



Aerospace Testing Technology (Shenzhen) Co., Ltd.

101, Block A4, No. 5, 8th Road, Shapu Yangyong Industrial Park,
Songgang Street, Bao'an District, Shenzhen, Guangdong, China

EMC TEST REPORT

Report No : AST2208082011

Product Name : Smart TV box

Product Model : T95S2,T95Plus,T95AIR,T95mini,T95Max,
T95max+,T95SUPER,T95X4,T95X3,T95P
RO,T95PRO+,T9,T10,T10Max,T10Pro,T9
5S2,Leyf DUO,Blacksat DUO

Applied Standard : EN 55032 :2015/A11:2020
EN 55035:2017/A11:2020

Test Result : PASS

Issue Date : Aug. 08, 2022

| | |
|--|---|
| Product Name | : Smart TV box |
| Tested Model | : T95S2 |
| Attached Model | : T95Plus,T95AIR,T95mini,T95Max,T95max+,T95SUPER,T95X4,T95X3,T95PRO,T95 PRO+,T9,T10,T10 Max,T10 Pro,T95S2,Leyf DUO,Blacksat DUO |
| Trademark | : SUNSHINE TOP |
| Applicant | : Shenzhen bochuangyinuo technology co.,ltd |
| Address | : Room 208, Floor 2th,Jichuang innovation park, Fuyong street, Baoan district, shenzhen, P.R. China |
| Manufacturer | : Shenzhen bochuangyinuo technology co.,ltd |
| Address | : Room 208, Floor 2th,Jichuang innovation park, Fuyong street, Baoan district, shenzhen, P.R. China |
| Factory | : Shenzhen bochuangyinuo technology co.,ltd |
| Address | : Room 208, Floor 2th,Jichuang innovation park, Fuyong street, Baoan district, shenzhen, P.R. China |
| Test date | : Aug. 01, 2022 to Aug. 08, 2022 |
| <p>Remark: <i>This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Aerospace Testing Technology (Shenzhen) Co., Ltd.</i></p> | |

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Aug. 08, 2022

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1. Test Laboratory

| | |
|------------------|---|
| Test Site1 | |
| Name | : Aerospace Testing Technology (Shenzhen) Co., Ltd. |
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| Test Site2 | |
| Name | : Shenzhen Supersonic Measurement And Control Technology Co.,Ltd. |
| Address | : B2 Building 101, Jinweiyuan Industrial Plant Area, Augongshan District, Longtian Street Industrial Zone, Pingshan District, Shenzhen, Guangdong, China. |
| Phone | : + 086 0755-84636042 |
| E-mail | : ranguangfu@supersonic-mc.com |
| Test Site3 | |
| Name | : Shenzhen Academy of Metrology & Quality Inspection |
| Address | : No.4 Tongfa Road Xili Street Nanshan District, Shenzhen, Guangdong, China. |
| Phone | : +86 0755-26001833 |
| E-mail | : qiubo@smq.com.cn |
| Test Report Form | : ASTCX-31-JL03-EN55032&EN55035 EMC Test Report Version:1.0 |
| TRF Originator | : Aerospace Testing Technology (Shenzhen) Co., Ltd. |
| Master TRF | : Aug. 1, 2021 |

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2. Summary of test result

| Test Items | Test site | Result |
|--|-----------|--------|
| <u>Radiated Emissions (RE) 30MHz-1000MHz</u> <input checked="" type="checkbox"/> Enclosure Port | Site 1 | Pass |
| <u>Radiated Emissions (RE)1000MHz-6000MHz</u> <input type="checkbox"/> Enclosure Port | Site 1 | N/A |
| <u>Conducted Emission (CE)</u> <input type="checkbox"/> Mains port <input type="checkbox"/> Auxiliary ports <input type="checkbox"/> Wired network ports <input type="checkbox"/> Mains port of motor operated tools | Site 1 | N/A |
| <u>Electrostatic Discharge (ESD)</u> <input type="checkbox"/> Enclosure Port | Site 2 | N/A |
| <u>RF Electromagnetic Field (RS)</u> <input type="checkbox"/> Enclosure Port | Site 2 | N/A |
| <u>Power frequency magnetic fields (PMF)</u> <input type="checkbox"/> Enclosure Port | Site 2 | N/A |
| <u>Fast Transients Common mode (EFT)</u> <input type="checkbox"/> AC Power ports <input type="checkbox"/> DC Power ports <input type="checkbox"/> Signal and control lines | Site 2 | N/A |
| <u>RF Common mode (CS)</u> <input type="checkbox"/> AC Power ports <input type="checkbox"/> DC Power ports <input type="checkbox"/> Signal and control lines | Site 2 | N/A |
| <u>Surges</u> <input type="checkbox"/> AC Power ports | Site 2 | N/A |
| <u>Voltage Dips and Interruptions (AC DIP)</u> <input type="checkbox"/> AC Power ports | Site 2 | N/A |

Note:

- test case does not apply to the test object.....: N/A
- test object does meet the requirement.....: Pass
- test object does not meet the requirement: Fail

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3. Equipment Under Test information

| | | |
|------------------------------|---|---|
| Rating Voltage | : | Input:12V $\overline{\text{---}}$ 2A Output: 3.3V $\overline{\text{---}}$ 3A |
| Rating Current | : | / |
| Test Voltage | : | 12Vdc |
| The difference of the models | : | / |

Table 3-1 Test Mode List

| Test Mode | Describe |
|-----------|----------------|
| TM1 | Normal Working |
| / | / |
| / | / |



Figure 1-1 Test configuration

Table 3-2 Associated Equipment used during test

| Name | Model | Manufacturer | S/N | Cal Due Date |
|---------------------|-------|--------------|-----|--------------|
| Mainframe computers | / | Lab provided | / | / |

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4. Test Condition

4.1 Environmental conditions

- Temperature : 23°C
- Relative humidity: 60%

4.2 Measurement uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Table 4-1 measurement uncertainty

| Test Site | Measurement Frequency Range | U (dB) |
|-----------|-----------------------------|--------|
| SR843-1 | 150 kHz ~ 30MHz | 3.2 |
| SAC966-1 | 30MHz ~ 1000MHz | 3.4 |
| | 1000MHz ~ 6000MHz | 3.2 |

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5. Electromagnetic Interference (EMI)

5.1 Radiated Disturbance 30MHz to 1000MHz

5.1.1 Test procedure

The EUT was configured as described in section 1 for this test. The enclosure port was tested.

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 and CISPR 16-1-4. The test distance was 3m for 30~1GHz.

The set-up and test methods were according to CISPR 16-2-3.

A preliminary scan and a final scan of the emissions were made from 30MHz to 1GHz by using test script of software; the emissions were measured using Quasi-Peak Detector. The maximal emission value was acquired by adjusting the antenna height, polarization and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1m to 4m, the azimuth range of turntable was 0° to 360°, The receive antenna has two polarizations V and H.

5.1.2 Test method

- a) According as the EUT information, Configured the ports and powered the EUT with the normal voltage.
- b) The EUT was placed on the top of a table 0.8 meters above the ground at 3-meter SAC as figure 5-2 or 0.12m above the ground at 3-meter SAC as figure 5-3.
- c) The measuring distance of at 3m shall be used for measurements at frequency up to 1GHz.
- d) The polarizations of the antenna were set to horizontal.
- e) The height of the test antenna was 1m.
- f) The turn table was rotating from 0° to 360° and the test receiver pre-scan.
- g) Change the height of the test antenna from 1m to 4m, then repeated f) and recorded and save the maximum value.
- h) Select six points have little margin from limit and finally reading.
- i) Recording the maximum value, and the deg. and the height of the test antenna.
- j) Change the polarizations to vertical and repeated the e) to i).

5.1.3 Test setup

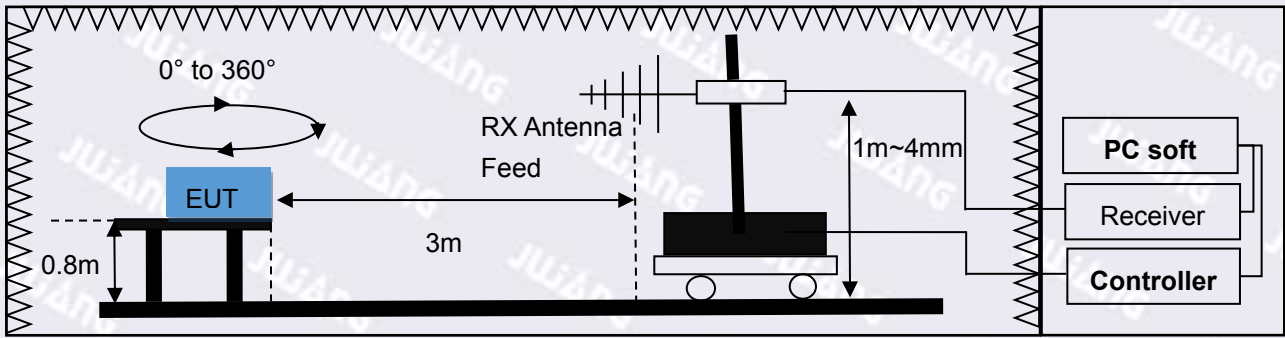


Figure 5-1 Test set-up of radiated disturbance(30MHz-1GHz)

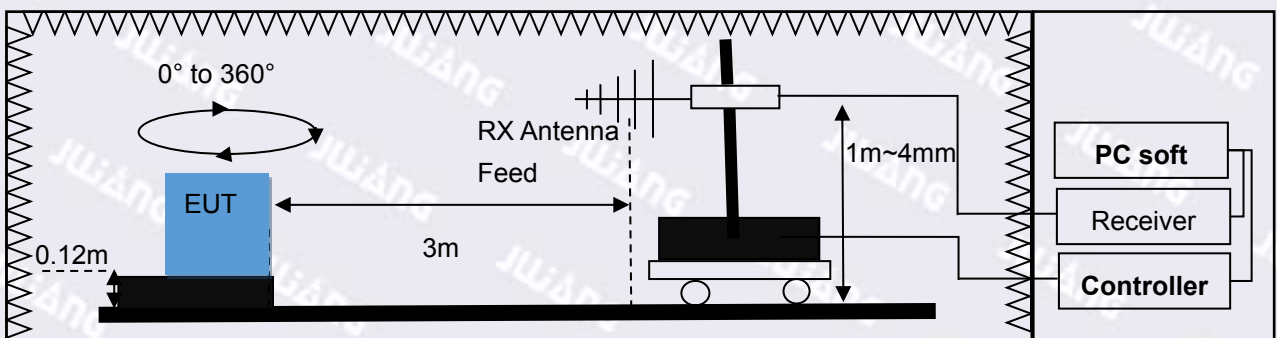


Figure 5-2 Test set-up of radiated disturbance(30MHz-1GHz)

5.1.4 Test limits

Table 5-1 RE test limits 30MHz to 1000MHz

| Frequency (MHz) | Class A Quasi-peak dB μ V/m | Class B Quasi-peak dB μ V/m |
|-----------------|---------------------------------|---------------------------------|
| 30 to 230 | 50 | 40 |
| 230 to 1000 | 57 | 47 |

Note 1: Test distance is 3m.
 Note 2: The lower limit shall apply at the transition frequency.

Table 5-2 RE test limits from FM receivers

| Frequency (MHz) | Fundamental Quasi-peak dB μ V/m | Harmonics Quasi-peak dB μ V/m |
|-----------------|-------------------------------------|-----------------------------------|
| 30 to 230 | 60 | 52 |
| 230 to 300 | | 52 |
| 300 to 1000 | | 56 |

Note 1: Test distance is 3m.
 Note 2: The lower limit shall apply at the transition frequency.

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5.1.5 Test results

The EUT has met requirements for Radiated disturbance. The test data as follow:

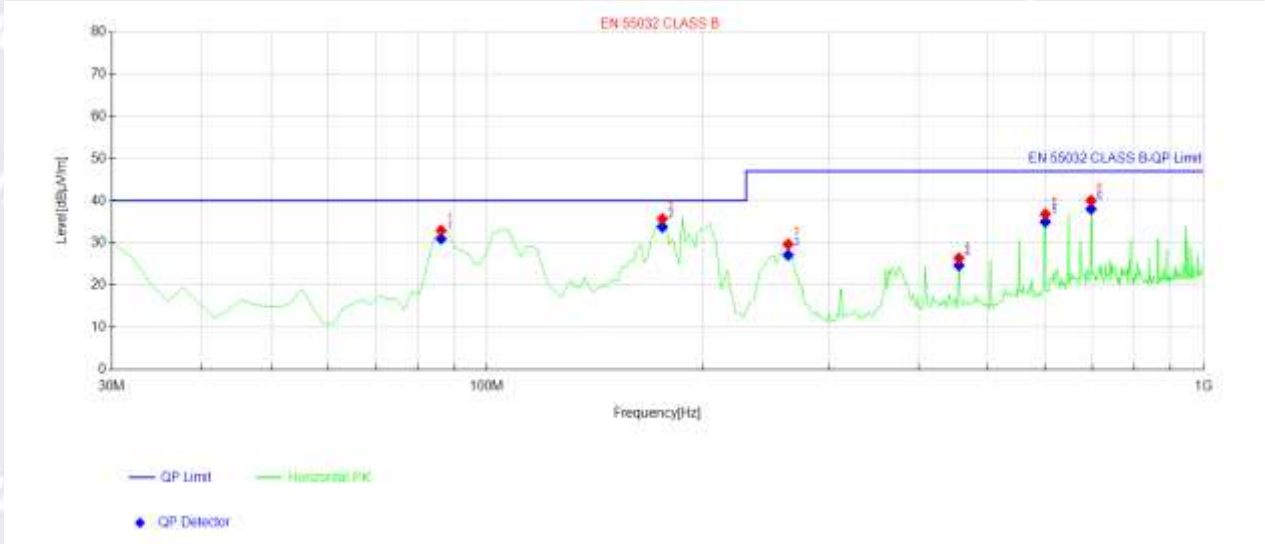
Remark:

Level= Reading Level + Factor,

Factor= Cable Loss +Antenna Factor – Amplifier,

(The Level is recorded by software which is not shown in the sheet).

Margin=Limit – Level.



| Final Test Data | | | | | | | | |
|-----------------|-------------|-------------------|-------------------|----------------|-------------|-----------|------------|--------|
| NO. | Freq. [MHz] | QP Value [dBµV/m] | QP Limit [dBµV/m] | QP Margin [dB] | Height [cm] | Angle [°] | Polarity | Result |
| 1 | 86.3727 | 30.98 | 40.00 | 9.02 | 300 | 129 | Horizontal | PASS |
| 2 | 175.7916 | 33.78 | 40.00 | 6.22 | 300 | 349 | Horizontal | PASS |
| 3 | 263.2665 | 27.12 | 47.00 | 19.88 | 100 | 83 | Horizontal | PASS |
| 4 | 455.7114 | 24.67 | 47.00 | 22.33 | 300 | 64 | Horizontal | PASS |
| 5 | 601.503 | 34.99 | 47.00 | 12.01 | 100 | 336 | Horizontal | PASS |
| 6 | 696.7535 | 38.08 | 47.00 | 8.95 | 100 | 17 | Horizontal | PASS |

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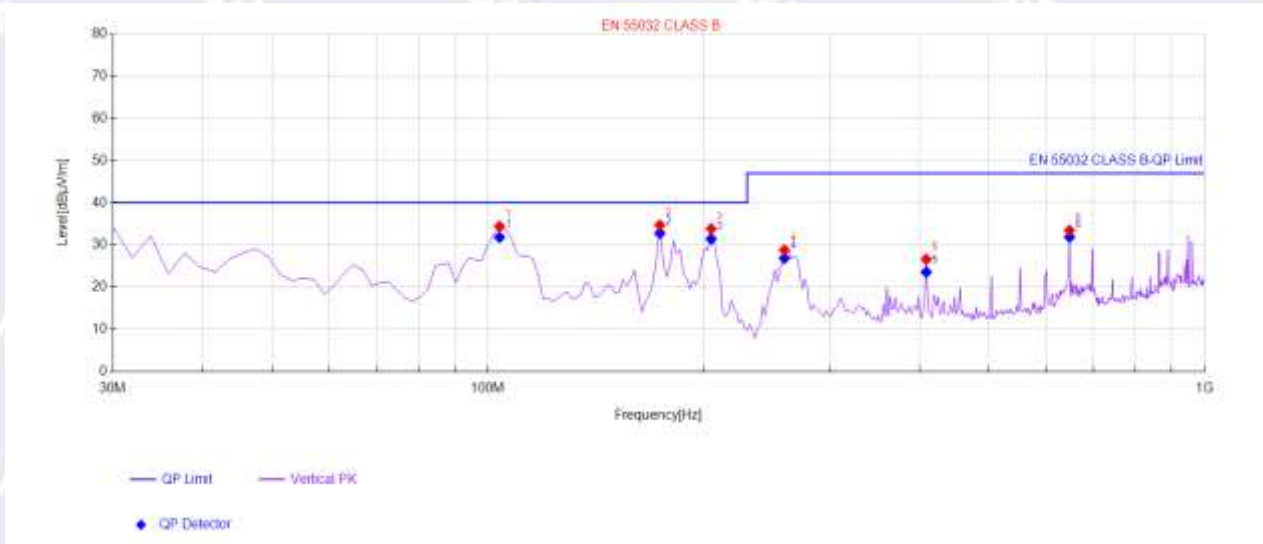
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| Final Test Data | | | | | | | | |
|-----------------|-------------|-------------------|-------------------|----------------|-------------|-----------|----------|--------|
| NO. | Freq. [MHz] | QP Value [dBµV/m] | QP Limit [dBµV/m] | QP Margin [dB] | Height [cm] | Angle [°] | Polarity | Result |
| 1 | 103.8677 | 31.83 | 40.00 | 8.17 | 100 | 176 | Vertical | PASS |
| 2 | 173.8477 | 32.78 | 40.00 | 7.22 | 100 | 200 | Vertical | PASS |
| 3 | 204.9499 | 31.44 | 40.00 | 8.56 | 100 | 162 | Vertical | PASS |
| 4 | 259.3788 | 26.85 | 47.00 | 20.15 | 100 | 124 | Vertical | PASS |
| 5 | 409.0881 | 23.57 | 47.00 | 23.43 | 100 | 176 | Vertical | PASS |
| 6 | 648.1563 | 31.86 | 47.00 | 15.14 | 100 | 172 | Vertical | PASS |

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5.2 Radiated Disturbance 1000MHz to 6000MHz

5.2.1 Test procedure

The EUT was configured as described in section 1 for this test. The enclosure port was tested.

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 and CISPR 16-1-4. The test distance was 3m for 1000MHz~6000MHz.

The set-up and test methods were according to CISPR 16-2-3.

A preliminary scan and a final scan of the emissions were made from 1000MHz to 6000MHz by using test script of software; the emissions were measured using Quasi-Peak Detector. The maximal emission value was acquired by adjusting the antenna height, polarization and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1m to 4m, the azimuth range of turntable was 0° to 360°, The receive antenna has two polarizations V and H.

5.2.2 Test method

- a) According as the EUT information, Configured the ports and powered the EUT with the normal voltage.
- b) The EUT was placed on the top of a table 0.8 meters above the ground at 3-meter SAC as figure 5-4 or 0.12m above the ground at 3-meter SAC as figure 5-5.
- c) The measuring distance of at 3m shall be used for measurements at frequency 1000MHz-6000MHz.
- d) The polarizations of the antenna were set to horizontal.
- e) The height of the test antenna was 1m.
- f) The turn table was rotating from 0° to 360° and the test receiver pre-scan.
- g) Change the height of the test antenna from 1m to 4m, then repeated f) and recorded and save the maximum value.
- h) Select six points have little margin from limit and finally reading.
- i) Recording the maximum value, and the deg. and the height of the test antenna.
- j) Change the polarizations to vertical and repeated the e) to i).

5.2.3 Test setup

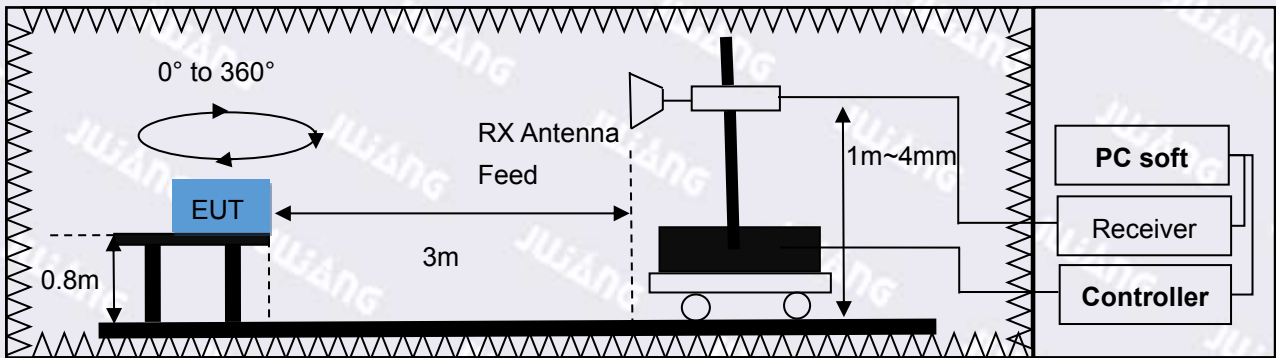


Figure 5-3 Test set-up of radiated disturbance(1000MHz-6000MHz)

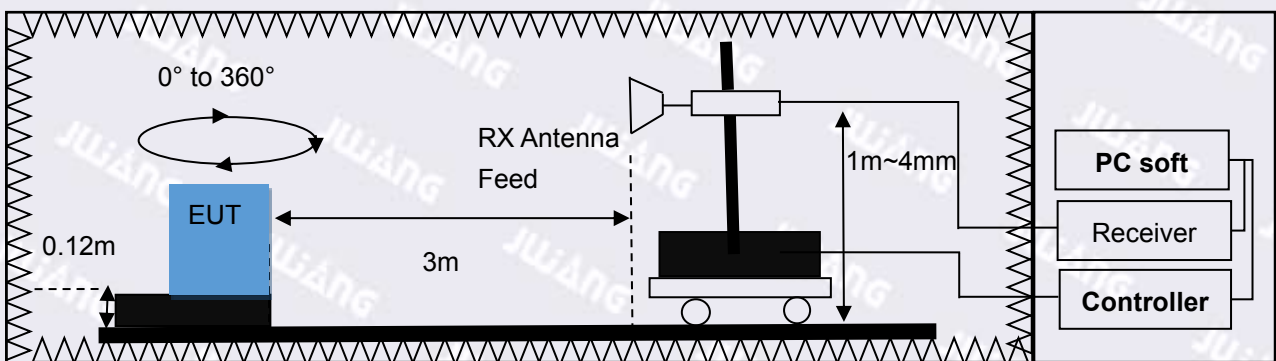


Figure 5-4 Test set-up of radiated disturbance(1000MHz-6000MHz)

5.2.4 Test limits

Table 5-3 RE test limits 1000MHz to 6000MHz

| Frequency (MHz) | Class A | | Class B | |
|-----------------|-------------|----------------|-------------|----------------|
| | Peak dBμV/m | Average dBμV/m | Peak dBμV/m | Average dBμV/m |
| 1000 to 6000 | 80 | 60 | 74 | 54 |

Note 1: Test distance is 3m.
 Note 2: The lower limit shall apply at the transition frequency.

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5.2.5 Test results

The EUT has met requirements for Radiated disturbance. The test data as follow:

Remark:

Level= Reading Level + Factor,

Factor= Cable Loss +Antenna Factor – Amplifier,

(The Level is recorded by software which is not shown in the sheet).

Margin=Limit – Level.

N/A

5.3 Conducted Disturbance 150 kHz to 30MHz

5.3.1 Test procedure

The EUT was configured as described in section 1 for this test. The mains cable of the EUT being measured shall be connected to LISN, The LISN shall be placed 0.8m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

All telecommunication and signal ports must be correctly terminated using either appropriate associated equipment or a representative termination during the measurement of the conducted disturbances at the mains.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1m.

The set-up and test methods were according to CISPR 16-2-3.

5.3.2 Test setup

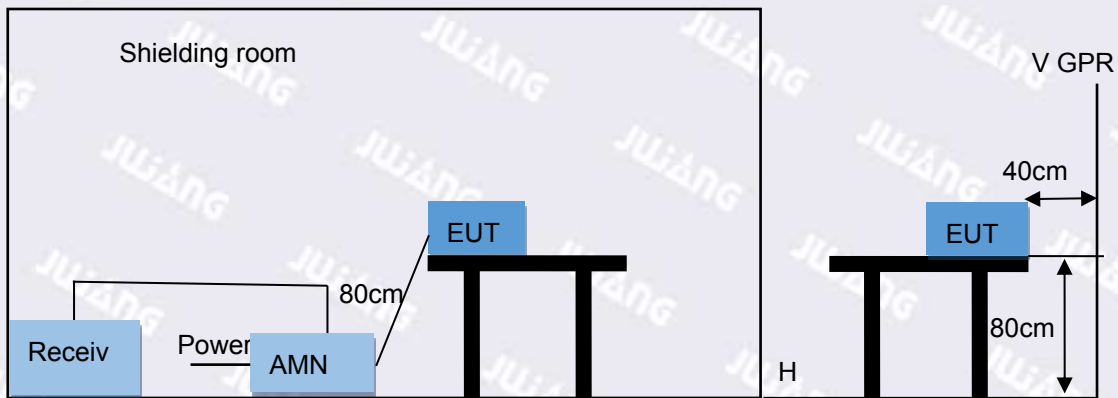


Figure 5-5 Test set-up of conducted disturbance for power port

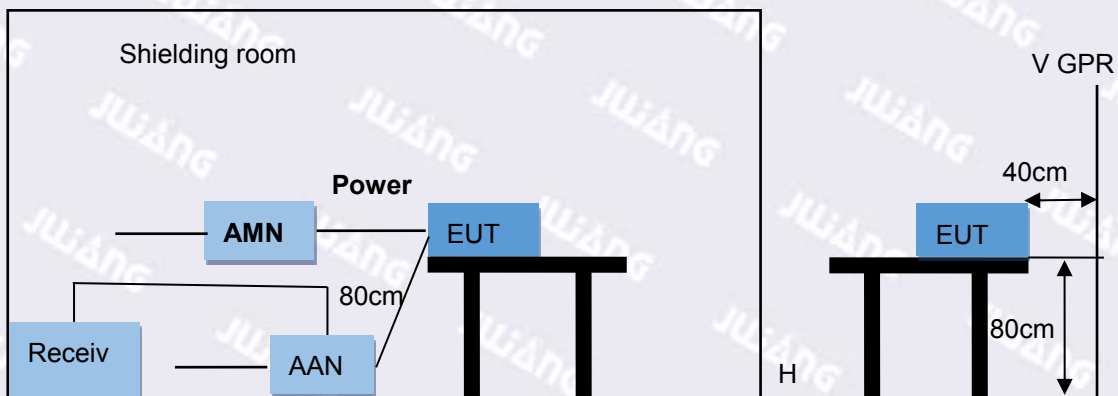


Figure 5-6 Test set-up of conducted disturbance for wired network ports

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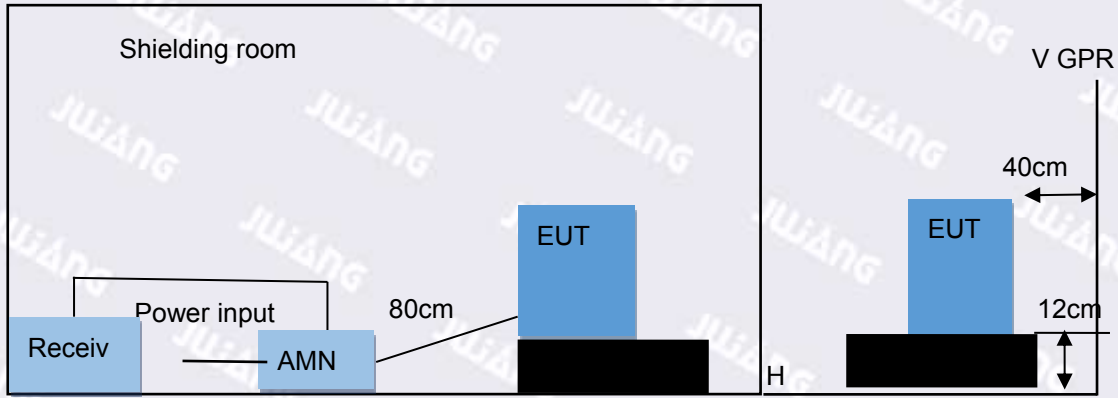


Figure 5-7 Test set-up of conducted disturbance for power port

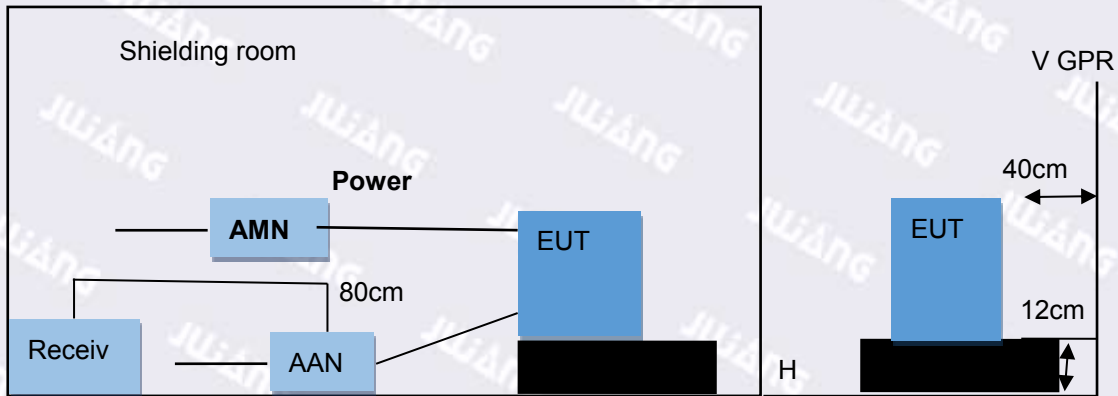


Figure 5-8 Test set-up of conducted disturbance for wired network ports

5.3.3 Test limits

Table 5-4 Test Limit of AC mains port

| Frequency range | Class A | | Class B | |
|-----------------|-----------------------|--------------------|-----------------------|--------------------|
| | Quasi Peak dB μ V | Average dB μ V | Quasi Peak dB μ V | Average dB μ V |
| 0.15MHz~0.5MHz | 79 | 66 | 66 to 56 | 56 to 46 |
| 0.5MHz~5MHz | 73 | 60 | 56 | 46 |
| 5MHz~30MHz | 73 | 60 | 60 | 50 |

Table 5-5 Test Limit for asymmetric mode

| Frequency range | Class A | | Class B | |
|-----------------|-----------------------|--------------------|-----------------------|--------------------|
| | Quasi Peak dB μ V | Average dB μ V | Quasi Peak dB μ V | Average dB μ V |
| 0.15MHz~0.5MHz | 97 to 87 | 84 to 74 | 84 to 74 | 74 to 64 |
| 0.5MHz~30MHz | 87 | 74 | 74 | 64 |

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5.3.4 Test results

Remark:

Level= Reading Level + Correction Factor

Factor= Cable Loss + Factor

(The Reading Level is recorded by software which is not shown in the sheet)

Margin=Limit – Level.

N/A

6. Electromagnetic Susceptibility (EMS)

6.1 Performance criteria

Performance criterion A:

The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion B:

During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test. After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion C:

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

6.2 Immunity to Electrostatic Discharge

6.2.1 Test procedure

The EUT was configured as described in section 1 for this test. The set-up and test methods were according to IEC 61000-4-2. Twenty discharges (10 with positive and 10 with negative polarity) were be applied on each accessible metallic part of the enclosure (terminals were excluded). Air discharges were used where contact discharges cannot be applied. Discharges were applied on the horizontal or vertical coupling planes.

6.2.2 Test setup

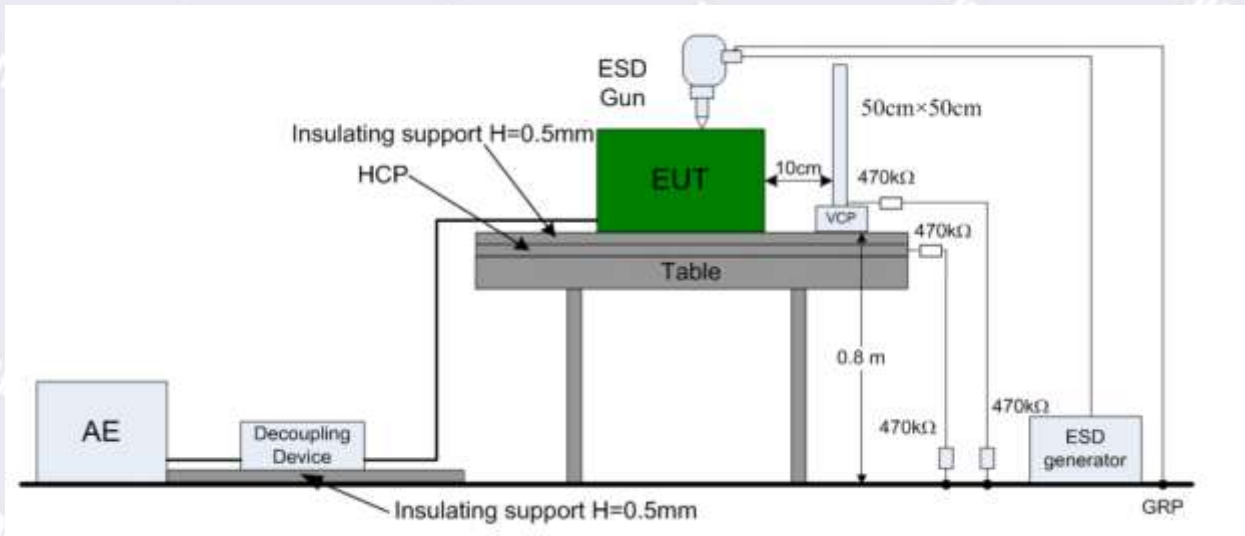


Figure 6-1 Test set-up of electrostatic discharge

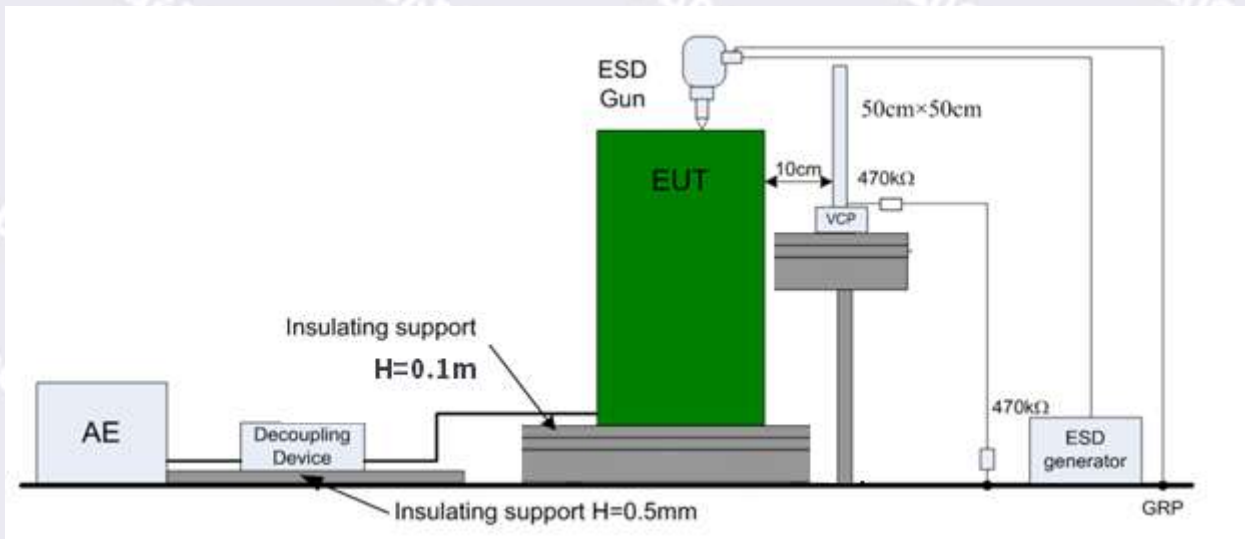


Figure 6-2 Test set-up of electrostatic discharge

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6.2.3 Test levels

Table 6-1 Electrostatic discharges levels

| Characteristics | Test levels | Performance Criterion |
|-------------------|-------------|-----------------------|
| Contact discharge | ±4kV | B |
| Air discharge | ±8kV | B |

6.2.4 Test results

Details of the points tested were presented in below:

| Test Results | | | | | | |
|---|--------------------------------|----------|------------------------------------|----------|-----------|------------|
| Test Points | Specification Level | | | | Criterion | Conclusion |
| | ±2kV, ±4 kV Contact Discharges | | ±2 kV, ±4 kV, ±8 kV Air Discharges | | | |
| | Positive | Negative | Positive | Negative | | |
| Indirect Contact | | | | | | |
| Indirect Contact, HCP (left, right, front, rear) | √ | √ | N/A | N/A | B | Pass |
| Indirect Contact, VCP (left, right, front, rear) | √ | √ | N/A | N/A | B | Pass |
| Direct Contact/ Air Contact | | | | | | |
| Housing | √ | √ | √ | √ | B | Pass |
| Gaps | N/A | N/A | √ | √ | B | Pass |
| Buttons | √ | √ | N/A | N/A | B | Pass |
| Note: <input checked="" type="checkbox"/> The EUT's performance was paired at this test point when the ESD pulse was applied. | | | | | | |

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6.3 Immunity to Radiated Electric Fields 80MHz to 1000MHz

6.3.1 Test procedure

The EUT was configured as described in section 1 for this test. The set-up and test methods were according to IEC 61000-4-3. All sides of the EUT (front, rear, left and right) were tested by antenna with vertical and horizontal polarization.

6.3.2 Test setup

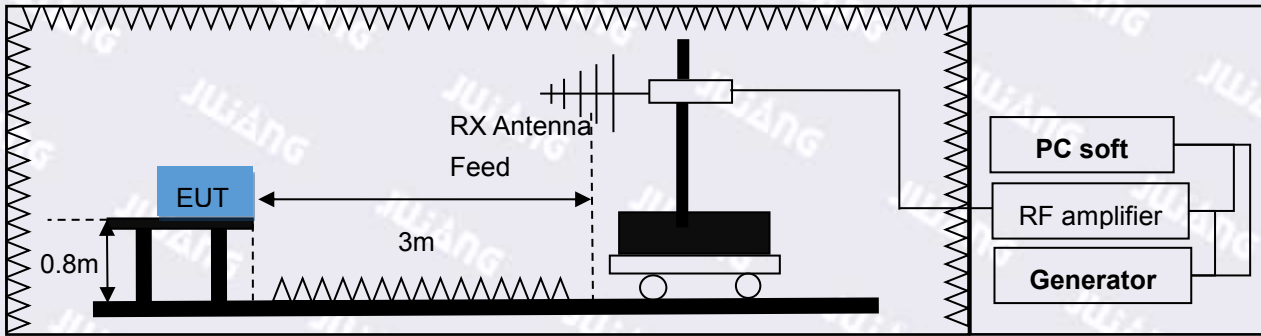


Figure 6-3 Test set-up of Immunity to Radiated Electric Fields (80MHz-1000MHz)

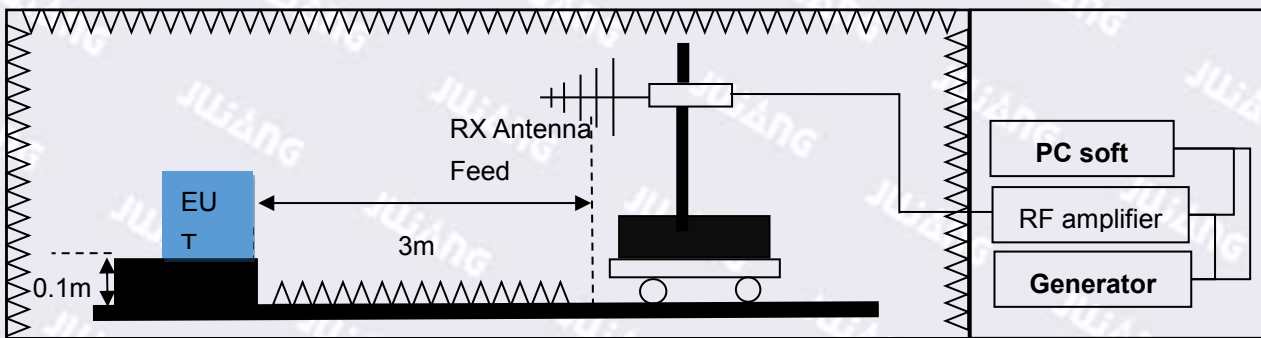


Figure 6-4 Test set-up of Immunity to Radiated Electric Fields (80MHz-1000MHz)

6.3.3 Test levels

Table 6-2 Radiated Electric Fields levels

| Characteristics | Test levels | Performance Criterion |
|-----------------|--------------------------|-----------------------|
| Frequency range | 80MHz to 1000MHz | A |
| Test level | 3V/m (unmodulated) | |
| Modulation | 1 kHz, 80% AM, sine wave | |

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6.3.4 Test results

| Test Results | |
|------------------|--------------------------|
| Test side of EUT | Front, Rear, Left, Right |
| Criterion | A |
| Frequency range | 80MHz –1000MHz |
| Test Level | 3 V/m(Unmodulated, rms.) |
| Modulation | 80% AM, 1kHz |
| Conclusion | Pass |

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6.4 Immunity of Power frequency magnetic fields

6.4.1 Test procedure

The EUT was configured as described in section 1 for this test. The set-up and test methods were according to IEC 61000-4-8 and need only to be applied to equipment containing components susceptible to magnetic fields, such as Hall elements or magnetic field sensors. In case of mains-operated devices, the test frequency shall be locked to the mains frequency. All sides of the EUT (front, rear, left and right) were tested by antenna with vertical and horizontal polarization.

6.4.2 Test setup

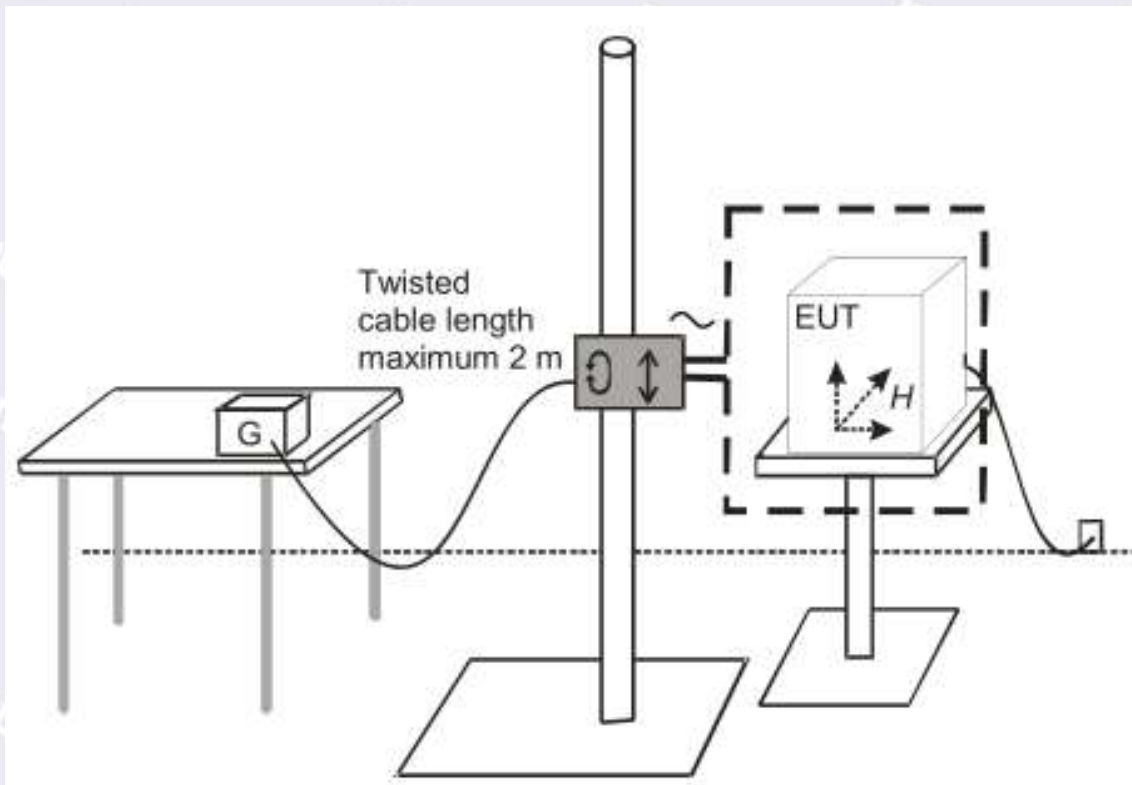


Figure 6-5 Test set-up of Immunity of Power frequency magnetic fields

6.4.3 Test levels

Table 5-3 Power frequency magnetic fields levels

| Characteristics | Test levels |
|-----------------------|-------------------------|
| Field Frequency | 50Hz/60Hz |
| Antenna Polarization | vertical and horizontal |
| Performance Criterion | A |
| Test level | 1A/m |

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6.4.4 Test results

| Test Results of Radiated Electric Fields | |
|--|--------------------------|
| Test side of EUT | Front, Rear, Left, Right |
| Antenna Polarization | vertical and horizontal |
| Criterion | A |
| Field Frequency | 50Hz/60Hz |
| Test level | 3A/m |
| Conclusion | Pass |

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6.5 Immunity to Electrical Fast Transient Bursts

6.5.1 Test procedure

The EUT was configured as described in section 1 for this test. A series of Fast Transient Bursts meeting the specification were applied for a period of 120 seconds. The Transient Bursts were applied for both Positive and Negative Burst Trains to Power Port. The set-up and test methods were according to IEC 61000-4-4.

6.5.2 Test setup

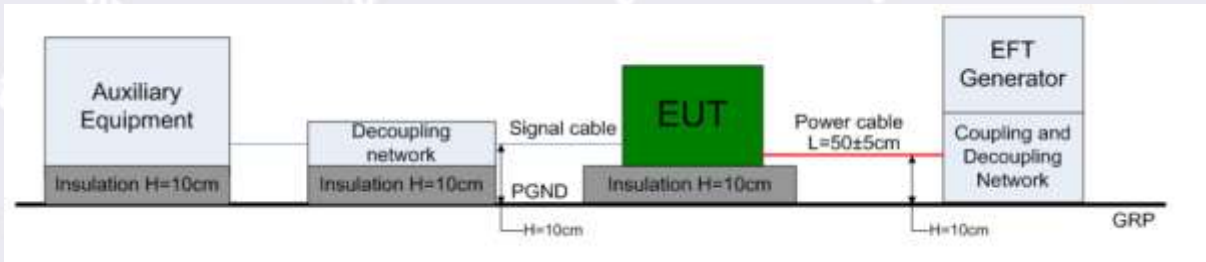


Figure 6-6 Test set-up of immunity to electrical fast transient bursts

6.5.3 Test levels

Table 6-4 Fast transients test levels for AC power ports

| Characteristics | Test levels |
|-----------------------|-------------|
| Test Level | ±1kV (peak) |
| Rise time/hold time | 5/50 ns |
| Repetition frequency | 5kHz |
| Performance Criterion | B |

Table 6-5 Fast transients test levels for DC power ports

| Characteristics | Test levels |
|-----------------------|---------------|
| Test Level | ±0.5kV (peak) |
| Rise time/hold time | 5/50 ns |
| Repetition frequency | 5kHz |
| Performance Criterion | B |

Table 6-6 Fast transients test levels for signal and control lines

| Characteristics | Test levels |
|-----------------------|---------------|
| Test Level | ±0.5kV (peak) |
| Rise time/hold time | 5/50 ns |
| Repetition frequency | 5kHz |
| Performance Criterion | B |

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6.5.4 Test results

| Test Results of Electrical Fast Transient Bursts | | | | |
|--|---|------------------|-----------|------------|
| Ports | Measuring condition Couple mode | Description | Criterion | Conclusion |
| AC Power Port | L-Ref G, N-Ref G, L+N-Ref G Level: $\pm 1.0\text{kV}$, Tr/ Th: 5/50ns, 5kHz Test Duration: 120 seconds | No fail detected | B | Pass |
| DC Power Port | (DC+) - Ref G, (DC-) - Ref G, (DC+) + (DC-) - Ref G Level: $\pm 0.5\text{kV}$, Tr/ Th: 5/50ns, 5kHz Test Duration: 120 seconds | N/A | B | N/A |
| Signal and control lines | Lines-Ref G Level: $\pm 0.5\text{kV}$, Tr/ Th: 5/50ns, 5kHz Test Duration: 120 seconds | N/A | B | N/A |

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6.6 Immunity to Continuous Conducted Interference 0.15MHz to 80MHz

6.6.1 Test procedure

The EUT was configured as described in section 1 for this test. The applied level was Amplitude Modulated by a 1 kHz sinusoidal signal to a modulation depth of 80%. The set-up and test methods were according to IEC 61000-4-6.

6.6.2 Test setup

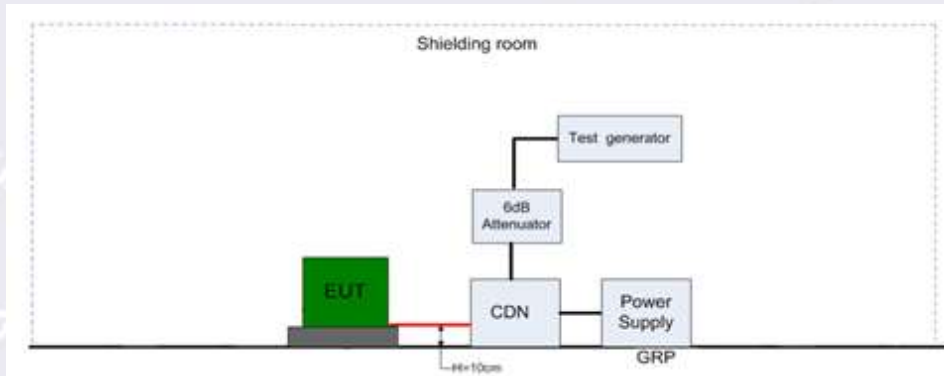


Figure 6-7 Test set-up of immunity to continuous conducted interference

6.6.3 Test levels

Table 6-7 Continuous Conducted Interference

| Characteristics | Test levels |
|-----------------------|-------------------------|
| Frequency range | 0.15MHz to 80MHz |
| Test levels | 3V r.m.s. (unmodulated) |
| Modulation | 1kHz, 80% AM, sine wave |
| Source impedance | 150Ω |
| Performance Criterion | A |

6.6.4 Test results

| Test Results of Continuous Conducted Interference | | | | | |
|---|---|---------------|---------------------|-----------|------------|
| Ports | Measuring condition | Inject method | Description | Criterion | Conclusion |
| AC Power Port | Frequency range: 0.15 MHz to 80 MHz Induced voltage :3 V (r.m.s.) | CDN M3 | No fail detected | A | Pass |
| DC Power Port | Frequency range: 0.15 MHz to 80 MHz Induced voltage :3 V (r.m.s.) | CDN M2 | N/A | A | N/A |

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| | | | | | |
|--------------------------|---|----------|-----|---|-----|
| Signal and control lines | Frequency range: 0.15 MHz to 80 MHz Induced voltage :3 V (r.m.s.) | EM Clamp | N/A | A | N/A |
|--------------------------|---|----------|-----|---|-----|

6.7 Immunity to Surges

6.7.1 Test procedure

The EUT was configured as described in section 1 for this test. A series of High Energy Surges were applied to Power Port. The set-up and test methods were according to IEC 61000-4-5.

6.7.2 Test setup

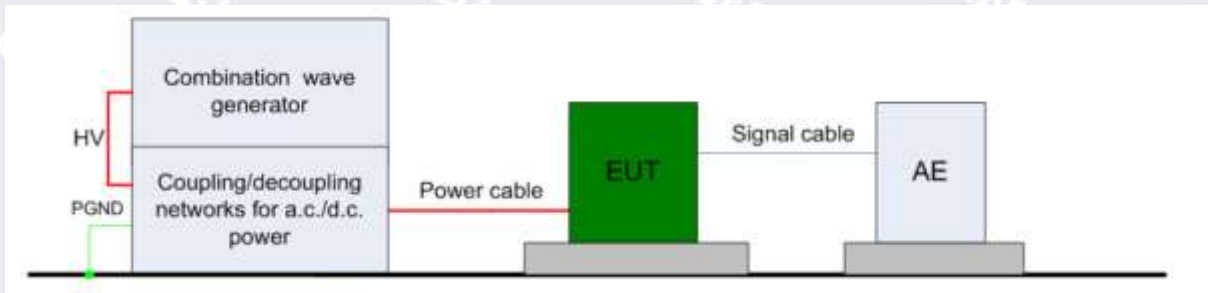


Figure 6-8 Test set-up of immunity to surge

6.7.3 Test levels

Table 6-8 Surge test levels for AC power ports

| Test line | Test levels | Wave shape | Performance Criterion |
|----------------|-------------|------------|-----------------------|
| Line to Line | ±1kV | 1.2/50us | B |
| Line to ground | ±2kV | 1.2/50us | B |

6.7.4 Test results

| Test Results of Surges | | | | |
|------------------------|---|------------------|-----------|------------|
| Ports | Measuring condition | Description | Criterion | Conclusion |
| AC Power Port | Line to Line: L-N Level:±1.0kV, Tr/Th:1.2/50µs Interval: 60 seconds Phase: Sync | No fail detected | B | Pass |
| | Line to ground: L- Ref G,N- Ref G, L+N-Ref G Level:±2.0kV, Tr/Th:1.2/50µs Interval: 60 seconds Phase: Sync | No fail detected | B | Pass |

6.8 Immunity to Voltage Dips and Short Interruption of AC Power Port

6.8.1 Test procedure

The EUT was configured as described in section 1 for this test. The set-up and test methods were according to IEC 61000-4-11. Changes to the voltage level shall occur at a zero crossing point in the AC voltage waveform.

6.8.2 Test setup

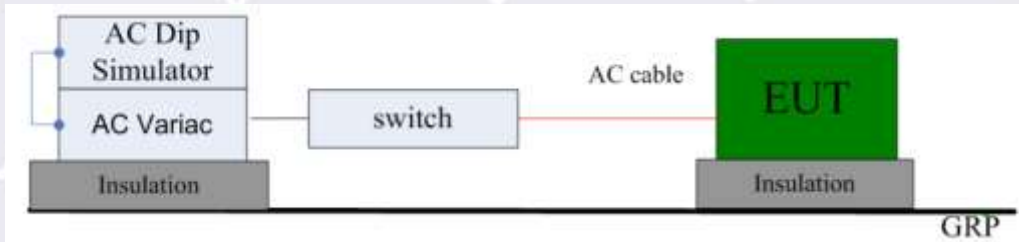


Figure 6-9 test set-up of Voltage Dips and Short Interruption of AC Power Port

6.8.3 Test levels

Table 6-9 Voltage dips

| Ports | Test levels | Number of periods | Performance Criterion |
|---------------|-------------|-------------------|-----------------------|
| AC Power Port | 0% | 0.5 | B |
| | 70% | 25/30 | C |
| | 0% | 250/300 | C |

6.8.4 Test results

In the case where the equipment is fitted with or connected to a battery back-up, the performance criteria for transient phenomena shall apply.

In the case where the equipment is powered solely from the AC mains supply (without the use of a parallel battery back-up) volatile user data may have been lost and if applicable the communication link need not to be maintained and lost functions should be recoverable by user or operator; no unintentional responses shall occur at the end of the test.

| Test Results of Voltage Dips and Short Interruption | | | | |
|---|--|-----------------------|------------------|------------|
| Ports | Measuring condition | Performance Criterion | Description | Conclusion |
| AC Power Port | Voltage dip: 0 % residual voltage for 0.5 cycles | B | No fail detected | Pass |
| | Voltage dip: 70 % residual voltage for 25/30 cycles | C | No fail detected | Pass |
| | Voltage dip: 0 % residual voltage for 250/300 cycles | C | No fail detected | Pass |

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7. Measurement Instruments

Table 7-1 RE instruments

| Item | Kind of Equipment | Manufacturer | Type No. | Calibrated until |
|------|---------------------|--------------|------------|------------------|
| 1 | EMI Test Receiver | R&S | ESU8 | Aug. 24, 2022 |
| 2 | Bilog Antenna | SCHWARZBECK | VULB 9163 | Aug. 24, 2022 |
| 3 | Horn Antenna | SCHWARZBECK | BBHA9120D | Aug. 24, 2022 |
| 4 | Amplifier | Tonscend | TAP-9E6343 | Aug. 24, 2022 |
| 5 | Amplifier | Tonscend | TAP-081841 | Aug. 24, 2022 |
| 6 | Triple-Loop Antenna | Daze | ZN30401 | Aug. 24, 2022 |

Table 7-2 CE instruments

| Item | Kind of Equipment | Manufacturer | Type No. | Calibrated until |
|------|-------------------|--------------|-------------|------------------|
| 1 | EMI Test Receiver | R&S | ESRP3 | Aug. 24, 2022 |
| 2 | LISN | Schwarzbeck | NNLK 8121 | Aug. 24, 2022 |
| 3 | Amplitude limiter | Schwarzbeck | VTSD 9561 F | Aug. 24, 2022 |

Table 7-3 ESD instruments

| Item | Kind of Equipment | Manufacturer | Type No. | Calibrated until |
|------|--------------------|--------------|----------|------------------|
| 1 | ESD TEST GENERATOR | 3Ctest | EDS 30V | Aug. 24, 2022 |

Table 7-4 RS instruments

| Item | Kind of Equipment | Manufacturer | Type No. | Calibrated until |
|------|-------------------|--------------|------------------|------------------|
| 1 | Signal Generator | Keysight | N5181A | Aug. 24, 2022 |
| 2 | Power Amplifier | Mic-top | MPA-80-1000-1000 | Aug. 24, 2022 |
| 3 | Power meter | Keysight | E4419A | Aug. 24, 2022 |
| 3 | Power probe | Keysight | E9304A | Aug. 24, 2022 |
| 4 | Power Amplifier | AR | 25S1G4A | Aug. 24, 2022 |
| 5 | Antenna | Schwarzbeck | STLP9149 | Aug. 24, 2022 |

Table 7-5 EFT, AC-DIP and SURGE instruments

| Item | Kind of Equipment | Manufacturer | Type No. | Calibrated until |
|------|-------------------|--------------|----------|------------------|
| 1 | Immunity test | 3CTest | CCS 600 | Aug. 24, 2022 |

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| | | | | |
|---|-------------------|--------|-----------|---------------|
| 2 | Coupling clamp | 3CTest | CCC100 | Aug. 24, 2022 |
| 3 | CDN | 3CTest | SEPN3832T | Aug. 24, 2022 |
| 4 | Voltage regulator | 3CTest | VVT2216 | Aug. 24, 2022 |

8. Photos of the EUT



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Figure 8-1 EUT

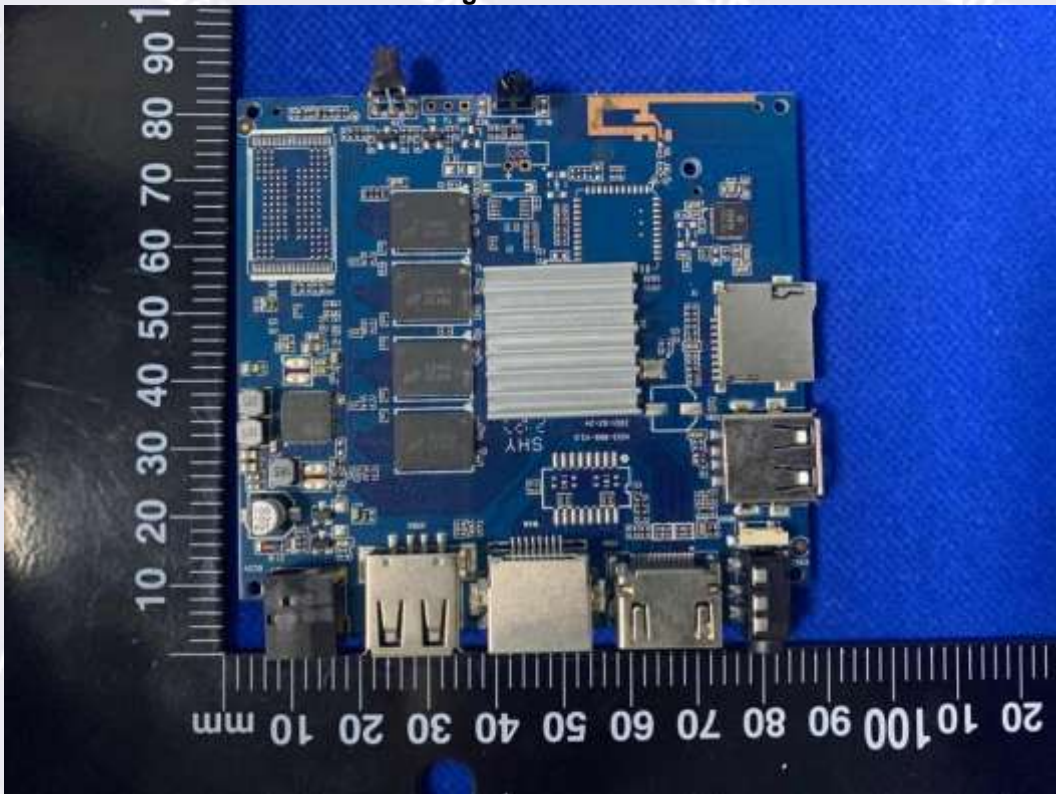


Figure 8-2 EUT

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9. Photos of test setup



Figure 9-1 RE test setup

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The End of Report
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