



RF Exposure Evaluation Declaration

FCC ID: 2AABGQ4020-1M
IC: 25041-Q40201M
APPLICANT: EnzyTek Technology Inc
Application Type: Certification
Product: Wireless module
Model No.: BTA-QA4020-1
Brand Name: EnzyTek
FCC Rule Part(s): Part 2.1093 (Portable)
IC Standard: RSS 102 (issue5)
Test Procedure(s): KDB 447498 D01v06
Test Date: April 15, 2019 ~ June 12, 2019

Reviewed By :

Paddy Chen

(Paddy Chen)

Approved By :

Chenz Ker

(Chenz Ker)



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Taiwan) Co., Ltd

Revision History

Report No.	Version	Description	Issue Date	Note
1904TW0501-U5	1.0	Original Report	2019-06-19	

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name	Wireless module
Model No.	BTA-QA4020-1
Brand Name	EnzyTek
Supports Radios Spec.	2.4G: 802.11b/g/n-20/n-40 5G: 802.11a/n-20/n-40, Band 1,4 BLE 5.0 ZigBee 15.4
Wi-Fi Specification	802.11a/b/g/n
Frequency Range	<u>2.4GHz:</u> For 802.11b/g/n-HT20: 2412 ~ 2462 MHz For 802.11n-HT40: 2422 ~ 2452 MHz <u>5GHz:</u> For 802.11a/n-HT20: 5180~5240MHz, 5745MHz~5825MHz For 802.11n-HT40: 5190~5230MHz, 5755MHz~5795MHz
Modulation Type	802.11a/n-20/n-40: OFDM (BPSK, QPSK, 16QAM, 64QAM,256QAM)

1.2. Antenna Description

No.	Manufacturer	Part No.	Antenna Type	Mode	Peak Gain
1	EnzyTek Technology Inc.	BTA-QA4020-1	PCB	Zigbee	-2.06dBi
2				WIFI 2.4G	2.68dBi
3				WIFI5G Band 1,4	-2.07dBi

2. RF Exposure Evaluation

2.1. FCC Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
0.3-1.4	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

Note : (1) f= Frequency in MHz , (2) * = Plane-wave equivalent power density

Calculation Formula:

$$Pd = (Pout \cdot G) / (4 \cdot \pi \cdot r^2)$$

Where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

r = distance between observation point and center of the radiator in cm

Under normal use condition, is at least 20cm away from the body of the user .

So, this device is classified as **Mobile Device**.

2.2. IC Limits

According to RSS 102 The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in Table 4
LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

**Table 4: RF Field Strength Limits for Devices Used by the General Public
(Uncontrolled Environment)**

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	87/ $f^{0.5}$	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ $f^{0.25}$	0.1540/ $f^{0.25}$	8.944/ $f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 $f^{0.3417}$	0.008335 $f^{0.3417}$	0.02619 $f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ $f^{1.2}$
150000-300000	0.158 $f^{0.5}$	4.21 x 10 ⁻⁴ $f^{0.5}$	6.67 x 10 ⁻⁵ f	616000/ $f^{1.2}$
Note: f is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				

Calculation Formula:

$$Pd = (Pout * G) / (4 * \pi * r^2)$$

Where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

r = distance between observation point and center of the radiator in cm

Under normal use condition, is at least 20cm away from the body of the user .

So, this device is classified as **Mobile Device**.

2.3. Test Result of RF Exposure Evaluation

Band (MHz)	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
BLE 5.0	2402 ~ 2480	11.259	13	-2.06	20	0.0017	1
Zigbee	2405 ~ 2480	21.389	137.7	-2.06	20	0.0170	1
WIFI 2.4G	2412 ~ 2462	23.58	228.0	2.68	20	0.0841	1
WIFI 5G B1,B4	5150~5250 5745~5825	13.19	21	-2.07	20	0.0026	1

Conclusion :

$$\text{CPD1/LPD1} + \text{CPD2/LPD2} + \dots + \text{CPDN/LPDN} \leq 1$$

CPD : Calculation Power Density

LPD : Limit of Power Density

Mode	Power Density	Limit	Conclusion	Result (≤ 1)
BLE 5.0	0.0017	1	0.1051	Pass
Zigbee	0.0170	1		
WIFI 2.4G	0.0841	1		
WIFI 5G B1,B4	0.0026	1		

_____ The End _____