Report on the Testing of the

Underground Magnetics Inc.
GL2RF9

FCC ID: 2A3JY2RF9
IC: 28818-2RF9

Prepared for: Underground Magnetics Inc.
5501 NW Beaver Dr
Johnston, IA 50131

America

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Document Number: NC72174575.2 | Issue: 1

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NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Sean Sellergren	Sr EMC Engineer	**Authorized Signatory**	07 February 2022

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD America, Inc. document control rules.

FCC Accreditation Designation Number US1148 New Brighton, MN Test Laboratory	Innovation, Science, and Economic Development Canada Accreditation Site Number 4512A New Brighton, MN Test Laboratory

EXECUTIVE SUMMARY
A sample of this product was tested and found to be compliant with the standards listed above.

A2LA Cert. No. 2955.11

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1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Table 1.1-1 – Modification Record

Issue	Description of Change	Date of Issue
1	First Issue	07 February 2022

General Information:

Applicant: Underground Magnetics Inc.
Device Category: Fixed, ≥ 20 cm separation
Environment: General Population/Uncontrolled Exposure

Technical Information: E27-RF2

FCC ID: 2A3JY2RF9
IC: 28818-2RF9
Antenna Type: ½ Wave Dipole, Yagi
Antenna Gain: ½ Wave Dipole = 2.5 dBi, Yagi 9.0 dBi
Exposure Conditions: ≥ 20 centimeters

½ Wave Dipole Antenna

Frequency Band (MHz)	Exposure Condition (cm)	EIRP (dBm)	EIRP (mW)
902.5-927.5 MHz	≥ 20	22.35	171.79

Yagi Antenna

Frequency Band (MHz)	Exposure Condition (cm)	EIRP (dBm)	EIRP (mW)
902.5-927.5 MHz	≥ 20	28.85	767.36

MPE Calculation FCC

The Power Density (mW/cm^2) is calculated as follows:

$$S = \frac{PG}{4\pi R^2}$$

Where:
S = power density (in appropriate units, e.g. mW/cm2)
P = power input to the antenna (in appropriate units, e.g., mW)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Table 1: MPE Calculation – FCC, ½ Wave Dipole Antenna

Radio	Transmit Frequency	Power EIRP (mW)	Power Density (mW/cm^2)	Uncontrolled Exposure Limit (mW/cm^2)	Limit Ratio (%)	MPE Distance
902-928 MHz Band	902.5-927.5 MHz	171.79	0.034	0.602	5.7%	20 cm

Table 2: MPE Calculation – FCC, Yagi Antenna

Radio	Transmit Frequency	Power EIRP (mW)	Power Density (mW/cm^2)	Uncontrolled Exposure Limit (mW/cm^2)	Limit Ratio (%)	MPE Distance
902-928 MHz Band	902.5-927.5 MHz	767.36	0.153	0.602	25.42%	20 cm

MPE Calculation ISED

The Power Density (W/m^2) is calculated as follows:

$$S = \frac{PG}{4\pi R^2}$$

Where:
S = power density (in appropriate units, e.g. W/m2)
P = power input to the antenna (in appropriate units, e.g., W)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna (appropriate units, e.g., m)

Table 1: MPE Calculation – ISED, ½ Wave Dipole Antenna

Radio	Transmit Frequency	Power EIRP (mW)	Power Density (W/m^2)	Uncontrolled Exposure Limit (W/m^2)	Limit Ratio (%)	MPE Distance
902-928 MHz Band	902.5-927.5 MHz	171.79	0.034	2.79	1.22%	20 cm

Table 2: MPE Calculation – ISED, Yagi Antenna

Radio	Transmit Frequency	Power EIRP (mW)	Power Density (W/m^2)	Uncontrolled Exposure Limit (W/m^2)	Limit Ratio (%)	MPE Distance
902-928 MHz Band	902.5-927.5 MHz	767.36	0.153	2.79	5.48%	20 cm