



APPLICATION FOR ELECTROMAGNETIC COMPATIBILITY DIRECTIVE

On Behalf of

XI'AN BEICHENG ELECTRONICS CO., LTD

Digital multimeter

Model No. : VC97, VC9801A+, VC9802A+, VC9804A+, VC9805A+,
VC9806+, VC9807A+, VC9808+, VC980+

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TEST REPORT DECLARATION

Applicant : XI'AN BEICHENG ELECTRONICS CO., LTD
Manufacturer : XI'AN BEICHENG ELECTRONICS CO., LTD
EUT Description : Digital multimeter


(A) Model No. : VC97, VC9801A+, VC9802A+, VC9804A+,
VC9805A+, VC9806+, VC9807A+, VC9808+,
VC980+
(B) Trademark : VICTOR
(C) Power Supply : DC 9V
(D) Test Voltage : DC 9V From Battery

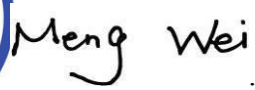
Measurement Standard Used:

EN 61326-1: 2013
EN 61326-2-2: 2013
(IEC 61000-4-2: 2008, IEC 61000-4-3: 2006 + A1:2007 + A2:2010)

The device described above is tested by Product Technology Service(Ningbo) Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Product Technology Service(Ningbo) Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the EN 61326-1 and EN 61326-2-2 requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Product Technology Service(Ningbo) Co., Ltd.

Originator (name + signature)..... : Danyan Wang 

Verifier (name + signature)..... : Meng Wei 

Authorize (name + signature)..... : Shizong Nie 

Date of issue..... : January 3, 2017



1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION				
Description of Test Item	Standard	Limits	Results	
Conducted disturbance at mains terminals	EN 61326-1: 2013	Class B	N/A	
Conducted disturbance at telecommunication port	EN 61326-1: 2013	Class B	N/A	
Radiated disturbance	EN 61326-1: 2013	Class B	PASS	
Harmonic current emissions	EN 61000-3-2: 2014	Class A	N/A	
Voltage fluctuations & flicker	EN 61000-3-3: 2013	Section 5	N/A	
IMMUNITY				
Description of Test Item	Basic Standard	Performance Criteria	Observation Criteria	Results
Electrostatic discharge (ESD)	IEC 61000-4-2:2008	B	A	PASS
Radio-frequency, Continuous radiated disturbance	IEC 61000-4-3:2006+ A1:2007 + A2:2010	A	A	PASS
Electrical fast transient (EFT)	IEC 61000-4-4:2012	B	N/A	N/A
Surge (Input a.c. power port)	IEC 61000-4-5:2014	B	N/A	N/A
Surge(Telecommunication port)		B	N/A	N/A
Radio-frequency,Continuous conducted disturbance	IEC 61000-4-6:2013	A	N/A	N/A
Voltage dips, 0% reduction	IEC 61000-4-11:2004	B	N/A	N/A
Voltage dips, 40% reduction		C	N/A	N/A
Voltage dips, 70% reduction		C	N/A	N/A
Voltage interruptions		C	N/A	N/A
N/A is an abbreviation for Not Applicable.				

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

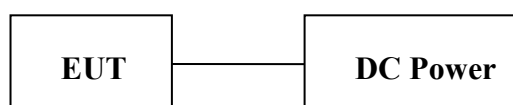
Description	: Digital multimeter
Classification	: Class III
Model Number	: VC97, VC9801A+, VC9802A+, VC9804A+, VC9805A+, VC9806+, VC9807A+, VC9808+, VC980+
DIFF.	: All modles have same electrical parts. All tests were performed on model VC97 which cover other models.
Trademark	: VICTOR
Applicant Address	: XI'AN BEICHENG ELECTRONICS CO., LTD : JINGYUAN 7 ROAD, JINGHE INDUSTRIAL PARK, NORTH DISTRICT,XI'AN, CHINA
Manufacturer Address	: XI'AN BEICHENG ELECTRONICS CO., LTD : JINGYUAN 7 ROAD, JINGHE INDUSTRIAL PARK, NORTH DISTRICT,XI'AN, CHINA
Sample Type	: Prototype production

2.2. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number
1.	DC Power	LONGWEI	TPP-12010D	010936329

Signal Cable Description of the above Support Units					
No.	Port Name	Cable	Length	Shielded (Yes or No)	Detachable (Yes or No)
1.	N/A	N/A	N/A	N/A	N/A

2.3. Block Diagram of connection between EUT and simulators



※ EUT: Digital multimeter

2.4. Test Facility

Product Technology Service(Ningbo) Co., Ltd.
 3/F., Building 1, Hengyu Industrial Park, Fengjia, Shiqi Street, Yinzhou
 District, Ningbo, Zhejiang, China

2.5. Measurement Uncertainty

(95% confidence levels, k=2)

Test Item	Uncertainty	U _{cispr}
Uncertainty for Conduction emission test	2.71dB	3.8 dB
Uncertainty for Radiation Emission test	3.90 dB (Distance: 3m Polarize: V)	5.2 dB
	3.92 dB (Distance: 3m Polarize: H)	
Uncertainty for Radiation Emission test (1GHz-18GHz)	4.26 dB (Distance: 3m Polarize: V)	5.2 dB
	4.28 dB (Distance: 3m Polarize: H)	

2.6. Test mode Description

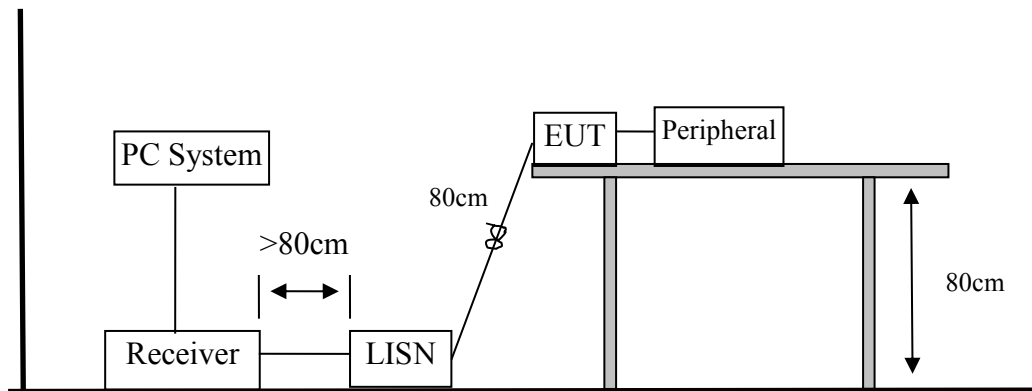
	Test Mode
※1.	Working with Voltage Mode
2.	Working with Current Mode
3.	Working with Resister Mode
4.	Standby
Note: ※ is worst case mode, so this report only reflected the worst mode. In this report only call it “Working”.	

3. CONDUCTED DISTURBANCE AT MAINS TERMINALS TEST

3.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	101165	2016.09.29	1 Year
2.	L.I.S.N.#1	Schwarzbeck	NSLK812 6	8126466	2016.09.29	1 Year
3.	L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2016.09.29	1 Year
4.	Pulse Limiter	Schwarzbeck	9516F	9618	2016.09.29	1 Year

3.2. Block Diagram of Test Setup



3.3. Test Standard

EN 61326-1:2006 (EN 55011)

3.4. Power Line Conducted Disturbance at Mains Terminals Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level Db(μ V)	Average Level Db(μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. Emission level=Read level+LISN factor-Preamp factor+Cable loss

2. * Decreasing linearly with logarithm of frequency.

3. The lower limit shall apply at the transition frequencies.

3.5. EUT Configuration on Test

The following equipments are installed on Conducted Emission Test to meet EN 61326-1 requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

3.5.1. Support Equipment : As Tested Supporting System Detail, in Section 2.2.

3.6. Operating Condition of EUT

- 3.6.1. Setup the EUT and simulator as shown as Section 3.2.
- 3.6.2. Turn on the power of all equipment.
- 3.6.3. Let the Digital multimeter (EUT) work in test mode (Working) and measure it.
- 3.6.4. The other peripheral devices were driven and operated in turn during all testing.

3.7. Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). This provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N.#2). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to EN 61326-1 on conducted Disturbance test.

The bandwidth of test receiver (R & S ESCI) is set at 10kHz.

The frequency range from 150kHz to 30MHz is checked. The test results are reported and test results for Conducted Disturbance Test on Section 3.8.

3.8. Conducted Disturbance at Mains Terminals Test Results

The EUT is supplied by Battery, so this item does not applicable.

4. RADIATED DISTURBANCE TEST

4.1. Test Equipments

4.1.1. For frequency range 30MHz~1000MHz (At Semi Anechoic Chamber)

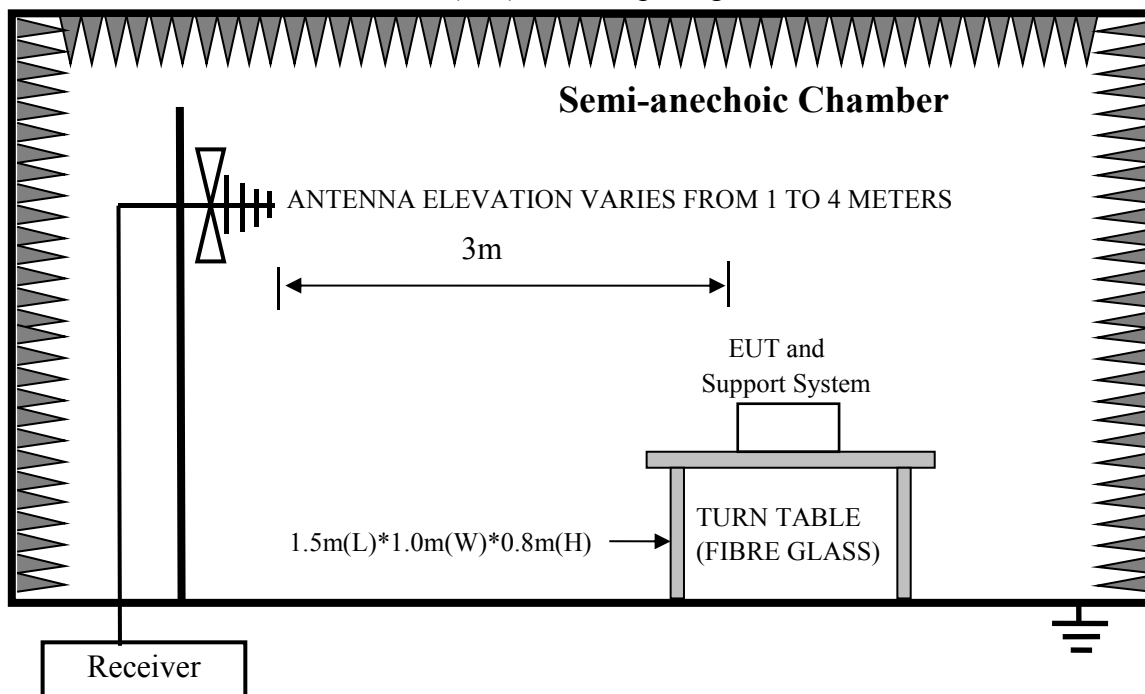
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Test Receiver	ROHDE&SCHW ARZ	ESR	ROHDE&SCH WARZ	2016.09.29	1 Year
2	Antenna	Schwarzbeck	VULB9168	9168-438	2016. 09.30	1 Year

4.1.2. For frequency range 1GHz~6GHz (At Semi Anechoic Chamber)

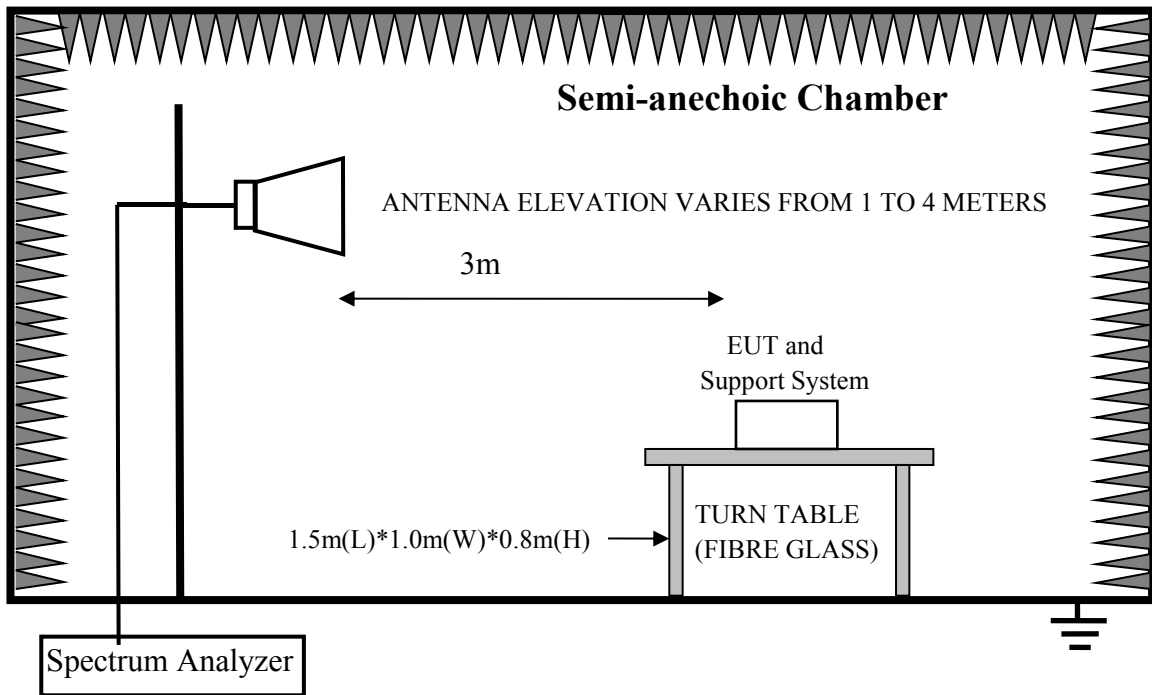
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	E4407B	MY4951005 5	2016.09.29	1 Year
2	Horn Antenna	Schwarzbeck	BBHA 9120 D	BBHA 9120 D(1201)	2016.09.29	2 Year
3	Amplifier	Agilent	8449B	3008A02664	2016.09.29	1 Year

4.2. Block Diagram of Test Setup

4.2.1. In Anechoic Chamber (3m)Test Setup Diagram for 30MHz~1000MHz



4.2.2. In Anechoic (3m) Chamber Test Setup Diagram for 1-6GHz



4.3. Test Standard

EN 61326-1: 2013 (EN 55011)

4.4. Radiated Disturbance Limit

All emanations from a Class **B** computing devices 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 LIMITS (Db μ V/m)
30 ~ 230	3	40
230 ~ 1000	3	47
1000~3000	3	70(Peak) 50(Average)
3000~6000	3	74(Peak) 54(Average)

Note: (1) Emission level = Read level+Antenna Factor-Preamplifier Factor +Cable Loss

(2) The lower limit shall apply at the transition frequencies.

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

4.5. EUT Configuration on Test

The EN 61326-1 regulations test method must be used to find the maximum emission during Radiated Disturbance test. The configuration of EUT is same as used in Conducted Disturbance test. Please refer to Section 3.5.

4.6. Operating Condition of EUT

- 4.6.1. Setup the EUT and simulator as shown as Section 4.2.
- 4.6.2. Turn on the power of all equipment.
- 4.6.3. Let the Digital multimeter (EUT) work in test mode (Working) and measure it.
- 4.6.4. The other peripheral devices were driven and operated in turn during all testing.

4.7. Test Procedure

The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. An antenna was located 3m & 3m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all the interface cables were changed according to EN 61326-1 on Radiated Disturbance test.

The bandwidth setting on the test receiver (Rohde&Schwarz Test Receiver ESCI) is 120 kHz.

The resolution bandwidth of the Agilent Spectrum Analyzer E4407B was set at 1MHz. (For above 1GHz)

The frequency range from 30MHz to 1000MHz was pre-scanned with a peak detector and all final readings of measurement from Test Receiver are Quasi-Peak values.

The frequency range from 1GHz to 6GHz was checked with peak and average detector, measurement distance is 3m in 3m chamber.

Finally, selected operating situations at Semi Anechoic Chamber measurement, all the test results are listed in section 4.8.

4.8. Radiated Disturbance Test Results

PASS. (All emissions not reported below are too low against the prescribed limits.)

The EUT with the following test mode was tested and read Q.P values, the test result are listed in next pages.

Temperature: 24.3°C Humidity: 35%

The details of test mode is as follows :

No.	Test Mode
1.	Working

For frequency range 1GHz~6GHz

The highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. So the frequency rang 1GHz-6GHz radiation test not applicable.

Site: LAB	Polarization: Horizontal	Temperature: 24.3
Limit: EN 61326 ClassB Radiation	Power: DC 9V from battery	Humidity: 35 %
EUT: Digital multimeter	Distance: 3m	
M/N: VC97		
Mode: Working		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree
1		38.6160	-0.78	14.05	13.27	40.00	-26.73	peak	
2		63.9828	2.26	12.22	14.48	40.00	-25.52	peak	
3		146.8877	4.81	14.33	19.14	40.00	-20.86	peak	
4		229.2931	7.95	11.76	19.71	40.00	-20.29	peak	
5		501.1790	3.89	17.22	21.11	47.00	-25.89	peak	
6	*	952.0937	9.19	23.58	32.77	47.00	-14.23	peak	

Note: 1. *:Maximum data; x:Over limit; l:over margin.
 2. Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Site: LAB	Polarization: Vertical	Temperature: 24.3
Limit: EN 61326 ClassB Radiation	Power: DC 9V from battery	Humidity: 35 %
EUT: Digital multimeter	Distance: 3m	
M/N: VC97		
Mode: Working		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree
1		38.3462	0.71	13.95	14.66	40.00	-25.34	peak	
2		62.8708	3.78	12.24	16.02	40.00	-23.98	peak	
3		71.8320	11.40	10.70	22.10	40.00	-17.90	peak	
4	*	146.8877	9.44	14.33	23.77	40.00	-16.23	peak	
5		227.6906	4.78	11.68	16.46	40.00	-23.54	peak	
6		952.0937	5.40	23.58	28.98	47.00	-18.02	peak	

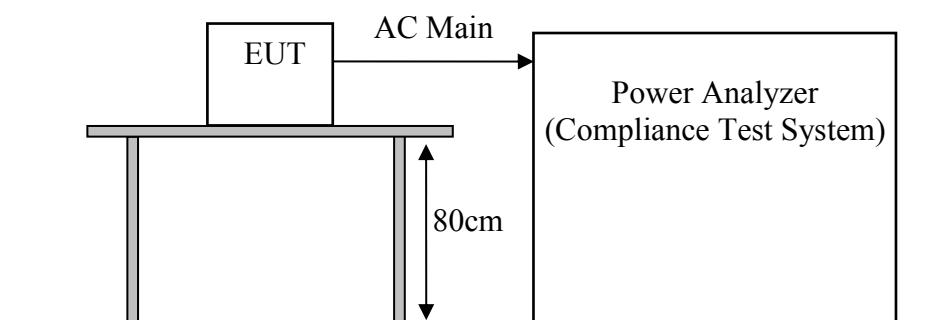
Note: 1. *: Maximum data; x: Over limit; l: over margin.
 2. Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

5. HARMONIC CURRENT TEST

5.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Harmonics Flicker Analyser	Voltech	PM6000	200006700 495	2016.09.29	1 Year

5.2. Block Diagram of Test Setup



5.3. Test Standard

EN 61000-3-2: 2014; Class A

5.4. Limits of Harmonic Current

Limits for Class D Equipment		
Harmonic order (n)	Maximum permissible harmonic current per watt (mA/W)	Maximum permissible harmonic current (A)
3	3.4	0.23
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
13	0.30	0.21
15 ≤ n ≤ 39 (odd harmonic only)	3.85/n	0.15 × 15/n

Limits for Class A equipment	
Harmonic order	Maximum permissible Harmonic current
n	A
Odd harmonics	
3	2,30
5	1,14
7	0,77
9	0,40
11	0,33
13	0,21
$15 \leq n \leq 39$	$0,15 \frac{15}{n}$
Even harmonics	
2	1,08
4	0,43
6	0,30
$8 \leq n \leq 40$	$0,23 \frac{8}{n}$

Limits for Class C equipment	
Harmonic order	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency
n	%
2	2
3	$30 \cdot \lambda$ *
5	10
7	7
9	5
$11 \leq n \leq 39$ (odd harmonics only)	3

* λ is the circuit power factor

5.5. Operating Condition of EUT

Same as Section 3.6. except the test setup replaced by Section 5.2.

5.6. Test Procedure

The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the necessary for the EUT to be exercised.

5.7. Test Results

EUT Supply by Battery, so this item is not applicable.

6. VOLTAGE FLUCTUATIONS & FLICKER TEST

6.1. Test Equipment

Same as Section 5.1.

6.2. Block Diagram of Test Setup

Same as Section 5.2.

6.3. Test Standard

EN 61000-3-3: 2014

6.4. Limits of Voltage Fluctuation and Flick

Test Item	Limit	Note
P_{st}	1.0	P_{st} means Short-term flicker indicator
P_{lt}	0.65	P_{lt} means long-term flicker indicator
T_{dt}	0.2	T_{dt} means maximum time that dt exceeds 3%
$d_{max}(\%)$	4%	d_{max} means maximum relative voltage change.
$d_c(\%)$	3%	d_c means relative steady-state voltage change.

6.5.

6.6. Operating Condition of EUT

Same as Section 5.5.

6.7. Test Procedure

The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal conditions during the flick measurement, the measure time shall include that part of whole operation changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

6.8. Test Results

EUT Supply by Battery, so this item is not applicable.

7. IMMUNITY PERFORMANCE CRITERIA

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 by its manufacturer or the requestor of the test, or the agreed between the manufacturer and the purchaser of the product.

Definition related to the performance level:

1. Based on the used product standard
2. Based on the declaration of the manufacturer, requestor or purchaser

Performance criterion A

When seen from the normal viewing distance, the EUT shall operate with no change beyond the manufacturer's specification, in flicker, colour, focus and jitter (except for the power frequency magnetic field test).

Power frequency magnetic field test

For CRT monitors, the following also applies:

The jitter shall be measured using a measuring microscope as specified in 6.6.14 of ISO 9241-3.

The jitter (in mm) shall not exceed the value $\frac{(\text{character height in mm} + 0,3) \times 2,5}{33,3}$ when the CRT monitor is immersed in a continuous magnetic field of 1A/m (r.m.s.) at one of the power frequencies of 50Hz.

Alternatively, a field of 50A/m may be applied, and a transparent graduated mask used to assess the jitter. In that case, the jitter shall not exceed 50 times the value in the above formula.

NOTE-This test level is used to simplify the measurement of jitter. Lesser values of the test level may be used if non-linearity is experienced, due to, for example, saturation of screening material.

The EUT shall be tested in two positions, both perpendicular to the magnetic field.

Performance criterion B

Screen disturbances during the application of the test are permissible.

Performance criterion C

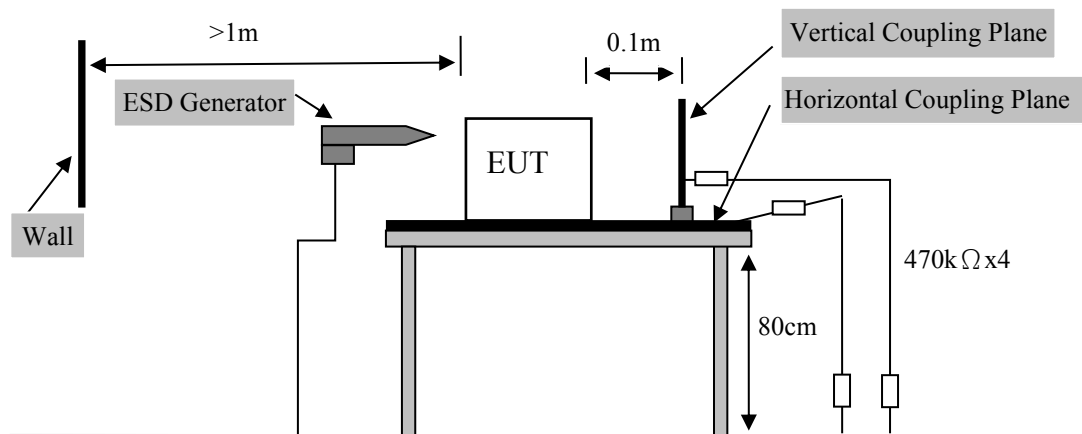
Failures which are not self-recovered after removal of the external disturbance, but which can be recovered to normal operation by reset or reboot are permissible.

8. ELECTROSTATIC DISCHARGE IMMUNITY TEST

8.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Tester	HAEFELY	PESD1610	H310546	2016.09.30	1 Year

8.2. Block Diagram of Test Setup



8.3. Test Standard

EN 61326-2-2: 2013(EN 61326-1: 2013, IEC 61000-4-2: 2008)
 (Severity Level 1 & 2 & 3 for Air Discharge at 2 kV & 4 kV & 8kV,
 Severity Level 1 & 2 for Contact Discharge at 2 kV & 4kV)

8.4. Severity Levels and Performance Criterion

8.4.1. 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

8.4.2. Performance criterion : **B**

8.5. EUT Configuration

The configurations of EUT are listed in Section 3.5.

8.6. Operating Condition of EUT

Same as Conducted Emission test that is listed in Section 3.6. except the test set up replaced by Section 8.2.

8.7. Test Procedure

8.7.1. Air Discharge:

The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. This procedure was repeated until all the air discharge completed

8.7.2. Contact Discharge:

All the procedure was same as Section 8.7.1. except that the generator was re-triggered for a new single discharge and repeated 50 times for each pre-selected test point. The tip of the discharge electrode was touching the EUT before the discharge switch was operated.

8.7.3. Indirect discharge for horizontal coupling plane:

At least 20 single discharges were 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.

8.7.4. Indirect discharge for vertical coupling plane:

At least 20 single discharges were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

8.8. Test Results

PASS.

The EUT was tested and all the test results are listed in next page.

Electrostatic Discharge Test Results

Applicant	:	XI'AN BEICHENG ELECTRONICS CO., LTD	Test Date	:	December 26, 2016
EUT	:	Digital multimeter	Temperature	:	24°C
M/N	:	VC97	Humidity	:	56%
Test Voltage	:	DC 9V From Battery	Test Mode	:	Working
Test Engineer	:	Lucas Pang	Pressure	:	101.3KPa
Required Performance	:	B	Actual Performance	:	A

Air Discharge: $\pm 2\text{kV}$ $\pm 4\text{kV}$ $\pm 8\text{kV}$ # For Air Discharge each Point Positive 10 times and negative 10 times discharge.

Contact Discharge: $\pm 2\text{kV}$ $\pm 4\text{kV}$ # For Contact Discharge each point positive 10 times and negative 10 times discharge

For the time interval between successive single discharges an initial value of one second.

Discharge Voltage (kV)	Type of discharge	Dischargeable Points	Performance		Result (Pass/Fail)
			Required	Observation	
± 2	Contact	3	B	A	Pass
± 4	Contact	3	B	A	Pass
± 2	Air	1,2	B	A	Pass
± 4	Air	1,2	B	A	Pass
± 8	Air	1,2	B	A	Pass
± 2	HCP-Bottom	Edge of the HCP	B	A	Pass
± 2	VCP-Front	Center of the VCP	B	A	Pass
± 2	VCP-Left	Center of the VCP	B	A	Pass
± 2	VCP-Back	Center of the VCP	B	A	Pass
± 2	VCP-Right	Center of the VCP	B	A	Pass
± 4	HCP-Bottom	Edge of the HCP	B	A	Pass
± 4	VCP-Front	Center of the VCP	B	A	Pass
± 4	VCP-Left	Center of the VCP	B	A	Pass
± 4	VCP-Back	Center of the VCP	B	A	Pass
± 4	VCP-Right	Center of the VCP	B	A	Pass

Discharge Points Description

<u>1</u>	Screen	<u>5</u>	
<u>2</u>	Slots	<u>6</u>	
<u>3</u>	Metal	<u>7</u>	
<u>4</u>		<u>8</u>	

Remark: 1. Class A is no function loss.

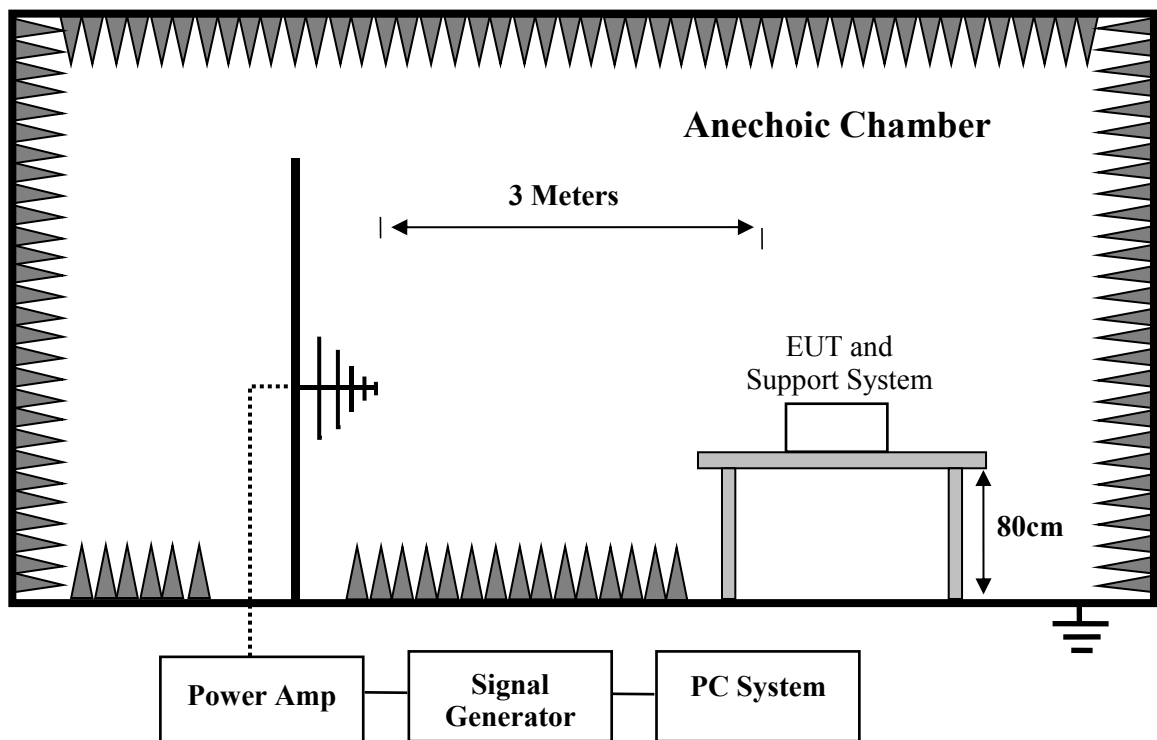
Discharge was considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).

9. RF FIELD STRENGTH SUSCEPTIBILITY TEST

9.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	vector Signal Generator	Agilent	E4438C	US44271917	2016.09.29	1 Year
2.	Power meter	Agilent	E4419B	GB4020212 2	2016.09.29	1 Year
3.	Power Sensor	Agilent	E9300A	MY4149662 5	2016.09.29	1 Year
4.	RF power Amplifier	OPHIR	5225R	1045	N/A	NCR
5.	Antenna	SCHWARZB ECK	STLP9128E- special	STLP9128E s#139	N/A	NCR

9.2. Block Diagram of Test Setup



9.3. Test Standard

EN 61326-2-2: 2013(EN 61326-1: 2013, IEC 61000-4-3: 2006 + A1:2007 + A2:2010)
(Severity Level: 3 at 10V / m)

9.4. Severity Levels and Performance Criterion

9.4.1. Severity level

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

9.4.2. Performance criterion : A

9.5. EUT Configuration

The configurations of EUT are listed in Section 3.5.

9.6. Operating Condition of EUT

Same as Conducted Emission test that is listed in Section 3.6. except the test set up replaced by Section 9.2.

9.7. Test Procedure

Testing was performed in a Fully anechoic chamber as recommended by IEC 61000-4-3. The EUT was placed on an 80 cm high non-conductive table located in the area of field uniformity. The radiating antenna was placed 3m in front of the EUT and Support system, and dwell time of the radiated interference was controlled by an automated, computer-controlled system. The signal source was stepped through the applicable frequency range at a rate no faster than 1 % of the fundamental. The signal was amplitude modulated 80% over the frequency range 80 MHz to 1GHz at a level of 3 V/m. The dwell time was set at 3 s. Field presence was monitored during testing via a field probe placed in close proximity to the EUT. Throughout testing, the EUT was closely monitored for signs of susceptibility. The test was performed with the antennae oriented in both a horizontal and vertical polarization.

All the scanning conditions are as follows:

Condition of Test	Remarks
1. Test Fielded Strength	10 V/m (Severity Level 2)
2. Radiated Signal	80% amplitude modulated with a 1kHz sine wave
3. Scanning Frequency	80 - 1000 MHz
4. Sweeping time of radiated	0.0015 decade/s
5. Dwell Time	3 Sec.

9.8. Test Results

PASS.

The EUT was tested and all the test results are listed in next page.

RF Field Strength Susceptibility Test Results

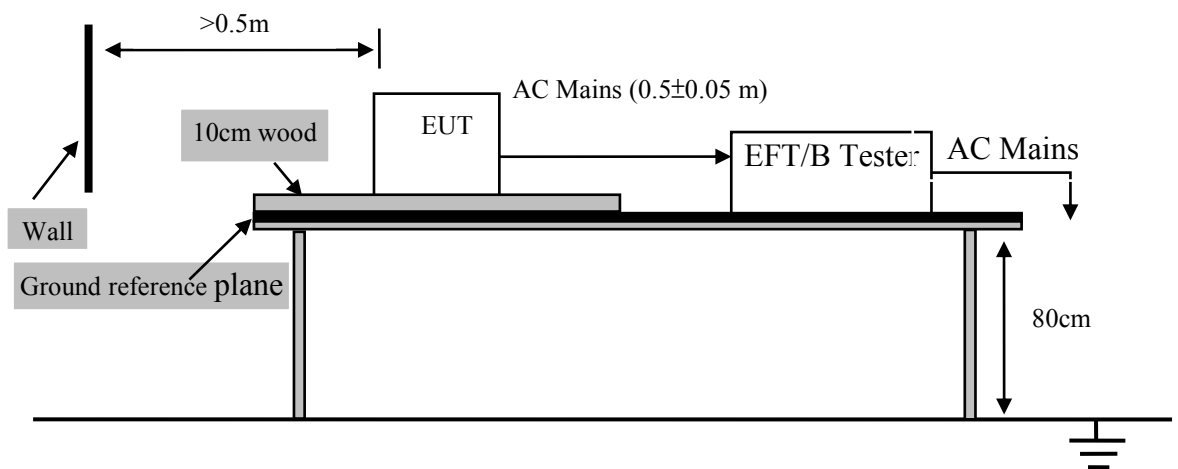
Applicant	:	XI'AN BEICHENG ELECTRONICS CO., LTD	Test Date	:	December 26, 2016
EUT	:	Digital multimeter	Temperature	:	24°C
M/N	:	VC97	Humidity	:	56%
Test Voltage	:	DC 9V From Battery	Pressure	:	101.3KPa
Test Engineer	:	Lucas Pang	Test Mode	:	Working
Frequency Range	:	80 MHz -1000MHz	Field Strength	:	3V/m
Required Performance	:	A	Actual Performance	:	A
Modulation: <input checked="" type="checkbox"/> AM <input type="checkbox"/> Pulse <input type="checkbox"/> none 1 kHz 80%					
Frequency Range :80 MHz -1000MHz					
Steps	1%				
	Horizontal		Vertical		Result
	Required	Observation	Required	Observation	(Pass / Fail)
Front	A	A	A	A	Pass
Right	A	A	A	A	Pass
Rear	A	A	A	A	Pass
Left	A	A	A	A	Pass
Test Equipment : 1. Signal Generator : Marconi 2031B 2. Power Amplifier : A&R 500A/100;100W/1000M. 3. Power Antenna : A&R AT-1080. 4. Field Monitor : A&R FM7004.					
Remark: Class A is no function loss.					

10. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

10.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EFT Equipment	3ctest	EFT-4001G	EC0461015	2016.09.29	1 Year
2.	Capacitive Coupling	3ctest	EFTC	EC0441049	2016.09.29	1 Year

10.2. Block Diagram of Test Setup



10.3. Test Standard

EN 61326-2-2: 2013(EN 61326-1: 2013, IEC 61000-4-4:2012)(Severity Level 4 at 2kV)

10.4. Severity Levels and Performance Criterion

10.4.1. 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

10.4.2. Performance criterion : B

10.5. EUT Configuration

The configurations of EUT are listed in Section 3.5.

10.6. Operating Condition of EUT

Same as Conducted Emission test that is listed in Section 3.6. except the test set up replaced by Section 10.2.

Test Procedure

The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support $0.1\text{m} \pm 0.01\text{m}$ thick. The ground reference plane was $1\text{m} \times 1\text{m}$ metallic sheet with 0.65mm minimum thickness. This reference ground plane was 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 was more than 0.5m . All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.

10.6.1. For input and AC power ports:

The EUT was connected to the power mains by using a coupling device that couples the EFT interference signal to AC power lines. Both positive transients and negative transients of test voltage were applied during compliance test and the duration of the test can't less than 1min.

10.6.2. For signal lines and control lines ports:

It's unnecessary to test.

10.6.3. For DC input and DC output power ports:

It's unnecessary to test.

10.7. Test Results

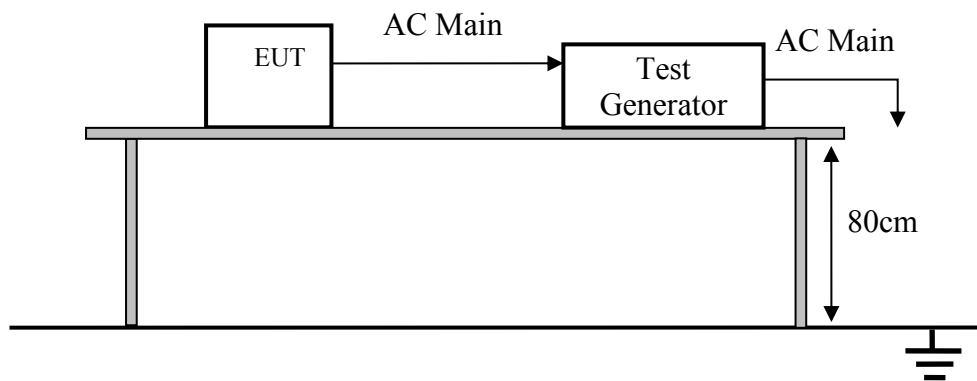
The EUT is supplied by battery inside, so this item does not applicable.

11. SURGE TEST

11.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge CDN	3ctest	SGN-5010G	EC5591004	2016.09.29	1 Year
2.	Surge Generator	3ctest	SG-5006G	EC5581006	2016.09.29	1 Year

11.2. Block Diagram of Test Setup



11.3. Test Standard

EN 61326-2-2: 2013(EN 61326-1: 2013, IEC 61000-4-5: 2014)
(Severity Level: Line to Line was Level 2 at 1kV)

11.4. Severity Levels and Performance Criterion

11.4.1. Severity level

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

11.4.2. Performance criterion: **B**

11.5. EUT Configuration

The configurations of EUT are listed in Section 3.5.

11.6. Operating Condition of EUT

Same as Conducted Emission test that is listed in Section 3.6. except the test set up replaced by Section 11.2

Test Procedure

- 1) Set up the EUT and test generator as shown on Section 11.2.
- 2) For line-to-line coupling mode, provide a 1kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral lines to ground are same except test level is 2kV.
- 3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied 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.

11.7. Test Results

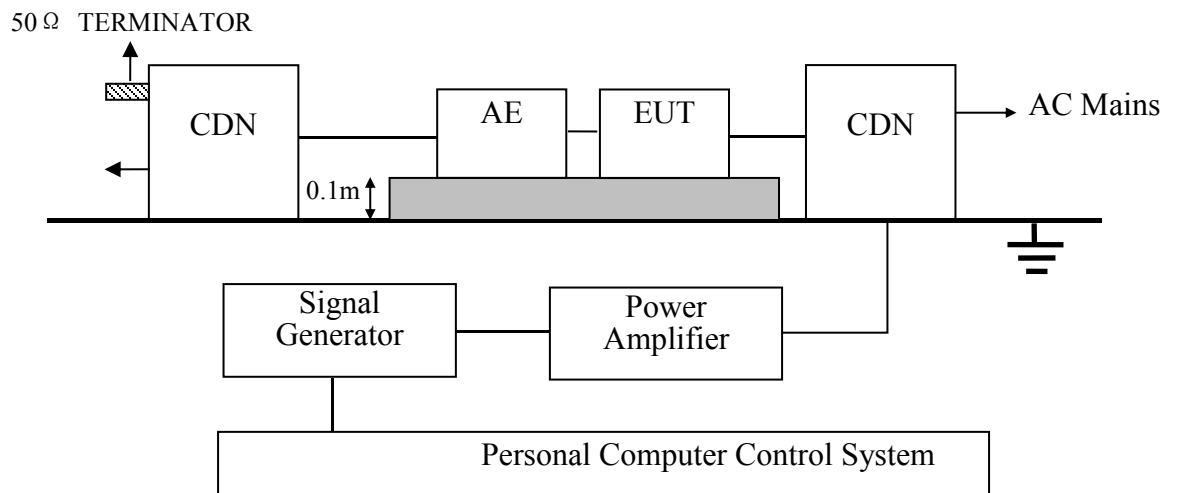
EUT Supply by DC Power, so this item is not applicable.

12. INJECTED CURRENTS SUSCEPTIBILITY TEST

12.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	CONDUCTED IMMUNITY TEST SYSTEM (RF-Generator)	Frankonia	CIT-10/75	12681247/2013	2016.09.29	1 Year
2.	Fixed Coaxial Attenuator (6dB Attenuation)	CD	ATT-0675	120540086	2016.09.29	1 Year
3.	coupling-decoupling network (CDN)	CD	CDN M2/M3	2302	2016.09.29	1 Year
4.	Electromagnetic Injection Clamp (EMC-Clamp)	CD	EM-Clamp	0513A031201	2016.09.29	1 Year

12.2. Block Diagram of Test Setup



12.3. Test Standard

EN 61326-2-2: 2013(EN 61326-1: 2013, IEC61000-4-6: 2013)
 (Severity Level 2 at 3V (r.m.s.) and frequency is from 0.15MHz to 80MHz)

Severity Levels and Performance Criterion

12.3.1. Severity level

Level	Voltage Level (e.m.f.) V
1.	1
2.	3
3.	10
X	Special

12.3.2. Performance criterion: A

12.4. EUT Configuration

The configurations of EUT are listed in Section 3.5.

12.5. Operating Condition of EUT

Same as Conducted Emission test that is listed in Section 3.6. except the test set up replaced by Section 12.2.

12.6. Test Procedure

- 1) Set up the EUT, CDN and test generators as shown on Section 12.2.
- 2) Let the EUT work in test mode and test 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 10 and 30 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 0.150MHz 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.

12.7. Test Results

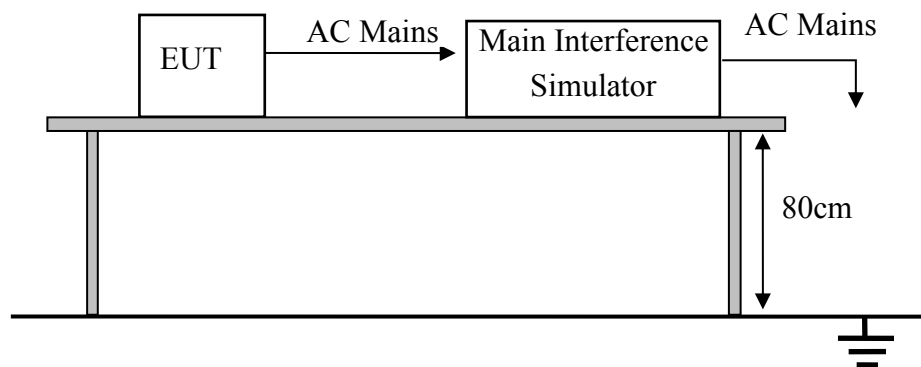
The EUT is supplied by battery inside, so this item does not applicable.

13. VOLTAGE DIPS AND INTERRUPTIONS TEST

13.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Main Interference Simulator	3ctest	VDG-1105G	EC0171002	2016.09.29	1 Year

13.2. Block Diagram of Test Setup



13.3. Test Standard

EN 61326-2-2: 2013(EN 61326-1: 2013, IEC 61000-4-11: 2004)

13.4. Severity Levels and Performance Criterion

13.4.1. Severity level

Test Level %U _T	Voltage dip and short interruptions %U _T	Performance Criterion	Duration (in period)
0	100	C	250
0	100	B	0.5
70	30	C	25

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

13.5. EUT Configuration

The configurations of EUT are listed in Section 3.5.

13.6. Operating Condition of EUT

Same as Conducted Emission test that is listed in Section 3.6. except the test set up replaced by Section 13.2.

Test Procedure

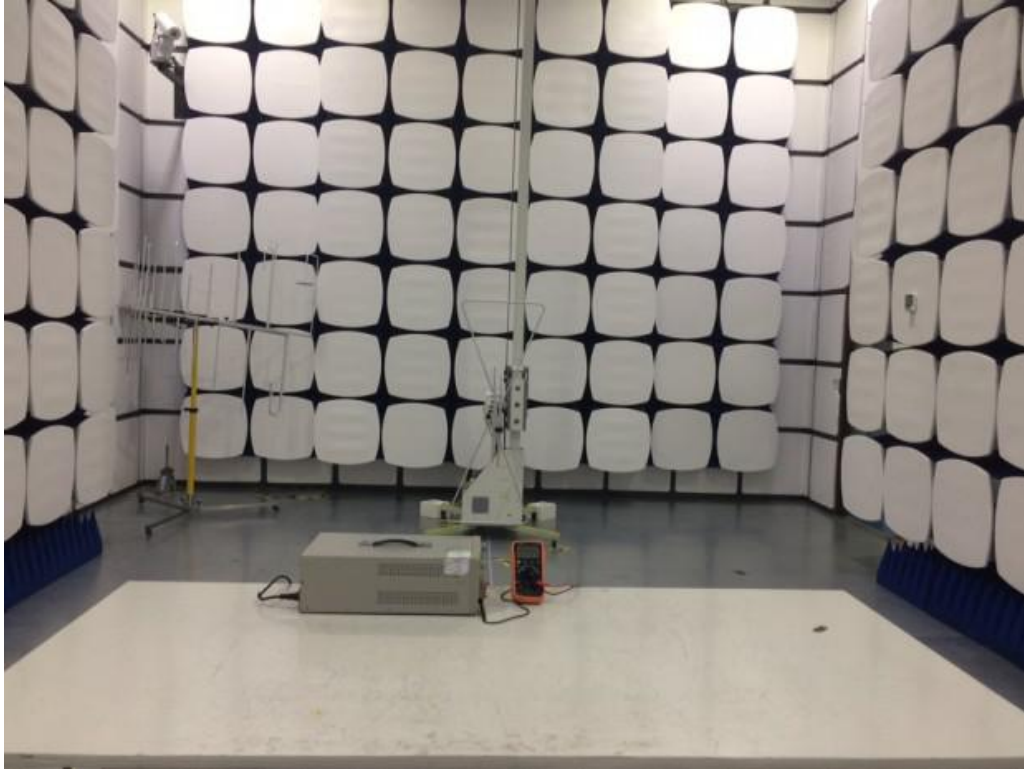
- 1) The EUT and test generator were setup as shown on Section 13.2.
- 2) The interruption is introduced at selected phase angles with specified duration.
- 3) Record any degradation of performance.

13.7. Test Results

The EUT is supplied by battery inside, so this item does not applicable.

14. PHOTOGRAPHS

14.1. Photos of Radiated Emission Test (In Anechoic Chamber)



14.2. Photos of Electrostatic Discharge Immunity Test



15. PHOTOS OF THE EUT



Full View



Top View



Bottom View



Front View



Rear View



Left View



Right View



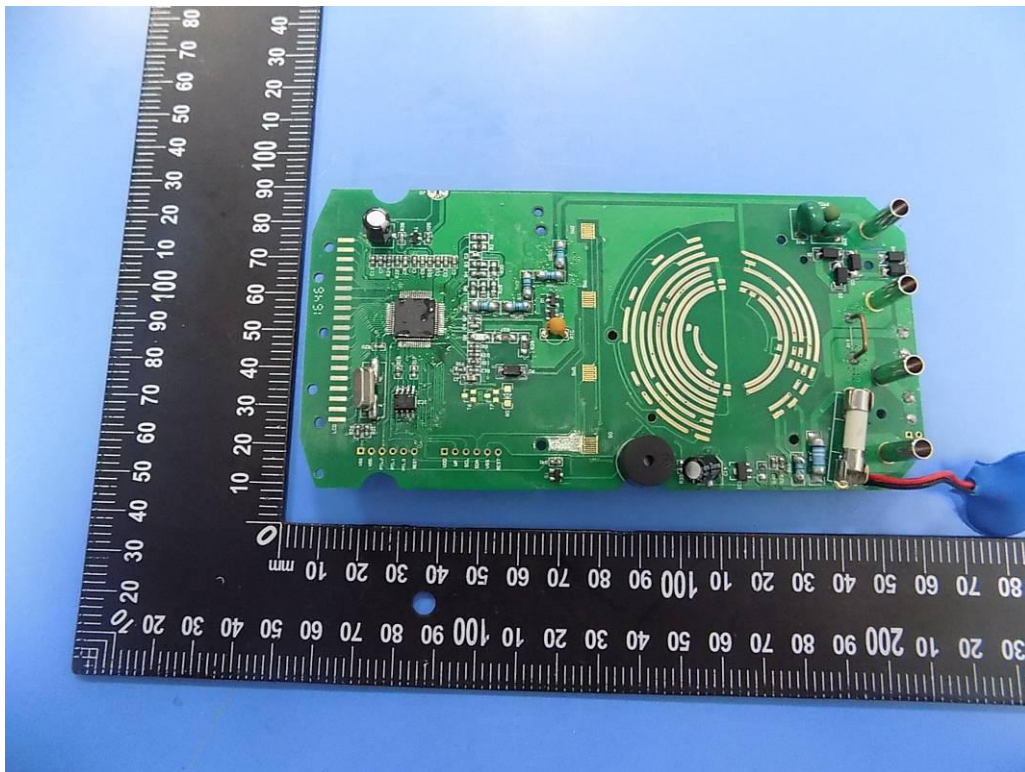
Inside View



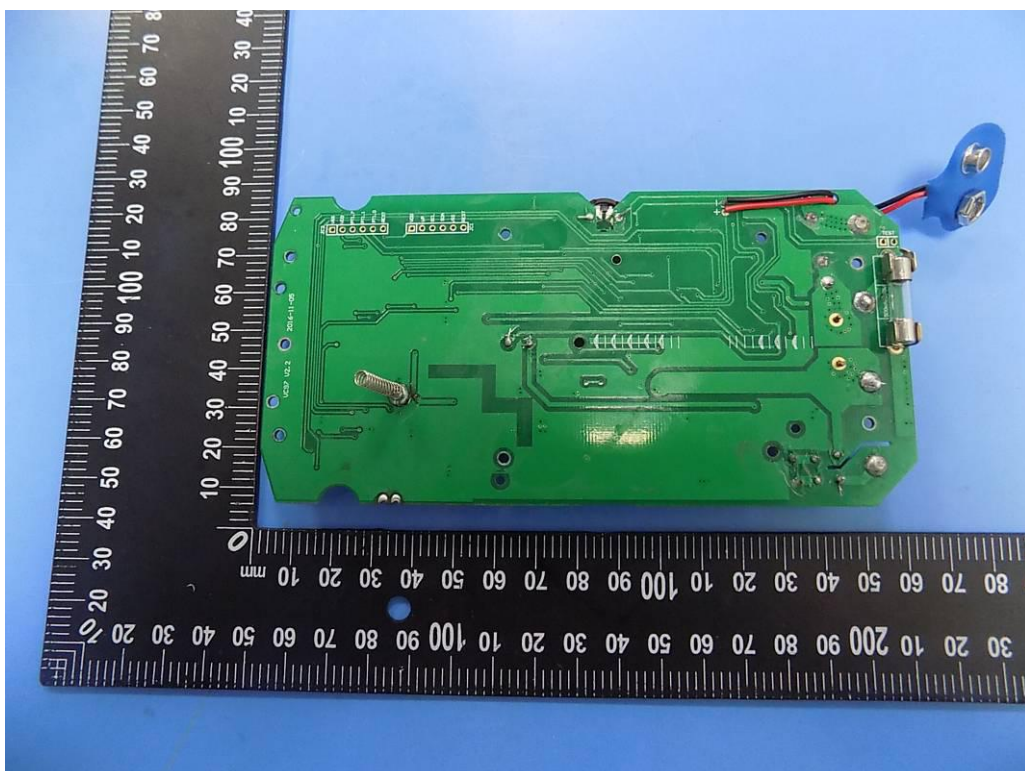
Inside View



Inside View



Inside View



Inside View

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