

Radio Exposure Evaluation Report

FCC ID : PPQ-WPX8988
Contains FCC ID : PPQ-WM6321
Equipment : Wireless Access Point
Brand Name : LITEON, PoEWit
Model Name : WPX8988, WPX8988-1, WAP-1
Applicant : LITE-ON Technology Corp
Bldg. C, 90, Chien 1 Rd., Chung-Ho, New Taipei City,
23585 Taiwan
Manufacturer : LITE-ON Network Communication (Dongguan)
Limited
30#Keji Rd., Yin Hu Industrial Area, Qingxi
Town, DongGuan City, Guangdong, China
Standard : 47 CFR FCC Part 2 Subpart J, section 2.1091

The product was received on Oct. 12, 2021, and testing was started from Oct. 22, 2021 and completed on Nov. 17, 2021. 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: Allen Lin

SPORTON INTERNATIONAL INC. Hsinhua Laboratory
No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)



Table of Contents

HISTORY OF THIS TEST REPORT	3
1 GENERAL DESCRIPTION	5
1.1 Information.....	5
1.2 Testing Location	8
2 MAXIMUM PERMISSIBLE EXPOSURE	9
2.1 Limit of Maximum Permissible Exposure	9
2.2 MPE Calculation Method	10
2.3 Calculated Result and Limit.....	11
Photographs of EUT V01	



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	-

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: Sam Tsai

Report Producer: Jenny Yang

1 General Description

1.1 Information

The EUT contains certified module FCC ID: PPQ-WM6321 for WLAN 5G Radio 3.

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)
5GHz WLAN	5725-5850	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	BR / EDR: FHSS (GFSK / $\pi/4$ -DQPSK / 8DPSK) LE: DSSS (GFSK)

1.1.2 Antenna Information

Group	Ant.	Brand Name	Model Name	Ant. Type	Connector	Radio
1	5	LYNwave	MLX20X-126AA0-B	PIFA	I-Pex	2.4G R1 + 5G R0
	6	LYNwave	MLX20X-126AA0-B	PIFA	I-Pex	
	7	LYNwave	MLX20X-126AA0-B	PIFA	I-Pex	
	8	LYNwave	MLX20X-126AA0-B	PIFA	I-Pex	
2	1	LYNwave	MLX20X-126AA0-B	PIFA	I-Pex	5G R2
	2	LYNwave	MLX20X-126AA0-B	PIFA	I-Pex	
	3	LYNwave	MLX20X-126AA0-B	PIFA	I-Pex	
	4	LYNwave	MLX20X-126AA0-B	PIFA	I-Pex	
3	9	LYNwave	MLX20X-126AA0-B	PIFA	I-Pex	5G R3
	10	LYNwave	MLX20X-126AA0-B	PIFA	I-Pex	
4	11	LYNwave	MLX20X-126AA0-B	PIFA	I-Pex	BT



Group	Ant.	Port	Gain (dBi)		
			2.4G	5G	BT
1	5	1	4.1	6.2	-
	6	2	4.5	6.3	-
	7	3	4.4	6.6	-
	8	4	5	5.9	-
2	1	5	-	5.9	-
	2	6	-	5.2	-
	3	7	-	4.1	-
	4	8	-	4.6	-
3	9	1	-	5.3	-
	10	2	-	5.6	-
4	11	1	-	-	5.1

Note 1: The EUT has eleven antennas.

For 2.4GHz function:

For IEEE 802.11 b/g/n/VHT/ax mode (4TX/4RX)

Ant. 5 (port 1), Ant. 6 (port 2), Ant. 7 (port 3) and Ant. 8 (port 4) could transmit/receive simultaneously.

For BT function:

For IEEE 802.15.1 Bluetooth mode (1TX/1RX)

Only Ant. 11 (port 1) can be used as transmitting/receiving antenna.

For 5GHz function:

For IEEE 802.11 a/n/ac mode (2TX/2RX) **(Radio 3)**

Ant. 9 (port 1) and Ant. 10 (port 2) could transmit/receive simultaneously.

For IEEE 802.11 a/n/ac/ax mode (4TX/4RX) **(Radio 0, Radio 2)**

Ant. 5 (port 1), Ant. 6 (port 2), Ant. 7 (port 3) and Ant. 8 (port 4) could transmit/receive simultaneously.

Ant. 1 (port 5), Ant. 2 (port 6), Ant. 3 (port 7) and Ant. 4 (port 8) could transmit/receive simultaneously.

For IEEE 802.11 a/n/ac/ax mode (8TX/8RX) **(Radio 0+2)**

Ant. 5 (port 1), Ant. 6 (port 2), Ant. 7 (port 3), Ant. 8 (port 4), Ant. 1 (port 5), Ant. 2 (port 6), Ant. 3(port 7), and Ant. 4 (port 8) could transmit/receive simultaneously.

1.1.3 Table for Multiple Listing

SKU	Model Name	Radio spec.	Radio 0 filter source
SKU 1	WPX8988	Radio 0+1+2+3+BT	Radio 0 filter Main Source CIROCOMM J5697E
	WPX8988-1	Radio 0+1+2+BT	
	WAP-1	Radio 0+1+2+3+BT	
SKU 2	WPX8988	Radio 0+1+2+3+BT	Radio 0 filter 2nd Source WALSIN WDBPF5697360KAT
	WPX8988-1	Radio 0+1+2+BT	
	WAP-1	Radio 0+1+2+3+BT	

Brand Name	Model Name	Note
LITEON	WPX8988-1	1. Remove DVDD33_PCIE and VDD_3P3_radio power net: R137 and R7093 2. Remove PCIe connector and level shifter: J1, C7252, C7268, Q26, Q27, and Q50. And 2 screw holes: J13 and J14. 3. Remove sniffer: LED control: Q7 and R7232 4. Remove 2pcs 5GHz Sniffer Antennas 5. Remove PCIE Sniffer Radio 3 (QCA9886, 802.11a/b/g/n/ac, 5G Only)
	WPX8988	The difference of model is in sales marketing.
PoEWit	WAP-1	

1.1.4 Accessories

Accessories				
AC Adapter 1(US Plug)	Brand Name	APD	Model Name	WA-36N12FU
	Manufacturer	-	SN	-
	Power Rating	I/P: 100-240 Vac, 0.9 A, O/P: 12 Vdc, 3A		
	Power Cord	1.8 meter, non-shielded cable, w/o ferrite core		

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

1.2 Testing Location

Test Lab. : Sporton International Inc. Hsinhua Laboratory			
☒	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.			
☐	Wen 33rd.St. (TAF: 3785)	ADD: No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)	
		TEL: 886-3-318-0787	FAX: 886-3-318-0287
Test site Designation No. TW0008 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 2.4GHz (Radio 1) + WLAN 5GHz 4TX (Radio 0) + WLAN 5GHz 4TX (Radio 2) + WLAN 5GHz (Radio 3) + Bluetooth
2. WLAN 2.4GHz (Radio 1) + WLAN 5GHz 8TX (Radio 0 + Radio 2) + WLAN 5GHz (Radio 3) + Bluetooth



2.2 MPE Calculation Method

The MPE was calculated at 29 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

**WLAN 2.4GHz (Radio 1) + WLAN 5GHz 4TX (Radio 0) + WLAN 5GHz 4TX (Radio 2) + WLAN 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	10.53	23.51	34.04	0.50	34.54	2.84446	29	0.26915	1.00000	0.26915
R0;5.8G;D1D	6.60	28.23	34.83	0.50	35.33	3.41193	29	0.32285	1.00000	0.32285
R2;5.2G;D1D	5.90	27.42	33.32	0.50	33.82	2.40991	29	0.22803	1.00000	0.22803
R3;5.8G;D1D	8.46	23.73	32.19	0.50	32.69	1.85780	29	0.17579	1.00000	0.17579
2.4G;BT-BR	5.10	8.76	13.86	0.50	14.36	0.02729	29	0.00258	1.00000	0.00258
									Sum Ratio	0.99840
									Ratio Limit	1

WLAN 2.4GHz (Radio 1) + WLAN 5GHz 8TX (Radio 0 + Radio 2) + WLAN 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	10.53	23.51	34.04	0.50	34.54	2.84446	29	0.26915	1.00000	0.26915
R0+2;5.8G;D1D	6.60	28.87	35.47	0.50	35.97	3.95367	29	0.37411	1.00000	0.37411
R3;5.8G;D1D	8.46	23.73	32.19	0.50	32.69	1.85780	29	0.17579	1.00000	0.17579
2.4G;BT-BR	5.10	8.76	13.86	0.50	14.36	0.02729	29	0.00258	1.00000	0.00258
									Sum Ratio	0.82163
									Ratio Limit	1

————THE END————