Radio Exposure Evaluation Report

FCC ID	:	**XNI-ID214162**
Contain FCC ID	:	**XMR201807EG95NA**
Equipment	:	**Router Gen2 Hotspot with Telematics**
Brand Name	:	**LCI**
Model Name	:	**2021015320**
Applicant	:	**Lippert Components 6801 15 Mile Road Sterling Heights Michigan United States 48312**
Manufacturer	:	**Lippert Components 6801 15 Mile Road Sterling Heights Michigan United States 48312**
Standard	:	**47 CFR FCC Part 2 Subpart J, section 2.1091**

The product was received on Dec. 21, 2020, and testing was started from Jan. 28, 2021 and completed on May 19, 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.)

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History of this test report

Report No.	Version	Description	Issued Date
FA071337-01	01	Initial issue of report	Aug. 24, 2021

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 EUT supports beamforming and CDD modes, and the CDD mode is the worse case. Therefore, all test items are evaluated in the report. The beamforming mode only evaluateds the output power.

Reviewed by: Sam Tsai

Report Producer: Debby Hung

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/VHT: OFDM (BPSK, QPSK, 16QAM, 64QAM)
5GHz WLAN	5150-5250 5725-5850	5180-5240 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Bluetooth	2400-2483.5	2402-2480	LE: DSSS (GFSK)

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector
1	Lynwave	ALX20P-222AA1-00	PCB antenna	I-PEX
2	Lynwave	ALX20P-222AA1-00	PCB antenna	I-PEX
3	-	-	PCB monopole antenna	I-PEX

Ant.	Port	Gain (dBi)		
		2.4G	**5G**	**BT**
1	1	3.7	5	-
2	2	3.7	5	-
3	1	-	-	1.85

For 2.4GHz function:

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

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

For 5GHz function:

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

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

For BT function:

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

Ant. 3 (port 1) could transmit/receive.

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.			

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 20 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 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

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	3.70	22.16	25.86	0.50	26.36	0.43251	20	0.08605	1.00000
2.4G;D1D	3.70	23.03	26.73	0.50	27.23	0.52845	20	0.10513	1.00000
5.2G;D1D	5.00	23.01	28.01	0.50	28.51	0.70958	20	0.14117	1.00000
5.8G;D1D	5.00	24.24	29.24	0.50	29.74	0.94189	20	0.18738	1.00000
WCDMA;B8;F9W	4.00	23.20	27.20	0.50	27.70	0.58884	20	0.11715	0.55093
LTE;B5;G7D	4.00	23.97	27.97	0.50	28.47	0.70307	20	0.13987	0.56500
LTE;B5;W7D	4.00	23.62	27.62	0.50	28.12	0.64863	20	0.12904	0.55033
WCDMA;B2;F9W	4.00	23.46	27.46	0.50	27.96	0.62517	20	0.12437	1.00000
LTE;B2;G7D	4.00	23.94	27.94	0.50	28.44	0.69823	20	0.13891	1.00000
LTE;B2;W7D	4.00	23.60	27.60	0.50	28.10	0.64565	20	0.12845	1.00000
WCDMA;B4;F9W	4.00	23.56	27.56	0.50	28.06	0.63973	20	0.12727	1.00000
LTE;B4;G7D	4.00	23.99	27.99	0.50	28.49	0.70632	20	0.14052	1.00000
LTE;B4;W7D	4.00	23.80	27.80	0.50	28.30	0.67608	20	0.13450	1.00000
LTE;B12;G7D	4.00	23.91	27.91	0.50	28.41	0.69343	20	0.13795	0.47167
LTE;B12;W7D	4.00	23.64	27.64	0.50	28.14	0.65163	20	0.12964	0.47633
LTE;B13;G7D	4.00	23.78	27.78	0.50	28.28	0.67298	20	0.13388	0.52133
LTE;B13;W7D	4.00	23.06	27.06	0.50	27.56	0.57016	20	0.11343	0.51967
2.4G;BT-LE	1.85	-2.95	-1.10	0.50	-0.60	0.00087	20	0.00017	1.00000

Co-location (2.4GHz WLAN+5GHz WLAN+LTE)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm²)	S Limit (mW/cm²)	Ratio (S/Limit)
5.8G;D1D	5.00	24.24	29.24	0.50	29.74	0.94189	20	0.18738	1.00000	0.18738
2.4G;D1D	3.70	23.03	26.73	0.50	27.23	0.52845	20	0.10513	1.00000	0.10513
LTE;B12;G7D	4.00	23.91	27.91	0.50	28.41	0.69343	20	0.13795	0.47167	0.29248
									Sum Ratio	0.58499
									Ratio Limit	1

Co-location (BT +LTE)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm²)	S Limit (mW/cm²)	Ratio (S/Limit)
2.4G;BT-LE	1.85	-2.95	-1.10	0.50	-0.60	0.00087	20	0.00017	1.00000	0.00017
LTE;B12;G7D	4.00	23.91	27.91	0.50	28.41	0.69343	20	0.13795	0.47167	0.29248
									Sum Ratio	0.29265
									Ratio Limit	1

———THE END———