

# Abbott Laboratories

## RF Exposure Exhibit

**SCOPE OF WORK**

EMC TESTING – Merlin 2 PCS Programmer, Model: MER3700

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**RF Exposure Exhibit  
(mobile devices)**

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**Product Designation: Merlin 2 PCS Programmer**

**Model Tested: MER3700**

to

**47CFR 2.1091**

**RSS-102 Issue 5**

for

**Abbott Laboratories**

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<b>Report No. 105602398MPK-004</b>	
<b>Equipment Under Test:</b>	Merlin 2 PCS Programmer
<b>Trade Name:</b>	Abbott Laboratories
<b>Model(s) Tested:</b>	MER3700
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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 <sup>2</sup> )	Average Time (minutes)
<b>(A)Limits For Occupational / Control Exposures</b>				
0.3 – 3.0	614	1.63	*100	6
3.0 – 30	1842/f	4.89/f	*900/f <sup>2</sup>	6
30-300	61.4	0.163	1.0	6
300 - 1500	...	...	F/300	6
1500 - 100,000	...	...	5	6
<b>(B)Limits For General Population / Uncontrolled Exposure</b>				
0.3 – 1.34	614	1.63	*100	30
1.34 – 30	824/f	2.19/f	*180/f <sup>2</sup>	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.

<b>Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)</b>				
Frequency Range	Electric Field	Magnetic Field	Power Density	Reference Period
(MHz)	(V/m rms)	(A/m rms)	(W/m <sup>2</sup> )	(minutes)
0.003-10	83	90	-	Instantaneous*
0.1-10	-	0.73/ <i>f</i>	-	6**
1.1-10	87/ <i>f</i> <sup>0.5</sup>	-	-	6**
10-20	27.46	0.0728	-2	6
20-48	58.07/ <i>f</i> <sup>0.25</sup>	0.1540/ <i>f</i> <sup>0.25</sup>	8.944/ <i>f</i> <sup>0.5</sup>	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 <i>f</i> <sup>0.3417</sup>	0.008335 <i>f</i> <sup>0.3417</sup>	0.02619 <i>f</i> <sup>0.6834</sup>	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ <i>f</i> <sup>1.2</sup>
150000-300000	0.158 <i>f</i> <sup>0.5</sup>	4.21 x 10 <sup>-4</sup> <i>f</i> <sup>0.5</sup>	6.67 x 10 <sup>-5</sup> <i>f</i>	616000/ <i>f</i> <sup>1.2</sup>

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 installed at least 20cm away from the body of the user and accessible to the end user. Warning statement to the user for keeping at least 20cm or more separation distance with the antenna should be included in user's manual.

#### 3.2 EIRP calculations

The Merlin 2, model: MER3700 consists of one radio module model: 9260NGW (FCC ID: PD99260NG).

- 2.4GHz Wifi.
- 5GHz U-NII 1.
- 5GHz U-NII 2A
- 5GHz U-NII 2C.
- 5GHz U-NII 3.

#### 3.3 Maximum RF Power

Frequency Range (MHz)	RF Output (dBm)	Antenna Gain <sup>1</sup> (dBi)	Note
2400-2483.5	22.54	5.03	Conducted power measurements were taken from Report # 105602398MPK-001.
5150 – 5250	17.74	5.32	Conducted power measurements were taken from Report # 105602398MPK-002.
5250 – 5350	17.33	5.32	Conducted power measurements were taken from Report # 105602398MPK-002.
5470 – 5725	17.85	5.32	Conducted power measurements were taken from Report # 105602398MPK-002.
5725 – 5850	17.30	5.32	Conducted power measurements were taken from Report # 105602398MPK-002.

<sup>1</sup>As declared by the manufacturer.

**3.4 RF Exposure Calculation**

**3.4.1 RF Exposure calculation.**

Calculations for this report are based on highest power measured for each band.

Frequency Range (MHz)	EIRP <sup>1</sup> (dBm)	EIRP <sup>1</sup> (mW)	Power Density (mW/cm <sup>2</sup> ) @20cm	FCC Limit (mW/cm <sup>2</sup> )
2400-2483.5	27.57	571.478	0.1137	1
5150 – 5250	23.06	202.301	0.04024	1
5250 – 5350	22.65	184.077	0.03662	1
5470 – 5725	23.17	207.491	0.04127	1
5725 – 5850	22.62	182.810	0.03636	1

Frequency Range (MHz)	EIRP <sup>1</sup> (dBm)	EIRP <sup>1</sup> (mW)	Power Density (W/m <sup>2</sup> ) @20cm	RSS Limit (W/m <sup>2</sup> )
2400-2483.5	27.57	571.478	1.1137	5.469
5150 – 5250	23.06	202.301	0.4024	9.831
5250 – 5350	22.65	184.077	0.3662	9.831
5470 – 5725	23.17	207.491	0.4127	9.831
5725 – 5850	22.62	182.810	0.3636	9.831



## Appendix A: 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/cm<sup>2</sup>

D is the distance from the antenna in cm.

**4.0 Document History**

<b>Revision/ Job Number</b>	<b>Writer Initials</b>	<b>Reviewers Initials</b>	<b>Date</b>	<b>Change</b>
1.0/ G105602398	GGR	ML	January 09, 2024	Original document
2.0/ G105602398	GGR	ML	January 26, 2024	Fixed typo on customer contact phone number.