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# RF Exposure Evaluation Report

**Report No. :** CQASZ171001520EW-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 X4 Desire Pro

**Model No.:** H216A

**Brand Name:** HUBSAN

**FCC ID:** 2AN75-216ARX

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

**Date of Test:** 2018-01-08 to 2018-01-12

**Date of Issue:** 2018-01-12

**Test Result :** **PASS\***

**Tested By:**

(Aaron Ma)

**Reviewed By:**

(Owen Zhou)

**Approved By:**

(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.

## 2 Version

### Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ171001520EW-02	Rev.01	Initial report	2018-01-12

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## 4 General Information

### 4.1 Client Information

Applicant:	SHENZHEN HUBSAN TECHNOLOGY CO., LTD.
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Manufacturer:	SHENZHEN HUBSAN TECHNOLOGY CO., LTD.
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Factory:	Dongguan Tengsheng Industrial Co., Ltd.
Address of Factory:	A22# Luyi Street, Tianxin Village, Tangxia Town, Dongguan, China.

### 4.2 General Description of EUT

Product Name:	HUBSAN X4 Desire Pro
Model No.:	H216A
Trade Mark:	HUBSAN
Hardware version:	EA4000136-01
Software version:	H216A-FC-V2.1.35
Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels IEEE 802.11n HT40: 7 Channels
Channel Separation:	5MHz
Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g : OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20 and HT40) : OFDM (64QAM, 16QAM, QPSK,BPSK)
Sample Type:	portable production
Test Software of EUT:	Atheros Radio Test 2 (provided by manufacturer)
Antenna Type:	internal antenna with ipex connector
Antenna Gain:	0.5dBi
Power Supply:	Lithium ion batteries: DC7.6V, 750mAh

Note: The EUT has two WIFI antennas, They are SISO and cannot be transmitted at the same time. Antenna 1 and antenna 2 have been tested, find test data of the antenna 1 is the worst case, only the worst case is recorded in the report.

## 5 RF Exposure Evaluation

### 5.1 RF Exposure Compliance Requirement

#### 5.1.1 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 <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3–3.0 .....	614	1.63	*(100)	6
3.0–30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300 .....	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	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/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

G = gain of antenna in linear scale

$\pi$  = 3.1416

R = distance between observation point and center of the radiator in cm

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. 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.

#### 5.1.2 Test Procedure

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

## 5.2 EUT RF Exposure Evaluation

### 1) For WIFI

Antenna Gain: 0.5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.12 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

#### Measurement Data

802.11b mode	
Test channel	Peak Output Power (dBm)
Lowest(2412MHz)	13.02
Middle(2437MHz)	12.95
Highest(2462MHz)	13.01
802.11g mode	
Test channel	Peak Output Power (dBm)
Lowest(2412MHz)	17.35
Middle(2437MHz)	17.42
Highest(2462MHz)	17.42
802.11n(HT20)mode	
Test channel	Peak Output Power (dBm)
Lowest(2412MHz)	16.18
Middle(2437MHz)	16.31
Highest(2462MHz)	16.10
802.11n(HT40)mode	
Test channel	Peak Output Power (dBm)
Lowest(2422MHz)	14.85
Middle(2437MHz)	15.30
Highest(2452MHz)	14.73

802.11g(worst case)

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit	Result
Highest	2462	17.42	55.21	0.5	0.0123	1.0	PASS

Note: 1) Refer to report No. CQASZ171001520EE-01 for EUT test Max Conducted average Output Power value.

$$2) Pd = (Pout * G) / (4 * \pi * R^2) = (55.21 * 2.1) / (4 * 3.1416 * 20^2) = 0.0048$$