

RADIO REPORT FCC 47 CFR Part 15C ISED Canada RSS-247 Digital transmission systems operating within the 902 – 828 MHz band	
Report Reference No	G0M-1912-8648-TFC247DT-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	    DAkkS - Registration number : D-PL-12092-01-03 (ISED) ISED Testing Laboratory site: 3470A-2 DAkkS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	Kamstrup A/S
Address	Industrivej 28 8660 Skanderborg DENMARK
Test Specification	According to FCC/ISED rules
Standard	47 CFR Part 15C RSS-247, Issue 2, 2017-02 RSS-Gen, Issue 5, Amendment 1, 2019-03
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	wireless mbus US radio module with pulse input for MULTICAL
Model(s)	wireless mbus US radio module with pulse input for MULTICAL
Additional Model(s)	None
Brand Name(s)	None
Hardware Version(s)	5550 1868 A3 (5536 1731C1 layout)
Software Version(s)	50981586 C1 / 5514 2007 C1
FCC-ID	OUY-HC-003-34
IC	22376-HC00334
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 - 23 °C	
Test Lab Humidity	32 – 38 %	
Date of receipt of test item	2020-01-13	
Report:		
Compiled by	Wilfried Treffke	
Tested by (+ signature) (Responsible for Test)	Wilfried Treffke	
Approved by (+ signature) (Head of Lab)	Christian Weber	
Date of Issue	2020-01-23	
Total number of pages	110	
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:		
Duty cycle Statement 1868A3 Radio: The longest RF packet is 19.5 ms every 16 sec over a 100 ms observation interval, this gives a worse case duty cycle below 20%. This will provide an additional margin on the radiated harmonics if taken into account. (558074 D01 15.247 Meas Guidance v05) The radiated measurements were performed with 100% duty cycle and not corrected for duty cycle.		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2020-01-23	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 mbus US radio module with pulse input for MULTICAL	
Model	wireless mbus US radio module with pulse input for MULTICAL	
Additional Model(s)	None	
Brand Name(s)	None	
Serial Number(s)	71769202/7Z/19	
Hardware Version(s)	5550 1868 A3 (5536 1731C1 layout)	
Software Version(s)	50981586 C1 / 5514 2007 C1	
PMN	HC-003-34	
HVIN	HC-003-34	
FVIN	5098 1586 C1/ 5514 2007 C1	
HMN	MULTICAL®403	
FCC-ID	OUY-HC-003-34	
IC	22376-HC00334	
Equipment type	End Product	
Radio type	Transceiver	
Assigned frequency bands	902.0 - 928.0 MHz	
Radio technology	Digital Modulation	
Modulation	2-FSK	
Number of antenna ports	1	
Antenna 1	Type	Integrated
	Model	6699482 B3
	Manufacturer	Kamstrup A/S
	Gain	1.8 dBi (customer declaration)
Antenna 2	Type	External
	Model	6699448 A4
	Manufacturer	smarteq
	Gain	2.15 dBi (customer declaration)
Supply Voltage 1	V _{NOM}	3.6 VDC (lithium battery)
Supply Voltage 2	V _{NOM}	24 VAC VDC
Operating Temperature	T _{NOM}	25 °C
AC/DC-Adaptor	Model	60200004000000 A4
	Vendor	Kamstrup
	Input	24 VAC
	Output	3.6 VDC
Manufacturer	Kamstrup A/S Industrivej 28 8660 Skanderborg DENMARK	

1.1 Photos – Equipment External



1.2 Photos – Equipment Internal



1.3 Photos – Test Setup



1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	optical eye reader	Kamstrup	optical eye reader	-
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

1.5 Test mode duty cycle

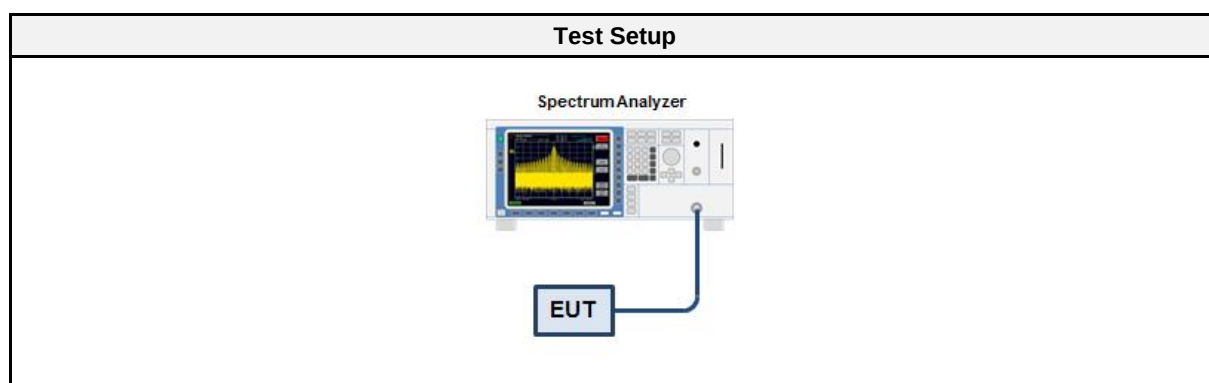
1.5.1 Information

Test Information	
Measurement Method	ANSI C63.10 11.6

1.5.2 Requirements

Requirements	
Duty cycle	Duty cycle correction
$\geq 98 \%$	No correction required
$< 98 \%$	Correction required ($10 \times \log_{10}(1/DC)$)

1.5.3 Setup



1.5.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2019-07	2020-07

1.5.5 Procedure

Test Procedure
1. EUT set to test mode 2. Span is set to zero span 3. Detector set to peak 4. Sweep time is set long enough to capture at least 5 bursts 5. Envelope peak value of emission spectrum is selected 6. The maximum burst duration T_{ON} is measured using two markers set to the start and the end of the longest burst 7. The minimum idle duration T_{OFF} is measured using two markers set to the start and the end of the shortest idle period 8. The duty cycle is calculated by $DC = T_{ON} / (T_{ON} + T_{OFF})$ 9. The duty cycle correction is calculated by $DC = 10 \times \log_{10}(T_{ON} / (T_{ON} + T_{OFF}))$

1.5.6 Results

Duty Cycle Results		
Mode	Duty Cycle	Correction Factor [dB]
Transmit	1	0

1.6 Test Modes

Mode	Description
Transmit	Mode = Transmit Modulation = 2-FSK Duty cycle = 100 %
Receive	Mode = Receive Modulation = 2-FSK
Comment:	

1.7 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx / Rx	1	912.5
F2	Tx / Rx	2	915.0
F3	Tx / Rx	3	918.5

1.8 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).

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

FCC 47 CFR Part 15C, ISED RSS-247				
Product Standard Reference	Requirement	Reference Method	Result	Remarks
ISED RSS-Gen, Issue 5 (section 6.6)	Occupied Bandwidth	ANSI C63.10-2013	N/R	Informational only
FCC § 15.247(a)(2) ISED RSS-247, Issue 2 (section 5.2)	6 dB Bandwidth	ANSI C63.10-2013	PASS	
FCC § 15.247(b)(1) ISED RSS-247, Issue 2 (section 5.4)	Maximum peak conducted power	ANSI C63.10-2013	PASS	
FCC § 15.247(e) ISED RSS-247, Issue 2 (section 5.2)	Power spectral density	ANSI C63.10-2013	PASS	
FCC § 15.207 ISED RSS-247, Issue 2 (section 3.1)	AC power line conducted emissions	ANSI C63.10-2013	PASS	
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Band edge compliance	ANSI C63.10-2013	PASS	
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Conducted spurious emissions	ANSI C63.10-2013	PASS	
FCC § 15.247(d) FCC § 15.209 ISED RSS-Gen, Issue 5 (section 6.13)	Transmitter radiated spurious emissions	ANSI C63.10-2013	PASS	
ISED RSS-247, Issue 2 (section 3.1)	Receiver radiated spurious emissions	ANSI C63.10-2013	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

3 Test Conditions and Results

3.1 Test Conditions and Results - Occupied bandwidth

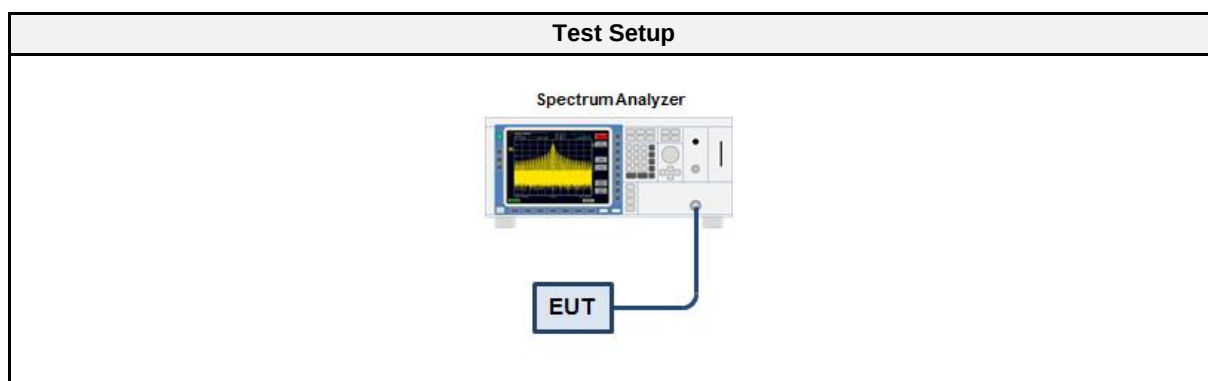
3.1.1 Information

Test Information	
Reference	ISED RSS-Gen, Issue 5 (section 6.6)
Measurement Method	ANSI C63.10 6.9.3
Operator	Wilfried Treffke
Date	2020-01-13

3.1.2 Limits

Limits
None (Informational only)

3.1.3 Setup



3.1.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2019-07	2020-07

3.1.5 Procedure

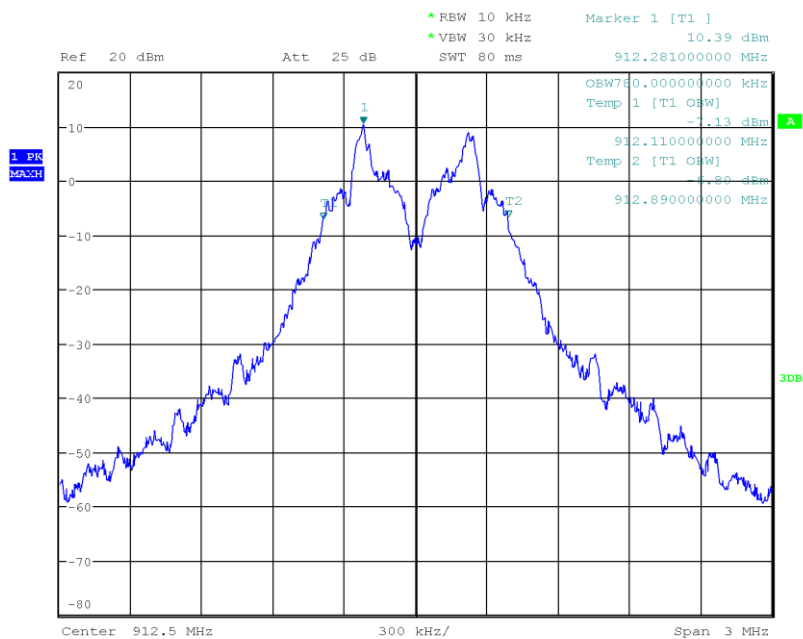
Test Procedure
1. EUT transmitter is activated in test mode under normal conditions 2. The spectrum analyzer is set to peak detection and maximum hold with a span twice the emission spectrum 3. The resolution bandwidth is set to the range of 1 % to 5 % of the occupied bandwidth 4. The occupied bandwidth is measured with the build-in analyzer function

3.1.6 Results

Test Results		
Mode	Frequency [MHz]	Bandwidth [MHz]
Transmit	912.5	0.780
Transmit	918.5	0.777

Occupied Bandwidth

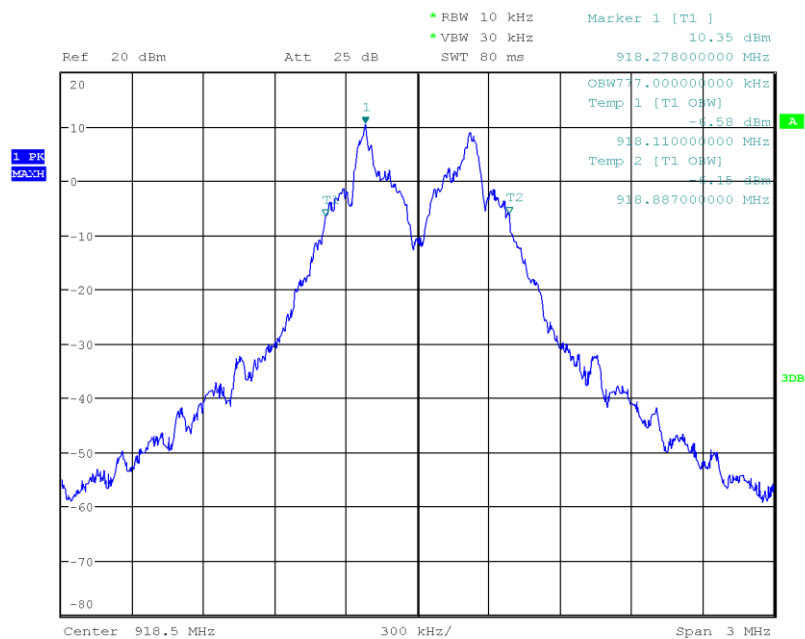
Project Number: G0M-1912-8648
 Applicant: Kamstrup A/S
 Model Description: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Sample ID: 27333
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: 2-FSK, Channel: 912.5 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-01-13
 Occupied Bandwidth [MHz]: 0.780



Date: 13.JAN.2020 08:56:37

Occupied Bandwidth

Project Number: G0M-1912-8648
 Applicant: Kamstrup A/S
 Model Description: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Sample ID: 27333
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: 2-FSK, Channel: 918.5 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-01-13
 Occupied Bandwidth [MHz]: 0.777



Date: 13.JAN.2020 08:59:26

3.2 Test Conditions and Results - 6 dB bandwidth

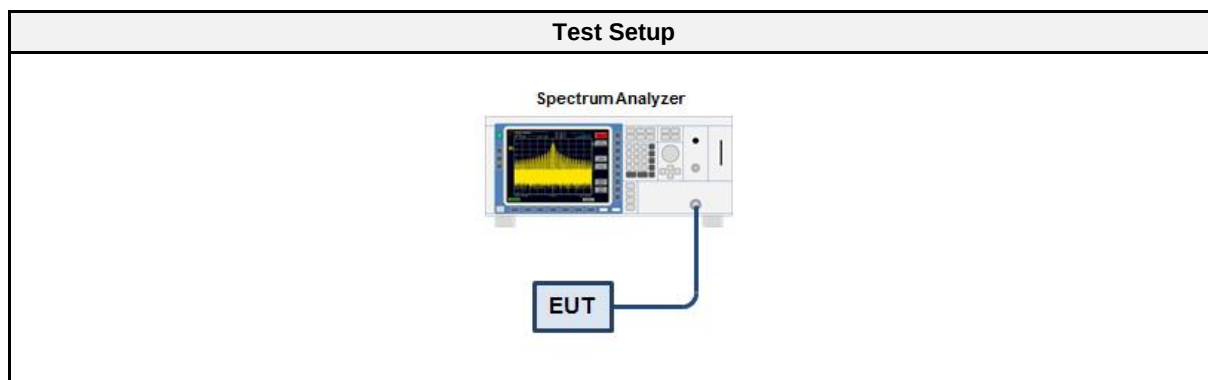
3.2.1 Information

Test Information	
Reference	FCC § 15.247(a)(2); ISED RSS-247, Issue 2 (section 5.2)
Measurement Method	ANSI C63.10 11.8
Operator	Wilfried Treffke
Date	2020-01-13

3.2.2 Limits

Limits
≥ 500kHz

3.2.3 Setup



3.2.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2019-07	2020-07

3.2.5 Procedure

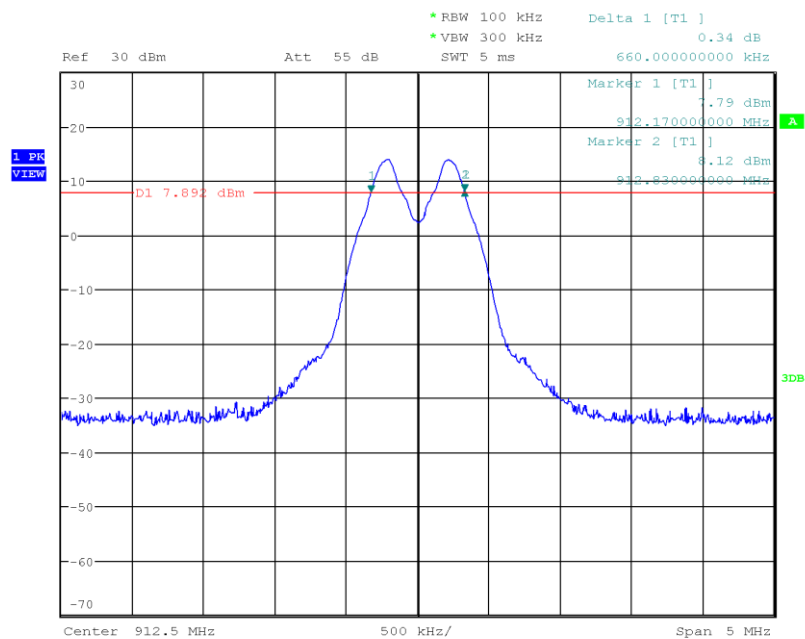
Test Procedure
1. EUT set to test mode 2. Span set to at least twice the emission spectrum 3. Detector set to peak and max hold and RBW is set to 100 kHz 4. Envelope peak value of emission spectrum is selected 5. Marker on envelope of spectrum is set to level of -6 dB to the left of the peak 6. Marker on envelope of spectrum is set to level of -6 dB to the right of the peak 7. 6 dB Bandwidth is determined by marker frequency separation

3.2.6 Results

Test Results				
Mode	Frequency [MHz]	Bandwidth [kHz]	Limit [kHz]	Verdict
Transmit	912.5	660	500	PASS
Transmit	918.5	655	500	PASS

DTS (6 dB) Bandwidth

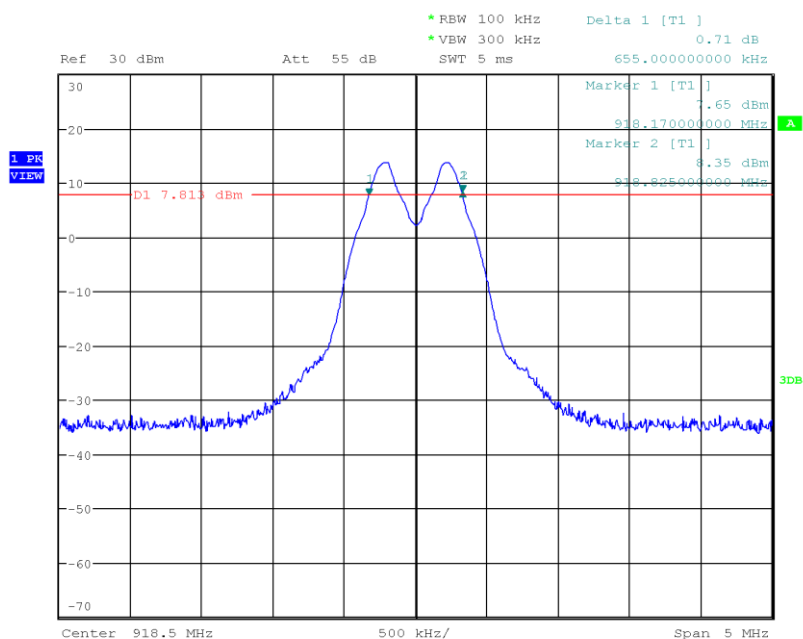
Project Number: G0M-1912-8648
 Applicant: Kamstrup A/S
 Model Description: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Sample ID: 27333
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: 2-FSK, Channel: 912.5 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-01-13
 Lower Frequency [MHz]: 912.170
 Upper Frequency [MHz]: 912.830
 6 dB Bandwidth [kHz]: 660



Date: 13.JAN.2020 09:07:45

DTS (6 dB) Bandwidth

Project Number: G0M-1912-8648
 Applicant: Kamstrup A/S
 Model Description: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Sample ID: 27333
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: 2-FSK, Channel: 918.5 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-01-13
 Lower Frequency [MHz]: 918.170
 Upper Frequency [MHz]: 918.825
 6 dB Bandwidth [kHz]: 655



Date: 13.JAN.2020 09:10:09

3.3 Test Conditions and Results - Maximum peak conducted output power

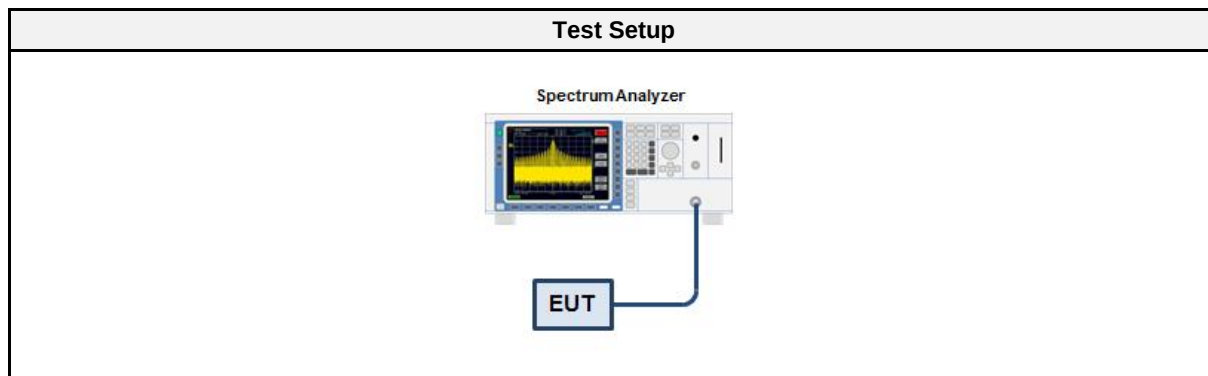
3.3.1 Information

Test Information	
Reference	FCC § 15.247(b)(1); ISED RSS-247, Issue 2 (section 5.4)
Measurement Method	ANSI C63.10 11.9.1
Operator	Wilfried Treffke
Date	2020-01-13

3.3.2 Limits

Limits
1 W (30 dBm)
The conducted output power limit specified above is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in the table, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.3 Setup



3.3.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2019-07	2020-07

3.3.5 Procedure

Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Analyzer resolution bandwidth is set $\geq$ DTS bandwidth 3. Detector set to peak and max hold 4. Sweep time is set to auto 5. After the trace has stabilized a marker is set to peak of envelope

3.3.6 Results

Test Results				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
912.5	14.694	0.0295	1.0	PASS
918.5	14.655	0.0292	1.0	PASS

3.4 Test Conditions and Results - Power spectral density

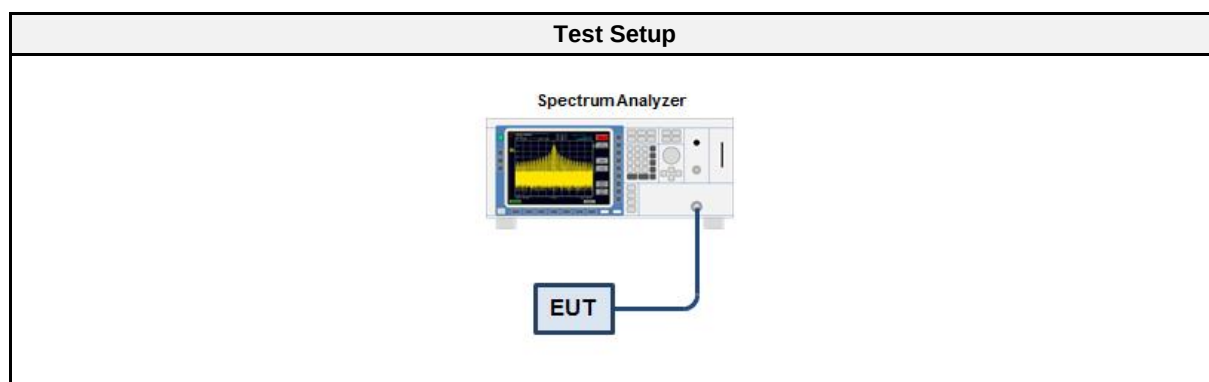
3.4.1 Information

Test Information	
Reference	FCC § 15.247(e); ISSED RSS-247, Issue 2 (section 5.2)
Measurement Method	ANSI C63.10 11.10.2, 14.3.2
Operator	Wilfried Treffke
Date	2020-01-13

3.4.2 Limits

Limits
8 dBm / 3 kHz

3.4.3 Setup



3.4.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2019-07	2020-07

3.4.5 Procedure

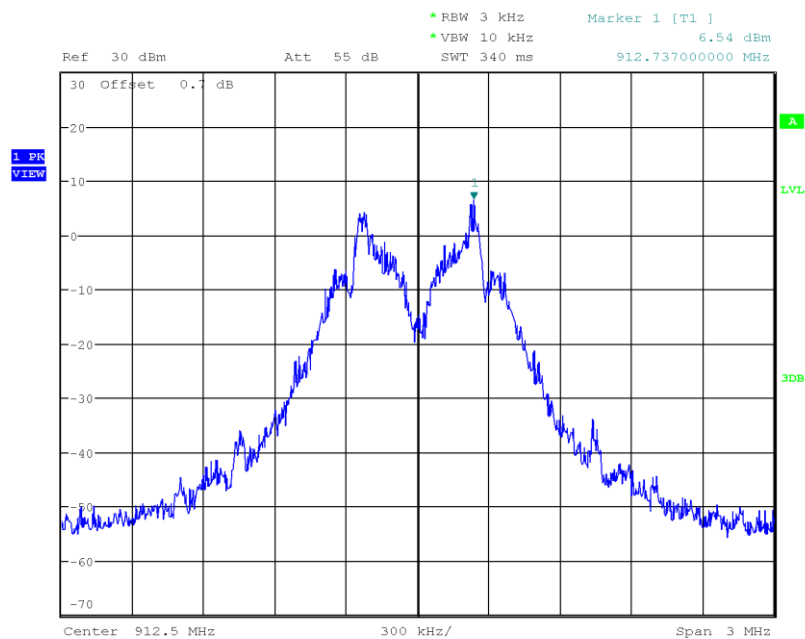
Test Procedure
1. EUT set to test mode 2. The analyzer is set to DTS channel center frequency with a span of 1.5 times the DTS bandwidth 3. The RBW is set to 100 kHz with VBW $\geq$ RBW and the detector is set to peak with max hold 4. After the trace has stabilized a marker is set to the envelope maximum 5. If the power spectral density is above the limit the RBW is reduced (not lower than 3 kHz) and the measurement is repeated 6. If the EUT has more than one transmit chain the procedure is repeated for each transmit chain

3.4.6 Results

Test Results			
Channel [MHz]	PSD [dBm/RBW]	Limit [dBm/3kHz]	Verdict
912.5	6.536	8.0	PASS
918.5	6.354	8.0	PASS
RBW = 3 kHz			

Peak Power Spectral Density

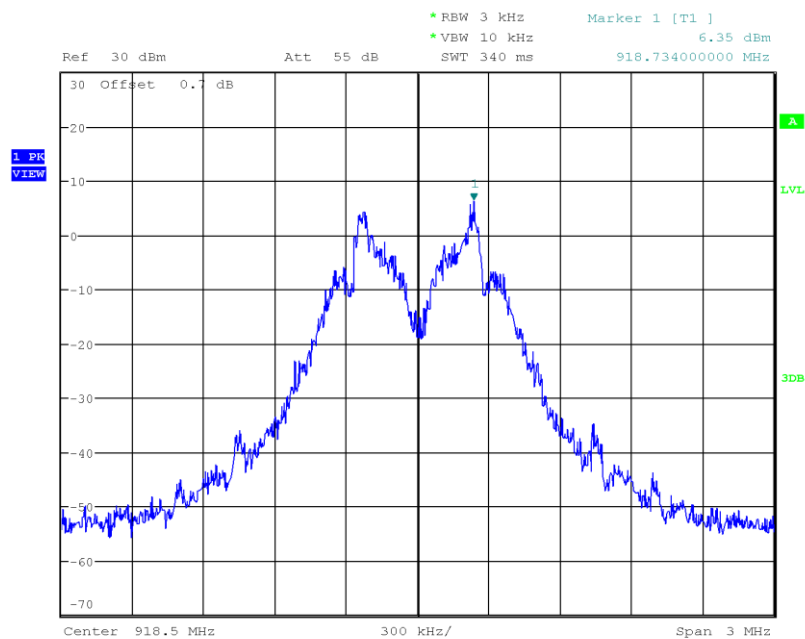
Project Number: G0M-1912-8648
 Applicant: Kamstrup A/S
 Model Description: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Sample ID: 27333
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: 2-FSK, Channel: 912.5 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-01-13
 Peak Frequency [MHz]: 912.737
 Spectral Density [dBm/RBW]: 6.536
 Resolution Bandwidth [kHz]: 3 kHz



Date: 13.JAN.2020 09:51:12

Peak Power Spectral Density

Project Number: G0M-1912-8648
 Applicant: Kamstrup A/S
 Model Description: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Sample ID: 27333
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: 2-FSK, Channel: 918.5 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-01-13
 Peak Frequency [MHz]: 918.734
 Spectral Density [dBm/RBW]: 6.354
 Resolution Bandwidth [kHz]: 3 kHz



Date: 13.JAN.2020 09:52:43

3.5 Test Conditions and Results - AC powerline conducted emissions

3.5.1 Information

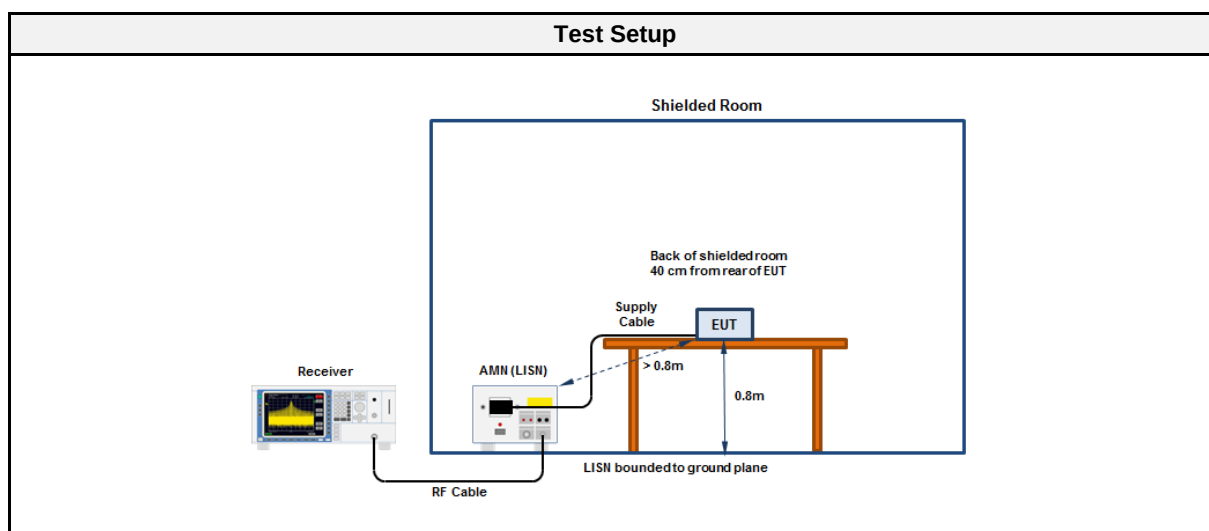
Test Information	
Reference	FCC § 15.207; ISED RSS-247, Issue 2 (section 3.1)
Measurement Method	ANSI C63.10 6.2
Operator	Wilfried Treffke
Date	2020-01-14

3.5.2 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

3.5.3 Setup



3.5.4 Equipment

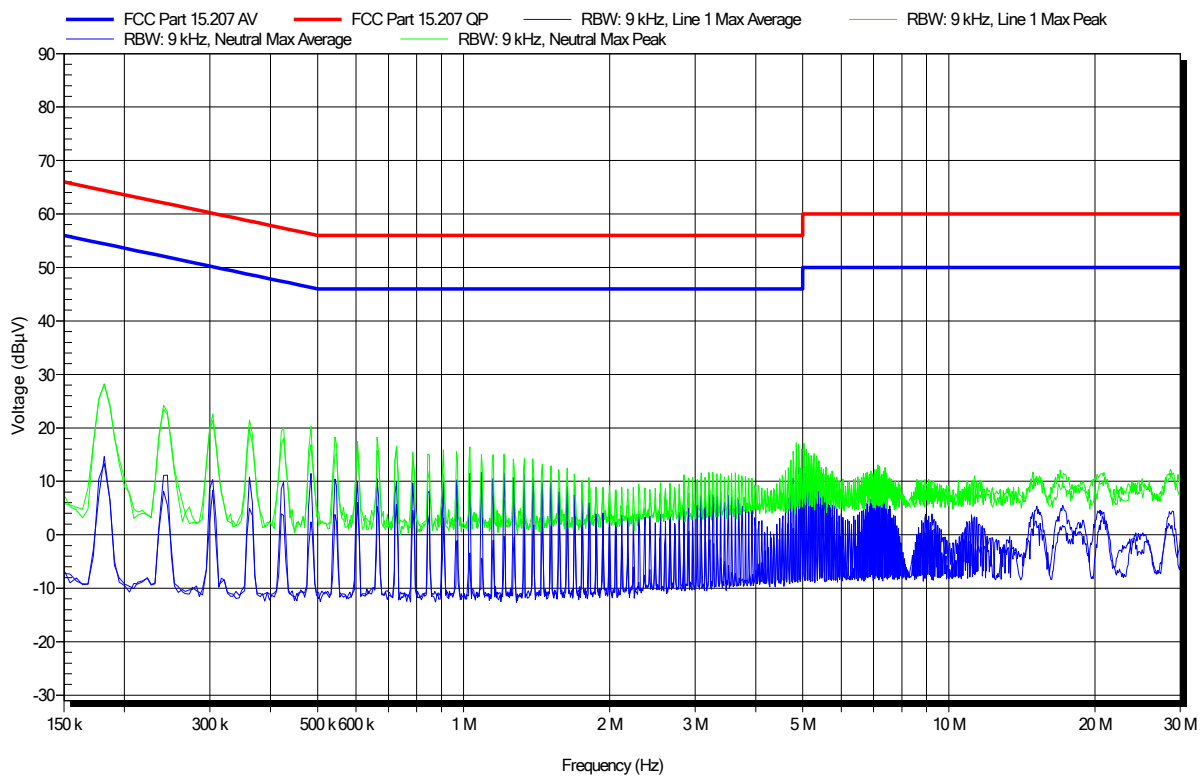
Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2016.1.10

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Receiver	R&S	ESU 26	EF00241	2019-07	2021-07
LISN	R&S	ESH3-Z5	EF00036	2019-07	2021-07

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

Project Number: G0M-1912-8648
 Applicant: Kamstrup A/S
 Model Description: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Sample ID: 27333
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Date: 2020-01-14
 Operating Conditions: ambient temperature: 22°C
 power input: 120 VAC (external power supply)
 LISN: Rohde & Schwarz ESH3-Z5
 Mode: 2-FSK, 915.0 MHz

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3.6 Test Conditions and Results - Band-edge compliance

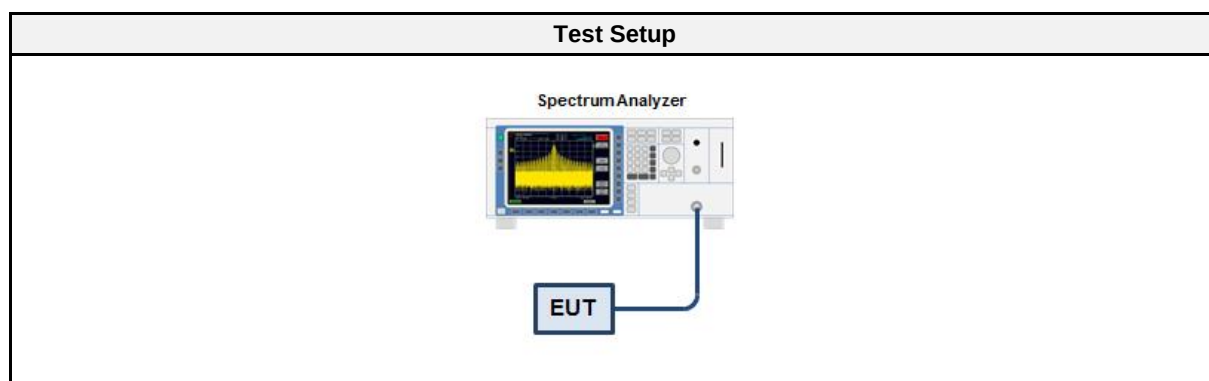
3.6.1 Information

Test Information	
Reference	FCC § 15.247(d); ISSED RSS-247, Issue 2 (section 5.5)
Measurement Method	ANSI C63.10 11.13
Operator	Wilfried Treffke
Date	2020-01-13

3.6.2 Limits

Limits	
Power Measurement	Out-of-band attenuation [dB]
Peak	20
RMS	30

3.6.3 Setup



3.6.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2019-07	2020-07

3.6.5 Procedure

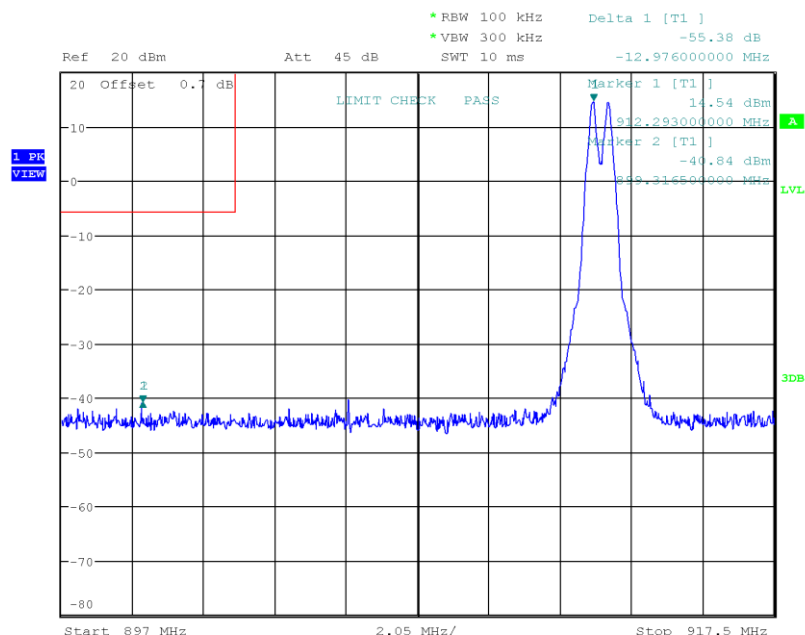
Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Span set around lower band edge and detector is set to peak and max hold 3. Resolution bandwidth is set to 100 kHz 4. Markers are set to peak emission levels within frequency band and outside frequency band 5. Band edge attenuation is determined from level difference

3.6.6 Results

Test Results				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
Transmit	912.5	-55.38	-20	PASS
Transmit	918.5	-55.91	-20	PASS

Emissions in nonrestricted frequency bands at the Band-edge

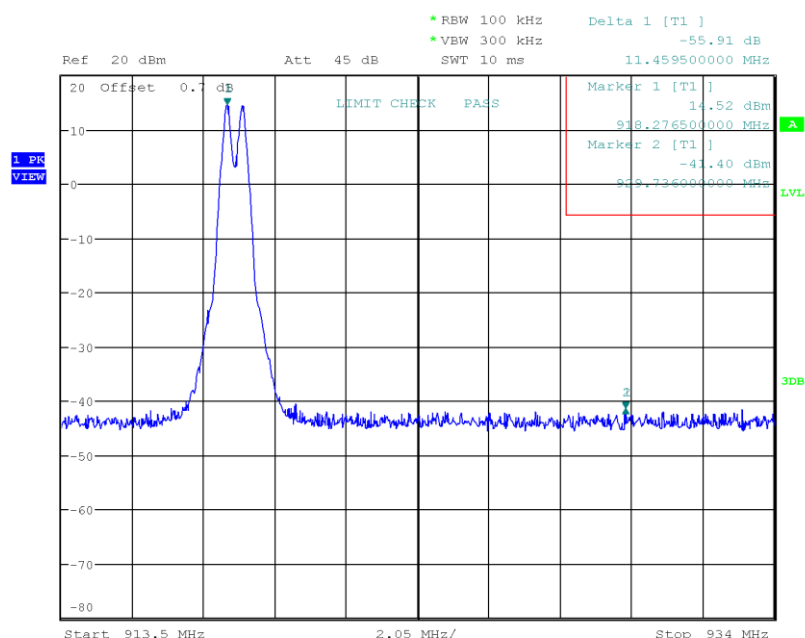
Project Number: G0M-1912-8648
 Applicant: Kamstrup A/S
 Model Description: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Sample ID: 27333
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.10
 Operational Mode: 2-FSK, Channel: 912.5 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-01-13
 Band-edge: Lower
 In-band Frequency [MHz]: 912.293
 Max. in-band Level [dBm/100 kHz]: 14.54
 Out-of-band Frequency [MHz]: 899.317
 Max. out-of-band Level [dBm/100 kHz]: -40.838
 Attenuation [dB]: -55.38



Date: 13.JAN.2020 09:58:24

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-1912-8648
 Applicant: Kamstrup A/S
 Model Description: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Sample ID: 27333
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.10
 Operational Mode: 2-FSK, Channel: 918.5 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-01-13
 Band-edge: Upper
 In-band Frequency [MHz]: 918.277
 Max. in-band Level [dBm/100 kHz]: 14.517
 Out-of-band Frequency [MHz]: 929.736
 Max. out-of-band Level [dBm/100 kHz]: -41.397
 Attenuation [dB]: -55.91



Date: 13.JAN.2020 10:00:55

3.7 Test Conditions and Results - Conducted spurious emissions

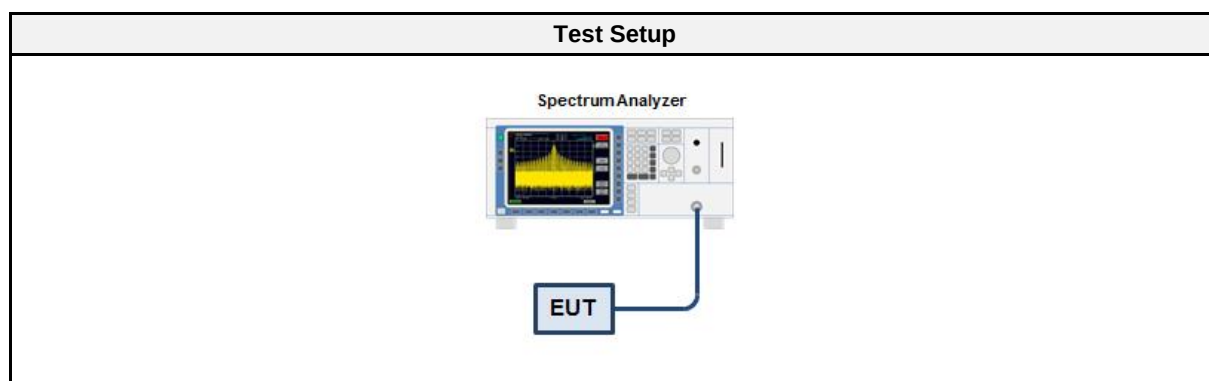
3.7.1 Information

Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 2 (section 5.5)
Measurement Method	ANSI C63.10 11.11
Operator	Wilfried Treffke
Date	2020-01-13

3.7.2 Limits

Limits	
Power Measurement	Out-of-band attenuation [dB]
Peak	20
RMS	30

3.7.3 Setup



3.7.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2019-07	2020-07

3.7.5 Procedure

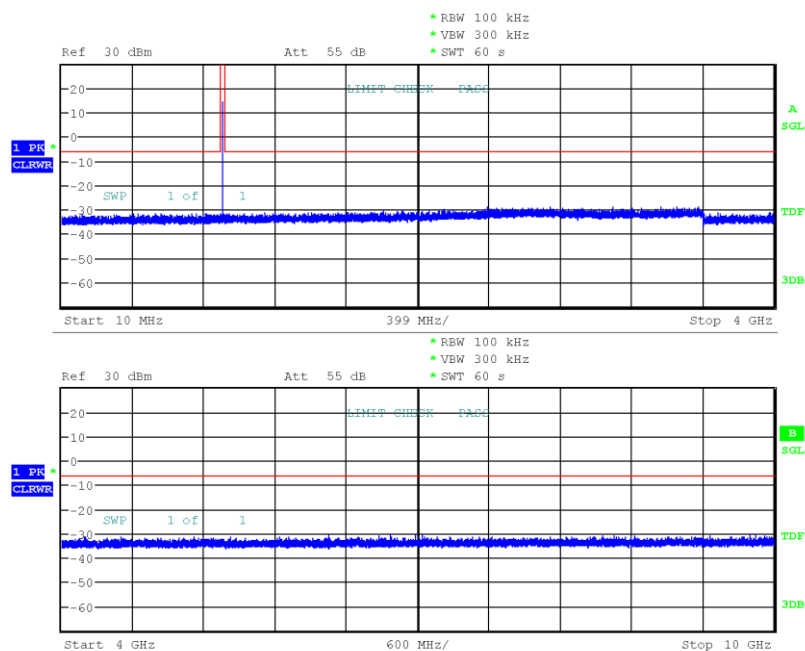
Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Span set around lower band edge and detector is set to peak and max hold 3. Resolution bandwidth is set to 100 kHz 4. Markers are set to peak emission levels within frequency band and outside frequency band 5. Band edge attenuation is determined from level difference

3.7.6 Results

Test Results		
Mode	Channel [MHz]	Verdict
Transmit	912.5	PASS
Transmit	918.5	PASS

Conducted Spurious Emissions

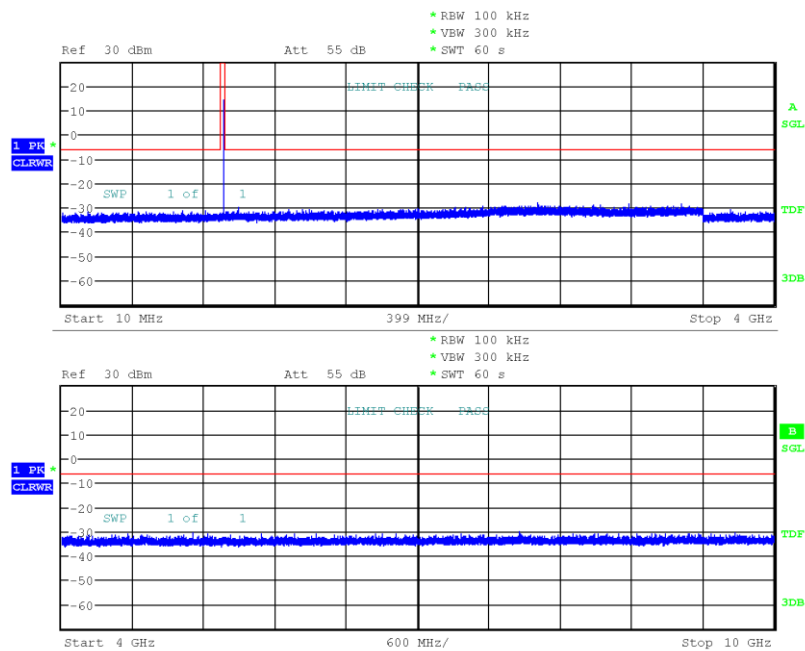
Project Number: G0M-1912-8648
 Applicant: Kamstrup A/S
 Model Description: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Sample ID: 27333
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: 2-FSK, Channel: 912.5 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-01-13
 Max. in-band Frequency [MHz]: 912.3
 Max. in-band Level [dBm/100 kHz]: 14.3
 Out-of-band Limit [dBm/100 kHz]: -5.7



Date: 13.JAN.2020 10:12:32

Conducted Spurious Emissions

Project Number: G0M-1912-8648
 Applicant: Kamstrup A/S
 Model Description: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Sample ID: 27333
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: 2-FSK, Channel: 918.5 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-01-13
 Max. in-band Frequency [MHz]: 918.3
 Max. in-band Level [dBm/100 kHz]: 14.3
 Out-of-band Limit [dBm/100 kHz]: -5.7



Date: 13.JAN.2020 10:15:59

3.8 Test Conditions and Results - Transmitter radiated emissions

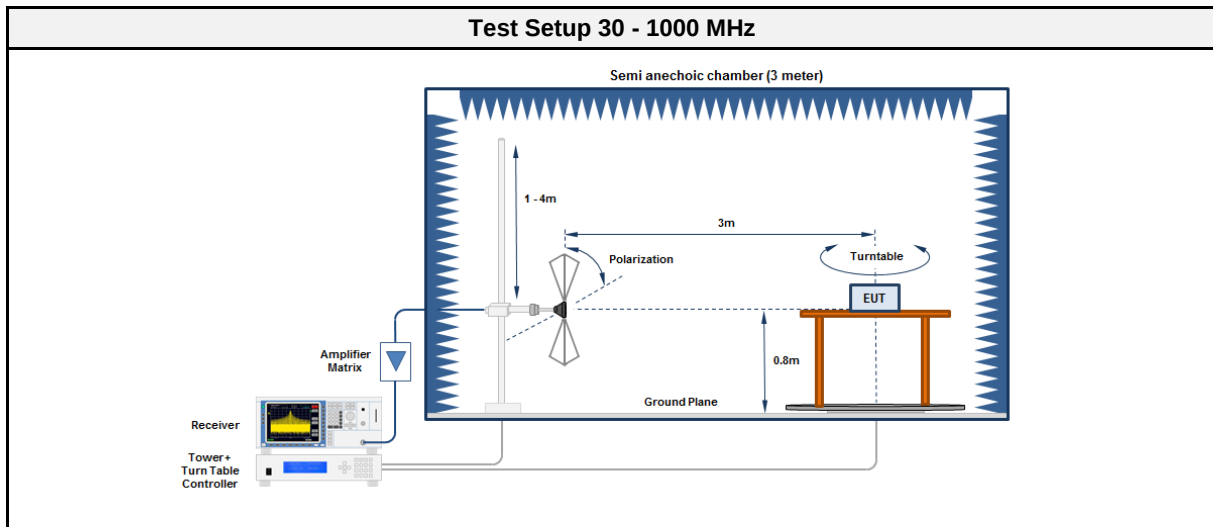
3.8.1 Information

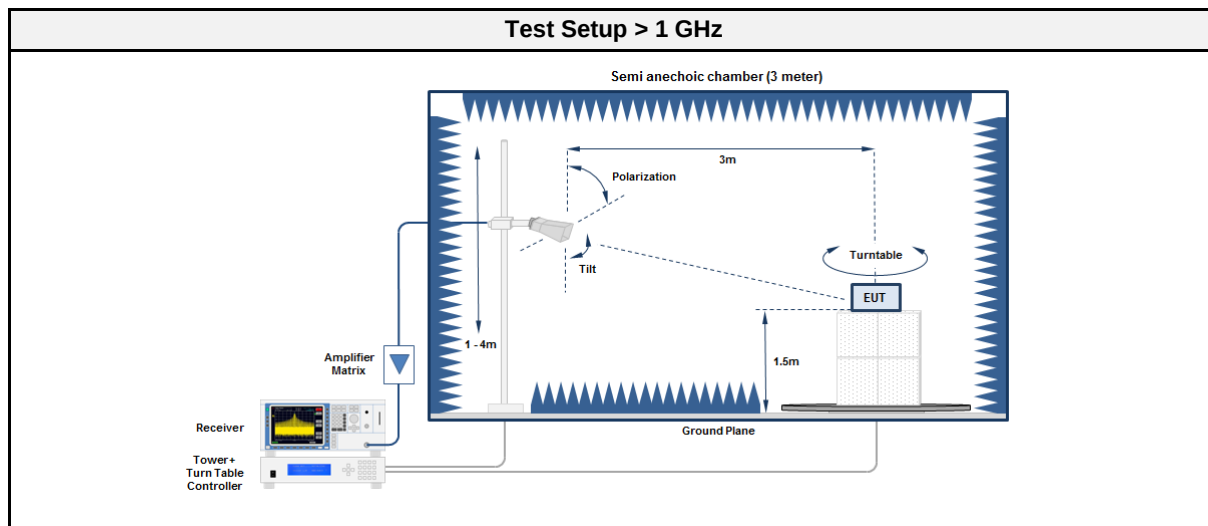
Test Information	
Reference	FCC § 15.247(d); FCC § 15.209; ISSED RSS-Gen, Issue 5 (section 6.13)
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6, 11.12
Operator	Florian Voigt
Date	2020-01-13

3.8.2 Limits

Limits			
Frequency [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

3.8.3 Setup





3.8.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2016.1.10

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Biconical antenna	R&S	HK116	EF00203	2018-06	2020-06
Antenna	R&S	HL 223	EF00187	2019-05	2022-05
Spectrum analyzer	R&S	FSU 26	EF01003	2019-07	2020-07

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2019-10	2022-10
Spectrum analyzer	R&S	FSU 26	EF01003	2019-07	2020-07

3.8.5 Procedure

Test Procedure 30 - 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					

3.8.6 Results

Test Results with external antenna						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
918.5	7346	38.81	pk	hor	74.00	-35.19
918.5	9188	45.99	pk	ver	74.00	-28.01
918.5	9188	36.48	RMS	ver	54.00	-17.52
918.5	9189	41.33	pk	hor	74.00	-32.67

Test Results with internal antenna						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
912.5	2738	29.11	RMS	hor	54.00	-24.89
912.5	8215	46.21	pk	hor	74.00	-27.79
912.5	8215	47.90	pk	ver	74.00	-26.10
912.5	9127	56.14	pk	hor	74.00	-17.86
912.5	9127	51.94	RMS	hor	54.00	-02.06
912.5	9127	56.57	pk	ver	74.00	-17.43
912.5	9127	52.42	RMS	ver	54.00	-01.58
912.5	2737	20.88	RMS	ver	54.00	-33.12
918.5	8265	49.65	pk	ver	74.00	-24.35
918.5	8265	44.70	RMS	ver	54.00	-09.30
918.5	8269	47.98	pk	hor	74.00	-26.02
918.5	8269	42.23	RMS	hor	54.00	-11.77
918.5	9183	57.09	pk	hor	74.00	-16.91
918.5	9183	53.34	RMS	hor	54.00	-00.66
918.5	9183	55.21	pk	ver	74.00	-18.79
918.5	9183	51.20	RMS	ver	54.00	-02.80

3.9 Test Conditions and Results - Receiver radiated emissions

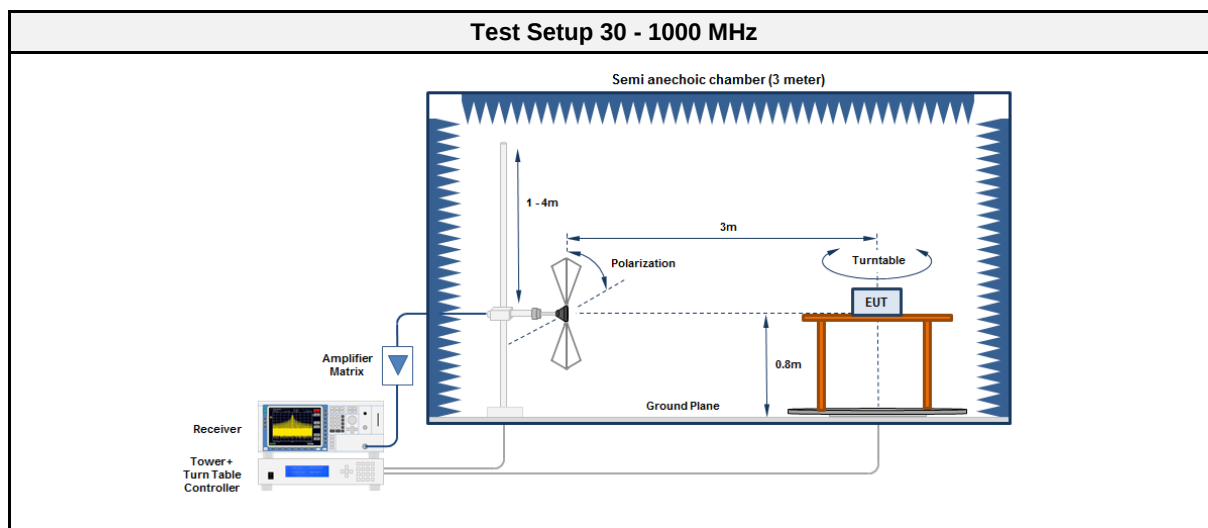
3.9.1 Information

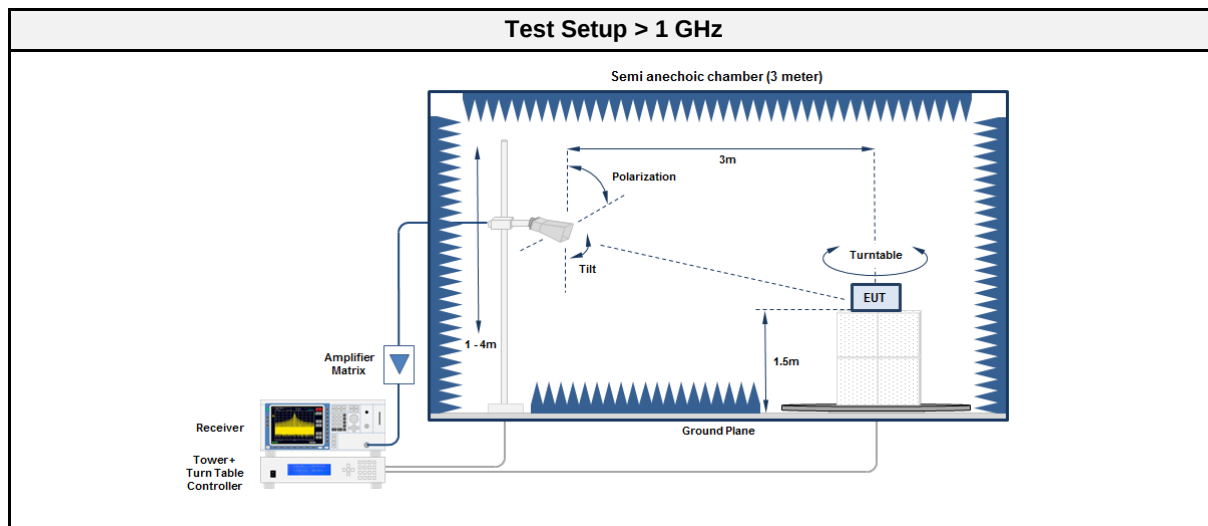
Test Information	
Reference	ISED RSS-247, Issue 2 (section 3.1)
Measurement Method	ANSI C63.10 6.5, 6.6, 11.12
Operator	Florian Voigt
Date	2020-01-13

3.9.2 Limits

Limits			
Frequency [MHz]	Detector	Field strength [dB μ V/m]	Measurement distance [m]
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

3.9.3 Setup





3.9.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2016.1.10

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Spectrum analyzer	R&S	FSU 26	EF01003	2019-07	2020-07
Biconical antenna	R&S	HK116	EF00203	2018-06	2020-06
Antenna	R&S	HL 223	EF00187	2019-05	2022-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2019-10	2022-10
Spectrum analyzer	R&S	FSU 26	EF01003	2019-07	2020-07

3.9.5 Procedure

Test Procedure 30 - 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

3.9.6 Results

Test Results with external antenna						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
915.0	379.487	21.93	pk	ver	46.00	-24.07
915.0	7744	39.30	pk	ver	53.98	-14.68

Test Results with internal antenna						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
915.0	921.795	21.95	pk	hor	46.00	-24.05

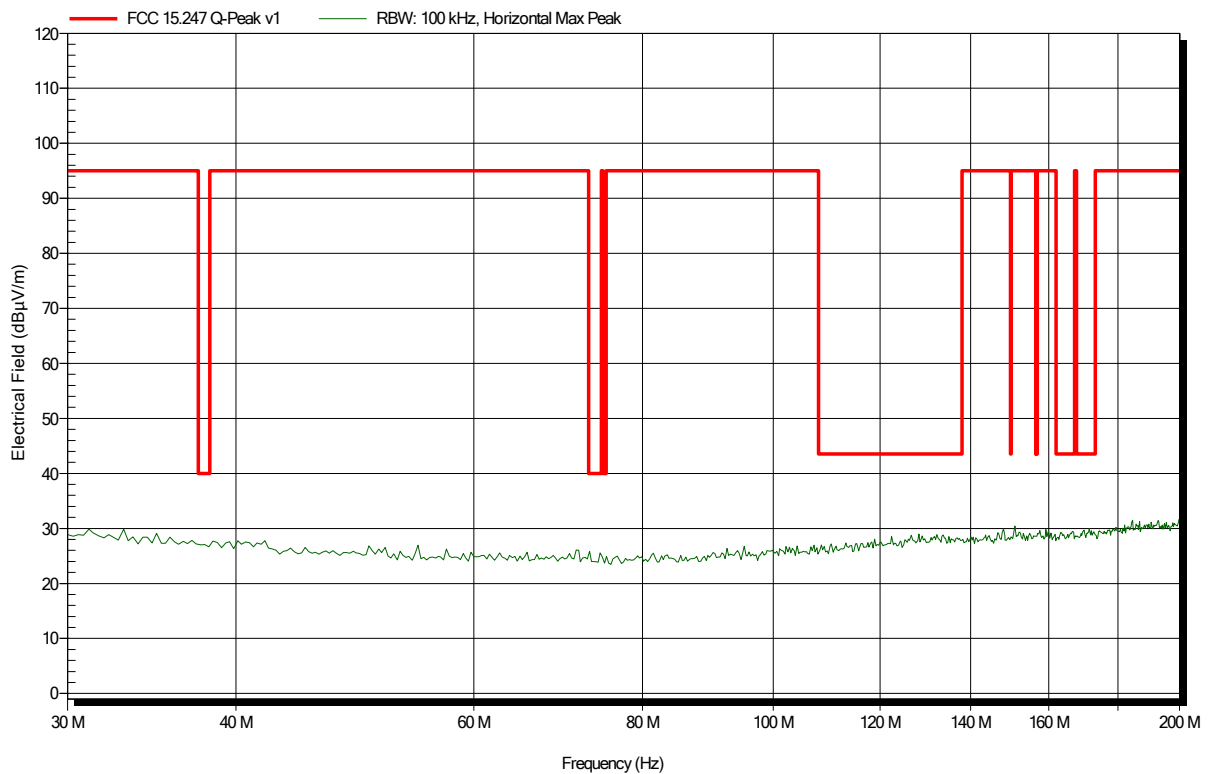
ANNEX A Transmitter spurious emissions

Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
 EUT Name: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Site: Eurofins Product Service GmbH
 Operator: Florian Voigt
 Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: TX; 912.5MHz, 2-FSK, Internal antenna, EUT ver.
 Test Date: 2020-01-13
 Note:

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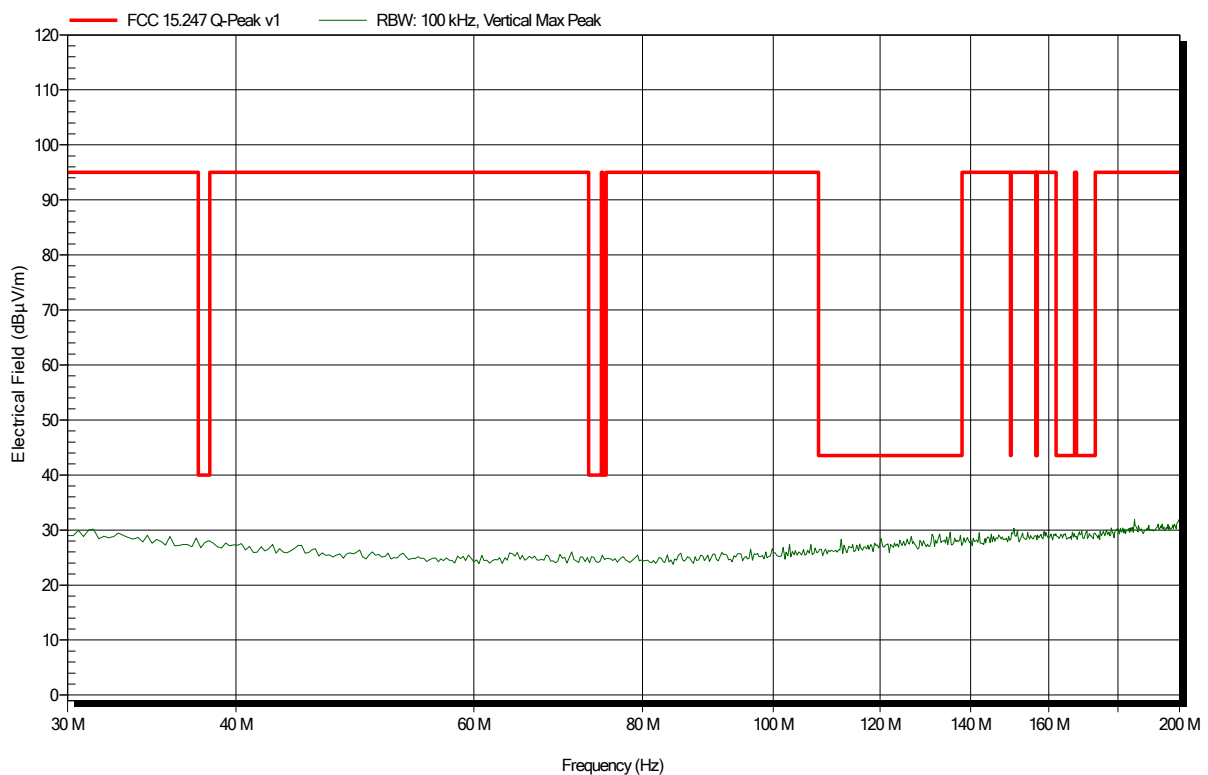


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
Antenna: Rohde & Schwarz HK 116, Vertical
Measurement distance: 3 m
Mode: TX; 912.5MHz, 2-FSK, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

Index 22

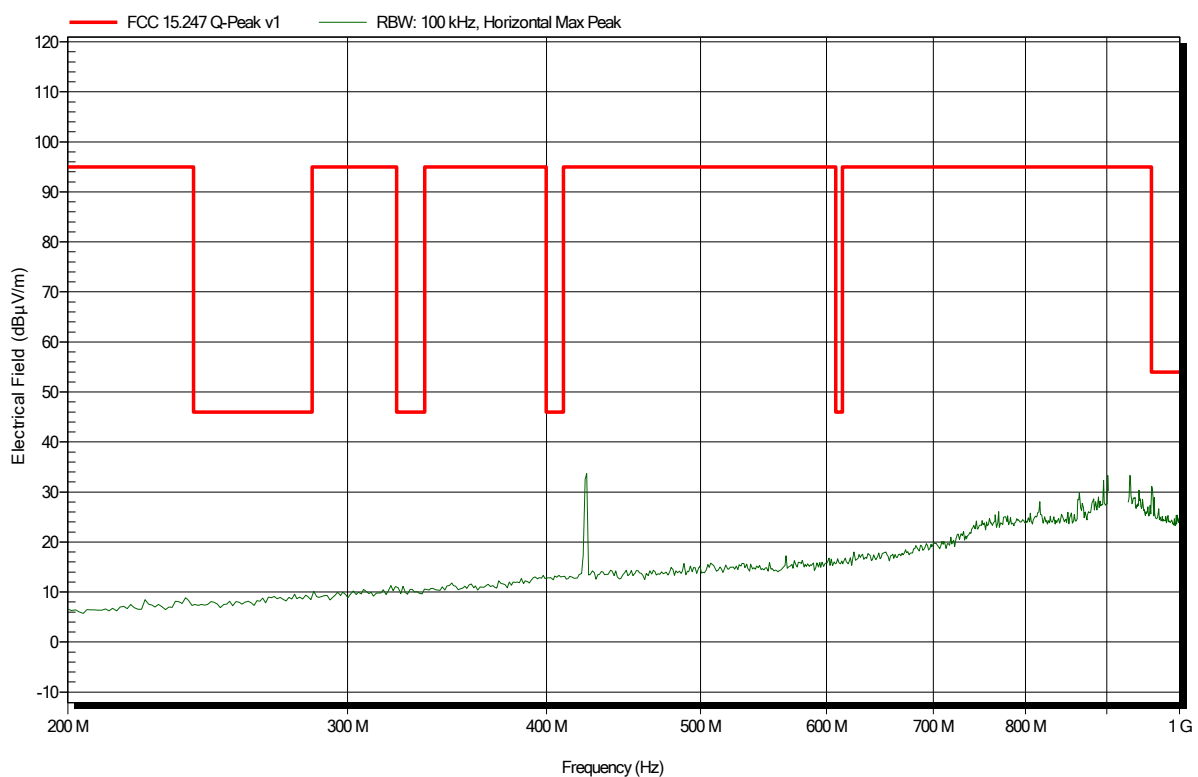


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
Antenna: Rohde & Schwarz HL 223, Horizontal
Measurement distance: 3 m
Mode: TX; 912.5MHz, 2-FSK, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

Index 20

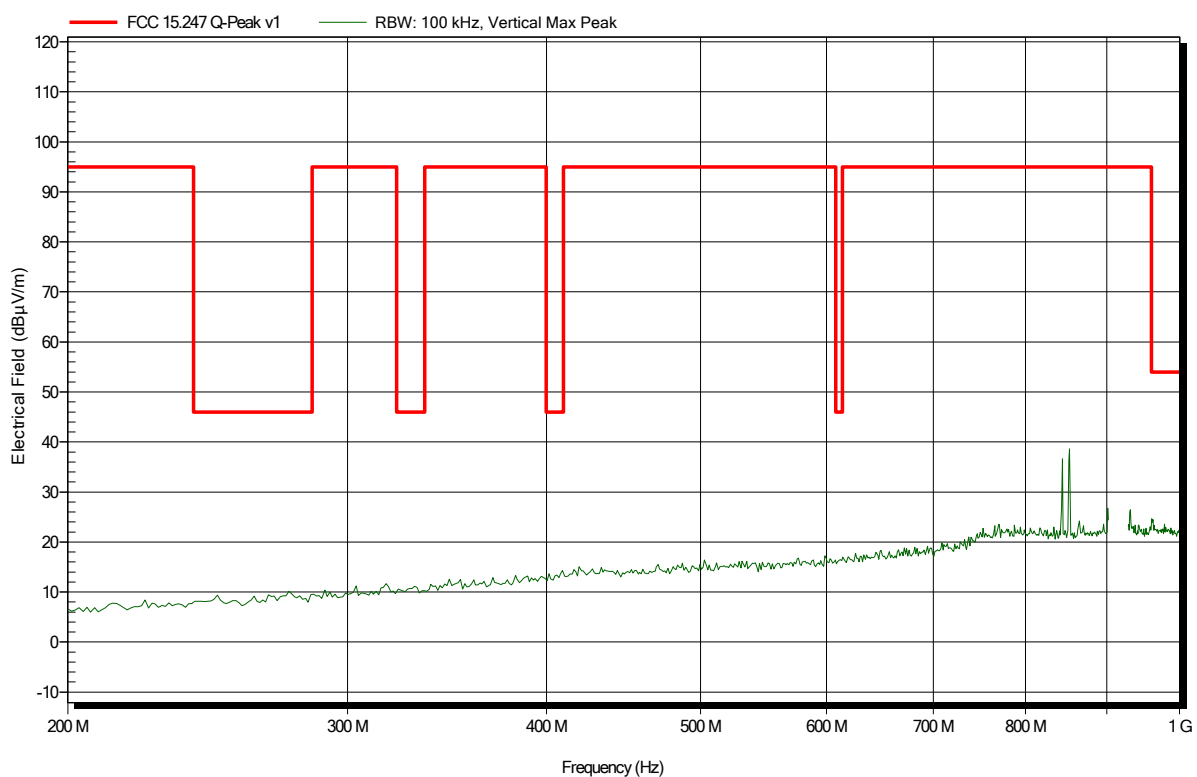


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
Antenna: Rohde & Schwarz HL 223, Vertical
Measurement distance: 3 m
Mode: TX; 912.5MHz, 2-FSK, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

Index 21

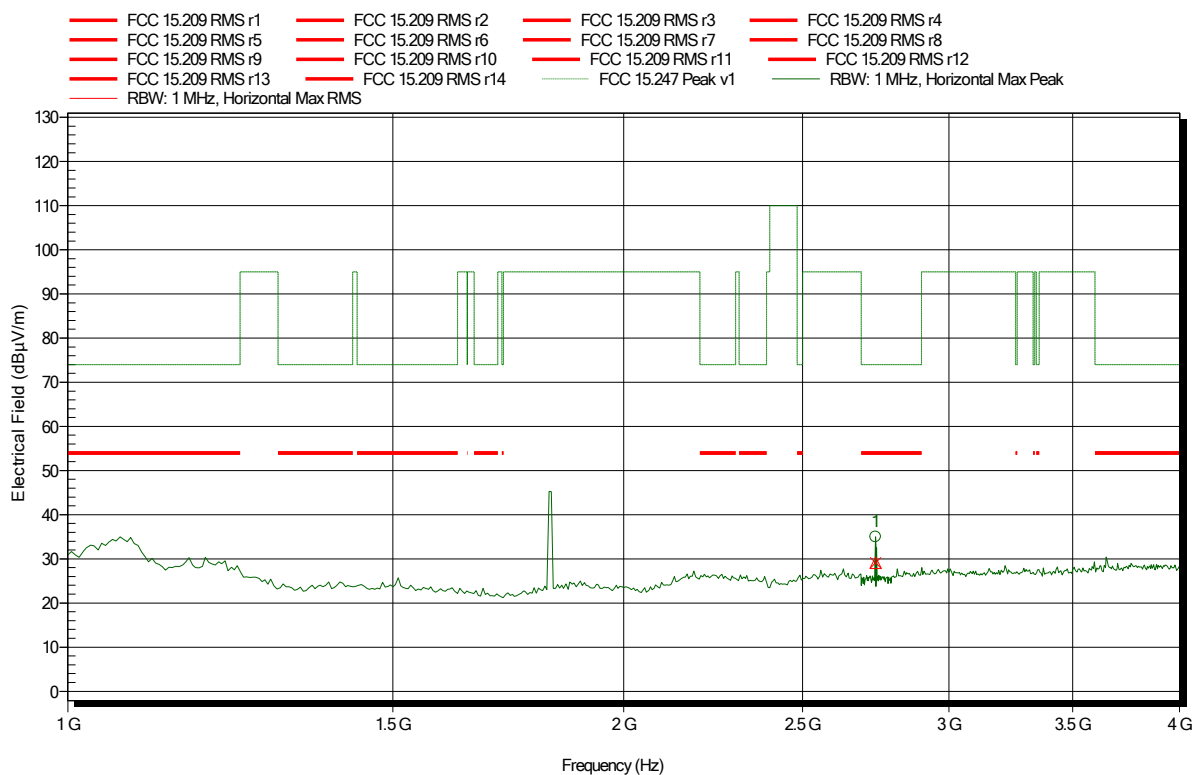


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; 912.5MHz, 2-FSK, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

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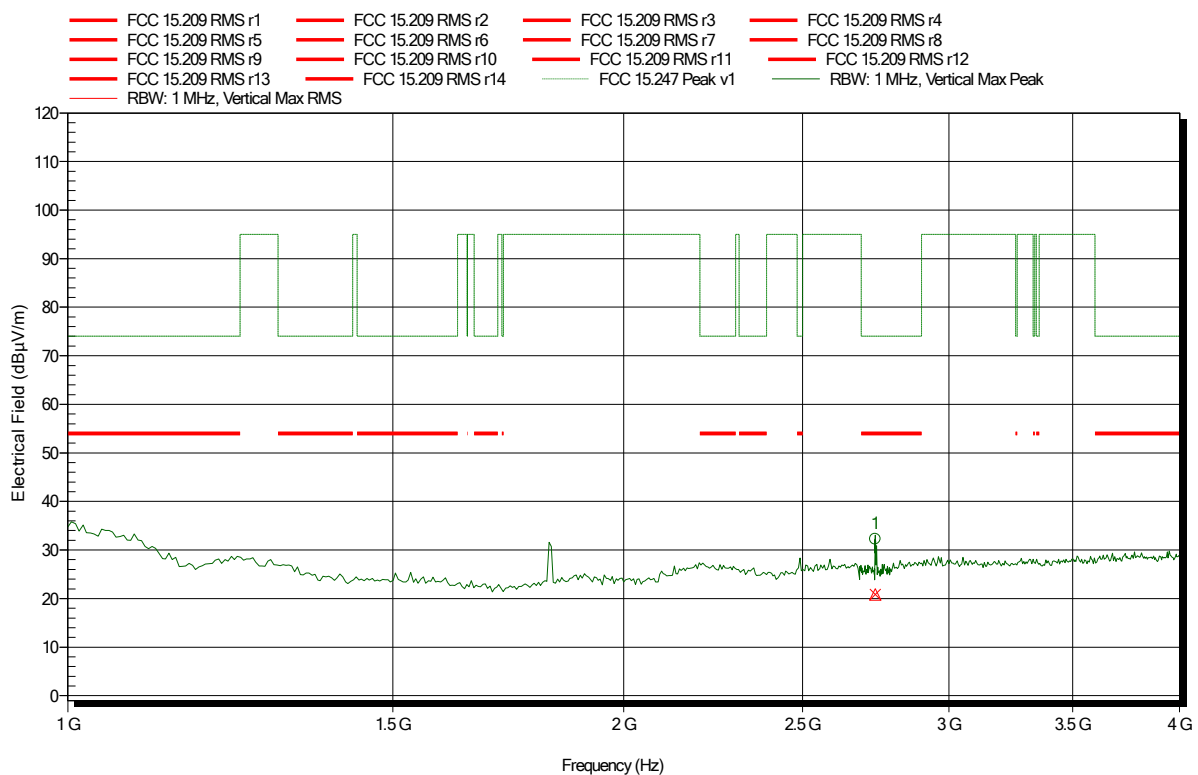
Frequency 2.738 GHz	Peak 35 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -39 dB	Peak Status Pass
Frequency 2.738 GHz	RMS 29.11 dBμV/m	RMS Limit 54 dBμV/m	RMS Difference -24.89 dB	RMS Status Pass

Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; 912.5MHz, 2-FSK, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

Index 1



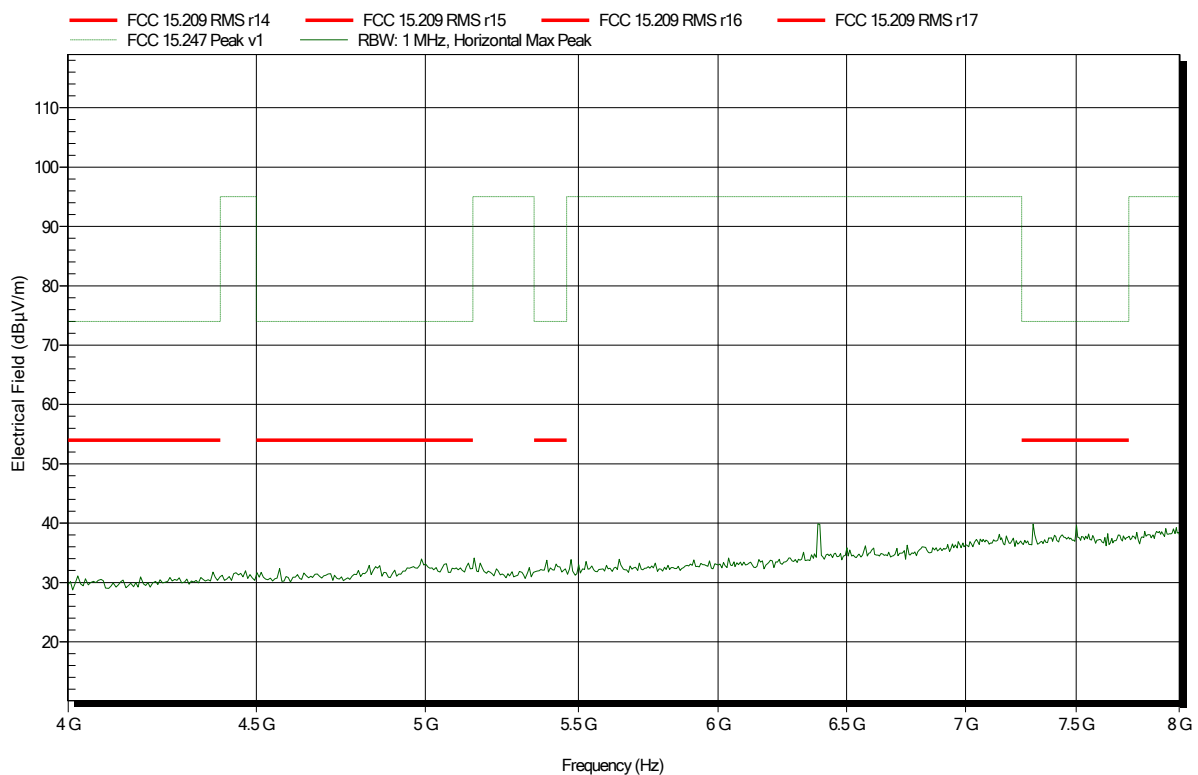
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.737 GHz	32.22 dBμV/m	74 dBμV/m	-41.78 dB	Pass
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.737 GHz	20.88 dBμV/m	54 dBμV/m	-33.12 dB	Pass

Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; 912.5MHz, 2-FSK, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

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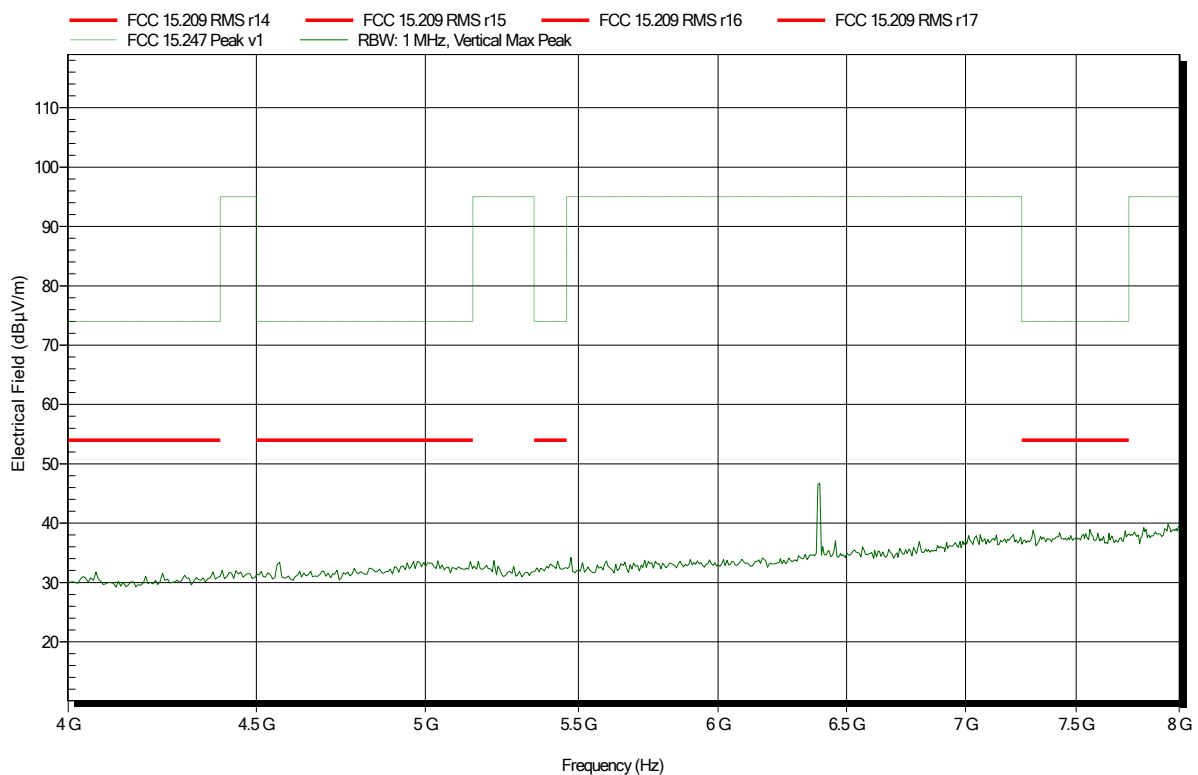


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; 912.5MHz, 2-FSK, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

Index 2

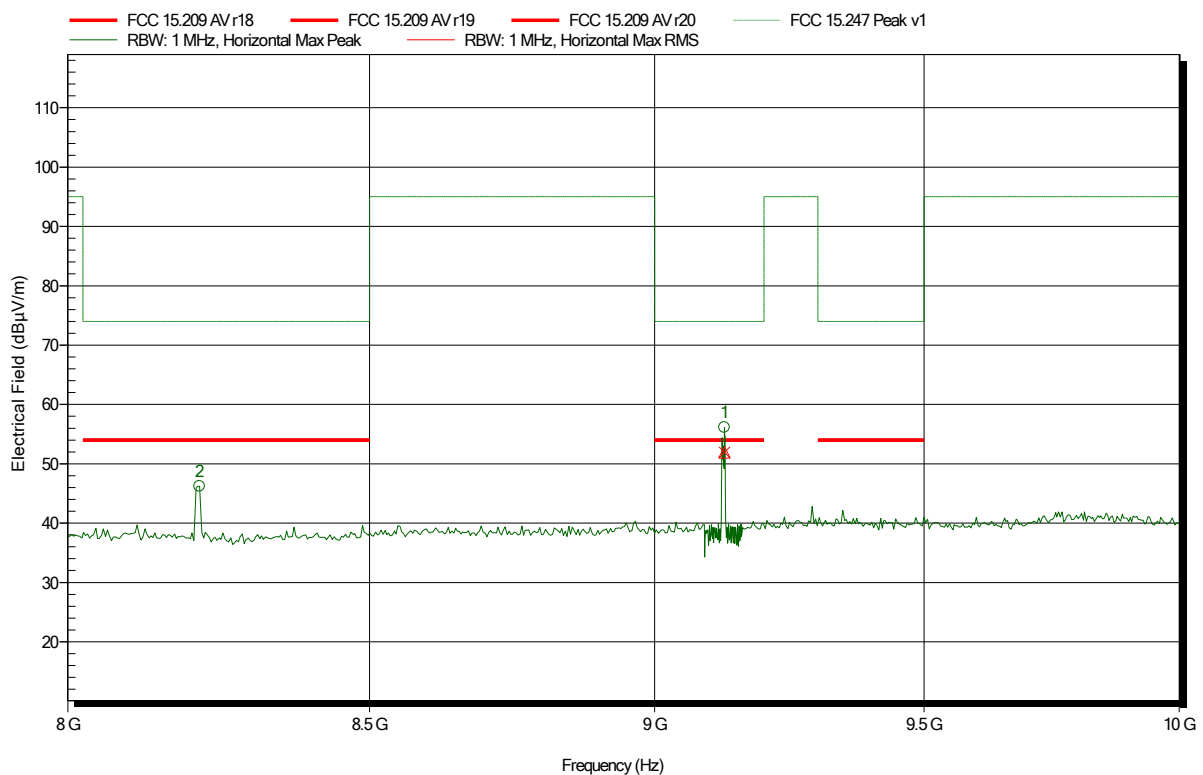


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
 EUT Name: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Site: Eurofins Product Service GmbH
 Operator: Florian Voigt
 Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; 912.5MHz, 2-FSK, Internal antenna, EUT ver.
 Test Date: 2020-01-13
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
8.215 GHz	46.21 dBµV/m	74 dBµV/m	-27.79 dB	Pass
9.127 GHz	56.14 dBµV/m	74 dBµV/m	-17.86 dB	Pass

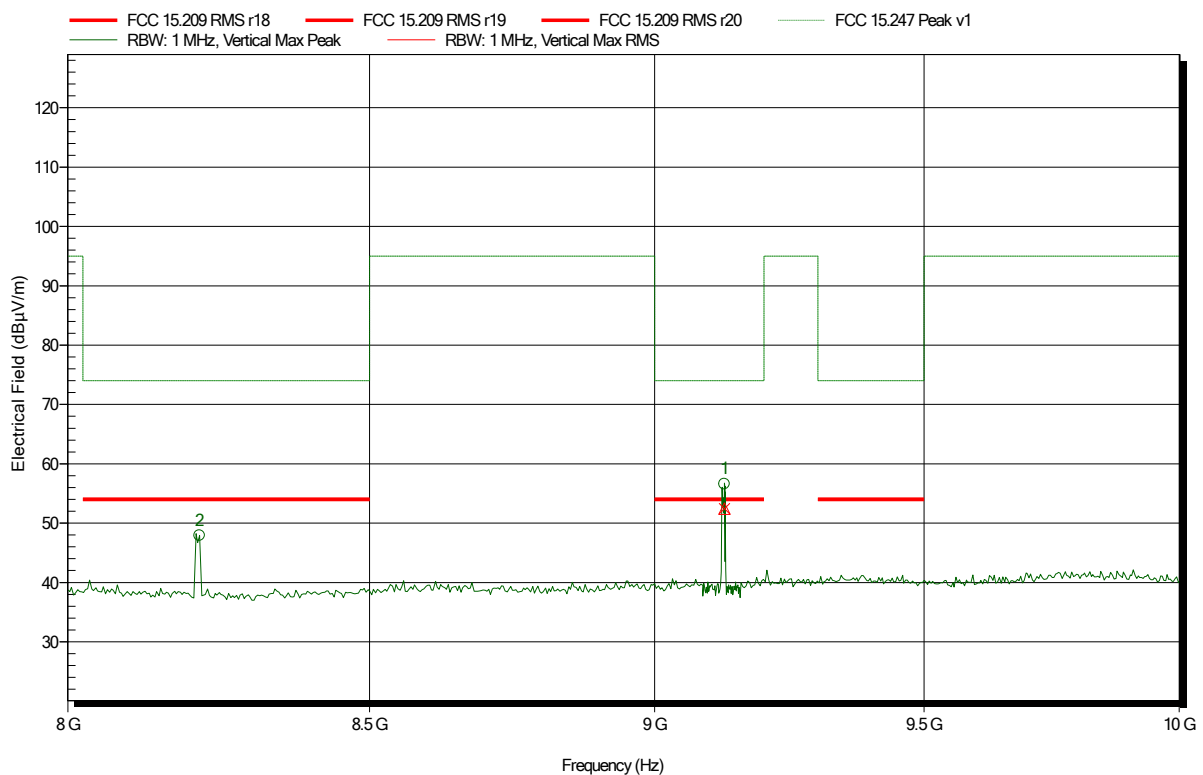
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
9.127 GHz	51.94 dBµV/m	54 dBµV/m	-2.06 dB	Pass

Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
 EUT Name: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Site: Eurofins Product Service GmbH
 Operator: Florian Voigt
 Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; 912.5MHz, 2-FSK, Internal antenna, EUT ver.
 Test Date: 2020-01-13
 Note:

Index 4



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
8.215 GHz	47.9 dBµV/m	74 dBµV/m	-26.1 dB	Pass
9.127 GHz	56.57 dBµV/m	74 dBµV/m	-17.43 dB	Pass

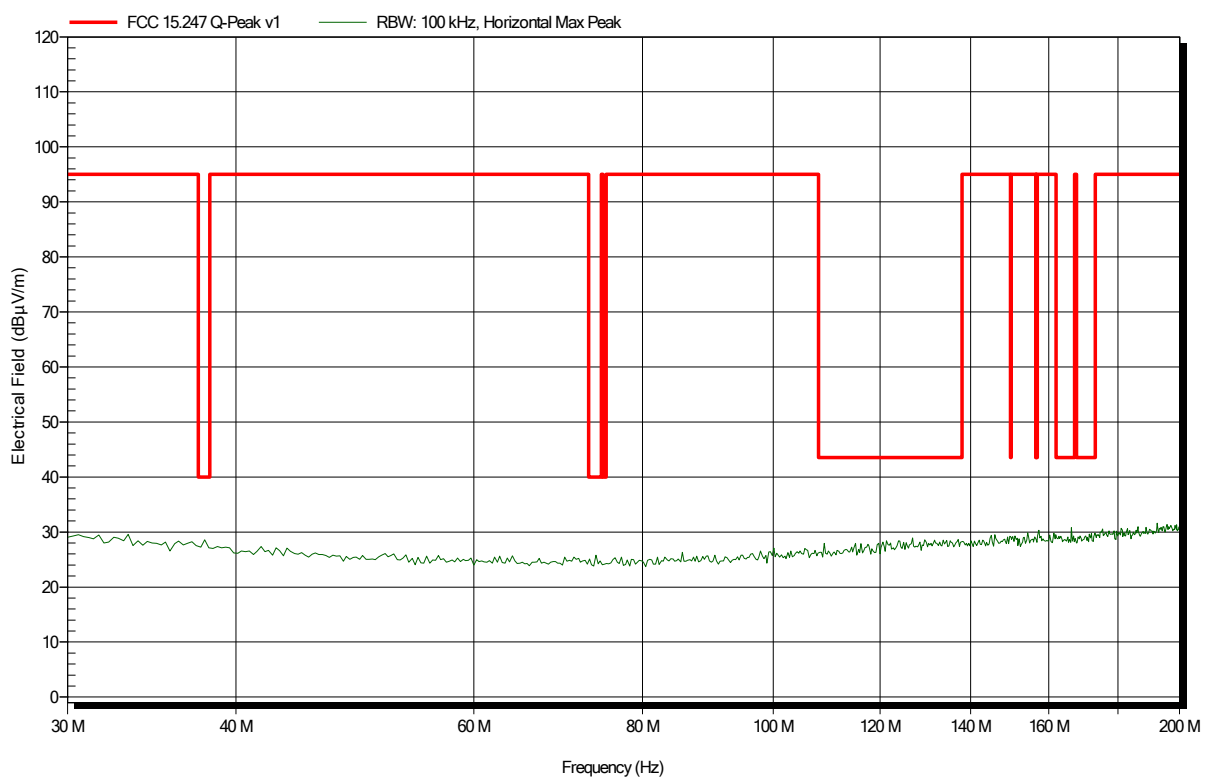
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
9.127 GHz	52.42 dBµV/m	54 dBµV/m	-1.58 dB	Pass

Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
Antenna: Rohde & Schwarz HK 116, Horizontal
Measurement distance: 3 m
Mode: TX; 918.5MHz, 2-FSK, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

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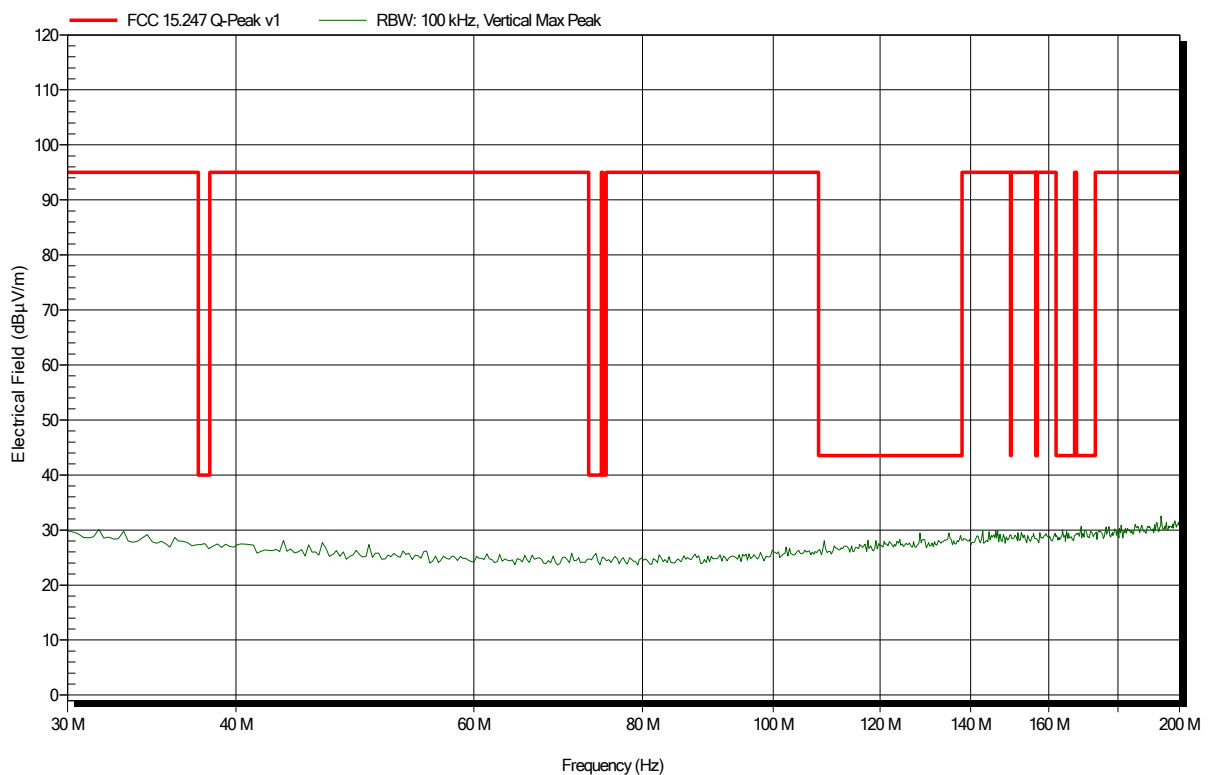


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
 EUT Name: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Site: Eurofins Product Service GmbH
 Operator: Florian Voigt
 Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: TX; 918.5MHz, 2-FSK, Internal antenna, EUT ver.
 Test Date: 2020-01-13
 Note:

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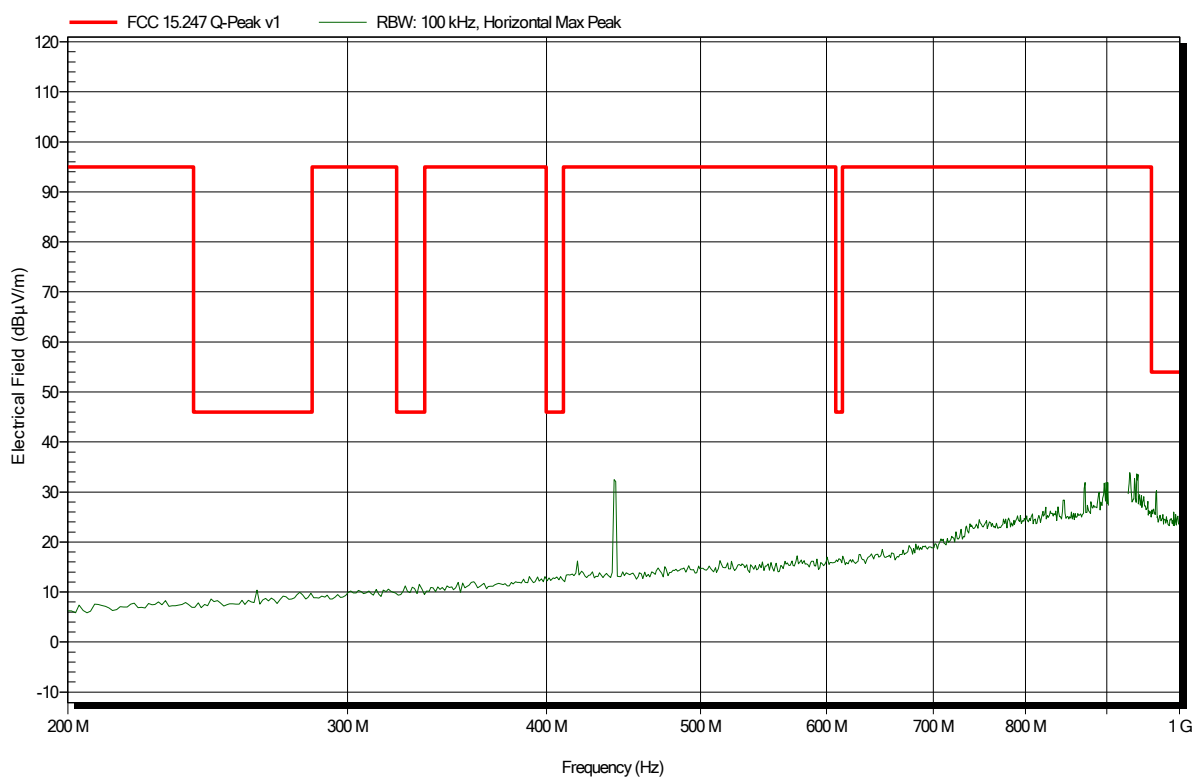


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
Antenna: Rohde & Schwarz HL 223, Horizontal
Measurement distance: 3 m
Mode: TX; 918.5MHz, 2-FSK, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

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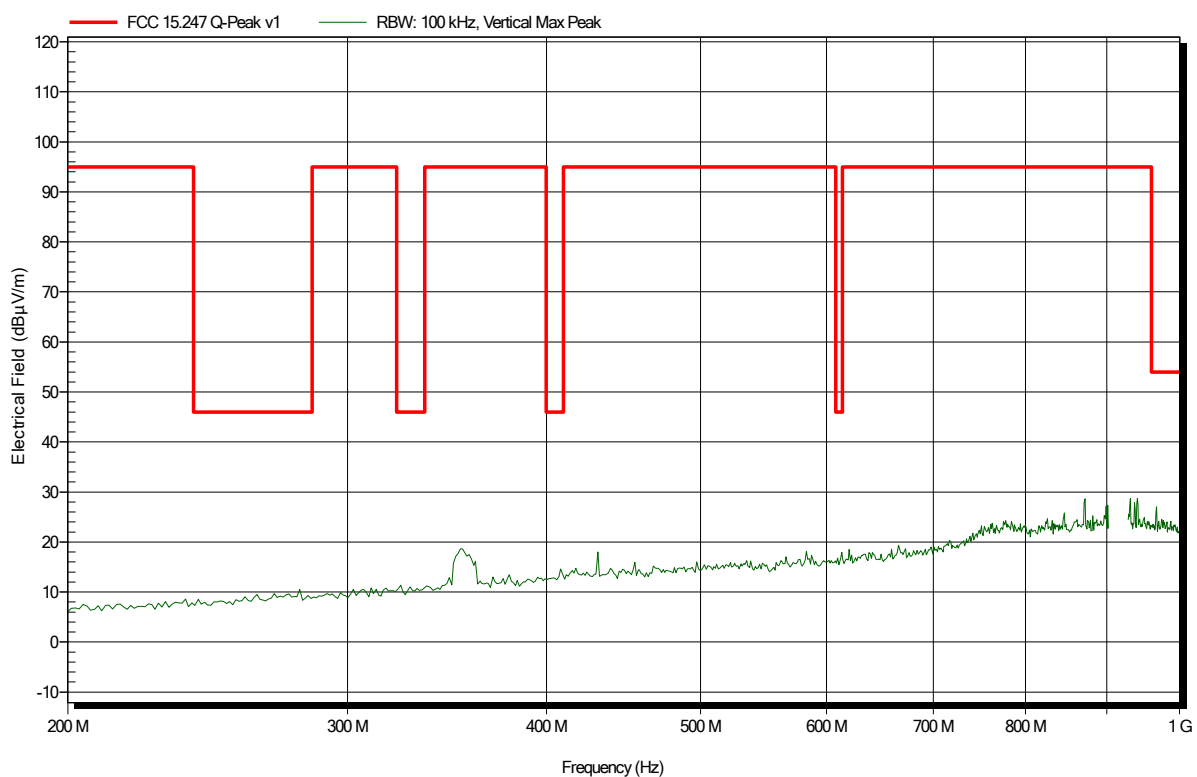


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
Antenna: Rohde & Schwarz HL 223, Vertical
Measurement distance: 3 m
Mode: TX; 918.5MHz, 2-FSK, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

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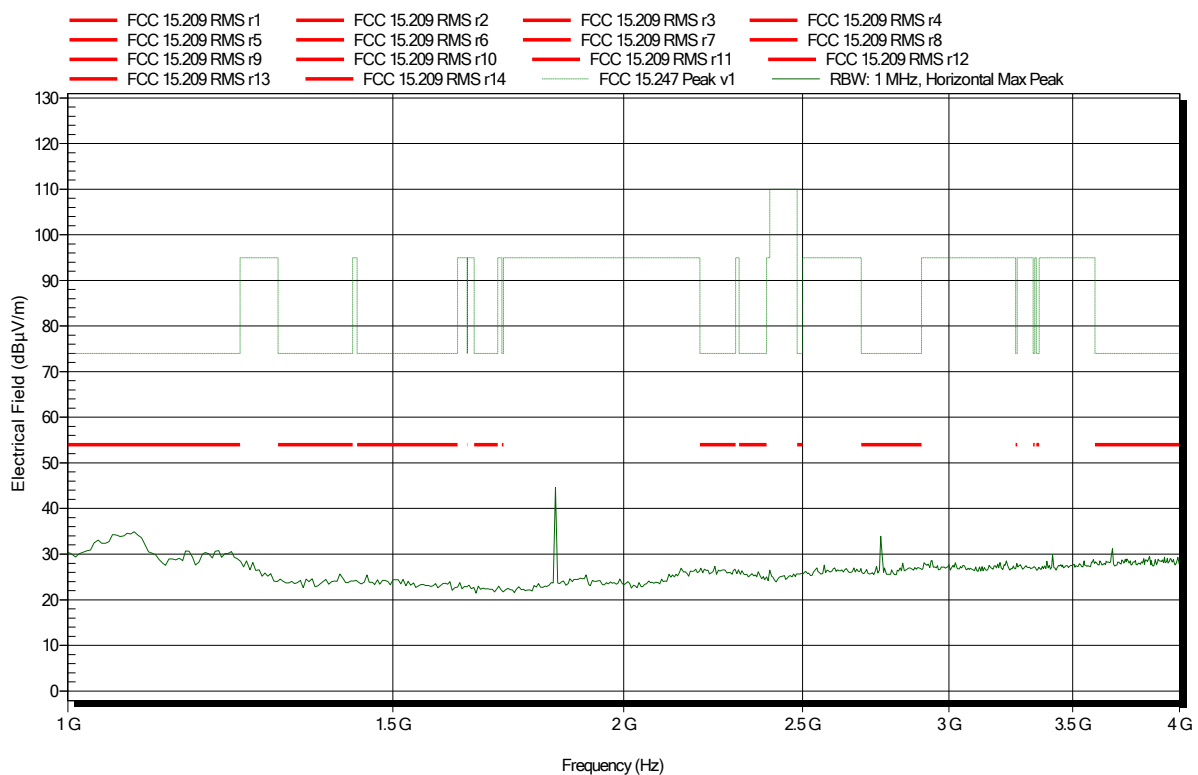


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; 918.5MHz, 2-FSK, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

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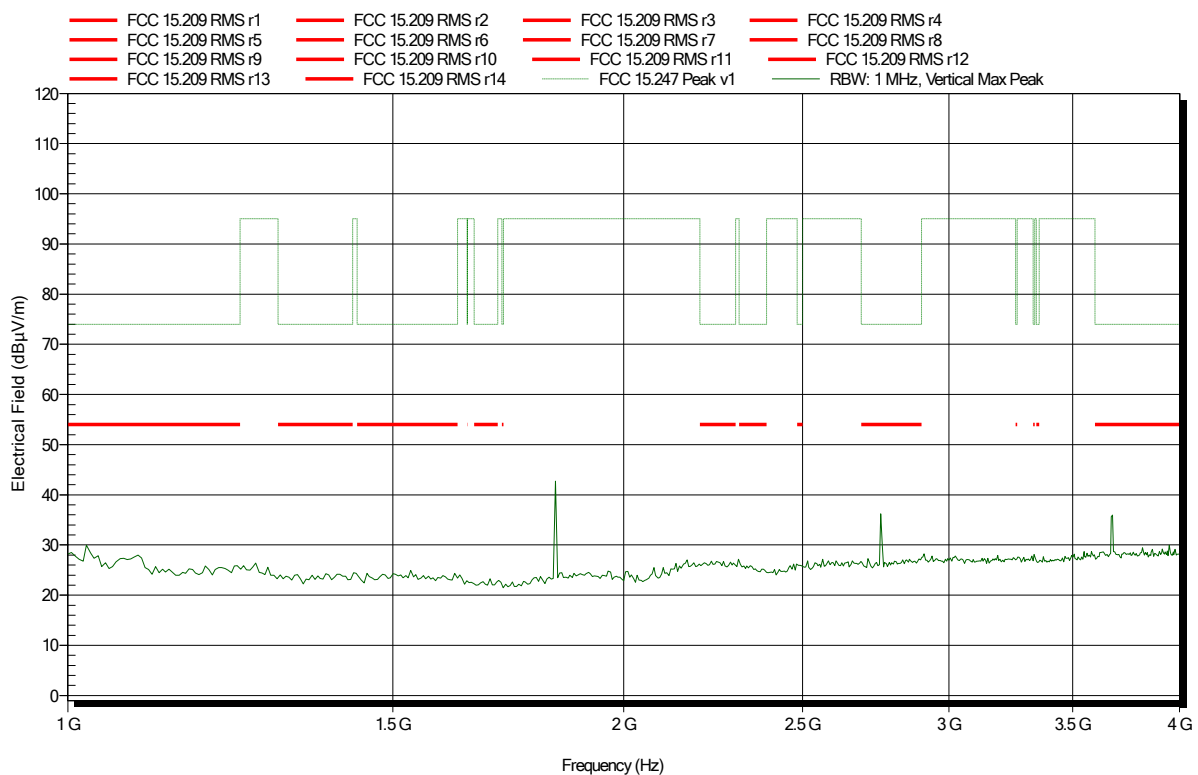


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; 918.5MHz, 2-FSK, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

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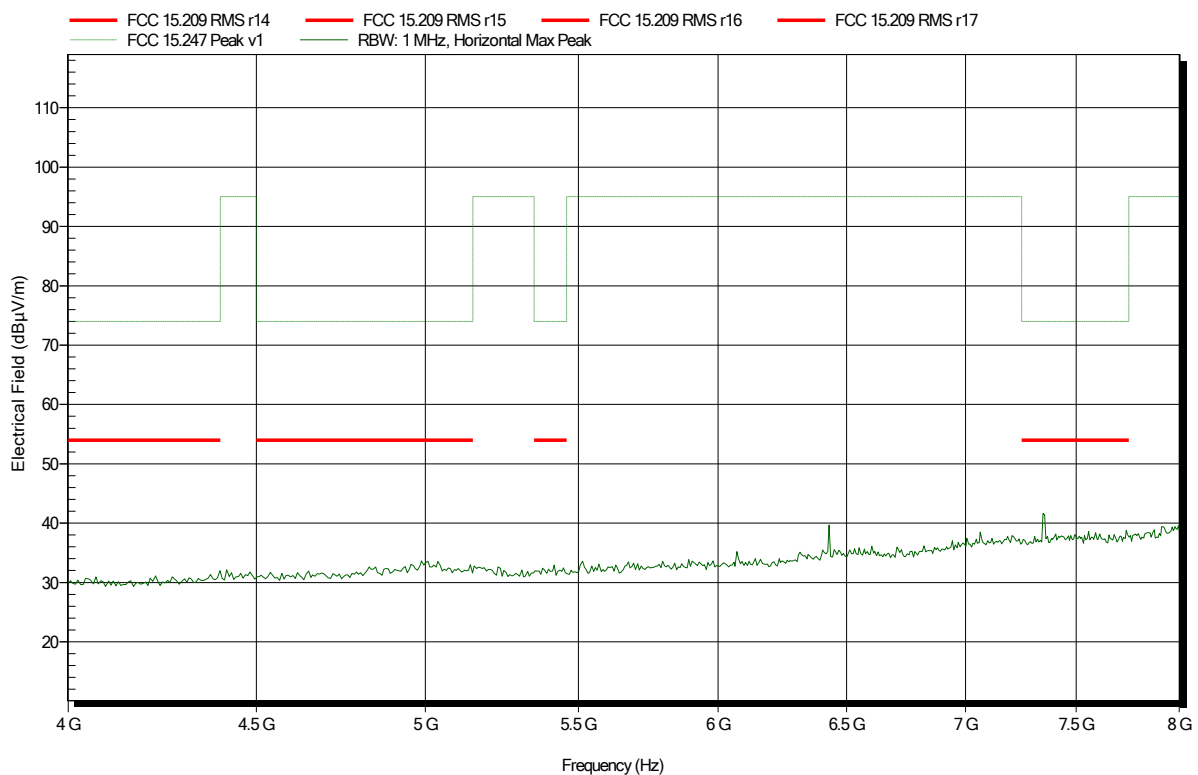


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; 918.5MHz, 2-FSK, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

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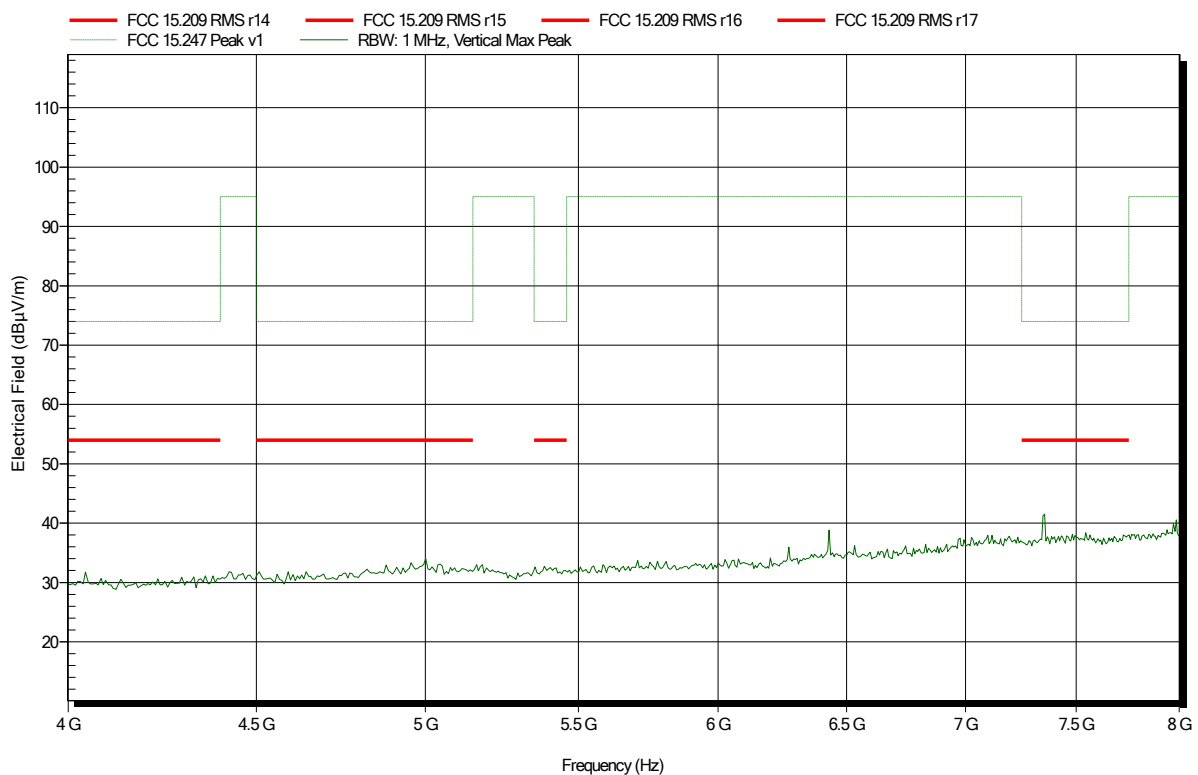


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; 918.5MHz, 2-FSK, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

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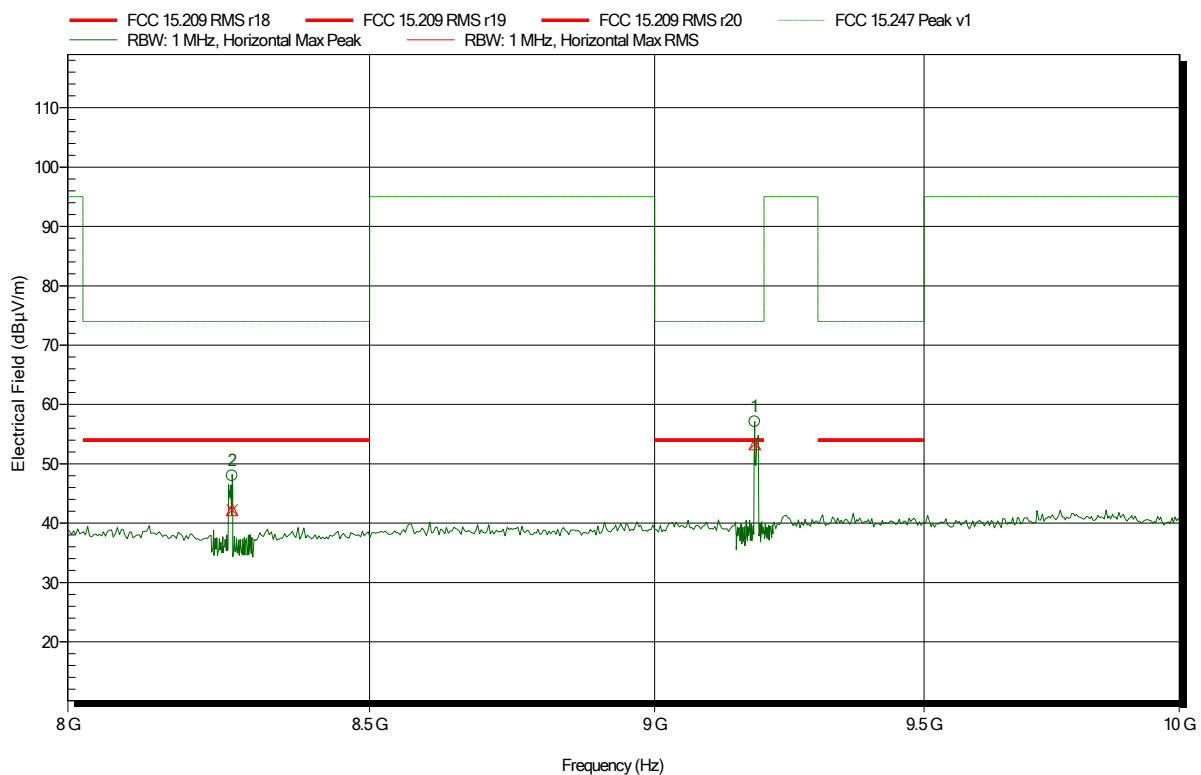


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
 EUT Name: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Site: Eurofins Product Service GmbH
 Operator: Florian Voigt
 Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; 918.5MHz, 2-FSK, Internal antenna, EUT ver.
 Test Date: 2020-01-13
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
8.269 GHz	47.98 dBµV/m	74 dBµV/m	-26.02 dB	Pass
9.183 GHz	57.09 dBµV/m	74 dBµV/m	-16.91 dB	Pass

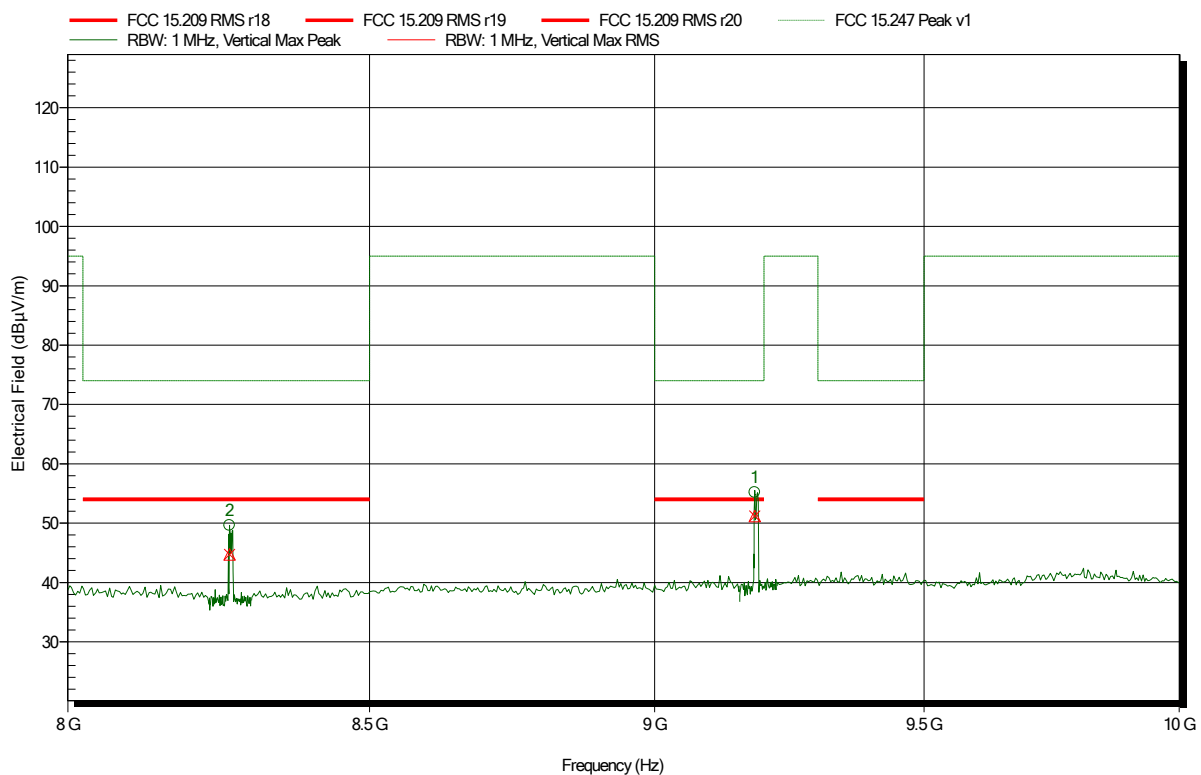
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
8.269 GHz	42.23 dBµV/m	54 dBµV/m	-11.77 dB	Pass
9.183 GHz	53.34 dBµV/m	54 dBµV/m	-0.66 dB	Pass

Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
 EUT Name: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Site: Eurofins Product Service GmbH
 Operator: Florian Voigt
 Test Conditions: Tnom: 24.5°C, Vnom: 3.6 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; 918.5MHz, 2-FSK, Internal antenna, EUT ver.
 Test Date: 2020-01-13
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
8.265 GHz	49.65 dBµV/m	74 dBµV/m	-24.35 dB	Pass
9.183 GHz	55.21 dBµV/m	74 dBµV/m	-18.79 dB	Pass

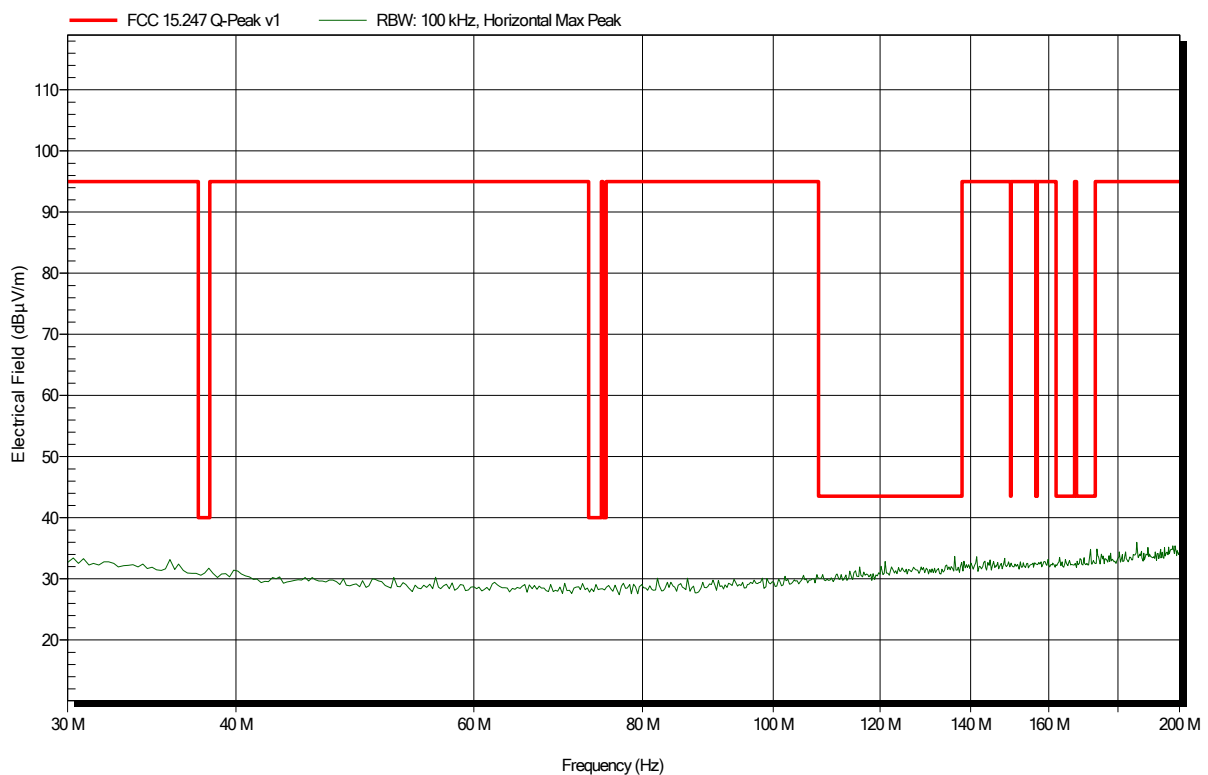
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
8.265 GHz	44.7 dBµV/m	54 dBµV/m	-9.3 dB	Pass
9.183 GHz	51.2 dBµV/m	54 dBµV/m	-2.8 dB	Pass

Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 25°C, Vnom: 24 VAC
Antenna: Rohde & Schwarz HK 116, Horizontal
Measurement distance: 3 m
Mode: TX; 912.5MHz, 2-FSK, External antenna, EUT ver.
Test Date: 2020-01-13
Note:

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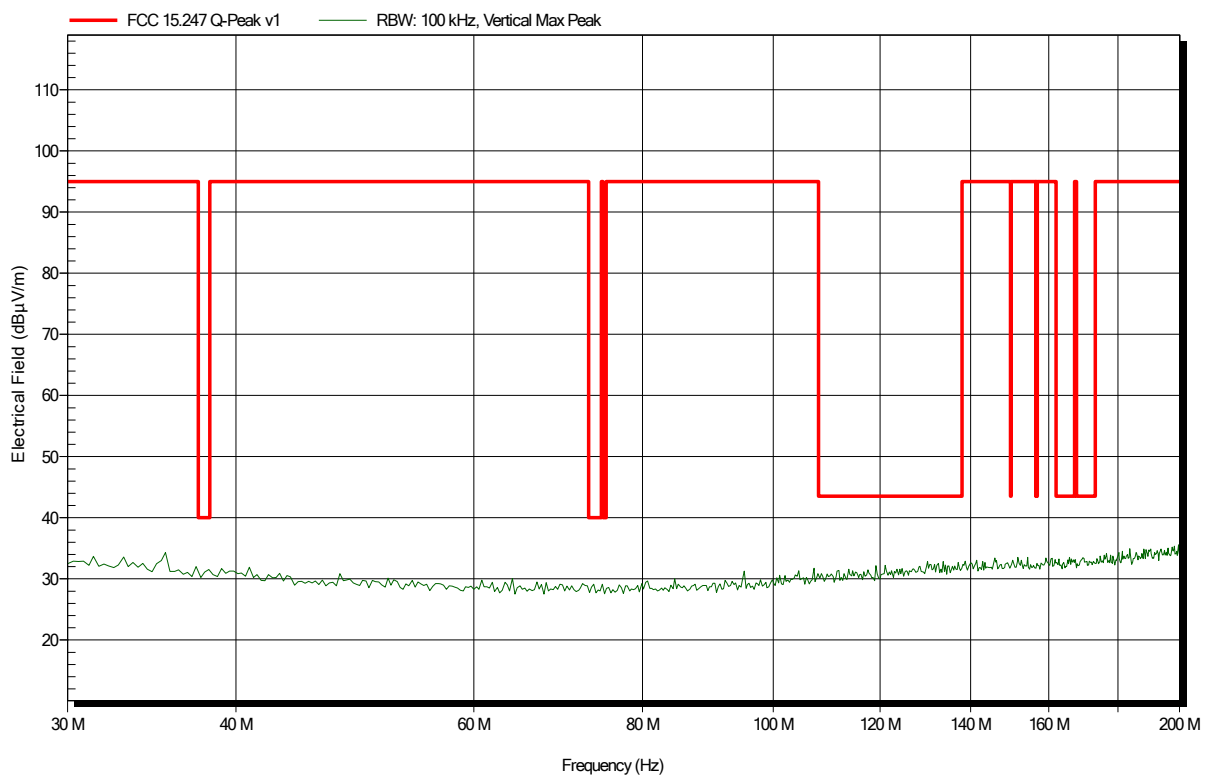


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 25°C, Vnom: 24 VAC
Antenna: Rohde & Schwarz HK 116, Vertical
Measurement distance: 3 m
Mode: TX; 912.5MHz, 2-FSK, External antenna, EUT ver.
Test Date: 2020-01-13
Note:

Index 15

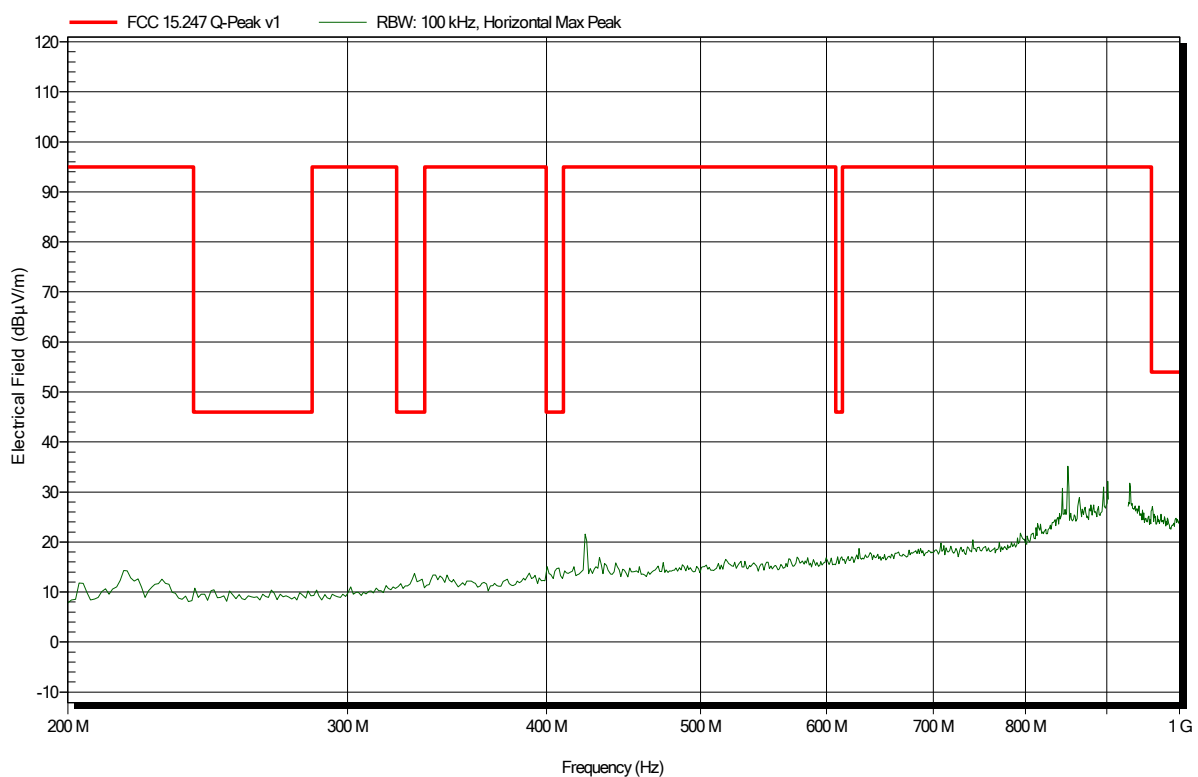


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
 EUT Name: wireless mbus US radio module with pulse input for MULTICAL
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 Test Site: Eurofins Product Service GmbH
 Operator: Florian Voigt
 Test Conditions: Tnom: 25°C, Vnom: 24 VAC
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: TX; 912.5MHz, 2-FSK, External antenna, EUT ver.
 Test Date: 2020-01-13
 Note:

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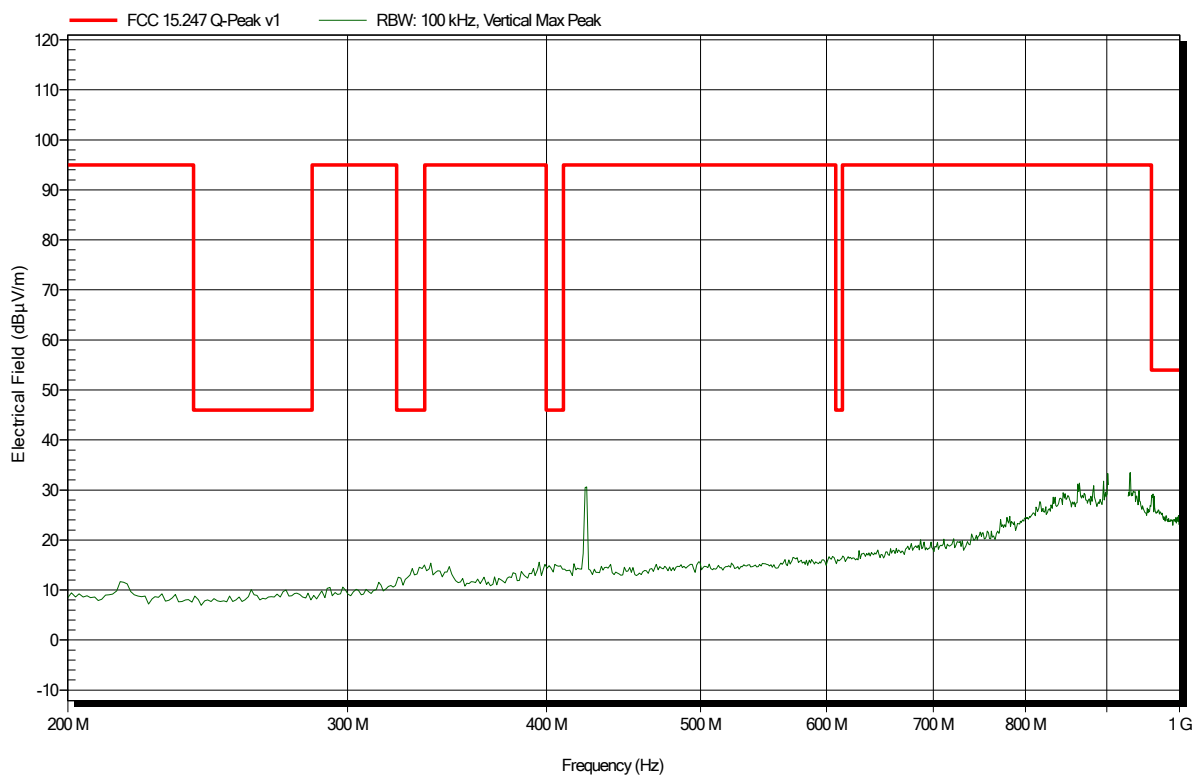


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
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Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 25°C, Vnom: 24 VAC
Antenna: Rohde & Schwarz HL 223, Vertical
Measurement distance: 3 m
Mode: TX; 912.5MHz, 2-FSK, External antenna, EUT ver.
Test Date: 2020-01-13
Note:

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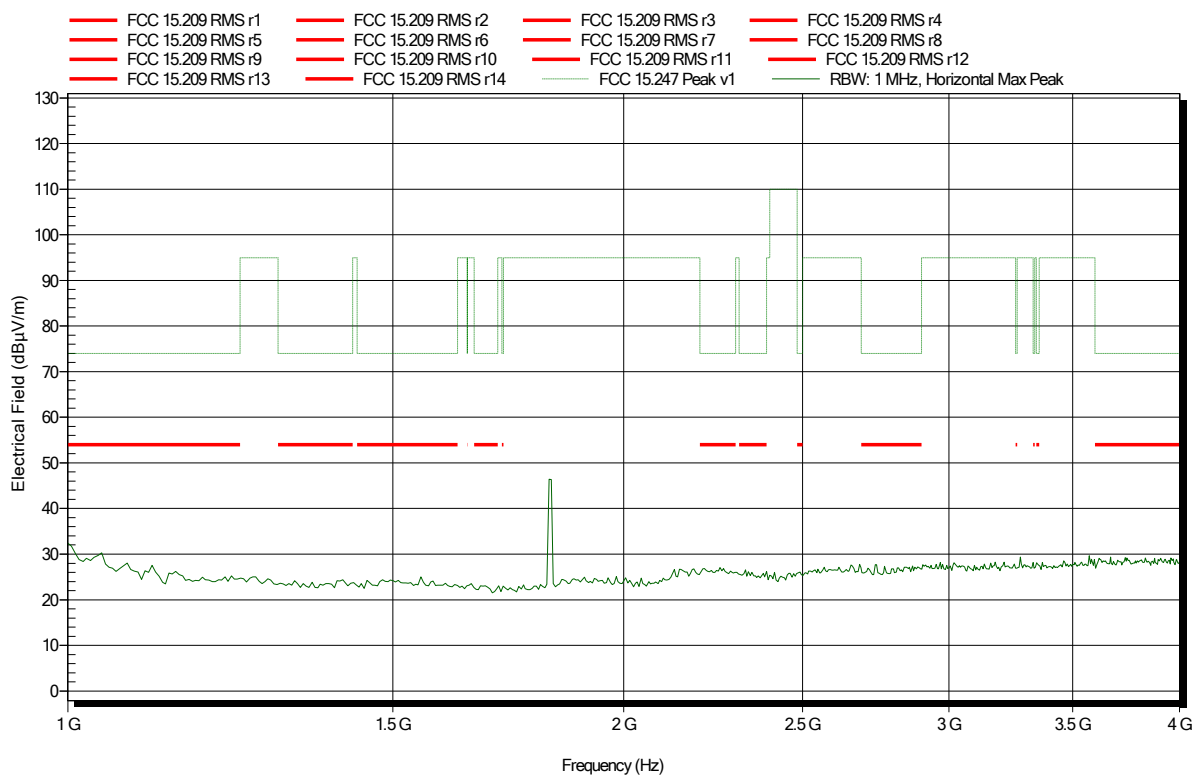


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 25°C, Vnom: 24 VAC
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; 912.5MHz, 2-FSK, External antenna, EUT ver.
Test Date: 2020-01-13
Note:

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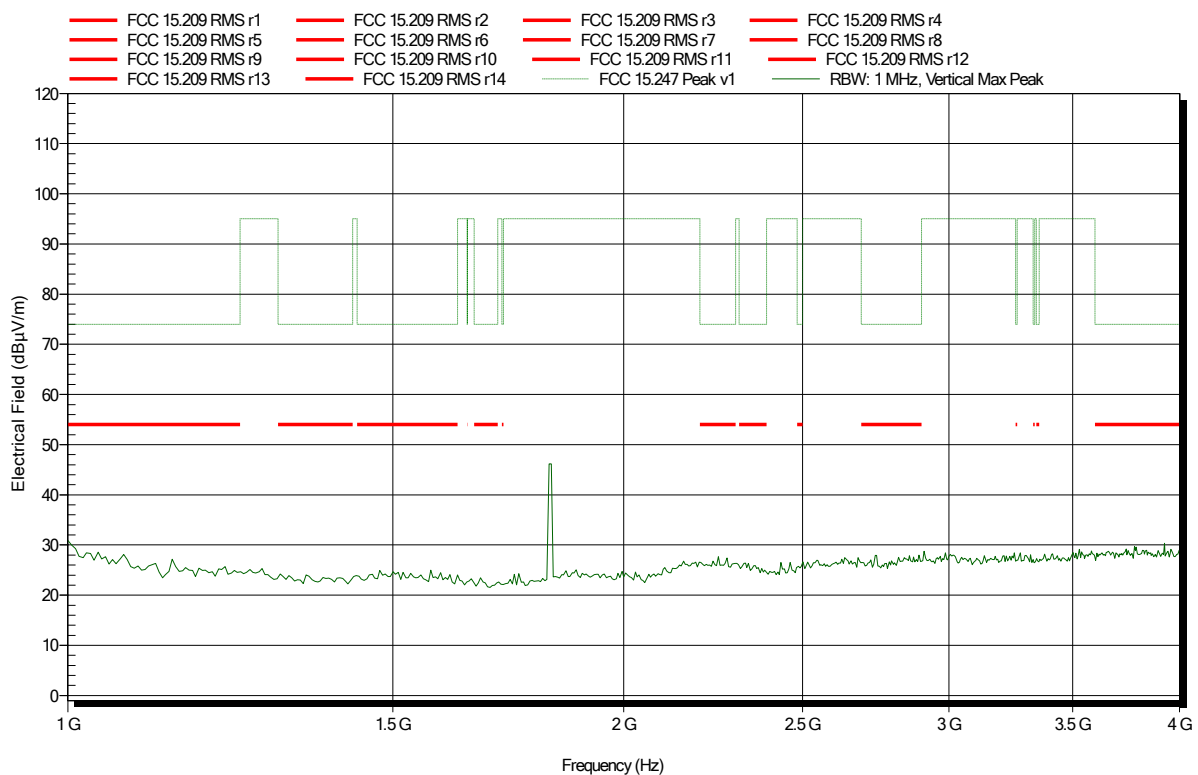


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 25°C, Vnom: 24 VAC
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; 912.5MHz, 2-FSK, External antenna, EUT ver.
Test Date: 2020-01-13
Note:

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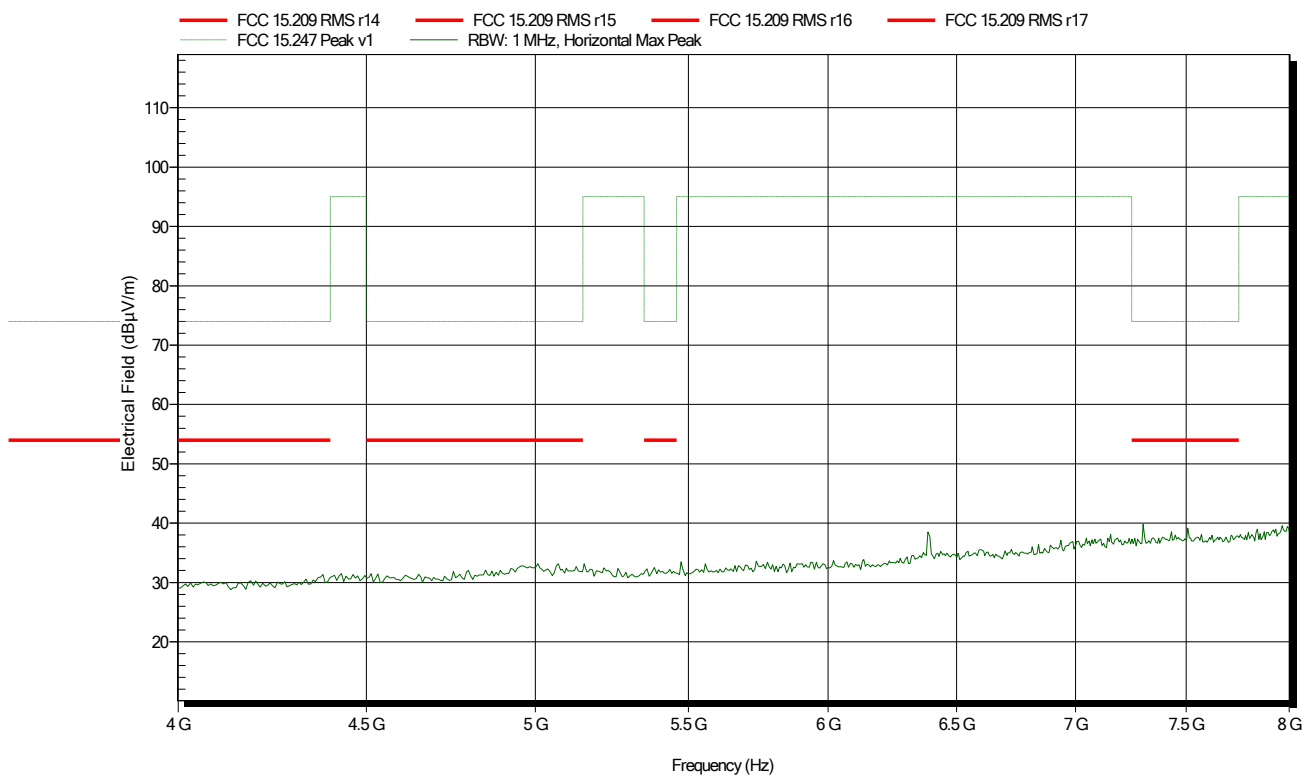


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 25°C, Vnom: 24 VAC
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; 912.5MHz, 2-FSK, External antenna, EUT ver.
Test Date: 2020-01-13
Note:

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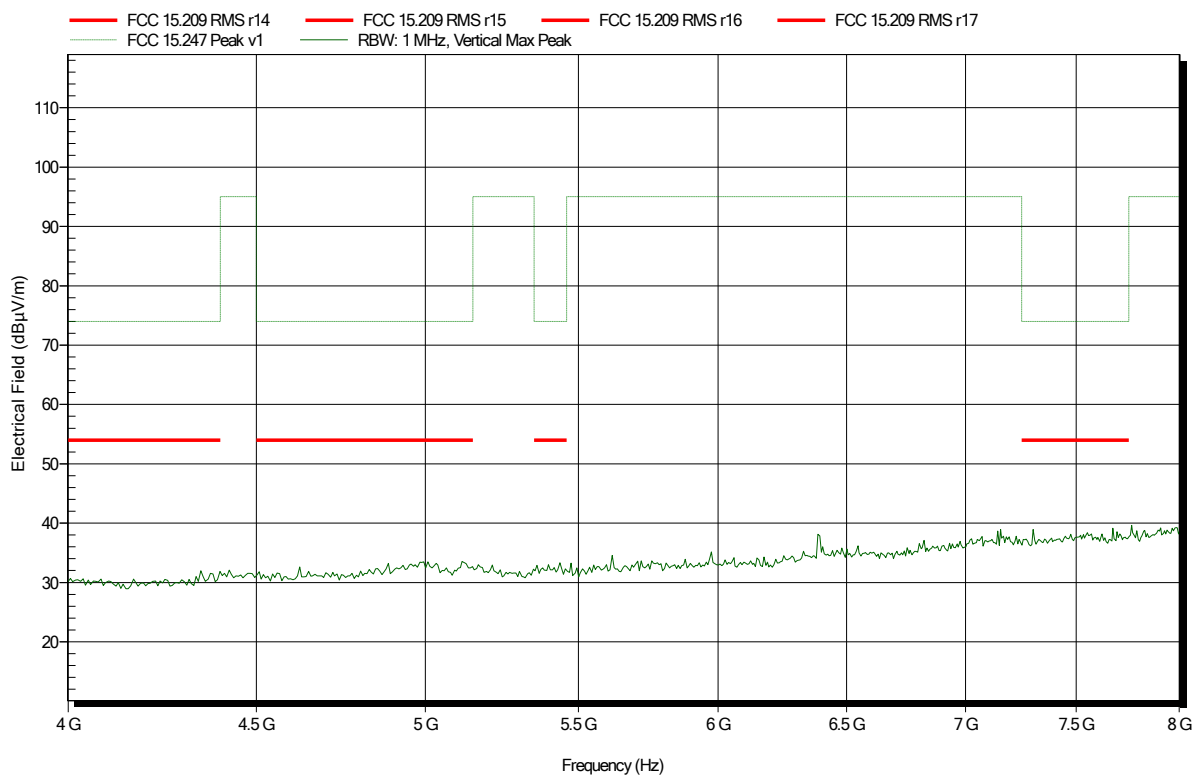


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 25°C, Vnom: 24 VAC
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; 912.5MHz, 2-FSK, External antenna, EUT ver.
Test Date: 2020-01-13
Note:

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Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S

EUT Name: wireless mbus US radio module with pulse input for MULTICAL

Model: wireless mbus US radio module with pulse input for MULTICAL

Test Site: Eurofins Product Service GmbH

Operator: Florian Voigt

Test Conditions: Tnom: 25°C, Vnom: 24 VAC

Antenna: Schwarzbeck BBHA 9120D, Horizontal

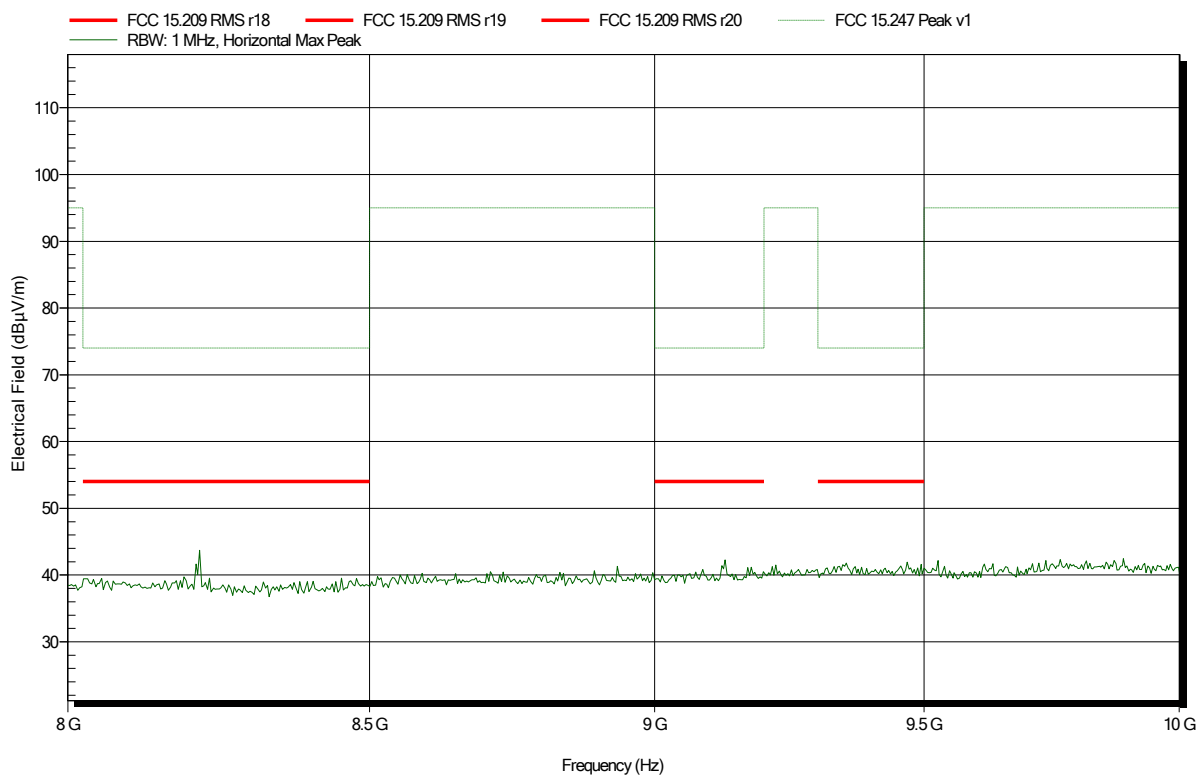
Measurement distance: 1 m converted to 3m

Mode: TX; 912.5MHz, 2-FSK, External antenna, EUT ver.

Test Date: 2020-01-13

Note:

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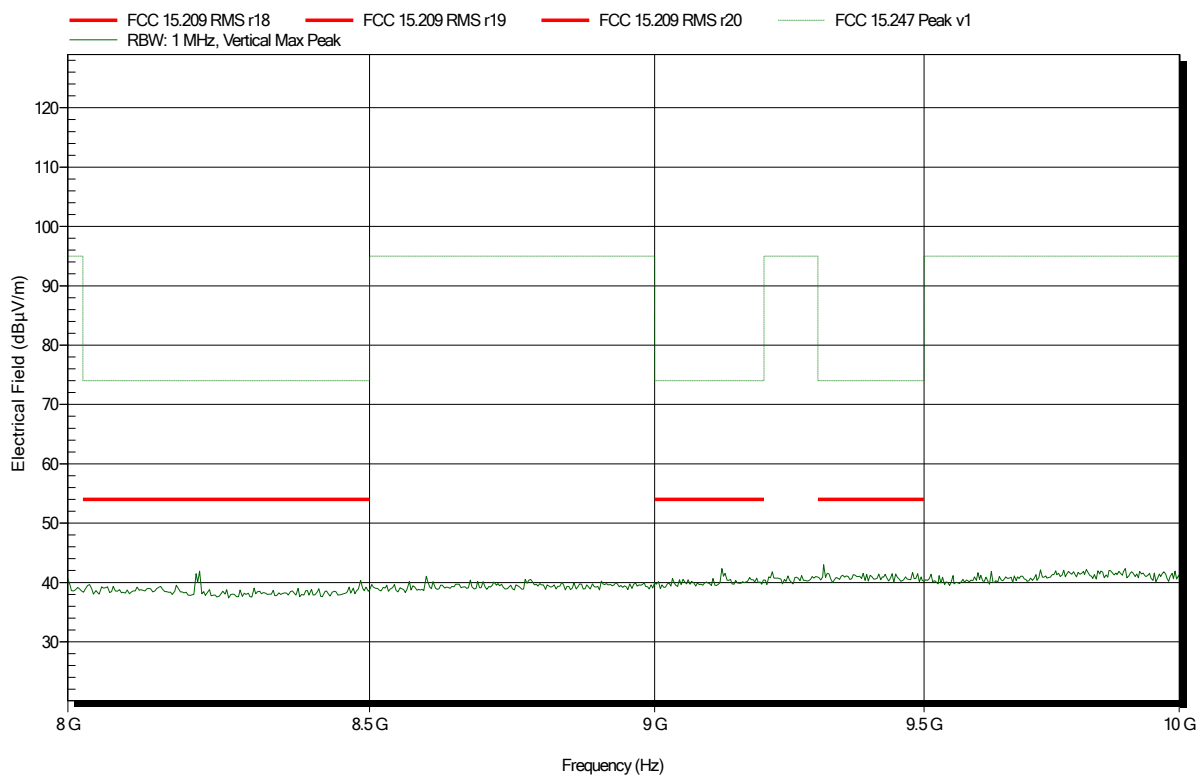


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
 EUT Name: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Site: Eurofins Product Service GmbH
 Operator: Florian Voigt
 Test Conditions: Tnom: 25°C, Vnom: 24 VAC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; 912.5MHz, 2-FSK, External antenna, EUT ver.
 Test Date: 2020-01-13
 Note:

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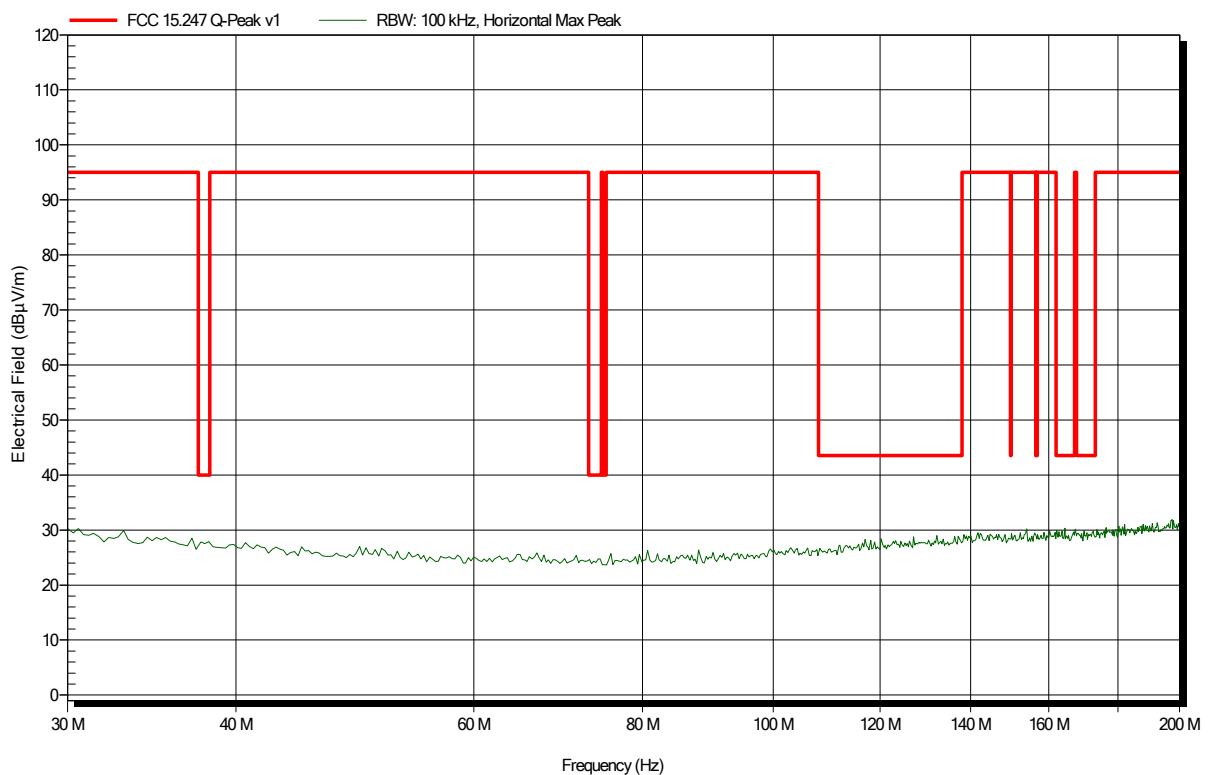


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 25°C, Vnom: 24 VAC
Antenna: Rohde & Schwarz HK 116, Horizontal
Measurement distance: 3 m
Mode: TX; 918.5MHz, 2-FSK, External antenna, EUT ver.
Test Date: 2020-01-13
Note:

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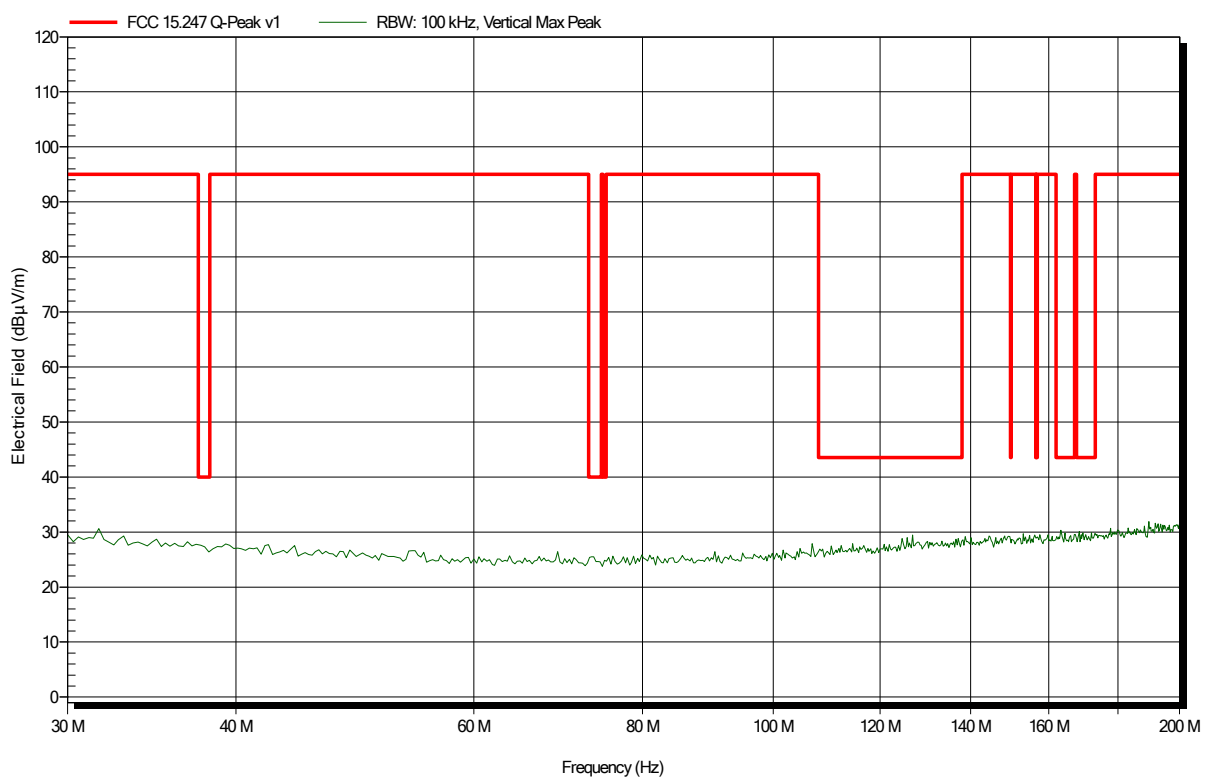


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
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Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 25°C, Vnom: 24 VAC
Antenna: Rohde & Schwarz HK 116, Vertical
Measurement distance: 3 m
Mode: TX; 918.5MHz, 2-FSK, External antenna, EUT ver.
Test Date: 2020-01-13
Note:

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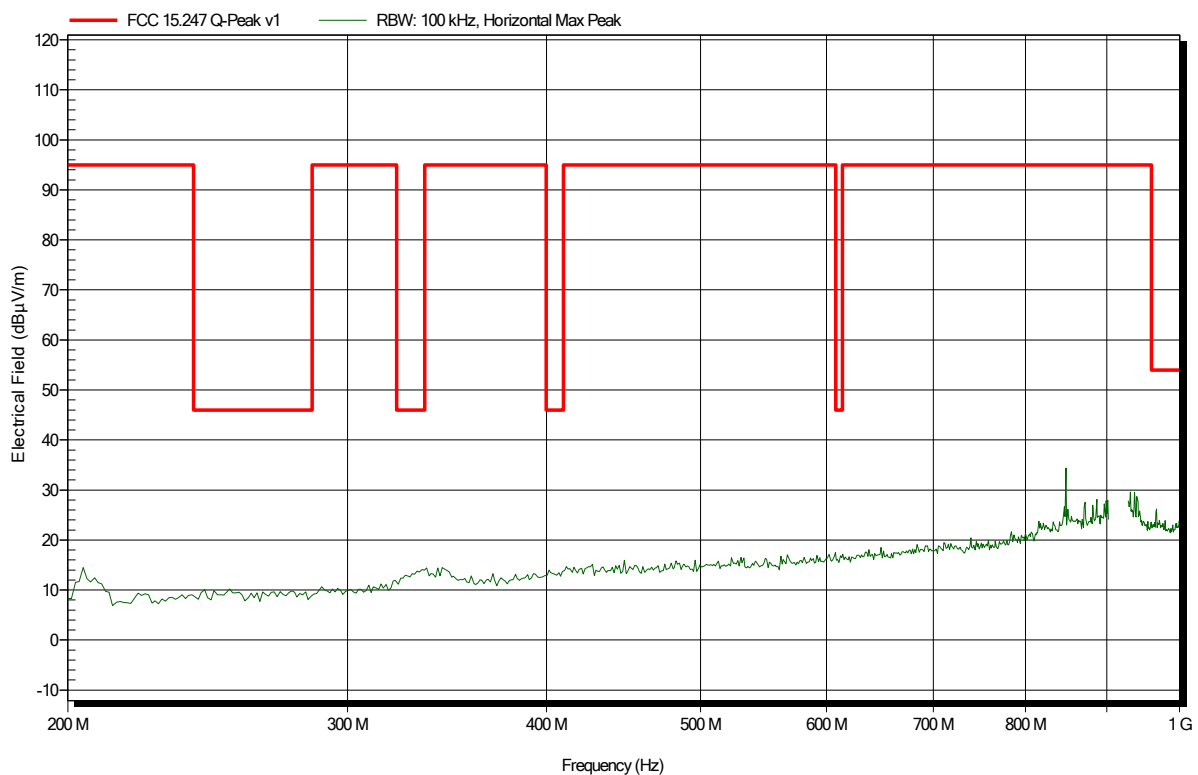


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
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Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 25°C, Vnom: 24 VAC
Antenna: Rohde & Schwarz HL 223, Horizontal
Measurement distance: 3 m
Mode: TX; 918.5MHz, 2-FSK, External antenna, EUT ver.
Test Date: 2020-01-13
Note:

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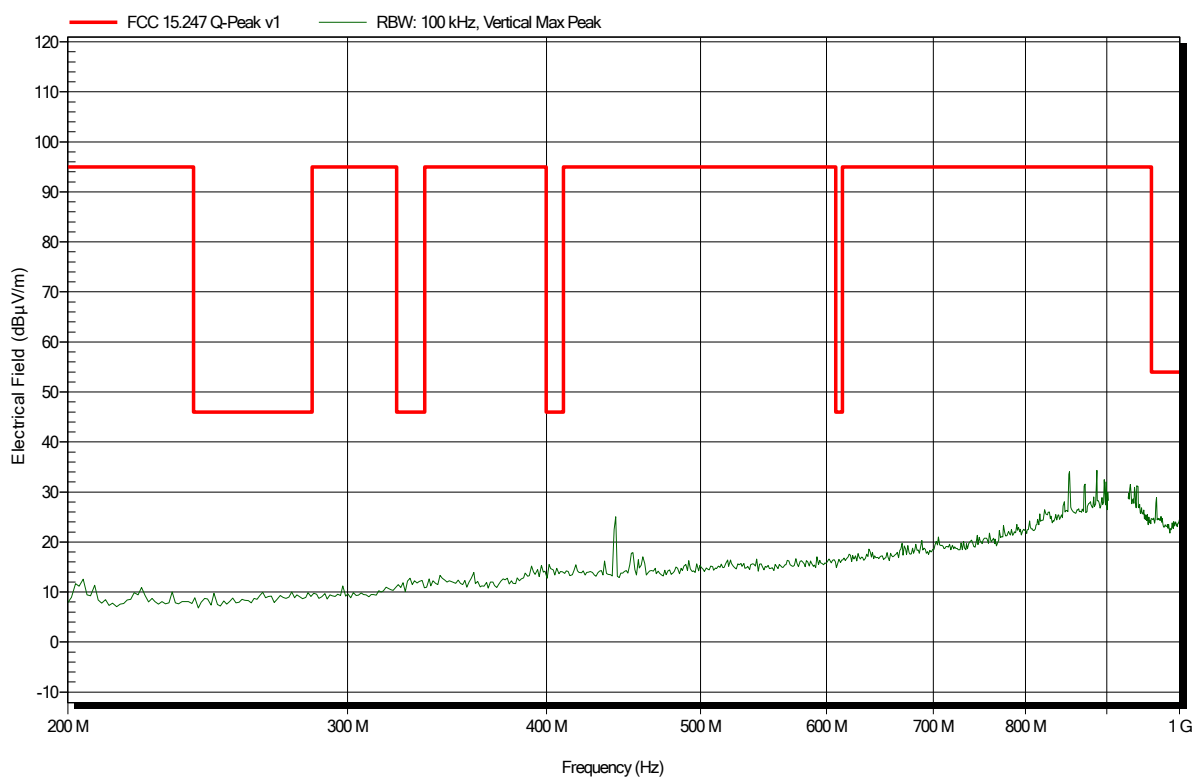


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
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Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 25°C, Vnom: 24 VAC
Antenna: Rohde & Schwarz HL 223, Vertical
Measurement distance: 3 m
Mode: TX; 918.5MHz, 2-FSK, External antenna, EUT ver.
Test Date: 2020-01-13
Note:

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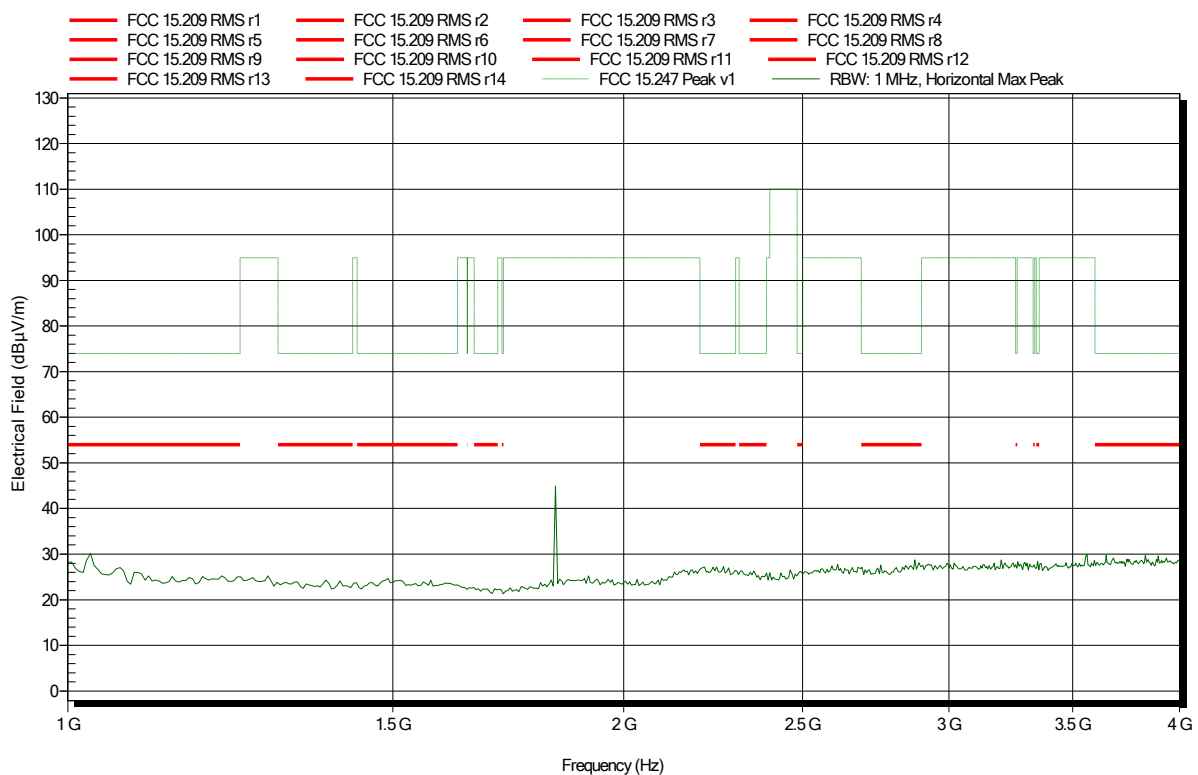


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
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Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 25°C, Vnom: 24 VAC
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; 918.5MHz, 2-FSK, External antenna, EUT ver.
Test Date: 2020-01-13
Note:

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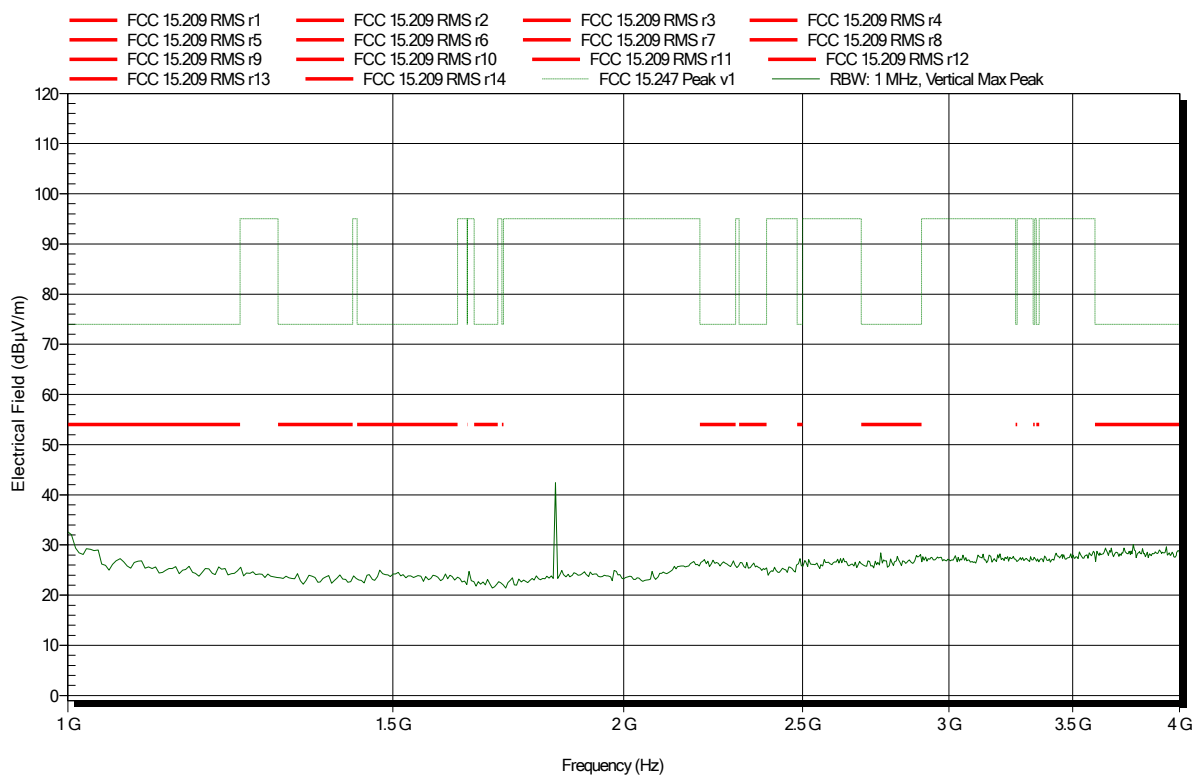


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 25°C, Vnom: 24 VAC
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; 918.5MHz, 2-FSK, External antenna, EUT ver.
Test Date: 2020-01-13
Note:

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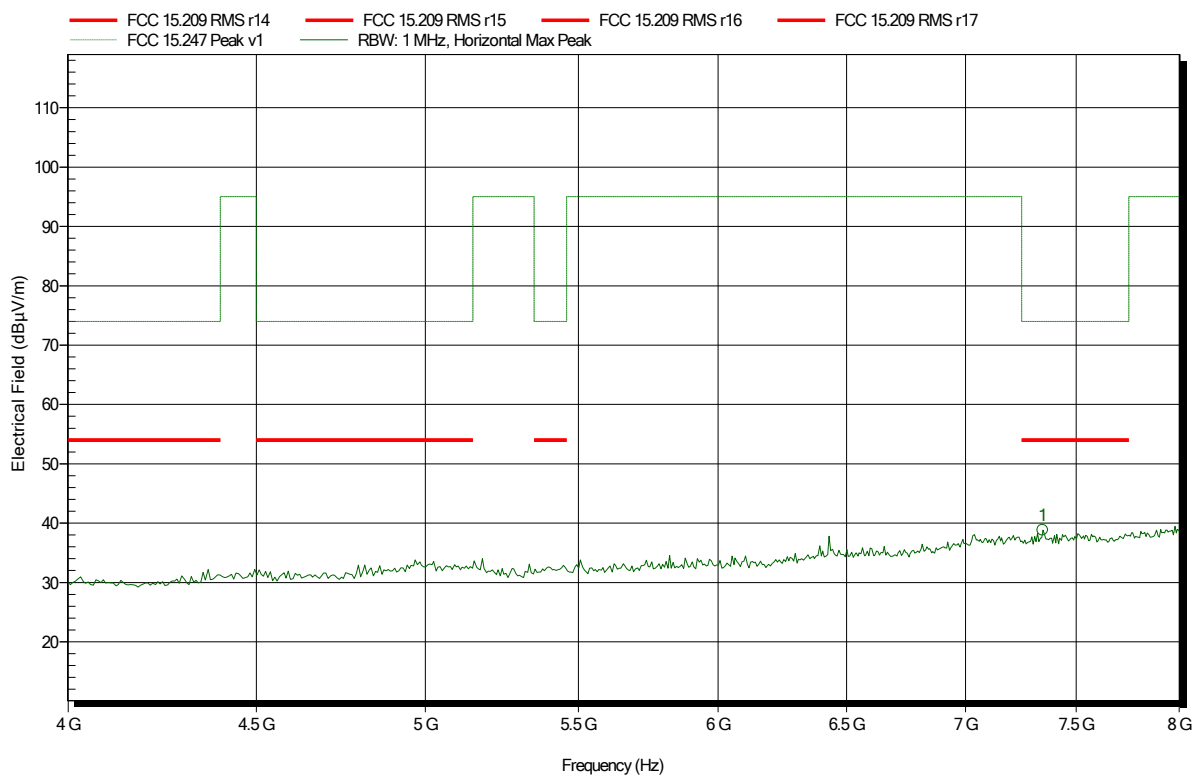


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
 EUT Name: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Site: Eurofins Product Service GmbH
 Operator: Florian Voigt
 Test Conditions: Tnom: 25°C, Vnom: 24 VAC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; 918.5MHz, 2-FSK, External antenna, EUT ver.
 Test Date: 2020-01-13
 Note:

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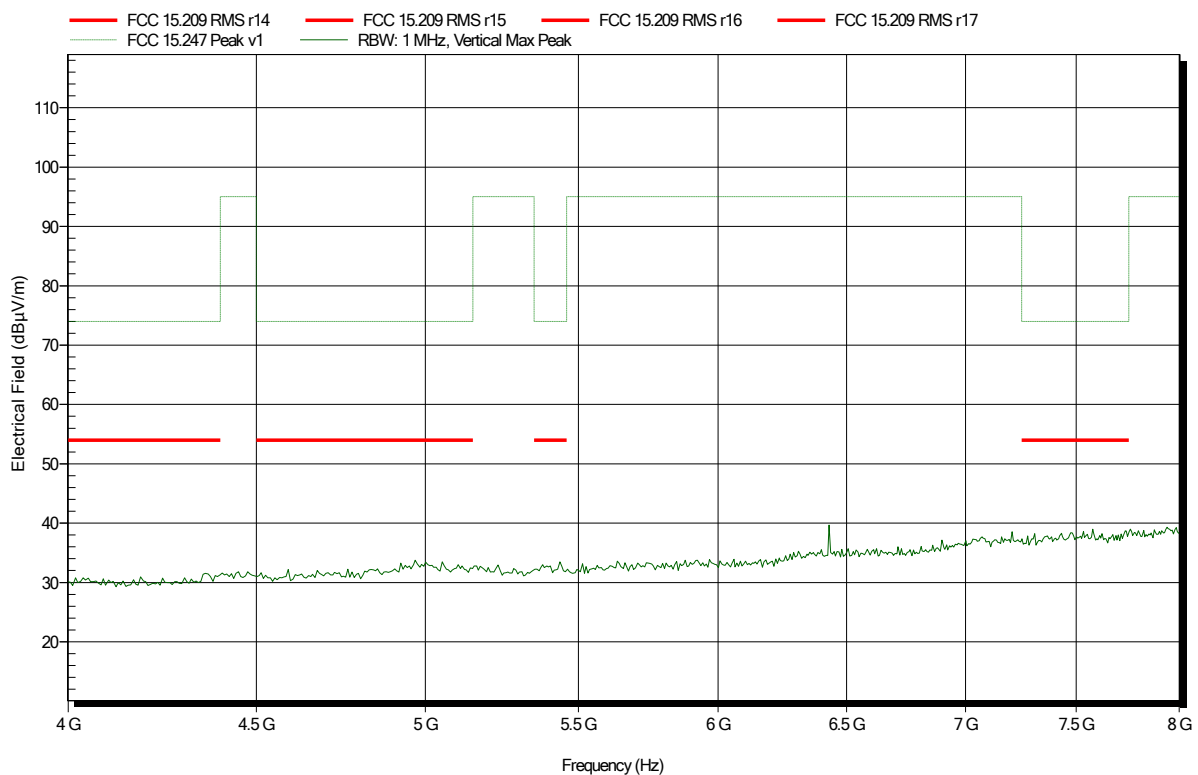
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
7.346 GHz	38.81 dBµV/m	74 dBµV/m	-35.19 dB	Pass

Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
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Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 25°C, Vnom: 24 VAC
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; 918.5MHz, 2-FSK, External antenna, EUT ver.
Test Date: 2020-01-13
Note:

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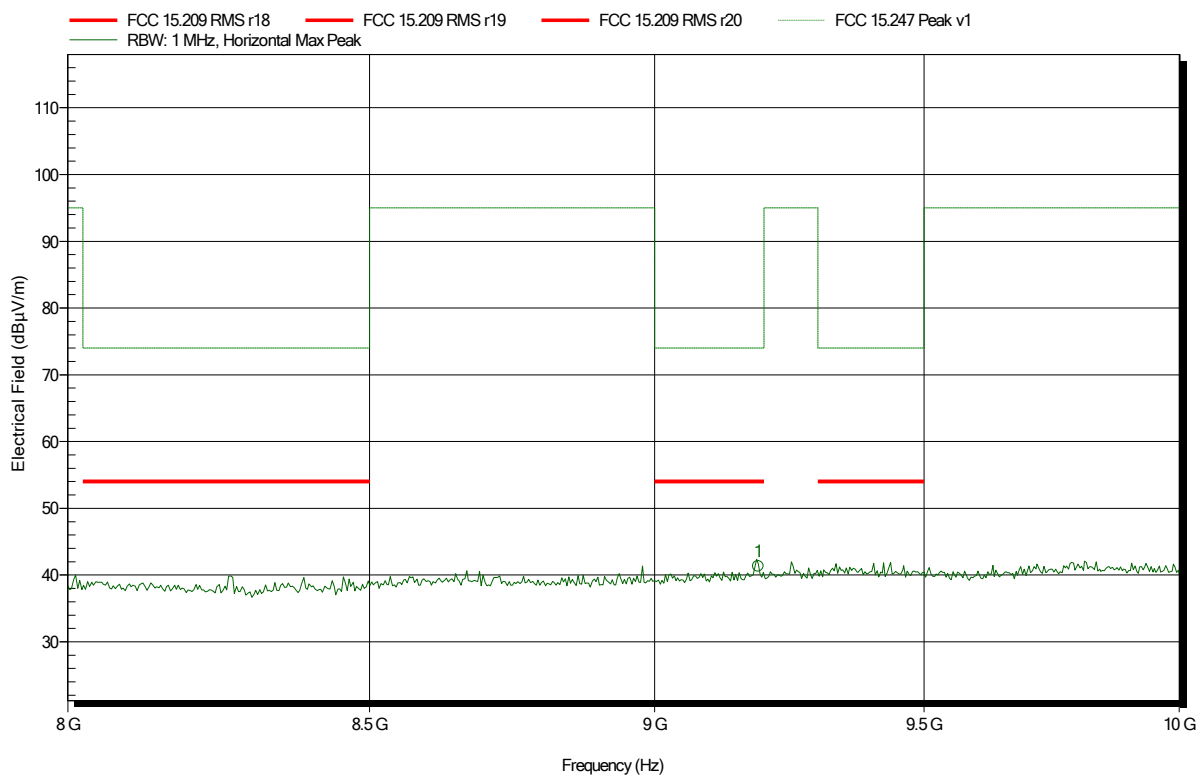


Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
 EUT Name: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Site: Eurofins Product Service GmbH
 Operator: Florian Voigt
 Test Conditions: Tnom: 25°C, Vnom: 24 VAC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; 918.5MHz, 2-FSK, External antenna, EUT ver.
 Test Date: 2020-01-13
 Note:

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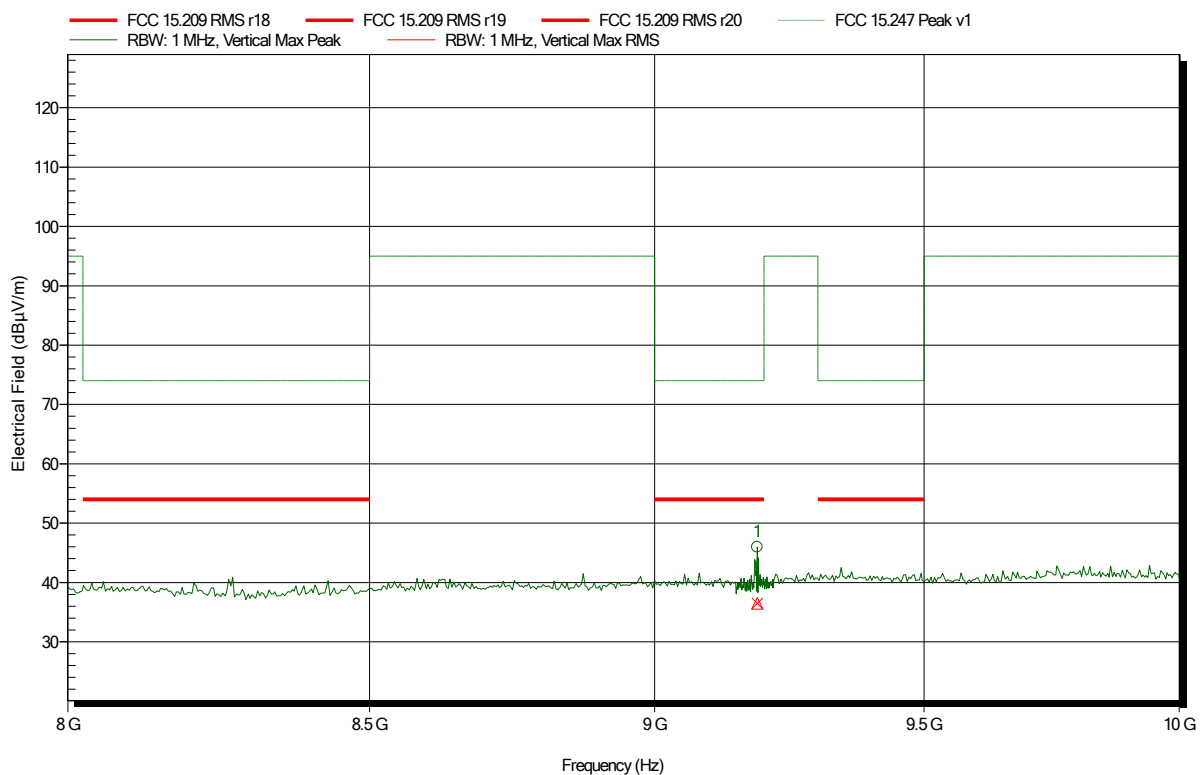
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
9.189 GHz	41.33 dBµV/m	74 dBµV/m	-32.67 dB	Pass

Spurious emissions according to RSS-247 Issue 2, FCC 47 e-CFR §15.247

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 25°C, Vnom: 24 VAC
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; 918.5MHz, 2-FSK, External antenna, EUT ver.
Test Date: 2020-01-13
Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
9.188 GHz	45.99 dBµV/m	74 dBµV/m	-28.01 dB	Pass
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
9.188 GHz	36.48 dBµV/m	54 dBµV/m	-17.52 dB	Pass

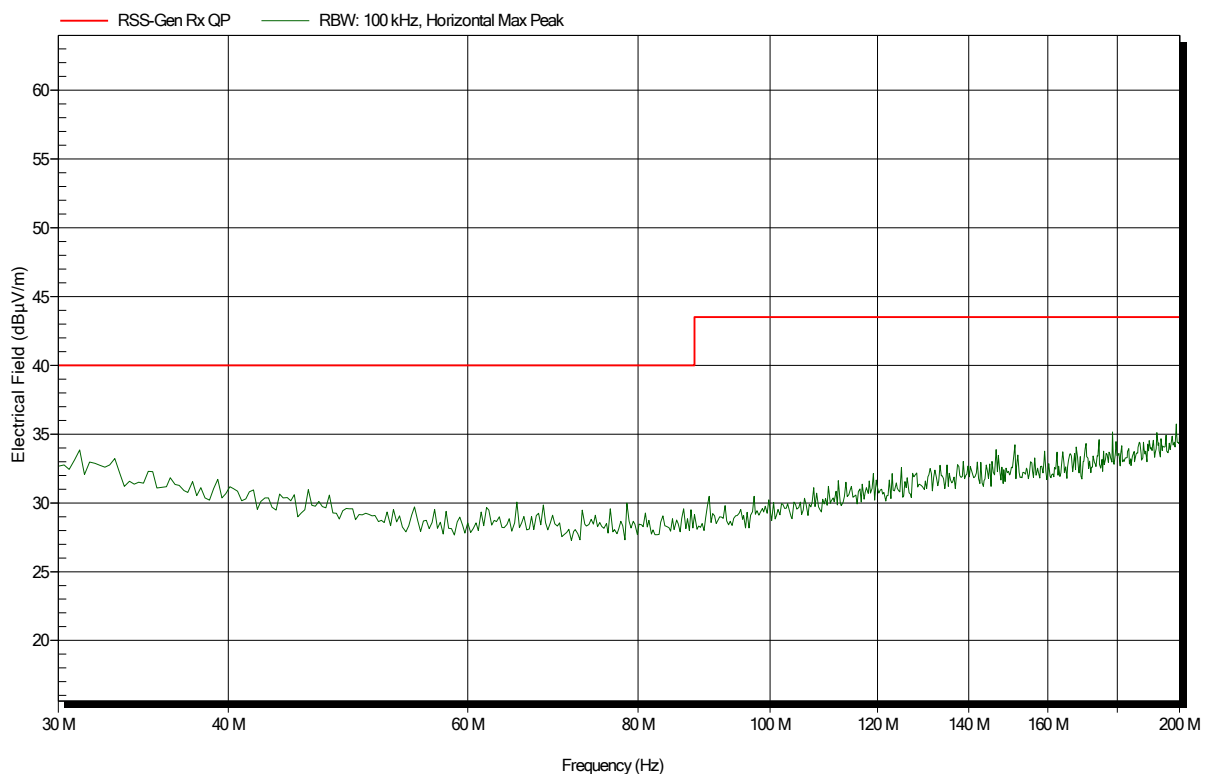
ANNEX B Receiver spurious emissions

Spurious emissions according to RSS-247 Issue 2

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
 EUT Name: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Site: Eurofins Product Service GmbH
 Operator: Florian Voigt
 Test Conditions: Tnom: 24.7°C, Vnom: 3.6 VDC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: RX; 915.0MHz, Internal antenna, EUT ver.
 Test Date: 2020-01-13
 Note:

Index 1

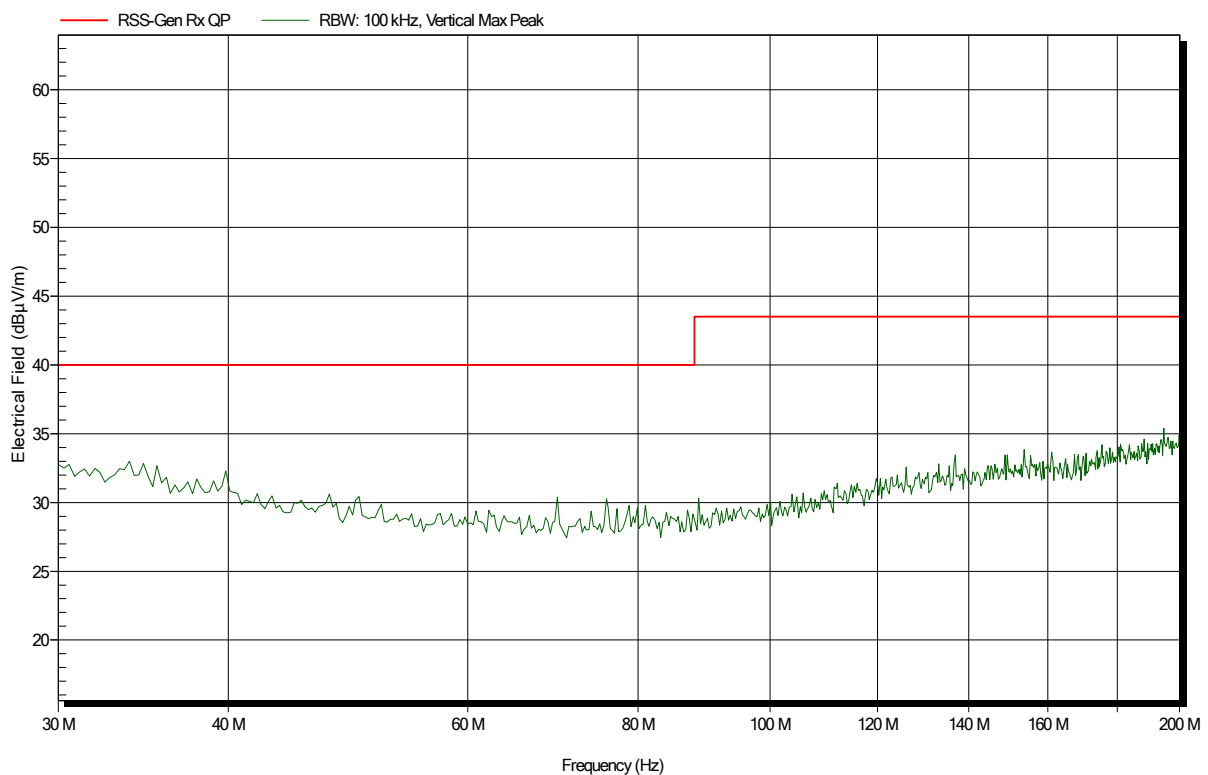


Spurious emissions according to RSS-247 Issue 2

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.7°C, Vnom: 3.6 VDC
Antenna: Rohde & Schwarz HK 116, Vertical
Measurement distance: 3 m
Mode: RX; 915.0MHz, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

Index 2

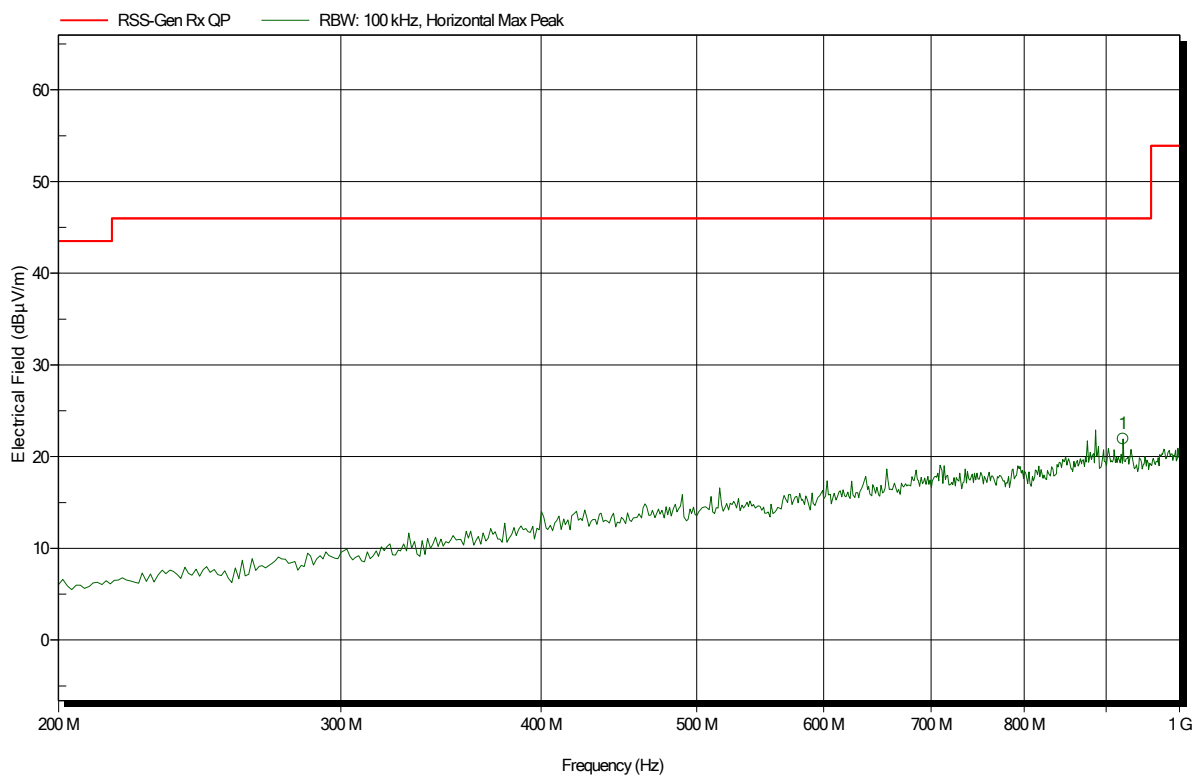


Spurious emissions according to RSS-247 Issue 2

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.7°C, Vnom: 3.6 VDC
Antenna: Rohde & Schwarz HL 223, Horizontal
Measurement distance: 3 m
Mode: RX; 915.0MHz, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

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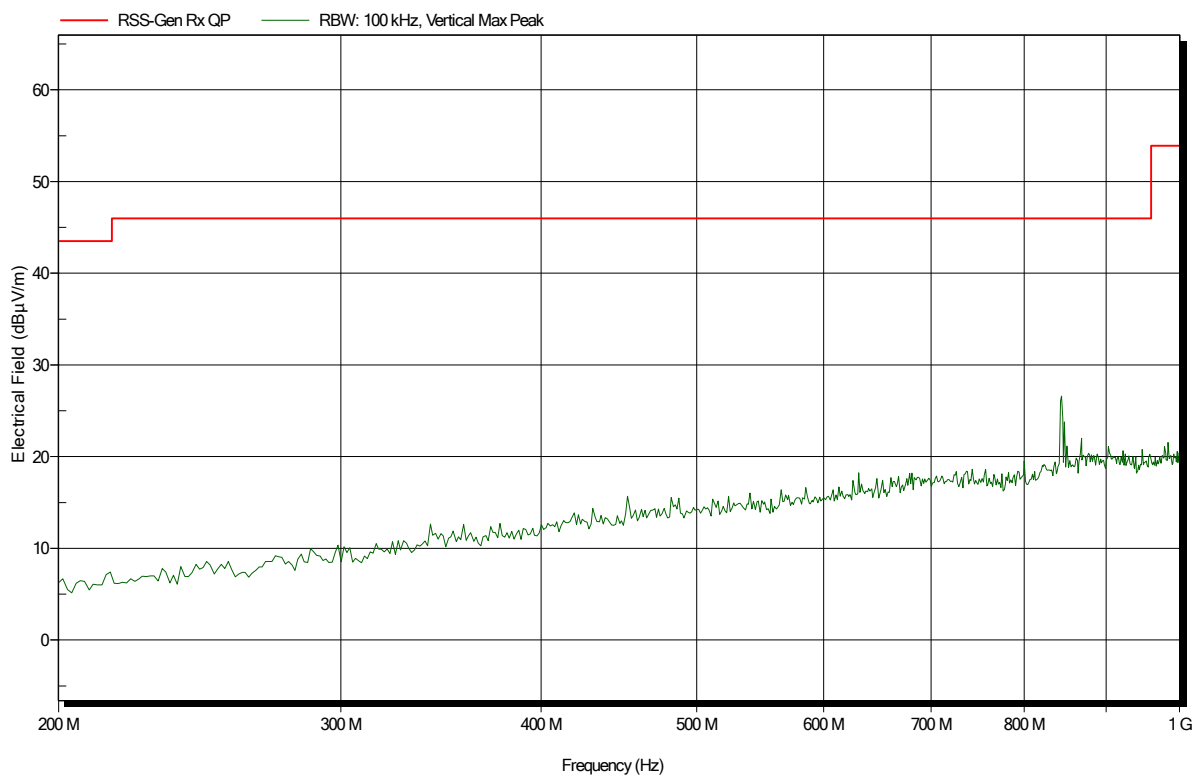
Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
921.795 MHz	21.95 dBµV/m	46 dBµV/m	-24.05 dB	Pass	315 Degree	1.2 m

Spurious emissions according to RSS-247 Issue 2

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.7°C, Vnom: 3.6 VDC
Antenna: Rohde & Schwarz HL 223, Vertical
Measurement distance: 3 m
Mode: RX; 915.0MHz, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

Index 3

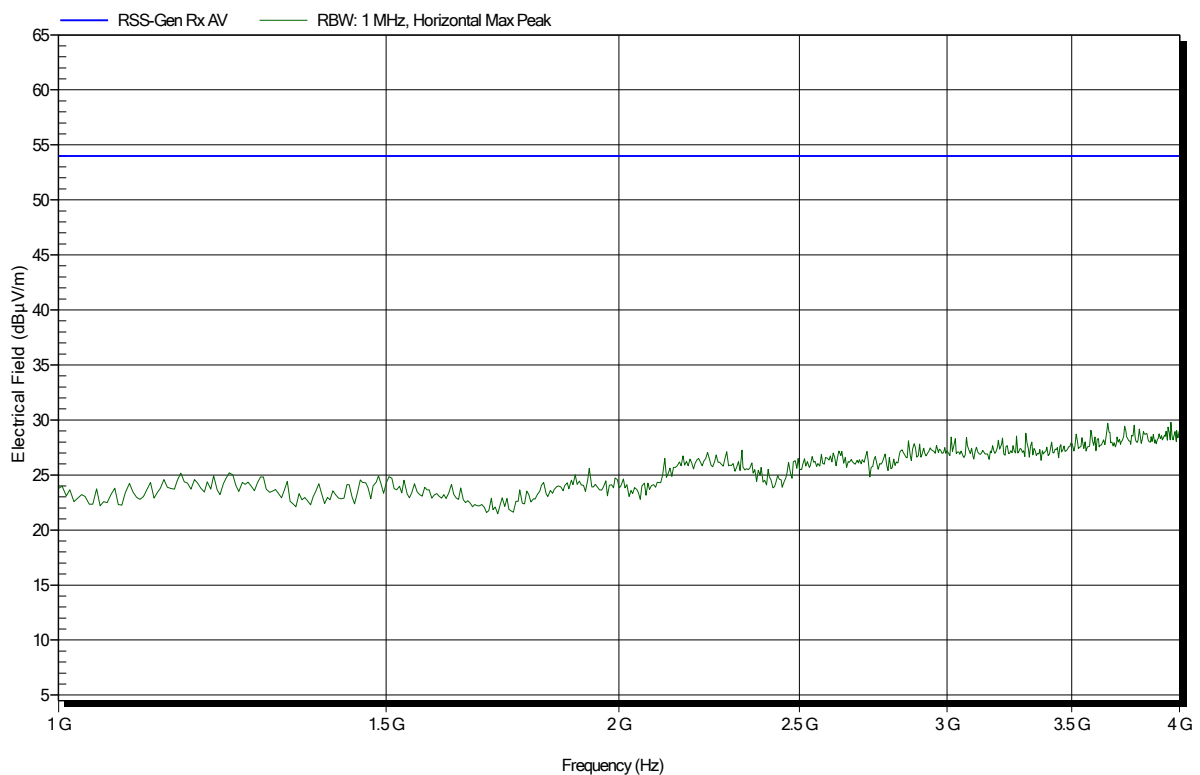


Spurious emissions according to RSS-247 Issue 2

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.7°C, Vnom: 3.6 VDC
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m
Mode: RX; 915.0MHz, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

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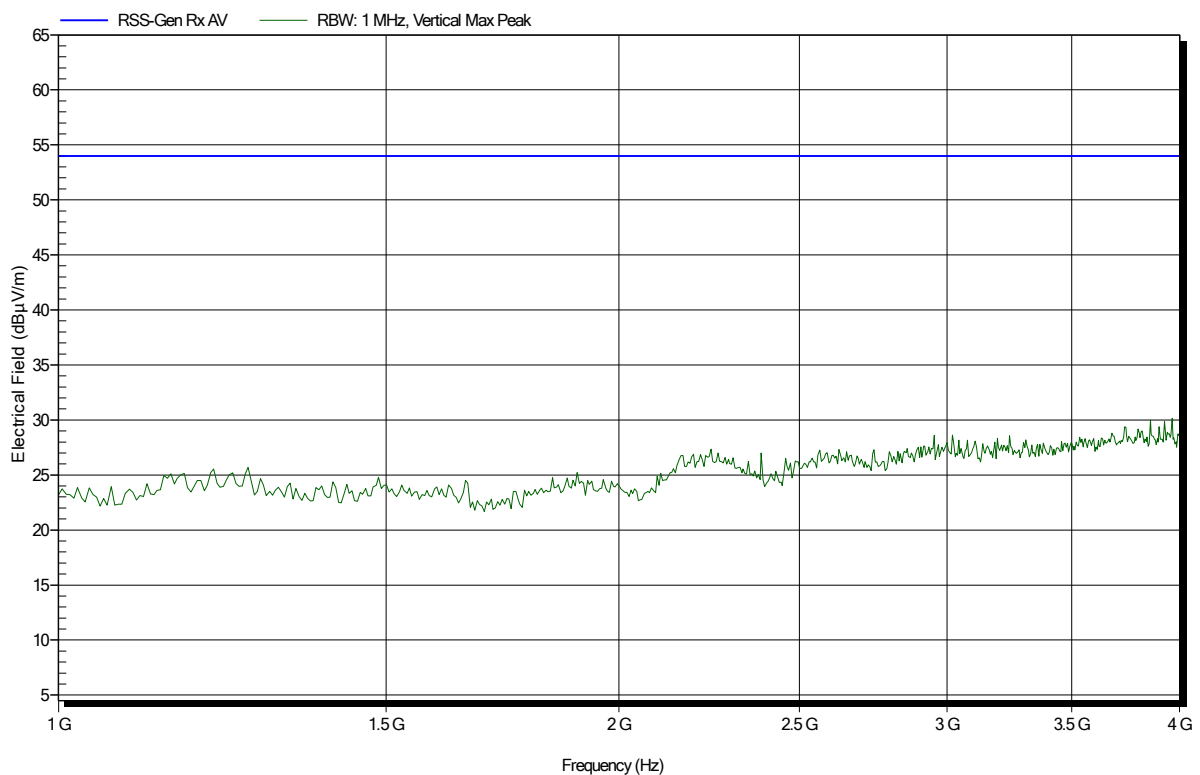


Spurious emissions according to RSS-247 Issue 2

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.7°C, Vnom: 3.6 VDC
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m
Mode: RX; 915.0MHz, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

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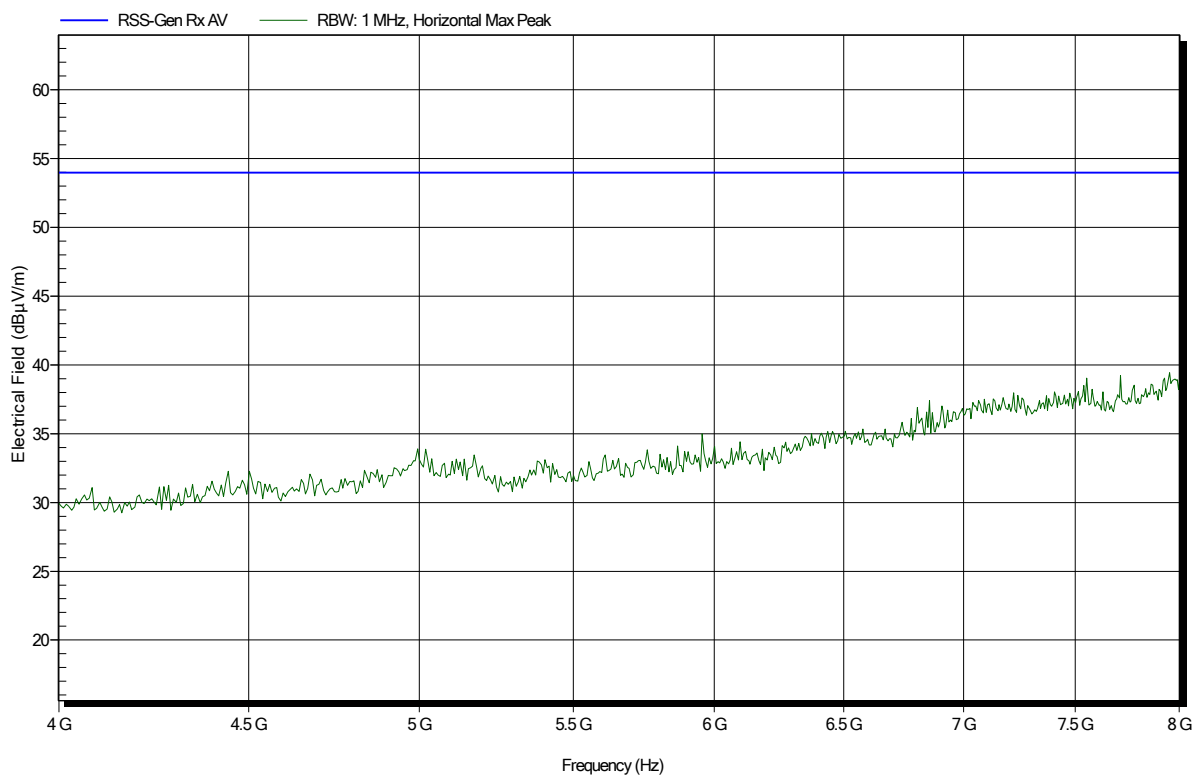


Spurious emissions according to RSS-247 Issue 2

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 24.7°C, Vnom: 3.6 VDC
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m
Mode: RX; 915.0MHz, Internal antenna, EUT ver.
Test Date: 2020-01-13
Note:

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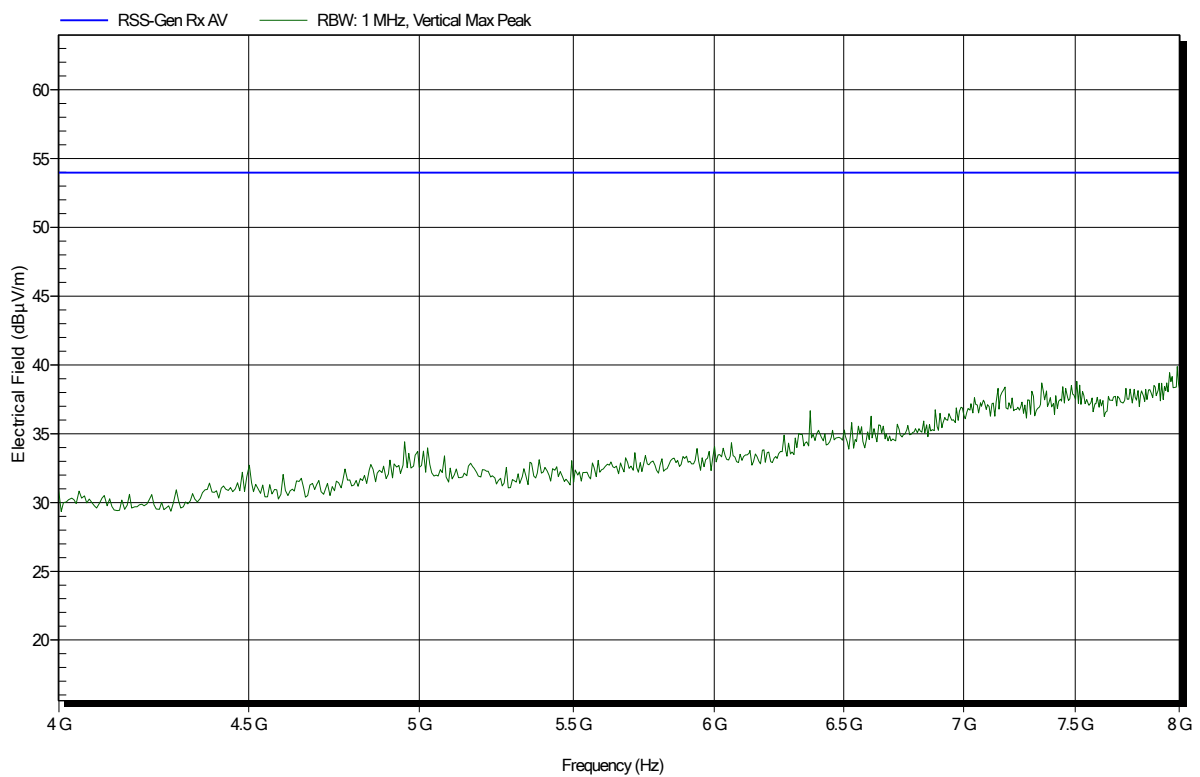


Spurious emissions according to RSS-247 Issue 2

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
 EUT Name: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Site: Eurofins Product Service GmbH
 Operator: Florian Voigt
 Test Conditions: Tnom: 24.7°C, Vnom: 3.6 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: RX; 915.0MHz, Internal antenna, EUT ver.
 Test Date: 2020-01-13
 Note:

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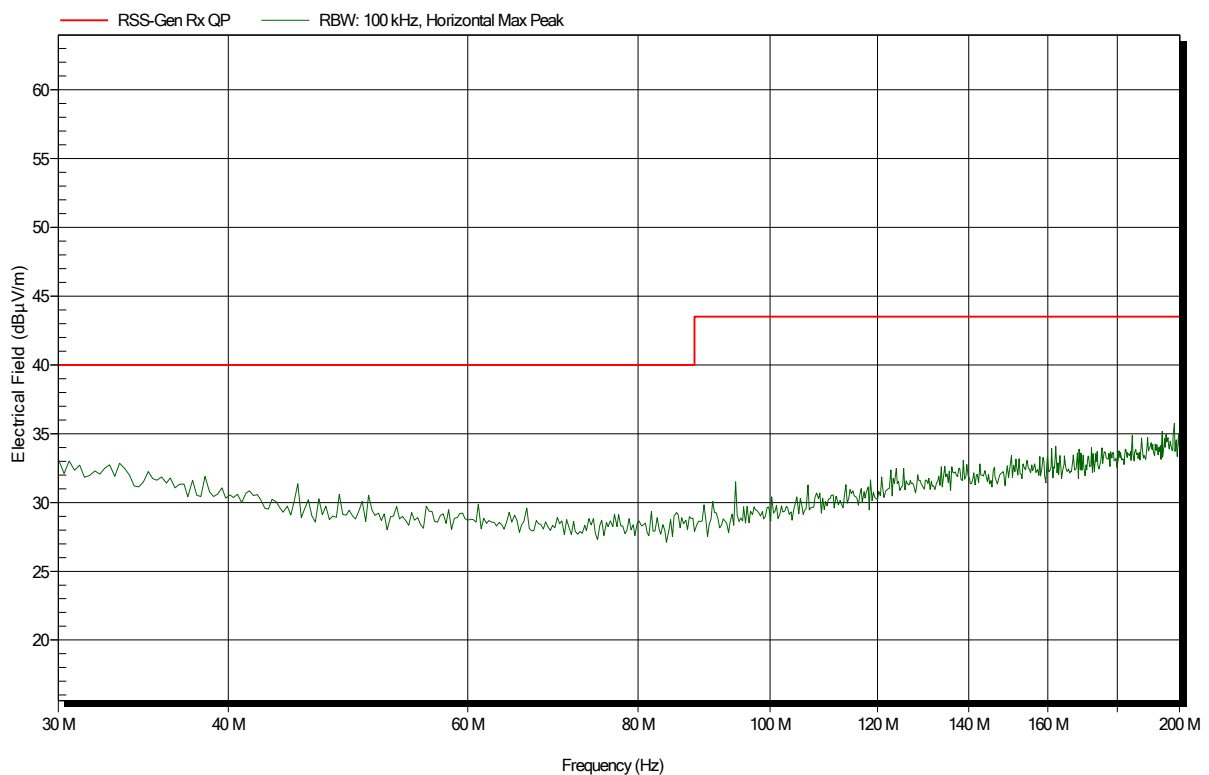


Spurious emissions according to RSS-247 Issue 2

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 25°C, Vnom: 24 VAC
Antenna: Rohde & Schwarz HK 116, Horizontal
Measurement distance: 3 m
Mode: RX; 915.0MHz, External antenna, EUT ver.
Test Date: 2020-01-13
Note:

Index 6

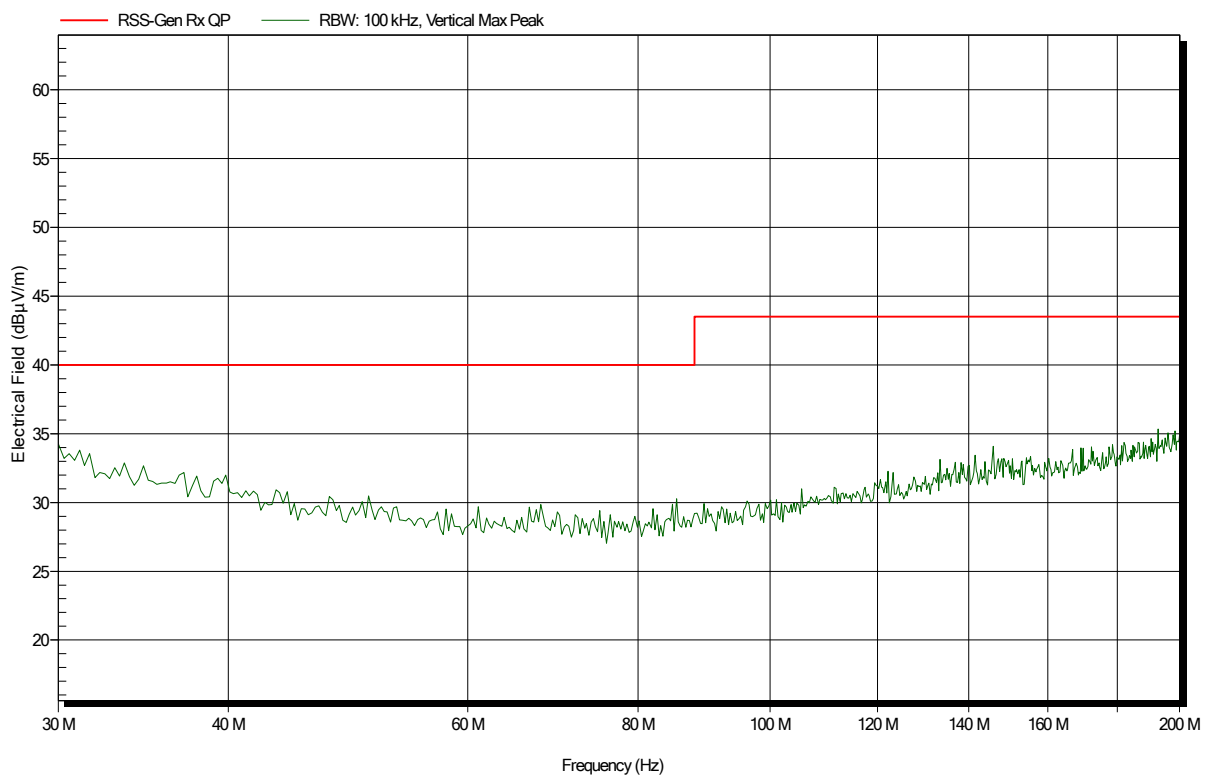


Spurious emissions according to RSS-247 Issue 2

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
 EUT Name: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Site: Eurofins Product Service GmbH
 Operator: Florian Voigt
 Test Conditions: Tnom: 25°C, Vnom: 24 VAC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: RX; 915.0MHz, External antenna, EUT ver.
 Test Date: 2020-01-13
 Note:

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Spurious emissions according to RSS-247 Issue 2

Project number: G0M-1912-8648

Applicant: Kamstrup A/S

EUT Name: wireless mbus US radio module with pulse input for MULTICAL

Model: wireless mbus US radio module with pulse input for MULTICAL

Test Site: Eurofins Product Service GmbH

Operator: Florian Voigt

Test Conditions: Tnom: 25°C, Vnom: 24 VAC

Antenna: Rohde & Schwarz HL 223, Horizontal

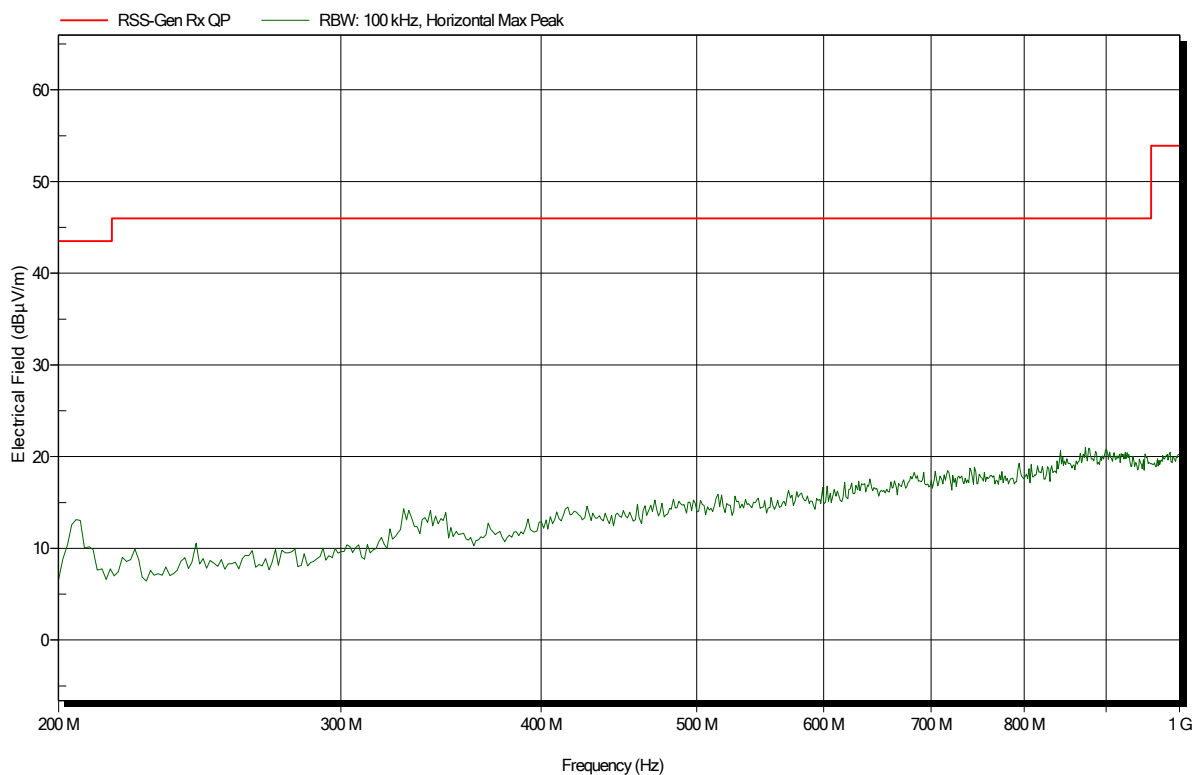
Measurement distance: 3 m

Mode: RX; 915.0MHz, External antenna, EUT ver.

Test Date: 2020-01-13

Note:

Index 8

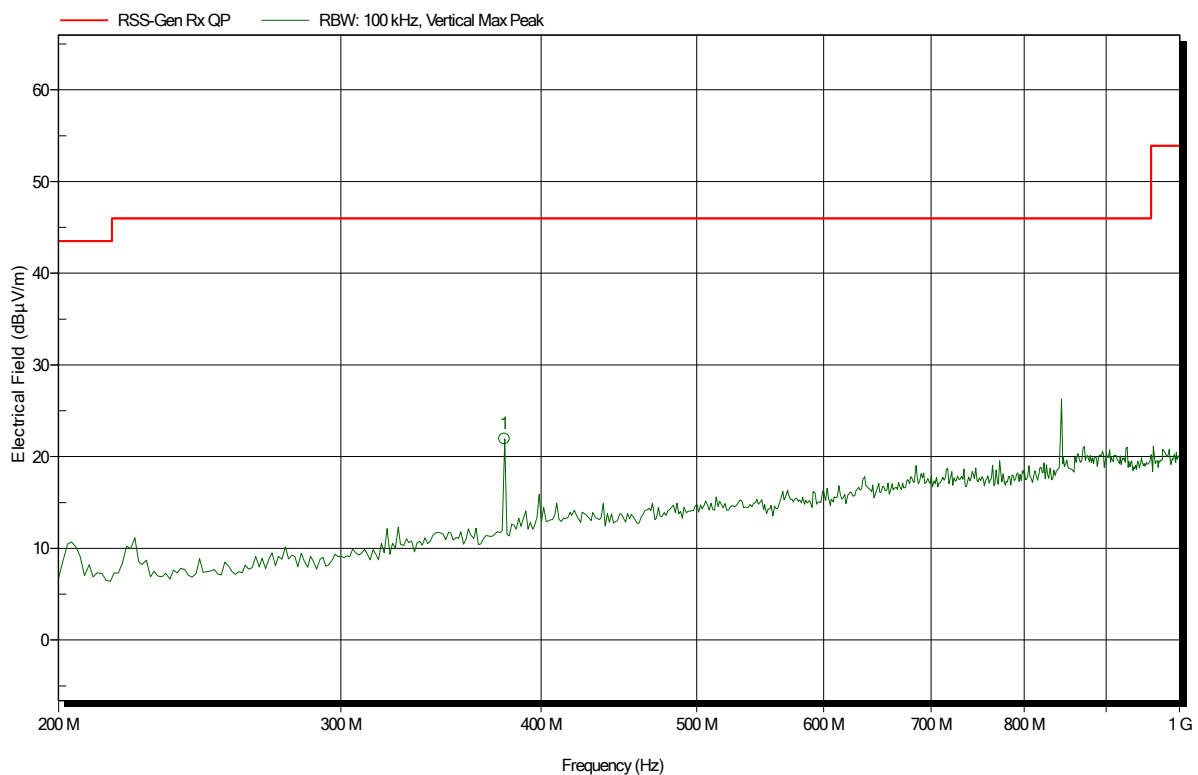


Spurious emissions according to RSS-247 Issue 2

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 25°C, Vnom: 24 VAC
Antenna: Rohde & Schwarz HL 223, Vertical
Measurement distance: 3 m
Mode: RX; 915.0MHz, External antenna, EUT ver.
Test Date: 2020-01-13
Note:

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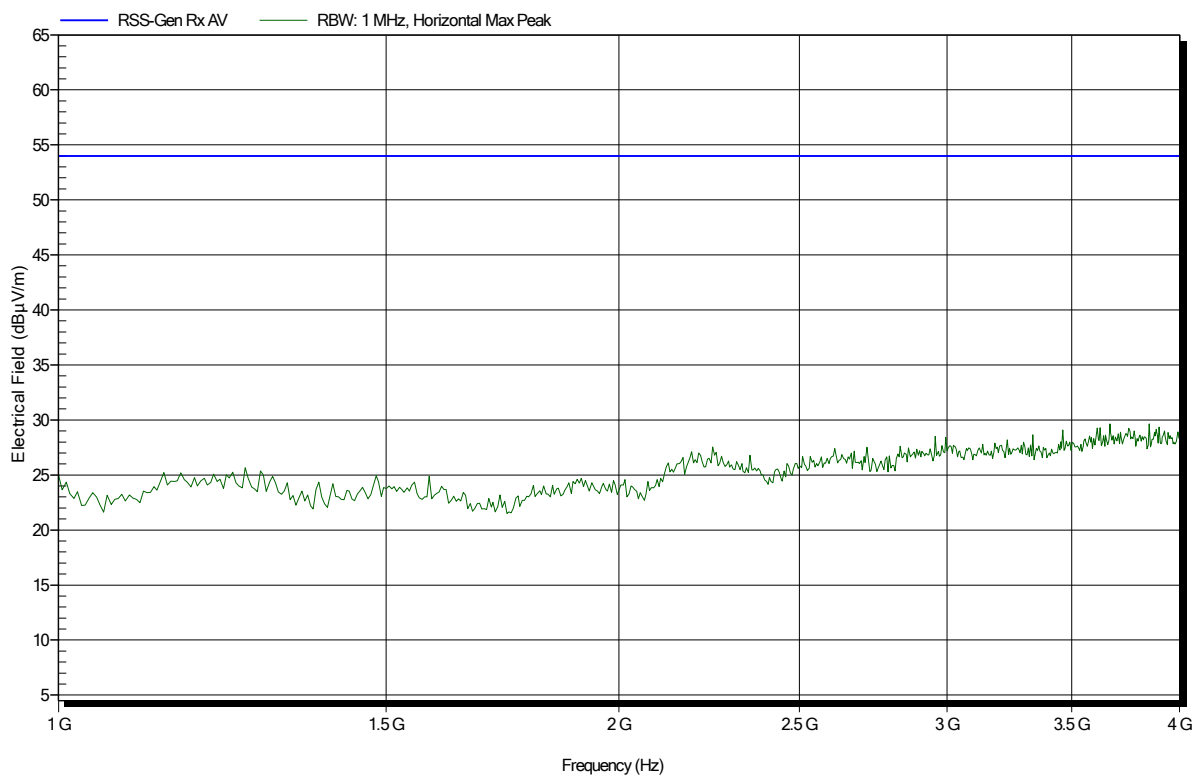
Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
379.487 MHz	21.93 dBµV/m	46 dBµV/m	-24.07 dB	Pass	292 Degree	1.2 m

Spurious emissions according to RSS-247 Issue 2

Project number: G0M-1912-8648

Applicant: Kamstrup A/S
 EUT Name: wireless mbus US radio module with pulse input for MULTICAL
 Model: wireless mbus US radio module with pulse input for MULTICAL
 Test Site: Eurofins Product Service GmbH
 Operator: Florian Voigt
 Test Conditions: Tnom: 25°C, Vnom: 24 VAC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: RX; 915.0MHz, External antenna, EUT ver.
 Test Date: 2020-01-13
 Note:

Index 2

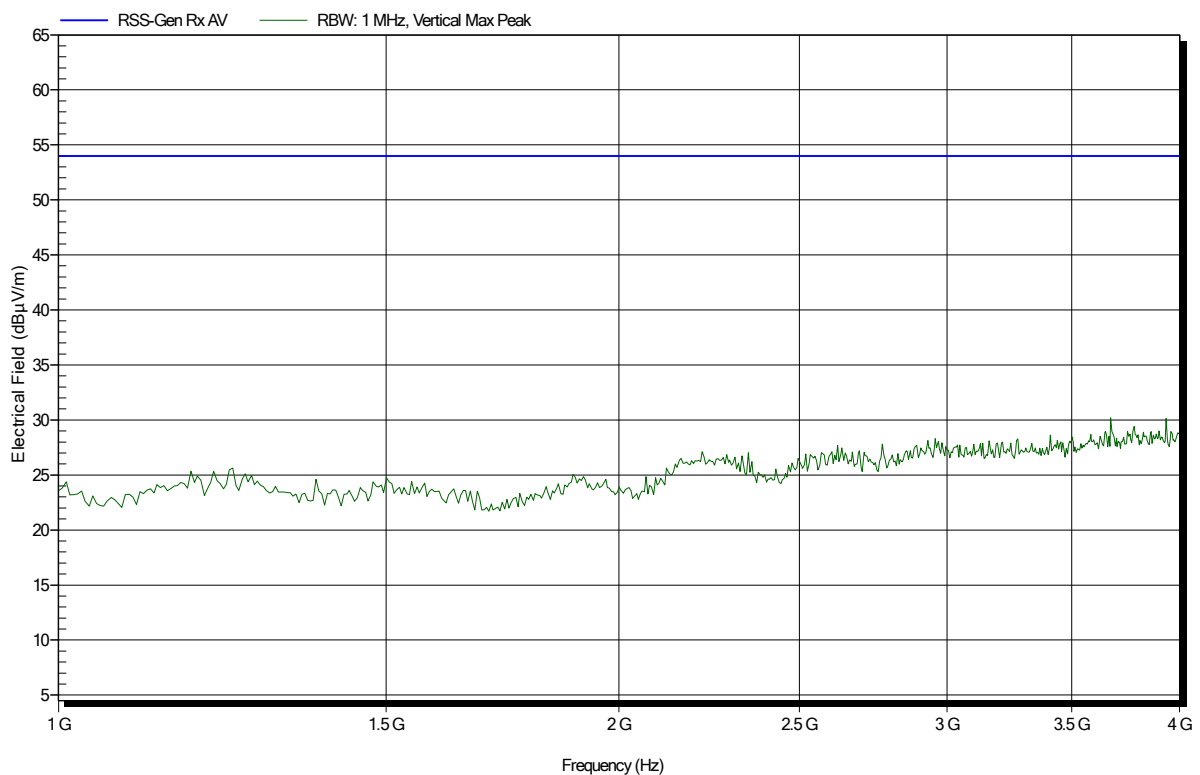


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Project number: G0M-1912-8648

Applicant: Kamstrup A/S
EUT Name: wireless mbus US radio module with pulse input for MULTICAL
Model: wireless mbus US radio module with pulse input for MULTICAL
Test Site: Eurofins Product Service GmbH
Operator: Florian Voigt
Test Conditions: Tnom: 25°C, Vnom: 24 VAC
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m
Mode: RX; 915.0MHz, External antenna, EUT ver.
Test Date: 2020-01-13
Note:

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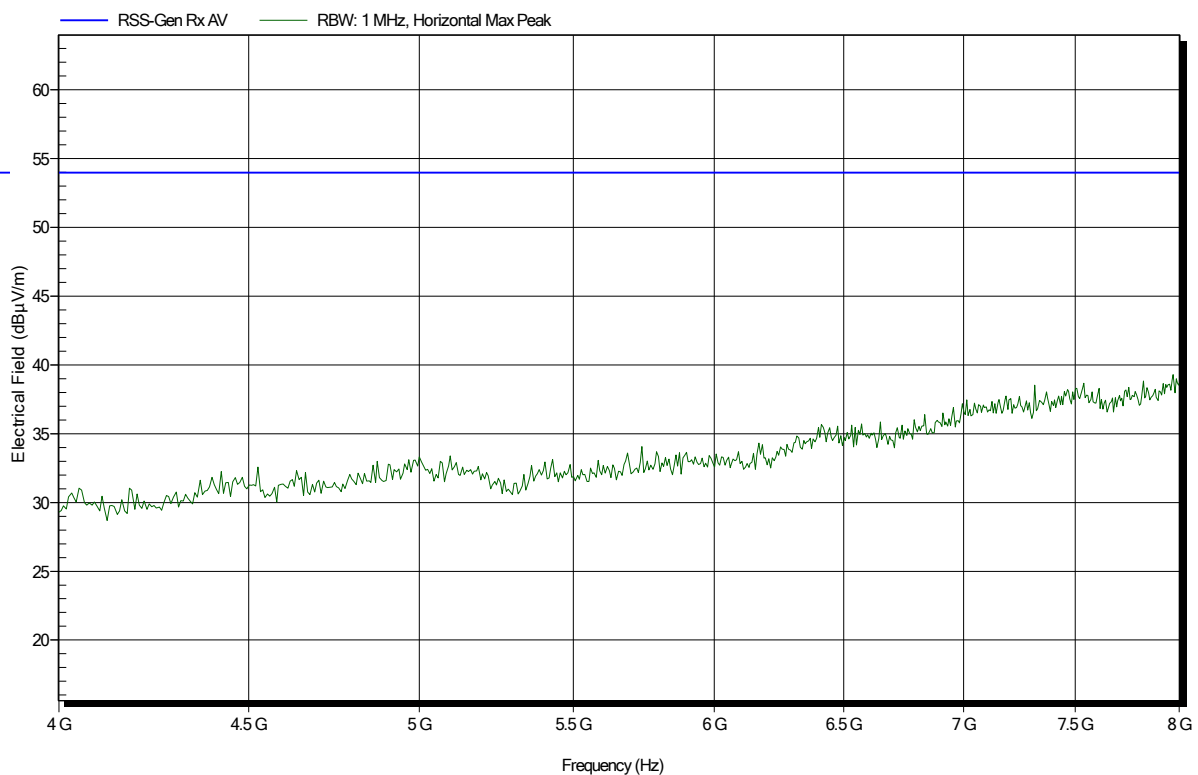


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Applicant: Kamstrup A/S
 EUT Name: wireless mbus US radio module with pulse input for MULTICAL
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 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: RX; 915.0MHz, External antenna, EUT ver.
 Test Date: 2020-01-13
 Note:

Index 1

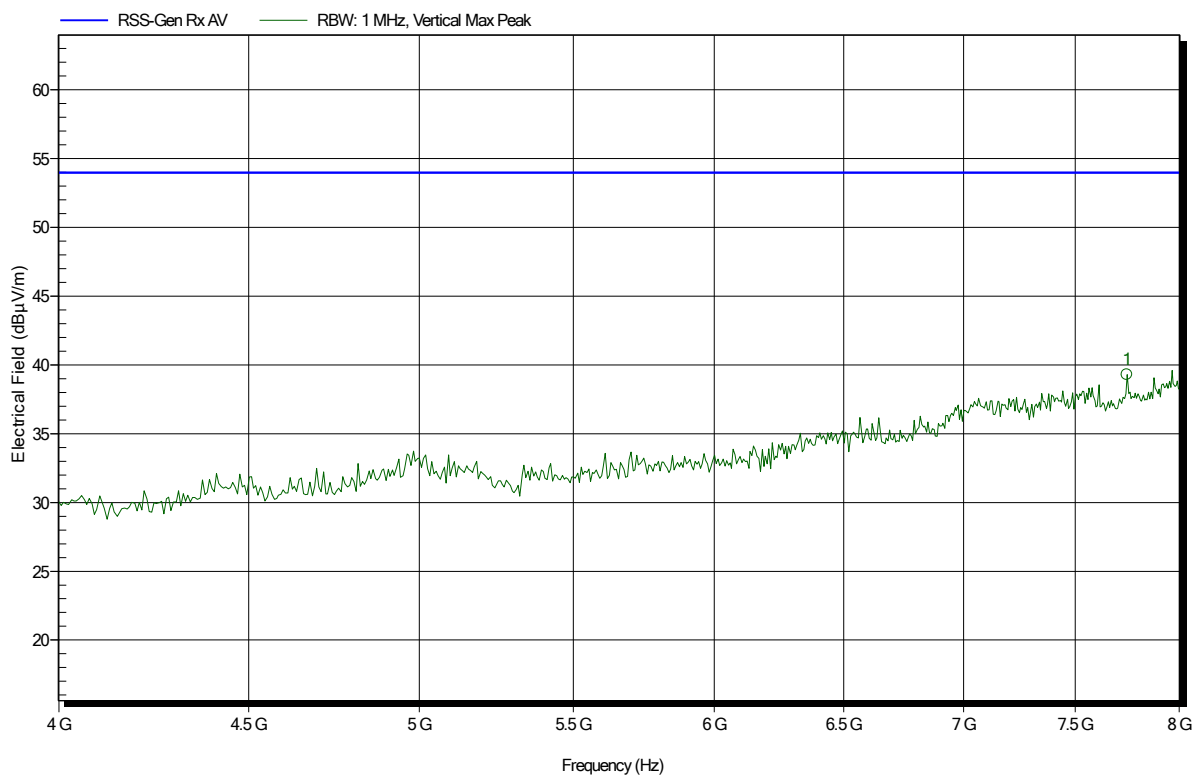


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 EUT Name: wireless mbus US radio module with pulse input for MULTICAL
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 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: RX; 915.0MHz, External antenna, EUT ver.
 Test Date: 2020-01-13
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
7.744 GHz	39.3 dBµV/m	53.98 dBµV/m	-14.68 dB	Pass