



EMC TEST REPORT FCC 47 CFR Part 15B Industry Canada ICES-003 Electromagnetic compatibility - Unintentional radiators	
Report Reference No.	G0M-1609-5876-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	TomTom Telematics B.V.
Address	De Ruijterkade 154 1011 AC Amsterdam NETHERLANDS
Test specification:	
Standard.....	47 CFR Part 15 Subpart B ICES-003, Issue 6:2016 ANSI C63.4:2014
Equipment under test (EUT):	
Product description	Telematics Accessory with Touch-Display and RFID-interface
Model No.	PRO202
Additional Models	None
Hardware version	Plugtown_2_mb_20160218
Firmware / Software version	1.0.xxxx
Contains	FCC-ID: 2AGPAPRO202 IC: 20911-PRO202
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 : 2016-09-22

Date (s) of performance of tests : 2016-10-27


Compiled by : Yu Yu

Tested by (+ signature)..... : Yu Yu

Approved by (+ signature) : Andre Sauerbrey
Head of Lab

Date of issue..... : 2016-11-02

Total number of pages..... : 22



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	2016-11-08	Initial Release	

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1 Equipment (Test item) Description

Description	Telematics Accessory with Touch-Display and RFID-interface
Model	PRO202
Additional Models	None
Serial number	None
Hardware version	Plugtown_2_mb_20160218
Software / Firmware version	1.0.xxxx
Contains FCC-ID	2AGPAPRO202
Contains IC	20911-PRO202
Power supply	12/24V DC
Manufacturer	ProDrive Technologies BV Science Park Eindhoven 5501 5692 EM Son The Netherlands
Equipment classification	Class : B Type : Vehicular use Highest internal frequency : 96MHz
Number of tested samples	1

1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments (e.g. serial no.)
AE	RFID-Tag	-	-	
None				
<p>*Note: Use the following abbreviations:</p> <p>AE : Auxiliary/Associated Equipment, or</p> <p>SIM : Simulator (Not Subjected to Test)</p> <p>CABL : Connecting cables</p>				

1.5 Input / Output Ports

Port #	Name	Type*	Max. Cable Length	Cable Shielded	Comments (e.g. Cat. of Cable)
1	Power	DC	2.5m	No	
2	K-line	I/O	2.5m	No	Open during the tests
<p>*Note: Use the following abbreviations:</p> <p>AC : AC power port</p> <p>DC : DC power port</p> <p>N/E : Non electrical</p> <p>I/O : Signal input or output port</p> <p>TP : Telecommunication port</p>					

1.6 Operating Modes and Configurations

Mode #	Description
1	Powered on: RFID acquiring

Configuration #	EUT Configuration
1	With 12V DC power supply. The K-line open
2	With 24V DC power supply. The K-line open

1.7 Test Equipment Used During Testing

Measurement Software			
Description	Manufacturer	Name	Version
EMC Test Software	Dare Instruments	Radimation	2015.1.12

Radiated emissions – 3m Chamber					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Biconical Antenna	R&S	HK 116	EF00012	2016-05	2019-05
LPD-Antenne	R&S	HL 223	EF00187	2016-05	2019-05
EMI Test Receiver	R&S	ESU26	EF00887	2016-01	2017-01
RF Cable			-	System Cal.	System Cal
RF Cable			-	System Cal.	System Cal

1.8 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:

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

2 Result Summary

FCC 47 CFR Part 15B, Industry Canada ICES-003				
Product Specific Standard	Requirement – Test	Reference Method	Result	Remarks
47 CFR 15.109 ICES-003 Item 6.2	Radiated emissions	ANSI C 63.4	PASS	
47 CFR 15.107 ICES-003 Item 6.1	AC power line conducted emissions	ANSI C63.4	N/A	Vehicular use
Remarks:				

3 Test Conditions and Results

3.1 Test Conditions and Results – Radiated emissions

Radiated emissions acc. FCC 47 CFR 15.109 / ICES-003				Verdict: PASS		
Laboratory Parameters:		Required prior to the test		During the test		
Ambient Temperature		15 to 35 °C		23°C		
Relative Humidity		30 to 60 %		45%		
Test according referenced standards		Reference Method				
		ANSI C63.4				
Sample is tested with respect to the requirements of the equipment class		Equipment class				
		Fehler! Verweisquelle konnte nicht gefunden werden.				
Test frequency range determined from highest emission frequency		Highest emission frequency				
		Fmax [MHz] = 96				
Fully configured sample scanned over the following frequency range		Frequency range				
		30 MHz to 1 GHz				
Operating mode		1				
Configuration		1/2				
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: the plots of the tests with 12V DC power supply are presented as worst case						

Test Procedure:

The test site is in accordance with ANSI C63-4:2014 requirements and is listed by FCC.
The measurement procedure is as follows:

Exploratory measurement:

- The EUT was placed on a non-conductive table at a height of 0.8m.
- The EUT and support equipment, if needed, were set up to simulate typical usage.
- Cables, of type and length specified by the manufacturer, were connected to at least one port of each type and were terminated by a device or simulating load of actual usage.
- The antenna was placed at a distance of 3 or 10 m.
- The received signal was monitored at the measurement receiver.
 - Cables not bundled were manipulated within the range of likely arrangements to produce the highest emission amplitude
 - To maximize the suspected emissions the EUT is rotated 360 degrees. If the signal exceeds the previous amplitude, go back to the corresponding azimuth and manipulate the cables again for maximizing the emissions if possible.
 - Move the antenna from 1 to 4m to maximize the suspected highest amplitude signal.
- This procedure has to be performed in both antenna polarizations, horizontal and vertical.
- The arrangement of the equipment with the maximum emission level is shown on the setup picture at item 1.3.

Final measurement:

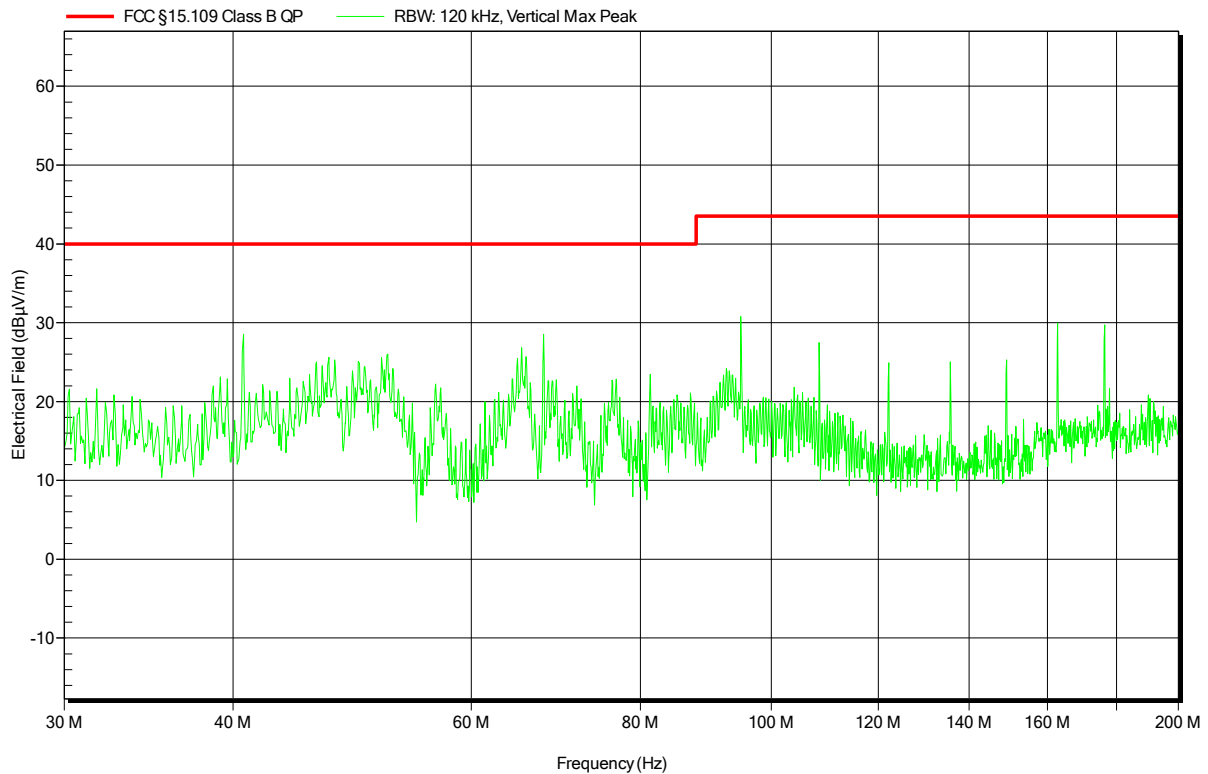
- The EUT was placed on a 0.8 m non-conductive table at a 3 m distance from the receive antenna. The antenna output was connected to the measurement receiver
- A biconical antenna was used for the frequency range 30 – 200 MHz, a logarithmic periodical antenna was used for the frequency range from 200 – 1000 MHz. Above one 1 GHz a Double Ridged Broadband Horn antenna was used. The antenna was placed on an adjustable height antenna mast
- The EUT and cable arrangement were based on the exploratory measurement results
- Emissions were maximized at each frequency by rotating the EUT and adjusting the receive antenna height and polarization. The maximum values were recorded.
- The test data of the worst-case conditions were recorded and shown on the next pages.

Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1609-5876

Applicant:	TomTom Telematics B.V.
EUT Name:	Telematics Accessory with Touch-Display and RFID-interface
Model:	PRO202
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Yu
Test Conditions:	Tnom: 23°C, Unom: 12V DC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3m
Mode:	1
Test Date:	2016-10-27
Note:	

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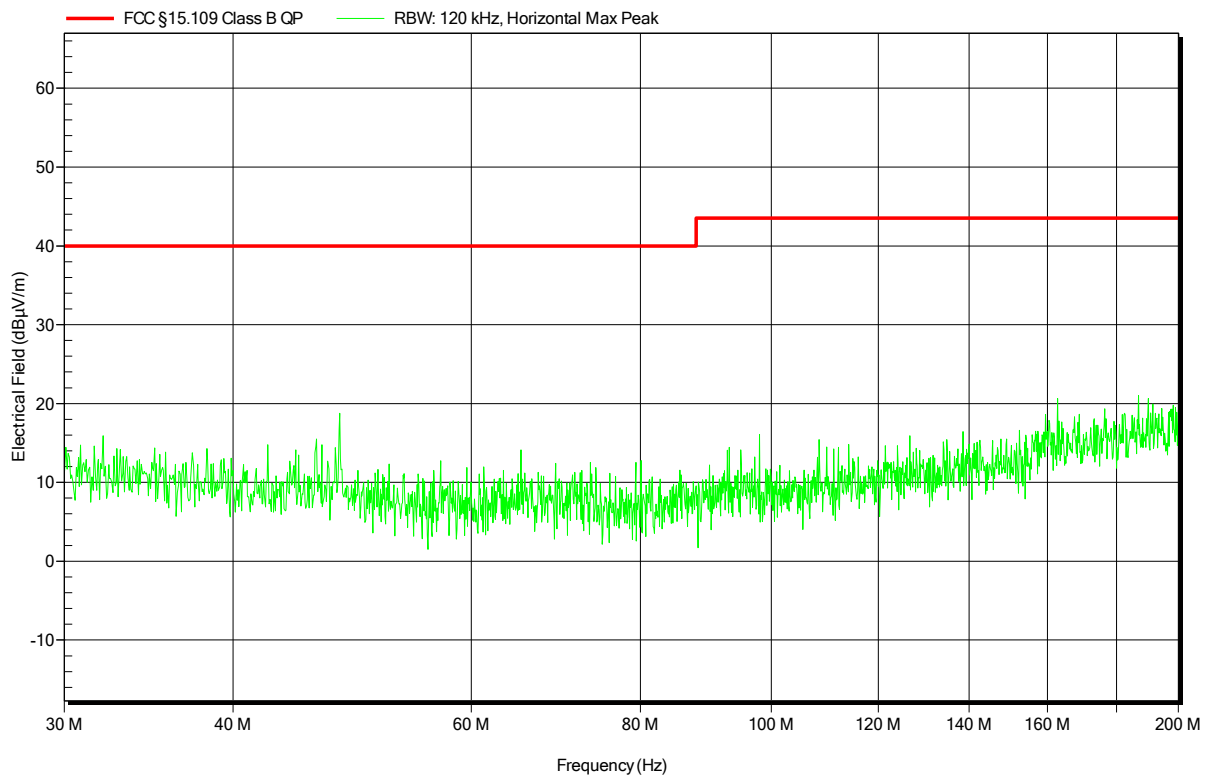


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1609-5876

Applicant:	TomTom Telematics B.V.
EUT Name:	Telematics Accessory with Touch-Display and RFID-interface
Model:	PRO202
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Yu
Test Conditions:	Tnom: 23°C, Unom: 12V DC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3m
Mode:	1
Test Date:	2016-10-27
Note:	

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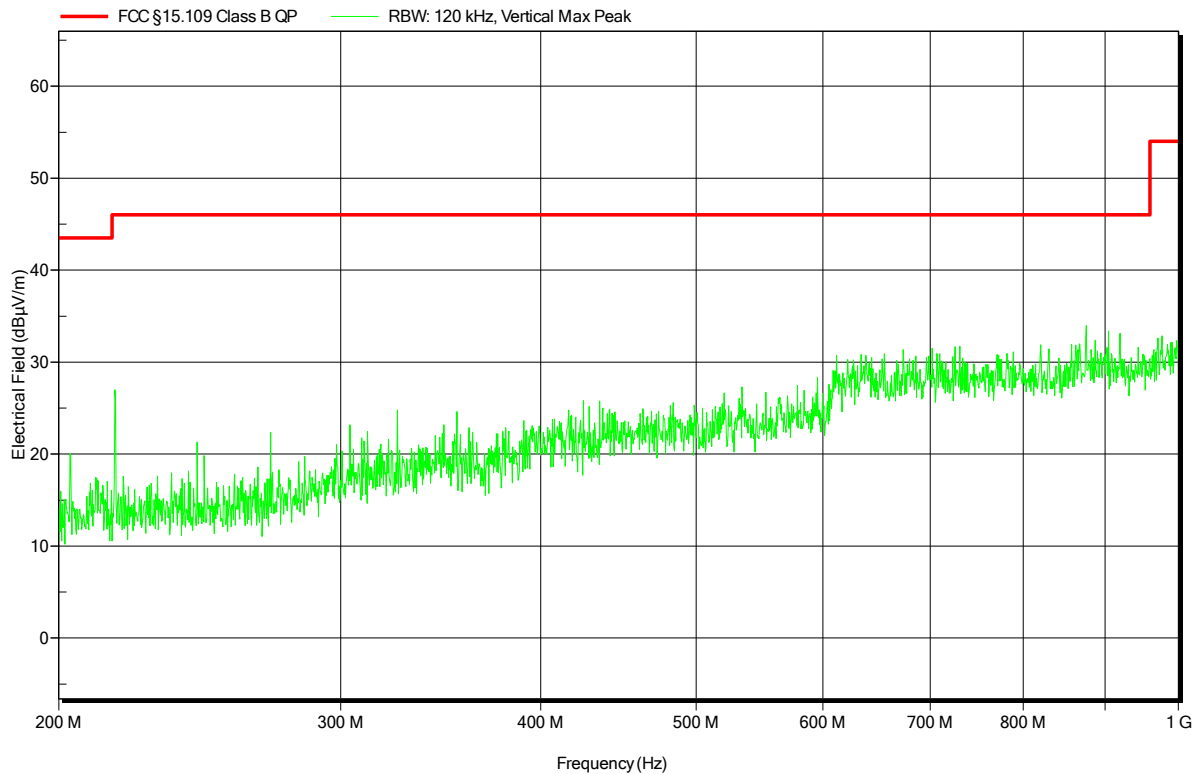


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1609-5876

Applicant:	TomTom Telematics B.V.
EUT Name:	Telematics Accessory with Touch-Display and RFID-interface
Model:	PRO202
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Yu
Test Conditions:	Tnom: 23°C, Unom: 12V DC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3m
Mode:	1
Test Date:	2016-10-27
Note:	

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Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1609-5876

Applicant:	TomTom Telematics B.V.
EUT Name:	Telematics Accessory with Touch-Display and RFID-interface
Model:	PRO202
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Yu
Test Conditions:	Tnom: 23°C, Unom: 12V DC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3m
Mode:	1
Test Date:	2016-10-27
Note:	

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