



RADIO EXPOSURE TEST REPORT

FCC ID : UDX-600124010
Equipment : Wi-Fi 6 Access Point
Brand Name : CISCO
Model Name : MR36H-HW
Applicant : Cisco Systems, Inc.
170 West Tasman Drive, San Jose, CA 95134 USA
Manufacturer : Cisco Systems, Inc.
170 West Tasman Drive, San Jose, CA 95134 USA
Standard : 47 CFR Part 2.1091

The product was received on Jul. 28, 2021, and testing was started from Aug. 20, 2021 and completed on Oct. 14, 2021. We, Sporton International Inc. Hsinchu 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 variant report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.


Approved by: Sam Chen

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Photographs of EUT v01



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: Sandy Chuang



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) VHT: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5180-5240 5250-5320 5500-5700 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 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	1	Sercomm	617211KN	PIFA	I-PEX	Note 1
2	2	Sercomm	617211KP	PIFA	I-PEX	
3	1	Unictron	H2U84W1H1S0300	CHIP	N/A	
4	1	Sercomm	617211KR	PIFA	I-PEX	

Note 1

Ant.	Port	Gain (dBi)						Radio	Remark
		2.4GHz	5GHz UNII 1	5GHz UNII 2A	5GHz UNII 2C	5GHz UNII 3	Bluetooth		
1	1	3.3	4.2	4.2	4.4	4.1	-	Radio 1	1TX/2RX
2	2	3.1	3.4	3.4	3.5	3.4	-		2TX/2RX
3	1	2.9	2.9	2.9	3.0	3.2	-	Radio 2	1TX/1RX
4	1	-	-	-	-	-	2.5	Radio 3	1TX/1RX

Note 2: The above information was declared by manufacturer.

<For Radio 1>

2.4GHz Band

For IEEE 802.11b/g/n/VHT/ax mode (1TX/2RX):

The EUT supports 1TX/2RX function, and it supports TX diversity function.

Both Port 1 and Port 2 could be used as transmitting antenna, but only one of them will be used at one time. Port 1 and Port 2 could receive simultaneously.

Both Port 1 and Port 2 are selected to test.

802.11b/g/n/VHT/ax mode (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

5GHz Band

For IEEE 802.11a/n/ac/ax mode (1TX/2RX):

The EUT supports 1TX/2RX function, and it supports TX diversity function.

Both Port 1 and Port 2 could be used as transmitting antenna, but only one of them will be used at one time. Port 1 and Port 2 could receive simultaneously.

Both Port 1 and Port 2 are selected to test.

For IEEE 802.11a/n/ac/ax mode (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.



<For Radio 2: Scanning>

2.4GHz Band

For IEEE 802.11b/g/n/VHT mode (1TX/1RX):

Only Port 1 can be used as transmitting/receiving antenna.

5GHz Band

For IEEE 802.11a/n/ac mode (1TX/1RX):

Only Port 1 can be used as transmitting/receiving antenna.

<For Radio 3>

For Bluetooth mode (1TX/1RX):

Only Port 1 can be used as transmitting/receiving antenna.

Note3: Directional gain information

Type	Maximum Output Power	Power Spectral Density
Non-BF	Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT ≤ 4	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left[\sum_{k=1}^{N_{ANT}} g_{j,k} \right]^2}{N_{ANT}} \right]$
BF	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left[\sum_{k=1}^{N_{ANT}} g_{j,k} \right]^2}{N_{ANT}} \right]$	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left[\sum_{k=1}^{N_{ANT}} g_{j,k} \right]^2}{N_{ANT}} \right]$

Ex.

Directional Gain (NSS1) formula :

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left[\sum_{k=1}^{N_{ANT}} g_{j,k} \right]^2}{N_{ANT}} \right]$$

$$N_{SS1}(g1,1) = 10^{G1/20} ; N_{SS1}(g1,2) = 10^{G2/20} ;$$

$$g_{j,k} = (N_{SS1}(g1,1) + N_{SS1}(g1,2) +$$

$$DG = 10 \log[(N_{SS1}(g1,1) + N_{SS1}(g1,2) / N_{ANT}] =>$$

$$10 \log[(10^{G1/20} + 10^{G2/20})^2 / N_{ANT}]$$

Where ;

G1 = Ant 1 Gain ; G2 = Ant 2 Gain

5 GHz U-NII-1 DG = 6.82 dBi

5 GHz U-NII-2A DG = 6.82 dBi

5 GHz U-NII-2C DG = 6.97 dBi

5 GHz U-NII-3 DG = 6.77 dBi



1.3 Accessories

Equipment Name	Brand Name	Model Name	Remark
RJ-45 cable*1	Nienyi	NYS4942	Non-Shielded, 0.1m
Wall Bracket*1	Chain-Ray	945DKN01SB	-

1.4 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FA172724.

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

Modifications	Performance Checking
Adding UNII 2A and UNII 2C (5250~5350 MHz, 5470~5725 MHz) for this device.	Maximum Permissible Exposure.

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

1.5 Testing Location

Testing Location Information	
Test Lab. : Sporton International Inc. Hsinchu Laboratory	
Hsinchu	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)
(TAF: 3787)	TEL: 886-3-656-9065 FAX: 886-3-656-9085
	Test site Designation No. TW3787 with FCC.
	Conformity Assessment Body Identifier (CABID) TW3787 with ISED.



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:

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

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

<Radio 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)
2.4G;D1D	3.30	25.44	28.74	0.50	29.24	0.83946	20	0.16701	1.00000
5.2G;D1D	4.20	25.40	29.60	0.50	30.10	1.02329	20	0.20358	1.00000
5.3G;D1D	4.20	23.96	28.16	0.50	28.66	0.73451	20	0.14613	1.00000
5.6G;D1D	4.40	23.86	28.26	0.50	28.76	0.75162	20	0.14953	1.00000
5.8G;D1D	4.10	26.51	30.61	0.50	31.11	1.29122	20	0.25688	1.00000

<Radio 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;G1D	2.90	25.52	28.42	0.50	28.92	0.77983	20	0.15514	1.00000
5.2G;D1D	2.90	21.39	24.29	0.50	24.79	0.30130	20	0.05994	1.00000
5.3G;D1D	2.90	18.44	21.34	0.50	21.84	0.15276	20	0.03039	1.00000
5.6G;D1D	3.00	18.65	21.65	0.50	22.15	0.16406	20	0.03264	1.00000
5.8G;D1D	3.20	21.37	24.57	0.50	25.07	0.32137	20	0.06393	1.00000

<Radio 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;BT-LE	2.50	19.88	22.38	0.50	22.88	0.19409	20	0.03861	1.00000



Simultaneous Transmission Analysis Mode:

Radio 1 (2.4GHz) + Radio 1 (5GHz) + Radio 2 (2.4GHz) + Radio 3 (Bluetooth)

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	3.30	25.44	28.74	0.50	29.24	0.83946	20	0.16700	1.00000	0.16700
5.8G;D1D	4.10	26.51	30.61	0.50	31.11	1.29122	20	0.25687	1.00000	0.25687
2.4G;G1D	2.90	25.52	28.42	0.50	28.92	0.77983	20	0.15514	1.00000	0.15514
2.4G;BT-LE	2.50	19.88	22.38	0.50	22.88	0.19409	20	0.03861	1.00000	0.03861
									Sum Ratio	0.61762
									Ratio Limit	1

Radio 1 (2.4GHz) + Radio 1 (5GHz) + Radio 2 (5GHz) + Radio 3 (Bluetooth)

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	3.30	25.44	28.74	0.50	29.24	0.83946	20	0.16700	1.00000	0.16700
5.8G;D1D	4.10	26.51	30.61	0.50	31.11	1.29122	20	0.25687	1.00000	0.25687
5.8G;D1D	3.20	21.37	24.57	0.50	25.07	0.32137	20	0.06393	1.00000	0.06393
2.4G;BT-LE	2.50	19.88	22.38	0.50	22.88	0.19409	20	0.03861	1.00000	0.03861
									Sum Ratio	0.52641
									Ratio Limit	1

Note: The above antenna gain was declared by manufacturer.

—————THE END—————