RADIO REPORT

FCC 47 CFR Part 15C
ISED Canada RSS-247

Digital transmission systems operating within the 2400 – 2483.5 MHz band

Report Reference No	G0M-1909-8466-TFC247BL-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	DAkkS - Registration number : D-PL-12092-01-03 (ISED) ISED Testing Laboratory site: 3470A-2 DAkkS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	Motogadget GmbH
Address	Köpenicker Str. 145 10997 Berlin GERMANY
Test Specification	According to FCC/ISED rules
Standard	47 CFR Part 15C RSS-247, Issue 2, 2017-02 RSS-Gen, Issue 5, Amendment 1, 2019-03
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	vehicle data gateway - motogadget instrument
Model(s)	4005000
Additional Model(s)	None
Brand Name(s)	mo.hub
Hardware Version(s)	rev2
Software Version(s)	650
FCC-ID	2AIF8-4005000
IC	21495-4005000
Test Result	**PASSED**

Possible test case verdicts:		
Required by standard but not tested	N/T	
Not required by standard	N/R	
Not applicable to EUT	N/A	
Test object does meet the requirement	P(PASS)	
Test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	22 - 25 °C	
Test Lab Humidity	40 – 50 %	
Date of receipt of test item	2019-10-28	
Report:		
Compiled by	Florian Voigt	
Tested by (+ signature) (Responsible for Test)	Florian Voigt supervised by Wilfried Treffke Wilfried Treffke	F. Voigt W. Treffke
Approved by (+ signature) (Head of Lab)	Christian Weber	C. Weber
Date of Issue	2019-10-30	
Total number of pages	97	
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 History			
Version	Issue Date	Remarks	Revised By
01	2019-10-30	Initial Release	

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
EUT	Equipment Under Test
FCC	Federal Communications Commission
ISED	Innovation, Science and Economic Development Canada
RBW	Resolution bandwidth
RMS	Root mean square
VBW	Video bandwidth
V_{NOM}	Nominal supply voltage

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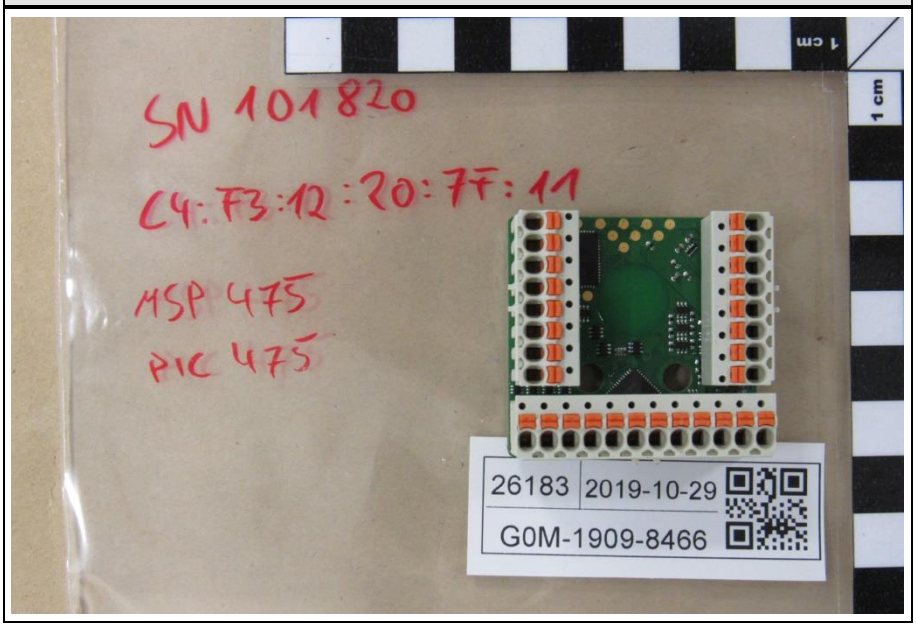
1 Equipment (Test Item) Under Test

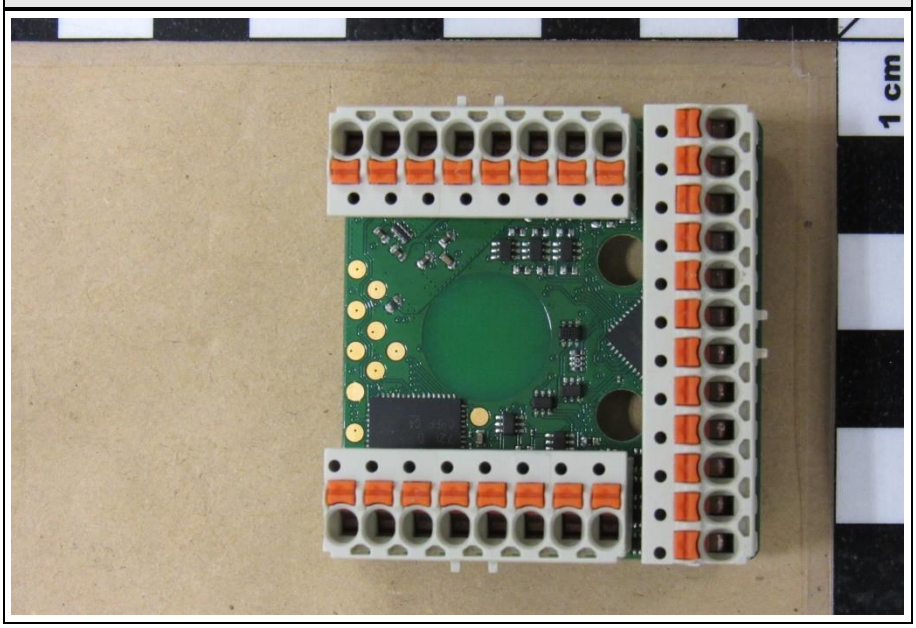
Description	vehicle data gateway - motogadget instrument	
Model	4005000	
Additional Model(s)	None	
Brand Name(s)	mo.hub	
Serial Number(s)	101820, 100998	
Hardware Version(s)	rev2	
Software Version(s)	650	
PMN	mo.hub	
HVIN	mo.hub	
FVIN	475	
HMN	N/A	
FCC-ID	2AIF8-4005000	
IC	21495-4005000	
Equipment type	End Product	
Radio type	Transceiver	
Assigned frequency bands	2400 - 2483.5 MHz	
Radio technology	Bluetooth LE	
Modulation	GFSK	
Number of antenna ports	1	
Antenna	Type	Integrated chip-antenna
	Model	A10192
	Manufacturer	Antenova
	Gain	0.8 dBi (customer declaration)
Supply Voltage	V_{NOM}	12 VDC
Operating Temperature	T_{NOM}	20 °C
AC/DC-Adaptor	N/A	
Manufacturer	Motogadget GmbH Köpenicker Str. 145 10997 Berlin GERMANY	

1.1 Photos – Equipment

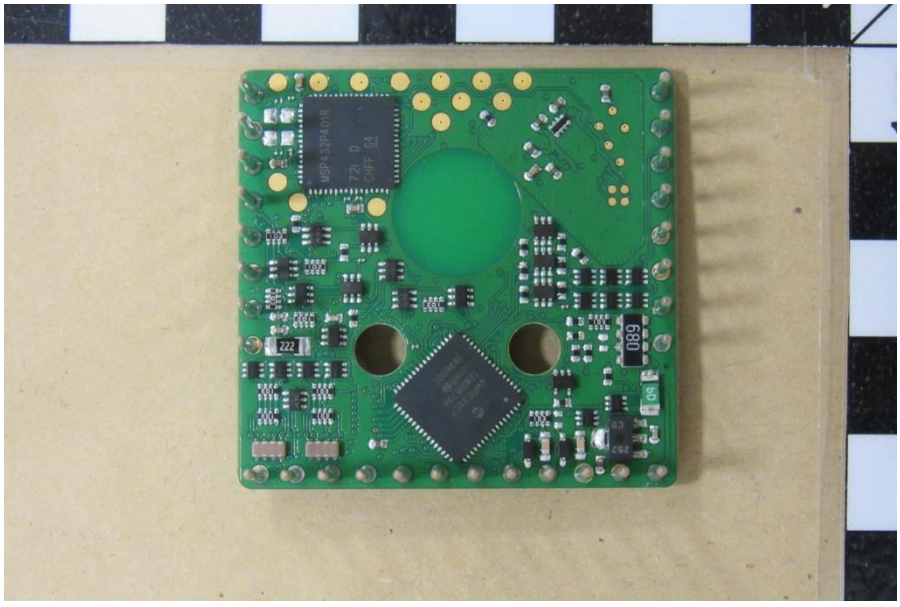
EUT with label

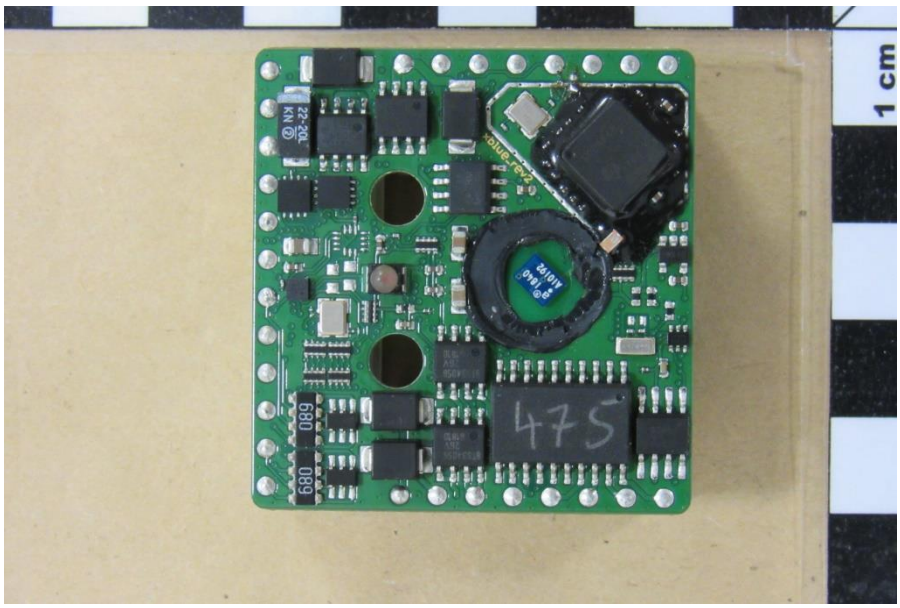


EUT top

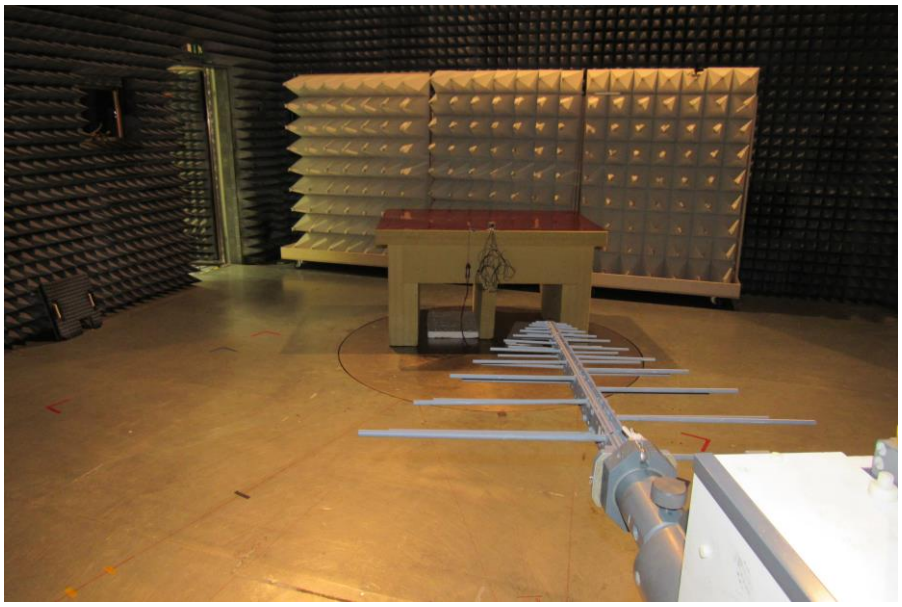


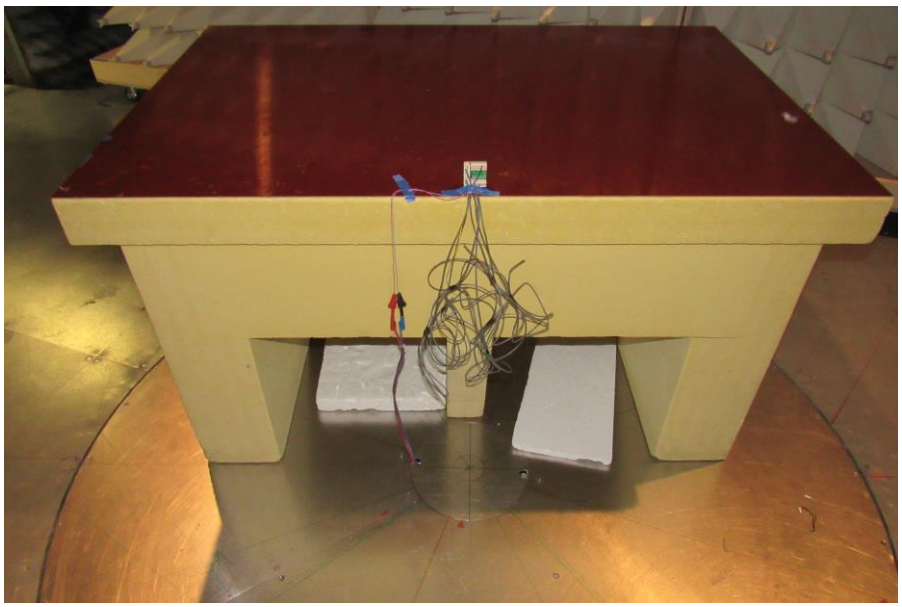
EUT side

EUT PCB top


EUT PCB bottom


1.2 Photos – Test Setup

Testsetup from antenna view


Testsetup close view


1.3 Support Equipment.

Product Type	Device	Manufacturer	Model	Comment
AE	Laptop	AsusPro	---	Used for setting testmodes on EUT
SFT	Bluetooth Hardware Evaluation Tool	---	TICC256x	Used for setting testmodes on EUT
AE	USB to LIN Gateway	---	---	Used for setting testmodes on EUT
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

1.4 Test Modes

Mode	Description
GFSK	Mode = Transmit Modulation = GFSK Spreading = None Duty cycle = 100% Power = 13 (software setting)
Receive	Mode = Receive
Comment:	

1.5 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx / Rx	0	2402
F2	Tx / Rx	19	2440
F3	Tx / Rx	39	2480

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 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/m) = 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/m	= 47.5 dBµV/m	:	47.5 dBµV/m - 57.0 dBµV/m	= -9.5 dB

2 Result Summary

FCC 47 CFR Part 15C, ISED RSS-247				
Product Standard Reference	**Requirement**	**Reference Method**	**Result**	**Remarks**
ISED RSS-Gen, Issue 5 (section 6.6)	Occupied Bandwidth	ANSI C63.10-2013	N/R	Informational only
FCC § 15.247(a)(2) ISED RSS-247, Issue 2 (section 5.2)	6 dB Bandwidth	ANSI C63.10-2013	PASS	
FCC § 15.247(b)(1) ISED RSS-247, Issue 2 (section 5.4)	Maximum peak conducted power	ANSI C63.10-2013	PASS	
FCC § 15.247(e) ISED RSS-247, Issue 2 (section 5.2)	Power spectral density	ANSI C63.10-2013	PASS	
FCC § 15.207 ISED RSS-247, Issue 2 (section 3.1)	AC power line conducted emissions	ANSI C63.10-2013	N/R	EUT is not powered (directly or indirectly) via AC-Mains
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Band edge compliance	ANSI C63.10-2013	PASS	
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Conducted spurious emissions	ANSI C63.10-2013	PASS	
FCC § 15.247(d) FCC § 15.209 ISED RSS-Gen, Issue 5 (section 6.13)	Transmitter radiated spurious emissions	ANSI C63.10-2013	PASS	
ISED RSS-247, Issue 2 (section 3.1)	Receiver radiated spurious emissions	ANSI C63.10-2013	PASS	
Comment:				

Possible Test Case Verdicts	
PASS	Test object does meet the requirements
FAIL	Test object does not meet the requirements
N/T	Required by standard but not tested
N/R	Not required by standard for the test object

3 Test Conditions and Results

3.1 Test Conditions and Results - Occupied bandwidth

3.1.1 Information

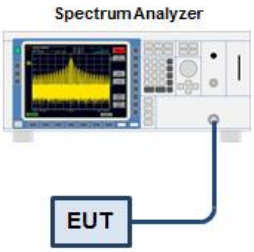
Test Information	
Reference	ISED RSS-Gen, Issue 5 (section 6.6)
Measurement Method	ANSI C63.10 6.9.3
Operator	Wilfried Treffke
Date	2019-10-29

3.1.2 Limits

Limits
None (Informational only)

3.1.3 Setup

Test Setup



3.1.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSW 43	EF00896	2019-07	2020-07

3.1.5 Procedure

Test Procedure

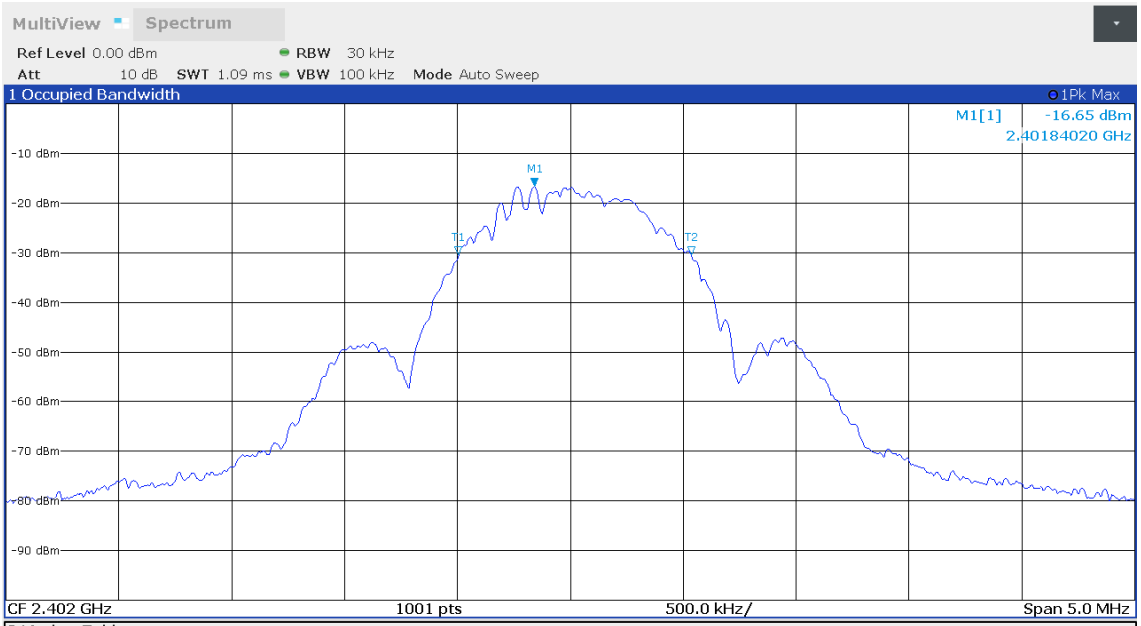
1. EUT transmitter is activated in test mode under normal conditions
2. The spectrum analyzer is set to peak detection and maximum hold with a span twice the emission spectrum
3. The resolution bandwidth is set to the range of 1 % to 5 % of the occupied bandwidth
4. The occupied bandwidth is measured with the build-in analyzer function

3.1.6 Results

Test Results		
Mode	Frequency [MHz]	Bandwidth [MHz]
GFSK	2402	1.031
GFSK	2440	1.030
GFSK	2480	1.031

Occupied Bandwidth

Project Number:	G0M-1909-8466
Applicant:	Motogadget GmbH
Model Description:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Sample ID:	26184
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	GFSK, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-10-29
Occupied Bandwidth [MHz]:	1.031



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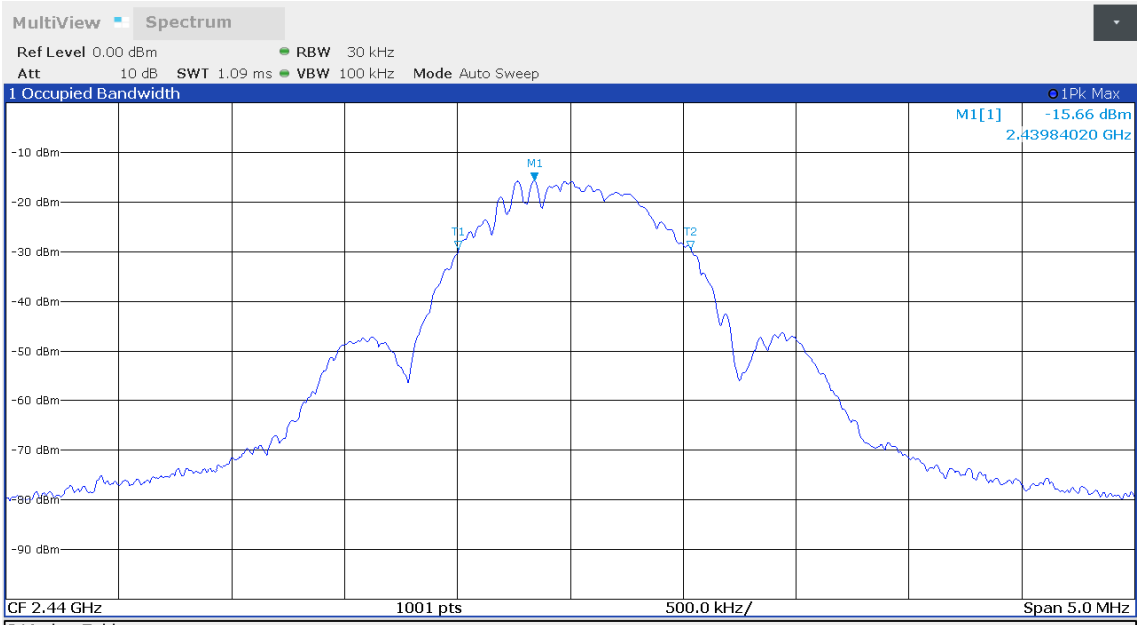
Occupied Bandwidth

Project Number:	G0M-1909-8466
Applicant:	Motogadget GmbH
Model Description:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Sample ID:	26184
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	GFSK, Channel: 19, 2440 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-10-29
Occupied Bandwidth [MHz]:	1.030



2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**2.4398402 GHz**	**-15.66 dBm**	Occ Bw	**1.030323458 MHz**
T1		1	2.43950385 GHz	-29.48 dBm	Occ Bw Centroid	2.440019007 GHz
T2		1	2.44053417 GHz	-29.52 dBm	Occ Bw Freq Offset	19.00735835 kHz

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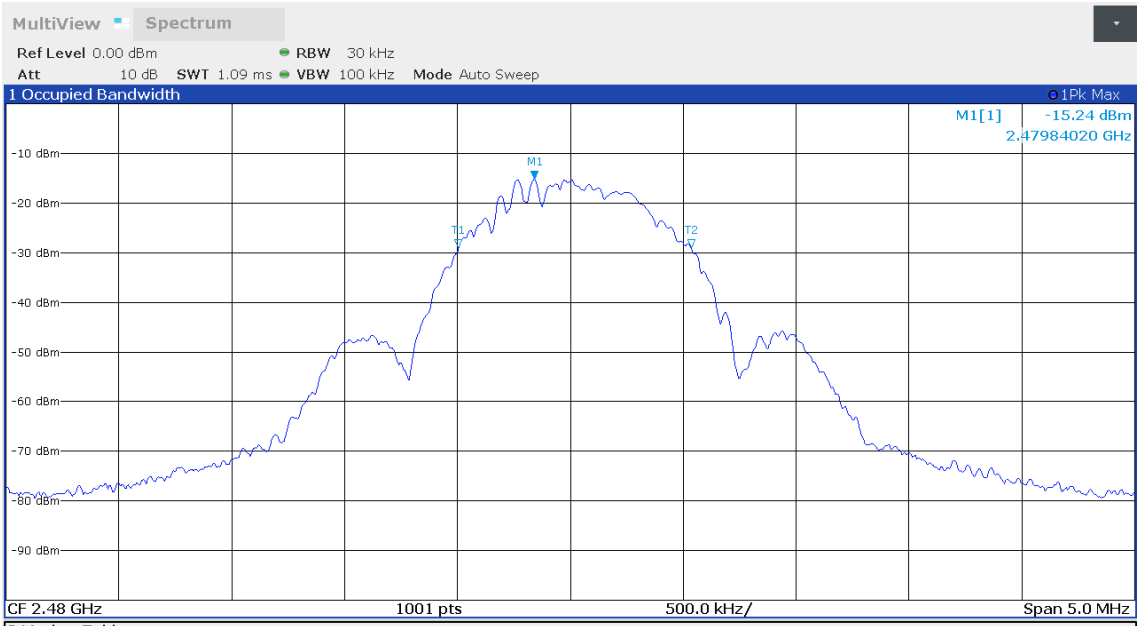
Occupied Bandwidth

Project Number:	G0M-1909-8466
Applicant:	Motogadget GmbH
Model Description:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Sample ID:	26184
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	GFSK, Channel: 39, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-10-29
Occupied Bandwidth [MHz]:	1.031



2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**2.4798402 GHz**	**-15.24 dBm**	Occ Bw	**1.031117656 MHz**
T1		1	2.4795037 GHz	-28.95 dBm	Occ Bw Centroid	2.480019255 GHz
T2		1	2.48053481 GHz	-29.01 dBm	Occ Bw Freq Offset	19.254828058 kHz

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3.2 Test Conditions and Results - 6 dB bandwidth

3.2.1 Information

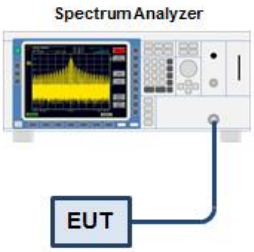
Test Information	
Reference	FCC § 15.247(a)(2); ISED RSS-247, Issue 2 (section 5.2)
Measurement Method	ANSI C63.10 11.8
Operator	Wilfried Treffke
Date	2019-10-29

3.2.2 Limits

Limits
≥ 500kHz

3.2.3 Setup

Test Setup



3.2.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSW 43	EF00896	2019-07	2020-07

3.2.5 Procedure

Test Procedure

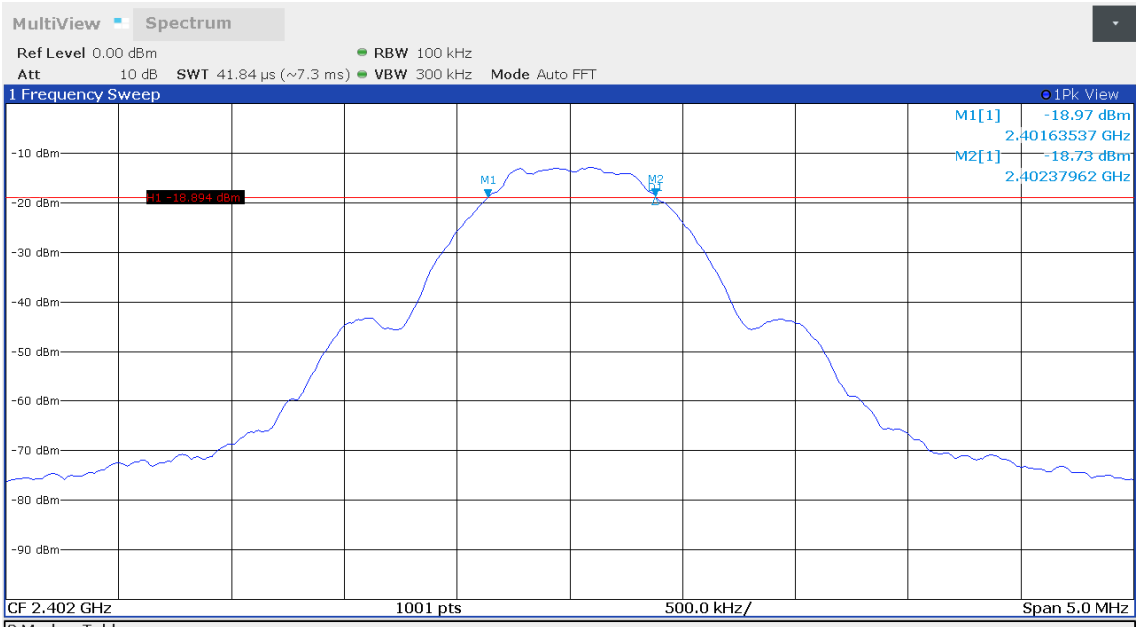
1. EUT set to test mode
2. Span set to at least twice the emission spectrum
3. Detector set to peak and max hold and RBW is set to 100 kHz
4. Envelope peak value of emission spectrum is selected
5. Marker on envelope of spectrum is set to level of -6 dB to the left of the peak
6. Marker on envelope of spectrum is set to level of -6 dB to the right of the peak
7. 6 dB Bandwidth is determined by marker frequency separation

3.2.6 Results

Test Results				
Mode	Frequency [MHz]	Bandwidth [kHz]	Limit [kHz]	Verdict
GFSK	2402	744	500	PASS
GFSK	2440	729	500	PASS
GFSK	2480	739	500	PASS

DTS (6 dB) Bandwidth

Project Number:	G0M-1909-8466
Applicant:	Motogadget GmbH
Model Description:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Sample ID:	26184
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	GFSK, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-10-29
Lower Frequency [MHz]:	2401.635
Upper Frequency [MHz]:	2402.380
6 dB Bandwidth [kHz]:	744



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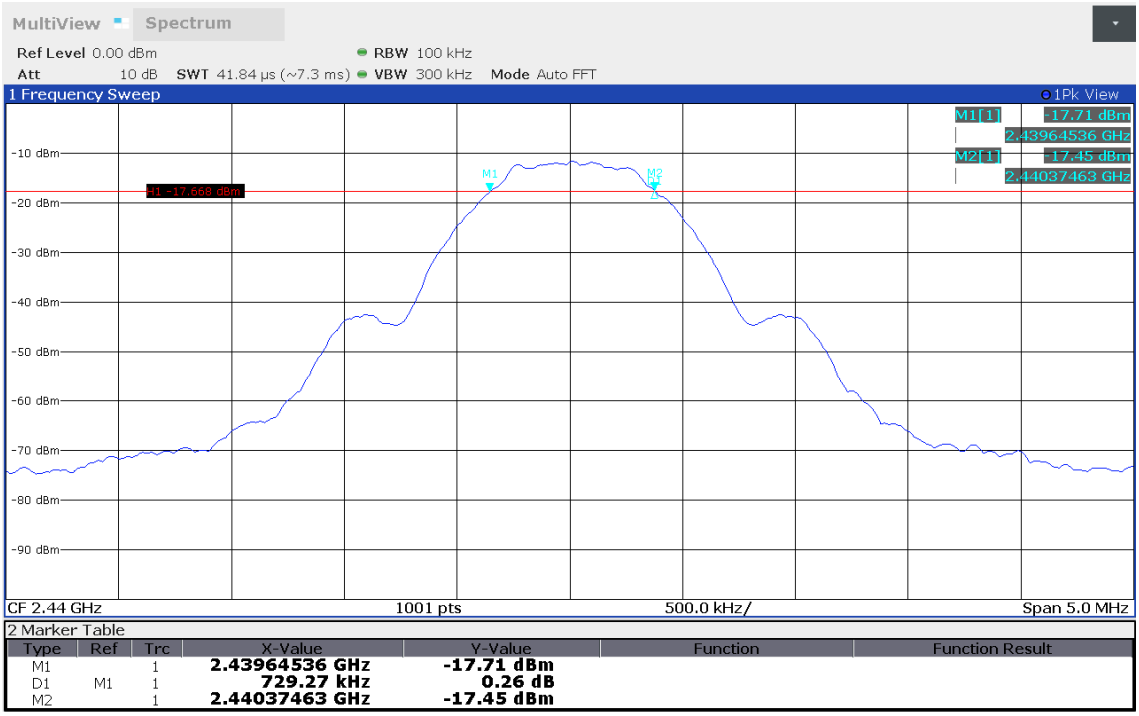
DTS (6 dB) Bandwidth

Project Number:	G0M-1909-8466
Applicant:	Motogadget GmbH
Model Description:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Sample ID:	26184
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	GFSK, Channel: 19, 2440 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-10-29
Lower Frequency [MHz]:	2439.645
Upper Frequency [MHz]:	2440.375
6 dB Bandwidth [kHz]:	729



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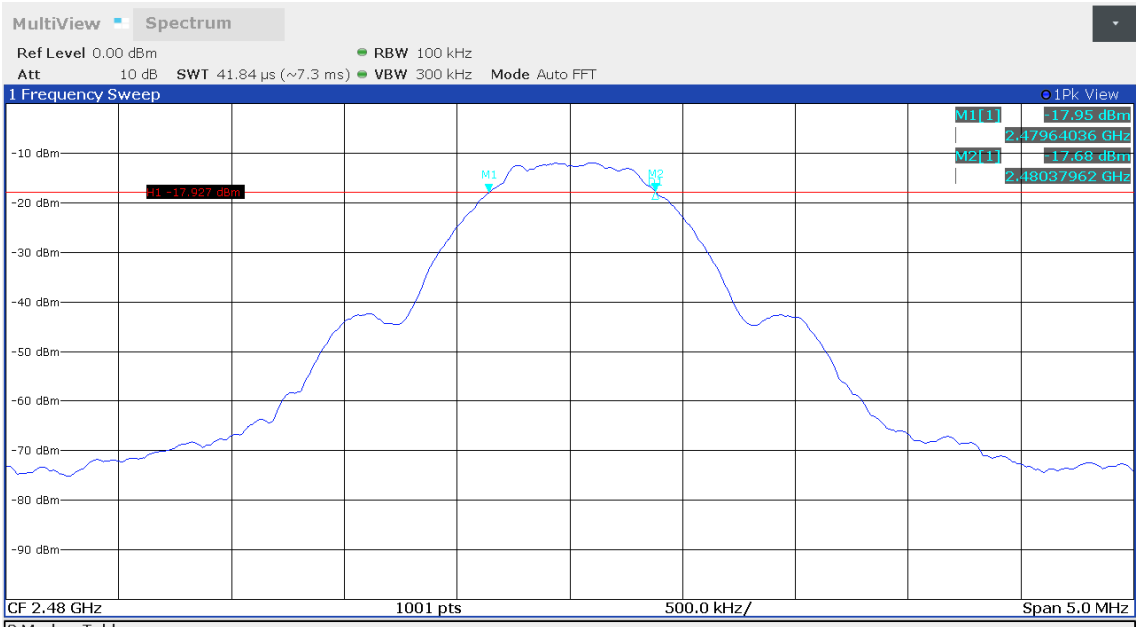
DTS (6 dB) Bandwidth

Project Number:	G0M-1909-8466
Applicant:	Motogadget GmbH
Model Description:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Sample ID:	26184
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	GFSK, Channel: 39, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-10-29
Lower Frequency [MHz]:	2479.640
Upper Frequency [MHz]:	2480.380
6 dB Bandwidth [kHz]:	739



2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	2.47964036 GHz	-17.95 dBm		
D1	M1	1	739.26 kHz	0.28 dB		
M2		1	2.48037962 GHz	-17.68 dBm		

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3.3 Test Conditions and Results - Maximum peak conducted output power

3.3.1 Information

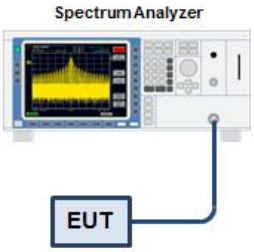
Test Information	
Reference	FCC § 15.247(b)(1); ISED RSS-247, Issue 2 (section 5.4)
Measurement Method	ANSI C63.10 11.9.1
Operator	Wilfried Treffke
Date	2019-10-29

3.3.2 Limits

Limits
1 W (30 dBm)
The conducted output power limit specified above is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in the table, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.3 Setup

Test Setup



3.3.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSW 43	EF00896	2019-07	2020-07

3.3.5 Procedure

Test Procedure

1. EUT set to test mode (Communication tester is used if needed)
2. Analyzer resolution bandwidth is set ≥ DTS bandwidth
3. Detector set to peak and max hold
4. Sweep time is set to auto
5. After the trace has stabilized a marker is set to peak of envelope

3.3.6 Results

Test Results				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
2402	-4.730	0.0003	1.0	PASS
2440	-3.690	0.0004	1.0	PASS
2480	-3.741	0.0004	1.0	PASS

3.4 Test Conditions and Results - Power spectral density

3.4.1 Information

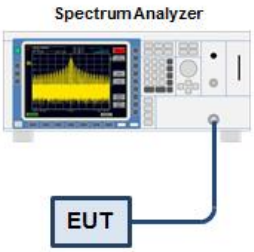
Test Information	
Reference	FCC § 15.247(e); ISED RSS-247, Issue 2 (section 5.2)
Measurement Method	ANSI C63.10 11.10.2, 14.3.2
Operator	Wilfried Treffke
Date	2019-10-29

3.4.2 Limits

Limits
8 dBm / 3 kHz

3.4.3 Setup

Test Setup



3.4.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSW 43	EF00896	2019-07	2020-07

3.4.5 Procedure

Test Procedure

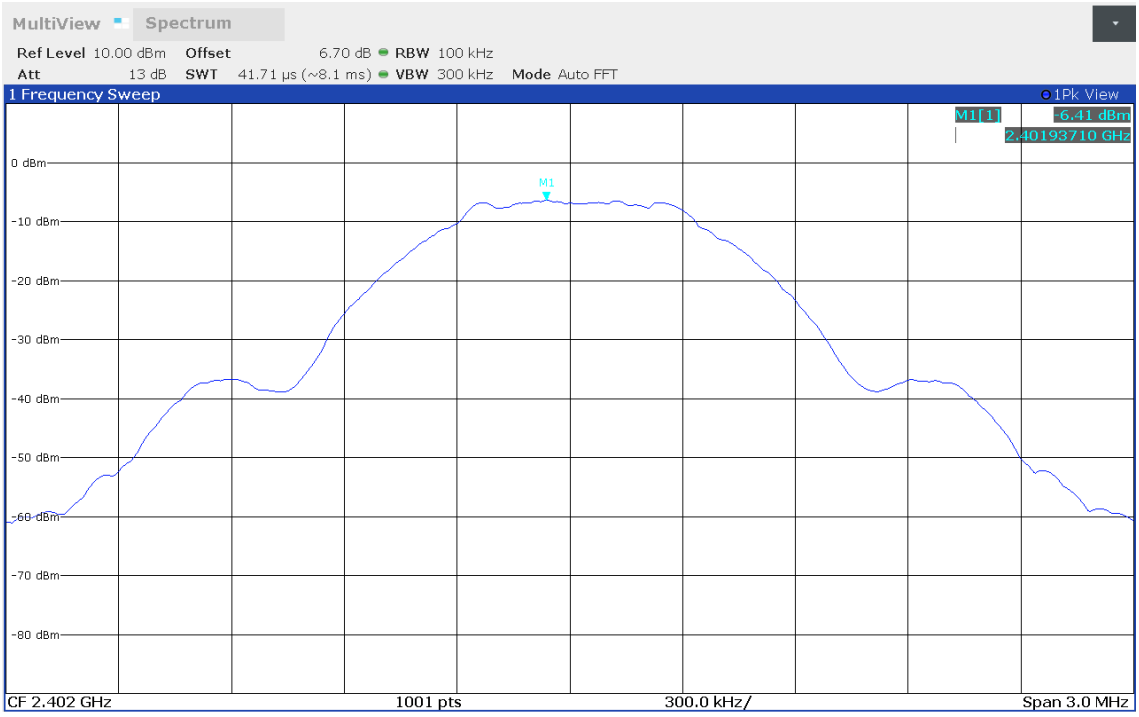
1. EUT set to test mode
2. The analyzer is set to DTS channel center frequency with a span of 1.5 times the DTS bandwidth
3. The RBW is set to 100 kHz with VBW ≥ RBW and the detector is set to peak with max hold
4. After the trace has stabilized a marker is set to the envelope maximum
5. If the power spectral density is above the limit the RBW is reduced (not lower than 3 kHz) and the measurement is repeated
6. If the EUT has more than one transmit chain the procedure is repeated for each transmit chain

3.4.6 Results

Test Results			
Channel [MHz]	PSD [dBm/RBW]	Limit [dBm/3kHz]	Verdict
2402	-6.413	8.0	PASS
2440	-4.793	8.0	PASS
2480	-5.303	8.0	PASS
RBW = 100 kHz			

Peak Power Spectral Density

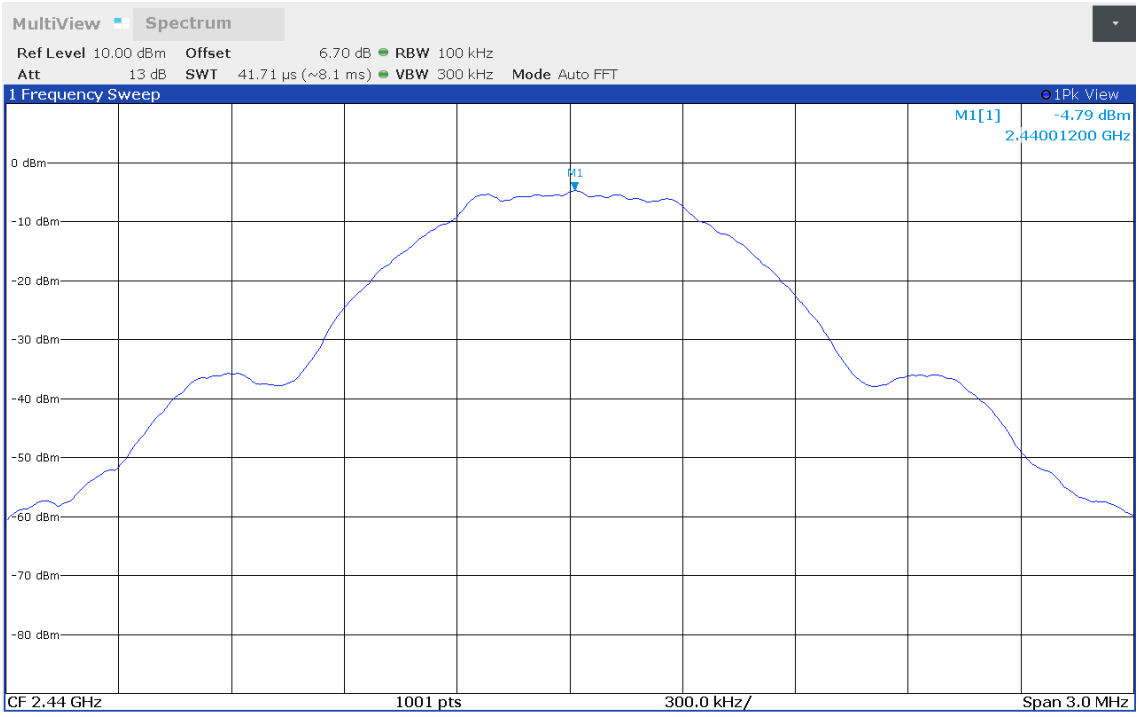
Project Number:	G0M-1909-8466
Applicant:	Motogadget GmbH
Model Description:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Sample ID:	26184
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.10.2
Operational Mode:	GFSK, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-10-29
Peak Frequency [MHz]:	2401.937
Spectral Density [dBm/RBW]:	-6.413
Resolution Bandwidth [kHz]:	100 kHz



14:01:15 29.10.2019

Peak Power Spectral Density

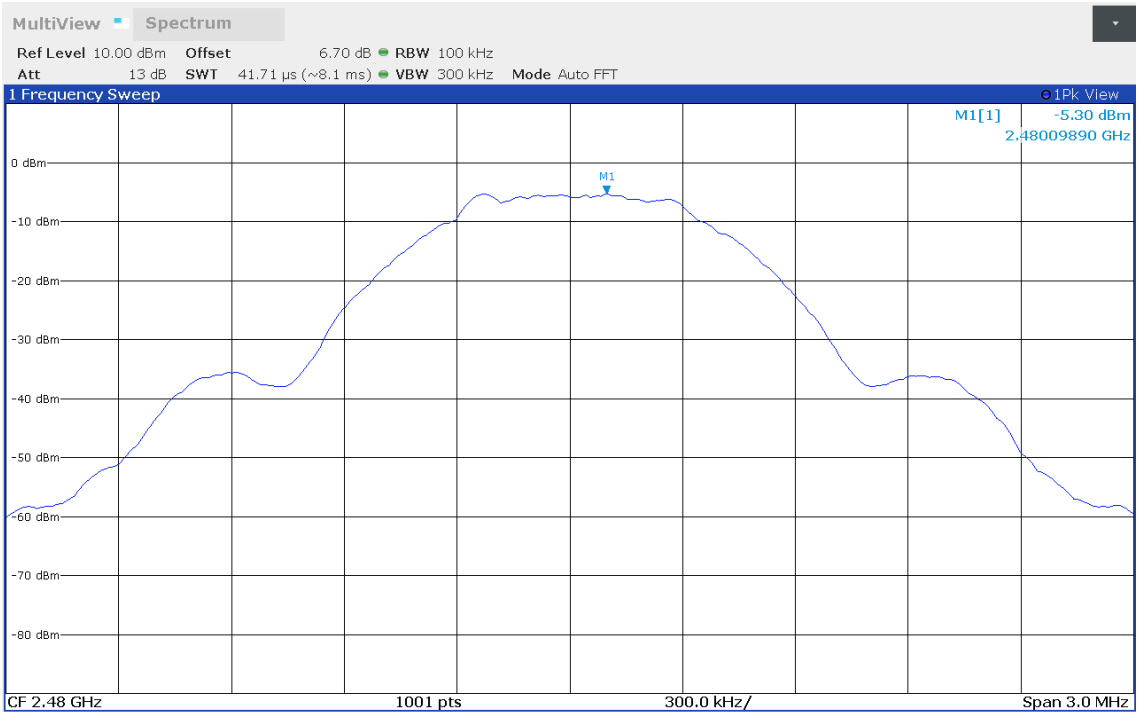
Project Number:	G0M-1909-8466
Applicant:	Motogadget GmbH
Model Description:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Sample ID:	26184
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.10.2
Operational Mode:	GFSK, Channel: 19, 2440 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-10-29
Peak Frequency [MHz]:	2440.012
Spectral Density [dBm/RBW]:	-4.793
Resolution Bandwidth [kHz]:	100 kHz



14:02:07 29.10.2019

Peak Power Spectral Density

Project Number:	G0M-1909-8466
Applicant:	Motogadget GmbH
Model Description:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Sample ID:	26184
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.10.2
Operational Mode:	GFSK, Channel: 39, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-10-29
Peak Frequency [MHz]:	2480.099
Spectral Density [dBm/RBW]:	-5.303
Resolution Bandwidth [kHz]:	100 kHz



14:03:02 29.10.2019

3.5 Test Conditions and Results - Band-edge compliance

3.5.1 Information

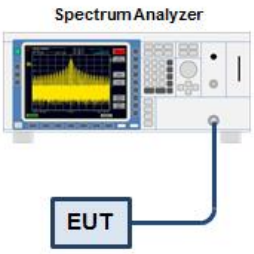
Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 2 (section 5.5)
Measurement Method	ANSI C63.10 11.13
Operator	Wilfried Treffke
Date	2019-10-29

3.5.2 Limits

Limits	
Power Measurement	Out-of-band attenuation [dB]
Peak	20
RMS	30

3.5.3 Setup

Test Setup



3.5.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSW 43	EF00896	2019-07	2020-07

3.5.5 Procedure

Test Procedure

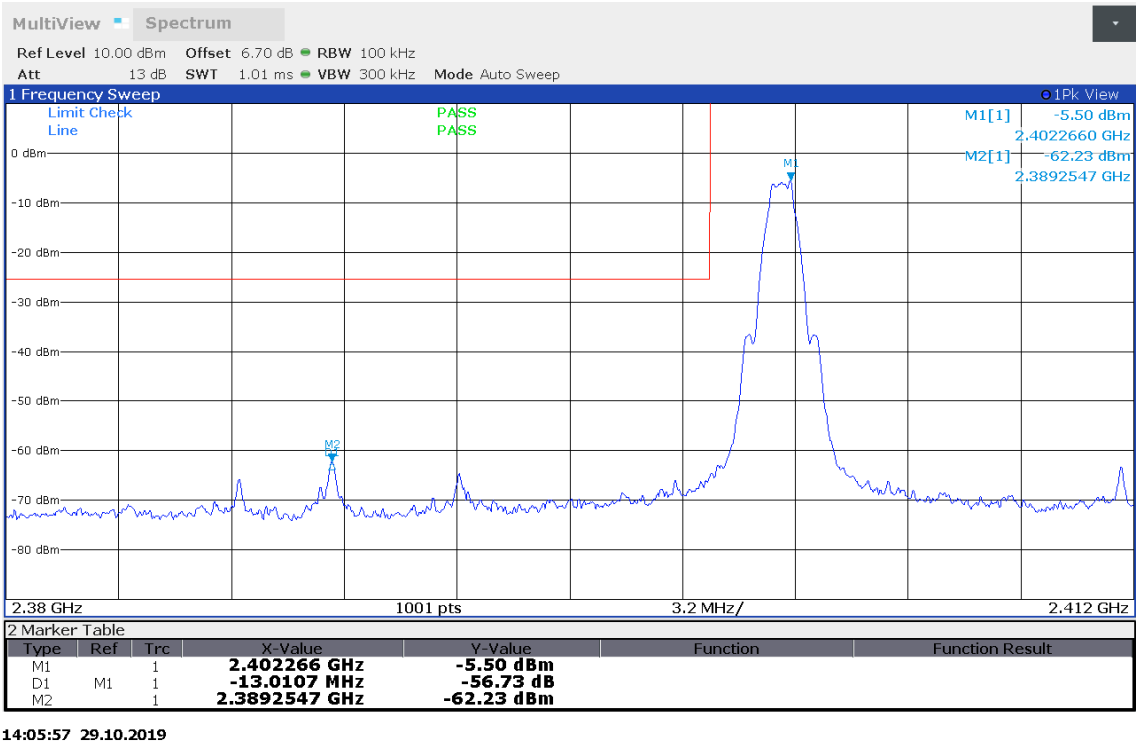
1. EUT set to test mode (Communication tester is used if needed)
2. Span set around lower band edge and detector is set to peak and max hold
3. Resolution bandwidth is set to 100 kHz
4. Markers are set to peak emission levels within frequency band and outside frequency band
5. Band edge attenuation is determined from level difference

3.5.6 Results

Test Results				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
GFSK	2402	-56.73	-20	PASS
GFSK	2480	-62.81	-20	PASS

Emissions in nonrestricted frequency bands at the Band-edge

Project Number:	G0M-1909-8466
Applicant:	Motogadget GmbH
Model Description:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Sample ID:	26184
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-10-29
Band-edge	Lower
In-band Frequency [MHz]:	2402.266
Max. in-band Level [dBm/100 kHz]:	-5.502
Out-of-band Frequency [MHz]:	2389.255
Max. out-of-band Level [dBm/100 kHz]:	-62.235
Attenuation [dB]:	-56.73



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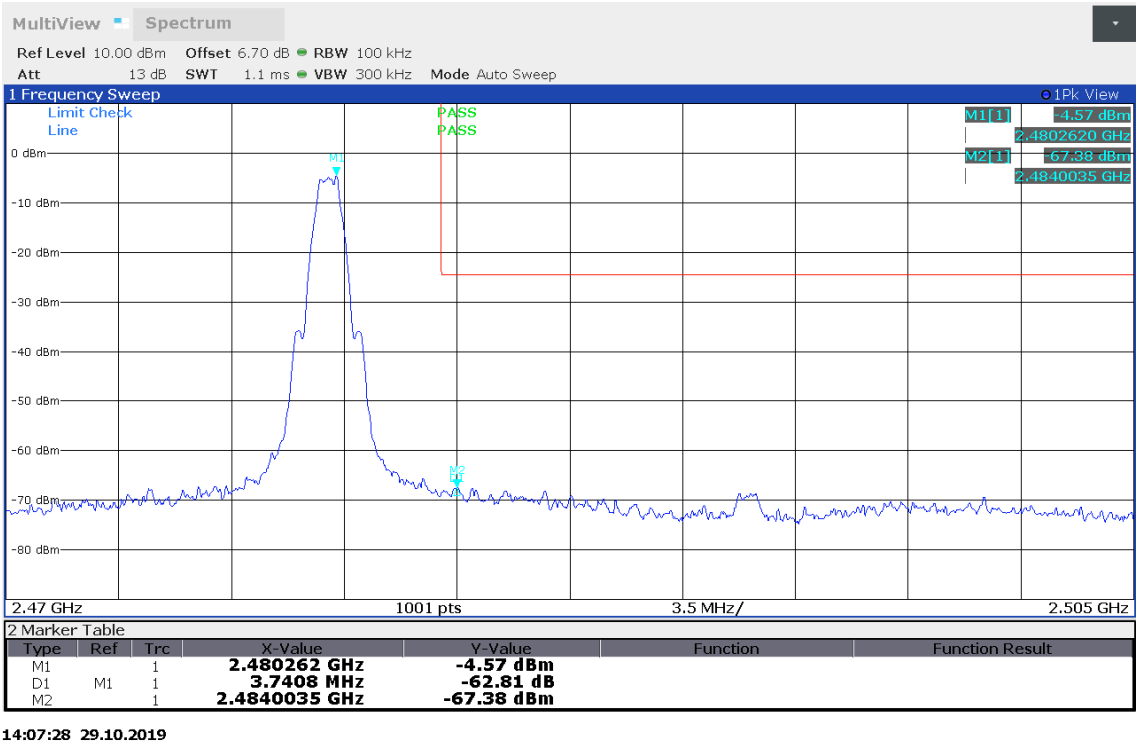
Emissions in nonrestricted frequency bands at the Band-edge

Project Number:	G0M-1909-8466
Applicant:	Motogadget GmbH
Model Description:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Sample ID:	26184
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-10-29
Band-edge	Upper
In-band Frequency [MHz]:	2480.262
Max. in-band Level [dBm/100 kHz]:	-4.568
Out-of-band Frequency [MHz]:	2484.003
Max. out-of-band Level [dBm/100 kHz]:	-67.375
Attenuation [dB]:	-62.81



14:07:28 29.10.2019

3.6 Test Conditions and Results - Conducted spurious emissions

3.6.1 Information

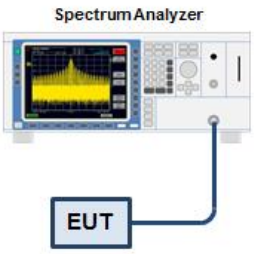
Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 2 (section 5.5)
Measurement Method	ANSI C63.10 11.11
Operator	Wilfried Treffke
Date	2019-10-29

3.6.2 Limits

Limits	
Power Measurement	Out-of-band attenuation [dB]
Peak	20
RMS	30

3.6.3 Setup

Test Setup



3.6.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSW 43	EF00896	2019-07	2020-07

3.6.5 Procedure

Test Procedure

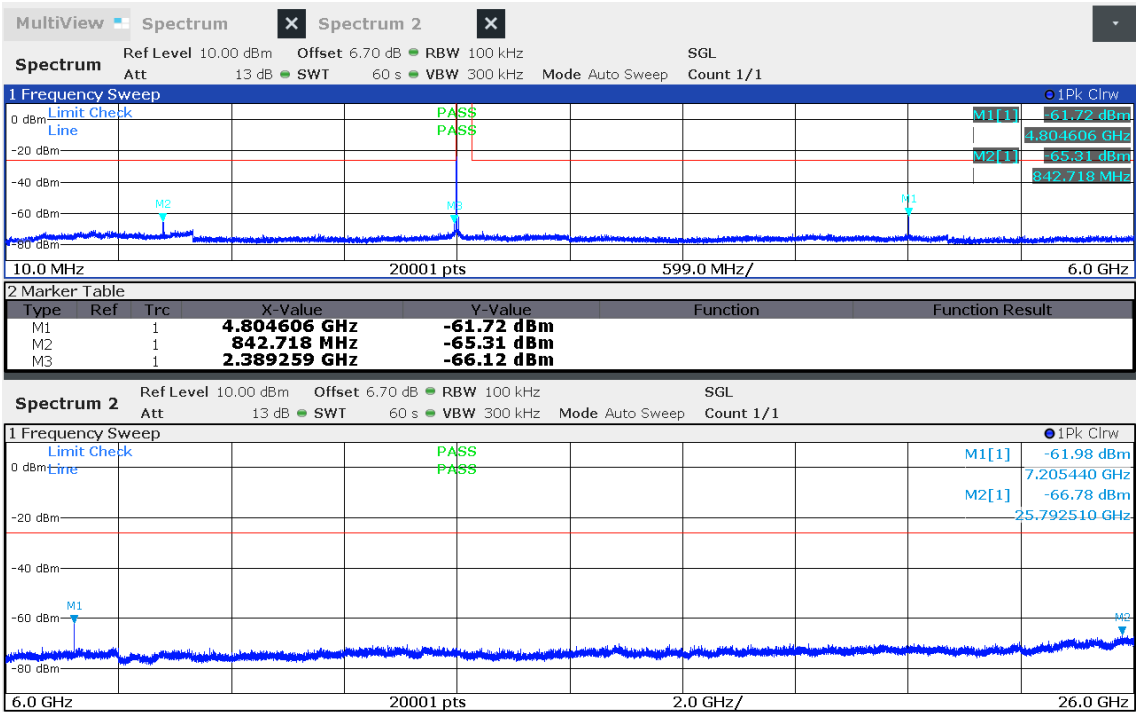
1. EUT set to test mode (Communication tester is used if needed)
2. Span set around lower band edge and detector is set to peak and max hold
3. Resolution bandwidth is set to 100 kHz
4. Markers are set to peak emission levels within frequency band and outside frequency band
5. Band edge attenuation is determined from level difference

3.6.6 Results

Test Results		
Mode	Channel [MHz]	Verdict
GFSK	2402	PASS
GFSK	2440	PASS
GFSK	2480	PASS

Conducted Spurious Emissions

Project Number:	G0M-1909-8466
Applicant:	Motogadget GmbH
Model Description:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Sample ID:	26184
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	GFSK, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-10-29
Max. in-band Frequency [MHz]:	2402.1
Max. in-band Level [dBm/100 kHz]:	-6.2
Out-of-band Limit [dBm/100 kHz]:	-26.2



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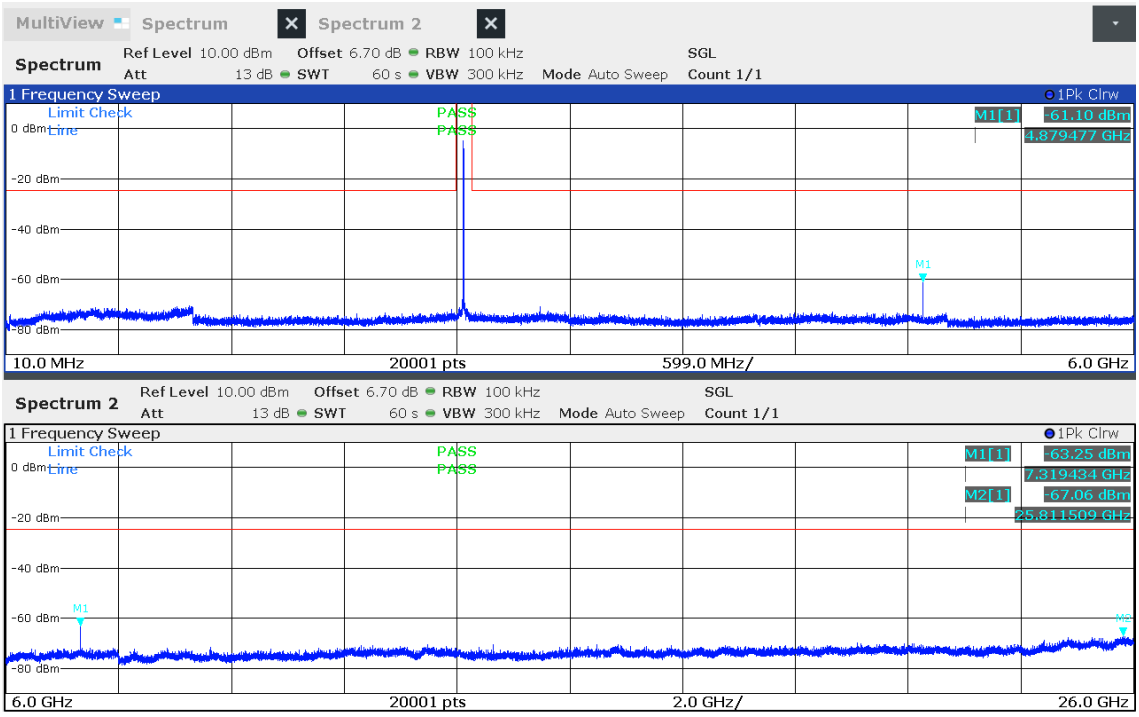
Conducted Spurious Emissions

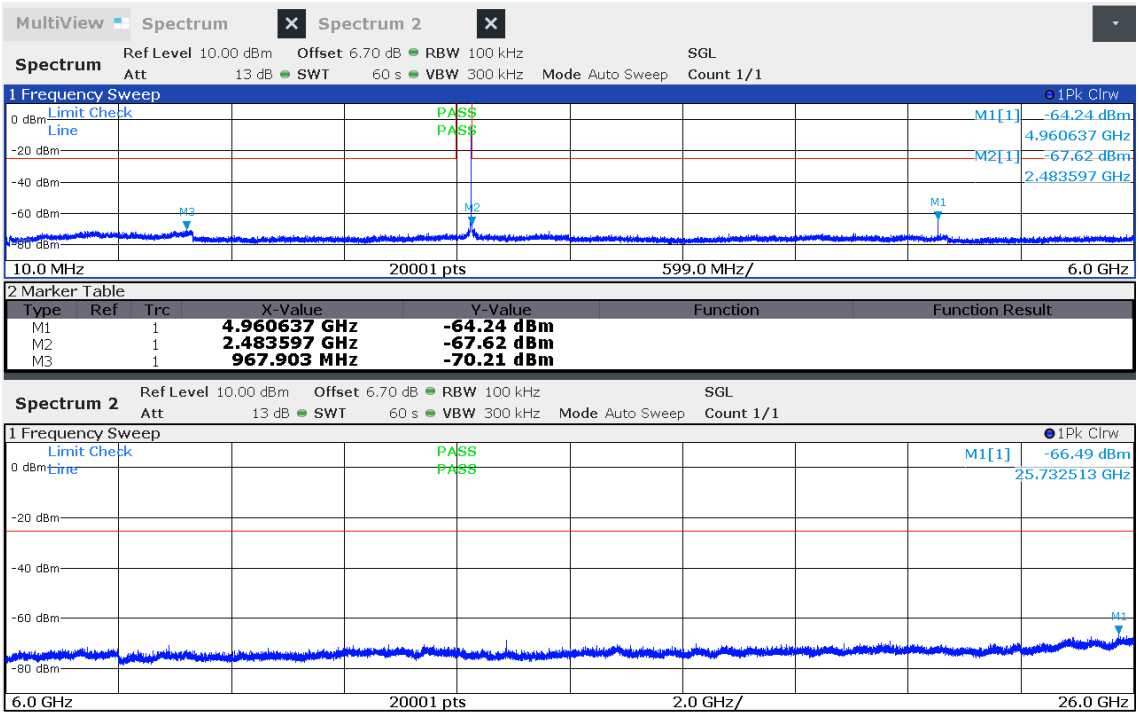
Project Number:	G0M-1909-8466
Applicant:	Motogadget GmbH
Model Description:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Sample ID:	26184
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	GFSK, Channel: 19, 2440 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-10-29
Max. in-band Frequency [MHz]:	2440.0
Max. in-band Level [dBm/100 kHz]:	-4.8
Out-of-band Limit [dBm/100 kHz]:	-24.8



14:16:34 29.10.2019

Conducted Spurious Emissions

Project Number:	G0M-1909-8466
Applicant:	Motogadget GmbH
Model Description:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Sample ID:	26184
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	GFSK, Channel: 39, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-10-29
Max. in-band Frequency [MHz]:	2480.1
Max. in-band Level [dBm/100 kHz]:	-5.2
Out-of-band Limit [dBm/100 kHz]:	-25.2



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3.7 Test Conditions and Results - Transmitter radiated emissions

3.7.1 Information

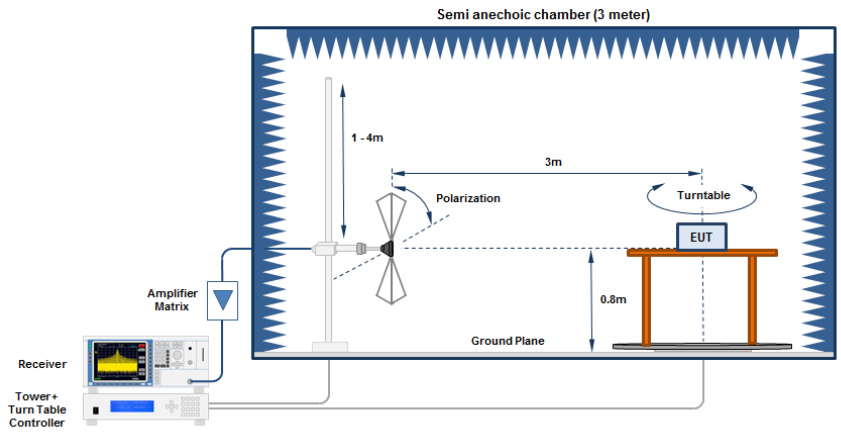
Test Information	
Reference	FCC § 15.247(d); FCC § 15.209; ISED RSS-Gen, Issue 5 (section 6.13)
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6, 11.12
Operator	Florian Voigt
Date	2019-10-28 + 2019-10-29

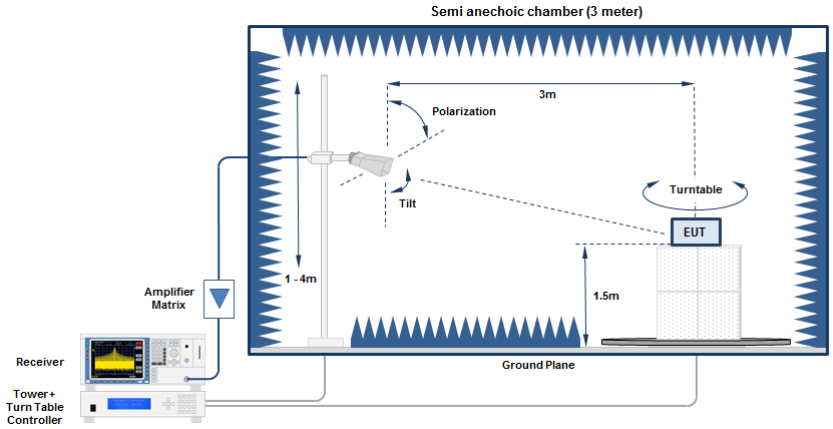
3.7.2 Limits

Limits			
Frequency [MHz]	Detector	Field strength [µV/m]	Measurement distance [m]
0.009 - 0.09	Average	2400/F[kHz]	300
0.09 - 0.110	Quasi-Peak	2400/F[kHz]	300
0.110 - 0.490	Average	2400/F[kHz]	300
0.490 - 1.705	Quasi-Peak	24000/F[kHz]	30
1.705 - 30.0	Quasi-Peak	30	30
30 - 88	Quasi-Peak	100	3
88 - 216	Quasi-Peak	150	3
216 - 960	Quasi-Peak	200	3
960 - 1000	Quasi-Peak	500	3
>1000	Average	500	3

3.7.3 Setup

Test Setup 30 - 1000 MHz



Test Setup > 1 GHz


3.7.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2016.1.10

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Spectrum analyzer	R&S	FSU 26	EF01003	2019-07	2020-07
Antenna	R&S	HK 116	EF00030	2019-04	2022-04
Antenna	R&S	HL 223	EF00212	2019-05	2020-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Spectrum analyzer	R&S	FSU 26	EF01003	2019-07	2020-07
Antenna	Schwarzbeck	BBHA 9120D	EF01153	2019-10	2020-10
Antenna	Amplifier Research	AT4560	EF00302	2019-05	2020-05

3.7.5 Procedure

Test Procedure 30 - 1000 MHz
1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector

Test Procedure > 1 GHz
1. EUT is placed on a non conducting support at the center of a turn table 1.5 m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector

3.7.6 Results

Test Results						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
2402	4801	38.77	pk	hor	74.00	-35.23
2402	4801	42.45	pk	ver	74.00	-31.55
2440	4878	41.95	pk	ver	74.00	-32.05
2440	7319	56.91	pk	hor	74.00	-17.09
2440	7319	51.68	RMS	hor	54.00	-02.32
2440	7321	51.77	pk	ver	74.00	-22.23
2440	7321	46.14	RMS	ver	54.00	-07.86
2480	4962	37.00	pk	hor	74.00	-37.00
2480	4962	43.11	pk	ver	74.00	-30.89
2480	7439	55.75	pk	hor	74.00	-18.25
2480	7439	50.63	RMS	hor	54.00	-03.37
2480	7441	51.64	pk	ver	74.00	-22.36
2480	7441	45.49	RMS	ver	54.00	-08.51

3.8 Test Conditions and Results - Receiver radiated emissions

3.8.1 Information

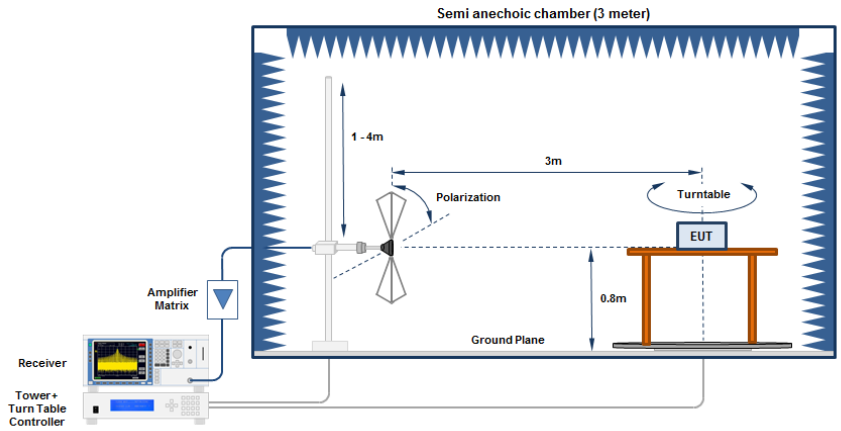
Test Information	
Reference	ISED RSS-247, Issue 2 (section 3.1)
Measurement Method	ANSI C63.10 6.5, 6.6, 11.12
Operator	Florian Voigt
Date	2019-10-29

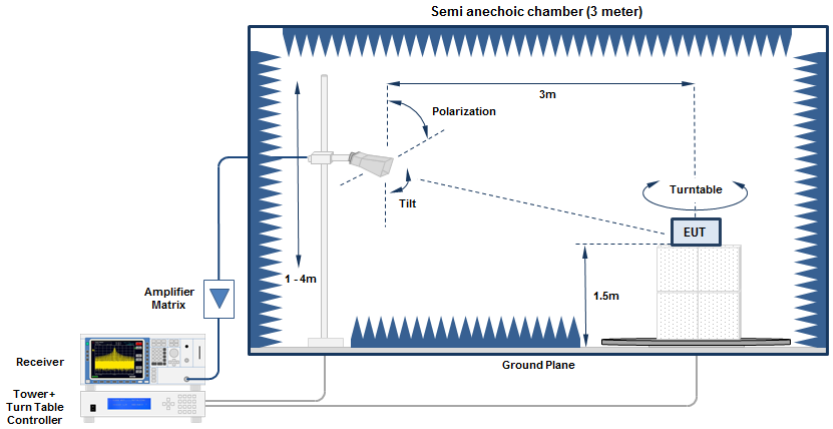
3.8.2 Limits

Limits			
Frequency [MHz]	Detector	Field strength [dBµV/m]	Measurement distance [m]
30 - 88	Quasi-Peak	100	3
88 - 216	Quasi-Peak	150	3
216 - 960	Quasi-Peak	200	3
960 - 1000	Quasi-Peak	500	3
>1000	Average	500	3

3.8.3 Setup

Test Setup 30 - 1000 MHz



Test Setup > 1 GHz


3.8.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2016.1.10

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Spectrum analyzer	R&S	FSU 26	EF01003	2019-07	2020-07
Antenna	R&S	HK 116	EF00030	2019-04	2022-04
Antenna	R&S	HL 223	EF00212	2019-05	2020-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Spectrum analyzer	R&S	FSU 26	EF01003	2019-07	2020-07
Antenna	Schwarzbeck	BBHA 9120D	EF01153	2019-10	2020-10
Antenna	Amplifier Research	AT4560	EF00302	2019-05	2020-05

3.8.5 Procedure

Test Procedure 30 - 1000 MHz
1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector

Test Procedure > 1 GHz
1. EUT is placed on a non conducting support at the center of a turn table 1.5 m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector

3.8.6 Results

Test Results						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
2440	No significant spurious emissions					

ANNEX A Transmitter spurious emissions

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; 2402MHz, GFSK, EUT ver
Test Date:	2019-10-29
Note:	

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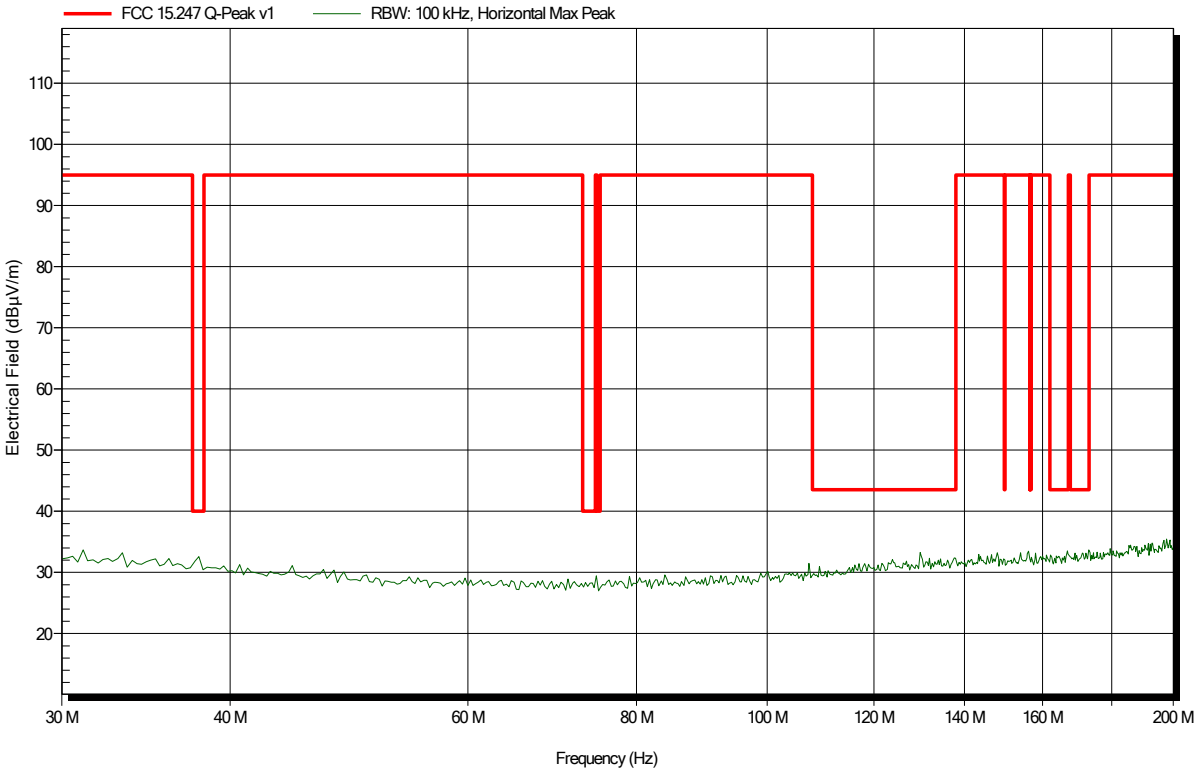

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; 2402MHz, GFSK, EUT ver
Test Date:	2019-10-29
Note:	

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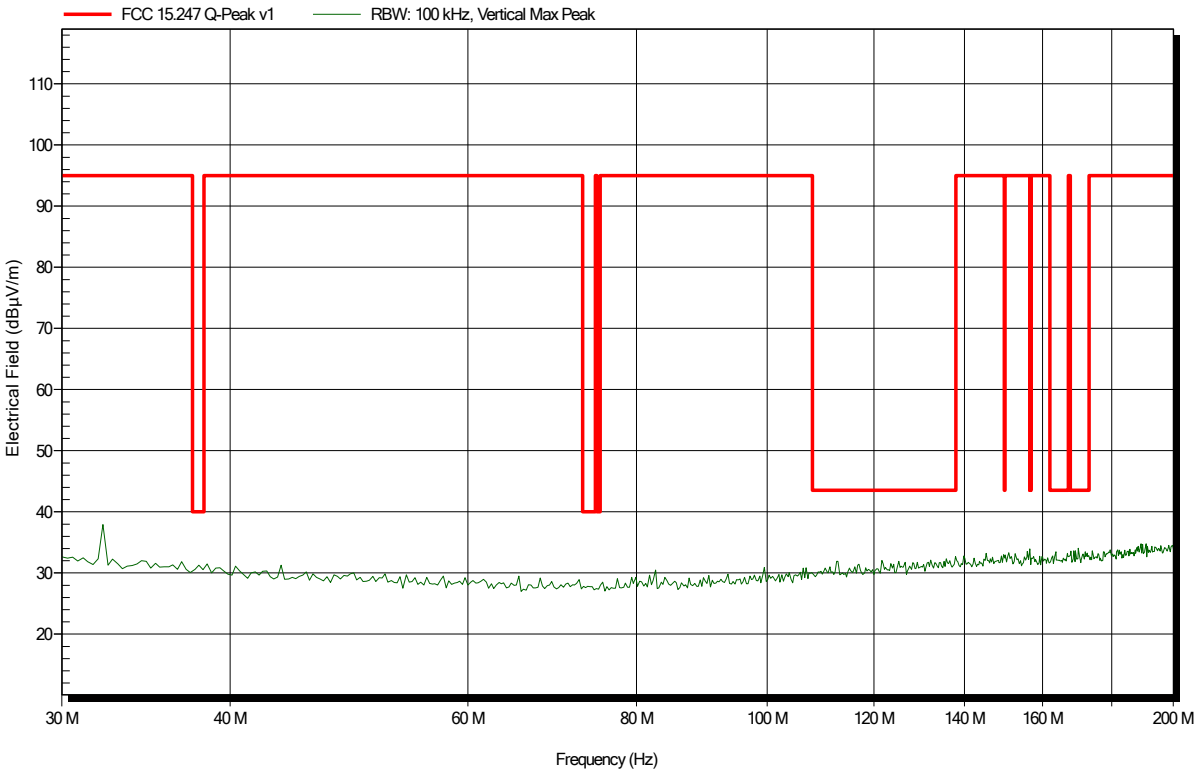

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 2402MHz, GFSK, EUT ver
Test Date:	2019-10-29
Note:	

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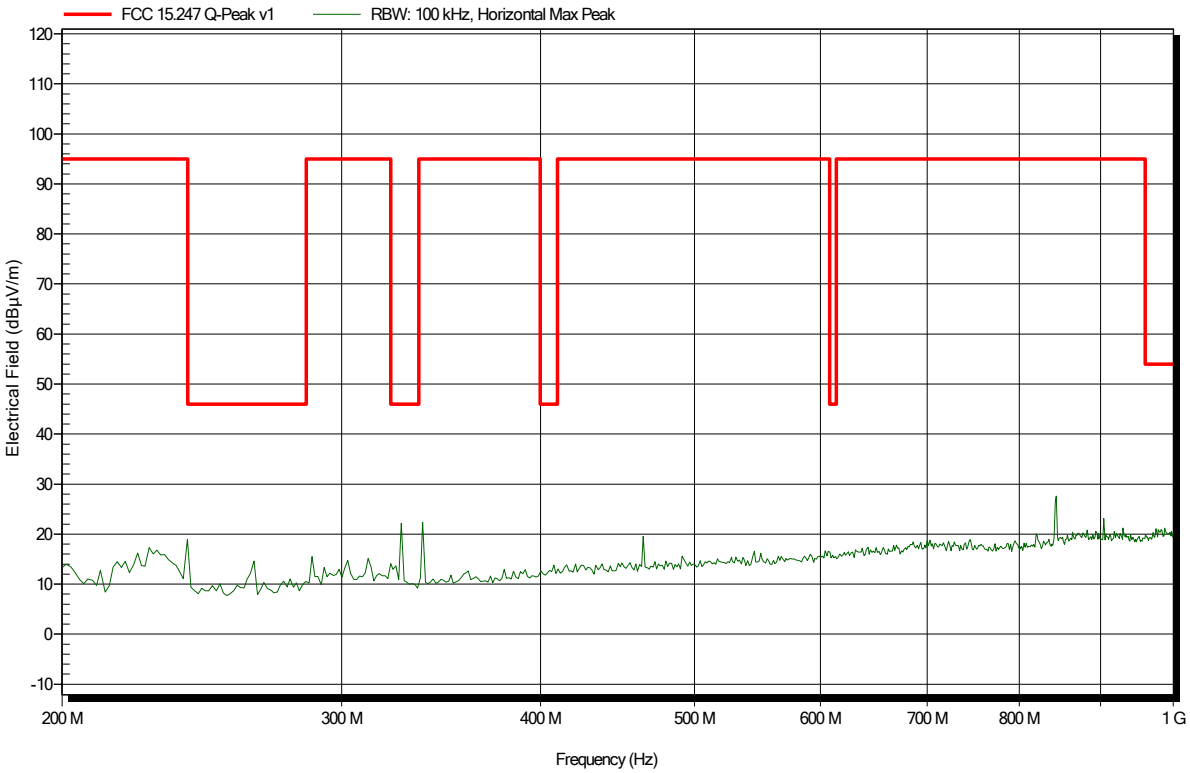

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 2402MHz, GFSK, EUT ver
Test Date:	2019-10-29
Note:	

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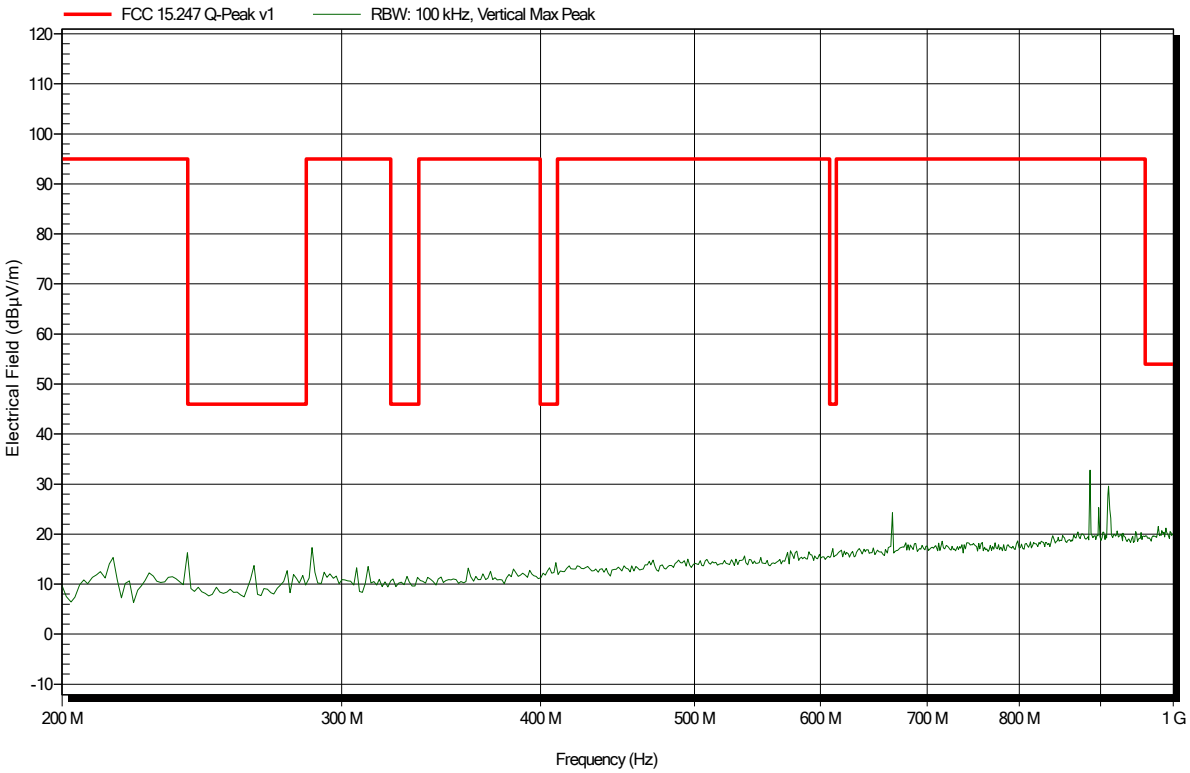

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2402MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	

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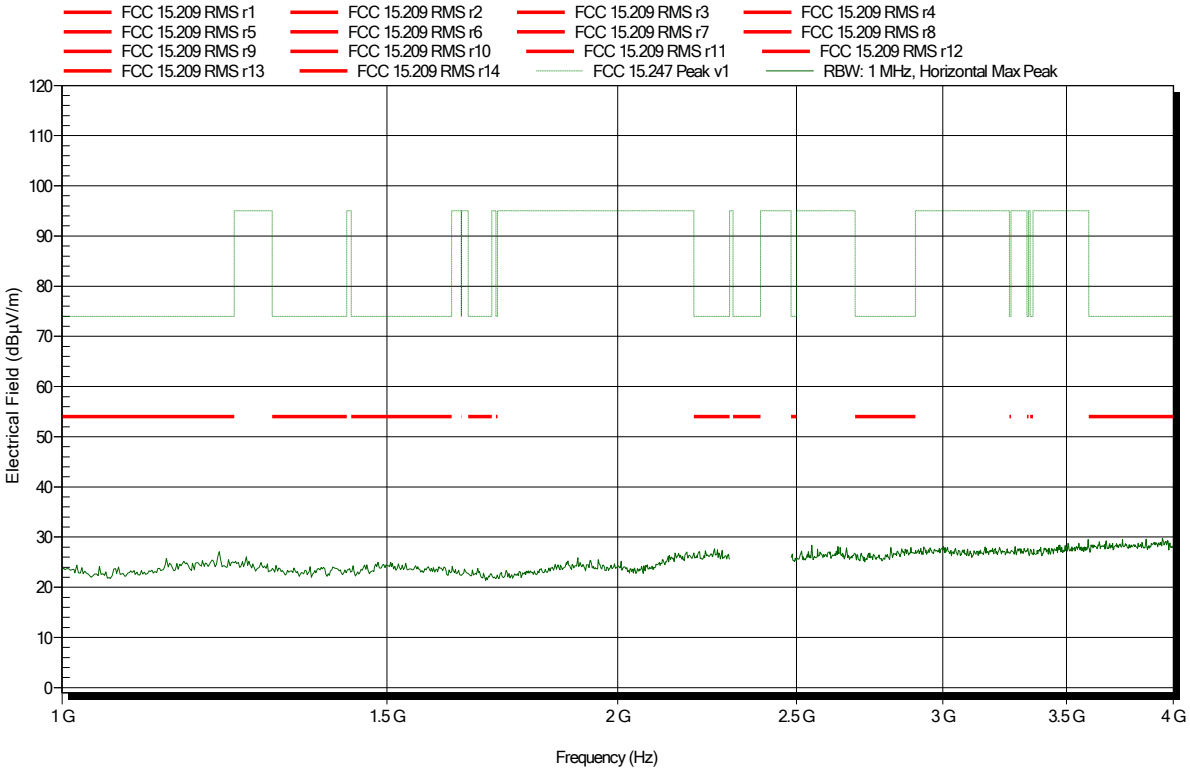

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2402MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	

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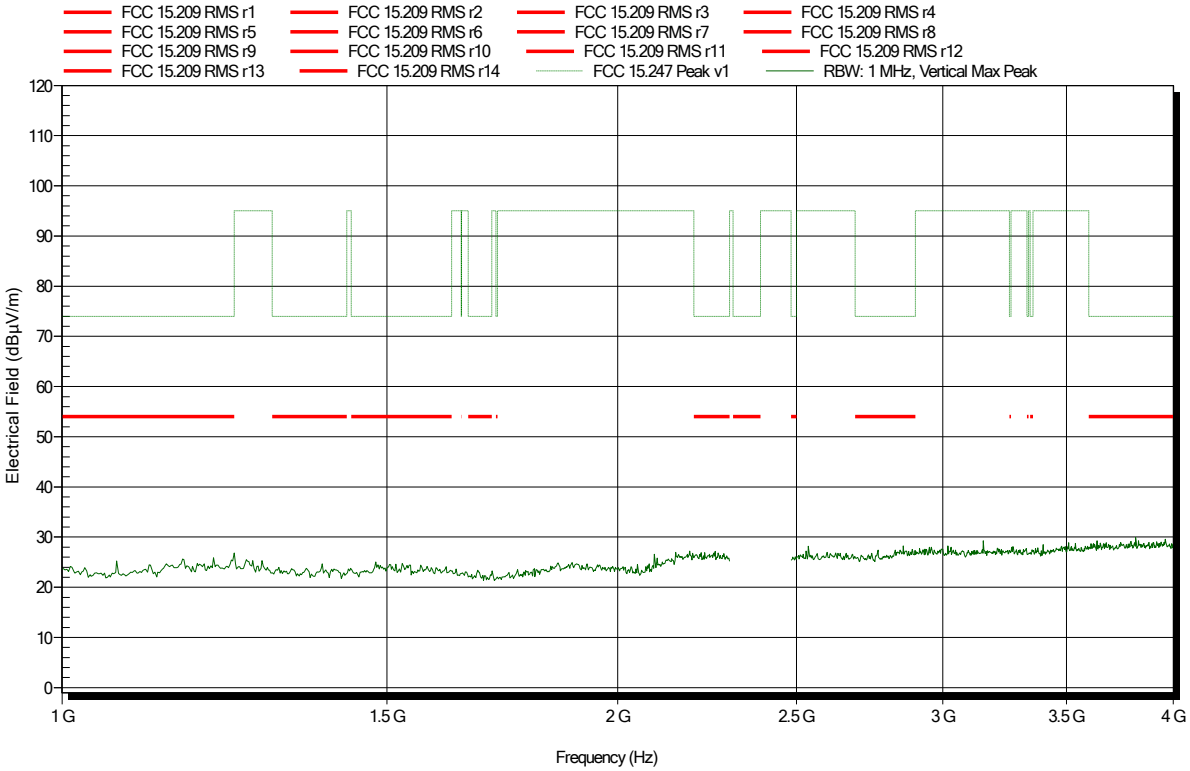

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2402MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	lower bandedge

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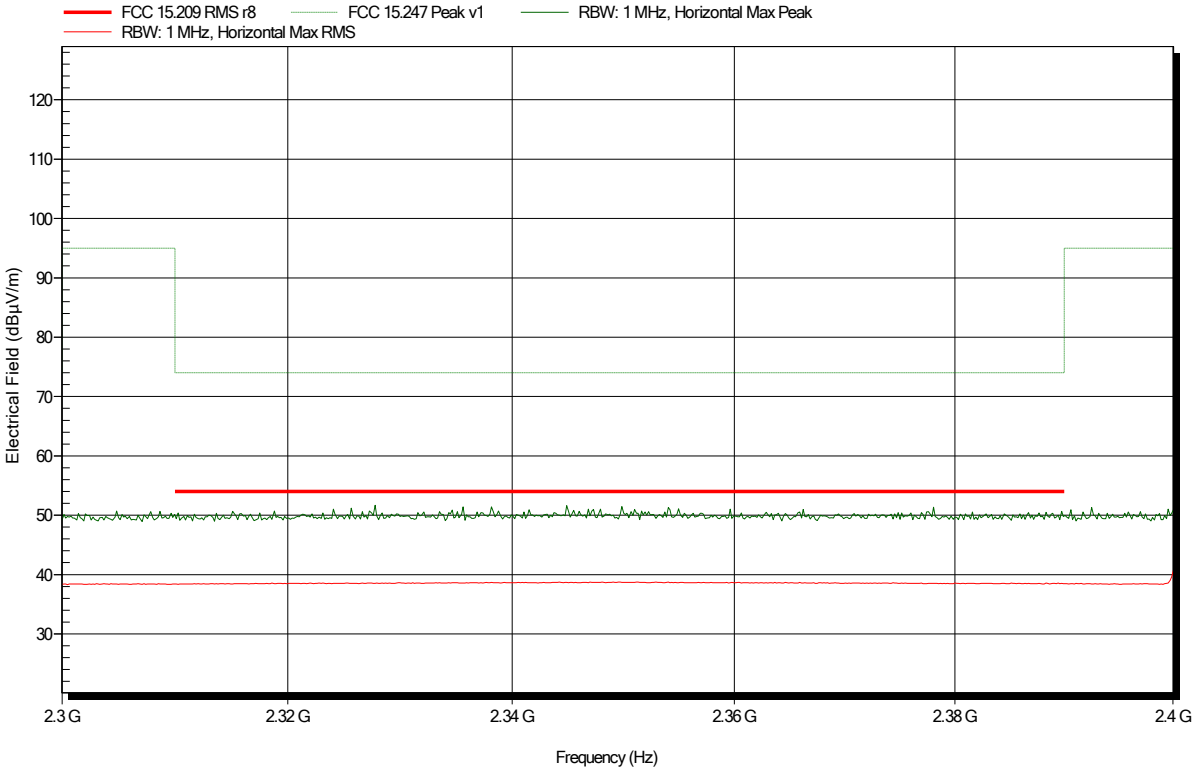

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2402MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	lower bandedge

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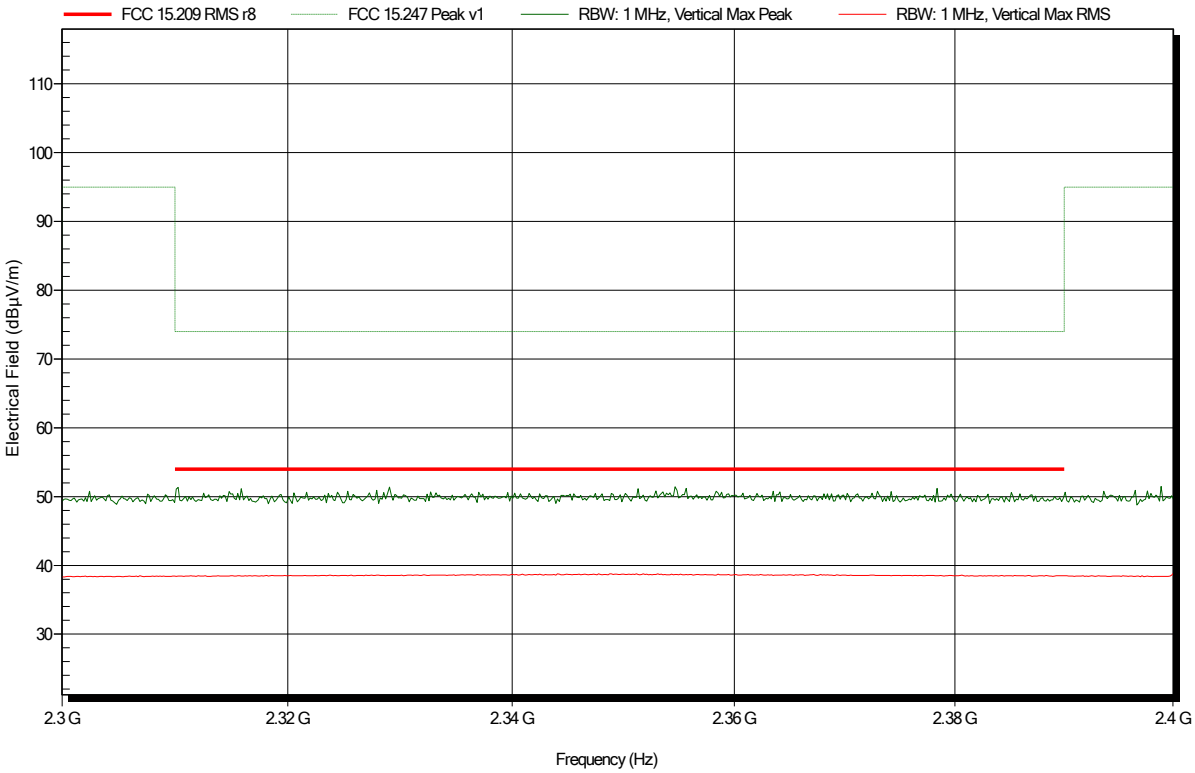

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2402MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	

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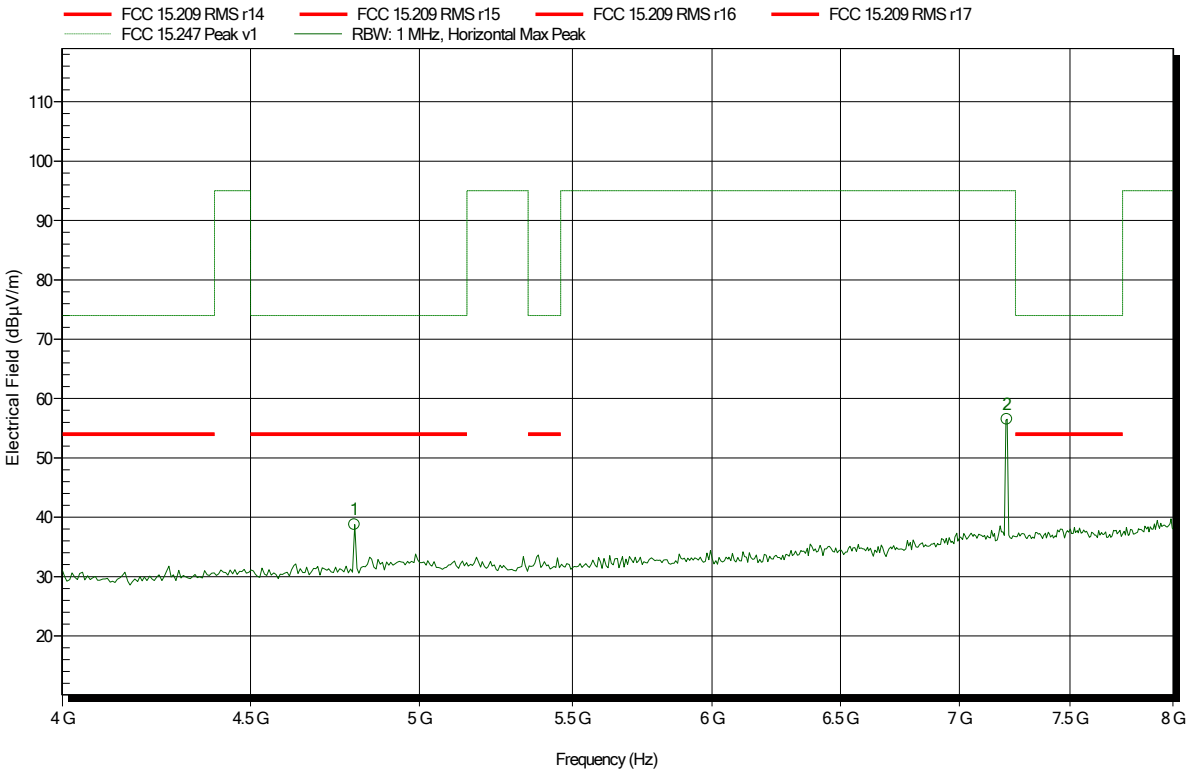

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.801 GHz	38.77 dBµV/m	74 dBµV/m	-35.23 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2402MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	

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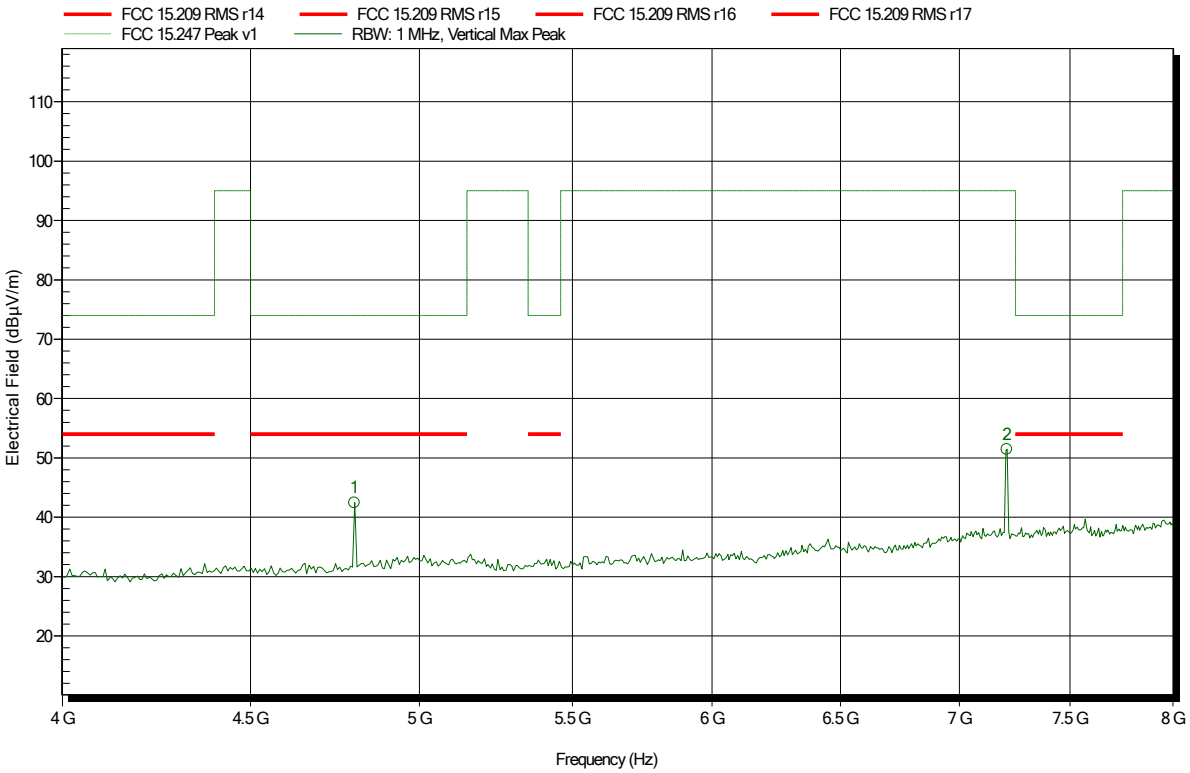

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.801 GHz	42.45 dBµV/m	74 dBµV/m	-31.55 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2402MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	

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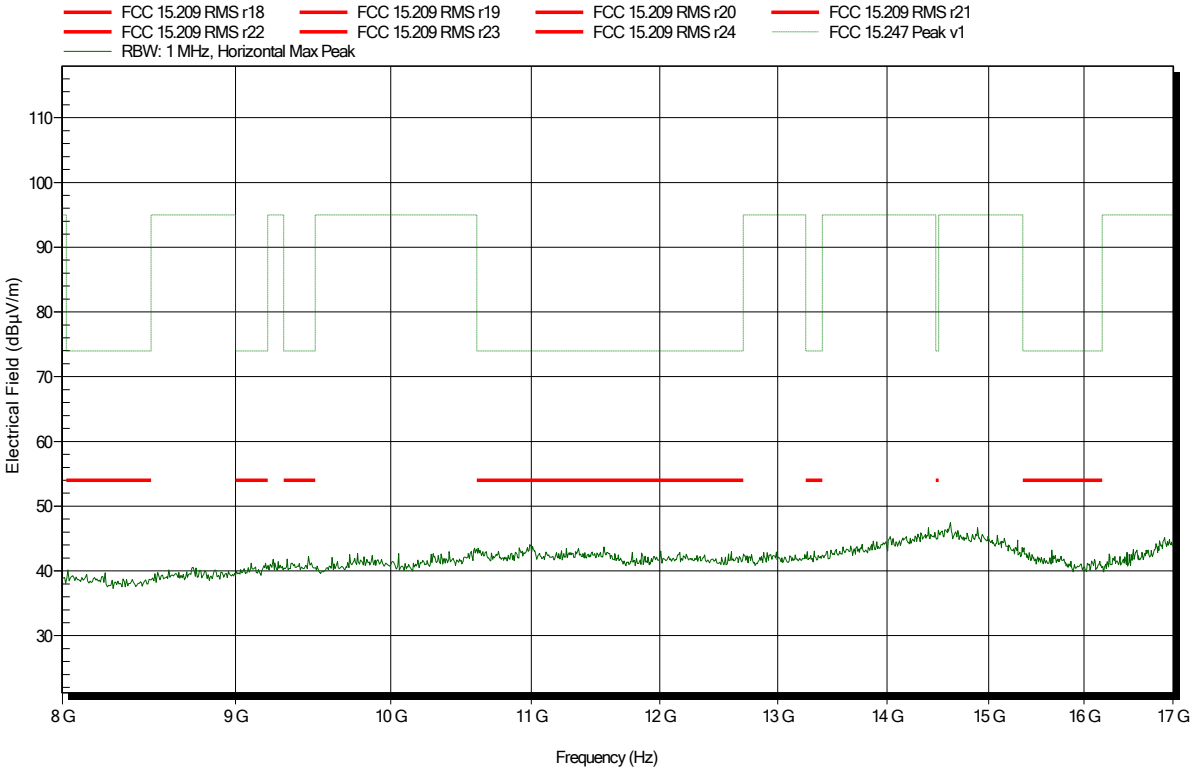

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2402MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	

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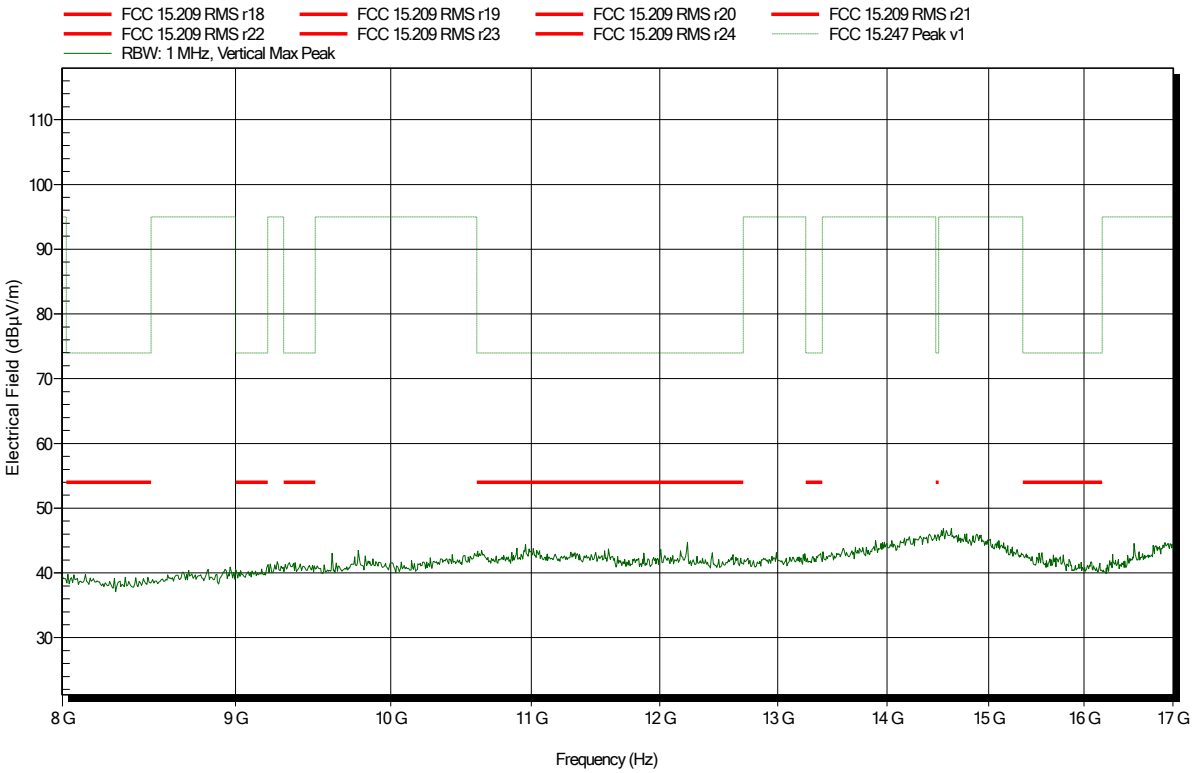

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Amplifier Research AT4560, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2402MHz, GFSK, EUT ver
Test Date:	2019-10-29
Note:	

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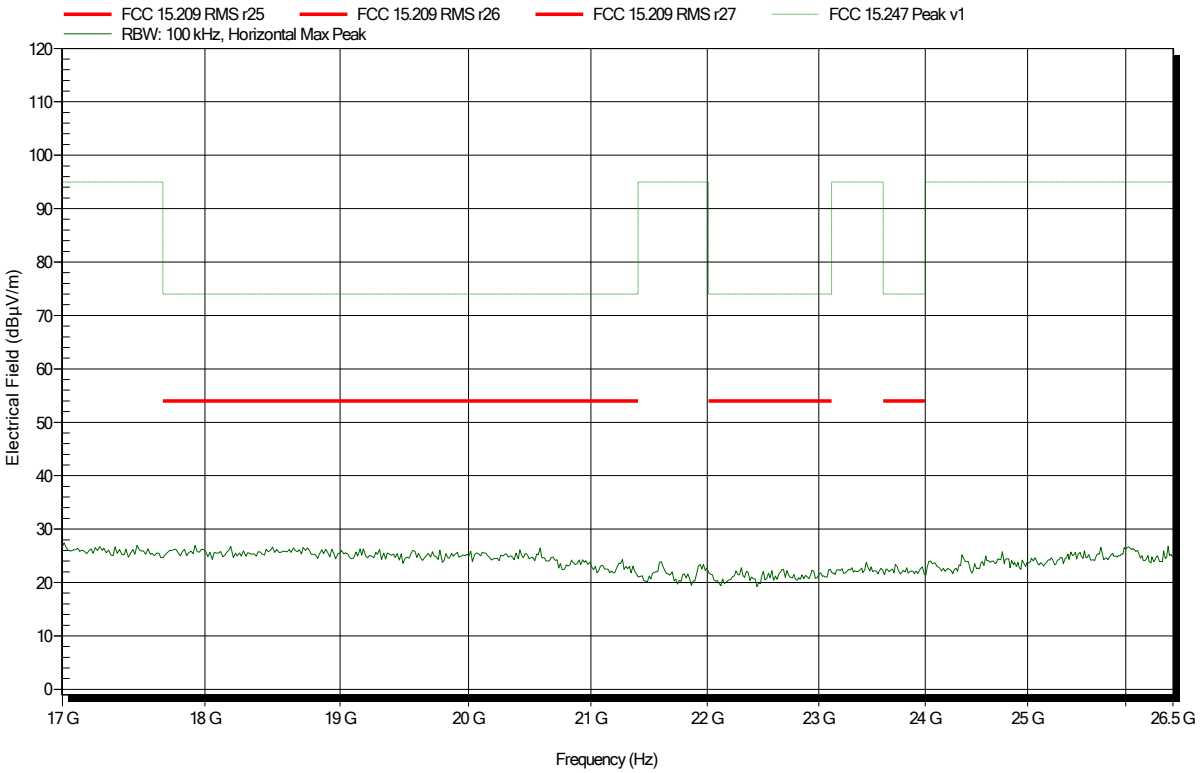

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Amplifier Research AT4560, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2402MHz, GFSK, EUT ver
Test Date:	2019-10-29
Note:	

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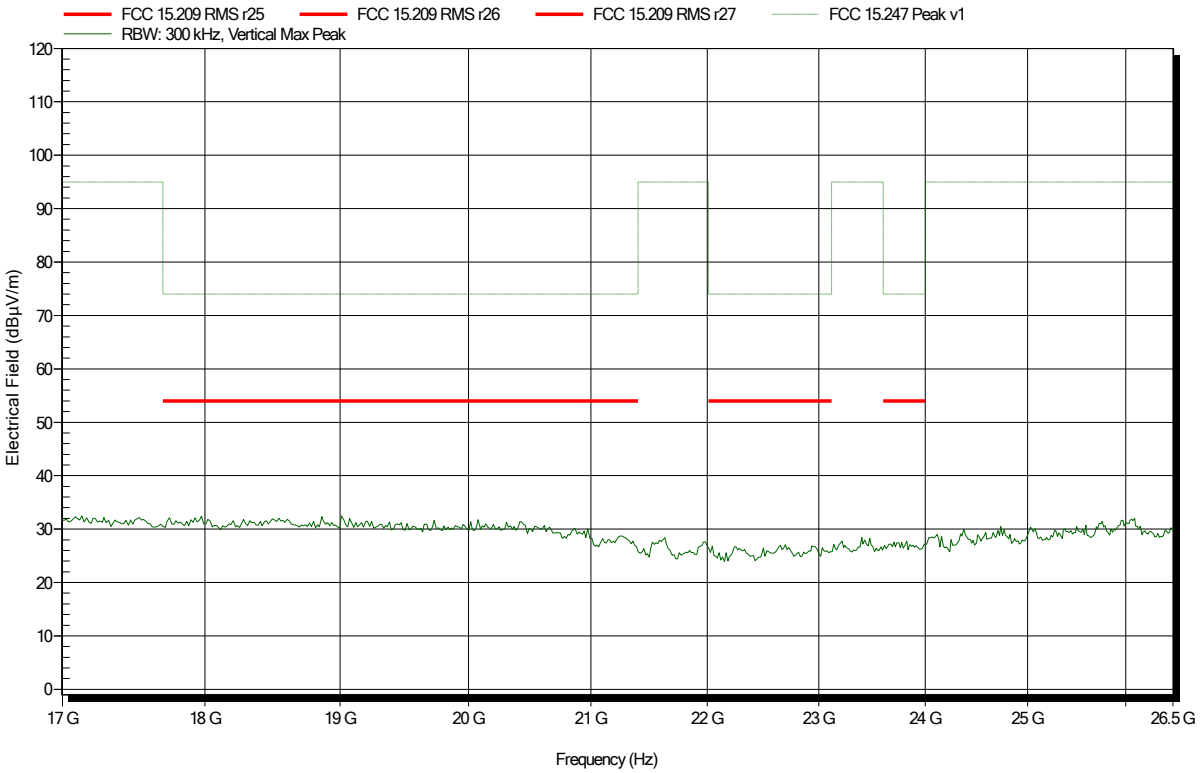

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; 2440MHz, GFSK, EUT ver
Test Date:	2019-10-29
Note:	

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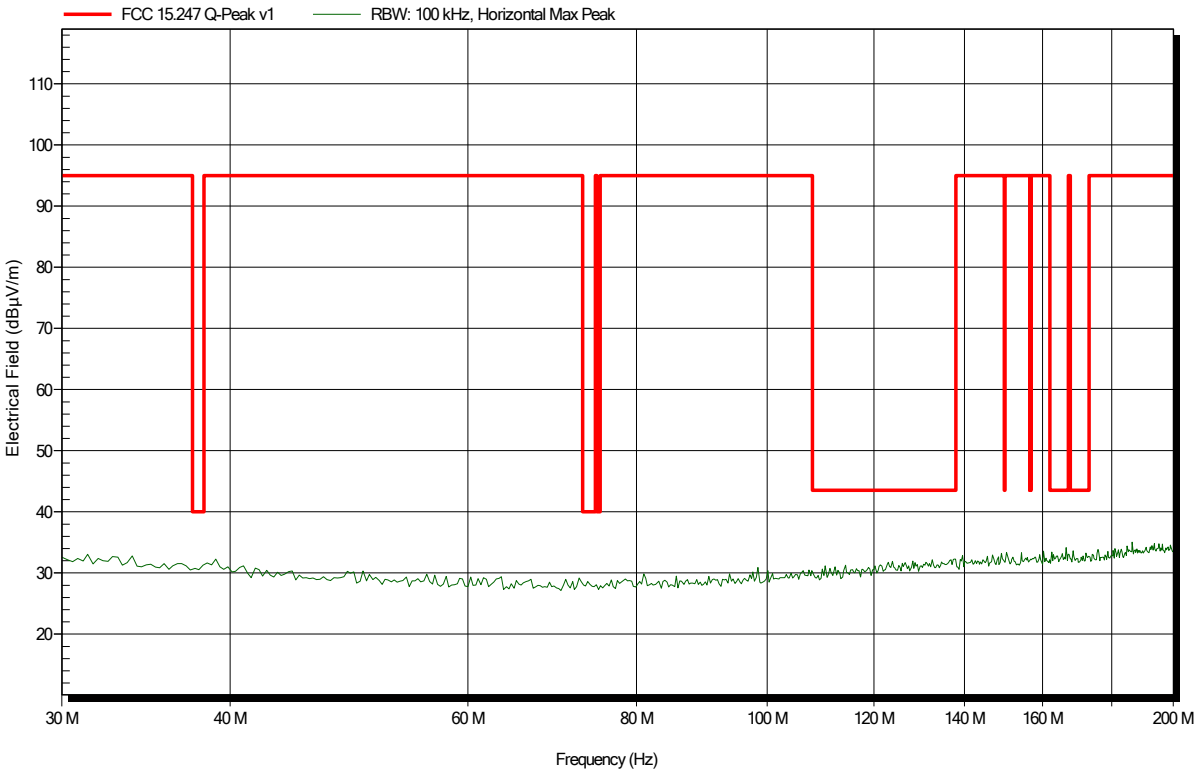

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; 2440MHz, GFSK, EUT ver
Test Date:	2019-10-29
Note:	

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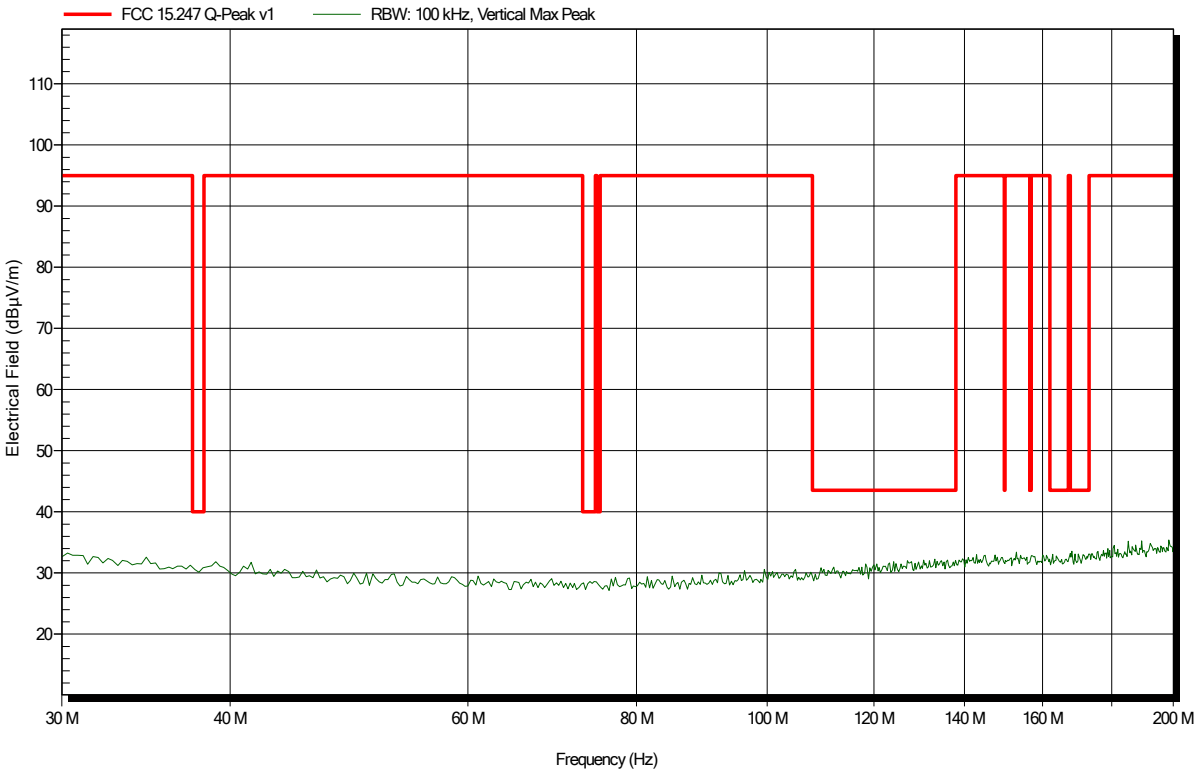

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 2440MHz, GFSK, EUT ver
Test Date:	2019-10-29
Note:	

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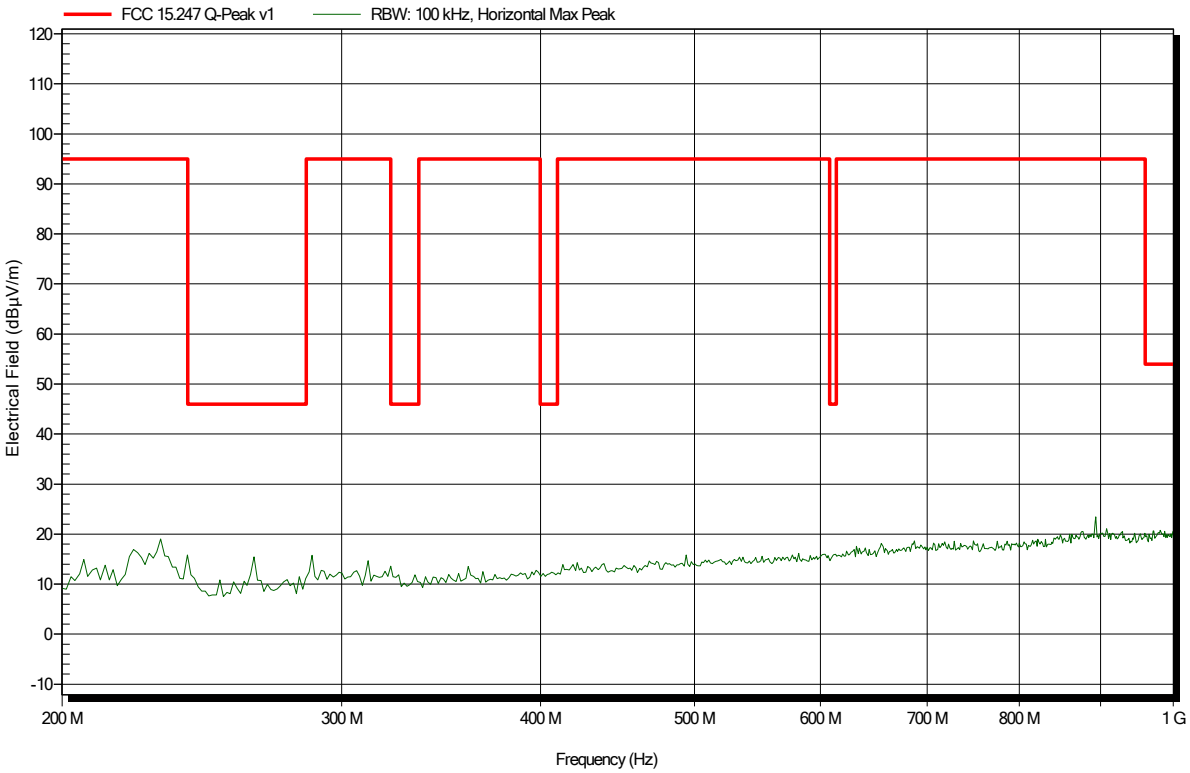

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
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Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 2440MHz, GFSK, EUT ver
Test Date:	2019-10-29
Note:	

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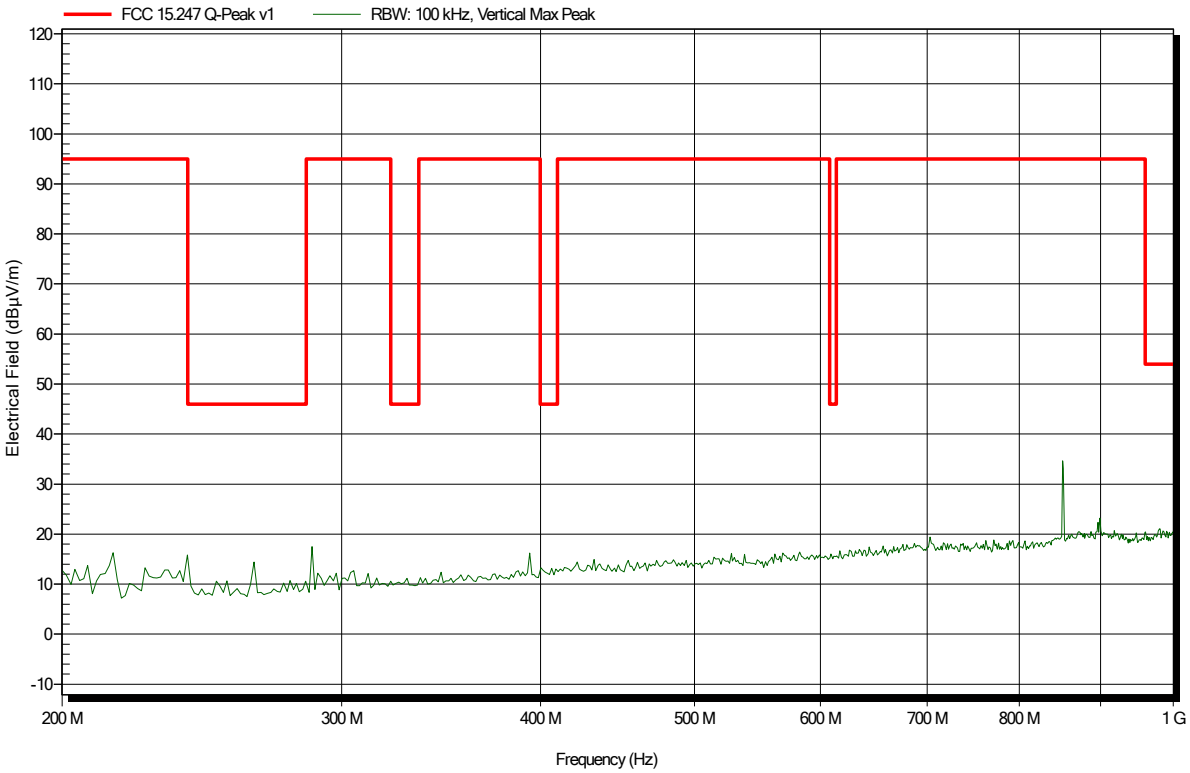

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2440MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	

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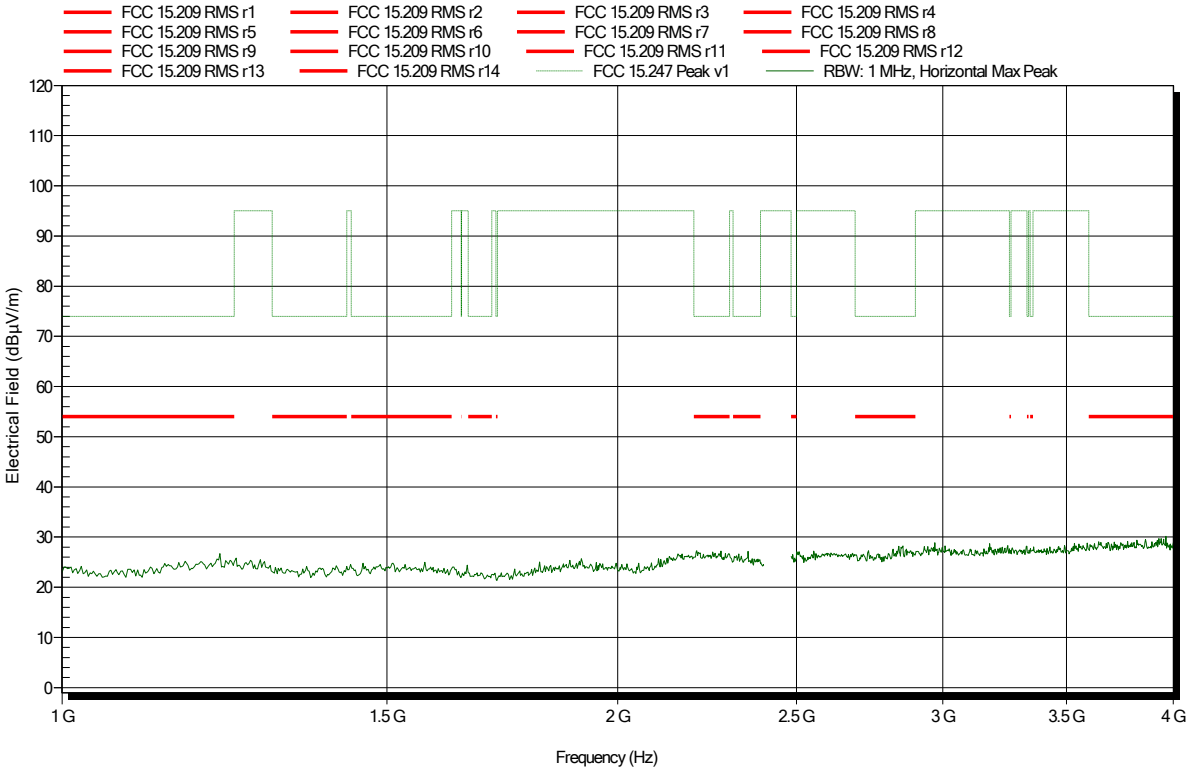

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2440MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	

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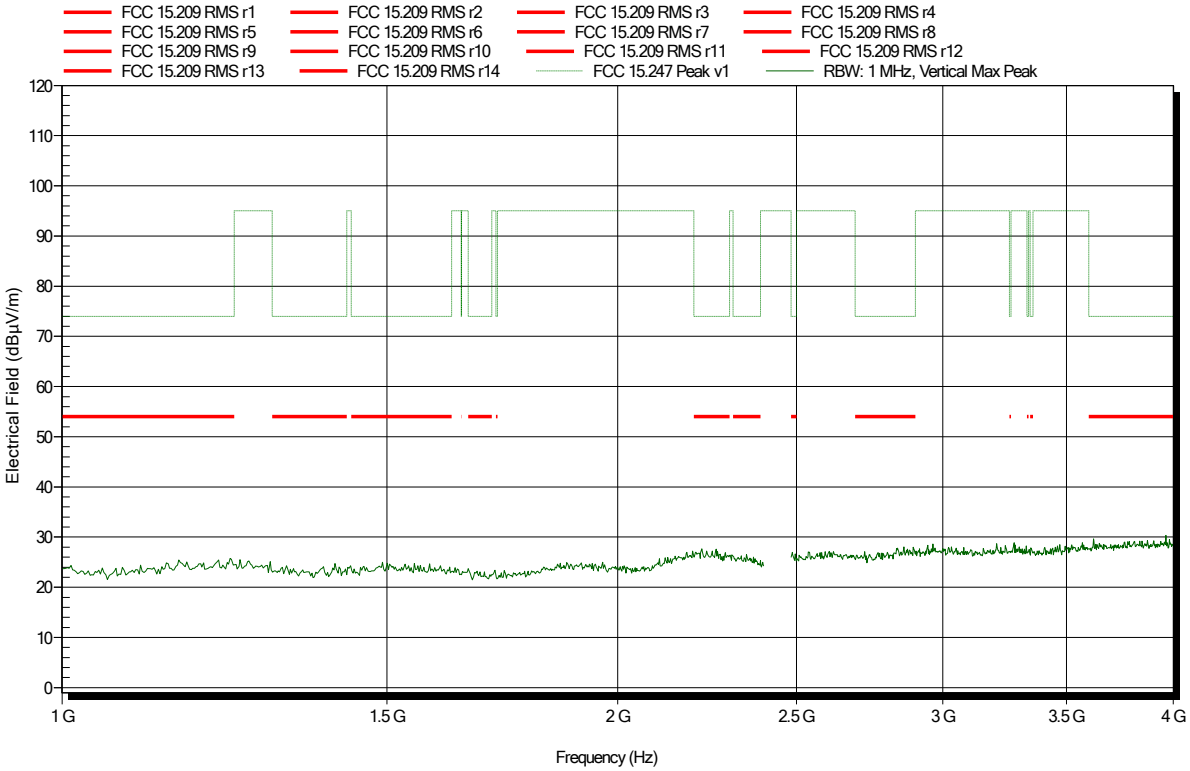

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2440MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	

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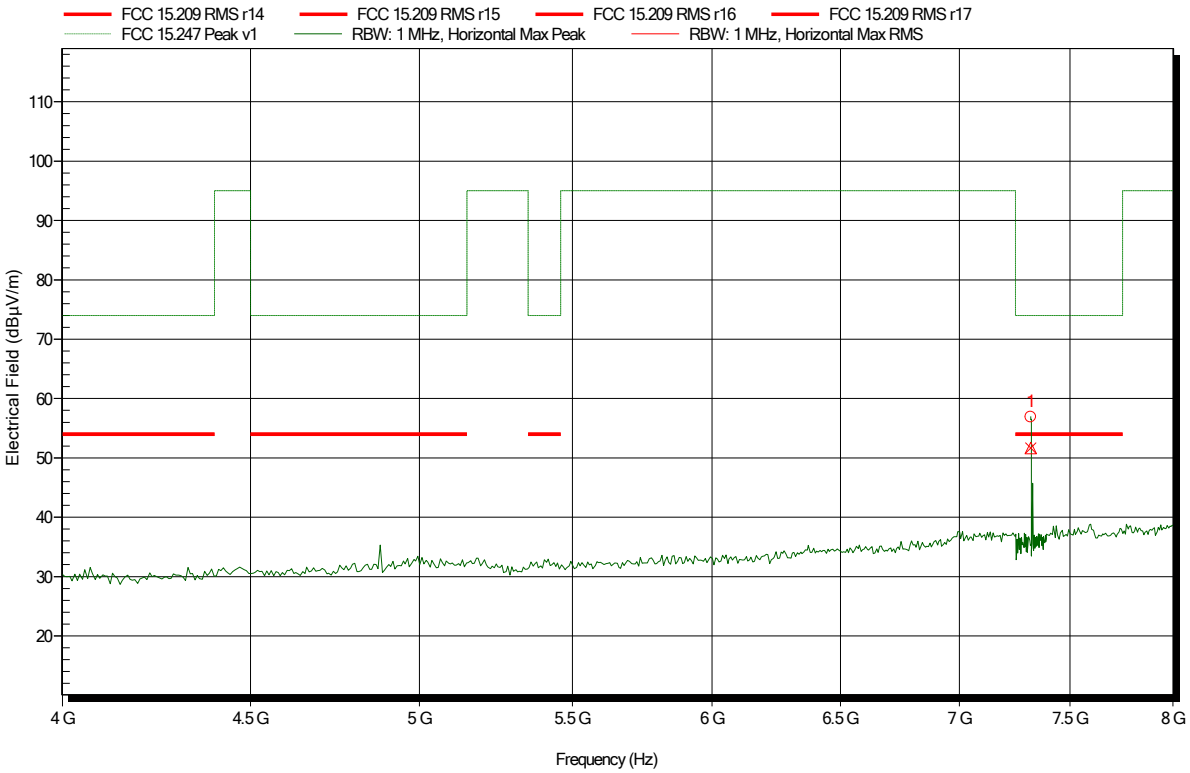

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
7.319 GHz	56.91 dBµV/m	74 dBµV/m	-17.09 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
7.319 GHz	51.68 dBµV/m	54 dBµV/m	-2.32 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2440MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	

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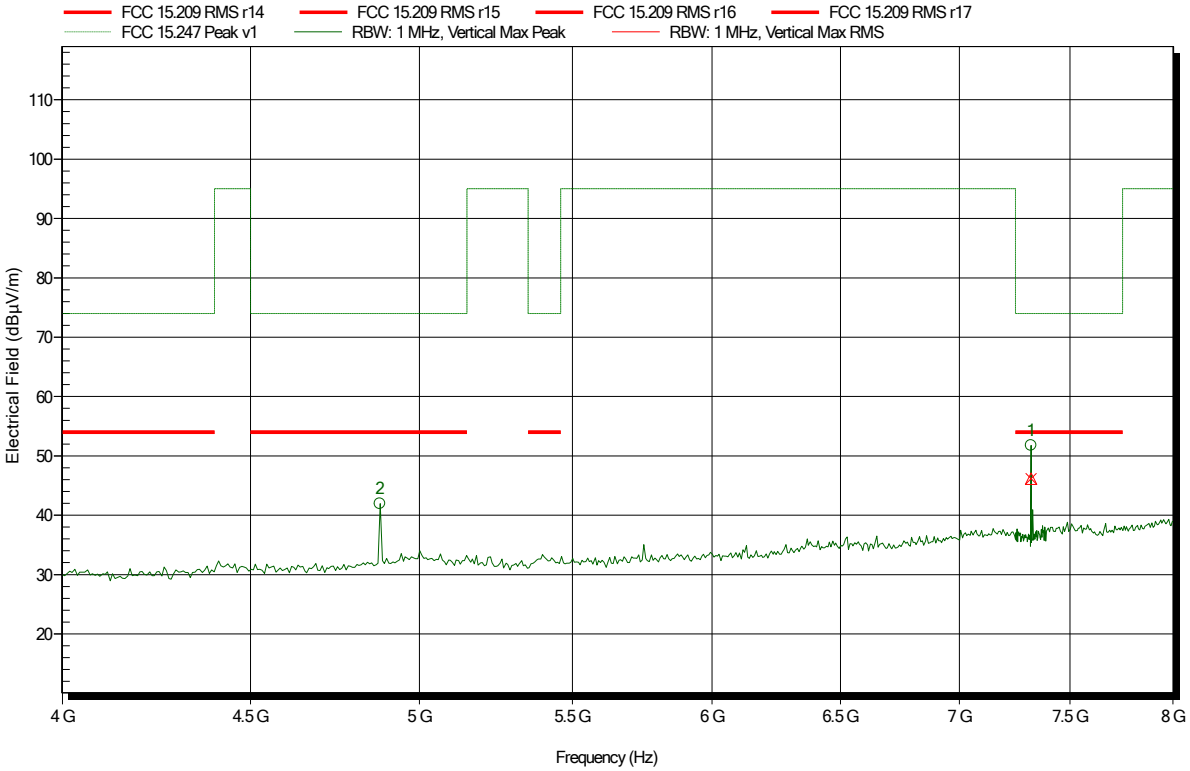

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.878 GHz	41.95 dBµV/m	74 dBµV/m	-32.05 dB	Pass
7.321 GHz	51.77 dBµV/m	74 dBµV/m	-22.23 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
7.321 GHz	46.14 dBµV/m	54 dBµV/m	-7.86 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2440MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	

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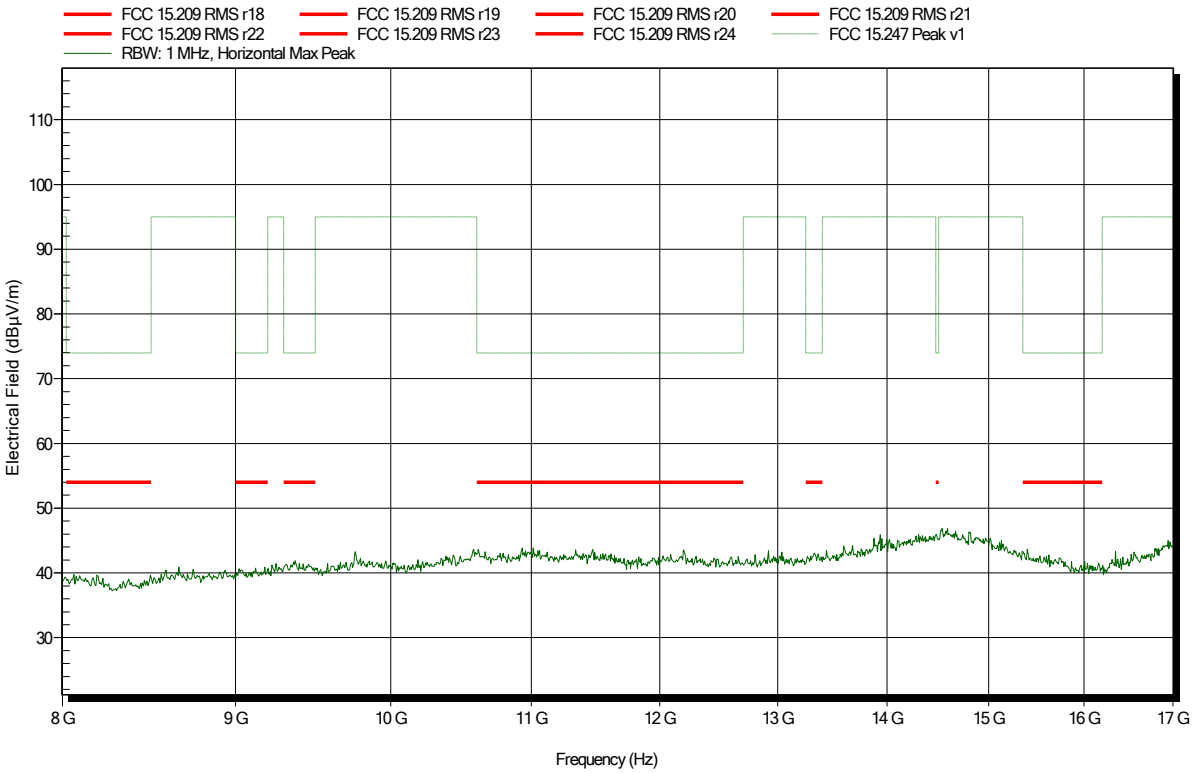

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2440MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	

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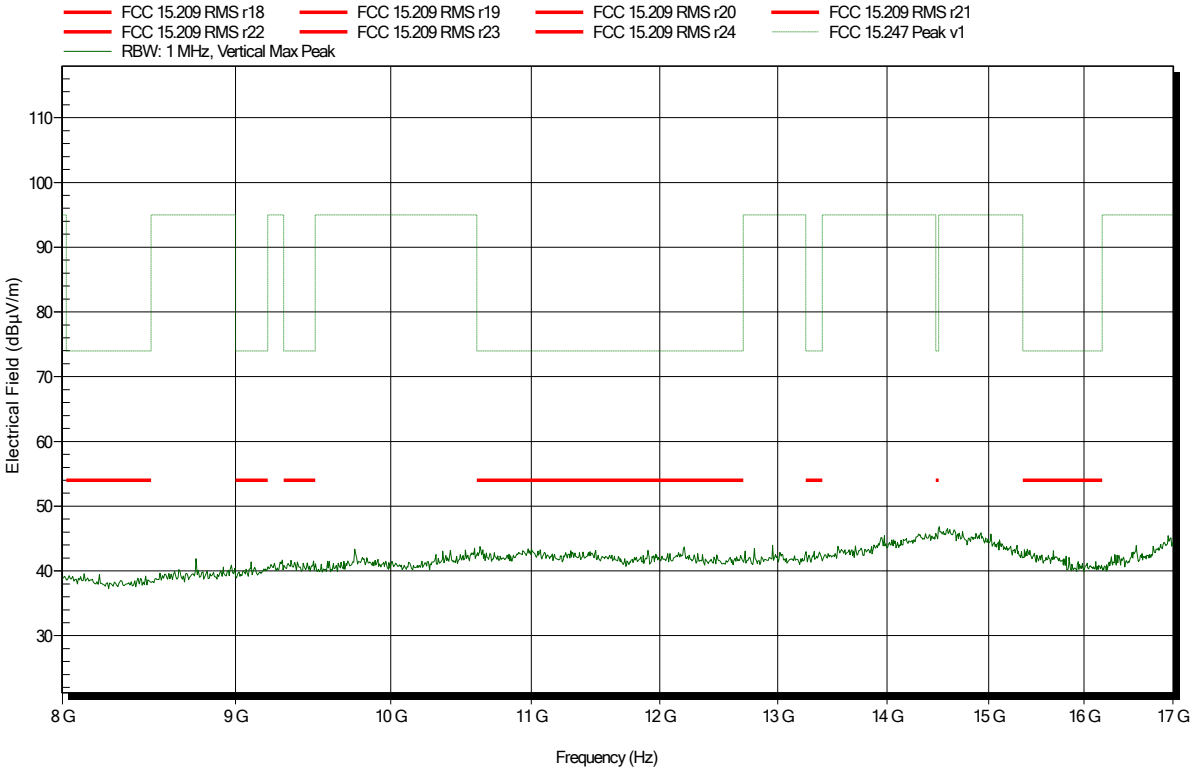

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Amplifier Research AT4560, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2440MHz, GFSK, EUT ver
Test Date:	2019-10-29
Note:	

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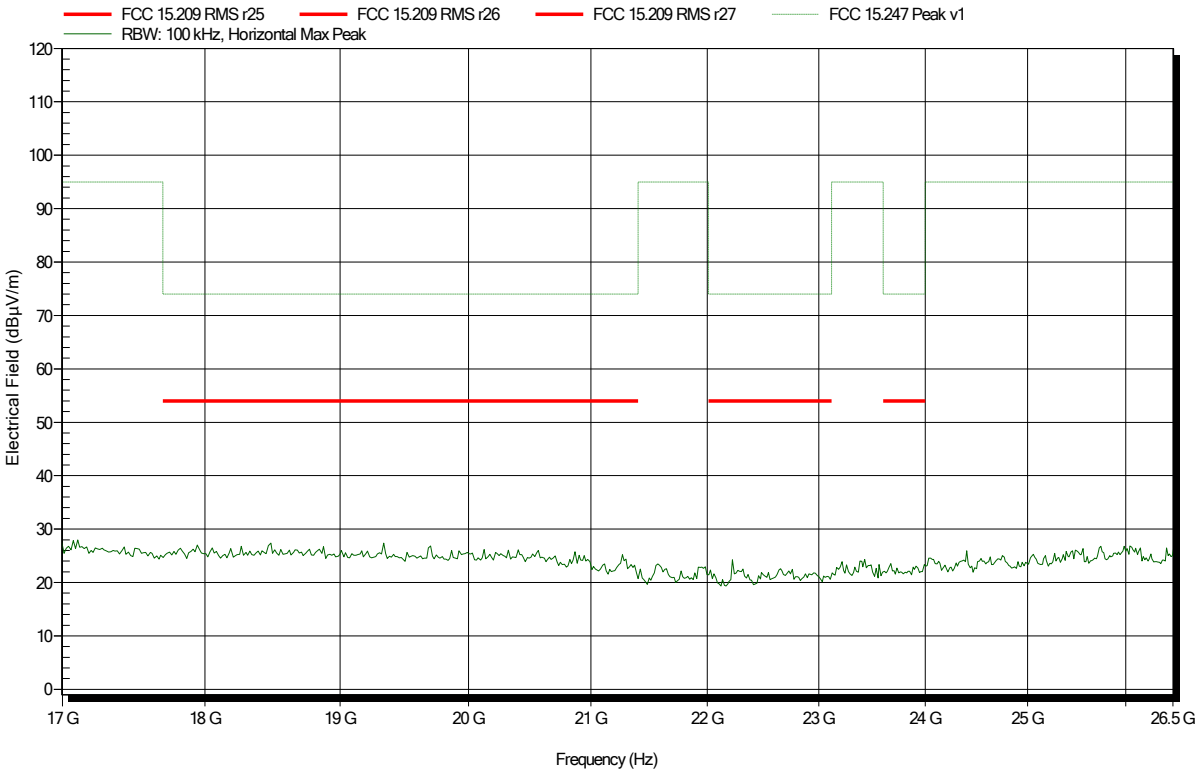

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Amplifier Research AT4560, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2440MHz, GFSK, EUT ver
Test Date:	2019-10-29
Note:	

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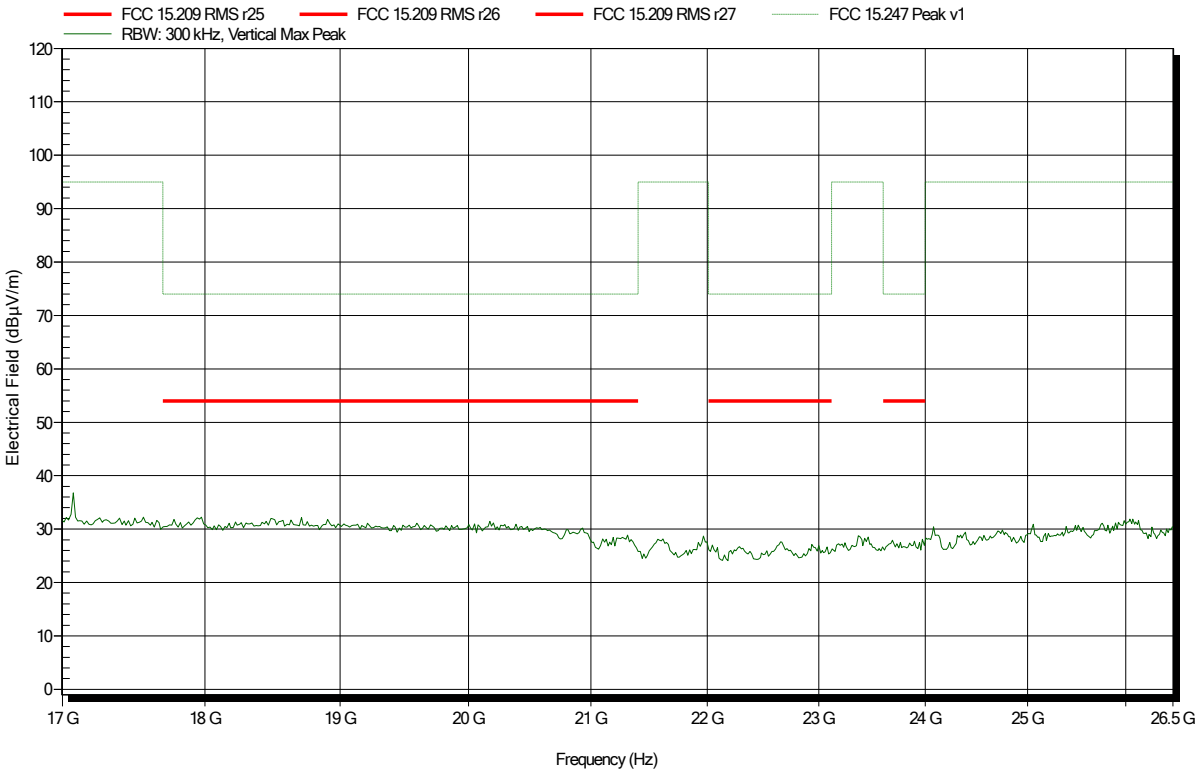

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; 2480MHz, GFSK, EUT ver
Test Date:	2019-10-29
Note:	

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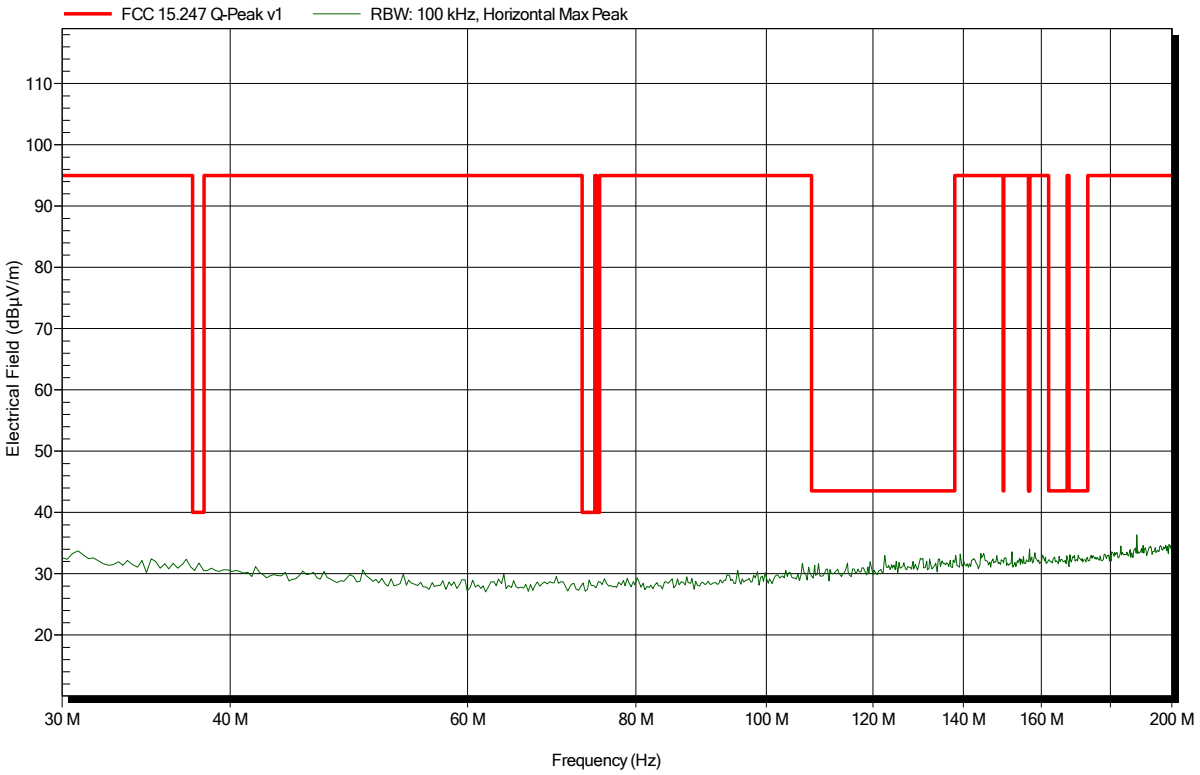

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; 2480MHz, GFSK, EUT ver
Test Date:	2019-10-29
Note:	

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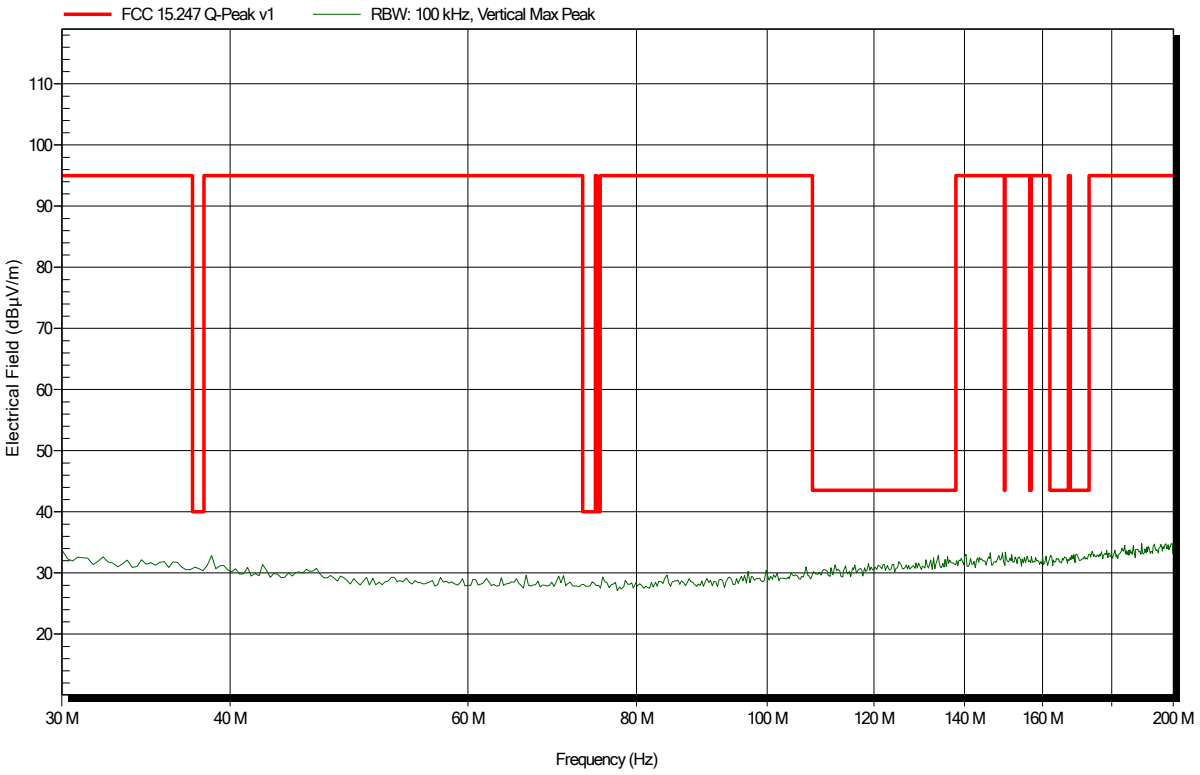

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Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 2480MHz, GFSK, EUT ver
Test Date:	2019-10-29
Note:	

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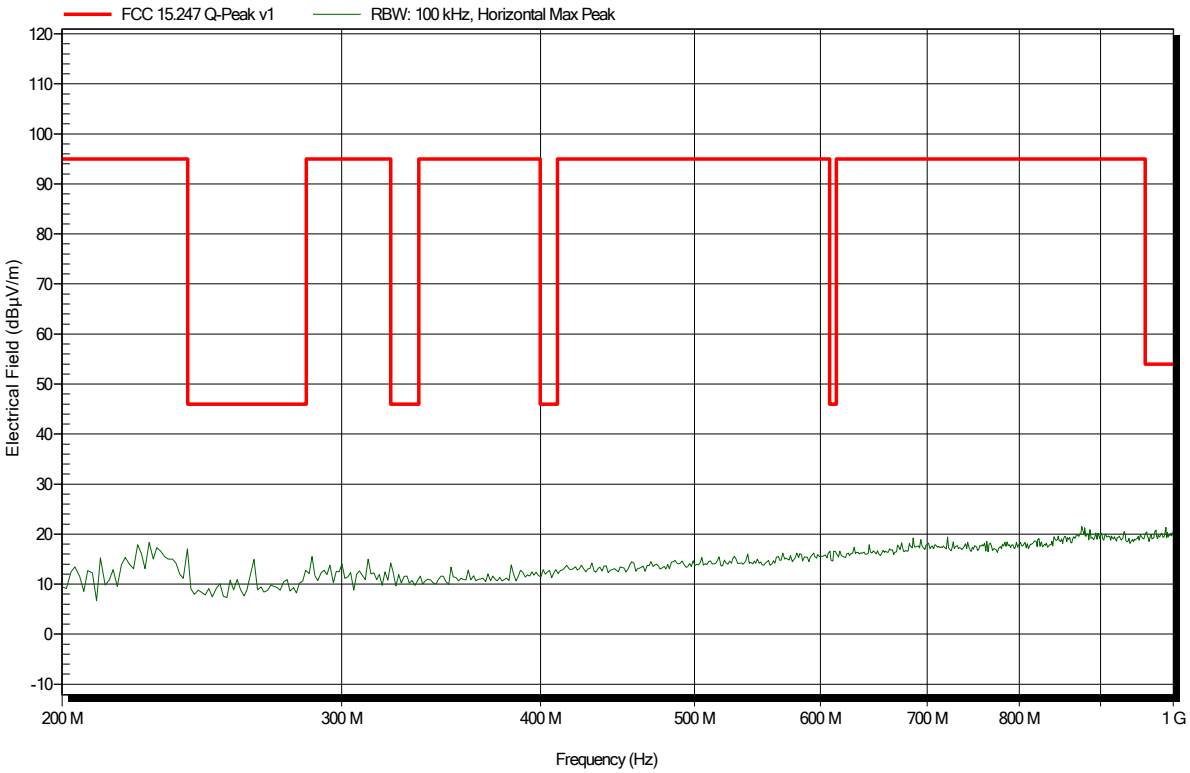

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Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 2480MHz, GFSK, EUT ver
Test Date:	2019-10-29
Note:	

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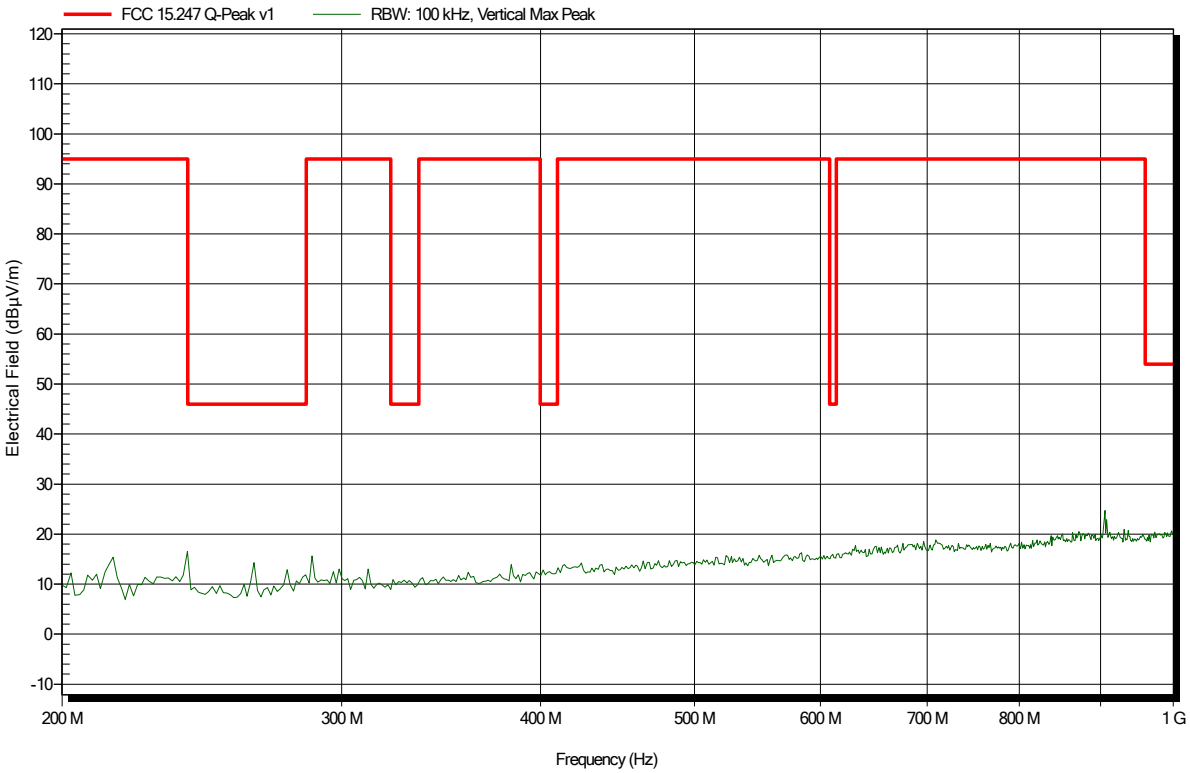

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2480MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	

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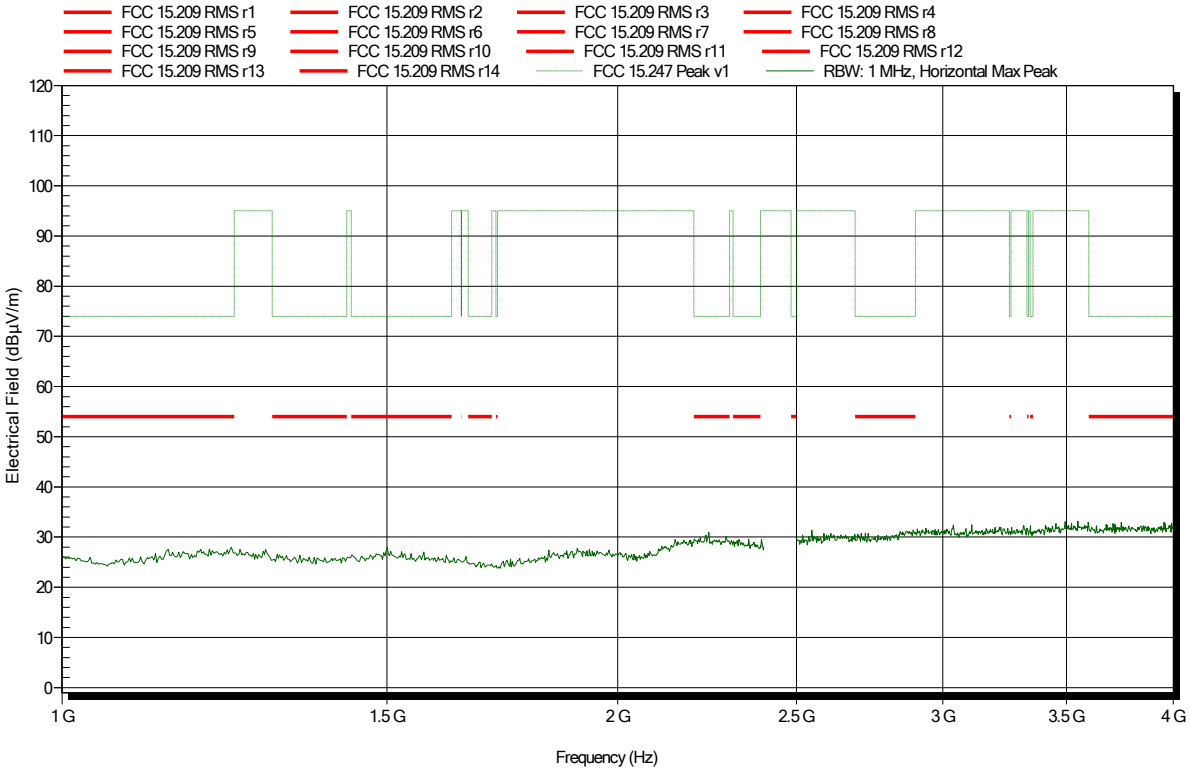

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2480MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	

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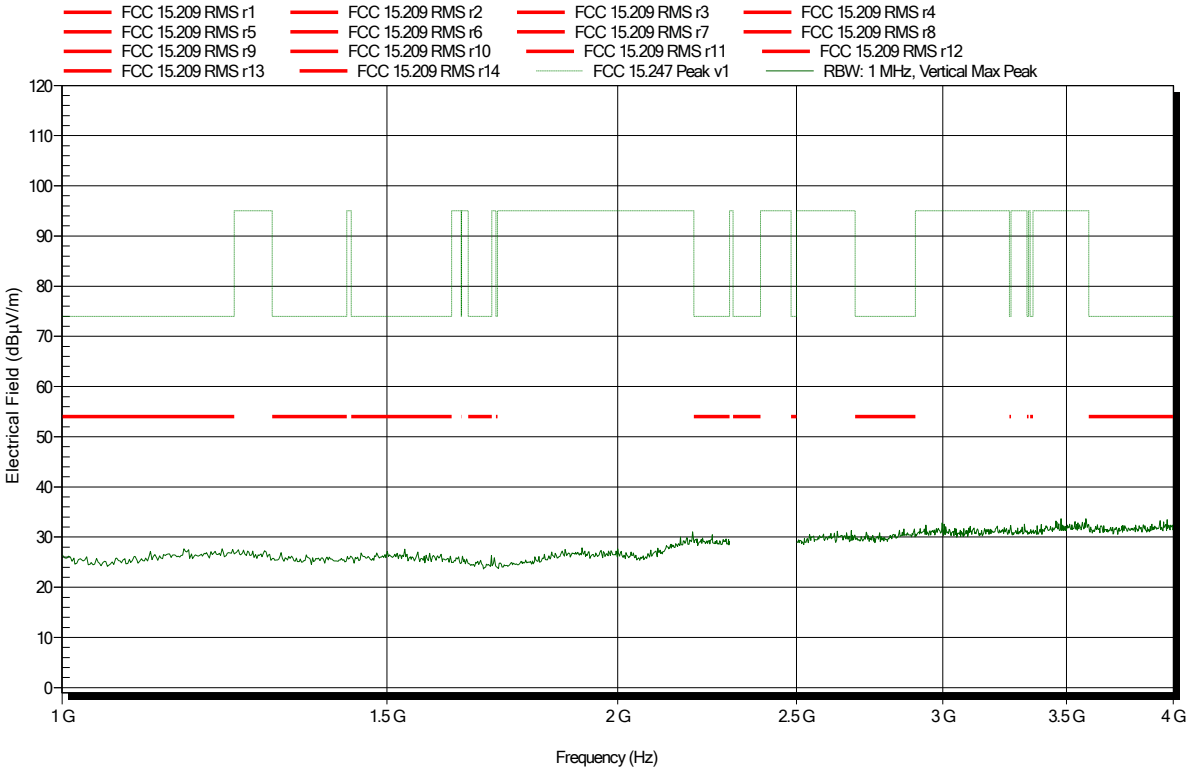

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2480MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	upper bandedge

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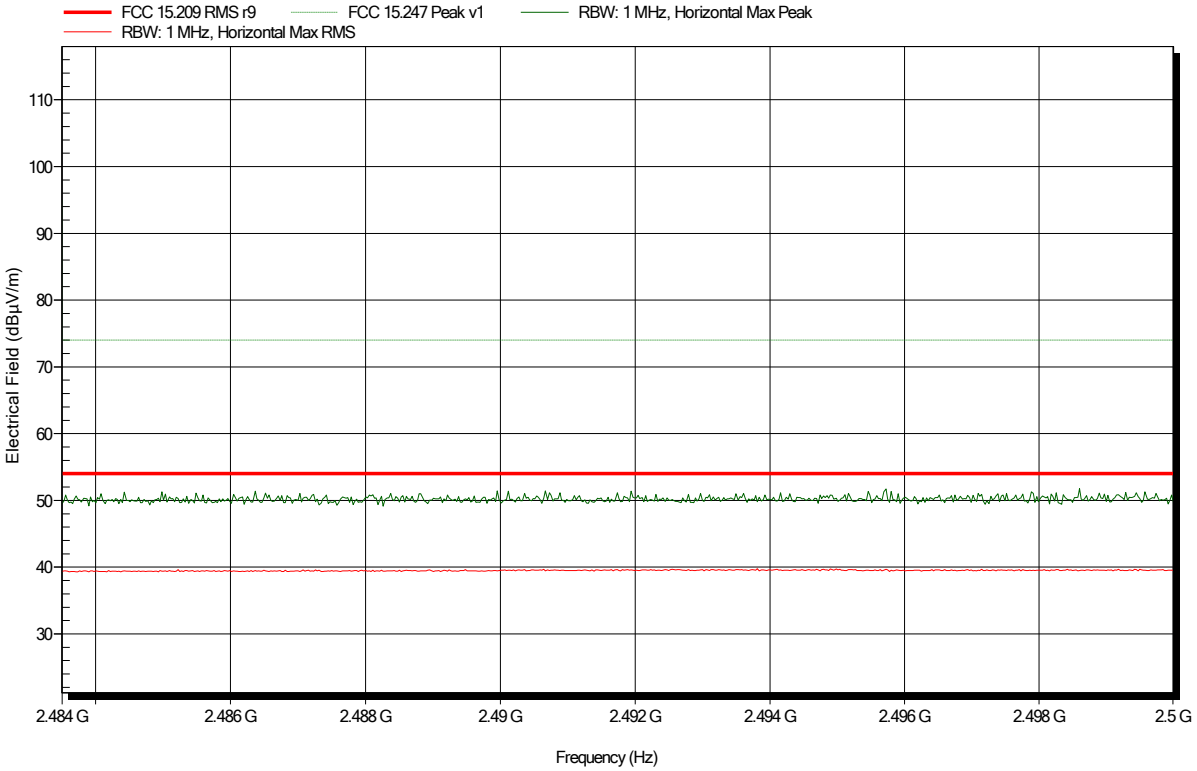

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2480MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	upper bandedge

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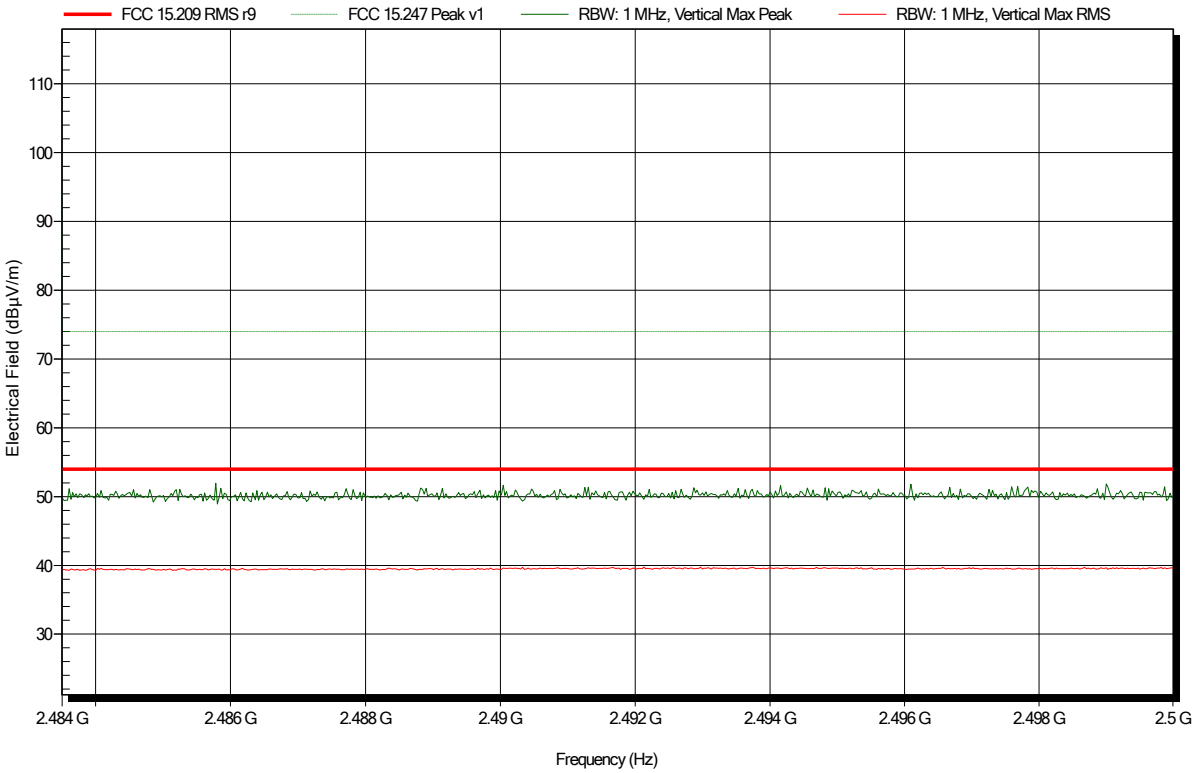

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2480MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	

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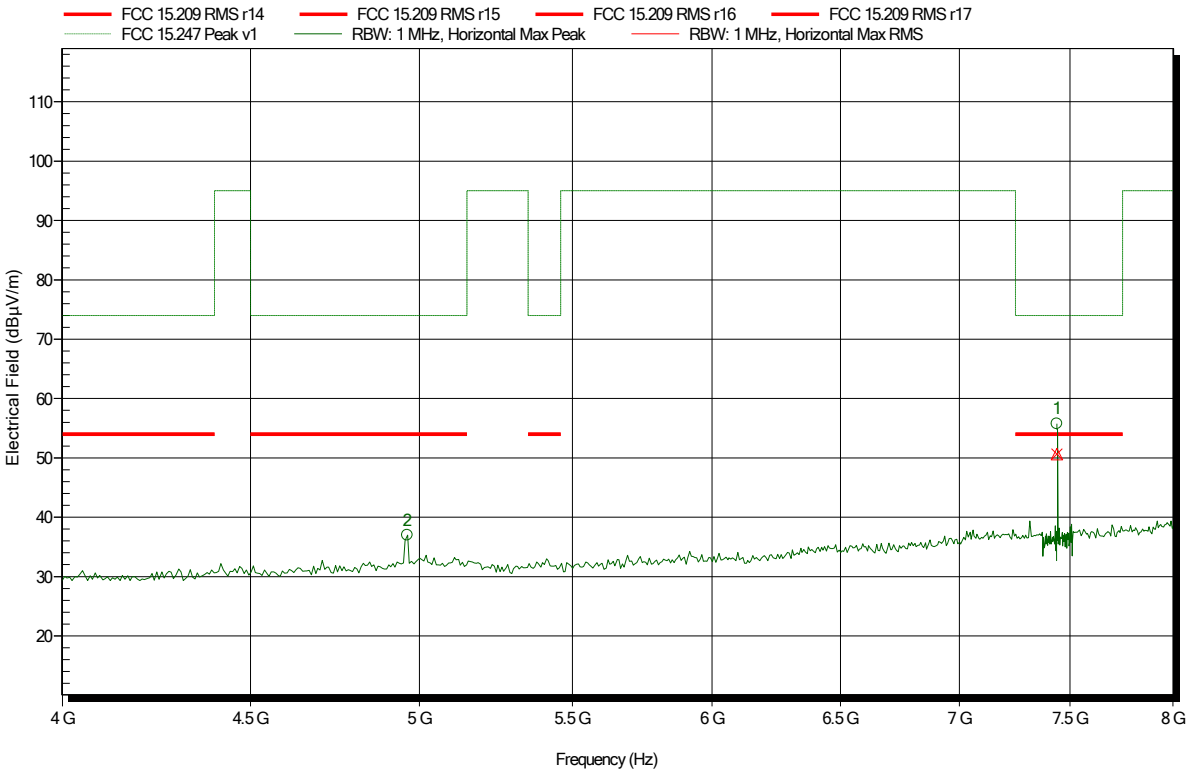

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.962 GHz	37 dBµV/m	74 dBµV/m	-37 dB	Pass
7.439 GHz	55.75 dBµV/m	74 dBµV/m	-18.25 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
7.439 GHz	50.63 dBµV/m	54 dBµV/m	-3.37 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2480MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	

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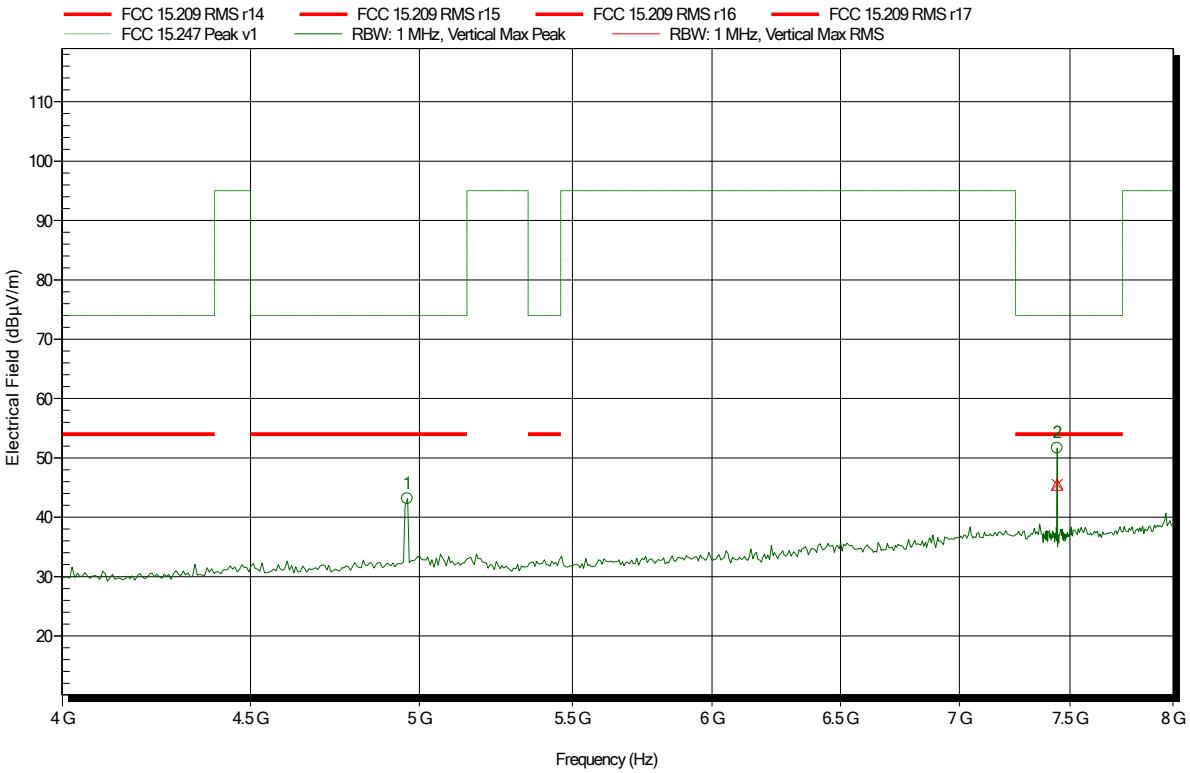

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.962 GHz	43.11 dBµV/m	74 dBµV/m	-30.89 dB	Pass
7.441 GHz	51.64 dBµV/m	74 dBµV/m	-22.36 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
7.441 GHz	45.49 dBµV/m	54 dBµV/m	-8.51 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2480MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	

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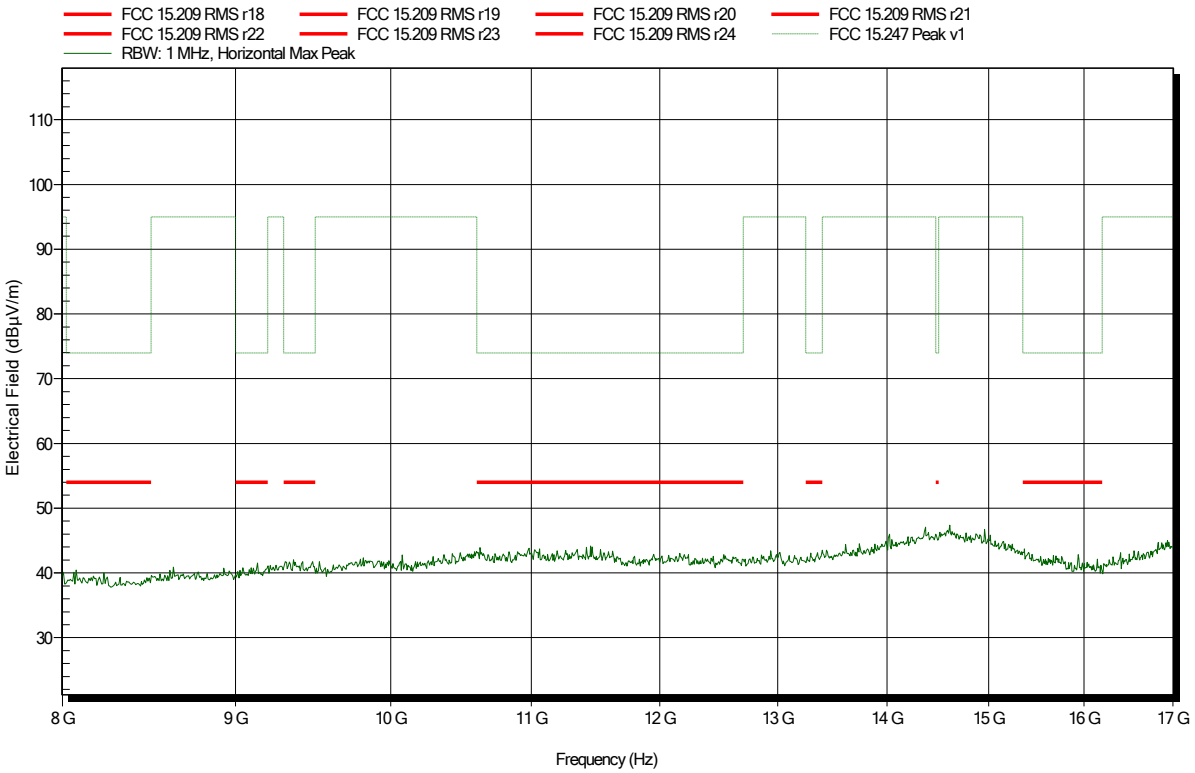

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2480MHz, GFSK, EUT ver
Test Date:	2019-10-28
Note:	

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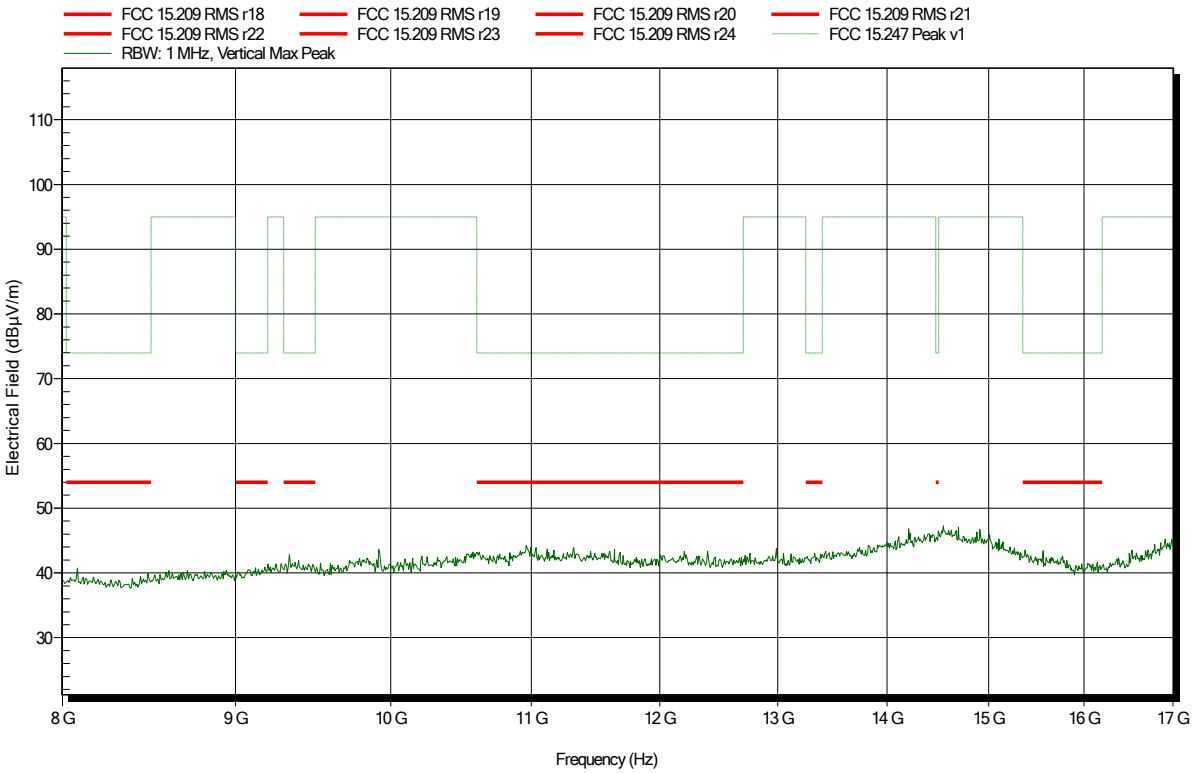

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Amplifier Research AT4560, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2480MHz, GFSK, EUT ver
Test Date:	2019-10-29
Note:	

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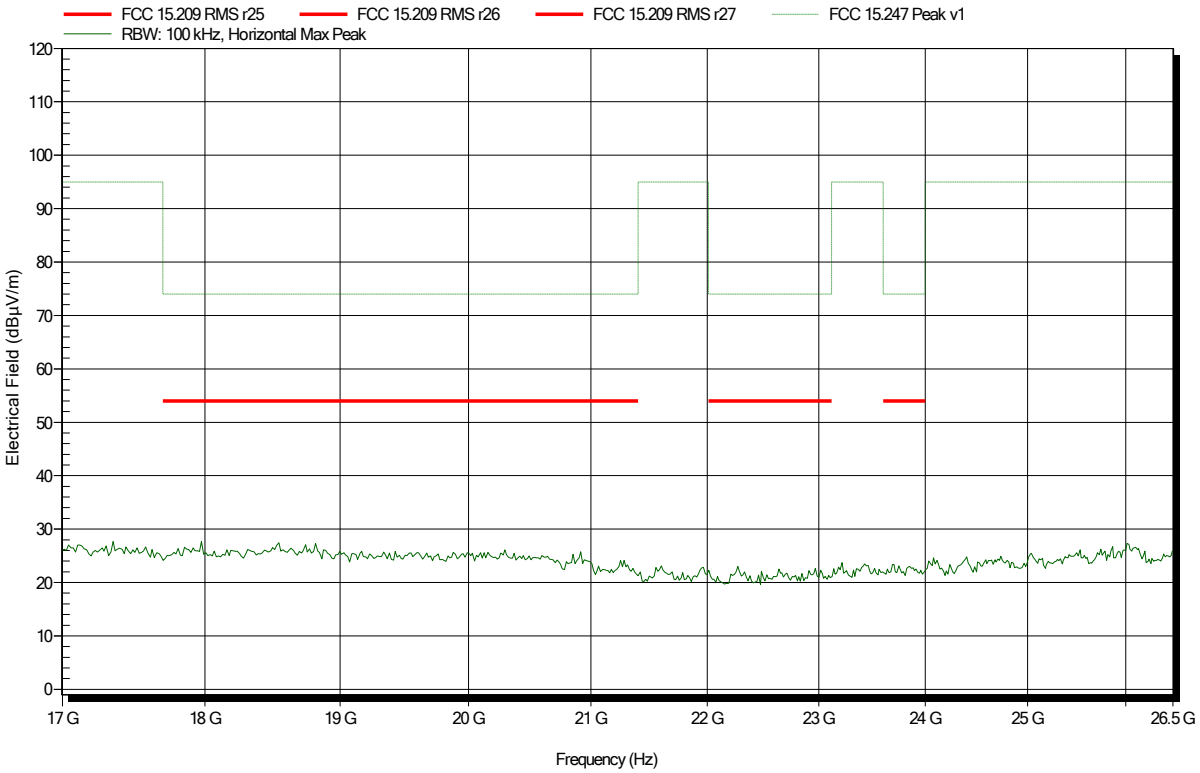

Spurious emissions according to FCC 47 e-CFR §15.247, RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 22.9°C, Vnom: 12 VDC
Antenna:	Amplifier Research AT4560, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2480MHz, GFSK, EUT ver
Test Date:	2019-10-29
Note:	

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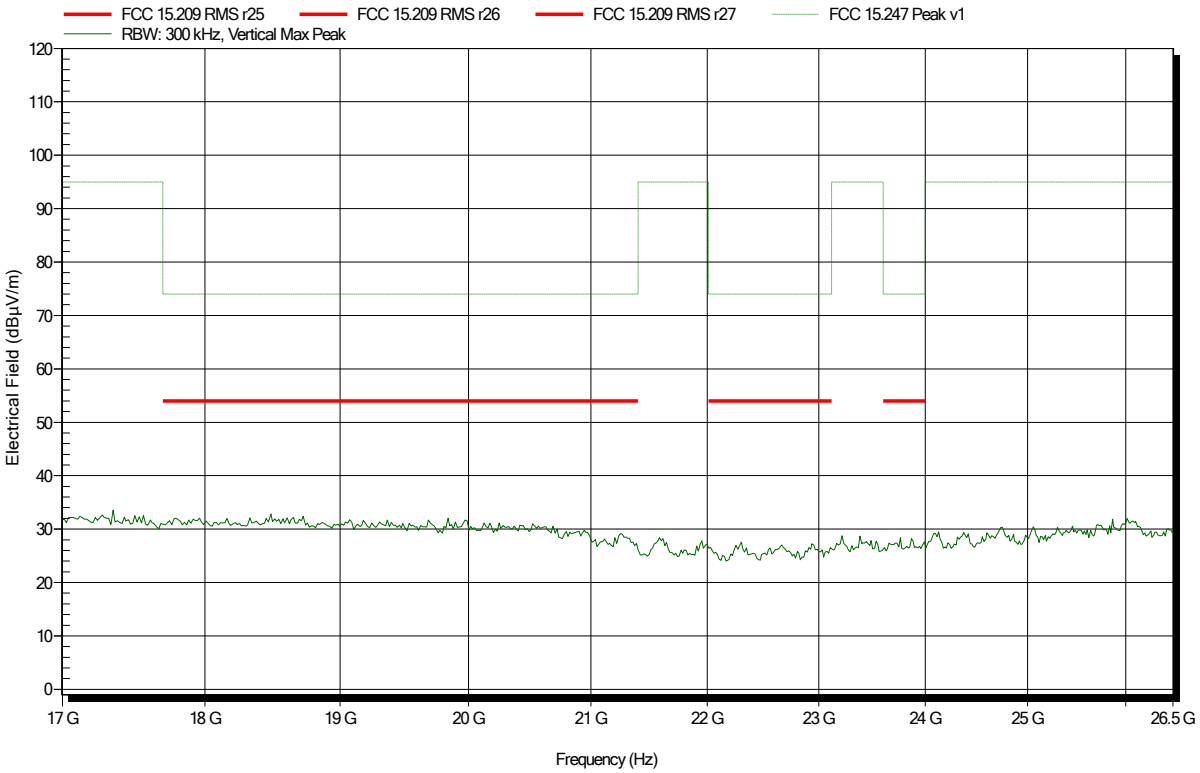

ANNEX B Receiver spurious emissions

Spurious emissions according to RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 23.9°C, Vnom:
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	RX; 2440MHz
Test Date:	2019-10-29
Note:	

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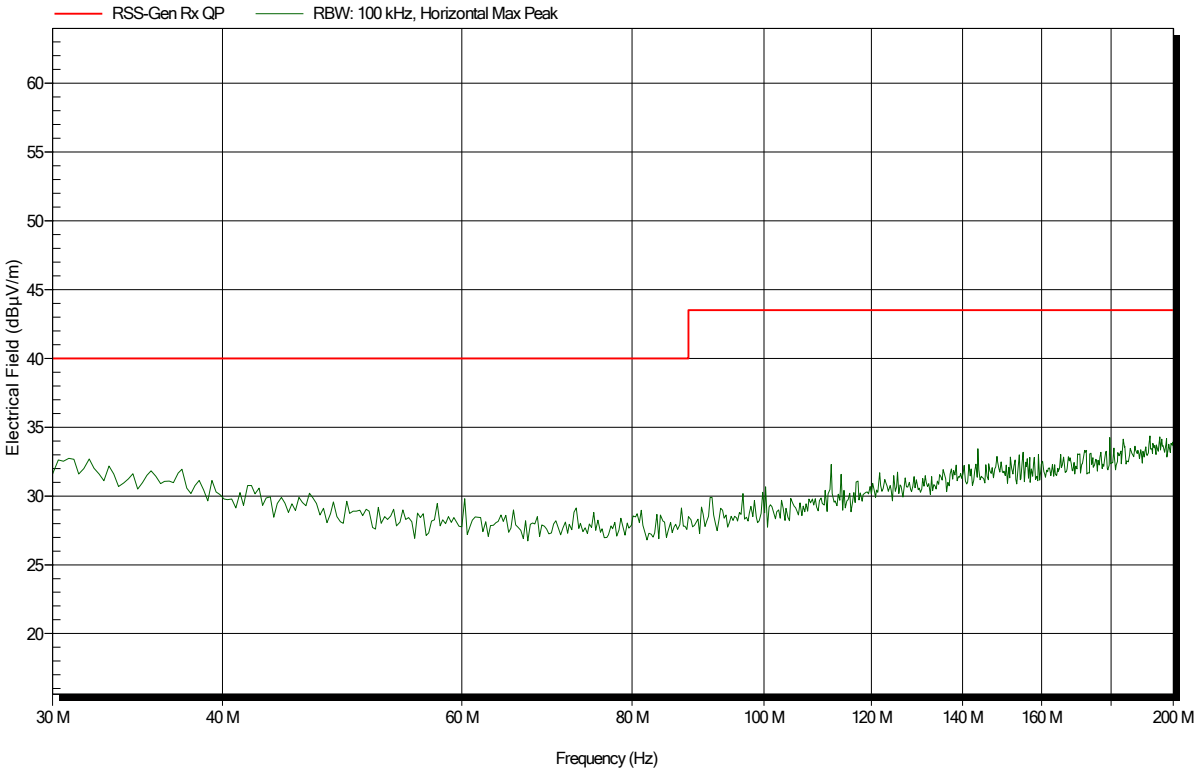

Spurious emissions according to RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 23.9°C, Vnom:
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	RX; 2440MHz
Test Date:	2019-10-29
Note:	

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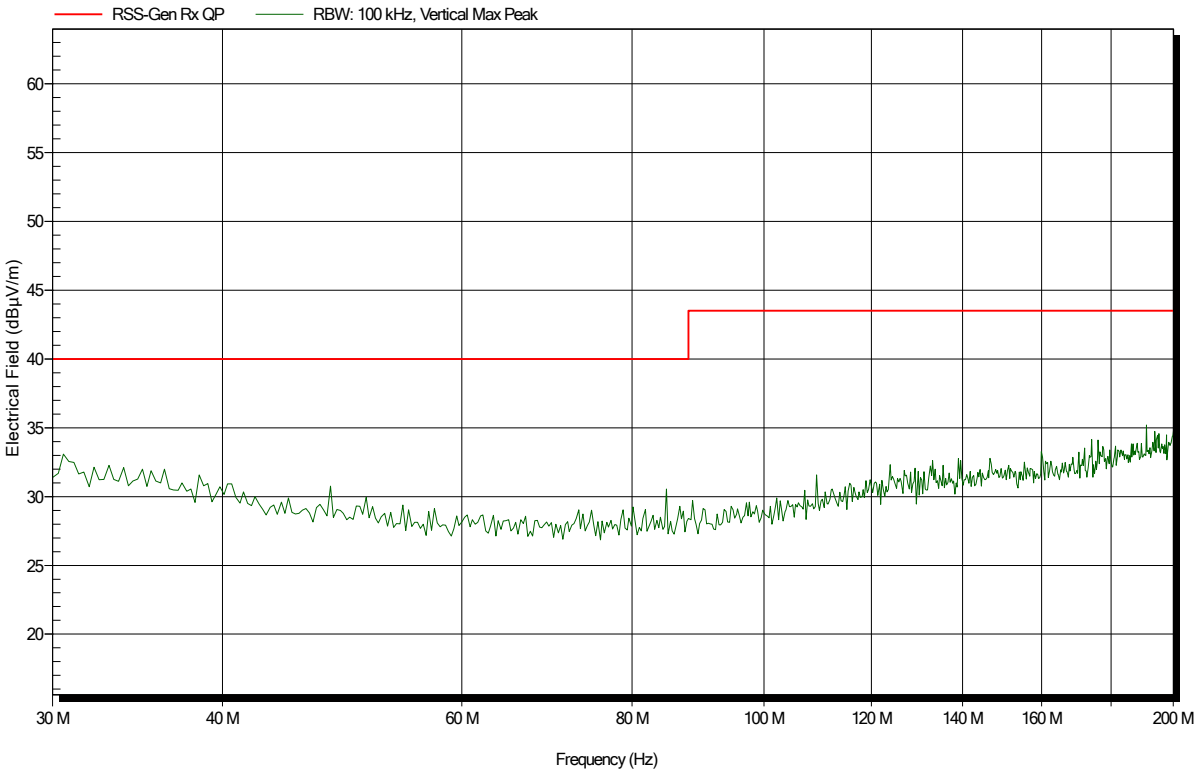

Spurious emissions according to RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 23.3°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	RX; 2440MHz
Test Date:	2019-10-29
Note:	

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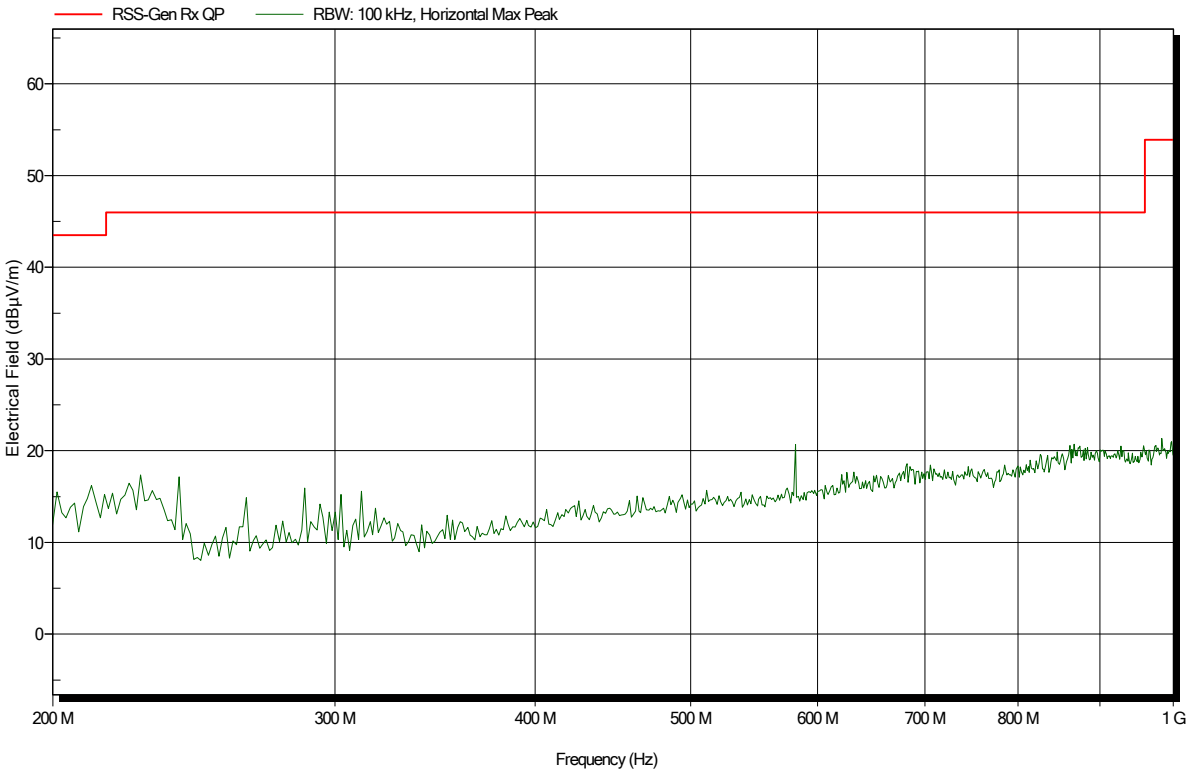

Spurious emissions according to RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 23.9°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	RX; 2440MHz
Test Date:	2019-10-29
Note:	

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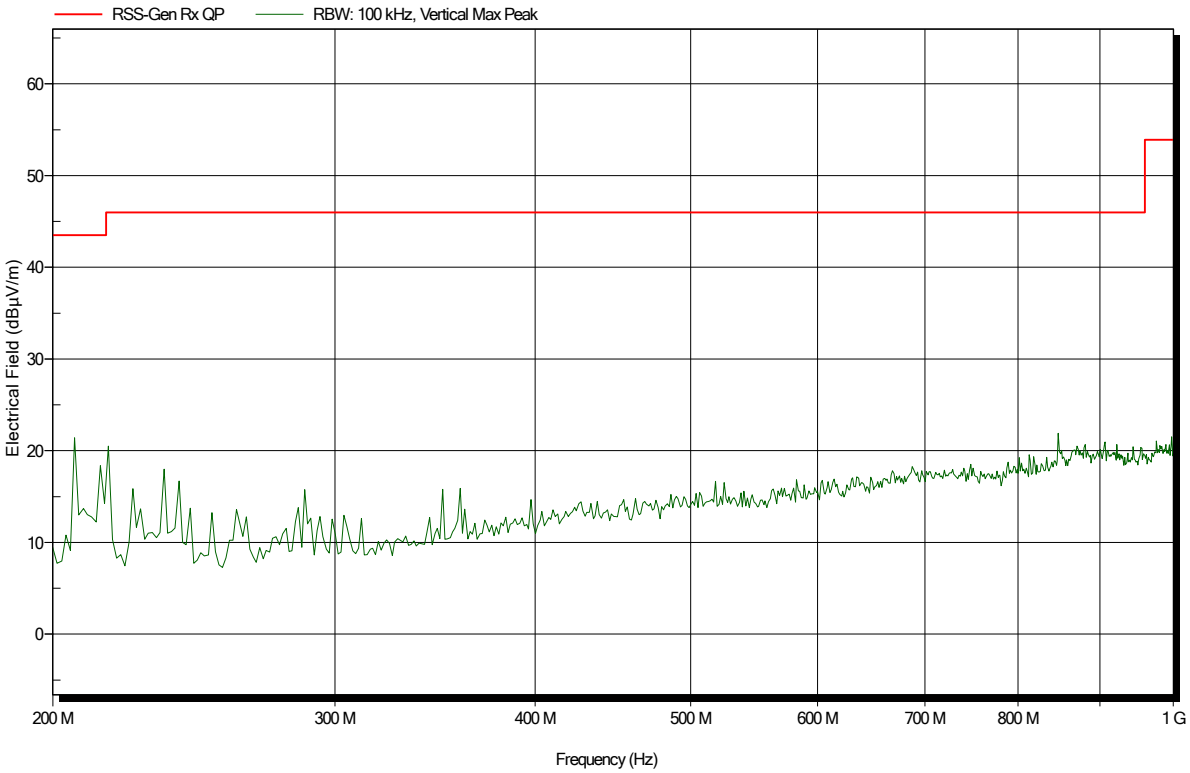

Spurious emissions according to RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 23.3°C, Vnom:
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m
Mode:	RX; 2440MHz
Test Date:	2019-10-29
Note:	

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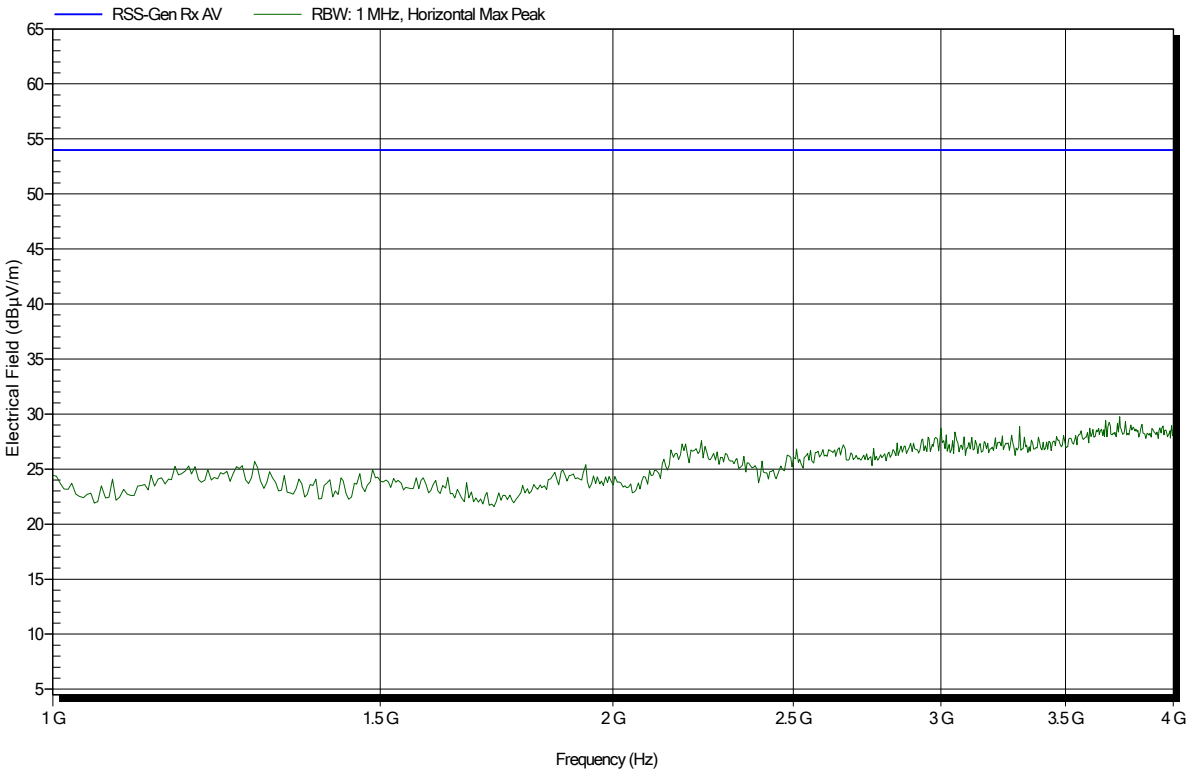
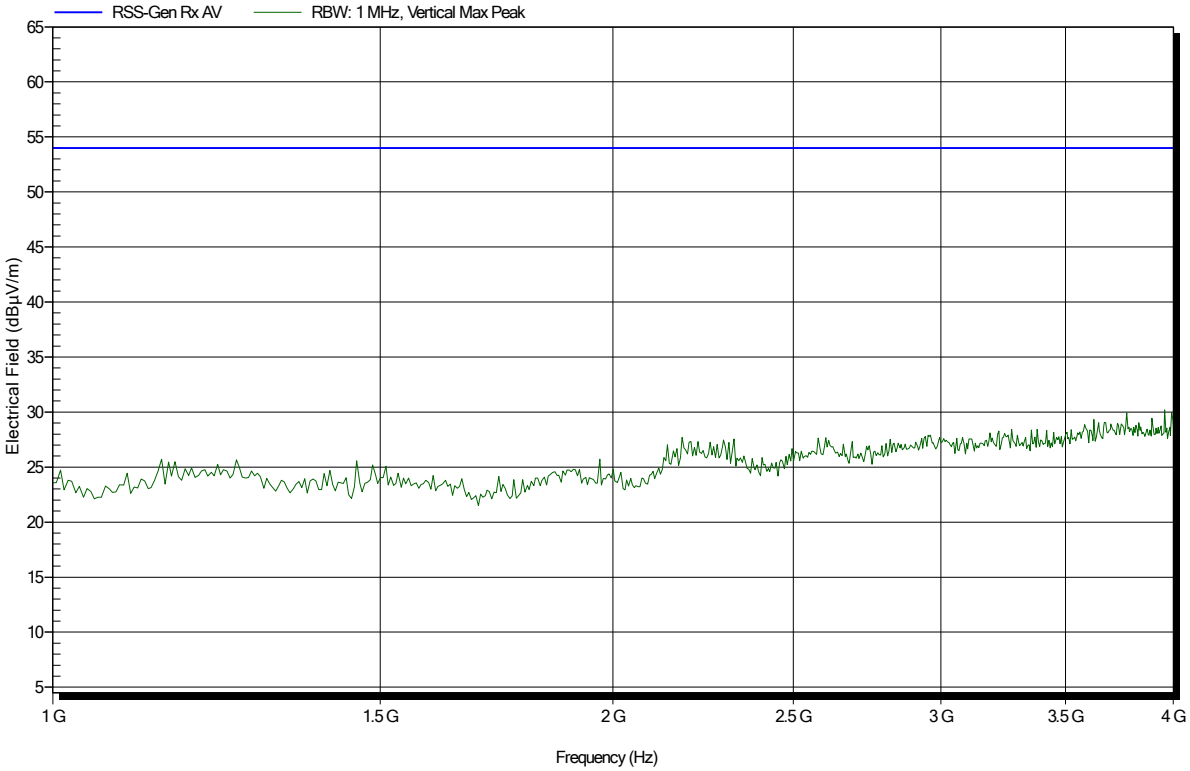


Spurious emissions according to RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 23.3°C, Vnom:
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m
Mode:	RX; 2440MHz
Test Date:	2019-10-29
Note:	

Index 1



Spurious emissions according to RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 23.3°C, Vnom:
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m
Mode:	RX; 2440MHz
Test Date:	2019-10-29
Note:	

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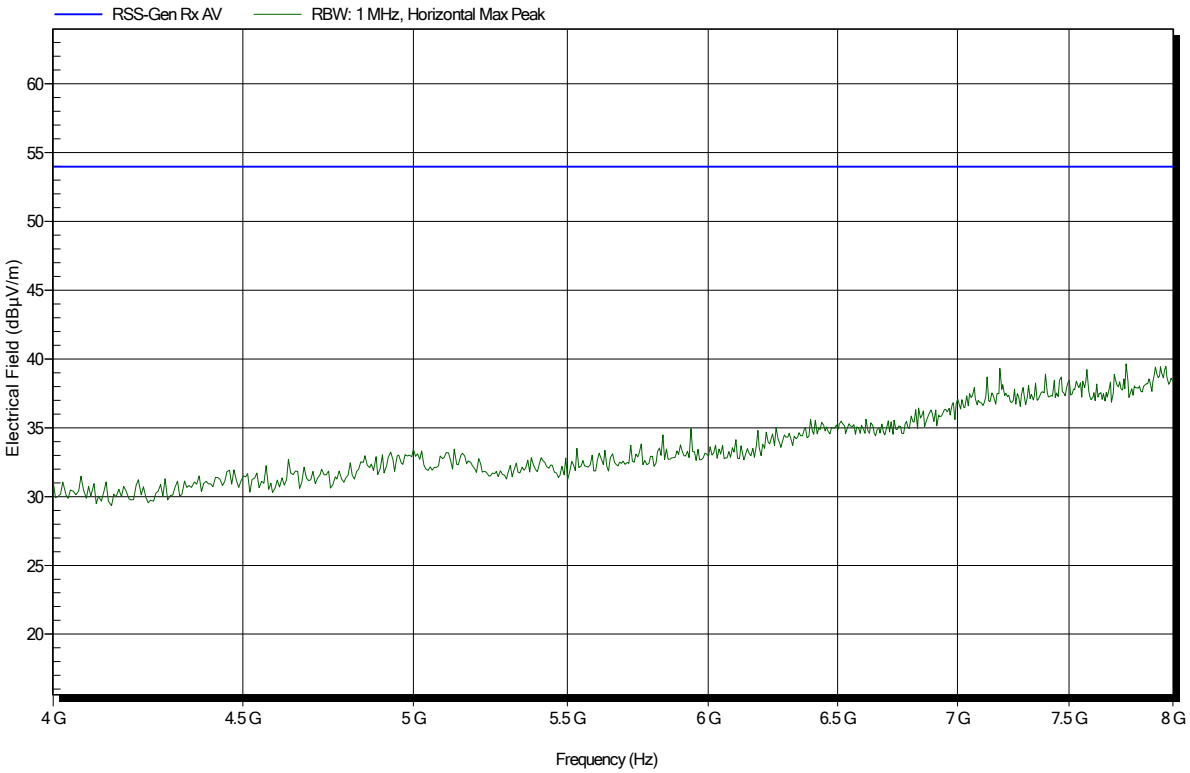
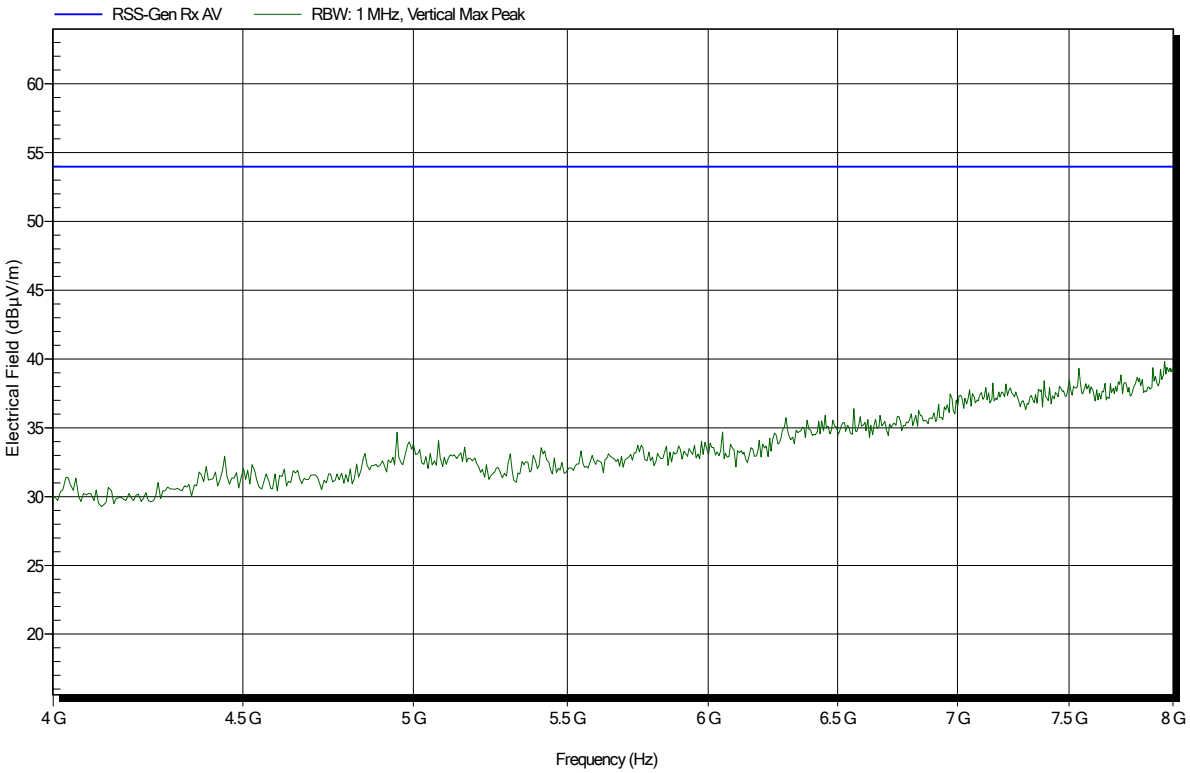


Spurious emissions according to RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 23.3°C, Vnom:
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m
Mode:	RX; 2440MHz
Test Date:	2019-10-29
Note:	

Index 2



Spurious emissions according to RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 23.3°C, Vnom:
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	RX; 2440MHz
Test Date:	2019-10-29
Note:	

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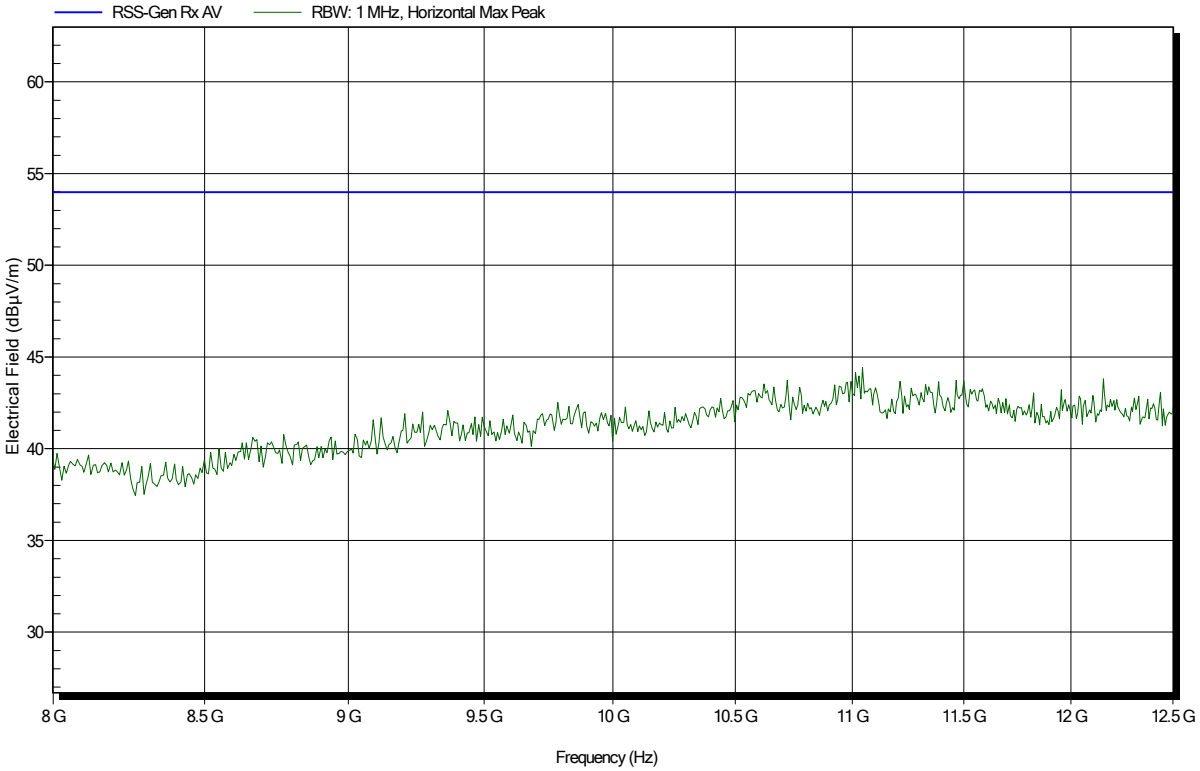
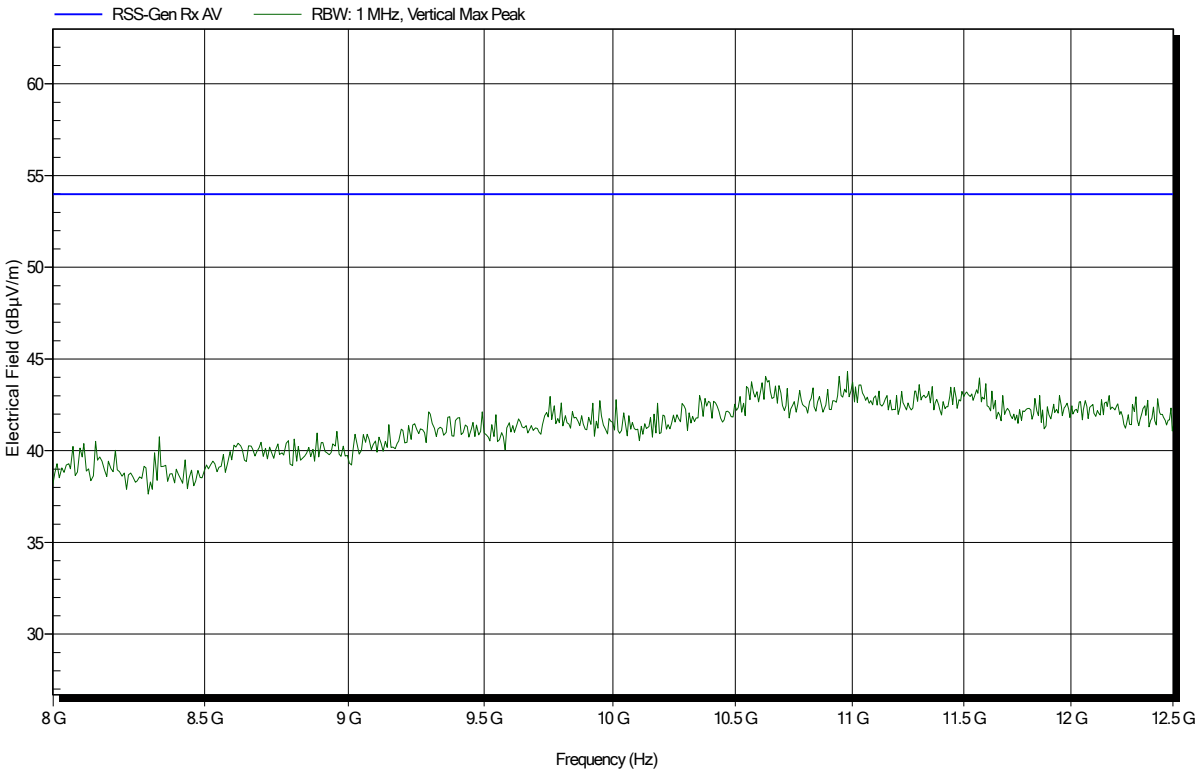


Spurious emissions according to RSS-247 Issue 2

Project number:	G0M-1909-8466
Applicant:	Motogadget GmbH
EUT Name:	vehicle data gateway - motogadget instrument
Model:	4005000
Test Site:	Eurofins Product Service GmbH
Operator:	Florian Voigt
Test Conditions:	Tnom: 23.3°C, Vnom:
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	RX; 2440MHz
Test Date:	2019-10-29
Note:	

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