



RADIO EXPOSURE TEST REPORT

FCC ID : LDK-9160S2875

Equipment : Catalyst Wireless 9164I Series Wi-Fi 6E Access Point

Brand Name : CISCO

Model Name : CW9164I-B,CW9164I-MR

Applicant : Cisco Systems Inc
125 West Tasman Drive San Jose California United States 95134-1706

Manufacturer : Cisco Systems Inc
125 West Tasman Drive San Jose California United States 95134-1706

Standard : 47 CFR Part 2.1091

The product was received on Dec. 28, 2021, and testing was started from Jan. 22, 2022 and completed on Oct. 05, 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

[illegible]



Summary of Test Result

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

Note: Reference to Sporton Project No.: 1D2822-01.

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: Penny Kao



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	5180-5250 5250-5320 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)
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	Model Name	Ant. Type	Connector	Gain (dBi)
	R1: WLAN 2.4GHz	R1: WLAN 5GHz UNII 1~3	R2: WLAN 6GHz UNII 5~8	R3: WLAN 2.4GHz /5GHz UNII 1~3 /6GHz UNII 5~8	Bluetooth					
1	-	4	-	-	-	CISCO	95XEAJ15.G04	Folded	I-PEX	Note2
2	-	3	-	-	-	CISCO	95XEAJ15.G03	Folded	I-PEX	
3	2	2	-	-	-	CISCO	95XEAJ15.G05	Folded	I-PEX	
4	1	1	-	-	-	CISCO	95XEAJ15.G06	Folded	I-PEX	
5	-	-	4	-	-	CISCO	95XEAJ15.G12	H-POL Alford loop	I-PEX	
6	-	-	3	-	-	CISCO	95XEAJ15.G11	H-POL Alford loop	I-PEX	
7	-	-	1	-	-	CISCO	95XEAJ15.G09	H-POL Alford loop	I-PEX	
8	-	-	2	-	-	CISCO	95XEAJ15.G10	H-POL Alford loop	I-PEX	
9	-	-	-	1	-	CISCO	95XEAJ15.G07	PIFA	I-PEX	
10	-	-	-	2	-	CISCO	95XEAJ15.G08	PIFA	I-PEX	
11	-	-	-	-	1	CISCO	95XEAJ15.G13	PIFA	I-PEX	

Note1: R means Radio.

Note2:

Ant.	Antenna Gain (dBi)										Remark
	WLAN 2.4GHz	WLAN 5GHz UNII 1	WLAN 5GHz UNII 2A	WLAN 5GHz UNII 2C	WLAN 5GHz UNII 3	WLAN 6GHz UNII 5	WLAN 6GHz UNII 6	WLAN 6GHz UNII 7	WLAN 6GHz UNII 8	Bluetooth	
1	-	4.27	3.94	1.88	2.57	-	-	-	-	-	Radio 1
2	-	5.09	5.16	2.89	2.72	-	-	-	-	-	Radio 1
3	2.79	2.78	2.74	2.66	1.91	-	-	-	-	-	Radio 1
4	2.62	5.24	5.46	4.26	3.94	-	-	-	-	-	Radio 1
5	-	-	-	-	-	2.4	2.41	1.39	0.77	-	Radio 2
6	-	-	-	-	-	2.95	1.96	1.32	0.87	-	Radio 2
7	-	-	-	-	-	2.95	2.31	0.99	0.61	-	Radio 2
8	-	-	-	-	-	2.91	3.96	1.59	0.33	-	Radio 2
9	3.3	4.0				5.3				-	Radio 3
10	3.3	4.0				5.3				-	Radio 3
11	-	-	-	-	-	-	-	-	-	3.8	Radio 4

Note3:

Directional Gain (dBi)										
Item	WLAN 2.4GHz	WLAN 5GHz UNII 1	WLAN 5GHz UNII 2A	WLAN 5GHz UNII 2C	WLAN 5GHz UNII 3	WLAN 6GHz UNII 5	WLAN 6GHz UNII 6	WLAN 6GHz UNII 7	WLAN 6GHz UNII 8	Remark
2T1S	4.29	5.39	5.26	4.69	4.16	-	-	-	-	Radio 1
2T2S	1.28	2.99	2.99	2.02	1.65	-	-	-	-	
4T1S	-	6.99	7.25	6.62	5.97	-	-	-	-	
4T2S	-	5.24	5.46	4.26	3.94	-	-	-	-	
4T4S	-	1.09	1.55	0.94	0.27	-	-	-	-	
2T1S	-	-	-	-	-	5.38	4.47	4.13	3.08	Radio 2
2T2S	-	-	-	-	-	2.37	1.59	1.12	0.09	
4T1S	-	-	-	-	-	7.45	6.03	6.05	4.51	
4T2S	-	-	-	-	-	4.45	3.96	3.05	1.51	
4T4S	-	-	-	-	-	1.51	0.27	0.07	-1.19	



Note4: The above information (except gain of Radio 1 and Radio 2) was declared by manufacturer.

Note5: Radio 1 (WLAN 2.4/5GHz UNII 1~3), Radio 2 (6GHz UNII 5~8): The directional gain is measured which follows the procedure of KDB 662911 D03.

Note6: The EUT has eleven antennas.

For WLAN 2.4GHz function (Radio 1):

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

For 1TX

Only Port 1 can be use as transmitting antenna.

For 2TX

Only Port 1 and Port 2 can be use as transmitting antenna.

Port 1 and Port 2 could transmit simultaneously.

For 2RX

Port 1, Port 2 can be used as receiving antennas.

Port 1, Port 2 could receive simultaneously.

For WLAN 5GHz function (Radio 1):

For IEEE 802.11a/n/ac/ax mode (1TX,2TX,4TX/4RX):

For 1TX

Only Port 1 can be use as transmitting antenna.

For 2TX

Only Port 1 and Port 2 can be use as transmitting antenna.

Port 1 and Port 2 could transmit simultaneously.

For 4TX

Port 1, Port 2, Port 3 and Port 4 can be use as transmitting antenna.

Port 1, Port 2, Port 3 and Port 4 could transmit simultaneously.

For 4RX

Port 1, Port 2, Port 3 and Port 4 can be used as receiving antennas.

Port 1, Port 2, Port 3 and Port 4 could receive simultaneously.

For 6GHz function (Radio 2):

For IEEE 802.11ax mode (1TX,2TX,4TX/4RX):

For 1TX

Only Port 1 can be use as transmitting antenna.

For 2TX

Only Port 1 and Port 2 can be use as transmitting antenna.

Port 1 and Port 2 could transmit simultaneously.

For 4TX

Port 1, Port 2, Port 3 and Port 4 can be use as transmitting antenna.

Port 1, Port 2, Port 3 and Port 4 could transmit simultaneously.

For 4RX

Port 1, Port 2, Port 3 and Port 4 can be used as receiving antennas.

Port 1, Port 2, Port 3 and Port 4 could receive simultaneously.

For Scanning Radio 3:

For WLAN 2.4GHz function

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

For 1TX

Only Port 1 can be use as transmitting antenna.

For 2RX

Port 1 and Port 2 can be used as receiving antennas.

Port 1 and Port 2 could receive simultaneously.

For WLAN 5GHz function

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

For 1TX

Only Port 1 can be use as transmitting antenna.

For 2RX

Port 1 and Port 2 can be used as receiving antennas.

Port 1 and Port 2 could receive simultaneously.



For 6GHz function:

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

For 1TX

Only Port 1 can be use as transmitting antenna.

For 2RX

Port 1 and Port 2 can be used as receiving antennas.

Port 1 and Port 2 could receive simultaneously.

For Bluetooth function (Radio 4):

For Bluetooth mode (1TX/1RX):

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



1.3 Table for Multiple Listing

Equipment Name	Model Name	SW	R1: 2.4GHz	R1: 5GHz Full Band	R2: 6GHz	R3: 2.4GHz/ 5GHz/ 6GHz	R4: Bluetooth
Catalyst Wireless 9164I Wi-Fi 6E Series Access Point	CW9164I-B	Cisco	V	V (with 80+80MHz)	V	V	V
	CW9164I-MR	Meraki	V	V (without 80+80MHz)	V	V	V

Note1: From the above models, model: CW9164I-B was selected as representative model for the test and its data was recorded in this report.

Note2: The above information was declared by manufacturer.

1.3.1 Table for Radio function

Function Radio	WLAN 2.4GHz	WLAN 5GHz UNII 1~2A	WLAN 5GHz UNII 2C~3	WLAN 6GHz UNII 5~8	Bluetooth
1 (Iron Radio)	V	V	V	-	-
2 (Pine Radio)	-	-	-	V	-
3 (Scanning Radio)	V	V	V	V	-
4	-	-	-	-	V

Note1 : The above information was declared by manufacture.

Note2 : The Radio 2 and Radio 3 can't operate simultaneously.

1.4 Table for EUT Operation Function

Mode	Operation Function
1	R1: 2.4GHz/5GHz Full Band+R2: 6GHz+R3: 2.4GHz+R4: Bluetooth
2	R1: 2.4GHz/5GHz Full Band+R2: 6GHz+R3: 5GHz+R4: Bluetooth
3	R1: 2.4GHz/5GHz Full Band+R2: 6GHz+R3: 6GHz+R4: Bluetooth

Note: The above information was declared by manufacturer.

1.5 Accessories

Wall-mounted rack*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.

Note: The tested sample of Maximum Permissible Exposure for Simultaneous Transmission was received on Jul. 21, 2022.



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 41 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 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, <= P_{th}.

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

Where

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

and

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

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 $R > \lambda / 2 \pi$.

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	$0.0128 R^2 f$
1,500-100,000	$19.2 R^2$
Note: R is in meters, f is in MHz.	



2.4 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	4.29	20.30	24.59	0.50	25.09	0.32285	41	0.01528	1.00000
5.2G;D1D	6.99	23.98	30.97	0.50	31.47	1.40281	41	0.06641	1.00000
5.3G;D1D	7.25	22.35	29.60	0.39	29.99	0.99770	41	0.04723	1.00000
5.6G;D1D	6.62	23.33	29.95	0.04	29.99	0.99770	41	0.04723	1.00000
5.8G;D1D	5.97	23.87	29.84	0.50	30.34	1.08143	41	0.05119	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)
6.2G;D1D	7.45	19.59	27.04	0.50	27.54	0.56754	41	0.02687	1.00000
6.4G;D1D	6.03	20.83	26.86	0.50	27.36	0.54450	41	0.02578	1.00000
6.7G;D1D	6.05	21.13	27.18	0.50	27.68	0.58614	41	0.02775	1.00000
7.0G;D1D	4.51	22.78	27.29	0.50	27.79	0.60117	41	0.02846	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;G1D	3.30	19.94	23.24	0.50	23.74	0.23659	41	0.01120	1.00000
5.2G;D1D	4.00	19.70	23.70	0.50	24.20	0.26303	41	0.01245	1.00000
5.3G;D1D	4.00	19.85	23.85	0.50	24.35	0.27227	41	0.01289	1.00000
5.6G;D2D	4.00	19.89	23.89	0.50	24.39	0.27479	41	0.01301	1.00000
5.8G;D3D	4.00	19.98	23.98	0.50	24.48	0.28054	41	0.01328	1.00000
6.2G;D1D	5.30	21.27	26.57	0.50	27.07	0.50933	41	0.02411	1.00000
6.4G;D1D	5.30	20.51	25.81	0.50	26.31	0.42756	41	0.02024	1.00000
6.7G;D1D	5.30	20.68	25.98	0.50	26.48	0.44463	41	0.02105	1.00000
7.0G;D1D	5.30	21.03	26.33	0.50	26.83	0.48195	41	0.02281	1.00000

<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	3.80	18.46	22.26	0.50	22.76	0.18880	41	0.00894	1.00000

**<Radio 1>**

MPE Exemption Option C							
Frequency (MHz)	$\lambda/2\pi$ (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	25.09	22.94	0.197	3.228	Complies
5230	0.0091		31.47	29.32	0.855	3.228	Complies

<Radio 2>

MPE Exemption Option C							
Frequency (MHz)	$\lambda/2\pi$ (m)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	MPE Exemption
6985	0.0068	0.41	27.79	25.64	0.366	3.228	Complies

<Radio 3>

MPE Exemption Option C							
Frequency (MHz)	$\lambda/2\pi$ (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	23.74	21.59	0.144	3.228	Complies
5745	0.0083		24.48	22.33	0.171	3.228	Complies
6185	0.0077		27.07	24.92	0.310	3.228	Complies

<Radio 4>

MPE Exemption Option C							
Frequency (MHz)	$\lambda/2\pi$ (m)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	MPE Exemption
2440	0.0196	0.41	22.76	20.61	0.115	3.228	Complies

**Simultaneous Transmission Analysis:****Mode 1: R1: 2.4GH + R1: 5GHz Full Band +R2: 6GHz + R3: 2.4GHz + R4: Bluetooth**

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
R1 2437	0.41	25.09	22.94	0.197	3.228	0.52	<= 1
R1 5230		31.47	29.32	0.855	3.228		
R2 6985		27.79	25.64	0.366	3.228		
R4 2440		22.76	20.61	0.115	3.228		
R3 2437		23.74	21.59	0.144	3.228		

Mode 2: R1: 2.4GH + R1: 5GHz Full Band +R2: 6GHz + R3: 5GHz + R4: Bluetooth

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
R1 2437	0.41	25.09	22.94	0.197	3.228	0.53	<= 1
R1 5230		31.47	29.32	0.855	3.228		
R2 6985		27.79	25.64	0.366	3.228		
R4 2440		22.76	20.61	0.115	3.228		
R3 5745		24.48	22.33	0.171	3.228		

Mode 3: R1: 2.4GH + R1: 5GHz Full Band +R2: 6GHz + R3: 6GHz + R4: Bluetooth

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
R1 2437	0.41	25.09	22.94	0.197	3.228	0.57	<= 1
R1 5230		31.47	29.32	0.855	3.228		
R2 6985		27.79	25.64	0.366	3.228		
R4 2440		22.76	20.61	0.115	3.228		
R3 6185		27.07	24.92	0.310	3.228		

————THE END————