

Radio Exposure Evaluation Report

FCC ID : PPQ-WRB8326
Equipment : Wi-Fi 7 Tri-Band Mesh Router
Brand Name : LITEON
Model Name : WRB8326A, WRB8326B, WRB8326C, WRB8326D
Applicant : LITE-ON TECHNOLOGY CORP.
Bldg. C, 90, Chien 1 Road, Chung Ho, New Taipei City
23585, Taiwan, R.O.C.
Manufacturer : LITE-ON TECHNOLOGY CORP.
Bldg. C, 90, Chien 1 Road, Chung Ho, New Taipei City
23585, Taiwan, R.O.C.
Standard : 47 CFR FCC Part 2 Subpart J, section 2.1091

The product was received on Aug. 29, 2024, and testing was started from Sep. 18, 2024 and completed on Sep. 30, 2024. We, SPORTON INTERNATIONAL INC. Hsinhua Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR FCC Part 2 Subpart J, section 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. Hsinhua Laboratory, the test report shall not be reproduced except in full.



Approved by: Jackson Tsai

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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:

None

Reviewed by: Ben Tseng

Report Producer: Amber Chiu



1 General Description

1.1 Information

1.1.1 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) 802.11be: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM)
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, 1024QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11be: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM)
6GHz WLAN	5925-7125	5935-7115	802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11be: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM)
Bluetooth	2400-2483.5	2402-2480	LE: DSSS (GFSK)
ZigBee	2400-2483.5	2405-2480	DSSS (O-QPSK)



1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Support	Remark
1	LITEON	20301-002000A000	PIFA	I-Pex	2.4G+5G	-
2	LITEON	20301-002020A000	PIFA	I-Pex	2.4G+5G	-
3	LITEON	20301-002030A000	Monopole	I-Pex	6G	-
4	LITEON	20301-002040A000	Monopole	I-Pex	6G	-
5	LITEON	20301-002010A000	Dipole	I-Pex	BT/Zigbee/Thread	-

Ant.	Port	Gain (dBi)						BT/Zigbee/ Thread
		2.4G	UNII-1	UNII-2A	UNII-2C	UNII-3	UNII-5~8	
1	1	2.35	2.35	2.46	3.44	3.72	-	-
2	2	2.33	2.51	2.18	3.35	3.43	-	-
3	1	-	-	-	-	-	3.19	-
4	2	-	-	-	-	-	3.7	-
5	1	-	-	-	-	-	-	4.67

Composite Gain (dBi)					
	2.4G	UNII-1	UNII-2A	UNII-2C	UNII-3
DG [1SS]	2.69	4.1	4.57	5.27	4.74
DG [2SS]	2.35	2.51	2.46	3.44	3.72

Note 1: The EUT has five antennas.

Note 2: The composite gain is derived as KDB 662911 D03 v01 which was used as directional gain. For more detail information, please refer to the Antenna Pattern Report AP482702.

For 2.4GHz function:

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

Ant. 1 (port 1) and Ant. 2 (port 2) could receive simultaneously.

For 5GHz function:

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

Ant. 1 (port 1) and Ant. 2 (port 2) could receive simultaneously.

For 6GHz function:

For IEEE 802.11ax/be mode (2TX/2RX)

Ant. 3 (port 1), Ant. 4 (port 2) could transmit/receive simultaneously.

For BT function:

For IEEE 802.15.1 mode (1TX/1RX)

Ant. 5 could transmit/receive.

For Zigbee/Thread function:

For IEEE 802.15.4 mode (1TX/1RX)

Ant. 5 could transmit/receive.



1.1.3 Table for Multiple Listing

The brand/model names in the following table are all refer to the identical product.

Brand Name	Model Name	SKU	5GE	2.5GE	USB 2.0	IoT(2.4G)
LITEON	WRB8326A	SKU 1	V	V	V	V
	WRB8326B	SKU 2	V	V	-	V
	WRB8326C	SKU 3	V	-	-	V
	WRB8326D	SKU 4	-	V	-	V

From the above models, model: WRB8326A was selected as representative model for the test and its data was recorded in this report.

1.1.4 Accessories

Accessories			
AC Adapter (US)	Brand Name	RISUNIC	Model Name R0183-1202500US
	Power Rating	I/P: 100 - 240Vac, 1.5A A, O/P:12Vdc, 2.5A	
	Power Cord	1.5 meter, non-shielded cable, with w/o ferrite core	

Reminder: Regarding to more detail and other information, please refer to user manual.



1.2 Applicable Standards

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

- ♦ 47 CFR FCC Part 2 Subpart J, section 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

1.3 Testing Location

Test Lab. : Sporton International Inc. Hsinhua Laboratory		
<input checked="" type="checkbox"/>	Hsinhua (TAF: 3785)	ADD: No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.) TEL: 886-3-327-3456 FAX: 886-3-327-0973
Test site Designation No. TW3785 with FCC.		
<input type="checkbox"/>	Wenhua 3rd. (TAF: 3785)	ADD: No. 58, Aly. 75, Ln. 564, Wenhua 3rd Rd., Guishan Dist. Taoyuan City 333, Taiwan (R.O.C.) TEL: 886-3-327-0868
Test site Designation No. TW0036 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

Multiple Transmitters Condition

Co-location as simultaneously transmitting (co-transmitting) and the evaluation shall be consider that simultaneous transmissions from co-located devices the individual transmitters are evaluated separately. After sum of the individual value (basic restriction / reference level) are measured/calculated also have to under basic restriction / reference level.

Co-transmitting mode:

1. WLAN 2.4G + 5G + 6G + Bluetooth
2. WLAN 2.4G + 5G + 6G + 802.15.4

2.2 RF Exposure Exempt Measurement

Option	Refer Std.	Exemption Exposure Thresholds (TL)
A	§1.1307(b)(3)(i)(A)	Available maximum time-averaged power is no more than 1 mW
B	§1.1307(b)(3)(i)(B)	$P_{th}(mW) = \begin{cases} ERP_{20cm} (d / 20cm)^x \rightarrow d \leq 20cm \\ ERP_{20cm} \rightarrow 20cm < d \leq 40cm \end{cases}$ $x = -\log_{10} \left(\frac{60}{ERP_{20cm} \sqrt{f}} \right) \text{ and } f \text{ is in GHz}$ $\begin{cases} ERP_{20cm} : 0.3GHz \leq f < 1.5GHz \rightarrow 2040 f (mW) \\ ERP_{20cm} : 1.5GHz \leq f \leq 6GHz \rightarrow 3060 (mW) \end{cases}$
C	§1.1307(b)(3)(i)(C)	$\begin{cases} 0.3 \sim 1.34MHz \rightarrow ERP(W) = 1920 R^2 \\ 1.34 \sim 30MHz \rightarrow ERP(W) = 3450 R^2 / f^2 \\ 30 \sim 300MHz \rightarrow ERP(W) = 3.83R^2 \\ 300 \sim 1500MHz \rightarrow ERP(W) = 0.0128 R^2 f \\ 1500 \sim 100000MHz \rightarrow ERP(W) = 19.2R^2 \end{cases}$ <p>f is in MHz; R is in m; $R > \lambda / 2\pi$</p>



2.3 Multiple RF Sources Exposure

Refer Std.	Exemption Exposure Thresholds (TL)
§1.1307(b)(3)(ii)(A)	<p>The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required)</p>
§1.1307(b)(3)(ii)(B)	$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{ExposureLimit_k} \leq 1$ <p>a = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(B) of this section for P , including existing exempt transmitters and those being added.</p> <p>b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(C) of this section for Threshold ERP, including existing exempt transmitters and those being added.</p> <p>c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.</p> <p>P_i = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).</p> <p>P_{th,i} = the exemption threshold power (P_{th}) according to paragraph §1.1307(b)(3)(i)(B) of this section for fixed, mobile, or portable RF source i.</p> <p>ERP_j = the ERP of fixed, mobile, or portable RF source j.</p> <p>ERP_{th,j} = exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least λ/2π according to the applicable formula of paragraph §1.1307(b)(3)(i)(C) of this section.</p> <p>Evaluated_k = the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation at the location of exposure.</p> <p>Evaluated Limit_k = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source k, as applicable from § 1.1310 of this chapter.</p>



2.4 MPE Calculation Method

The MPE was calculated at 21 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

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



2.5 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

WLAN 2.4GHz_Non-Beamforming

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;G1D	2.35	26.97	29.32	0.50	584.9382	21.00	B	3060.000	0.1912
2.4G;D1D	2.35	27.74	30.09	0.50	698.4093	21.00	B	3060.000	0.2282

WLAN 5GHz_Non-Beamforming

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
5.2G;D1D	2.51	27.93	30.44	0.50	757.0246	21.00	B	3060.000	0.2474
5.3G;D1D	2.46	23.66	26.12	0.50	279.9690	21.00	B	3060.000	0.0915
5.6G;D1D	3.44	23.95	27.39	0.50	375.07	21.00	B	3060.000	0.1226
5.8G;D1D	3.72	27.50	31.22	0.50	905.96	21.00	B	3060.000	0.2961

WLAN 6GHz_Non-Beamforming

Mode	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
6.2G;D1D	25.77	0.50	258.2914	21.00	C	846.720	0.3050
6.4G;D1D	25.62	0.50	249.5227	21.00	C	846.720	0.2947
6.7G;D1D	25.52	0.50	243.8428	21.00	C	846.720	0.2880
7.0G;D1D	23.94	0.50	169.4767	21.00	C	846.720	0.2002

Bluetooth

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;BT-LE	4.67	20.24	24.91	0.50	211.8898	21.00	B	3060.000	0.0692

802.15.4

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;G1D	4.67	20.19	24.86	0.50	209.4643	21.00	B	3060.000	0.0685



WLAN 2.4GHz_Beamforming

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	2.69	26.56	29.25	0.50	575.5857	21.00	B	3060.000	0.1881

WLAN 5GHz_Beamforming

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
5.2G;D1D	4.10	27.76	31.86	0.50	1049.8083	21.00	B	3060.000	0.3431
5.3G;D1D	4.57	23.53	28.10	0.50	441.6823	21.00	B	3060.000	0.1443
5.6G;D1D	5.27	23.83	29.10	0.50	556.05	21.00	B	3060.000	0.1817
5.8G;D1D	4.74	27.38	32.12	0.50	1114.58	21.00	B	3060.000	0.3642

WLAN 6GHz_Beamforming

Mode	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
6.2G;D1D	26.13	0.50	280.6144	21.00	C	846.720	0.3314
6.4G;D1D	24.66	0.50	200.0368	21.00	C	846.720	0.2362
6.7G;D1D	25.92	0.50	267.3684	21.00	C	846.720	0.3158
7.0G;D1D	25.22	0.50	227.5674	21.00	C	846.720	0.2688

Note 1: Option A, B and C refer as clause 2.2

Note 2: For option B, Pth(mW) convert to TL ERP(mW); For option C, ERP(W) convert to TL ERP(mW)

Note 3: TL Ratio=Tune-up ERP(mW)/TL ERP(mW)



Simultaneous Transmission Analysis Mode:

WLAN 2.4G + 5G + 6G + Bluetooth

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	2.35	27.74	30.09	0.50	698.4093	21.00	B	3060.000	0.2282
5.8G;D1D	4.74	27.38	32.12	0.50	1114.5768	21.00	B	3060.000	0.3642
6.2G;D1D	-	-	26.13	0.50	280.6144	21.00	C	846.720	0.3314
2.4G;BT-LE	4.67	20.24	24.91	0.50	211.89	21.00	B	3060.000	0.0692
Sum Ratio	0.9930								
Ratio Limit	1.00000								

WLAN 2.4G + 5G + 6G + 802.15.4

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	2.35	27.74	30.09	0.50	698.4093	21.00	B	3060.000	0.2282
5.8G;D1D	4.74	27.38	32.12	0.50	1114.5768	21.00	B	3060.000	0.3642
6.2G;D1D	-	-	26.13	0.50	280.6144	21.00	C	846.720	0.3314
2.4G;G1D	4.67	20.19	24.86	0.50	209.46	21.00	B	3060.000	0.0685
Sum Ratio	0.9923								
Ratio Limit	1.00000								

Note 1: Option A, B and C refer as clause 2.2

Note 2: For option B, Pth(mW) convert to TL ERP(mW); For option C, ERP(W) convert to TL ERP(mW)

Note 3: TL Ratio=Tune-up ERP(mW)/TL ERP(mW)

Note 4: Refer as clause 2.3 Multiple RF Sources Exposure. Please follow below option and sum TL ration table.

Option	Sum TL Ratio_B	Option	Sum TL Ratio_C	Option	Sum TL Ratio_E
B	$\sum_{i=1}^a \frac{P_i}{P_{th,i}}$	C	$\sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}}$	E	$\sum_{k=1}^c \frac{Evaluated_k}{ExposureLimit_k}$

Note: The above antenna gain was declared by manufacturer.

—————THE END—————