RADIO REPORT

FCC 47 CFR Part 15C
ISED Canada RSS-247

Digital transmission systems operating within the 2400 – 2483.5 MHz band

Report Reference No	G0M-2001-8761-TFC247DT-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	DAkkS Deutsche Akkreditierungsstelle D-PL-12092-01-03 DAkkS Deutsche Akkreditierungsstelle D-PL-12092-01-04 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	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	Ultrasonic water meter
Model(s)	FlowIQ 2250
Additional Model(s)	FlowIQ 3250
Brand Name(s)	Kamstrup
Hardware Version(s) - FlowIQ 2250	620120101 rev C1 / RF board 55491605 rev B2
Software Version(s) - FlowIQ 2250	50981336 rev N1; 55141570 rev D1
Hardware Version(s) - FlowIQ 3250	620220103 rev B1 / RF board 55501605 rev F1
Software Version(s) - FlowIQ 3250	50981336 rev N1; 55141570 rev D1
FCC-ID	OUY-FLOWX250
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 - 23 °C	
Test Lab Humidity	32 – 38 %	
Date of receipt of test item	2020-04-16	
Report:		
Compiled by	Wilfried Treffke	
Tested by (+ signature) (Responsible for Test)	Wilfried Treffke	W. Treffke .....
Approved by (+ signature) (Head of Lab)	Christian Weber	C. Weber .....
Date of Issue	2020-05-12	
Total number of pages	76	
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:		

ADDITIONAL VARIANTS

Additional Variants (not tested and not evaluated variants)		
Not-tested Variant	**Description**	
1	Product Type Description	Ultrasonic water meter
	Model name	FlowIQ 2250
	Brand name	None
	Hardware Version	620120102 rev C2 / RF board 55501605 rev F1
	Software Version	50981336 rev N1; 55141570 rev D1
2	Product Type Description	Ultrasonic water meter
	Model name	FlowIQ 2250
	Brand name	None
	Hardware Version	620120103 rev C2 / RF board 55501605 rev F1
	Software Version	50981336 rev N1; 55141570 rev D1
3	Product Type Description	Ultrasonic water meter
	Model name	FlowIQ 3250
	Brand name	None
	Hardware Version	620220101 rev B1 / RF board 55501605 rev F1
	Software Version	50981336 rev N1; 55141570 rev D1
4	Product Type Description	Ultrasonic water meter
	Model name	FlowIQ 3250
	Brand name	None
	Hardware Version	620220102 rev B1 / RF board 55501605 rev F1
	Software Version	50981336 rev N1; 55141570 rev D1
5	Product Type Description	Ultrasonic water meter
	Model name	FlowIQ 3250
	Brand name	None
	Hardware Version	620220104 rev 00 / RF board 55501605 rev F1
	Software Version	50981336 rev N1; 55141570 rev D1
6	Product Type Description	Ultrasonic water meter
	Model name	FlowIQ 3250
	Brand name	None
	Hardware Version	620220105 rev B1 / RF board 55501605 rev F1
	Software Version	50981336 rev N1; 55141570 rev D1
7	Product Type Description	Ultrasonic water meter
	Model name	FlowIQ 3250
	Brand name	None
	Hardware Version	620220106 rev A2 / RF board 55501605 rev F1
	Software Version	50981336 rev N1; 55141570 rev D1
8	Product Type Description	Ultrasonic water meter
	Model name	FlowIQ 3250
	Brand name	None
	Hardware Version	620220107 rev A2 / RF board 55501605 rev F1
	Software Version	50981336 rev N1; 55141570 rev D1
9	Product Type Description	Ultrasonic water meter
	Model name	FlowIQ 3250
	Brand name	None
	Hardware Version	620220108 rev A1 / RF board 55501605 rev F1
	Software Version	50981336 rev N1; 55141570 rev D1

10	Product Type Description	Ultrasonic water meter
	Model name	FlowIQ 3250
	Brand name	None
	Hardware Version	620220109 rev A2 / RF board 55501605 rev F1
	Software Version	50981336 rev N1; 55141570 rev D1
11	Product Type Description	Ultrasonic water meter
	Model name	FlowIQ 3250
	Brand name	None
	Hardware Version	620220110 rev A1 / RF board 55501605 rev F1
	Software Version	50981336 rev N1; 55141570 rev D1
Comment: Those named additional variants above have not been tested. Those additional variants of the series have been declared by the manufacturer. The test report explicitly states that those variants were neither tested nor assessed nor evaluated.		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2020-05-12	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

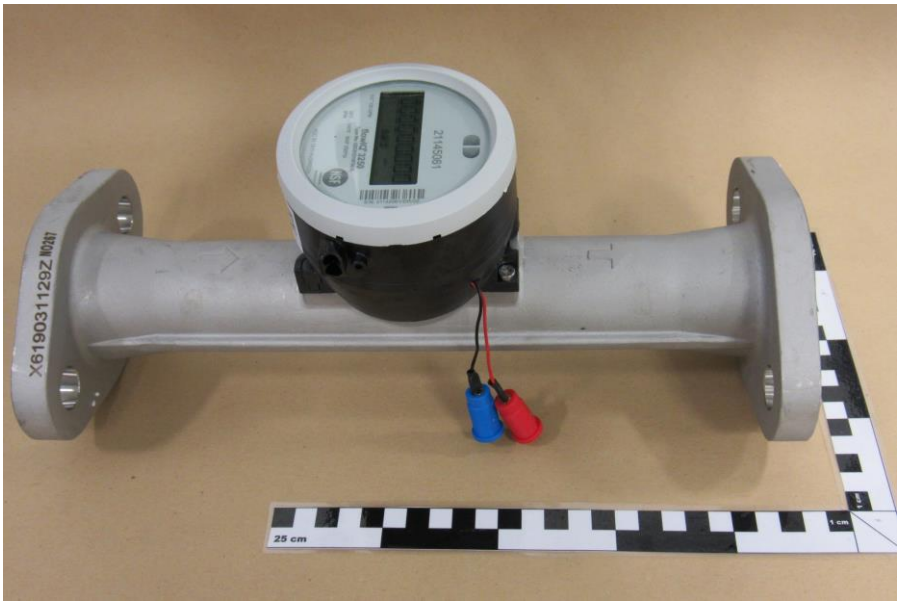
REPORT INDEX

1 Equipment (Test Item) Under Test

Description	Ultrasonic water meter	
Model	FlowIQ 2250	
Additional Model(s)	FlowIQ 3250	
Brand Name(s)	Kamstrup	
Serial Number(s)	79489892 (FlowIQ 2250) / 21145061 (FlowIQ 3250)	
Hardware Version(s) - (FlowIQ 2250)	620120101 rev C1 / RF board 55501605 rev F1	
Software Version(s) - (FlowIQ 2250)	50981336 rev N1; 55141570 rev D1	
Hardware Version(s) - (FlowIQ 3250)	620220103 rev B1 / RF board 55501605 rev F1	
Software Version(s) - (FlowIQ 3250)	50981336 rev N1; 55141570 rev D1	
FCC-ID	OUY-FLOWX250	
IC	N/A	
Equipment type	End Product	
Radio type	Transceiver	
Assigned frequency bands	902.0 - 928.0 MHz	
Radio technology	Digital Modulation	
Modulation	2FSK	
Number of antenna ports	1	
Antenna	Type	External Pit Antenna
	Model	669716
	Manufacturer	Kamstrup
	Gain	1.2 dBi (declaration of applicant)
Supply Voltage	V_{NOM}	3.6 VDC
Operating Temperature	T_{NOM}	25 °C
AC/DC-Adaptor	Model	None
Manufacturer	Kamstrup A/S Industrivej 28 8660 Skanderborg DENMARK	

1.1 Photos – Equipment External

EUT Flow IQ 2250 Top View


EUT Flow IQ 2250 Side View


EUT Flow IQ 2250 Close View


EUT Flow IQ 3250 Side View


EUT Flow IQ 3250 Close View

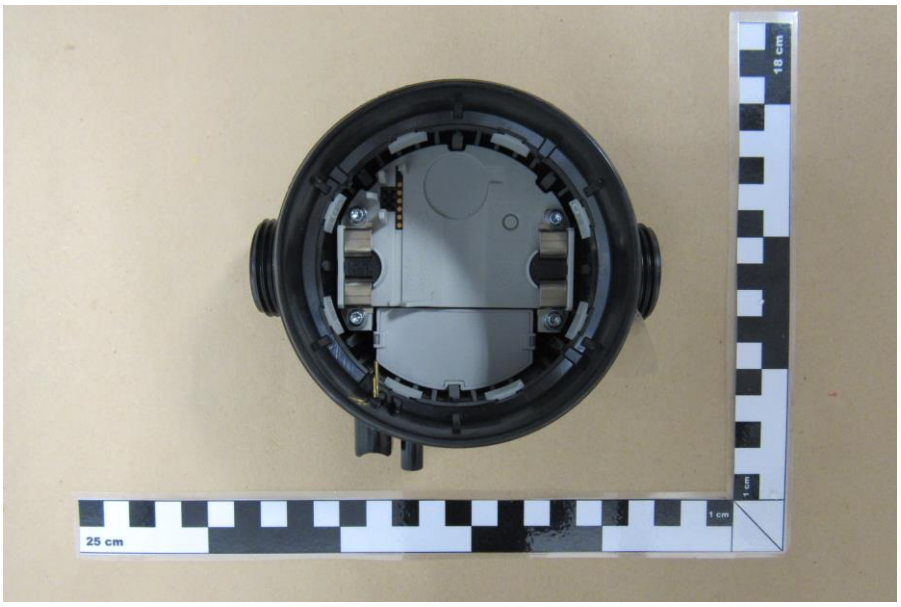

External Antenna Top View


External Antenna Side View

AE Optical Read Out Head Overview

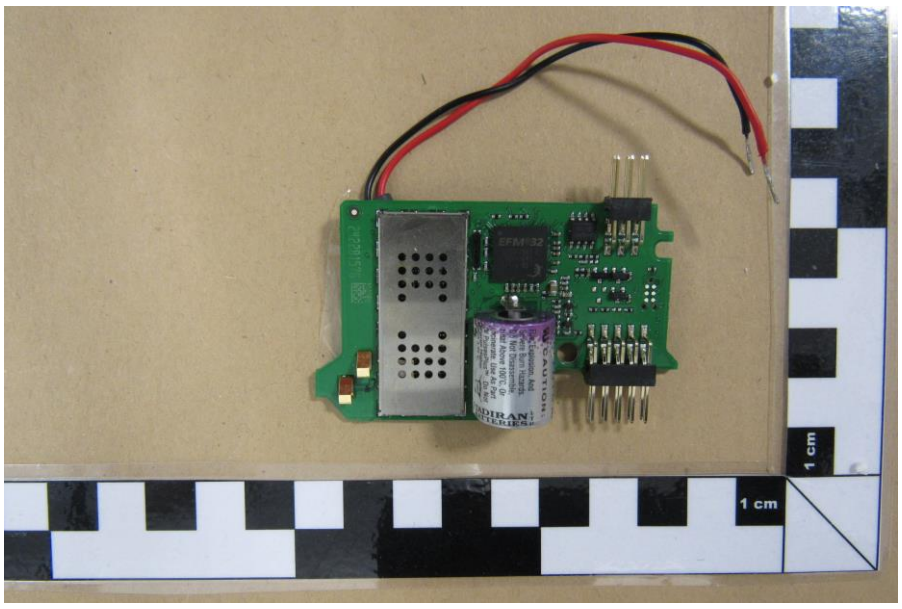
AE Optical Read Out Head Label View

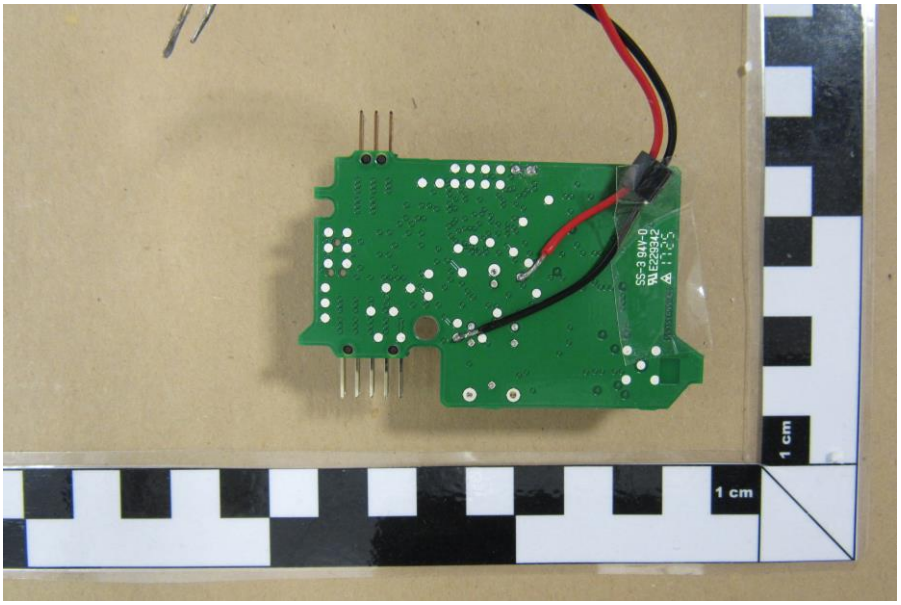

1.2 Photos – Equipment Internal

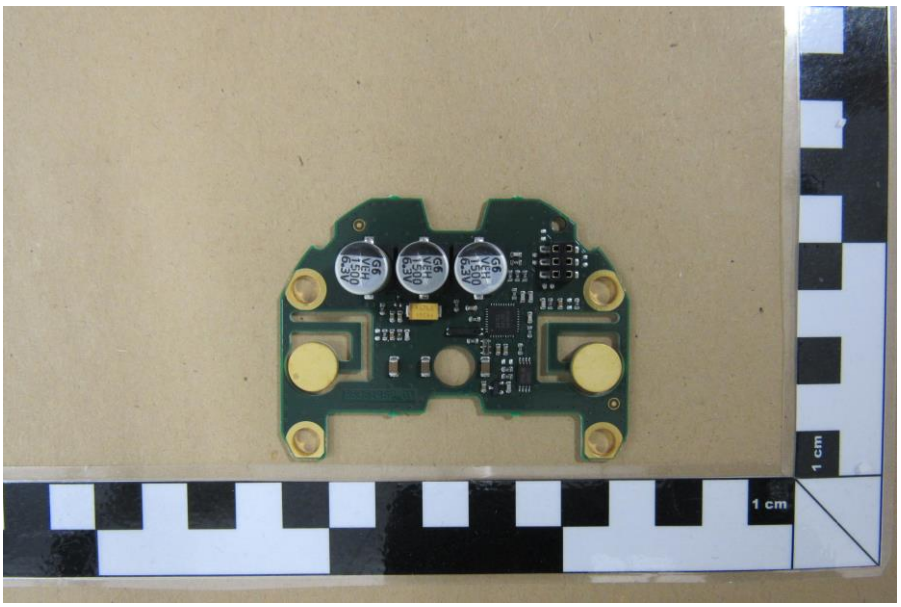
FlowIQ 2250


FlowIQ 2250


FlowIQ 2250


FlowIQ 2250 RF-PCB


FlowIQ 2250 RF PCB


FlowIQ 2250


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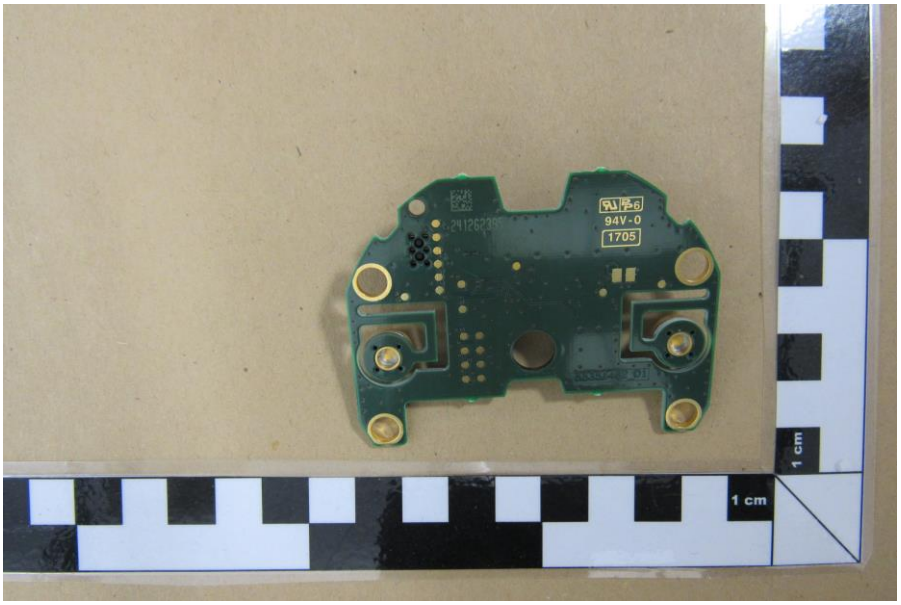
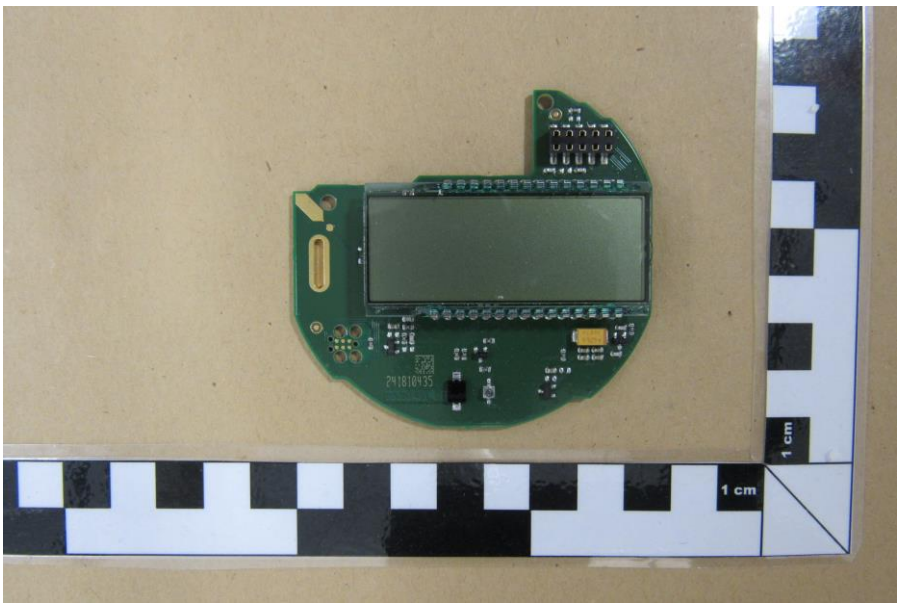
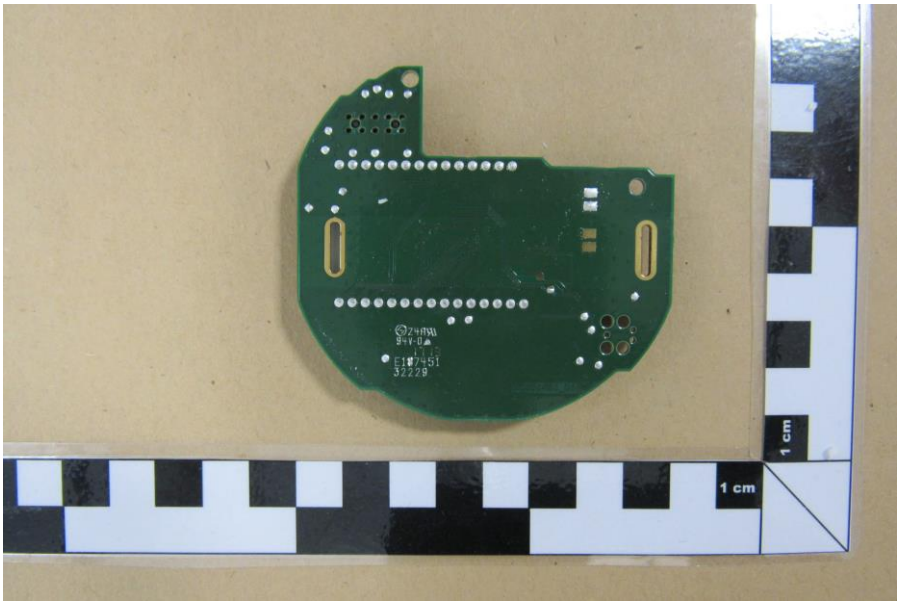


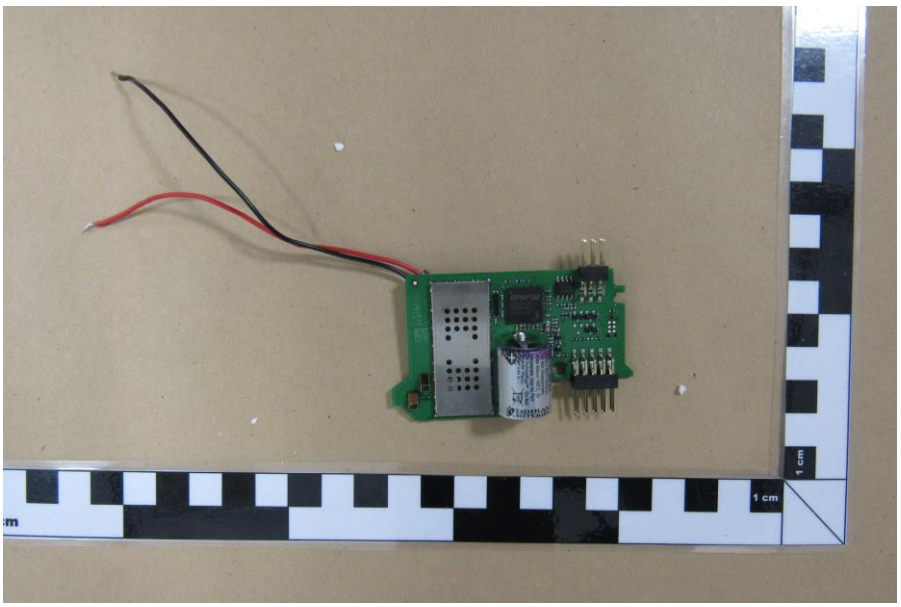
FlowIQ 2250


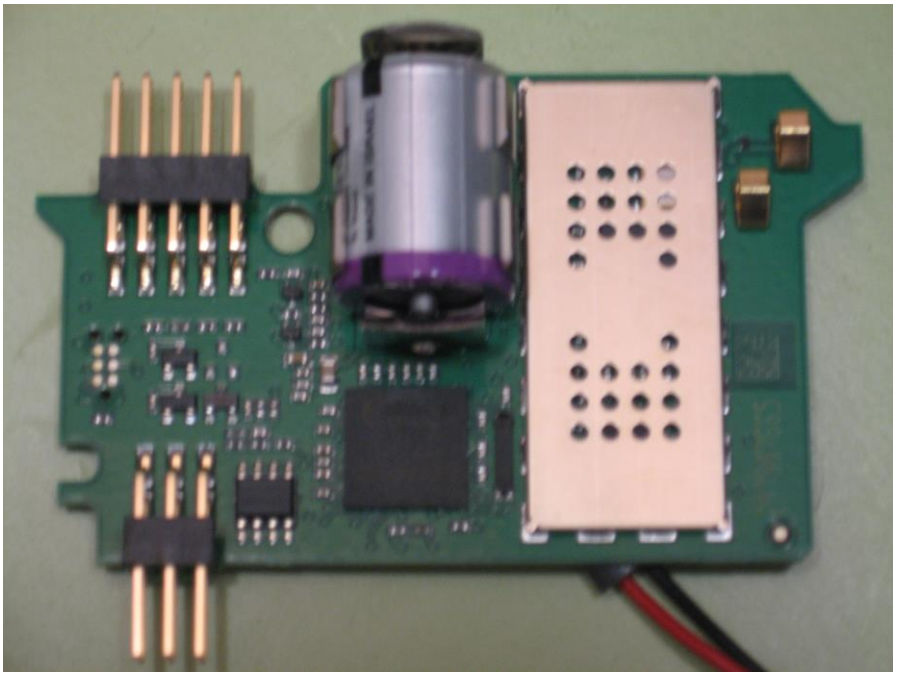
FlowIQ 2250

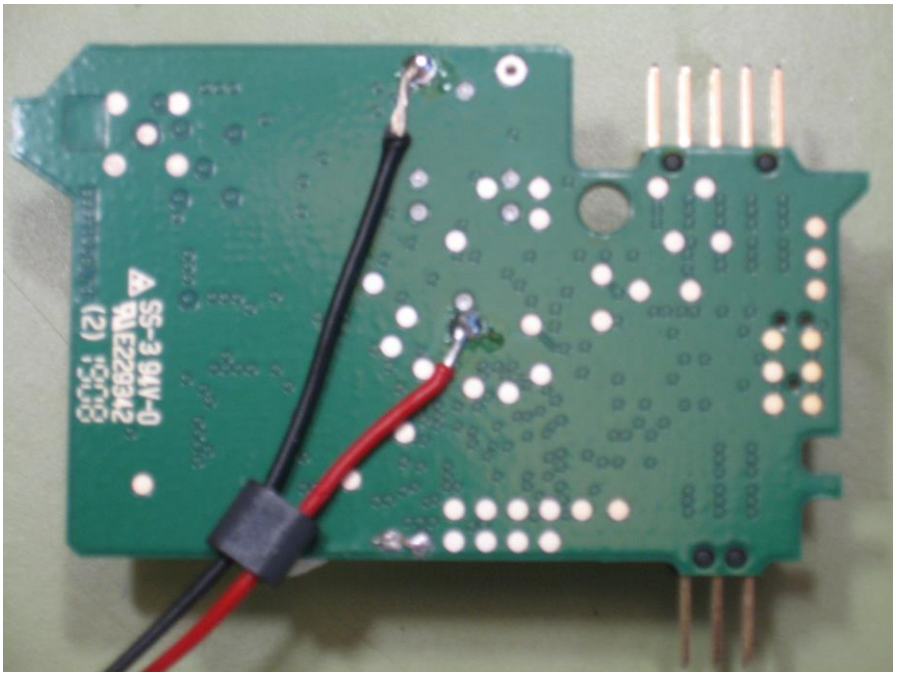


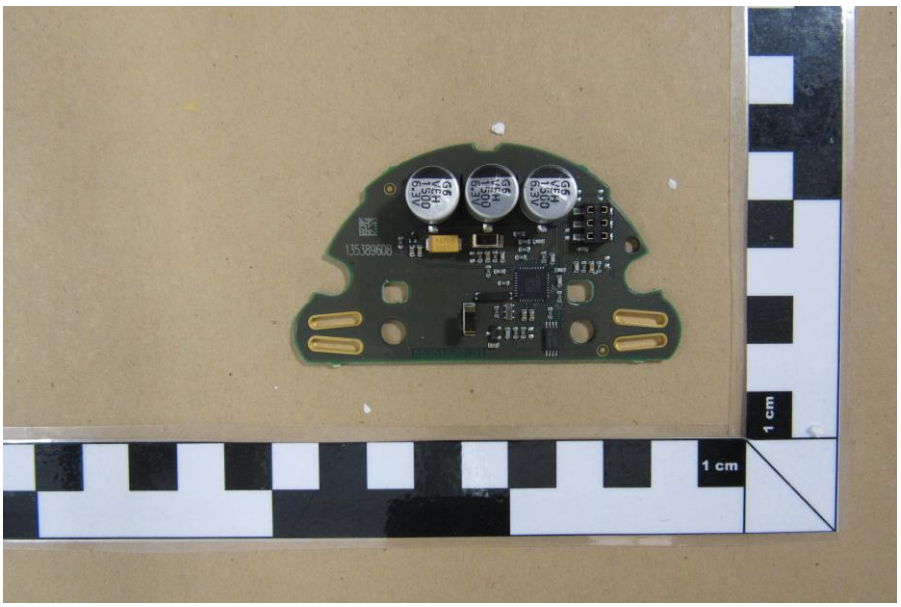
FlowIQ 3250

FlowIQ 3250


FlowIQ 3250 RF PCB


55501605revF1_Front


55501605revF1_Back


FlowIQ 3250


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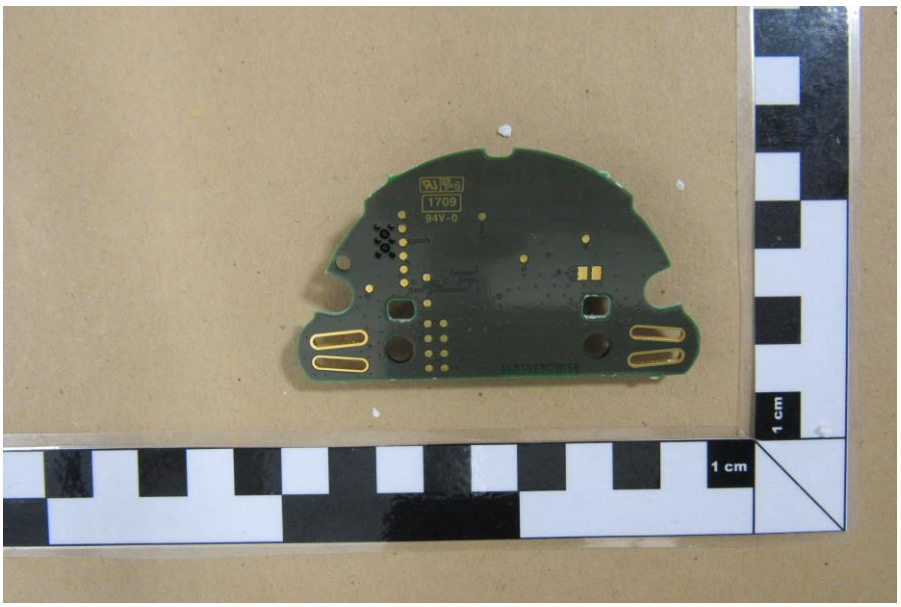
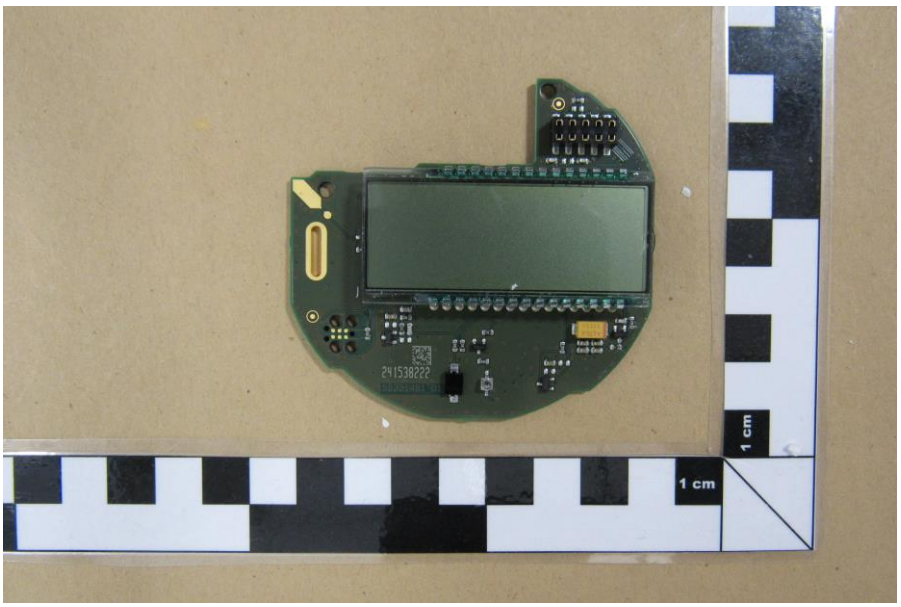
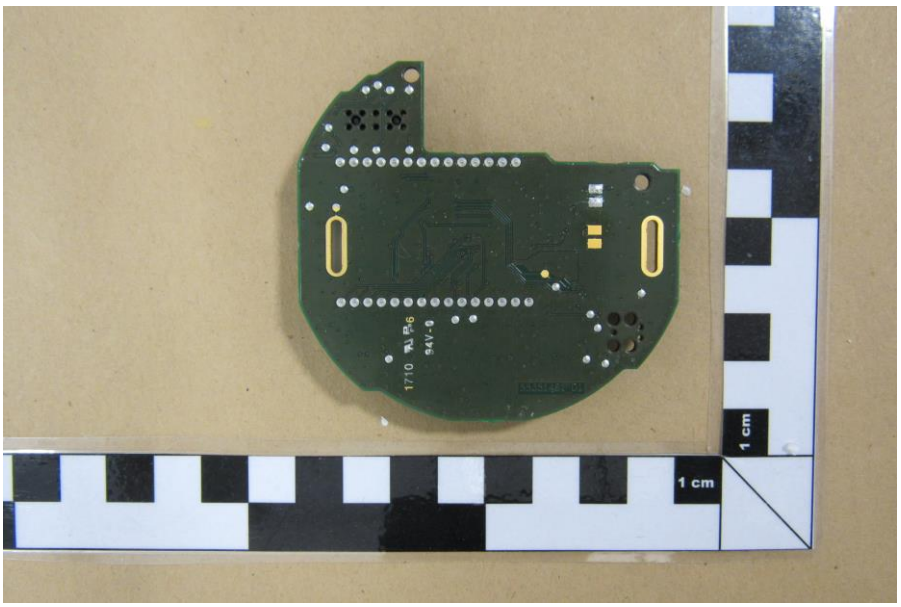
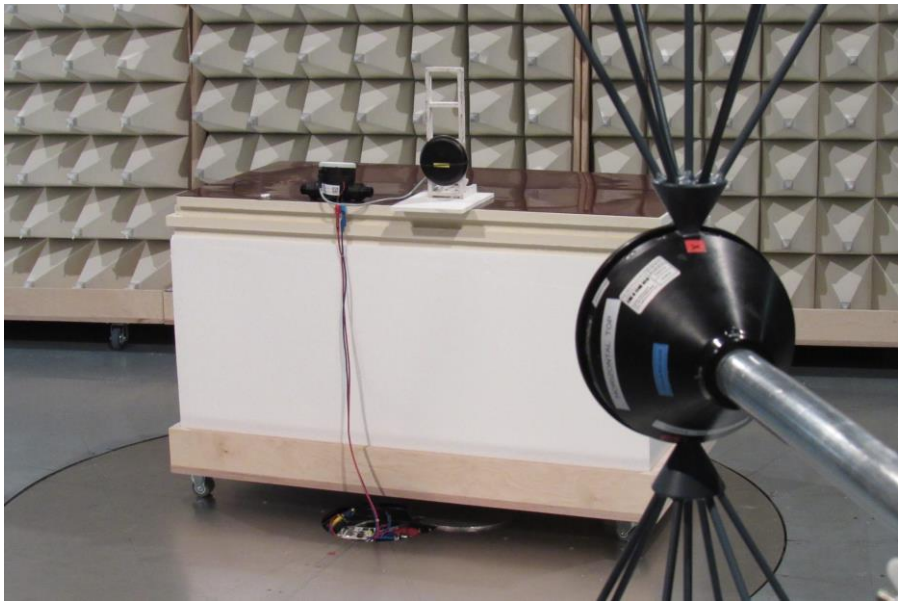
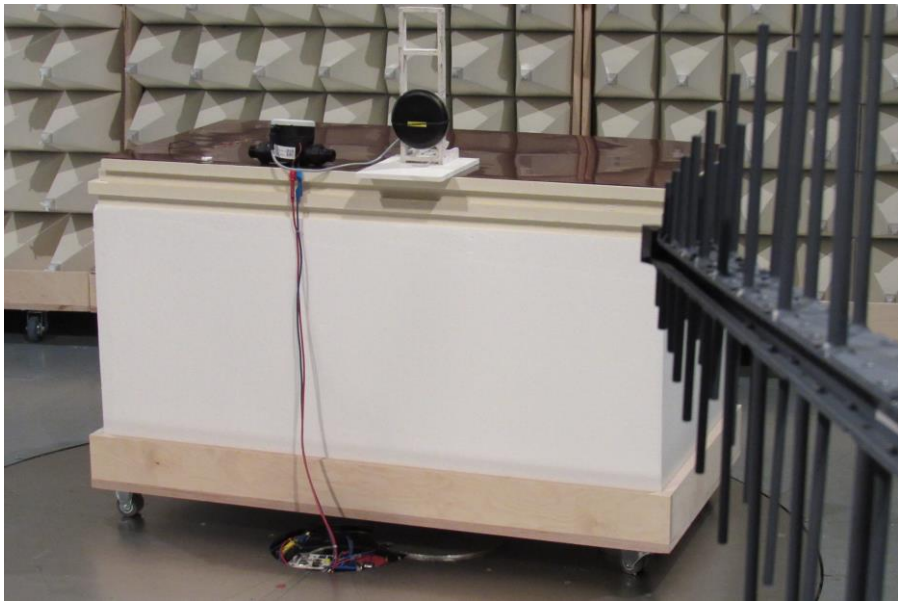


FlowIQ 3250


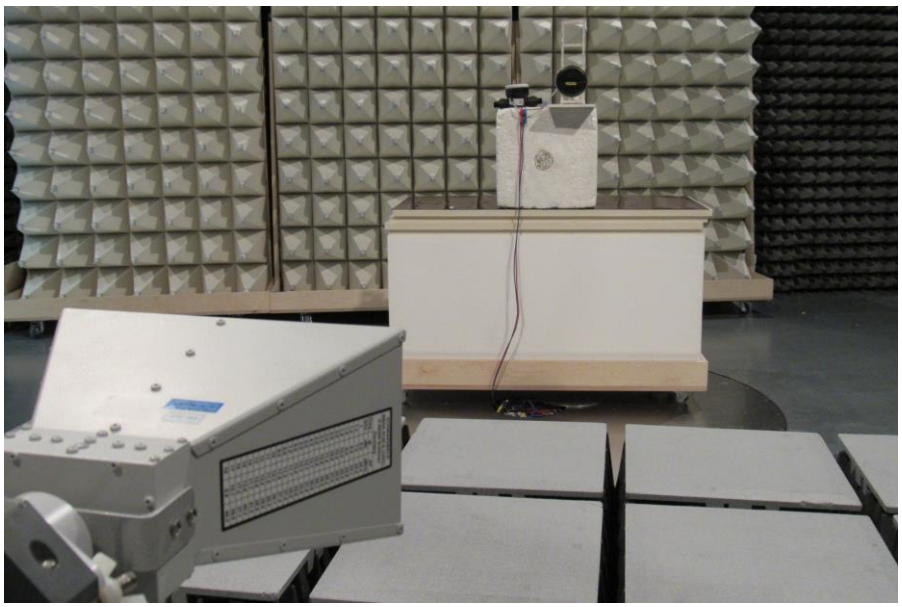
FlowIQ 3250


1.4 Photos – Test Setup

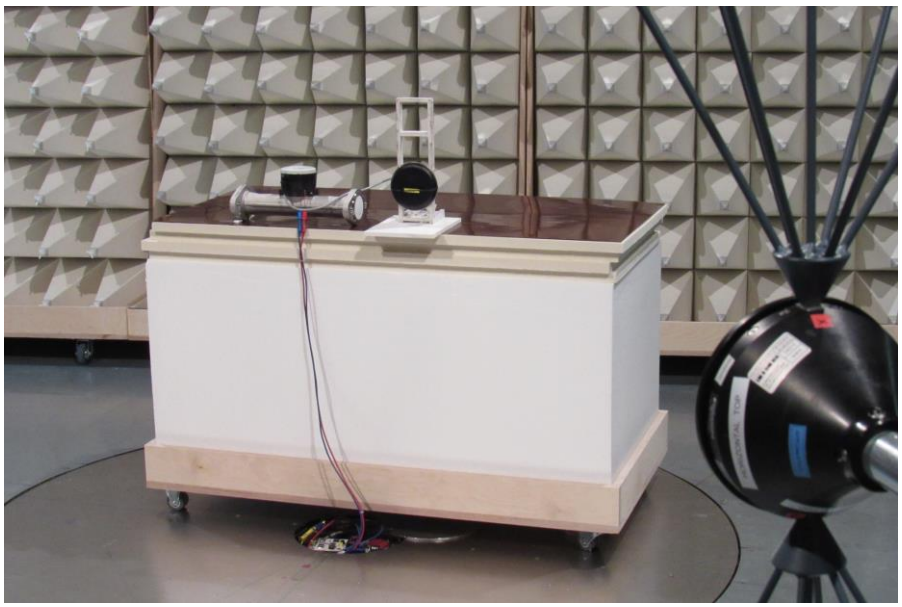
Setup 1 - Flow IQ 2250


Setup 2 - Flow IQ 2250


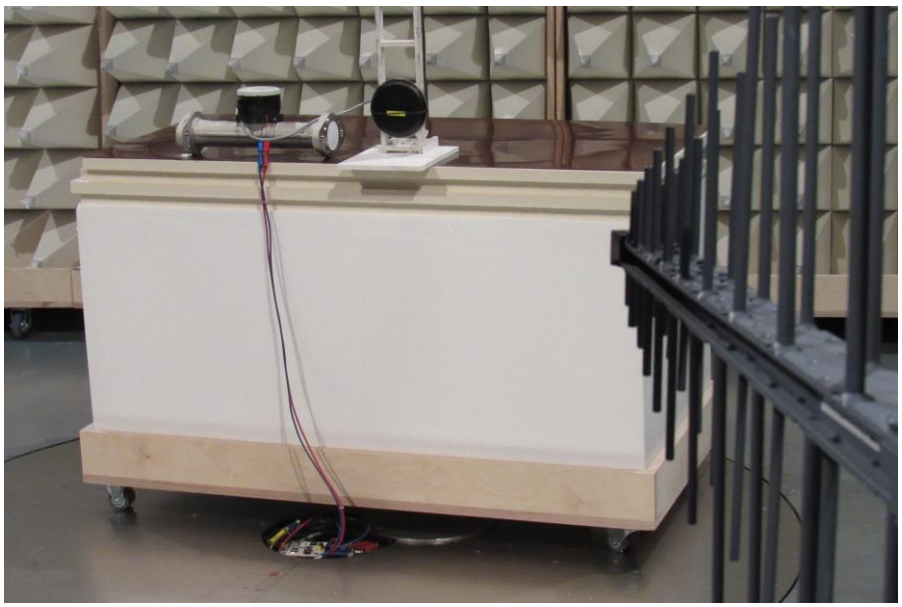
Setup 3 - Flow IQ 2250



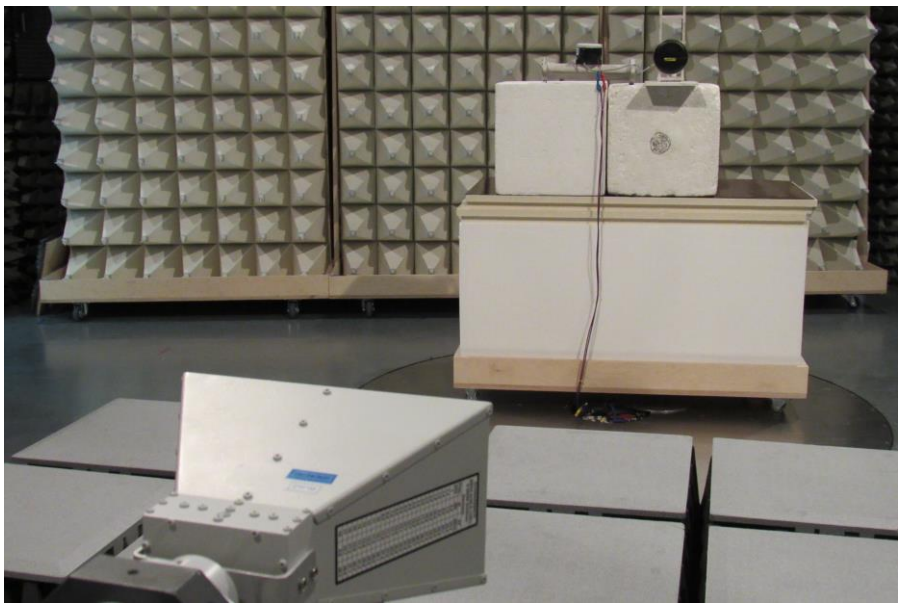
Setup 1 - Flow IQ 3250



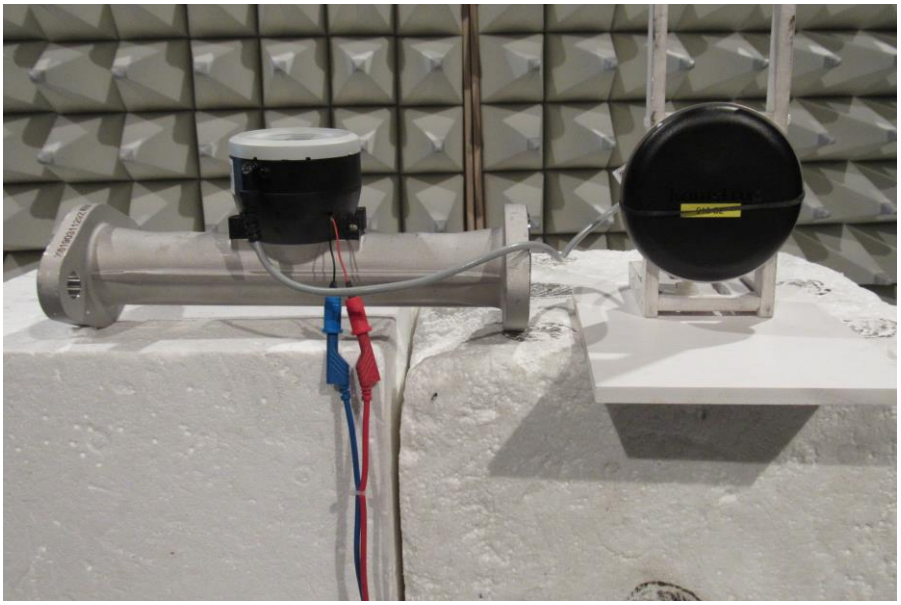
Setup 2 - Flow IQ 3250



Setup 3 - Flow IQ 3250



Setup Close EUT - Flow IQ 3250



1.5 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	Optical readout head	Kamstrup	6697916	Test mode settings
SFT	Device Control Tool	Kamstrup	deviceCtrlToolDemoPCB	For set the test parameters
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

1.6 Test mode duty cycle

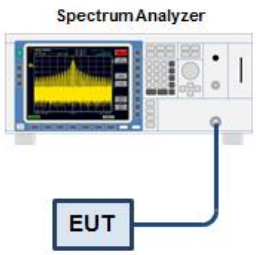
1.6.1 Information

Test Information	
Measurement Method	ANSI C63.10 11.6

1.6.2 Requirements

Requirements	
Duty cycle	Duty cycle correction
≥ 98 %	No correction required
< 98 %	Correction required (10 x Log_{10}(1/DC)

1.6.3 Setup

Test Setup


1.6.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01003	2019-07	2020-07

1.6.5 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 x Log_{10}(T_{ON} / (T_{ON} + T_{OFF}))

1.6.6 Results

Duty Cycle Results		
Mode	Duty Cycle	Correction Factor [dB]
Transmit	100%	0

1.7 Test Modes

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

1.8 Test Frequencies

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

1.9 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:

Reading on Analyzer (dBµV) + A.F. (dB/m) = Net field strength (dBµV/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:

Limit (dBµV/m) = 20*log (µV/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/T	
FCC § 15.247(a)(2) ISED RSS-247, Issue 2 (section 5.2)	6 dB Bandwidth	ANSI C63.10-2013	N/T	
FCC § 15.247(b)(1) ISED RSS-247, Issue 2 (section 5.4)	Maximum peak conducted power	ANSI C63.10-2013	N/T	
FCC § 15.247(e) ISED RSS-247, Issue 2 (section 5.2)	Power spectral density	ANSI C63.10-2013	N/T	
FCC § 15.207 ISED RSS-247, Issue 2 (section 3.1)	AC power line conducted emissions	ANSI C63.10-2013	N/T	
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Band edge compliance	ANSI C63.10-2013	N/T	
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Conducted spurious emissions	ANSI C63.10-2013	N/T	
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	N/T	
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 - Transmitter radiated emissions

3.1.1 Information

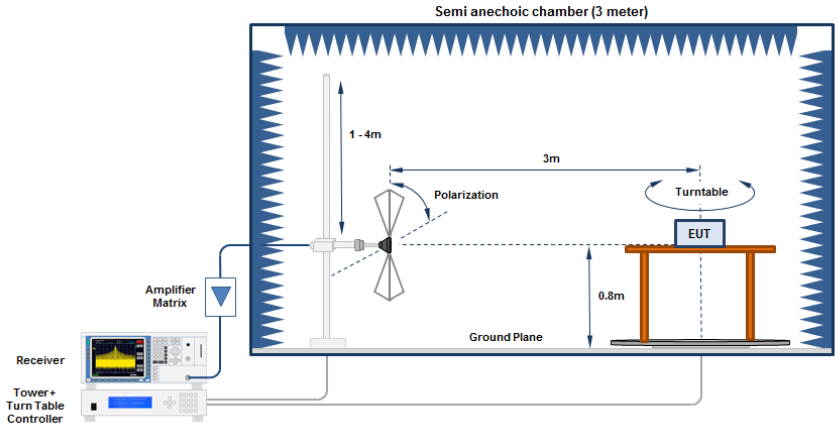
Test Information	
Reference	FCC § 15.247(d); FCC § 15.209; ISED RSS-Gen, Issue 5 (section 6.13)
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6, 11.12
Operator	Wilfried Treffke
Date	2020-04-20 – 2020-04-23

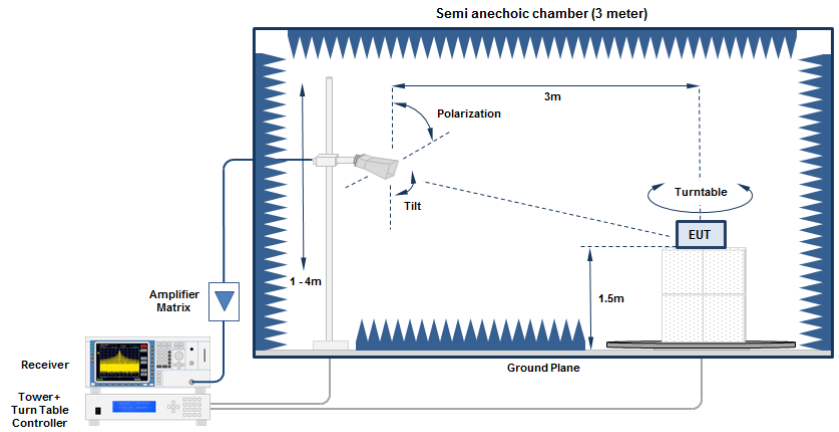
3.1.2 Limits

Limits			
Frequency [MHz]	Detector	Field strength [µV/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

3.1.3 Setup

Test Setup 30 - 1000 MHz



Test Setup > 1 GHz


3.1.4 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
Measurement Receiver	R&S	ESU 26	EF00887	2019-07	2020-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2019-09	2020-09
Antenna	R&S	HK 116	EF00030	2019-04	2022-04
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
Measurement Receiver	R&S	ESU 26	EF00887	2019-07	2020-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2019-09	2020-09
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2019-10	2022-10
Antenna	Amplifier Research	AT4560	EF00302	2019-05	2020-05

3.1.5 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

3.1.6 Results

Test Results - FlowIQ 2250						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
912.5	1009	51.06	pk	hor	74.00	-22.94
912.5	1009	39.90	RMS	hor	54.00	-14.10
912.5	1009	44.20	pk	ver	74.00	-29.80
912.5	1009	32.94	RMS	ver	54.00	-21.06
912.5	2738	40.61	pk	hor	74.00	-33.39
912.5	2738	35.87	RMS	hor	54.00	-18.13
912.5	2738	33.45	pk	ver	74.00	-40.55
912.5	2738	26.42	RMS	ver	54.00	-27.58
918.5	1006	48.17	pk	hor	74.00	-25.83
918.5	1006	36.43	RMS	hor	54.00	-17.57
918.5	1025	44.39	pk	ver	74.00	-29.61
918.5	1025	33.46	RMS	ver	54.00	-20.54
918.5	2756	42.03	pk	hor	74.00	-31.97
918.5	2756	37.67	RMS	hor	54.00	-16.33

Test Results - FlowIQ 3250						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
912.5	1008	51.58	pk	hor	74.00	-22.42
912.5	1008	40.26	RMS	hor	54.00	-13.74
912.5	1074	44.33	pk	ver	74.00	-29.67
912.5	1074	32.88	RMS	ver	54.00	-21.12
912.5	2737	43.48	pk	hor	74.00	-30.52
912.5	2737	39.47	RMS	hor	54.00	-14.53
912.5	2737	38.50	pk	ver	74.00	-35.50
912.5	2737	33.25	RMS	ver	54.00	-20.75
918.5	1006	51.22	pk	hor	74.00	-22.78
918.5	1006	39.58	RMS	hor	54.00	-14.42
918.5	2756	43.24	pk	hor	74.00	-30.76
918.5	2756	39.12	RMS	hor	54.00	-14.88

ANNEX A Transmitter spurious emissions - FlowIQ 2250

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-21
Note:	

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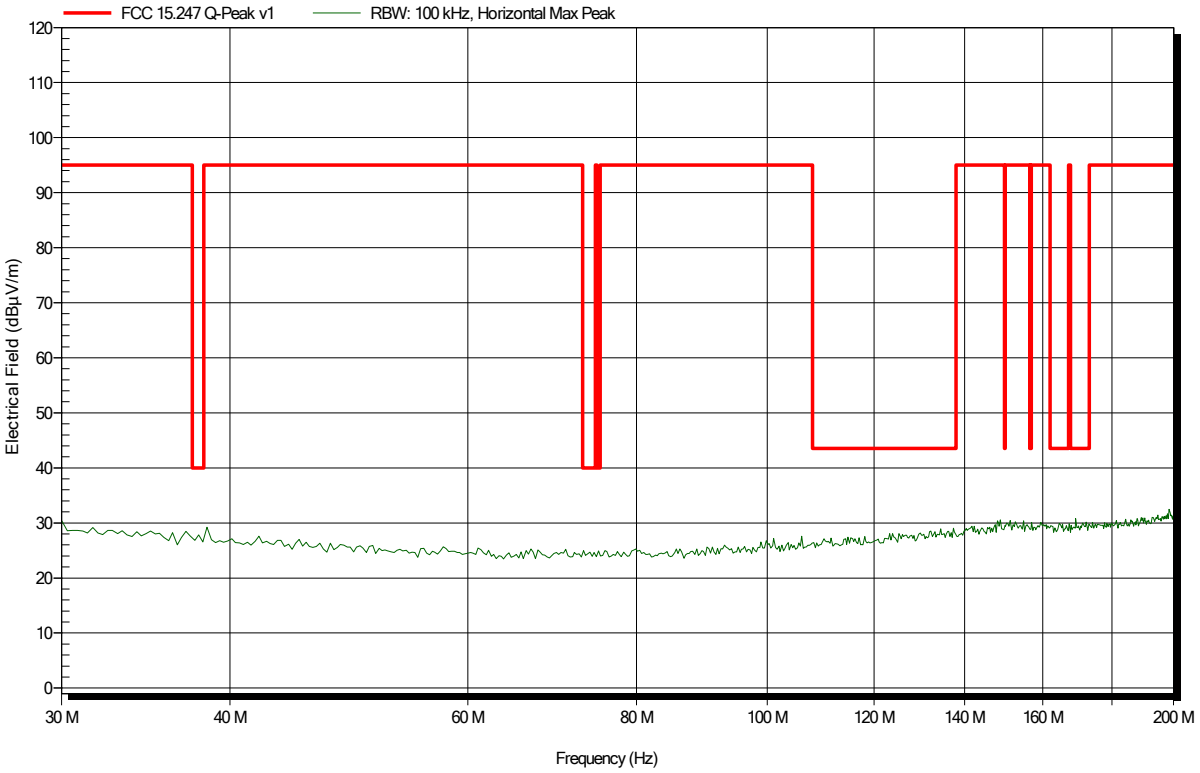

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-21
Note:	

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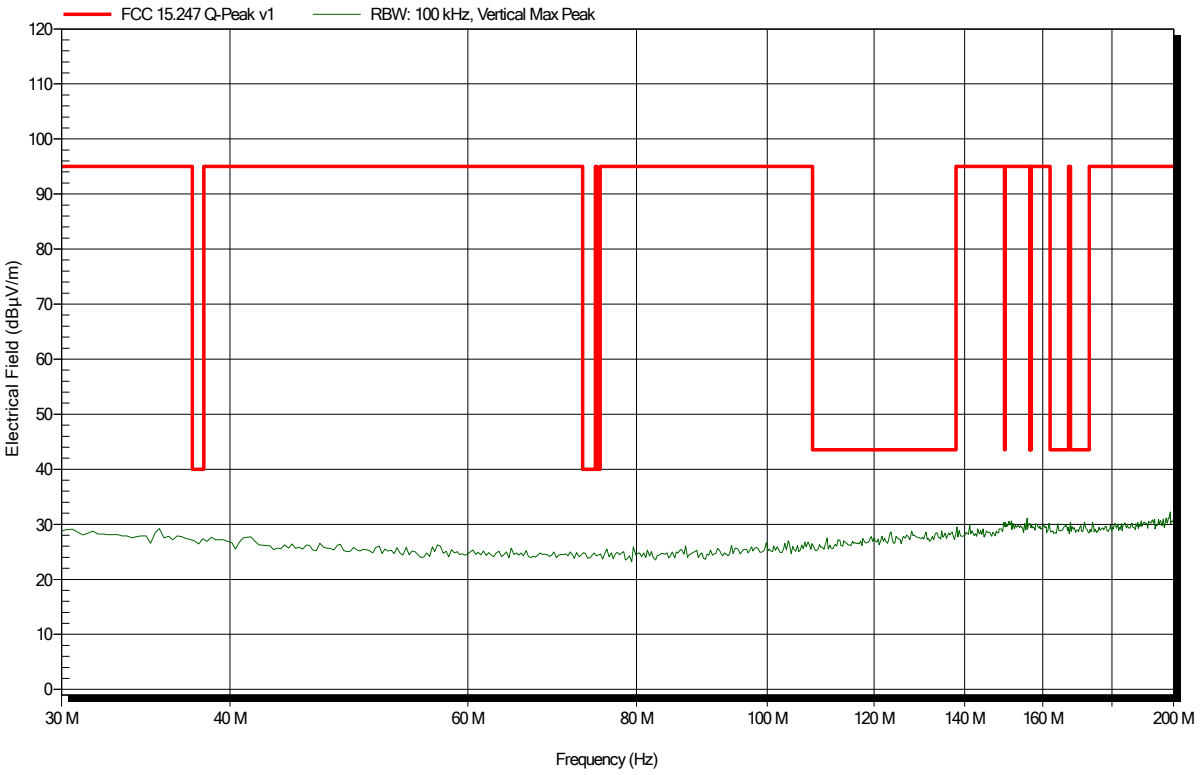

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-22
Note:	

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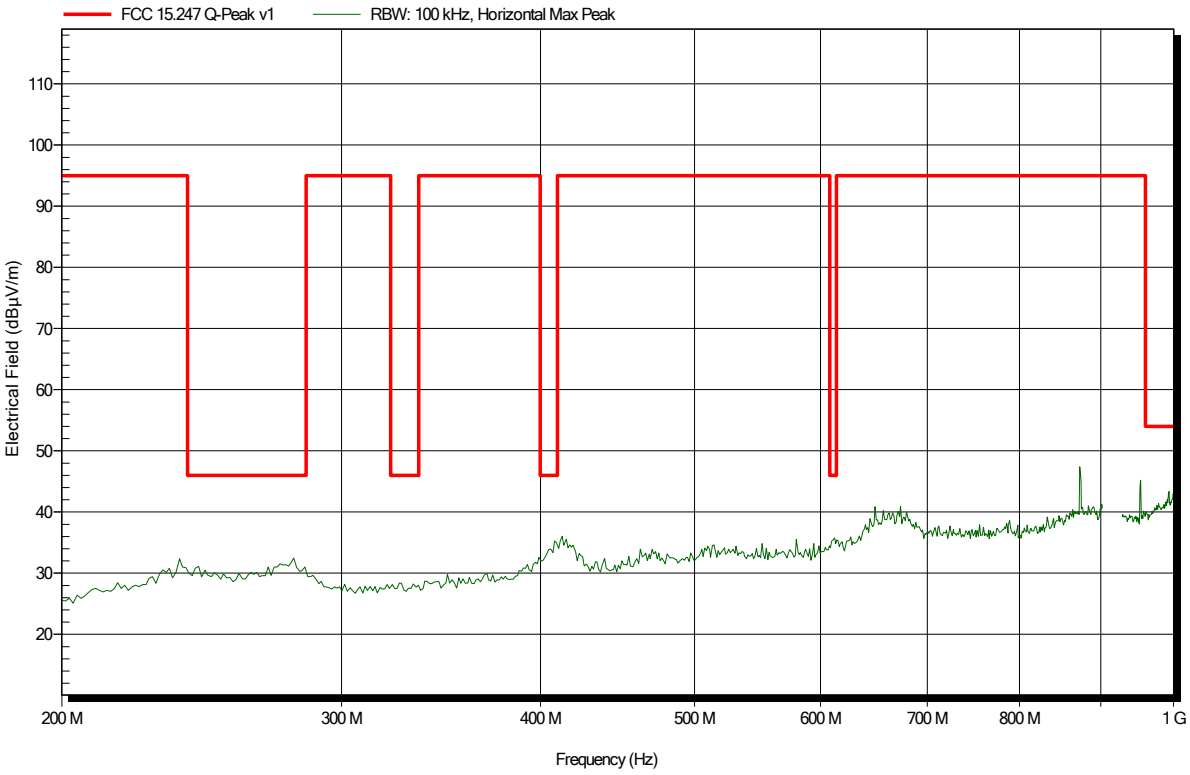

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-22
Note:	

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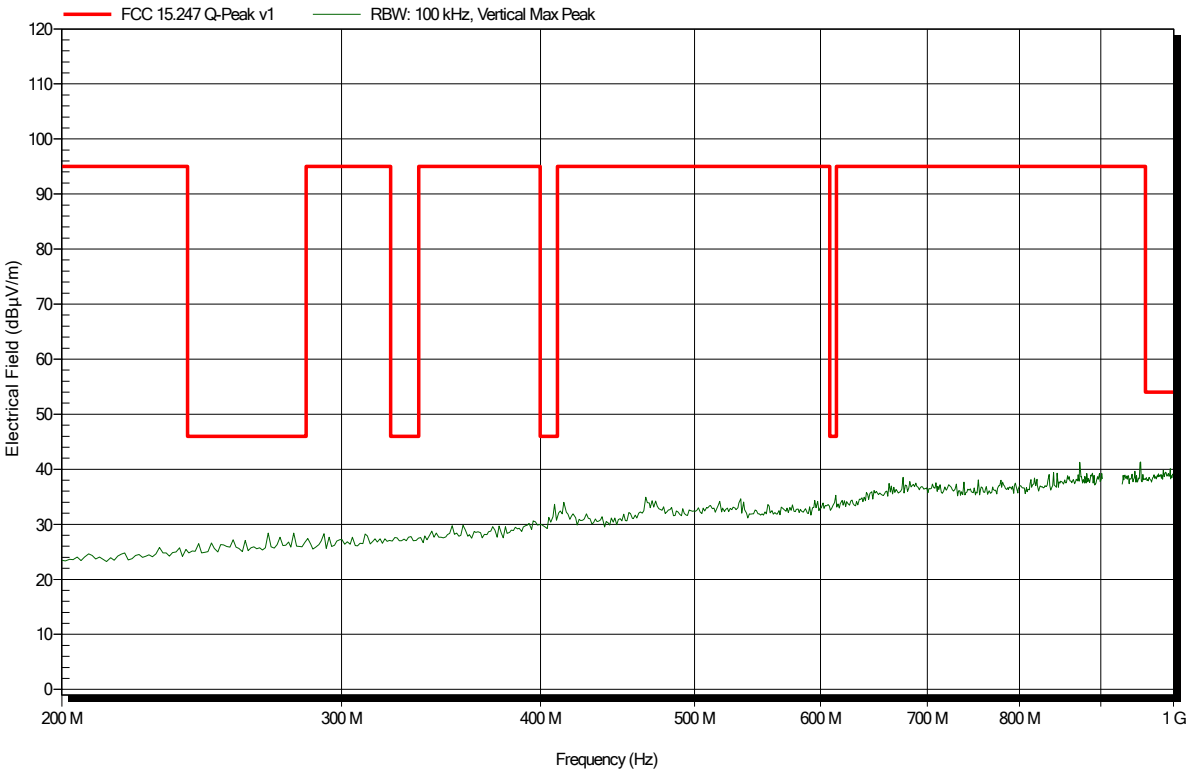
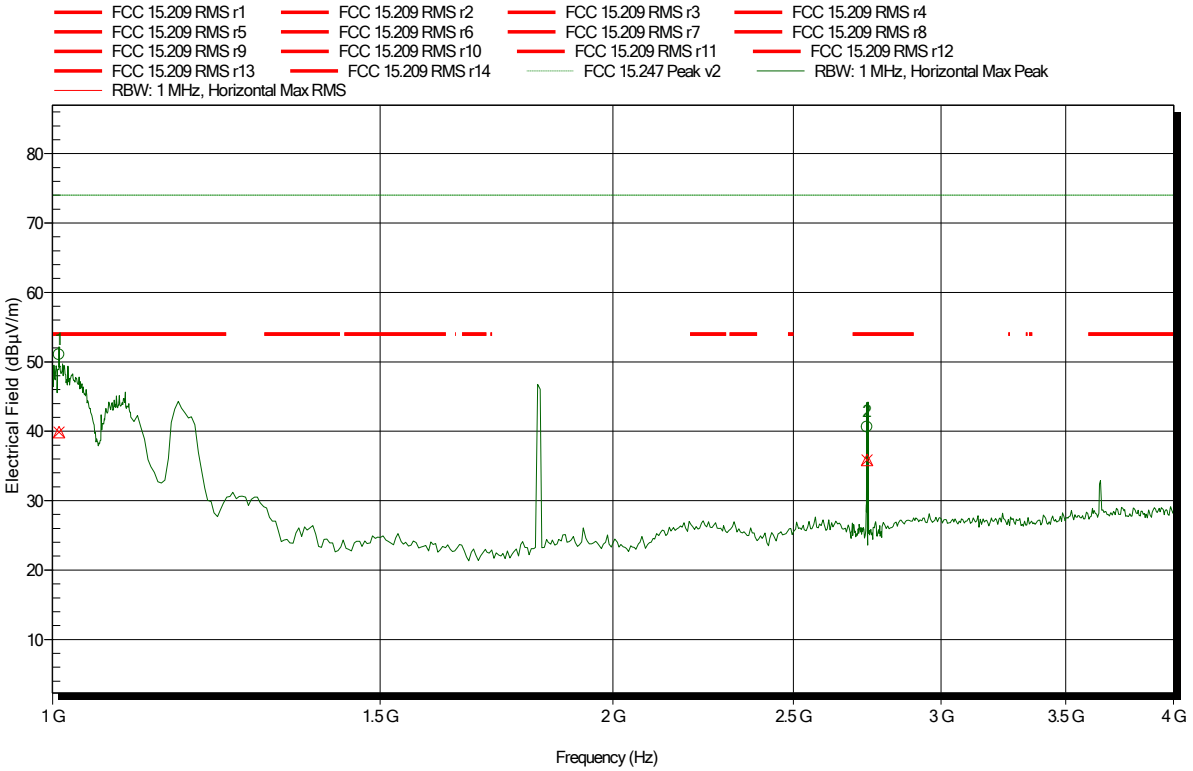


Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-21
Note:	

Index 1



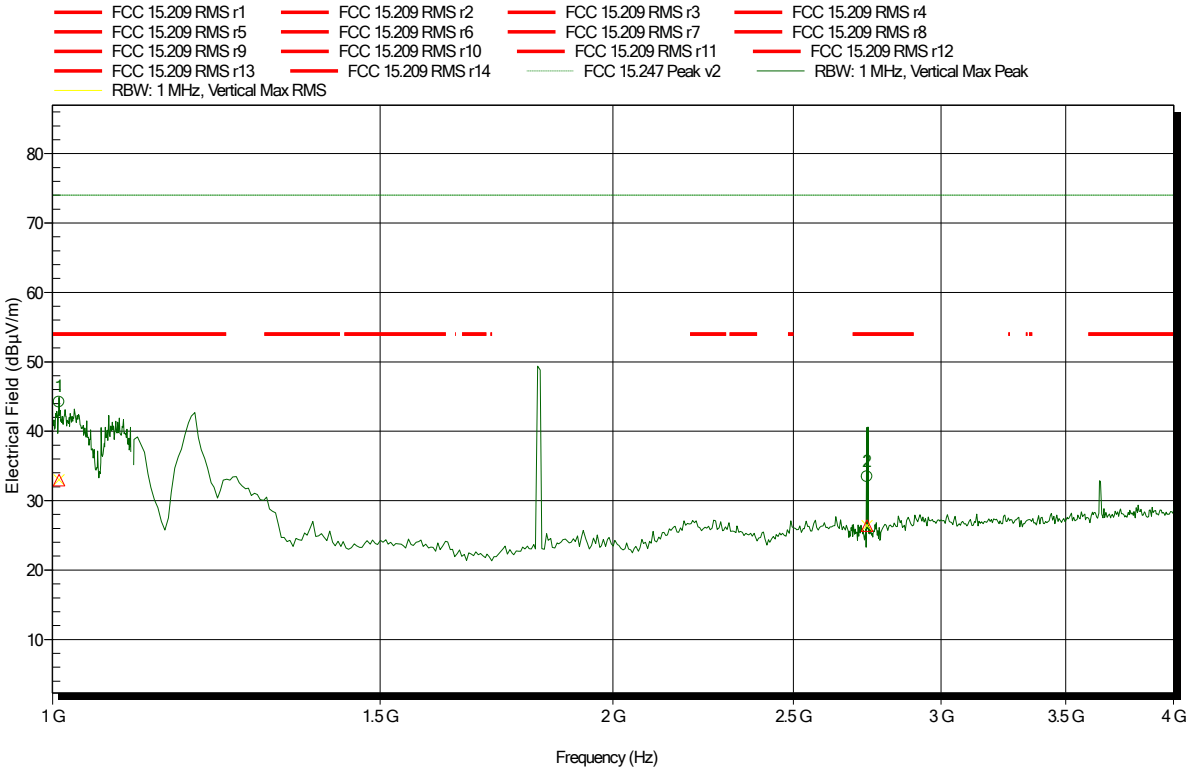
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.009 GHz	51.06 dBµV/m	74 dBµV/m	-22.94 dB	Pass
2.738 GHz	40.61 dBµV/m	74 dBµV/m	-33.39 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
1.009 GHz	39.9 dBµV/m	54 dBµV/m	-14.1 dB	Pass
2.738 GHz	35.87 dBµV/m	54 dBµV/m	-18.13 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-21
Note:	

Index 4



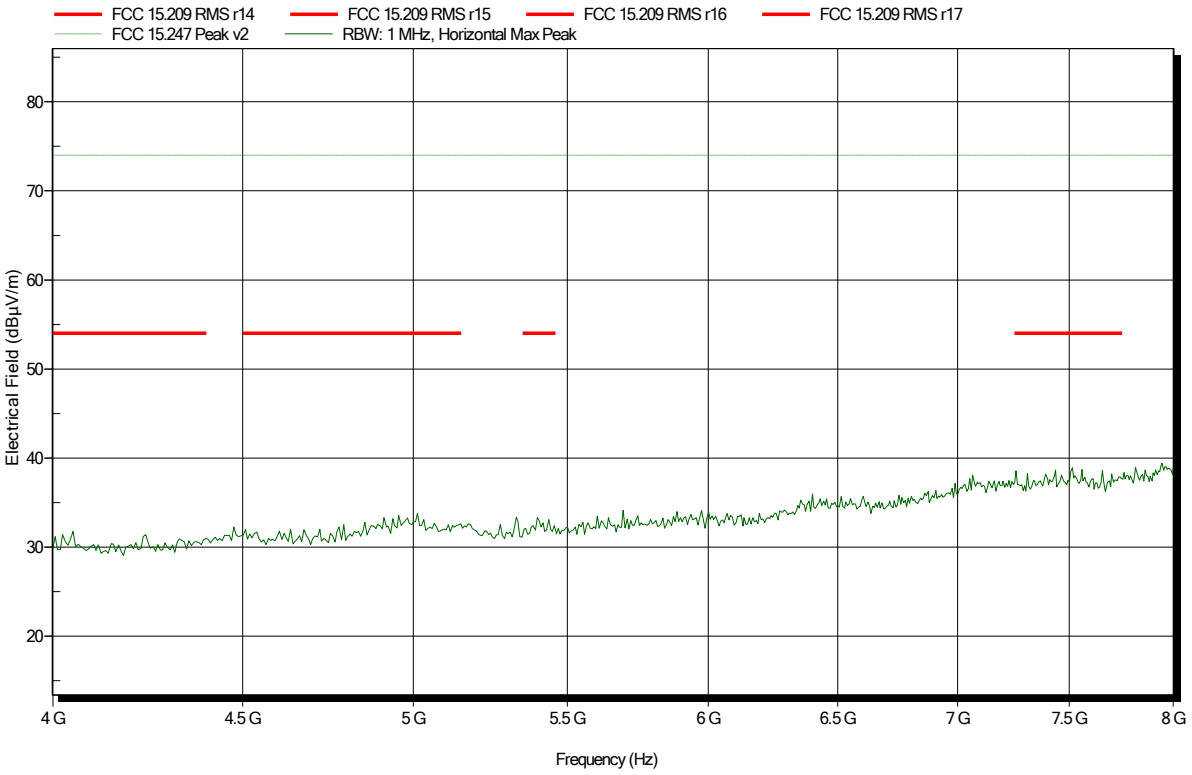
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.009 GHz	44.2 dBµV/m	74 dBµV/m	-29.8 dB	Pass
2.738 GHz	33.45 dBµV/m	74 dBµV/m	-40.55 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
1.009 GHz	32.94 dBµV/m	54 dBµV/m	-21.06 dB	Pass
2.738 GHz	26.42 dBµV/m	54 dBµV/m	-27.58 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-21
Note:	

Index 2



Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2016.1.10
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-21
Note:	

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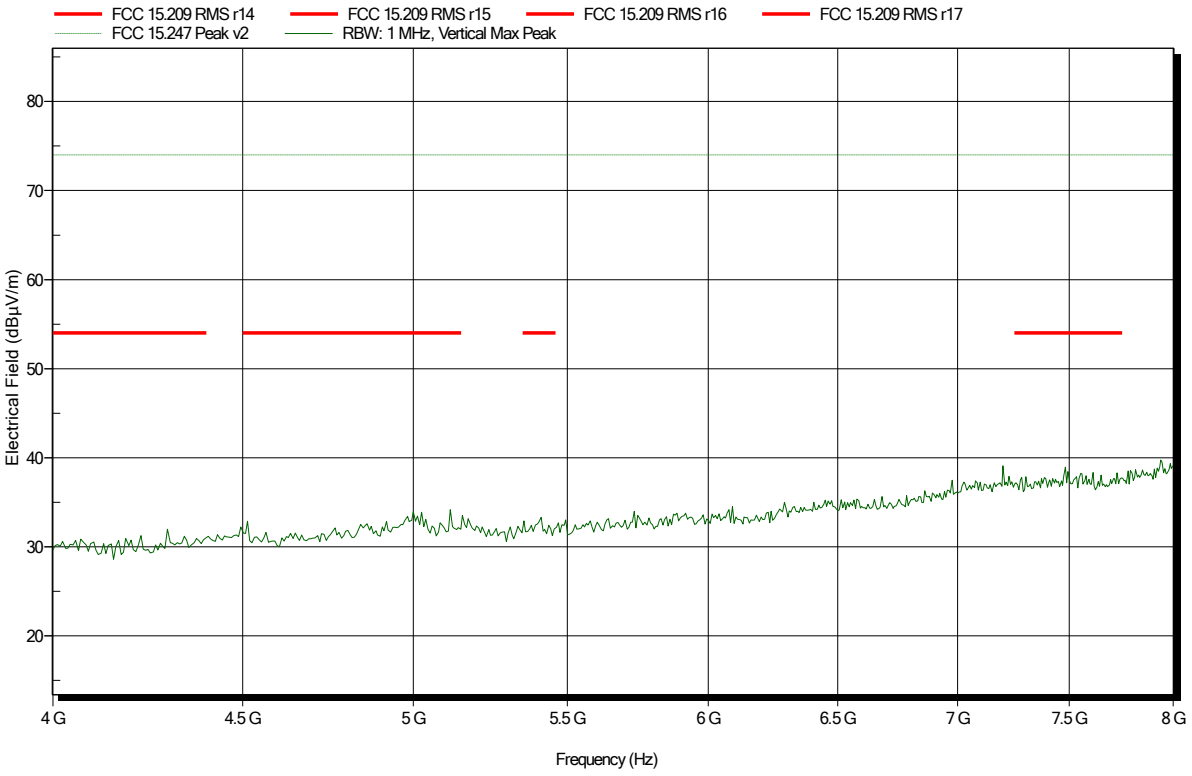

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-21
Note:	

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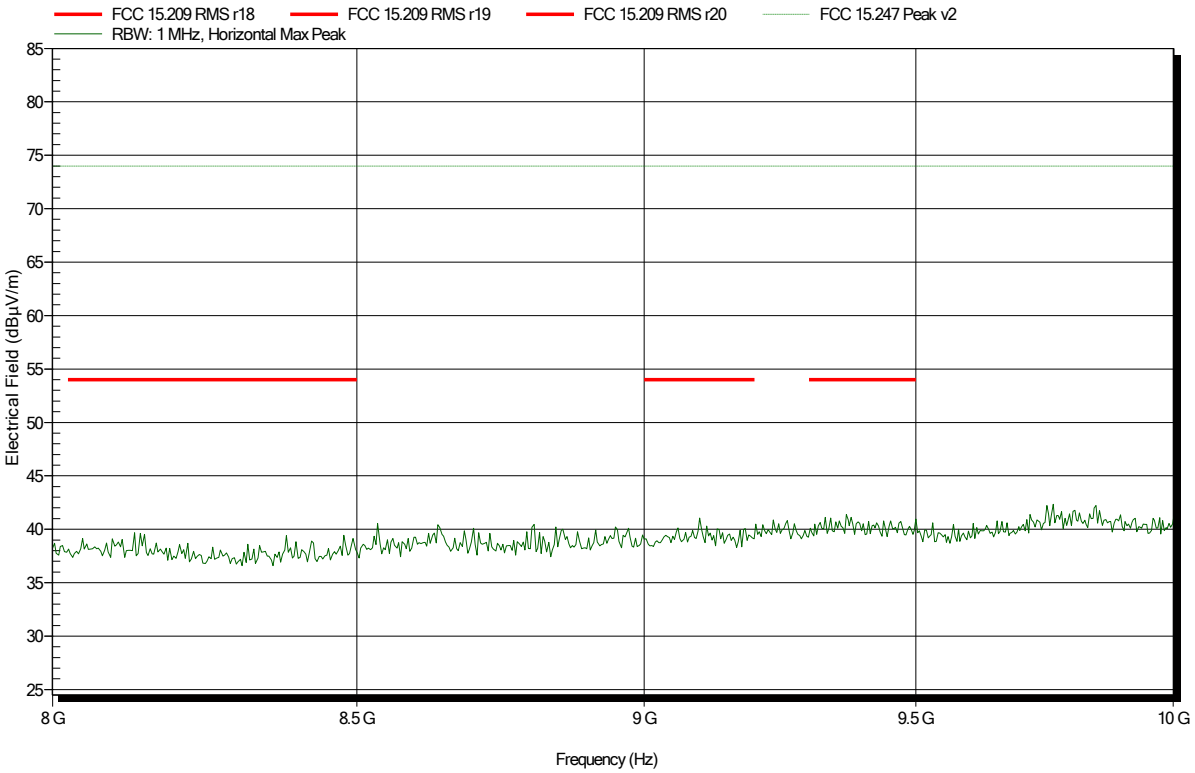

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-21
Note:	

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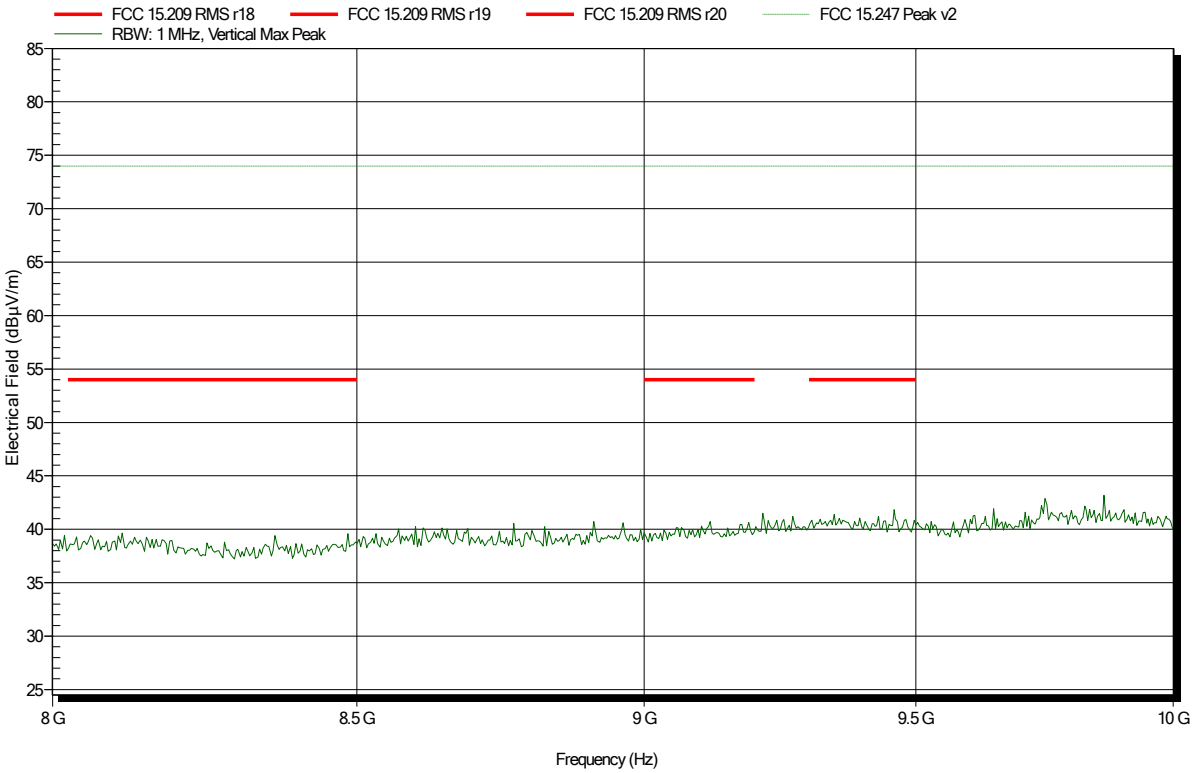

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-21
Note:	

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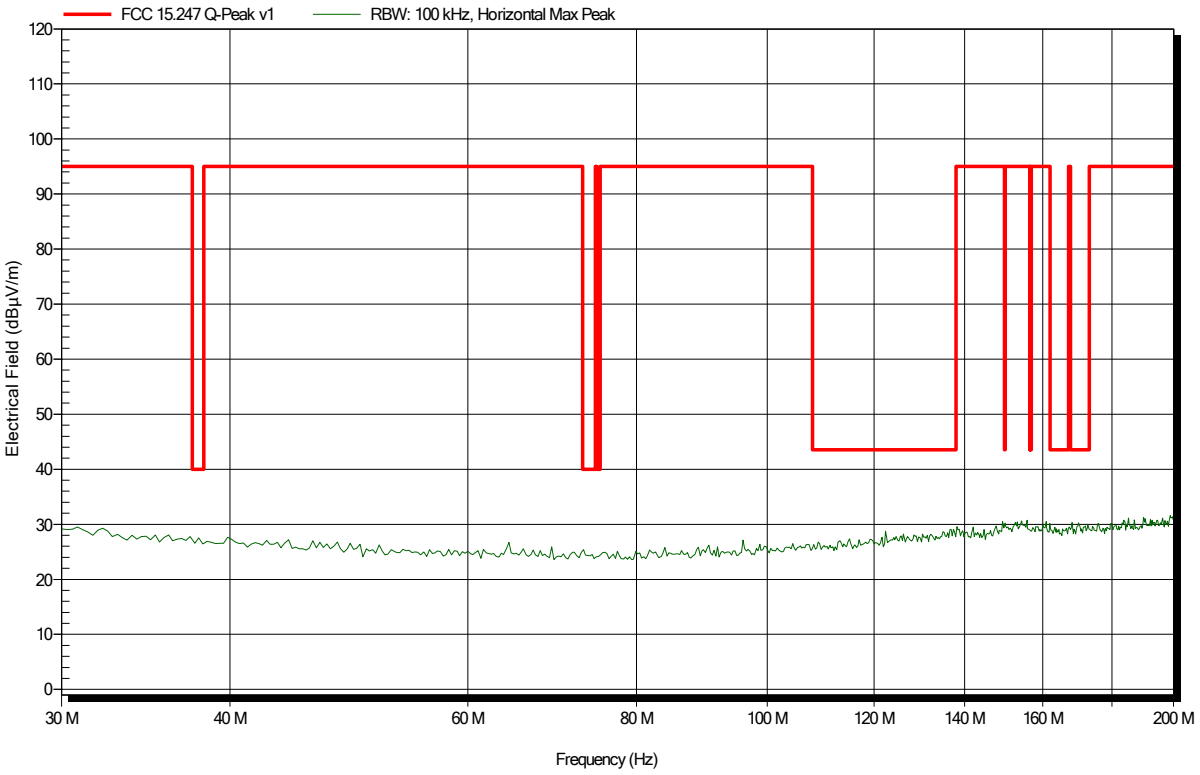

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-21
Note:	

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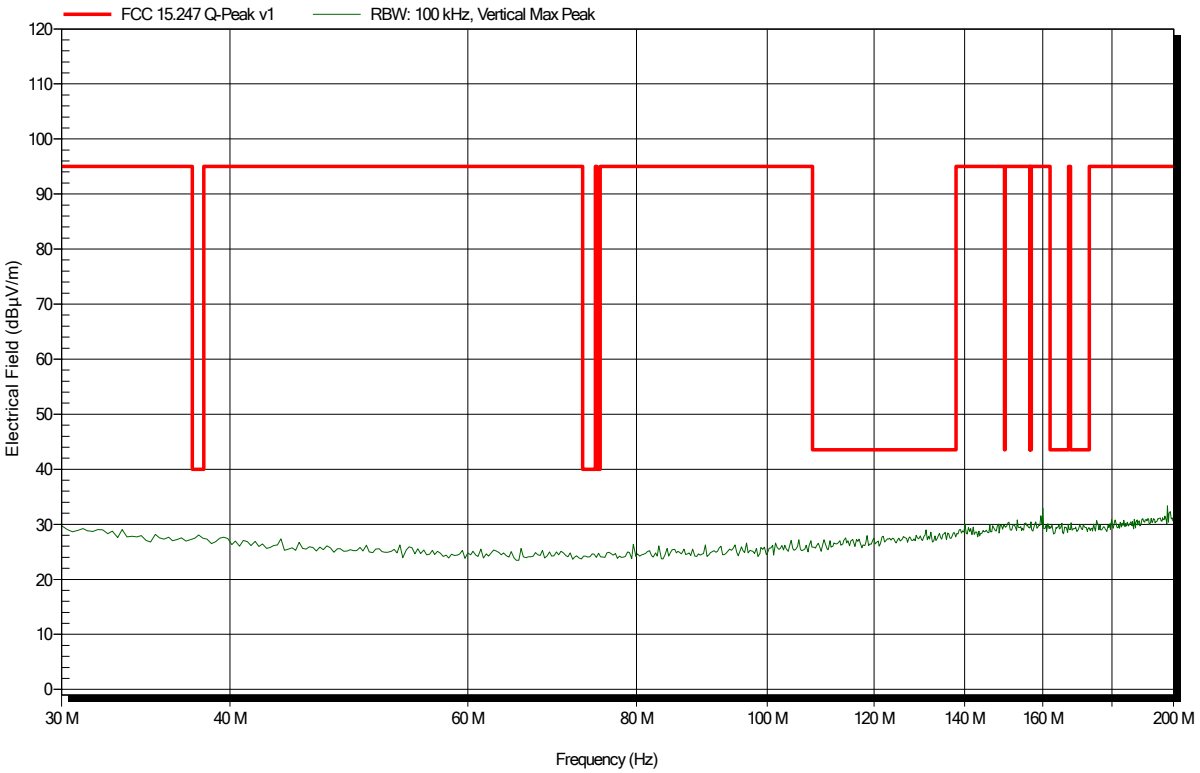

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-22
Note:	

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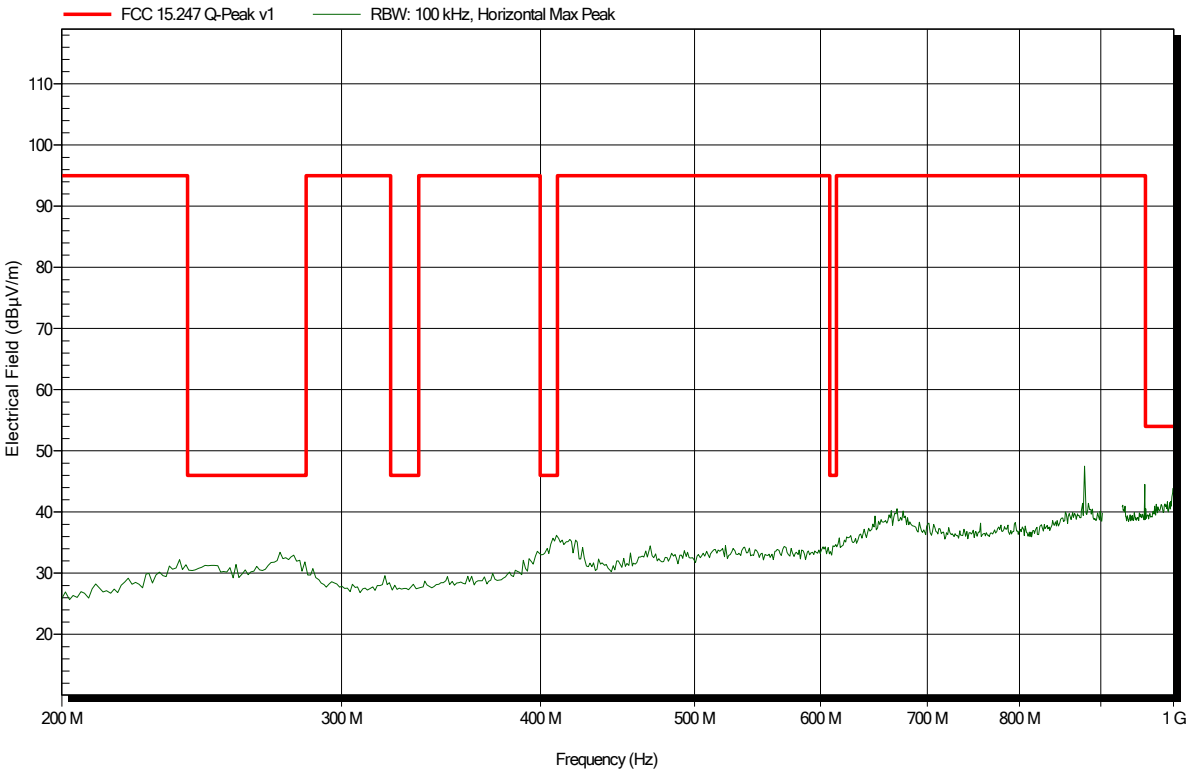

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-22
Note:	

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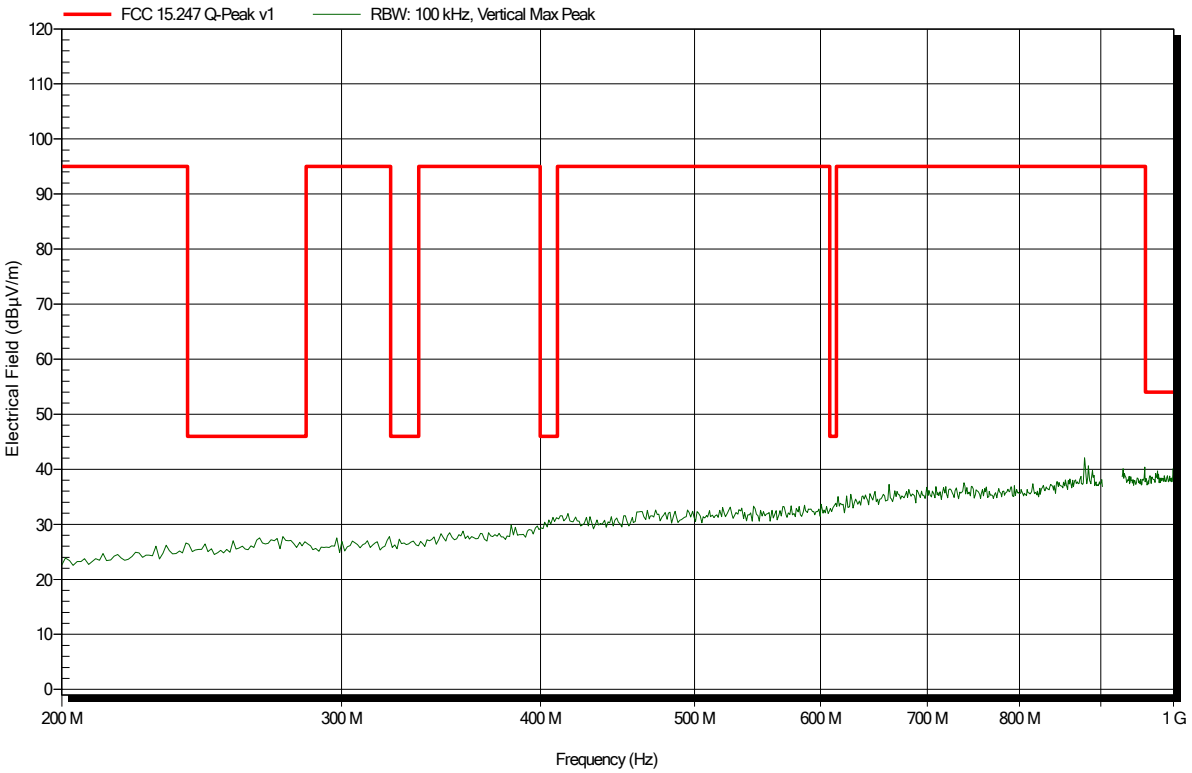

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-21
Note:	

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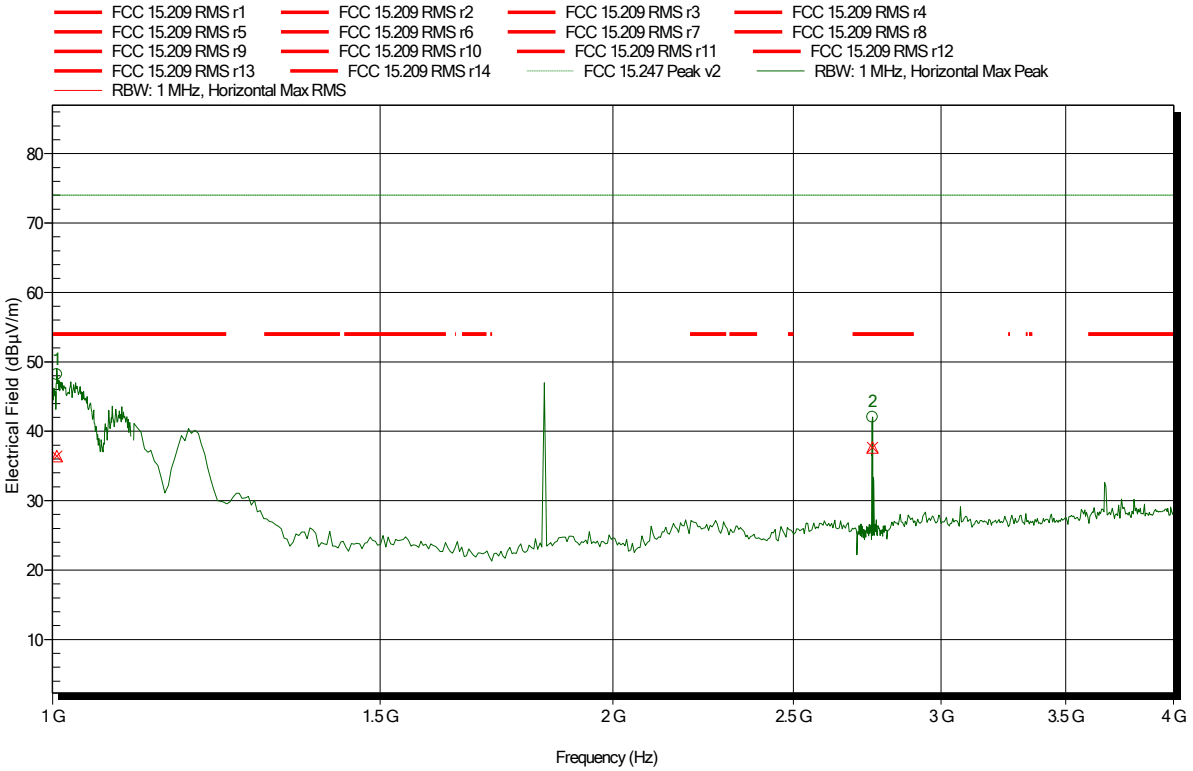

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.006 GHz	48.17 dBµV/m	74 dBµV/m	-25.83 dB	Pass
2.756 GHz	42.03 dBµV/m	74 dBµV/m	-31.97 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
1.006 GHz	36.43 dBµV/m	54 dBµV/m	-17.57 dB	Pass
2.756 GHz	37.67 dBµV/m	54 dBµV/m	-16.33 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-21
Note:	

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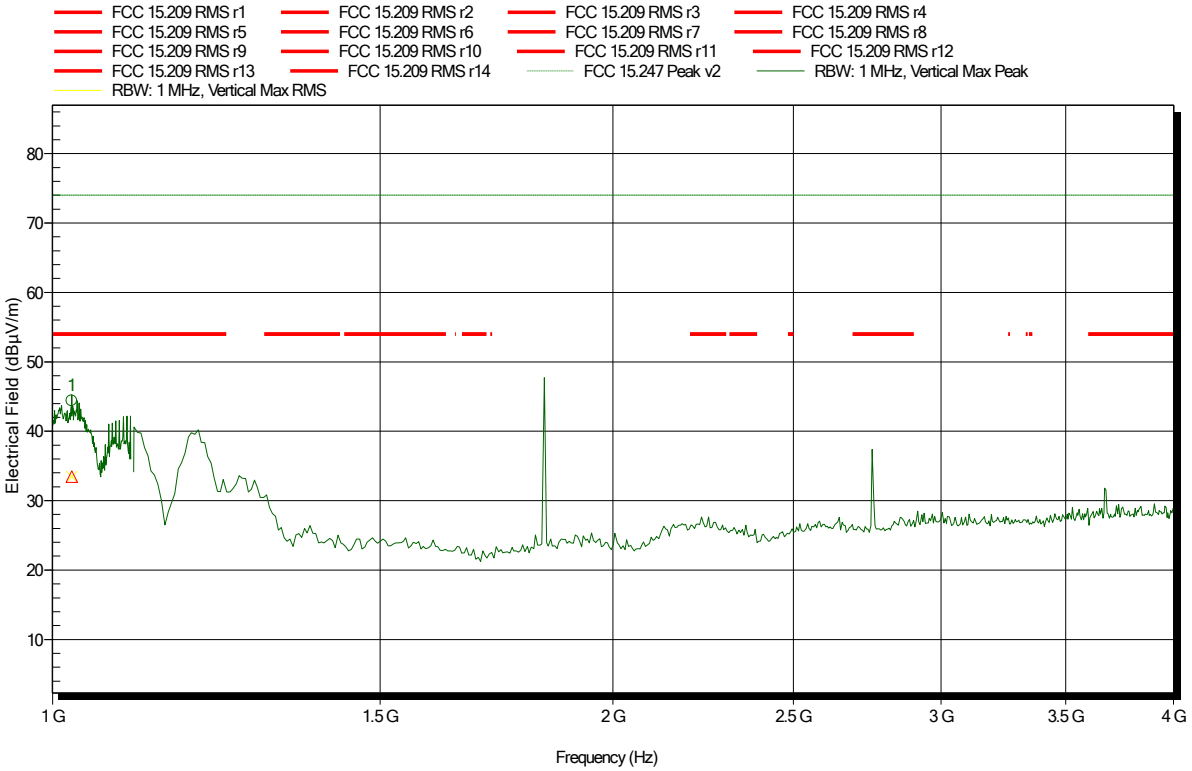

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.025 GHz	44.39 dBµV/m	74 dBµV/m	-29.61 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
1.025 GHz	33.46 dBµV/m	54 dBµV/m	-20.54 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-21
Note:	

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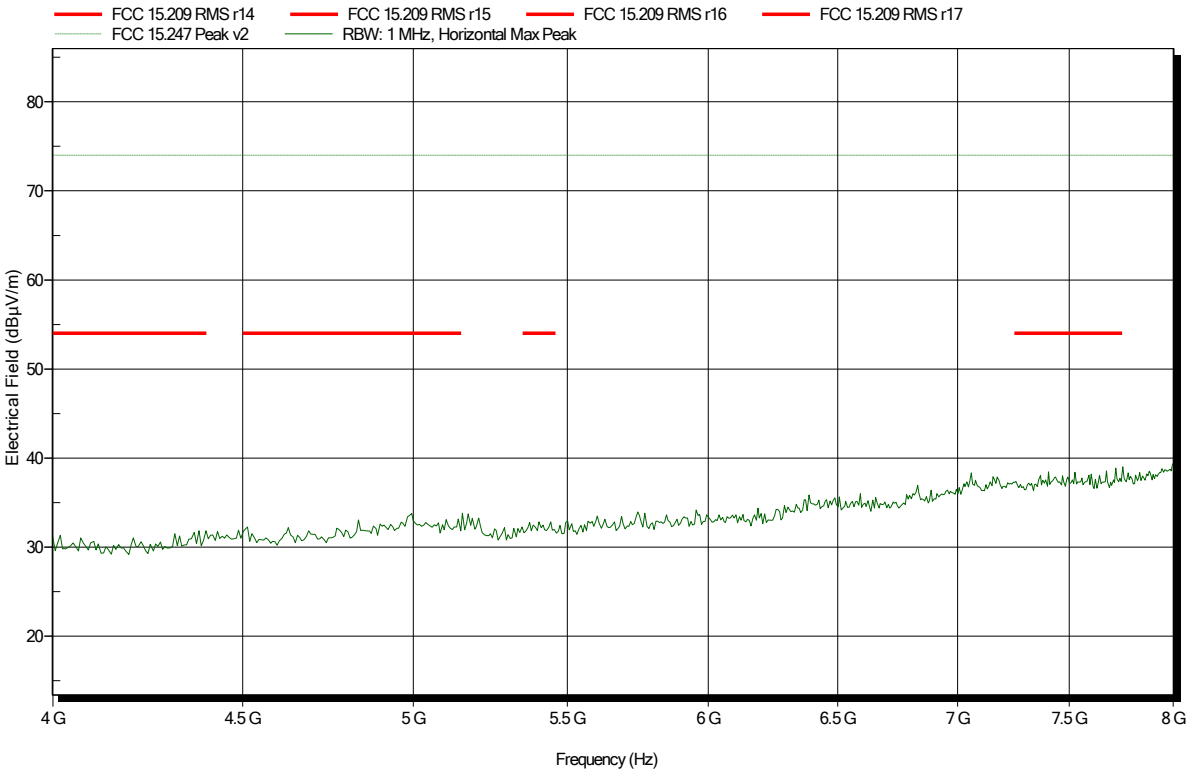

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2016.1.10
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-21
Note:	

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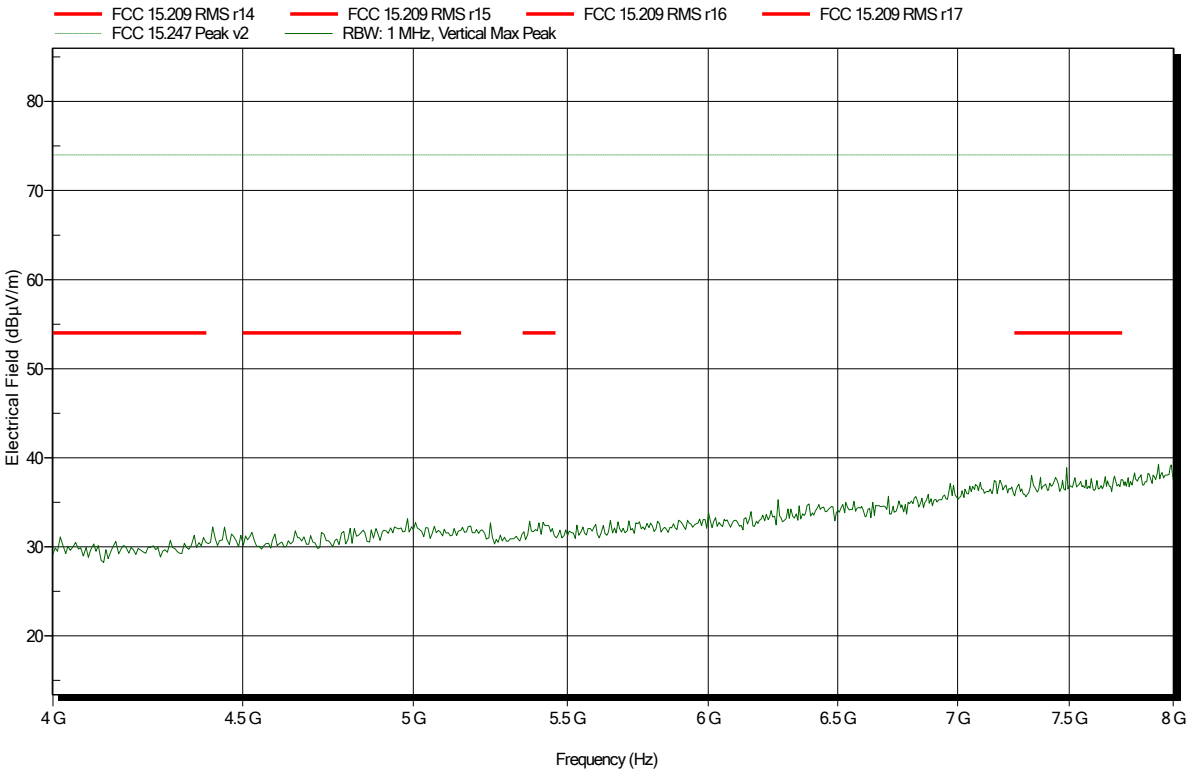

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-21
Note:	

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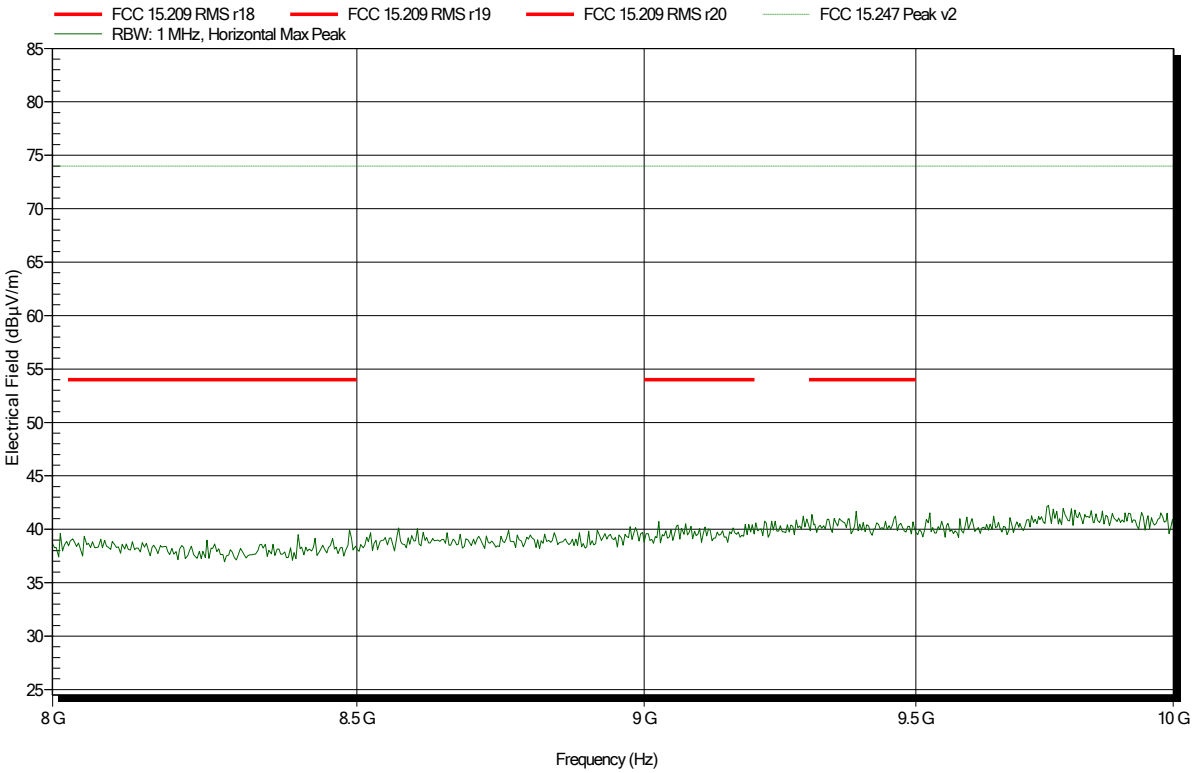

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 2250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-21
Note:	

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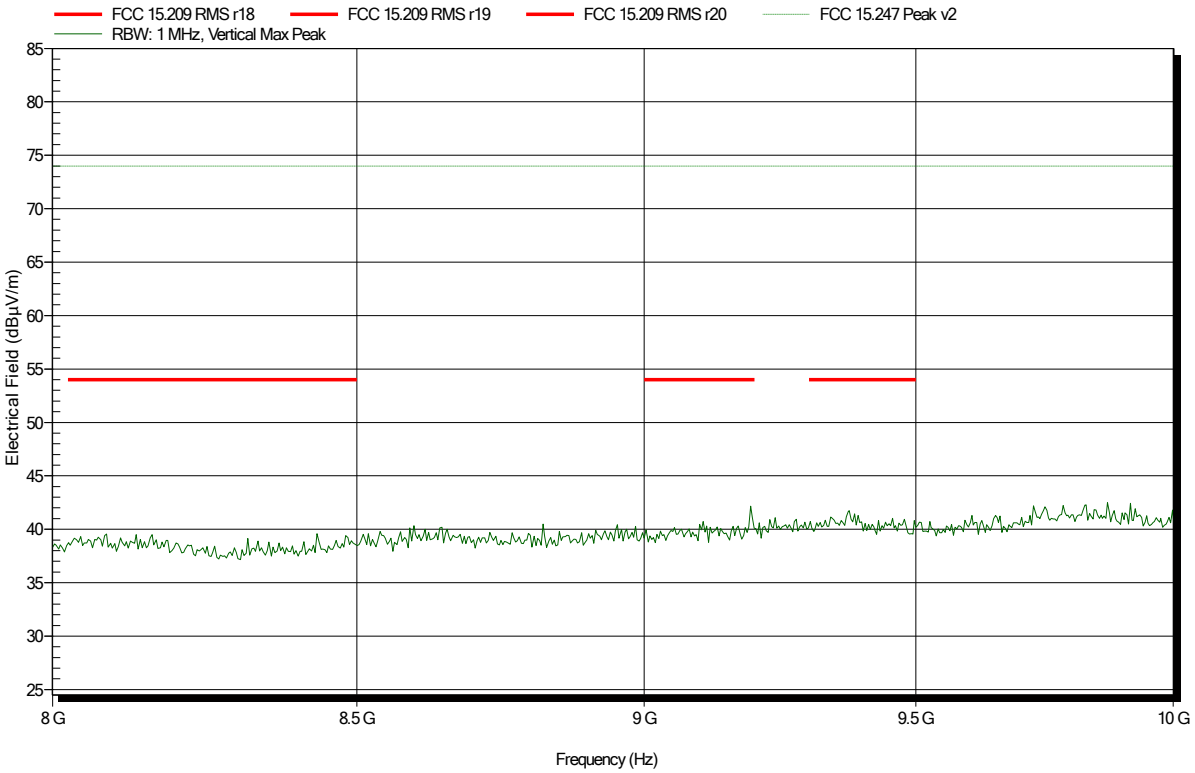

ANNEX B Transmitter spurious emissions - FlowIQ 3250

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 3250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-22
Note:	

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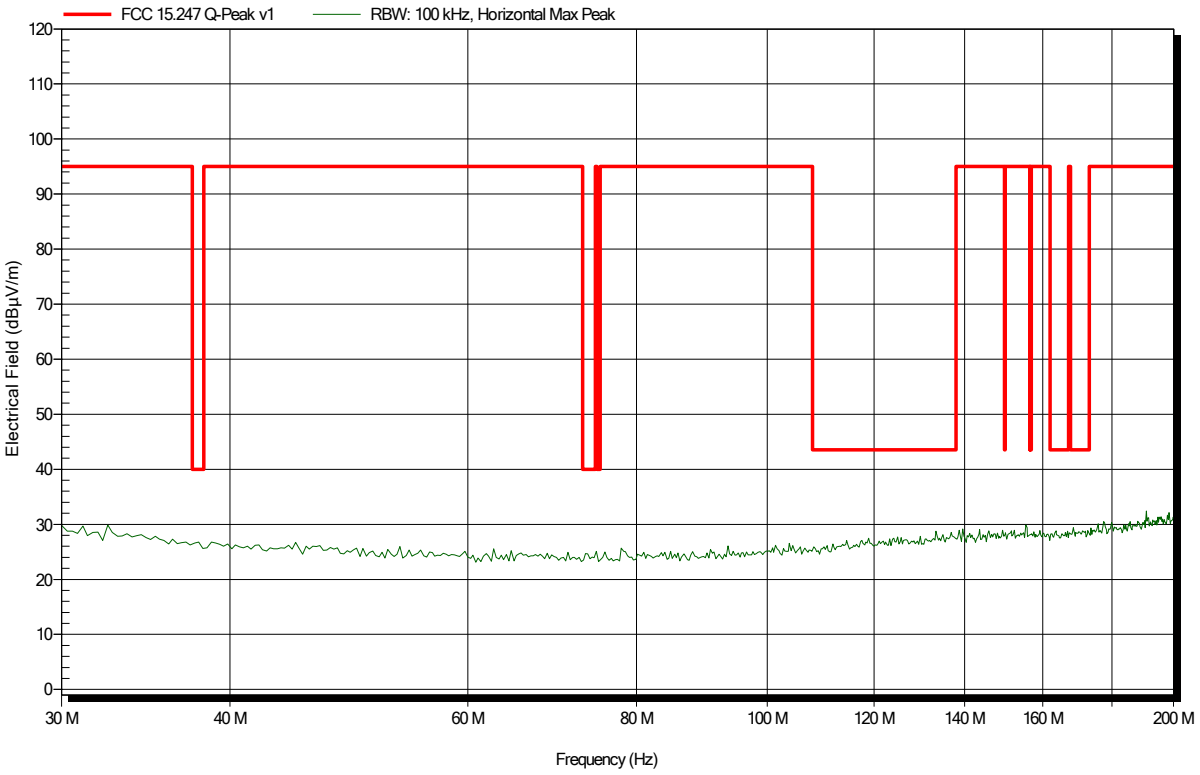

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 3250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-22
Note:	

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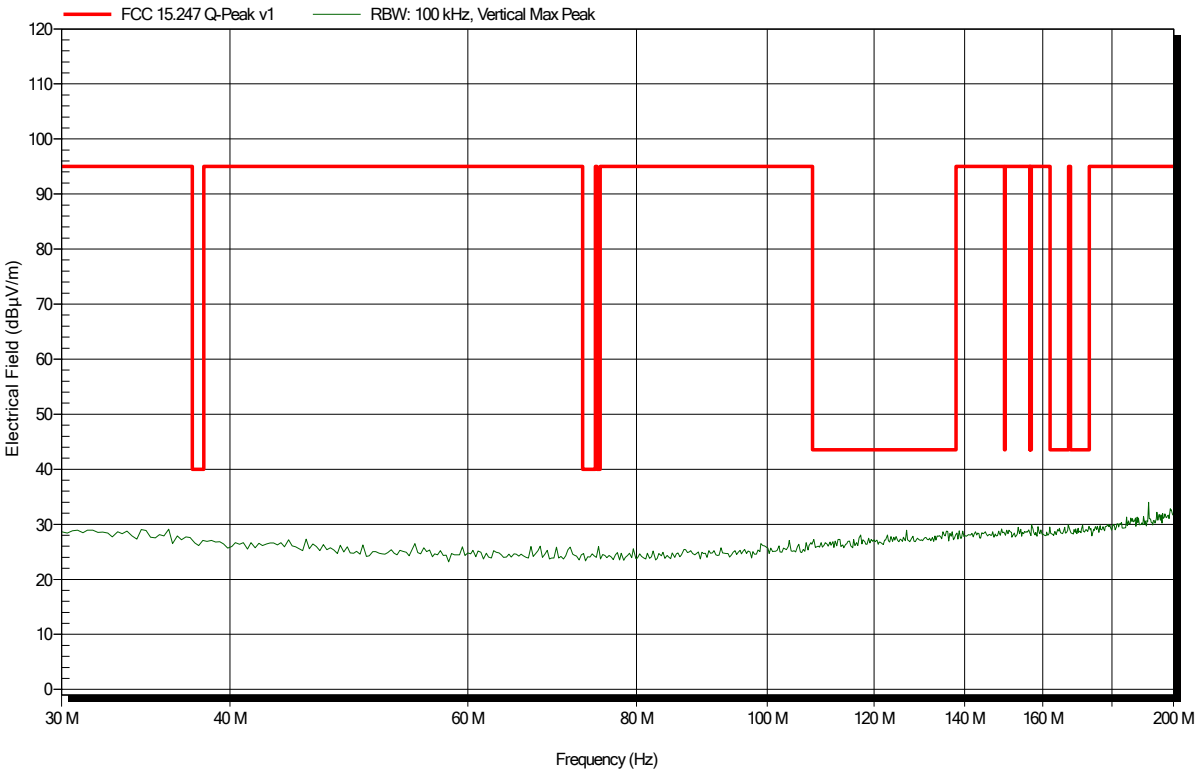

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 3250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-23
Note:	

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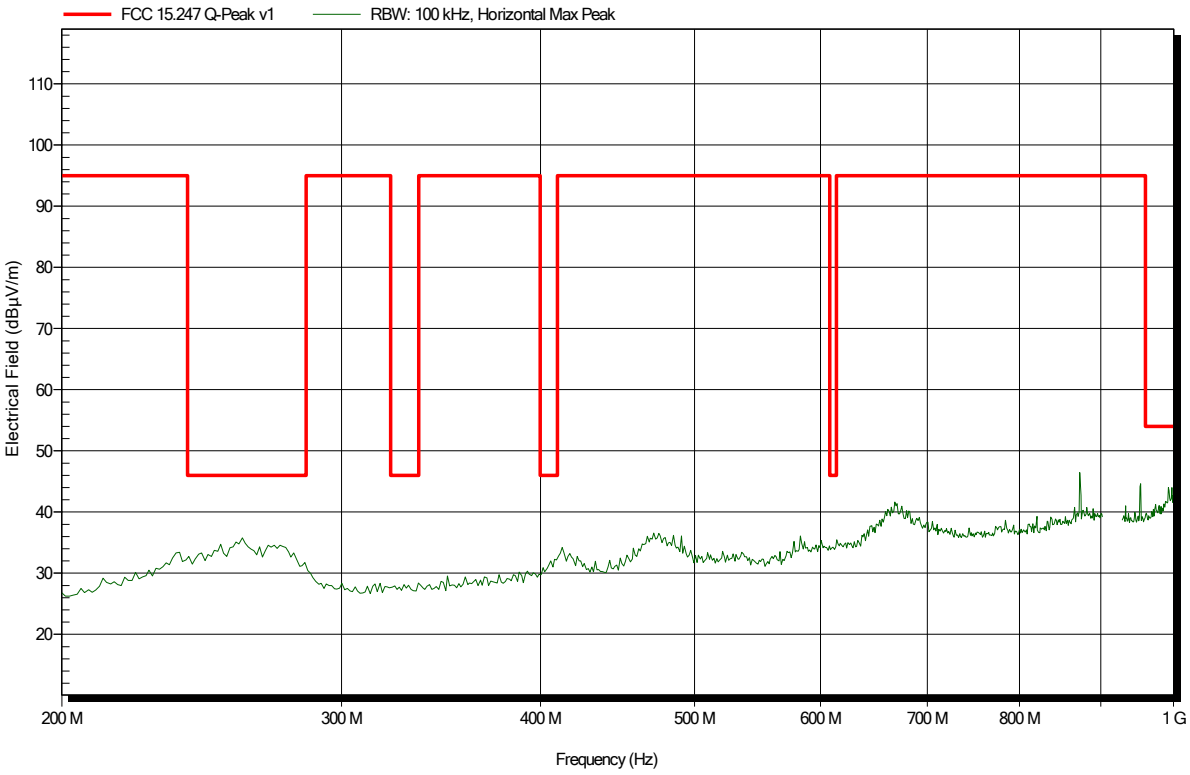

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 3250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-23
Note:	

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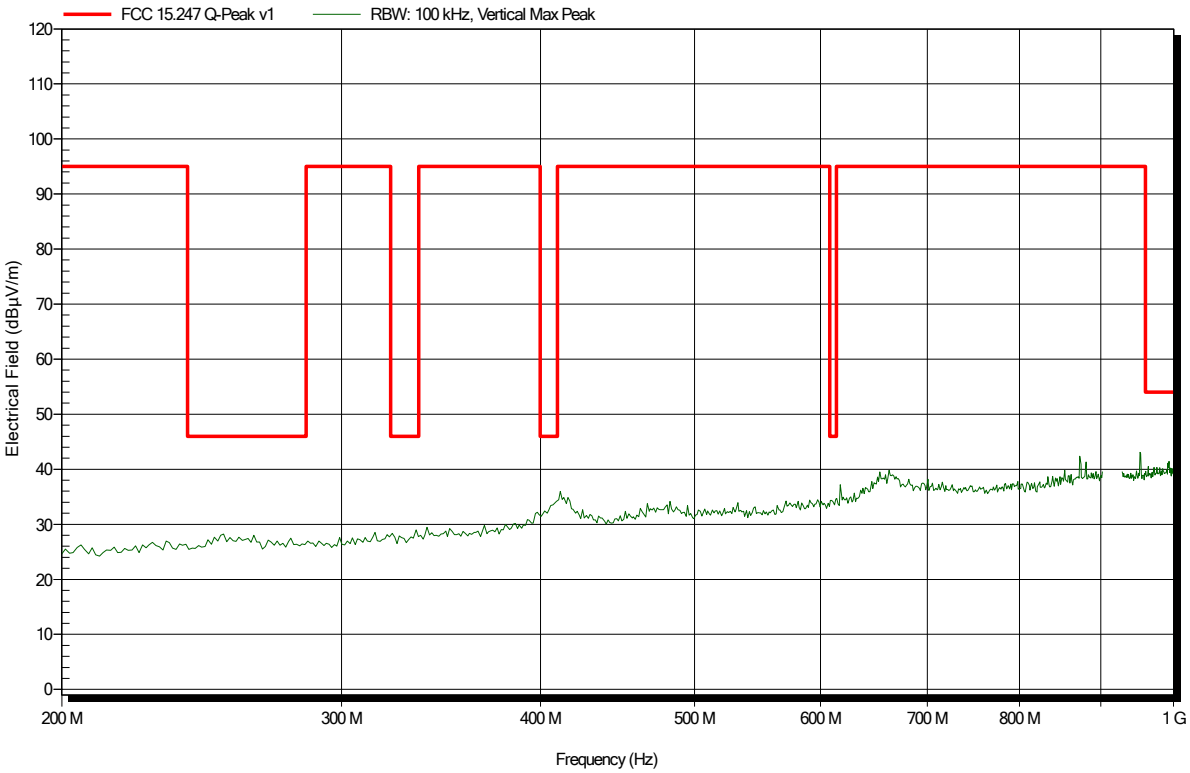

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 3250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-23
Note:	

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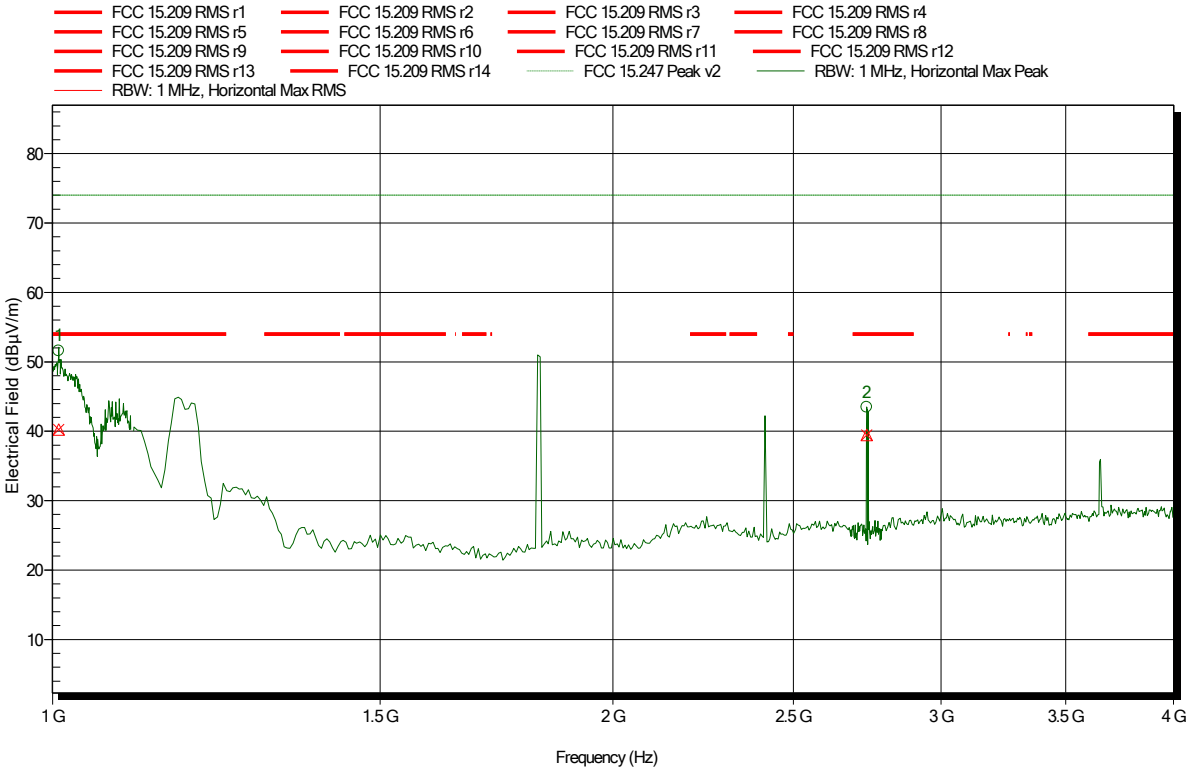

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.008 GHz	51.58 dBµV/m	74 dBµV/m	-22.42 dB	Pass
2.737 GHz	43.48 dBµV/m	74 dBµV/m	-30.52 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
1.008 GHz	40.26 dBµV/m	54 dBµV/m	-13.74 dB	Pass
2.737 GHz	39.47 dBµV/m	54 dBµV/m	-14.53 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 3250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-23
Note:	

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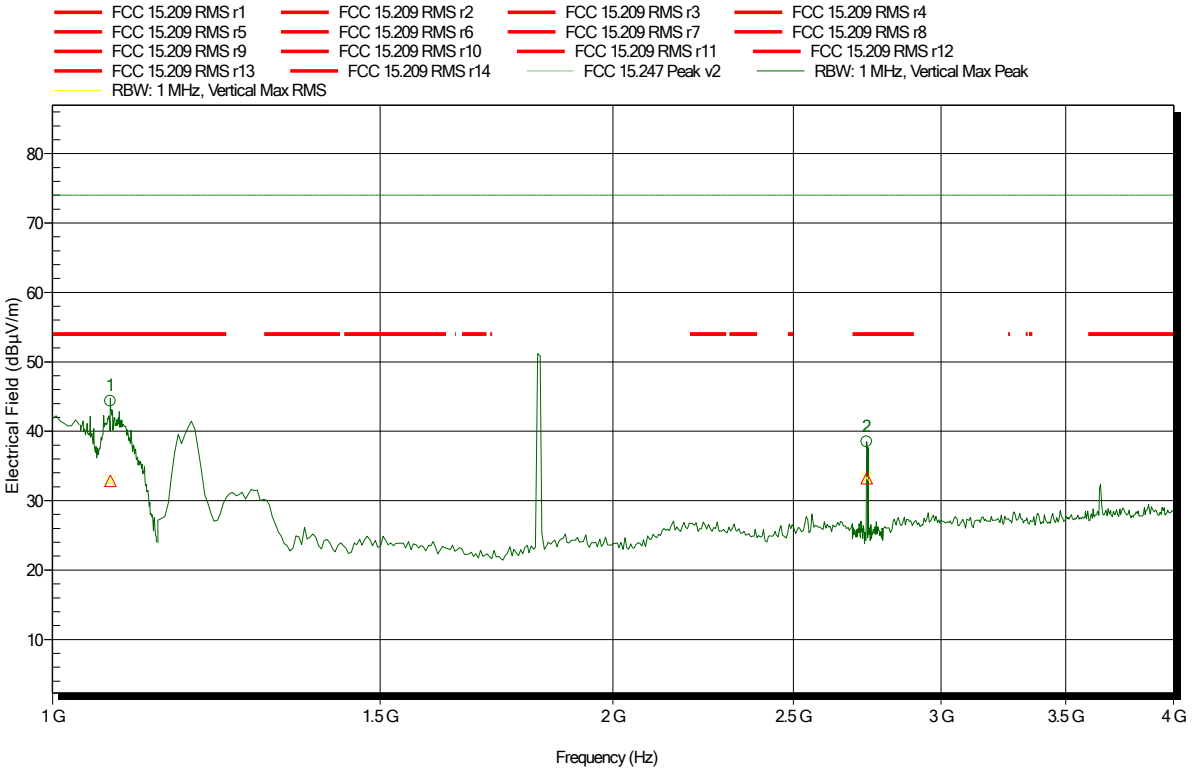

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.074 GHz	44.33 dBµV/m	74 dBµV/m	-29.67 dB	Pass
2.737 GHz	38.5 dBµV/m	74 dBµV/m	-35.5 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
1.074 GHz	32.88 dBµV/m	54 dBµV/m	-21.12 dB	Pass
2.737 GHz	33.25 dBµV/m	54 dBµV/m	-20.75 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 3250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-23
Note:	

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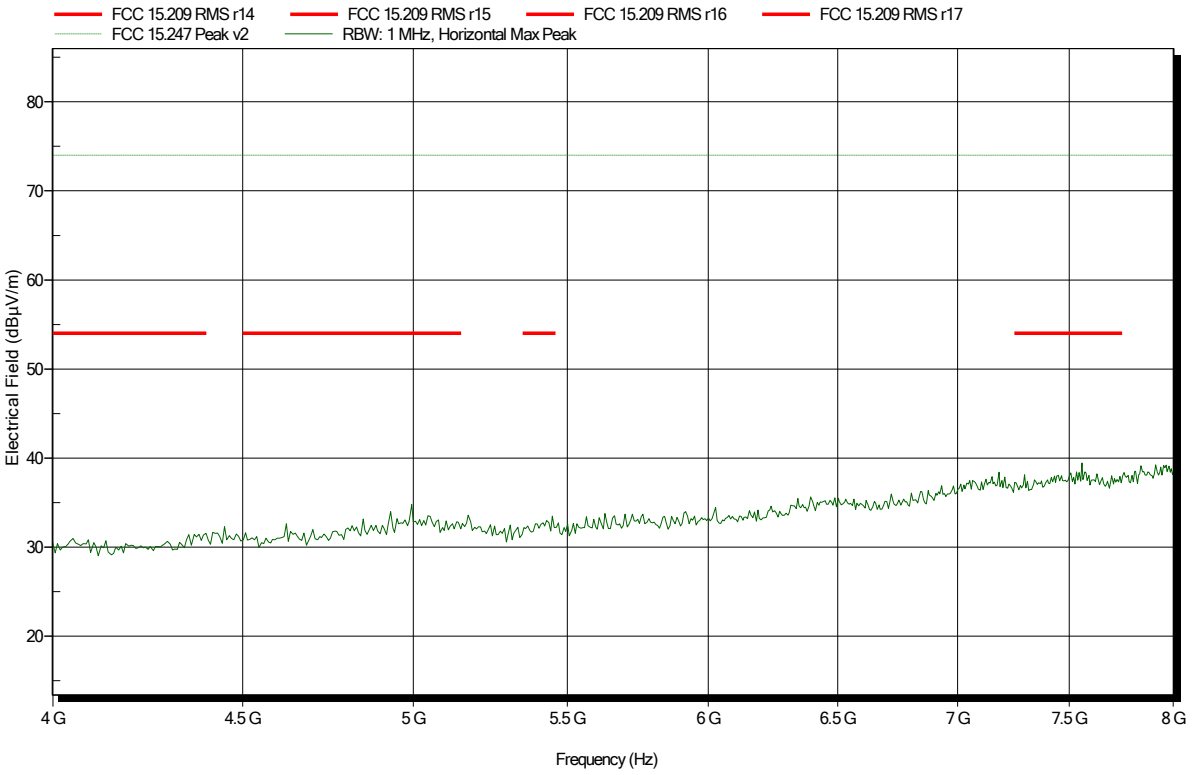

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 3250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2016.1.10
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-23
Note:	

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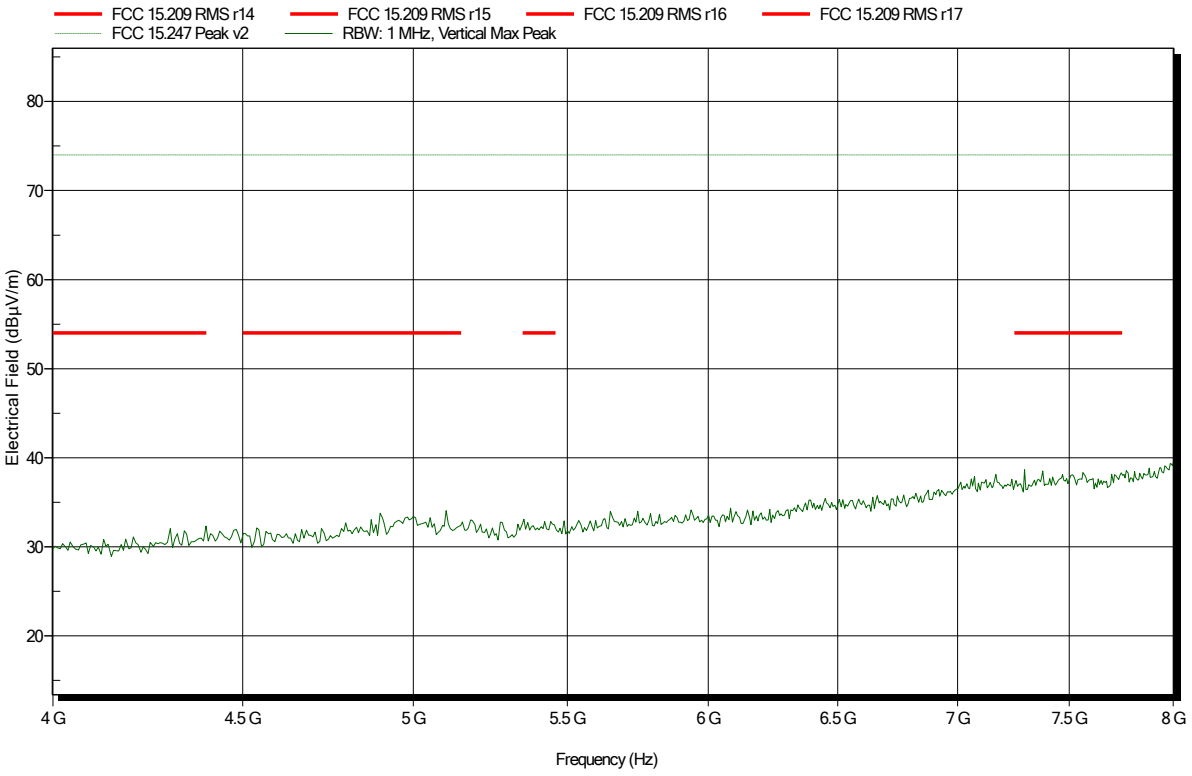

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 3250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-23
Note:	

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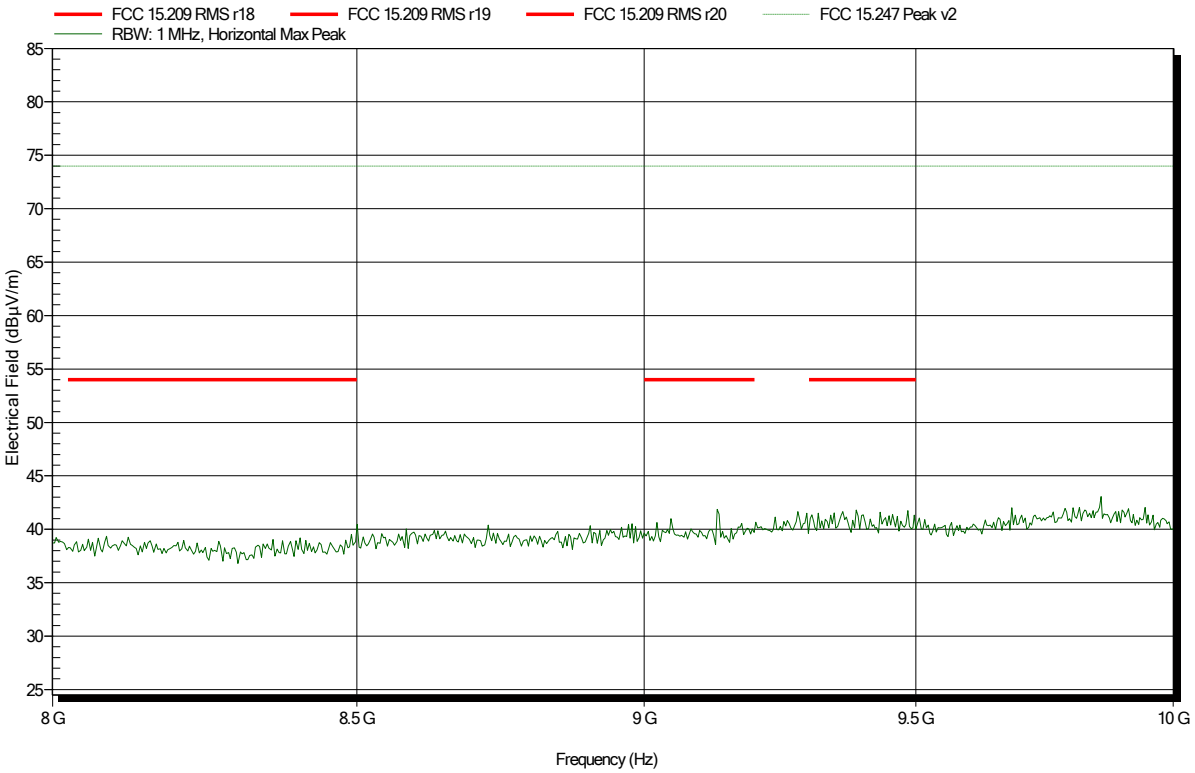

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 3250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 912.5 MHz
Test Date:	2020-04-23
Note:	

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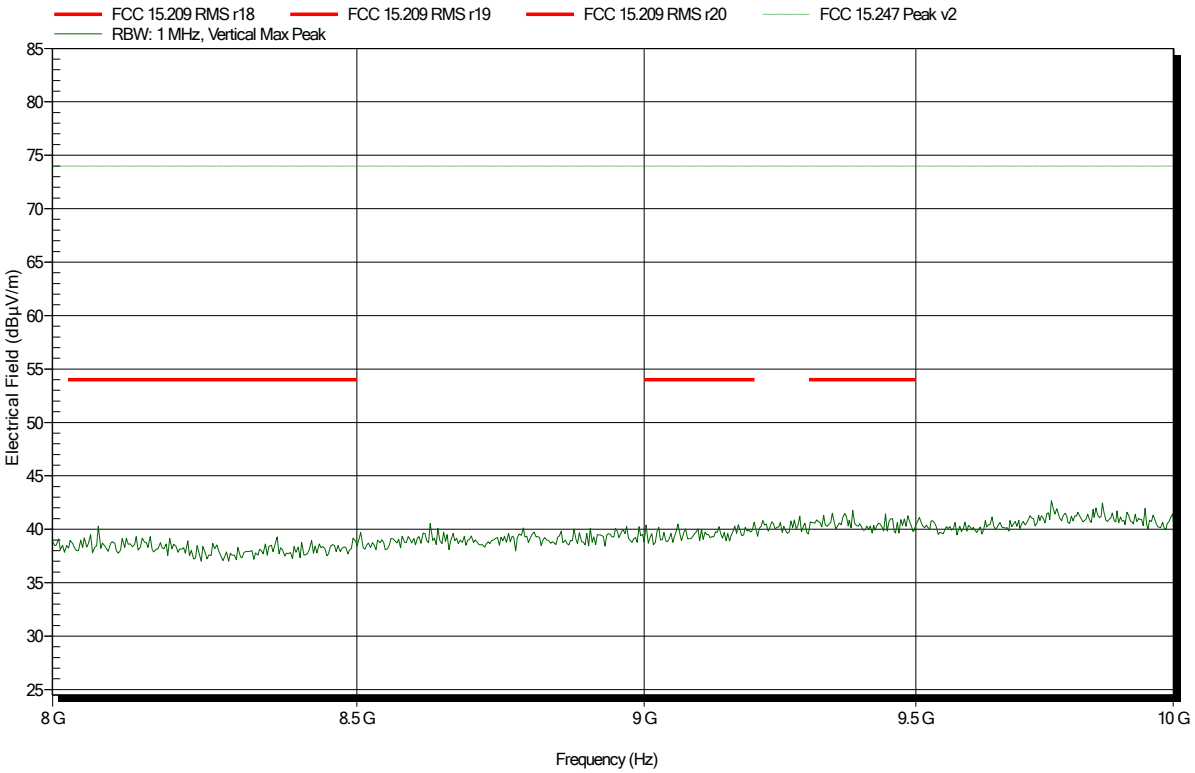

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 3250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-23
Note:	

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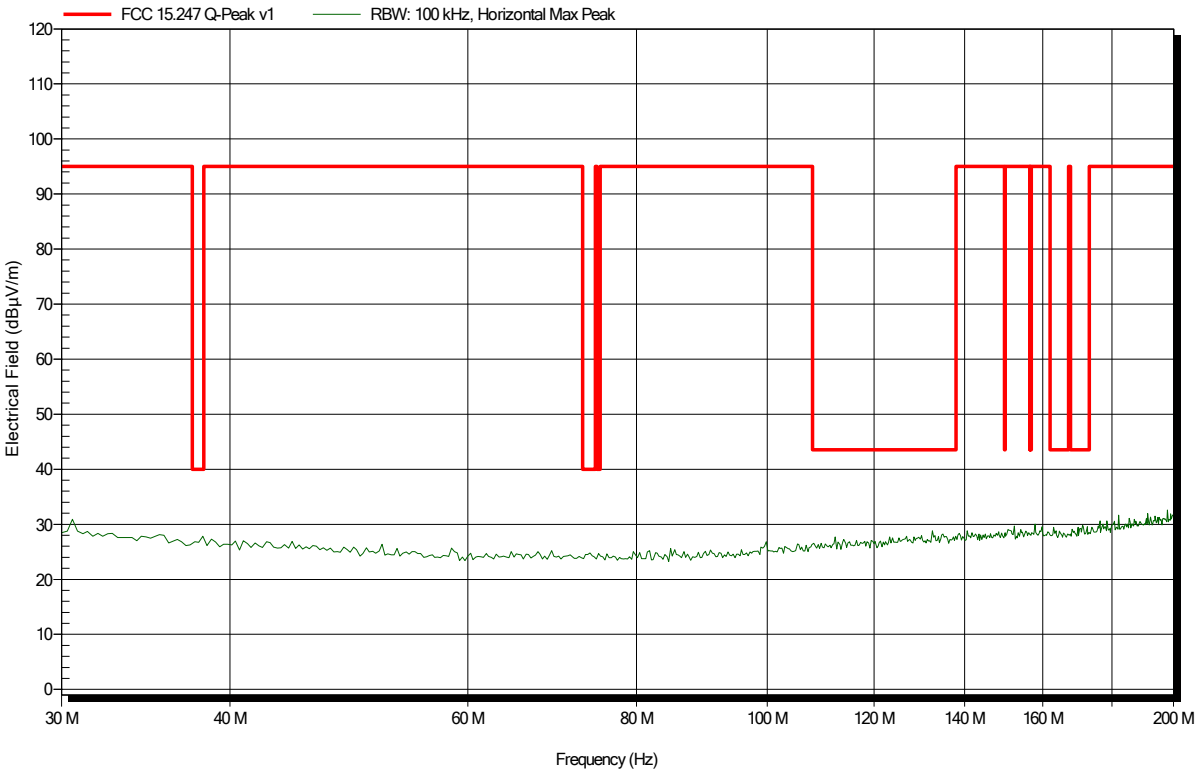

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 3250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-22
Note:	

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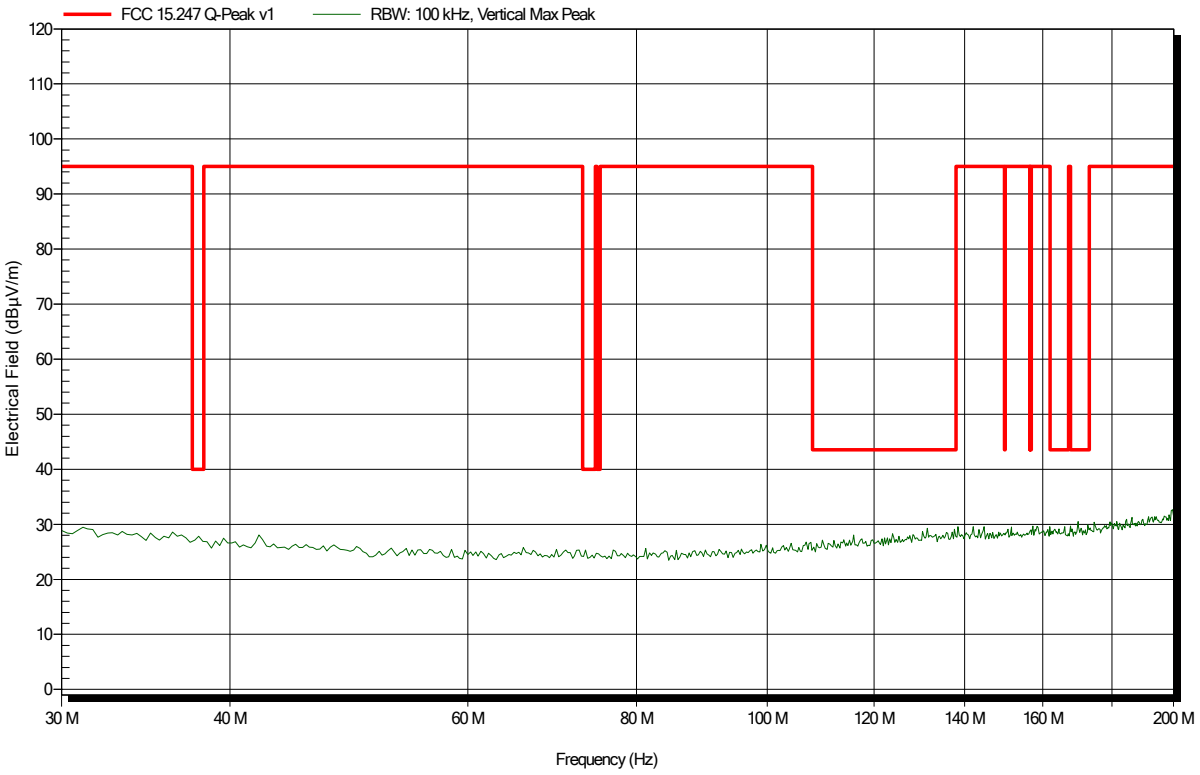

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 3250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-23
Note:	

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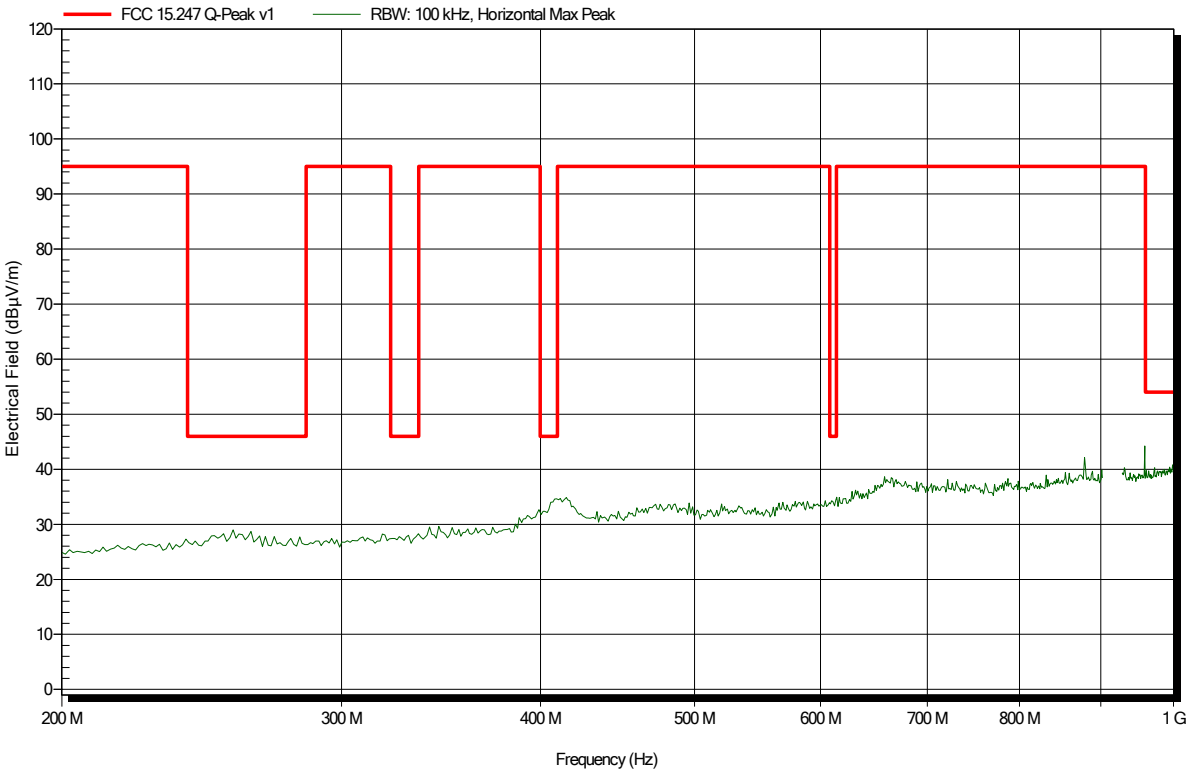

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 3250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-23
Note:	

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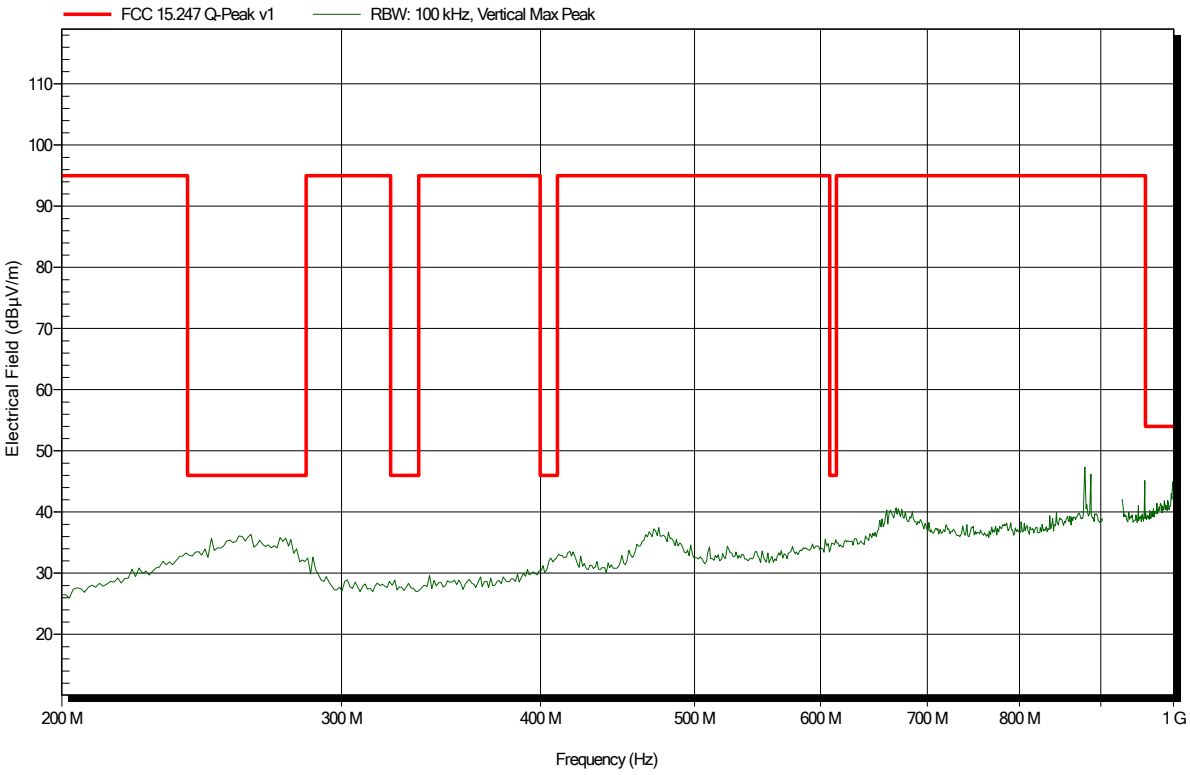

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 3250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-23
Note:	

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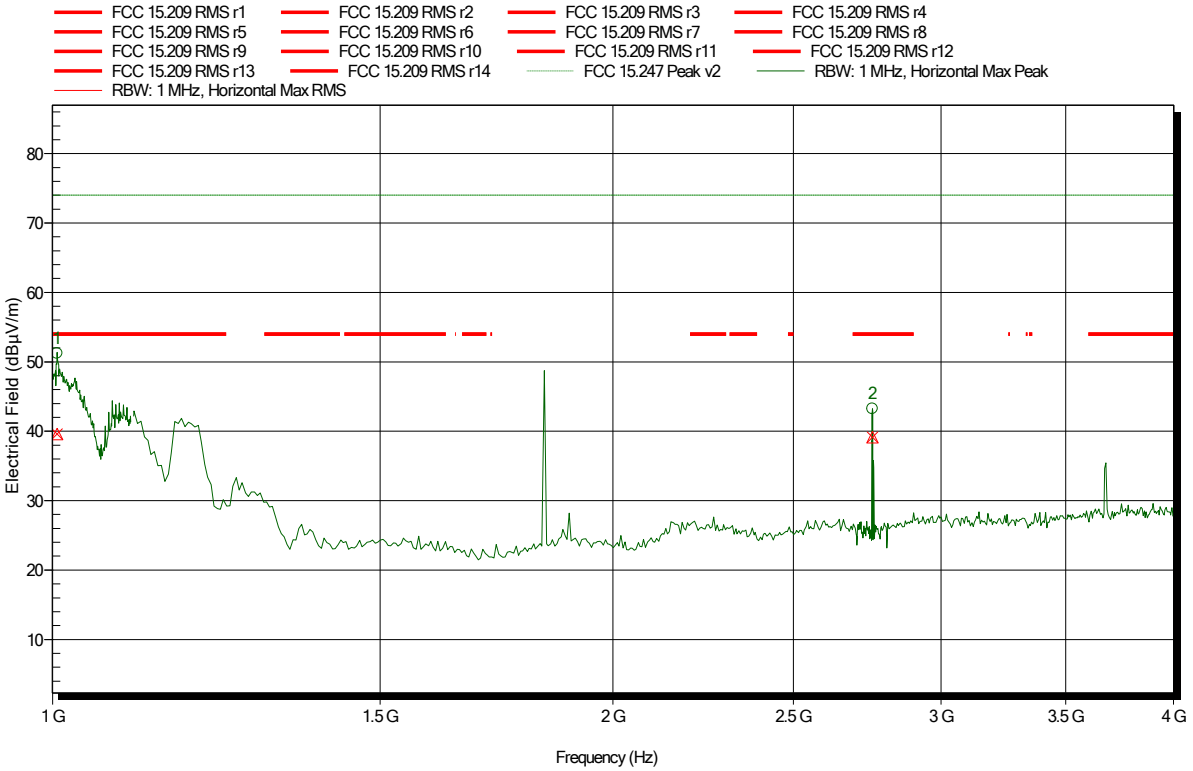

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.006 GHz	51.22 dBµV/m	74 dBµV/m	-22.78 dB	Pass
2.756 GHz	43.24 dBµV/m	74 dBµV/m	-30.76 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
1.006 GHz	39.58 dBµV/m	54 dBµV/m	-14.42 dB	Pass
2.756 GHz	39.12 dBµV/m	54 dBµV/m	-14.88 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
Model:	FlowIQ 3250
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-23
Note:	

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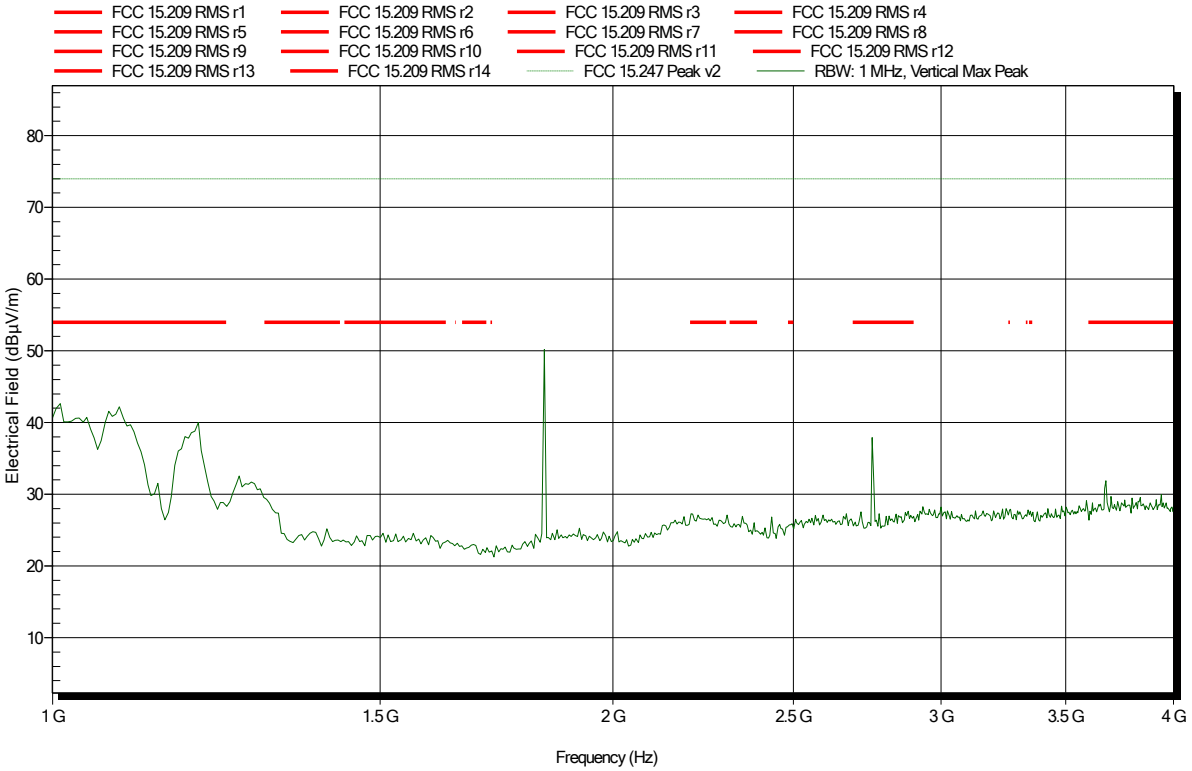

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
EUT Name:	Ultrasonic water meter
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Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-23
Note:	

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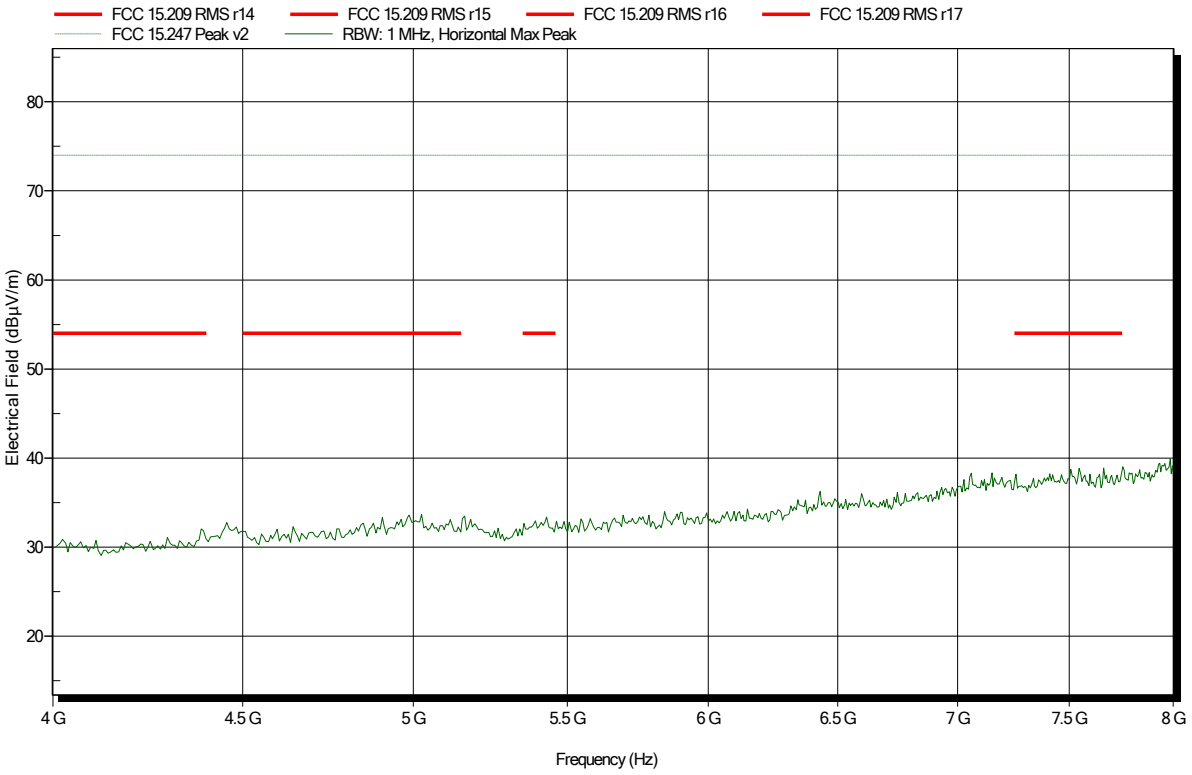

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EUT Name:	Ultrasonic water meter
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Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2016.1.10
Test Conditions:	Tnom: 23°C, Vnom: 3.6 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-23
Note:	

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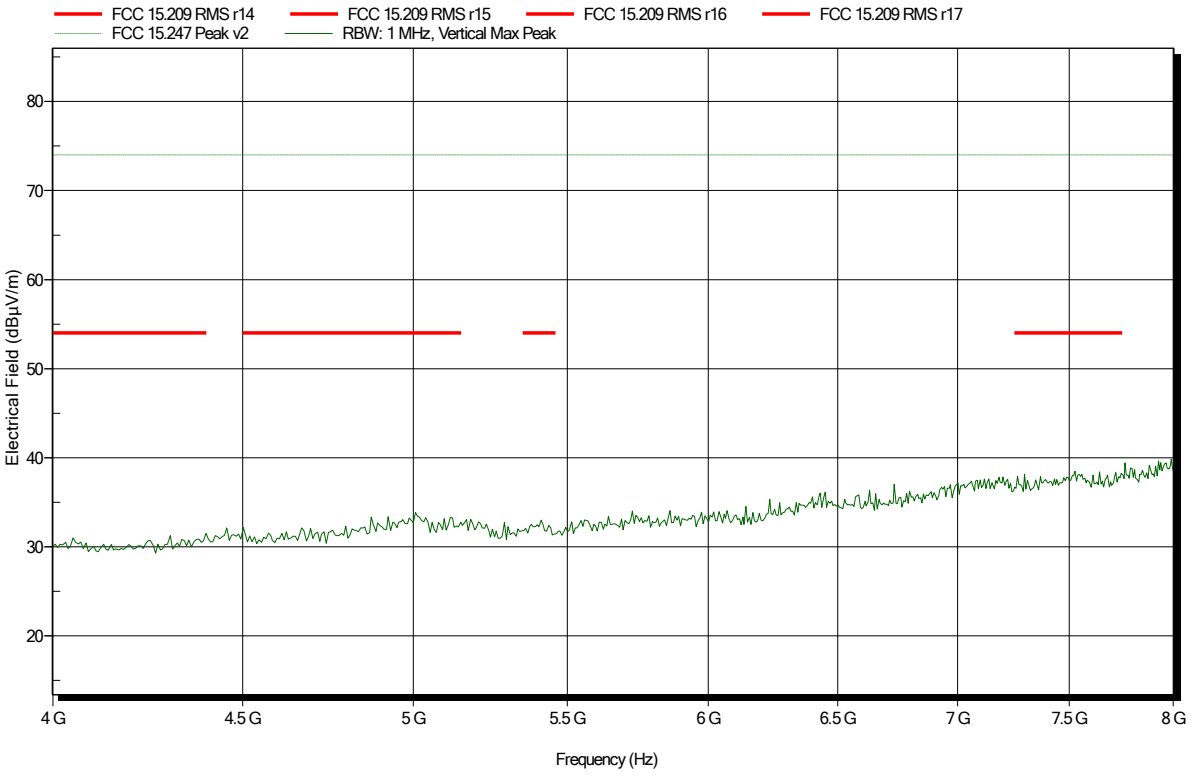

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
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Measurement distance:	1 m converted to 3m
Mode:	TX; 2-FSK; Ext. antenna; 918.5 MHz
Test Date:	2020-04-23
Note:	

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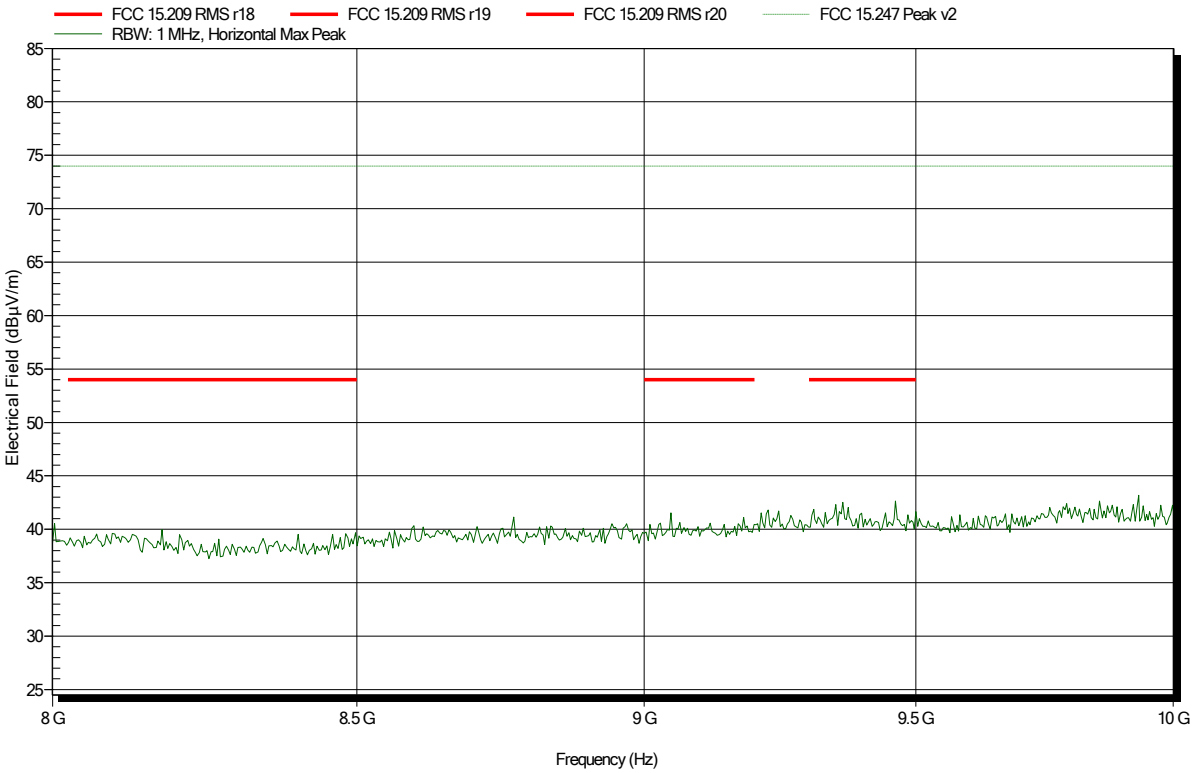

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-2001-8761
Applicant:	Kamstrup A/S
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Note:	

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