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FCC TEST REPORT

FCC 47 CFR Part 15C
Industry Canada RSS-247
Digital transmission systems operating within the 902 – 928 MHz band

Report Reference No. ..... :	G0M-1511-5210-TFC247DT-V01
Testing Laboratory ..... :	Eurofins Product Service GmbH
Address ..... :	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation ..... :	A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Filed Test Laboratory, Reg.-No.: 96970 IC OATS Filing assigned code: 3470A
Applicant's name ..... :	Kamstrup A/S
Address ..... :	Industrivej 28 8660 Skanderborg DENMARK
Test specification:	
Standard..... :	47 CFR Part 15C RSS-247, Issue 1, 2015-05 RSS-Gen, Issue 4, 2014-11 ANSI C63.10:2013 ANSI C63.4:2014
Test scope…….. ..... :	complete Radio compliance test
Equipment under test (EUT):	
Product description	flowIQ 2100
Model No.	flowIQ 2100
Additional Model(s)	None
Brand Name(s)	None
Hardware version	5550 1443 based on 55351367_a1 + 55501379 (radio) + 55501350 (Antenna)
Firmware / Software version	50981101 (fw for 1367)+50981053 (fw for 1379) + 5514 1060 (eeprom)
	FCC-ID: OUY-FLOW2100-3C IC: N/A
Test result	**Passed**

Possible test case verdicts:

- neither assessed nor tested ..... : N/N
- required by standard but not appl. to test object ..... : N/A
- required by standard but not tested ..... : N/T
- not required by standard for the test object ..... : N/R
- 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 ..... : 2016-01-18

Date (s) of performance of tests ..... : 2016-01-18

Compiled by ..... : Wilfried Treffke

Tested by (+ signature) ..... : Wilfried Treffke .....
(Responsible for Test)

Approved by (+ signature) ..... : Christian Weber .....
(Head of Lab)

Date of issue ..... : 2016-02-04

Total number of pages ..... : 58

General remarks:

The test results presented in this report relate only to the object tested.
The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

Additional comments:

Version History

Version	Issue Date	Remarks	Revised by
01	2016-02-04	Initial Release	

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1 Equipment (Test item) Description

Description	flowIQ 2100	
Model	flowIQ 2100	
Additional Model(s)	None	
Brand Name(s)	None	
Serial number	None	
Hardware version	5550 1443 based on 55351367_a1 + 55501379 (radio) + 55501350 (Antenna)	
Software / Firmware version	50981101 (fw for 1367)+50981053 (fw for 1379) + 5514 1060 (eeprom)	
FCC-ID	OUY-FLOW2100-3C	
IC	N/R	
Equipment type	End product	
Radio type	Transmitter only	
Radio technology	custom	
Operating frequency range	912.5 - 918.5 MHz	
Assigned frequency band	902 - 928 MHz	
Frequency range	F_{LOW}	912.5 MHz
	F_{MID}	915.0 MHz
	F_{HIGH}	918.5 MHz
Spreading	None	
Modulations	2FSK	
Number of channels	3 Channel	
Channel spacing	None	
Number of antennas	1	
Antenna	Type	integrated
	Model	55501350
	Manufacturer	Kamstrup A/S
	Gain	-1.2 dBi
Manufacturer	Kamstrup A/S Industrivej 28 8660 Skanderborg DENMARK	
Power supply	V_{NOM}	3.3 VDC
	V_{MIN}	3.5 VDC
	V_{MIN}	3.7 VDC
AC/DC-Adaptor	Model	N/A
	Vendor	N/A
	Input	N/A
	Output	N/A

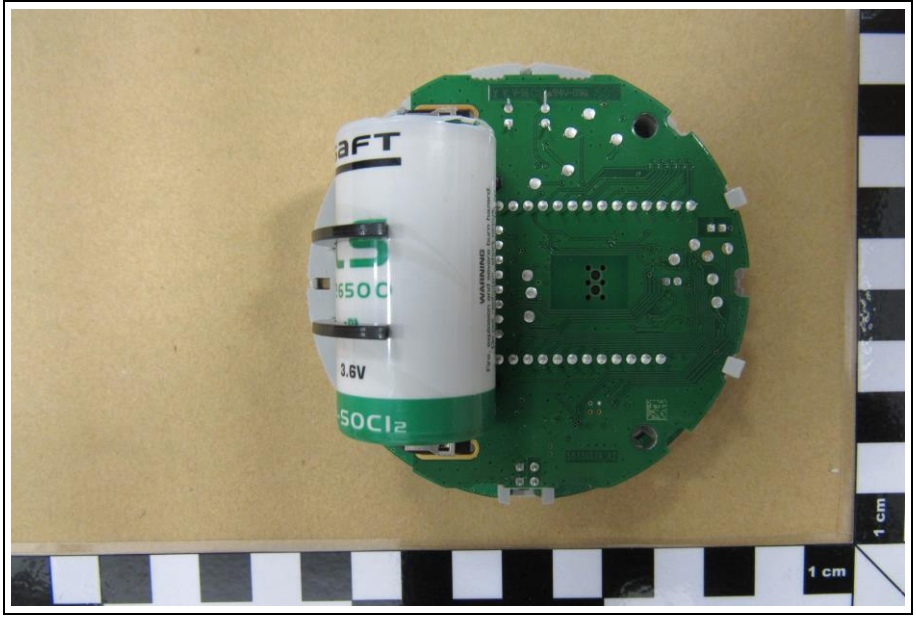
1.1 Photos – Equipment External

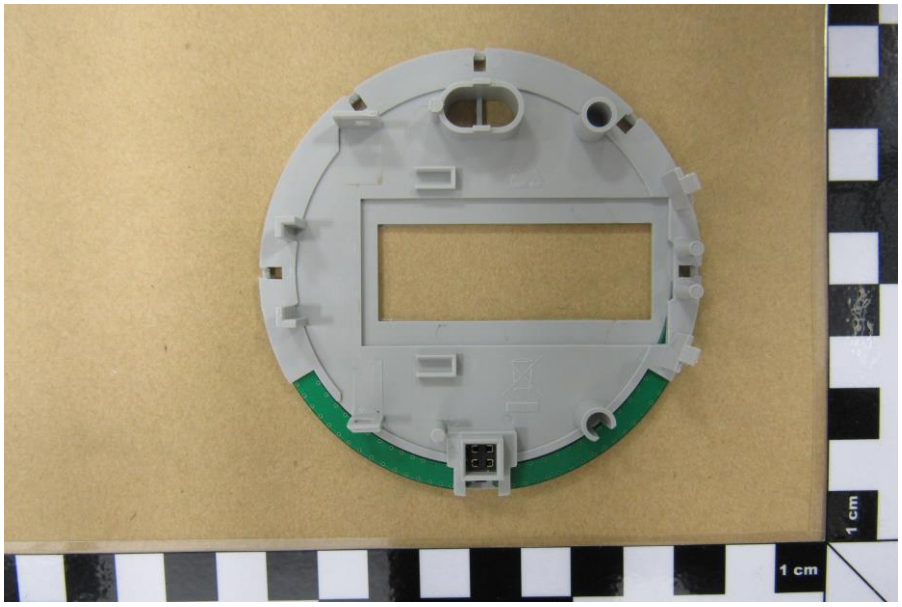
EUT TOP

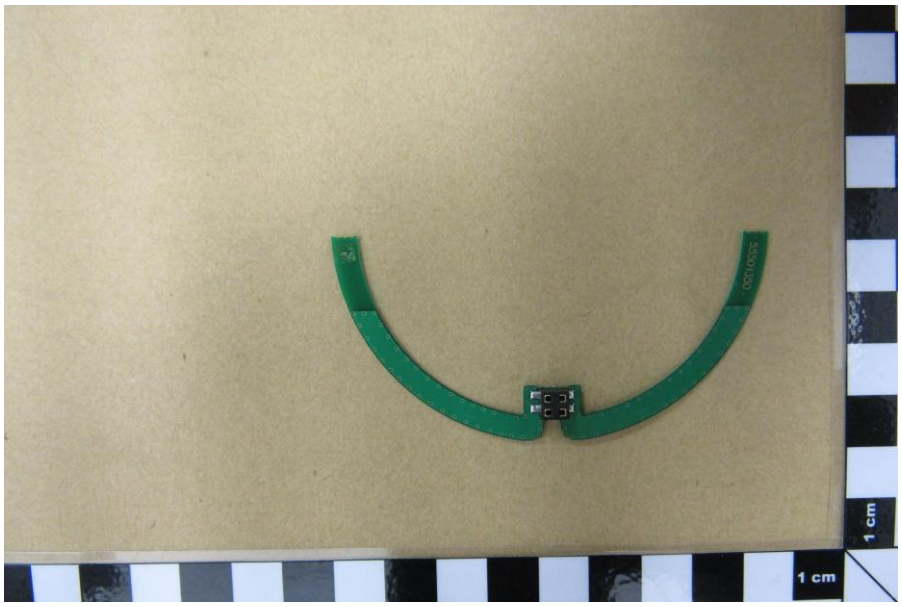
EUT BOTTOM

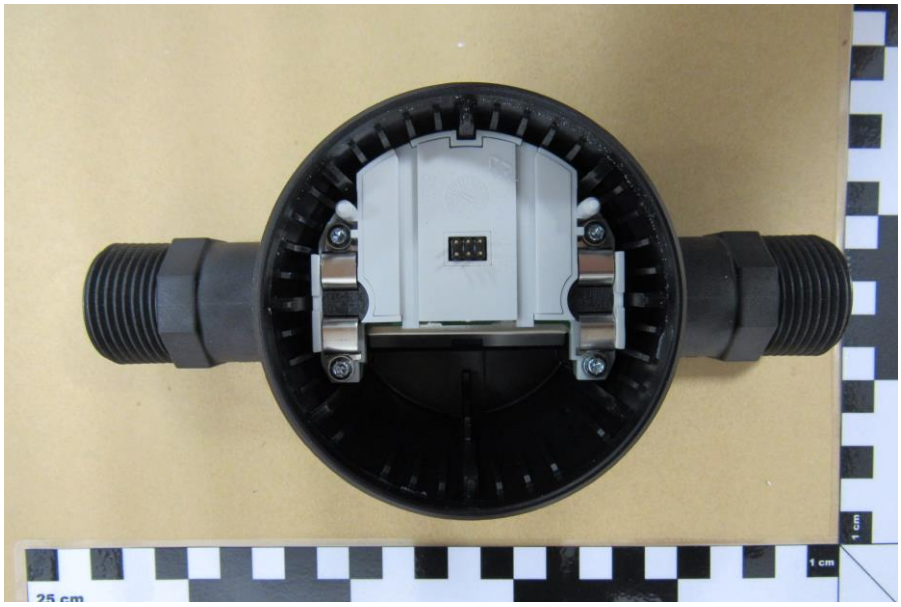
1.2 Photos – Equipment internal

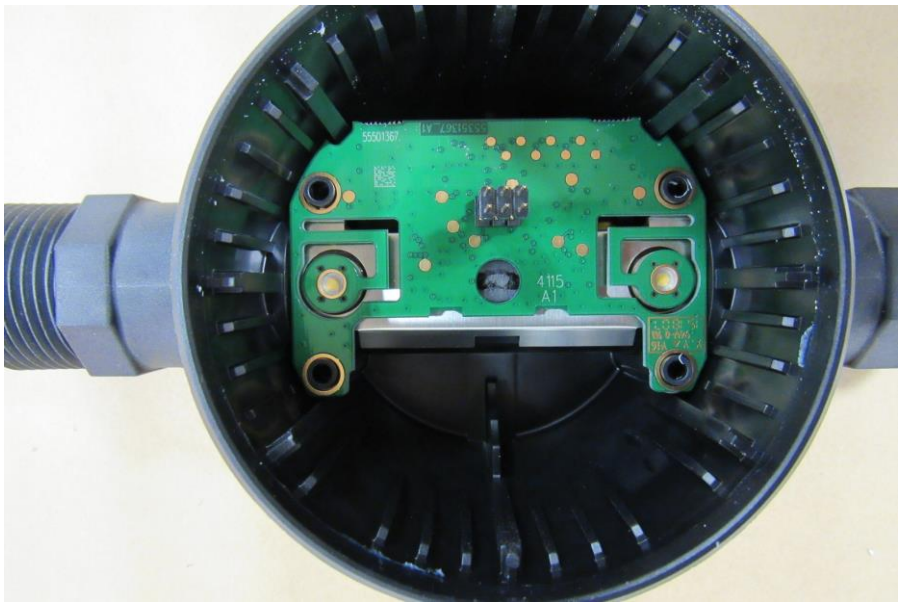
EUT OPEN TOP

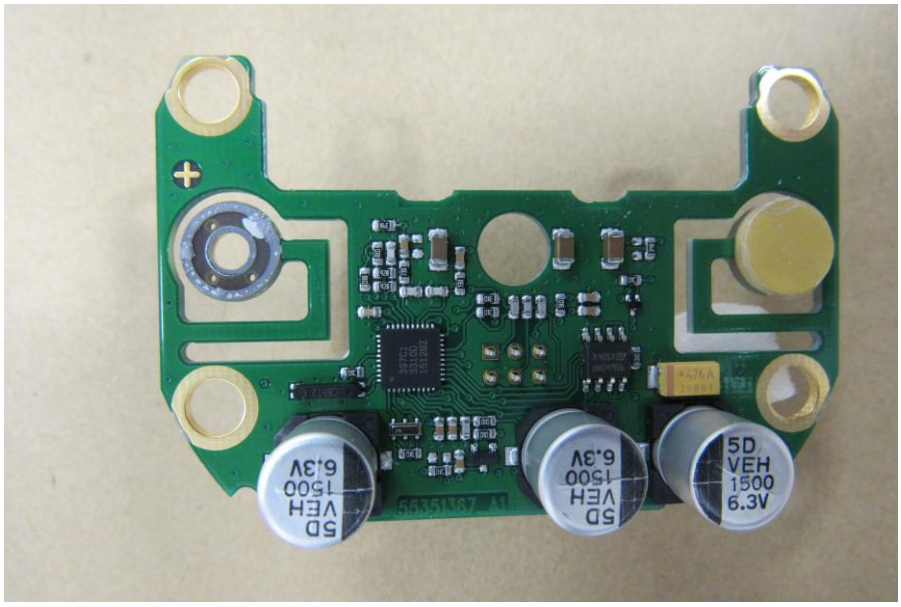
EUT OPEN BOTTOM


ANTENNA FRONT PANEL


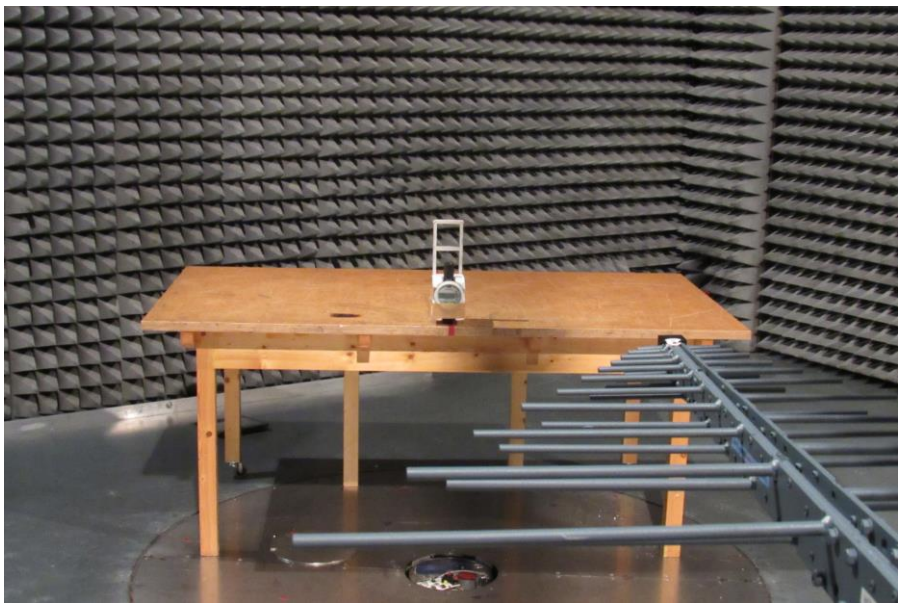
PCB ANTENNA


EUT LOWER PART


EUT LOWER PCB TOP IN HAUSING


EUT LOWER PCB BOTTOM


1.3 Photos – Test setup

TEST SETUP RADIATED


1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
None				

***Note:** Use the following abbreviations:

AE : Auxiliary/Associated Equipment, or

SIM : Simulator (Not Subjected to Test)

CABL : Connecting cables

1.5 Test Modes

Mode #	Description	
Single	General conditions:	EUT powered by fully battery
	Radio conditions:	Mode = standalone transmit Spreading = None Modulation = 2FSK Duty cycle = 100 % Power level = Maximum

1.6 Test Equipment Used During Testing

Measurement Software			
Description	Manufacturer	Name	Version
EMC Test Software	Dare Instruments	Radimation	2014.1.15

Occupied Bandwidth					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2015-02	2016-02

6dB Bandwidth					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2015-02	2016-02

Maximum peak conducted power					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2015-02	2016-02

Power spectral density					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2015-02	2016-02

Band edge compliance					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2015-02	2016-02

Conducted spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2015-02	2016-02

Radiated spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Semi-anechoic chamber	Frankonia	AC 1	EF00062	-	-
Spectrum Analyzer	R&S	FSIQ26	EF00242	2015-04	2016-04
Biconical Antenna	R&S	HK 116	EF00012	2013-02	2016-02
LPD Antenna	R&S	HL 223	EF00187	2014-03	2017-03
LPD Antenna	R&S	HL 025	EF00327	2015-10	2018-10

1.7 Sample emission level calculation

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

Reading:

This is the reading obtained on the spectrum 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) = 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:

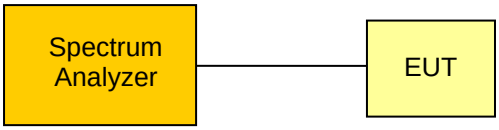
Reading	+	AF	=	Net Reading	:	Net reading - FCC limit = Margin
21.5 dBµV	+	26 dB	=	47.5 dBµV/m	:	47.5 dBµV/m - 57.0 dBµV/m = -9.5 dB

2 Result Summary

FCC 47 CFR Part 15C, IC RSS-247				
Product Specific Standard Section	**Requirement – Test**	**Reference Method**	**Result**	**Remarks**
RSS-Gen 6.6	Occupied Bandwidth	ANSI C63.10	N/R	Informational only
FCC § 15.247(a)(2) IC RSS-247 § 5.2	6dB Bandwidth	ANSI C63.10	PASS	
FCC § 15.247(b)(3) IC RSS-247 § 5.4	Maximum peak conducted power	ANSI C63.10	PASS	
FCC § 15.247(e) IC RSS-247 § 5.2	Power spectral density	ANSI C63.10	PASS	
47 CFR 15.207 IC RSS-247 § 3.1	AC power line conducted emissions	ANSI C63.4	N/R	No powered (directly or indirectly) via AC-Mains
FCC § 15.247(d) IC RSS-247 § 5.5	Band edge compliance	ANSI C63.10	PASS	
FCC § 15.247(d) IC RSS-247 § 5.5	Conducted spurious emissions	ANSI C63.10	PASS	
FCC § 15.247(d) FCC § 15.209 IC RSS-247 § 5.5	Transmitter radiated spurious emissions	ANSI C63.10	PASS	
IC RSS-247 § 3.1	Receiver radiated spurious emissions	ANSI C63.10	N/R	No receiver inside the EUT
Remarks:				

3 Test Conditions and Results

3.1 Test Conditions and Results – Occupied Bandwidth

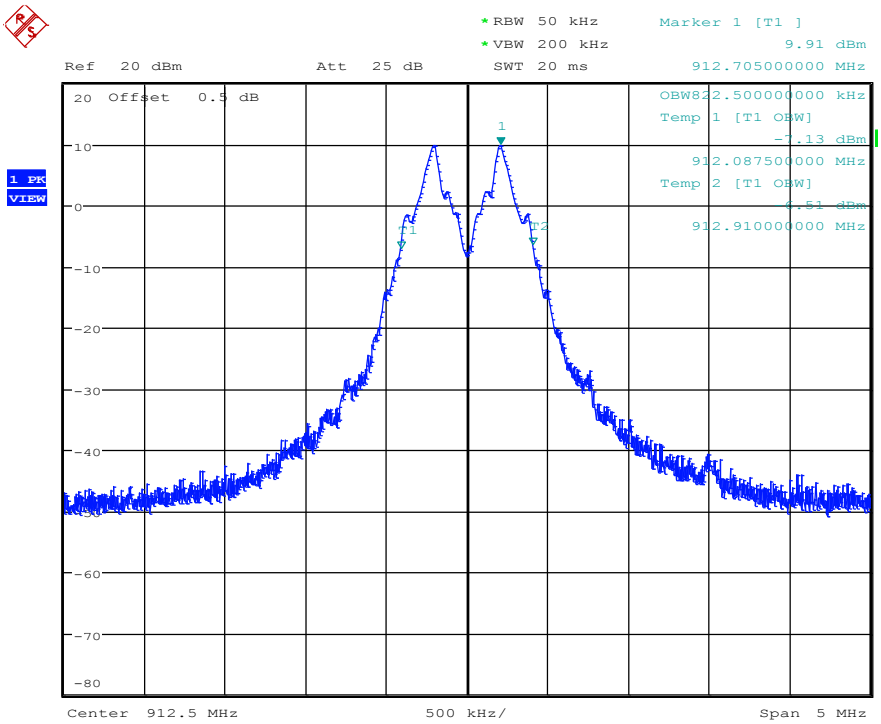
Occupied Bandwidth acc. to IC RSS-Gen		**Verdict: PASS**
Test according to measurement reference	Reference Method	
	ANSI C63.10	
Test frequency range	Tested frequencies	
	F_{MID}	
EUT test mode	Single	
Limits		
None (Informational only)		
Test setup		
		
Test procedure		
1. EUT set to test mode (Communication tester is used if needed) 2. Span set to at least twice the emission spectrum 3. Resolution bandwidth set to 1 % of span 4. Occupied Bandwidth (99 %) measurement with spectrum analyzer built in measurement function		
Test results		
Channel	Frequency [MHz]	Occupied Bandwidth [kHz]
F_{LOW}	912.5	822.50
F_{HIGH}	918.5	826.25
Comments:		

Occupied Bandwidth – F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom / Vnom
Mode:	Tx, 912.5 MHz, 2FSK
Test Date:	2016-01-18
Verdict:	PASS
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW= 822.5 MHz



Occupied bandwidth: 822.5 KHz

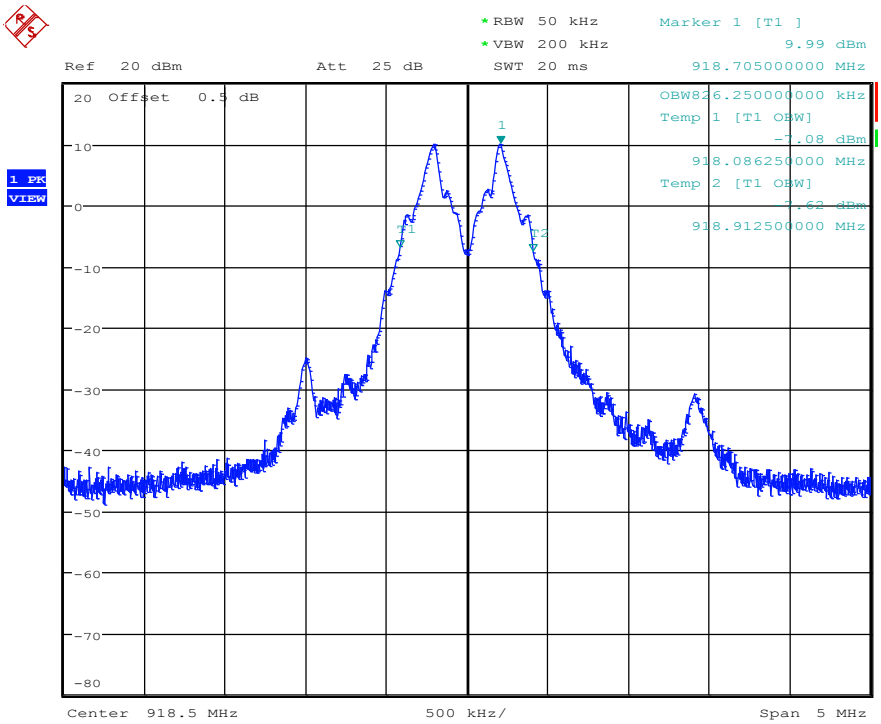
Date: 18.JAN.2016 15:35:09

Occupied Bandwidth – F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom / Vnom
Mode:	Tx, 918.5 MHz, 2FSK
Test Date:	2016-01-18
Verdict:	PASS
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW= 826.25 kHz



Occupied bandwidth: 826.2 KHz

Date: 18.JAN.2016 14:09:34

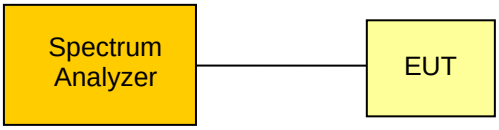
3.2 Test Conditions and Results – 6dB Bandwidth

6dB Bandwidth acc. to FCC 15.247 / IC RSS-247	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(a)(2) / IC RSS-247 5.2
Test according to measurement reference	Reference Method
	ANSI C63.10
Test frequency range	Tested frequencies
	F_{MID}
EUT test mode	Single

Limits

≥ 500 kHz

Test setup



Test procedure

1. EUT set to test mode (Communication tester is used if needed)
2. Span set to at least twice the emission spectrum
3. Detector set to peak and max hold
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. 6dB Bandwidth is determined by marker frequency separation

Test results

Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Limit [kHz]	Result
F_{LOW}	912.5	659.7	≥ 500	PASS
F_{HIGH}	918.5	659.7	≥ 500	PASS

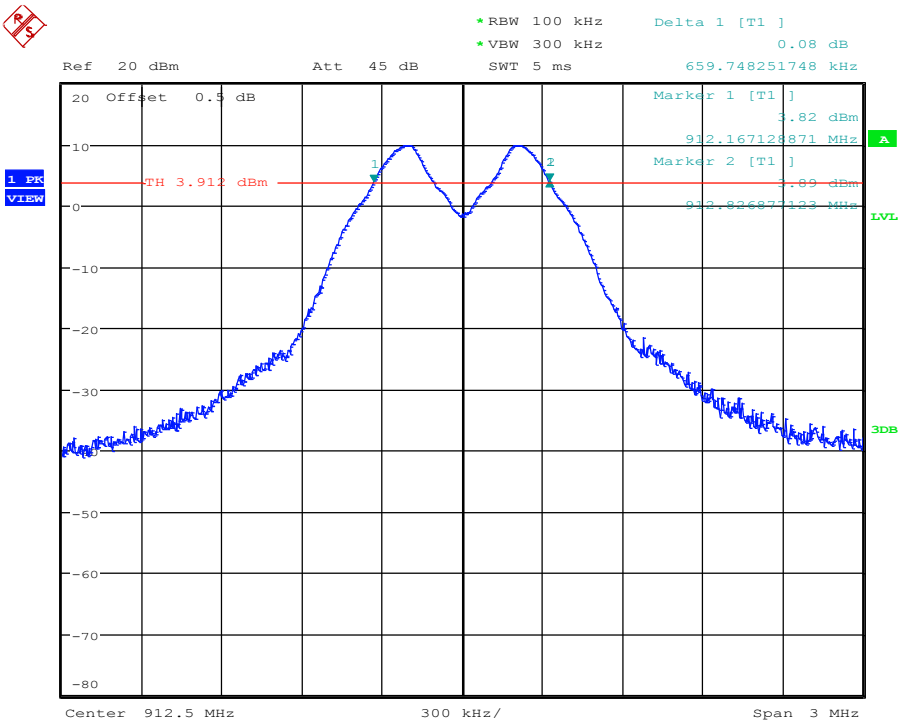
Comments:

6dB Bandwidth – F_{LOW}

Minimum 6 dB Bandwidth acc. to FCC 15.247

Project Number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom / Vnom
Mode:	Tx, 912.5 MHz, 2FSK
Test Date:	2016-01-18
Verdict:	PASS
Note 1:	Procedure according to ANSI C63.10
Note 2:	Minimum 6 dB Bandwidth conducted



6 dB bandwidth: 659.7 KHz > 500 KHz; verdict: PASS

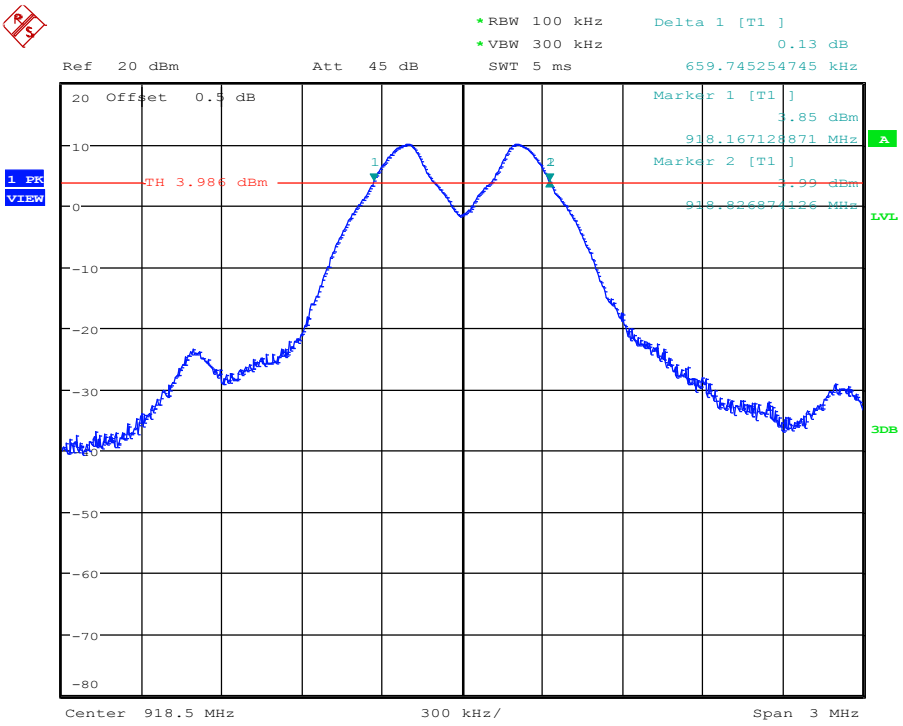
Date: 18.JAN.2016 15:15:17

6dB Bandwidth – F_{HIGH}

Minimum 6 dB Bandwidth acc. to FCC 15.247

Project Number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom / Vnom
Mode:	Tx, 918.5 MHz, 2FSK
Test Date:	2016-01-18
Verdict:	PASS
Note 1:	Procedure according to ANSI C63.10
Note 2:	Minimum 6 dB Bandwidth conducted



6 dB bandwidth: 659.7 KHz > 500 KHz; verdict: PASS

Date: 18.JAN.2016 13:58:52

3.3 Test Conditions and Results – Maximum peak conducted power

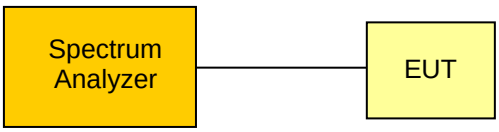
Maximum peak conducted power acc. to FCC 15.247 / IC RSS-247	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(b)(3) / IC RSS-247 5.4
Test according to measurement reference	Reference Method
	ANSI C63.10
Test frequency range	Tested frequencies
	F_{MID}
EUT test mode	Single
Measurement mode	Peak
Maximum antenna gain	-1.2 dBi ⇒ Limit correction = 0 dB

Limits

1W (30dBm)

The conducted output power limit specified above is based on the use of antennas with directional gains that do not exceed 6dBi. If transmitting antennas of directional gain greater than 6dBi 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 6dBi.

Test setup



Test procedure

1. EUT set to test mode (Communication tester is used if needed)
2. Center frequency set to test channel center frequency
3. Span is set to be larger than the 6 dB bandwidth and RBW is set to be at least the 6 dB bandwidth
4. Peak output power is determined from the maximum of the emission envelope

Test results

Channel	Frequency [MHz]	Voltage	Peak power [dbm]	Peak power [W]	Limit [dBm]	Margin [dB]	Result
F_{LOW}	912.5	3.3 VDC	9.9	0.0099	30	-20.10	PASS
F_{LOW}	912.5	3.5 VDC	9.9	0.0099	30	-20.10	PASS
F_{LOW}	912.5	3.7 VDC	9.9	0.0099	30	-20.10	PASS
F_{LOW}	918.5	3.3 VDC	10.0	0.0100	30	-20.00	PASS
F_{LOW}	918.5	3.5 VDC	10.0	0.0100	30	-20.00	PASS
F_{LOW}	918.5	3.7 VDC	10.0	0.0100	30	-20.00	PASS

Comments:

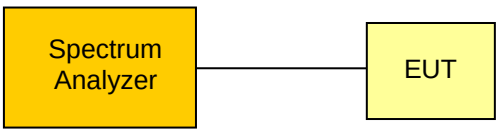
3.4 Test Conditions and Results – Power spectral density

Power spectral density acc. to FCC 15.247 / IC RSS-247	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(e) / IC RSS-247 5.2
Test according to measurement reference	Reference Method
	ANSI C63.10
Test frequency range	Tested frequencies
	F_{MID}
EUT test mode	Single
Measurement mode	Peak

Limits

8 dBm / 3 kHz

Test setup



Test procedure

1. EUT set to test mode (Communication tester is used if needed)
2. Center frequency set to test channel center frequency
3. Span is set large enough to capture maximum emissions in passband, RBW is set to 3 kHz
4. Peak power density is determined from peak emission of envelope

Test results

Channel	Frequency [MHz]	Voltage	Peak frequency [MHz]	Peak power density [dBm]	Limit [dBm/3kHz]	Margin [dB]	Result
F_{LOW}	912.5	3.3 VDC	912.716	1.48	8.0	-06.52	PASS
F_{HIGH}	918.5	3.3 VDC	918.726	2.64	8.0	-05.36	PASS

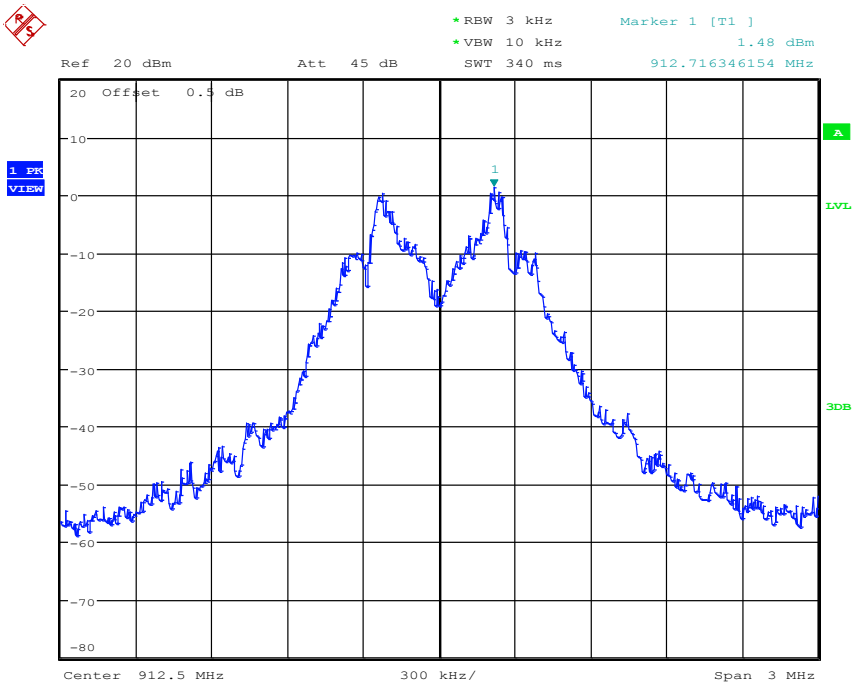
Comments:

Power spectral density – F_{LOW}

Power spectral density acc. to FCC 15.247

Project Number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom / Vnom
Mode:	Tx, 912.5 MHz, 2FSK
Test Date:	2016-01-18
Verdict:	PASS
Note 1:	Procedure according to ANSI C63.10
Note 2:	Power spectral density conducted



Maximum Power Spectral Density=1.48dBm

f=912.716 MHz RBW= 3kHz , Limit <8dBm/3kHz

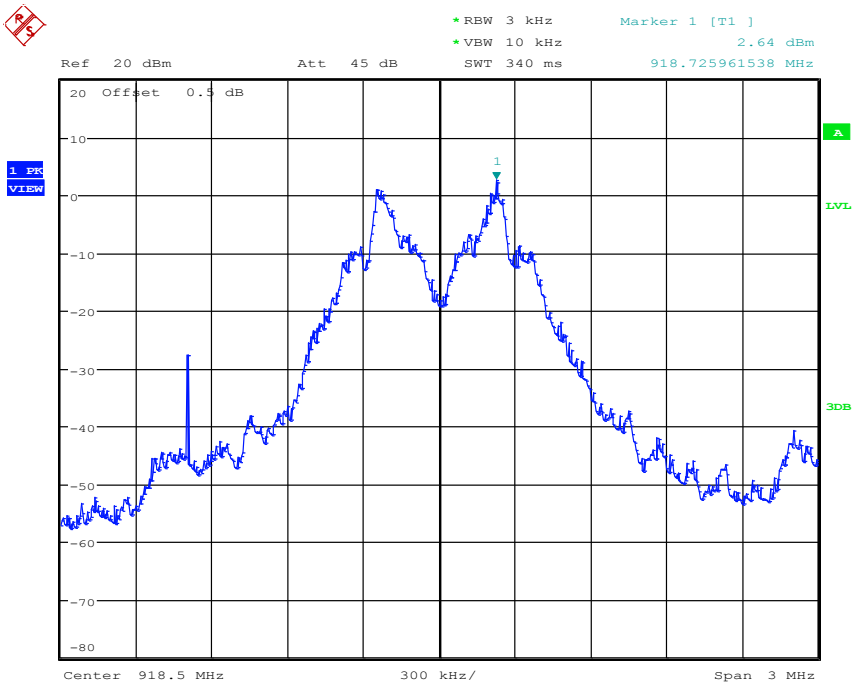
Date: 18.JAN.2016 14:54:56

Power spectral density – F_{HIGH}

Power spectral density acc. to FCC 15.247

Project Number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom / Vnom
Mode:	Tx, 918.5 MHz, 2FSK
Test Date:	2016-01-18
Verdict:	PASS
Note 1:	Procedure according to ANSI C63.10
Note 2:	Power spectral density conducted



Maximum Power Spectral Density=2.64dBm

f=918.726 MHz RBW= 3kHz , Limit <8dBm/3kHz

Date: 18.JAN.2016 13:50:06

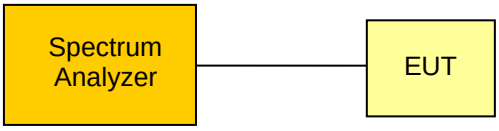
3.6 Test Conditions and Results – Band edge compliance

Band-edge compliance acc. to FCC 15.247 / IC RSS-247	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(d) / IC RSS-247 5.5
Test according to measurement reference	Reference Method
	ANSI C63.10
Test frequency range	Tested frequencies
	F_{MID}
EUT test mode	Single

Limits

Limit	Condition
≤ -20 dB / 100 kHz	Peak power measurement detector = Peak
≤ -30 dB / 100 kHz	Peak power measurement detector = RMS

Test setup



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

Test results

Channel	Frequency [MHz]	Mode	Level [dBc]	Limit [dBc]	Margin [dB]	Result
F_{LOW}	912.5	Single	-53.0	-20	-33.00	PASS
F_{HIGH}	918.5	Single	-53.0	-20	-33.00	PASS

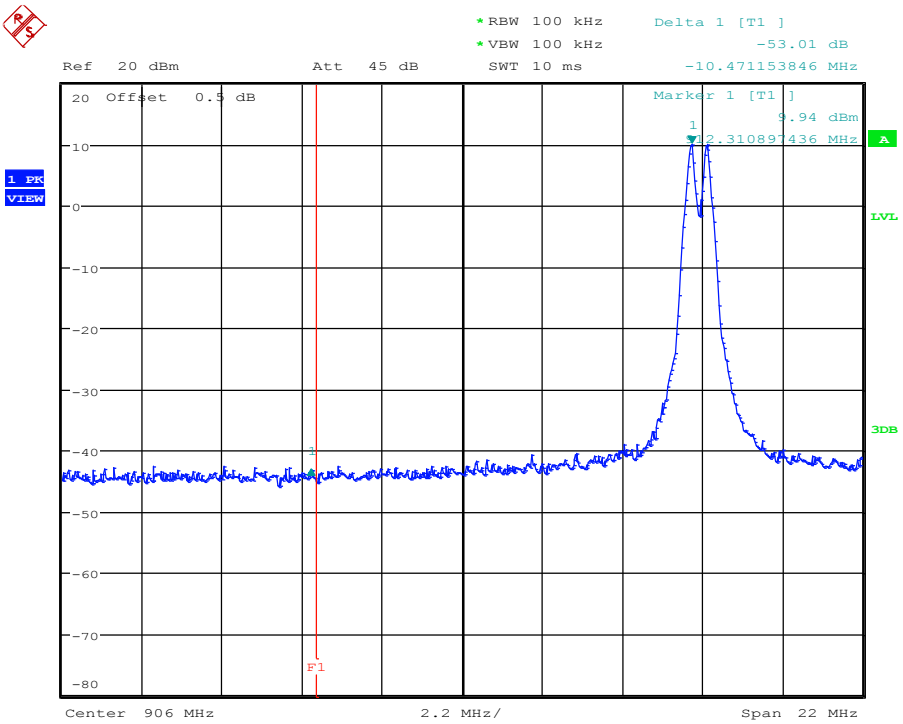
Comments:

Band-edge compliance – F_{MID} single – Lower Edge

Band-edge compliance acc. to FCC 15.247

Project Number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom / Vnom
Mode:	Tx, 912.5 MHz, 2FSK
Test Date:	2016-01-18
Verdict:	PASS
Note 1:	Reference Method according to ANSI C63.10
Note 2:	lower Band-edge, conducted measurement



Limit: Marker Delta value >20 dB; Result: PASS

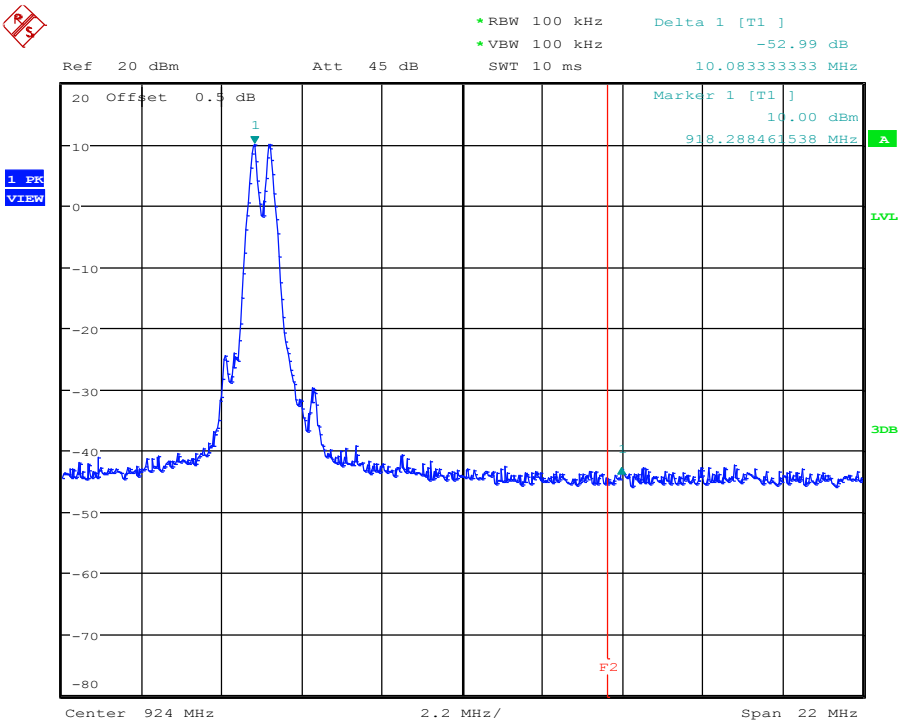
Date: 18.JAN.2016 14:47:52

Band-edge compliance – F_{MID} single – Upper Edge

Band-edge compliance acc. to FCC 15.247

Project Number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom / Vnom
Mode:	Tx, 918.5 MHz, 2FSK
Test Date:	2016-01-18
Verdict:	PASS
Note 1:	Reference Method according to ANSI C63.10
Note 2:	upper Band-edge, conducted measurement



Limit: Marker Delta value >20 dB; Result: PASS

Date: 18.JAN.2016 14:19:44

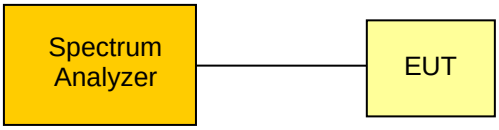
3.7 Test Conditions and Results – Conducted spurious emissions

Conducted spurious emissions acc. to FCC 15.247 / IC RSS-247	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(d) / IC RSS-247 5.5
Test according to measurement reference	Reference Method
	ANSI C63.10
Test frequency range	Tested frequencies
	10 MHz – 10th Harmonic
EUT test mode	Single

Limits

Limit	Condition
≤ -20 dB / 100 kHz	Peak power measurement detector = Peak
≤ -30 dB / 100 kHz	Peak power measurement detector = RMS

Test setup



Test procedure

1. EUT set to test mode (Communication tester is used if needed)
2. Span it set according to measurement range
3. Resolution bandwidth is set to 100 kHz and detector to peak and max hold
4. Markers are set to peak emission levels within frequency band
5. Emission level is determined by second marker on emission peak
6. Attenuation is determined from level difference

Test results

Channel	Frequency [MHz]	Emission [MHz]	Emission Level [dbm]	Peak power [dBm]	Limit [dBm]	Margin [dB]	Result
F_{LOW}	912.5	1824.778	-41.7	9.9	-10.1	-31.60	PASS
F_{HIGH}	918.5	1836.137	-43.5	10.0	-10.0	-33.50	PASS

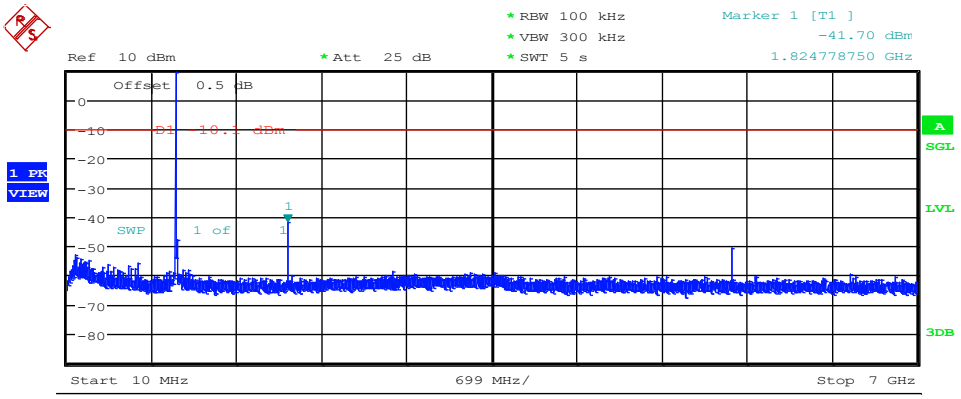
Comments:

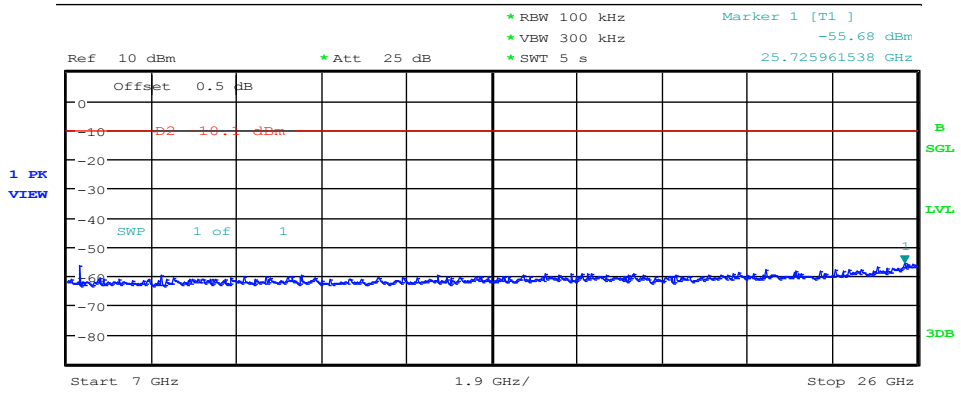
Conducted spurious emissions – F_{LOW}

Spurious Emissions acc. to FCC 15.247

Project Number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom / Vnom
Mode:	Tx, 912.5 MHz, 2FSK
Test Date:	2016-01-18
Verdict:	PASS
Note 1:	Spurious in non-restricted frequency bands (ANSI C63.10)
Note 2:	conducted measurement





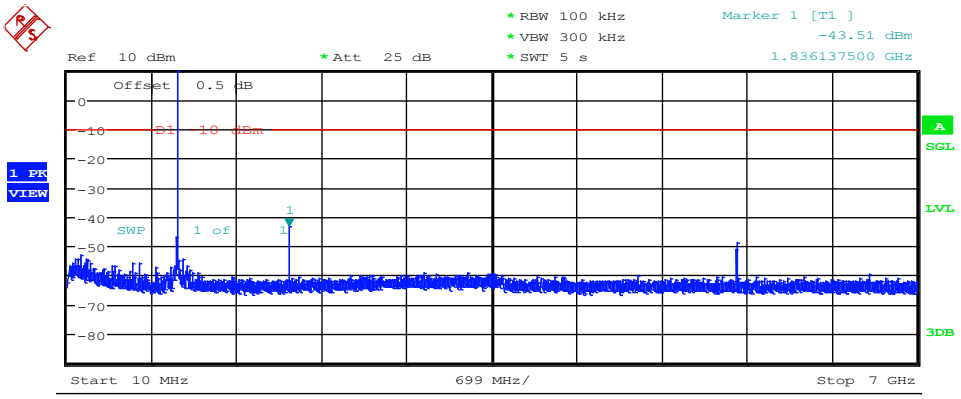
Date: 18.JAN.2016 14:40:10

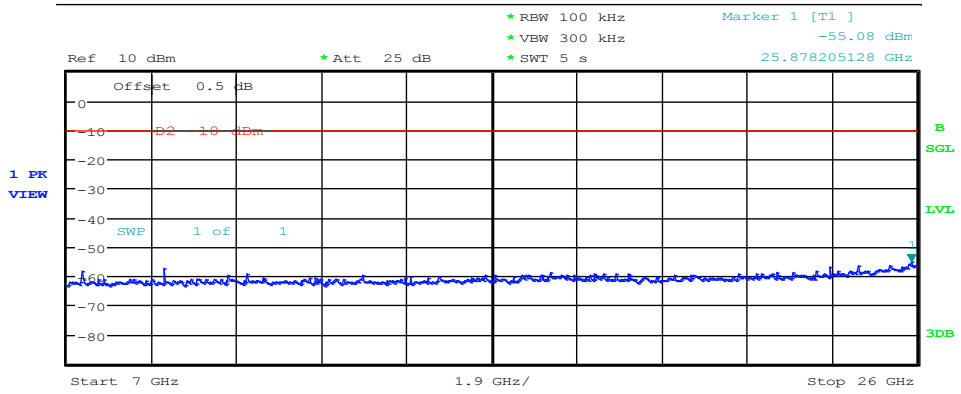
Conducted spurious emissions – F_{HIGH}

Spurious Emissions acc. to FCC 15.247

Project Number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom / Vnom
Mode:	Tx, 918.5 MHz, 2FSK
Test Date:	2016-01-18
Verdict:	PASS
Note 1:	Spurious in non-restricted frequency bands (ANSI C63.10)
Note 2:	conducted measurement

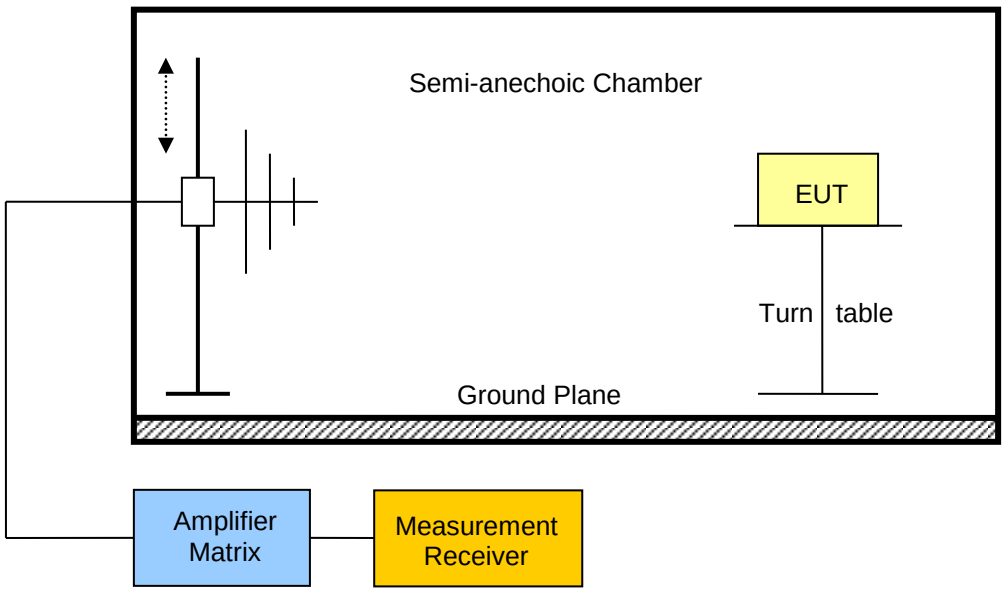




Date: 18.JAN.2016 14:24:57

3.8 Test Conditions and Results – Transmitter radiated emissions

Transmitter radiated emissions acc. to FCC 47 CFR 15.247 / IC RSS-247				**Verdict: PASS**
Test according referenced standards	Reference Method			
	FCC 15.247(d) / IC RSS-247 5.5			
Test according to measurement reference	Reference Method			
	ANSI C63.10			
Test frequency range	Tested frequencies			
	30 MHz – 10th Harmonic			
EUT test mode	Single			
Limits				
Frequency range [MHz]	Detector	Limit [µV/m]	Limit [dBµV/m]	Limit Distance [m]
30 – 88	Quasi-Peak	100	40	3
88 – 216	Quasi-Peak	150	43.5	3
216 – 960	Quasi-Peak	200	46	3
960 – 1000	Quasi-Peak	500	54	3
> 1000	Average	500	54	3
Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)). When average radiated emission measurements are specified, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.				
Test setup				



Test procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Span it set according to measurement range 3. Resolution bandwidth below 1 GHz is set according to CISPR 16 with peak/quasi-peak detector and RBW of 1 MHz with peak/average detector is used above 1 GHz 4. Markers are set to peak emission levels within restricted bands

Test results – Internal Antenna

Channel	Frequency [MHz]	Emission [MHz]	Level [dbµV/m]	Detector	Pol.	Limit [dbµV/m]	Limit distance [m]*	Margin [dB]
F_{LOW}	912.5	2737	52.41	pk	hor	74.00	3	-21.59
F_{LOW}	912.5	2737	52.06	pk	ver	74.00	3	-21.94
F_{LOW}	912.5	3649	55.35	pk	hor	74.00	3	-18.65
F_{LOW}	912.5	3651	56.82	pk	ver	74.00	3	-17.18
F_{LOW}	912.5	4564	55.82	pk	hor	74.00	3	-18.18
F_{LOW}	912.5	4564	57.28	pk	ver	74.00	3	-16.72
F_{LOW}	912.5	7298	56.64	pk	hor	74.00	3	-17.36
F_{HIGH}	918.5	2755	52.62	pk	ver	74.00	3	-21.38
F_{HIGH}	918.5	2756	55.31	pk	hor	74.00	3	-18.69
F_{HIGH}	918.5	3673	55.54	pk	ver	74.00	3	-18.46
F_{HIGH}	918.5	3675	57.02	pk	hor	74.00	3	-16.98
F_{HIGH}	918.5	4591	58.18	pk	hor	74.00	3	-15.82
F_{HIGH}	918.5	4594	53.61	pk	ver	74.00	3	-20.39

Comments: * Physical distance between EUT and measurement antenna.

ANNEX A Transmitter radiated spurious emissions

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; 912.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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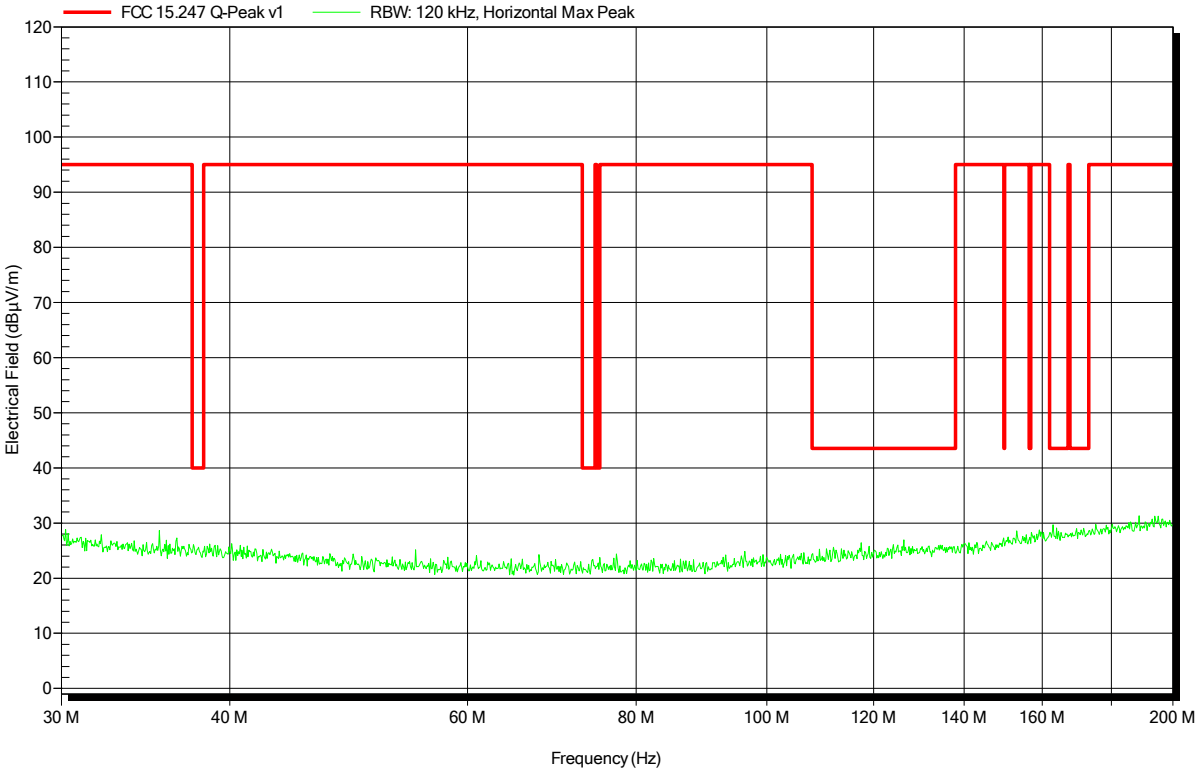

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; 912.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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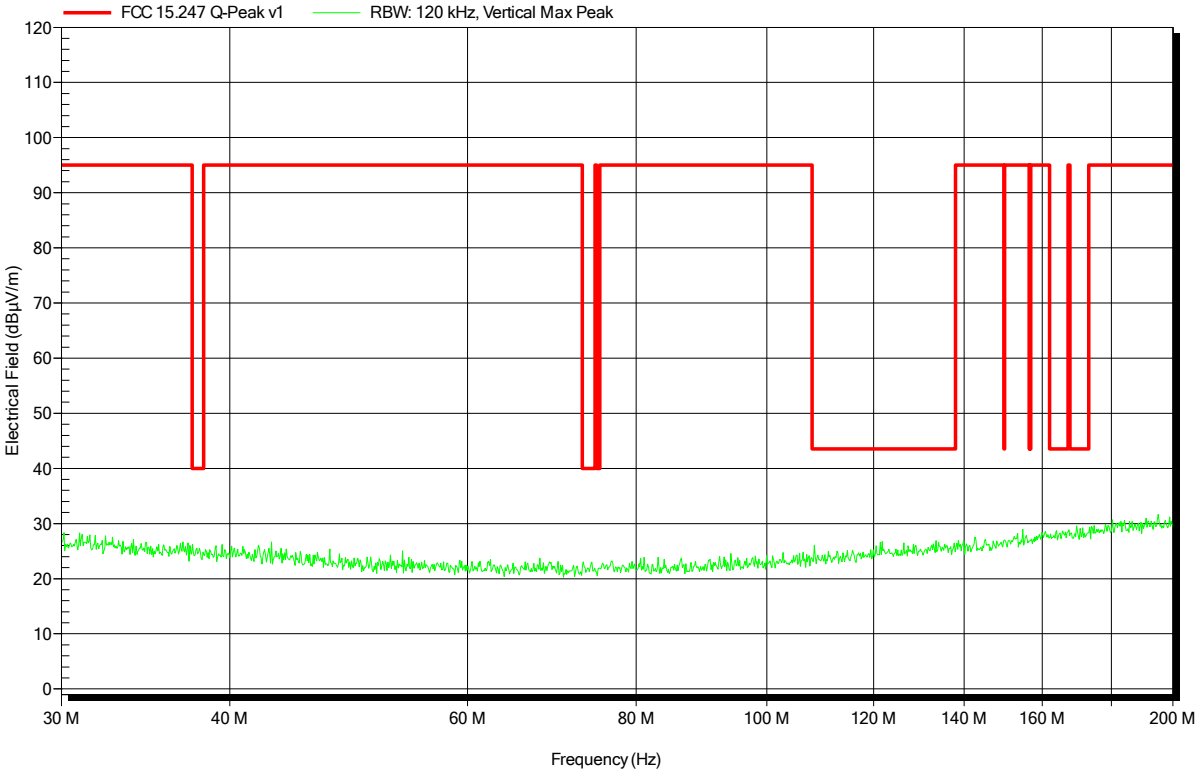

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 912.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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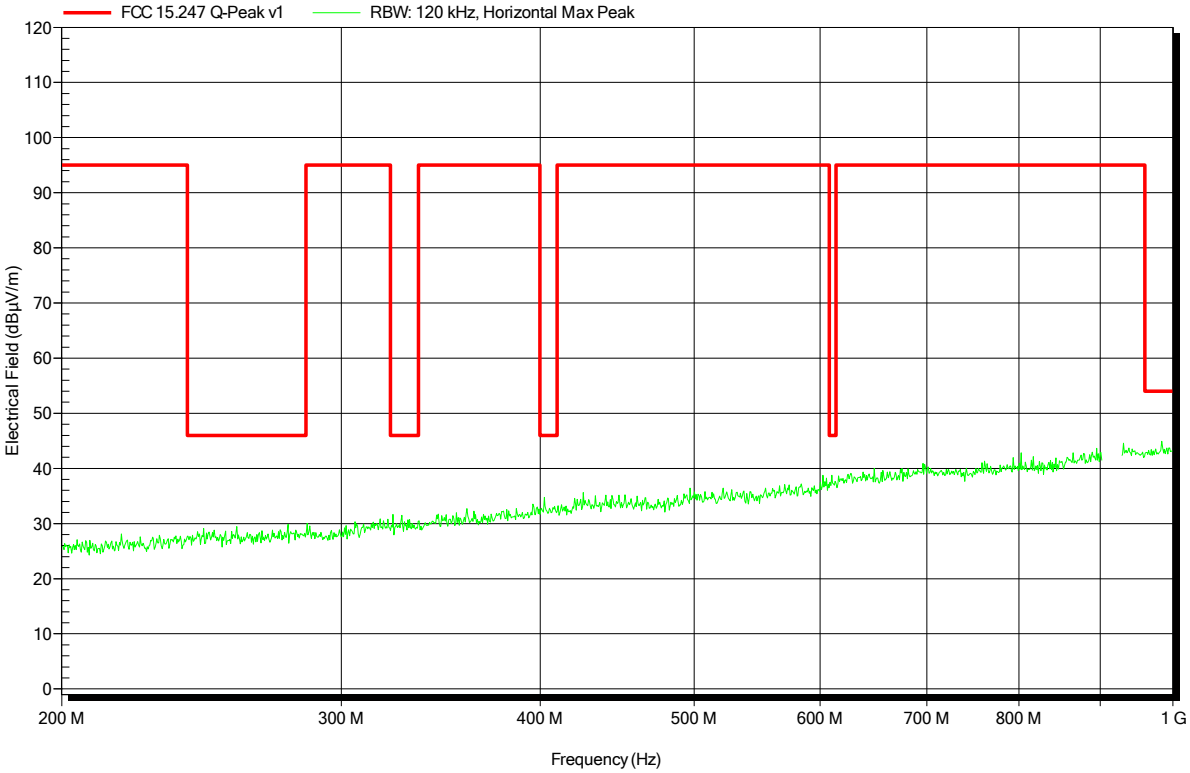

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 912.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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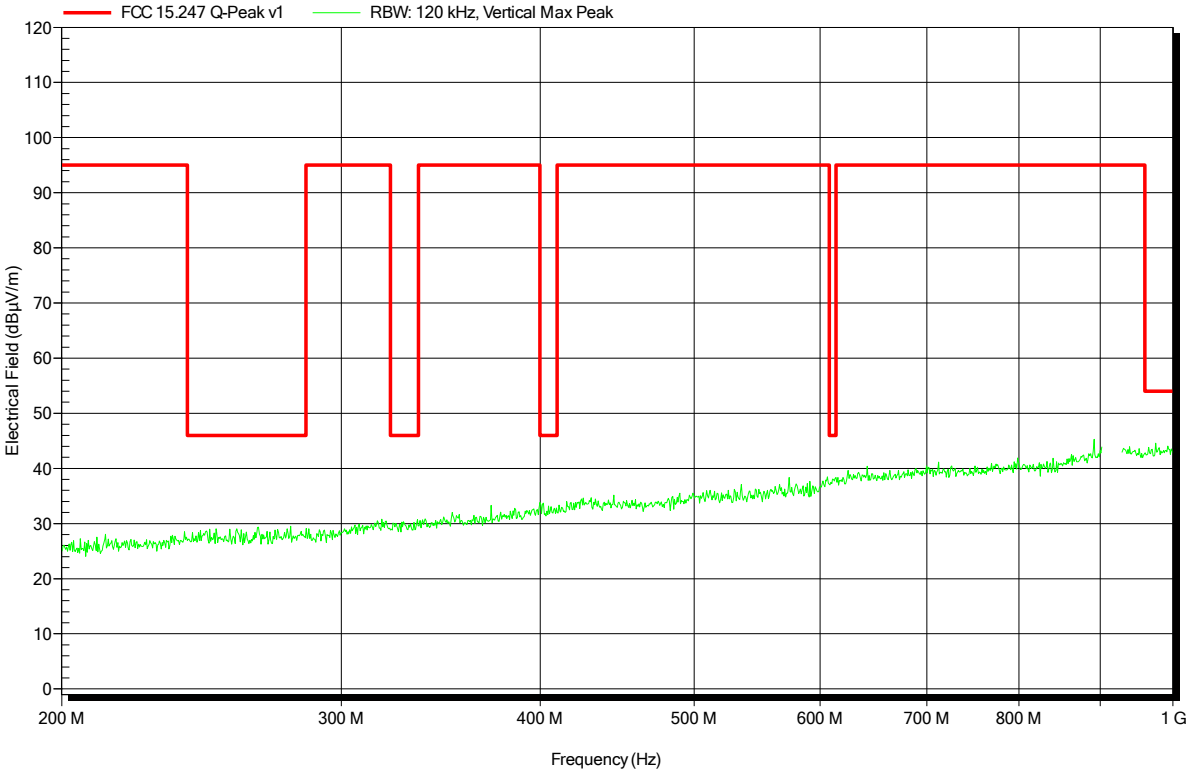

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 912.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	lower Bandedge

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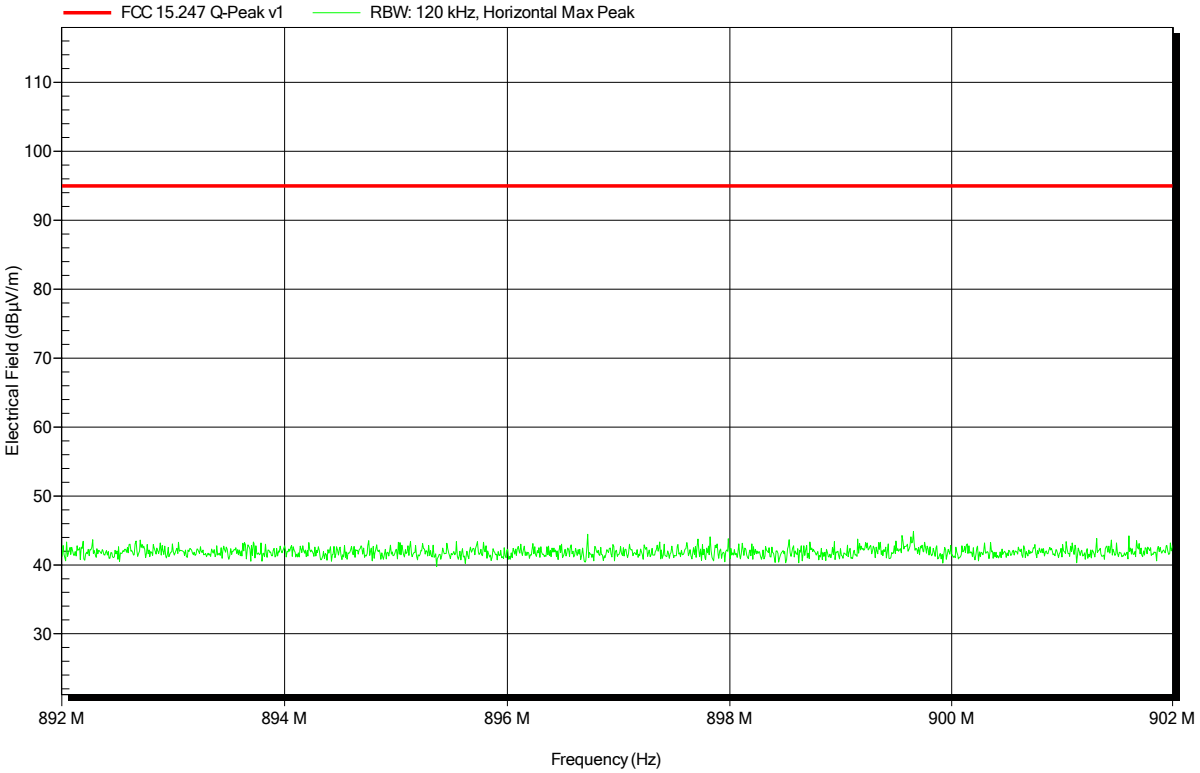

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 912.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	lower Bandedge

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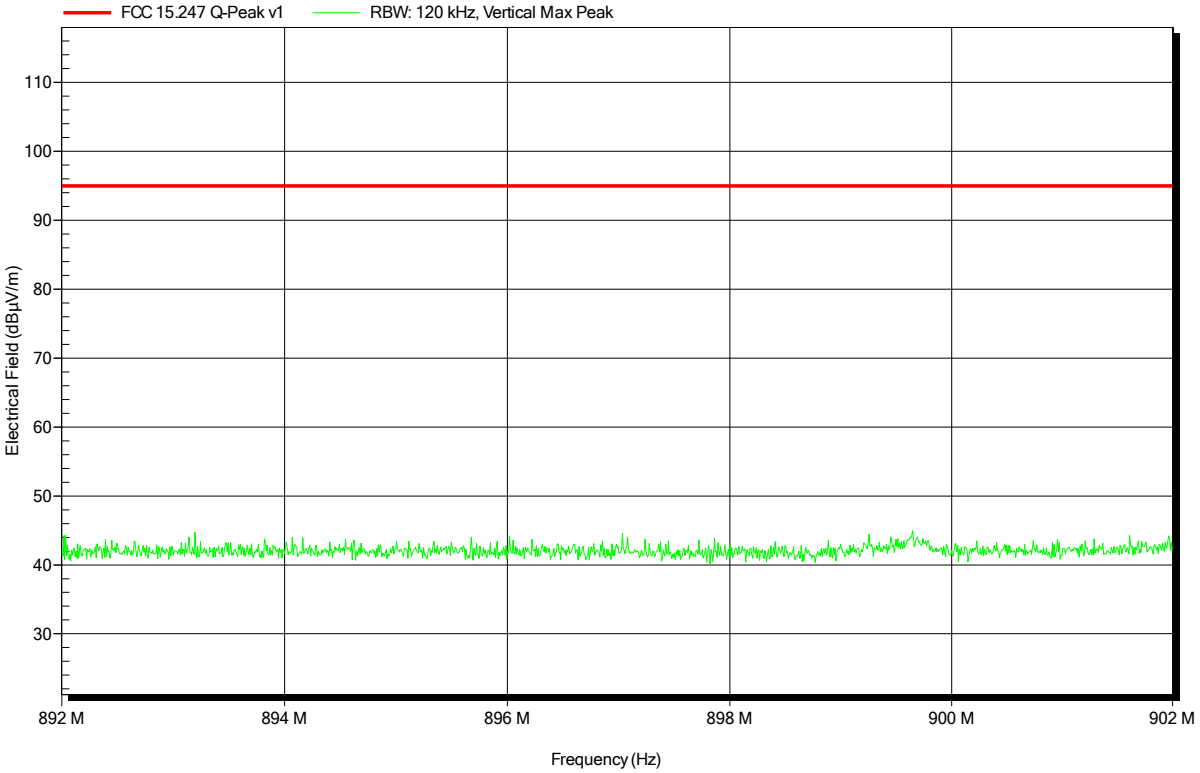

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	TX; 912.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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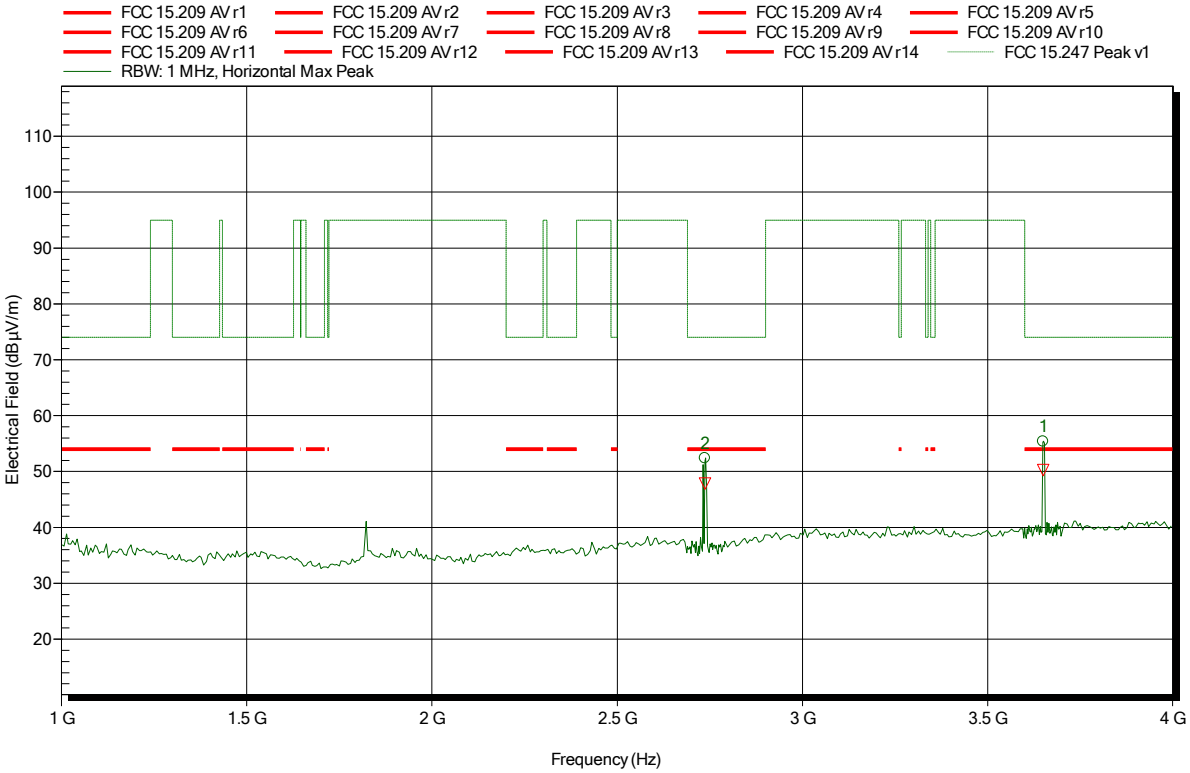

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.737 GHz	52.41 dBµV/m	74 dBµV/m	-21.59 dB	Pass
3.649 GHz	55.35 dBµV/m	74 dBµV/m	-18.65 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	TX; 912.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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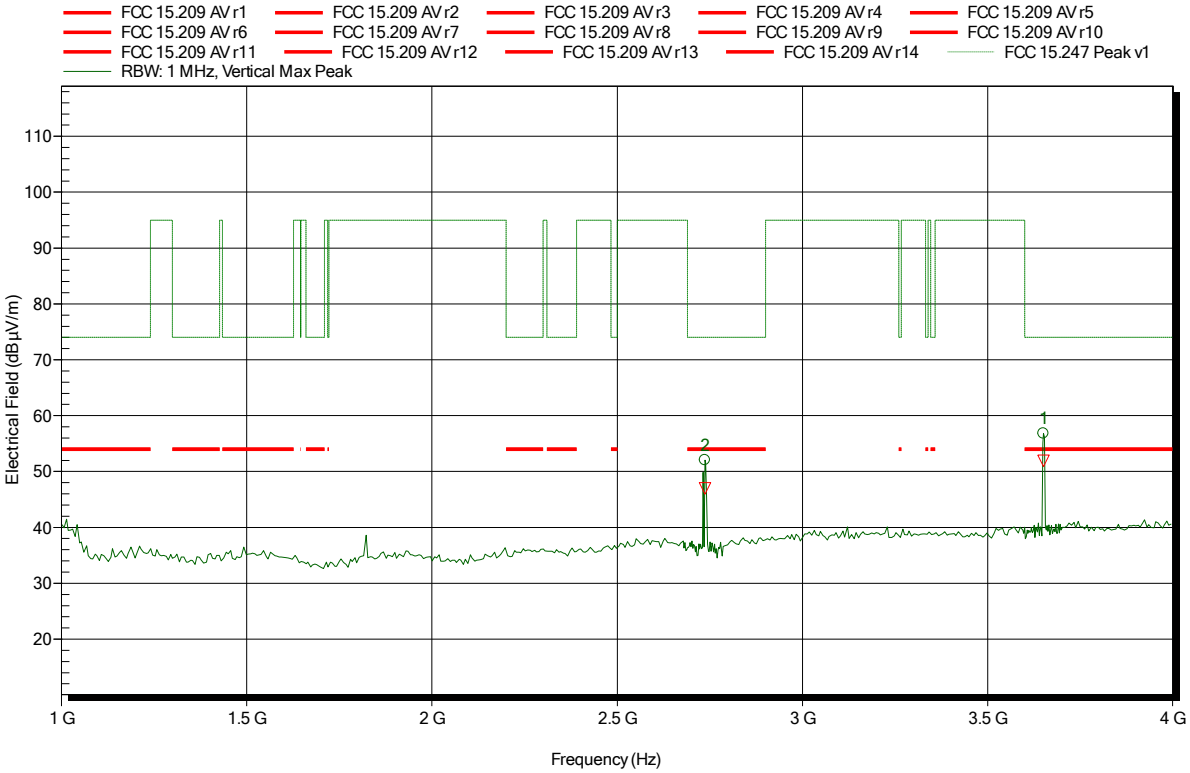

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.737 GHz	52.06 dBµV/m	74 dBµV/m	-21.94 dB	Pass
3.651 GHz	56.82 dBµV/m	74 dBµV/m	-17.18 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	TX; 912.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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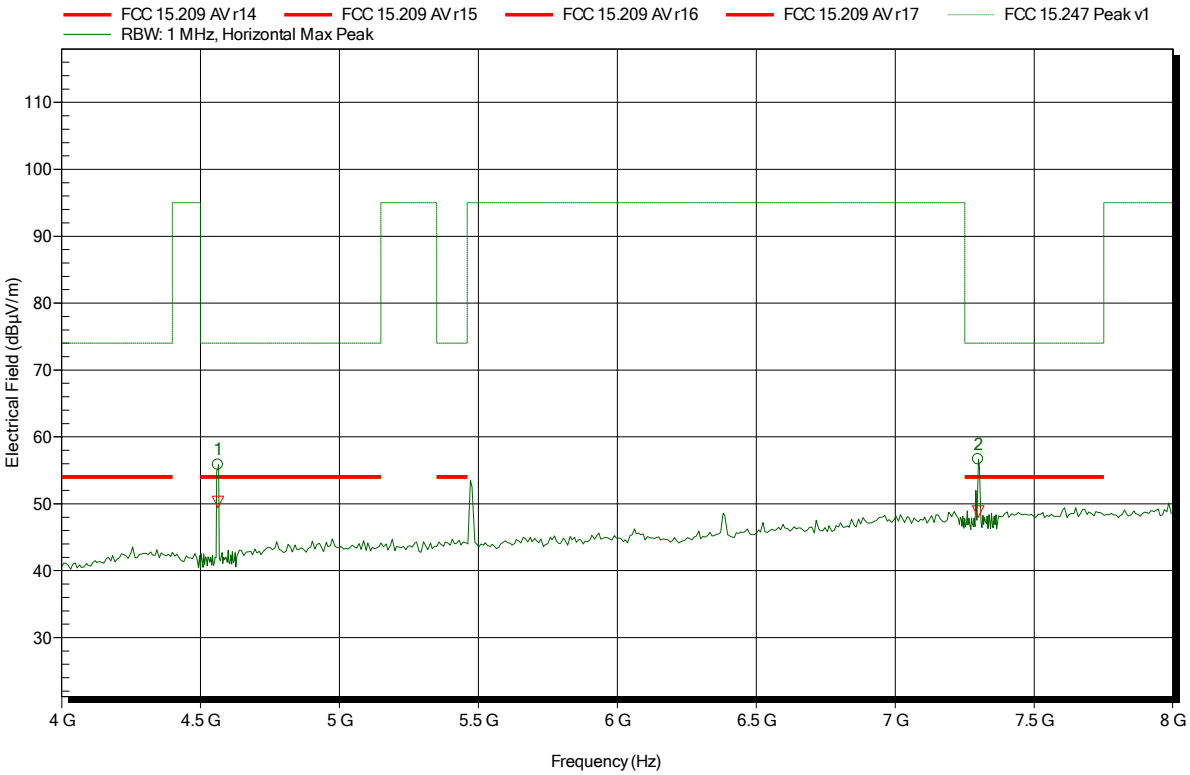

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.564 GHz	55.82 dBµV/m	74 dBµV/m	-18.18 dB	Pass
7.298 GHz	56.64 dBµV/m	74 dBµV/m	-17.36 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	TX; 912.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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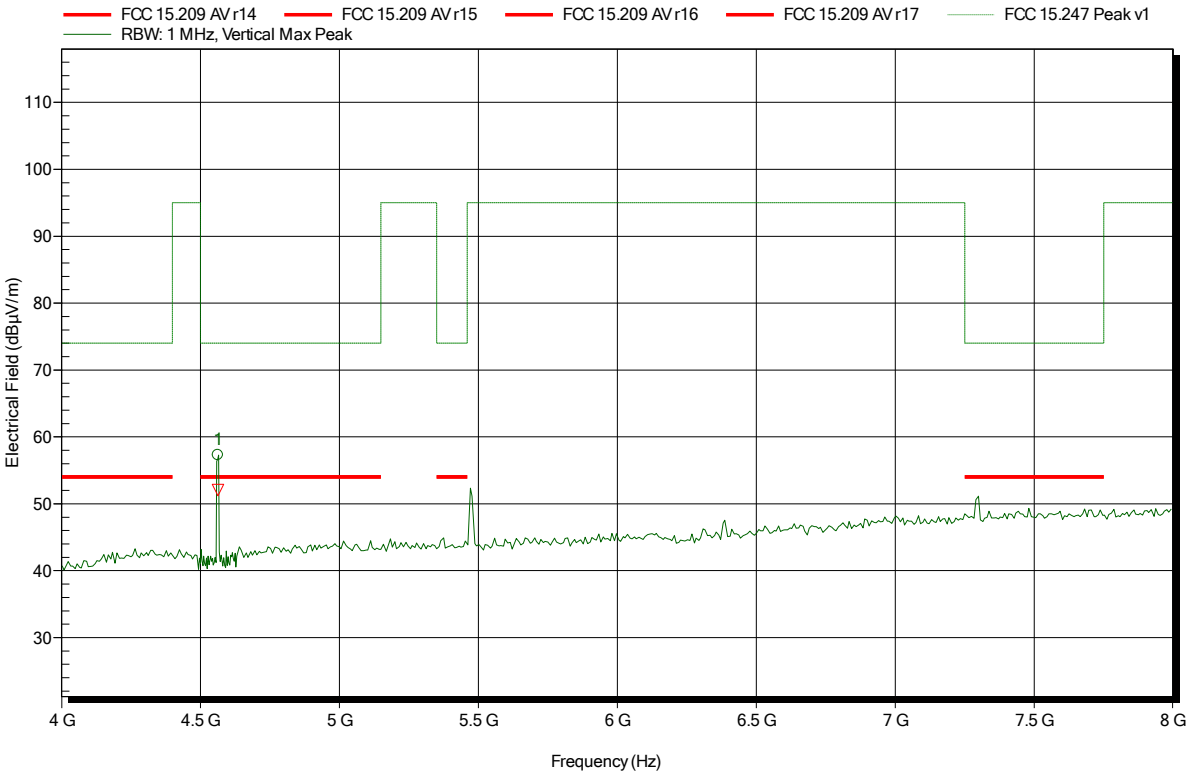

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.564 GHz	57.28 dBµV/m	74 dBµV/m	-16.72 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 912.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 912.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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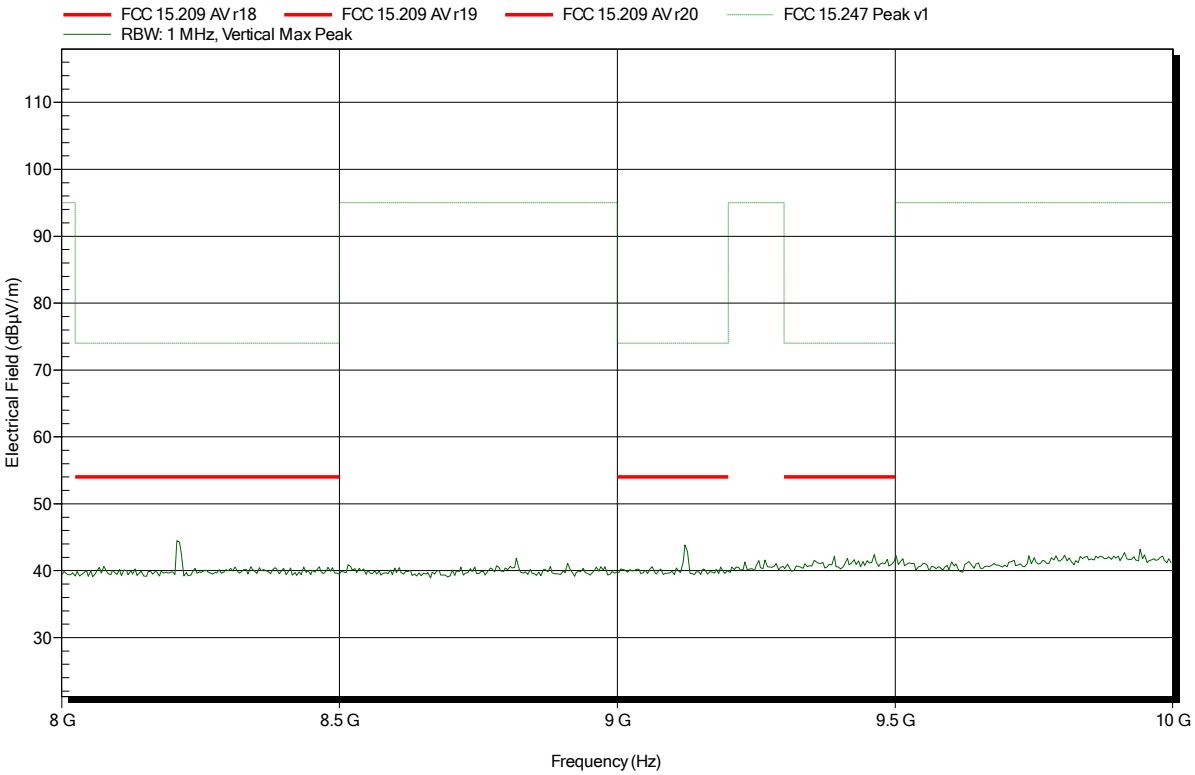

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; 918.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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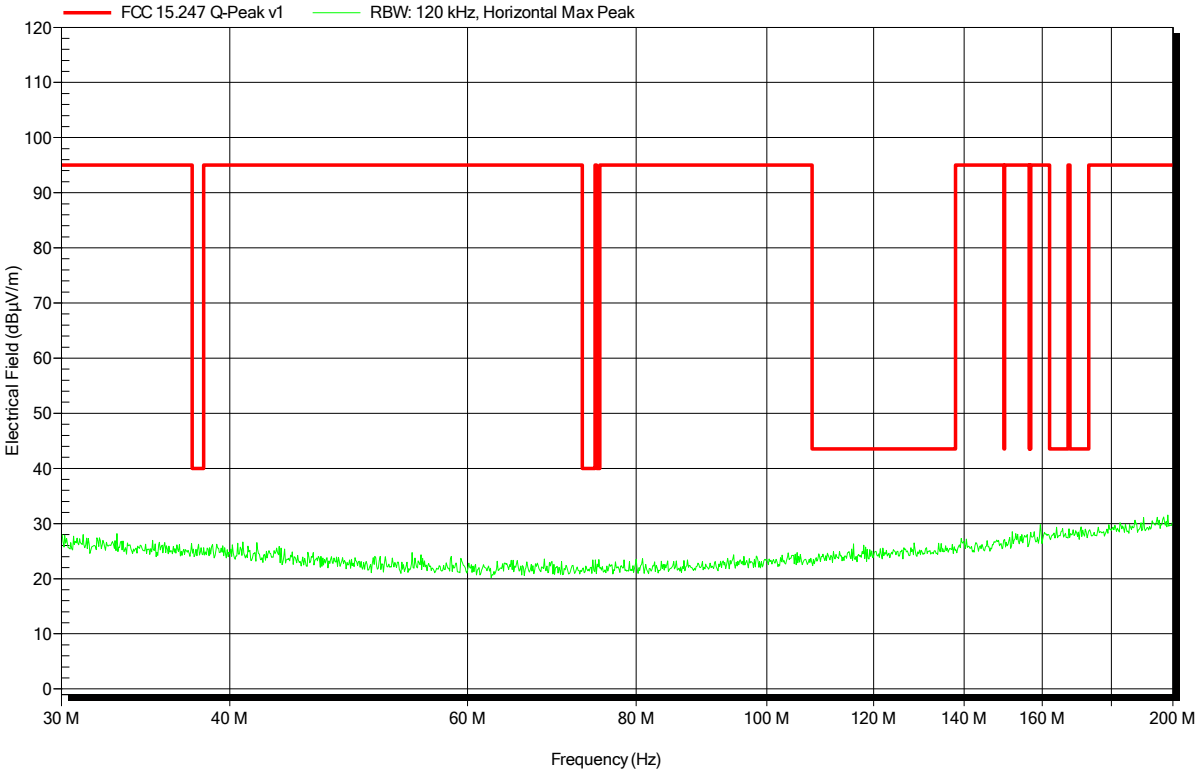

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; 918.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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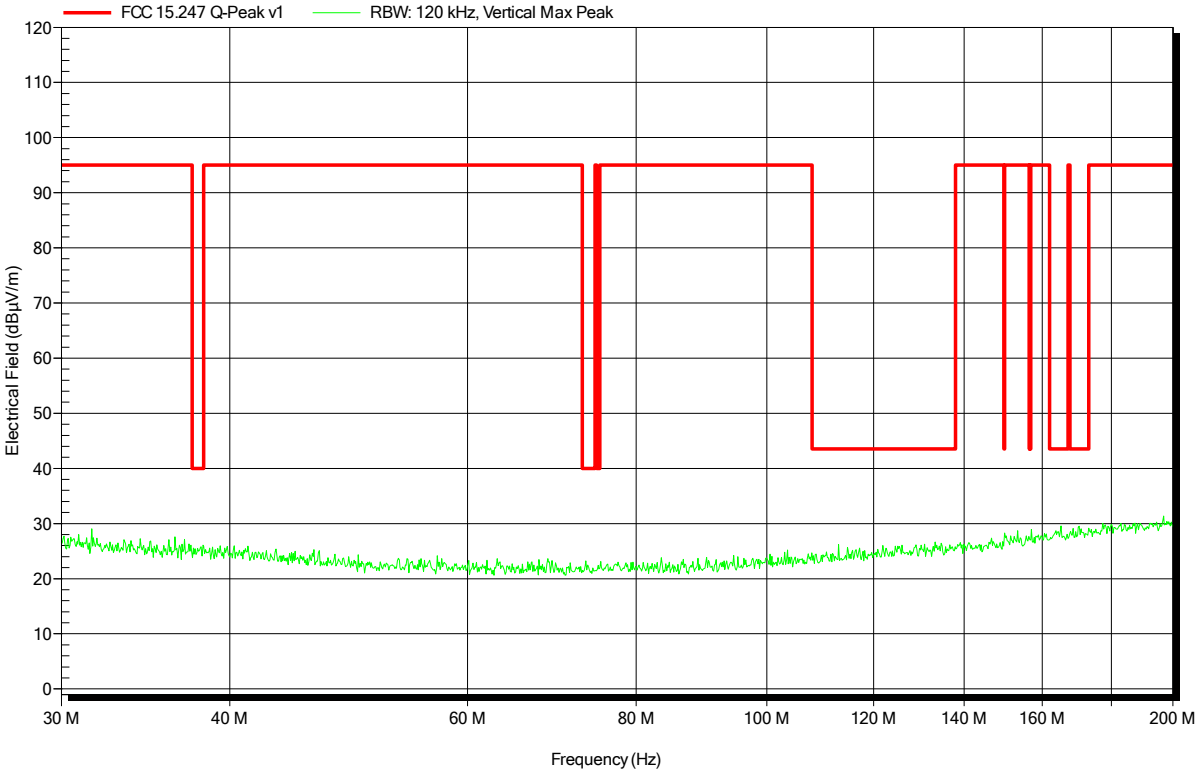

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 918.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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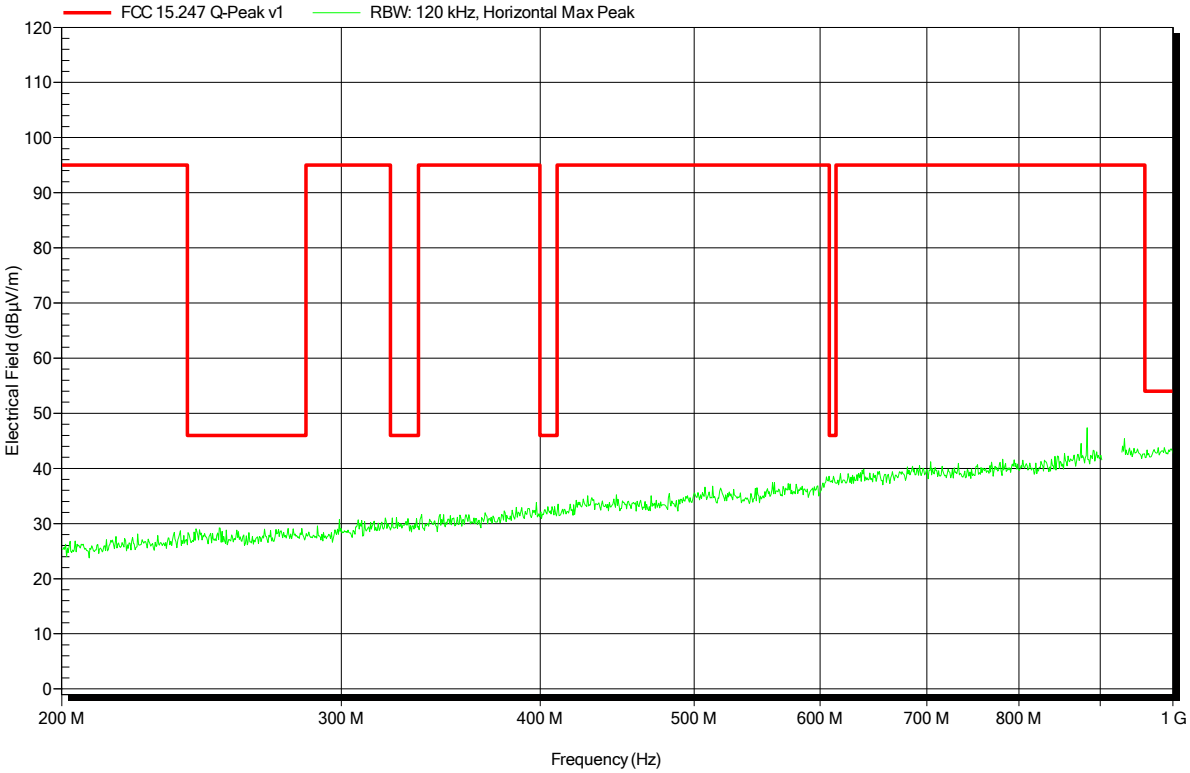

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 918.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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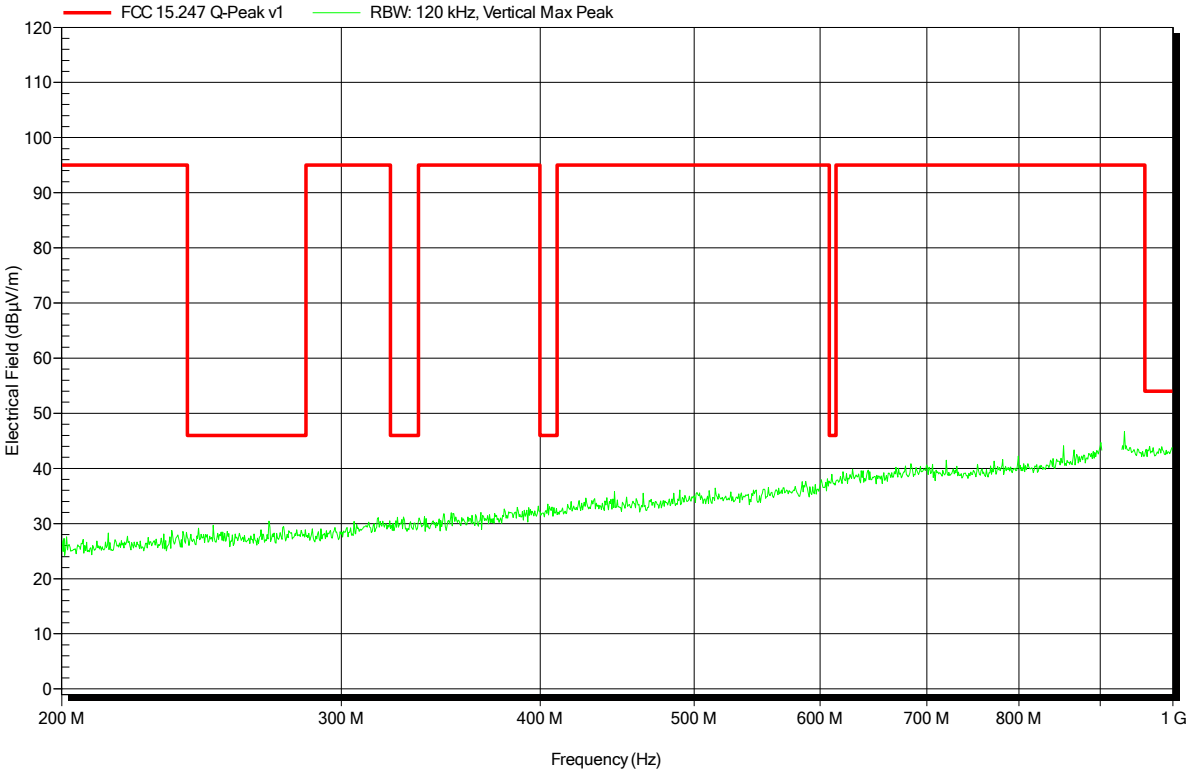

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 918.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	upper Bandedge

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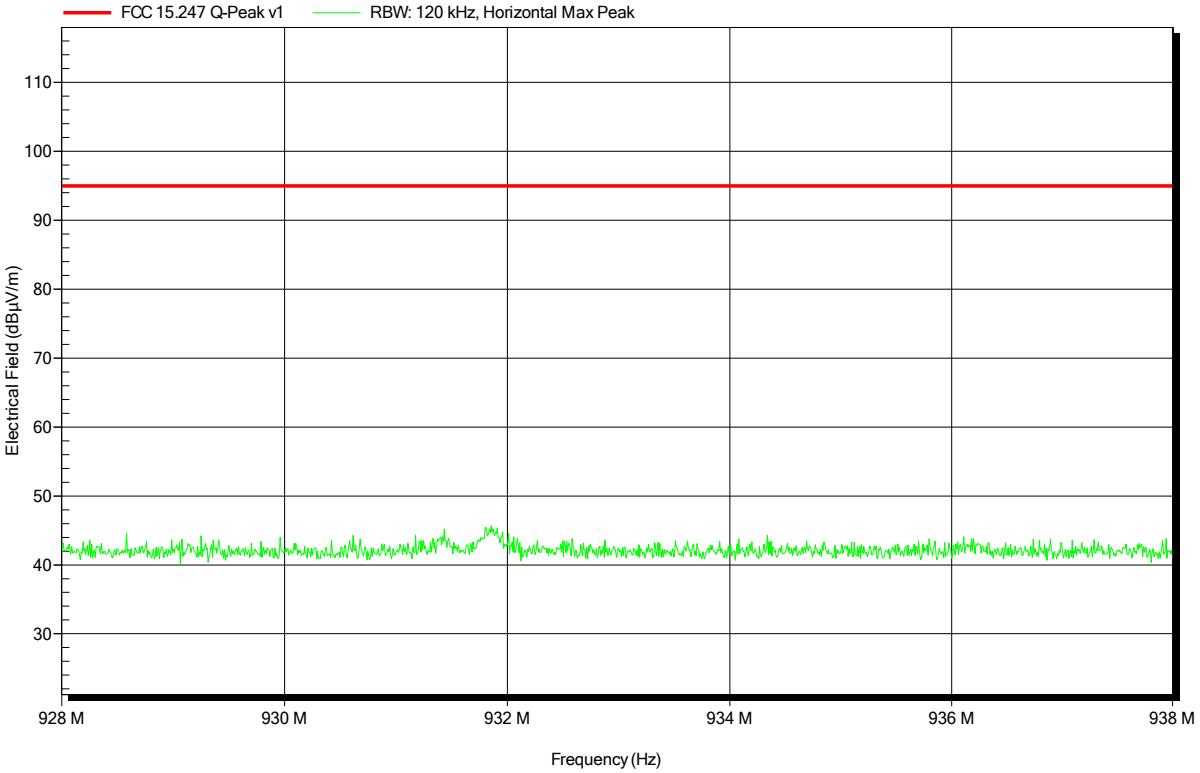

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 918.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	upper Bandedge

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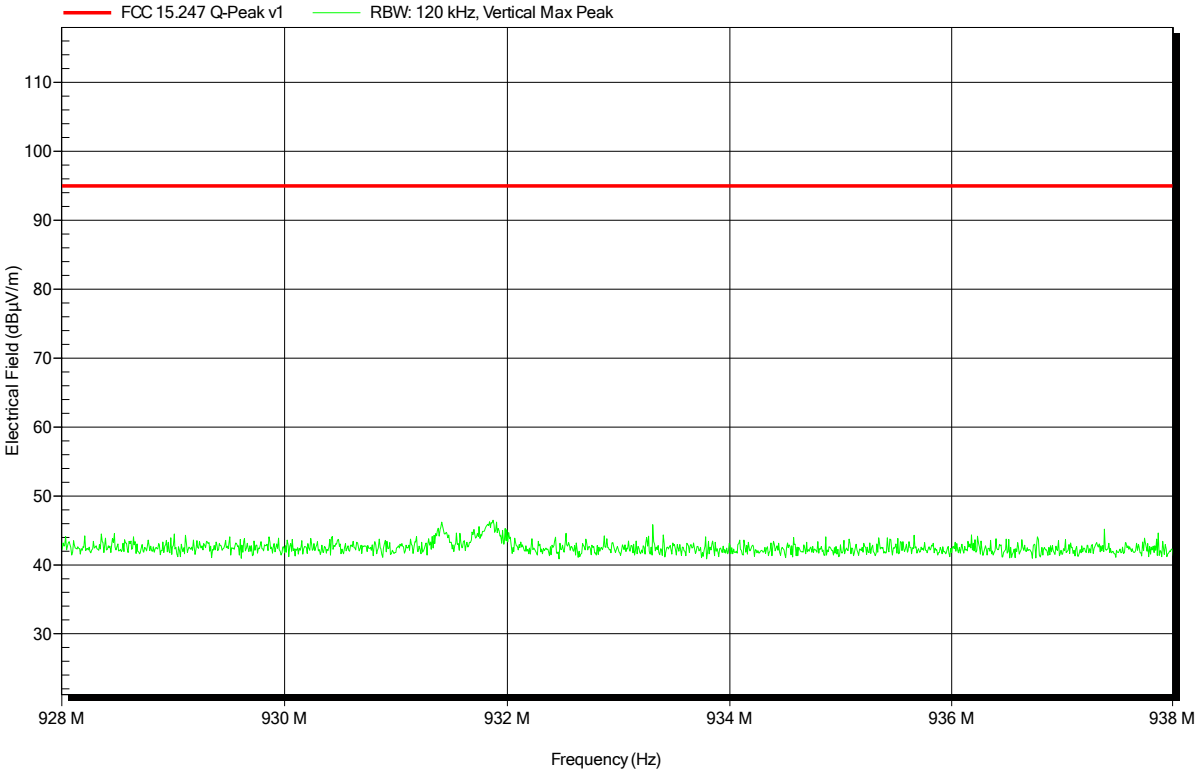

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	TX; 918.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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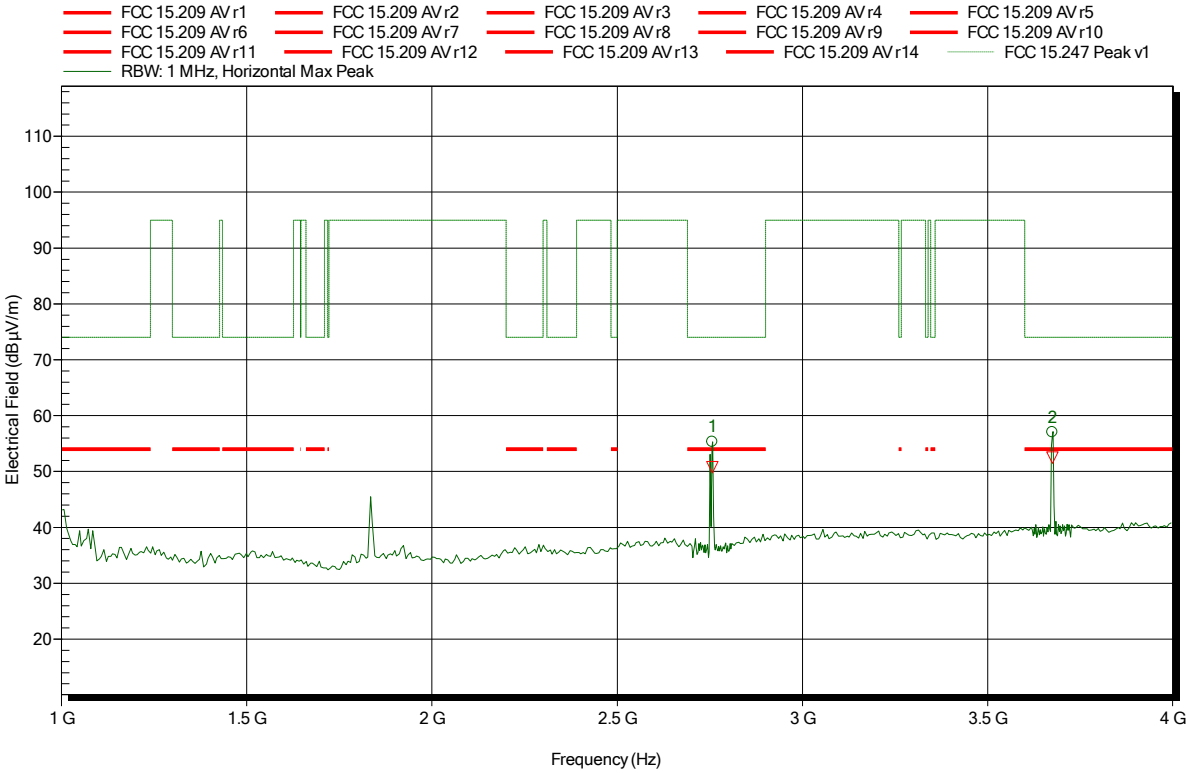

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.756 GHz	55.31 dBµV/m	74 dBµV/m	-18.69 dB	Pass
3.675 GHz	57.02 dBµV/m	74 dBµV/m	-16.98 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	TX; 918.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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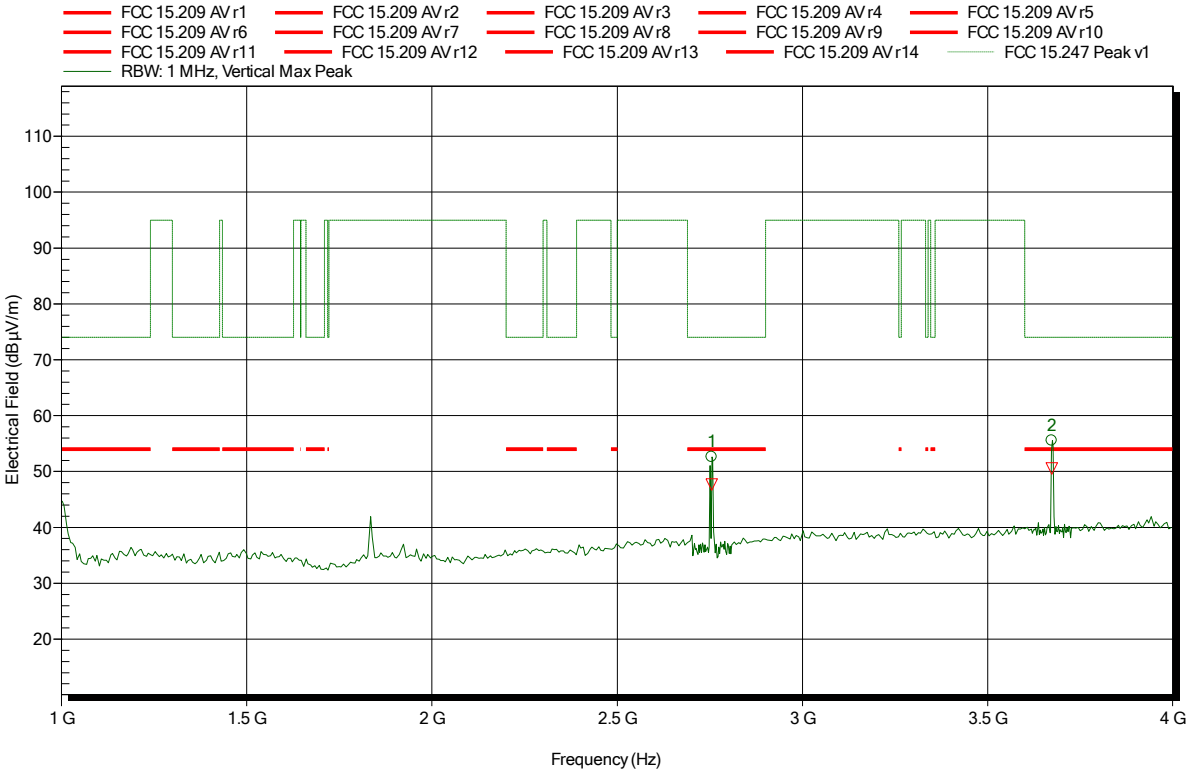

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.755 GHz	52.62 dBµV/m	74 dBµV/m	-21.38 dB	Pass
3.673 GHz	55.54 dBµV/m	74 dBµV/m	-18.46 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	TX; 918.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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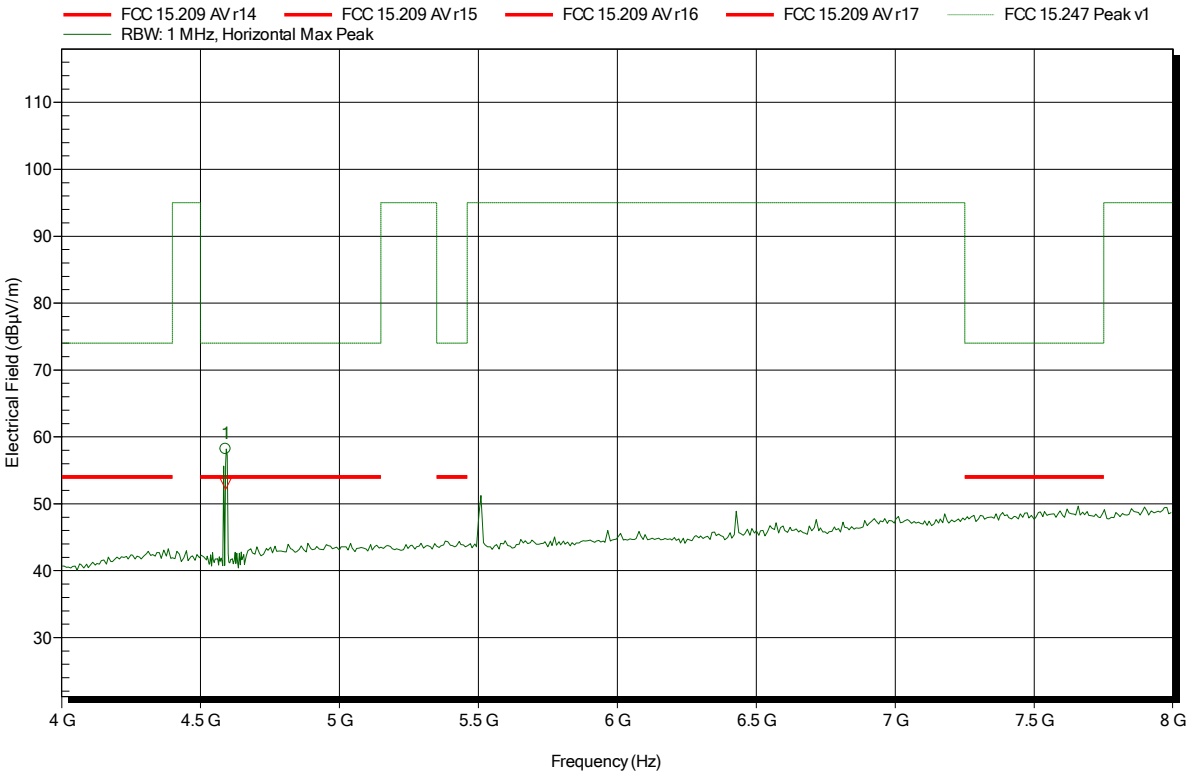

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.591 GHz	58.18 dBµV/m	74 dBµV/m	-15.82 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	TX; 918.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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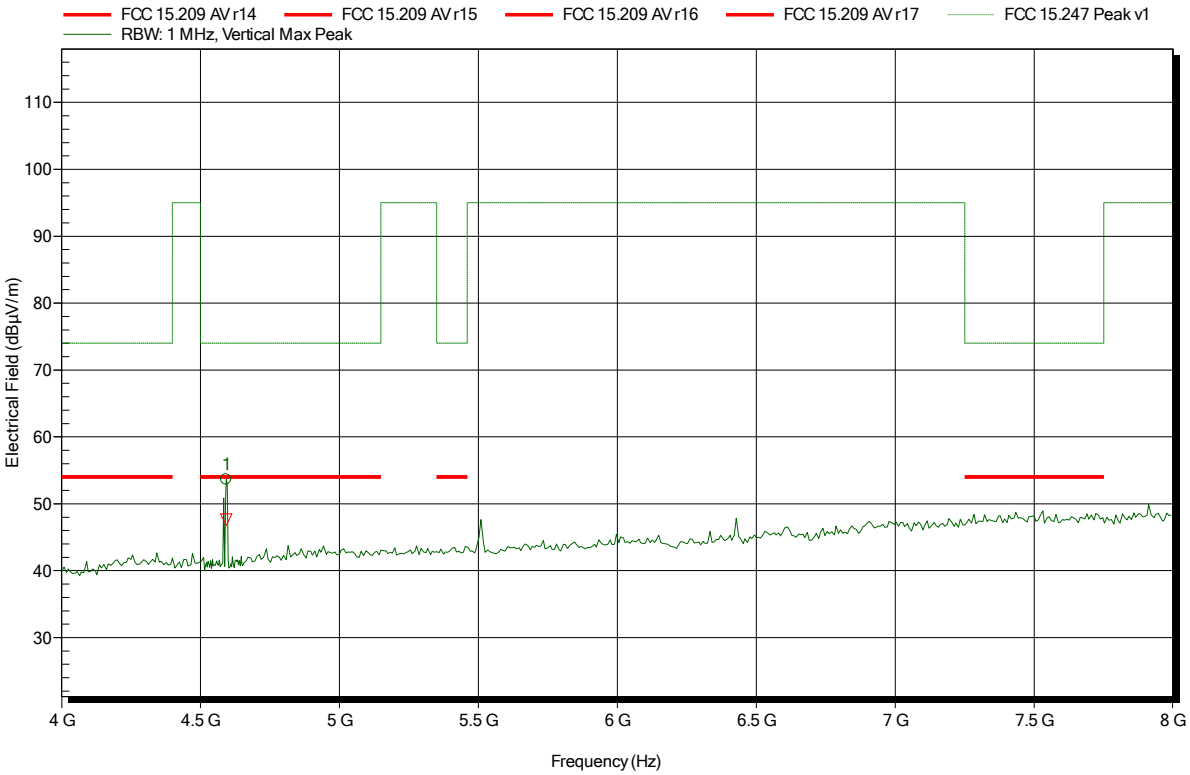

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.594 GHz	53.61 dBµV/m	74 dBµV/m	-20.39 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 918.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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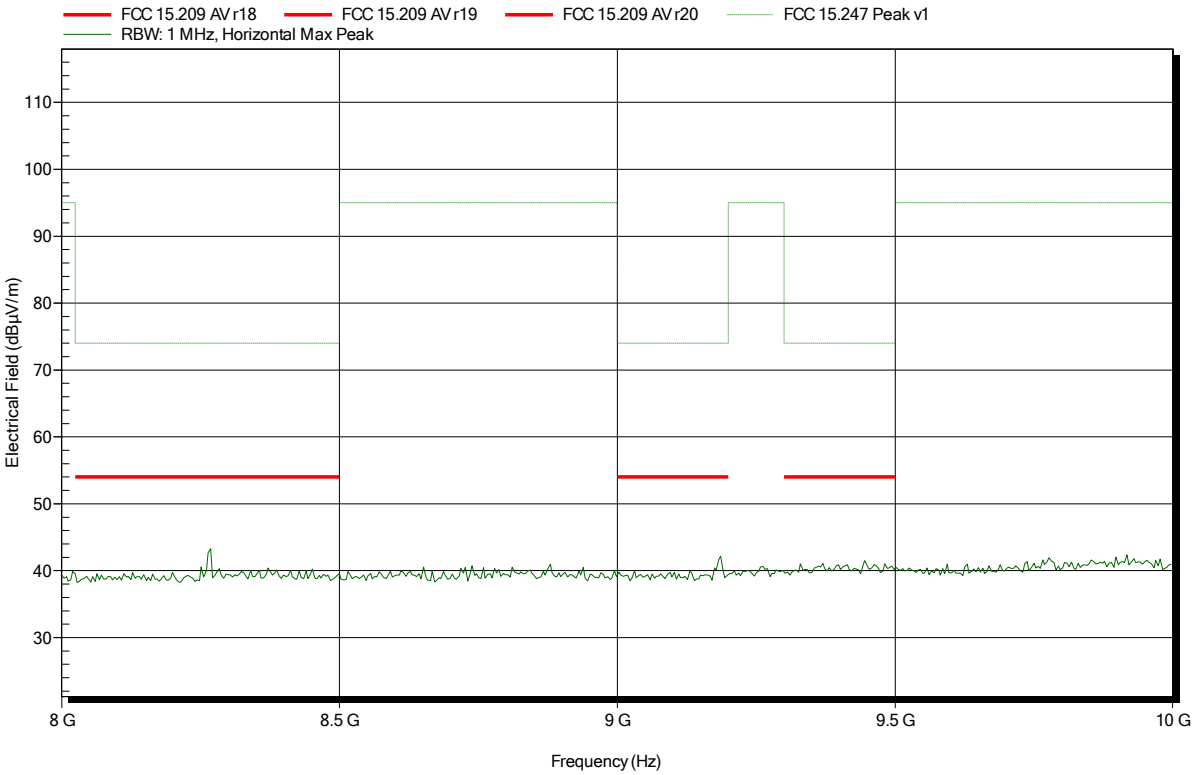
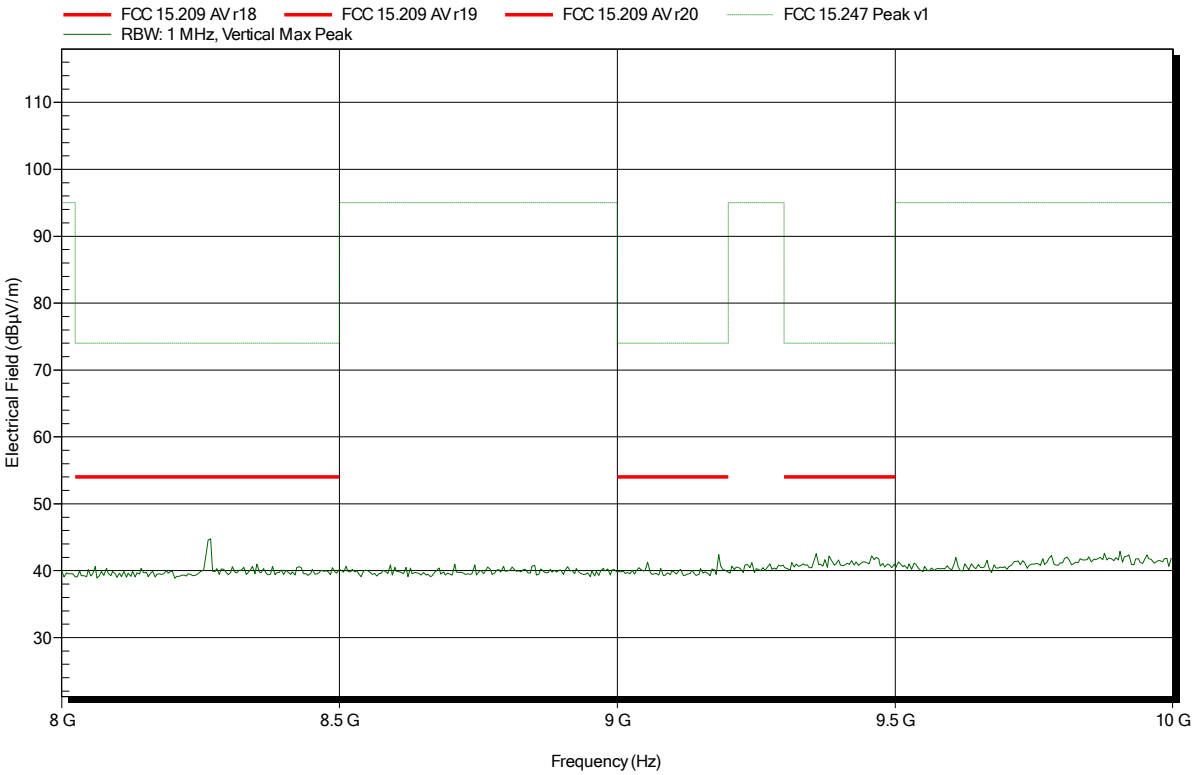


Spurious emissions according to FCC 15.247

Project number: G0M-1511-5210

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Vnom: 3.6 V DC (battery)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 918.5 MHz; 2FSK
Test Date:	2016-01-18
Note:	

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