RF Exposure Evaluation declaration

Product Name ： Wireless-AC1700 Dual Band Gigabit Router

Trade Name ： ASUS

Model No. ： RT-ACRH17, RT-AC1700

FCC ID. ： MSQ-RTHD00

Applicant : ASUSTeK COMPUTER INC.

Address ： 4F, No. 150, Li-Te Rd., Peitou, Taipei, Taiwan

Date of Receipt ： Jul. 04, 2017

Date of Declaration ： Jul. 21, 2017

Report No. ： 1770022R-RF-US-Exp

Report Version ： V1.0

ilac-MRA

TAF
Testing Laboratory
3024

1. RF Exposure Evaluation

1.1. 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

Friis Formula

Friis transmission 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

Pd id the limit of MPE, 1 mW/cm^2. 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.

1.2. Test Procedure

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

The temperature and related humidity: 18℃ and 78％ RH.

1.3. Test Result of RF Exposure Evaluation

Product	Wireless-AC1700 Dual Band Gigabit Router
Test Mode	Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.66dBi or 1.47 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11b (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
1	2412	736.2658	0.21532
6	2437	738.0041	0.21583
11	2462	764.7731	0.22366

IEEE 802.11g (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
1	2412	208.4491	0.06096
6	2437	526.0173	0.15383
11	2462	185.7804	0.05433

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm^2.

Product	Wireless-AC1700 Dual Band Gigabit Router
Test Mode	Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.66 dBi or 1.87 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11n (20MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
1	2412	185.7804	0.05433
6	2437	550.8077	0.16108
11	2462	172.9816	0.05059

IEEE 802.11n (40MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
3	2422	109.6478	0.03207
6	2437	286.4178	0.08376
9	2452	198.1527	0.05795

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm^2.

Product	Wireless-AC1700 Dual Band Gigabit Router
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Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is: 1.76dBi or 1.50 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11a (ANT 0+1+2+3)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
36	5180	274.1574	0.08181
40	5220	329.6097	0.09836
44	5240	318.4198	0.09502

IEEE 802.11a (ANT 0+1+2+3)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
149	5745	882.4543	0.26334
157	5785	825.7033	0.24640
165	5825	746.5854	0.22279

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm^2.

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Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is: 1.76dBi or 1.50 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11 n (20MHz) (ANT 0+1+2+3)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
36	5180	263.0268	0.07849
40	5220	324.3396	0.09679
44	5240	306.9022	0.09158

IEEE 802.11 n (20MHz) (ANT 0+1+2+3)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
149	5745	597.9468	0.17844
157	5785	597.2215	0.17822
165	5825	599.5751	0.17892

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm^2.

Product	Wireless-AC1700 Dual Band Gigabit Router
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Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is: 1.76dBi or 1.50 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11 n (40MHz) (ANT 0+1+2+3)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
38	5190	108.1434	0.03227
46	5230	437.5221	0.13056

IEEE 802.11 n (40MHz) (ANT 0+1+2+3)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
151	5755	301.1992	0.08988
159	5795	601.8702	0.17961

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm^2.

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Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is: 1.76dBi or1.50 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11ac (80MHz) (ANT 0+1+2+3)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
42	5210	93.5406	0.02791

IEEE 802.11ac (80MHz) (ANT 0+1+2+3)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
155	5775	175.5143	0.05238

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm^2.

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Power Density (2.4GHz) (mW/cm2)	Power Density (5GHz) (mW/cm2)	Total Power Density (2.4GHz+5GHz) (mW/cm2)	Limit (mW/cm2)
0.22366	0.26334	0.4870	1