

## RF Exposure Report

**Report No.:** SA150826C05A

**FCC ID:** PY315100319

**Test Model:** R7800

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

**Test Date:** Dec. 23, 2015 ~ May 26, 2016

**Issued Date:** Jun. 04, 2016

**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

**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
SA150826C05A	Original release.	Jun. 04, 2016

## 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:** Dec. 23, 2015 ~ May 26, 2016

**Standards:** FCC Part 2 (Section 2.1091)  
KDB 447498 D01 (October 23, 2015)  
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:** Jun. 04, 2016  
Polly Chien / Specialist

**Approved by :**  , **Date:** Jun. 04, 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 <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	<b>0.401</b>	1
		2437	27.13	6.13	29	0.200	1
	802.11n (HT20)	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 (HT40)	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-2A)	802.11a	5260	22.83	6.93	29	0.090	1
		5300	22.85	7.13	29	0.094	1
		5320	22.77	7.13	29	0.092	1
	802.11n (HT20)	5260	22.68	6.93	29	0.086	1
		5300	22.70	7.13	29	0.091	1
		5320	22.74	7.13	29	0.092	1
	802.11n (HT40)	5270	23.60	7.03	29	0.109	1
		5310	23.85	7.13	29	0.119	1
	802.11ac (VHT80)	5290	20.46	7.13	29	0.054	1
5GHz (U-NII-2C)	802.11a	5500	22.86	7.53	29	0.104	1
		5580	22.72	7.53	29	0.100	1
		5700	22.73	7.53	29	0.100	1
	802.11n (HT20)	5500	22.97	7.53	29	0.106	1
		5580	22.65	7.53	29	0.099	1
		5700	22.68	7.53	29	0.099	1
	802.11n (HT40)	5510	23.86	7.63	29	<b>0.133</b>	1
		5550	23.80	7.53	29	0.129	1
		5670	23.81	7.63	29	0.132	1
	802.11ac (VHT80)	5530	22.37	7.63	29	0.095	1
		5610	23.71	7.53	29	0.126	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-2A)	802.11ac (VHT80+VHT80)	5210	22.79	3.82	29	0.043	0.090	1
		5290	22.82	4.12		0.047		
5GHz (U-NII-2A & U-NII-2C)		5530	20.59	4.62	29	0.031	0.031	1
		5610	20.56	4.52	29	0.030		
5GHz (U-NII-2C & U-NII-3)	802.11ac (VHT80+VHT80)	5690	17.58	4.52	29	0.015	0.015	1
		5690	4.84	4.52		0.001	0.031	
		5775	20.49	4.52		0.030		

**Note:**

- 2412MHz: Directional gain = 0.21dBi + 10log(4) = 6.23dBi
- 2422MHz: Directional gain = 0.41dBi + 10log(4) = 6.43dBi
- 2437MHz: Directional gain = 0.41dBi + 10log(4) = 6.43dBi
- 2452MHz: Directional gain = 0.21dBi + 10log(4) = 6.23dBi
- 2462MHz: Directional gain = 0.11dBi + 10log(4) = 6.13dBi
- 5210MHz: Directional gain = 1.11dBi + 10log(4) = 7.13dBi
- 5260MHz: Directional gain = 0.91dBi + 10log(4) = 6.93dBi
- 5270MHz: Directional gain = 1.01dBi + 10log(4) = 7.03dBi
- 5290MHz: Directional gain = 1.11dBi + 10log(4) = 7.13dBi
- 5300MHz: Directional gain = 1.11dBi + 10log(4) = 7.13dBi
- 5310MHz: Directional gain = 1.11dBi + 10log(4) = 7.13dBi
- 5320MHz: Directional gain = 1.11dBi + 10log(4) = 7.13dBi
- 5500MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi
- 5510MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi
- 5530MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi
- 5550MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi
- 5580MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi
- 5610MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi
- 5670MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi
- 5700MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi

**\*802.11ac (VHT80+VHT80):**

- 5210MHz: Directional gain = 0.81dBi + 10log(4/2) = 3.82dBi
- 5290MHz: Directional gain = 1.11dBi + 10log(4/2) = 4.12dBi
- 5530MHz: Directional gain = 1.61dBi + 10log(4/2) = 4.62dBi
- 5610MHz: Directional gain = 1.51dBi + 10log(4/2) = 4.52dBi
- 5690MHz: Directional gain = 1.51dBi + 10log(4/2) = 4.52dBi
- 5575MHz: Directional gain = 1.51dBi + 10log(4/2) = 4.52dBi

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 (HT20)	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 (HT40)	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-2A)	802.11n (HT20)	5260	23.07	6.93	29	0.095	1
		5300	22.87	7.13	29	0.095	1
		5320	22.87	7.13	29	0.095	1
	802.11n (HT40)	5270	22.66	7.03	29	0.088	1
		5310	22.85	7.13	29	0.094	1
	802.11ac (VHT80)	5290	20.46	7.13	29	0.054	1
5GHz (U-NII-2C)	802.11n (HT20)	5500	22.47	7.53	29	0.095	1
		5580	22.47	7.53	29	0.095	1
		5700	22.47	7.53	29	0.095	1
	802.11n (HT40)	5510	22.34	7.63	29	0.094	1
		5550	22.31	7.53	29	0.091	1
		5670	22.34	7.63	29	0.094	1
	802.11ac (VHT80)	5530	22.31	7.63	29	0.093	1
		5610	22.22	7.53	29	0.089	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-2A)	802.11ac (VHT80+VHT80)	5210	22.82	3.82	29	0.044	0.091	1
		5290	22.81	4.12		0.047		
5GHz (U-NII-2A & U-NII-2C)	802.11ac (VHT80+VHT80)	5530	19.24	4.62	29	0.023	0.045	1
		5610	19.23	4.52	29	0.022		
5GHz (U-NII-2C & U-NII-3)	802.11ac (VHT80+VHT80)	5690	17.64	4.52	29	0.016	0.016	1
		5690	4.73	4.52		0.001	0.029	
		5775	20.23	4.52		0.028		

**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 =  $0.11\text{dBi} + 10\log(4) = 6.13\text{dBi}$   
 5260MHz: Directional gain =  $0.91\text{dBi} + 10\log(4) = 6.93\text{dBi}$   
 5270MHz: Directional gain =  $1.01\text{dBi} + 10\log(4) = 7.03\text{dBi}$   
 5290MHz: Directional gain =  $1.11\text{dBi} + 10\log(4) = 7.13\text{dBi}$   
 5300MHz: Directional gain =  $1.11\text{dBi} + 10\log(4) = 7.13\text{dBi}$   
 5310MHz: Directional gain =  $1.11\text{dBi} + 10\log(4) = 7.13\text{dBi}$   
 5320MHz: Directional gain =  $1.11\text{dBi} + 10\log(4) = 7.13\text{dBi}$   
 5500MHz: Directional gain =  $1.51\text{dBi} + 10\log(4) = 7.53\text{dBi}$   
 5510MHz: Directional gain =  $1.61\text{dBi} + 10\log(4) = 7.63\text{dBi}$   
 5530MHz: Directional gain =  $1.61\text{dBi} + 10\log(4) = 7.63\text{dBi}$   
 5550MHz: Directional gain =  $1.61\text{dBi} + 10\log(4) = 7.63\text{dBi}$   
 5580MHz: Directional gain =  $1.51\text{dBi} + 10\log(4) = 7.53\text{dBi}$   
 5610MHz: Directional gain =  $1.51\text{dBi} + 10\log(4) = 7.53\text{dBi}$   
 5670MHz: Directional gain =  $1.61\text{dBi} + 10\log(4) = 7.63\text{dBi}$   
 5700MHz: Directional gain =  $1.51\text{dBi} + 10\log(4) = 7.53\text{dBi}$

**\*802.11ac (VHT80+VHT80):**

5210MHz: Directional gain =  $0.81\text{dBi} + 10\log(4/2) = 3.82\text{dBi}$   
 5290MHz: Directional gain =  $1.11\text{dBi} + 10\log(4/2) = 4.12\text{dBi}$   
 5530MHz: Directional gain =  $1.61\text{dBi} + 10\log(4/2) = 4.62\text{dBi}$   
 5610MHz: Directional gain =  $1.51\text{dBi} + 10\log(4/2) = 4.52\text{dBi}$   
 5690MHz: Directional gain =  $1.51\text{dBi} + 10\log(4/2) = 4.52\text{dBi}$   
 5575MHz: Directional gain =  $1.51\text{dBi} + 10\log(4/2) = 4.52\text{dBi}$

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 (HT20)	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 (HT40)	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-2A)	802.11n (HT20)	5260	22.67	3.92	29	0.043	1
		5300	22.70	4.12	29	0.045	1
		5320	22.73	4.12	29	0.046	1
	802.11n (HT40)	5270	23.66	4.02	29	0.055	1
		5310	23.84	4.12	29	0.059	1
	802.11ac (VHT80)	5290	20.45	4.12	29	0.027	1
5GHz (U-NII-2C)	802.11n (HT20)	5500	22.85	4.52	29	0.052	1
		5580	22.67	4.52	29	0.050	1
		5700	22.85	4.52	29	0.052	1
	802.11n (HT40)	5510	23.87	4.62	29	0.067	1
		5550	23.78	4.62	29	0.065	1
		5670	23.81	4.62	29	0.066	1
	802.11ac (VHT80)	5530	22.38	4.62	29	0.047	1
		5610	23.69	4.52	29	0.063	1

**Note:**

2412MHz: Directional gain =  $0.21\text{dBi} + 10\log(4/2) = 3.22\text{dBi}$   
 2422MHz: Directional gain =  $0.41\text{dBi} + 10\log(4/2) = 3.42\text{dBi}$   
 2437MHz: Directional gain =  $0.41\text{dBi} + 10\log(4/2) = 3.42\text{dBi}$   
 2452MHz: Directional gain =  $0.21\text{dBi} + 10\log(4/2) = 3.22\text{dBi}$   
 2462MHz: Directional gain =  $0.11\text{dBi} + 10\log(4/2) = 3.12\text{dBi}$   
 5260MHz: Directional gain =  $0.91\text{dBi} + 10\log(4/2) = 3.92\text{dBi}$   
 5270MHz: Directional gain =  $1.01\text{dBi} + 10\log(4/2) = 4.02\text{dBi}$   
 5290MHz: Directional gain =  $1.11\text{dBi} + 10\log(4/2) = 4.12\text{dBi}$   
 5300MHz: Directional gain =  $1.11\text{dBi} + 10\log(4/2) = 4.12\text{dBi}$   
 5310MHz: Directional gain =  $1.11\text{dBi} + 10\log(4/2) = 4.12\text{dBi}$   
 5320MHz: Directional gain =  $1.11\text{dBi} + 10\log(4/2) = 4.12\text{dBi}$   
 5500MHz: Directional gain =  $1.51\text{dBi} + 10\log(4/2) = 4.52\text{dBi}$   
 5510MHz: Directional gain =  $1.61\text{dBi} + 10\log(4/2) = 4.62\text{dBi}$   
 5550MHz: Directional gain =  $1.61\text{dBi} + 10\log(4/2) = 4.62\text{dBi}$   
 5530MHz: Directional gain =  $1.61\text{dBi} + 10\log(4/2) = 4.62\text{dBi}$   
 5580MHz: Directional gain =  $1.51\text{dBi} + 10\log(4/2) = 4.52\text{dBi}$   
 5610MHz: Directional gain =  $1.51\text{dBi} + 10\log(4/2) = 4.52\text{dBi}$   
 5670MHz: Directional gain =  $1.61\text{dBi} + 10\log(4/2) = 4.62\text{dBi}$   
 5700MHz: Directional gain =  $1.51\text{dBi} + 10\log(4/2) = 4.52\text{dBi}$

**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

$$\text{WLAN 2.4G} + \text{WLAN 5.0G} = 0.401 + 0.133 = 0.534$$

Therefore, the maximum calculation of this situation is 0.534, which is less than the "1" limit.

**---END---**