Testing Laboratory 3787

RADIO EXPOSURE TEST REPORT

FCC ID	:	UDX-600155010
Equipment	:	Catalyst Wireless 9162I Series Wi-Fi 6E Access Point
Brand Name	:	CISCO
Model Name	:	CW9162I-B, CW9162I-MR
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 Mar. 03, 2022, and testing was started from Mar. 24, 2022 and completed on Jul. 19, 2022. 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 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

Sporton International Inc. Hsinchu Laboratory
No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FA230306-01	01	Initial issue of report	Sep. 13, 2022

Summary of Test Result

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

Declaration of Conformity:
1. The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results. 2. The measurement uncertainty please refer to report "Measurement Uncertainty".
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: Vicky Huang

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, 1024QAM)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850 5725-5895	5180-5240 5260-5320 5500-5720 5745-5825 5835-5885	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)
6GHz WLAN	5925-7125	5955-7115	802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Bluetooth	2400-2483.5	2402-2480	LE: GFSK

1.2 Antenna Information

Ant.	Port								Brand Name	Model Name	Antenna Type	Connector	Gain (dBi)
	WLAN 2.4GHz (Radio 1)		WLAN 5GHz (Radio 1)		WLAN 6E (Radio 2)		WLAN 2.4GHz / WLAN 5GHz / WLAN 6GHz (Scanning Radio 3)	BT (Radio 4)					
	1TX	2TX	1TX	2TX	1TX	2TX							
1	1	2	1	2	-	-	-	-	WNC	95XEAJ15.G19	PIFA	I-PEX	Note 1
2	-	1	-	1	-	-	-	-	WNC	95XEAJ15.G20	PIFA	I-PEX	
3	-		-		1	2	-	-	WNC	95XEAJ15.G21	Dipole	I-PEX	
4	-		-		-	1	-	-	WNC	95XEAJ15.G22	Dipole	I-PEX	
5	-		-		-		-	1	WNC	95XEAJ15.G23	PIFA	I-PEX	
6	-		-		-		1	-	WNC	95XEAJ15.G24	PIFA	I-PEX	

Note 1:

Ant.	Antenna Gain (dBi)																
	WLAN 2.4GHz (Radio 1)	WLAN 5GHz (Radio 1)					WLAN 6GHz (Radio 2)				WLAN 2.4GHz (Scanning Radio 3)	WLAN 5GHz (Scanning Radio 3)	WLAN 6GHz (Scanning Radio 3)				BT (Radio 4)
		UNII 1	UNII 2A	UNII 2C	UNII 3	UNII 4	UNII 5	UNII 6	UNII 7	UNII 8		UNII 1~UNII 3	UNII 5	UNII 6	UNII 7	UNII 8	
1	2.74	1.75	1.67	1.80	1.64	1.45	-	-	-	-	-	-	-	-	-	-	-
2	2.51	2.13	2.37	1.82	1.50	2.06	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	4.38	3.62	3.78	4.08	-	-	-	-	-	-	-
4	-	-	-	-	-	-	4.33	3.72	3.95	4.11	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.85
6	-	-	-	-	-	-	-	-	-	-	3.80	5.54	5.43	5.23	5.50	5.40	-

Ant.	Directional Gain (dBi)											
	WLAN 2.4GHz (Radio 1)		WLAN 5GHz (Radio 1)									
			UNII 1		UNII 2A		UNII 2C		UNII 3		UNII 4	
	2T1S	2T2S	2T1S	2T2S	2T1S	2T2S	2T1S	2T2S	2T1S	2T2S	2T1S	2T2S
1	5.12	2.74	4.19	2.13	4.07	2.37	4.41	1.82	4.08	1.64	3.96	2.06
2												

Note 2: The EUT has six antennas.

Note 3: The above information (excepting antenna gain of Radio 1 2.4GHz, 5GHz UNII 1~UNII 4) was declared by manufacturer.

Note 4: Radio 1 2.4GHz, 5GHz UNII 1~UNII 4: Maximum Directional Gain following KDB662911 D03.

For Radio 1
For 2.4GHz:
For IEEE 802.11b/g/n/VHT/ax mode (1TX/2RX):
Only Port 1 can be use as transmitting antenna.
Port 1, Port 2 can be used as receiving antennas.
Port 1, Port 2 could receive simultaneously.
For IEEE 802.11b/g/n/VHT/ax mode (2TX/2RX):
Port 1, Port 2 can be use as transmitting antenna.
Port 1, Port 2 could transmitting simultaneously.
Port 1, Port 2 can be used as receiving antennas.
Port 1, Port 2 could receive simultaneously.
For 5GHz UNII 1~UNII 4:
For IEEE 802.11a/n/ac/ax mode (1TX/2RX):
Only Port 1 can be use as transmitting antenna.
Port 1, Port 2 can be used as receiving antennas.
Port 1, Port 2 could receive simultaneously.
For IEEE 802.11a/n/ac/ax mode (2TX/2RX):
Port 1, Port 2 can be use as transmitting antenna.
Port 1, Port 2 could transmitting simultaneously.
Port 1, Port 2 can be used as receiving antennas.
Port 1, Port 2 could receive simultaneously.
For Radio 2
For 6GHz UNII 5~UNII 8:
For IEEE 802.11ax mode (1TX/2RX):
Only Port 1 can be use as transmitting antenna.
Port 1, Port 2 can be used as receiving antennas.
Port 1, Port 2 could receive simultaneously.
For IEEE 802.11ax mode (2TX/2RX):
Port 1, Port 2 can be use as transmitting antenna.
Port 1, Port 2 could transmitting simultaneously.
Port 1, Port 2 can be used as receiving antennas.
Port 1, Port 2 could receive simultaneously.
For Radio 4
Bluetooth (1TX/1RX):
Only Port 1 can be used as transmitting/receiving antenna.
For Scanning Radio 3
For 2.4GHz:
For IEEE 802.11b/g/n/VHT/ax mode (1TX/1RX):
Only Port 1 can be used as transmitting/receiving antenna.
For 5GHz UNII 1~UNII 4:
For IEEE 802.11a/n/ac/ax mode (1TX/1RX):
Only Port 1 can be used as transmitting/receiving antenna.
For 6GHz UNII 5~UNII 8:
For IEEE 802.11ax mode (1TX/1RX):
Only Port 1 can be used as transmitting/receiving antenna.

1.3 Table for Multiple Listing

Model Name	EUT No.	SW
CW9162I-B	1	Cisco
CW9162I-MR	2	Meraki

Note 1: From the above models, model: CW9162I-B was selected as representative model for the test and its data was recorded in this report.
Note 2: The above information was declared by manufacturer.

1.4 Table for Radio function

Radio (R)	WLAN 2.4GHz	5GHz UNII 1~4	6GHz UNII 5~8	Bluetooth
R1	V	V	-	-
R2	-	-	V	-
R3 (Scanning radio)	V	V	V	-
R4	-	-	-	V

Note: The above information was declared by manufacturer.

1.5 Accessories

Accessories
Bracket*1

1.6 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 2.1091
- KDB 447498 D04 Interim General RF Exposure Guidance v01

The following reference test guidance is not within the scope of accreditation of TAF.

- 47 CFR Part 1.1307
- 47 CFR Part 1.1310

1.7 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/ 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/f²)	<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/f²)	<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 41 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 MPE Exemption

Option (A): 1.1307(b)(3)(i)(A): Available maximum time-averaged power is < 1 mW

Option (B): 1.1307(b)(3)(i)(B): Device operates between 300 MHz and 6 GHz and the maximum time-averaged power or effective radiated power (ERP), whichever is greater, <= Pth.

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\ cm}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\ cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20\ cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

d = the separation distance (cm);

Option (C): 1.1307(b)(3)(i)(C): ERP is below a threshold calculated based on the distance R between the person and the antenna / radiating structure, where R > λ / 2 π.

Single RF Sources Subject to Routine Environmental Evaluation	
RF Source frequency (MHz)	**Threshold ERP (watts)**
0.3-1.34	1,920 R^2.
1.34-30	3,450 R^2/f^2.
30-300	3.83 R^2.
300-1,500	0.0128 R^2f.
1,500-100,000	19.2R^2.
Note: R is in meters, f is in MHz.	

2.4 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

For 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-BF 2TX	5.12	25.90	31.02	0.50	31.52	1.41906	41	0.06718	1.00000
5.2G;D1D-BF 2TX	4.19	26.92	31.11	0.50	31.61	1.44877	41	0.06858	1.00000
5.3G;D1D-BF 2TX	4.07	23.65	27.72	0.50	28.22	0.66374	41	0.03142	1.00000
5.6G;D1D-BF 2TX	4.41	23.69	28.10	0.50	28.60	0.72444	41	0.03429	1.00000
5.8G;D1D-BF 2TX	4.08	27.38	31.46	0.50	31.96	1.57036	41	0.07434	1.00000
5.81G;D1D-BF 2TX	3.96	26.66	30.62	0.50	31.12	1.29420	41	0.06126	1.00000
5.87G;D1D-BF 2TX	3.96	25.48	29.44	0.50	29.94	0.98628	41	0.04669	1.00000

For 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)
6.2G;D1D 1TX	4.38	-	27.69	0.50	28.19	0.65917	41	0.03120	1.00000
6.4G;D1D 1TX	3.62	-	26.54	0.50	27.04	0.50582	41	0.02394	1.00000
6.7G;D1D 1TX	3.78	-	26.69	0.50	27.19	0.52360	41	0.02479	1.00000
7.0G;D1D 1TX	4.08	-	24.54	0.50	25.04	0.31915	41	0.01511	1.00000

For Scanning 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;G1D 1TX	3.80	22.38	26.18	0.50	26.68	0.46559	41	0.02204	1.00000
5.2G;D1D 1TX	5.54	21.49	27.03	0.50	27.53	0.56624	41	0.02680	1.00000
5.3G;D1D 1TX	5.54	21.55	27.09	0.50	27.59	0.57412	41	0.02718	1.00000
5.6G;D1D 1TX	5.54	21.20	26.74	0.50	27.24	0.52966	41	0.02507	1.00000
5.8G;D1D 1TX	5.54	24.95	30.49	0.50	30.99	1.25603	41	0.05946	1.00000
6.2G;D1D 1TX	5.50	11.74	17.24	0.50	17.74	0.05943	41	0.00281	1.00000
6.4G;D1D 1TX	5.50	12.07	17.57	0.50	18.07	0.06412	41	0.00304	1.00000
6.7G;D1D 1TX	5.50	11.80	17.30	0.50	17.80	0.06026	41	0.00285	1.00000
7.0G;D1D 1TX	5.50	12.23	17.73	0.50	18.23	0.06653	41	0.00315	1.00000

For Radio 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;BT-LE	3.85	18.28	22.13	0.50	22.63	0.18323	41	0.00867	1.00000

For Radio 1

MPE Exemption Option C							
Frequency (MHz)	λ/2π (m)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	MPE Exemption
2437	0.0196	0.41	31.52	29.37	0.865	3.228	Complies
5785	0.0082		31.96	29.81	0.957	3.228	Complies

For Radio 2

MPE Exemption Option C							
Frequency (MHz)	λ/2π (m)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	MPE Exemption
6345	0.0075	0.41	28.19	26.04	0.402	3.228	Complies

For Scanning Radio 3

MPE Exemption Option C							
Frequency (MHz)	λ/2π (m)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	MPE Exemption
2437	0.0196	0.41	26.68	24.53	0.284	3.228	Complies
5785	0.0082		30.99	28.84	0.766	3.228	Complies
7115	0.0067		18.23	16.08	0.041	3.228	Complies

For Radio 4

MPE Exemption Option C							
Frequency (MHz)	λ/2π (m)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	MPE Exemption
2402	0.0199	0.41	22.63	20.48	0.112	3.228	Complies

Simultaneous Transmission Analysis Mode:

EUT 1 (R1: 2.4GHz + 5GHz + R2: 6GHz + R4: Bluetooth) + (Scanning R3: 2.4GHz)

Simultaneous Transmissions Option C							
Frequency (MHz)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	Simultaneous Transmissions	Simultaneous Transmissions Limit
2437	0.41	31.52	29.37	0.865	3.228	0.81	<= 1
5785		31.96	29.81	0.957	3.228		
6345		28.19	26.04	0.402	3.228		
2402		22.63	20.48	0.112	3.228		
2437		26.68	24.53	0.284	3.228		

EUT 1 (R1: 2.4GHz + 5GHz + R2: 6GHz + R4: Bluetooth) + (Scanning R3: 5GHz)

Simultaneous Transmissions Option C							
Frequency (MHz)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	Simultaneous Transmissions	Simultaneous Transmissions Limit
2437	0.41	31.52	29.37	0.865	3.228	0.96	<= 1
5785		31.96	29.81	0.957	3.228		
6345		28.19	26.04	0.402	3.228		
2402		22.63	20.48	0.112	3.228		
5785		30.99	28.84	0.766	3.228		

EUT 1 (R1: 2.4GHz + 5GHz + R2: 6GHz + R4: Bluetooth) + (Scanning R3: 6GHz)

Simultaneous Transmissions Option C							
Frequency (MHz)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	Simultaneous Transmissions	Simultaneous Transmissions Limit
2437	0.41	31.52	29.37	0.865	3.228	0.74	<= 1
5785		31.96	29.81	0.957	3.228		
6345		28.19	26.04	0.402	3.228		
2402		22.63	20.48	0.112	3.228		
7115		18.23	16.08	0.041	3.228		

———THE END———