



RF - TEST REPORT

- Human Exposure -

Model Name : Compact Max+

Product Description : RFID LF Reader for PET animal identification

Applicant : Datamars SA

Address : Via Industria 16

Lamone 6814, SWITZERLAND

Manufacturer : Datamars SA

Address : Via Industria 16

Lamone 6814, SWITZERLAND

Test Result according to the standards
listed in clause 1 test standards:

POSITIVE

Test Report No. : **80193276-06 Rev_1**

06. June 2025

Date of issue



Deutsche
Akkreditierungsstelle
D-PL-12030-01-03
D-PL-12030-01-04

Contents

1	<u>TEST STANDARDS</u>	<u>3</u>
2	<u>EQUIPMENT UNDER TEST</u>	<u>4</u>
2.1	Information provided by the Client	4
2.2	Sampling	4
2.3	Photo documentation of the EUT – See ATTACHMENT A	4
2.4	Equipment type, category	4
2.5	Short description of the equipment under test (EUT)	4
2.6	Variants of the EUT	4
2.7	Operation frequency and channel plan	5
2.8	Transmit operating modes	5
2.9	Antennas	6
2.10	Power supply system utilised	6
2.11	Peripheral devices and interface cables	6
2.12	Determination of worst case conditions for final measurement	6
3	<u>TEST RESULT SUMMARY</u>	<u>7</u>
3.1	Revision history of test report	7
3.2	Final assessment	7
4	<u>TEST ENVIRONMENT</u>	<u>8</u>
4.1	Address of the test laboratory	8
4.2	Environmental conditions	8
4.3	Statement of the measurement uncertainty	8
5	<u>HUMAN EXPOSURE</u>	<u>9</u>
5.1	SAR test exclusion considerations	9

ATTACHMENT A as separate supplement

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 1, Subpart I - Procedures Implementing the National Environmental Policy Act of 1969

Part 1, Subpart I, Section 1.1310	Radiofrequency radiation exposure limits
Part 2, Subpart J, Section 2.1093	Radiofrequency radiation exposure evaluation: portable devices.
KDB 447498 D01 V06	RF Exposure procedures and equipment authorisation policies for mobile and portable devices, April 20, 2021.
IEEE C95.1: 2019 / Cor.2: 2020	IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz Corrigenda 2
IEEE C95.3: 2021	IEEE Recommended Practice for Measurements and Computations of Electric, Magnetic, and Electromagnetic Fields with Respect to Human Exposure to Such Fields, 0 Hz to 300 GHz

2 EQUIPMENT UNDER TEST

2.1 Information provided by the Client

Please note, we do not take any responsibility for information provided by the client or his representative which may have an influence on the validity of the test results.

2.2 Sampling

The customer is responsible for the choice of sample. Sample configuration, start-up and operation is carried out by the customer or according to his/her instructions.

2.3 Photo documentation of the EUT – See ATTACHMENT A

2.4 Equipment type, category

BLE and RFID device, portable equipment.

2.5 Short description of the equipment under test (EUT)

The EUT is a RFID LF Reader for PET animal identification with a BLE IC for data communication.

Number of tested samples: 1
Serial number: SAMPLE-A0001

BLE:

Items	Description
BT type	5.0 Low Energy
BT chipset type	STM32WB55RGV6
Modulation	GFSK
Frequency range	2400 MHz to 2483.5 MHz
Channel numbers	40
Data rate (kbps)	1000, 2000 kbps
Antenna type	Integrated PCB

RFID:

The EUT transmits at a frequency of 134.2 kHz and uses an antenna with dimensions of 7 cm by 14 cm.

2.6 Variants of the EUT

There are no variants.

2.7 Operation frequency and channel plan

Operating range 1: 2400 MHz to 2483.5 MHz.
Operating range 2: 90 kHz to 140 kHz

Channel plan BLE:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
37	2402	18	2442
0	2404	19	2444
1	2406	20	2446
2	2408	21	2448
3	2410	22	2450
4	2412	23	2452
5	2414	24	2454
6	2416	25	2456
7	2418	26	2458
8	2420	27	2460
9	2422	28	2462
10	2424	29	2464
38	2426	30	2466
11	2428	31	2468
12	2430	32	2470
13	2432	33	2472
14	2434	34	2474
15	2436	35	2476
16	2438	36	2478
17	2440	39	2480

Note: The marked frequencies are used for testing.

Channel RFID:

Only modulation LF (134.2 kHz)

2.8 Transmit operating modes

BLE:

The EUT uses GFSK modulation and may provide following data rates:

- 1 Mbps
- 2 Mbps

(Mbps = Megabits per second)

RFID:

Only modulation LF (134.2 kHz)

2.9 Antennas

The following PCB antenna is used with the EUT for BLE:

Number	Characteristic	Name	Connector	Frequency band (GHz)	Gain (dBi)
1	omnidirectional	integrated PCB trace	-	2.4 – 2.5	1.95

RFID:

Loop antenna with dimensions of 7 cm by 14 cm.

2.10 Power supply system utilised

Power supply voltage, V_{nom} : 3.7V DC Polymer Li-ion battery

2.11 Peripheral devices and interface cables

The following peripheral devices and interface cables are connected during the measurements:

- none Model: -

2.12 Determination of worst case conditions for final measurement

As worst case, the following channels and test modes are selected for the final test:

BLE	Available channel	Tested channels	Power setting	Modulation	Modulation type	Data rate
802.15.1	0 - 39	37, 39	Pmax	DSSS	GFSK	1 Mbps
802.15.1	0 - 39	37, 39	Pmax	DSSS	GFSK	2 Mbps

RFID:

Tag reading at 134.2 kHz.

2.12.1 Test jig

No special test jig was used for testing.

2.12.2 Test software

The EUT has a special firmware that allows enabling the Direct Test Mode.

3 TEST RESULT SUMMARY

FCC Rule Part	Description	Result
KDB 447498, 7.1	MPE	not applicable ¹
KDB 447498, 4.3.1	SAR exclusion consideration	passed
KDB 447498, 7.2	Co-location, Co-transmission	passed

Note: ¹ Not applicable, because the EUT is portable equipment and the distance to the antenna is < 20cm.

3.1 Revision history of test report

Test report No	Rev.	Issue Date	Changes
80183971-06	0	13 March 2025	Initial test report
80183971-06	1	06 June 2025	SAR exclusion for both BLE and RFID

The test report with the highest revision number replaces the previous test reports.

3.2 Final assessment

The equipment under test fulfils the requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 13 November 2024

Testing concluded on : 31 January 2025

Checked by:


Jürgen Pessinger
 2025.06.06
 12:25:58 +02'00'

 Jürgen Pessinger
 Radio Team

Tested by:


Christopher Thaller
 signed in behalf of
 2025.06.06
 10:52:36 +02'00'

 Laurin Roth
 Radio Team

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

**CSA Group Bayern GmbH
Straubinger Straße 100
94447 PLATTILING
GERMANY**

4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15 - 35 °C

Humidity: 30 - 60 %

Atmospheric pressure: 86 - 106 kPa

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. It is noted that the expanded measurement uncertainty corresponds to the measurement results from the standard measurement uncertainty multiplied by the coverage factor $k = 2$. The true value is located in the corresponding interval with a probability of 95 %. The measurement uncertainty was calculated for all measurements listed in this test report on basis of the ETSI Technical Report TR 100 028 Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1 and Part 2. The results are documented in the quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

4.4 Conformity Decision Rule

The applied conformity decision rule is based on ILAC G8:09/2019 clause 4.2.1 Binary Statement for Simple Acceptance Rule ($w = 0$).

Details can be found in the procedure CSA_B_V50_29.

5 HUMAN EXPOSURE

5.1 SAR test exclusion considerations

5.1.1 Applicable standard

According to RF exposure guidance:

Systems operating under the provisions of this section shall be operated in a manner that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

5.1.2 Determination of the standalone SAR test exclusion threshold

The minimum separation distance results from the application of the EUT which is handled by hand. This distance is assumed to be 1,2 mm from antenna to the user.

The formula under 4.3.1 b) for 100 MHz to 6 GHz for standalone equipment is used:

BLE module:

Rated output power:	-1,7 dBm	0,68 mW
Tune-up tolerance:	1,00 dB	
Maximum output power:	-0,7 dBm	0,9 mW
Antenna gain max:	1,95 dBi	
Maximum EIRP:	1,3 dBm	1,3 mW
Minimum distance r:	1,2 mm	

Channel frequency (MHz)	A (mW)	Threshold level	Limit 1g	Margin 10g
2402	0,9	1,11	3,0	-1,9
2440	0,9	1,11	3,0	-1,9
2480	0,9	1,12	3,0	-1,9

RFID calculated from field strength:

Rated output power:	2,6 mW	4,1 dBm
Tune-up tolerance:	1,00 dB	
Maximum output power:	5,1 dBm	3,3 mW
Minimum distance r:	1,2 mm	

Channel frequency (kHz)	A (mW)	Threshold level	Limit 1g	Margin 1g
134	3.3	1.87	3.0	-1.1

Conclusion: The Threshold level is lower than the limit, SAR measurement is NOT necessary.

5.1.3 Determination of the SAR test exclusion threshold for simultaneous transmission

When both technologies are active the max threshold level has to be summed and the total threshold level is determined.

$$\text{Level BLE} + \text{Level RFID} = 1,12 + 1,87 \leq 3,0$$

Conclusion: The Threshold level is smaller than the limit, SAR measurement is not necessary. Technology 1 and technology 2 can be co-located without exceeding SAR limits.

The requirements are **FULFILLED**.

Remarks: The RF output power is taken from the test reports 80193276-03 and 80193276-08
issued by CSA Group Bayern GmbH.