

RF Exposure Report

Report No.: SABBQZ-WTW-P20120749

FCC ID: PY320400515

Test Model: MR5100C

Received Date: Dec. 23, 2020

Test Date: Jan. 05 ~ Feb. 17, 2021

Issued Date: Mar. 03, 2021

Applicant and Manufacturer: NETGEAR INC.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan
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**FCC Registration /
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
SABBQZ-WTW-P20120749	Original release	Mar. 03, 2021

1 Certificate of Conformity

Product: 5G MHS Travel Router

Brand: Netgear

Test Model: MR5100C

Sample Status: Engineering sample

Applicant: NETGEAR INC.

Test Date: Jan. 05 ~ Feb. 17, 2021

Standards: FCC Part 2 (Section 2.1091)
IEEE C95.3 -2002

References Test Guidance: KDB 447498 D01 General RF Exposure Guidance v06

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 RF characteristics under the conditions specified in this report.

Prepared by : Celine Chou , **Date:** Mar. 03, 2021
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Approved by : Bruce Chen , **Date:** Mar. 03, 2021
Bruce Chen / Senior Project Engineer

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 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

3 Calculation Result of Maximum Conducted Power

WLAN

Frequency Band (MHz)	Max AV Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2412-2462	12.97	6.08	20	0.016	1.00
5180-5240	12.74	4.64	20	0.011	1.00
5745-5825	12.92	5.69	20	0.014	1.00

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

2412-2462MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.08\text{dBi}$

5180-5240MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 4.64\text{dBi}$

5745-5825MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 5.69\text{dBi}$

WWAN SA Mode (External Antenna)

Band	ERP Power (dBm)	EIRP Power (dBm)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
WCDMA B2	-	21.00	20	0.025	1.00
WCDMA B5	20.75	22.90	20	0.039	0.54
LTE B2	-	19.50	20	0.018	1.00
LTE B4	-	22.00	20	0.032	1.00
LTE B5	21.10	23.25	20	0.042	0.54
LTE B7	-	20.90	20	0.024	1.00
LTE B12	18.90	21.05	20	0.025	0.46
LTE B13	18.70	20.85	20	0.024	0.51
LTE B17	18.80	20.95	20	0.025	0.47
LTE B25	-	21.50	20	0.028	1.00
LTE B30	-	19.90	20	0.019	1.00
LTE B38	-	21.00	20	0.025	1.00
LTE B41	-	21.10	20	0.026	1.00
LTE B66	-	21.80	20	0.030	1.00
LTE B71	18.90	21.05	20	0.025	0.44

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. EIRP = ERP + 2.15dB

WWAN CA Mode (External Antenna)

Band	ERP Power (dBm)	EIRP Power (dBm)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
n5	22.54	24.69	20	0.059	0.55
LTE B2	-	19.29	20	0.017	1.00
LTE B66	-	20.60	20	0.023	1.00
n25	-	22.40	20	0.035	1.00
LTE B12	18.70	20.85	20	0.024	0.46
LTE B66	-	20.80	20	0.024	1.00
n66	-	22.50	20	0.035	1.00
LTE B2	-	18.00	20	0.013	1.00
LTE B5	19.60	21.75	20	0.030	0.54
LTE B7	-	19.60	20	0.018	1.00
LTE B12	18.80	20.95	20	0.025	0.46
LTE B13	19.01	21.16	20	0.026	0.51
n71	24.10	26.25	20	0.084	0.44
LTE B2	-	18.00	20	0.013	1.00
LTE B7	-	19.70	20	0.019	1.00
LTE B66	-	20.50	20	0.022	1.00

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. EIRP = ERP + 2.15dB

Conclusion:

The formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

*WLAN 2.4G and 5G cannot transmit simultaneously.

*WLAN 2.4G and WWAN can transmit simultaneously.

*WLAN 5G and WWAN can transmit simultaneously.

WWAN CA Mode (n5A + LTE B2, B66)

$$n5 + \text{LTE B2} = 0.059 / 0.55 + 0.017 / 1.00 = 0.124$$

$$n5 + \text{LTE B66} = 0.059 / 0.55 + 0.023 / 1.00 = 0.130$$

WWAN CA Mode (n25A + LTE B12, B66)

$$n25 + \text{LTE B12} = 0.035 / 1.00 + 0.024 / 0.46 = 0.087$$

$$n25 + \text{LTE B66} = 0.035 / 1.00 + 0.024 / 1.00 = 0.059$$

WWAN CA Mode (n66A + LTE B2, B5, B7, B12, B13)

$$n66 + \text{LTE B2} = 0.035 / 1.00 + 0.013 / 1.00 = 0.048$$

$$n66 + \text{LTE B5} = 0.035 / 1.00 + 0.030 / 0.54 = 0.091$$

$$n66 + \text{LTE B7} = 0.035 / 1.00 + 0.018 / 1.00 = 0.053$$

$$n66 + \text{LTE B12} = 0.035 / 1.00 + 0.025 / 0.46 = 0.089$$

$$n66 + \text{LTE B13} = 0.035 / 1.00 + 0.026 / 0.51 = 0.086$$

WWAN CA Mode (n71A + LTE B2, B7, B66)

$$n71 + \text{LTE B2} = 0.084 / 0.44 + 0.013 / 1.00 = 0.204$$

$$n71 + \text{LTE B7} = 0.084 / 0.44 + 0.019 / 1.00 = 0.210$$

$$n71 + \text{LTE B66} = 0.084 / 0.44 + 0.022 / 1.00 = 0.213$$

WLAN + WWAN SA Mode

$$2.4\text{G} + \text{WWAN SA Mode} = 0.016 / 1.00 + 0.039 / 0.54 = 0.088$$

$$5\text{G} + \text{WWAN SA Mode} = 0.014 / 1.00 + 0.039 / 0.54 = 0.086$$

WLAN + WWAN CA Mode

$$2.4\text{G} + \text{WWAN CA Mode} = 0.016 / 1.00 + 0.084 / 0.44 + 0.022 / 1.00 = 0.229$$

$$5\text{G} + \text{WWAN CA Mode} = 0.014 / 1.00 + 0.084 / 0.44 + 0.022 / 1.00 = 0.227$$

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

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