

# WaveLynx Technologies RF Exposure Exhibit

**SCOPE OF WORK**

EMC TESTING – Mullion Fusion IP Reader, Part Number: ER10

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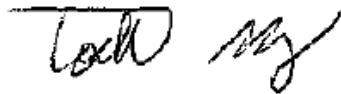


**RF Exposure Exhibit  
(mobile devices)****Report Number: 103916593MPK-002C****Project Number: G103916593****Original Report Issue Date: April 07, 2020****Revision Report Issue Date: June 11, 2020****Product Designation: Mullion Fusion IP Reader****Part Number: ER10****CPN: ER10, ER10-PCB****FCC ID: 2AEI3WLTC-ER10-MM17****IC: 20063-WLTDHMMER17****to****47CFR 2.1091****RSS-102 Issue 5****for****WaveLynx Technologies****Tested by:**

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<b>Report No. 103916593MPK-002C</b>	
<b>Equipment Under Test:</b>	Mullion Fusion IP Reader
<b>Trade Name:</b>	WaveLynx Technologies
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<b>Applicable Regulation:</b>	47CFR 2.1091 RSS-102 Issue 5

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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: <i>f</i> 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 Mullion Fusion IP Reader, Model: ER10 consists of three radios: 125 kHz and 13.56 RFID and Bluetooth. For RF exposure compliance refer reports #103916593MPK-002C & 103916593MPK-003C.

#### 3.3 Maximum RF Power

Frequency Range (MHz)	Peak FS @10m (dBµV/m)	Note
13.56	50.2	FS measurement was taken from Report # 103916593MPK-001C.

Frequency Range (MHz)	RF Output (dBm)	Antenna Gain <sup>1</sup> (dBi)	Note
2402-2480	2.16	0.5	Conducted power measurements were taken from FCC ID: WAP2001.

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

### 3.4 RF Exposure Calculation

#### 3.4.1 RF Exposure calculation for RFID

Frequency Range (MHz)	Peak FS @10m (dB $\mu$ V/m)	Peak FS @20 cm* (dB $\mu$ V/m)	Peak FS @20 cm (V/m)	RSS Limit (V/m)	FCC Limit (V/m)	Results
13.56	50.2	118.16	0.809	27.46	60.77	Complies

\* Distance Correction Factor was used.

#### 3.4.2 RF Exposure calculation for Bluetooth

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

Frequency Range (MHz)	EIRP (dBm)	EIRP (mW)	Power Density (mW/cm <sup>2</sup> ) @20 cm	FCC Limit (mW/cm <sup>2</sup> )	Results
2402-2480	2.66	1.85	0.00037	1	Complies

Note: Antenna gains below 0 are considered as 0dBi.

Frequency Range (MHz)	EIRP (dBm)	EIRP (mW)	Power Density (W/m <sup>2</sup> ) @20 cm	RSS Limit (W/m <sup>2</sup> )	Results
2402-2480	2.66	1.85	0.0037	5.47	Complies

Note: Antenna gains below 0 are considered as 0dBi.



### **Appendix A: Power Density Calculation**

The Power Density can be calculated using the formula

$$S = EIRP / 4\pi D^2$$

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/ G103916593	TM	KV	April 07, 2020	Original document
2.0/ G103916593	TM	KV	June 03, 2020	Updated Model Number from F10 to ER10 per client's request.
3.0/ G103916593	TM	KV	June 11, 2020	Updated report with new FCC ID, IC ID and CPNs per client's request.