

FCC Radio Test Report

FCC ID: RWO-RZ090301

This report concerns: ☒ Class II Change

Project No. : 1903C099
Equipment : WLAN and BT, 2x2 PCIe M.2 2230 adapter card
Test Model : AX200NGW
Series Model : N/A
Applicant : Razer Inc.
Address : 201 3rd Street, Suite 900, San Francisco, CA 94103
USA

Date of Receipt : Mar. 04, 2019
Date of Test : Mar. 06, 2019 ~ Apr. 26, 2019
Issued Date : May 06, 2019
Tested by : BTL Inc.

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Certificate #5123.02

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BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Apr. 26, 2019
R01	Revised report to address comments.	May 06, 2019

1. GENERAL SUMMARY

Equipment : WLAN and BT, 2x2 PCIe M.2 2230 adapter card
Brand Name : Intel® Wi-Fi 6 AX200
Test Model : AX200NGW
Series Model : N/A
Applicant : Razer Inc.
Manufacturer : Razer Inc.
Address : 201 3rd Street, Suite 900, San Francisco, CA 94103 USA
Date of Test : Mar. 06, 2019 ~ Apr. 26, 2019
Test Sample : Engineering Sample No.: D190302089
Standard(s) : FCC Part15, Subpart C (15.247)
ANSI C63.10-2013
KDB 558074 D01 15.247 Meas Guidance

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-1-1903C099) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of A2LA according to the ISO/IEC 17025 quality assessment standard and technical standard(s).

Test results included in this report are only for the WLAN 2.4 GHz part.

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

Applied Standard(s): FCC Part15, Subpart C (15.247)				
Standard(s) Section	Test Item	Test Result	Judgment	Remark
15.247(b)(3)	Maximum Output Power	APPENDIX A	PASS	-----

Note:

(1) "N/A" denotes test is not applicable in this test report.

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.

BTL's Test Firm Registration Number for FCC: 357015

BTL's Designation Number for FCC: CN1240

2.2 MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

The BTL measurement uncertainty as below table:

A. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	U, (dB)
DG-C02	CISPR	150 kHz ~ 30 MHz	2.32

B. Radiated emissions test:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
DG-CB03	CISPR	9 KHz~30 MHz	V	3.79
		9 KHz~30 MHz	H	3.57
		30 MHz~200 MHz	V	3.82
		30 MHz~200 MHz	H	3.78
		200 MHz~1,000 MHz	V	4.10
		200 MHz~1,000 MHz	H	4.06
		1 GHz~18 GHz	V	3.12
		1 GHz~18 GHz	H	3.68
		18 GHz~40 GHz	V	4.15
		18 GHz~40 GHz	H	4.14

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	WLAN and BT, 2x2 PCIe M.2 2230 adapter card
Brand Name	Intel® Wi-Fi 6 AX200
Test Model	AX200NGW
Series Model	N/A
Model Difference(s)	N/A
Power Source	1# DC Voltage supplied from AC/DC adapter. Model: RC30-024801 2# Supplied from Li-ion battery Model: RC30-0248
Power Rating	1# Model: I/P:100-240V~3.6A 50/60Hz O/P:19.5V --- 11.8A 2# DC15.4V,5209mAh/80Wh
Operation Frequency	2412 MHz ~ 2472 MHz
Modulation Type	802.11b: DSSS 802.11g: OFDM 802.11n: OFDM 802.11ax: OFDMA
Bit Rate of Transmitter	802.11b: 11/5.5/2/1 Mbps 802.11g: 54/48/36/24/18/12/9/6 Mbps 802.11n: up to 300 Mbps 802.11ax: up to 573.6 Mbps
Maximum Output Power	IEEE 802.11b: 17.45 dBm (0.0556 W) IEEE 802.11g: 17.85 dBm (0.0610 W) IEEE 802.11n (HT20): 17.76 dBm (0.0597 W) IEEE 802.11n (HT40): 17.89 dBm (0.0615 W) IEEE 802.11ax (HE20): 17.56 dBm (0.0570 W) IEEE 802.11ax (HE40): 17.49 dBm (0.0561 W)

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. Channel List:

CH01 - CH13 for 802.11b, 802.11g, 802.11n(20MHz), 802.11ax(20MHz) CH03 - CH11 for 802.11n(40MHz), 802.11ax(40MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	05	2432	09	2452	13	2472
02	2417	06	2437	10	2457		
03	2422	07	2442	11	2462		
04	2427	08	2447	12	2467		

3. Table for Filed Antenna:

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	molex	2065720301	PIFA	N/A	3.13
2	molex	2065720401	PIFA	N/A	3.06

Note:

- 1) The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and receivers (2T2R).
- 2) Antenna 1 refers to antenna A also refers to aux antenna.
Antenna 2 refers to antenna B also refers to main antenna.

4. The worst case for 1TX/2TX as follow:

Operating Mode	TX Mode	1TX	2TX
802.11b		V (Ant. 1)	-
802.11g		V (Ant. 1)	-
802.11n(20MHz)		-	V (Ant. 1+ Ant. 2)
802.11n(40MHz)		-	V (Ant. 1+ Ant. 2)
802.11ax(20MHz)		-	V (Ant. 1+ Ant. 2)
802.11ax(40MHz)		-	V (Ant. 1+ Ant. 2)

3.2 DESCRIPTION OF TEST MODES

The test system was pre-tested based on the consideration of all possible combinations of EUT operation mode.

Pretest Mode	Description
Mode 1	TX B Mode Channel 01/06/11/12/13
Mode 2	TX G Mode Channel 01/06/11/12/13
Mode 3	TX N-20 MHz Mode Channel 01/06/11/12/13
Mode 4	TX N-40 MHz Mode Channel 03/06/09/10/11
Mode 5	TX AX-20 MHz Mode Channel 01/06/11/12/13
Mode 6	TX AX-40 MHz Mode Channel 03/06/09/10/11

Following mode(s) as (were) found to be the worst case(s) and selected for the final test.

Maximum Output Power Test	
Final Test Mode:	Description
Mode 1	TX B Mode Channel 01/06/11/12/13
Mode 2	TX G Mode Channel 01/06/11/12/13
Mode 3	TX N-20 MHz Mode Channel 01/06/11/12/13
Mode 4	TX N-40 MHz Mode Channel 03/06/09/10/11
Mode 5	TX AX-20 MHz Mode Channel 01/06/11/12/13
Mode 6	TX AX-40 MHz Mode Channel 03/06/09/10/11

Note:

The measurements for Maximum Output Power of 802.11ax mode were tested during full bandwidth resource unit, it was the worst case.

3.3 PARAMETERS OF TEST SOFTWARE

Test Software	DRTU				
Frequency (MHz)	2412	2437	2462	2467	2472
IEEE 802.11b	17.25	17.25	17.25	17	14.5
IEEE 802.11g	16.25	17.25	14.50	13.5	11.5
IEEE 802.11n (HT20)	14/14	14/14	13.5/13.5	12/12	7.5/7.5
IEEE 802.11ax (HE20)	14.5/14.5	14.5/14.5	13./13	10.25/10.25	7.75/7.75
Frequency (MHz)	2422	2437	2452	2457	2462
IEEE 802.11n (HT40)	14/13.75	14/14	14/14	7.75/7.75	5.25/5.25
IEEE 802.11ax (HE40)	14/13.75	14.5/14.5	13.25/13.25	7.25/7.25	5.25/5.25

4. MAXIMUM OUTPUT POWER TEST

4.1 LIMIT

FCC Part15, Subpart C (15.247)		
Section	Test Item	Limit
15.247(b)(3)	Maximum Output Power	1 Watt or 30dBm

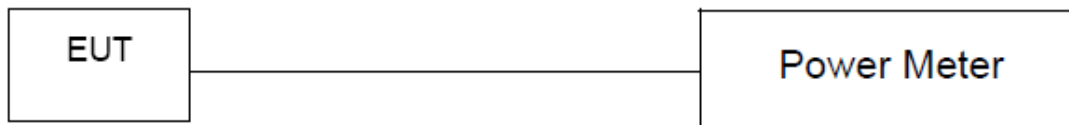
4.2 TEST PROCEDURE

- The EUT was directly connected to the power meter and antenna output port as show in the block diagram below.
- The maximum conducted output power was performed in accordance with method 11.9.2.3 of ANSI C63.10-2013.

4.3 DEVIATION FROM STANDARD

No deviation.

4.4 TEST SETUP



4.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 EUT TEST CONDITIONS

Temperature: 23°C Relative Humidity: 62% Test Voltage: AC 230V/50Hz

4.7 TEST RESULTS

Please refer to the APPENDIX A.

5. MEASUREMENT INSTRUMENTS LIST

Maximum Output Power					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	P-series power meter	Agilent	N1911A	MY45100473	Aug. 11, 2019
2	wideband power sensor	Agilent	N1921A	MY51100041	Aug. 11, 2019

Remark: "N/A" denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.

APPENDIX A - MAXIMUM OUTPUT POWER

Test Mode	TX B Mode
-----------	-----------

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	17.27	0.0533	30.00	1.0000	Complies
06	2437	17.22	0.0527	30.00	1.0000	Complies
11	2462	17.45	0.0556	30.00	1.0000	Complies
12	2467	16.84	0.0483	30.00	1.0000	Complies
13	2472	14.53	0.0284	30.00	1.0000	Complies

Test Mode	TX G Mode
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Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	16.95	0.0495	30.00	1.0000	Complies
06	2437	17.85	0.0610	30.00	1.0000	Complies
11	2462	14.96	0.0313	30.00	1.0000	Complies
12	2467	13.43	0.0220	30.00	1.0000	Complies
13	2472	11.57	0.0144	30.00	1.0000	Complies

Test Mode	TX N-20M Mode_ANT1
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Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	14.78	0.0301	30.00	1.0000	Complies
06	2437	14.76	0.0299	30.00	1.0000	Complies
11	2462	14.16	0.0261	30.00	1.0000	Complies
12	2467	12.02	0.0159	30.00	1.0000	Complies
13	2472	7.48	0.0056	30.00	1.0000	Complies

Test Mode	TX N-20M Mode_ANT2
-----------	--------------------

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	14.71	0.0296	30.00	1.0000	Complies
06	2437	14.60	0.0288	30.00	1.0000	Complies
11	2462	14.09	0.0256	30.00	1.0000	Complies
12	2467	11.99	0.0158	30.00	1.0000	Complies
13	2472	7.43	0.0055	30.00	1.0000	Complies

Test Mode	TX N-20M Mode_Total
-----------	---------------------

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	17.76	0.0597	30.00	1.0000	Complies
06	2437	17.69	0.0587	30.00	1.0000	Complies
11	2462	17.14	0.0518	30.00	1.0000	Complies
12	2467	15.02	0.0318	30.00	1.0000	Complies
13	2472	10.47	0.0111	30.00	1.0000	Complies

Test Mode	TX N-40M Mode_ANT1
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Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
03	2422	14.49	0.0281	30.00	1.0000	Complies
06	2437	14.89	0.0308	30.00	1.0000	Complies
09	2452	14.81	0.0303	30.00	1.0000	Complies
10	2457	7.71	0.0059	30.00	1.0000	Complies
11	2462	5.34	0.0034	30.00	1.0000	Complies

Test Mode	TX N-40M Mode_ANT2
-----------	--------------------

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
03	2422	14.32	0.0270	30.00	1.0000	Complies
06	2437	14.87	0.0307	30.00	1.0000	Complies
09	2452	14.85	0.0305	30.00	1.0000	Complies
10	2457	7.67	0.0058	30.00	1.0000	Complies
11	2462	5.31	0.0034	30.00	1.0000	Complies

Test Mode	TX N-40M Mode_Total
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Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
03	2422	17.42	0.0552	30.00	1.0000	Complies
06	2437	17.89	0.0615	30.00	1.0000	Complies
09	2452	17.84	0.0608	30.00	1.0000	Complies
10	2457	10.70	0.0117	30.00	1.0000	Complies
11	2462	8.34	0.0068	30.00	1.0000	Complies

Test Mode	TX AX-20M Mode_ANT1
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Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	14.47	0.0280	30.00	1.0000	Complies
06	2437	14.54	0.0284	30.00	1.0000	Complies
11	2462	13.44	0.0221	30.00	1.0000	Complies
12	2467	10.28	0.0107	30.00	1.0000	Complies
13	2472	7.66	0.0058	30.00	1.0000	Complies

Test Mode	TX AX-20M Mode_ANT2
-----------	---------------------

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	14.62	0.0290	30.00	1.0000	Complies
06	2437	14.48	0.0281	30.00	1.0000	Complies
11	2462	13.47	0.0222	30.00	1.0000	Complies
12	2467	10.24	0.0106	30.00	1.0000	Complies
13	2472	7.69	0.0059	30.00	1.0000	Complies

Test Mode	TX AX-20M Mode_Total
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Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	17.56	0.0570	30.00	1.0000	Complies
06	2437	17.52	0.0565	30.00	1.0000	Complies
11	2462	16.47	0.0444	30.00	1.0000	Complies
12	2467	13.27	0.0212	30.00	1.0000	Complies
13	2472	10.69	0.0117	30.00	1.0000	Complies

Test Mode	TX AX-40M Mode_ANT1
-----------	---------------------

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
03	2422	14.41	0.0276	30.00	1.0000	Complies
06	2437	14.35	0.0272	30.00	1.0000	Complies
09	2452	13.74	0.0237	30.00	1.0000	Complies
10	2457	7.31	0.0054	30.00	1.0000	Complies
11	2462	5.02	0.0032	30.00	1.0000	Complies

Test Mode	TX AX-40M Mode_ANT2
-----------	---------------------

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
03	2422	14.54	0.0284	30.00	1.0000	Complies
06	2437	14.58	0.0287	30.00	1.0000	Complies
09	2452	13.87	0.0244	30.00	1.0000	Complies
10	2457	7.26	0.0053	30.00	1.0000	Complies
11	2462	5.98	0.0040	30.00	1.0000	Complies

Test Mode	TX AX-40M Mode_Total
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Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
03	2422	17.49	0.0561	30.00	1.0000	Complies
06	2437	17.48	0.0560	30.00	1.0000	Complies
09	2452	16.82	0.0481	30.00	1.0000	Complies
10	2457	10.30	0.0107	30.00	1.0000	Complies
11	2462	8.54	0.0071	30.00	1.0000	Complies

End of Test Report