FCC RF EXPOSURE REPORT

FCC ID: 2AF5PMG8702

Project No.	:	1908C159
Equipment	:	DOCSIS 3.1 Cable Modem plus AC3200 Router
Brand Name	:	motorola
Test Model	:	MG8702XY
Series Model	:	N/A
Applicant	:	MTRLC LLC
Address	:	225 Franklin St. 26th Floor, Boston, MA 02110
Manufacturer	:	MTRLC LLC
Address	:	225 Franklin St. 26th Floor, Boston, MA 02110
Date of Receipt	:	Aug. 20, 2019
Date of Test	:	Aug. 26, 2019 ~ Oct. 24, 2019
Issued Date	:	Jan. 21, 2020
Report Version	:	R00
Test Sample	:	Engineering Sample No.: DG19082034
Standard(s)	:	FCC Guidelines for Human Exposure IEEE C95.1 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	Jan. 21, 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

Antenna Specification:

For 2.4GHz:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Internal	N/A	3.00
2	N/A	N/A	Internal	N/A	3.00
3	N/A	N/A	Internal	N/A	3.00
4	N/A	N/A	Internal	N/A	3.00

Note:

(1) For Non Beamforming function:
This EUT supports CDD, and all antennas have the same gain, Directional gain = G_{ANT}+Array Gain, where Array Gain is as follows:
For power spectral density measurements, N_{ANT} = 4, N_{SS} = 1.
So Directional gain = G_{ANT} + Array Gain =3.00+10 log (N_{ANT}/ N_{SS}) dB =3.00+10log(4/1)dBi =9.02. Then, the power spectral density limit is 8-9.02+6=4.98.
For power measurements, Array Gain = 0 dB (N_{ANT} ≤ 4), so the Directional gain=3.00.

(2) For Beamforming function, Beamforming Gain: 6.00 dB.
So Directional gain = 6.00+3.00=9.00. Then, output power limit is 30-9.00+6=27.00.

For 5GHz:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Internal	N/A	3.00
2	N/A	N/A	Internal	N/A	3.00
3	N/A	N/A	Internal	N/A	3.00
4	N/A	N/A	Internal	N/A	3.00

Note:

(1) For Non Beamforming function:
This EUT supports CDD, and all antennas have the same gain, Directional gain = G_{ANT}+Array Gain, where Array Gain is as follows:
For power spectral density measurements, N_{ANT} = 2, N_{SS} = 1.
So Directional gain = G_{ANT} + Array Gain =10 log (N_{ANT}/ N_{SS}) dB =3.00+10log(2/1)dBi=9.02.
Then, the UNII-1 power spectral density limit is 17-9.02+6=13.98,
the UNII-3 power spectral density limit is 30-9.02+6=26.98.
For power measurements, Array Gain = 0 dB (N_{ANT} ≤ 4), so the Directional gain=3.00.

(2) For Beamforming function, Beamforming Gain: 6.00 dB.
So Directional gain = 6.00+3.00=9.00. Then, UNII-1 and UNII-3 output power limit is 30-9.00+6=27.00.

2. TEST RESULTS

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
3.00	1.9953	29.94	986.2795	0.25069	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
9.00	7.9433	26.64	461.3176	0.46680	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
3.00	1.9953	26.79	477.5293	0.12138	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
3.00	1.9953	28.73	746.4488	0.18973	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
9.00	7.9433	26.01	399.0249	0.40377	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
9.00	7.9433	26.77	475.3352	0.48098	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
0.46680	0.48098	0.94778	1	Complies

Note: The calculated distance is 25 cm.
Output power including tune up tolerance.

End of Test Report