

## RF Exposure Evaluation Declaration

**FCC ID:** 2ACQELR8X

**IC:** 27195-LR8X

**Applicant:** Flowline, Inc.

**Application Type:** Certification

**Product:** LR Radar Level Instrument

**Model No.:** LR84

**Serial Model No.:** LR80, LR81, LR82, LR83, LR85, LR86

**Brand Name:** ECHOBEAM

**FCC Rule Part(s):** FCC Part 2.1091

**ISED Rules:** RSS-102 Issue 5

**Reviewed By:** Vincent Yu

Vincent Yu

**Approved By:** Robin Wu

Robin Wu



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

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## Revision History

Report No.	Version	Description	Issue Date	Note
2102RSU015-U3	Rev. 01	Initial Report	05-19-2021	Valid

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## 1. GENERAL INFORMATION

### 1.1. Applicant

Flowline, Inc.

10500 Humboldt St., Los Alamitos, California 90720, United States

### 1.2. Manufacturer

Flowline, Inc.

10500 Humboldt St., Los Alamitos, California 90720, United States

### 1.3. Testing Facility

<input checked="" type="checkbox"/>	<b>Test Site – MRT Suzhou Laboratory</b>
	<b>Laboratory Location (Suzhou - Wuzhong)</b>
	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
	<b>Laboratory Location (Suzhou - SIP)</b>
	4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China
	<b>Laboratory Accreditations</b>
	A2LA: 3628.01 CNAS: L10551
	FCC: CN1166 ISED: CN0001
	VCCI: R-20025, G-20034, C-20020, T-20020
<input type="checkbox"/>	<b>Test Site – MRT Shenzhen Laboratory</b>
	<b>Laboratory Location (Shenzhen)</b>
	1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China
	<b>Laboratory Accreditations</b>
	A2LA: 3628.02 CNAS: L10551
	FCC: CN1284 ISED: CN0105
<input type="checkbox"/>	<b>Test Site – MRT Taiwan Laboratory</b>
	<b>Laboratory Location (Taiwan)</b>
	No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
	<b>Laboratory Accreditations</b>
	TAF: L3261-190725
	FCC: 291082, TW3261 ISED: TW3261

## 2. PRODUCT INFORMATION

### 2.1. Equipment Description

Product Name	LR Radar Level Instrument
Model No.	LR84
Serial Model No.	LR80, LR81, LR82, LR83, LR85, LR86
Brand Name	ECHOBEAM
Bluetooth Version	v4.0 (BLE Only)
LPR Frequency Range	76 ~ 80GHz
Sample ID	LR84PARCM
Hardware Version	H01
Software Version	R01
Operating Temp.	-40 ~ 80°C
Process Temp. at the antenna	-40 ~ 120°C
Normal Supply Voltage	24VDC
Remark: The EUT is made up of electronic part, housing part, process connection part, installation accessories part and antenna. All electronic parts including RF circuit are same within these models, and differences of other parts such as Shell Material, Installation method and power supply method etc. can not affect RF performance of the product. Only the differences of antennas can affect the RF performance and we selected the model LR84 with the largest antenna gain for all RF testing. For detailed differences between models, please refer to the declaration letter of model differences.	

### 3. RF EXPOSURE EVALUATION

#### 3.1. Test Limits

##### §1.1310 Radiofrequency radiation exposure limits.

Below sets forth limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging 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 <sup>2</sup>	6
30-300	61.4	0.163	1.0	6
300-1,500	--	--	f/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
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
300-1,500	--	--	f/1500	30
1,500-100,000	--	--	1.0	30

f= Frequency in MHz

\* = Plane-wave equivalent power density

According to RSS-102 section 4: Exposure Limits

**Table 4: RF Field Strength Limits for Devices Used by the General Public  
(Uncontrolled Environment)**

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m <sup>2</sup> )	Reference Period (minutes)
0.003-10 <sup>21</sup>	83	90	-	Instantaneous*
0.1-10	-	0.73/f	-	6**
1.1-10	87/f <sup>0.5</sup>	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/f <sup>0.25</sup>	0.1540/f <sup>0.25</sup>	8.944/f <sup>0.5</sup>	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142* f <sup>0.3417</sup>	0.008335*f <sup>0.3417</sup>	0.02619*f <sup>0.6834</sup>	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/f <sup>1.2</sup>
150000-300000	0.158* f <sup>0.5</sup>	4.21*10 <sup>-4*</sup> f <sup>0.5</sup>	6.67*10 <sup>-5*</sup> f	616000/f <sup>1.2</sup>

Note: *f* is frequency in MHz.

\*Based on nerve stimulation (NS).

\*\* Based on specific absorption rate (SAR).

Calculation Formula:  $Pd = (Pout*G)/(4*\pi*r^2) = E/(4*\pi*r^2)$

Where

Pd = power density in mW/cm<sup>2</sup>

Pout = output power to antenna in mW

E = EIRP in mW

G = gain of antenna in linear scale

$\pi$  = 3.14

r = distance between observation point and center of the radiator in cm

### 3.2. Test Result

Product	LR Radar Level Instrument
Test Item	RF Exposure Evaluation

Test Mode	Frequency Range (MHz)	Maximum EIRP (dBm)	Power Density at $r = 20 \text{ cm}$ (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
LPR	76000 ~ 80000	30.12	0.2045	1	Pass
BLE	2402 ~ 2480	0.10	0.0002	1	Pass

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The End

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## Appendix - EUT Photograph

Refer to "2102RSU015-UE" file.