FCC RF EXPOSURE REPORT

FCC ID: XU8TEW831DR

Project No.	:	2001C070
Equipment	:	AC1200 Wireless Dual band Gigabit Router
Brand Name	:	TRENDnet
Test Model	:	TEW-831DR
Series Model	:	N/A
Applicant	:	TRENDnet,Inc.
Address	:	20675 Manhattan Place ,Torrance, CA 90501 USA
Manufacturer	:	TRENDnet,Inc.
Address	:	20675 Manhattan Place ,Torrance, CA 90501 USA
Factory	:	SHENZHEN GONGJIN ELECTRONICS CO.,LTD
Address	:	No.2, Danzi North Road,Kengzi Street, Shenzhen, Guangdong, China
Date of Receipt	:	Jan. 19, 2020
Date of Test	:	Jan. 19, 2020 ~ Jun. 03, 2020
Issued Date	:	Jul. 10, 2020
Report Version	:	R02
Test Sample	:	Engineering Sample No.: DG2020011969 for conducted, DG202005095 for radiated
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. 17, 2020
R01	Revised report to address comments.	Jul. 02, 2020
R02	Revised report to address comments.	Jul. 10, 2020

1. MPE CALCULATION METHOD

Calculation Method of RF Safety Distance:

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

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	UNILINK	N/A	External	N/A	5.21
2	UNILINK	N/A	External	N/A	5.21

Note:
This EUT supports MIMO 2X2, any transmit signals are correlated with each other, so Directional gain= G_{ANT}+10log(N)dBi, that is Directional gain=5.21+10log(2)dBi=8.22.
So, the output power limit is 30-(8.22-6)=27.78, the power spectral density limit is 8-(8.22-6)=5.78.

For 5G:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	UNILINK	N/A	External	N/A	5.15
2	UNILINK	N/A	External	N/A	5.15

Note:
This EUT supports MIMO 2X2, any transmit signals are correlated with each other, so,
(1) For Non Beamforming:
Directional gain= G_{ANT}+10log(N)dBi, that is Directional gain=5.15+10log(2)dBi=8.16.
So, the UNII-1 output power limit is 24-(8.16-6)=21.84, the UNII-3 output power limit is 30-(8.16-6)=27.84. The UNII-1 power spectral density limit is 11-(8.16-6)=8.84, the UNII-3 power spectral density limit is 30-(8.16-6)=27.84.
(2) For Beamforming:
Beamforming Gain:3dBi, Directional gain=3+5.15=8.15
So, the UNII-1 output power limit is 24-(8.15-6)=21.85, the UNII-3 output power limit is 30-(8.15-6)=27.85.

Table for Antenna Configuration:

For 2.4G:

Operating Mode / TX Mode	1TX	2TX
802.11b	V (Ant. 2)	-
802.11g	V (Ant. 2)	-
802.11n(20 MHz)	-	V (Ant. 1 + Ant. 2)
802.11n(40 MHz)	-	V (Ant. 1 + Ant. 2)

For 5G:

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:

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
8.22	6.6374	14.12	25.8226	0.03412	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
8.16	6.5464	15.3	33.8844	0.04415	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
8.16	6.5464	15.06	32.0627	0.04178	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
8.15	6.5313	15.24	33.4195	0.04345	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
8.15	6.5313	14.99	31.5500	0.04102	1	Complies

For the max simultaneous transmission MPE:

Power Density (S) (mW/cm^2) 2.4GHz	Power Density (S) (mW/cm^2) 5GHz	Total	Limit of Power Density (S) (mW/cm^2)	Test Result
0.03412	0.04415	0.07827	1	Complies

Note: The calculated distance is 20 cm.

End of Test Report