China

# FCC - TEST REPORT

| | | | | |
|---|---|---|---|---|
| Report Number | : | 60.790.18.030.01R01 | Date of Issue : | June 23, 2018 |
| Model | : | USEE | | |
| Product Type | : | **Head up display for bike helmets** | | |
| Applicant | : | DAYTON INDUSTRIAL CO. LTD | | |
| Address | : | 11A, 2-12 KWAI FAT ROAD, KWAI CHUNG, NEW TERRITORIES, HONG KONG | | |
| Production Facility | : | Kendy Electronics (Dongguan) Co. Ltd | | |
| Address | : | Xingsi Huangtang Village, Hengli Town, Dongguan City, Guangdong Province, P. R. China | | |
| Test Result | : | ■Positive ☐Negative | | |
| Total pages including Appendices | : | 14 | | |

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# 1 Table of Contents

# 2 Description of Equipment Under Test

**Description of the Equipment Under Test**

| | |
|---|---|
| Product: | Head up display for bike helmets |
| Model no.: | USEE |
| FCC ID: | O4GUSEE |
| Rating: | 3 VDC (1 x CR2302 battery) |
| Frequency: | 2457MHz |
| Antenna gain: | 0 dBi |
| Number of operated channel: | 1 |
| Modulation: | GFSK |

# 3 Summary of Test Standards

| Test Standards |
| --- |
| FCC Part 15 Subpart C 10-1-17 Edition<br>Federal Communications Commission, PART 15 — Radio Frequency Devices,<br>Subpart C — Unintentional Radiators |

# 4 Details about the Test Laboratory

## Site 1

Company name: TÜV SÜD Hong Kong Ltd.
3/F, West Wing, Lakeside 2,
10 Science Park West Avenue,
Science Park, Shatin, Hong Kong

## Site 2

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13 Zhiheng Wisdomland Business Park,
Nantou Checkpoint Road 2,
Shenzhen 518052, P.R.China
FCC Registration Number: 502708

| Emission Tests | |
|---|---|
| Test Item | Test Site |
| **FCC Part 15 Subpart C** | |
| FCC Title 47 Part 15.205, 15.209 & 15.249 & Radiated Emission | Site 2 |
| FCC Title 47 Part 15.207 Conduct Emission | NIL |
| FCC Title 47 Part 15.215 20dB & 99% Bandwidth | Site 2 |
| FCC Title 47 Part 15.203 Antenna Requirement | Site 2 |

## 4.1 Test Equipment Site List

**Radiated emission Test – Site 2**

| DESCRIPTION | MANUFACTURER | MODEL NO. | SERIAL NO. | CAL. DUE DATE |
|---|---|---|---|---|
| EMI Test Receiver | Rohde & Schwarz | ESR 26 | 101269 | 2018-7-14 |
| Trilog Super Broadband Test Antenna | Schwarzbeck | VULB 9163 | 707 | 2018-7-14 |
| Horn Antenna | Rohde & Schwarz | HF907 | 102294 | 2018-7-14 |
| Pre-amplifier | Rohde & Schwarz | SCU 18 | 102230 | 2018-7-14 |
| Signal Generator | Rohde & Schwarz | SMY01 | 839369/005 | 2018-7-7 |
| Attenuator | Agilent | 8491A | MY39264334 | 2018-7-7 |
| 3m Semi-anechoic chamber | TDK | 9X6X6 | ---- | 2020-7-7 |
| Test software | Rohde & Schwarz | EMC32 | Version 9.15.00 | N/A |

**Bandwidth Test– Site 2**

| DESCRIPTION | MANUFACTURER | MODEL NO. | SERIAL NO. | CAL. DUE DATE |
|---|---|---|---|---|
| Signal Generator | Rohde & Schwarz | SMB100A | 108272 | 2018-7-7 |
| Signal Analyzer | Rohde & Schwarz | FSV40 | 101030 | 2018-7-7 |
| Vector Signal Generator | Rohde & Schwarz | SMU 200A | 105324 | 2018-7-7 |
| RF Switch Module | Rohde & Schwarz | OSP120/OSP-B157 | 101226/100851 | 2018-7-7 |

## 4.2 Measurement System Uncertainty

### Measurement System Uncertainty Emissions

| System Measurement Uncertainty | |
|---|---|
| **Items** | **Extended Uncertainty** |
| Uncertainty for Radiated Emission in 3m chamber 9kHz-30MHz | 4.54dB |
| Uncertainty for Radiated Emission in 3m chamber 30MHz-1000MHz | Horizontal: 4.83dB; Vertical: 4.91dB; |
| Uncertainty for Radiated Emission in 3m chamber 1000MHz-25000MHz | Horizontal: 4.89dB; Vertical: 4.88dB; |
| Uncertainty for Conducted RF test | 2.04dB |

# 5 Summary of Test Results

| Emission Tests | | | | |
|---|---|---|---|---|
| **FCC Part 15 Subpart C** | | | | |
| Test Condition | Pages | Test Result | | |
| | | Pass | Fail | N/A |
| FCC Title 47 Part 15.205,15.209 & 15.249 Radiated Emission | 10-11 | ☒ | ☐ | ☐ |
| FCC Title 47 Part 15.207 Conduct Emission (1) | NIL | ☐ | ☐ | ☒ |
| FCC Title 47 Part 15.215 20dB & 99% Bandwidth | 12 | ☒ | ☐ | ☐ |
| FCC Title 47 Part 15.203 Antenna Requirement | 13 | ☒ | ☐ | ☐ |

**Remark:**

1) These requirements do not apply for equipment which employ battery power for operation and which do not operate from the AC power lines.

# 6 General Remarks

**Remarks**

NIL

**SUMMARY:**

- All tests according to the regulations cited on page 5 were

■ - Performed

☐ - **Not** Performed

- The Equipment Under Test

■ - **Fulfills** the general approval requirements.

☐ - **Does not** fulfill the general approval requirements.

Sample Received Date: April 30, 2018

Testing Start Date: May 2, 2018

Testing End Date: May 30, 2018

Reviewed by: Hosea CHAN
EMC Project Engineer

Prepared by: Eric LI
EMC Senior Project Engineer

China

# 7 Emission Test Results

## 7.1 Radiated Emission

EUT: USEE
Op Condition: Operated, TX Mode (2457MHz)
Test Specification: FCC15.249 & 15.209, Antenna: Horizontal
Comment: 3 VDC
Remark: 9kHz to 25GHz

Test Result
☒ Passed
☐ Not Passed

| Frequency MHz | Result dBµV/m | Limit dBµV/m | Margin dB | Detector |
|---|---|---|---|---|
| 37.412 | 17.48 | 40 | -22.52 | Quasi Peak |
| 197.864 | 21.61 | 43.5 | -21.89 | Quasi Peak |
| 324.123 | 28.15 | 46 | -17.85 | Quasi Peak |
| 875.512 | 31.48 | 46 | -14.52 | Quasi Peak |
| 2457.000 | 99.25 | 114 | -14.75 | Peak |
| 2457.000 | 89.62 | 94 | -4.38 | Average |
| 4913.906 | 56.65 | 74 | -17.35 | Peak |
| 4913.906 | 34.84 | 54 | -19.16 | Average |
| 8828.906 | 41.47 | 74 | -32.53 | Peak |
| 8828.906 | 25.50 | 54 | -28.50 | Average |

## Radiated Emission

EUT: USEE
Op Condition: Operated, TX Mode (2457MHz)
Test Specification: FCC15.249 & 15.209, Antenna: Vertical
Comment: 3 VDC
Remark: 9kHz to 25GHz

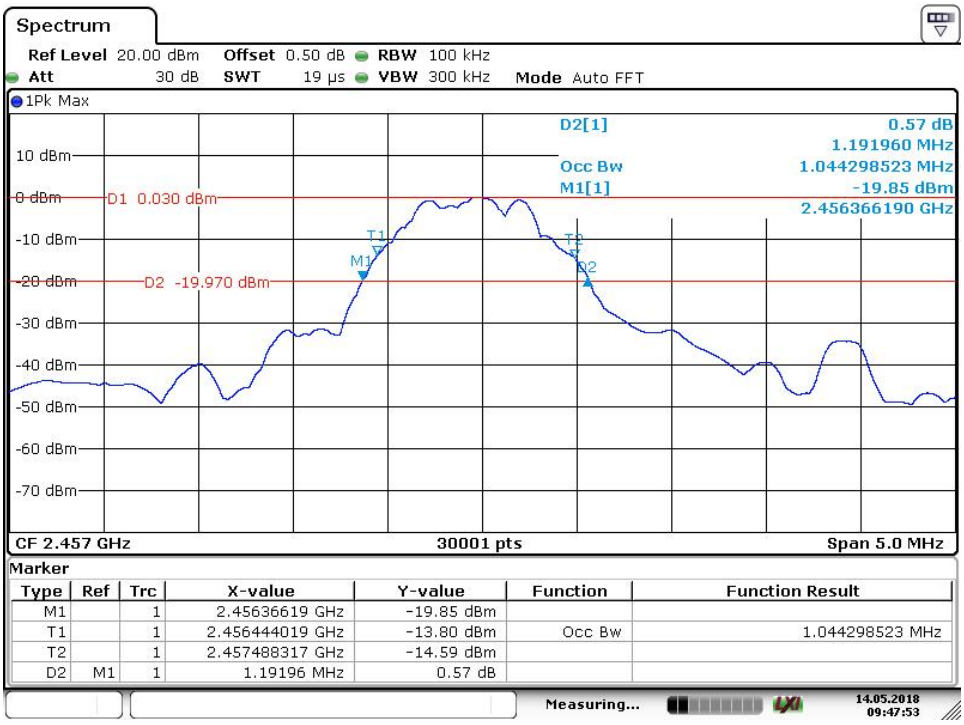
Test Result
☒ Passed
☐ Not Passed

| Frequency MHz | Result dBµV/m | Limit dBµV/m | Margin dB | Detector |
|---|---|---|---|---|
| 60.611 | 20.51 | 40 | -19.49 | Quasi Peak |
| 252.023 | 22.46 | 46 | -23.54 | Quasi Peak |
| 287.966 | 25.15 | 46 | -20.85 | Quasi Peak |
| 874.330 | 26.32 | 46 | -19.68 | Quasi Peak |
| 2457.000 | 97.87 | 114 | -16.13 | Peak |
| 2457.000 | 82.72 | 94 | -11.28 | Average |
| 4913.906 | 51.34 | 74 | -22.66 | Peak |
| 4913.906 | 31.57 | 54 | -22.43 | Average |
| 8096.250 | 40.49 | 74 | -33.51 | Peak |
| 8096.250 | 24.90 | 54 | -29.10 | Average |

## 7.2 20dB & 99% Bandwidth

| | |
|---|---|
| EUT: | USEE |
| Op Condition: | Operated, TX Mode (2457MHz) |
| Test Specification: | FCC15.215 |
| Comment: | 3 VDC |

Test Result
☒ Passed
☐ Not Passed




| 20dB bandwidth |
|---|
| 1191.96 kHz |

| 99% bandwidth |
|---|
| 1044.2985 kHz |

## 7.3 Antenna Requirement

| | |
|---|---|
| EUT: | USEE |
| Op Condition: | Operated, TX Mode |
| Test Specification: | FCC15.203 (b) |
| Comment: | 3 VDC |

Test Result
☒ Passed
☐ Not Passed

**Limit**

For intentional device, according to FCC Title 47 Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

**Antenna Connector Construction**

The antenna used in this product is integrated antenna on PCB, which in accordance to section 15.203, is considered sufficient to comply with the antenna requirement.

# 8 Appendix A - General Product Information

**Radiofrequency radiation exposure evaluation**

According to KDB 447498 D01v06 section 4.3.1, For frequencies between 100 MHz to 6GHz and test separation distances ≤ 50 mm, the Numeric threshold is determined as:

Step a)
[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR

>> The fundamental frequency of the EUT is 2402-2480MHz,
the test separation distance is ≤ 50mm.
(Manufacturer specified the separation distance is: 20mm)

Step a)
>> Numeric threshold (2457MHz), mW / 20mm * √2.457GHz ≤ 3.0
Numeric threshold (2457MHz) ≤ 38.278mW

>>The power of EUT measured (2457MHz) is: 0.23 dBm = 1.054mW

Which is smaller than the Numeric threshold.
Therefore, the device is exempt from stand-alone SAR test requirements.

## Appendix A - Conducted power

| | |
|---|---|
| EUT: | USEE |
| Op Condition: | Operated, TX Mode (2457MHz) |
| Comment: | 3 VDC |
| Remark: | NA |

Test Result
☒ Passed
☐ Not Passed