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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.

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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 : Midoli Peng , **Date:** July 29, 2016
Midoli Peng / Specialist

Approved by : May Chen , **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 ²)	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/cm²

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)
External (3)	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 (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 ²)	Limit (mW/cm ²)
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 ²)	Limit (mW/cm ²)
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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