

TEST REPORT

Product: 2ACK3-A4000-E1

Model No.: Action Camera

Trade mark: A4000-E1

Additional Model No.: A4000-C1, A4000-D1

Report No.: TCT171211E023

Issued Date: November 27, 2017

Issued for:

**Shenzhen Aobaisen Electronic Technology CO., Ltd
4 F, Building A, Chuangyu Industry Area, No.1222 Guanguang Road,
Guanlan Street, Longhua New District, Shenzhen, China**

Issued By:

**Shenzhen Tongce Testing Lab.
1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District,
Shenzhen, Guangdong, China
TEL: +86-755-27673339
FAX: +86-755-27673332**

Note: *This report shall not be reproduced except in full, without the written approval of Shenzhen Tongce Testing Lab. This document may be altered or revised by Shenzhen Tongce Testing Lab. personnel only, and shall be noted in the revision section of the document. The test results in the report only apply to the tested sample.*

TABLE OF CONTENTS

| | |
|--------------------------------------------------|----|
| 1. TEST CERTIFICATION..... | 3 |
| 2. TEST RESULT SUMMARY..... | 4 |
| 3. EUT DESCRIPTION..... | 5 |
| 4. TEST METHODOLOGY | 6 |
| 4.1. DECISION OF FINAL TEST MODE | 6 |
| 4.2. EUT SYSTEM OPERATION | 6 |
| 5. SETUP OF EQUIPMENT UNDER TEST..... | 7 |
| 5.1. DESCRIPTION OF SUPPORT UNITS..... | 7 |
| 5.2. CONFIGURATION OF SYSTEM UNDER TEST..... | 8 |
| 6. FACILITIES AND ACCREDITATIONS | 9 |
| 6.1. FACILITIES | 9 |
| 6.2. MEASUREMENT UNCERTAINTY | 9 |
| 7. EMISSION TEST | 10 |
| 7.1. CONDUCTED EMISSION AT MAINS TERMINALS | 10 |
| 7.2. RADIATED EMISSION | 14 |
| 8. PHOTOGRAPHS OF TEST CONFIGURATION | 19 |
| 9. PHOTOGRAPHS OF EUT | 21 |

1. Test Certification

| | |
|------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Product: | Action Camera |
| Model No.: | A4000-E1 |
| Additional Model No.: | A4000-C1, A4000-D1 |
| Applicant: | Shenzhen Aobaisen Electronic Technology CO., Ltd |
| Address: | 4 F, Building A, Chuangyu Industry Area, No.1222 Guanguang Road, Guanlan Street, Longhua New District, Shenzhen, China |
| Manufacturer: | Shenzhen Aobaisen Electronic Technology CO., Ltd |
| Address: | 4 F, Building A, Chuangyu Industry Area, No.1222 Guanguang Road, Guanlan Street, Longhua New District, Shenzhen, China |
| Test Voltage: | 110V/60Hz |
| Date of Test: | Nov. 01, 2017 to Nov. 25, 2017 |
| Applicable Standards: | 47 CFR FCC Part 15 Subpart B ANSI C63.4: 2014 |

The above equipment has been tested by Shenzhen Tongce Testing Lab and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By:



Hanley

Date:

Nov. 25, 2017

Check By:



Joe Zhou

Date:

Nov. 27, 2017

Approved By:



Tomsin

Date:

Nov. 27, 2017

2. Test Result Summary

| Emission | | |
|------------------------------|---------------------------------------|--------|
| Test Method | Item | Result |
| FCC 47 CFR Part 15 Subpart B | Conducted Emission at Mains Terminals | Pass |
| | Radiated Emission | Pass |

Note:

1. Pass: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.
5. The information of measurement uncertainty is available upon the customer's request.

3. EUT Description

| | |
|------------------------------|---------------------------------------------------------------------------------------------|
| Product Name: | Action Camera |
| Model No.: | A4000-E1 |
| Additional Model No.: | A4000-C1, A4000-D1 |
| Power supply: | Li-Polymer Battery : S009 Voltage: 3.7V Capacity: 900mAh Limited Charge Voltage: 4.2V |

Model(s) List

| No. | Model Number | Tested With |
|--------------|--------------------|-------------------------------------|
| 1 | A4000-E1 | <input checked="" type="checkbox"/> |
| Other models | A4000-C1, A4000-D1 | <input type="checkbox"/> |

Note: A4000-E1 is tested model, other models are derivative models. The models are identical in circuit and PCB layout, only different on the model names. So the test data of A4000-E1 can represent the remaining models.

4. Test Methodology

4.1. Decision of Final Test Mode

The EUT was tested together with the thereafter additional components, and a configuration, which produced the worst emission levels, was selected and recorded in this report.

The following test mode(s) were assessed:

| Pretest Mode | Description |
|--------------|-----------------------------|
| Mode 1 | Video Recording |
| Model 2 | Video Playing |
| Mode 3 | Exchange data with computer |

4.2. EUT System Operation

1. Set up EUT with the support equipments.
2. Make sure the EUT work normally during the test.

5. Setup of Equipment under Test

5.1. Description of Support Units

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.

| Equipment | Model No. | Serial No. | FCC ID | Trade Name |
|-----------|-----------|------------|--------|------------|
| / | / | / | / | / |

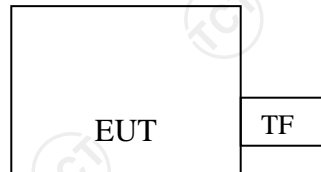
| Item | Equipment | Mfr/Brand | Model/Type No. | Series No. | Note |
|------|-----------|-----------|----------------|------------|------|
| 1 | PC | ThinkPad | ThinkPad E450 | / | / |
| 2 | Adapter | ThinkPad | DALX65NCC3A | / | / |

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

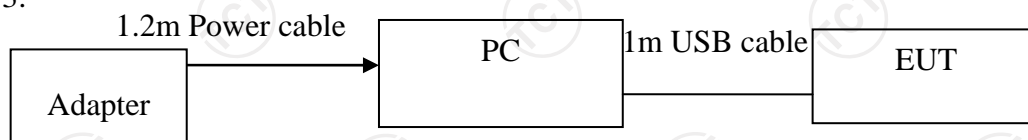
5.2. Configuration of System Under Test

Mode 1&2



(EUT: Action Camera)

Mode 3:



(EUT: Action Camera)

| I/O Port of EUT | | | |
|-----------------|------|--------------------------|-------------|
| I/O Port Type | Q'TY | Cable | Tested with |
| Power | 1 | 1m USB cable, unshielded | 1 |

6. Facilities and Accreditations

6.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

- FCC - Registration No.: 645098

Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

- IC - Registration No.: 10668A-1

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

6.2. 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:

| No. | Item | MU |
|-----|-------------------------------|---------------------------|
| 1. | Temperature | $\pm 0.1^{\circ}\text{C}$ |
| 2. | Humidity | $\pm 1.0 \%$ |
| 3. | Spurious Emissions, Conducted | $\pm 2.56 \text{ dB}$ |
| 4. | All Emissions, Radiated | $\pm 4.28 \text{ dB}$ |

This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of $k=2$.

7. Emission Test

7.1. Conducted Emission at Mains Terminals

7.1.1. Test Specification

| | |
|--------------------------|------------------------------|
| Test Requirement: | FCC 47 CFR Part 15 Subpart B |
| Test Method: | ANSI C63.4: 2014 |
| Frequency Range: | 150 kHz to 30 MHz |

7.1.2. Limits

| Frequency (MHz) | Class A dB(uV) | | Class B dB(uV) | |
|-----------------|----------------|---------|----------------------|----------------------|
| | Quasi-peak | Average | Quasi-peak | Average |
| 0.15 - 0.5 | 79 | 66 | 66 – 56 ^a | 56 – 46 ^a |
| 0.50 - 5.0 | 73 | 60 | 56 | 46 |
| 5.0 - 30.0 | 73 | 60 | 60 | 50 |

a. Decreases with the logarithm of the frequency

7.1.3. Test Instruments

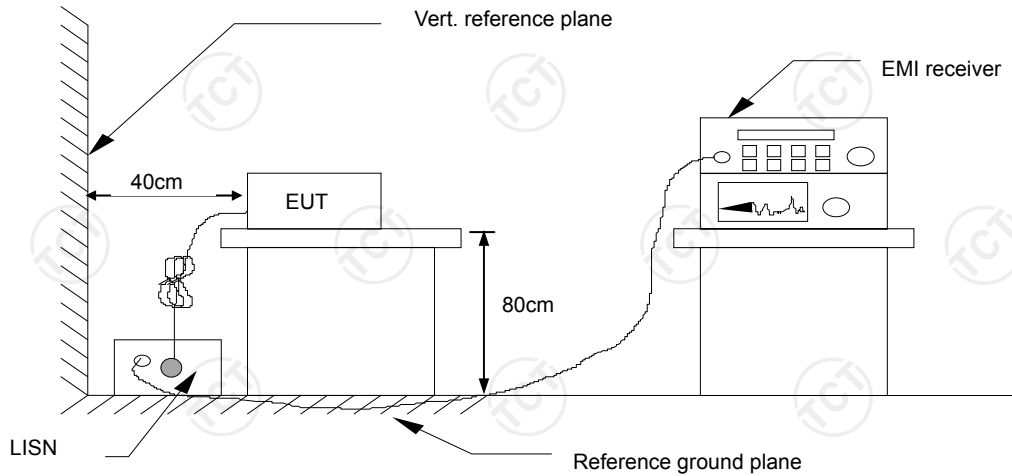
| Conducted Emission Shielding Room Test Site (843) | | | | |
|---------------------------------------------------|--------------|-----------|---------------|-----------------|
| Equipment | Manufacturer | Model | Serial Number | Calibration Due |
| EMI Test Receiver | R&S | ESCS30 | 100139 | Sep. 27, 2018 |
| LISN | Schwarzbeck | NSLK 8126 | 8126453 | Sep. 27, 2018 |

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

7.1.4. Test Method

The AMN was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the AMN. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN

7.1.5. Block Diagram of Test Setup



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

7.1.6. Test Results

| | | | |
|--------------------------|--------------|--------------|---------------|
| Test Environment: | Temp.: 23 °C | Humid.: 51 % | Press.: 96hPa |
| Test Mode: | Mode 3 | | |
| Test Voltage: | 110V/60Hz | | |
| Test Result: | Pass | | |

This is the worst pattern data

Note:

L1 = Live Line / N = Neutral Line

Freq. = Emission frequency in MHz

Reading level (dB μ V) = Receiver reading

Correct Factor (dB) = LISN factor + Cable loss

Measurement (dB μ V) = Reading level (dB μ V) + Corr. Factor (dB)

Limit (dB μ V) = Limit stated in standard

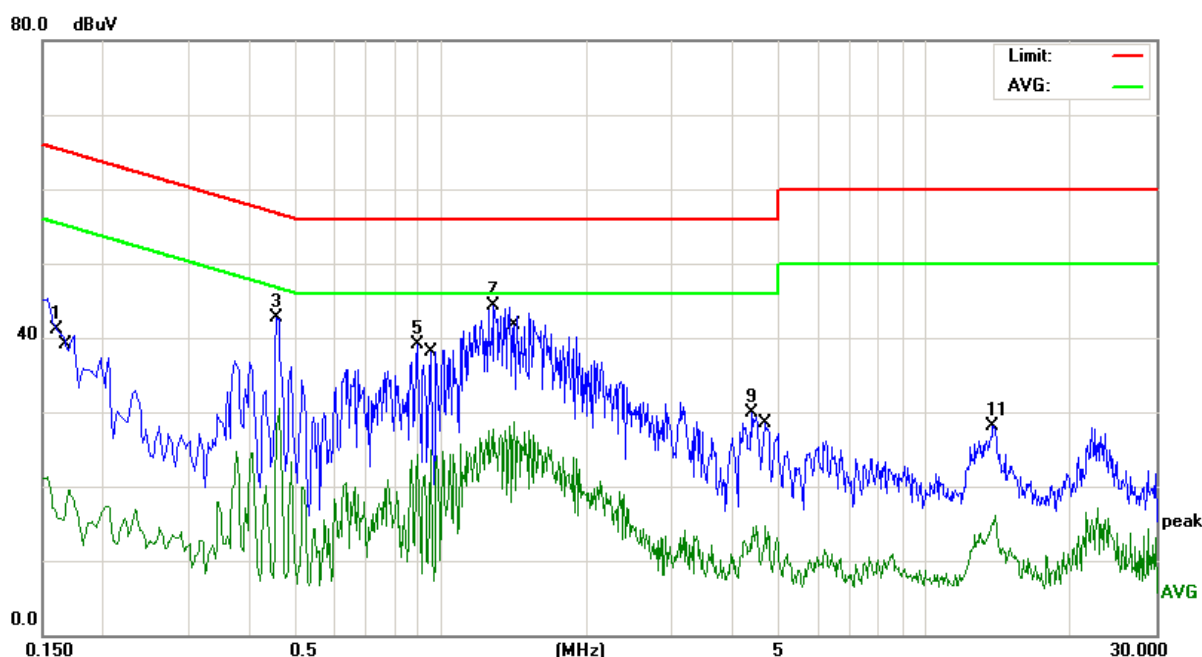
Margin (dB) = Measurement (dB μ V) – Limits (dB μ V)

Q.P. =Quasi-Peak AVG =average

* is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.

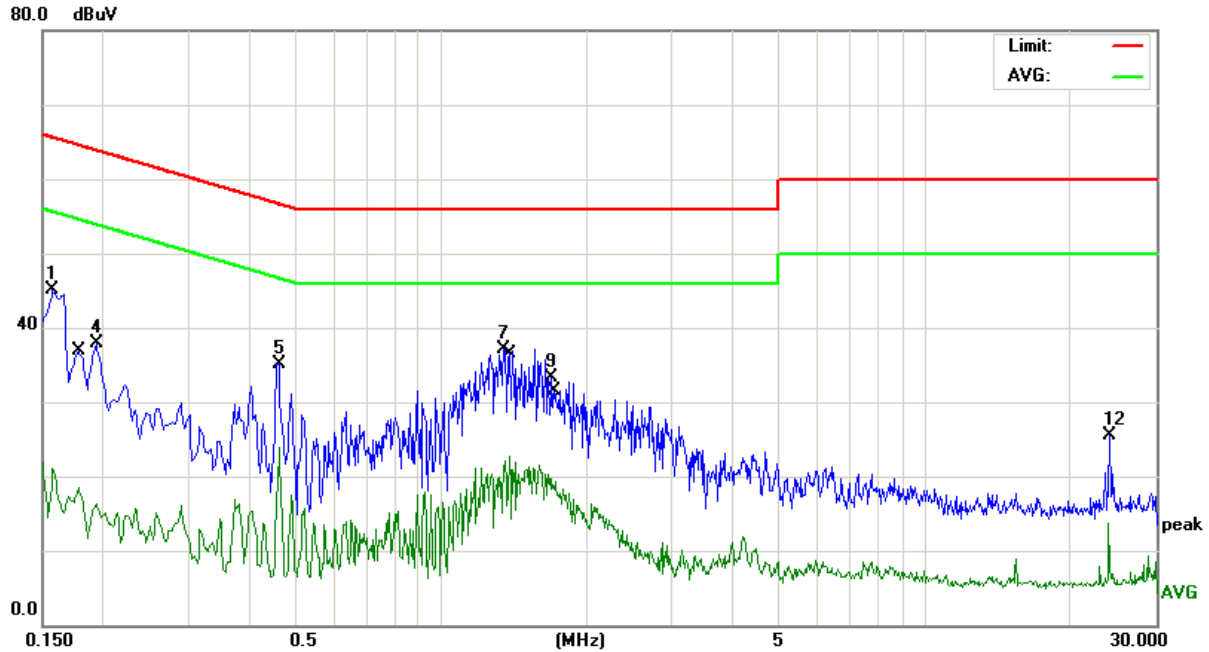
Please refer to following diagram for individual

L:



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV | Limit dBuV | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|
| 1 | | 0.1607 | 30.66 | 10.44 | 41.10 | 65.42 | -24.32 | peak |
| 2 | | 0.1700 | 9.14 | 10.44 | 19.58 | 54.96 | -35.38 | AVG |
| 3 | | 0.4580 | 32.23 | 10.40 | 42.63 | 56.73 | -14.10 | peak |
| 4 | | 0.4620 | 20.05 | 10.40 | 30.45 | 46.66 | -16.21 | AVG |
| 5 | | 0.8900 | 28.85 | 10.35 | 39.20 | 56.00 | -16.80 | peak |
| 6 | | 0.9500 | 14.60 | 10.35 | 24.95 | 46.00 | -21.05 | AVG |
| 7 | * | 1.2860 | 33.92 | 10.33 | 44.25 | 56.00 | -11.75 | peak |
| 8 | | 1.4140 | 18.34 | 10.32 | 28.66 | 46.00 | -17.34 | AVG |
| 9 | | 4.3780 | 19.74 | 10.24 | 29.98 | 56.00 | -26.02 | peak |
| 10 | | 4.6940 | 4.47 | 10.24 | 14.71 | 46.00 | -31.29 | AVG |
| 11 | | 13.7780 | 17.89 | 10.16 | 28.05 | 60.00 | -31.95 | peak |
| 12 | | 13.9340 | 5.85 | 10.16 | 16.01 | 50.00 | -33.99 | AVG |

N:



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV | Limit dBuV | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|
| 1 | | 0.1580 | 34.57 | 10.44 | 45.01 | 65.56 | -20.55 | peak |
| 2 | | 0.1580 | 10.64 | 10.44 | 21.08 | 55.56 | -34.48 | AVG |
| 3 | | 0.1780 | 8.02 | 10.44 | 18.46 | 54.57 | -36.11 | AVG |
| 4 | | 0.1940 | 27.50 | 10.43 | 37.93 | 63.86 | -25.93 | peak |
| 5 | | 0.4620 | 24.76 | 10.40 | 35.16 | 56.66 | -21.50 | peak |
| 6 | | 0.4620 | 13.58 | 10.40 | 23.98 | 46.66 | -22.68 | AVG |
| 7 | * | 1.3500 | 26.81 | 10.32 | 37.13 | 56.00 | -18.87 | peak |
| 8 | | 1.3860 | 12.30 | 10.32 | 22.62 | 46.00 | -23.38 | AVG |
| 9 | | 1.6980 | 22.96 | 10.31 | 33.27 | 56.00 | -22.73 | peak |
| 10 | | 1.7340 | 8.23 | 10.30 | 18.53 | 46.00 | -27.47 | AVG |
| 11 | | 23.9980 | 3.52 | 10.10 | 13.62 | 50.00 | -36.38 | AVG |
| 12 | | 24.0580 | 15.40 | 10.10 | 25.50 | 60.00 | -34.50 | peak |

7.2. Radiated Emission

7.2.1. Test Specification

| | |
|------------------------------|------------------------------|
| Test Requirement: | FCC 47 CFR Part 15 Subpart B |
| Test Method: | ANSI C63.4: 2014 |
| Frequency Range: | 30 MHz to 1000 MHz |
| Measurement Distance: | 3 m |
| Antenna Polarization: | Horizontal & Vertical |

7.2.2. Limits

| Frequency (MHz) | Class A (at 3m) | Class B (at 3m) |
|-----------------|-----------------|-----------------|
| | dBuV/m | dBuV/m |
| 30 ~ 88 | 49.0 | 40.0 |
| 88 ~ 216 | 53.5 | 43.5 |
| 216 ~ 960 | 56.4 | 46.0 |
| 960 ~ 1000 | 59.5 | 54.0 |

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level $\text{dB}(\mu\text{V/m}) = 20 \log \text{Emission level } (\mu\text{V/m})$.

7.2.3. Test Instruments

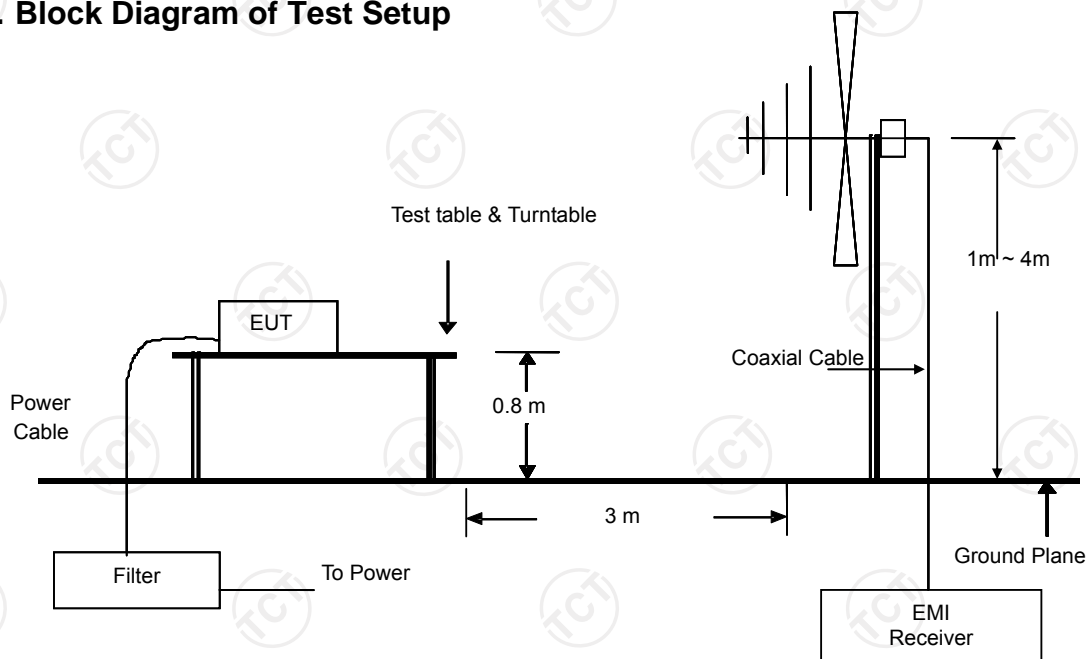
| Radiated Emission Test Site (966) | | | | |
|-----------------------------------|--------------|------------|---------------|-----------------|
| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
| EMI Test Receiver | R&S | ESVD | 100008 | Sep. 27, 2018 |
| Spectrum Analyzer | R&S | FSEM | 848597-001 | Sep. 27, 2018 |
| Amplifier | HP | 8447D | 2727A05017 | Sep. 27, 2018 |
| Amplifier | EM | EM30265 | 07032613 | Sep. 27, 2018 |
| Broadband Antenna | Schwarzbeck | VULB9163 | 340 | Sep. 27, 2018 |
| Horn Antenna | Schwarzbeck | BBHA 9120D | 631 | Sep. 27, 2018 |

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

7.2.4. Test Method

Measurements were made in a 3-meter semi-anechoic chamber or Open Area Test Site that complies to CISPR 16. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3 meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in horizontal and vertical polarities. Final measurements (quasi-peak) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 m. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable. Block Diagram of Test Setup.

7.2.5. Block Diagram of Test Setup



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

7.2.6. Test Results

| | | | |
|--------------------------|--------------|--------------|---------------|
| Test Environment: | Temp.: 23 °C | Humid.: 51 % | Press.: 96hPa |
| Test Mode: | Mode 3 | | |
| Test Voltage: | 110V/60Hz | | |
| Test Result: | Pass | | |

This is the worst pattern data

Freq. = Emission frequency in MHz

Reading level (dBμV) = Receiver reading

Corr. Factor (dB) = Antenna factor + Cable loss-AMP factor

Measurement (dBμV) = Reading level (dBμV) + Corr. Factor (dB)

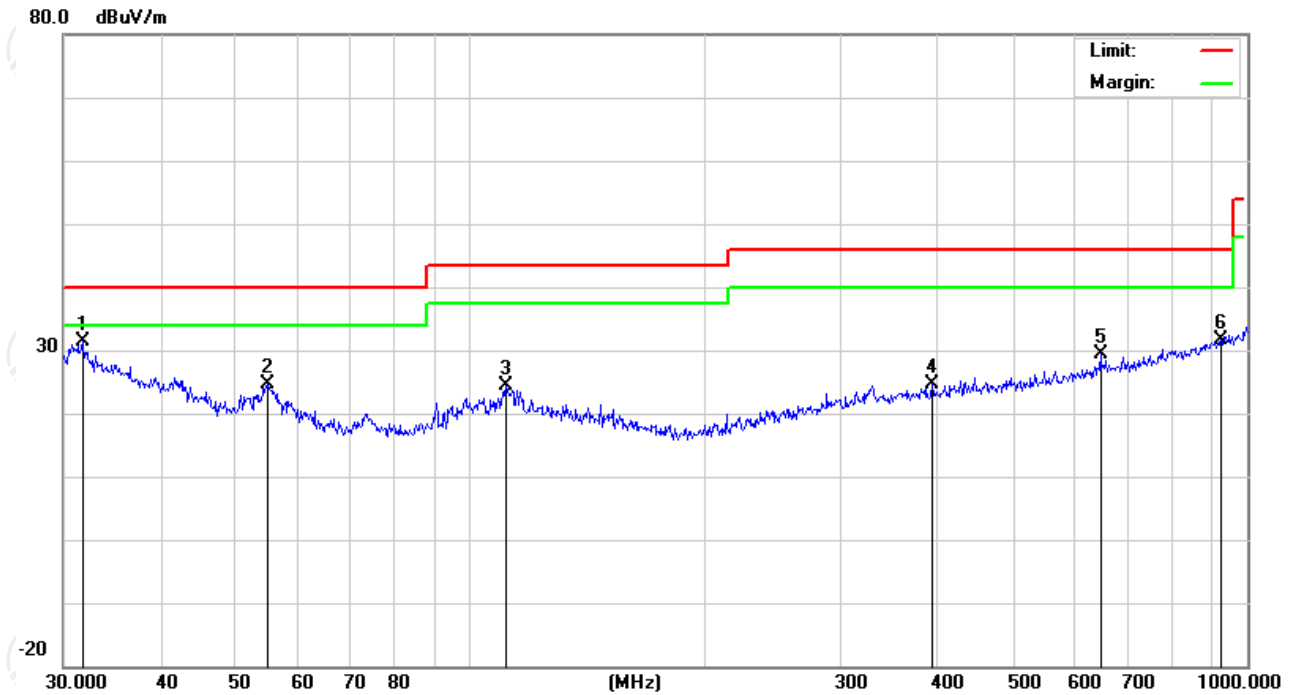
Limit (dBμV) = Limit stated in standard

Margin (dB) = Measurement (dBμV) – Limits (dBμV)

* is meaning the worst frequency has been tested in the test frequency range

Please refer to following diagram for individual

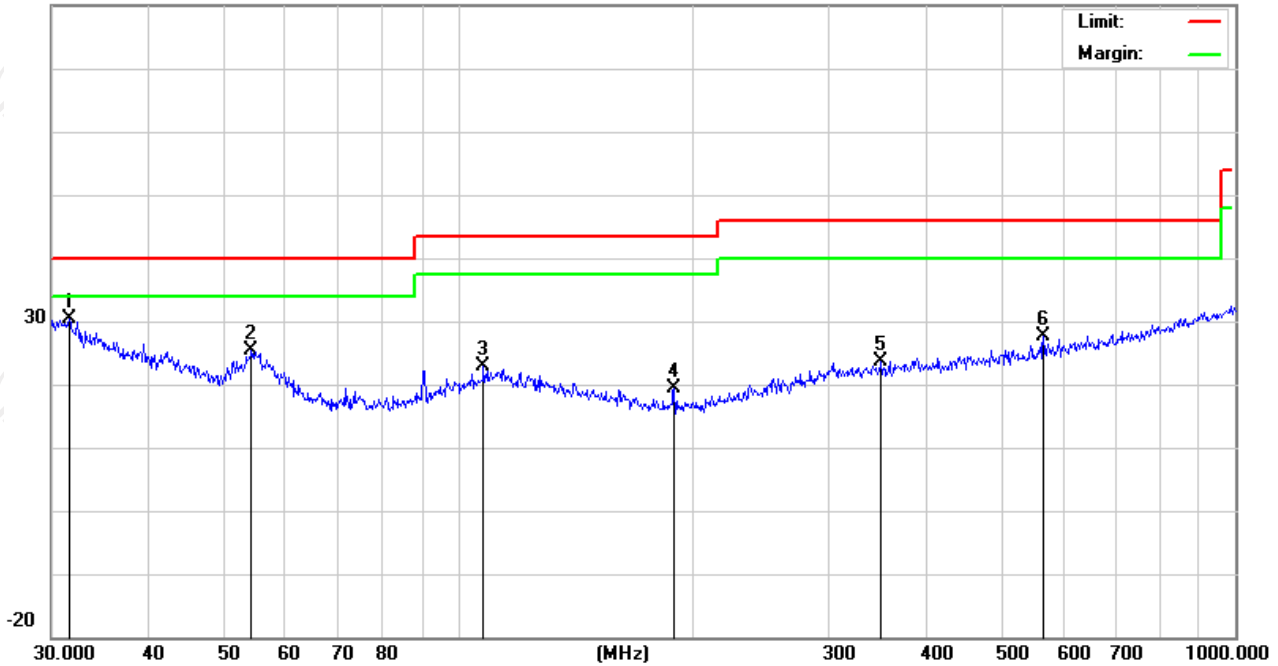
H:



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | * | 31.7313 | 27.21 | 4.13 | 31.34 | 40.00 | -8.66 | QP |
| 2 | | 55.0274 | 30.16 | -5.62 | 24.54 | 40.00 | -15.46 | QP |
| 3 | | 111.3468 | 26.30 | -2.00 | 24.30 | 43.50 | -19.20 | QP |
| 4 | | 393.4723 | 26.28 | -1.56 | 24.72 | 46.00 | -21.28 | QP |
| 5 | | 647.3856 | 27.79 | 1.50 | 29.29 | 46.00 | -16.71 | QP |
| 6 | | 925.7563 | 25.65 | 6.00 | 31.65 | 46.00 | -14.35 | QP |

V:

80.0 dBuV/m



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | * | 31.6202 | 26.24 | 4.17 | 30.41 | 40.00 | -9.59 | QP |
| 2 | | 54.2610 | 31.01 | -5.53 | 25.48 | 40.00 | -14.52 | QP |
| 3 | | 107.8877 | 25.17 | -2.28 | 22.89 | 43.50 | -20.61 | QP |
| 4 | | 189.7385 | 26.67 | -7.19 | 19.48 | 43.50 | -24.02 | QP |
| 5 | | 350.4768 | 25.31 | -1.58 | 23.73 | 46.00 | -22.27 | QP |
| 6 | | 566.6223 | 26.56 | 1.15 | 27.71 | 46.00 | -18.29 | QP |

TEST RESULTS (1GHz to 25GHz)

This is the worst pattern data

| | | | |
|-------------|--------|-------------------|--------|
| Temperature | 23 °C | Relative Humidity | 51% |
| Pressure | 96 hPa | Test Mode | Mode 3 |

| Freq. (MHz) | Ant. Pol. | Emission Level(dBuV) | | Limit 3m(dBuV/m) | | Over(dB) | |
|----------------|--------------|----------------------|-------|------------------|----|----------|--------|
| | H/V | PK | AV | PK | AV | PK | AV |
| 4809.12 | V | 60.30 | 40.84 | 74 | 54 | -13.70 | -13.16 |
| 7207.08 | V | 58.94 | 39.60 | 74 | 54 | -15.06 | -14.40 |
| 4802.93 | H | 59.71 | 39.41 | 74 | 54 | -14.29 | -14.59 |
| 7207.95 | H | 59.75 | 40.75 | 74 | 54 | -14.25 | -13.25 |

Remark:

All emissions not reported were more than 20dB below the specified limit or in the noise floor.

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

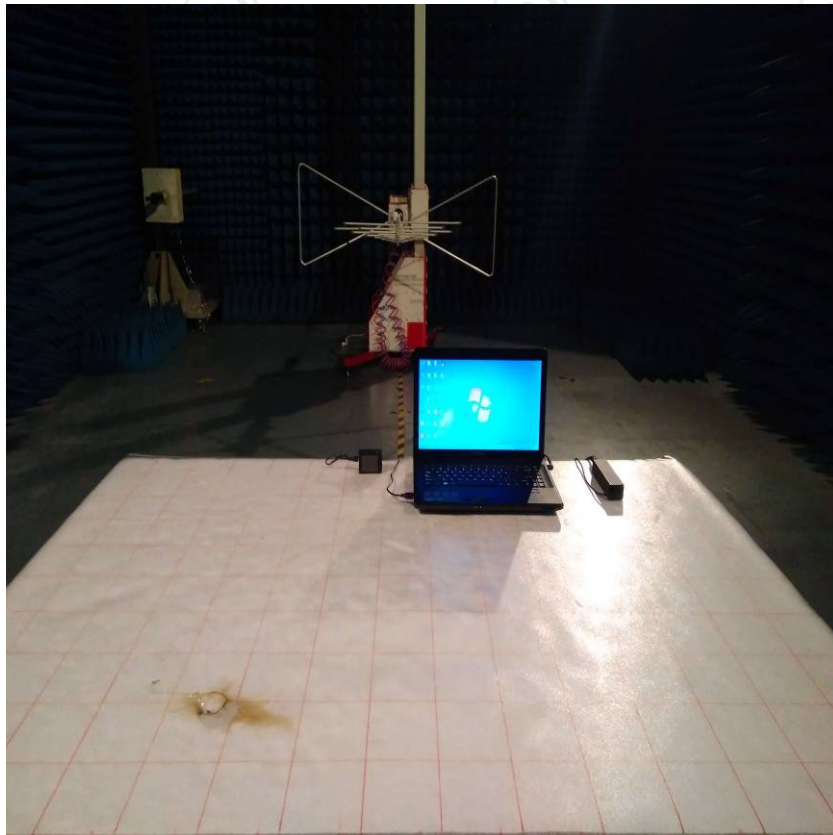
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

8. Photographs of Test Configuration

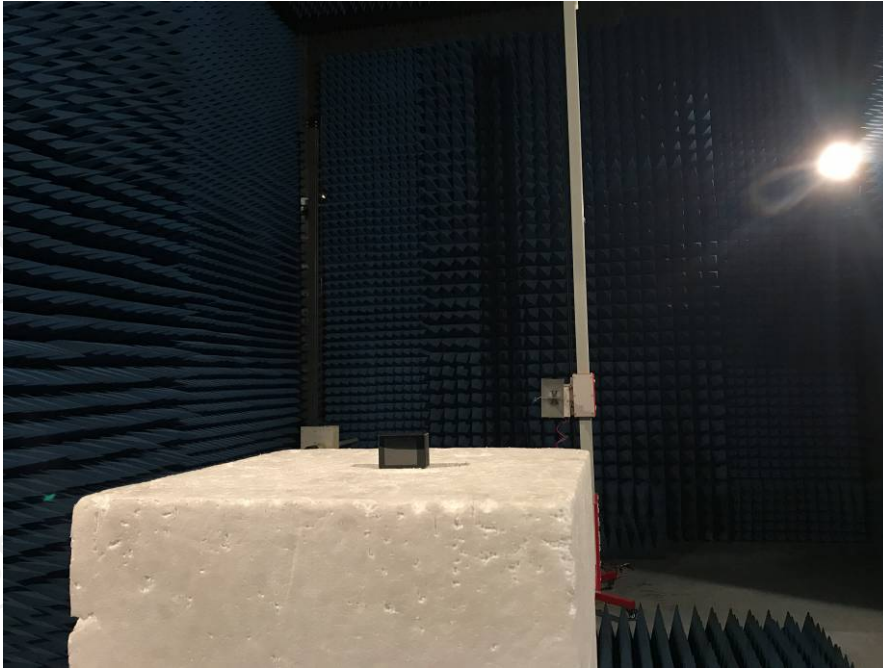
Conducted Emission Test View



Radiated Emission Test View



Radiated Emission Test View



9. Photographs of EUT

Refer to test report TCT171211E022

*******END OF REPORT*******