

FCC TEST REPORT	
FCC 47 CFR Part 15C ISED RSS-247	
Digital transmission systems operating within the 2400 – 2483.5 MHz band	
Report Reference No. :	G0M-1605-5591-TFC247BL-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	  A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Filed Test Laboratory, Reg.-No.: 96970 ISED OATS Filing assigned code: 3470A
Applicant's name	Motogadget GmbH
Address	Köpenicker Str. 145 10997 Berlin GERMANY
Test specification:	
Standard..... :	47 CFR Part 15C RSS-247, Issue 1, 2015-05
Test scope..... :	complete Radio compliance test
Equipment under test (EUT):	
Product description	vehicle body control module
Model No.	m.unit_blue
Additional Model(s)	None
Brand Name(s)	None
Hardware version	1.4
Firmware / Software version	177 / 130
	FCC-ID: 2AIF8-4002040 IC: 21495-4002040
Test result	Passed

Possible test case verdicts:

- neither assessed nor tested : N/N
- required by standard but not appl. to test object : N/A
- required by standard but not tested : N/T
- not required by standard for the test object : N/R
- test object does meet the requirement : P (Pass)
- test object does not meet the requirement : F (Fail)

Testing:

Test Lab Temperature : 20 – 23 °C

Test Lab Humidity : 32 – 38 %

Date of receipt of test item : 2016-05-13

Date (s) of performance of tests : 2016-08-18 – 2016-09-09

Compiled by : Matthias Handrik

Tested by (+ signature) : Sebastian Suckow
(Responsible for Test)

Approved by (+ signature) : Christian Weber
(Head of Lab)

Date of issue : 2016-09-16

Total number of pages : 77



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
01	2016-09-16	Initial Release	

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1 Equipment (Test item) Description

Description	vehicle body control module	
Model	m.unit_blue	
Additional Model(s)	None	
Brand Name(s)	None	
Serial number	None	
Hardware version	1.4	
Software / Firmware version	177 / 130	
PMN	None	
HVIN	m.unit_blue	
FVIN	N/A	
HMN	None	
FCC ID	2AIF8-4002040	
IC	21495-400204021495-4002040	
Equipment type	End product	
Radio type	Transceiver	
Radio technology	Bluetooth 4.0 Low Energy	
Operating frequency range	2402 - 2480 MHz	
Assigned frequency band	2400 - 2483.5 MHz	
Main test frequencies	F _{LOW}	2402 MHz
	F _{MID}	2440 MHz
	F _{HIGH}	2480 MHz
Spreading	Frequency Hopping	
Modulations	GFSK	
Number of channels	40	
Channel spacing	2MHz	
Number of antennas	1	
Antenna	Type	integrated
	Model	LDA21K 7488930245
	Manufacturer	Murata
	Gain	+0.8 dBi (manufacturer declaration)
Manufacturer	Motogadget GmbH Köpenicker Str. 145 10997 Berlin GERMANY	
Power supply	V _{NOM}	12.0 VDC (Car battery powered)
	V _{MIN}	6.0 VDC
	V _{MAX}	18.0 VDC
AC/DC-Adaptor	none	

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

1.5 Supporting Equipment Used During Testing

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

1.6 Test Modes

Mode #	Description	
Transmit	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone transmit Spreading = Hopping stopped (single hopping channel) Modulation = GFSK Data rate = 1 Mbps Bandwidth = 2 MHz Duty cycle = 100 % Power level = 10 (Maximum would have been 15)
Receive	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone receive (scan mode) Spreading = On Modulation = GFSK

1.7 Test Equipment Used During Testing

Measurement Software			
Description	Manufacturer	Name	Version
EMC Test Software	Dare Instruments	Radimation	2015.2.4

Occupied Bandwidth					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyzer	R&S	FSW43	EF00896	2016-05	2016-12

6dB Bandwidth					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyzer	R&S	FSW43	EF00896	2016-05	2016-12

Maximum peak conducted power					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyzer	R&S	FSW43	EF00896	2016-05	2016-12

Power spectral density					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyzer	R&S	FSW43	EF00896	2016-05	2016-12

Band edge compliance					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyzer	R&S	FSW43	EF00896	2016-05	2016-12

Conducted spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyzer	R&S	FSW43	EF00896	2016-05	2016-12

Radiated spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Semi-Anechoic chamber	Frankonia GmbH	AC 5	EF00395	-	-
Broadband Antenna	Schwarzbeck	VULB 9162	EF00978	2015-10	2016-10
Horn antenna	Schwarzbeck	BBHA 9120D	EF00018	2013-09	2016-09
40GHz High Gain Antenna	Amplifier Research	AT4560	EF00302	2016-01	2017-01
EMI Test Receiver	R&S	ESU26	EF00887	2016-01	2017-01

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

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

A.F.:

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

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

Net:

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

Limit:

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

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

Margin:

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

Example only:

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

2 Result Summary

FCC 47 CFR Part 15C, ISSED RSS-247				
Product Specific Standard Section	Requirement – Test	Reference Method	Result	Remarks
RSS-Gen 6.6	Occupied Bandwidth	ANSI C63.10	N/R	Informational only
FCC § 15.247(a)(2) ISED RSS-247 § 5.2	6dB Bandwidth	ANSI C63.10	PASS	
FCC § 15.247(b)(3) ISED RSS-247 § 5.4	Maximum peak conducted power	ANSI C63.10	PASS	
FCC § 15.247(e) ISED RSS-247 § 5.2	Power spectral density	ANSI C63.10	PASS	
47 CFR 15.207 ISED RSS-247 § 3.1	AC power line conducted emissions	ANSI C63.4	N/R	Vehicular use
FCC § 15.247(d) ISED RSS-247 § 5.5	Band edge compliance	ANSI C63.10	PASS	
FCC § 15.247(d) ISED RSS-247 § 5.5	Conducted spurious emissions	ANSI C63.10	PASS	
FCC § 15.247(d) FCC § 15.209 ISED RSS-247 § 5.5	Transmitter radiated spurious emissions	ANSI C63.10	PASS	
ISED RSS-247 § 3.1	Receiver radiated spurious emissions	ANSI C63.10	PASS	
Remarks:				

3 Test Conditions and Results

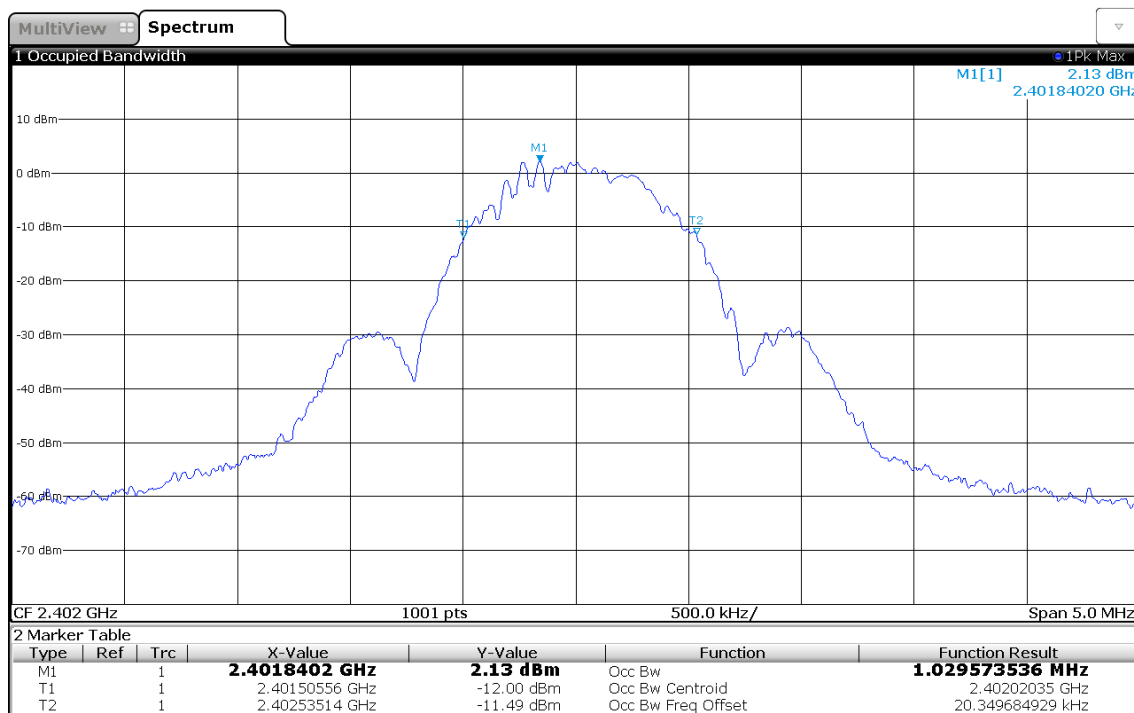
3.1 Test Conditions and Results – Occupied Bandwidth

Occupied Bandwidth acc. to ISED RSS-Gen			Verdict: PASS
Test according to measurement reference	Reference Method		
	ANSI C63.10		
Test frequency range	Tested frequencies		
	F _{LOW} / F _{MID} / F _{HIGH}		
Limits			
None (Informational only)			
Test setup			
Spectrum Analyzer EUT			
Test procedure			
1. EUT set to test mode (Communication tester is used if needed) 2. Span set to at least twice the emission spectrum 3. Resolution bandwidth set to 1 % of span 4. Occupied Bandwidth (99 %) measurement with spectrum analyzer built in measurement function			
Test results			
Channel	Frequency [MHz]	Mode	Occupied Bandwidth [MHz]
F _{LOW}	2402	Transmit	1.030
F _{MID}	2440	Transmit	1.030
F _{HIGH}	2480	Transmit	1.030
Comments:			

Occupied Bandwidth – F_{Low}

Occupied Bandwidth

Project Number: G0M-1605-5591
 Applicant: Motogadget GmbH
 Model Description: vehicle body control module
 Model: m.unit_blue
 Test Sample ID: conducted
 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: M. Handrik
 Test Site: Eurofins Product Service GmbH
 Test Date: 2016-09-09
 Occupied Bandwidth [MHz]: 1.030

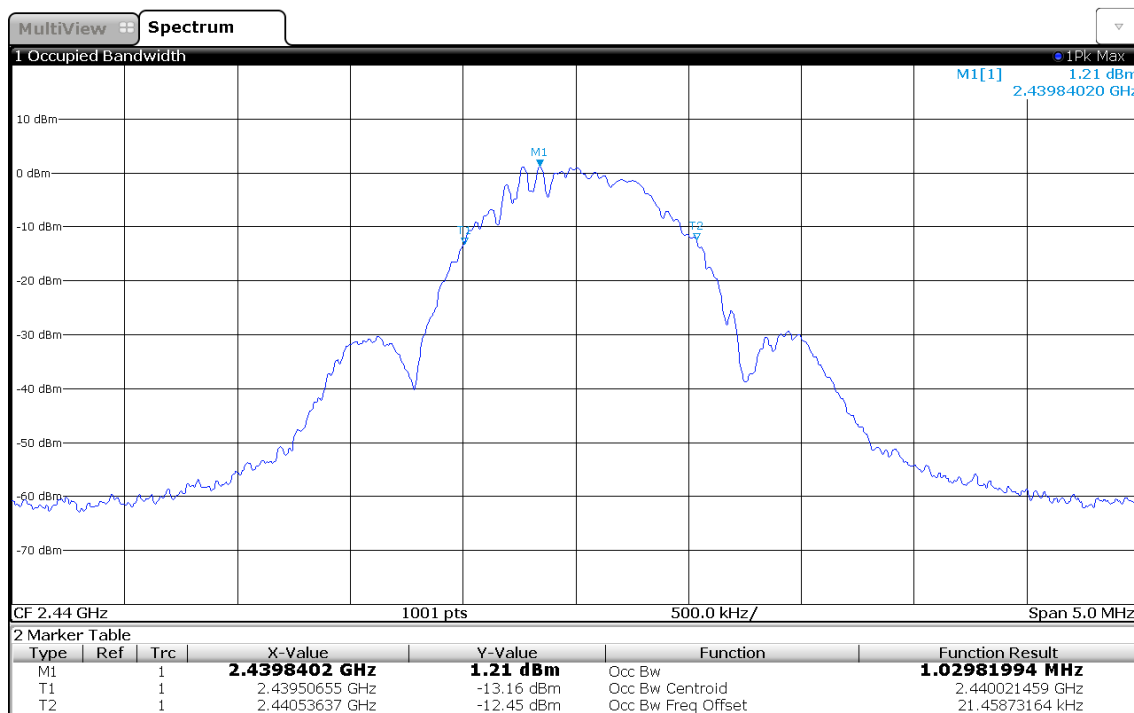


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Occupied Bandwidth – F_{MID}

Occupied Bandwidth

Project Number: G0M-1605-5591
 Applicant: Motogadget GmbH
 Model Description: vehicle body control module
 Model: m.unit_blue
 Test Sample ID: conducted
 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: M. Handrik
 Test Site: Eurofins Product Service GmbH
 Test Date: 2016-09-09
 Occupied Bandwidth [MHz]: 1.030

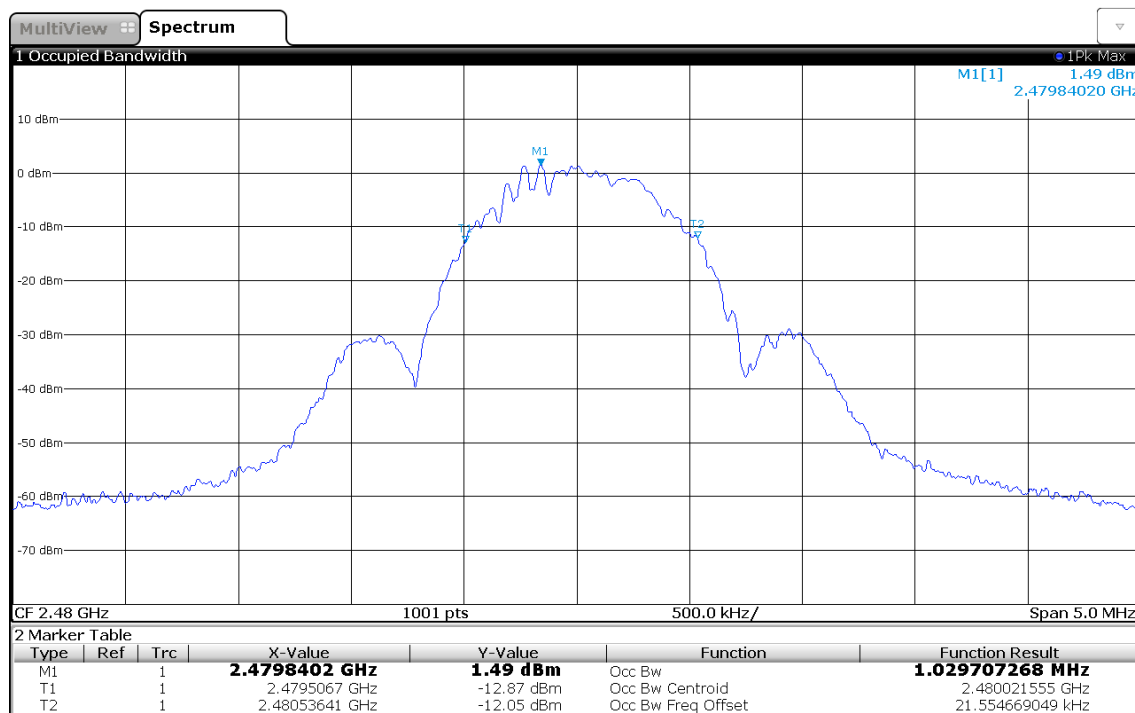


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Occupied Bandwidth – F_{HIGH}

Occupied Bandwidth

Project Number: G0M-1605-5591
Applicant: Motogadget GmbH
Model Description: vehicle body control module
Model: m.unit_blue
Test Sample ID: conducted
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: M. Handrik
Test Site: Eurofins Product Service GmbH
Test Date: 2016-09-09
Occupied Bandwidth [MHz]: 1.030



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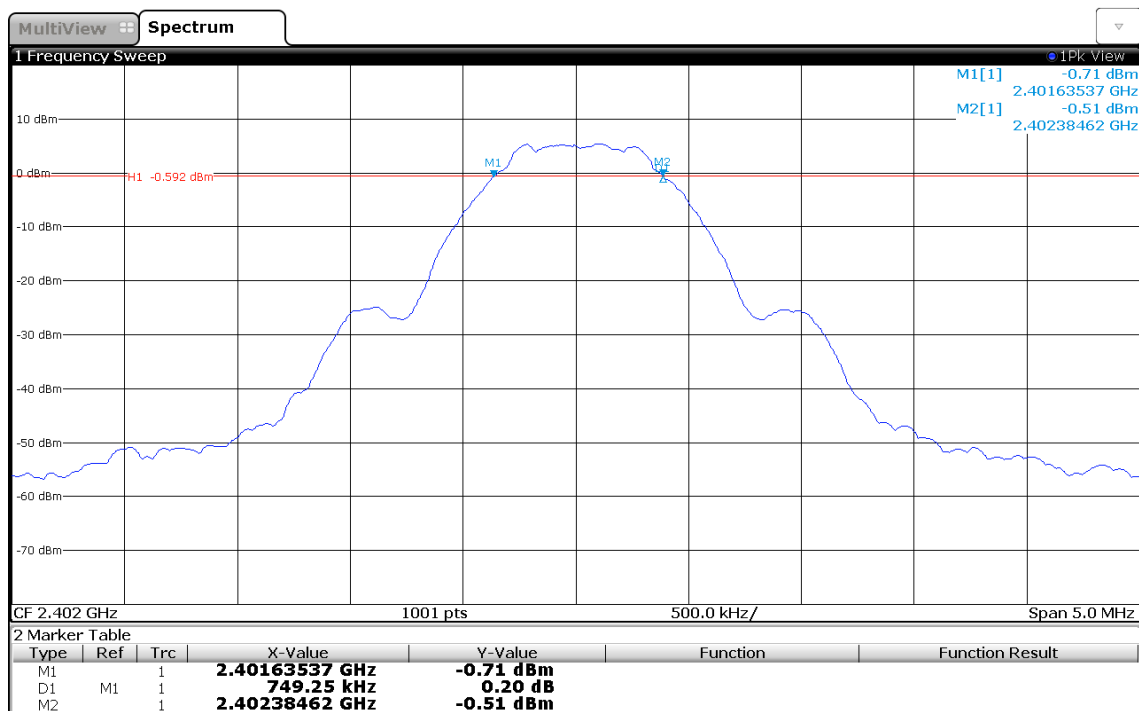
3.2 Test Conditions and Results – 6 dB Bandwidth

6dB Bandwidth acc. to FCC 15.247 / ISED RSS-247				Verdict: PASS	
EUT requirement rule parts and clause		Reference			
		FCC 15.247(a)(2) / ISED RSS-247 5.2			
Test according to measurement reference		Reference Method			
		ANSI C63.10			
Test frequency range		Tested frequencies			
		F _{LOW} / F _{MID} / F _{HIGH}			
Limits					
Limit					
≥ 500kHz					
Test setup					
Spectrum Analyzer EUT					
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					
Test results					
Channel	Frequency [MHz]	Mode	6 dB Bandwidth [kHz]	Limit [kHz]	Result
F _{LOW}	2402	Transmit	749	500	PASS
F _{MID}	2440	Transmit	744	500	PASS
F _{HIGH}	2480	Transmit	739	500	PASS
Comments:					

6 dB Bandwidth – F_{Low}

DTS (6 dB) Bandwidth

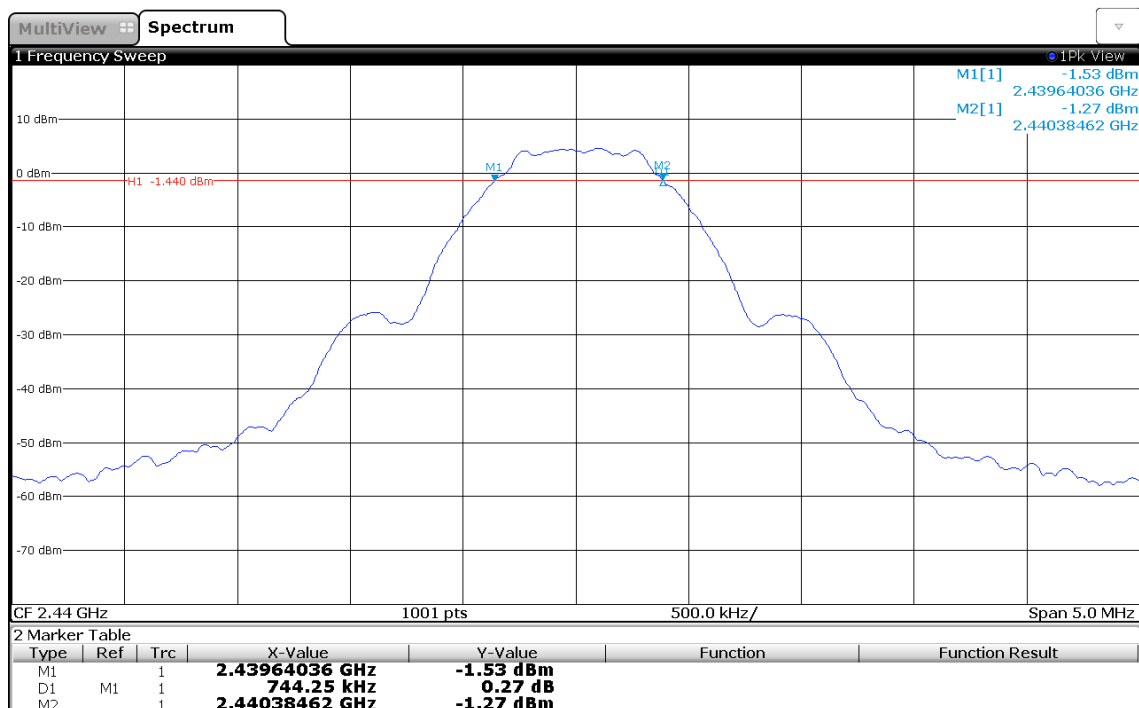
Project Number: G0M-1605-5591
 Applicant: Motogadget GmbH
 Model Description: vehicle body control module
 Model: m.unit_blue
 Test Sample ID: conducted
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: T_{nom}/V_{nom}
 Operator: M. Handrik
 Test Site: Eurofins Product Service GmbH
 Test Date: 2016-09-09
 Lower Frequency [MHz]: 2401.635
 Upper Frequency [MHz]: 2402.385
 6 dB Bandwidth [kHz]: 749



6 dB Bandwidth – F_{MID}

DTS (6 dB) Bandwidth

Project Number: G0M-1605-5591
 Applicant: Motogadget GmbH
 Model Description: vehicle body control module
 Model: m.unit_blue
 Test Sample ID: conducted
 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: T_{nom}/V_{nom}
 Operator: M. Handrik
 Test Site: Eurofins Product Service GmbH
 Test Date: 2016-09-09
 Lower Frequency [MHz]: 2439.640
 Upper Frequency [MHz]: 2440.385
 6 dB Bandwidth [kHz]: 744

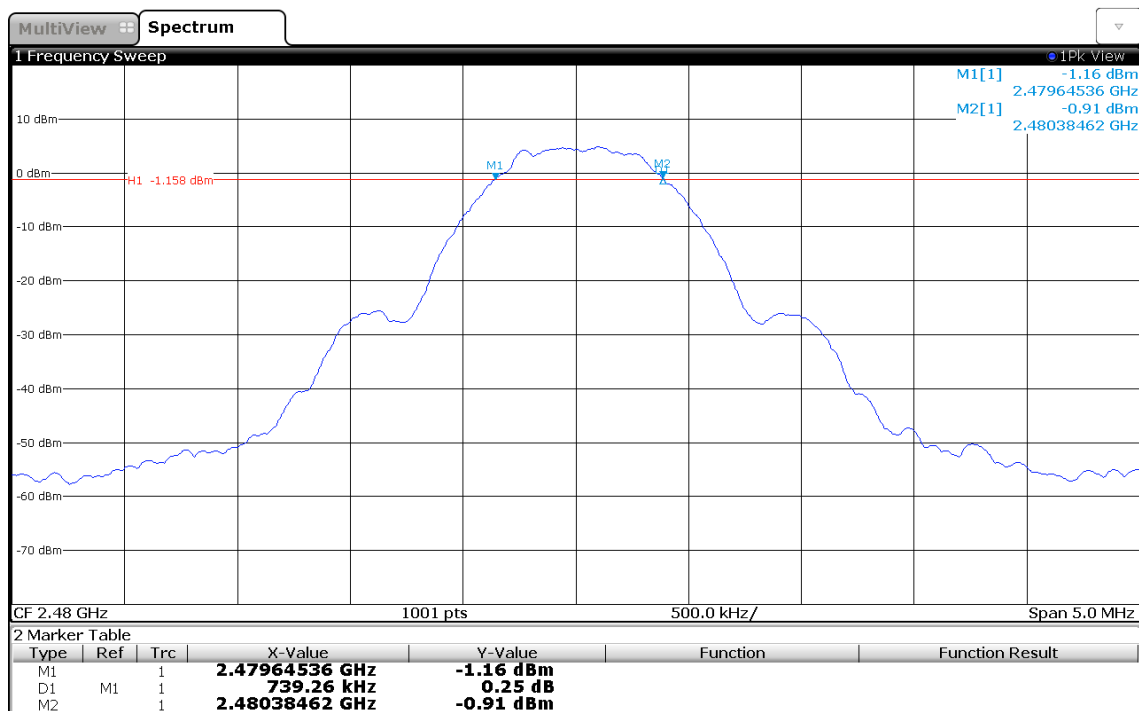


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6 dB Bandwidth – F_{HIGH}

DTS (6 dB) Bandwidth

Project Number: G0M-1605-5591
 Applicant: Motogadget GmbH
 Model Description: vehicle body control module
 Model: m.unit_blue
 Test Sample ID: conducted
 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: M. Handrik
 Test Site: Eurofins Product Service GmbH
 Test Date: 2016-09-09
 Lower Frequency [MHz]: 2479.645
 Upper Frequency [MHz]: 2480.385
 6 dB Bandwidth [kHz]: 739



3.3 Test Conditions and Results – Maximum peak conducted power

Maximum peak conducted power acc. to FCC 15.247 / ISSED RSS-247		Verdict: PASS
EUT requirement rule parts and clause	Reference	
	FCC 15.247(b)(3) / ISSED RSS-247 5.4	
Test according to measurement reference	Reference Method	
	ANSI C63.10	
Test frequency range	Tested frequencies	
	F _{LOW} / F _{MID} / F _{HIGH}	
Measurement mode	Peak	
Maximum antenna gain	0.8 dBi ⇒ Limit correction = 0 dB	
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.		
Test setup		
Spectrum Analyzer EUT		
Test procedure		
1. EUT set to test mode (Communication tester is used if needed) 2. Center frequency set to test channel center frequency 3. Span set to twice the 20 dB bandwidth and detector to peak and max hold 4. Resolution bandwidth is set to 3 MHz 5. Peak conducted power is determined from peak of spectrum envelope		

Test results							
Channel	Frequency [MHz]	Voltage	Mode	Peak power [dbm]	Peak power [W]	Limit [dBm]	Margin [dB]
F _{LOW}	2402	V _{nom} = 12.0V	Transmit	7.357	0.005	30	-22.64
F _{MID}	2440	V _{nom} = 12.0V	Transmit	6.567	0.005	30	-23.43
F _{HIGH}	2480	V _{nom} = 12.0V	Transmit	6.660	0.005	30	-23.34
Comment:							

3.4 Test Conditions and Results – Power spectral density

Power spectral density acc. to FCC 15.247 / ISED RSS-247					Verdict: PASS	
EUT requirement rule parts and clause	Reference					
	FCC 15.247(e) / ISED RSS-247 5.2					
Test according to measurement reference	Reference Method					
	ANSI C63.10					
Test frequency range	Tested frequencies					
	F _{LOW} / F _{MID} / F _{HIGH}					
Measurement mode	Peak					
Limits						
8 dBm / 3 kHz						
Test setup						
Spectrum Analyzer EUT						
Test procedure						
1. EUT set to test mode (Communication tester is used if needed) 2. Center frequency set to test channel center frequency 3. Span is set large enough to capture maximum emissions in passband, RBW is set to 3kHz 4. Peak power density is determined from peak emission of envelope						
Test results						
Channel	Frequency [MHz]	Test mode	Peak frequency [MHz]	Peak power density [dBm]	Limit [dBm/3kHz]	Margin [dB]
F _{LOW}	2402	Transmit	2402.264	5.540	8.0	-02.460
F _{MID}	2440	Transmit	2440.267	4.875	8.0	-03.125
F _{HIGH}	2480	Transmit	2480.270	4.929	8.0	-03.071
Comments:						

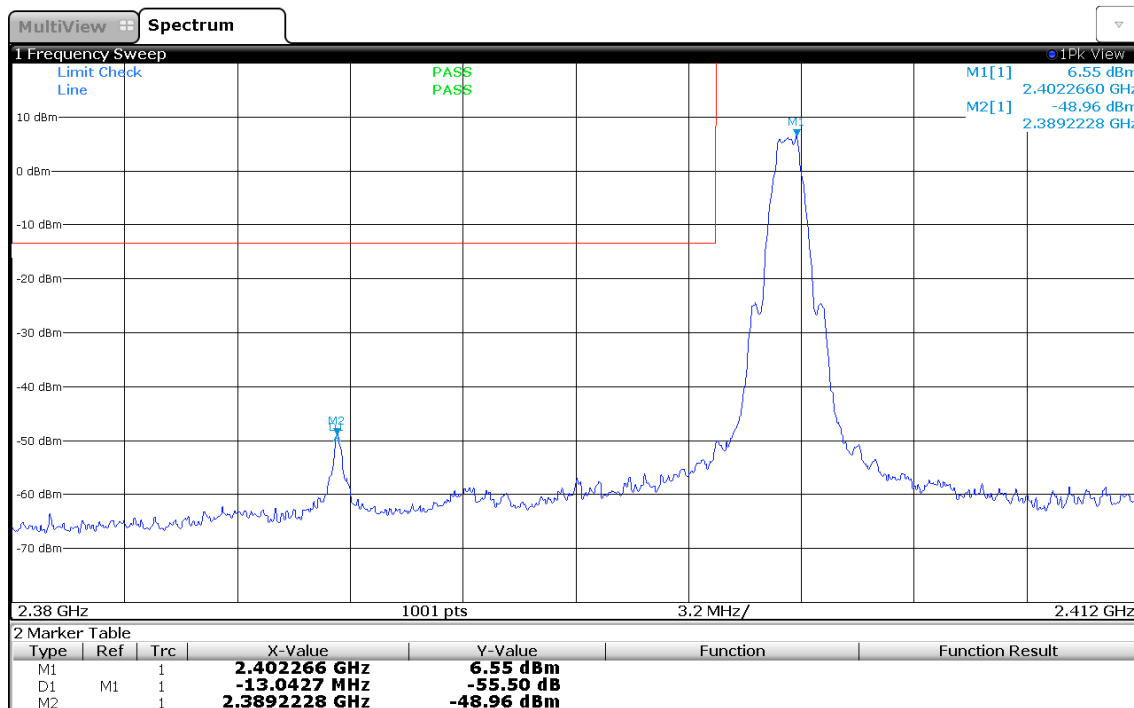
3.5 Test Conditions and Results – Band edge compliance

Band-edge compliance acc. to FCC 15.247 / ISED RSS-247					Verdict: PASS
EUT requirement rule parts and clause		Reference			
		FCC 15.247(d) / ISED RSS-247 5.5			
Test according to measurement reference		Reference Method			
		ANSI C63.10			
Test frequency range		Tested frequencies			
		F _{LOW} / F _{HIGH}			
Measurement mode		Peak			
Limits					
Limit			Condition		
≤ -20 dB / 100 kHz			Power measurement detector = Peak		
≤ -30 dB / 100 kHz			Power measurement detector = RMS		
Test setup					
Spectrum Analyzer EUT					
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					
Test results					
Channel	Frequency [MHz]	Mode	Level [dBc]	Limit [dBc]	Margin [dB]
F _{LOW}	2402	Transmit	-55.5	-20	-35.50
F _{HIGH}	2480	Transmit	-62.57	-20	-42.57
Comments:					

Band-edge compliance - F_{Low}

Band-edge Compliance

Project Number: G0M-1605-5591
 Applicant: Motogadget GmbH
 Model Description: vehicle body control module
 Model: m.unit_blue
 Test Sample ID: conducted
 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: M. Handrik
 Test Site: Eurofins Product Service GmbH
 Test Date: 2016-09-09
 Band-edge: Lower
 In-band Frequency [MHz]: 2402.266
 Max. in-band Level [dBm/100 kHz]: 6.546
 Out-of-band Frequency [MHz]: 2389.223
 Max. out-of-band Level [dBm/100 kHz]: -48.957
 Attenuation [dB]: -55.5

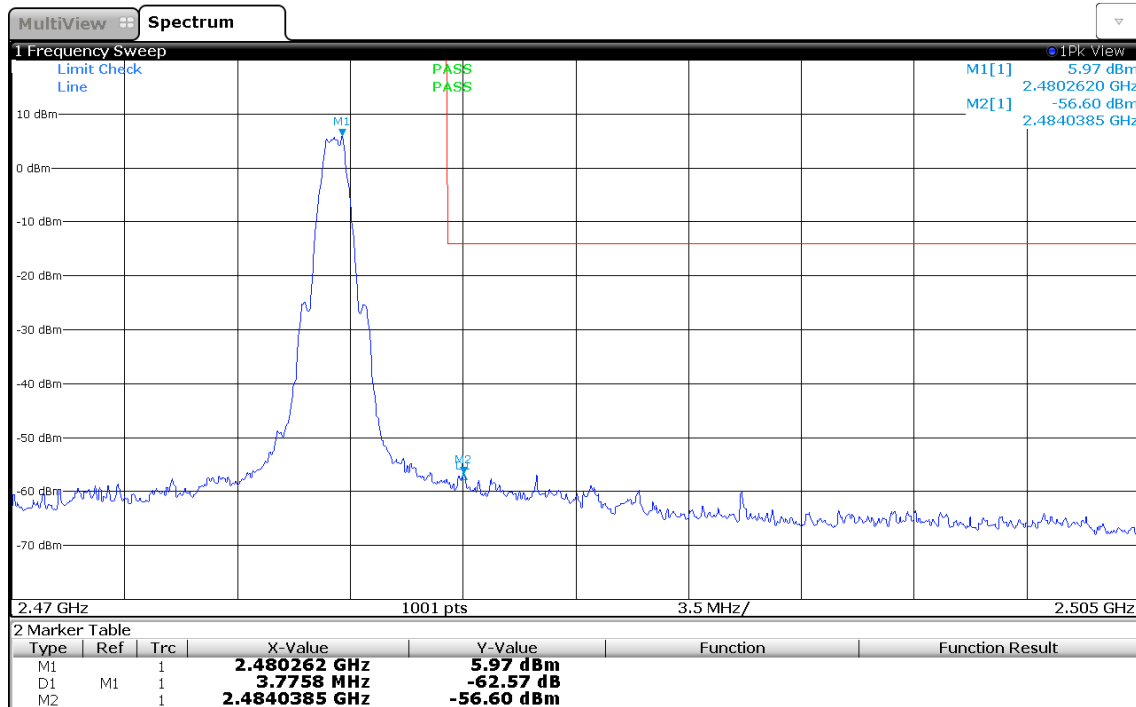


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Band-edge compliance – F_{HIGH}

Band-edge Compliance

Project Number: G0M-1605-5591
 Applicant: Motogadget GmbH
 Model Description: vehicle body control module
 Model: m.unit_blue
 Test Sample ID: conducted
 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: M. Handrik
 Test Site: Eurofins Product Service GmbH
 Test Date: 2016-09-09
 Band-edge: Upper
 In-band Frequency [MHz]: 2480.262
 Max. in-band Level [dBm/100 kHz]: 5.967
 Out-of-band Frequency [MHz]: 2484.038
 Max. out-of-band Level [dBm/100 kHz]: -56.599
 Attenuation [dB]: -62.57



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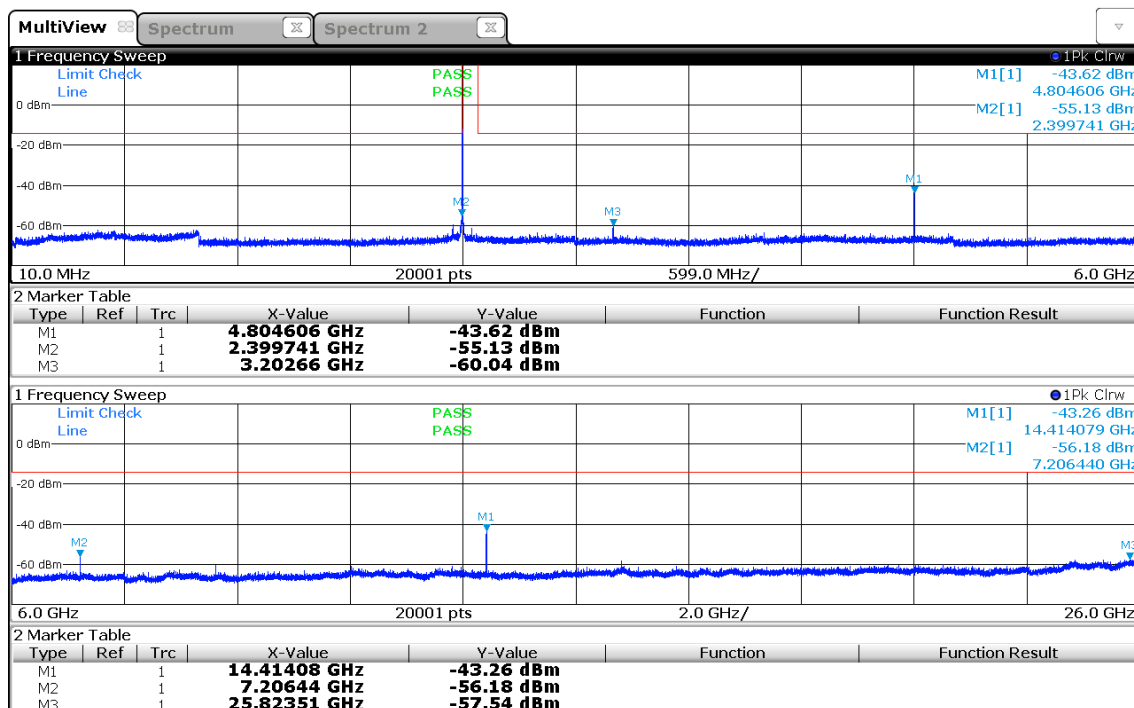
3.6 Test Conditions and Results – Conducted spurious emissions

Conducted spurious emissions acc. to FCC 15.247 / ISED RSS-247						Verdict: PASS	
EUT requirement rule parts and clause			Reference				
			FCC 15.247(d) / ISED RSS-247 5.5				
Test according to measurement reference			Reference Method				
			ANSI C63.10				
Test frequency range			Tested frequencies				
			10 MHz – 10 th Harmonic				
Measurement mode			Peak				
Limits							
Limit				Condition			
≤ -20 dB / 100 kHz				Peak power measurement detector = Peak			
≤ -30 dB /100 kHz				Peak power measurement detector = RMS			
Test setup							
Spectrum Analyzer EUT							
Test procedure							
1. EUT set to test mode (Communication tester is used if needed) 2. Span it set according to measurement range 3. Resolution bandwidth is set to 100 kHz and detector to peak and max hold 4. Markers are set to peak emission levels within frequency band 5. Emission level is determined by second marker on emission peak 6. Attenuation is determined from level difference							
Test results							
Channel	Frequency [MHz]	Mode	Emission [MHz]	Emission Level [dbm]	Peak power [dBm]	Limit [dBm]	Margin [dB]
F _{LOW}	2402	BTLE	4804	-43.62	5.8	-14.2	-29.42
F _{LOW}	2402	BTLE	14414	-43.26	5.8	-14.2	-29.06
F _{MID}	2440	BTLE	4879	-45.30	5.1	-14.9	-30.40
F _{MID}	2440	BTLE	14639	-37.34	5.1	-14.9	-22.44
F _{HIGH}	2480	BTLE	4960	-46.81	5.3	-14.7	-32.11
F _{HIGH}	2480	BTLE	14882	-40.21	5.3	-14.7	-25.51
Comments:							

Conducted spurious emissions – F_{Low}

Conducted Spurious Emissions

Project Number: G0M-1605-5591
 Applicant: Motogadget GmbH
 Model Description: vehicle body control module
 Model: m.unit_blue
 Test Sample ID: conducted
 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: T_{nom}/V_{nom}
 Operator: M. Handrik
 Test Site: Eurofins Product Service GmbH
 Test Date: 2016-09-09
 Max. in-band Frequency [MHz]: 2402.1
 Max. in-band Level [dBm/100 kHz]: 5.8
 Out-of-band Limit [dBm/100 kHz]: -14.2

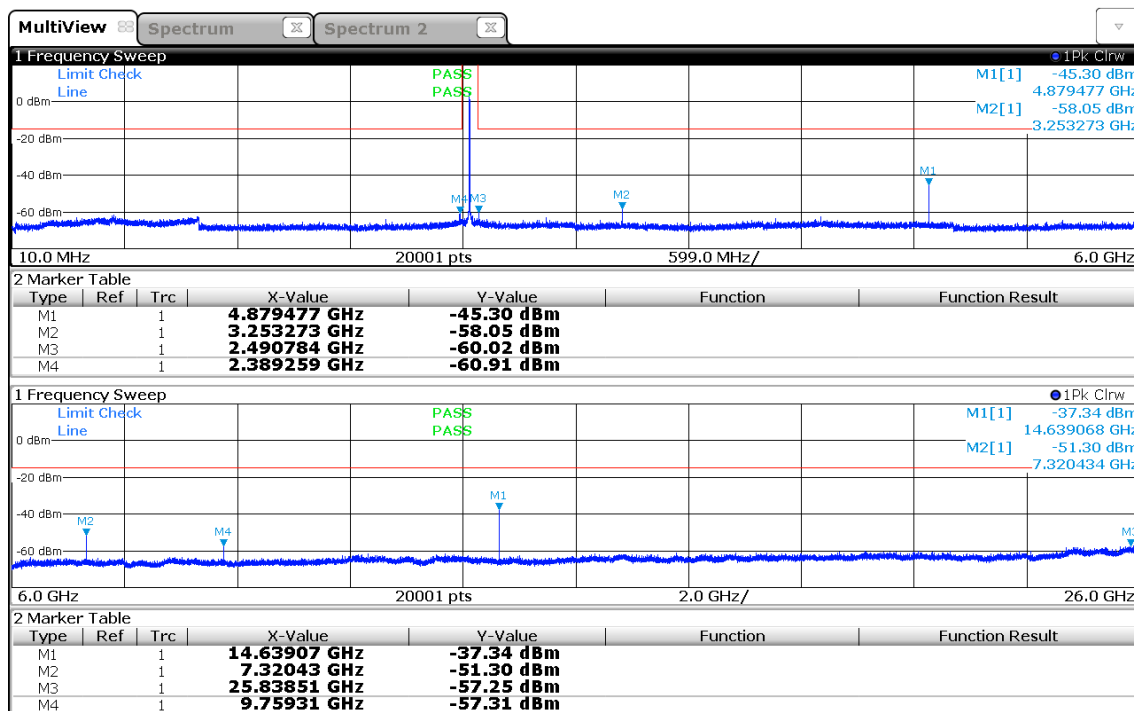


15:41:31 09.09.2016

Conducted spurious emissions – F_{MID}

Conducted Spurious Emissions

Project Number: G0M-1605-5591
 Applicant: Motogadget GmbH
 Model Description: vehicle body control module
 Model: m.unit_blue
 Test Sample ID: conducted
 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: T_{nom}/V_{nom}
 Operator: M. Handrik
 Test Site: Eurofins Product Service GmbH
 Test Date: 2016-09-09
 Max. in-band Frequency [MHz]: 2440.1
 Max. in-band Level [dBm/100 kHz]: 5.1
 Out-of-band Limit [dBm/100 kHz]: -14.9

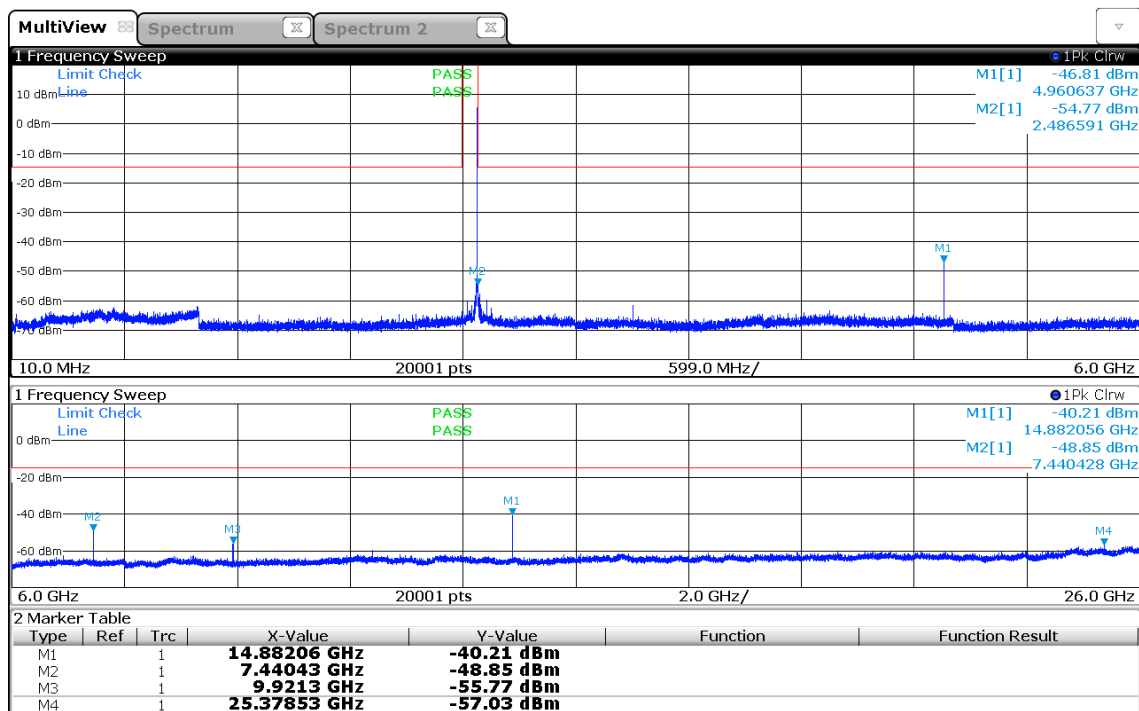


15:45:50 09.09.2016

Conducted spurious emissions – F_{HIGH}

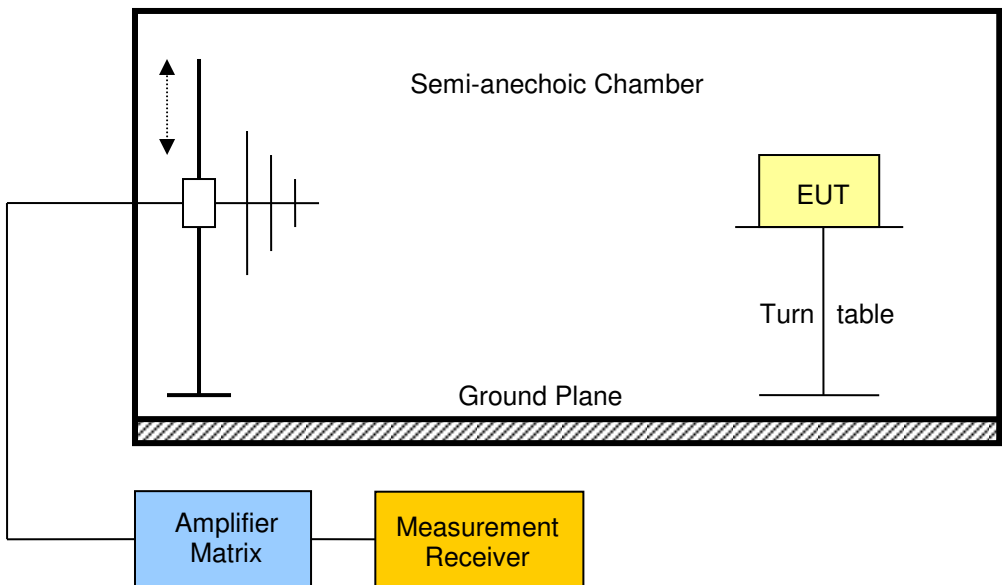
Conducted Spurious Emissions

Project Number: G0M-1605-5591
 Applicant: Motogadget GmbH
 Model Description: vehicle body control module
 Model: m.unit_blue
 Test Sample ID: conducted
 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: T_{nom}/V_{nom}
 Operator: M. Handrik
 Test Site: Eurofins Product Service GmbH
 Test Date: 2016-09-09
 Max. in-band Frequency [MHz]: 2480.3
 Max. in-band Level [dBm/100 kHz]: 5.3
 Out-of-band Limit [dBm/100 kHz]: -14.7



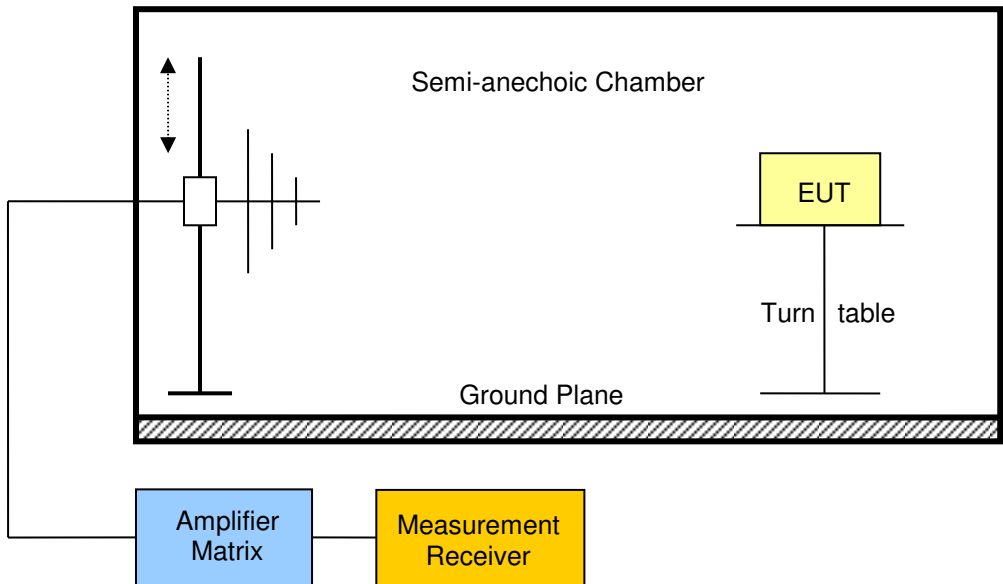
15:49:08 09.09.2016

3.7 Test Conditions and Results – Transmitter radiated emissions

Transmitter radiated emissions acc. to FCC 47 CFR 15.247 / ISED RSS-247				Verdict: PASS
Test according referenced standards	Reference Method			
	FCC 15.247(d) / ISED RSS-247 5.5			
Test according to measurement reference	Reference Method			
	ANSI C63.10			
Test frequency range	Tested frequencies			
	30 MHz – 10 th Harmonic			
Limits				
Frequency range [MHz]	Detector	Limit [µV/m]	Limit [dBµV/m]	Limit Distance [m]
30 – 88	Quasi-Peak	100	40	3
88 – 216	Quasi-Peak	150	43.5	3
216 – 960	Quasi-Peak	200	46	3
960 – 1000	Quasi-Peak	500	54	3
> 1000	Average	500	54	3
Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)). When average radiated emission measurements are specified, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.				
Test setup				
				

Test procedure									
1. EUT set to test mode (Communication tester is used if needed) 2. Span it set according to measurement range 3. Resolution bandwidth below 1 GHz is set according to CISPR 16 with peak/quasi-peak detector and RBW of 1 MHz with peak/average detector is used above 1 GHz 4. Markers are set to peak emission levels within restricted bands									
Test results									
Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Limit dist. [m]*	Margin [dB]
F _{LOW}	2402	Transmit	4804	56.17	pk	ver	74.00	3	-17.83
F _{LOW}	2402	Transmit	4804	52.56	avg	ver	54.00	3	-01.44
F _{LOW}	2402	Transmit	4805	56.73	pk	hor	74.00	3	-17.27
F _{LOW}	2402	Transmit	4805	53.18	avg	hor	54.00	3	-00.82
F _{LOW}	2402	Transmit	12009	49.40	pk	hor	74.00	3	-24.60
F _{LOW}	2402	Transmit	12009	40.42	avg	hor	54.00	3	-13.58
F _{LOW}	2402	Transmit	19214	43.31	avg	ver	54.00	3	-10.69
F _{MID}	2440	Transmit	4879	56.02	pk	ver	74.00	3	-17.98
F _{MID}	2440	Transmit	4879	51.72	avg	ver	54.00	3	-02.28
F _{MID}	2440	Transmit	4880	54.45	pk	hor	74.00	3	-19.55
F _{MID}	2440	Transmit	4880	51.09	avg	hor	54.00	3	-02.91
F _{MID}	2440	Transmit	7319	59.12	pk	hor	74.00	3	-14.88
F _{MID}	2440	Transmit	7319	53.97	avg	hor	54.00	3	-00.03
F _{MID}	2440	Transmit	19518	53.62	pk	ver	74.00	3	-20.38
F _{HIGH}	2480	Transmit	19518	46.30	avg	ver	54.00	3	-07.70
F _{HIGH}	2480	Transmit	2483.5	56.30	pk	hor	74.00	3	-17.70
F _{HIGH}	2480	Transmit	2483.5	46.35	RMS	hor	54.00	3	-07.65
F _{HIGH}	2480	Transmit	2483.5	55.45	pk	ver	74.00	3	-18.55
F _{HIGH}	2480	Transmit	2483.5	46.02	RMS	ver	54.00	3	-07.98
F _{HIGH}	2480	Transmit	4960	47.72	avg	hor	54.00	3	-06.28
F _{HIGH}	2480	Transmit	4960	52.63	pk	ver	74.00	3	-21.37
F _{HIGH}	2480	Transmit	4960	48.70	avg	ver	54.00	3	-05.30
F _{HIGH}	2480	Transmit	7439	58.50	pk	hor	74.00	3	-15.50
F _{HIGH}	2480	Transmit	7439	53.13	avg	hor	54.00	3	-00.87
F _{HIGH}	2480	Transmit	7441	45.95	avg	ver	54.00	3	-08.05
F _{HIGH}	2480	Transmit	19838	52.07	pk	ver	74.00	3	-21.93
F _{HIGH}	2480	Transmit	19838	44.50	avg	ver	54.00	3	-09.50
Comments: * Physical distance between EUT and measurement antenna.									

3.8 Test Conditions and Results – Receiver radiated emissions

Receiver radiated emissions acc. to ISED RSS-247				Verdict: PASS
Test according referenced standards	Reference Method			
	ISED RSS-247 3.1			
Test according to measurement reference	Reference Method			
	ANSI C63.10			
Test frequency range	Tested frequencies			
	30 MHz – 5 th Harmonic			
EUT test mode	Receive			
Limits				
Frequency range [MHz]	Detector	Limit [μV/m]	Limit [dBμV/m]	Limit Distance [m]
30 – 88	Quasi-Peak	100	40	3
88 – 216	Quasi-Peak	150	43.5	3
216 – 960	Quasi-Peak	200	46	3
960 – 1000	Quasi-Peak	500	54	3
> 1000	Average	500	54	3
Test setup				
				

Test procedure							
1. EUT set to receive mode (Communication tester is used if needed) 2. Span it set according to measurement range 3. Resolution bandwidth below 1 GHz is set according to CISPR 16 with peak/quasi-peak detector and RBW of 1 MHz with peak/average detector is used above 1 GHz 4. Markers are set to peak emission levels							
Test results							
Channel	Frequency [MHz]	Emission [MHz]	Emission Level [dB μ V/m]	Pol.	Det.	Limit [dB μ V/m]	Margin [dB μ V/m]
F _{MID}	2440	49.08	33.70	ver	QP	40.00	-06.30
F _{MID}	2440	62.916	37.10	ver	QP	40.00	-02.90
F _{MID}	2440	206.94	32.70	ver	QP	43.50	-10.80
F _{MID}	2440	4959	46.78	hor	avg	53.98	-7.2 dB
Comments:							

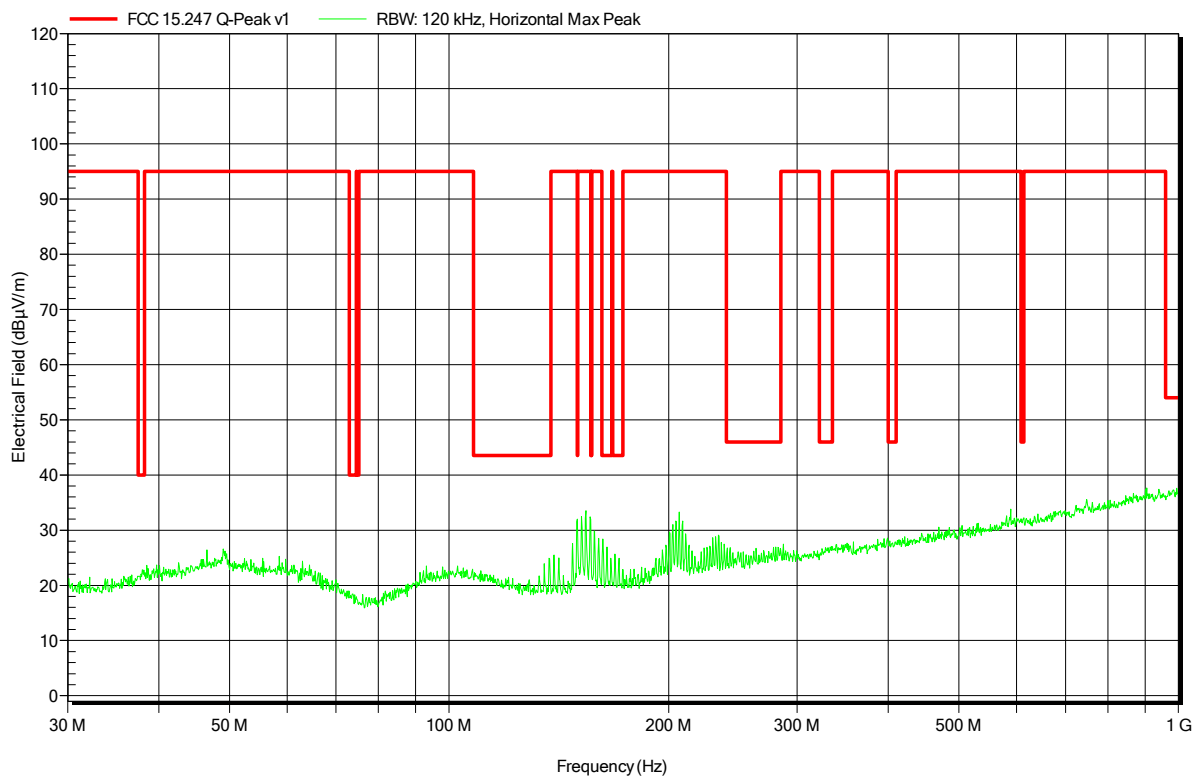
ANNEX A Transmitter radiated spurious emissions

Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant:	Motogadget GmbH
EUT Name:	vehicle body control module
Model:	m.unit_blue
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Unom: 12 VDC
Antenna:	Schwarzbeck VULB 9162, Horizontal
Measurement distance:	10m corrected to 3 m
Mode:	Tx 2402 MHz
Test Date:	2016-09-09
Note:	

Index 3

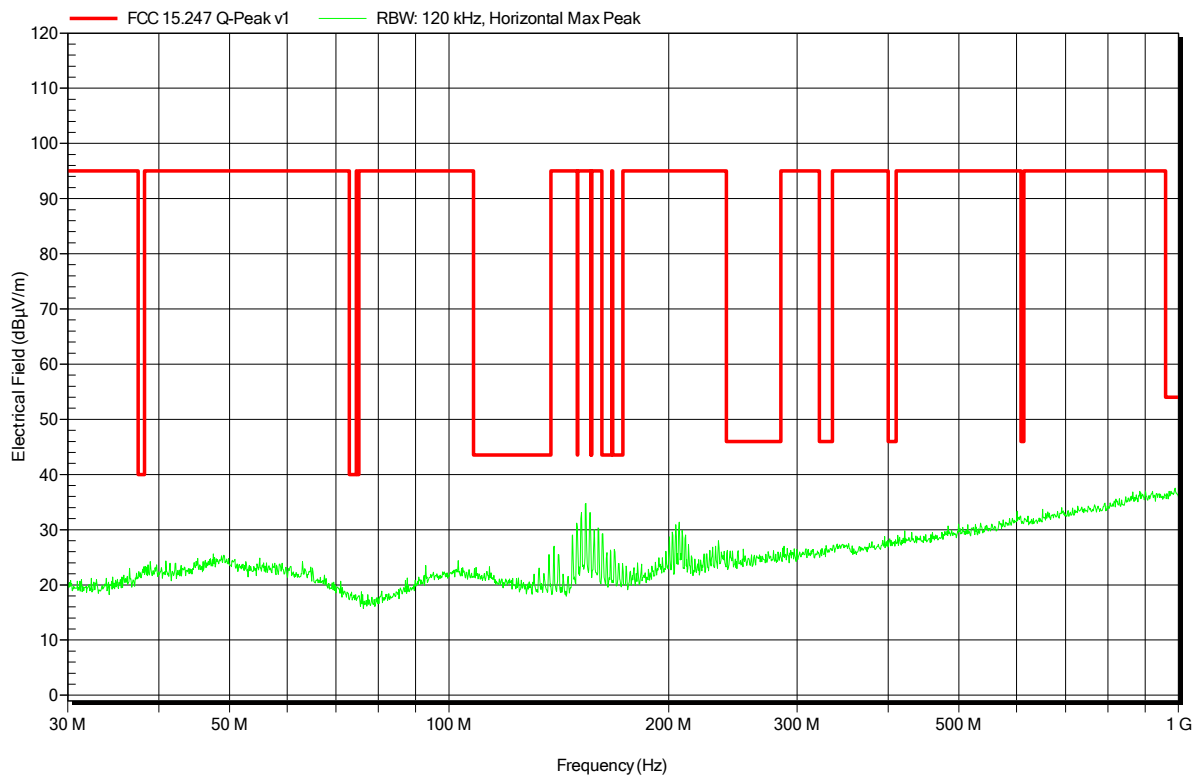


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant:	Motogadget GmbH
EUT Name:	vehicle body control module
Model:	m.unit_blue
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Unom: 12 VDC
Antenna:	Schwarzbeck VULB 9162, Horizontal
Measurement distance:	10m corrected to 3 m
Mode:	Tx 2440 MHz
Test Date:	2016-09-09
Note:	

Index 4

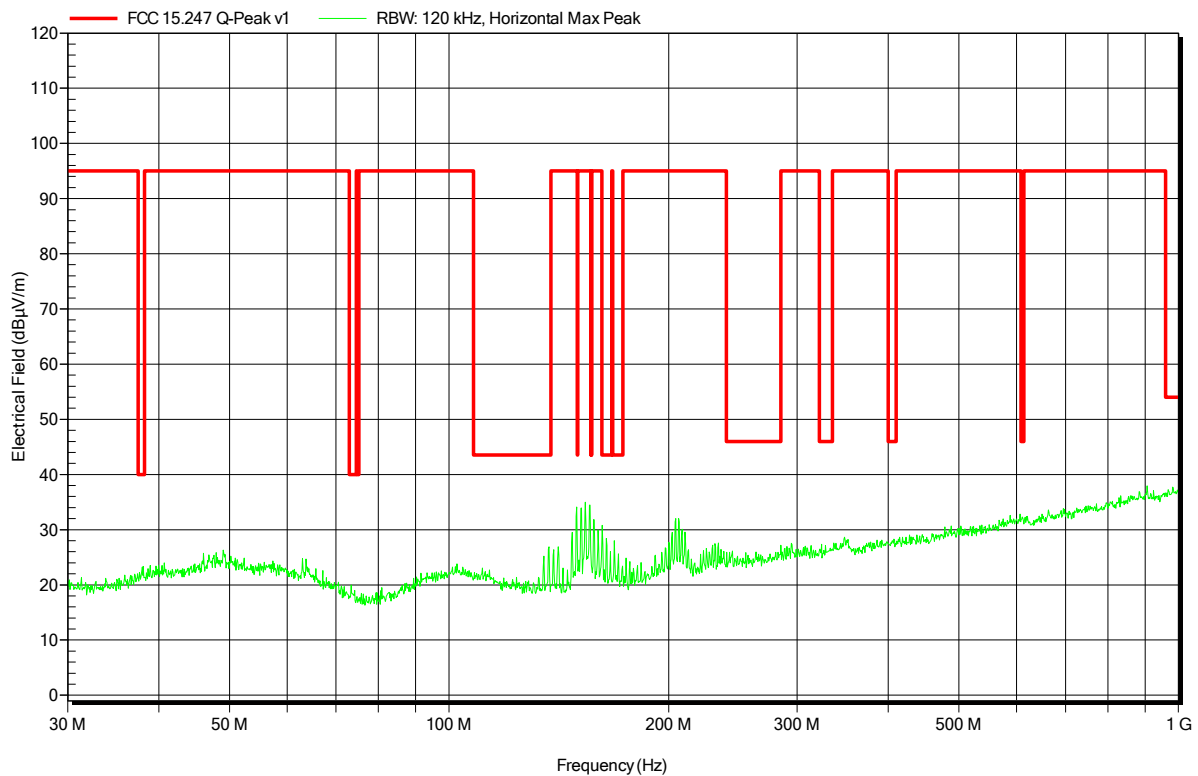


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant:	Motogadget GmbH
EUT Name:	vehicle body control module
Model:	m.unit_blue
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Unom: 12 VDC
Antenna:	Schwarzbeck VULB 9162, Horizontal
Measurement distance:	10m corrected to 3 m
Mode:	Tx 2480 MHz
Test Date:	2016-09-09
Note:	

Index 5

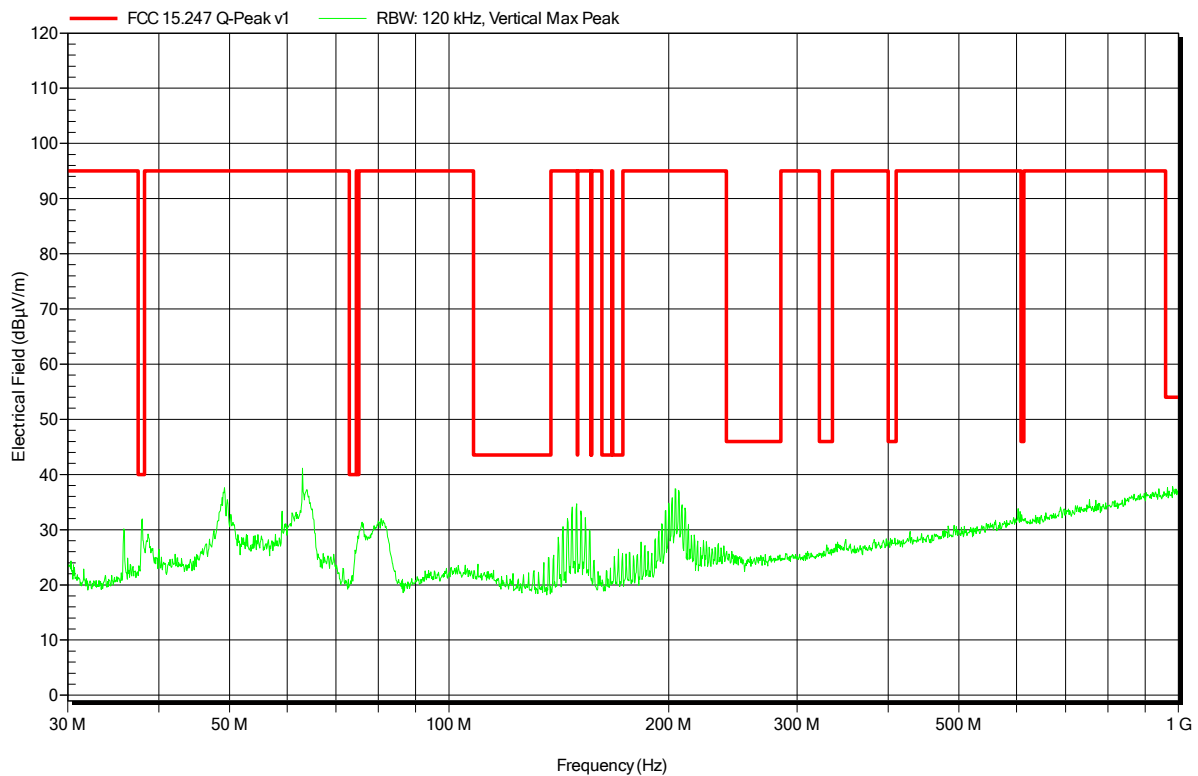


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant:	Motogadget GmbH
EUT Name:	vehicle body control module
Model:	m.unit_blue
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Unom: 12 VDC
Antenna:	Schwarzbeck VULB 9162, Vertical
Measurement distance:	10m corrected to 3 m
Mode:	Tx 2480 MHz
Test Date:	2016-09-09
Note:	

Index 6

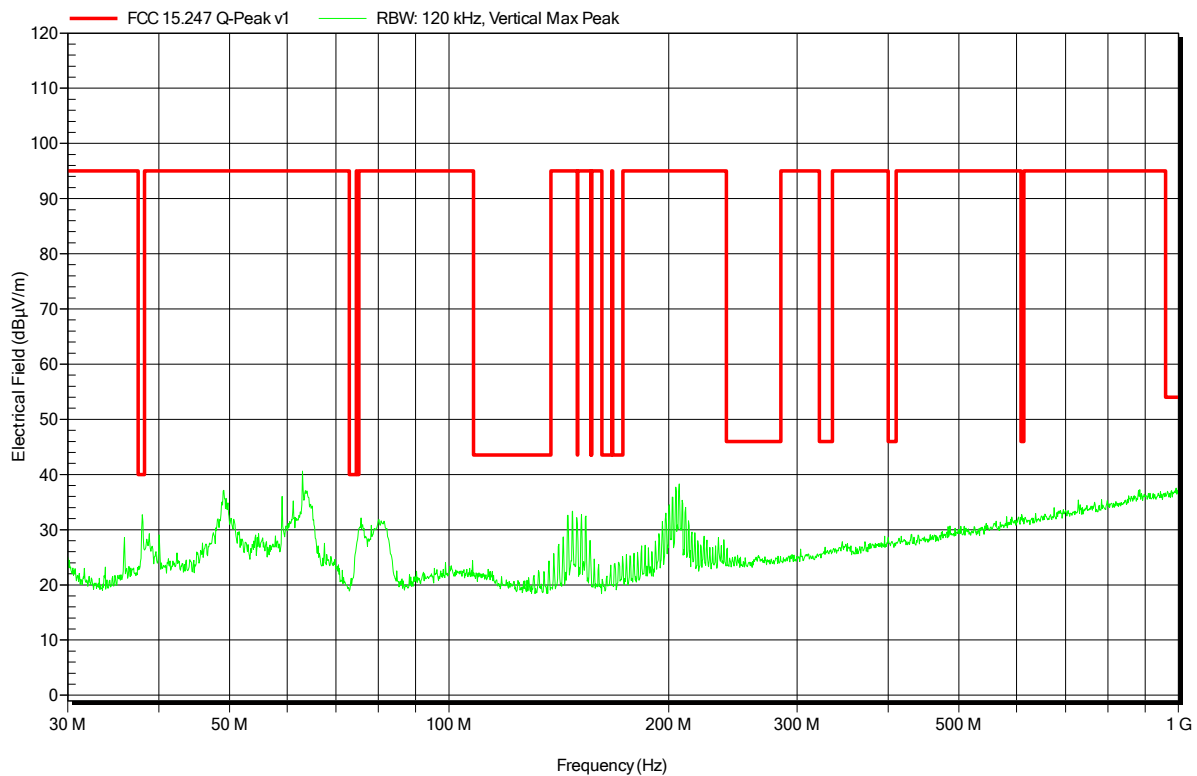


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant:	Motogadget GmbH
EUT Name:	vehicle body control module
Model:	m.unit_blue
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Unom: 12 VDC
Antenna:	Schwarzbeck VULB 9162, Vertical
Measurement distance:	10m corrected to 3 m
Mode:	Tx 2440 MHz
Test Date:	2016-09-09
Note:	

Index 7

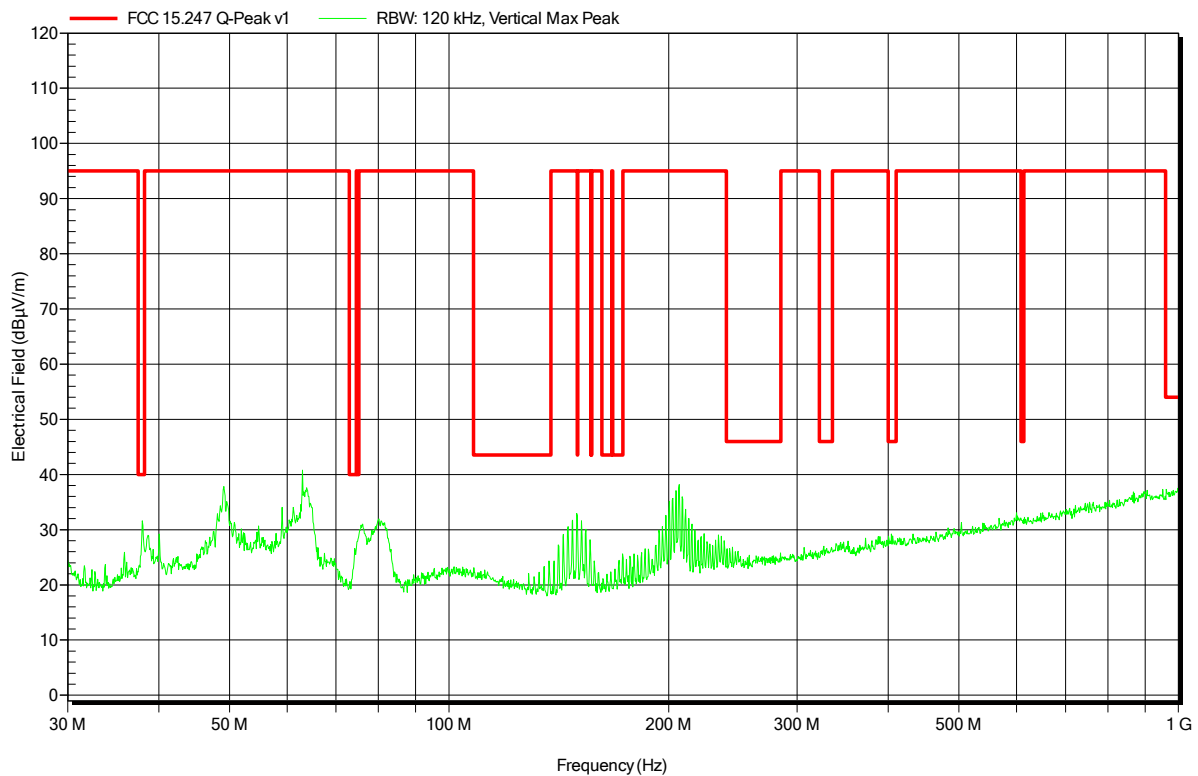


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant:	Motogadget GmbH
EUT Name:	vehicle body control module
Model:	m.unit_blue
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Unom: 12 VDC
Antenna:	Schwarzbeck VULB 9162, Vertical
Measurement distance:	10m corrected to 3 m
Mode:	Tx 2402 MHz
Test Date:	2016-09-09
Note:	

Index 8

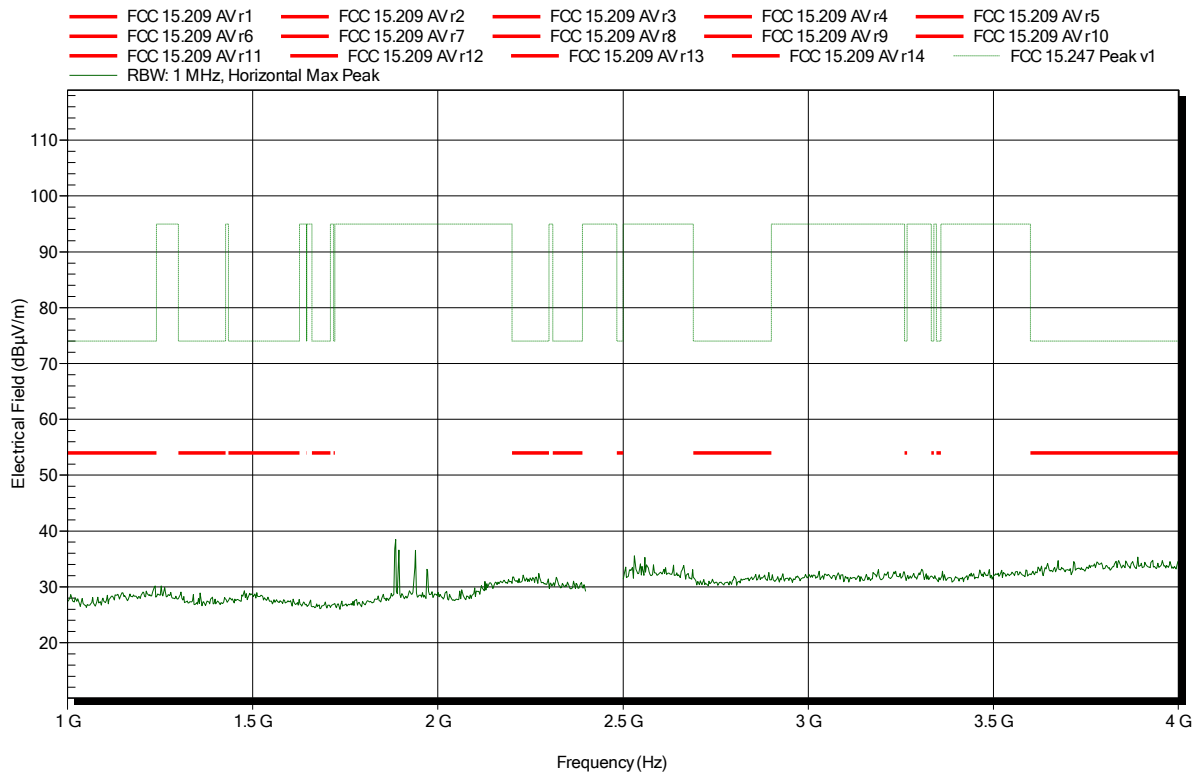


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2480
 Test Date: 2016-09-09
 Note:

Index 58

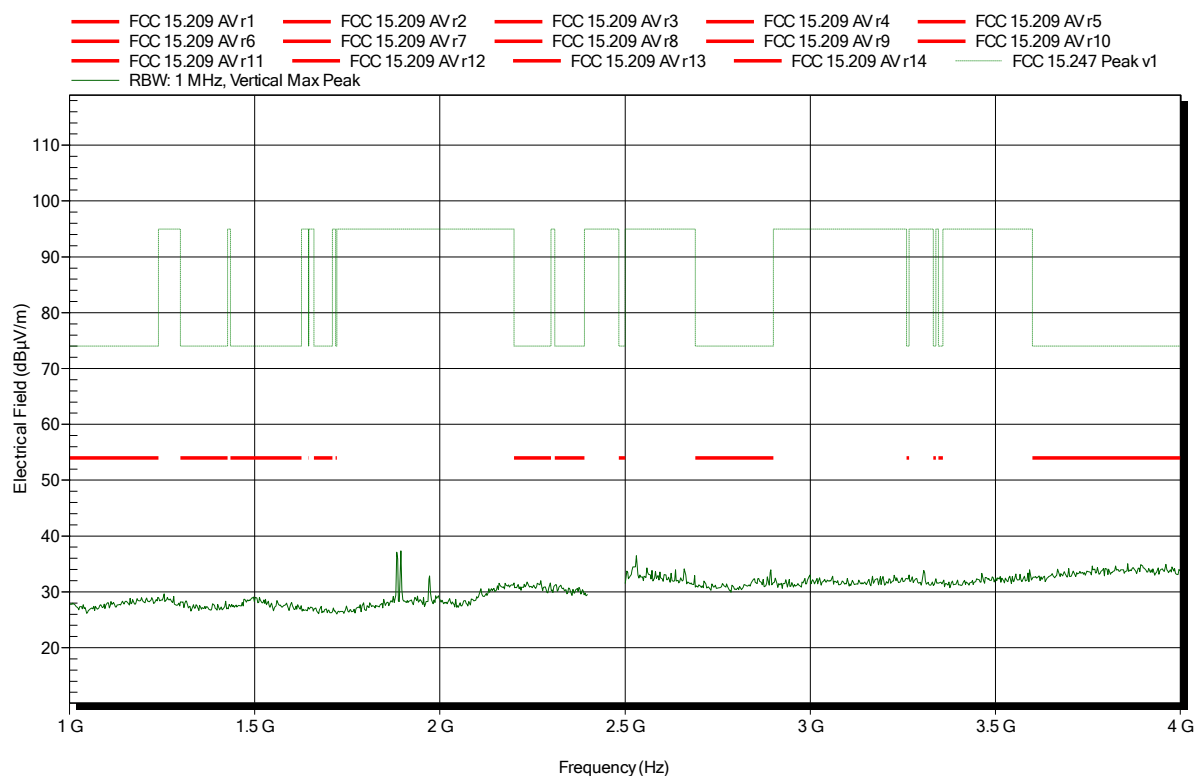


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2480
 Test Date: 2016-09-09
 Note:

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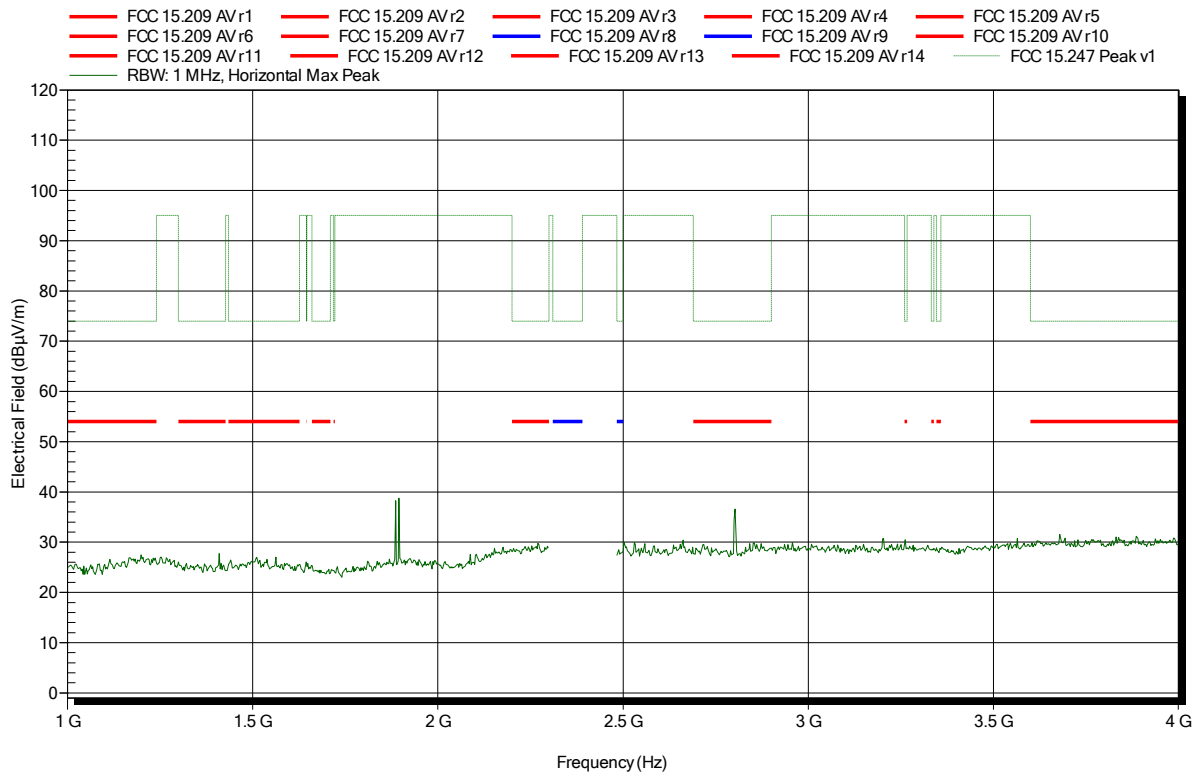


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2402
 Test Date: 2016-09-09
 Note:

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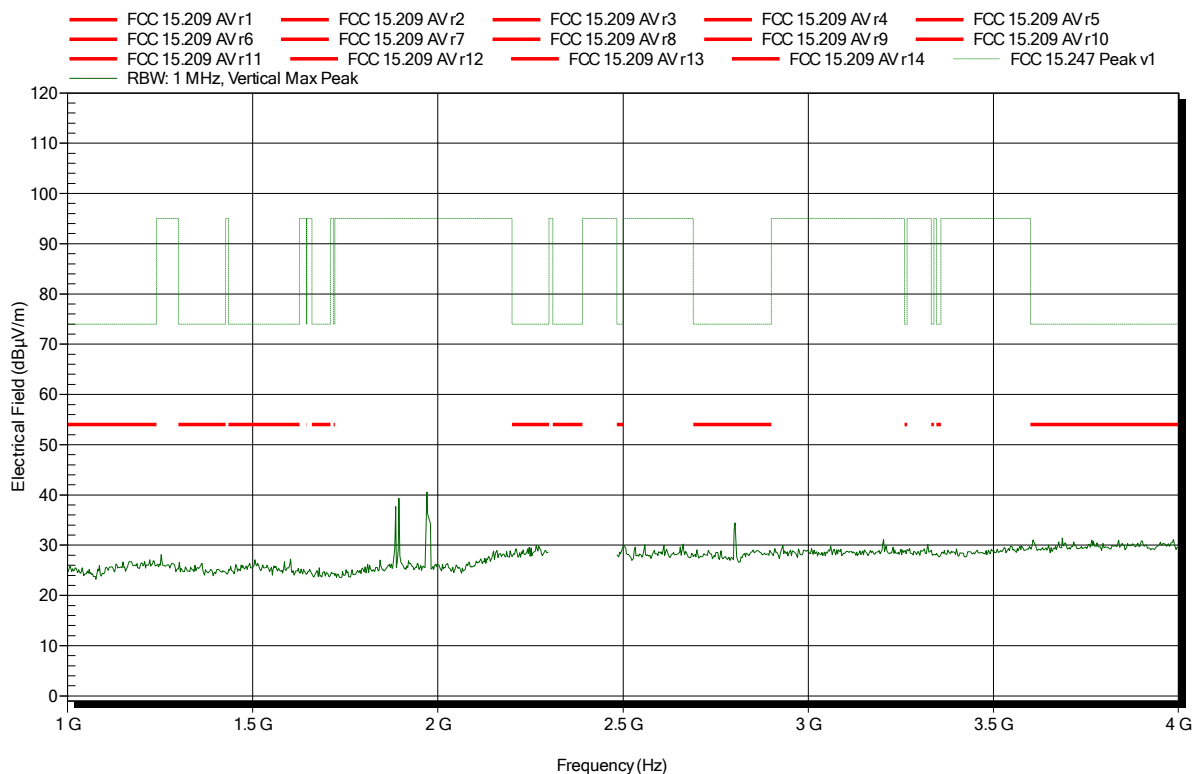


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2402
 Test Date: 2016-09-09
 Note:

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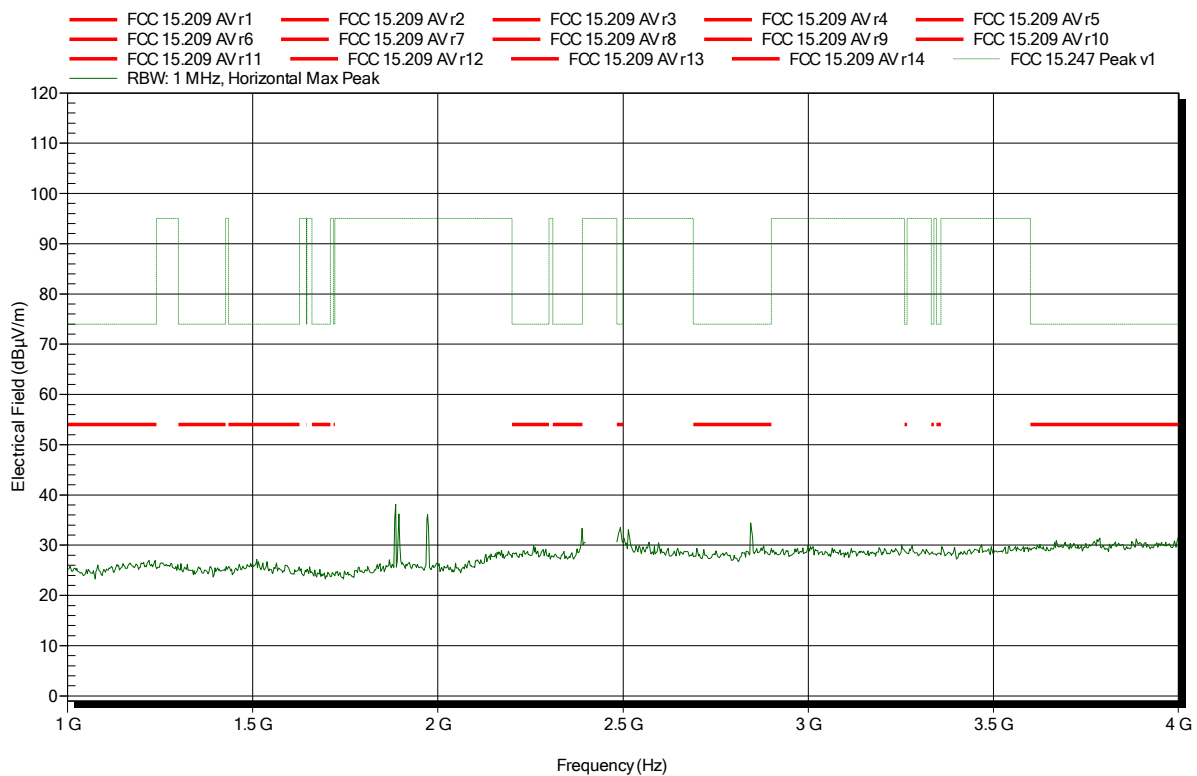


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2440
 Test Date: 2016-09-09
 Note:

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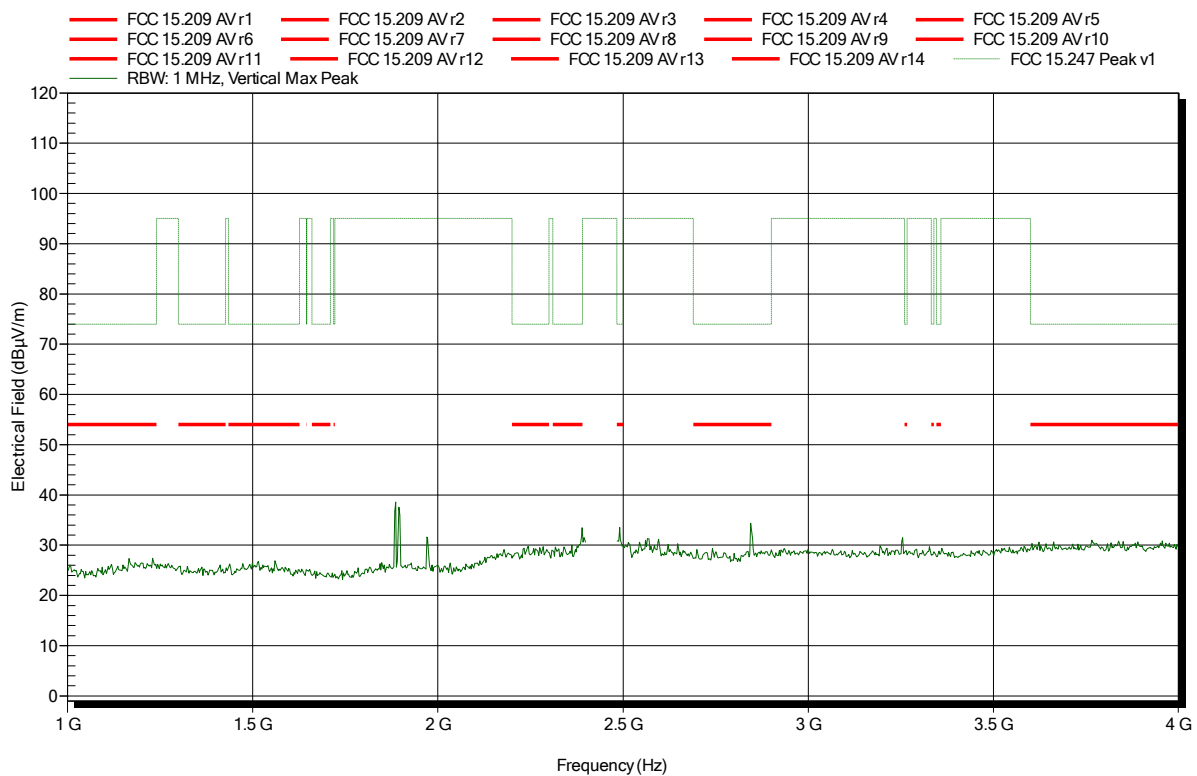


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2440
 Test Date: 2016-09-09
 Note:

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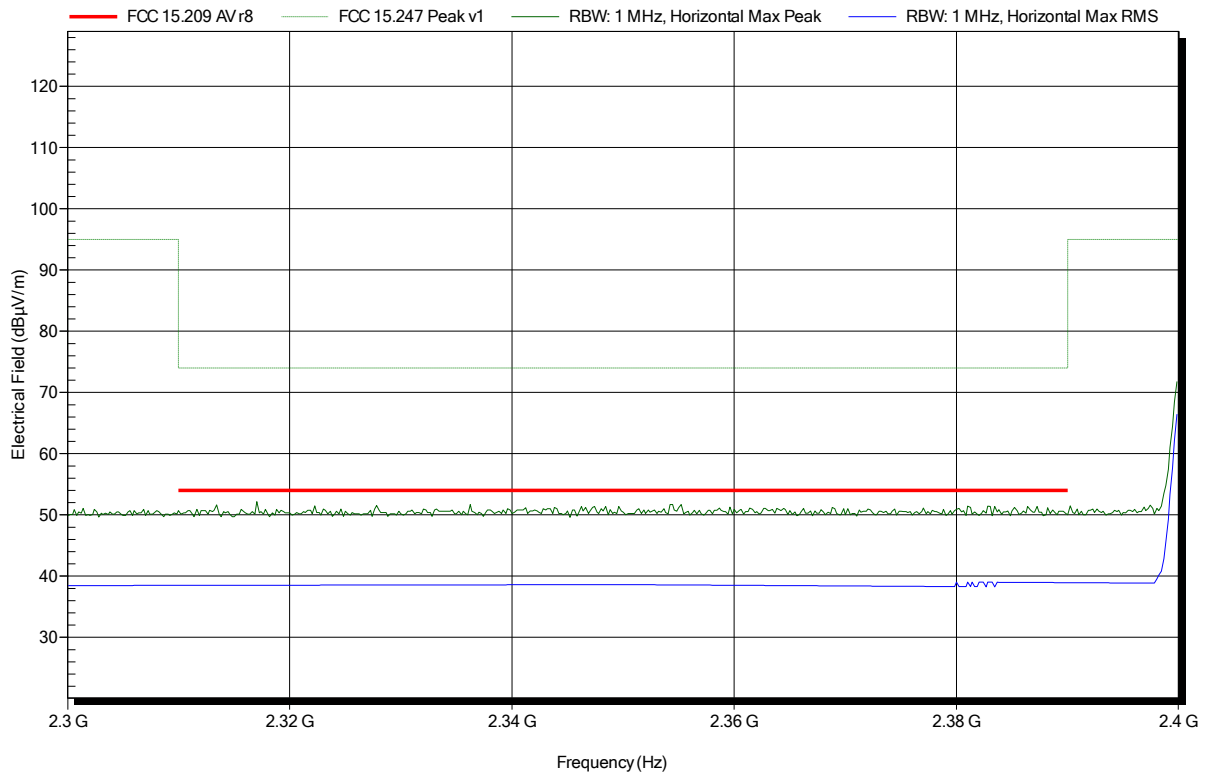


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant:	Motogadget GmbH
EUT Name:	vehicle body control module
Model:	m.unit_blue
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Vnom: 12 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2402
Test Date:	2016-09-09
Note:	lower bandedge

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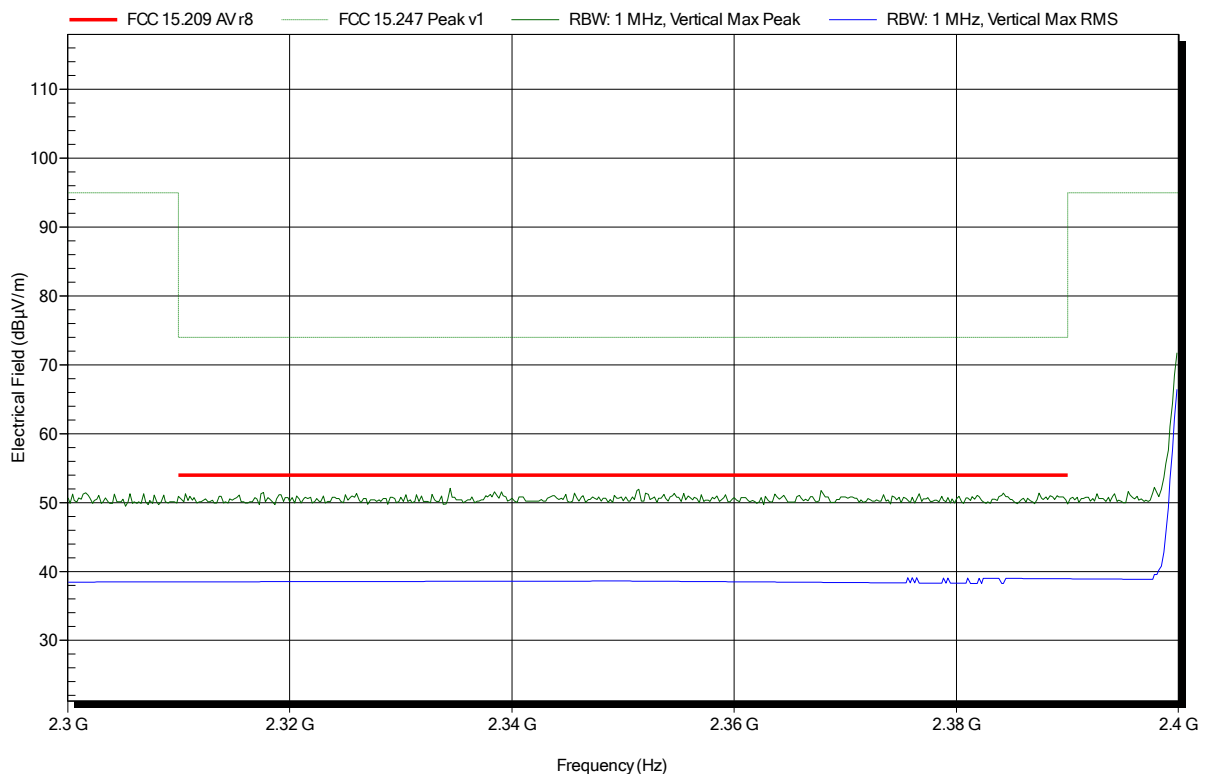


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant:	Motogadget GmbH
EUT Name:	vehicle body control module
Model:	m.unit_blue
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Vnom: 12 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2402
Test Date:	2016-09-09
Note:	lower bandedge

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Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2480
 Test Date: 2016-09-09
 Note: upper bandedge

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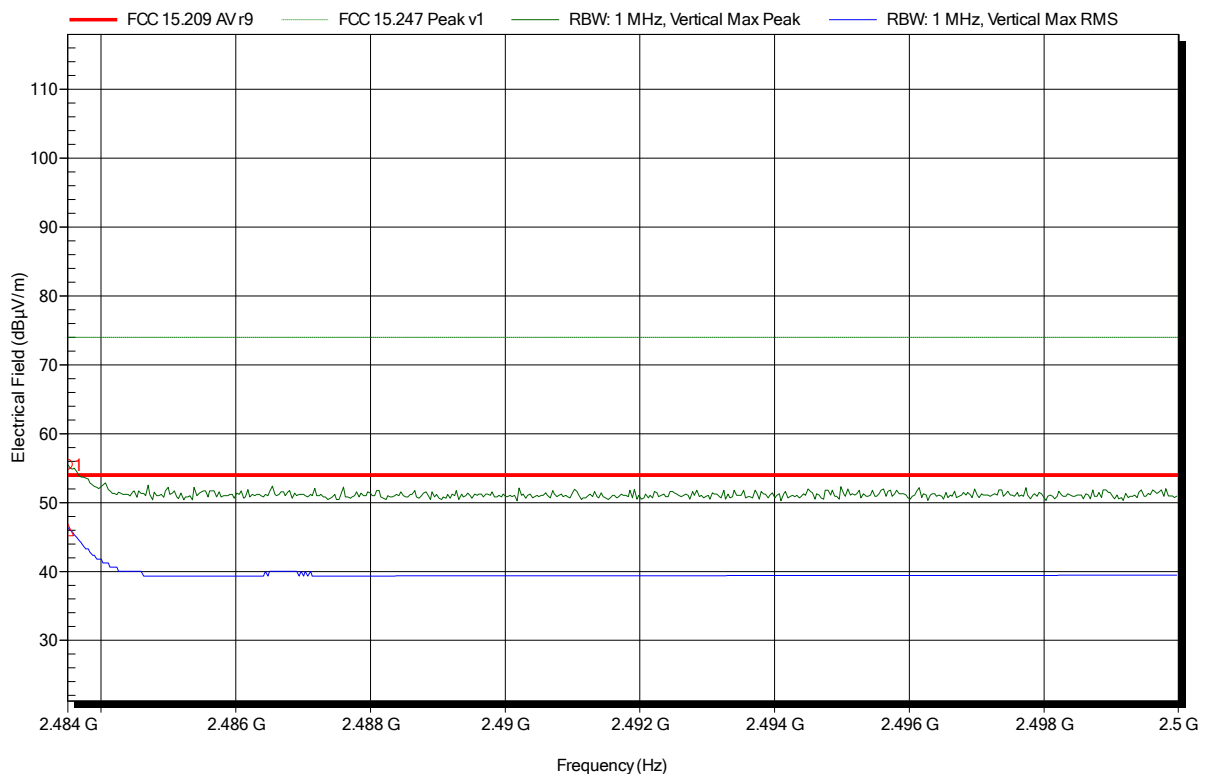
Frequency 2.4835 GHz	Peak 56.3 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -17.7 dB	Peak Status Pass
Frequency 2.4835 GHz	RMS 46.35 dBµV/m	RMS Limit 54 dBµV/m	RMS Difference -7.65 dB	RMS Status Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2480
 Test Date: 2016-09-09
 Note: upper bandedge

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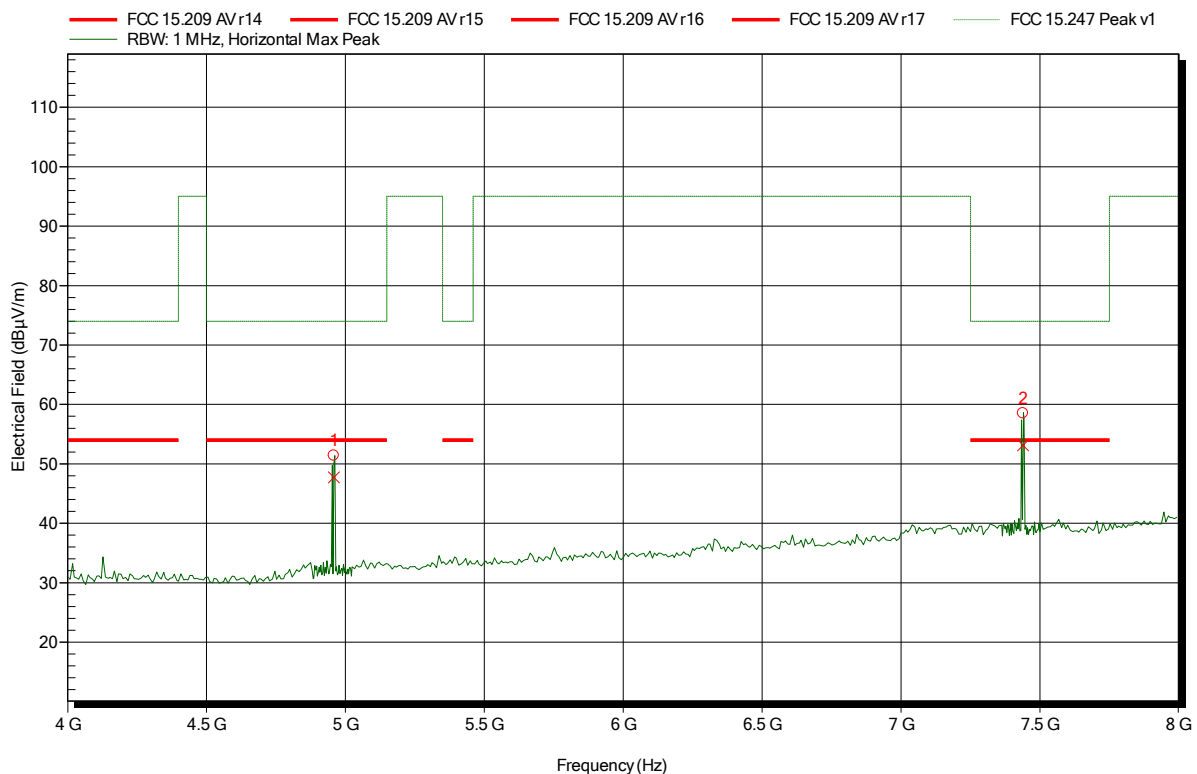
Frequency 2.4835 GHz	Peak 55.45 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -18.55 dB	Peak Status Pass
Frequency 2.4835 GHz	RMS 46.02 dBµV/m	RMS Limit 54 dBµV/m	RMS Difference -7.98 dB	RMS Status Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2480
 Test Date: 2016-08-18
 Note: Power Level 10

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Frequency	Peak	Peak Limit	Peak Difference	Status
4.96 GHz	51.38 dBμV/m	74 dBμV/m	-22.62 dB	Pass
7.439 GHz	58.5 dBμV/m	74 dBμV/m	-15.5 dB	Pass

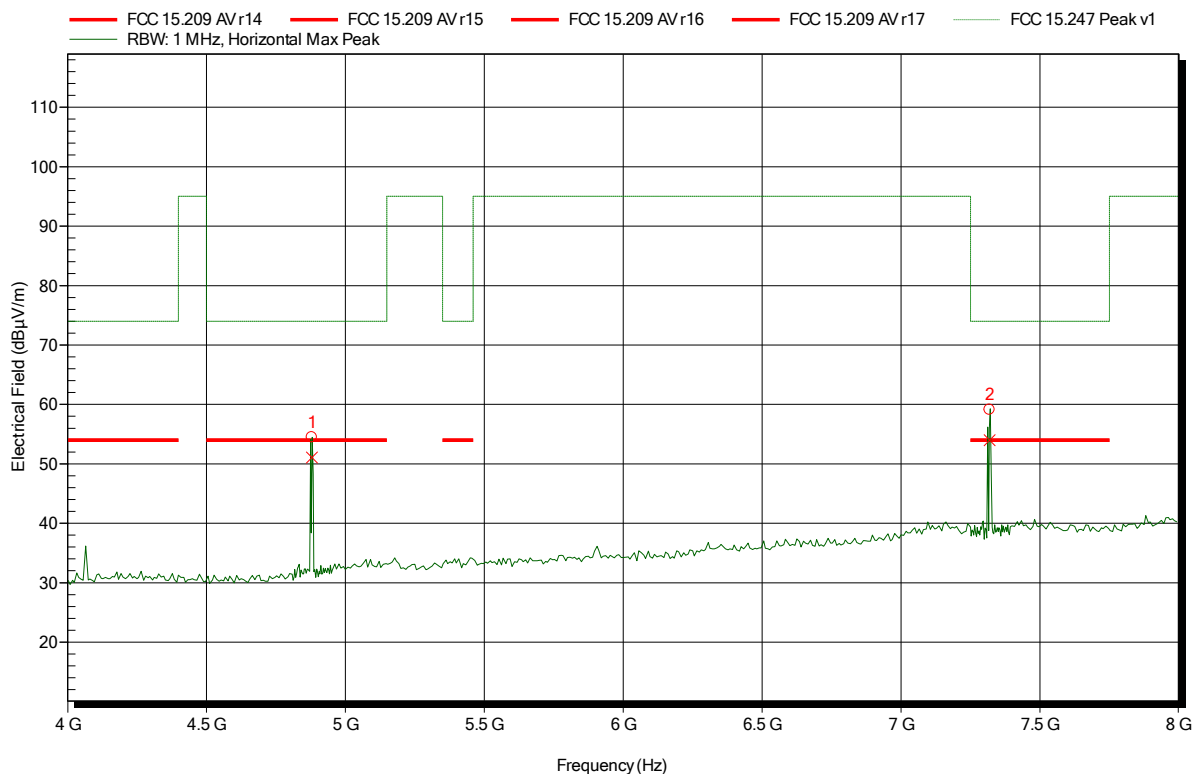
Frequency	Average	Average Limit	Average Difference	Average Status
4.96 GHz	47.72 dBμV/m	54 dBμV/m	-6.28 dB	Pass
7.439 GHz	53.13 dBμV/m	54 dBμV/m	-0.87 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2440
 Test Date: 2016-08-18
 Note: Power Level 10

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Frequency	Peak	Peak Limit	Peak Difference	Status
4.88 GHz	54.45 dBμV/m	74 dBμV/m	-19.55 dB	Pass
7.319 GHz	59.12 dBμV/m	74 dBμV/m	-14.88 dB	Pass

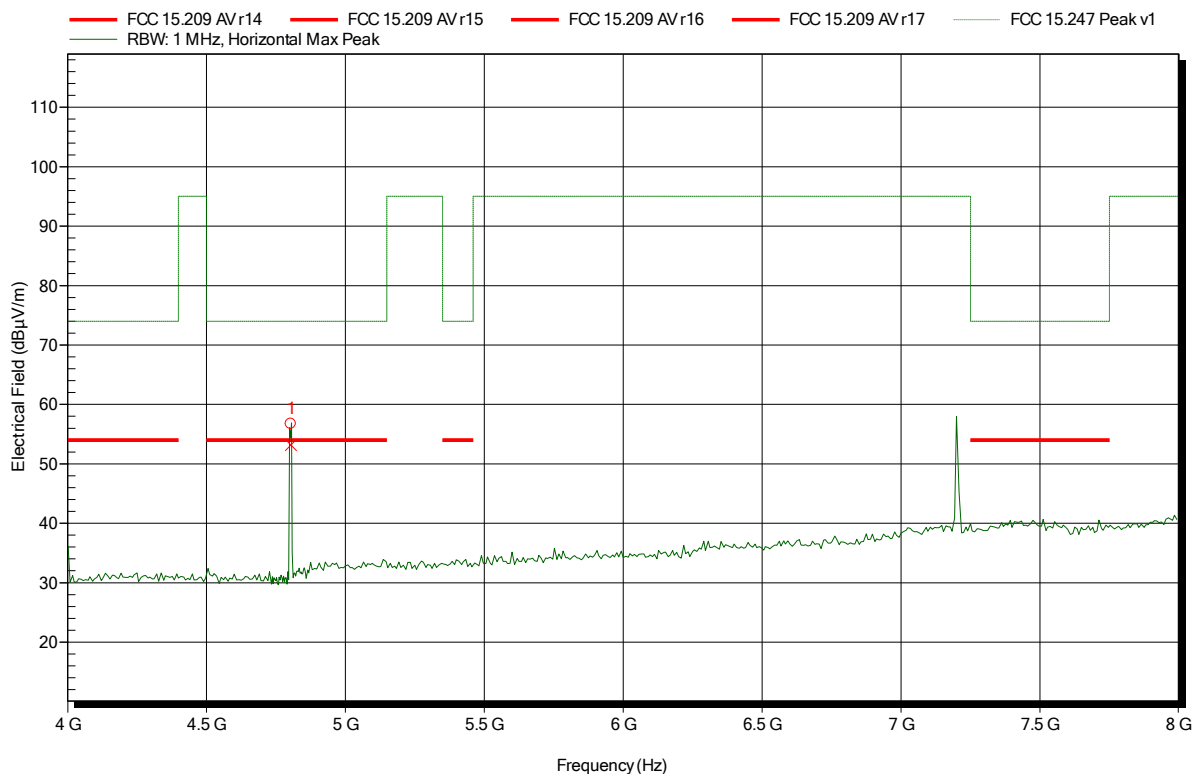
Frequency	Average	Average Limit	Average Difference	Average Status
4.88 GHz	51.09 dBμV/m	54 dBμV/m	-2.91 dB	Pass
7.319 GHz	53.97 dBμV/m	54 dBμV/m	-0.03 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2402
 Test Date: 2016-08-18
 Note: Power Level 10

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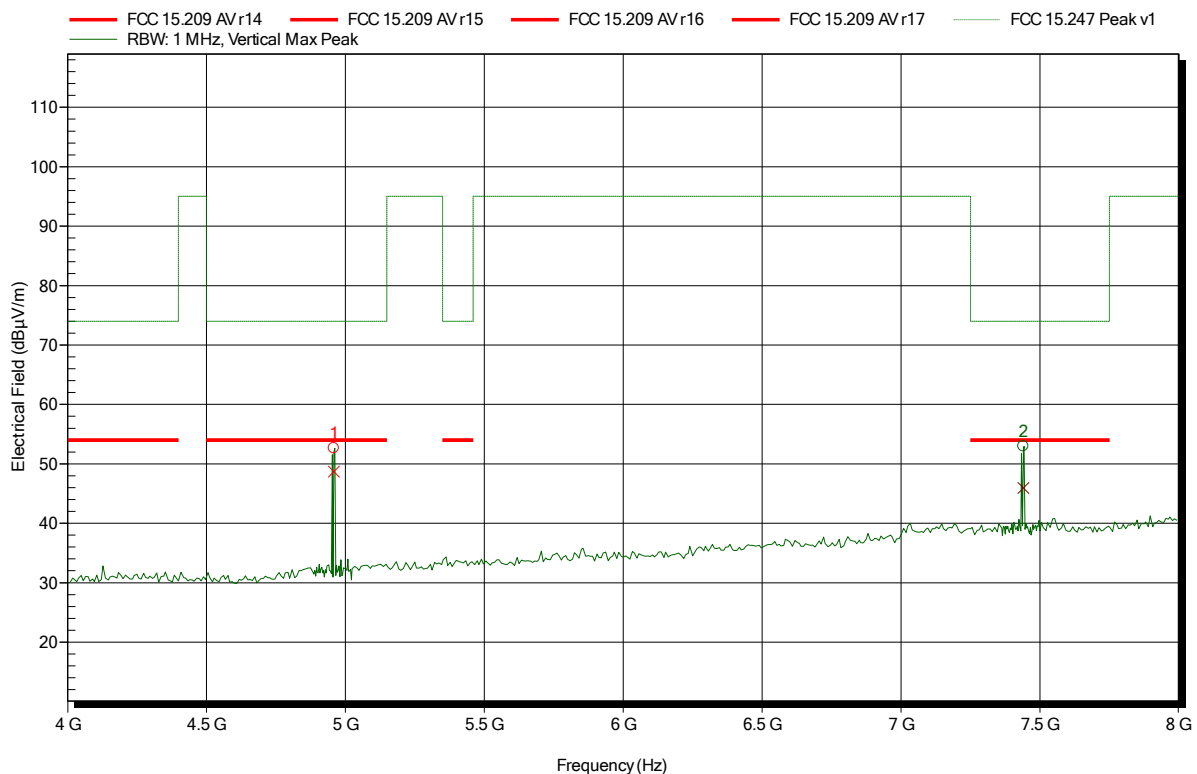
Frequency 4.805 GHz	Peak 56.73 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -17.27 dB	Status Pass
Frequency 4.805 GHz	Average 53.18 dBµV/m	Average Limit 54 dBµV/m	Average Difference -0.82 dB	Average Status Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2480
 Test Date: 2016-08-18
 Note: Power Level 10

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Frequency	Peak	Peak Limit	Peak Difference	Status
4.96 GHz	52.63 dBµV/m	74 dBµV/m	-21.37 dB	Pass
7.441 GHz	52.96 dBµV/m	74 dBµV/m	-21.04 dB	Pass

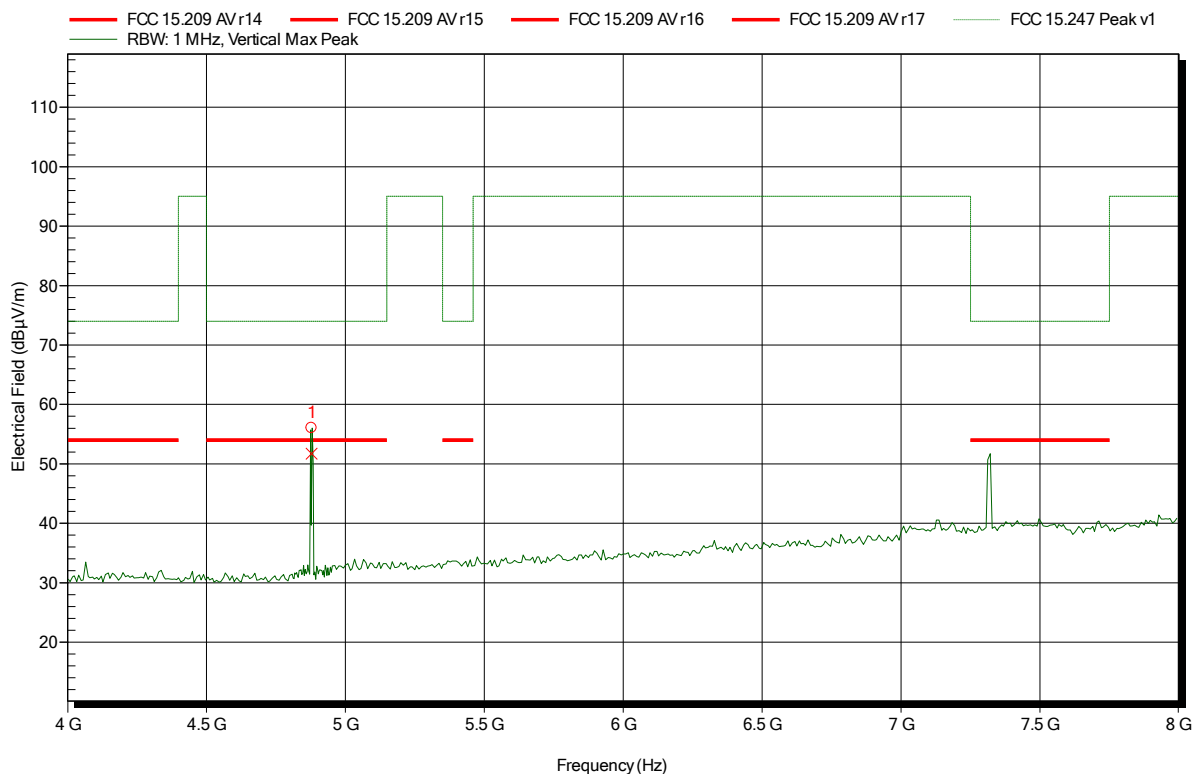
Frequency	Average	Average Limit	Average Difference	Average Status
4.96 GHz	48.7 dBµV/m	54 dBµV/m	-5.3 dB	Pass
7.441 GHz	45.95 dBµV/m	54 dBµV/m	-8.05 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2440
 Test Date: 2016-08-18
 Note: Power Level 10

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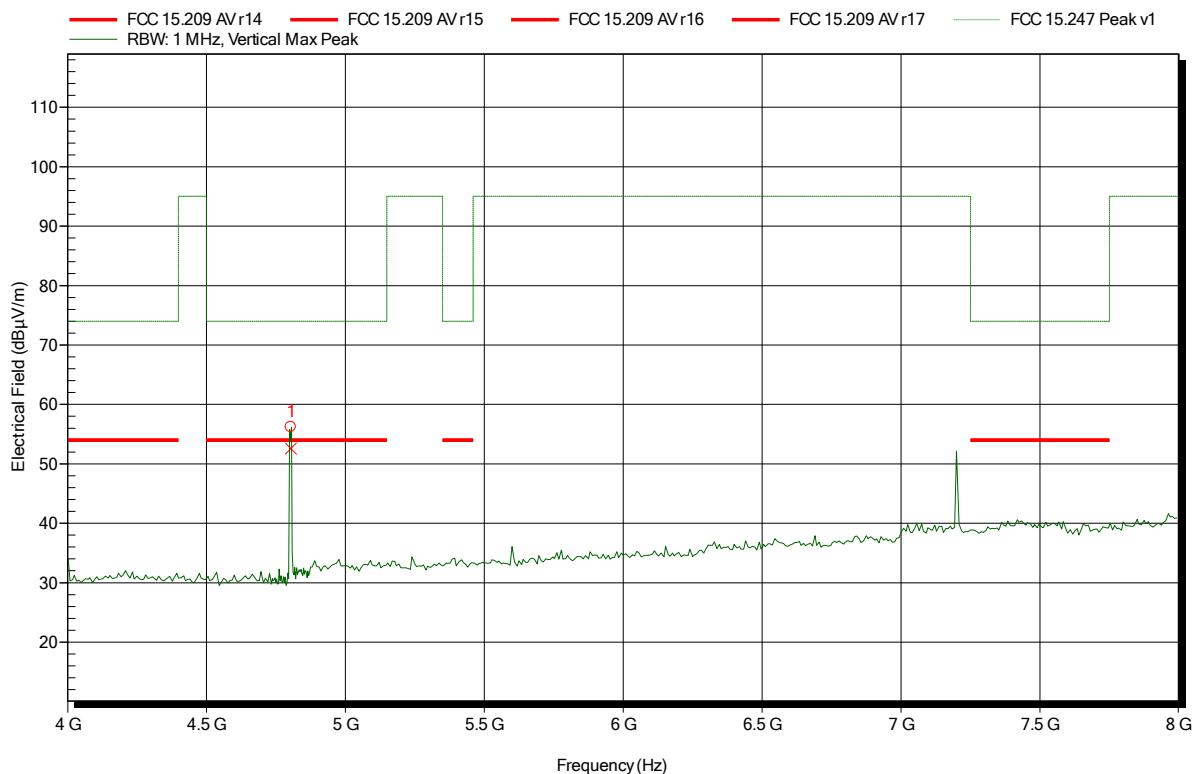
Frequency 4.879 GHz	Peak 56.02 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -17.98 dB	Status Pass
Frequency 4.879 GHz	Average 51.72 dBµV/m	Average Limit 54 dBµV/m	Average Difference -2.28 dB	Average Status Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2402
 Test Date: 2016-08-18
 Note: Power Level 10

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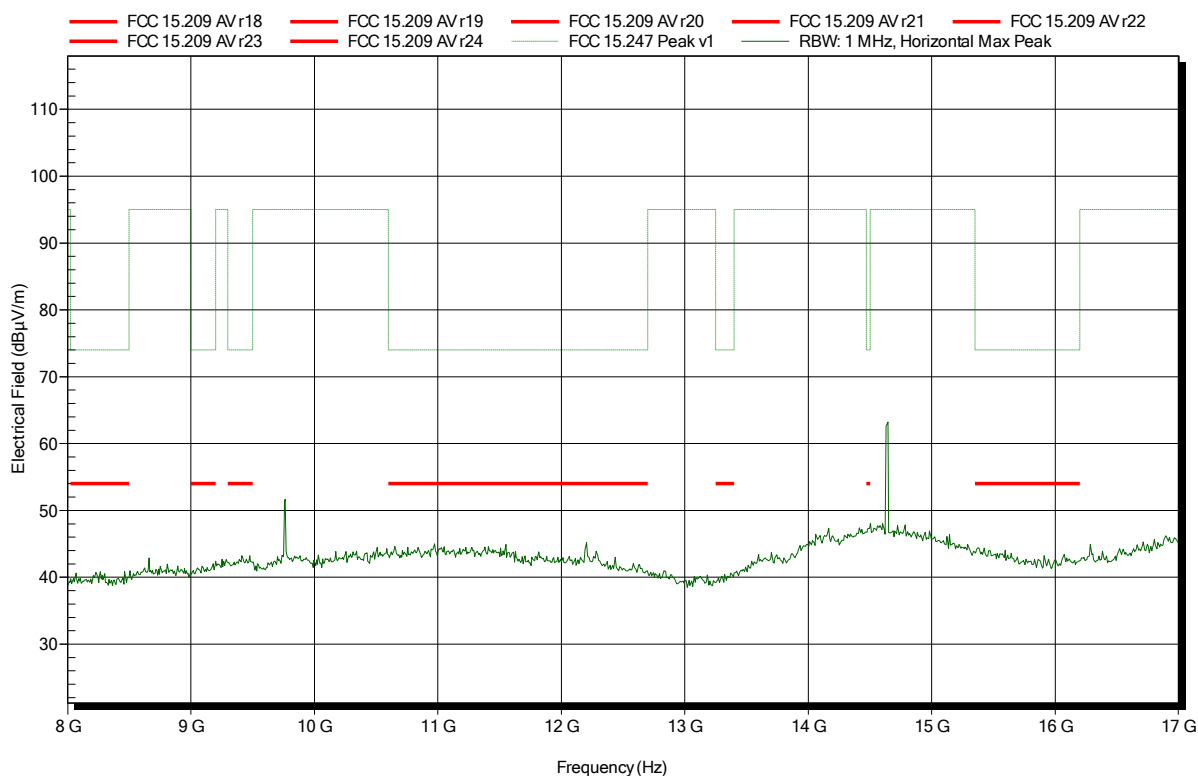
Frequency 4.804 GHz	Peak 56.17 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -17.83 dB	Status Pass
Frequency 4.804 GHz	Average 52.56 dBµV/m	Average Limit 54 dBµV/m	Average Difference -1.44 dB	Average Status Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2440
 Test Date: 2016-09-09
 Note:

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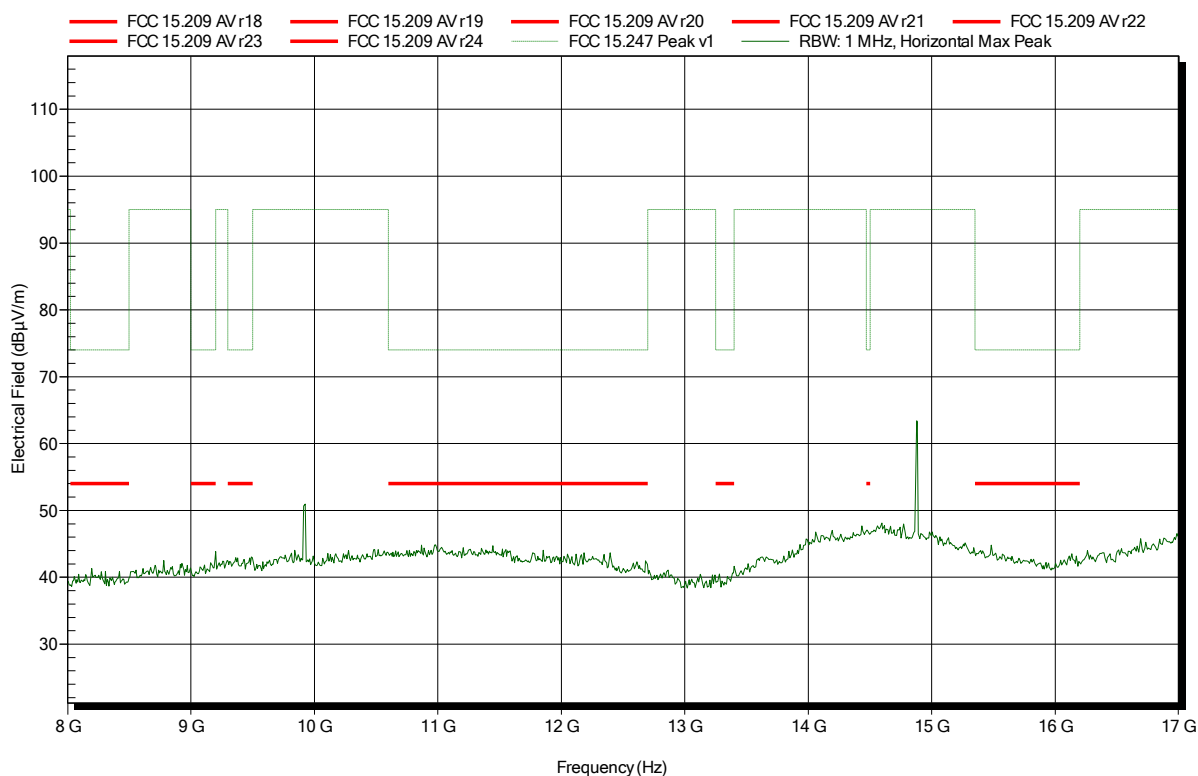


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2480
 Test Date: 2016-09-09
 Note:

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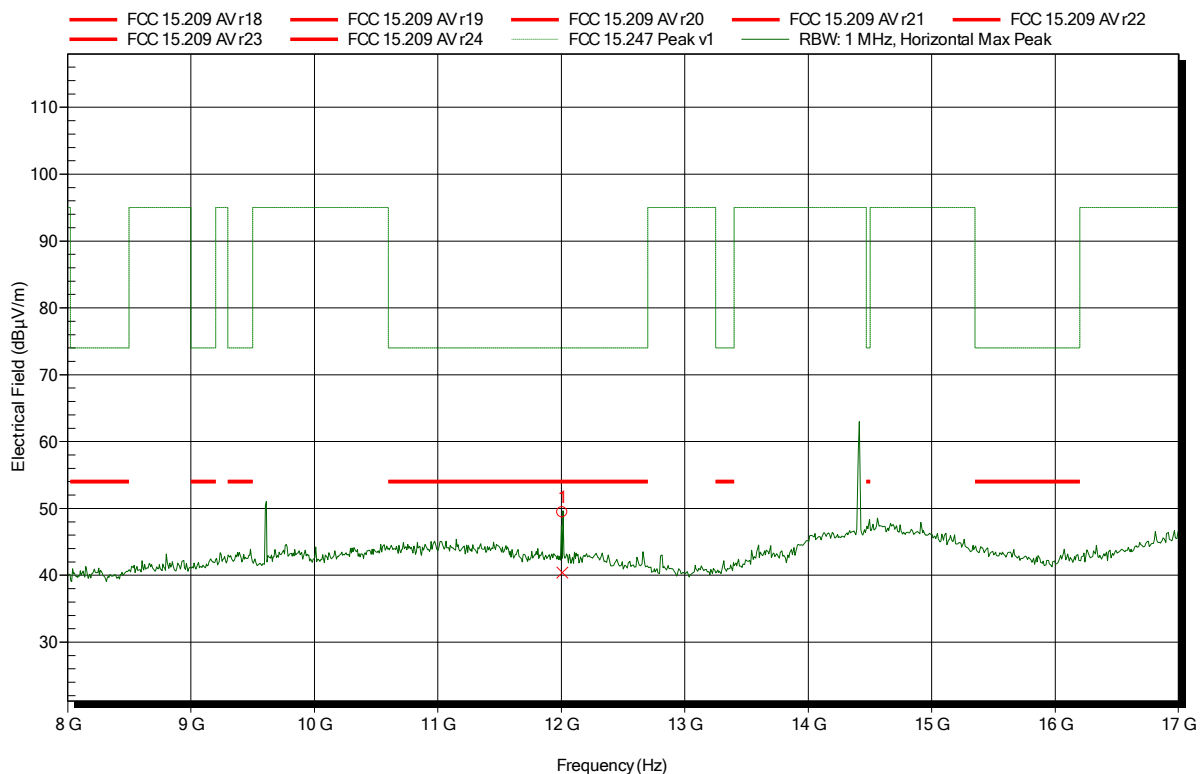


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2402
 Test Date: 2016-09-09
 Note:

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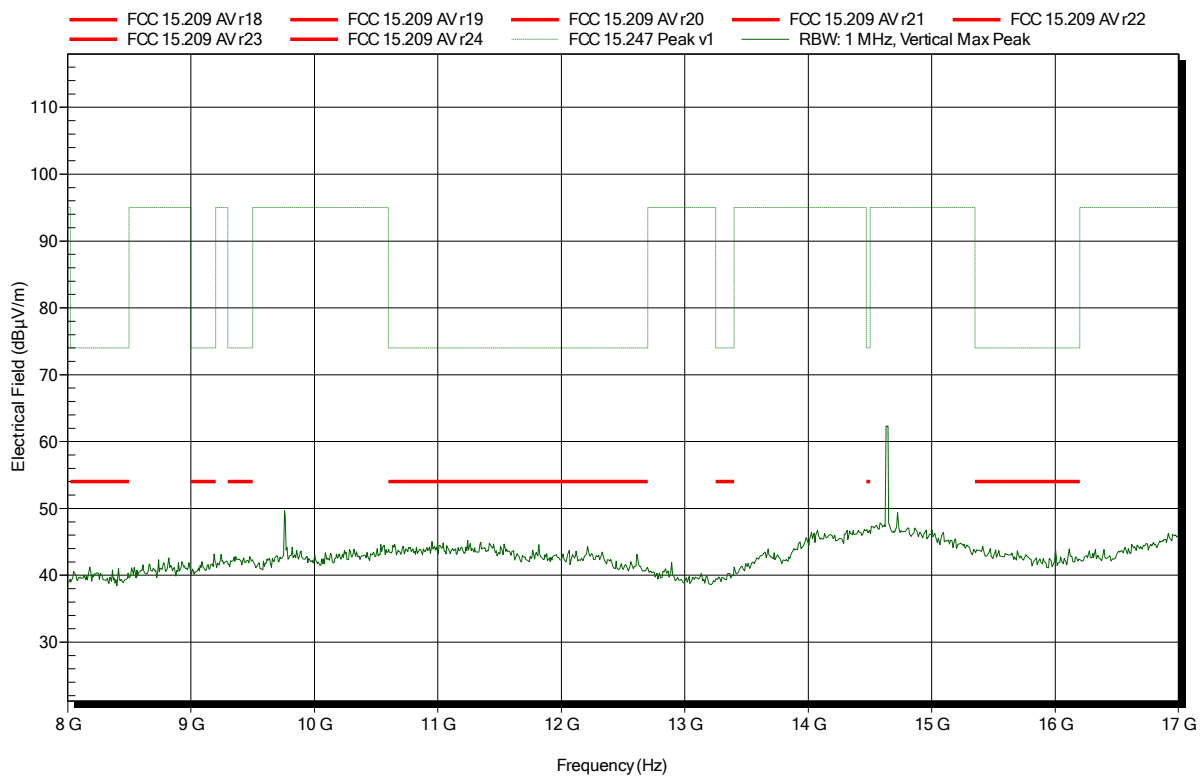
Frequency 12.009 GHz	Peak 49.4 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -24.6 dB	Status Pass
Frequency 12.009 GHz	Average 40.42 dBμV/m	Average Limit 54 dBμV/m	Average Difference -13.58 dB	Average Status Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2440
 Test Date: 2016-09-09
 Note:

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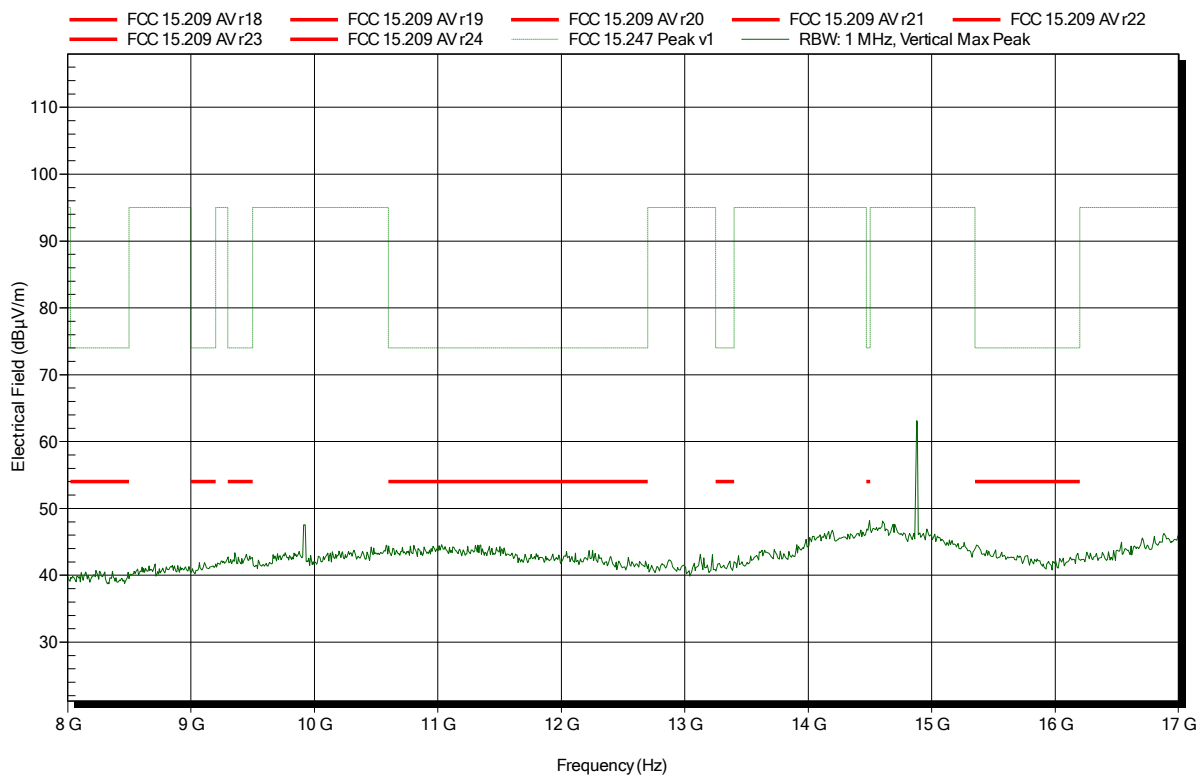


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2480
 Test Date: 2016-09-09
 Note:

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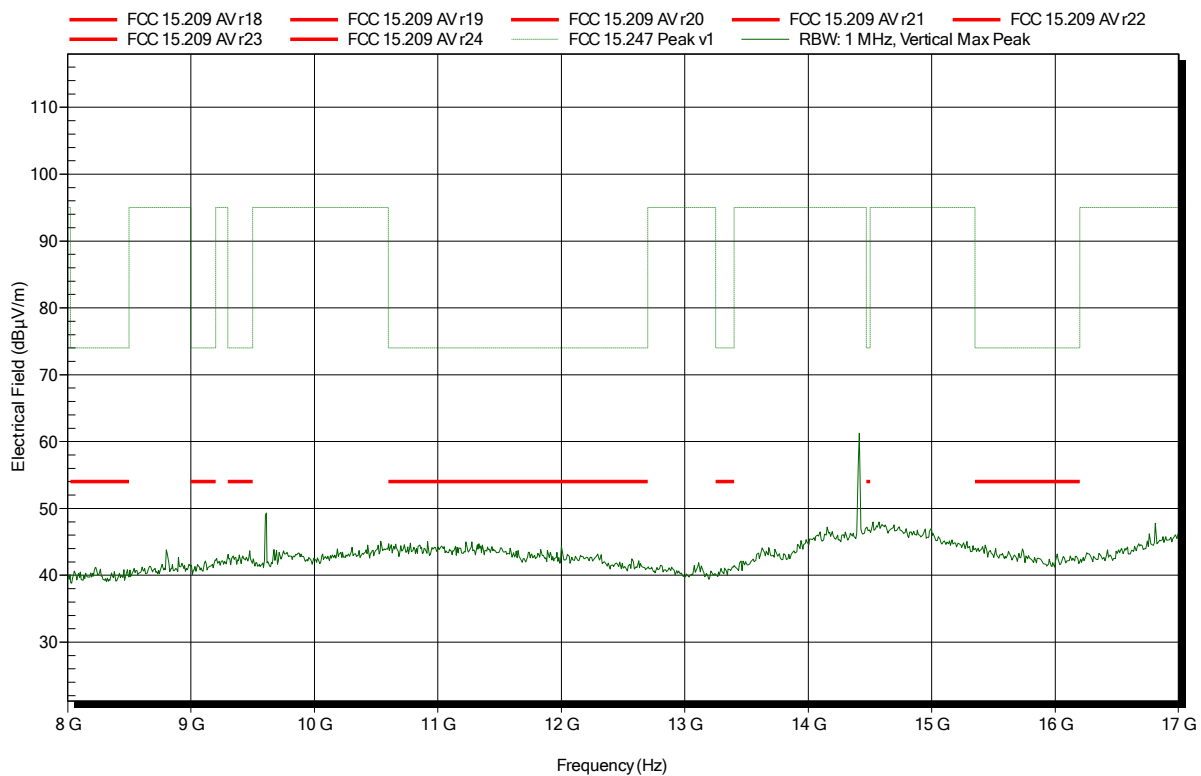


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2402
 Test Date: 2016-09-09
 Note:

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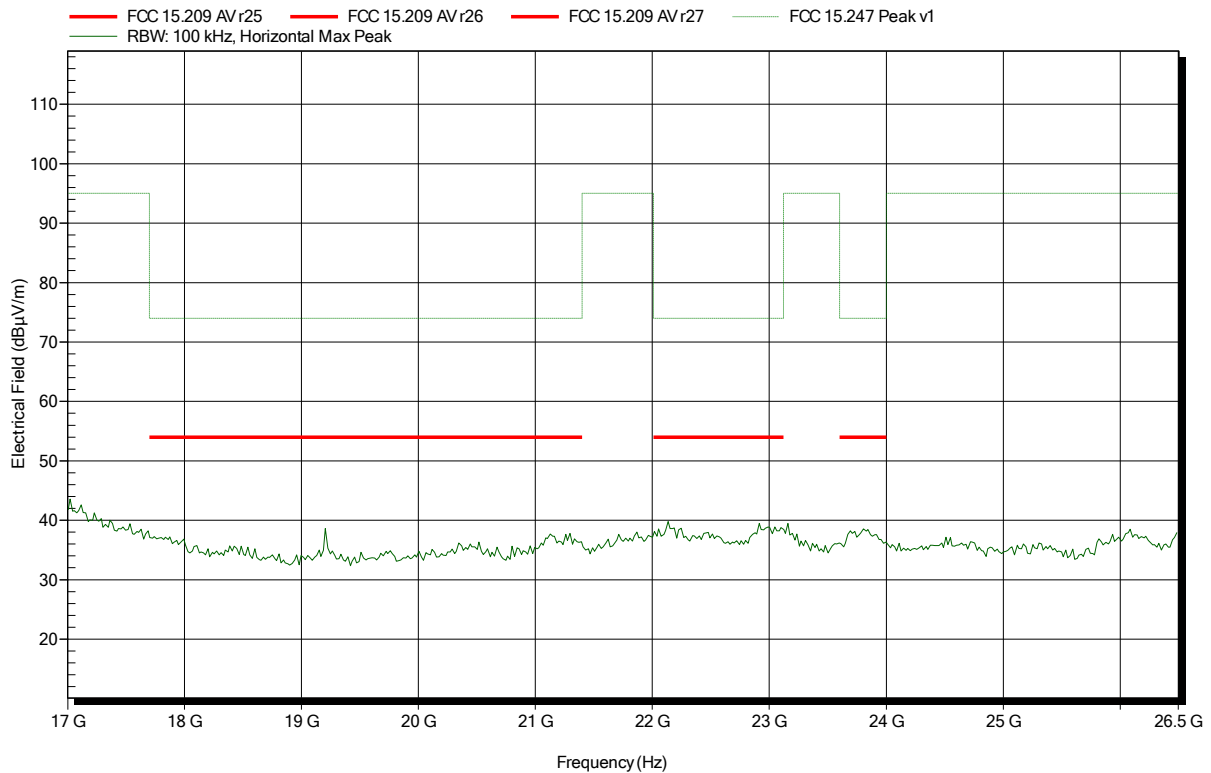


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant:	Motogadget GmbH
EUT Name:	vehicle body control module
Model:	m.unit_blue
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Vnom: 12 V DC
Antenna:	Amplifier Research AT 4560, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; 2402
Test Date:	2016-09-09
Note:	

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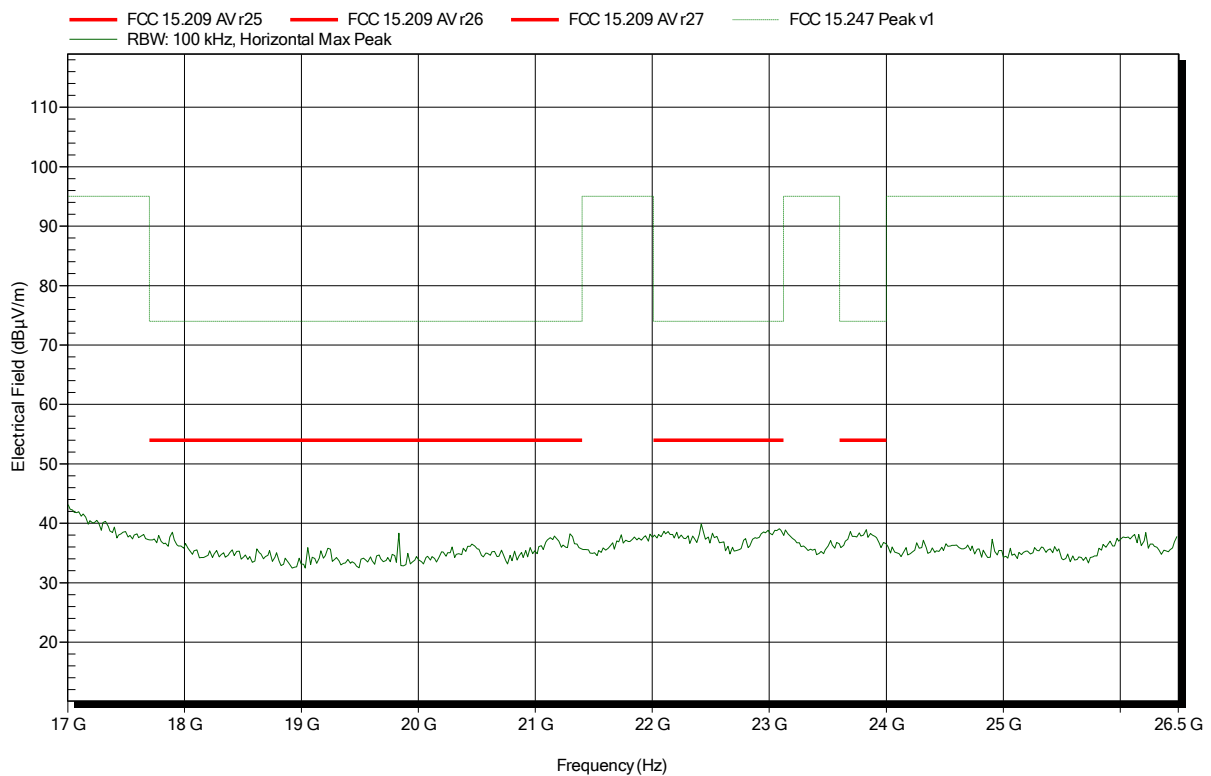


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Amplifier Research AT 4560, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2480
 Test Date: 2016-09-09
 Note:

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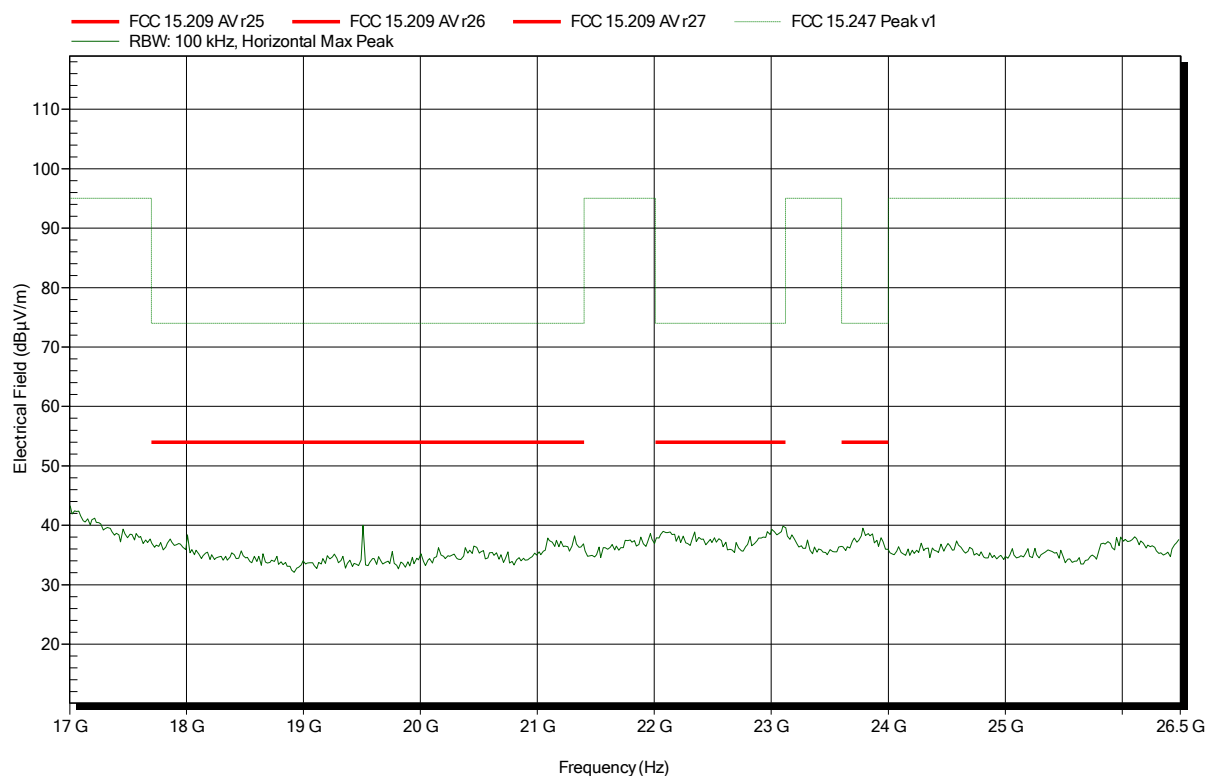


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Amplifier Research AT 4560, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2440
 Test Date: 2016-09-09
 Note:

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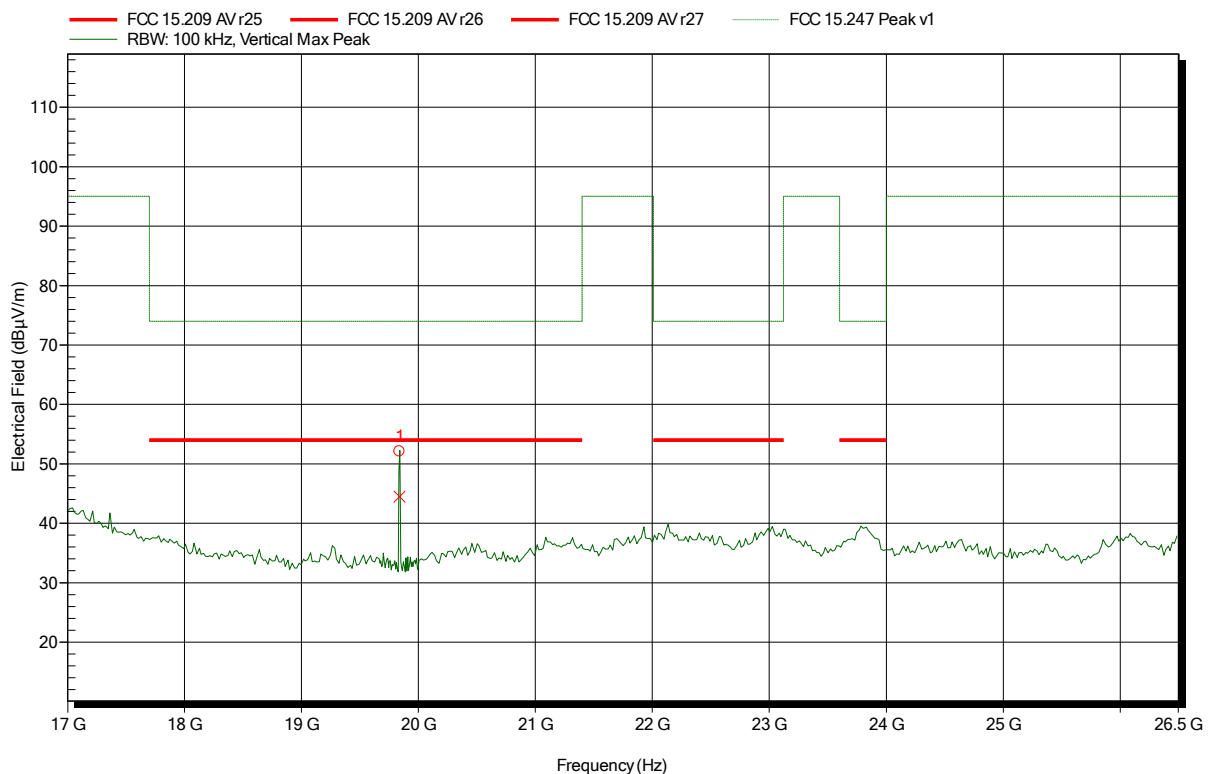


Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Amplifier Research AT 4560, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2480
 Test Date: 2016-09-09
 Note:

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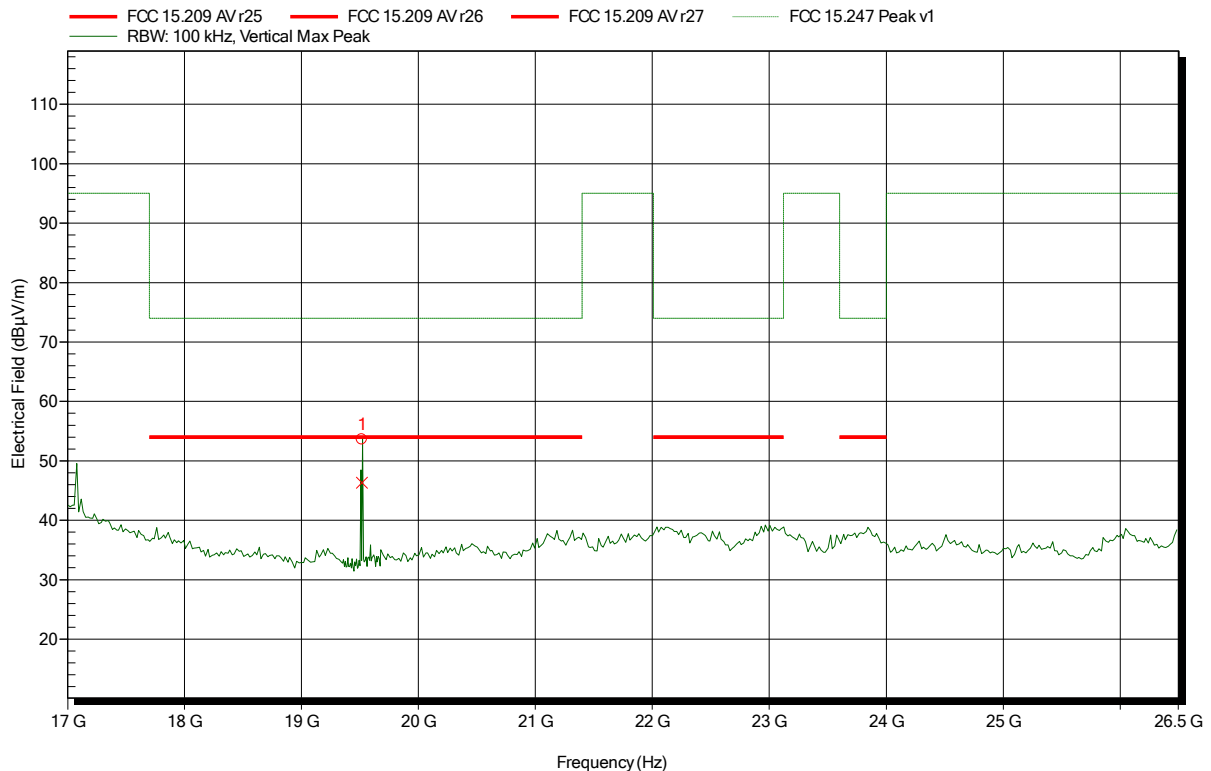
Frequency 19.838 GHz	Peak 52.07 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -21.93 dB	Status Pass
Frequency 19.838 GHz	Average 44.5 dBµV/m	Average Limit 54 dBµV/m	Average Difference -9.5 dB	Average Status Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Amplifier Research AT 4560, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2440
 Test Date: 2016-09-09
 Note:

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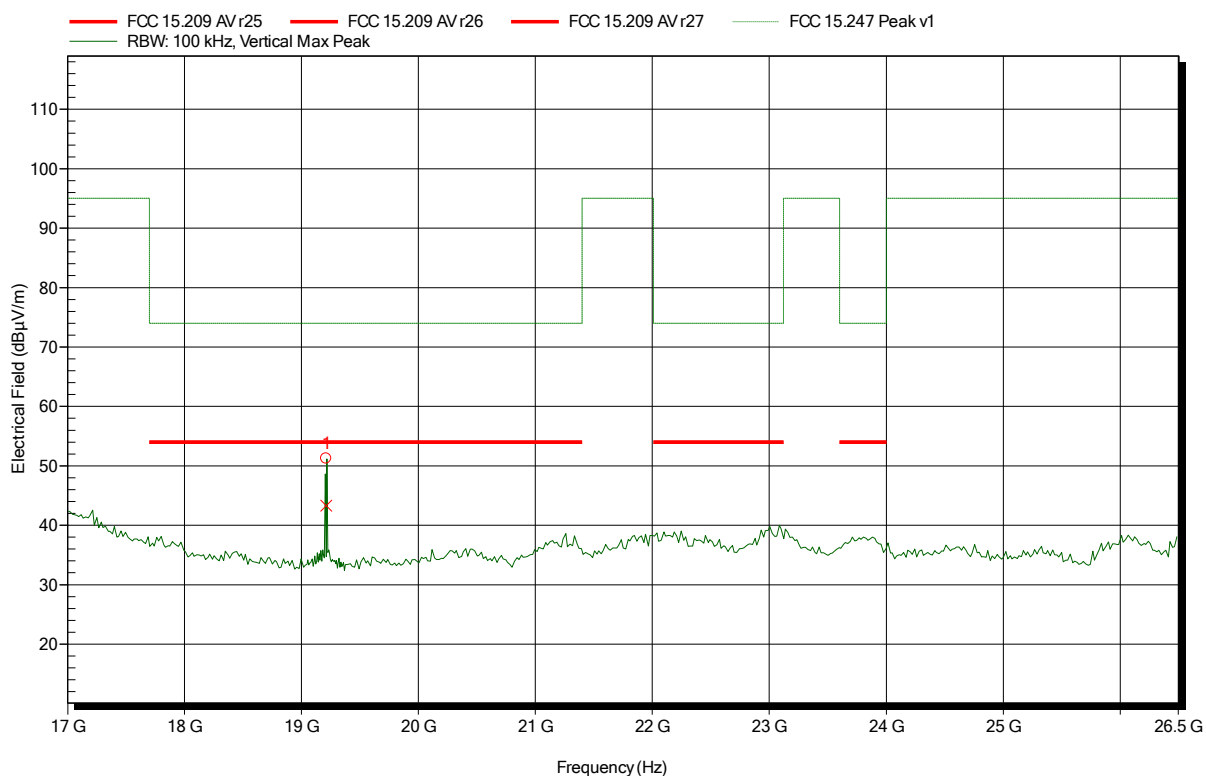
Frequency 19.518 GHz	Peak 53.62 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -20.38 dB	Status Pass
Frequency 19.518 GHz	Average 46.3 dBµV/m	Average Limit 54 dBµV/m	Average Difference -7.7 dB	Average Status Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Amplifier Research AT 4560, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; 2402
 Test Date: 2016-09-09
 Note:

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Frequency 19.214 GHz	Peak 51.21 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -22.79 dB	Status Pass
Frequency 19.214 GHz	Average 43.31 dBµV/m	Average Limit 54 dBµV/m	Average Difference -10.69 dB	Average Status Pass

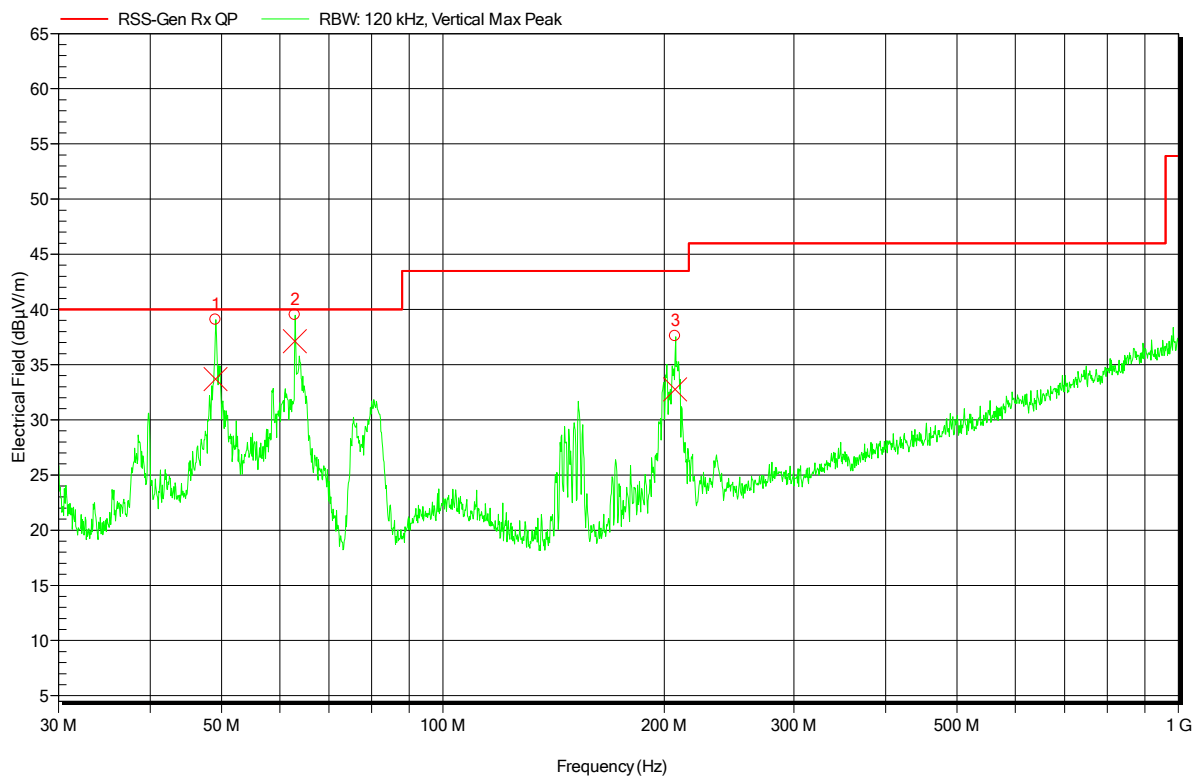
ANNEX B Receiver radiated spurious emissions

Spurious emissions under normal conditions according to RSS-Gen

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Unom: 12 VDC
 Antenna: Schwarzbeck VULB 9162, Vertical
 Measurement distance: 10m corrected to 3 m
 Mode: Rx 2440 MHz
 Test Date: 2016-09-09
 Note:

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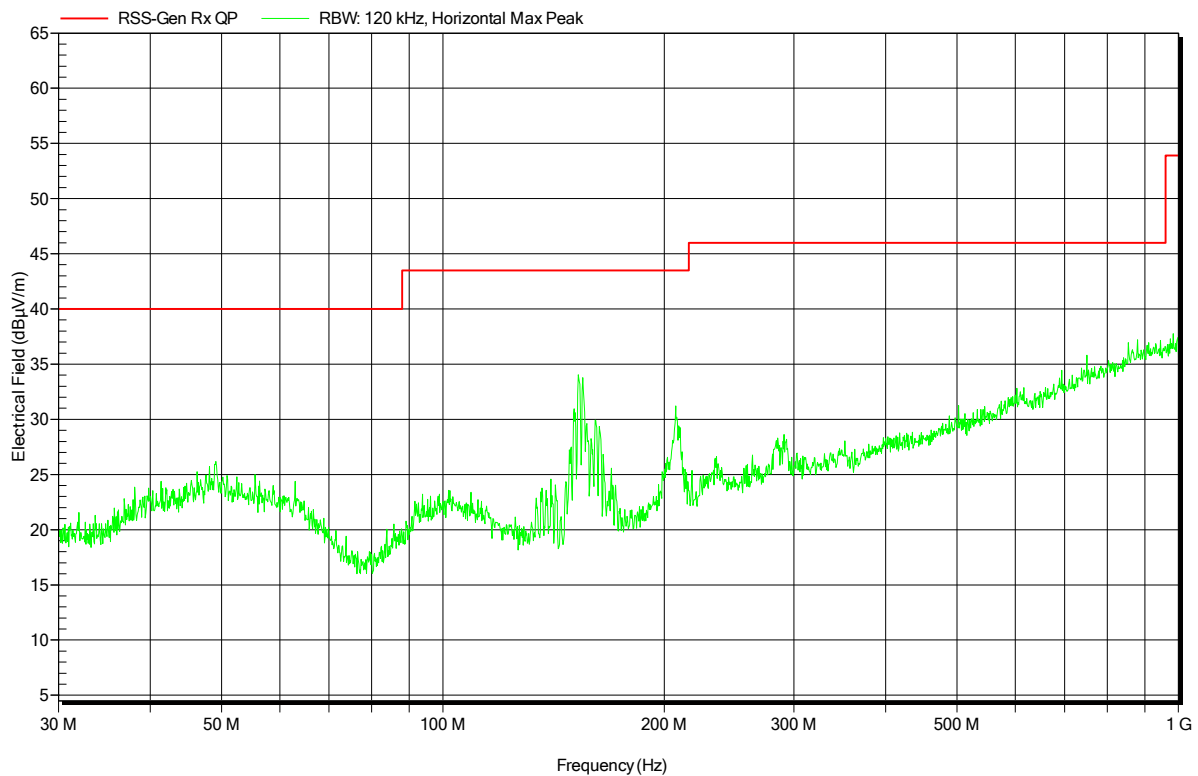
Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	49.08 MHz	33.7 dBμV/m	40 dBμV/m	-6.3 dB	Pass	0 Degree	1 m
2	62.916 MHz	37.1 dBμV/m	40 dBμV/m	-2.9 dB	Pass	0 Degree	1 m
3	206.94 MHz	32.7 dBμV/m	43.5 dBμV/m	-10.8 dB	Pass	0 Degree	1 m

Spurious emissions under normal conditions according to RSS-Gen

Project number: G0M-1605-5591

Applicant:	Motogadget GmbH
EUT Name:	vehicle body control module
Model:	m.unit_blue
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Unom: 12 VDC
Antenna:	Schwarzbeck VULB 9162, Horizontal
Measurement distance:	10m corrected to 3 m
Mode:	Rx 2440 MHz
Test Date:	2016-09-09
Note:	

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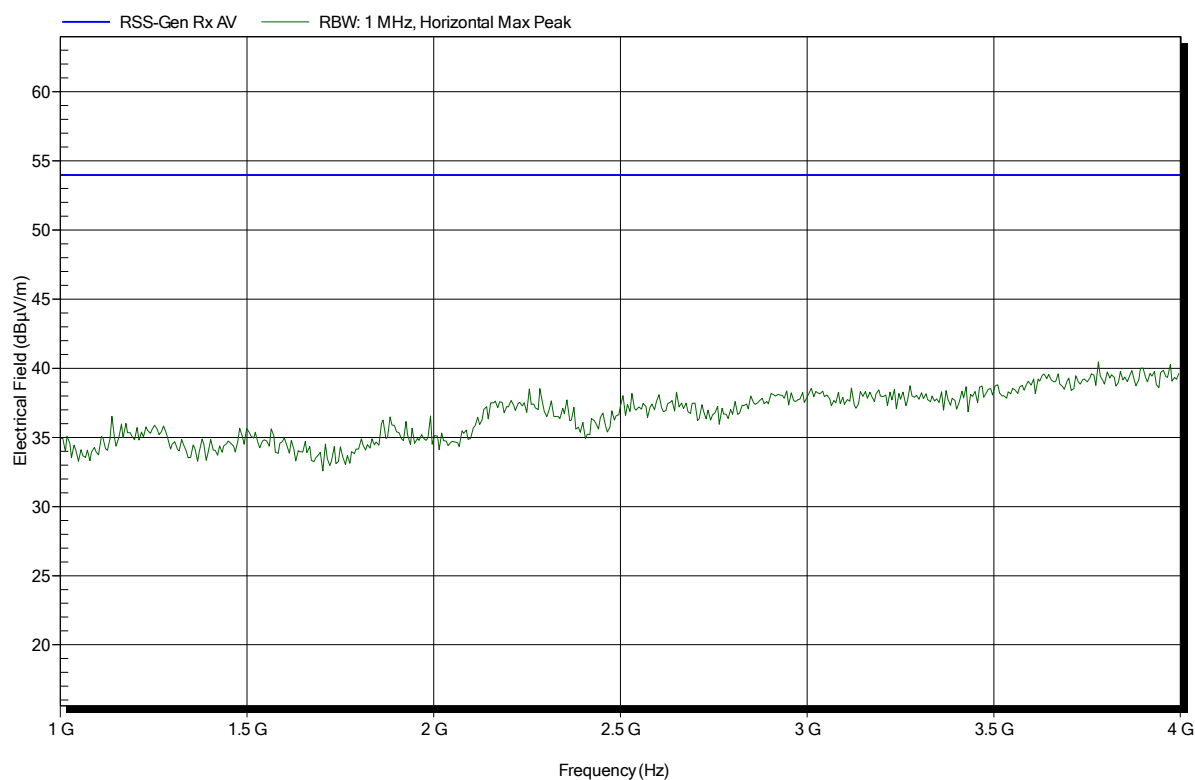


Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1605-5591

Applicant:	Motogadget GmbH
EUT Name:	vehicle body control module
Model:	m.unit_blue
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Vnom: 12 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	RX; 2440
Test Date:	2016-09-09
Note:	

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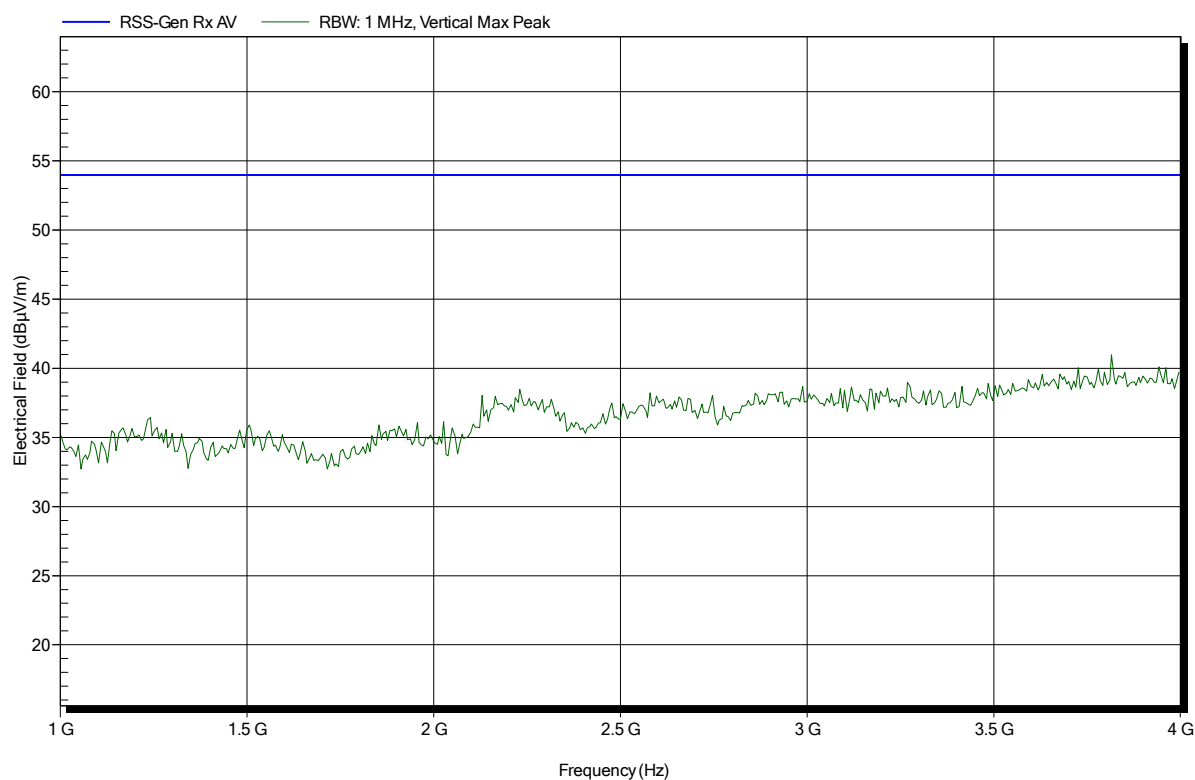


Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1605-5591

Applicant:	Motogadget GmbH
EUT Name:	vehicle body control module
Model:	m.unit_blue
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Vnom: 12 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	RX; 2440
Test Date:	2016-09-09
Note:	

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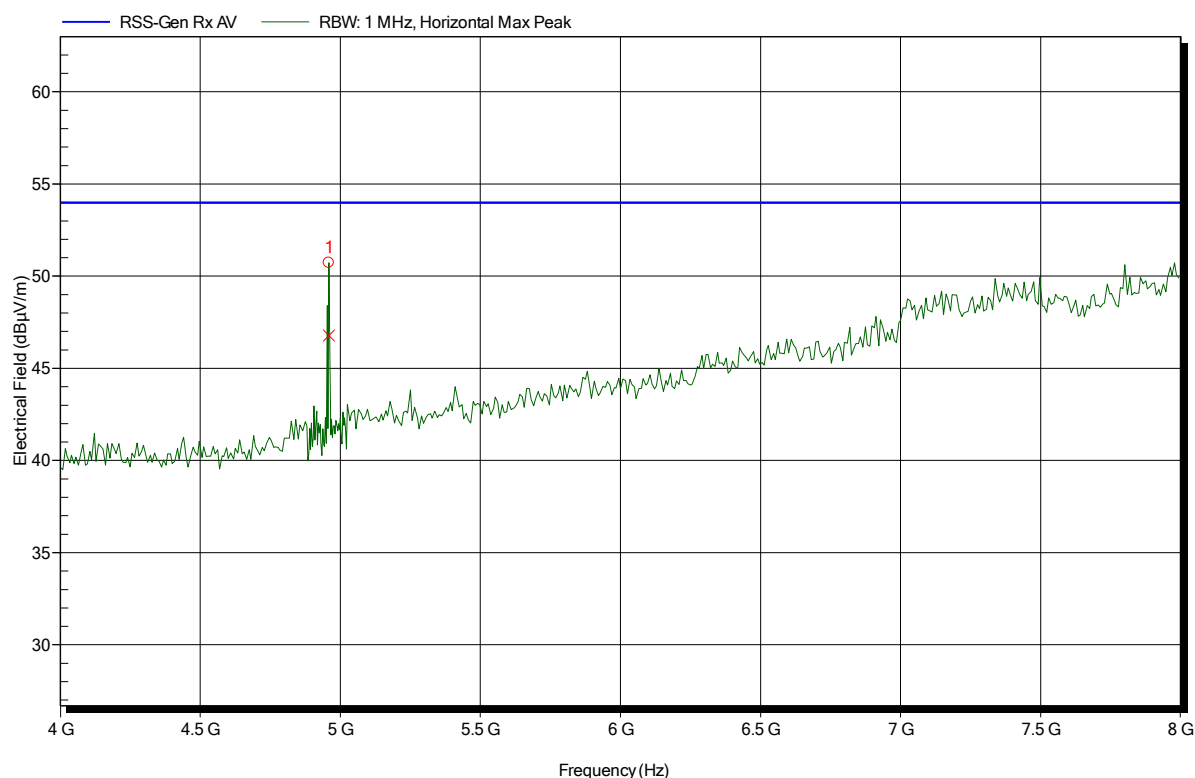


Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: RX; 2440
 Test Date: 2016-09-09
 Note:

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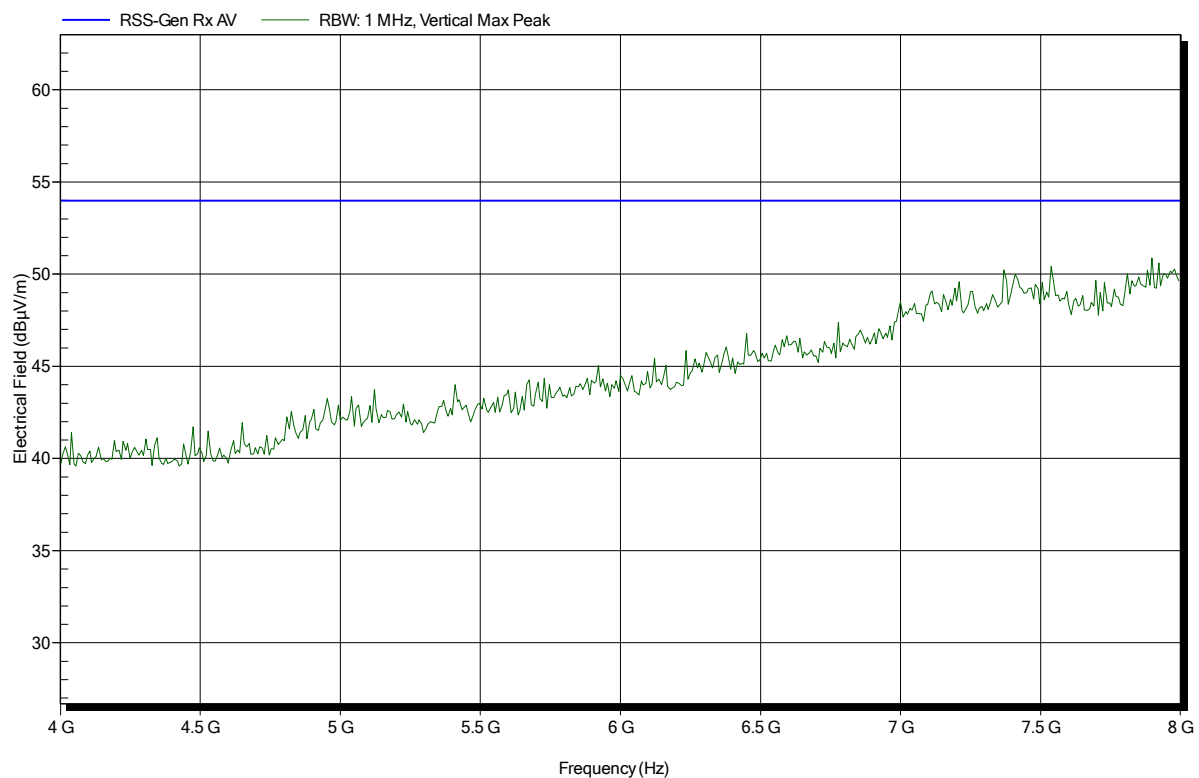
Frequency	Average	Average Limit	Average Difference	Average Status
4.959 GHz	46.78 dBµV/m	53.98 dBµV/m	-7.2 dB	Pass

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1605-5591

Applicant:	Motogadget GmbH
EUT Name:	vehicle body control module
Model:	m.unit_blue
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Vnom: 12 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	RX; 2440
Test Date:	2016-09-09
Note:	

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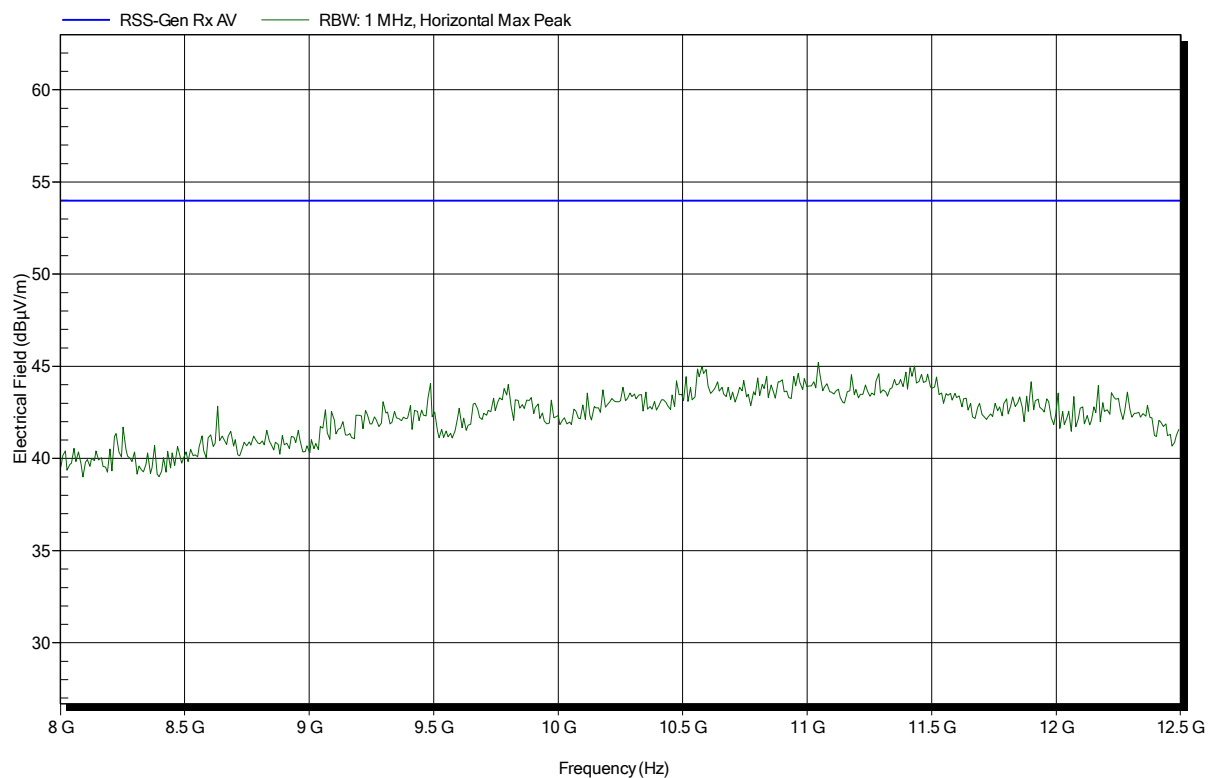


Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1605-5591

Applicant:	Motogadget GmbH
EUT Name:	vehicle body control module
Model:	m.unit_blue
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 20°C, Vnom: 12 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	RX; 2440
Test Date:	2016-09-09
Note:	

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Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1605-5591

Applicant: Motogadget GmbH
 EUT Name: vehicle body control module
 Model: m.unit_blue
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 20°C, Vnom: 12 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: RX; 2440
 Test Date: 2016-09-09
 Note:

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