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# EMC Test Report

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Report No.: AGC02862190901EE01

**PRODUCT DESIGNATION** : MY FIRST DIGITAL PLAYER WITH MICS  
**BRAND NAME** : LEXIBOOK  
**MODEL NAME** : MP300  
**APPLICANT** : LEXIBOOK LIMITED  
**DATE OF ISSUE** : Sep. 29, 2019  
**STANDARD(S)** : EN 301 489-1 V2.2.1: 2019-03 (draft)  
: EN 301 489-17 V3.2.0: 2017-03 (draft)  
**REPORT VERSION** : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

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## REPORT REVISE RECORD

| Report Version | Revise Time | Issued Date   | Valid Version | Notes           |
|----------------|-------------|---------------|---------------|-----------------|
| V1.0           | /           | Sep. 29, 2019 | Valid         | Initial release |



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## 1. TEST REPORT CERTIFICATION

|                                 |  |
|---------------------------------|--|
| <b>Applicant</b>                | LEXIBOOK LIMITED   |
| <b>Address</b>                  | Unit 8-9, 4th Floor, Kenning Ind. Bldg., 19 Wang Hoi Road, Kowloon Bay, Kowloon, Hong Kong |
| <b>Manufacturer</b>             | LEXIBOOK LIMITED   |
| <b>Address</b>                  | Unit 8-9, 4th Floor, Kenning Ind. Bldg., 19 Wang Hoi Road, Kowloon Bay, Kowloon, Hong Kong |
| <b>Factory</b>                  | LEXIBOOK LIMITED   |
| <b>Address</b>                  | Unit 8-9, 4th Floor, Kenning Ind. Bldg., 19 Wang Hoi Road, Kowloon Bay, Kowloon, Hong Kong |
| <b>Product Designation</b>      | MY FIRST DIGITAL PLAYER WITH MICS  |
| <b>Brand Name</b>               | LEXIBOOK   |
| <b>Test Model</b>               | MP300  |
| <b>Date of test</b>             | Sep. 16, 2019 to Sep. 27, 2019   |
| <b>Deviation</b>                | None   |
| <b>Condition of Test Sample</b> | Normal   |
| <b>Report Template</b>          | AGCRT-EC-BLE/EMC (2013-03-01)  |

We, Attestation of Global Compliance (Shenzhen) Co., Ltd., hereby certify that the submitted samples of the above item, as detailed in chapter 2.1 of this report, has been tested in our facility. The test record, data evaluation and test configuration represented herein are true and accurate accounts of measurements of the sample's EMC characteristics under the conditions herein specified.

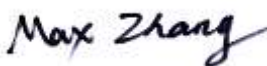
Prepared By



Sky Dong  
(Project Engineer)

Sep. 29, 2019

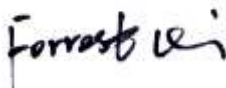
Reviewed By



Max Zhang  
(Reviewer)

Sep. 29, 2019

Approved By



Forrest Lei  
(Authorized Officer)

Sep. 29, 2019

## 2. GENERAL INFORMATION

### 2.1. DESCRIPTION OF EUT

The EUT is a short range, lower power, Bluetooth device.

It is designed by way of FHSS modulation achieves the system operating.

Details of technical specification refer to the description in follows:

Transmitter/Receiver (TX/RX)

|                            |                                      |
|----------------------------|--------------------------------------|
| <b>Operating Frequency</b> | 2.402 GHz to 2.480GHz                |
| <b>Bluetooth Version</b>   | V4.2                                 |
| <b>Modulation</b>          | GFSK, $\pi/4$ -DQPSK                 |
| <b>Hardware Version</b>    | JL-332R-V2                           |
| <b>Software Version</b>    | V1.02                                |
| <b>Antenna Type</b>        | PCB Antenna                          |
| <b>Number of channels</b>  | 79 channels                          |
| <b>Antenna Gain</b>        | -0.58dBi                             |
| <b>Power Supply</b>        | DC 6V by battery or DC 5V by adapter |

Note: The EUT doesn't support BLE.



## 2.2. OBJECTIVE

Perform Electro Magnetic Interference (EMI) and Electro Magnetic Susceptibility (EMS) tests for CE Marking.

## 2.3. TEST STANDARDS AND RESULTS

The EUT has been tested according to ETSI EN 301 489-1 V2.2.1 (2019-03) and ETSI EN 301 489-17 V3.2.0 (2017-03).

|                           |  |
|---------------------------|--|
| <b>ETSI EN 301 489-1</b>  | ElectroMagnetic Compatibility (EMC)<br>standard for radio equipment and services;<br>Part 1: Common technical requirements;<br>Harmonised Standard covering the essential requirements |
| <b>ETSI EN 301 489-17</b> | ElectroMagnetic Compatibility (EMC)<br>standard for radio equipment and services;<br>Part 17: Specific conditions for<br>Broadband Data Transmission Systems;                          |



## 2.4. TEST ITEMS AND THE RESULTS

| No.                                 | Basic Standard | Test Type   | Result |
|-------------------------------------|----------------|---|--------|
| <b>EMISSION (EN 301 489-1 §7.1)</b> |                |   |        |
| 1                                   | EN 55032       | Radiated emission                                       | PASS   |
| 2                                   | EN 55032       | Conducted emission, AC ports                            | PASS   |
| 3                                   | EN 55032       | Conducted emission, Telecom ports                       | N/A    |
| 4                                   | EN 61000-3-2   | Harmonic current emissions                              | N/A    |
| 5                                   | EN 61000-3-3   | Voltage fluctuations & flicker                          | PASS   |
| <b>IMMUNITY (EN 301 489-1 §7.2)</b> |                |   |        |
| 6                                   | EN 61000-4-2   | Electrostatic discharge immunity                        | PASS   |
| 7                                   | EN 61000-4-3   | Radiated RF electromagnetic field immunity              | PASS   |
| 8                                   | EN 61000-4-4   | Electrical fast transient/burst immunity                | PASS   |
| 9                                   | ISO 7637-1, -2 | Transients and surges, DC ports                         | N/A    |
| 10                                  | EN 61000-4-5   | Surge immunity, AC ports, Telecom ports                 | PASS   |
| 11                                  | EN 61000-4-6   | Immunity to conducted disturbances induced by RF fields | PASS   |
| 12                                  | EN 61000-4-11  | Voltage dips and short interruptions immunity           | PASS   |

**Note:** 1. N/A- Not Applicable.  
2. The latest versions of basic standards are applied.

## 2.5. ENVIRONMENTAL CONDITIONS

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

- Temperature: 15-35°C
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa



### 3. TEST MODE DESCRIPTION

| TEST MODE DESCRIPTION |   |       |
|-----------------------|---|-------|
| NO.                   | EMI TEST MODE DESCRIPTION                       | WORST |
| 1                     | AUX mode with adapter, smart phone and earphone | V     |
| 2                     | BT link with adapter and earphone               |       |
| 3                     | SD card with adapter and earphone               |       |
| 4                     | U-disk with adapter and earphone                |       |
| 5                     | AUX mode with battery, smart phone and earphone |       |
| 6                     | BT link with battery and earphone               |       |
| 7                     | SD card with battery and earphone               |       |
| 8                     | U-disk with battery and earphone                |       |
| NO.                   | EMS TEST MODE DESCRIPTION                       |       |
| 1                     | AUX mode with adapter, smart phone and earphone |       |
| 2                     | BT link with adapter and earphone               |       |
| 3                     | SD card with adapter and earphone               |       |
| 4                     | U-disk with adapter and earphone                |       |
| 5                     | AUX mode with battery, smart phone and earphone |       |
| 6                     | BT link with battery and earphone               |       |
| 7                     | SD card with battery and earphone               |       |
| 8                     | U-disk with battery and earphone                |       |

**Note:** 1. V means EMI worst mode.  
2. All modes have been tested, and only the worst data recorded in the report.

I/O Port Information (☒Applicable ☐Not Applicable)

| I/O Port of EUT     |        |                   |             |
|---------------------|--------|-------------------|-------------|
| I/O Port Type       | Number | Cable Description | Tested With |
| DC IN               | 1      | 1m                | 1           |
| LINE IN             | 1      | 1m                | 1           |
| USB                 | 1      | --                | 1           |
| MICRO SD            | 1      | --                | 1           |
| 3.5mm Stereo output | 1      | 1m                | 1           |

#### 4. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in Measurement” (GUM) published by ISO.

- Uncertainty of Conducted Emission,  $U_c = \pm 3.2\text{dB}$
- Uncertainty of Radiated Emission below 1GHz,  $U_c = \pm 3.9\text{ dB}$
- Uncertainty of Radiated Emission above 1GHz,  $U_c = \pm 4.8\text{ dB}$

#### 5. SUPPORT EQUIPMENT

| Device Type | Manufacturer | Model Name            | S/N | Data Cable |
|-------------|--------------|-----------------------|-----|------------|
| Adapter     | N/A          | DYS602-050200W        | N/A | N/A        |
| Smartphone  | N/A          | P8                    | N/A | N/A        |
| earphone    | N/A          | Edifier               | N/A | N/A        |
| U disk      | N/A          | Data Traveler SE9 16G | N/A | N/A        |
| SD card     | N/A          | SDC10                 | N/A | N/A        |



## 6. IDENTIFICATION OF THE RESPONSIBLE TESTING LOCATION

|                 |  |
|-----------------|--|
| <b>Site</b>     | Attestation of Global Compliance (Shenzhen) Co., Ltd   |
| <b>Location</b> | 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China |

### TEST EQUIPMENT OF CONDUCTED EMISSION TEST

| Equipment     | Manufacturer | Model   | S/N    | Cal. Date     | Cal. Due      |
|---------------|--------------|---------|--------|---------------|---------------|
| TEST RECEIVER | R&S          | ESPI    | 101206 | Jun. 12, 2019 | Jun. 11, 2020 |
| LISN          | R&S          | ESH2-Z5 | 100086 | Aug. 26, 2019 | Aug. 25, 2020 |

### TEST EQUIPMENT OF RADIATED EMISSION TEST

| Equipment                    | Manufacturer | Model    | S/N        | Cal. Date     | Cal. Due      |
|------------------------------|--------------|----------|------------|---------------|---------------|
| Test Receiver                | R&S          | ESCI     | 10096      | Jun.12, 2019  | Jun. 11, 2020 |
| ANTENNA                      | SCHWARZBECK  | VULB9168 | 494        | Jan. 09, 2019 | Jan. 08, 2021 |
| Double-Ridged Waveguide Horn | ETS LINDGREN | 3117     | 00034609   | May. 17, 2019 | May. 16, 2021 |
| EXA Signal Analyzer          | Aglient      | N9010A   | MY53470504 | Dec. 20, 2018 | Dec.19, 2019  |

### TEST EQUIPMENT OF POWER HARMONICS / VOLTAGE FLUCTUATION / FLICKER TEST

| Equipment                | Manufacturer | Model     | S/N   | Cal. Date     | Cal. Due      |
|--------------------------|--------------|-----------|-------|---------------|---------------|
| Signal Conditioning Unit | Schaffner    | CCN1000-1 | 72431 | Aug. 26, 2019 | Aug. 25, 2020 |
| AC Source                | Schaffner    | NSG1007   | 56825 | Aug. 26, 2019 | Aug. 25, 2020 |

### TEST EQUIPMENT OF ESD TEST

| Equipment     | Manufacturer | Model   | S/N | Cal. Date     | Cal. Due      |
|---------------|--------------|---------|-----|---------------|---------------|
| ESD Simulator | Schaffner    | NSG 438 | 782 | Oct. 25, 2018 | Oct. 24, 2019 |

### TEST EQUIPMENT OF RS IMMUNITY TEST

| Equipment                    | Manufacturer | Model        | S/N             | Cal. Date     | Cal. Due      |
|------------------------------|--------------|--------------|-----------------|---------------|---------------|
| Signal Generator             | R&S          | E4421B       | MY43351603      | Jun. 12, 2019 | Jun. 11, 2020 |
| POWER SENSOR                 | R&S          | URV5-Z4      | 100124          | May 17, 2019  | May 16, 2020  |
| POWER METER                  | R&S          | NRVD         | 8323781027      | May 17, 2019  | May 16, 2020  |
| POWER AMPLIFIER              | KALMUS       | 7100LC       | 04-02/17-06-001 | Jun.12, 2019  | Jun.11, 2020  |
| RF AMPLIFIER                 | Milmega      | AS0104-55_55 | 1004793         | Jun.12, 2019  | Jun.11, 2020  |
| Double-Ridged Waveguide Horn | ETS LINDGREN | 3117         | 00034609        | May. 17, 2019 | May. 16, 2021 |
| Broadband Preamplifier       | SCHWARZBEC K | VULB9168     | 494             | Jan. 09, 2019 | Jan. 08, 2021 |

### TEST EQUIPMENT OF SURGE/EFT/DIPS TEST

| Equipment                  | Manufacturer | Model       | S/N   | Cal. Date     | Cal. Due      |
|----------------------------|--------------|-------------|-------|---------------|---------------|
| EFT, Surge, Dips Generator | Schaffner    | Modula 6150 | 34437 | Aug. 26, 2019 | Aug. 25, 2020 |

### TEST EQUIPMENT OF CS IMMUNITY TEST

| Equipment                       | Manufacturer | Model   | S/N        | Cal. Date     | Cal. Due      |
|---------------------------------|--------------|---------|------------|---------------|---------------|
| Power Amplifier                 | AR           | 75A250  | 18464      | Jun. 12, 2019 | Jun. 11, 2020 |
| CDN                             | ZHINAN       | ZN3751  | 15004      | Sep. 09, 2019 | Sep. 08, 2020 |
| 6dB attenuator                  | ZHINAN       | E-002   | N/A        | Sep. 09, 2019 | Sep. 08, 2020 |
| Electromagnetic Injection Clamp | Luthi        | EM101   | 35773      | Oct. 21, 2018 | Oct. 20, 2019 |
| Power Sensor                    | R&S          | URV5-Z4 | 100124     | May 17, 2019  | May 16, 2020  |
| Power Meter                     | R&S          | NRVD    | 8323781027 | May 17, 2019  | May 16, 2020  |
| SIGNAL GENERATOR                | R&S          | E4421B  | MY43351603 | Jun. 12, 2019 | Jun. 11, 2020 |



## 7. RADIATED DISTURBANCE MEASUREMENT

### 7.1. LIMITS OF RADIATED DISTURBANCES

Limits for radiated disturbance 30M to1 GHz at a measurement distance of 3 m

| Frequency range (MHz) | Quasi peak limits(dBuV/m),<br>for Class B ITE, at 3m measurement distance |
|-----------------------|---|
| 30 - 230              | 40  |
| 230 - 1000            | 47  |

Limits for radiated disturbance above 1 GHz at a measurement distance of 3 m

| Frequency range (MHz) | Limits (dBuV/m), Class B ITE |         |
|-----------------------|------------------------------|---------|
|                       | Peak                         | Average |
| 1000-3000MHz          | 70                           | 50      |
| 3000-6000MHz          | 74                           | 54      |

Note: 1. The lower limit shall apply at the transition frequency.

2. Additional provisions may be required for cases where interference occurs.

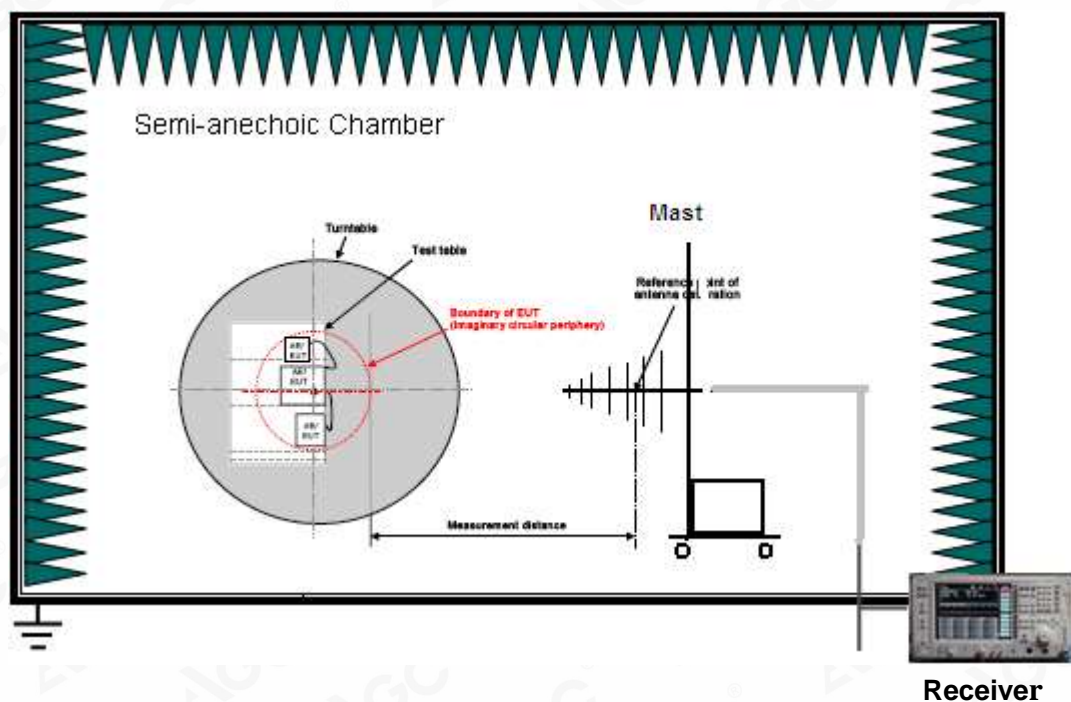
### 7.2. TEST PROCEDURE

- (1). The EUT was placed on the top of an insulating table 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- (2). The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- (3).The antenna is a broadband antenna, and its height is varied from 1 to 4 meter above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- (4). For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to the heights from 1 to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

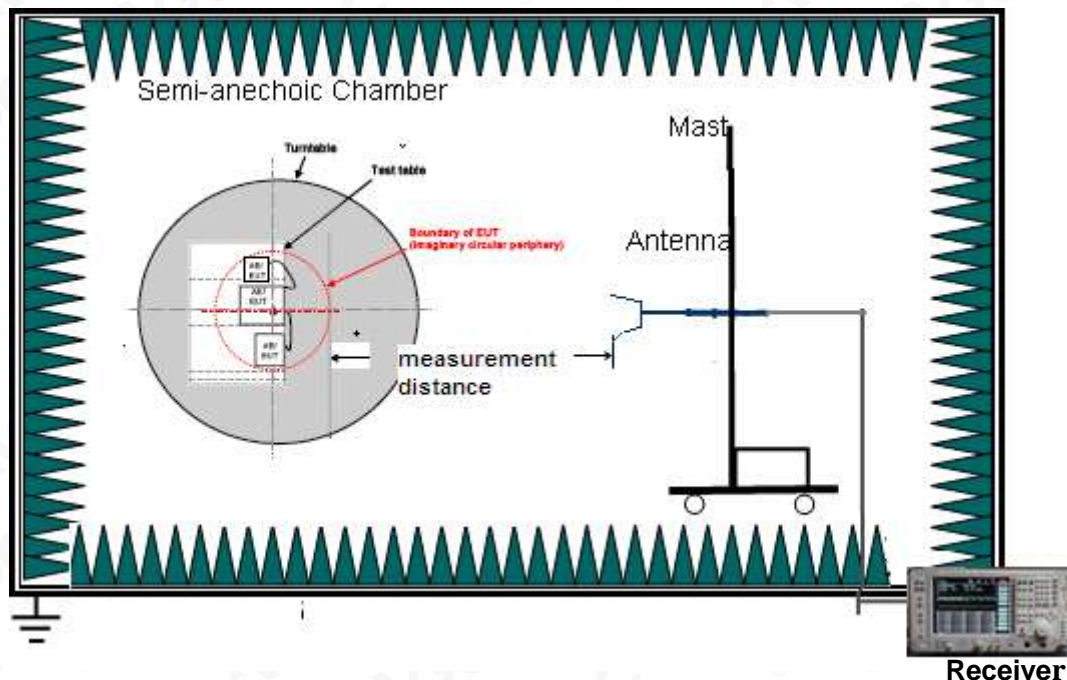


### 7.3. BLOCK DIAGRAM OF TEST SETUP

#### Radiated Disturbance below 1 GHz



#### Radiated Disturbance above 1 GHz



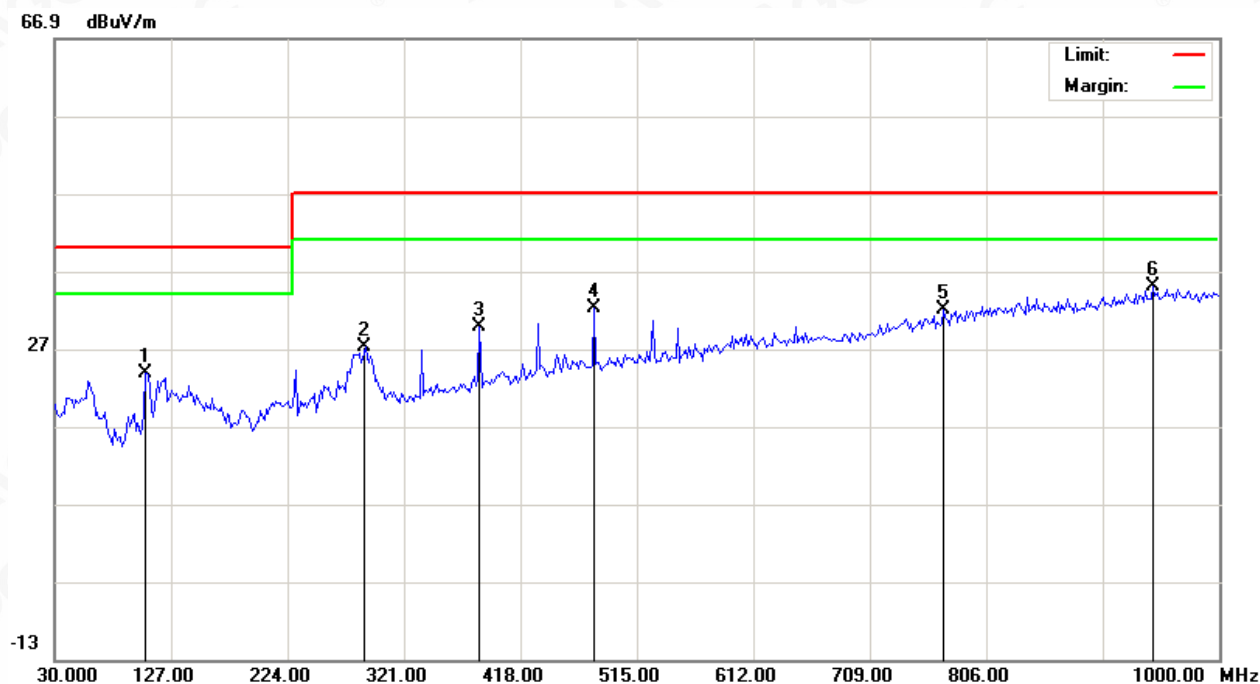
For the actual test configuration, please refer to the related item-Photographs of the Test Configuration.

## 7.4 TEST RESULT

The test modes were carried out for all modes.

The worst test mode of the EUT was Mode 1, and its test data was showed as the follow.

### RADIATED EMISSION BELOW 1GHz– HORIZONTAL

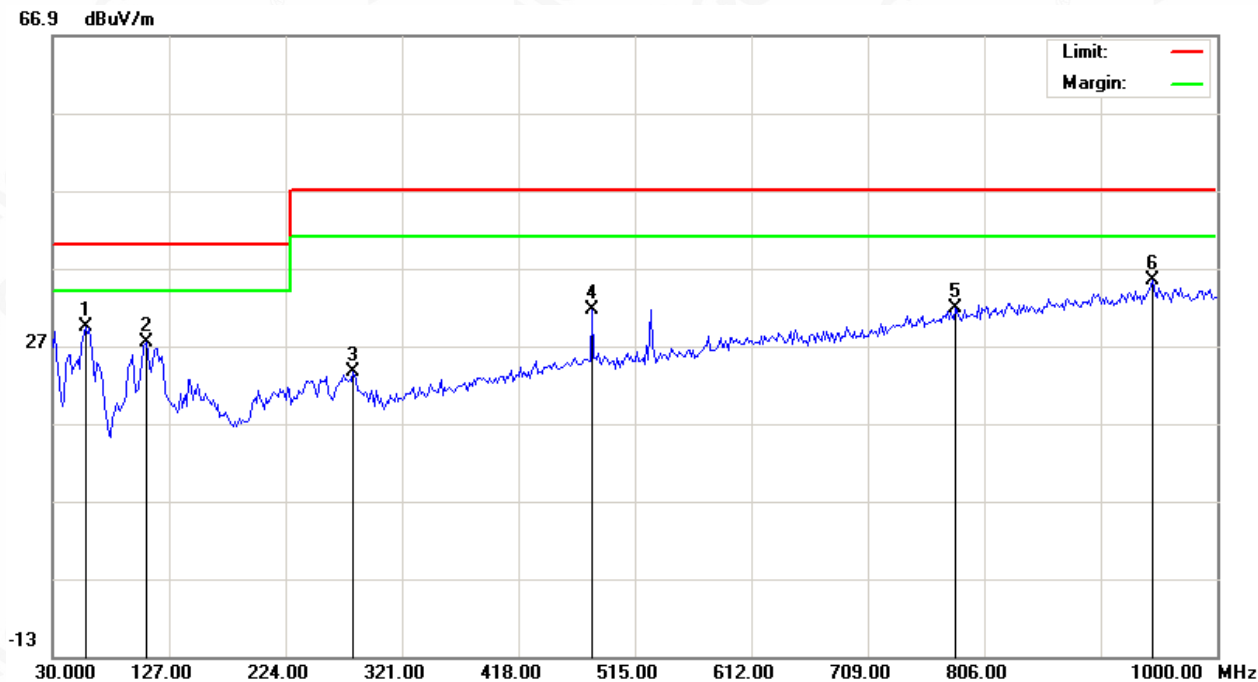


| No. | Mk | Freq.    | Reading | Factor | Measurement | Limit  | Over   | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
|     |    | MHz      | dBuV    | dB/m   | dBuV/m      | dBuV/m | dB     |          | cm             | degree       |         |
| 1   |    | 105.9833 | 7.13    | 16.60  | 23.73       | 40.00  | -16.27 | peak     |                |              |         |
| 2   |    | 288.6666 | 7.40    | 19.74  | 27.14       | 47.00  | -19.86 | peak     |                |              |         |
| 3   |    | 384.0500 | 7.44    | 22.42  | 29.86       | 47.00  | -17.14 | peak     |                |              |         |
| 4   |    | 479.4333 | 7.63    | 24.58  | 32.21       | 47.00  | -14.79 | peak     |                |              |         |
| 5   |    | 770.4333 | 2.21    | 29.74  | 31.95       | 47.00  | -15.05 | peak     |                |              |         |
| 6   | *  | 945.0333 | 2.91    | 32.09  | 35.00       | 47.00  | -12.00 | peak     |                |              |         |

**RESULT: PASS**



## RADIATED EMISSION BELOW 1GHz- VERTICAL



| No. | Mk | Freq.    | Reading | Factor | Measurement | Limit  | Over   | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
|     |    | MHz      | dBuV    | dB/m   | dBuV/m      | dBuV/m | dB     |          | cm             | degree       |         |
| 1   | *  | 57.4833  | 10.23   | 19.09  | 29.32       | 40.00  | -10.68 | peak     |                |              |         |
| 2   |    | 107.6000 | 10.56   | 16.75  | 27.31       | 40.00  | -12.69 | peak     |                |              |         |
| 3   |    | 280.5833 | 3.60    | 19.93  | 23.53       | 47.00  | -23.47 | peak     |                |              |         |
| 4   |    | 479.4333 | 6.96    | 24.58  | 31.54       | 47.00  | -15.46 | peak     |                |              |         |
| 5   |    | 781.7500 | 1.88    | 30.00  | 31.88       | 47.00  | -15.12 | peak     |                |              |         |
| 6   |    | 946.6500 | 3.38    | 32.10  | 35.48       | 47.00  | -11.52 | peak     |                |              |         |

### RESULT: PASS

Remark: which above 1GHz are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.



## 8. MAINS TERMINAL DISTURBANCE VOLTAGE MEASUREMENT

### 8.1. LIMITS OF MAINS TERMINAL DISTURBANCE VOLTAGE

| Frequency range (MHz) | Limits (dBuV), Class B ITE |          |
|-----------------------|----------------------------|----------|
|                       | Quasi-peak                 | Average  |
| 0.15 - 0.50           | 66 to 56                   | 56 to 46 |
| 0.50 - 5              | 56                         | 46       |
| 5 - 30                | 60                         | 50       |

**NOTE:**

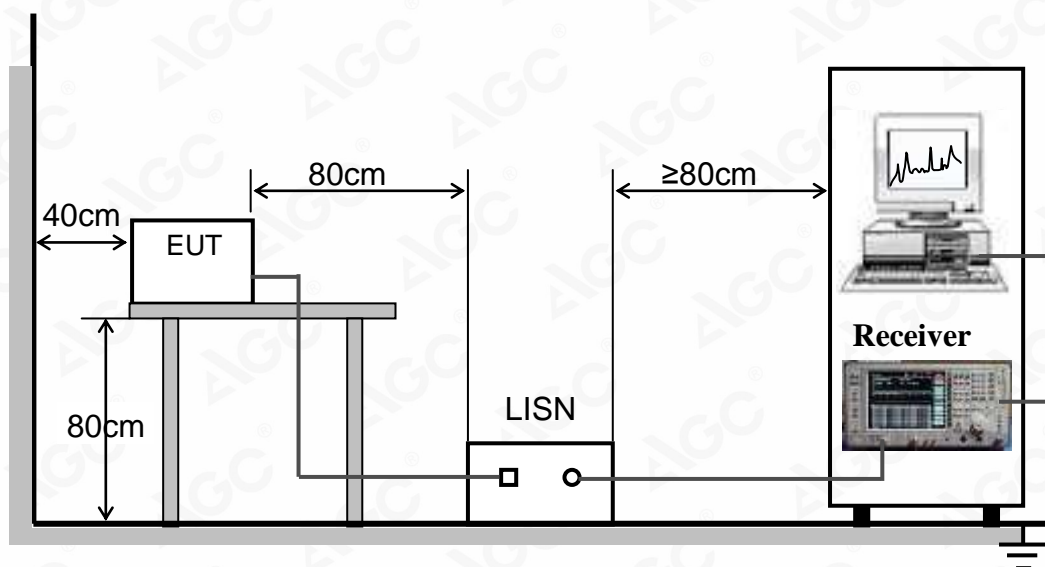
1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

### 8.2. TEST PROCEDURE

- (1) The EUT was placed 0.4 meters from the conducting wall of shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). The LISN provide 50Ω/50μH of coupling impedance for the measuring instrument.
- (2) Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- (3) The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 20dB under the prescribed limits are not reported.



### 8.3. TEST SETUP



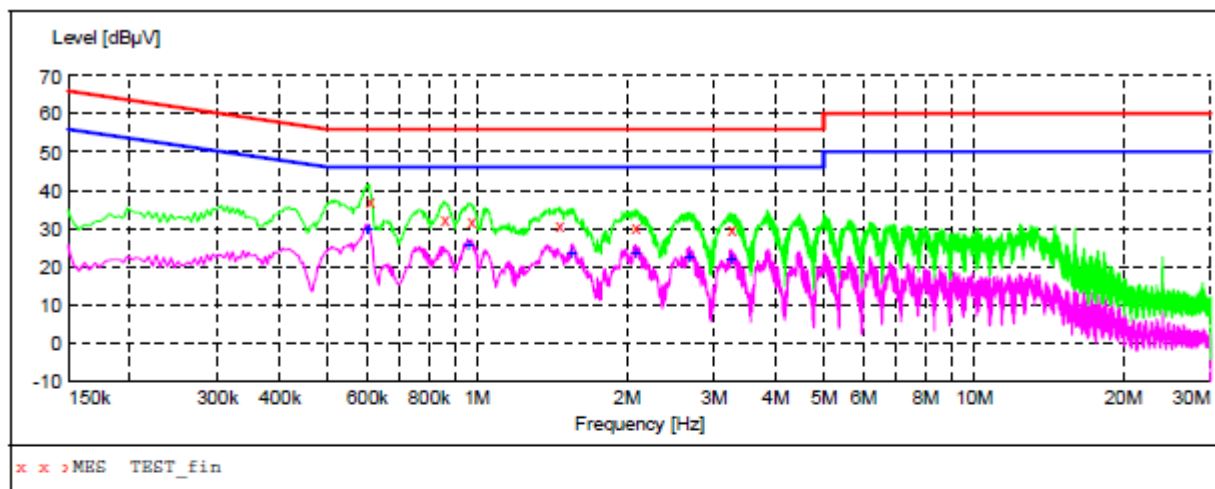
For the actual test configuration, please refer to the related item - Photographs of the Test Configuration.

### 8.4. TEST RESULT

The test modes were carried out for all modes.

The worst test mode of the EUT was Mode 1, and its test data was showed as the follow.

# LINE CONDUCTED EMISSION TEST-L



## MEASUREMENT RESULT: "TEST\_fin"

9/16/2019 9:55PM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.606000         | 37.40         | 10.7         | 56            | 18.6         | QP       | L1   | FLO |
| 0.858000         | 32.40         | 11.0         | 56            | 23.6         | QP       | L1   | FLO |
| 0.974000         | 32.20         | 11.4         | 56            | 23.8         | QP       | L1   | FLO |
| 1.462000         | 31.10         | 11.5         | 56            | 24.9         | QP       | L1   | FLO |
| 2.082000         | 30.20         | 11.5         | 56            | 25.8         | QP       | L1   | FLO |
| 3.246000         | 29.60         | 11.5         | 56            | 26.4         | QP       | L1   | FLO |

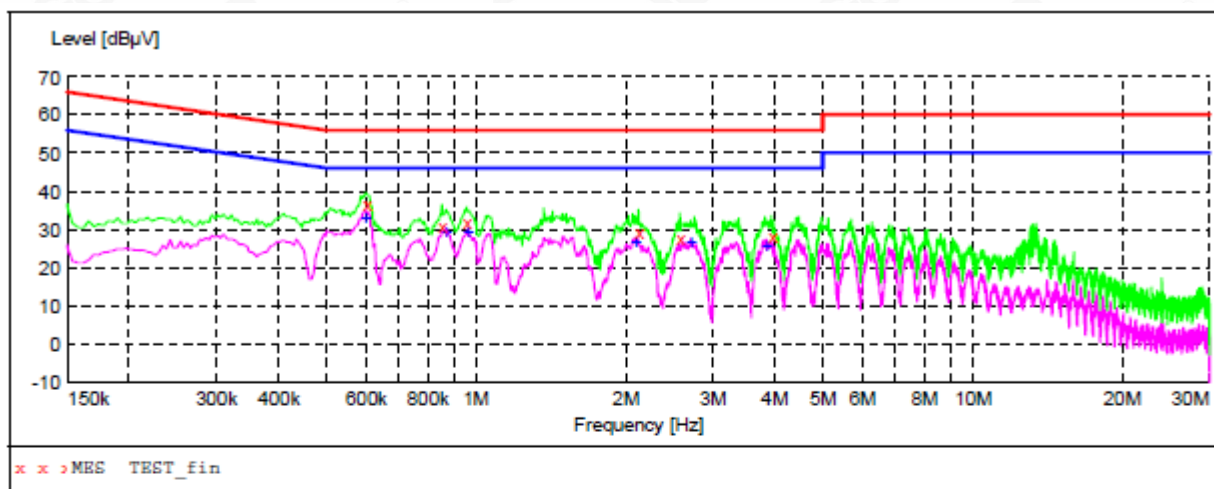
## MEASUREMENT RESULT: "TEST\_fin2"

9/16/2019 9:55PM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.602000         | 29.90         | 10.7         | 46            | 16.1         | AV       | L1   | FLO |
| 0.958000         | 25.80         | 11.3         | 46            | 20.2         | AV       | L1   | FLO |
| 1.546000         | 23.70         | 11.5         | 46            | 22.3         | AV       | L1   | FLO |
| 2.082000         | 23.60         | 11.5         | 46            | 22.4         | AV       | L1   | FLO |
| 2.670000         | 22.30         | 11.5         | 46            | 23.7         | AV       | L1   | FLO |
| 3.246000         | 22.10         | 11.5         | 46            | 23.9         | AV       | L1   | FLO |



# LINE CONDUCTED EMISSION TEST-N



## MEASUREMENT RESULT: "TEST\_fin"

9/16/2019 9:52PM

| Frequency<br>MHz | Level<br>dBuV | Transd<br>dB | Limit<br>dBuV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.602000         | 36.50         | 10.7         | 56            | 19.5         | QP       | N    | FLO |
| 0.854000         | 31.00         | 11.0         | 56            | 25.0         | QP       | N    | FLO |
| 0.958000         | 32.00         | 11.3         | 56            | 24.0         | QP       | N    | FLO |
| 2.126000         | 29.40         | 11.5         | 56            | 26.6         | QP       | N    | FLO |
| 2.574000         | 27.60         | 11.5         | 56            | 28.4         | QP       | N    | FLO |
| 3.942000         | 28.10         | 11.6         | 56            | 27.9         | QP       | N    | FLO |

## MEASUREMENT RESULT: "TEST\_fin2"

9/16/2019 9:52PM

| Frequency<br>MHz | Level<br>dBuV | Transd<br>dB | Limit<br>dBuV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.598000         | 33.10         | 10.7         | 46            | 12.9         | AV       | N    | FLO |
| 0.870000         | 29.10         | 11.0         | 46            | 16.9         | AV       | N    | FLO |
| 0.966000         | 29.20         | 11.3         | 46            | 16.8         | AV       | N    | FLO |
| 2.098000         | 26.60         | 11.5         | 46            | 19.4         | AV       | N    | FLO |
| 2.706000         | 26.50         | 11.5         | 46            | 19.5         | AV       | N    | FLO |
| 3.838000         | 25.40         | 11.6         | 46            | 20.6         | AV       | N    | FLO |





## 9. HARMONIC CURRENT MEASUREMENT

### 9.1. LIMITS OF HARMONIC CURRENT

| Limits for Class A Equipment |                                       |
|------------------------------|---------------------------------------|
| Harmonics Order n            | Max. permissible harmonic current (A) |
| <b>Odd harmonics</b>         |                                       |
| 3                            | 2.30                                  |
| 5                            | 1.14                                  |
| 7                            | 0.77                                  |
| 9                            | 0.40                                  |
| 11                           | 0.33                                  |
| 13                           | 0.21                                  |
| $15 \leq n \leq 39$          | $0.15 \times 15/n$                    |
| <b>Even harmonics</b>        |                                       |
| 2                            | 1.08                                  |
| 4                            | 0.43                                  |
| 6                            | 0.30                                  |
| $8 \leq n \leq 40$           | $0.23 \times 8/n$                     |

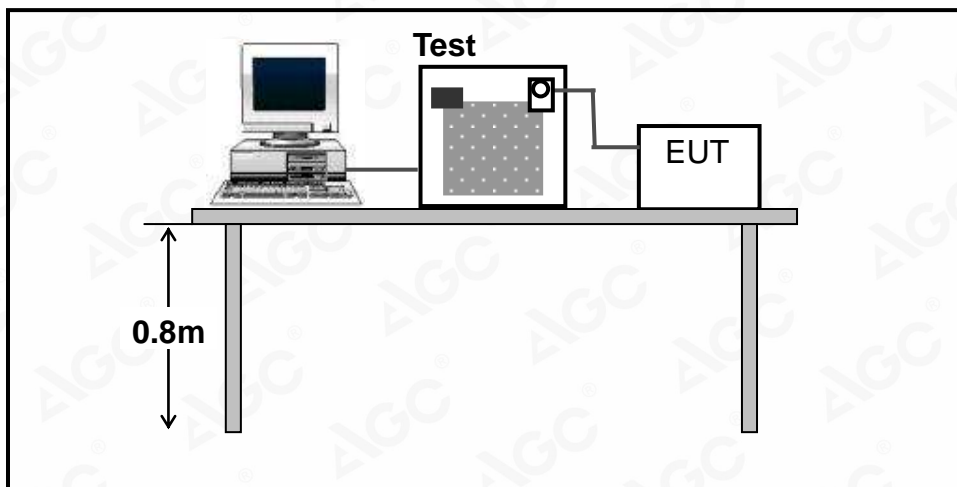
**NOTE:**

1. According to section 5 of EN61000-3-2: 2014, the EUT is Class C equipment.
2. The above limits are for all applications having an active input power > 75W. No limits apply for equipment with an active input power up to and including 75W.

### 9.2. TEST PROCEDURE

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

### 9.3. TEST SETUP



For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

### 9.4. TEST RESULT

No applicable for equipment with an active input power up to and including 75W.

## 10. VOLTAGE FLUCTUATIONS AND FLICK MEASUREMENT

### 10.1. LIMITS OF VOLTAGE FLUCTUATIONS AND FLICK

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

### 10.2. TEST PROCEDURE

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

### 10.3. TEST SETUP

Same as 9.3

### 10.4. TEST RESULT

#### Test Specification

|                 |      |               |  |
|-----------------|------|---------------|--|
| Test Frequency: | 50Hz | Test Voltage: | 230V AC                                      |
| Waveform:       | Sine | Test Time:    | 10 minutes( $P_{st}$ ); 2 hours ( $P_{lt}$ ) |

#### Test Result

| Test Parameter | Measurement Value | Limit | Remarks |
|----------------|-------------------|-------|---------|
| $P_{st}$       | 0.0096            | 1.0   | Pass    |
| $P_{lt}$       | 0.0089            | 0.65  | Pass    |
| $T_{dt(s)}$    | 0.0042            | 0.2   | Pass    |
| $d_{max}(\%)$  | 0.059%            | 4%    | Pass    |
| $d_c(\%)$      | 0.045%            | 3%    | Pass    |

## 11. PERFORMANCE CRITERIA FOR IMMUNITY TEST

### 11.1. EUT SETUP AND OPERATING CONDITIONS

Each immunity test was performed according to the requirements of the standard.

### 11.2. GENERAL PERFORMANCE CRITERIA

#### 1. Performance criteria for Continuous phenomena applied to Transmitter (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.

#### 2. Performance criteria for Transient phenomena applied to Transmitter (TT)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 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.

#### 3. Performance criteria for Continuous phenomena applied to Receiver (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.

#### 4. Performance criteria for Transient phenomena applied to Receiver (TR)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 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.





## 12. ELECTROSTATIC DISCHARGE IMMUNITY TEST

### 12.1 TEST SPECIFICATION

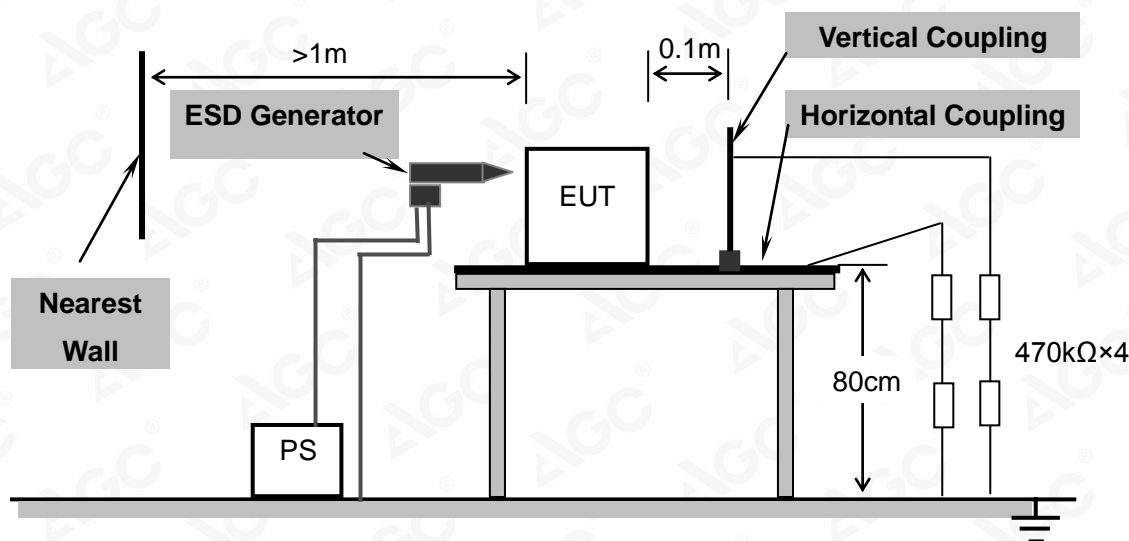
|                            |  |
|----------------------------|--|
| <b>Basic Standard</b>      | EN 61000-4-2                                   |
| <b>Discharge Impedance</b> | 330Ω / 150 pF                                  |
| <b>Discharge Voltage</b>   | Air Discharge –8 kV , Contact Discharge – 4 kV |
| <b>Polarity</b>            | Positive / Negative                            |
| <b>Number of Discharge</b> | Minimum 20 times at each test point            |
| <b>Discharge Mode</b>      | Single discharge                               |
| <b>Discharge Period</b>    | 1-second minimum                               |

### 12.2 TEST PROCEDURE

The test procedure was in accordance with EN 61000-4-2:

- Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
- The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- The time interval between two successive single discharges was at least 1 second.
- The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.
- Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were completed.
- At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator was positioned vertically at a distance of 0.1 meters from the EUT with the discharge electrode touching the HCP.
- At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m×0.5m) was placed vertically to and 0.1 meters from the EUT.

### 12.3 TEST SETUP



For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

### 12.4 TEST RESULT

| Criteria | During Test  | After Test   |
|----------|--|--|
| A        | Shall operate as intended.<br>May show degradation of performance (see note 1).<br>Shall be no loss of function.<br>Shall be no unintentional transmissions. | Shall operate as intended.<br>Shall be no degradation of performance (see note 2).<br>Shall be no loss of function.<br>Shall be no loss of stored data or user programmable functions.                         |
| B        | May show loss of function (one or more).<br>May show degradation of performance (see note 1).<br>No unintentional transmissions.                             | Functions shall be self-recoverable.<br>Shall operate as intended after recovering.<br>Shall be no degradation of performance (see note 2).<br>Shall be no loss of stored data or user programmable functions. |

**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.

# DESCRIPTION OF THE ELECTROSTATIC DISCHARGES (ESD)

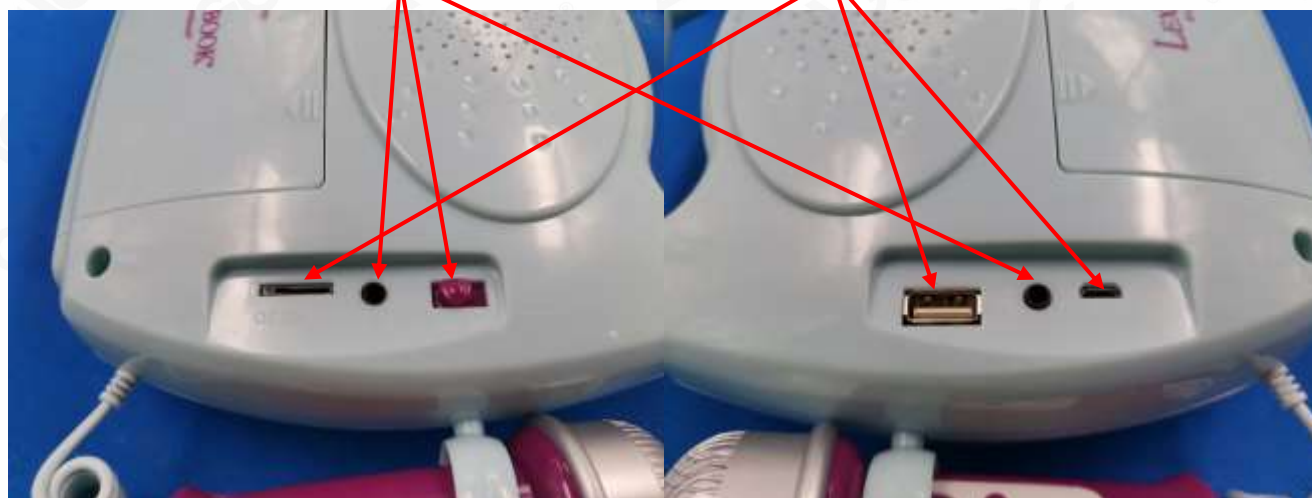
| Amount of Discharges | Voltage          | Coupling               | Observation      | Performance | Result (Pass/Fail) |
|----------------------|------------------|------------------------|------------------|-------------|--------------------|
| Mini 20 / Point      | ±2KV, ±4kV       | Contact Discharge      | No Function Loss | B           | Pass               |
| Mini 20 / Point      | ±2KV, ±4kV, ±8kV | Air Discharge          | No Function Loss | B           | Pass               |
| Mini 20 / Point      | ±2KV, ±4kV       | Indirect Discharge HCP | No Function Loss | B           | Pass               |
| Mini 20 / Point      | ±2KV, ±4kV       | Indirect Discharge VCP | No Function Loss | B           | Pass               |

**Note:** operating mode include all modes of EMS in page 8



Air Discharge

Contact Discharge





## 12.5 PERFORMANCE

|  |  |
|--|--|
| <input checked="" type="checkbox"/> <b>Criteria A:</b> | The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.  |
| <input type="checkbox"/> <b>Criteria B:</b>            | The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. |
| <input type="checkbox"/> <b>Criteria C:</b>            | Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.  |

☒ **PASS**

☐ **FAIL**





### 13. RADIATED, RADIO FREQUENCY ELECTROMAGNETIC FIELD IMMUNITY TEST

#### 13.1 TEST SPECIFICATION

|                     |                                     |
|---------------------|-------------------------------------|
| Basic Standard      | EN 61000-4-3                        |
| Frequency Range     | 80 MHz – 6000MHz                    |
| Field Strength      | 3V/m                                |
| Modulation          | 1 kHz sine wave, 80%, AM modulation |
| Frequency Step      | 1% of fundamental                   |
| Polarity of Antenna | Horizontal and Vertical             |
| Test Distance       | 3m                                  |
| Antenna Height      | 1.55m                               |
| Dwell Time          | 3 seconds                           |

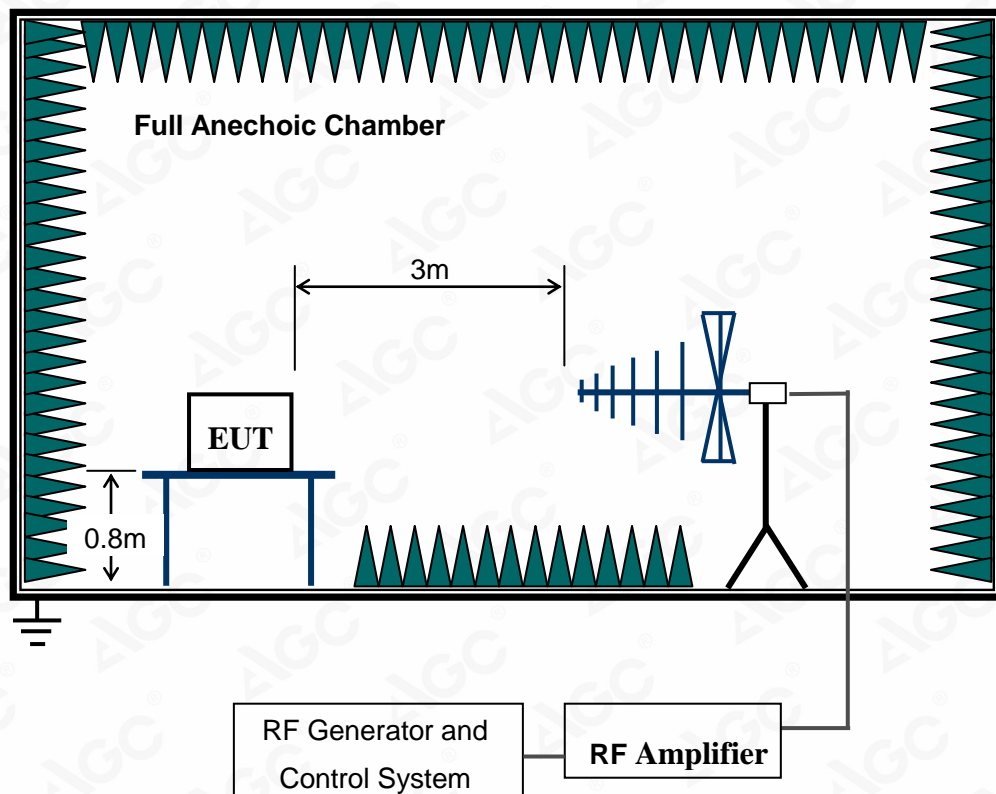
#### 13.2. TEST PROCEDURE

The test procedure was in accordance with EN 61000-4-3.

- The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
- The test signal was 80% amplitude modulated with a 1 kHz sine wave.
- The frequency range was swept from 80 MHz to 6000MHz with the exception of the exclusion band for transmitters, receivers and duplex transceivers. The rate of sweep did not exceed  $1.5 \times 10^{-3}$  decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- The field strength level was 3V/m.
- The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.



### 13.3. TEST SETUP



For the actual test configuration, please refer to Appendix A : Photographs of the Test Configuration.

### 13.4. TEST RESULT

| Criteria   | During Test  | After Test   |
|--|--|--|
| A  | Shall operate as intended.<br>May show degradation of performance (see note 1).<br>Shall be no loss of function.<br>Shall be no unintentional transmissions. | Shall operate as intended.<br>Shall be no degradation of performance (see note 2).<br>Shall be no loss of function.<br>Shall be no loss of stored data or user programmable functions. |
| <p><b>NOTE 1:</b> 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.</p> <p><b>NOTE 2:</b> 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.</p> |  |  |

| Freq. Range (MHz) | Field | Modulation | Polarity | Position | Observation      | performance | Result (Pass/Fail) |
|-------------------|-------|------------|----------|----------|------------------|-------------|--------------------|
| 80-6000           | 3V/m  | Yes        | H / V    | Front    | No Function Loss | A           | PASS               |
| 80-6000           | 3V/m  | Yes        | H / V    | Back     | No Function Loss | A           | PASS               |
| 80-6000           | 3V/m  | Yes        | H / V    | Left     | No Function Loss | A           | PASS               |
| 80-6000           | 3V/m  | Yes        | H / V    | Right    | No Function Loss | A           | PASS               |
| 80-6000           | 3V/m  | Yes        | H / V    | Top      | No Function Loss | A           | PASS               |
| 80-6000           | 3V/m  | Yes        | H / V    | Bottom   | No Function Loss | A           | PASS               |

**Note:** operating mode include all modes of EMS in page 8

### 13.5. PERFORMANCE

|  |  |
|--|--|
| <input checked="" type="checkbox"/> <b>Criteria A:</b> | The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.  |
| <input type="checkbox"/> <b>Criteria B:</b>            | The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. |
| <input type="checkbox"/> <b>Criteria C:</b>            | Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.  |

☒ **PASS**

☐ **FAIL**





## 14. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

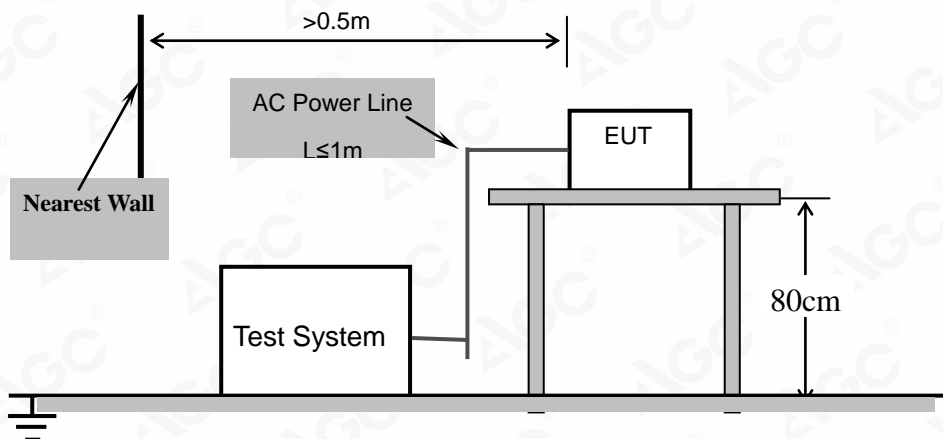
### 14.1. TEST SPECIFICATION

|                            |                        |
|----------------------------|------------------------|
| <b>Basic Standard:</b>     | IEC 61000-4-4          |
| <b>Test Voltage:</b>       | a.c. power port – 1 kV |
| <b>Polarity:</b>           | Positive/Negative      |
| <b>Impulse Frequency:</b>  | 5kHz                   |
| <b>Impulse wave shape:</b> | 5/50ns                 |
| <b>Burst Duration:</b>     | 15ms                   |
| <b>Burst Period:</b>       | 300ms                  |
| <b>Test Duration:</b>      | Not less than 1 min.   |

### 14.2. TEST PROCEDURE

1. The EUT was tested with 1000 volt discharges to the AC power input leads.
2. Both positive and negative polarity discharges were applied.
3. The length of the “hot wire” from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 1 meter.
4. The duration time of each test sequential was 1 minute.
5. The transient/burst waveform was in accordance with IEC 61000-4-4, 5/50ns.

### 14.3. TEST SETUP



For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

#### 14.4. TEST RESULT

| Test Point     | Polarity | Test Level (kV) | Observation      | performance | Conclusion |
|----------------|----------|-----------------|------------------|-------------|------------|
| a.c. port, L   | +/-      | 1               | No function loss | A           | Pass       |
| a.c. port, N   | +/-      | 1               | No function loss | A           | Pass       |
| a.c. port, L-N | +/-      | 1               | No function loss | A           | Pass       |

Note: There was not any unintentional transmission discovered in standby mode

**Note:** operating mode include all modes of EMS in page 8

#### 14.5. PERFORMANCE

|  |  |
|--|--|
| <input checked="" type="checkbox"/> <b>Criteria A:</b> | The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.  |
| <input type="checkbox"/> <b>Criteria B:</b>            | The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. |
| <input type="checkbox"/> <b>Criteria C:</b>            | Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.  |

☒ **PASS**
☐ **FAIL**


## 15. SURGE IMMUNITY TEST

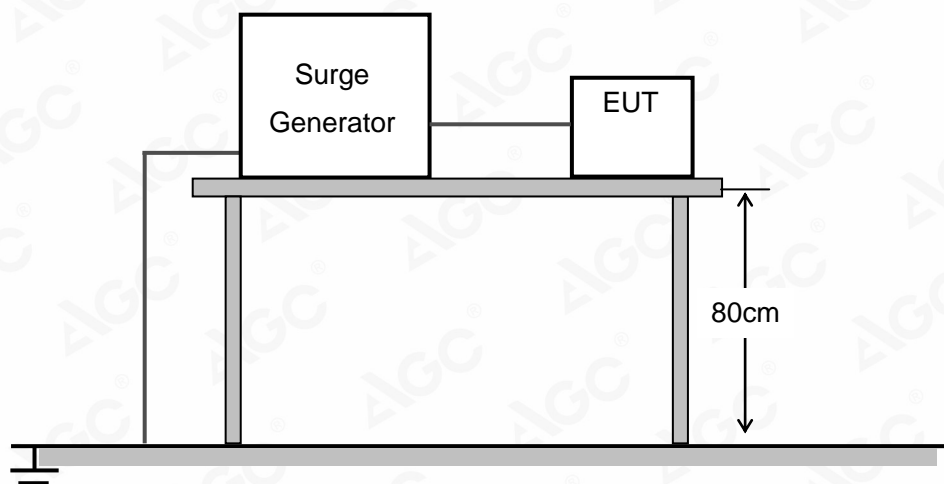
### 15.1. TEST SPECIFICATION

|                         |  |
|-------------------------|--|
| <b>Basic Standard:</b>  | IEC 61000-4-5                                |
| <b>Waveform:</b>        | Voltage 1.2/50 $\mu$ s; Current 8/20 $\mu$ s |
| <b>Test Voltage:</b>    | a.c. power port, line to line 1.0 kV         |
| <b>Polarity:</b>        | Positive/Negative                            |
| <b>Phase Angle:</b>     | 0°, 90°, 180°, 270°                          |
| <b>Repetition Rate:</b> | 60sec  |
| <b>Times:</b>           | 5 time/each condition.                       |

### 15.2. TEST PROCEDURE

- The EUT and the auxiliary equipment were placed on a table of 0.8m heights above a metal ground reference plane. The size of ground plane is greater than 1m $\times$ 1m and project beyond the EUT by at least 0.1m on all sides. The ground plane is connected to the protective earth. The length of power cord between the coupling device and the EUT was less than 2 meters (provided by the manufacturer).
- The EUT was connected to the power mains through a coupling device that directly couples the surge interference signal. The surge noise was applied synchronized to the voltage phase at the zero crossing and the peak value of the AC voltage wave (positive and negative).
- The surges were applied line to line and line(s) to earth. All lower levels including the selected test level were tested. The polarity of each surge level included positive and negative test pulses.

### 15.3. TEST SETUP



For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

#### 15.4. TEST RESULT

| Coupling Line   | Polarity | Voltage (kV) | Observation      | performance | Conclusion |
|-----------------|----------|--------------|------------------|-------------|------------|
| a.c. power, L-N | +/-      | 1.0          | No function loss | A           | Pass       |

Note: There was not any unintentional transmission discovered in standby mode

**Note:** operating mode include all modes of EMS in page 8

#### 15.5. PERFORMANCE

|  |  |
|--|--|
| <input checked="" type="checkbox"/> <b>Criteria A:</b> | The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.  |
| <input type="checkbox"/> <b>Criteria B:</b>            | The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. |
| <input type="checkbox"/> <b>Criteria C:</b>            | Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.  |

☒ **PASS**
☐ **FAIL**




## 16. IMMUNITY TO CONDUCTED DISTURBANCES INDUCED BY RF FIELDS

### 16.1. TEST SPECIFICATION

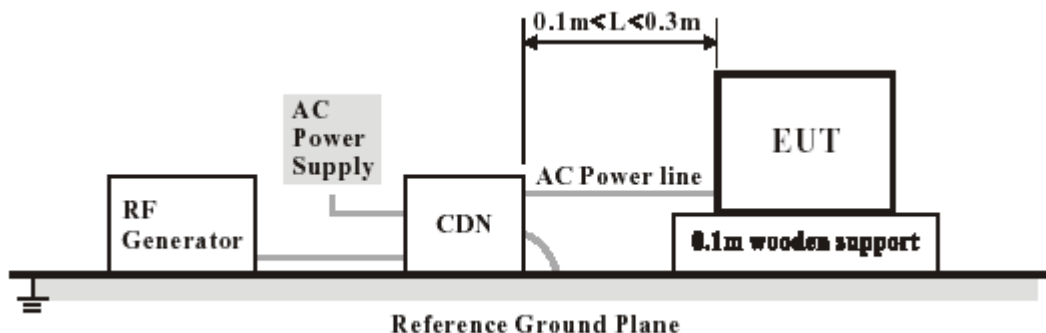
|                         |                         |
|-------------------------|-------------------------|
| <b>Basic Standard:</b>  | IEC 61000-4-6           |
| <b>Frequency Range:</b> | 0.15 MHz – 80 MHz       |
| <b>Field Strength:</b>  | 3Vrms                   |
| <b>Modulation:</b>      | 1 kHz Sine Wave, 80% AM |
| <b>Frequency Step:</b>  | 1% of fundamental       |
| <b>Coupled Cable:</b>   | a.c. power line         |
| <b>Coupling Device:</b> | CDN-M2                  |

### 16.2. TEST PROCEDURE

1. The EUT shall be tested within its intended operating and climatic conditions.
2. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.
3. The test signal was 80% amplitude modulated with a 1 kHz sine wave
4. The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80% amplitude. The sweep rate shall not exceed  $1.5 \times 10^{-3}$  decades/s. The step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value where the frequency is swept incrementally.
5. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequencies and harmonics or frequencies of dominant interest, shall be analyzed separately.
6. Attempts should be made to fully exercise the EUT during test, and to fully interrogate all exercise modes selected for susceptibility.



### 16.3. TEST SETUP



For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

### 16.4. TEST RESULT

| EUT Working Mode | Test Point | Frequency (MHz) | Field Strength (Vrms) | Observation      | performance | Conclusion |
|------------------|------------|-----------------|-----------------------|------------------|-------------|------------|
| Normal           | a.c. port  | 0.15 – 80       | 3                     | No function loss | A           | Pass       |

Note: There was not any unintentional transmission in standby mode

**Note:** operating mode include all modes of EMS in page 8

### 16.5. PERFORMANCE

|  |  |
|--|--|
| <input checked="" type="checkbox"/> <b>Criteria A:</b> | The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.  |
| <input type="checkbox"/> <b>Criteria B:</b>            | The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. |
| <input type="checkbox"/> <b>Criteria C:</b>            | Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.  |

☒ **PASS**
☐ **FAIL**

## 17. VOLTAGE DIPS AND SHORT INTERRUPTIONS IMMUNITY TEST

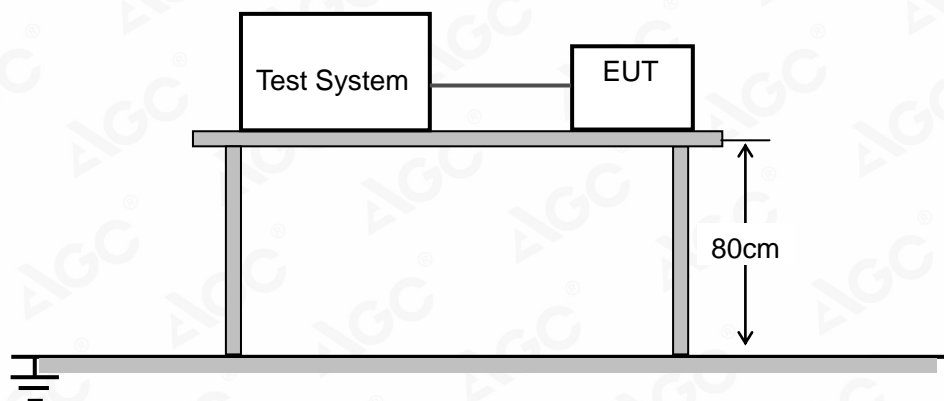
### 17.1. TEST SPECIFICATION

|                               |  |
|-------------------------------|--|
| <b>Basic Standard:</b>        | IEC 61000-4-11   |
| <b>Voltage Dips:</b>          | 100% reduction, 0.5 Cycle<br>100% reduction, 1.0 Cycle<br>30% reduction, 25 Cycles |
| <b>Voltage Interruptions:</b> | 100% reduction, 250 Cycles   |
| <b>Voltage Phase Angle:</b>   | 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°   |

### 17.2. TEST PROCEDURE

- The power cord was used as supplied by the manufacturer. The EUT was connected to the line output of the Voltage Dips and Interruption Generator.
- The EUT was tested for (1) 100% voltage dip of supplied voltage with duration of 0.5 cycles, (2) 100% voltage dip of supplied voltage and duration 1.0 cycle. (3) 30% voltage dip of supplied voltage and duration 25 cycles. (4) 100% voltage interruption of supplied voltage with duration of 250 Cycles was followed.
- Voltage reductions occur at 0 degree crossover point of the voltage waveform. The performance of the EUT was checked after the voltage dip or interruption.

### 17.3. TEST SETUP



For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

#### 17.4. TEST RESULT

| Test Mode             | Voltage Reduction | Duration (cycle) | Times | Interval (ms) | Observation      | performance | Conclusion |
|-----------------------|-------------------|------------------|-------|---------------|------------------|-------------|------------|
| Voltage dips          | 100%              | 0.5              | 3     | 10            | No function loss | B           | Pass       |
|                       | 100%              | 1                | 3     | 20            | No function loss | C           | Pass       |
|                       | 30%               | 25               | 3     | 500           | No function loss | C           | Pass       |
| Voltage interruptions | 100%              | 250              | 3     | 5000          | No function loss | C           | Pass       |

Note: There was not any unintentional transmission in standby mode

**Note:** operating mode include all modes of EMS in page 8

#### 17.5. PERFORMANCE

|  |  |
|--|--|
| <input type="checkbox"/> <b>Criteria A:</b>            | The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.  |
| <input checked="" type="checkbox"/> <b>Criteria B:</b> | The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. |
| <input checked="" type="checkbox"/> <b>Criteria C:</b> | Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.  |

☒ **PASS**
☐ **FAIL**



**APPENDIX A: PHOTOGRAPHS OF TEST SETUP**

Refer to Attached file(Appendix I).

**APPENDIX B: PHOTOGRAPHS OF EUT**

Refer to Attached file(Appendix I).

**----END OF REPORT----**

