



EMC TEST REPORT FCC 47 CFR Part 15B Industry Canada RSS-Gen Electromagnetic compatibility - Unintentional radiators	
Report Reference No.	G0M-1406-3913-EF0115B-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	<div style="text-align: center;">   </div> <p>A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Filed Test Laboratory, Reg.-No.: 96970 IC OATS Filing assigned code: 3470A</p>
Applicant's name	Panasonic Industrial Devices Europe GmbH
Address	Zeppelinstr. 19 21337 Lüneburg GERMANY
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	Bluetooth Smart Module
Model No.	PAN1740
Additional Models	None
Hardware version	02
Firmware / Software version	02
Contains	FCC-ID: T7V1740 IC: 216Q-1740
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: 2014-06-25

Date (s) of performance of tests: 2014-07-01 - 2014-07-02

Compiled by: Matthias Handrik

Tested by (+ signature).....: Matthias Handrik 

Approved by (+ signature): Marcus Klein 

Date of issue: 2014-07-03

Total number of pages: 23

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

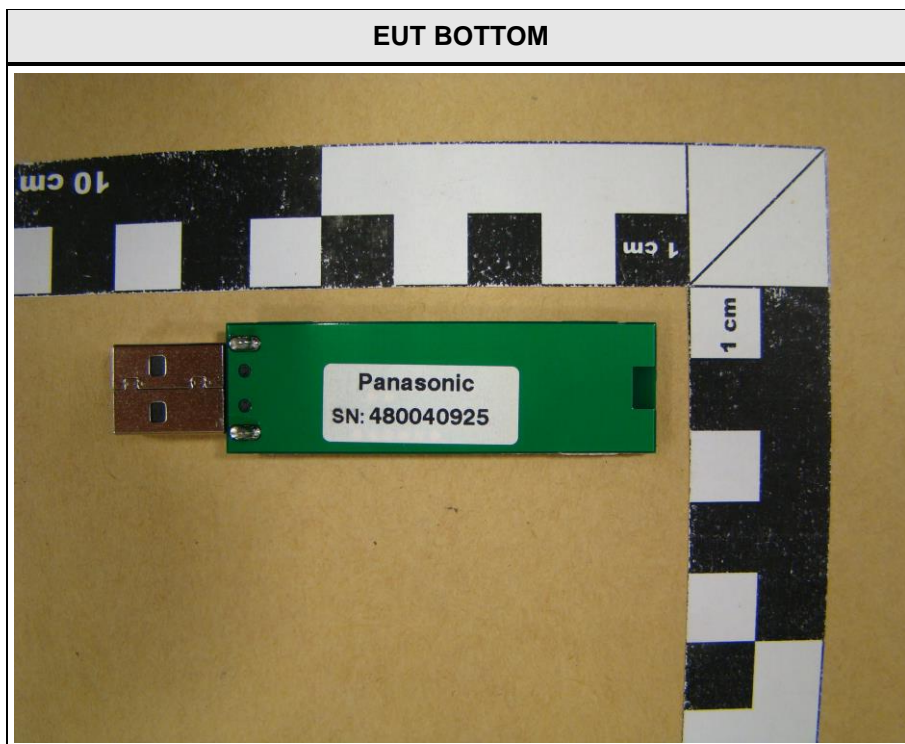
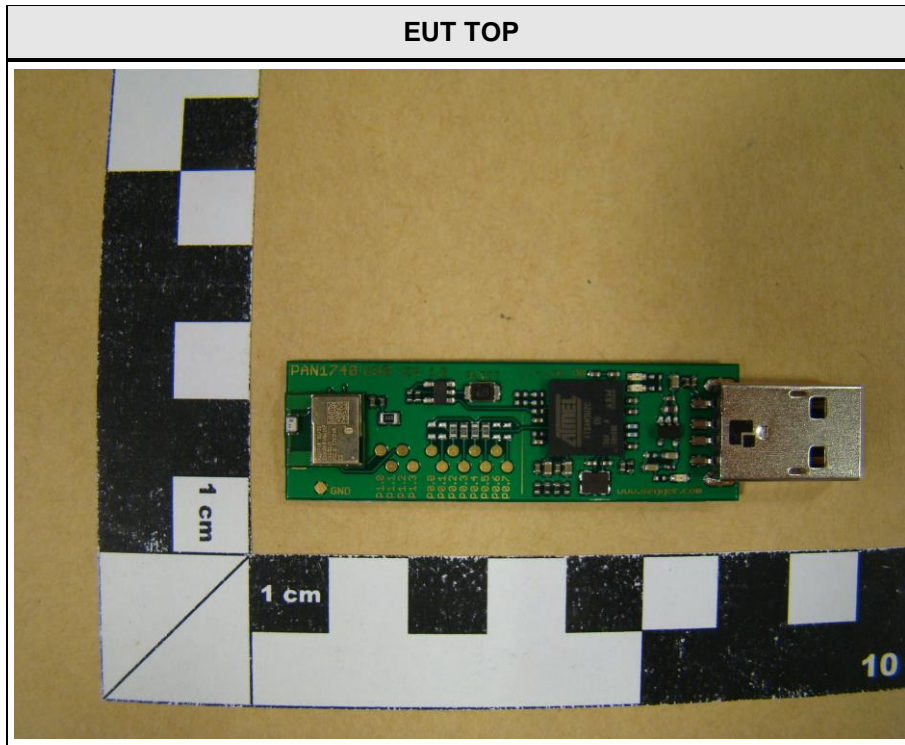
Version	Issue Date	Remarks	Revised by
V01	2014-07-03	Initial Release	

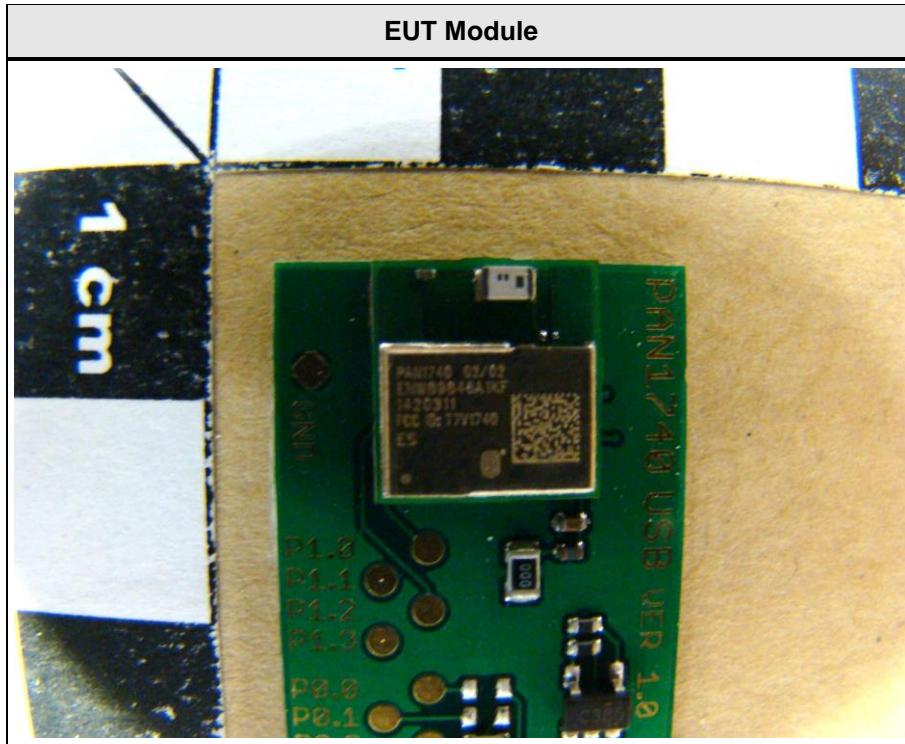
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1 Equipment (Test item) Description

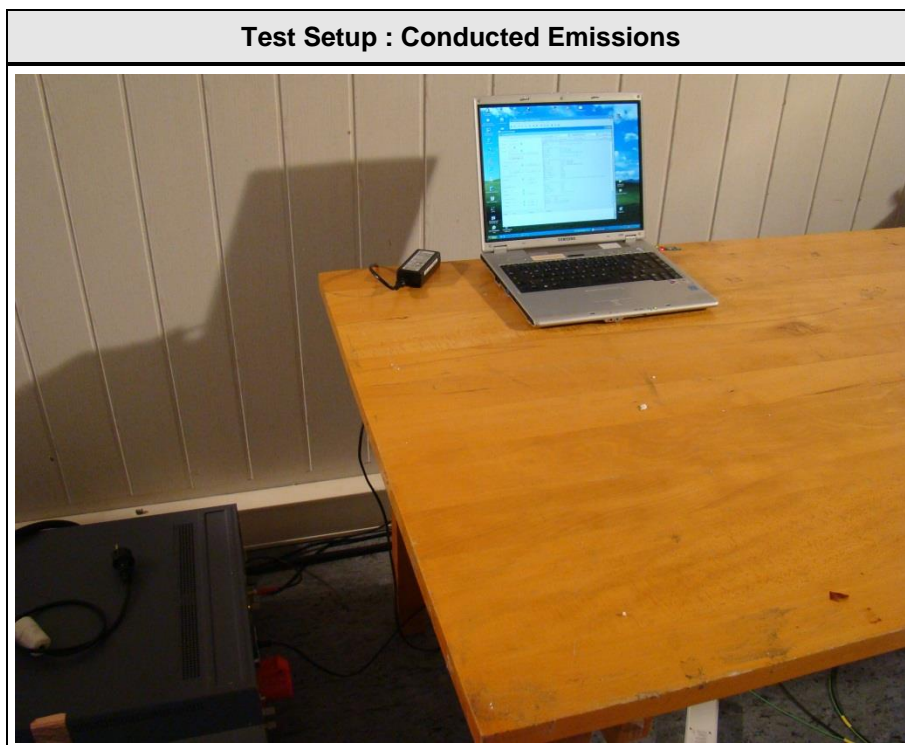
Description	Bluetooth Smart Module	
Model	PAN1740	
Additional Models	None	
Serial number	480040925	
Hardware version	02	
Software / Firmware version	02	
Contains FCC-ID	T7V1740	
Contains IC	216Q-1740	
Power supply	5 VDC via USB	
AC/DC-Adaptor	None	
Radio module	Type	Bluetooth Smart Module
	Model	PAN1740
	Manufacturer	Panasonic Industrial Devices Slovakia s.r.o.
	HW Version	02
	SW Version	02
	SVN	N/A
	FCC-ID	T7V1740
	IC	216Q-1740
	IMEI	N/A
Manufacturer	Panasonic Industrial Devices Slovakia s.r.o. Tovarenska 13 06401 Stara Lubovna SLOVAKIA	
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





1.2 Photos – Test setup



1.3 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
AE	Laptop	Samsung	NP-X20 J	
AE : Auxiliary/Associated Equipment				

1.4 Operating Modes

Mode #	Description
1	Bluetooth LE Test mode continuous TX channel: 37

1.5 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

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

1.6 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 μ 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 μ V/m). The FCC limits are given in units of μ V/m. The following formula is used to convert the units of μ V/m to dB μ 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	PASS	
Remarks:				

3 Test Conditions and Results

3.1 Test Conditions and Results – Radiated emissions

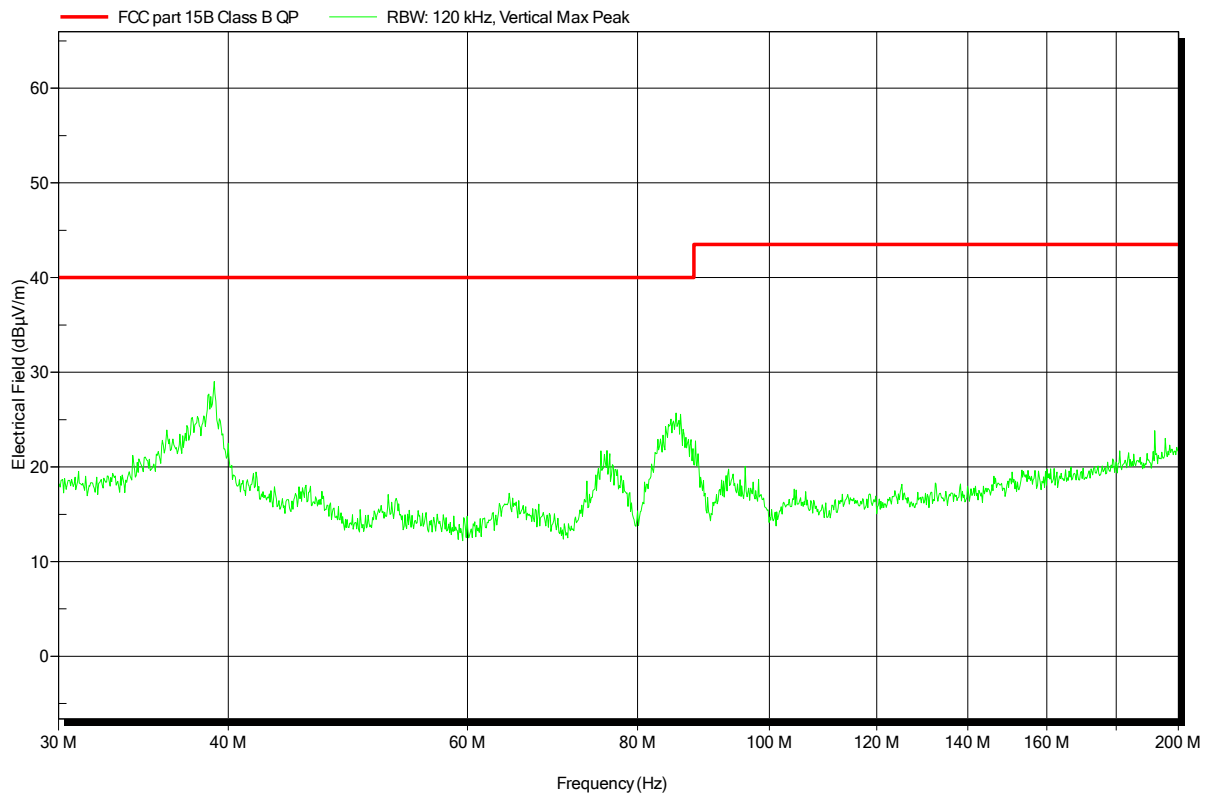
Radiated emissions acc. FCC 47 CFR 15.109 / IC RSS-Gen		Verdict: PASS				
Laboratory Parameters:	Required prior to the test	During the test				
Ambient Temperature	15 to 35 °C	22°C				
Relative Humidity	30 to 60 %	39%				
Test according referenced standards	Reference Method					
	ANSI C63.4					
Sample 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 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 15B

Project number: G0M-1406-3913

Manufacturer:	Panasonic Industrial Devices Europe
EUT Name:	Bluetooth Smart Module
Model:	PAN1740
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 24°C, Unom: 5 V DC (USB)
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3m
Mode:	Bluetooth LE CH.: 37
Test Date:	2014-07-02
Note:	

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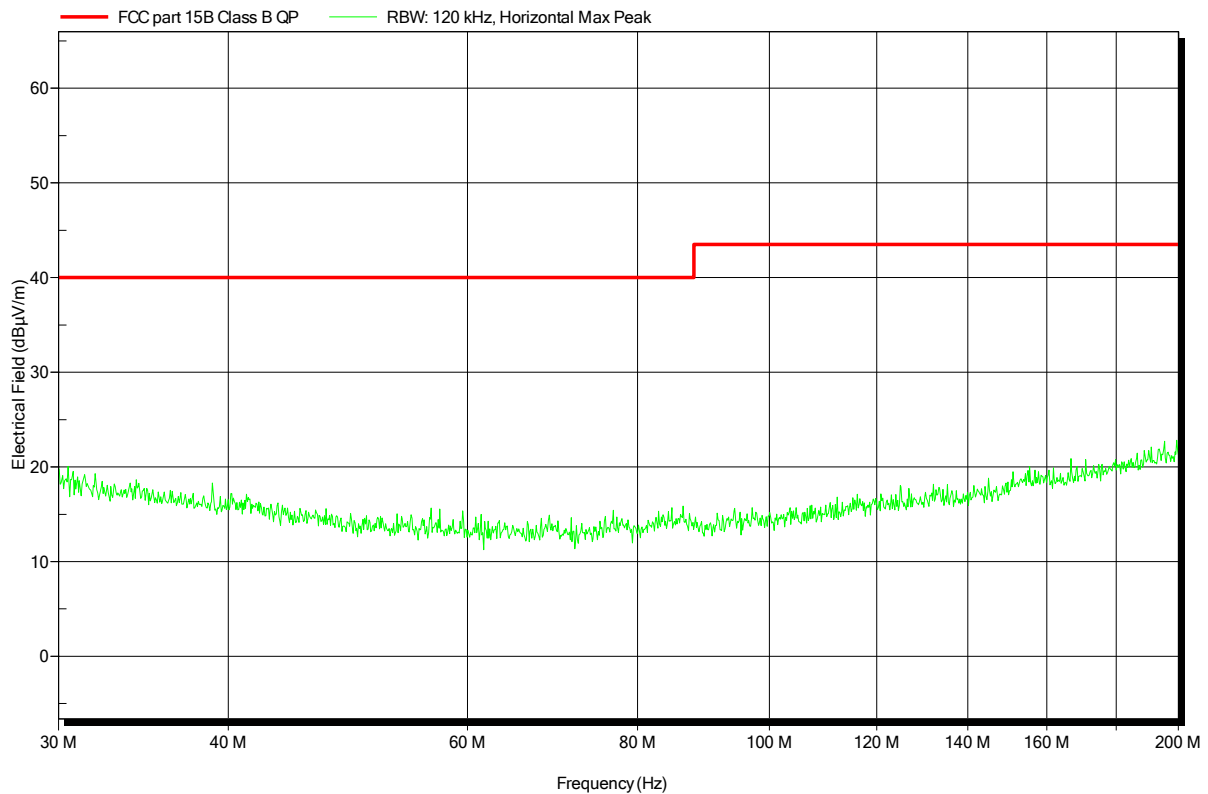


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Model:	PAN1740
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Operator:	Mr. Handrik
Test Conditions:	Tnom: 24°C, Unom: 5 V DC (USB)
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3m
Mode:	Bluetooth LE CH.: 37
Test Date:	2014-07-02
Note:	

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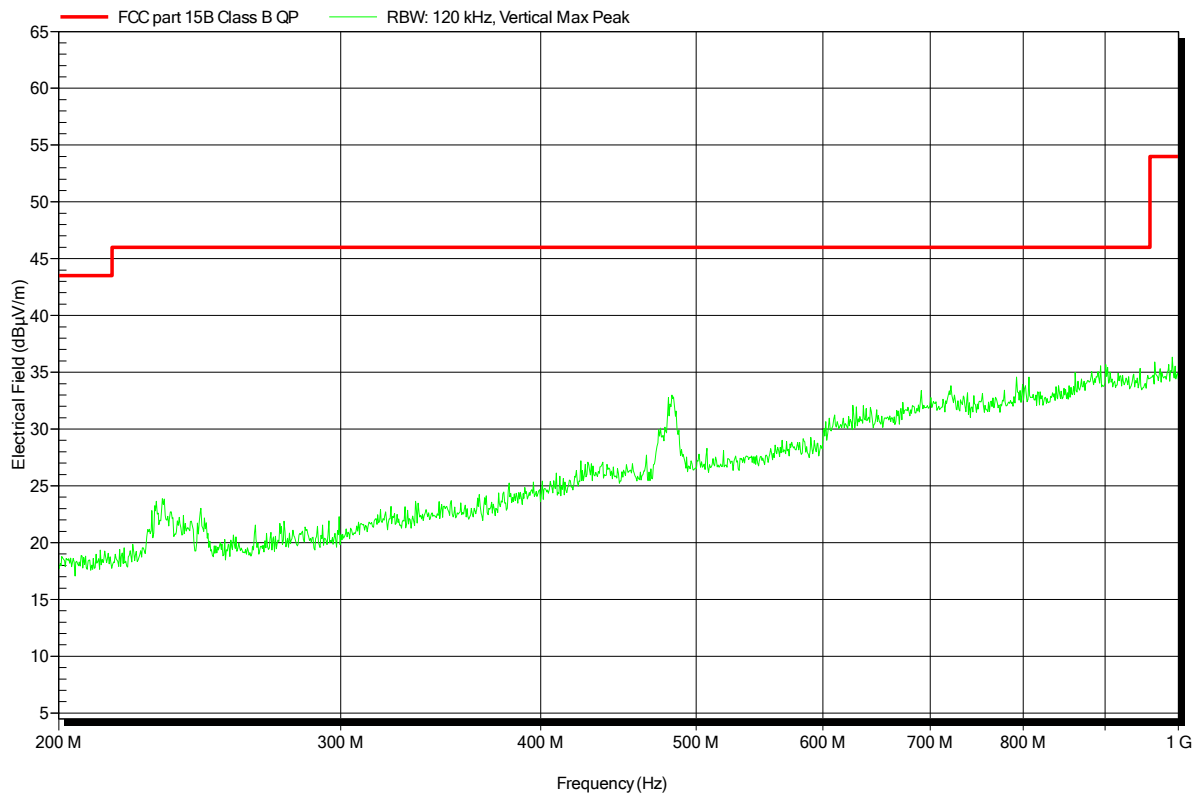


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1406-3913

Manufacturer:	Panasonic Industrial Devices Europe
EUT Name:	Bluetooth Smart Module
Model:	PAN1740
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 24°C, Unom: 5 V DC (USB)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3m
Mode:	Bluetooth LE CH.: 37
Test Date:	2014-07-02
Note:	

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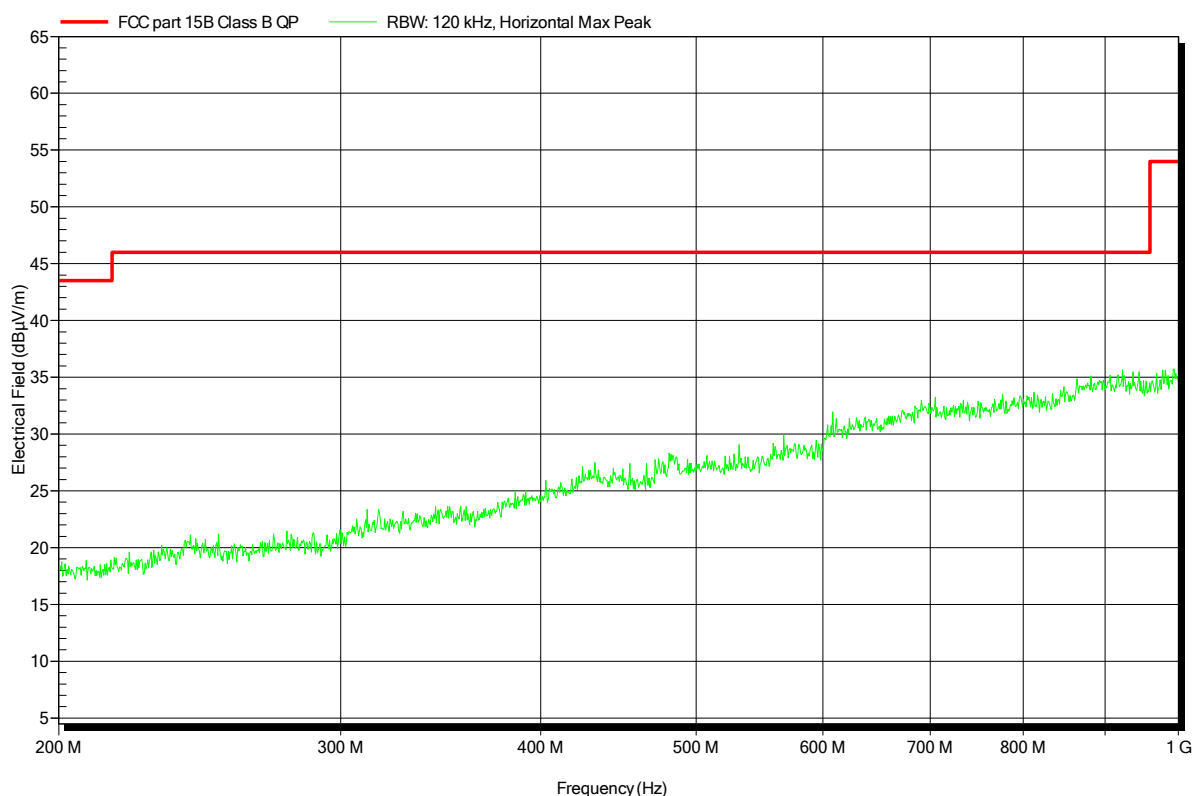


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Manufacturer:	Panasonic Industrial Devices Europe
EUT Name:	Bluetooth Smart Module
Model:	PAN1740
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 24°C, Unom: 5 V DC (USB)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3m
Mode:	Bluetooth LE CH.: 37
Test Date:	2014-07-02
Note:	

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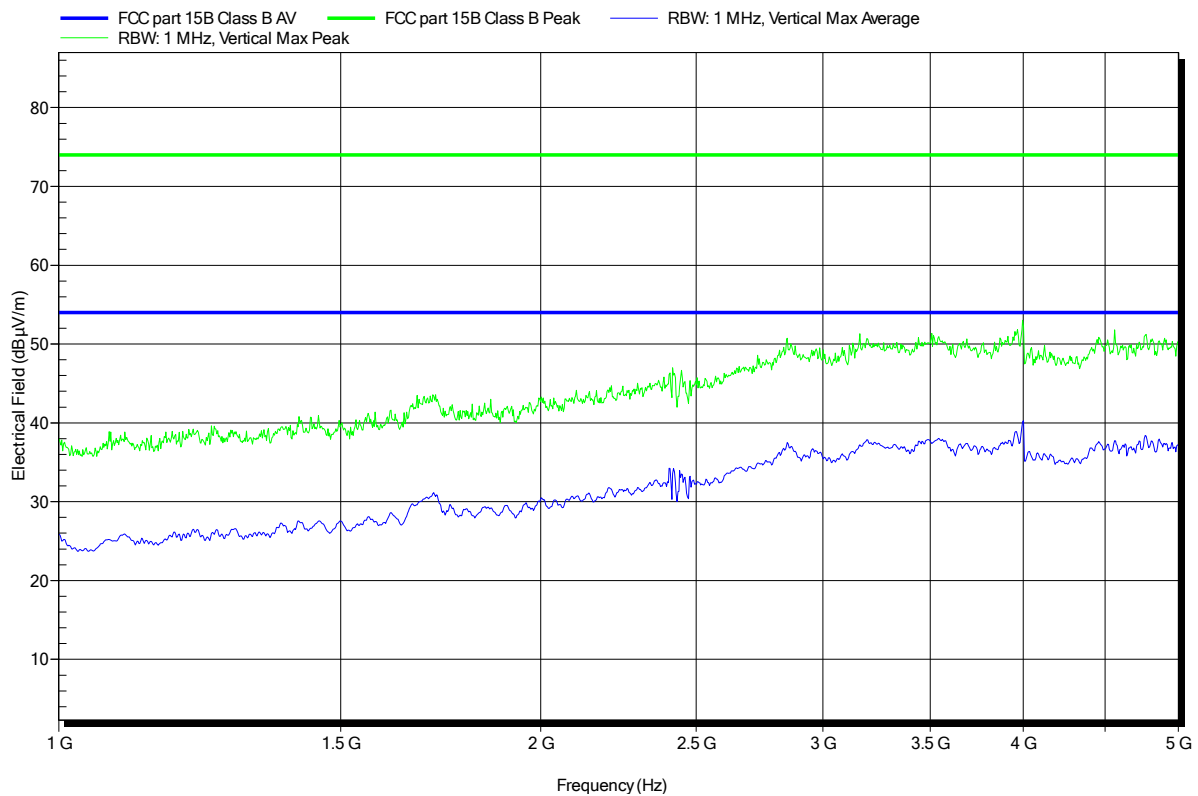


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1406-3913

Manufacturer:	Panasonic Industrial Devices Europe
EUT Name:	Bluetooth Smart Module
Model:	PAN1740
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 24°C, Unom: 5 V DC (USB)
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	3m
Mode:	Bluetooth LE CH.: 37
Test Date:	2014-07-02
Note:	

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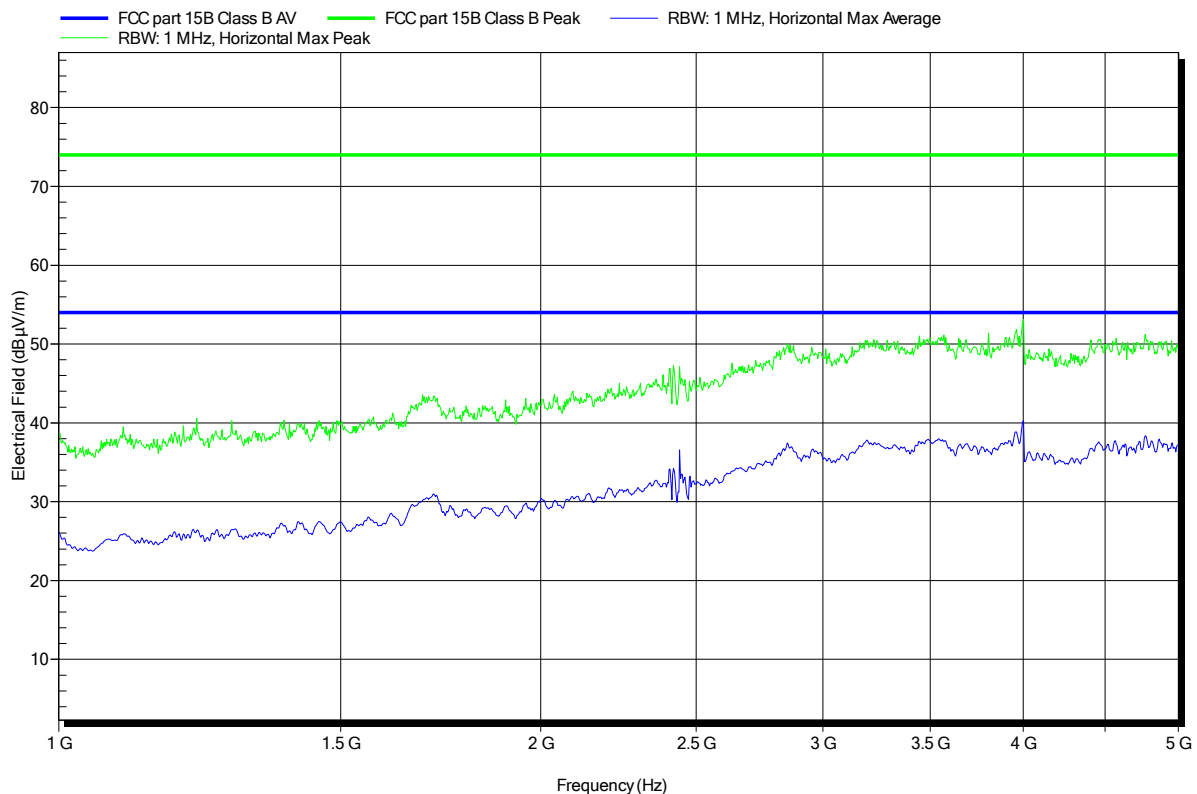


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1406-3913

Manufacturer:	Panasonic Industrial Devices Europe
EUT Name:	Bluetooth Smart Module
Model:	PAN1740
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 24°C, Unom: 5 V DC (USB)
Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	3m
Mode:	Bluetooth LE CH.: 37
Test Date:	2014-07-02
Note:	

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3.2 Test Conditions and Results – AC power line conducted emissions

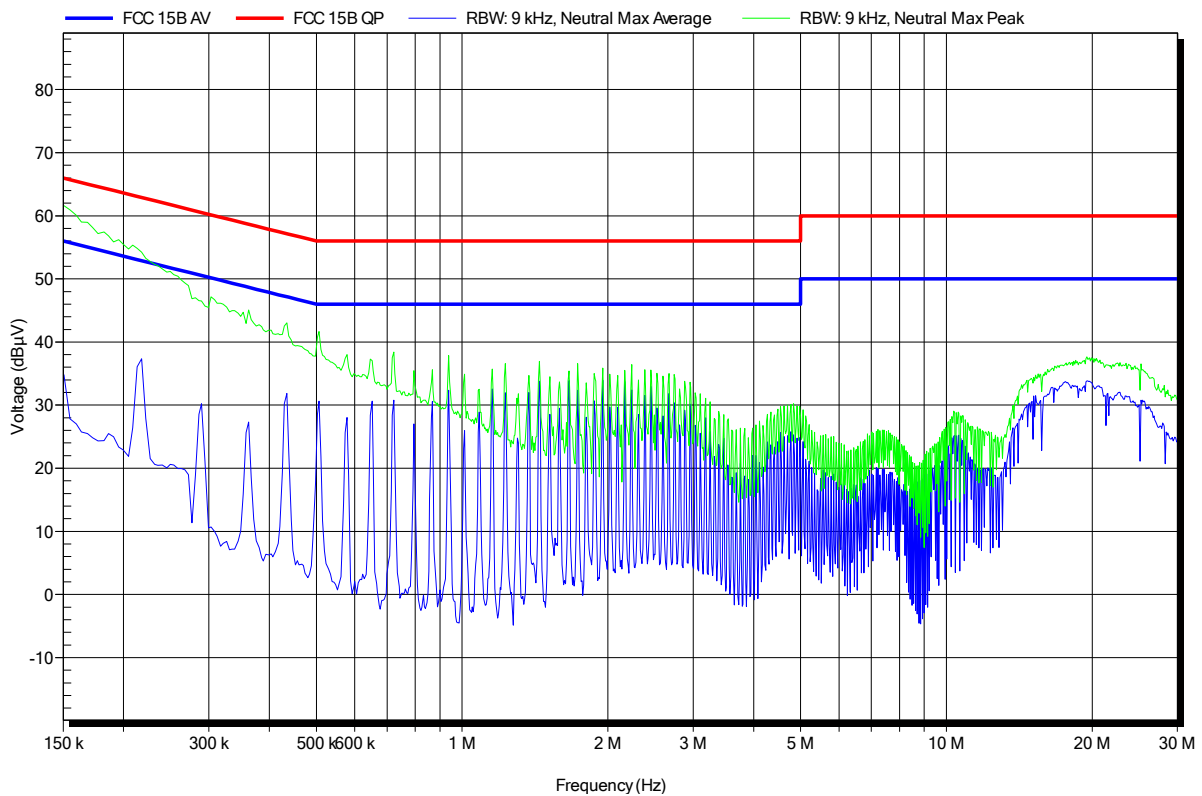
Conducted emissions acc. FCC 47 CFR 15.107 / IC RSS-Gen		Verdict: PASS		
Laboratory Parameters:	Required prior to the test	During the test		
Ambient Temperature	15 to 35 °C	22°C		
Relative Humidity	30 to 60 %	39%		
Test according referenced standards	Reference Method			
	ANSI C63.4			
Fully configured 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 [dB μ V]	Result	Average [dB μ V]	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 15B

Project number: G0M-1406-3913

Manufacturer:	Panasonic Industrial Devices Europe
EUT Name:	Bluetooth Smart Module
Model:	PAN1740
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 24°C, Unom: 5 V DC (USB)
LISN:	ESH2-Z5 N
Mode:	Bluetooth LE CH.: 37
Test Date:	2014-07-01
Note:	

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

Project number: G0M-1406-3913

Manufacturer:	Panasonic Industrial Devices Europe
EUT Name:	Bluetooth Smart Module
Model:	PAN1740
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 24°C, Unom: 5 V DC (USB)
LISN:	ESH2-Z5 L
Mode:	Bluetooth LE CH.: 37
Test Date:	2014-07-01
Note:	

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