

St. Jude Medical RF Exposure Exhibit

SCOPE OF WORK

EMC TESTING – Merlin™ 2 PCS, Model Tested: MER3700BLE

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RF Exposure Exhibit (mobile devices)

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Product Designation: Merlin™ 2 PCS

Model Tested: MER3700BLE

FCC ID: RIA-MER3700BLE

IC: 8454A-MER3700BLE

to

47CFR 2.1091
RSS-102 Issue 5

for

St. Jude Medical

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Report No. 104663935MPK-013b	
Equipment Under Test:	Merlin™ 2 PCS
Trade Name:	St. Jude Medical
Model(s) Tested:	MER3700BLE
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1.0 RF Exposure Summary

Test	Reference FCC	Reference Industry Canada	Result
Radio frequency Radiation Exposure Evaluation	47 CFR§2.1091	RSS-102 Issue 5	Complies

2.0 RF Exposure Limits

In this document, we evaluate the RF Exposure to human body due the intentional transmission from the transmitter (EUT). The limits for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 and RSS-102 are followed.

2.1 FCC Limits

According to FCC 1.1310 table 1: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
(A)Limits For Occupational / Control 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 density

2.2 Industry Canada Limits

According to RSS-102, Industry Canada has adopted the SAR and RF field strength limits established in Health Canada's RF exposure guideline, Safety Code 6.

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)				
Frequency Range	Electric Field	Magnetic Field	Power Density	Reference Period
(MHz)	(V/m rms)	(A/m rms)	(W/m ²)	(minutes)
0.003-10	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).				

3.0 Test Results (Mobile Configuration)

3.1 Classification

Radio is installed inside a mobile host device. The antenna of the product, under normal use condition, is at least 20 cm away from the body of the user and accessible to the end user. Warning statement to the user for keeping at least 20 cm or more separation distance with the antenna should be included in user’s manual.

3.2 EIRP calculations

The Merlin™ 2 PCS, Model: MER3700BLE consists of: 0.032768 MHz (Inductive), 13.56 MHz (NFC), and 2402-2480 MHz (Bluetooth LE) Radios. Bluetooth LE radio does not simultaneously transmit with other Host Device transmitters (NFC & inductive).

3.3 Maximum RF Power

Merlin™ 2 PCS, Model: MER3700BLE:

Frequency Range	EIRP	EIRP	notes
(MHz)	(dBm)	(mW)	
2402-2480 (BLE)	16.59	45.604	RF Power is 11.56 dBm & Antenna Gain is 5.03 dBi Antenna Gain & Conducted power measurements were taken from Report# 170524-01.TR05 under FCC ID PD99260NG

Note: Bluetooth LE Radio is installed in the Host Device Model Number: MER3700

3.4 RF Exposure Calculation

3.4.1 RF Exposure calculation for Bluetooth, Merlin™ 2 PCS, Model: MER3700BLE:

Frequency Range (MHz)	EIRP ¹ (dBm)	EIRP ¹ (mW)	Power Density (mW/cm ²) @20 cm	FCC Limit (mW/cm ²)
2402-2480	16.59	45.6037	0.00908	1.00

Frequency Range (MHz)	EIRP ¹ (dBm)	EIRP ¹ (mW)	Power Density (W/m ²) @20 cm	RSS Limit (W/m ²)
2402-2480	16.59	45.6037	0.09077	5.35

Power Density Calculation

The Power Density can be calculated using the formula

$$S = \text{EIRP} / 4\pi D^2$$

Where: S is Power Density in mW/cm²

D is the distance from the antenna in cm.

4.0 Document History

Revision/ Job Number	Writer Initials	Reviewers Initials	Date	Change
1.0/ G104663935	AS	ML	July 14, 2022	Original document