

## 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 :** Polly Chien , **Date:** Oct. 30, 2015  
Polly Chien / Specialist

**Approved by :** Ken Liu , **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> )
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 =  $0.21\text{dBi} + 10\log(4/2) = 3.22\text{dBi}$   
 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 =  $0.11\text{dBi} + 10\log(4/2) = 3.12\text{dBi}$   
 5180MHz: Directional gain =  $0.61\text{dBi} + 10\log(4/2) = 3.62\text{dBi}$   
 5190MHz: Directional gain =  $0.71\text{dBi} + 10\log(4/2) = 3.72\text{dBi}$   
 5200MHz: Directional gain =  $0.71\text{dBi} + 10\log(4/2) = 3.72\text{dBi}$   
 5210MHz: Directional gain =  $0.81\text{dBi} + 10\log(4/2) = 3.82\text{dBi}$   
 5230MHz: Directional gain =  $0.91\text{dBi} + 10\log(4/2) = 3.92\text{dBi}$   
 5240MHz: Directional gain =  $0.91\text{dBi} + 10\log(4/2) = 3.92\text{dBi}$   
 5745MHz: Directional gain =  $1.61\text{dBi} + 10\log(4/2) = 4.62\text{dBi}$   
 5755MHz: Directional gain =  $1.51\text{dBi} + 10\log(4/2) = 4.52\text{dBi}$   
 5775MHz: Directional gain =  $1.51\text{dBi} + 10\log(4/2) = 4.52\text{dB}$   
 5785MHz: Directional gain =  $1.51\text{dBi} + 10\log(4/2) = 4.52\text{dBi}$   
 5795MHz: Directional gain =  $1.61\text{dBi} + 10\log(4/2) = 4.62\text{dBi}$   
 5825MHz: Directional gain =  $1.61\text{dBi} + 10\log(4/2) = 4.62\text{dB}$

**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

$$\text{WLAN 2.4G} + \text{WLAN 5.0G} = 0.401 + 0.547 = 0.948$$

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

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