

47 CFR PART 2.1091

RADIOFREQUENCY RADIATION EXPOSURE EVALUATION

MOBILE DEVICES

REPORT NUMBER: M2005002-9

STANDARD: 47 CFR § 2.1091

CLIENT: DEFINIUM TECHNOLOGIES

DEVICE: COOLER GUARDIAN

MODEL: DT1104

DATE OF ISSUE: 14 NOVEMBER 2020

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REVISION TABLE

Version	Sec/Para Changed	Change Made	Date
1		Initial issue of document	14/11/2020



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RADIOFREQUENCY RADIATION EXPOSURE EVALUATION REPORT - MPE

Device: COOLER GUARDIAN
Model Number: DT1104

FCC ID: FCC ID: 2AW4U-DT1104-0100

Manufacturer: DEFINIUM TECHNOLOGIES
Inspected for: DEFINIUM TECHNOLOGIES
Address: Unit 6, 16-18 Goodman Court, Invermay Tasmania, 7248
Phone Number: +61 03 6334 1048
Contact: Tony Oetterli
Email: toetterli@definium.net


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

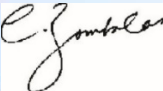
47 CFR § 2.1091

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 COOLER GUARDIAN, model DT1104 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 M2005002-9 for full details

Issue Date: 14 November 2020

Assessment Engineer: 
Emad Mansour
EMR Lead Engineer
EMC Technologies Pty Ltd

Authorised Signatory: 
Chris Zombolas
Technical Director
EMC Technologies Pty Ltd

Issued by: EMC Technologies Pty. Ltd.,
176 Harrick Road, Keilor Park, VIC, 3042, Australia.

Phone: +61 3 9365 1000

E-mail: emc-general@emctech.com.au

Web: www.emctech.com.au



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1 INTRODUCTION

This report is intended to demonstrate compliance of the COOLER GUARDIAN model DT1104 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 were 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)

The device is Lora IoT temperature and humidity sensor.

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

Table 2-1: Transmitter Parameters

Transmitter #1	
Radio	Semtech SX1262 LoRa Transceiver
Manufacturer:	Semtech Corporation
Operating Frequency:	902 MHz – 928 MHz
Effective Radiated Power:	-0.21 dBm
Antenna Type:	PulseLarsen W3113 PCB Helical Trace
Max Antenna gain:	0.8 dBi

Note 1: Effective Radiated Power extracted from M2005002-5 RDO FCC15.247_RSS247_DTS issued by EMC Technologies

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

TABLE 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.

A 100% duty cycle is assumed.

Maximum gain used for assessment

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



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6 RF EXPOSURE CALCULATIONS

The reference level was evaluated at 20 cm to show compliance with the power density listed in Table 4 (Section3)

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>	%
SX1262 LoRa Transceiver	902	-1.01	0.8	100%	-0.21	0.95	0.0002	0.60	0.03%
Total percentage of the limit at 20 cm									0.03%

7 CONCLUSION

Based on an assessment of the documentation provided the COOLER GUARDIAN, model DT1104 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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