

47 CFR PART 2.1091

RADIOFREQUENCY RADIATION EXPOSURE EVALUATION

MOBILE DEVICES

REPORT NUMBER: M2012010-5

STANDARD: 47 CFR § 2.1091

CLIENT: PLANET INNOVATION

**ON BEHALF OF PINE TREES
HEALTH**

**DEVICE: PINE TREES HEALTH
READER**

MODEL: 10

DATE OF ISSUE: 4 MAY 2021

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REVISION TABLE

Version	Sec/Para Changed	Change Made	Date
1		Initial issue of document	4/05/2021



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RADIOFREQUENCY RADIATION EXPOSURE EVALUATION REPORT - MPE

Device: Pine Trees Health Reader
Model Number: 10
Serial Number: 23

FCC ID: FCC ID: 2AYYC-2232021

Manufacturer: Pine Trees Health
LabCentral Inc. – Cambridge, MA 02139 USA

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Standards: **447498 D01 General RF Exposure Guidance v06**
RF exposure procedures and equipment authorization policies for mobile and portable devices.


47 CFR § 2.1091

Radiofrequency radiation exposure evaluation: mobile devices (Transmitter is more than 20 cm from human body).

Result: Based on an assessment of the documentation provided the Pine Trees Health Reader, model 10 complies with the RF exposure requirements of 47 CFR Part 2.1091, however an exclusion zone of 20 cm in front of the radiating elements applies, elsewhere the exposure level was below the applicable limits. Refer to Report M2012010-5 for full details

Issue Date: 4 May 2021

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1 INTRODUCTION

This report is intended to demonstrate compliance of the Pine Trees Health Reader model 10 with the RF exposure requirements of 47 CFR Part 2.1091. Evaluation was performed in accordance with FCC KDB 447498 D01.

The test sample was provided by the Client. The conclusion herein is based on the information provided by the client.

1.1 Laboratory Overview

EMC Technologies Pty. Ltd. is an independently owned Australian company that is NATA accredited to ISO 17025 for both testing and calibration and ISO 17020 for Inspection. – **Accreditation Number 5292.**

1.2 Test Laboratory/Accreditations

Inspection was performed at EMC Technologies' laboratory in Keilor Park, Victoria Australia.

Table 1-1: *Accreditations for Conformity Assessment*

Country/Region	Body	
Australia/New Zealand	NATA	Accreditation Number: 5292
Europe	European Union	Notified Body Number: 0819
USA	FCC	Designation Number: AU0001 (Melb)
Canada	ISED Canada	Company Number: 3569B(Melb)
Japan	VCCI	Company Number: 785
Taiwan	BSMI	Lab Code SL2-IN-E-5001R

2 DEVICE DETAILS

(Information supplied by the Client)

Pine Trees Health Reader is a point-of-care device that performs a COVID-19 test which is a rapid molecular *in vitro* diagnostic test utilizing isothermal nucleic acid amplification technology and detection of the resulting amplicon using CRISPR-mediated collateral reporter unlocking. Intended for the qualitative detection of nucleic acid from SARS-Cov-2 viral RNA in nasal swabs from individuals who are suspected of COVID-19 infection by a healthcare professional.

The device also includes a passive NFC chip.

Manufacturer: Pine Trees Health
Inspected Sample: Pine Trees Health Reader
Model Number: 10
Serial Number: 23

Transmit parameters were provided by the customer and are shown below:

Table 2-1: *Transmitter Parameters*

Transmitter #1	
Wireless Interface 1 (ToF):	Bluetooth Transceiver
Operating Frequency:	2402 – 2480MHz
RF Output Power Level:	+8dBm
Antenna Type:	Inverted F - PCB antenna
Max Antenna gain:	+2 dBi

3 LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE), §1.1310

Table 3-1: Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
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
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	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
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

4 UNCERTAINTY

EMC Technologies has evaluated the tools and methods used to perform Radiated Electromagnetic Field predictions.

The estimated inspection uncertainties for the test shown within this report are as follows:

Electromagnetic Modelling

30 MHz to 100GHz ± 2.8 dB

The above expanded uncertainties are based on standard uncertainties multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

5 ASSUMPTIONS IN THIS ASSESSMENT

This assessment does not include accumulated RF fields from nearby sites/antennas or possible radio signal reflections or attenuation due to buildings or the general environment.

Antenna Parameters and power settings were supplied by the customer. As antenna gain was speculated as 2dBi. For prudence, a gain of 4dBi was selected for the calculation.

A 100% duty cycle is assumed.

As the device is normally used at a separation distance greater than 20cm, the device Mobile Class 2.1091 classification was deemed to be most applicable. For confidence, the device was also assessed using SAR methodology and would be exempt under the SAR Test Exclusion Threshold.

The aperture of the radiating element assumed to be a point source in free space and far field conditions.

6 RF EXPOSURE CALCULATIONS

The reference level was evaluated at 20 cm to show compliance with the power density listed in Table 3-1 (Section 3)

The following formula was used to calculate the power density at 20 cm:

$$S = \frac{P * G}{4\pi R^2}$$

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

Where:

- (S): Power density (mW/cm^2)
- (P): Output power at antenna terminal (mW)
- (G): Gain (ratio)
- (R): Minimum test separation distance (20 cm)

Table 6-1: Calculations

Technology	Frequency Band (MHz)	Power	Gain	Duty Cycle	EIRP	EIRP	Flux Density at 20 cm	Flux Density limit	Percentage of the limit
		<i>dBm</i>	<i>dBi</i>	%	<i>dBm</i>	<i>mW</i>	<i>mW/cm²</i>	<i>mW/cm²</i>	%
STM32WB55RG	2450	8	4	100%	12.00	15.85	0.003	1	0.32%
Total percentage of the limit at 20 cm for simultaneous transmission (Worst-case)									0.32%

7 CONCLUSION

Based on an assessment of the documentation provided the Pine Trees Health Reader, model 10 complies with the 47 CFR Part 2.1091. An exclusion zone of 20 cm in front of the radiating elements applies, elsewhere the exposure level was below the applicable limits.



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8 APPENDIX A

Table 8-1: Referenced Documents

Document	Comments
Form 005 Customer Information Sheet_PI	Module, antenna and peak power details



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