

RF Exposure Evaluation Declaration

Product Name : Wireless-AC1900 Dual Band Gigabit Router
Trade Name : ASUS
Model No. : RT-AC68U V3
FCC ID : MSQ-RTACIB00

Applicant : ASUSTeK COMPUTER INC.

Address : 1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan

Date of Receipt : Mar. 30, 2020
Date of Declaration : Jun. 04, 2020
Report No. : 2030813R-RF-US-Exp
Report Version : V1.0



The declaration results relate only to the samples calculated.

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Address : 1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan

Manufacturer : ASUSTeK COMPUTER INC.

Address : 1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan

Trade Name : ASUS

Model No. : RT-AC68U V3

FCC ID : MSQ-RTACIB00

Applicable Standard : FCC 47 CFR Part 2.1091 Radiofrequency radiation exposure evaluation: mobile devices.

Test Lab : Hsin Chu Laboratory

Address : No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 310, Taiwan, R.O.C.
TEL: +886-3-582-8001 / FAX: +886-3-582-8958

Test Result : Complied

Tested By

:



(Scott Chang / Engineer)

Approved By

:



(Louis Hsu / Deputy Manager)

Revision History

Version	Description	Issued Date
V1.0	Initial issue of report	Jun. 04, 2020

1.1. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required	Test Site
Temperature (°C)	Peak Output Power	15 - 35	3
Humidity (%RH)		25 - 75	

Note: Test site information refers to Laboratory Information.

Laboratory Information

USA : FCC Registration Number: TW3024
Canada : IC Registration Number: 22397-1 / 22397-2 / 22397-3

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: <http://www.dekra.com.tw>

If you have any comments, please don't hesitate to contact us. Our test sites as below:

Test Laboratory	DEKRA Testing and Certification Co., Ltd.
Address	1. No. 75-2, 3rd Lin, WangYe Keng, Yonghxing Tsuen, Qionglin Shiang, Hsinchu County 307, Taiwan, R.O.C. 2. No.372, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. 3. No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.
Phone number	1. +886-3-592-8858 2. +886-3-582-8001 3. +886-3-582-8001
Fax number	1. +886-3-592-8859 2. +886-3-582-8958 3. +886-3-582-8958
Email address	info.tw@dekra.com
Website	http://www.dekra.com.tw

1.2. List of Test Equipment

Peak Output Power / SR12-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	2019/12/02	2020/12/01
Pulse Power Sensor	Anritsu	MA2411B	1531043	2019/12/02	2020/12/01
Pulse Power Sensor	Anritsu	MA2411B	1531044	2019/12/02	2020/12/01
Power Meter	Keysight	8990B	MY51000248	2019/05/21	2020/05/20
Power Sensor	Keysight	N1923A	MY57240005	2019/05/21	2020/05/20

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

1.3. Uncertainty

Test item	Uncertainty
Peak Output Power	± 2.26 dB

Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2. RF Exposure Evaluation

2.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

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)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

RF Field Strength Limits for Controlled Use Devices (Controlled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-1023	170	180	-	Instantaneous*
0.1-10	-	1.6/ f	-	6**
1.29-10	193/ f 0.5	-	-	6**
10-20	61.4	0.163	10	6
20-48	129.8/ f 0.25	0.3444/ f 0.25	44.72/ f 0.5	6
48-100	49.33	0.1309	6.455	6
100-6000	15.60 f 0.25	0.04138 f 0.25	0.6455 f 0.5	6
6000-15000	137	0.364	50	6
15000-150000	137	0.364	50	616000/ f 1.2
150000-300000	0.354 f 0.5	9.40 x 10 ⁻⁴ f 0.5	3.33 x 10 ⁻⁴ f	616000/ f 1.2
Note: f is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				

Friis Formula

Friis transmission 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

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

2.3. Test Result of RF Exposure Evaluation

Product	Wireless-AC1900 Dual Band Gigabit Router
Test Mode	Transmit _CDD mode
Test Condition	RF Exposure Evaluation

Antenna Gain: The maximum antenna gain is 1.33dBi.

Output Power into Antenna & RF Exposure Evaluation Distance:

WLAN Function					
2.4GHz Band					
Mode	Frequency (MHz)	Conducted Output Power		Power Density at R = 20cm (mW/cm ²)	Limit (mW/cm ²)
		dBm	mW		
802.11b	2412	27.506	563.081	0.112	1.000
	2437	29.006	795.359	0.158	1.000
	2462	26.166	413.646	0.082	1.000
802.11g	2412	22.004	158.642	0.032	1.000
	2437	29.012	796.476	0.158	1.000
	2462	19.451	88.135	0.018	1.000
802.11n (20MHz)	2412	18.870	77.085	0.015	1.000
	2437	28.305	676.928	0.135	1.000
	2462	19.334	85.777	0.017	1.000
802.11n (40MHz)	2422	17.702	58.912	0.012	1.000
	2437	19.655	92.355	0.018	1.000
	2452	16.216	41.843	0.008	1.000

Note:

1. The antenna information is from the customer declaration.
2. The results are evaluated using the maximum power.

Product	Wireless-AC1900 Dual Band Gigabit Router
Test Mode	Transmit _ CDD mode
Test Condition	RF Exposure Evaluation

Antenna Gain: The maximum antenna gain is 1.85dBi.

Output Power into Antenna & RF Exposure Evaluation Distance:

WLAN Function					
5GHz Band					
Mode	Frequency (MHz)	Conducted Output Power		Power Density at R = 20cm (mW/cm ²)	Limit (mW/cm ²)
		dBm	mW		
802.11a	5180	17.503	56.277	0.017	1.000
	5220	17.139	51.754	0.016	1.000
	5240	16.788	47.731	0.015	1.000
	5745	29.017	797.424	0.243	1.000
	5785	29.073	807.847	0.246	1.000
	5825	29.008	795.783	0.242	1.000
802.11ac (20MHz)	5180	17.798	60.226	0.018	1.000
	5220	17.503	56.277	0.017	1.000
	5240	17.939	62.220	0.019	1.000
	5745	28.217	663.259	0.202	1.000
	5785	28.882	773.060	0.235	1.000
	5825	29.041	801.832	0.244	1.000
802.11ac (40MHz)	5190	17.726	59.238	0.018	1.000
	5230	21.695	147.745	0.045	1.000
	5755	26.464	443.020	0.135	1.000
	5795	27.828	606.465	0.185	1.000
802.11ac (80MHz)	5210	16.933	49.346	0.015	1.000
	5775	24.101	257.127	0.078	1.000

Note:

1. The antenna information is from the customer declaration.
2. The results are evaluated using the maximum power.

Product	Wireless-AC1900 Dual Band Gigabit Router
Test Mode	Transmit _BF Mode
Test Condition	RF Exposure Evaluation

Antenna Gain: The maximum antenna gain is 1.33dBi.

Output Power into Antenna & RF Exposure Evaluation Distance:

WLAN Function					
2.4GHz Band					
Mode	Frequency (MHz)	Conducted Output Power		Power Density at R = 20cm (mW/cm ²)	Limit (mW/cm ²)
		dBm	mW		
802.11n (20MHz)	2412	18.870	77.085	0.015	1.000
	2437	27.159	519.841	0.103	1.000
	2462	19.728	93.937	0.019	1.000
802.11n (40MHz)	2422	17.498	56.211	0.011	1.000
	2437	19.769	94.827	0.019	1.000
	2452	15.962	39.461	0.008	1.000

Note:

1. The antenna information is from the customer declaration.
2. The results are evaluated using the maximum power.

Product	Wireless-AC1900 Dual Band Gigabit Router
Test Mode	Transmit _BF mode
Test Condition	RF Exposure Evaluation

Antenna Gain: The maximum antenna gain is 1.85dBi.

Output Power into Antenna & RF Exposure Evaluation Distance:

WLAN Function					
5GHz Band					
Mode	Frequency (MHz)	Conducted Output Power		Power Density at R = 20cm (mW/cm ²)	Limit (mW/cm ²)
		dBm	mW		
802.11ac (20MHz)	5180	16.220	41.875	0.013	1.000
	5220	17.399	54.939	0.017	1.000
	5240	17.265	53.269	0.016	1.000
	5745	27.008	502.139	0.153	1.000
	5785	24.548	284.977	0.087	1.000
	5825	24.229	264.804	0.081	1.000
802.11ac (40MHz)	5190	16.725	47.044	0.014	1.000
	5230	20.824	120.881	0.037	1.000
	5755	25.070	321.355	0.098	1.000
	5795	25.716	372.872	0.114	1.000
802.11ac (80MHz)	5210	19.376	86.618	0.026	1.000
	5775	24.545	284.782	0.087	1.000

Note:

1. The antenna information is from the customer declaration.
2. The results are evaluated using the maximum power.

Product	Wireless-AC1900 Dual Band Gigabit Router
Test Mode	Collocation Power Density
Test Condition	RF Exposure Evaluation

Power Density for WiFi 2.4GHz (mW/cm ²)	Power Density for WiFi 5GHz (mW/cm ²)	Collocation Power Density (mW/cm ²)	Limit (mW/cm ²)
0.158	0.246	0.404	1