

RF Exposure Evaluation Declaration

FCC ID: 2AQV6DRAGON
IC: 24210-DRAGON
Application: Suzhou Pairlink Network Technology Ltd.
Application Type: Certification
Product: Bluetooth 5 BLE module
Model No.: Dragon-B, Dragon-C
Brand Name: Pairlink
FCC Rule Part(s): KDB 447498 D01 General RF Exposure Guidance v06
IEEE C95.1-1992
ISED Rule Part(s): RSS-102 Issue 5
Test Date: March 04 ~ 24, 2020

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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.

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Revision History

Report No.	Version	Description	Issue Date	Note
2002RSU008-U3	Rev. 01	Initial Report	03-26-2020	Valid

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name:	Bluetooth 5 BLE module
Model No.:	Dragon-B, Dragon-C
Brand Name:	Pairlink
Bluetooth Specification:	V5.0(BR/EDR+BLE 1M)
Operating Temperature:	-30 ~ 105°C
Power Type:	DC input(3.0~3.6V)
Operating Environment:	Indoor Use

Note : Different models are only to different antennas, Dragon-B is multilayer ceramic antenna and Dragon-C is antenna connector which connect to external antenna. Schematics of other parts are identical, the antenna gain of Dragon-B is larger than Dragon-C, so choose Dragon-B to conducted test. Dragon-B and Dragon-C both test Radiated Emission.

1.2. Product Specification Subjective

Frequency Range:	2402~2480MHz
Number of Channels:	For Bluetooth: 79 For BT-LE: 40
Channel Spacing:	For Bluetooth: 1MHz For BT-LE: 2MHz
Type of Modulation:	For Bluetooth: 1Mbps (GFSK), 2Mbps (Pi/4 DQPSK), 3Mbps (8DPSK) For BT-LE: GFSK
Data Rate:	Up to 2Mbps

Note: For other features of this EUT, test report will be issued separately.

1.3. Description of Available Antennas

Model No.	Antenna Type	Manufacturer	Frequency Band (GHz)	Max Peak Gain (dBi)
Dragon-B	Ceramic Antenna	Walsin	2.4 ~ 2.5	2.0
Dragon-C	FPC Antenna	Zhaodong	2.4 ~ 2.5	0.0

Note: The antenna for Dragon-C is supplied by customer for Radiated Emission testing.

2. RF Exposure Evaluation

2.1. Limits for FCC:

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				
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	f/1500	6
1500-100,000	--	--	1	30

f= Frequency in MHz

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

Pd is the limit of MPE, 1mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2. Limits for IC:

According to RSS-102: Exemption Limits for Routine Evaluation – RF exposure evaluation is required if the separation distance between the user and/or bystander and the device’s radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of

the device is equal to or less than $22.48/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;

- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

2.3. Test Result of RF Exposure Evaluation for FCC and IC

Product	Robotic Vacuum Cleaner
Test Item	RF Exposure Evaluation

FCC:

Test Mode	Frequency Band (MHz)	Maximum Average Output Power (dBm)	E.I.R.P (dBm)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)
Bluetooth	2402 ~ 2480	8.38	10.38	0.0022	1
Bluetooth-LE	2402 ~ 2480	8.47	10.47	0.0022	1

IC:

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Tune-up (dBm)	Maximum EIRP (W)	Limit (W)
Bluetooth	2402 ~ 2480	10.38	11.38	0.01374	2.6764
Bluetooth-LE	2402 ~ 2480	10.47	11.47	0.01403	2.6764

CONCLUSION:

The Max Power Density at R (20 cm) = 0.0022 < 1mW/cm².

The device is excluded for SAR test and complies with the IC exposure requirements since the maximum conducted peak output power is lower than the SAR test exclusion thresholds.

So the EUT complies with RF Exposure requirement.

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Appendix - EUT Photograph

Refer to "2002RSU008-UE" file.