



18/88 Merrindale Drive Croydon South, Victoria, 3136, Australia
Telephone: +61 3 9761 5888
Facsimile: +61 3 8761 6547
Email: sales@emcbayswater.com.au
ABN: 49 112 221 333

RF Radiation Exposure Evaluation

In accordance with:

FCC KDB 447498 D01 v06

Bradken Resources Pty. Ltd

SRBEACONFLAT-R1

SmartRoller Beacon

FCC ID: 2BVRZ-SRBEACON

REPORT: E2603-1955-3

DATE: May, 2026



RF Radiation Exposure Evaluation Report

EMC Bayswater Test Report: E2603-1955-3
Issue Date: May, 2026

Product: SmartRoller Beacon
Model No: SRBEACONFLAT-R1
Serial No: Not stated
FCC ID: 2BVRZ-SRBEACON
Variant: SRBEACONOFF-R0

Customer Details: Mr. Kevin Joyce
Bradken Resources Pty. Ltd
20 McIntosh Dr, Mayfield West
New South Wales, 2304
Australia
Phone No: +61 419 126 466 e-mail: Kjoyce@bradken.com

Standard(s): FCC KDB 447498 D01 v06
RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES
FOR MOBILE AND PORTABLE DEVICES
CFR47 FCC Part 2, Subpart J, 2.1091
Radiofrequency radiation exposure evaluation: mobile devices.
CFR47 FCC Part 2, Subpart J, 2.1093
Radiofrequency radiation exposure evaluation: portable devices.

Results Summary: RF Radiation exposure requirements **Complied**

Test Date(s): 1st of April, 2026

Test House (Issued By): EMC Bayswater Pty Ltd
18/88 Merrindale Drive
Croydon South
Victoria, 3136, Australia

FCC Accredited Test Firm Registration number: 527798
FCC Accredited Test Firm Designation number: AU0004

Phone No: +61 3 9761 5888 Email: sales@emcbayswater.com.au
Fax: +61 3 8761 6547 Web: www.emcbayswater.com.au

The Bradken Resources Pty. Ltd, SRBEACONFLAT-R1, SmartRoller Beacon, measured EIRP is below the SAR exception threshold (5mm distance) and the calculated power density level at a distance of 20cm are below the maximum levels allowed by regulations therefore complied with the requirements of CFR47 FCC Part 2, Subpart J, 2.1093.

This is to certify that the necessary evaluations were made by EMC Bayswater Pty Ltd, and that the Bradken Resources Pty. Ltd, SRBEACONFLAT-R1, SmartRoller Beacon, has been tested in accordance with requirements contained in the appropriate commission regulations.

Prepared by:



Jignesh Mody
(EMC Test Engineer)

Approved by:



Neville Liyanapatabendige
(Manager)

12/05/2026 15:33

Date

RF Radiation Exposure Evaluation *for* Bradken Resources Pty. Ltd

Contents

1. Introduction	4
2. Test Report Revision History	4
3. Report Information	4
4. Product Details	5
4.1. Product Sample Details	5
4.2. Product description	5
5. SAR and RF Exposure exception evaluation	6
5.1. SAR exception evaluation	6
5.2. RF Exposure Evaluation (MPE)	7
6. Conclusion	7
Appendix A – Customer Declaration of Product Variant	8

1. Introduction

RF Radiation Exposure evaluation was performed on a Bradken Resources Pty. Ltd, SRBEACONFLAT-R1, SmartRoller Beacon in accordance with FCC KDB 447498 D01 v06.

2. Test Report Revision History

None

3. Report Information

EMC Bayswater Pty Ltd reports apply only to the specific samples tested under the stated test conditions. All samples tested were in good operating condition throughout the entire test program unless otherwise stated. EMC Bayswater Pty Ltd does not in any way guarantees the later performance of the product/equipment. It is the manufacturer's responsibility to ensure that additional production units of the tested model are manufactured with identical electrical and mechanical components. EMC Bayswater Pty Ltd shall have no liability for any deductions, inference or generalisations drawn by the clients or others from EMC Bayswater Pty Ltd issued reports. This report shall not be used to claim, constitute or imply product endorsement by EMC Bayswater Pty Ltd. This report shall not be reproduced except in full, without the written approval of EMC Bayswater Pty Ltd. This document may be altered or revised by EMC Bayswater Pty Ltd personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by EMC Bayswater Pty Ltd will nullify the document.

4. Product Details

4.1. Product Sample Details

The device, as supplied by the client, is described as follows:

Product:	SmartRoller Beacon		
Model No:	SRBEACONFLAT-R1		
Variant:	SRBEACONOFF-R0		
	<i>*The customer (Bradken Resources Pty. Ltd) declared testing of one variant as a worst-case representative sample and declared the Bradken Resources Pty. Ltd to be the SRBEACONFLAT-R1 (refer to Appendix D within this report for the customer declaration of worst-case variant)..</i>		
Serial No:	Not stated		
Firmware:	Beacon Normal	2.0.0	
	Beacon Custom Firmware	2.0.0_FCC	
Software:	N/A		
Power Specifications:	Beacons operates on 3.3v internal embedded battery		
Dimensions:	120Radiusx25 (mm)		
Weight (kg):	1.87		
EUT Type:	Tested as table-top		
Transmitter Details:	Description:	Beacon Device	
	Type:	BLE Advertising Radio Duty cycle: Programmable - 0.17% (10ms every 6 sec TX mode)	
	Modulation:	BLE 1M BLE PHY (GFSK)	
	Channels:	BLE channels 0-39Frequency: 2400– 2483.5 MHz	
	Max power:	-17.6dBm EIRP (measured)	
	Antenna:	Unictron H2UB6D1K1B0100 chip antenna Antenna Gain: -0.4dBi	
	FCC ID:	2BVRZ-SRBEACON	
	IC:	EFR32MG24B010F1536IM40- B	
	CE mark	No	
	RCM Logo	No	

(Customer supplied product information)

4.2. Product description

The EUT (Equipment Under Test) has been described by the customer as follows:

“The SmartRoller Beacon is a low-power wireless transmitting device designed for temperature monitoring of excavator load rollers in industrial mining environments. The device operates within the 2.4 GHz ISM band (2400–2483.5 MHz) using a proprietary wireless communication protocol. The beacon is based on an integrated system-on-chip (SoC) transceiver (EFR32MG24 series), which incorporates a microcontroller, RF transmitter/receiver, and baseband processing. A temperature sensing element is interfaced with the microcontroller, which periodically measures roller temperature and transmits this data using short, low-duty-cycle RF packets. The RF transmission utilizes Gaussian Frequency Shift Keying (GFSK) modulation with a nominal bandwidth of approximately 1 MHz. The RF carrier is generated through an internal phase-locked loop (PLL) referenced to a crystal oscillator, operating across the 2400–2483.5 MHz frequency range. The RF output is routed through an

impedance matching network to a PCB-mounted chip antenna (Unictron H2UB6D1K1B0100 or equivalent), providing an approximately omnidirectional radiation pattern with a nominal gain of -0.4dBi. The device is powered by a lithium coin cell battery and includes onboard voltage regulation and filtering to ensure stable operation of both digital and RF sections. A continuous ground plane with appropriate via stitching is implemented to maintain RF stability and minimize emissions. During operation, the SmartRoller Beacon transmits temperature data to nearby receivers for further processing and monitoring within the SmartRoller system.”

(Customer supplied product description information)

The Beacon (EUT) is part of the SmartRoller System.

5. SAR and RF Exposure exception evaluation

5.1. SAR exception evaluation

As per Appendix A of KDB 447498 D01 General RF Exposure Guidance v06

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table. The equation and threshold in 4.3.1 must be applied to determine SAR test exclusion.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	<i>SAR Test Exclusion Threshold (mW)</i>
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

SAR test exclusion threshold for 2402MHz transmitter is 10.0mW for 5mm distance

SAR test exclusion threshold for 2440MHz transmitter is 10.0mW for 5mm distance

SAR test exclusion threshold for 2480MHz transmitter is 9.9mW for 5mm distance

- The measured maximum EIRP at 2402MHz is 0.006mW (Worst-case, Without Duty Cycle correction factor).
- The measured maximum EIRP at 2440MHz is 0.017mW (Worst-case, Without Duty Cycle correction factor).
- The measured maximum EIRP at 2480MHz is 0.015mW (Worst-case, Without Duty Cycle correction factor).

The measurement uncertainty was calculated at ±4.83dB. The reported uncertainty is an expanded uncertainty calculated using a coverage factor of approximately k=2 which gives a level of confidence of approximately 95%.

The measured EIRP is below the SAR exception threshold for a 5mm distance.

5.2. RF Exposure Evaluation (MPE)

As per section 1.1310 of CFR 47 following Maximum Permissible Exposure (MPE) limits are applicable.

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

Limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields for 2402 to 2480MHz as per Table 1 of Section 15.1310 is 1 mW/cm² (General Population/Un-controlled).

Prediction Worst case:

Using equation

$$S = PG / 4\pi R^2$$

where: S = Power density
P = Power input to the antenna
G = Antenna gain
R = Distance to the center of radiation of the antenna

Band	Maximum Conducted Power @ Antenna (dBm)*	Antenna Gain (dBi)	Maximum EIRP (dBm)	Maximum EIRP (mW)	Distance (cm)	Calculated Power Density at 20cm (mW/cm ²)	Power Density Limit** (mW/cm ²)
2.4GHz BLE	-17.2	-0.4	-17.6	0.017	20	0.00000338	1

*Worst-case, Without Duty Cycle correction factor

** MPE limit for General Population/Un-controlled exposure

Table 1: Results for MPE Evaluation

6. Conclusion

The measured EIRP is below the SAR exception threshold (5mm distance) and the calculated power density level at a distance of 20cm are below the maximum levels allowed by regulations.

Appendix A – Customer Declaration of Product Variant

**Contact Details**

T +61 419 126 466

E bradken@bradken.com

W bradken.com

20 McIntosh Drive, Mayfield
West, NSW, 2304 Australia

Date: 28/04/2026

Declaration of Product Variations

We Bradken Resources Pty Limited of 20 McIntosh Dr Mayfield West, NSW, 2304 Australia hereby declare that:

Equipment SmartRoller Beacon
Model number SRBEACON

to be the worst case variant used for EMC testing of a product range consisting of other variants along with the justification declared in the table below. Bradken Resources Pty Limited accepts all responsibility for any adverse effects with respect to the EMC performance of the variant products listed in the table with regards to the performance observed whilst testing the declared worst case model.

Model tested	Beacon Variants models	Justification (examples)
Model used for EMC & Radio testing	Model SRBEACONxxxx-xx	Model Name (Primary): SRBEACONFLAT-R1 Additional Model(s): SRBEACONOFF-R0 All models listed (SRBEACONOFF-R0, SRBEACONFLAT-R1) are electrically identical in RF design, circuit, and operating characteristics. Differences are limited to mechanical design (enclosure) and minor PCB layout adjustments that do not affect RF performance. Please refer the model difference details in doc "SmartRoller Beacon Models.pdf"

Signed by: 
Name: Kevin Joyce
Position: Head of Digital Technology
Date signed: 1 May 2026