Test Report

HELEM2503000058-3 v1.0

FINAS Finnish Accreditation Service T004 (EN ISO/IEC 17025)

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

Equipment Under Test:	RFID Reader
Model:	T11
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	Date:	15 August 2025
Issued by:	Lauri Sippola Testing Engineer	Checked by:	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:	T11		
Type:	-		
Trademark:	-		
Serial no:	-		
FCC ID:	UJRT11		
IC:	6701A-T11		
Radio module or chip:	RFID/NFC:	STMicroelectronics	ST25R3916B-AQWT

General Description

Access control reader with BLE and 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:	-

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	PASS
§15.207(a), RSS-GEN 8.8	Conducted emissions 150 kHz to 30 MHz	PASS
§15.209(a), RSS-210 B.6(a)	Radiated Emissions 9 kHz to 1 GHz	PASS
§15.225(e) / RSS-210 B.6(b)	Frequency Stability	PASS
RSS-GEN 6.7	Occupied bandwidth (99%)	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. BLE radio was set to transmit on the highest channel during emission tests.

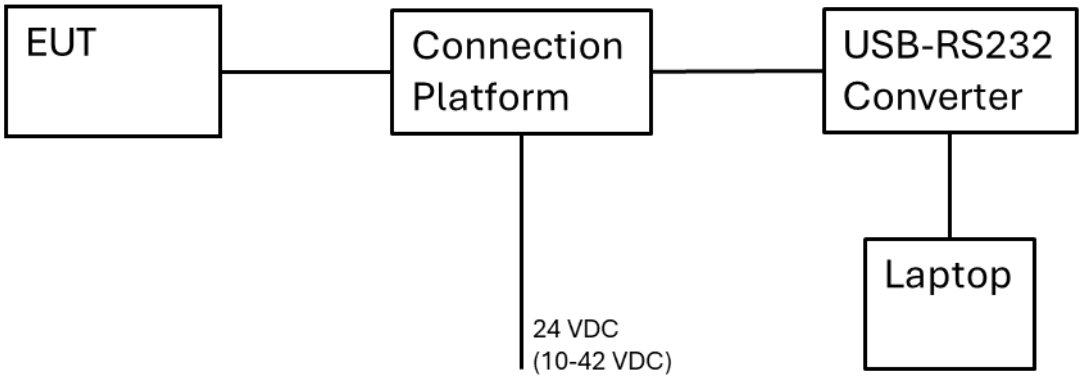

Figure 1: Test setup block diagram

Table 1. Normal and extreme test conditions

Test conditions:		Temperature [ºC]:	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 Takomotie 8 FI-00380, HELSINKI FINLAND
Test Site:	☐ K10LAB, ISED Canada registration number: **8708A-1** ☒ K5LAB, ISED Canada registration number: **8708A-2** ☐ 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	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	

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:	± 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.

Frequency of emission (MHz)	Conducted limit (dBµV)	
	Quasi-peak	Average
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

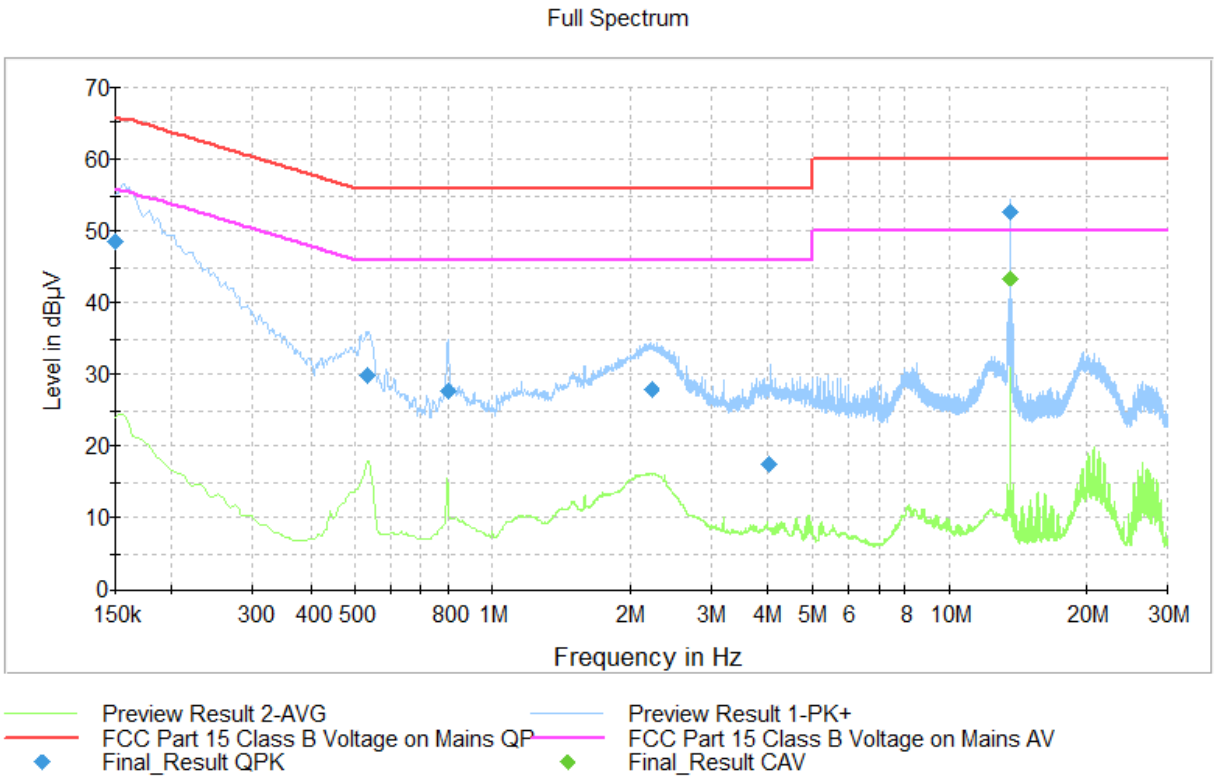

Figure 2. The measured curves with peak- and average detector.

Table 2. Final results.

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	48.55	---	66.00	17.45	1000.0	9.000	N	9.7
0.535500	29.79	---	56.00	26.21	1000.0	9.000	L1	9.7
0.799250	27.74	---	56.00	28.26	1000.0	9.000	L1	9.8
2.229500	27.93	---	56.00	28.07	1000.0	9.000	L1	9.9
4.024250	17.40	---	56.00	38.60	1000.0	9.000	N	9.9
13.558500	---	43.49	50.00	6.51	1000.0	9.000	N	10.4
13.558500	52.53	---	60.00	7.47	1000.0	9.000	N	10.4

Radiated Emissions 9 kHz to 1 GHz

Standard:	ANSI C63.10	(2020)
Tested by:	LAS	LAS
Date:	10 March 2025	12 March 2025
Temperature:	22 °C	22 °C
Humidity:	39 % RH	35 % 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 71.17 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 (with tag).

Test results

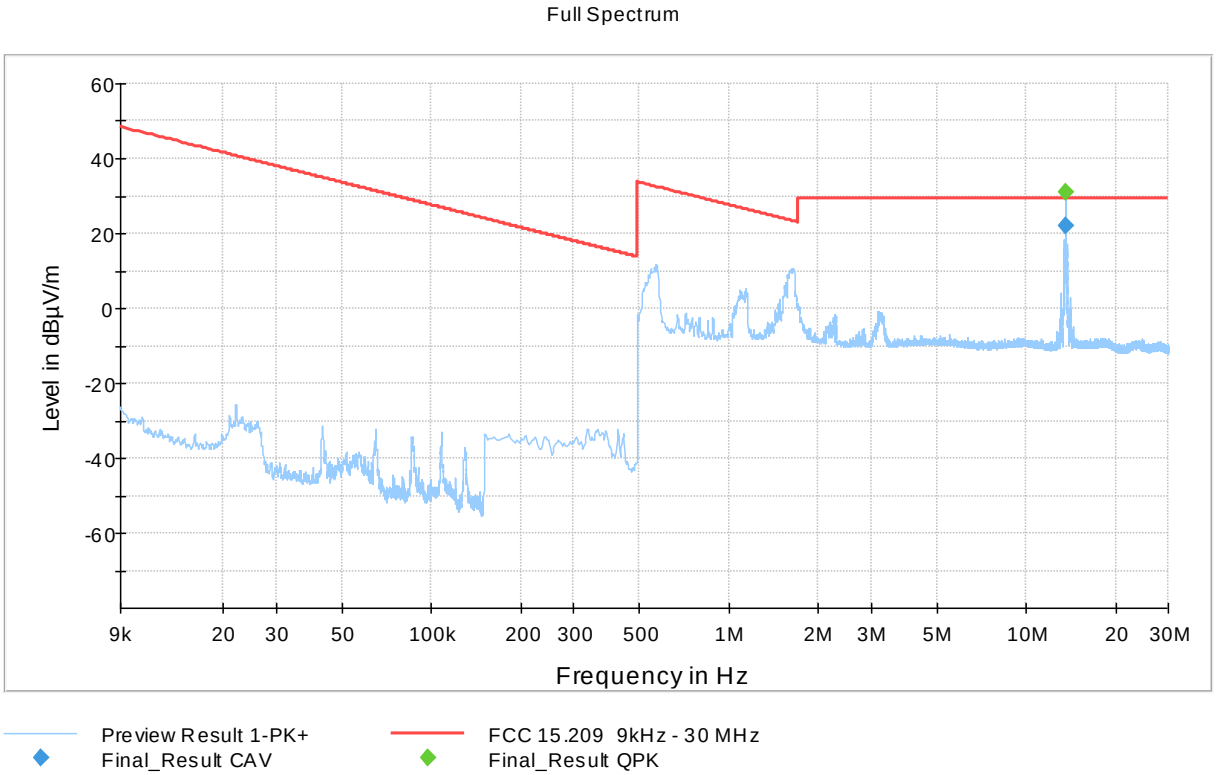

Figure 3: TX radiated emission 9 kHz to 30MHz, with tag, coaxial

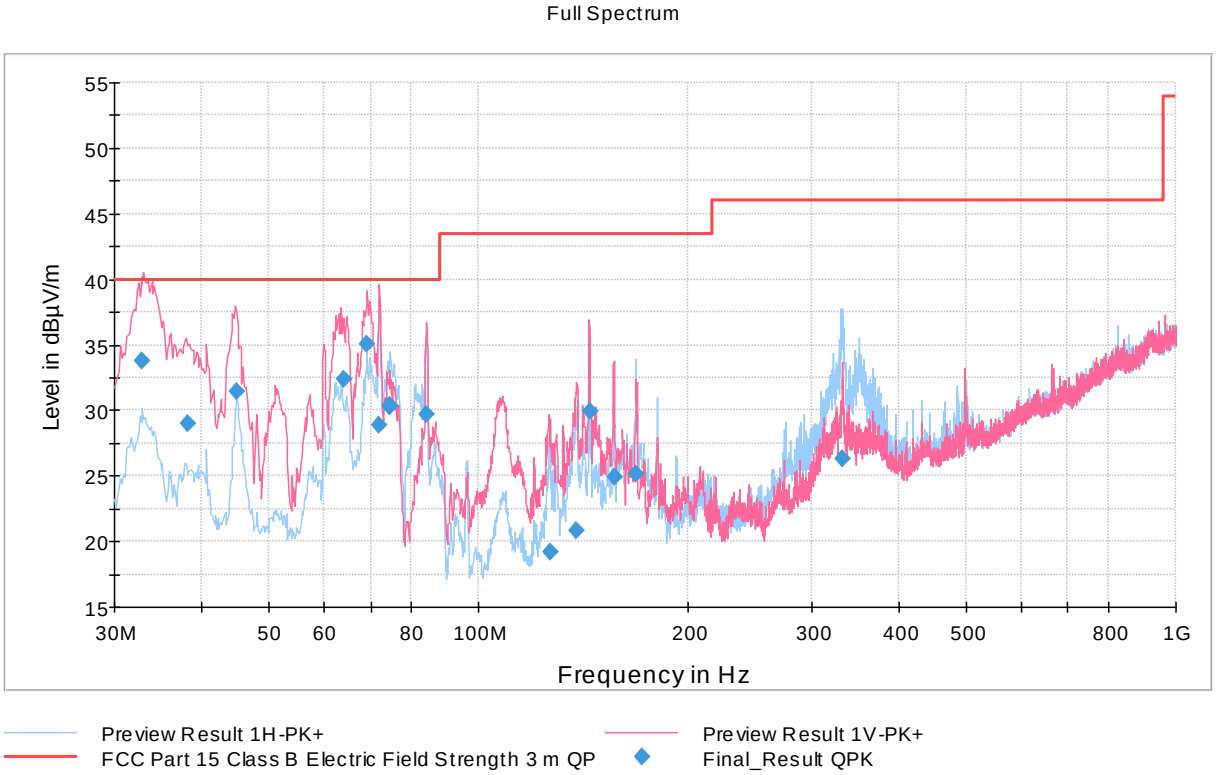

Figure 4: TX radiated emission 30 – 1000 MHz, with tag

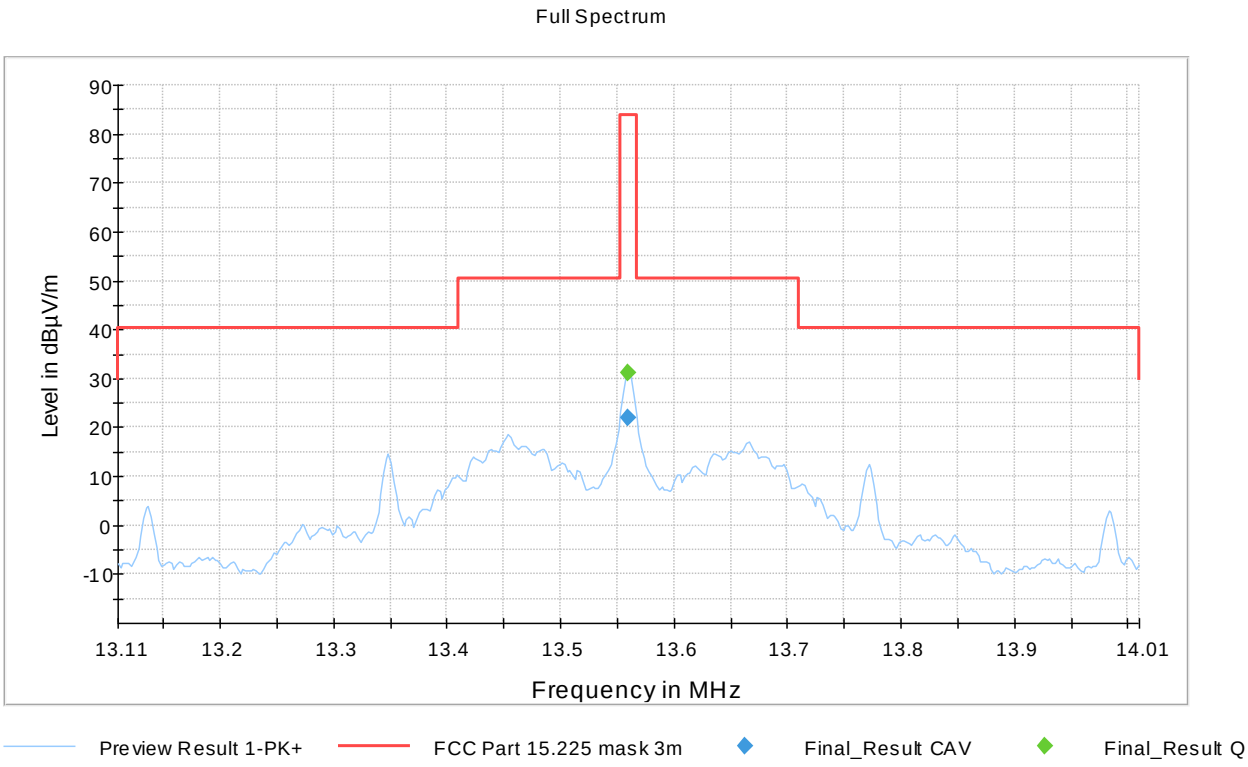

Figure 5: Operating within the band 13.110 – 14.010 MHz

Table 3: The final results 9 kHz – 30 MHz

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB/m)
13.559000	31.17	84.00	52.83	1000.0	9.000	Coax	25.0	-20.3

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

Table 4: 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)
32.935000	33.72	40.00	6.28	1000.0	120.000	175.0	V	105.0	16.6
38.165000	28.94	40.00	11.06	1000.0	120.000	100.0	V	280.0	16.7
44.835000	31.48	40.00	8.52	1000.0	120.000	105.0	V	25.0	17.7
64.105000	32.37	40.00	7.63	1000.0	120.000	100.0	V	159.0	17.4
69.165000	35.02	40.00	4.98	1000.0	120.000	100.0	V	124.0	16.4
71.895000	28.87	40.00	11.13	1000.0	120.000	330.0	V	257.0	15.8
74.585000	30.42	40.00	9.58	1000.0	120.000	277.0	H	6.0	14.9
74.595000	30.23	40.00	9.77	1000.0	120.000	194.0	H	3.0	14.9
84.075000	29.67	40.00	10.33	1000.0	120.000	148.0	V	269.0	12.2
126.345000	19.15	43.52	24.37	1000.0	120.000	147.0	V	333.0	16.3
138.015000	20.86	43.52	22.66	1000.0	120.000	100.0	V	299.0	17.7
144.045000	29.97	43.52	13.55	1000.0	120.000	100.0	V	336.0	18.4
156.205000	24.94	43.52	18.58	1000.0	120.000	100.0	V	19.0	18.6
168.085000	25.10	43.52	18.42	1000.0	120.000	195.0	H	333.0	18.0
331.855000	26.34	46.02	19.68	1000.0	120.000	100.0	H	272.0	20.4

Frequency Stabilty

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	13.5598950	0.0007743	PASS
-10	24	13.5599210	0.0005826	PASS
0	24	13.5599070	0.0006858	PASS
+10	24	13.5598760	0.0009145	PASS
+20	10	13.5598351	0.0012161	PASS
+20	24	13.5598321	0.0012382	PASS
+20	42	13.5598341	0.0012235	PASS
+30	24	13.5597951	0.0015111	PASS
+40	24	13.5597481	0.0018577	PASS
+50	24	13.5597381	0.0019315	PASS

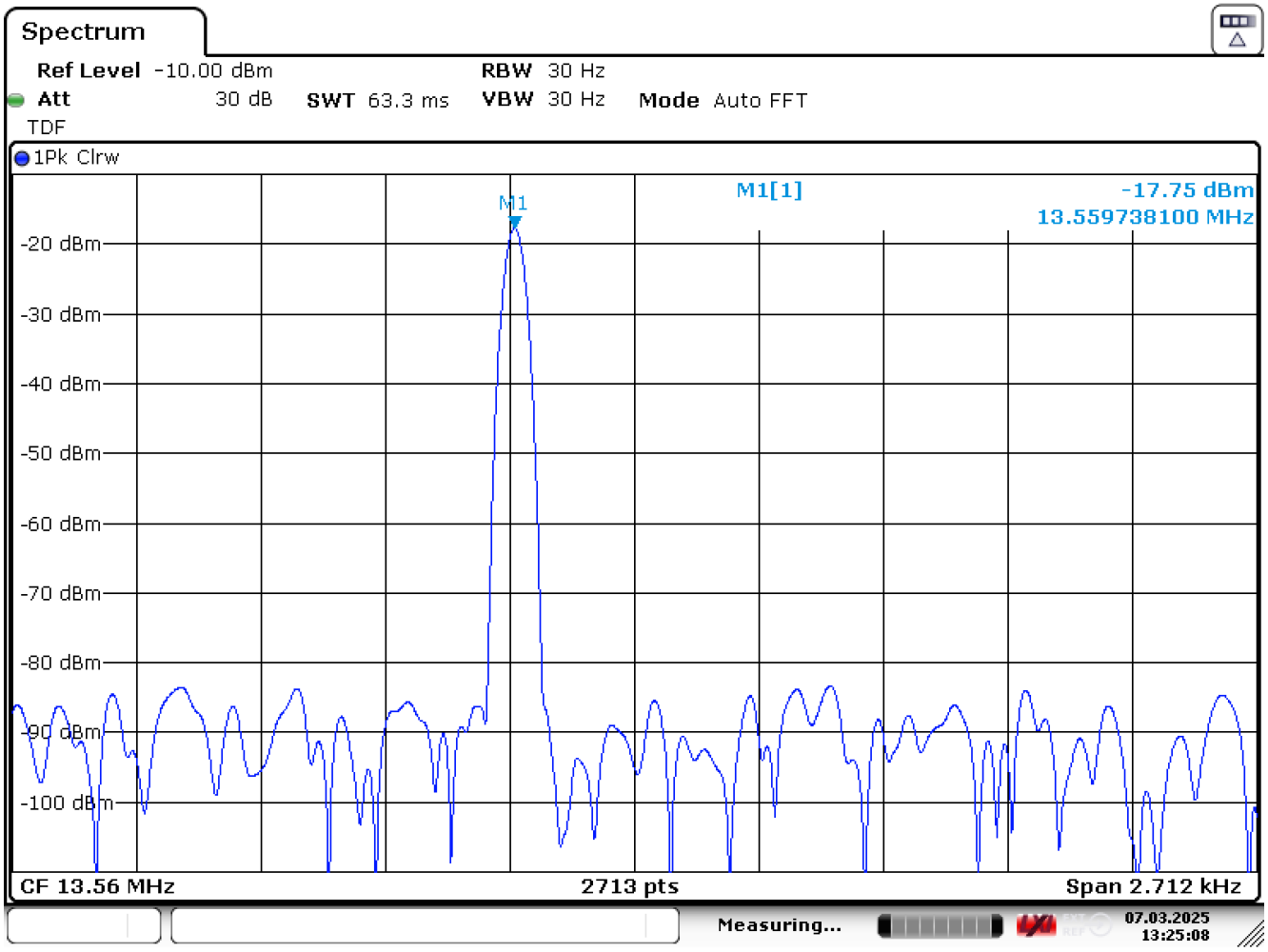

Figure 6: Spectrum analyzer figure with the worst-case results (+50 °C)

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
1.701128491	N/A	PASS

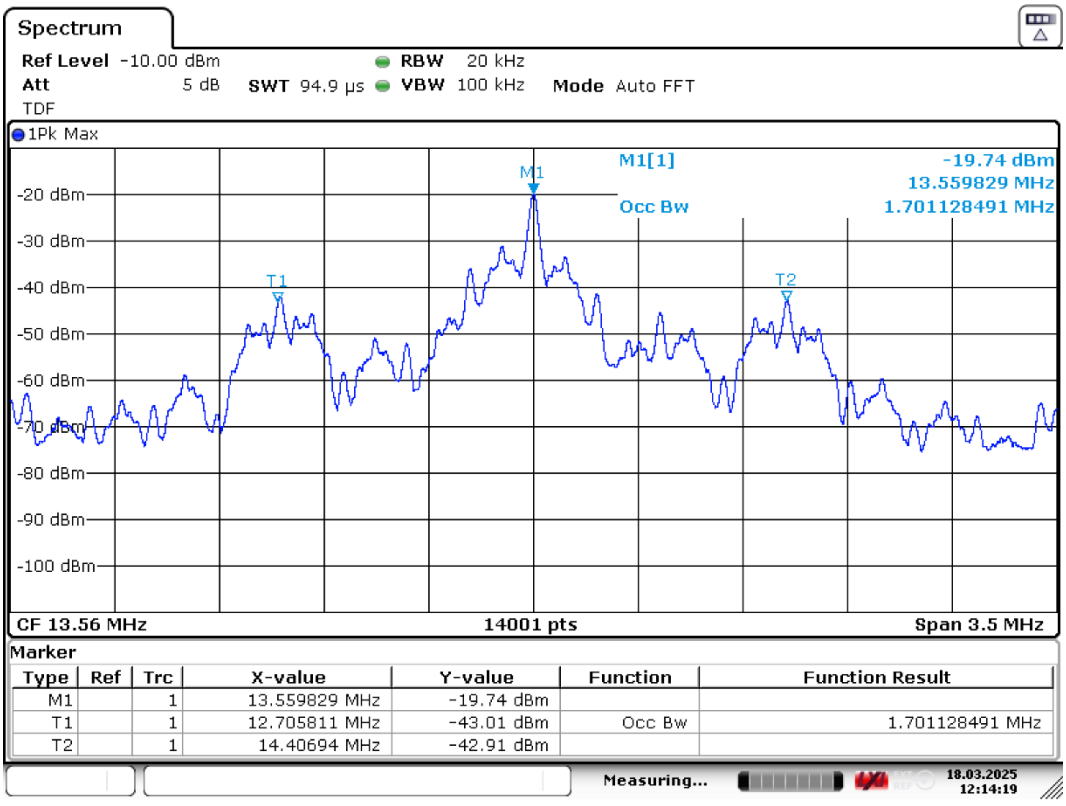

Figure 7: 99% OBW

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	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