

RF EXPOSURE EVALUATION REPORT

Application No.: GZCR2206000771AT
Applicant: DSEA A/S
Address of Applicant: Kongebakken 9,DK-2765 Smørum, Denmark
Manufacturer: DSEA A/S
Address of Manufacturer: Kongebakken 9,DK-2765 Smørum, Denmark
Factory: Dongguan Tai Sing Audio Technology Ltd.
Address of Factory: No. 12, Niujiokeng Road, Dongcheng Street, Dongguan City, Guangdong Province, China


Equipment Under Test (EUT):
EUT Name: Expand Control
Model No.: DSWBT2
Trade Mark: EPOS
Standard(s) : 47 CFR Part 1.310
KDB447498D01 General RF Exposure Guidance v06

Date of Receipt: 2022-06-17
Date of Evaluation: 2022-10-21 to 2022-10-21
Date of Issue: 2022-10-28

Evaluation Result:

Pass*

* In the configuration evaluated, the EUT complied with the standards specified above.



Kobe Jian
EMC Laboratory Manager



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Revision Record			
Version	Report No.	Date	Remark
01	GZCR220600077106	2022-10-28	Original

Authorized for issue by:			
		Kevin Zhang	
		Kevin Zhang/Project Engineer	
		Vico Cui	
		Vico Cui/Reviewer	



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2 Evaluation Summary

Item	Standard	Method	Requirement	Result
RF Exposure	KDB447498D01 General RF Exposure Guidance v06	KDB447498D01 General RF Exposure Guidance v06	47 CFR Part 1.310	Pass

Note:

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.

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4 General Information

4.1 Details of E.U.T.

Power supply: DC 48 V

Cable(s): LAN ports with LAN cables (shielded, 4.8 m)
Type C ports

For BLE

Operation Frequency: 2402MHz to 2480MHz

Bluetooth Version: V5.0 Dual mode

Modulation Type: GFSK

Number of Channels: 40

Channel Spacing: 2MHz

Antenna Type: FPC Antenna

Antenna Gain: 1.65 dBi

For BT Classic

Operation Frequency: 2402MHz to 2480MHz

Bluetooth Version: V5.0 Dual mode

Modulation Type: GFSK, pi/4DQPSK, 8DPSK

Number of Channels: 79

Channel Spacing: 1MHz

Spectrum Spread Technology: Frequency Hopping Spread Spectrum(FHSS)

Antenna Type: FPC Antenna

Antenna Gain: 1.65 dBi

For 2.4 GHz Wi-Fi

Operation Frequency: 802.11b/g/n(HT20): 2412MHz to 2462MHz

Modulation Type: 802.11b: DSSS (CCK, DQPSK, DBPSK);802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)

Number of Channels: 802.11b/g/n(HT20):11

Channel Spacing: 5MHz

Antenna Type: FPC Antenna

Antenna Number: 2

Antenna Gain: 1.65 dBi for ANT1; 1.72 dBi for ANT2

Remark: Two antennas can simultaneous transmission

For 5 GHz Wi-Fi

Operation Frequency / Number of channels (20MHz): U-NII-1: 5180-5240MHz (4 Channels); U-NII-2A: 5260-5320MHz (4 Channels); U-NII-2C: 5500-5700MHz (11 Channels); U-NII-3: 5745-5825MHz (5 Channels)

Operation Frequency / Number of channels (40MHz): U-NII-1: 5190-5230MHz (2 Channels); U-NII-2A: 5270-5310MHz (2 Channels); U-NII-2C: 5510-5670MHz (5 Channels); U-NII-3: 5755-5795MHz (2 Channels)

Operation Frequency / Number of channels (80MHz): U-NII-1: 5210MHz (1 Channel); U-NII-2A: 5290MHz (1 Channel); U-NII-2C: 5530-5610MHz (2 Channels); U-NII-3: 5775MHz (1 Channels)

Modulation Type: 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK); 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM); 802.11ac: OFDM (BPSK, QPSK, 16QAM,



64QAM, 256QAM)

Channel Spacing: 802.11a/n(HT20)/ac(HT20): 20MHz; 802.11n(HT40)/ac(HT40): 40MHz;
802.11ac(HT80): 80MHz

DFS Function: Slave without Radar detection

TPC Function: Without TPC function

Antenna Type: FPC Antenna

Antenna Number: 2

Antenna Gain: 2.68 dBi for ANT1; 2.79 dBi for ANT2

Remark: Two antennas can simultaneous transmission

4.2 Evaluating Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,
198 Kezhu Road, Sciencetech Park, Guangzhou Economic & Technology Development District,
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No tests were sub-contracted.



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4.3 Facility

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

- **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

- **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian/New Zealand Regulatory Compliance Mark (RCM).

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

- **FCC Recognized Accredited Test Firm(Registration No.: 486818)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818.

- **ISED (Registration No.: 4620B, CAB identifier: CN0052)**

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

- **VCCI (Registration No.: R-12460, C-12584, G-20107 and T-11179)**

The 10m Semi-anechoic chamber, 966 Anechoic Chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-20107 and T-11179 respectively.

- **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.



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4.4 Deviation from Standards

None

4.5 Abnormalities from Standard Conditions

None



5 Technical Requirements Specification

5.1 General Description of Applied Standards

KDB447498D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

5.2 RF Exposure Evaluation

5.2.1 Limit & Test Method

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
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				
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

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * P_i * R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

P_i = 3.1416

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.



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5.2.2 Conclusion

Normal use condition for
Distance between antenna and body: > 20cm declared by applicant

Antenna Gain: 1.65 dBi for BT, 1.72 dBi SISO, 4.72 dBi MIMO for 2.4 GHz Wi-Fi, 2.79 dBi SISO, 5.79 dBi MIMO for 5GHz Wi-Fi

For Bluetooth BLE

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
2440	1.462	-12.34	0.058	0.00002	1	Complies

For Bluetooth Classic

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
2480	1.462	5.29	3.381	0.00098	1	Complies

For 2.4 GHz Wi-Fi

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
2462	2.965	23.45	221.309	0.13053	1	Complies

For 5GHz Wi-Fi

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
5270	3.802	21.98	157.761	0.11932	1	Complies

The Bluetooth and Wi-Fi can be transmitted together, the result is

$0.00002/1 + 0.00098/1 + 0.13053/1 + 0.11932/1 = 0.25085 < 1.0$

So SAR report is not required.

Note: Refer to report No. GZCR220600077102 to GZCR220600077105 for EUT test Max Conducted Peak Output Power value.



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6 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for GZCR2206000771AT

- End of the Report -



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