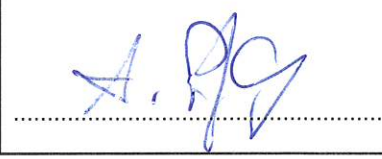


EMC TEST REPORT FCC CFR Title 47 / Chapter I / Subchapter A / Part 15 / Subpart B ISED ICES-003 Issue 7	
Report Reference No	G0M-2207-1565-EF0115B-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	    A2LA - Registration number: 1983.01 (ISED) ISED wireless device testing laboratory: CN 3470A DAKKS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	Dräger MSI GmbH
Address	Rohrstraße 32 58093 Hagen Germany
Test Specification Standard(s)	FCC CFR Title 47 / Chapter I / Subchapter A / Part 15 / Subpart B ISED ICES-Gen Issue 1 ; Amendment 1 (February 2021) ISED ICES-003 Issue 7 ANSI C63.4:2014+A1:2017
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	Wireless gas detection transmitter
Model(s)	X-node 1
Additional Model(s)	None
Brand Name(s)	X-node 1
Hardware Version(s)	EU-F7a
Software Version(s)	2.1.5
FCC-ID	2A9SW-LR01
IC	N/A
Test Result	PASSED

Possible test case verdicts:		
required by standard but not tested	N/T	
not required by standard	N/R	
required by standard but not appl. to test object	N/A	
test object does meet the requirement	P(PASS)	
test object does not meet the requirement	F(FAIL)	
Testing:		
Date of receipt of test item	2022-10-04	
Report:		
Compiled by	Stephan Liebich	
Tested by (+ signature) (Responsible for Test)	Stephan Liebich	
Approved by (+ signature) (Test Lab Engineer)	Andreas Pflug	
Date of Issue	2023-02-06	
Total number of pages	43	
General Remarks:		
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. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.		
Statement concerning the uncertainty of the measurement systems used for decisions on conformity (decision rule): The Decision Rule is applied on the basis of CISPR 16-4-2 and/or IEC 61000-4-x (TR 61000-1-6) and their national publications. These standards provide guidance on how to calculate and apply measurement uncertainty whilst providing maximum uncertainties allowance. In all cases due consideration will be given to ILAC-G8:09/2019. Compliance or non-compliance with a disturbance limit is determined in the following manner. - If U_{lab} is less than or equal to U_{cispr}, then: compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit; non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit. - If U_{lab} is greater than U_{cispr}, then: compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit; non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit. Where appropriate for the test, for example for EMC pulsed immunity tests, the laboratory has demonstrated, by calibrating its equipment and facilities, that it complies with the above requirements and therefore no allowance of uncertainties has been given to the tolerances.		
Additional Comments:		
None		

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
EUT	Equipment Under Test
FCC	Federal Communications Commission
ISED	Innovation, Science and Economic Development Canada
T _{NOM}	Nominal operating temperature
V _{NOM}	Nominal supply voltage

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2023-02-06-	Initial Release	-

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1 Equipment (Test Item) Under Test

Description	Wireless gas detection transmitter		
Intended Use	The wireless Dräger X-node is a measurement and analysis system for continuously monitoring the concentration of a gas. It simultaneously measures the ambient temperature, humidity and pressure. The measured values can be transferred to a database in real time via a LoRa network and to your smartphone via Bluetooth®.		
Model	X-node 1		
Additional Model(s)	None		
Brand Name(s)	X-node 1		
Hardware Version(s)	EU-F7a		
Software Version(s)	2.1.5		
Number of tested samples	1		
Sample Identification	EUT #	Sample-ID	Serial Number
	EUT 1	41711	KSRC-0382
EUT Dimensions [cm]	9 x 16 x 9		
FCC-ID	2A9SW-LR01		
IC	N/A		
Class	Class B		
Equipment type	Table top		
Highest internal frequency [MHz]	2480 (BLE)		
Protective Earth	No		
Functional Earth	No		
Radio Module 1	Type	Bluetooth Low Energy (BLE)	
	Model	ISP1807	
	Manufacturer	Insight SIP	
	FCC-ID	2AAQS-ISP180	
	IC	11306A-ISP1807	
Radio Module 2	Type	Short Range Devices (SRD) LoRa	
	Model	SX1261	
	Manufacturer	Semtech	
	FCC-ID	N/A	
	IC	N/A	
Supply Voltage	V _{NOM}	3.7 V DC via internal rechargeable Lithium batteries (2x LP953566) 5 V DC via USB connection	
AC/DC-Adaptor	None		
Manufacturer	Dräger MSI GmbH Rohrstraße 32 58093 Hagen Germany		
Factory	Dräger MSI GmbH Rohrstraße 32 58093 Hagen Germany		

1.1 Equipment Ports

Name	Type	Attributes	Comment
Power	DC/IO	Count: 1 Cable length [m]: 1.8 Direction: IO Service only: No Shielded: Yes	Charging/data transfer; Shield of the cable is connected on both sides (EUT and Support Equipment) micro-USB connector
Description:			
AC	AC mains power input/output port		
DC	DC power input/output port		
BAT	DC power input port connected to external battery		
IO	Input/Output port		
TP	Telecommunication port		
NE	Non-electrical port		

1.2 Equipment Photos - Internal

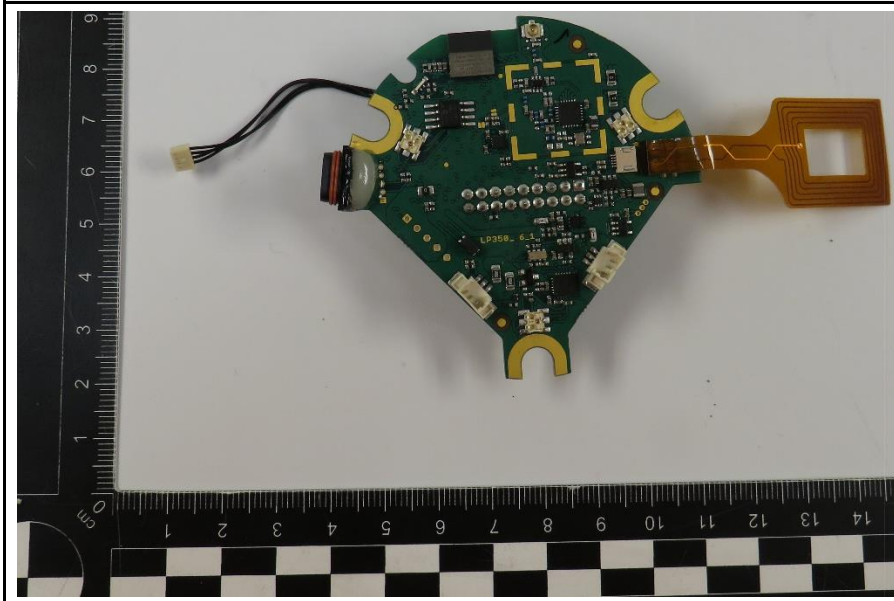
01 EUT WITH OPEN COVER



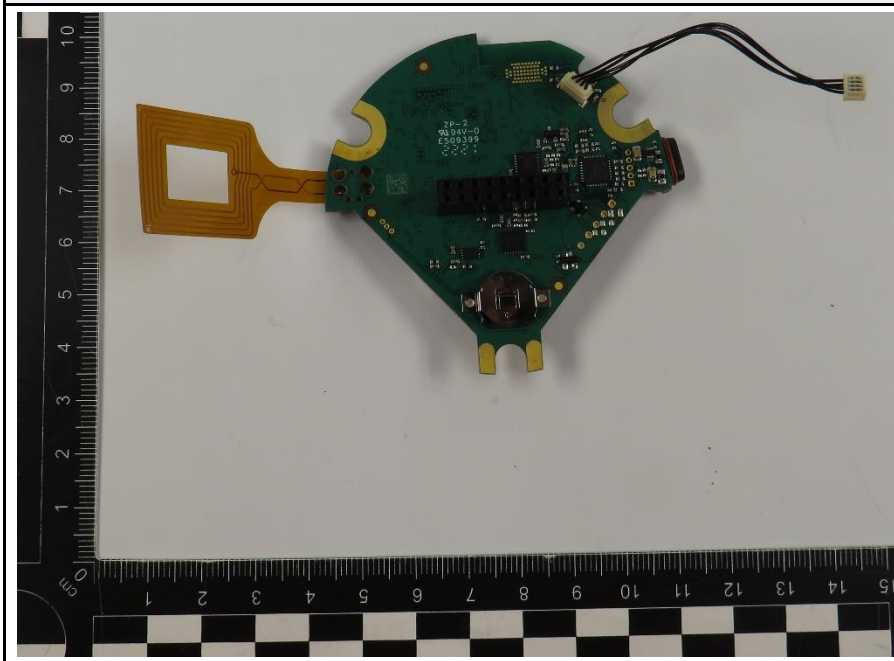
02 EUT WITHOUT COVER



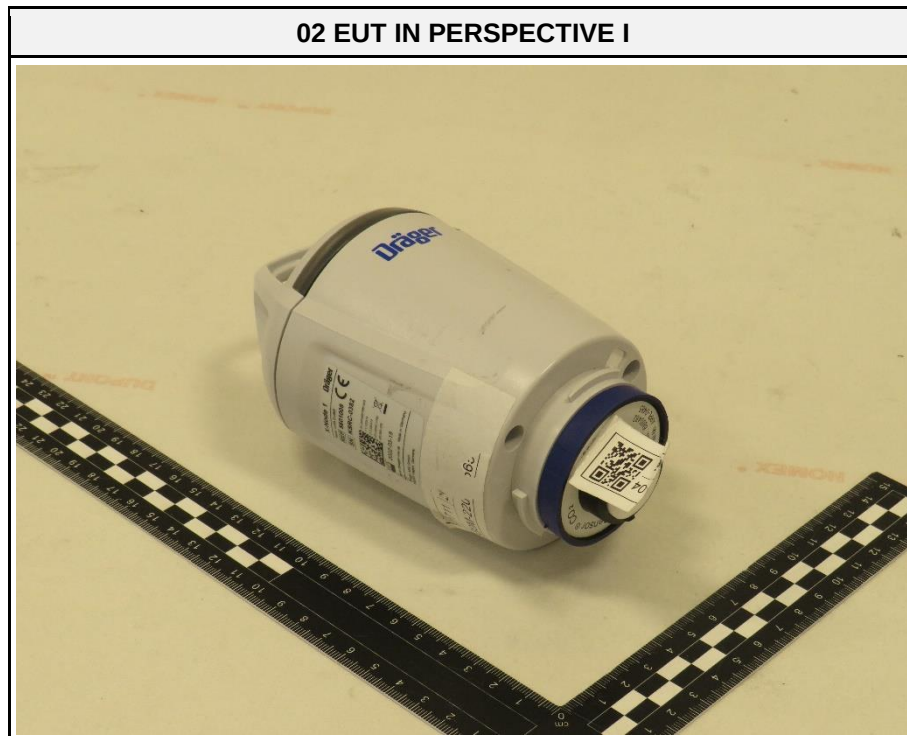
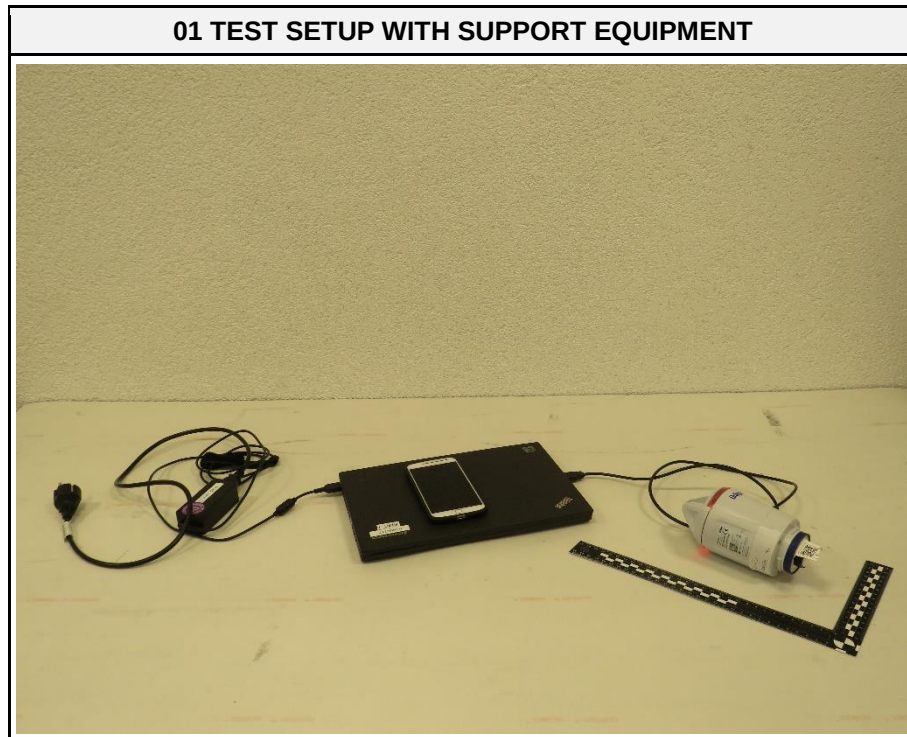
03 EUT PCB TOP SIDE



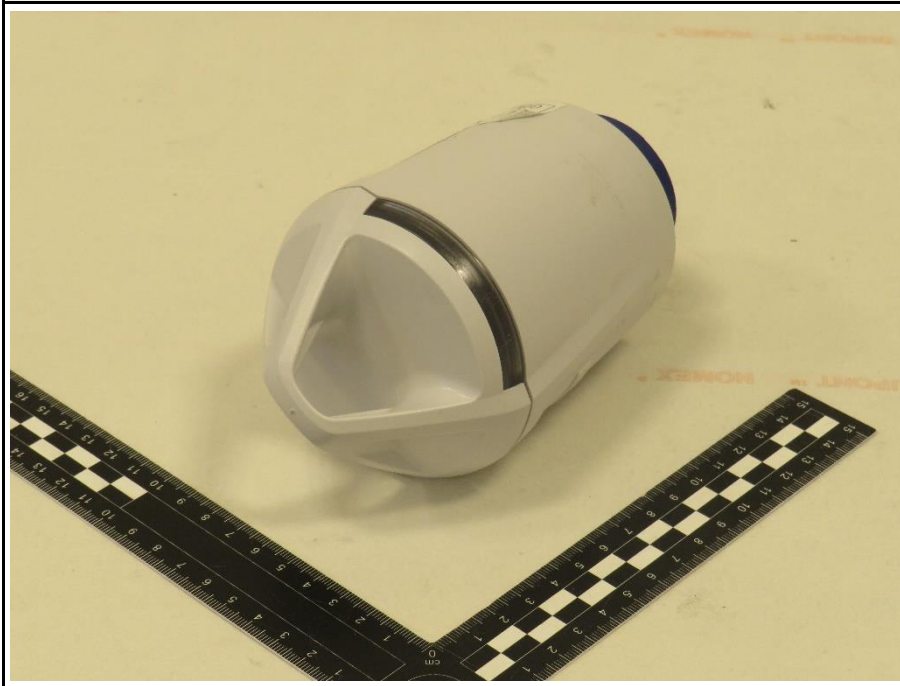
04 EUT PCB BOTTOM SIDE



1.3 Equipment Photos - External



03 EUT IN PERSPECTIVE II



04 EUT REAR SIDE



05 EUT FRONT SIDE



06 EUT RIGHT SIDE



07 EUT LEFT SIDE



08 EUT TOP SIDE



09 EUT BOTTOM SIDE



10 EUT LABEL



11 EUT USB-connector closed



12 EUT USB-connector open (only for documentation)



13 SUPPORT EQUIPMENT SENSOR



14 EUT Battery



15 Label FCC only

X-Node 1 Dräger

FCC ID: 2A9SW-LR01

Radio: LoRa US915

REF 5601026



SN KSPH-0111



(01)04048675735656

(11)230124

(17)230124

(21)KSPH-0111

(93)5601026



2023-01-24

www.draeger-msi.de Made in Germany

Dräger MSI GmbH
58093 Hagen, Germany

1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	DrägerSensor	Dräger	6800482	Customer Support Equipment
AE	Laptop	lenovo	X250	--
AE	AC/DC-Adapter	lenovo	ADLX45NLC3A	--
AE	Smartphone	Motorola	Moto G4 Plus	--
SW	App	Dräger	Dräger X-node V1.8.1	Customer Support Equipment
CBL	USB cable	AWM	E314459	Customer Support Equipment; Cable length is 1 m Micro USB to USB A
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
MON	Monitoring Equipment			
SW	Software			
CBL	Connecting Cable			
Comment: --				

1.5 Operational Modes

Mode #	Description
1	EUT measures permanently temperature, CO ₂ concentration, air pressure and humidity. EUT sends/receives permanently status information to/from Smartphone via BLE (2.4 GHz) connection. EUT sends permanently status information via SRD (903.822 MHz) connection. TX-mode, power 15 dBm.
2	EUT measures permanently temperature, CO ₂ concentration, air pressure and humidity. EUT sends/receives permanently status information to/from Smartphone via BLE (2.4 GHz) connection. EUT sends permanently status information via SRD (903.822 MHz) connection. Internal battery is charging and USB connection is established.
Comment: --	

1.6 EUT Configuration

Configuration #	Description
1	EUT is powered by 3.7 V DC via internal rechargeable Lithium battery. EUT is connected with Smartphone via BLE connection (monitored with App). The DrägerSensor is inserted into the EUT.
2	EUT is connected with Smartphone via BLE connection (monitored with App). EUT is powered by 5 V DC via USB connection. USB connection is established with Laptop. Laptop is powered by dedicated AC/DC-adapter. Dedicated AC/DC-adapter is powered by external laboratory power supply unit. The DrägerSensor is inserted into the EUT.
Comment: --	

1.7 Sample emission level calculation

The following is a description of terms and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading:

This is the reading obtained on the spectrum analyser in dBµV. Any external preamplifiers used are taken into account through internal analyser settings.

A.F.:

This is the antenna factor for the receiving antenna. It is a conversion factor, which converts electric fields strengths to voltages, which can be measured directly on the spectrum analyser. It is treated as a loss in dB. Cable losses have been included with the A.F. to simplify the calculations. The antenna factor is used in calculations as follows:

$$\text{Reading on Analyser (dB}\mu\text{V)} + \text{A.F. (dB/m)} = \text{Net field strength (dB}\mu\text{V/m)}$$

Net:

This is the net field strength measurement (as shown above).

Limit:

This is the FCC Class B radiated emission limit (in units of dBµV/m). The FCC limits are given in units of µV/m. The following formula is used to convert the units of µV/m to dBµV/m:

$$\text{Limit (dB}\mu\text{V/m)} = 20 \cdot \log(\mu\text{V/m})$$

Margin:

This is the margin of compliance below the FCC limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Example only:

Reading + AF	= Net Reading	:	Net reading - FCC limit	= Margin
+21.5 dBµV + 26 dB/m	= 47.5 dBµV/m	:	47.5 dBµV/m - 57.0 dBµV/m	= -9.5 dB

2 Result Summary

Title 47 CFR Part 15B, ISED ICES-003 Issue 7				
Reference	Requirement	Reference Method	Result	Remarks
Emission				
FCC 15.109 ICES-003, 3.2.2	Radiated emissions	ANSI C63.4:2014 +A1:2017	PASS	--
FCC 15.107 ICES-003, 3.2.1	AC power line conducted emissions	ANSI C63.4:2014 +A1:2017	PASS	--
Comment: --				

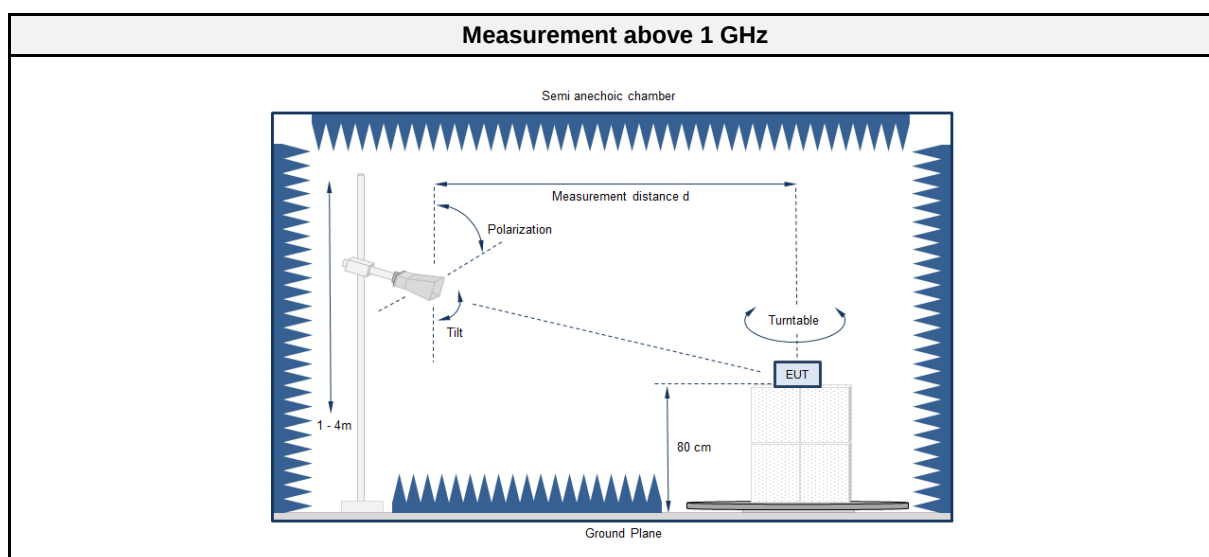
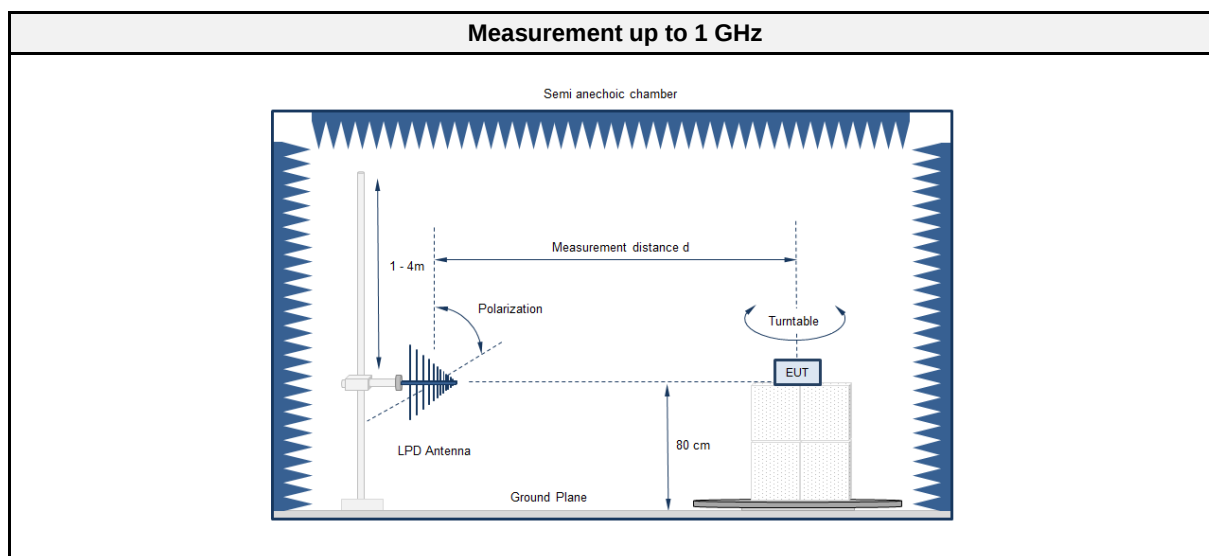
Possible Test Case Verdicts	
PASS	Test object does meet the requirements
FAIL	Test object does not meet the requirements
N/T	Required by standard but not tested
N/R	Not required by standard for the test object

2.1 Test Conditions and Results - Radiated emissions acc. to ANSI C63.4

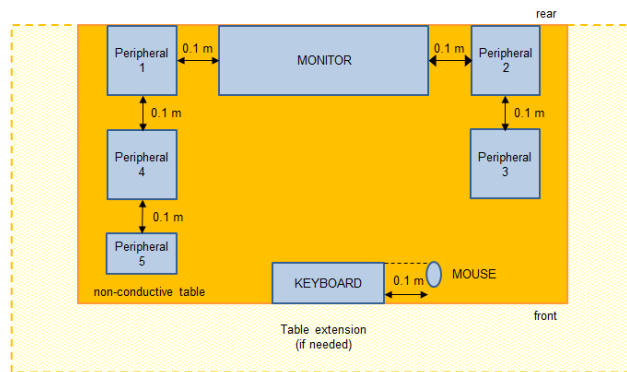
2.1.1 Information

Test Information	
Reference	FCC 15.109, ICES-003, 3.2.2
Reference method	ANSI C63.4:2014+A1:2017 Section 8
Equipment class	Class B
Equipment type	Table top
Highest internal frequency [MHz]	2480
Measurement range	30 MHz to 13000 MHz
Temperature [°C]	21 – 24
Humidity [%]	23 – 30
Operator	Stephan Liebich
Date	2022-12-15 and 2022-12-16

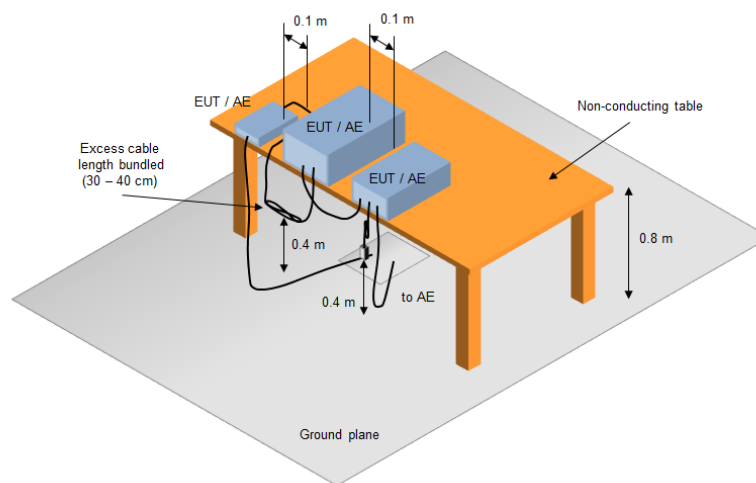
2.1.2 Setup *Table top*:



Equipment placement - Table top



Test Setup



2.1.3 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	Radimation	2020.1.8

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic chamber (NSA)	Frankonia	AC1	EF00062	2022-11	2025-11
Anechoic chamber (SVSWR)	Frankonia	AC 1	EF01011	2022-11	2023-11
Programmable AC Source	Chroma ATE Inc.	61604	EF01068	2021-07	2023-07
EMI Test Receiver	Keysight	N9038A-526/WXP	EF01070	2021-07	2023-01
Trilog Broadband Antenna	Schwarzbeck	VULB 9168	EF01824	2022-10	2023-10
Horn antenna	Schwarzbeck	BBHA 9120D	EF01561	2021-11	2024-11
Climatic Sensor	Embedded Data Systems, LLC.	2800100000254 17E	EF01054	2022-04	2023-04

2.1.4 Procedure

Exploratory measurement Table top
- The EUT was placed on a non-conductive table at a height of 0.8m. - The EUT and support equipment, if needed, were set up to simulate typical usage. - Cables, of type and length specified by the manufacturer, were connected to at least one port of each type and were terminated by a device or simulating load of actual usage. - The antenna was placed at a distance of 3 or 10 m. - The received signal was monitored at the measurement receiver. - This procedure has to be performed in both antenna polarizations, horizontal and vertical. - The arrangement of the equipment with the maximum emission level is shown on the setup picture at item 2.1.2

Final measurement 3m Table top
- The EUT was placed on a 0.8 m non-conductive table at a 3 or 10 m distance from the receive antenna. The antenna output was connected to the measurement receiver. - A biconical antenna was used for the frequency range 30 – 200 MHz, a logarithmic periodical antenna was used for the frequency range from 200 – 1000 MHz. Above one 1 GHz a Double Ridged Broadband Horn antenna was used. The antenna was placed on an adjustable height antenna mast. A broadband hybrid antenna was used for the frequency range 30 – 1000 MHz. Above 1 GHz the antenna was placed on an adjustable height antenna mast. If required, in the range 1- 18 GHz a double ridged broadband horn antenna was used, from 18 – 26.5 GHz the AT4560 and above 26.5 GHz the antenna CBL26402075. - The EUT and cable arrangement were based on the exploratory measurement results. - Emissions were maximized at each frequency by rotating the EUT and adjusting the receive antenna height and polarization. The maximum values were recorded. - The test data of the worst-case conditions were recorded and shown on the next pages.

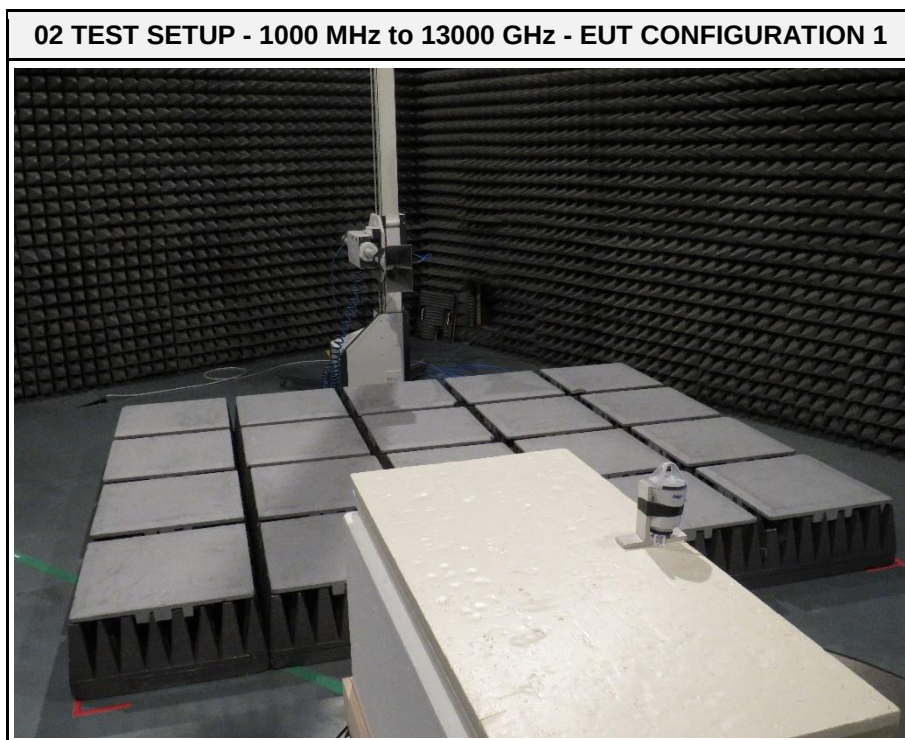
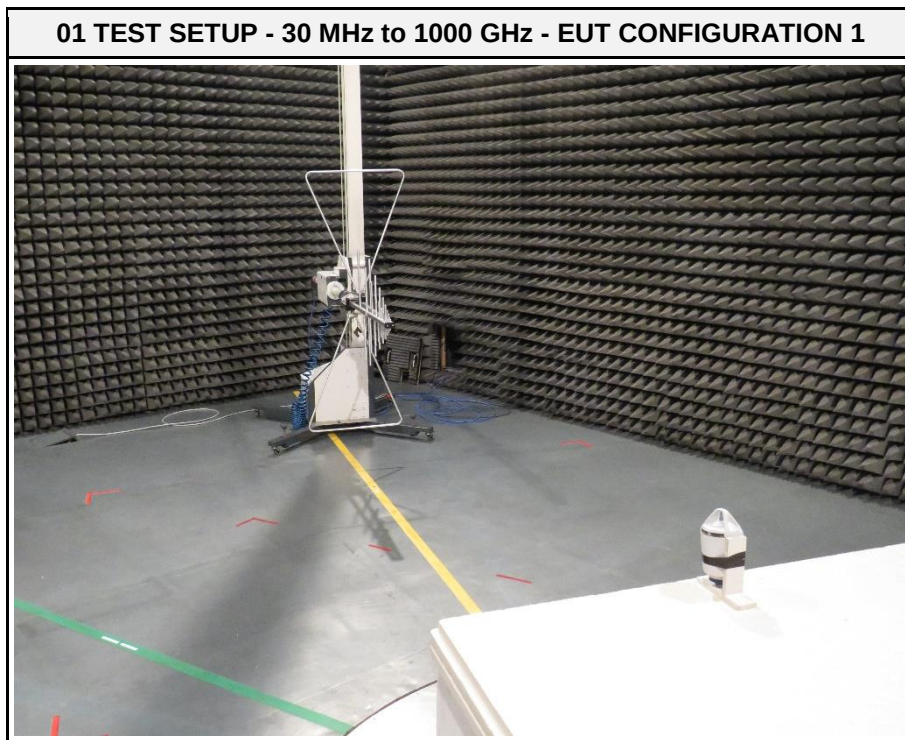
2.1.5 Limits

Class B @ 3 m		
Frequency [MHz]	Detector	Limit [dB μ V/m]
30 - 88	Quasi-peak	40
88 - 216	Quasi-peak	43.5
216 - 960	Quasi-peak	46
960 - 1000	Quasi-peak	54
> 1000	Peak	74
	Average	54

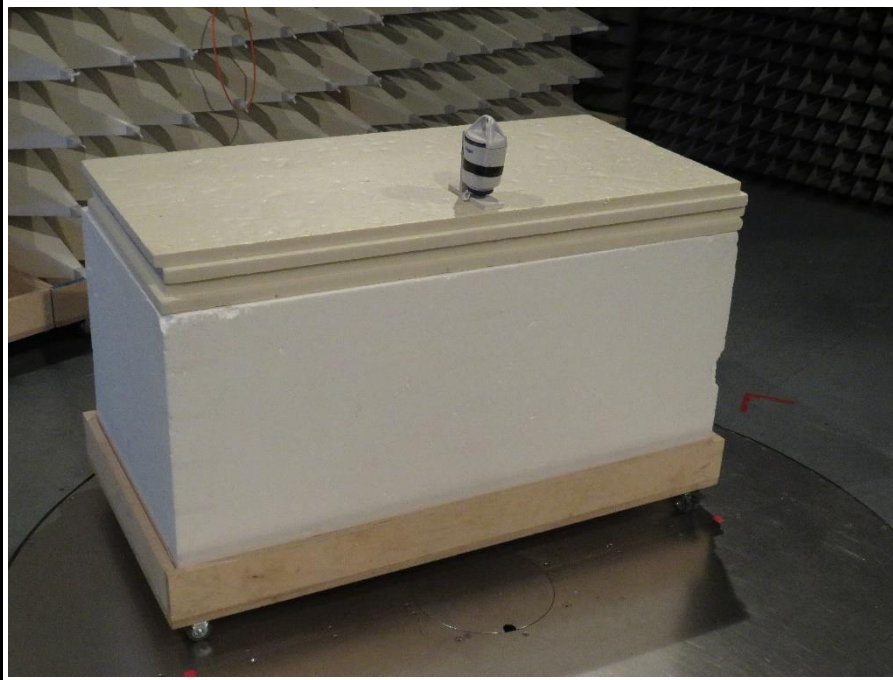
2.1.6 Results

Test Results			
Operational mode	EUT Configuration	Verdict	Remark
1	1	PASS	3.7 V DC
2	2	PASS	5 VDC via USB

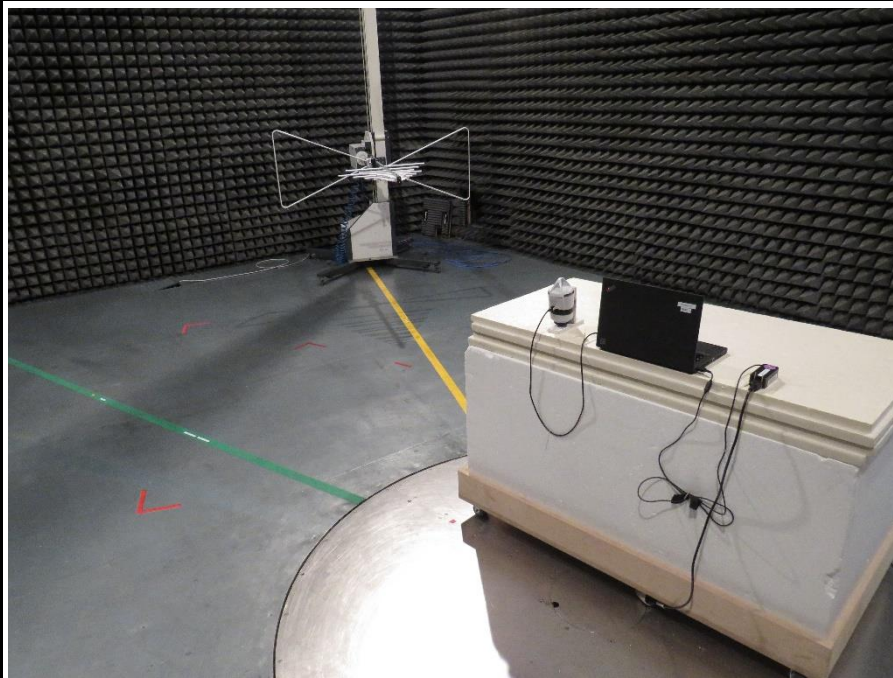
2.1.7 Setup Photos



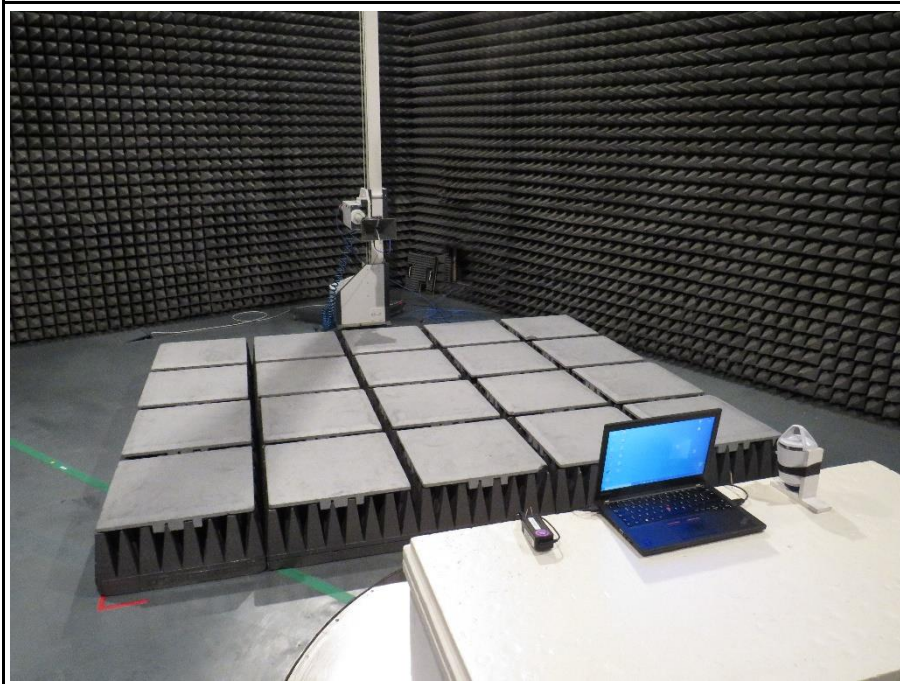
03 TEST SETUP - FOCUS - EUT CONFIGURATION 1



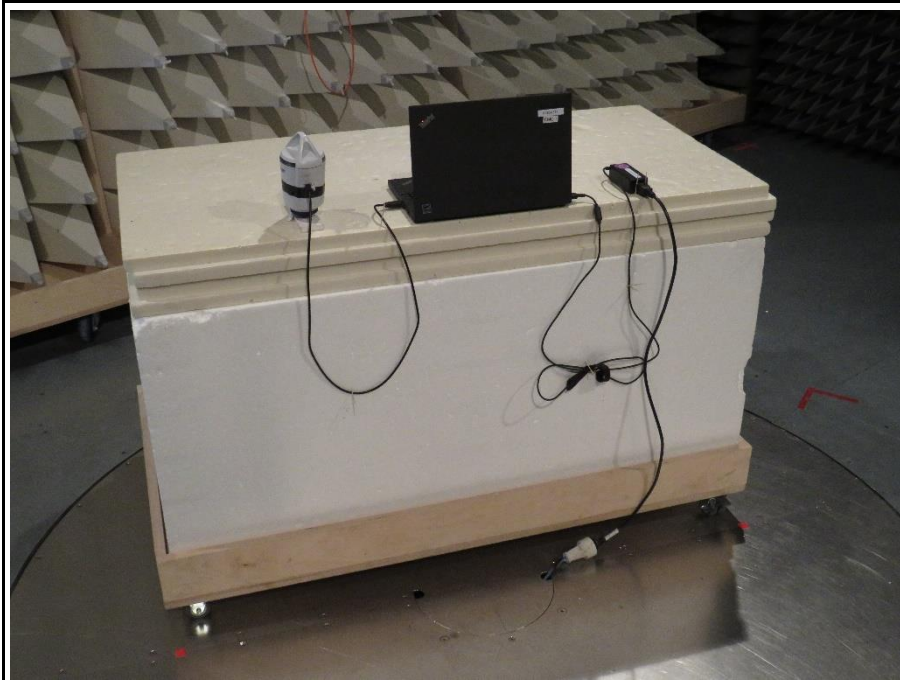
04 TEST SETUP - 30 MHz to 1000 GHz - EUT CONFIGURATION 2



05 TEST SETUP - 1000 MHz to 13000 GHz - EUT CONFIGURATION 2



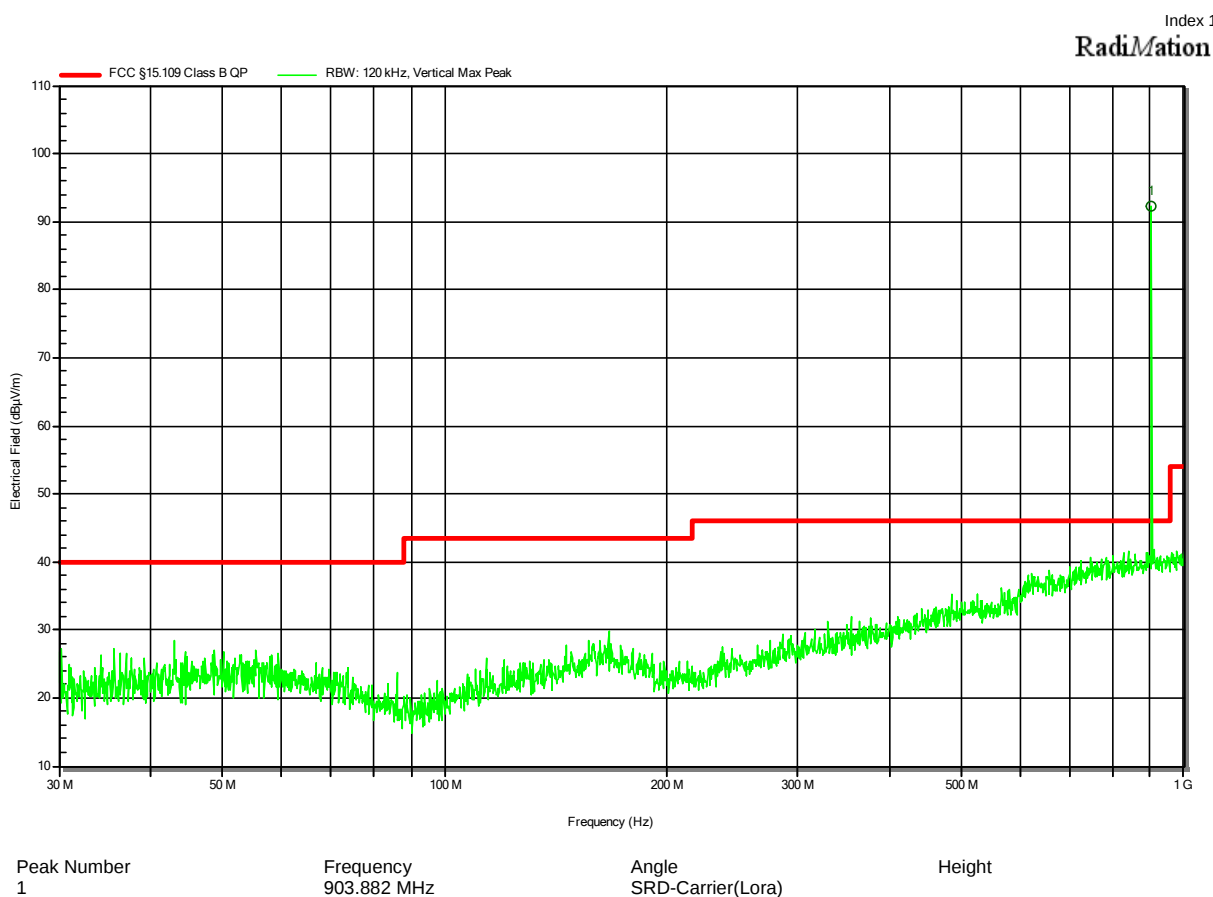
06 TEST SETUP - FOCUS - EUT CONFIGURATION 2



2.1.8 Records

Radiated emissions according to FCC part 15B

Project Number: G0M-2207-1565
 Applicant: Dräger MSI GmbH
 Model Description: Wireless gas detection transmitter
 Model: X-node 1
 Test Sample ID: 41711
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Liebich
 Test Date: 2022-12-15
 Operating Conditions: ambient temperature: 23 °Celsius
 power input: 3.7 V DC via internal rechargeable Lithium battery
 Antenna: Schwarzbeck VULB 9168, Vertical
 Measurement Distance: 3m
 Operational Mode: 1
 EUT Configuration: 1
 Note 1: antenna 1 m
 table -120°

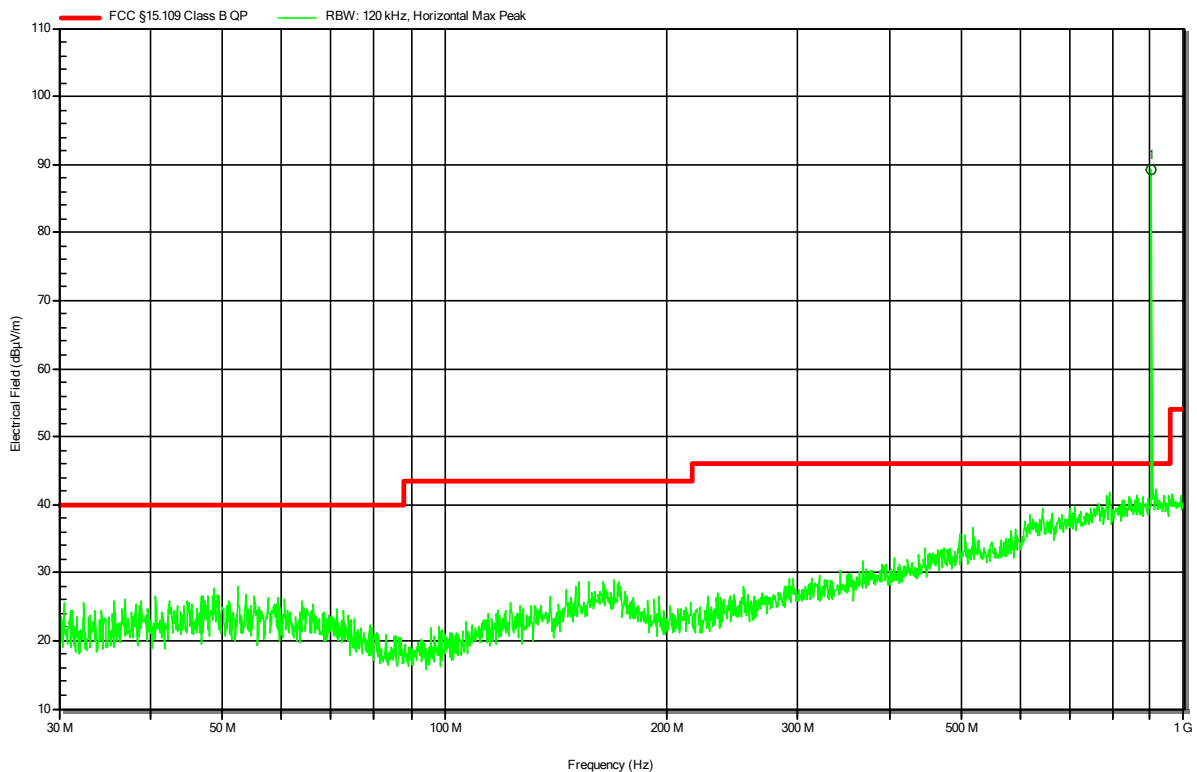


Radiated emissions according to FCC part 15B

Project Number: G0M-2207-1565
 Applicant: Dräger MSI GmbH
 Model Description: Wireless gas detection transmitter
 Model: X-node 1
 Test Sample ID: 41711
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Liebich
 Test Date: 2022-12-15
 Operating Conditions: ambient temperature: 23 °Celsius
 power input: 3.7 V DC via internal rechargeable Lithium battery
 Antenna: Schwarzbeck VULB 9168, Horizontal
 Measurement Distance: 3m
 Operational Mode: 1
 EUT Configuration: 1
 Note 1: antenna 1.7 m
 table -90°

Index 2

RadiMation



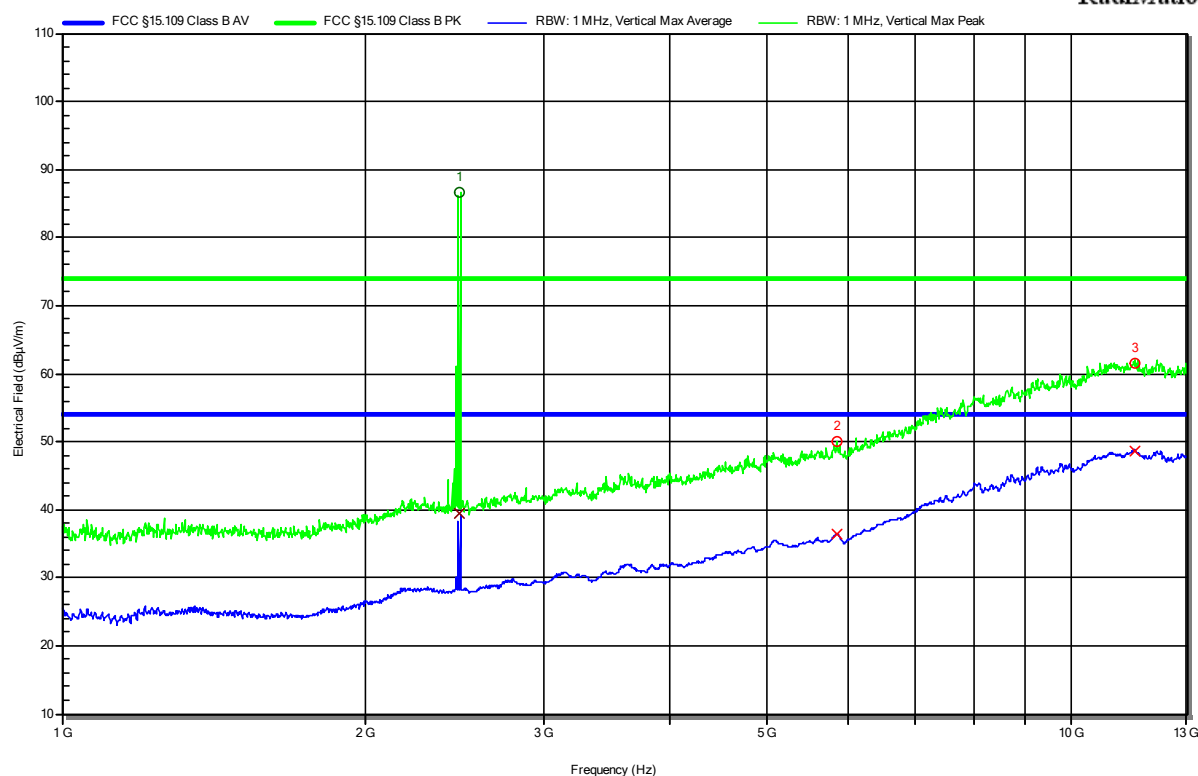
Peak Number	Frequency	Angle	Height
1	903.882 MHz	SRD-Carrier	

Radiated emissions according to FCC part 15B

Project Number: G0M-2207-1565
Applicant: Dräger MSI GmbH
Model Description: Wireless gas detection transmitter
Model: X-node 1
Test Sample ID: 41711
Test Site: Eurofins Product Service GmbH
Operator: Mr. Liebich
Test Date: 2022-12-16
Operating Conditions: ambient temperature: 21 °Celsius
power input: 3.7 V DC via internal rechargeable Lithium battery
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement Distance: 3m
Operational Mode: 1
EUT Configuration: 1
Note 1: --

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RadiMation



Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	2.479 GHz	BLE-Carrier					
2	5.851 GHz	50.01 dBμV/m	73.98 dBμV/m	-23.97 dB	Pass	0 degrees	1 m
3	11.542 GHz	61.5 dBμV/m	73.98 dBμV/m	-12.48 dB	Pass	0 degrees	1 m

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	Angle	Height
1	2.479 GHz	BLE-Carrier					
2	5.851 GHz	36.38 dBμV/m	53.98 dBμV/m	-17.6 dB	Pass	0 degrees	1 m
3	11.542 GHz	48.7 dBμV/m	53.98 dBμV/m	-5.28 dB	Pass	0 degrees	1 m

Test Report No.: G0M-2207-1565-EF0115B-V01

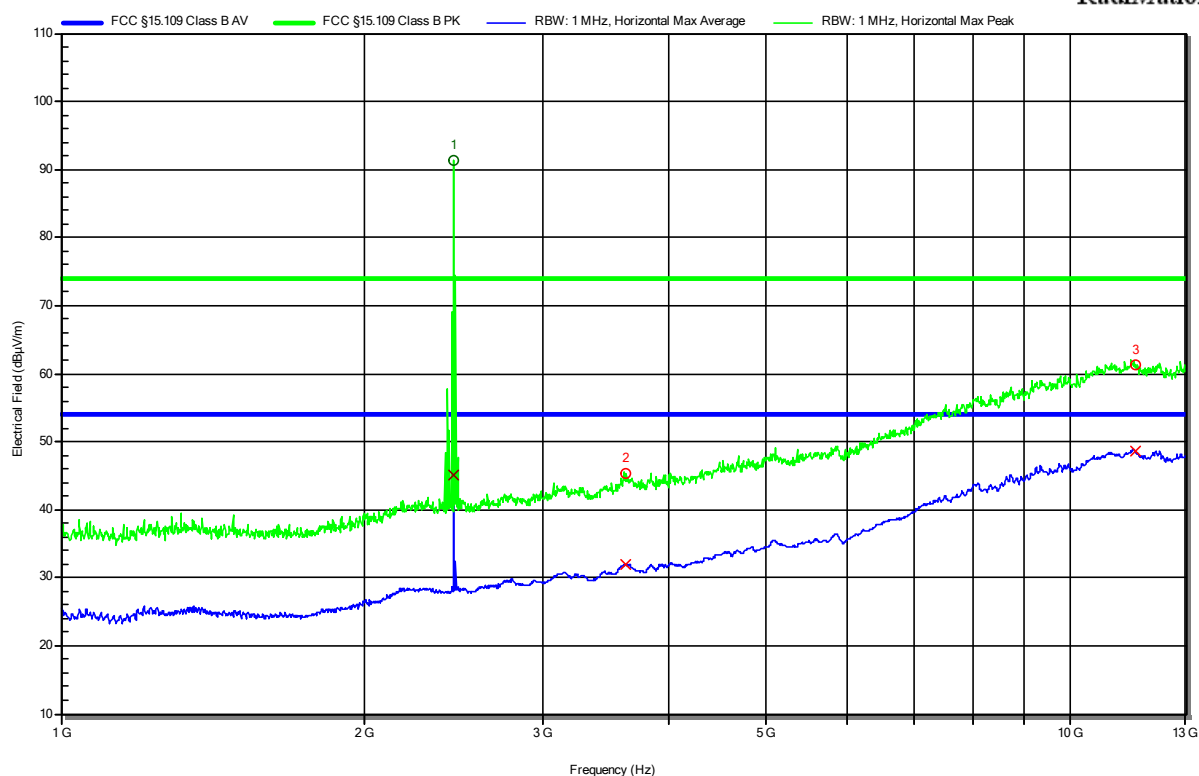
Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated emissions according to FCC part 15B

Project Number: G0M-2207-1565
 Applicant: Dräger MSI GmbH
 Model Description: Wireless gas detection transmitter
 Model: X-node 1
 Test Sample ID: 41711
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Liebich
 Test Date: 2022-12-16
 Operating Conditions: ambient temperature: 21 °Celsius
 power input: 3.7 V DC via internal rechargeable Lithium battery
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement Distance: 3m
 Operational Mode: 1
 EUT Configuration: 1
 Note 1: --

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RadiMation



Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	2.448 GHz	BLE-Carrier					
2	3.627 GHz	45.33 dBμV/m	73.98 dBμV/m	-28.65 dB	Pass	90 degrees	1 m
3	11.574 GHz	61.21 dBμV/m	73.98 dBμV/m	-12.77 dB	Pass	90 degrees	1 m

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	Angle	Height
1	2.448 GHz	BLE-Carrier					
2	3.627 GHz	31.88 dBμV/m	53.98 dBμV/m	-22.1 dB	Pass	90 degrees	1 m
3	11.574 GHz	48.72 dBμV/m	53.98 dBμV/m	-5.26 dB	Pass	90 degrees	1 m

Test Report No.: G0M-2207-1565-EF0115B-V01

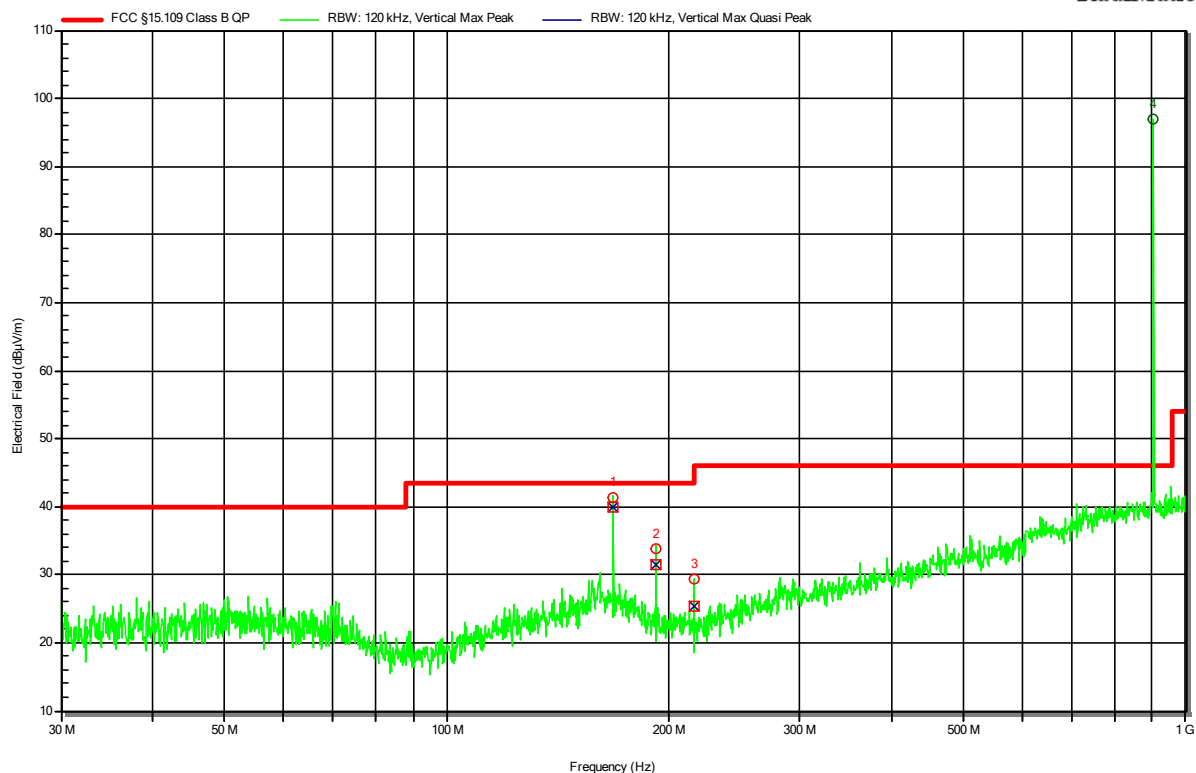
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

**Radiated emissions
according to FCC part 15B**

Project Number: G0M-2207-1565
 Applicant: Dräger MSI GmbH
 Model Description: Wireless gas detection transmitter
 Model: X-node 1
 Test Sample ID: 41711
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Liebich
 Test Date: 2022-12-15
 Operating Conditions: ambient temperature: 23 °Celsius
 power input: 5 V DC via USB connection
 Antenna: Schwarzbeck VULB 9168, Vertical
 Measurement Distance: 3m
 Operational Mode: 2
 EUT Configuration: 2
 Note 1: --

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RadiMation



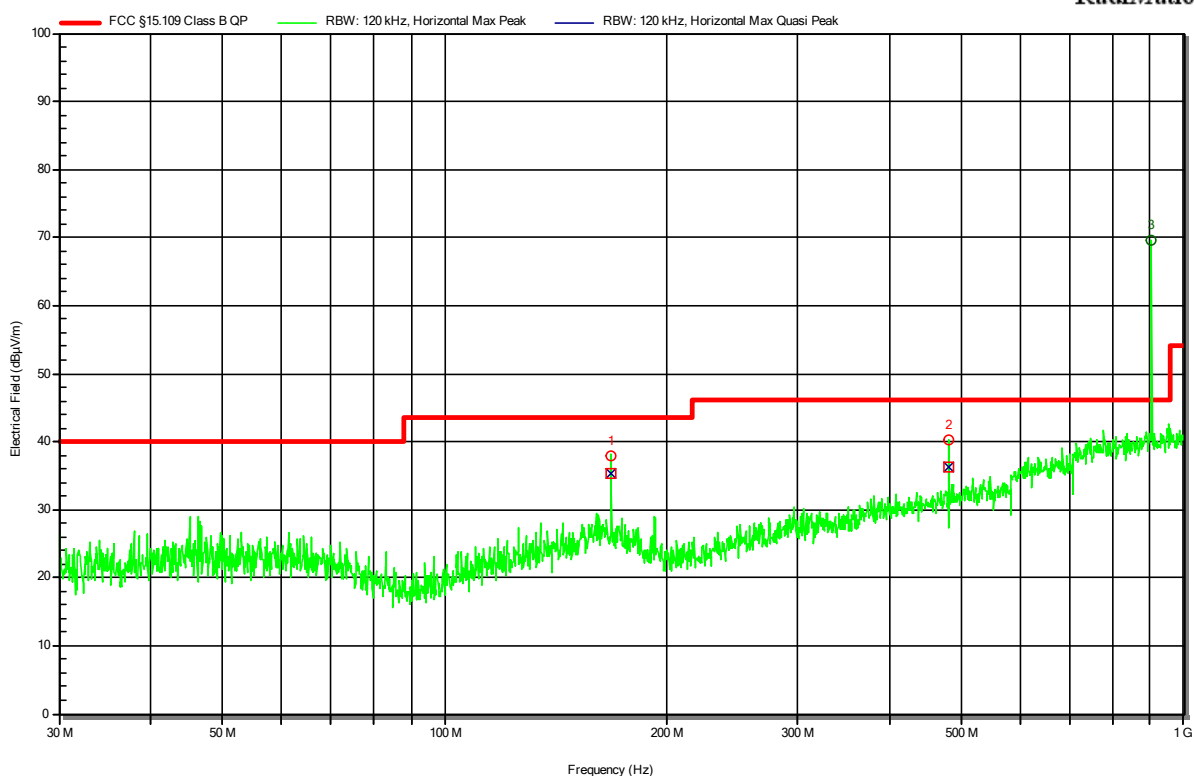
Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	168.003 MHz	39.88 dBμV/m	43.52 dBμV/m	-3.64 dB	Pass	-120 degrees	1 m
2	192.003 MHz	31.46 dBμV/m	43.52 dBμV/m	-12.06 dB	Pass	-120 degrees	1 m
3	215.996 MHz	25.29 dBμV/m	43.52 dBμV/m	-18.23 dB	Pass	-120 degrees	1 m
4	903.882 MHz	SRD-Carrier(LoRa)					

Radiated emissions according to FCC part 15B

Project Number: G0M-2207-1565
Applicant: Dräger MSI GmbH
Model Description: Wireless gas detection transmitter
Model: X-node 1
Test Sample ID: 41711
Test Site: Eurofins Product Service GmbH
Operator: Mr. Liebich
Test Date: 2022-12-15
Operating Conditions: ambient temperature: 23 °Celsius
power input: 5 V DC via USB connection
Antenna: Schwarzbeck VULB 9168, Horizontal
Measurement Distance: 3m
Operational Mode: 2
EUT Configuration: 2
Note 1: --

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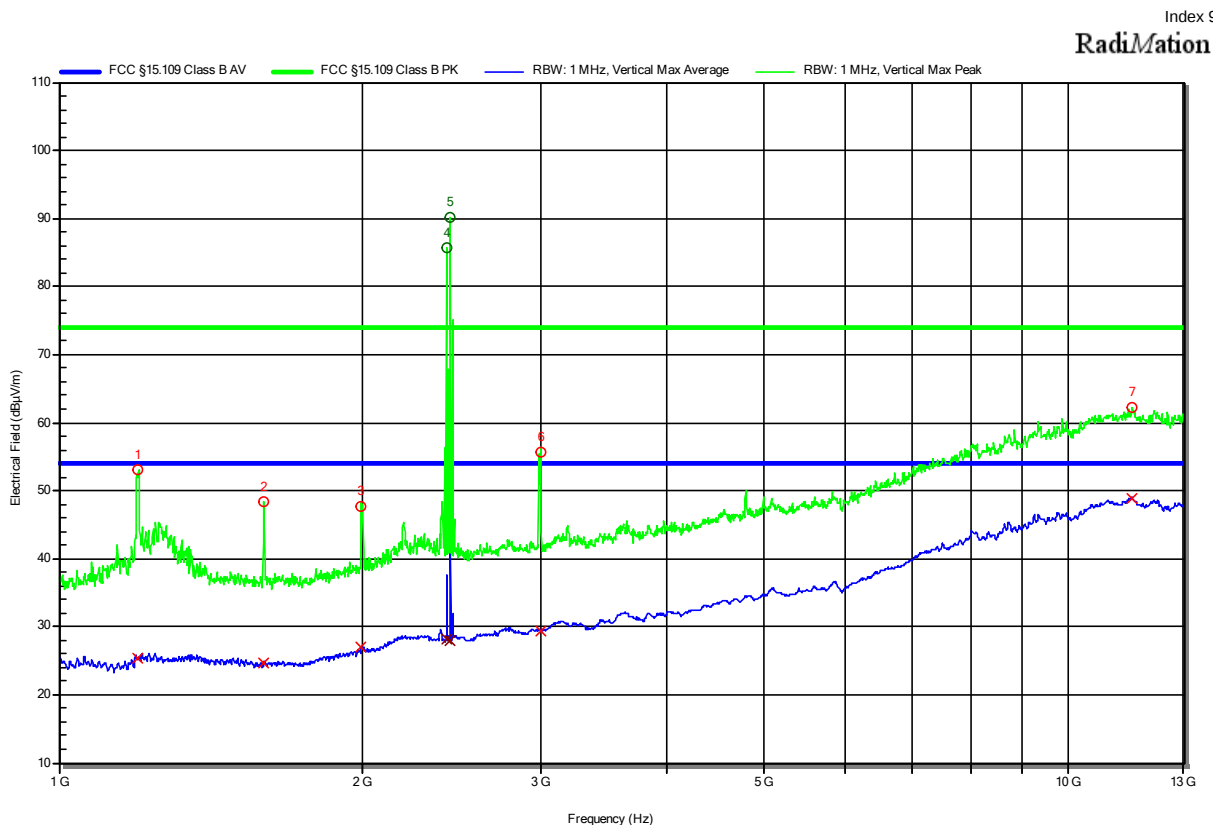
RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	167.997 MHz	35.35 dBμV/m	43.52 dBμV/m	-8.17 dB	Pass	90 degrees	1.7 m
2	480.009 MHz	36.33 dBμV/m	46.02 dBμV/m	-9.69 dB	Pass	90 degrees	1.7 m
3	903.882 MHz	SRD-Carrier(LoRa)					

Radiated emissions according to FCC part 15B

Project Number:	G0M-2207-1565
Applicant:	Dräger MSI GmbH
Model Description:	Wireless gas detection transmitter
Model:	X-node 1
Test Sample ID:	41711
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Liebich
Test Date:	2022-12-16
Operating Conditions:	ambient temperature: 21 °Celsius power input: 5 V DC via USB connection
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement Distance:	3m
Operational Mode:	2
EUT Configuration:	2
Note 1:	--



Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	1.199 GHz	53.18 dBµV/m	73.98 dBµV/m	-20.8 dB	Pass	-180 degrees	1 m
2	1.594 GHz	48.29 dBµV/m	73.98 dBµV/m	-25.69 dB	Pass	180 degrees	1 m
3	1.994 GHz	47.67 dBµV/m	73.98 dBµV/m	-26.31 dB	Pass	180 degrees	1 m
4	2.419 GHz	BLE-Carrier					
5	2.442 GHz						
6	2.997 GHz	55.71 dBµV/m	73.98 dBµV/m	-18.27 dB	Pass	180 degrees	1 m
7	11.566 GHz	62.29 dBµV/m	73.98 dBµV/m	-11.69 dB	Pass	180 degrees	1 m

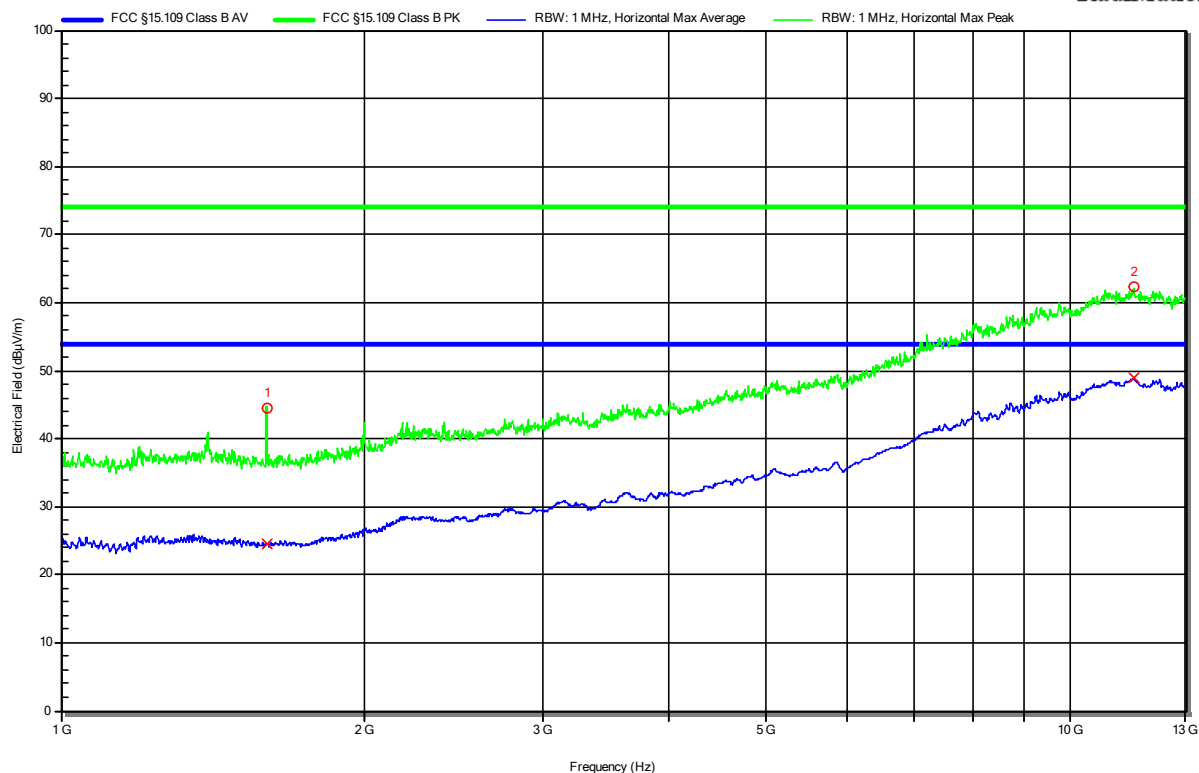
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	Angle	Height
1	1.199 GHz	25.45 dBµV/m	53.98 dBµV/m	-28.53 dB	Pass	180 degrees	1 m
2	1.594 GHz	24.6 dBµV/m	53.98 dBµV/m	-29.38 dB	Pass	180 degrees	1 m
3	1.994 GHz	27.1 dBµV/m	53.98 dBµV/m	-26.88 dB	Pass	180 degrees	1 m
4	2.419 GHz	BLE-Carrier					
5	2.442 GHz						
6	2.997 GHz	29.31 dBµV/m	53.98 dBµV/m	-24.67 dB	Pass	180 degrees	1 m
7	11.566 GHz	48.85 dBµV/m	53.98 dBµV/m	-5.13 dB	Pass	180 degrees	1 m

**Radiated emissions
according to FCC part 15B**

Project Number: G0M-2207-1565
 Applicant: Dräger MSI GmbH
 Model Description: Wireless gas detection transmitter
 Model: X-node 1
 Test Sample ID: 41711
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Liebich
 Test Date: 2022-12-16
 Operating Conditions: ambient temperature: 21 °Celsius
 power input: 5 V DC via USB connection
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement Distance: 3m
 Operational Mode: 2
 EUT Configuration: 2
 Note 1: --

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RadiMation



Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	1.598 GHz	44.38 dBμV/m	73.98 dBμV/m	-29.6 dB	Pass	0 degrees	1 m
2	11.555 GHz	62.24 dBμV/m	73.98 dBμV/m	-11.74 dB	Pass	0 degrees	1 m

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	Angle	Height
1	1.598 GHz	24.51 dBμV/m	53.98 dBμV/m	-29.47 dB	Pass	0 degrees	1 m
2	11.555 GHz	48.83 dBμV/m	53.98 dBμV/m	-5.15 dB	Pass	0 degrees	1 m

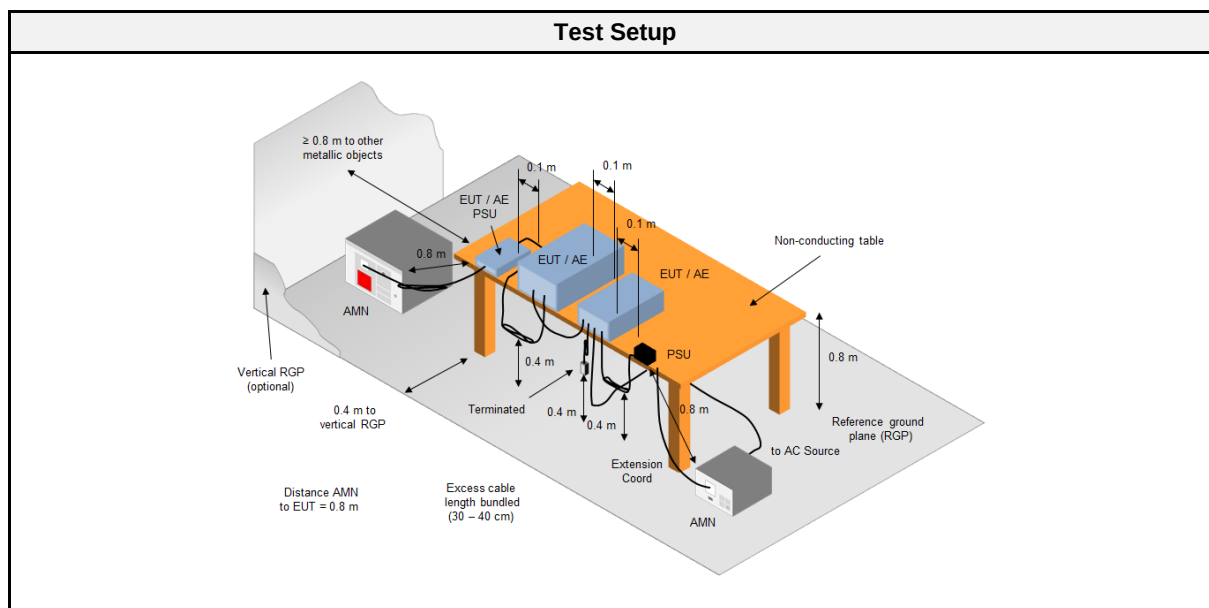
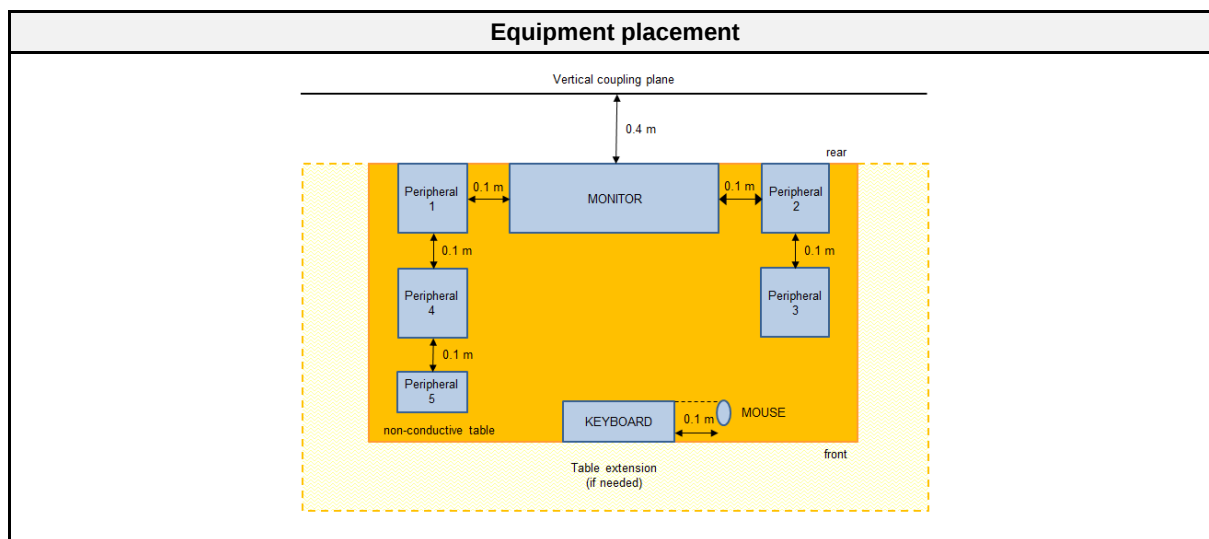
Test Report No.: G0M-2207-1565-EF0115B-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

2.2.1 Information

Test Information	
Reference	FCC 15.107, ICES-003, 3.2.1
Reference method	ANSI C63.4:2014+A1:2017 Section 12
Measurement range	150 kHz to 30 MHz
Equipment class	Class B
Equipment type	Table top
Temperature [°C]	21 – 23
Humidity [%]	23 – 27
Operator	Stephan Liebich
Date	2022-12-16

2.2.2 Setup *Table top*



2.2.3 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	Radimation	2020.1.8

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
AMN	Schwarzbeck	NSLK 8127	EF01592	2021-07	2023-07
Pulse Limiter	R&S	ESH3-Z2	EF01063	2021-07	2023-07
EMI Test Receiver	R&S	ESR 7	EF00943	2022-07	2023-07
Climatic Sensor	Embedded Data Systems, LLC.	2800100000254 17E	EF01054	2022-04	2023-04

2.2.4 Procedure

Exploratory measurement Table top
- The EUT was placed on a non conductive table 0.8 m above the reference ground plane and 0.4 m away from the vertical conducting plane (ANSI C63.4: 2014 item 7.3.1) - The power cord that is normally supplied or recommended by the manufacturer was connected to the LISN. - The distance between the outer edge of the EUT and the LISN shall be set to 0.8 m. A longer power cord shall be bundled to this length (bundling shall not exceed 40 cm in length). - The LISN measurement port was connected to a measurement receiver - I/O cables were bundled not longer than 0.4 m - Measurement was performed in the frequency range 0.15 – 30MHz on each current-carrying conductor - To maximize the emissions the cable positions were manipulated - The worst configuration of EUT and cables is shown on a test setup picture at item 2.2.2

Final measurement Table Top
- The EUT was placed on a non conductive table 0.8 m above the reference ground plane and 0.4 m away from the vertical conducting plane (ANSI C63.4: 2014 item 7.3.1) - The power cord that is normally supplied or recommended by the manufacturer was connected to the LISN. - The distance between the outer edge of the EUT and the LISN shall be set to 0.8 m. A longer power cord shall be bundled to this length (bundling shall not exceed 40 cm in length). - The LISN measurement port was connected to a measurement receiver - The EUT and cable arrangement were based on the exploratory measurement results - The test data of the worst-case conditions were recorded and shown on the next pages

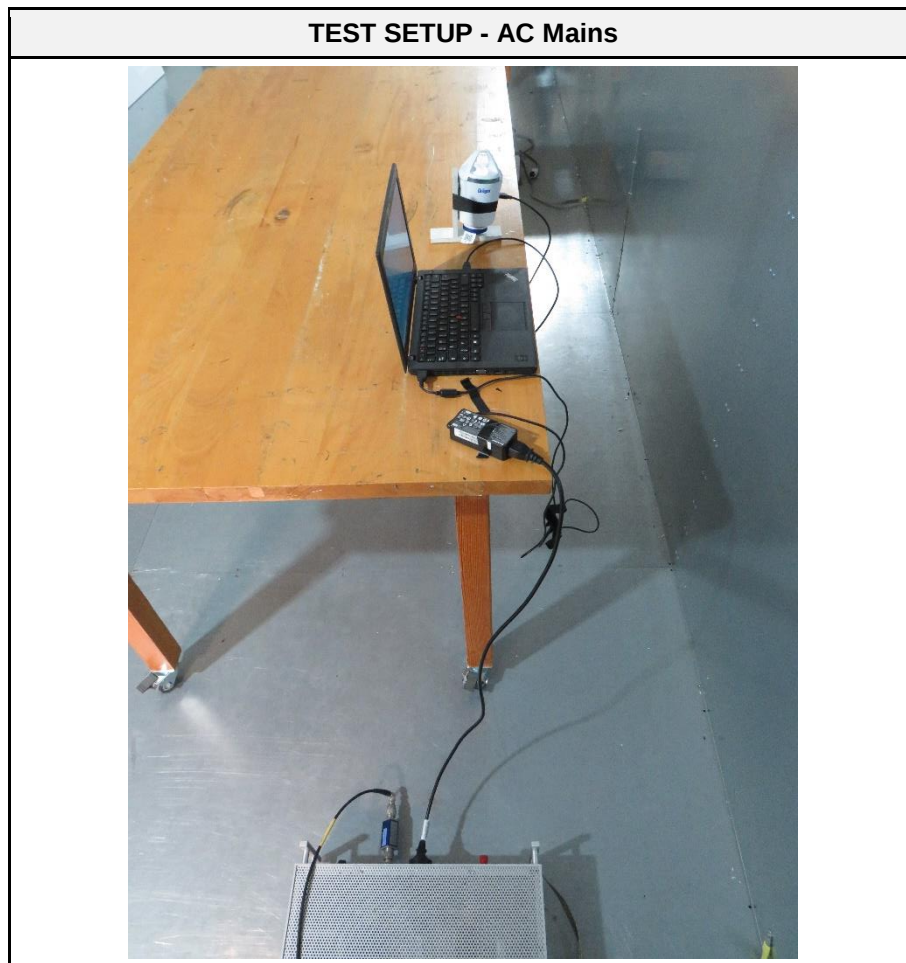
2.2.5 Limits

Class B		
Frequency [MHz]	Quasi-peak Limit [dBμV]	Average Limit [dBμV]
0.15 - 0.5	66 - 56 *	56 - 46 *
0.5 - 5	56	46
5 - 30	60	50
* Decreases with the logarithm of the frequency		

2.2.6 Results

AC power line conducted emissions					
Port	Coupling	Operational mode	EUT Configuration	Verdict	Remark
AC Mains	AMN	2	2	PASS	Port of the dedicated AC/DC-adapter (Laptop)

2.2.7 Setup Photos



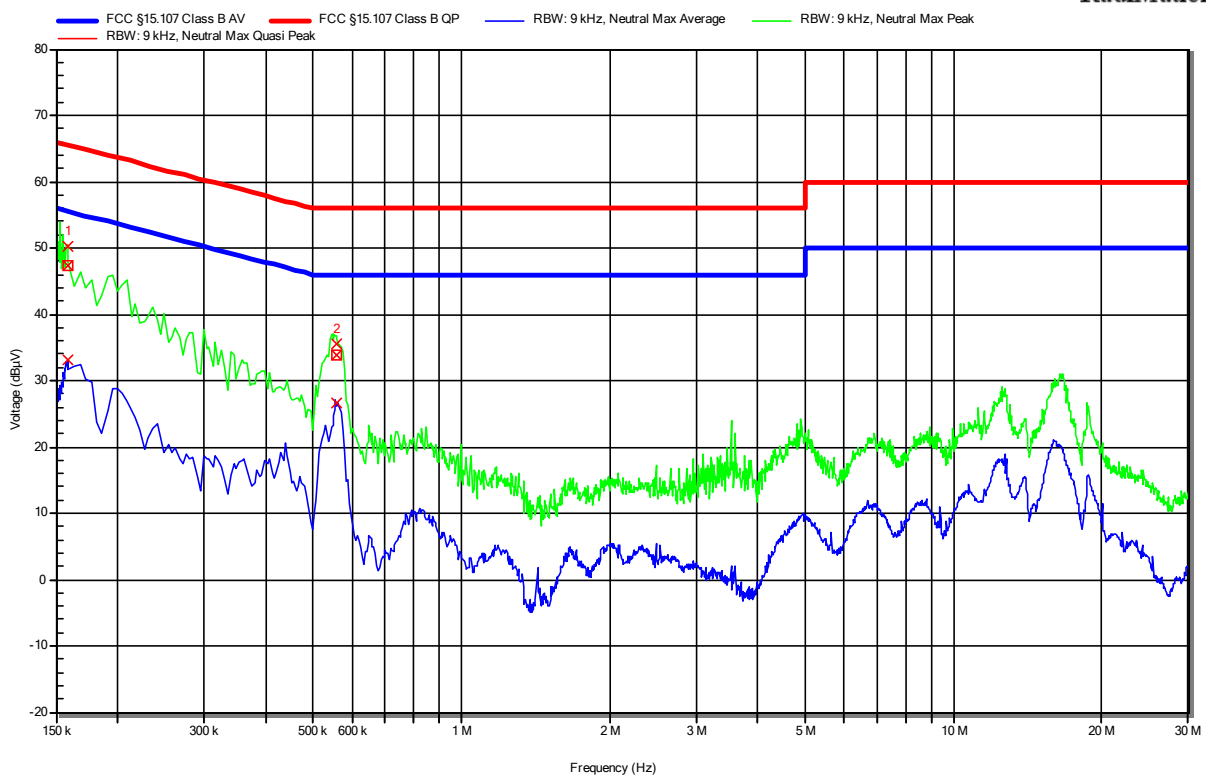
2.2.8 Records

Conducted emissions at the mains power port according to FCC part 15B

Project Number: G0M-2207-1565
 Applicant: Dräger MSI GmbH
 Model Description: Wireless gas detection transmitter
 Model: X-node 1
 Test Sample ID: 41711
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Liebich
 Test Date: 2022-12-16
 Operating Conditions: ambient temperature: 22 °Celsius
 power input: 120V AC 60 Hz (AC/DC-adapter, ADLX45NLC3A)
 LISN: Schwarzbeck NSLK 8127 N
 Operational Mode: 2
 EUT Configuration: 2
 Applied to Port: AC Mains
 Note 1: --

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RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	158.55 kHz	47.45 dBµV	65.54 dBµV	-18.09 dB	Pass	Neutral
2	558.6 kHz	33.97 dBµV	56 dBµV	-22.03 dB	Pass	Neutral

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	158.55 kHz	33.16 dBµV	55.54 dBµV	-22.38 dB	Pass	Neutral
2	558.6 kHz	26.58 dBµV	46 dBµV	-19.42 dB	Pass	Neutral

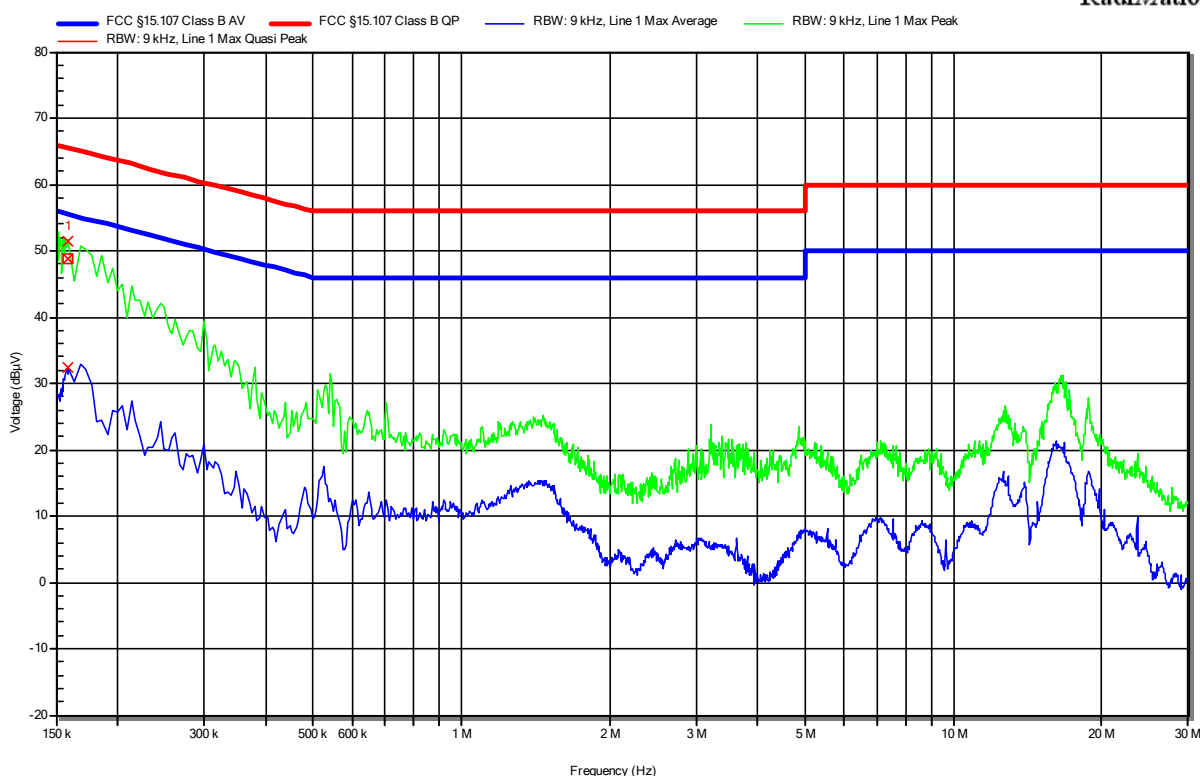
Test Report No.: G0M-2207-1565-EF0115B-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Conducted emissions at the mains power port according to FCC part 15B

Project Number: G0M-2207-1565
 Applicant: Dräger MSI GmbH
 Model Description: Wireless gas detection transmitter
 Model: X-node 1
 Test Sample ID: 41711
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Liebich
 Test Date: 2022-12-16
 Operating Conditions: ambient temperature: 22 °Celsius
 power input: 120V AC 60 Hz (AC/DC-adapter, ADLX45NLC3A)
 LISN: Schwarzbeck NSLK 8127 RC L1
 Operational Mode: 2
 EUT Configuration: 2
 Applied to Port: AC Mains
 Note 1: --

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RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	159 kHz	48.86 dBµV	65.52 dBµV	-16.66 dB	Pass	Line 1
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	159 kHz	32.38 dBµV	55.52 dBµV	-23.14 dB	Pass	Line 1

Test Report No.: G0M-2207-1565-EF0115B-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

3 Measurement Uncertainty

All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2.

Test Name	Measurement Uncertainty
Conducted emissions at the mains power port	150kHz to 30MHz, 3.35dB
Radiated Emission	30MHz to 200MHz @ 3m, 5.1dB 200MHz to 1GHz @ 3m, 5.3dB >1GHz to 13GHz @3m, 5.95dB