

RF Exposure Technical Brief for ISED RSS-102 (issue 5) section 2.5

Product name : Ambient sensor
Applicant : Rockwool BV
IC : 25447-CL002

Test report No. : 200701991 008 v2.00 ISED RF exposure

Laboratory information

Accreditation

Telefication complies with the accreditation criteria for test laboratories as laid down in ISO/IEC 17025:2017. The accreditation covers the quality system of the laboratory as well as the specific activities as described in the authorized annex bearing the accreditation number L021 and is granted on 30 November 1990 by the Dutch Council For Accreditation (RvA: Raad voor Accreditatie).

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Documentation

The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The documentation of the testing performed on the tested devices is archived for 10 years at Telefication Netherlands.

Testing Location

Test Site	Kiwa Telefication BV
Test Site location	Wilmersdorf 50 7327 AC Apeldoorn The Netherlands Tel. +31 88998 3393
Test Site FCC	NL0001
CABID	NL0001

Revision History

Version	Date	Remarks	By
v1.00	07-06-2021	Release version	RvB
V2.00	13-09-2021	Changed model name	RvB

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1 General Description

1.1 Applicant

Client name:	Rockwool BV
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Zip code:	6045 JG
E-mail:	Edwin.dilling@grodan.com
Contact name:	Mr. E. Dilling

1.2 Manufacturer

Client name:	Rockwool BV
Address:	Industrieweg 15, Roermond, The Netherlands
Zip code:	6045 JG
E-mail:	Edwin.dilling@grodan.com
Contact name:	Mr. E. Dilling

1.3 Tested Equipment Under Test (EUT)

Product name:	Ambient sensor
Brand name:	ROCKWOOL, Grodan, GroSens
Product type:	Sensor
IC:	25447-CL002
Model(s):	GS21CL12, GS21CL13
Software version:	--
Hardware version:	--

1.4 Calculation of the exemption limit for routine RF exposure evaluation

Introduction

The device is equipped with one BLE radio and one LoRa radio.

SAR evaluation

According to RSS-102 – Issue 5 March 19, 2015, clause 2.5 Exemption Limits for Routine Evaluation — SAR Evaluation, SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table 1.

Table 1: SAR evaluation — Exemption limits for routine evaluation based on frequency and separation distance

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤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 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤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

1.5 Conclusion

Exemption Limits for Routine Evaluation – RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiated element is greater than 20 cm, except when the device operates as follows:

Operating frequency range	Maximum source-based, time averaged maximum e.i.r.p	Calculated range exemption limit
< 20 MHz	1 W	1W
≥ 20 MHz to < 48 MHz	$4.49/f^{0.5}$ W	1 W to 0.648 W
≥ 48 MHz to < 300 MHz	0.6 W	0.6 W
≥ 300 MHz to < 6 GHz	$1.31 \cdot 0.01 \cdot f^{0.6834}$ W	0.646 W to 5.0 W
≥ 6 GHz	5 W	5 W

Note: in the equations above, f is the operating frequency in MHz

Since the measured e.i.r.p. values are 1.87 mW at 2440 MHz for BLE (Telefication report no. 200701991 007) and 1.69 mW at 914.9 MHz for LoRa (Telefication report 200701991 004 v1.00), are less than the exemption limit for a separation distance of 20 cm, the product is exempt from routine RF exposure evaluation.

Assessment for multiple transmitters capable of transmitting simultaneously

In the case of RF sources operating in the same time averaging period, evaluate if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation:

$$\frac{P_1}{P_{th1}} + \frac{P_2}{P_{th2}} + \dots + \frac{P_n}{P_{thn}} \leq 1$$

Where P_x is the calculated power and P_{thx} the calculated limit for each transmitter.

$$\frac{0.00187}{2.7} + \frac{0.00169}{1.4} = 0.0019 \leq 1$$