

Radio Exposure Evaluation Report

FCC ID : 2AIHD2024

Contains FCC ID : NKRM18Q2

Equipment : IG15

Brand Name : Samsara

Model Name : 010-1015

Applicant : Samsara Networks Inc
1990 Alameda St, San Francisco, CA 94103, USA

Manufacturer : Samsara Networks Inc
1990 Alameda St, San Francisco, 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 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
FA7N2021-06	01	Initial issue of report	Jul. 22, 2020
FA7N2021-06	02	Revise typo (This report is the latest version replacing for the report issued on Jul. 22, 2020)	Aug. 06, 2020

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: Debby Hung

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) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)
Bluetooth	2400-2483.5	2402-2480	BR / EDR: FHSS (GFSK / $\pi/4$ -DQPSK / 8DPSK) 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 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
Equipment/Model name: IG15/010-1015 was added. (This model replaces the internal antennas of LTE and GPS with external antennas.)	1. MPE was evaluated 2. Photographs of EUT

1.3 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/ cm ²)	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/ cm ²)	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:

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

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	0.00	21.62	0.14521	20	0.02889	1.00000	0.02889
WCDMA Band V	3.20	24.44	27.64	0.00	27.64	0.58076	20	0.11554	0.55093	0.20972
									Sum Ratio	0.23861
									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	0.00	13.47	0.02223	20	0.00442	1.00000	0.00442
WCDMA Band V	3.20	24.44	27.64	0.00	27.64	0.58076	20	0.11554	0.55093	0.20972
									Sum Ratio	0.21414
									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	2.60	24.13	26.73	0.00	26.73	0.47098	20	0.09370	1.00000
WCDMA Band V	3.20	24.44	27.64	0.00	27.64	0.58076	20	0.11554	0.55093
LTE Band 2	3.20	23.07	26.27	0.00	26.27	0.42364	20	0.08428	1.00000
LTE Band 4	3.20	23.77	26.97	0.00	26.97	0.49774	20	0.09902	1.00000
LTE Band 5	2.60	23.43	26.03	0.00	26.03	0.40087	20	0.07975	0.54980
LTE Band 12	2.60	23.50	26.10	0.00	26.10	0.40738	20	0.08105	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—————