

TEST REPORT nr. KC0000555_FCC_0001 R00

Testing Location Kiwa Cermet Italia S.p.A.
Corso Spagna, 12
35127 Padova – Italy

Customer pro-micron GmbH

Issuing date 2026-02-10

Project nr. KC0000555

Test sample description Transmitter

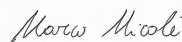
Model Spike2

Id sample 0xA4CC; 0xA4CD; 0xA4CE; 0xA4CF

Method / Reference standard See par. 4

Tested by
(Test Engineer)

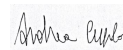
Marco Nicolè



Documento firmato da:
NICOLE' MARCO
01.04.2026 14:02:35
UTC

Verified and Approved by
(Lab manager)

Andrea Cupido



Cupido Andrea
07.04.2026 14:12:28 GMT+02:00

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History sheet of test Report

<i>Report Number</i>	<i>Rev.</i>	<i>Date</i>	<i>Description of modification</i>
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Total number of pages		Pag. 22
OBJECT		FCC Part15C and ISED RSS-247 Issue 4
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1 OBJECT OF THE TESTS

The objective of the tests is the evaluation of the conformity of the EUT to the requirements of the standards and test methods specified on par. 4 of present Test Report.

2 IDENTIFICATION

2.1 Laboratory

Name : Kiwa Cermet Italia S.p.A.
Street: Corso Spagna, 12
City : 35127 Padova - ITALY
Phone : +39 0514593111
www.Kiwa.com

FCC Designation number: IT0016

ISED CAB Identifier: IT0007

2.2 Customer

Manufacturer: pro-micron GmbH
Street: Gottlieb-Daimler Str. 6
City: 87600 Kaufbeuren - Germany
Phone: +49 8341 9560 50
Refer to: Mr Marco Lombardini

3 EQUIPMENT UNDER TEST (EUT)

3.1 EUT identification (declared under responsibility of the customer)

EUT Description: Transmitter
Model: spike2
Code: 42000808
Serial N°: 0xA4CC; 0xA4CD; 0xA4CE; 0xA4CF
Software release: WEPO41120A00_sha256.hex
Size: Ø63x136mm
Manufacturer: pro-micron GmbH
Supply voltage: 5V USB loaded / battery inside
Rated Electrical Power: 2.5 W
Rated Input Current: 0.5 A
FCC ID: 2BN2JSPK2

3.2 EUT classifications

The manufacture declared the following classification:

Object	Descriptions
Operating frequency range	2405 – 2480 MHz
Equipment type	IEEE 802.15.4 (ZigBee)
Modulation	O-QPSK
Nominal Channel Bandwidth	2 MHz
Frequency Hopping Spread Spectrum	NO
Listen Before Talk	NO
Adaptive	NO
Number of Channels	16
Antenna Type	Integrated antenna
Extreme Temperature Range	-10°C ÷ +60°C

3.3 EUT additional information

Object	Descriptions
Classification of installation and use	☐ Stand-alone ☒ Combined Equipment (Equipment where the radio part is fully integrated within another type of equipment) ☐ Plug-in radio device (Equipment intended for a variety of host systems) ☐ Other
Means for connection to the supply:	☐ Supply cord fitted with a plug ☐ Supply cord without plug (for permanently connection to fixed wiring) ☒ Battery ☐ Appliance provided with a set of terminals allowing the connection of cables or fixed wiring
Date of receipt of test item	2026-01-12
Date(s) of performance of tests	See the data specified in test results details

3.4 EUT cables

The EUT has been configured by the manufacturer with the following input / output cables:

Classification	Description	Cable		note
		Shielded	Specified max. length	
DC power port (used only for the recharge)	d.c. input cable	☐	☐ none ☒ ≤ 1m ☐ ≤ 3m ☐ ≤ 10m ☐ ≤ 30m	type of power source: ☐ Internal Power Supply ☐ External Power Supply or AC/DC adapter ☒ Battery ☐ Other

3.5 EUT Auxiliary Equipments (AEs)

To ensure the correct functioning of the EUT, it has been necessary to make use of the following auxiliary equipment (AE):

Auxiliary Equipment AE N°01

Description: Laptop
Model: L13 Yoga
Manufacturer: THINKPAD

Auxiliary Equipment AE N°02

Description: Receiver
Model: readFlex
Manufacturer: pro-micron GmbH

3.6 Sampling and adopted criteria

Equipment used for testing was selected by the customer. Sampling criteria adopted by the customer is unknown to Kiwa Cermet Italia S.p.A. laboratory that is not liable for that.

3.7 EUT documents

The following documentations have been provided by the customer

Descriptions
Annex E customer's declaration

4 STANDARDS AND TEST METHODS

4.1 Reference standards

DOCUMENT	DATE	OBJECT
ANSI C63.10	2020	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
ANSI C63.10 Cor.1	2023	

4.1.1 Test summary

The following table specifies the tests required by the reference standard and test performed on EUT.

TEST	FCC Rule	ISED Rule	Note	Results
Channel Separation	§15.247 (a)(1)	RSS-247 Issue 4	Not tested as required by the customer	---
Minimum Hopping Channel	§15.247 (a)(1)(iii)	RSS-247 Issue 4	Not tested as required by the customer	---
6 dB (DTS) & 20 dB Bandwidth & 99% of power	§15.247 (a)(2) §15.215 (c)	RSS-247 Issue 4 §6.3.1	---	Complies
Dwell Time	§15.247 (a)(1)(iii)	RSS-247 Issue 4	Not tested as required by the customer	---
Peak Output Power (Conduction)	§15.247 (b)(3)	RSS-247 Issue 4	Not tested as required by the customer	---
AC Power Line Conducted Emissions	§15.207	RSS-247 Issue 4	Not tested as required by the customer	---
Spurious Emissions (Radiation)	§15.209	RSS-247 Issue 4	Not tested as required by the customer	---
Band edge measurement	§15.247 (d)	RSS-247 Issue 4 §6.6	---	Complies
Power spectral density	§15.247 (e)	RSS-247 Issue 4 §6.3.1	---	Complies

Note: All the tests were performed following 558074 D01 15.247 Meas Guidance v05r02

4.2 Test methods

DOCUMENT	DATE	METHOD	ACCREDIA accreditation	Test Sequence (See Note 1)
C63.10	2020	Occupied Bandwidth	Yes	02
C63.10	2020	Band edge measurement	Yes	03
C63.10	2020	Power spectral density	Yes	01

Note :

1) The tests have been carried out in the order specified in this column

4.3 Deviation from test methods

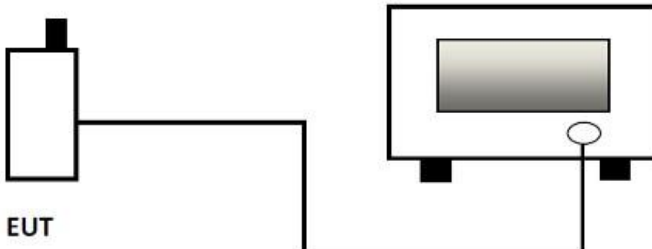
None.

5 EUT OPERATING CONDITIONS DURING TESTS

The EUT was set to function as indicated in Table 1, in compliance with the manufacturer's prescriptions and with that which is stated in the applied standards, test methods and procedures.

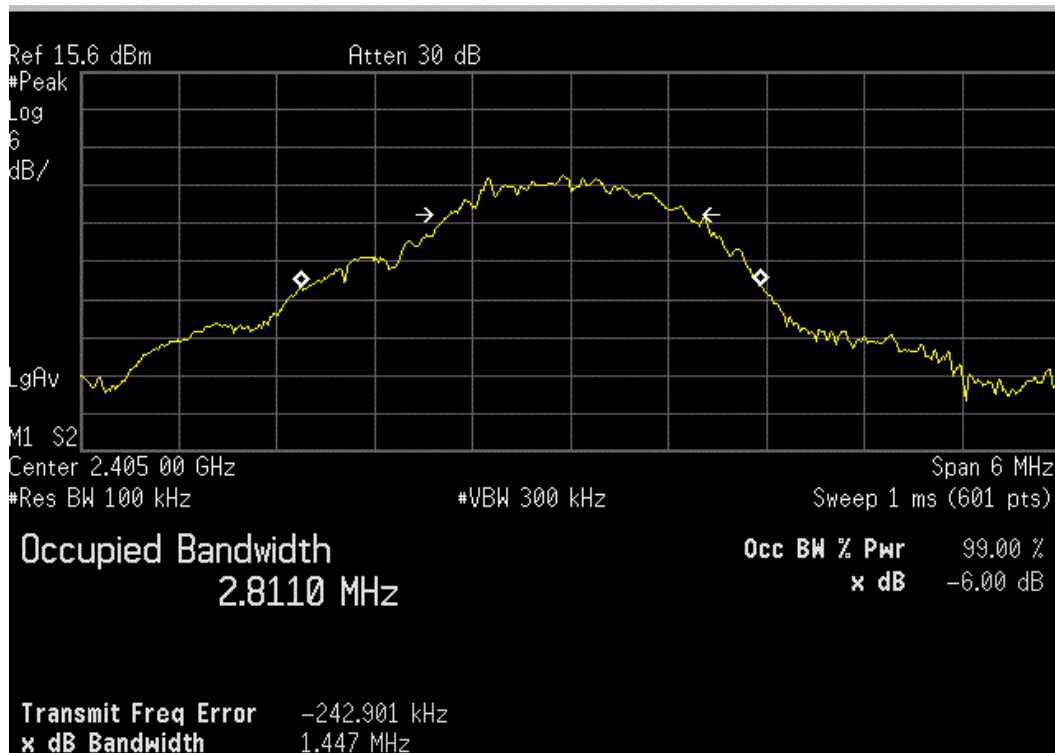
OPERATING CONDITION	DESCRIPTION OF FUNCTIONING
TX01	<u>EUT details: during the test the EUT</u> • was powered at 5 Vdc with internal battery • was in continuous working state/ Device operated in standard continuous transmit mode (Cont TX function) • Channel 0.was activated (2405 MHz) • Channel was set to maximum power • Was set COSTANT CARRIER <u>AE details: during the test the Auxiliary Equipment (AE), connected to EUT, was:</u> • AE N°01 & 02 used only to set the EUT
TX02	<u>EUT details: during the test the EUT</u> • was powered at 5 Vdc with internal battery • was in continuous working state/ Device operated in standard continuous transmit mode (Cont TX function) • Channel 0.was activated (2440 MHz) • Channel was set to maximum power • Was set COSTANT CARRIER <u>AE details: during the test the Auxiliary Equipment (AE), connected to EUT, was:</u> • AE N°01 & 02 used only to set the EUT
TX03	<u>EUT details: during the test the EUT</u> • was powered at 5 Vdc with internal battery • was in continuous working state/ Device operated in standard continuous transmit mode (Cont TX function) • Channel 0.was activated (2480 MHz) • Channel was set to maximum power • Was set COSTANT CARRIER <u>AE details: during the test the Auxiliary Equipment (AE), connected to EUT, was:</u> • AE N°01 & 02 used only to set the EUT

6 TEST RESULTS

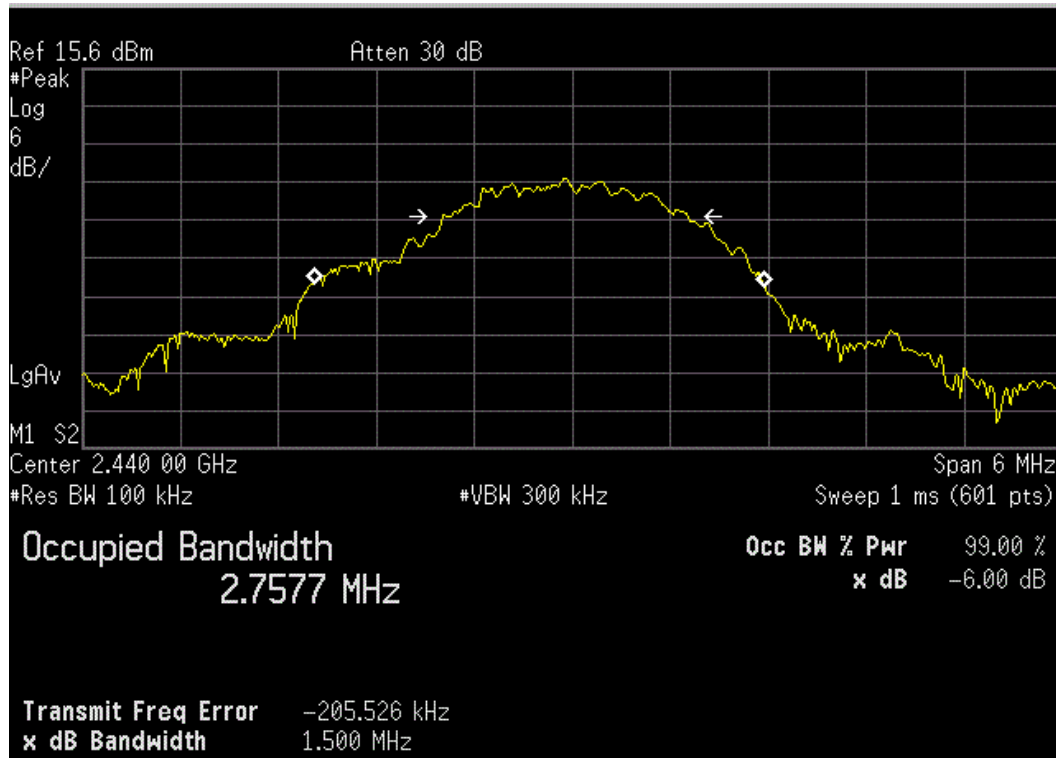
Test method:	FCC part 15 C - §15.247 (a)(2) & §15.215 (c) ISED RSS-247 Issue 4 §6.3.1 Occupied Bandwidth For details see par. 4 of this report	
Operator	Marco Nicolè	
Test Date	2026-02-09	
Test Temperature	22 °C	
Test Humidity	35 %	
Test Pressure	1009 hPa	
Electrical wiring	Cable ---	Length [m] ---
Operating conditions	TX01; TX02; TX03 See par. 5 of this report	
Auxiliary equipment (AE)	See par. 3.5 of this report	
Limits	The minimum 6 dB and 20 dB bandwidth (for FCC part 15 C - §15.247 (a)(2) & §15.215 (c)) and 99% of band (for ISED RSS-247 Issue 4) shall be at least 500 kHz.	
Test set up		
Test instrumentations	See Annex B	
Measurement Uncertainty (k=2)	See Annex F	

Operating condition	6 dB bandwidth	99% of band	LIMIT	RESULT
TX01	1.447 MHz	2.811 MHz	At least 500 kHz	COMPLIES
TX02	1.500 MHz	2.757 MHz	At least 500 kHz	COMPLIES
TX03	1.450 MHz	2.754 MHz	At least 500 kHz	COMPLIES
Test Procedure Use the following spectrum analyser settings: Span = approximately 2 to 3 times the 6 dB or 20 dB bandwidth, centred on a channel RBW = 100 kHz VBW = 300 kHz Sweep = auto Detector function = peak Trace = max hold The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6 dB or 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 6 dB or 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.				
EUT modification during this test	None			

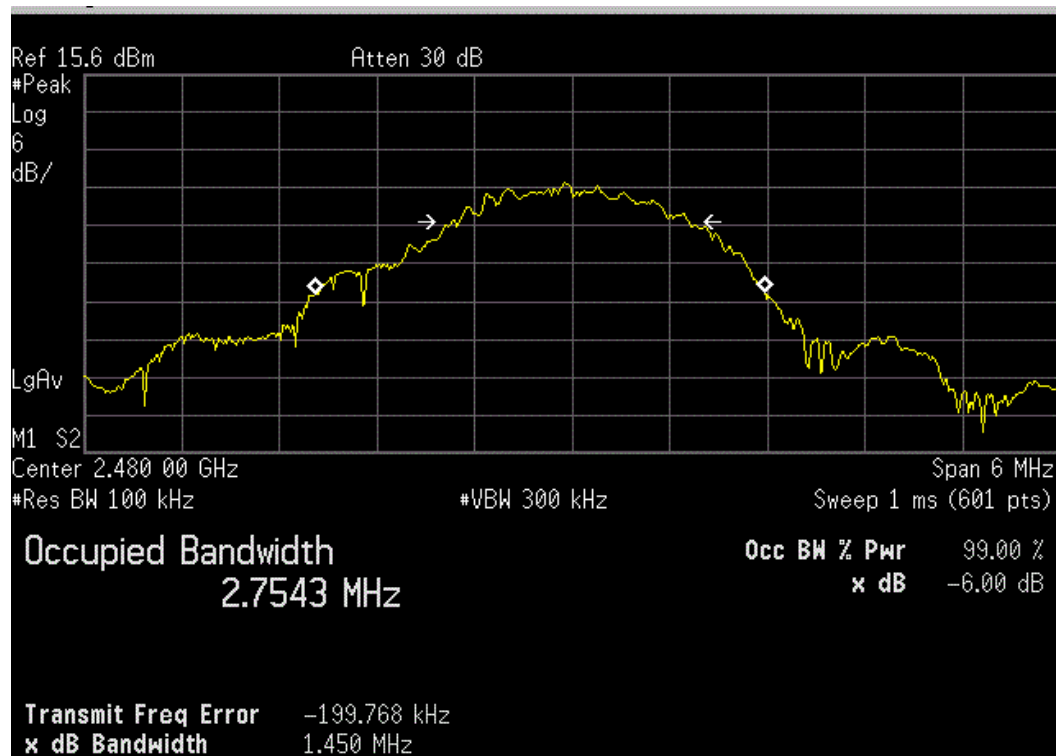
Test result TX01

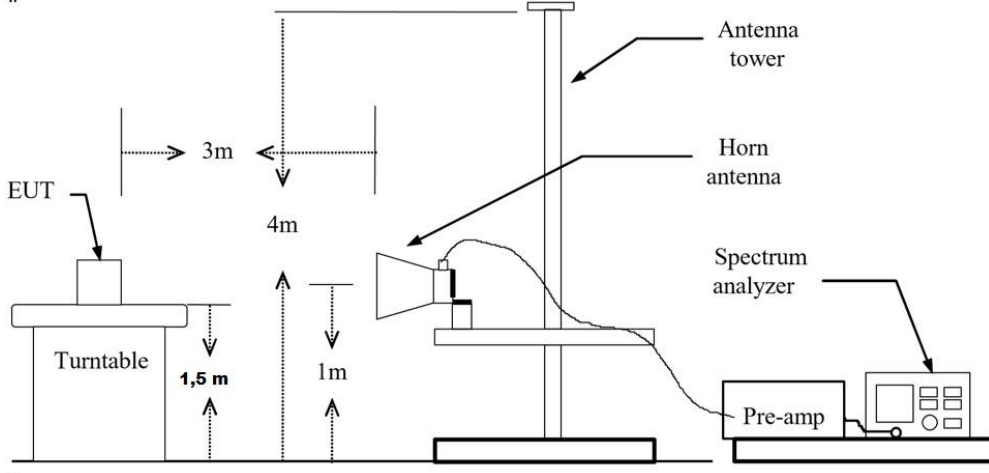


Test result TX02

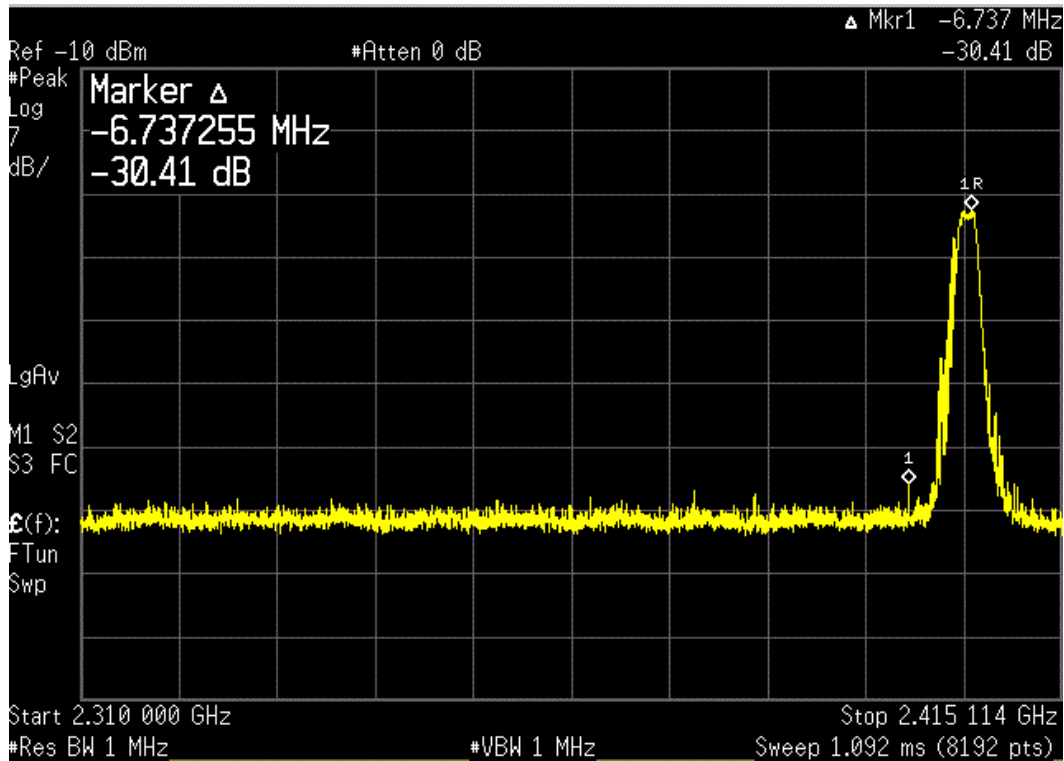


Test result TX03

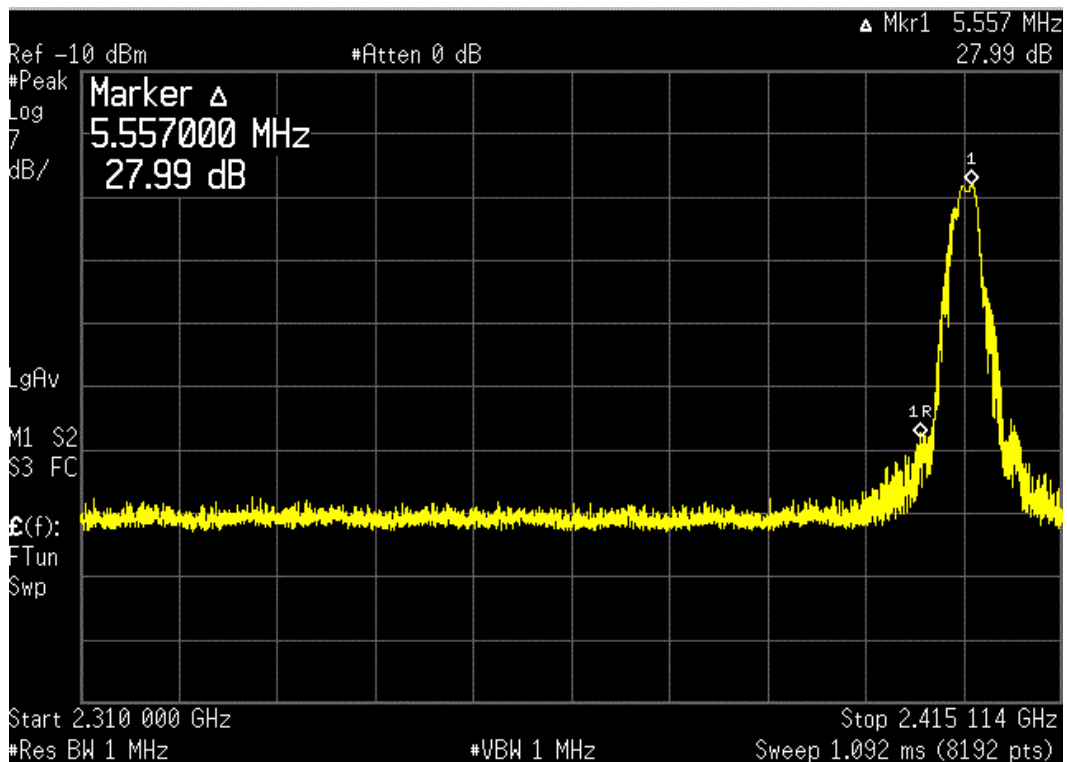


Test method:	FCC part 15 C - §15.247 (d) ISED RSS-247 Issue 4 §6.6 Band Edge measurement For details see par. 4 of this report	
Operator	Marco Nicolè	
Test Date	2026-02-10	
Test Temperature	22 °C	
Test Humidity	36 %	
Test Pressure	1008 hPa	
Electrical wiring	Cable ---	Length [m] ---
Operating conditions	TX01; TX03 See par. 5 of this report	
Auxiliary equipment (AE)	See par. 3.5 of this report	
Limits	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a).	
Test set up		
Measuring distance in the anechoic chamber	3 m	
Test instrumentations	See Annex B	
Measurement Uncertainty (k=2)	See Annex F	
Result	COMPLIES	
Test Procedure	The EUT is placed on a turntable, which is 1.5 m above the ground plane. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission. Set the spectrum analyser in the following setting in order to capture the lower and upper band-edges of the emission: RBW=VBW=1MHz / Sweep=AUTO Repeat the procedures in the other POLARIZATION.	
Note	---	
EUT modification during this test	None	

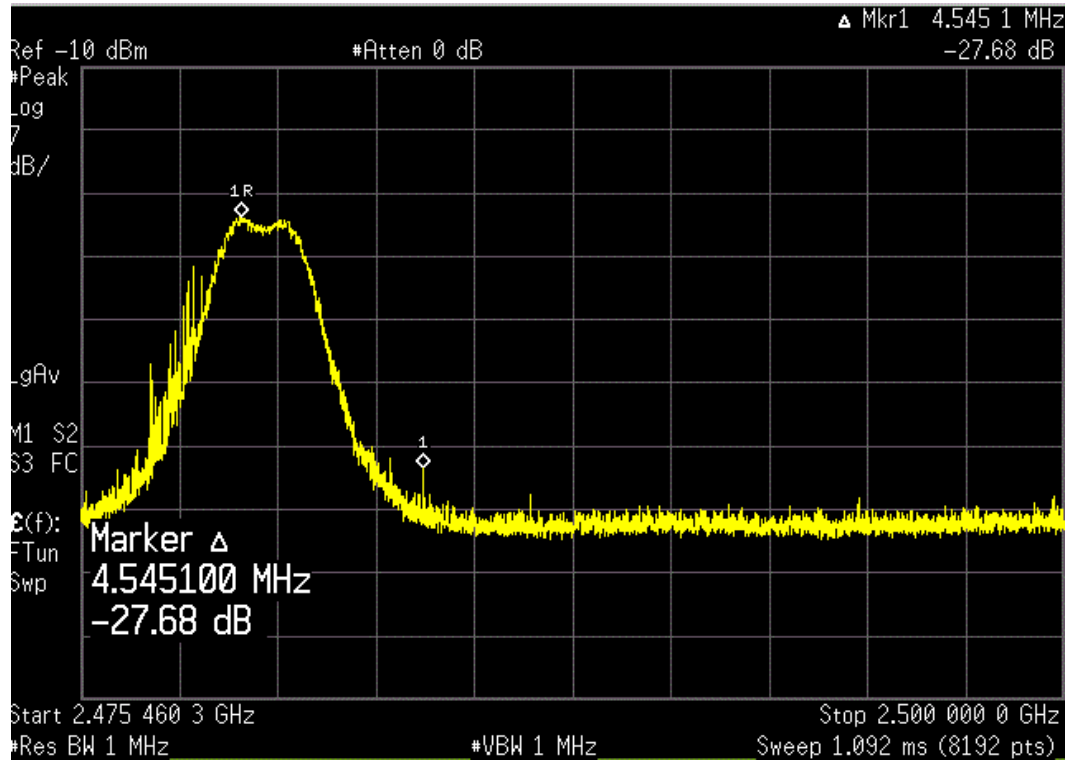
Test result TX01 – BAND EDGE LEFT SIDE
Vertical polarization



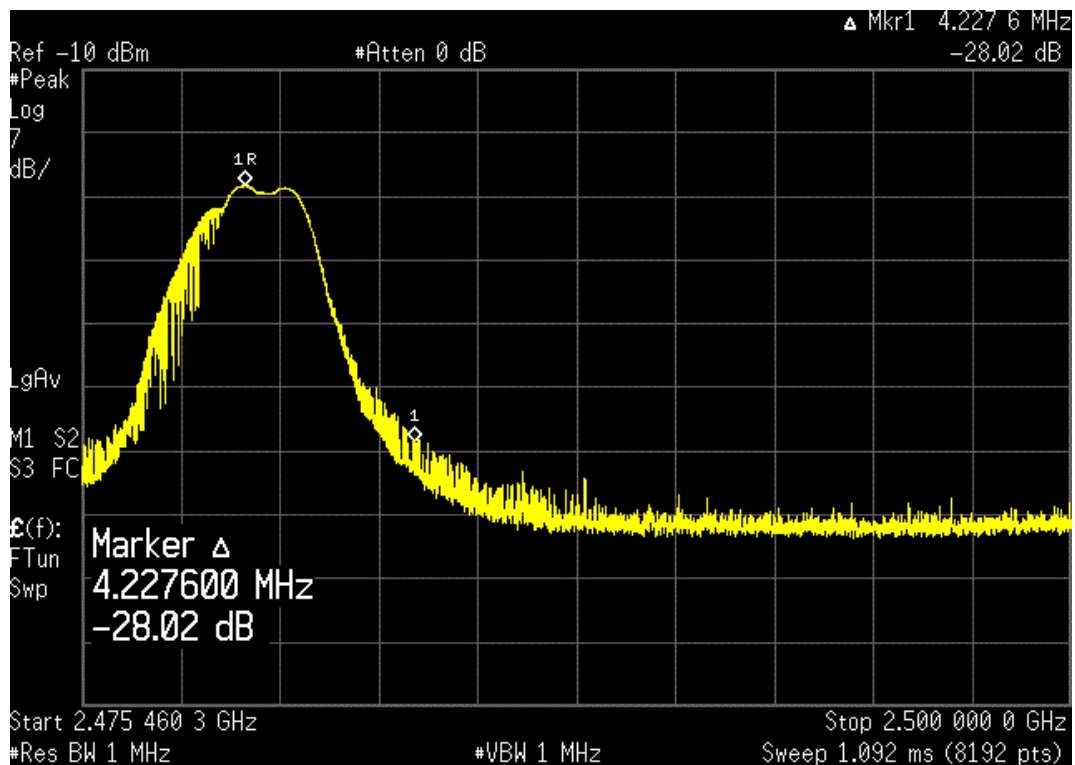
Test result TX01 – BAND EDGE LEFT SIDE
Horizontal polarization

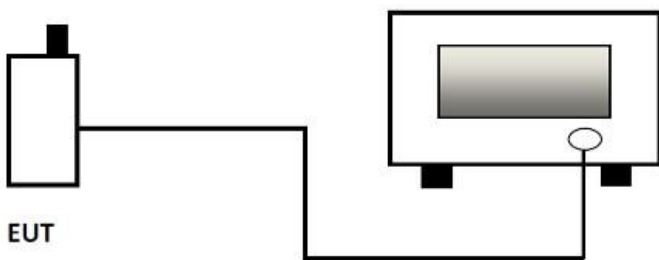


Test result TX03 – BAND EDGE RIGHT SIDE
Vertical polarization



Test result TX03 – BAND EDGE RIGHT SIDE
Horizontal polarization

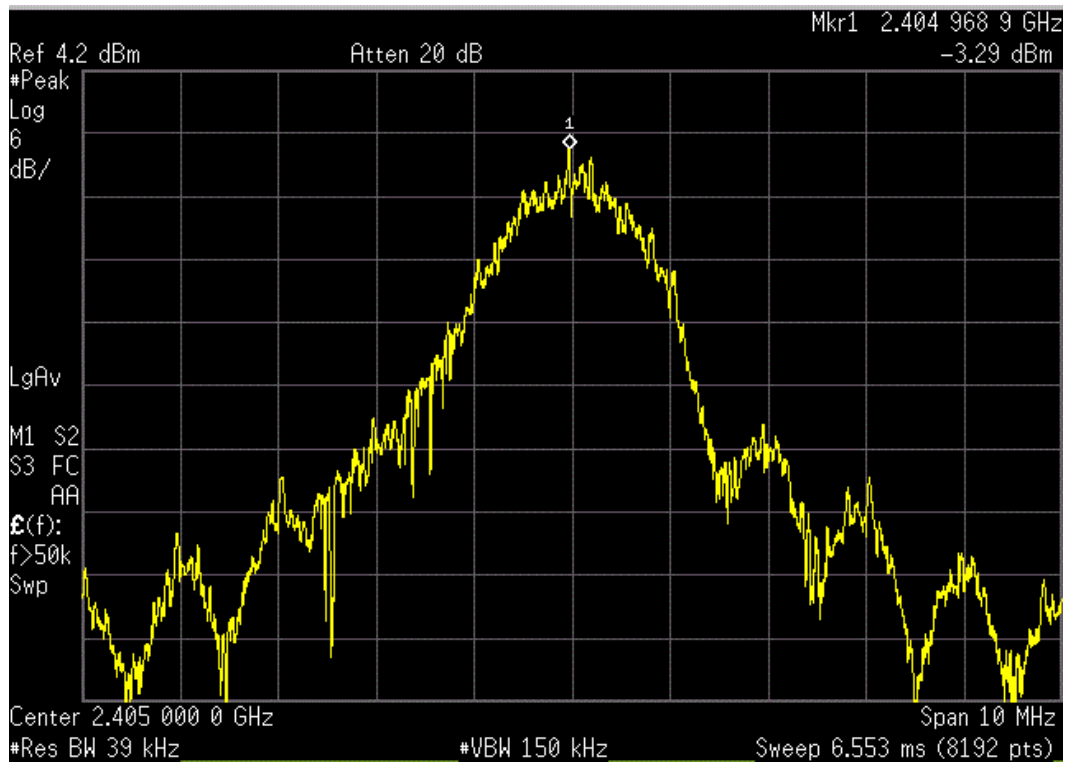


Test method:		FCC part 15 C - §15.247 (e) ISED RSS-247 Issue 4 §6.3.1 Power spectral density For details see par. 4 of this report			
Operator		Marco Nicolè			
Test Date		2026-02-09			
Test Temperature		22 °C			
Test Humidity		35 %			
Test Pressure		1007 hPa			
Electrical wiring		Cable		Length [m]	
		---		---	
Operating conditions		TX01; TX02; TX03 See par. 5 of this report			
Auxiliary equipment (AE)		See par. 3.5 of this report			
Limits		For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission			
Test set up					
Test instrumentations		See Annex B			
Measurement Uncertainty (k=2)		See Annex F			
Test result	Operative condition	Frequency [MHz]	Amplitude [dBm]	Limit [dBm]	RESULT
1	TX01	2405	-3.29	+8	COMPLIES
2	TX02	2440	-4.09	+8	COMPLIES
3	TX3	2480	-4.03	+8	COMPLIES
Test Procedure		Use the following spectrum analyser settings: Span = 1.5* DTS Bandwidth RBW = 3 kHz ≤ RBW ≤ 100 kHz. VBW ≥ [3 × RBW] Sweep = auto Detector function = peak Trace = max hold Allow the trace to stabilize. Use the peak marker function to determine the maximum amplitude level within the RBW. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.			

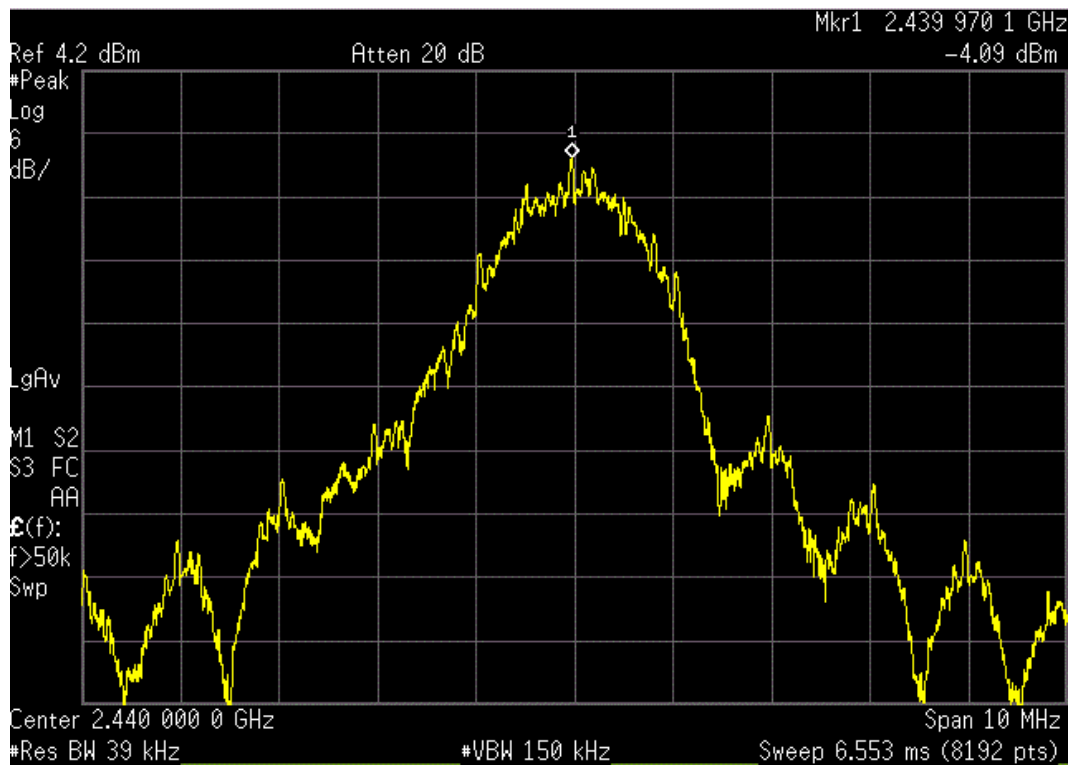
EUT modification during
this test

None

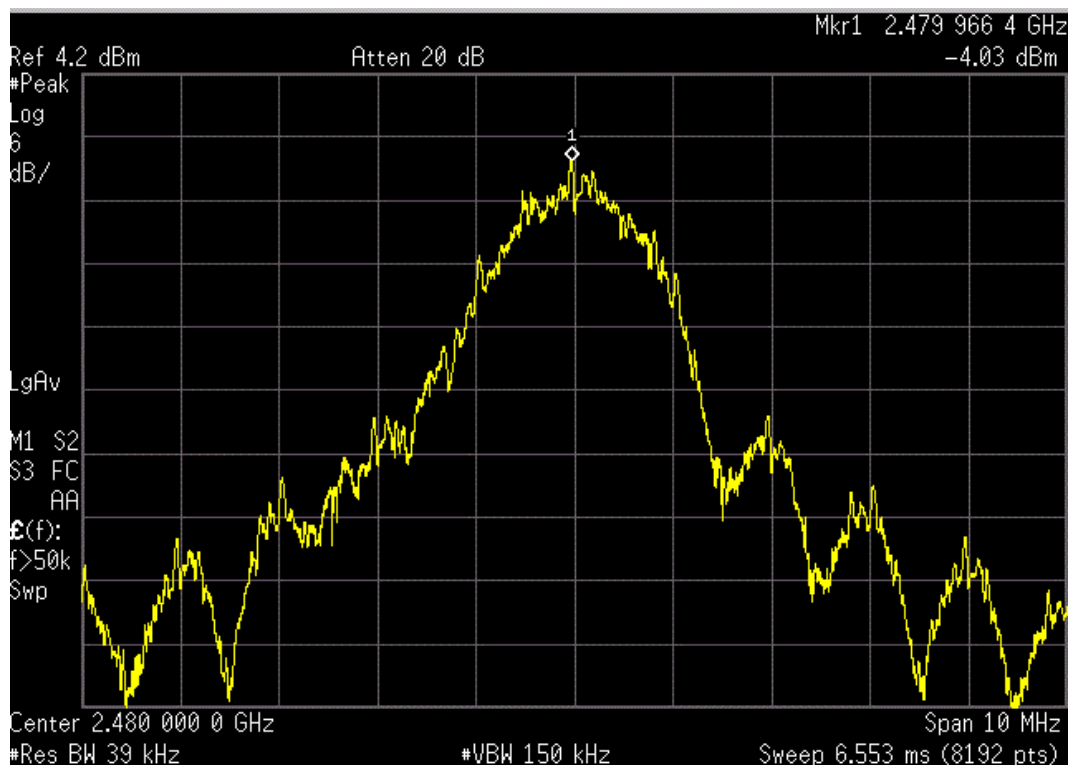
Test result TX01



Test result TX02



Test result TX03



7 EUT MODIFICATIONS

None.

End of the report.

Annex B Test instrumentations

FCC Part15					
Description	Manufacturer	Model	Identifier	Cal data	Cal due
RF cable - set of RF cables (771/LAB + 791/LAB + 938/LAB)			802/LAB	2026-01-21	2027-01-21
RF Cable - N-N 1,8m	Siva Cables Italy	RG 58A/U	243/LAB	2025-08-28	2026-08-28
Filter PB	G. De PAOLI	BPF.0.15-30MHz	268/LAB	2025-08-28	2026-08-28
Pulse Limiter ESH3-Z2	ROHDE&SCHWARZ Gmbh	ESH3-Z2	528/LAB	2025-08-28	2026-08-28
Semianechoic Chamber	Albatross Projects GmbH	-	739/CA	2025-02-01	2027-02-01
EMI Receiver - PSA Spectrum Analyzer	Agilent Technologies	E4446A	740/LAB	2025-09-02	2026-09-02
RF Cable - N-N 5m	INTERCOND	M17/74 RG 213	225/LAB	2025-08-28	2026-08-28
Antenna - Horn Antenna 1 GHz ÷ 18 GHz	ETS-LINDGREN	3117	778/LAB	2023-10-12	2026-10-11
EMI Test Receiver	Rohde & Schwarz	EPL1000	1993/LAB	2026-03-02	2027-03-02
RF Cable - set of RF cables 769/LAB + 791/LAB + 938/LAB + Pre-Amplifier 2096/LAB with cable			803/LAB	2025-04-04	2026-04-04
RF cable - set of RF cables (760/LAB + 804/LAB + 805/LAB)			806/LAB	2025-04-04	2026-04-04

Annex B Test instrumentations

EMI Receiver - MXE	Keysight Technologies	N9038A	1444/LAB	2026-02-05	2027-02-05
Antenna - BiConiLog Antenna 30MHz÷ 6 GHz	ETS-LINDGREN	3142E	1508/LAB	2024-01-26	2027-01-25
Attenuator 10dB (installed on Power Sensor 1537/LAB)	Mini Circuits	BW-N10W5+	1554/LAB	--	--
Software BAT-EMC	Nexio	BAT-EMC	1910/LAB	--	--
Pre-Amplifier 18 GHz ÷ 40 GHz	Spin Electronics	PRE-1840-35	759/LAB	2025-05-30	2027-05-30

Annex D Auxiliary instrumentations

<i>Application</i>	<i>Description</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Identifier</i>	<i>Cal. data</i>	<i>Cal. due</i>
Monitoring of environmental conditions	Barometer - Atmospheric pressure measurement	Delta Ohm	HD2001	1002/LAB	2025-04-11	2026-04-11
Monitoring of environmental conditions	Climatic Sensor (pri site) - 739/LAB Emission Anec	HW group	HWg-STE	1299/LAB	2025-06-24	2026-06-24
Distance monitoring	Metro Laser	Leica	DISTO A2	1094/LAB	2025-11-17	2027-11-17

Annex F Compliance Decision Rule and measurements uncertainty

F1: Decision Rule

- A decision rule defines the role of uncertainty in assessing the conformity of measured values with respect to specification limits.
- The KIWA decision uses the “simple acceptance” rule, then the measure is assessed compliant with specifications if it is less or equal to the specification limit.
- The rule of simple acceptance is also called “shared risk” because the probability to be over the tolerance limit may be as high as 50% in the case when a measurement result is exactly on the tolerance limit (assuming a symmetric normal distribution of the measurements).
- This rule results in accordance with :
 - IEC Guide 115 Application of uncertainty of measurement to conformity assessment activities in the electrotechnical sector
 - ILAC-G8 Guidelines on the Reporting of Compliance with Specification
 - JGCM guide 106

F.2 Measurements uncertainty

Frequency Readout – Conducted Test	<i>Uncertainty (k=2)</i>
Test Uncertainty [kHz]	10.3
Frequency Readout – Radiated Test	
Test Uncertainty [kHz]	10.6
Effective radiated power ERP (30 MHz to 1000 MHz)	
Test Uncertainty [dB]	6.4
Effective radiated power EIRP (above 1 GHz)	
Test Uncertainty [dB]	6.6
Radiated receiver blocking tests (above 1 GHz)	
Test Uncertainty [dB]	4.9
Conducted spurious emissions	
Test Uncertainty [dB]	3.3
Radiated spurious emissions	
Test Uncertainty [dB]	5.8
Channel power	
Test Uncertainty [dB]	2.6
Adjacent channel power	
Test Uncertainty [dB]	2.2
RF Output power (EIRP)	
Test Uncertainty [dB]	2.3
Occupied Channel Bandwidth	
Test Uncertainty [Hz]	[span/600]

--- End of test report ---