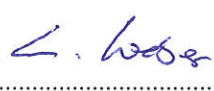


RADIO REPORT FCC 47 CFR Part 15C ISED Canada RSS-247 Digital transmission systems operating within the 2400 – 2483.5 MHz band	
Report Reference No	G0M-1905-8226-TFC247DT-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	    DAkkS - Registration number : D-PL-12092-01-03 (ISED) ISED Testing Laboratory site: 3470A-2 DAkkS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	digades GmbH
Address	Äußere Weberstraße 20 02763 Zittau GERMANY
Test Specification	According to FCC/ISED rules
Standard	47 CFR Part 15C RSS-247, Issue 2, 2017-02 RSS-Gen, Issue 5, Amendment 1, 2019-03
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	VW RemoteStart
Model(s)	Remote Start Receiver - VWRSTR
Additional Model(s)	None
Brand Name(s)	None
Hardware Version(s)	HW 005
Software Version(s)	SW 0801
FCC-ID	QNFVWRSTR
IC	6869A-VWRSTR
Test Result	PASSED

Possible test case verdicts:		
required by standard but not tested	N/T	
not required by standard	N/R	
not applicable to EUT	N/A	
test object does meet the requirement	P(PASS)	
test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	20 - 23 °C	
Test Lab Humidity	32 – 38 %	
Date of receipt of test item	2019-07-16	
Report:		
Compiled by	Wilfried Treffke	
Tested by (+ signature) (Responsible for Test)	Wilfried Treffke	
Approved by (+ signature) (Head of Lab)	Christian Weber	
Date of Issue	2019-07-17	
Total number of pages	60	
General Remarks:		
The test results presented in this report relate only to the object tested. The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.		
Additional Comments:		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2019-07-17	Initial Release	

ABBREVIATIONS AND ACRONYMS

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

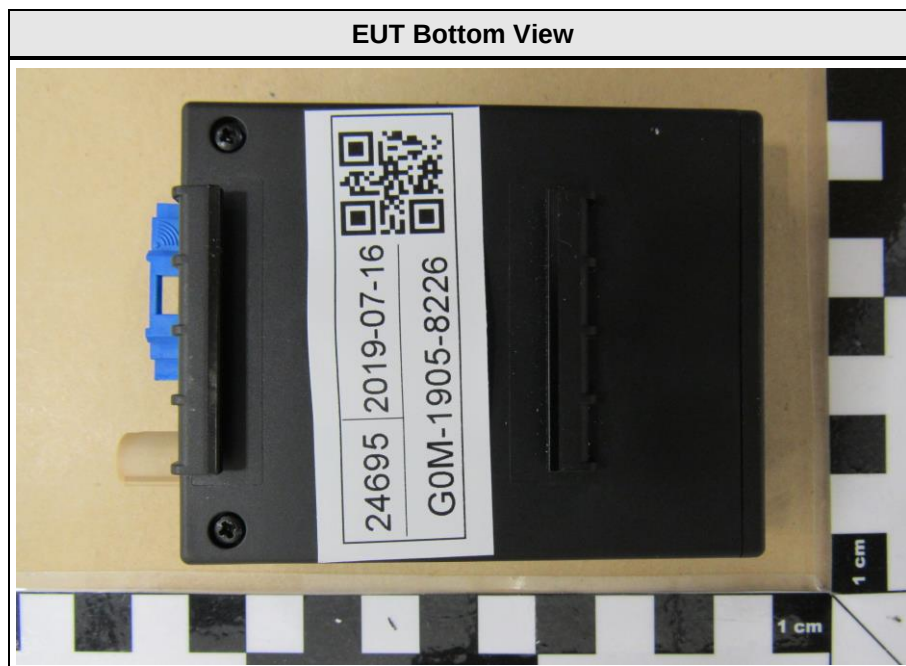
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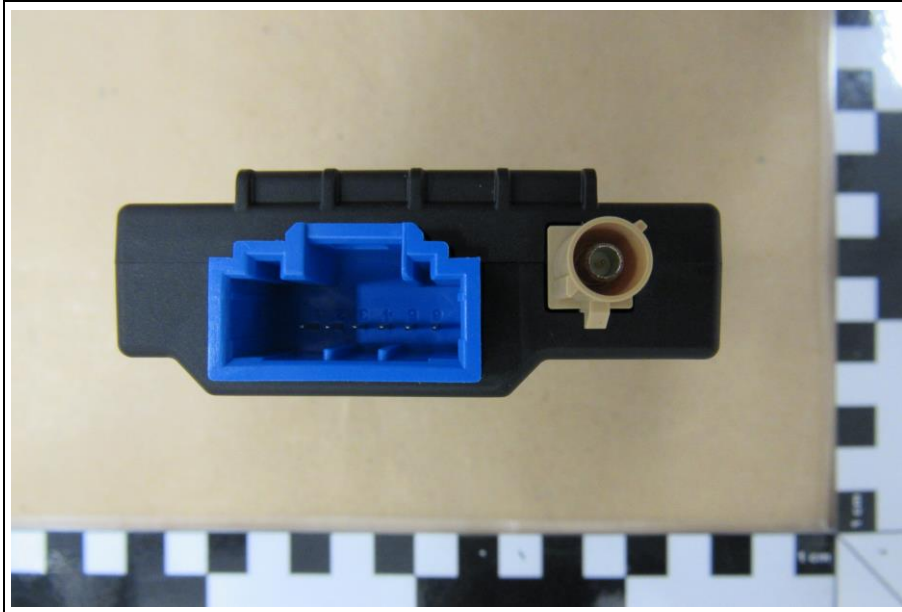
1 Equipment (Test Item) Under Test

Description	VW RemoteStart	
Model	Remote Start Receiver - VWRSTR	
Additional Model(s)	None	
Brand Name(s)	None	
Serial Number(s)	None	
Hardware Version(s)	HW 005	
Software Version(s)	SW 0801	
PMN	Remote Start Receiver	
HVIN	Remote Start Receiver	
FVIN	None	
HMN	None	
FCC-ID	QNFVWRSTR	
IC	6869A-VWRSTR	
Equipment type	End Product	
Radio type	Transceiver	
Assigned frequency bands	902.0 - 928.0 MHz	
Radio technology	Digital Modulation	
Modulation	LoRa (CSS)	
Number of antenna ports	1	
Antenna	Type	External
	Model	2J520-250RG174-C96 Fakra D
	Manufacturer	2J
	Gain	-2.8 dBi (manufacturer declaration)
Supply Voltage	V _{NOM}	12 VDC
Operating Temperature	T _{NOM}	25 °C
AC/DC-Adaptor	Model	None
	Vendor	None
	Input	None
	Output	None
Manufacturer	digades GmbH Äußere Weberstraße 20 02763 Zittau GERMANY	

1.1 Photos – Equipment External



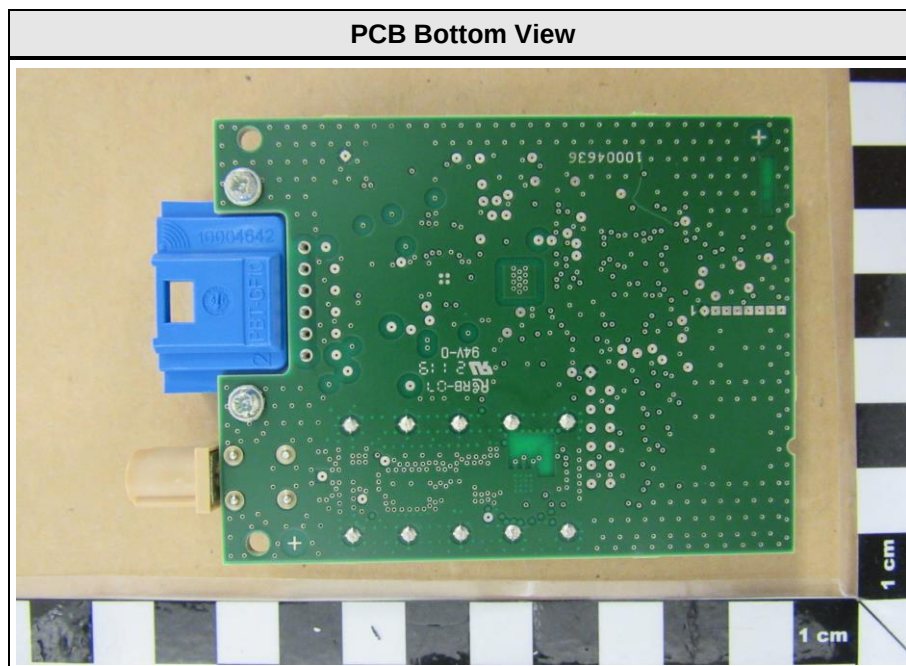
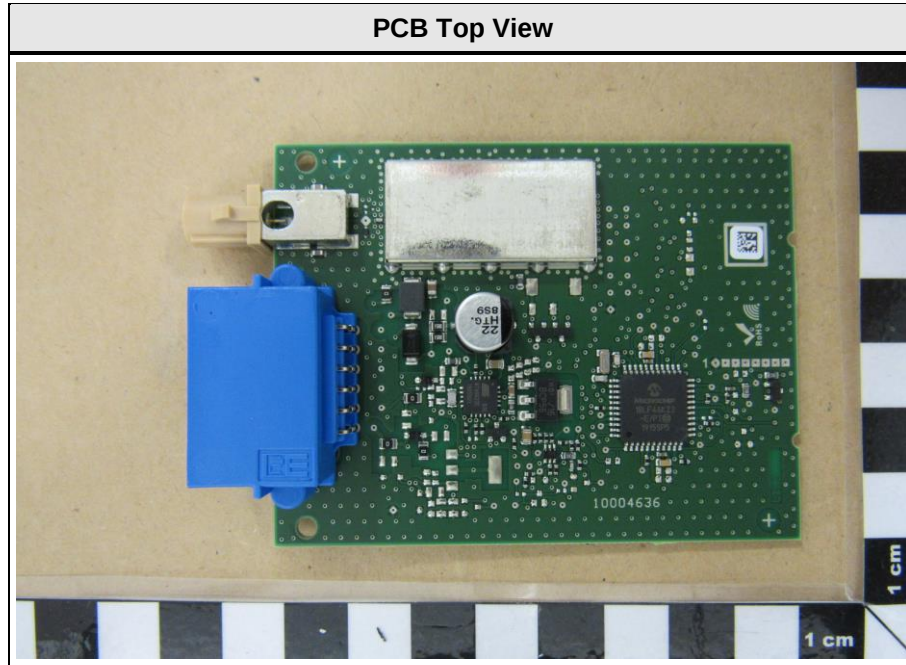
EUT Connectors View

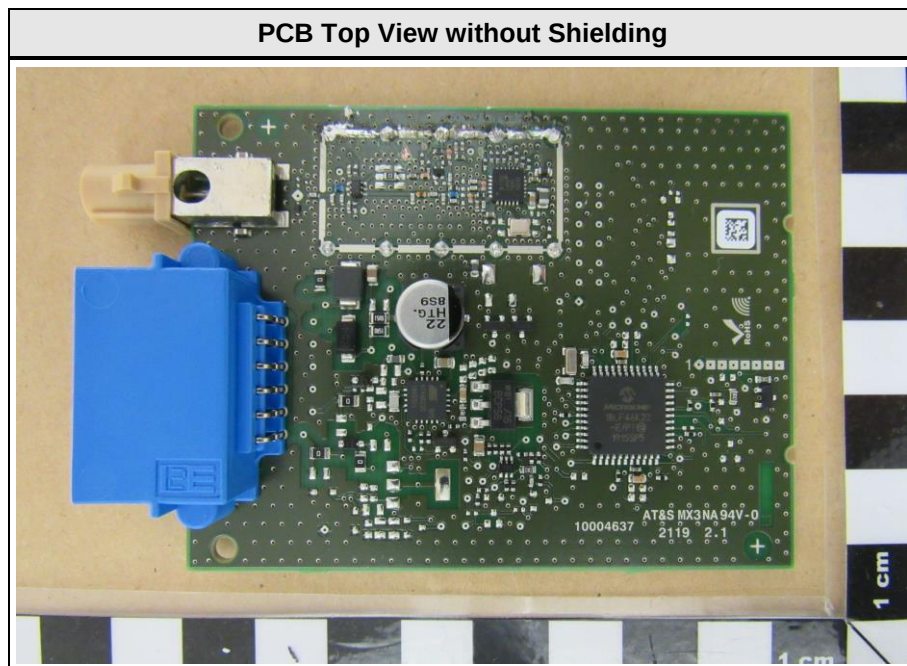


Antenna (12 cm length)

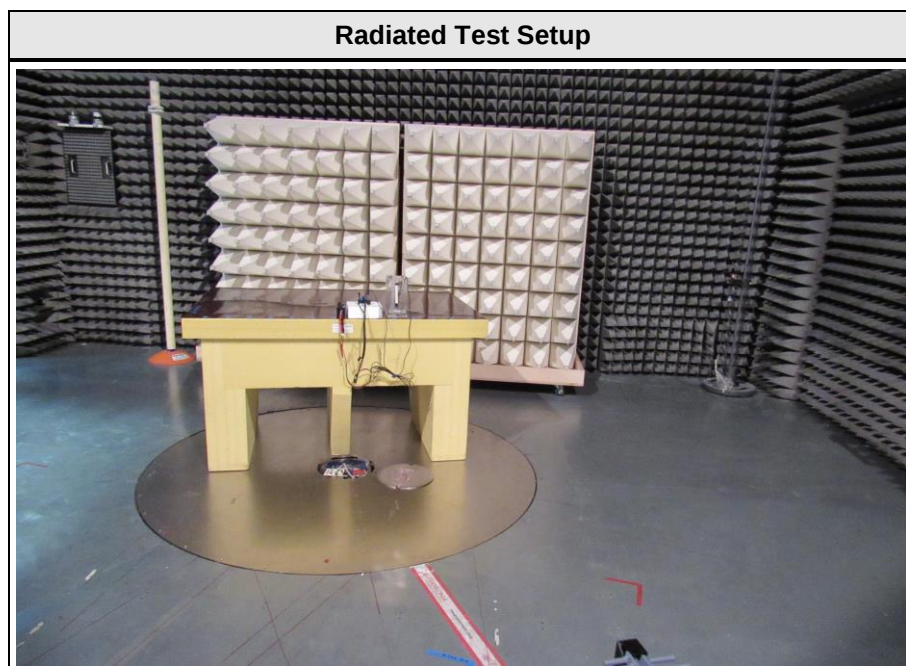


1.2 Photos – Equipment Internal





1.3 Photos – Test Setup



1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
None				
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

1.5 Test mode duty cycle

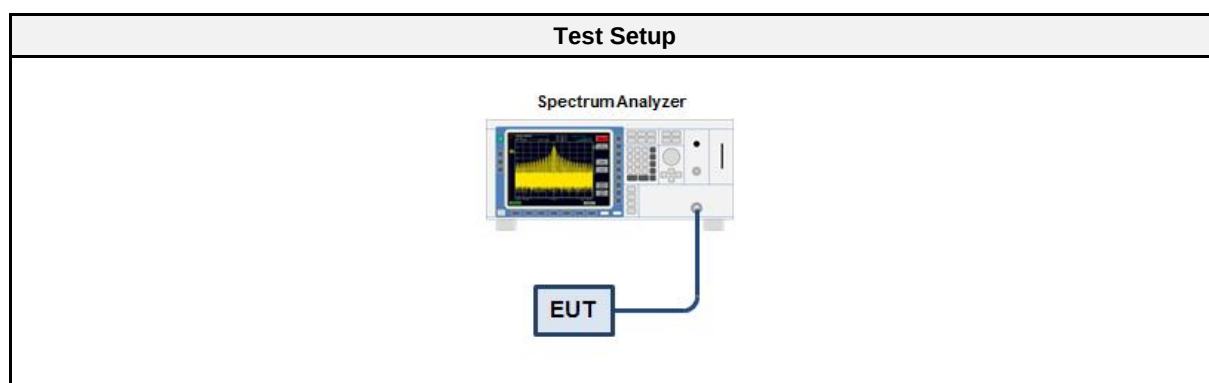
1.5.1 Information

Test Information	
Measurement Method	ANSI C63.10 11.6

1.5.2 Requirements

Requirements	
Duty cycle	Duty cycle correction
$\geq 98 \%$	No correction required
$< 98 \%$	Correction required ($10 \times \log_{10}(1/DC)$)

1.5.3 Setup



1.5.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2018-12	2019-12

1.5.5 Procedure

Test Procedure
1. EUT set to test mode 2. Span is set to zero span 3. Detector set to peak 4. Sweep time is set long enough to capture at least 5 bursts 5. Envelope peak value of emission spectrum is selected 6. The maximum burst duration T_{ON} is measured using two markers set to the start and the end of the longest burst 7. The minimum idle duration T_{OFF} is measured using two markers set to the start and the end of the shortest idle period 8. The duty cycle is calculated by $DC = T_{ON} / (T_{ON} + T_{OFF})$ 9. The duty cycle correction is calculated by $DC = 10 \times \log_{10}(T_{ON} / (T_{ON} + T_{OFF}))$

1.5.6 Results

Duty Cycle Results		
Mode	Duty Cycle	Correction Factor [dB]
Transmit	100%	0

1.6 Test Modes

Mode	Description
Transmit	Mode = Transmit Modulation = LoRa (CSS) Duty cycle = 100 %
Receive	Mode = Receive Modulation = LoRa (CSS)
Comment:	

1.7 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx / Rx	1	910.5
F2	Tx / Rx	2	919.5
F3	Rx	3	915.0

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:

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

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:

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

2 Result Summary

FCC 47 CFR Part 15C, ISED RSS-247				
Product Standard Reference	Requirement	Reference Method	Result	Remarks
ISED RSS-Gen, Issue 5 (section 6.6)	Occupied Bandwidth	ANSI C63.10-2013	N/R	Informational only
FCC § 15.247(a)(2) ISED RSS-247, Issue 2 (section 5.2)	6 dB Bandwidth	ANSI C63.10-2013	N/T	
FCC § 15.247(b)(1) ISED RSS-247, Issue 2 (section 5.4)	Maximum peak conducted power	ANSI C63.10-2013	PASS	
FCC § 15.247(e) ISED RSS-247, Issue 2 (section 5.2)	Power spectral density	ANSI C63.10-2013	N/T	
FCC § 15.207 ISED RSS-247, Issue 2 (section 3.1)	AC power line conducted emissions	ANSI C63.10-2013	N/R	No powered (directly or indirectly) via AC-Mains
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Band edge compliance	ANSI C63.10-2013	N/T	
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Conducted spurious emissions	ANSI C63.10-2013	N/T	
FCC § 15.247(d) FCC § 15.209 ISED RSS-Gen, Issue 5 (section 6.13)	Transmitter radiated spurious emissions	ANSI C63.10-2013	PASS	
ISED RSS-247, Issue 2 (section 3.1)	Receiver radiated spurious emissions	ANSI C63.10-2013	PASS	
Comment:				

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

3 Test Conditions and Results

3.1 Test Conditions and Results - Occupied bandwidth

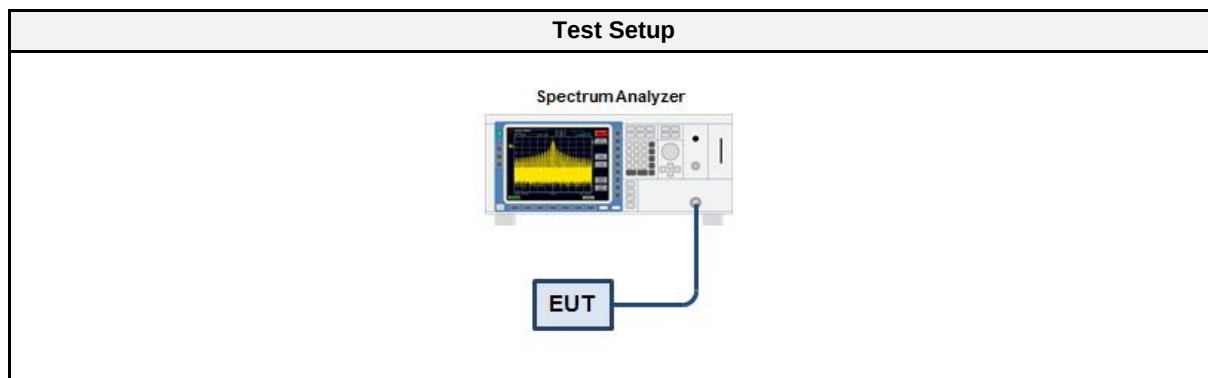
3.1.1 Information

Test Information	
Reference	ISED RSS-Gen, Issue 5 (section 6.6)
Measurement Method	ANSI C63.10 6.9.3
Operator	Wilfried Treffke
Date	2019-07-16

3.1.2 Limits

Limits
None (Informational only)

3.1.3 Setup



3.1.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2018-12	2019-12

3.1.5 Procedure

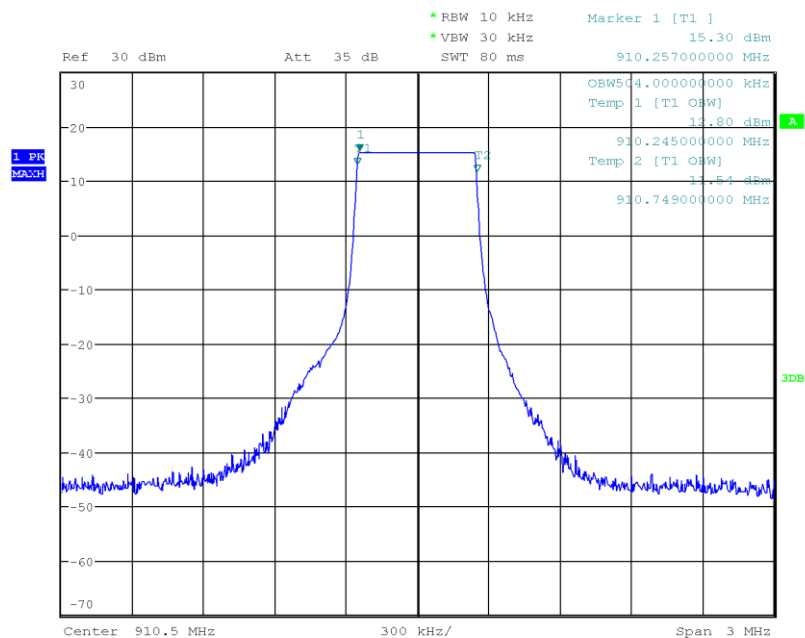
Test Procedure
1. EUT transmitter is activated in test mode under normal conditions 2. The spectrum analyzer is set to peak detection and maximum hold with a span twice the emission spectrum 3. The resolution bandwidth is set to the range of 1 % to 5 % of the occupied bandwidth 4. The occupied bandwidth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

3.1.6 Results

Test Results		
Mode	Frequency [MHz]	Bandwidth [MHz]
Transmit	910.5	0.507
Transmit	919.5	0.504

Occupied Bandwidth

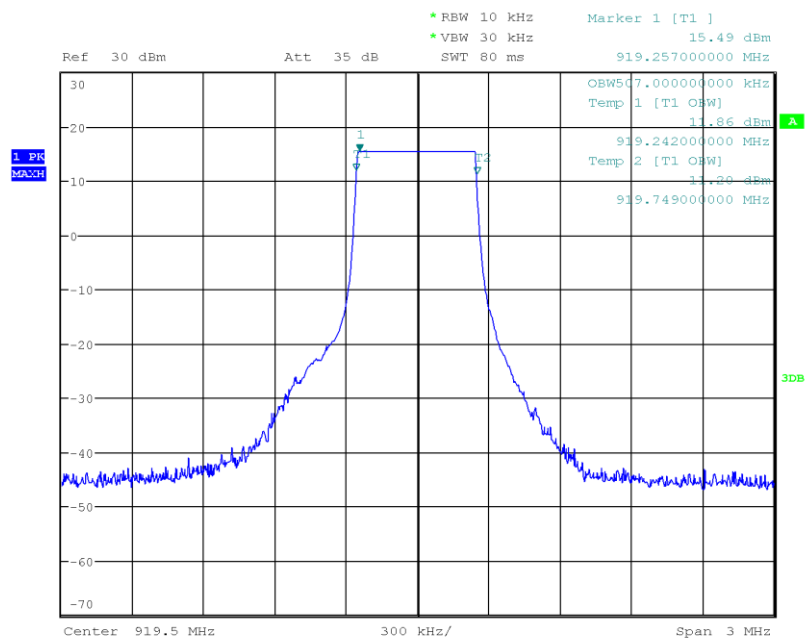
Project Number: G0M-1905-8226
 Applicant: digades GmbH
 Model Description: VW RemoteStart
 Model: Remote Start Receiver - VWRSTR
 Test Sample ID: 24695
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: LoRa (CSS), Channel: 910.5 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-07-16
 Occupied Bandwidth [MHz]: 0.504



Date: 16.JUL.2019 08:51:28

Occupied Bandwidth

Project Number: G0M-1905-8226
 Applicant: digades GmbH
 Model Description: VW RemoteStart
 Model: Remote Start Receiver - VWRSTR
 Test Sample ID: 24695
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: LoRa (CSS), Channel: 919.5 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-07-16
 Occupied Bandwidth [MHz]: 0.507



Date: 16.JUL.2019 08:49:49

3.2 Test Conditions and Results - Maximum peak conducted output power

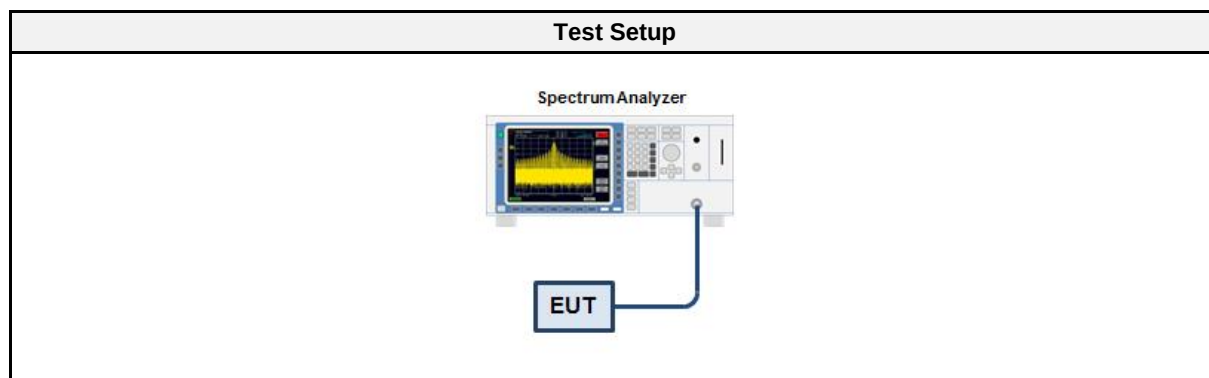
3.2.1 Information

Test Information	
Reference	FCC § 15.247(b)(1); ISED RSS-247, Issue 2 (section 5.4)
Measurement Method	ANSI C63.10 11.9.1
Operator	Wilfried Treffke
Date	2019-07-16

3.2.2 Limits

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

3.2.3 Setup



3.2.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2018-12	2019-12

3.2.5 Procedure

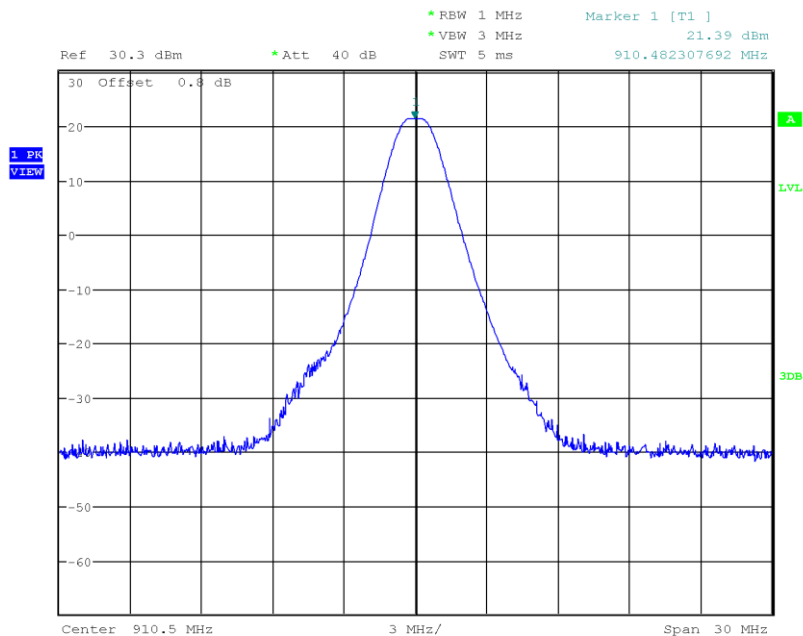
Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Analyzer resolution bandwidth is set $\geq$ DTS bandwidth 3. Detector set to peak and max hold 4. Sweep time is set to auto 5. After the trace has stabilized a marker is set to peak of envelope

3.2.6 Results

Test Results				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
910.5	21.39	0.138	1.0	PASS
919.5	21.02	0.126	1.0	PASS

Peak Conducted Output Power

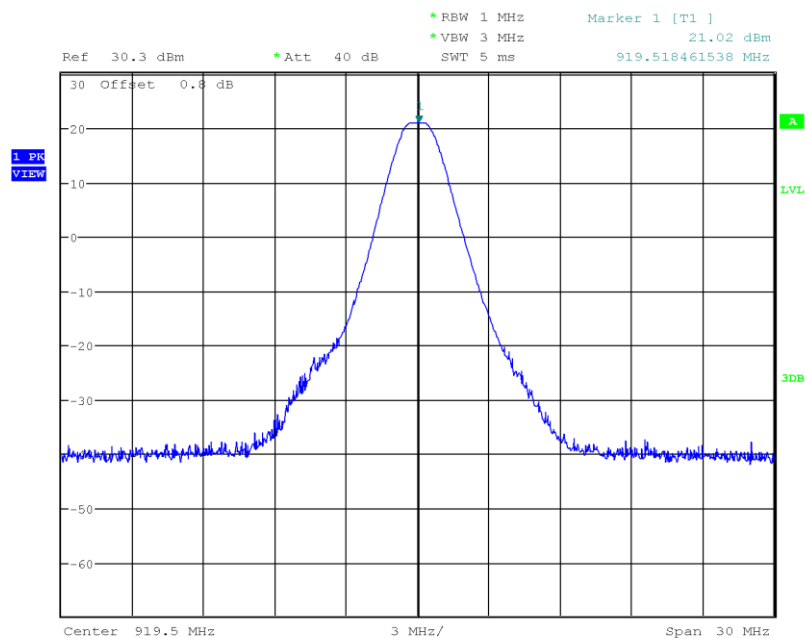
Project Number: G0M-1905-8226
 Applicant: digades GmbH
 Model Description: VW RemoteStart
 Model: Remote Start Receiver - VWRSTR
 Test Sample ID: 24695
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-07-16
 Operating Conditions: Tnom/Vnom
 Mode: LoRa (CSS), Channel: 910.5 MHz
 Note 1: FCC 15.247, RSS-247
 Note 2: ANSI C63.10:2013, Section 11.9.1.1
 Result: 21.39 dBm



Date: 16.JUL.2019 08:30:15

Peak Conducted Output Power

Project Number: G0M-1905-8226
 Applicant: digades GmbH
 Model Description: VW RemoteStart
 Model: Remote Start Receiver - VWRSTR
 Test Sample ID: 24695
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-07-16
 Operating Conditions: Tnom/Vnom
 Mode: LoRa (CSS), Channel: 919.5 MHz
 Note 1: FCC 15.247, RSS-247
 Note 2: ANSI C63.10:2013, Section 11.9.1.1
 Result: 21.02 dBm



Date: 16.JUL.2019 08:38:40

3.3 Test Conditions and Results - Transmitter radiated emissions

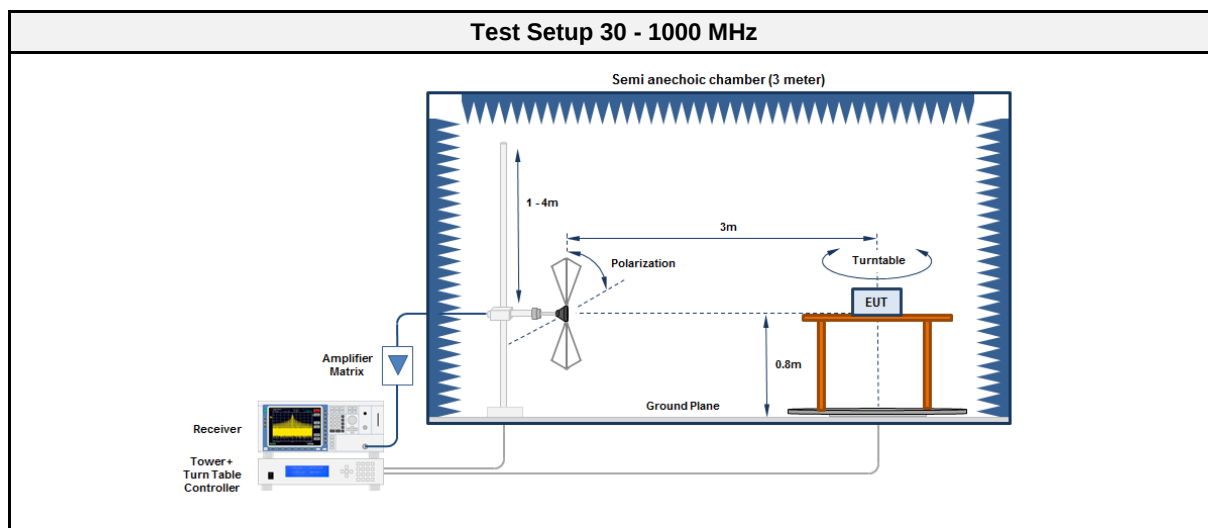
3.3.1 Information

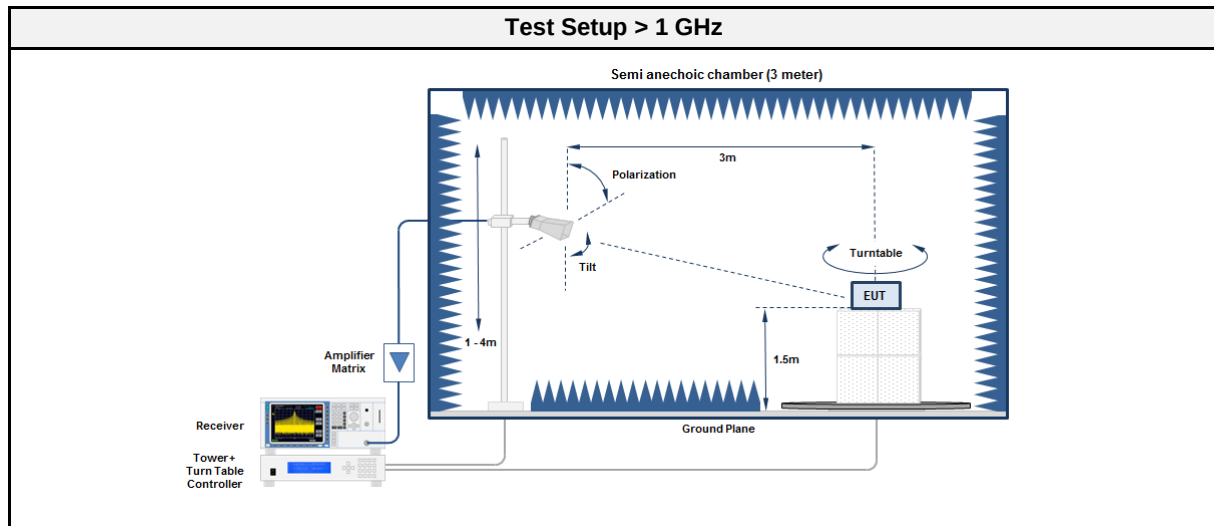
Test Information	
Reference	FCC § 15.247(d); FCC § 15.209; ISSED RSS-Gen, Issue 5 (section 6.13)
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6, 11.12
Operator	Wilfried Treffke
Date	2019-07-16

3.3.2 Limits

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

3.3.3 Setup





3.3.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2015.2.4

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2018-08	2019-08
Antenna	R&S	HK 116	EF00030	2019-04	2022-04
Antenna	R&S	HL 223	EF00187	2019-05	2022-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2018-08	2019-08
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2016-09	2019-09

3.3.5 Procedure

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

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

Test Procedure > 1 GHz

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

3.3.6 Results

Test Results

Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
910.5	1014	47.75	pk	ver	74.00	-26.25
910.5	1014	36.68	RMS	ver	54.00	-17.32
910.5	2731	40.23	pk	hor	74.00	-33.77
910.5	2731	38.83	RMS	hor	54.00	-15.17
910.5	2732	43.35	pk	ver	74.00	-30.65
910.5	2732	42.44	RMS	ver	54.00	-11.56
910.5	7284	49.62	pk	hor	74.00	-24.38
910.5	7284	47.81	RMS	hor	54.00	-06.19
910.5	7284	46.20	pk	ver	74.00	-27.80
910.5	7284	43.28	RMS	ver	54.00	-10.72
910.5	8193	48.75	pk	hor	74.00	-25.25
910.5	8193	46.18	RMS	hor	54.00	-07.82
919.5	1044	48.14	pk	ver	74.00	-25.86
919.5	1044	37.44	RMS	ver	54.00	-16.56
919.5	1113	43.24	pk	hor	74.00	-30.76
919.5	1113	32.38	RMS	hor	54.00	-21.62
919.5	2758	39.43	pk	hor	74.00	-34.57
919.5	2758	37.80	RMS	hor	54.00	-16.20
919.5	2759	44.91	pk	ver	74.00	-29.09
919.5	2759	44.07	RMS	ver	54.00	-09.93
919.5	7355	50.18	pk	ver	74.00	-23.82
919.5	7355	48.36	RMS	ver	54.00	-05.64
919.5	7356	54.91	pk	hor	74.00	-19.09
919.5	7356	52.50	RMS	hor	54.00	-01.50
919.5	9195	50.57	pk	hor	74.00	-23.43
919.5	9195	47.92	RMS	hor	54.00	-06.08

3.4 Test Conditions and Results - Receiver radiated emissions

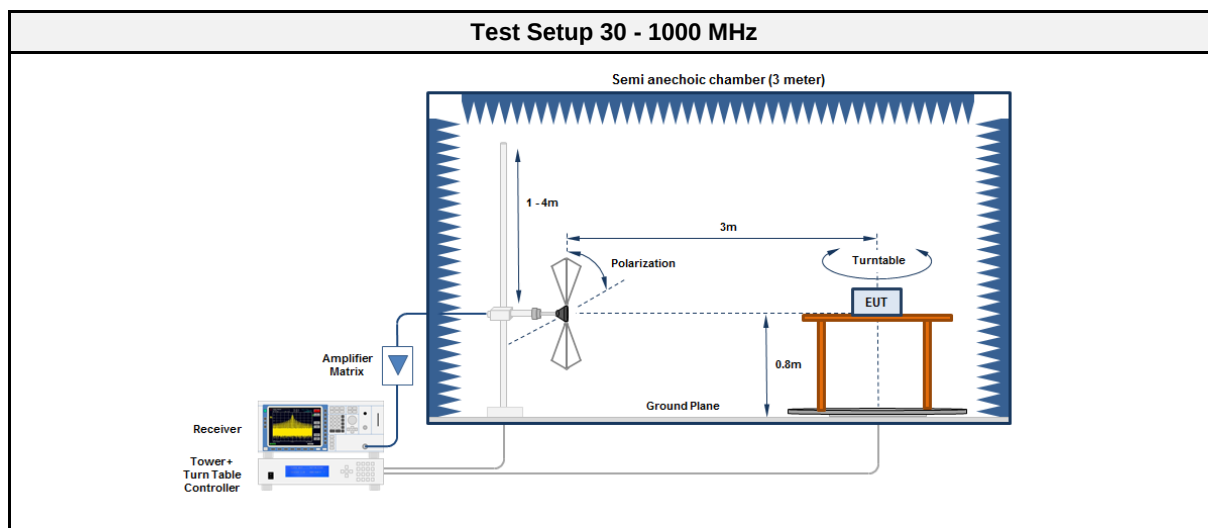
3.4.1 Information

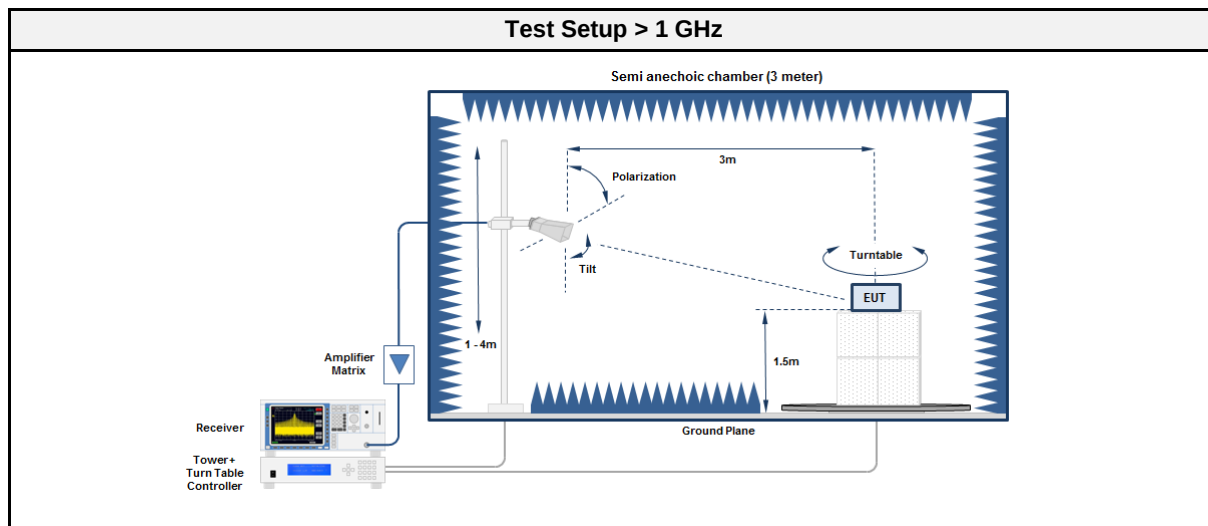
Test Information	
Reference	ISED RSS-247, Issue 2 (section 3.1)
Measurement Method	ANSI C63.10 6.5, 6.6, 11.12
Operator	Wilfried Treffke
Date	2019-07-16

3.4.2 Limits

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

3.4.3 Setup





3.4.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2015.2.4

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2018-08	2019-08
Antenna	R&S	HK 116	EF00030	2019-04	2022-04
Antenna	R&S	HL 223	EF00187	2019-05	2022-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2018-08	2019-08
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2016-09	2019-09

3.4.5 Procedure

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

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

3.4.6 Results

Test Results						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
915.0	232.051	20.19	pk	ver	46.00	-25.81
915.0	319.231	24.85	pk	ver	46.00	-21.15
915.0	7827	39.34	pk	ver	53.98	-14.64
915.0	7981	39.57	pk	hor	53.98	-14.41

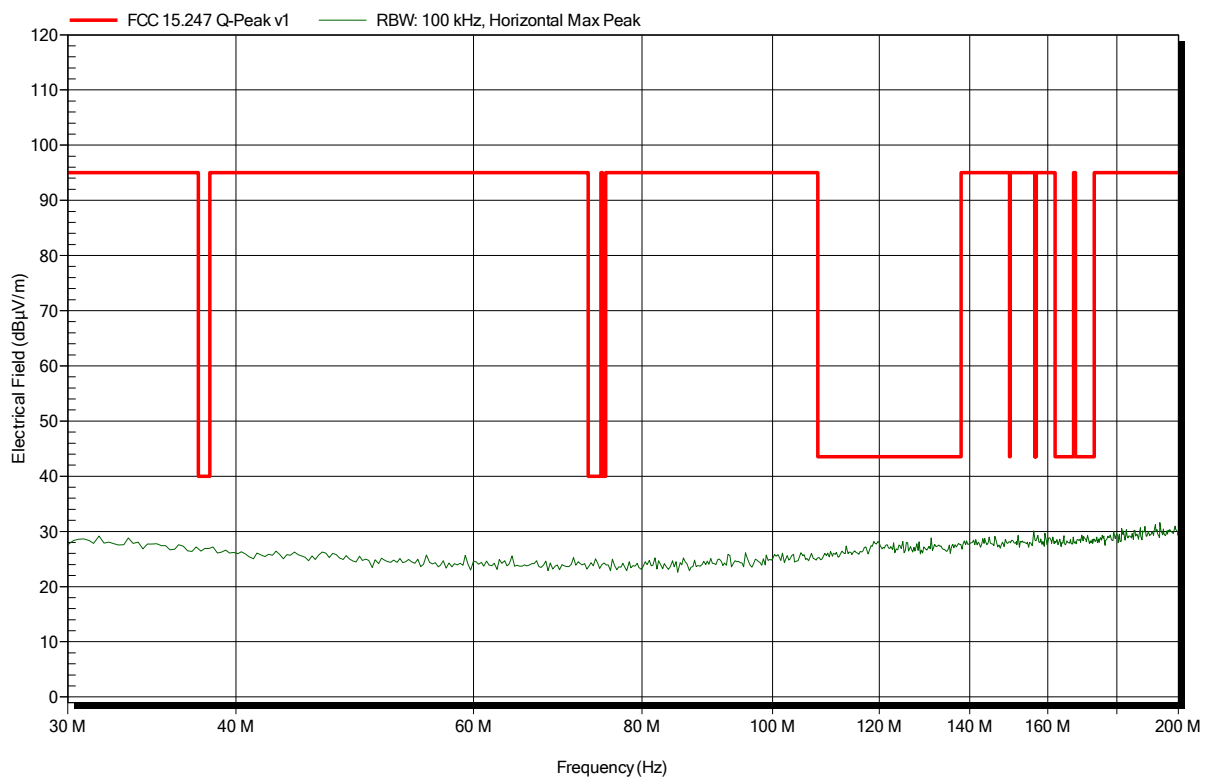
ANNEX A Transmitter spurious emissions

Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
 EUT Name: VW RemoteStart
 Model: Remote Start Receiver - VWRSTR
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: TX; LoRa; 910.5 MHz
 Test Date: 2019-07-16
 Note:

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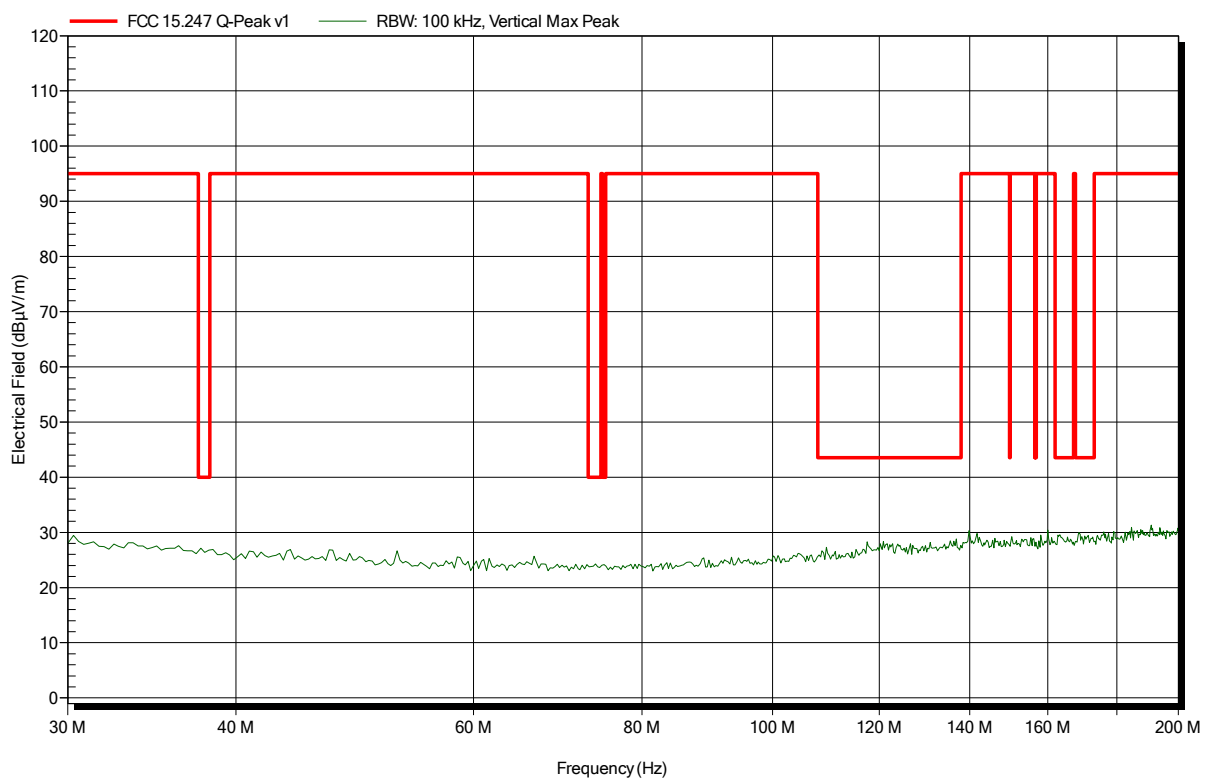


Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
EUT Name: VW RemoteStart
Model: Remote Start Receiver - VWRSTR
Test Site: Eurofins Product Service GmbH
Operator: Wilfried Treffke
Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
Antenna: Rohde & Schwarz HK 116, Vertical
Measurement distance: 3 m
Mode: TX; LoRa; 910.5 MHz
Test Date: 2019-07-16
Note:

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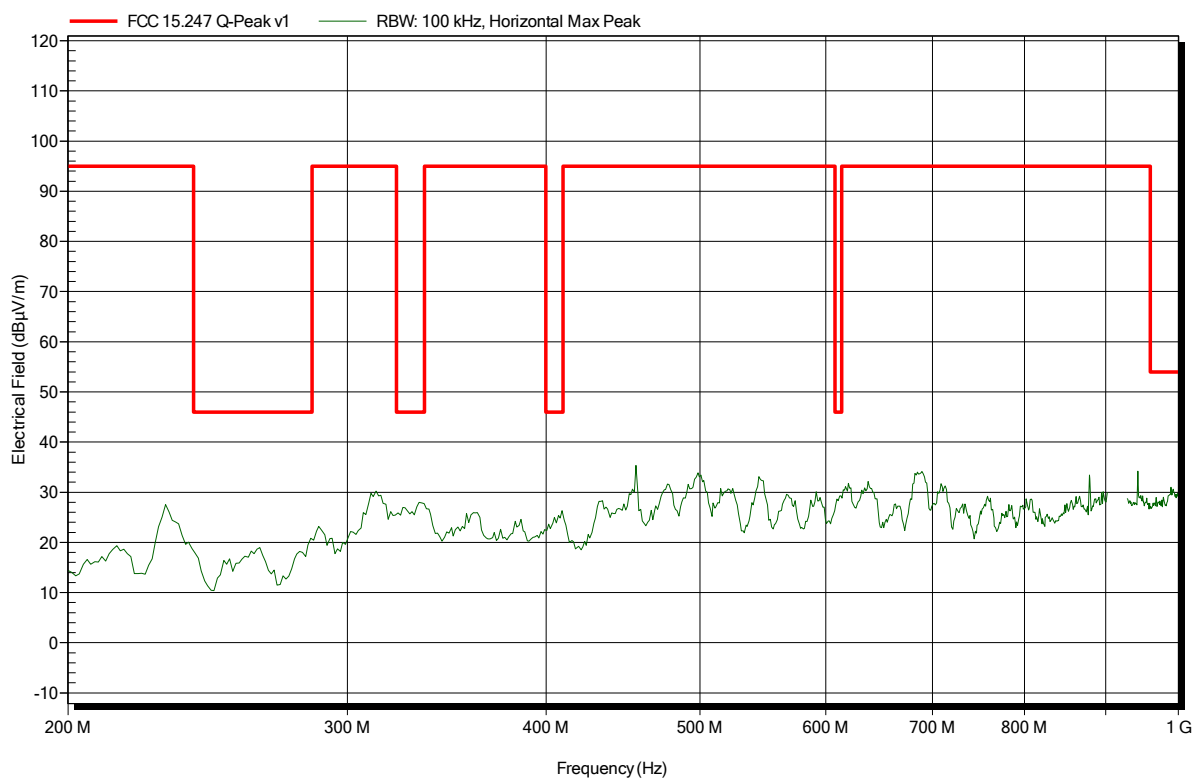


Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
EUT Name: VW RemoteStart
Model: Remote Start Receiver - VWRSTR
Test Site: Eurofins Product Service GmbH
Operator: Wilfried Treffke
Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
Antenna: Rohde & Schwarz HL 223, Horizontal
Measurement distance: 3 m
Mode: TX; LoRa; 910.5 MHz
Test Date: 2019-07-16
Note:

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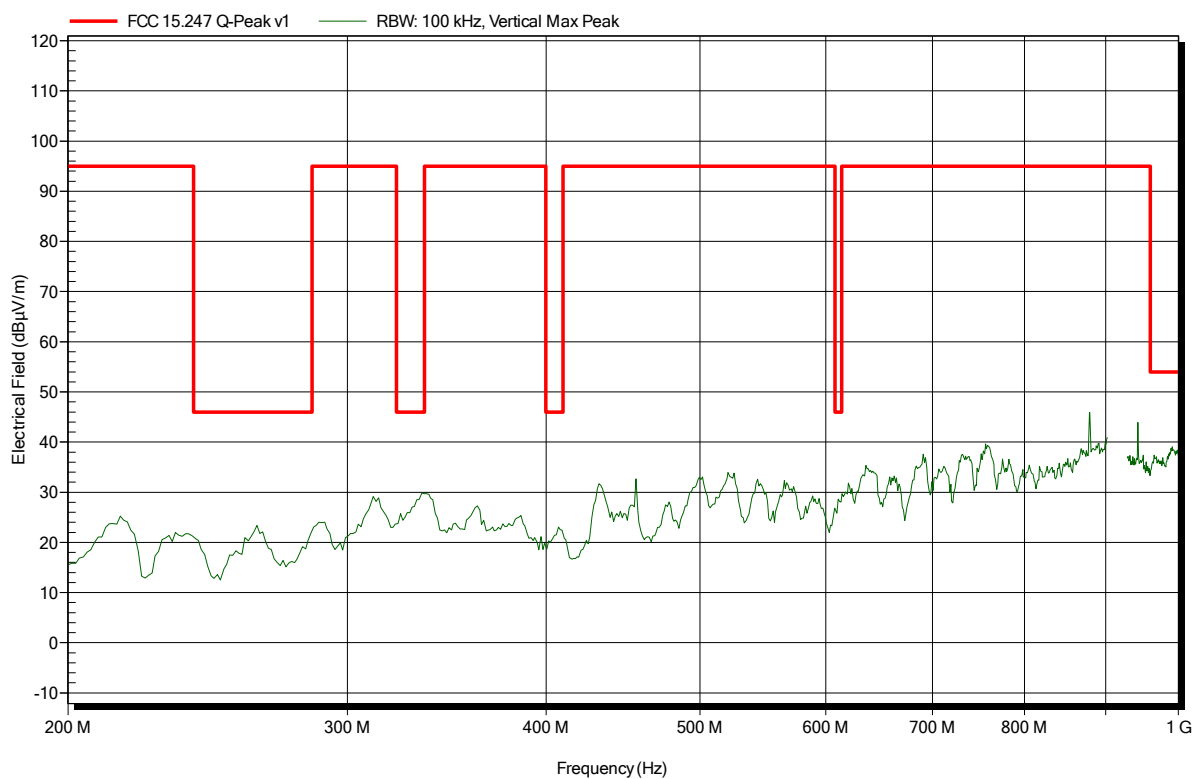


Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
EUT Name: VW RemoteStart
Model: Remote Start Receiver - VWRSTR
Test Site: Eurofins Product Service GmbH
Operator: Wilfried Treffke
Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
Antenna: Rohde & Schwarz HL 223, Vertical
Measurement distance: 3 m
Mode: TX; LoRa; 910.5 MHz
Test Date: 2019-07-16
Note:

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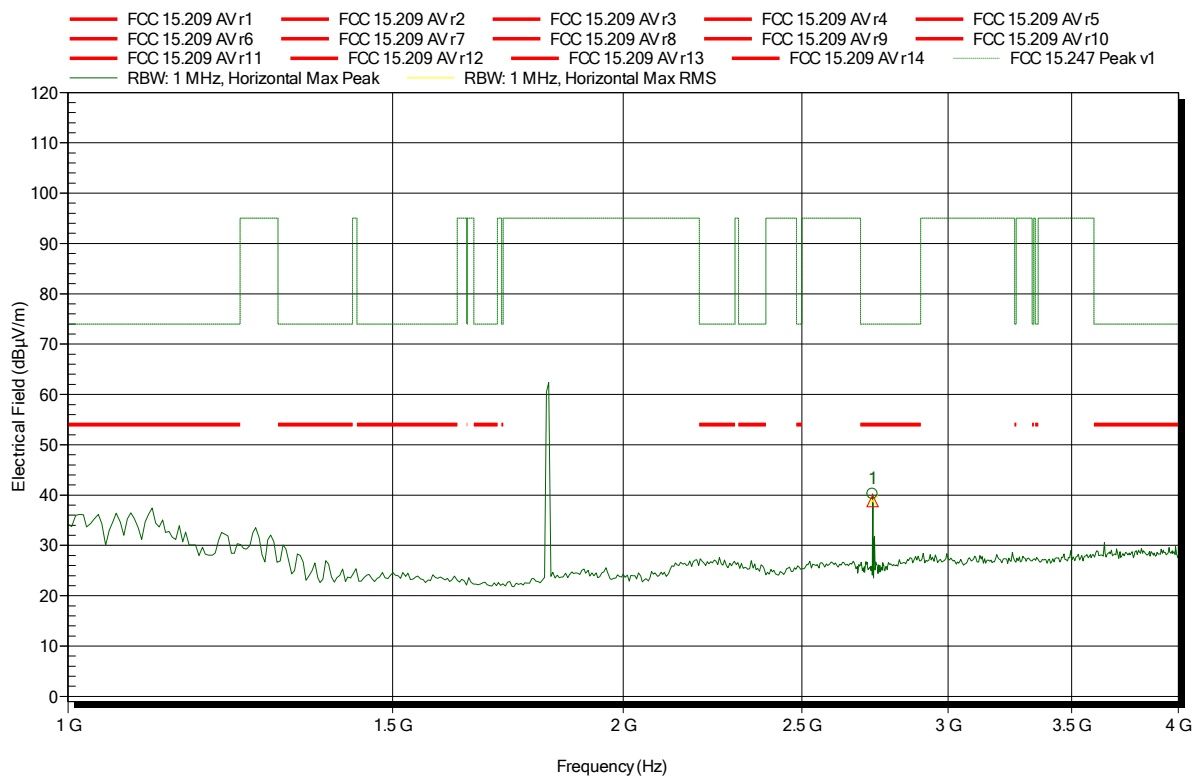


Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
EUT Name: VW RemoteStart
Model: Remote Start Receiver - VWRSTR
Test Site: Eurofins Product Service GmbH
Operator: Wilfried Treffke
Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; LoRa; 910.5 MHz
Test Date: 2019-07-16
Note:

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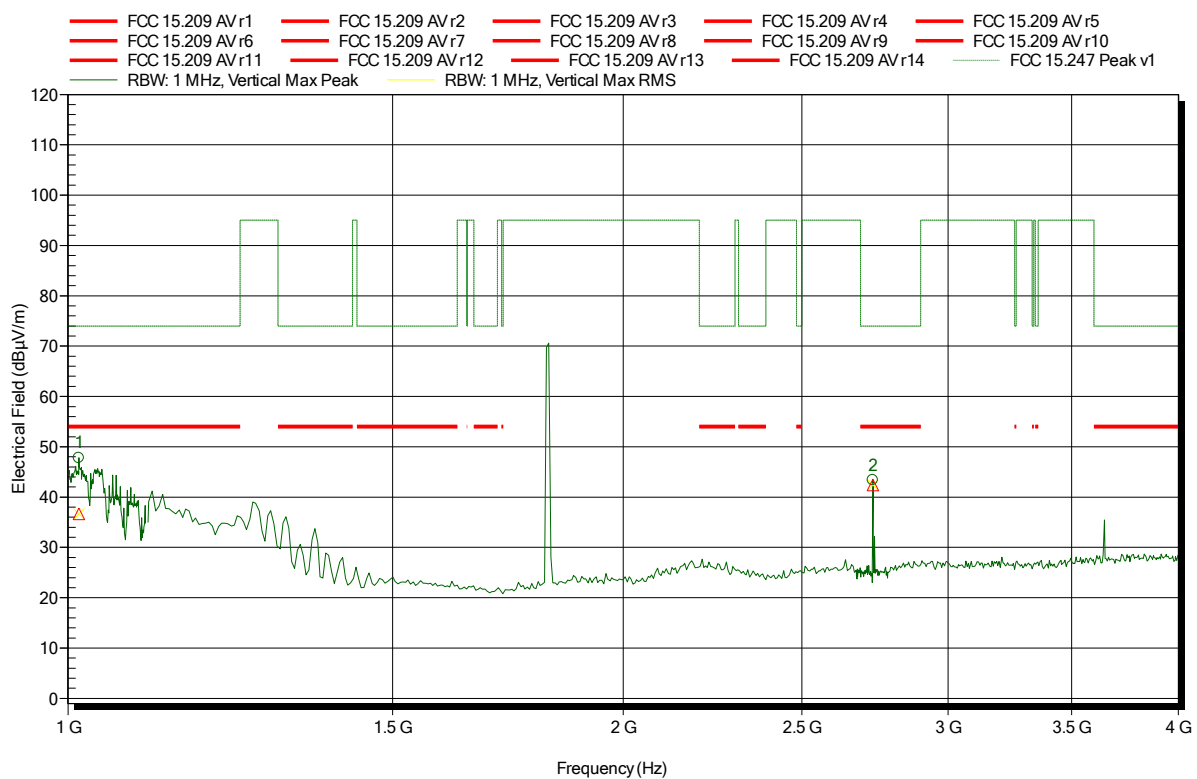
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.731 GHz	40.23 dBµV/m	74 dBµV/m	-33.77 dB	Pass
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.731 GHz	38.83 dBµV/m	54 dBµV/m	-15.17 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
EUT Name: VW RemoteStart
Model: Remote Start Receiver - VWRSTR
Test Site: Eurofins Product Service GmbH
Operator: Wilfried Treffke
Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; LoRa; 910.5 MHz
Test Date: 2019-07-16
Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.014 GHz	47.75 dBµV/m	74 dBµV/m	-26.25 dB	Pass
2.732 GHz	43.35 dBµV/m	74 dBµV/m	-30.65 dB	Pass

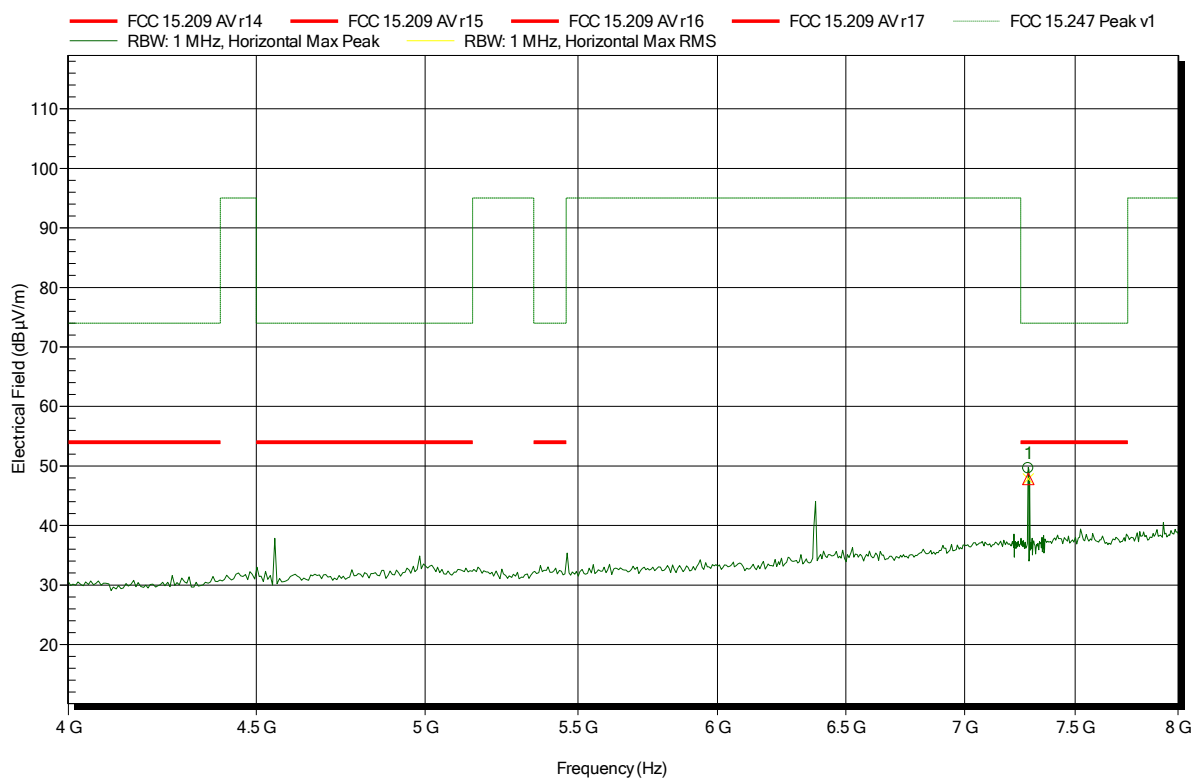
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
1.014 GHz	36.68 dBµV/m	54 dBµV/m	-17.32 dB	Pass
2.732 GHz	42.44 dBµV/m	54 dBµV/m	-11.56 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
EUT Name: VW RemoteStart
Model: Remote Start Receiver - VWRSTR
Test Site: Eurofins Product Service GmbH
Operator: Wilfried Treffke
Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; LoRa; 910.5 MHz
Test Date: 2019-07-16
Note:

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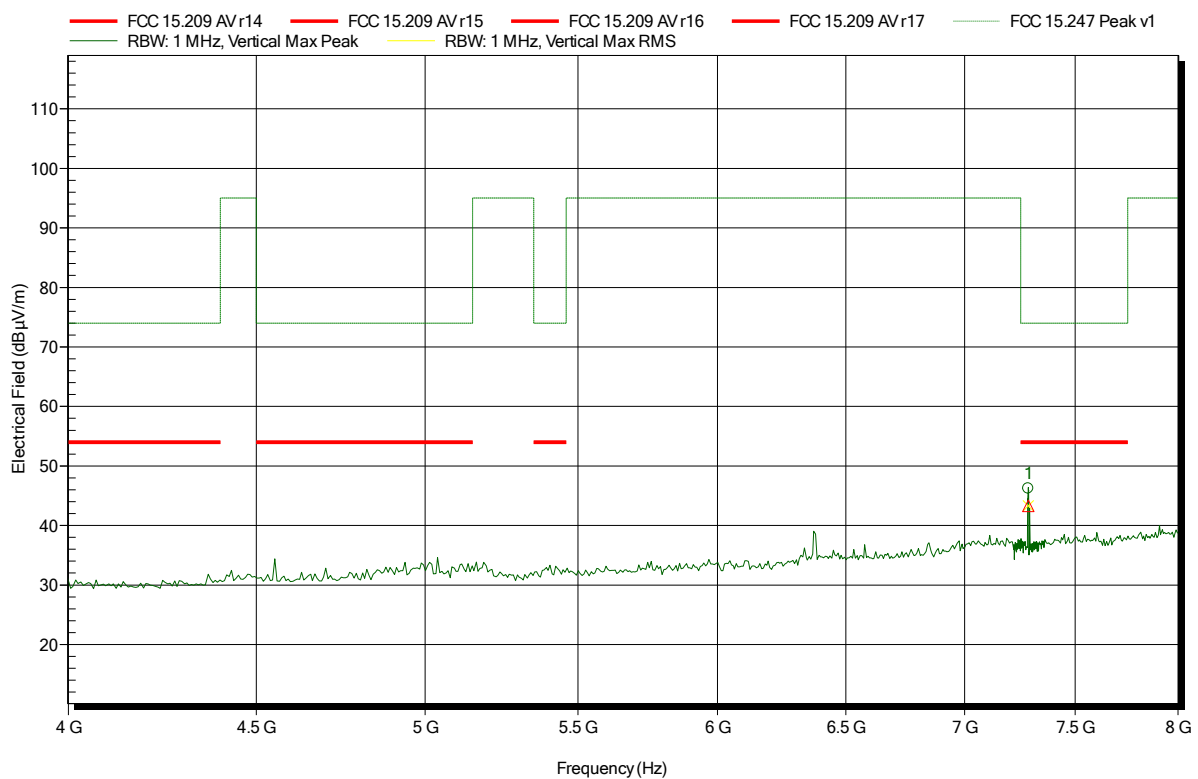
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
7.284 GHz	49.62 dBµV/m	74 dBµV/m	-24.38 dB	Pass
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
7.284 GHz	47.81 dBµV/m	54 dBµV/m	-6.19 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
EUT Name: VW RemoteStart
Model: Remote Start Receiver - VWRSTR
Test Site: Eurofins Product Service GmbH
Operator: Wilfried Treffke
Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m, converted to 3 m
Mode: TX; LoRa; 910.5 MHz
Test Date: 2019-07-16
Note:

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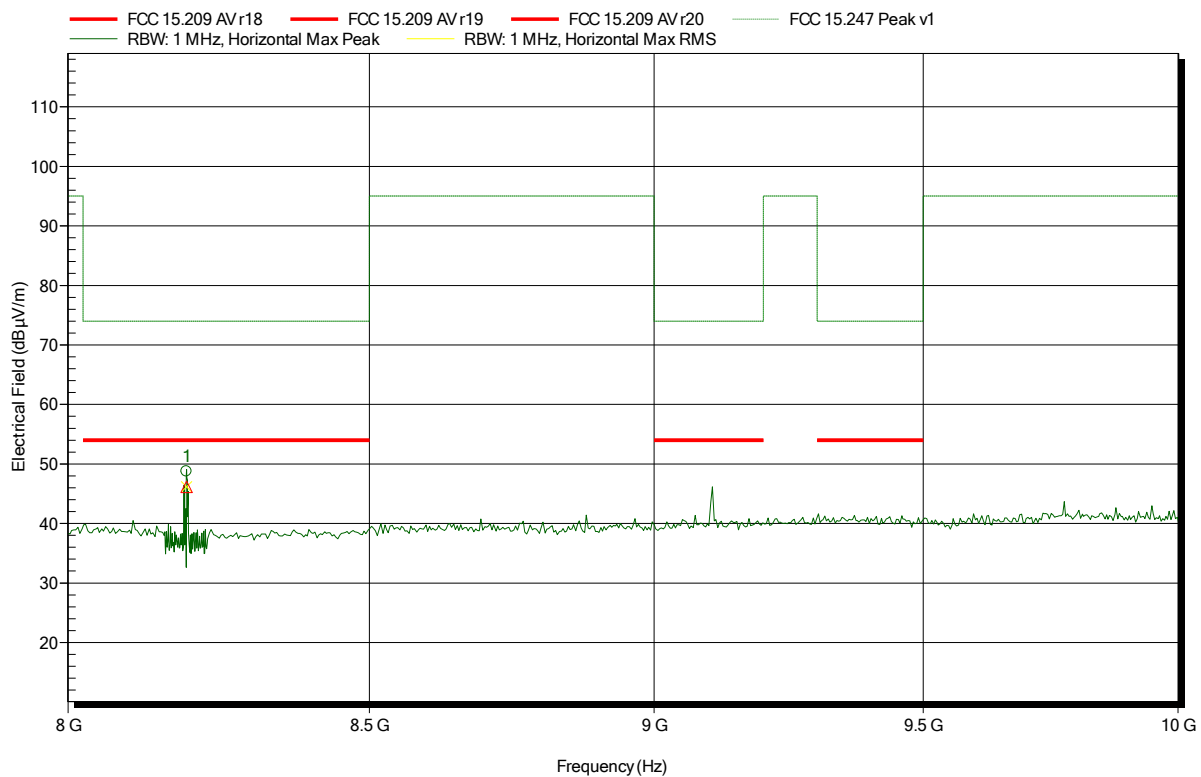
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Height
7.284 GHz	46.2 dBµV/m	74 dBµV/m	-27.8 dB	Pass	1.2 m
Frequency	RMS	RMS Limit	RMS Difference	RMS Status	Height
7.284 GHz	43.28 dBµV/m	54 dBµV/m	-10.72 dB	Pass	1.2 m

Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
EUT Name: VW RemoteStart
Model: Remote Start Receiver - VWRSTR
Test Site: Eurofins Product Service GmbH
Operator: Wilfried Treffke
Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; LoRa; 910.5 MHz
Test Date: 2019-07-16
Note:

Index 4



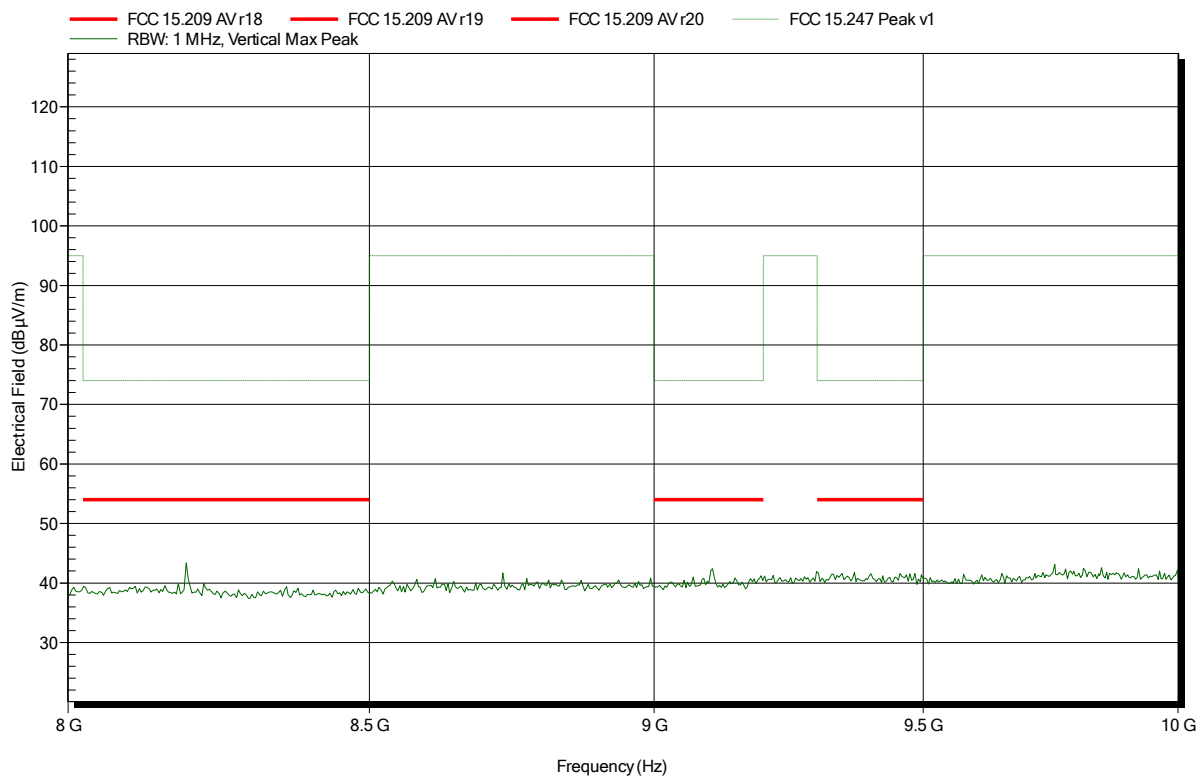
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
8.193 GHz	48.75 dBµV/m	74 dBµV/m	-25.25 dB	Pass
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
8.193 GHz	46.18 dBµV/m	54 dBµV/m	-7.82 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
 EUT Name: VW RemoteStart
 Model: Remote Start Receiver - VWRSTR
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; LoRa; 910.5 MHz
 Test Date: 2019-07-16
 Note:

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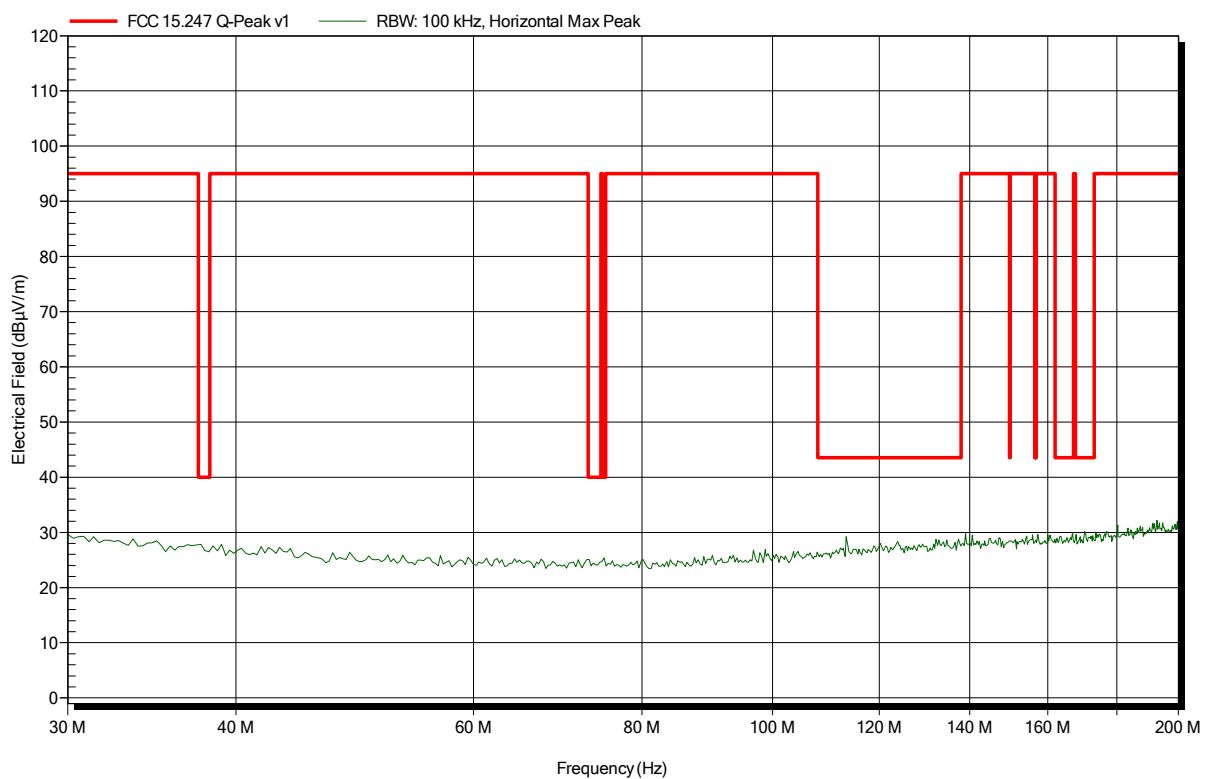


Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
EUT Name: VW RemoteStart
Model: Remote Start Receiver - VWRSTR
Test Site: Eurofins Product Service GmbH
Operator: Wilfried Treffke
Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
Antenna: Rohde & Schwarz HK 116, Horizontal
Measurement distance: 3 m
Mode: TX; LoRa; 919.5 MHz
Test Date: 2019-07-16
Note:

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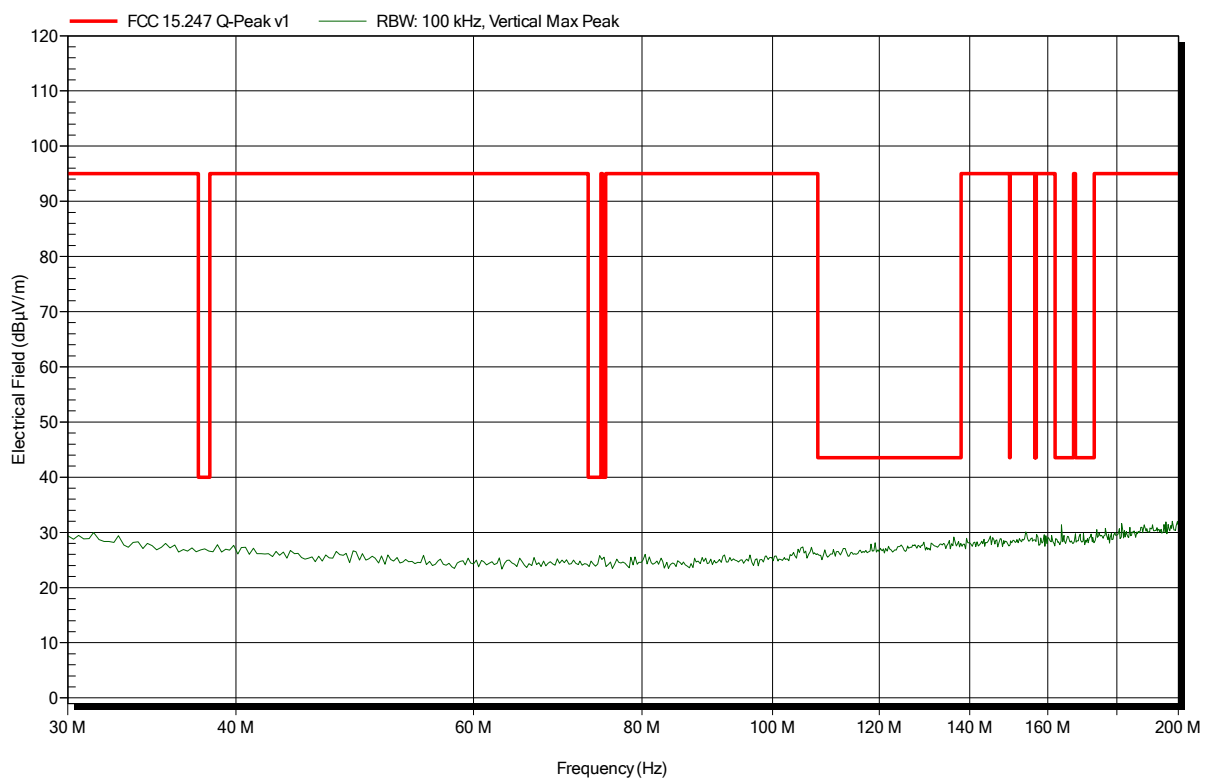


Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
EUT Name: VW RemoteStart
Model: Remote Start Receiver - VWRSTR
Test Site: Eurofins Product Service GmbH
Operator: Wilfried Treffke
Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
Antenna: Rohde & Schwarz HK 116, Vertical
Measurement distance: 3 m
Mode: TX; LoRa; 919.5 MHz
Test Date: 2019-07-16
Note:

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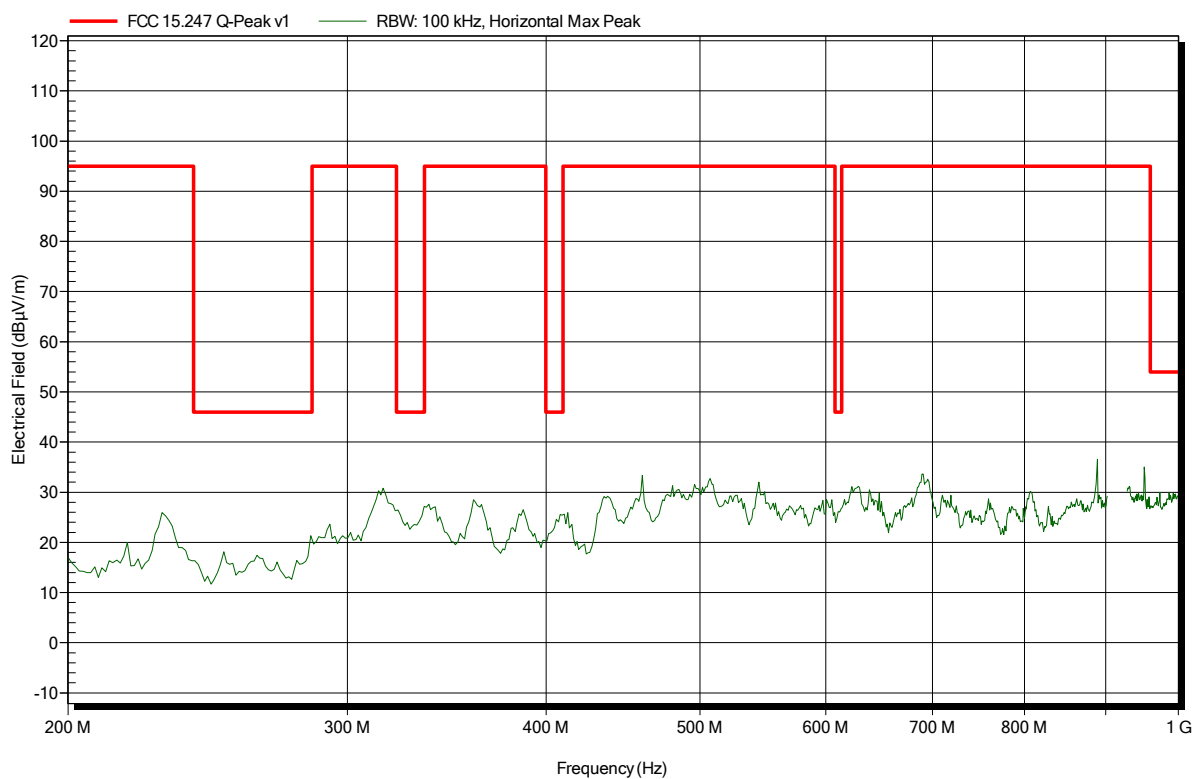


Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
EUT Name: VW RemoteStart
Model: Remote Start Receiver - VWRSTR
Test Site: Eurofins Product Service GmbH
Operator: Wilfried Treffke
Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
Antenna: Rohde & Schwarz HL 223, Horizontal
Measurement distance: 3 m
Mode: TX; LoRa; 919.5 MHz
Test Date: 2019-07-16
Note:

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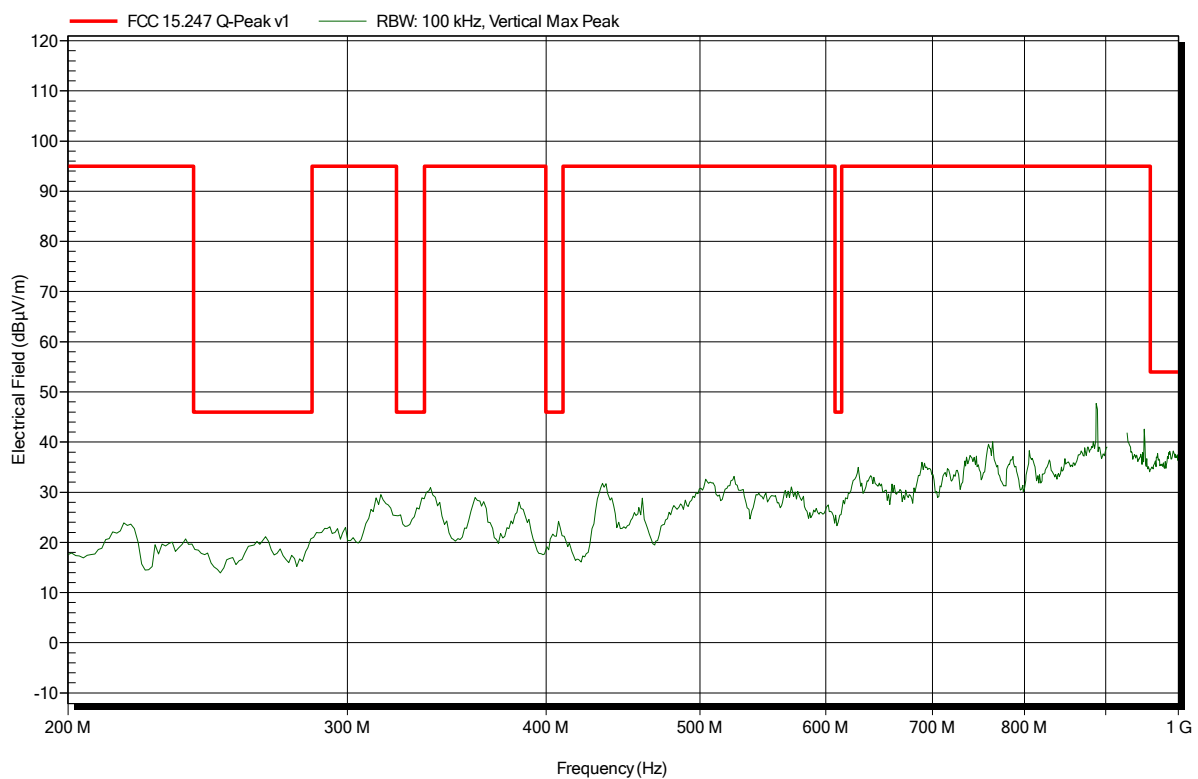


Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
 EUT Name: VW RemoteStart
 Model: Remote Start Receiver - VWRSTR
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: TX; LoRa; 919.5 MHz
 Test Date: 2019-07-16
 Note:

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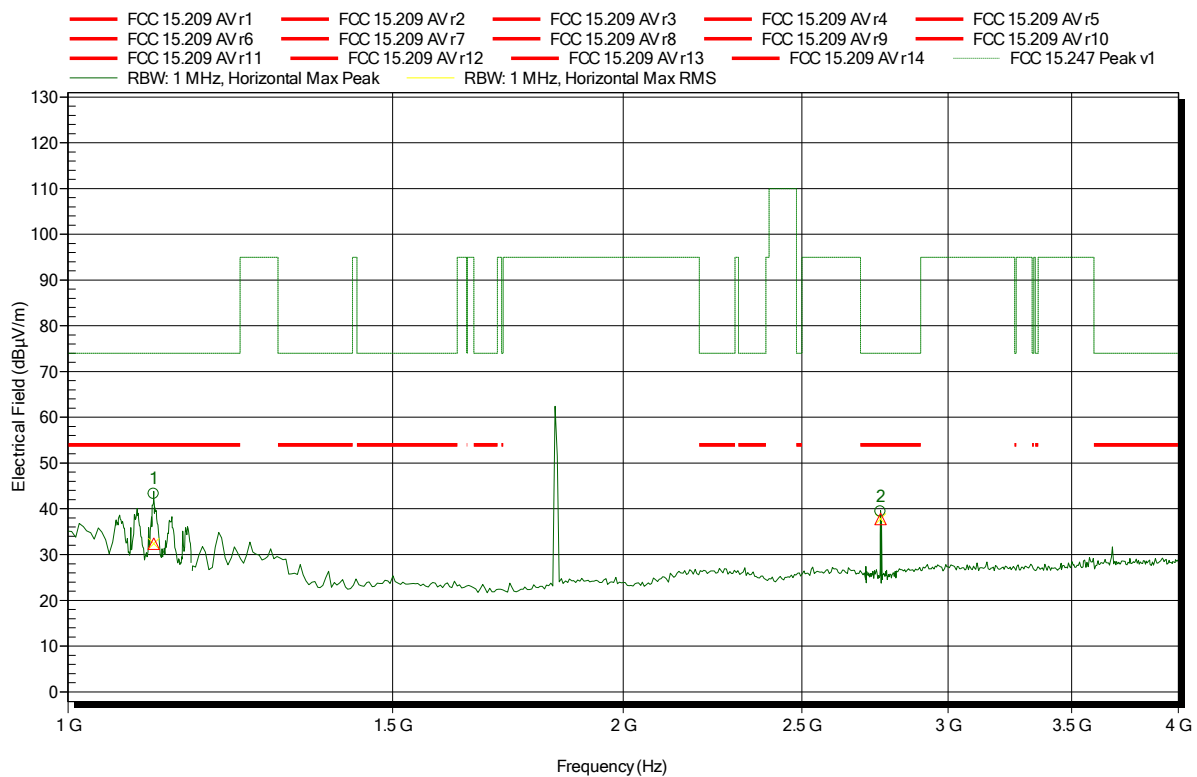


Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
 EUT Name: VW RemoteStart
 Model: Remote Start Receiver - VWRSTR
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; LoRa; 919.5 MHz
 Test Date: 2019-07-16
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.113 GHz	43.24 dBμV/m	74 dBμV/m	-30.76 dB	Pass
2.758 GHz	39.43 dBμV/m	74 dBμV/m	-34.57 dB	Pass

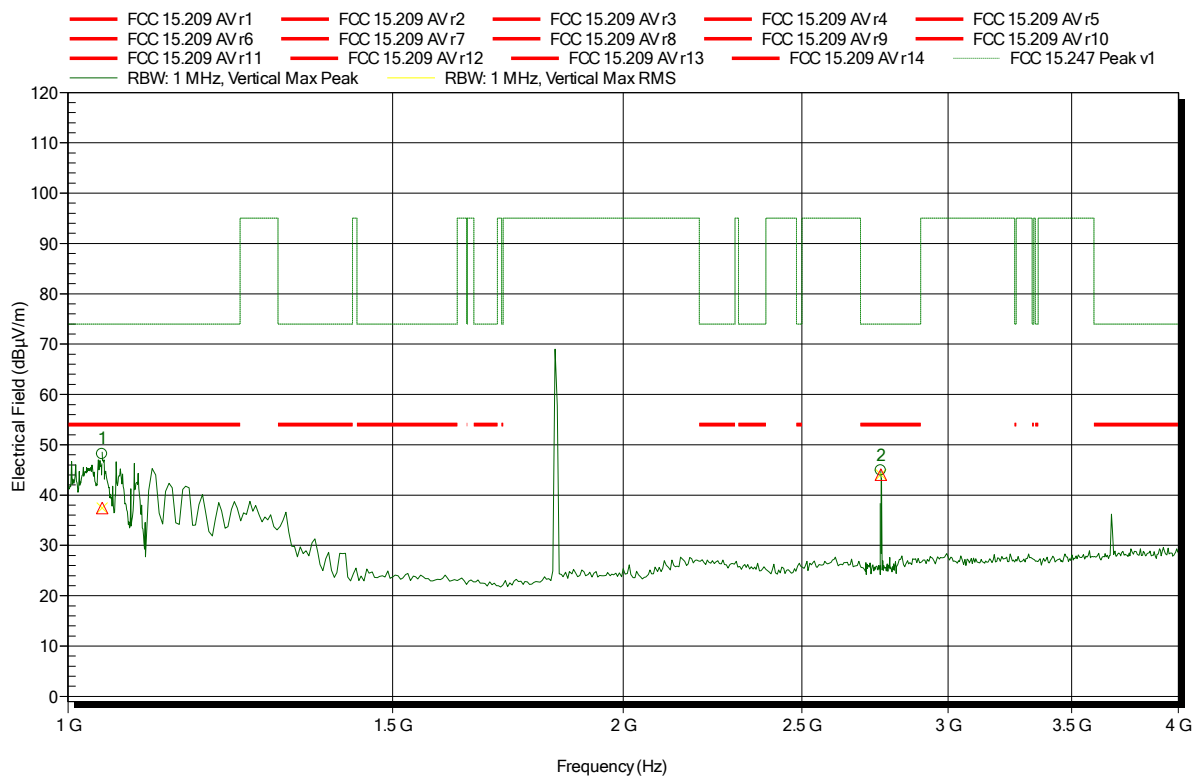
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
1.113 GHz	32.38 dBμV/m	54 dBμV/m	-21.62 dB	Pass
2.758 GHz	37.8 dBμV/m	54 dBμV/m	-16.2 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
 EUT Name: VW RemoteStart
 Model: Remote Start Receiver - VWRSTR
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; LoRa; 919.5 MHz
 Test Date: 2019-07-16
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.044 GHz	48.14 dBµV/m	74 dBµV/m	-25.86 dB	Pass
2.759 GHz	44.91 dBµV/m	74 dBµV/m	-29.09 dB	Pass

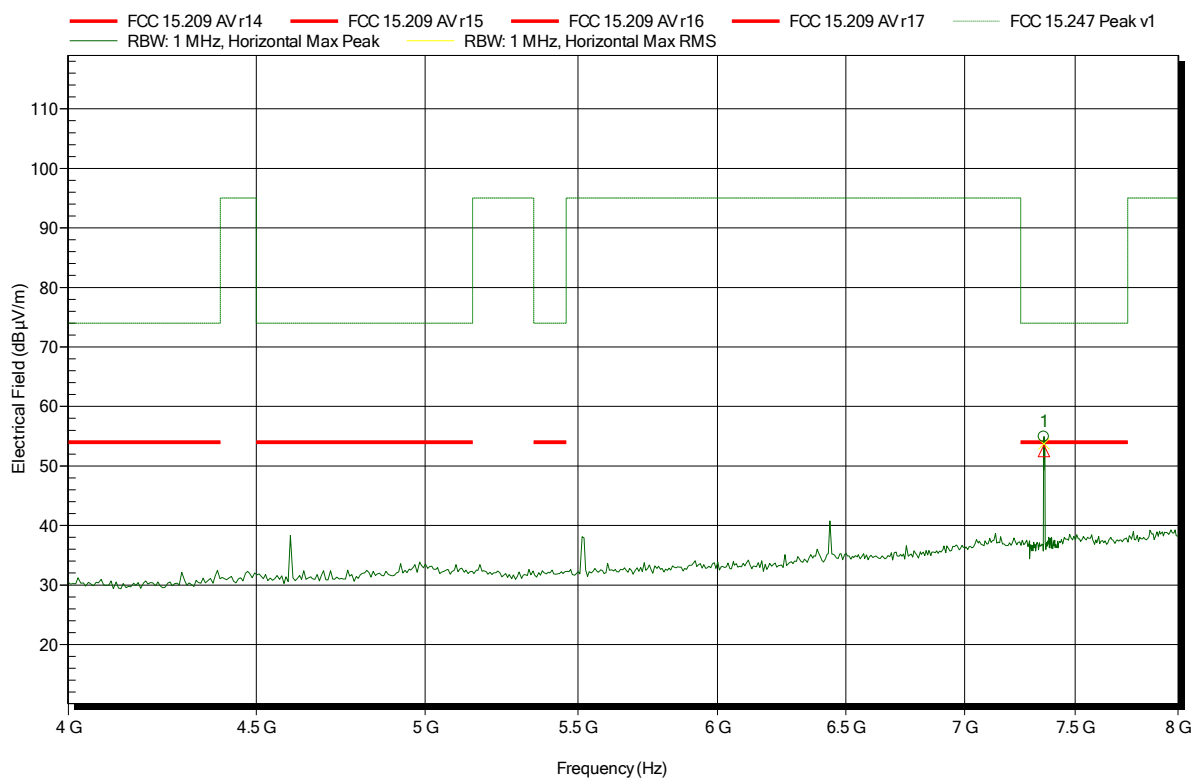
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
1.044 GHz	37.44 dBµV/m	54 dBµV/m	-16.56 dB	Pass
2.759 GHz	44.07 dBµV/m	54 dBµV/m	-9.93 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
EUT Name: VW RemoteStart
Model: Remote Start Receiver - VWRSTR
Test Site: Eurofins Product Service GmbH
Operator: Wilfried Treffke
Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; LoRa; 919.5 MHz
Test Date: 2019-07-16
Note:

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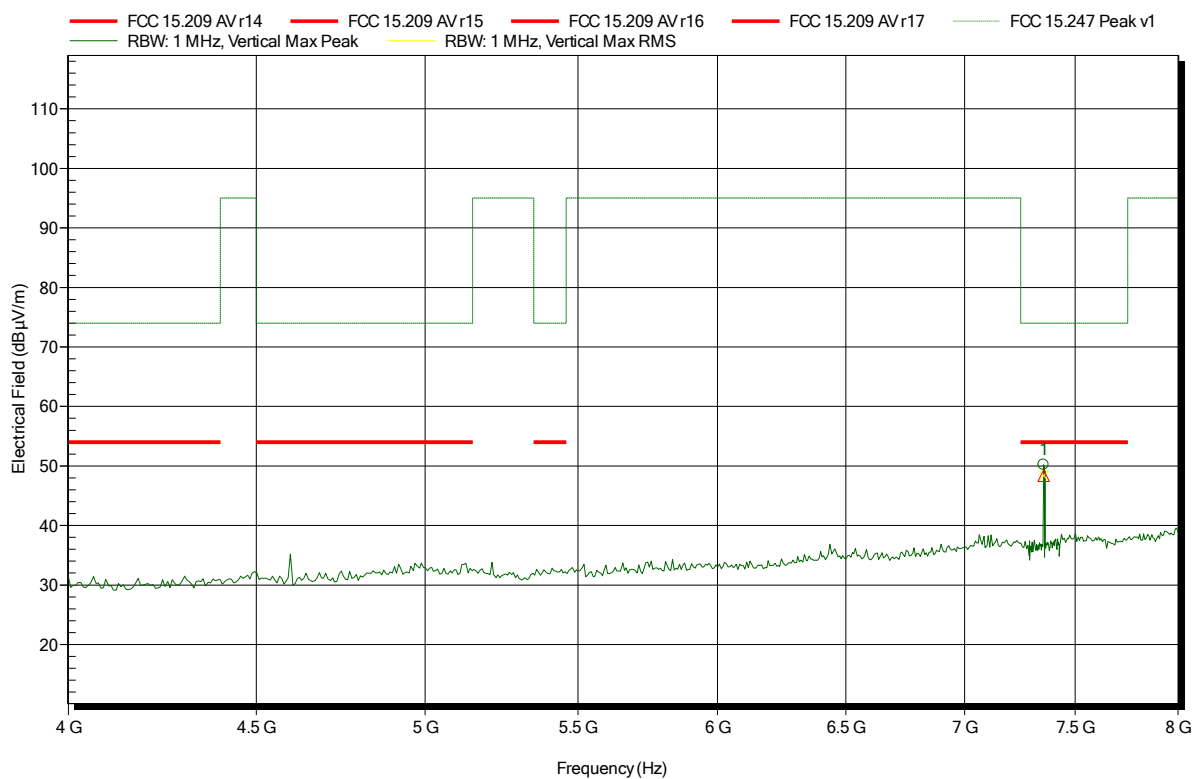
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
7.356 GHz	54.91 dBµV/m	74 dBµV/m	-19.09 dB	Pass
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
7.356 GHz	52.5 dBµV/m	54 dBµV/m	-1.5 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
EUT Name: VW RemoteStart
Model: Remote Start Receiver - VWRSTR
Test Site: Eurofins Product Service GmbH
Operator: Wilfried Treffke
Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m, converted to 3 m
Mode: TX; LoRa; 919.5 MHz
Test Date: 2019-07-16
Note:

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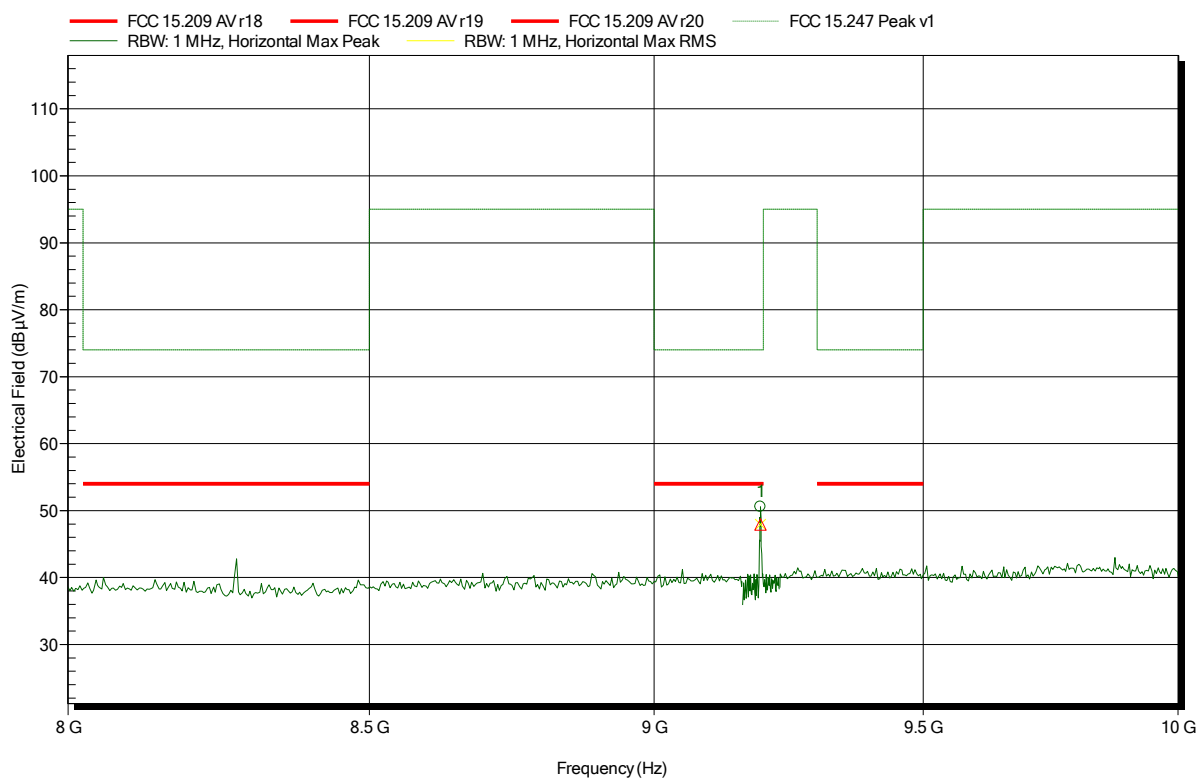
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Height
7.355 GHz	50.18 dBµV/m	74 dBµV/m	-23.82 dB	Pass	1.2 m
Frequency	RMS	RMS Limit	RMS Difference	RMS Status	Height
7.355 GHz	48.36 dBµV/m	54 dBµV/m	-5.64 dB	Pass	1.2 m

Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
 EUT Name: VW RemoteStart
 Model: Remote Start Receiver - VWRSTR
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; LoRa; 919.5 MHz
 Test Date: 2019-07-16
 Note:

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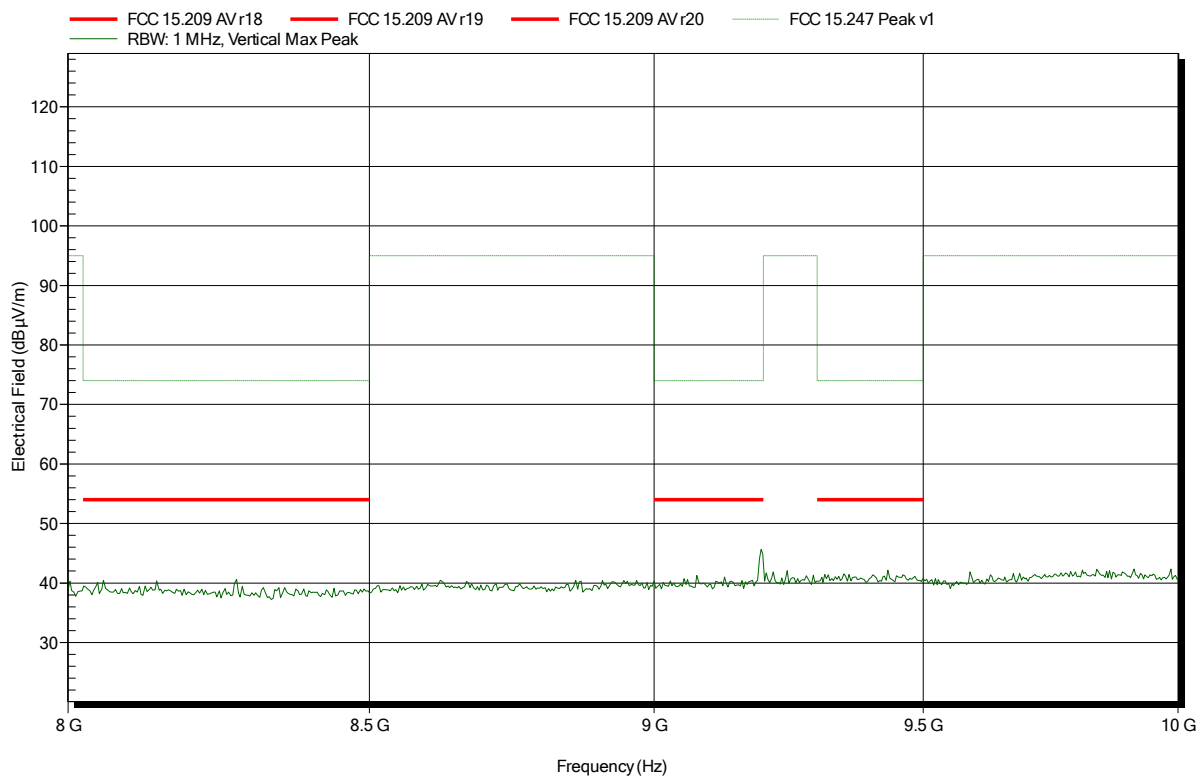
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
9.195 GHz	50.57 dBµV/m	74 dBµV/m	-23.43 dB	Pass
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
9.195 GHz	47.92 dBµV/m	54 dBµV/m	-6.08 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number: G0M-1905-8226

Applicant: digades GmbH
EUT Name: VW RemoteStart
Model: Remote Start Receiver - VWRSTR
Test Site: Eurofins Product Service GmbH
Operator: Wilfried Treffke
Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; LoRa; 919.5 MHz
Test Date: 2019-07-16
Note:

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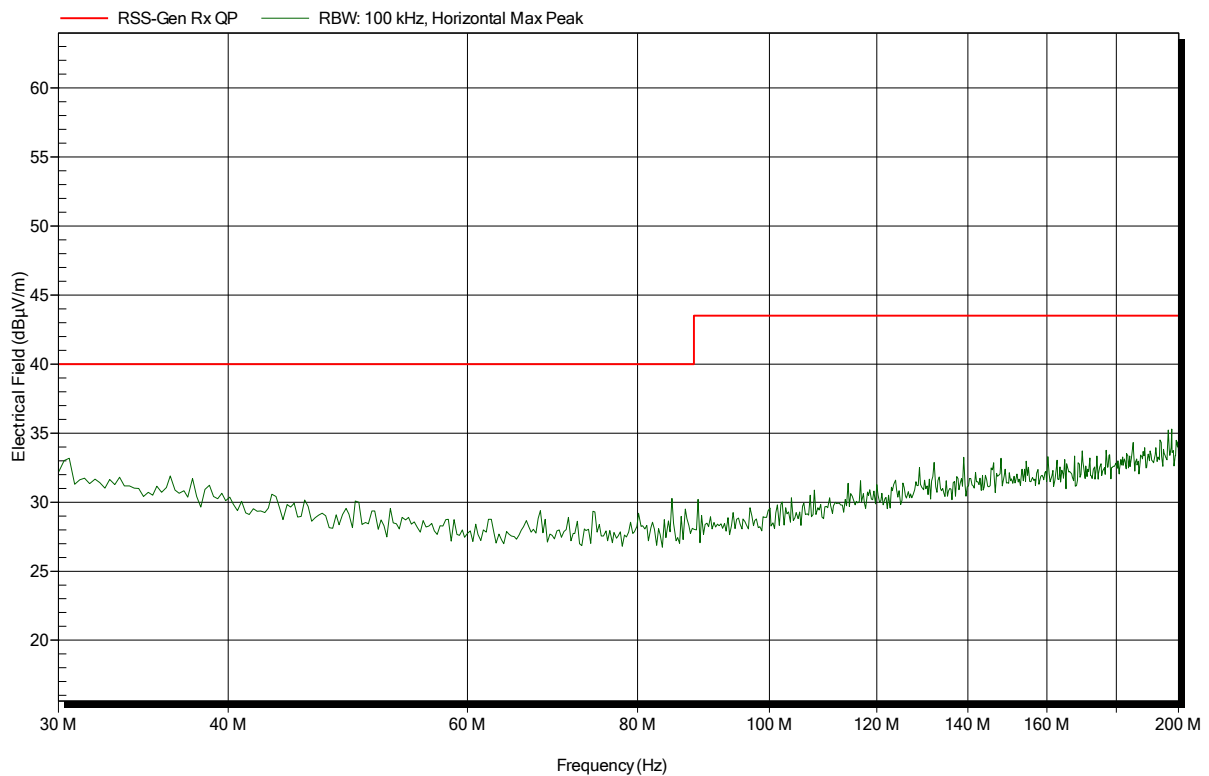
ANNEX B Receiver spurious emissions

Spurious emissions according to ISSED RSS-247 Issue 2 (February 2017)

Project number: G0M-1905-8226

Applicant: digades GmbH
 EUT Name: VW RemoteStart
 Model: Remote Start Receiver - VWRSTR
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: RX; LoRa; 915.0 MHz
 Test Date: 2019-07-16
 Note:

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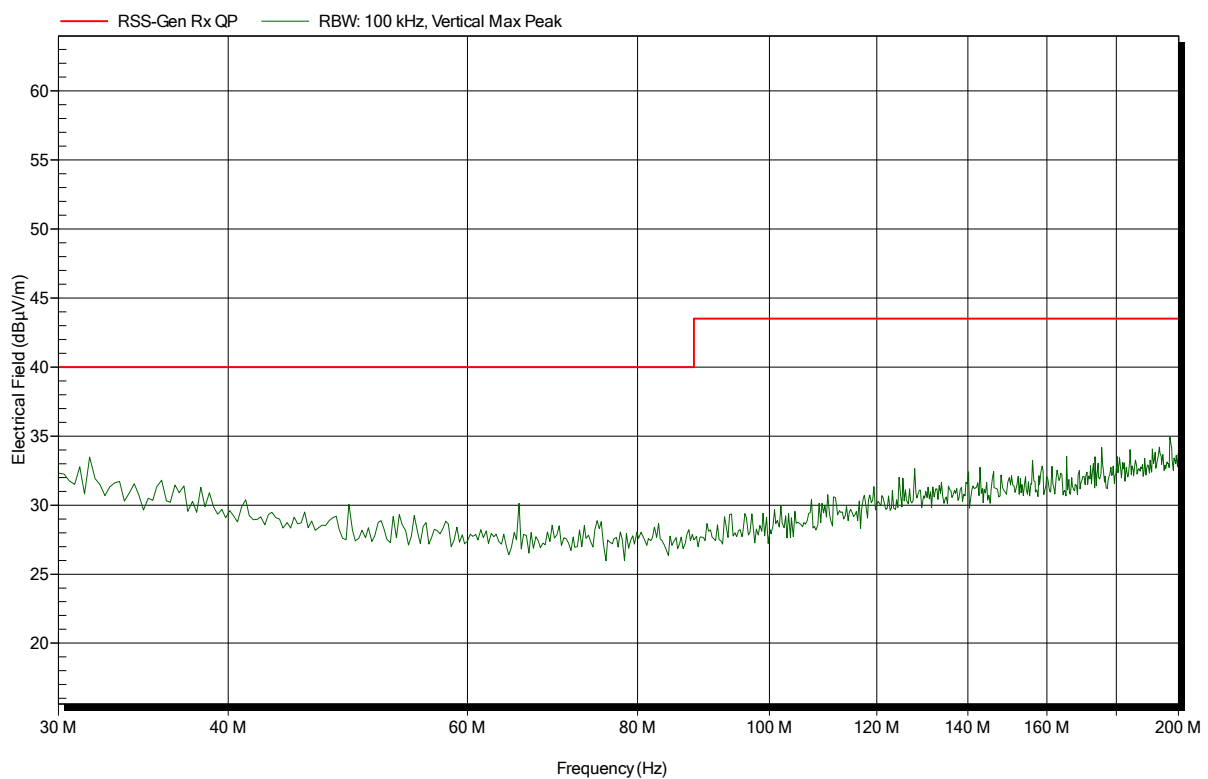


Spurious emissions according to ISSED RSS-247 Issue 2 (February 2017)

Project number: G0M-1905-8226

Applicant: digades GmbH
 EUT Name: VW RemoteStart
 Model: Remote Start Receiver - VWRSTR
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: RX; LoRa; 915.0 MHz
 Test Date: 2019-07-16
 Note:

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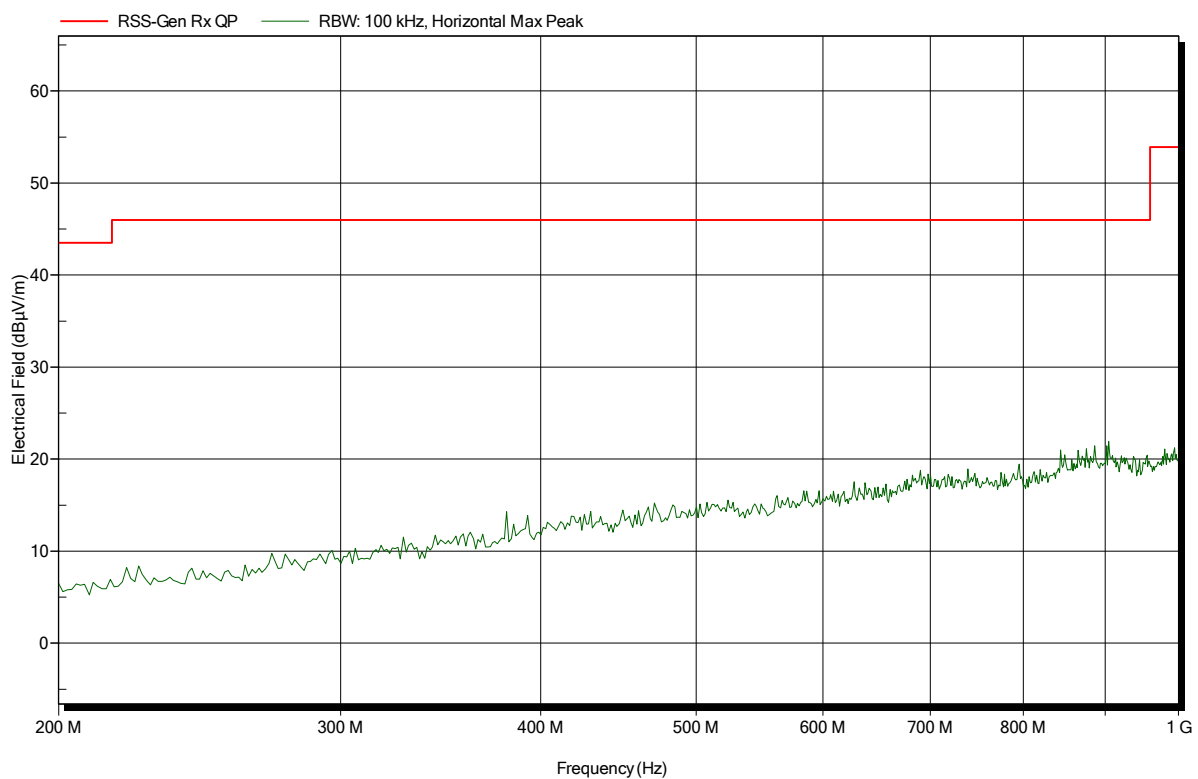


Spurious emissions according to ISED RSS-247 Issue 2 (February 2017)

Project number: G0M-1905-8226

Applicant: digades GmbH
EUT Name: VW RemoteStart
Model: Remote Start Receiver - VWRSTR
Test Site: Eurofins Product Service GmbH
Operator: Wilfried Treffke
Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
Antenna: Rohde & Schwarz HL 223, Horizontal
Measurement distance: 3 m
Mode: RX; LoRa; 915.0 MHz
Test Date: 2019-07-16
Note:

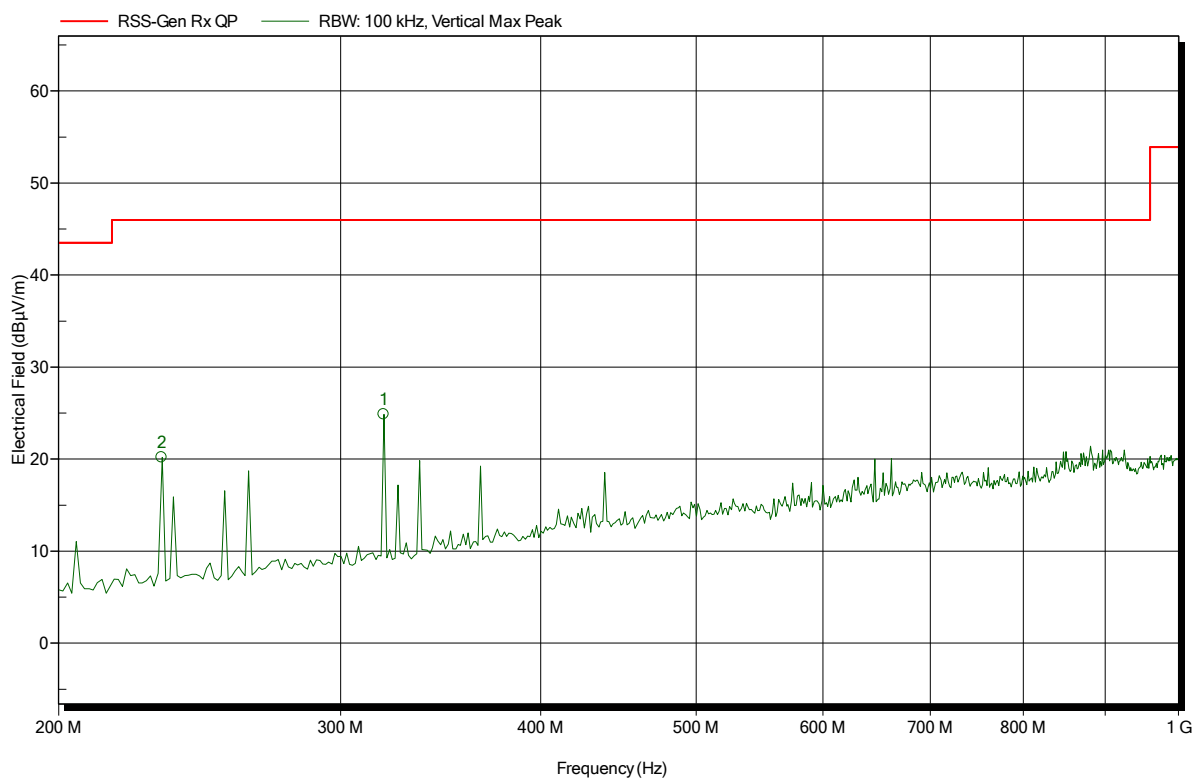
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Spurious emissions according to ISCED RSS-247 Issue 2 (February 2017)

Project number: G0M-1905-8226
 Applicant: digades GmbH
 EUT Name: VW RemoteStart
 Model: Remote Start Receiver - VWRSTR
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: RX; LoRa; 915.0 MHz
 Test Date: 2019-07-16
 Note:

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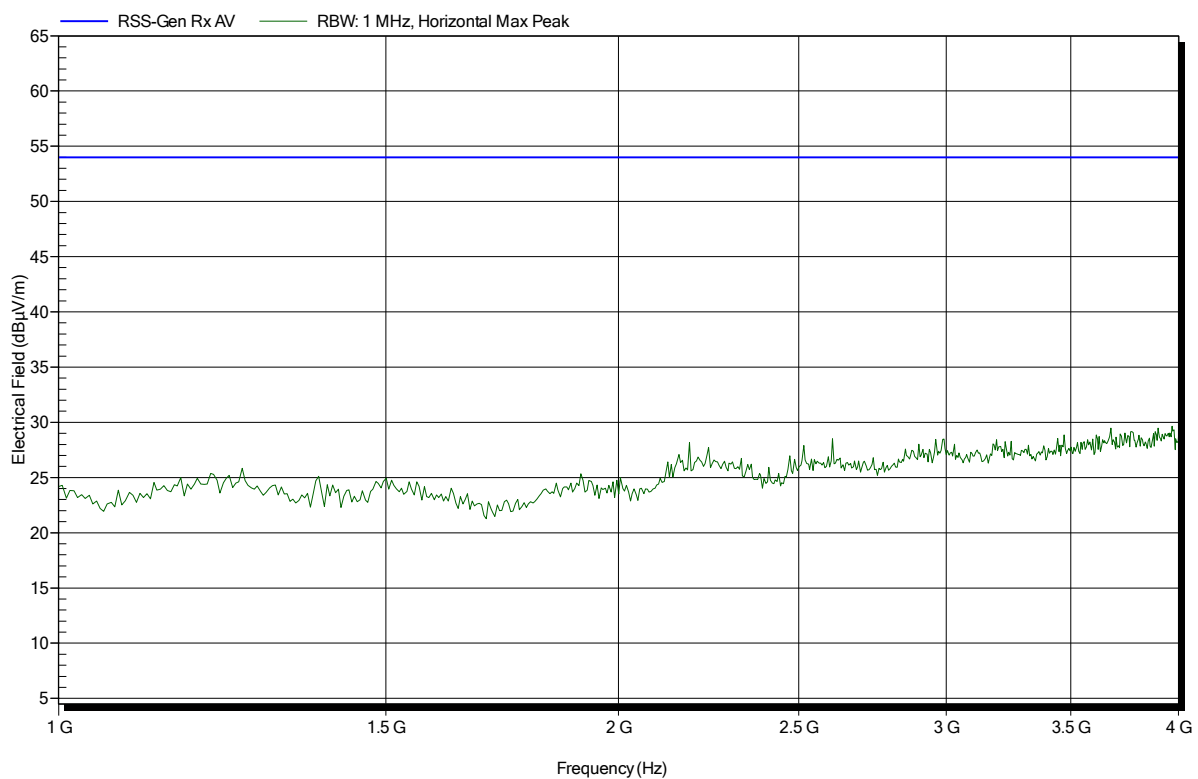
Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
232.051 MHz	20.19 dBμV/m	46 dBμV/m	-25.81 dB	Pass	90 Degree	1.2 m
319.231 MHz	24.85 dBμV/m	46 dBμV/m	-21.15 dB	Pass	90 Degree	1.2 m

Spurious emissions according to ISED RSS-247 Issue 2 (February 2017)

Project number: G0M-1905-8226

Applicant: digades GmbH
EUT Name: VW RemoteStart
Model: Remote Start Receiver - VWRSTR
Test Site: Eurofins Product Service GmbH
Operator: Wilfried Treffke
Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m
Mode: RX; LoRa; 915.0 MHz
Test Date: 2019-07-16
Note:

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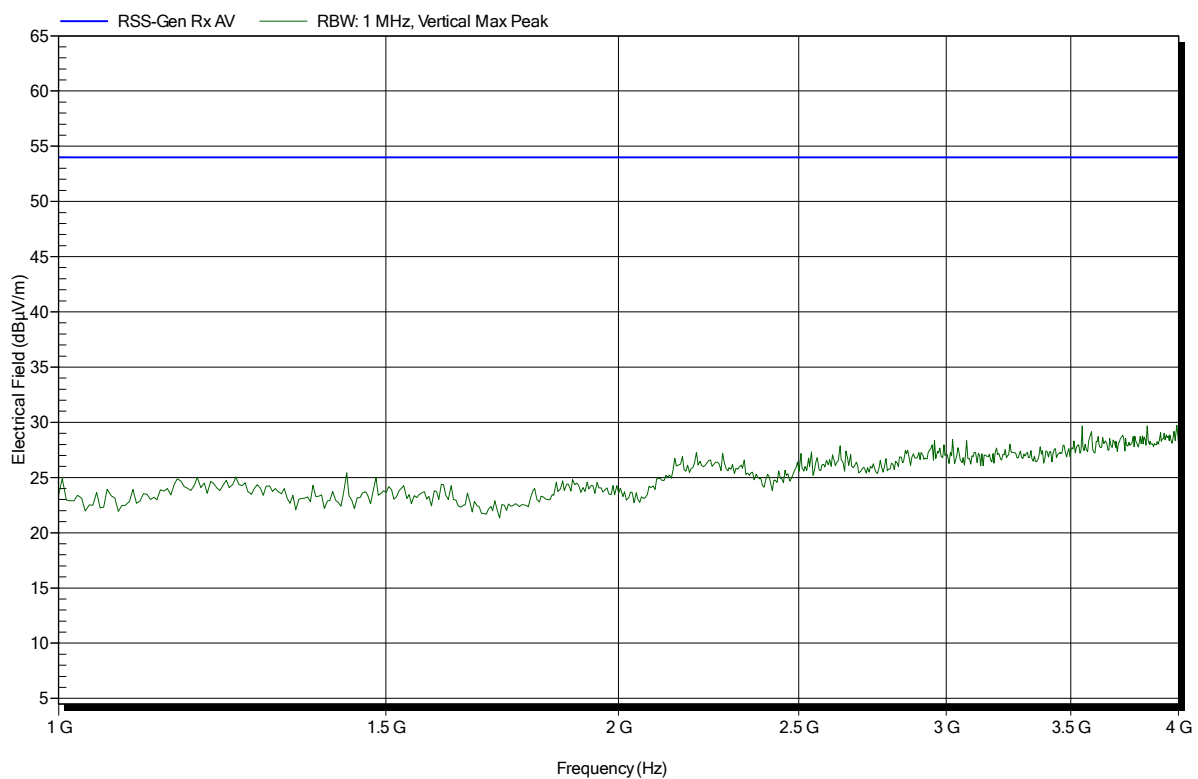


Spurious emissions according to ISED RSS-247 Issue 2 (February 2017)

Project number: G0M-1905-8226

Applicant: digades GmbH
 EUT Name: VW RemoteStart
 Model: Remote Start Receiver - VWRSTR
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: RX; LoRa; 915.0 MHz
 Test Date: 2019-07-16
 Note:

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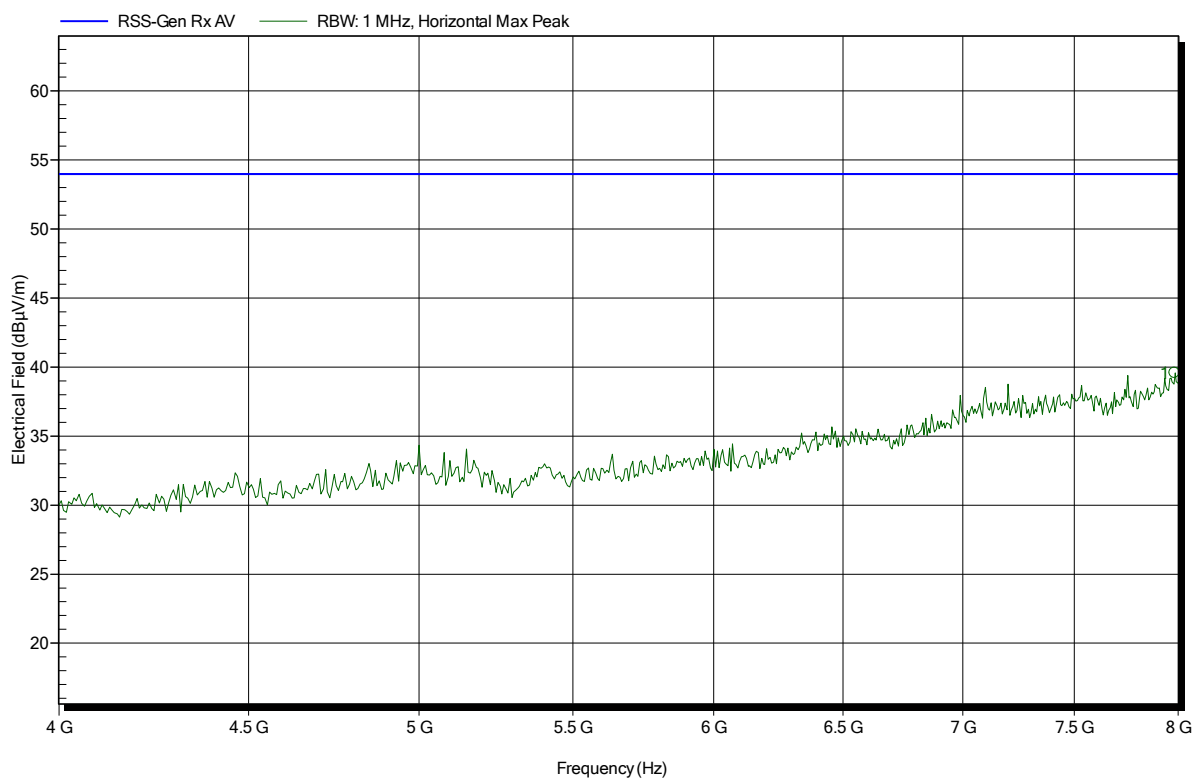


Spurious emissions according to ISED RSS-247 Issue 2 (February 2017)

Project number: G0M-1905-8226

Applicant: digades GmbH
EUT Name: VW RemoteStart
Model: Remote Start Receiver - VWRSTR
Test Site: Eurofins Product Service GmbH
Operator: Wilfried Treffke
Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m
Mode: RX; LoRa; 915.0 MHz
Test Date: 2019-07-16
Note:

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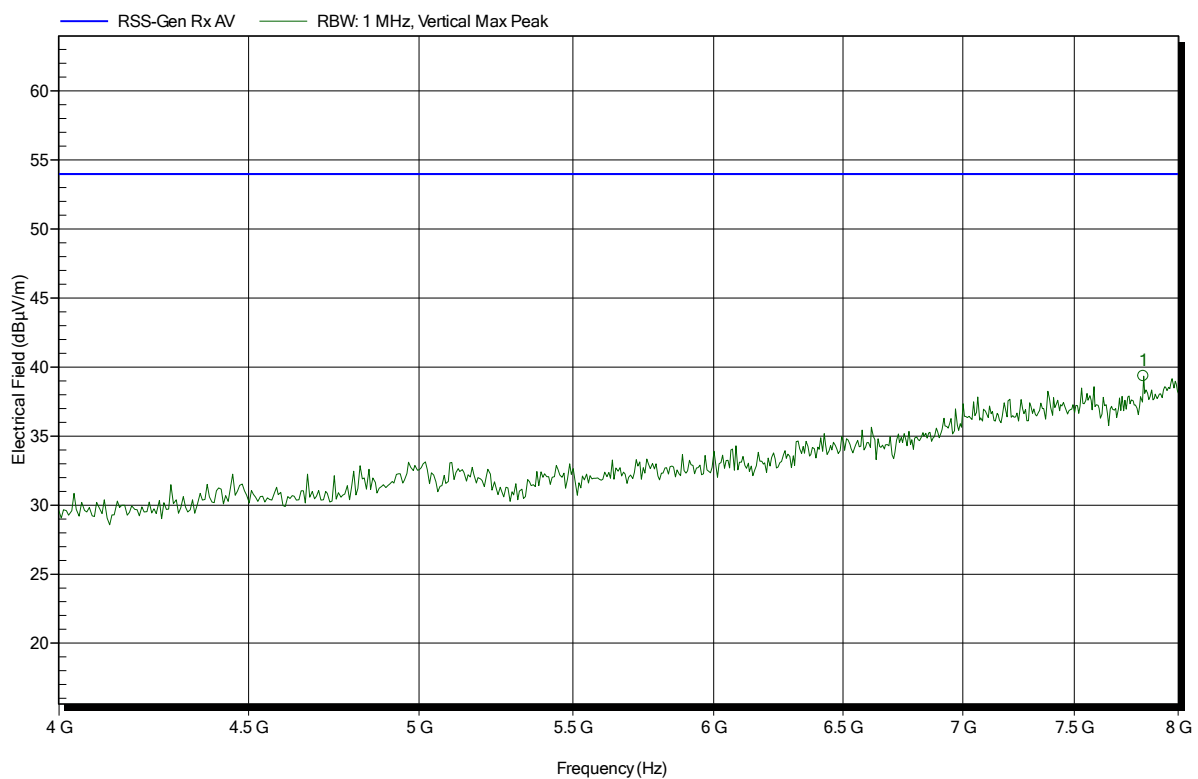
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
7.981 GHz	39.57 dBµV/m	53.98 dBµV/m	-14.41 dB	Pass

Spurious emissions according to ISED RSS-247 Issue 2 (February 2017)

Project number: G0M-1905-8226

Applicant: digades GmbH
EUT Name: VW RemoteStart
Model: Remote Start Receiver - VWRSTR
Test Site: Eurofins Product Service GmbH
Operator: Wilfried Treffke
Test Conditions: Tnom: 23.7°C, Vnom: 12 VDC
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m
Mode: RX; LoRa; 915.0 MHz
Test Date: 2019-07-16
Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
7.827 GHz	39.34 dBµV/m	53.98 dBµV/m	-14.64 dB	Pass