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.
Address:	350 East Plumeria Drive San Jose, CA 95134
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.)

Table of Contents

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 2. With internet function
				UNII-1/ U-NII-2A	Module 2	
	Orbi Satellite	RBS40	Satellite	2.4G/ U-NII-2C / UNII-3	Module 1	Master mode and Client mode for 2.4GHz Client mode for U-NII-2C, UNII-3
				UNII-1/ U-NII-2A	Module 2	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/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 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 = $10 \log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/2] = 5.75dBi$

5.0GHz:

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

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

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

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

Conclusion:
The formula of calculated the MPE is:
CPD1 / LPD1 + CPD2 / LPD2 + ……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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