

RF Exposure Report

Report No.: SABBQZ-WTW-P21020267

FCC ID: PY320400511

Test Model: NBR750

Received Date: Jan. 27, 2021

Test Date: May 04, 2021

Issued Date: May 11, 2021

**Applicant and
Manufacturer:** NETGEAR, Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
SABBQZ-WTW-P21020267	Original release.	May 11, 2021

1 Certificate of Conformity

Product: 5G Orbi Router

Brand: NETGEAR

Test Model: NBR750

Sample Status: Engineering sample

**Applicant and
Manufacturer:** NETGEAR, Inc.

Test Date: May 04, 2021

Standards: FCC Part 2 (Section 2.1091)

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 EMC characteristics under the conditions specified in this report.

Prepared by : Vivian Huang , **Date:** May 11, 2021
Vivian Hunag / Specialist

Approved by : Clark Lin , **Date:** May 11, 2021
Clark Lin / Technical Manager

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

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

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

2.4 Antenna Gain

1. The directional antenna gain, please refer to the following table:

Frequency Range (GHz)	Directional Antenna Gain (dBi)	Antenna Type	Connector Type
2.4~2.4835	4.37	Dipole	i-pex(MHF)
5.15 ~ 5.25	4.48		
5.725 ~ 5.85	6.78		

Note: More detailed information, please refer to antenna specification.

2. The WWAN antennas provided to the EUT, please refer to the following table:

Antenna gain list						
Band	Freq. Range (MHz)	Internal Ant				External Ant Gain(dBi)
		Ant 1 Gain (dBi)	Ant 2 Gain (dBi)	Ant 3 Gain (dBi)	Ant 4 Gain (dBi)	
Band 2	1850~1910	0.11	0.02	0.19	-	-4.00
Band 4	1710~1755	0.92	1.11	1.19	1.23	-4.00
Band 5	824~849	-0.33	0.05	-	-	-2.80
Band 7	2500~2570	0.25	0.24	0.24	0.49	-4.53
Band 12	698~716	-1.02	-0.71	-	-	-2.80
Band 13	777~787	-0.45	-0.82	-	-	-2.80
Band 14	788~798	-0.45	-0.82	-	-	-2.80
Band 25	1850 ~1915	0.11	0.02	0.19	0.22	-4.00
Band 26	814 ~849	-0.33	0.05	-	-	-2.80
Band 30	2305 ~2315	-3.98	-3.36	-3.18	-3.57	-4.53
Band 41	2496~2690	0.25	0.24	0.74	0.65	-4.53
Band 48	3550 ~3700	-4.45	-4.54	-4.45	-4.36	-4.53
Band 66	1710 ~1780	0.92	1.11	1.19	1.23	-4.00
Band 71	663 to 698	-1.21	-0.23	-	-	-2.80

*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.

2.5 Calculation Result

Operation Mode	Evaluation Frequency (MHz)	Max Average Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
WLAN 2.4GHz	2412~2462	874.084	4.37	30	0.21140	1
WLAN 5GHz U-NII-1	5180~5250	791.922	4.48	30	0.19644	1
WLAN 5GHz U-NII-3	5745~5825	943.449	6.78	30	0.39743	1

Note:

- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- 2.4GHz: $1.87 \text{ dBi} + 10\log(2) = 4.37 \text{ dBi}$
- 5GHz: For U-NII-1: $2.84 \text{ dBi} + 10\log(2) = 4.48 \text{ dBi}$
For U-NII-3: $2.91 \text{ dBi} + 10\log(4) = 6.78 \text{ dBi}$

For WWAN module - Worst Case (FCC ID: XMR2020RM502QAE):

Operation Mode	Evaluation Frequency (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
LTE 41	2496-2690	478.63	0.74	30	0.05018	1

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

$$\text{WLAN 2.4GHz} + \text{WLAN 5GHz (U-NII-1)} + \text{WLAN 5GHz (U-NII-3)} + \text{LTE} = 0.21140 / 1 + 0.19644 / 1 + 0.39743 / 1 + 0.05018 / 1 = 0.85545$$

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

Appendix

WWAN module (FCC ID: XMR2020RM502QAE)

MPE Evaluation

For Internal Ant:

Mode	Equipment Category	Transmitter Range (MHz)		Maximum		Antenna Gain (dBi)	Power Density (mW/cm ²)		Ratio
		Start	Stop	(mW)	(dBm)		Vaule	Limit	
LTE	Band 2	1850	1910	198.61	22.98	0.19	0.01835	1	0.01835
	Band 4	1710	1755	198.61	22.98	1.23	0.02331	1	0.02331
	Band 5	824	849	279.9	24.47	0.05	0.02504	1	0.04558
	Band 7	2500	2570	211.35	23.25	0.49	0.02092	1	0.02092
	Band 12	698	716	210.38	23.23	-0.71	0.01580	0.46533	0.03395
	Band 13	777	787	228.03	23.58	-0.45	0.01818	0.518	0.03510
	Band 14	788	798	286.42	24.57	-0.45	0.02283	0.52533	0.04346
	Band 25	1850	1915	198.61	22.98	0.22	0.01847	1	0.01847
	LTE (Band 26) (Part 90S)	814	824	281.84	24.50	0.05	0.02521	0.54267	0.04646
	LTE (Band 26) (Part 22H)	824	849	279.9	24.47	0.05	0.02504	0.54933	0.04558
	Band 30	2305	2315	210.38	23.23	-3.18	0.00894	1	0.00894
	Band 41	2496	2690	478.63	26.80	0.74	0.05018	1	0.05018
	Band 48	3550	3700	229.61	23.61	-4.36	0.00744	1	0.00744
	Band 66	1710	1780	198.61	22.98	1.23	0.02331	1	0.02331
	Band 71	663	698	214.29	23.31	-0.23	0.01797	0.442	0.04066
	CA 2c	1850	1910	257.63	24.11	0.19	0.02380	1	0.02380
	CA 5b	824	849	228.56	23.59	0.05	0.02044	0.54933	0.03721
	CA 7c	2500	2670	269.77	24.31	0.49	0.02670	1	0.02670
	CA 41d	2496	2690	301.3	24.79	0.74	0.03159	1	0.03159
	CA 66d	1710	1780	253.51	24.04	1.23	0.02975	1	0.02975

5G NR	FR1 n2	1850	1910	215.77	23.34	0.05	0.01930	0.54933	0.02106
	FR1 n5	824	849	228.03	23.58	0.22	0.02121	1	0.03513
	FR1 n25	1850	1915	449.78	26.53	0.74	0.04716	1	0.02121
	FR1 n41	2496	2690	243.22	23.86	1.23	0.02855	1	0.04716
	FR1 n66	1710	1780	247.17	23.93	-0.23	0.02073	0.442	0.02855
	FR1 n71	663	698	215.77	23.34	0.05	0.01930	0.54933	0.04690
	ENDC at FR1 2A+n71	663	698	244.91	23.89	-0.23	0.02054	0.442	0.04647
	ENDC at FR1 66A+n71	663	698	244.91	23.89	-0.23	0.02054	0.442	0.04647
	ENDC at FR1 7A+n71	663	698	244.91	23.89	-0.23	0.02054	0.442	0.04647
	ENDC at FR1 2A+n5	824	849	257.04	24.10	0.05	0.02299	0.54933	0.04185
	ENDC at FR1 30A+n5	824	849	257.04	24.10	0.05	0.02299	0.54933	0.04185
	ENDC at FR1 66A+n5	824	849	257.04	24.10	0.05	0.02299	0.54933	0.04185
	ENDC at FR1 25A+n41	2496	2690	233.35	23.68	0.74	0.02447	1	0.02447
	ENDC at FR1 2A+n41	2496	2690	233.35	23.68	0.74	0.02447	1	0.02447
	ENDC at FR1 25A+n41	2496	2690	233.35	23.68	0.74	0.02447	1	0.02447
	ENDC at FR1 2A+n12	698	716	248.89	23.96	-0.71	0.01869	0.46533	0.04017
	ENDC at FR1 66A+n12	698	716	248.89	23.96	-0.71	0.01869	0.46533	0.04017
	ENDC at FR1 5A+n66	1710	1780	208.93	23.20	1.23	0.02452	1	0.02452
	ENDC at FR1 2A+n66	1710	1780	208.93	23.20	1.23	0.02452	1	0.02452
	ENDC at FR1 5A+n2	1850	1910	205.12	23.12	0.19	0.01895	1	0.01895
	ENDC at FR1 41A+n41	2496	2690	233.35	23.68	0.74	0.02447	1	0.02447
	ENDC at FR1 71A+n71	663	698	244.91	23.89	-0.23	0.02054	0.442	0.04647

For External Ant:

Mode	Equipment Category	Transmitter Range (MHz)		Maximum		Antenna Gain (dBi)	Power Density (mW/cm ²)		Ratio
		Start	Stop	(mW)	(dBm)		Vaule	Limit	
LTE	Band 2	1850	1910	198.61	22.98	-4.00	0.00699	1	0.00699
	Band 4	1710	1755	198.61	22.98	-4.00	0.00699	1	0.00699
	Band 5	824	849	279.9	24.47	-2.80	0.01299	0.54933	0.02365
	Band 7	2500	2570	211.35	23.25	-4.53	0.00658	1	0.00658
	Band 12	698	716	210.38	23.23	-2.80	0.00976	0.46533	0.03395
	Band 13	777	787	228.03	23.58	-2.80	0.01058	0.518	0.03510
	Band 14	788	798	286.42	24.57	-2.80	0.02283	0.52533	0.04346
	Band 25	1850	1915	198.61	22.98	-4.00	0.00699	1	0.00699
	LTE (Band 26) (Part 90S)	814	824	281.84	24.50	-2.80	0.01308	0.54267	0.02410
	LTE (Band 26) (Part 22H)	824	849	279.9	24.47	-2.80	0.01299	0.54933	0.02365
	Band 30	2305	2315	210.38	23.23	-4.53	0.00655	1	0.00655
	Band 41	2496	2690	478.63	26.80	-4.53	0.01491	1	0.01491
	Band 48	3550	3700	229.61	23.61	-4.53	0.00715	1	0.00715
	Band 66	1710	1780	198.61	22.98	-4.00	0.00699	1	0.00699
	Band 71	663	698	214.29	23.31	-2.80	0.00994	0.442	0.02249
	CA 2c	1850	1910	257.63	24.11	-4.00	0.00907	1	0.00907
	CA 5b	824	849	228.56	23.59	-2.80	0.01061	0.54933	0.01931
	CA 7c	2500	2670	269.77	24.31	-4.53	0.00841	1	0.00841
	CA 41d	2496	2690	301.3	24.79	-4.53	0.00939	1	0.00803
	CA 66d	1710	1780	253.51	24.04	-4.00	0.00892	1	0.01822

5G NR	FR1 n2	1850	1910	215.77	23.34	-4.00	0.00803	1	0.00803
	FR1 n5	824	849	228.03	23.58	-2.80	0.01001	0.54933	0.01401
	FR1 n25	1850	1915	449.78	26.53	-4.00	0.00803	1	0.00856
	FR1 n41	2496	2690	243.22	23.86	-4.53	0.01401	1	0.02595
	FR1 n66	1710	1780	247.17	23.93	-4.00	0.00856	1	0.00803
	FR1 n71	663	698	215.77	23.34	-2.80	0.01147	0.442	0.01822
	ENDC at FR1 2A+n71	663	698	244.91	23.89	-2.80	0.01136	0.442	0.02570
	ENDC at FR1 66A+n71	663	698	244.91	23.89	-2.80	0.01136	0.442	0.02570
	ENDC at FR1 7A+n71	663	698	244.91	23.89	-2.80	0.01136	0.442	0.02570
	ENDC at FR1 2A+n5	824	849	257.04	24.10	-2.80	0.01193	0.54933	0.02172
	ENDC at FR1 30A+n5	824	849	257.04	24.10	-2.80	0.01193	0.54933	0.02172
	ENDC at FR1 66A+n5	824	849	257.04	24.10	-2.80	0.01193	0.54933	0.02172
	ENDC at FR1 25A+n41	2496	2690	233.35	23.68	-4.53	0.00727	1	0.00727
	ENDC at FR1 2A+n41	2496	2690	233.35	23.68	-4.53	0.00727	1	0.00727
	ENDC at FR1 25A+n41	2496	2690	233.35	23.68	-4.53	0.00727	1	0.00727
	ENDC at FR1 2A+n12	698	716	248.89	23.96	-2.80	0.01155	0.46533	0.02482
	ENDC at FR1 66A+n12	698	716	248.89	23.96	-2.80	0.01155	0.46533	0.02482
	ENDC at FR1 5A+n66	1710	1780	208.93	23.20	-4.00	0.00735	1	0.00735
	ENDC at FR1 2A+n66	1710	1780	208.93	23.20	-4.00	0.00735	1	0.00735
	ENDC at FR1 5A+n2	1850	1910	205.12	23.12	-4.00	0.00722	1	0.00722
	ENDC at FR1 41A+n41	2496	2690	233.35	23.68	-4.53	0.00727	1	0.00727
	ENDC at FR1 71A+n71	663	698	244.91	23.89	-2.80	0.01136	0.442	0.02570

Note: For operating frequency range 300-1500MHz: Limit of Power Density = F/1500

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