

FCC RF EXPOSURE EVALUATION REPORT

Product Name: LED Controller
Trade Mark: SPERLL
Model No.: SP802E
Add. Model No.: SP803E, SP804E, SP805E, SP806E, SP807E, SP808E, SP809E
Report Number: 24121815301RFC-3
Test Standards: FCC 47 CFR Part 1 Subpart I
FCC ID: 2ATV8SP80NE
Test Result: PASS
Date of Issue: January 22, 2025

Prepared for:

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Version

Version No.	Date	Description
V1.0	January 22, 2025	Original



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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Shenzhen Sperll Optoelectronic Technology Co., Ltd.
Address of Applicant:	4th Floor, Building 3, NO.1059 Songbai Road, Nanshan District, Shenzhen, China
Manufacturer:	Shenzhen Sperll Optoelectronic Technology Co., Ltd.
Address of Manufacturer:	4th Floor, Building 3, NO.1059 Songbai Road, Nanshan District, Shenzhen, China

1.2 EUT INFORMATION

Product Name:	LED Controller		
Model No.:	SP802E		
Add. Model No.:	SP803E,SP804E,SP805E,SP806E,SP807E,SP808E,SP809E		
Trade Mark:	SPERLL		
EUT Supports Function: (Provided by the customer)	2.4 GHz ISM Band:	IEEE 802.11b/g/n	
		Bluetooth 5.0	
Sample Received Date:	December 18, 2024		
Sample Tested Date:	December 23, 2024 to January 8, 2025		
Note: The additional models are identical with the test model SP802E except the model number for marketing purpose.			

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

For BT_LE	
Frequency Band:	2400 MHz to 2483.5 MHz
Frequency Range:	2402 MHz to 2480 MHz
Bluetooth Version:	Bluetooth LE
Type of Modulation:	GFSK
Number of Channels:	40
Channel Separation:	2 MHz
Antenna Type:	PCB Antenna
Antenna Gain: (Provided by the customer)	2.07 dBi
Maximum Peak Power:	7.27 dBm

For 2.4 GHz ISM Band of Wi-Fi	
Frequency Band:	2400 MHz to 2483.5 MHz
Frequency Range:	2412 MHz to 2462 MHz
Support Standards:	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20
Type of Modulation:	IEEE 802.11b: DSSS(CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM(64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT20: OFDM(64-QAM, 16-QAM, QPSK, BPSK)
Data Rate:	IEEE 802.11b: Up to 11 Mbps IEEE 802.11g: Up to 54 Mbps IEEE 802.11n-HT20: Up to MCS7
Number of Channels:	IEEE 802.11b: 11 IEEE 802.11g: 11 IEEE 802.11n-HT20: 11
Channel Separation:	5 MHz
Antenna Type:	PCB Antenna

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Antenna Gain: (Provided by the customer)	2.07 dBi
Maximum Peak Power:	IEEE 802.11b: 14.32 dBm IEEE 802.11g: 17.45 dBm IEEE 802.11n-HT20: 17.26 dBm

1.4 OTHER INFORMATION

Test channels for BT_LE				
Type of Modulation	Tx/Rx Frequency	Test RF Channel Lists		
GFSK	2402 MHz to 2480 MHz	Lowest(L)	Middle(M)	Highest(H)
		Channel 0	Channel 19	Channel 39
		2402 MHz	2440 MHz	2480 MHz

Test channels for 2.4 GHz ISM Band of Wi-Fi				
Mode	Tx/Rx Frequency	Test RF Channel Lists		
		Lowest(L)	Middle(M)	Highest(H)
IEEE 802.11b	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz
IEEE 802.11g	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz
IEEE 802.11n-HT20	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz

1.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC 47 CFR Part 1 Subpart I

All test items have been performed and recorded as per the above standards

1.6 TEST LOCATION

All tests were performed at:

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6th, Baoneng Science and Technology Park, Longhua Street, Longhua District, Shenzhen, China, China 518109
Telephone: +86 (0) 755 2823 0888
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1.7 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L9069

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6th, Baoneng Science and Technology Park, Longhua Street, Longhua District, Shenzhen, China

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The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories

CAB identifier: CN0032

FCC Accredited Lab.

Designation Number: CN1194

Test Firm Registration Number: 259480

1.8 DEVIATION FROM STANDARDS

None.

1.9 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.10 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

2. EQUIPMENT LIST

Please refer to the RF test report.

3. MPE EVALUATION

3.1 REFERENCE DOCUMENTS FOR EVALUATION

No.	Identity	Document Title
1	FCC 47 CFR Part 1 Subpart I	PROCEDURES IMPLEMENTING THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969
2	KDB 447498 D01 General RF Exposure Guidance v06	RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES

3.2 MPE COMPLIANCE REQUIREMENT

3.2.1 Limits

According to §1.1307(b)(1), system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

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 Times 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)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

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 Times 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)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100000	/	/	1	30

Note: f = frequency in MHz: * = Plane-wave equivalent power density.

3.2.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

3.3 MPE CALCULATION METHOD

$$S = PG/4\pi R^2 = EIRP/4\pi R^2$$

S = power density (in appropriate units, e.g., mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.

R = 20cm, distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

3.4 MPE CALCULATION RESULTS

Note: For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

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3.4.1 For WLAN

For Wi-Fi function, operating at 2412MHz to 2462 MHz for IEEE802.11b/g/n

3.4.1.1 Antenna Type:

Chain 0: PCB Antenna

3.4.1.2 Antenna Gain:

Chain 0: 2412MHz to 2462 MHz: 2.07 dBi

3.4.1.3 Results for WLAN

Operating Mode		Freq.	Declared maximum conducted average output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	MPE Limit	MPE Value
		(MHz)	(dBm)		(dBi)	(dBm)	(mW)	(mw/cm ²)	
SIS	IEEE 802.11b	2412	14	1.5	2.07	17.57	57.1479	1	0.0114
		2437	14	1.5	2.07	17.57	57.1479	1	0.0114
		2462	14	1.5	2.07	17.57	57.1479	1	0.0114
	IEEE 802.11g	2412	17	1.5	2.07	20.57	114.0250	1	0.0227
		2437	17	1.5	2.07	20.57	114.0250	1	0.0227
		2462	17	1.5	2.07	20.57	114.0250	1	0.0227
	IEEE 802.11n-HT20	2412	16	2.0	2.07	20.07	101.6249	1	0.0202
		2437	16	2.0	2.07	20.07	101.6249	1	0.0202
		2462	16	2.0	2.07	20.07	101.6249	1	0.0202

3.4.2 For BT

For BT_LE function, operating at 2402MHz to 2480 MHz for GFSK

3.4.2.1 Antenna Type:

Chain 0: PCB Antenna

3.4.2.2 Antenna Gain:

Chain 0: 2402MHz to 2480 MHz: 2.07 dBi

3.4.2.3 Results for BT

Operating Mode	Freq.	Declared maximum conducted average output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	MPE Limit	MPE Value
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(mW)	(mw/cm ²)	
LE	2402	6.5	1	2.07	9.57	9.0573	1	0.0018
	2440	6.5	1	2.07	9.57	9.0573	1	0.0018
	2480	6.5	1	2.07	9.57	9.0573	1	0.0018

3.4.3 Simultaneous Multi-band Transmission MPE Analysis

3.4.4.1 List of Mode for Simultaneous Multi-band Transmission

No.	Configurations	Support/Not Support
1	2.4G_SISO_WLAN + BT	Not Support

APPENDIX 1 PHOTOS OF TEST SETUP

N/A

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

*** End of Report ***

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of UnionTrust, this report can't be reproduced except in full.
