

EMC TEST REPORT

Reference No.: SZQLAB-20230824004E

Product: Video Processor

Model No.: See Model List

Applicant: Shanghai ONBON Technology Inc

Address: Floor 7, Tower 88, 1199#, North Qinzhou Road,Xuhui District,shanghai,China

Issued by: Suzhou SZQ Testing Co., Ltd.

Lab location: Building 1, Yuanchang Park, No.3-2, Dongwu South Road, Wuzhong Economic Development Zone, Suzhou

Tel: 86 512 68796618



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Revision History

| Report No | Version | Date | Description |
|---------------------|---------|-----------------|---------------|
| SZQLAB-20230824004E | 1 | August 24, 2023 | Initial Issue |

Table of Contents

| | | |
|---|---|----|
| 1 | Test Report Certification | 3 |
| 2 | General Information | 4 |
| | 2.1 Description of EUT | 4 |
| | 2.2 Details of Support Equipment(s) | 4 |
| 3 | Test Methodology | 5 |
| | 3.1 Objective | 5 |
| | 3.2 Description of Test Modes | 5 |
| | 3.3 EUT System Operation | 5 |
| | 3.4 Setup Of Equipment Under Test | 5 |
| | 3.5 Test Standards and Results | 6 |
| | 3.6 Measurement uncertainty | 7 |
| | 3.7 List of Equipments Used | 8 |
| 4 | Emission Test | 9 |
| | 4.1 Conducted Disturbance at Mains Terminals | 9 |
| | 4.2 Conducted Disturbance at Telecommunication ports | 13 |
| | 4.3 Radiated Disturbance Measurement | 16 |
| | 4.4 Harmonic Current Measurement | 22 |
| | 4.5 Voltage Fluctuation and Flick Measurement | 25 |
| 5 | Immunity Test | 27 |
| | 5.1 EUT Setup and Operating Conditions | 27 |
| | 5.2 Performance Criteria | 27 |
| | 5.3 Electrostatic Discharge Immunity Test | 27 |
| | 5.4 Radiated, Radio Frequency Electromagnetic Field Immunity Test | 30 |
| | 5.5 Electrical Fast Transient/Burst Immunity Test | 32 |
| | 5.6 Surge Immunity Test | 34 |
| | 5.6.1 Test Specification | 34 |

| | |
|---|----|
| 5.7 Immunity to Conducted Disturbances Induced by RF Fields | 36 |
| 5.8 Power Frequency Magnetic Field Immunity Test | 38 |
| 5.9 Voltage Dips and Short Interruptions Immunity Test | 40 |
| ANNEX I - EUT PHOTOS | 42 |

1 Test Report Certification

Product: Video Processor

Model No.: See Appendix

Applicant: Shanghai ONBON Technology Inc

Applicant Address: Floor 7,Tower 88,1199#,North Qinzhou Road,Xuhui District,shanghai,China

Manufacturer: Shanghai ONBON Technology Inc

Manufacturer Address: Floor 7,Tower 88,1199#,North Qinzhou Road,Xuhui District,shanghai,China

Factory: ONBON (Jiangsu) Optoelectronic Industrial Co.,LTD

Factory Address: No.1299 fuchunjiang road,Kunshan,Jiangsu.China

Test Standards: EN 55032:2015+A1:2020
EN 55032:2015+A11:2020
EN 55035:2017+A11:2020
IEC 61000-3-2:2020
EN 61000-3-3:2013+A1:2019

Date of Test: From 2023-08-29 to 2023-08-30

Test Result: PASS

We, Suzhou SZQ Testing Co., Ltd. hereby certify that the Equipment Under Test (EUT) described above has been tested in our facility. The test record, data evaluation and EUT configuration represented herein are true and accurate accounts of measurements of the sample's EMC characteristics under the conditions herein specified.

Tested by: Shan zuo Gu, Date: September 13, 2023

Checked by: White Ma, Date: September 13, 2023

2 General Information

2.1 Description of EUT

| | |
|----------------------------|--|
| Product: | Video Processor |
| Model No.: | OVP-M4X |
| Brand Name: | — |
| Serial No.: | — |
| Rated power supply: | 100-240VAC,50/60Hz,50W |
| I/O Ports: | Power Input、DVI、HDMI、VGA、Wifi、LED Ports、USB、RJ45 |
| Accessories: | — |

Note:

(1). The EUT is class B information technology equipment according to EN55032. The test samples are preproduction. For more detailed features description about the EUT, please refer to User's Manual.

(2). Model List

| NO. | MODELS | power supply |
|-----|--|------------------------|
| 1 | OVP-L1X, OVP-L2X, OVP-L3X, OVP-L4X, OVP-M2DA, OVP-M1X, OVP-M2X, OVP-M3X, OVP-M4X, OVP-M6X, OVP-M8X, OVP-MX, OVP-H3XL, OVP-H4XL, OVP-H6XL, OVP-H8XL, OVP-H3X, OVP-H4X, OVP-H6X, OVP-H8X, OVP-HX, OVP-F4, OVP-F6, OVP-F8, OVP-F12, OVP-F16, OVP-FX, OVP-N4, OVP-N6, OVP-N8, OVP-N12, OVP-N16, OVP-G6, OVP-G8, OVP-G12, OVP-G16, OVP-G20, OVP-G24, OVP-G32, OVP-GX, OVP-Y5E, OVP-VH4, OVP-VH8, OVP-V4, OVP-V6, OVP-V8, OVP-V12, OVP-V16, OVP-VX, OVP-Zn, OVP-ZX | 100-240VAC,50/60Hz,50W |

2.2 Details of Support Equipment(s)

| Description | Manufacturer | Model No. | Connection Port | Working State |
|-------------|--------------|-------------|-----------------|---------------|
| Laptop | Thinkpad | SL410(2824) | RJ45 | Normal |
| / | / | / | / | / |
| / | / | / | / | / |
| / | / | / | / | / |

3 Test Methodology

3.1 Objective

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

3.2 Description of Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

| Pretest Mode | Description |
|--------------|------------------|
| Mode 1 | Normal Operation |

| Final Mode | Description |
|------------|------------------|
| Mode 1 | Normal Operation |

3.3 EUT System Operation

1. According to the erection of figure for site erection.
2. The tested sample is in rated working condition.
3. Start testing.

3.4 Setup Of Equipment Under Test

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

3.5 Test Standards and Results

The EUT has been tested according to the following specifications:

| EMISSION (EN 55032:2015+A1:2020) | | |
|--|---|--------|
| Test Type | Standard | Result |
| Mains terminal disturbance voltage | <input checked="" type="checkbox"/> EN 55032:2015+A1:2020,Class B | PASS |
| | <input type="checkbox"/> EN 55032:2015+A1:2020,Class A | |
| Conducted Common mode Disturbance at Telecommunication Ports | <input checked="" type="checkbox"/> EN 55032:2015+A1:2020,Class B | PASS |
| | <input type="checkbox"/> EN 55032:2015+A1:2020,Class A | |
| Radiated disturbance (30MHz-1GHz) | <input checked="" type="checkbox"/> EN 55032:2015+A1:2020,Class B | PASS |
| | <input type="checkbox"/> EN 55032:2015+A1:2020,Class A | |
| Radiated disturbance (1GHz-6GHz) | <input checked="" type="checkbox"/> EN 55032:2015+A1:2020,Class B | PASS |
| | <input type="checkbox"/> EN 55032:2015+A1:2020,Class A | |
| Harmonic current emissions | IEC 61000-3-2:2020 | PASS |
| Voltage fluctuation & flicker | EN 61000-3-3: 2013/A1:2019 | PASS |
| IMMUNITY (EN 55035:2017+A11:2020) | | |
| Test Type | Basic Standard | Result |
| Electrostatic discharge immunity | IEC 61000-4-2 | PASS |
| Radiated, radio frequency electromagnetic field immunity | IEC 61000-4-3 | PASS |
| Electrical fast transient/burst immunity | IEC 61000-4-4 | PASS |
| Surge immunity | IEC 61000-4-5 | PASS |
| Immunity to conducted disturbances induced by RF fields | IEC 61000-4-6 | PASS |
| Power frequency magnetic field immunity | IEC 61000-4-8 | PASS |
| Voltage dips and short interruptions immunity | IEC 61000-4-11 | PASS |

Note: The latest versions of basic standards are applied.

3.6 Measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement | Frequency | Uncertainty |
|---------------------------------------|---------------|--------------------|
| Conducted emissions (Power Port) | 0.15MHz~30MHz | $\pm 1.7\text{dB}$ |
| Conducted emissions (Telecom Port) | 0.15MHz~30MHz | $\pm 2.4\text{dB}$ |

| Measurement | Polarity | Frequency | Uncertainty |
|------------------------------------|----------|-------------------|--------------------|
| Radiated emissions (below 1GHz) | H | 30MHz ~ 200MHz | $\pm 4.7\text{dB}$ |
| | | 200MHz ~ 1000MHz | $\pm 4.7\text{dB}$ |
| | V | 30MHz ~ 200MHz | $\pm 4.7\text{dB}$ |
| | | 200MHz ~ 1000MHz | $\pm 4.7\text{dB}$ |
| Radiated emissions (above 1GHz) | H | 1000MHz ~ 6000MHz | $\pm 4.7\text{dB}$ |
| | V | 1000MHz ~ 6000MHz | $\pm 4.7\text{dB}$ |

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.
- (2) Consistent with industry standard (e.g. CISPR 32: 2019, clause 11, Measurement Uncertainty) determining compliance with the limits shall be based on the results of the compliance measurement. Consequently the measured emissions being less than the maximum allowed emission result in this being a compliant test or passing test.
- (3) The acceptable measurement uncertainty value without requiring revision of the compliance statement is based on conducted and radiated emissions being less than UCISPR which is 3.6dB and 5.2dB respectively. CCS values (called ULab in CISPR 16-4-2) is less than UCISPR as shown in the table above. Therefore, MU need not be considered for compliance.

3.7 List of Equipments Used

| Description | Model No. | Calibration period of validity | Serial No. |
|---|---------------------|--------------------------------|------------|
| EMI Test Receiver | ESCI | 2024.07.13 | RU-001E |
| LISN | ESH 3-z5 | 2024.07.13 | EV-202E |
| PULSE LINITER | ESH 3-z2 | 2024.04.17 | RZ-032E |
| TRILOG Broadband Antenna | VULB9163 | 2024.07.15 | RG-001E |
| Spectrum Analyzer | N9000A | 2024.02.06 | RU-002E |
| Pre-Amplifier | LNA0640 | 2024.04.17 | RZ-020E |
| Broad-Band Horn Antenna | 3115 | 2024.02.06 | RG-003E |
| ISN | FCC-TLISN T2-02 | 2024.07.13 | RZ-001E |
| ISN | FCC-TLISN T4-02 | 2024.07.13 | RZ-002E |
| ISN | FCC-TLISN T8-02 | 2024.07.13 | RZ-003E |
| EMC HARMONICS & FLICKER TEST SYSTEMS | ECTS2-140M | 2024.07.13 | RZ-018E |
| ESD Generator | NSG437 | 2024.07.15 | EV-200E |
| Signal Generator | SMB100A | 2024.02.06 | EV-003E |
| Power Amplifier | HAP_80M01G-250W | 2024.07.13 | RZ-011E |
| Power Amplifier | HAP_01G06G-75W | 2024.07.13 | RZ-012E |
| Power Sensor | U2001A | 2024.07.13 | RZ-030E |
| Power Sensor | U2001A | 2024.07.13 | RZ-031E |
| RF Switch | PFSU_DC18G-4C | 2024.07.13 | RZ-013E |
| Stacked logarithmic periodic antenna | STLP 9129 PLUS | N/A | RZ-014E |
| Filed Probe | EFS-10 | 2024.07.16 | RZ-015E |
| Combined immunity tester | CCS 600 | 2024.07.13 | RZ-004E |
| RF conducted immunity testing system | CST 1075 | 2024.07.13 | RZ-005E |
| Coupled decoupling network | CDN M2M3 | 2024.07.13 | RZ-024E |
| EM Clamp | EM CL100 | 2024.07.13 | RZ-021E |
| Capacitive coupling clamp | CCC 100 | 2024.07.13 | RZ-006E |
| Power fail simulator | PFS 2216SD | 2024.07.13 | RZ-007E |
| AC/DC variable frequency magnetic field with coil | MFS 300AP TYX130 | 2024.07.13 | RZ-010E |
| 50ohm Termination | TF2-1G-A | 2024.07.13 | RZ-022E |
| 50ohm Termination | TF2-1G-A | 2024.07.13 | RZ-023E |

Note: Equipments above have been calibrated and are in the period of validation.

4 Emission Test

4.1 Conducted Disturbance at Mains Terminals

4.1.1 Limits

| Frequency range (MHz) | Limits (dB μ V), Class B | | Limits (dB μ V), Class A | |
|-----------------------|------------------------------|----------|------------------------------|---------|
| | Quasi-peak | Average | Quasi-peak | Average |
| 0.15 - 0.50 | 66 to 56 | 56 to 46 | 79 | 66 |
| 0.50 - 5 | 56 | 46 | 73 | 60 |
| 5 - 30 | 60 | 50 | 73 | 60 |

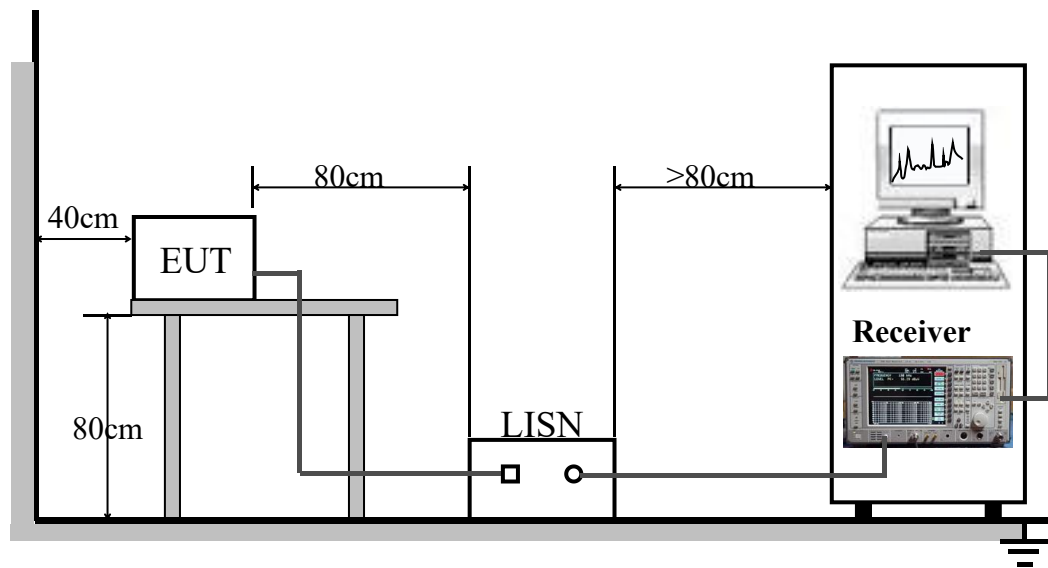
Notes:

- (1) The lower limit shall apply at the transition frequencies.
- (2) The limit decreases linearly with the logarithm of the frequency in the range 50 kHz to 150 kHz and 150 kHz to 0.5 MHz.
- (3) If the quasi-peak value is lower than Average Limits, it is no necessary to conduct the average measurement.

4.1.2 Test Procedure

- a. 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 50 Ω /50 μ H of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits are not reported.

4.1.3 Test Setup



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

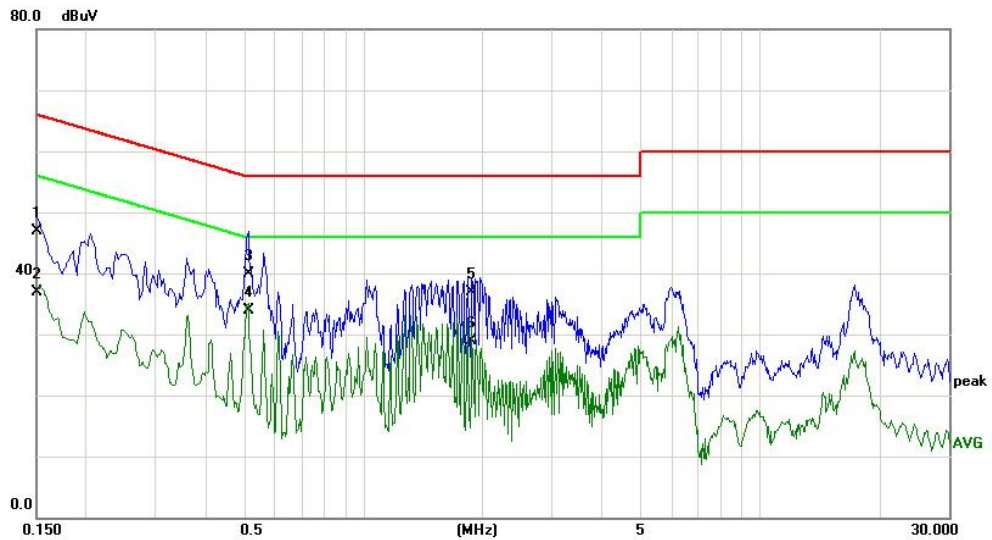
4.1.4 Test Location

Shield Room: Located at C2.

4.1.5 Test Result

Conducted Disturbance at Mains Terminals (L-Line)

Test Curve

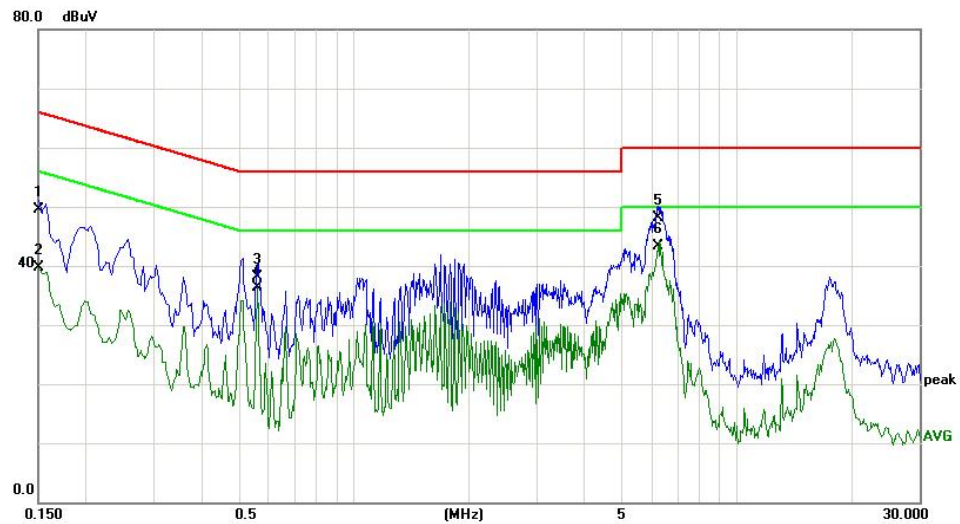


Test Data

| Freq. (MHz) | Measured (dBuV) | Limits (dBuV) | Margin (dB) | Note |
|----------------|--------------------|------------------|----------------|------|
| 0.150 | 46.95 | 66.00 | -19.05 | QP |
| 0.150 | 36.95 | 56.00 | -19.05 | AVG |
| 0.514 | 39.86 | 56.00 | -16.14 | QP |
| 0.514 | 33.89 | 46.00 | -12.11 | AVG |
| 1.882 | 36.85 | 56.00 | -19.15 | QP |
| 1.882 | 28.96 | 46.00 | -17.04 | AVG |

Conducted Disturbance at Mains Terminals (N-Line)

Test Curve



Test Data

| Freq. (MHz) | Measured (dBuV) | Limits (dBuV) | Margin (dB) | Note |
|----------------|--------------------|------------------|----------------|------|
| 0.150 | 49.42 | 66.00 | -16.58 | QP |
| 0.150 | 39.67 | 56.00 | -16.33 | AVG |
| 0.562 | 38.02 | 56.00 | -17.98 | QP |
| 0.562 | 36.25 | 46.00 | -9.75 | AVG |
| 6.246 | 48.02 | 60.00 | -11.98 | QP |
| 6.246 | 43.37 | 50.00 | -6.63 | AVG |

4.2 Conducted Disturbance at Telecommunication ports

4.2.1 Limits

| Frequency range (MHz) | Limits (dBuV), Class B | |
|-----------------------|------------------------|----------|
| | Quasi-peak | Average |
| 0.15 - 0.50 | 84 to 74 | 74 to 64 |
| 0.50 - 30 | 74 | 64 |

| Frequency range (MHz) | Limits (dBuV), Class A | |
|-----------------------|------------------------|----------|
| | Quasi-peak | Average |
| 0.15 - 0.50 | 97 to 87 | 84 to 74 |
| 0.50 - 30 | 87 | 74 |

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.
- (3). If the quasi-peak value is lower than Average Limits, it is no necessary to conduct the average measurement.

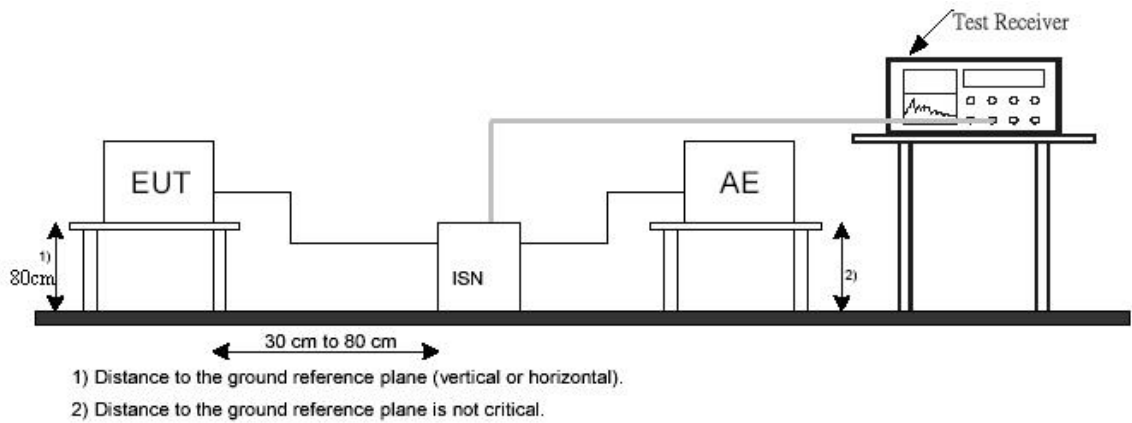
4.2.2 TEST Procedure

The following test modes was scanned during the preliminary test:

Mode 1:100Mbps

After the preliminary scan, we found the following test mode producing the highest emission level and test data of the worst case was recorded..

4.2.3 Test Setup



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

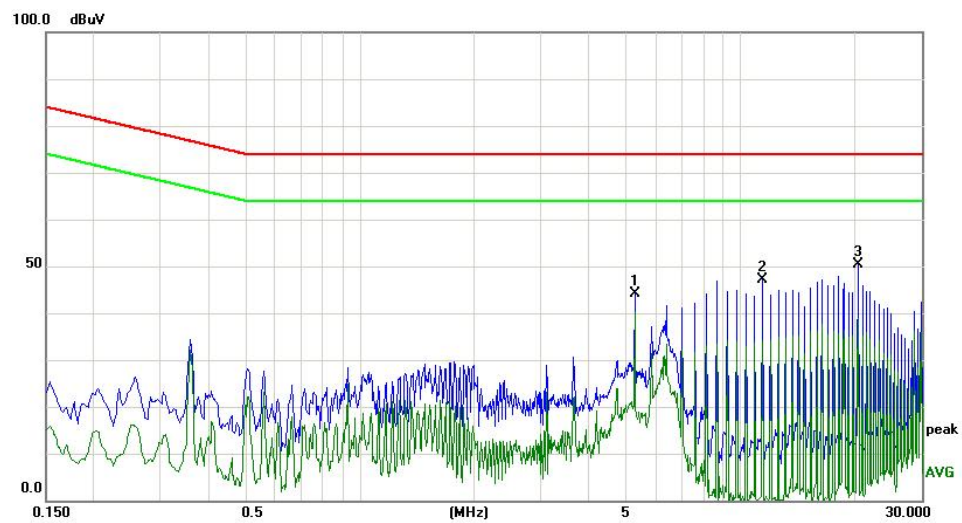
4.2.4 Test Location

Shield Room: Located at C2.

4.2.5 Test Result

Conducted Disturbance at telecommunication ports (Category 5 cable)

Test Curve



Test Data

| Freq. (MHz) | Measured (dBuV) | Limits (dBuV) | Margin (dB) | Note |
|----------------|--------------------|------------------|----------------|------|
| 5.213 | 45.27 | 74.00 | -28.73 | QP |
| 5.213 | 42.19 | 64.00 | -21.81 | AVG |
| 11.967 | 47.86 | 74.00 | -26.14 | QP |
| 11.967 | 41.89 | 64.00 | -22.11 | AVG |
| 20.996 | 50.12 | 74.00 | -23.88 | QP |
| 20.996 | 45.19 | 64.00 | -18.84 | AVG |

4.3 Radiated Disturbance Measurement

4.3.1 Limits of Radiated Disturbance (30MHz~1000MHz)

| Frequency range (MHz) | Quasi peak limits(dB μ V/m) | |
|-----------------------|---|---|
| | For Class B, at 3m measurement distance | For Class B, at 3m measurement distance |
| 30 - 230 | 40 | 50 |
| 230 - 1000 | 47 | 57 |

Notes:

- (1) The lower limit shall apply at the transition frequency.
- (2) Additional provisions may be required for cases where interference occurs.

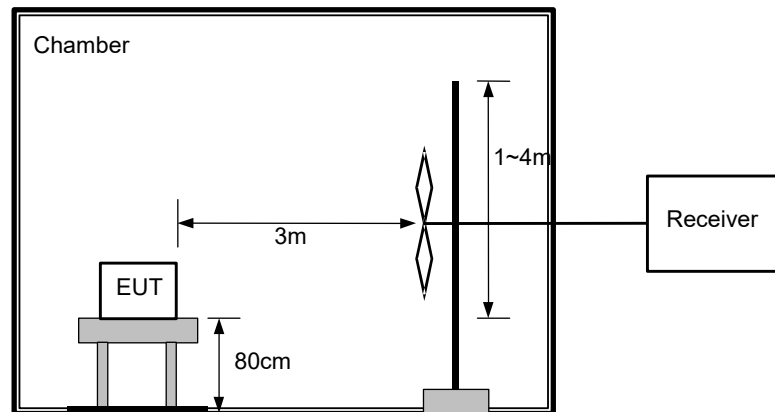
4.3.2 Limits of Radiated Disturbance (Above 1GHz)

| Frequency range (GHz) | Limits(dB μ V/m), Class B | | Limits(dB μ V/m), Class A | |
|-----------------------|-------------------------------|------|-------------------------------|------|
| | Average | peak | Average | peak |
| 1~3 | 50 | 70 | 56 | 76 |
| 3~6 | 54 | 74 | 60 | 80 |

4.3.3 Test Procedure

- a. 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.
- b. The Boundary of EUT(imaginary circular periphery) was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. 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.
- d. 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 ratable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detector Function and Specified Bandwidth with Maximum Hold Mode. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emission that did not have 10dB margin would be retested one by one using the quasi-peak method.

4.4.4 Test Setup

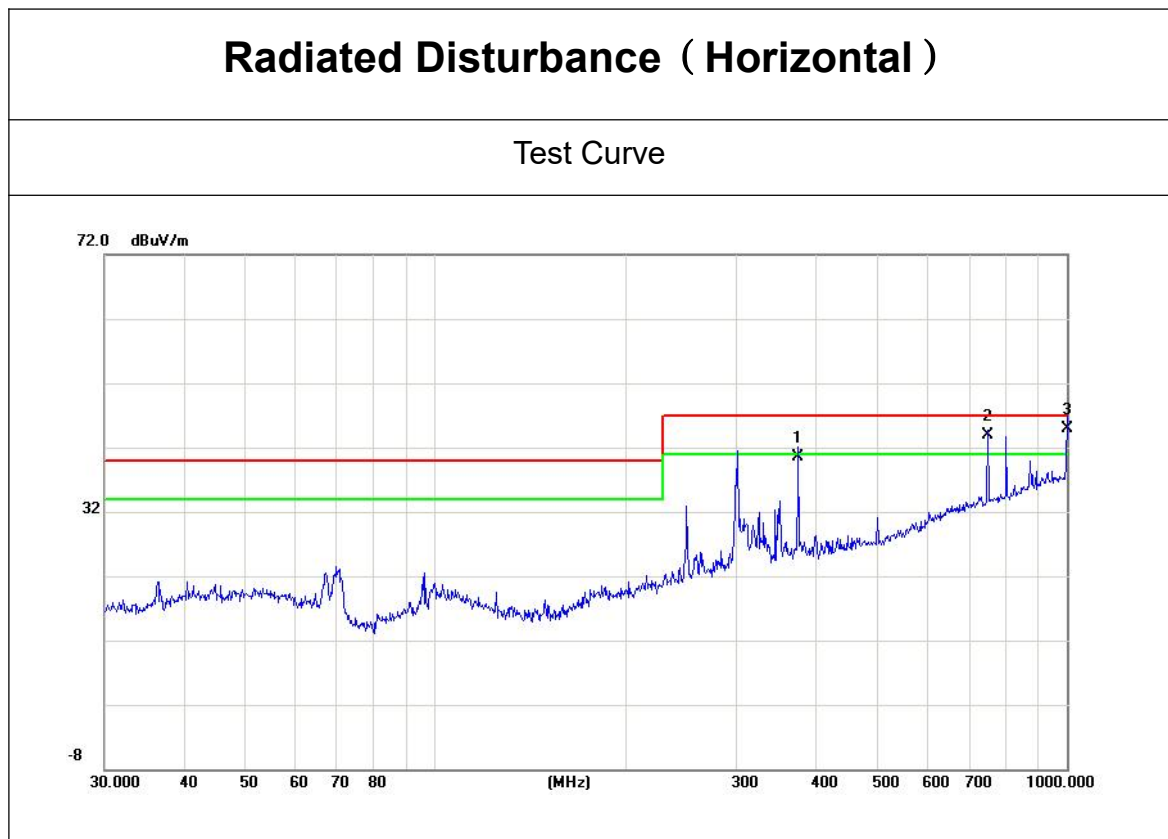


For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.3.5 Test Location

Semi-anechoic chamber: SAC3.

4.3.6 Test Result (30MHz~1000MHz)



Test Data

| Freq. (MHz) | Height of Antenna (cm) | Angle of Turntable ($^{\circ}$) | Limits(QP) (dBuV/m) | Measurement Value (QP) dB(V/m) | Margin (dB) |
|----------------|------------------------------|---|------------------------|--------------------------------------|----------------|
| 375.938 | 200 | 216 | 40.52 | 47.00 | -6.48 |
| 750.108 | 200 | 157 | 43.96 | 47.00 | -3.04 |
| 1000.000 | 200 | 323 | 44.85 | 47.00 | -2.15 |

Radiated Disturbance (Vertical)

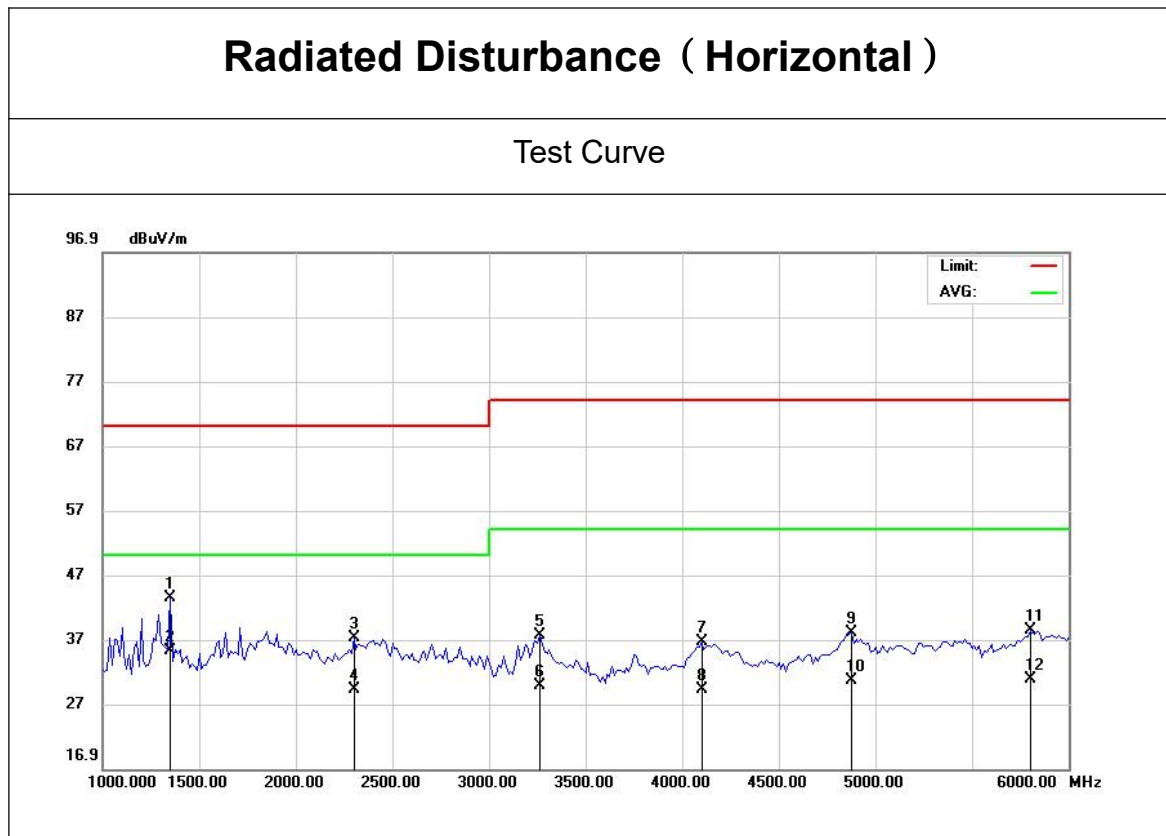
Test Curve



Test Data

| Freq. (MHz) | Height of Antenna (cm) | Angle of Turntable ($^{\circ}$) | Limits(QP) (dBuV/m) | Measurement Value (QP) dB(V/m) | Margin (dB) |
|----------------|------------------------------|---|------------------------|--------------------------------------|----------------|
| 375.938 | 100 | 321 | 35.29 | 47.00 | -11.71 |
| 750.108 | 100 | 298 | 40.01 | 47.00 | -6.99 |
| 1000.000 | 100 | 203 | 42.98 | 47.00 | -4.02 |

4.3.7 Test Result (Above 1GHz)

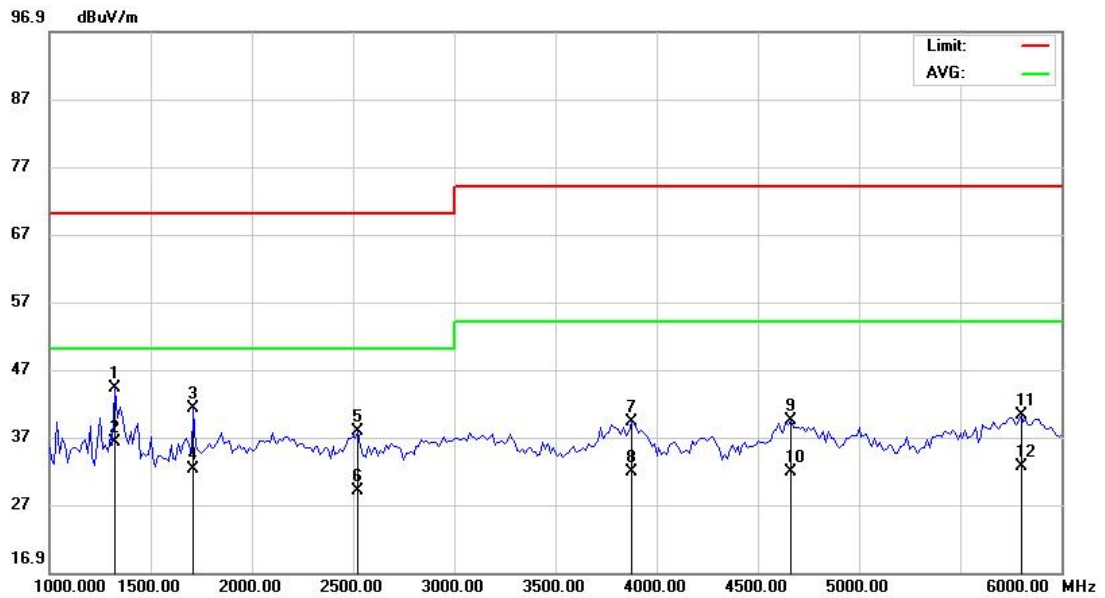


Test Data

| Height of Antenna (cm) | Angle of Turntable (°) | Average Detector | | | Peak Detector | | |
|------------------------|------------------------|------------------|---------------------|---------------------------------|---------------|-----------------------|-----------------------------------|
| | | Freq. (MHz) | Limit (AV) dB(μV/m) | Measurement Value (AV) dB(μV/m) | Freq. (MHz) | Limit (Peak) dB(μV/m) | Measurement Value (Peak) dB(μV/m) |
| 200 | 121 | 1328.17 | 50.00 | 36.07 | 1328.17 | 70.00 | 45.11 |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |

Radiated Disturbance (Vertical)

Test Curve



Test Data

| Height of Antenna (cm) | Angle of Turntable (°) | Average Detector | | | Peak Detector | | |
|------------------------|------------------------|------------------|---------------------|---------------------------------|-----------------|-----------------------|-----------------------------------|
| | | Frequency (MHz) | Limit (AV) dB(μV/m) | Measurement Value (AV) dB(μV/m) | Frequency (MHz) | Limit (PEAK) dB(μV/m) | Measurement Value (PEAK) dB(μV/m) |
| 100 | 112 | 1330.11 | 50.00 | 36.87 | 1330.11 | 70.00 | 46.08 |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |

4.4 Harmonic Current Measurement

4.4.1 Limits of Harmonic Current

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

| Limits for Class B Equipment |
|---|
| For Class B equipment, the harmonics of the input current shall not exceed the values given in Table that is the limit of Class A multiplied by a factor of 1,5 |

| Limits for Class C Equipment | |
|---|--|
| Harmonics Order n | Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency % |
| 2 | 2 |
| 3 | 27* |
| 5 | 10 |
| 7 | 7 |
| 9 | 5 |
| $11 < n < 39$ (odd harmonics only) | 3 |
| *The limit is determined based on the assumption of modern lighting technologies having power factors of 0,90 or higher | |

| Limits for Class D Equipment | | |
|-------------------------------------|--|--|
| Harmonics Order n | Maximum permissible harmonic current per watt mA/W | Maximum permissible harmonic current A |
| 3 | 3.4 | 2.30 |
| 5 | 1.9 | 1.14 |
| 7 | 1.0 | 0.77 |
| 9 | 0.5 | 0.40 |
| 11 | 0.35 | 0.33 |
| 11 < n < 39 (odd harmonics only) | 3.85/h | See limit of Class A |

Note:

- (1). Class A and Class D are classified according to item 7.4.3.
- (2). According to section 7 of EN 61000-3-2, the above limits for all equipment except for lighting equipment having an active input power > 5 W and no limits apply for equipment with an active input power up to and including 75 W.

4.4.2 Test Procedure

- a. 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.
- b. The EUT is classified as follows:

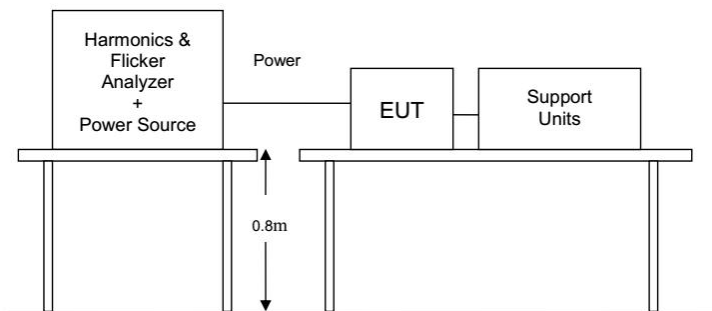
Class A: Balanced three-phase equipment, household appliances, Excluding those specified as belonging to Class B, C or D, Vacuum cleaners, High pressure cleaners, Tools, Excluding portable tools, Independent phase control dimmers, Audio equipment, Professional luminaires for stage lighting and studios.

Class B: Portable tools, Arc welding equipment which is not professional equipment.

Class C: Lighting equipment.

Class D: Equipment having a specified power less than or equal to 600 W according to 6.3.2, of the following types: Personal computers and personal computer monitors, Television receivers, Refrigerators and freezers having one or more variable-speed drives to control compressor motor(s).
- c. 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.

4.4.3 Test Setup



4.4.4 Test Location

Testing room: Located at C2.

4.4.5 Test Result

| | |
|----------------------------------|------------------------|
| E. U. T. rated power(W): | 100-240VAC,50/60Hz,50W |
| Observation period (s): | / |
| Voltage(V): | / |
| Frequency(Hz): | / |
| Power factor: | / |
| Active power(W): | / |
| THD: | / |
| System power: | / |
| E. U. T. class: | A |
| E. U. T. test conclusion: | No suitable limit |

Note:

- (1). Limits classified according to item 7.4.1. Test data please see Appendix I for details
- (2). The test should comply with the requirements of EN 61000-3-2. Because the rated power of EUT is less than 75W, there is no limit for Harmonics test to be performed according to EN 61000-3-2.

4.5 Voltage Fluctuation and Flick Measurement

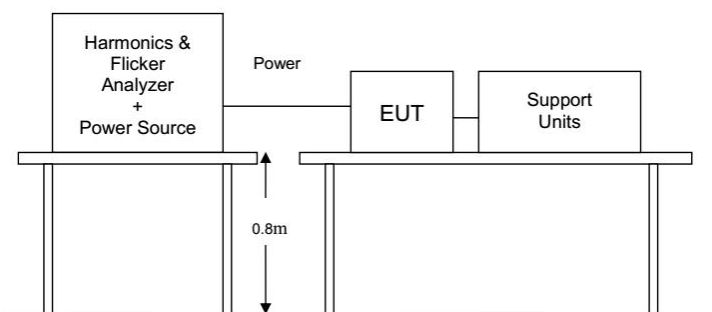
4.5.1 Limits of Voltage Fluctuation and Flick

| 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} | 500ms | T_{dt} means maximum time that d_t exceeds 3% |
| $d_{max}(\%)$ | 4% | d_{max} means maximum relative voltage change. |
| $D_c(\%)$ | 3.3% | d_c means relative steady-state voltage change. |

4.5.2 Test Procedure

- 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
- 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.

4.5.3 Test Setup



4.5.4 Test Location

Testing room: Located at C2.

4.5.5 Test Result

Test Specification

Test Frequency: 50Hz

Test Voltage: 230Vac

Waveform: Sine

Test Time: 10 minutes(P_{st})

Test Result

| Test Parameter | Measurement Value | Limit | Remarks |
|----------------|-------------------|-------|---------|
| P_{st} | 0.057 | 1.0 | Pass |
| P_{lt} | 0.031 | 0.65 | Pass |
| $T_{dt(s)}$ | 0.000 | 500ms | Pass |
| $d_{max}(\%)$ | 1.341 | 4% | Pass |
| $d_c(\%)$ | 1.387 | 3.3% | Pass |

5 Immunity Test

5.1 EUT Setup and Operating Conditions

Same as 3.1

5.2 Performance Criteria

| | |
|--------------------|---|
| Criterion A | The apparatus shall continue 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. |
| Criterion B | The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. |
| Criterion C | Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls. |

5.3 Electrostatic Discharge Immunity Test

5.3.1 Test Specification

| | |
|-----------------------------|---|
| Basic Standard: | IEC 61000-4-2 |
| Discharge Impedance | 330Ω / 150 pF |
| Discharge Voltage: | Air Discharge : ± 8 kV Contact Discharge: ± 4 kV |
| Number of Discharge: | Minimum 10 times at each test point |
| Discharge Mode: | Single discharge |
| Discharge Period: | 1-second minimum |

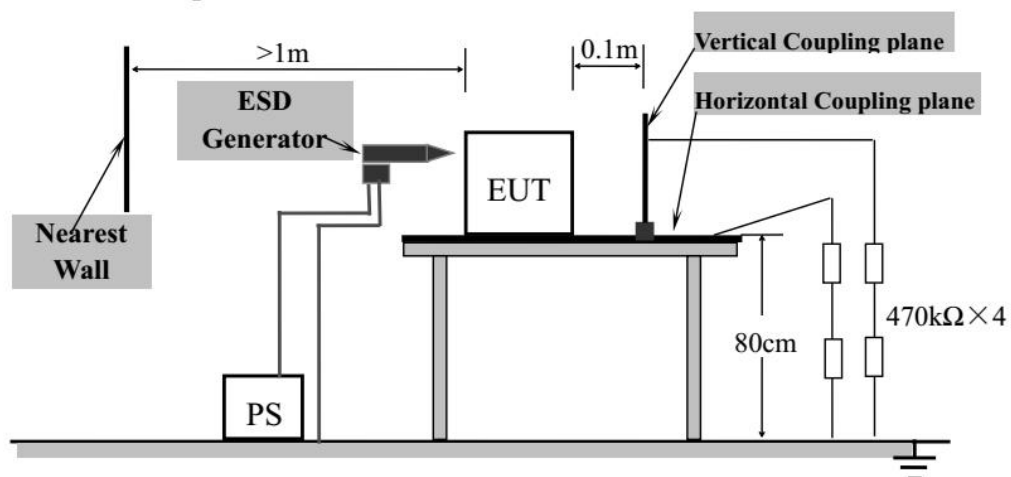
5.3.2 Test Procedure

The basic test procedure was in accordance with IEC 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.

- 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×0.5m) was placed vertically to and 0.1 meters from the EUT.

5.3.3 Test Setup



5.3.4 Test Result

Testing Room: Located at C1.

5.3.5 Test Result

| Test Points | Discharge Level (kV) | Discharge Mode | Observation | Comply with Criterion |
|----------------|----------------------|----------------|-------------|-----------------------|
| HCP | ±4 | Contact | Note(1) | A |
| VCP | ±4 | Contact | Note(1) | A |
| Shell | ±4 | Contact | Note(1) | A |
| Screw | ±4 | Contact | Note(1) | A |
| Led port | ±4 | Contact | Note(1) | A |
| Monitor port | ±4 | Contact | Note(1) | A |
| Ext port | ±4 | Contact | Note(1) | A |
| DVI port | ±4 | Contact | Note(1) | A |
| HDMI port | ±4 | Contact | Note(1) | A |
| DP port | ±4 | Contact | Note(1) | A |
| VGA port | ±4 | Contact | Note(1) | A |
| AUDIO_In port | ±4 | Contact | Note(1) | A |
| AUDIO_Out port | ±4 | Contact | Note(1) | A |
| LAN port | ±4 | Contact | Note(1) | A |
| COM port | ±4 | Contact | Note(1) | A |
| RS232 port | ±4 | Contact | Note(1) | A |
| WiFi port | ±4 | Contact | Note(1) | A |
| Screen | ±8 | Air | Note(1) | A |
| Key | ±8 | Air | Note(1) | A |

Note:

- (1). The apparatus shall continue 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.
- (2). The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.

5.4 Radiated, Radio Frequency Electromagnetic Field Immunity Test

5.4.1 Test Specification

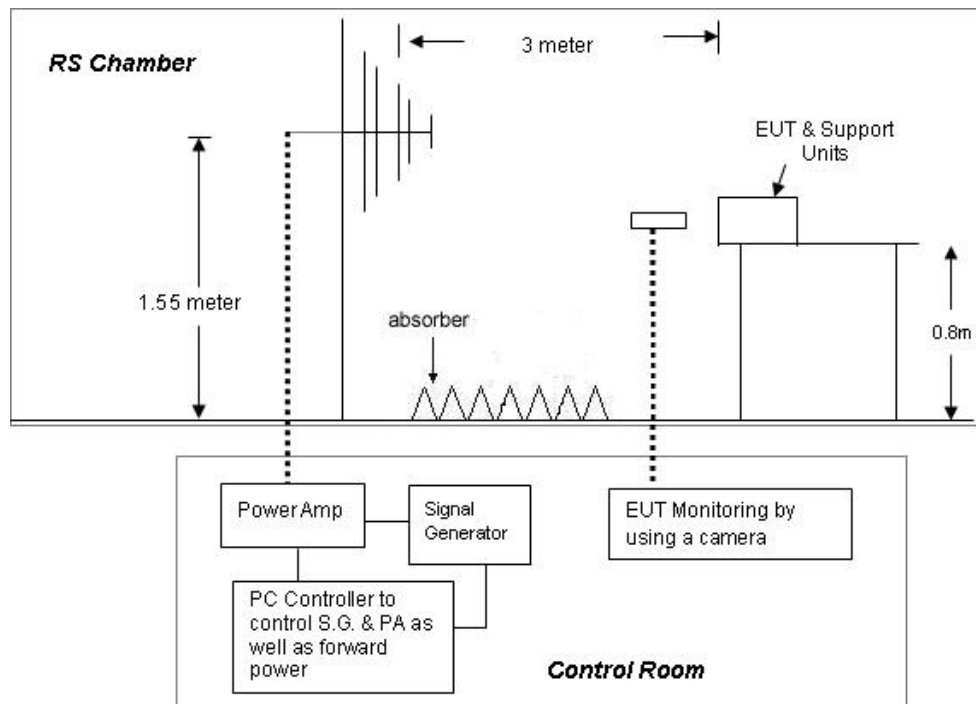
| | |
|----------------------------|--|
| Basic Standard: | IEC 61000-4-3 |
| Frequency Range: | 80 MHz – 1000 MHz 1800 MHz, 2600 MHz, 3500 MHz, 5000 MHz (Frequency $\pm 1\%$) |
| Field Strength: | 3 V/m |
| Modulation: | 1kHz sine wave, 80%, AM modulation |
| Frequency Step: | 1% of fundamental |
| Polarity of Antenna | Horizontal and Vertical |
| Test Distance: | 3m |
| Antenna Height: | 1.55m |

5.4.2 Test Procedure

The test procedure was in accordance with IEC 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 frequency range is swept from 80 MHz to 1000MHz , 1800 MHz, 2600 MHz, 3500 MHz, 5000 MHz (Frequency $\pm 1\%$) with the signal 80% amplitude modulated with a 1 kHz sine wave. 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.
- 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.

5.4.3 Test Setup



5.4.4 Test Result

Testing Room: Located at SAC 3.

5.4.5 Test Result

| Frequency (MHz) | Polarity | Azimuth | Field Strength (V/m) | Observation | Comply with Criterion |
|-----------------------------|----------|---------|----------------------|-------------|-----------------------|
| 80-1000,1800,2600,3500,5000 | H&V | Front | 3 | Note(1) | A |
| 80-1000,1800,2600,3500,5000 | H&V | Rear | 3 | Note(1) | A |
| 80-1000,1800,2600,3500,5000 | H&V | Left | 3 | Note(1) | A |
| 80-1000,1800,2600,3500,5000 | H&V | Right | 3 | Note(1) | A |

Note:

- (1). The apparatus shall continue 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.
- (2). The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.

5.5 Electrical Fast Transient/Burst Immunity Test

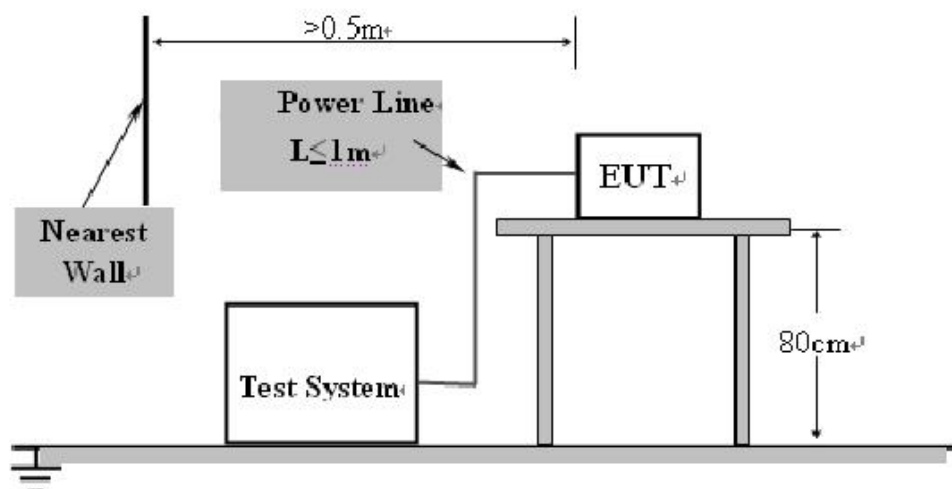
5.5.1 Test Specification

| | |
|----------------------------|---|
| Basic Standard: | IEC 61000-4-4 |
| Test Voltage: | AC Power Port: $\pm 1\text{KV}$ Signal Ports and Telecommunication Ports: $\pm 0.5\text{KV}$ |
| Impulse Frequency: | 5kHz |
| Impulse wave shape: | 5/50ns |
| Burst Duration: | 15ms |
| Burst Period: | 300ms |
| Test Duration: | $\geq 1\text{ min.}$ / polarity |

5.5.2 Test Procedure

- The EUT was tested with 1000 volt discharges to the AC power input leads.
- Both positive and negative polarity discharges were applied.
- 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.
- The duration time of each test sequential was 1 minute.
- The transient/burst waveform was in accordance with IEC 61000-4-4, 5/50ns.

5.5.3 Test Setup



5.5.4 Test Location

Testing Room: Located at C3.

5.5.5 Test Result

| Test Point | Polarity | Test Level (kV) | Observation | Comply with Criterion |
|------------|----------|-----------------|-------------|-----------------------|
| L | \pm | 1 | Note (1) | A |
| N | \pm | 1 | Note (1) | A |
| L-N | \pm | 1 | Note (1) | A |
| Lan Ports | \pm | 1 | Note (1) | A |

Note:

- (1). The apparatus shall continue 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.
- (2). The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.

5.6 Surge Immunity Test

5.6.1 Test Specification

| | |
|-------------------------|---|
| Basic Standard: | IEC 61000-4-5 |
| Waveform: | Voltage 1.2/50 μ s; Current 8/20 μ s |
| Test Voltage: | Power port, line to line 1 kV, line to earth 2 kV |
| Polarity: | Positive/Negative |
| Phase Angle: | 90°, 270° |
| Repetition Rate: | 60sec |
| Times: | 5 times/each condition. |

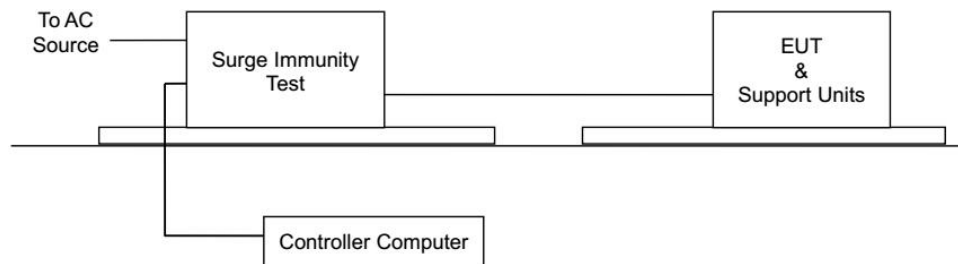
5.6.2 Test Procedure

- a. 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×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).
- b. 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).
- c. The surges were applied line to line and line(s) to earth. When testing line to earth the test voltage was applied successively between each of the lines and earth. Steps up to the test level specified increased the test voltage. All lower levels including the selected test level were tested. The polarity of each surge level included positive and negative test pulses.
- d. The number of pulses applied shall be as follows:
 - Five positive pulses line-to-neutral at 90° phase
 - Five negative pulses line-to-neutral at 270° phase

The following additional pulses are required only if the EUT has an earth connection or if the EUT is earthed via any AE.

- Five positive pulses line-to-earth at 90° phase
- Five negative pulses line-to-earth at 270° phase
- Five negative pulses neutral-to-earth at 90° phase
- Five positive pulses neutral-to-earth at 270° phase

5.6.3 Test Setup



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

5.6.4 Test Location

Testing Room: Located at C3.

5.6.5 Test Result

| Coupling Line | Polarity | Voltage (kV) | Observation | Comply with Criterion |
|---------------|-----------------|--------------|-------------|-----------------------|
| L-N | + 90° - 270° | 1 | Note (1) | A |
| L-PE | + 90° - 270° | 2 | Note (1) | A |
| N-PE | + 90° - 270° | 2 | Note (1) | A |

Note:

- (1). The apparatus shall continue 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.
- (2). The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.

5.7 Immunity to Conducted Disturbances Induced by RF Fields

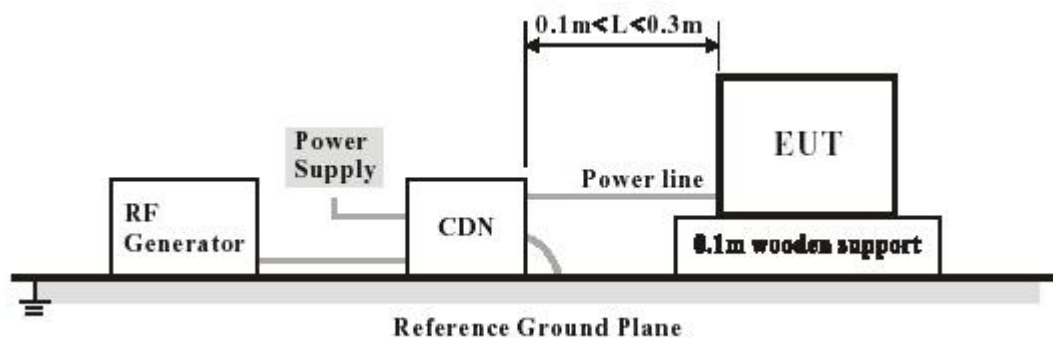
5.7.1 Test Specification

| | | | |
|-------------------------|-------------------------------------|-----------------|-----------------|
| Basic Standard: | IEC 61000-4-6 | | |
| Frequency Range: | 0.15 MHz – 10 MHz | 10 MHz – 30 MHz | 30 MHz – 80 MHz |
| Field Strength: | 3 Vms | 3 Vms to 1 Vms | 3 Vms |
| Modulation: | 1 kHz Sine Wave, 80%, AM Modulation | | |
| Frequency Step: | 1% of fundamental | | |
| Coupled Cable: | a.c. power line | | |

5.7.2 Test Procedure

- The EUT shall be tested within its intended operating and climatic conditions.
- 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.
- 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 signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. 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.
- 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.
- Attempts should be made to fully exercise the EUT during test, and to fully interrogate all exercise modes selected for susceptibility.

5.7.3 Test Setup



5.7.4 Test Result

Testing Room: Located at C4.

5.7.5 Test Result

| Test Point | Frequency (MHz) | Field Strength (Vrms) | Observation | Comply with criterion |
|-----------------|-----------------|-----------------------|-------------|-----------------------|
| a.c. power line | 0.15 to 10 | 3 | Note(1) | A |
| | 10 to 30 | 3 to 1 | Note(1) | A |
| | 30 to 80 | 1 | Note(1) | A |

Note:

- (1). The apparatus shall continue 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.
- (2). The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.

5.8.4 Test Result

Testing Room: Located at C3.

5.8.5 Test Result

| Direction | Field Strength (A/m) | Frequency Range: | Observation | Comply with Criterion |
|-----------|----------------------|------------------|-------------|-----------------------|
| X | 1 | 50Hz | Note(1) | A |
| Y | 1 | 50Hz | Note(1) | A |
| Z | 1 | 50Hz | Note(1) | A |

Note:

- (1). The apparatus shall continue 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.
- (2). The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.

5.9 Voltage Dips and Short Interruptions Immunity Test

5.9.1 Test Specification

| | | |
|-------------------------------|-----------------|---|
| Basic Standard: | IEC 61000-4-11 | |
| Voltage Dips: | 50 Hz | >95% reduction, 0.5 period 30% reduction, 25 periods |
| | 60 Hz | >95% reduction, 0.5 period 30% reduction, 30 periods |
| Voltage Interruptions: | 50 Hz | >95% reduction, 250 periods |
| | 60 Hz | >95% reduction, 300 periods |
| Voltage Phase Angle: | 0° / 90° / 270° | |
| Test cycle: | 3 times | |

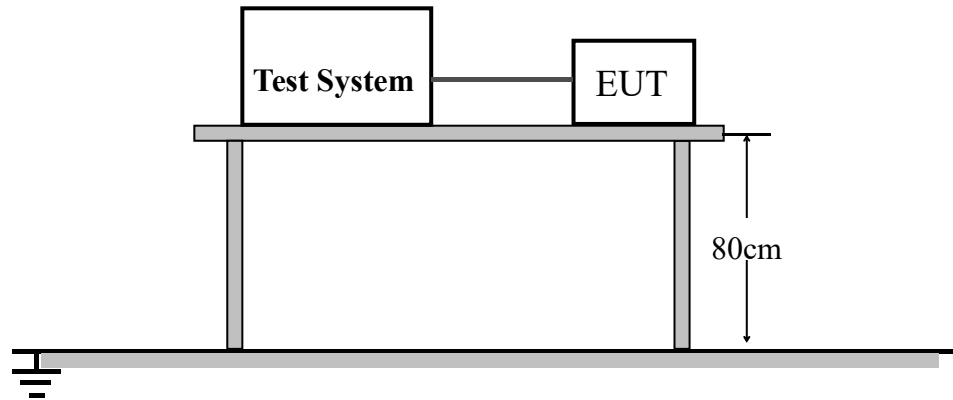
5.9.2 Test Procedure

- 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 (I) 95% voltage dip of supplied voltage with duration of 10ms, (II) 30% voltage dip of supplied voltage and duration 500ms. Both of the dip tests were carried out for a sequence of three voltage dips with intervals of 10 seconds.
- 95% voltage interruption of supplied voltage with duration of 5000ms was followed, which was a sequence of three voltage interruptions with intervals of 10 seconds.
- Changes to occur at 0 degree crossover point of the voltage waveform. If the EUT does not demonstrate compliance when tested with 0 degree switching, the test shall be repeated with the switching occurring at both 90 degrees and 270 degrees. If the EUT satisfies these alternative requirements, then it fulfils the requirements. This condition shall be recorded in the test report.
- Where the equipment has a rated voltage range the following shall apply:

If the voltage range does not exceed 20 % of the lower voltage specified for the rated voltage range. A single voltage within that range may be selected for testing.

In all other cases, the test procedure shall be applied for both the lowest and highest voltages declared in the voltage range.

5.9.3 Test Setup



5.9.4 Test Location

Testing Room: Located at C3.

5.9.5 Test Result

| Test Mode | Voltage Reduction | Duration (period) | Times | Interval (Sec) | Observation | Comply with Criterion |
|-----------------------|-------------------|-------------------|-------|----------------|-------------|-----------------------|
| Voltage dips | >95% | 0.5 | 3 | 10 | Note (1) | A |
| | 30% | 25 | 3 | 10 | Note (1) | A |
| Voltage interruptions | >95% | 250 | 3 | 10 | Note (3) | C |

Note:

- (1). The EUT continued to operate as intended. No degradation of performance was observed.
- (2). The EUT continued to operate as intended after test. Degradation of performance was observed during test.
- (3). The EUT continued to operate as intended after test. But can be restored by the operation of the controls.

ANNEX I - EUT PHOTOS

EUT PHOTOS (1)



EUT PHOTOS (2)



Name Plate



Port photo



End of the report
