

# RF Exposure Evaluation Declaration

Product Name : Wireless-AC2600 Dual WAN VPN Wireless Router  
Trade Name : ASUS  
Model No. : BRT-AC828/M2, BRT-AC828  
FCC ID. : MSQ-RT0V00

Applicant : ASUSTeK COMPUTER INC.

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

Date of Receipt : Feb. 17, 2016  
Issued Date : Jun. 03, 2016  
Report No. : 1620268R-RF-US-Exp-A  
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<br>(MHz)                                  | Electric Field<br>Strength (V/m) | Magnetic Field<br>Strength (A/m) | Power Density<br>(mW/cm <sup>2</sup> ) | Average Time<br>(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:  $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$

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        | Wireless-AC2600 Dual WAN VPN Wireless Router |
| Test Mode      | Mode 1: Transmit_CDD Mode                    |
| Test Condition | RF Exposure Evaluation                       |

#### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.19dBi or 2.08 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 <sup>2</sup> ) |
| 36                         | 5180                    | 294.4422                     | 0.12184                                          |
| 40                         | 5220                    | 297.8516                     | 0.12325                                          |
| 44                         | 5240                    | 289.7344                     | 0.11989                                          |

| 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 <sup>2</sup> ) |
| 36                                 | 5180                    | 309.7419                     | 0.12817                                          |
| 40                                 | 5220                    | 308.3188                     | 0.12758                                          |
| 44                                 | 5240                    | 306.9022                     | 0.12700                                          |

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        | Wireless-AC2600 Dual WAN VPN Wireless Router |
| Test Mode      | Mode 1: Transmit_CDD Mode                    |
| Test Condition | RF Exposure Evaluation                       |

### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.19dBi or 2.08 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 <sup>2</sup> ) |
| 38                                 | 5190                    | 374.9730                     | 0.15516                                          |
| 46                                 | 5230                    | 635.3309                     | 0.26290                                          |

| IEEE 802.11 ac(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 <sup>2</sup> ) |
| 42                                  | 5210                    | 287.0781                     | 0.11879                                          |

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        | Wireless-AC2600 Dual WAN VPN Wireless Router |
| Test Mode      | Mode 2: Transmit_Beamforming Mode            |
| Test Condition | RF Exposure Evaluation                       |

### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.19dBi or 2.08 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 <sup>2</sup> ) |
| 36                                 | 5180                    | 312.6079                     | 0.15797                                          |
| 40                                 | 5220                    | 304.7895                     | 0.15401                                          |
| 44                                 | 5240                    | 309.0295                     | 0.15616                                          |

| 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 <sup>2</sup> ) |
| 38                                 | 5190                    | 285.1018                     | 0.14407                                          |
| 46                                 | 5230                    | 467.7351                     | 0.23635                                          |

| IEEE 802.11 ac(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 <sup>2</sup> ) |
| 42                                  | 5210                    | 244.3431                     | 0.12347                                          |

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        | Wireless-AC2600 Dual WAN VPN Wireless Router |
| Test Mode      | Mode 1: Transmit_CDD Mode                    |
| Test Condition | RF Exposure Evaluation                       |

### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.19dBi or 2.08 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 <sup>2</sup> ) |
| 149                        | 5745                    | 851.1380                     | 0.35220                                          |
| 153                        | 5785                    | 859.0135                     | 0.35546                                          |
| 165                        | 5825                    | 870.9636                     | 0.36041                                          |

| 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 <sup>2</sup> ) |
| 149                                | 5745                    | 885.1156                     | 0.36626                                          |
| 153                                | 5785                    | 853.1001                     | 0.35301                                          |
| 165                                | 5825                    | 855.0667                     | 0.35383                                          |

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        | Wireless-AC2600 Dual WAN VPN Wireless Router |
| Test Mode      | Mode 1: Transmit_CDD Mode                    |
| Test Condition | RF Exposure Evaluation                       |

### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.19dBi or 2.08 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 <sup>2</sup> ) |
| 151                                | 5755                    | 835.6030                     | 0.34577                                          |
| 159                                | 5795                    | 887.1560                     | 0.36711                                          |

| IEEE 802.11 ac(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 <sup>2</sup> ) |
| 155                                 | 5775                    | 810.9611                     | 0.33558                                          |

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        | Wireless-AC2600 Dual WAN VPN Wireless Router |
| Test Mode      | Mode 2: Transmit_Beamforming Mode            |
| Test Condition | RF Exposure Evaluation                       |

### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.19dBi or 2.08 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 <sup>2</sup> ) |
| 149                                | 5745                    | 449.7799                     | 0.18612                                          |
| 153                                | 5785                    | 459.1980                     | 0.19002                                          |
| 165                                | 5825                    | 458.1419                     | 0.18958                                          |

| 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 <sup>2</sup> ) |
| 151                                | 5755                    | 462.3810                     | 0.19133                                          |
| 159                                | 5795                    | 459.1980                     | 0.19002                                          |

| IEEE 802.11 ac(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 <sup>2</sup> ) |
| 155                                 | 5775                    | 459.1980                     | 0.19002                                          |

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        | Wireless-AC2600 Dual WAN VPN Wireless Router |
| Test Mode      | Mode 3: (80+80MHz) Mode                      |
| Test Condition | RF Exposure Evaluation                       |

| Power Density (5.2GHz)<br>(mW/cm <sup>2</sup> ) | Power Density (5.8GHz)<br>(mW/cm <sup>2</sup> ) | Total Power Density<br>(5.2GHz+5.8GHz)<br>(mW/cm <sup>2</sup> ) | Limit<br>(mW/cm <sup>2</sup> ) |
|-------------------------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------|
| 0.12347                                         | 0.33558                                         | 0.45905                                                         | 1                              |