

Test Report

Product : Smart Watch

Trade Name : UMIDIGI

Model Number : Uwatch · Uwatch2 · Uwatch3

Prepared for

Shenzhen Key Smart Limited
406-407 Jinqi Zhigu Building, 4F Tangling Road, Nanshan District,
Shenzhen City

Prepared by

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TEST RESULT CERTIFICATION

Applicant's name : Shenzhen Key Smart Limited
Address : 406-407 Jinqi Zhigu Building, 4F Tangling Road, Nanshan District, Shenzhen City
Manufacturer's Name : Shenzhen Key Smart Limited
Address : 406-407 Jinqi Zhigu Building, 4F Tangling Road, Nanshan District, Shenzhen City

Product description

Product name : Smart Watch
Model and/or type reference : Uwatch · Uwatch2 · Uwatch3

Standards : ETSI EN 301 489-1 v 2.1.1 (2017)
ETSI EN 301 489-17 v 3.1.1 (2017)

This device described above has been tested by CTB, and the test results show that the equipment under test (EUT) is in compliance with Part the 2014\53\EU RED Directive requirement. And it is applicable only to the tested sample identified in the report. This report shall not be reproduced except in full, without the written approval of CTB, this document may be altered or revised by CTB, personal only, and shall be noted in the revision of the document.

Date of Test :
Date (s) of performance of tests : 10 November 2018 ~ 14 November 2018
Date of Issue : 14 November 2018
Test Result : **Pass**

Testing Engineer : _____

Mason Lai

Authorized Signatory : _____



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1. GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

| | | | | | | |
|---------------------|--|--|--|--|--|--|
| Equipment | | Smart Watch | | | | |
| Brand Name | | UMIDIGI | | | | |
| Model Name | | Uwatch · Uwatch2 · Uwatch3 | | | | |
| Product Description | | The EUT is Smart Watch | | | | |
| | | Operation Frequency: | | 2412MHz~2462MHz | | |
| | | Modulation Type: | | DSSS/OFDM | | |
| | | Number Of Channel | | 11CH | | |
| | | Bit Rate of Transmitter | | 802.11b:11/5.5/2/1Mbps 802.11g:54/48/36/24/18/12/9/6Mbps 802.11n(20M):54/48/36/24/18/12/9/6Mbps 802.11n(40M):300/270/240/180/150/120/108/90Mbps | | |
| | | Antenna Designation: | | External antenna | | |
| | | Antenna Gain(Peak) | | 1.0dBi | | |
| | | Power Rating | | 5V/1A, capacity: 180mA | | |
| | | Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual. | | | | |
| | | Hardware Version | | N/A | | |
| | | | | | | |
| Note | : 1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. | | | | | |
| | | | | | | |
| | | | | | | |

1 TEST FACILITY

Shenzhen CTB Testing Technology Co., Ltd.

Add.: Floor 1&2, Building E, No. 26 of Xinhe Road, Xinqiao Community, Xinqiao Street, Baoan District, Shenzhen, Guangdong, China.

2 MEASUREMENT UNCERTAINTY

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

| No. | Item | Uncertainty |
|-----|-------------------------------|---------------------------|
| 1 | Conducted Emission Test | $\pm 1.38\text{dB}$ |
| 2 | RF power, conducted | $\pm 0.16\text{dB}$ |
| 3 | Spurious emissions, conducted | $\pm 0.21\text{dB}$ |
| 4 | All emissions, radiated(<1G) | $\pm 4.68\text{dB}$ |
| 5 | All emissions, radiated(>1G) | $\pm 4.89\text{dB}$ |
| 6 | Temperature | $\pm 0.5^{\circ}\text{C}$ |
| 7 | Humidity | $\pm 2\%$ |

1.8 Ancillary and Peripheral Devices

| Device | Manufacturer | Model | Cable |
|--------|--------------|-------|-------|
| | | | N/A |

- Note : An Equipment (apparatus) used in connection with a receiver or transmitter is considered as an ancillary Equipment (apparatus) if:
- The equipment is intended for use in conjunction with a receiver or transmitter to provide additional operational and/or control features to the radio equipment. (e.g. to extend control to another position or location); and
 - The equipment cannot be used on a stand alone basis to provide user functions independently of a receiver or transmitter; and
 - The receiver or transmitter to which it is connected, is capable of providing some intended operation such as transmitting and/or receiving without the ancillary equipment (i.e. it is not a sub-unit of the main equipment essential to the main equipment basic functions).

1.9 Test Standards

| |
|--|
| ETSI EN 301 489-1 v 2.1.1 (2017) |
| Electromagnetic compatibility and Radio spectrum Matters (ERM); |
| Electromagnetic Compatibility (EMC) standard for radio equipment and services; |
| Part 1: Common technical requirements |
| ETSI EN 301 489-17 v 3.1.1 (2017) |
| Electromagnetic compatibility and Radio spectrum Matters (ERM); |
| Electromagnetic Compatibility (EMC) standard for radio equipment and services; |
| Part 17: Specific conditions for 2.4GHz wideband transmission systems and 5GHz high performance RLAN equipment |

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

2. Technical Test

2.1 Summary of Test Results

| | |
|---|-------------|
| No deviations from the technical specification(s) were ascertained in the course of the tests Performed | |
| Final Verdict: (Only "Passed" if all Measurements are "Passed") | Pass |

2.2 Test Report

Emission (EMI)

| EMI Phenomenon | Port | Requirement | | Result | Applicability |
|---|---------------------|-------------------------------------|---------------------|----------|----------------|
| | | Standard | Basic Standard | | |
| Conducted Interference Voltage | AC Mains | ETSI EN301 489-1 v 1.9.2 Clause 8.4 | EN 55032: 2012 | Complies | Not Applicable |
| Conducted Interference Voltage | DC | ETSI EN301 489-1 v 1.9.2 Clause 8.3 | EN 55032: 2012 | Complies | Not Applicable |
| Radiated Interference Field Strength 30~1000MHz | Enclosure | ETSI EN301 489-1 v 1.9.2 Clause 8.2 | EN 55032: 2012 | Complies | Applicable |
| Harmonic Current Emissions | AC Mains Input Port | ETSI EN301 489-1 v 1.9.2 Clause 8.5 | EN 61000-3-2 : 2014 | Complies | Not Applicable |
| Flicker & Voltage Fluctuation | AC Mains Input Port | ETSI EN301 489-1 v 1.9.2 Clause 8.6 | EN 61000-3-3 :2013 | Complies | Not Applicable |

Immunity (EMS)

| EMS Phenomenon | Port | Requirement | | Result | Applicability |
|--|--------------------------------|-------------------------------------|---------------------------|----------|----------------|
| | | Standard | Basic Standard | | |
| Electronic Discharge (ESD) | Enclosure | ETSI EN301 489-1 v 1.9.2 Clause 9.3 | EN 61000-4-2:2009 | Complies | Applicable |
| RF-Electro-Magnetic Field | Enclosure | ETSI EN301 489-1 v 1.9.2 Clause 9.2 | EN 61000-4-3:2010 | Complies | Applicable |
| Fast Transients, Burst | Power Line AC/DC | ETSI EN301 489-1 v 1.9.2 Clause 9.4 | EN61000-4-4: 2004+A1:2010 | Complies | Not Applicable |
| Surge | Power Line (1 phase) | ETSI EN301 489-1 v 1.9.2 Clause 9.8 | EN 61000-4-5:2006 | Complies | Not Applicable |
| Transients & Surge Vehicular Environment | Power Line (Car Charge) | ETSI EN301 489-1 v 1.9.2 Clause 9.6 | ISO 7637-2:2004 | Complies | Not Applicable |
| RF Common Mode (0.15-80MHz) | Power Line AC/ DC signal Lines | ETSI EN301 489-1 v 1.9.2 Clause 9.5 | EN 61000-4-6:2009 | Complies | Not Applicable |
| Vol. Dips, Interruptions & Fluctuations | Input & Output AC Ports only | ETSI EN301 489-1 v 1.9.2 Clause 9.7 | EN 61000-4-11:2004 | Complies | Not Applicable |

N/A=Not Applicable

-Performance criteria A for immunity tests with phenomena of a continuous phenomena;

Communication link shall be maintained after the test.

-Performance criteria B for immunity tests with phenomena of a transient phenomena;

N/A

-Performance criteria C for immunity tests with power interruptions exceeding a certain time.

N/A

Clause 8.2 Emission Test – Radiated Emission

This test assesses that ability of ancillary equipment to limit their internal noise from being radiated from the enclosure.

According to EMC basic standard (EN 55032)

Measurement according to EMC basic standard, The test results correspond to the 3m Semi-Anechoic Chamber results.

The EUT and its simulators are placed on a turntable which is 0.8 meter above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

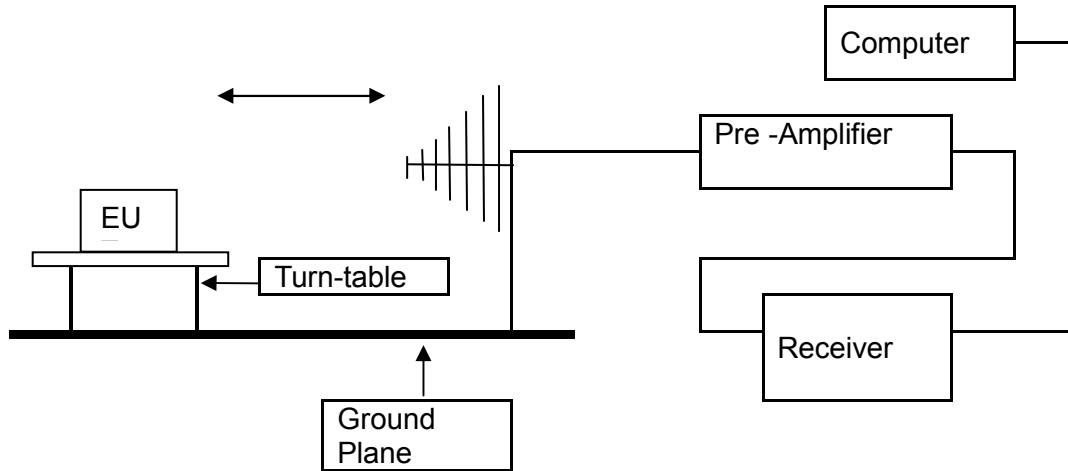
The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to EN55022: 2010 on radiated measurement.

Radiated emissions were investigated over the frequency range from 30MHz to 1 GHz using a receiver bandwidth of 120kHz.

Radiated Emission was performed at an antenna to EUT distance of 3 meters.

Radiated Emission Test

Block diagram of Test setup
Distance = 3m



Power line conducted Emission Limit

| Frequency Range (MHz) | Distance (m) | Quasi-Peak limits (dB μ V/m) |
|-----------------------|--------------|----------------------------------|
| 30-230 | 10/3 | 30.0/40.0 |
| 230-1000 | 10/3 | 37.0/47.0 |
| 1000-3000 | 3 | 50 (AV) /70 (PK) |
| 3000-6000 | 3 | 54 (AV) /74 (PK) |

Note: The lower limit shall apply at the transition frequencies

Test result

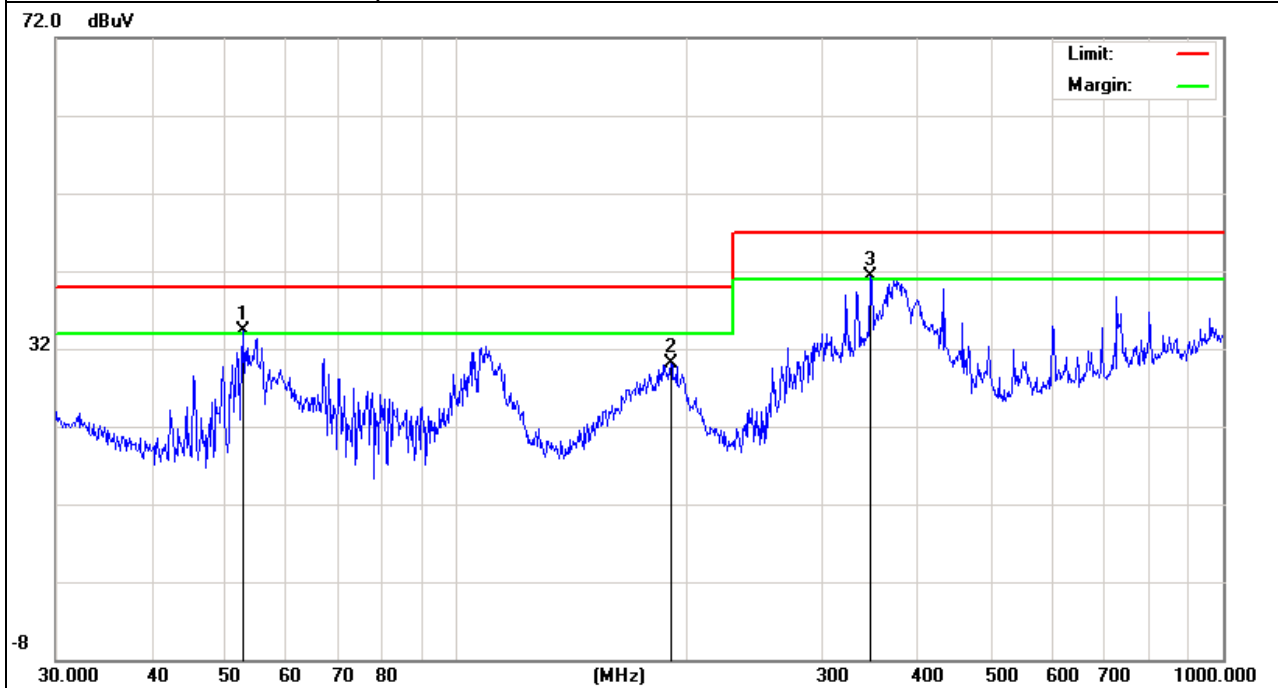
Please refer to the following table

| | | | |
|---------------|-------------|---------------------|------------|
| EUT : | Smart Watch | Model Name. : | Uwatch |
| Temperature : | 24 °C | Relative Humidity : | 54% |
| Pressure : | 1010 hPa | Test Date : | 2018-11-14 |
| Test Mode : | Running | Polarization : | Horizontal |

| Freq. (MHz) | Reading (dBuV) | Factor (dBuV) | Measurement (dBuV) | Limit (dBuV) | Over (dB) | Detector |
|----------------|-------------------|------------------|-----------------------|-----------------|--------------|----------|
| 52.7599 | 27.30 | 6.92 | 34.22 | 40.00 | -5.78 | QP |
| 190.4050 | 21.46 | 8.74 | 30.20 | 40.00 | -9.80 | QP |
| 346.8091 | 26.05 | 15.28 | 41.33 | 47.00 | -5.67 | QP |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Antenna Factor + Cable Loss.
3. N/A means All Data have pass Limit

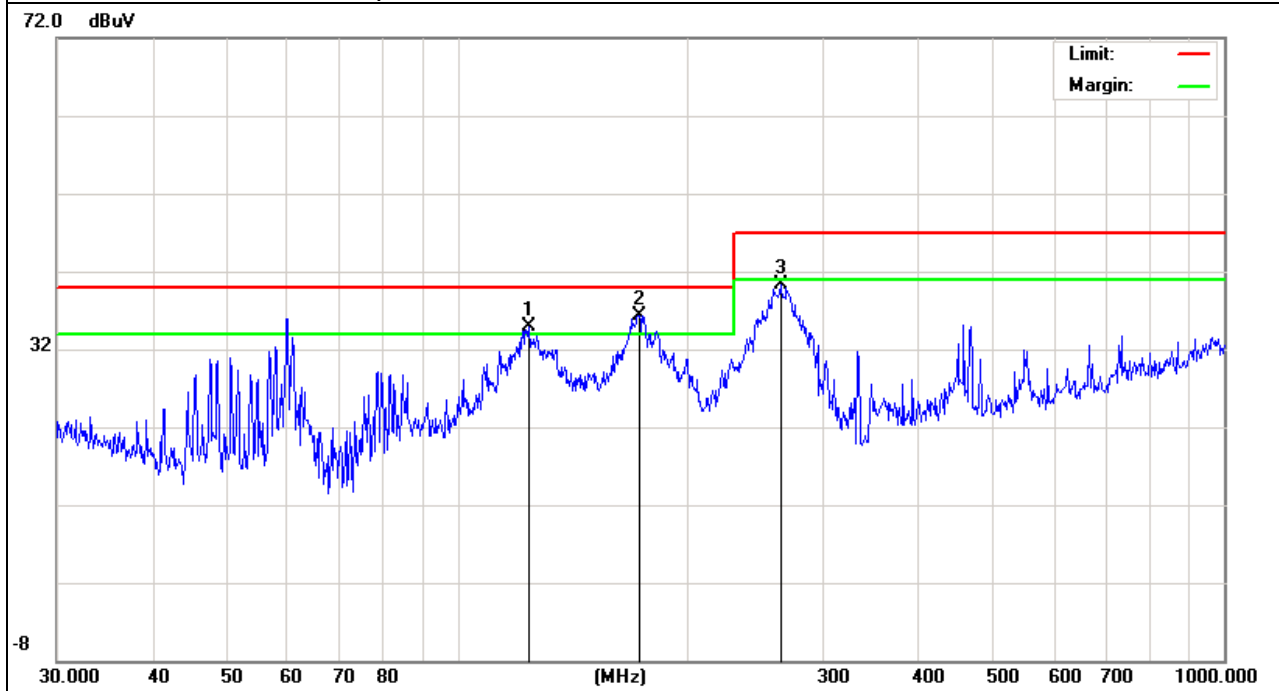


| | | | |
|---------------|-------------|---------------------|------------|
| EUT : | Smart Watch | Model Name. : | Uwatch |
| Temperature : | 24 °C | Relative Humidity : | 54% |
| Pressure : | 1010 hPa | Test Date : | 2018-11-14 |
| Test Mode : | Running | Polarization : | Vertical |

| Freq. (MHz) | Reading (dBuV) | Factor (dBuV) | Measurement (dBuV) | Limit (dBuV) | Over (dB) | Detector |
|----------------|-------------------|------------------|-----------------------|-----------------|--------------|----------|
| 123.6984 | 23.03 | 11.87 | 34.90 | 40.00 | -5.10 | QP |
| 172.5988 | 26.55 | 9.85 | 36.40 | 40.00 | -3.60 | QP |
| 263.8190 | 26.41 | 13.99 | 40.40 | 47.00 | -6.60 | QP |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Antenna Factor + Cable Loss.
3. N/A means All Data have pass Limit



Clause 8.3 DC Power Input/Output Ports Conducted Emissions

Test Method:

According to EMC Basic Standard (EN 55032 [7] Class-B) and the Artificial Mains Networks (AMN) shall be

connected to a DC power source.

The measurement frequency range extends from 150 kHz to 30 MHz. When the EUT is a transmitter operating at

frequencies below 30 MHz, then the exclusion band for transmitters applies (see clause 4.3) for measurements in

the transmit mode of operation.

For emission measurements on DC output ports the relevant port shall be connected via an AMN to a load

drawing the rated current of the source.

Test Result: N/A

| | | | | | | |
|---------------------------|--------------|-------|-----------|-----|-----------------------|--------|
| Environmental conditions: | Temperature: | 22° C | Humidity: | 53% | Atmospheric pressure: | 103kPa |
|---------------------------|--------------|-------|-----------|-----|-----------------------|--------|

A Conducted Emission on Live Terminal of the power line (150kHz to 30MHz)

EUT Description:

Operation Mode:

Tested By:

Test date:

| Start Frequency | Stop Frequency | Step | IF BW | Detector | Final M-Time |
|-----------------|----------------|--------|-------|----------|--------------|
| 0.15MHz | 30MHz | 4.5KHz | 10KHz | QP+AV | 1s |

| Frequency (MHz) | Reading(dBμV) | | | | Limit (dBμV) | |
|--------------------|---------------|---------|------------|---------|-----------------|---------|
| | Live | | Neutral | | | |
| | Quasi-peak | Average | Quasi-peak | Average | Quasi-peak | Average |
| -- | -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- | -- |

B Conducted Emission on Neutral Terminal of the power line (150kHz to 30MHz)

EUT Description:

Operation Mode:

Tested By:

Test date:

| | | | | | |
|-----------|-----------|--------|-------|----------|--------------|
| Start | Stop | Step | IF BW | Detector | Final M-Time |
| Frequency | Frequency | | | | |
| 0.15MHz | 30MHz | 4.5KHz | 10KHz | QP+AV | 1s |

| Frequency (MHz) | Reading(dBμV) | | | | Limit (dBμV) | |
|--------------------|---------------|---------|------------|---------|-----------------|---------|
| | Live | | Neutral | | | |
| | Quasi-peak | Average | Quasi-peak | Average | Quasi-peak | Average |
| -- | -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- | -- |

Note: The test item is not applicable.

Clause 8.4 AC Line Conducted Emissions

According to EMC Basic Standard (EN 55032 [7] Class-B)

1. For the table top EUT the distance to the reference ground plane (wall) should be 40 cm.
2. AC input line plugged into LISN.
3. The frequency spectrum from 0.15MHz to 30MHz was investigated. All readings are quasi-peak values with a resolution bandwidth of 9 KHz
4. The worse cases was selected to conducted the test

| | | | | | | |
|---------------------------|--------------|-------|-----------|-----|-----------------------|--------|
| Environmental conditions: | Temperature: | 22° C | Humidity: | 53% | Atmospheric pressure: | 103kPa |
|---------------------------|--------------|-------|-----------|-----|-----------------------|--------|

A Conducted Emission on Line Terminal of the power line (150kHz to 30MHz)

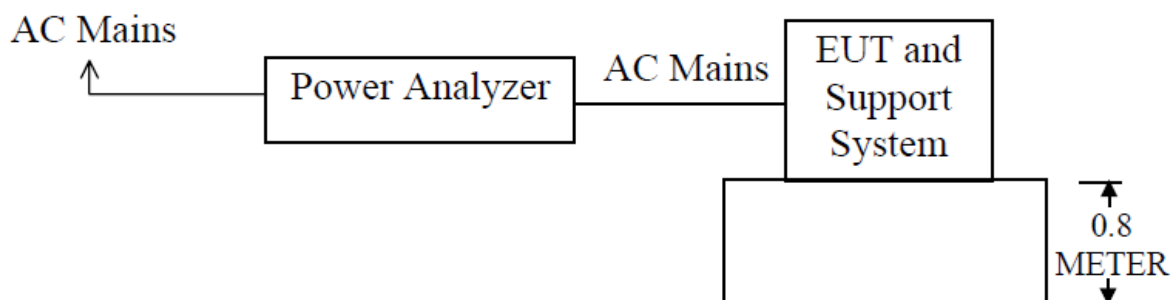
EUT Description: Smart camera
 Operation Mode: Normal operation mode
 Tested By: Mason Lai
 Test date: November 20, 2018

| Start Frequency | Stop Frequency | Step | IF BW | Detector | Final M-Time |
|-----------------|----------------|--------|-------|----------|--------------|
| 0.15MHz | 30MHz | 4.5KHz | 10KHz | QP+AV | 1s |

Clause 8.5 Harmonic Current Emissions

EUT Operating Mode
Normal operation mode

Block Diagram of Test Setup.



This test was performed as per EMC Basic Standard EN61000-3-2 Class A

Results

| Port | EUT Operating mode | Result (Passed / Failed) |
|----------|-----------------------|-----------------------------|
| AC Input | Normal operation mode | Pass |

Test Equipment

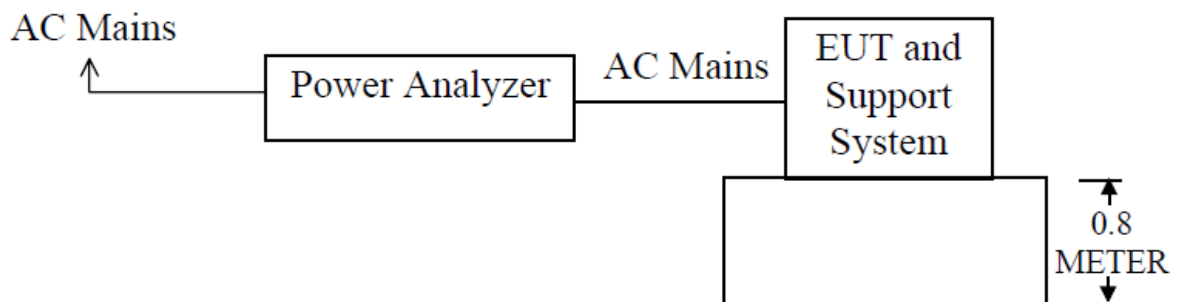
Please refer to Section 6 this report.

| | | | | | | |
|---------------------------|---------------|-------|------------|-----|-----------------------|--------|
| Environmental conditions: | Temperature : | 21° C | Humidity : | 44% | Atmospheric pressure: | 103kPa |
|---------------------------|---------------|-------|------------|-----|-----------------------|--------|

Clause 8.6 Flicker and Voltage Fluctuation

EUT Operating Mode
Normal operation mode

Block Diagram of Test Setup.



This test was performed as per EMC Basic Standard EN 61000-3-3

Results

| Port | EUT Operating mode or operating mode no. | Result (Passed / Failed) |
|----------|--|-----------------------------|
| AC Input | Normal operation mode | Pass |

| Limits of Voltage Fluctuation and Flicks Measurement | | |
|--|-------|--|
| Test Item | Limit | Note |
| P_{st} | 1.0 | Pst means short-term flicker indicator |
| P_{lt} | 0.65 | Plt means long-term flicker indicator |
| T_{dt} (ms) | 200 | Tdt means maximum time that dt exceeds 3%. |
| d_{max} (%) | 4 | Dmax means maximum relative voltage change. |
| dc (%) | 3 | Dc means relative steady-state voltage change. |

Test Equipment

Please refer to Section 6 this report.

Environmental conditions: Temperature: 21° C Humidity : 44% Atmospheric pressure: 103kPa

Clause 9.2 Immunity Test – Radiated, RF Electromagnetic Field**According to EMC Basic Standard (EN 61000-4-3)**

EUT Operation Mode: Normal operation mode

Type of Port: Enclosure

Performance Criterion: CT/CR

The distance between the turn-table axis and transmitting antenna is 3m.

Field strength = 3V/m

Start Frequency = 80MHz Stop Frequency = 1000MHz and

Start Frequency = 1400MHz Stop Frequency = 2700MHz

Frequency Step = 1% of the present frequency

The test signal is amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1000 Hz

Environmental conditions: Temperature: 21° C Humidity 54% Atmospheric pressure: 103kPa

Results

| Frequency (MHz) | Antenna Polarity | Radiation to | Reaction of the EUT During and after test | Result |
|--------------------|------------------|--------------|---|--------|
| 80-1000, 1400-2700 | Horizontal | Front | No reactions recognized | Pass |
| 80-1000, 1400-2700 | Vertical | Front | No reactions recognized | Pass |
| 80-1000, 1400-2700 | Horizontal | Rear | No reactions recognized | Pass |
| 80-1000, 1400-2700 | Vertical | Rear | No reactions recognized | Pass |
| 80-1000, 1400-2700 | Horizontal | Left | No reactions recognized | Pass |
| 80-1000, 1400-2700 | Vertical | Left | No reactions recognized | Pass |
| 80-1000, 1400-2700 | Horizontal | Right | No reactions recognized | Pass |
| 80-1000, 1400-2700 | Vertical | Right | No reactions recognized | Pass |

Note: Performance criteria A observed.

Test Equipment

Please refer to Section 6 this report.

Test Procedure

The EUT and load, which are placed on a table that is 0.8 meter above ground, are placed with one coincident with

the calibration plane so that the distance from antenna to the EUT was 3 meters.

Both horizontal and vertical polarization of the antenna and four sides of the EUT are set on measurement.

In order to judge the EUT performance, a CCD camera is used to monitor EUT .

Clause 9.3 Electrostatic Discharge

According to EMC basic standard (EN61000-4-2)

EUT Operation Mode: Normal operation mode

Type of Port: Enclosure

Performance Criterion: TT/TR

For the table top EUT the distance to the reference ground plane should be 80 cm.

Direct contact discharge on conducting surfaces of EUT

Indirect air discharge on insulating surfaces of EUT

±2kV, ±4kV direct discharge & ±2kV, ±4kV, ±8kV air discharge

Test Equipment

Please refer to Section 6 this report.

| | | | | | | |
|---------------------------|--------------|-------|------------|-----|-----------------------|--------|
| Environmental conditions: | Temperature: | 21° C | Humidity : | 44% | Atmospheric pressure: | 103kPa |
|---------------------------|--------------|-------|------------|-----|-----------------------|--------|

Test Results

| Item | Contact Discharge to conducted surfaces and to coupling planes | | Air Discharge at insulating surfaces | Result |
|--------------|--|----------------------------|--------------------------------------|-----------|
| | Direct Contact Discharge | Indirect Contact Discharge | | |
| Test Voltage | Reaction of EUT | Reaction of EUT | Reaction of EUT | Pass/Fail |
| +2kV | n.r.r. | n.r.r. | n.r.r. | Pass |
| -2kV | n.r.r. | n.r.r. | n.r.r. | Pass |
| +4kV | n.r.r. | n.r.r. | n.r.r. | Pass |
| -4kV | n.r.r. | n.r.r. | n.r.r. | Pass |
| +8kV | N/A | N/A | n.r.r. | Pass |
| -8kV | N/A | N/A | n.r.r. | Pass |

Remarks: n.r.r. = no reaction recognized

Note: N/A = not applicable.

According to EMC basic standard (EN61000-4-4)

EUT Operation Mode: Normal operation mode

Type of Port: AC mains power port

Performance Criterion: TT/TR

For the table top EUT the distance to the reference ground plane should be 80 cm.

The test level for AC mains power input ports shall be 1KV open circuit.

Test Setup

The minimum distance between the EUT and all other conductive structures, except the ground reference plane shall be more than 0.5 m.

Test Equipment

Please refer to Section 6 this report.

| | | | | | | |
|---------------------------|--------------|----------|---------------|-----|-----------------------|--------|
| Environmental conditions: | Temperature: | 23° C | Humidity : | 53% | Atmospheric pressure: | 103kPa |
|---------------------------|--------------|----------|---------------|-----|-----------------------|--------|

Test Results

| Line | Test Voltage | Inject Time(s) | Performance | | | Result |
|-------------|--------------|----------------|-------------|----------------|----------------|-----------|
| | | | Required | Observation(+) | Observation(-) | Pass/Fail |
| L | 1kV | 120 | TT/TR | N/A | N/A | N/A |
| N | 1kV | 120 | TT/TR | N/A | N/A | N/A |
| PE | 1kV | 120 | TT/TR | N/A | N/A | N/A |
| L N | 1kV | 120 | TT/TR | N/A | N/A | N/A |
| L PE | 1kV | 120 | TT/TR | N/A | N/A | N/A |
| N PE | 1kV | 120 | TT/TR | N/A | N/A | N/A |
| L N PE | 1kV | 120 | TT/TR | N/A | N/A | N/A |
| Signal line | | | | | | |

Remark: Operation as intended, no loss of function was found during and after the test.

N/A = not applicable.

Clause 9.5 RF Common Mode

According to EMC basic standard (EN61000-4-6)

EUT Operation Mode: Normal operation mode

Type of Port: AC mains power input/output port

Performance Criterion: CT/CR

Start Frequency = 150KHz Stop Frequency = 80MHz

The step size is 1% of the preceding frequency value

The test signal is amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1000 Hz

Test Equipment

Please refer to Section 6 this report.

| | | | | | | |
|---------------------------|--------------|-------|------------|-----|-----------------------|--------|
| Environmental conditions: | Temperature: | 24° C | Humidity : | 52% | Atmospheric pressure: | 103kPa |
|---------------------------|--------------|-------|------------|-----|-----------------------|--------|

Test Setup

Injection via CDN or MIC clamp

Test Results

| Injection On | Injection Via | Reaction of the EUT During and after test | Result |
|-----------------------------------|---------------|---|--------|
| AC input power line/DC power port | CDN | n.r.r. | N/A |

Performance criteria A observed

Remarks: n.r.r. = no reaction recognized

Clause 9.6 Transients and Surges in the Vehicular Environment

The test method shall be in accordance with ISO 7637-2 for 12 V/24V DC powered equipment

EUT Operation Mode: Normal operation mode

Type of Port: DC power input port

Performance Criterion: CT/CR

Test Requirement:

a) Pulse 3a and 3b, level III, with the test time reduced to 20 min for each;

Pulse 4, level III, 10 pulses, with the characteristics as follows:

Vs = -6.5V; Va = -2,5 V; t6 = 25 ms; t7 = 20 ms; t8 = 20ms; t9 = 5 s; t10=50ms, t11=20ms,pulse cycle time: 60 s

b) Pulse 1, level III: t1 = 2,5 s; t2=200ms, t3=50µs 10 pulses;

Pulse 2, level III: t1 = 2,5 s; 10 pulses;

Both a) and b) shall be done as the manufacturer does not require the radio equipment to have a direct

connection to the 12 V and 24V main vehicle battery

Test Equipment

Please refer to Section 6 this report.

Environmental conditions: Temperature: 23° C Humidity 53% Atmospheric pressure: 103kPa

Test Result:

For 12V system

| Test Pulse Number | Test Voltage | Test Level | Number of test pulses or test time | Reaction of EUT during and after Test | Test result |
|-------------------|--------------|------------|------------------------------------|--|-------------|
| 1 | -75 V | III | 10pulses | n.r.r- performance criteria A observed | N/A |
| 2a | +37 V | III | 10pulses | n.r.r- performance criteria A observed | N/A |
| 2b | +10 V | III | 10pulses | n.r.r- performance criteria A observed | N/A |
| 3a | -112 V | III | 20min | n.r.r- performance criteria A observed | N/A |
| 3b | +75 V | III | 20min | n.r.r- performance criteria A observed | N/A |
| 4 | -6 V | III | 10pulses | n.r.r- performance criteria A observed | N/A |

For 24V system

| Test Pulse Number | Test Voltage | Test Level | Number of test pulses or test time | Reaction of EUT during and after Test | Test result |
|-------------------|--------------|------------|------------------------------------|--|-------------|
| 1 | -450 V | III | 10pulses | n.r.r- performance criteria A observed | N/A |
| 2a | +37 V | III | 10pulses | n.r.r- performance criteria A observed | N/A |
| 2b | +20 V | III | 10pulses | n.r.r- performance criteria A observed | N/A |
| 3a | -150 V | III | 20min | n.r.r- performance criteria A observed | N/A |
| 3b | +150 V | III | 20min | n.r.r- performance criteria A observed | N/A |
| 4 | -12 V | III | 10pulses | n.r.r- performance criteria A observed | N/A |

Note1: N/A = not applicable.

Note2: The EUT is not vehicular equipment, so the test item is not applicable.

Clause 9.7 Voltage Dips and Interruption

According to EMC basic standard (EN61000-4-11)

EUT Operation mode: Normal operation mode

Type of Port: AC mains power input port

Performance Criterion: TT/TR

For the table top EUT the distance to the reference ground plane should be 80 cm.

Test Equipment

Please refer to Section 6 this report.

Environmental conditions: Temperature: 23° C Humidity: 53% Atmospheric pressure: 103kPa

Test Results

Voltage Dips

| Terminal Supply Voltage | Start by Trigger Angle (AC) | Duration of Test Voltage | Test Voltage | Reaction of EUT during and after Test | Result |
|-------------------------|-----------------------------|--------------------------|--------------|--|--------|
| U_1 | | T_{U2} | U_2 | | |
| 100% U_N : 230V | 0° | 10ms | 0% UN: 0V | n.r.r- performance criteria A observed | N/A |
| 100% U_N : 230V | 0° | 20ms | 0% UN: 0V | n.r.r- performance criteria A observed | N/A |
| 100% U_N : 230V | 0° | 500ms | 70% UN: 161V | n.r.r- performance criteria C observed | N/A |
| Voltage Interruption | | | | | |
| 100% U_N : 230V | 0° | 5000ms | 0% UN: 0V | n.r.r- performance criteria C observed | N/A |

n.r.r- no reaction recognised

Note: N/A = not applicable.

Clause 9.8 Surges Common & Differential Mode (1-phase)**According to EMC basic standard (EN61000-4-5)**

EUT operation mode: Normal operation mode

Type of Port: AC mains power input port

Performance Criterion: TT/TR

For the table top EUT the distance to the reference ground plane should be 80 cm.

1KV open circuit for common mode & 0.5KV open circuit for differential mode.

Test Equipment

Please refer to Section 6 this report.

| | | | | | | |
|---------------------------|--------------|----------|---------------|-----|-----------------------|--------|
| Environmental conditions: | Temperature: | 21° C | Humidity : | 51% | Atmospheric pressure: | 103kPa |
|---------------------------|--------------|----------|---------------|-----|-----------------------|--------|

Test Results

For AC power ports five positive and five negative pulses each at 0°, 90° 180°, 270°.

Repetition rate is 1 min.

| Test Voltage | Reaction of the EUT during and after the test | | | | Result |
|------------------|---|---------------------------|---------------------------|---------------------------|--------|
| | 0°/pulse | 90°/pulse | 180°/pulse | 270°/pulse | |
| -0.5kV +0.5kV | No reaction Recognized | No reaction Recognized | No reaction Recognized | No reaction Recognized | N/A |
| -1.0kV +1.0kV | No reaction Recognized | No reaction Recognized | No reaction Recognized | No reaction Recognized | N/A |
| -2.0Kv +2.0kV | No reaction Recognized | No reaction Recognized | No reaction Recognized | No reaction Recognized | N/A |
| - kV +kV | N/A | N/A | N/A | N/A | N/A |

3. CE Mark label specification

Text of the mark is black or white in color and is left justified. Labels are printed in indelible ink on permanent adhesive backing and shall be affixed at a conspicuous location on the EUT or silk-screened onto the EUT.

Mark Location: Rear enclosure



4. Photographs – Test Setup

4.1 Photograph – Conducted Test Setup-- N/A

4.2 Photograph –Radiated Emission Test Setup

5. Photograph - EUT

Photo documentation

Photo 1



| 6.0 | Test Equipments | | | |
|-------------------|-----------------|---------|--------------|------------|
| Instrument Type | Manufacturer | Model | Date of Cal. | Due Date |
| ESD Simulator | Schaffner | NSG 435 | 2017-07-25 | 2018-07-25 |
| HCP | CTB | -- | 2017-07-25 | 2018-07-25 |
| VCP | CTB | -- | 2017-07-25 | 2018-07-25 |
| Signal Generator | R&S | SML03 | 2017-07-25 | 2018-07-25 |
| Power meter | R&S | URVD | 2017-07-25 | 2018-07-25 |
| Power probe | R&S | URV5-Z4 | 2017-07-25 | 2018-07-25 |
| Power Amplifier | KALMUS | 7100C | 2017-07-25 | 2018-07-25 |
| Biconilog Antenna | EMCO | 3142C | 2017-07-25 | 2018-07-25 |

End of the report