

FCC RF EXPOSURE REPORT

FCC ID: V7TMESH12

Project No. : 2003C093
Equipment : AC2100 Tri-band Whole Home Mesh WiFi System
Brand Name : Tenda
Test Model : Mesh12
Series Model : MW12, MW12a, MW12c, CM12
Applicant : SHENZHEN TENDA TECHNOLOGY CO.,LTD
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Manufacturer : SHENZHEN TENDA TECHNOLOGY CO.,LTD
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Date of Receipt : Mar. 12, 2020
Date of Test : Mar. 19, 2020 ~ Apr. 09, 2020
Issued Date : Jun. 28, 2020
Report Version : R00
Test Sample : Engineering Sample No.: DG2020031237
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	Jun. 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 2.4GHz

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Internal	N/A	3.52
2	N/A	N/A	Internal	N/A	3.52

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

- 1) For Non Beamforming, Directional gain= G_{ANT} +Array Gain.
For output power measurements, Array Gain=0 ($N_{ANT} \leq 4$), so the Directional gain=3.52.
For power spectral density measurements, Array Gain= $10\log(N_{ANT}/N_{SS})$ dB, so the Directional gain= $3.52+10\log(2/1)=6.53$. So, the power spectral density limit is $8-(6.53-6)=7.47$.
- 2) For Beamforming, Beamforming Gain: 3dB. So the Directional gain= $3+3.52=6.52$. So the output power limit is $30-(6.52-6)=29.48$

For 5GHz:

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

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

- 1) For Non Beamforming, Directional gain= G_{ANT} +Array Gain.
For output power measurements, Array Gain=0 ($N_{ANT} \leq 4$), so the Directional gain=4.
For power spectral density measurements, Array Gain= $10\log(N_{ANT}/N_{SS})$ dB, so the Directional gain= $4+10\log(2/1)=7.01$. So, the UNII-1 power spectral density limit is $17-(7.01-6)=15.99$, the UNII-3 power spectral density limit is $30-(7.01-6)=28.99$.
- 2) For Beamforming, Beamforming Gain: 3dB. So the Directional gain= $3+4=7$. So the output power limit is $30-(7-6)=29$.

Table for Antenna Configuration:

For 2.4GHz:

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)

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 5GHz:

Non Beamforming:

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

Beamforming:

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

2. TEST RESULTS

For 2.4GHz 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
3.52	2.2491	29.98	995.4054	0.33694	1	Complies

For 2.4GHz 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
6.52	4.4875	26.42	438.5307	0.29618	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	23.9	245.4709	0.09280	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	29.93	984.0111	0.37201	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
7	5.0119	23.94	247.7422	0.18688	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
7	5.0119	29.37	864.9679	0.65246	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			
0.33694	0.65246	0.9894	1	Complies

Note: The calculated distance is 23 cm.

End of Test Report