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Test Report

EN 55032 Electromagnetic compatibility of multimedia equipment - Emission Requirements

EN 55024 Information technology equipment – Immunity characteristics – Limits and methods of measurement

Report Reference No. : CTL1705046011-E

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Date of issue : May 11, 2017

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

Address : Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055

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

Applicant's name : USU019

Address :

Test specification:

Standard : EN 55032: 2015 EN 55024: 2010+ A1: 2015
EN 61000-3-2:2014 EN 61000-3-3: 2013

Non-standard test method : /

Test Report Form No.

TRF Originator : Shenzhen CTL Testing Technology Co., Ltd

Master TRF : Dated 2011-01

Shenzhen CTL Testing Technology Co., Ltd.

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Test item description : CHARGING CABLE

Trade Mark : Spector&co

Test voltage : DC 12V

Result : Positive

EMC -- Test Report

Test Report No. : CTL1705046011-E	May 11, 2017
	Date of issue

Equipment under Test : CHARGING CABLE

Type / Model : T991

Listed Models : /

Applicant : USU019

Address :

Manufacturer : USU019

Address :

Test Result	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.

History of this test report

Report No.	Version	Description	Issued Date
CTL1705046011-E	V1.0	Initial Issued Report	May 11, 2017



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1. TEST STANDARDS

The tests were performed according to following standards:

[EN 55032: 2015](#) Electromagnetic compatibility of multimedia equipment - Emission Requirements

[EN 55024: 2010+ A1: 2015](#) Information technology equipment – Immunity characteristics – Limits

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

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



2. SUMMARY

2.1. General Remarks:

Date of receipt of test sample : May 05, 2017

Testing commenced on : May 05, 2017

Testing concluded on : May 10, 2017

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 CHARGING CABLE

2.4. EUT operation mode:

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

The tests are carried out with surge protective devices disconnected.

Test program (customer specific)

Emissions tests.....: According to EN55032, searching for the highest disturbance.

Immunity tests: According to EN55024, searching for the highest susceptibility.

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

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

2.5. EUT configuration:

(The CDF filled by the applicant can be viewed at the test laboratory.)

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

■- supplied by the manufacturer

o - supplied by the lab

2.6. Performance Criteria

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

Shenzhen CTL Testing Technology Co., Ltd.
Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 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 55032 requirements.

3.2. Test Facility

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

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology Co., 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 970318, December 19, 2013.

3.3. Environmental conditions

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

Temperature: 22-25 ° C

Humidity: 40-54 %

Atmospheric pressure: 950-1050mbar

3.4. Test Description

Emission Measurement		
Radiated Emission	EN 55032: 2015	PASS
Conduction Emission	EN 55032: 2015	N/A
Harmonic Current	EN 61000-3-2:2014	N/A
Voltage Fluctuation and Flicker	EN 61000-3-3: 2013	N/A
Immunity Measurement		
Electrostatic Discharge	EN 55024: 2010+ A1: 2015 IEC 61000-4-2: 2008	PASS
RF Field Strength Susceptibility	EN 55024: 2010+ A1: 2015 IEC 61000-4-3: 2010 #	PASS
Electrical Fast Transient/Burst Test	EN 55024: 2010+ A1: 2015 IEC 61000-4-4: 2012	N/A
Surge Test	EN 55024: 2010+ A1: 2015 IEC 61000-4-5: 2014	N/A
Conducted Susceptibility Test	EN 55024: 2010+ A1: 2015 IEC 61000-4-6: 2013	N/A
Power Frequency Magnetic Field Susceptibility Test	EN 55024: 2010+ A1: 2015 IEC 61000-4-8: 2009	PASS
Voltage Dips and Interruptions Test	EN 55024: 2010+ A1: 2015 IEC 61000-4-11: 2004	N/A

Remark:

1. The test result PASS and /or FAIL has no relationship with the measurement uncertainty.
2. “#” indicates the testing item(s) was(were) fulfilled by subcontracted lab.

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 Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	$\pm 3.56\text{dB}$	(1)
Radiated Emission	1~12.75GHz	$\pm 4.32\text{dB}$	(1)
Conducted Emission	0.15~30MHz	$\pm 2.66\text{dB}$	(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.	Cal.Due
1	ULTRA-BROADBAND ANTENNA	Sunol Sciences Corp.	JB1 Antenna	A061713	2016/06/01	2017/05/31
2	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	2016/06/01	2017/05/31
3	Horn Antenna	Sunol Sciences Corp	DRH-118	A062013	2016/06/01	2017/05/31

Electrostatic Discharge						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	ESD Simulator	TESEQ AG	NSG 437	1058	2016/06/01	2017/05/31

RF Field Strength Susceptibility						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	SIGNAL GENERATOR	ROHDE & SCHWARZ	SMB100A	177746	2016/07/13	2017/07/12
2	Power Amplifier	OPHIR RF	5225F	1037	2017/02/17	2018/02/16
3	Power Meter	Agilent	E4419B	GB40201833	2016/11/25	2017/11/24
4	Directional Coupler	Werlantone	C5982-10	109275	N/A	N/A
5	Test Antenna-Bi-Log	SCHWARZBECK	VULB 9163	9163-624	2015/07/22	2017/07/21

Power Frequency Magnetic Field Susceptibility						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	MAGNETIC COIL	HTEC Instruments Ltd.	HPFMF	154402	2016/06/01	2017/05/31

4. TEST CONDITIONS AND RESULTS

4.1. Radiated Emission

For test instruments and accessories used see section 3.6.

4.1.1. Description of the test location

Test location: Radiation Lab

4.1.2. Limits of disturbance

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

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

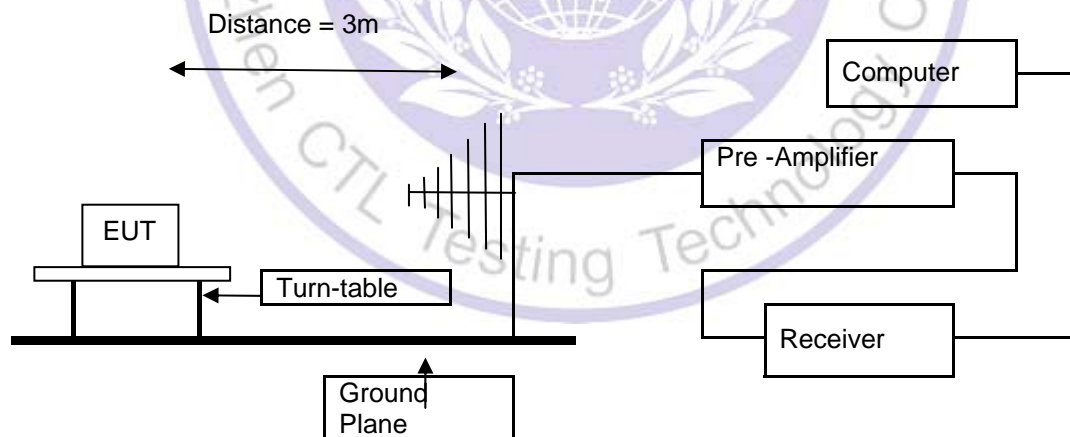
(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

4.1.3. Description of the test set-up

4.1.3.1. 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.

4.1.3.2. Configuration of test setup



4.1.4. Test result

The requirements are **Fulfilled**

Band Width: 120KHz

Frequency Range: 30MHz to 1000MHz

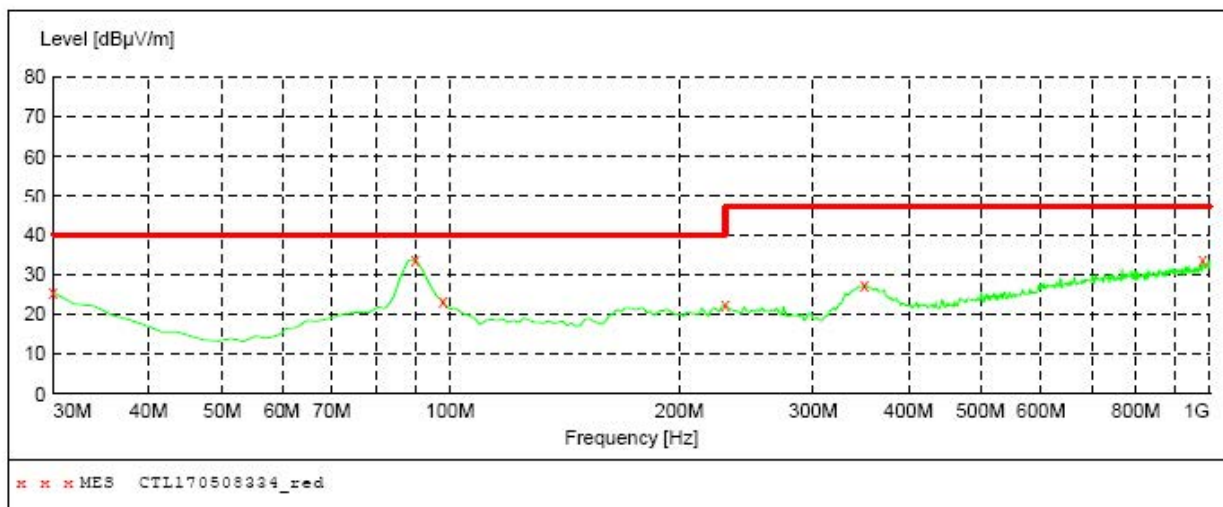
Remarks: The limits are kept. For detailed results, please see the following page(s).

Shenzhen CTL Testing Technology Co.,Ltd**Radiation Emission Test EN 55032**

EUT: T991
 Manufacturer:
 Operating Condition: ON
 Test Site: 3M Chamber
 Operator: LI
 Test Specification: DC 12V
 Comment:
 Start of Test: 5/9/2017 / 12:35:24PM

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
Frequency 30.0 MHz	Frequency 1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1

**MEASUREMENT RESULT: "CTL170508334_red"**

12/30/2016 12:46AM

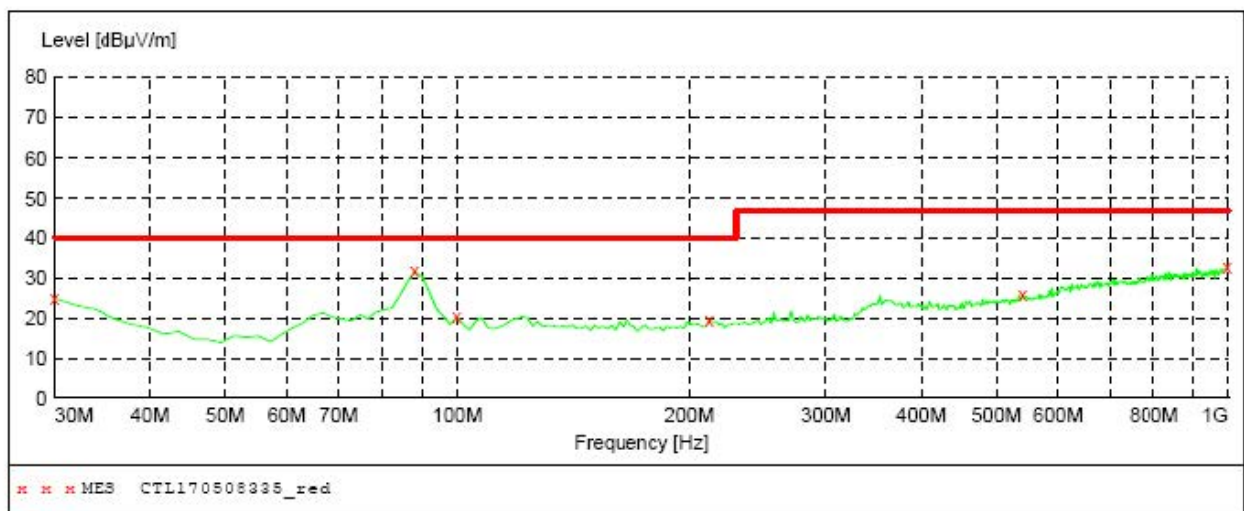
Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	25.50	20.8	40.0	14.5	---	0.0	0.00	HORIZONTAL
90.140000	33.80	9.4	40.0	6.2	---	0.0	0.00	HORIZONTAL
97.900000	23.10	10.7	40.0	16.9	---	0.0	0.00	HORIZONTAL
229.820000	22.40	13.8	40.0	17.6	---	0.0	0.00	HORIZONTAL
350.100000	27.50	16.8	47.0	19.5	---	0.0	0.00	HORIZONTAL
978.660000	33.50	26.9	47.0	13.5	---	0.0	0.00	HORIZONTAL

Shenzhen CTL Testing Technology Co.,Ltd**Radiation Emission Test EN 55032**

EUT: T991
 Manufacturer:
 Operating Condition: ON
 Test Site: 3M Chambe
 Operator: LI
 Test Specification: DC 12V
 Comment:
 Start of Test: 5/9/2017 / 12:37:38PM

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency				
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1

**MEASUREMENT RESULT: "CTL170508335_red"**

12/30/2016 12:44AM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	25.00	20.8	40.0	15.0	---	0.0	0.00	VERTICAL
88.200000	31.70	9.2	40.0	8.3	---	0.0	0.00	VERTICAL
99.840000	20.50	11.1	40.0	19.5	---	0.0	0.00	VERTICAL
212.360000	19.60	14.0	40.0	20.4	---	0.0	0.00	VERTICAL
540.220000	25.80	20.7	47.0	21.2	---	0.0	0.00	VERTICAL
996.120000	32.70	27.2	47.0	14.3	---	0.0	0.00	VERTICAL

4.2. Conducted disturbance

The test is not applicable.

4.3. Harmonic current

The test is not applicable.

4.4. Voltage Fluctuation and Flicker

The test is not applicable.

4.5. Electrostatic discharge

For test instruments and accessories used see section 3.6.

4.5.1. Description of the test location and date

Test location: 1# EMC Test Room

Date of test: May 10, 2017

Operator: NADA

4.5.2. Severity levels of electrostatic discharge

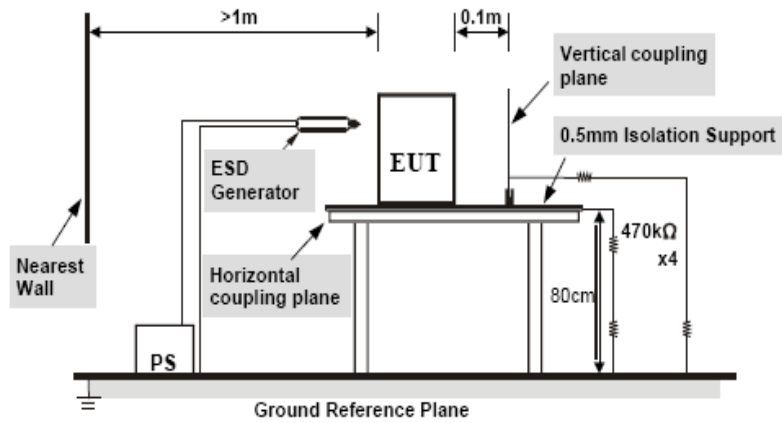
Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1	2	2
2	4	4
3	6	8
4	8	15
X	Special	Special

4.5.3. Description of the test set-up

4.5.3.1. Operating Condition

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

4.5.3.2. Configuration of test setup



4.5.4. Test specification:

Contact discharge voltage:

■ 2 kV ■ 4 kV

■ 4 kV

Air discharge voltage:

■ 2 kV ■ 4 kV

■ 8 kV

Number of discharges:

□ ≥ 10 ■ ≥ 25

■ ≥ 25

Type of discharge:

Direct discharge

- Air discharge

- Contact discharge

- Contact discharge

Polarity:

- Positive

- Negative

Discharge location:

- see photo documentation of the test set-up

- all external locations accessible by hand

- horizontal plate (HCP)

- vertical coupling plate (VCP)

4.5.5. Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

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

4.6. Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 3.6.

4.6.1. Description of the test location and date

Test location: Subcontracted Lab

Date of test: May 10, 2017

Operator: Bove

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

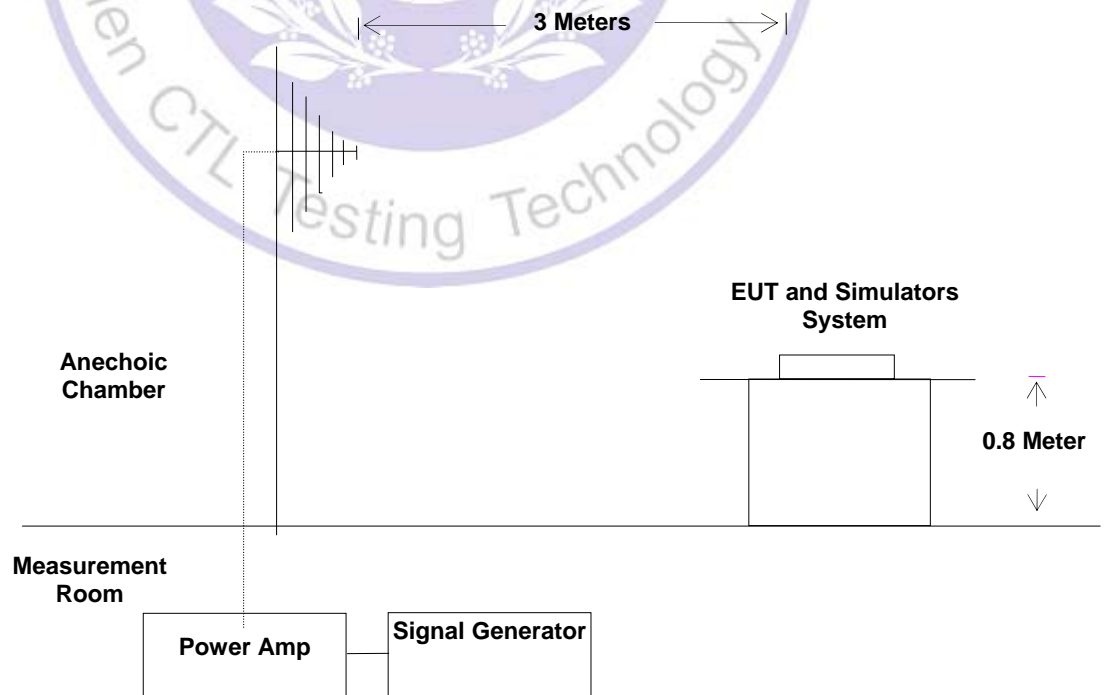
Level	Field Strength (V/m)
1.	1
2.	3
3.	10
X	Special

4.6.3. Description of the test set-up

4.6.3.1. Operating Condition

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

4.6.3.2. Configuration of test setup



4.6.4. Test specification:

<u>Frequency range:</u>	■ 80 MHz to 1000 MHz
<u>Field strength:</u>	■ 3 V/m
<u>EUT - antenna separation:</u>	■ 3 m
<u>Modulation:</u>	■ AM: 80 % ■ sinusoidal 1000Hz
<u>Frequency step:</u>	■ 1 % with 3 s dwell time
<u>Antenna polarisation:</u>	■ horizontal ■ vertical

4.6.5. Test resultThe requirements are **Fulfilled**Performance Criterion: **A****Remarks:** During the test no deviation was detected to the selected operation mode(s).**4.7. Electrical fast transients / Burst**

The test is not applicable.

4.8. Surge

The test is not applicable.

4.9. Conducted disturbances induced by radio-frequency fields

The test is not applicable.

4.10. Magnetic Field Immunity

For test instruments and accessories used see section 3.6.

4.10.1. Description of the test location

Test location: 2# EMC Test Room

Date of test: May 10, 2017

Operator: Andy

4.10.2. Severity levels of magnetic field immunity

Level	Magnetic Field Strength (A/m)
1	1
2	3
3	10
4	30
5	100
X.	Special

4.10.3. Description of the test set-up

4.10.3.1. Operating Condition

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

4.10.4. Test specification:

Test frequency: ■ 50 Hz

Continuous field: ■ 1 A/m

Test duration: ■ 5 m

Antenna factor: 0.917 A/m

Axis: ■ x-axis ■ y-axis ■ z-axis

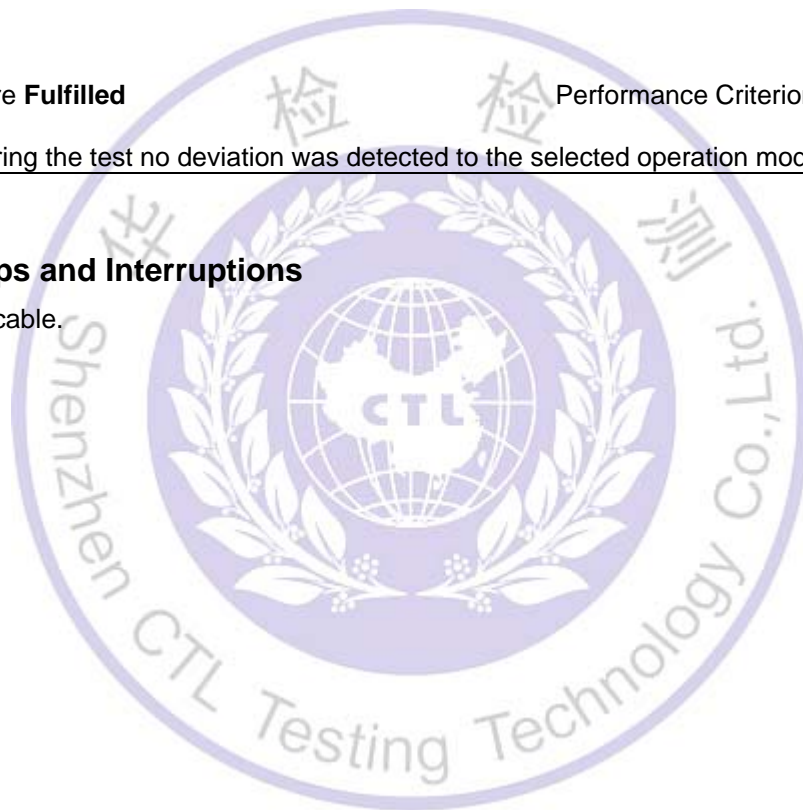
4.10.5. Test result

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

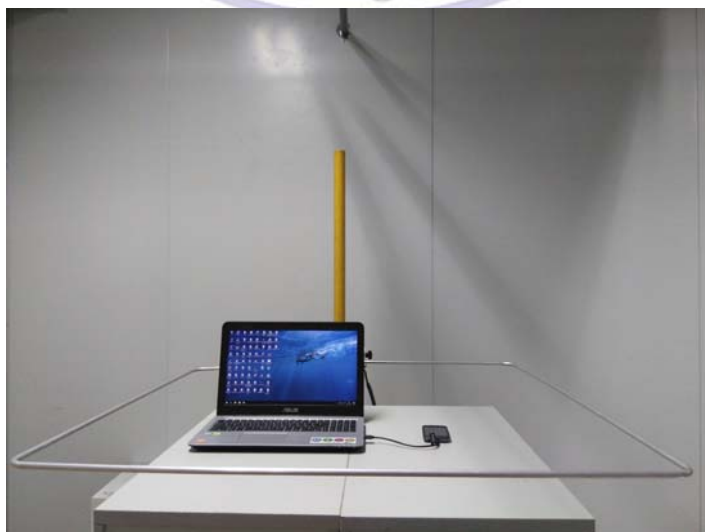
Remarks: During the test no deviation was detected to the selected operation mode(s).

4.11. Voltage Dips and Interruptions

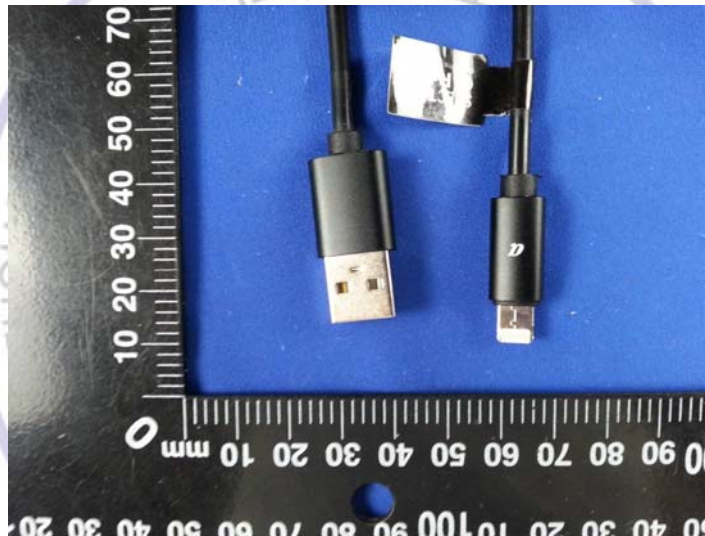
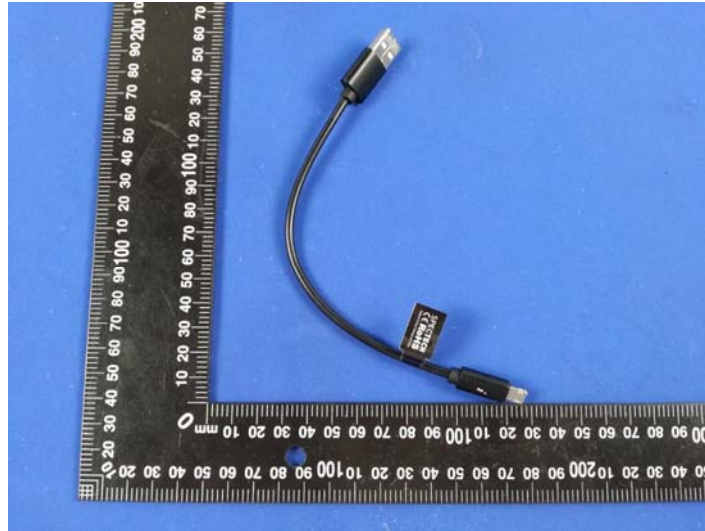
The test is not applicable.



5. Test Setup Photos



6. Photos of the EUT



..... End Of Report.....