

## 8.1 WIFI Output Power

### 8.1.1 WIFI2.4G Output Power

| WIFI2.4G- Power |       |         |                 |                       |               |          |
|-----------------|-------|---------|-----------------|-----------------------|---------------|----------|
|                 | Mode  | Channel | Frequency (MHz) | Conducted Power (dBm) | Tune up (dBm) | SAR Test |
| 2.4G            | 11b   | 1       | 2412            | <b>18.29</b>          | 19.50         | Yes      |
|                 |       | 6       | 2437            | 18.18                 | 19.50         | Yes      |
|                 |       | 11      | 2462            | 18.24                 | 19.50         | Yes      |
|                 | 11g   | 1       | 2412            | 13.67                 | 15.00         | No       |
|                 |       | 2       | 2417            | 17.11                 | 18.00         | No       |
|                 |       | 6       | 2437            | 17.15                 | 18.00         | No       |
|                 |       | 11      | 2462            | 17.23                 | 18.00         | No       |
|                 | 11n20 | 1       | 2412            | 13.50                 | 15.00         | No       |
|                 |       | 2       | 2417            | 16.10                 | 17.00         | No       |
|                 |       | 6       | 2437            | 16.13                 | 17.00         | No       |
|                 |       | 11      | 2462            | 16.05                 | 17.00         | No       |
|                 | 11n40 | 3       | 2422            | 14.25                 | 16.00         | No       |
|                 |       | 6       | 2437            | 14.40                 | 16.00         | No       |
|                 |       | 9       | 2452            | 14.37                 | 16.00         | No       |

Note: When multiple channel bandwidth configurations in a frequency band have the same maximum tune-up output power, the test configuration is determined by applying the following steps sequentially.

- 1) The largest channel bandwidth configuration is selected between the multiple configurations in a frequency band with the same maximum tune-up output power.
- 2) When multiple transmission modes (802.11b/g/n) have the same maximum tune-up output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11b is chosen over 802.11g, and 802.11g chosen over 802.11n.
- 3) According KDB 247228, when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg, OFDM SAR test is not required.

Adjusted SAR =  $1.024 * (63.10\text{mW}/89.13\text{mW}) = 0.725$  W/Kg, so 2.4G OFDM SAR test is not required.

## 8.1.2 WIFI5G Output Power

| WIFI5G-Power |        |         |                 |                       |               |          |
|--------------|--------|---------|-----------------|-----------------------|---------------|----------|
|              | Mode   | Channel | Frequency (MHz) | Conducted Power (dBm) | Tune up (dBm) | SAR Test |
| 5.2G         | 11a    | 36      | 5180            | 16.70                 | 18.00         | No       |
|              |        | 44      | 5220            | 16.75                 | 18.00         | No       |
|              |        | 48      | 5240            | 17.18                 | 18.00         | No       |
|              | 11n20  | 36      | 5180            | 15.75                 | 17.00         | No       |
|              |        | 44      | 5220            | 15.76                 | 17.00         | No       |
|              |        | 48      | 5240            | 16.17                 | 17.00         | No       |
|              | 11n40  | 38      | 5190            | 15.69                 | 17.00         | No       |
|              |        | 46      | 5230            | 16.09                 | 17.00         | No       |
|              | 11ac20 | 36      | 5180            | 15.83                 | 17.00         | No       |
|              |        | 44      | 5220            | 16.29                 | 17.00         | No       |
|              |        | 48      | 5240            | 16.23                 | 17.00         | No       |
|              | 11ac40 | 38      | 5190            | 15.75                 | 17.00         | No       |
|              |        | 46      | 5230            | 16.12                 | 17.00         | No       |
|              | 11ac80 | 42      | 5210            | 15.23                 | 17.00         | No       |
| 5.3G         | 11a    | 52      | 5260            | 16.79                 | 18.00         | Yes      |
|              |        | 60      | 5300            | <b>17.11</b>          | 18.00         | Yes      |
|              |        | 64      | 5320            | 17.08                 | 18.00         | Yes      |
|              | 11n20  | 52      | 5260            | 15.73                 | 17.00         | No       |
|              |        | 60      | 5300            | 16.05                 | 17.00         | No       |
|              |        | 64      | 5320            | 15.98                 | 17.00         | No       |
|              | 11n40  | 54      | 5270            | 15.53                 | 17.00         | No       |
|              |        | 62      | 5310            | 15.10                 | 17.00         | No       |
|              | 11ac20 | 52      | 5260            | 15.69                 | 17.00         | No       |
|              |        | 60      | 5300            | 16.05                 | 17.00         | No       |
|              |        | 64      | 5320            | 16.00                 | 17.00         | No       |
|              | 11ac40 | 54      | 5270            | 15.56                 | 17.00         | No       |
|              |        | 62      | 5310            | 15.13                 | 17.00         | No       |
|              | 11ac80 | 58      | 5290            | 14.14                 | 16.00         | No       |
| 5.6G         | 11a    | 100     | 5500            | 15.52                 | 16.50         | Yes      |
|              |        | 104     | 5520            | 16.86                 | 18.00         | Yes      |
|              |        | 108     | 5540            | 16.72                 | 18.00         | Yes      |
|              |        | 112     | 5560            | 16.75                 | 18.00         | Yes      |
|              |        | 116     | 5580            | <b>16.90</b>          | 18.00         | Yes      |
|              |        | 120     | 5600            | 16.80                 | 18.00         | Yes      |
|              |        | 124     | 5620            | 16.74                 | 18.00         | Yes      |
|              |        | 128     | 5640            | 16.85                 | 18.00         | Yes      |
|              |        | 132     | 5660            | 16.71                 | 18.00         | Yes      |
|              |        | 136     | 5680            | 16.88                 | 18.00         | Yes      |
|              |        | 140     | 5700            | 14.16                 | 15.50         | No       |
|              | 11n20  | 100     | 5500            | 14.83                 | 16.00         | No       |
|              |        | 104     | 5520            | 15.79                 | 16.50         | No       |
|              |        | 116     | 5580            | 15.85                 | 16.50         | No       |
|              |        | 136     | 5680            | 15.81                 | 16.50         | No       |
|              |        | 140     | 5700            | 14.53                 | 16.00         | No       |
|              | 11n40  | 102     | 5510            | 12.59                 | 14.00         | No       |
|              |        | 110     | 5550            | 15.41                 | 16.50         | No       |
|              |        | 118     | 5590            | 15.62                 | 16.50         | No       |
|              |        | 134     | 5670            | 15.35                 | 16.50         | No       |
|              | 11ac20 | 100     | 5500            | 15.39                 | 16.50         | No       |
|              |        | 104     | 5520            | 15.74                 | 16.50         | No       |
|              |        | 116     | 5580            | 15.81                 | 16.50         | No       |
|              |        | 136     | 5680            | 15.73                 | 16.50         | No       |
|              |        | 140     | 5700            | 13.52                 | 15.00         | No       |
|              | 11ac40 | 102     | 5510            | 13.69                 | 15.00         | No       |
|              |        | 110     | 5550            | 15.51                 | 16.50         | No       |
|              |        | 118     | 5590            | 15.62                 | 16.50         | No       |
|              |        | 134     | 5670            | 15.34                 | 16.50         | No       |
|              | 11ac80 | 106     | 5530            | 12.10                 | 14.00         | No       |
|              |        | 122     | 5610            | 15.21                 | 16.50         | No       |

|      |        |     |      |              |       |     |
|------|--------|-----|------|--------------|-------|-----|
| 5.8G | 11a    | 149 | 5745 | 16.40        | 17.00 | Yes |
|      |        | 157 | 5785 | 16.54        | 17.00 | Yes |
|      |        | 165 | 5825 | <b>16.69</b> | 17.00 | Yes |
|      | 11n20  | 149 | 5745 | 15.31        | 16.50 | No  |
|      |        | 157 | 5785 | 15.47        | 16.50 | No  |
|      |        | 165 | 5825 | 15.58        | 16.50 | No  |
|      | 11n40  | 151 | 5755 | 15.24        | 16.50 | No  |
|      |        | 159 | 5795 | 15.81        | 16.50 | No  |
|      | 11ac20 | 149 | 5745 | 15.37        | 16.50 | No  |
|      |        | 157 | 5785 | 15.92        | 16.50 | No  |
|      |        | 165 | 5825 | 15.61        | 16.50 | No  |
|      | 11ac40 | 151 | 5755 | 15.28        | 16.50 | No  |
|      |        | 159 | 5795 | 15.37        | 16.50 | No  |
|      | 11ac80 | 155 | 5775 | 14.85        | 16.50 | No  |

Note: When multiple channel bandwidth configurations in a frequency band have the same maximum tune-up output power, the test configuration is determined by applying the following steps sequentially.

1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is  $\leq 1.2$  W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.

2) The largest channel bandwidth configuration is selected among the multiple configurations in a frequency band with the same maximum tune-up output power.

3) When multiple transmission modes (802.11a/g/n/ac) have the same maximum tune-up output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then 802.11ac.

## 8.2 Bluetooth

### 8.2.1 Bluetooth Output Power

| Bluetooth-Power                                                                                                                                                                                                                                                  |            |                |                |                       |                |          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------|----------------|-----------------------|----------------|----------|
| Test Mode                                                                                                                                                                                                                                                        | Modulation | Channel number | Frequency(MHz) | Conducted Power (dBm) | Tune up (dBm)) | SAR Test |
| BT                                                                                                                                                                                                                                                               | DH5        | 0              | 2402           | 8.44                  | 10.00          | Yes      |
|                                                                                                                                                                                                                                                                  |            | 39             | 2441           | <b>8.58</b>           | 10.00          | Yes      |
|                                                                                                                                                                                                                                                                  |            | 78             | 2480           | 8.45                  | 10.00          | Yes      |
|                                                                                                                                                                                                                                                                  | 2DH5       | 0              | 2402           | 4.85                  | 6.50           | No       |
|                                                                                                                                                                                                                                                                  |            | 39             | 2441           | 5.93                  | 6.50           | No       |
|                                                                                                                                                                                                                                                                  |            | 78             | 2480           | 5.58                  | 6.50           | No       |
|                                                                                                                                                                                                                                                                  | 3DH5       | 0              | 2402           | 4.54                  | 6.50           | No       |
|                                                                                                                                                                                                                                                                  |            | 39             | 2441           | 5.67                  | 6.50           | No       |
|                                                                                                                                                                                                                                                                  |            | 78             | 2480           | 5.23                  | 6.50           | No       |
|                                                                                                                                                                                                                                                                  | BLE-1M     | 0              | 2402           | -4.67                 | -3.00          | No       |
|                                                                                                                                                                                                                                                                  |            | 19             | 2440           | -4.00                 | -3.00          | No       |
|                                                                                                                                                                                                                                                                  |            | 39             | 2480           | -4.12                 | -3.00          | No       |
|                                                                                                                                                                                                                                                                  | BLE-2M     | 1              | 2404           | -4.43                 | -3.00          | No       |
|                                                                                                                                                                                                                                                                  |            | 19             | 2440           | -3.83                 | -3.00          | No       |
|                                                                                                                                                                                                                                                                  |            | 38             | 2478           | -3.68                 | -3.00          | No       |
| Note: Since bluetooth BR mode is the maximum output power mode, SAR measurements were performed with test software using DH5 modulation, and SAR measurement is not required for the EDR and LE. When the secondary mode is ≤ ¼ dB higher than the primary mode. |            |                |                |                       |                |          |

## 8.2.2 Bluetooth Duty Cycle

The Bluetooth DH5 duty cycle is 76.31% as following figure, according to 2016 Oct. TCB workshop for Bluetooth SAR scaling need further consideration and the maximum duty cycle is 100%, therefore the actual duty cycle will be scaled up to 100% for Bluetooth reported SAR calculation.

