



EMC TEST REPORT

Report No: TMC160125002-E

File reference No: 2015-1-28

Applicant: Shenzhen Wins Novelty Co.,Ltd

Product: Head Up Display

Brand Name: N/A

Model No: X3

Test Standards: ETSI EN301 489-1 V 1.9.2 (2011-09)
ETSI EN301 489-17 V 2.2.1 (2012-09)

Test result: The EMC testing has been performed on the submitted samples and found in compliance with council EMC Directive 2004/108/EC and R & TTE Directive 1999/5/EC

Approved By



Lemon Rao

EMC Manager

Dated: January 28, 2016

Results appearing herein relate only to the sample tested

The technical reports is issued errors and omissions exempt and is subject to withdrawal at

TMC International Inspection & Certification Group LTD

D103, Tianhui Building, Yousong Road, Longhua District, Shenzhen,
Guangdong, P.R. China

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1. General Information

1.1 Notes

The test results of this report relate exclusively to the test item specified in 1.5. The TMC Lab does not assume Responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the TMC Lab.

1.2 Testing Laboratory

TMC International Inspection & Certification Group LTD

D103, Tianhui Building, Yousong Road, Longhua District, Shenzhen, Guangdong, P.R. China

1.3 Details of Applicant

Name: Shenzhen Wins Novelty Co.,Ltd

Address: 3F,Gushu No 1 road (NO. 171), Gushu community, Xixiang Street,Bao an district,Shen zhen,China

1.4 Test Item

Manufacturer: Shenzhen Wins Novelty Co.,Ltd

Address: 3F,Gushu No 1 road (NO. 171), Gushu community, Xixiang Street,Bao an district,Shen zhen,China

Brand Name: N/A

Model No.: X3

Additional Model No.: N/A

Additional Brand Name: N/A

Description: Head Up Display

Additional Information

Frequency: 2402-2480 MHz

Number of Channels: 79 Channels

Antenna Designation: Integral Antenna

Type of Modulation: GFSK, $\pi/4$ QPSK, 8DPSK for Bluetooth

Extreme Temp. Tolerance: -20°C to 55°C

1.6 List of Ports

Port	Description	Classification ¹	Maximum cable Length	Cable Type
USB Port				
Line in Port				

Note ¹ports shall be classified as ac power, dc power or signal/control port.

²Maximum cable length corresponding to the appropriate ports shall be classified as $\leq 3m$ or $> 3m$.

1.7 Ancillary and Peripheral Devices

Description	Designation	Serial No.	Manufacturer
N/A	-	-	-

List of Peripheral Devices Used for Testing

Description	Designation	Serial No.	Manufacturer

Note: An Equipment (apparatus) used in connection with a receiver or transmitter is considered as an ancillary Equipment (apparatus) if:

- a. The equipment is intended for use in conjunction with a receiver or transmitter to provide additional operational and/or control features to the radio equipment. (e.g. to extend control to another position or location); and
- b. The equipment cannot be used on a stand alone basis to provide user functions independently of a receiver or transmitter; and
- c. The receiver or transmitter to which it is connected, is capable of providing some intended operation such as transmitting and/or receiving without the ancillary equipment (i.e. it is not a sub-unit of the main equipment essential to the main equipment basic functions).

1.8 Test Standards

ETSI EN 301 489-1 v 1.9.2 (2011-09)
Electromagnetic compatibility and Radio spectrum Matters (ERM);
Electromagnetic Compatibility (EMC) standard for radio equipment and services;
Part 1: Common technical requirements
ETSI EN 301 489-17 v 2.2.1 (2012-09)
Electromagnetic compatibility and Radio spectrum Matters (ERM);
Electromagnetic Compatibility (EMC) standard for radio equipment and services;
Part 17: Specific conditions for 2.4GHz wideband transmission systems and 5GHz high performance RLAN equipment

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

1.9 Test or Witness Test Engineering

Test By: Vivian Jiang

Printing Name: Vivian Jiang

2. Summary

2.1. General Remarks

Date of receipt of test sample: January 25, 2016

Testing commenced on: January 25, 2016

Testing concluded on: January 28, 2016

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage : o 230V / 50 Hz o 115V / 60Hz

● 12 V DC o 24 V DC

o Other (specified in blank below)

5.0V DC

2.3. Description of the Equipment under Test (EUT)

The device is a Head Up Display, work frequency at 2402-2480MHz, Support Bluetooth.

For more details, refer to the user's manual of the EUT.

2.4. EUT operation mode

The EUT has been tested under typical operating condition. Software used to control the EUT for staying in transmitting and receiving mode for testing.

2.5. EUT configuration

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

o - supplied by the manufacturer

● - supplied by the lab

2.6. Mode of Operation

TMC has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode	
EMI	Mode 1: Charging Mode 2: Communicate by Bluetooth
EMS	Mode 1: Charging Mode 2: Communicate by Bluetooth Mode 3: Standby

Test modes description:

1. Charging mode: during the test, the EUT was charging. Test configuration: EUT + line +notebook PC.
2. Bluetooth communicate mode: during the test, the Bluetooth function was on and transmitting files.

2.7. Immunity Performance criteria

General Requirements (ETSI EN 301489-1):

The performance criteria are used to take a decision on whether radio equipment passes or fails immunity tests.

For the purpose of the present document four categories of performance criteria apply:

- ☐ performance criteria for continuous phenomena applied to transmitters;
- ☐ performance criteria for transient phenomena applied to transmitters;
- ☐ performance criteria for continuous phenomena applied to receivers;
- ☐ performance criteria for transient phenomena applied to receivers.

Normally, the performance criteria depend on the type of radio equipment. Thus, the present document only contains general performance criteria commonly used for the assessment of radio equipment. More specific and product-related performance criteria for a dedicated type of radio equipment may be found in the part of EN 301 489 series [22] dealing with the particular type of radio equipment.

(1) Performance criteria for continuous phenomena applied to transmitters and receivers

If no further details are given in the relevant part of EN 301 489 series [22] dealing with the particular type of radio equipment, the following general performance criteria for continuous phenomena shall apply.

During and after the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed a permissible performance level specified by the manufacturer when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the test the EUT shall not unintentionally transmit or change its actual operating state and stored data.

If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

(2) Performance criteria for transient phenomena applied to transmitters and receivers

If no further details are given in the relevant part of EN 301 489 series [22] dealing with the particular type of radio equipment, the following general performance criteria for transient phenomena shall apply.

After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the EMC exposure to an electromagnetic phenomenon, a degradation of performance is, however, allowed. No change of the actual mode of operation (e.g. unintended transmission) 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 deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

(3) Performance criteria for equipment which does not provide a continuous communication link

For radio equipment which does not provide a continuous communication link, the performance criteria described in clauses (1) and (2) are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation. The related specifications set out in clause 5.3 of EN 301 489-1 V1.9.2 (2011-09) have also to be taken into account.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in clauses (1) and (2).

(4) Performance criteria for ancillary equipment tested on a stand alone basis

If ancillary equipment is intended to be tested on a stand alone basis, the performance criteria described in clauses (1) and (2) are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation. The related specifications set out in clause 5.3 of EN 301 489-1 V1.9.2 (2011-09) have also to be taken into account.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in clauses (1) and (2).

Special Performance Requirements (ETSI EN 301489-17):

The performance criteria are:

- ☐ performance criteria A for immunity tests with phenomena of a continuous nature;
- ☐ performance criteria B for immunity tests with phenomena of a transient nature;
- ☐ performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified in the following clauses.

Performance criteria for Continuous phenomena applied to Transmitters (CT)

The performance criteria A shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an Acknowledgement (ACK) or Not Acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied to Transmitters (TT)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5000 ms duration, for which performance criteria C shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK)

or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Continuous phenomena applied to Receivers (CR)

The performance criteria A shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied to Receivers (TR)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5000 ms duration for which performance criteria C shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

EN 301 489 -17 Performance criteria		
Criteria	During Test	After test
A	Shall operate as intended May show degradation of performance (see note 1) Shall be no loss of function Shall be no unintentional transmissions	Shall operate as intended Shall be no degradation of performance (see note 2) Shall be no loss of function Shall be no loss of stored data or user programmable functions
B	May show loss of function (one or more) May show degradation of performance (see note 1) No unintentional transmission	Functions shall be self-recoverable Shall operate as intended after recovering Shall be no degradation of performance (see note 2) Shall be no loss of stored data or user programmable functions
C	May be loss of function (one or more)	Functions shall be recoverable by the operator Shall operate as intended after recovering Shall be no degradation of performance (see note 2)

NOTE 1: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.

If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

3 Test environment

3.1. Address of the test laboratory

TMC International Inspection & Certification Group LTD

D103, Tianhui Building, Yousong Road, Longhua District, Shenzhen, Guangdong, P.R. China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2009) and CISPR Publication 13

3.2. Environmental conditions

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

Temperature: 22-25 °C

Humidity: 40-54 %

Atmospheric pressure: 950-1050mbar

3.3. Test Description

NO	Basic Standard	Test Type	Result
EMISSION (EN 301 489-1 §7.1)			
1	EN 55022	Radiated emission	PASS
2	EN 55022	Conducted emission, DC ports	N/A
3	EN 55022	Conducted emission, AC ports	PASS
4	EN 55022	Conducted emission, Telecom ports	N/A
5	EN 61000-3-2	Harmonic current emissions	N/A
6	EN 61000-3-2	Voltage fluctuations & flicker	N/A
IMMUNITY (EN 301 489-1 §7.2)			
7	EN 61000-4-2	Electrostatic discharge immunity	PASS
8	EN 61000-4-3	Radiated RF electromagnetic field immunity (80MHz to 2000MHz)	PASS
9	EN 61000-4-4	Electrical fast transient/burst immunity	PASS
10	ISO 7637-1, -2	Transients and surges, DC ports	PASS
11	EN 61000-4-5	Surge immunity, AC ports, Telecom ports	N/A
12	EN 61000-4-6	Immunity to conducted disturbances induced by RF fields	N/A
13	EN 61000-4-11	Voltage dips and short interruptions immunity	N/A

Remark: The measurement uncertainty is not included in the test result.

3.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in TMC. quality system acc.

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 TMC laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	±4.10dB	(1)
Radiated Emission	1~12.75GHz	±4.32dB	(1)
Conducted Emission	0.15~30MHz	±3.22dB	(1)

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

3.5. Equipments Used during the Test

Conducted Susceptibility (CS) :					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Conducted Disturbances test system	SCHLODER	CDG 6000	N/A	2015/05/20
2	Amplifier	SCHLODER	4N100W-6DB	N/A	2015/05/20
3	Dual Directional Coupler	AR	DC2600	302389	2015/05/13
4	6db Attenuator	EMTEST	ATT6/75	0010230A	2015/05/20
5	EM CLAMP	LÜTHI	EM101	335625	2015/05/20
6	CDN	SCHLODER	CDN M2+M3	A2210225/2013	2015/05/20

Harmonic Current/ Voltage Fluctuation and Flicker					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Purified Power Source	MToni	PHF 5010	N/A	2015/05/20
2	Harmonic And Flicker Analyzer	Voltech	PM6000	N/A	2015/05/20

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ULTRA-BROADBAND ANTENNA	Sunol Sciences Corp.	JB1 Antenna	A061713	2015/05/22

2	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESPI	1164.6407.07	2015/05/22
3	RF TEST PANEL	ROHDE & SCHWARZ	TS / RSP	335015/ 0017	2015/05/19
4	Controller	EM Electronics	Controller EM 1000	N/A	2015/05/19
5	EMI TEST SOFTWARE	ROHDE & SCHWARZ	ESK1	N/A	2015/05/22

Conducted Emission

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	2015/05/20
2	LISN	ROHDE & SCHWARZ	ENV216	101034	2015/05/19
3	EMI Test Software	ROHDE & SCHWARZ	ESK1	N/A	2015/05/19

RF Field Strength Susceptibility

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	SIGNAL GENERATOR	IFR	2032	203002/100	2015/05/22
2	AMPLIFIER	AR	150W1000	301584	2015/05/20
3	DUAL DIRECTIONAL COUPLER	AR	DC6080	301508	2015/05/20
4	POWER HEAD	AR	PH2000	301193	2015/05/20
5	POWER METER	AR	PM2002	302799	2015/05/20

Electrical Fast Transient/Surge/Dips

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Ultra Compact Simulator	HAEFELY	ECOMPACT4	174887	2015/05/20

Electrostatic Discharge

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ESD Simulator	SKYLARK	ESD-2000	0220K10251	2015/05/13

Magnetic Field Emission

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	2015/05/20
2	Triple-Loop Antenna	EVERFINE	LLA-2	1008002	2015/05/20
3	EMI Test Software	ROHDE & SCHWARZ	ESK1	N/A	2015/05/20

Disturbance Power					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	2015/05/20
2	Absorbing Clamp	EVERFINE	MDS-21	4035	2015/05/22
3	EMI Test Software	ROHDE & SCHWARZ	ESK1	N/A	2015/05/20

Antenna Terminal					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	2015/05/20
2	RF TEST PANNEL	EVERFINE	TS / RSP	335015/ 0017	2015/05/20
3	SIGNAL	BARCO	COSMS	50041	2015/05/20
4	EMI Test Software	ROHDE & SCHWARZ	ESK1	N/A	2015/05/20

Power Frequency Magnetic Field Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ULTRA COMPACT SIMULATOR	EM TEST	UCS500M6	202304/060	2015/05/20
2	MOTOR DRIVEN VOLTAGE TRANSFORMER	EM TEST	MV2616	302205	2015/05/20
3	CURRENT TRANSFORMER	EM TEST	MC2630	302389	2015/05/20
4	MAGNETIC COIL	EM TEST	MS100	0010230A	2015/05/20

Mark: The Cal. Due is 1 year.

4. Test conditions and result

4.1. Radiated Emission

For test instruments and accessories used see section 3.6.

4.1.1. Description of the test location

Test location: Shielded room No. 2

4.1.2. Limits of disturbance (EN55013 B)

Please refer to ETSI EN 301 489-1 Clause 8.2.3, Table 4 and EN 55022 Clause 6, Table 6, Class 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.

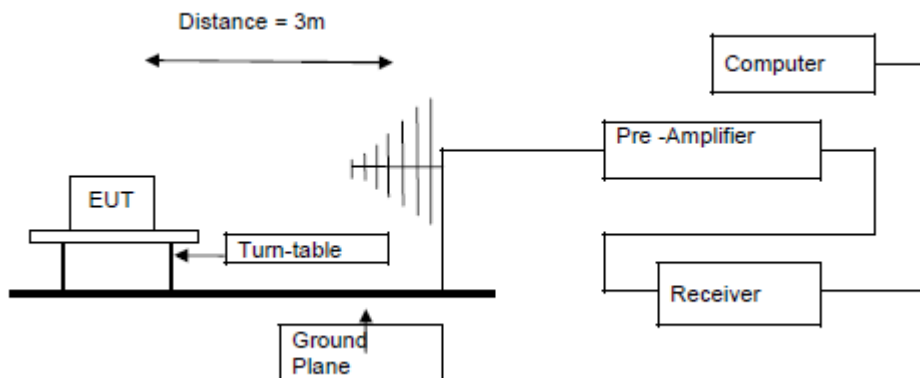
(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

4.1.3. Description of the test set-up

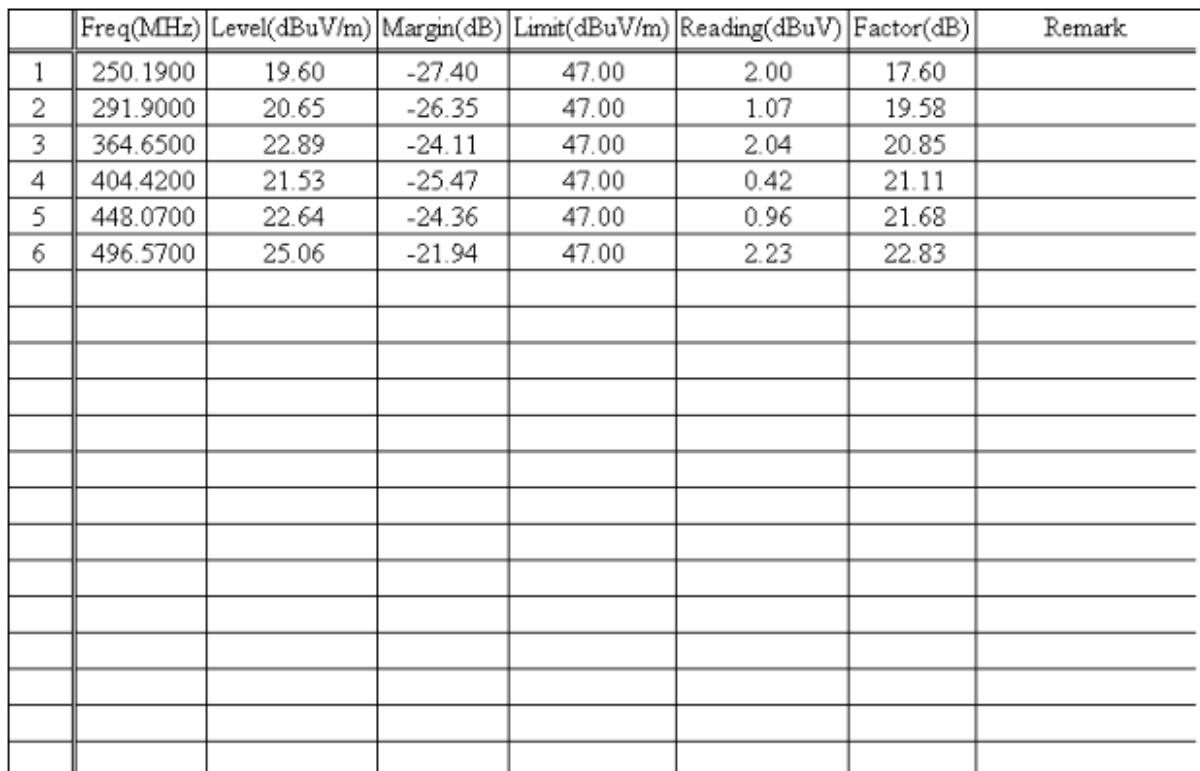
4.1.3.1. Operating Condition

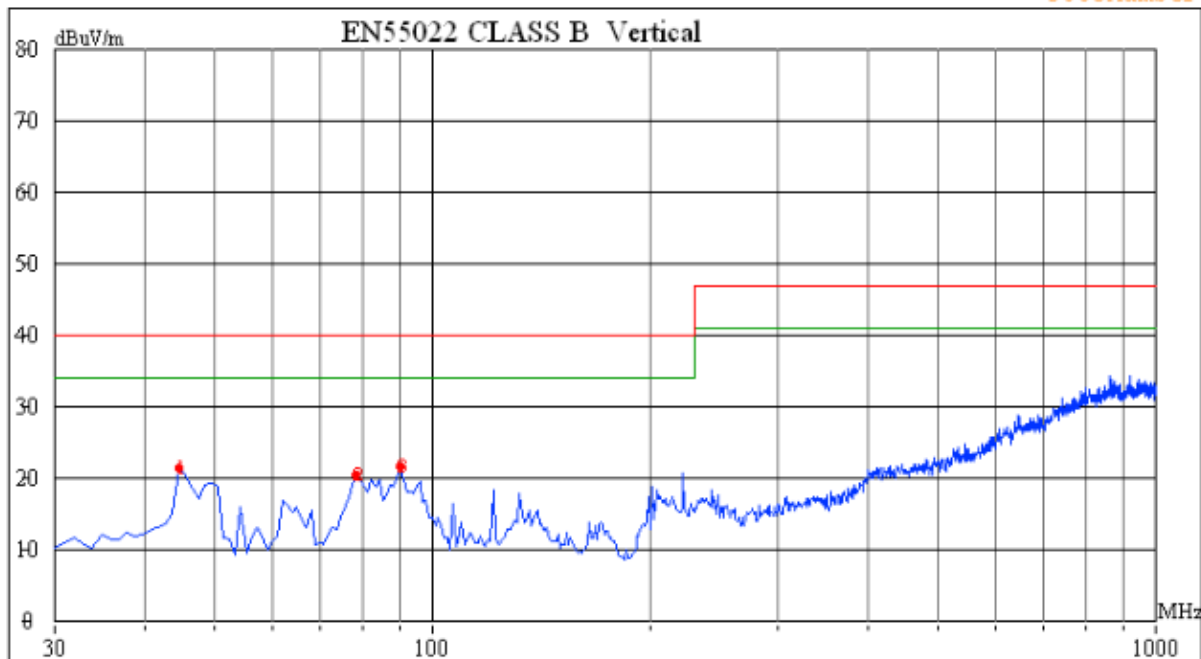
The EUT is set to work shall be carried out with normal communication mode during the test, and the maximum emanating results are recorded.

4.1.3.2. Configuration of test setup



966Chamber



[illegible]

Note: Radiated emission test above 1GHz up to 6GHz was verified, and no any emission was found except system noise floor.

4.2. Conducted disturbance

For test instruments and accessories used see section 3.6.

4.2.1. Description of the test location

Test location: Shielded room No. 1

4.2.2. Limits of disturbance

Please refer to ETSI EN 301 489-1 Clause 8.4.3, Table 8 and EN 55013 Clause 5, Table 2, Class B

Limit of disturbance voltage at the mains terminals

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150~0.500	66~56	56~46
0.500~5.000	56	46
5.000~30.00	60	50

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

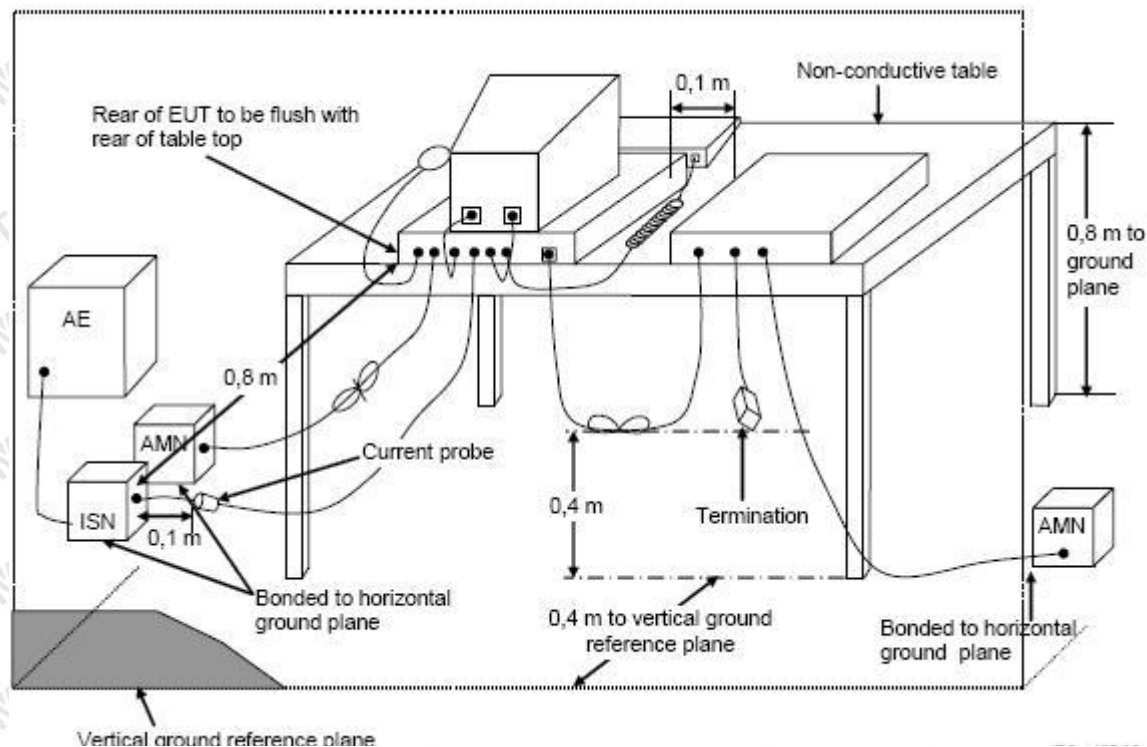
4.2.3. Description of the test set-up

4.2.3.1. Operating Condition

The EUT is set to normal communication mode during the test, and the maximum emanating results are recorded.

4.2.3.2. Configuration of test setup

Mains terminals:



4.3. AC Mains Harmonic Current Emission

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 Harmonic Current

Test configuration and procedure see clause 7.1 of standard EN 61000-3-2.

4.3.3. Description of the test set-up

4.3.3.1. Operating Condition

The EUT is Normal communication mode during the test, and the maximum emanating results are recorded.

4.3.3.2. Test Configuration and Procedure

Test configuration and procedure see clause 6.2.2 and Appendix C of standard EN 61000-3-2.

4.3.4. Test result

Not applicable to this device.

4.4. AC Mains Voltage Fluctuation and Flicker

For test instruments and accessories used see section 3.6.

4.4.1. Description of the test location

Test location: Shielded room No. 3

4.4.2. Limits of Voltage Fluctuation and Flicker

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

4.4.3. Description of the test set-up

4.4.3.1. Operating Condition

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

4.4.3.2. Configuration of test setup



4.4.4. Test result

Not applicable to this device.

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: Shielded room No. 3

Date of test: January 26, 2016

Operator:

4.5.2. Severity levels of electrostatic discharge

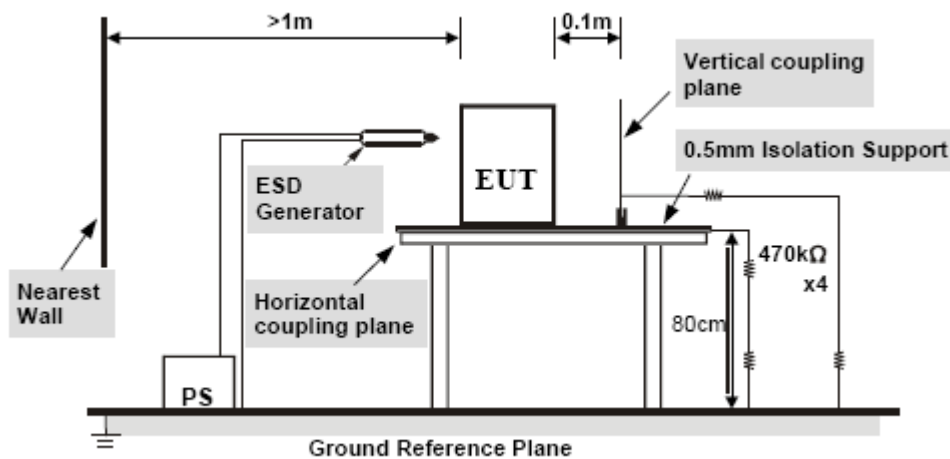
Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1	2	2
2	4	4
3	6	6
4	8	8
X	Special	Special

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 communication mode during the test, and the maximum emanating results are recorded.

4.5.3.2. Configuration of test setup



4.5.4. Test specification:

Test Modes:	Mode 1: Charging
	Mode 2: Communicate by Bluetooth
	Mode 3: Standby
Contact discharge voltage:	▪ 2 kV ▪ 4 kV
Air discharge voltage:	▪ 2 kV ▪ 4 kV ▪ 8 kV
Number of discharges:	□ ≥ 10 ▪ ≥ 25
Type of discharge:	Direct discharge ▪ Air discharge ▪ Contact discharge Indirect 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

4.6. RF Electromagnetic Field

For test instruments and accessories used see section 3.6.

4.6.1. Description of the test location and date

Test location: Shielded room No. 3

Date of test: January 26, 2016

Operator:

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

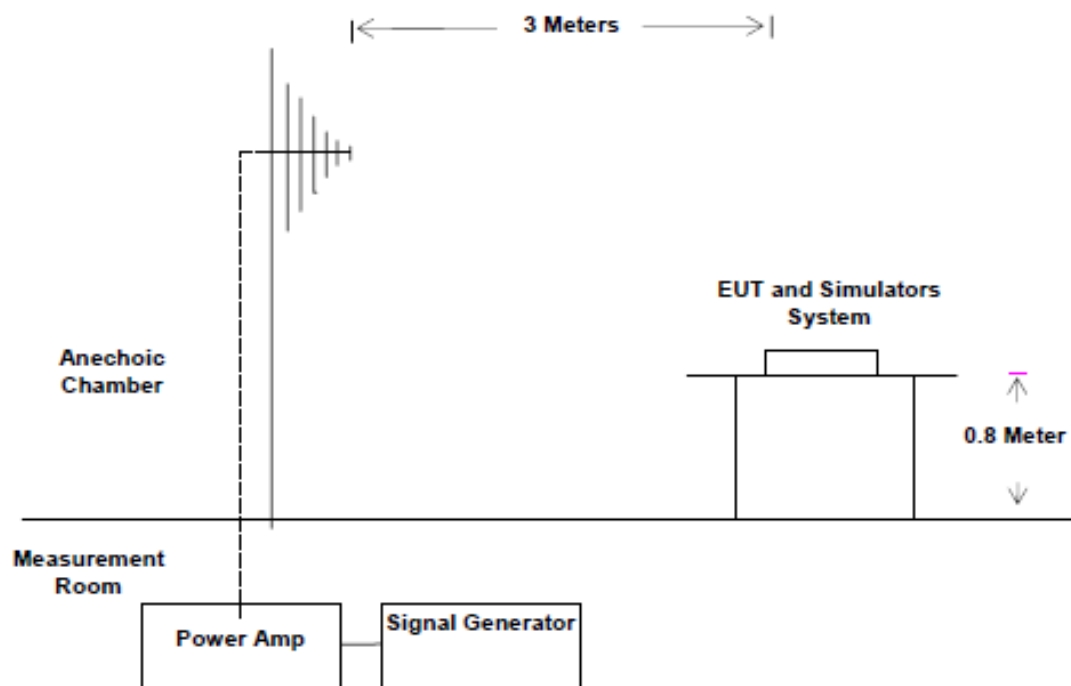
Level	Field Strength (V/m)
1	1
2	3
3	10
X	Special

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 communication mode during the test, and the maximum emanating results are recorded

4.6.3.2. Configuration of test setup



4.6.4. Test specification:

Test Modes:	Mode 1: Charging Mode 2: Communicate by Bluetooth Mode 3: Standby
Frequency range:	▪ 80 MHz to 2700 MHz
Field strength::	▪ 3 V/m
EUT - antenna separation::	▪ 3 m
Modulation:	▪ AM: 80 % ▪ sinusoidal 1000Hz
Frequency step:	▪ 1 % with 3 s dwell time
Antenna polarisation::	▪ horizontal ▪ vertical

4.6.5. Test result

The requirements are Fulfilled

Performance Criterion: A

☒ Description of Preliminary Test (Operating & Standby (Receiving) Modes)

	Freq. Range (MHz)	Field	Modulation	Polarity	Position (°)	Selection for the final test
1	80-1000	6V/m	Yes	H / V	Front	
	1400-2700	6V/m	Yes	H / V	Front	
2	80-1000	6V/m	Yes	H / V	Right	☒
	1400-2700	6V/m	Yes	H / V	Right	☒
3	80-1000	6V/m	Yes	H / V	Back	
	1400-2700	6V/m	Yes	H / V	Back	
4	80-1000	6V/m	Yes	H / V	Left	
	1400-2000	6V/m	Yes	H / V	Left	

☒ Result of Final Tests (Operating Mode & Standby(Receiving) Mode)

Freq. Range (MHz)	Field	Modulation	Polarity	Position (°)	Mode	Result (Pass/Fail)
1400-2700	3V/m	Yes	H / V	Right	Normal	PASS
80-1000	3V/m	Yes	H / V	Right	Operating	PASS

PERFORMANCE CRITERIA

Criteria requested	☒ A / ☐ B / ☐ C
Criteria meet	☒ A / ☐ B / ☐ C

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

4.7. Electrical Fast Transient/Burst Immunity Test

4.7.1. Description of the test location

Test location:

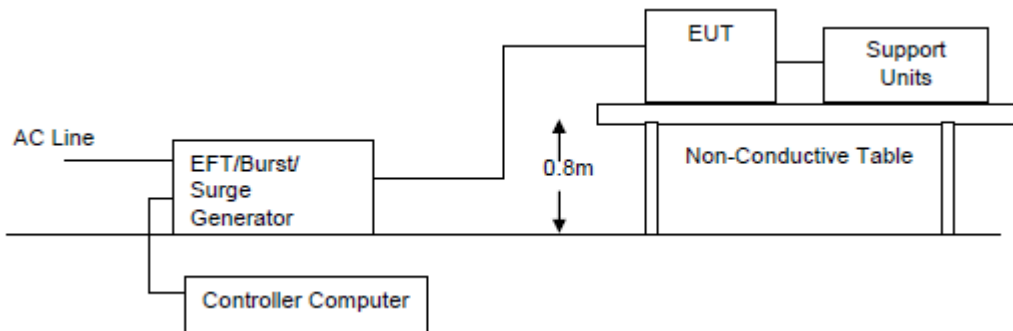
Date of test:

Operator:

4.7.2. Limit

Please refer to EN 61000-4-4

4.7.3. Test configuration



4.7.4. Test Procedure

Please refer to ETSI EN 301 489-1 Clause 9.4.2 and EN 61000-4-4 for the measurement methods.

4.7.5. Test results

Not applicable to this device.

4.8. Surge Immunity Test

4.8.1. Description of the test location

Test location: Shielded room No. 3

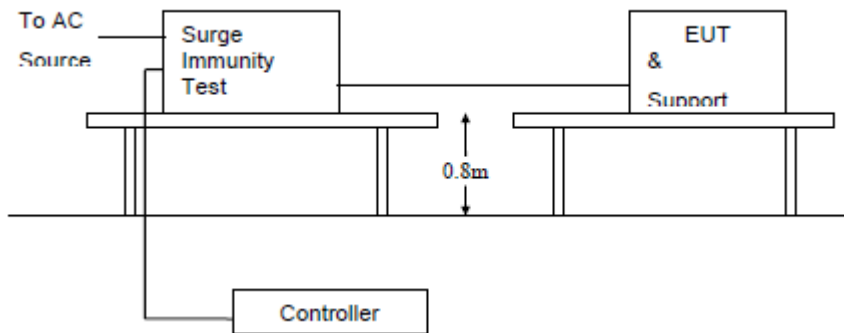
Date of test: January 26, 2016

Operator:

4.8.2. Limit

Please refer to EN 61000-4-5

4.8.3. Test Configuration



4.8.4. Test procedure

Please refer to ETSI EN 301 489-1 Clause 9.4.2 and EN 61000-4-5 for the measurement methods.

4.8.5. Test results

Not applicable to this device.

4.9. Immunity to conducted disturbances induced by RF fields

For test instruments and accessories used see section 3.6.

4.9.1. Description of the test location

Test location

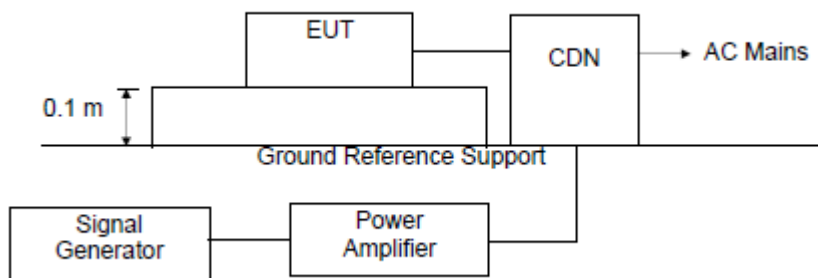
Date of test:

Operator:

4.9.2. Severity levels of conducted disturbances

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

4.9.3. Description of the test set-up



4.9.4. Test specification:

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

4.9.5. Coupling points

Cable description

Screening:

Status:

Signal transmission:

Length:

DC power line

☐ Screened

☐ Passive

☐ Analogue

☐ 1.5 m

☐ unscreened

☐ active

☐ digital

4.9.6. Test result

Not applicable to this device.

4.10. Voltage Dips and Interruptions

For test instruments and accessories used see section 3.6.

4.10.1. Description of the test location

Test location:

Date of test:

Operator:

4.10.2. Limit

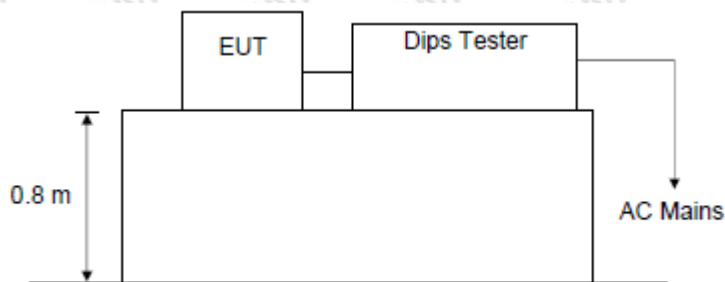
Environmental phenomenon	Test specification	Units	Performance criterion
AC mains power input ports			
Voltage dips	0	% residual	TT, TR
	0.5	cycle	(B)
	0	% residual	TT, TR
	1	cycle	(B)
	70	% residual	TT, TR
	0.5	cycle	(B) (Note 2)
	70	% residual	TT, TR
	25	cycle	(B)
Voltage interruptions	0	% residual	TT, TR
	250	cycle	(C)
Note 1: Changes to occur at 0 degree crossover point of the voltage waveform.			
Note 2: As per EN 301489-7, there is special requirement for voltage dip.			

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 communication mode during the test, and the maximum emanating results are recorded.

4.10.3.2. Configuration of test setup



4.10.4. Test specification:

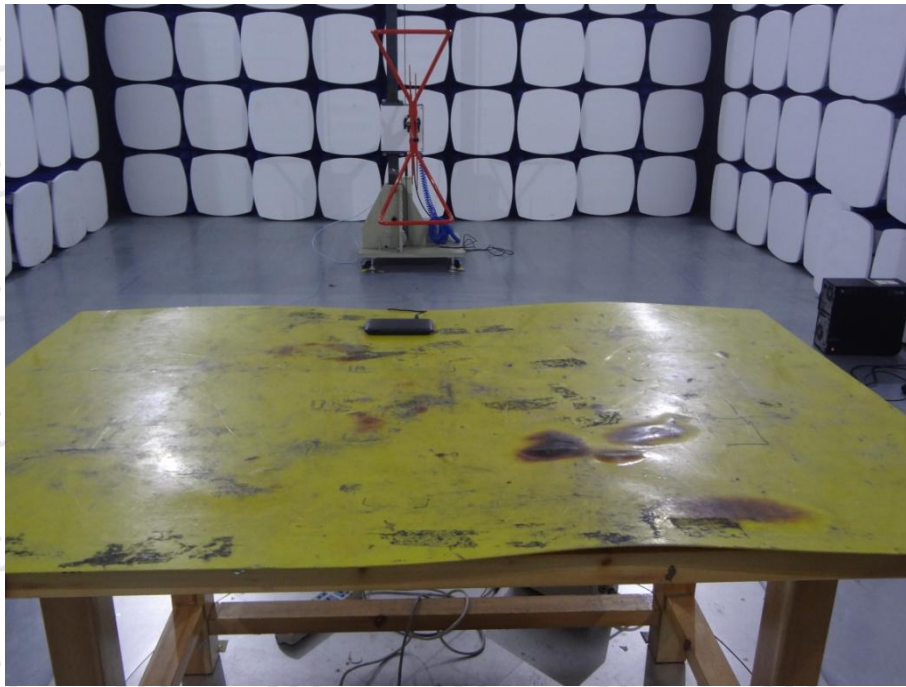
Nominal Mains Voltage (V_N):	▪
Number of voltage fluctuations:	▪3
Level of reduction(dip) / duration:	▪100 % / 10ms ▪30 % / 500ms
Nominal Mains Voltage (V_N):	▪
Number of Interruptions:	▪3
Duration of the Interruption:	▪5000 ms

4.10.5. Test result

Not applicable to this device.

5. Test setup photo

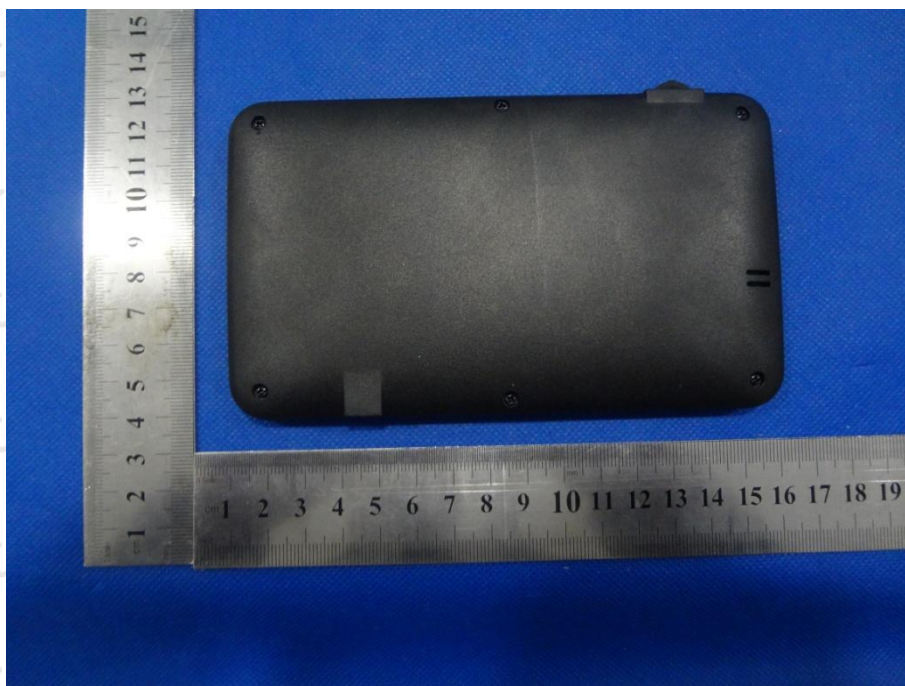
Radiated Emission



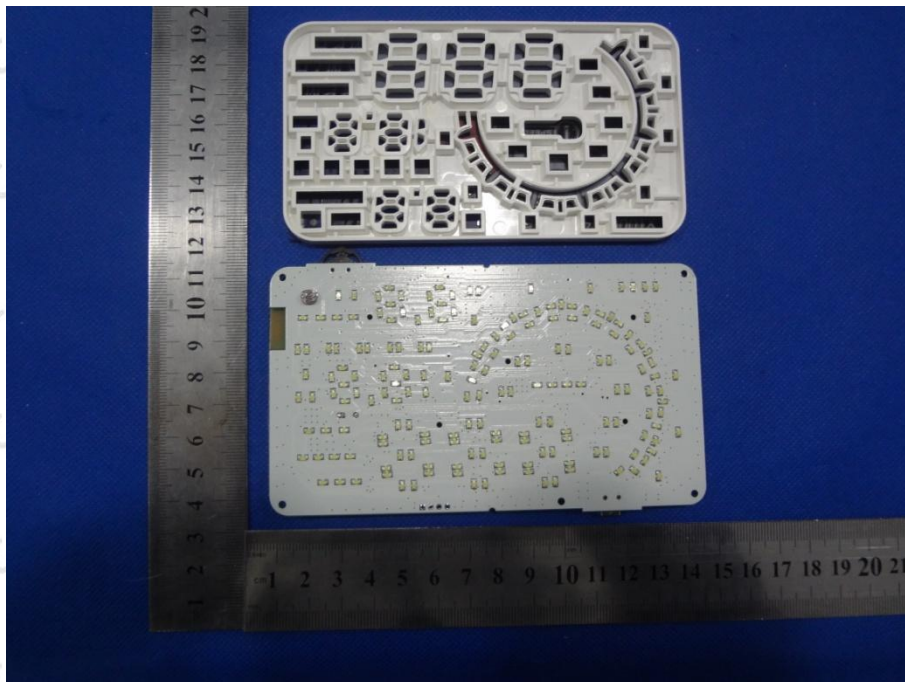
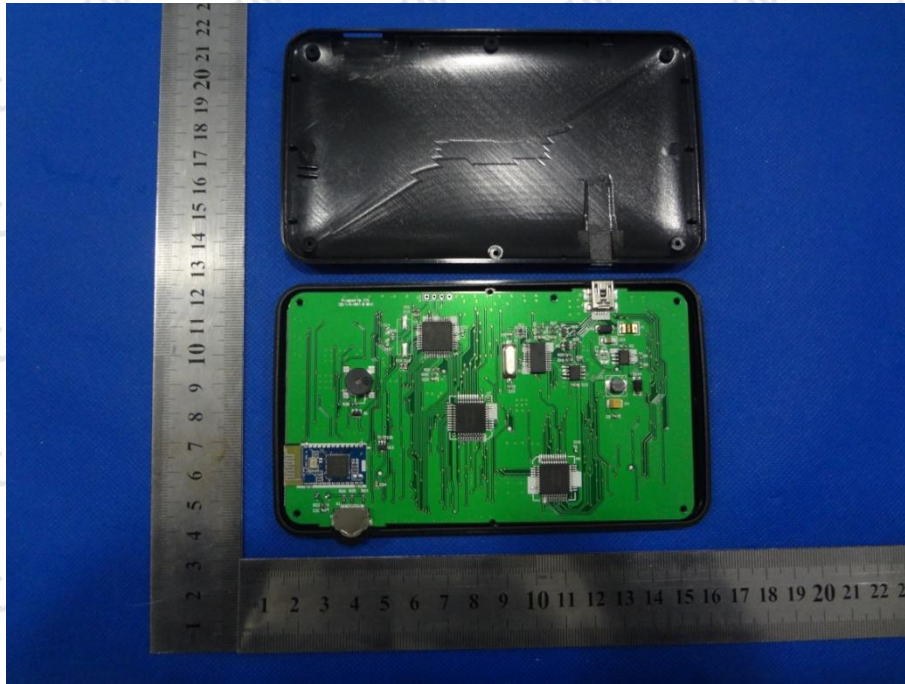
ESD Test

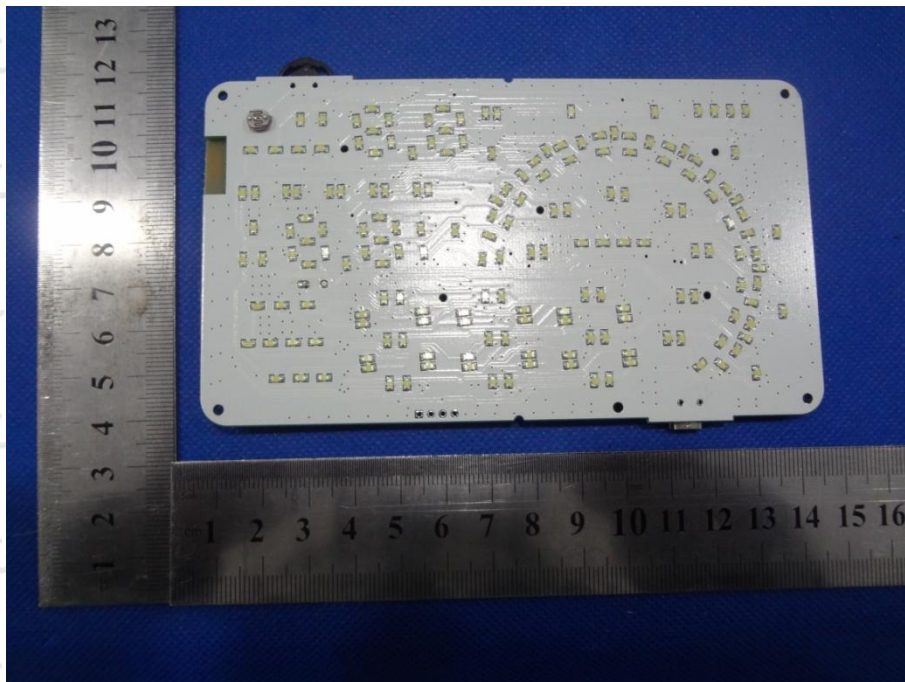
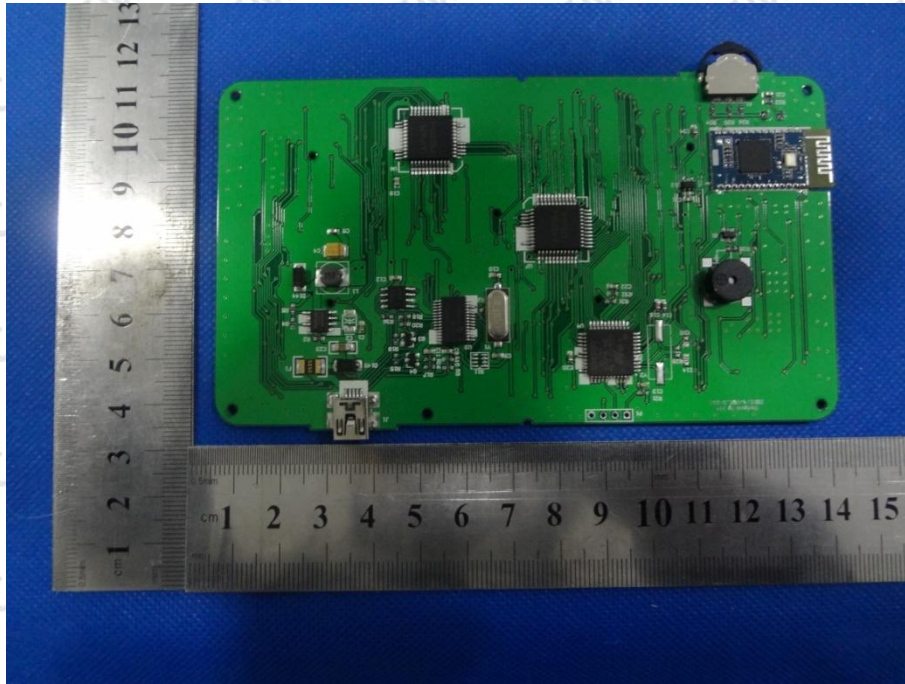


6. Photo for the EUT









End of report