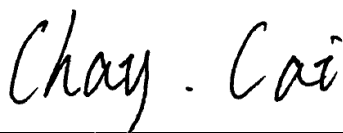


# FCC RF EXPOSURE REPORT

## FCC ID: V7TAC23

**Project No.** : 1912C172  
**Equipment** : AC2100 Dual Band Gigabit WiFi Router  
**Brand Name** : Tenda  
**Test Model** : AC23  
**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. 20, 2020  
**Issued Date** : Feb. 28, 2020  
**Report Version** : R00  
**Test Sample** : Engineering Sample No.: DG2019122551  
**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	Feb. 28, 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	5
2	N/A	N/A	Dipole	N/A	5

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 =  $G_{ANT} + \text{Array Gain} = G_{ANT} + 10 \log(N_{ANT}/N_{SS})$  dB =  $5 + 10 \log(2/1)$  dBi = 8.01.

Then, the power density limit is  $8 - (8.01 - 6) = 5.99$ .

For power measurements, Array Gain = 0 dB ( $N_{ANT} \leq 4$ ), so the Directional gain = 5.

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

So Directional gain =  $3 + 5 = 8$ . Then, the output power limit is  $30 - (8 - 6) = 28$ .

**For 5G:**

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Dipole	N/A	5
2	N/A	N/A	Dipole	N/A	5
3	N/A	N/A	Dipole	N/A	5
4	N/A	N/A	Dipole	N/A	5

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 =  $G_{ANT} + \text{Array Gain} = G_{ANT} + 10 \log(N_{ANT}/N_{SS})$  dB =  $5 + 10 \log(4/1)$  dBi = 11.02.

Then, the UNII-1 power spectral density limit is  $17 - (11.02 - 6) = 11.98$ .

the UNII-3 power spectral density limit is  $30 - (11.02 - 6) = 24.98$ .

For power measurements, Array Gain = 0 dB ( $N_{ANT} \leq 4$ ), so the Directional gain = 5.

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

So Directional gain =  $5 + 6 = 11$ . Then, the UNII-1 and UNII-3 output power limit is  $30 - (11 - 6) = 25$ .

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. 3)	-
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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
5	3.1623	22.52	178.6488	0.11245	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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
8	6.3096	18.30	67.6083	0.08491	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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
5	3.1623	23.95	248.3133	0.15630	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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
11	12.5893	23.76	237.6840	0.59559	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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
5	3.1623	25.48	353.1832	0.22231	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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
11	12.5893	24.80	301.9952	0.75675	1	Complies

**For the max simultaneous transmission MPE:**

Power Density (S) (mW/cm <sup>2</sup> )	Power Density (S) (mW/cm <sup>2</sup> )	Total	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
2.4GHz	5GHz			
0.11245	0.75675	0.8692	1	Complies

Note: The calculated distance is 20 cm.

**End of Test Report**