

TEST REPORT



Applicant	Particle Industries, Inc
Address	325 9th Street, San Francisco, CA 94103, United States Of America

Manufacturer or Supplier	Particle Industries, Inc	
Address	325 9th Street, San Francisco, CA 94103, United States Of America	
Product	Photon 2	
Brand Name	Particle	
Model	PHN2	
Additional Model & Model Difference	N/A	
Date of tests	Feb. 21, 2021 ~ Apr. 06, 2022	

The submitted sample of the above equipment has been tested according to the requirements of the following standard:

- EN IEC 62311:2020
- EN 50665:2017

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Lucas Chen Project Engineer / EMC Department	Approved by Glyn He Assistant Manager / EMC Department
	
Date: Mar. 20, 2023	

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Test Report No.: SE2209WDG0276-2

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SE2202WDG0092-2	Original release	May 19, 2022
SE2209WDG0276-2	Based on the original report SE2202WDG0092-2, changed the applicant/manufacture address, product name, model number and added the debugging base, but it doesn't need to be retested.	Mar. 20, 2023

1. GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Photon 2
MODEL NO.	PHN2
ADDITIONAL MODEL	N/A
NOMINAL VOLTAGE	5.0Vdc (Adapter) 3.7Vdc (Li-ion, Battery)
OPERATING TEMPERATURE RANGE	-20 ~ +70°C
MODULATION TECHNOLOGY	DSSS, OFDM
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
OPERATING FREQUENCY	2.4GHz WIFI: 2412-2472MHz for 11b/g/n(HT20) 5GHz WIFI: 5180 ~ 5240MHz, 5260 ~ 5320MHz 5500 ~ 5700MHz, 5745 ~ 5825MHz for Band1/2/3/4
EIRP POWER	19.80dBm For WIFI 2.4G 20.87dBm For WIFI 5G Band 1/2/3 13.47dBm For WIFI 5G Band 4
ANTENNA TYPE	WIFI 2.4G PCB Antenna, with 2.41dBi gain External PCB Antenna, with 1.55dBi gain 5180 ~ 5240MHz: PCB antenna with 1.28dBi gain External PCB antenna with -0.32dBi gain 5260 ~ 5320MHz: PCB antenna with 1.60dBi gain External PCB antenna with -0.08dBi gain 5500 ~ 5700MHz: PCB antenna with 1.74dBi gain External PCB antenna with 0.87dBi gain 5745 ~ 5825MHz for Band4: PCB antenna with 1.21dBi gain External PCB antenna with 1.26dBi gain

NOTES:

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- For the test results, the EUT had been tested with all conditions, but only the worst case was shown in test report.
- Please refer to the EUT photo document (Reference No.: 2209WDG0276) for detailed product photo.
- The Photon 2 uses two antennas, but couldn't transmit simultaneously, only the antenna type and gain are different.

5. The EUT provides completed transmitters and receivers, the EUT uses only one antenna at any time.

MODULATION MODE	TX FUNCTION
802.11b	1TX/1RX
802.11g	1TX/1RX
802.11n (HT20)	1TX/1RX

MODULATION MODE	TX FUNCTION
802.11a	1TX/1RX
802.11n (HT20), 802.11ac (VHT20)	1TX/1RX
802.11n (HT40), 802.11ac (VHT40)	1TX/1RX

2. RF EXPOSURE MEASUREMENT

2.1 INTRODUCTION

This International Standard applies to electronic and electrical equipment for which no dedicated product- or product family standard regarding human exposure to electromagnetic fields applies.

The frequency range covered is 0 Hz to 300 GHz.

The object of this generic standard is to provide assessment methods and criteria to evaluate such equipment against basic restrictions or reference levels on exposure of the general public related to electric, magnetic and electromagnetic fields and induced and contact current.

2.2 LIMIT

According to EN IEC 62311, the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified 1999/519/EC.

FREQUENCY RANGE (GHz)	E-FIELD STRENGTH (V/m)
2 ~ 300	61

2.3 CLASSIFICATION OF THE ASSESSMENT METHODS

The antenna of the product, under normal use condition is at least 20 cm away from the body of the user. Warning statement to the user for keeping at least 20cm separation distance and the prohibition of operating to a person has been printed on the WLAN easy install sheet. So, this product under normal use is located on electromagnetic far field between the human body.

Far Field Calculation Formula

$$E = \eta_0 H = \frac{\sqrt{30PG(\theta, \phi)}}{r}$$

G = antenna gain relative to an isotropic antenna
 θ, ϕ = elevation and azimuth angles to point of investigation
 r = distance from observation point to the antenna
 η_0 = Characteristic impedance of free space

2.4 TEST RESULTS

CALCULATION FOR MAXIMUM E.I.R.P.

Output Power E.I.R.P. (dBm)	Output Power E.I.R.P. (mW)	E-Field Strength (V/m)	E-Field Strength Limit (V/m)	PASS / FAIL
19.80 for 2.4GHz WIFI	95.499	8.463	61.00	PASS
20.87 for 5GHz WIFI (Band 1/2/3)	122.180	9.573	61.00	PASS
13.47 for 5GHz WIFI (Band 4)	22.233	4.083	61.00	PASS

Note: This device couldn't transmit simultaneously in WIFI 2.4G and 5G.