

Test Report

HELEM2505000136-2 v1.0



INTENTIONAL RADIATOR TESTS ACCORDING TO FCC PART 15 C AND ISED CANADA REQUIREMENTS

Equipment Under Test: RFID Reader
Model: T103
Customer / Manufacturer: Idesco Oy
Elektroniikkatie 4
FI-90590 Oulu
Finland
FCC Rule Part: 15.225
IC Rule Part: RSS-210, Issue 11
RSS-GEN Issue 5 Amendment 2

Date: 15 August 2025

Issued by:

A blue ink signature of Lauri Sippola.

Lauri Sippola
Testing Engineer

Date: 15 August 2025

Checked by:

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Rauno Repo
Senior EMC Specialist

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GENERAL REMARKS

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

RELEASE HISTORY

Version	Changes	Issued
1.0	Initial release	15 August 2025

PRODUCT DESCRIPTION

Equipment Under Test

Equipment Under Test: RFID Reader
 Model: T103
 Type: -
 Trademark: -
 Serial no: -
 FCC ID: -
 IC: -
 Radio module or chip: RFID/NFC: STMicroelectronics ST25R3916B-AQWT

General Description

Access control reader with NFC support.

Classification

Fixed device
 Mobile Device (Human body distance > 20cm)
 Portable Device (Human body distance < 20cm)

Modifications Incorporated in the EUT

No modifications.

Ratings and declarations

Operating Frequency Range (OFR): 13.56 MHz
 Channels: 1
 Antennas: Integral inductive loop PCB antenna

Power Supply

Operating voltage: 10 - 42 VDC (24 VDC nominal)
 Maximum Current: -

Ports and Cables

Cable / Port	Description	Length
2 x 7 Terminal blocks	14 x 0.25 LIYY, CAT6 or equivalent, used to connect reader to controller	1200 m (max)

Peripherals

Peripheral	Description / Usage
Laptop computer	Used for EUT configuration
USB-RS232 converter	Used for laptop connection
Connection platform	Used for laptop connection
EV3-tag	Used for RFID reading function

SUMMARY OF TESTING

Test Specification	Description of Test	Result
§15.203	Antenna Requirement	PASS
§15.209(a), RSS-210 B.6(a)	Radiated Emissions 9 kHz to 1 GHz	PASS

The decision rule applied for the tests results stated in this test report is according to the requirements of section 1.4 of ANSI C63.10-2020.

EUT Test Conditions during Testing

Configuration of the EUT was made to correspond to the actual assembling conditions as far as possible. EUT was configured using laptop with software "Terminal V1.9b" supplied by the customer. Tests were done with and without EV3-tag. USB-RS232 converter and laptop was placed outside the test chamber.

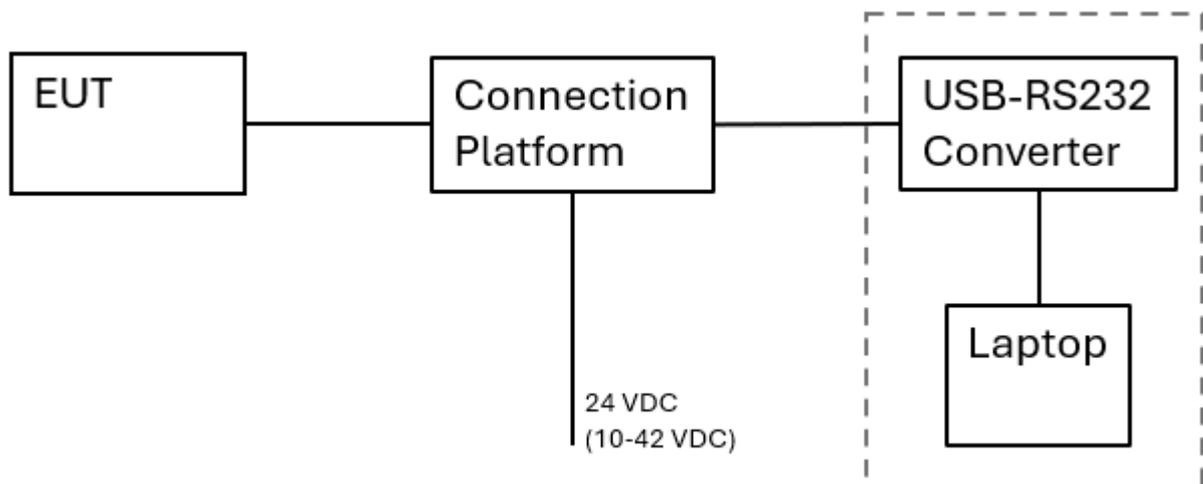


Figure 1: Test setup block diagram

Table 1. Normal and extreme test conditions

Test conditions:		Temperature [°C]:	Voltage [V]:
Normal		+20 - 25	24
Extreme	Minimum	-40	10
	Maximum	55	42

Extreme temperatures are manufacturer's declarations for ambient temperature.

Test Facility

Testing Laboratory / address: FCC designation number: FI0002 ISED CAB identifier: T004	SGS Fimko Ltd Karakaarenuja 4 FI-02610, ESPOO FINLAND
Test Site:	<input type="checkbox"/> K10LAB, ISED Canada registration number: 8708A-1 <input checked="" type="checkbox"/> K5LAB, ISED Canada registration number: 8708A-2 <input type="checkbox"/> T10LAB

TEST RESULTS

Antenna requirement

Standard: FCC Rule §15.203
Tested by: LAS
Date: 27 May 2025

FCC Rule: 15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Specification	Requirement (at least one of the following shall be applied)	Conclusion
§15.203	1. Permanently attached antenna 2. Unique coupling to the intentional radiator 3. Professionally installed radio. The installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.	PASS
Note	Option 1 is used	

Radiated Emissions 9 kHz to 1 GHz
Radiated Emissions 9 kHz to 1 GHz

Standard: ANSI C63.10 (2020)
Tested by: LAS
Date: 27 May 2025
Temperature: 23 °C
Humidity: 46 % RH
Measurement uncertainty: ± 4.51 dB Level of confidence 95 % (k = 2)

**FCC Rule: 15.225(a)-(d)
RSS-210 B.6(a)**

The field strength of any emissions within the band 13.110-14.010 MHz shall not exceed the following limits:

Frequency range [MHz]	Limit [µV/m]	Distance [m]	Detector
13.110 - 13.410	106	30	Quasi-peak
13.410 - 13.553	334	30	Quasi-peak
13.553 - 13.567	15848	30	Quasi-peak
13.567 - 13.710	334	30	Quasi-peak
13.710 - 14.010	106	30	Quasi-peak

The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209 and RSS-GEN.

Frequency range [MHz]	Limit [µV/m]	Distance [m]	Detector
0.009 - 0.490	2400/F(kHz)	300	Quasi-peak
0.490 - 1.705	24000/F(kHz)	30	Quasi-peak
1.705 - 30.0	30	30	Quasi-peak
30 - 88	100	3	Quasi-peak
88 - 216	150	3	Quasi-peak
216 - 960	200	3	Quasi-peak
960 - 1000	500	3	Quasi-peak

According to ANSI C63.10 (clause 5.3.2) and RSS-Gen (Clause 4.11) the measurements below 30 MHz can be performed at a closer distance than the EUT limit distance, the results shall be extrapolated to limit distance by using the square of an inverse linear distance extrapolation factor (40 dB/ decade). This method was used when performing measurements at a distance of 3 m instead of limit distances 300 m or 30 m.

According to §15.209(c) any unwanted emission shall not exceed the level of the fundamental emission. As the measurement has been made from 3 m distance and the result has been extrapolated by -40 dB to the 30 meter distance, the correct level of fundamental emission for comparison to unwanted emissions in the 30-1000 MHz frequency range is 74.27 dBµV/m.

The correction factor in the final result table contains the sum of the transducers (antenna + cables + distance). The result value is the measured value corrected with the correction factor.

The pre-measurements were performed with the EUT being in three orthogonal positions (X, Y, Z). The presented final results are the results in the worst orientation.

The measurements were performed with and without the peripheral NFC tag. The worst-case results are presented, 9 kHz – 30 MHz without tag and 30 – 1000 MHz with tag.

Test results

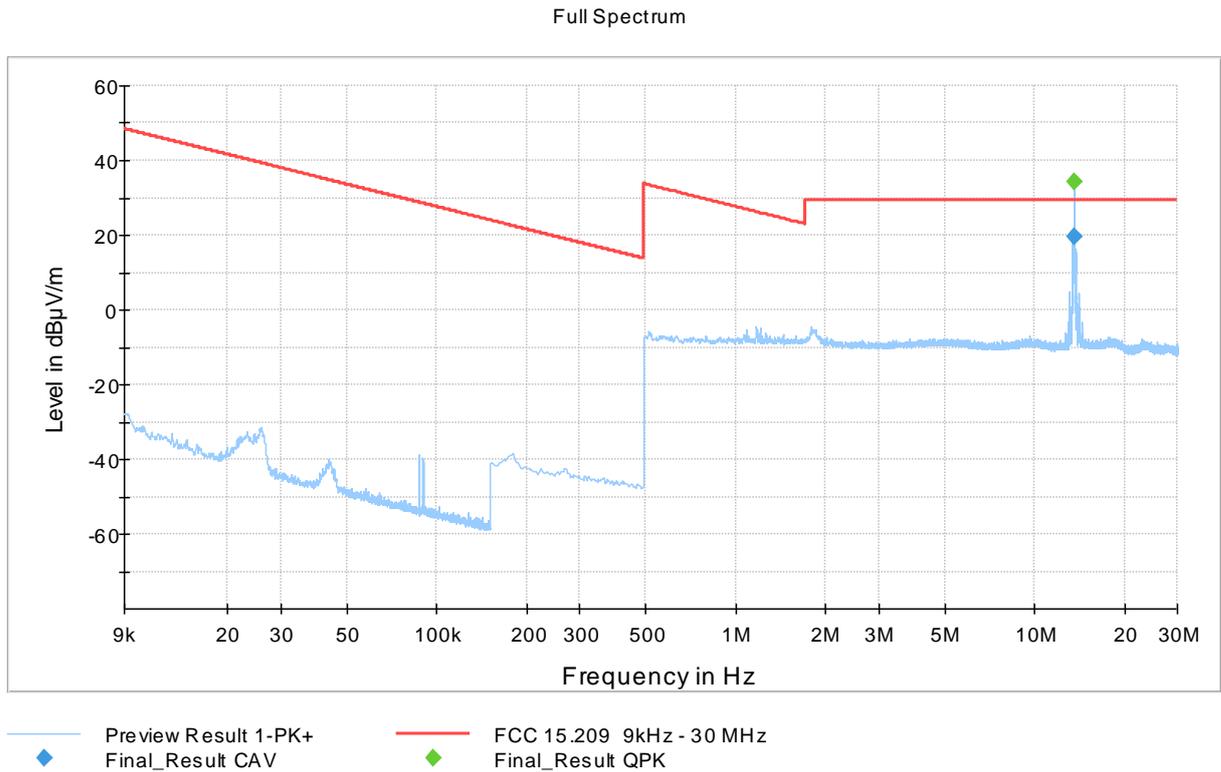


Figure 2: TX radiated emission 9 kHz to 30MHz, without tag, coaxial

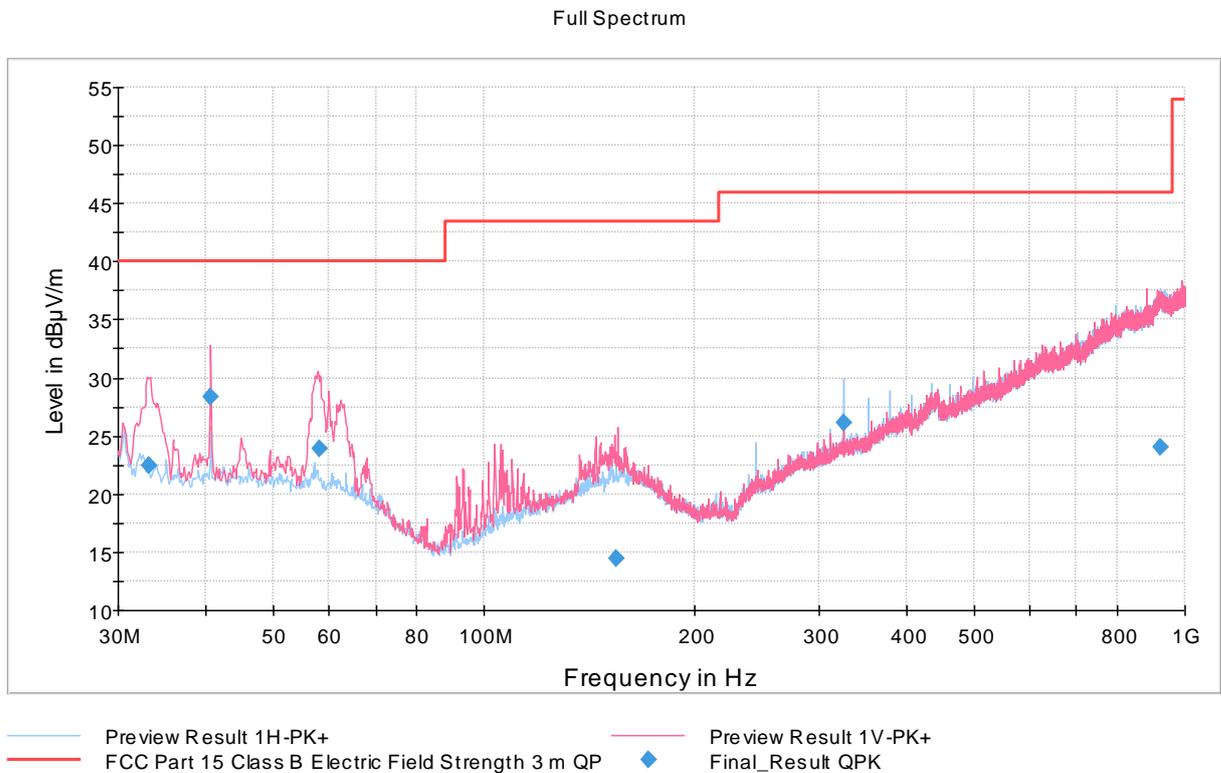


Figure 3: TX radiated emission 30 – 1000 MHz, with tag

Radiated Emissions 9 kHz to 1 GHz

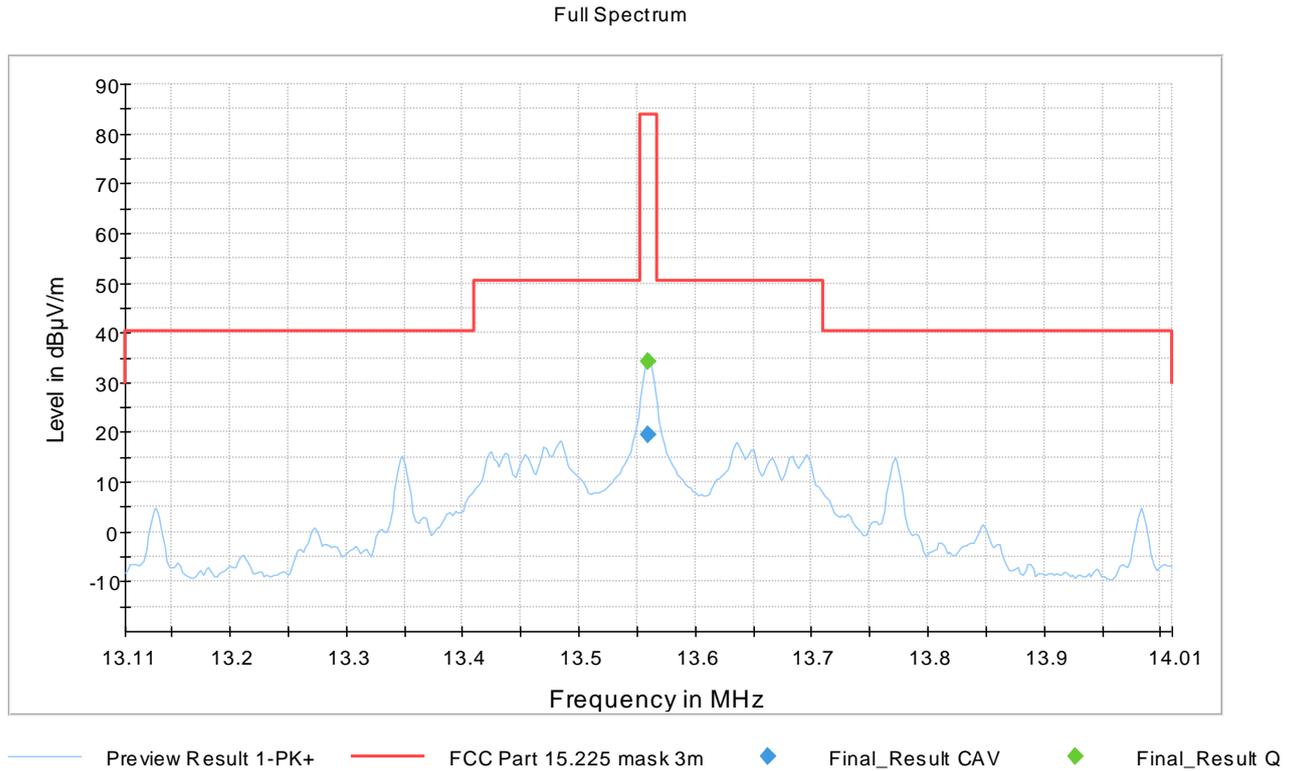


Figure 4: Operating within the band 13.110 – 14.010 MHz

Table 2: The final results 9 kHz – 30 MHz

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB/m)
13.559000	34.27	84.00	49.73	1000.0	9.000	Coax	7.0	-20.0

* coax/copl = measurement loop antenna in coaxial or coplanar orientation

Table 3: The final results 30 – 1000 MHz

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
33.255000	22.40	40.00	17.60	1000.0	120.000	105.0	V	152.0	16.9
40.665000	28.37	40.00	11.63	1000.0	120.000	100.0	V	71.0	17.7
58.205000	23.93	40.00	16.07	1000.0	120.000	100.0	V	191.0	18.3
154.335000	14.51	43.50	28.99	1000.0	120.000	100.0	V	240.0	19.3
325.445000	26.09	46.00	19.91	1000.0	120.000	100.0	H	81.0	21.3
923.805000	24.02	46.00	21.98	1000.0	120.000	119.0	H	79.0	33.1

TEST EQUIPMENT

RF-Test Equipment

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
ANTENNA	ROHDE & SCHWARZ	HFH2-Z2 , 335.4711.52	inv. 8013	2024-11-18	2025-11-18
ANTENNA	SCHWARZBECK	VULB 9168	inv. 8911	2024-12-11	2026-12-11
ANTENNA MAST	MATURO	TAM 4.0E	inv. 10181	NCR	NCR
ATTENUATOR	PASTERNAK	PE 7004-4 (4dB)	inv. 10126	2024-12-11	2026-12-11
CABLE	-	FB3AirC	inv. C155	NCR	NCR
COAX CHAIN K5 EMI < 1GHz	-	C053+FP3AirC+C138	-	2025-03-26	2026-03-26
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW26	inv. 10679	2024-06-12	2025-06-11
MAST & TURNTABLE CONTROLLER	MATURO	NCD	inv. 10183	NCR	NCR
POWER SUPPLY	DELTA	SM 130-25D	inv. 10406	NCR	NCR
TEMPERATURE/ HUMIDITY SENSOR	EDS	OW-ENV-TH, K5 SAC	inv. 10517	2024-11-02	2025-11-02
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	-	-
TURNTABLE	MATURO	DS430 UPGRADED	inv. 10182	NCR	NCR
POWER SUPPLY	CALIFORNIA INSTR.	5001 iX Series II	inv. 7826	NCR	NCR

NCR = No calibration required

END OF REPORT