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RF Exposure Evaluation Report

Report No. : CQASZ20181100060E-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

Manufacturer: SHENZHEN HUBSAN TECHNOLOGY CO., LTD

Address of Manufacturer: 13th Floor, Bldg 1C, Shenzhen Software Industry Base, Xuefu Road, Nanshan District, Shenzhen, China 518054

Factory: Dongguan Tengsheng Industrial Co., Ltd.

Address of Factory: A22# Luyi Street, Tianxin Village, Tangxia Town, Dongguan, China.

Equipment Under Test (EUT):

Product: Hubsan Zino

Model No.: Zino

Brand Name: Hubsan

FCC ID: 2AN75-ZINORX

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

Date of Test: 2018-11-26 to 2018-12-12

Date of Issue: 2018-12-12

Test Result : PASS*

Tested By:

Daisy Qin

(Daisy Qin)

Reviewed By:

Aaron Ma

(Aaron Ma)

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
CQASZ20181100060E-02	Rev.01	Initial report	2018-12-12

2 Contents

	Page
1 VERSION.....	2
2 CONTENTS	3
3 GENERAL INFORMATION.....	4
3.1 CLIENT INFORMATION.....	4
3.2 GENERAL DESCRIPTION OF EUT	4
4 RF EXPOSURE EVALUATION.....	5
4.1 RF EXPOSURE COMPLIANCE REQUIREMENT	5
4.1.1 Limits.....	5
4.1.2 Test Procedure	5
4.2 1.1.3 EUT RF EXPOSURE EVALUATION	6

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
Factory:	Dongguan Tengsheng Industrial Co., Ltd.
Address of Factory:	A22# Luyi Street, Tianxin Village, Tangxia Town, Dongguan, China.

3.2 General Description of EUT

Product Name:	Hubsan Zino
Model No.:	Zino
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, 802.11n (HT20) 2 for 802.11n (HT40)
Type of Modulation:	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM(64QAM, 16QAM, QPSK, BPSK)
Channel Spacing:	IEEE 802.11a/n-HT20: 20 MHz IEEE 802.11n-HT40: 40 MHz
Sample Type:	<input checked="" type="checkbox"/> Mobile <input type="checkbox"/> Portable <input type="checkbox"/> Fix Location
Test Software of EUT:	Atheros Radio test 2(manufacturer declare)
Antenna Type:	The antenna is internal antenna with ipex connector.
Antenna Gain:	ANT1: 2.95dBi ANT2: 2.95dBi
Power Supply:	Battery 11.4V

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 5G WIFI

Antenna Gain: 2.95dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.97 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	12.62	11.5±1.5	13	19.953
5785	10.46	11.5±1.5	13	19.953
5825	10.40	11.5±1.5	13	19.953
802.11n(HT20) mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
5745	11.75	10.5±1.5	12	15.849
5785	10.18	10.5±1.5	12	15.849
5825	10.39	10.5±1.5	12	15.849
802.11n(HT40)mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
5755	11.97	11±1	12	15.849
5795	11.33	11±1	12	15.849

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
19.953	2.95	0.008	1.0	PASS

Note: 1) Refer to report No. CQASZ20181100060E-01 for EUT test Max Conducted average Output Power value.

$$2) P_d = (P_{out} * G) / (4 * \pi * R^2) = (19.953 * 1.97) / (4 * 3.1416 * 20^2) = 0.008$$

ANT2:

802.11a mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
5745	12.02	11.5±1.0	12.5	17.783
5785	11.40	11.5±1.0	12.5	17.783
5825	11.76	11.5±1.0	12.5	17.783
802.11n(HT20) mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
5745	12.47	11.5±1.0	12.5	17.783
5785	11.41	11.5±1.0	12.5	17.783
5825	11.83	11.5±1.0	12.5	17.783
802.11n(HT40)mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
5755	11.63	11±1	12	15.849
5795	11.71	11±1	12	15.849

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
17.783	2.95	0.007	1.0	PASS

Note: 1) Refer to report No. CQASZ20181100060E-01 for EUT test Max Conducted average Output Power value.

$$2) P_d = (P_{out} * G) / (4 * \pi * R^2) = (17.783 * 1.97) / (4 * 3.1416 * 20^2) = 0.007$$