



中国认可  
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检测  
TESTING  
CNAS L3163

# CE RF Exposure Report

**Project No.** : 2307C104  
**Equipment** : N300 Wi-Fi 4G LTE Router  
**Brand Name** : Tenda  
**Test Model** : 4G03 Pro  
**Series Model** : 4G05  
**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** : Jul. 12, 2023  
**Date of Test** : Jul. 14, 2023 ~ Aug. 16, 2023  
**Issued Date** : Aug. 18, 2023  
**Report Version** : R01  
**Test Sample** : Engineering Sample No.: DG20230712320 for 2.4G WIFI, DG20230712320 and DG20230712323 for WCDMA and LTE.  
**Standard(s)** : EN 50385:2017  
EN IEC 62311:2020  
EN 62232:2017

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

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**REPORT ISSUED HISTORY**

Report No.	Version	Description	Issued Date	Note
BTL-ETSP-3-2307C104	R00	Original Report.	Aug. 01, 2023	Invalid
BTL-ETSP-3-2307C104	R01	Added information of 2.4G WIFI.	Aug. 18, 2023	Valid

## 1. GENERAL INFORMATION

### 1.1 GENERAL DESCRIPTION OF EUT

Equipment	N300 Wi-Fi 4G LTE Router		
Brand Name	Tenda		
Test Model	4G03 Pro		
Series Model	4G05		
Model Difference(s)	Only differ in model name.		
Power Source	DC Voltage supplied from AC adapter. 1# Model: BN003-A05009E(EU) 2# Model: BN003-A05009B(UK) Only differ in plug.		
Power Rating	I/P: 100-240V ~ 50/60Hz 0.3A O/P: 9V  0.6A		
Product Description for WCDMA	Operation Frequency Bands	Band I: UL:1920MHz ~ 1980MHz, DL: 2110MHz ~ 2170MHz Band VIII: UL: 880MHz ~ 915MHz, DL: 925MHz ~ 960MHz	
	Modulation Type	UL: BPSK, QPSK, 16QAM DL: BPSK, QPSK, 16QAM, 64QAM	
	Power Class	3	
	IMEI NO.	Radiated	864995060015480 / 864995060084627
	Max. Tune Up Power	Band I/VIII: 25 dBm	
Product Description for LTE	Operation Frequency Bands	LTE Band 1: Uplink: 1920-1980 MHz, Downlink: 2110-2170 MHz LTE Band 3: Uplink: 1710-1785 MHz, Downlink: 1805-1880 MHz LTE Band 7: Uplink: 2500-2570 MHz, Downlink: 2620-2690 MHz LTE Band 8: Uplink: 880-915 MHz, Downlink: 925-960 MHz LTE Band 20: Uplink: 832-862 MHz, Downlink: 791-821 MHz LTE Band 28: Uplink: 703-748 MHz, Downlink: 758-803 MHz LTE Band 38: Uplink: 2570-2620 MHz, Downlink: 2570-2620 MHz LTE Band 40: Uplink: 2300-2400 MHz, Downlink : 2300-2400 MHz	
	Modulation Type	UL: QPSK, 16QAM DL: QPSK, 16QAM, 64QAM	
	Power Class	3	
	IMEI NO.	Radiated	864995060015480 / 864995060084627
	Max. Tune Up Power	Band 1/3/7/8/20/28/38/40: 25 dBm	

Product Description for 2.4GHz	Operation Frequency Band	2412 MHz ~ 2472 MHz
	Modulation Technology	IEEE 802.11b: DSSS IEEE 802.11g: OFDM IEEE 802.11n: OFDM
	Bit Rate of Transmitter	IEEE 802.11b: 11/5.5/2/1 Mbps IEEE 802.11g: 54/48/36/24/18/12/9/6 Mbps IEEE 802.11n: up to 300 Mbps
	Max. e.i.r.p.	IEEE 802.11b: 19.97 dBm (99.31 mW) IEEE 802.11g: 19.83 dBm (96.16 mW) IEEE 802.11n(HT20): 19.79 dBm (95.28 mW) IEEE 802.11n(HT40): 19.80 dBm (95.50 mW)

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. Channel List:

For WCDMA:

Bands	Sub-test	Channel	Frequency (MHz)	
WCDMA Band I	---	9613	Low	1922.6
		9750	Mid	1950.0
		9887	High	1977.4
WCDMA Band VIII	---	4232	Low	882.6
		2713	Mid	897.6
		2788	High	912.4

For LTE:

Band	Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
1	5	18025	18300	18575	1922.5	1950.0	1977.5
1	10	18050	18300	18550	1925.0	1950.0	1975.0
1	15	18075	18300	18525	1927.5	1950.0	1972.5
1	20	18100	18300	18500	1930.0	1950.0	1970.0

Band	Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
3	1.4	19207	19575	19943	1710.7	1747.5	1784.3
3	3	19215	19575	19935	1711.5	1747.5	1783.5
3	5	19225	19575	19925	1712.5	1747.5	1782.5
3	10	19250	19575	19900	1715.0	1747.5	1780.0
3	15	19275	19575	19875	1717.5	1747.5	1777.5
3	20	19300	19575	19850	1720.0	1747.5	1775.0

Band	Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
7	5	20775	21100	21425	2502.5	2535.0	2567.5
7	10	20800	21100	21400	2505.0	2535.0	2565.0
7	15	20825	21100	21375	2507.5	2535.0	2562.5
7	20	20850	21100	21350	2510.0	2535.0	2560.0

Band	Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
8	1.4	21457	21625	21793	880.7	897.5	914.3
8	3	21465	21625	21785	881.5	897.5	913.5
8	5	21475	21625	21775	882.5	897.5	912.5
8	10	21500	21625	21750	885.0	897.5	910.0

Band	Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
20	5	24175	24300	24425	834.5	847.0	859.5
20	10	24200	24300	24400	837.0	847.0	857.0
20	15	24225	24300	24375	839.5	847.0	854.5
20	20	24250	24300	24350	842.0	847.0	852.0

Band	Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
28	3	27225	27375	27645	704.5	719.5	746.5
28	5	27235	27385	27635	705.5	720.5	745.5
28	10	27260	27410	27610	708.0	723.0	743.0
28	15	27285	27435	27585	710.5	725.5	740.5
28	20	27310	27460	27560	713.0	728.0	738.0

Band	Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
38	5	37775	38000	38225	2572.5	2595.0	2617.5
38	10	37800	38000	38200	2575.0	2595.0	2615.0
38	15	37825	38000	38175	2577.5	2595.0	2612.5
38	20	37850	38000	38150	2580.0	2595.0	2610.0

Band	Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
40	5	38675	39150	39625	2302.5	2350.0	2397.5
40	10	38700	39150	39600	2305.0	2350.0	2395.0
40	15	38725	39150	39575	2307.5	2350.0	2392.5
40	20	38750	39150	39550	2310.0	2350.0	2390.0

For 2.4GHz:

CH01 - CH13 for IEEE 802.11b, IEEE 802.11g, IEEE 802.11n(HT20)					
CH03 - CH11 for IEEE 802.11n(HT40)					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	06	2437	11	2462
02	2417	07	2442	12	2467
03	2422	08	2447	13	2472
04	2427	09	2452		
05	2432	10	2457		

### 3. Table for Filed Antenna:

For WCDMA:

Ant. Model Name	Type	Brand	Antenna Gain(dBi)	Note
N/A	Dipole	Tenda	2.37	Band I
			-0.28	Band VIII

Note: The antenna gain is provided by the manufacturer.

For LTE:

Ant. Model Name	Type	Brand	Antenna Gain(dBi)	Note
N/A	Dipole	Tenda	2.37	Band 1
			1.43	Band 3
			2.11	Band 7
			-0.28	Band 8
			0.89	Band 20
			-2.27	Band 28
			2.50	Band 38
			0.56	Band 40

Note: The antenna gain is provided by the manufacturer.

For 2.4GHz:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Tenda	N/A	PIFA	N/A	3.90
2	Tenda	N/A	PIFA	N/A	3.85

Note:

- 1) The EUT supports MIMO(Except IEEE 802.11b mode and IEEE 802.11g mode). Physically, the EUT provides two completed transmitters and receivers (2T2R).
- 2) The antenna gain is provided by the manufacturer.

### 4. The worst case for 1TX/2TX as follow:

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

### 3. MAXIMUM PERMISSIBLE EXPOSURE

#### 3.1 Applicable Standard

According to its specifications, the EUT must comply with the requirements of the following standards:

EN 50385 - Product standard to demonstrate the compliance of base station equipment with radiofrequency electromagnetic field exposure limits (110 MHz - 100 GHz), when placed on the market

EN IEC 62311 - Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz to 300 GHz)

EN 62232 - Determination of RF field strength, power density and SAR in the vicinity of radio communication base stations for the purpose of evaluating human exposure

#### 1 LIMIT

Council Recommendation 1999/519/EC Annex III

Reference levels for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density $S_{eq}$ (W/m <sup>2</sup> )
0-1 Hz	—	$3,2 \times 10^4$	$4 \times 10^4$	—
1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	—
8-25 Hz	10 000	$4\,000/f$	$5\,000/f$	—
0,025-0,8 kHz	$250/f$	$4/f$	$5/f$	—
0,8-3 kHz	$250/f$	5	6,25	—
3-150 kHz	87	5	6,25	—
0,15-1 MHz	87	$0,73/f$	$0,92/f$	—
1-10 MHz	$87/f^{1/2}$	$0,73/f$	$0,92/f$	—
10-400 MHz	28	0,073	0,092	2
400-2 000 MHz	$1,375\ f^{1/2}$	$0,0037\ f^{1/2}$	$0,0046\ f^{1/2}$	$f/200$
2-300 GHz	61	0,16	0,20	10

## 2 MPE Calculation Method

If a reflecting ground plane is present (e.g. see Figure B.14), use Equation (B.18):

$$S = (1 + |\Gamma|)^2 \frac{\bar{P}_{\text{net}} G_{\theta, \phi}}{4\pi r^2} \quad (\text{B.18})$$

with reflection coefficient  $|\Gamma| = 1$  for the theoretical highest field strength scenario of a perfectly conducting ground plane (e.g. flat metallic roof) or with reflection coefficient  $|\Gamma| = 0,6$  for typical [15] ground reflection conditions. Use of the far-field spherical formulas in the near-field region will overestimate the field strength levels.

$$|\Gamma| = 0.6$$

$$\bar{P}_{\text{net}} = \text{Output Power (W)}$$

$$G_{\theta, \phi} = \text{EUT Antenna gain (Linear ratio)}$$

$$\text{e.i.r.p. (W)} = \bar{P}_{\text{net}} * G_{\theta, \phi}$$

r=0.20m, as the calculated distance.



## 4. TEST RESULTS

### For WCDMA:

Band	Frequency (MHz)	Max. Tune Up Power (dBm)	Max. Tune Up Power (W)	Antenna Gain (dBi)	Antenna Gain (Linear ratio)	Power density (W/m <sup>2</sup> )	Limit (W/m <sup>2</sup> )	Result
Band I	1922.6	25	0.3162	2.37	1.73	2.7809	9.613	Pass
Band VIII	882.6	25	0.3162	-0.28	0.94	1.5107	4.413	Pass

### For LTE:

Band	Frequency (MHz)	Max. Tune Up Power (dBm)	Max. Tune Up Power (W)	Antenna Gain (dBi)	Antenna Gain (Linear ratio)	Power density (W/m <sup>2</sup> )	Limit (W/m <sup>2</sup> )	Result
Band 1	1922.5	25	0.3162	2.37	1.73	2.7809	9.6125	Pass
Band 3	1710.7	25	0.3162	1.43	1.39	2.2397	8.5535	Pass
Band 7	2502.5	25	0.3162	2.11	1.63	2.6193	10	Pass
Band 8	880.7	25	0.3162	-0.28	0.94	1.5107	4.4035	Pass
Band 20	834.5	25	0.3162	0.89	1.23	1.9778	4.1725	Pass
Band 28	704.5	25	0.3162	-2.27	0.59	0.9554	3.5225	Pass
Band 38	2572.5	25	0.3162	2.50	1.78	2.8654	10	Pass
Band 40	2302.5	25	0.3162	0.56	1.14	1.8331	10	Pass

### For 2.4GHz:

Max. e.i.r.p. (dBm)	Max. e.i.r.p. (W)	Power density (W/m <sup>2</sup> )	Limit (W/m <sup>2</sup> )	Result
19.97	0.0993	0.5060	10	Pass

### Conclusion:

Both of the 2.4GHz and LTE device can transmit simultaneously, the formula of calculated the exposure is:

$$(CPD1 / LPD1) + (CPD2 / LPD2) + \dots \text{etc.} < 1$$

**CPD = Calculation Power Density**

**LPD = Limit of Power Density**

Therefore, the calculation of this situation is  $(0.5060 / 10) + (1.9778 / 4.1725) = 0.52$ , which is less than the "1" limit.

RF exposure assessment has been performed above to prove that this unit will not generate the harmful EM emission above the reference level as specified in EC Council Recommendation (1999/519/EC).

**End of Test Report**