# RF Exposure Report

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|---|---|
| **Report No.:** | SA160205C08I |
| **FCC ID:** | PY315200317 |
| **Test Model:** | EX7300 |
| **Received Date:** | Nov. 01, 2016 |
| **Test Date:** | Dec. 02 ~ Dec. 27, 2016 |
| **Issued Date:** | Dec. 27, 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 |
| **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 |
|---|---|---|
| SA160205C08I | Original release. | Dec. 27, 2016 |

## 1 Certificate of Conformity

| | |
|---|---|
| **Product:** | Nighthawk X4 AC2200 WiFi Range Extender |
| **Brand:** | NETGEAR |
| **Test Model:** | EX7300 |
| **Sample Status:** | Engineering sample |
| **Applicant:** | NETGEAR, INC. |
| **Test Date:** | Dec. 02 ~ Dec. 27, 2016 |
| **Standards:** | FCC Part 2 (Section 2.1091)<br>KDB 447498 D01 General RF Exposure Guidance v06<br>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:** Dec. 27, 2016

Suntee Liu / Specialist

**Approved by :** _____ , **Date:** Dec. 27, 2016

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 ($mW/cm^2$) | 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 $mW/cm^2$

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 29cm away from the body of the user. So, this device is classified as Mobile Device.

## 3 Calculation Result of Maximum Conducted Power

CDD Mode

| Band | Modulation type | Frequency (MHz) | Max Power (dBm) | Antenna Gain (dBi) | Distance (cm) | Power Density ($mW/cm^2$) | Limit ($mW/cm^2$) |
|---|---|---|---|---|---|---|---|
| 2412~2462Hz | 802.11b | 2412 | 25.56 | 7.16 | 29 | 0.177 | 1 |
| | | 2437 | 27.25 | 7.69 | 29 | 0.295 | 1 |
| | | 2462 | 25.53 | 8.27 | 29 | 0.227 | 1 |
| | 802.11g | 2412 | 22.85 | 7.16 | 29 | 0.095 | 1 |
| | | 2437 | 27.36 | 7.69 | 29 | 0.303 | 1 |
| | | 2462 | 24.06 | 8.27 | 29 | 0.162 | 1 |
| | 802.11n (HT20) | 2412 | 21.71 | 7.16 | 29 | 0.073 | 1 |
| | | 2437 | 27.50 | 7.69 | 29 | **0.313** | 1 |
| | | 2462 | 21.95 | 8.27 | 29 | 0.100 | 1 |
| | 802.11n (HT40) | 2422 | 19.31 | 7.30 | 29 | 0.043 | 1 |
| | | 2437 | 21.68 | 7.69 | 29 | 0.082 | 1 |
| | | 2452 | 19.88 | 8.07 | 29 | 0.059 | 1 |
| 5180~5240MHz | 802.11a | 5180 | 27.13 | 8.60 | 29 | 0.354 | 1 |
| | | 5200 | 28.04 | 8.76 | 29 | 0.453 | 1 |
| | | 5240 | 27.39 | 9.01 | 29 | 0.413 | 1 |
| | 802.11ac (VHT20) | 5180 | 27.11 | 8.60 | 29 | 0.352 | 1 |
| | | 5200 | 27.90 | 8.76 | 29 | 0.439 | 1 |
| | | 5240 | 27.20 | 9.01 | 29 | 0.395 | 1 |
| | 802.11ac (VHT40) | 5190 | 25.66 | 8.64 | 29 | 0.255 | 1 |
| | | 5230 | 27.46 | 8.89 | 29 | 0.408 | 1 |
| | 802.11ac (VHT80) | 5210 | 25.76 | 8.87 | 29 | 0.275 | 1 |
| 5250~5350MHz | 802.11a | 5260 | 20.35 | 9.01 | 29 | 0.082 | 1 |
| | | 5300 | 20.43 | 8.98 | 29 | 0.083 | 1 |
| | | 5320 | 20.41 | 9.08 | 29 | 0.084 | 1 |
| | 802.11ac (VHT20) | 5260 | 20.51 | 9.01 | 29 | 0.085 | 1 |
| | | 5300 | 20.54 | 8.98 | 29 | 0.085 | 1 |
| | | 5320 | 20.48 | 9.08 | 29 | 0.086 | 1 |
| | 802.11ac (VHT40) | 5270 | 22.00 | 9.01 | 29 | 0.119 | 1 |
| | | 5310 | 21.44 | 9.08 | 29 | 0.107 | 1 |
| | 802.11ac (VHT80) | 5290 | 21.01 | 8.98 | 29 | 0.094 | 1 |
| 5470~5725MHz | 802.11a | 5500 | 20.48 | 8.97 | 29 | 0.083 | 1 |
| | | 5580 | 20.42 | 9.13 | 29 | 0.085 | 1 |
| | | 5700 | 20.49 | 9.41 | 29 | 0.092 | 1 |
| | 802.11ac (VHT20) | 5500 | 20.44 | 8.97 | 29 | 0.083 | 1 |
| | | 5580 | 20.48 | 9.13 | 29 | 0.086 | 1 |
| | | 5700 | 20.47 | 9.41 | 29 | 0.092 | 1 |
| | 802.11ac (VHT40) | 5510 | 21.27 | 9.05 | 29 | 0.102 | 1 |
| | | 5550 | 21.76 | 9.28 | 29 | 0.120 | 1 |
| | | 5670 | 22.22 | 9.39 | 29 | 0.137 | 1 |
| | 802.11ac (VHT80) | 5530 | 23.87 | 9.17 | 29 | 0.191 | 1 |
| | | 5610 | 23.75 | 9.31 | 29 | 0.191 | 1 |
| 5745~5825MHz | 802.11a | 5745 | 28.77 | 9.39 | 29 | 0.619 | 1 |
| | | 5785 | 28.76 | 9.56 | 29 | 0.643 | 1 |
| | | 5825 | 28.76 | 9.63 | 29 | 0.653 | 1 |
| | 802.11ac (VHT20) | 5745 | 28.72 | 9.39 | 29 | 0.612 | 1 |
| | | 5785 | 28.73 | 9.56 | 29 | 0.638 | 1 |
| | | 5825 | 28.75 | 9.63 | 29 | 0.652 | 1 |
| | 802.11ac (VHT40) | 5755 | 28.79 | 9.47 | 29 | 0.634 | 1 |
| | | 5795 | 28.80 | 9.61 | 29 | **0.656** | 1 |
| | 802.11ac (VHT80) | 5775 | 28.71 | 9.56 | 29 | 0.635 | 1 |

Beamforming Mode

| Band | Modulation type | Frequency (MHz) | Max Power (dBm) | Antenna Gain (dBi) | Distance (cm) | Power Density ($mW/cm^2$) | Limit ($mW/cm^2$) |
|---|---|---|---|---|---|---|---|
| 5180~5240MHz | 802.11ac (VHT20) | 5180 | 26.99 | 8.60 | 29 | 0.343 | 1 |
| | | 5200 | 26.99 | 8.76 | 29 | 0.356 | 1 |
| | | 5240 | 26.89 | 9.01 | 29 | 0.368 | 1 |
| | 802.11ac (VHT40) | 5190 | 25.43 | 8.64 | 29 | 0.242 | 1 |
| | | 5230 | 27.07 | 8.89 | 29 | 0.373 | 1 |
| | 802.11ac (VHT80) | 5210 | 25.26 | 8.87 | 29 | 0.245 | 1 |
| 5250~5350MHz | 802.11ac (VHT20) | 5260 | 20.51 | 9.01 | 29 | 0.085 | 1 |
| | | 5300 | 20.54 | 8.98 | 29 | 0.085 | 1 |
| | | 5320 | 20.48 | 9.08 | 29 | 0.086 | 1 |
| | 802.11ac (VHT40) | 5270 | 20.50 | 9.01 | 29 | 0.085 | 1 |
| | | 5310 | 20.44 | 9.08 | 29 | 0.085 | 1 |
| | 802.11ac (VHT80) | 5290 | 19.73 | 8.98 | 29 | 0.070 | 1 |
| 5470~5725MHz | 802.11ac (VHT20) | 5500 | 20.44 | 8.97 | 29 | 0.083 | 1 |
| | | 5580 | 20.48 | 9.13 | 29 | 0.086 | 1 |
| | | 5700 | 20.47 | 9.41 | 29 | 0.092 | 1 |
| | 802.11ac (VHT40) | 5510 | 20.71 | 9.05 | 29 | 0.090 | 1 |
| | | 5550 | 20.66 | 9.28 | 29 | 0.093 | 1 |
| | | 5670 | 20.58 | 9.39 | 29 | 0.094 | 1 |
| | 802.11ac (VHT80) | 5530 | 20.68 | 9.17 | 29 | 0.091 | 1 |
| | | 5610 | 20.63 | 9.31 | 29 | 0.093 | 1 |
| 5745~5825MHz | 802.11ac (VHT20) | 5745 | 26.42 | 9.39 | 29 | 0.361 | 1 |
| | | 5785 | 26.43 | 9.56 | 29 | 0.376 | 1 |
| | | 5825 | 26.34 | 9.63 | 29 | 0.374 | 1 |
| | 802.11ac (VHT40) | 5755 | 26.49 | 9.47 | 29 | 0.373 | 1 |
| | | 5795 | 26.38 | 9.61 | 29 | 0.376 | 1 |
| | 802.11ac (VHT80) | 5775 | 26.41 | 9.56 | 29 | 0.374 | 1 |

Note:

2412MHz: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N] = 7.16dBi$

2437MHz: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N] = 7.69dBi$

2462MHz: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N] = 8.27dBi$

2422MHz: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N] = 7.30dBi$

2452MHz: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N] = 8.07dBi$

5180MHz: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N] = 8.60dBi$

5200MHz: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N] = 8.76dBi$

5240MHz: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N] = 9.01dBi$

5190MHz: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N] = 8.64dBi$

5230MHz: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N] = 8.89dBi$

5210MHz: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N] = 8.87dBi$

5260MHz: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N] = 9.01dBi$

5300MHz: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N] = 8.98dBi$

5320MHz: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N] = 9.08dBi$

5270MHz: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N] = 9.01dBi$

5310MHz: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N] = 9.08dBi$

5290MHz: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N] = 8.98dBi$

5500MHz: Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)$^2$/N] = 8.97dBi
5580MHz: Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)$^2$/N] = 9.13dBi
5700MHz: Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)$^2$/N] = 9.41dBi
5510MHz: Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)$^2$/N] = 9.05dBi
5550MHz: Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)$^2$/N] = 9.28dBi
5670MHz: Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)$^2$/N] = 9.39dBi
5530MHz: Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)$^2$/N] = 9.17dBi
5610MHz: Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)$^2$/N] = 9.31dBi
5745MHz: Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)$^2$/N] = 9.39dBi
5785MHz: Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)$^2$/N] = 9.56dBi
5825MHz: Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)$^2$/N] = 9.63dBi
5755MHz: Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)$^2$/N] = 9.47dBi
5795MHz: Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)$^2$/N] = 9.61dBi
5775MHz: Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)$^2$/N] = 9.56dBi

**Conclusion:**
The formula of calculated the MPE is:
CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1
CPD = Calculation power density
LPD = Limit of power density

WLAN 2.4GHz + WLAN 5GHz = 0.313 + 0.656 = 0.969 < 1

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