

# Maximum Permissible Exposure Evaluation

## FCC ID: 2ANBD-201

### 1. Client Information

**Applicant** : Brightswitch, Inc  
**Address** : 2437 Twin Knolls Dr., # 1, Bend, Oregon, USA 97701  
**Manufacturer** : Brightswitch, Inc  
**Address** : 2437 Twin Knolls Dr., # 1, Bend, Oregon, USA 97701

### 2. General Description of EUT

|                                                                                 |   |                                                                    |                                                                                                 |
|---------------------------------------------------------------------------------|---|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| EUT Name                                                                        | : | Brightswitch 201                                                   |                                                                                                 |
| Models No.                                                                      | : | 201                                                                |                                                                                                 |
| Product Description                                                             | : | Operation Frequency:                                               | 802.11b/g/n(HT20): 2412MHz~2462MHz<br>Bluetooth V4.0: 2402~2480 MHz                             |
|                                                                                 |   | RF Output Power:                                                   | 802.11b: 16.76dBm<br>802.11g: 15.75dBm<br>802.11n (HT20): 15.26dBm<br>Bluetooth: 1.493dBm(GFSK) |
|                                                                                 |   | Antenna Gain:                                                      | 2dBi PFC Antenna                                                                                |
|                                                                                 |   |                                                                    |                                                                                                 |
| Power Supply                                                                    | : | DC Voltage supplied by AC/DC Adapter                               |                                                                                                 |
| Power Rating                                                                    | : | AD/DC Adapter Model(201)<br>Input: AC 120V/60Hz<br>Output: 5V/1.5A |                                                                                                 |
| Connecting I/O Port(S)                                                          | : | Please refer to the User's Manual                                  |                                                                                                 |
| Note: More information about the RF function, please refer the RF test reports. |   |                                                                    |                                                                                                 |

## MPE Calculations for WIFI

### 1. Antenna Gain:

PFC Antenna: 2dBi.

### 2. EUT Operation Condition:

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

### 3. Exposure Evaluation:

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S=(PG)/4\pi R^2$$

Where

**S:** power density

**P:** power input to the antenna

**G:** power gain of the antenna in the direction of interest relative to an isotropic radiator.

**R:** distance to the center of radiation of the antenna

### 4. Test Result:

| Worst Maximum MPE Result |                 |             |                            |                    |                             |                    |                   |                                          |
|--------------------------|-----------------|-------------|----------------------------|--------------------|-----------------------------|--------------------|-------------------|------------------------------------------|
| Mode                     | N <sub>TX</sub> | Freq. (MHz) | Conducted Power(max) (dBm) | Turn-up Power (dB) | Max tune up power (dBm) [P] | ANT Gain (dBi) [G] | Distance (cm) [R] | Power Density (mW/ cm <sup>2</sup> ) [S] |
| 802.11b                  | 1               | 2412        | 16.45                      | 16±1               | 17                          | 2                  | 20                | 0.0158                                   |
|                          |                 | 2437        | 16.41                      | 16±1               | 17                          | 2                  | 20                | 0.0158                                   |
|                          |                 | 2462        | 16.76                      | 16±1               | 17                          | 2                  | 20                | 0.0158                                   |
| 802.11g                  | 1               | 2412        | 15.75                      | 15±1               | 16                          | 2                  | 20                | 0.0126                                   |
|                          |                 | 2437        | 15.64                      | 15±1               | 16                          | 2                  | 20                | 0.0126                                   |
|                          |                 | 2462        | 15.42                      | 15±1               | 16                          | 2                  | 20                | 0.0126                                   |
| 802.11n (HT20)           | 1               | 2412        | 15.12                      | 15±1               | 16                          | 2                  | 20                | 0.0126                                   |
|                          |                 | 2437        | 15.26                      | 15±1               | 16                          | 2                  | 20                | 0.0126                                   |
|                          |                 | 2462        | 15.19                      | 15±1               | 16                          | 2                  | 20                | 0.0126                                   |

**Note:**  
 (1) N<sub>TX</sub>= Number of Transmit Antennas  
 (2) RF Output power specifies that Maximum Conducted Peak Output Power.

| Worst Maximum MPE Result   |                 |             |                            |                    |                             |                    |                   |                                          |
|----------------------------|-----------------|-------------|----------------------------|--------------------|-----------------------------|--------------------|-------------------|------------------------------------------|
| Mode                       | N <sub>TX</sub> | Freq. (MHz) | Conducted Power(max) (dBm) | Turn-up Power (dB) | Max tune up power (dBm) [P] | ANT Gain (dBi) [G] | Distance (cm) [R] | Power Density (mW/ cm <sup>2</sup> ) [S] |
| Bluetooth Mode (GFSK)      | 1               | 2402        | 1.493                      | 0.5±1              | 1.5                         | 2                  | 20                | 0.0005                                   |
|                            |                 | 2441        | 1.152                      | 0.5±1              | 1.5                         | 2                  | 20                | 0.0005                                   |
|                            |                 | 2480        | 0.389                      | 0.5±1              | 1.5                         | 2                  | 20                | 0.0005                                   |
| Bluetooth Mode (π/4-DQPSK) | 1               | 2402        | 0.348                      | 0±1                | 1                           | 2                  | 20                | 0.0004                                   |
|                            |                 | 2441        | 0.157                      | 0±1                | 1                           | 2                  | 20                | 0.0004                                   |
|                            |                 | 2480        | -0.517                     | 0±1                | 1                           | 2                  | 20                | 0.0004                                   |
| Bluetooth Mode (8-DPSK)    | 1               | 2402        | 0.436                      | 0±1                | 1                           | 2                  | 20                | 0.0004                                   |
|                            |                 | 2441        | 0.267                      | 0±1                | 1                           | 2                  | 20                | 0.0004                                   |
|                            |                 | 2480        | -0.445                     | 0±1                | 1                           | 2                  | 20                | 0.0004                                   |

Note:  
 (3) N<sub>TX</sub>= Number of Transmit Antennas  
 (4) RF Output power specifies that Maximum Conducted Peak Output Power.

| Test separation:20mm             |                |                         |                 |
|----------------------------------|----------------|-------------------------|-----------------|
| The worst RF Exposure Evaluation |                |                         |                 |
| Worst Calculation Value          |                | Total Calculation Value | Threshold Value |
| WiFi Mode                        | Bluetooth Mode |                         |                 |
| 0.0158                           | 0.0005         | 0.0163                  | 1mW             |

### 5. Conclusion:

As specified in Table 1B of 47 CFR 1.1310- Limits for Maximum Permissible Exposure (MPE),

#### Limits for General Population/ Uncontrolled Exposure

| Frequency Range (MHz) | Power density (mW/ cm <sup>2</sup> ) |
|-----------------------|--------------------------------------|
| 300-1,500             | F/1500                               |
| 1,500-100,000         | 1.0                                  |

For 802.11b/g/n (2412~2462 MHz)

Bluetooth Mode (GFSK, π/4-DQPSK, 8-DPSK)

MPE limit S: 1mW/ cm<sup>2</sup>

The MPE is calculated as 0.0163mW / cm<sup>2</sup> < limit 1mW / cm<sup>2</sup>. So, RF exposure limit warning or SAR test are not required.

The EUT will only be used with a separation of 20cm or greater between the antenna and nearby persons and can therefore be considered a mobile transmitter per 47 CFR2.1091 (b).

The RF Exposure Information page from the manual is included here for reference.

**Note**

For a more detailed features description, please refer to the RF Test Report.

-----END OF REPORT-----