

EMC TEST REPORT Report Number RP20170711049 Date of 14 July 2017 : Issue: Model / Serial No. XT-23G 1 Product Type **IP PHONE** 2 Applicant SAHAB TECHNOLOGY 2 Address Ofiice 21, Qibla Tower, Fahad Al Salem St., Qibla, State of : **KUWAIT** Manufacturer SAHAB TECHNOLOGY : Address Ofiice 21, Qibla Tower, Fahad Al Salem St., Qibla, State of 2 KUWAIT **Test Result 6** Negative 2 **⑤** Positive Total pages including 39 Appendices 2

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1 <u>General Information</u>

1.1 Notes

It is the test results from all the tests which are performed in the EMC Laboratory of Shenzhen Zoom Rel Testing Technology Co., Ltd. The EMC Lab was certificated by CNAS and the registration number was L0611.

The Test modes / monitoring methods for all the tests are specified by the manufacturer which can demonstrate the worst case in the emission tests and prove the EUT is still normal working during / after the immunity tests.

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1.2 Testing Laboratory

Shenzhen Zoom Rel Testing Technology Co., Ltd.

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1.3 Details of Manufacture

Manufacture : SAHAB TECHNOLOGY

ADDRESS: Ofiice 21, Qibla Tower, Fahad Al Salem St., Qibla, State of KUWAIT

PRODUCT DESCRIPTION: IP PHONE

MANUFACTURERS MODEL NUMBER: XT-23G

SAMPLE NUMBER: EMC20155700S,S20170711049

1.4 Application Details

Date of receipt of order: 2016/04/13 Date of receipt of test item: 2016/04/17 Date of test: 2016/04/01-2016/05/16, 2017/07/12

1.5 Test Item

Refer to Chapter 2.

1.6 Applied Standard

| | Tab.1 Standard |
|------------------|-------------------|
| | EN 55032:2012 |
| | EN 55024:2010 |
| APPLIED STANDARD | EN 61000-3-2:2014 |
| | EN 61000-3-3:2013 |



Summary of Results 2

| Tab.2 Summary of Results | | | | | |
|---|------------------------|--|--------|------|-------------------------|
| EUT Classification: Customer Equipment | | | | | |
| Test Items | Test Configuration | LIMITS/Required Performance Criteria | Result | Site | Location |
| Radiated Emissions Enclosure Port | Chap.4 | CLASS B | Pass | 1.2 | ⊠ Nanjing ☐ Shenzhen |
| Conducted Emissions ⊠ AC Power Port ⊠ Ethernet Port | Chap.4 | CLASS B | Pass | 1.2 | ⊠ Nanjing □ Shenzhen |
| Harmonics Emission ⊠ AC Power Port | Chap.4 | А | Pass | 1.2 | ⊠ Nanjing □ Shenzhen |
| Voltage Flicker ⊠ AC Power Port | Chap.4 | N/A | Pass | 1.2 | ⊠ Nanjing □ Shenzhen |
| Electrostatic Discharge Immunity Enclosure Port | Chap.4 | В | Pass | 1.2 | Nanjing |
| Radiated Electromagnetic Fields Immunity Enclosure Port | Chap.4 | A | Pass | 1.2 | ☐ Nanjing ⊠ Shenzhen |
| Electrical Fast Transient Bursts Immunity ⊠ AC Power Port ⊠ Ethernet Port | Chap.4 | В | Pass | 1.2 | ⊠ Nanjing □ Shenzhen |
| Surges Immunity ⊠ AC Power Port ⊠ Ethernet Port | Chap.4 | В | Pass | 1.2 | ⊠ Nanjing □ Shenzhen |
| Continuous Conducted Interference Immunity | Chap.4 | A | Pass | 1.2 | ⊠ Nanjing □ Shenzhen |
| Continuous Voltage dips and Short Interruption Immunity ⊠AC Power Port | Chap.4 | B&C | Pass | 1.2 | ⊠ Nanjing □ Shenzhen |
| Note: 1, Measurement taken is within the measurement | nt uncertainty of meas | surement system. | | | |



3 Equipment Specification

3.1 General Description

The XT-23G telephone gives you great features with four Session Initiation Protocol (SIP) accounts and a competitive price point. The XT-23G IP phone is designed exclusively for FreePBX.The XT-23G is so smart you can quickly and easily use it right out of the box. It features industry standard Power over Ethernet, so no power cable or outlets required. They have full duplex speakerphones,dual Ethernet Ports, multi-way conference calling, high definition voice quality, and they're Virtual Private Network (VPN) capable.

3.2 Technical Specifications

Model:XT-23G Input:5V=1.2A

Adapter: RD0501200-C55-KOG Input: AC100-240V 50/60Hz 0.18A Output: DC5V 1200mA SHENZHEN RUIDE Electronic INDUSTRIAL CO..LTD





4 General configuration description and monitoring methods

In the EMC test, the system configuration is as below:







Handset Cord

Ethernet Cable

| | Network | |
|-----------|---------|----|
| TP Phone | cable | PC |
| II I HOME | | IC |

Fig.1 The measurement setting

During EMC test, the XT-23G and basic network configuration are shown in Fig.1. As is shown, during the test, the EUT connects PC, PC pings EUT and monitors the data flow.

For the CE and RE, the test result in this report is the worst case of EUT with input voltage of 230Vac.



5 Immunity Performance Criteria

The manufacturer has the obligation to express the performance criteria in terms which relate to the performance of his specific product when used as intended.

The following performance criteria are applicable, and shall only be evaluated when the functions referred to are implemented.

Examples of functions defined by the manufacturer to be evaluated during testing include, but are not limited to, the following:

- . Essential operational modes and states;
- . Tests of all peripheral access (hard disks, floppy disks, printers, keyboard, mouse, etc.);
- . Quality of software execution;
- . Quality of data display and transmission;
- . Quality of speech transmission.

5.1 Performance Criterion A

During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT 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 EUT if used as intended.

5.2 Performance Criterion B

After the test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance.

During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.

If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.

5.3 Performance Criterion C

During and after testing, a temporary loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls or cycling of the power to the EUT by the user in accordance with the manufacturer's instructions.

Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.



6 Electromagnetic Susceptibility

6.1 Electrostatic Discharge Immunity test

- . .

6.1.1 Test Procedure

In order to minimize the impact of environmental parameters on test results, the tests shall be carried out in climatic and electromagnetic reference conditions. The electromagnetic environmental of the laboratory shall not influence the test results. The test climatic environment conditions recorded complied with the reference conditions were:

| Tab.1 Test Environment Condition during ESD Test | | |
|--|--------|--|
| Ambient temperature | 24.1°C | |
| Relative humidity | 45.8% | |
| Atmospheric pressure | 101kPa | |

The static electricity discharges shall be applied only to those points and surfaces of the EUT which are accessible to persons during normal use.

The set-up and test methods were according to EN 61000-4-2. The test set-up consists of the test generator, EUT and auxiliary instrumentation necessary to perform direct and indirect application of discharges to the EUT. See the following figure.



Fig.2 Electrostatic discharge immunity test

For conformance testing, the EUT shall be continually operated in its most sensitive mode (program cycle) which shall be determined by preliminary testing. The EUT shall be connected to the grounding system, in accordance with its installation specifications. The test shall be performed with single discharges. On preselected points at least ten single discharges (in the most sensitive polarity) shall be applied.



6.1.2 Test Results

The EUT has met the requirements of Performance Criterion B for Immunity to Electrostatic Discharge of enclosure port. Perform ten single discharges for each polarity on each preselected point .Details of the points tested were presented in following Table.

| | Tab.3 Test Resu | lts | |
|---------------|----------------------------|-----------------------------------|------------|
| | Specification Level | | |
| Test Points | ±4kV Contact Discharges | ±2kV, ±4kV,±8kV Air Discharges | Conclusion |
| HCP | \checkmark | N/A | pass |
| VCP | \checkmark | N/A | pass |
| Surface slots | N/A | \checkmark | pass |
| LED ports | N/A | | pass |

 \checkmark The EUT's performance was not impaired at this test point when the ESD pulse was applied.



6.2 Radiated Electric Fields Immunity test

6.2.1 Test Procedure

All testing of equipment shall be performed in a configuration as close as possible to actual installation conditions. The set-up and test methods were according to EN 61000-4-3.

The test facility typically consists of an absorber-lined shielded enclosure large enough to accommodate the EUT whilst allowing adequate control over the field strengths. This includes anechoic chambers or modified semi-anechoic chambers. The test shall normally be performed with the generating antenna facing each side of the EUT. The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally.

The tests are normally performed in the frequency range 80 MHz to 2.7GHz. The standard does not suggest that a single test level is applicable over the entire frequency range. The test field strength column gives values of the unmodulated carrier signal. For testing of equipment, this carrier signal is 80 % amplitude modulated with a 1 kHz sine wave to simulate actual threats.



Fig.3 Radiated electric fields immunity test

6.2.2 Test Results

The EUT has met the requirements of Performance Criterion A for Immunity to Radiated Electric Fields of enclosure port.

| Т | ab.4 Test Results |
|-------------------|---------------------------------------|
| Test side of EUT | Front, Rear, Left, Right |
| Frequency range & | 80MHz–1000MHz |
| Test Level | test level: 3 V/m (Unmodulated, rms) |
| | 1.4GHz–2.7GHz ^(a) |
| | test level: 10 V/m (Unmodulated, rms) |
| Modulation | 80% AM, 1kHz |
| Criterion | Α |
| Conclusion | Pass |

Remark ^(a): Required by manufacturer, only for reference.



6.3 Electrical Fast Transient Bursts Immunity test

6.3.1 Test Procedure

The repetitive fast transient test is intended to demonstrate the immunity of electrical and electronic equipment when subjected to types of transient disturbances such as those originating from switching transients (interruption of inductive loads, relay contact bounce, etc.).

The test with bursts consists of a number of fast transients provided by a burst generator, coupled into power supply, control, signal and earth ports of electrical and electronic equipment. Significant for the test are the high amplitude, the short rise time, the high repetition rate, and the low energy of the transients.

The coupling/decoupling network is required for acceptance tests of AC/DC power supply ports. The capacitive coupling clamp provides the ability of coupling the fast transients/bursts to the circuit under test without any galvanic connection to the terminals of the EUT's ports, shielding of the cables or any other part of the EUT.

The set-up and test methods were according to EN 61000-4-4. See the following figure.



Fig.4 Electrical Fast Transient Bursts Immunity test (AC Power Port)

6.3.2 Test Results

The EUT has met the requirements of Performance Criterion B for Immunity to Electrical Fast Transient Bursts. The duration time is 90s.

| Tab.5 Test Results | | |
|--------------------|---------------|---------------|
| Ports | AC Power port | Ethernet port |
| Frequency range | 5kHz | 5kHz |
| Test Level | ±1kV | ±0.5kV |



| Criterion | В | В |
|------------|------|------|
| Conclusion | Pass | Pass |



6.4 Surges Immunity test

6.4.1 Test Procedure

The rapid change of voltage and flow of current which can occur as a result of the operation of a lightning protection device can induce electromagnetic disturbances into adjacent equipment.

Two types of combination wave generator are specified. Each has its own particular applications, depending on the type of port to be tested. The 10/700 μ s combination wave generator is used to test ports intended for connection to symmetrical communication lines. The 1.2/50 μ s combination wave generator is used in all other cases, and in particular, for testing ports intended for power lines and short-distance signal connections. The set-up and test methods were according to EN 61000-4-5. See the following figure.





6.4.2 Test Results

The EUT has met the requirements of Performance Criterion B for Immunity to Surges. For each port, test for 5 positive and 5 negative pulses. Time between successive pulses is 60s.

| Tab.6 Test Results | | |
|--------------------|------------------------------------|---------------|
| Dorto | AC Power port | |
| POILS | L/N | L/P N/P |
| Surge Wave | 1.2/50us | 1.2/50us |
| | | \pm 0.5 kV, |
| Test Voltage & | $\pm 0.5 \text{ kV},$ + 1 0 kV/ | \pm 1.0 kV, |
| Resistor | | \pm 2.0 kV |
| | 232 | 12Ω |



| Criterion | В |
|------------|------|
| Conclusion | Pass |



6.5 Continuous Conducted Interference Immunity test

6.5.1 Test Procedure

The test shall be performed with the test generator connected to each of the coupling devices (CDN, EM clamp, current injection probe) in turn. The frequency range is swept from 150 kHz to 80 MHz, using the signal levels established during the setting process, and with the disturbance signal 80 % amplitude modulated with a 1 kHz sine wave. The set-up and test methods were according to EN 61000-4-6. See the following figure.



Fig.6 Continuous Conducted Interference Immunity test (AC Power Port)

6.5.2 Test Results

The EUT has met the requirements of Performance Criterion A for Immunity to Continuous Conducted Interference.

| Tab.7 Test Results | | |
|------------------------------------|---------------------------------------|---------------------------------------|
| Ports | AC Power port | Ethernet port |
| Frequency range & Test Level | 150kHz–80MHz 3V (Unmodulated, rms) | 150kHz–80MHz 3V (Unmodulated, rms) |
| Modulation | 80% AM, 1kHz | 80% AM, 1kHz |
| Criterion | A | A |
| Conclusion | Pass | Pass |



6.6 Power Frequency Magnetic Field Immunity test

6.6.1 Test Procedure

All testing of equipment shall be performed in a configuration as close as possible to actual installation conditions. The set-up and test methods were according to EN 61000-4-8.

The test with a shout duration magnetic field related to fault conditions, requires test levels that differ from those for steady-state conditions; The highest values apply mainly to equipment to be installed in exposed places of electrical plants.

The preferential range of test levels, respectively for continuous and short duration application of the magnetic field, applicable to distribution networks at 50 Hz and 60 Hz.

The magnetic field strength is expressed in A/m, 1 A/m corresponds to a free space induction of 1,26 $\,\mu$ T.



Fig.7 Power Frequency Magnetic Field immunity test (charge mode)

6.6.2 Test Results

The EUT has met the requirements of Performance Criterion A for Immunity to Radiated Electric Fields of enclosure port.

| Frequency range & | 50Hz | |
|-------------------|---|--|
| Test Level | test level: 1 A/m, 3 A/m ^(a) | |
| Inductance Coil | Rectangular type,1m×1m | |
| Observation Time | 5 minute | |
| Criterion | A | |
| Conclusion | Pass | |

Remark ^(a): Required by manufacturer, only for reference.



| | lab | .9 Test Results | |
|-------------------------|-------------------------|------------------|------------|
| Antenna Polarization | Magnetic Field (A/m) | Test Result | Phenomenon |
| Х | 1,3 | ⊠ Pass □ Fail | normal |
| Y | 1,3 | ⊠ Pass □ Fail | normal |
| Z | 1,3 | ⊠ Pass □ Fail | normal |



6.7 Voltage Dips and Short Interruption and Voltage Variation Immunity test

6.7.1 Test Procedure

Voltage dips and short interruptions are caused by faults in the network, primarily short circuits, in installations or by sudden large changes of load. In certain cases, two or more consecutive dips or interruptions may occur. Voltage variations are caused by continuously varying loads connected to the network.

The EUT shall be tested for each selected combination of test level and duration with a sequence of three dips/interruptions. The set-up and test methods were according to EN 61000-4-11. See the following figure.



Fig.8 Voltage Dips and Short Interruption and Voltage Variation Immunity test

6.7.2 Test Results

The EUT has met the requirements Performance Criterion for Immunity to Voltage dips and short interruption of AC Power ports.

| | | Deufermene | Teet Desult | |
|--------------------------|--|------------|-------------|------------|
| Test Items | Measuring Condition | Criterion | Description | Conclusion |
| Voltage | Voltage reduction 100% Duration 0.01s Test Voltage 0V | В | normal | Pass |
| Interruption, Voltage | Voltage reduction 100% Duration 0.02s ^(a) Test Voltage 0V | В | normal | Pass |
| variation | Voltage reduction 30% Duration 0.5s | С | normal | Pass |

| | I | ab. | 10 | Test | Results | |
|--|---|-----|----|------|---------|--|
|--|---|-----|----|------|---------|--|



| Test Voltage 161V | | | |
|--|---|-------------------------------------|------|
| Voltage reduction 100% Duration 5s Test Voltage 0V | С | Interrupted but can be normal | Pass |

Remark ^(a): Required by manufacturer, only for reference.



7 <u>Electromagnetic Interference</u>

7.1 Conducted Emissions

7.1.1 Test Procedure

The mains cable of the EUT being measured shall be connected to LISN, The LISN shall be placed 0.8 m 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 0.8 m 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 0.1 m.

The set up of Conducted Disturbance for telecommunication port was according to Annex C of EN 55032/CISPR 32. See the following figure.



Fig.9 Conducted emissions test (AC Power Port)





Fig.10 Conducted emissions test (Ethernet port)

7.1.2 Test Results

The EUT has met requirements of conducted disturbance. The test data see section 10.1 of this report.

| | Frequency | QP | AV |
|------------------|----------------|-----------|-----------|
| | 0.15MHz~0.5MHz | 66~56dBµV | 56~46dBµV |
| Limits (Class B) | 0.5MHz~5MHz | 56dBµV | 46dBµV |
| | 5MHz~30MHz | 60dBµV | 50dBµV |

Tab.11 Limits for conducted disturbance at main ports

Tab.12 Limits for conducted disturbance at telecommunication ports

| | Frequency | Voltage | e limits |
|------------------|----------------|----------|----------|
| Limite (Class P) | | QP | AV |
| | 0.15MHz~0.5MHz | 84~74BµV | 74~64BµV |
| | 0.5MHz~30MHz | 74dBµV | 64dBµV |



7.2 Radiated Emissions

7.2.1 Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 (2014). The test distance was 3m. The set-up and test methods were according to EN 55032/CISPR 32

A preliminary scan and a final scan of the emissions shall be made from 30 MHz to 1GHz by using a Quasi-Peak Detector, and from 1GHz to 6GHz by using average and peak Detector. The maximal emission value was acquired by adjusting the antenna height, polarisation 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 Vertical and Horizontal. See the following figure.



Fig.11 Radiated emission test (Below 1GHz)





Fig.12 Radiated emission test (Above 1GHz)

7.2.2 Test Results

The EUT has met the requirements of Radiated Emission of enclosure port. The test data see section10.2 of this report.

| Measuring distance | | 3m | |
|--------------------|-----------------|----------|-----------|
| | Frequency range | QP | |
| Limits(Class B) | 30MHz~230MHz | 40dBµV/m | |
| | 230MHz~1GHz | 47dBµV/m | |
| | Frequency range | Peak | AV |
| | 1GHz~3GHz | 70dBµV/m | 50 dBµV/m |
| | 3GHz~6GHz | 74dBuV/m | 54 dBuV/m |

Tab.13 Limits for radiated disturbance



7.3 Harmonics Emission

7.3.1 Test Procedure

The EUT is to be powered from a clean (low distortion) AC power source. The set-up and test methods were according to EN 61000-3-2. See the following figure.



Fig.13 Harmonic Emission

The test environment conditions recorded were:

| Tab.14 | Test Environment | Condition | during Test |
|--------|------------------|-----------|-------------|
|--------|------------------|-----------|-------------|

| Ambient temperature | 25.7°C |
|----------------------|--------|
| Relative humidity | 54.1% |
| Atmospheric pressure | 101kPa |

7.3.2 Test Results

The EUT has met the requirements of EN 61000-3-2 for harmonics in AC power ports. The test data see section 10.3.



7.4 Voltage Flicker

7.4.1 Test Procedure

The EUT is to be powered from a clean (low distortion) AC power source. The set-up and test methods were according to EN 61000-3-3. See the following figure.



Fig.14 Flicker emission

The test environment conditions recorded were:

| Tab.15 | Test Environment Condition during Test |
|--------|---|
| 100.10 | Tool Environment Contaition during 1000 |

| Ambient temperature | 25.7°C |
|----------------------|--------|
| Relative humidity | 54.1% |
| Atmospheric pressure | 101kPa |

7.4.2 Test Results

The EUT has met the requirements of EN 61000-3-3 for flicker in AC power ports. The test data see section 10.4.



8 Main Test Instruments

Tab.16 Main Test Instruments

| Test item | Test Instrument | Model | Manufacturer | Last Calibration Date | Calibration Interval (years) |
|-------------------|----------------------------------|-----------------------|--------------|-----------------------------|------------------------------------|
| ESD | ESD Simulator | ONYX30 | HAEFELY | 2015-11-12 | 1 |
| | Millivoltmeter | URV 5 | R&S | 2015-10-10 | 1 |
| | Power Amplifier | BLWA 0810- 250/200 | R&S | N/A | N/A |
| RS | Power Amplifier | BLWA 1030-100 | R&S | N/A | N/A |
| | Signal Generator | SMB 100A | R&S | 2015-4-13 | 1 |
| | Log periodic Antenna | HL046E | R&S | 2015-7-13 | 1 |
| | Fast Transient Burt Simulator | NSG 2025 | Schaffner | 2015-5-12 | 1 |
| EFT | Capacitive Clamp | CDN8014 | SCHAFFNER | 2015-5-12 | 1 |
| | AC Main CDN | CDN163 | SCHAFFNER | 2015-5-12 | 1 |
| | Surge Simulator (1.2- 50us) | UCS500-M6 | EM Test | 2015-11-12 | 1 |
| | Signal Lines CDN | CNV504A | EM Test | 2015-11-12 | 1 |
| | Signal Lines CDN | CNV508S1 | EM Test | 2015-11-12 | 1 |
| SURGE | Surge Simulator (1.2- 50us) | UCS500N7 | EM Test | 2015-11-12 | 1 |
| | Signal Lines CDN | CNT508 | EM Test | 2015-11-12 | 1 |
| | Signal Lines CDN | CNV 508 S19 | EM Test | 2015-11-12 | 1 |
| | Surge Simulator (10- 700us) | TSURGE7 | EM Test | 2015-11-12 | 1 |
| | 6dB Attenuator (75W) | ATT 6 | EM Test | 2015-5-12 | 1 |
| CS | EM Clamp | KEMZ801 | SCHAFFNER | 2015-5-12 | 1 |
| | Continuous Wave Simulator | CWS500N1 | EM Test | 2015-5-12 | 1 |
| | Power Lines CDN | CDN M2-M3 | EM Test | 2015-5-12 | 1 |
| | Generator | UCS500-M6 | EM Test | 2015-10-13 | 1 |
| PFMF | magnetic field coil | MS100 | EM Test | 2015-4-10 | 1 |
| current converter | | MC2630 | EM Test | 2015-4-10 | 1 |
| Voltage | Generator | UCS500-M6 | EM Test | 2015-10-13 | 1 |
| dips | Voltage Dips simulator | MV 2616 | EM Test | 2015-5-12 | 1 |



| - | | | | | | | | |
|----------|--|---------------|--------------------|--------------|--------|-----|------------|---|
| | EMI Test Receiver | | | ESCI3 | | R&S | 2017-5-3 | 1 |
| | LISN | | NNLK8128 | | | R&S | 2016-11-7 | 1 |
| UE | ISN | | E | ENY81 | | R&S | 2016-11-17 | 1 |
| | Pulse Lir | niter | E | SH3-Z2 | | R&S | 2016-11-7 | 1 |
| | EMI Test R | eceiver | | ESIB7 | | R&S | 2016-11-7 | 1 |
| | Log periodic Antenna | | SWB | -VUBA9163 | | R&S | 2016-11-19 | 1 |
| RE | Double-Ridged Waveguide Horn Antenna | | R&S® HF906 | | | R&S | 2016-11-19 | 1 |
| | Anechoic Chamber | | 966 | | | R&S | 2016-11-7 | 1 |
| | EMI Test R | eceiver | FSL06 | | | R&S | 2016-11-7 | 1 |
| Harmonic | Harmonic & Analyz | Flicker er | F | PACS-1 | | R&S | 2015-8-12 | 1 |
| Flicker | Programable Suppl | e Power y | e Power 50 y 50 | | | R&S | 2015-8-12 | 1 |
| | | | So | ftware Infor | mation | | | |
| Test | Item | Softw Nam | are ne | Manufact | urer | | Version | |
| R | RE | EMC | 32 | R&S | | | V.8.40.0 | |
| C | E | EMC | 32 | R&S | | | V8.52.0 | |
| AC- | Dips | UCS50 | 0-M6 | EMTES | ST | | V2.4 | |
| Harmonic | and Flicker | er CTS 4 | | CI | | | V4.9.0 | |



9 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

| | Items | Extended Uncertainty |
|-------|---------------------------------|--|
| RE | Field strength (dBµV/m) | 4.1dB (k=2) 30MHz~1GHz) 4.6dB (k=2) (1GHz~6GHz) |
| CE | Disturbance Voltage(dBµV) | 2.0dB (k=2) |
| RS | Field strength(V/m) | 3.6dB (k=2) |
| CS | Voltage(V) | 1.17dB (k=2) |
| сст | Voltage(V) | 4% |
| | Time | 3% (k=2) |
| | Charge Voltage(V) | 1% |
| FSD | Peak Current of discharge | 6% |
| | Rise time with discharge switch | 10% |
| | Current at 30ns/60ns | 6% (k=2) |
| | Voltage(V) | 3.8% |
| SURGE | Current | 1.8% (k=2) |

Tab.17 System Measurement Uncertainty



10 Test record

10.1 Conducted Emission

| TEST | |
|-----------------------------|-------------------------------------|
| Conducted Emission | |
| EUT: | XT-23G |
| Operating Condition: | Running |
| Test Site: | ZRT EMC Nanjing LAB |
| Operator: | Zhao Ruru |
| Test Specification: | EN 55032 CLASS B |
| Comment: | AC Power port-L |
| | LOG-Voltage with 4-Line-LISN ClassB |



Final Result 1

| Frequency (MHz) | QuasiPeak (dB µ V) | Meas. Time (ms) | Bandwidth (kHz) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dB µ V) |
|--------------------|-----------------------|-----------------------|--------------------|-----|------|---------------|----------------|----------------------|
| 0.153760 | 49.1 | 1000.0 | 9.000 | FLO | L1 | 9.9 | 16.7 | 65.8 |
| 0.418551 | 47.5 | 1000.0 | 9.000 | FLO | L1 | 9.9 | 10.0 | 57.5 |
| 0.672079 | 44.5 | 1000.0 | 9.000 | FLO | L1 | 9.9 | 11.5 | 56.0 |
| 1.090934 | 40.8 | 1000.0 | 9.000 | FLO | L1 | 9.9 | 15.2 | 56.0 |
| 3.555326 | 35.2 | 1000.0 | 9.000 | FLO | L1 | 9.9 | 20.8 | 56.0 |
| 12.782588 | 39.9 | 1000.0 | 9.000 | FLO | L1 | 10.0 | 20.1 | 60.0 |

| Frequency (MHz) | CAverage (dB µ V) | Meas. Time (ms) | Bandwidth (kHz) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dB µ V) |
|--------------------|----------------------|-----------------------|--------------------|-----|------|---------------|----------------|----------------------|
| 0.329056 | 30.4 | 1000.0 | 9.000 | FLO | L1 | 9.9 | 19.1 | 49.5 |
| 0.417706 | 39.5 | 1000.0 | 9.000 | FLO | L1 | 9.9 | 8.0 | 47.5 |
| 0.672097 | 34.5 | 1000.0 | 9.000 | FLO | L1 | 9.9 | 11.5 | 46.0 |
| 1.095000 | 29.9 | 1000.0 | 9.000 | FLO | L1 | 9.9 | 16.2 | 46.0 |
| 2.038185 | 25.7 | 1000.0 | 9.000 | FLO | L1 | 9.9 | 20.3 | 46.0 |
| 13.330525 | 30.1 | 1000.0 | 9.000 | FLO | L1 | 10.0 | 19.9 | 50.0 |

TESTConducted EmissionEUT:XT-23GOperating Condition:RunningTest Site:ZRT EMC Nanjing LABOperator:Zhao RuruTest Specification:EN 55032 CLASS BComment:AC Power port-N

LOG-Voltage with 4-Line-LISN ClassB



Final Result 1

| Frequency (MHz) | QuasiPeak (dB | Meas. Time (ms) | Bandwidth (kHz) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dB µ V) |
|--------------------|------------------|-----------------------|--------------------|-----|------|---------------|----------------|----------------------|
| 0.155012 | 49.8 | 1000.0 | 9.000 | FLO | Ν | 9.9 | 16.0 | 65.7 |
| 0.416022 | 42.5 | 1000.0 | 9.000 | FLO | Ν | 9.9 | 15.1 | 57.5 |
| 0.589672 | 38.0 | 1000.0 | 9.000 | FLO | Ν | 9.9 | 18.0 | 56.0 |
| 0.671736 | 40.2 | 1000.0 | 9.000 | FLO | Ν | 9.9 | 15.8 | 56.0 |
| 0.687169 | 40.1 | 1000.0 | 9.000 | FLO | Ν | 9.9 | 15.9 | 56.0 |
| 0.738725 | 38.6 | 1000.0 | 9.000 | FLO | Ν | 9.9 | 17.4 | 56.0 |

| Frequency (MHz) | CAverage (dB µ V) | Meas. Time (ms) | Bandwidth (kHz) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dB µ V) |
|--------------------|----------------------|-----------------------|--------------------|-----|------|---------------|----------------|----------------------|
| 0.417697 | 35.3 | 1000.0 | 9.000 | FLO | N | 9.9 | 12.2 | 47.5 |
| 0.661368 | 26.9 | 1000.0 | 9.000 | FLO | N | 9.9 | 19.1 | 46.0 |
| 0.895886 | 23.9 | 1000.0 | 9.000 | FLO | N | 9.9 | 22.1 | 46.0 |
| 12.808163 | 26.9 | 1000.0 | 9.000 | FLO | N | 10.0 | 23.1 | 50.0 |
| 17.251093 | 28.6 | 1000.0 | 9.000 | FLO | N | 10.1 | 21.4 | 50.0 |
| 19.604890 | 24.1 | 1000.0 | 9.000 | FLO | N | 10.1 | 25.9 | 50.0 |



TESTConducted EmissionEUT:XT-23GOperating Condition:RunningTest Site:ZRT EMC Nanjing LABOperator:Zhao RuruTest Specification:EN 55032 CLASS BComment:Ethernet port



Final Result 1

| Frequency (MHz) | QuasiPeak (dB | Meas. Time (ms) | Bandwidth (kHz) | Cor r. (dB) | Mar gin (dB) | Limit (dB µV) |
|--------------------|------------------|-----------------------|--------------------|-------------------|--------------------|---------------------|
| 0.416661 | 54.2 | 1000.0 | 9.000 | 19.5 | 21.3 | 75.5 |
| 0.673031 | 52.9 | 1000.0 | 9.000 | 19.5 | 21.1 | 74.0 |
| 0.805620 | 52.7 | 1000.0 | 9.000 | 19.5 | 21.3 | 74.0 |
| 8.512193 | 46.0 | 1000.0 | 9.000 | 19.4 | 28.0 | 74.0 |
| 13.915569 | 51.9 | 1000.0 | 9.000 | 19.5 | 22.1 | 74.0 |
| 29.911309 | 48.9 | 1000.0 | 9.000 | 20.2 | 25.1 | 74.0 |

| Frequency (MHz) | CAverage (dB µ V) | Meas. Time (ms) | Bandwidth (kHz) | Cor r. (dB) | Mar gin (dB) | Limit (dB µV) |
|--------------------|----------------------|-----------------------|--------------------|-------------------|--------------------|---------------------|
| 0.387744 | 46.8 | 1000.0 | 9.000 | 19.6 | 19.3 | 66.1 |
| 0.417494 | 51.9 | 1000.0 | 9.000 | 19.5 | 13.6 | 65.5 |
| 0.573611 | 44.7 | 1000.0 | 9.000 | 19.5 | 19.3 | 64.0 |
| 0.835121 | 45.0 | 1000.0 | 9.000 | 19.4 | 19.0 | 64.0 |
| 13.613069 | 44.2 | 1000.0 | 9.000 | 19.5 | 19.8 | 64.0 |
| 29.911309 | 43.7 | 1000.0 | 9.000 | 20.2 | 20.3 | 64.0 |



10.2 Radiated Emission

| TEST | |
|--------------------------------|---------------------|
| Electric Field Strengtl | า |
| EUT: | XT-23G |
| Operating Condition: | RUNNING |
| Test Site: | ZRT EMC Nanjing LAB |
| Operator: | Yang Jianfeng |
| Test Specification: | EN 55032 CLASS B |
| Comment: | HOR (30MHz~1GHz) |



| Frequency | QuasiPeak | Meas. | Bandwidth | Height | Polarization | Azimuth | Corr. | Margin | Limit |
|------------|-----------|--------|-----------|--------|--------------|---------|-------|--------|-------|
| (MHz) | (dB | Time | (kHz) | (cm) | | (deg) | (dB) | (dB) | (dBμ |
| | | (ms) | | | | | | | V/m) |
| 160.013226 | 35.3 | 1000.0 | 120.000 | 150.0 | Н | 329.0 | 10.0 | 4.7 | 40.0 |
| 198.698597 | 22.7 | 1000.0 | 120.000 | 100.0 | Н | 89.0 | 12.6 | 17.3 | 40.0 |
| 204.862124 | 18.9 | 1000.0 | 120.000 | 100.0 | Н | 47.0 | 12.8 | 21.1 | 40.0 |
| 216.698597 | 35.4 | 1000.0 | 120.000 | 100.0 | Н | 83.0 | 13.4 | 4.6 | 40.0 |
| 224.981564 | 37.0 | 1000.0 | 120.000 | 100.0 | Н | 104.0 | 13.8 | 3.0 | 40.0 |
| 267.040081 | 24.0 | 1000.0 | 120.000 | 100.0 | Н | 214.0 | 15.1 | 23.0 | 47.0 |



TESTElectric Field StrengthEUT:XT-23GOperating Condition:RUNNINGTest Site:ZRT EMC Nanjing LABOperator:Yang JianfengTest Specification:EN 55032 CLASS BComment:VER (30MHz~1GHz)



| Frequency (MHz) | QuasiPeak (dB | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB µ V/m) |
|--------------------|------------------|-----------------------|--------------------|----------------|--------------|------------------|---------------|----------------|------------------------|
| 30.194790 | 33.9 | 1000.0 | 120.000 | 100.0 | V | 122.0 | 11.9 | 6.1 | 40.0 |
| 91.486579 | 23.4 | 1000.0 | 120.000 | 100.0 | V | 307.0 | 12.4 | 16.6 | 40.0 |
| 105.332068 | 26.8 | 1000.0 | 120.000 | 100.0 | V | 89.0 | 13.1 | 13.2 | 40.0 |
| 124.960555 | 30.0 | 1000.0 | 120.000 | 150.0 | V | 207.0 | 10.3 | 10.0 | 40.0 |
| 160.004466 | 36.1 | 1000.0 | 120.000 | 100.0 | V | 350.0 | 10.0 | 3.9 | 40.0 |
| 215.031048 | 23.4 | 1000.0 | 120.000 | 100.0 | V | 98.0 | 13.3 | 16.6 | 40.0 |



TESTElectric Field StrengthEUT:XT-23GOperating Condition:RUNNINGTest Site:ZRT EMC Nanjing LABOperator:Zhao RuruTest Specification:EN 55032 CLASS BComment:HOR (1GHz~6GHz)



| Frequency | Average | Meas. | Bandwidth | Height | Polarization | Azimuth | Corr. | Margin | Limit |
|-------------|---------|-------|-----------|--------|--------------|---------|-------|--------|-------|
| (MHz) | (dB μ | Time | (kHz) | (cm) | | (deg) | (dB) | (dB) | (dB μ |
| | V/m) | (ms) | | | | | | | V/m) |
| 1887.360625 | 30.5 | 500.0 | 1000.000 | 188.0 | Н | 295.0 | -7.2 | 19.5 | 50.0 |
| 2375.123125 | 40.9 | 500.0 | 1000.000 | 138.0 | Н | 112.0 | -6.0 | 9.1 | 50.0 |
| 2499.981875 | 47.1 | 500.0 | 1000.000 | 195.0 | Н | 310.0 | -5.4 | 2.9 | 50.0 |
| 2624.869375 | 39.9 | 500.0 | 1000.000 | 154.0 | Н | -1.0 | -4.7 | 10.1 | 50.0 |
| 3812.420625 | 42.8 | 500.0 | 1000.000 | 146.0 | Н | 293.0 | -0.3 | 11.2 | 54.0 |
| 5726.019375 | 46.8 | 500.0 | 1000.000 | 189.0 | Н | 300.0 | 4.0 | 7.2 | 54.0 |



TESTElectric Field StrengthEUT:XT-23GOperating Condition:RUNNINGTest Site:ZRT EMC Nanjing LABOperator:Zhao RuruTest Specification:EN 55032 CLASS BComment:VER(1GHz~6GHz)



| Frequency | Average | Meas. | Bandwidth | Height | Polarization | Azimuth | Corr. | Margin | Limit |
|-------------|---------|-------|-----------|--------|--------------|---------|-------|--------|-------|
| (MHz) | (dB μ | Time | (kHz) | (cm) | | (deg) | (dB) | (dB) | (dB μ |
| | V/m) | (ms) | | | | | | | V/m) |
| 1466.953750 | 39.8 | 500.0 | 1000.000 | 100.0 | V | -2.0 | -9.7 | 10.2 | 50.0 |
| 1471.681250 | 38.1 | 500.0 | 1000.000 | 153.0 | V | 285.0 | -9.7 | 11.9 | 50.0 |
| 2375.058750 | 43.0 | 500.0 | 1000.000 | 100.0 | V | 278.0 | -6.0 | 7.0 | 50.0 |
| 2500.022500 | 47.5 | 500.0 | 1000.000 | 100.0 | V | 32.0 | -5.4 | 2.5 | 50.0 |
| 5000.161875 | 46.1 | 500.0 | 1000.000 | 125.0 | V | 314.0 | 1.8 | 7.9 | 54.0 |
| 5734.121875 | 46.7 | 500.0 | 1000.000 | 100.0 | V | 203.0 | 3.9 | 7.3 | 54.0 |



10.3 Harmonics Emission

Harmonics – Class-A per Ed. 4.0 (2014)(Run time) incl. inter-harmonics

EUT: XT-23GTested by: Tested byTest category: Class-A per Ed. 4.0 (2014) (European limits)Test Margin: 100Test date: 2016-4-14Start time: 11:53:31End time: 11:54:53Test duration (min): 1Data file name: H-000068.cts_dataComment: CommentCustomer: Customer information

Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line European Limits



Test result: Pass Worst harmonic was #15 with 4.1% of the limit.



Current Test Result Summary (Run time)

| EUT: Test Test Test Com | XT-23G category: Clas date: 2016-4-14 duration (min): ment: Comme | s-A per Ed. 4 4 Start f 1 Data f nt | 4.0 (2014) time: 11:5 ïle name: |) (European lim 53:31 9 H-000068.cts_ | Tested by: its) Tes End time: 1 data | Tested by t Margin: 1(1:54:53 |)0 |
|-------------------------------------|---|--|---------------------------------------|---|---|--------------------------------------|--------------|
| Test THC(| Result: Pass A): 0.036 I- | Source o THD(%): 235 | qualificat .4 P(| ion: Normal OHC(A): 0.005 | POHC L | imit(A): 0.2 | 51 |
| High | ost paramotor i | valuos durin | a toet: | | | | |
| mgm | V RMS (Vol | ts): | g lest. | 230.14 | Frequenc | y(Hz): 50.0 | 00 |
| | I_Peak (Amp | ps): | | 0.196 | I_RMS (A | mps): | 0.039 |
| | I_Fund (Am | ps): | | 0.016 | Crest Fac | tor: 5.047 | |
| | Power (Watt | ts): | | 3.6 | Power Fa | ctor: | 0.400 |
| Harm | #Harms(avg)1 | 00%Limit % | of Limit | Harms(max) | 150%Limit | %of Limit | Status |
| 2 | 0.001 | 1.080 | N/A | 0.001 | 1.620 | N/A | Pass |
| 3 | 0.015 | 2.300 | 0.7 | 0.016 | 3.450 | 0.5 | Pass |
| 4 | 0.001 | 0.430 | N/A | 0.001 | 0.645 | N/A | Pass |
| 5 | 0.015 | 1.140 | 1.3 | 0.015 | 1.710 | 0.9 | Pass |
| 6 | 0.000 | 0.300 | N/A | 0.000 | 0.450 | N/A | Pass |
| 7 | 0.014 | 0.770 | 1.8 | 0.014 | 1.155 | 1.2 | Pass |
| 8 | 0.000 | 0.230 | N/A | 0.000 | 0.345 | N/A | Pass |
| 9 | 0.013 | 0.400 | 3.2 | 0.013 | 0.600 | 2.1 | Pass |
| 10 | 0.000 | 0.184 | N/A | 0.000 | 0.276 | N/A | Pass |
| 11 | 0.012 | 0.330 | 3.5 | 0.012 | 0.495 | 2.4 | Pass |
| 12 | 0.000 | 0.153 | N/A | 0.000 | 0.230 | N/A | Pass |
| 13 | 0.010 | 0.210 | 5.U N/A | 0.010 | 0.315 | 3.3 N/A | Pass |
| 14 | 0.000 | 0.131 | IN/A | 0.000 | 0.197 | N/A | Pass |
| 15 | 0.009 | 0.150 | 0.1 N/A | 0.009 | 0.225 | 4. I N/A | Pass Dass |
| 10 | 0.000 | 0.115 | 59 | 0.000 | 0.173 | 3.9 | Pass Pass |
| 18 | 0.000 | 0.102 | 0.5 N/Δ | 0.000 | 0.150 | 0.5 N/Δ | Pass |
| 19 | 0.006 | 0.102 | 54 | 0.006 | 0.100 | 36 | Pass |
| 20 | 0.000 | 0.092 | Ν/Δ | 0.000 | 0 138 | N/A | Pass |
| 21 | 0.005 | 0.107 | 4.8 | 0.005 | 0.161 | 3.2 | Pass |
| 22 | 0.000 | 0.084 | N/A | 0.000 | 0.125 | N/A | Pass |
| 23 | 0.004 | 0.098 | N/A | 0.004 | 0.147 | N/A | Pass |
| 24 | 0.000 | 0.077 | N/A | 0.000 | 0.115 | N/A | Pass |
| 25 | 0.003 | 0.090 | N/A | 0.003 | 0.135 | N/A | Pass |
| 26 | 0.000 | 0.071 | N/A | 0.000 | 0.107 | N/A | Pass |
| 27 | 0.002 | 0.083 | N/A | 0.002 | 0.125 | N/A | Pass |
| 28 | 0.000 | 0.066 | N/A | 0.000 | 0.099 | N/A | Pass |
| 29 | 0.002 | 0.078 | N/A | 0.002 | 0.116 | N/A | Pass |
| 30 | 0.000 | 0.061 | N/A | 0.000 | 0.092 | N/A | Pass |
| 31 | 0.002 | 0.073 | N/A | 0.002 | 0.109 | N/A | Pass |
| 32 | 0.000 | 0.058 | N/A | 0.000 | 0.086 | N/A | Pass |
| 33 | 0.002 | 0.068 | N/A | 0.002 | 0.102 | N/A | Pass |
| 34 | 0.000 | 0.054 | N/A | 0.000 | 0.081 | N/A | Pass |
| 35 | 0.002 | 0.064 | N/A | 0.002 | 0.096 | N/A | Pass |
| 36 | 0.000 | 0.051 | N/A | 0.000 | 0.077 | N/A | Pass |
| 37 | 0.002 | 0.061 | N/A | 0.002 | 0.091 | N/A | Pass |
| 38 | 0.000 | 0.048 | N/A | 0.000 | 0.073 | N/A | Pass |
| 39 | 0.002 | 0.058 | N/A | 0.002 | 0.087 | N/A | Pass |
| 40 | 0.000 | 0.046 | N/A | 0.000 | 0.069 | N/A | Pass |



10.4 Voltage Flicker

Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)

EUT: XT-23GTested by: Tested byTest category: All parameters (European limits)Test Margin: 100Test date: 2016-4-14Start time: 11:57:04End time: 12:07:35Test duration (min): 10Data file name: F-000069.cts_dataComment: CommentCustomer: Customer informationTest Result: PassStatus: Test CompletedPsti and limit lineEuropean Limits



Plt and limit line



Parameter values recorded during the test: Vrms at the end of test (Volt):230.09

| with at the end of test (work) | .200.00 | | | |
|--------------------------------|---------|------------------|-------|------|
| Highest dt (%): | 0.00 | Test limit (%): | N/A | N/A |
| T-max (mS): | 0 | Test limit (mS): | 500.0 | Pass |
| Highest dc (%): | 0.00 | Test limit (%): | 3.30 | Pass |
| Highest dmax (%): | -0.03 | Test limit (%): | 4.00 | Pass |
| Highest Pst (10 min. period): | 0.159 | Test limit: | 1.000 | Pass |
| Highest Plt (2 hr. period): | 0.069 | Test limit: | 0.650 | Pass |

---End of Report---