

# RF Exposure Evaluation Declaration

Product Name : Dual Band 3x3 802.11ac PCI-E Adapter  
Trade Name : ASUS  
Model No. : PCE-AC68  
FCC ID. : MSQ-PCEAC68

Applicant : ASUSTeK COMPUTER INC.

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

Date of Receipt : Jan. 30, 2016  
Issued Date : May 12, 2016  
Report No. : 1620097R-RF-US-Exp  
Report Version : V1.0



The declaration results relate only to the samples calculated.

The declaration shall not be reproduced except in full without the written approval of QuieTek Corporation.

## 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:  $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$

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        | Dual Band 3x3 802.11ac PCI-E Adapter |
| 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 3dBi or 2 in linear scale.

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

| IEEE 802.11a (ANT 0+1+2) |                         |                              |                                                  |
|--------------------------|-------------------------|------------------------------|--------------------------------------------------|
| WLAN Function            |                         |                              |                                                  |
| Channel                  | Channel Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm <sup>2</sup> ) |
| 36                       | 5180                    | 89.1251                      | 0.03546                                          |
| 40                       | 5220                    | 62.5173                      | 0.02487                                          |
| 44                       | 5240                    | 89.7429                      | 0.03571                                          |

| IEEE 802.11 n(20MHz) (ANT 0+1+2) |                         |                              |                                                  |
|----------------------------------|-------------------------|------------------------------|--------------------------------------------------|
| WLAN Function                    |                         |                              |                                                  |
| Channel                          | Channel Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm <sup>2</sup> ) |
| 36                               | 5180                    | 70.3072                      | 0.02797                                          |
| 40                               | 5220                    | 77.6247                      | 0.03089                                          |
| 44                               | 5240                    | 93.3254                      | 0.03713                                          |

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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| Test Condition | RF Exposure Evaluation               |

### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3dBi or 2 in linear scale.

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

| IEEE 802.11 n(40MHz) (ANT 0+1+2) |                         |                              |                                                  |
|----------------------------------|-------------------------|------------------------------|--------------------------------------------------|
| WLAN Function                    |                         |                              |                                                  |
| Channel                          | Channel Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm <sup>2</sup> ) |
| 38                               | 5190                    | 86.6962                      | 0.03450                                          |
| 46                               | 5230                    | 181.5516                     | 0.07224                                          |

| IEEE 802.11 ac(80MHz) (ANT 0+1+2) |                         |                              |                                                  |
|-----------------------------------|-------------------------|------------------------------|--------------------------------------------------|
| WLAN Function                     |                         |                              |                                                  |
| Channel                           | Channel Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm <sup>2</sup> ) |
| 42                                | 5210                    | 55.4626                      | 0.02207                                          |

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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| 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 3dBi or 2 in linear scale.

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

| IEEE 802.11a (ANT 0+1+2) |                         |                              |                                                  |
|--------------------------|-------------------------|------------------------------|--------------------------------------------------|
| WLAN Function            |                         |                              |                                                  |
| Channel                  | Channel Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm <sup>2</sup> ) |
| 149                      | 5745                    | 502.3426                     | 0.19988                                          |
| 153                      | 5785                    | 528.4453                     | 0.21026                                          |
| 165                      | 5825                    | 503.5006                     | 0.20034                                          |

| IEEE 802.11 n(20MHz) (ANT 0+1+2) |                         |                              |                                                  |
|----------------------------------|-------------------------|------------------------------|--------------------------------------------------|
| WLAN Function                    |                         |                              |                                                  |
| Channel                          | Channel Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm <sup>2</sup> ) |
| 149                              | 5745                    | 474.2420                     | 0.18869                                          |
| 153                              | 5785                    | 533.3349                     | 0.21221                                          |
| 165                              | 5825                    | 533.3349                     | 0.21221                                          |

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 is 3dBi or 2 in linear scale.

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

| IEEE 802.11 n(40MHz) (ANT 0+1+2) |                         |                              |                                                  |
|----------------------------------|-------------------------|------------------------------|--------------------------------------------------|
| WLAN Function                    |                         |                              |                                                  |
| Channel                          | Channel Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm <sup>2</sup> ) |
| 151                              | 5755                    | 380.1894                     | 0.15127                                          |
| 159                              | 5795                    | 618.0164                     | 0.24590                                          |

| IEEE 802.11 ac(80MHz) (ANT 0+1+2) |                         |                              |                                                  |
|-----------------------------------|-------------------------|------------------------------|--------------------------------------------------|
| WLAN Function                     |                         |                              |                                                  |
| Channel                           | Channel Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm <sup>2</sup> ) |
| 155                               | 5775                    | 330.3695                     | 0.13145                                          |

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>.