

**RF Exposure Report
(mobile devices)
47CFR 2.1091
RSS-102 Issue 6**

Report No.: WIRS1129408 – FCC & ISSED RF Exposure Report

Test Model: LEITLINK 4GF

Received Date: 08/05/2024

Test Date: 08/07/2024 - 09/30/2024

Issued Date: 11/14/2024

Applicant: DIG Corporation

Address: 1210 Activity Drive, VISTA CA 92081

Issued By: Eurofins Electrical and Electronic Testing NA, Inc.

Lab Address: 3162 Belick St. Santa Clara CA, 95054



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1. Certificate of Conformity**Product:** LEITLINK Controller**Brand:** DIG Corporation**Test Model:** LEITLINK Controller**Sample Status:** Pre-production**Applicant:** DIG Corporation**Test Date:** 09/20/2024 - 09/30/2024**Standard:** 47CFR FCC Part 2.1091 and FCC Part 1.1310
RSS-102 Issue 6*Sureshkondapalli*Suresh Kondapalli
EMC & Wireless Engineering Manager

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 22 Subpart H and Part 24 Subpart E and Part 27 Subpart L of the FCC Rules under normal use and maintenance.

Ollie Moyrong
Director, Operations

Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	November 14, 2024	Initial Issue.
1	October 06, 2025	Corrected calculations on page, removed NB-IOT references

1. EUT General info

LEITLINK Controller is a central irrigation controller with LTE-M capabilities. Device NORDIC SEMICONDUCTOR radio module nRF9160 (FCC ID: 2ANPO00NRF9160).

Four models of the device are available LEITLINK 4GF-08, LEITLINK 4GF-16, LEITLINK 4GF-24, LEITLINK 4GF-32.

LEITLINK Transmitter employs TAO GLAS Maximus FXUB66 flexible wideband antenna FXU B66.07.0150C internal to the enclosure.

LEITLINK Transmitter employs TAO GLAS G30 Olympian high performance screw mount wide-band cellular antenna G30.B.108111 for external use.

The Module consists of an IOT Module that has Application CPU, LTE Cat-M1 Radio and GPS Receiver.

Band (MHz)	Technology	Band	Max. RF output power (dBm)	Tune-up tolerance (dB)	Max. output power, including tune-up (dBm)
1900	LTE Cat-M1	2	23.0	+1/-3	24.0
1700		4	23.0	+1/-3	24.0
850		5	23.0	+1/-3	24.0
700		12	23.0	+1/-3	24.0
700		13	23.0	+1/-3	24.0
700	LTE Cat-M1	14	23.0	+1/-3	24.0
700	LTE Cat-M1	17	23.0	+1/-3	24.0
1900		25	23.0	+1/-3	24.0
850		26	23.0	+1/-3	24.0
1700		66	23.0	+1/-3	24.0

2. 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 issue 6 were 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 Maximum RF Power

Band	Frequency Range MHz	Max Power with tune up (dBm)	Internal Antenna Peak Gain (dBi)	External Antenna Peak Gain (dBi)	Max EIRP dBm	Max EIRP mWatts
LTE 12, 17	699.0-716.0	24.0	0.2	3.38	27.38	547.0
LTE 13	787.0-787.0	24.0	0.2	3.38	27.38	547.0
LTE 14	788.0-798.0	24.0	0.2	3.38	27.38	547.0
LTE 5/26	814.0-849.0	24.0	0.2	3.38	27.38	547.0
LTE 4/66	1710.0-1780.0	24.0	2.0	6.21	30.21	1049.5
LTE 2/25	1850.0-1915.0	24.0	2.0	6.21	30.21	1049.5

¹As declared by the manufacturer.

Note:

- The above EUT information is declared by the manufacturer.
- Max Antenna gains for internal and external antennas are declared by the client. Antenna specifications sheets are attached at Appendix A..

3.4 RF Exposure Calculation

ISED Limits

Calculations for this report are based on highest power declared for each band by module manufacturer

Frequency Range (MHz)	EIRP ¹ (dBm)	EIRP ¹ (mW)	Power Density (W/m ²) @20 cm	RSS Limit (W/m ²)	Results
699.0-716.0	27.38	547.0	1.088	2.30	Complies
777.0-787.0	27.38	547.0	1.088	2.47	Complies
788.0-798.0	27.38	547.0	1.088	2.49	Complies
814.0-849.0	27.38	547.0	1.088	2.55	Complies
1710.0-1780.0	30.21	1049.5	2.087	4.24	Complies
1850.0-1915.0	30.21	1049.5	2.087	4.47	Complies

FCC limits

Frequency Range (MHz)	EIRP ¹ (dBm)	EIRP ¹ (mW)	Power Density (mW/cm ²) @20 cm	FCC Limit (mW/cm ²)	Results
699.0-716.0	27.38	547.0	0.1088	0.466	Complies
777.0-787.0	27.38	547.0	0.1088	0.518	Complies
788.0-798.0	27.38	547.0	0.1088	0.525	Complies
814.0-849.0	27.38	547.0	0.1088	0.542	Complies
1710.0-1780.0	30.21	1049.5	0.2087	1.0	Complies
1850.0-1915.0	30.21	1049.5	0.2087	1.0	Complies

¹Note: As declared by the module manufacturer.

Power Density Calculation

$$Pd = (P_{out} * G) / (4 * \pi * r^2)$$

Where

Pd = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

4 Conclusion

This device is compliant with RF Exposure requirements of the limits for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 and RSS-102 Issue 6 for General Public (Uncontrolled Environment)

Appendix A

Internal Antenna



2. Specifications

Electrical									
Frequency (MHz)	600-960	1390-1435	1575.42	1710-1990	1755-2170	2400-2500	2500-2700	3300-3800	4800-6000
Peak Gain (dBi)									
2mm ABS	0.2dBi	2.5dBi	4.1dBi	2dBi	1.6dBi	2.8dBi	2.6dBi	3.5dBi	4.8dBi
Average Gain (dB)									
2mm ABS	-2.7dB	-2.6dB	-1.3dB	-2.1dB	-2.5dB	-2dB	-1.8dB	-1.8dB	-2.4dB
Max VSWR									
2mm ABS	3.5:1	3.5:1	1.1:1	3:1	3.3:1	2.2:1	2:1	2.2:1	3:1
Max Return Loss(dB)									
2mm ABS	-5dB	-5dB	-20dB	-6dB	-5.5dB	-7dB	-10dB	-7dB	-6dB
Efficiency									
2mm ABS	60%	48%	73%	61%	56%	63%	65%	66%	57%
Impedance		50Ω							
Polarization		Linear							
Radiation Pattern		Omni-Directional							
Input Power		5 W							
Mechanical									
Dimensions		120.4 x 50.4 x 0.2 mm							
Material		Flexible Polymer							
Cable		150mm of Ø1.37 (Fully customizable)							
Connector		I-PEX MHF® I U.FL Compatible(Fully customizable)							
Environmental									
Operating Temperature		-40°C to 85°C							
Storage Temperature		-40°C to 85°C							

External Antenna



Part No: G30.B.108111	Description Olympian Direct Mount Ultra Wide-Band 4G/3G/2G LTE / Cellular / Wi-Fi Antenna For 2G/3G/4G Applications
Features: 698 to 960MHz, 2.4GHz and 1710 to 2700MHz Heavy duty screw mount UV and Features vandal resistant ABS housing and thread IP67 compliant Standard is 1M RG-316 SMA(M) Cables and Connectors Customizable CE Certified RoHS & REACH Compliant	

2. Specification

LTE Electrical									
Band	Frequency (MHz)	Measurement	Efficiency (%)	Average Gain (dB)	Peak Gain (dBi)	Impedance	Polarization	Radiation Pattern	Max. input power
5GNR/4G Band 5,8,12,13,14,17,18, 20,26,27,28,29,71	617-960	Free Space.	46.2	-3.36	3.38	50 Ω	Linear	Omni	2W
		Ground Plane.	47.6	-3.22	4.54				
5GNR/4G Band 21,32,74,75, 76	1427-1518	Free Space.	31.9	-4.96	2.90				
		Ground Plane.	23.8	-6.24	0.92				
4G/3G Band 1,2,3,4,9,23,25,35, 39,66	1710-2200	Free Space.	52.7	-2.78	6.21				
		Ground Plane.	59.3	-2.27	4.39				
4G/3G Band 40	2300-2400	Free Space.	52.3	-2.81	4.39				
		Ground Plane.	52.0	-2.84	2.76				
Wi-Fi 2400	2400-2500	Free Space.	50.2	-2.99	4.30				
		Ground Plane.	48.6	-3.14	2.28				
4G/3G Band 7,38,41	2490-2690	Free Space.	50.2	-2.99	3.29				
		Ground Plane.	48.2	-3.17	1.92				

* The G30 antenna performance was measured with 30X30 cm metal ground plane.

Mechanical	
Dimensions (mm)	Height=48mm and Diameter=50mm
Weight	66g
Material	UV Resistant ABS
Connector	SMA(M) Fully Customizable
Cable	1m of RG316
Base and Thread	Nickel plated steel
Weather proof gasket	CR4305 foam with 3M9448B double-side adhesive
Nut	M12
Sealant	Rubber Stopper

Environmental	
Temperature Range	-40°C to +85°C