

1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 General Information

Client Information

Applicant: SHENZHEN ZK TECHNOLOGY CO., LTD
SHENZHEN CITY LONGGANG DISTRICT STREETS QINGLIN
Address of applicant: ROAD SHENZHEN CITY STUDENTS (LONGGANG) BUSINESS
PA... CHINA

Manufacturer: SHENZHEN ZK TECHNOLOGY CO., LTD
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Address of manufacturer: ROAD SHENZHEN CITY STUDENTS (LONGGANG) BUSINESS
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General Description of EUT:

Product Name: Wireless Router
Trade Name: HNK
Model No.: RAX1500
Adding Model(s): /
Rated Voltage: DC12V
MODEL:APS-M012120100W-G
Power Adapter Model: INPUT: AC100-240, 50/60Hz, 0.35A Max
OUTPUT:DC12V,1.0A
FCC ID: 2AUZB-RAX1500
Equipment Type: Mobile Device

Technical Characteristics of EUT:	
Wi-Fi (2.4G)	
Support Standards:	802.11b, 802.11g, 802.11n
Frequency Range:	2412-2462MHz for 802.11b/g/n(HT20) 2422-2452MHz for 802.11n(HT40)
RF Output Power:	Antenna 1: 16.59dBm (Conducted) Antenna 2: 15.30dBm (Conducted)
Type of Modulation:	DBPSK,BPSK,DQPSK,QPSK,16QAM,64QAM
Quantity of Channels:	11 for 802.11b/g/n(HT20); 7 for 802.11n(HT40)
Channel Separation:	5MHz
Type of Antenna:	External Antenna
Antenna Gain:	5dBi
Wi-Fi (5G)	
Support Standards:	802.11a, 802.11n(HT20) , 802.11n-HT40, 802.11ac-VHT80, 802.11ax-HE20, 802.11ax-HE40, 802.11ax-HE80
Frequency Range:	5150-5250MHz, 5725-5850MHz

RF Output Power:	5150-5250MHz: Antenna 0: 15.36dBm (Conducted) Antenna 1:15.69dBm (Conducted) 5725-5850MHz: Antenna 0: 15.13dBm (Conducted) Antenna 1: 14.78dBm (Conducted)
Type of Modulation:	QPSK, 16QAM, 64QAM, 256QAM, 1024QAM
Type of Antenna:	External Antenna
Antenna Gain:	5dBi

1.2 Standard Applicable

According to § 1.1307(b)(1) and KDB 447498 D01 General RF Exposure Guidance v06, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

(a) Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100000	/	/	1	30

Note: f = frequency in MHz: * = Plane-wave equivalents power density

1.3 MPE Calculation Method

$$S = (30 \cdot P \cdot G) / (377 \cdot R^2)$$

S = power density (in appropriate units, e.g., mw/cm²)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator,
the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

1.4 MPE Calculation Result

For Wi-Fi(2.4G)

Maximum Tune-Up output power: 17.0 (dBm)

Maximum peak output power at antenna input terminal: 50.12 (mW)

Prediction distance: >20(cm)

Prediction frequency: 2412 (MHz)

Antenna gain: 5.0(dBi)

Directional gain (numeric gain): 3.16

The worst case is power density at prediction frequency at 20cm: 0.0315 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm²)

For Wi-Fi (5G)

Maximum Tune-Up output power: 17.0 (dBm)

Maximum peak output power at antenna input terminal: 50.12 (mW)

Prediction distance: >20(cm)

Prediction frequency: 5180 (MHz)

Antenna gain: 5.0(dBi)

Directional gain (numeric gain): 3.16

The worst case is power density at prediction frequency at 20cm: 0.0315 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm²)

Mode for Simultaneous Multi-band Transmission

The worst case is Wi-Fi (2.4G)+ Wi-Fi (5G)

Evaluation Result: 0.0315/1+0.0315/1=0.0630

Limit: 1

Result: Pass