

FCC RF EXPOSURE REPORT

FCC ID: V7TAC19

Project No. : 1912C171
Equipment : AC2100 Dual Band Gigabit WiFi Router
Brand Name : Tenda
Test Model : AC19
Series Model : N/A
Applicant : SHENZHEN TENDA TECHNOLOGY CO.,LTD
Address : 6-8 Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052
Manufacturer : SHENZHEN TENDA TECHNOLOGY CO.,LTD
Address : 6-8 Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052
Date of Receipt : Dec. 25, 2019
Date of Test : Dec. 27, 2019 ~ Feb. 21, 2020
Issued Date : Mar. 02, 2020
Report Version : R00
Test Sample : Engineering Sample No.: DG2019122549
Standard(s) : FCC Guidelines for Human Exposure IEEE C95.1 & FCC Part 2.1091
FCC Title 47 Part 2.1091, OET Bulletin 65 Supplement C

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

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REPORT ISSUED HISTORY

| Report Version | Description | Issued Date |
|----------------|----------------|---------------|
| R00 | Original Issue | Mar. 02, 2020 |

1. MPE CALCULATION METHOD

Calculation Method of RF Safety Distance:

$$S = \frac{PG}{4\pi^2} = \frac{EIRP}{4\pi^2}$$

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

Table for Filed Antenna:

For 2.4G:

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) |
|------|-------|------------|--------------|-----------|------------|
| 1 | N/A | N/A | Dipole | N/A | 4 |
| 2 | N/A | N/A | Dipole | N/A | 4 |

Note:

This EUT supports CDD, and all antennas have the same gain,

(1) For Non-Beamforming function, Directional gain = $G_{ANT} + \text{Array Gain}$, where Array Gain is as follows:

For power spectral density measurements, $N_{ANT} = 2$, $N_{SS} = 1$.

So Directional gain = $G_{ANT} + \text{Array Gain} = G_{ANT} + 10 \log(N_{ANT}/N_{SS}) \text{ dB} = 4 + 10 \log(2/1) \text{ dBi} = 7.01$.

Then, the power density limit is $8 - (7.01 - 6) = 6.99$.

For power measurements, Array Gain = 0 dB ($N_{ANT} \leq 4$), so the Directional gain = 4.

(2) For Beamforming function, Beamforming Gain: 3 dB

So Directional gain = $3 + 4 = 7$. Then, the output power limit is $30 - (7 - 6) = 29$.

For 5G:

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) |
|------|-------|------------|--------------|-----------|------------|
| 1 | N/A | N/A | Dipole | N/A | 4 |
| 2 | N/A | N/A | Dipole | N/A | 4 |
| 3 | N/A | N/A | Dipole | N/A | 4 |
| 4 | N/A | N/A | Dipole | N/A | 4 |

Note:

This EUT supports CDD, and all antennas have the same gain,

(1) For Non-Beamforming function, Directional gain = $G_{ANT} + \text{Array Gain}$, where Array Gain is as follows:

For power spectral density measurements, $N_{ANT} = 4$, $N_{SS} = 1$.

So Directional gain = $G_{ANT} + \text{Array Gain} = G_{ANT} + 10 \log(N_{ANT}/N_{SS}) \text{ dB} = 4 + 10 \log(4/1) \text{ dBi} = 10.02$.

Then, the UNII-1 power spectral density limit is $17 - (10.02 - 6) = 12.98$.

the UNII-3 power spectral density limit is $30 - (10.02 - 6) = 25.98$.

For power measurements, Array Gain = 0 dB ($N_{ANT} \leq 4$), so the Directional gain = 4.

(2) For Beamforming function, Beamforming Gain: 6.00 dB.

So Directional gain = $4 + 6 = 10$. Then, the UNII-1 and UNII-3 output power limit is $30 - (10 - 6) = 26$,

The worst case for 3TX as follow:

For 2.4G:

For Non Beamforming:

| Operating Mode / TX Mode | 1TX | 2TX |
|--------------------------|------------|--------------------|
| IEEE 802.11b | V (Ant. 1) | - |
| IEEE 802.11g | V (Ant. 1) | - |
| IEEE 802.11n(HT20) | - | V (Ant. 1+ Ant. 2) |
| IEEE 802.11n(HT40) | - | V (Ant. 1+ Ant. 2) |

For Beamforming:

| Operating Mode / TX Mode | 2TX |
|--------------------------|--------------------|
| IEEE 802.11n(HT20) | V (Ant. 1+ Ant. 2) |
| IEEE 802.11n(HT40) | V (Ant. 1+ Ant. 2) |

For 5G:

For Non Beamforming:

| Operating Mode / TX Mode | 1TX | 4TX |
|--------------------------|------------|---------------------------------|
| IEEE 802.11a | V (Ant. 4) | - |
| IEEE 802.11n (HT20) | - | V (Ant. 1+Ant. 2+Ant. 3+Ant. 4) |
| IEEE 802.11n (HT40) | - | V (Ant. 1+Ant. 2+Ant. 3+Ant. 4) |
| IEEE 802.11ac(VHT20) | - | V (Ant. 1+Ant. 2+Ant. 3+Ant. 4) |
| IEEE 802.11ac(VHT40) | - | V (Ant. 1+Ant. 2+Ant. 3+Ant. 4) |
| IEEE 802.11ac(VHT80) | - | V (Ant. 1+Ant. 2+Ant. 3+Ant. 4) |

For Beamforming:

| Operating Mode / TX Mode | 4TX |
|--------------------------|---------------------------------|
| IEEE 802.11n (HT20) | V (Ant. 1+Ant. 2+Ant. 3+Ant. 4) |
| IEEE 802.11n (HT40) | V (Ant. 1+Ant. 2+Ant. 3+Ant. 4) |
| IEEE 802.11ac(VHT20) | V (Ant. 1+Ant. 2+Ant. 3+Ant. 4) |
| IEEE 802.11ac(VHT40) | V (Ant. 1+Ant. 2+Ant. 3+Ant. 4) |
| IEEE 802.11ac(VHT80) | V (Ant. 1+Ant. 2+Ant. 3+Ant. 4) |

2. TEST RESULTS

For 2.4GHz_Non Beamforming:

| Directional Gain (dBi) | Directional Gain (numeric) | Max. AVG Output Power (dBm) | Max. Output Power (mW) | Power Density (S) (mW/cm ²) | Limit of Power Density (S) (mW/cm ²) | Test Result |
|------------------------|----------------------------|-----------------------------|------------------------|---|--|-------------|
| 4 | 2.5119 | 22.74 | 187.9317 | 0.09396 | 1 | Complies |

For 2.4GHz_Beamforming:

| Directional Gain (dBi) | Directional Gain (numeric) | Max. AVG Output Power (dBm) | Max. Output Power (mW) | Power Density (S) (mW/cm ²) | Limit of Power Density (S) (mW/cm ²) | Test Result |
|------------------------|----------------------------|-----------------------------|------------------------|---|--|-------------|
| 7 | 5.0119 | 18.93 | 78.1628 | 0.07797 | 1 | Complies |

For 5GHz UNII-1_Non Beamforming:

| Directional Gain (dBi) | Directional Gain (numeric) | Max. Output Power (dBm) | Max. Output Power (mW) | Power Density (S) (mW/cm ²) | Limit of Power Density (S) (mW/cm ²) | Test Result |
|------------------------|----------------------------|-------------------------|------------------------|---|--|-------------|
| 4 | 2.5119 | 26.15 | 412.0975 | 0.20604 | 1 | Complies |

For 5GHz UNII-1_Beamforming:

| Directional Gain (dBi) | Directional Gain (numeric) | Max. Output Power (dBm) | Max. Output Power (mW) | Power Density (S) (mW/cm ²) | Limit of Power Density (S) (mW/cm ²) | Test Result |
|------------------------|----------------------------|-------------------------|------------------------|---|--|-------------|
| 10 | 10.0000 | 25.88 | 387.2576 | 0.77082 | 1 | Complies |

For 5GHz UNII-3_Non Beamforming:

| Directional Gain (dBi) | Directional Gain (numeric) | Max. Output Power (dBm) | Max. Output Power (mW) | Power Density (S) (mW/cm ²) | Limit of Power Density (S) (mW/cm ²) | Test Result |
|------------------------|----------------------------|-------------------------|------------------------|---|--|-------------|
| 4 | 2.5119 | 28.37 | 687.0684 | 0.34352 | 1 | Complies |

For 5GHz UNII-3_Beamforming:

| Directional Gain (dBi) | Directional Gain (numeric) | Max. Output Power (dBm) | Max. Output Power (mW) | Power Density (S) (mW/cm ²) | Limit of Power Density (S) (mW/cm ²) | Test Result |
|------------------------|----------------------------|-------------------------|------------------------|---|--|-------------|
| 10 | 10.0000 | 25.99 | 397.1915 | 0.79059 | 1 | Complies |

For the max simultaneous transmission MPE:

| Power Density (S) (mW/cm ²) | Power Density (S) (mW/cm ²) | Total | Limit of Power Density (S) (mW/cm ²) | Test Result |
|---|---|---------|--|-------------|
| 2.4GHz | 5GHz | | | |
| 0.09396 | 0.79059 | 0.88455 | 1 | Complies |

Note: The calculated distance is 20 cm.

End of Test Report