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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) (Responsible for Test)	Sebastian Suckow
Approved by (+ signature) (Head of Lab)	Christian Weber
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.

Additional comments:

Version History

Version	Issue Date	Remarks	Revised by
01	2016-09-16	Initial Release	

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

REPORT INDEX

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	

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

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:

Reading on Analyzer (dBµV) + A.F. (dB) = Net field strength (dBµV/m)

Net:

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

Limit:

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

Limit (dBµV/m) = 20*log (µV/m)

Margin:

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

Example only:

Reading	+	AF	=	Net Reading	:	Net reading - FCC limit	= Margin
21.5 dBµV	+	26 dB	=	47.5 dBµV/m	:	47.5 dBµV/m - 57.0 dBµV/m	= -9.5 dB

2 Result Summary

FCC 47 CFR Part 15C, ISED 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

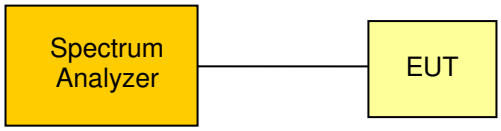
3.1 Test Conditions and Results – Occupied Bandwidth

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



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

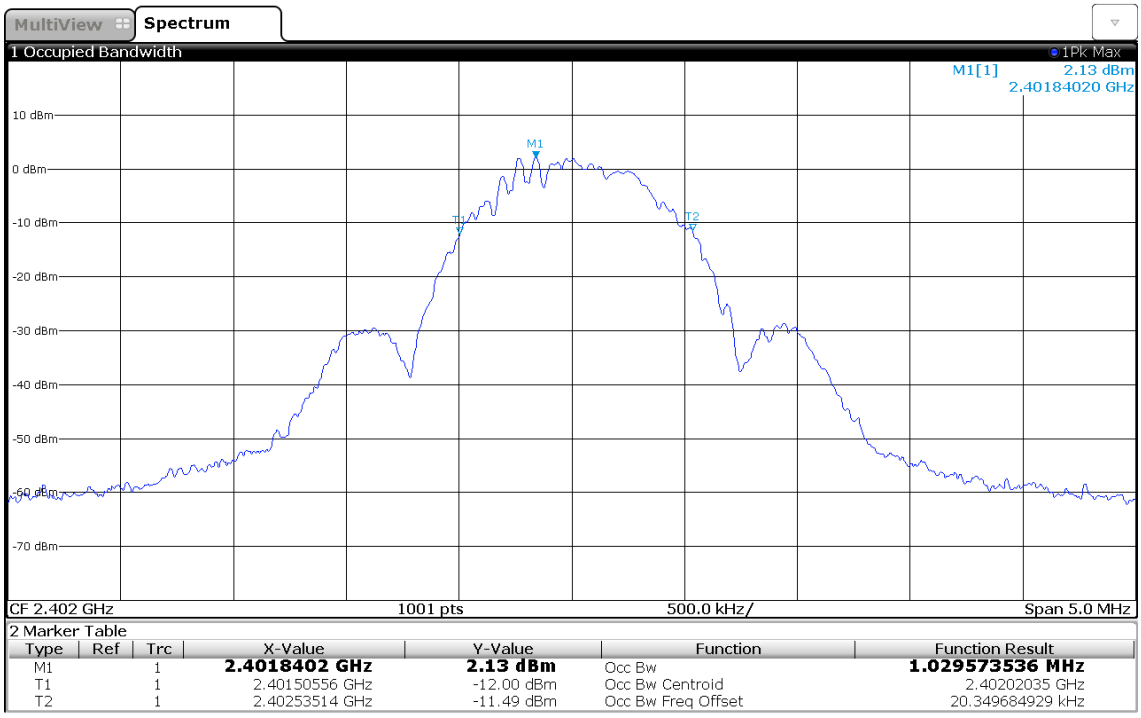
Channel	Frequency [MHz]	Mode	Occupied Bandwidth [MHz]
F_{LOW}	2402	Transmit	1.030
F_{MID}	2440	Transmit	1.030
F_{HIGH}	2480	Transmit	1.030

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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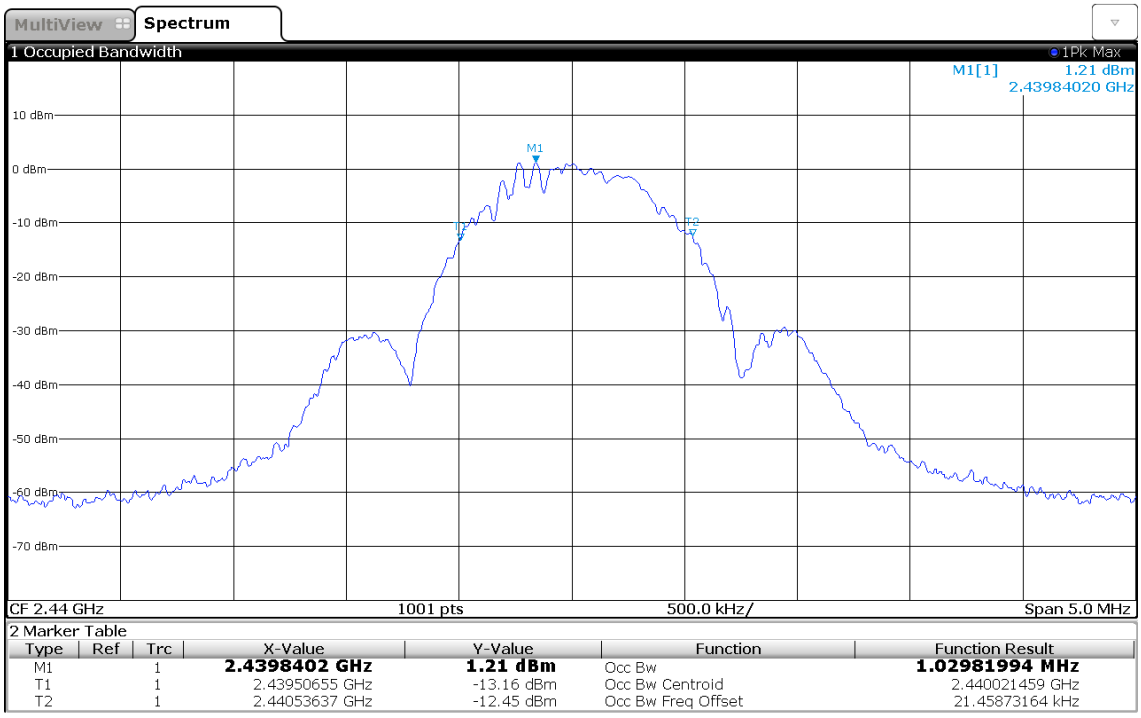
Occupied Bandwidth – F_{MID}

Occupied Bandwidth

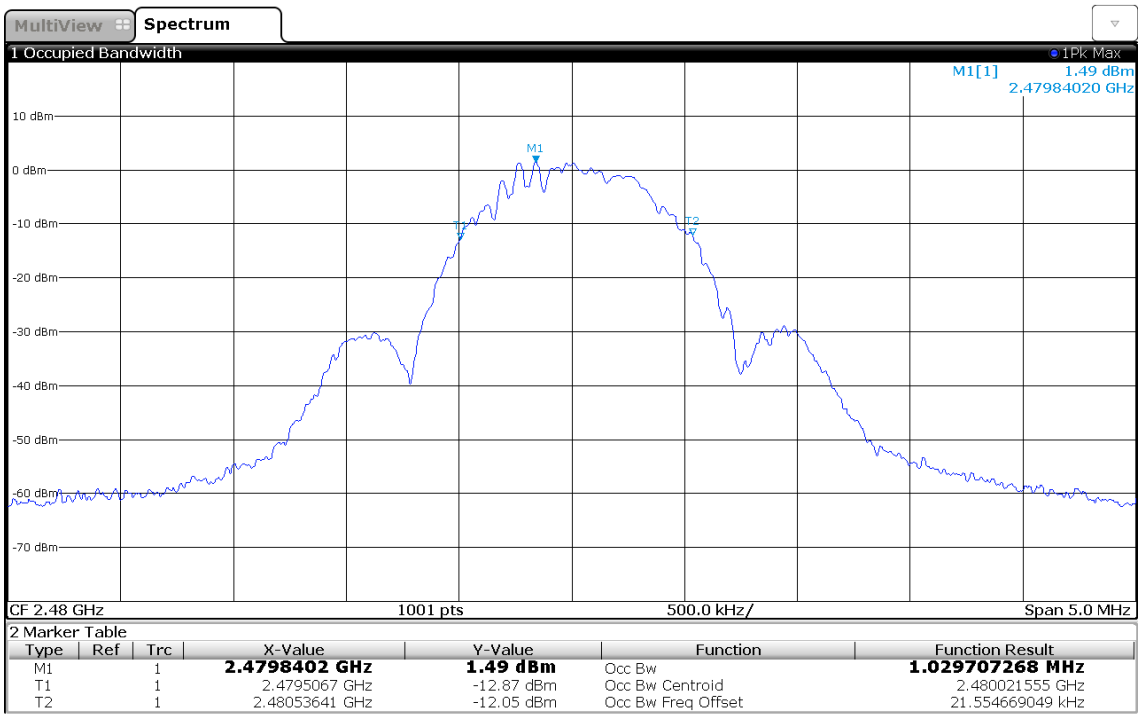
Project Number:	G0M-1605-5591
Applicant	Motogadget GmbH
Model Description	vehicle body control module
Model:	m.unit_blue
Test Sample ID:	conducted
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	GFSK, Channel: 19, 2440 MHz
Operating Conditions:	Tnom/Vnom
Operator:	M. Handrik
Test Site:	Eurofins Product Service GmbH
Test Date:	2016-09-09
Occupied Bandwidth [MHz]:	1.030



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



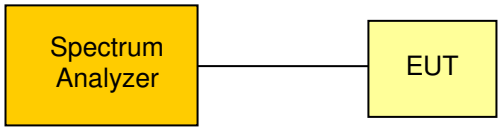
3.2 Test Conditions and Results – 6 dB Bandwidth

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



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

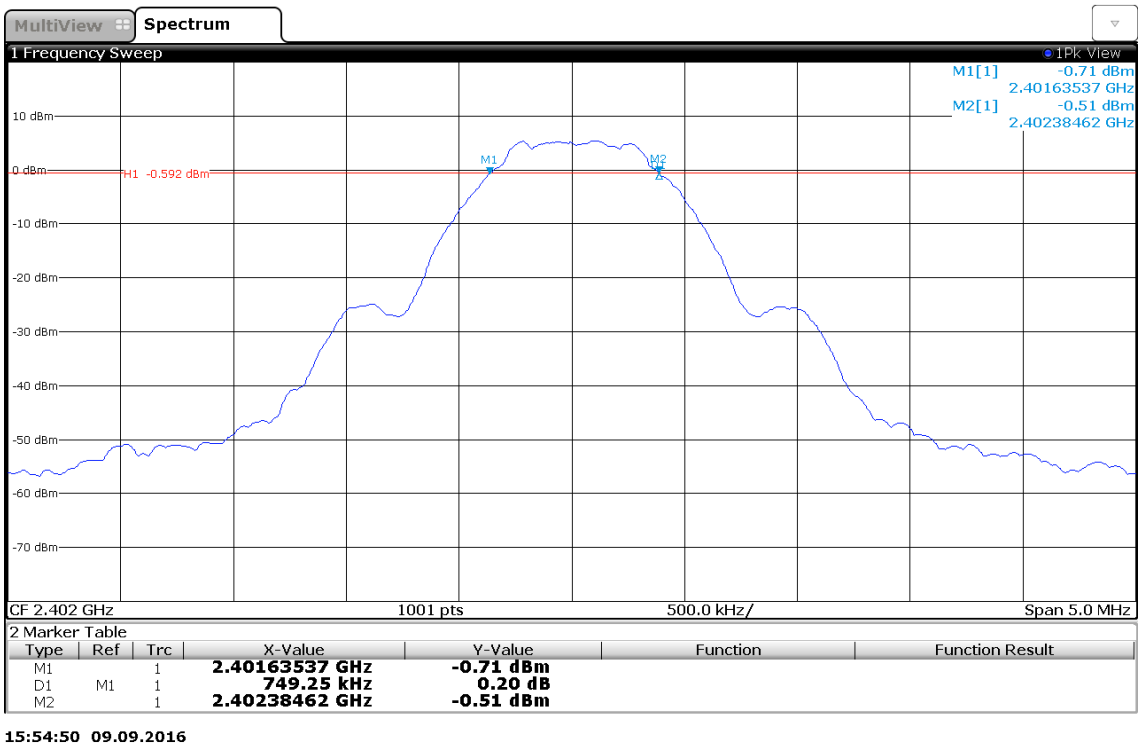
Test results

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

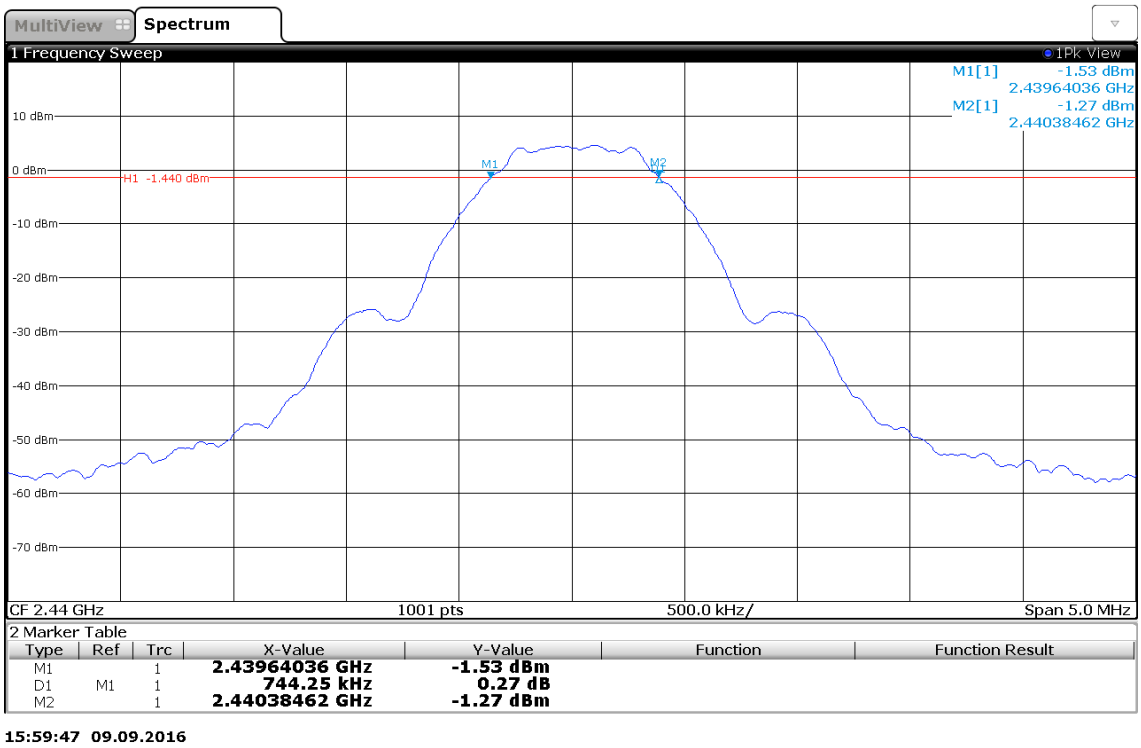
Project Number:	G0M-1605-5591
Applicant	Motogadget GmbH
Model Description	vehicle body control module
Model:	m.unit_blue
Test Sample ID:	conducted
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	GFSK, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
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

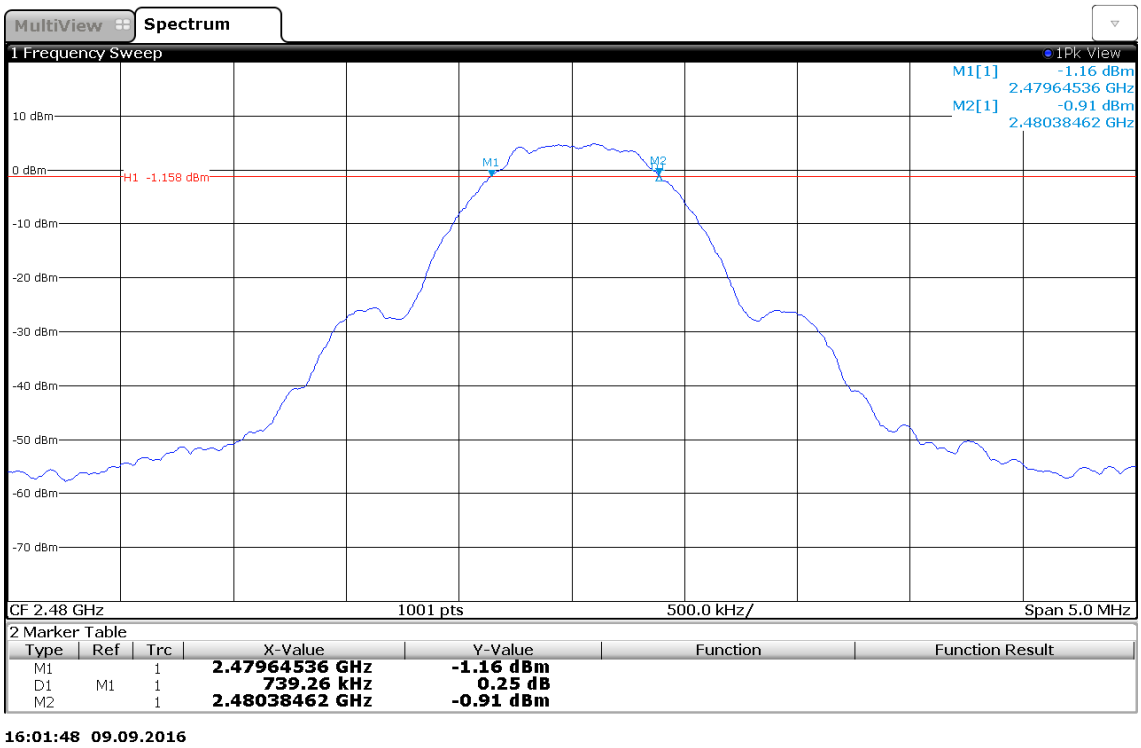
Project Number:	G0M-1605-5591
Applicant	Motogadget GmbH
Model Description	vehicle body control module
Model:	m.unit_blue
Test Sample ID:	conducted
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	GFSK, Channel: 19, 2440 MHz
Operating Conditions:	Tnom/Vnom
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



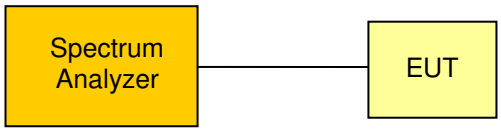
6 dB Bandwidth – F_{HIGH}

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 / ISED RSS-247	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(b)(3) / ISED 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	
	
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:							

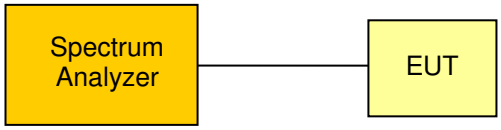
3.4 Test Conditions and Results – Power spectral density

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



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:

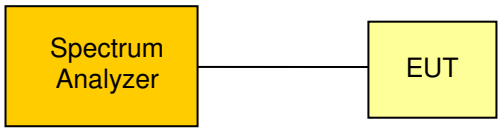
3.5 Test Conditions and Results – Band edge compliance

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



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

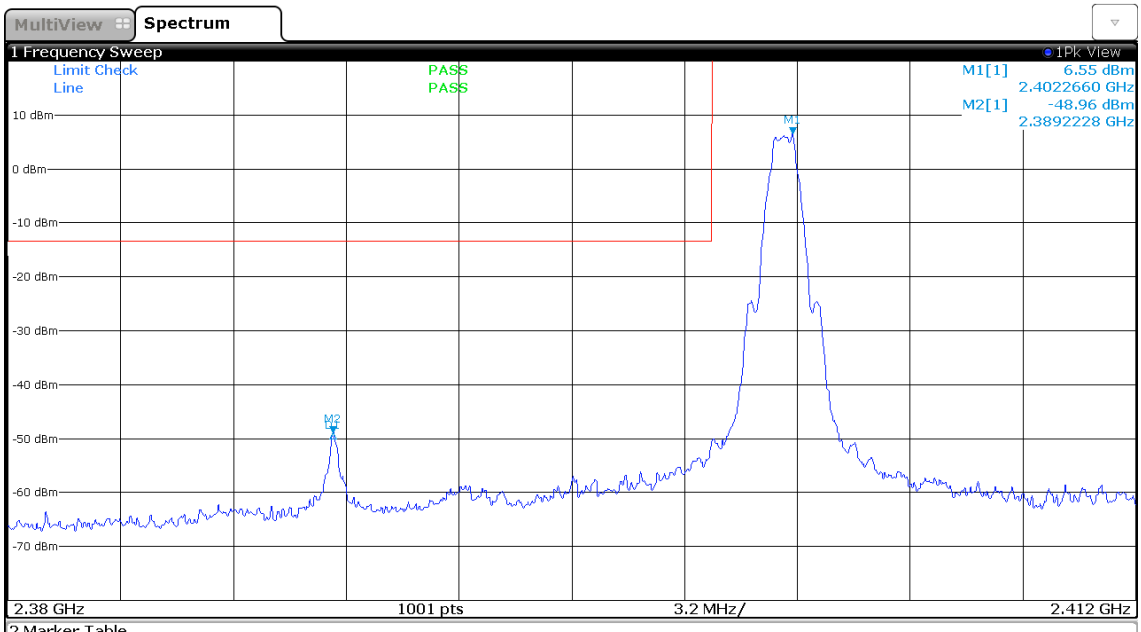
Channel	Frequency [MHz]	Mode	Level [dBc]	Limit [dBc]	Margin [dB]
F_{LOW}	2402	Transmit	-55.5	-20	-35.50
F_{HIGH}	2480	Transmit	-62.57	-20	-42.57

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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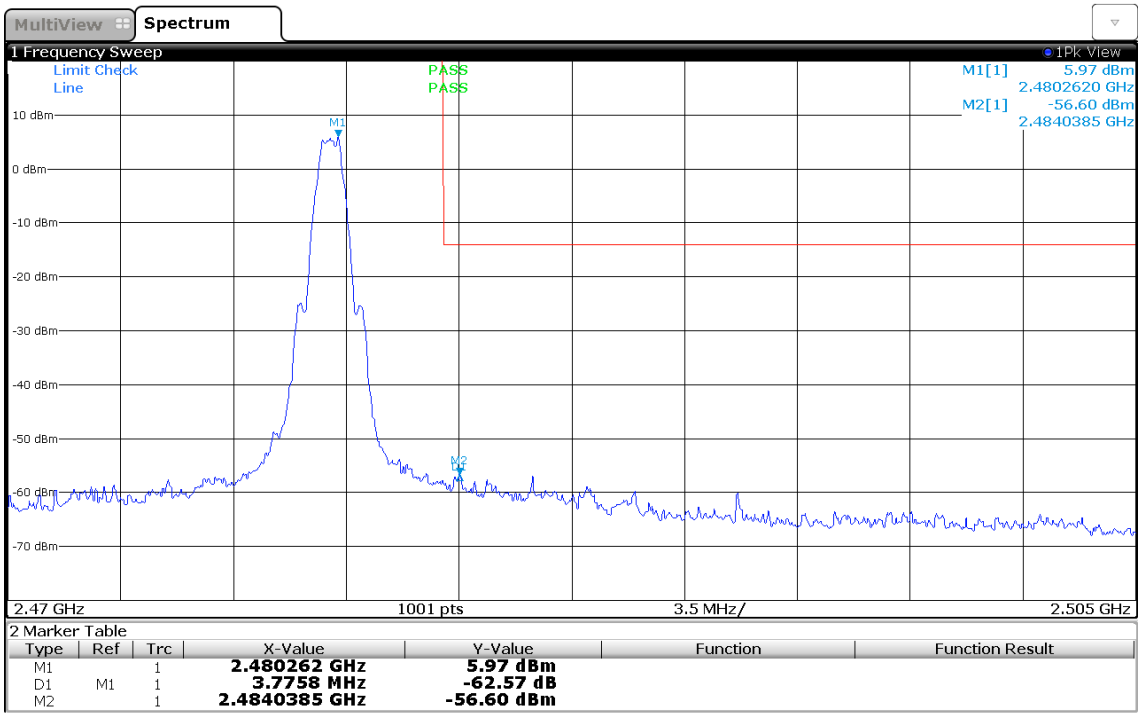
Band-edge compliance – F_{HIGH}

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



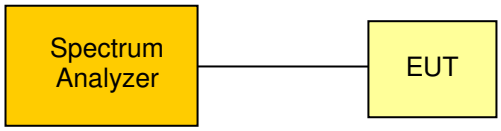
3.6 Test Conditions and Results – Conducted spurious emissions

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 – 10th 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



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

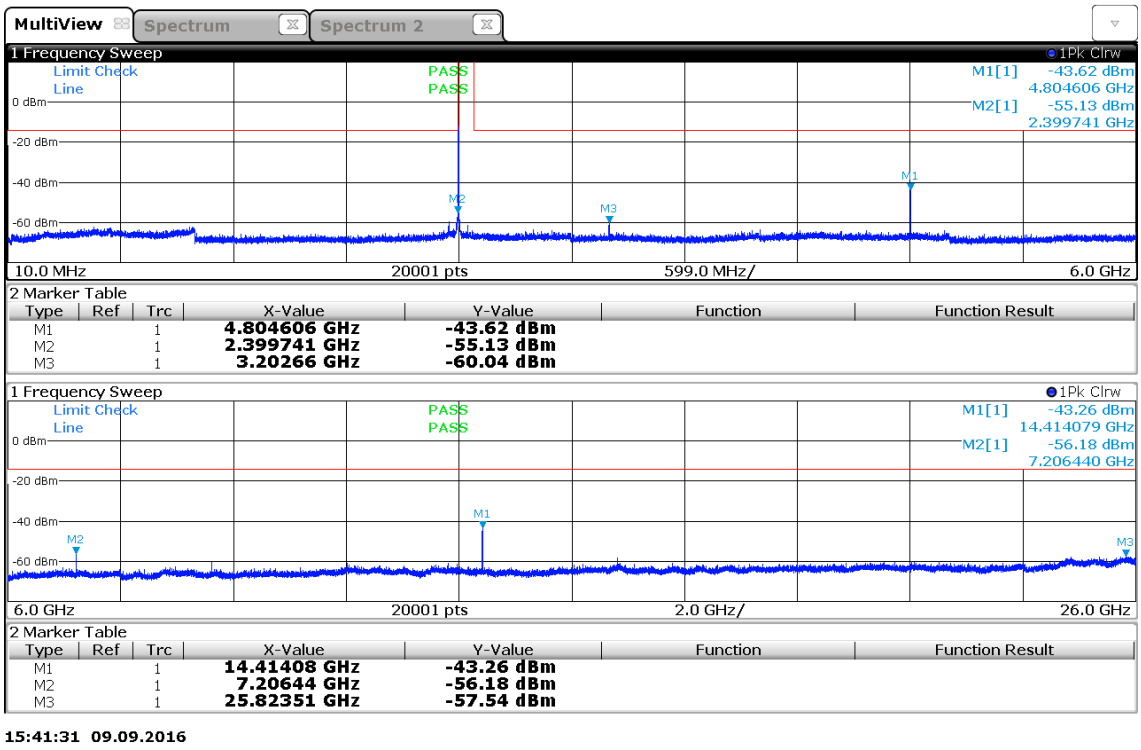
Channel	Frequency [MHz]	Mode	Emission [MHz]	Emission Level [dbm]	Peak power [dBm]	Limit [dBm]	Margin [dB]
F_{LOW}	2402	BTLE	4804	-43.62	5.8	-14.2	-29.42
F_{LOW}	2402	BTLE	14414	-43.26	5.8	-14.2	-29.06
F_{MID}	2440	BTLE	4879	-45.30	5.1	-14.9	-30.40
F_{MID}	2440	BTLE	14639	-37.34	5.1	-14.9	-22.44
F_{HIGH}	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

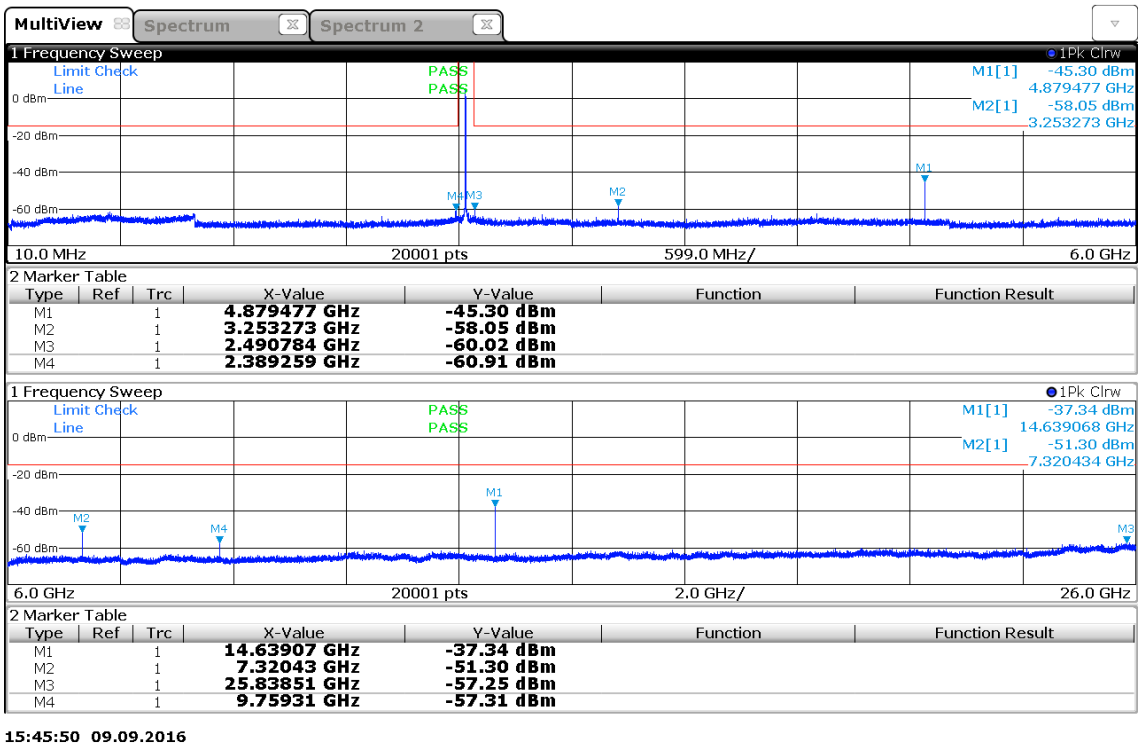
Project Number:	G0M-1605-5591
Applicant	Motogadget GmbH
Model Description	vehicle body control module
Model:	m.unit_blue
Test Sample ID:	conducted
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	GFSK, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
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



Conducted spurious emissions – F_{MID}

Conducted Spurious Emissions

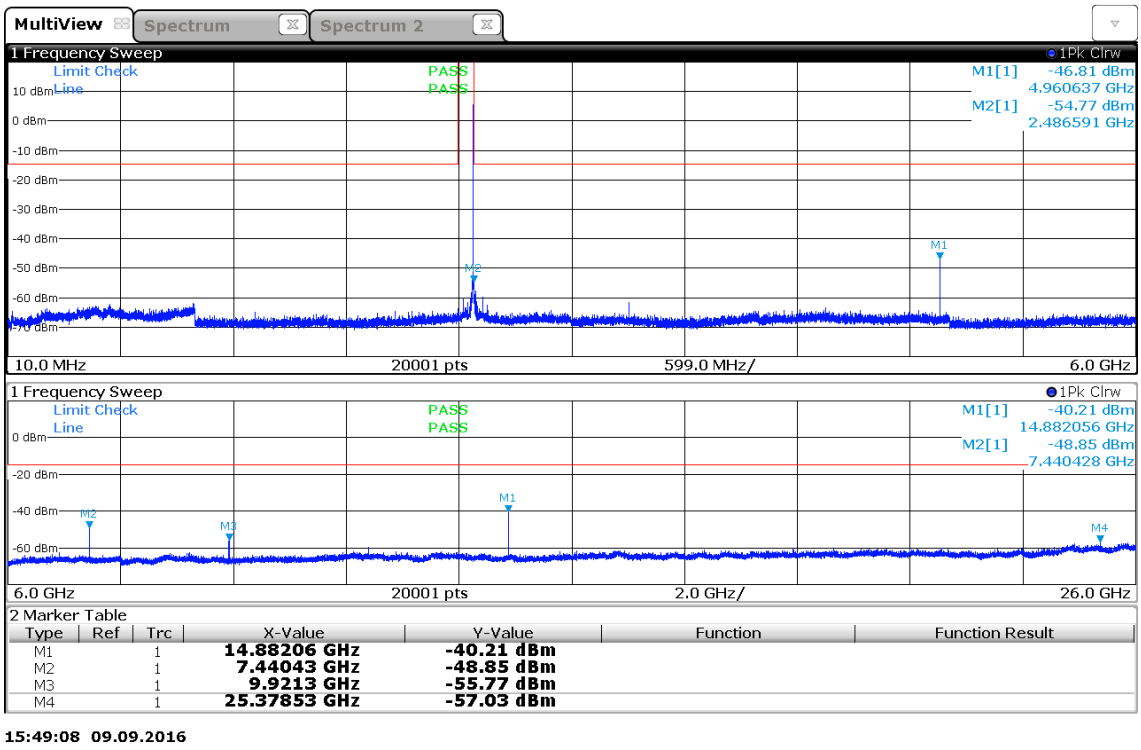
Project Number:	G0M-1605-5591
Applicant	Motogadget GmbH
Model Description	vehicle body control module
Model:	m.unit_blue
Test Sample ID:	conducted
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	GFSK, Channel: 19, 2440 MHz
Operating Conditions:	Tnom/Vnom
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



Conducted spurious emissions – F_{HIGH}

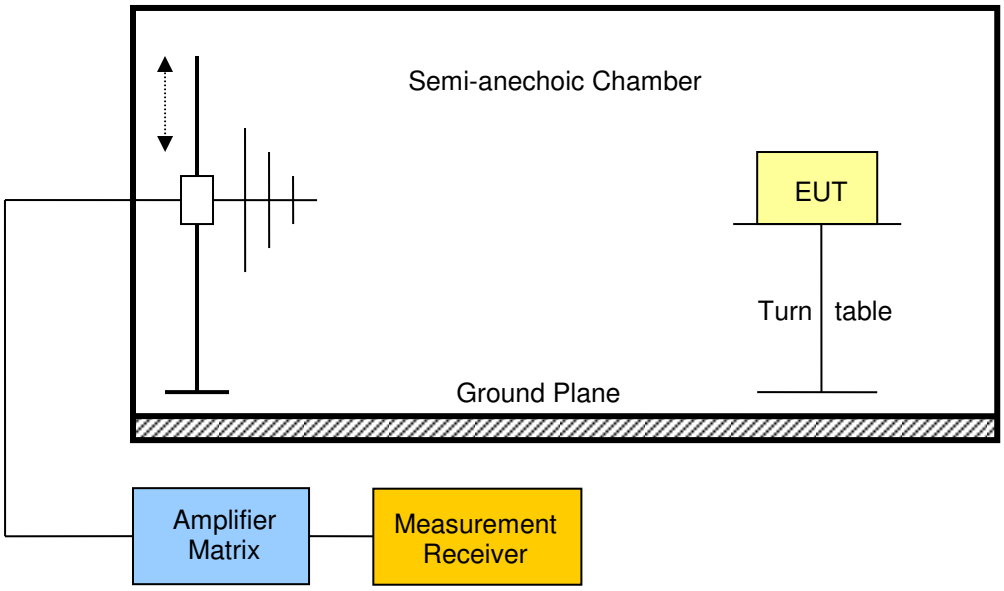
Conducted Spurious Emissions

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:	Tnom/Vnom
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



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 – 10th 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

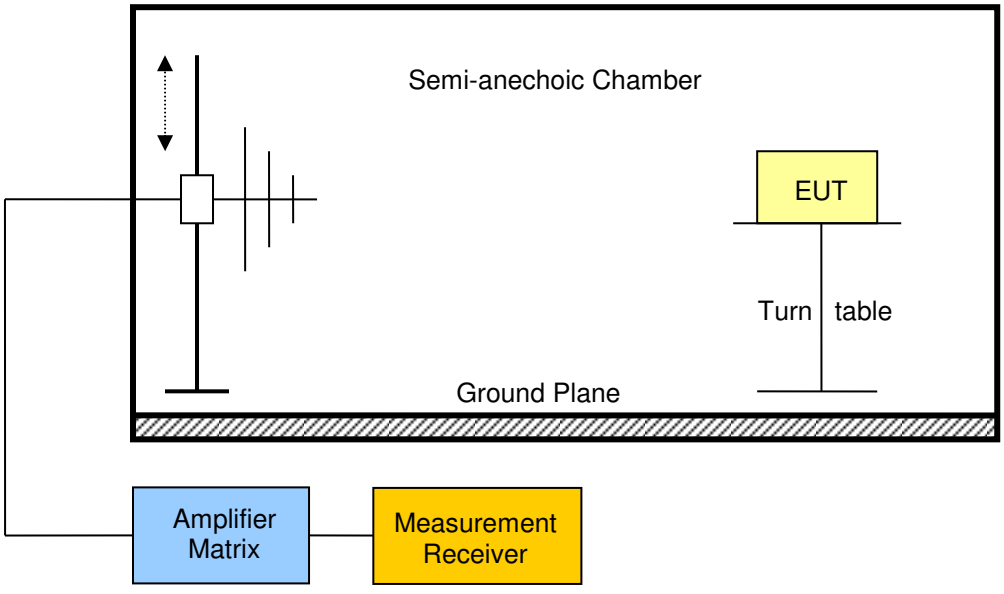
Test results

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 – 5th 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 [dbµV/m]	Pol.	Det.	Limit [dBµV/m]	Margin [dBµV/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:							

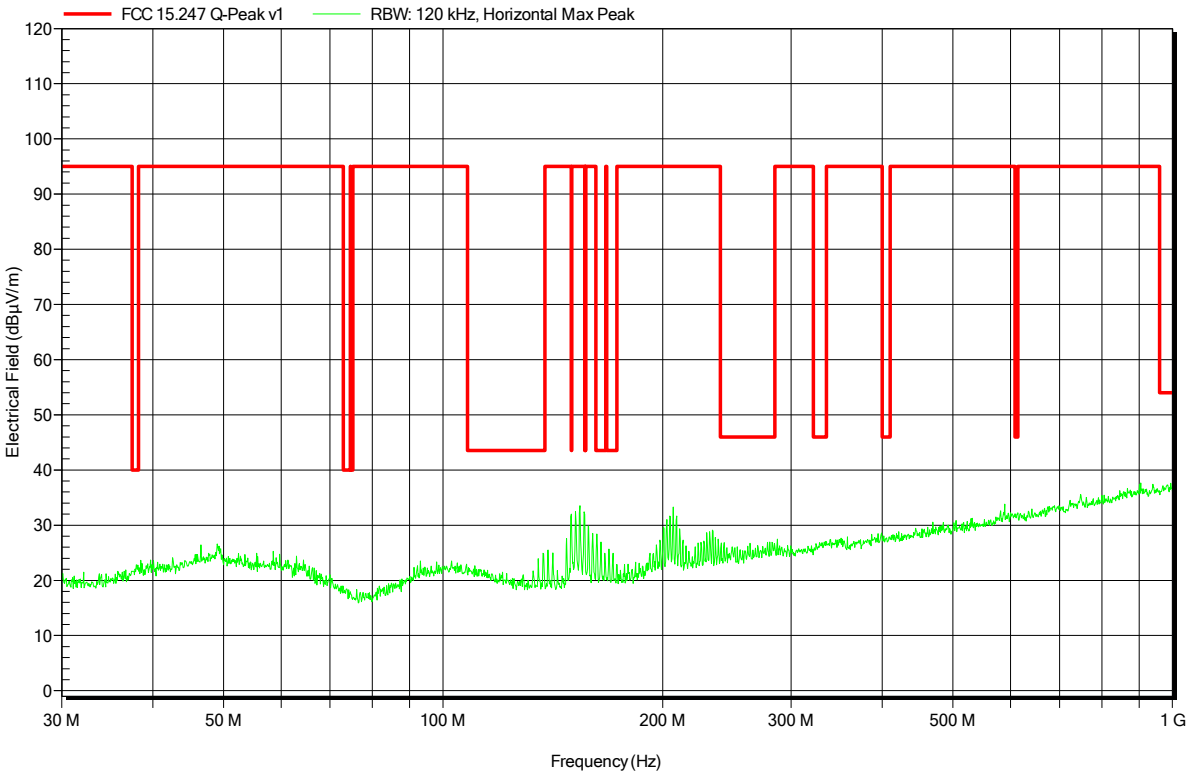
ANNEX A Transmitter radiated spurious emissions

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

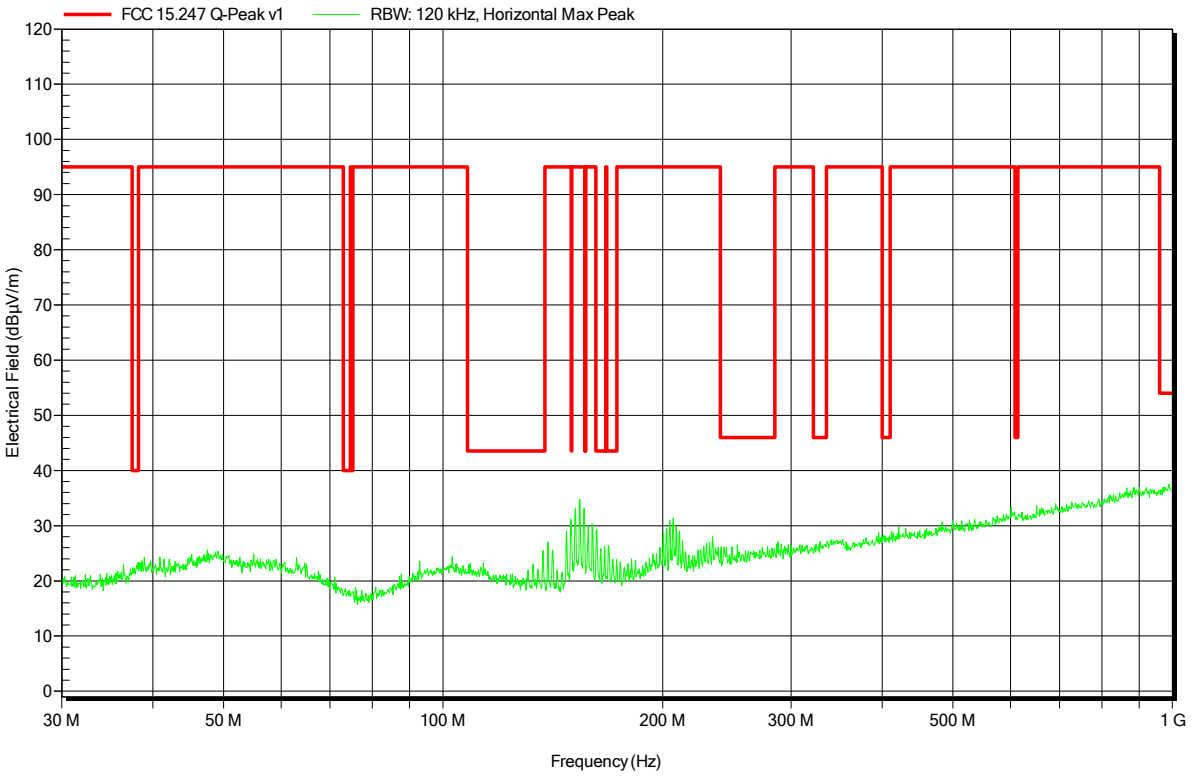


Spurious emissions according to FCC 15.247

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

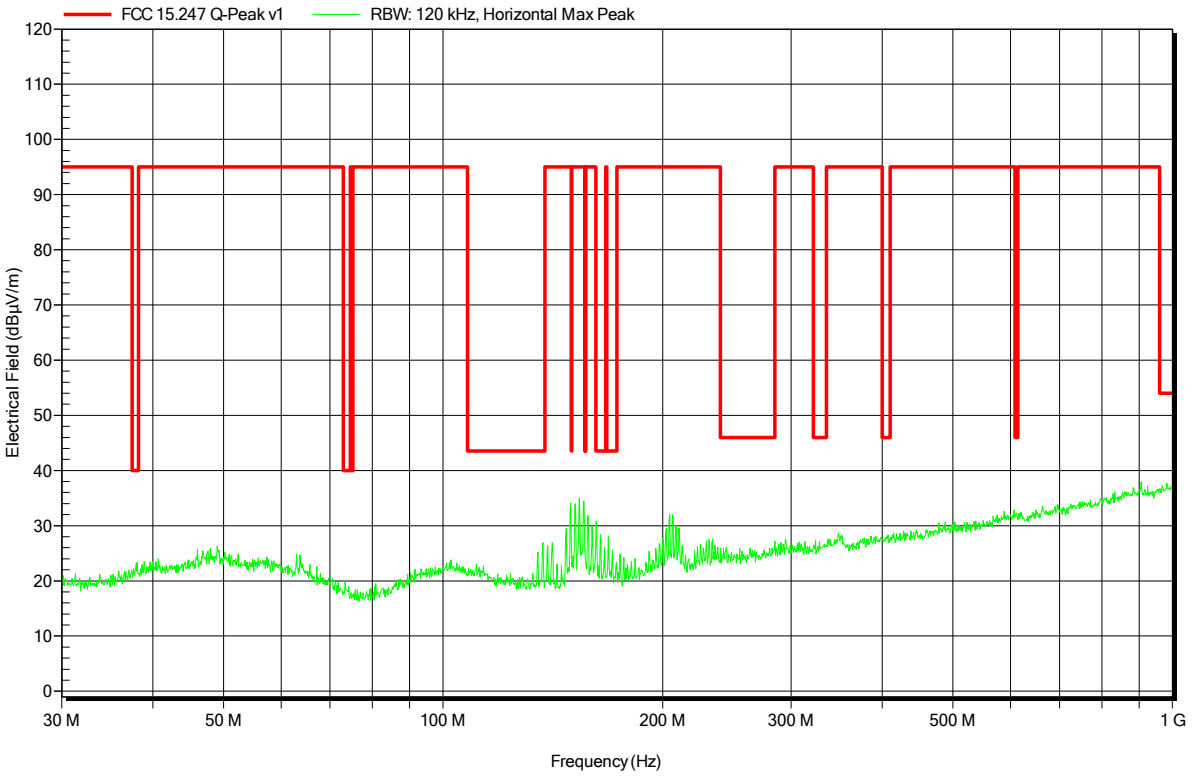


Spurious emissions according to FCC 15.247

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

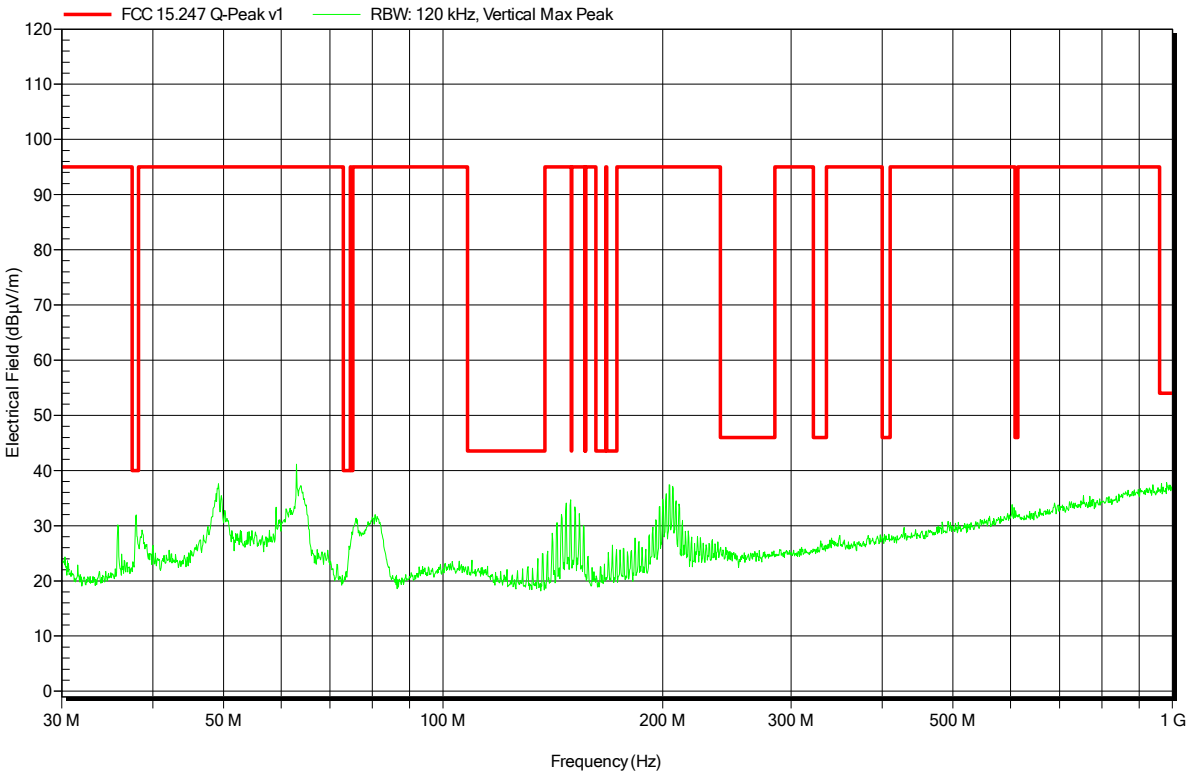


Spurious emissions according to FCC 15.247

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

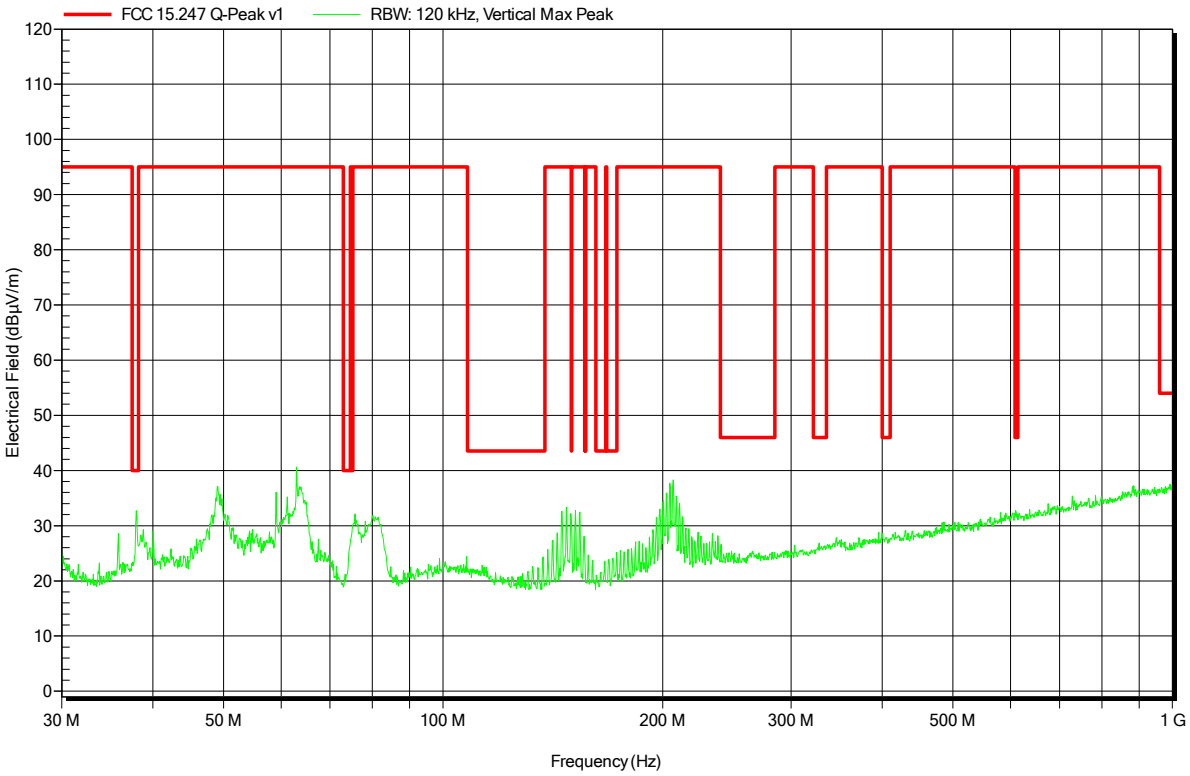


Spurious emissions according to FCC 15.247

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

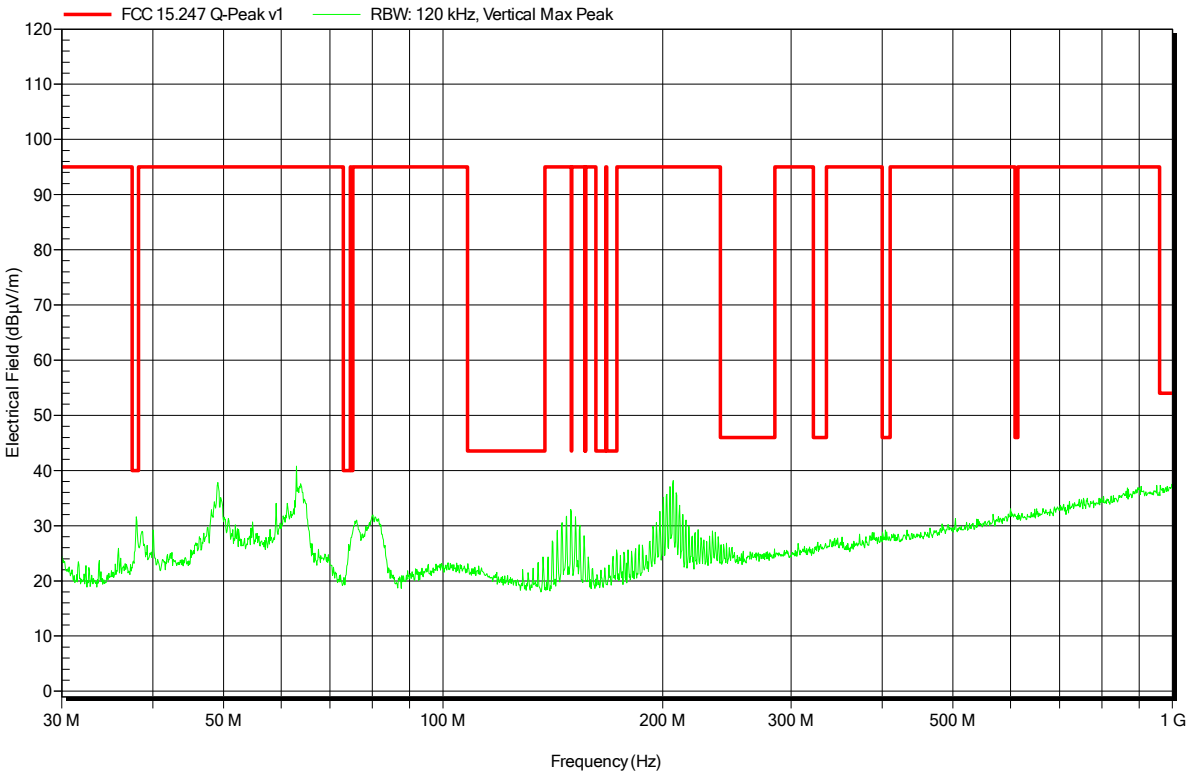


Spurious emissions according to FCC 15.247

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

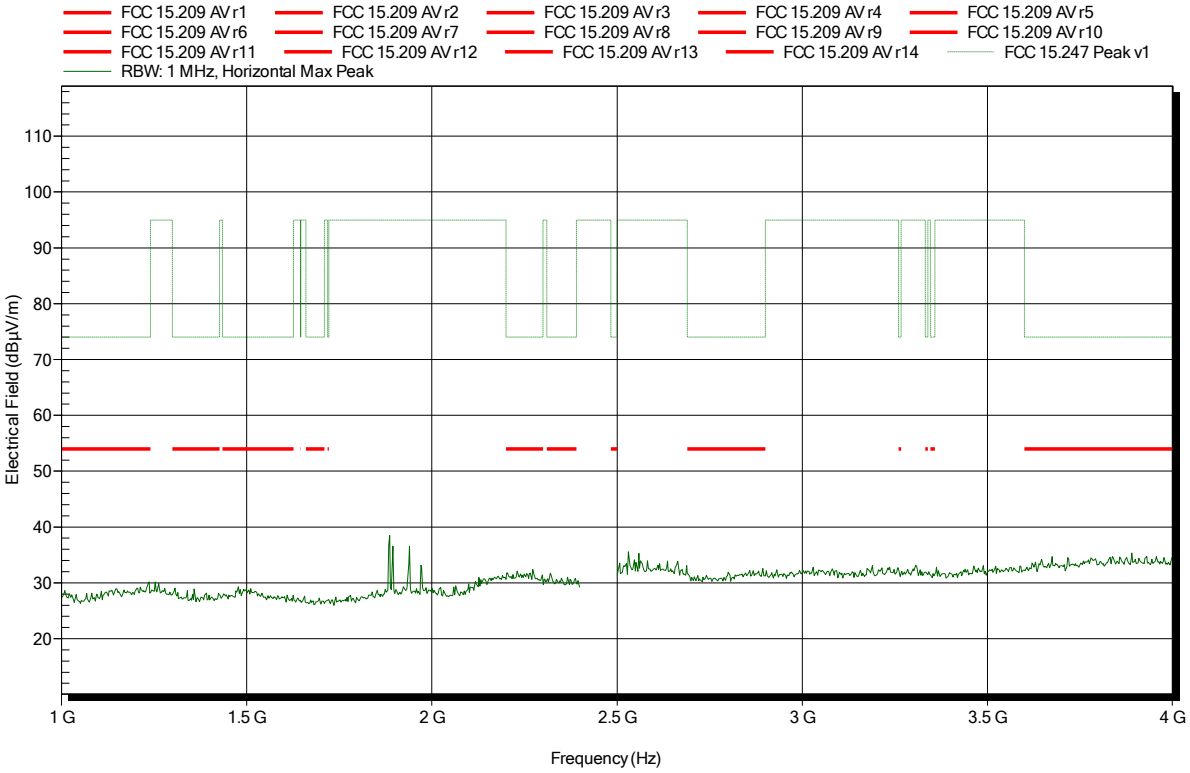


Spurious emissions according to FCC 15.247

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

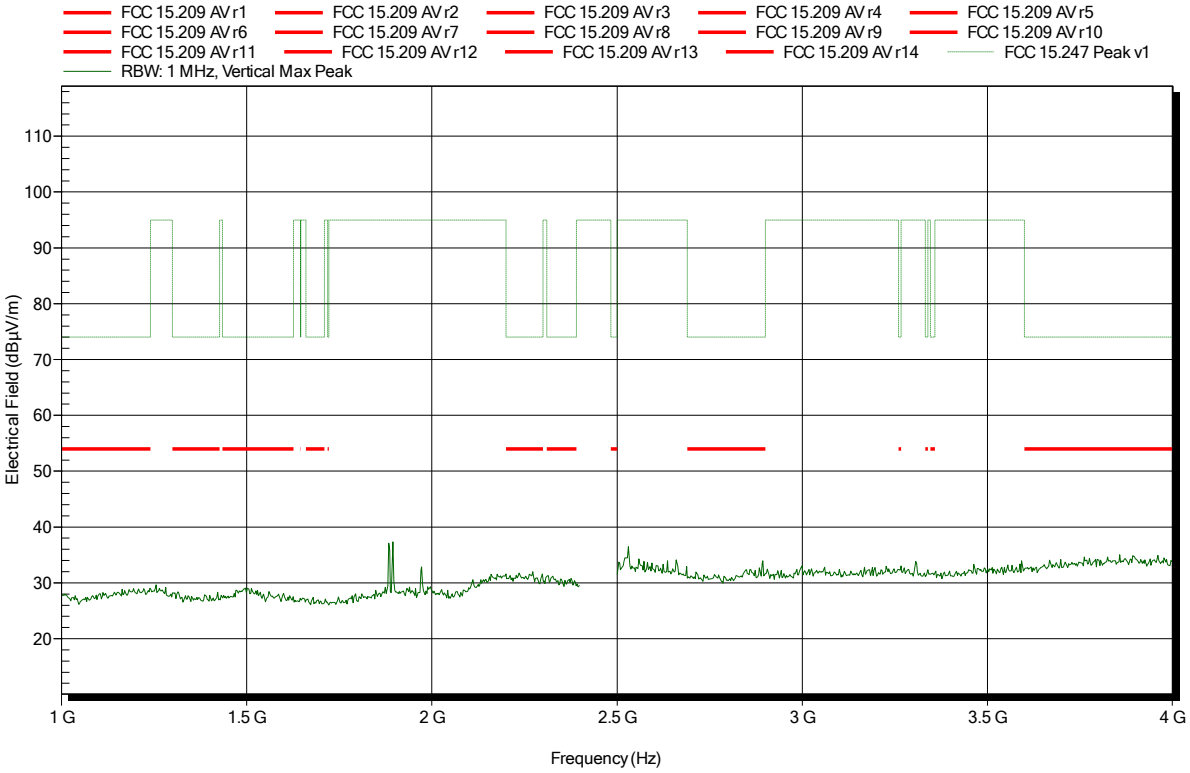


Spurious emissions according to FCC 15.247

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:	

Index 59

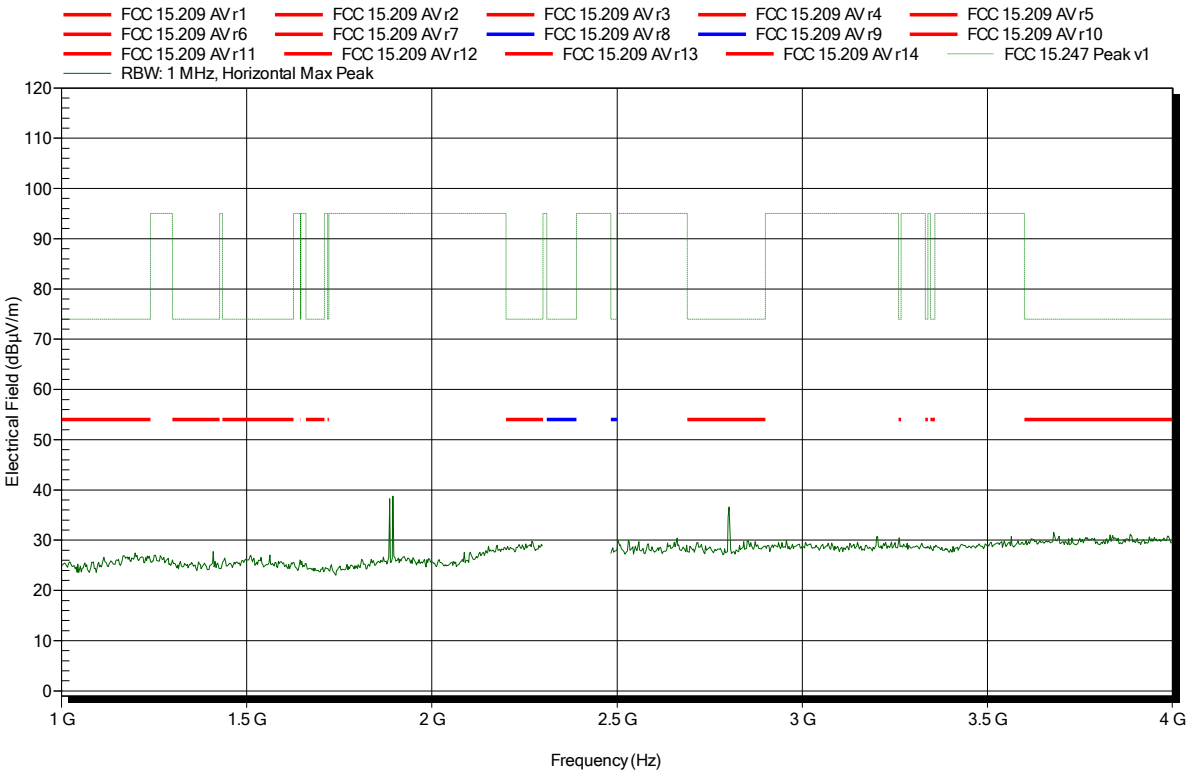


Spurious emissions according to FCC 15.247

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:	

Index 53

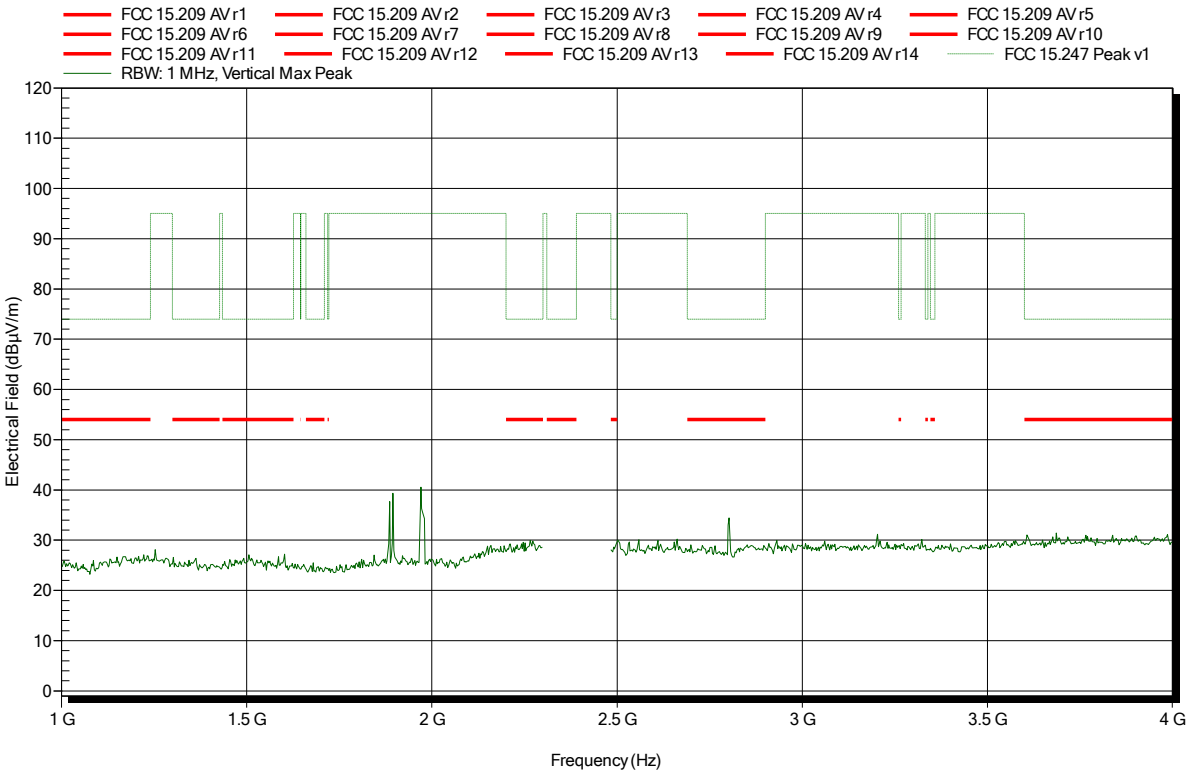


Spurious emissions according to FCC 15.247

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:	

Index 54

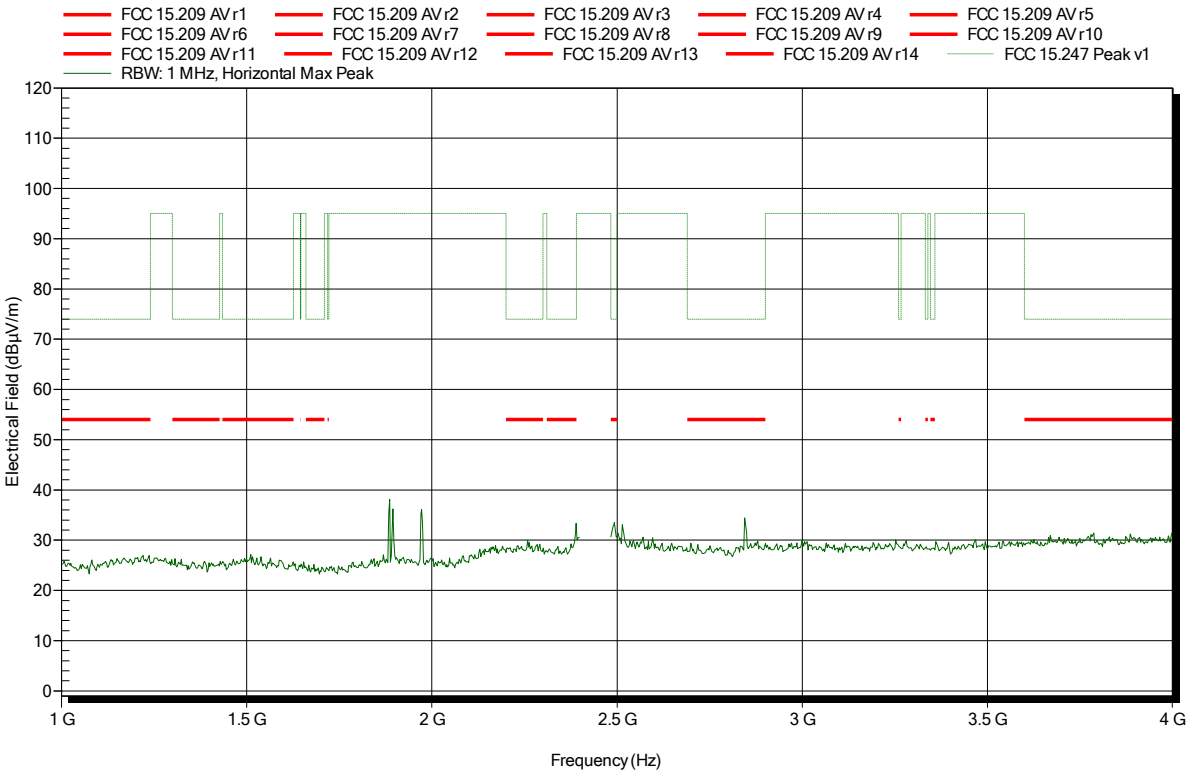


Spurious emissions according to FCC 15.247

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:	

Index 56

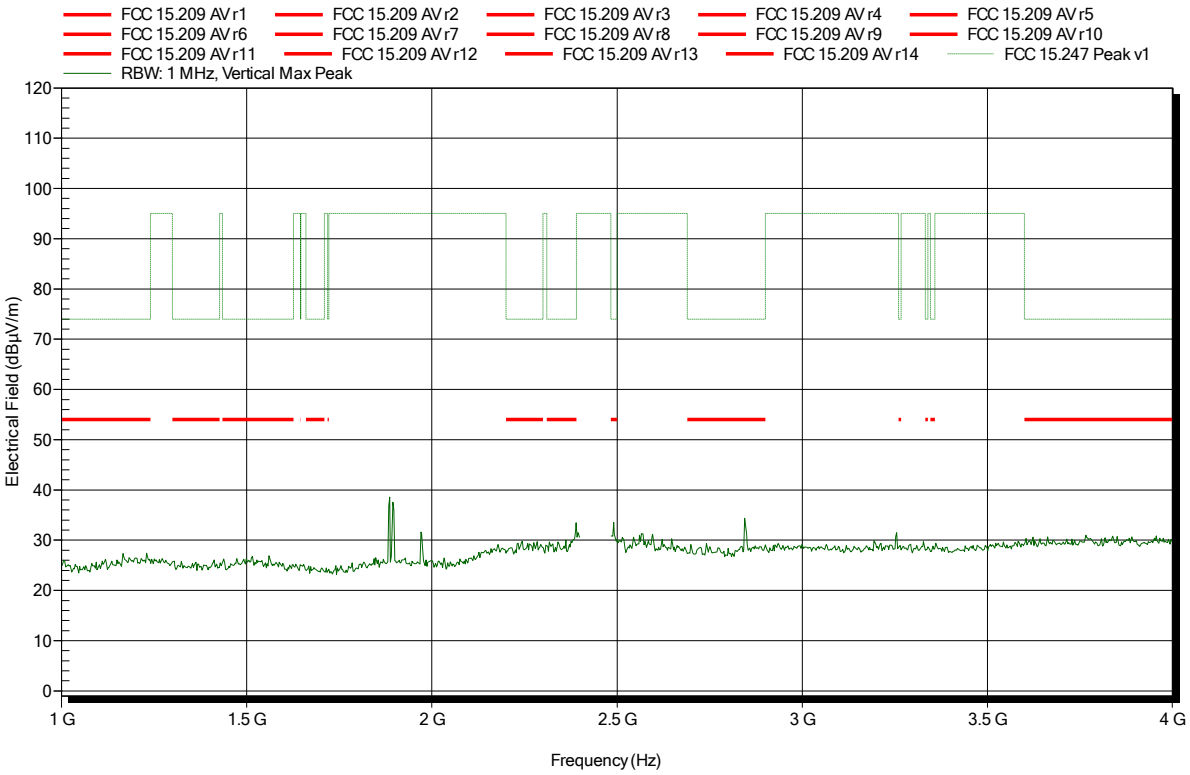


Spurious emissions according to FCC 15.247

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:	

Index 57

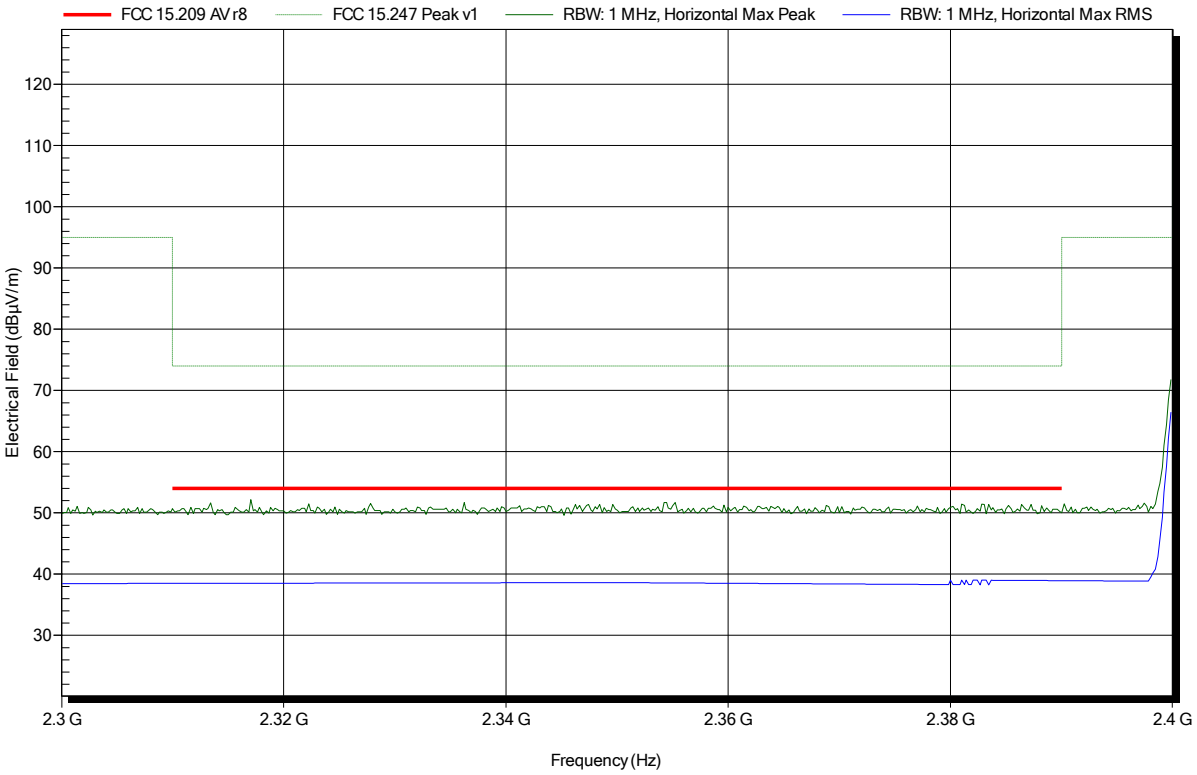


Spurious emissions according to FCC 15.247

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

Index 63

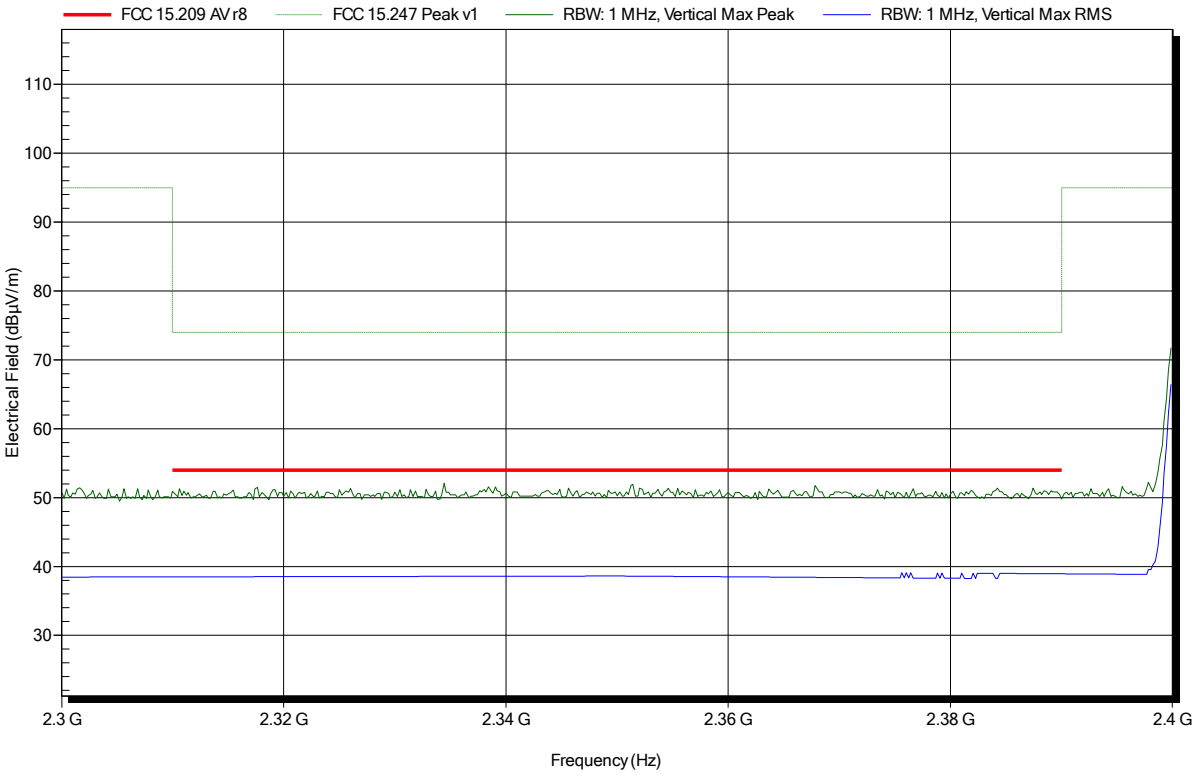


Spurious emissions according to FCC 15.247

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

Index 62

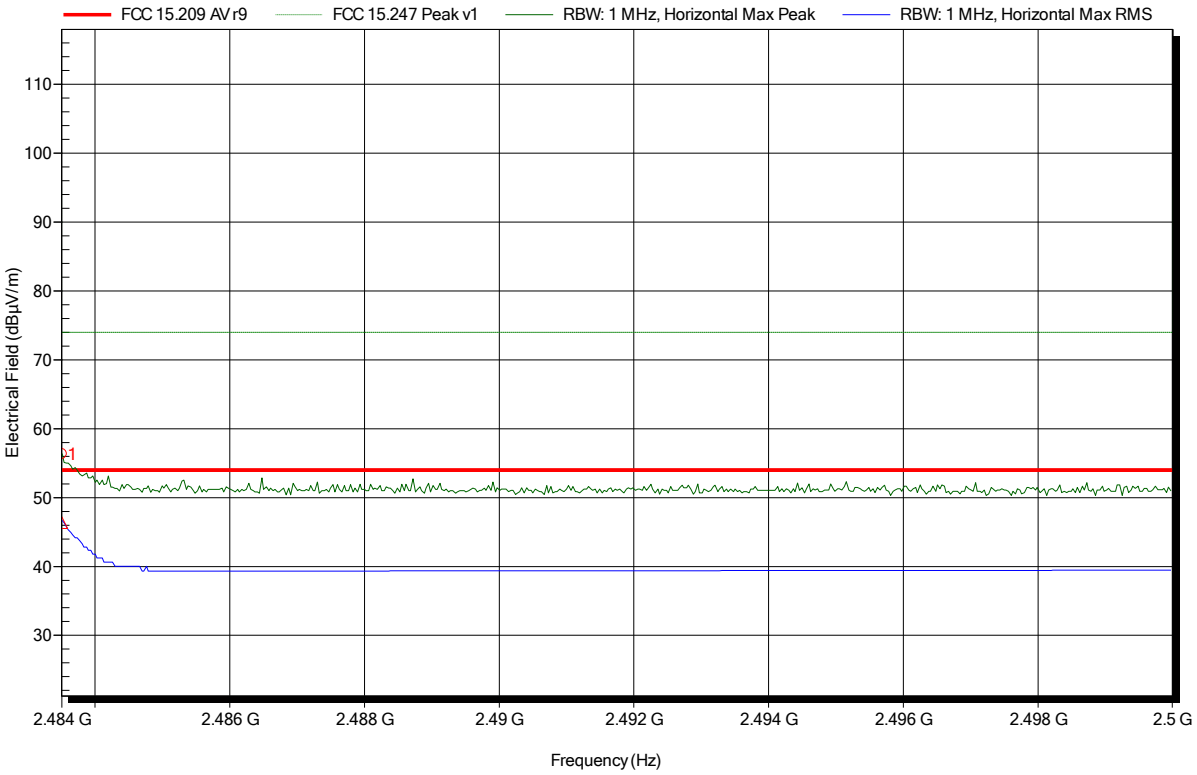


Spurious emissions according to FCC 15.247

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

Index 60



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

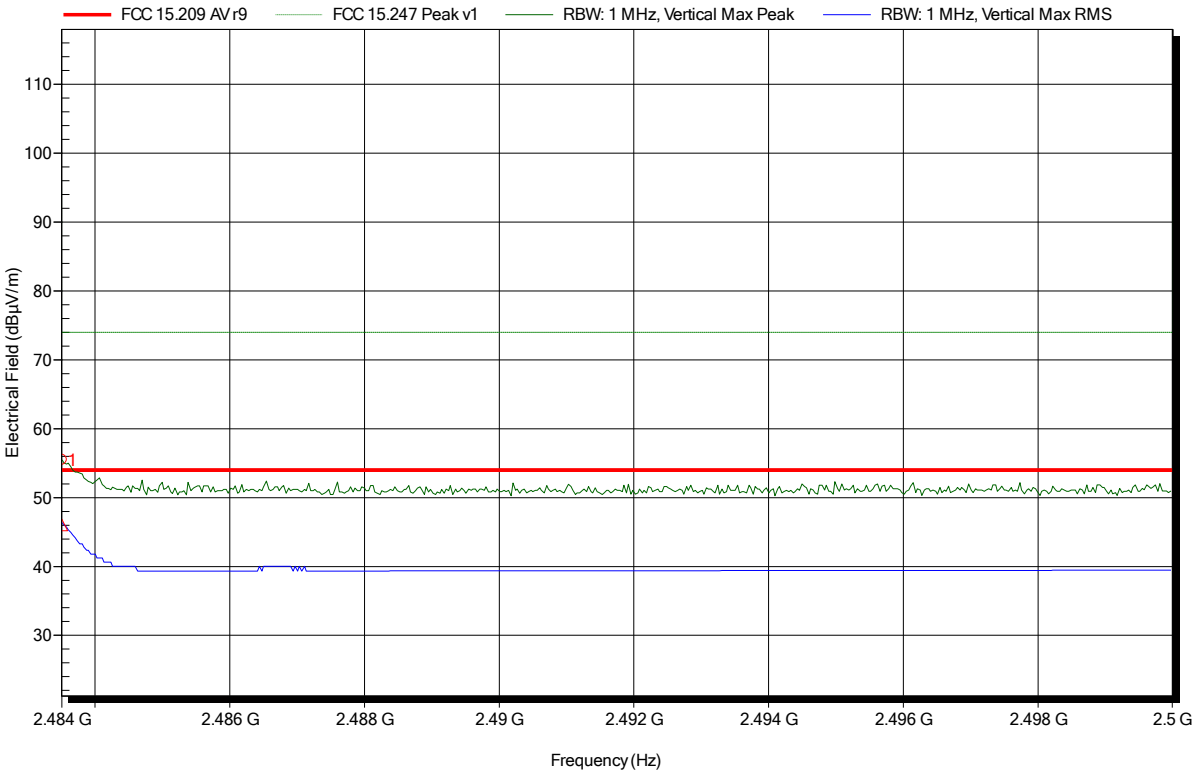
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4835 GHz	46.35 dBµV/m	54 dBµV/m	-7.65 dB	Pass

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; 2480
Test Date:	2016-09-09
Note:	upper bandedge

Index 61



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

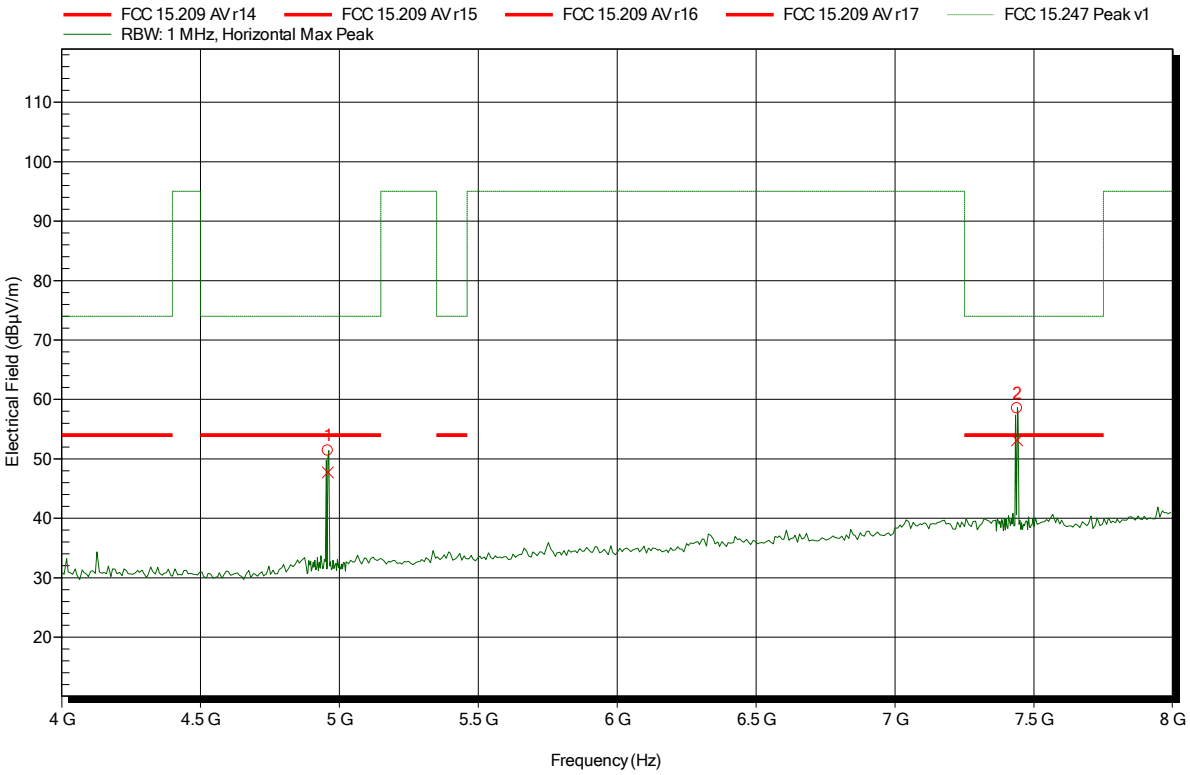
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4835 GHz	46.02 dBµV/m	54 dBµV/m	-7.98 dB	Pass

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; 2480
Test Date:	2016-08-18
Note:	Power Level 10

Index 45



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

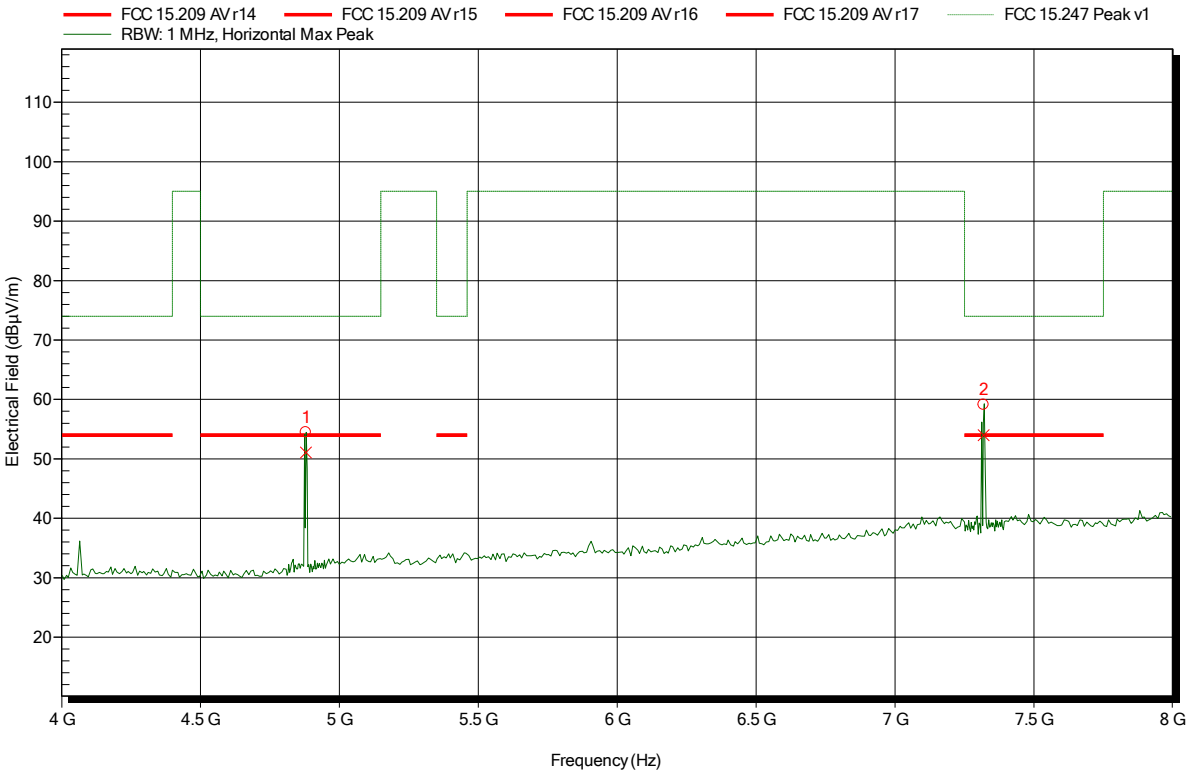
Frequency	Average	Average Limit	Average Difference	Average Status
4.96 GHz	47.72 dBµV/m	54 dBµV/m	-6.28 dB	Pass
7.439 GHz	53.13 dBµV/m	54 dBµV/m	-0.87 dB	Pass

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

Index 43



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

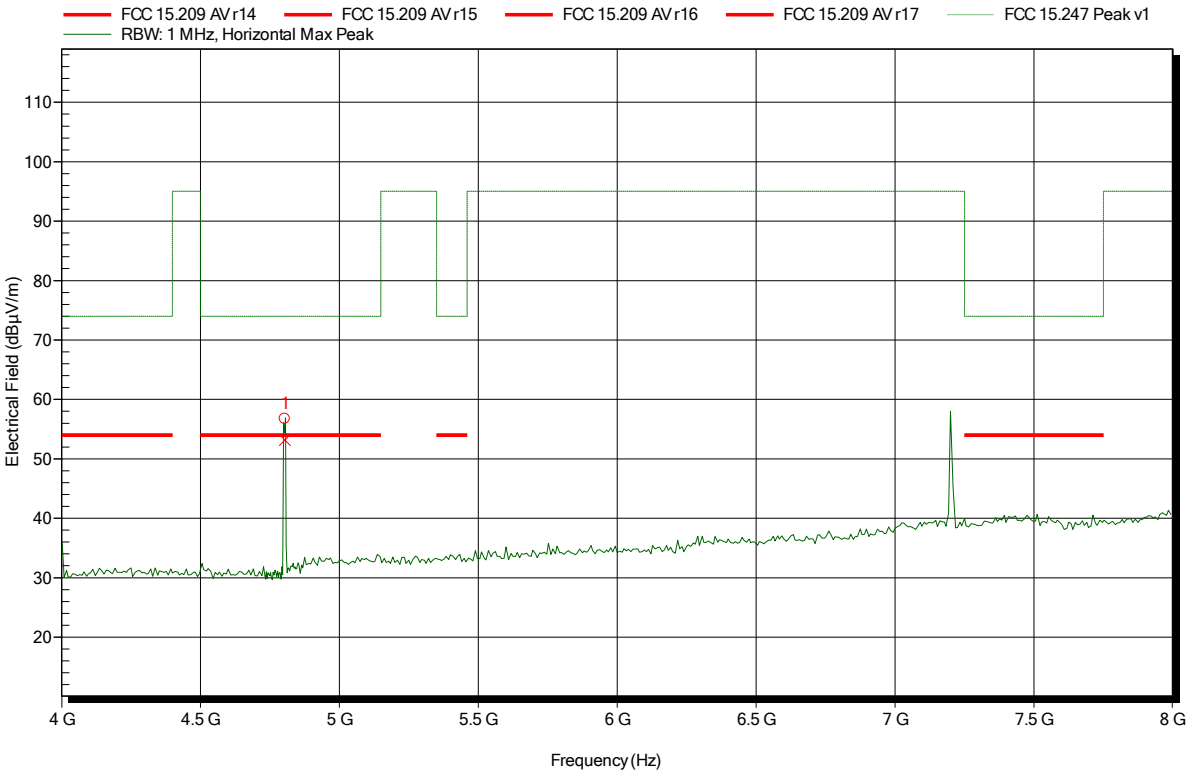
Frequency	Average	Average Limit	Average Difference	Average Status
4.88 GHz	51.09 dBµV/m	54 dBµV/m	-2.91 dB	Pass
7.319 GHz	53.97 dBµV/m	54 dBµV/m	-0.03 dB	Pass

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

Index 38



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

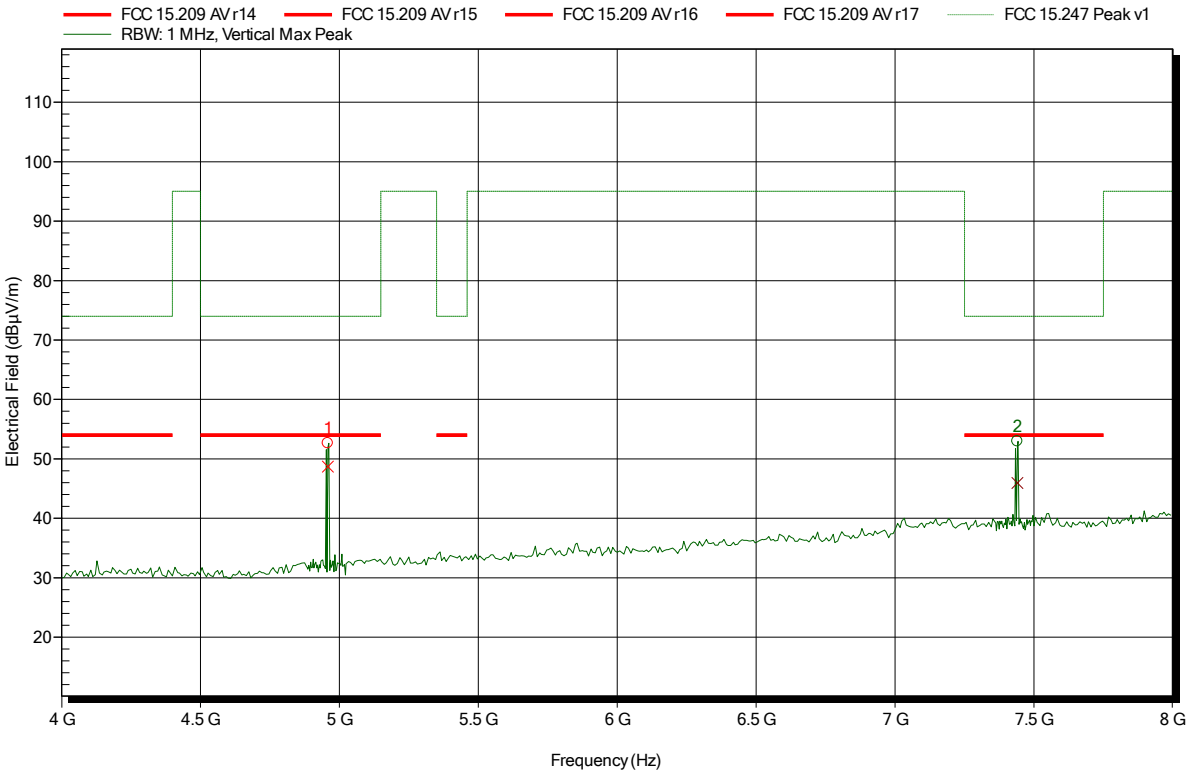
Frequency	Average	Average Limit	Average Difference	Average Status
4.805 GHz	53.18 dBµV/m	54 dBµV/m	-0.82 dB	Pass

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; 2480
Test Date:	2016-08-18
Note:	Power Level 10

Index 46



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

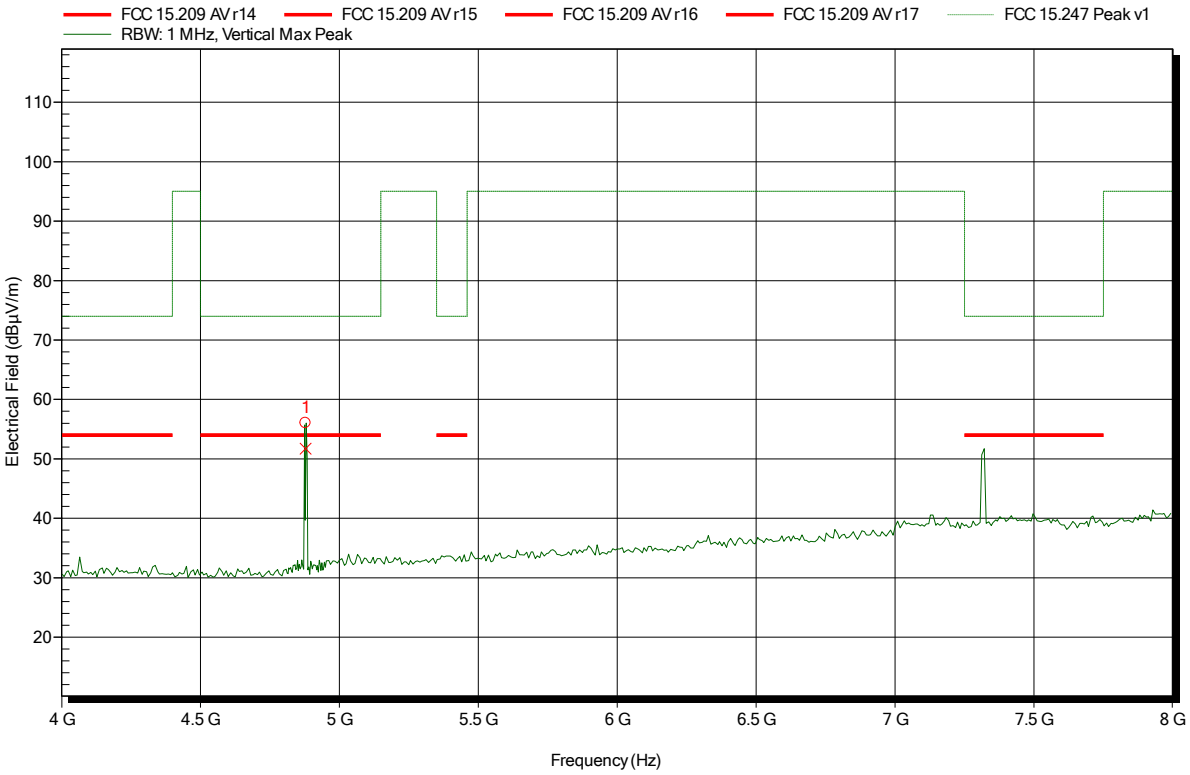
Frequency	Average	Average Limit	Average Difference	Average Status
4.96 GHz	48.7 dBµV/m	54 dBµV/m	-5.3 dB	Pass
7.441 GHz	45.95 dBµV/m	54 dBµV/m	-8.05 dB	Pass

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

Index 42



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

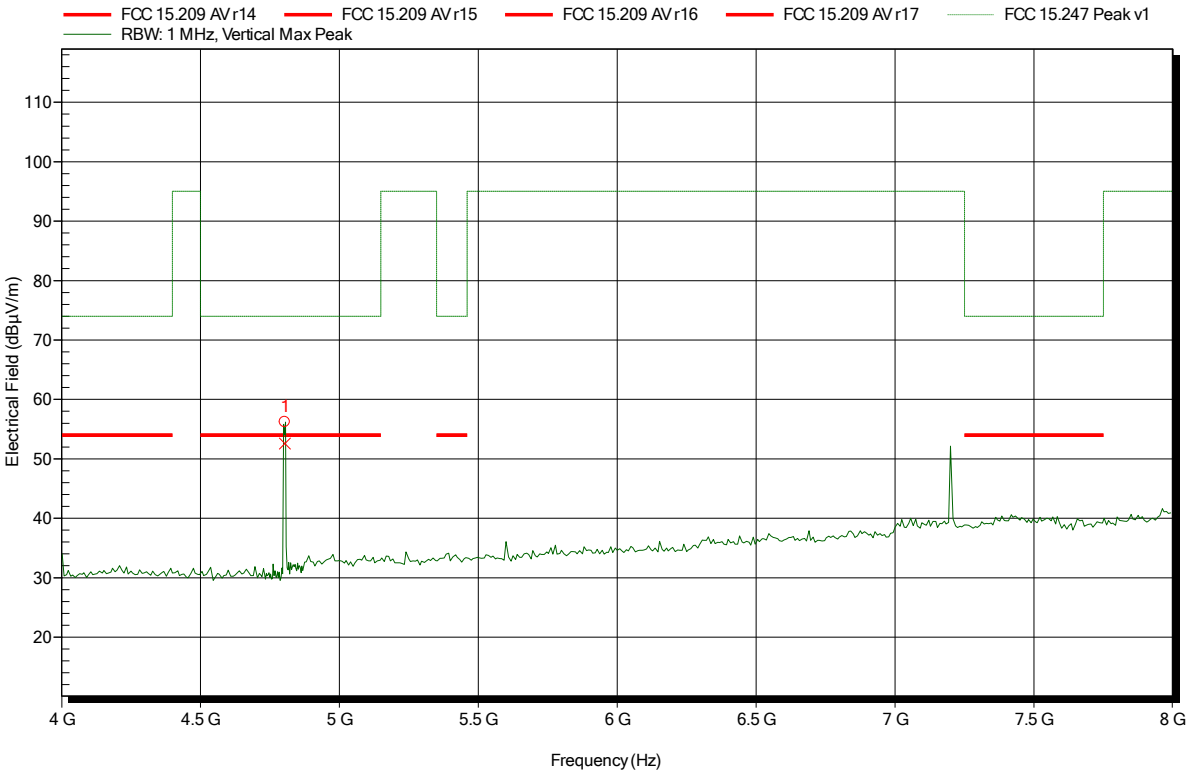
Frequency	Average	Average Limit	Average Difference	Average Status
4.879 GHz	51.72 dBµV/m	54 dBµV/m	-2.28 dB	Pass

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; 2402
Test Date:	2016-08-18
Note:	Power Level 10

Index 39



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

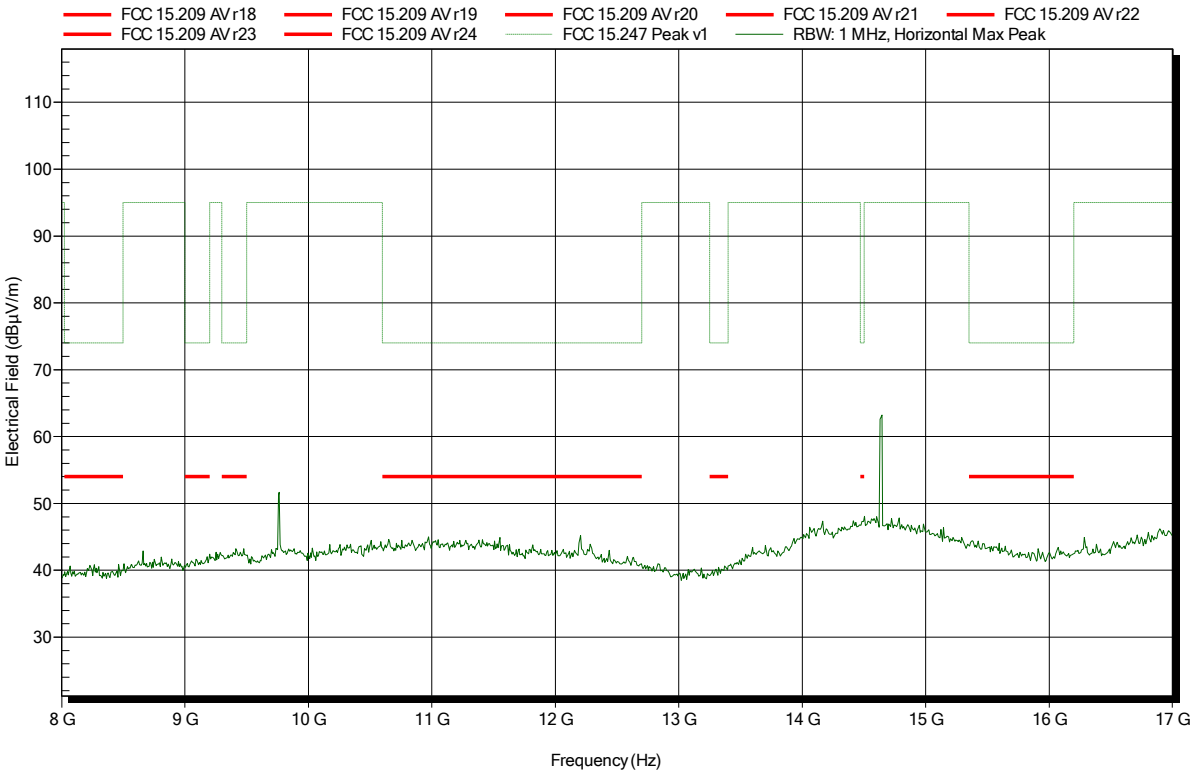
Frequency	Average	Average Limit	Average Difference	Average Status
4.804 GHz	52.56 dBµV/m	54 dBµV/m	-1.44 dB	Pass

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:	2016-09-09
Note:	

Index 70

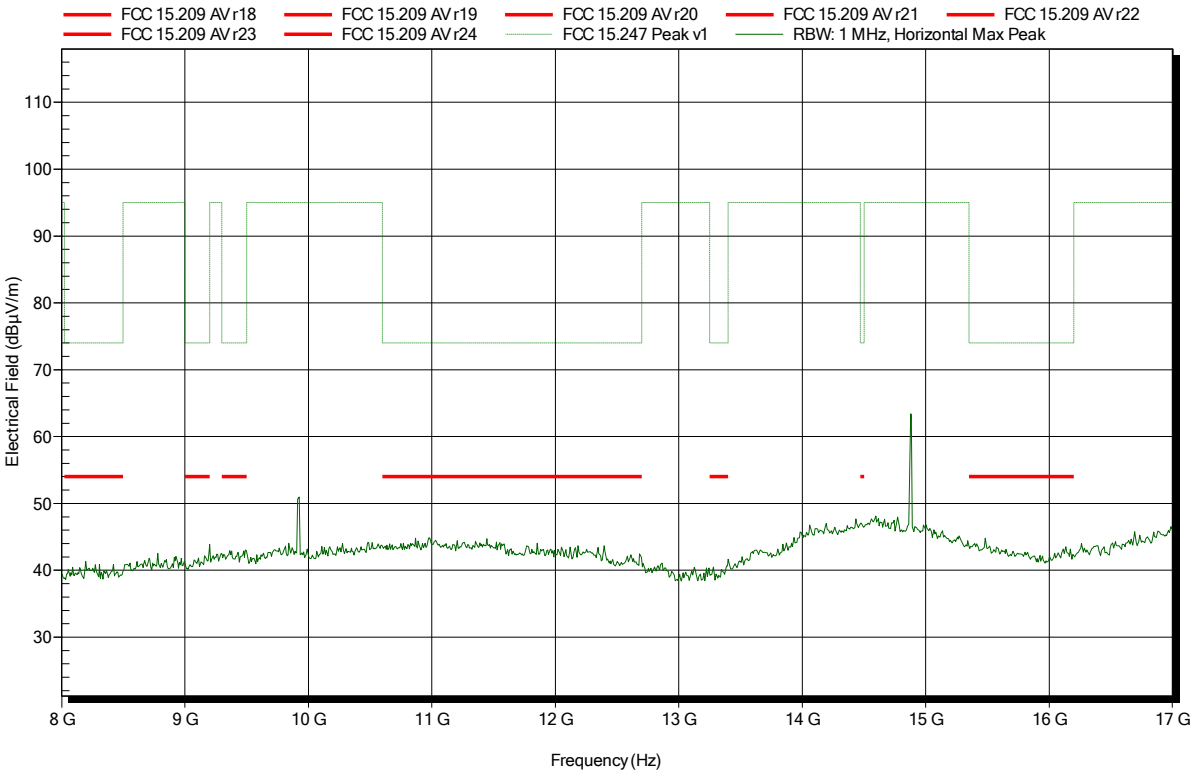


Spurious emissions according to FCC 15.247

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 69

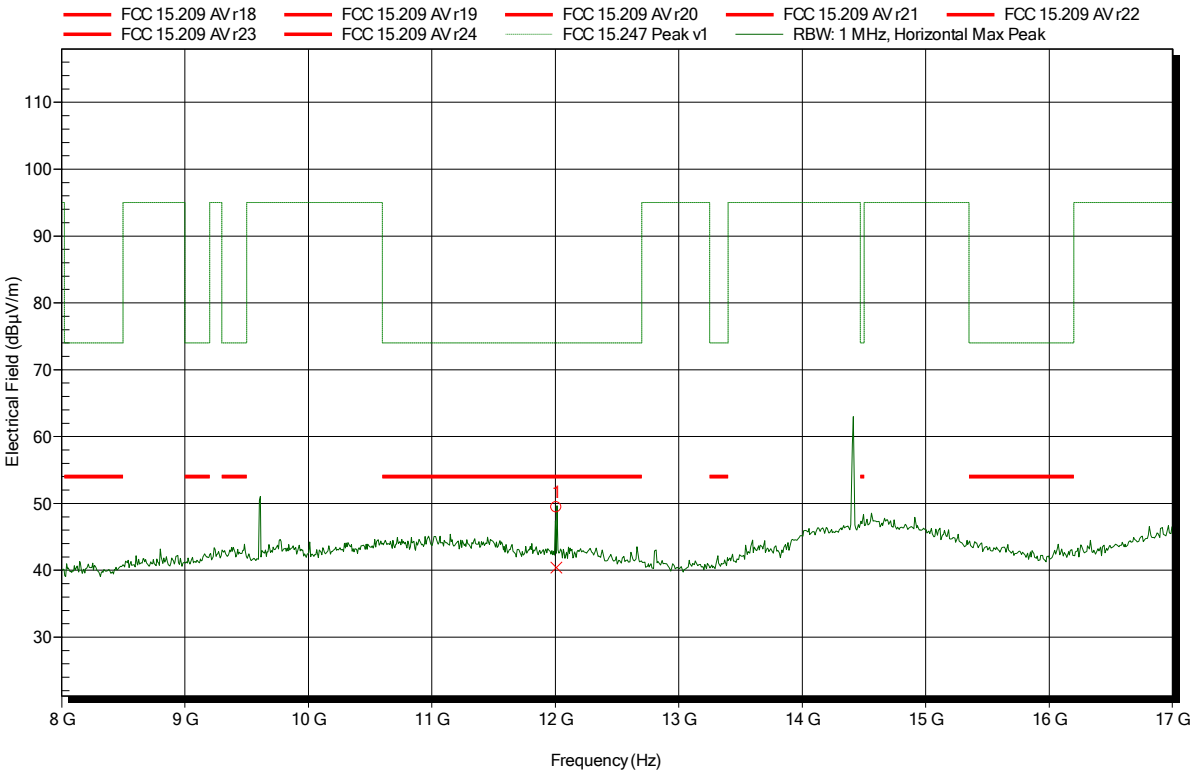


Spurious emissions according to FCC 15.247

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:	

Index 65



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

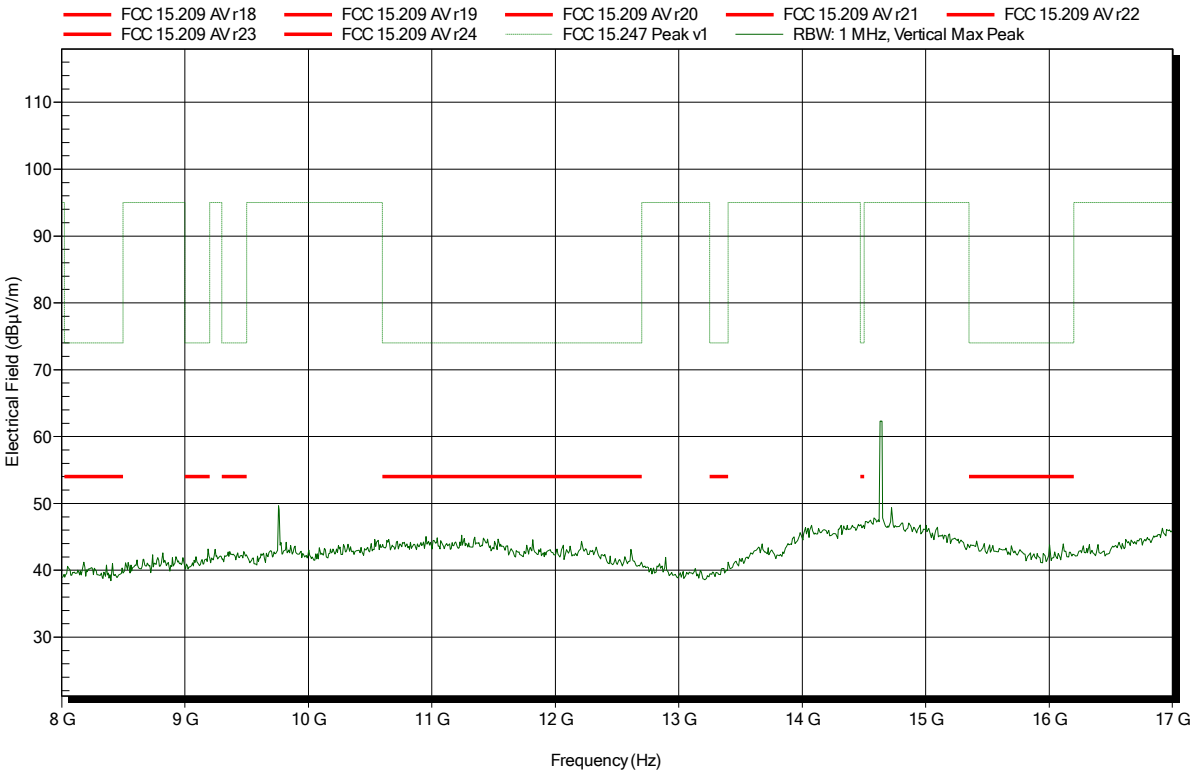
Frequency	Average	Average Limit	Average Difference	Average Status
12.009 GHz	40.42 dBµV/m	54 dBµV/m	-13.58 dB	Pass

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:	2016-09-09
Note:	

Index 71

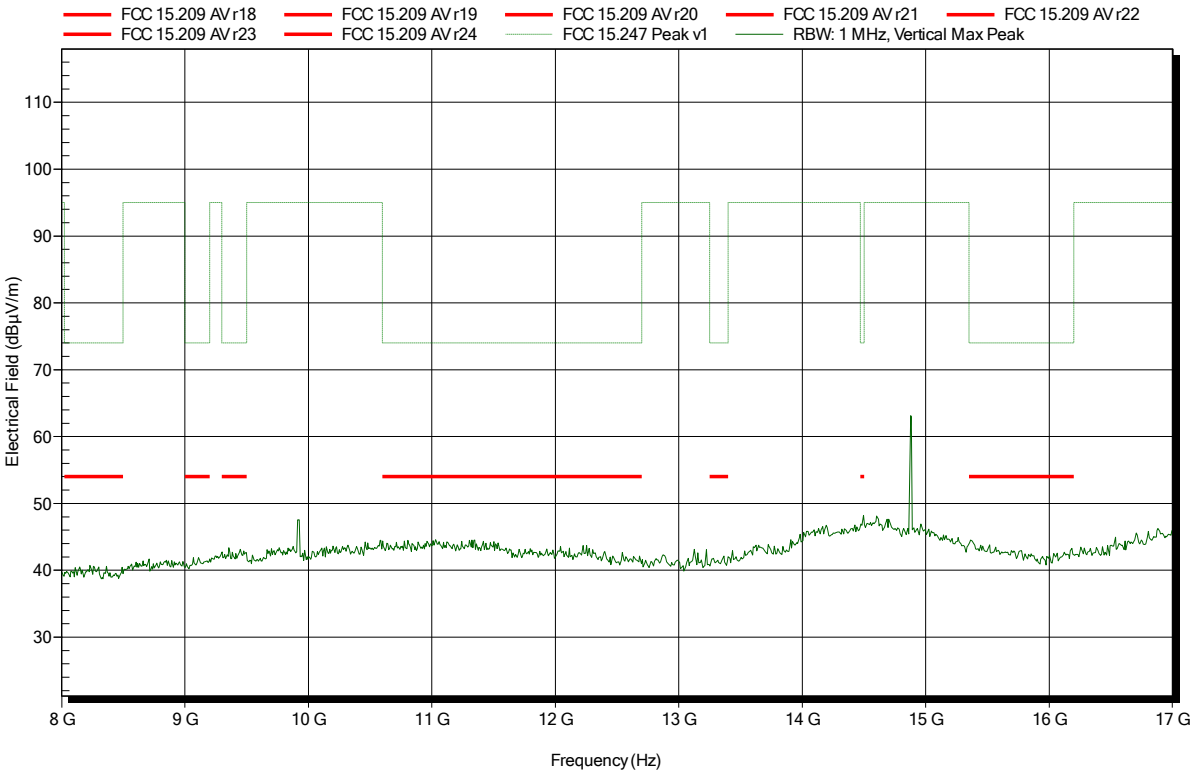


Spurious emissions according to FCC 15.247

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:	

Index 67

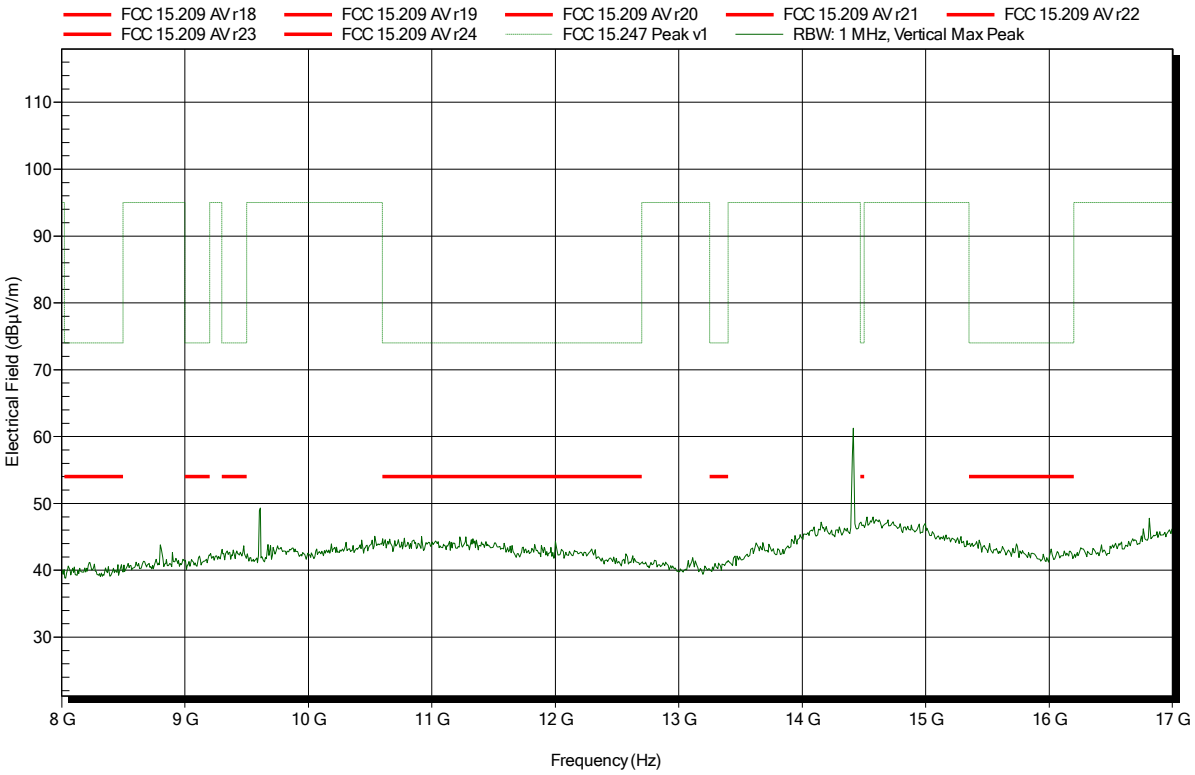


Spurious emissions according to FCC 15.247

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:	

Index 66

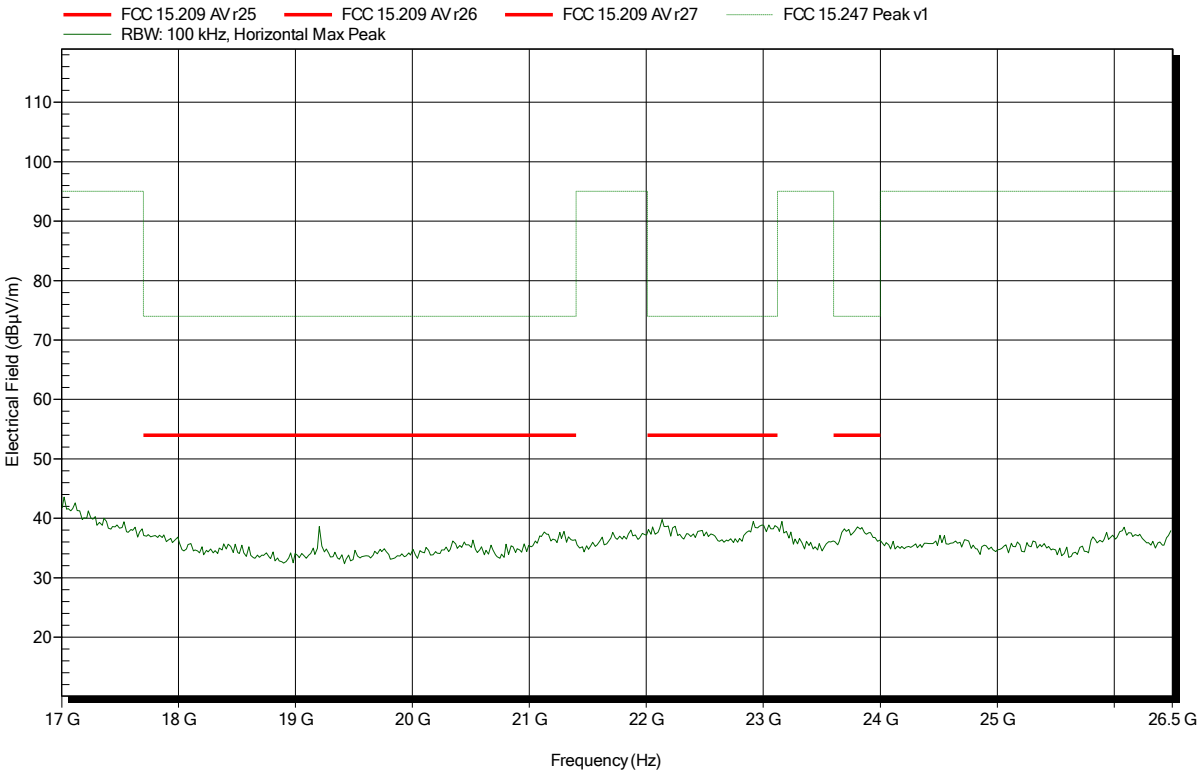


Spurious emissions according to FCC 15.247

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:	

Index 78

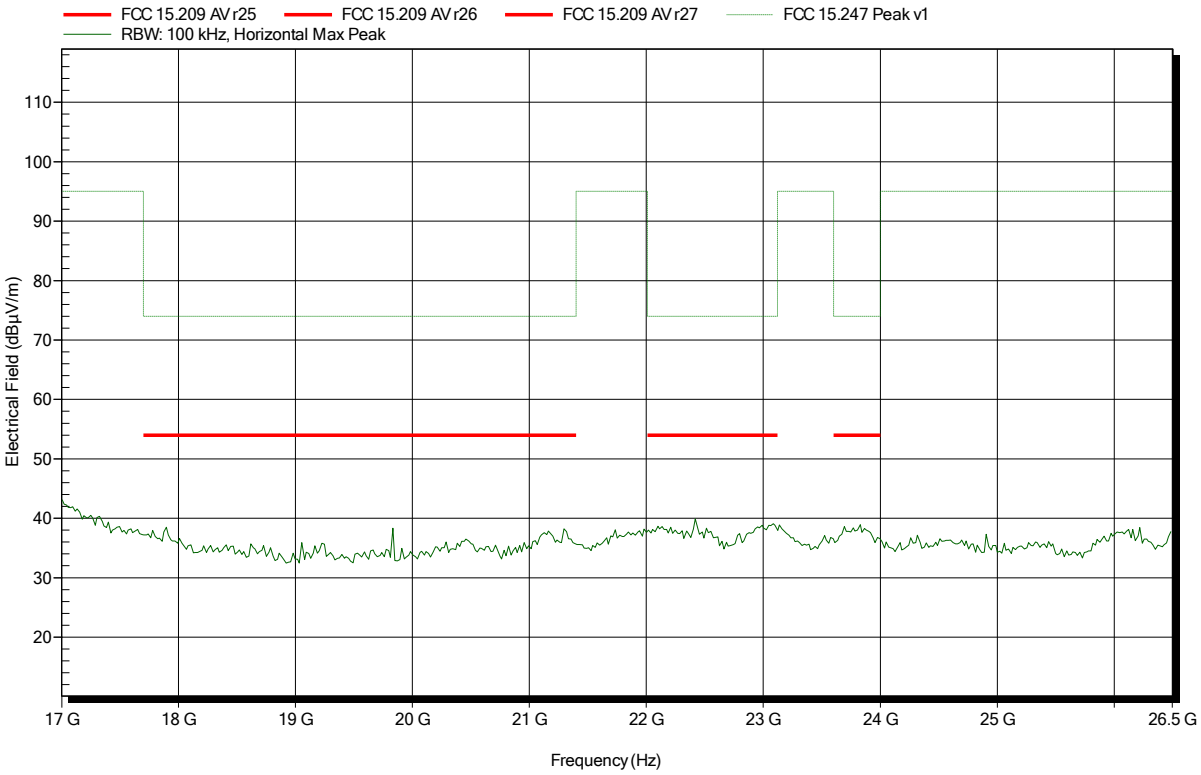


Spurious emissions according to FCC 15.247

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:	

Index 77

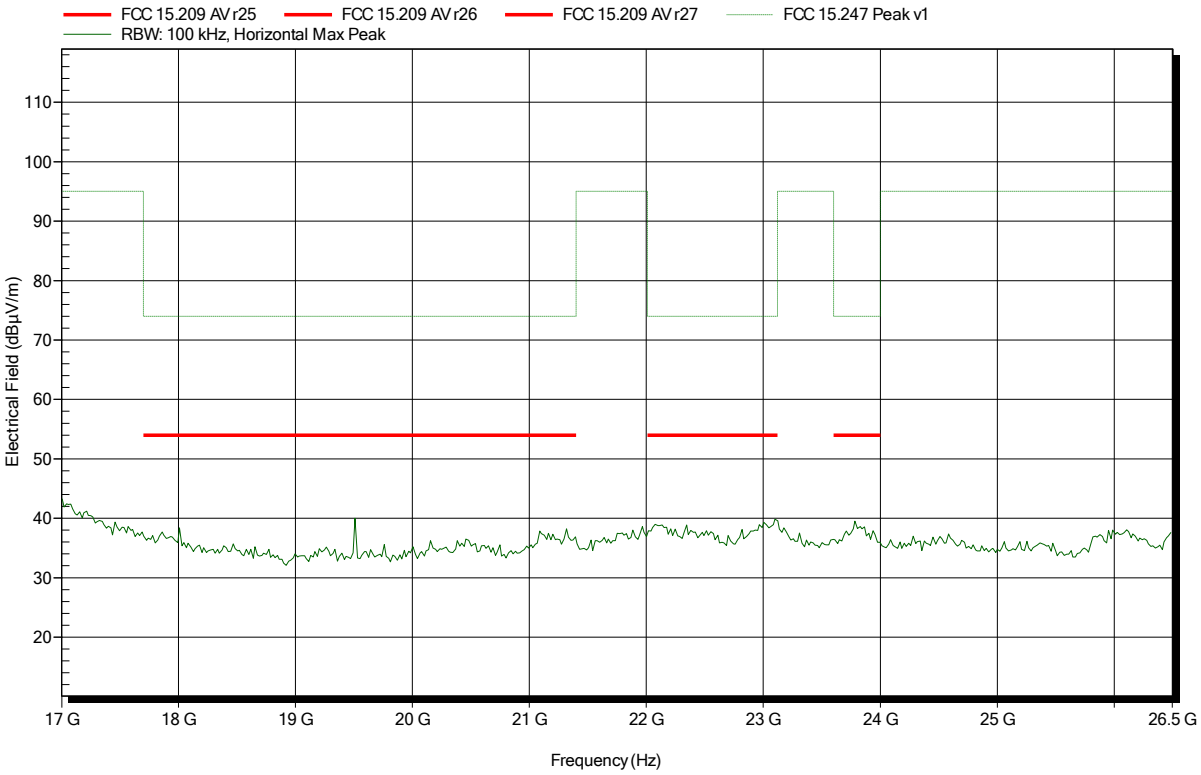


Spurious emissions according to FCC 15.247

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:	

Index 74

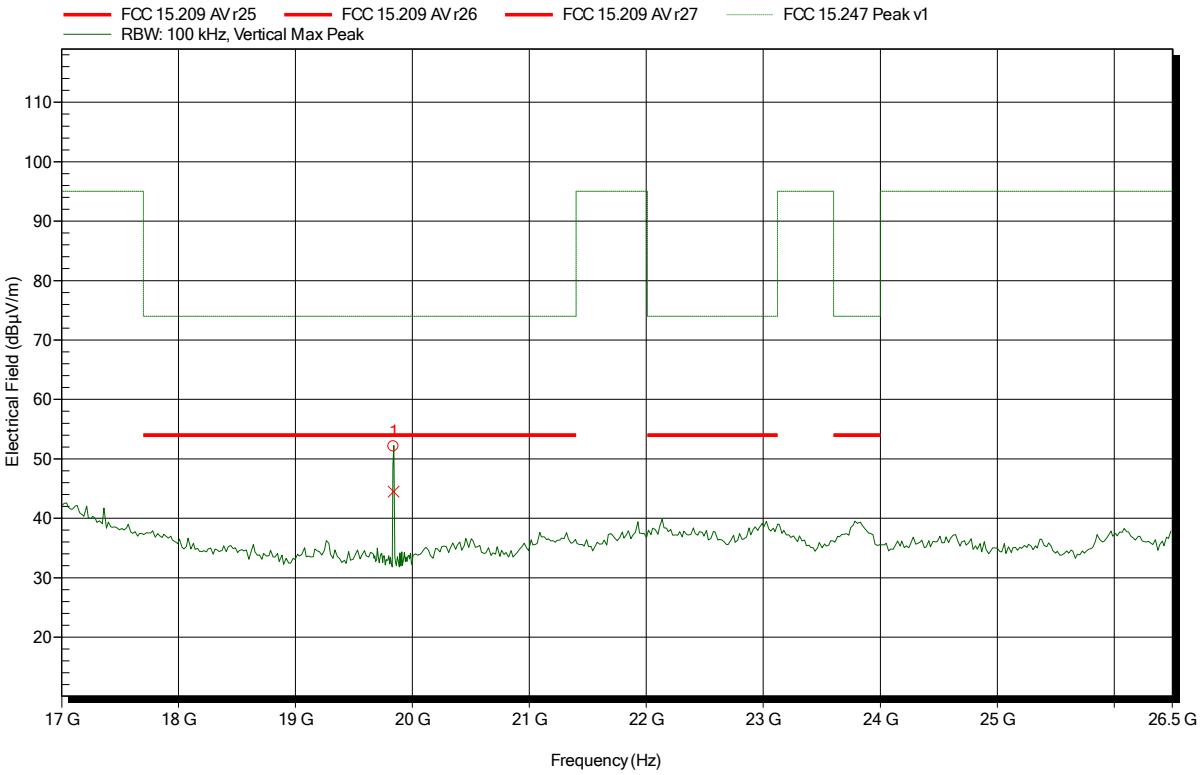


Spurious emissions according to FCC 15.247

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:	

Index 76



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

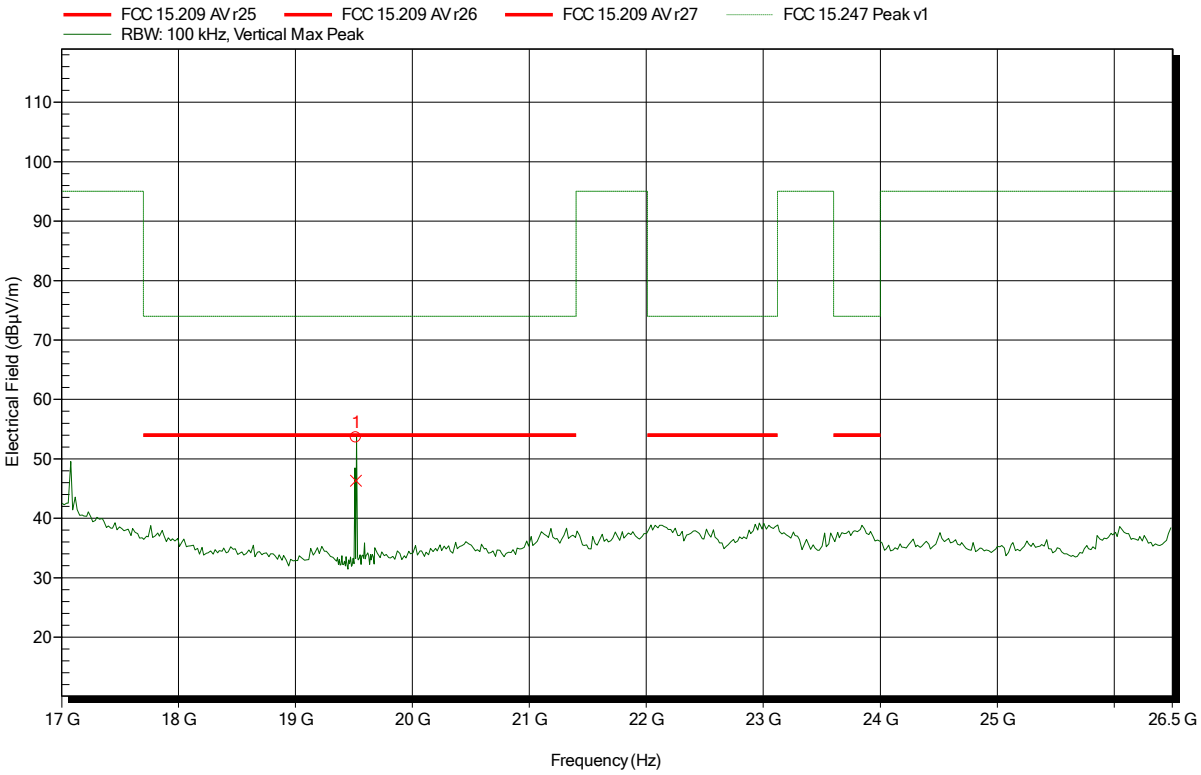
Frequency	Average	Average Limit	Average Difference	Average Status
19.838 GHz	44.5 dBµV/m	54 dBµV/m	-9.5 dB	Pass

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:	Amplifier Research AT 4560, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2440
Test Date:	2016-09-09
Note:	

Index 75



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

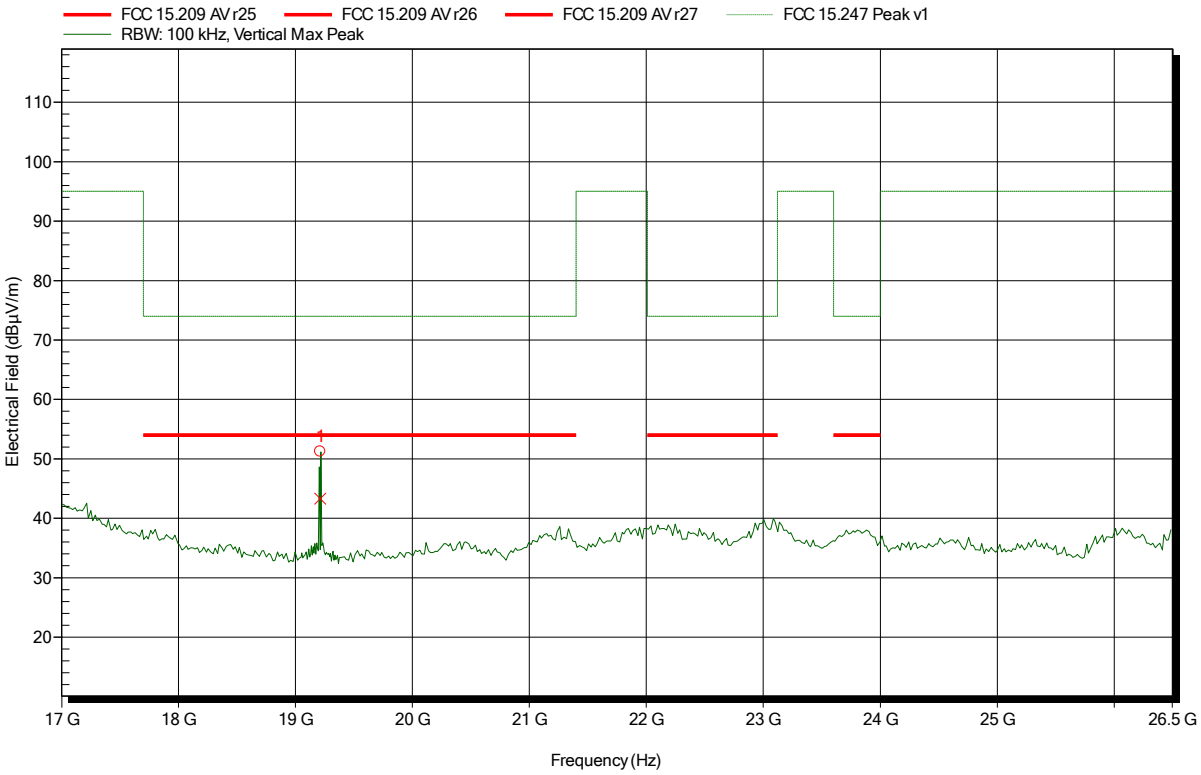
Frequency	Average	Average Limit	Average Difference	Average Status
19.518 GHz	46.3 dBµV/m	54 dBµV/m	-7.7 dB	Pass

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:	Amplifier Research AT 4560, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; 2402
Test Date:	2016-09-09
Note:	

Index 72



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

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

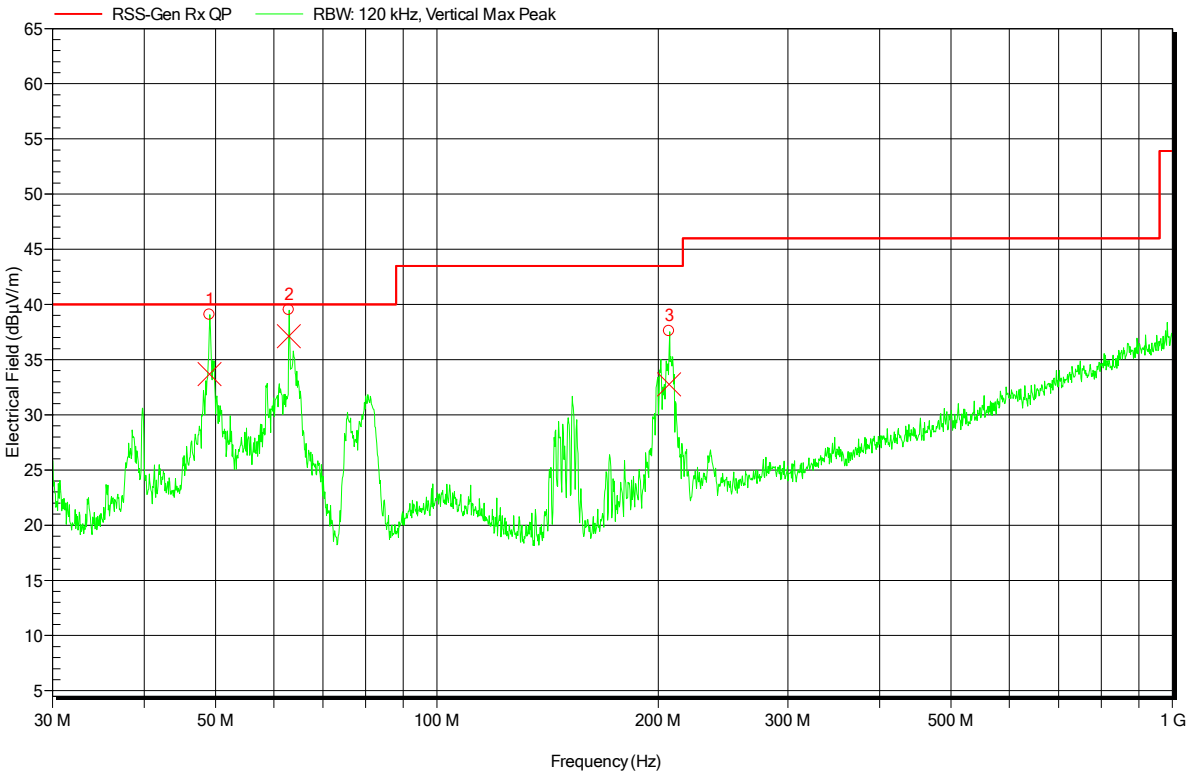
ANNEX B Receiver radiated spurious emissions

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:	

Index 1



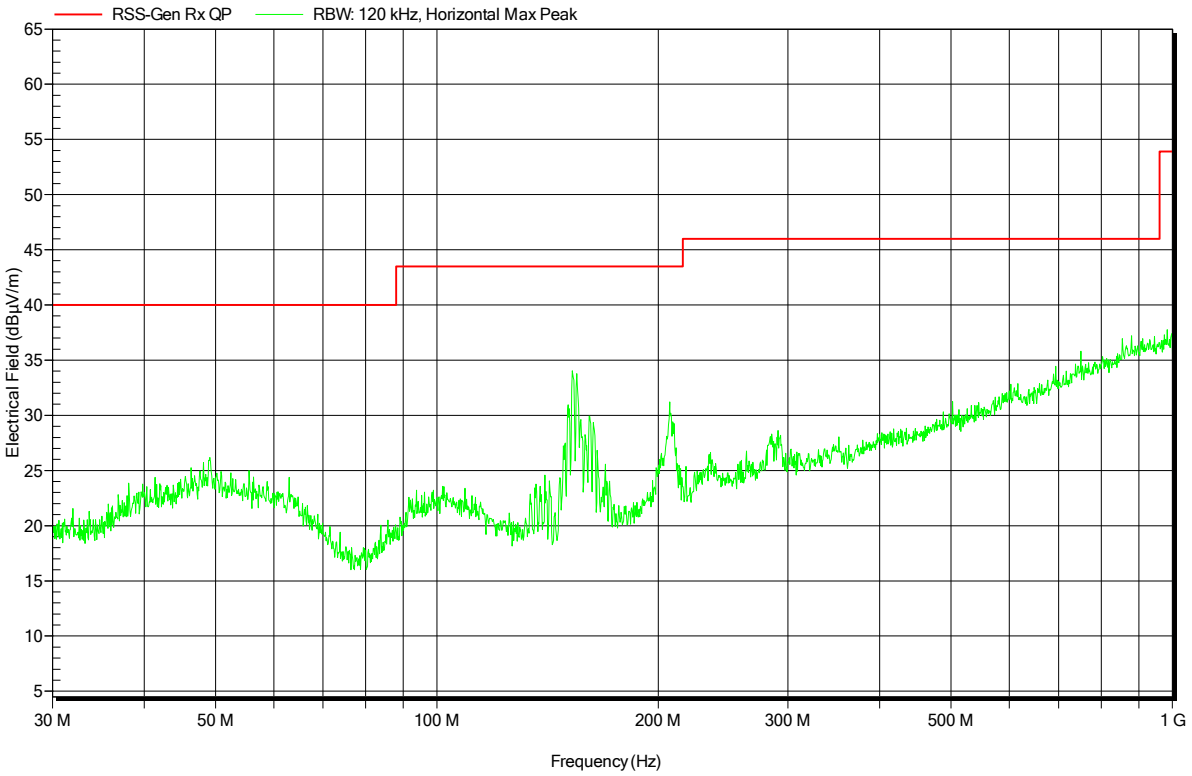
Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	49.08 MHz	33.7 dBµV/m	40 dBµV/m	-6.3 dB	Pass	0 Degree	1 m
2	62.916 MHz	37.1 dBµV/m	40 dBµV/m	-2.9 dB	Pass	0 Degree	1 m
3	206.94 MHz	32.7 dBµV/m	43.5 dBµV/m	-10.8 dB	Pass	0 Degree	1 m

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:	

Index 2

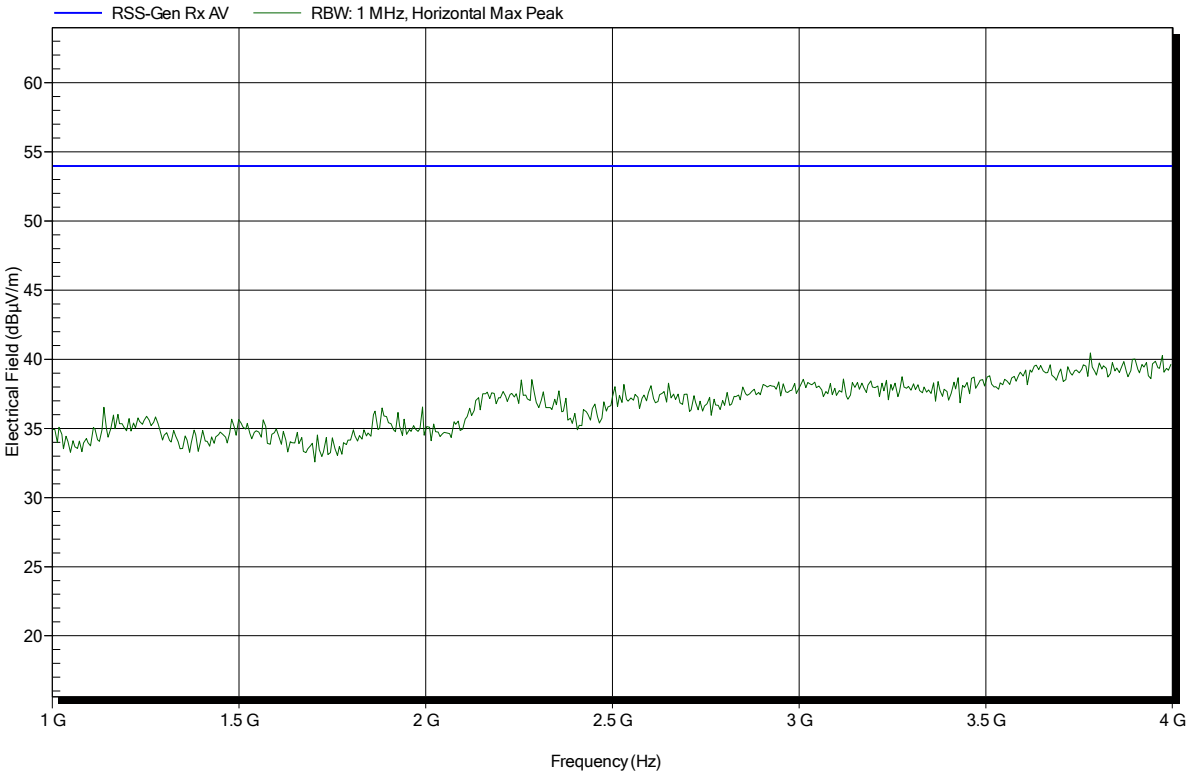


Spurious emissions according to RSS-Gen Issue 4

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:	

Index 75

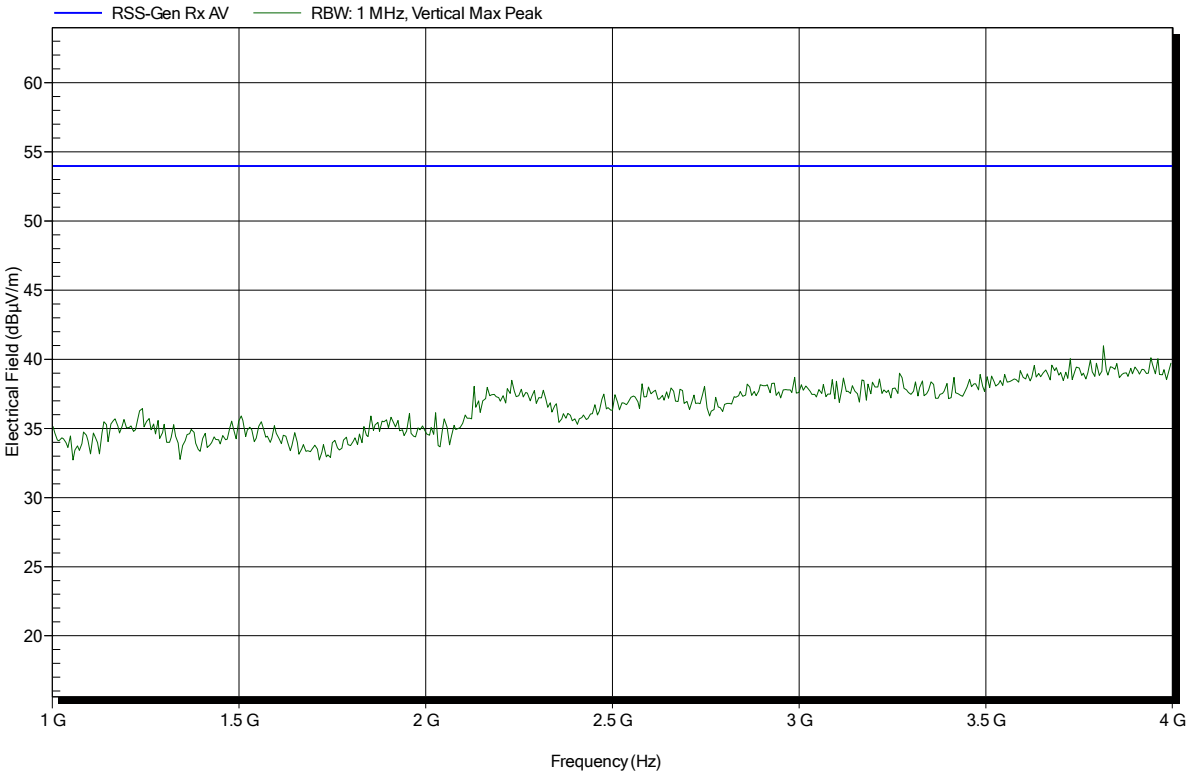


Spurious emissions according to RSS-Gen Issue 4

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:	

Index 72

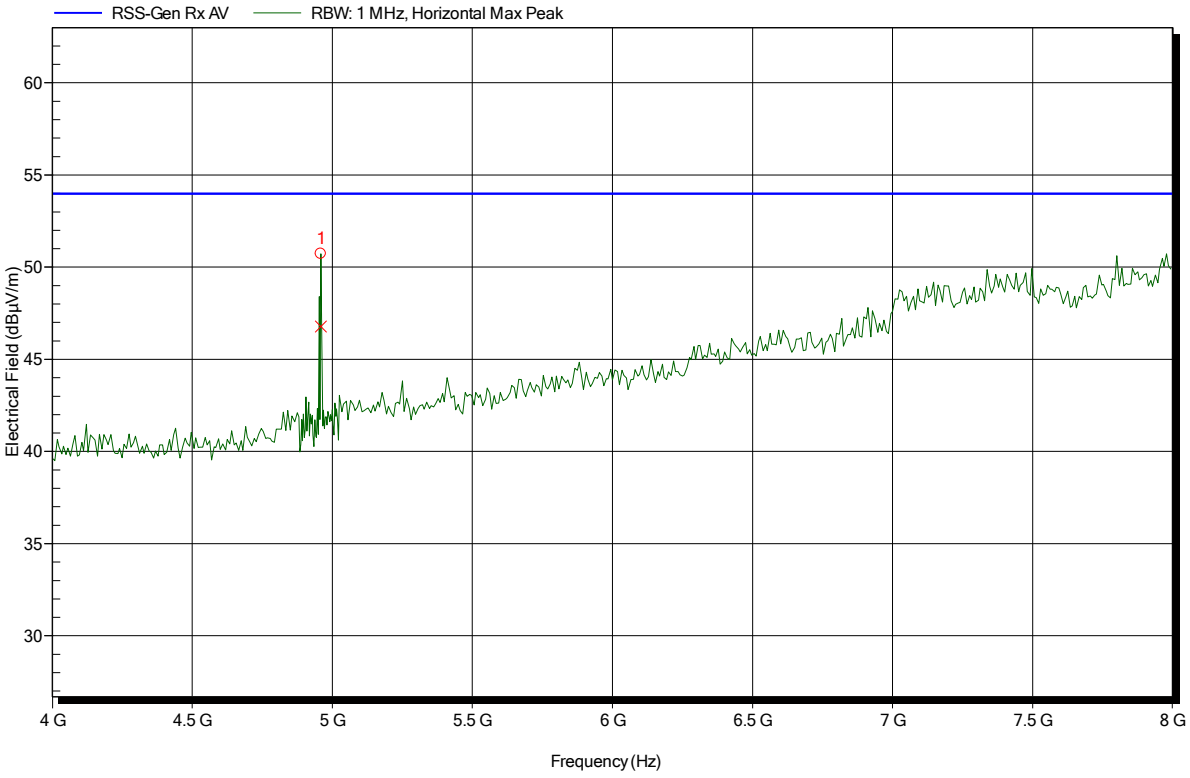


Spurious emissions according to RSS-Gen Issue 4

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:	

Index 77



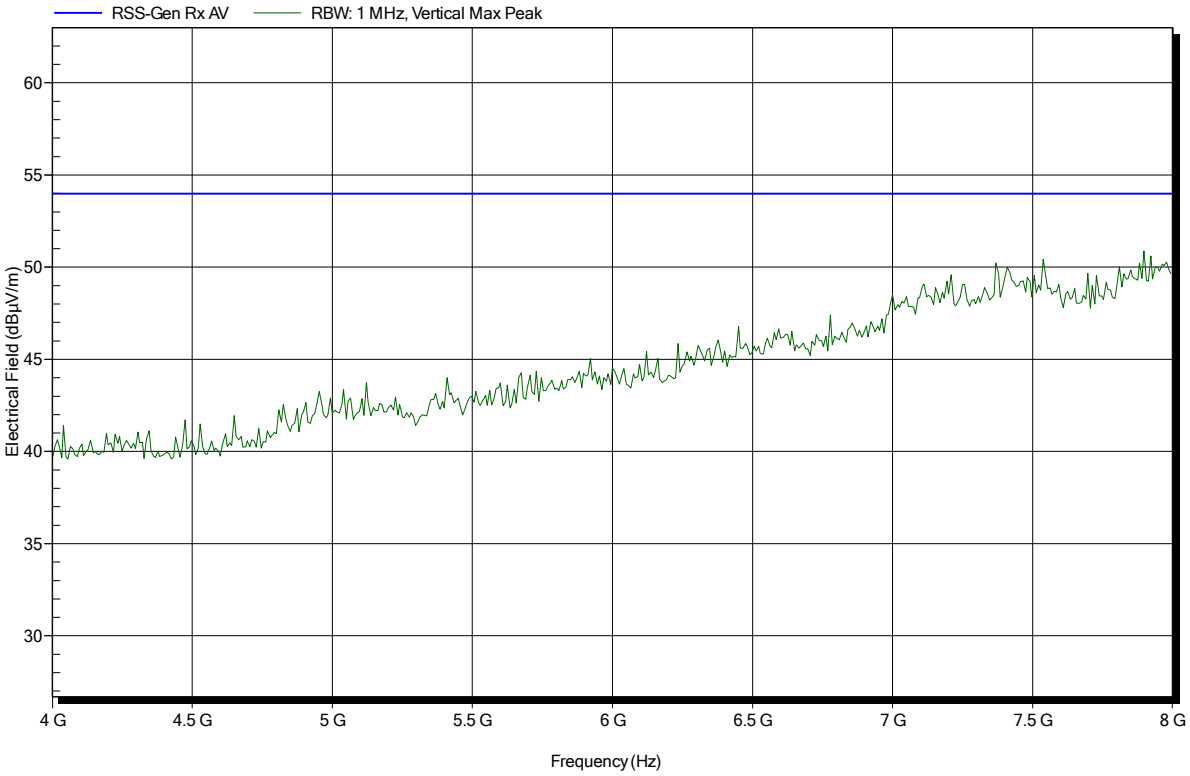
Frequency	Average	Average Limit	Average Difference	Average Status
4.959 GHz	46.78 dBµV/m	53.98 dBµV/m	-7.2 dB	Pass

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:	

Index 73

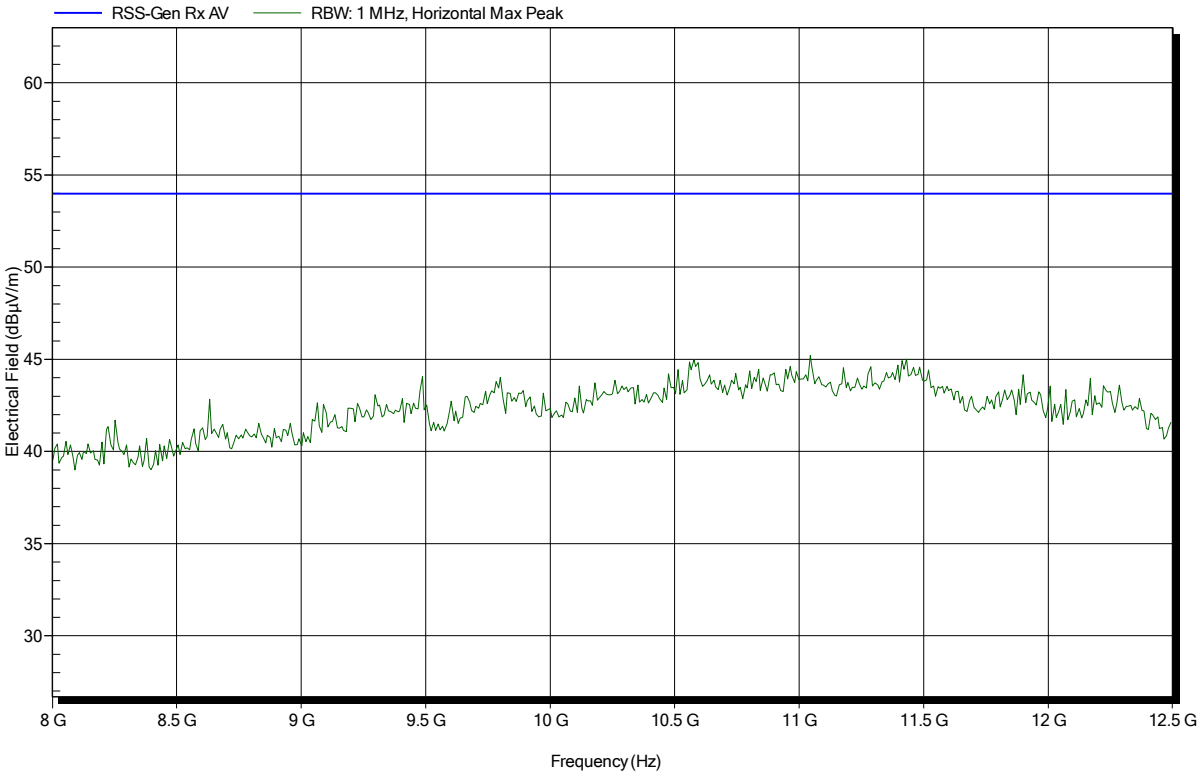


Spurious emissions according to RSS-Gen Issue 4

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:	

Index 79



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:	

Index 74