# EMC TEST REPORT

| | |
|---|---|
| Product Name: | Thermometer |
| Trade mark: | / |
| Model No.: | WT120(WS7002) |
| S/N: | / |
| Report No.: | CTB230216039EX |
| Applicant: | LA CROSSE TECHNOLOGY |
| Address: | 6A RUE DU COMMERCE 67118 GEISPOLSHEIM - FRANCE |
| Manufacturer: | FUJIAN EMAX INTELLIGENT CO., LTD |
| Address: | Building 5-6-7, EMAX Intelligent Industrial Park, No. 30, Wisdom Avenue, Nanyu Town, High-tech Zone, Fuzhou, China |
| Prepared by: | Shenzhen CTB Testing Technology Co., Ltd. |
| Address: | 1&2/F., Building A, No.26, Xinhe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China |
| Date of Receipt: | Feb. 10, 2023 |
| Date of Test(s): | Feb. 10, 2023 ~ Feb. 13, 2023 |
| Date of Issue: | Feb. 16, 2023 |
| Test Standard(s): | EN IEC 55014-1:2021, EN IEC 55014-2:2021 |
| Test Result: | Pass |

All test data come from the report of No.: CTB230213015EX

In the configuration tested, the EUT complied with the standards specified above.

| Compiled by: | Reviewed by: | Approved by: |
|---|---|---|
| Blake Cai | Zack Zhu | Bin Mei |



Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client. "*" indicates the testing items were fulfilled by subcontracted lab. "#" indicates the items are not in CNAS accreditation scope.

**Table of Contents**

## 1. Description of version

| Report No. | Issue Date | Description | Approved |
|---|---|---|---|
| CTB230216039EX | Feb. 16, 2023 | Original | Valid |
| | | | |

## 2. Test summary

| Emission | | |
|---|---|---|
| Test item | Test Method | Result |
| Continuous disturbance | EN IEC 55014-1 | N/A[1] |
| Discontinuous disturbance | | N/A[2] |
| Magnetic field strength | | N/A[3] |
| Disturbance power | | N/A |
| Radiated emission | | PASS |
| **Immunity(EN IEC 55014-2)** | | |
| Test item | Test Method | Result |
| Electrostatic discharges | IEC 61000-4-2 | PASS |
| Fast transients | IEC 61000-4-4 | N/A[1] |
| Injected currents | IEC 61000-4-6 | N/A[1] |
| Radio frequency electromagnetic field | IEC 61000-4-3 | PASS |
| Surges | IEC 61000-4-5 | N/A[1] |
| Voltage dips | IEC 61000-4-11 | N/A[1] |

**Note:** N/A is abbreviation for Not Applicable.

1. The Product is powered by DC power, this test items is not applicable.

2. The Product has no switching operations, automatic programme or other electrically controlled or operated functions

3. It only apply to induction cooking appliances.

## 3. Measurement uncertainty

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard

| Test item | Frequency | Expanded Uncertainty ($U_{Lab}$) |
|---|---|---|
| Conducted Emission | 150 kHz to 30 MHz | ±3.2 dB |
| Disturbance power | 30 MHz to 300 MHz | ±3.7 dB |
| Magnetic field strength | 9 kHz-30 MHz | ±2.8 dB |
| Radiated Emission | 30 MHz to 1000 MHz | ±4.8 dB |

uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %

## 4. General information

### 4.1. Description of EUT

| | |
|---|---|
| Product name | Thermometer |
| Trade Mark | / |
| Model | WT120(WS7002) |
| Serial Model No. | / |
| Model Difference | / |
| Rated Power | / |
| Rated Voltage& current | DC 3V |
| Category | ☐I ☐II ☒III ☐IV ☐V |
| The highest frequency of the internal sources of the EUT | ☒ less than 108 MHz, the measurement shall only be made up to 1 GHz.<br>☐ between 108 MHz and 500 MHz, the measurement shall only be made up to GHz.<br>☐ between 500 MHz and 1 GHz, the measurement shall only be made up to GHz.<br>☐ above 1 GHz, the measurement shall be made up to 6 GHz. |
| Configuration | ☒ Table-top ☐ Floor-standing |
| Adapter Information | / |

**Note:** The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

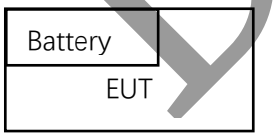
### 4.2. Description of Accessory Device

| No. | Device Type | Brand | Model | Specification | Note |
|---|---|---|---|---|---|
| 1. | Battery | / | / | / | / |

### 4.3. Test conditions

Temperature: 15-25℃
Relative Humidity: 30-60 %
Atmospheric pressure: 800hPa-1060hPa

### 4.4. Block diagram of EUT configuration




### 4.5. Operating condition of EUT

| | | | | |
|---|---|---|---|---|
| Operating condition | Mode 1 | Working | Test Voltage | DC 3V |
| Note:This test covers all possible operating modes of the device, only the worst data are list in report. The worst data are shows (*)is the nearest standard limit which were recorded in this report. | | | | |

## 5. List of test and measurement instruments

| Radiated emission | | | | | |
|---|---|---|---|---|---|
| No. | Equipment | Manufacturer | Model No. | Serial No. | Calibrated until |
| 1 | 966 Chamber | C/ R/ T | 966 | / | 2024/8/11 |
| 2 | Double Ridged Broadband Horn Antenna | Schwarzbeck | BBHA 9120D | 1911 | 2023/7/23 |
| 3 | TRILOG Broadband Antenna | Schwarzbeck | VULB 9168 | 869 | 2023/7/22 |
| 4 | Amplifier | Agilent | 8449B | 3008A01838 | 2023/7/19 |
| 5 | Amplifier | HP | 8447E | 2945A02747 | 2023/7/19 |
| 6 | EMI TEST RECEIVER | ROHDE&SCHWARZ | ESPI7 | 100362 | 2023/7/25 |
| 7 | Coaxial cable | ETS | RFC-SNS-100-NMS-80 NI | / | 2023/7/19 |
| 8 | Coaxial cable | ETS | RFC-SNS-100-NMS-20 NI | / | 2023/7/19 |
| 9 | Coaxial cable | ETS | RFC-SNS-100-SMS-20 NI | / | 2023/7/19 |
| 10 | Coaxial cable | ETS | RFC-NNS-100 -NMS-300 NI | / | 2023/7/19 |
| 11 | EZ-EMC | Frad | EMC-con3A1.1 | / | / |

| Electrostatic discharges | | | | | |
|---|---|---|---|---|---|
| No. | Equipment | Manufacturer | Model No. | Serial No. | Calibrated until |
| 1 | ESD Simulator | TESTQ | NSG437 | 329 | 2023/7/25 |

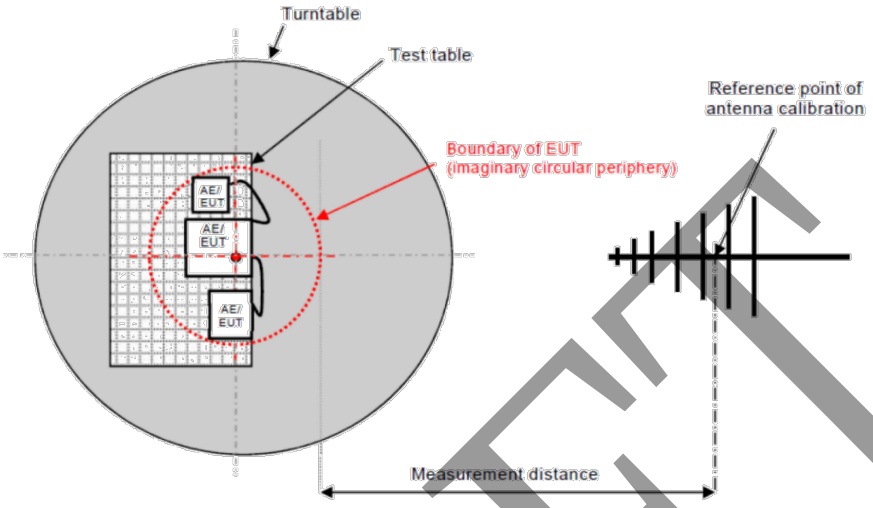
| Radio frequency electromagnetic field | | | | | |
|---|---|---|---|---|---|
| No. | Equipment | Manufacturer | Type No. | Serial No. | Calibrated until |
| 1 | 966 Chamber | C/ R/ T | 966 | / | 2024/8/11 |
| 2 | Signal Generator | Agilent | N5181A | MY50140365 | 2023/7/19 |
| 3 | Stacked Double Log.-Per. Antenna | SKET | STLP 9129 Plus | 2106070106 | / |
| 4 | Switch Controller | SKET | RFSU-DC18G -4C | RFSU-DC18G-4 C | / |
| 5 | RF Power Meter | Agilent | U2001 | MY41490462 | 2023/7/19 |
| 6 | RF Power Meter | Agilent | E9301A | MY41495675 | 2023/7/19 |
| 7 | E-Field Probe | Narda | EP-601 | 811ZX10305 | 2023/7/27 |
| 8 | Power Amplifier | SKET | HAP-80M01G-250W | 2106070103 | / |
| 9 | Power Amplifier | SKET | HAP-01G 06G-75W | 2106070104 | / |
| 10 | Audio Analysis | R&S | UPV | ATS 1-41152 | 2023/7/24 |
| 11 | Audio Output Matching Network | SKET | RCO Network | / | 2023/7/19 |
| 12 | EMC-S Test software | SKET | V2.0.0.19 | / | / |

# 6. Emission

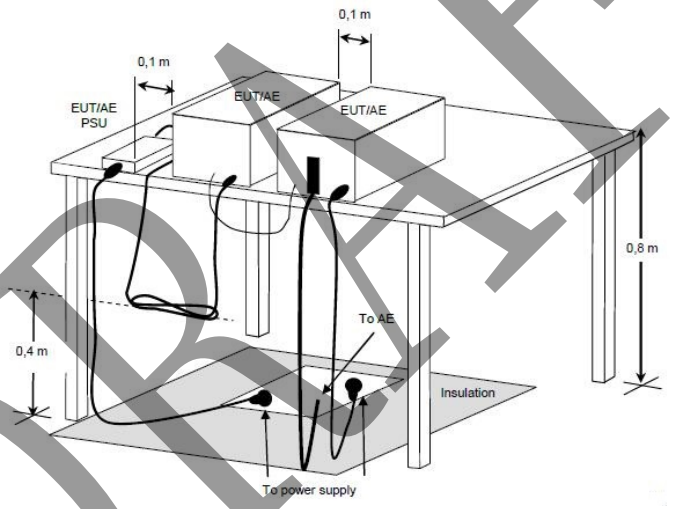
## 6.1. Radiated emission

6.1.1. Block diagram of test setup

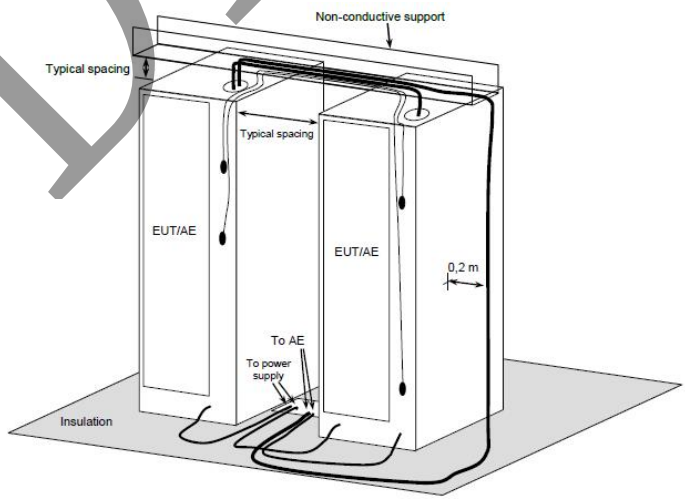
Measurement distance




For table-top equipment




For floor standing equipment



6.1.2. Limit

Up to 1GHz:

| Frequency range MHz | Measurement | | | Limits dB(μV/m) |
|---|---|---|---|---|
| | Facility | Distance m | Detector type / bandwidth | |
| 30 to 230 | SAC | 3 | Quasi Peak / 120 kHz | 40 |
| 230 to 1 000 | | | | 47 |

Above 1GHz:

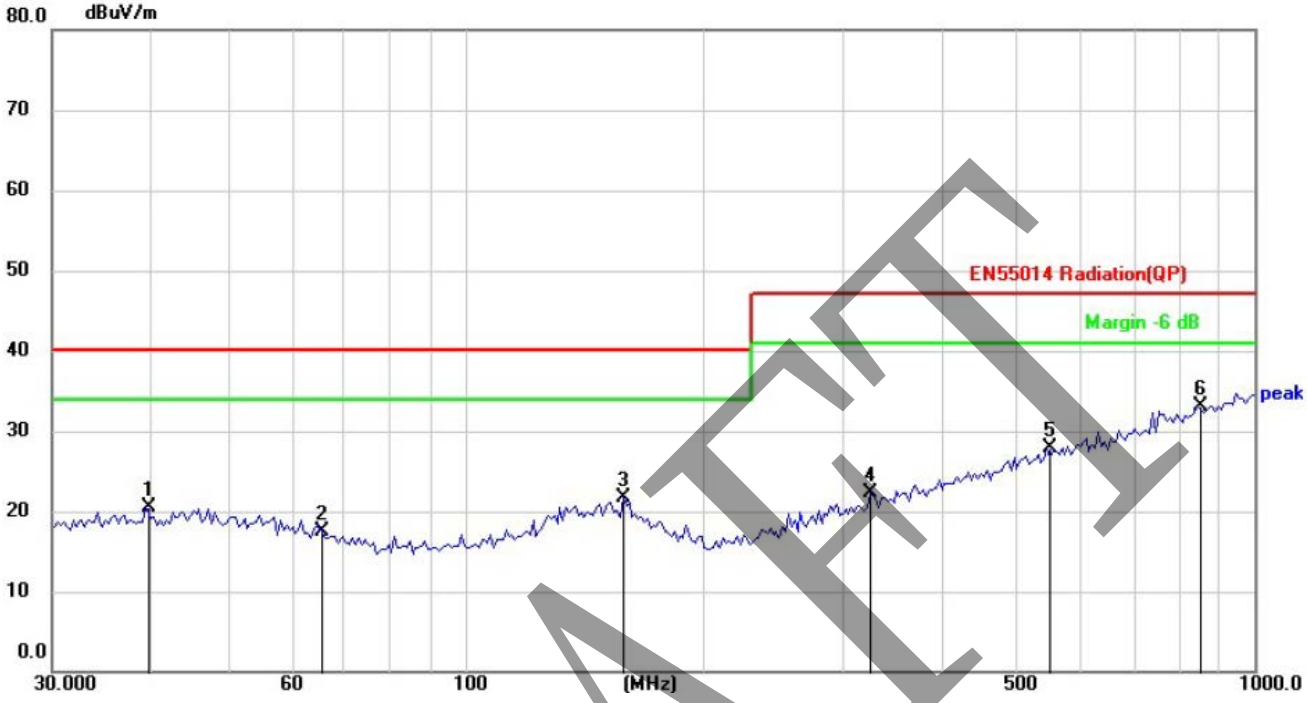
| Frequency range MHz | Measurement | | | Class B limits dB(μV/m) |
|---|---|---|---|---|
| | Facility | Distance m | Detector type / bandwidth | |
| 1 000 to 3 000 | FSOATS | 3 | Average / 1MHz | 50 |
| 3 000 to 6 000 | | | | 54 |
| 1 000 to 3 000 | | 3 | Peak / 1MHz | 70 |
| 3 000 to 6 000 | | | | 74 |

6.1.3. Test procedure

1. The EUT is placed on a turn table which is 0,8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The Boundary of EUT (imaginary circular periphery) is set 3 meters away from the receiving antenna (Reference point of antenna calibration) which is mounted on an antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antennas (calibrated by dipole antenna) are used as a receiving antenna.
2. Both horizontal and vertical polarizations of the antenna are set on test.
3. The bandwidth setting on the test receiver (R&S ESPI) reference 5.3.2.
4. The EUT is tested in Semi-Anechoic Chamber.
5. The Test results are listed in Section 5.3.4.

6.1.4. Test results

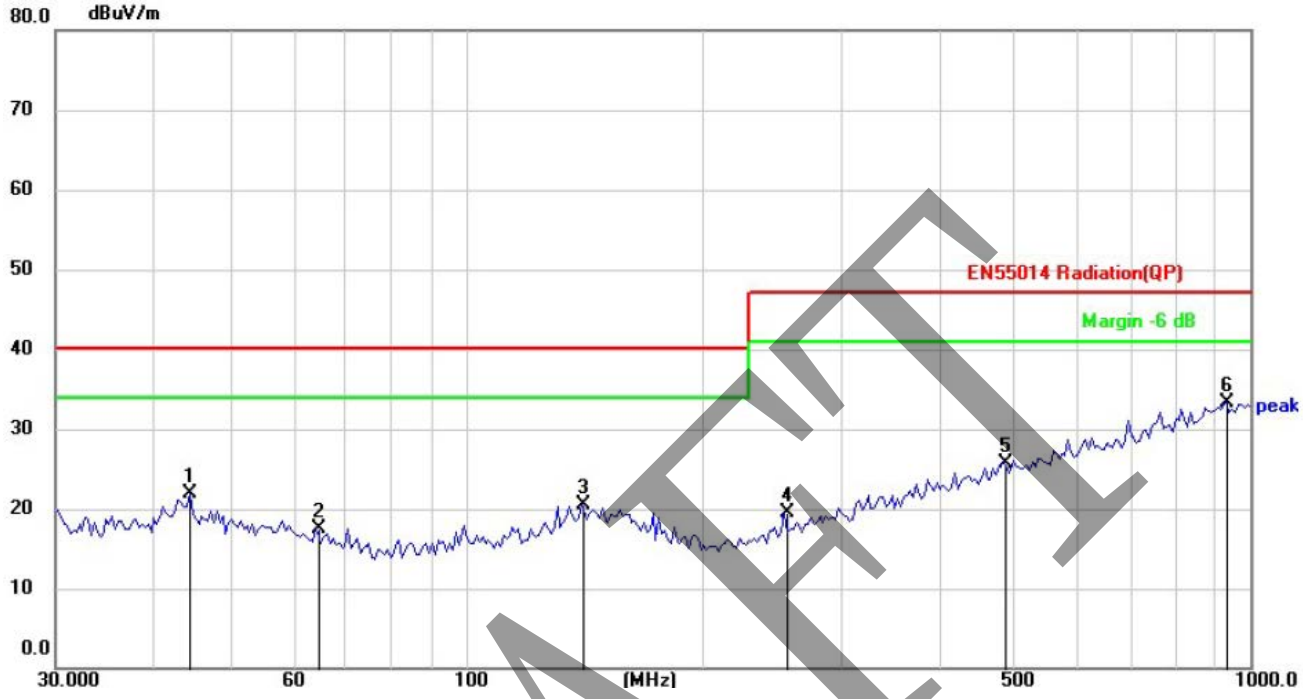
| Temperature: | 23℃ | Relative Humidity: | 54 % |
|---|---|---|---|
| Pressure: | 101kPa | Polarization : | Horizontal |
| Test Voltage : | DC 3V | Test Mode: | Mode 1 |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dB/m | dB | Detector |
| 1 | | 39.3681 | 26.91 | -6.49 | 20.42 | 40.00 | -19.58 | QP |
| 2 | | 66.0342 | 25.94 | -8.47 | 17.47 | 40.00 | -22.53 | QP |
| 3 | | 158.6677 | 27.10 | -5.47 | 21.63 | 40.00 | -18.37 | QP |
| 4 | | 325.5958 | 26.96 | -4.75 | 22.21 | 47.00 | -24.79 | QP |
| 5 | | 546.1393 | 26.73 | 1.15 | 27.88 | 47.00 | -19.12 | QP |
| 6 | * | 846.5708 | 26.77 | 6.38 | 33.15 | 47.00 | -13.85 | QP |

Note: Result=Reading + Factor
Over Limit=Result - Limit

| Temperature: | 23℃ | Relative Humidity: | 54 % |
|---|---|---|---|
| Pressure: | 101kPa | Polarization : | Vertical |
| Test Voltage : | DC 3V | Test Mode: | Mode 1 |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dB/m | dB | Detector |
| 1 | | 44.5087 | 28.40 | -6.54 | 21.86 | 40.00 | -18.14 | QP |
| 2 | | 64.3202 | 25.66 | -8.21 | 17.45 | 40.00 | -22.55 | QP |
| 3 | | 140.3421 | 26.03 | -5.51 | 20.52 | 40.00 | -19.48 | QP |
| 4 | | 254.7284 | 27.06 | -7.59 | 19.47 | 47.00 | -27.53 | QP |
| 5 | | 483.0618 | 26.18 | -0.42 | 25.76 | 47.00 | -21.24 | QP |
| 6 | * | 932.2715 | 25.79 | 7.44 | 33.23 | 47.00 | -13.77 | QP |

Note: Result=Reading + Factor
Over Limit=Result - Limit

## 7. Immunity

### 7.1. Performance criterion

**Performance criterion A:** 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.

**Performance criterion B:** 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 to persist after the test. 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.

**Performance criterion C:** 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.

### 7.2. Classification of apparatus

**Category I:** equipment containing no electronic control circuitry.
All appliances having no electronic control circuitry are considered to be category I.
Electric circuits consisting of passive components (such as radio interference suppression capacitors or inductors, mains transformers, mains frequency rectifiers and heating elements) are not considered to be electronic control circuitry.

**Category II:** mains operated equipment containing electronic control circuitry with no clock frequency higher than 15 MHz.
**Test items:**
Electrostatic discharges with performance criterion B;
Electric fast transients with performance criterion B;
Injected currents 150 kHz to 230 MHz with performance criterion A;
Surges with performance criterion B;
Voltage dips with performance criterion C.

**Category III:** battery operated equipment not included in Category I.
NOTE: The assignment to Category III is independent of the clock frequency
This category also includes equipment provided with rechargeable batteries, which can be charged, directly or indirectly, from the mains. Accordingly, this equipment shall also be subjected to the test requirements for mains operated equipment but only when testing the charging function.
If the equipment can operate its intended functions when connected, directly or indirectly to the mains, then it is not battery operated. Accordingly, it shall be classified as Category II, Category IV or Category V, as applicable, and subjected to the corresponding test requirements when in mains operation.

**Test items:**
Electrostatic discharges with performance criterion B/C[a];
Electric fast transients with performance criterion B;
Injected currents 150 kHz to 80 MHz with performance criterion A;
Radio frequency electromagnetic fields [b, c] 80 MHz to (F) MHz with performance criterion A;
Surges with performance criterion B;
NOTE:
a. Performance criterion C may be applied to toys not using score or data entered by the user (e.g. musical soft toys and sounding toys).
b. The frequency (F), up to which this test needs to be performed, is determined from either categories IV test requirements or categories IV test requirements, according to the principle for distinguishing between categories IV and V.
c. For Category III toys, the radio frequency electromagnetic fields test shall be applicable only for ride on toys.

**Category IV:** mains operated equipment containing electronic control circuitry with a highest clock frequency greater than 15 MHz but lower than or equal to 200 MHz.

**Test items:**

Electrostatic discharges with performance criterion B;
Electric fast transients with performance criterion B;
Injected currents 150 kHz to 80 MHz with performance criterion A;
Radio frequency electromagnetic fields 80 MHz to 1000 MHz with performance criterion A;
Surges with performance criterion B;
Voltage dips with performance criterion C.

**Category V:** mains operated equipment containing electronic control circuitry with a highest clock frequency greater than 200 MHz.

**Test items:**

Electrostatic discharges with performance criterion B;
Electric fast transients with performance criterion B;
Injected currents 150 kHz to 80 MHz with performance criterion A;
Radio frequency electromagnetic fields 80 MHz to 6000 MHz with performance criterion A;
Surges with performance criterion B;
Voltage dips with performance criterion C.

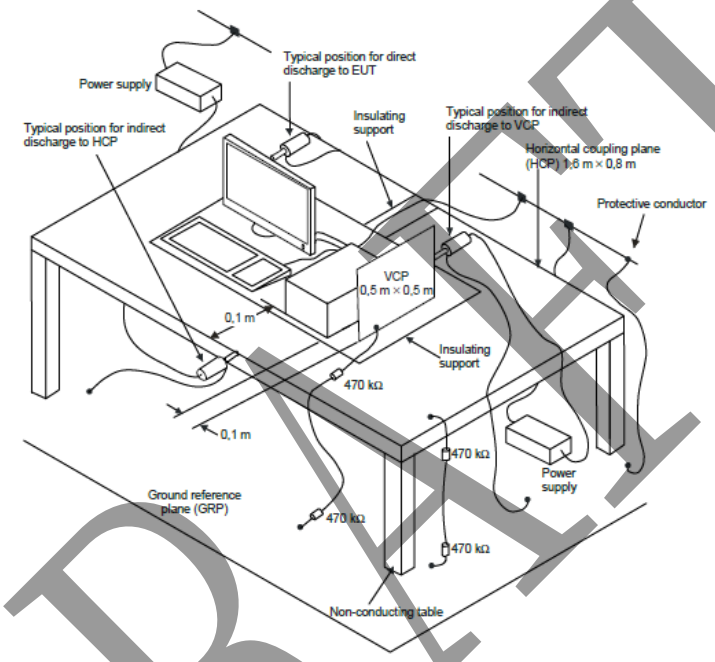
### 7.3. Electrostatic discharges

7.3.1. Test standard and Levels

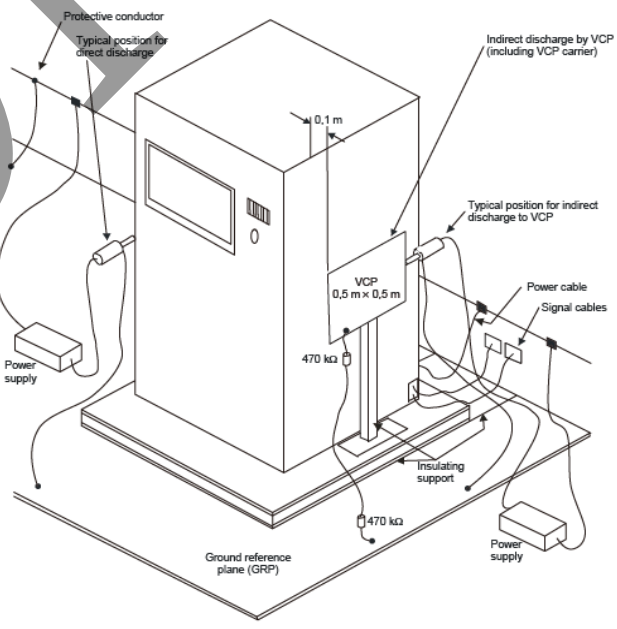
| Environmental phenomenon | Test specifications | Basic Standard |
|---|---|---|
| Electrostatic discharge | 8 kV air discharge | IEC 61000-4-2 |
| | 4 kV contact discharge | |

7.3.2. Block diagram of test setup

For table-top equipment




For floor standing equipment



7.2.3. Test procedure

1. Air discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

2. Contact discharge:

All the procedure shall be same as Section 1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

3. Indirect discharge for horizontal coupling plane

At least 20 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

4. Indirect discharge for vertical coupling plane

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

7.3.4. Test results

| | | | |
|---|---|---|---|
| Temperature: | 23℃ | Relative Humidity: | 54 % |
| Pressure: | 101kPa | Test Mode: | Mode 1 |
| Test Voltage : | DC 3V | | |

| Discharge Method | Discharge Position | Voltage (±kV) | Min. No. of Discharge per polarity (Each Point) | Performance Criterion | Required Criterion |
|---|---|---|---|---|---|
| Contact Discharge | Conductive Surfaces | 4 | 10 | B | A |
| | Indirect Discharge HCP | 4 | 10 | B | A |
| | Indirect Discharge VCP | 4 | 10 | B | A |
| Air Discharge | Slots, Apertures, and Insulating Surfaces | 8 | 10 | B | A |
| Note*: N/A | | | | | |

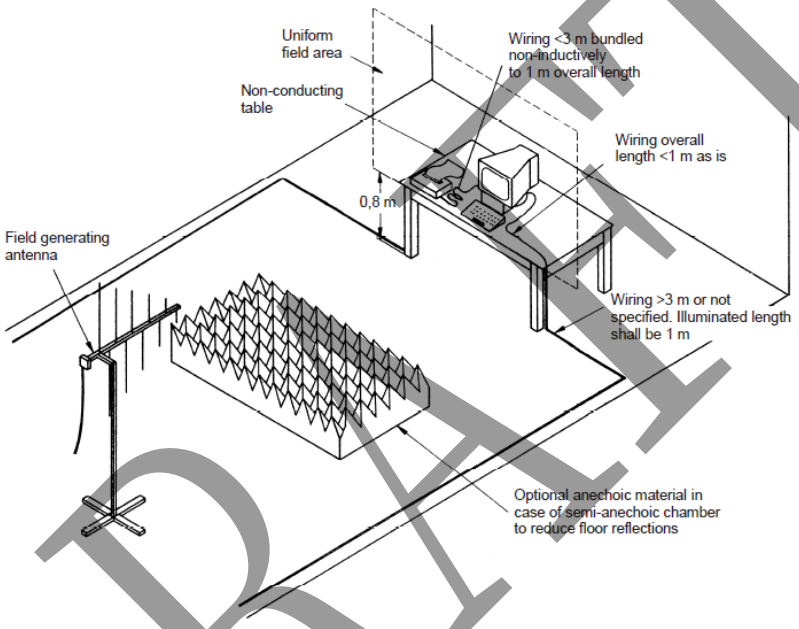
### 7.4. Radio frequency electromagnetic fields

7.4.1. Test standard and Levels and Performance Criterion

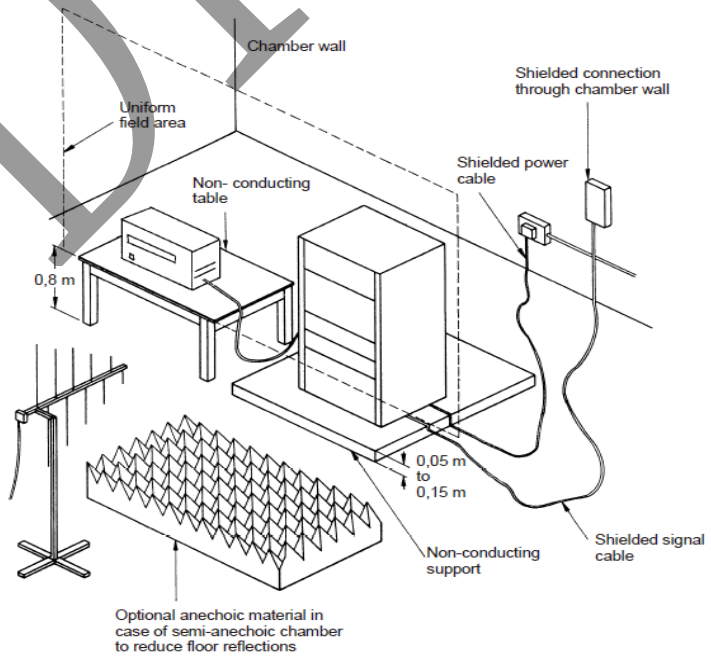
| Enclosure port | | |
|---|---|---|
| Environmental phenomenon | Test specifications | Basic Standard |
| Radio-frequency electromagnetic field, 1 kHz, 80% AM | 80 MHz to 1 000 MHz | IEC 61000-4-3 |
| | 3 V/m (unmodulated) | |

7.4.2. Block diagram of test setup

For table-top equipment




For floor standing equipment



7.4.3. Test procedure

1. The EUT and its simulators are placed on a turn table which is 0.8 meter above the ground. The EUT is set 3 meters away from the transmitting antenna which is mounted on an antenna tower.

Both horizontal and vertical polarizations of the antenna are set on test. 2. Each of the four sides of EUT must be faced this transmitting antenna and measured individually.

3.In order to determine the performance of EUT, a CCD camera is used to monitor the EUT.

7.4.4. Test results

| | | | |
|---|---|---|---|
| Temperature: | 23℃ | Relative Humidity: | 54 % |
| Pressure: | 101kPa | Test Mode: | Mode 1 |
| Test Voltage : | DC 3V | | |

| Frequency range [MHz] | Test Level [V/m] | Polarization | EUT Face | Performance Criterion | Required Criterion |
|---|---|---|---|---|---|
| 80 to 1000 | 3 | Horizontal & Vertical | Front/ Rear | A | A |
| | | | Right/ Left | A | A |
| | | | Top/ Underside | A | A |

## 8. Photographs of test setup

**RE**

**ESD**

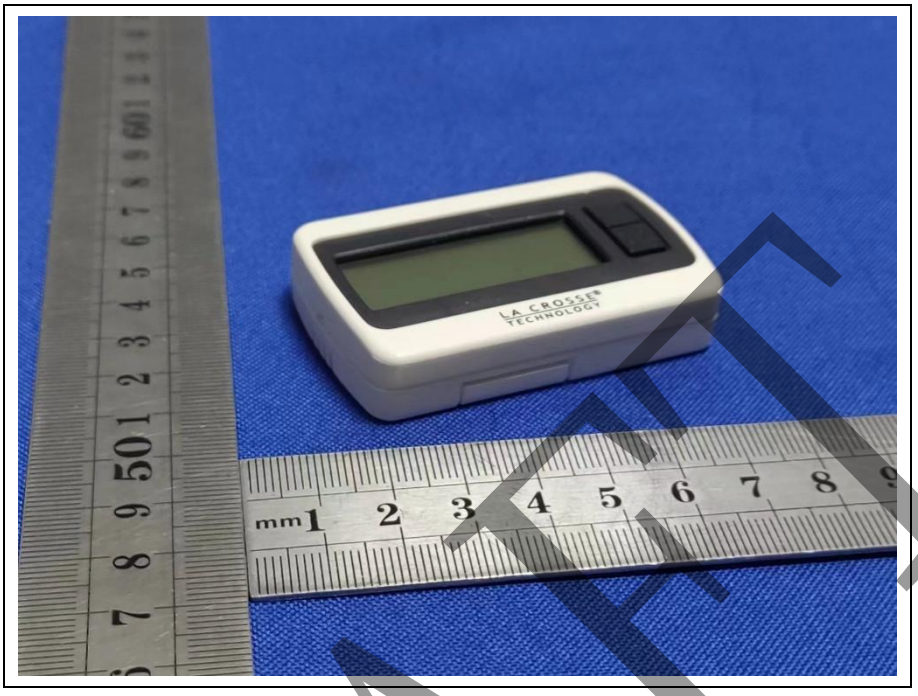
**RS**

## 9. Photographs of EUT

**EUT photo 1**


**EUT photo 2**

**EUT photo 3**




**EUT photo 4**




***End of report***