# Radio Exposure Evaluation Report

| | | |
|---|---|---|
| **FCC ID** | : | **2AIHD2024** |
| **Contains FCC ID** | : | **NKRM18Q2** |
| **Equipment** | : | **AG26, AG46P** |
| **Brand Name** | : | **Samsara** |
| **Model Name** | : | **010-2026, 010-2047** |
| **Applicant** | : | **Samsara Networks Inc**<br>**1990 Alameda St, San Francisco,**<br>**CA 94103, USA** |
| **Manufacturer** | : | **Samsara Networks Inc**<br>**1990 Alameda St, San Francisco,**<br>**CA 94103, USA** |
| **Standard** | : | **47 CFR Part 2.1091** |

**The product was received on May 28, 2020, and testing was started from Jun. 08, 2020 and completed on Jun. 10, 2020. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.**

**The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of United States government.**

**The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.**

Approved by: Allen Lin

***SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory***

*No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)*

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# History of this test report

| Report No. | Version | Description | Issued Date |
|---|---|---|---|
| FA7N2021-05 | 01 | Initial issue of report | Jul. 22, 2020 |
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# Summary of Test Result

| Report Clause | Ref Std. Clause | Test Items | Result (PASS/FAIL) | Remark |
|---|---|---|---|---|
| 2 | - | Exposure evaluation | PASS | - |

| **Declaration of Conformity:** |
|---|
| The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. |
| **Comments and Explanations:** |
| None. |

**Reviewed by: Sam Tsai**

**Report Producer: Michelle Tsai**

# 1 General Description

## 1.1 EUT General Information

| RF General Information | | | |
|---|---|---|---|
| **Evaluation Mode** | **Frequency Range (MHz)** | **Operating Frequency (MHz)** | **Modulation Type** |
| 2.4GHz WLAN | 2400-2483.5 | 2412-2462 | 802.11b: DSSS (DBPSK, DQPSK, CCK)<br>802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) |
| Bluetooth | 2400-2483.5 | 2402-2480 | BR / EDR: FHSS (GFSK / π/4-DQPSK / 8DPSK)<br>LE: DSSS (GFSK) |

| RF General Information | | | | |
|---|---|---|---|---|
| **Evaluation Mode** | **Frequency Range (MHz)** | **Bandwidth (MHz)** | **Operating Frequency (MHz)** | **Modulation Type** |
| WWAN | WCDMA Band 5 | 5 | 826.4 ~ 846.6 | QPSK, 16QAM, 64QAM |
| | WCDMA Band 2 | 5 | 1852.4 ~ 1907.6 | |
| | LTE Band 5 | 1.4 | 824.7 ~ 848.3 | |
| | | 3 | 825.5 ~ 847.5 | |
| | | 5 | 826.5 ~ 846.5 | |
| | | 10 | 829.0 ~ 844.0 | |
| | LTE Band 2 | 1.4 | 1850.7 ~ 1909.3 | |
| | | 3 | 1851.5 ~ 1908.5 | |
| | | 5 | 1852.5 ~ 1907.5 | |
| | | 10 | 1855.0 ~ 1905.0 | |
| | | 15 | 1857.5 ~ 1902.5 | |
| | | 20 | 1860.0 ~ 1900.0 | |
| | LTE Band 4 | 1.4 | 1710.7 ~ 1754.3 | |
| | | 3 | 1711.5 ~ 1753.5 | |
| | | 5 | 1712.5 ~ 1752.5 | |
| | | 10 | 1715.0 ~ 1750.0 | |
| | | 15 | 1717.5 ~ 1747.5 | |
| | | 20 | 1720.0 ~ 1745.0 | |
| | LTE Band 12 | 1.4 | 699.7 ~ 715.3 | |
| | | 3 | 700.5 ~ 714.5 | |
| | | 5 | 701.5 ~ 713.5 | |
| | | 10 | 704.0 ~ 711.0 | |

## 1.2 Table for Multiple Listing

| Sample | Model Name | Description |
|---|---|---|
| 1 | 010-2026 | 010-2026 - new enclosure, packaging, labels, some components not populated as part of solar panel removal and pack wiring changes. |
| 2 | 010-2047 | 010-2047 - coloration change to the resin; all else identical (besides labels, etc) to 010-2026. |

Note: Sample 2 configuration was measured during the test.

## 1.3 Table for Permissive Change

This product is an extension of original one reported under FCC ID: 2AIHD2024

Below is the table for the change of the product with respect to the original one.

| Modifications | Performance Checking |
|---|---|
| Model Name 010-2026 and 010-2047 was added | 1. MPE was evaluated<br>2. Photographs of EUT |

## 1.4 Testing Location

| Testing Location | | | |
|---|---|---|---|
| ☒ | HWA YA | ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) | |
| | | TEL : 886-3-327-3456 | FAX : 886-3-327-0973 |
| Test site Designation No. TW1190 with FCC. | | | |
| ☐ | JHUBEI | ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.) | |
| | | TEL : 886-3-656-9065 | FAX : 886-3-656-9085 |
| Test site Designation No. TW0006 with FCC. | | | |

# 2 Maximum Permissible Exposure

## 2.1 Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/ cm²) | Averaging Time \|E\|²,\|H\|² or S (minutes) |
|---|---|---|---|---|
| 0.3-3.0 | 614 | 1.63 | (100)* | 6 |
| 3.0-30 | 1842 / f | 4.89 / f | (900 / $f^2$)* | 6 |
| 30-300 | 61.4 | 0.163 | 1.0 | 6 |
| 300-1500 | - | - | F/300 | 6 |
| 1500-100,000 | - | - | 5 | 6 |

(B) Limits for General Population / Uncontrolled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/ cm²) | Averaging Time \|E\|²,\|H\|² or S (minutes) |
|---|---|---|---|---|
| 0.3-1.34 | 614 | 1.63 | (100)* | 30 |
| 1.34-30 | 824/f | 2.19/f | (180/$f^2$)* | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | - | - | F/1500 | 30 |
| 1500-100,000 | - | - | 1.0 | 30 |

Note: f = frequency in MHz ; *Plane-wave equivalent power density

## 2.2 MPE Calculation Method

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

E (V/m) = $\frac{\sqrt{30 \times P \times G}}{d}$ Power Density: *Pd* (W/m²) = $\frac{E^2}{377}$

**E** = Electric field (V/m)

**P** = RF output power (W)

**G** = EUT Antenna numeric gain (numeric)

**d** = Separation distance between radiator and human body (m)

The formula can be changed to

***Pd*** = $\frac{30 \times P \times G}{377 \times d^2}$

## 2.3 Calculated Result and Limit

**Exposure Environment: General Population / Uncontrolled Exposure**

**WLAN+WWAN**

| Mode | DG (dBi) | Power (dBm) | EIRP (dBm) | Tolerance (dB) | Tune-up EIRP (dBm) | Tune-up EIRP (W) | Distance (cm) | S (mW/cm$^2$) | S Limit (mW/cm$^2$) | Ratio (S/Limit) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2.4G;D1D | 3.80 | 17.82 | 21.62 | 0.50 | 22.12 | 0.16293 | 20 | 0.03241 | 1.00000 | 0.03241 |
| WCDMA Band V | 4.70 | 24.44 | 29.14 | 0.50 | 29.64 | 0.92045 | 20 | 0.18312 | 0.55093 | 0.33238 |
| | | | | | | | | | Sum Ratio | 0.36479 |
| | | | | | | | | | Ratio Limit | 1 |

**BT+WWAN**

| Mode | DG (dBi) | Power (dBm) | EIRP (dBm) | Tolerance (dB) | Tune-up EIRP (dBm) | Tune-up EIRP (W) | Distance (cm) | S (mW/cm$^2$) | S Limit (mW/cm$^2$) | Ratio (S/Limit) |
|---|---|---|---|---|---|---|---|---|---|---|
| BT | 3.80 | 9.67 | 13.47 | 0.50 | 13.97 | 0.02495 | 20 | 0.00496 | 1.00000 | 0.00496 |
| WCDMA Band V | 4.70 | 24.44 | 29.14 | 0.50 | 29.64 | 0.92045 | 20 | 0.18312 | 0.55093 | 0.33238 |
| | | | | | | | | | Sum Ratio | 0.33734 |
| | | | | | | | | | Ratio Limit | 1 |

| Mode | DG (dBi) | Power (dBm) | EIRP (dBm) | Tolerance (dB) | Tune-up EIRP (dBm) | Tune-up EIRP (W) | Distance (cm) | S (mW/cm$^2$) | S Limit (mW/cm$^2$) |
|---|---|---|---|---|---|---|---|---|---|
| WCDMA Band II | 4.50 | 24.13 | 28.63 | 0.00 | 28.63 | 0.72946 | 20 | 0.14512 | 1.00000 |
| WCDMA Band V | 4.70 | 24.44 | 29.14 | 0.00 | 29.14 | 0.82035 | 20 | 0.16320 | 0.55093 |
| LTE Band 2 | 4.50 | 23.07 | 27.57 | 0.00 | 27.57 | 0.57148 | 20 | 0.11369 | 1.00000 |
| LTE Band 4 | 3.50 | 23.77 | 27.27 | 0.00 | 27.27 | 0.53333 | 20 | 0.10610 | 1.00000 |
| LTE Band 5 | 4.70 | 23.43 | 28.13 | 0.00 | 28.13 | 0.65013 | 20 | 0.12934 | 0.54980 |
| LTE Band 12 | 4.30 | 23.50 | 27.80 | 0.00 | 27.80 | 0.60256 | 20 | 0.11988 | 0.46647 |
| 2.4G;D1D | 3.80 | 17.82 | 21.62 | 0.00 | 21.62 | 0.14521 | 20 | 0.02889 | 1.00000 |
| BT | 3.80 | 9.67 | 13.47 | 0.50 | 13.97 | 0.02495 | 20 | 0.00496 | 1.00000 |

———THE END———