

Wismar, 2024-10-21

Test Report #422.208.4 Rev.0

EMC tests on the devices/equipment:

VN202 mkII

Equipment under Test:

Description: oxygen analyzer
Model: VN202 **mkII**

Applicant/ Manufacturer: VANDAGRAPH Ltd.
15 Station Road
Cross Hills
BD20 7DT Keighley ,United Kingdom

Test laboratory: CEcert GmbH
Alter Holzhafen 19a
D-23966 Wismar, Germany

Summary of Test:

Tests	Standards	Result
Emission:		
Radiated emission	FCC Part 15 / 47 CFR (2024-09-26)	PASS

Explanation:

PASS – The EUT meets the test requirements. FAIL – The EUT does not meet the requirements N/A – Test is not applicable

Evaluation:

The Equipment under Test (EuT) meets the EMC requirements of the FCC Part 15 in the above listed specification.

Period of test: 2024-10-07

This test report with Appendix consists of **10** pages.

1. General information on the test item(s)

Description: oxygen analyzer
Model: VN202 mkII
Serial no.: --
Manufacturer/Customer: VANDAGRAPH Ltd.
Contact person: Mr. Ryan Swaine
Date of receipt of test items: 2024-09-24

Brief description:

EMC conformity test of an oxygen analyser for use in industrial and commercial application.
The test scope was defined by the manufacturer.

System frequencies:

Lowest frequency band in which the device operates:
not specified --> radiated test starts at 30 MHz

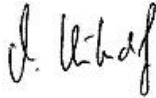

Highest frequency band in which the device operates:
<108 MHz (manufacturer specification) --> radiated test up to 1 GHz

Steps to EMC, suppressions:

- none

Participant in the tests: none

Responsible for the technical content of the test report:

	Name	Signature
Tested by	Marco Klüßendorf	
Approved by	Andreas Schenk	

Note:

The CEcert GmbH assures the applicant that the tests are carried out within the scope of the tests outlined under point 2 and in accordance with the test specifications outlined under point 3. Any exceptions or deviations will be clearly indicated.

The results contained in this test report are relevant exclusively to the item(s) submitted for testing. The CEcert GmbH is not liable for any conclusions and generalizations which may be drawn from the test results and applied to further samples and examples of the type of device represented by the item submitted for testing.

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Report history Log:

Ref.	Date of issue	Comment	Approved by
422.208.4 Rev.0	2024-10-21	first certification	Andreas Schenk

2. Test Specification

2.1. Emission

Applied standards:

FCC Part 15 / 47 CFR (2024-09-26)

Classification: unintentional radiator, class B digital device

Tests performed:

Test method:	Basic Standard:	Chapter:
Radiated disturbance (ER)	ANSI C63.4:2014	4.1.

Exceptions and explanations:

none

2.2. Susceptibility

none

2.3. Low frequency phenomena, line feedback

none

2.4. Applied non-standard methods

none

3. Specification of the device/equipment

3.1. Configuration

Description:	Model:	S/N.:	Manufacturer:	Notes:
Product:				
oxygen analyzer	VN202 mkII	--	VANDAGRAPH Ltd.	
Components:				
oxygen analyzer	VN202 mkII	--	VANDAGRAPH Ltd.	
oxygen sensor	R-17VAN	111167	VANDAGRAPH Ltd.	
Accessories/peripherals:				
--				
Simulators: none				
Software: not defined				

3.2. Cables and Lines

Interface:	Type/model/plug:	Length:	Shielding:	Comments:
Sensor line	Helix cable	< 3 m	yes	

3.3. Particulars related to EMC

System frequencies: --
 Earth / Grounding: none
 Shielding: none

3.4. Notes and/or sketches



Fig. 1: Test set-up radiated emissions (tested together with VN202)



Fig. 2: Equipment under Test

**Fig. 3: Label**

Dimension of EuT: 14 cm x 6 cm x 3 cm

3.5. Operating condition of the product

The status of the test object during the tests represented its normal area of deployment.

measurement mode: The EUT is switched on and measures the oxygen concentration of the ambient air.

Power supply: 3 Vdc (internal battery supplied – 2x PC1500 LR6 1,5Vdc)

Climatic conditions during the tests:

Ambient temperature: 15 °C - 35 °C (if not otherwise specified in this report)

Relatively air humidity: 25 % - 75 % (if not otherwise specified in this report)

Air pressure: 86 kPa - 106 kPa (860 mbar - 1060 mbar)

3.6. Simulation of operating conditions

None

3.7. Sampling particulars

The product was tested as a single device.

Measurements and Test Results

4. Emission

4.0.1 Particulars of measuring uncertainties and tolerance range

The calculated uncertainties and tolerance ranges of the Tests are in accordance with the requirements of IEC/CISPR 16-4.

4.0.2 Preliminary remarks and classification

Classification:

Class A: A digital device that is marketed for use in a commercial, industrial or business environment, exclusive of a device which is marketed for use by the general public or is intended to be used in the home.

Class B: A digital device that is marketed for use in a residential environment notwithstanding use in commercial, business and industrial environments. Examples of such devices include, but are not limited to, personal computers, calculators, and similar electronic devices that are marketed for use by the general public.

The device is classified as follows:

Class B

ISM equipment with internal frequencies lower than 100 MHz and below 500 watt.

4.0.3 Pre information

The test object was tested with the configuration and operating conditions described in section 3.

Notes on measuring the radiated measurements:

The spectrographs have a logarithmic frequency division. Measurements with the Peak-detector were used to assess the product. If these measuring values are in the range of the Quasi-Peak or Average limits, the frequencies are measured using the Quasi-Peak or Average detector. The observation time at the relevant frequencies will take at least 3 seconds.

4.1. Radiated Emissions

Basic standard: FCC Part 15 / 47 CFR (2024-09-26)

Measuring set-up: ANSI C63.4

Measuring Equipment:

Description	Model	Identifier	Manufacturer	Cal/Ver. Date	Cal//Ver. Due
EMI Receiver (9 kHz - 7 GHz)	ESCI 7	002/03	R&S	2024,03	2025,03
Two-line-V-artificial mains network 16 A	ESH3-Z5	003/01	R&S	2023,04	2026,03
Chase antenna (30 MHz - 1GHz)	CBL 6111B	008/06	EMC	2023,03	2026,03
Data logger temp./humid. *	Testo 150 TUC4, Probe 0572 2164	065/25	Testo	2024,01	2025,03
semi anechoic chamber	3- Meter	070/06	Frankonia	2022,02	2025,03
Measurement cable 14 m 3 m chamber	LMR-400	PHM 013/05	arnotec	2024,09	2025,09
EMC test software	V2022.3.06	PHM 015/08	DARE	N/A	N/A

*) used for ambient monitoring
ICO initial calibration only

Measuring process:

A prescan with in horizontal and vertical polarization was done at the beginning. The accessories/peripherals were placed insidee the test set-up.

The radiated emissions were measured in the whole frequency range with the maximum level. The position of the equipment and the antenna height were changed during the measurements.

Measurement results:

Operating condition	Frequency range [MHz]	Polarization	Position of the EUT / Antenna height	Test results diagram / table	Compliance Pass/ Fail/ N/A
measurement mode	30 – 1000	horizontal, vertical	0 - 360° / 1 - 4 m	see Appendix	PASS

Measuring distance: 3 m

Receiver bandwidth: 100 kHz

During this EMC test several relevant interference emissions from the test object could be determined. Final test results (frequencies, max hold level) see appendix.

The measurement environment was the shielded, absorber-lined hall.

Measurement results:

According to the above test set-up the equipment under test specified in chapter 3 meets the radiated emission requirements in accordance with FCC Part 15 / 47 CFR (2024-09-26).

Appendix List:

Test (description)	Page
Radiated emission (Peak-detector) Max-Hold-Graph; 30 MHz – 1000 MHz	10

CEcert GmbH

EUT:

Serial Number:

Manufacturer:

Operating Condition:

Comment:

Radiated Emissions

VN202 mkII

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VANDAGRAPH Ltd.

measurement mode

Scan Settings:

Frequency Range: 30 MHz – 1000 MHz

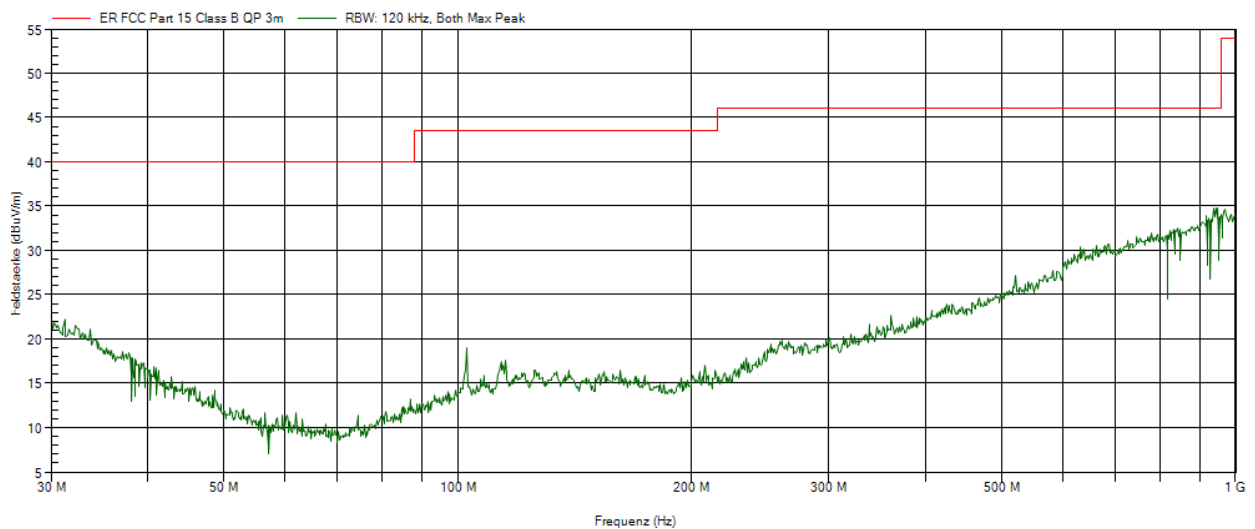
Receiver Bandwidth: 100 kHz

Measure Time: 15 ms (Prescan), 3 s (Final Measurement)

Measurement Distance: 3 m

Prescan (MAX Hold Graph):

RadiMation



Detected Peaks:

none