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RF Exposure Evaluation Report

Report No. : CQASZ20191001098E-02
Applicant: SHENZHEN HUBSAN TECHNOLOGY CO., LTD.
Address of Applicant: 13th Floor, Bldg 1C, Shenzhen Software Industry Base, Xuefu Road, Nanshan District, Shenzhen, China 518054
Equipment Under Test (EUT):
EUT Name: Hubsan ZINO PRO
Model No.: ZINO PRO, Zino Pro
Test Model No.: Zino Pro
Brand Name: Hubsan
FCC ID: 2AN75-ZINOPRORX
Standards: 47 CFR Part 1.1307
47 CFR Part 1.1310
KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2019-11-01
Date of Test: 2019-11-01 to 2019-11-25
Date of Issue: 2019-11-25
Test Result : PASS*

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

Tested By:

Tom Chen

(Tom chen)

Reviewed By:

Aaron Ma

(Aaron Ma)

Approved By:

Jack Ai
(Jack Ai)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20191001098E-02	Rev.01	Initial report	2019-11-25

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3 General Information

3.1 Client Information

Applicant:	SHENZHEN HUBSAN TECHNOLOGY CO., LTD.
Address of Applicant:	13th Floor, Bldg 1C, Shenzhen Software Industry Base, Xuefu Road, Nanshan District, Shenzhen, China 518054
Manufacturer:	SHENZHEN HUBSAN TECHNOLOGY CO., LTD.
Address of Manufacturer:	13th Floor, Bldg 1C, Shenzhen Software Industry Base, Xuefu Road, Nanshan District, Shenzhen, China 518054

3.2 General Description of EUT

Product Name:	Hubsan ZINO PRO
Model No.:	ZINO PRO, Zino Pro
Test Model No.:	Zino Pro
Trade Mark:	Hubsan
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	5725 ~ 5850 MHz
Channel Numbers:	5725 ~ 5850 MHz: 5 for 802.11a
Channel Separation:	5MHz
Type of Modulation:	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK)
Channel Spacing:	IEEE 802.11a: 20 MHz
Sample Type:	☒ Mobile ☐ Portable ☐ Fix Location
Test Software of EUT:	Atheros Radio test 2(manufacturer declare)
Antenna Type:	Integral antenna
Antenna Gain:	3.0dBi
Power Supply:	Battery: 11.4 V 3000 mAh Li-Po

Note:

Model No.: ZINO PRO, Zino Pro

Only the model Zino Pro was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being model name.

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 5.8G WIFI

ANT1:

Antenna Gain: 3.0dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.0 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

ANT1:

802.11a mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
5745	17.35	17.0±1	18.0	63.096
5785	17.54	17.0±1	18.0	63.096
5825	18.46	18.0±1	19.0	79.433

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm²)	Limit	Result
79.433	3.0	0.0315	1.0	PASS

Note: 1) Refer to report No. CQASZ20191001098E-01 for EUT test Max Conducted average Output Power value.

$$2) P_d = (P_{out} * G) / (4 * \pi * R^2) = (79.433 * 2.0) / (4 * 3.1416 * 20^2) = 0.0315$$

ANT2:

Antenna Gain: 3.0dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.0 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

ANT2:

802.11a mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
5745	16.49	16.0±1.0	17.0	50.119
5785	16.01	15.5±1.0	16.5	44.668
5825	15.08	14.5±1.0	15.5	35.481

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm²)	Limit	Result
50.119	3.0	0.0199	1.0	PASS

Note: 1) Refer to report No. CQASZ20191001098E-01 for EUT test Max Conducted average Output Power value.

$$2) P_d = (P_{out} * G) / (4 * \pi * R^2) = (50.119 * 2.0) / (4 * 3.1416 * 20^2) = 0.0199$$

These two antennas do not transmit simultaneously.