

Maximum Permissible Exposure Report

For

NEXXT SOLUTIONS

3505 N.W 107TH AVE. MIAMI, Florida 33178, United States

FCC ID: X4YNX12AC

FCC Rule(s):	<u>FCC 47CFR Part 1.1310</u>
Product Description:	<u>Wireless Router</u>
Tested Model:	<u>ARNEL904U1</u>
Report No.:	<u>HCT17GR191E-3</u>
Sample Receipt Date:	<u>October 12, 2017</u>
Tested Date:	<u>October 12~ October 28, 2017</u>
Issued Date:	<u>October 29, 2017</u>
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM Test Technology Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information	
Applicant:	NEXXT SOLUTIONS
Address of applicant:	3505 N.W 107TH AVE. MIAMI, Florida 33178, United States
Manufacturer:	YICHEN (Shenzhen) Technology Co., Ltd.
Address of manufacturer:	6th Building, Yasen Industrial Park, Chengxin Road 8, Baolong Industrial Estate, Longgang District, Shenzhen, China.

General Description of EUT	
Product Name:	Wireless Router
Trade Name:	NEXXT
Model No.:	ARNEL904U1
Adding Model(s):	N/A
Rated Voltage:	Input: AC 100-240V 50~60Hz 0.6Amax Output: DC 12V 1A
Power Adapter Model:	RD1201000-CSS-HMG
<i>Note: The test data is gathered from a production sample provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Frequency Range:	IEEE 802.11b: 2412MHz~2462MHz IEEE 802.11g: 2412MHz~2462MHz IEEE802.11nHT20: 2412MHz~2462MHz, 5180MHz~5240MHz, 5745MHz~5825MHz IEEE802.11nHT40: 2422MHz~2452MHz, IEEE 802.11a: 5180MHz~5240MHz, 5745MHz~5825MHz
Data Rate:	maximum of 150Mbps
Modulation:	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK)
Quantity of Channels:	11 for 802.11a/b/g/n(HT20); 7 for 802.11n(HT40)

Type of Antenna:	5dB Dual Frequency Welding Antenna
Antenna Gain:	5.5dBi

1.2 Test Standards

The objective of the following report is used to demonstrate that EUT operated in a manner that ensures the public is not exposed to radio frequency energy levels in excess of the relative provisions of FCC 47CFR Part 1.1310

1.3 General Description of Test

Items	Description
EUT Frequency band	☐ FHSS: 2.400GHz ~ 2.483GHz ☒ WLAN: 2.400GHz ~ 2.483GHz ☒ WLAN: 5.150GHz ~ 5.250GHz ☒ WLAN: 5.745GHz ~ 5.825GHz ☐ Others: _____ Note: 2.4G WiFi and 5G WiFi can not transmit simultaneously
Device category	☐ Portable (<20cm separation) ☐ Mobile (>20cm separation) ☒ Others <u>Fixed location</u> (>20cm separation)
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm ²) ☒ General Population/Uncontrolled exposure (S=1mW/cm ²) ☐ Others: _____
Antenna diversity	☐ Single antenna ☒ Multiple antennas: ☐ Tx diversity ☐ Rx diversity ☒ Tx/Rx diversity
Max. output power	WLAN: 2.400GHz ~ 2.483GHz The total peak power: P1 = 21.09dBm (0.1285W) WLAN: 5.150GHz ~ 5.250GHz The total peak power: P2 = 15.73dBm (0.0374W) WLAN: 5.745GHz ~ 5.825GHz The total peak power: P3 = 16.66dBm (0.0463W)
Antenna gain (Max)	WLAN: 2.400GHz ~ 2.483GHz: G1=5.5dBi (Numeric gain:3.55) WLAN: 5.150GHz ~ 5.250GHz: G2=5.5dBi (Numeric gain:3.55) WLAN: 5.745GHz ~ 5.825GHz: G3=5.5dBi (Numeric gain:3.55)
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation
Note: 1. For mobile or fixed location transmitters, no SAR consideration applied. The minimum separation generally be used is at least 20 cm, even if the calculations indicate that the MPE distance would be	

lesser.

1.4 Human Exposure Assessment Results

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 Exposure				
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
300–1,500			f/300	6
1,500–100,000			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
300–1,500			f/1500	30
1,500–100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

Calculation

$$\text{Given } E = \frac{\sqrt{30 \times P \times G}}{d} \quad \& \quad S = \frac{E^2}{3770}$$

Where E = Field Strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power Density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = 100 * d \text{ (m)}$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$

Equation 1

Where d = distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power Density in mW / cm²

EUT parameter (data from the separate report)	
Given $E = \frac{\sqrt{30 \times P \times G}}{d} \quad \& \quad S = \frac{E^2}{3770}$	Where G: numerical gain of transmitting antenna; TP: Transmitted power in watt; d: distance from the transmitting antenna in meter
Exposure classification	S=1mW/cm ²
Minimum distance in meter (d) (from transmitting structure to the human body)	20cm (0.2m)
Yields $S = \frac{30 \times P \times G}{3770 d^2}, \quad d=0.2m=20cm$ WLAN: 2.400GHz ~ 2.483GHz P1=0.1285W=128.5mW, G1=3.55, S1=0.091mW/cm² WLAN: 5.150GHz ~ 5.250GHz P2=0.0374W=37.4mW, G2=3.55, S2=0.026mW/cm² WLAN: 5.745GHz ~ 5.825GHz P3=0.0463W=46.3mW, G3=3.55, S3=0.033mW/cm²	
Conclusion: S1=0.091mW/cm², S2=0.026mW/cm², S3=0.033mW/cm² is significant lower than the FCC 47CFR Part 1.1310 Limit 1mW/cm². (For mobile or fixed location transmitters, the maximum power density is 1.0 mW / cm² even if the calculation indicates that the power density would be larger.)	