

FCC RF EXPOSURE REPORT

FCC ID: 2AUA9-RQZY001

Project No. : 1910C010
Equipment : AC1200 DUAL-BAND SMART WIFI ROUTER
Brand Name : rock space, ROCK
Test Model : RSD0611
Series Model : N/A
Applicant : Shenzhen Renqing Excellent Technology Co., Ltd.
Address : 104, No.15, Longfu Industrial Zone, Huarong Road, Tongsheng Community, Dalang Street, Longhua District, Shenzhen, China
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Date of Receipt : Oct. 10, 2019
Date of Test : Oct. 11, 2019 ~ Oct. 25, 2019
Issued Date : Nov. 12, 2019
Report Version : R02
Test Sample : Engineering Sample No.: DG201910091168
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.	Nov. 01, 2019
R01	Changed the product name.	Nov. 11, 2019
R02	Updated the antenna gain of 5GHz.	Nov. 12, 2019

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

Antenna Specification:

For 2.4G:

Ant.	Manufacturer	Model Name	Antenna Type	Connector	Gain (dBi)
1	DONGGUAN SLEing INTEL-TECH.CO.,LTD	N/A	Dipole	N/A	3.50
2	DONGGUAN SLEing INTEL-TECH.CO.,LTD	N/A	Dipole	N/A	3.50

Note:

- (1) For Non Beamforming function, this EUT supports CDD, and all antennas have the same gain, Directional gain = $G_{ANT} + \text{Array Gain}$, where Array Gain is as follows:
For output power measurements, Array Gain = 0 ($N_{ANT} \leq 4$), so, Directional gain = 3.50
For power spectral density measurements, Array Gain = $10\log(N_{ANT}/N_{SS})$ dB
that is Directional gain = $3.50 + 10\log(2/1) = 6.51$.
So, the power density limit is $30 - 6.51 + 6 = 29.49$
- (2) For Beamforming function, Beamforming gain: 3.0dB, so Directional gain = $3.0 + 3.50 = 6.50$.
Then, the output Power limit is $30 - 6.50 + 6 = 29.50$

For 5G:

Ant.	Manufacturer	Model Name	Antenna Type	Connector	Gain (dBi)
1	DONGGUAN SLEing INTEL-TECH.CO.,LTD	N/A	Dipole	N/A	5.0
2	DONGGUAN SLEing INTEL-TECH.CO.,LTD	N/A	Dipole	N/A	5.0

Note:

- (1) For Non Beamforming function, This EUT supports CDD, and all antennas have the same gain, Directional gain = $G_{ANT} + \text{Array Gain}$, where Array Gain is as follows:
For output power measurements, Array Gain = 0 ($N_{ANT} \leq 4$), so, Directional gain = 5.0
For power spectral density measurements, Array Gain = $10\log(N_{ANT}/N_{SS})$ dB,
so Directional gain = $5.0 + 10\log(2/1) = 8.01$.
So, the UNII-1 power density limit is $17 - 8.01 + 6 = 14.99$
the UNII-3 power density limit is $30 - 8.01 + 6 = 27.99$
- (2) For Beamforming function, Beamforming gain: 3.0dB, so Directional gain = $3.0 + 5.0 = 8.0$
Then, the output Power limit is $30 - 8.0 + 6 = 28.00$

The worst case for 1TX/2TX 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	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)

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)
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

Tune up tolerance(dBm)	
2.4GHz	5GHz
1.5	2

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
3.50	2.2387	20.46	111.1732	0.04954	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
6.50	4.4668	19.95	98.8553	0.08789	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
5.85	3.8459	21.55	142.8894	0.10938	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
5.85	3.8459	21.51	141.5794	0.10838	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
8.85	7.6736	21.01	126.1828	0.19273	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
8.85	7.6736	20.89	122.7439	0.18748	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			
0.08789	0.19273	0.28062	1	Complies

Note: The calculated distance is 20 cm.
Output power including tune up tolerance.

End of Test Report