

RADIO REPORT FCC 47 CFR Part 15C Digital transmission systems operating within the 2400.0 MHz - 2483.5 MHz band	
Report Reference No	G0M-2207-1565-TFC247BL-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	  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	47 CFR Part 15C
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	
Not applicable to EUT	N/A	
Test object does meet the requirement	P(PASS)	
Test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	20 °C - 30 °C	
Test Lab Humidity	25 % - 55 %	
Date of receipt of test item	2022-10-04	
Report:		
Compiled by	Odai Qawasmeh	
Tested by (+ signature) (Responsible for Test)	Odai Qawasmeh	
Approved by (+ signature) (Test Lab Engineer)	Radwan Jaafar	
Date of Issue	2023-03-01	
Total number of pages	36	
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.		
Additional Comments:		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2023-03-01	Initial Release	

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
EUT	Equipment Under Test
FCC	Federal Communications Commission
ISED	Innovation, Science and Economic Development Canada
RBW	Resolution bandwidth
RMS	Root mean square
VBW	Video bandwidth
V _{NOM}	Nominal supply voltage

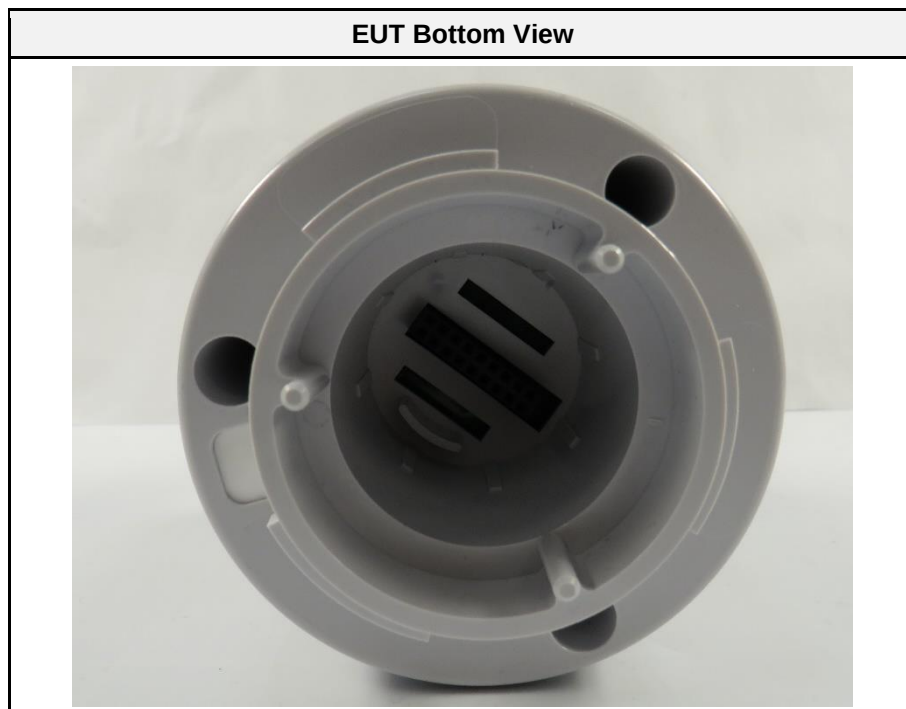
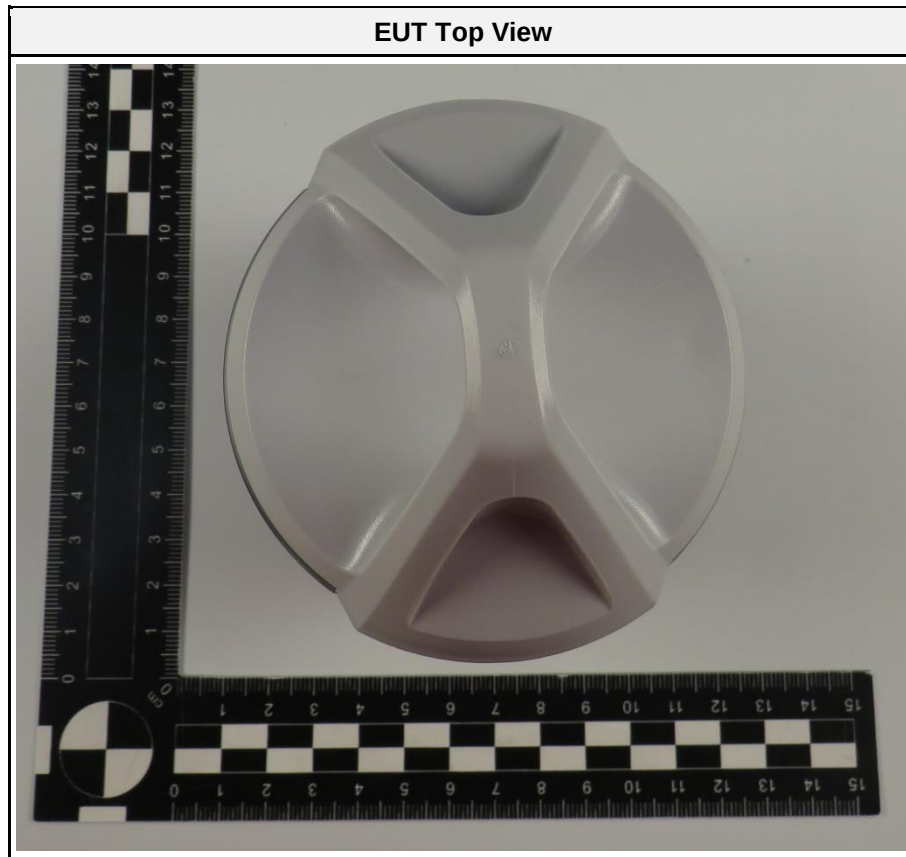
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1 Equipment (Test Item) Under Test

Description	Wireless gas detection transmitter	
Model	X-node 1	
Additional Model(s)	None	
Brand Name(s)	X-node 1	
Serial Number(s)	Prototype	
Test Sample Id(s)	41711	
Hardware Version(s)	EU-F7a	
Software Version(s)	2.1.5	
FCC ID	2A9SW-LR01	
IC	N/A	
Equipment type	End Product	
Radio type	Transceiver	
Assigned frequency bands	2400.0 MHz - 2483.5 MHz	
Radio technology	Bluetooth LE 5.0	
Bluetooth Specification	LE 1M PHY	Yes
	LE 2M PHY	Yes
	LE Coded PHY S=8 (125 kbit)	No
	LE Coded PHY S=2 (500 kbit)	No
	Stable Modulation Index - Transmitter	No
	Stable Modulation Index - Receiver	No
Modulation	GFSK	
Number of antenna ports	1	
Radio Module	Type	Bluetooth module
	Model	ISP1807
	Manufacturer	Insight SIP
	HW Version	LR
	SW Version	1.6
	FCC-ID	2AAQS-ISP1807
Antenna	Type	Integrated
	Model	ISP1807
	Manufacturer	Insight SIP
	Gain	0.6 dBi
Supply Voltage	V _{NOM}	3.7 VDC (battery, rechargeable via USB)
Operating Temperature	T _{NOM}	20 °C
AC/DC-Adaptor	None	
Manufacturer	Dräger MSI GmbH Rohrstraße 32 58093 Hagen Germany	

1.1 Photos – Equipment External



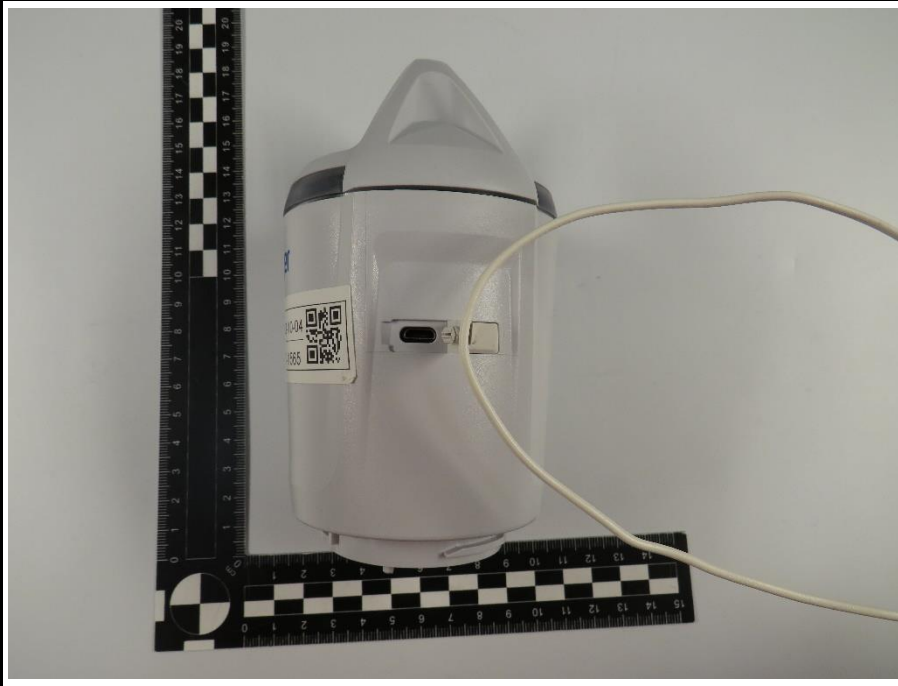
EUT Front View



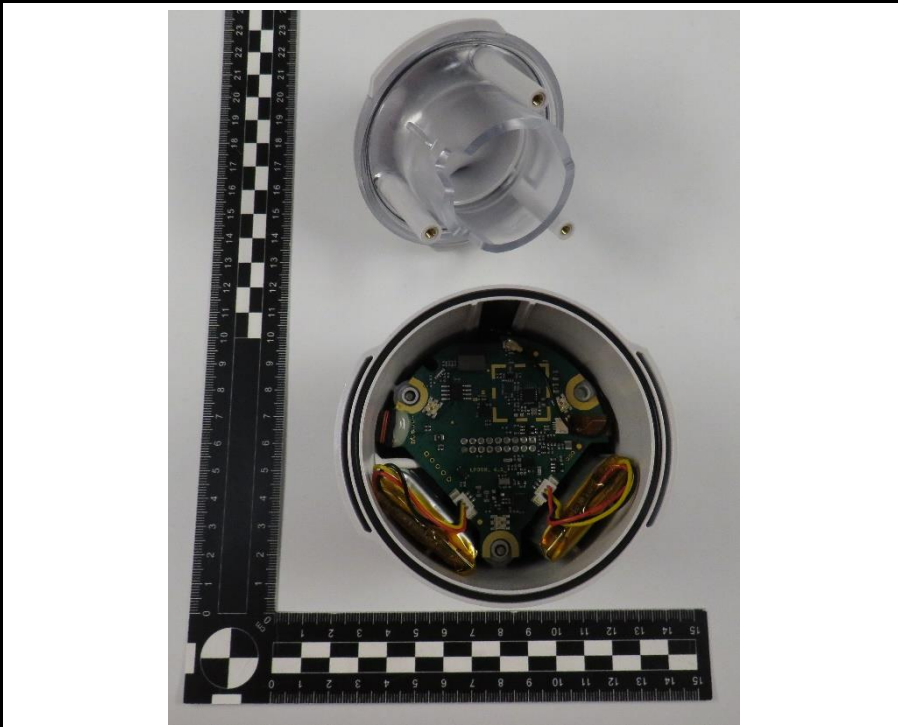
EUT Side View (with label)



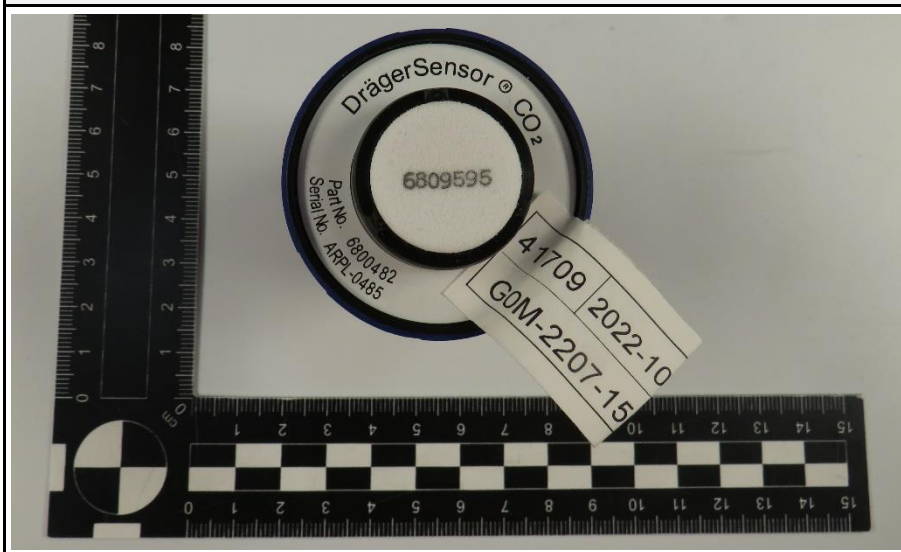
EUT Side View (with USB Port)



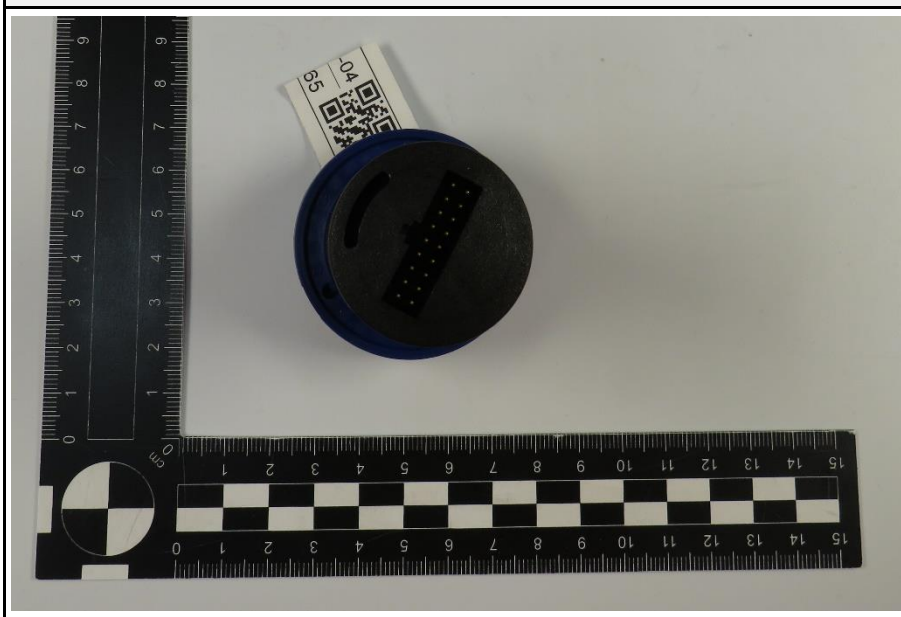
EUT opened



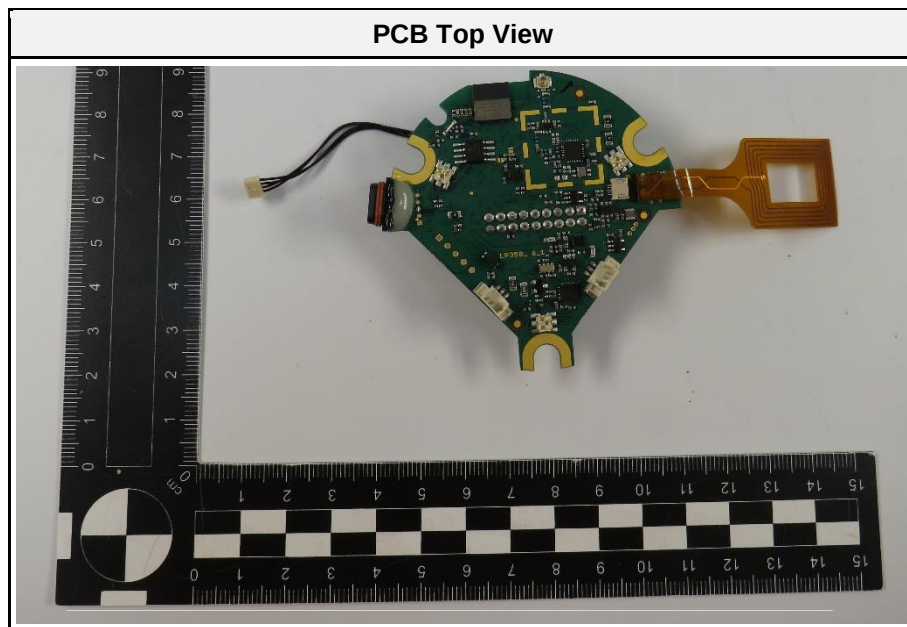
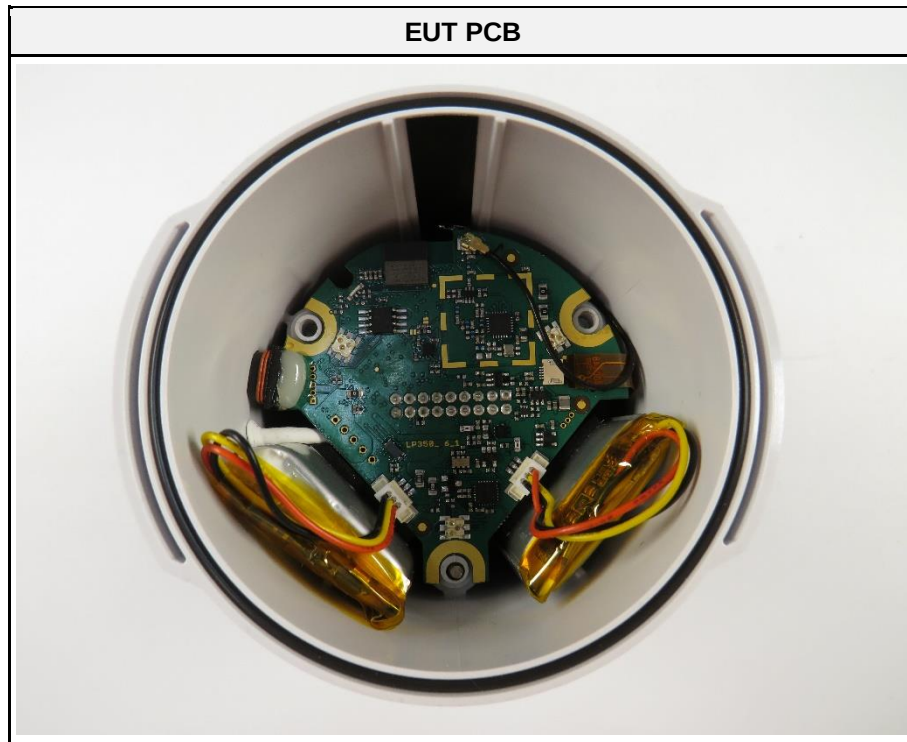
Gas detector Top View

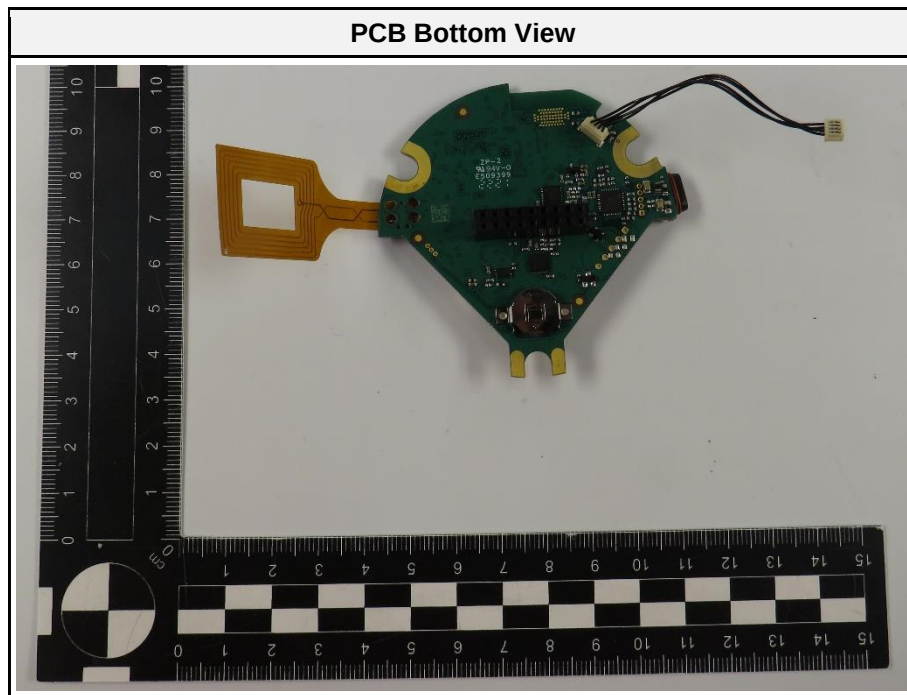


Gas detector Bottom View



1.2 Photos – Equipment Internal





1.3 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
CBL	USB Cable	-	-	-
AE	Notebook	Lenovo	Thinkpad	-
SFT	-	Nordic	nRF Connect Desktop	for activating direct testmode
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

1.4 Test Modes

Mode	Description
GFSK	Mode = Transmit Modulation = GFSK Spreading = None Packet Length = 239 Bytes Packet Type = PRBS9 Data rate = 2 Mbit/s Duty cycle = 81%
Receive	Mode = Receive
Comment: Worst case was found in module test report number DRTFCC2002-0049 issued by DT&C Co., Ltd. on 2020-02-24.	

1.5 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx	0	2402
F3	Tx	39	2480

1.6 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 analyzer in dBμV. Any external preamplifiers used are taken into account through internal analyzer 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 analyzer. 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:

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

Net:

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

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.

Field strength 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:

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

Example only for radiated field strength:

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

2 Result Summary

FCC 47 CFR Part 15C				
Product Standard Reference	Requirement	Reference Method	Result	Remarks
ISED RSS-Gen, Issue 5 A2 (section 6.7)	Occupied Bandwidth	ANSI C63.10-2013	N/R	Informational only
FCC § 15.247(a)(2)	6 dB Bandwidth	ANSI C63.10-2013	N/T	
FCC § 15.247(b)	Maximum peak conducted power	ANSI C63.10-2013	N/T	
FCC § 15.247(e)	Power spectral density	ANSI C63.10-2013	N/T	
FCC § 15.207	AC power line conducted emissions	ANSI C63.10-2013	PASS	
FCC § 15.247(d)	Band edge compliance	ANSI C63.10-2013	N/T	
FCC § 15.247(d)	Conducted spurious emissions	ANSI C63.10-2013	N/T	
FCC § 15.247(d) FCC § 15.209	Transmitter radiated spurious emissions	ANSI C63.10-2013	PASS	
Comment: The Decision Rule is applied on the basis of ETSI TR 102 273 and ETSI TR 100 028. 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. Where a result is considered conditional in respect of its proximity to the limit line, the customer would be made aware of situation so that they can make an informed decision on how to proceed.				

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

3 Test Conditions and Results

3.1 Test Conditions and Results - AC powerline conducted emissions

3.1.1 Information

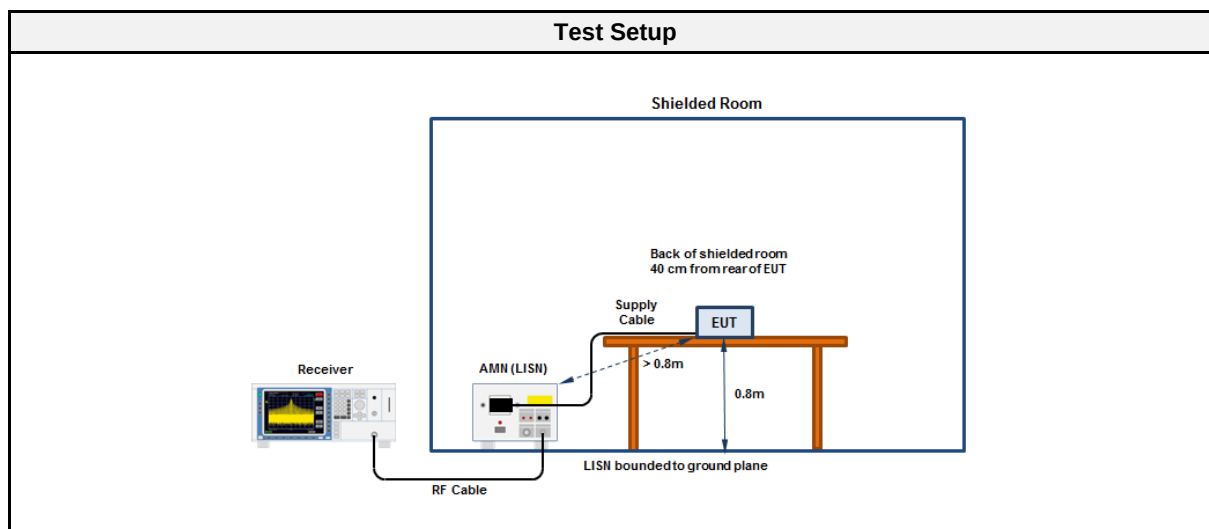
Test Information	
Reference	FCC § 15.207
Measurement Method	ANSI C63.10 6.2
Measurement Uncertainty	± 3.82 dB
Operator	Odai Qawasmeh
Date	2022-11-11

3.1.2 Limits

Limits		
Frequency [MHz]	Quasi-Peak [dBμV]	Average [dBμV]
0.15 - 0.5	66 - 56*	56 - 46*
0.5 - 5	56	46
5 - 30	60	50

* Limit decreases linearly with the logarithm of the frequency

3.1.3 Setup

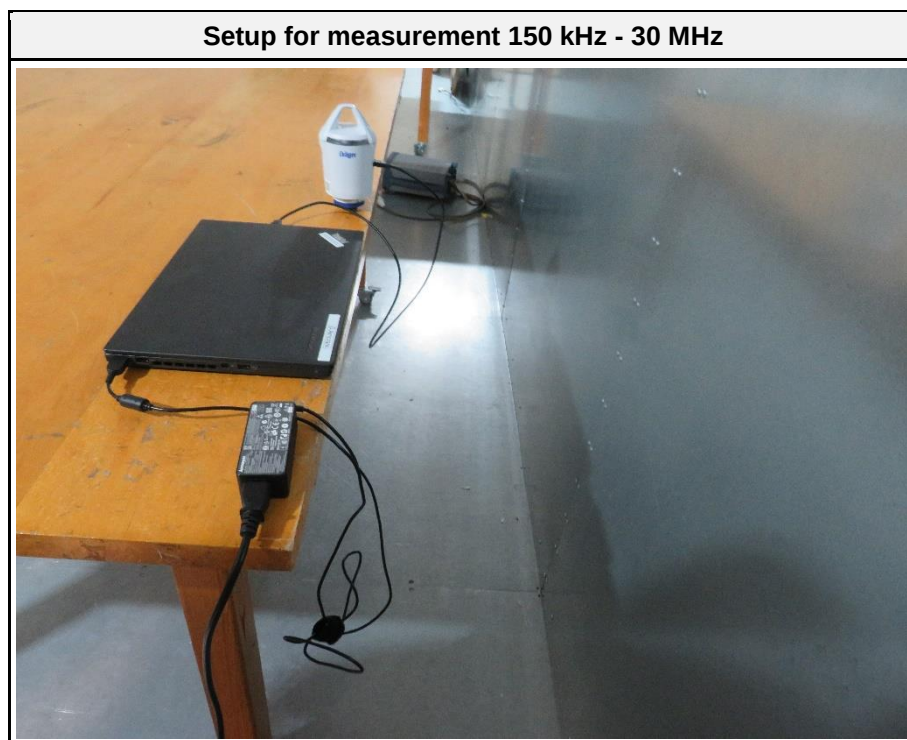
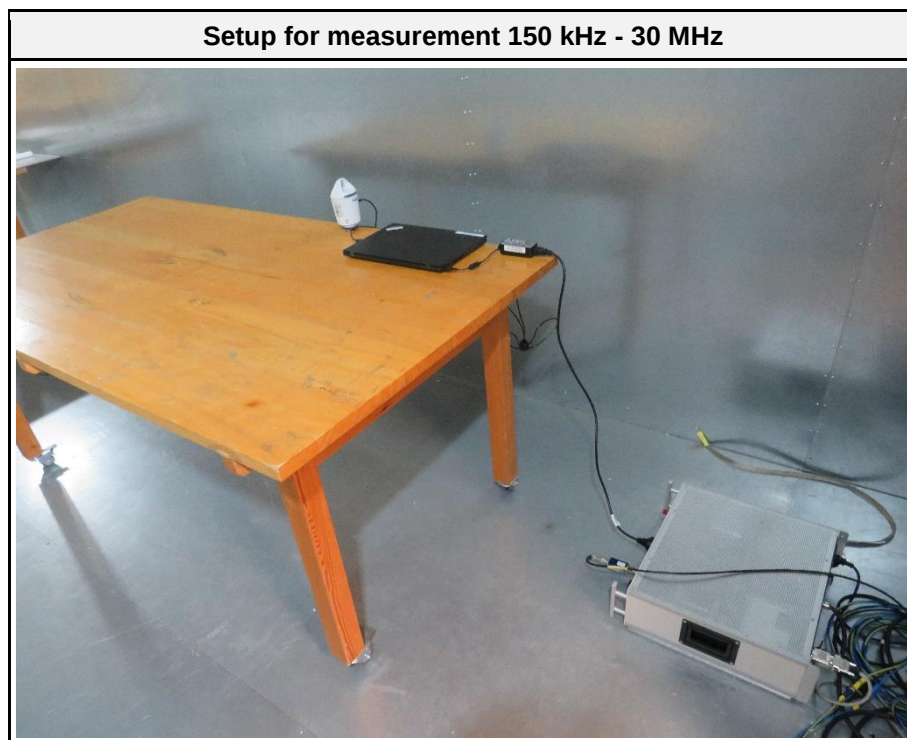


3.1.4 Equipment

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

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESR7	EF00943	2022-07	2023-07
Pulse Limiter	R&S	ESH3-Z2	EF01222	2021-07	2023-07
LISN	Schwarzbeck	NSLK 8127 RC	EF01592	2021-07	2023-07

3.1.5 Setup Photos

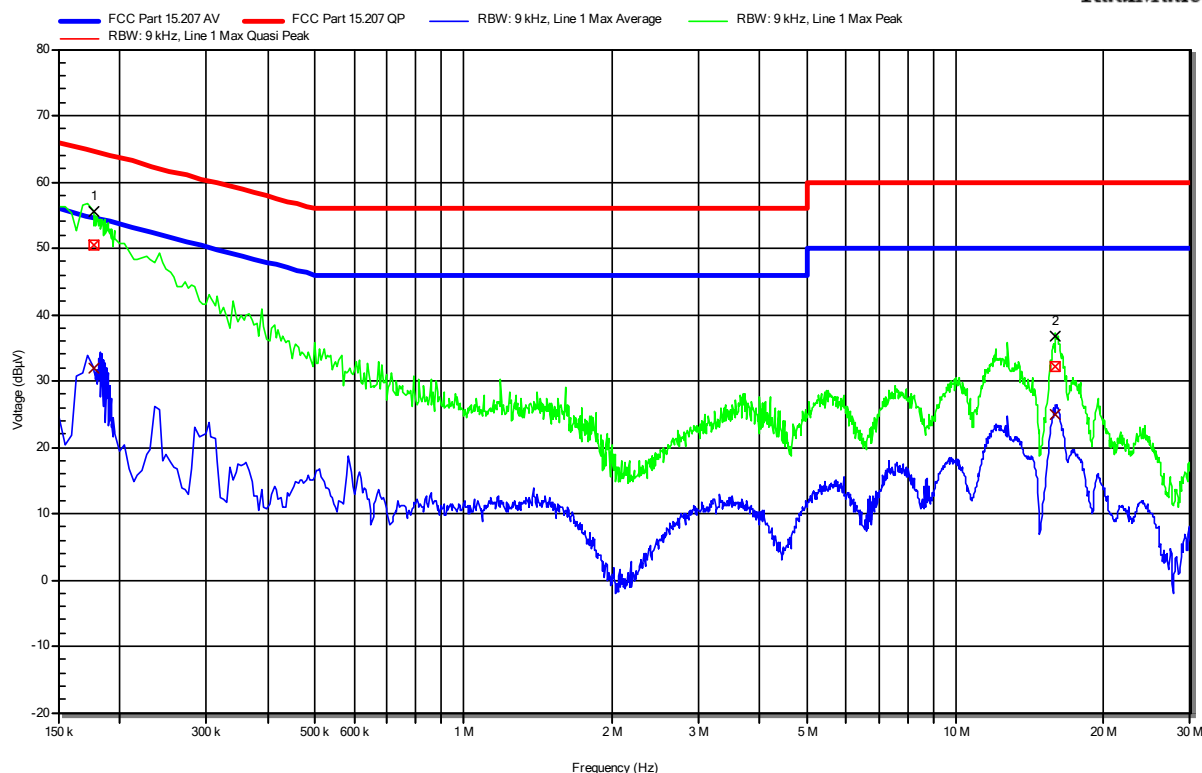


Conducted emissions at the mains power port according to 47 CFR Part 15.247

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. Qawasmeh
 Test Date: 2022-11-11
 Operating Conditions: ambient temperature: 24 °Celsius
 power input: 3.7 VDC (Battery)
 LISN: Schwarzbeck NSLK 8127 RC L1
 Operational Mode: BT-LE, 2480 MHz, 2 Mbit/s, PRBS9, 239 Bytes
 Applied to Port: 120 VAC / 60 Hz

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Radiation



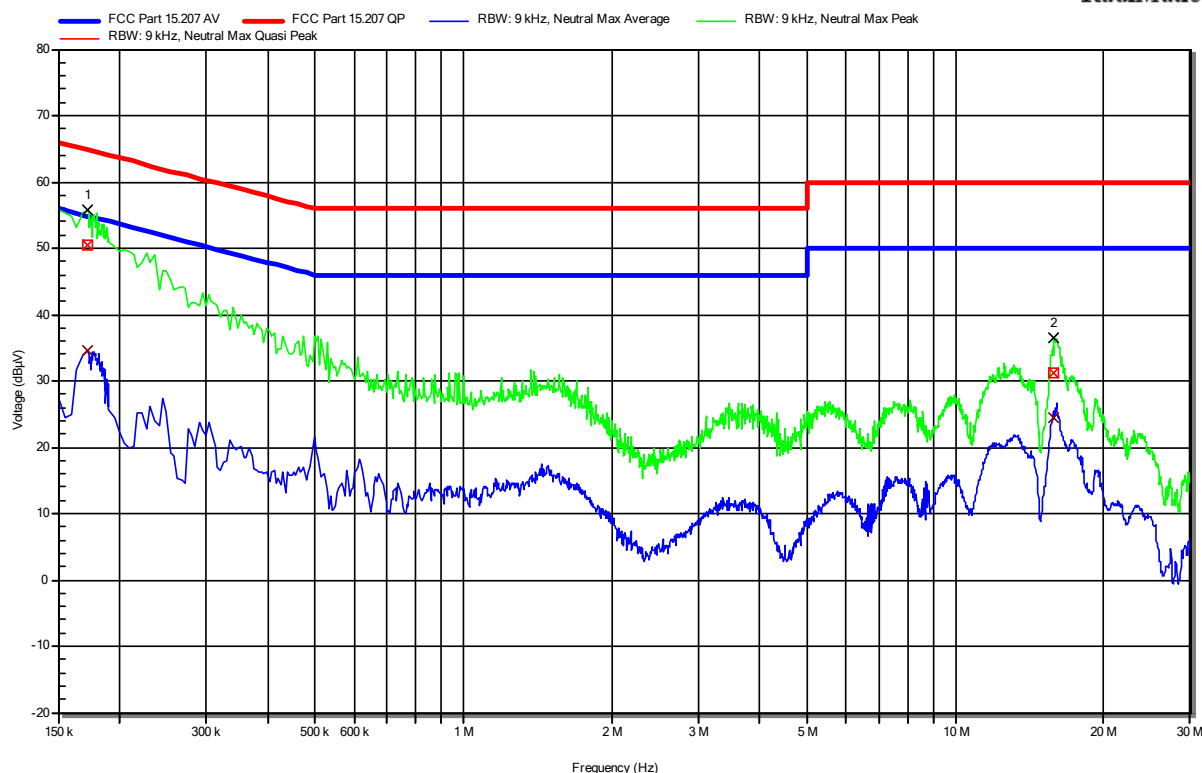
Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	177 kHz	50.55 dBμV	64.63 dBμV	-14.07 dB	Pass	Line 1
2	15.882 MHz	32.24 dBμV	60 dBμV	-27.76 dB	Pass	Line 1

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	177 kHz	31.97 dBμV	54.63 dBμV	-22.66 dB	Pass	Line 1
2	15.882 MHz	25.05 dBμV	50 dBμV	-24.95 dB	Pass	Line 1

Conducted emissions at the mains power port according to 47 CFR Part 15.247

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. Qawasmeh
 Test Date: 2022-11-11
 Operating Conditions: ambient temperature: 24 °Celsius
 power input: 3.7 VDC (Battery)
 LISN: Schwarzbeck NSLK 8127
 Operational Mode: BT-LE, 2480 MHz, 2 Mbit/s, PRBS9, 239 Bytes
 Applied to Port: 120 VAC / 60 Hz

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RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	172.5 kHz	50.57 dBμV	64.84 dBμV	-14.27 dB	Pass	Neutral
2	15.86 MHz	31.21 dBμV	60 dBμV	-28.79 dB	Pass	Neutral

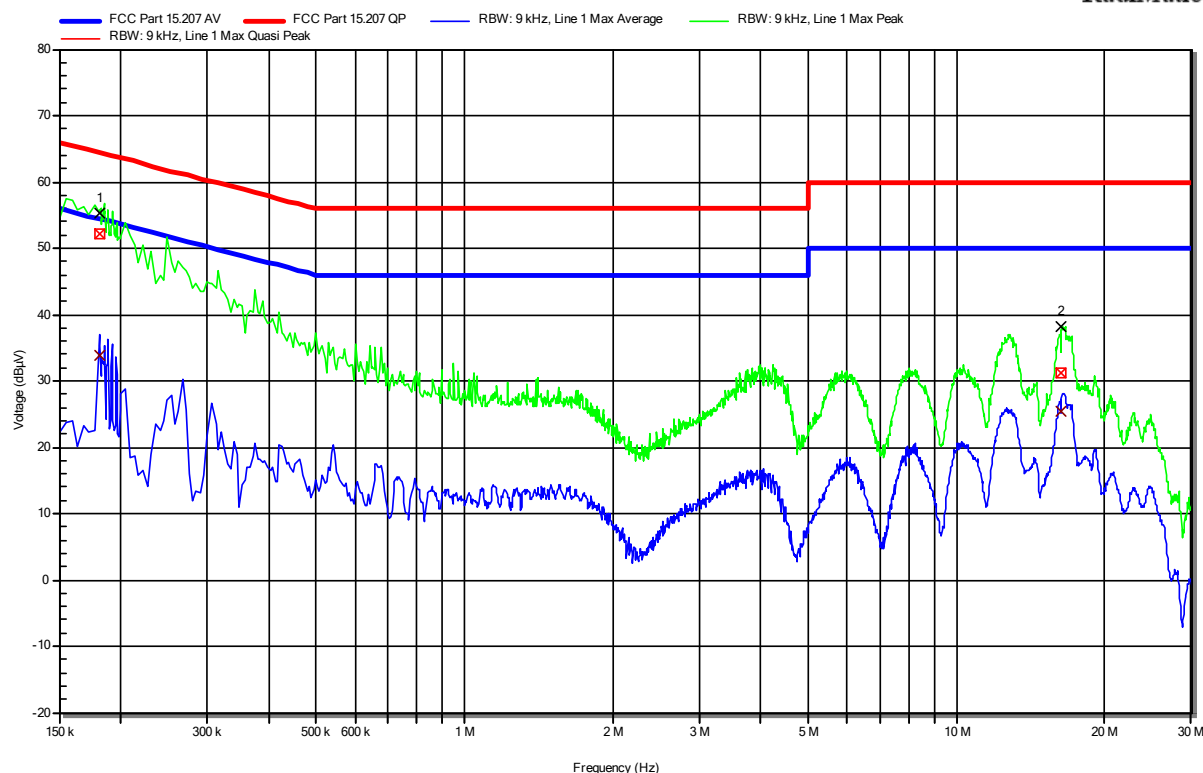
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	172.5 kHz	34.51 dBμV	54.84 dBμV	-20.33 dB	Pass	Neutral
2	15.86 MHz	24.51 dBμV	50 dBμV	-25.49 dB	Pass	Neutral

Conducted emissions at the mains power port according to 47 CFR Part 15.247

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. Qawasmeh
 Test Date: 2022-11-11
 Operating Conditions: ambient temperature: 24 °Celsius
 power input: 3.7 VDC (Battery)
 LISN: Schwarzbeck NSLK 8127 RC L1
 Operational Mode: BT-LE, 2480 MHz
 Applied to Port: 120 VAC / 60 Hz

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RadiMation



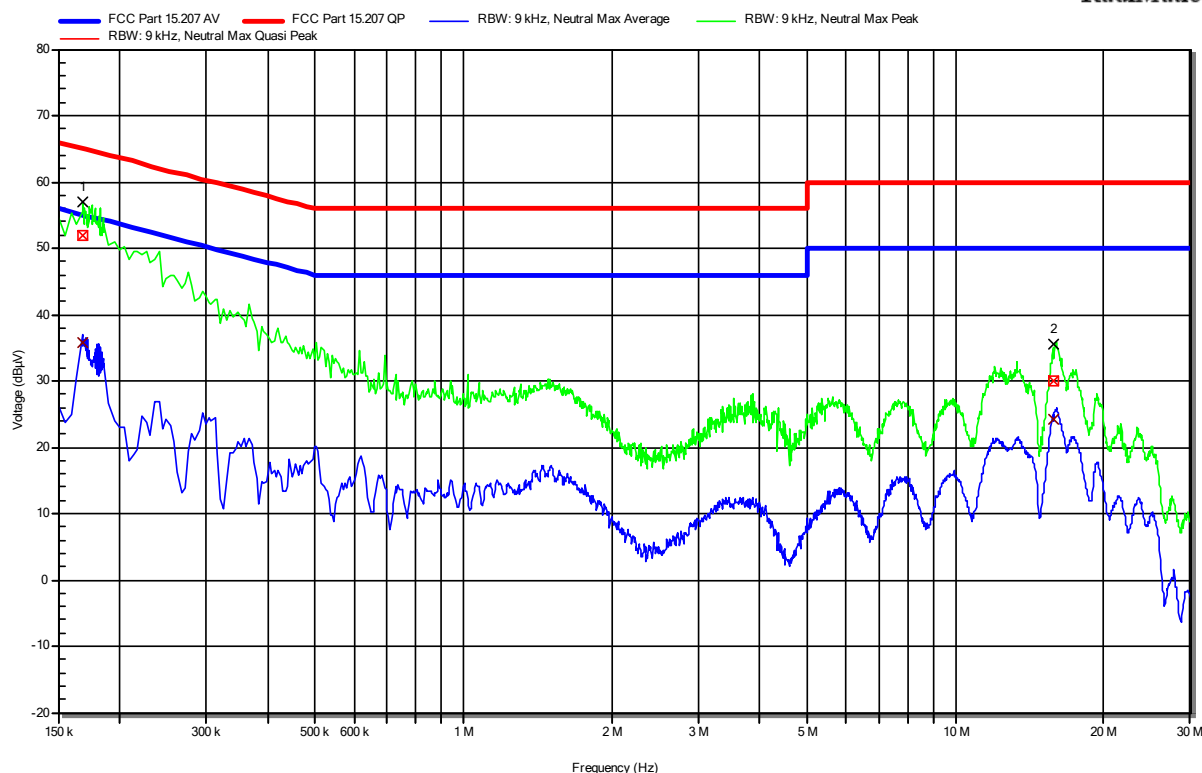
Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	181.5 kHz	52.15 dBμV	64.42 dBμV	-12.27 dB	Pass	Line 1
2	16.305 MHz	31.3 dBμV	60 dBμV	-28.7 dB	Pass	Line 1

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	181.5 kHz	33.76 dBμV	54.42 dBμV	-20.65 dB	Pass	Line 1
2	16.305 MHz	25.33 dBμV	50 dBμV	-24.67 dB	Pass	Line 1

Conducted emissions at the mains power port according to 47 CFR Part 15.247

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. Qawasmeh
 Test Date: 2022-11-11
 Operating Conditions: ambient temperature: 24 °Celsius
 power input: 3.7 VDC (Battery)
 LISN: Schwarzbeck NSLK 8127
 Operational Mode: BT-LE, 2480 MHz
 Applied to Port: 120 VAC / 60 Hz

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RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	168.9 kHz	51.93 dBμV	65.01 dBμV	-13.08 dB	Pass	Neutral
2	15.846 MHz	29.96 dBμV	60 dBμV	-30.04 dB	Pass	Neutral

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	168.9 kHz	35.88 dBμV	55.01 dBμV	-19.13 dB	Pass	Neutral
2	15.846 MHz	24.26 dBμV	50 dBμV	-25.74 dB	Pass	Neutral

Test Report No.: G0M-2207-1565-TFC247BL-V01

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

3.2 Test Conditions and Results - Transmitter radiated emissions

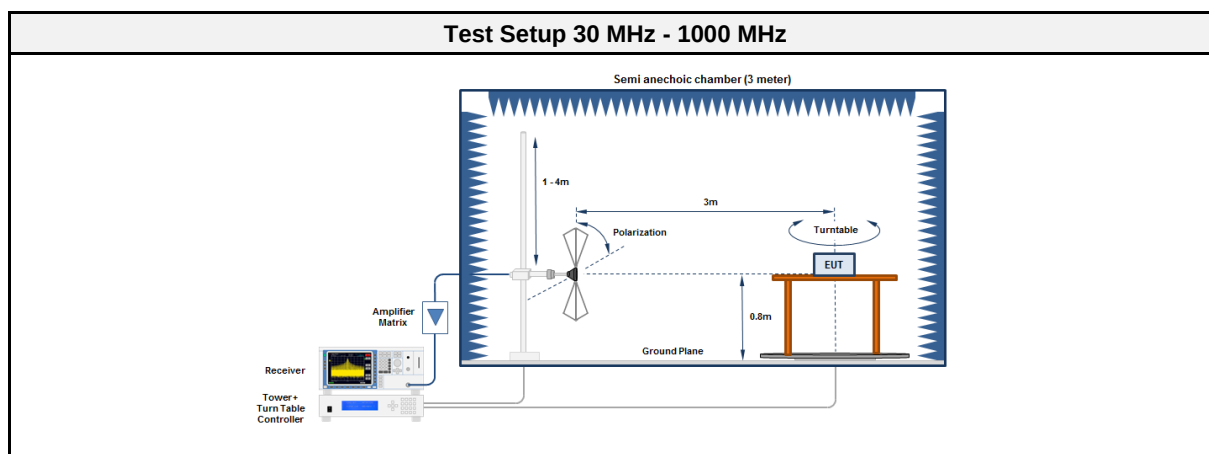
3.2.1 Information

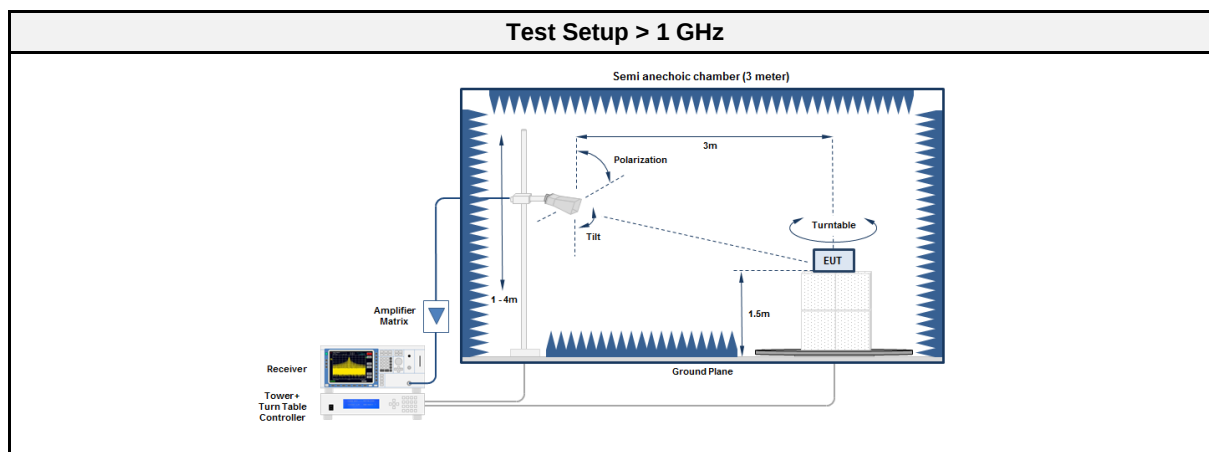
Test Information	
Reference	FCC § 15.247(d); FCC § 15.209
Measurement Uncertainty	± 5.95 dB
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6, 11.12
Operator	Odai Qawasmeh
Date	2022-11-02

3.2.2 Limits

Limits			
Frequency range [MHz]	Detector	Field strength [$\mu\text{V/m}$]	Measurement distance [m]
0.009 - 0.09	Average	2400/F[kHz]	300
0.09 - 0.110	Quasi-Peak	2400/F[kHz]	300
0.110 - 0.490	Average	2400/F[kHz]	300
0.490 - 1.705	Quasi-Peak	24000/F[kHz]	30
1.705 - 30.0	Quasi-Peak	30	30
30 - 88	Quasi-Peak	100	3
88 - 216	Quasi-Peak	150	3
216 - 960	Quasi-Peak	200	3
960 - 1000	Quasi-Peak	500	3
>1000	Average	500	3

3.2.3 Setup





3.2.4 Equipment

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

Test Equipment 30 MHz - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2021-02	2024-02
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2021-07	2023-01
Antenna	R&S	HK 116	EF00030	2021-05	2024-05
Antenna	R&S	HL 223	EF00187	2022-06	2025-06

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC2	EF01616	2022-10	2023-10
Spectrum analyzer	R&S	FSW43	EF00896	2022-08	2023-08
Antenna	Schwarzbeck	BBHA 9120D	EF01678	2021-03	2024-03
Antenna	Schwarzbeck	HWRD 650	EF01679	2021-03	2024-03
Antenna	Amplifier Research	AT4560	EF00302	2021-06	2023-06

3.2.5 Procedure

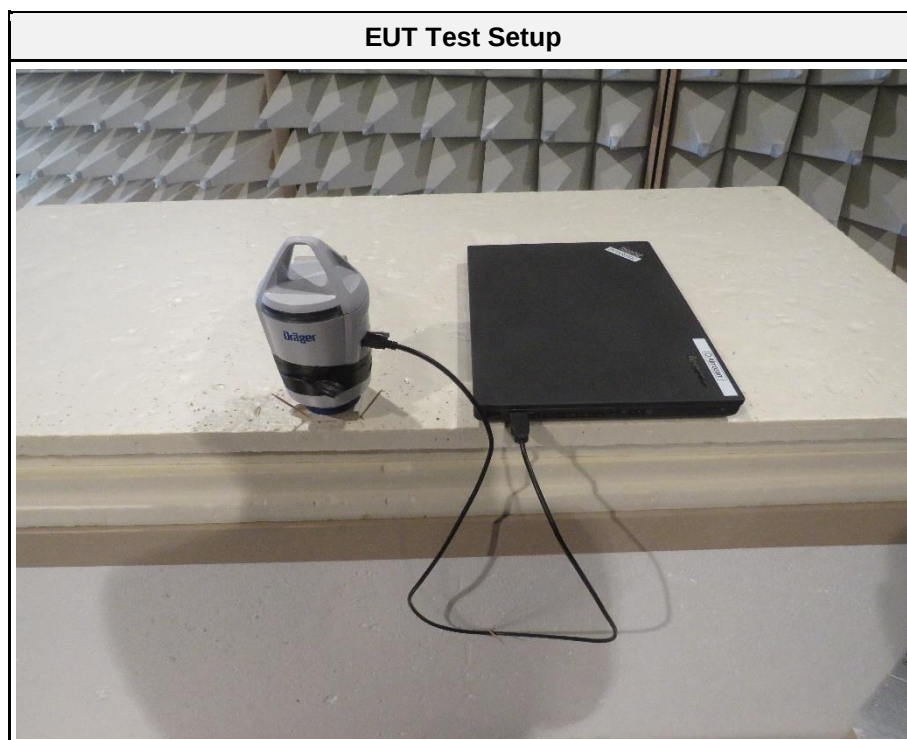
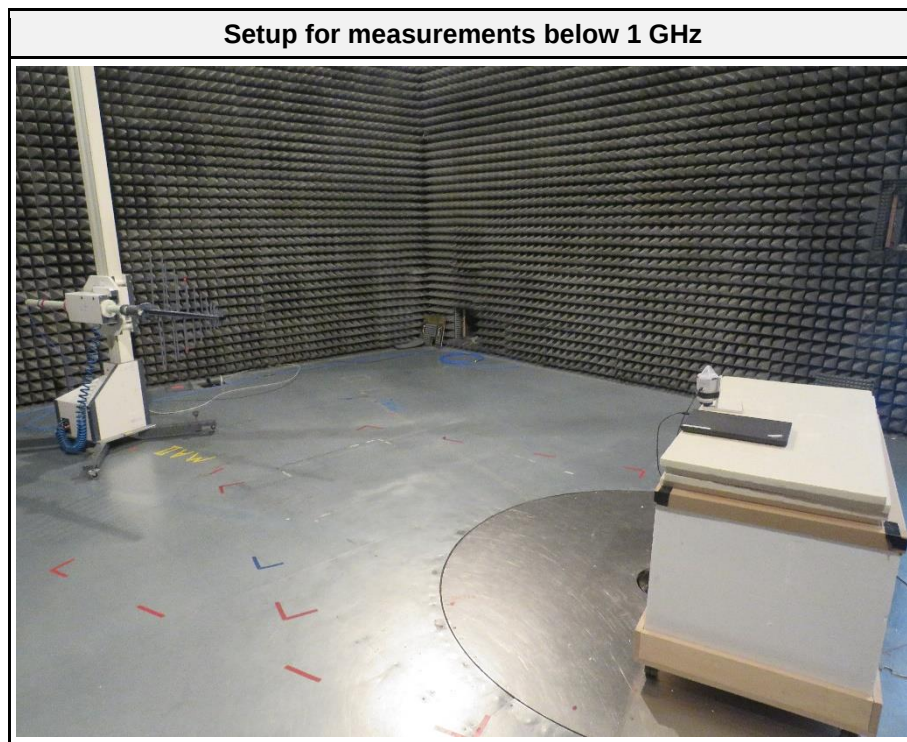
Test Procedure 30 MHz - 1000 MHz	
1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector	

Test Procedure > 1 GHz	
1. EUT is placed on a non conducting support at the center of a turn table 1.5 m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector	

3.2.6 Results

Test Results						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
2402	2366.7	53.12	pk	ver	74.00	-20.88
2402	2366.7	41.86	avg	ver	54.00	-12.14
2480	149.901	30.30	qpk	ver	43.50	-13.19
2480	162.3128	32.40	qpk	ver	43.50	-11.16
2480	162.6425	31.20	qpk	ver	43.50	-12.30
2480	992.26	30.40	pk	ver	54.00	-23.60
2480	2483.9	54.25	pk	ver	74.00	-19.75
2480	2483.9	44.33	avg	ver	54.00	-09.67
2480	4961	45.94	pk	ver	74.00	-28.06
2480	4961	37.29	avg	ver	54.00	-16.71
2480	7439	56.55	pk	hor	74.00	-17.45
2480	7439	51.83	avg	hor	54.00	-02.17
2480	12402	45.88	pk	hor	74.00	-28.12
2480	12402	37.39	avg	hor	54.00	-16.61
2480	22063	47.34	pk	hor	74.00	-26.66
2480	22063	36.79	avg	hor	54.00	-17.21

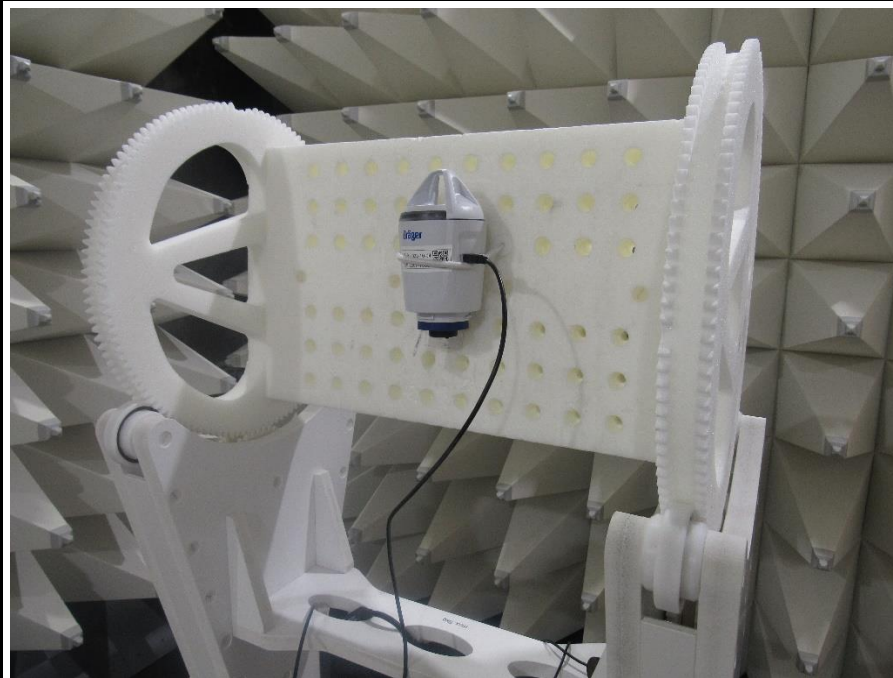
3.2.7 Setup Photos



Setup for measurements above 1 GHz



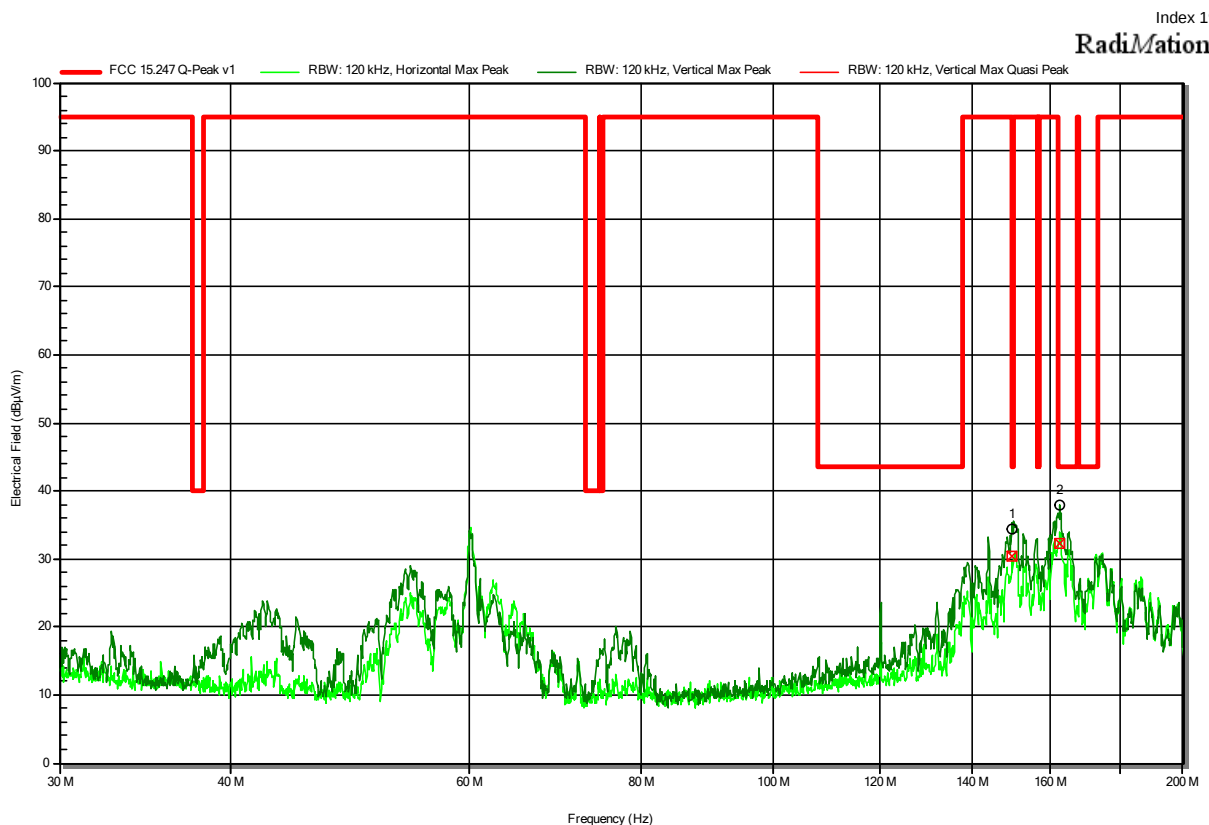
EUT Test Setup



ANNEX A Transmitter spurious emissions

Radiated Spurious Emissions according to 47 CFR Part 15.247

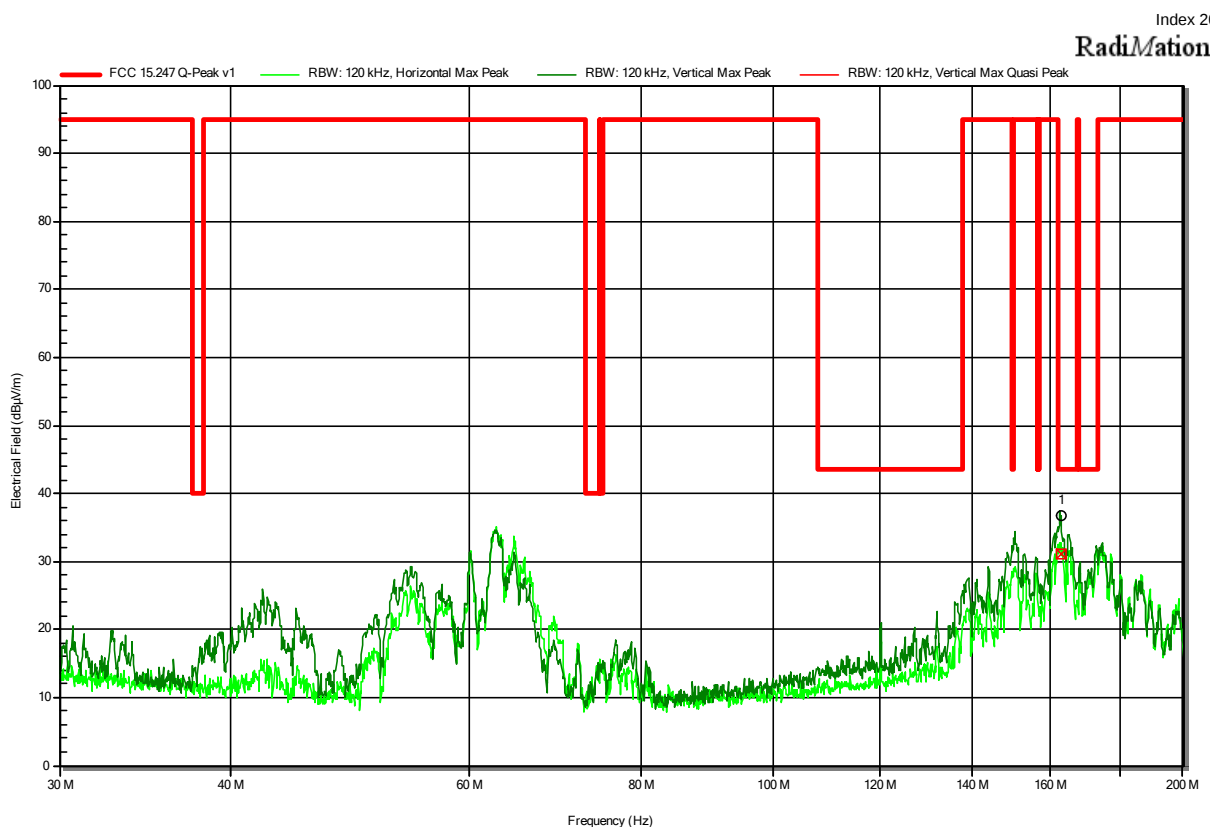
Project Number: G0M-2207-1565
 Applicant: Dräger MSI GmbH
 Model Description: Wireless gas detection transmitter
 Model: X-Node 1
 Test Sample ID: 41711
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.7 VDC (Battery)
 Antenna: Rohde & Schwarz HK 116
 Measurement distance: 3 m
 Mode: Tx; BT-LE, 2480 MHz, 2 Mbit/s, PRBS9, 239 Bytes
 Test Date: 2022-11-02
 Note: EUT vertical



Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Polarization
149.901 MHz	30.3 dBμV/m	43.5 dBμV/m	-13.19 dB	Pass	Vertical
162.3128 MHz	32.4 dBμV/m	43.5 dBμV/m	-11.16 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

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. Qawasmeh
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.7 VDC (Battery)
 Antenna: Rohde & Schwarz HK 116
 Measurement distance: 3 m
 Mode: Tx; BT-LE, 2480 MHz, 2 Mbit/s, PRBS9, 239 Bytes
 Test Date: 2022-11-02
 Note: EUT horizontal



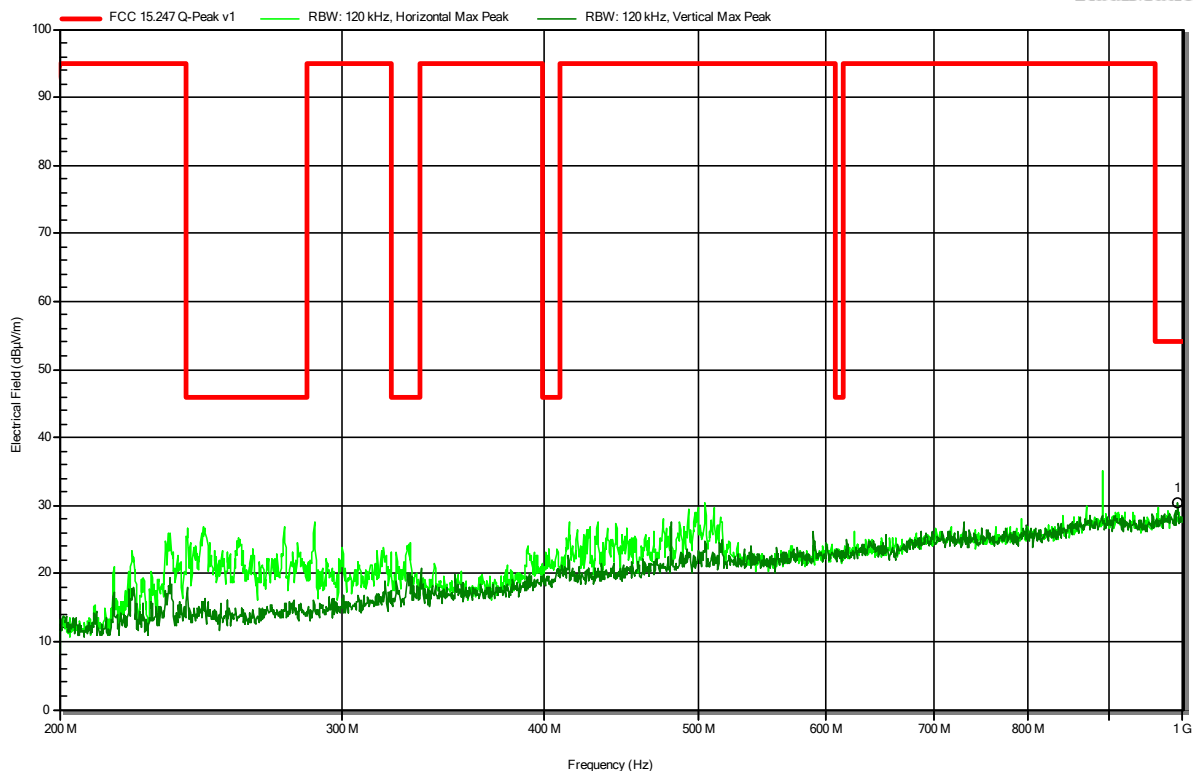
Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Polarization
162.6425 MHz	31.2 dBμV/m	43.5 dBμV/m	-12.3 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

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. Qawasmeh
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.7 VDC (Battery)
 Antenna: Rohde & Schwarz HL 223
 Measurement distance: 3 m
 Mode: Tx; BT-LE, 2480 MHz, 2 Mbit/s, PRBS9, 239 Bytes
 Test Date: 2022-11-02
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
992.26 MHz	30.4 dBμV/m	54 dBμV/m	-23.6 dB	Pass	Vertical

Test Report No.: G0M-2207-1565-TFC247BL-V01

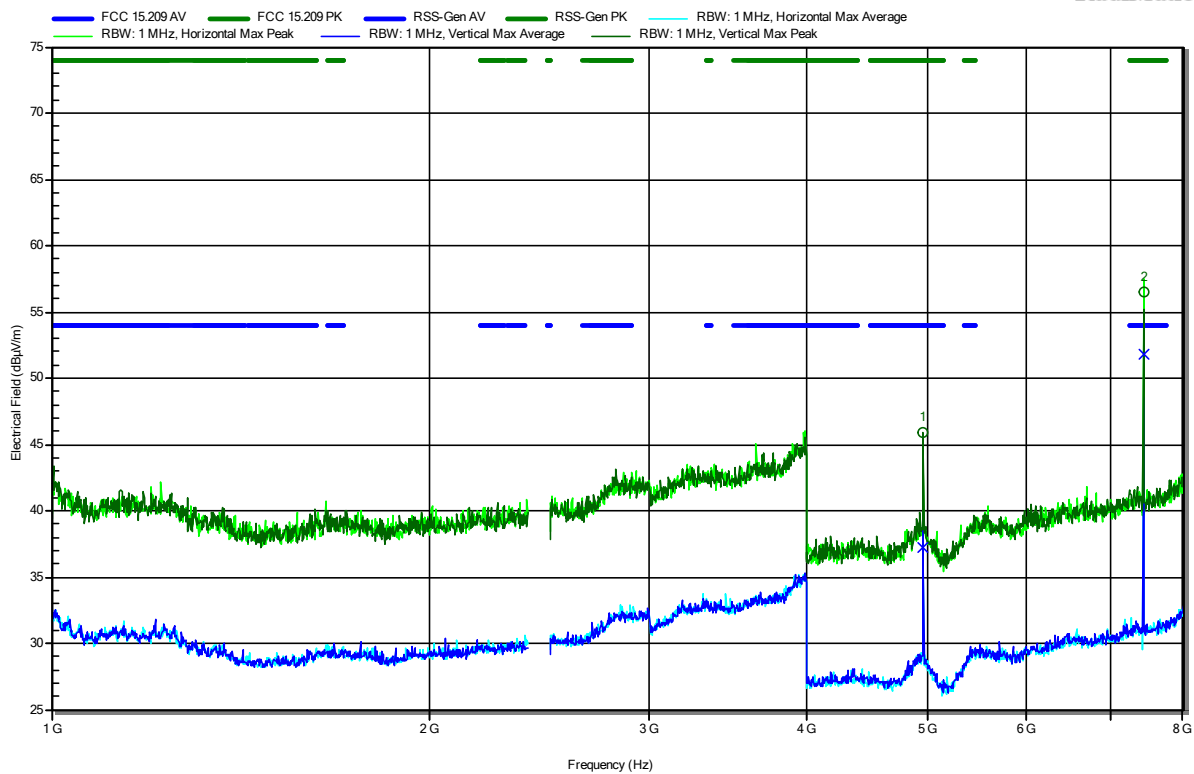
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

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. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.7 VDC (Battery)
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; BT-LE, 2480 MHz, 2 Mbit/s, PRBS9, 239 Bytes
 Test Date: 2022-11-03
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
4.961 GHz	45.94 dBμV/m	74 dBμV/m	-28.06 dB	Pass	Vertical
7.439 GHz	56.55 dBμV/m	74 dBμV/m	-17.45 dB	Pass	Horizontal

Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
4.961 GHz	37.29 dBμV/m	54 dBμV/m	-16.71 dB	Pass	Vertical
7.439 GHz	51.83 dBμV/m	54 dBμV/m	-2.17 dB	Pass	Horizontal

Test Report No.: G0M-2207-1565-TFC247BL-V01

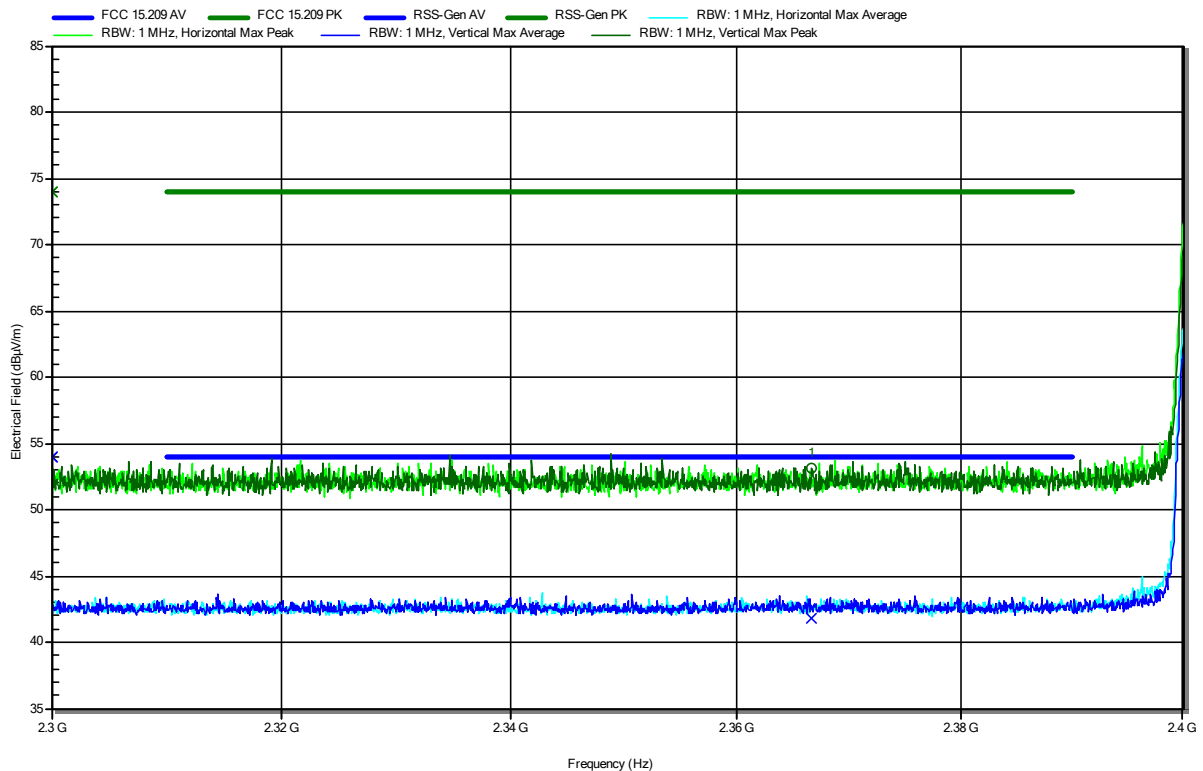
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

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. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.7 VDC (Battery)
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; BT-LE, 2402 MHz, 2 Mbit/s, PRBS9, 239 Bytes
 Test Date: 2022-11-03
 Note: lower bandedge

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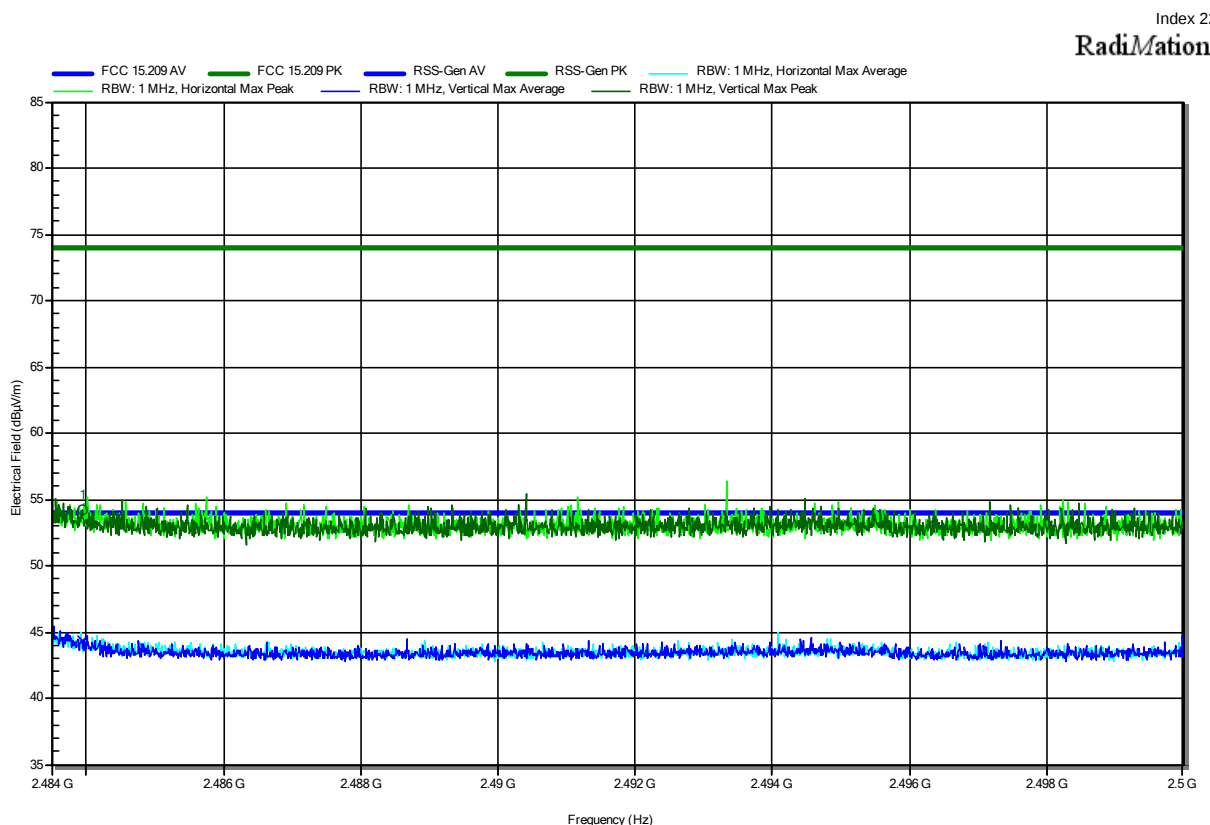
RadiMation



Frequency 2.3667 GHz	Peak 53.12 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -20.88 dB	Peak Status Pass	Polarization Vertical
Frequency 2.3667 GHz	Average 41.86 dBμV/m	Average Limit 54 dBμV/m	Average Difference -12.14 dB	Average Status Pass	Polarization Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

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. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.7 VDC (Battery)
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; BT-LE, 2480 MHz, 2 Mbit/s, PRBS9, 239 Bytes
 Test Date: 2022-11-03
 Note: upper bandedge



Frequency 2.4839 GHz	Peak 54.25 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -19.75 dB	Peak Status Pass	Polarization Vertical
Frequency 2.4839 GHz	Average 44.33 dBµV/m	Average Limit 54 dBµV/m	Average Difference -9.67 dB	Average Status Pass	Polarization Vertical

Test Report No.: G0M-2207-1565-TFC247BL-V01

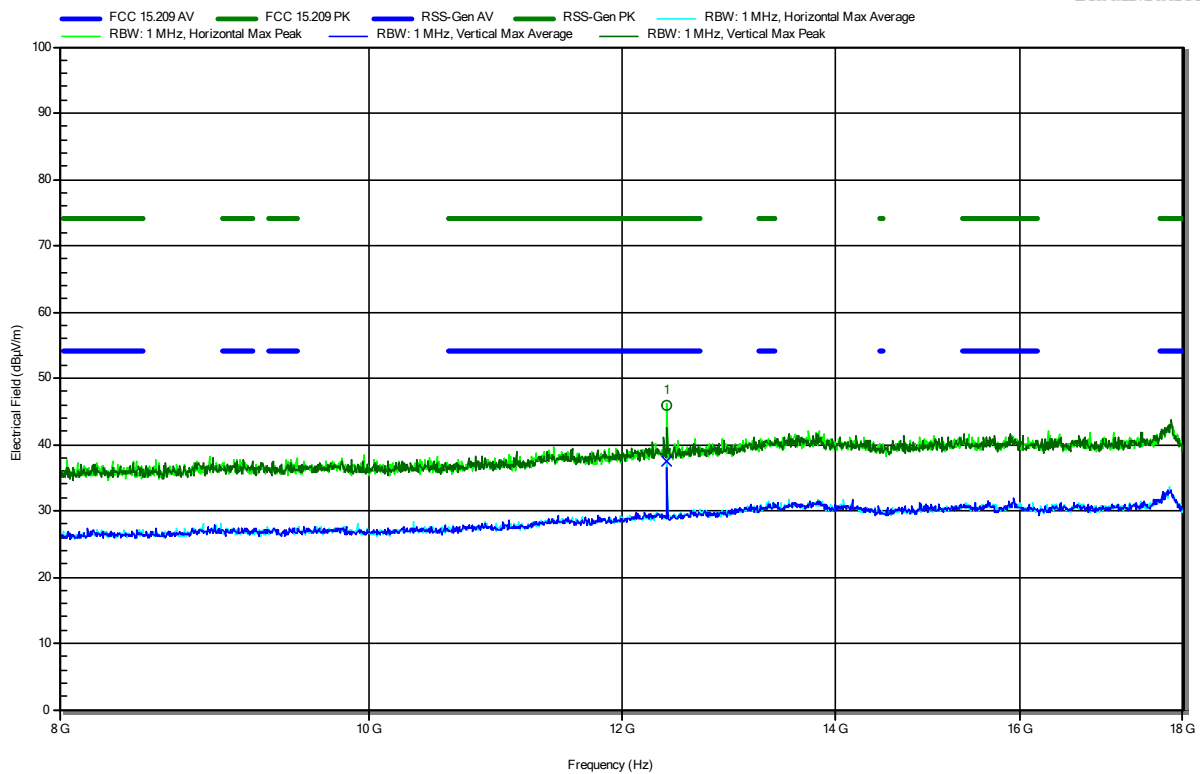
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

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. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.7 VDC (Battery)
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; BT-LE, 2480 MHz, 2 Mbit/s, PRBS9, 239 Bytes
 Test Date: 2022-11-03
 Note:

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RadiMation



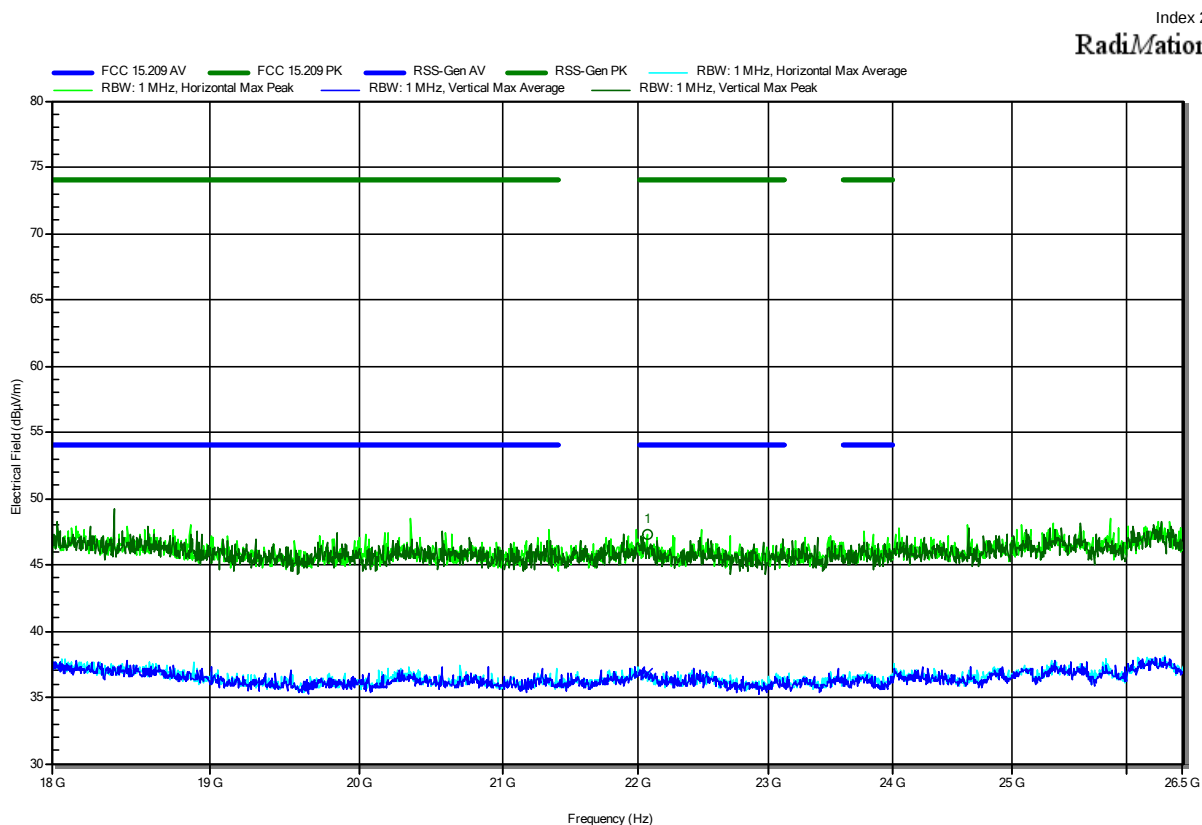
Frequency 12.402 GHz	Peak 45.88 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -28.12 dB	Peak Status Pass	Polarization Horizontal
Frequency 12.402 GHz	Average 37.39 dBµV/m	Average Limit 54 dBµV/m	Average Difference -16.61 dB	Average Status Pass	Polarization Horizontal

Test Report No.: G0M-2207-1565-TFC247BL-V01

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

Radiated Spurious Emissions according to 47 CFR Part 15.247

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. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.7 VDC (Battery)
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; BT-LE, 2480 MHz, 2 Mbit/s, PRBS9, 239 Bytes
 Test Date: 2022-11-03
 Note:



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
22.063 GHz	47.34 dBμV/m	74 dBμV/m	-26.66 dB	Pass	Horizontal
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
22.063 GHz	36.79 dBμV/m	54 dBμV/m	-17.21 dB	Pass	Horizontal

== = END OF TEST REPORT == =

Test Report No.: G0M-2207-1565-TFC247BL-V01

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