

EMC TEST REPORT
for

TSCALE ELECTRONICS MFG (KUNSHAN) CO., LTD

Electronic balance
Model No.: NB, NHB, TB, THB, EB, EHB, IHB

Prepared for : TSCALE ELECTRONICS MFG (KUNSHAN) CO., LTD

Address : No.99, Shunchang Road, Zhoushi, Kunshan City, Jiangsu
Province, China

Prepared by : Shenzhen Anbotek Compliance Laboratory Limited

Address : 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road,
Nanshan District, Shenzhen, Guangdong, China
Tel: (86) 755-26066544
Fax: (86) 755-26014772

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APPENDIX I (Photos of the EUT) (3 pages)

TEST REPORT VERIFICATION

Applicant : TSCALE ELECTRONICS MFG (KUNSHAN) CO., LTD
Manufacturer : TSCALE ELECTRONICS MFG (KUNSHAN) CO., LTD
EUT : Electronic balance
Model No. : NB, NHB, TB, THB, EB, EHB, IHB
Rating : DC 12V, 500mA
Trade Mark : T-scale

Measurement Procedure Used:

EN 55032: 2015;
EN 61000-3-2: 2014;
EN 61000-3-3: 2013;
EN 55024: 2010+A1: 2015;
(IEC 61000-4-2; IEC 61000-4-3; IEC 61000-4-4;
IEC 61000-4-5; IEC 61000-4-6; IEC 61000-4-11)

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the EN 55032, EN 61000-3-2, EN 61000-3-3 and EN 55024 requirements. The Project in IEC 61000-4-3 was tested in Shenzhen EMTEK Co., Ltd.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test : Mar. 17~30, 2017

Prepared by : 
(Engineer/ Baron Wen)

Reviewer : 
(Project Manager/ Lucy Xu)

Approve & Authorized Signer : 
(Manager/ Tom Chen)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	: Electronic balance
Model Number	: NB, NHB, TB, THB, EB, EHB, IHB (Note: All samples are the same except the model number & appearance, so we prepare “NB” for EMC test only.)
Test Power Supply	: DC 12V via adapter AC 230V, 50Hz/ DC 12V via adapter AC 110V, 50Hz
Applicant	: TSCALE ELECTRONICS MFG (KUNSHAN) CO., LTD
Address	: No.99, Shunchang Road, Zhoushi, Kunshan City, Jiangsu Province, China
Manufacturer	: TSCALE ELECTRONICS MFG (KUNSHAN) CO., LTD
Address	: No.99, Shunchang Road, Zhoushi, Kunshan City, Jiangsu Province, China
Factory	: TSCALE ELECTRONICS MFG (KUNSHAN) CO., LTD
Address	: No.268, Zhujiawan Road, Zhoushi, Kunshan City, Jiangsu Province, China

1.2. Auxiliary Equipment Used during Test

N/A

1.3. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 752021

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Loads Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, July 06, 2016.

IC-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A-1, Jun. 13, 2016.

CNAS - LAB Code: L3503

Shenzhen Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing Laboratories.

Test Location

All Emissions tests were performed

Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

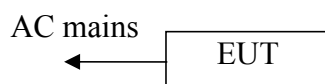
1.4. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.1dB (Horizontal) Ur = 4.3dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4 dB
Disturbance Uncertainty	:	Ud = 2.6 dB

1.5. Description of Test Mode

Pretest Mode	Description
Mode 1	On

For Mode 1 Block Diagram of Test Setup



1.6. Test Summary

Test Items	Test Mode	Status
Power Line Conducted Emission Test (150KHz To 30MHz)	Mode 1	P
Radiated Emission Test (30MHz To 1000MHz)	Mode 1	P
Harmonic Current Test	Mode 1	P
Voltage Fluctuations and Flicker Test	Mode 1	P
Electrostatic Discharge immunity Test	Mode 1	P
RF Field Strength susceptibility Test	Mode 1	P
Electrical Fast Transient/Burst Immunity Test	Mode 1	P
Surge Immunity Test	Mode 1	P
Injected Currents Susceptibility Test	Mode 1	P
Magnetic Field Susceptibility Test	/	N
Voltage Dips and Interruptions Test	Mode 1	P

P) Indicates that the through the test.

N) Don't test.

1.7. EMS Performance Criteria

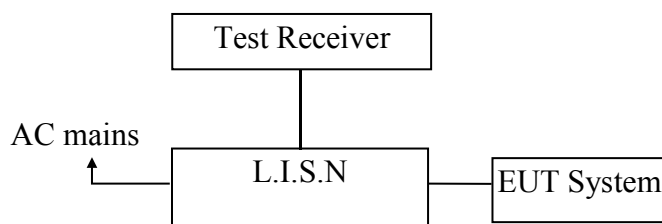
- √ A: Normal performance within the specification limits
- √ B: Temporary degradation or loss of function or performance which is self-recoverable
- √ C: Temporary degradation or loss of function or performance which requires operator intervention or system reset
- √ D: Degradation or loss of function which is not recoverable due to damage of equipment (components) or software, or loss of data

Note: The manufacturer's specification may define effects on the EUT which may be considered insignificant, and therefore acceptable.

This classification may be used as a guide in formulating performance criteria, by committees responsible for generic, product and product-family standards, or as a framework for the agreement on performance criteria between the manufacturer and the purchaser, for example where no suitable generic, product or product-family standard exists.

2. POWER LINE CONDUCTED EMISSION TEST

2.1. Block Diagram of Test Setup



2.2. Measuring Standard

EN 55032

2.3. Power Line Conducted Emission Limits

Frequency (MHz)	Limit (dB μ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.00	60.0	50.0

NOTE1-The lower limit shall apply at the transition frequencies.
NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

2.4. EUT Configuration on Measurement

The following equipments are installed on conducted emission measurement to meet EN 55032 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

2.5. Operating Condition of EUT

2.5.1. Setup the EUT as shown on Section 2.1.

2.5.2. Turn on the Power of all equipments.

2.5.3. Let the EUT work in measuring mode and measure it.

2.6. Test Procedure

The EUT is put on the plane 0.8 m high above the ground by insulating support and

connected to the AC mains through Line Impedance Stability Network(L.I.S.N). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are investigated to find out the maximum conducted emission according to the EN55032 regulations during conducted emission measurement.

The bandwidth of the field strength meter (R&S Test Receiver ESCI) is set at 9kHz in 150kHz~30MHz.

The frequency range from 150kHz to 30MHz is investigated for AC mains.

The test results are listed in Section 2.8.

2.7. Test Equipment

The following test equipments are used during the power line conducted measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Two-Line V-network	Rohde & Schwarz	ENV216	100055	Jul. 19, 2016	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Jun. 17, 2016	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Jun. 17, 2016	1 Year

2.8. Measuring Results

PASS

The frequency range 150KHz to 30MHz is investigated

The test curves are shown in the following pages.

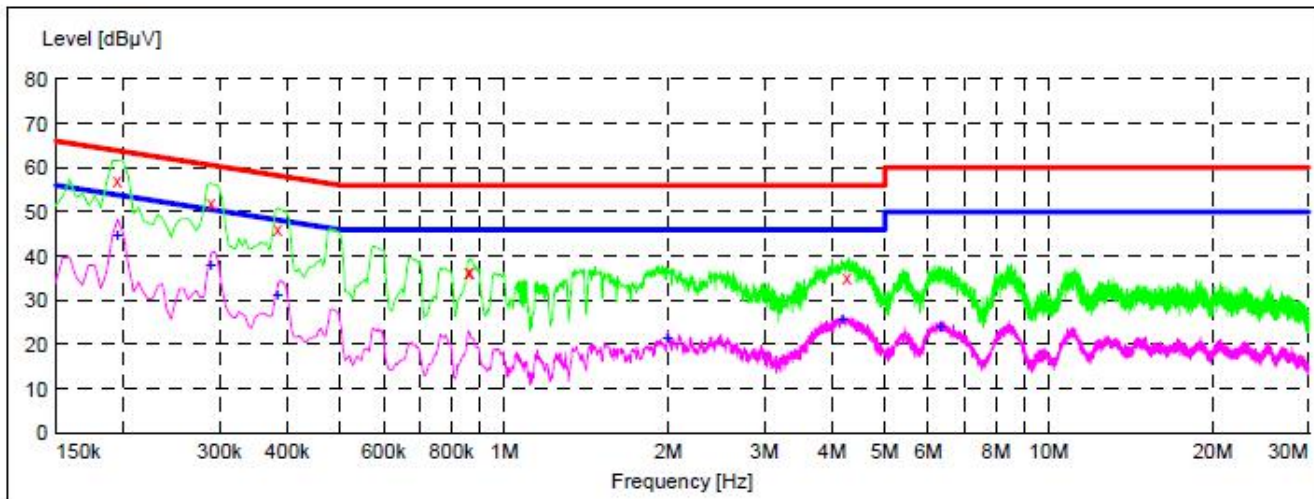
The EUT was tested on (Data 1, Data 2) datas, only the worst data of (Data 1) are attached in the following pages.

CONDUCTED EMISSION TEST DATA

Test Site: 1# Shielded Room
Test Specification: DC 12V via adapter AC 230V, 50Hz
Comment: L
Tem.: 22.2°C Hum.: 60%

SCAN TABLE: "Voltage (150K~30M) FIN"

Short Description: 150K-30M Disturbance Voltages



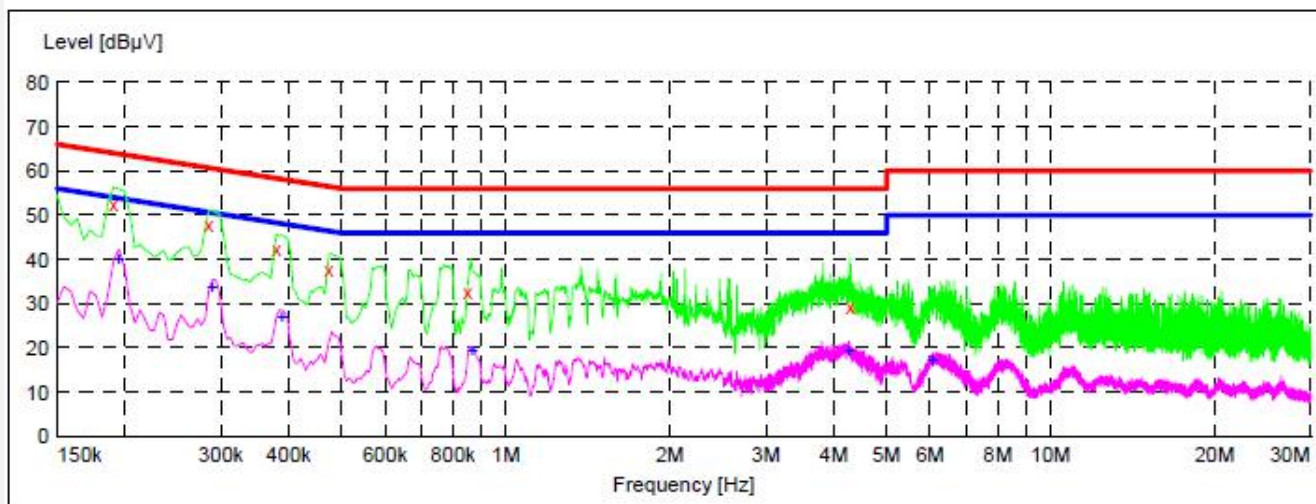
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.195000	57.30	20.1	64	6.5	QP	L1	GND
0.289500	51.90	20.1	61	8.6	QP	L1	GND
0.384000	46.20	20.1	58	12.0	QP	L1	GND
0.861000	36.70	20.1	56	19.3	QP	L1	GND
0.865500	36.50	20.1	56	19.5	QP	L1	GND
4.258000	35.30	20.5	56	20.7	QP	L1	GND
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.195000	45.00	20.1	54	8.8	AV	L1	GND
0.289500	38.10	20.1	51	12.4	AV	L1	GND
0.384000	31.30	20.1	48	16.9	AV	L1	GND
1.994500	21.90	20.3	46	24.1	AV	L1	GND
4.181500	25.80	20.5	46	20.2	AV	L1	GND
6.332500	24.20	20.5	50	25.8	AV	L1	GND

CONDUCTED EMISSION TEST DATA

Test Site: 1# Shielded Room
Test Specification: DC 12V via adapter AC 230V, 50Hz
Comment: N
Tem.: 22.2°C Hum.: 60%

SCAN TABLE: "Voltage (150K~30M) FIN"

Short Description: 150K-30M Disturbance Voltages



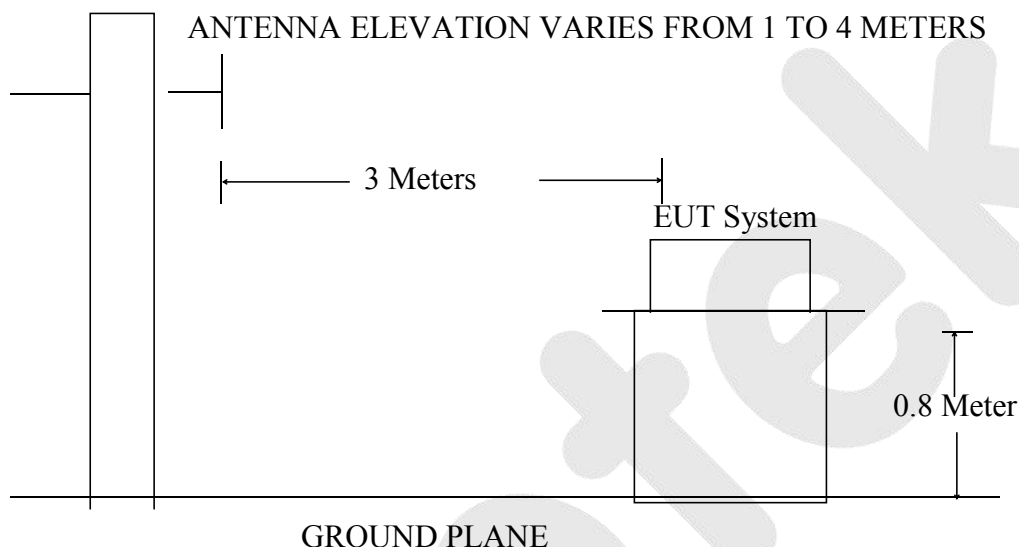
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.190500	52.70	20.1	64	11.3	QP	N	GND
0.285000	47.80	20.1	61	12.9	QP	N	GND
0.379500	42.30	20.1	58	16.0	QP	N	GND
0.474000	37.80	20.1	56	18.6	QP	N	GND
0.852000	32.80	20.1	56	23.2	QP	N	GND
4.289500	29.40	20.5	56	26.6	QP	N	GND

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.195000	40.10	20.1	54	13.7	AV	N	GND
0.289500	33.80	20.1	51	16.7	AV	N	GND
0.388500	27.10	20.1	48	21.0	AV	N	GND
0.870000	19.80	20.1	46	26.2	AV	N	GND
4.258000	19.80	20.5	46	26.2	AV	N	GND
6.062500	17.60	20.5	50	32.4	AV	N	GND

3. RADIATED EMISSION TEST

3.1. Block Diagram of Test

3.1.1. Block diagram of test setup (In chamber)



3.2. Measuring Standard

EN 55032

3.3. Radiated Emission Limits

All emanations from an EN 55032 device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMIT (dB μ V/m)
30 ~ 230	3	40
230 ~ 1000	3	47

- Note:
- (1) The smaller limit shall apply at the combination point between two frequency bands.
 - (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.

3.4. EUT Configuration on Test

The EN 55032 regulations test method must be used to find the maximum emission during radiated emission measurement.

3.5. Operating Condition of EUT

3.5.1. Turn on the Power .

3.5.2. Let the EUT work in measuring mode and measure it.

3.6. Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Bilog antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna are set on test.

The bandwidth of the Receiver (ESCI) is set at 120kHz.

The EUT is tested in 9*6*6 Chamber.

The test results are listed in Section 3.8.

3.7. Test Equipment

The following test equipments are used during radiated emission measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Jun. 17, 2016	1 Year
2.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	May 06, 2016	1 Year
3.	Pre-amplifier	SONOMA	310N	186860	Jun. 17, 2016	1 Year

3.8. Measuring Results

PASS

The frequency range from 30MHz to 1000MHz is investigated.

The test curves are shown in the following pages.

The EUT was tested on (Data 1, Data 2) datas, only the worst data of (Data 1) are attached in the following pages.

Test item:	Radiation Test	Polarization:	Vertical
Standard:	(RE)EN 55032	Power Source:	DC 12V via adapter AC 230V, 50Hz
Distance:	3m	Temp.(°C)/Hum.(%RH):	24.3(°C)/55%RH
Note:			



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	32.2925	48.48	-15.73	32.75	40.00	-7.25	peak			
2	47.8860	48.71	-13.62	35.09	40.00	-4.91	QP	100	360	
3	95.7622	48.25	-15.98	32.27	40.00	-7.73	peak			
4	130.3789	48.62	-17.84	30.78	40.00	-9.22	peak			
5	189.7385	51.87	-15.95	35.92	40.00	-4.08	QP	100	0	
6	226.8936	44.83	-14.76	30.07	40.00	-9.93	peak			

Test item:	Radiation Test	Polarization:	Horizontal
Standard:	(RE)EN 55032	Power Source:	DC 12V via adapter AC 230V, 50Hz
Distance:	3m	Temp.(°C)/Hum.(%RH):	24.3(°C)/55%RH
Note:			

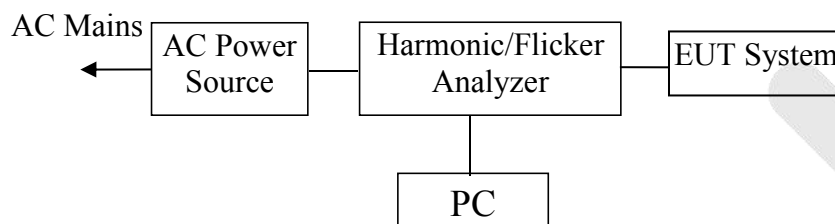


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	40.7016	32.42	-10.64	21.78	40.00	-18.22	peak			
2	55.2207	34.89	-14.94	19.95	40.00	-20.05	peak			
3	95.7622	50.32	-20.98	29.34	40.00	-10.66	peak			
4	199.2855	54.11	-20.87	33.24	40.00	-6.76	QP	300	0	
5	231.7179	49.73	-18.92	30.81	47.00	-16.19	peak			
6	265.6757	46.41	-18.77	27.64	47.00	-19.36	peak			

4. HARMONIC CURRENT EMISSION TEST

4.1. Block Diagram of Test Setup

4.1.1. Block diagram of connection between the EUT and simulators



4.2. Measuring Standard

EN 61000-3-2

4.3. Operation Condition of EUT

4.3.1. Setup the EUT as shown on Section 4.1.

4.3.2. Turn on the Power of all equipments.

4.3.3. After that, let the EUT work and measure it.

4.4. Test Equipment

The following test equipments are used during harmonic current emission measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Programmable AC Power source	SOPH POWER	PAG-1050	630250	Jun. 17, 2016	1 Year
2.	Harmonic and Flicker Analyzer	LAPLACE	AC-2000A	272629	Apr. 16, 2016	1 Year

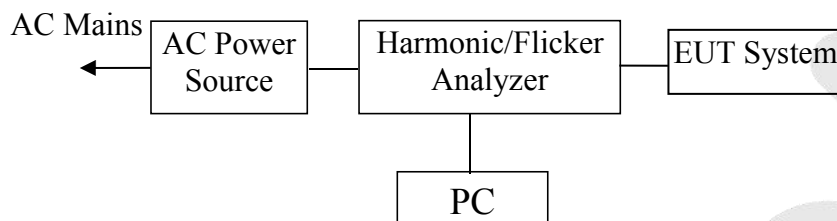
4.5. Measuring Results

The active input power of the EUT is less than 75W. Therefore, according to EN 61000-3-2, no limits are necessary.

5. VOLTAGE FLUCTUATION AND FLICKER TEST

5.1. Block Diagram of Test Setup

5.1.1. Block diagram of connection between the EUT and simulators



5.2. Measuring Standard

EN 61000-3-3

5.3. Operation Condition of EUT

5.3.1. Setup the EUT as shown on Section 5.1.

5.3.2. Turn on the Power of all equipments.

5.3.3. After that, let the EUT work and measure it.

5.4. Test Equipment

The following test equipments are used during the voltage fluctuations and flicker measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Programmable AC Power source	SOPH POWER	PAG-1050	630250	Jun. 17, 2016	1 Year
2.	Harmonic and Flicker Analyzer	LAPLACE	AC-2000A	272629	Apr. 16, 2016	1 Year

5.5. Measuring Results

PASS

The test dates are shown in the following pages.

Flicker Test Summary per EN/IEC61000-3-3 (Run time)

Tested On : Mar. 17, 2017 14:52 for 600 Seconds.

Supply Voltage : 229.1 Vrms 324.5 Vpk Frequency : 50.00 Hz
Load Current : 13.9 to 16.4 mArms 95.2 to 128.9 mApk Crest Factor: 7.847

Test Method: EN61000-3-3: 2013

Voltage Variations :

Highest Level:	-0.16%	
Lowest Level:	-0.72%	
d(max):	0.57%	PASS
Highest d(t) of 500ms:	0.00%	PASS
Present d(t) over 3.33%:	0.00 Seconds	
Longest d(t) over 3.33%:	0.00 Seconds	
Highest Steady State:	-0.41%	
Lowest Steady State:	-0.41%	
Max d(c) Between Adjacent:	0.00%	PASS
Max d(c) Between Any:	0.00%	
Short Term Flicker Pst:	0.64	PASS

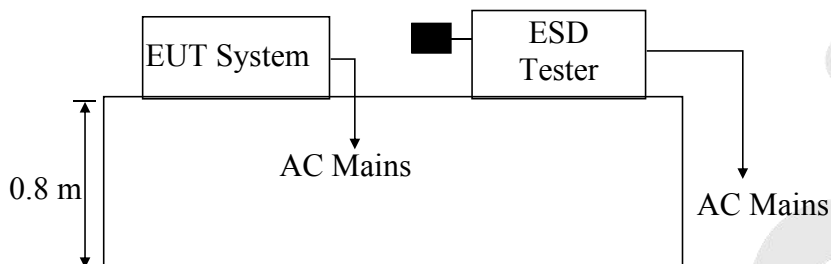
Flicker Results :

Pst Classifier	Plt Calculation	
Duration	Flicker Interval	Pst
0.1%	10.22	
0.7%	2.88	
1.0%	1.47	
1.5%	0.50	
2.2%	0.13	
3%	0.06	
4%	0.03	
6%	0.00	
8%	0.00	
10%	0.00	
13%	0.00	
17%	0.00	
30%	0.00	
50%	0.00	
80%	0.00	

6. ELECTROSTATIC DISCHARGE IMMUNITY TEST

6.1. Block Diagram of Test Setup

6.1.1. Block diagram of test setup



6.2. Measuring Standard

EN 55024 (IEC 61000-4-2)

Severity Level: 3 / Air Discharge: ± 8 kV Level: 2 / Contact Discharge: ± 4 kV

6.3. Severity Levels and Performance Criterion

6.3.1. Severity level

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

6.3.2. Performance criterion: **B**

6.4. EUT Configuration

The following equipments are installed on electrostatic discharge immunity measurement to meet EN 55024 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

6.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 2.5 except the test set up replaced by Section 6.1.

6.6. Test Procedure

6.6.1. Air Discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 100 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

6.6.2. Contact Discharge:

All the procedure shall be same as Section 6.6.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

6.6.3. Indirect discharge for horizontal coupling plane

At least 50 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

6.6.4. Indirect discharge for vertical coupling plane

At least 50 single discharge shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

6.7. Test Equipment

The following test equipments are used during the Electrostatic Discharge measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Simulators	3ctest	ESD-30T	ES0131505	Jun. 17, 2016	1 Year

6.8. Measuring Results

PASS

Please refer to the following pages.

Electrostatic Discharge Test Results

Shenzhen Anbotech Compliance Laboratory Limited

Air discharge : $\pm 8.0\text{kV}$ Temperature : 25°C
Contact discharge: $\pm 4.0\text{kV}$ Humidity : 54%
Power Supply : DC 12V via adapter AC 230V, 50Hz Criterion required : B
Number of discharge : 25 Test Result: ☒ Pass ☐ Fail

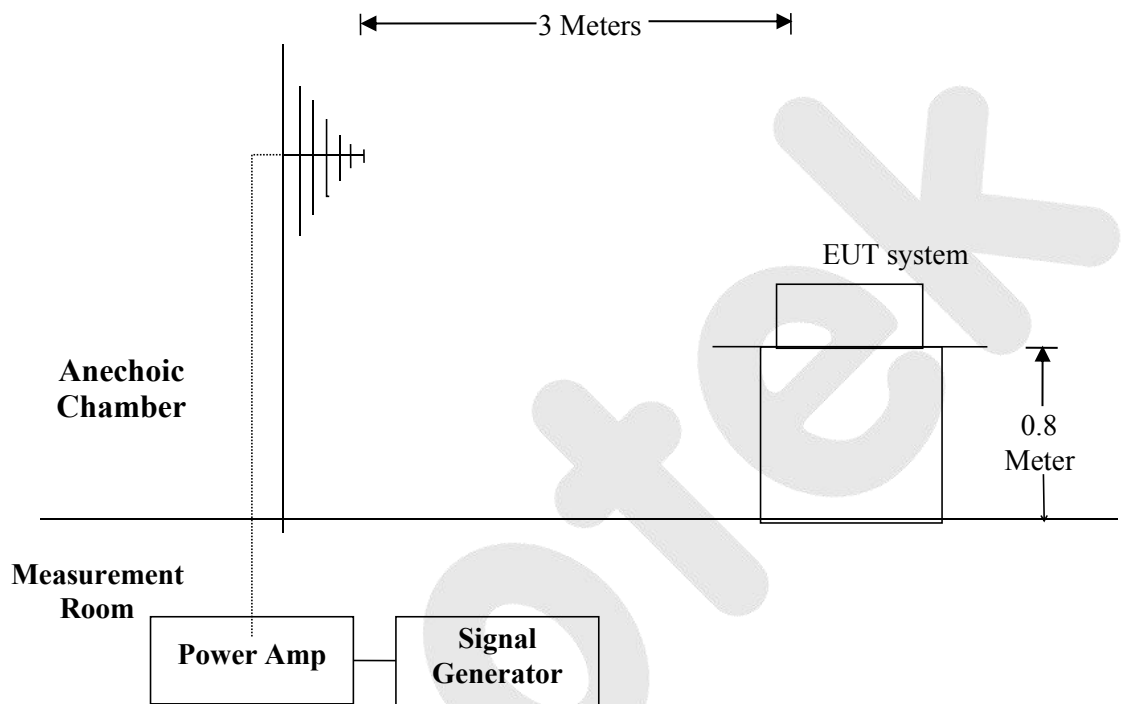
Location		Kind A-Air Discharge C-Contact Discharge	Result
Slot of the EUT	8 points	A	☒ A ☐ B ☐ C ☐ D
Others	8 points	A	☒ A ☐ B ☐ C ☐ D
Function Keys	6 points	A	☒ A ☐ B ☐ C ☐ D
Screen	6 points	A	☒ A ☐ B ☐ C ☐ D
Screws	4 points	C	☒ A ☐ B ☐ C ☐ D
HCP	4 points	C	☒ A ☐ B ☐ C ☐ D
VCP of front	4 points	C	☒ A ☐ B ☐ C ☐ D
VCP of rear	4 points	C	☒ A ☐ B ☐ C ☐ D
VCP of left	4 points	C	☒ A ☐ B ☐ C ☐ D
VCP of right	4 points	C	☒ A ☐ B ☐ C ☐ D

Note: Discharge should be considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).

7. RF FIELD STRENGTH SUSCEPTIBILITY TEST

7.1. Block Diagram of Test

7.1.1. Block diagram of RS test setup



7.2. Measuring Standard

EN 55024 (IEC 61000-4-3)
Severity Level: 2, 3V / m

7.3. Severity Levels and Performance Criterion

7.3.1. Severity Levels

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

7.3.2. Performance Criterion: A

7.4. EUT Configuration on Test

The following equipments are installed on RF Field Strength susceptibility Measurement to meet EN 55024 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

7.5. Operating Condition of EUT

Same as conducted emission measurement which is listed in Section 2.5. except the test setup replaced as Section 7.1.

7.6. Test Procedure

The EUT are placed on a table which is 0.8 meter high above the ground. The EUT is set 3 meters away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of the EUT must be faced this transmitting antenna and measured individually.

In order to judge the EUT performance, a CCD camera is used to monitor its screen. All the scanning conditions are as following:

Condition of Test	Remark
1. Fielded Strength	3V/m (Severity Level 2)
2. Radiated Signal	Unmodulated
3. Scanning Frequency	80-1000MHz
4. Sweep time of radiated	0.0015 Decade/s
2. Dwell Time	1 Sec.

7.7. Test Equipment

The following test equipments are used during the R/S (Shenzhen EMTEK) measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	RF Power Meter. Dual Channel	BOONTON	4232A	10539	May 29, 2016	1 year
2.	50ohm Diode Power Sensor	BOONTON	51011EMC	34236/34238	May 29, 2016	1 year
3.	Broad-Band Horn Antenna	SCHWARZBECK	BBHA9120 L3F	332	May 29, 2016	1 year
4.	Power Amplifier	PRANA	AP32MT215	N/A	May 29, 2016	1 year
5.	Power Amplifier	MILMEGA	AS0102-55	N/A	May 29, 2016	1 year
6.	Signal Generator	AEROFLEX	2023B	N/A	May 29, 2016	1 year
7.	Field Strength Meter	HOLADAY	HI-6005	N/A	May 29, 2016	1 year
8.	RS232 Fiber Optic Modem	HOLADAY	HI-4413P	N/A	May 29, 2016	1 year
9.	Log.-Per. Antenna	SCHWARZBECK	VULP 9118E	N/A	May 29, 2016	1 year

7.8. Measuring Results

PASS

Please refer to the following page.

RF Field Strength Susceptibility Test Results

Shenzhen Anbotek Compliance Laboratory Limited

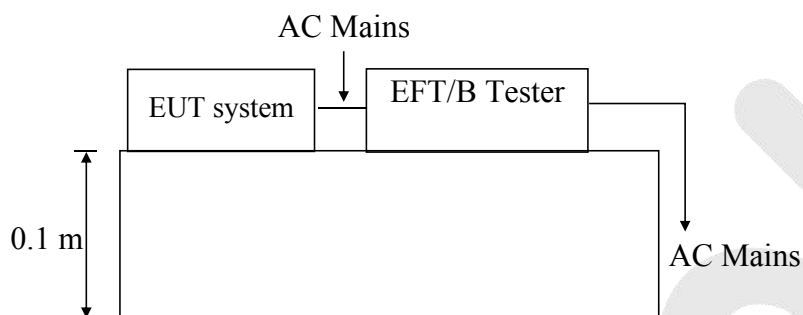
Temperature:	25°C	Humidity:	54%
Field Strength:	3 V/m	Criterion required:	A
Power Supply:	DC 12V via adapter AC 230V, 50Hz	Frequency Range:	80 MHz to 1000 MHz
Test Result : ☒ Pass ☐ Fail			
Modulation:	☐ None	☐ Pulse	☒ AM 1KHz 80%
Steps	# / %		
	Horizontal	Vertical	
Front	3 V/m	3 V/m	☒ A ☐ B ☐ C ☐ D
Right	3 V/m	3 V/m	☒ A ☐ B ☐ C ☐ D
Rear	3 V/m	3 V/m	☒ A ☐ B ☐ C ☐ D
Left	3 V/m	3 V/m	☒ A ☐ B ☐ C ☐ D

Note: The Project was tested in Shenzhen EMTEK Co., Ltd.

8. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

8.1. Block Diagram of Test Setup

8.1.1. EFT Test Setup



8.2. Measuring Standard

EN 55024 (IEC 61000-4-4)
Severity Level 2: 1kV

8.3. Severity Levels and Performance Criterion

8.3.1. Severity level

Open Circuit Output Test Voltage $\pm 10\%$		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1.	0.5 kV	0.25 kV
2.	1 kV	0.5 kV
3.	2 kV	1 kV
4.	4 kV	2 kV
X	Special	Special

8.3.2. Performance criterion: **B**

8.4. EUT Configuration

The following equipments are installed on electrical fast transient/burst immunity measurement to meet EN 55024 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

8.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 2.5, except the test set up replaced by Section 8.1.

8.6. Test Procedure

The EUT is put on the table which is 0.1 meter high above the ground. 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.

8.6.1. For input and output AC Power ports:

The EUT is connected to the Power mains by using a coupling device which couples the EFT interference signal to AC Power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 mins.

8.6.2. For signal lines and control lines ports:

No I/O ports. It's unnecessary to test.

8.6.3. For DC output line ports:

It's unnecessary to test.

8.7. Test Equipment

The following test equipments are used during the Electrical Fast Transient /Burst Immunity measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.1	EFT Burst Simulator	PRIMA	EFT61004B	PR10114282	Jul. 12, 2016	1 Year
1.2	EFT-Clamp	PRIMA	EFT-Clamp	/	Jul. 12, 2016	1 Year
2.1	EFT Burst Simulator	TESEQ	NSG 3060-1	1480	Mar. 30, 2016	1 Year
2.2	CDN	TESEQ	CDN 3061	1408	Apr. 05, 2016	1 Year

8.8. Measuring Results

PASS

Please refer to the following page.

Electrical Fast Transient/Burst Test Results

Shenzhen Anbotek Compliance Laboratory Limited

Ambient Condition : 24°C 55% RH

Criterion required : B

Power Supply : DC 12V via adapter AC 230V, 50Hz

Inject Method: Direct

Inject Line : AC Mains

Inject Time(s): 120

Test Result : ☒ Pass ☐ Fail

Line	Polarity	Test Voltage	Result
L	±	1kV	☒ A ☐ B ☐ C ☐ D
N	±	1kV	☒ A ☐ B ☐ C ☐ D
PE			
L、N	±	1kV	☒ A ☐ B ☐ C ☐ D
L、PE			
N、PE			
L、N、PE			
Signal Line			
DC Line			

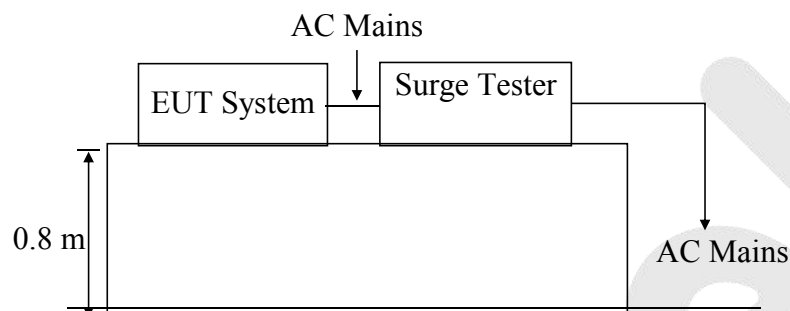
Note :

Remark:

9. SURGE IMMUNITY TEST

9.1. Block Diagram of Test Setup

9.1.1. Surge Test Setup



9.2. Measuring Standard

EN 55024 (IEC 61000-4-5)
Severity Level 2, Line to Line: 1.0kV

9.3. Severity Levels and Performance Criterion

9.3.1. Severity level

Severity Level	Open-Circuit Test Voltage kV
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

9.3.2. Performance criterion: **B**

9.4. EUT Configuration

The following equipments are installed on surge immunity measurement to meet EN 55024 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

9.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 2.5, except the test set up replaced by Section 9.1.1.

9.6. Test Procedure

- 1) Set up the EUT and test generator as shown on Section 9.1.1.
- 2) For line to line coupling mode, provide a 1.0 kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.
- 3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
- 4) Different phase angles are done individually.
- 5) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

9.7. Test Equipment

The following test equipments are used during the Surge Immunity measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.1	6kV Surge Generator	TESEQ	NSG 3060-1	1480	Mar. 30, 2016	1 Year
1.2	CDN	TESEQ	CDN 3061	1408	Apr. 05, 2016	1 Year
2.1	6kV Surge Generator	EMPEK	LSG-5060G	06010017N	Jul. 12, 2016	1 Year
2.2	CDN	EMPEK	CDN-5110G	061100005 N	Jul. 12, 2016	1 Year

9.8. Measuring Results

PASS

Please refer to the following page.

Surge Immunity Test Results

Shenzhen Anbotech Compliance Laboratory Limited

Humidity: 55%		Temperature: 24°C	
Power Supply : DC 12V via adapter AC 230V, 50Hz		Criterion required: B	
Test Result : ☒ Pass ☐ Fail			

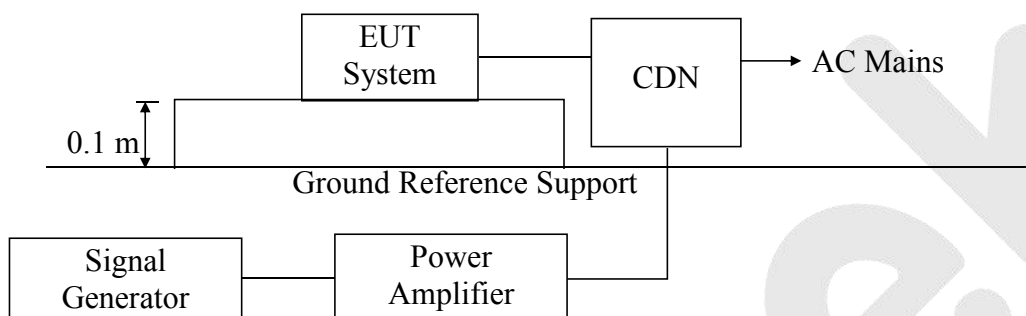
Location	Polarity	Phase Angle	Number of Pulse	Pulse Voltage (kV)	Result
L-N	±	☒ 0° ☒ 90° ☒ 180° ☒ 270°	5	1.0	☒ A ☐ B ☐ C ☐ D
L-PE					
N-PE					

Remark:

10. INJECTED CURRENTS SUSCEPTIBILITY TEST

10.1. Block Diagram of Test Setup

10.1.1. Block Diagram of Test Setup



10.2. Measuring Standard

EN 55024 (IEC 61000-4-6)

Severity Level 2: 3V (rms), (0.15MHz ~ 80MHz)

10.3. Severity Levels and Performance Criterion

10.3.1. Severity level

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

10.3.2. Performance criterion: A

10.4. EUT Configuration

The following equipments are installed on currents susceptibility measurement to meet EN 55024 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

10.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 2.5, except the test set up replaced by Section 10.1.

10.6. Test Procedure

10.6.1. For AC Mains

- 1) Set up the EUT, CDN and test generators as shown on Section 10.1.1.
- 2) Let the EUT work in test mode and measure it.
- 3) The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. 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).
- 4) The disturbance signal described below is injected to EUT through CDN.
- 5) The EUT operates within its operational mode(s) under intended climatic conditions after Power on.
- 6) The frequency range is swept from 150KHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sine wave.
- 7) The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
- 8) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

10.6.2. For signal lines and control lines ports:

No I/O ports. It's unnecessary to test.

10.6.3. For DC output line ports:

It's unnecessary to test.

10.7. Test Equipment

The following test equipments are used during the Injected Current Susceptibility measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	C/S Conducted Immunity Test System	FRANKONIA	CIT-10	126A1196/2012	Apr. 16, 2016	1 Year
2.	CDN	FRANKONIA	CDN - M2+ M3	A2210178/2012	Jun. 18, 2016	1 Year
3.	6dB attenuator	FRANKONIA	DAM 26W	1172202	Jun. 17, 2016	1 Year

10.8. Measuring Results

PASS

Please refer to the following page.

Injected Currents Susceptibility Test Results

Shenzhen Anbotek Compliance Laboratory Limited

Power Supply : DC 12V via adapter AC 230V, 50Hz Temperature : 24°C

Criterion required: A

Humidity : 53%

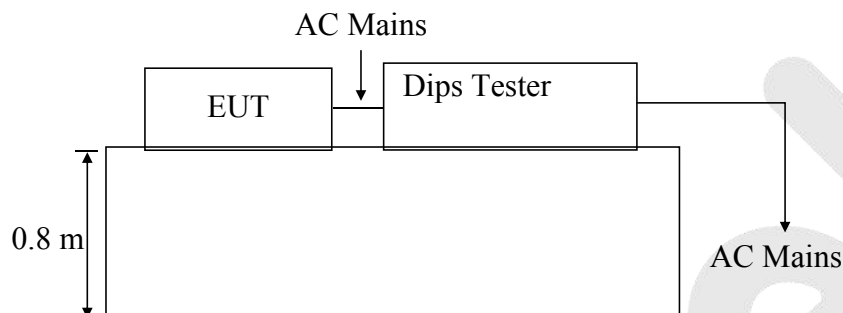
Test Result : ☒ Pass ☐ Fail

Frequency Range (MHz)	Injected Position	Strength (Unmodulated)	Result
0.15 ~ 80	AC Mains	3V	☒ A ☐ B ☐ C ☐ D
Frequency Range (MHz)	Injected Position	Strength (Unmodulated)	Result
Remark :		Note:	

11. VOLTAGE DIPS AND INTERRUPTIONS TEST

11.1. Block Diagram of Test Setup

11.1.1. Dips Test Setup



11.2. Measuring Standard

EN 55024 (IEC 61000-4-11)

11.3. Severity Levels and Performance Criterion

11.3.1. Severity level

Test Level $\%U_T$	Voltage dip and short interruptions $\%U_T$	Duration (in period)
0	100	0.5
40	60	1
70	30	5
0	100	10
		25
		50
		*

11.3.2. Performance criterion: **B&C**

11.4. EUT Configuration

The following equipments are installed on voltage dips and interruptions measurement to meet EN 55024 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

11.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 2.5, except the test set up replaced by Section 11.1.

11.6. Test Procedure

- 1) Set up the EUT and test generator as shown on Section 11.1.1.
- 2) The interruptions is introduced at selected phase angles with specified duration.
- 3) Record any degradation of performance.

11.7. Test Equipment

The following test equipments are used during the Dips Immunity measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	CYCLE SAG Simulator	PRIMA	DRP61011AG	PR12046234	Jun. 17, 2016	1 Year

11.8. Measuring Results

PASS

Please refer to the following page.

Voltage Dips and Interruptions Test Results

Shenzhen Anbotech Compliance Laboratory Limited

Temperature : 24°C		Humidity : 55%	
Power Supply : DC 12V via adapter AC 230V, 50Hz		Criterion required : B&C	
Test Result : ☒ Pass ☐ Fail			

Test Level % U _T	Voltage Dips & Short Interruptions % U _T	Duration (in periods)	Result
0	100	0.5P	☐ A ☒ B ☐ C ☐ D
70	30	25P	☐ A ☒ B ☐ C ☐ D

Test Level % U _T	Voltage Dips & Short Interruptions % U _T	Duration (in periods)	Result
0	100	250P	☐ A ☐ B ☒ C ☐ D

Remark:

APPENDIX I (Photos of EUT)

Figure 1
The EUT- Top View



Figure 2
The EUT- Bottom View



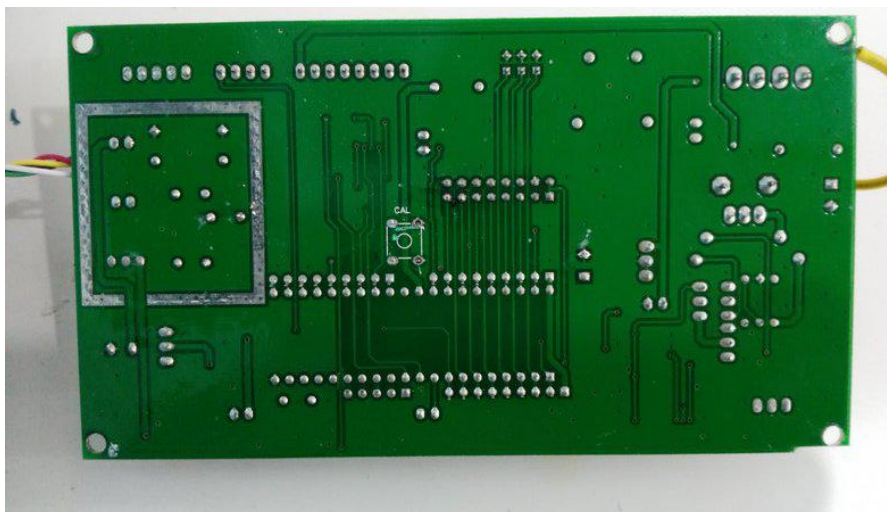
Figure 3
The EUT- Inside View



Figure 4
PCB of The EUT View



Figure 5
PCB of The EUT View



CE Label

1. The CE conformity marking must consist of the initials 'CE' taking the following form:
If the CE marking is reduced or enlarged, the proportions given in the above graduated drawing must be respected.
2. The CE marking must have a height of at least 5 mm except where this is not possible on account of the nature of the apparatus.
3. The CE marking must be affixed to the product or to its data plate. Additionally it must be affixed to the packaging, if any, and to the accompanying documents.
4. The CE marking must be affixed visibly, legibly and indelibly.
It must have the same height as the initials 'CE'.

Anbotek