


<b>EMC TEST REPORT</b> <b>FCC 47 CFR Part 15B</b> <b>Industry Canada RSS-Gen</b> <b>Electromagnetic compatibility - Unintentional radiators</b>		
<b>Report Reference No.</b> .....	G0M-1405-3797-EF0115B-V01	
<b>Testing Laboratory</b> .....	Eurofins Product Service GmbH	
Address .....	Storkower Str. 38c 15526 Reichenwalde Germany	
Accreditation .....	 <p>A2LA Accredited Testing Laboratory, Certificate No.: 1983.01            FCC Filed Test Laboratory, Reg.-No.: 96970            IC OATS Filing assigned code: 3470A</p>	
<b>Applicant's name</b> .....	Kamstrup A/S	
Address .....	Industrivej 28 DK-8660 Skanderborg DENMARK	
<b>Test specification:</b>		
Standard.....	47 CFR Part 15 Subpart B RSS-Gen, Issue 3, 2010-12 ANSI C63.4:2009	
<b>Equipment under test (EUT):</b>		
Product description	flowIQ 2100	
Model No.	flowIQ 2100	
Additional Models	None	
Hardware version	55351364_B1	
Firmware / Software version	None	
Contains	FCC-ID: OUY-FLOW2100	IC: N/A
<b>Test result</b>	<b>Passed</b>	

**Possible test case verdicts:**

- not applicable to test object .....: N/A
- test object does meet the requirement.....: P (Pass)
- test object does not meet the requirement.....: F (Fail)

**Testing:**

Date of receipt of test item .....: 2014-05-26  
 Date (s) of performance of tests .....: 2014-05-27  
 Compiled by .....: Matthias Handrik  
 Tested by (+ signature).....: Matthias Handrik  
 Approved by (+ signature) .....: Marcus Klein  
 Date of issue .....: 2014-05-30  
 Total number of pages .....: 26


**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
V01	2014-05-30	Initial Release	

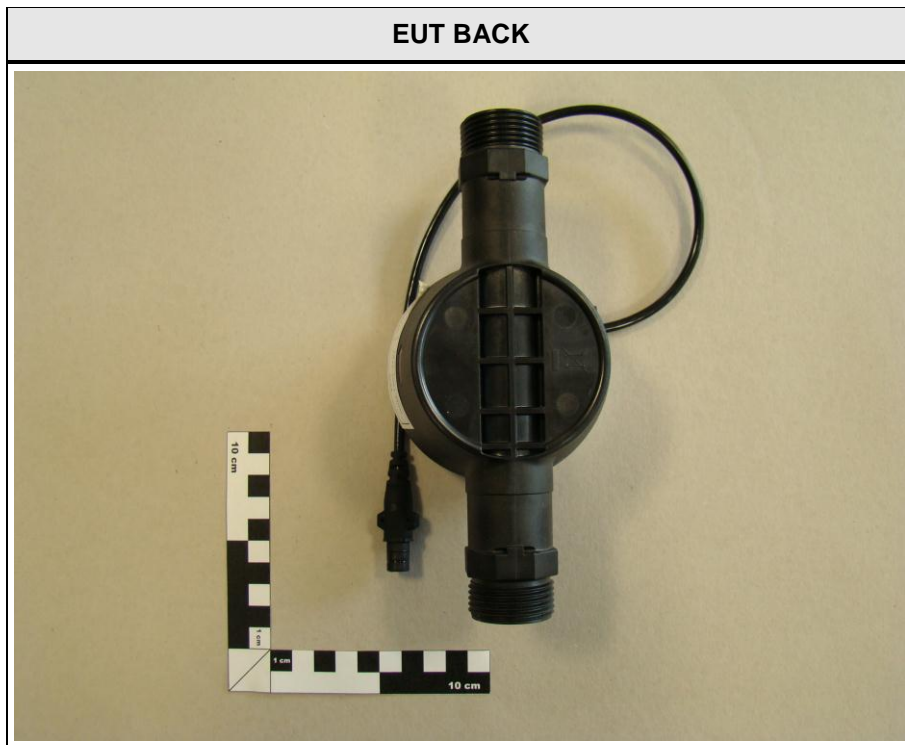
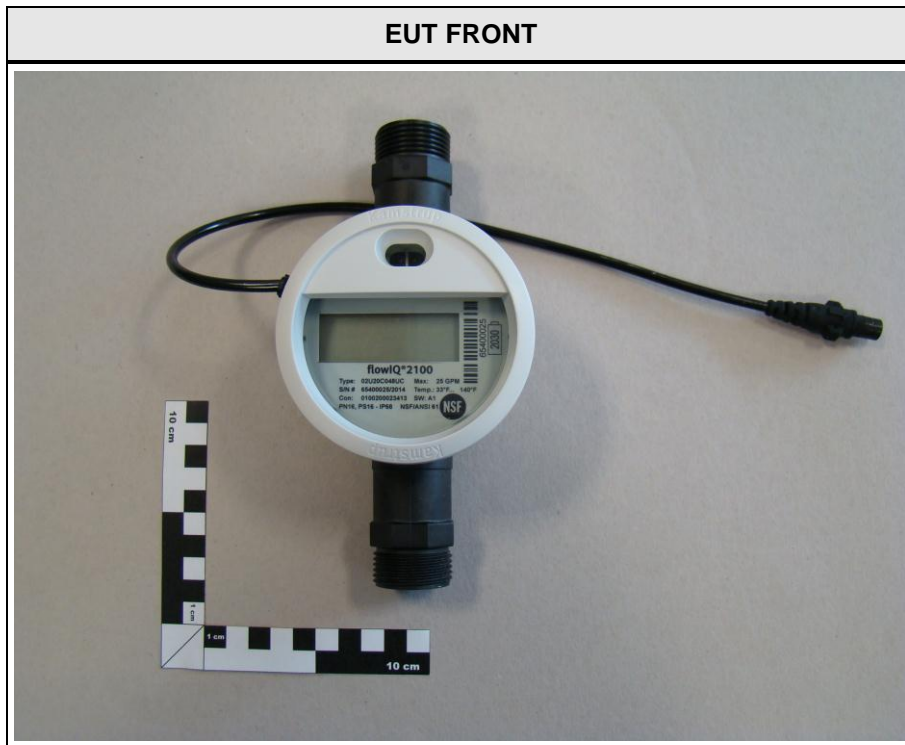
---

<b>1</b>	<b>EQUIPMENT (TEST ITEM) DESCRIPTION</b>	<b>5</b>
1.1	Photos – Equipment external	6
1.2	Photos – Equipment internal	7
1.3	Photos – Test setup	10
1.4	Supporting Equipment Used During Testing	11
1.5	Operating Modes	12
1.6	Test Equipment Used During Testing	13
1.7	Sample emission level calculation	14
<b>2</b>	<b>RESULT SUMMARY</b>	<b>15</b>
<b>3</b>	<b>TEST CONDITIONS AND RESULTS</b>	<b>16</b>
3.1	Test Conditions and Results – Radiated emissions	16

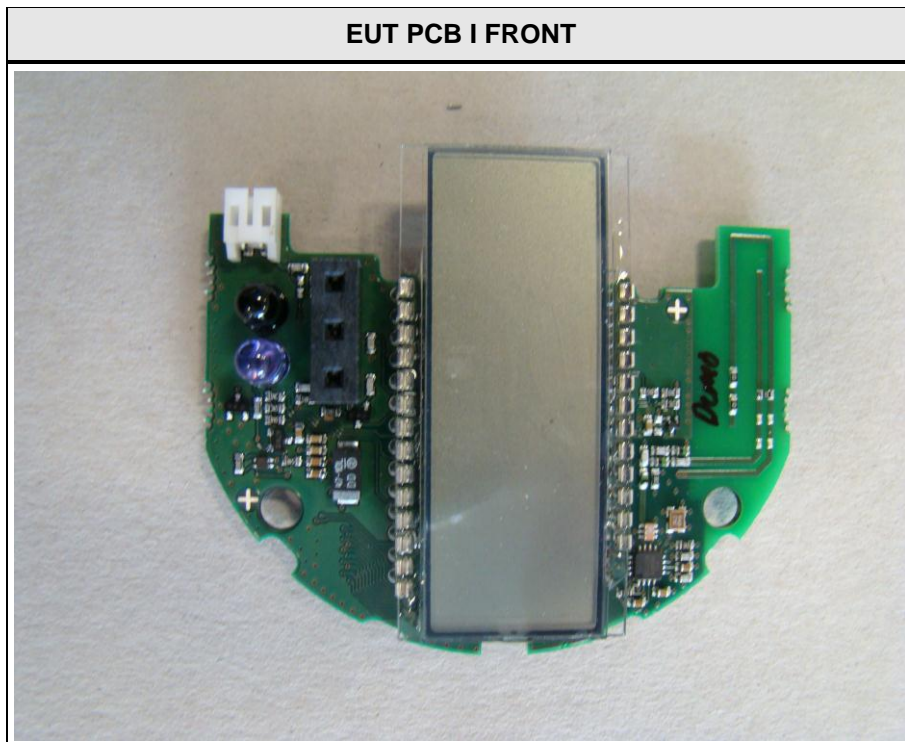
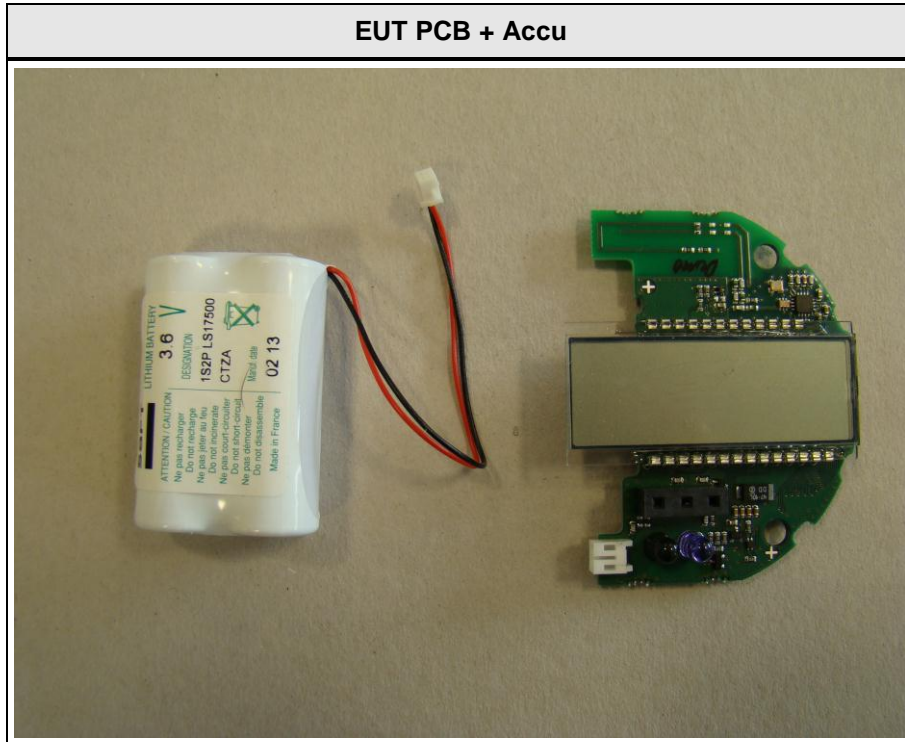
## 1 Equipment (Test item) Description

<b>Description</b>	flowIQ 2100	
<b>Model</b>	flowIQ 2100	
<b>Additional Models</b>	None	
<b>Serial number</b>	None	
<b>Hardware version</b>	55351364_B1	
<b>Software / Firmware version</b>	None	
<b>Contains FCC-ID</b>	OUY-FLOW2100	
<b>Contains IC</b>	N/A	
<b>Power supply</b>	3.6 VDC	
<b>AC/DC-Adaptor</b>	None	
<b>Radio module</b>	Type	flowIQ 2100
	Model	flowIQ 2100
	Manufacturer	kamstrup
	HW Version	55351364_B1
	SW Version	test sw
	SVN	N/A
	FCC-ID	OUY-FLOW2100
	IC	N/A
	IMEI	none
<b>Manufacturer</b>	Kamstrup A/S Industrivej 28 DK-8660 Skanderborg DENMARK	
<b>Highest emission frequency</b>	> 1000 MHz (up to 5th Harm)	
<b>Device classification</b>	Class B	
<b>Equipment type</b>	Tabletop	
<b>Number of tested samples</b>	1	

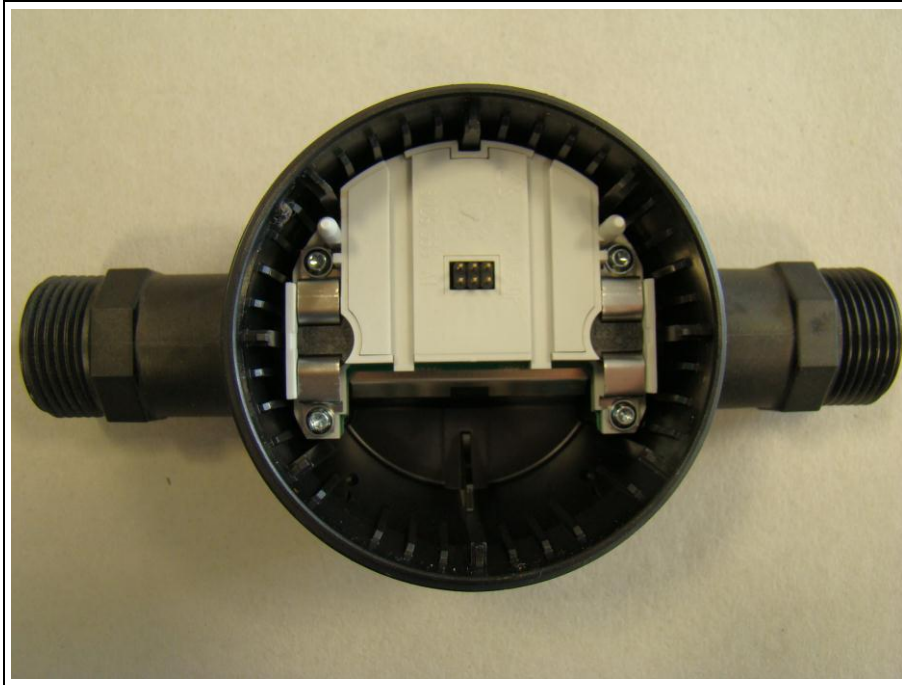
1.1 Photos – Equipment external



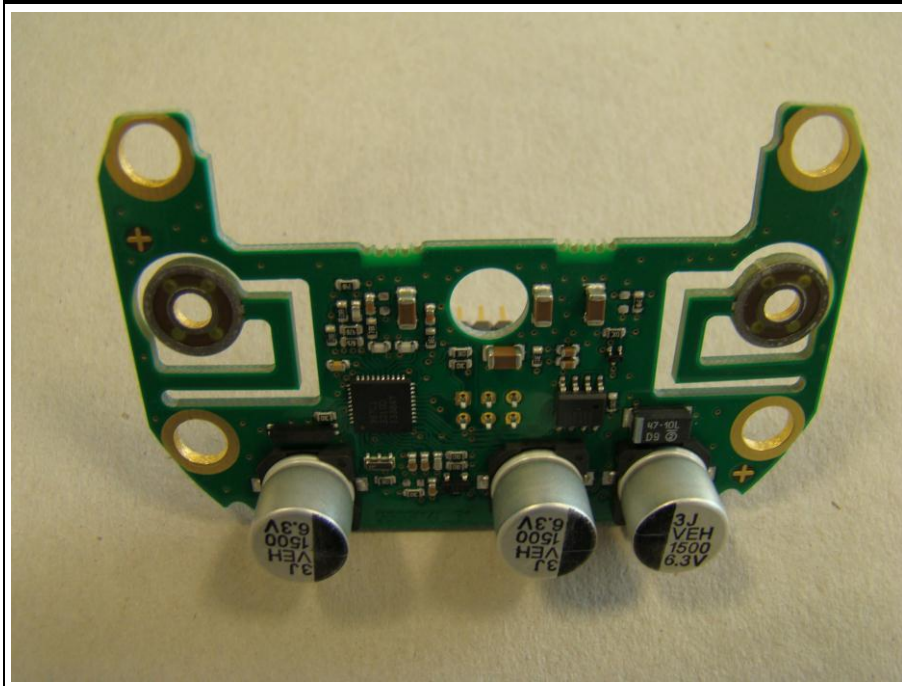
1.2 Photos – Equipment internal



EUT Inside

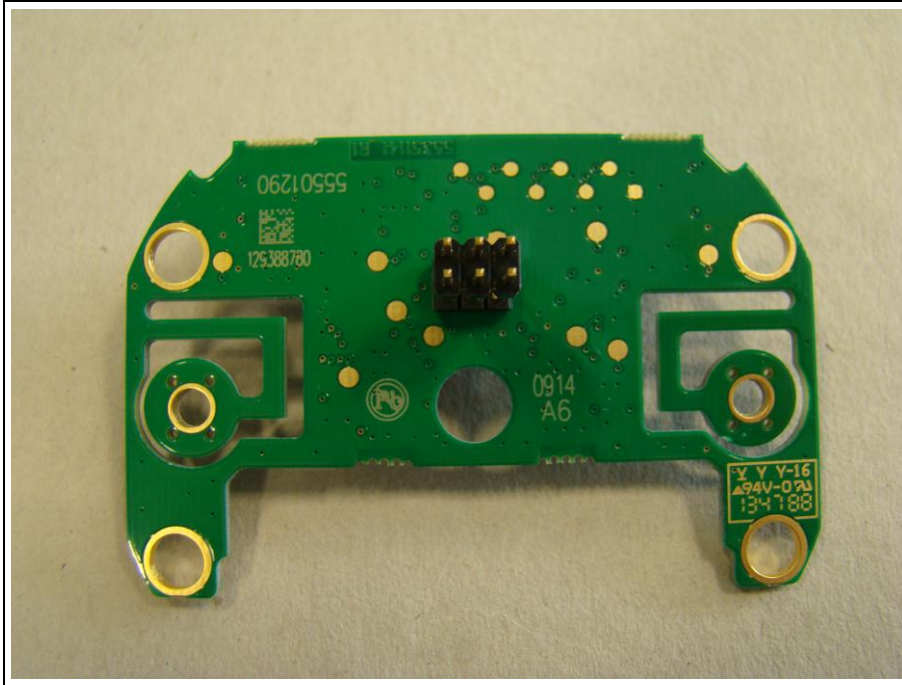


EUT PCB II FRONT

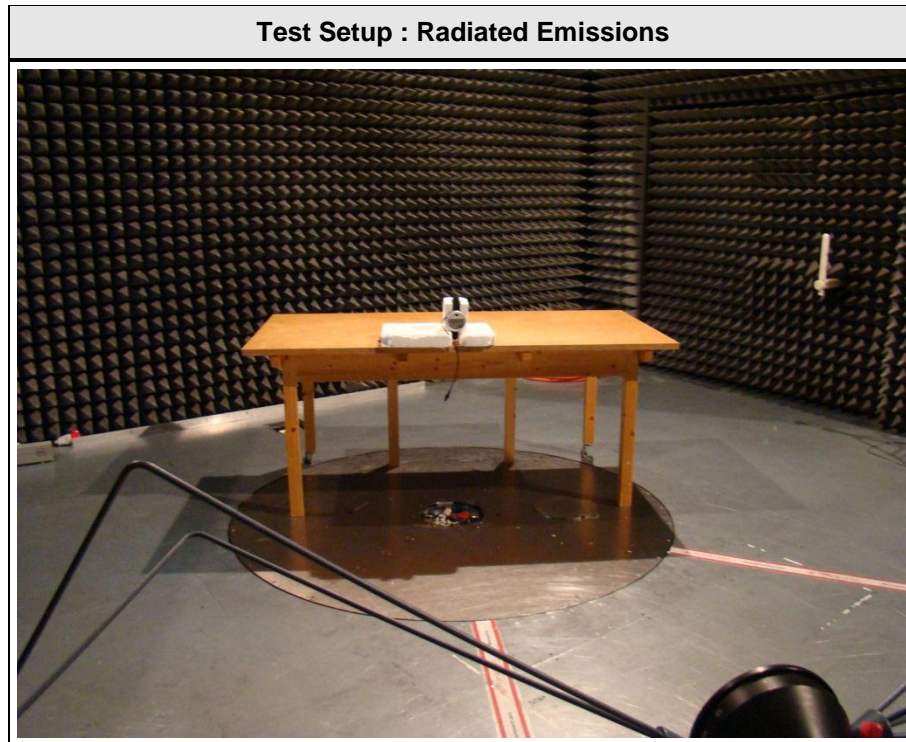




EUT PCB II BACK



1.3 Photos – Test setup



**1.4 Supporting Equipment Used During Testing**

Product Type*	Device	Manufacturer	Model No.	Comments
None				
<p><b>*Note:</b> Use the following abbreviations:</p> <ul style="list-style-type: none"> <li>AE : Auxiliary/Associated Equipment, or</li> <li>SIM : Simulator (Not Subjected to Test)</li> <li>CABL : Connecting cables</li> </ul>				

## 1.5 Operating Modes

Mode #	Description
1	Active transmit on 915 MHz

## 1.6 Test Equipment Used During Testing

Radiated emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Biconical Antenna	R&S	HK 116	EF00012	2013-02	2016-02
LPD-Antenne	R&S	HL 223	EF00187	2014-03	2017-03
LPD-Antenna	R&S	HL 025	EF00327	2013-02	2016-02
EMI Test Receiver	R&S	ESU26	EF00887	2014-01	2015-01

## 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 dB $\mu$ V. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

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

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

Net:

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

Limit:

This is the FCC Class B radiated emission limit (in units of dB $\mu$ V/m). The FCC limits are given in units of  $\mu$ V/m. The following formula is used to convert the units of  $\mu$ V/m to dB $\mu$ V/m:

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

Margin:

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

Example only:

$$\begin{array}{rclcl} \text{Reading} & + & \text{AF} & = & \text{Net Reading} & : & \text{Net reading - FCC limit} & = & \text{Margin} \\ 21.5 \text{ dB}\mu\text{V} & + & 26 \text{ dB} & = & 47.5 \text{ dB}\mu\text{V/m} & : & 47.5 \text{ dB}\mu\text{V/m} - 57.0 \text{ dB}\mu\text{V/m} & = & -9.5 \text{ dB} \end{array}$$

## 2 Result Summary

FCC 47 CFR Part 15B, Industry Canada RSS-Gen				
Product Specific Standard	Requirement – Test	Reference Method	Result	Remarks
47 CFR 15.109 RSS-Gen 4.9 & 4.10	Radiated emissions	ANSI C 63.4	PASS	
47 CFR 15.107 RSS-Gen 7.2.4	AC power line conducted emissions	ANSI C63.4	N/A	DC powered by battery
<b>Remarks:</b>				

### 3 Test Conditions and Results

#### 3.1 Test Conditions and Results – Radiated emissions

Radiated emissions acc. FCC 47 CFR 15.109 / IC RSS-Gen		Verdict: PASS				
Laboratory Parameters:	Required prior to the test	During the test				
Ambient Temperature	15 to 35 °C	22°C				
Relative Humidity	30 to 60 %	43%				
Test according referenced standards	Reference Method					
	ANSI C63.4					
Sample is tested with respect to the requirements of the equipment class	Equipment class					
	Class B					
Test frequency range determined from highest emission frequency	Highest emission frequency					
	> 1000 MHz (up to 5th Harm)					
Fully configured sample scanned over the following frequency range	Frequency range					
	30 MHz to 26.5 GHz					
Operating mode	1					
Limits and results Class B						
Frequency [MHz]	Quasi-Peak [dB $\mu$ V/m]	Result	Average [dB $\mu$ V/m]	Result	Peak [dB $\mu$ V/m]	Result
30 – 88	40	PASS	-		-	-
88 – 216	43.5	PASS	-		-	-
216 – 960	46	PASS	-		-	-
960 – 1000	54	PASS	-		-	-
> 1000	-	-	54	PASS	74	PASS
Comments:						

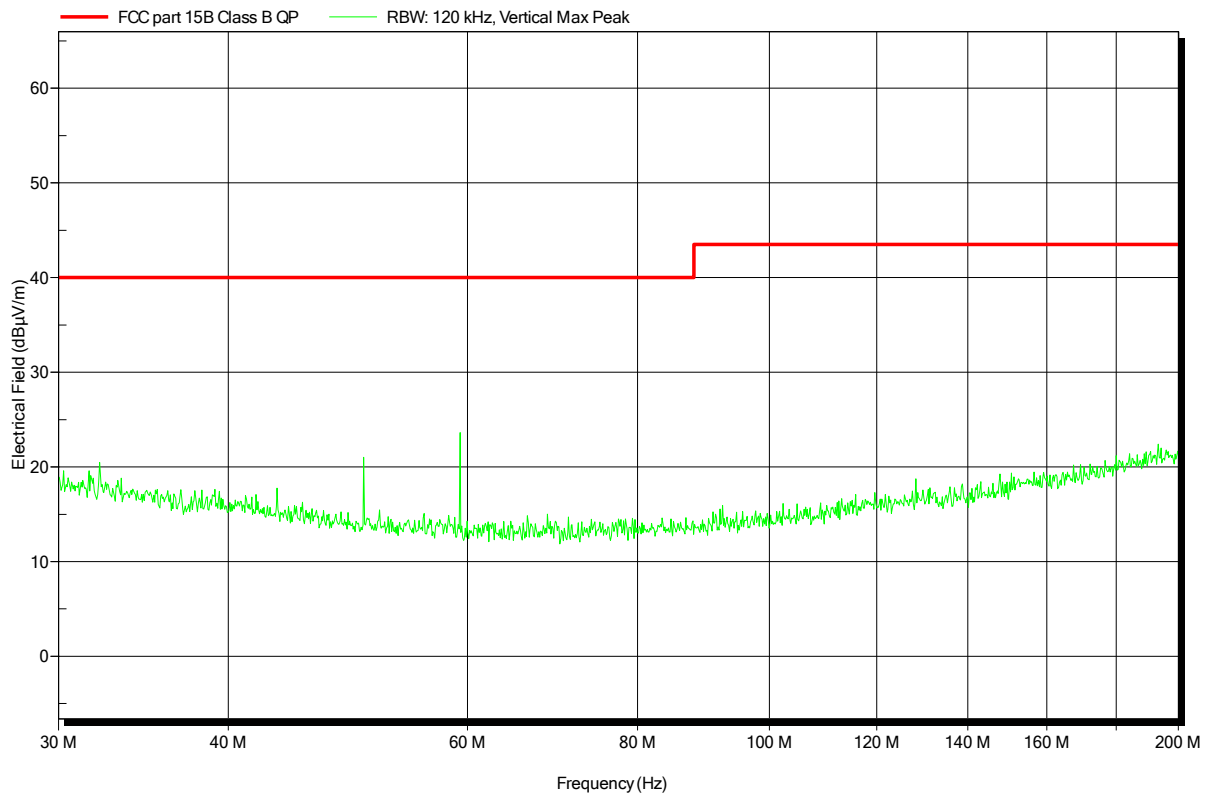


**Spurious emissions under normal conditions according to FCC Part 15b**

Project number: G0M-1405-3797

Manufacturer:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Unom: 3.6 V DC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3m
Mode:	active transmit 915 MHz
Test Date:	2014-05-27
Note:	

Index 1

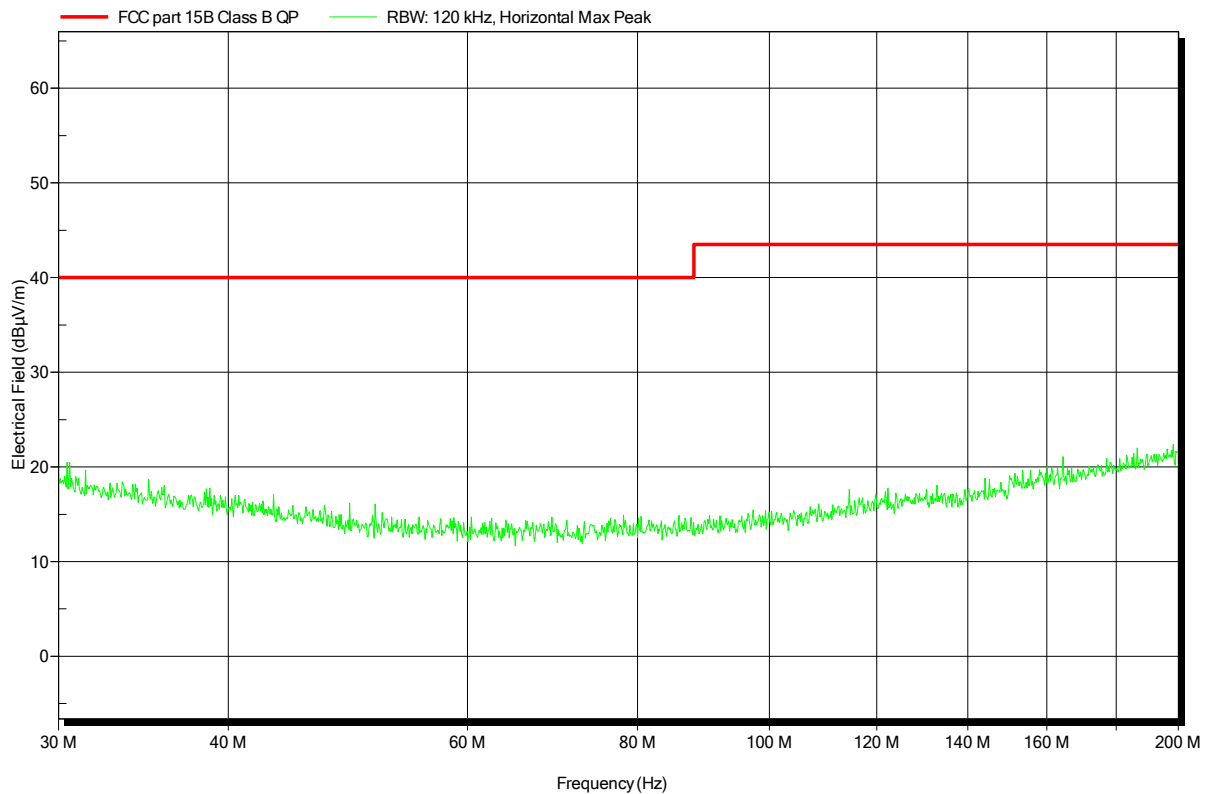


**Spurious emissions under normal conditions according to FCC Part 15b**

Project number: G0M-1405-3797

Manufacturer:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Unom: 3.6 V DC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3m
Mode:	active transmit 915 MHz
Test Date:	2014-05-27
Note:	

Index 2

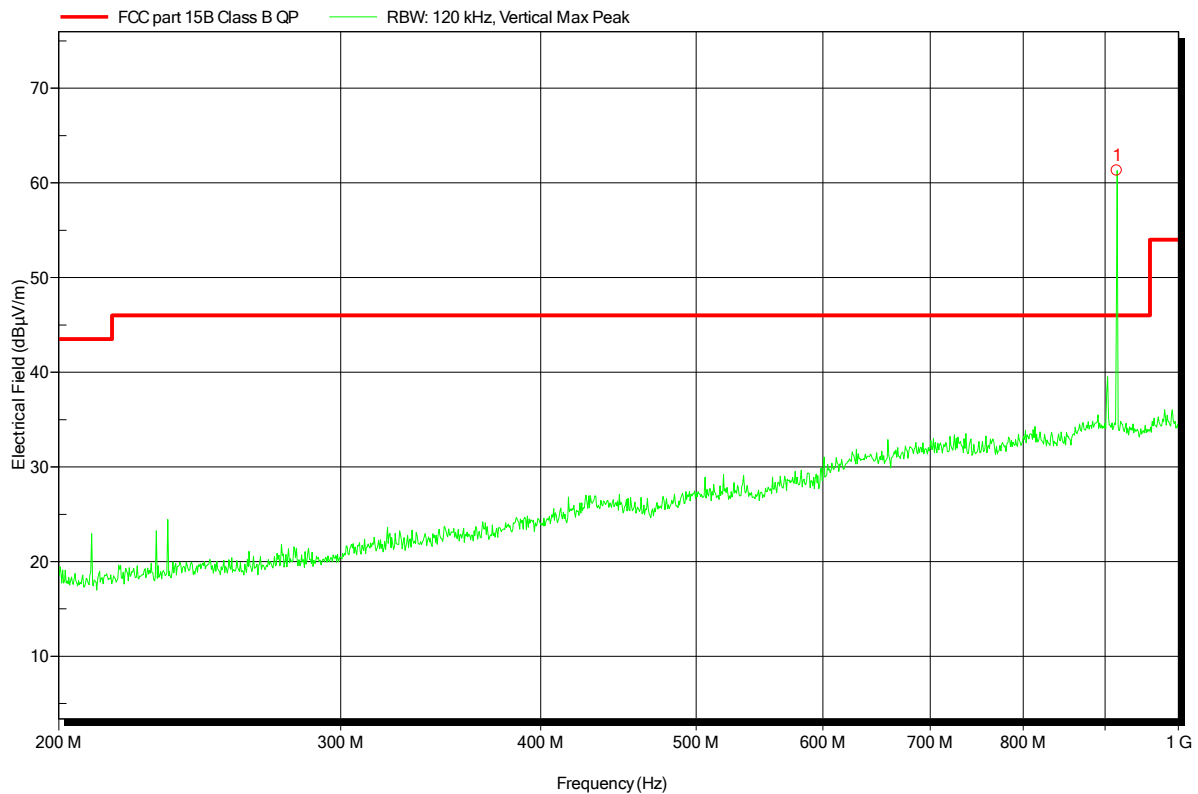


**Spurious emissions under normal conditions according to FCC Part 15b**

Project number: G0M-1405-3797

Manufacturer:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Unom: 3.6 V DC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3m
Mode:	active transmit 915 MHz
Test Date:	2014-05-27
Note:	

Index 3



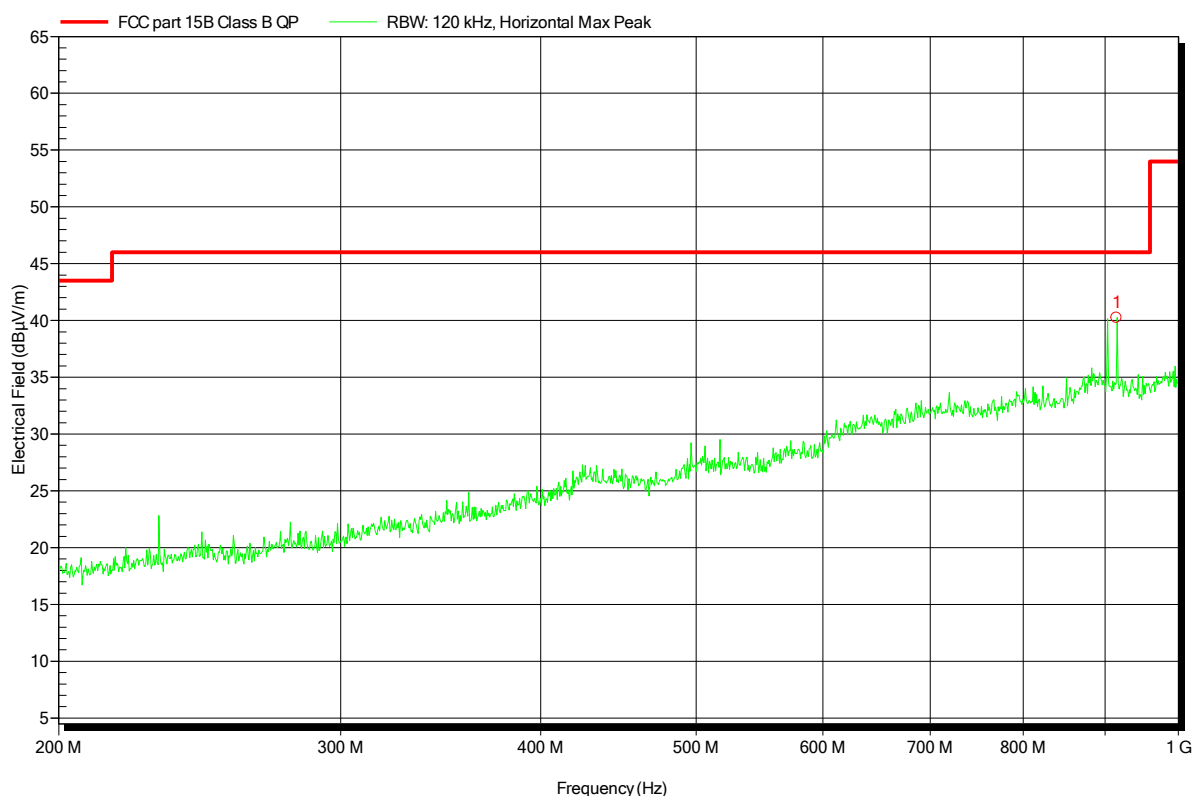
Frequency  
915.2 MHz RF Carrier

**Spurious emissions under normal conditions according to FCC Part 15b**

Project number: G0M-1405-3797

Manufacturer:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Unom: 3.6 V DC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3m
Mode:	active transmit 915 MHz
Test Date:	2014-05-27
Note:	

Index 4



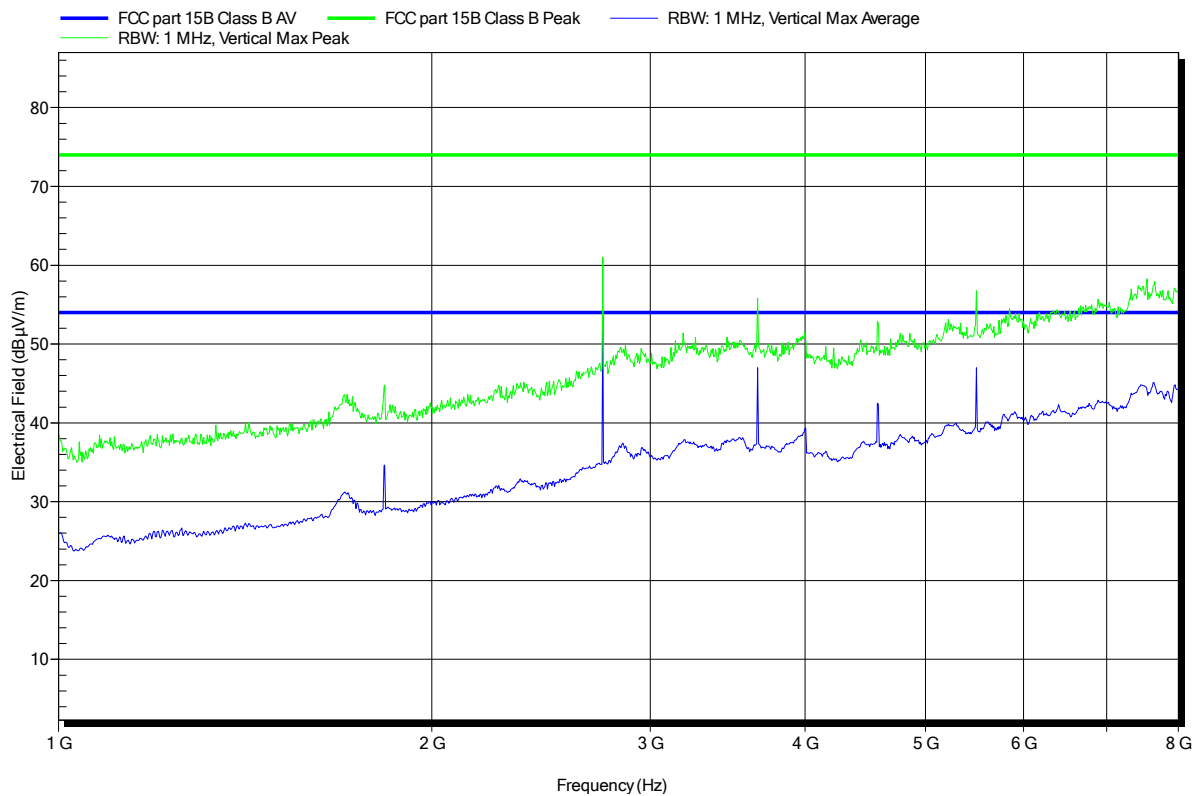
Frequency  
914.8 MHz RF Carrier

**Spurious emissions under normal conditions according to FCC Part 15b**

Project number: G0M-1405-3797

Manufacturer:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Unom: 3.6 V DC
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	3m
Mode:	active transmit 915 MHz
Test Date:	2014-05-27
Note:	

Index 5

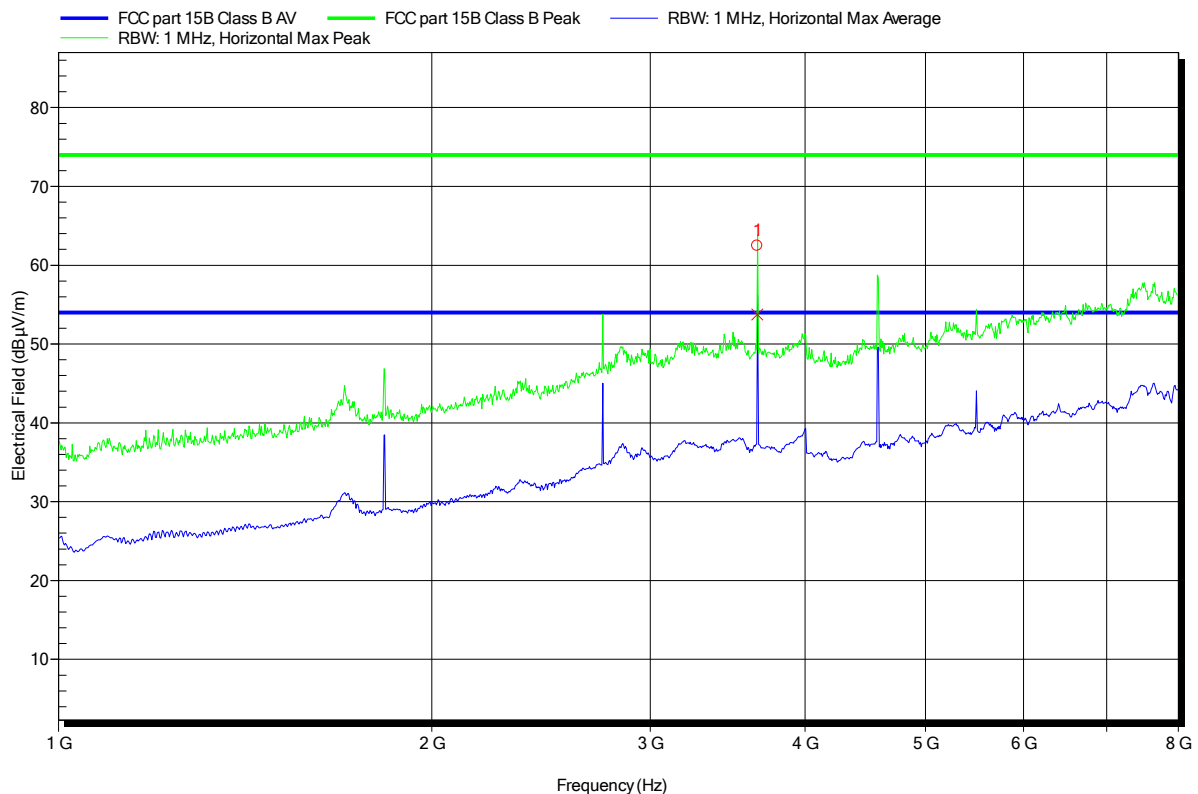


**Spurious emissions under normal conditions according to FCC Part 15b**

Project number: G0M-1405-3797

Manufacturer: Kamstrup A/S  
 EUT Name: flowIQ 2100  
 Model: flowIQ 2100  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Handrik  
 Test Conditions: Tnom: 20°C, Unom: 3.6 V DC  
 Antenna: Rohde & Schwarz HL 025, Horizontal  
 Measurement distance: 3m  
 Mode: active transmit 915 MHz  
 Test Date: 2014-05-27  
 Note:

Index 6



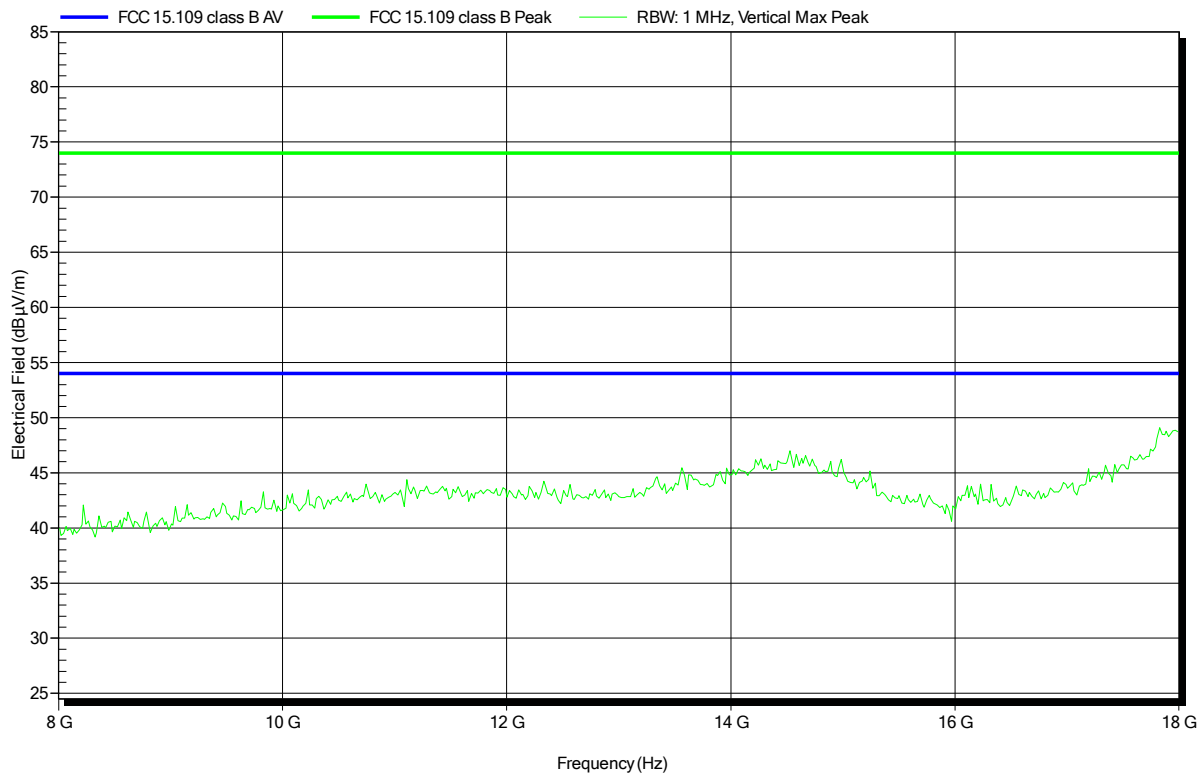
Frequency	Average	Average Limit	Average Difference	Average Status
3.66 GHz	53.76 dBµV/m	54 dBµV/m	-0.24 dB	Pass

**Spurious emissions according to FCC Part 15b**

Project number: G0M-1405-3797

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Vnom: 3.6 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	RX; active transmit 915 MHz
Test Date:	2014-05-27
Note:	

Index 7

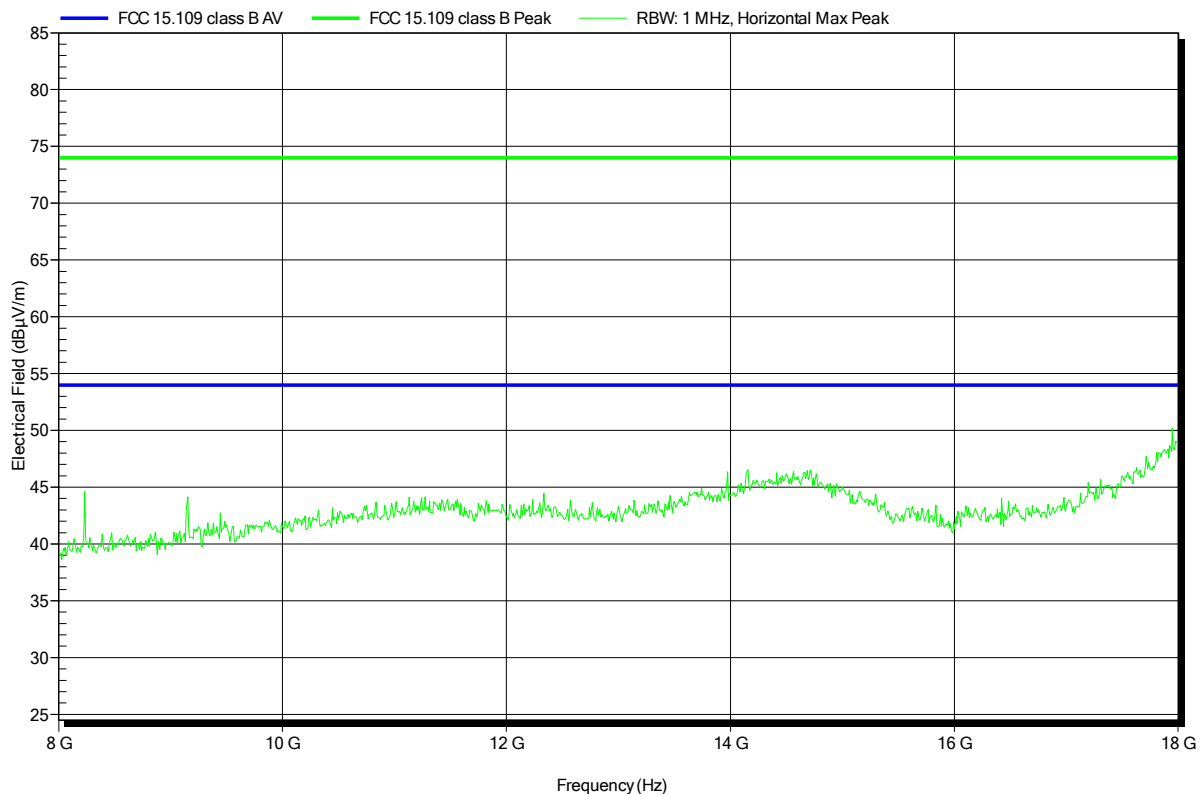


**Spurious emissions according to FCC Part 15b**

Project number: G0M-1405-3797

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Vnom: 3.6 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	RX; active transmit 915 MHz
Test Date:	2014-05-27
Note:	

Index 10



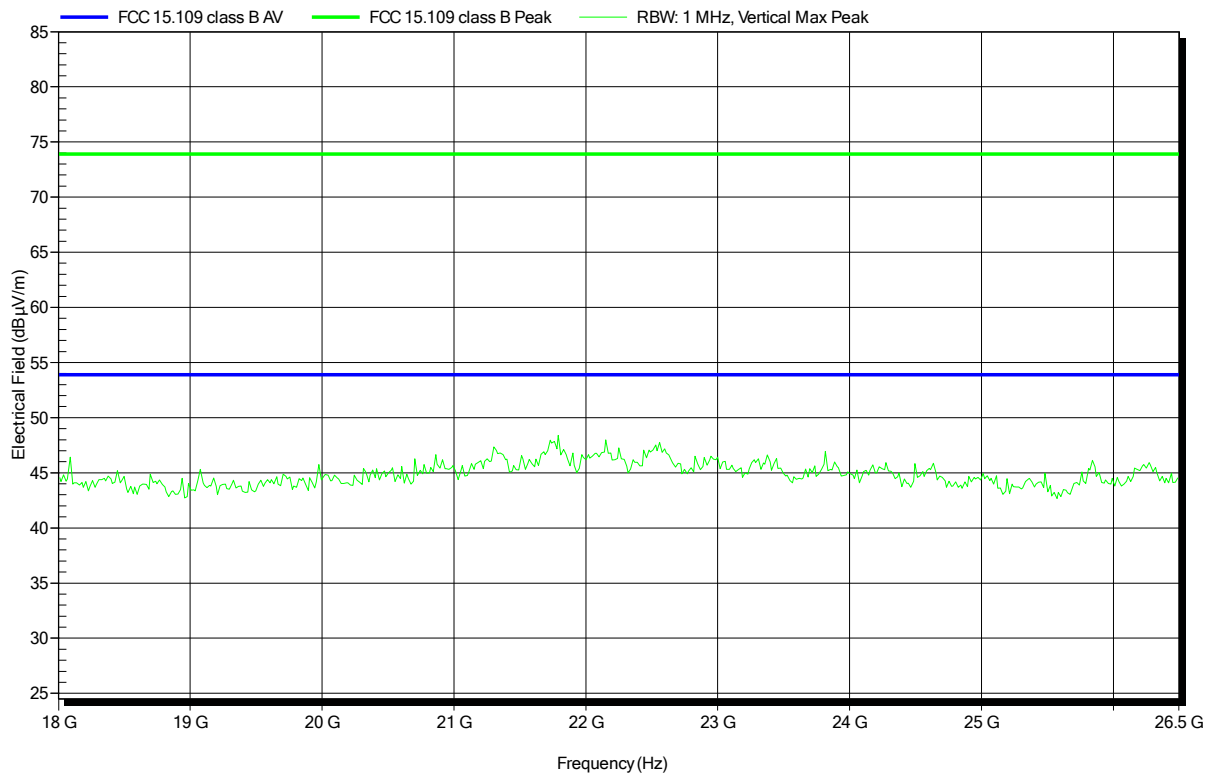


**Spurious emissions according to FCC Part 15b**

Project number: G0M-1405-3797

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Vnom: 3.6 V DC
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	1 m converted to 3m
Mode:	RX; active transmit 915 MHz
Test Date:	2014-05-27
Note:	

Index 8



**Spurious emissions according to FCC Part 15b**

Project number: G0M-1405-3797

Applicant:	Kamstrup A/S
EUT Name:	flowIQ 2100
Model:	flowIQ 2100
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Vnom: 3.6 V DC
Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	RX; active transmit 915 MHz
Test Date:	2014-05-27
Note:	

Index 9

