

# RF Exposure Evaluation Declaration

Product Name : Dual-band Wireless-AC1200 Gigabit Router  
Model No. : RT-AC56S  
FCC ID. : MSQ-RTAC56UA

Applicant : ASUSTeK COMPUTER INC.

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

Date of Receipt : 2014/03/21

Date of Declaration : 2014/08/18

Report No. : 1430420R-RF-US-Exp

Report Version : V1.0



The declaration results relate only to the samples calculated.

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## 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 <sup>2</sup> )	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:  $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = 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

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. 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°C and 78% RH.

### 1.3. Test Result of RF Exposure Evaluation

Product	Dual-band Wireless-AC1200 Gigabit Router
Test Mode	Transmit (CDD mode)
Test Condition	RF Exposure Evaluation

#### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.71dBi or 2.35 in linear scale.

#### Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11b			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
1	2412	319.1538	0.14921
6	2437	320.6269	0.14990
11	2462	314.7748	0.14716

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 <sup>2</sup> )
1	2412	261.2161	0.12212
6	2437	328.0953	0.15339
11	2462	276.0578	0.12906

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<sup>2</sup>.

Product	Dual-band Wireless-AC1200 Gigabit Router
Test Mode	Transmit (CDD mode)
Test Condition	RF Exposure Evaluation

### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.71dBi or 2.35 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 <sup>2</sup> )
1	2412	185.3532	0.08666
6	2437	341.1929	0.15951
11	2462	158.8547	0.07427

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 <sup>2</sup> )
3	2422	103.5142	0.04839
6	2437	115.6112	0.05405
9	2452	46.7735	0.02187

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<sup>2</sup>.

Product	Dual-band Wireless-AC1200 Gigabit Router
Test Mode	Transmit (CDD mode) _Bridge Mode
Test Condition	RF Exposure Evaluation

### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber are 5.8G:3.71dBi(or 2.35) and 5.2G:3.07dBi(or 2.03) in linear scale.

### Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11a (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
36	5180	174.5822	0.0704
40	5220	97.9490	0.0395
44	5240	97.2747	0.0392

IEEE 802.11a (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
149	5745	479.7334	0.22810
157	5785	492.0395	0.23395
165	5825	487.5285	0.23181

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<sup>2</sup>.

Product	Dual-band Wireless-AC1200 Gigabit Router
Test Mode	Transmit (CDD mode) _Bridge Mode
Test Condition	RF Exposure Evaluation

### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber are 5.8G:3.71dBi(or 2.35) and 5.2G:3.07dBi(or 2.03) in linear scale.

### Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11 n(20MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
36	5180	208.9296	0.0843
40	5220	104.4720	0.0421
44	5240	104.4720	0.0421

IEEE 802.11 n(20MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
149	5745	492.0395	0.23395
157	5785	489.7788	0.23288
165	5825	481.9478	0.22915

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<sup>2</sup>.

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### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber are 5.8G:3.71dBi(or 2.35) and 5.2G:3.07dBi(or 2.03) in linear scale.

### Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11 n(40MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
38	5190	70.1455	0.0283
46	5230	178.6488	0.0721

IEEE 802.11 n(40MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
151	5755	500.0345	0.20194
159	5795	494.3107	0.19963

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<sup>2</sup>.

Product	Dual-band Wireless-AC1200 Gigabit Router
Test Mode	Transmit (CDD mode) _Bridge Mode
Test Condition	RF Exposure Evaluation

### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber are 5.8G:3.71dBi(or 2.35) and 5.2G:3.07dBi(or 2.03) in linear scale.

### Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11ac (80MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
42	5210	51.7607	0.0209

IEEE 802.11ac (80MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
155	5775	460.2566	0.18588

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<sup>2</sup>.

Product	Dual-band Wireless-AC1200 Gigabit Router
Test Mode	Transmit (Beamforming mode) _Bridge Mode
Test Condition	RF Exposure Evaluation

### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber are 5.8G:3.71dBi(or 2.35) and 5.2G:3.07dBi(or 2.03) in linear scale.

### Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11 n(20MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
36	5180	163.6817	0.0660
40	5220	75.5092	0.0305
44	5240	72.9458	0.0294

IEEE 802.11 n(20MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
149	5745	481.9478	0.45831
157	5785	479.7334	0.45620
165	5825	469.8941	0.44685

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<sup>2</sup>.

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### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber are 5.8G:3.71dBi(or 2.35) and 5.2G:3.07dBi(or 2.03) in linear scale.

### Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11 n(40MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
38	5190	58.0764	0.0234
46	5230	154.1700	0.0622

IEEE 802.11 n(40MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
151	5755	470.9773	0.44788
159	5795	493.1738	0.46898

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<sup>2</sup>.

Product	Dual-band Wireless-AC1200 Gigabit Router
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### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber are 5.8G:3.71dBi(or 2.35) and 5.2G:3.07dBi(or 2.03) in linear scale.

### Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11ac (80MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
42	5210	41.8794	0.0169

IEEE 802.11ac (80MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
155	5775	426.5795	0.40566

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<sup>2</sup>.

Product	Dual-band Wireless-AC1200 Gigabit Router
Test Mode	Transmit (CDD mode) _Repeat Mode
Test Condition	RF Exposure Evaluation

### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber are 3.07dBi(or 2.03) in linear scale.

### Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11a (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
36	5180	129.4196	0.0522
40	5220	97.9490	0.0395
44	5240	97.2747	0.0392

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<sup>2</sup>.

Product	Dual-band Wireless-AC1200 Gigabit Router
Test Mode	Transmit (CDD mode) _Repeat Mode
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### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber are 3.07dBi(or 2.03) in linear scale.

### Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11 n(20MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
36	5180	130.9182	0.0528
40	5220	104.4720	0.0421
44	5240	104.4720	0.0421

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<sup>2</sup>.

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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<sup>2</sup>.

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WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
42	5210	52.3600	0.0211

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<sup>2</sup>.

Product	Dual-band Wireless-AC1200 Gigabit Router
Test Mode	Transmit (Beamforming mode) _Repeat Mode
Test Condition	RF Exposure Evaluation

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Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
36	5180	130.9182	0.0528
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38	5190	58.0764	0.0234
46	5230	154.1700	0.0622

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<sup>2</sup>.

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