RF Exposure Report

Report No.:	SABBQZ-WTW-P21031117
FCC ID:	PY320400515
Test Model:	MR5200
Received Date:	Mar. 31, 2021
Test Date:	Apr. 27 ~ May 09, 2021
Issued Date:	May 19, 2021
Applicant and Manufacturer:	NETGEAR INC.
Address:	350 East Plumeria Drive, San Jose, CA 95134, USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
	Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
SABBQZ-WTW-P21031117	Original release	May 19, 2021

1 Certificate of Conformity

Product:	5G MHS Travel Router
Brand:	NETGEAR
Test Model:	MR5200
Sample Status:	Engineering sample
Applicant:	NETGEAR INC.
Test Date:	Apr. 27 ~ May 09, 2021
Standards:	FCC Part 2 (Section 2.1091)
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 : Pettie Chen , **Date:** May 19, 2021

Pettie Chen / Senior Specialist

Approved by : Bruce Chen , **Date:** May 19, 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				
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	…	…	f/1500	30
1500-100,000	…	…	1.0	30

f = Frequency in MHz; *Plane-wave equivalent power density

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 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 = $10\log[(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2] = 6.08dBi$

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

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

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 B14	23.91	26.06	20	0.080	0.53
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, the Power Density value is based on EIRP.

WWAN CA Mode (External Antenna)

Band	ERP Power (dBm)	EIRP Power (dBm)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
n2	-	23.65	20	0.046	1.00
LTE B5	19.52	21.67	20	0.029	0.55
LTE B12	18.76	20.91	20	0.025	0.46
LTE B66	-	20.00	20	0.020	1.00
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
n41	-	18.15	20	0.013	1.00
LTE B2	-	18.20	20	0.013	1.00
LTE B66	-	19.90	20	0.019	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
n77	-	16.66	20	0.009	1.00
LTE B2	-	17.99	20	0.013	1.00
LTE B7	-	19.71	20	0.019	1.00
LTE B12	18.79	20.94	20	0.025	0.46
LTE B66	-	19.90	20	0.019	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, the Power Density value is based on EIRP.

Conclusion:

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 and 5G cannot transmit simultaneously.

*WLAN 2.4G and WWAN can transmit simultaneously.

*WLAN 5G and WWAN can transmit simultaneously.

WWAN CA Mode (n2A + LTE B5, B12, B66)

n2 + LTE B5 = 0.046 / 1.00 + 0.029 / 0.55 = 0.099

n2 + LTE B12 = 0.046 / 1.00 + 0.025 / 0.46 = 0.099

n2 + LTE B66 = 0.046 / 1.00 + 0.020 / 1.00 = 0.066

WWAN CA Mode (n5A + LTE B2, B66)

n5 + LTE B2 = 0.059 / 0.55 + 0.017 / 1.00 = 0.124

n5 + LTE B66 = 0.059 / 0.55 + 0.023 / 1.00 = 0.130

WWAN CA Mode (n25A + LTE B12, B66)

n25 + LTE B12 = 0.035 / 1.00 + 0.024 / 0.46 = 0.087

n25 + LTE B66 = 0.035 / 1.00 + 0.024 / 1.00 = 0.059

WWAN CA Mode (n41A + LTE B2, B66)

n41 + LTE B2 = 0.013 / 1.00 + 0.013 / 1.00 = 0.026

n41 + LTE B66 = 0.013 / 1.00 + 0.019 / 1.00 = 0.032

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

n66 + LTE B2 = 0.035 / 1.00 + 0.013 / 1.00 = 0.048

n66 + LTE B5 = 0.035 / 1.00 + 0.030 / 0.54 = 0.091

n66 + LTE B7 = 0.035 / 1.00 + 0.018 / 1.00 = 0.053

n66 + LTE B12 = 0.035 / 1.00 + 0.025 / 0.46 = 0.089

n66 + LTE B13 = 0.035 / 1.00 + 0.026 / 0.51 = 0.086

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

n71 + LTE B2 = 0.084 / 0.44 + 0.013 / 1.00 = 0.204

n71 + LTE B7 = 0.084 / 0.44 + 0.019 / 1.00 = 0.210

n71 + LTE B66 = 0.084 / 0.44 + 0.022 / 1.00 = 0.213

WWAN CA Mode (n77A + LTE B2, B7, B12, B66)

n77 + LTE B2 = 0.009 / 1.00 + 0.013 / 1.00 = 0.022

n77 + LTE B7 = 0.009 / 1.00 + 0.019 / 1.00 = 0.028

n77 + LTE B12 = 0.009 / 1.00 + 0.025 / 0.46 = 0.063

n77 + LTE B66 = 0.009 / 1.00 + 0.019 / 1.00 = 0.028

WLAN + WWAN SA Mode

2.4G + WWAN SA Mode = 0.016 / 1.00 + 0.080 / 0.53 = 0.168
5G + WWAN SA Mode = 0.014 / 1.00 + 0.080 / 0.53 = 0.166

WLAN + WWAN CA Mode

2.4G + WWAN CA Mode = 0.016 / 1.00 + 0.084 / 0.44 + 0.022 / 1.00 = 0.229
5G + 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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