eurofins | Product Service

EMC TEST REPORT

FCC 47 CFR Part 15B
Industry Canada RSS-Gen

Electromagnetic compatibility - Unintentional radiators

Report Reference No. ..... :	G0M-1305-2845-EF01-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 ..... :	Multi Teknik Odense ApS
Address ..... :	Rosenvej 3 5250 Odense 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	SRD Transmitter
Model No.	Quick Pager System MP-D
Additional Models	None
Hardware version	GPE 1307
Firmware / Software version	Pagerpanel_Repeater_FW_915
Contains	FCC-ID: 2AAFOHG915 IC: N/A
Test result	**Passed**

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 ..... :	2013-05-21	
Date (s) of performance of tests ..... :	2013-05-21 – 2013-05-22	
Compiled by ..... :	Marcus Klein	
Tested by (+ signature) ..... :	Matthias Handrik	.....
Approved by (+ signature) ..... :	Christian Weber	..... C. Weber .....
Date of issue ..... :	2013-06-27	
Total number of pages ..... :	29	

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.

Additional comments:

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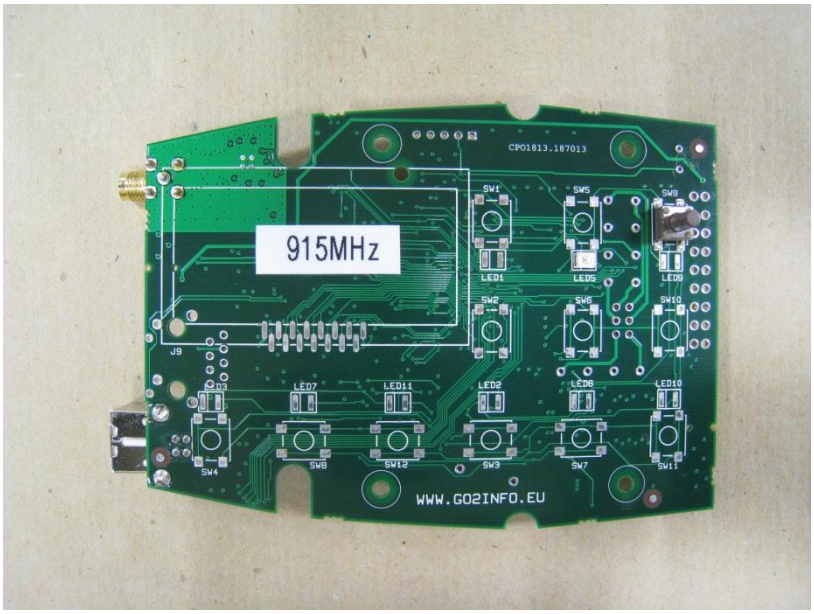
1 Equipment (Test item) Description

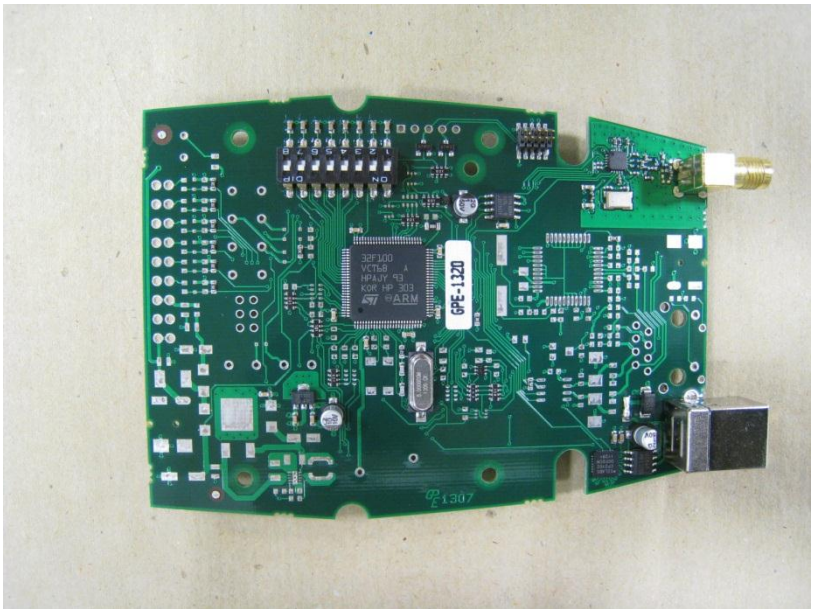
Description	SRD Transmitter	
Model	Quick Pager System MP-D	
Additional Models	None	
Serial number	None	
Hardware version	GPE 1307	
Software / Firmware version	Pagerpanel_Repeater_FW_915	
Contains FCC-ID	2AAFOHG915	
Contains IC	N/A	
Power supply	120 VAC via USB AC/DC Adpater	
Radio module	Type	Short Range Device Module
	Model	Quick Pager System MP-D
	Manufacturer	Multi teknik Odense ApS
	HW Version	GPE1307
	SW Version	Pagerpanel_repeater_FW_915
	SVN	N/A
	FCC-ID	2AAFOHG915
	IC	N/A
	IMEI	N/A
Manufacturer	Multi Teknik Odense ApS Rosenvej 3 5250 Odense Denmark	
Highest emission frequency	26 MHz	
Device classification	Class B	
Equipment type	Tabletop	
Number of tested samples	1	

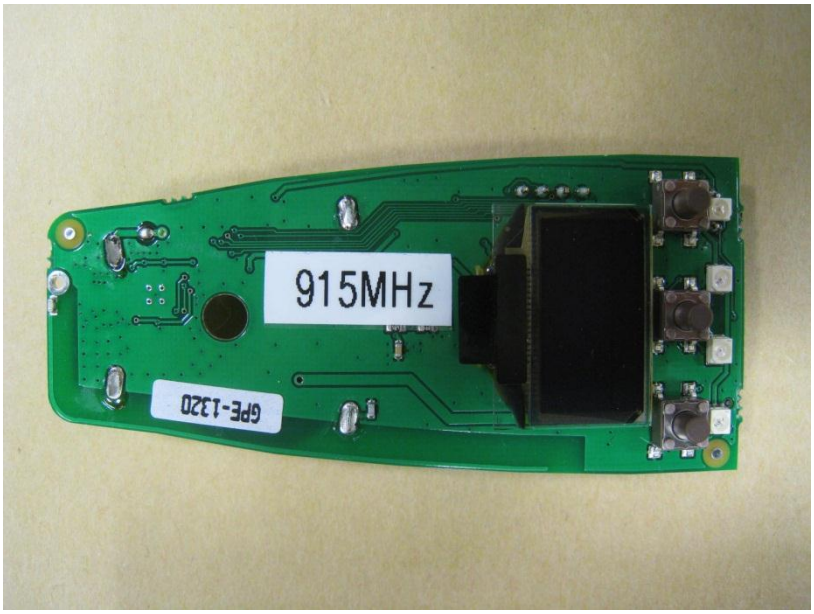
1.1 Photos – Equipment external

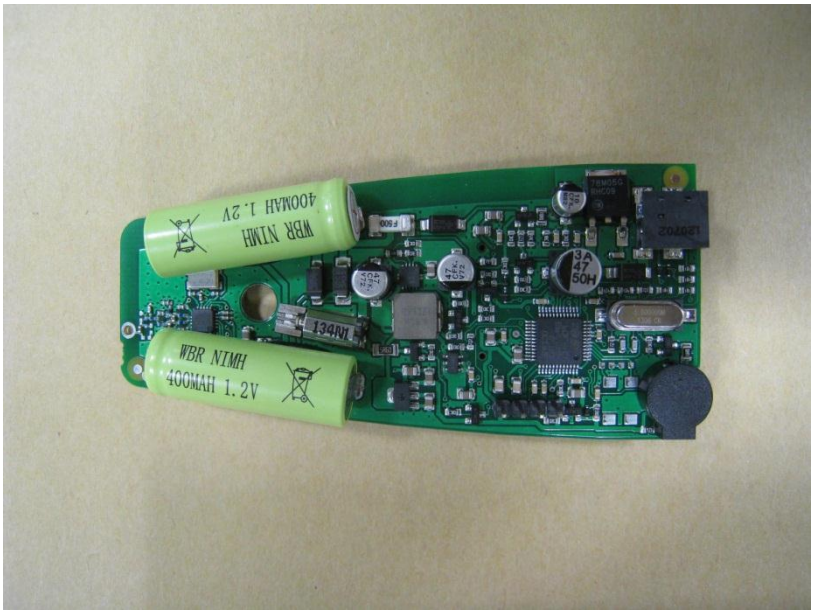

Quick Multi Pager QR-01D
alertsystems
www.alertsystems.dk
OK
Menu
On
Set

1.2 Photos – Equipment internal



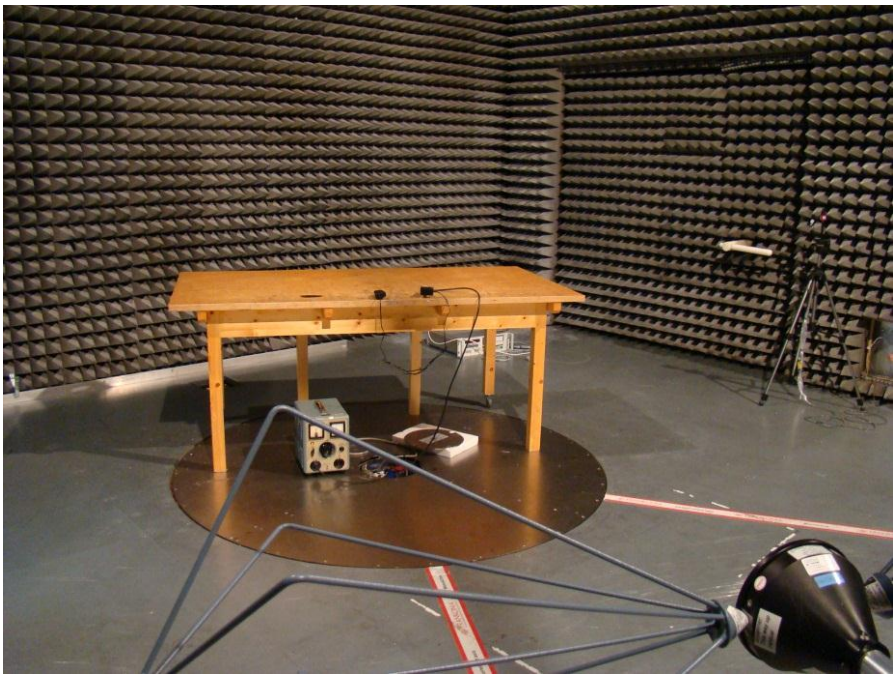


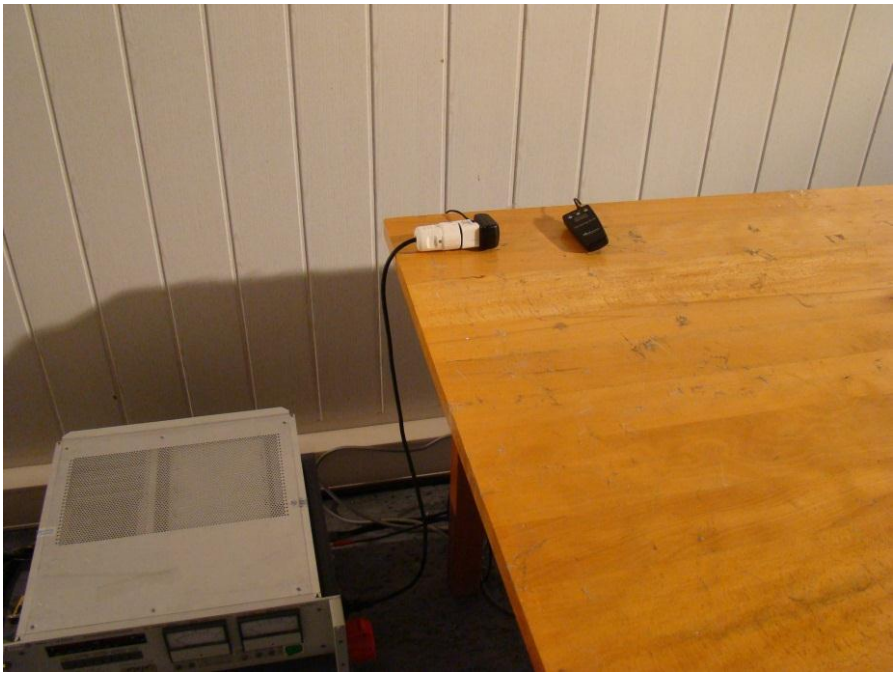

915MHz
GPE-1320


WBR NIMH
400MAH 1.2V
WBR NIMH
400MAH 1.2V

1.3 Photos – Test setup

Test Setup : Radiated Emissions


Test Setup : Radiated Emissions


Test Setup : Conducted Emissions


Test Setup : Conducted Emissions


1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
No additional support equipment used				

***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	Transmitting Test mode @ 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	2011-02	2014-02
LPD-Antenna	R&S	HL 025	EF00327	2013-02	2016-02
EMI Test Receiver	R&S	ESU8	EF00379	2013-03	2014-03
EMI Test Receiver	R&S	ESCS30	EF00295	2012-08	2013-08

Conducted emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
AMN	R&S	ESH2-Z5	EF00182	2012-10	2014-10
AMN	R&S	ESH3-Z5	EF00036	2012-11	2014-11
EMI Test Receiver	R&S	ESCS 30	EF00295	2012-08	2013-08

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 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	PASS	-
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	20 °C
Relative Humidity	30 to 60 %	40 %
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	
	26 MHz	
Fully configured sample scanned over the following frequency range	Frequency range	
	30 MHz to 1 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	-		-	-

Comments:

Spurious emissions under normal conditions according to FCC part 15B

Project number: G0M-1305-2845

Manufacturer:	Bolls ApS
EUT Name:	SRD
Model:	Pager (transmitter)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3m
Mode:	active; TX: 915 MHz (test mode)
Test Date:	2013-05-22
Note:	

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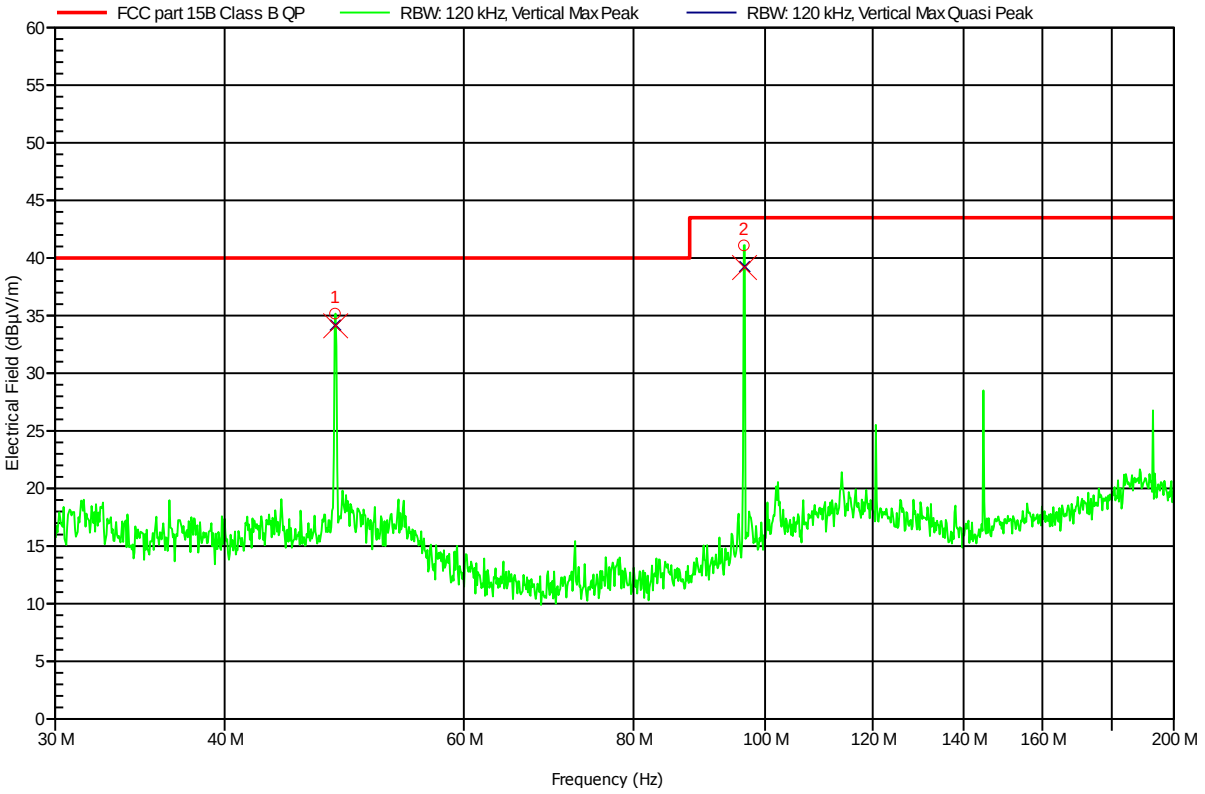

Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
48.228 MHz	34.17 dBµV/m	40 dBµV/m	-5.83 dB	Pass
96.462 MHz	39.23 dBµV/m	43.5 dBµV/m	-4.27 dB	Pass

Spurious emissions under normal conditions according to FCC part 15B

Project number: G0M-1305-2845

Manufacturer:	Bolls ApS
EUT Name:	SRD
Model:	Pager (transmitter)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3m
Mode:	active; TX: 915 MHz (test mode)
Test Date:	2013-05-22
Note:	

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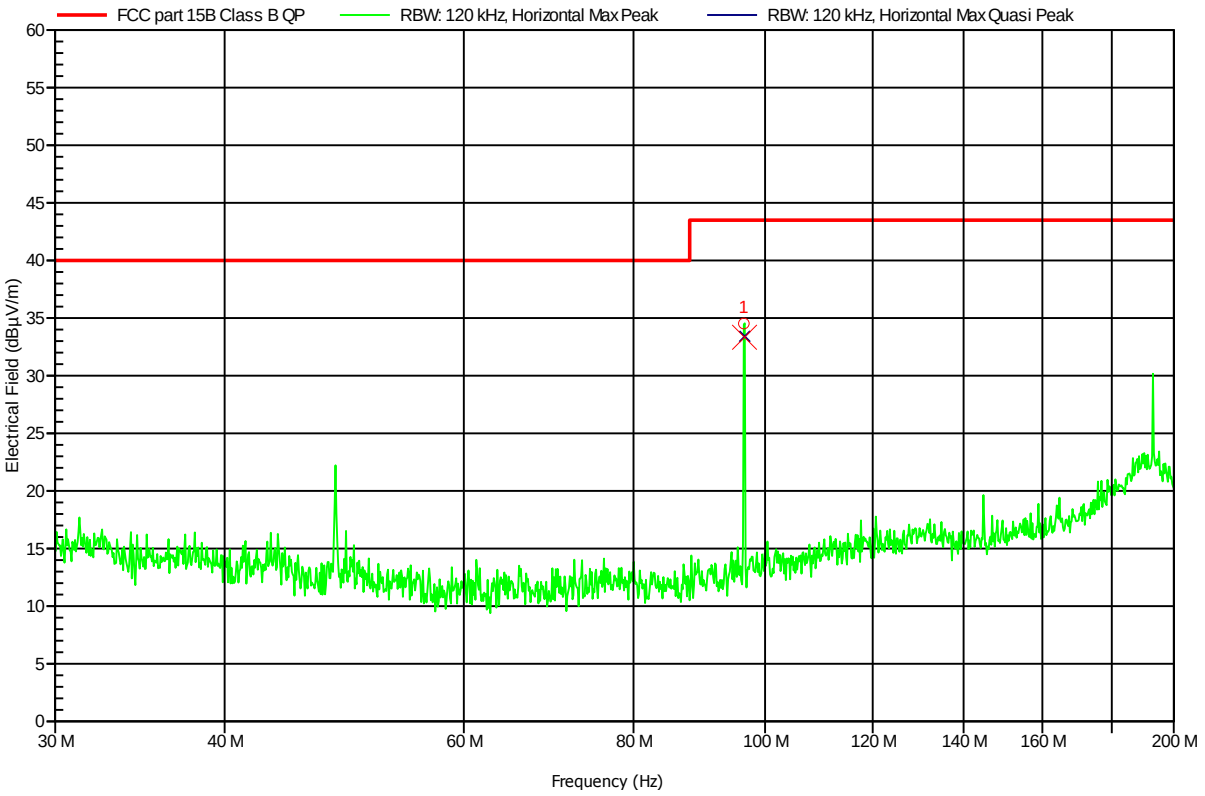

Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
96.462 MHz	33.39 dBµV/m	43.5 dBµV/m	-10.11 dB	Pass

Spurious emissions under normal conditions according to FCC part 15B

Project number: G0M-1305-2845

Manufacturer:	Bolls ApS
EUT Name:	SRD
Model:	Pager (transmitter)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3m
Mode:	active; TX: 915 MHz (test mode)
Test Date:	2013-05-22
Note:	

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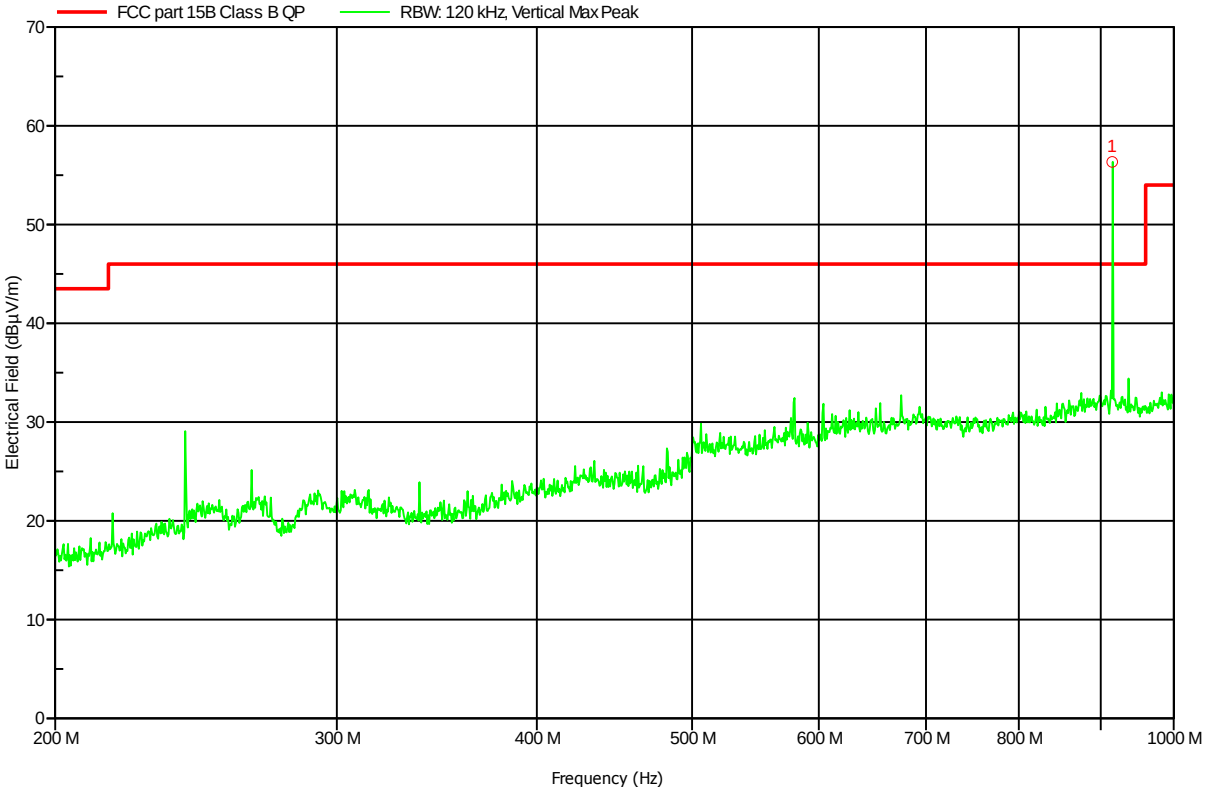
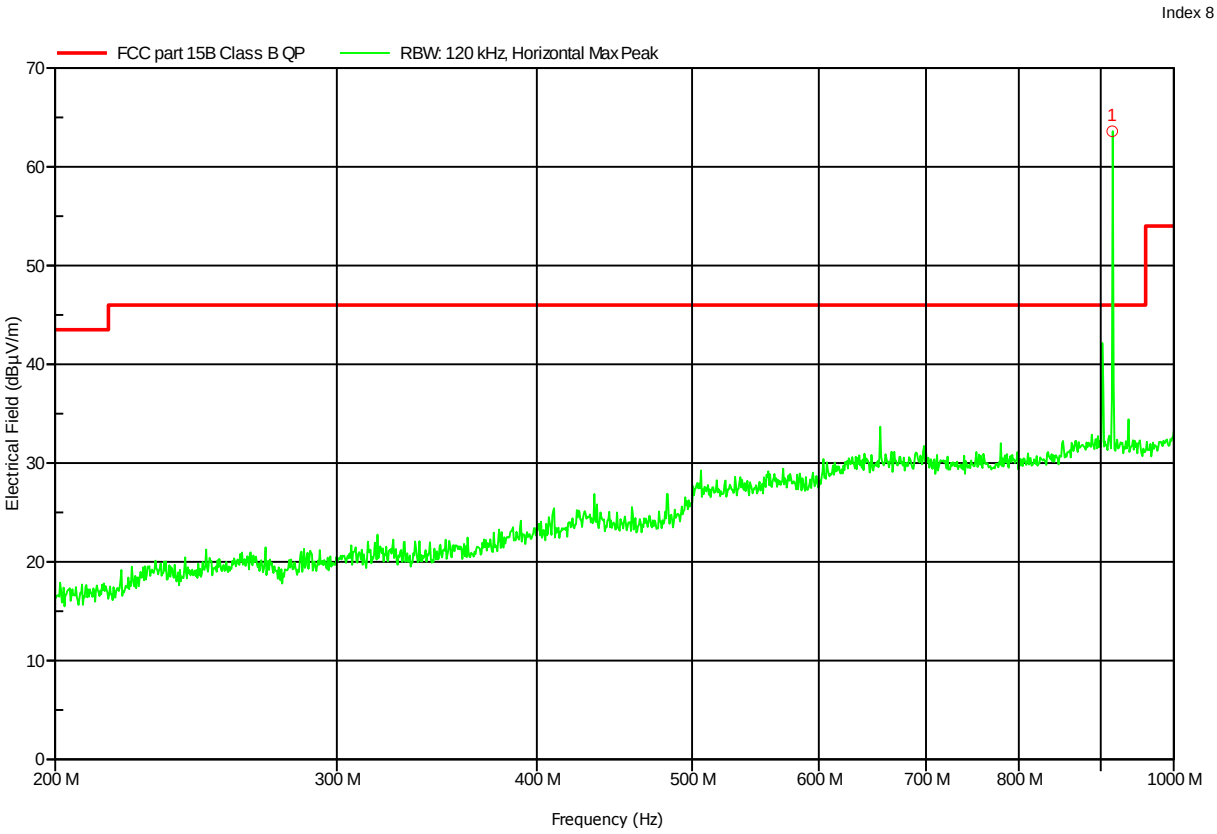


Frequency
915.02 MHz first harmonic

Spurious emissions under normal conditions according to FCC part 15B

Project number: G0M-1305-2845

Manufacturer:	Bolls ApS
EUT Name:	SRD
Model:	Pager (transmitter)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3m
Mode:	active; TX: 915 MHz (test mode)
Test Date:	2013-05-22
Note:	



Frequency
915.02 MHz first harmonic

Spurious emissions under normal conditions according to FCC part 15B

Project number: G0M-1305-2846

Manufacturer:	Bolls ApS
EUT Name:	SRD
Model:	Pager (receiver)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor: Model Nr: DYS 052-120033W-1)
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3m
Mode:	active; RX: 915 MHz (charging)
Test Date:	2013-05-22
Note:	

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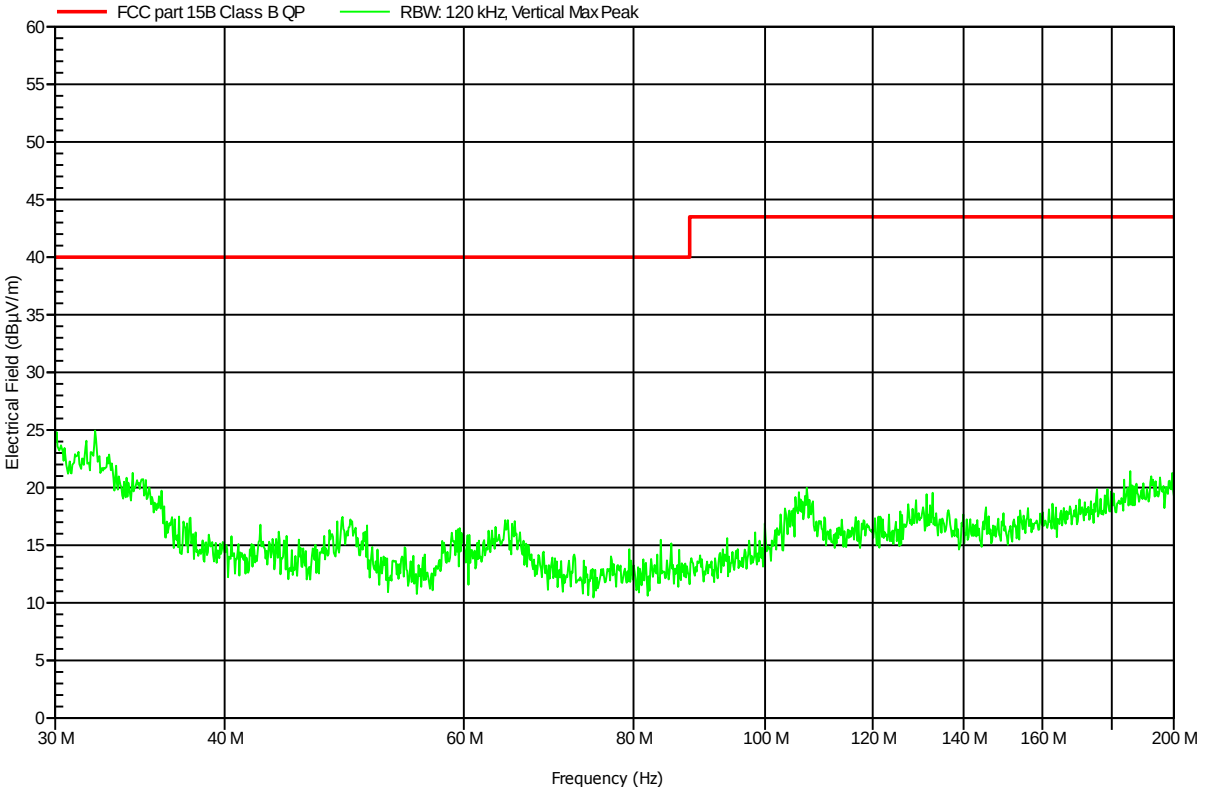

Spurious emissions under normal conditions according to FCC part 15B

Project number: G0M-1305-2846

Manufacturer:	Bolls ApS
EUT Name:	SRD
Model:	Pager (receiver)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor: Model Nr: DYS 052-120033W-1)
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3m
Mode:	active; RX: 915 MHz (charging)
Test Date:	2013-05-22
Note:	

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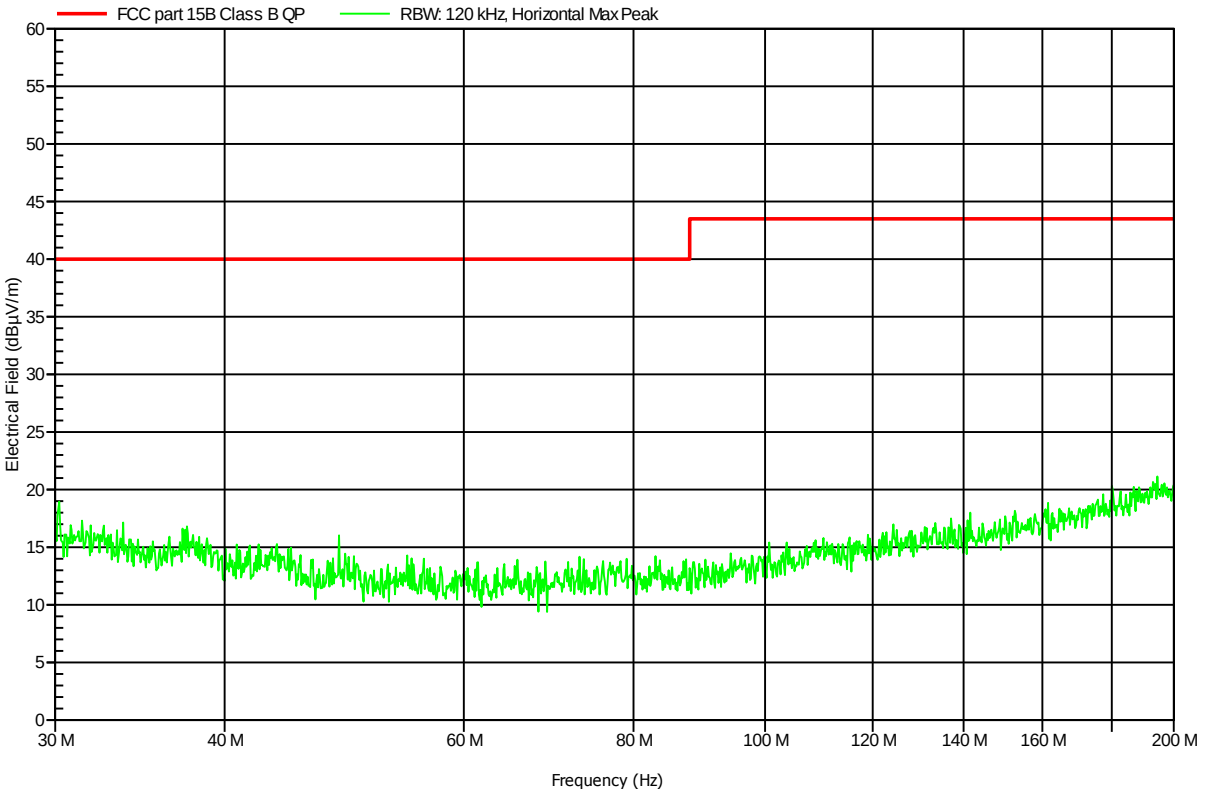

Spurious emissions under normal conditions according to FCC part 15B

Project number: G0M-1305-2846

Manufacturer:	Bolls ApS
EUT Name:	SRD
Model:	Pager (receiver)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor: Model Nr: DYS 052-120033W-1)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3m
Mode:	active; RX: 915 MHz (charging)
Test Date:	2013-05-22
Note:	

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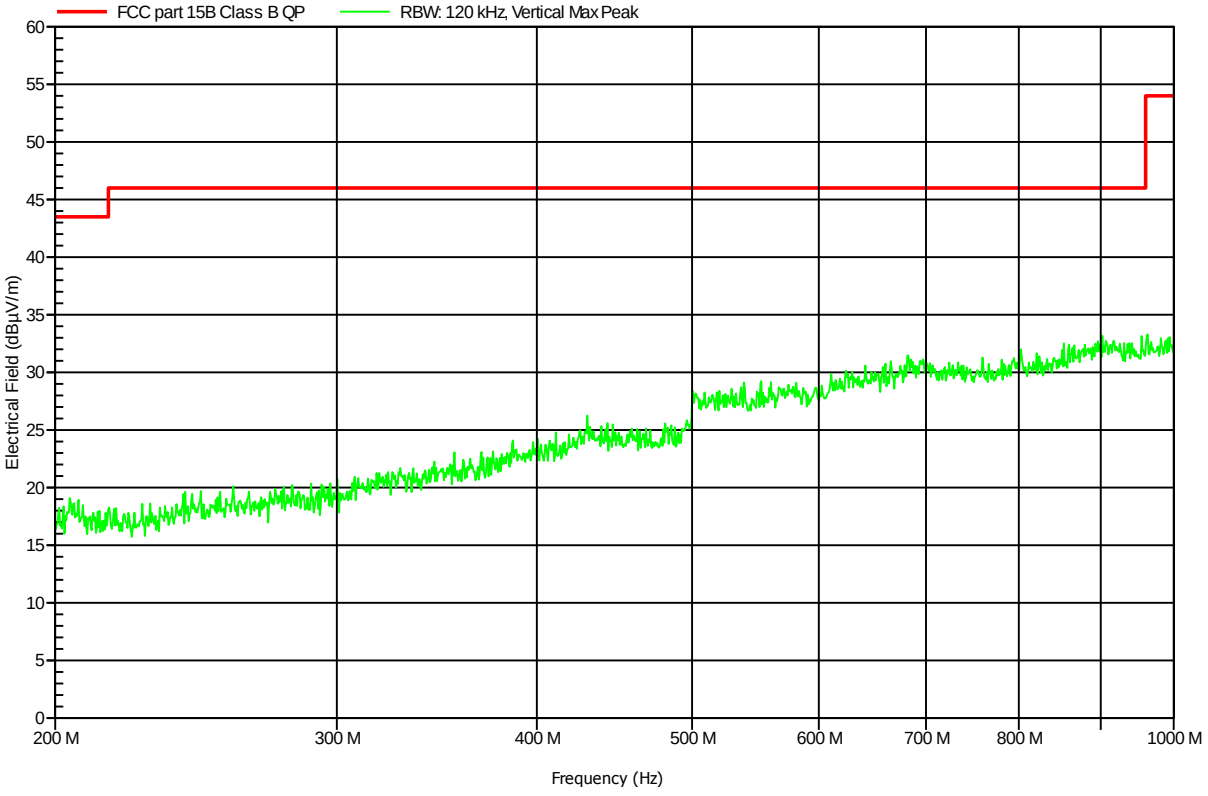
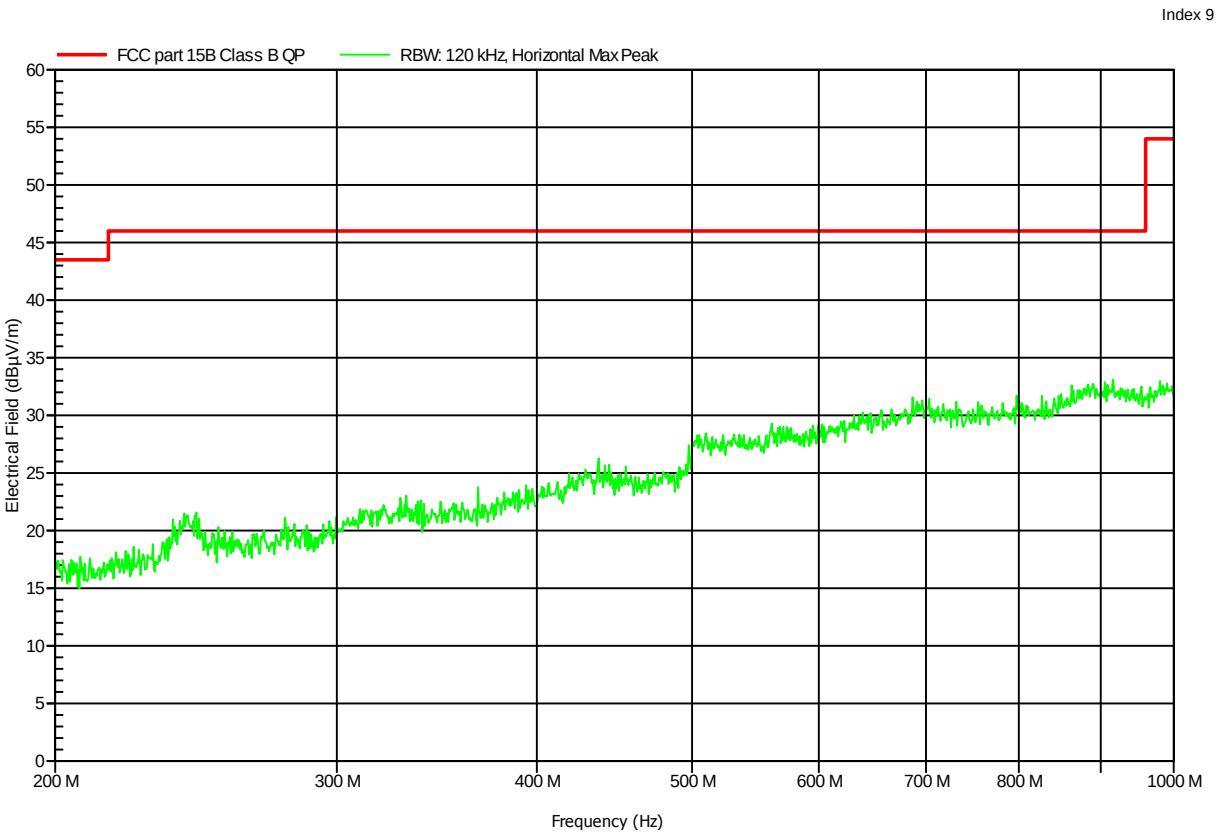


Spurious emissions under normal conditions according to FCC part 15B

Project number: G0M-1305-2846

Manufacturer:	Bolls ApS
EUT Name:	SRD
Model:	Pager (receiver)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor: Model Nr: DYS 052-120033W-1)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3m
Mode:	active; RX: 915 MHz (charging)
Test Date:	2013-05-22
Note:	



3.2 Test Conditions and Results – AC power line conducted emissions

Conducted emissions acc. FCC 47 CFR 15.107 / IC RSS-Gen				**Verdict: PASS**
Laboratory Parameters:	Required prior to the test	During the test		
Ambient Temperature	15 to 35 °C	20 °C		
Relative Humidity	30 to 60 %	40 %		
Test according referenced standards	Reference Method			
	ANSI C63.4			
Fully configured sample scanned over the following frequency range	Frequency range			
	0.15 MHz to 30 MHz			
Sample is tested with respect to the requirements of the equipment class	Equipment class			
	Class B			
Points of Application	Application Interface			
AC Mains	LISN			
Operating mode	1			

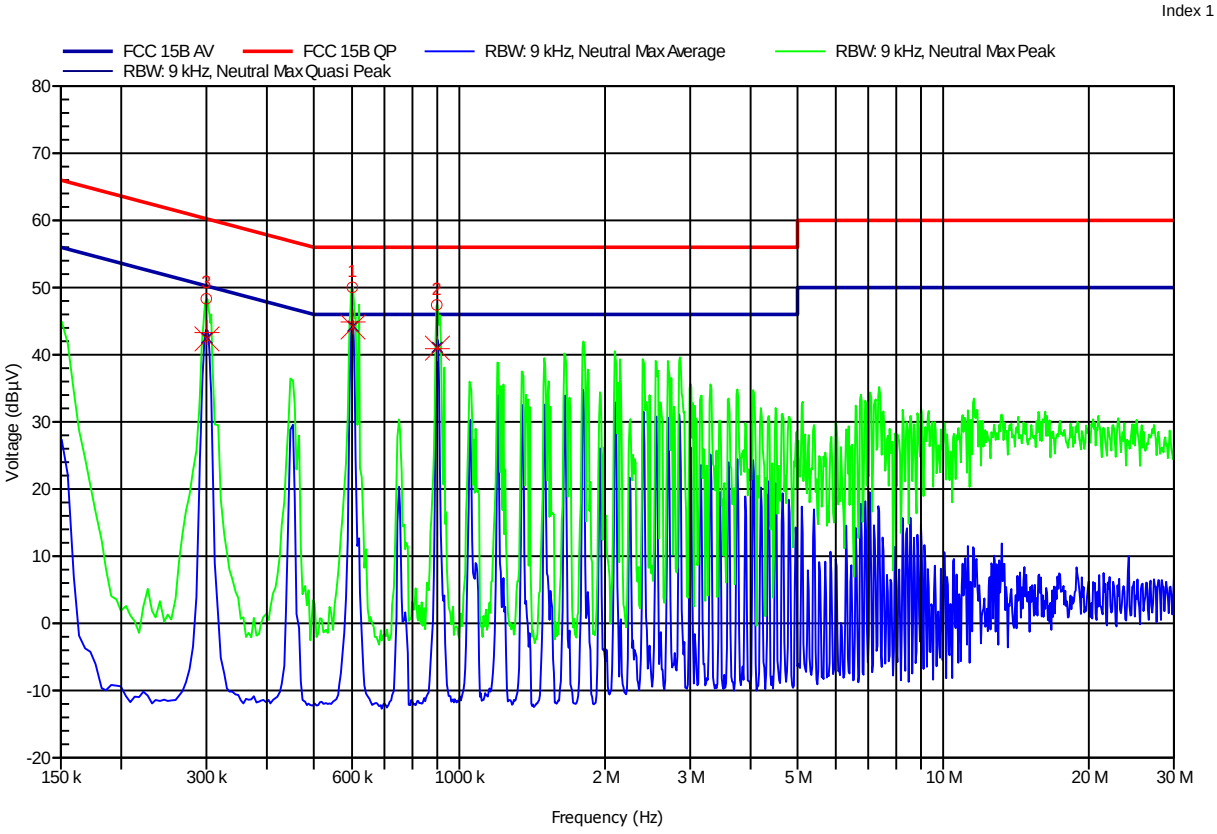
Limits and results Class B				
Frequency [MHz]	Quasi-Peak [dBµV]	Result	Average [dBµV]	Result
0.15 to 5	66 to 56*	PASS	56 to 46*	PASS
0.5 to 5	56	PASS	46	PASS
5 to 30	60	PASS	50	PASS

Comments:
* Limit decreases linearly with the logarithm of the frequency.

EMI voltage test in the ac-mains according to FCC part 15B

Project number: G0M-1305-2845

Manufacturer:	Bolls ApS
EUT Name:	SRD
Model:	Pager (transmitter)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC
LISN:	ESH2-Z5 N
Mode:	active; TX: 915 MHz (test mode)
Test Date:	2013-05-21
Note:	



Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
299.85 kHz	42.45 dBµV	60.25 dBµV	-17.79 dB	Pass
600.9 kHz	44.21 dBµV	56 dBµV	-11.79 dB	Pass
897.9 kHz	41.07 dBµV	56 dBµV	-14.93 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
299.85 kHz	43.39 dBµV	50.25 dBµV	-6.85 dB	Pass
600.9 kHz	44.97 dBµV	46 dBµV	-1.03 dB	Pass
897.9 kHz	41 dBµV	46 dBµV	-5 dB	Pass

EMI voltage test in the ac-mains according to FCC part 15B

Project number: G0M-1305-2845

Manufacturer:	Bolls ApS
EUT Name:	SRD
Model:	Pager (transmitter)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC
LISN:	ESH2-Z5 L
Mode:	active; TX: 915 MHz (test mode)
Test Date:	2013-05-21
Note:	

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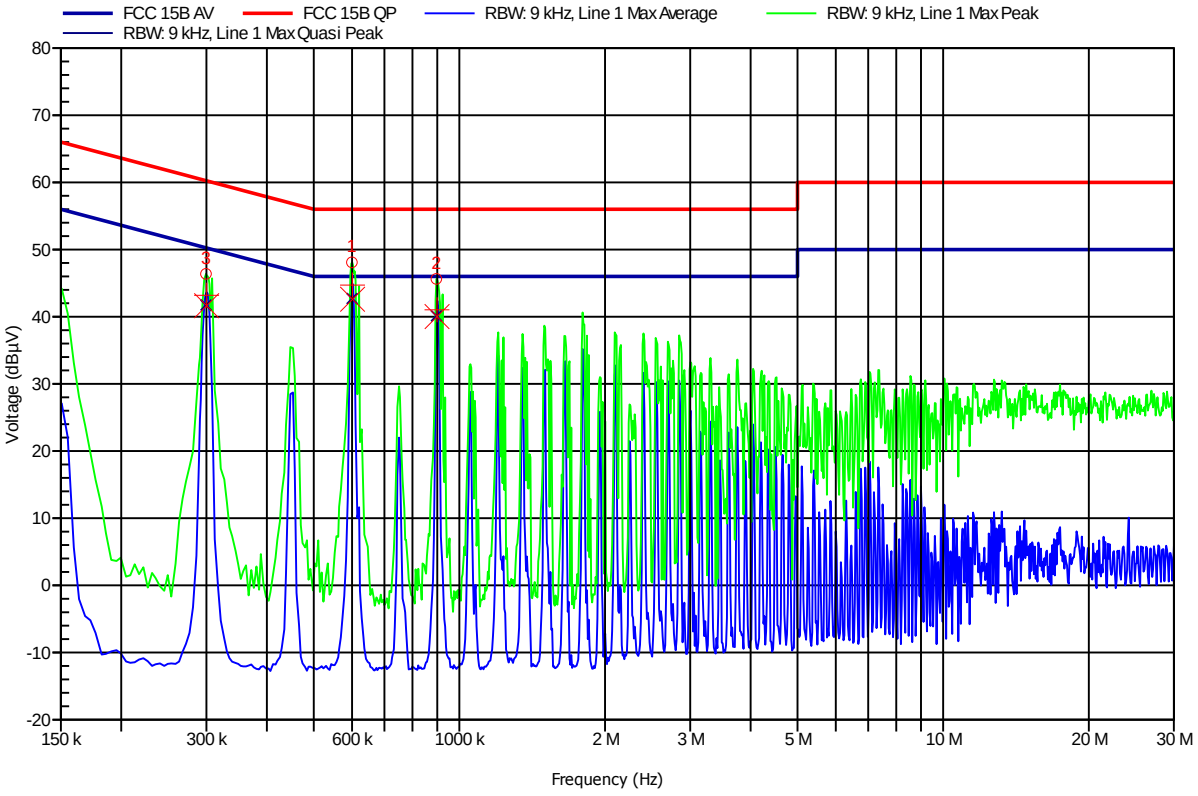

Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
299.4 kHz	41.73 dBµV	60.26 dBµV	-18.53 dB	Pass
599.55 kHz	42.7 dBµV	56 dBµV	-13.3 dB	Pass
896.55 kHz	40.12 dBµV	56 dBµV	-15.88 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
299.4 kHz	43.29 dBµV	50.26 dBµV	-6.97 dB	Pass
599.55 kHz	44.8 dBµV	46 dBµV	-1.2 dB	Pass
896.55 kHz	41.13 dBµV	46 dBµV	-4.87 dB	Pass

EMI voltage test in the ac-mains according to FCC part 15B

Project number: G0M-1305-2846

Manufacturer:	Bolls ApS
EUT Name:	SRD
Model:	Pager (receiver)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor: Model Nr: DYS 052-120033W-1)
LISN:	ESH2-Z5 N
Mode:	active; RX: 915 MHz (charging)
Test Date:	2013-05-21
Note:	

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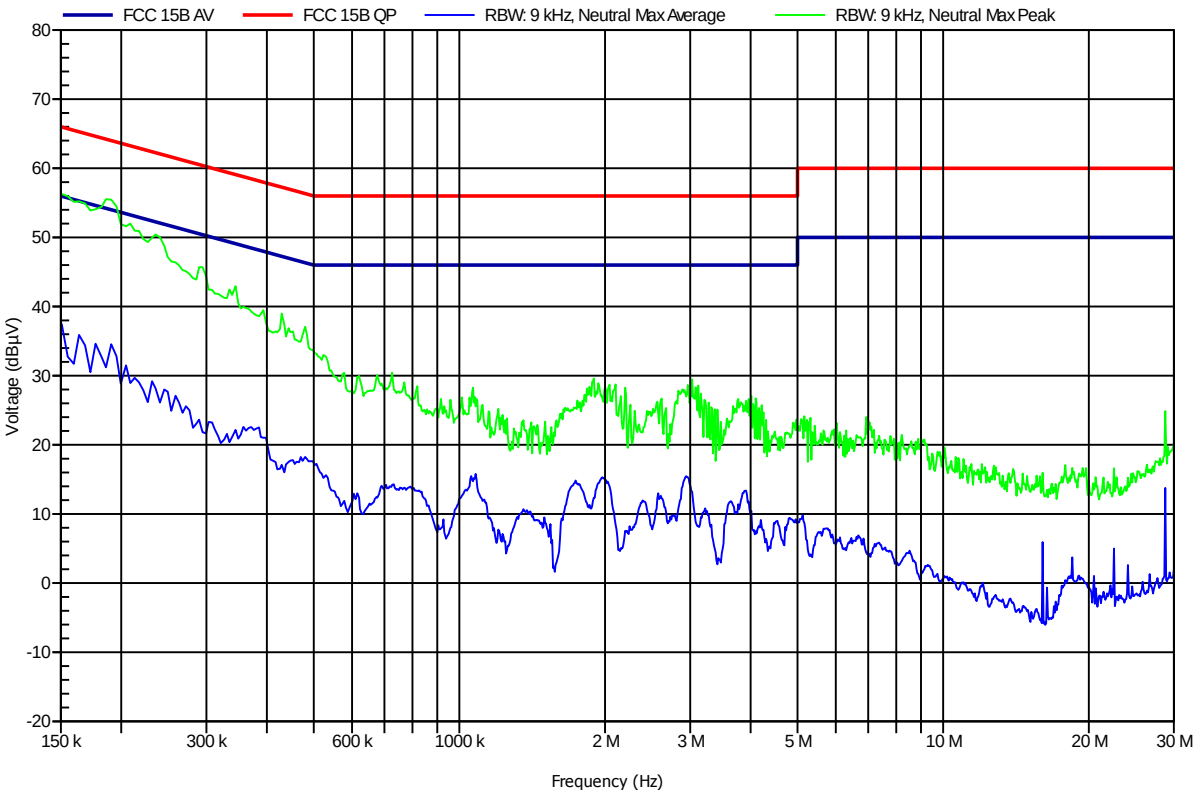

EMI voltage test in the ac-mains according to FCC part 15B

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Manufacturer:	Bolls ApS
EUT Name:	SRD
Model:	Pager (receiver)
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Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor: Model Nr: DYS 052-120033W-1)
LISN:	ESH2-Z5 L
Mode:	active; RX: 915 MHz (charging)
Test Date:	2013-05-21
Note: