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RF Exposure Evaluation Report

Report No. : CQASZ20190900939E-02

Applicant: TV Ears Inc.

Address of Applicant: 2701 Via Orange Way Ste 1 Spring Valley, CA 91978

Equipment Under Test (EUT):

Product: TV Ears Long Range Headset System

All Model No.: Long Range Headset System, Long Range Digital Transmitter, Long Range Analog Transmitter, Long Analog Transmitter Sound Bar

Test Model No.: Long Range Headset System

Brand Name: TV Ears

FCC ID: 2AUOK-TVEA01

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

Date of Receipt: 2019-09-16

Date of Test: 2019-09-16 to 2019-09-20

Date of Issue: 2019-09-20

Test Result : PASS*

Tested By:

Tom Chen

(Tom chen)

Reviewed By:

Sheek Luo

(Sheek Luo)

Approved By:

Jack Ai

(Jack Ai)



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

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CQA, this report can't be reproduced except in full.

1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20190900939E-02	Rev.01	Initial report	2019-09-20

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3 General Information

3.1 Client Information

Applicant:	TV Ears Inc.
Address of Applicant:	2701 Via Orange Way Ste 1Spring Valley, CA 91978
Manufacturer:	DONGGUAN WISIC ELECTRONIC CO.,LTD.
Address of Manufacturer:	Rm301, 2nd Building, No.5 Songyin Road, Tangxia Town, Dongguan City, Guangdong Province, China

3.2 General Description of EUT

Name:	TV·Ears Long Range Headset System
All Model No.:	Long Range Headset System, Long Range Digital Transmitter, Long Range Analog Transmitter, Long Analog Transmitter Sound Bar
Test Model No.:	Long Range Headset System
Trade Mark :	TV Ears
Hardware Version:	V2.0
Software Version:	V2.0
Frequency Range:	5725MHz ~ 5850MHz
Modulation Type:	GFSK
Number of Channels:	18(declared by the client)
Sample Type:	Mobile production
Test Software of EUT:	RF test (manufacturer declare)
Antenna Type:	PCB antenna
Antenna Gain:	0dBi
Power Supply:	DC5V
Adapter:	Model: M050100E111U1 Input: AC 100~240V 50/60Hz 0.35A Output: DC 5V 1000mA

Note:

All model: Long Range Headset System, Long Range Digital Transmitter, Long Range Analog Transmitter, Long Analog Transmitter Sound Bar

Only the model Long Range Headset System was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being color of appearance.

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 5.8GHz

Antenna Gain: 0dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

$$e_{irp} = p_t \times g_t = (E \times d)^2 / 30$$

where:

p_t = transmitter output power in watts,

g_t = numeric gain of the transmitting antenna (unitless),

E = electric field strength in V/m, $10^{((dB\mu V/m)/20)/10^6}$,

d = measurement distance in meters (m)---3m,

$$\text{So } p_t = (E \times d)^2 / 30 / g_t$$

The worst case (refer to report CQASZ20190900939E-01) is below:

Antenna polarization: Horizontal		
Frequency (MHz)	Level (dBuV/m)	Polarization
5727	98.28	Peak
5727	89.43	Average

Antenna polarization: Vertical		
Frequency (MHz)	Level (dBuV/m)	Polarization
5727	90.36	Peak
5727	84.2	Average

For 5727MHz wireless:

Field strength = 98.28dBuV/m @3m

Ant. gain 0dBi; so Ant numeric gain=1.0

$$\text{So } p_t = \{ [10^{(98.28/20)/10^6} \times 3]^2 / 30 / 1.0 \} \times 1000 \text{mW} = 2.019 \text{mW}$$

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
2.019	0	0.0004	1.0	PASS

Note: 1) $P_d = (P_{out} \times G) / (4 \times \pi \times R^2) = (2.019 \times 1) / (4 \times 3.1416 \times 20^2) = 0.0004$