

RF Exposure Report

Report No.: SA161229C25G

FCC ID: PY317400404

Test Model: RBR40

Series Model: RBS40

Received Date: Dec. 22, 2016

Test Date: Dec. 23, 2016 ~ Mar. 15, 2017

Issued Date: Feb. 02, 2018

Applicant: NETGEAR, INC.

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

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Release Control Record

Issue No.	Description	Date Issued
SA161229C25G	Original release	Feb. 02, 2018

1 Certificate of Conformity

Product: Orbi Router, Orbi Satellite
Brand: NETGEAR
Test Model: RBR40
Series Model: RBS40
Sample Status: Engineering sample
Applicant: NETGEAR, INC.
Test Date: Dec. 23, 2016 ~ Mar. 15, 2017
Standards: FCC Part 2 (Section 2.1091)
 KDB 447498 D03 (January 17, 2014)
 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:** Feb. 02, 2018
 Pettie Chen / Senior Specialist

Approved by :  , **Date:** Feb. 02, 2018
 Bruce Chen / Project Engineer

Note: All models are electrically identical except software firmware. Model: RBR40 is the representative for final test.

Brand	Product Name	Model	Function	Band	RF Module	Difference
NETGEAR	Orbi Router	RBR40	Router	2.4G/ U-NII-2C/ UNII-3	Module 1	1. Master mode only
				UNII-1/ U-NII-2A	Module 2	2. With internet function
	Orbi Satellite	RBS40	Satellite	2.4G/ U-NII-2C / UNII-3	Module 1	Master mode and Client mode for 2.4GHz
				UNII-1/ U-NII-2A	Module 2	Client mode for U-NII-2C, UNII-3 Master mode only for UNII-1, U-NII-2A

*RBK40= RBR40 + RBS40

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/cm²

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 31cm away from the body of the user. So, this device is classified as **Mobile Device**.

3 Calculation Result of Maximum Conducted Power

Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
WLAN					
CDD Mode					
2412-2462	29.86	5.75	31	0.301	1
5180-5240	29.41	6.62	31	0.332	1
5260-5320	23.68	6.56	31	0.100	1
5500-5700	23.67	6.51	31	0.099	1
5745-5825	29.45	6.70	31	0.341	1
Beamforming Mode					
2412-2462	29.64	5.75	31	0.286	1
5180-5240	29.32	6.62	31	0.325	1
5260-5320	23.42	6.56	31	0.094	1
5500-5700	23.47	6.51	31	0.094	1
5745-5825	29.25	6.70	31	0.326	1

Note:

2.4GHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2]$ = 5.75dBi

5.0GHz:

For U-NII-1: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2]$ = 6.62dBi

For U-NII-2A: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2]$ = 6.56dBi

For U-NII-2C: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2]$ = 6.51dBi

For U-NII-3: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2]$ = 6.70dBi

Conclusion:

The formula of calculated the MPE is:

$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$

CPD = Calculation power density

LPD = Limit of power density

The simultaneous operation mode was determined by client.

No	Mode
1	WLAN 2.4GHz + WLAN 5GHz B2
2	WLAN 2.4GHz + WLAN 5GHz B3
3	WLAN 5GHz B2 + WLAN 5GHz B3
4	WLAN 5GHz B2 + WLAN 5GHz B4
5	WLAN 5GHz B1 + WLAN 5GHz B3
6	WLAN 2.4GHz + WLAN 5GHz B2 + WLAN 5GHz B4
7	WLAN 2.4GHz + WLAN 5GHz B1 + WLAN 5GHz B3
8	WLAN 2.4GHz + WLAN 5GHz B2 + WLAN 5GHz B3

1. $WLAN\ 2.4GHz + WLAN\ 5GHz\ B2 = 0.301 + 0.100 = 0.401$

2. $WLAN\ 2.4GHz + WLAN\ 5GHz\ B3 = 0.301 + 0.099 = 0.400$

3. $WLAN\ 5GHz\ B2 + WLAN\ 5GHz\ B3 = 0.100 + 0.099 = 0.199$

4. $WLAN\ 5GHz\ B2 + WLAN\ 5GHz\ B4 = 0.100 + 0.341 = 0.441$

5. $WLAN\ 5GHz\ B1 + WLAN\ 5GHz\ B3 = 0.332 + 0.099 = 0.431$

6. $WLAN\ 2.4GHz + WLAN\ 5GHz\ B2 + WLAN\ 5GHz\ B4 = 0.301 + 0.100 + 0.341 = 0.742$

7. $WLAN\ 2.4GHz + WLAN\ 5GHz\ B1 + WLAN\ 5GHz\ B3 = 0.301 + 0.332 + 0.099 = 0.732$

8. $WLAN\ 2.4GHz + WLAN\ 5GHz\ B2 + WLAN\ 5GHz\ B3 = 0.301 + 0.100 + 0.099 = 0.500$

Therefore all the maximum calculations of above situations are less than the "1" limit.

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