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Prismatik Dentalcraft, Inc. SAR EXEMPTION REPORT

SCOPE OF WORK

SAR EXEMPTION CALCULATION
ON THE SMART SPORT MOUTHGUARD

REPORT NUMBER

105820372LEX-011

ISSUE DATE

7/29/2024

PAGES

17

DOCUMENT CONTROL NUMBER

Non-Specific EMC Report Shell Rev. December 2017
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SAR EXEMPTION TEST REPORT

Report Number: 105820372LEX-011

Project Number: G105820372

Report Issue Date: 7/29/2024

Product Name: Smart Sport Mouthguard
Model OSG-001

Standards: ANSI C63.10:2020 § 11.9 Fundamental
Emission Output Power
FCC Part 2.1093
RSS-102 Issue 6

Tested by:
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Client:
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18651 Von Karman
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1 Introduction and Conclusion

SAR exemption calculations were performed on the product constructed as described in section 4. Information provided by the client including maximum output power, antenna gain(s), and minimum separation distance(s) was used to determine if the product under evaluation was exempt from SAR. Any change in these stated values may invalidate these results. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product under evaluation is **exempt** from SAR requirements for each of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) evaluated. Intertek does not make any claims of compliance for samples or variants which were not evaluated.

2 Test Summary

Section	Requirement	Result
6	FCC SAR Exemption Criteria (FCC Title 47 CFR Part 1.1307, 2.1093)	Exempt from SAR
7	ISED SAR Exemption Criteria (RSS-102 Issue 6)	Exempt from SAR

**3 Client Information**

This product was tested at the request of the following:

Client Information	
Client Name:	PrismaTek Dentalcraft, Inc.
Address:	18651 Von Karman Irvine, CA 92612 USA
Contact:	Fernando Vera
Telephone:	+1 (562) 852-2519
Email:	fernando.vera@glidewell dental.com
Manufacturer Information	
Manufacturer Name:	PrismaTek Dentalcraft, Inc.
Manufacturer Address:	18651 Von Karman Irvine, CA 92612 USA



4 Description of Equipment under Test and Variant Models

Equipment Under Test	
Product Name	Smart Sport Mouthguard
Model Number	OSG-001
Type of Transmission	Bluetooth Low Energy (BLE)
Rated RF Output Power	0 dBm
Antenna(s) and Gain ¹	InsightSIP ISP1807 built in antenna, 0.6dBi gain
Antenna Separation (mm)	< 5 mm
Frequency Range	2402 – 2480 MHz
Type of Modulation / Data Rate	Gaussian Frequency Shift Keying (GFSK), 1Mbit/s, 2Mbit/s
Number of Channel(s)	40
Description of Equipment Under Test (provided by client)	
The product is Orb Smart Sport Mouthguard that can gather biometric data such as heart rate and impact forces. This can help sport players determine if an impact force is severe. It can also be used for feedback on training intensity based on heart rate data. The product is not intended as a medical device and should not be used to make any medical diagnosis.	

4.1 Variant Models:

There were no variant models covered by this evaluation.

¹ This information was provided by the client and may affect compliance. Intertek does not make any claims of compliance for values other than those shown.



5 Fundamental Emissions Output Power

1.1 Test Method:

Tests are performed in accordance with ANSI C63.10 §11.9.

1.2 Test Limits:

47 CFR 15.247(b)

- (1) For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the *maximum conducted output power* is the highest total transmit power occurring in any mode.

RSS-247 §5.4

- d. For DTSS employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).



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1.3 Test Equipment Used:

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	8258	Rohde & Schwarz	ESW44	9/19/2023	9/19/2024
Horn Antenna (1-18GHz)	4001	ETS	3117	3/4/2024	3/4/2025
1-18GHz Signal Path with Preamplifier	3074, 3918, 8310, 2593, 8188, 8185	-	-	3/1/2024	3/1/2025
System Controller	4096	ETS Lindgren	2090	Verify at Time of Use	Verify at Time of Use

1.4 Test Software Used:

Description	Manufacturer	Version
RSCommander	Rohde & Schwarz	2.4.2 64 bit (2023)

1.5 Measurement Uncertainty

Description	Expanded Uncertainty (k=2)
Fundamental Emission Output Power, Radiated (3m)	4.6 dB

No measurement correction based on measurement uncertainty is performed.

1.6 Test Conditions

Test Personnel	Supervising / Reviewing Engineer	Test Date	Ambient Temperature	Relative Humidity	Pressure
Brian Lackey	NA	7/26/2024	27.5°C	41.5%	985.4mbar

1.7 Test Results:

The sample tested was found to Comply. The conducted output power was less than 1 W. The EIRP was last than 4 W.

1.8 Test Data:

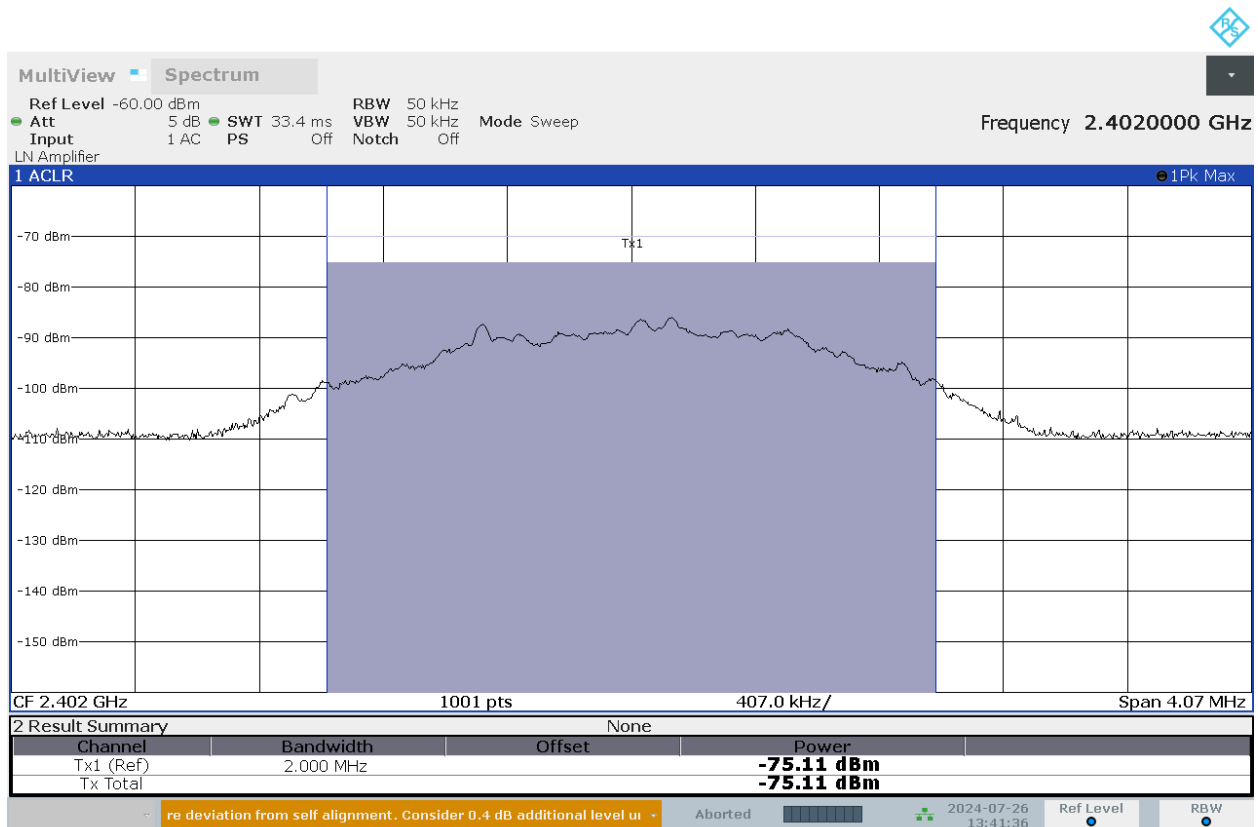
Data Rate (Mbit/s)	Frequency (MHz)	Channel Power (dBm)	Channel Power (dBuV)	Cable Loss (dB)	Antenna Factor (dB/m)	E Field (dBuV/m)	EIRP (dBm)
2	2402	-75.11	31.88	7.04	32.02	70.94	-24.29
	2440	-75.42	31.57	7.11	32.28	70.96	-24.27
	2480	-76.93	30.06	7.27	32.45	69.78	-25.45
1	2402	-74.24	32.75	7.04	32.02	71.81	-23.42
	2440	-75.29	31.7	7.11	32.28	71.09	-24.14
	2480	-77.49	29.5	7.27	32.45	69.22	-26.01



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1.9 Test Plots: Output Power (2Mbit/s)

1.9.1 Low Channel

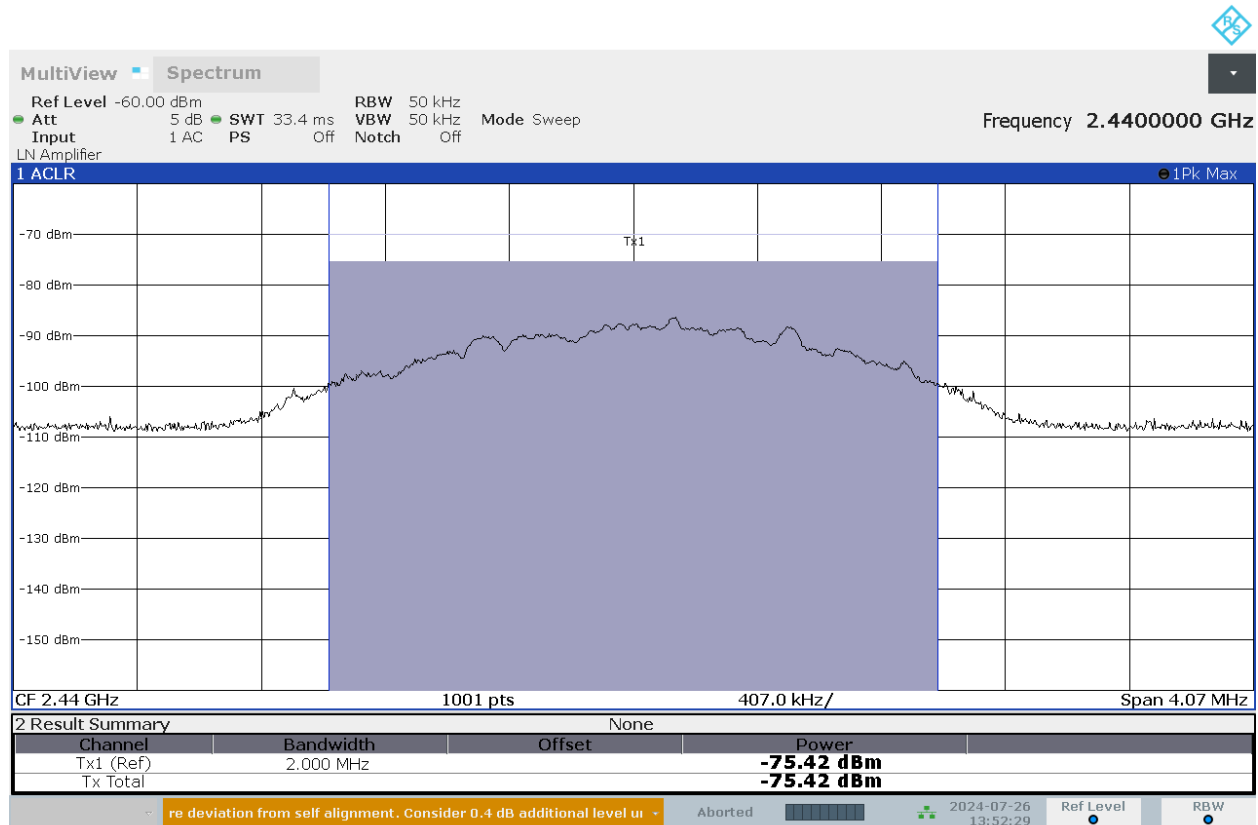


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SAR Exemption Report

1.9.2 Mid Channel

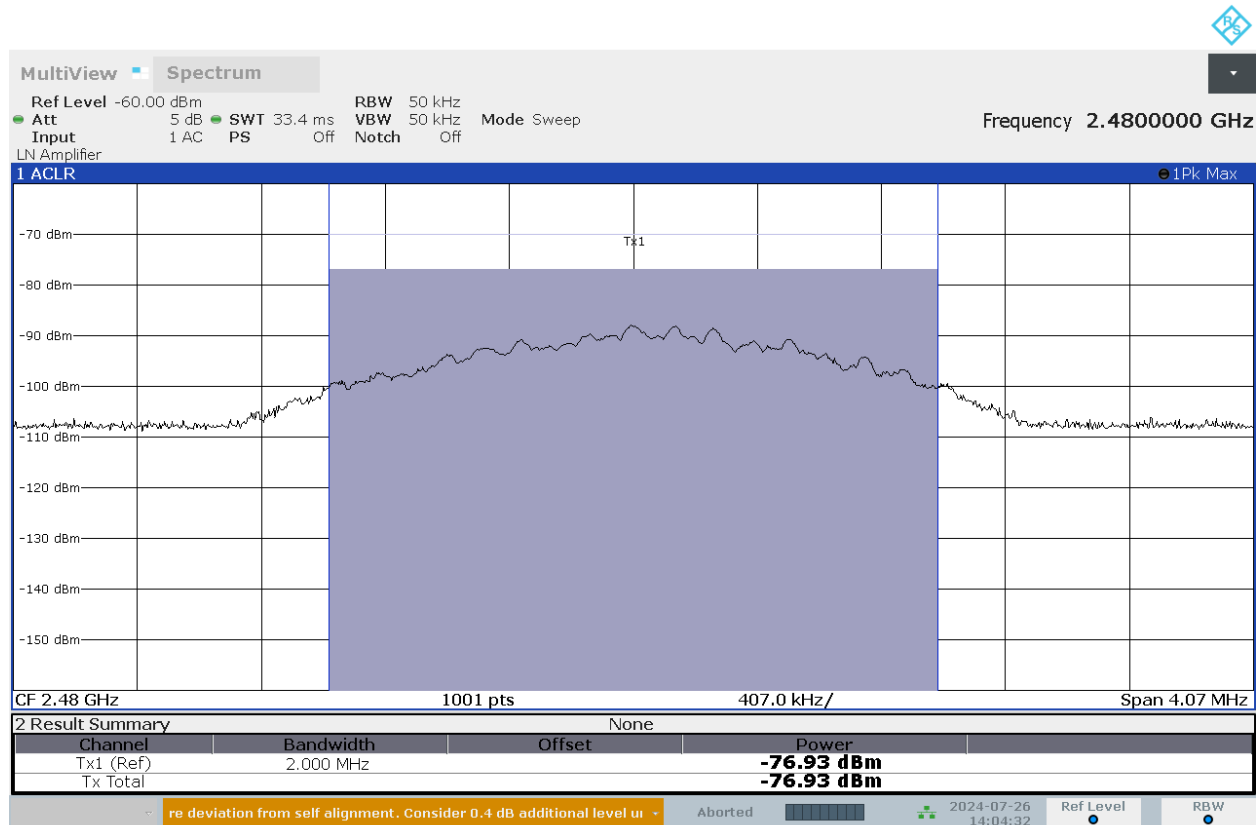


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SAR Exemption Report

1.9.3 High Channel



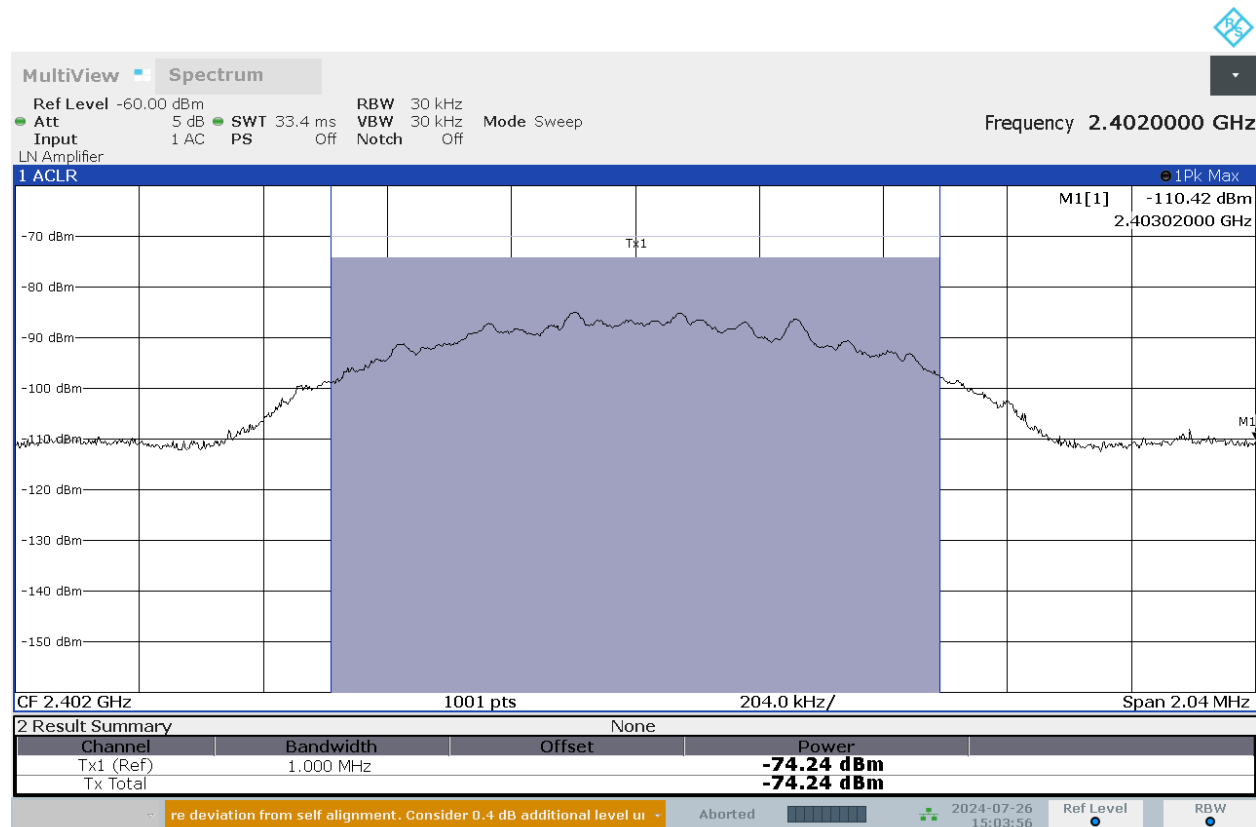
02:04:33 PM 07/26/2024



SAR Exemption Report

1.10 Test Plots: Output Power (1Mbit/s)

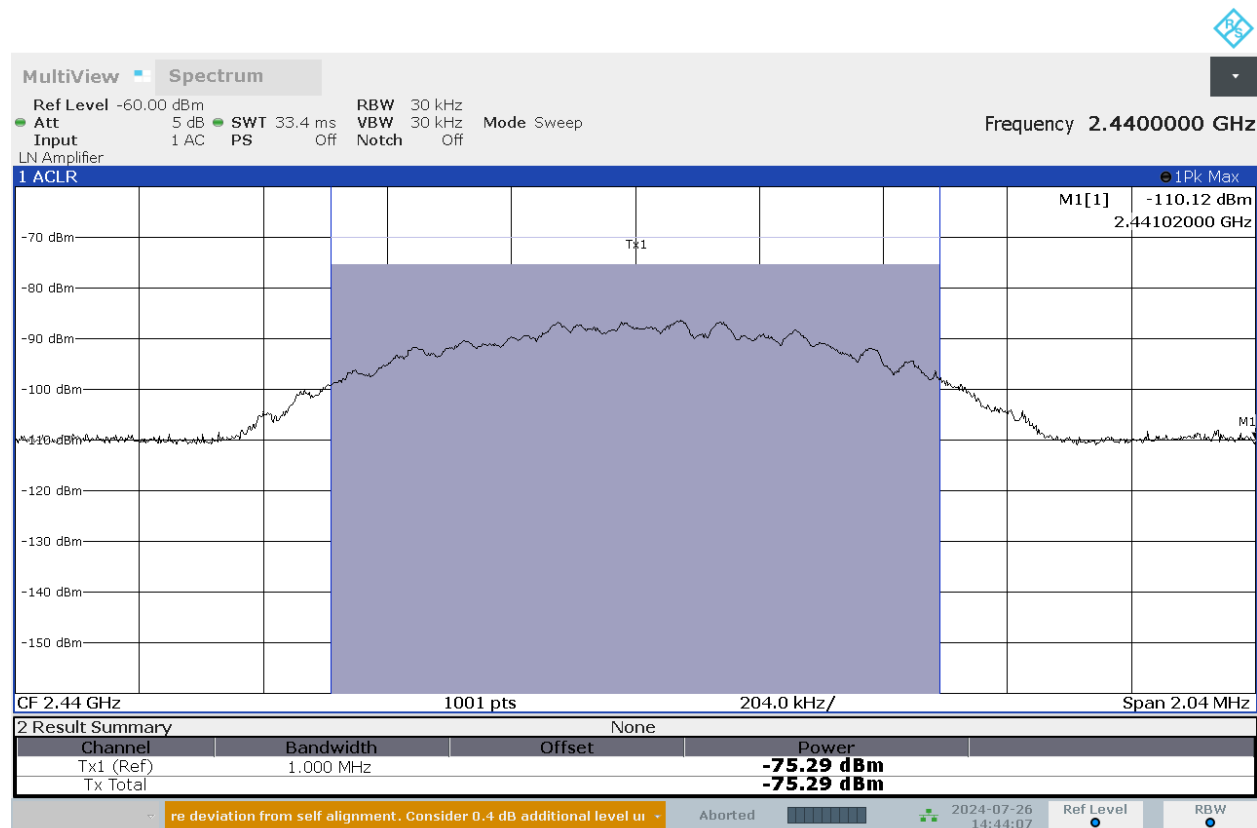
1.10.1 Low Channel



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1.10.2 Mid Channel

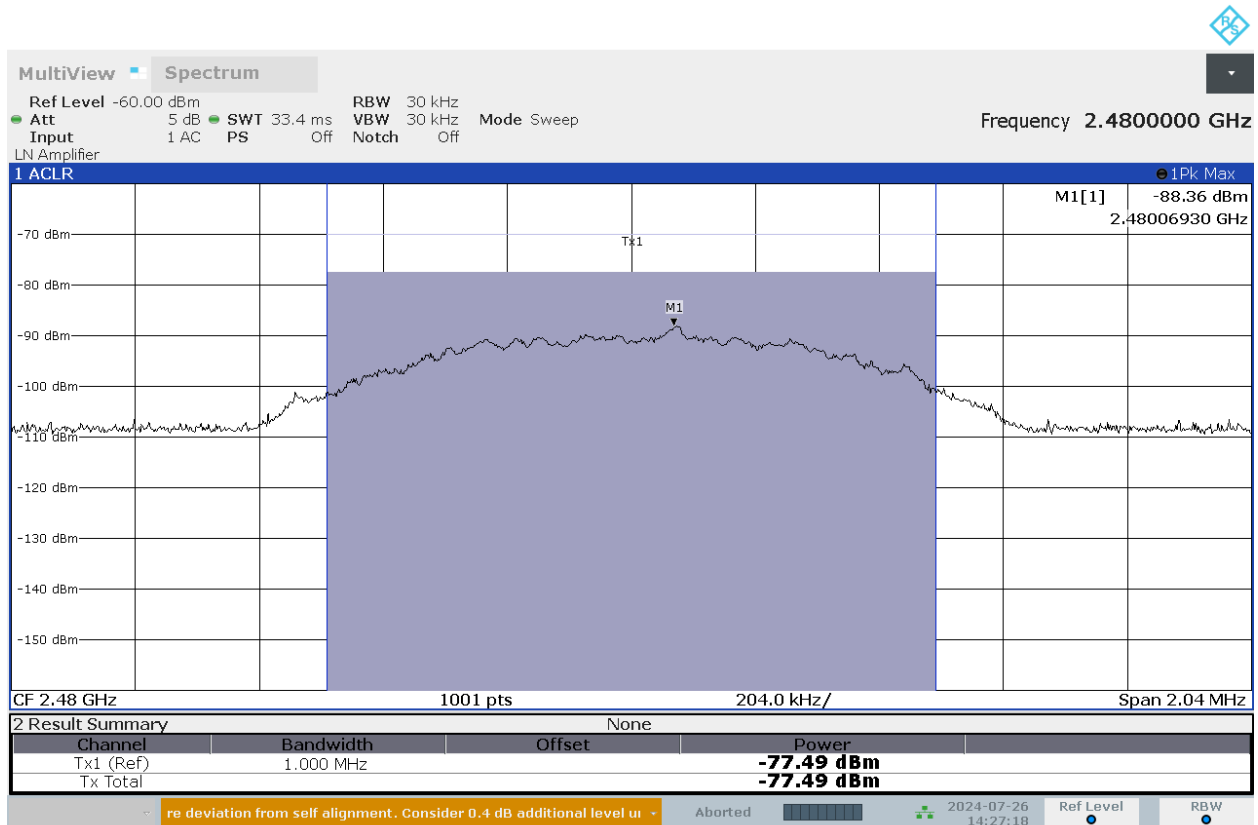


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SAR Exemption Report

1.10.3 High Channel



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**6 FCC SAR Exemption Criteria****FCC Title 47 CFR Part 1.1307(3)(i):**

For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

- (A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);
- (B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

6.1 Test Results:

The maximum available output power was less than 1mW, and the device is categorically exempt from SAR testing.



7 ISED SAR Exemption Criteria

RSS-102 Issue 6 § 6.3: SAR exemption limits

Devices operating at or below the applicable output power levels (adjusted for tune-up tolerance) specified in table 11, based on the separation distance, are exempt from SAR evaluation. The separation distance, defined as the distance between the user and/or bystander and the antenna and/or radiating element of the device or the outer surface of the device, shall be less than or equal to 20 cm for these exemption limits to apply.

Table 11: Power limits for exemption from routine SAR evaluation based on the separation distance

Frequency (MHz)	≤ 5 mm (mW)	10 mm (mW)	15 mm (mW)	20 mm (mW)	25 mm (mW)	30 mm (mW)	35 mm (mW)	40 mm (mW)	45 mm (mW)	> 50 mm (mW)
≤ 300	45	116	139	163	189	216	246	280	319	362
450	32	71	87	104	124	147	175	208	248	296
835	21	32	41	54	72	96	129	172	228	298
1900	6	10	18	33	57	92	138	194	257	323
2450	3	7	16	32	56	89	128	170	209	245
3500	2	6	15	29	50	72	94	114	134	158
5800	1	5	13	23	32	41	54	74	102	128

The exemption limits in Table 11 are based on measurements and simulations of half-wave dipole antennas at separation distances of 5 mm to 50 mm from a flat phantom, which provides a SAR value of approximately 0.4 W/kg for 1 g of tissue.

For limb-worn devices where the 10 gram of tissue applies, the exemption limits for routine evaluation in table 11 are multiplied by a factor of 2.5.

For controlled-use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in table 11 are multiplied by a factor of 5.

When the operating frequency of the device is between two frequencies located in table 11, linear interpolation shall be applied for the applicable separation distance. If the separation distance of the device is between two distances located in table 11, linear interpolation may be applied for the applicable frequency. Alternatively, the limit corresponding to the smaller distance may be employed. For example, in case of a 7 mm separation distance, either use the exception value for a 5 mm separation distance or interpolate between the limits corresponding to 5 mm and 10 mm separation distances

7.1 Test Results:

The maximum available power was less than the threshold output power specific in RSS-102 Issue 6 Table 11 so the device is categorically exempt from SAR.



8 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	7/29/2024	105820372LEX-011	BL	MC	Original Issue