
EMC Test Report

Report No.: AGC03709200901EE01B

PRODUCT DESIGNATION : smartwatch
BRAND NAME : Blackview, IOWODO, FeipuQu
MODEL NAME : R3Pro, W10E, R3Max, R2, R3, R5, R1, R6
APPLICANT : Shenzhen Xinhuaajitong Technology Co., Ltd.
DATE OF ISSUE : Nov. 15, 2022
STANDARD(S) : ETSI EN 301 489-1 V2.2.3 (2019-11)
: ETSI EN 301 489-17 V3.2.4 (2020-09)
REPORT VERSION : V1.0



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REPORT REVISE RECORD

| Report Version | Revise Time | Issued Date | Valid Version | Notes |
|----------------|-------------|---------------|---------------|-----------------|
| V1.0 | / | Nov. 15, 2022 | Valid | Initial release |

Note: The original test report AGC03709200901EE01 (dated Sep. 28, 2020 and tested from Sep. 04, 2020 to Sep. 28, 2020) was modified on Nov. 15, 2022, including the following changes and additions:

- Change the device name and model;
- Change the device brand name;
- Updated EMC standards (Final draft ETSI EN 301 489-17 V3.2.3 (2020-07) changed to ETSI EN 301 489-17 V3.2.4 (2020-09));

For above described changes, no further testing is necessary.

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1. TEST REPORT CERTIFICATION

| | |
|-------------------------------------|---|
| Applicant | Shenzhen Xinhuaajitong Technology Co., Ltd. |
| Address | 802, Building 3, No. 7 Industrial Zone, Yulu Community, Yutang Street, Guangming District, Shenzhen |
| Manufacturer | Shenzhen Xinhuaajitong Technology Co., Ltd. |
| Address | 802, Building 3, No. 7 Industrial Zone, Yulu Community, Yutang Street, Guangming District, Shenzhen |
| Factory | Shenzhen Xinhuaajitong Technology Co., Ltd. |
| Address | 802, Building 3, No. 7 Industrial Zone, Yulu Community, Yutang Street, Guangming District, Shenzhen |
| Product Designation | smartwatch |
| Brand Name | Blackview, IOWODO, FeipuQu |
| Test Model | R3Pro |
| Series Model | W10E, R3Max, R2, R3, R5, R1, R6 |
| Difference Description | All the same except for the model name. |
| Date of receipt of test item | Nov. 14, 2022 |
| Date of test | N/A |
| Deviation | None |
| Condition of Test Sample | Normal |
| Test Result | Pass |
| Report Template | AGCRT-EC-EMC |

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 

 Thea Huang
 (Project Engineer) Nov. 15, 2022

Reviewed By 

 Calvin Liu
 (Reviewer) Nov. 15, 2022

Approved By 

 Max Zhang
 (Authorized Officer) Nov. 15, 2022

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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)

| | |
|----------------------------|---|
| Operating Frequency | 2.402 GHz to 2.480GHz |
| Bluetooth Version | V5.0 |
| Modulation | BLE <input checked="" type="checkbox"/> GFSK 1Mbps <input checked="" type="checkbox"/> GFSK 2Mbps |
| Hardware Version | RH112T-V01 |
| Software Version | RH112TG1378 |
| Antenna designation | PIFA Antenna |
| Number of channels | 40 Channels |
| Antenna Gain | 0dBi |
| Power Supply | DC 3.8V by battery or DC 5V by adapter |

Note: The EUT doesn't support BR/EDR.

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 V2.2.3 (2019-11) and ETSI EN 301 489-17 V3.2.4 (2020-09).

| | |
|---------------------------|--|
| ETSI EN 301 489-1 | ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility. |
| ETSI EN 301 489-17 | ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility |

2.4. TEST ITEMS AND THE RESULTS

| No. | Basic Standard | Test Type | Result |
|-------------------------------------|----------------|---|--------|
| EMISSION (EN 301 489-1 §7.1) | | | |
| 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 |
| IMMUNITY (EN 301 489-1 §7.2) | | | |
| 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.

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2.5. ENVIRONMENTAL CONDITIONS

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

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

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3. TEST MODE DESCRIPTION

| TEST MODE DESCRIPTION | | |
|-----------------------|---------------------------|-------|
| NO. | EMI TEST MODE DESCRIPTION | WORST |
| 1 | Standby with charging | V |
| 2 | BT Link | - |
| NO. | EMS TEST MODE DESCRIPTION | WORST |
| 1 | Standby with charging | V |
| 2 | BT Link | - |

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

I/O Port Information (Applicable Not Applicable)

| I/O Port of EUT | | | |
|-----------------|--------|-------------------|-------------|
| I/O Port Type | Number | Cable Description | Tested With |
| Charging Port | 1 | 0.6m unshielded | 1 |

Note: All the above "--" means that EUT has no cable.

4. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by CISPR and ANSI.

- Uncertainty of Radiated Emission, $U_c = \pm 3.1$ dB
- Uncertainty of Radiated Emission below 1GHz, $U_c = \pm 4.0$ dB
- Uncertainty of Radiated Emission above 1GHz, $U_c = \pm 4.8$ dB

5. SUPPORT EQUIPMENT

| Device Type | Manufacturer | Model Name | Data Cable |
|--------------|--------------|---------------------|------------|
| Mobile phone | TCL | J326T | -- |
| Adapter | Zhongli | ZL-PCB0100020502000 | -- |

Note: 1. “--” means no any support device during testing.
2. All the cables were provided by AGC Lab.

6. IDENTIFICATION OF THE RESPONSIBLE TESTING LOCATION

| | |
|-----------------|--|
| Site | Attestation of Global Compliance (Shenzhen) Co., Ltd |
| Location | 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 | ESCI | 10096 | May 15, 2020 | May 14,2021 |
| LISN | R&S | ESH2-Z5 | 100086 | Jul. 03,2020 | Jul. 02,2021 |

TEST EQUIPMENT OF RADIATED EMISSION TEST

| Equipment | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|------------------------------|--------------|----------|------------|---------------|---------------|
| Test Receiver | R&S | ESCI | 10096 | May 15, 2020 | May 14,2021 |
| 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. 12, 2019 | Dec.11, 2020 |

TEST EQUIPMENT OF ESD TEST

| Equipment | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---------------|--------------|---------|-----|---------------|---------------|
| ESD Simulator | EM Test | NSG 438 | 782 | Jan. 10, 2020 | Jan. 09, 2022 |

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 | Jul. 15,2020 | Jul. 14,2022 |
| AC Source | Schaffner | NSG 1007 | 56825 | Jul. 15,2020 | Jul. 14,2022 |

TEST EQUIPMENT OF SURGE/EFT/DIPSTEST

| Equipment | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---------------------|--------------|-------------|-------|--------------|--------------|
| EFT Surge Generator | Schaffner | Modula 6150 | 34437 | Jul. 03,2020 | Jul. 02,2022 |

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TEST EQUIPMENT OF RS IMMUNITY TEST

| Equipment | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|------------------------------|--------------|--------------|-----------------|---------------|---------------|
| Signal Generator | R&S | E4421B | MY43351603 | Jun. 08, 2020 | Jun. 07, 2022 |
| POWER SENSOR | R&S | URV5-Z4 | 100124 | May 22, 2020 | May 21, 2022 |
| POWER METER | R&S | NRVD | 8323781027 | May 22, 2020 | May 21, 2022 |
| POWER AMPLIFIER | KALMUS | 7100LC | 04-02/17-06-001 | N/A | N/A |
| RF AMPLIFIER | Milmega | AS0104-55_55 | 1004793 | N/A | N/A |
| Double-Ridged Waveguide Horn | ETS LINDGREN | 3117 | 00034609 | May 17, 2019 | May 16, 2021 |
| ANTENNA | SCHWARZBECK | VULB9168 | 494 | Jan. 09,2019 | Jan. 08,2021 |

TEST EQUIPMENT OF CS IMMUNITY TEST

| Equipment | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---------------------------------|--------------|---------|------------|---------------|---------------|
| Power Amplifier | AR | 75A250 | 18464 | N/A | N/A |
| CDN | ZHINAN | ZN3751 | 15004 | Sep. 03, 2020 | Sep. 02, 2022 |
| 6dB attenuator | ZHINAN | E-002 | N/A | Sep. 03, 2020 | Sep. 02, 2022 |
| Electromagnetic Injection Clamp | Luthi | EM101 | 35773 | Aug. 25,2020 | Aug. 24,2022 |
| Power Sensor | R&S | URV5-Z4 | 100124 | May 22, 2020 | May 21, 2022 |
| Power Meter | R&S | NRVD | 8323781027 | May 22, 2020 | May 21, 2022 |
| SIGNAL GENERATOR | R&S | E4421B | MY43351603 | Jun. 08, 2020 | Jun. 07, 2022 |

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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), 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.

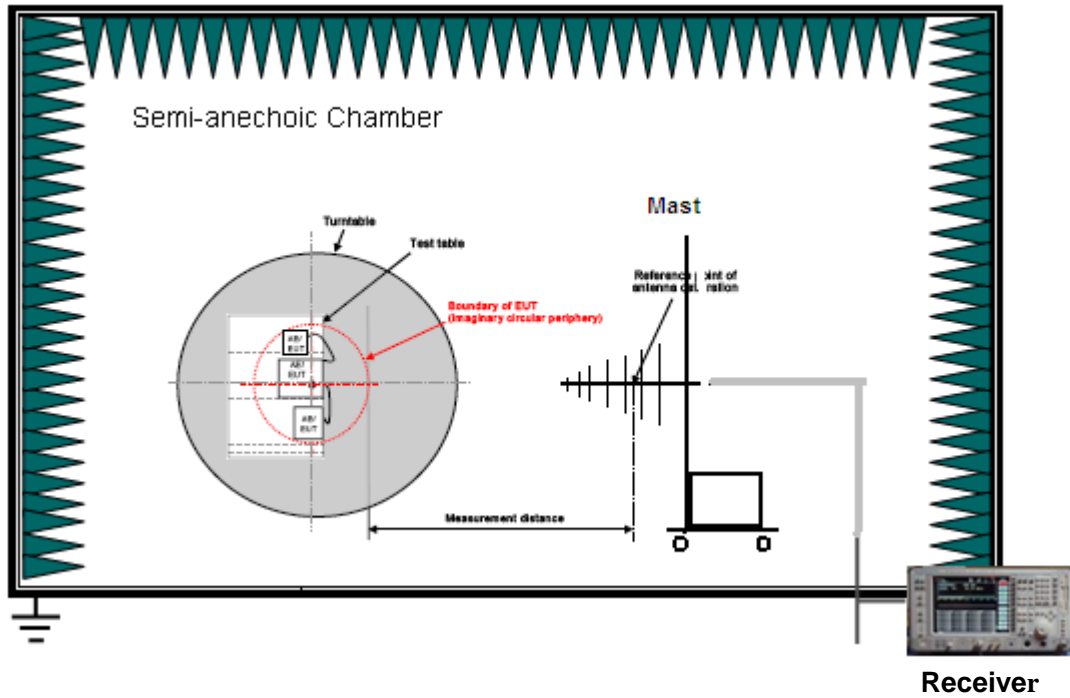
2. Additional provisions may be required for cases where interference occurs.

7.2. TEST PROCEDURE

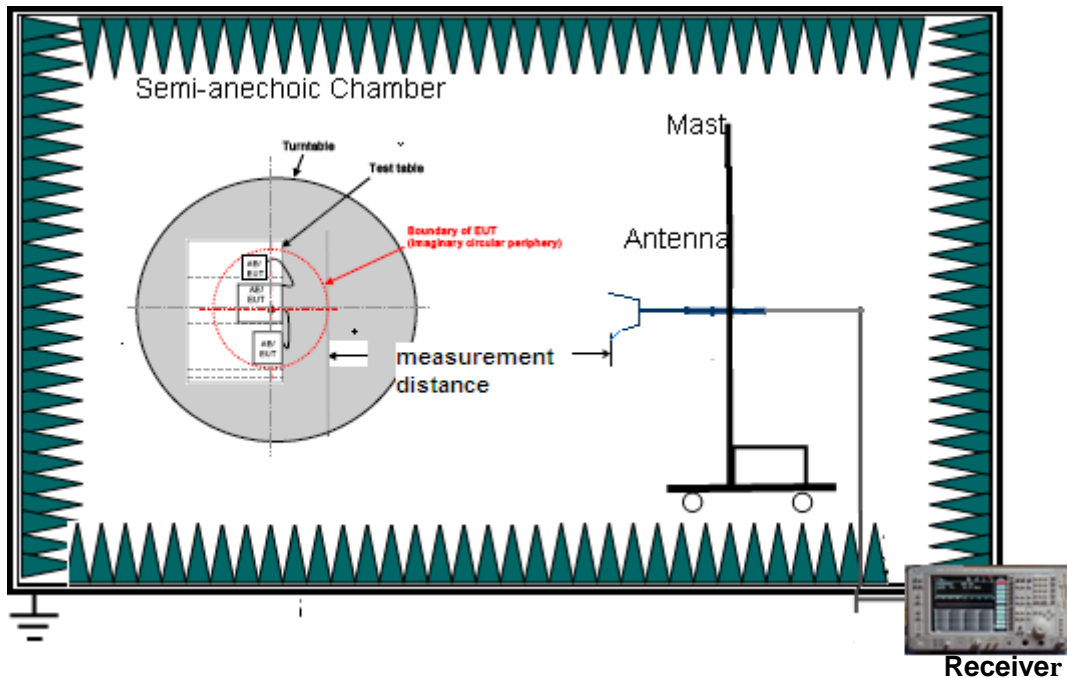
- (1). The EUT was placed on the top of an insulating table 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- (2). The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on 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.

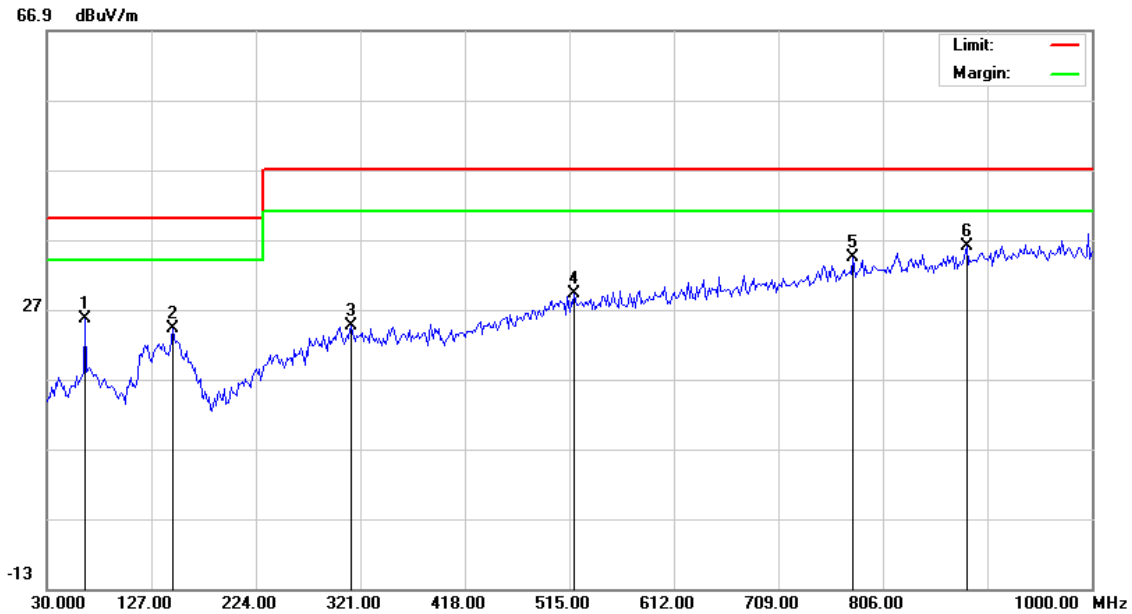
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7.4. TEST RESULT

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

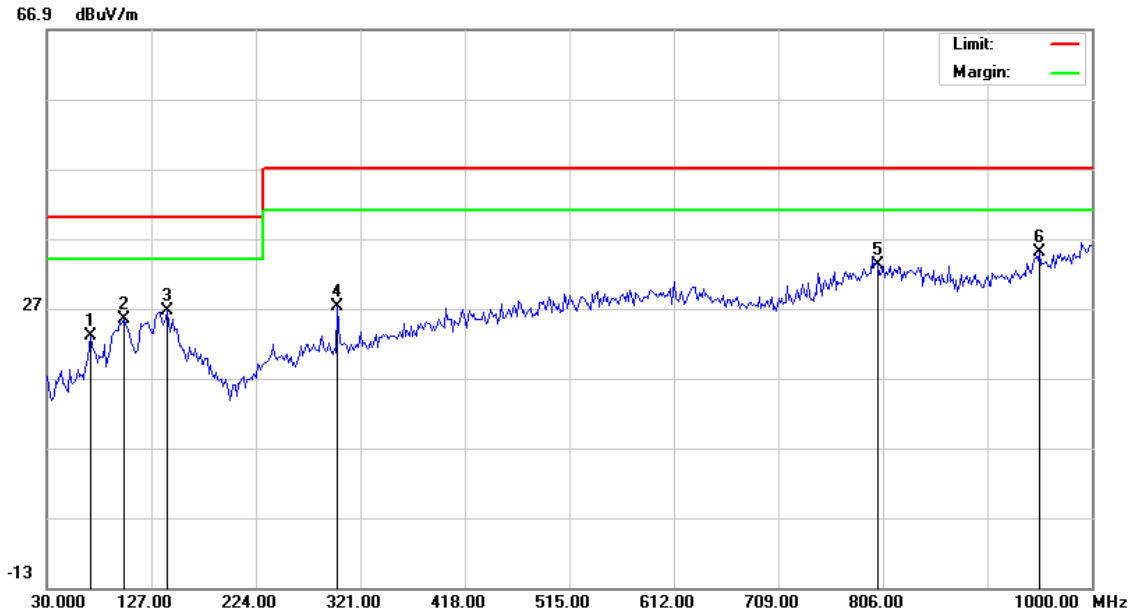


| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 65.5667 | 9.00 | 16.56 | 25.56 | 40.00 | -14.44 | peak |
| 2 | | 146.4000 | 8.38 | 15.82 | 24.20 | 40.00 | -15.80 | peak |
| 3 | | 312.9166 | 3.13 | 21.41 | 24.54 | 47.00 | -22.46 | peak |
| 4 | | 519.8500 | 3.85 | 25.38 | 29.23 | 47.00 | -17.77 | peak |
| 5 | | 778.5167 | 4.57 | 29.92 | 34.49 | 47.00 | -12.51 | peak |
| 6 | * | 883.6000 | 4.53 | 31.49 | 36.02 | 47.00 | -10.98 | peak |

RESULT: PASS

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RADIATED EMISSION BELOW 1GHz- VERTICAL

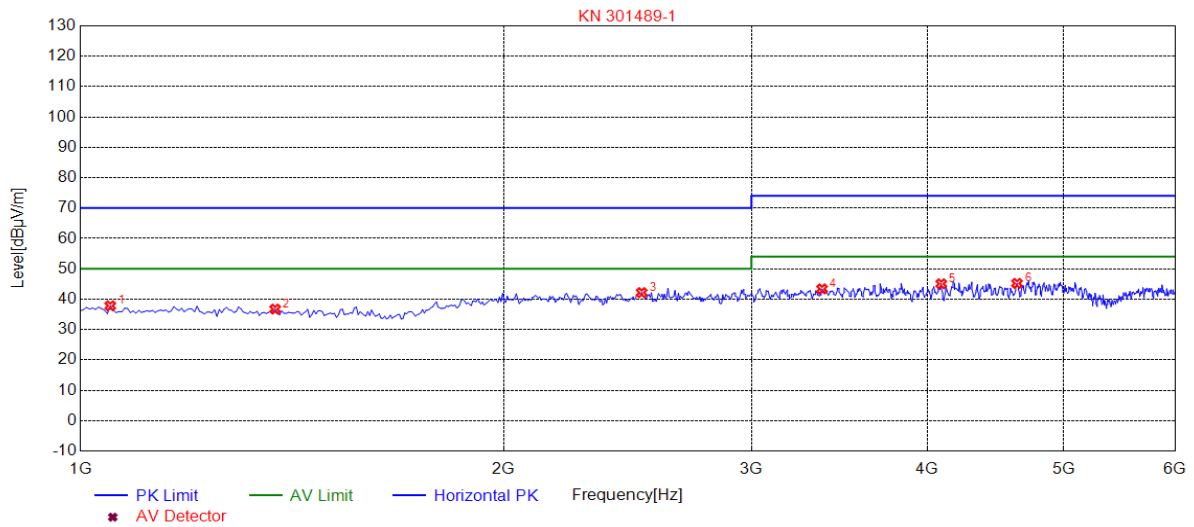


| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 70.4167 | 5.95 | 17.02 | 22.97 | 40.00 | -17.03 | peak |
| 2 | | 101.1333 | 9.34 | 16.12 | 25.46 | 40.00 | -14.54 | peak |
| 3 | | 141.5500 | 7.29 | 19.23 | 26.52 | 40.00 | -13.48 | peak |
| 4 | | 299.9833 | 7.68 | 19.47 | 27.15 | 47.00 | -19.85 | peak |
| 5 | | 801.1500 | 2.83 | 30.38 | 33.21 | 47.00 | -13.79 | peak |
| 6 | * | 951.5000 | 4.74 | 30.20 | 34.94 | 47.00 | -12.06 | peak |

RESULT: PASS

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RADIATED EMISSION ABOVE 1GHz – HORIZONTAL

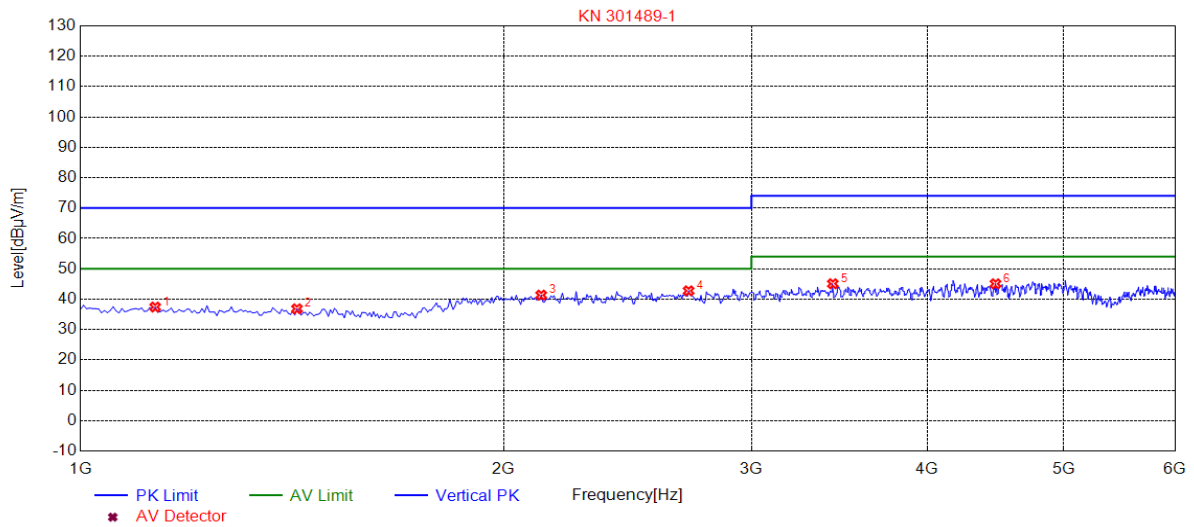


| NO. | Freq. [MHz] | Level [dBµV/m] | Factor [dB] | Limit [dBµV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| 1 | 1050.0501 | 37.82 | -16.69 | 70.00 | 32.18 | 100 | 180 | Horizontal |
| 2 | 1375.3754 | 36.73 | -17.01 | 70.00 | 33.27 | 100 | 250 | Horizontal |
| 3 | 2506.5065 | 42.16 | -9.71 | 70.00 | 27.84 | 100 | 290 | Horizontal |
| 4 | 3367.3674 | 43.38 | -8.06 | 74.00 | 30.62 | 100 | 230 | Horizontal |
| 5 | 4093.0931 | 45.07 | -6.26 | 74.00 | 28.93 | 100 | 260 | Horizontal |
| 6 | 4633.6336 | 45.20 | -5.07 | 74.00 | 28.80 | 100 | 150 | Horizontal |

RESULT: PASS

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RADIATED EMISSION ABOVE 1GHz - VERTICAL



| NO. | Freq. [MHz] | Level [dBµV/m] | Factor [dB] | Limit [dBµV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| 1 | 1130.1301 | 37.41 | -16.77 | 70.00 | 32.59 | 100 | 240 | Vertical |
| 2 | 1425.4254 | 36.83 | -17.06 | 70.00 | 33.17 | 100 | 300 | Vertical |
| 3 | 2126.1261 | 41.33 | -11.29 | 70.00 | 28.67 | 100 | 180 | Vertical |
| 4 | 2706.7067 | 42.75 | -9.56 | 70.00 | 27.25 | 100 | 330 | Vertical |
| 5 | 3427.4274 | 45.09 | -7.85 | 74.00 | 28.91 | 100 | 180 | Vertical |
| 6 | 4473.4735 | 45.06 | -5.27 | 74.00 | 28.94 | 100 | 20 | Vertical |

RESULT: PASS

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8. MAINS TERMINAL DISTURBANCE VOLTAGE MEASUREMENT

8.1. LIMITS OF MAINS TERMINAL DISTURBANCE VOLTAGE

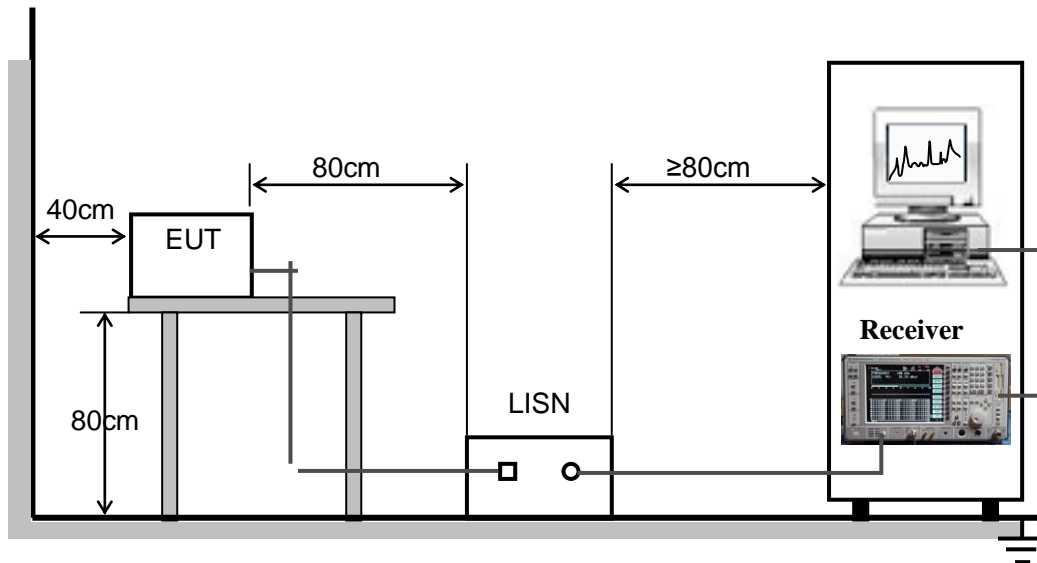
| Frequency range (MHz) | Limits (dBuV) Class B ITE | |
|-----------------------|---------------------------|----------|
| | Quasi-peak | Average |
| 0.15 - 0.50 | 66 to 56 | 56 to 46 |
| 0.50 - 5 | 56 | 46 |
| 5 - 30 | 60 | 50 |

- 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.

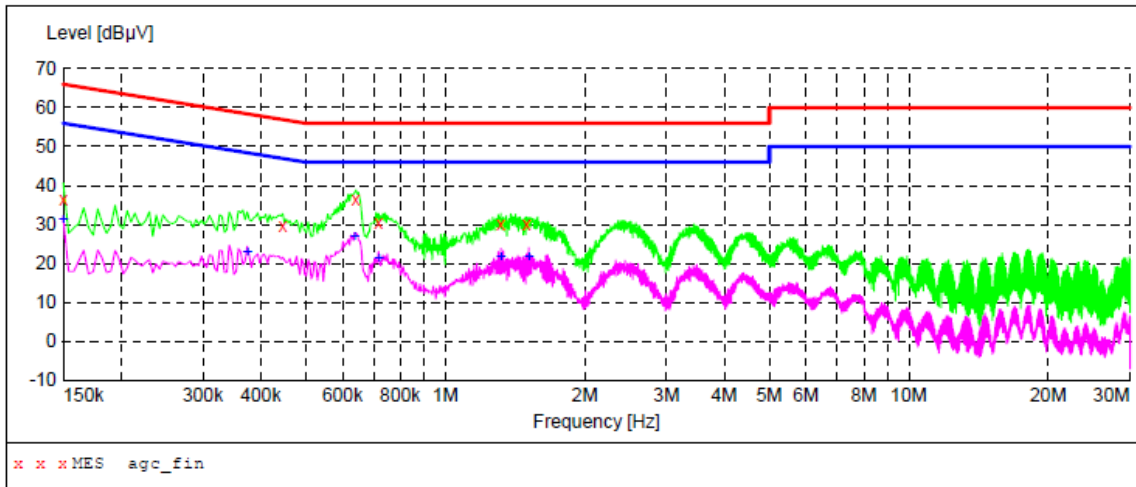
8.4. TEST RESULT

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:

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LINE CONDUCTED EMISSION TEST-L



MEASUREMENT RESULT: "agc_fin"

2020/9/5 0:41

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.150000 | 36.30 | 9.3 | 66 | 29.7 | QP | L1 | GND |
| 0.446000 | 29.50 | 9.3 | 57 | 27.4 | QP | L1 | GND |
| 0.642000 | 36.60 | 9.3 | 56 | 19.4 | QP | L1 | GND |
| 0.718000 | 30.50 | 9.3 | 56 | 25.5 | QP | L1 | GND |
| 1.318000 | 29.90 | 9.3 | 56 | 26.1 | QP | L1 | GND |
| 1.498000 | 29.90 | 9.3 | 56 | 26.1 | QP | L1 | GND |

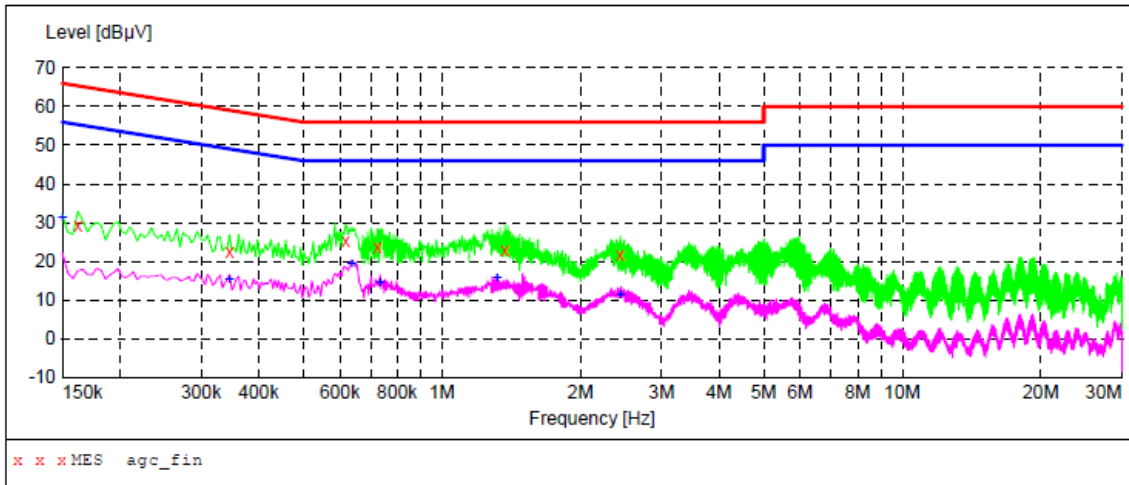
MEASUREMENT RESULT: "agc_fin2"

2020/9/5 0:41

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.150000 | 31.40 | 9.3 | 56 | 24.6 | AV | L1 | GND |
| 0.374000 | 22.80 | 9.3 | 48 | 25.6 | AV | L1 | GND |
| 0.638000 | 26.80 | 9.3 | 46 | 19.2 | AV | L1 | GND |
| 0.718000 | 21.30 | 9.3 | 46 | 24.7 | AV | L1 | GND |
| 1.318000 | 21.80 | 9.3 | 46 | 24.2 | AV | L1 | GND |
| 1.514000 | 21.80 | 9.3 | 46 | 24.2 | AV | L1 | GND |

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LINE CONDUCTED EMISSION TEST-N



MEASUREMENT RESULT: "agc_fin"

2020/9/5 0:45

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.162000 | 29.40 | 9.3 | 65 | 36.0 | QP | N | GND |
| 0.346000 | 22.60 | 9.3 | 59 | 36.5 | QP | N | GND |
| 0.618000 | 25.40 | 9.3 | 56 | 30.6 | QP | N | GND |
| 0.726000 | 23.80 | 9.3 | 56 | 32.2 | QP | N | GND |
| 1.370000 | 22.80 | 9.3 | 56 | 33.2 | QP | N | GND |
| 2.442000 | 21.60 | 9.4 | 56 | 34.4 | QP | N | GND |

MEASUREMENT RESULT: "agc_fin2"

2020/9/5 0:45

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.150000 | 31.30 | 9.3 | 56 | 24.7 | AV | N | GND |
| 0.346000 | 15.10 | 9.3 | 49 | 34.0 | AV | N | GND |
| 0.638000 | 19.30 | 9.3 | 46 | 26.7 | AV | N | GND |
| 0.734000 | 14.40 | 9.3 | 46 | 31.6 | AV | N | GND |
| 1.318000 | 15.50 | 9.3 | 46 | 30.5 | AV | N | GND |
| 2.442000 | 11.30 | 9.4 | 46 | 34.7 | AV | N | GND |

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9. HARMONIC CURRENT MEASUREMENT

9.1. LIMITS OF HARMONIC CURRENT

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

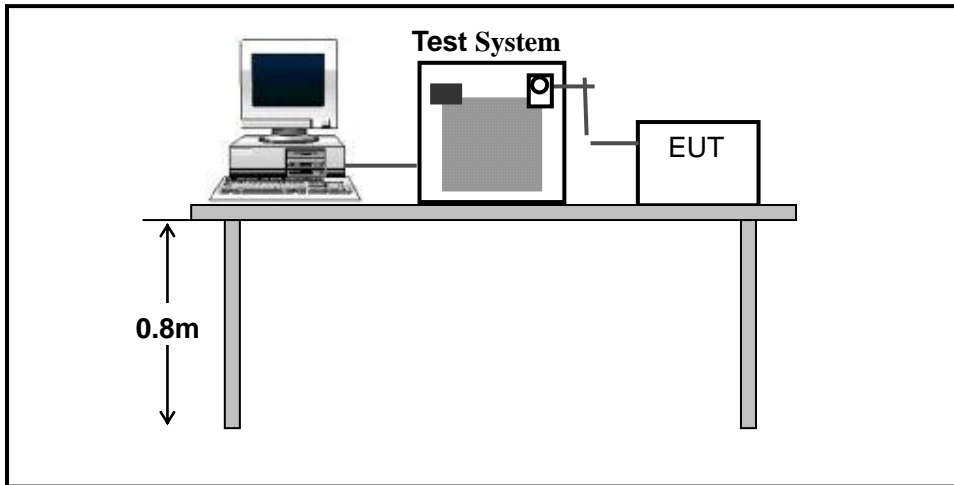
Note: 1. According to section 5 of EN61000-3-2: 2014, the EUT is Class A equipment.

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} | 0.5 | T_{dt} means maximum time that d_t exceeds 3.3% |
| $d_{max}(\%)$ | 4% | d_{max} means maximum relative voltage change. |
| $d_c(\%)$ | 3.3% | 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} | 0.160 | 1.0 | Pass |
| P_{lt} | 0.070 | 0.65 | Pass |
| $T_{dt(s)}$ | 0.0 | 0.5 | Pass |
| $d_{max}(\%)$ | 0.00% | 4% | Pass |
| $d_c(\%)$ | 0.00% | 3.3% | Pass |

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11. 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.

5. Performance Table

| EN 301 489-17 Performance criteria | | |
|--|--|---|
| Criteria | During Test | After Test (i.e. as a result of the application of the test) |
| A | Shall operate as intended. (see note). Shall be no loss of function. Shall be no unintentional transmissions. | Shall operate as intended. Shall be no degradation of performance. Shall be no loss of function. Shall be no loss of critical stored data. |
| B | May be loss of function. | Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no loss of critical stored data. |
| C | May be loss of function. | Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no loss of critical stored data. |
| Note: Operate as intended during the test allows a level of degradation in accordance with the Minimum performance level. | | |
| Minimum performance level | | |
| For equipment that supports a PER or FER, the minimum performance level shall be a PER or FER less than or equal to 10 %. | | |
| For equipment that does not support a PER or a FER, the minimum performance level shall be no loss of the wireless transmission function needed for the intended use of the equipment. | | |

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12. ELECTROSTATIC DISCHARGE IMMUNITY TEST

12.1 TEST SPECIFICATION

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

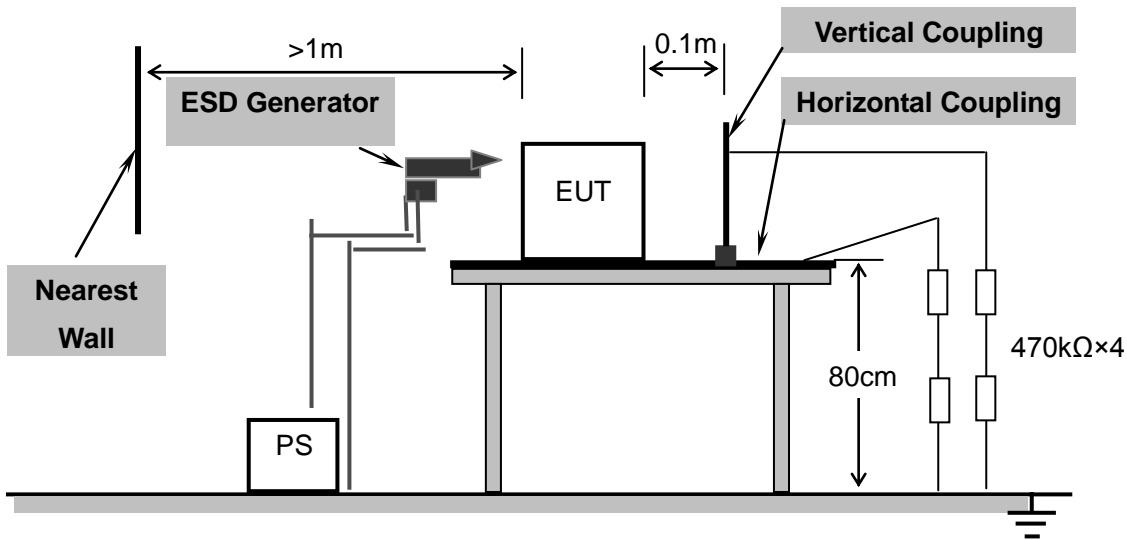
12.2 TEST PROCEDURE

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

- a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
- b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- c. The time interval between two successive single discharges was at least 1 second.
- d. 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.
- e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- f. 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.
- g. 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.
- h. 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 x 0.5m) was placed vertically to and 0.1 meters from the EUT.

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12.3 TEST SETUP



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

12.4 TEST RESULT

DESCRIPTION OF THE ELECTROSTATIC DISCHARGES (ESD)

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

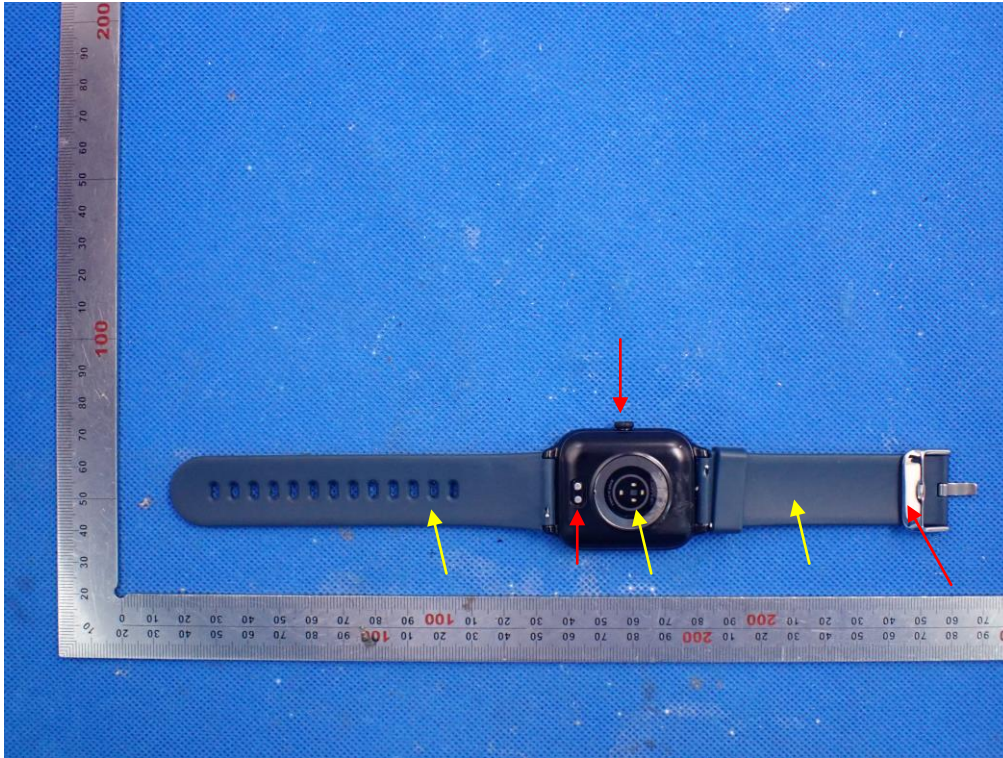
Note: operating mode include all modes of EMS in page 10.

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ESD location:

Yellow line: Air discharge

Red line: Contact discharge



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Attestation of Global Compliance(Shenzhen)Co., Ltd

Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd

Tel: +86-755 2523 4088 E-mail: agc@agccert.com Web: <http://www.agccert.com/>

12.5 PERFORMANCE

| | |
|--|--|
| <input checked="" type="checkbox"/> Criteria A: | 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"/> Criteria 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"/> Criteria C: | Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls. |

| | |
|---|--------------------------------------|
| <input checked="" type="checkbox"/> PASS | <input type="checkbox"/> FAIL |
|---|--------------------------------------|

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13. RADIATED, RADIO FREQUENCY ELECTROMAGNETIC FIELD IMMUNITY TEST

13.1. TEST SPECIFICATION

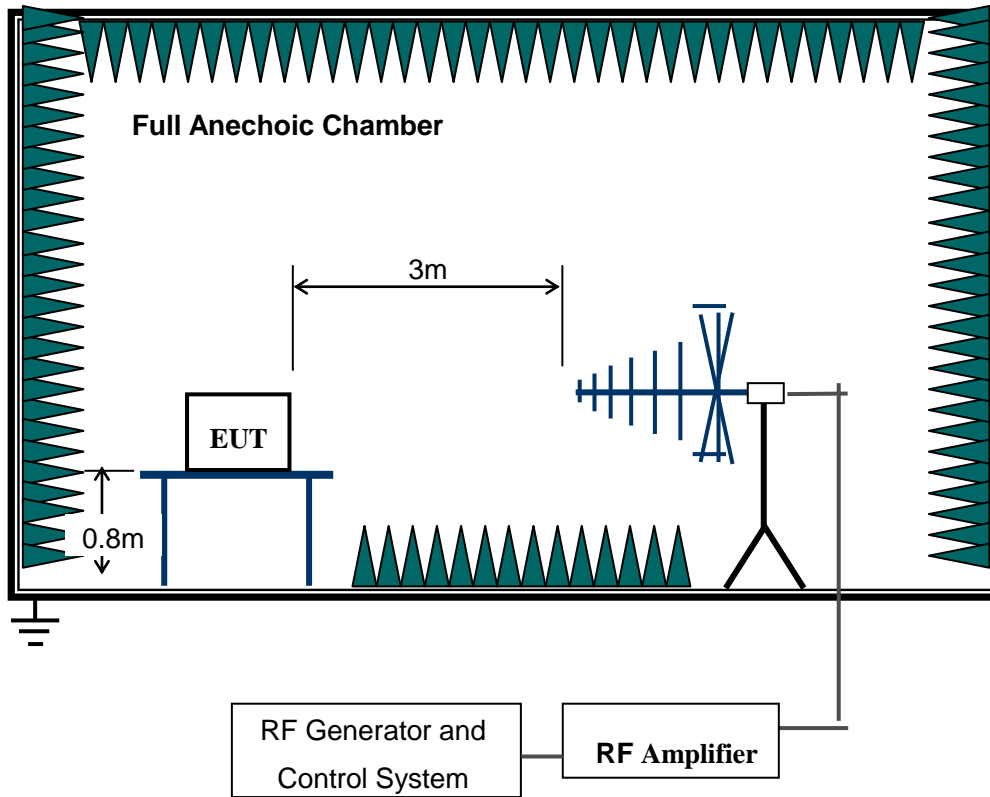
| | |
|----------------------------|-------------------------------------|
| Basic Standard | EN 61000-4-3 |
| Frequency Range | 80 MHz – 6000MHz |
| Field Strength | 3V/m |
| Modulation | 1 kHz sine wave, 80%, AM modulation |
| Frequency Step | 1% of fundamental |
| Polarity of Antenna | Horizontal 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.

- a. The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
- b. The test signal was 80% amplitude modulated with a 1 kHz sine wave.
- c. 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 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- d. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- e. The field strength level was 3V/m.
- f. 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.

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13.4. TEST RESULT

| 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 10.

13.5. PERFORMANCE

| | |
|--|--|
| <input checked="" type="checkbox"/> Criteria A: | 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"/> Criteria 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"/> Criteria C: | Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls. |

PASS

FAIL

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14. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

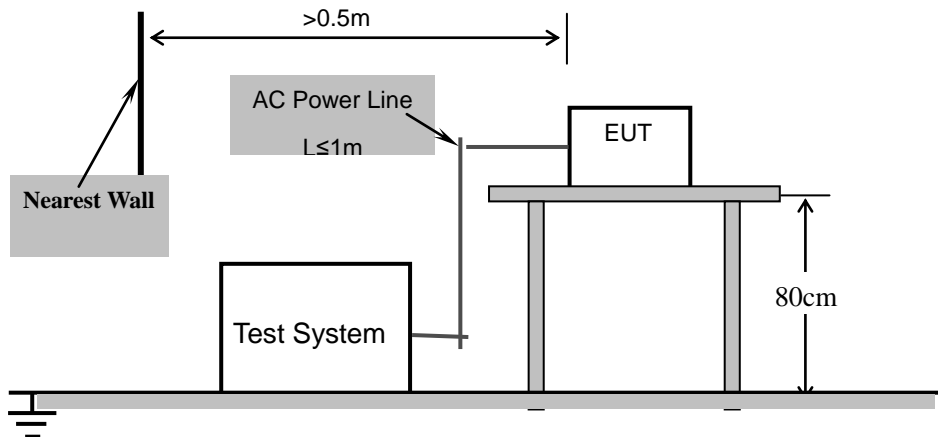
14.1. TEST SPECIFICATION

| | |
|---------------------------|------------------------|
| Basic Standard | EN 61000-4-4 |
| Test Voltage | a.c. power port – 1 kV |
| Polarity | Positive/Negative |
| Impulse Frequency | 5kHz |
| Impulse wave shape | 5/50ns |
| Burst Duration | 15ms |
| Burst Period | 300ms |
| Test Duration | 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 A: 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: operating mode include all modes of EMS in page 10.

14.5. PERFORMANCE

| | |
|--|--|
| <input checked="" type="checkbox"/> Criteria A: | 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"/> Criteria 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"/> Criteria C: | Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls. |

| | |
|---|--------------------------------------|
| <input checked="" type="checkbox"/> PASS | <input type="checkbox"/> FAIL |
|---|--------------------------------------|

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15. SURGE IMMUNITY TEST

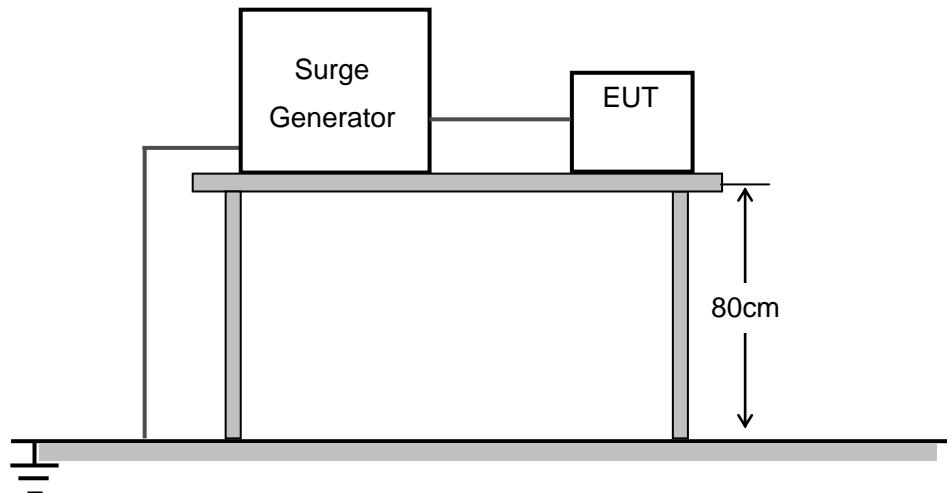
15.1. TEST SPECIFICATION

| | |
|------------------------|--|
| Basic Standard | EN 61000-4-5 |
| Waveform | Voltage 1.2/50 μ s; Current 8/20 μ s |
| Test Voltage | a.c. power port, line to line 1.0 kV |
| Polarity | Positive/Negative |
| Phase Angle | 0°, 90°, 180°, 270° |
| Repetition Rate | 60sec |
| Times | 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 A: 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: operating mode include all modes of EMS in page 10.

15.5. PERFORMANCE

| | |
|--|--|
| <input checked="" type="checkbox"/> Criteria A: | 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"/> Criteria 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"/> Criteria C: | Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls. |

PASS **FAIL**

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16. IMMUNITY TO CONDUCTED DISTURBANCES INDUCED BY RF FIELDS

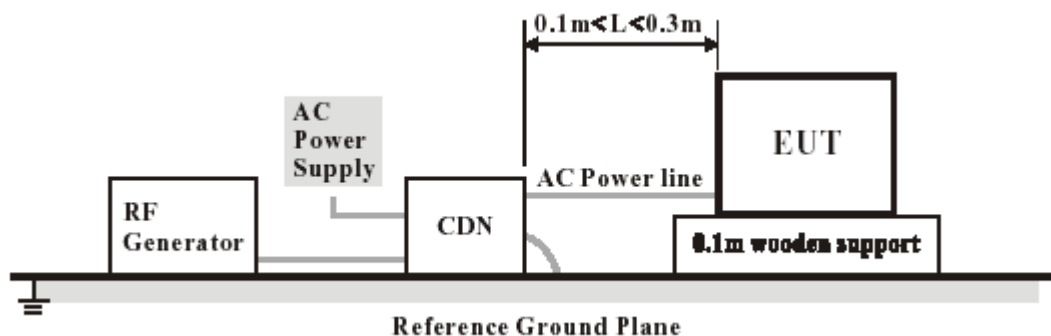
16.1. TEST SPECIFICATION

| | |
|------------------------|-------------------------|
| Basic Standard | EN 61000-4-6 |
| Frequency Range | 0.15 MHz – 80 MHz |
| Field Strength | 3Vrms |
| Modulation | 1 kHz Sine Wave, 80% AM |
| Frequency Step | 1% of fundamental |
| Coupled Cable | a.c. power line |
| Coupling Device | 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 1.5×10^{-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 A: Photographs of the Test Configuration.

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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: operating mode include all modes of EMS in page 10.

16.5. PERFORMANCE

| | |
|--|--|
| <input checked="" type="checkbox"/> Criteria A: | 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"/> Criteria 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"/> Criteria C: | Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls. |

PASS **FAIL**

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17. VOLTAGE DIPS AND SHORT INTERRUPTIONS IMMUNITY TEST

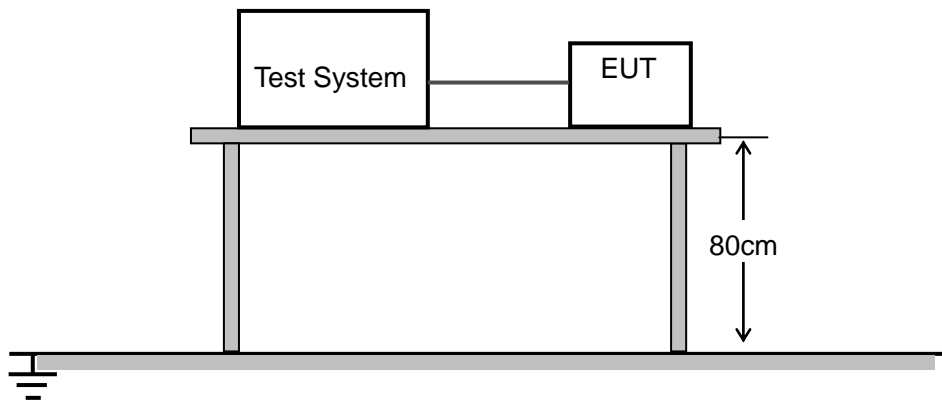
17.1. TEST SPECIFICATION

| | |
|------------------------------|--|
| Basic Standard | EN 61000-4-11 |
| Voltage Dips | 100% reduction, 0.5 Cycle 100% reduction, 1.0 Cycle 30% reduction, 25 Cycles |
| Voltage Interruptions | 100% reduction, 250 Cycles |
| Voltage Phase Angle | 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 A, 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: operating mode include all modes of EMS in page 10.

17.5. PERFORMANCE

| | |
|--|--|
| <input type="checkbox"/> Criteria A: | 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"/> Criteria 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. |
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PASS **FAIL**

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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----

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3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.
4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.
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8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.
9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

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