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.

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Testing Laboratory
0659

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REVISON 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	16
	5.26GHz~5.32GHz	16.5
	5.50GHz~5.70GHz	15
	5.745GHz~5.825GHz	15.5
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 + ……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