



FCC Part 1 Subpart I
FCC Part 2 Subpart J
INDUSTRY CANADA RSS-102 ISSUE 5

RF EXPOSURE REPORT

FOR

WIRELESS INTEGRATED MODULE

MODEL NAME: WIM

FCC ID: 2ACQ6-WIM
IC: 11481A-WIM

REPORT NUMBER: R12663786-E1

ISSUE DATE: 2019-02-21

Prepared for
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NVLAP LAB CODE 200246-0

Revision History

Ver.	Issue Date	Revisions	Revised By
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Cree Inc.
4600 Silicon Drive
Durham, NC 27703-8475 USA

EUT DESCRIPTION: 802.15.4 module

MODEL: WIM

SERIAL NUMBER: 45

DATE TESTED: 2019-01-07

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 1 SUBPART I & PART 2 SUBPART J	Compliant
ISED CANADA RSS-102 ISSUE 5	Compliant

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

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Approved & Released
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2. TEST METHODOLOGY

All calculations were made in accordance with FCC Parts 2.1091, 2.1093 and KDB 447498 D01 v06 and IC Safety Code 6, RSS 102 Issue 5.

3. REFERENCES

All measurements were made as documented in test report UL LLC Document R12663786-E1 for operation in the 2.4 GHz band.

Output power, Duty cycle and Antenna gain data is excerpted from the applicable test reports.

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Dr., Research Triangle Park, NC 27709, USA and 2800 Perimeter Park Dr., Suite B, Morrisville, NC 27560, USA.

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0.

5. DEVICE UNDER TEST

The EUT is a 802.15.4 radio module.

6. STANDALONE SAR TEST EXCLUSION CONSIDERATIONS

6.1. FCC

SAR test exclusion in accordance with KDB 447498.

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [f(\text{GHz})] \leq 3.0$, for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- $f_{(\text{GHz})}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

This test exclusion is applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances > 50 mm are determined by:

1. $\{[\text{Power allowed at numeric threshold for } 50 \text{ mm}] + [(\text{test separation distance} - 50 \text{ mm}) \cdot (f(\text{MHz})/150)]\} \text{ mW}$, for 100 MHz to 1500 MHz
 - $f_{(\text{MHz})}$ is the RF channel transmit frequency in MHz
2. $\{[\text{Power allowed at numeric threshold for } 50 \text{ mm}] + [(\text{test separation distance} - 50 \text{ mm}) \cdot 10]\} \text{ mW}$, for > 1500 MHz and ≤ 6 GHz

SAR Exclusion Calculation Table for Portable Devices (separation distance ≤ 50 mm)

Tx	Frequency (MHz)	Avg Output power		Separation distances (mm)	Calculated Threshold
		dBm	mW		
802.15.4	2480	6.00	3.98	50	0.125

Conclusion:

The computed values are < 3 ; therefore, the device qualifies for Standalone SAR test exclusion.

6.2. ISED CANADA

The SAR exclusion table from RSS-102 issue 5 is reproduced below:

Table 1: SAR evaluation - exemption limits for routine evaluation based on frequency and separation distance.

Frequency MHz	Exemption Limits (mW)				
	At separation distance of ≤5mm	At separation distance of 10mm	At separation distance of 15mm	At separation distance of 20mm	At separation distance of 25mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Frequency MHz	Exemption Limits (mW)				
	At separation distance of 30mm	At separation distance of 35mm	At separation distance of 40mm	At separation distance of 45mm	At separation distance of ≥50mm
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

The minimum antenna to user distance that will be encountered in normal use is 5cm. This results in an exemption limit of 309mW at 2450 MHz.

Tx	Frequency (MHz)	Maximum Avg Power	Antenna Gain	0.5	dBi (mW)
			(dBm)	(mW)	
802.15.4	2480	Conducted	6.0	3.98	
		E.I.R.P	6.5	4.47	

As the maximum output power is 3.98mW conducted and 4.47mW EIRP the DUT qualifies for SAR test exclusion.

END OF TEST REPORT