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RF Exposure Evaluation Report

Report No.: CQASZ20210200171E-02

Applicant: SHENZHEN JINGWEI ELECTRONICS TECHNOLOGY CO., LTD.

Address of Applicant: RM410,4/F, NO.B YIDEHANG IND ZONE, FUKANG SHEQU, LONGHUA ST., LONGHUA DIST. SHENZHEN

Equipment Under Test (EUT):

EUT Name: BT AMP BOX

Model No.: AMP-BTX01, Herdio HMS5104, Herdio HCS528, Herdio HCS418, Herdio HCS628, Herdio HMS61, Herdio HMS60

Test Model No.: AMP-BTX01

Brand Name: Herdio

FCC ID: 2AYZ2-BTX01

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

Date of Receipt: 2021-2-25

Date of Test: 2021-2-25 to 2021-4-8

Date of Issue: 2021-4-8

Test Result: **PASS***

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

Tested By: Jun Li
(Jun Li)

Reviewed By: Ares Liu
(Ares Liu)

Approved By: Sheek Luo
(Sheek Luo)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20210200171E-02	Rev.01	Initial report	2021-4-8

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3 General Information

3.1 Client Information

Applicant:	SHENZHEN JINGWEI ELECTRONICS TECHNOLOGY CO., LTD.
Address of Applicant:	RM410,4/F, NO.B YIDEHANG IND ZONE, FUKANG SHEQU, LONGHUA ST., LONGHUA DIST. SHENZHEN
Manufacturer:	SHENZHEN JINGWEI ELECTRONICS TECHNOLOGY CO., LTD.
Address of Manufacturer:	RM410,4/F, NO.B YIDEHANG IND ZONE, FUKANG SHEQU, LONGHUA ST., LONGHUA DIST. SHENZHEN
Factory:	SHENZHEN JINGWEI ELECTRONICS TECHNOLOGY CO., LTD.
Address of Factory:	RM410,4/F, NO.B YIDEHANG IND ZONE, FUKANG SHEQU, LONGHUA ST., LONGHUA DIST. SHENZHEN

3.2 General Description of EUT

Product Name:	BT AMP BOX
Model No.:	AMP-BTX01, Herdio HMS5104, Herdio HCS528, Herdio HCS418, Herdio HCS628, Herdio HMS61, Herdio HMS60
Test Model No.:	AMP-BTX01
Trade Mark:	Herdio
Hardware Version:	1.0
Software Version:	1.0
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	V5.0
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, $\pi/4$ DQPSK
Transfer Rate:	1Mbps/2Mbps
Number of Channel:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Product Type:	☐ Mobile ☐ Portable ☒ Fix Location
Test Software of EUT:	BT_Tool (manufacturer declare)
Antenna Type:	PCB antenna
Antenna Gain:	0.94dBi
Power Supply:	AC/DC Adapter Mode:BX-1203000 Input:AC100-240V 50/60Hz 0.8A MAX Output: 12V 3A

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: 0.94dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.24 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)	1.050	0±1	1	1.259
Middle(2441MHz)	1.550	0.5±1	1.5	1.413
Highest(2480MHz)	1.740	1±1	2	1.585
π/4DQPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	1.470	0.5±1	1.5	1.413
Middle(2441MHz)	2.030	1±1	1	1.259
Highest(2480MHz)	2.250	1±1	2	1.585

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
1.585	0.94	0.0004	1.0	PASS

Note: 1) Refer to report No. CQASZ20210200171E-01 for EUT test Max Conducted Peak Output Power value.

$$2) P_d = (P_{out} * G) / (4 * \pi * R^2) = (1.585 * 1.24) / (4 * 3.1416 * 20^2) = 0.0004$$