

Maximum Permissible Exposure Report

FCC ID: 2ALZB-AG1103

Report No. : BTL-FCCP-5-2102T091
Equipment : IEEE 802.11 2X2 MU-MIMO ac/a/b/g/n Wireless LAN +Bluetooth NGFF Module
Model Name : W8997-1216
Brand Name : Marvell
Applicant : SECO S.p.A
Address : Via Achille Grandi 20, 52100 Arezzo Italy

FCC Rule Part(s) : FCC CFR Title 47, Part 2 (2.1091)
FCC Guidelines for Human Exposure IEEE C95.1

Date of Receipt : 2021/2/9
Date of Test : 2021/2/9 ~ 2021/5/31
Issued Date : 2021/10/6

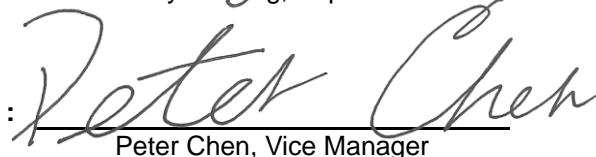
The above equipment has been tested and found in compliance with the requirement of the above standards by BTL Inc.

Prepared by

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REVISION HISTORY

Report No.	Version	Description	Issued Date
BTL-FCCP-5-2102T091	R00	Original Report.	2021/7/28
BTL-FCCP-5-2102T091	R01	Revised report to address TCB's comments.	2021/8/16
BTL-FCCP-5-2102T091	R02	Revised report to address TCB's comments.	2021/8/26
BTL-FCCP-5-2102T091	R03	Revised report to address TCB's comments.	2021/10/6

Table for Filed Antenna

Antenna	Manufacture	Part number	Type	Frequency Range (MHz)	Gain (dBi)
Main	dynaflex	616	Dipole	2400-2480	1.1
				5000-5800	2.5

Maximum RF OUTPUT POWER

Mode	Maximum Tune-up Power (dBm)
WLAN 2.4 GHz	15.5
RLAN 5 GHz	5.18GHz~5.24GHz
	5.26GHz~5.32GHz
	5.50GHz~5.70GHz
	5.745GHz~5.825GHz
BT	4.5
BLE	2.5

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

RESULTS

For BT:

Antenna Gain (dBi)	Antenna 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
1.10	1.2882	4.50	2.8184	0.00072269	1	Complies

For BLE:

Antenna Gain (dBi)	Antenna 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
1.10	1.2882	2.50	1.7783	0.00045598	1	Complies

For 2.4G WLAN:

Antenna Gain (dBi)	Antenna 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
1.10	1.2882	15.50	35.4813	0.00909809	1	Complies

For 5G RLAN:

Antenna Gain (dBi)	Antenna 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
2.50	1.7783	16.5	44.6684	0.01581067	1	Complies

Note:

1. The calculated distance is 20 cm.

Simultaneous Transmission:

Both of the Lora, Bluetooth and Wi-Fi can transmit simultaneously, the formula of calculated the MPE is:
 $CPD1 / LPD1 + CPD2 / LPD2 + \dots \dots \text{etc.} < 1$

CPD: Calculation power density

LPD: Limit of power density

2.4G+BT

Therefore, the worst -case situation calculated as below, which the result is less than "1".
 $0.00909809/1 + 0.00072269/1 = 0.00982078 < 1$

5G+BT

Therefore, the worst -case situation calculated as below, which the result is less than "1".
 $0.01581067/1 + 0.00072269/1 = 0.01653336 < 1$

End of Test Report