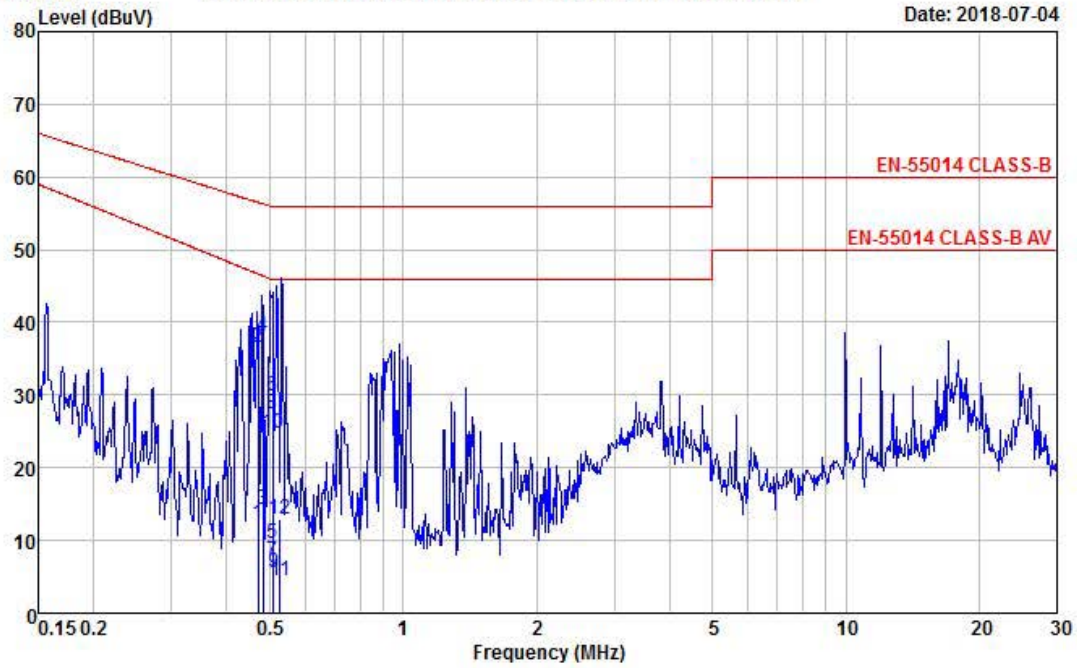
EUT / Model No.	: HIGEN3+	Phase	: LINE
Test Mode	: Operating mode 3	Test Power	: 230 / 50
Temp. / Humi.	: 24 / 49	Test Engineer	: CHOI M Y

Data: 161 File: D:\Conducted Data\2018\LTA_Conduction_2018_7.EM6 (170)



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
0.470	17.21	-7.15	19.44	36.65	12.29	56.51	46.66	19.86	34.37
0.483	18.61	-5.19	19.44	38.05	14.25	56.28	46.37	18.23	32.12
0.507	10.40	-9.91	19.44	29.84	9.53	56.00	46.00	26.16	36.47
0.508	7.91	-12.23	19.44	27.35	7.21	56.00	46.00	28.65	38.79
0.510	5.31	-13.87	19.44	24.75	5.57	56.00	46.00	31.25	40.43
0.527	-6.58	-14.96	19.44	12.86	4.48	56.00	46.00	43.14	41.52

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

Conducted emissions (NEUTRAL) / Operating mode 3

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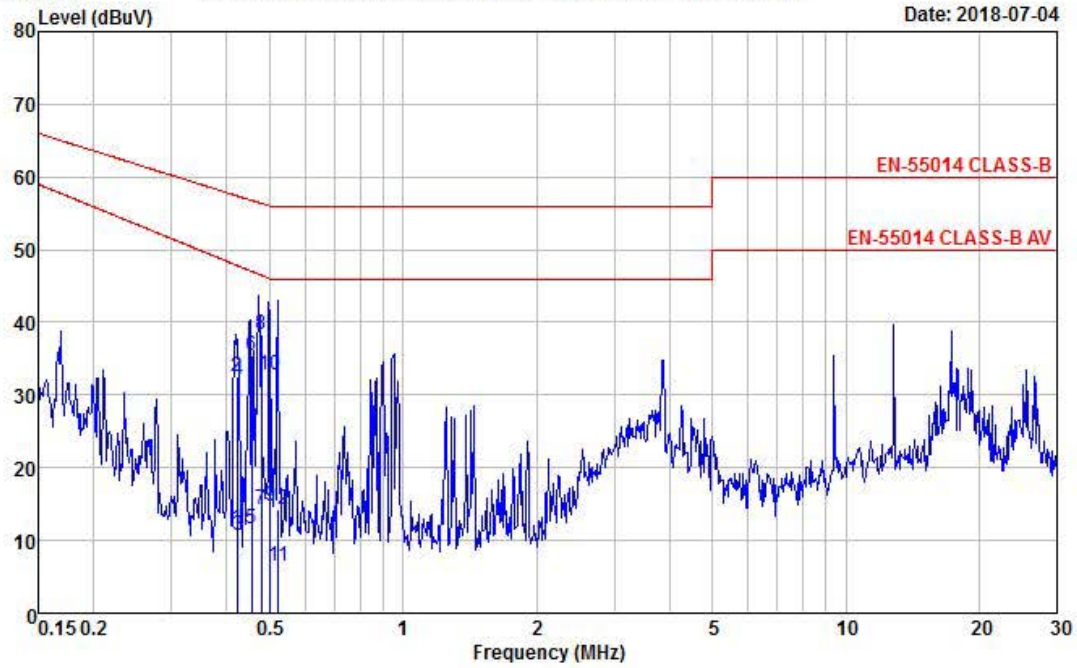
EUT / Model No. : HIGEN3+ Phase : NEUTRAL

Test Mode : Operating mode 3 Test Power : 230 / 50

Temp. / Humi. : 24 / 49 Test Engineer : CHOI M Y

Data: 164 File: D:\Conducted Data\2018\LTA_Conduction_2018_7.EM6 (170)



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
0.422	13.15	-7.89	19.42	32.57	11.53	57.41	47.83	24.84	36.30
0.423	12.69	-8.61	19.42	32.11	10.81	57.39	47.81	25.28	37.00
0.455	16.07	-7.91	19.42	35.49	11.51	56.78	47.01	21.29	35.50
0.478	18.82	-5.27	19.42	38.24	14.15	56.37	46.48	18.13	32.33
0.502	13.37	-4.68	19.42	32.79	14.74	56.00	46.00	23.21	31.26
0.523	-5.18	-12.89	19.42	14.24	6.53	56.00	46.00	41.76	39.47

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

Conducted emissions (LINE) / Operating mode 4

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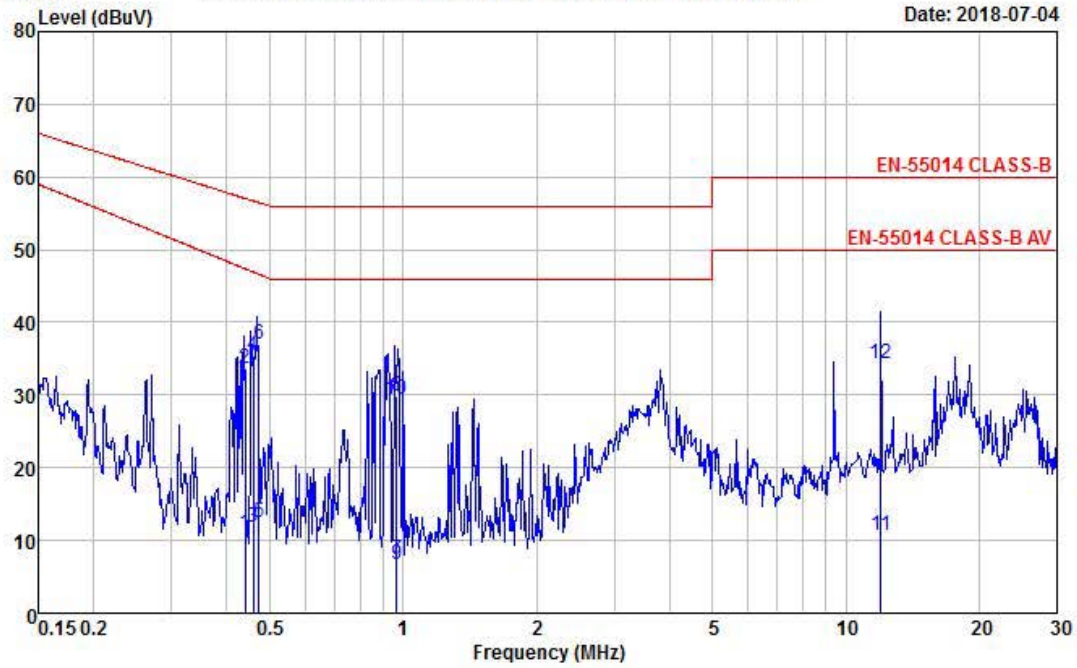
EUT / Model No. : HIGEN3+ | Phase : LINE
Test Mode : Operating mode 4 | Test Power : 230 / 50
Temp. / Humi. : 24 / 49 | Test Engineer : CHOI M Y

Data: 170 File: D:\Conducted Data\2018\LTA_Conduction_2018_7.EM6 (170)



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
0.440	14.11	-8.56	19.44	33.55	10.88	57.06	47.38	23.51	36.50
0.458	15.94	-7.59	19.44	35.38	11.85	56.72	46.94	21.34	35.09
0.473	17.58	-7.05	19.44	37.02	12.39	56.46	46.59	19.44	34.20
0.966	10.29	-12.09	19.46	29.75	7.37	56.00	46.00	26.25	38.63
0.968	9.87	-12.70	19.46	29.33	6.76	56.00	46.00	26.67	39.24
11.995	14.83	-8.90	19.58	34.41	10.68	60.00	50.00	25.59	39.32

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

Conducted emissions (NEUTRAL) / Operating mode 4

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EUT / Model No.	: HIGEN3+	Phase	: NEUTRAL
Test Mode	: Operating mode 4	Test Power	: 230 / 50
Temp. / Humi.	: 24 / 49	Test Engineer	: CHOI M Y

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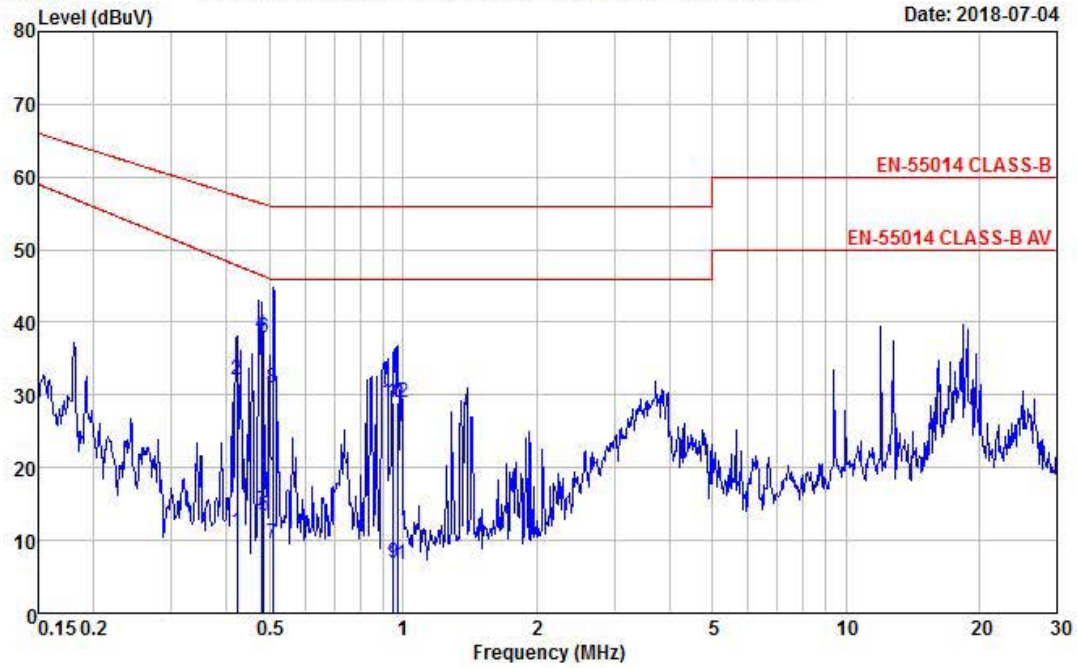

Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.423	12.58	-8.30	19.42	32.00	11.12	57.40	47.82	25.40	36.70
0.478	18.80	-5.30	19.42	38.22	14.12	56.37	46.48	18.15	32.36
0.485	18.42	-6.00	19.42	37.84	13.42	56.26	46.33	18.42	32.91
0.507	11.61	-9.85	19.42	31.03	9.57	56.00	46.00	24.97	36.43
0.950	9.43	-12.51	19.44	28.87	6.93	56.00	46.00	27.13	39.07
0.970	9.57	-12.81	19.44	29.01	6.63	56.00	46.00	26.99	39.37

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

3.2.2 Discontinuous Disturbance Voltage

Definition:

Switching operations in thermostatically controlled appliances, automatic program controlled machines and other electrically controlled or operated appliances generate discontinuous disturbance.

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

Test method	:	EN 55014-1:2006/A1:2009/A2:2011
Measurement Frequency range	:	150 kHz – 30 MHz
Observed Time	:	120 min for each measurement
Test mode	:	Operating mode
Result	:	**Complies**

Measurement Data:

Discontinuous Disturbance Voltage / Operating mode 1

CL55 TEST REPORT

TEST PASS

6/7/2018 9:08:43.34

Title	KYK CO.,LTD	Time Test	02:00:01.42
Required		Executed by	CHOI M Y
Description	22℃, 47%R.H		
Model	HIGEN3+		
Type	Operating mode	SN	N/A
Report			

Mode	Click Rate		
Type of Eut	Electro-mechanical office machines		
Rx 150 KHz Att. [dB]	0	Rx 500 kHz Att. [dB]	0
Rx 1.4 MHz Att. [dB]	0	Rx 30 MHz Att. [dB]	0
Rx 150 kHz Input Offset [dB]	9.5	Rx 500 kHz Input Offset [dB]	9.5
Rx 1.4 MHz Input Offset [dB]	9.5	Rx 30 MHz Input Offset [dB]	9.7
External Att. [dB]	NONE		
Remote	NONE - LINE		

	150 kHz	500 kHz	1.4 MHz	30 MHz
First Run				
Short	0	0	0	0
Long	0	0	0	0
Fast Long	0	0	0	0
Total Clicks	0	0	0	0
Events	0	0	0	0
Time(s)	0.00	0.00	0.00	0.00
Sw.Op.	0	0	0	0
4.2.3.4 events	0	0	0	0
Limit dBuV	66	56	56	60
N	0.00	0.00	0.00	0.00
	PASS	**PASS**	**PASS**	**PASS**

150 kHz	No Clicks	500 kHz	No Clicks
1.4 MHz	No Clicks	30 MHz	No Clicks

New Limit [dBuV]	
Allowed Clicks	SECOND PASS NOT ALLOWED
Short	
Long	
Total Clicks	
Events	
Time(s)	
4.2.3.4 events	

CL55 TEST REPORT

TEST PASS

6/7/2018 11:11:18

Title	**KYK CO.,LTD**	Time Test	**02:00:01:14**
Required	**EN55014-1**	Executed by	**CHOI M Y**
Description	**24℃, 47%R.H**		
Model	**HIGEN3+**		
Type	Operating mode	SN	**N/A**
Report			

Mode	**Click Rate**		
Type of Eut	**Electro-mechanical office machines**		
Rx 150 KHz Att. [dB]	**0**	Rx 500 kHz Att. [dB]	**0**
Rx 1.4 MHz Att. [dB]	**0**	Rx 30 MHz Att. [dB]	**0**
Rx 150 kHz Input Offset [dB]	**9.5**	Rx 500 kHz Input Offset [dB]	**9.5**
Rx 1.4 MHz Input Offset [dB]	**9.5**	Rx 30 MHz Input Offset [dB]	**9.8**
External Att. [dB]	**NONE**		
Remote	**NONE - NEUTRAL**		

	150 kHz	500 kHz	1.4 MHz	30 MHz
First Run				
Short	0	0	0	0
Long	0	0	0	0
Fast Long	0	0	0	0
Total Clicks	0	0	0	0
Events	0	0	0	0
Time(s)	0.00	0.00	0.00	0.00
Sw.Op.	0	0	0	0
4.2.3.4 events	0	0	0	0
Limit dBuV	66	56	56	60
N	0.00	0.00	0.00	0.00
	PASS	**PASS**	**PASS**	**PASS**

150 kHz	No Clicks	500 kHz	No Clicks
1.4 MHz	No Clicks	30 MHz	No Clicks

New Limit [dBuV]	
Allowed Clicks	SECOND PASS NOT ALLOWED
Short	
Long	
Total Clicks	
Events	
Time(s)	
4.2.3.4 events	

Discontinuous Disturbance Voltage / Operating mode 2

CL55 TEST REPORT

TEST PASS

6/7/2018 15:11:52.27

Title	KYK CO.,LTD	Time Test	02:00:00.24
Required		Executed by	CHOI M Y
Description	22℃, 47%R.H		
Model	HIGEN3+		
Type	Operating mode	SN	N/A
Report			

Mode	Click Rate		
Type of Eut	Electro-mechanical office machines		
Rx 150 KHz Att. [dB]	0	Rx 500 kHz Att. [dB]	0
Rx 1.4 MHz Att. [dB]	0	Rx 30 MHz Att. [dB]	0
Rx 150 kHz Input Offset [dB]	9.5	Rx 500 kHz Input Offset [dB]	9.5
Rx 1.4 MHz Input Offset [dB]	9.5	Rx 30 MHz Input Offset [dB]	9.7
External Att. [dB]	NONE		
Remote	NONE - LINE		

	150 kHz	500 kHz	1.4 MHz	30 MHz
First Run				
Short	0	0	0	0
Long	0	0	0	0
Fast Long	0	0	0	0
Total Clicks	0	0	0	0
Events	0	0	0	0
Time(s)	0.00	0.00	0.00	0.00
Sw.Op.	0	0	0	0
4.2.3.4 events	0	0	0	0
Limit dBuV	66	56	56	60
N	0.00	0.00	0.00	0.00
	PASS	**PASS**	**PASS**	**PASS**

150 kHz	No Clicks	500 kHz	No Clicks
1.4 MHz	No Clicks	30 MHz	No Clicks

New Limit [dBuV]	
Allowed Clicks	SECOND PASS NOT ALLOWED
Short	
Long	
Total Clicks	
Events	
Time(s)	
4.2.3.4 events	

CL55 TEST REPORT

TEST PASS

6/7/2018 17:21:22

Title	**KYK CO.,LTD**	Time Test	**02:01:11.53**
Required	**EN55014-1**	Executed by	**CHOI M Y**
Description	**22 'C, 47 % R.H.**		
Model	**HIGEN3+**		
Type	**Operating mode**	SN	**N/A**
Report			

Mode	**Click Rate**		
Type of Eut	**Electro-mechanical office machines**		
Rx 150 KHz Att. [dB]	**0**	Rx 500 kHz Att. [dB]	**0**
Rx 1.4 MHz Att. [dB]	**0**	Rx 30 MHz Att. [dB]	**0**
Rx 150 kHz Input Offset [dB]	**9.5**	Rx 500 kHz Input Offset [dB]	**9.5**
Rx 1.4 MHz Input Offset [dB]	**9.5**	Rx 30 MHz Input Offset [dB]	**9.8**
External Att. [dB]	**NONE**		
Remote	**NONE - NEUTRAL**		

	150 kHz	500 kHz	1.4 MHz	30 MHz
First Run				
Short	0	0	0	0
Long	0	0	0	0
Fast Long	0	0	0	0
Total Clicks	0	0	0	0
Events	0	0	0	0
Time(s)	0.00	0.00	0.00	0.00
Sw.Op.	0	0	0	0
4.2.3.4 events	0	0	0	0
Limit dBuV	66	56	56	60
N	0.00	0.00	0.00	0.00
	PASS	**PASS**	**PASS**	**PASS**

150 kHz	No Clicks	500 kHz	No Clicks
1.4 MHz	No Clicks	30 MHz	No Clicks

New Limit [dBuV]

Allowed Clicks

SECOND PASS NOT ALLOWED

Short

Long

Total Clicks

Events

Time(s)

4.2.3.4 events

Discontinuous Disturbance Voltage / Operating mode 3

CL55 TEST REPORT

TEST PASS

9/7/2018 09:02:34.54

Title	KYK CO.,LTD	Time Test	02:00:02.11
Required		Executed by	CHOI M Y
Description	23℃, 50%R.H		
Model	HIGEN3+		
Type	Operating mode	SN	N/A
Report			

Mode	Click Rate		
Type of Eut	Electro-mechanical office machines		
Rx 150 KHz Att. [dB]	0	Rx 500 kHz Att. [dB]	0
Rx 1.4 MHz Att. [dB]	0	Rx 30 MHz Att. [dB]	0
Rx 150 kHz Input Offset [dB]	9.5	Rx 500 kHz Input Offset [dB]	9.5
Rx 1.4 MHz Input Offset [dB]	9.5	Rx 30 MHz Input Offset [dB]	9.7
External Att. [dB]	NONE		
Remote	NONE - LINE		

	150 kHz	500 kHz	1.4 MHz	30 MHz
First Run				
Short	0	0	0	0
Long	0	0	0	0
Fast Long	0	0	0	0
Total Clicks	0	0	0	0
Events	0	0	0	0
Time(s)	0.00	0.00	0.00	0.00
Sw.Op.	0	0	0	0
4.2.3.4 events	0	0	0	0
Limit dBuV	66	56	56	60
N	0.00	0.00	0.00	0.00
	PASS	PASS	PASS	PASS

150 kHz	No Clicks	500 kHz	No Clicks
1.4 MHz	No Clicks	30 MHz	No Clicks

New Limit [dBuV]

Allowed Clicks

SECOND PASS NOT ALLOWED

Short

Long

Total Clicks

Events

Time(s)

CL55 TEST REPORT

TEST PASS

9/7/2018 13:20:32

Title	**KYK CO.,LTD**	Time Test	**02:00:01:18**
Required	**EN55014-1**	Executed by	**CHOI M Y**
Description	**23°C, 50%R.H**		
Model	**HIGEN3+**		
Type	Operating mode	SN	**N/A**
Report			

Mode	**Click Rate**		
Type of Eut	**Electro-mechanical office machines**		
Rx 150 KHz Att. [dB]	**0**	Rx 500 kHz Att. [dB]	**0**
Rx 1.4 MHz Att. [dB]	**0**	Rx 30 MHz Att. [dB]	**0**
Rx 150 kHz Input Offset [dB]	**9.5**	Rx 500 kHz Input Offset [dB]	**9.5**
Rx 1.4 MHz Input Offset [dB]	**9.5**	Rx 30 MHz Input Offset [dB]	**9.8**
External Att. [dB]	**NONE**		
Remote	**NONE - NEUTRAL**		

	150 kHz	500 kHz	1.4 MHz	30 MHz
First Run				
Short	0	0	0	0
Long	0	0	0	0
Fast Long	0	0	0	0
Total Clicks	0	0	0	0
Events	0	0	0	0
Time(s)	0.00	0.00	0.00	0.00
Sw.Op.	0	0	0	0
4.2.3.4 events	0	0	0	0
Limit dBuV	66	56	56	60
N	0.00	0.00	0.00	0.00
	PASS	**PASS**	**PASS**	**PASS**

150 kHz	No Clicks	500 kHz	No Clicks
1.4 MHz	No Clicks	30 MHz	No Clicks

New Limit [dBuV]	
Allowed Clicks	SECOND PASS NOT ALLOWED
Short	
Long	
Total Clicks	
Events	
Time(s)	
4.2.3.4 events	

Discontinuous Disturbance Voltage / Operating mode 4

CL55 TEST REPORT

TEST PASS

11/7/2018 15:32:08.25

Title	**KYK CO.,LTD**	Time Test	**02:00:01.48**
Required		Executed by	**CHOI M Y**
Description	**23°C, 50%R.H**		
Model	**HIGEN3+**		
Type	**Operating mode**	SN	**N/A**
Report			

Mode	**Click Rate**		
Type of Eut	**Electro-mechanical office machines**		
Rx 150 KHz Att. [dB]	**0**	Rx 500 kHz Att. [dB]	**0**
Rx 1.4 MHz Att. [dB]	**0**	Rx 30 MHz Att. [dB]	**0**
Rx 150 kHz Input Offset [dB]	**9.5**	Rx 500 kHz Input Offset [dB]	**9.5**
Rx 1.4 MHz Input Offset [dB]	**9.5**	Rx 30 MHz Input Offset [dB]	**9.7**
External Att. [dB]	**NONE**		
Remote	**NONE - LINE**		

	150 kHz	500 kHz	1.4 MHz	30 MHz
First Run				
Short	0	0	0	0
Long	0	0	0	0
Fast Long	0	0	0	0
Total Clicks	0	0	0	0
Events	0	0	0	0
Time(s)	0.00	0.00	0.00	0.00
Sw.Op.	0	0	0	0
4.2.3.4 events	0	0	0	0
Limit dBuV	66	56	56	60
N	0.00	0.00	0.00	0.00
	PASS	**PASS**	**PASS**	**PASS**

150 kHz	No Clicks	500 kHz	No Clicks
1.4 MHz	No Clicks	30 MHz	No Clicks

New Limit [dBuV]	
Allowed Clicks	SECOND PASS NOT ALLOWED
Short	
Long	
Total Clicks	
Events	
Time(s)	
4.2.3.4 events	

CL55 TEST REPORT

TEST PASS

9/7/2018 11:23:42

Title	**KYK CO.,LTD**	Time Test	**02:00:01:11**
Required	**EN55014-1**	Executed by	**CHOI M Y**
Description	**22°C, 46%R.H**		
Model	**HIGEN3+**		
Type	Operating mode	SN	**N/A**
Report			

Mode	**Click Rate**		
Type of Eut	**Electro-mechanical office machines**		
Rx 150 KHz Att. [dB]	**0**	Rx 500 kHz Att. [dB]	**0**
Rx 1.4 MHz Att. [dB]	**0**	Rx 30 MHz Att. [dB]	**0**
Rx 150 kHz Input Offset [dB]	**9.5**	Rx 500 kHz Input Offset [dB]	**9.5**
Rx 1.4 MHz Input Offset [dB]	**9.5**	Rx 30 MHz Input Offset [dB]	**9.8**
External Att. [dB]	**NONE**		
Remote	**NONE - NEUTRAL**		

	150 kHz	500 kHz	1.4 MHz	30 MHz
First Run				
Short	0	0	0	0
Long	0	0	0	0
Fast Long	0	0	0	0
Total Clicks	0	0	0	0
Events	0	0	0	0
Time(s)	0.00	0.00	0.00	0.00
Sw.Op.	0	0	0	0
4.2.3.4 events	0	0	0	0
Limit dBuV	66	56	56	60
N	0.00	0.00	0.00	0.00
	PASS	**PASS**	**PASS**	**PASS**

150 kHz	No Clicks	500 kHz	No Clicks
1.4 MHz	No Clicks	30 MHz	No Clicks

New Limit [dBuV]	
Allowed Clicks	SECOND PASS NOT ALLOWED
Short	
Long	
Total Clicks	
Events	
Time(s)	
4.2.3.4 events	

3.2.3 Disturbance Power

Definition:

The test assesses the ability of the EUT to limit its internal noise from being present at all terminals.

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

Test method	:	EN 55014-1:2006/A1:2009/A2:2011
Measurement Frequency range	:	30 MHz – 300 MHz
Measurement RBW	:	120 kHz
Test mode	:	Operating mode
Result	:	**Complies**

Measurement Data:

Limits

Frequency Range	Quasi-peak	Average
(30 – 300) MHz	(45 – 55) dB(pW)	(35 – 45) dB(pW)

Decision data for test Voltage

Test Voltage	207 Vac(-10 %)	230 Vac	253 Vac(+10 %)
Level [dBuV] at 50 MHz	14.62	14.88	14.74
Test Voltage : 230 Vac			

Disturbance Power / Operating mode 1

LTA
Laboratory for Test & Approval Co.,Ltd.

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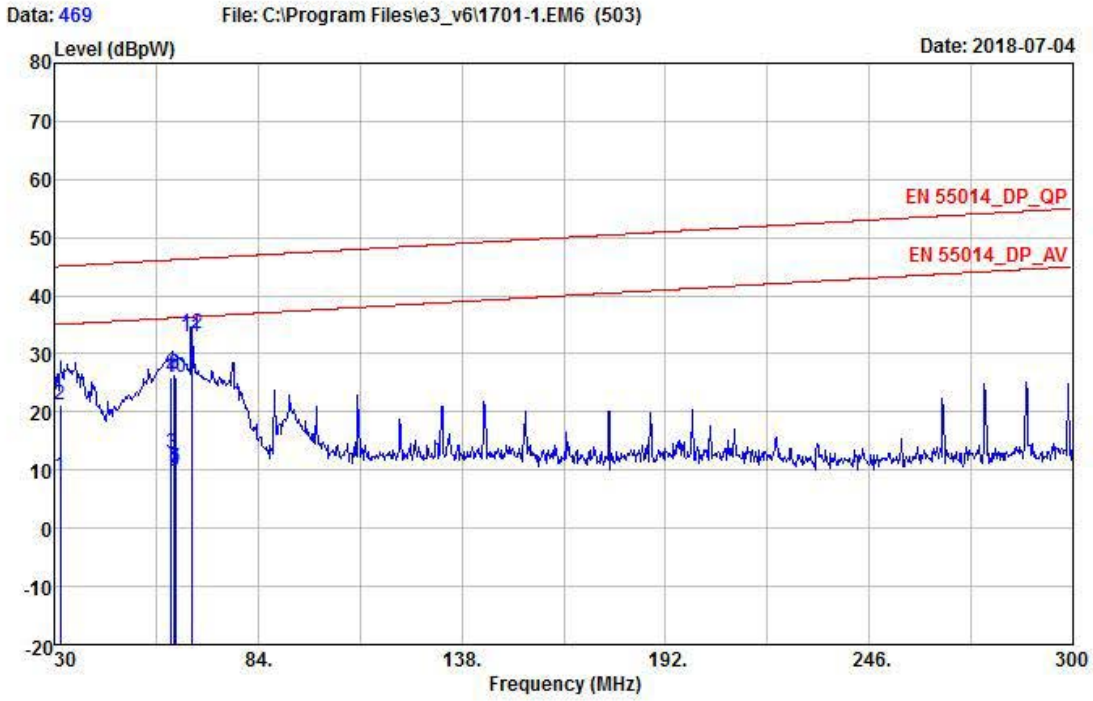
449-822 Korea
Tel:+82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. : HIGEN3+ | Test Mode : Operating mode 1

Temp. / Humi. : 20 / 40 | Test Engineer : CHOI M Y



Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBpW	dBpW	dB	dBpW	dBpW	dBpW	dBpW	dB	dB
31.699	-3.18	-15.49	24.43	21.25	8.94	45.07	35.07	23.82	26.13
61.033	0.44	-12.85	25.62	26.06	12.77	46.16	36.16	20.10	23.39
61.785	0.76	-15.28	25.64	26.40	10.36	46.19	36.19	19.79	25.83
61.787	0.84	-15.30	25.64	26.48	10.34	46.19	36.19	19.71	25.85
62.066	0.41	-15.87	25.64	26.05	9.77	46.20	36.20	20.15	26.43
66.347	7.79	7.16	25.73	33.52	32.89	46.36	36.36	12.84	3.47

Remarks: C.F (Correction Factor) = ABS Clamp + Cable loss

Disturbance Power / Operating mode 2

LTA
Laboratory for Test & Approval Co.,Ltd.

4, Songjuro 236 Beon-gil, Yangji-myeon
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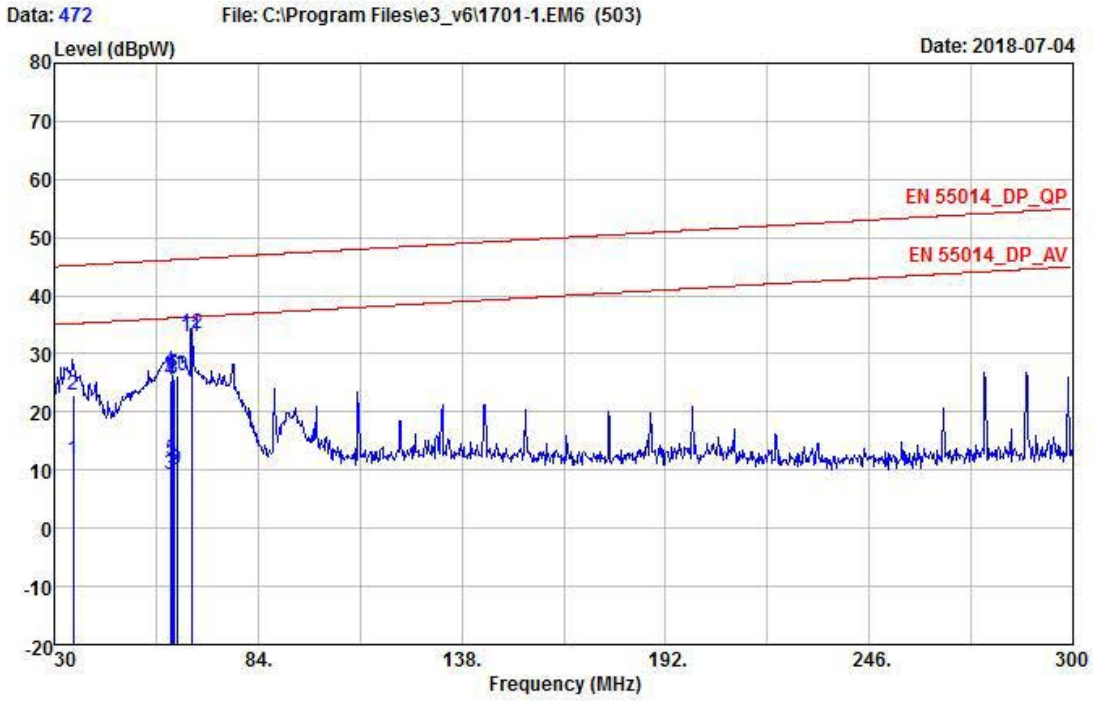
449-822 Korea
Tel:+82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. : HIGEN3+ | Test Mode : Operating mode 2

Temp. / Humi. : 20 / 40 | Test Engineer : CHOI M Y



Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBpW	dBpW	dB	dBpW	dBpW	dBpW	dBpW	dB	dB
34.954	-1.72	-13.02	24.69	22.97	11.67	45.19	35.19	22.22	23.52
60.815	-0.24	-16.31	25.62	25.38	9.31	46.15	36.15	20.77	26.84
61.134	0.88	-13.82	25.63	26.51	11.81	46.16	36.16	19.65	24.35
61.617	-0.05	-16.32	25.64	25.59	9.32	46.18	36.18	20.59	26.86
62.477	0.63	-15.48	25.65	26.28	10.17	46.21	36.21	19.93	26.04
66.359	7.81	7.24	25.73	33.54	32.97	46.36	36.36	12.82	3.39

Remarks: C.F (Correction Factor) = ABS Clamp + Cable loss

Disturbance Power / Operating mode 3

LTA
Laboratory for Test & Approval Co.,Ltd.

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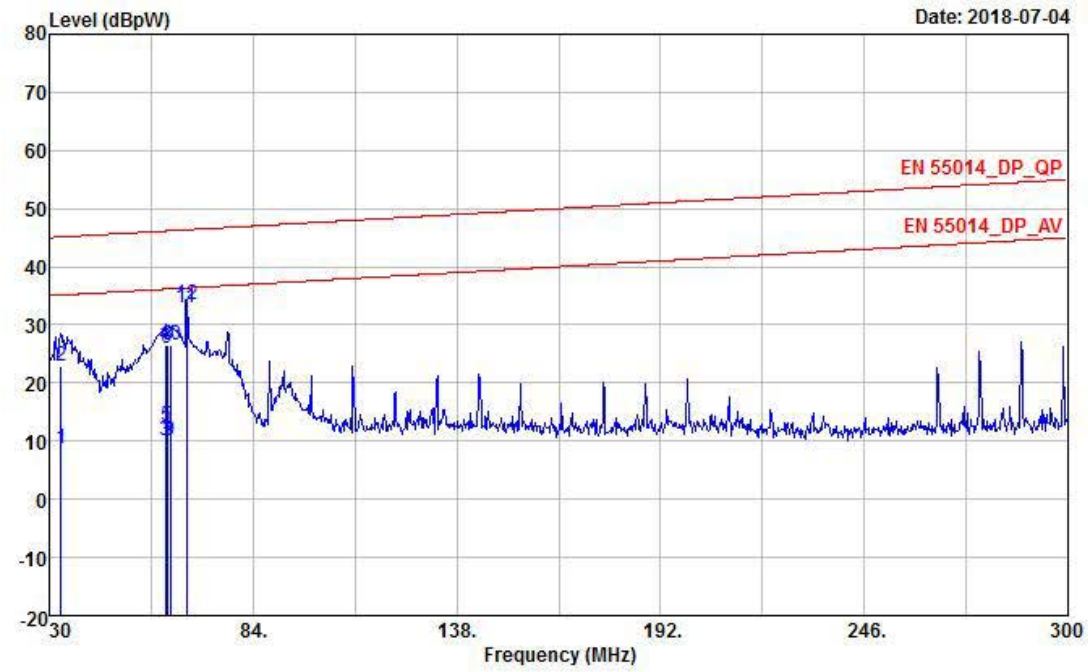
Tel:+82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. : HIGEN3+ | Test Mode : Operating mode 3

Temp. / Humi. : 20 / 40 | Test Engineer : CHOI M Y

Data: 475 File: C:\Program Files\e3_v6\1701-1.EM6 (503)



Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBpW	dBpW	dB	dBpW	dBpW	dBpW	dBpW	dB	dB
33.011	-1.66	-15.77	24.53	22.87	8.76	45.12	35.12	22.25	26.36
60.900	0.78	-15.58	25.62	26.40	10.04	46.15	36.15	19.75	26.11
61.028	0.48	-13.00	25.62	26.10	12.62	46.16	36.16	20.06	23.54
61.475	0.89	-15.77	25.63	26.52	9.86	46.18	36.18	19.66	26.32
62.046	0.96	-15.67	25.64	26.60	9.97	46.20	36.20	19.60	26.23
66.353	7.76	7.17	25.73	33.49	32.90	46.36	36.36	12.87	3.46

Remarks: C.F (Correction Factor) = ABS Clamp + Cable loss

Disturbance Power / Operating mode 4

LTA
Laboratory for Test & Approval Co.,Ltd.

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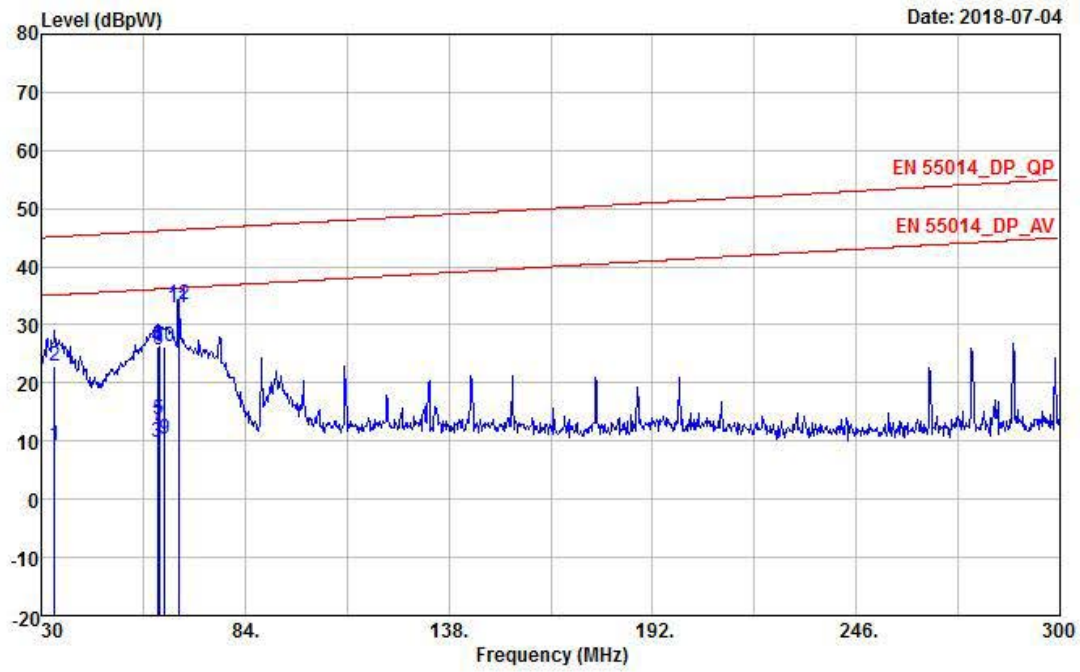
Fax:+82-31-3236010

EUT / Model No. : HIGEN3+ | Test Mode : Operating mode 4

Temp. / Humi. : 20 / 40 | Test Engineer : CHOI M Y

Data: 478 File: C:\Program Files\e3_v6\1701-1.EM6 (503)



Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBpW	dBpW	dB	dBpW	dBpW	dBpW	dBpW	dB	dB
33.558	-1.79	-15.27	24.58	22.79	9.31	45.14	35.14	22.35	25.83
60.756	0.69	-15.68	25.62	26.31	9.94	46.15	36.15	19.84	26.21
61.070	0.06	-11.96	25.62	25.68	13.66	46.16	36.16	20.48	22.50
61.133	0.85	-13.16	25.63	26.48	12.47	46.16	36.16	19.68	23.69
62.833	0.70	-15.39	25.66	26.36	10.27	46.23	36.23	19.87	25.96
66.360	7.68	7.11	25.73	33.41	32.84	46.36	36.36	12.95	3.52

Remarks: C.F (Correction Factor) = ABS Clamp + Cable loss

3.2.4 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 55014-1:2006/A1:2009/A2:2011
Measuring Distance	:	10 m
Measurement Frequency range	:	30 MHz – 1 000 MHz
Measurement RBW	:	120 kHz
Test mode	:	- mode
Result	:	**Not Applicable**

Measurement Data:

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

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

Decision data for test Voltage

Test Voltage	207 Vac(-10 %)	230 Vac	253 Vac(+10 %)
Level [dBuV] at 50 MHz	-	-	-
Test Voltage : 230 Vac			

3.2.5 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
Measured power	:	2.525 W
Result	:	**Not Applicable**

Measurement Data:

- We did not test EN61000-3-2 (Harmonic current emissions) for the HIGEN3+ because equipment whose rated power is less or equal 75W don’t need to be tested.

Harmonic Current

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IEC61000-3-2:2014
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	KYK Co.,Ltd	
Model	HIGEN3+	
Serial	N/A	
Impedance Network ID	N/A	
Test Conditions		
	User Entered	**Measured**
Rated Voltage	N/A	230.938V
Rated Current	N/A	77.688mA
Rated Frequency	N/A	50.000Hz
Rated Power	N/A	2.525W
Additional Test Information		
Measured Power Factor	0.141	
Max Current THD	46.77%	
Max THC	36.124mA	
Max Power	3.235W	
Max F.Current	77.762mA	
Average F.Current	75.204mA	
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 IEC61000-3-2:2014 standard declares that no Harmonic current limits are specified for equipment with a rated power of

3.2.6 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
Result	:	**Complies**

Measurement Data:

Voltage Variation and Flicking / Operating mode 1

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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	KYK Co.,Ltd
Model	HIGEN3+
Serial	N/A
Impedance Network ID	N/A

Test Conditions		
	User Entered	**Measured**
Rated Voltage	N/A	230.960V
Rated Current	N/A	N/A
Rated Frequency	N/A	50.000Hz
Rated Power	N/A	N/A
D max	0.0650% (Limit: 4.0%)	
T max	0.0000 s (Limit: 0.5 s)	
DC max	0.0083% (Limit: 3.3%)	

Additional Test Details	
Operator	N/A
Lab Name	N/A
Location	N/A
Notes	
Signature	
Results	**Phase1: PASS**

06th July 2018 - 11:17:49	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	KYK Co.,Ltd	
Model	HIGEN3+	
Serial	N/A	

Flicker Test Results

PST no.	Status	DC (%)	Dmax (%)	Tmax (s)	PST	PST Lim	PLT	PLT Lim
1	Phase1: PASS	0.008	0.06499	0	0.082	1.00	0.082	0.65

Voltage Variation and Flicking / Operating mode 2

06th July 2018 - 11:31:12	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	KYK Co.,Ltd
Model	HIGEN3+
Serial	N/A
Impedance Network ID	N/A

Test Conditions		
	User Entered	**Measured**
Rated Voltage	N/A	230.964V
Rated Current	N/A	N/A
Rated Frequency	N/A	50.000Hz
Rated Power	N/A	N/A
D max	0.0673% (Limit: 4.0%)	
T max	0.0000 s (Limit: 0.5 s)	
DC max	0.0013% (Limit: 3.3%)	
Additional Test Details		
Operator	N/A	
Lab Name	N/A	
Location	N/A	
Notes		
Signature		
Results	Phase1: PASS	

06th July 2018 - 11:31:12	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	KYK Co.,Ltd	
Model	HIGEN3+	
Serial	N/A	

Flicker Test Results

PST no.	Status	DC (%)	Dmax (%)	Tmax (s)	PST	PST Lim	PLT	PLT Lim
1	Phase1: PASS	0.001	0.06732	0	0.082	1.00	0.082	0.65

Voltage Variation and Flicking / Operating mode 3

06th July 2018 - 11:46:05	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	KYK Co.,Ltd
Model	HIGEN3+
Serial	N/A
Impedance Network ID	N/A

Test Conditions		
	User Entered	**Measured**
Rated Voltage	N/A	230.966V
Rated Current	N/A	N/A
Rated Frequency	N/A	50.000Hz
Rated Power	N/A	N/A
D max	0.0665% (Limit: 4.0%)	
T max	0.0000 s (Limit: 0.5 s)	
DC max	0.0061% (Limit: 3.3%)	

Additional Test Details	
Operator	N/A
Lab Name	N/A
Location	N/A
Notes	
Signature	
Results	**Phase1: PASS**

06th July 2018 - 11:46:05	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	KYK Co.,Ltd	
Model	HIGEN3+	
Serial	N/A	

Flicker Test Results

PST no.	Status	DC (%)	Dmax (%)	Tmax (s)	PST	PST Lim	PLT	PLT Lim
1	Phase1: PASS	0.006	0.06654	0	0.082	1.00	0.082	0.65

Voltage Variation and Flicking / Operating mode 4

06th July 2018 - 11:58:34	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	KYK Co.,Ltd
Model	HIGEN3+
Serial	N/A
Impedance Network ID	N/A

Test Conditions		
	User Entered	**Measured**
Rated Voltage	N/A	230.970V
Rated Current	N/A	N/A
Rated Frequency	N/A	50.000Hz
Rated Power	N/A	N/A
D max	0.0711% (Limit: 4.0%)	
T max	0.0000 s (Limit: 0.5 s)	
DC max	0.0043% (Limit: 3.3%)	

Additional Test Details	
Operator	N/A
Lab Name	N/A
Location	N/A
Notes	
Signature	
Results	**Phase1: PASS**

06th July 2018 - 11:58:34	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	KYK Co.,Ltd	
Model	HIGEN3+	
Serial	N/A	

Flicker Test Results

PST no.	Status	DC (%)	Dmax (%)	Tmax (s)	PST	PST Lim	PLT	PLT Lim
1	Phase1: PASS	0.004	0.07108	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. 07.05.
Test method	:	EN 61000-4-2:2009
Temperature / Humidity / Pressure	:	23 ℃ / 46 % RH / 100 kPa
Discharge Impedance	:	(330 ±10 %) Ω / (150 ±10 %) pF
Type of Discharge (air discharge)	:	± 8 kV
Type of Discharge (contact discharge)	:	± 4 kV
Number of discharges at each point	:	20 of each polarity
Discharge Repetition on Rate	:	1 / sec
Test mode	:	Operating mode
Performance Criteria	:	B (Refer to the appendix B)
Result	:	**Complies (A)**

- Classification of EUT is Category II

Measurement Data:

ESD Test Point and Result

1-1. Indirect Discharge

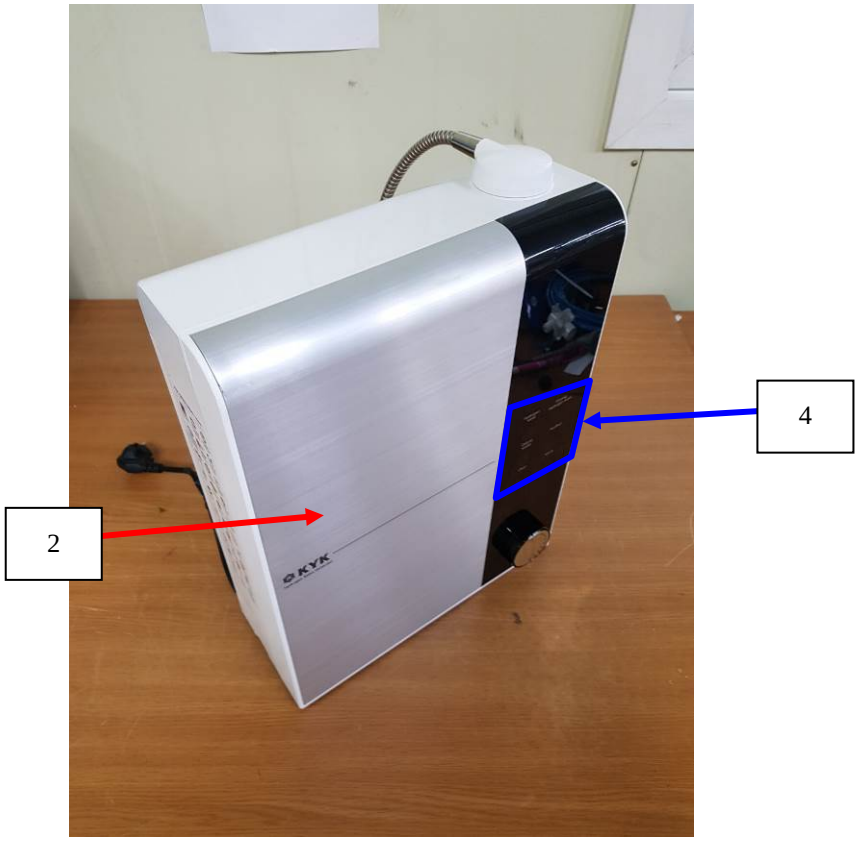
No.	Position	Kind of Discharge	Results	Remarks
1	HCP	Contact	Complies (A)	No reaction recognized
2	VCP	Contact	Complies (A)	No reaction recognized

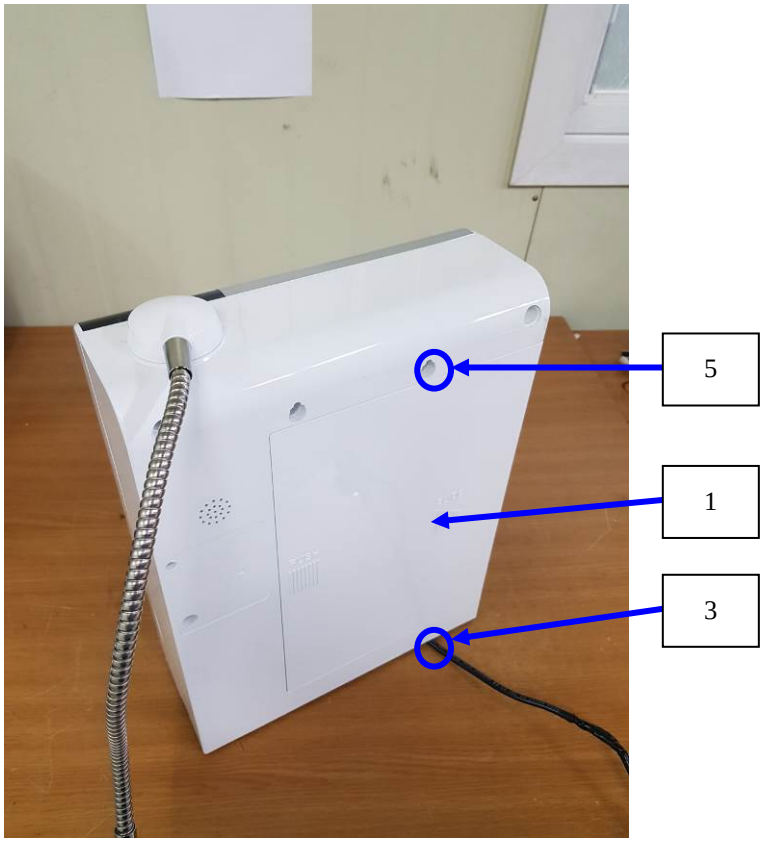
1-2. Direct Discharge

No.	Position	Kind of Discharge	Result	Remarks
1	Enclosure #1	Air	Complies (A)	No reaction recognized
2	Enclosure #2	Contact	Complies (A)	No reaction recognized
3	AC IN	Air	Complies (A)	No reaction recognized
4	Touch Pad	Air	Complies (A)	No reaction recognized
5	Screw	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. 06.
Test method	:	EN 61000-4-3:2006/A1:2008/A2:2010
Temperature / Humidity / Pressure	:	23 ℃ / 46 % R.H. / 100 kPa
Frequency range	:	80 ㎒ to 1 ㎓
Test level	:	3 V/m (measured unmodulated)
Amplitude Modulation	:	AM, 80 %, 1 ㎑ Sine Wave
Step size	:	1 % of fundamental
Test mode	:	Operating mode
Performance Criteria	:	A (Refer to the appendix B)
Result	:	**Complies (A)**

- Classification of EUT is Category II

Measurement Data:

Pol	Side	Result	Remark
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. 07. 06.
Test method	:	EN 61000-4-4:2012
Temperature / Humidity / Pressure	:	22 ℃ / 44 % R.H. / 100 kPa
Cable length	:	< 3 m
Test level	:	1.0 kV (AC power input port)
Polarity	:	Negative/ positive
Repetition frequency	:	5 ㎑
Test mode	:	Operating mode
Performance Criteria	:	B (Refer to the appendix B)
Result	:	**Complies (A)**

- Classification of EUT is Category II

Measurement Data:

power Line	Test level	Result	Remarks
L – N – PE	± 1.0 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	:	2018. 07. 06.
Test method	:	EN 61000-4-5 :2014
Temperature / Humidity / Pressure	:	22 ℃ / 44 % R.H. / 100 kPa
Test level	:	1.0 kV (line to line)
Polarity	:	Negative/ positive
Wave shape	:	1.2/ 50 μs pulse
Number of surges	:	5 (at each phase)
Test mode	:	Operating mode
Performance Criteria	:	B (Refer to the appendix B)
Result	:	**Complies (A)**

- Classification of EUT is Category II

Measurement Data:

Phase	Line	level	Result	Remark
90°	Line(L) to line(N)	+ 1 kV	Complies (A)	No reaction recognized
	Line(L) to ground	+ 1 kV	Complies (A)	No reaction recognized
	Line(N) to ground	+ 1 kV	Complies (A)	No reaction recognized
270°	Line(L) to line(N)	- 1 kV	Complies (A)	No reaction recognized
	Line(L) to ground	- 1 kV	Complies (A)	No reaction recognized
	Line(N) to ground	- 1 kV	Complies (A)	No reaction recognized

3.3.5 Conducted disturbances, induced by radio-frequency fields (0.15 MHz – 80 MHz)

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	:	-
Test method	:	EN 61000-4-6:2014/AC:2015
Temperature / Humidity / Pressure	:	- ℃ / - % R.H. / - kPa
Frequency range	:	0.15 ㎒ – 80 ㎒
Test level	:	3 Vrms unmodulated
Amplitude Modulation	:	AM, 80 %, 1 ㎑ Audio signal
Step size	:	1 % of fundamental.
Test mode	:	- mode
Performance Criteria	:	A (Refer to the appendix B)
Result	:	**Not Applicables**

Measurement Data:

Port	Mode	Result	Remarks
-	-	-	-

3.3.6 Conducted disturbances, induced by radio-frequency fields (0.15 MHz – 230 MHz)

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. 06.
Test method	:	EN 61000-4-6:2014/AC:2015
Temperature / Humidity / Pressure	:	22 ℃ / 46 % R.H. / 100 kPa
Frequency range	:	0.15 ㎒ – 230 ㎒
Test level	:	3 Vrms unmodulated
Amplitude Modulation	:	AM, 80 %, 1 ㎑ Audio signal
Step size	:	1 % of fundamental.
Test mode	:	Operating mode
Performance Criteria	:	A (Refer to the appendix B)
Result	:	**Complies (A)**

- Classification of EUT is Category II

Measurement Data:

Port	Mode	Result	Remarks
Power	Operating mode	Complies (A)	No reaction recognized

3.3.7 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. 06.
Test method	:	EN 61000-4-11:2004
Temperature / Humidity / Pressure	:	22 ℃ / 48 % R.H. / 100 kPa
Voltage droop	:	40 % for duration of 10 period
		70 % for duration of 25 period
Voltage Interruption	:	0 % for duration of 0.5 period
Ut	:	230 Vac
Test mode	:	Operating mode
Performance Criteria	:	C (Refer to the appendix B)
Result	:	**Complies**

- Classification of EUT is Category II

Measurement Data:

Test Level %Ut	Voltage droop and interruptions %Ut	Duration of Reduction (period)	Result	Remarks
0	0	0.5	Complies (A)	No reaction recognized
30	70	10	Complies (A)	No reaction recognized
60	40	25	Complies (A)	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	2018.09.07	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	-	-	-

Discontinuous Disturbance Voltage

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Click Meter	CL55C	AFJ	55041225172	2018.07.13	1 year
☒	LISN	LT32C/10	AFJ	32031518210	2018.11.24	1 year
☒	TEST PROGRAM	CMS_Ver:2.3	AFJ	-	-	-

Disturbance Power

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	EMI TEST Receiver	ESCI7	Rohde & Schwarz	100772	2018.09.07	1 year
☒	ABSORBING CLAMP	MDS21	SCHWARZBECK	3665	2019.01.22	1 year
☒	ATTENUATOR(6 dB)	F04-B0306-01	SRT Technology	-	2019.01.22	1 year
☒	TEST PROGRAM	e3_Ver: 6.2009-10-12a	AUDIX	-	-	-

Harmonic Current / Flicker

	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 ㎒ ~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

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

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

APPENDIX B

PERFORMANCE CRITERIA

Performance criterion A:

The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion B:

The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however, no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion C:

Temporary loss of function is allowed, provided the function is self- recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

APPENDIX C

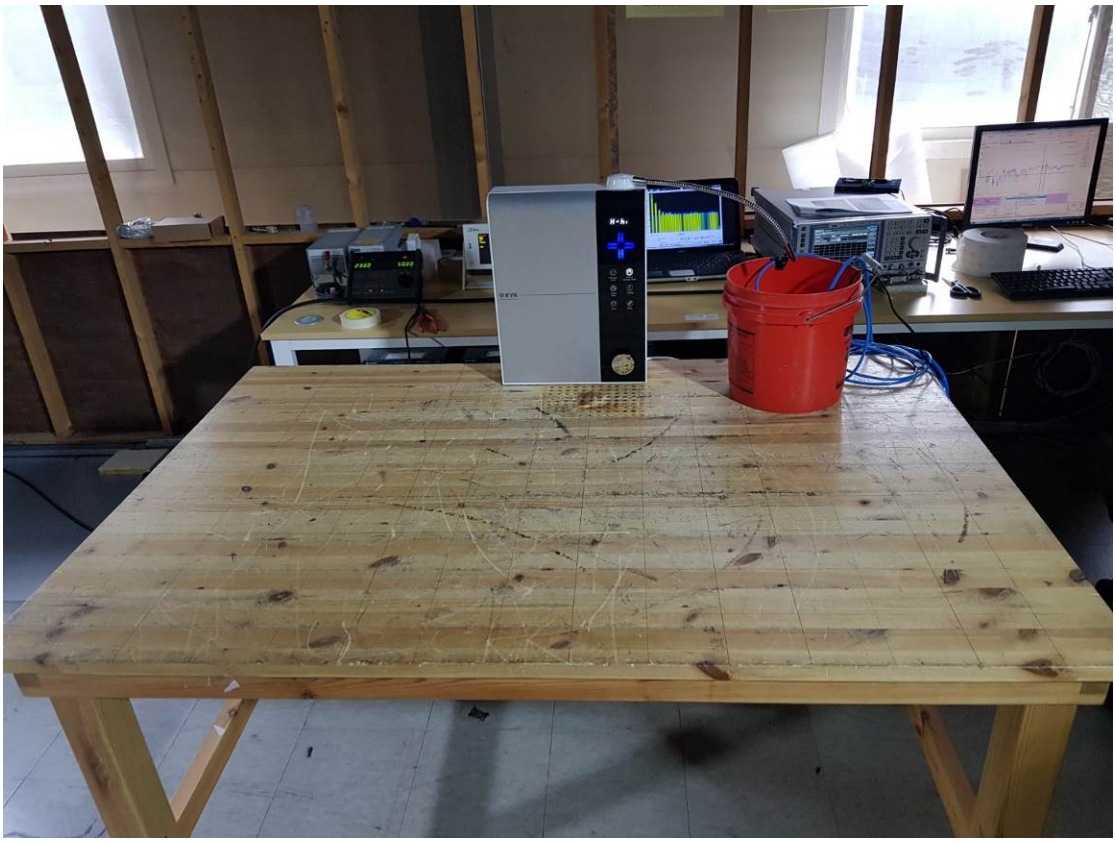
PHOTOGRAPHS

Conducted emission (Maximum emission configuration)

Discontinuous Disturbance Voltage

Disturbance Power

Harmonic Current



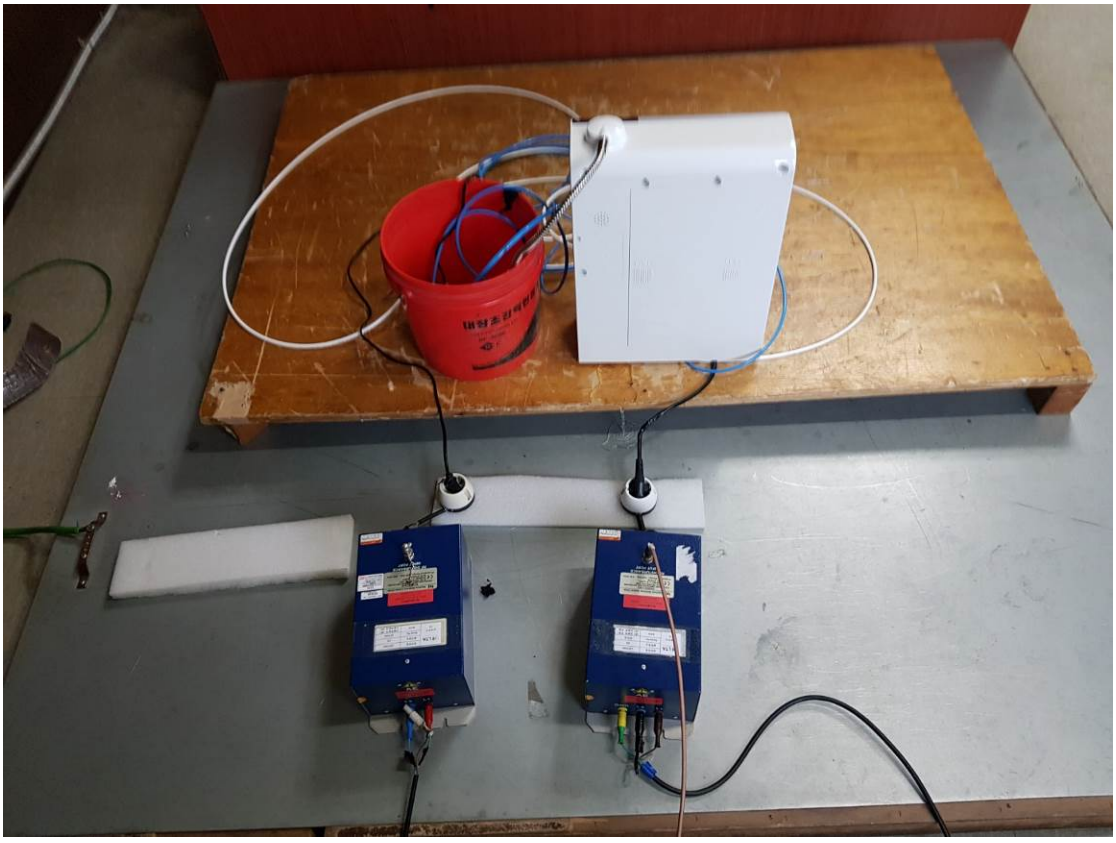
Voltage Variation and Flicking

Electrostatic Discharge

Electrical fast transients

Surge

Conducted disturbances, induced by radio-frequency fields



Mains supply voltage dips, short interruptions

EUT

EUT