



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.....: **CTL1307081080-E**

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Date of issue.....: July 11, 2013

Testing Laboratory Name: **Shenzhen CTL Electromagnetic Technology Co., Ltd.**

Address.....: Zone B, 4/F, Block 20, Guangqian Industrial Park, Longzhu Road, Nanshan, Shenzhen 518055 China

Testing location/ procedure: Full application of Harmonised standards
Partial application of Harmonised standards
Other standard testing methods

Applicant's name.....: **Shenzhen Microcig Innovation Technology CO., LTD.**

Address.....: 8F 31# Cunqian Road, Wanfeng, Shajing, Baoan District, Shenzhen City, China

Test specification:

Standard: **EN 55014-1: 2006+A2: 2011**
EN 55014-2: 1997+A2: 2008
EN 61000-3-2: 2006+A2: 2009
EN 61000-3-3: 2008

Non-standard test method.....: /

TRF Originator.....: Shenzhen CTL Electromagnetic Technology Co., Ltd

Master TRF.....: Dated 2013-07

Shenzhen CTL Electromagnetic Technology Co., Ltd

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Test item description: **Electronic Cigarette**

Trade Mark: /

Manufacturer: Shenzhen Microcig Innovation Technology CO., LTD.

Models: EVOD

Ratings.....: AC 100-240V 50/60Hz

Result.....: **Positive**

EMC -- TEST REPORT

Test Report No. : CTL1307081080-E	July 11, 2013 Date of issue
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Equipment under Test : Electronic Cigarette

Model No. : EVOD

Listed Models : MAXIMIZER, PROTANK, TANK, T2, T3, T3S, MT3S, BCC, EE2, EE3, Replacement Coil, G5, G6, 618 Pipe, CE102, CE203, CE304, CE405, CE506, CE607, CE708, CE809, CE910, BT102, BT203, BT304, BT405, BT506, BT607, BT708, BT809, BT910

Applicant : **Shenzhen Microcig Innovation Technology CO., LTD.**

Address : 8F 31# Cunjian Road, Wanfeng, Shajing, Baoan District, Shenzhen City, China

Manufacturer : **Shenzhen Microcig Innovation Technology CO., LTD.**

Address : 8F 31# Cunjian Road, Wanfeng, Shajing, Baoan District, Shenzhen City, China

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.

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1 TEST STANDARDS

The tests were performed according to following standards:

[EN 55014-1:2006+A2: 2011](#) Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus -- Part 1: Emission

[EN 55014-2:1997+A2: 2008](#) Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus -- Part 2: Immunity - Product family standard

[EN 61000-3-2:2006+A2: 2009](#) 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::2008](#) 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 : July 8, 2013

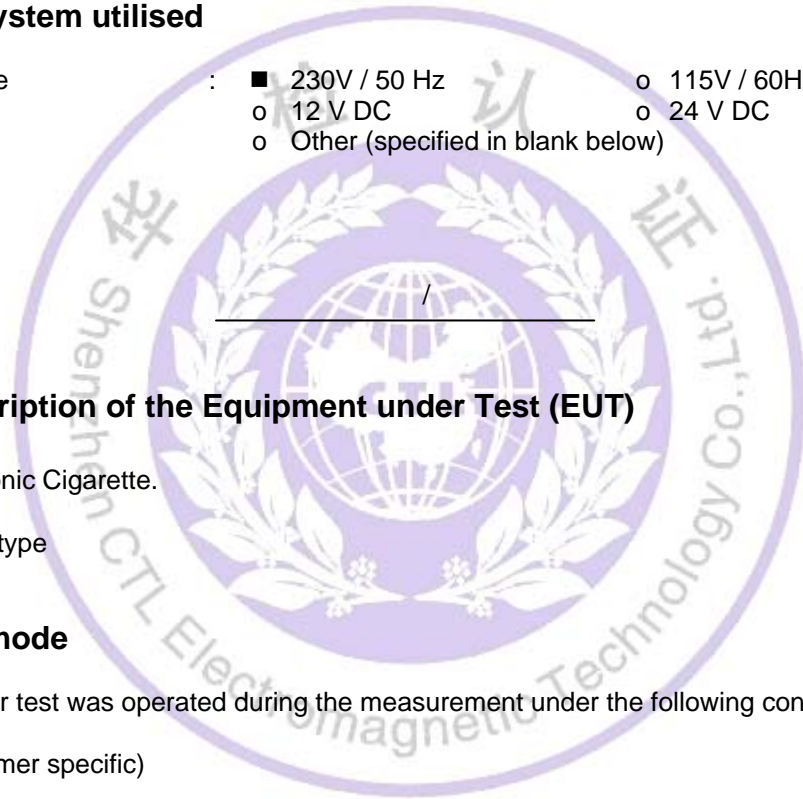
Testing commenced on : July 8, 2013

Testing concluded on : July 11, 2013

2.2 Equipment Under Test

Power supply system utilised

Power supply voltage : 230V / 50 Hz 115V / 60Hz
 12 V DC 24 V DC
 Other (specified in blank below)



2.3 Short description of the Equipment under Test (EUT)

The EUT is a Electronic Cigarette.

Serial number: prototype

EUT operation mode

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

Test program (customer specific)

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.

EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- - supplied by the manufacturer
- - supplied by the lab

2.4 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
- 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

Bontek Compliance Testing Laboratory Ltd
1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

There is one 3m semi-anechoic chamber and two line conducted labs for final test.
The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

3.2 Test Facility

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

IC Registration No.: 7631A

The 3m alternate test site of Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on March, 2011.

FCC-Registration No.: 338263

Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 338263, March 24, 2008.

3.3 Environmental conditions

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

Temperature:	<u>15-35 ° C</u>
Humidity:	<u>30-60 %</u>
Atmospheric pressure:	<u>950-1050mbar</u>

3.4 Test Description

Emission Measurement		
Conducted Disturbance	EN 55014-1: 2006+A2:2011	PASS
Radiated Emission	EN 55014-1: 2006+A2:2011	N/A
Click Test	EN 55014-1: 2006+A2:2011	N/A
Power Clamp Radiation	EN 55014-1: 2006+A2:2011	PASS
Harmonic Current	EN 61000-3-2: 2006+A2: 2009	N/A
Voltage Fluctuation and Flicker	EN 61000-3-3: 2008	PASS
Immunity Measurement		
Electrostatic Discharge	EN 55014-2: 1997+A2:2008 EN 61000-4-2:2009	PASS
RF Field Strength Susceptibility	EN 55014-2: 1997+A2:2008 EN 61000-4-3:2006+A2:2010	N/A
Electrical Fast Transient/Burst Test	EN 55014-2: 1997+A2:2008 EN 61000-4-4:2004+A1:2010	PASS
Surge Test	EN 55014-2: 1997+A2:2008	PASS

	EN 61000-4-5:2006	
Conducted Susceptibility Test	EN 55014-2: 1997+A2:2008 EN 61000-4-6:2009	PASS
Power frequency magnetic field	EN 55014-2: 1997+A2:2008 EN 61000-4-8:2010	N/A
Voltage Dips and Interruptions Test	EN 55014-2: 1997+A2:2008 EN 61000-4-11:2004	PASS

Remark: N/A means "not applicable".

The measurement uncertainty is not included in the test result.

3.5 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 Bontek Compliance Testing Laboratory 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.

Hereafter the best measurement capability for Bontek laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Conducted Disturbance	0.15~30MHz	3.22dB	(1)
Radiated Emission	30~1000MHz	4.10dB	(1)

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

3.6 Equipments Used during the Test

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ULTRA-BROADBAND ANTENNA	ROHDE & SCHWARZ	HL562	100015	2013/04
2	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESI 26	100009	2013/04
3	RF TEST PANEL	ROHDE & SCHWARZ	TS / RSP	335015/ 0017	2013/04
4	TURNTABLE	ETS	2088	2149	2013/04
5	ANTENNA MAST	ETS	2075	2346	2013/04
6	EMI TEST SOFTWARE	ROHDE & SCHWARZ	ESK1	N/A	2013/04

Conducted Disturbance					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100106	2013/04
2	Artificial Mains	ROHDE & SCHWARZ	ESH2-Z5	100028	2013/04
3	Pulse Limiter	ROHDE & SCHWARZ	ESH3-Z2	100044	2013/04
4	EMI Test Software	ROHDE & SCHWARZ	ESK1	N/A	2013/04

Power Clamp Radiation					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Emi Test Receiver	ROHDE & SCHWARZ	ESI 26	100009	2013/04
2	Absorbing Clamp	ROHDE & SCHWARZ	MDS-21	100011	2013/04
3	EMI In Motion	HD	KMS 560	560/385 BJ:01	2013/04
4	Controller	HD	HD 050	050/477 BJ:01	2013/04
5	EMI Test Software	ROHDE & SCHWARZ	ESK1	N/A	2013/04

Harmonic Current					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Purified Power Source	CALIFORNIA INSTRUMENTS	HFS500	54513	2013/04
2	Harmonic And Flicker Analyzer	EM TEST	DPA503S1	0500-10	2013/04

Voltage Fluctuation and Flicker					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Purified Power Source	CALIFORNIA INSTRUMENTS	HFS500	54513	2013/04
2	Harmonic And Flicker Analyzer	EM TEST	DPA503S1	0500-10	2013/04

Electrostatic Discharge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ESD Simulator	EM TEST	DITOC0103Z	0301-04	2013/04

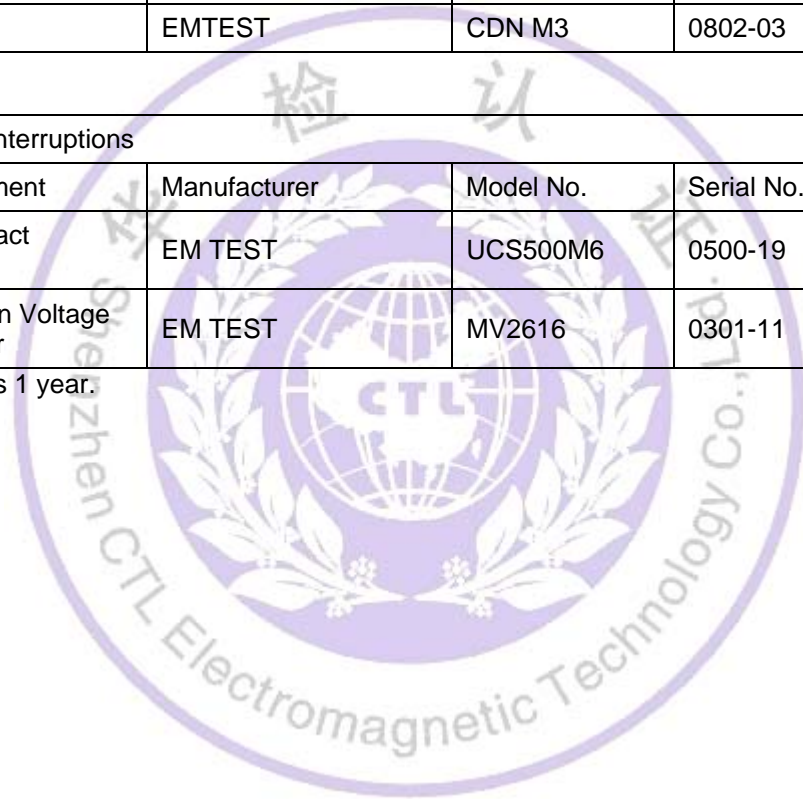
Electrical Fast Transient/Burst					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Ultra Compact Simulator	EM TEST	UCS500M6	0500-19	2013/04
2	Coupling Clamp	EM TEST	HFK	1501-14	2013/04

Surge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ULTRA COMPACT SIMULATOR	EM TEST	UCS500M6	0500-19	2013/04

Conducted Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal Generator	IFR	2023A	202304/060	2013/04
2	Amplifier	AR	75A250	302205	2013/04
3	Dual Directional Coupler	AR	DC2600	302389	2013/04
4	6db Attenuator	EMTEST	ATT6/75	0010230A	2013/04
5	EM CLAMP	LÜTHI	EM101	335625	2013/04
6	CDN	EMTEST	CDN M3	0802-03	2013/04

Voltage Dips and Interruptions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Ultra Compact Simulator	EM TEST	UCS500M6	0500-19	2013/04
2	Motor Driven Voltage Transformer	EM TEST	MV2616	0301-11	2013/04

Mark: The cal. Due is 1 year.



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: Shielded room no. 3

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

According to clause 5.2.2.2 in EN 55014-1: 2006+A2:2011 “the general principle to be followed in the application of the artificial hand is that the metal foil shall be wrapped around all handles” and “when the casing of the appliance is of insulating material, metal foil shall be wrapped round the handles”, application of the artificial hand is used.

4.1.3.1 Operating Condition

The EUT is turned on during the test, and the maximum emanating results are recorded.

4.1.4 Test result

The requirements are **Fulfilled**

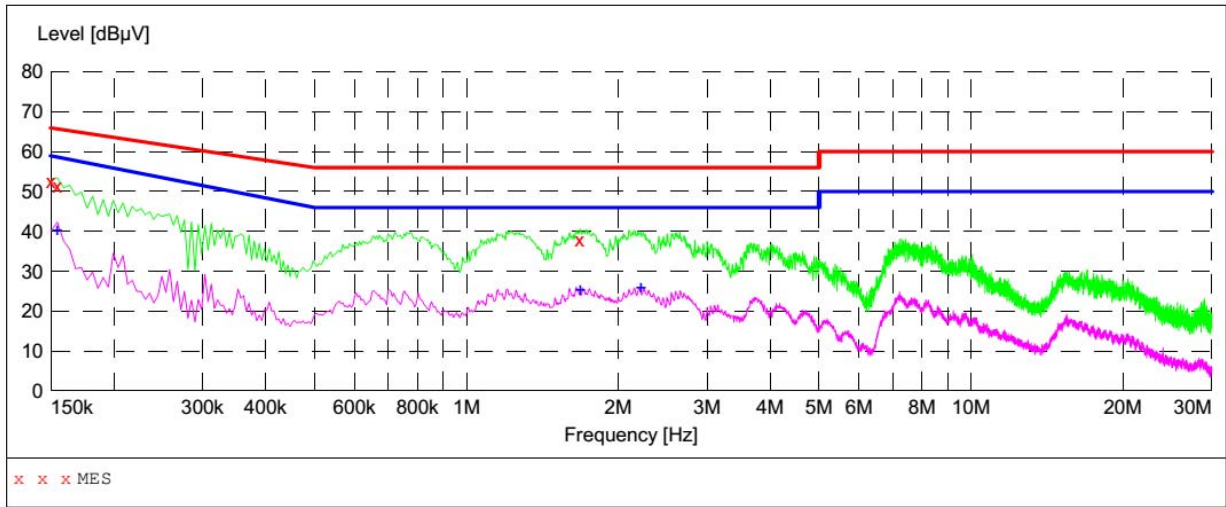
Band Width: 9 KHz

Frequency Range: 0.15MHz to 30 MHz

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

SCAN TABLE: "Vol (9K-30M)FIN NEW"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	52.50	10.3	66	13.5	QP	L1	GND
0.154500	51.50	10.3	66	14.3	QP	L1	GND
1.675500	37.90	10.4	56	18.1	QP	L1	GND

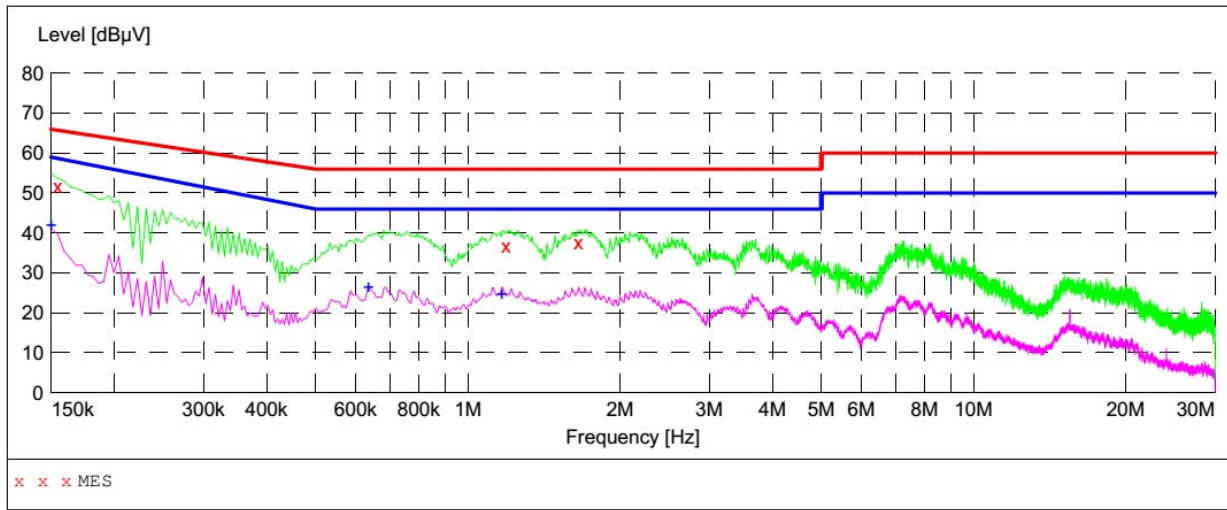
MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.154500	40.30	10.3	59	18.4	AV	L1	GND
1.680000	25.40	10.4	46	20.6	AV	L1	GND
2.215500	25.80	10.4	46	20.2	AV	L1	GND



SCAN TABLE: "Vol (9K-30M)FIN NEW"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.154500	51.80	10.3	66	14.0	QP	N	GND
1.189500	36.70	10.4	56	19.3	QP	N	GND
1.653000	37.60	10.4	56	18.4	QP	N	GND

MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	42.00	10.3	59	17.0	AV	N	GND
0.636000	26.50	10.3	46	19.5	AV	N	GND
1.167000	24.60	10.4	46	21.4	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: Shielded room No. 2

4.2.2 Limits of disturbance(EN55022 B)

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.

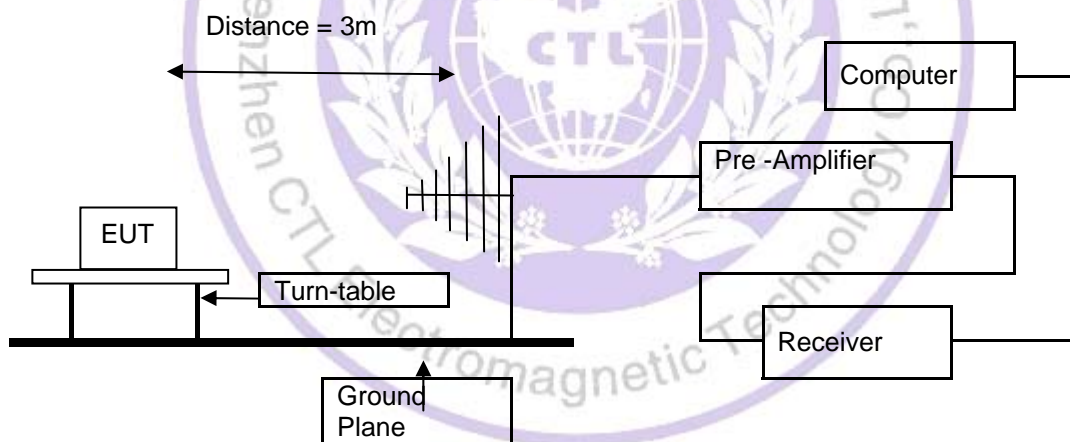
(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

4.2.3 Description of the test set-up

4.2.3.1 Operating Condition

The EUT is set to work shall be carried out with full load mode during the test, and the maximum emanating results are recorded.

4.2.3.2 Configuration of test setup



4.2.4 Test result

The test is not applicable.

4.3 Disturbance power

For test instruments and accessories used see section 3.6.

4.3.1 Description of the test location

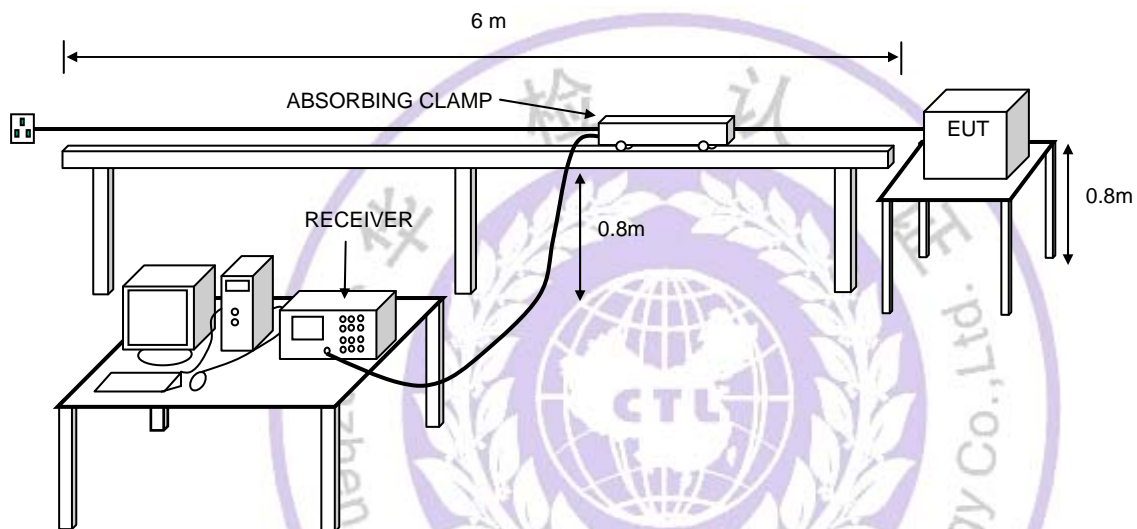
Test location: Shielded room No. 3

4.3.2 Limits of disturbance

Frequency Range (MHz)	Limits (dBpW)	
	Quasi-Peak	Average
30~300	45~55	35~45

Note: (1) The limit line is a linear line.

4.3.3 Description of the test set-up



4.3.4 Test result

The requirements are **Fulfilled**

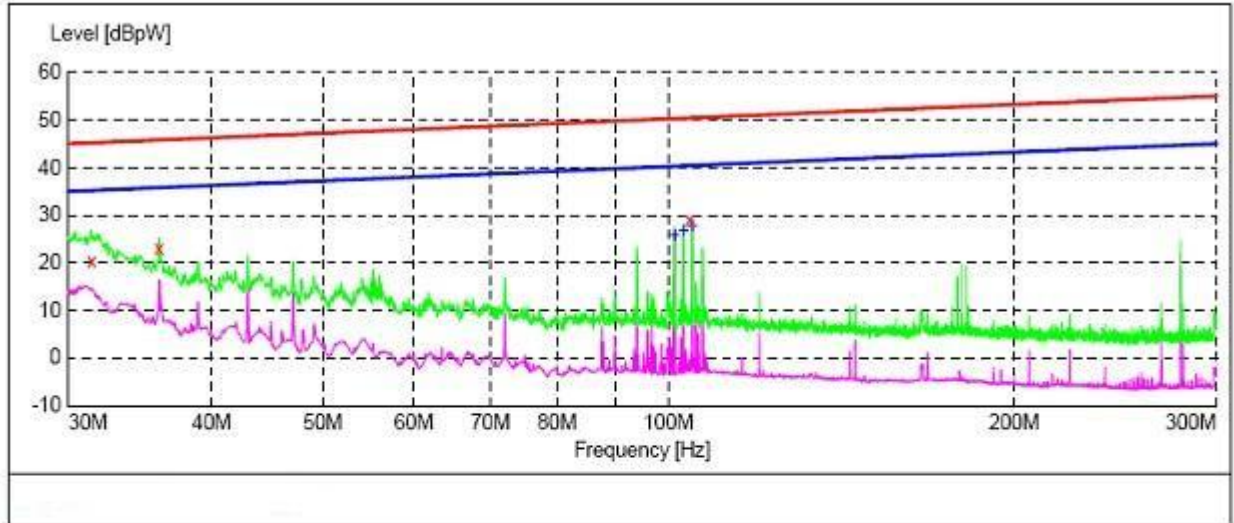
Band Width: 120 KHz

Frequency Range: 30 MHz to 300 MHz

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

SCAN TABLE: "POWER (30M-300M) FIN"

Short Description: EN 55013 Power



MEASUREMENT RESULT:

Frequency MHz	Level dBpW	Transd dB	Limit dBpW	Margin dB	Det.	Position cm
31.440000	20.20	4.1	45	25.0	QP	0.0
36.000000	22.90	2.6	46	22.9	QP	0.0
104.280000	29.00	0.0	50	21.4	QP	0.0

MEASUREMENT RESULT:

Frequency MHz	Level dBpW	Transd dB	Limit dBpW	Margin dB	Det.	Position cm
101.220000	25.80	-0.1	40	14.5	AV	0.0
103.020000	26.90	-0.1	40	13.5	AV	0.0
104.880000	27.80	0.0	40	12.6	AV	0.0

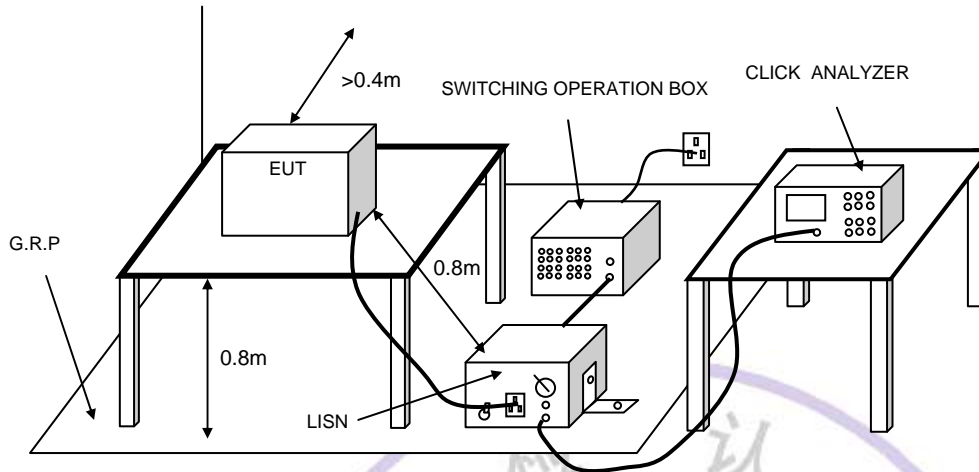


4.4 Click

4.4.1 Description of the test location

Test location: Shielded room no. 2

4.4.2 Diagram of Test Setup



4.4.3 Test Description

4.4.3.1 Operating Condition of EUT

The operation mode of EUT is same as Section 2.4.3, except the test setup.

4.4.3.2 Test Configuration and Procedure

Test Configuration and Procedure see clause 7.4.2 of standard EN 55014-1

4.4.4 Test Results

The test is not applicable

4.5 Harmonic current

Not applicable. The EUT is less than 75w.

4.6 Voltage fluctuations and flicker

For test instruments and accessories used see section 3.6.

4.6.1 Description of the test location

Test location: Shielded room No. 3

4.6.2 Limits of Voltage Fluctuation and Flicker

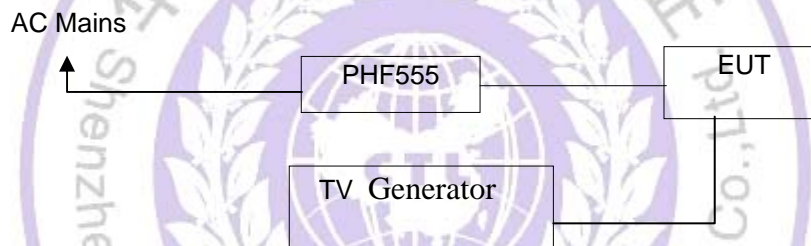
Test configuration and procedure see clause 5 of standard EN 61000-3-3: 2008.

4.6.3 Description of the test set-up

4.4.3.1 Operating Condition

The EUT is set to work shall be carried out with Play mode during the test, and the maximum emanating results are recorded.

4.6.1.1 Configuration of test setup



4.6.4 Test result

The requirements are **Fulfilled**

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

Standard used:	EN/IEC 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	120 min (12 Flicker measurements)
Customer:	Shenzhen Microcig Innovation Technology CO., LTD.
Mains supply voltage:	AC 230V/ 50Hz
Ambient Temperature:	23°C
Humidity:	51%
E. U. T.:	Electronic Cigarette
	M/N: EVOD
Tester:	IVAN

Test Result	PASS
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Maximum Flicker results

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.127	4.00	PASS
dt [s]	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.127	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 2	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.093	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 3	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.093	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 4	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.091	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 5	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.092	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 6	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.095	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 7	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.091	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 8	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.094	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 9	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.093	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 10	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.094	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 11	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.095	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 12	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.093	4.00	PASS
dt [s]	0.000	0.50	PASS



4.7 Electrostatic discharge

For test instruments and accessories used see section 3.6.

4.7.1 Description of the test location and date

Test location: Shielded room No. 3

Date of test: July 8, 2013

Operator: Sam

4.7.2 Severity levels of electrostatic discharge

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

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

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 on mode during the test, and the results of the maximum susceptibility are recorded.

4.7.3.2 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.

4.7.4 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

■ Contact discharge

Indirect discharge

■ Contact discharge

Polarity:

■ Positive

■ Negative

Discharge location:

■ all external locations accessible by hand

■ horizontal coupling plane (HCP)

■ vertical coupling plane (VCP)

4.7.5 Test resultThe requirements are **Fulfilled**Performance Criterion: **B****Remarks:**During the test no deviation was detected to the selected operation mode(s).

4.8 RF Field Strength Susceptibility

The test is not applicable.

4.9 Electrical fast transients / Burst

For test instruments and accessories used see section 3.6.

4.9.1 Description of the test location and date

Test location: Shielded room No. 3

Date of test: July 8, 2013

Operator: Byron

4.9.2 Severity levels of electrical fast transients / Burst

4.9.2.1 Severity level: $\pm 1000V$ for AC power supply lines

Open circuit output test voltage and repetition rate of the impulses		
Level	On power port, PE	
	V peak(KV)	Repetition rate (KHz)
1.	0.5	5 or 100
2.	1	5 or 100
3.	2	5 or 100
4.	4	5 or 100
X	Special	Special

4.9.2.2 Performance criterion: B

4.9.3 Description of the test set-up

4.9.3.1 Operating Condition

The EUT is ON during the test, and the results of the maximum susceptible results are recorded.

4.9.3.2 Test Configuration and Procedure

For AC power input ports:

—The 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.

Without signal / control lines and DC power lines, The EUT is unnecessary to test on these mentioned ports.

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

4.9.4 Test specification:

Coupling network: 0.5 kV 1 kV 2 kV
Coupling clamp: 0.5 kV 1 kV
Burst frequency: 5.0 kHz
Coupling duration: 60 s
Polarity: positive negative

4.9.5 Coupling points

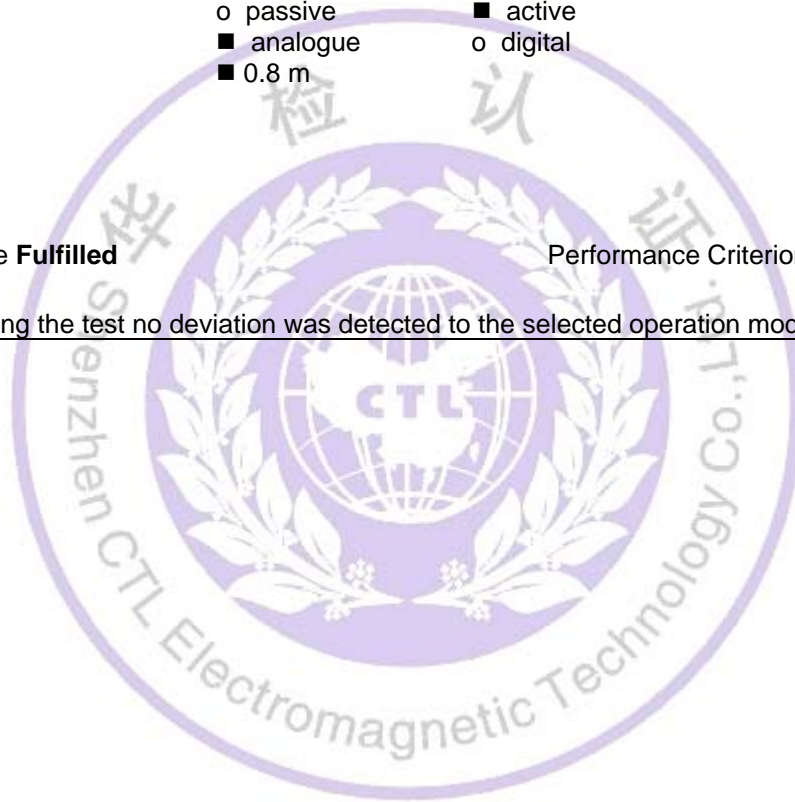
Cable description: AC power line : L, N, L-N,L-PE,N-PE,PE

Screening: screened unscreened
Status: passive active
Signal transmission: analogue digital
Length: 0.8 m

4.9.6 Test result

The requirements are **Fulfilled** Performance Criterion: **B**

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



4.10 Surge

For test instruments and accessories used see section 3.6.

4.10.1 Description of the test location and date

Test location: Test location No. 3

Date of test: July 8, 2013

Operator: Byron

4.10.2 Severity levels of surge

4.10.2.1 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

4.10.2.2 Performance criterion: **B**

4.10.3 Description of the test set-up

4.10.3.1 Operating Condition

The EUT is ON during the test, and the results of the maximum susceptible results are recorded.

4.10.3.2 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 1 time more than 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 angle (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.

4.10.4 Test specification:

Pulse amplitude-Power line sym.: 0.5 kV 1 kV 2 kV 4 kV
Source impedance: $2\ \Omega + 18\ \mu\text{F}$

Pulse amplitude-Power line unsym.: 0.5 kV 1 kV 2 kV 4 kV
Source impedance: $12\ \Omega + 9\ \mu\text{F}$

Number of surges: 5 Surges/Phase angle

Phase angle: 0° 90° 180° 270°

Repetition rate: 60 s

Polarity: positive negative

4.10.5 Coupling points

Cable description: AC power line: L-N L-PE N-PE

Screening: screened unscreened
Status: passive active
Signal transmission: analogue digital
Length: 0.8 m

4.10.6 Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

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



4.11 Conducted disturbances induced by radio-frequency fields

For test instruments and accessories used see section 3.6.

4.11.1 Description of the test location date

Test location: Shielded room No. 3

Date of test: July 8, 2013

Operator: Byron

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

4.11.2.1 Severity Level: 3V

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

4.11.2.2 Performance criterion: A

4.11.3 Description of the test set-up

4.11.3.1 Operating Condition

The EUT is ON during the test, and the results of the maximum susceptible results are recorded.

4.11.3.2 Test Configuration and Procedure

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.

4.11.4 Test specification:

- Frequency range: ■ 0.15 MHz to 230 MHz
- Test voltage: ■ 3 V
- Modulation: ■ AM: 80 %
■ sinusoidal 1000Hz
- Frequency step: ■ 1 % with 1 s dwell time

4.11.5 Coupling points

Cable description (Port1):

AC power line

Screening:

screened

unscreened

Status:

passive

active

Signal transmission:

analogue

digital

Length:

0.8 m

4.11.6 Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

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



4.12 Magnetic Field Immunity

The test is not applicable

4.13 Voltage dips and short interruptions

For test instruments and accessories used see section 3.6.

4.13.1 Description of the test location and date

Test location: Test location No. 3

Date of test: July 8, 2013

Operator: Byron

4.13.2 Severity levels of voltage Dips and Interruptions

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

4.13.3 Description of the test set-up

4.13.3.1 Operating Condition

The EUT is ON during the test, and the results of the maximum susceptible results are recorded.

4.13.3.2 Test Configuration and Procedure

EUT is connected to the simulator according to the setup outline of 12.3. When conducting the test level of 0.5 period duration, make sure that it shall start at the phase angle of 0° and 180°

4.13.4 Test specification:

Nominal Mains Voltage (V_N): ■ 230 V AC

Number of voltage fluctuations: ■ 3

Level of reduction(dip) / duration: ■ 100 % / 10ms ■ 30 % / 1000ms ■ 60 % / 200ms

4.13.5 Test result

The requirements are **Fulfilled**
Performance Criterion **See section 4.11.2**

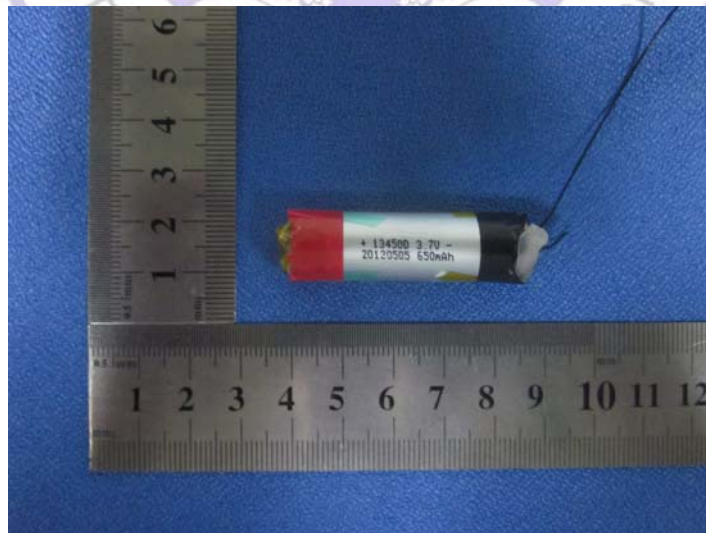
Remarks: During the test no deviation was detected to the selected operation mode(s).

5 Test Setup Photos



6 Photos of the EUT





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