



Radio Frequency Exposure Evaluation Report

FOR:
Innophase Inc.

Model Name:
INP1012

Product Description:
Low Power WiFi/BLE IOT Module

FCC ID: 2AVAL-INP2045
IC ID: 25715-INP2045

Per:

CFR Part Part1 (1.1307 &1.1310), Part 2 (2.1091),
FCC KDB 447498 D01 General RF Exposure Guidance v06
ISED RSS-102 Issue 5

Report number: EMC_INNOP-014-21001_INP1012_FCC_ISED_MPE

DATE: 2021-07-12



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1 Assessment

This RF Exposure evaluation report provides evidence for compliance of the below identified device with the RF Exposure limits for mobile devices as defined in FCC CFR Part 1 (1.1307 &1.1310), Part 2 (2.1091) and IC standard RSS-102 issue 5 under worst case conditions (measured or rated RF output power, antenna gain, distance towards human body, multiple transmitter information as presented by the applicant).

In addition, maximum antenna gain or minimum distance towards the human body is calculated respectively, where relevant.

The device meets the limits as stipulated by the above given FCC and IC rule parts based on available specifications for worst case conditions at 20cm distance to the body.

Company	Description	Model #
Innophase Inc.	Low Power WiFi/BLE IOT Module	INP1012

Report reviewed by: TCB Evaluator

2021-07-12	Compliance	Kevin Wang (Lab Manager)

Responsible for the Report:

2021-07-12	Compliance	Yuchan Lu (Test Engineer)

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Street Address:	411 Dixon Landing Road
City/Zip Code	Milpitas, CA 95035
Country	USA
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Lab Manager:	Kevin Wang
Responsible Project Leader:	Akanksha Baskaran

2.2 Identification of the Client / Manufacturer

Client's Name:	Innophase Inc.
Street Address:	6815 Flanders Drive
City/Zip Code	San Diego, CA 92121
Country	USA

2.3 Identification of the Manufacturer

Manufacturer's Name:	
Manufacturers Address:	Same as Client
City/Zip Code	
Country	

3 Equipment under Assessment

Marketing name:	Talaria TWO
HW Version :	REV1.4
SW Version :	T2_Release_2.2
Hardware Version Identification Number (HVIN):	INP1012
Product Marketing Name (PMN):	Talaria TWO
Regulatory Band:	<ul style="list-style-type: none">❖ <u>BLE:</u><ul style="list-style-type: none">▪ Nominal band: 2400 MHz – 2483.5 MHz;▪ Center to center: 2402 MHz (ch 0) – 2480 MHz (ch 39), 40 channels❖ <u>WLAN :</u><ul style="list-style-type: none">▪ Nominal band: 2400 MHz – 2483.5 MHz;▪ Center to center: 2412 MHz (ch 1) – 2462 MHz (ch 11), 11 channels
Integrated Module Info:	<ul style="list-style-type: none">❖ <u>WLAN, BT</u><ul style="list-style-type: none">▪ Module name: Talaria TWO▪ Module number: INP2045-H▪ FCC ID: 2AVAL-INP2045▪ IC ID: 25715-INP2045
Antenna Type:	<ul style="list-style-type: none">❖ <u>BT, WLAN:</u><ul style="list-style-type: none">▪ Model Name : Inventek Systems OEM 2.4GHz SMA Wi-Fi Antenna▪ Part No. : W24-ASMA-M▪ Antenna Gain: 2.15 dBi
Maximum Conducted Output Power:	<ul style="list-style-type: none">❖ <u>BLE:</u> From modular grant [Watts]: 0.009❖ <u>WLAN:</u> From modular grant [Watts]: 0.054
Power Supply/ Rated Operating Voltage Range:	Low 3.0 VDC, High 3.6 VDC
Operating Temperature Range:	Low -40°C, High 85°C
Sample Revision:	<input type="checkbox"/> Prototype Unit; <input type="checkbox"/> Production Unit; <input checked="" type="checkbox"/> Pre-Production

4 RF Exposure Limits and FCC and IC Basic Rules

For the specific described radio apparatus the following basic limits and rules apply for both, FCC and IC where not indicated differently.

4.1 Power Density Limits acc. to FCC 1.1310(e) / RSS-102 i5, cl. 4:

FCC

Frequency Range (MHz)	Power density (mW/cm ²)	Averaging time (minutes)
300 – 1500	$f \text{ (MHz)} / 1500$	30
1500 – 100000	1.0	30

IC

300 – 6000	$0.02619 \times f \text{ (MHz)}^{0.6834}$	6
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4.2 Routine Environmental Evaluation Categorical Exclusion Limits acc. to FCC 2.1091(c) / RSS-102, cl. 2.5 (rounded to 1 decimal point):

FCC

operating frequency < 1.5GHz: excluded if ERP < 1.5W / 31.8dBm (EIRP: 33.9 dBm);
operating frequency > 1.5GHz: excluded if ERP < 3.0W / 34.8dBm (EIRP: 36.9 dBm);

IC

300MHz < = operating frequency < 6 GHz: excluded if EIRP < $0.0131 \times f \text{ (MHz)}^{0.6834} \text{ W}$

4.3 RF Exposure Estimation (MPE Estimation)

Having available the source based average output power and peak antenna gain or the ERP/EIRP of the specified device and for a known minimum distance of its radiating structures from the body of persons according to its use cases (at least 20cm) the power density at that distance can be estimated by the following formula for plane-wave equivalent conditions (far-field conditions), when ground reflection is neglected.

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density (mW/cm² or W/m²)

P = power input to the antenna (mW or W)

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 (cm or m)

5 Evaluations

5.1 Analysis of RF Exposure for simultaneous transmission

- Evaluations are based on worst case power density limits for Canada.
- Calculations are made for 20cm.
- Evaluations are based on ERP/EIRP measured or calculated from known gain and conducted output power.

Radio	freq [MHz]	Max Conducted power [W]	Gain [dBi]	Gain [lin]	EIRP [W]	IC Limit [W/m ²]	FCC Limit [W/m ²]	Actual [W/m ²] ²	How much of limit is used up
WLAN	2412	0.054	2.15	1.64	0.089	5.366	10.000	0.176	3.28%
BTLE	2402	0.009	2.15	1.64	0.015	5.351	10.000	0.029	0.54%

Note1: The calculation is based on the distance of 20cm

5.2 Conclusion:

The worst-case transmission is WLAN transmission, which is using 3.28 of a limit of 100%. The equipment is passing RF exposure requirements for 20cm distance.

6 Revision History

Date	Report Name	Changes to report	Prepared by
2021-07-12	EMC_INNOP-014-21001_INP1012_FCC_ISED_MPE	Initial Release	Yuchan Lu

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