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^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

Band	Modulation type	Frequency Channel (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
	CDD Mode						
2.4GHz	802.11b	2412	29.89	6.23	29	0.387	1
		2422	29.84	6.43	29	**0.401**	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	**0.401**	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	**0.547**	1
	802.11n(40MHz)	5755	29.81	7.53	29	0.513	1
		5795	29.99	7.63	29	**0.547**	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^2)	Total Power Density (mW/cm^2)	Limit (mW/cm^2)
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 = 0.21dBi + 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
5180MHz: Directional gain = 0.61dBi + 10log(4) = 6.63dBi
5190MHz: Directional gain = 0.71dBi + 10log(4) = 6.73dBi
5200MHz: Directional gain = 0.71dBi + 10log(4) = 6.73dBi
5210MHz: Directional gain = 0.81dBi + 10log(4) = 6.83dBi
5230MHz: Directional gain = 0.91dBi + 10log(4) = 6.93dBi
5240MHz: Directional gain = 0.91dBi + 10log(4) = 6.93dBi
5745MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi
5755MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi
5775MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi
5785MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi
5795MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi
5825MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi

Band	Modulation type	Frequency Channel (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
	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^2)	Total Power Density (mW/cm^2)	Limit (mW/cm^2)
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 = 0.21dBi + 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
5180MHz: Directional gain = 0.61dBi + 10log(4) = 6.63dBi
5190MHz: Directional gain = 0.71dBi + 10log(4) = 6.73dBi
5200MHz: Directional gain = 0.71dBi + 10log(4) = 6.73dBi
5210MHz: Directional gain = 0.81dBi + 10log(4) = 6.83dBi
5230MHz: Directional gain = 0.91dBi + 10log(4) = 6.93dBi
5240MHz: Directional gain = 0.91dBi + 10log(4) = 6.93dBi
5745MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi
5755MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi
5775MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi
5785MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi
5795MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi
5825MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi

Band	Modulation type	Frequency Channel (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
	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

CONCULSION:

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

CPD1 / LPD1 + CPD2 / LPD2 + ……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.

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