

RF EXPOSURE TEST REPORT

Report Number: 103291273LEX-030
Project Number: G103291273

Report Issue Date: 12/18/2017

Model(s) Tested: Handheld Remote

Standards: FCC Title 47 CFR Part 2.1093
RSS-102 Issue 5

Tested by:
Intertek Testing Services NA, Inc.
731 Enterprise Drive
Lexington, KY 40510
USA

Client:
SPR Therapeutics, Inc.
22901 Millcreek Blvd, Suite 110
Cleveland, OH 44122

Report prepared by



Brian Lackey, Project Engineer

Report reviewed by



Bryan Taylor, Team Leader

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

Table of Contents

1	<i>Introduction and Conclusion</i>	3
2	<i>Test Summary</i>	3
3	<i>Client Information</i>	4
4	<i>Description of Equipment Under Test and Variant Models</i>	4
5	<i>Duty Cycle Calculation</i>	6
6	<i>SAR Exemption Calculation (FCC)</i>	7
7	<i>SAR Exemption Calculation (ISED)</i>	10
8	<i>Revision History</i>	14

1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. 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 Handheld Remote was exempt from the SAR testing outlined in FCC Title 47 CFR § 2.1093 and RSS-102 Issue 5. Intertek does not make any claims of compliance for samples or variants which were not tested.

2 Test Summary

Section	Test full name	Result
5	Duty Cycle Calculation	-
6	SAR Exemption Calculation (FCC) (FCC Title 47 CFR § 2.1093)	Exempt from SAR
7	SAR Exemption Calculation (ISED) (RSS-102 Issue 5)	Exempt from SAR
8	Revision History	

3 Client Information

This EUT was tested at the request of:

Client: SPR Therapeutics, Inc.
22901 Millcreek Blvd, Suite 110
Cleveland, OH 44122

Contact: Matt Wunzin

Manufacturer: SPR Therapeutics, Inc.
22901 Millcreek Blvd, Suite 110
Cleveland, OH 44122
USA

4 Description of Equipment Under Test and Variant Models

Description of Equipment Under Test (provided by client)			
This is a stop-watch like wireless patient remote control for the EPG			
Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Handheld Remote	SPR Therapeutics, Inc.	9620	17440004

Receive Date:	11/10/2017
Received Condition:	Good
Type:	Production

Variant Models:

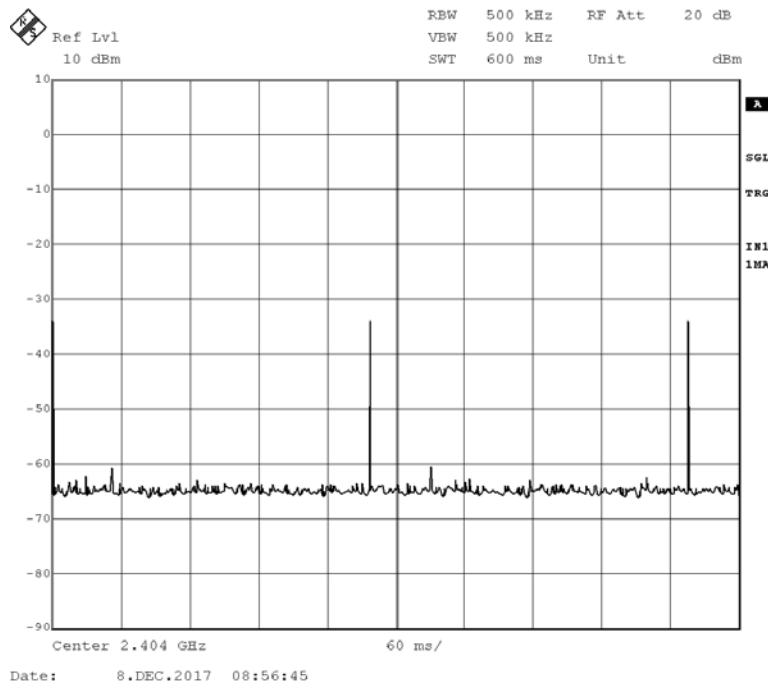
There were no variant models covered by this evaluation.

4.1 EUT Photo:

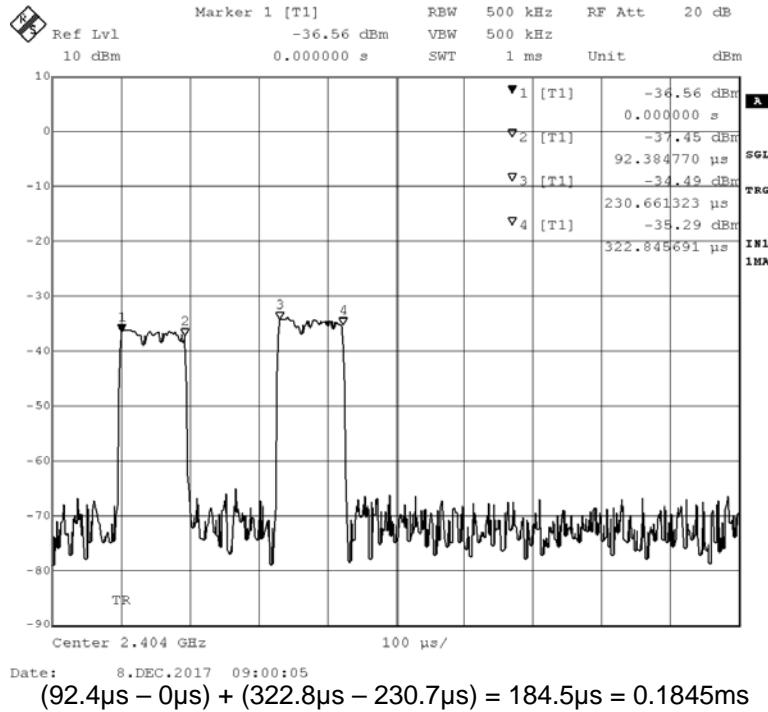


5 Duty Cycle Calculation

The device is a frequency hopping spread spectrum (FHSS) transmitter. The time to repeat the hopping sequence was measured to be 277.5ms:



The device utilizes 37 unique hopping channels once per hopping sequence, for an occupation time of $277.5\text{ms} / 37 = 7.5\text{ms}$ per hopping channel. At each hopping channel, the total transmit time was measured to be $184.5\mu\text{s}$:



$$(92.4\mu\text{s} - 0\mu\text{s}) + (322.8\mu\text{s} - 230.7\mu\text{s}) = 184.5\mu\text{s} = 0.1845\text{ms}$$

Therefore the average duty cycle is calculated as $0.1845\text{ms} / 7.5\text{ms} = 0.0246 = 2.46\%$

6 SAR Exemption Calculation (FCC)

6.1 Test Limits

§ 1.1310: The criteria listed in table 1 shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

Part 1.1310 Limits for Maximum Permissible Exposure (MPE)

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 Exposures				
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
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	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
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

6.2 Test Procedure

ANSI C63.10: 2013. The peak output power was measured using the marker to peak function of the spectrum analyzer.

KDB 447498 D01 General RF Exposure Guidance v06 § 4.3.1 *Standalone SAR test exclusion considerations*

6.3 Test Equipment Used

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	9/20/2017	9/20/2018

6.4 Test Results

The device was found to be **exempt**. The SAR exclusion threshold was less than the 10-g SAR limit.

6.5 Test Conditions

Test Personnel: Brian Lackey
Supervising/Reviewing
Engineer:
(Where Applicable) NA
Input Voltage: Battery

Test Date: 11/10/2017
Ambient Temperature: 22.1C
Relative Humidity: 35.2%
Atmospheric Pressure: 992.0mbar

6.6 Test Data (10-g SAR Exclusion Threshold):

Frequency (GHz)	Maximum Declared EIRP (dBm)	Duty Cycle (%)	Source Based Output Power (mW)
2.402	10	2.38	0.238
2.440	10	2.38	0.238
2.480	10	2.38	0.238

Source based output power, mW = $10^{((\text{EIRP, dBm}) / 10) \cdot (\text{Duty cycle, \%}) / 100}$

Frequency (GHz)	Source Based Output Power (mW)	Minimum Separation Distance (mm)	SAR Exclusion Threshold	10-g SAR Limit	Exempt?
2.402	1 ⁽¹⁾	5	0.310	7.5	Exempt
2.440	1 ⁽¹⁾	5	0.312	7.5	Exempt
2.480	1 ⁽¹⁾	5	0.315	7.5	Exempt

SAR exclusion threshold = $(\text{Maximum source based output power, mW}) \cdot \sqrt{(\text{Frequency, GHz}) / (\text{Minimum separation distance, mm})}$

¹ Source based output power rounded up to 1mW

7 SAR Exemption Calculation (ISED)

7.1 Test Limits

RSS-102 § 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^{b5}

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

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6 ^{**}
1.1-10	87/ $f^{0.5}$	-	-	6 ^{**}
10-20	27.46	0.0728	-2	6
20-48	58.07/ $f^{0.25}$	0.1540/ $f^{0.25}$	8.944/ $f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 $f^{0.3417}$	0.008335 $f^{0.3417}$	0.02619 $f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ $f^{1.2}$
150000-300000	0.158 $f^{0.5}$	4.21 x 10 ⁻⁴ $f^{0.5}$	6.67 x 10 ⁻⁵ f	616000/ $f^{1.2}$

Note: f is frequency in MHz.

* Based on nerve stimulation (NS).

** Based on specific absorption rate (SAR).

7.2 Test Procedure

ANSI C63.10: 2013. The peak output power was measured using the marker to peak function of the spectrum analyzer.

RSS-102 Issue 5 § 2.5.1 *Exemption Limits for Routine Evaluation – SAR Evaluation*

7.3 Test Equipment Used

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	9/20/2017	9/20/2018

7.4 Test Results

The device was found to be **exempt**. The source based output power was less than the SAR exemption limit.

7.5 Test Conditions

Test Personnel: Brian Lackey
Supervising/Reviewing
Engineer:
(Where Applicable) NA
Input Voltage: Battery

Test Date: 11/10/2017
Ambient Temperature: 22.1C
Relative Humidity: 35.2%
Atmospheric Pressure: 992.0mbar

7.6 Test Data (SAR Exemption Limits):

Frequency (GHz)	Maximum Declared EIRP (dBm)	Duty Cycle (%)	Source Based Output Power (mW)
2.402	10	2.38	0.238
2.440	10	2.38	0.238
2.480	10	2.38	0.238

Source based output power, mW = $10^{(EIRP, \text{ dBm}) / 10} \cdot (\text{Duty cycle, \%}) / 100$

Frequency (GHz)	Minimum Separation Distance (mm)	Source Based Output Power (mW)	SAR Exemption Limit (mW)	Exempt?
2.402	5	0.238	10.65 ⁽²⁾	Exempt
2.440	5	0.238	10.14 ⁽²⁾	Exempt
2.480	5	0.238	9.86 ⁽²⁾	Exempt

² SAR exemption limits linearly interpolated by frequency from RSS-102 Issue 5 Table 1 and multiplied by 2.5 for 10 gram extremity limits

8 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	12/18/2017	103291273LEX-030	BZ	BCT	Original Issue