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SPR Therapeutics, INC SAR EXEMPTION REPORT

SCOPE OF WORK

SAR EXEMPTION CALCULATION
ON THE SPRINT PNS (EXTERNAL PULSE GENERATOR REF: 9610)

REPORT NUMBER

105410623LEX-003.1

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SAR EXEMPTION TEST REPORT

Report Number: 105410623LEX-003.1

Project Number: G105410623

Report Issue Date: 5/25/2023

Report Revised Date: 6/22/2023

Product Name: SPRINT PNS (External Pulse Generator Ref:
9610)
Model 9610

Standards: FCC Part 2.1093
RSS-102 Issue 5

Tested by:
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Lexington, KY 40510
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Client:
SPR Therapeutics, INC
22901 Millcreek Blvd Ste 500
Cleveland, OH 44122-5724
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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
5	FCC SAR Exemption Criteria (FCC Title 47 CFR Part 1.1307, 2.1093)	Exempt from SAR
6	ISED SAR Exemption Criteria (RSS-102 Issue 5)	Exempt from SAR



3 Client Information

This product was tested at the request of the following:

Client Information	
Client Name:	SPR Therapeutics, INC
Address:	22901 Millcreek Blvd Ste 500 Cleveland, OH 44122-5724 USA
Contact:	Jeff Waterman
Telephone:	(216) 455-7447
Email:	jwaterman@sprtherapeutics.com
Manufacturer Information	
Manufacturer Name:	SPR Therapeutics, INC
Manufacturer Address:	22901 Millcreek Blvd Ste 500 Cleveland, OH 44122-5724 USA



4 Description of Equipment under Test and Variant Models

Equipment Under Test	
Product Name	SPRINT PNS (External Pulse Generator Ref: 9610)
Model Number	9610
FCC Identifier	2BBB4-9610
Type of Transmission	Bluetooth Low Energy (BLE)
Antenna(s) and Gain	AH316M245001-T, 1.6 dBm
Software Used By EUT	DEV-5045-XSF-000[08] & 5042-XSF-000[N]
Frequency Range	2402MHz - 2480MHz
Type of Modulation / Data Rate	GFSK 4.1
Number of Channel(s)	40
Description of Equipment Under Test (provided by client)	
SPRINT PNS – External Pulse Generator. This device is a body-worn, 2 channel peripheral nerve stimulator with BLE user interface. The device generates stimulus pulse current through 1 or 2 percutaneous leads. The entirety of these tests utilized a Pulse Generator with increased BLE transmit power (7).	

4.1 Variant Models:

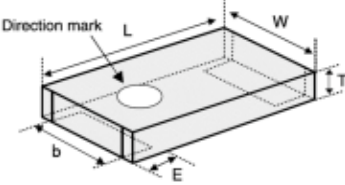
There were no variant models covered by this evaluation.



4.2 Antenna Separation

The following information was provided by SPR Therapeutics, INC and may affect compliance. Intertek does not make any claims of compliance for values other than those shown below.

Spec Sheet
Chip Antennas(Multilayer)
AH316M245001-T



■ Features

- Item Summary
MonoPole, 3.2x1.6x0.5mm,
for Bluetooth/W-LAN/ZigBee
- Lifecycle Stage
New PN available
- Standard packaging quantity (minimum)
Taping Embossed 3000pcs

■ Products characteristics table

System	Bluetooth/W-LAN/ZigBee
Frequency Band Width	2400 to 2500 MHz
Center Frequency	2450 MHz
Gain1 (Peak Gain)(typ)	+1.6 dBi
Gain2 (Ave. Gain at OMNI plane)	-0.1 dBi
Efficiency (typ)	-1.4 dB (72 %)
VSWR (typ)	3
Type	MonoPole
Operating Temp. Range	-40 to +85 °C
RoHS Compliance (10 subst.)	Yes
REACH Compliance (223 subst.)	Yes
Halogen Free	Yes
Soldering	Reflow

■ External Dimensions

Dimension L	3.2 ±0.15 mm
Dimension W	1.6 ±0.15 mm
Dimension T	0.5 ±0.1 mm
Dimension E	0.5 ±0.2 mm
Dimension b	Min 1.0 mm

The data is reference only. Electrical characteristics vary depending on environment or measurement condition.
TAIYO YUDEN reserves the right to make change to the data at any time without notice.
Before making final selection, please check product specification.

2022.06.09



4.3 Maximum Output Power

The maximum output power was measured and recorded in Intertek report 105410623LEX-002, reproduced below.

Frequency (MHz)	Max Peak (dBμV)	Conducted Power (dBm)	Conducted Power Limit (dBm)	Max Antenna Gain ¹ (dBi)	EIRP (dBm)	EIRP Limit (dBm)
2402	101.4	-5.6	30	1.6	-4	36.02
2440	98.74	-8.2	30	1.6	-6.6	36.02
2480	97.72	-9.3	30	1.6	-7.7	36.02

¹ Antenna gain not measured; values used are from § 4.2 Antenna Specifications, a client provided document.



5 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);

RF Source	Frequency (GHz)	Separation Distance (cm)	Output Power (dBm)	Output Power (mW)	P_{th} (mW)	Exempt from SAR?
Low	2.402	0.5	-5.6	0.398	-	Exempt
Mid	2.440	0.5	-8.2	0.219	-	Exempt
High	2.480	0.5	-9.3	0.170	-	Exempt

Since the output power was less than 1 mW, the device was considered categorically exempt per 1.1307(3)(i)(A).



6 ISED SAR Exemption Criteria

RSS-102 Issue 5 § 2.5.1: 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 ^{4,5}					
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

Output power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power. For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 5. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 2.5. If the operating frequency of the device is between two frequencies located in Table 1, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required.

Device	Frequency (MHz)	Output Power (dBm)	Separation Distance (mm)	Limit (mW)	Exempt from SAR?
Low	2402	-4	5	4.20	Exempt
Mid	2440	-6.6	5	4.04	Exempt
High	2480	-7.7	5	3.88	Exempt



7 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	5/25/2023	105410623LEX-003	JP	BL	Original Issue
1	6/22/2023	105410623LEX-003.1	JP	BL	Updated per TCB feedback