



FCC RADIO EXPOSURE TEST REPORT

FCC ID : UDX-60093010

Equipment : 4x4 Wi-Fi 6 Access Point with External Antennas

Brand Name : CISCO

Model Name : MR46E-HW

Applicant : Cisco Systems
170 West Tasman Drive, San Jose, CA 95134 USA

Manufacturer : Cisco Systems
170 West Tasman Drive, San Jose, CA 95134 USA

Standard : 47 CFR Part 2.1091

The product was received on Jun. 20, 2019, and testing was started from Jul. 03, 2019 and completed on Oct. 17, 2019. 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 government.

The test results in this variant 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: Cliff Chang

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

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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:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

Report Producer: Wendy Pan



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) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5180-5240 5260-5320 5500-5720 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Bluetooth	2400-2483.5	2402-2480	LE: GFSK

1.2 Table for DDR information

EUT No.	Brand Name	Model No.	Main source	Second source
1	Hynix	H5AN8G6NAFR-UHC	V	-
2	Micron	MT40A512M16LY-075:E	-	V



1.3 Table for Class III Change

This product is an extension of original one reported under Sporton project number: FA960317

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

Modifications	Performance Checking
Adding 5GHz band 2 and band 3 (5250~5350 MHz, 5470~5725 MHz) for this device.	Maximum Permissible Exposure.

Note: Maximum Permissible Exposure of 2.4GHz, Bluetooth and 5GHz band 1, 4 are based on original test report.

1.4 Testing Location

Testing Location		
☐	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-327-0973
☒	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.



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)*	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)*	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 27 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

MPE / Antenna / Set 1 and Set 2

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)
2.4G;D1D (Radio 1)	3.39	28.51	31.90	0.50	32.40	1.73780	27	0.18969	1
5.2G;D1D (Radio 2)	11.11	24.29	35.40	0.50	35.90	3.89045	27	0.42467	1
5.3G;D1D (Radio 2)	8.05	21.91	29.96	0.03	29.99	0.99770	27	0.10891	1
5.6G;D1D (Radio 2)	8.05	21.92	29.97	0.02	29.99	0.99770	27	0.10891	1
5.8G;D1D (Radio 2)	11.11	24.71	35.82	0.17	35.99	3.97192	27	0.43356	1
2.4G;BT-LE (Radio 4)	3.24	19.12	22.36	0.50	22.86	0.19320	27	0.02109	1

MPE / Antenna / Set 3

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)
2.4G;D1D (Radio 1)	4.49	29.92	34.41	0.50	34.91	3.09742	27	0.33811	1
5.2G;D1D (Radio 2)	7.69	28.11	35.80	0.19	35.99	3.97192	27	0.43356	1
5.3G;D1D (Radio 2)	7.69	22.27	29.96	0.03	29.99	0.99770	27	0.10891	1
5.6G;D1D (Radio 2)	7.69	22.23	29.92	0.07	29.99	0.99770	27	0.10891	1
5.8G;D1D (Radio 2)	7.69	28.28	35.97	0.02	35.99	3.97192	27	0.43356	1
2.4G;BT-LE (Radio 4)	4.34	19.12	23.46	0.50	23.96	0.24889	27	0.02717	1

**MPE / Antenna / Set 4**

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)
2.4G;D1D (Radio 1)	2.49	29.92	32.41	0.50	32.91	1.95434	27	0.21333	1
5.2G;D1D (Radio 2)	7.33	28.11	35.44	0.50	35.94	3.92645	27	0.42860	1
5.3G;D1D (Radio 2)	7.33	22.27	29.60	0.39	29.99	0.99770	27	0.10891	1
5.6G;D1D (Radio 2)	7.33	22.55	29.88	0.11	29.99	0.99770	27	0.10891	1
5.8G;D1D (Radio 2)	7.33	28.62	35.95	0.04	35.99	3.97192	27	0.43356	1
2.4G;BT-LE (Radio 4)	2.34	19.12	21.46	0.50	21.96	0.15704	27	0.01714	1

MPE / Antenna / Set 5

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)
2.4G;D1D (Radio 1)	13.18	22.33	35.51	0.48	35.99	3.97192	27	0.43356	1
5.2G;D1D (Radio 2)	11.70	24.29	35.99	0.00	35.99	3.97192	27	0.43356	1
5.3G;D1D (Radio 2)	5.69	23.91	29.60	0.39	29.99	0.99770	27	0.10891	1
5.6G;D1D (Radio 2)	11.70	17.97	29.67	0.32	29.99	0.99770	27	0.10891	1
5.8G;D1D (Radio 2)	5.69	29.98	35.67	0.32	35.99	3.97192	27	0.43356	1
2.4G;BT-LE (Radio 4)	6.44	19.12	25.56	0.50	26.06	0.40365	27	0.04406	1

**MPE / Antenna / Set 6**

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)
2.4G;D1D (Radio 1)	10.79	24.93	35.72	0.27	35.99	3.97192	27	0.43356	1
5.2G;D1D (Radio 2)	9.27	26.70	35.97	0.02	35.99	3.97192	27	0.43356	1
5.3G;D1D (Radio 2)	16.45	13.51	29.96	0.03	29.99	0.99770	27	0.10891	1
5.6G;D1D (Radio 2)	16.45	13.51	29.96	0.03	29.99	0.99770	27	0.10891	1
5.8G;D1D (Radio 2)	9.27	26.36	35.63	0.36	35.99	3.97192	27	0.43356	1
2.4G;BT-LE (Radio 4)	10.64	19.12	29.76	0.50	30.26	1.06170	27	0.11589	1

Simultaneous Transmission Analysis Mode:**Radio 1 (2.4GHz) + Radio 2 (5GHz) + Radio 4 (BT4.0)**

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 (Radio 1)	10.79	24.93	35.72	0.27	35.99	3.97192	27	0.43356	1	0.43356
5.8G;D1D (Radio 2)	5.69	29.98	35.67	0.32	35.99	3.97192	27	0.43356	1	0.43356
2.4G;BT-LE (Radio 4)	10.64	19.12	29.76	0.50	30.26	1.06170	27	0.11589	1	0.11589
									Sum Ratio	0.98301
									Ratio Limit	1

Note: The above antenna gain was declared by manufacturer.

—————THE END—————