



Test report issued under the responsibility of:
EMITECH MONTPELLIER laboratory
MRA US-EU Designation Number: FR0006
Canadian CAB Identifier: FR0003

RADIO TEST REPORT

FCC 47 CFR PART 15: March 2024
RSS-210, Issue 11: June 2024

Company: **STMICROELECTRONICS (Rousset) SAS**
Address.....: 190 AVENUE CELESTIN COQ
13106 ROUSSET
FRANCE

Test item description: **NFC Reader**
Trade Mark: STMICROELECTRONICS
Manufacturer: STMICROELECTRONICS
FCC ID.....: YCPNFC12A1
IC: 8976A-NFC12A1
Model/Type reference.....: X-NUCLEO-NFC12A1
Ratings.....: 5Vdc

Testing Laboratory: **EMITECH MONTPELLIER laboratory**
Address.....: 145 rue de Massacan
34740 VENDARGUES
FRANCE

Report Reference No.: **RR-EVE-25A212-3A**
Test procedure: FCC IC Certification
Diffusion.....: Mr MAURAN
Applicant's name: STMICROELECTRONICS (Rousset) SAS
Date of issue.....: May 27, 2025
Total number of pages.....: 34
Revision.....: 0
Compiled by.....: Morgan PATEY
Approved by (+ signature): Olivier HEYER (Deputy Laboratory Manager)



*Duplication of this test report is only permitted for an integral photographic facsimile. It includes the number of pages referenced here above.
This document is the result of testing a specimen or a sample of the product submitted. It does not imply an assessment of the conformity of
the whole manufactured products of the tested sample.*

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REVISION HISTORY:

Revision	Date	Modified pages	Modifications
0	May 27, 2025	/	Creation

1. GENERAL INFORMATIONS

This document submits the results of Radio tests performed on the equipment **NFC Reader X-NUCLEO-NFC12A1** (denominated hereafter E.U.T.: equipment under test) according to document(s) listed in §2 of this test report.

TESTING PROCEDURE AND TESTING LOCATION:					
Testing Location : EMITECH MONTPELLIER laboratory & Open Area Test Site in SALINELLES (30) Address : 145 rue de Massacan 34740 VENDARGUES FRANCE Test procedure. : FCC IC Certification Tested by : Morgan PATEY Test supervisor : None Date of receipt of test item : N/A Date (s) of performance of tests : From January 27 th to 29 th of 2025					
APPLICANT'S GENERAL INFORMATIONS:					
Company name : STMICROELECTRONICS (Rousset) SAS Company address. : 190 AVENUE CELESTIN COQ 13106 ROUSSET FRANCE Person(s) present during the tests. : No representative for company attended the tests. Responsible. : Mr MAURAN					
GENERAL REMARKS:					
The information in italics is declared by the manufacturer and is under his responsibility The test results presented in this report relate only to the object tested. The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report. "(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report. Throughout this report the decimal separator is point.					
POSSIBLE TEST CASE VERDICTS:					
Test case does not apply to the test object. . : N/A Test case not performed..... : N/P Test object does meet the requirement..... : P (Pass) Test object does not meet the requirement.. : F (Fail)					
DEFINITIONS AND ABBREVIATIONS:					
E.U.T.	Equipment Under Test	AE	Ancillary Equipment	Pk	Peak detector
RBW	Resolution BandWidth	VBW	Video BandWidth	QP	Quasi-peak detector
FSOATS	Free Space Open Area Test Site	FAR	Full Anechoic Room	Av	Average detector
VP	Vertical Polarization	HP	Horizontal Polarization	RMS	Root Mean Square
RF	Radio Frequency	N.T.R	Nothing To Report	N/C	Not Communicated
SAC	Semi Anechoic Chamber				

2. REFERENCE DOCUMENT(S)

NORMATIVE REFERENCES:

The following referenced documents are necessary for the application of the present test report.

FCC 47 CFR PART 15: March 2024

Code of federal regulations – Title 47 telecommunication - Part 15 - Radio frequency devices

FCC 47 CFR PART 15.225: March 2024

Operation within the band 13.110-14.010 MHz

RSS-210, Issue 11: June 2024

Licence-exempt Radio Apparatus: Category I Equipment - Annex B – Devices Operating in Frequency Bands for Any Application

RSS-GEN, Issue 5: April 2018 / AMD1: 2019 / AMD2: 2021

General requirements and Information for the Certification of radio Apparatus

ANSI C63.4:2014

American National Standard for Methods of measurement of Radio-Noise from low-voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

ANSI C63.10: 2020

American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

Although the product standard uses obsolete technical standards, the latest versions of standards achievable by the laboratory will be used for testing.

INFORMATIVE REFERENCES:

The following referenced documents are not necessary for the application of the present test report but they assist the user with regard to a particular subject area.

3. EQUIPMENT TECHNICAL DESCRIPTION

3.1. Test Conditions

Test item description. : NFC Reader
Model/Type reference..... : X-NUCLEO-NFC12A1
Trade Mark. : STMICROELECTRONICS
Serial number (S/N)..... : Not communicated
Part number (P/N). : Not communicated
Software version..... : *Not communicated*
Firmware version. : *Not communicated*
Type of sample. : Pre-serial
Function(s)..... : Not communicated
Manufacturer name. : STMICROELECTRONICS
Address..... : 776 RUE ALBERT CAQUOT
SKY SOPHIA BAT B
06410 BIOT
FRANCE

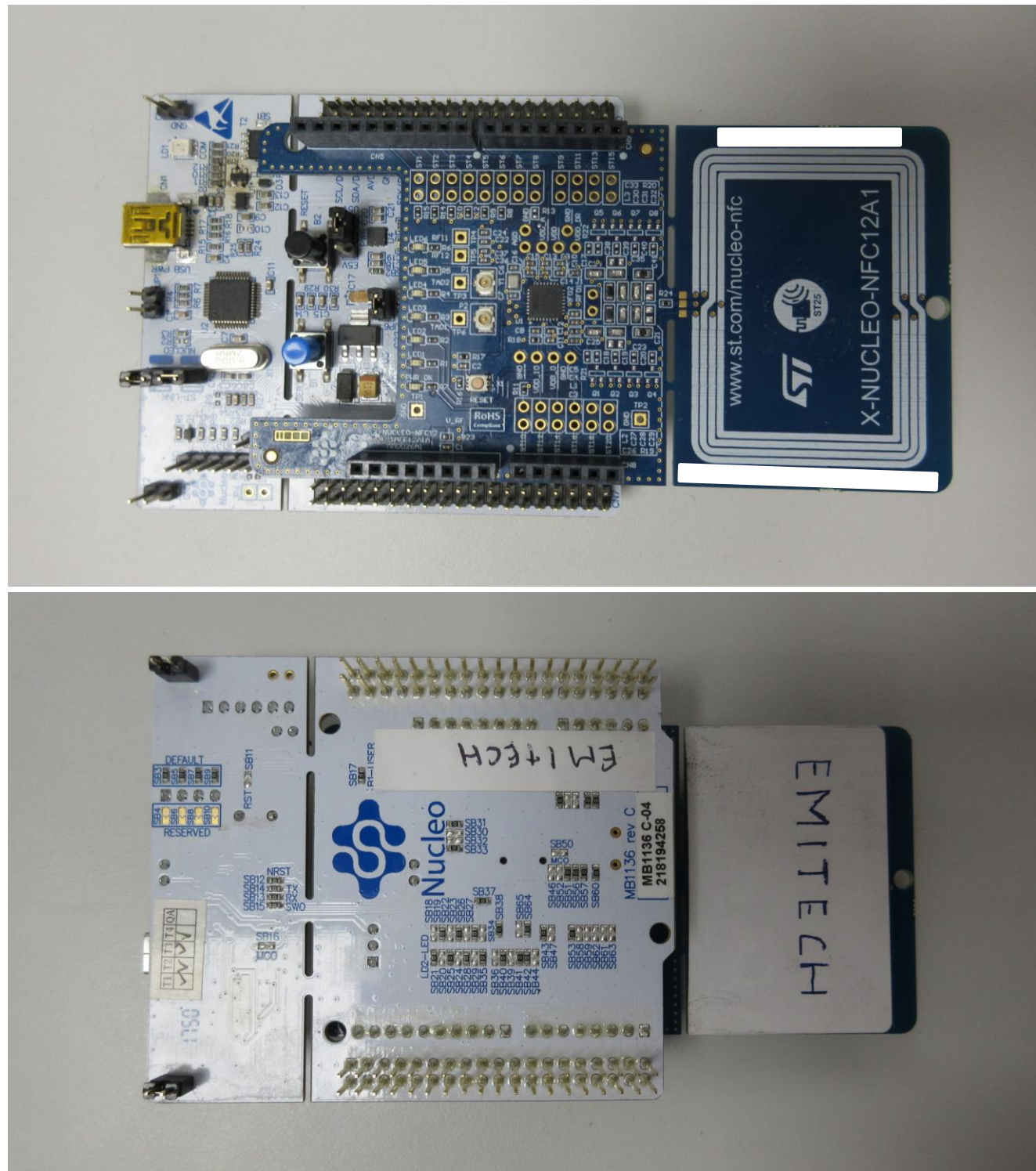
General product information:

N/A

3.2. E.U.T. Marking plate



3.3.E.U.T. General view



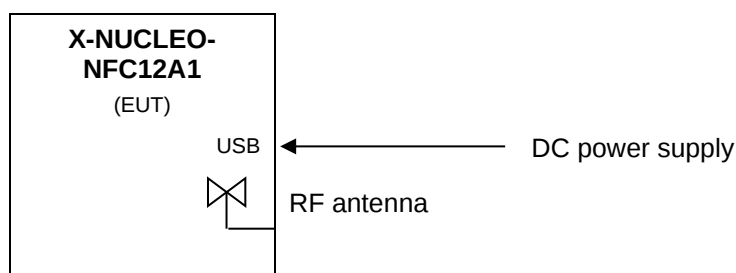
3.4.E.U.T. Mechanical and Electrical Design

Power supply..... : 5Vdc
Power supply range..... : 5Vdc
Power type..... : DC
Power (W)..... : Not communicated
Nominal current (A). : Not communicated
Dimensions (L x W x H) (m). : Not communicated
Weight (kg). : Not communicated
Temperature range (°C). : 0 to +60
Ground bounding strap..... : No

Comments:

N/A

3.5.E.U.T. Input/Output ports



PORT	NAME	TYPE	LENGTH	CABLE TYPE	COMMENTS
0	Main frame	N/E	N/A	PCB	N/A
1	DC power supply	DC	50cm	N/A	5Vdc
2	RF antenna	RF	N/A	PCB	13.56MHz

AC/DC : AC/DC Converter port

I/O..... : Input or Output port

N/E : Non Electrical port

AC..... : Alternative current port

TP : Telecommunication port

DC : Direct current port

RF..... : Radio frequency port

3.6. Supporting Equipment Used During Test

Sample subject to the tests was tested with following equipment.

PRODUCT TYPE	MANUFACTURER	MODEL	N°EMITECH / COMMENTS
AC/DC block	HN Electronic Components GmbH & Co, KG	HNP06-USBL6	Used to power EUT through USB

(AE)



3.7. EUT Radio Specifications

a) GENERAL INFORMATIONS	
According to manufacturer's declarations :	
EUT type.....	<i>Transceiver</i>
Technology	<i>RFID</i>
Environmental profile	<i>Data transmissions</i>
Temperature range	<i>0°C to +60°C</i>
Antenna type	<i>PCB</i>
Antenna Gain.....	<i>Not communicated</i>
Comments:	
<i>N/A</i>	
b) TRANSMITTER PARAMETERS (Tx)	
Frequency bands.....	<i>13.553 MHz to 13.567 MHz</i>
RF Power.....	<i>Not communicated</i>
Number of channels / Separation.....	<i>1</i>
Modulation type	<i>Not communicated</i>
Duty cycle	<i>Not communicated</i>
Tested frequency.....	<i>13.56 MHz</i>
c) RECEIVER PARAMETERS (Rx)	
Frequency bands.....	<i>13.553 MHz to 13.567 MHz</i>
Category/Class	<i>Not communicated</i>
Bandwidth	<i>Not communicated</i>

4. RESULT SUMMARY

TEST DESIGNATION	SEVERITY	VERDICT	COMMENTS
GENERAL			
Labeling requirements		N/P	15.19 / See certification documents
Information to user		N/P	15.21 / See certification documents
Home-built devices		N/A	15.23
Kits		N/A	15.25
Special Accessories		N/P	15.27 / See certification documents
Inspection by the Commission		N/A	15.29
Measurement standards		PASS	15.31
Test procedure for CPU boards and computer power supplies		N/A	15.32
Frequency range of radiated measurements		PASS	15.33
Measurement detector functions and bandwidths		PASS	15.35
Transition provisions for compliance with the rules		N/P	15.37 / See certification documents
UNINTENTIONAL RADIATORS			
Equipment authorization			15.101
- Verification		N/A	
- Declaration of Conformity		N/A	
CPU boards and power supplies used in personal computers		N/A	15.102
Exempted device		N/A	15.103
Information to the user		N/P	See certification documents
Conducted limits	Class B	PASS	15.107
Radiated emission limits	Class B	PASS	15.109
Antenna power conduction limits for receivers		N/A	15.111
Power line carrier systems		N/A	15.113
TV interface devices, including cable system terminal devices		N/A	15.115
TV broadcast receivers		N/A	15.117
Cable ready consumer electronics equipment		N/A	15.118
Program blocking technology requirements for TV receivers		N/A	15.120
Scanning receivers and frequency converters used with scanning receivers		N/A	15.121
Labeling of digital cable ready products		N/A	15.123
INTENTIONAL RADIATORS			

TEST DESIGNATION	SEVERITY	VERDICT	COMMENTS
Equipment authorization requirement		PASS	15.201 / Transmitter part is subject to Certification procedure
Certified operating frequency range		N/A	15.202
Antenna requirement		PASS	15.203 / Dedicated integral antenna
External radio frequency power amplifiers and antenna modifications		N/A	15.204
Restricted bands of operation		PASS	15.205
Conducted limits		PASS	15.207
Radiated emission limits; general requirements		PASS	15.209
Tunnel radio systems		N/A	15.211
Modular transmitters		N/A	15.212
Cable locating equipment		N/A	15.213
Cordless telephones		N/A	15.214
Additional provisions to the general radiated emission limits		PASS	15.215
Operation within the band 13.110-14.010 MHz.		PASS	15.225
- Field strength in the band 13.553-13.567 MHz		PASS	(a)
- Field strength in the band 13.410-13.553 MHz and 13.567-13.710 MHz		PASS	(b)
- Field strength in the band 13.110-13.410 MHz and 13.710-14.010 MHz		PASS	(c)
- Field strength outside the band 13.110-14.010 MHz		PASS	(d)
- Frequency tolerance of the carrier signal		PASS	(e)
- Radio frequency powered tag		N/A	(f) EUT is an RFID reader

Sample subject to the test complies with the requirements of the reference document(s) listed in §2 of this test report and, where applicable, with deviation(s) specified in this document.

To declare, or not, the compliance with the specifications, it was not explicitly taken account of uncertainty associated with the results.

Opinion(s) and interpretation(s): N/A

5. MEASUREMENT UNCERTAINTY

PARAMETER	MAXIMAL EMITECH UNCERTAINTY	MINIMAL STANDARD UNCERTAINTY
Radio frequency	$\pm 1 \times 10^{-7}$	$\pm 1 \times 10^{-7}$
Occupied bandwidth		
RF power	$\pm 3.8 \%$	$\pm 5 \%$
Supply voltages	$\pm 3 \%$	$\pm 3 \%$
Temperature	$\pm 1 ^\circ\text{C}$	$\pm 1 ^\circ\text{C}$
Humidity	$\pm 5 \%$	$\pm 5 \%$
Time / Duty cycle	$\pm 4.4 \%$	$\pm 5 \%$
Conducted emission (FCC)		
(Artificial Mains Network) 150kHz – 30MHz	$\pm 3.4 \text{ dB}$	$\pm 3.4 \text{ dB}$
Radiated emission (electric field for FCC standard)		
9kHz – 30MHz	$\pm 2.7 \text{ dB}$	/
30MHz – 1GHz	$\pm 5.0 \text{ dB}$	/
1GHz – 18GHz	$\pm 5.3 \text{ dB}$	/
18GHz – 40GHz	$\pm 6.1 \text{ dB}$	/
40GHz – 140GHz	$\pm 5.7 \text{ dB}$	/

For the calculation of expanded uncertainty, the confidence interval is 95 % (k=2).

6. TEST CONDITIONS AND RESULTS

6.1. AC power-line conducted emissions

Reference standard:	FCC part 15.225 & 15.207 RSS-210 & RSS-Gen
Test method:	ANSI C63.10: 2020
General test setup: EUT is set on an insulating support at 80cm above the horizontal ground reference plane, and at 40cm of the vertical ground reference plane. All power was connected to the system through Artificial Mains Network (AMN). The AMN is placed at 80cm from the boundary of the EUT and bonded to a ground reference plane.	

TESTED CABLE	PARAMETER	SEVERITY	RESULT TAB.	VERDICT
120 VAC / 60 HZ / X-NUCLEO-NFC12A1 / 50 OHM LOAD	150kHz-30MHz	15.207	EMI4706	PASS

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	See Graph(es)
Relative Humidity	30 to 60 %	See Graph(es)
Atmospheric pressure	N/A	See Graph(es)
Test method deviation: N/A		
Supplementary information: EUT power supply is done through a "standard power supply" which meets FCC and RSS requirements. As provided in §6.2.5 of ANSI C63.10 (2020), antenna is replaced with a dummy load.		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
AC power source	KIKUSUI	PCR 4000L	15322	20/02/2024	20/04/2026
Cable	N	3m	16413	16/08/2023	16/10/2025
Cable	EMITECH	Current absorber sheath	18366	17/08/2023	17/10/2025
LISN	Rohde & Schwarz	ENV216	17925	06/12/2023	06/02/2026
Multimeter	FLUKE	8808A	10382	11/07/2024	11/09/2025
Receiver	Rohde & Schwarz	ESI	9704	31/03/2025	31/05/2026
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/09/2023	25/11/2025
Thermohygrometer	Testo	608-H1	19386	08/03/2024	08/05/2026

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TEST SETUP PHOTO(S) – CONDUCTED MEASUREMENT



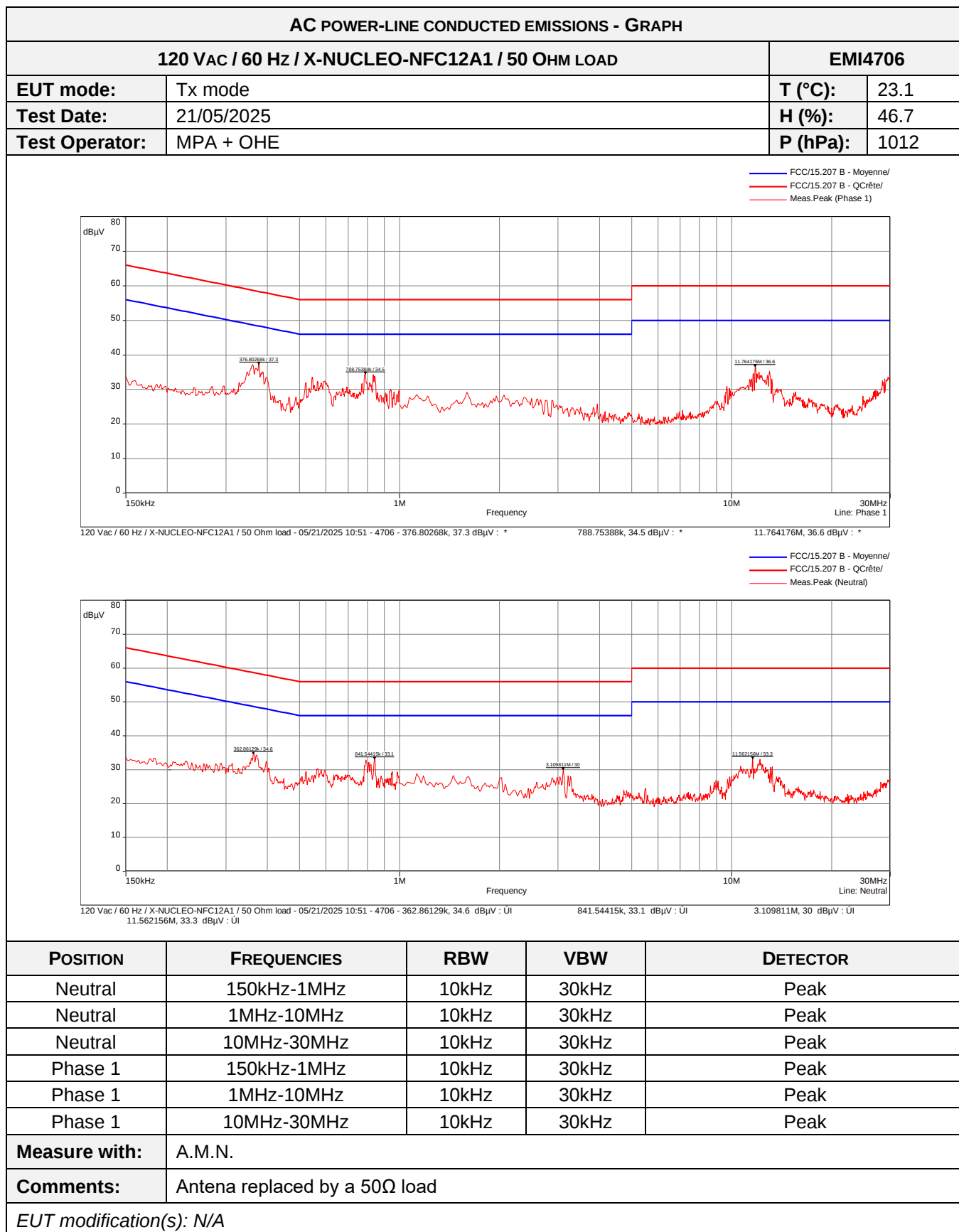
AC POWER-LINE CONDUCTED EMISSIONS - TABULATED RESULTS

120 VAC / 60 Hz / X-NUCLEO-NFC12A1 / 50 OHM LOAD

EMI4706

TERMINAL	FREQUENCY (MHz)	DETECTOR (Pk/QP/Av)	LEVEL (dBμV)	LIMIT (dBμV)	MARGIN (dB)
Neutral	0.363	Peak	34.74	48.66	-13.92
Neutral	0.792	Peak	32.86	46	-13.14
Neutral	0.842	Peak	33.14	46	-12.86
Neutral	3.110	Peak	30.02	46	-15.98
Neutral	11.562	Peak	33.25	50	-16.75
Neutral	13.246	Peak	30.90	50	-19.10
Line 1	0.377	Peak	37.43	48.36	-10.93
Line 1	0.545	Peak	33.61	46	-12.39
Line 1	0.789	Peak	34.49	46	-11.51
Line 1	11.764	Peak	36.61	50	-13.39
Line 1	13.206	Peak	33.04	50	-16.96
Line 1	29.880	Peak	33.63	50	-16.37

Supplementary information: When margin between peak measurements and Average or Qpeak limit(s) is > 6dB, no Average or Qpeak measurements were performed.



6.2. Occupied bandwidth

Reference standard:	FCC part 15 Radio part 15.205 RSS-210
Test method:	ANSI C63.10: 2020
Test description: The occupied bandwidth (OBW) is the Frequency Range in which 99 % of the total mean power of a given emission falls. The residual part of the total power being denoted as β, which, in cases of symmetrical spectra, splits up into $\beta/2$ on each side of the spectrum. Unless otherwise specified, $\beta/2$ is taken as 0,5 %. The maximum occupied bandwidth includes all associated side bands above the appropriate emissions level and the frequency error or drift under extreme test conditions. EUT is connected to the measuring receiver via 50Ω attenuator(s).	

TESTED CABLE	OBW	SEVERITY	RESULT TAB.	VERDICT
99% bandwidth	11.177 kHz	< 14 kHz	EMI4519	PASS

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	23.5 °C
Relative Humidity	20 to 75 %	34.1 %
Atmospheric pressure	N/A	1017 hPa
Test method deviation: N/A		
Supplementary information:		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Antenna	EMITECH	3.5 cm	4653		
Cable	SUCOFLEX	N-3m	14379	17/08/2023	17/10/2025
Multimeter	FLUKE	8808A	10382	12/07/2024	12/09/2025
Spectrum analyzer	Rohde & Schwarz	FSW43	14830	31/08/2022	28/04/2025
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/09/2023	25/11/2025
Thermohygrometer	Testo	608-H1	19386	08/03/2024	08/05/2026

Blank cells = Permanent validity

OCCUPIED BANDWIDTH - GRAPH	
99% BANDWIDTH	
EMI4519	
EUT mode:	Tx mode
Test Date:	29/01/2025
Test Operator:	MPA
MultiViewSpectrum Ref Level 0.00 dBmAtt 10 dBSWT 33.4 msRBW 300 HzVBW 1 kHzMode Sweep 1 Occupied Bandwidth </	

6.3. Radiated spurious emissions

Reference standard:	FCC Part 15.225 & 15.209 RSS-210 & RSS-Gen
Test method:	ANSI C63.10: 2020
General test setup: For $f < 30\text{MHz}$, EUT is set on an insulating support at 80cm above the ground reference plane. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3-meter in a semi-anechoic chamber. The EUT was rotated 360° in order to maximize radiated levels. Test antenna was oriented in 3 axes (0°, 45° and 90°). Final measurements (quasi-peak) were then performed in a 10-meter Open Area Test Site that complies to CISPR 16 in the same measurement conditions. For $f > 30\text{MHz}$, EUT is set on an insulating support at 80cm above the ground reference plane. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in horizontal and vertical polarities. Final measurements (quasi-peak or average) were then performed in a semi-anechoic chamber or Open Area Test Site that complies to CISPR 16. The EUT was rotated 360° about its azimuth and adjusting the receive antenna height from 1 to 4 m. All frequencies were investigated, where applicable. For portable equipments a research of maximum level is done on the 3 axes. Only the highest levels are recorded.	

TESTED CONFIGURATION	PARAMETER	SEVERITY	RESULT TAB.	VERDICT
Radiated measurement / 0°	9kHz-30MHz	§15.209	EMI4571	PASS
Radiated measurement / 45°	9kHz-30MHz	§15.209	EMI4630	PASS
Radiated measurement / 90°	9kHz-30MHz	§15.209	EMI4631	PASS
Tx mode / 30 MHz to 1 GHz	30MHz-1GHz	§15.209	EMI4573	PASS

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	See Graph(s)
Relative Humidity	20 to 75 %	See Graph(s)
Atmospheric pressure	N/A	See Graph(s)
Test method deviation: N/A		
Supplementary information: From 9 kHz to 30MHz: limit indicated on the curves is calculated with 40 dB/decade extrapolation factor and 51.5 dB conversion factor. From 30MHz to 1GHz Quasi peak limit provided is the limit given in §15.209.		

TEST EQUIPMENT USED – 9 KHz TO 30 MHz					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Antenna	Rohde & Schwarz	HFH2-Z2	5825	17/08/2022	17/04/2025
Cable	SUCOFLEX	N-3m	14378	17/08/2023	17/10/2025
Cable	SUCOFLEX	N-6,5m	14380	17/08/2023	17/10/2025
Cable	Techniwave	N-8m	18349	17/08/2023	17/10/2025
Multimeter	FLUKE	8808A	10382	12/07/2024	12/09/2025
Receiver	Rohde & Schwarz	ESW8	19536	02/05/2024	02/07/2025
Shielded enclosure	COMTEST	SAC 3m	14494	08/08/2023	08/10/2026
Software	Nexio	BAT EMC	0000		
Thermohygrometer	Testo	608-H1	7562	28/09/2023	28/11/2025
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/09/2023	25/11/2025

BAT-EMC software version: V3.18.0.26

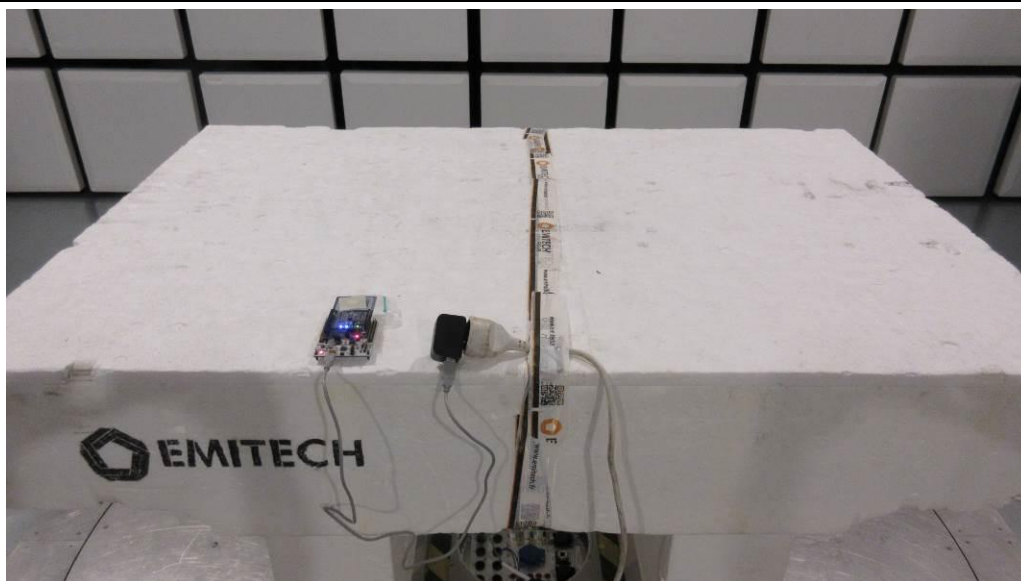
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TEST EQUIPMENT USED – 30 MHz TO 1 GHz					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Antenna	ETS lindgren	3142E	14523	27/01/2022	27/03/2025
Cable	SUCOFLEX	N-3m	14378	17/08/2023	17/10/2025
Cable	SUCOFLEX	N-6,5m	14380	17/08/2023	17/10/2025
Cable	Techniwave	N-8m	18349	17/08/2023	17/10/2025
Converter		2.15	9988		
Multimeter	FLUKE	8808A	10382	12/07/2024	12/09/2025
Receiver	Rohde & Schwarz	ESW8	19536	02/05/2024	02/07/2025
Shielded enclosure	COMTEST	SAC 3m	14494	08/08/2023	08/10/2026
Software	Nexio	BAT EMC	0000		
Thermohygrometer	Testo	608-H1	7561	17/12/2024	17/02/2026
Thermohygrometer	Testo	608-H1	7562	28/09/2023	28/11/2025
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/09/2023	25/11/2025

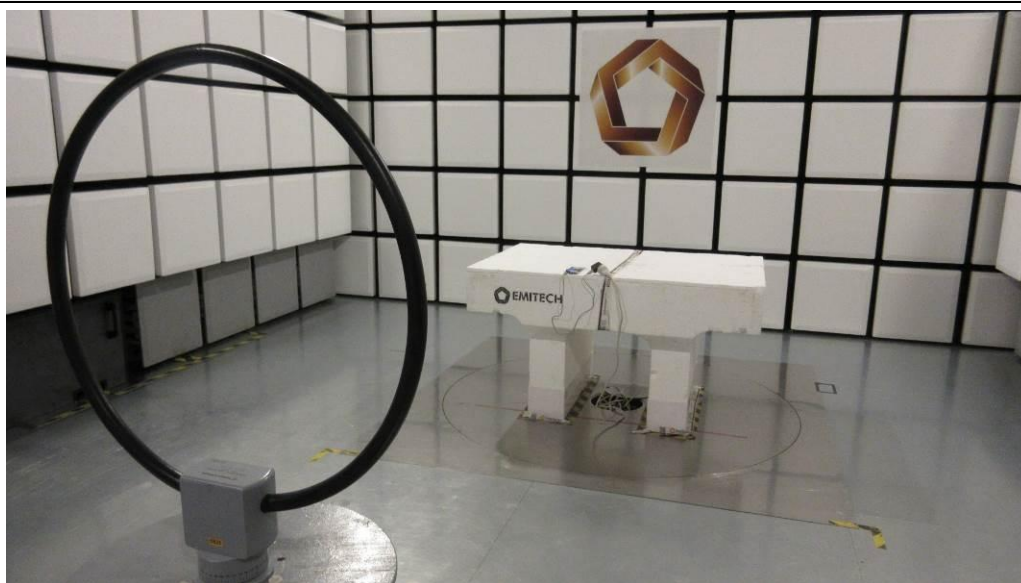
BAT-EMC software version: V3.18.0.26

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TEST SETUP PHOTO(S) – EUT POSITION



TEST SETUP PHOTO(S) - 9 KHZ TO 30 MHZ



TEST SETUP PHOTO(S) - 30 MHz TO 1 GHz

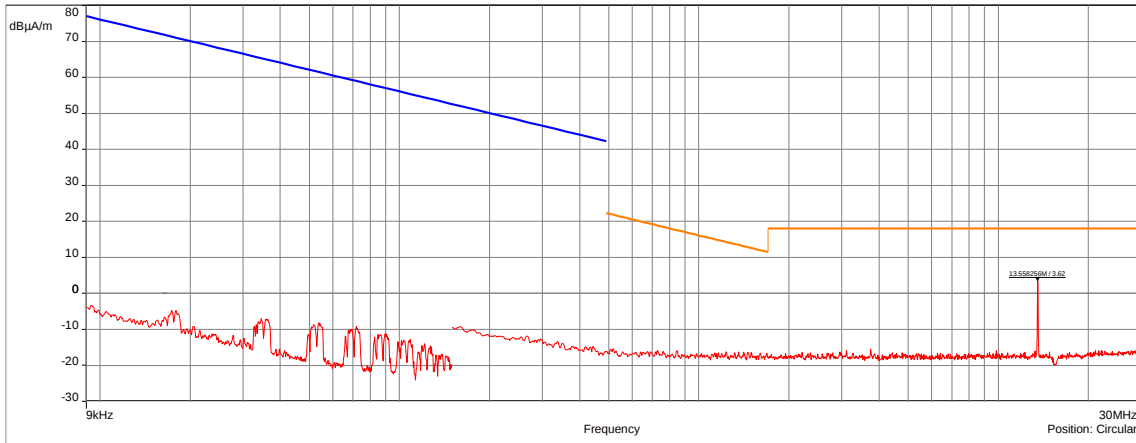


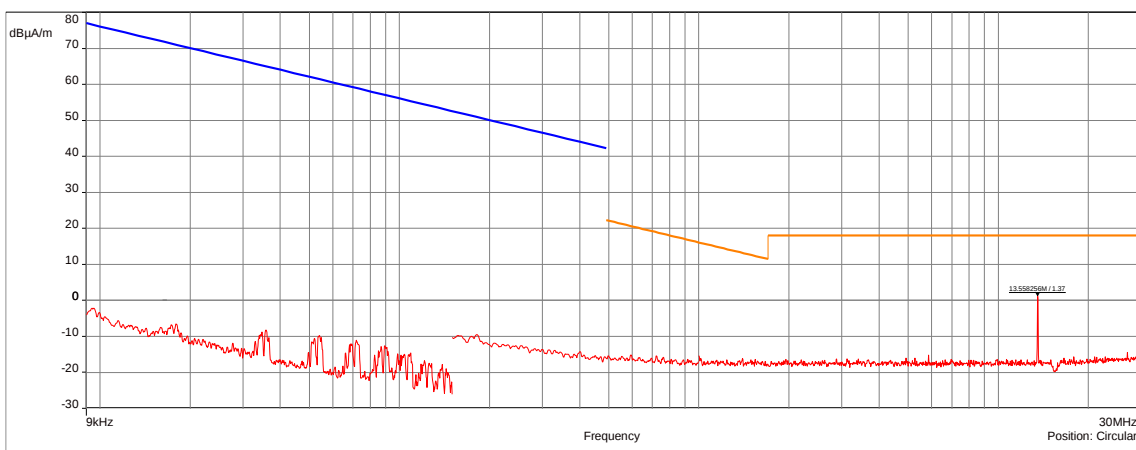
RADIATED SPURIOUS EMISSIONS – TABULATED RESULTS					
RADIATED MEASUREMENT / 0°					EMI4571
FREQUENCY (MHz)	POLARIZATION	PEAK LEVEL (dBμA/m)	AVERAGE OR QPEAK LEVEL (dBμA/m)	LIMIT (dBμA/m)	MARGING (dB)
0.072	0°	-9.20	N/P	58.99	-68.19
0.090	0°	-11.14	N/P	57.04	-68.18
0.103	0°	-13.04	N/P	55.81	-68.85
0.109	0°	-12.84	N/P	55.37	-68.21
0.121	0°	-13.99	N/P	54.42	-68.41
0.127	0°	-14.66	N/P	54.03	-68.70
Supplementary information: When margin between peak measurements and average/quasi-peak limit(s) is >6dB, no average/quasi-peak measurements were performed.					

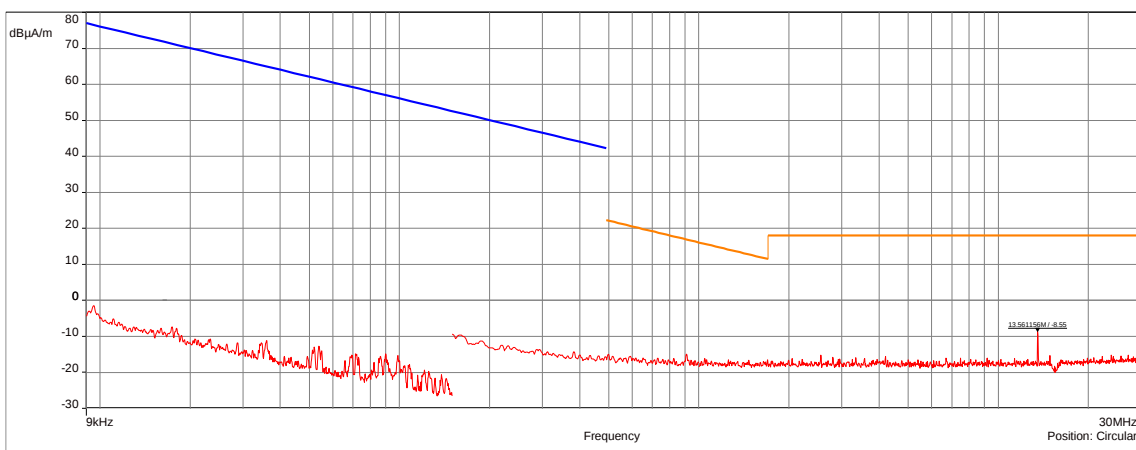
RADIATED SPURIOUS EMISSIONS – TABULATED RESULTS					
RADIATED MEASUREMENT / 45°					EMI4630
FREQUENCY (MHz)	POLARIZATION	PEAK LEVEL (dBμA/m)	AVERAGE OR QPEAK LEVEL (dBμA/m)	LIMIT (dBμA/m)	MARGING (dB)
0.072	45°	-11.09	N/P	58.99	-70.08
0.087	45°	-12.90	N/P	57.32	-70.22
0.089	45°	-12.56	N/P	57.07	-69.64
0.104	45°	-15.02	N/P	55.76	-70.78
0.109	45°	-14.64	N/P	55.36	-70.00
0.139	45°	-17.81	N/P	53.25	-71.06
Supplementary information: When margin between peak measurements and average/quasi-peak limit(s) is >6dB, no average/quasi-peak measurements were performed.					

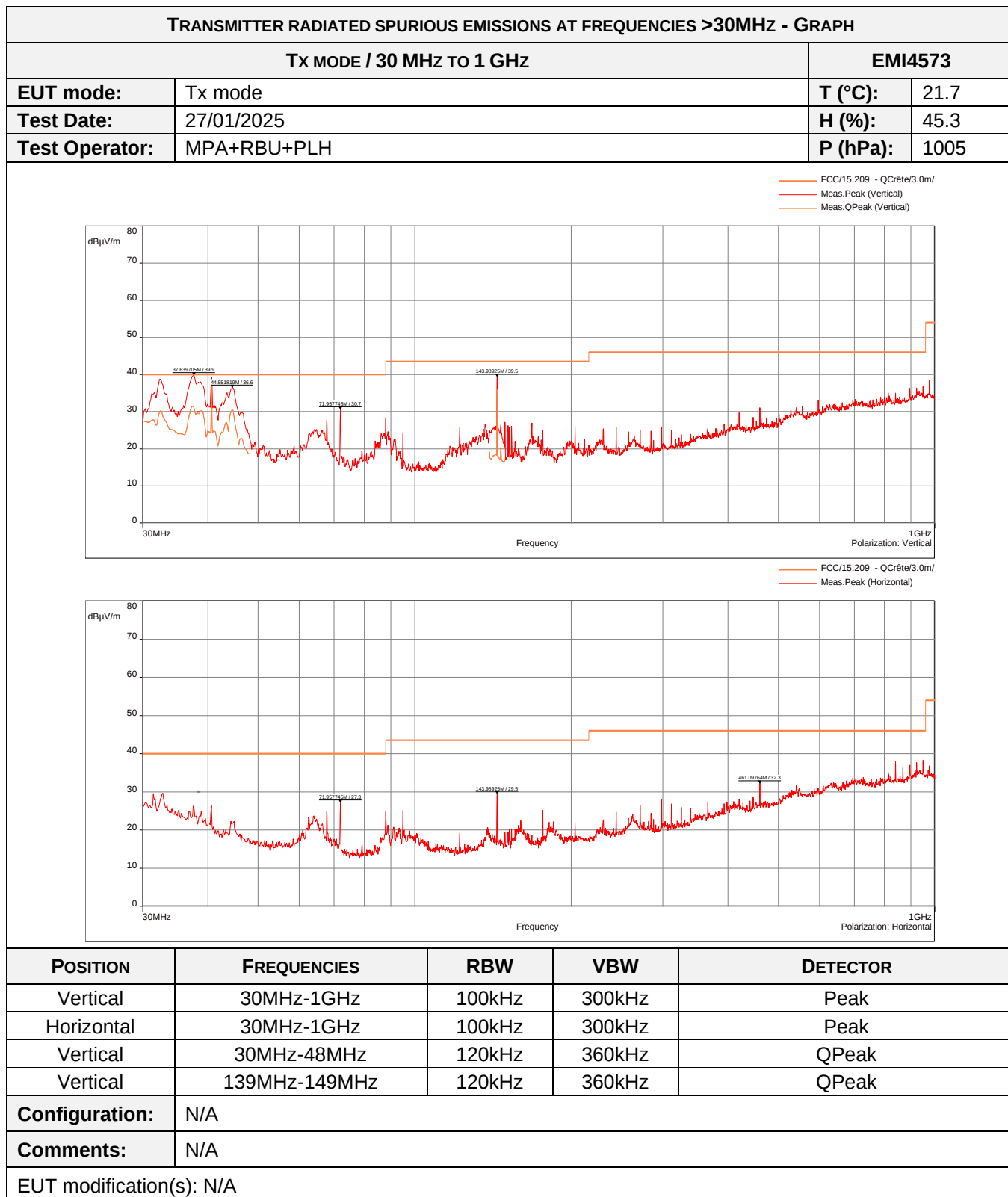
RADIATED SPURIOUS EMISSIONS – TABULATED RESULTS					
RADIATED MEASUREMENT / 90°					EMI4631
FREQUENCY (MHz)	POLARIZATION	PEAK LEVEL (dBμA/m)	AVERAGE OR QPEAK LEVEL (dBμA/m)	LIMIT (dBμA/m)	MARGING (dB)
0.086	90°	-15.58	N/P	57.37	-72.95
0.090	90°	-14.85	N/P	57.01	-71.86
0.099	90°	-15.34	N/P	56.2	-71.53
0.108	90°	-17.85	N/P	55.44	-73.29
0.121	90°	-19.30	N/P	54.43	-73.74
0.125	90°	-19.70	N/P	54.15	-73.85
Supplementary information: When margin between peak measurements and average/quasi-peak limit(s) is >6dB, no average/quasi-peak measurements were performed.					

RADIATED SPURIOUS EMISSIONS – TABULATED RESULTS					
TX MODE / 30 MHz TO 1 GHz					EMI4573
FREQUENCY (MHz)	POLARIZATION	PEAK LEVEL (dBμV/m)	QPEAK LEVEL (dBμV/m)	QPEAK LIMIT (dBμV/m)	MARGING (dB)
32.43	Vertical	38.74	30.26	40	-9.74
37.64	Vertical	39.94	31.47	40	-8.53
40.67	Vertical	39.30	35.99	40	-4.01
44.55	Vertical	36.59	30.54	40	-9.46
71.96	Vertical	30.74	N/P	40	-9.26
143.99	Vertical	39.50	36.14	43.5	-7.36
32.79	Horizontal	29.66	N/P	40	-10.34
71.96	Horizontal	27.29	N/P	40	-12.71
143.99	Horizontal	29.55	N/P	43.5	-13.95
461.10	Horizontal	32.34	N/P	46	-13.66
840.78	Horizontal	38.12	N/P	46	-7.88
949.31	Horizontal	38.25	N/P	46	-7.75
Supplementary information: When margin between peak measurements and quasi-peak limit(s) is > 6dB, no quasi-peak measurements were performed					

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH					
RADIATED MEASUREMENT / 0°				EMI4571	
EUT mode:	Tx mode			T (°C):	21.7
Test Date:	27/01/2025			H (%):	45.3
Test Operator:	MPA			P (hPa):	1005
FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ Meas.Peak  80 70 60 50 40 30 20 10 0 -10 -20 -30 9kHz Frequency 30MHz Position: Circular					
POSITION	FREQUENCIES	RBW	VBW	DETECTOR	
Circular	9kHz-150kHz	300Hz	1kHz	Peak	
Circular	150kHz-1MHz	10kHz	30kHz	Peak	
Circular	1MHz-30MHz	10kHz	30kHz	Peak	
Configuration:	N/A				
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. The 13.56 MHz is the main carrier frequency of the EUT's radio signal.				
EUT modification(s): N/A					

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH					
RADIATED MEASUREMENT / 45°				EMI4630	
EUT mode:	Tx mode			T (°C):	21.7
Test Date:	27/01/2025			H (%):	45.3
Test Operator:	MPA			P (hPa):	1005
FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ Meas.Peak 					
POSITION	FREQUENCIES	RBW	VBW	DETECTOR	
Circular	9kHz-150kHz	300Hz	1kHz	Peak	
Circular	150kHz-1MHz	10kHz	30kHz	Peak	
Circular	1MHz-30MHz	10kHz	30kHz	Peak	
Configuration:	N/A				
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. The 13.56 MHz is the main carrier frequency of the EUT's radio signal.				
EUT modification(s): N/A					

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH					
RADIATED MEASUREMENT / 90°				EMI4631	
EUT mode:	Tx mode			T (°C):	21.7
Test Date:	27/01/2025			H (%):	45.3
Test Operator:	MPA			P (hPa):	1005
FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ Meas.Peak 					
POSITION	FREQUENCIES	RBW	VBW	DETECTOR	
Circular	9kHz-150kHz	300Hz	1kHz	Peak	
Circular	150kHz-1MHz	10kHz	30kHz	Peak	
Circular	1MHz-30MHz	10kHz	30kHz	Peak	
Configuration:	N/A				
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. The 13.56 MHz is the main carrier frequency of the EUT's radio signal.				
EUT modification(s): N/A					



6.4. Field strength in the band 13.553-13.567MHz

Reference standard:	FCC Part 15.225 a) RSS-210
Test method:	ANSI C63.10: 2020
General test setup: EUT is set on an insulating support at 80cm. Measurements were then performed in a 10-meter Open Area Test Site that complies to CISPR 16. The EUT was rotated 360° in order to maximize radiated levels. Test antenna was oriented in 3 axes (0°, 45° and 90°). For portable equipments a research of maximum level is done on the 3 axes. Only the highest levels are recorded.	

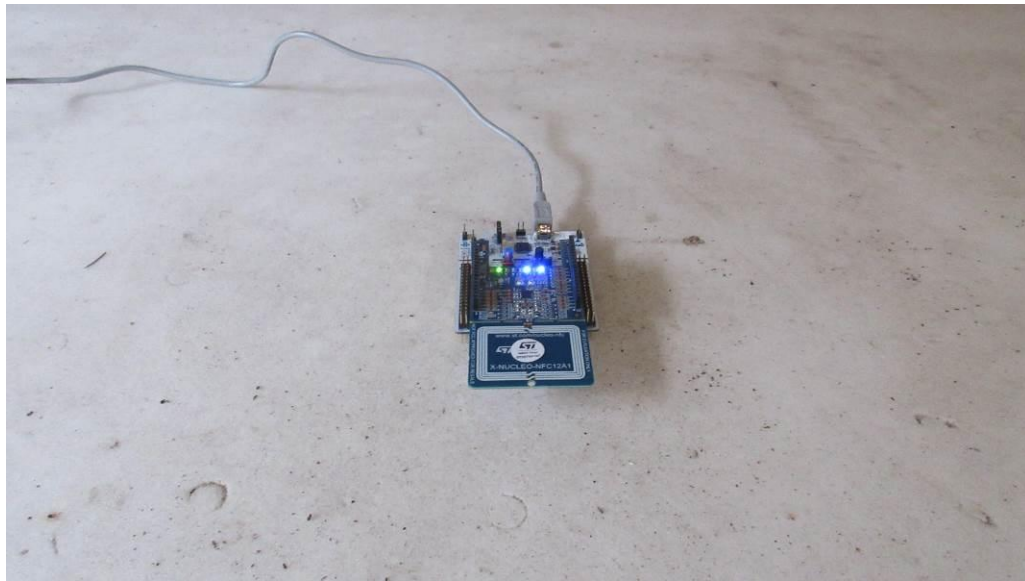
TEST CASE	EUT MODE	SEVERITY	RESULT TAB.	VERDICT
Field strength	Tx mode	15848µV/m at 30m	EMI4400	PASS

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	23.5 °C
Relative Humidity	20 to 75 %	34.1 %
Atmospheric pressure	N/A	1017 hPa
Test method deviation: N/A		
Supplementary information: Only maximum level is recorded		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Antenna	Rohde & Schwarz	HFH2-Z2	5825	17/08/2022	17/04/2025
Cable	Huber + Suhner	N-10m	8472	16/08/2023	16/10/2025
Multimeter	FLUKE	8808A	10382	12/07/2024	12/09/2025
Open area test site	EMITECH	Salinelles	3482	22/08/2021	22/04/2025
Receiver	Rohde & Schwarz	ESHS10	3371	17/12/2024	17/02/2026
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/09/2023	25/11/2025
Thermohygrometer	Testo	608-H1	19386	08/03/2024	08/05/2026

Blank cells = Permanent validity

TEST SETUP PHOTO(S) – EUT POSITION



TEST SETUP PHOTO(S) - OATS



FIELD STRENGTH - TABULATED RESULTS				EMI4400
Frequency (MHz)	Polarization (°)	Level at 10m (dBμA/m)	Limit at 10m (dBμA/m)	Limit at 30m (μV/m)
13.56	0	-15.04	51.58	15848
13.56	45	-4.24	51.58	15848
13.56	90	-14.84	51.58	15848
Comments:	Maximun level at 10 m is -4.24 dBμA/m for a limit at 51.58 dBμA/m. Using an extrapolation factor of 40 dB/dec and a conversion factor of -51.5 dB, level at 30m is 28.18 dBμV/m for a limit at 84 dBμV/m.			

EUT MODIFICATIONS	OPERATOR	TEST DATE	RESULT TAB.
N/A	MPA	29/01/2025	EMI4400

6.5. Field strength outside the band 13.110-14.010MHz

Reference standard:	FCC Part 15.225 b) c) & d) RSS-210
Test method:	ANSI C63.10: 2020
General test setup: EUT is set inside the climatic enclosure. Carrier level are correlated with the maximum carrier level measured in normal conditions.	

FREQUENCY BAND	SEVERITY	RESULT TAB.	VERDICT
13.110-13.410MHz	106µV/m at 30m	See graphic	PASS
13.410-13.553MHz	334µV/m at 30m	See graphic	PASS
13.553-13.567MHz	15,848µV/m at 30m	See graphic & §6.4 of this report	PASS
13.567-13.710MHz	334µV/m at 30m	See graphic	PASS
13.710-14.010MHz	106µV/m at 30m	See graphic	PASS
Above 14.010MHz	§15.209	See graphic & §6.3 of this report	PASS
Below 13.110MHz	§15.209	See graphic & §6.3 of this report	PASS

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	See Graph(es)
Relative Humidity	20 to 75 %	See Graph(es)
Atmospheric pressure	N/A	See Graph(es)
Test method deviation: N/A		
Supplementary information: N/A		

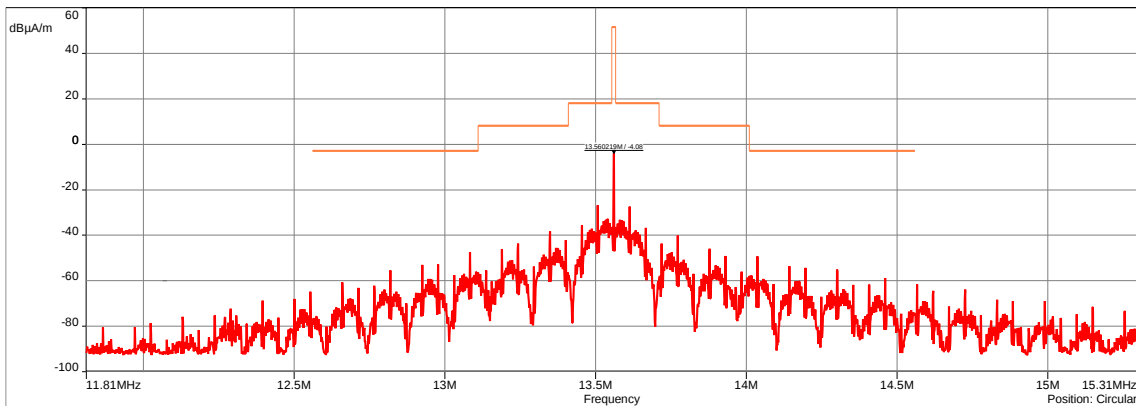
TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Antenna	EMITECH	3.5 cm	4653		
Cable	SUCOFLEX	N-3m	14379	17/08/2023	17/10/2025
Climatic enclosure	Secasi	SM600C	1670		
Multimeter	FLUKE	8808A	10382	12/07/2024	12/09/2025
Receiver	Rohde & Schwarz	FPL1003	16027	03/04/2024	03/06/2025
Software	Nexio	BAT EMC	0000		
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/09/2023	25/11/2025
Thermohygrometer	Testo	608-H1	19386	08/03/2024	08/05/2026

BAT-EMC software version: V3.18.0.26

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TEST SETUP PHOTO(S) – CLIMATIC ENCLOSURE



FIELD STRENGTH IN THE BAND 13.110-14.010MHZ AND OUTSIDE – GRAPH				
FIELD STRENGTH IN THE BAND 13.110-14.010MHZ AND OUTSIDE		EMI4572		
EUT mode:	Tx mode	T (°C):	23.5	
Test Date:	29/01/2025	H (%):	34.1	
Test Operator:	MPA	P (hPa):	1017	
Sub-range 1 Frequencies: 11.81 MHz - 15.31 MHz (Analyser mode) 8000 Points Settings: RBW: 300Hz, VBW: 1kHz, Auto, Attenuation: Auto, Sweep count 1, Preamp: Off, LN Preamp: Off, Preselector: Off Position: Circular Distance: 10 m  RFID Mask / X-NUCLEO-NFC12A1 / 25°C / 5Vdc - 4572				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	11.81MHz-15.31MHz	300Hz	1kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor.			
EUT modification(s): N/A				

6.6. Measurement of Frequency Stability

Reference standard:	FCC 47 CRF Part 15.225 e) RSS-210
Test method :	ANSI C63.10: 2020
General test setup: The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to $+ 50$ degrees 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 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery. EUT is set inside the climatic enclosure. Carrier level are correlated with the maximum carrier level measured in normal conditions.	

TEST CASE	EUT MODE	SEVERITY	RESULT TAB.	VERDICT
Frequency stability	Tx mode	+/-0.01%	EMI4500	PASS

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	23.5 °C
Relative Humidity	20 to 75 %	34.1 %
Atmospheric pressure	N/A	1017 hPa
Test method deviation: N/A		
Supplementary information: N/A		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Antenna	EMITECH	3.5 cm	4653		
Cable	SUCOFLEX	N-3m	14379	17/08/2023	17/10/2025
Climatic enclosure	Secasi	SM600C	1670		
Multimeter	FLUKE	8808A	10382	12/07/2024	12/09/2025
Spectrum analyzer	Rohde & Schwarz	FSW43	14830	31/08/2022	28/04/2025
Software	Nexio	BAT EMC	0000		
Thermohygrometer	Testo	608-H1	7562	28/09/2023	28/11/2025

BAT-EMC software version: V3.18.0.26

Blank cells = Permanent validity

TEST SETUP PHOTO(S)



FREQUENCY STABILITY - TABULATED RESULTS					EMI4500
Test Case	Temperature (°C)	Power supply (Vdc)	Frequency (MHz)	Frequency error (%)	Limit (%)
Normal conditions	+25	5	13.560395	-	+/- 0.01
Extremes conditions	0	5	13.560435	0.00029	
	+60	5	13.560304	-0.00067	

EUT MODIFICATIONS	OPERATOR	TEST DATE	RESULT TAB.
N/A	MPA	29/01/2025	EMI4500

End of test report