

EMC TEST REPORT

FCC 47 CFR Part 15B
Industry Canada RSS-Gen

Electromagnetic compatibility - Unintentional radiators

Report Reference No. : G0M-1405-3797-EF0115B-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
DK-8660 Skanderborg
DENMARK

Test specification:

Standard..... : 47 CFR Part 15 Subpart B
RSS-Gen, Issue 3, 2010-12
ANSI C63.4:2009

Equipment under test (EUT):

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
Test result	Passed	

Test Report No.: G0M-1405-3797-EF0115B-V01

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

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

Handwritten signatures:

 M. Klein

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:

Test Report No.: G0M-1405-3797-EF0115B-V01

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

Version History

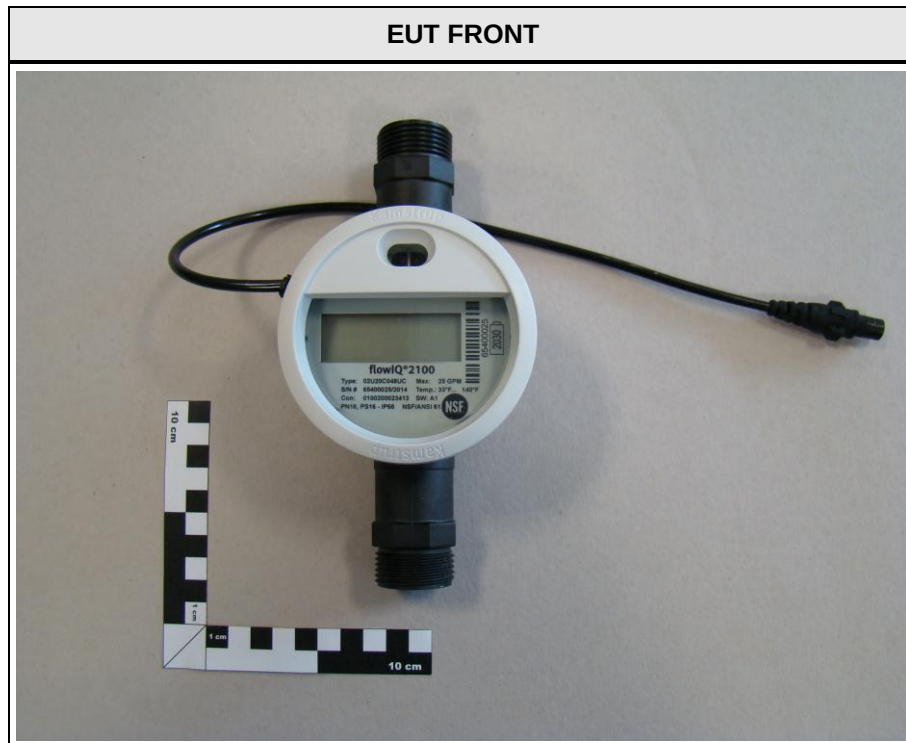
Version	Issue Date	Remarks	Revised by
V01	2014-05-30	Initial Release	

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1 Equipment (Test item) Description

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

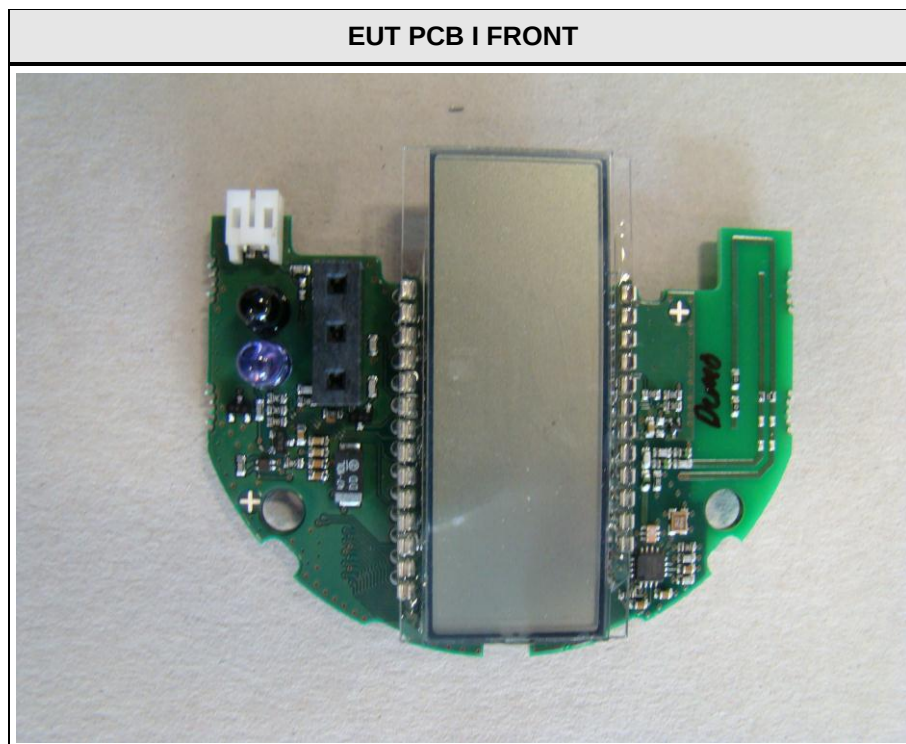
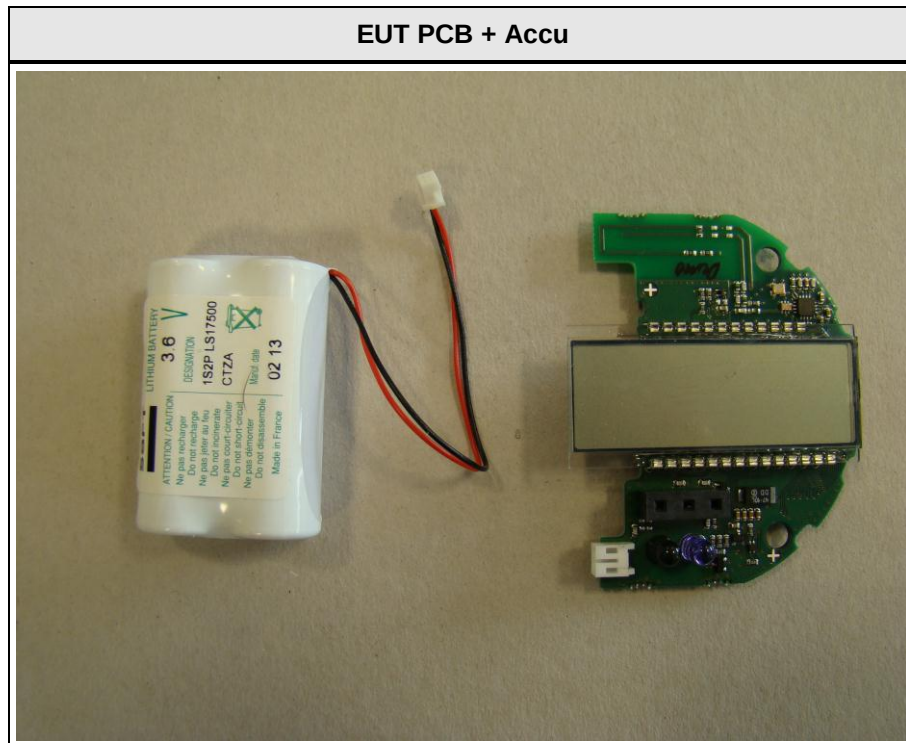
1.1 Photos – Equipment external



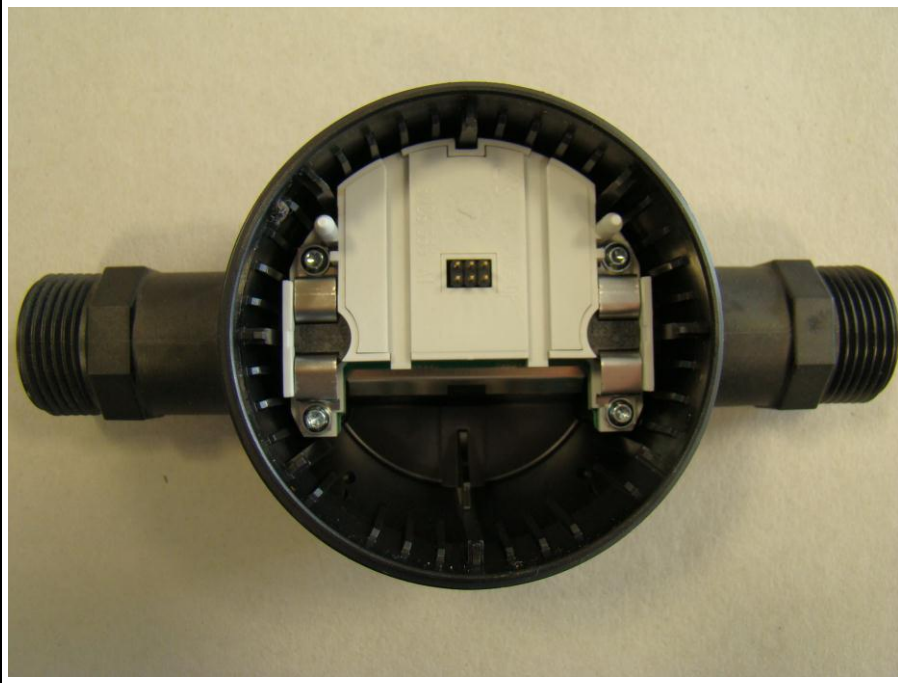
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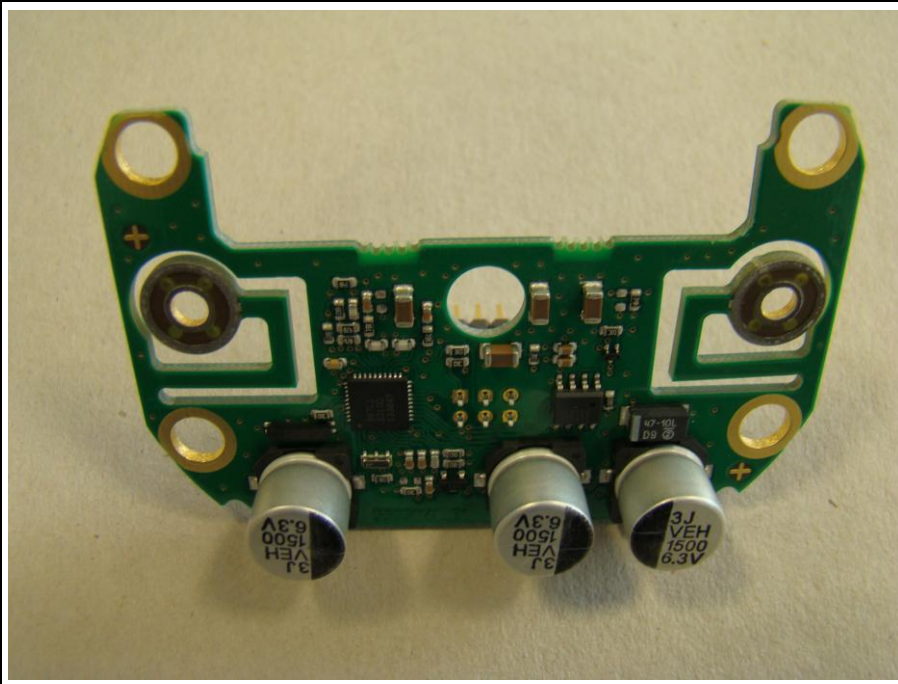
1.2 Photos – Equipment internal



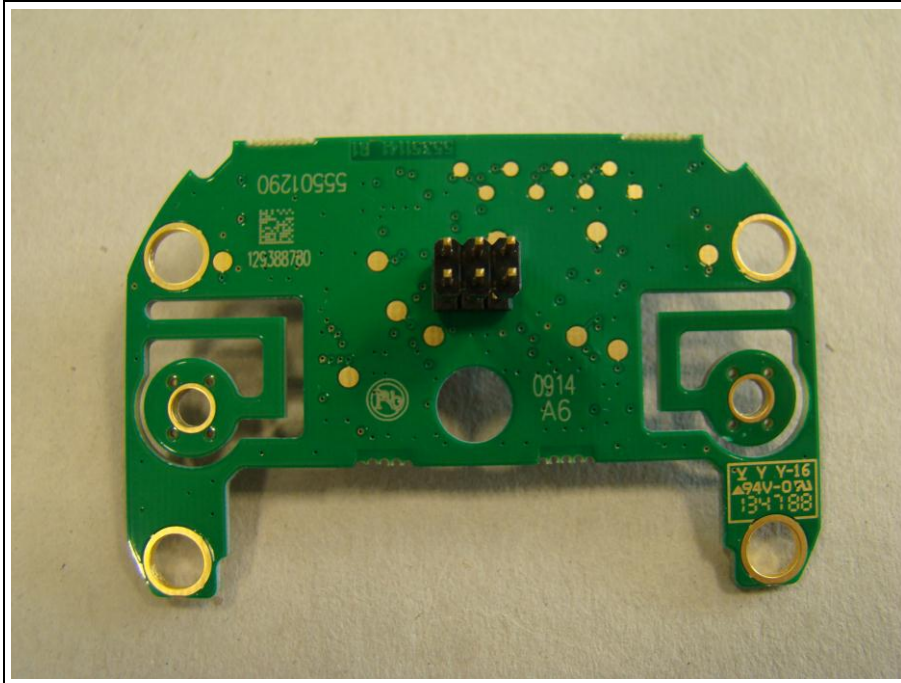
EUT Inside



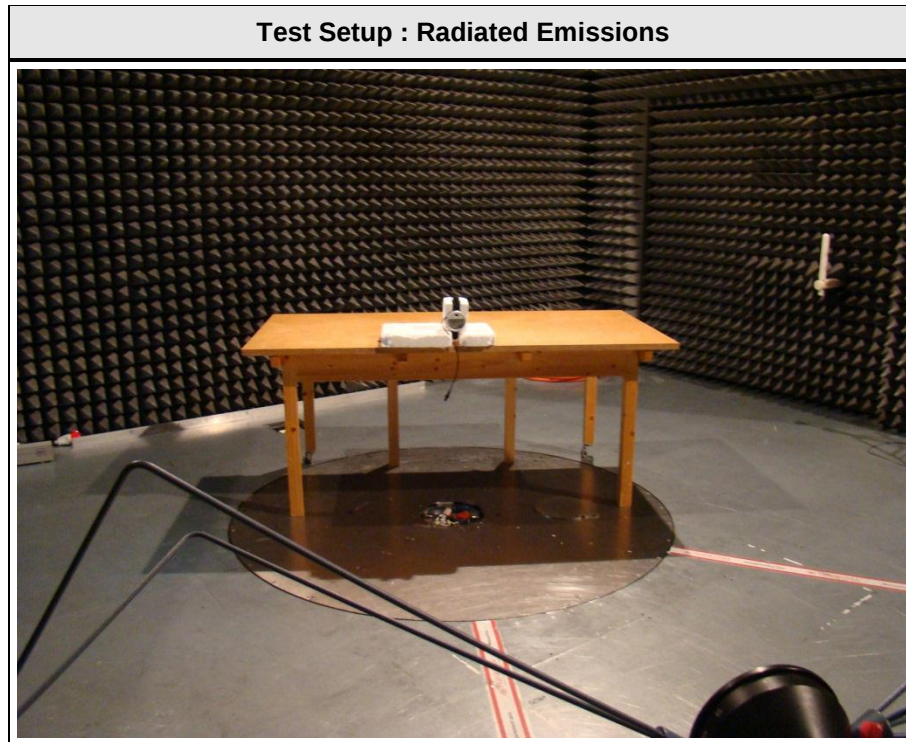
EUT PCB II FRONT



EUT PCB II BACK



1.3 Photos – Test setup



1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
None				
*Note: Use the following abbreviations: AE : Auxiliary/Associated Equipment, or SIM : Simulator (Not Subjected to Test) CABL : Connecting cables				

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 dBμV. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

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

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

Net:

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

Limit:

This is the FCC Class B radiated emission limit (in units of dBμV/m). The FCC limits are given in units of μV/m. The following formula is used to convert the units of μV/m to dBμV/m:

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

Margin:

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

Example only:

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

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
Remarks:				

3 Test Conditions and Results

3.1 Test Conditions and Results – Radiated emissions

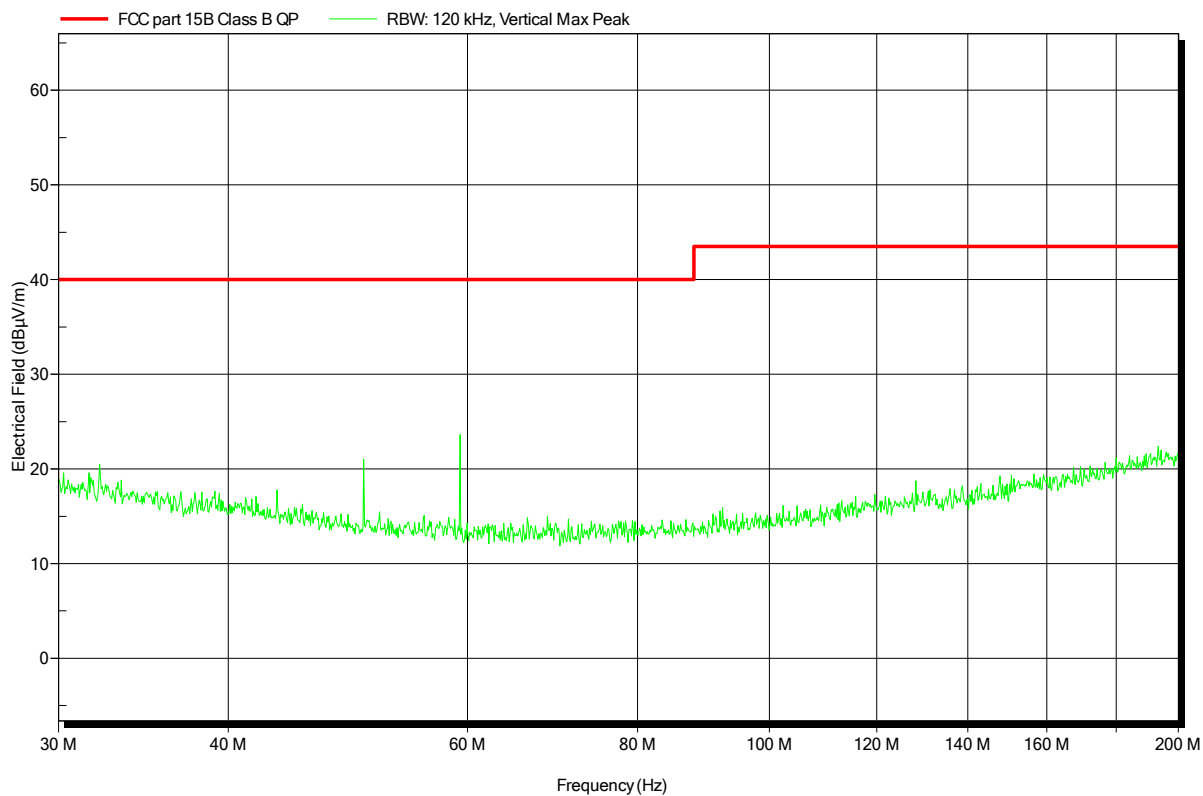
Radiated emissions acc. FCC 47 CFR 15.109 / IC RSS-Gen					Verdict: PASS	
Laboratory Parameters:		Required prior to the test		During the test		
Ambient Temperature		15 to 35 °C		22°C		
Relative Humidity		30 to 60 %		43%		
Test according referenced standards		Reference Method				
		ANSI C63.4				
Sample 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 [dBµV/m]	Result	Average [dBµV/m]	Result	Peak [dBµV/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

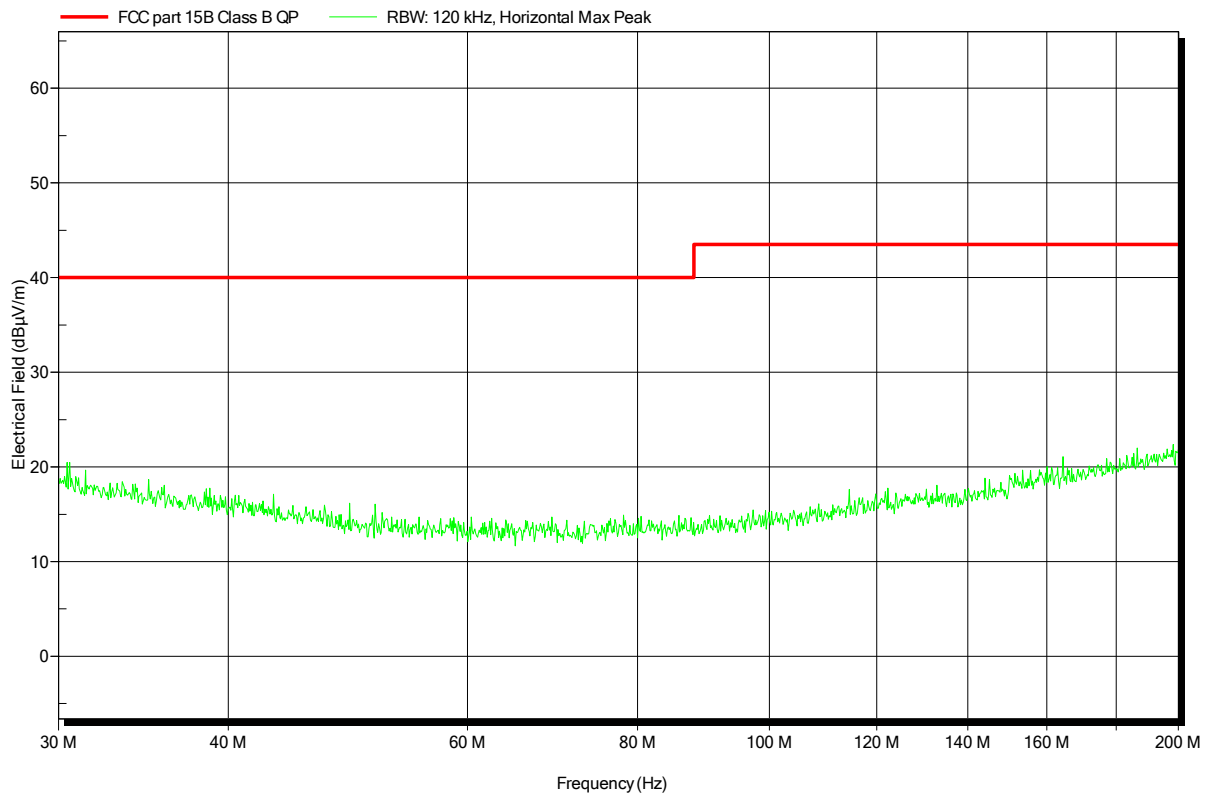


Spurious emissions under normal conditions according to FCC Part 15b

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

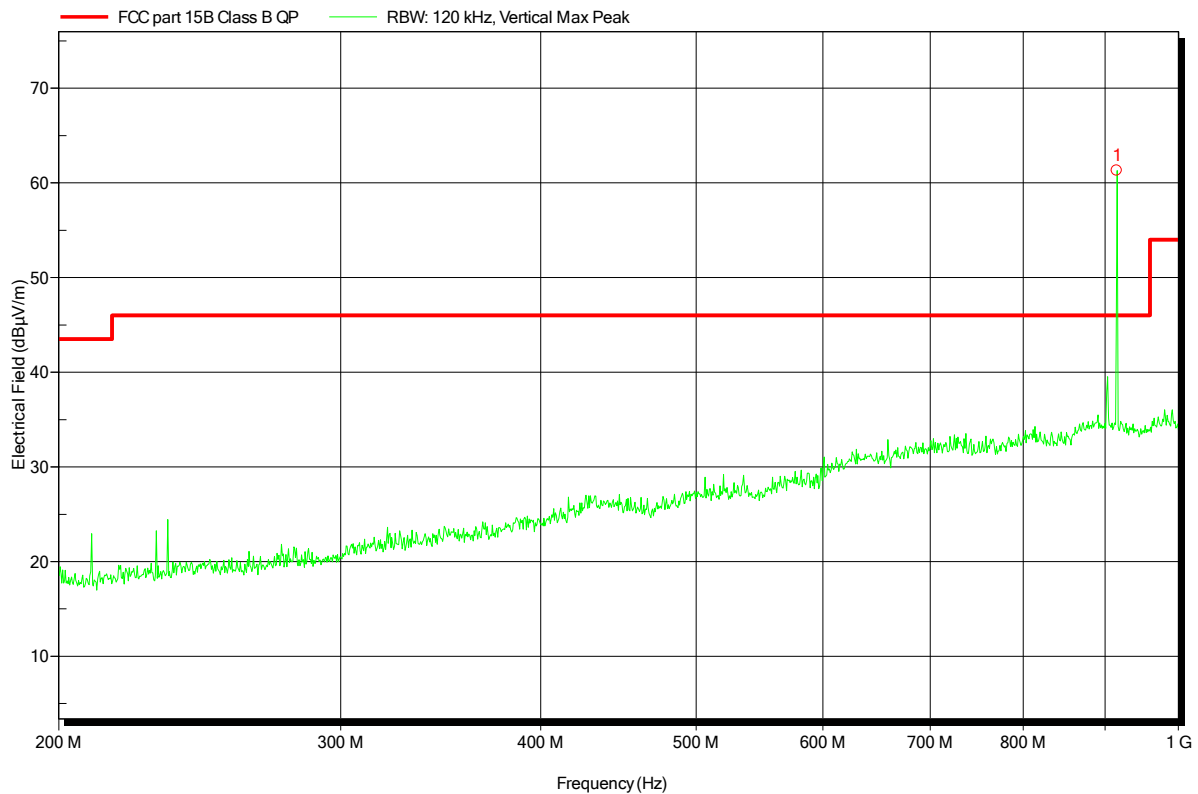


Spurious emissions under normal conditions according to FCC Part 15b

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:

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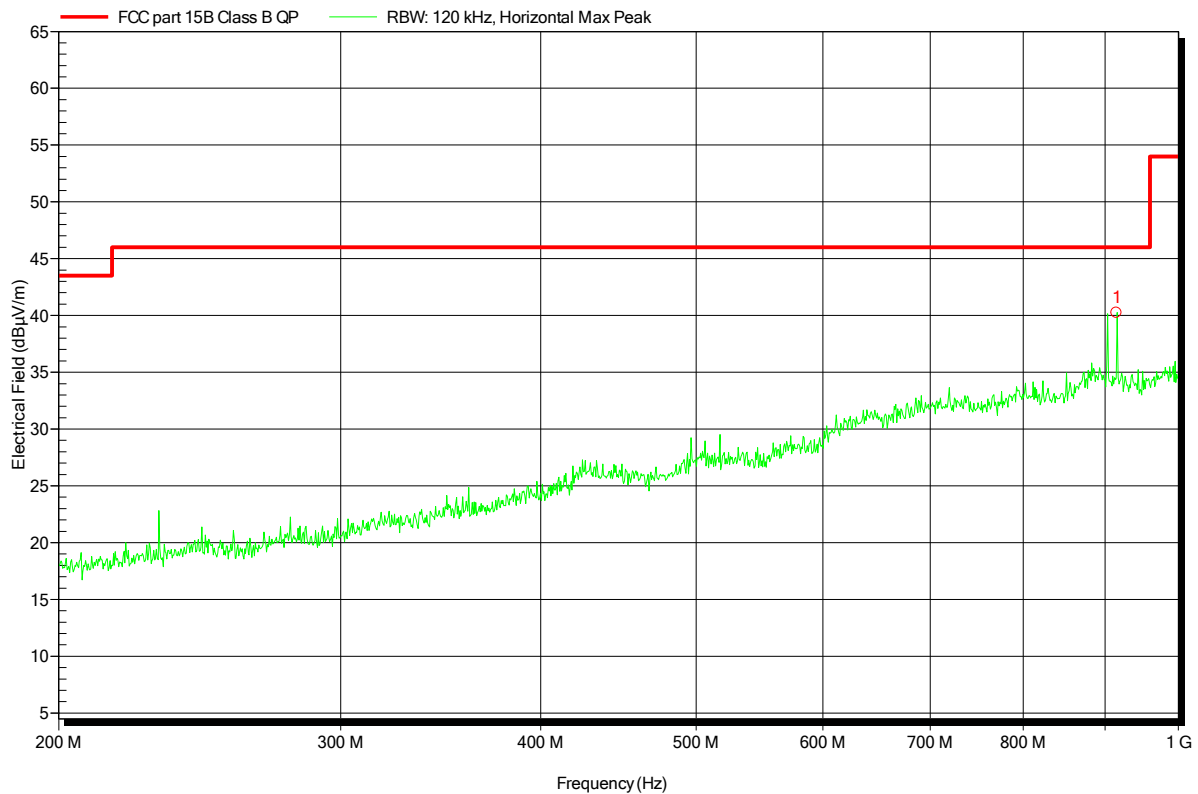
Frequency
 915.2 MHz RF Carrier

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:

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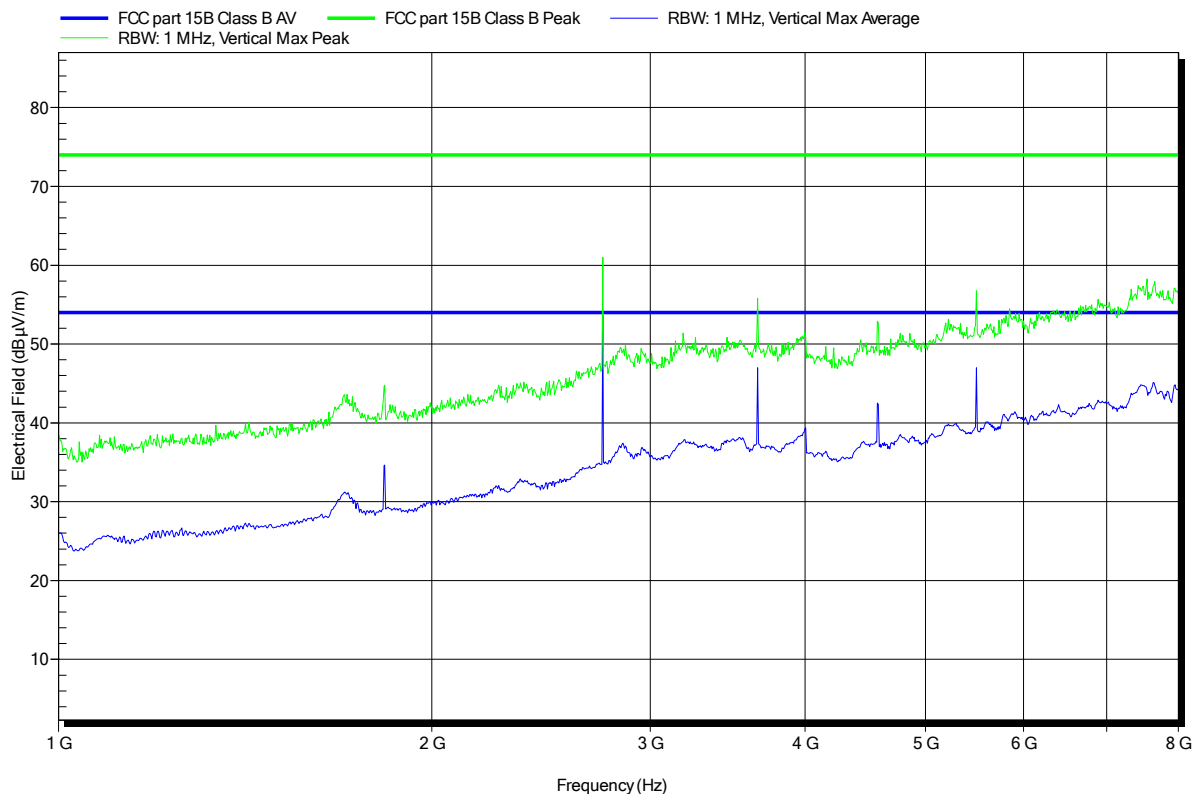
Frequency
 914.8 MHz RF Carrier

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:

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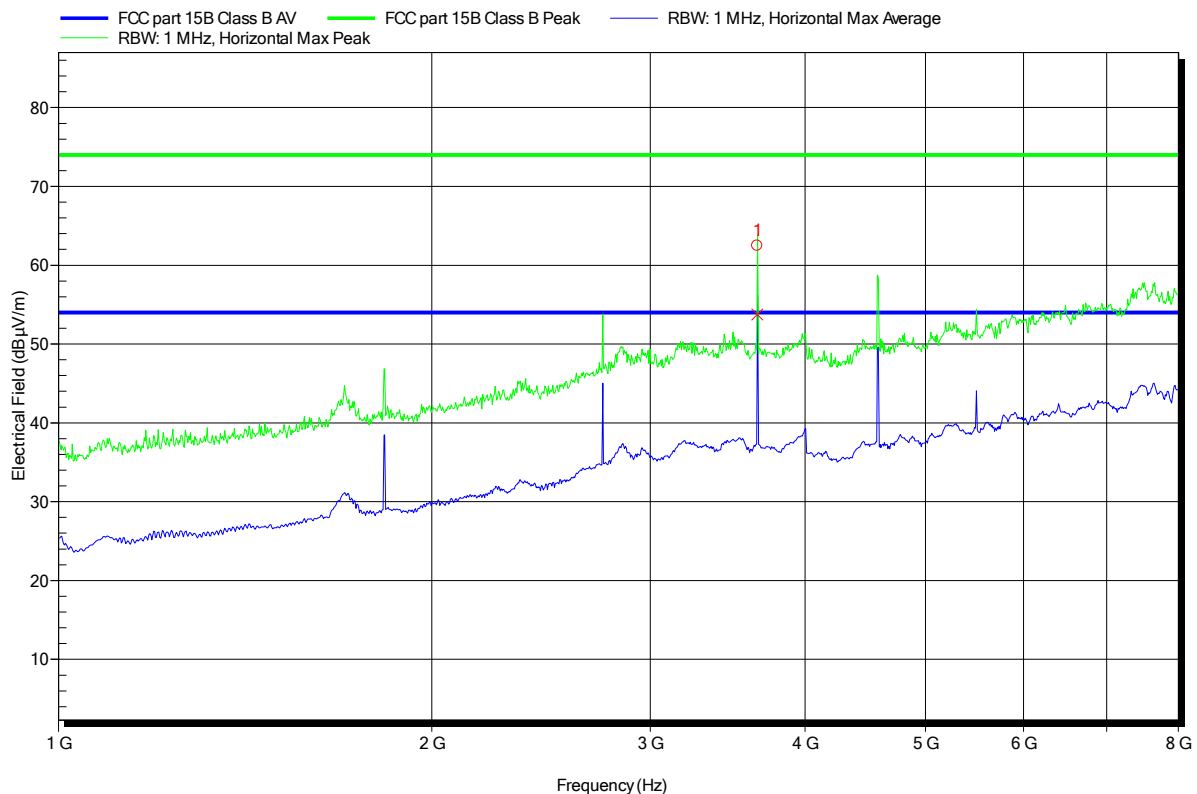


Spurious emissions under normal conditions according to FCC Part 15b

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:

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

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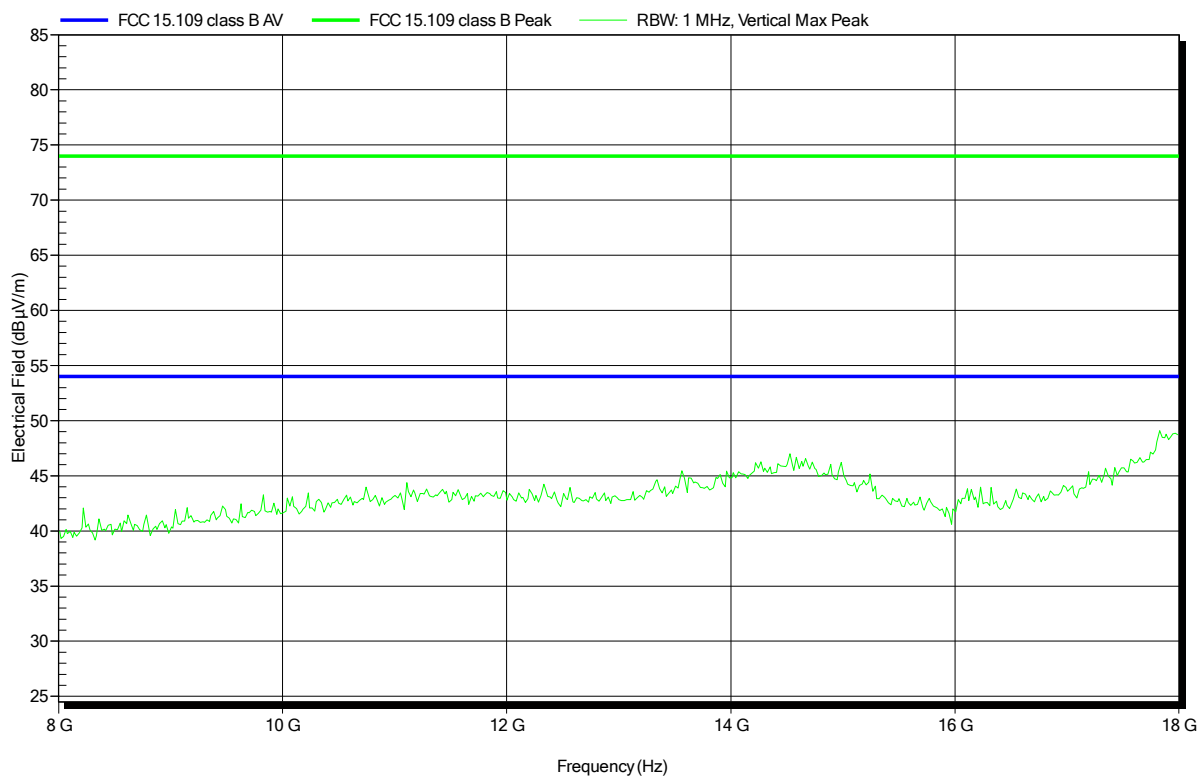
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

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:

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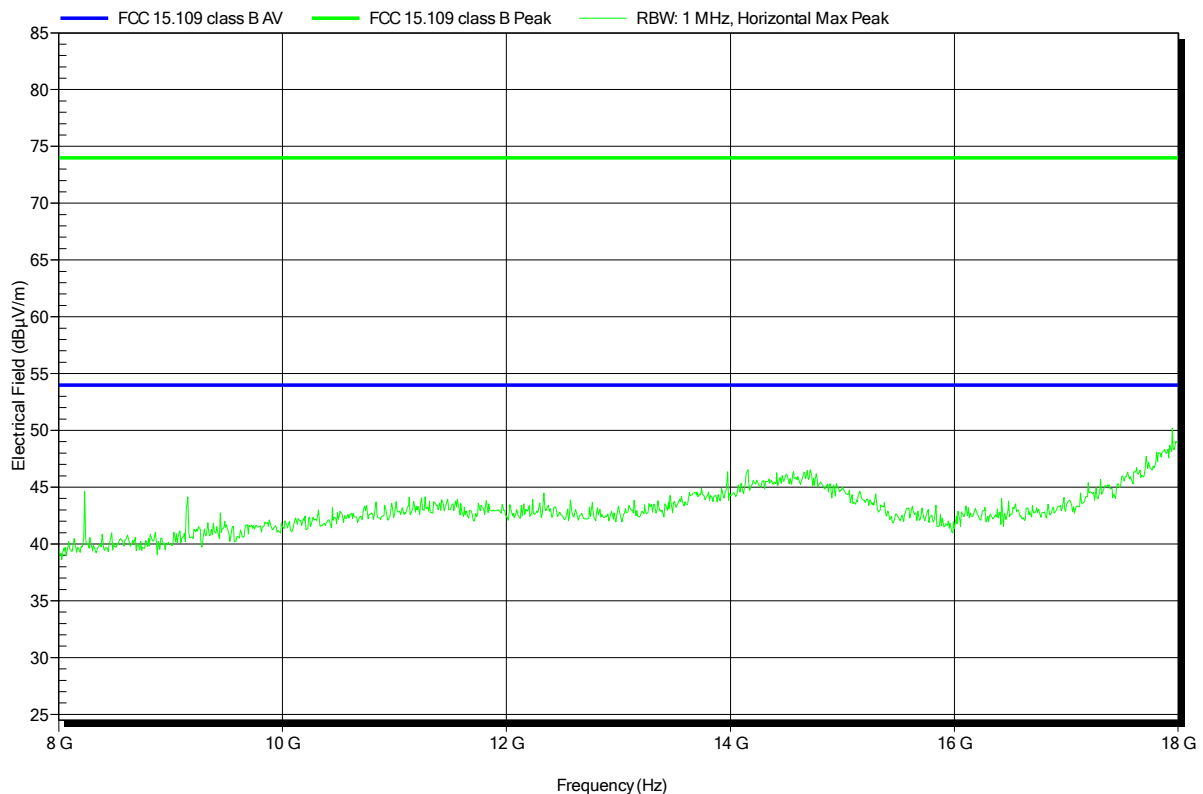


Spurious emissions according to FCC Part 15b

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:

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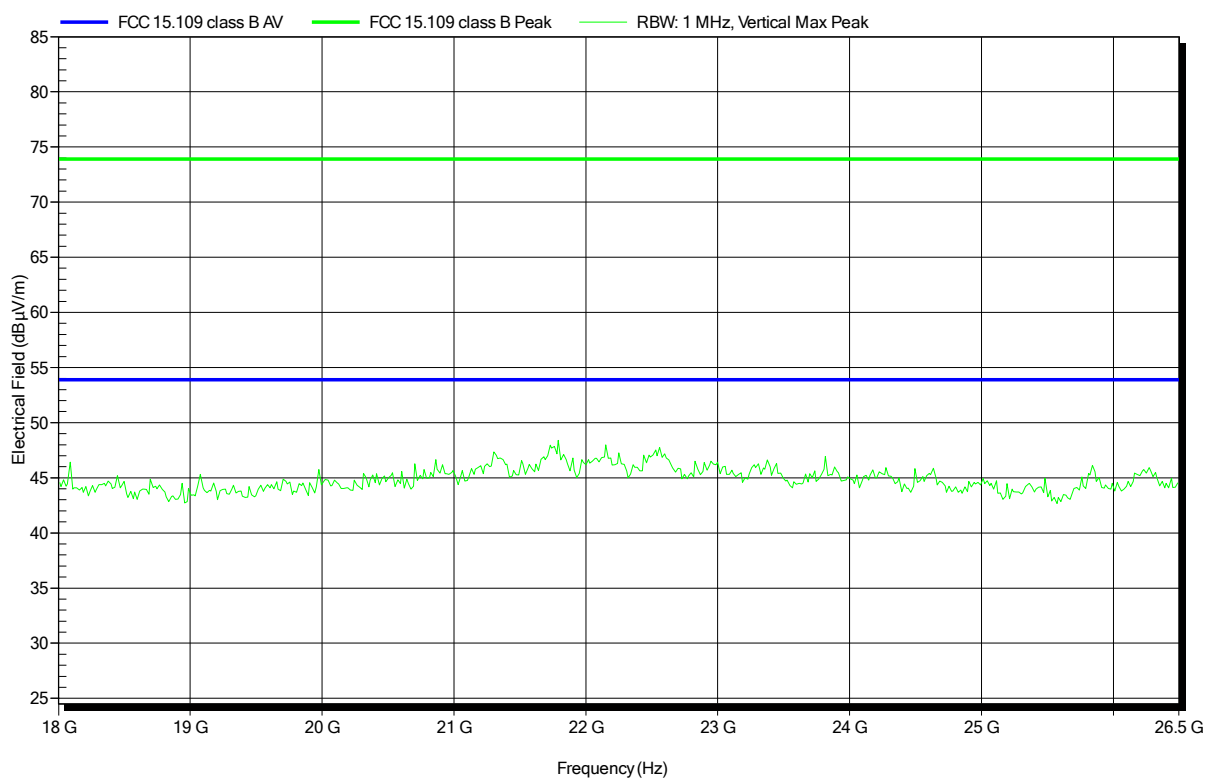


Spurious emissions according to FCC Part 15b

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:	

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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:

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