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RF Exposure Evaluation Report

Report No. : CQASZ20200800894E-03

Applicant: Shenzhen SKY DRAGON Audio-video Technology Co., LTD

Address of Applicant: B16, Laneway3, Liuxian 2RD, District71, Baoan, Shenzhen, China

Equipment Under Test (EUT):

EUT Name: Bluetooth Soundbar, Bluetooth Subwoofer

Model No.: SR503, IHTB059B

Test Model No.: SR503

Brand Name: SAMESAY, CKY

FCC ID: ZJP-SR503

Standards: 47 CFR Part 1.1307
47 CFR Part 1.1310
KDB447498D01 General RF Exposure Guidance v06

Date of Receipt: 2020-08-20

Date of Test: 2020-08-20 to 2020-09-117

Date of Issue: 2020-09-17

Test Result : **PASS***

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

Tested By:

Tiny You

(Tiny You)

Reviewed By:

Sheek, Luo

(Sheek Luo)

Approved By:

Jack Ai

(Jack Ai)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20200800894E-03	Rev.01	Initial report	2020-09-17

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3 General Information

3.1 Client Information

Applicant:	Shenzhen SKY DRAGON Audio-video Technology Co., LTD
Address of Applicant:	B16, Laneway3, Liuxian 2RD, District71, Baoan, Shenzhen, China
Manufacturer:	Shenzhen SKY DRAGON Audio-video Technology Co., LTD
Address of Manufacturer:	B16, Laneway3, Liuxian 2RD, District71, Baoan, Shenzhen, China
Factory:	Huizhou Clinav Industrial Development Co., LTD
Address of Factory:	Shangnan Village Committee, Yuanzhou Town Boluo County, Huizhou City, Guangdong

3.2 General Description of EUT

Product Name:	Bluetooth Soundbar, Bluetooth Subwoofer
Model No.:	SR503, IHTB059B
Test Model No.:	SR503
Trade Mark:	SAMESAY, CKY
Hardware Version:	5.0
Software Version:	V2.5.1
Sample Type:	<input type="checkbox"/> Mobile <input type="checkbox"/> Portable <input checked="" type="checkbox"/> Fix Location
EUT Power Supply:	DC 18V by adapter

3.3 General Description of BT

Operation Frequency:	2402MHz~2480MHz
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, $\pi/4$ DQPSK
Number of Channel:	79
Transfer Rate:	1Mbps/2Mbps
Hopping Channel Type:	Adaptive Frequency Hopping systems
Test Software of EUT:	FCCAssist 2.4 (manufacturer declare)
Antenna Type:	PCB Antenna
Antenna Gain:	-0.58 dBi

3.4 General Description of BLE

Operation Frequency:	2402MHz~2480MHz
Modulation Type:	GFSK
Transfer Rate:	1Mbps
Number of Channel:	40
Test Software of EUT:	FCCAssist 2.4 (manufacturer declare)
Antenna Type:	PCB Antenna
Antenna Gain:	-0.58 dBi

4 RF Exposure Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 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.

4.1.2 Test Procedure

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

4.2 1.1.3 EUT RF Exposure Evaluation

1) For BT

Antenna Gain: -0.58dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0.87 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	1.820	1.0±1	2.0	1.585
Middle(2441MHz)	2.570	2.0±1	3.0	1.995
Highest(2480MHz)	2.990	2.0±1	3.0	1.995
π/4DQPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	2.380	1.5±1	2.5	1.778
Middle(2441MHz)	3.140	2.5±1	3.5	2.239
Highest(2480MHz)	3.590	3.0±1	4.0	2.512

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
2.512	-0.58	0.00044	1.0	PASS

Note: 1) Refer to report No. CQASZ20200800894E-01 for EUT test Max Conducted Peak Output Power value.

$$2) Pd = (Pout * G) / (4 * \pi * R^2) = (2.512 * 0.87) / (4 * 3.1416 * 20^2) = 0.00044$$

2) For BLE

Antenna Gain: -0.58dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0.87 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2403.5MHz)	2.05	1.5±1	2.5	1.778
Middle(2438.9MHz)	2.68	2.0±1	3.0	1.995
Highest(2477.3MHz)	3.04	2.5±1	3.5	2.239

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
2.239	-0.58	0.01	1.0	PASS

Note: 1) Refer to report No. CQASZ20200800894E-02 for EUT test Max Conducted Peak Output Power value.

$$2) Pd = (Pout * G) / (4 * \pi * R^2) = (2.239 * 0.87) / (4 * 3.1416 * 20^2) = 0.0004$$