**Shenzhen EBO Testing Center**

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# TEST REPORT

| | |
|---|---|
| **Applicant:** | EKEN GROUP LIMITED |
| **Address of Applicant:** | Room 2511-2512, Meilan Business Center, Qianjin Two Road, XiXiang, Baoan District, ShenZhen, China |
| **Manufacturer/Factory:** | EKEN GROUP LIMITED |
| **Address of Manufacturer/Factory:** | Room 2511-2512, Meilan Business Center, Qianjin Two Road, XiXiang, Baoan District, ShenZhen, China |

**Equipment Under Test (EUT)**

| | |
|---|---|
| Product Name: | ACTION CAMERA |
| Model No.: | Please refer to page 5 |
| **FCC ID:** | 2ADDG-V8S |
| **Applicable standards:** | FCC CFR Title 47 Part 15 Subpart B:2016 |
| **Date of sample receipt:** | May 05, 2017 |
| **Date of Test:** | May 05, 2017 to May 19, 2017 |
| **Date of report issued:** | May 19, 2017 |
| **Test Result :** | PASS * |

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Kevin Yu
Laboratory Manager

## 2 Version

| Version No. | Date | Description |
|---|---|---|
| *00* | *May 19, 2017* | *Original* |
| | | |
| | | |
| | | |
| | | |

***Prepared by:***  ***Date:*** *May 19, 2017*

***Project Engineer***

***Reviewed by:***  ***Date:*** *May 19, 2017*

***Reviewer***

# 3 Contents

# 4 Test Summary

| Test Item | Section in CFR 47 | Result |
|---|---|---|
| Conducted Emission | Part15.107 | Pass |
| Radiated Emissions | Part15.109 | Pass |

*Pass: The EUT comply with the essential requirements in the standard.*

*Remark: Test according to ANSI C63.4:2014.*

**Measurement Uncertainty**

| Test Item | Frequency Range | Measurement Uncertainty | Notes |
|---|---|---|---|
| Radiated Emission | 9kHz ~ 30MHz | ± 4.34dB | (1) |
| Radiated Emission | 30MHz ~ 1000MHz | ± 4.24dB | (1) |
| Radiated Emission | 1GHz ~ 26.5GHz | ± 4.68dB | (1) |
| AC Power Line Conducted Emission | 0.15MHz ~ 30MHz | ± 3.45dB | (1) |
| Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%. | | | |

# 5 General Information

## 5.1 General Description of EUT

| | |
|---|---|
| Product Name: | ACTION CAMERA |
| Model No.: | V8s, A7, A8, A9, W7, W8, W9, W9R, W9se, W9Rse, H2, H2R, H2Rse, H3, H3R, N2, N9, H8, H8R, H8s, H8se, H8 Pro, H8 Plus, H9, H9s, H9R, H9Rse, H9 Pro, H9 Plus, G2, G3, K8, V1s, V2s, V3s, V4s, V5s, V6s, V7s, V9s, V8s Mack II<br>Remark: All models are identical in the same PCB layout, interior structure and electrical circuits. The only differences are the model name and appearance color for commercial purpose |
| Test Model No.: | V8s |
| Power supply: | Power Adapter<br>Model:ZXT-051500E<br>Input:AC 100-240V 50/60Hz, 0.4A<br>Output:DC 5V,1A<br>Or<br>DC 3.7V,1050mAh,3.885Wh Rechargeable Li-ion battery pack |

## 5.2 Test mode and Test voltage

| **Test mode:** | |
|---|---|
| PC mode | Keep the EUT in data exchange with PC. |
| REC mode | Keep the EUT in rec mode |

## 5.3 Description of Support Units

Note: All support units are DOC approval

| Manufacturer | Description | Model | Serial Number |
|---|---|---|---|
| Apple | PC | A1278 | C1MN99ERDTY3 |
| DELL | KEYBOARD | SK-8115 | N/A |
| DELL | MOUSE | MOC5UO | N/A |
| Kingston | TF card | SD-C01G | N/A |

## 5.4 Test Location

| |
|---|
| All tests were performed at: FCC —Registration No.: 600491 |
| Global United Technology Services Co., Ltd.<br>Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102<br>Tel: 0755-27798480<br>Fax: 0755-27798960 |

# 6 Test Instruments list

| Radiated Emission: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | 3m Semi- Anechoic Chamber | ZhongYu Electron | 9.0(L)*6.0(W)* 6.0(H) | 250 | July. 03 2015 | July. 02 2020 |
| 2 | Control Room | ZhongYu Electron | 6.2(L)*2.5(W)* 2.4(H) | 251 | N/A | N/A |
| 3 | ESU EMI Test Receiver | R&S | ESU26 | 203 | June.29 2016 | June.28 2017 |
| 4 | BiConiLog Antenna | SCHWARZBECK | VULB9163 | 214 | June.29 2016 | June.28 2017 |
| 5 | Double-ridged horn antenna | SCHWARZBECK | 9120D | 208 | June.29 2016 | June.28 2017 |
| 6 | Horn Antenna | ETS-LINDGREN | 3160-09 | 218 | June.29 2016 | June.28 2017 |
| 7 | RF Amplifier | HP | 8347A | 204 | June.29 2016 | June.28 2017 |
| 8 | Broadband Preamplifier | SCHWARZBECK | BBV9718 | 535 | June.29 2016 | June.28 2017 |
| 9 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 10 | Coaxial Cable | GTS | N/A | 211 | June.29 2016 | June.28 2017 |
| 11 | Coaxial Cable | GTS | N/A | 210 | June.29 2016 | June.28 2017 |
| 12 | Coaxial Cable | GTS | N/A | 212 | June.29 2016 | June.28 2017 |
| 13 | Thermo meter | N/A | N/A | 256 | June.29 2016 | June.28 2017 |

| Conducted Emission | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | Shielding Room | ZhongYu Electron | 7.3(L)x3.1(W)x2.9(H) | 252 | May.16 2014 | May.15 2019 |
| 2 | EMI Test Receiver | R&S | ESCI 7 | 552 | June. 29 2016 | June. 28 2017 |
| 3 | Coaxial Switch | ANRITSU CORP | MP59B | 225 | June. 29 2016 | June. 28 2017 |
| 4 | Artificial Mains Network | SCHWARZBECK MESS | NSLK8127 | 226 | June. 29 2016 | June. 28 2017 |
| 5 | Coaxial Cable | GTS | N/A | 227 | N/A | N/A |
| 6 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 7 | Thermo meter | KTJ | TA328 | 233 | June. 29 2016 | June. 28 2017 |

| General used equipment: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (dd-mm-yy)** | **Cal.Due date (dd-mm-yy)** |
| 1 | Barometer | ChangChun | DYM3 | 257 | June. 29 2016 | June. 28 2017 |

# 7 Test Results and Measurement Data

## 7.1 Radiated Emission

| | |
|---|---|
| Test Requirement: | FCC Part15 B Section 15.109 |
| Test Method: | ANSI C63.4:2014 |
| Test Frequency Range: | 30MHz to 25000MHz |
| Test site: | Measurement Distance: 3m (Semi-Anechoic Chamber) |

Receiver setup:

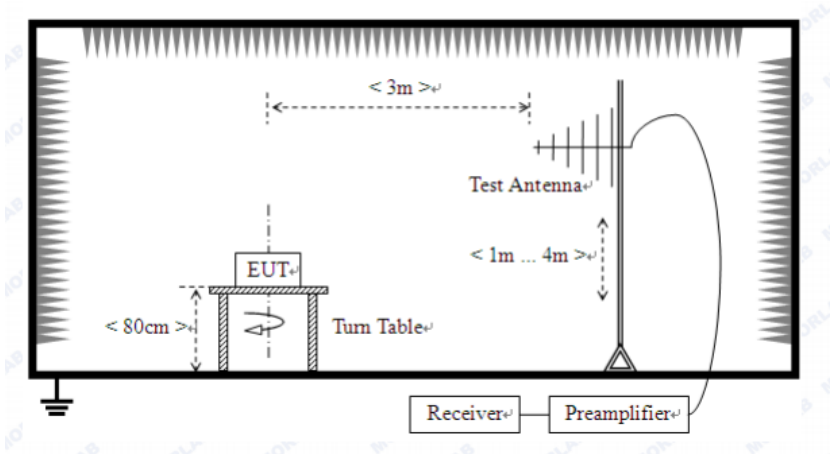
| Frequency | Detector | RBW | VBW | Remark |
|---|---|---|---|---|
| 30MHz-1GHz | Quasi-peak | 120kHz | 300kHz | Quasi-peak Value |
| Above 1GHz | Peak | 1MHz | 3MHz | Peak Value |
| | Peak | 1MHz | 10Hz | Average Value |

Limit:

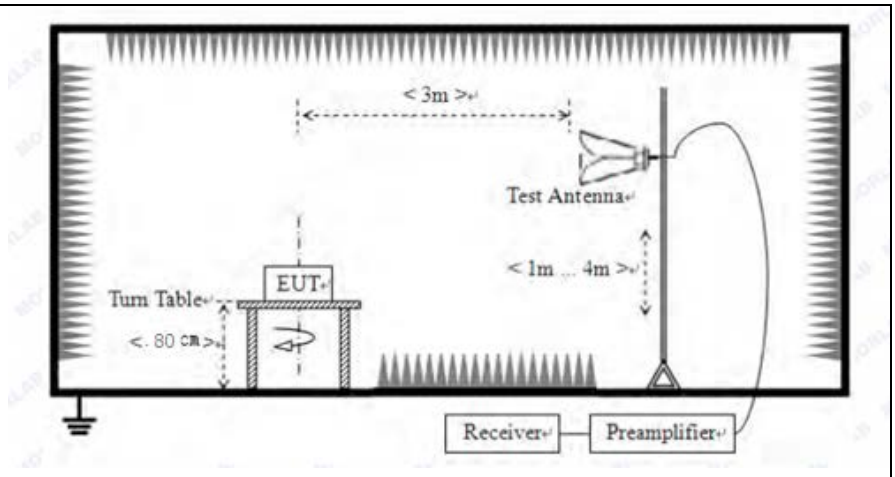
| Frequency | Limit (dBuV/m @3m) | Remark |
|---|---|---|
| 30MHz-88MHz | 40.00 | Quasi-peak Value |
| 88MHz-216MHz | 43.50 | Quasi-peak Value |
| 216MHz-960MHz | 46.00 | Quasi-peak Value |
| 960MHz-1GHz | 54.00 | Quasi-peak Value |
| Above 1GHz | 54.00 | Average Value |
| | 74.00 | Peak Value |

Test setup:

Below 1GHz

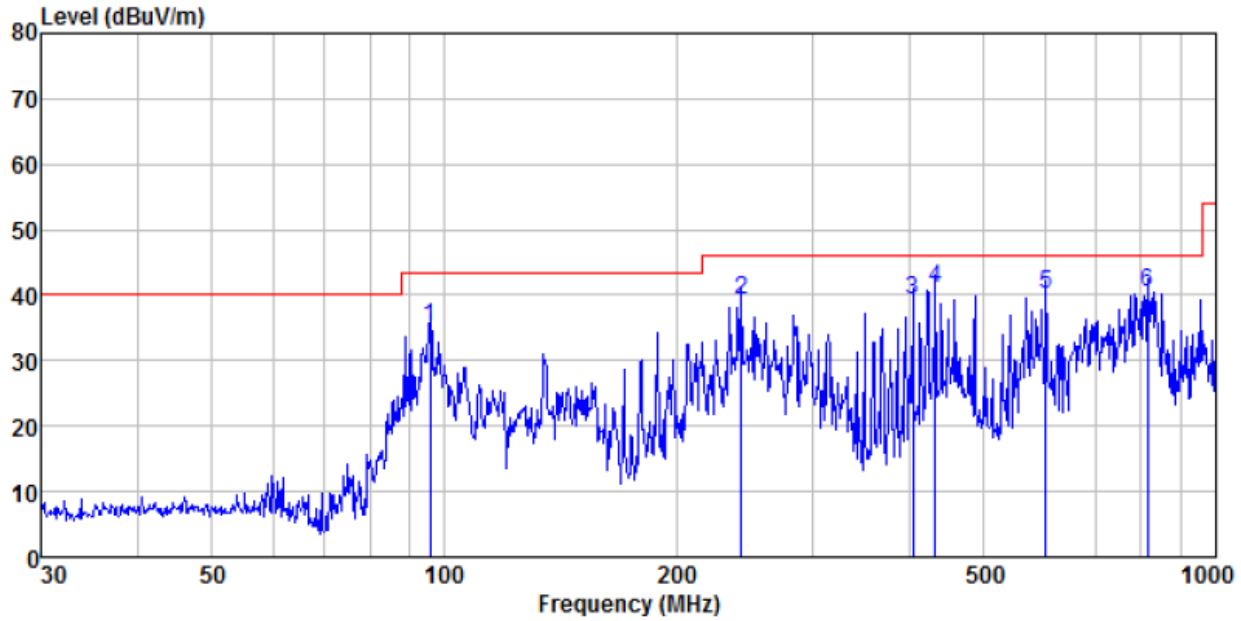



Above 1GHz

| | |
|---|---|
| |  |
| Test Procedure: | 1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.<br>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.<br>3. The antenna height is varied from one meter to four meters 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.<br>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.<br>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.<br>6. 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 emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. |
| Test environment: | Temp.: 25 °C Humid.: 52% Press.: 1 012mbar |
| Measurement Record: | Uncertainty: ± 4.50dB |
| Test Instruments: | Refer to section 6 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

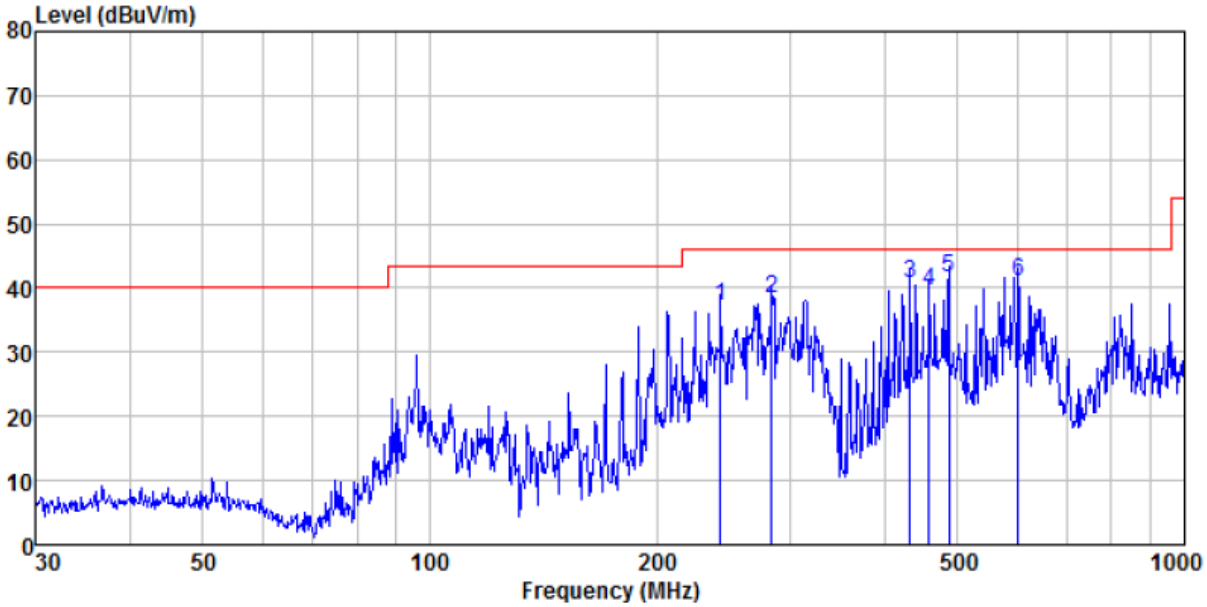
**Measurement Data**
**Below 1GHz**

| Test mode: | PC mode | Antenna Polarity: | Horizontal |
|---|---|---|---|




| Freq MHz | Reading level dBuV | Antenna factor dB/m | Cable loss dB | Preamp factor dB | level dBuV/m | Limit level dBuV/m | Over limit dB | Remark |
|---|---|---|---|---|---|---|---|---|
| 95.762 | 52.40 | 11.35 | 1.16 | 29.82 | 35.09 | 43.50 | -8.41 | QP |
| 242.525 | 55.16 | 11.66 | 2.08 | 29.74 | 39.16 | 46.00 | -6.84 | QP |
| 404.667 | 50.32 | 15.56 | 2.88 | 29.59 | 39.17 | 46.00 | -6.83 | QP |
| 432.546 | 51.49 | 16.17 | 3.01 | 29.57 | 41.10 | 46.00 | -4.90 | QP |
| 601.427 | 46.65 | 19.30 | 3.73 | 29.39 | 40.29 | 46.00 | -5.71 | QP |
| 815.968 | 43.60 | 21.46 | 4.52 | 29.14 | 40.44 | 46.00 | -5.56 | QP |

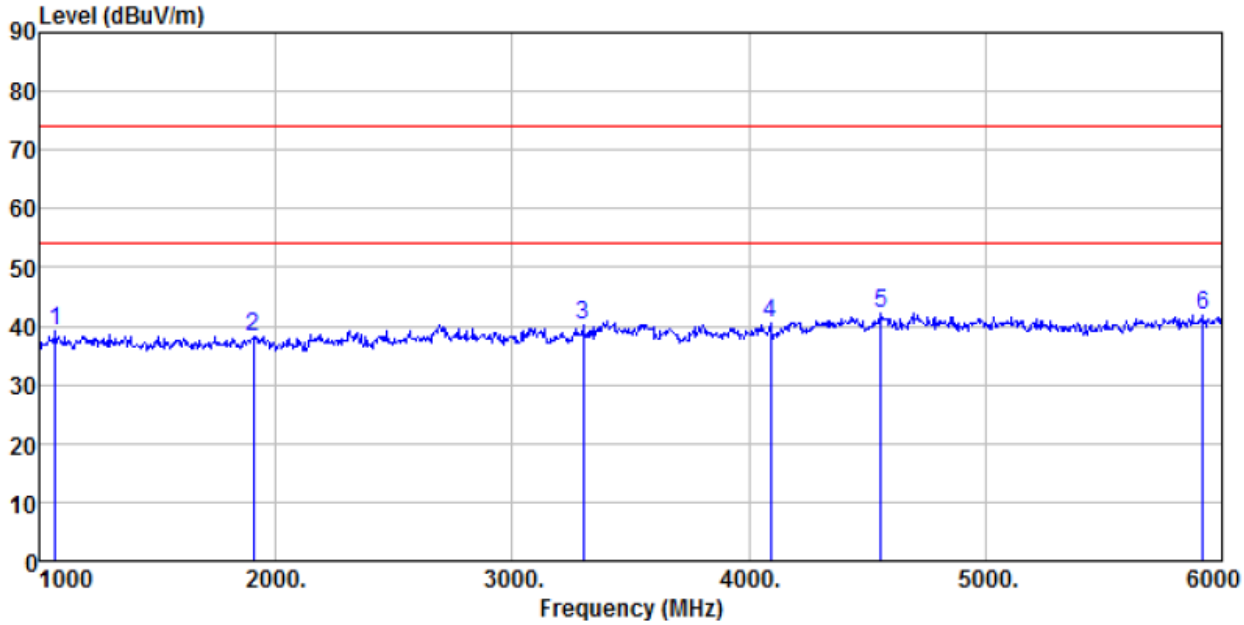
| Test mode: | PC mode | Antenna Polarity: | Vertical |
|---|---|---|---|




| Freq MHz | Reading level dBuV | Antenna factor dB/m | Cable loss dB | Preamp factor dB | level dBuV/m | Limit level dBuV/m | Over limit dB | Remark |
|---|---|---|---|---|---|---|---|---|
| 242.525 | 53.06 | 11.66 | 2.08 | 29.74 | 37.06 | 46.00 | -8.94 | QP |
| 283.979 | 53.05 | 13.01 | 2.29 | 30.08 | 38.27 | 46.00 | -7.73 | QP |
| 432.546 | 51.27 | 16.17 | 3.01 | 29.57 | 40.88 | 46.00 | -5.12 | QP |
| 459.114 | 49.17 | 16.65 | 3.13 | 29.54 | 39.41 | 46.00 | -6.59 | QP |
| 487.315 | 50.51 | 17.26 | 3.25 | 29.51 | 41.51 | 46.00 | -4.49 | QP |
| 601.427 | 47.53 | 19.30 | 3.73 | 29.39 | 41.17 | 46.00 | -4.83 | QP |

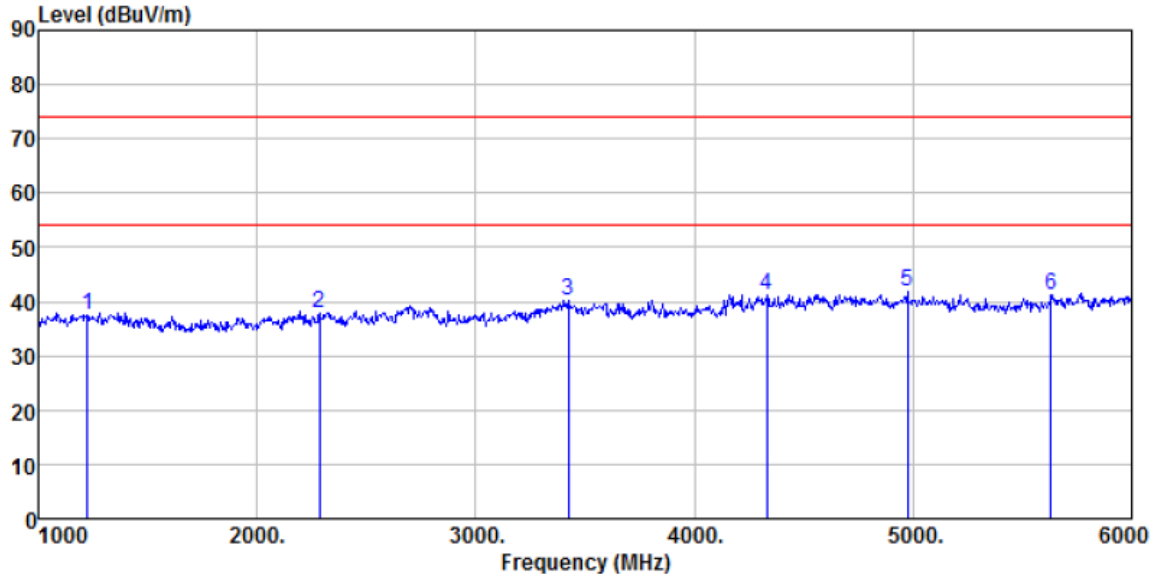
**Above 1GHz**

| Test mode: | PC mode | Antenna Polarity: | Horizontal |
|---|---|---|---|




| Freq | Reading level | Antenna factor | Cable loss | Preamp factor | level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 1070.000 | 42.89 | 24.67 | 4.35 | 32.87 | 39.04 | 74.00 | -34.96 | Peak |
| 1905.000 | 41.79 | 25.77 | 4.91 | 34.29 | 38.18 | 74.00 | -35.82 | Peak |
| 3300.000 | 38.21 | 28.35 | 6.56 | 32.99 | 40.13 | 74.00 | -33.87 | Peak |
| 4090.000 | 34.82 | 29.89 | 7.95 | 32.07 | 40.59 | 74.00 | -33.41 | Peak |
| 4560.000 | 34.33 | 31.44 | 8.39 | 31.96 | 42.20 | 74.00 | -31.80 | Peak |
| 5920.000 | 31.24 | 32.78 | 10.09 | 32.18 | 41.93 | 74.00 | -32.07 | Peak |

| Test mode: | PC mode | Antenna Polarity: | Vertical |
|---|---|---|---|

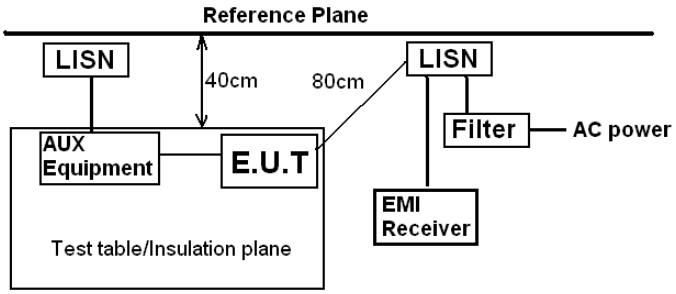



| Freq MHz | Reading level dBuV | Antenna factor dB/m | Cable loss dB | Preamp factor dB | level dBuV/m | Limit level dBuV/m | Over limit dB | Remark |
|---|---|---|---|---|---|---|---|---|
| 1225.000 | 40.82 | 25.45 | 4.49 | 33.13 | 37.63 | 74.00 | -36.37 | Peak |
| 2285.000 | 38.85 | 27.99 | 5.28 | 34.13 | 37.99 | 74.00 | -36.01 | Peak |
| 3425.000 | 37.46 | 28.72 | 6.82 | 32.83 | 40.17 | 74.00 | -33.83 | Peak |
| 4330.000 | 34.19 | 30.83 | 8.18 | 31.86 | 41.34 | 74.00 | -32.66 | Peak |
| 4975.000 | 33.31 | 31.94 | 8.74 | 32.17 | 41.82 | 74.00 | -32.18 | Peak |
| 5630.000 | 31.69 | 32.32 | 9.70 | 32.36 | 41.35 | 74.00 | -32.65 | Peak |

*Note:*
*The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:*
*Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor*

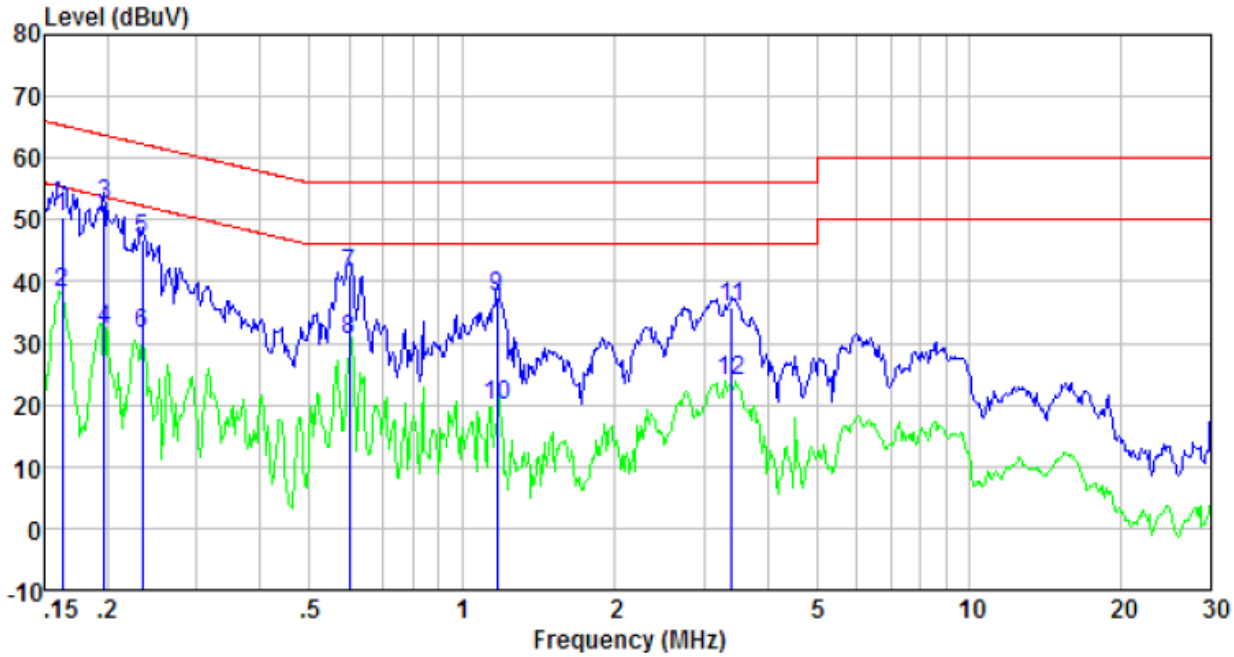
No emission found for above 6GHz， so only worse case 30MHz to 6GHz is reported

## 7.2 Conducted Emissions

| | |
|---|---|
| Test Requirement: | FCC Part15 B Section 15.107 |
| Test Method: | ANSI C63.4:2014 |
| Test Frequency Range: | 150kHz to 30MHz |
| Class / Severity: | Class B |
| Receiver setup: | RBW=9kHz, VBW=30kHz |
| Limit: | Frequency range (MHz) / Limit (dBμV): Quasi-peak / Average<br>0.15-0.5: 66 to 56* / 56 to 46*<br>0.5-5: 56 / 46<br>0.5-30: 60 / 50 |
| Test setup: |  <br>*Remark:*<br>*E.U.T: Equipment Under Test*<br>*LISN: Line Impedence Stabilization Network*<br>*Test table height=0.8m* |
| Test procedure | 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment.<br>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs).<br>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement. |
| Test environment: | Temp.: 25 °C / Humid.: 52% / Press.: 1 012mbar |
| Test Instruments: | Refer to section 6 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

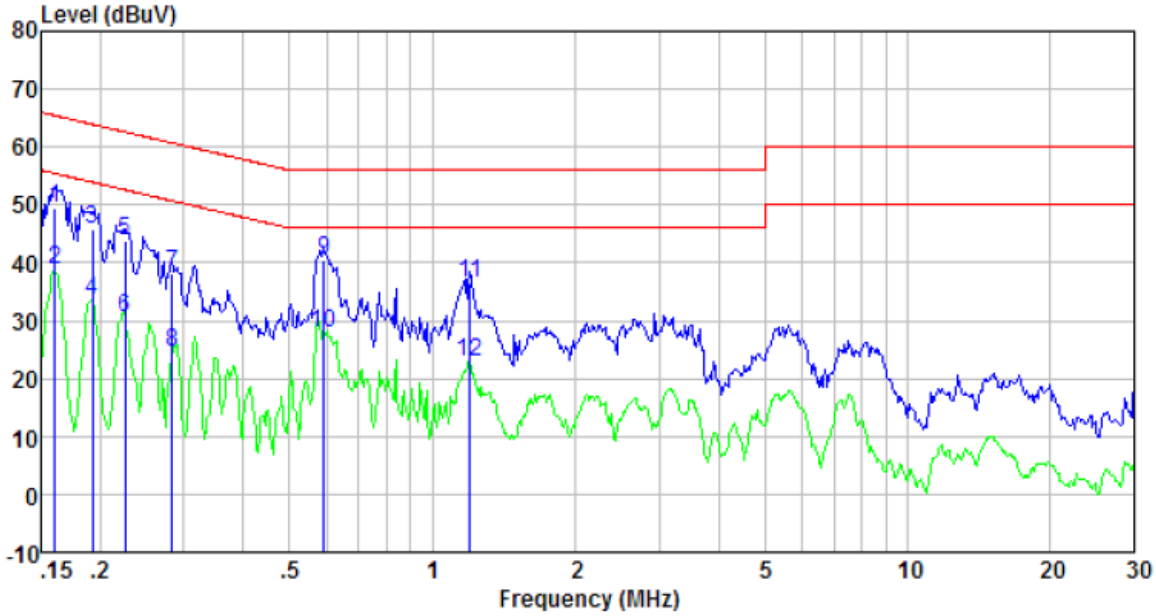
**Measurement Data**

| Test mode: | PC mode | Phase Polarity: | Line |
|---|---|---|---|




| Freq MHz | Reading level dBuV | lISN/ISN factor dB | Cable loss dB | level dBuV | Limit level dBuV | Over limit dB | Remark |
|---|---|---|---|---|---|---|---|
| 0.162 | 50.06 | 0.41 | 0.12 | 50.59 | 65.34 | -14.75 | QP |
| 0.162 | 37.53 | 0.41 | 0.12 | 38.06 | 55.34 | -17.28 | Average |
| 0.197 | 52.02 | 0.41 | 0.13 | 52.56 | 63.76 | -11.20 | QP |
| 0.197 | 31.56 | 0.41 | 0.13 | 32.10 | 53.76 | -21.66 | Average |
| 0.234 | 46.37 | 0.42 | 0.12 | 46.91 | 62.30 | -15.39 | QP |
| 0.234 | 30.91 | 0.42 | 0.12 | 31.45 | 52.30 | -20.85 | Average |
| 0.598 | 40.88 | 0.28 | 0.12 | 41.28 | 56.00 | -14.72 | QP |
| 0.598 | 30.28 | 0.28 | 0.12 | 30.68 | 46.00 | -15.32 | Average |
| 1.172 | 37.25 | 0.21 | 0.13 | 37.59 | 56.00 | -18.41 | QP |
| 1.172 | 19.59 | 0.21 | 0.13 | 19.93 | 46.00 | -26.07 | Average |
| 3.399 | 35.37 | 0.21 | 0.15 | 35.73 | 56.00 | -20.27 | QP |
| 3.399 | 23.37 | 0.21 | 0.15 | 23.73 | 46.00 | -22.27 | Average |

| Test mode: | PC mode | Phase Polarity: | Neutral |
|---|---|---|---|

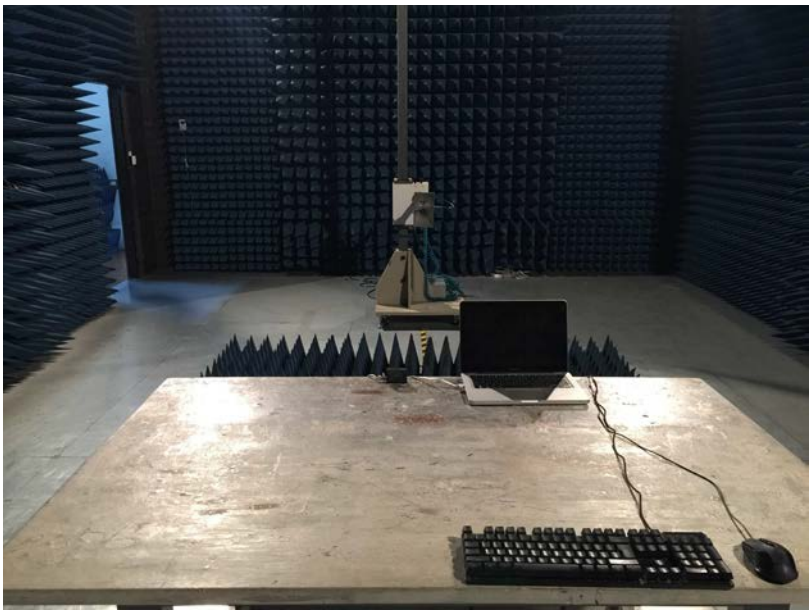



| Freq MHz | Reading level dBuV | lISN/ISN factor dB | Cable loss dB | level dBuV | Limit level dBuV | Over limit dB | Remark |
|---|---|---|---|---|---|---|---|
| 0.161 | 48.77 | 0.42 | 0.12 | 49.31 | 65.43 | -16.12 | QP |
| 0.161 | 38.23 | 0.42 | 0.12 | 38.77 | 55.43 | -16.66 | Average |
| 0.192 | 45.24 | 0.43 | 0.13 | 45.80 | 63.93 | -18.13 | QP |
| 0.192 | 32.79 | 0.43 | 0.13 | 33.35 | 53.93 | -20.58 | Average |
| 0.226 | 43.27 | 0.43 | 0.12 | 43.82 | 62.61 | -18.79 | QP |
| 0.226 | 29.83 | 0.43 | 0.12 | 30.38 | 52.61 | -22.23 | Average |
| 0.283 | 37.60 | 0.44 | 0.10 | 38.14 | 60.72 | -22.58 | QP |
| 0.283 | 24.14 | 0.44 | 0.10 | 24.68 | 50.72 | -26.04 | Average |
| 0.592 | 39.91 | 0.31 | 0.12 | 40.34 | 56.00 | -15.66 | QP |
| 0.592 | 27.34 | 0.31 | 0.12 | 27.77 | 46.00 | -18.23 | Average |
| 1.197 | 36.06 | 0.24 | 0.13 | 36.43 | 56.00 | -19.57 | QP |
| 1.197 | 22.43 | 0.24 | 0.13 | 22.80 | 46.00 | -23.20 | Average |

*Notes:*
*1. The following Quasi-Peak and Average measurements were performed on the EUT:*
*2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.*

# 8 Test Setup Photo

Radiated Emission:



Conducted Emission

# 9 EUT Constructional Details

Reference to the test report No. EBO1705017-E290

-----End------