



FCC RADIO EXPOSURE TEST REPORT

FCC ID : 2ADZRBGW320

Equipment : BGW320-505 Wireless Integrated ONT Residential Gateway

Brand Name : Nokia

Model Name : BGW320-505

Applicant : Nokia Shanghai Bell Co. Ltd.
No. 388, Ningqiao Rd. Pilot Free Trade Zone Shanghai, China
201206

Manufacturer : Nokia Shanghai Bell Co. Ltd.
No. 388, Ningqiao Rd. Pilot Free Trade Zone Shanghai, China
201206

Standard : 47 CFR Part 2.1091

The product was received on Mar. 18, 2019, and testing was started from Jul. 20, 2019 and completed on Aug. 08, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



Table of Contents

History of this test report.....	3
Summary of Test Result.....	4
1 General Description	5
1.1 EUT General Information	5
1.2 Table for Class II Change.....	5
1.3 Testing Location	5
2 Maximum Permissible Exposure	6
2.1 Limit of Maximum Permissible Exposure	6
2.2 MPE Calculation Method.....	6
2.3 Calculated Result and Limit.....	7

Photographs of EUT v01



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	PASS	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

Report Producer: Vicky Huang



1 General Description

1.1 EUT General Information

RF General Information			
Evaluation Mode	Frequency Range (MHz)	Operating Frequency (MHz)	Modulation Type
2.4GHz WLAN	2400-2483.5	2412-2462	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) VHT: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5180-5250 5250-5320 5500-5720 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)

1.2 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FA912114

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Adding 5GHz band 2 and band 3 (5250~5350 MHz, 5470~5725 MHz) for this device. 2. Adding 160MHz.	Maximum Permissible Exposure.

Note: Maximum Permissible Exposure of 2.4GHz and 5GHz band 1, 4 are based on original test report

1.3 Testing Location

Testing Location		
☐	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-327-0973
☒	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.

2 Maximum Permissible Exposure

2.1 Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Method

The MPE was calculated at 30 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



2.3 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)
2.4GHz Non-beamforming mode									
2.4G;G1D (1T/1S)	4.90	26.69	31.59	0.50	32.09	1.61808	30	0.14307	1
2.4G;D1D (3T1S)	4.90	29.79	34.69	0.50	35.19	3.30370	30	0.29210	1
2.4G;D1D (3T2S)	4.90	25.74	30.64	0.50	31.14	1.30017	30	0.11496	1
2.4G;D1D (3T3S)	2.30	25.65	27.95	0.50	28.45	0.69984	30	0.06188	1
2.4G;G1D (4T1S)	4.90	29.90	34.80	0.50	35.30	3.38844	30	0.29960	1
2.4G;D1D (4T1S)	4.90	29.98	34.88	0.50	35.38	3.45144	30	0.30517	1
2.4G;D1D (4T2S)	4.90	26.99	31.89	0.50	32.39	1.73380	30	0.15330	1
2.4G;D1D (4T3S)	4.90	26.91	31.81	0.50	32.31	1.70216	30	0.15050	1
2.4GHz beamforming mode									
2.4G;D1D (3T1S)	4.20	29.79	33.99	0.50	34.49	2.81190	30	0.24862	1
2.4G;D1D (3T2S)	4.20	25.14	29.34	0.50	29.84	0.96383	30	0.08522	1
2.4G;D1D (4T1S)	4.80	29.98	34.78	0.50	35.28	3.37287	30	0.29822	1
2.4G;D1D (4T2S)	4.80	26.47	31.27	0.50	31.77	1.50314	30	0.13290	1
2.4G;D1D (4T3S)	3.10	26.69	29.79	0.50	30.29	1.06905	30	0.09452	1



5GHz Non-beamforming mode									
5.2G;D1D (4T1S)	5.80	29.98	35.78	0.21	35.99	3.97192	30	0.35119	1
5.3G;D1D (4T1S)	6.00	23.96	29.96	0.03	29.99	0.99770	30	0.08821	1
5.6G;D1D (4T1S)	5.10	23.97	29.07	0.50	29.57	0.90573	30	0.08008	1
5.8G;D1D (4T1S)	4.70	29.95	34.65	0.50	35.15	3.27341	30	0.28943	1
5.2G;D1D (4T2S)	5.80	27.33	33.13	0.50	33.63	2.30675	30	0.20396	1
5.3G;D1D (4T2S)	6.00	18.38	24.38	0.50	24.88	0.30761	30	0.02720	1
5.6G;D1D (4T2S)	5.10	23.96	29.06	0.50	29.56	0.90365	30	0.07990	1
5.8G;D1D (4T2S)	4.70	28.64	33.34	0.50	33.84	2.42103	30	0.21406	1
5.2G;D1D (4T3S)	5.80	27.16	32.96	0.50	33.46	2.21820	30	0.19613	1
5.3G;D1D (4T3S)	6.00	18.35	24.35	0.50	24.85	0.30549	30	0.02701	1
5.6G;D1D (4T3S)	5.10	23.95	29.05	0.50	29.55	0.90157	30	0.07971	1
5.8G;D1D (4T3S)	4.70	28.49	33.19	0.50	33.69	2.33884	30	0.20679	1



5GHz beamforming mode									
5.2G;D1D (4T1S)	4.70	29.98	34.68	0.50	35.18	3.29610	30	0.29143	1
5.3G;D1D (4T1S)	4.20	23.96	28.16	0.50	28.66	0.73451	30	0.06494	1
5.6G;D1D (4T1S)	5.10	23.97	29.07	0.50	29.57	0.90573	30	0.08008	1
5.8G;D1D (4T1S)	5.00	29.95	34.95	0.50	35.45	3.50752	30	0.31013	1
5.2G;D1D (4T2S)	4.70	27.74	32.44	0.50	32.94	1.96789	30	0.17400	1
5.3G;D1D (4T2S)	4.20	20.36	24.56	0.50	25.06	0.32063	30	0.02835	1
5.6G;D1D (4T2S)	5.10	23.96	29.06	0.50	29.56	0.90365	30	0.07990	1
5.8G;D1D (4T2S)	5.00	28.30	33.30	0.50	33.80	2.39883	30	0.21210	1
5.2G;D1D (4T3S)	3.80	27.72	31.52	0.50	32.02	1.59221	30	0.14078	1
5.3G;D1D (4T3S)	2.80	20.66	23.46	0.50	23.96	0.24889	30	0.02201	1
5.6G;D1D (4T3S)	4.30	23.95	28.25	0.50	28.75	0.74989	30	0.06630	1
5.8G;D1D (4T3S)	3.80	28.16	31.96	0.50	32.46	1.76198	30	0.15579	1

Simultaneous Transmission Analysis Mode: WLAN 2.4GHz+WLAN 5GHz Band 1、Band 2 + Band 3、Band 4

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
2.4G;D1D (4T1S)	4.90	29.98	34.88	0.50	35.38	3.45144	30	0.30517	1.00000	0.30517
5.2G;D1D (4T1S)	5.80	29.98	35.78	0.21	35.99	3.97192	30	0.35119	1.00000	0.35119
5.8G;D1D (4T1S)	5.00	29.95	34.95	0.21	35.16	3.28095	30	0.29009	1.00000	0.29009
									Sum Ratio	0.94645
									Ratio Limit	1

Note: The above antenna gain was declared by manufacturer.

—————THE END—————