CE RF Exposure Report

Project No.	:	2406G030
Equipment	:	AC1200 Wireless Mini VPN Router
Brand Name	:	Cudy
Test Model	:	TR1200
Series Model	:	N/A
Applicant	:	Shenzhen Cudy Technology Co., Ltd.
Address	:	Room A606, Gaoxinqi Industrial Park, Liuxianyi Road, Baoan District, Shenzhen, China
Manufacturer	:	Shenzhen Cudy Technology Co., Ltd.
Address	:	Room A606, Gaoxinqi Industrial Park, Liuxianyi Road, Baoan District, Shenzhen, China
Factory	:	Shenzhen Cudy Technology Co., Ltd.
Address	:	Room A606, Gaoxinqi Industrial Park, Liuxianyi Road, Baoan District, Shenzhen, China
Date of Receipt	:	Jun. 14, 2024
Date of Test	:	Jun. 19, 2024 ~ Jul. 19, 2024
Issued Date	:	Jul. 29, 2024
Report Version	:	R00
Test Sample	:	Engineering Sample No.: SSL20240614212
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.

Prepared by : Nick Chen
Nick Chen

Approved by : Chay . Cai
Chay Cai

Room 108, Building 2, No.1, Yile Road, Songshan Lake Zone, Dongguan City, Guangdong, People's Republic of China.
Tel: +86-769-8318-3000 Web: www.newbtl.com Service mail: btl_qa@newbtl.com

REPORT ISSUED HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-ETSP-4-2406G030	R00	Original Report.	Jul. 29, 2024	Valid

1. GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

Equipment	AC1200 Wireless Mini VPN Router	
Brand Name	Cudy	
Test Model	TR1200	
Series Model	N/A	
Model Difference(s)	N/A	
Hardware Version	V1	
Software Version	2.1.3	
Power Source	DC voltage supplied from AC adapter (support unit).	
Power Rating	5V⎓2A	
Product Description _2.4GHz	Operation Frequency	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: 18.18 dBm (65.77 mW) IEEE 802.11g: 19.67 dBm (92.68 mW) IEEE 802.11n(HT20): 19.82 dBm (95.94 mW) IEEE 802.11n(HT40): 19.85 dBm (96.61 mW)
Product Description _5GHz	Operation Frequency Band(s)	5150 MHz ~ 5250 MHz 5725 MHz ~ 5850 MHz
	Modulation Type	IEEE 802.11a/n/ac: OFDM
	Bit Rate of Transmitter	IEEE 802.11a: 54/48/36/24/18/12/9/6 Mbps IEEE 802.11n: up to 300 Mbps IEEE 802.11ac: up to 866.7 Mbps
	Max. e.i.r.p._Band 1	IEEE 802.11a: 20.74 dBm (118.58 mW) IEEE 802.11n(HT20): 20.66 dBm (116.41 mW) IEEE 802.11n(HT40): 21.95 dBm (156.68 mW) IEEE 802.11ac(VHT20): 21.01 dBm (126.18 mW) IEEE 802.11ac(VHT40): 22.62 dBm (182.81 mW) IEEE 802.11ac(VHT80): 22.78 dBm (189.67 mW)
	Max. e.i.r.p._Band 4	IEEE 802.11a: 13.48 dBm (22.28 mW) IEEE 802.11n(HT20): 13.25 dBm (21.13 mW) IEEE 802.11n(HT40): 12.34 dBm (17.14 mW) IEEE 802.11ac(VHT20): 13.71 dBm (23.50 mW) IEEE 802.11ac(VHT40): 13.52 dBm (22.49 mW) IEEE 802.11ac(VHT80): 13.43 dBm (22.03 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 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		

For 5GHz:

IEEE 802.11a IEEE 802.11n(HT20) IEEE 802.11ac(VHT20)		IEEE 802.11n(HT40) IEEE 802.11ac(VHT40)		IEEE 802.11ac(VHT80)	
Band 1		Band 1		Band 1	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	38	5190	42	5210
40	5200	46	5230		
44	5220				
48	5240				

IEEE 802.11a IEEE 802.11n(HT20) IEEE 802.11ac(VHT20)		IEEE 802.11n(HT40) IEEE 802.11ac(VHT40)		IEEE 802.11ac(VHT80)	
Band 4		Band 4		Band 4	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	151	5755	155	5775
153	5765	159	5795		
157	5785				
161	5805				
165	5825				

3. Table for Filed Antenna:

For 2.4GHz:

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	South star	3.N102.1076	External	IPEX	3.97
2	South star	3.N102.1076	External	IPEX	3.97

Note:

1) This EUT supports CDD. Physically, the EUT provides two completed transmitters and receivers (2T2R).
2) The antenna gain is provided by the manufacturer.

For 5GHz Band1:

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	South star	3.N102.1076	External	IPEX	3.46
2	South star	3.N102.1076	External	IPEX	3.46

Note:

1) This EUT supports CDD. Physically, the EUT provides two completed transmitters and receivers (2T2R).
2) The antenna gain is provided by the manufacturer.

For 5GHz Band4:

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	South star	3.N102.1076	External	IPEX	3.56
2	South star	3.N102.1076	External	IPEX	3.56

Note:

1) This EUT supports CDD. Physically, the EUT provides two completed transmitters and receivers (2T2R).
2) The antenna gain is provided by the manufacturer.

4. The worst case for 2TX as follow:

For 2.4GHz:

Operating Mode / TX Mode	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)

For 5GHz:

Operating Mode / TX Mode	2TX
IEEE 802.11a	V (Ant. 1+Ant. 2)
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. MAXIMUM PERMISSIBLE EXPOSURE

2.1 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^2)
0-1 Hz	—	$3,2 \times 10^4$	4×10^4	—
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):

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

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.

| Γ | = 0.6

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

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

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

r=0.20m, as the calculated distance.

3. TEST RESULTS

For 2.4GHz:

Max. e.i.r.p. (dBm)	Max. e.i.r.p. (W)	Power density (W/m^2)	Limit (W/m^2)	Result
19.85	0.097	0.492	10	Pass

For 5GHz:

Max. e.i.r.p. (dBm)	Max. e.i.r.p. (W)	Power density (W/m^2)	Limit (W/m^2)	Result
22.78	0.190	0.966	10	Pass

Conclusion:

Both of the 2.4GHz and 5GHz device can transmit simultaneously, the formula of calculated the exposure is:

(CPD 1 / LPD1) + (CPD2 / LPD2) + ……etc. < 1
CPD = Calculation Power Density
LPD = Limit of Power Density

Therefore, the calculation of this situation is (0.492 / 10) + (0.966 / 10) =0.1458, 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