

WaveLynx Technologies RF Exposure Exhibit

SCOPE OF WORK

EMC TESTING – Single Gang Fusion IP Reader, Part Number: ER20

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103916593MPK-002A

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**RF Exposure Exhibit
(mobile devices)**

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Project Number: G103916593

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Product Designation: Single Gang Fusion IP Reader

Part Number: ER20

CPN: ER20, ER20-PCB

FCC ID: 2AEI3WLTC-ER2X-SK17

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to

47CFR 2.1091

RSS-102 Issue 5

for

WaveLynx Technologies

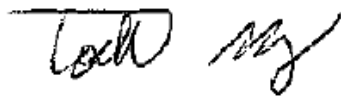
Tested by:

Intertek
1365 Adams Court
Menlo Park, CA 94025 USA

Client:

WaveLynx Technologies
100 Technology Drive Suite B150
Broomfield, CO 80021

Report prepared by:



Todd Moy / Project Engineer

Report reviewed by:



Krishna Vemuri / Engineering Team Lead

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Report No. 103916593MPK-002A	
Equipment Under Test:	Single Gang Fusion IP Reader
Trade Name:	WaveLynx Technologies
Part Number:	ER20
Applicant:	WaveLynx Technologies
Contact:	Daniel Field
Address:	WaveLynx Technologies 100 Technology Drive Suite B150 Burlingame, CA 94010
Country:	USA
Tel. Number:	(303) 327-1477
Email:	danielfield@wavelynxtech.com
Applicable Regulation:	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 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	$0.158/f^{0.5}$	$4.21 \times 10^{-4}/f^{0.5}$	$6.67 \times 10^{-5}/f$	$616000/f^{1.2}$
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 Single Gang Fusion IP Reader, Model: ER20 consists of three radios: 125 kHz and 13.56 RFID and Bluetooth. For RF exposure compliance refer reports #103916593MPK-002A & 103916593MPK-003A.

3.3 Maximum RF Power

Frequency Range (MHz)	Peak FS @10m (dBμV/m)	Note
13.56	52	FS measurement was taken from Report # 103916593MPK-001A.

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

¹As declared by the manufacturer.

3.4 RF Exposure Calculation

3.4.1 RF Exposure calculation for RFID

Frequency Range (MHz)	Peak FS @10m (dBμV/m)	Peak FS @20 cm* (dBμV/m)	Peak FS @20 cm (V/m)	RSS Limit (V/m)	FCC Limit (V/m)	Results
13.56	52	119.96	0.995	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 ²) @20 cm	FCC Limit (mW/cm ²)	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 ²) @20 cm	RSS Limit (W/m ²)	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

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

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/ G103916593	TM	KV	January 09, 2020	Original document
2.0/ G103916593	TM	KV	June 03, 2020	Updated Model Number from F20 to ER20 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.