



RF Exposure Requirements

1 General Information

Client Information

Applicant : AQUAGEM TECHNOLOGY LIMITED

Address of applicant : FLAT / RM H 19/F MAXGRAND, PLAZA 3 TAI YAU STREET,
SAN PO KONG KL, Hong Kong

Manufacturer..... : Aquagem Manufacturing Limited

Address of manufacturer..... : NO.15, 101, 16, 401, 501, No.193, Jinlong Road, Dalong Street,
Panyu District, Guangzhou

General Description of E.U.T

FCC ID..... : 2BRMV-P240H10

Product Name : Surfing Swim Jet

Model No. : See below table

Model Description : Two series have same control unit except the appearance of jet.
The models listed in same series have same electric circuit and
PCB except battery capacity.
Therefore the full tests were performed on model P240-H10.

Rated Voltage..... : See below table

Series	Model	Rating
iGarden Swim Jet P-H Series	P240-H10	DC 25.6V, 72Ah, 1150W
	P200-H6	DC 25.6V, 45Ah, 900W
	P160-H4	DC 25.6V, 30Ah, 650W
iGarden Swim Jet M-H Series	M230-H10	DC 25.6V, 72Ah, 1150W
	M180-H6	DC 25.6V, 45Ah, 800W
	M120-H4	DC 25.6V, 30Ah, 500W



Technical Characteristics of EUT

• WiFi Specification of RF Module ESP32-C3-WROOM-02U

Support Standards	: 802.11b, 802.11g, 802.11n
Frequency Range	: 2412-2462MHz for 802.11b/g/n(HT20) 2422-2452MHz for 802.11n(HT40)
RF Output Power	: 15.91dBm (Conducted)
Modulation	: 802.11b: DSSS(DBPSK/DQPSK/CCK) 802.11g/n: OFDM (BPSK/QPSK/16QAM/64QAM)
Quantity of Channels	: 11 for 802.11b/g/n(HT20); 8 for 802.11n(HT40)
Channel Separation.....	: 5MHz
Type of Antenna	: FPC IPEX Antenna
Antenna Gain*.....	: -2.93dBi

**The antenna gain information is provided by the customer. The laboratory is not responsible for the accuracy of the antenna gain information.*

• BLE Specification of RF Module ESP32-C3-WROOM-02U

Bluetooth Version	: Bluetooth LE
Frequency Range	: 2402-2480MHz
Max. RF Output Power	: 5.94dBm (Conducted)
Modulation	: GFSK
Data Rate	: 1Mbps, 2Mbps
Quantity of Channels	: 40
Channel Separation.....	: 2MHz
Type of Antenna	: FPC IPEX Antenna
Antenna Gain*.....	: -2.93dBi

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• BLE Specification of RF Module TB-03F

Bluetooth Version	: Bluetooth LE
Frequency Range	: 2402-2480MHz
Max. RF Output Power	: 2.46dBm (Conducted) @2Mbps
Modulation	: GFSK
Data Rate	: 1Mbps, 2Mbps
Quantity of Channels	: 40
Channel Separation.....	: 2MHz
Type of Antenna	: PCB Antenna
Antenna Gain*.....	: -3.22dBi

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2 Applicable Standard

According to FCC Rule Part 1.1307 (b)(3)(i)(C) and KDB 447498 D04 v01:

The minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency.

The table applies to any RF source (i.e., single fixed, mobile, and portable transmitters) and specifies power and distance criteria for each of the five frequency ranges used for the MPE limits.

RF Source Frequency (MHz)	Minimum Distance		Threshold ERP (W)
	$\lambda_L/2\pi$	$\lambda_H/2\pi$	
0.3-1.34	159 m-35.6 m		$1,920 R^2$
1.34-30	35.6m-1.6m		$3,450 R^2/f^2$
30-300	1.6 m-159 mm		$3.83 R^2$
300-1,500	159 mm-31.8 mm		$0.0128 R^2 f$
1,500-100,000	31.8mm-0.5mm		$19.2 R^2$
R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters.			

For Multiple RF sources: FCC Rule Part 1.1307(b)(3)(ii):

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required).

(B) In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$



3 Calculation Result

For Single RF Source

Radio Access Technology	ANT	Min. Frequency	Max. Output Power	Max. Tune-up Output Power	Antenna Gain	Duty Cycle	Max. Tune-up EIRP
		(MHz)	(dBm)	(dBm)	(dBi)	(%)	(dBm)
2.4GWiFi	FPC IPEX Antenna	2412	15.66	16.00	-2.93	100	13.07
BLE	PCB Antenna	2402	2.46	3.00	-3.22	100	-0.22

Frequency	Min. Distance	Tune-up ERP		Exposure Limit	Ratio	Result
(MHz)	(cm)	(dBm)	(mW)	(mW)		Pass/Fail
2412	20	10.92	12.36	768.00	0.016	Pass
2402	20	-2.37	0.58	768.00	0.001	Pass

Result: Pass

For Multiple RF Sources (Simultaneous Operations)

Radio Access Technology	Ratio 1	Ratio 2	Simultaneous Ratio	Limit	Result
WiFi+BLE	0.016	0.001	0.017	1.00	Pass

Result: Pass

Note:

1. EIRP= Output Power + Antenna gain; ERP=EIRP-2.15dB
2. Ratio= Tune-Up ERP(mW)/ Exposure Limit (mW)

=====End of Report=====