

# Test Report

HELEM2503000058-1 v1.0



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

Equipment Under Test: RFID Reader

Model: T10

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:

  
Lauri Sippola  
Testing Engineer

Date:

15 August 2025

Checked by:

  
Rauno Repo  
Senior EMC Specialist

**Table of Contents****TABLE OF CONTENTS**

TABLE OF CONTENTS .....	2
GENERAL REMARKS.....	3
Disclaimer .....	3
RELEASE HISTORY .....	4
PRODUCT DESCRIPTION .....	5
Equipment Under Test .....	5
General Description.....	5
Ratings and declarations.....	5
Power Supply .....	5
Ports and Cables .....	6
Peripherals .....	6
SUMMARY OF TESTING.....	7
EUT Test Conditions during Testing .....	7
Test Facility .....	8
TEST RESULTS .....	9
Antenna requirement.....	9
Conducted Emissions In The Frequency Range 150 kHz - 30 MHz.....	10
Radiated Emissions 9 kHz to 1 GHz .....	12
Frequency Stability.....	15
99% Occupied Bandwidth .....	17
TEST EQUIPMENT .....	18

**GENERAL REMARKS****Disclaimer**

*This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx>*

*Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.*

*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****RELEASE HISTORY**

Version	Changes	Issued
1.0	Initial release	15 August 2025

## PRODUCT DESCRIPTION

### Equipment Under Test

Equipment Under Test: RFID Reader  
Model: T10  
Type: -  
Trademark: -  
Serial no: -  
FCC ID: UJRT10  
IC: 6701A-T10  
Radio module or chip: RFID/NFC: STMicroelectronics ST25R3916B-AQWT

### General Description

Access control reader with BLE and NFC support.

### Classification

Fixed device	<input checked="" type="checkbox"/>
Mobile Device (Human body distance > 20cm)	<input type="checkbox"/>
Portable Device (Human body distance < 20cm)	<input type="checkbox"/>

### 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: -

#### AC/DC power adaptor:

Model: Lenovo ADLX65NCT3A  
Input: 100-240 VAC, 50/60 Hz, 1.8 A  
Output: 20 VDC, 3.25 A, 65 W

AC/DC power adaptor was supplied by the laboratory.

AC Power-Line Conducted Emissions test was performed with AC/DC power adaptor using 120 V and 60 Hz input voltage.

**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

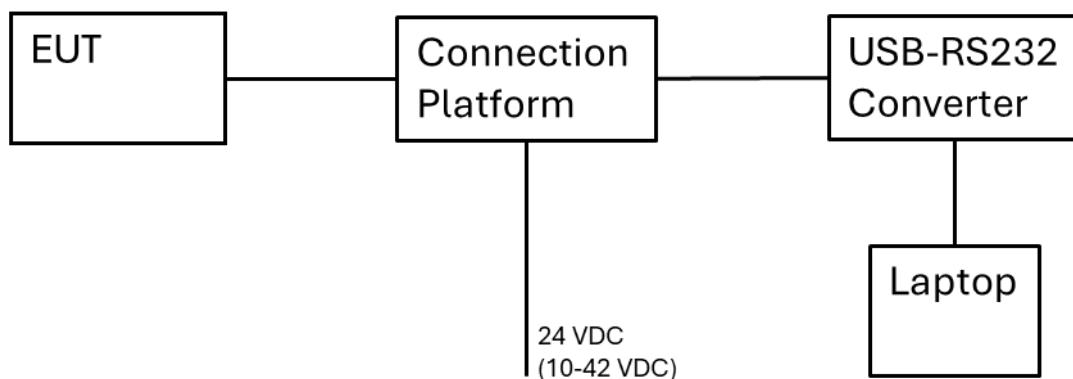
**SUMMARY OF TESTING**

Test Specification	Description of Test	Result
§15.203	Antenna Requirement	<b>PASS</b>
§15.207(a), RSS-GEN 8.8	Conducted emissions 150 kHz to 30 MHz	<b>PASS</b>
§15.209(a), RSS-210 B.6(a)	Radiated Emissions 9 kHz to 1 GHz	<b>PASS</b>
§15.225(e) / RSS-210 B.6(b)	Frequency Stability	<b>PASS</b>
RSS-GEN 6.7	Occupied bandwidth (99%)	<b>PASS</b>

*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. BLE radio was set to transmit on the highest channel during emission tests.



**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: <b>FI0002</b> ISED CAB identifier: <b>T004</b>	SGS Fimko Ltd Takomotie 8 FI-00380, HELSINKI FINLAND
Test Site:	<input type="checkbox"/> K10LAB, ISED Canada registration number: <b>8708A-1</b> <input checked="" type="checkbox"/> K5LAB, ISED Canada registration number: <b>8708A-2</b> <input type="checkbox"/> T10LAB

**TEST RESULTS****Antenna requirement**

**Standard:** FCC Rule §15.203  
**Tested by:** LAS  
**Date:** 10 March 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	<ol style="list-style-type: none"><li>1. Permanently attached antenna</li><li>2. Unique coupling to the intentional radiator</li><li>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.</li></ol>	<b>PASS</b>
Note	Option 1 is used	

**Conducted Emissions In The Frequency Range 150 kHz - 30 MHz****Conducted Emissions In The Frequency Range 150 kHz - 30 MHz**

**Standard:** ANSI C63.10 (2020)  
**Tested by:** LAS  
**Date:** 12 March 2025  
**Temperature:** 22 °C  
**Humidity:** 35 % RH  
**Measurement uncertainty:**  $\pm 2.9$  dB      Level of confidence 95 % (k = 2)

**FCC Rule: 15.207 (a)**  
**RSS-GEN 8.8**

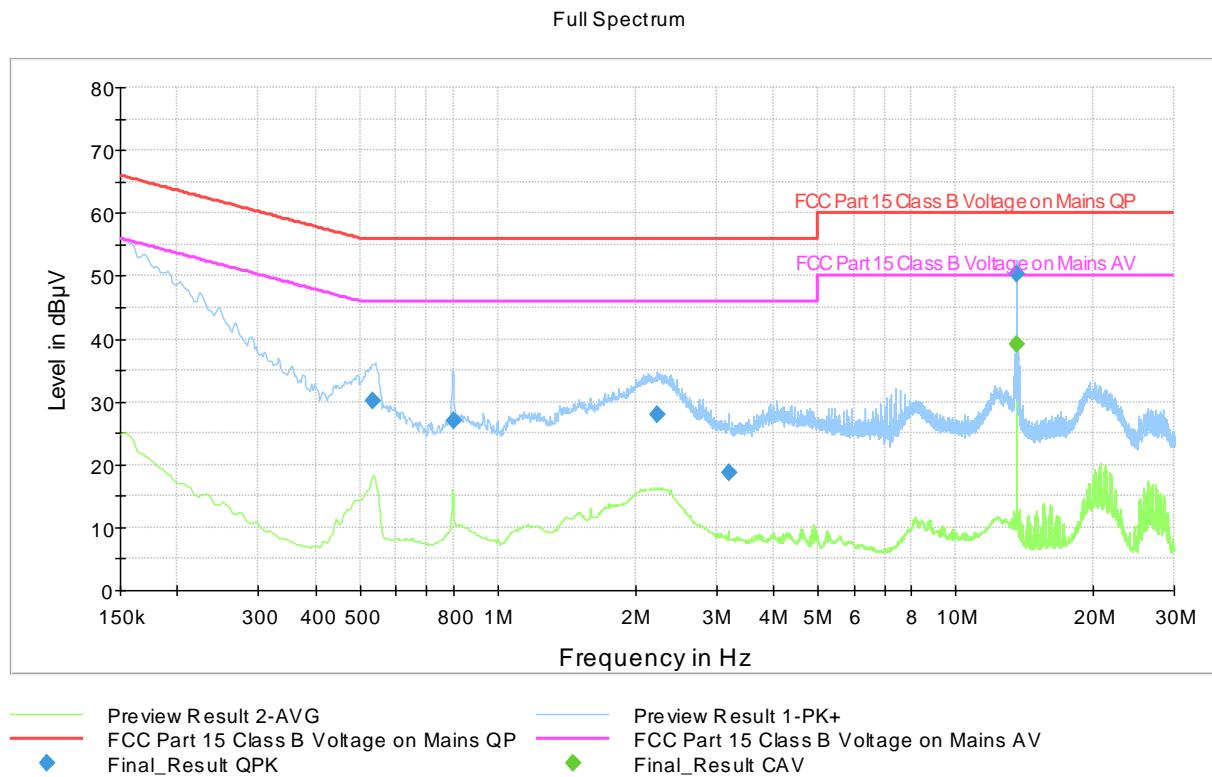
Conducted disturbance voltage was measured with an artificial main network from 150 kHz to 30 MHz with 4.5 kHz steps and a resolution bandwidth of 9 kHz. Measurements were carried out with peak and average detectors.

<b>Frequency of emission (MHz)</b>	<b>Conducted limit (dB<math>\mu</math>V)</b>	
	<b>Quasi-peak</b>	<b>Average</b>
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

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

## Test results



**Figure 2.** The measured curves with peak- and average detector.

**Table 2.** Final results.

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	CAverage (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.532500	30.24	---	56.00	25.76	1000.0	9.000	N	9.7
0.801000	26.90	---	56.00	29.10	1000.0	9.000	L1	9.8
2.230250	27.94	---	56.00	28.06	1000.0	9.000	L1	9.9
3.188750	18.69	---	56.00	37.31	1000.0	9.000	N	9.9
13.558500	50.41	---	60.00	9.59	1000.0	9.000	N	10.4
13.562500	---	39.22	50.00	10.78	1000.0	9.000	L1	10.4

## Radiated Emissions 9 kHz to 1 GHz

<b>Standard:</b>	ANSI C63.10	(2020)
<b>Tested by:</b>	LAS	LAS
<b>Date:</b>	10 March 2025	12 March 2025
<b>Temperature:</b>	22 °C	22 °C
<b>Humidity:</b>	39 % RH	35 % RH
<b>Measurement uncertainty:</b>	± 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 [ $\mu$ V/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 [ $\mu$ V/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.

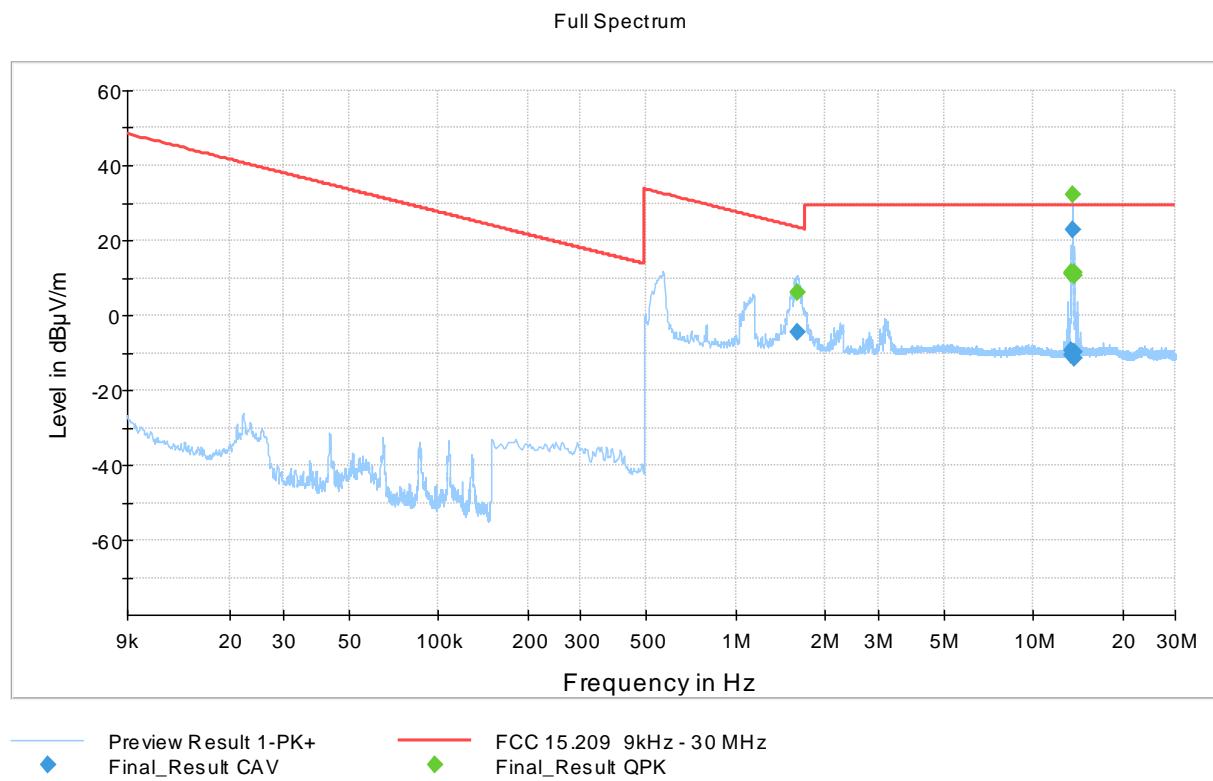
According to §15.209(c) any unwanted emission shall not exceed the level of the fundamental emission. As the measurement has been made from 3 m distance and the result has been extrapolated by -40 dB to the 30 meter distance, the correct level of fundamental emission for comparison to unwanted emissions in the 30-1000 MHz frequency range is 72.06 dB $\mu$ V/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.

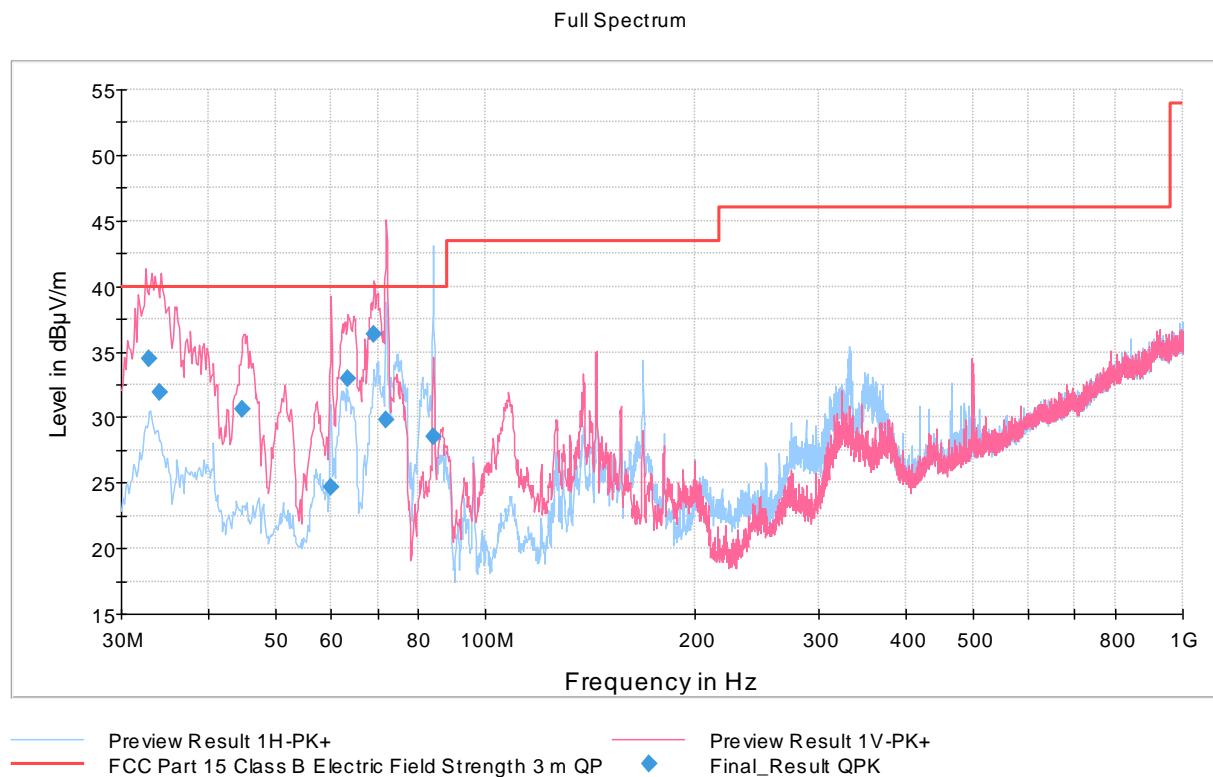
The pre-measurements were performed with the EUT being in three orthogonal positions (X, Y, Z). The presented final results are the results in the worst orientation.

The measurements were performed with and without the peripheral NFC tag. The worst-case results are presented (with tag).

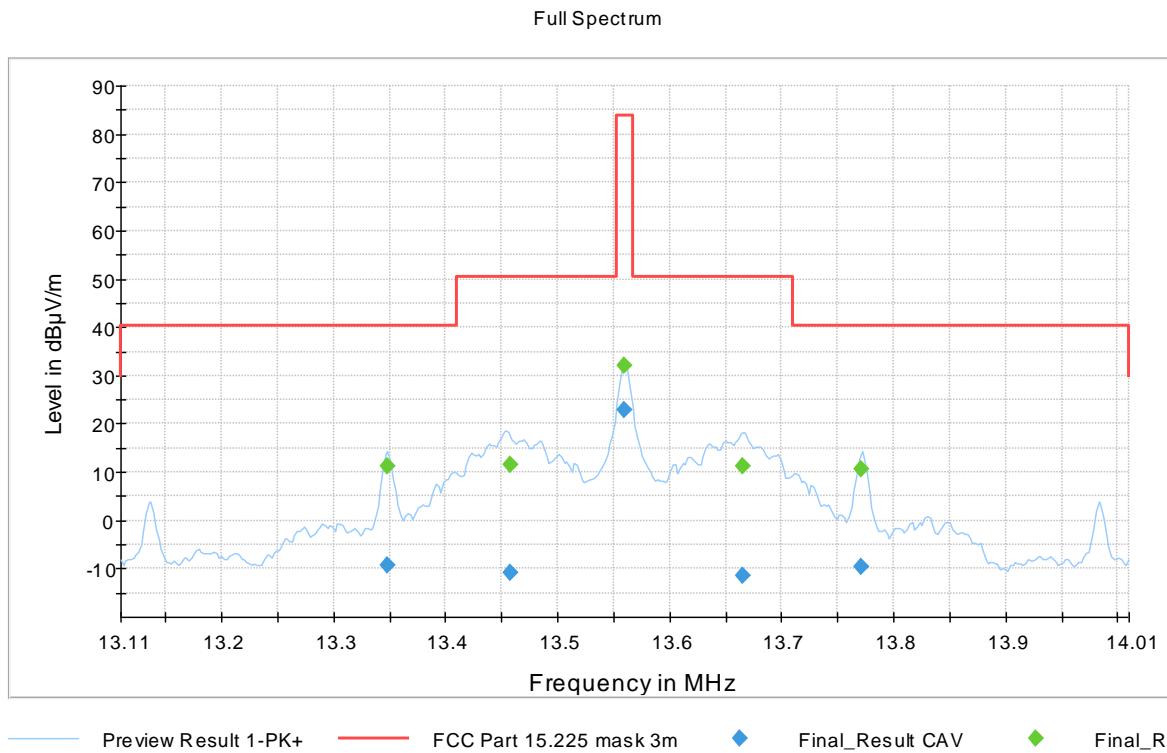
## Test results



**Figure 3:** TX radiated emission 9 kHz to 30MHz, with tag, coaxial



**Figure 4:** TX radiated emission 30 – 1000 MHz, with tag



**Figure 5:** Operating within the band 13.110 – 14.010 MHz

**Table 3:** The final results 9 kHz – 30 MHz

Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol *	Azimuth (deg)	Corr. (dB/m)
1.603500	5.92	23.53	17.61	1000.0	9.000	Coax	278.0	-20.5
13.347500	11.13	40.50	29.37	1000.0	9.000	Coax	29.0	-20.3
13.457250	11.49	50.50	39.01	1000.0	9.000	Coax	22.0	-20.3
13.559000	32.06	84.00	51.94	1000.0	9.000	Coax	22.0	-20.3
13.664750	11.28	50.50	39.22	1000.0	9.000	Coax	24.0	-20.3
13.770500	10.61	40.50	29.89	1000.0	9.000	Coax	20.0	-20.3

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

**Table 4:** The final results 30 – 1000 MHz

Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
32.855000	34.53	40.00	5.47	1000.0	120.000	148.0	V	124.0	16.6
34.115000	31.94	40.00	8.06	1000.0	120.000	148.0	V	136.0	16.6
44.715000	30.65	40.00	9.35	1000.0	120.000	100.0	V	120.0	17.7
60.055000	24.64	40.00	15.36	1000.0	120.000	100.0	V	356.0	17.9
63.305000	32.96	40.00	7.04	1000.0	120.000	105.0	V	144.0	17.5
69.025000	36.32	40.00	3.68	1000.0	120.000	100.0	V	121.0	16.4
71.995000	29.83	40.00	10.17	1000.0	120.000	161.0	V	352.0	15.8
84.135000	28.48	40.00	11.52	1000.0	120.000	237.0	H	330.0	12.2

## Frequency Stability

**Standard:** ANSI C63.10 (2020)  
**Tested by:** LAS  
**Date:** 7 – 14 March 2025  
**Temperature:** 23 ± 3 °C  
**Humidity:** 20 - 75 % RH

### 15.225(e) RSS-210 B.6(b), RSS-GEN (6.11)

The frequency tolerance of the carrier signal shall be maintained within ± 0.01% of the operating frequency over a temperature variation of -20 °C to +50 °C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 °C. For battery operated equipment, the equipment tests shall be performed using a new battery.

The EUT did not power on with 8.5 VDC, test was done with 10, 24 and 42 VDC.

## Test results

Manufacturer declaration for ambient temperature is -40 °C to +55 °C.

**Table 5:** Frequency stability test, extreme conditions.

Test conditions		Frequency [MHz]	deviation from nominal [%]	Result
Temperature [°C]	Voltage [V]			
-20	24	13.5599100	0.0006637	PASS
-10	24	13.5599090	0.0006711	PASS
0	24	13.5598890	0.0008186	PASS
+10	24	13.5598561	0.0010612	PASS
+20	10	13.5598151	0.0013636	PASS
+20	24	13.5598171	0.0013488	PASS
+20	42	13.5598131	0.0013783	PASS
+30	24	13.5597791	0.0016291	PASS
+40	24	13.5597451	0.0018798	PASS
+50	24	13.5597331	0.0019683	PASS

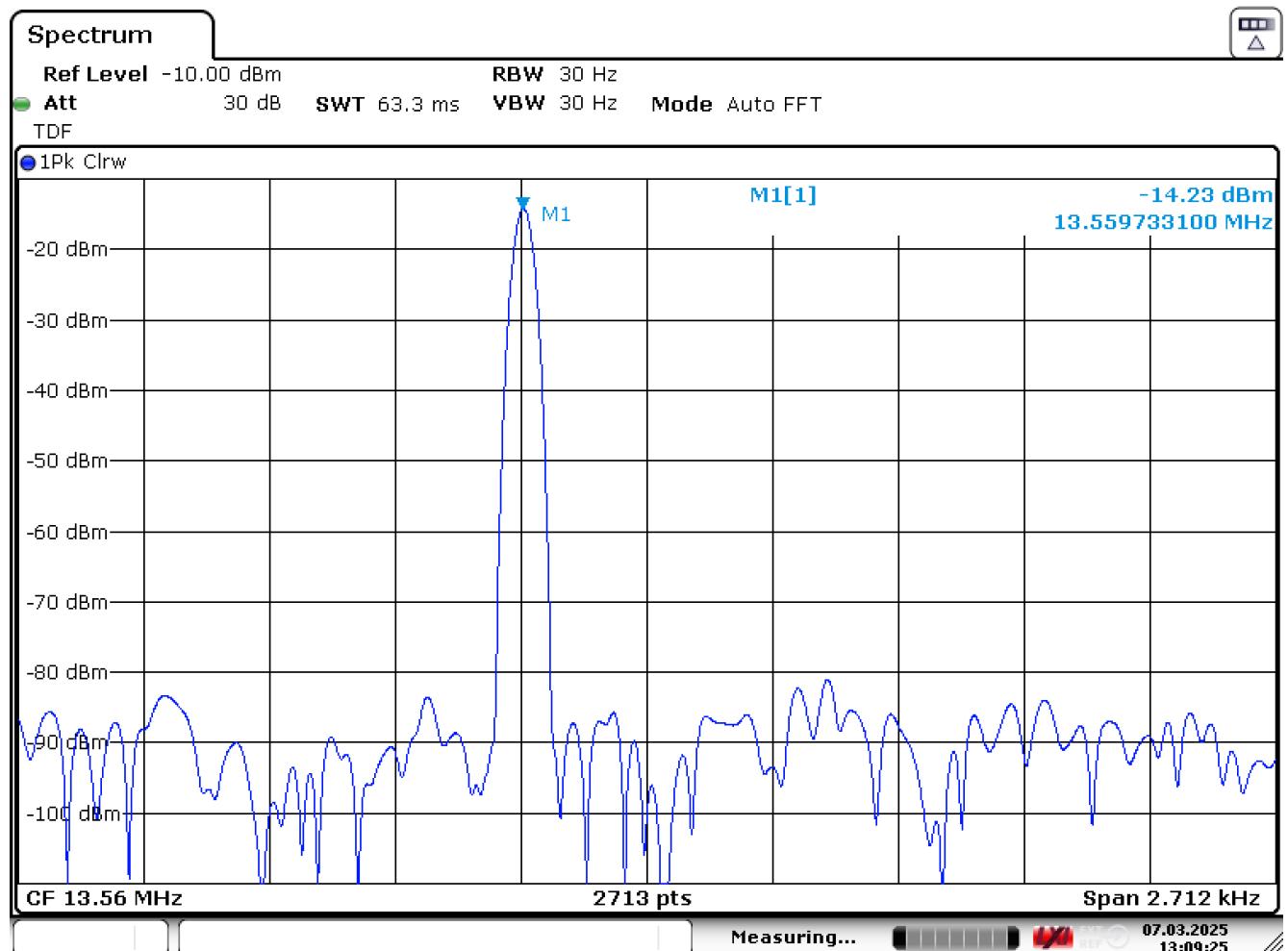


Figure 6: Spectrum analyzer figure with the worst-case results (+50 °C)

## 99% Occupied Bandwidth

**Standard:** RSS-GEN (2021)  
**Tested by:** LAS  
**Date:** 18 March 2025  
**Temperature:** 20 °C  
**Humidity:** 20 - 75 % RH

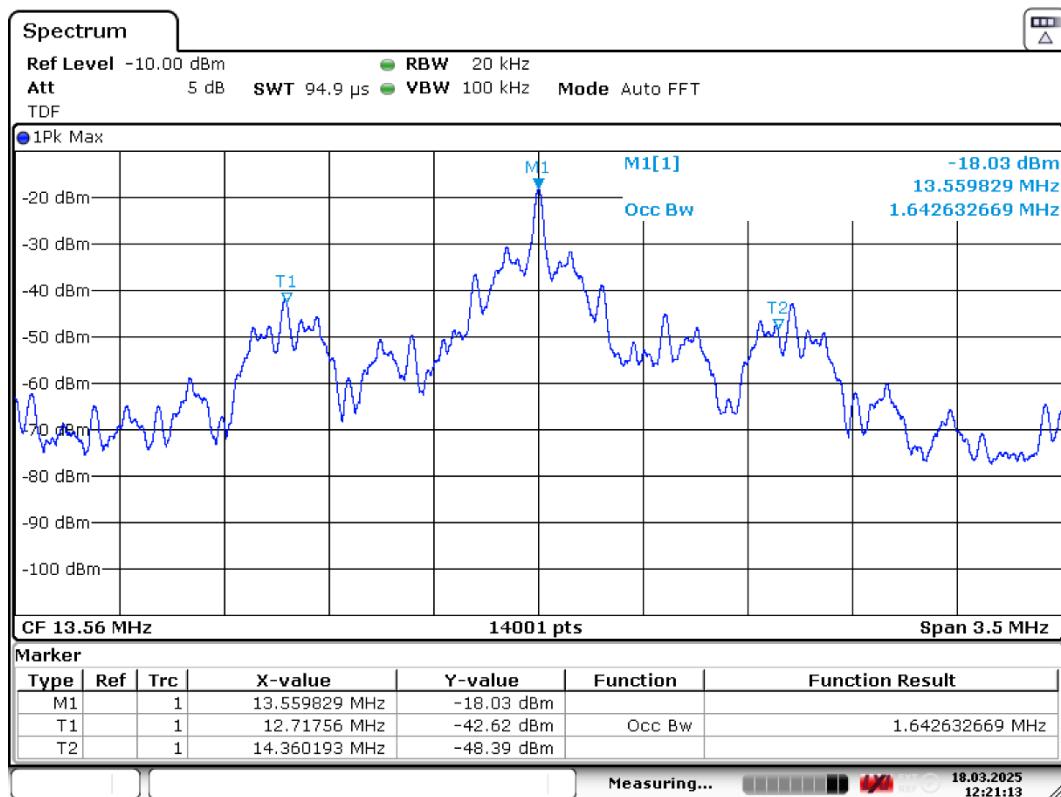
### RSS-GEN 6.7

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained.

## Test results

**Table 6:** 99% occupied bandwidth test results

99 % BW [MHz]	Limit	Result
1.642632669	N/A	PASS



**Figure 7:** 99% OBW

**TEST EQUIPMENT****RF-Test Equipment**

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
ANTENNA	ROHDE & SCHWARZ	HFH2-ZZ , 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	PASTERNACK	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	-	2024-03-28	2025-03-28
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
SPECTRUM ANALYZER	ROHDE & SCHWARZ	FSV40	inv. 9093	2024-06-13	2025-06-12
TEMPERATURE CHAMBER	CTS	T-65/50	inv. 10521	NCR	NCR
POWER SUPPLY	THANDAR	PL330TP	inv. 9787	NCR	NCR
ATTENUATOR	NARDA	757 C - 20 dB (A111)	inv. 9491	2024-12-11	2026-12-11
POWER SUPPLY	CALIFORNIA INSTR.	5001 iX Series II	inv. 7826	NCR	NCR
NEAR-FIELD PROBE SET	ROHDE & SCHWARZ	HS-14 1026.7744.02	inv. 7883	NCR	NCR

**Conducted Emissions**

Equipment	Manufacturer	Type	Inv or serial	Prev Calib	Next Calib
COAX CHAIN K5 EMI CE 9kHz-30MHz	-	C132+FP1SF+C153	-	2025-03-26	2026-03-26
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	NCR	NCR
LISN	ROHDE & SCHWARZ	ENV216	inv. 9611	2025-02-18	2026-02-18
LISN	ROHDE & SCHWARZ	ESH3-Z5	inv. 8019	2024-04-22	2025-04-22
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW26	inv. 10679	2024-06-12	2025-06-11
CABLE	SUHNER	SUCOFLEX, FP1SF	sn: C154	NCR	NCR

NCR = No calibration required

**END OF REPORT**