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RF Exposure Evaluation Report

Report No.: CQASZ20221101969E-02
Applicant: Shenzhen Deepsea Innovation Technology Co., Ltd.
Address of Applicant: Room 1901, Jinqizhigu Building, Tangling Road, Nanshan District, Shenzhen, CN
Equipment Under Test (EUT):
EUT Name: Atom SE
Model No.: DSDR04B, DSDR04C, DSDR04D, DSDR02D
Test Model No.: DSDR04B
Brand Name: N/A
FCC ID: 2AYUO-DSDR04B
Standards: 47 CFR Part 1.1307
47 CFR Part 1.1310
447498 D04 Interim General RF Exposure Guidance v01
Date of Receipt: 2022-11-22
Date of Test: 2022-11-22 to 2022-12-06
Date of Issue: 2023-01-30
Test Result: **PASS***

*In the configuration tested, the EUT complied with the standards specified above

Tested By: Lewis Zhou
(Lewis Zhou)

Reviewed By: Timo Lei
(Timo Lei)

Approved By: Jack Ai
(Jack Ai)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20221101969E-02	Rev.01	Initial report	2023-01-30

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3 General Information

3.1 Client Information

Applicant:	Shenzhen Deepsea Innovation Technology Co., Ltd.
Address of Applicant:	Room 1901, Jinqizhigu Building, Tangling Road, Nanshan District, Shenzhen, CN
Manufacturer:	Shenzhen Deepsea excellence technology Co.,Ltd
Address of Manufacturer:	5th Floor, Building 7, Hongfa High-tech Park, Keji 4th Road, Shiyan Street, Baoan District, Shenzhen
Factory:	Shenzhen Deepsea excellence technology Co.,Ltd
Address of Factory:	5th Floor, Building 7, Hongfa High-tech Park, Keji 4th Road, Shiyan Street, Baoan District, Shenzhen

3.2 General Description of EUT

Product Name:	Atom SE
Model No.:	DSDR04B, DSDR04C, DSDR04D, DSDR02D
Test Model No.:	DSDR04B
Trade Mark:	N/A
Software Version:	V1.2.7
Hardware Version:	V06
EUT Power Supply:	Li-ion battery DC 7.2V 2500mAh, Charge by DC 5V for adapter

3.3 General Description of 2.4G WIFI Classic

Operation Frequency:	2412MHz~2462MHz
Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g : OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20) : OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channel:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels
Channel Separation:	5MHz
Transfer Rate:	IEEE for 802.11b: 1Mbps/2Mbps/5.5Mbps/11Mbps IEEE for 802.11g : 6Mbps/9Mbps/12Mbps/18Mbps/24Mbps/36Mbps/48Mbps/54Mbps IEEE for 802.11n(HT20) : 6.5Mbps/13Mbps/19.5Mbps/26Mbps/39Mbps/52Mbps/58.5Mbps/65Mbps
Sample Type:	<input checked="" type="checkbox"/> Mobile <input type="checkbox"/> Portable
Antenna Type:	FPC antenna
Antenna Gain:	2.5 dBi@2.4GHz: Wi-Fi:ant 1, 2.5 dBi@2.4GHz: Wi-Fi: ant 2

Note:

The above parameters will directly affect the test results. The information is provided by the applicant.

4 MPE Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Limits

The table applies to any RF source (i.e., single fixed, mobile, and portable transmitters) and specifies power and distance criteria for each of the five frequency ranges used for the MPE limits. These criteria apply at separation distances from any part of the radiating structure of at least $\lambda/2\pi$. The thresholds are based on the general population MPE limits with a single perfect reflection, outside of the reactive near-field, and in the main beam of the radiator. For mobile devices that are not exempt per Table B.1 [Table 1 of § 1.1307(b)(1)(i)(C)] at distances from 20 cm to 40 cm and in 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in § 1.1310 is necessary if the ERP of the device is greater than ERP_{20cm} in Formula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

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

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i.e., without consideration of ERP only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave Dipole.

SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

4.1.2 Test Procedure

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

4.1.3 EUT RF Exposure

For 2.4G WIFI Classic

Measurement Data

ANT1:

11B mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	10.97	11.0±1	12.0	15.85
Middle(2437MHz)	12.09	12.0±1	13.0	19.95
Highest(2462MHz)	10.82	10.5±1	11.5	14.13
11G mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	8.98	9.0±1	10.0	10.00
Middle(2437MHz)	10.00	10.0±1	11.0	12.59
Highest(2462MHz)	8.22	8.0±1	9.0	7.94
11N20 mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	7.28	7.5±1	8.5	7.08
Middle(2437MHz)	8.51	8.5±1	9.5	8.91
Highest(2462MHz)	7.88	8.0±1	9.0	7.94

The test results were all less than 3060mW

ANT2:

11B mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	6.86	7±1	8	6.3
Middle(2437MHz)	7.59	8±1	9	7.94
Highest(2462MHz)	6.77	7±1	8	6.3
11G mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	4.63	5±1	6	3.98
Middle(2437MHz)	5.48	5±1	6	3.98
Highest(2462MHz)	4.65	5±1	6	3.98
11N20 mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	3.98	4±1	5	3.16
Middle(2437MHz)	4.73	5±1	6	3.98
Highest(2462MHz)	3.84	4±1	5	3.16

The test results were all less than 3060mW

ANT1+ANT2:

11N20 mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	9.17	9.0±1	10.0	10.00
Middle(2437MHz)	9.88	10.0±1	11.0	12.59
Highest(2462MHz)	9.17	9.0±1	10.0	10.00

The test results were all less than 3060mW

- Note: 1) Refer to report No. CQASZ20221101969E-01 for EUT test Average Output Power value.
2) EUT's module is more than 20cm away from the human body.

*** END OF REPORT ***