



Product Service

---

**Choose certainty.  
Add value.**

# Report On

RF Exposure Assessment of the  
Laerdal Medical AS  
Little Anne QCPR Sensor

FCC ID: QHQ-120-60750  
IC: 20263-12060750

Document 75931051 Report 07 Issue 1

August 2015



Product Service

TÜV SÜD Product Service, Octagon House, Concorde Way, Segensworth North,  
Fareham, Hampshire, United Kingdom, PO15 5RL  
Tel: +44 (0) 1489 558100. Website: [www.tuv-sud.co.uk](http://www.tuv-sud.co.uk)

**REPORT ON**

RF Exposure Assessment of the  
Laerdal Medical AS  
Little Anne QCPR Sensor

Document 75931051 Report 07 Issue 1

August 2015

**PREPARED FOR**

Laerdal Medical AS  
Tanke Svilandsgt.30  
4002 Stavanger  
Norway

**PREPARED BY**

A handwritten signature in black ink, appearing to read 'Ryan Henley'.

**Ryan Henley**  
Project Manager

**APPROVED BY**

A handwritten signature in black ink, appearing to read 'Mark Jenkins'.

**Mark Jenkins**  
Authorised Signatory

**DATED**

20 August 2015



Product Service

## CONTENTS

Section		Page No
<b>1</b>	<b>REPORT SUMMARY .....</b>	<b>3</b>
1.1	Introduction .....	4
1.2	Regional Requirements .....	5
1.3	Product Information .....	6
1.3.1	Technical Description .....	6
1.3.2	Supported Features .....	6
1.3.3	Antennas.....	6
1.4	Brief Summary of Results.....	7
<b>2</b>	<b>TEST DETAILS .....</b>	<b>8</b>
2.1	Rationale for Assessment of the RF Exposure .....	9
2.2	Test Result Details.....	10
<b>3</b>	<b>DISCLAIMERS AND COPYRIGHT.....</b>	<b>11</b>
3.1	Disclaimers and Copyright.....	12



Product Service

## **SECTION 1**

### **REPORT SUMMARY**

RF Exposure Assessment of the  
Laerdal Medical AS  
Little Anne QCPR Sensor



Product Service

## 1.1 INTRODUCTION

The information contained in this report is intended to show verification of the RF Exposure Assessment of the Laerdal Medical AS Little Anne QCPR Sensor to the requirements of the applied test specifications.

Objective	To perform RF Exposure Assessment to determine the Equipment Under Test's (EUT's) compliance of the applied rules.
Applicant	Laerdal Medical AS
Manufacturer	Laerdal Medical AS
Manufacturing Description	The purpose of the Little Anne QCPR Sensor is to provide the user with objective measurements and quality feedback on CPR when training on Little Anne. The feedback will be presented to the user on a smartphone application (Ref. URS-1022)
Hardware Version	REV A Prototype
Model Number(s)	Little Anne QCPR Sensor
Test Specification/Issue/Date	EN 62311:2008 CFR 47 Pt1.1310 Health Canada Safety Code 6 ARPANSA Radiation Protection Series No.3



Product Service

## 1.2 REGIONAL REQUIREMENTS

The table below shows the regional requirements that are referenced in this test report. A full list of the requirements is shown in Annex A.

Report Reference	Regional Requirement
EU	EN 62311:2008
FCC	CFR 47 Pt1.1310
IC	Health Canada Safety Code 6
AUS	ARPANSA Radiation Protection Series No.3



### 1.3 PRODUCT INFORMATION

#### 1.3.1 Technical Description

The Equipment under test was a Laerdal Medical AS Little Anne QCPR Sensor. The purpose of the Little Anne QCPR Sensor is to provide the user with objective measurements and quality feedback on CPR when training on Little Anne. The feedback will be presented to the user on a smartphone application (Ref. URS-1022). A full technical description can be found in the manufacturer's documentation.

All reported calculations were carried out on the relevant information supplied for the Little Anne QCPR Sensor to demonstrate compliance with the applied test specification(s). The sample assessed was found to comply with the requirements of the applied rules.

#### 1.3.2 Supported Features

The following radio access technologies and frequency bands are supported by the equipment under test.

Radio Access Technology	Bluetooth Low Energy
Frequency Band	2402 MHz to 2480 MHz

#### 1.3.3 Antennas

The following antennas are supported by the equipment under test.

No.	Model	Gain (dBi)
1	Internal	0



### 1.4 BRIEF SUMMARY OF RESULTS

The wireless device described within this report has been shown to be capable of compliance with the basic restrictions related to human exposure to electromagnetic fields for both General Public and Occupational. The calculations shown in this report were made in accordance the procedures specified in the applied test specification(s).

Required Compliance Boundary (m)	
Occupational	General Population
0.01	0.01

**Table 1 – Compliance Boundary Results**

Regional Requirement	Calculated RF exposure level at compliance boundary of 0.01 m					
	S Field (W/m <sup>2</sup> )		E Field (V/m)		H Field (A/m)	
	Result	Limit	Result	Limit	Result	Limit
ICNIRP	0.7958	50.0000	17.3205	137.0000	0.0459	0.3630
FCC*	0.0796	5.0000	N/A	N/A	N/A	N/A
RSS	0.7958	31.6361	17.3205	109.2114	0.0459	0.2897
ARPANSA	0.7958	50.0000	17.3205	137.0000	0.0459	0.3640

\* Requirement and Result in mW/cm<sup>2</sup>

**Table 2 – Occupational Results**

The calculations show that the EUT complies with the occupational exposure levels described in the EN 62311:2008, CFR 47 Pt1.1310, Health Canada Safety Code 6 and ARPANSA Radiation Protection Series No.3 at the point of investigation, 0.01 m.

Regional Requirement	Calculated RF exposure level at compliance boundary of 0.01 m					
	S Field (W/m <sup>2</sup> )		E Field (V/m)		H Field (A/m)	
	Result	Limit	Result	Limit	Result	Limit
ICNIRP	0.7958	10.0000	17.3205	61.0000	0.0459	0.1620
FCC*	0.0796	1.0000	N/A	N/A	N/A	N/A
RSS	0.7958	5.3508	17.3205	44.9105	0.0459	0.1191
ARPANSA	0.7958	10.0000	17.3205	61.4000	0.0459	0.1630

\* Requirement and Result in mW/cm<sup>2</sup>

**Table 3 – General Population Results**

The calculations show that the EUT complies with the occupational exposure levels described in the EN 62311:2008, CFR 47 Pt1.1310, Health Canada Safety Code 6 and ARPANSA Radiation Protection Series No.3 at the point of investigation, 0.01 m.





Product Service

## **SECTION 2**

### **TEST DETAILS**



## 2.1 RATIONALE FOR ASSESSMENT OF THE RF EXPOSURE

The aim of the assessment report is to evaluate the compliance boundary for a set of given input power(s) according to the basic restrictions (directly or indirectly via compliance with reference levels) related to human exposure to radio frequency electromagnetic fields.

The chosen assessment method to establish the compliance boundary in the far-field region is the reference method as defined in the relevant specifications.

The RF exposure assessment is based upon the following criteria:

The Little Anne QCPR Sensor The purpose of the Little Anne QCPR Sensor is to provide the user with objective measurements and quality feedback on CPR when training on Little Anne. The feedback will be presented to the user on a smartphone application (Ref. URS-1022) operates with the following transmitters active on the antenna ports shown in Section 1.3.3. For each transmitter, the Radio Access Technology (RAT), EIRP inclusive of antenna gain and duty cycle, gain of the antenna and lowest frequency of operation are shown as they contribute to the calculation of S Field, E field and H field values according to the following formulas.

The power flux (S Field):

$$S = \frac{PG_{(\theta, \phi)}}{4\pi r^2}$$

The electric field strength (E Field):

$$E = \frac{\sqrt{30PG_{(\theta, \phi)}}}{r}$$

The magnetic field strength (H Field):

$$H = \frac{E}{\eta_0}$$

Where:

P = Average Power (W)

G = Antenna Gain (dBi)

r = Distance (cm) or (m)

$\eta_0 = 377$



Product Service

## 2.2 TEST RESULT DETAILS

The frequencies shown in the tables below have been chosen based on the lowest possible frequency that the EUT can transmit.

Antenna Port	Tx No.	Ant No.	RAT	EIRP (W)	Duty Cycle (%)	Gain (dBi)	Frequency (MHz)	RF Exposure Level at compliance boundary of 0.01 m		
								S Field	E Field	H Field
1	1	1	Bluetooth Low Energy	0.001	100	0	2402	0.7958	17.3205	0.0459

**Table 4 – Occupational Transmitter Summary**

Antenna Port	Tx No.	Ant No.	RAT	EIRP (W)	Duty Cycle (%)	Gain (dBi)	Frequency (MHz)	RF Exposure Level at compliance boundary of 0.01 m		
								S Field	E Field	H Field
1	1	1	Bluetooth Low Energy	0.001	100	0	2402	0.7958	17.3205	0.0459

**Table 5 – General Population Transmitter Summary**



Product Service

## **SECTION 3**

### **DISCLAIMERS AND COPYRIGHT**



Product Service

### 3.1 DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

This report must not be reproduced, except in its entirety, without the written permission of  
TÜV SÜD Product Service

© 2015 TÜV SÜD Product Service



Product Service

## **ANNEX A**

### **REGIONAL REQUIREMENTS**



Product Service

Frequency Range (MHz)	Power Density (W/m <sup>2</sup> )	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
0.065 - 1	-	610/f	1.6/f
1 - 10	-	610/f	1.6/f
10 - 400	10	61	0.162
400 - 2000	f/40	3*f <sup>0.5</sup>	0.00796*f <sup>0.5</sup>
2000 - 300000	50	137	0.363

**Table A.1 – EN 62311:2008 Occupational Limits**

Frequency Range (MHz)	Power Density (W/m <sup>2</sup> )	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
0.003 - 0.15	-	87	5
0.15 - 1	-	87/f	0.73/f
1 - 10	-	87/f <sup>0.5</sup>	0.73/f
10 - 400	2	27	0.071
400 - 2000	f/200	1.375*f <sup>0.5</sup>	0.00364*f <sup>0.5</sup>
2000 - 300000	10	61	0.162

**Table A.2 – EN 62311:2008 General Population Limits**

Frequency Range (MHz)	S Field (mW/cm <sup>2</sup> )	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
0 - 0.3	-	-	-
0.3 - 3	100	614	1.63
3 - 30	900/f <sup>2</sup>	1842/f	4.89/f
30 - 300	1	61.4	0.163
300 - 1500	f/300	-	-
1500 - 100000	5	-	-

**Table A.3 – CFR 47 Pt1.1310 Occupational Limits**

Frequency Range (MHz)	S Field (mW/cm <sup>2</sup> )	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
0 - 0.3	-	-	-
0.3 - 3	100	614	1.63
3 - 30	180/f <sup>2</sup>	824/f	2.19/f
30 - 300	0.2	27.5	0.073
300 - 1500	f/1500	-	-
1500 - 100000	1	-	-

**Table A.4 – CFR 47 Pt1.1310 General Population Limits**

Frequency Range (MHz)	Power Density (W/m <sup>2</sup> )	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
10 - 20	10	61.4	0.163
20 - 48	44.72/f <sup>0.5</sup>	129.8/f <sup>0.25</sup>	0.3444/f <sup>0.25</sup>
48 - 100	6.455	49.33	0.1309
100 - 6000	0.6455*f <sup>0.5</sup>	15.60*f <sup>0.25</sup>	0.04138*f <sup>0.25</sup>
6000 - 150000	50	137	0.364

**Table A.5 – Health Canada Safety Code 6 Occupational Limits**

Frequency Range (MHz)	Power Density (W/m <sup>2</sup> )	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
10 - 20	2	27.46	0.0728
20 - 48	8.944/f <sup>0.5</sup>	58.07/f <sup>0.25</sup>	0.1540/f <sup>0.25</sup>
48 - 300	1.291	22.06	0.05852
300 - 6000	0.02619*f <sup>0.6834</sup>	3.142*f <sup>0.3417</sup>	0.008335*f <sup>0.3417</sup>
6000 - 15000	10	61.4	0.163

**Table A.6 – Health Canada Safety Code 6 General Population Limits**



Product Service

Frequency Range (MHz)	Power Density (W/m <sup>2</sup> )	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
0.1 - 1	-	614	1.63/f
1 - 10	1000/f <sup>2</sup>	614	1.63/f
10 - 400	10	61.4	0.163
400 - 2000	f/40	3.07*f <sup>0.5</sup>	0.00814*f <sup>0.5</sup>
2000 - 300000	50	137	0.364

**Table A.7 – ARPANSA Radiation Protection Series No.3 Occupational Limits**

Frequency Range (MHz)	Power Density (W/m <sup>2</sup> )	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
0.1 - 0.15	-	86.8	4.86
0.15 - 1	-	86.8	0.729/f
1 - 10	-	86.8/f <sup>0.5</sup>	0.729/f
10 - 400	2	27.4	0.0729
400 - 2000	f/200	1.37*f <sup>0.5</sup>	0.00364*f <sup>0.5</sup>
2000 - 300000	10	61.4	0.163

**Table A.8 – ARPANSA Radiation Protection Series No.3 General Population Limits**