



RF Exposure Evaluation Report

Application No.: SZEM2007006810CR
Applicant: DSEA A/S
Address of Applicant: Kongebakken 9 Smørum 2765 Denmark
Manufacturer: DSEA A/S
Address of Manufacturer: Kongebakken 9 Smørum 2765 Denmark
Factory: Dongguan Tai Sing Audio Technology Ltd.
Address of Factory: Sing Industrial Road, Bai Zhou Bian, Cheng, Dongguan 523113, China

Equipment Under Test (EUT):

EUT Name: Expand Vision 3, Expand Vision 3T

Model No.: EWBT1 ♣

♣

Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.

FCC ID: R3UEWBT1

Standards: 47 CFR Part 1.1307
47 CFR Part 1.1310
47 CFR Part 2.1091

Date of Receipt: 2020-07-22

Date of Test: 2020-07-27 to 2020-08-21

Date of Issue: 2020-08-21

Test Result :	PASS*
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* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu

Keny Xu
EMC Laboratory Manager



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch EMC Laboratory

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020-08-21		Original

Authorized for issue by:				
				
		Harry Wu/Project Engineer		
				
		Eric Fu/Reviewer		





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4 General Information

4.1 General Description of EUT

Product Name:	AC 100-240V, 50-60Hz
Power adapter:	Model: EA1019AVRS-050 Input: AC 100-240V, 50-60Hz, 0.8A Output: DC 5.0V, 3.0A
For BT:	
Bluetooth Version:	V5.0
Operation Frequency:	2402MHz to 2480MHz
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, p/4DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz
Antenna Type:	FPC Antenna
Antenna Gain:	2.98dBi
For BLE:	
Bluetooth Version:	V5.0
Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Data Rate:	1Mb/s,2Mb/s
Antenna Type:	FPC Antenna
Antenna Gain:	2.98dBi
For 2.4G:	
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 Gain:	Antenna 1 &2: 2.98dBi



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SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch

Report No.: SZEM200700681006

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Remark:	Two Antennas can simultaneous transmit WIFI signal at 802.11n(HT20) mode.			
For 5G:				
Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band I	IEEE 802.11a	5180-5240	4
		IEEE 802.11n/ac 20MHz	5180-5240	4
		IEEE 802.11n/ac 40MHz	5190-5230	2
		IEEE 802.11ac 80MHz	5210	1
	UNII Band II-A	IEEE 802.11a	5260-5320	4
		IEEE 802.11n/ac 20MHz	5260-5320	4
		IEEE 802.11n/ac 40MHz	5270-5310	2
		IEEE 802.11ac 80MHz	5290	1
	UNII Band II-C	IEEE 802.11a	5500-5700	11
		IEEE 802.11n/ac 20MHz	5500-5700	11
		IEEE 802.11n/ac 40MHz	5510-5670	5
		IEEE 802.11ac 80MHz	5530-5690	3
	UNII Band III	IEEE 802.11a	5745-5825	5
		IEEE 802.11n/ac 20MHz	5745-5825	5
		IEEE 802.11n/ac 40MHz	5755-5795	2
		IEEE 802.11ac 80MHz	5775	1
Type of Modulation:	IEEE 802.11a: OFDM(BPSK/QPSK/16QAM/64QAM) IEEE 802.11n: OFDM(BPSK/QPSK/16QAM/64QAM) IEEE 802.11ac: OFDM (BPSK/QPSK/16QAM/64QAM/256QAM)			
DFS mode:	Slave without radar detection			
Antenna Type	FPC Antenna			
Antenna Gain	Antenna 1& 2: 3.5dBi			
Remark1:	Two Antennas can simultaneous transmit WIFI signal at 802.11n(HT20), 802.11n(HT40), 802.11ac(HT20), 802.11ac(HT40), 802.11ac(HT80) modes.			



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Remark:

Model No.: EWBT1

The EWBT1 has two different versions: Expand Vision 3 and Expand Vision 3T.

Only the Expand Vision 3T was tested, since according to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions were identical for all the above models, with only difference on software. Expand Vision 3T comes with Microsoft Teams application installed whereas Expand Vision 3 does not.





4.2 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China
518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

4.3 Test Facility

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

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.4 Deviation from Standards

None.

4.5 Abnormalities from Standard Conditions

None.

4.6 Other Information Requested by the Customer

None.



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5 RF Exposure Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Limits

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: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 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.

5.1.2 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 Evaluation

For BT:

Antenna Gain: 2.98dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.99 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency (MHz)	Tx Type	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
2402 MHz	SISO	7.29	5.36	0.002	1.0	PASS

Note: Refer to report No. SZEM200700681002 for EUT test Max Conducted Peak Output Power value.
The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For BLE:

Antenna Gain: 2.98dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.99 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency (MHz)	Tx Type	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
2402 MHz	SISO	7.31	5.38	0.002	1.0	PASS

Note: Refer to report No. SZEM200700681003 for EUT test Max Conducted Peak Output Power value.
The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.





For 2.4G WIFI:

Antenna Gain 1 & 2: 2.98dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.99 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency (MHz)	Tx Type	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
2412 MHz	MIMO	23.27	212.32	0.084	1.0	PASS

Note: Refer to report No. SZEM200700681004 for EUT test Max Conducted Peak Output Power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For 5G WIFI:

Antenna Gain 1 & 2: 3.5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.24 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency (MHz)	Tx Type	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
5745 MHz	MIMO	19.51	89.33	0.040	1.0	PASS

Note: Refer to report No. SZEM200700681005 for EUT test Max Conducted Peak Output Power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

The simultaneous transmission result between of Bluetooth, WiFi :

The SAR Exclusion Threshold Level:

=CPD1 / LPD1 + CPD2 / LPD2

(CPD = Calculation power density, LPD = Limit of power density)

= (0.002/1) +(0.084/1) = 0.086 < 1

Since the conducted output power is well below the SAR low threshold level, so the EUT is considered to comply with SAR requirement without testing.

- End of the Report -

