



## RF Exposure Report

**Report No.:** SA150430E02B

**FCC ID:** PY315200309

**Test Model:** R8500

**Received Date:** May 07, 2015

**Test Date:** Dec. 29, 2015

**Issued Date:** July 29, 2016

**Applicant:** NETGEAR, Inc.

**Address:** 350 East Plumeria Drive San Jose, CA 95134

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Hsin Chu Laboratory

**Lab Address:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan R.O.C.

**Test Location (1):** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan R.O.C.

**Test Location (2):** No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin  
Chu Hsien 307, Taiwan R.O.C.

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by any government agencies.



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### Release Control Record

Issue No.	Description	Date Issued
SA150430E02B	Original release.	July 29, 2016



**1 Certificate of Conformity**

**Product:** Nighthawk X8 Tri Band WiFi Router

**Brand:** NETGEAR

**Test Model:** R8500

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** NETGEAR, Inc.

**Test Date:** Dec. 29, 2015

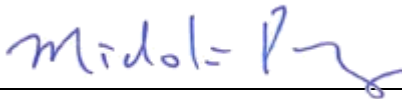
**Standards:** FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

IEEE C95.1-1992

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**Prepared by :**

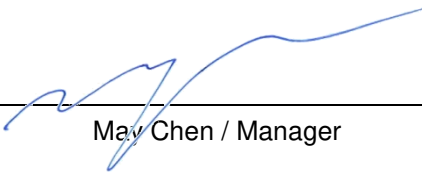


**Date:**

July 29, 2016

Midoli Peng / Specialist

**Approved by :**



**Date:**

July 29, 2016

May Chen / Manager

## 2 RF Exposure

### 2.1 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> )	Average Time (minutes)
Limits For General Population / Uncontrolled Exposure				
300-1500	...	...	F/1500	30
1500-100,000	...	...	1.0	30

F = Frequency in MHz

### 2.2 MPE Calculation Formula

$$Pd = (Pout * G) / (4 * \pi * r^2)$$

where

Pd = power density in mW/cm<sup>2</sup>

Pout = 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

### 2.3 Classification

The antenna of this product, under normal use condition, is at least 43cm away from the body of the user.

So, this device is classified as **Mobile Device**.

## 2.4 Antenna Gain

The antennas provided to the EUT, please refer to the following table:

Antenna No.	Ant. Gain(dBi)	Frequency range (GHz to GHz)	Antenna Type	Connector Type
Internal (1)	3.99	5.15~5.25	Dipole	i-pex(MHF)
	3.71	5.25~5.35	Dipole	i-pex(MHF)
	3.71	5.47~5.725	Dipole	i-pex(MHF)
	3.98	5.725~5.85	Dipole	i-pex(MHF)
Internal (2)	3.99	5.15~5.25	Dipole	i-pex(MHF)
	3.71	5.25~5.35	Dipole	i-pex(MHF)
	3.71	5.47~5.725	Dipole	i-pex(MHF)
	3.98	5.725~5.85	Dipole	i-pex(MHF)
Internal (3)	3.99	5.15~5.25	Dipole	i-pex(MHF)
	3.71	5.25~5.35	Dipole	i-pex(MHF)
	3.71	5.47~5.725	Dipole	i-pex(MHF)
	3.98	5.725~5.85	Dipole	i-pex(MHF)
Internal (4)	3.99	5.15~5.25	Dipole	i-pex(MHF)
	3.71	5.25~5.35	Dipole	i-pex(MHF)
	3.71	5.47~5.725	Dipole	i-pex(MHF)
	3.98	5.725~5.85	Dipole	i-pex(MHF)
External (1)	0.67	2.4~2.4835	Dipole	i-pex(MHF)
	-0.84	5.15~5.25	Dipole	i-pex(MHF)
	-1.38	5.25~5.35	Dipole	i-pex(MHF)
	-1.6	5.47~5.725	Dipole	i-pex(MHF)
	-1.79	5.725~5.85	Dipole	i-pex(MHF)
External (2)	0.67	2.4~2.4835	Dipole	i-pex(MHF)
	-0.84	5.15~5.25	Dipole	i-pex(MHF)
	-1.38	5.25~5.35	Dipole	i-pex(MHF)
	-1.6	5.47~5.725	Dipole	i-pex(MHF)
	-1.79	5.725~5.85	Dipole	i-pex(MHF)
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	-1.6	5.47~5.725	Dipole	i-pex(MHF)
	-1.79	5.725~5.85	Dipole	i-pex(MHF)
External (4)	0.67	2.4~2.4835	Dipole	i-pex(MHF)
	-0.84	5.15~5.25	Dipole	i-pex(MHF)
	-1.38	5.25~5.35	Dipole	i-pex(MHF)
	-1.6	5.47~5.725	Dipole	i-pex(MHF)
	-1.79	5.725~5.85	Dipole	i-pex(MHF)

## 2.5 The Directional gain table:

Frequency (MHz)	Max Gain (dBi)
5470~5725	6.23

Note:

1. Non-TxBF mode & TxBF mode antenna gain refer to KDB 662911 F 2) f) (ii)

$$DirectionalGain = 10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

$N_{SS}$  = the number of independent spatial streams of data;

$N_{ANT}$  = the total number of antennas

$g_{j,k} = 10^{G_k / 20}$  if the  $k$ th antenna is being fed by spatial stream  $j$ , or zero if it is not;

$G_k$  is the gain in dBi of the  $k$ th antenna.

## 2.6 Calculation Result of Maximum Conducted Power

**For 2.4GHz & 5GHz (U-NII-1 band & U-NII-3 band) data was copied from the original test report. (Report No.: SA150430E02C)**

### For 2.4GHz, 5GHz (U-NII-1 & U-NII-2A band)- With External Antenna

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
2412-2462	929.401	6.69	43	0.18666	1
5180-5240	985.604	5.18	43	0.13982	1
5260-5320	248.145	4.64	43	0.03109	1

NOTE:

2.4GHz: Directional gain = 0.67dBi + 10log(4) = 6.69dBi

5GHz(U-NII-1): Directional gain = -0.84dBi + 10log(4) = 5.18dBi

5GHz(U-NII-2A): Directional gain = -1.38dBi + 10log(4) = 4.64dBi

### For 5GHz (U-NII-2C & U-NII-3 band)- With Internal Antenna

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
5500-5700	249.545	6.23	43	0.04508	1
5745-5825	945.72	10	43	0.40702	1

NOTE:

5GHz(U-NII-2C): Directional gain = 6.23dBi

5GHz(U-NII-3): Directional gain = 3.98dBi + 10log(4) = 10dBi

### Conclusion:

The formula of calculated the MPE is:

$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$

CPD = Calculation power density

LPD = Limit of power density

Technology		
WLAN(2.4GHz) - External Antenna	WLAN (5GHz<5150~5250MHz & 5250~5350MHz> - External Antenna	WLAN (5GHz <5470~5725 & 5725~5850MHz> - Internal Antenna

Condition: 0.18666 + 0.13982 + 0.41129 = 0.734

**Therefore the maximum calculations of above situations are less than the "1" limit.**

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