

## RF Exposure Report

**Report No.:** SA150826C05

**FCC ID:** PY315100319

**Test Model:** R7800

**Received Date:** Aug. 21, 2015

**Test Date:** Sep. 04 ~ Oct. 28, 2015

**Issued Date:** Oct. 30, 2015

**Applicant:** NETGEAR INC.

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

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

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.

**Test Location:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)



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### Release Control Record

| Issue No.   | Description      | Date Issued   |
|-------------|------------------|---------------|
| SA150826C05 | Original release | Oct. 30, 2015 |

## 1 Certificate of Conformity

**Product:** Nighthawk X4S AC2600 Smart WiFi Router

**Brand:** NETGEAR

**Test Model:** R7800

**Sample Status:** Engineering sample

**Applicant:** NETGEAR INC.

**Test Date:** Sep. 04 ~ Oct. 28, 2015

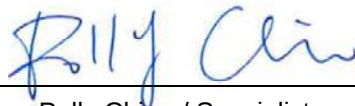
**Standards:** FCC Part 2 (Section 2.1091)

KDB 447498 D03

IEEE C95.1

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:**

Oct. 30, 2015

Polly Chien / Specialist

**Approved by :**



**Date:**

Oct. 30, 2015

Ken Liu / Senior 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

$$P_d = (P_{out} * G) / (4 * \pi * r^2)$$

where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = 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 29cm away from the body of the user. So, this device is classified as **Mobile Device**.

### 3 Calculation Result Of Maximum Conducted Power

| Band                     | Modulation type        | Frequency Channel (MHz) | Max Power (dBm) | Antenna Gain (dBi) | Distance (cm) | Power Density (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> )               |                             |
|--------------------------|------------------------|-------------------------|-----------------|--------------------|---------------|-------------------------------------|-------------------------------------------|-----------------------------|
|                          | CDD Mode               |                         |                 |                    |               |                                     |                                           |                             |
| 2.4GHz                   | 802.11b                | 2412                    | 29.89           | 6.23               | 29            | 0.387                               | 1                                         |                             |
|                          |                        | 2422                    | 29.84           | 6.43               | 29            | <b>0.401</b>                        | 1                                         |                             |
|                          |                        | 2437                    | 29.84           | 6.13               | 29            | 0.374                               | 1                                         |                             |
|                          | 802.11g                | 2412                    | 27.35           | 6.23               | 29            | 0.216                               | 1                                         |                             |
|                          |                        | 2422                    | 29.84           | 6.43               | 29            | 0.401                               | 1                                         |                             |
|                          |                        | 2437                    | 27.13           | 6.13               | 29            | 0.200                               | 1                                         |                             |
|                          | 802.11n(20MHz)         | 2412                    | 27.35           | 6.23               | 29            | 0.216                               | 1                                         |                             |
|                          |                        | 2437                    | 29.84           | 6.43               | 29            | <b>0.401</b>                        | 1                                         |                             |
|                          |                        | 2462                    | 27.35           | 6.13               | 29            | 0.211                               | 1                                         |                             |
|                          | 802.11n(40MHz)         | 2422                    | 23.79           | 6.43               | 29            | 0.100                               | 1                                         |                             |
|                          |                        | 2437                    | 26.76           | 6.43               | 29            | 0.197                               | 1                                         |                             |
|                          |                        | 2452                    | 25.51           | 6.23               | 29            | 0.141                               | 1                                         |                             |
| 5GHz (U-NII-1)           | 802.11a                | 5180                    | 29.02           | 6.63               | 29            | 0.348                               | 1                                         |                             |
|                          |                        | 5200                    | 29.05           | 6.73               | 29            | 0.358                               | 1                                         |                             |
|                          |                        | 5240                    | 29.04           | 6.93               | 29            | 0.374                               | 1                                         |                             |
|                          | 802.11n(20MHz)         | 5180                    | 29.04           | 6.63               | 29            | 0.349                               | 1                                         |                             |
|                          |                        | 5200                    | 28.99           | 6.73               | 29            | 0.353                               | 1                                         |                             |
|                          |                        | 5240                    | 28.94           | 6.93               | 29            | 0.366                               | 1                                         |                             |
|                          | 802.11n(40MHz)         | 5190                    | 26.13           | 6.73               | 29            | 0.183                               | 1                                         |                             |
|                          |                        | 5230                    | 29.97           | 6.93               | 29            | 0.463                               | 1                                         |                             |
|                          | 802.11ac(80MHz)        | 5210                    | 25.03           | 6.83               | 29            | 0.145                               | 1                                         |                             |
| 5GHz (U-NII-3)           | 802.11a                | 5745                    | 29.77           | 7.63               | 29            | 0.520                               | 1                                         |                             |
|                          |                        | 5785                    | 29.77           | 7.53               | 29            | 0.508                               | 1                                         |                             |
|                          |                        | 5825                    | 29.88           | 7.63               | 29            | 0.533                               | 1                                         |                             |
|                          | 802.11n(20MHz)         | 5745                    | 29.89           | 7.63               | 29            | 0.535                               | 1                                         |                             |
|                          |                        | 5785                    | 29.95           | 7.53               | 29            | 0.530                               | 1                                         |                             |
|                          |                        | 5825                    | 29.99           | 7.63               | 29            | <b>0.547</b>                        | 1                                         |                             |
|                          | 802.11n(40MHz)         | 5755                    | 29.81           | 7.53               | 29            | 0.513                               | 1                                         |                             |
|                          |                        | 5795                    | 29.99           | 7.63               | 29            | <b>0.547</b>                        | 1                                         |                             |
|                          | 802.11ac(80MHz)        | 5775                    | 28.44           | 7.53               | 29            | 0.374                               | 1                                         |                             |
| Band                     | Modulation type        | Frequency Channel (MHz) | Max Power (dBm) | Antenna Gain (dBi) | Distance (cm) | Power Density (mW/cm <sup>2</sup> ) | Total Power Density (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) |
| 5GHz (U-NII-1 & U-NII-3) | 802.11ac (80MHz+80MHz) | 5210                    | 23.44           | 3.82               | 29            | 0.05                                | 0.11                                      | 1                           |
|                          |                        | 5775                    | 23.49           | 4.52               |               | 0.06                                |                                           |                             |

Note:

2412MHz: Directional gain =  $0.21\text{dBi} + 10\log(4) = 6.23\text{dBi}$

2422MHz: Directional gain =  $0.41\text{dBi} + 10\log(4) = 6.43\text{dBi}$

2437MHz: Directional gain =  $0.41\text{dBi} + 10\log(4) = 6.43\text{dBi}$

2452MHz: Directional gain =  $0.21\text{dBi} + 10\log(4) = 6.23\text{dBi}$

2462MHz: Directional gain =  $0.11\text{dBi} + 10\log(4) = 6.13\text{dBi}$

5180MHz: Directional gain =  $0.61\text{dBi} + 10\log(4) = 6.63\text{dBi}$

5190MHz: Directional gain =  $0.71\text{dBi} + 10\log(4) = 6.73\text{dBi}$

5200MHz: Directional gain =  $0.71\text{dBi} + 10\log(4) = 6.73\text{dBi}$

5210MHz: Directional gain =  $0.81\text{dBi} + 10\log(4) = 6.83\text{dBi}$

5230MHz: Directional gain =  $0.91\text{dBi} + 10\log(4) = 6.93\text{dBi}$

5240MHz: Directional gain =  $0.91\text{dBi} + 10\log(4) = 6.93\text{dBi}$

5745MHz: Directional gain =  $1.61\text{dBi} + 10\log(4) = 7.63\text{dBi}$

5755MHz: Directional gain =  $1.51\text{dBi} + 10\log(4) = 7.53\text{dBi}$

5775MHz: Directional gain =  $1.51\text{dBi} + 10\log(4) = 7.53\text{dBi}$

5785MHz: Directional gain =  $1.51\text{dBi} + 10\log(4) = 7.53\text{dBi}$

5795MHz: Directional gain =  $1.61\text{dBi} + 10\log(4) = 7.63\text{dBi}$

5825MHz: Directional gain =  $1.61\text{dBi} + 10\log(4) = 7.63\text{dBi}$

| Band                     | Modulation type        | Frequency Channel (MHz) | Max Power (dBm) | Antenna Gain (dBi) | Distance (cm) | Power Density (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> )               |                             |
|--------------------------|------------------------|-------------------------|-----------------|--------------------|---------------|-------------------------------------|-------------------------------------------|-----------------------------|
|                          | Beamforming_NSS1 Mode  |                         |                 |                    |               |                                     |                                           |                             |
| 2.4GHz                   | 802.11n(20MHz)         | 2412                    | 27.29           | 6.23               | 29            | 0.213                               | 1                                         |                             |
|                          |                        | 2437                    | 29.56           | 6.43               | 29            | 0.376                               | 1                                         |                             |
|                          |                        | 2462                    | 28.42           | 6.13               | 29            | 0.270                               | 1                                         |                             |
|                          | 802.11n(40MHz)         | 2422                    | 23.85           | 6.43               | 29            | 0.101                               | 1                                         |                             |
|                          |                        | 2437                    | 26.72           | 6.43               | 29            | 0.195                               | 1                                         |                             |
|                          |                        | 2452                    | 24.36           | 6.23               | 29            | 0.108                               | 1                                         |                             |
| 5GHz (U-NII-1)           | 802.11n(20MHz)         | 5180                    | 29.04           | 6.63               | 29            | 0.349                               | 1                                         |                             |
|                          |                        | 5200                    | 29.02           | 6.73               | 29            | 0.356                               | 1                                         |                             |
|                          |                        | 5240                    | 29.01           | 6.93               | 29            | 0.372                               | 1                                         |                             |
|                          | 802.11n(40MHz)         | 5190                    | 25.43           | 6.73               | 29            | 0.156                               | 1                                         |                             |
|                          |                        | 5230                    | 29.06           | 6.93               | 29            | 0.376                               | 1                                         |                             |
|                          | 802.11ac(80MHz)        | 5210                    | 24.62           | 6.83               | 29            | 0.132                               | 1                                         |                             |
| 5GHz (U-NII-3)           | 802.11n(20MHz)         | 5745                    | 28.35           | 7.63               | 29            | 0.375                               | 1                                         |                             |
|                          |                        | 5785                    | 28.45           | 7.53               | 29            | 0.375                               | 1                                         |                             |
|                          |                        | 5825                    | 28.35           | 7.63               | 29            | 0.375                               | 1                                         |                             |
|                          | 802.11n(40MHz)         | 5755                    | 27.82           | 7.53               | 29            | 0.324                               | 1                                         |                             |
|                          |                        | 5795                    | 28.35           | 7.63               | 29            | 0.375                               | 1                                         |                             |
|                          | 802.11ac(80MHz)        | 5775                    | 27.39           | 7.53               | 29            | 0.294                               | 1                                         |                             |
| Band                     | Modulation type        | Frequency Channel (MHz) | Max Power (dBm) | Antenna Gain (dBi) | Distance (cm) | Power Density (mW/cm <sup>2</sup> ) | Total Power Density (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) |
| 5GHz (U-NII-1 & U-NII-3) | 802.11ac (80MHz+80MHz) | 5210                    | 23.46           | 6.83               | 29            | 0.101                               | 0.22                                      | 1                           |
|                          |                        | 5775                    | 23.47           | 7.53               |               | 0.119                               |                                           |                             |

Note:

2412MHz: Directional gain =  $0.21\text{dBi} + 10\log(4) = 6.23\text{dBi}$

2422MHz: Directional gain =  $0.41\text{dBi} + 10\log(4) = 6.43\text{dBi}$

2437MHz: Directional gain =  $0.41\text{dBi} + 10\log(4) = 6.43\text{dBi}$

2452MHz: Directional gain =  $0.21\text{dBi} + 10\log(4) = 6.23\text{dBi}$

2462MHz: Directional gain =  $0.11\text{dBi} + 10\log(4) = 6.13\text{dBi}$

5180MHz: Directional gain =  $0.61\text{dBi} + 10\log(4) = 6.63\text{dBi}$

5190MHz: Directional gain =  $0.71\text{dBi} + 10\log(4) = 6.73\text{dBi}$

5200MHz: Directional gain =  $0.71\text{dBi} + 10\log(4) = 6.73\text{dBi}$

5210MHz: Directional gain =  $0.81\text{dBi} + 10\log(4) = 6.83\text{dBi}$

5230MHz: Directional gain =  $0.91\text{dBi} + 10\log(4) = 6.93\text{dBi}$

5240MHz: Directional gain =  $0.91\text{dBi} + 10\log(4) = 6.93\text{dBi}$

5745MHz: Directional gain =  $1.61\text{dBi} + 10\log(4) = 7.63\text{dBi}$

5755MHz: Directional gain =  $1.51\text{dBi} + 10\log(4) = 7.53\text{dBi}$

5775MHz: Directional gain =  $1.51\text{dBi} + 10\log(4) = 7.53\text{dBi}$

5785MHz: Directional gain =  $1.51\text{dBi} + 10\log(4) = 7.53\text{dBi}$

5795MHz: Directional gain =  $1.61\text{dBi} + 10\log(4) = 7.63\text{dBi}$

5825MHz: Directional gain =  $1.61\text{dBi} + 10\log(4) = 7.63\text{dBi}$

| Band                  | Modulation type | Frequency Channel (MHz) | Max Power (dBm) | Antenna Gain (dBi) | Distance (cm) | Power Density (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) |
|-----------------------|-----------------|-------------------------|-----------------|--------------------|---------------|-------------------------------------|-----------------------------|
| Beamforming_NSS2 Mode |                 |                         |                 |                    |               |                                     |                             |
| 2.4GHz                | 802.11n(20MHz)  | 2412                    | 27.35           | 3.22               | 29            | 0.108                               | 1                           |
|                       |                 | 2437                    | 29.59           | 3.42               | 29            | 0.189                               | 1                           |
|                       |                 | 2462                    | 28.44           | 3.12               | 29            | 0.136                               | 1                           |
|                       | 802.11n(40MHz)  | 2422                    | 23.66           | 3.42               | 29            | 0.048                               | 1                           |
|                       |                 | 2437                    | 26.75           | 3.42               | 29            | 0.098                               | 1                           |
|                       |                 | 2452                    | 24.36           | 3.22               | 29            | 0.054                               | 1                           |
| 5GHz (U-NII-1)        | 802.11n(20MHz)  | 5180                    | 28.11           | 3.62               | 29            | 0.141                               | 1                           |
|                       |                 | 5200                    | 29.79           | 3.72               | 29            | 0.212                               | 1                           |
|                       |                 | 5240                    | 29.81           | 3.92               | 29            | 0.223                               | 1                           |
|                       | 802.11n(40MHz)  | 5190                    | 25.33           | 3.72               | 29            | 0.076                               | 1                           |
|                       |                 | 5230                    | 29.98           | 3.92               | 29            | 0.232                               | 1                           |
|                       | 802.11ac(80MHz) | 5210                    | 25.06           | 3.82               | 29            | 0.073                               | 1                           |
| 5GHz (U-NII-3)        | 802.11n(20MHz)  | 5745                    | 29.87           | 4.62               | 29            | 0.266                               | 1                           |
|                       |                 | 5785                    | 29.99           | 4.52               | 29            | 0.267                               | 1                           |
|                       |                 | 5825                    | 29.97           | 4.62               | 29            | 0.272                               | 1                           |
|                       | 802.11n(40MHz)  | 5755                    | 29.60           | 4.52               | 29            | 0.244                               | 1                           |
|                       |                 | 5795                    | 29.98           | 4.62               | 29            | 0.273                               | 1                           |
|                       | 802.11ac(80MHz) | 5775                    | 27.93           | 4.52               | 29            | 0.166                               | 1                           |

Note:

2412MHz: Directional gain = 0.21dBi + 10log(4/2) = 3.22dBi  
2422MHz: Directional gain = 0.41dBi + 10log(4/2) = 3.42dBi  
2437MHz: Directional gain = 0.41dBi + 10log(4/2) = 3.42dBi  
2452MHz: Directional gain = 0.21dBi + 10log(4/2) = 3.22dBi  
2462MHz: Directional gain = 0.11dBi + 10log(4/2) = 3.12dBi  
5180MHz: Directional gain = 0.61dBi + 10log(4/2) = 3.62dBi  
5190MHz: Directional gain = 0.71dBi + 10log(4/2) = 3.72dBi  
5200MHz: Directional gain = 0.71dBi + 10log(4/2) = 3.72dBi  
5210MHz: Directional gain = 0.81dBi + 10log(4/2) = 3.82dBi  
5230MHz: Directional gain = 0.91dBi + 10log(4/2) = 3.92dBi  
5240MHz: Directional gain = 0.91dBi + 10log(4/2) = 3.92dBi  
5745MHz: Directional gain = 1.61dBi + 10log(4/2) = 4.62dBi  
5755MHz: Directional gain = 1.51dBi + 10log(4/2) = 4.52dBi  
5775MHz: Directional gain = 1.51dBi + 10log(4/2) = 4.52dB  
5785MHz: Directional gain = 1.51dBi + 10log(4/2) = 4.52dBi  
5795MHz: Directional gain = 1.61dBi + 10log(4/2) = 4.62dBi  
5825MHz: Directional gain = 1.61dBi + 10log(4/2) = 4.62dB

**CONCLUSION:**

Both of the WLAN 2.4G & WLAN 5G can transmit simultaneously, the formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

$WLAN\ 2.4G + WLAN\ 5.0G = 0.401 + 0.547 = 0.948$

Therefore, the maximum calculation of this situation is 0.948, which is less than the "1" limit.

---END---