LAB N° 1363 L

RF TEST REPORT

Test Report No:	**24-4791393918-1-1-3-RAD-A**
UL Project No:	4791393918
Date of issue:	2024-08-01
Total number of pages:	21
Applicant:	SECO S.p.A. Via Achille Grandi, 20 52100 Arezzo (AR) – Italy
Contact's person:	Giacomo Martini (Giacomo.Martini@seco.com)
Testing Laboratory:	UL International Italia S.r.l. Via delle Industrie, 6 (Sede A) 20061 Carugate (MI) – Italy
Testing location:	UL International Italia S.r.l. Via delle Industrie, 6 20061 Carugate (MI) – Italy
Test specification:	
Regulations:	FCC/ISED
Standards:	**FCC 47 CFR - Part 15 Subpart C** **RSS-247 Issue 3:2023 + RSS-Gen Issue 5:2021**
Non-standard test method:	N/A
Scope of testing:	Wireless - New testing
TRF No.:	TRF_Accredia_FCC/ISED-FT_rev 0
Test Report Form(s) Originator:	UL International Italia S.r.l.
Master TRF	2017-07
Compiled by: (name, function, signature)	Francesco Casati *Operations Leader*
Approved by: (name, function, signature)	Marco Casiraghi *Laboratory Engineer*

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In some cases, the software in the tested sample is in a version dedicated exclusively to the test, and therefore does not represent the software installed in the final version of the product.

Test Item Description:	HMI display
Trade Mark: (*)	itema (Logo: itema)
Manufacturer: (*)	SECO S.p.A. Via Achille Grandi, 20 52100 Arezzo (AR) – Italy
FCC ID: (*)	Contains FCC ID: 2ALZB-MU1MWMO146
ISED Canada Certification number: (*)	Contains 22688-MU1MWMO146
FCC ID Host product:	2ALZB-7150PN
IC number Host product:	22688-7150PN
Host Product Name (HMN)	SYS-D90-ITE
Ratings: (*)	24 Vdc ±10 %; 2.5 A max (EUT) 100-240 Vac; 50/60 Hz; 1.3-0.6 A (AC/DC medical adaptor)
Testing:	
Date of receipt of test item:	2024-07-03
UL Sample Tag No.:	7370232
Status of sample upon receipt:	☒ New and operational ☐ Reconditioned ☐ Damaged
Date(s) of performance of tests:	2024-07-04 to 2024-07-05
Name and address of factory(ies): (*)	SECO S.p.A. Via Achille Grandi, 20 52100 Arezzo (AR) - Italy

General remarks:

A cross ☒ in a rectangular shape means that this option is applied.

☒ Indicates that the listed condition, standard or equipment is applicable for this report.

☐ Indicates that the listed condition, standard or equipment is not applicable for this report.

Throughout this report a ☐ comma / ☒ point is used as decimal separator.

Where not otherwise specified or communicated in writing, statements of conformity (e.g. Pass/Fail) are established according to the following decision rule:

- considering that the applied test standards take measurement uncertainty into account, acceptance limit equals the tolerance limit (simple acceptance). This leads to a maximum 50% of false accept or false reject when the measured value equals the tolerance limit. See ILAC-G8:09/2019 for further details.

General product information: (*)

HMI touchscreen for configuring and interacting with a weaving loom, fully controlling the operating parameters and collecting data for statistical purposes.

Document history

Test Report No.	Reason for change	Date of issue
24-4791393918-1-1-0-RAD-A	Original release	2024-07-05
24-4791393918-1-1-1-RAD-A	Revision 1 Duty Cycle and Bandwidth measurements are tests not strictly necessary. According to FCC rules, these tests have been removed.	2024-07-23
24-4791393918-1-1-2-RAD-A	Revision 2 As required by TCB for C2PC, the following fields have been removed: • Model Name or Number / HVIN • PMN	2024-07-31
24-4791393918-1-1-3-RAD-A	Revision 3 As required by TCB for C2PC, the following field has been added: • Host Product Name (HMN)	2024-08-01

NOTE: New test report issue cancels and replaces the previous one.

LAB N° 1363 L

Laboratory Accreditation

FCC Accredited Test Firm

Accreditation	MRA	Designation Number	Expiration Date
Ministero delle Sviluppo Economico- Direzione Generale Pianificazione e Gestione dello Spettro Radioelettrico Scope: • Unintentional Radiators - FCC Part 15 Subpart B • Industrial, Scientific, and Medical Equipment - FCC Part 18 • Intentional Radiators - FCC Part 15 Subpart C	US-EU	IT0010	2025-06-25

ISED Wireless Device Testing Laboratory

Company Number	CAB Identifier	Scope/Recognition Date	Expiration Date
UL INTERNATIONAL ITALIA S.R.L.	IT0008	RSS-GEN (2023-10-06) RSS-247 (2023-10-06)	RECOGNIZED UNTIL: 2025-06-16 ACCREDIA ISO/IEC 17025:2017 Expires: 2025-06-16

Table of Contents

1 Test Item Description

<table>
<tr><td>Serial number: (*)</td><td colspan="5">230130462</td></tr>
<tr><td>Date of production: (*)</td><td colspan="5">No information available</td></tr>
<tr><td rowspan="6">Ports: (*)</td><td colspan="2" rowspan="2">Port name and description</td><td colspan="3">Cable</td></tr>
<tr><td>Maximum length(m)</td><td>Attached during test</td><td>Shielded</td></tr>
<tr><td colspan="2">DC Mains</td><td>> 3</td><td>☒</td><td>☐</td></tr>
<tr><td colspan="2">Wired network port (Ethernet)</td><td>> 3</td><td>☒</td><td>☐</td></tr>
<tr><td colspan="2">USB</td><td>< 3</td><td>☒</td><td>☐</td></tr>
<tr><td colspan="2">RS 232</td><td>< 3</td><td>☒</td><td>☐</td></tr>
<tr><td colspan="2">AC Mains (*)</td><td>---</td><td>☒</td><td>☐</td></tr>
<tr><td>Supplementary information to the ports:</td><td colspan="5">(*) Input of external power supply</td></tr>
<tr><td rowspan="4">Rated power supply: (*)</td><td rowspan="2"></td><td rowspan="2">Voltage and frequency</td><td colspan="4">Reference poles</td></tr>
<tr><td>N</td><td>L1</td><td>L2</td><td>L3</td></tr>
<tr><td>☒</td><td>AC: 100-240 V; 50/60 Hz</td><td>☒</td><td>☒</td><td>☐</td><td>☐</td></tr>
<tr><td>☒</td><td colspan="4">DC: 24 V</td></tr>
<tr><td>Working frequencies: (*)</td><td colspan="5">Clock frequency: 20 MHz, 24 MHz, 25 MHz
Other: 1.8 MHz
WLAN/Bluetooth: 2.4 GHz band
NFC: 13.56 MHz</td></tr>
<tr><td>Firmware/Software version (original): (*)</td><td colspan="5">No information available</td></tr>
<tr><td>Firmware/Software version (used for testing): (*)</td><td colspan="5">No information available</td></tr>
<tr><td>Hardware version: (*)</td><td colspan="5">main board: CD90-1532-0886-C0</td></tr>
<tr><td>Dimensions in cm (W x H x D): (*)</td><td colspan="5">25 x 6.7 x 40</td></tr>
</table>

Number	Operating modes
1	Measure of maximum Peak Output Power Continuous video uploading on a PC by a wireless router. IEEE 802.11g, channel=6 (2437 MHz) (^)
2	Measure of maximum (Average) Output Power Continuous video uploading on a PC by a wireless router. IEEE 802.11b, channel=1 (2412 MHz) (^^)

Supplemental information to the operating mode:

(^) Worst case for **Peak Output Power** identified in the test report No. 2208RSU054-U2, issued on 2022-10-11 by MRT Technology (Suzhou) Co., Ltd.

Test Result of Peak Output Power

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Peak Power (dBm)	Limit (dBm)
11b	11Mbps	01	2412	17.82	≤ 30.00
11b	11Mbps	06	2437	17.66	≤ 30.00
11b	11Mbps	11	2462	17.73	≤ 30.00
11g	6Mbps	01	2412	21.31	≤ 30.00
11g	6Mbps	06	2437	22.96	≤ 30.00
11g	6Mbps	11	2462	21.73	≤ 30.00
11n-HT20	MCS0	01	2412	20.64	≤ 30.00
11n-HT20	MCS0	06	2437	22.49	≤ 30.00
11n-HT20	MCS0	11	2462	20.43	≤ 30.00

(^^) Worst case for **Average Output Power** identified in the test report No. 2208RSU054-U2, issued on 2022-10-11 by MRT Technology (Suzhou) Co., Ltd.

Test Result of Average Output Power (Reporting Only)

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Average Power (dBm)	Limit (dBm)
11b	11Mbps	01	2412	14.78	≤ 30.00
11b	11Mbps	06	2437	14.66	≤ 30.00
11b	11Mbps	11	2462	14.75	≤ 30.00
11g	6Mbps	01	2412	10.73	≤ 30.00
11g	6Mbps	06	2437	13.90	≤ 30.00
11g	6Mbps	11	2462	10.52	≤ 30.00
11n-HT20	MCS0	01	2412	10.22	≤ 30.00
11n-HT20	MCS0	06	2437	13.55	≤ 30.00
11n-HT20	MCS0	11	2462	10.23	≤ 30.00

The test report No. 2208RSU054-U2 is related to the Original Application of the radio module.

Auxiliary equipment (AuxEq):
Peripheral equipment that is part of the system under test

Description	Manufacturer	Type
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Associated equipment (AE):
Equipment that is not part of the system under test but needed to exercise and/or monitor the EUT

Description	Manufacturer	Type
Wireless router	Tp-link	Archer A6
Notebook	Lenovo	82KB
USB to Serial adapter	DIGITUS	DA-70155-1
Serial auxiliary board	SECO	CS863REVA

Documents as provided by the applicant: (*)

Description	File name	Issue date
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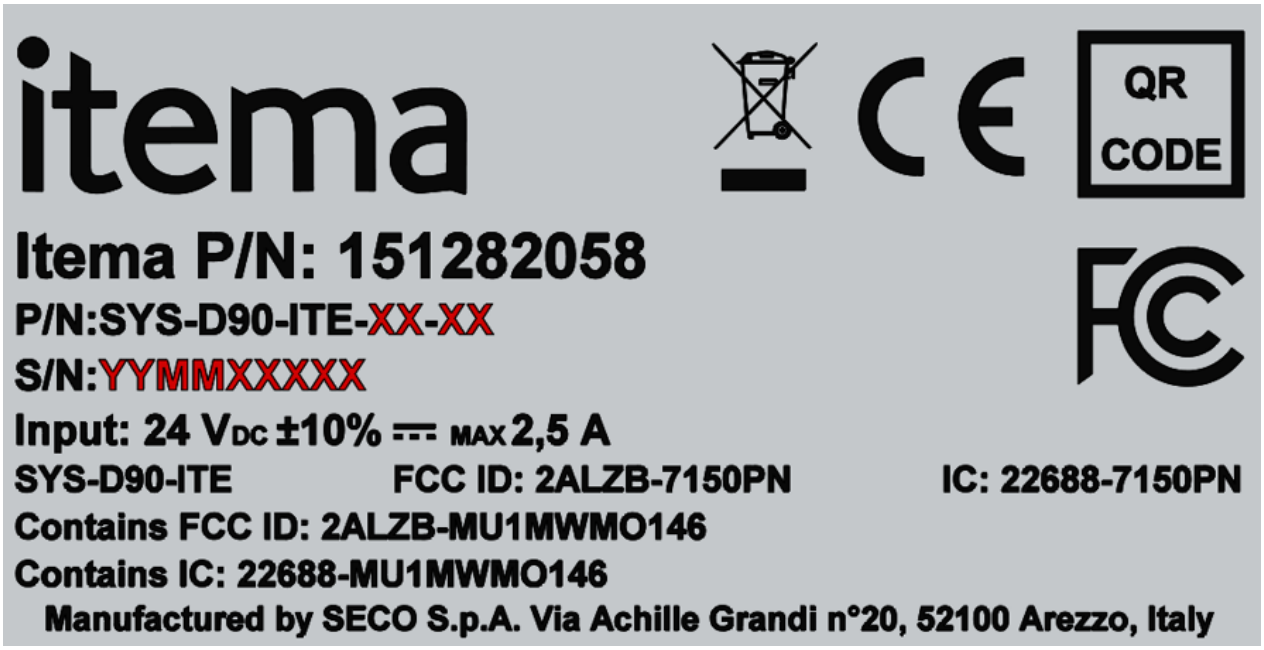
Modifications to the test item during testing: None

Copy of marking plate: (*)



1.1 Additional Information of Communication Module (*)

SoC	NXP Semiconductors, PN7150
Wi-Fi Specification	802.11a/b/g/n
Bluetooth Specification	BR & EDR
Working Voltage	DC 3.3V
WorkingTemperature	-30 ~ 85 °C

1.2 Description of Available Antennas (*)

Antenna 1	
Manufacturer:	Molex
Model/Type reference:	Series 146187
Mounting:	Integral
Type:	Dipole antenna
Gain (dBi)	2.8 dBi max @ 2.4 GHz 4.0 dBi max @ 5GHz
Other information can be taken from the test reports of module certification and/or from manufacturer's data sheet.	

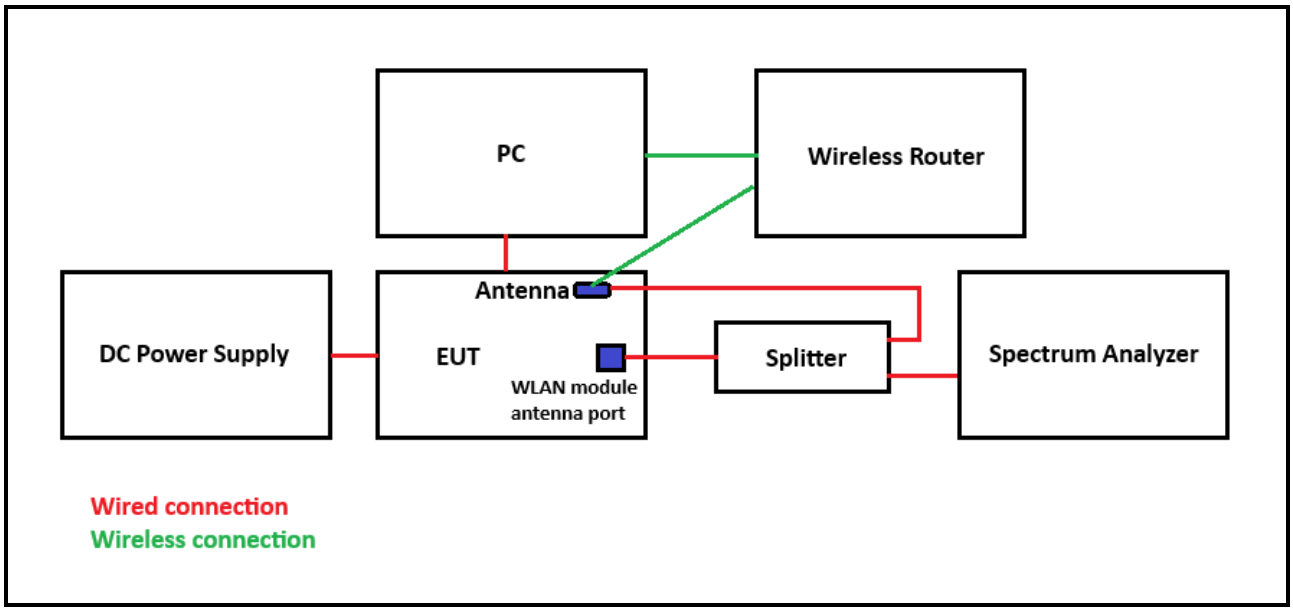
2 Verdict summary section

Standard clause		Description	Accreditation	Verdict
FCC	ISED			
15.203	---	Antenna requirements	Accredia	N/P
15.207	RSS-Gen 8.8	AC power-line conducted emissions	Accredia	N/P
15.209	RSS-Gen 6.13 RSS-247 5.5	Transmitter unwanted emissions	Accredia	N/P
15.35(c)	RSS-Gen 8.2	Transmitter duty cycle	Accredia	N/P
15.247(a)(1)	RSS-Gen 6.7 RSS-247 5.1(a)	20 dB emission bandwidth	Accredia	N/P
15.247(a)(1)	RSS-247 5.1(b)	Channel separation test	Accredia	N/P
15.247(a)(1)	RSS-247 5.1(d)	Time of occupancy (dwell time)	Accredia	N/P
15.247(a)(1)	RSS-247 5.1(d)	Quantity of hopping channels	Accredia	N/P
15.247(a)(2)	RSS-Gen 6.7 RSS-247 5.2(a)	6 dB emission bandwidth	Accredia	N/P
---	RSS-Gen 6.7	99% emission bandwidth	Accredia	N/P
15.247(b)	RSS-Gen 6.12 RSS-247 5.4(d)	Maximum peak conducted output power	Accredia	P
15.247(b)	RSS-Gen 6.12 RSS-247 5.4(d)	Transmitter maximum (average) output power	Accredia	P
15.247(c)	RSS-247 5.4(f)	Operation with directional antenna gains greater than 6 dBi	Accredia	N/P
15.209 15.247(d)	RSS-Gen 6.13 RSS-Gen 8.9 RSS-Gen 8.10 RSS-247 5.5	100 kHz bandwidth of frequency band edge	Accredia	N/P
15.247(e)	RSS-247 5.2(b)	Power spectral density	Accredia	N/P

Possible test case verdicts:
Test case not performed: N/P
Test case does not apply to test object: N/A
Test object does meet requirement: Pass (P)
Test object does not meet requirement: Fail (F)

3 Test Setup Diagrams

Test Setup for Transmitter Conducted Tests



4 Type Tests

4.1 Antenna Port Test Results

4.1.1 Maximum peak conducted output power

Tested by:	Francesco Casati
Test date:	2024-07-04 to 2024-07-05
Test location (stand):	EMC Laboratory
Ambient temperature:	23 °C to 24 °C
Relative humidity:	59 % to 61 %
Atmospheric pressure:	993 to 1000 mbar
FCC Reference:	Part 15.247(b)(3)
ISED Canada Reference:	RSS-Gen 6.12 / RSS-247 5.4(d)
Test Method Used	FCC KDB 558074 Section 8.3.1.2 referencing ANSI C63.10 Section 11.9.1.2 and Notes below
Used mains voltage/frequency:	24 Vdc
Supplementary information:	• Instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges was used. • The conducted power was added to the declared antenna gain to obtain the EIRP. • A correction of 4.8 dB was added to the value displayed on spectrum analyzer to compensate losses of RF cables and splitter.

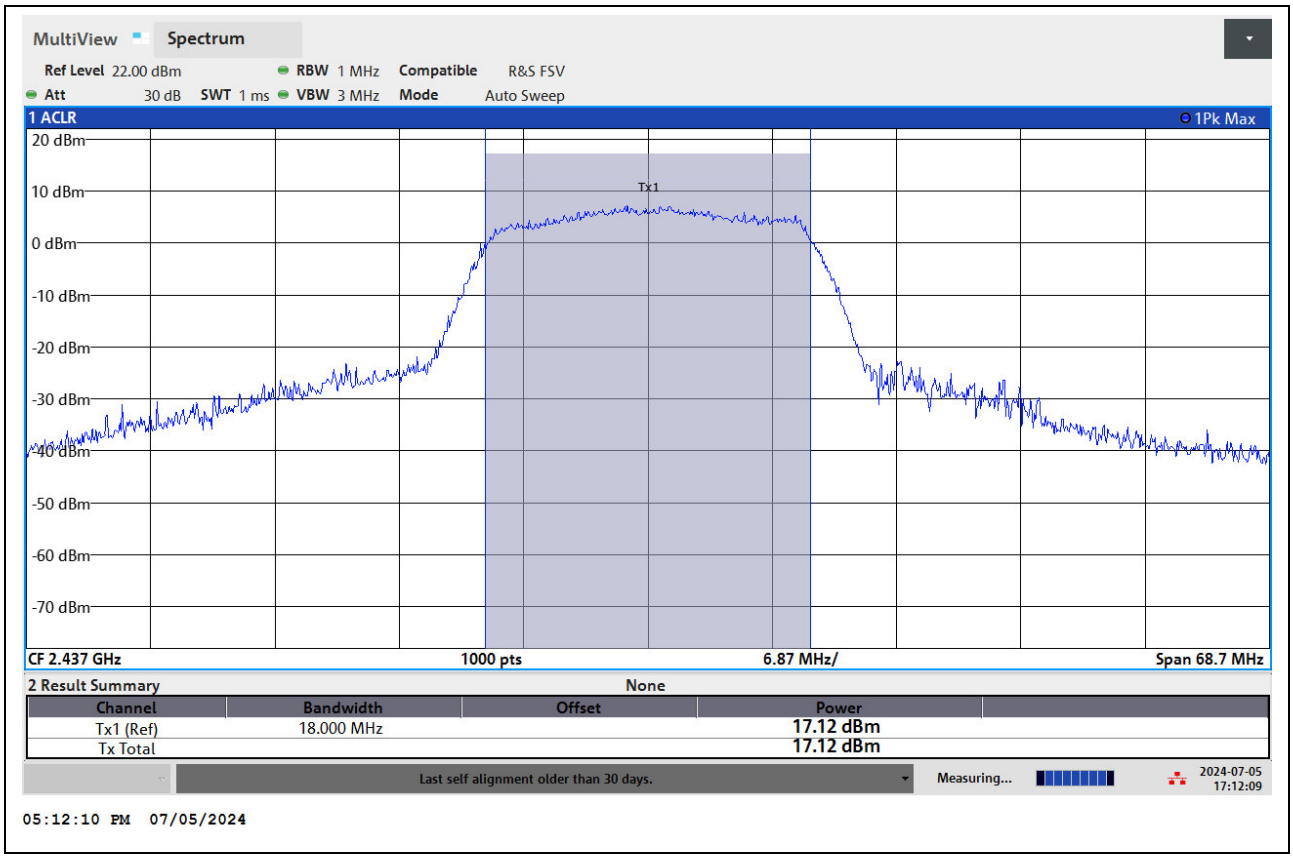
Test Results

Operating mode	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
1	21.92	30.0	8.08	Pass
2	22.05	30.0	7.95	Pass

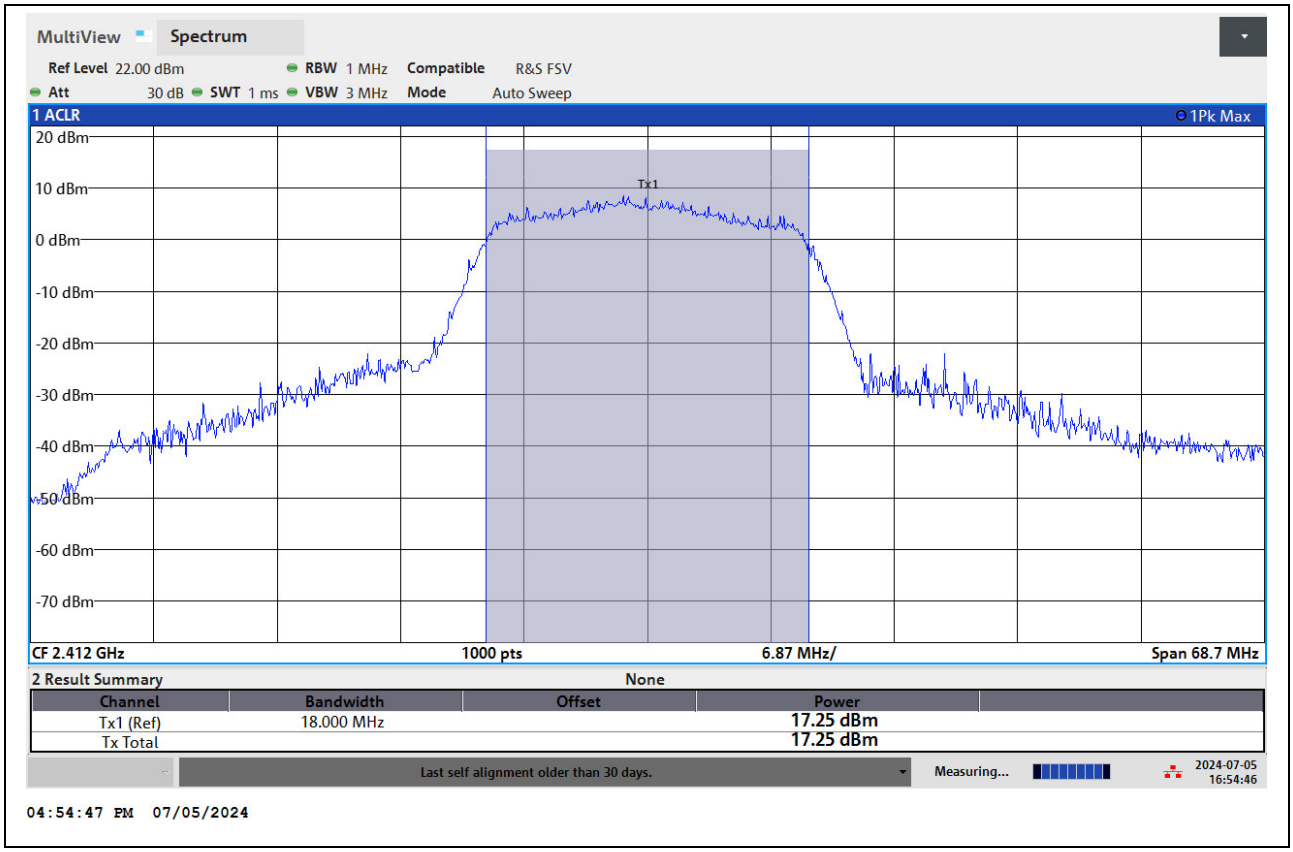
Operating mode	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
1	21.92	2.8	24.72	36.0	11.28	Pass
2	22.05	2.8	24.85	36.0	11.15	Pass

Plots

Operating mode: 1



Operating mode: 2



4.1.2 Transmitter maximum (average) output power

Tested by:	Francesco Casati
Test date:	2024-07-04 to 2024-07-05
Test location (stand):	EMC Laboratory
Ambient temperature:	23 °C to 24 °C
Relative humidity:	59 % to 61 %
Atmospheric pressure:	993 to 1000 mbar
FCC Reference:	Part 15.247(b)(3)
ISED Canada Reference:	RSS-Gen 6.12 / RSS-247 5.4(d)
Test Method Used	FCC KDB 558074 Section 8.3.2.2 referencing ANSI C63.10 Section 11.9.2.2.6 and Notes below
Used mains voltage/frequency:	24 Vdc
Supplementary information:	• Instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges was used. • The conducted power was added to the declared antenna gain to obtain the EIRP. • A correction of 4.8 dB was added to the value displayed on spectrum analyzer to compensate losses of RF cables and splitter.

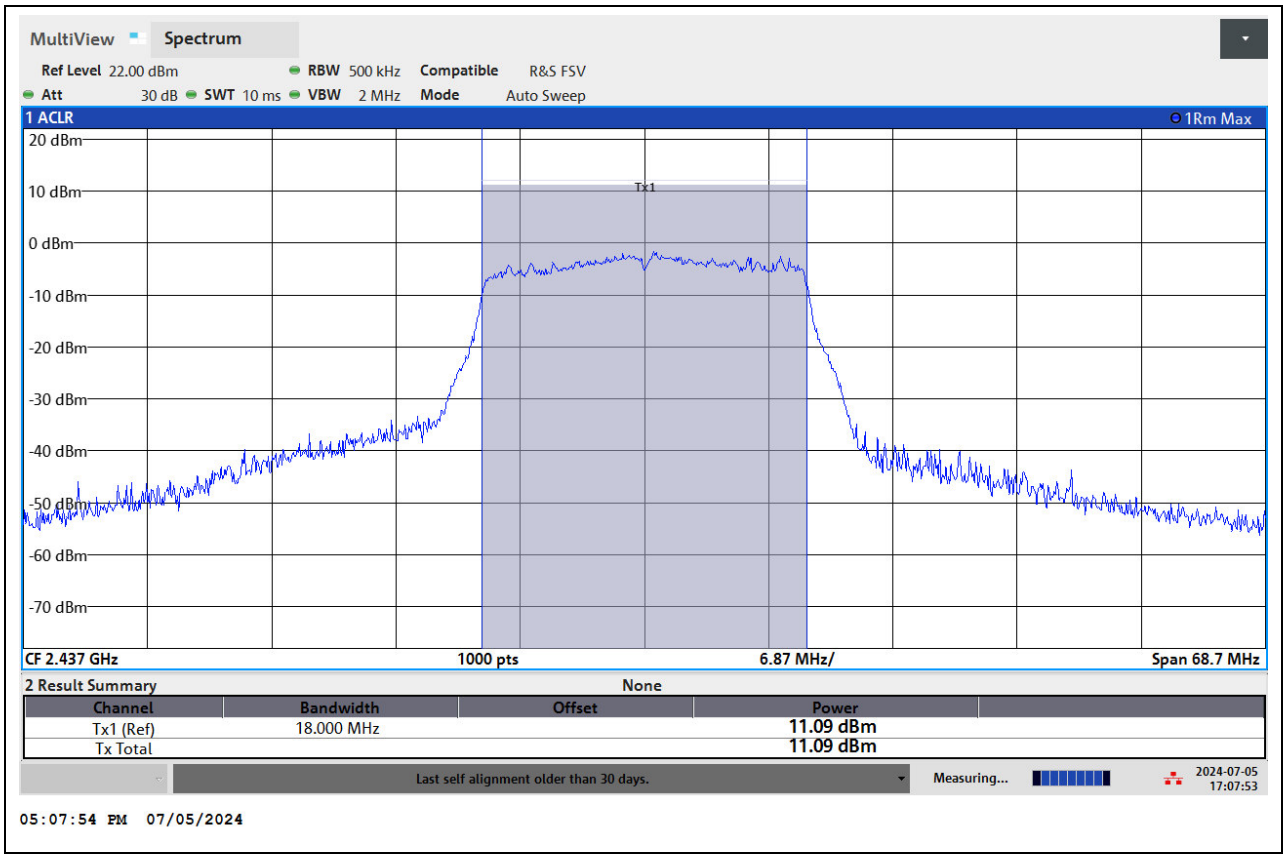
Test Results

Operating mode	Conducted Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
1	15.89	30.0	14.11	Pass
2	16.83	30.0	13.17	Pass

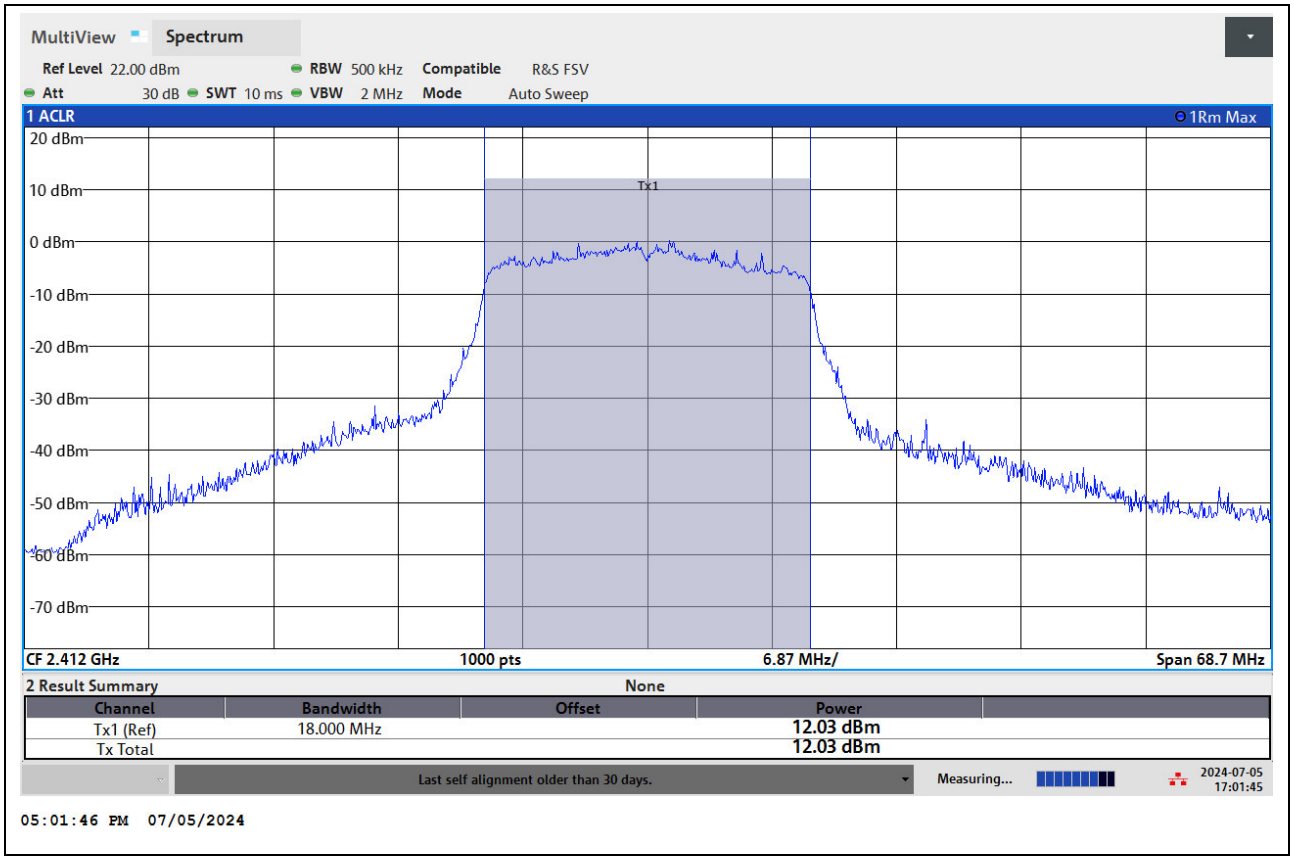
Operating mode	Conducted Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
1	15.89	2.8	18.69	36.0	17.31	Pass
2	16.83	2.8	19.63	36.0	16.37	Pass

Plots

Operating mode: 1



Operating mode: 2



5 List of test equipment

Equipment	Type	Inventory number	Manufacturer	Serial Number	Last calibration date	Calibration due date
Test Stand: Conducted radio tests						
Cable SK252 40GHz	SF102/11SK/11SK/900 mm	213659	Huber+Suhner	40420/2	2024-01-25	2025-01-28
2 ways power divider, 2-18GHz, SMAf	AAMCS-PWD-2W-2G-18G-10W-Sf	213710	AAMCS	000088	2024-05-10	2025-05-28
Signal and Spectrum Analyzer 44 GHz	FSV3044	213658	Rohde & Schwarz	101224	2024-04-26	2025-04-28
RF Cable Assemblies 150MM IPEX TO SMA FEMALE BULKHEAD 1.13 MM CABLE	ASMG015X113S17	234871	Siretta	None	2024-03-05	2025-03-28
Auxiliaries						
TRUE-RMS DIGITAL MULTIMETER	289	169495	Fluke Corporation	40780217	2023-04-05	2025-04-28
CLIMATIC CENTRAL UNIT (SACs side)	iBTHX-W	70611	Omega Engineering Inc.	1040495	2024-04-05	2025-04-28
Bench top power supply	IPS 2303	236438	RS COMPONENTS LTD	248D167G2	-	-

6 Measurement instrumentation uncertainties

The Uncertainty of Measurement (UoM) for each unit measured in this Test Report was estimated in accordance with the UL International Italia document No. 23-CL-G0025 and is retained on file. Details of the estimation of UoM may be made available upon request, in particular for quantities not listed.

Measurement	Range	Ulab	Unit
Frequency	9 kHz to 40 GHz	0.5	kHz
Time	0.7 µs to 16000 s	3.00	%
Conducted power, by spectrum analyzer	9 kHz to 40 GHz	0.45	dB
Conducted power, by fast power meter	9 kHz to 8 GHz	0.41	dB
Temperature (ambient)	15 to 35 °C	0.72	°C
Temperature (climatic chamber)	-40 to 100 °C	1.63	°C
Humidity (ambient)	30 to 70 %	5.76	%RH
Humidity (climatic chamber)	30 to 95 %	3.95	%RH
Supply voltage (AC)	0 to 500 V	3.00	%
Supply voltage (DC)	0 to 15 V	0.28	%
Conducted disturbance at mains and other port power using V-AMN	9 kHz to 150 kHz	3.71	dB
Conducted disturbance at mains and other port power using V-AMN	150 kHz to 30 MHz	3.32	dB
Radiated disturbance (magnetic field using a loop antenna)	9 kHz to 30 MHz	3.16	dB
Radiated disturbance (electric field strength in SAC 3, hybrid antenna, Hor)	30 MHz to 1000 MHz	4.22	dB
Radiated disturbance (electric field strength in SAC 3, hybrid antenna, Ver)	30 MHz to 1000 MHz	5.64	dB
Radiated disturbance (electric field strength in SAC 5, hybrid antenna, Hor)	30 MHz to 1000 MHz	3.98	dB
Radiated disturbance (electric field strength in SAC 5, hybrid antenna, Ver)	30 MHz to 1000 MHz	5.66	dB
Radiated disturbance (electric field strength in FSOATS 3) **(1)**	1 GHz to 6 GHz	5.43	dB
Radiated disturbance (electric field strength in FSOATS 3) **(2)**	1 GHz to 6 GHz	4.29	dB
Radiated disturbance (electric field strength in FSOATS 3) **(1)**	6 GHz to 18 GHz	5.18	dB
Radiated disturbance (electric field strength in FSOATS 3) **(2)**	6 GHz to 18 GHz	4.22	dB
Radiated disturbance (electric field strength in FSOATS 5) **(1)**	1 GHz to 6 GHz	5.12	dB
Radiated disturbance (electric field strength in FSOATS 5) **(2)**	1 GHz to 6 GHz	4.13	dB
Radiated disturbance (electric field strength in FSOATS 5) **(1)**	6 GHz to 18 GHz	5.63	dB
Radiated disturbance (electric field strength in FSOATS 5) **(2)**	6 GHz to 18 GHz	4.54	dB
Radiated disturbance (electric field strength in FSOATS 3) **(1)**	18 GHz to 40 GHz	7.63	dB
Radiated disturbance (electric field strength in FSOATS 5) **(1)**	18 GHz to 40 GHz	7.63	dB
Radiated Spurious Emission (ERP/EIRP, Substitution Method)	25 MHz to 26 GHz	5.97	dB

Legend/Remarks:
n.d.: not defined
(1) Using external EMI preamplifier.
(2) Not using external EMI preamplifier.
Supplementary information:
- The measurement uncertainty values are calculated and correspond to an expansion factor (coverage factor) k = 2 (which provide confidence level of 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).
- Listed values are intendended with prefix "±".

<END OF TEST REPORT>