

RF Exposure Report

Report No.: SA160809C28Q

FCC ID: PY317400405

Test Model: R9000

Series Model: R8900

Received Date: Apr. 26, 2018

Test Date: Apr. 28 ~ May 09, 2018

Issued Date: May 10, 2018

Applicant: NETGEAR, INC.

Address: 350 E. Plumeria Drive, San Jose CA 95134, USA

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

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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
SA160809C28Q	Original release.	May 10, 2018

1 Certificate of Conformity

Product: AD7200 Smart WiFi Router

Brand: NETGEAR

Test Model: R9000

Series Model: R8900

Sample Status: Engineering sample

Applicant: NETGEAR, INC.

Test Date: Apr. 28 ~ May 09, 2018

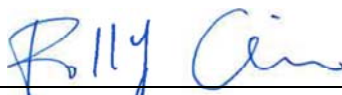
Standards: FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

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 :


Polly Chien / Specialist

Date:

May 10, 2018

Approved by :


Bruce Chen / Project Engineer

Date:

May 10, 2018

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

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

where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 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 28cm 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	28.83	3.6	28	0.178	1
		2437	28.86	3.6	28	0.179	1
		2462	28.91	3.6	28	0.181	1
	802.11g	2412	25.65	3.6	28	0.085	1
		2437	29.55	3.6	28	0.210	1
		2462	26.25	3.6	28	0.098	1
	802.11n (HT20)	2412	25.31	3.6	28	0.079	1
		2437	29.38	3.6	28	0.202	1
		2462	25.84	3.6	28	0.089	1
	802.11n (HT40)	2422	22.13	3.6	28	0.038	1
		2437	26.06	3.6	28	0.094	1
		2452	24.08	3.6	28	0.059	1
5GHz (U-NII-1)	802.11a	5180	26.66	5.18	28	0.155	1
		5200	29.54	5.18	28	0.301	1
		5240	29.51	5.18	28	0.299	1
	802.11ac (VHT20)	5180	26.34	5.18	28	0.144	1
		5200	29.54	5.18	28	0.301	1
		5240	29.45	5.18	28	0.295	1
	802.11ac (VHT40)	5190	26.23	5.18	28	0.140	1
		5230	29.21	5.18	28	0.279	1
	802.11ac (VHT80)	5210	24.27	5.18	28	0.089	1
5GHz (U-NII-2A)	802.11a	5260	23.12	5.18	28	0.069	1
		5300	23.14	5.18	28	0.069	1
		5320	23.14	5.18	28	0.069	1
	802.11ac (VHT20)	5260	23.12	5.18	28	0.069	1
		5300	23.35	5.18	28	0.072	1
		5320	23.31	5.18	28	0.072	1
	802.11ac (VHT40)	5270	23.84	5.18	28	0.081	1
		5310	23.78	5.18	28	0.080	1
	802.11ac (VHT80)	5290	20.49	5.18	28	0.037	1

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							
5GHz (U-NII-2C)	802.11a	5500	23.13	5.18	28	0.069	1
		5580	23.12	5.18	28	0.069	1
		5700	23.13	5.18	28	0.069	1
	802.11ac (VHT20)	5500	23.33	5.18	28	0.072	1
		5580	23.32	5.18	28	0.072	1
		5700	23.33	5.18	28	0.072	1
	802.11ac (VHT40)	5510	23.97	5.18	28	0.083	1
		5550	23.74	5.18	28	0.079	1
		5670	23.66	5.18	28	0.078	1
	802.11ac (VHT80)	5530	23.87	5.18	28	0.082	1
		5610	23.85	5.18	28	0.081	1
5GHz (U-NII-3)	802.11a	5745	29.64	5.18	28	0.308	1
		5785	29.50	5.18	28	0.298	1
		5825	29.68	5.18	28	0.311	1
	802.11ac (VHT20)	5745	29.39	5.18	28	0.291	1
		5785	29.47	5.18	28	0.296	1
		5825	29.67	5.18	28	0.310	1
	802.11ac (VHT40)	5755	29.34	5.18	28	0.287	1
		5795	29.43	5.18	28	0.293	1
	802.11ac (VHT80)	5775	27.75	5.18	28	0.199	1

For 802.11ac (VHT80+ VHT80)

Channel	Frequency (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
CDD Mode						
42+58	5210	21.14	3.58	28	0.030	1
	5290	21.75	3.58	28	0.035	1
42+106	5210	21.14	3.58	28	0.030	1
	5530	21.57	3.58	28	0.033	1
42+122	5210	21.14	3.58	28	0.030	1
	5610	21.56	3.58	28	0.033	1
42+155	5210	21.14	3.58	28	0.030	1
	5775	21.08	3.58	28	0.030	1
58+155	5290	23.46	3.58	28	0.051	1
	5775	23.47	3.58	28	0.051	1
106+155	5530	23.44	3.58	28	0.051	1
	5775	23.47	3.58	28	0.051	1
122+155	5610	23.39	3.58	28	0.051	1
	5775	23.47	3.58	28	0.051	1

Band	Modulation type	Frequency Channel (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
Beamforming Mode							
2.4GHz	802.11n (HT20)	2412	25.31	3.6	28	0.114	1
		2437	28.85	3.6	28	0.257	1
		2462	24.92	3.6	28	0.104	1
	802.11n (HT40)	2422	22.13	3.6	28	0.055	1
		2437	26.06	3.6	28	0.135	1
		2452	24.08	3.6	28	0.086	1
5GHz (U-NII-1)	802.11ac (VHT20)	5180	26.34	5.18	28	0.144	1
		5200	29.54	5.18	28	0.301	1
		5240	29.45	5.18	28	0.295	1
	802.11ac (VHT40)	5190	25.20	5.18	28	0.111	1
		5230	29.21	5.18	28	0.279	1
	802.11ac (VHT80)	5210	24.27	5.18	28	0.089	1
5GHz (U-NII-2A)	802.11ac (VHT20)	5260	23.12	5.18	28	0.069	1
		5300	23.35	5.18	28	0.072	1
		5320	23.31	5.18	28	0.072	1
	802.11ac (VHT40)	5270	23.84	5.18	28	0.081	1
		5310	23.78	5.18	28	0.080	1
	802.11ac (VHT80)	5290	20.49	5.18	28	0.037	1
5GHz (U-NII-2C)	802.11ac (VHT20)	5500	23.33	5.18	28	0.072	1
		5580	23.32	5.18	28	0.072	1
		5700	23.33	5.18	28	0.072	1
	802.11ac (VHT40)	5510	23.97	5.18	28	0.083	1
		5550	23.74	5.18	28	0.079	1
		5670	23.66	5.18	28	0.078	1
	802.11ac (VHT80)	5530	23.87	5.18	28	0.082	1
		5610	23.85	5.18	28	0.081	1
5GHz (U-NII-3)	802.11ac (VHT20)	5745	29.39	5.18	28	0.291	1
		5785	29.47	5.18	28	0.296	1
		5825	29.67	5.18	28	0.310	1
	802.11ac (VHT40)	5755	29.34	5.18	28	0.287	1
		5795	29.43	5.18	28	0.293	1
	802.11ac (VHT80)	5775	27.75	5.18	28	0.199	1

For 802.11ac (VHT80+ VHT80)

Channel	Frequency (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
Beamforming Mode						
42+58	5210	21.14	3.58	28	0.030	1
	5290	21.75	3.58	28	0.035	1
42+106	5210	21.14	3.58	28	0.030	1
	5530	21.57	3.58	28	0.033	1
42+122	5210	21.14	3.58	28	0.030	1
	5610	21.56	3.58	28	0.033	1
42+155	5210	21.14	3.58	28	0.030	1
	5775	21.08	3.58	28	0.030	1
58+155	5290	23.46	3.58	28	0.051	1
	5775	23.47	3.58	28	0.051	1
106+155	5530	23.44	3.58	28	0.051	1
	5775	23.47	3.58	28	0.051	1
122+155	5610	23.39	3.58	28	0.051	1
	5775	23.47	3.58	28	0.051	1

Note: The EUT uses following antennas.

Ant. Type	Dipole					
Connector Type	I-PEX					
Frequency	TX Function			Directional Antenna Gain (dBi)		
2400 ~ 2483.5 MHz	4TX			3.6		
5150 ~ 5350 MHz	4TX			5.18		
5470 ~ 5725 MHz	4TX			5.18		
5725 ~ 5825 MHz	4TX			5.18		
5150 ~ 5825 MHz	2TX+2TX (VHT80+VHT80)			3.58		

Modulation type	Frequency Channel	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
WLAN 60GHz 802.11ad	60.48 GHz	15.80	14.000	28	0.097	1

Note: WLAN 60GHz 802.11ad uses following antenna:

Ant. Type	Connector Type	Antenna Gain (dBi)
phased-array	I-PEX	14.000

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

$WLAN\ 2.4G + WLAN\ 5.0G + WLAN\ 60GHz\ 802.11ad = 0.257 + 0.311 + 0.097 = 0.665$

Therefore, the maximum calculation of this situation is 0.665, which is less than the "1" limit.

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