



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

Hexagon Pty Ltd

1.0

Development Optimiser

FCC ID: UTU-DEVOPB

REPORT: E2502-1839-6 Rev 1

DATE: October, 2025

*This report replaces the previously issued report E2502-1839-6
Please refer to section 2 of this report for details of any previously issued reports*



RF Radiation Exposure Evaluation Report

EMC Bayswater Test Report: E2502-1839-6 Rev 1
Issue Date: October, 2025

Product: Development Optimiser
Model No: 1.0
Serial No: Not stated
FCC ID: UTU-DEVOPB

Customer Details: Mr. Kieran Lee
Hexagon Pty Ltd
Level 16, 141 St George's Terrace,
Perth, Western Australia, 6000
Australia
Phone No: +61 8 94360700
e-mail: Perth.admin.min@hexagon.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): 24th of April, 2025

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 Hexagon Pty Ltd, 1.0, Development Optimiser, 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 Hexagon Pty Ltd, 1.0, Development Optimiser, has been tested in accordance with requirements contained in the appropriate commission regulations.

Prepared by:

Approved by:



Adnan Zaman
(EMC Test Engineer)



Neville Liyanapatabendige
(Manager)

06/10/2025 10:55

Date

RF Radiation Exposure Evaluation *for* Hexagon 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

1. Introduction

RF Radiation Exposure evaluation was performed on a Hexagon Pty Ltd, 1.0, Development Optimiser in accordance with FCC KDB 447498 D01 v06.

2. Test Report Revision History

ISSUE	DATE	Description	AUTHORISED BY
E2502-1839-6	06-08-2025	Original	Neville Liyanapatabendige (Manager)
E2502-1839-6 Rev1	06-10-2025	Customer requested to change the Model No to 1.0.	Neville Liyanapatabendige (Manager)

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:	Development Optimiser	
Model No:	1.0	
Serial No:	Not stated	
Firmware:	2.6	
Power Specifications:	Battery Powered 14.4V nominal	
Dimensions:	480x160x151mm (Length x Width x Height)	
Weight:	10kg	
EUT Type:	Tested as table-top	
Transmitter:	Description:	ESP32
	Type:	Transmitter/Receiver
	Manufacturer:	Espressif Systems
	Max Transmit Power:	-9.6 dBm (Measured max e.i.r.p)
	Modulation Scheme:	GFSK
	Frequency of Operation:	Bluetooth LE 2402-2480MHz
	Antenna Details:	Surface Mount 4.9dBi

(Customer supplied product information)

4.2. Product description

The device has been described by the customer as follows:

“Tool to assist an underground drill rig operator towards consistent and efficient drilling in an underground hardrock environment by providing real time information of relative attitude information for the drill rig booms. The system has an on board battery and charging system and requires connection to a 24V DC system with a minimum 2A supply to charge. The attitude data is relayed wirelessly over Bluetooth to an Android Tablet where it is displayed on the screen in a format familiar to the operators.”

(Customer supplied product description information)

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	SAR Test Exclusion Threshold (mW)
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 0.10mW (Worst-case, Without Duty Cycle correction factor).
- The measured maximum EIRP at 2440MHz is 0.06mW (Worst-case, Without Duty Cycle correction factor).
- The measured maximum EIRP at 2480MHz is 0.02mW (Worst-case, Without Duty Cycle correction factor).

The measurement uncertainty was calculated at ± 4.83 dB. 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 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 EIRP (dBm)	Maximum EIRP (mW)	Distance (cm)	Calculated Power Density at 20cm (mW/cm ²)	Power Density Limit** (mW/cm ²)
2.4GHz BLE	-9.6	0.109	20	0.00002	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.