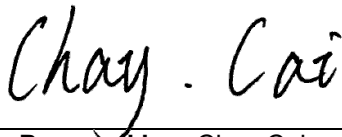


# FCC RF EXPOSURE REPORT

## FCC ID: 2AF5PMGMT77

**Project No.** : 1711C015B  
**Equipment** : 1) 24x8 Cable Modem plus AC1900 Router with Voice  
2) 24x8 Cable Modem plus AC1900 Router  
**Brand Name** : Motorola  
**Test Model** : 1) MT7711XY (where X can be A, B, C, D or blank, and Y can be A, B, C, D, or blank) The optional suffixes X and Y for identical hardware models for marketing purposes only)  
**Series Model** : 2) MG7700XY (where X can be A, B, C, D or blank, and Y can be A, B, C, D, or blank) The optional suffixes X and Y for identical hardware models for marketing purposes only)  
**Applicant** : MTRLC LLC  
**Address** : 225 Franklin Street, 26th Floor, Boston, Massachusetts, United States  
**Manufacturer** : MTRLC LLC  
**Address** : 225 Franklin Street, 26th Floor, Boston, Massachusetts, United States  
**Date of Receipt** : Nov. 02, 2017  
Mar. 13, 2020  
**Date of Test** : Nov. 02, 2017 ~ Dec. 20, 2017  
Mar. 13, 2020 ~ Apr. 16, 2020  
**Issued Date** : Jun. 01, 2020  
**Report Version** : R00  
**Test Sample** : Engineering Sample No.: DG2020031840  
**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.



Prepared by : Chay Cai



Approved by : Ethan Ma



Certificate #5123.02

Add: No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.

Tel: +86-769-8318-3000

Web: www.newbtl.com

**REPORT ISSUED HISTORY**

Report Version	Description	Issued Date
R00	Original Issue	Jun. 01, 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	PCB	u.fl	3
2	N/A	N/A	PCB	u.fl	3
3	N/A	N/A	PCB	u.fl	3

Note:

(1) The EUT supports the antenna with TX and RX diversity functions.

For IEEE 802.11b/g mode (1TX/1RX):

Ant. 1, Ant. 2 and Ant. 3 support transmit and receive functions, but only one of them will be used at one time. The Ant. 1 generated the worst case, so it was selected to test and record in the report.

For IEEE 802.11n mode (3TX/3RX):

Ant. 1, Ant. 2 and Ant. 3 can be used as transmitting/receiving antenna.

Ant. 1, Ant. 2 and Ant. 3 could transmit/receive simultaneously.

(2) Antenna Gain=3 dBi. This EUT supports MIMO 3X3, any transmit signals are correlated with each other, so Directional gain =  $G_{ANT} + 10\log(N)$  dBi, that is Directional gain =  $3 + 10\log(3)$  dBi = 7.77. So, the out power limit is  $30 - 7.77 + 6 = 28.23$ , the power density limit is  $8 - 7.77 + 6 = 6.23$ .

For 5GHz UNII-1 and UNII-3:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	PCB	u.fl	3
2	N/A	N/A	PCB	u.fl	3
3	N/A	N/A	PCB	u.fl	3

Note:

(1) The EUT supports the antenna with TX and RX diversity functions.

For IEEE 802.11a mode (1TX/1RX):

Ant. 1, Ant. 2 and Ant. 3 support transmit and receive functions, but only one of them will be used at one time. The Ant. 1 generated the worst case, so it was selected to test and record in the report.

For IEEE 802.11n20/n40/ac20/ac40/ac80 mode (3TX/3RX):

Ant. 1, Ant. 2 and Ant. 3 can be used as transmitting/receiving antenna.

Ant. 1, Ant. 2 and Ant. 3 could transmit/receive simultaneously.

(2) Antenna Gain=3 dBi. This EUT supports MIMO 3X3, any transmit signals are correlated with each other, so Directional gain =  $G_{ANT} + 10\log(N)$  dBi, that is Directional gain =  $3 + 10\log(3)$  dBi = 7.77. So, the UNII-1, UNII-3 output power limit is  $30 - 7.77 + 6 = 28.23$ .

The UNII-1 power density limit is  $17 - 7.77 + 6 = 15.23$ , the UNII-3 power density limit is  $30 - 7.77 + 6 = 28.23$ .

For 5GHz UNII-2A and UNII-2C:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	PCB	u.fl	2.8
2	N/A	N/A	PCB	u.fl	2.8
3	N/A	N/A	PCB	u.fl	2.8

Note:

- 1) Antenna Gain=2.8dBi. This EUT supports MIMO 3X3, any transmit signals are correlated with each other, so Directional gain =  $G_{Ant.} + 10\log(N)$ dBi, that is Directional gain=2.8+10log(3)dBi=7.57.  
So the output power limit is  $24-(7.57-6)=22.43$ , the power spectral density limit is  $11-(7.57-6)=9.43$ .
- 2) Beamforming Gain: 4.7dB. So the Directional gain =  $4.7+2.8 = 7.5$  dBi. So the output power limit is  $24-(7.5-6)=22.50$ , the power spectral density limit is  $11-(7.5-6)=9.50$ .

## 2. TEST RESULTS

For 2.4GHz:

Antenna Gain (dBi)	Antenna Gain (numeric)	Max. Average Output Power (dBm)	Max. Average Output Power (mW)	Power Density (S) (mW/cm <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
3	1.9953	19.87	97.0510	0.03854	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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
7.77	5.9841	22.10	162.1810	0.19317	1	Complies

For 5GHz UNII-2A Non Beamforming:

Directional Gain (dBi)	Directional Gain (numeric)	Max. Output Power (dBm)	Max. Output Power (mW)	Power Density (S) (mW/cm <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
7.57	5.7148	22.21	166.3413	0.18921	1	Complies

For 5GHz UNII-2C Non Beamforming:

Directional Gain (dBi)	Directional Gain (numeric)	Max. Output Power (dBm)	Max. Output Power (mW)	Power Density (S) (mW/cm <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
7.57	5.7148	22.16	164.4372	0.18705	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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
7.77	5.9841	27.54	567.5446	0.67601	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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
7.77	5.9841	22.15	164.0590	0.19541	1	Complies

## For 5GHz UNII-2A Beamforming:

Directional Gain (dBi)	Directional Gain (numeric)	Max. Output Power (dBm)	Max. Output Power (mW)	Power Density (S) (mW/cm <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
7.50	5.6234	22.09	161.8080	0.18111	1	Complies

## For 5GHz UNII-2C Beamforming:

Directional Gain (dBi)	Directional Gain (numeric)	Max. Output Power (dBm)	Max. Output Power (mW)	Power Density (S) (mW/cm <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
7.50	5.6234	22.02	159.2209	0.17822	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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
7.77	5.9841	27.57	571.4786	0.68069	1	Complies

**For the max simultaneous transmission MPE:**

Power Density (S) (mW/cm <sup>2</sup> )	Power Density (S) (mW/cm <sup>2</sup> )	Total	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
2.4GHz	5GHz			
0.03854	0.68069	0.719	1	Complies

Note: The calculated distance is 20 cm.

**End of Test Report**