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47 C.F.R. Part 1, Subpart I, Section 1.1310

47 C.F.R. Part 2, Subpart J, Section 2.1091

RF EXPOSURE REPORT

For

**Dual-lines VDSL2/ADSL2+ Wireless-N 600Mbps 3G/4G LTE VPN Firewall
Router**

Model: BiPAC 8920NX-600

**Data Applies To: BiPAC 8920NXL-600 ; BiPAC 8900NX-600 ;
BiPAC 8900NXL-600 ; BEC 8920NX ; BEC 8920NP**

Trade Name: Billion ; BEC

Issued for

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
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1. Limit

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter.

2. EUT Specification

Product Name	Dual-lines VDSL2/ADSL2+ Wireless-N 600Mbps 3G/4G LTE VPN Firewall Router
Model Number	BiPAC 8920NX-600
Data Applies To	BiPAC 8920NXL-600 ; BiPAC 8900NX-600 ; BiPAC 8900NXL-600 ; BEC 8920NX ; BEC 8920NP
Identify Number	T160503S01
Received Date	May 03, 2015
Frequency band (Operating)	802.11b/g/n HT20 Mode: 2412MHz ~ 2462MHz 802.11n HT40 Mode: 2422MHz ~ 2452MHz
Device category	Mobile (>20cm separation)
Exposure classification	☐ Occupational/Controlled exposure ($S = 5\text{mW}/\text{cm}^2$) ☒ General Population/Uncontrolled exposure ($S=1\text{mW}/\text{cm}^2$)
Antenna Specification	WiFi 2.4GHz Antenna: Dipole Antenna × 2 Ant. 1 (Chain 0), Antenna Gain: 5 dBi Ant. 2 (Chain 1), Antenna Gain: 5 dBi PCB Antenna × 1 : Ant. 3 (Chain 2), Antenna Gain : 2.36dBi
Maximum average output power	IEEE 802.11b Mode: 23.47 dBm IEEE 802.11g Mode: 20.94 dBm IEEE 802.11n HT20 MCS0 Mode: 19.80 dBm IEEE 802.11n HT40 MCS0 Mode: 19.75 dBm
Evaluation applied	MPE Evaluation*

The difference of the series models:

Model Number	Trade Name	xDSL Dual-lines	Wireless-N	USB	VPN
BiPAC 8920NX-600	Billion	V	V	V	V
BiPAC 8920NXL-600	Billion	V	V	V	X
BiPAC 8900NX-600	Billion	X	V	V	V
BiPAC 8900NXL-600	Billion	X	V	V	X
BEC 8920NX	BEC	V	V	V	X
BEC 8920NP	BEC	V	V	V	V

Remark:

1. For more details, please refer to the User's manual of the EUT.
2. This submittal(s) (test report) is intended for FCC ID: QI3BIL-8920NX600 filing.
3. The model BiPAC 8920NX-600 was considered the main model for testing.

3. Test Results

No non-compliance noted.

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:

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

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

Yields

$$S = \frac{30 \times (P/1000) \times G}{377 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \quad \textbf{Equation 1}$$

Where d = Distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm²

4. Maximum Permissible Exposure

Substituting the MPE safe distance using $d = 20$ cm into Equation 1:

$$S = 0.000199 \times P \times G$$

Where

P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm²

Mode	Frequency (MHz)	Power (dBm)	Ant. Gain (dBi)	Distance (cm)	Power density (mW/cm ²)	Limit (mW/cm ²)
IEEE 802.11b	2437	23.47	5	20	0.0002	1
IEEE 802.11g	2412	20.94	5	20	0.0002	1
IEEE 802.11n HT20 MCS0	2462	19.80	5	20	0.0002	1
IEEE 802.11n HT40 MCS0	2437	19.75	5	20	0.0002	1