TEST REPORT

Report Number: R15440806-E8

Applicant	:	RF IDEAS 425 N. Martingale Road Suite 1680 Schaumburg, IL 60173, USA
Model	:	MD30L00
FCC ID	:	M9MMD30L00
EUT Description	:	Dual Band RFID Card Reader
Test Standard(s)	:	FCC 47 CFR PART 1 SUBPART I FCC 47 CFR PART 2 SUBPART J OET BULLETIN NO. 65 IEEE C95.3 – 2021 ISED RSS-102 Issue 6

Date Of Issue:
2025-02-20

Prepared by:
UL LLC
12 Laboratory Dr.
Research Triangle Park, NC 27709 U.S.A.
TEL: (919) 549-1400

ACCREDITED
CERT #0751.05

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2025-02-17	Initial Issue	Charles Moody
V2	2025-02-20	Removed Standard Reference	Charles Moody

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: RF IDEAS
425 N. Martingale Road, Suite 1680
Schaumburg, IL 60173, USA

EUT DESCRIPTION: Dual Band RFID Card Reader

MODEL NUMBER: MD30L00

SERIAL NUMBER: WLDA000109, WLDA000118, WLDA000157, WLDA000158, WLSA000026, WLSA000027, WLSA000029

SAMPLE RECEIPT DATE: 2024-08-30

DATE TESTED: 2025-02-12, 2025-02-14

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
IEEE C95.3-2021	Complies
OET BULLETIN NO. 65	Complies
FCC 47 CFR PART 1 SUBPART I & PART 2 SUBPART J	Complies
ISED RSS-102 Issue 6	Complies

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document.

Approved & Released For
UL LLC By:

Charles Moody
Senior Project Engineer
Consumer, Medical and IT Segment
UL LLC

Reviewed By:

Michael Antola
Senior Staff Engineer
Consumer, Medical and IT Segment
UL LLC

2. TEST METHODOLOGY

This report contains data provided by the customer which can impact the validity of results. UL LLC is only responsible for correctly integrating customer-provided data with measurements performed by UL LLC.

All testing / calculations were made in accordance with.

- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 447498 D03 Supplement C Cross-Reference v01
- FCC KDB 680106 D01 Wireless Power Transfer v04
- FCC Parts 1.1310, 2.1091, 2.1093, IEEE Std C95.1-2005, IEEE Std C95.3-2021
- RSS-102 Issue 6
- RSS 216 Issue 2
- IC Safety Code 6

3. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, certification # 0751.06, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☐	Building: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	825374
☒	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A		27265	

4. DECISION RULES AND MEASUREMENT UNCERTAINTY (RF EXPOSURE)

4.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

4.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	U_{Lab}
Magnetic Field Reading (A/m)	+/-0.3 dB
Electric Field Reading (V/m)	+/-0.3 dB

Uncertainty figures are valid to a confidence level of 95.45%.

5. SUMMARY OF EUT RF EXPOSURE INFORMATION

Requirement	Device
(1) The radio frequency is below 1 MHz.	Yes. Frequency is 125 kHz.
(2) The output power from each transmitting element (e.g., coil) is less than or equal to 15 watts.	Output power unknown.
(3) A client device providing the maximum permitted load is placed in physical contact with the transmitter (i.e., the surfaces of the transmitter and client device enclosures need to be in physical contact)	N/A. 125 kHz RFID.
(4) Only § 2.1091-Mobile exposure conditions apply (i.e., this provision does not cover § 2.1093-Portable exposure conditions).	Yes. EUT is mobile only.
(5) The E-field and H-field strengths, at and beyond 20 cm surrounding the device surface, are demonstrated to be less than 50% of the applicable MPE limit, per KDB 447498, Table 1. These measurements shall be taken along the principal axes of the device, with one axis oriented along the direction of the estimated maximum field strength, and for three points per axis or until a 1/d (inverse distance from the emitter structure) field strength decay is observed. Symmetry considerations may be used for test reduction purposes. The device shall be operated in documented worst-case compliance scenarios (i.e., the ones that lead to the maximum field components), and while all the radiating structures (e.g., coils or antennas) that by design can simultaneously transmit are energized at their nominal maximum power.	Yes. Measurements are less than 50% of the limit.
(6) For systems with more than one radiating structure, the conditions specified in (5) must be met when the system is fully loaded (i.e., clients absorbing maximum power available), and with all the radiating structures operating at maximum power at the same time, as per design conditions. If the design allows one or more radiating structures to be powered at a higher level while other radiating structures are not powered, then those cases must be tested as well. For instance, a device may use three RF coils powered at 5 W, or one coil powered at 15 W: in this case, both scenarios shall be tested.	Only a single coil used for the 125 kHz RFID.

Table 1

NOTE: This table can be found in KDB 680106. However, section 3.2 of KDB 680106 states that this procedure can be applied to non-Part 18/WPT devices, therefore falling in the scope of 125 kHz RFID products such as this EUT.

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The EUT is a dual band RFID card reader capable of reading both 125 kHz and 13.56 MHz credentials and Legic Secure Segment credentials via Bluetooth communication. This report covers the RF exposure testing of the 125kHz RFID radio.

6.2. SOFTWARE AND FIRMWARE

The firmware version installed in the EUT during testing was:

The firmware installed in the EUT during testing was:
For USB: FW: WN5020600UPX7L0
For Serial: FW: WN5020600SPX7L0

6.3. WORST-CASE CONFIGURATION AND MODE

The following configurations were tested as worst-case position:

Config	Descriptions	Frequency
1	Tag Off	125 kHz
2	Tag On (Centered)	
3	Tag On (Offset to WC Positioning)	

Additionally, testing in five orientations at each of the three configurations were performed. These include; edge top, edge right, edge left, edge bottom and front. Only the worst-case data per configuration is included in the report.

NS Test Exclusion Calculations RSS-102 Issue 6 §6.2.2

An inductively coupled system is exempt from routine NS evaluation when the product of the number of turns, *n*, and RMS current, I_{RMS} (in amperes), in the transmission coil is less than or equal to the result on the right-hand side of equation (1), where *x* represents the separation distance in millimetres between the coil and exposed tissue.

$$nI_{RMS} \leq 24\left(\frac{7.827}{(x+0.2786)^{0.1557}} - 3.953\right)^{-1} \quad (1)$$

n = 25 turns | I_{RMS} = 0.06 A | x = 2.2 mm

$$(25)(0.06) \leq 24\left(\frac{7.827}{(x+0.2786)^{0.1557}} - 3.953\right)^{-1}$$

$$1.5 \leq 8.4$$

Note(s):

1. n* I_{RMS} is less than the calculated threshold, therefore NS is excluded per RSS-102 Issue 6 §6.2.2.
2. The coil is rectangular with max dimensions of 48mm X 26mm.

6.4. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID/ DoC**
Badge 125kHz	RF IDEAS	N/A	23993	NA

I/O CABLES (RADIATED EMISSIONS)						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	Hardwired	1	USB/Serial	Unshielded	>3m	Used to power EUT

6.5. MEASUREMENT SETUP

The measurements were taken using a probe placed 20 cm surrounding the device for all configurations per KDB 680106 D01.

20cm distance E-field and H-field are evaluated at the tip of the MAPGy probe.

For measurement setup and all testing photos, refer to external photos exhibit R15440806-EP4

7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was used for the tests documented in this report:

RTP probe

Test Equipment List					
Description	**Manufacturer**	**Model**	**Label ID**	**Cal Due**	**Cal Date**
Near-field Electric and Magnetic Field Sensor System	SPEAG Schmid & Partner Engineering AG	MAGPy-8H3D+E3d	3099 (S/N)	2025-03-31	2024-03-19
Thermometer - Digital	Control Company	14-650-118	168574	2026-05-31	2024-05-23

8. DUTY CYCLE

LIMITS

None; for reporting purposes only.

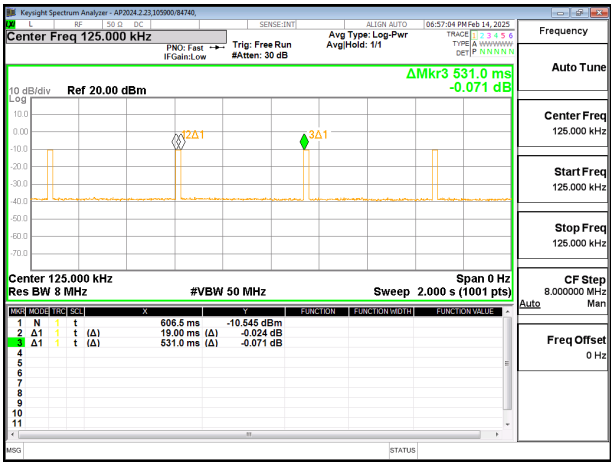
PROCEDURE

Zero-Span Spectrum Analyzer Method.

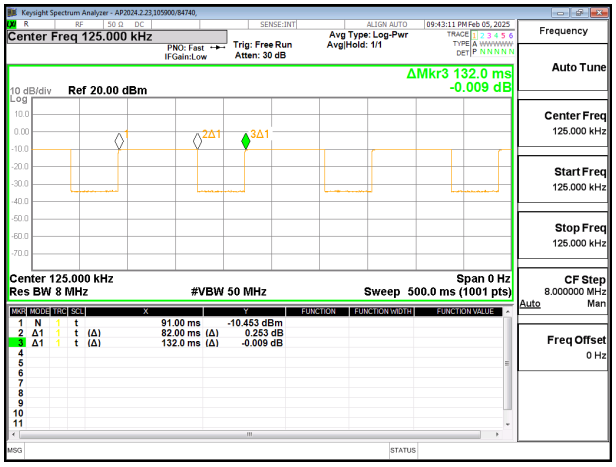
ON TIME AND DUTY CYCLE RESULTS

Test Engineer:	105900/84740

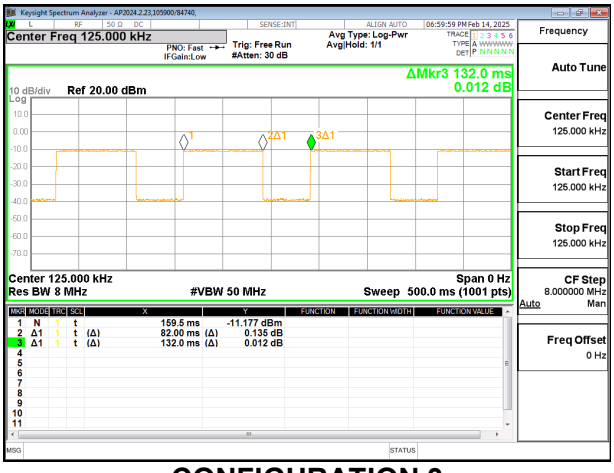
Configuration	Frequency (kHz)	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
1	125	19.00	531.00	0.04	3.58	NA
2	125	82.00	132.00	0.62	62.12	NA
3	125	82.00	132.00	0.62	62.12	NA



CONFIGURATION 1



CONFIGURATION 2



CONFIGURATION 3

INTENTIONALLY LEFT BLANK

9. MAXIMUM PERMISSIBLE RF EXPOSURE

9.1. FCC LIMITS AND SUMMARY

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

Table 1 to § 1.1310(e)(1) - Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(i) Limits for Occupational/Controlled Exposure				
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
300-1,500			f/300	<6
1,500-100,000			5	<6
(ii) 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
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

f = frequency in MHz. * = Plane-wave equivalent power density.

According to KDB 680106 D01 Wireless Power Transfer v04 section 3.2 : Accordingly, for § 2.1091-Mobile devices, the MPE limits between 100 kHz to 300 kHz are to be considered the same as those at 300 kHz in Table 1 of § 1.1310, that is, 614 V/m and 1.63 A/m, for the electric field and magnetic field, respectively.

RESULT:

Test Engineer:	105900/84740	Test Date:	2025-02-12

9.2. IC LIMITS

Radio Standards Specification 102, Issue 5 Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands), sets out the requirements and measurement techniques used to evaluate radio frequency (RF) exposure compliance of radio communication apparatus designed to be used within the vicinity of the human body

Table 2: Internal electric field strength basic restrictions (3 kHz to 10 MHz)

Condition	**Instantaneous RMS internal electric field strength (V_{RMS}/m) (any part of the body)**
Uncontrolled environment	1.35×10^{-4} *f*
Controlled environment	2.7×10^{-4} *f*

Note: *f* is frequency in Hz.

Table 6 : Magnetic field strength reference levels

Frequency range (MHz)	**Reference level basis**	**Reference level (H_{RL}) for uncontrolled environment (A_{RMS}/m)**	**Reference level (H_{RL}) for controlled environment (A_{RMS}/m)**	**Reference period**
0.003-10	NS	90	180	Instantaneous
0.1-10	SAR	0.73/ *f*	1.6/ *f*	6 minutes

Note: *f* is frequency in MHz.

9.2.1. MAXIMUM RESULT SUMMARY RF EXPOSURE (FCC)

CONFIGURATION 1: TAG OFF

Electric Field Limit			Magnetic Field Limit		
FCC RF Exposure Limit (V/m)	Maximum Average (V/m)	Percentage (%)	FCC RF Exposure (A/m)	Maximum Average (A/m)	Percentage (%)
614	0.18	<0.01%	1.63	0.01	0.61%

CONFIGURATION 2: TAG ON (CENTERED)

Electric Field Limit			Magnetic Field Limit		
FCC RF Exposure Limit (V/m)	Maximum Average (V/m)	Percentage (%)	FCC RF Exposure (A/m)	Maximum Average (A/m)	Percentage (%)
614	1.01	0.16%	1.63	0.02	1.45%

CONFIGURATION 3: TAG ON (OFFSET)

Electric Field Limit			Magnetic Field Limit		
FCC RF Exposure Limit (V/m)	Maximum Average (V/m)	Percentage (%)	FCC RF Exposure (A/m)	Maximum Average (A/m)	Percentage (%)
614	0.93	0.15%	1.63	0.04	2.42

9.2.2. MAXIMUM RESULT SUMMARY RF EXPOSURE (RSS 102)

CONFIGURATION 1: TAG OFF

Electric Field Limit			Magnetic Field Limit		
IC RF Exposure Limit (V/m)	Maximum Average (V/m)	Percentage (%)	IC RF Exposure Limit (A/m)	Maximum Average (A/m)	Percentage (%)
16.875	0.18	1.07%	5.84	0.01	0.17%

CONFIGURATION 2: TAG ON (CENTERED)

Electric Field Limit			Magnetic Field Limit		
IC RF Exposure Limit (V/m)	Maximum Average (V/m)	Percentage (%)	IC RF Exposure Limit (A/m)	Maximum Average (A/m)	Percentage (%)
16.875	1.01	5.99%	5.84	0.02	0.34%

CONFIGURATION 3: TAG ON (OFFSET)

Electric Field Limit			Magnetic Field Limit		
IC RF Exposure Limit (V/m)	Maximum Average (V/m)	Percentage (%)	IC RF Exposure Limit (A/m)	Maximum Average (A/m)	Percentage (%)
16.875	0.93	5.51%	5.84	0.04	0.68%

9.2.3. MAXIMUM RESULT SUMMARY NS (RSS 102)

See note in section 6.3. Device is exempt from RSS-102 NS requirements

9.2.4. E- FIELD AND H- FIELD MEASUREMENTS (FCC)

Note: Peak measurements were performed. RMS values were calculated from the peak measurement. Please refer to the formula for calculating the RMS values: [Field Strength x √Duty Cycle].

CONFIGURATION 1: TAG OFF

Configuration	Test Mode	Measuring Distance	Electric Field Limit (V/m)	Electric Field Reading (V/m)				Magnetic Field Limit (A/m)	Magnetic Field Reading (A/m)			
			FCC	Location	Peak	Duty Cycle %	FCC Average	FCC	Location	Peak	Duty Cycle %	FCC Average
1	NA	20	614	Top	0.87	3.58	0.16	1.63	Top	0.03	3.58	0.01
				Right	0.63		0.12		Right	0.02		<0.01
				Bottom	0.35		0.07		Bottom	0.01		<0.01
				Left	0.32		0.06		Left	0.02		<0.01
				Front	0.93		0.18		Front	0.05		0.01
				Max	0.93		0.18		**Max**	0.05		0.01

CONFIGURATION 2: TAG ON (CENTERED)

Configuration	Test Mode	Measuring Distance	Electric Field Limit (V/m)	Electric Field Reading (V/m)				Magnetic Field Limit (A/m)	Magnetic Field Reading (A/m)			
			FCC	Location	Peak	Duty Cycle %	FCC Average	FCC	Location	Peak	Duty Cycle %	FCC Average
2	NA	20	614	Top	1.08	62.12	0.85	1.63	Top	0.02	62.12	0.02
				Right	0.65		0.51		Right	0.02		0.02
				Bottom	1.00		0.79		Bottom	0.02		0.02
				Left	0.88		0.69		Left	0.03		0.02
				Front	1.28		1.01		Front	0.03		0.02
				Max	1.28		1.01		**Max**	0.03		0.02

CONFIGURATION 3: TAG ON (OFFSET)

Configuration	Test Mode	Measuring Distance	Electric Field Limit (V/m)	Electric Field Reading (V/m)				Magnetic Field Limit (A/m)	Magnetic Field Reading (A/m)			
			FCC	Location	Peak	Duty Cycle %	FCC Average	FCC	Location	Peak	Duty Cycle %	FCC Average
3	NA	20	614	Top	0.83	62.12	0.65	1.63	Top	0.02	62.12	0.02
				Right	1.10		0.87		Right	0.05		0.04
				Bottom	0.66		0.52		Bottom	0.02		0.02
				Left	1.18		0.93		Left	0.02		0.02
				Front	1.14		0.90		Front	0.04		0.03
				Max	1.18		0.93		**Max**	0.05		0.04

9.2.5. E- FIELD AND H- FIELD MEASUREMENTS (IC)

Note: Peak measurements were performed. RMS values were calculated from the peak measurement. Please refer to the formula for calculating the RMS values: [Field Strength x √Duty Cycle].

CONFIGURATION 1: TAG OFF

Configuration	Test Mode	Measuring Distance	Electric Field Limit (V/m)	Electric Field Reading (V/m)				Magnetic Field Limit (A/m)	Magnetic Field Reading (A/m)			
			IC	Location	Peak	Duty Cycle %	IC Average	IC	Location	Peak	Duty Cycle %	IC Average
1	NA	20	16.875	Top	0.87	3.58	0.16	5.84	Top	0.03	3.58	0.01
				Right	0.63		0.12		Right	0.02		<0.01
				Bottom	0.35		0.07		Bottom	0.01		<0.01
				Left	0.32		0.06		Left	0.02		<0.01
				Front	0.93		0.18		Front	0.05		0.01
				Max	0.93		0.18		**Max**	0.05		0.01

CONFIGURATION 2: TAG ON (CENTERED)

Configuration	Test Mode	Measuring Distance	Electric Field Limit (V/m)	Electric Field Reading (V/m)				Magnetic Field Limit (A/m)	Magnetic Field Reading (A/m)			
			IC	Location	Peak	Duty Cycle %	IC Average	IC	Location	Peak	Duty Cycle %	IC Average
2	NA	20	16.875	Top	1.08	62.12	0.85	5.84	Top	0.02	62.12	0.02
				Right	0.65		0.51		Right	0.02		0.02
				Bottom	1.00		0.79		Bottom	0.02		0.02
				Left	0.88		0.69		Left	0.03		0.02
				Front	1.28		1.01		Front	0.03		0.02
				Max	1.28		1.01		**Max**	0.03		0.02

CONFIGURATION 3: TAG ON (OFFSET)

Configuration	Test Mode	Measuring Distance	Electric Field Limit (V/m)	Electric Field Reading (V/m)				Magnetic Field Limit (A/m)	Magnetic Field Reading (A/m)			
			IC	Location	Peak	Duty Cycle %	IC Average	IC	Location	Peak	Duty Cycle %	IC Average
3	NA	20	16.875	Top	0.83	62.12	0.65	5.84	Top	0.02	62.12	0.02
				Right	1.10		0.87		Right	0.05		0.04
				Bottom	0.66		0.52		Bottom	0.02		0.02
				Left	1.18		0.93		Left	0.02		0.02
				Front	1.14		0.90		Front	0.04		0.03
				Max	1.18		0.93		**Max**	0.05		0.04

10. RF EXPOSURE TEST SETUP AND SETUP PHOTO

For measurement setup and all testing photos, refer to external photos exhibit R15440806-EP4

END OF REPORT