



TEST REPORT	
EN 55014-1 / EN 55014-2	
Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus.	
Part 1: Emission / Part 2: Immunity – Product family standard	
Report Reference No.	CSTEE20040001
Date of issue	Apr. 01, 2020
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Testing Laboratory Name	CCIC Huatongwei International Inspection(Suzhou) Co., Ltd.
Address	Room 101, Building G , NT national university technology Park, Ruoshui Road 388, Wuzhong, Suzhou, Jiangsu, China
Testing location/ procedure	Full application of Harmonised standards <input checked="" type="checkbox"/> Partial application of Harmonised standards <input type="checkbox"/> Other standard testing methods <input type="checkbox"/>
Applicant's name	Yalong Trade s.r.o.
Address	M.Bodickeho 1517/14, 05001 Revuca, Slovakia
Test specification:	
Standard	EN 55014-1: 2017 EN 55014-2: 2015 EN 61000-3-2: 2014 EN 61000-3-3: 2013
Non-standard test method	N/A
Test Report Form No.	HTWEMCIEC_1B
TRF Originator	Shenzhen Huatongwei International Inspection Co., Ltd.
Master TRF	Dated 2014-06
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Test item description	BIOquant® LED device
Trade Mark	BIOquant®
Manufacturer	Yalong Trade s.r.o.
Model/Type reference	BIOquant® LED
Listed models	--
Ratings	Main unit: 3.7Vd.c., 1300mAh Adaptor Input: 100-240Va.c., 50/60Hz Output: 5Vd.c., 1A.
Result	Positive

EMC -- TEST REPORT

Test Report No. : CHTEE20040001	Apr. 01, 2020
	Date of issue

Equipment under Test : BIOquant® LED device

Model /Type : BIOquant® LED

Listed Model : --

Applicant : Yalong Trade s.r.o.

Address : M.Bodickeho 1517/14, 05001 Revuca, Slovakia

Manufacturer : Yalong Trade s.r.o.

Address : M.Bodickeho 1517/14, 05001 Revuca, Slovakia

Test Result according to the standards on page 4:	Positive
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The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1	<u>TEST STANDARDS</u>	4
2	<u>SUMMARY</u>	5
2.1	General Remarks	5
2.2	Equipment Under Test	5
2.3	Short description of the Equipment under Test (EUT)	5
2.4	EUT operation mode	5
2.5	EUT configuration	6
2.6	Performance level	6
3	<u>TEST ENVIRONMENT</u>	7
3.1	Address of the test laboratory	7
3.2	Environmental conditions	7
3.3	Test Description	7
3.4	Statement of the measurement uncertainty	8
3.5	Equipments Used during the Test	8
4	<u>TEST CONDITIONS AND RESULTS</u>	11
4.1	Conducted disturbance	11
4.2	Radiated Emission	15
4.3	Harmonic current	19
4.4	Voltage fluctuations and flicker	19
4.5	Electrostatic discharge	21
4.6	Radiated, radio-frequency, electromagnetic field	24
4.7	Electrical fast transients / Burst	27
4.8	Surge	29
4.9	Conducted disturbances induced by radio-frequency fields	31
4.10	Voltage dips and short interruptions	33
5	<u>EXTERNAL AND INTERNAL PHOTOS OF THE EUT</u>	35
5.1	External photos of the EUT	35
5.2	Internal photos of the EUT	37

1 TEST STANDARDS

The tests were performed according to following standards:

[EN 55014-1: 2017](#) Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus -- Part 1: Emission

[EN 55014-2: 2015](#) Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus -- Part 2: Immunity - Product family standard

[EN 61000-3-2: 2014](#) Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16 A per phase)

[EN 61000-3-3: 2013](#) Electromagnetic compatibility (EMC) -- Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample : Mar. 20, 2020

Testing commenced on : Mar. 30, 2020

Testing concluded on : Mar. 31, 2020

2.2 Equipment Under Test

Power supply system utilised

Power supply voltage : 230V / 50 Hz 120V / 60Hz
 15 V DC 24 V DC
 Other (specified in blank below)

240Va.c.,50Hz&100Va.c,60Hz

2.3 Short description of the Equipment under Test (EUT)

The EUT is a BIOquant® LED device.

Serial number: Prototype

2.4 EUT operation mode

The equipment under test was operated during the measurement under the following conditions:

Mode 1:Charging.

Mode 2: Working.

The EUT is working during the test and use visual observation to monitor the function of the EUT.

Emissions tests.....: According to EN 55014-1, searching for the highest disturbance.

Immunity tests.....: According to EN 55014-2, searching for the highest susceptibility.

Harmonic current.....: According to EN 61000-3-2, searching for the highest disturbance.

Voltage fluctuation.....: According to EN 61000-3-3, searching for the highest disturbance.

2.5 EUT configuration

No peripheral devices and interface cables were connected during the measurement.

2.6 Performance level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level defined by its manufacturer or the requestor of the test, or agreed between the manufacturer and the purchaser of the product.

Definition related to the performance level:

- based on the used product standard
- o based on the declaration of the manufacturer, requestor or purchaser

Criterion A:

Definition: normal performance within limits specified by the manufacturer, requestor or purchaser:

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.

Criterion B:

Definition: temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention:

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.

Criterion C:

Definition: temporary loss of function or degradation of performance, the correction of which requires operator intervention:

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.

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

CCIC Huatongwei International Inspection(Suzhou) Co., Ltd.
Room 101,Building G , NT national university technology Park, Ruoshui Road 388, Wuzhong,
Suhzou,Jiangsu,China

3.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 950-1050mbar

3.3 Test Description

Emission Measurement		
Conducted Disturbance	EN 55014-1: 2017	PASS
Radiated Emission	EN 55014-1: 2017	PASS
Click Test	EN 55014-1: 2017	N/A
Power Clamp Radiation	EN 55014-1: 2017	N/A
Harmonic Current	EN 61000-3-2: 2014	N/A
Voltage Fluctuation and Flicker	EN 61000-3-3: 2013	PASS
Immunity Measurement		
Electrostatic Discharge	EN 55014-2: 2015 EN 61000-4-2: 2009	PASS
RF Field Strength Susceptibility	EN 55014-2: 2015 EN 61000-4-3: 2006+A1: 2008+A2: 2010	PASS
Electrical Fast Transient/Burst Test	EN 55014-2: 2015 EN 61000-4-4: 2012	PASS
Surge Test	EN 55014-2: 2015 EN 61000-4-5: 2014+A1: 2017	PASS
Conducted Susceptibility Test	EN 55014-2: 2015 EN 61000-4-6: 2014	PASS
Voltage Dips and Interruptions Test	EN 55014-2: 2015 EN 61000-4-11: 2004+A1: 2017	PASS

Remark: N/A means "not applicable".

The measurement uncertainty is not included in the test result.

3.4 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Test	Range	Measurement Uncertainty	Notes
Conducted Disturbance	0.15~30MHz	3.02dB	(1)
Power Clamp Radiation	30~300MHz	3.18dB	(1)
Radiated Emission	30~1000MHz	4.90dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

3.5 Equipments Used during the Test

Radiated Emission/ Radiated power						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Trilog Broadband Antenna	SCHWARZB ECK	VULB9163	01173	9/12/2018	9/11/2021
2	Emi Test Receiver	R&S	ESI26	100009	09/17/2019	09/16/2020
3	Pre-amplifier	SCHWARZB ECK	BBV 9744	00105	09/12/2019	09/11/2020
4	Turntable	MF	N/A	N/A	N/A	N/A
5	Antenna Mast	MF	N/A	N/A	N/A	N/A

Conducted Disturbance						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	EMI Test Receiver	R&S	ESCI	100106	9/17/2019	9/16/2020
2	3P LISN	SCHWARZB ECK	NNLK 8121RC	06168	9/17/2019	9/16/2020
3	Pulse Limiter	SCHWARZB ECK	VTSD 9561-F	00452	9/17/2019	9/16/2020

Harmonic Current						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Power Source	EMTEST	ACS500N6	P182122068 8	8/17/2019	8/16/2020
2	Harmonics & Flicker Analyser	EM TEST	DPA500N	P180721431 6	8/17/2019	8/16/2020

Voltage Fluctuation and Flicker						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Power Source	EMTEST	ACS500N6	P182122068 8	8/17/2019	8/16/2020
2	Harmonics & Flicker Analyser	EM TEST	DPA500N	P180721431 6	8/17/2019	8/16/2020

Electrostatic Discharge						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	ESD Simulator	DITO	0301-04	P125110788 8	7/23/2019	7/22/2020

Voltage Dips and Interruptions						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Multifunction Immunity Test System	EM TEST	NX5 bspt-1-300-16	P180721432 5	7/17/2019	7/16/2020
2	Voltage Regulators	EM TEST	NX-1 -260-16	P182822178 8	7/17/2019	7/16/2020

Electrical Fast Transient/Burst						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Multifunction Immunity Test System	EM TEST	NX5 bspt-1-300-16	P180721432 5	7/17/2019	7/16/2020

Surge						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Multifunction Immunity Test System	EM TEST	NX5 bspt-1-300-16	P180721432 5	7/17/2019	7/16/2020

RF Field Strength Susceptibility						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Signal Generator	Keysight	N5171B	MY59100 289	6/29/2019	6/28/2020

2	Amplifier	AR	150W1000	301584	9/17/2019	9/16/2020
3	Dual Directional Coupler	AR	DC6080	301508	9/17/2019	9/16/2020
4	Power Head	AR	PH2000	301193	9/17/2019	9/16/2020
5	Power Meter	AR	PM2002	302799	9/17/2019	9/16/2020
6	Transmit Antenna	AR	AT1080	28570	10/28/2018	10/27/2021
7	Dual Directional Coupler	AR	DC7144A	0325100	9/17/2019	9/16/2020
8	Microwave Horn Antenna	AR	AT4002A	0324848	10/28/2018	10/27/2021
9	Power Amplifier	AR	25S1G4A	0325511	11/21/2019	11/20/2020

Conducted Susceptibility

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Signal Generator	TESEQ	NSG 4070C-80	50504	3/16/2020	3/15/2021
2	Fixed Attenuator r	TESEQ	ATN 6150	/	3/16/2020	3/15/2021
3	CDN	TESEQ	CDN M016	50738	3/16/2020	3/15/2021

Power Frequency Magnetic Field Susceptibility

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Multifunction Immunity Test System	EM TEST	NX5 bspt-1-300-16	P1807214325	7/17/2019	7/16/2020
2	Current Transformer	EM TEST	MC2630	P1816215103	7/17/2019	7/16/2020
3	Magnetic Field Antenna	EM TEST	MS100N	P1803213718	8/2/2018	8/1/2021

4 TEST CONDITIONS AND RESULTS

4.1 Conducted disturbance

For test instruments and accessories used see section 3.6.

4.1.1 Description of the test location

Test location: Conductive Test Room

Date of test: Mar. 30, 2020

Operator: Casy.Sang

4.1.2 Limits of disturbance

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150~0.500	66~56	59~46
0.500~5.000	56	46
5.000~30.000	60	50

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

4.1.3 Description of the test set-up

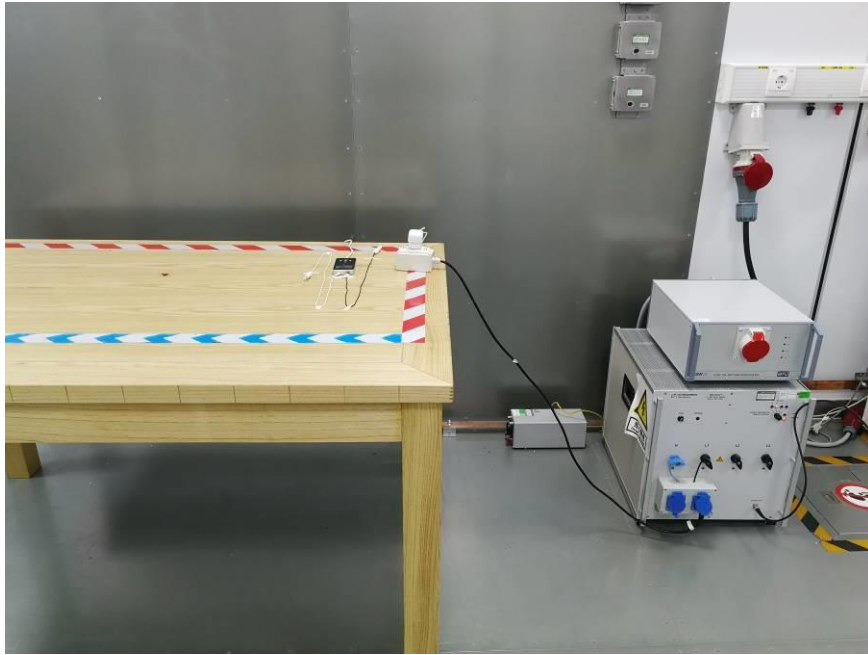
4.1.3.1 Operating Condition

The EUT is operated in the normal work during the test, and the maximum emanating results are recorded.

4.1.3.2 Test Configuration and Procedure

EUT is placed on a nonmetal table which is 0.8 meter (or 0.1 meter for floor-stood equipments) above the grounded reference plane. Connect the power line of the EUT to the LISN. Voltage of the power supply is varied over a range of 0.9 to 1.1 times of the rated voltage in order to check whether the level of disturbance varies considerably with the supply voltage at the selected frequency about 160KHz. Perform an initial measurement on each line with peak detector to identify the frequencies where the maximum disturbances may occur. Then measure and record the maximum disturbances with quasi-peak and average detector.

4.1.3.3 Photo of the test set-up
Mode1:



4.1.4 Test result

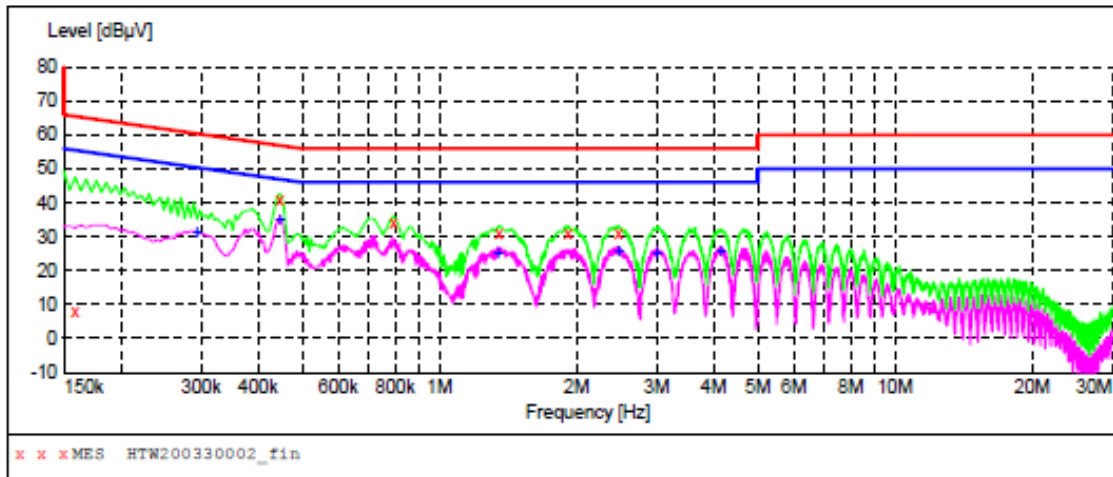
The requirements are **Fulfilled**

Band Width: 9KHz

Frequency Range: 150KHz to 30MHz

Remarks: The limits are kept. For detailed results, please see the following page(s).
Margin=Limit—Level, Level=read values+transducer, Transducer=Insertion loss of LISN+ Cable loss+Insertion loss of Pulse limiter

Mode 1:



MEASUREMENT RESULT: "HTW200330002_fin"

2020-3-30 9:16

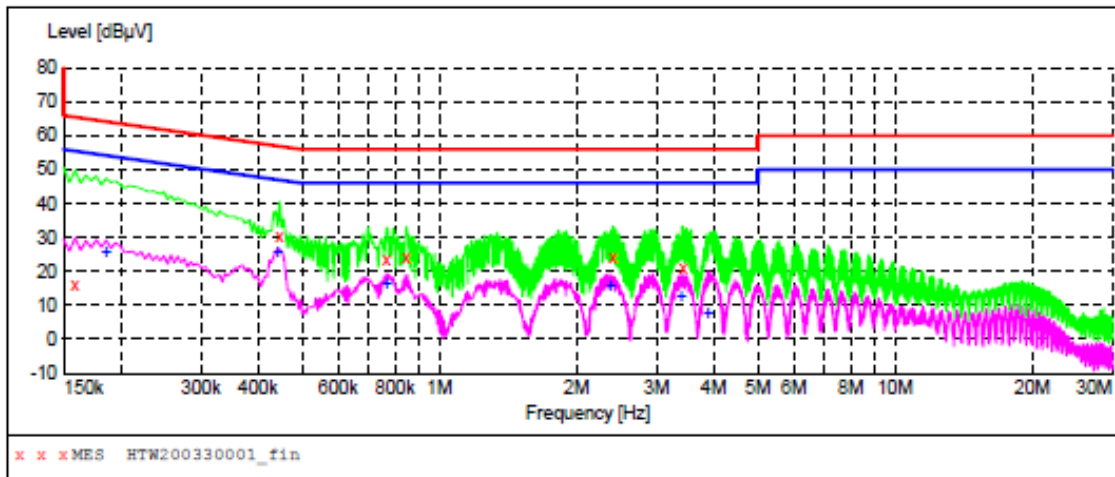
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.159000	8.20	-0.3	66	57.3	QP	L1	GND
0.447000	41.20	-0.2	57	15.7	QP	L1	GND
0.793500	33.90	-0.3	56	22.1	QP	L1	GND
1.351500	31.10	-0.1	56	24.9	QP	L1	GND
1.918500	31.20	0.0	56	24.8	QP	L1	GND
2.476500	30.70	-0.1	56	25.3	QP	L1	GND

MEASUREMENT RESULT: "HTW200330002_fin2"

2020-3-30 9:16

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.294000	31.40	-0.2	50	19.0	AV	L1	GND
0.447000	35.20	-0.2	47	11.7	AV	L1	GND
1.342500	25.40	-0.1	46	20.6	AV	L1	GND
2.476500	25.80	-0.1	46	20.2	AV	L1	GND
3.003000	25.20	-0.1	46	20.8	AV	L1	GND
4.150500	25.90	-0.1	46	20.1	AV	L1	GND

Mode 1:



MEASUREMENT RESULT: "HTW200330001_fin"

2020-3-30 9:13

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.159000	15.80	-0.3	66	49.7	QP	N	GND
0.447000	30.30	-0.2	57	26.6	QP	N	GND
0.766500	23.60	-0.3	56	32.4	QP	N	GND
0.847500	24.20	-0.3	56	31.8	QP	N	GND
2.404500	24.10	-0.1	56	31.9	QP	N	GND
3.426000	21.00	-0.1	56	35.0	QP	N	GND

MEASUREMENT RESULT: "HTW200330001_fin2"

2020-3-30 9:13

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.186000	26.00	-0.2	54	28.2	AV	N	GND
0.442500	25.90	-0.2	47	21.1	AV	N	GND
0.766500	16.50	-0.3	46	29.5	AV	N	GND
2.368500	16.20	-0.1	46	29.8	AV	N	GND
3.403500	12.90	-0.1	46	33.1	AV	N	GND
3.885000	8.20	-0.1	46	37.8	AV	N	GND

4.2 Radiated Emission

For test instruments and accessories used see section 3.6.

4.2.1 Description of the test location

Test location: Anechoic Chamber

Date of test: Mar. 30, 2020

Operator: Casy.Sang

4.2.2 Limits of disturbance

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB μ V/m)
30 ~ 230	3	40
230 ~ 1000	3	47

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

4.2.3 Description of the test set-up

4.2.3.1 Operating Condition

The EUT is operated in the normal work during the test, and the maximum emanating results are recorded.

4.2.3.2 Test Configuration and Procedure

EUT is tested in Semi-Anechoic Chamber. EUT is placed on a nonmetal table which is 0.8 meter above a grounded turntable. The turntable can rotate 360 degrees to determine the azimuth of the maximum emission level. EUT is set 3 meters away from the center of receiving antenna, and the antenna can move up and down from 1 to 4 meter to find out the maximum emission level. Both horizontal and vertical polarizations of the antenna are set on the test.

4.2.3.3 Photos of the test set-up

Mode 1:



Mode 2:



4.2.4 Test result

The requirements are **Fulfilled**

Band Width: 120kHz

Frequency Range: 30MHz to 1000MHz

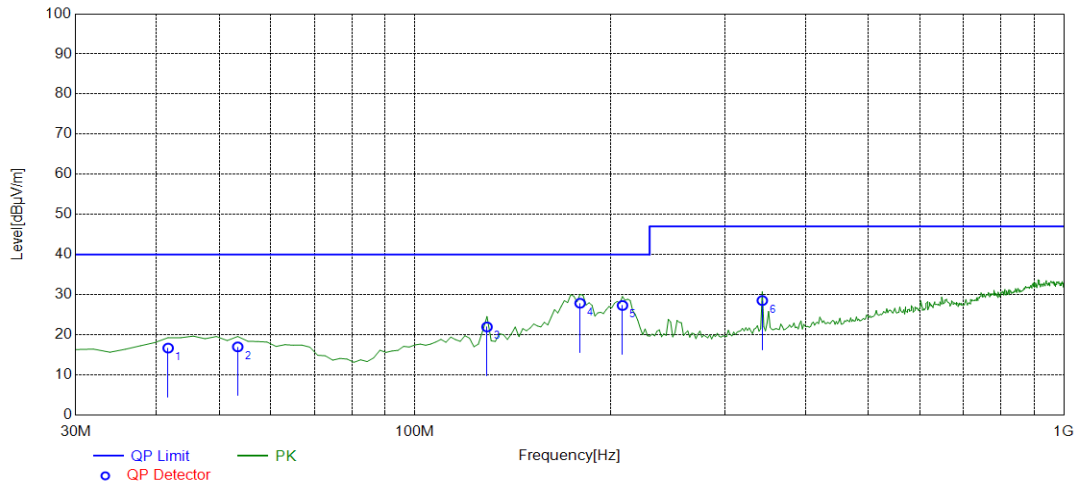
Remarks: The limits are kept. For detailed results, please see the following page(s).

Margin=limit-level

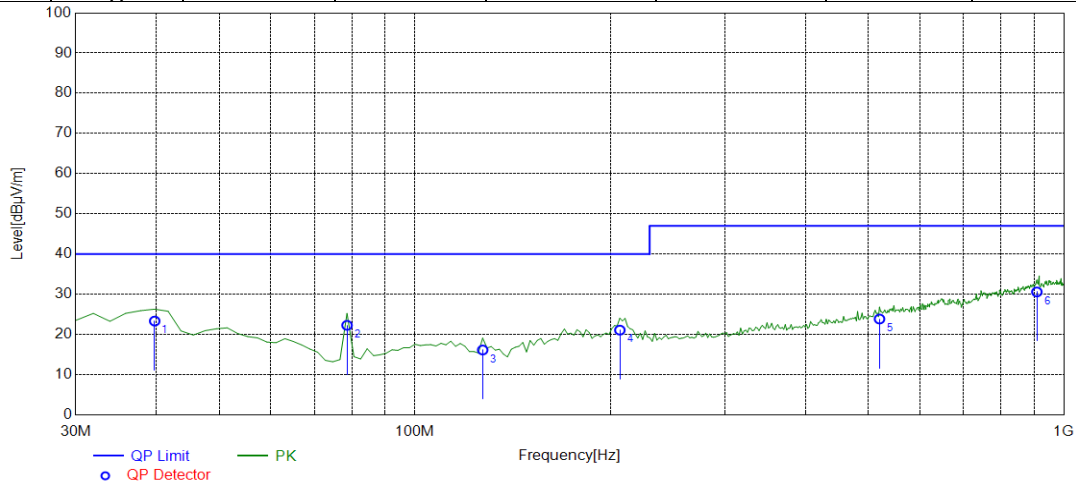
Level=read values+transducer

Transducer=antenna factor+pre-amplifier factor+cable loss

Mode 1:
AC 230V/50Hz:

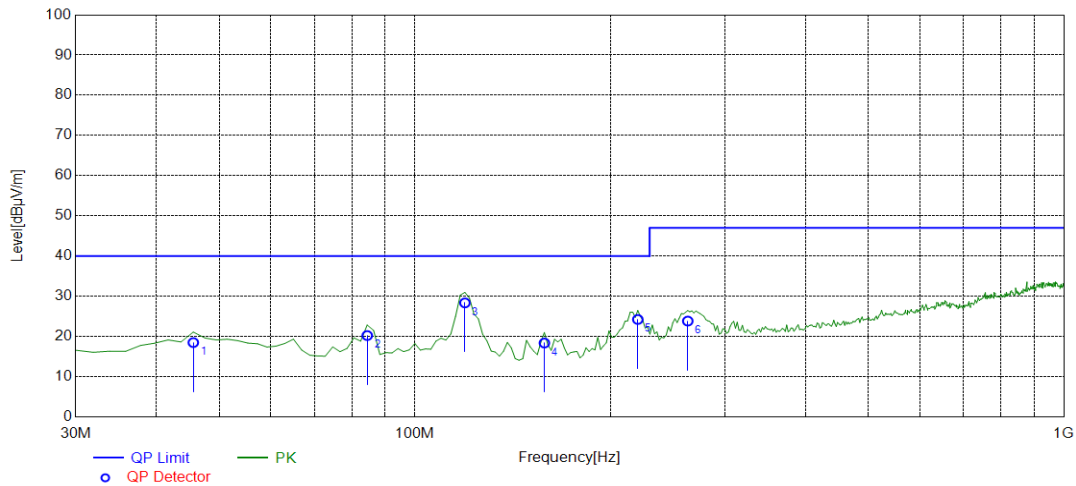


Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	41.6633	-11.56	16.71	40.00	23.29	100	26	Horizontal
2	53.3267	-11.31	17.01	40.00	22.99	200	144	Horizontal
3	129.138	-16.93	21.98	40.00	18.02	200	342	Horizontal
4	179.679	-15.72	27.88	40.00	12.12	200	73	Horizontal
5	208.837	-14.01	27.33	40.00	12.67	200	312	Horizontal
6	342.965	-9.85	28.55	47.00	18.45	100	296	Horizontal

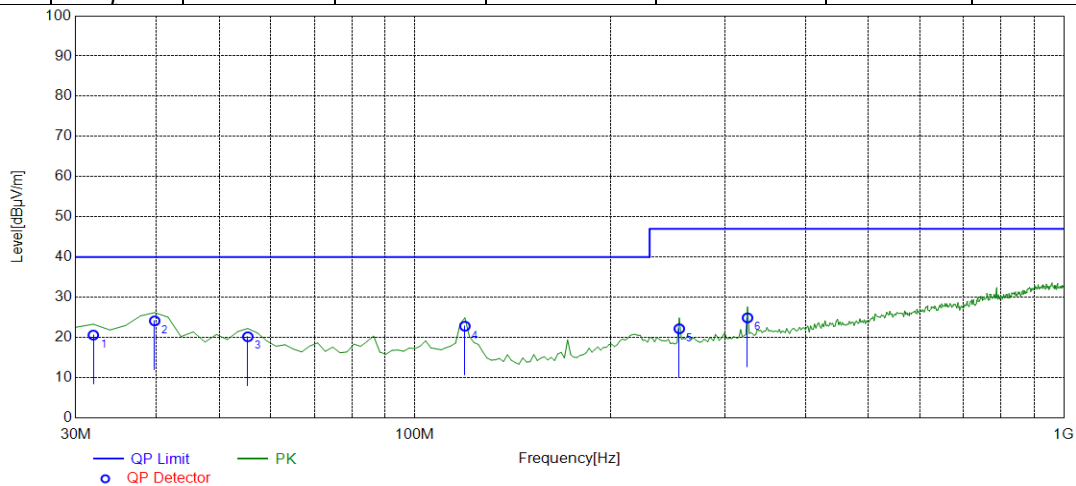


Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	39.7194	-12.20	23.35	40.00	16.65	100	289	Vertical
2	78.5972	-17.50	22.29	40.00	17.71	200	154	Vertical
3	127.194	-16.76	16.16	40.00	23.84	100	179	Vertical
4	206.893	-13.95	21.10	40.00	18.90	100	117	Vertical
5	519.859	-6.78	23.87	47.00	23.13	200	173	Vertical
6	908.637	-1.18	30.60	47.00	16.40	200	0	Vertical

Mode 2:
DC 3.7V



Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	45.5511	-11.16	18.50	40.00	21.50	200	279	Horizontal
2	84.4289	-16.77	20.25	40.00	19.75	200	348	Horizontal
3	119.418	-15.36	28.37	40.00	11.63	200	192	Horizontal
4	158.296	-16.88	18.39	40.00	21.61	100	208	Horizontal
5	220.501	-13.61	24.25	40.00	15.75	100	275	Horizontal
6	263.266	-12.23	23.85	47.00	23.15	100	88	Horizontal



Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	31.9439	-14.28	20.61	40.00	19.39	100	252	Vertical
2	39.7194	-12.20	24.14	40.00	15.86	100	82	Vertical
3	55.2705	-11.69	20.19	40.00	19.81	100	341	Vertical
4	119.418	-15.36	22.83	40.00	17.17	100	104	Vertical
5	255.491	-12.35	22.18	47.00	24.82	200	232	Vertical
6	325.470	-10.63	24.90	47.00	22.10	200	182	Vertical

4.3 Harmonic current

The test is not applicable to the EUT.

Remark: EUT is deemed to comply with the requirements of EN 61000-3-2: 2014 without test since the rating power of EUT is less than 75W.

4.4 Voltage fluctuations and flicker

For test instruments and accessories used see section 3.6.

4.4.1 Description of the test location

Test location: EMS Integrate Room

Date of test: Mar. 31, 2020

Operator: Janquan, Wu

4.4.2 Limit of voltage fluctuation and flicker

Test configuration and procedure see clause 5 of standard EN 61000-3-3: 2013.

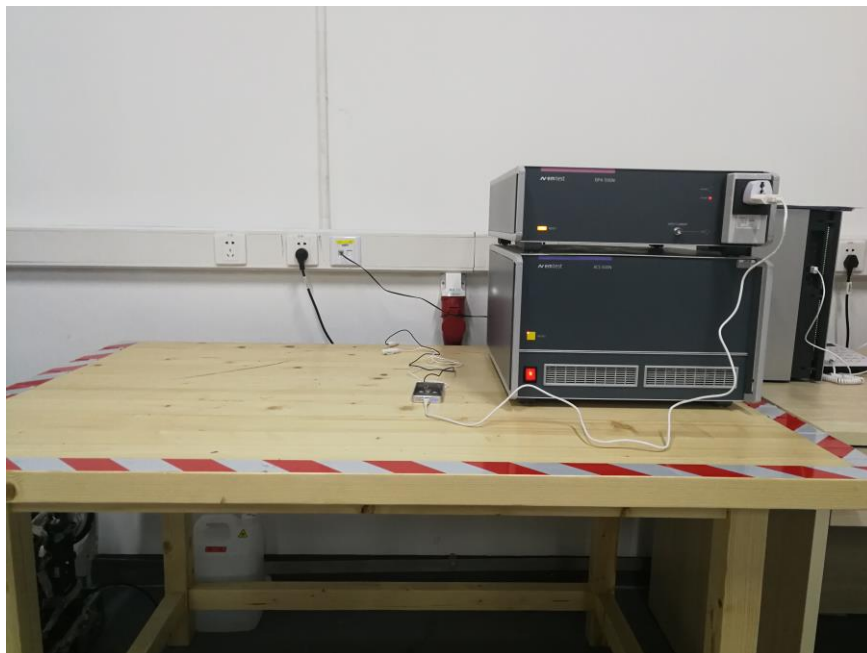
4.4.3 Description of the test set-up

4.4.3.1 Operating Condition

The EUT is operated in the normal work during the test, and the maximum emanating results are recorded.

4.4.3.2 Photo of the test set-up

Mode 1:



4.4.4 Test result

The requirements are **Fulfilled**

Remarks: The limits are kept. For detailed results, please see the following page(s).

Test Report of HTW

Standard used:	EN/IEC 61000-3-3 Flicker
Short time (Pst):	10 mins
Observation time:	120 mins (12Flicker measurements)
Mains supply voltage:	AC 230V/50Hz
Ambient Temperature	23°C
Humidity:	51%
Barometric Pressure:	1017mbar

Test Result	PASS
-------------	------

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.054	1.00	PASS
Plt	0.052	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	< 0.2	4.00	PASS
dt [s]	0.000	0.50	PASS

4.5 Electrostatic discharge

For test instruments and accessories used see section 3.6.

4.5.1 Description of the test location and date

Test location: ESD room

Date of test: Mar. 31, 2020

Operator: Casy. Sang

4.5.2 Severity levels of electrostatic discharge

4.5.2.1 Severity level: Contact Discharge at $\pm 4\text{KV}$ Air Discharge at $\pm 8\text{KV}$

Level	Test Voltage	Test Voltage
	Contact Discharge (KV)	Air Discharge (KV)
1	2	2
2	4	4
3	6	8
4	8	15
X	Special	Special

4.5.2.2 Performance criterion: **B**

4.5.3 Description of the test set-up

4.5.3.1 Operating Condition

The EUT is operated in the normal work during the test, and the results of the maximum susceptibility are recorded.

4.5.3.2 Test Configuration and Procedure:

Air Discharge:

- This test is done on a non-conductive surfaces. The round discharge tip of the Electrostatic Discharge simulator shall be approached as fast as possible then to touch the EUT. After each discharge, the simulator shall be removed from the EUT. The simulator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

Contact Discharge:

- All the procedure shall be same as air discharge, except using the acute discharge tip. The top end of the Electrostatic Discharge simulator is touch the EUT all the time when the simulator is re-triggered for a new single discharge and repeated 10 times for each pre-selected test point.

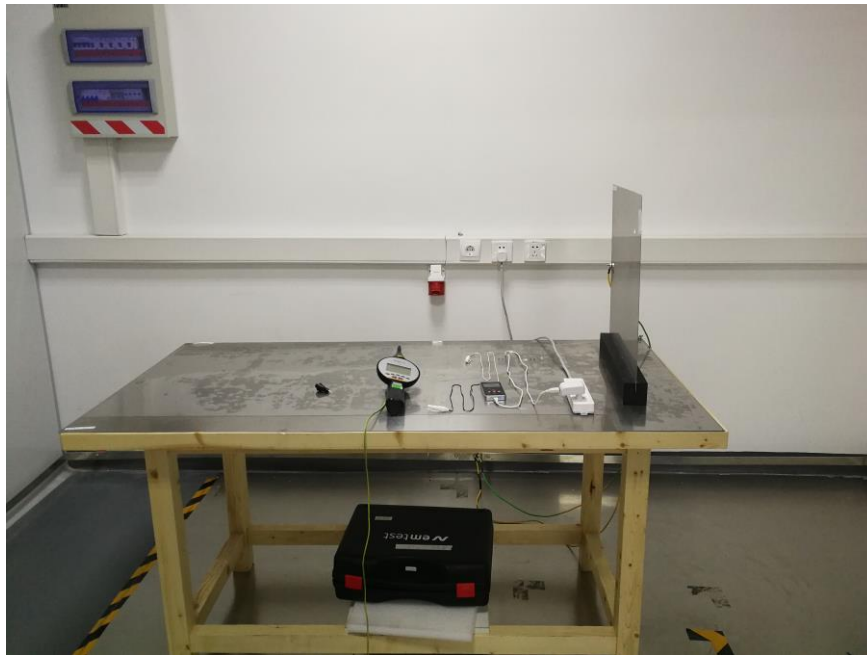
Indirect Discharge:

- The vertical coupling plane(VCP) is placed 0.1m away from EUT. The top end of Electrostatic Discharge simulator should aim at the center of one border of the VCP for at least 10 times discharge.
- The top end of Electrostatic Discharge simulator should place at the point 0.1m away from EUT on the horizontal coupling plane(HCP). At least 10 times discharge should be done for every pre-selected point around EUT

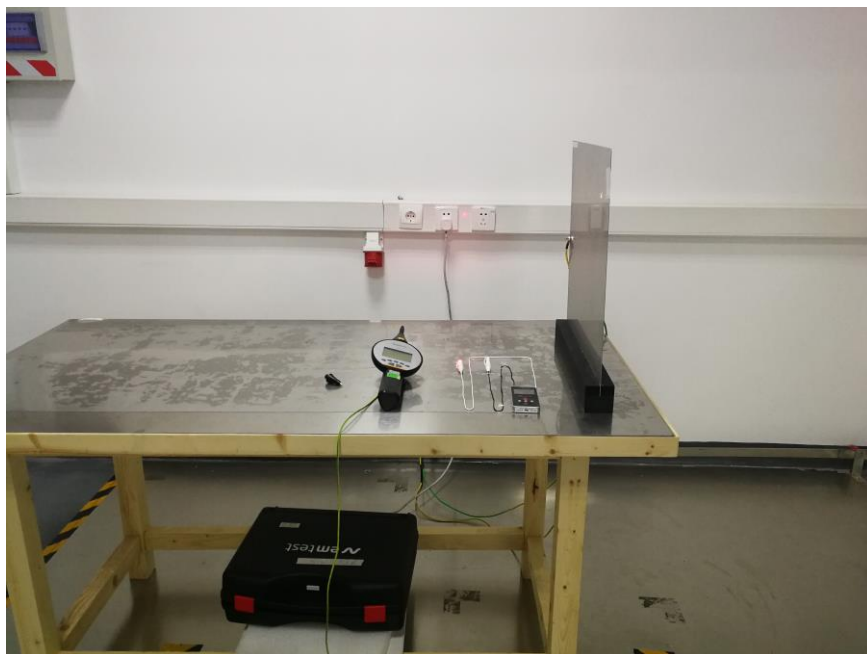
Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.5.3.3 Photo of the test set-up

Mode 1:



Mode 2:



4.5.4 Test specification:

Contact discharge voltage:

- 2 kV
- 4 kV

Air discharge voltage:

- 2 kV
- 4 kV
- 8 kV

Events(every polarity) /per point:

- 10

Time between events:

- 1 s

Type of discharge:

- | | |
|--------------------|---------------------|
| Direct discharge | ■ Air discharge |
| Indirect discharge | ■ Contact discharge |
| ■ Positive | ■ Contact discharge |
| | ■ Negative |

Polarity:

Discharge location:

- see photo documentation of the test set-up
- all external locations accessible by hand
- horizontal coupling plane (HCP)
- vertical coupling plane (VCP)

4.5.5 Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).

4.6 Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 3.6.

4.6.1 Description of the test location and date

Test location: 3m Anechoic Chamber

Date of test: Mar. 31, 2020

Operator: Casy. Sang

4.6.2 Severity levels of radiated, radio-frequency, electromagnetic field

4.6.2.1 Severity level: 3 V/m

Level	Field Strength (V/m)
1	1
2	3
3	10
X	Special

4.6.2.2 Performance criterion: A

4.6.3 Description of the test set-up

4.6.3.1 Operating Condition

The EUT is operated in the normal work during the test, and the results of the maximum susceptibility are recorded.

4.6.3.2 Test Configuration and Procedure

EUT is placed on a table which is 0.8 meter above ground. The front tip of the transmitting antenna is set 3 meter away from the EUT. During the test, each of four sides of EUT will face the transmitting antenna with the turntable cycled. Both horizontal and vertical polarization of the antenna are set on test and measured individually.

In order to judge the performance of the EUT, a set of monitor system is used.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.6.3.3 Photo of the test set-up

Mode 1:



Mode 1:



4.6.4 Test specification:

<u>Frequency range:</u>	■ 80 MHz to 1 000 MHz
<u>Field strength:</u>	■ 3 V/m
<u>EUT - antenna separation:</u>	■ 3 m
<u>Modulation:</u>	■ AM: 80% ■ sinusoidal 1kHz
<u>Frequency step:</u>	■ 1% with 1 s dwell time
<u>Antenna polarisation:</u>	■ horizontal ■ vertical

4.6.5 Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

Remarks: During the test no deviation was detected to the selected operation mode(s)

4.7 Electrical fast transients / Burst

For test instruments and accessories used see section 3.6.

4.7.1 Description of the test location and date

Test location: EMS Integrate Room

Date of test: Mar. 31, 2020

Operator: Casy. Sang

4.7.2 Severity levels of electrical fast transients / Burst

4.7.2.1 Severity level: \pm 1kV for AC power supply lines

Open circuit output test voltage and repetition rate of the impulses				
Level	On power port, PE		On I/O signal, data and control ports	
	V peak(KV)	Repetition rate (kHz)	Voltage peak	Repetition rate (kHz)
1.	0.5	5 or 100	0.25	5 or 100
2.	1	5 or 100	0.5	5 or 100
3.	2	5 or 100	1	5 or 100
4.	4	5 or 100	2	5 or 100
X	Special	Special	Special	Special

4.7.2.2 Performance criterion: **B**

4.7.3 Description of the test set-up

4.7.3.1 Operating Condition

The EUT is operated in the normal work during the test, and the results of the maximum susceptibility are recorded.

4.7.3.2 Test Requirements

EUT and its simulators shall be placed 0.1m high above the ground reference plane which is a minimum 1m*1m with minimum 0.65mm thickness. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

4.7.3.3 Test Configuration and Procedure

For AC power input lines:

- EUT is connected to coupling/decoupling network which couples the EFT signal to power input lines. During the test, both polarities of the test voltage should be applied and the duration of the test can't be less than 1mins.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.7.3.4 Photo of the test set-up

Mode 1:



4.7.4 Test specification:

- U: 0.5 kV 1 kV 2 kV
- Coupling: L N PE L+N L+PE N+PE L+N+PE
 Signal line (Only 0.5kV)
- Burst frequency: 5.0 kHz
- Test duration: 120s
- Time between Tests: 2 s
- td: 15 ms
- tr: 300 ms
- Polarity: positive negative

4.7.5 Coupling points

- Cable description: AC power line : L, N, L+N
- Screening: screened unshielded
- Status: passive active
- Signal transmission: analogue digital
- Length: / m

4.7.6 Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).

4.8 Surge

For test instruments and accessories used see section 3.6.

4.8.1 Description of the test location and date

Test location: EMS Integrate Room

Date of test: Mar. 31, 2020

Operator: Casy. Sang

4.8.2 Severity levels of surge

4.8.2.1 Severity level: Line to line: $\pm 1\text{KV}$

Level	Test Voltage (KV)
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

4.8.2.2 Performance Criterion: **B**

4.8.3 Description of the test set-up

4.8.3.1 Operating Condition

The EUT is operated in the normal work during the test, and the results of the maximum susceptibility are recorded.

4.8.3.2 Test Configuration and Procedure

In this test, the 1.2/50us & 8/20us surge generator must be used for AC power ports. The voltage for line to earth coupling mode is twice of that for line to line. At least 5 positive and 5 negative (polarity) surge signal with a maximum 1/min repetition rate are injected to AC power lines from 4 different phase angles (0° , 90° , 180° , 270°) during the test.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.8.3.3 Photo of the test set-up

Mode 1:



4.8.4 Test specification:

Pulse amplitude-Power line sym.: 0.5 kV 1 kV 2 kV 4 kV
 Source impedance: 2 Ω + 18μF

Pulse amplitude-Power line unsym.: 0.5 kV 1 kV 2 kV 4 kV
 Source impedance: 12 Ω + 9μF

Number of surges: 5 Surges/Phase angle

Phase angle: 0 ° 90 ° 180 ° 270 °

Repetition rate: 60 s

Polarity: positive negative

4.8.5 Coupling points

Cable description: AC power line: L-N

Screening: screened unshielded
 Status: passive active
 Signal transmission: analogue digital
 Length: / m

4.8.6 Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).

4.9 Conducted disturbances induced by radio-frequency fields

For test instruments and accessories used see section 3.6.

4.9.1 Description of the test location and date

Test location: EMS Integrate Room

Date of test: Mar. 31, 2020

Operator: Casy. Sang

4.9.2 Severity levels of conducted disturbances induced by radio-frequency fields

4.9.2.1 Severity Level: 3V

Level	Field Strength (V)
1.	1
2.	3
3.	10
X	Special

4.9.2.2 Performance Criterion: **A**

4.9.3 Description of the test set-up

4.9.3.1 Operating Condition

The EUT is operated in the normal work during the test, and the results of the maximum susceptibility are recorded.

4.9.3.2 Test Configuration and Procedure

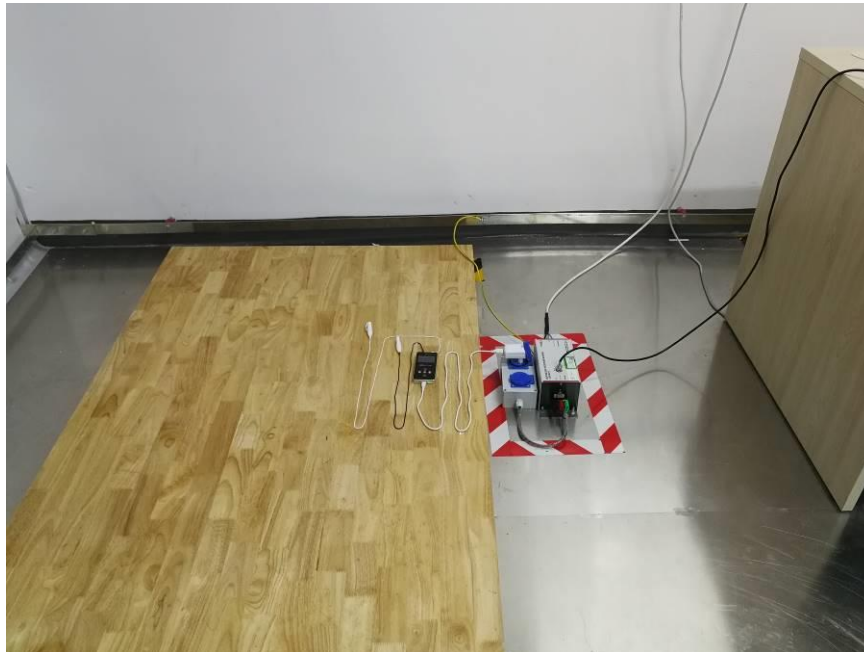
For AC power input lines:

—EUT is placed on an insulating support of 0.1m high above a ground reference plane. It must be 0.3m away the CDN (coupling and decoupling network) of which the bottom is made of metallic material and placed directly on the ground plane. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible). The disturbance signal amplified by amplifier is injected to EUT through CDN.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.9.3.3 Photo of the test set-up

Mode 1:



4.9.4 Test specification:

- Frequency range: ■ 0.15 MHz to 80 MHz
- Test voltage: ■ 3 V
- Modulation: ■ AM: 80 %
■ sinusoidal 1kHz
- Frequency step: ■ 1 % with 1 s dwell time

4.9.5 Coupling points

Cable description :	AC power line
Screening:	<input type="radio"/> screened <input checked="" type="radio"/> unscreened
Status:	<input type="radio"/> passive <input checked="" type="radio"/> active
Signal transmission:	<input checked="" type="checkbox"/> analogue <input type="radio"/> digital
Length:	<input checked="" type="checkbox"/> 1.5 m

4.9.6 Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

Remarks: During the test no deviation was detected to the selected operation mode(s).

4.10 Voltage dips and short interruptions

For test instruments and accessories used see section 3.6.

4.10.1 Description of the test location and date

Test location: EMS Integrate Room

Date of test: Mar. 31, 2020

Operator: Casy. Sang

4.10.2 Severity levels of voltage dips and short interruptions

Test Level (%Ut)	Voltage Dip And Short Interruptions (%Ut)	Performance Criterion	Duration (In Period)	
			50Hz	60Hz
0	100	C	0.5	0.5
40	60	C	10	12
70	30	C	25	30

4.10.3 Description of the test set-up

4.10.3.1 Operating Condition

The EUT is operated in the normal work during the test, and the results of the maximum susceptibility are recorded.

4.10.3.2 Test Configuration and Procedure

EUT is connected to the simulator according to the test photo. When conducting this test, the power supply shall be set at the minimum and maximum rated input voltages and test voltage changes shall be step changes at the phase angle of 0° , 45° , 90° , 135° , 180° , 225° , 270° and 315° .

4.10.3.3 Photo of the test set-up

Mode 1:



4.10.4 Test specification:

<u>Nominal Mains Voltage (V_N):</u>	■ 240 V AC	■ 100 V AC
<u>Number of voltage fluctuations:</u>	■ 3	
<u>Level of reduction(dip) / duration:</u>	■ 30 % / 500ms(50Hz&60Hz)	
<u>Nominal Mains Voltage (V_N):</u>	■ 240 V AC	■ 100 V AC
<u>Number of voltage fluctuations:</u>	■ 3	
<u>Level of reduction(dip) / duration:</u>	■ 60 % / 200ms(50Hz&60Hz)	
<u>Nominal Mains Voltage (V_N):</u>	■ 240 V AC	■ 100 V AC
<u>Number of voltage fluctuations:</u>	■ 3	
<u>Level of reduction(dip) / duration:</u>	■ 100 % / 10ms(50Hz), 8.3ms(60Hz)	

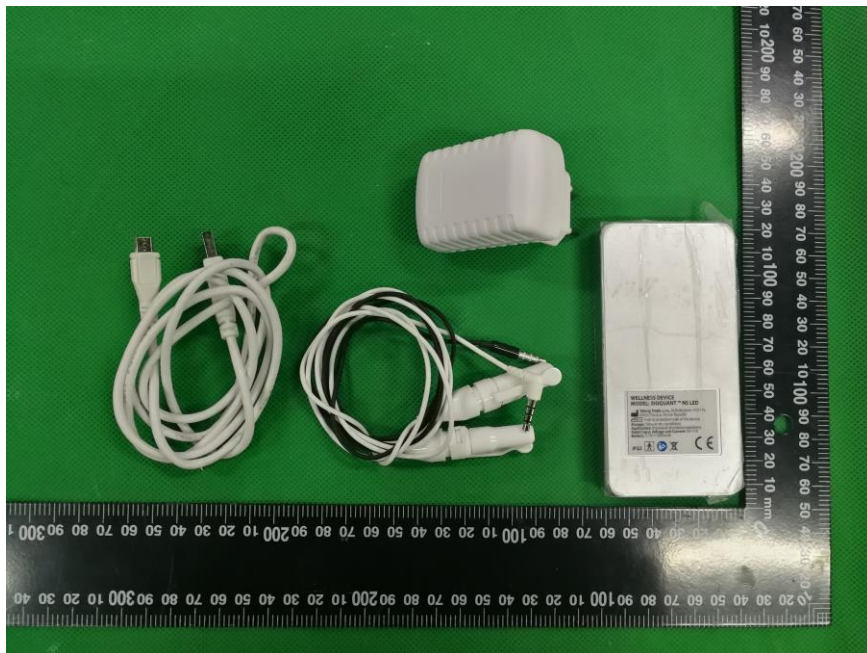
4.10.5 Test result

The requirements are **Fulfilled**
Performance Criterion **see clause 4.9.2**

Remarks: During the test the EUT has met the requirements of Performance Criterion C for Voltage Dip.

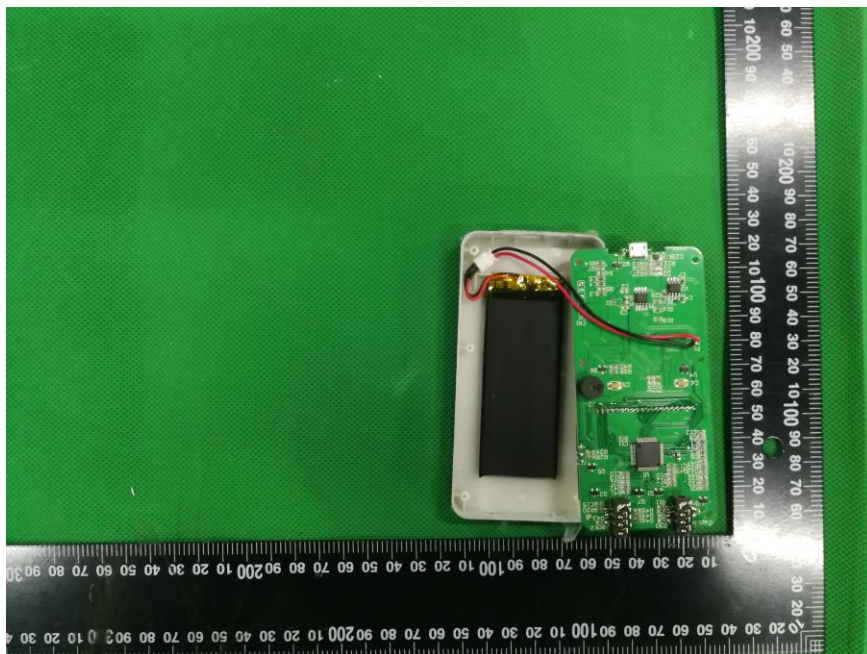
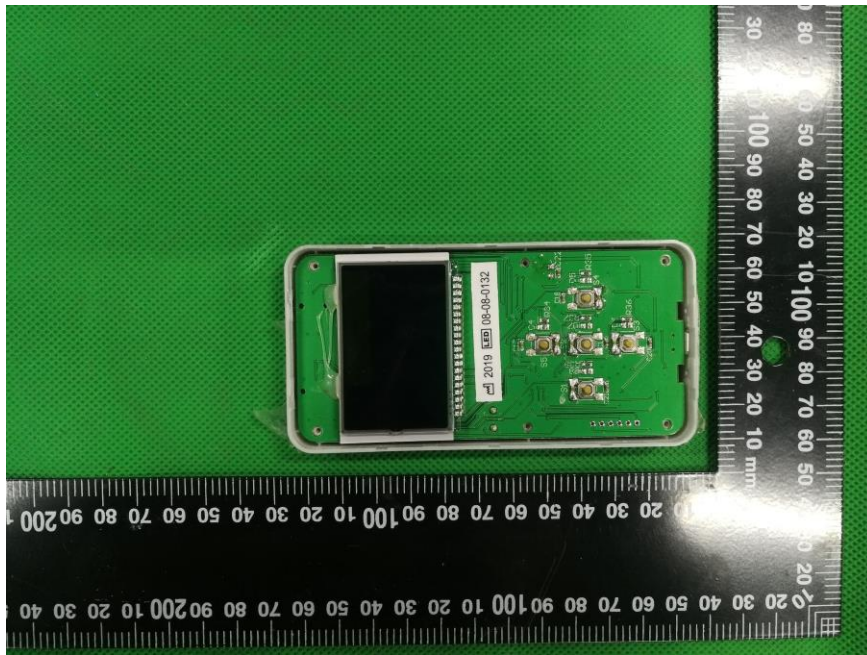
5 External and Internal Photos of the EUT

5.1 External photos of the EUT





5.2 Internal photos of the EUT



.....End of Report.....