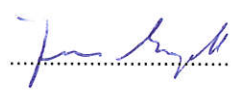


| EMC TEST REPORT                            |                                                                                                                                                                                                                                              |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FCC 47 CFR Part 15B, ISED ICES-003 Issue 6 |                                                                                                                                                                                                                                              |
| Report Reference No                        | G0M-1807-7557-EF0115B-V01                                                                                                                                                                                                                    |
| Testing Laboratory                         | Eurofins Product Service GmbH                                                                                                                                                                                                                |
| Address                                    | Storkower Str. 38c<br>15526 Reichenwalde<br>Germany                                                                                                                                                                                          |
| Accreditation                              |  <p>A2LA Accredited Testing Laboratory, Certificate No.: 1983.01<br/>FCC Filed Test Laboratory, Reg.-No.: 96970<br/>IC Testing Laboratory site: 3470A-2</p> |
| Applicant                                  | digades GmbH                                                                                                                                                                                                                                 |
| Address                                    | Äußere Weberstraße 20<br>02763 Zittau<br>GERMANY                                                                                                                                                                                             |
| Test Specification                         | Full compliance test                                                                                                                                                                                                                         |
| Standard                                   | 47 CFR Part 15 Subpart B<br>ISED ICES-003 Issue 6<br>ANSI C63.4:2014                                                                                                                                                                         |
| Non-Standard Test Method                   | None                                                                                                                                                                                                                                         |
| <b>Equipment under Test (EUT):</b>         |                                                                                                                                                                                                                                              |
| Product Description                        | VW RemoteStart                                                                                                                                                                                                                               |
| Model(s)                                   | Remote Start Key Fob - VWRSTT                                                                                                                                                                                                                |
| Additional Model(s)                        | None                                                                                                                                                                                                                                         |
| Brand Name(s)                              | None                                                                                                                                                                                                                                         |
| Hardware Version(s)                        | HW 005                                                                                                                                                                                                                                       |
| Software Version(s)                        | SW 0702                                                                                                                                                                                                                                      |
| FCC-ID                                     | QNFVWRSTT                                                                                                                                                                                                                                    |
| IC                                         | 6869A-VWRSTT                                                                                                                                                                                                                                 |
| Test Result                                | <b>PASSED</b>                                                                                                                                                                                                                                |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------------------------------------------------------------------|
| <b>Possible test case verdicts:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |                                                                                      |
| required by standard but not tested                                                                                                                                                                                                                                                                                                                                                                                                                                            | N/T              |                                                                                      |
| not required by standard                                                                                                                                                                                                                                                                                                                                                                                                                                                       | N/R              |                                                                                      |
| required by standard but not appl. to test object                                                                                                                                                                                                                                                                                                                                                                                                                              | N/A              |                                                                                      |
| test object does meet the requirement                                                                                                                                                                                                                                                                                                                                                                                                                                          | P(PASS)          |                                                                                      |
| test object does not meet the requirement                                                                                                                                                                                                                                                                                                                                                                                                                                      | F(FAIL)          |                                                                                      |
| <b>Testing:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |                                                                                      |
| Date of receipt of test item                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2018-08-23       |                                                                                      |
| <b>Report:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  |                                                                                      |
| Compiled by                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Matthias Handrik |                                                                                      |
| Tested by (+ signature)<br>(Responsible for Test)                                                                                                                                                                                                                                                                                                                                                                                                                              | Matthias Handrik |   |
| Approved by (+ signature)<br>(Deputy Head of Lab)                                                                                                                                                                                                                                                                                                                                                                                                                              | Jens Marquardt   |  |
| Date of Issue                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2018-09-10       |                                                                                      |
| Total number of pages                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 24               |                                                                                      |
| <b>General Remarks:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |                                                                                      |
| <p>The test results presented in this report relate only to the object tested.</p> <p>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.</p> <p>This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.</p> |                  |                                                                                      |
| <b>Additional Comments:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |                                                                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |                                                                                      |

## ABBREVIATIONS AND ACRONYMS

| Acronyms         |                                                     |
|------------------|-----------------------------------------------------|
| Acronym          | Description                                         |
| EUT              | Equipment Under Test                                |
| FCC              | Federal Communications Commission                   |
| ISED             | Innovation, Science and Economic Development Canada |
| T <sub>NOM</sub> | Nominal operating temperature                       |
| V <sub>NOM</sub> | Nominal supply voltage                              |

## VERSION HISTORY

| Version History |            |                 |            |
|-----------------|------------|-----------------|------------|
| Version         | Issue Date | Remarks         | Revised By |
| 01              | 2018-09-10 | Initial Release |            |

## REPORT INDEX

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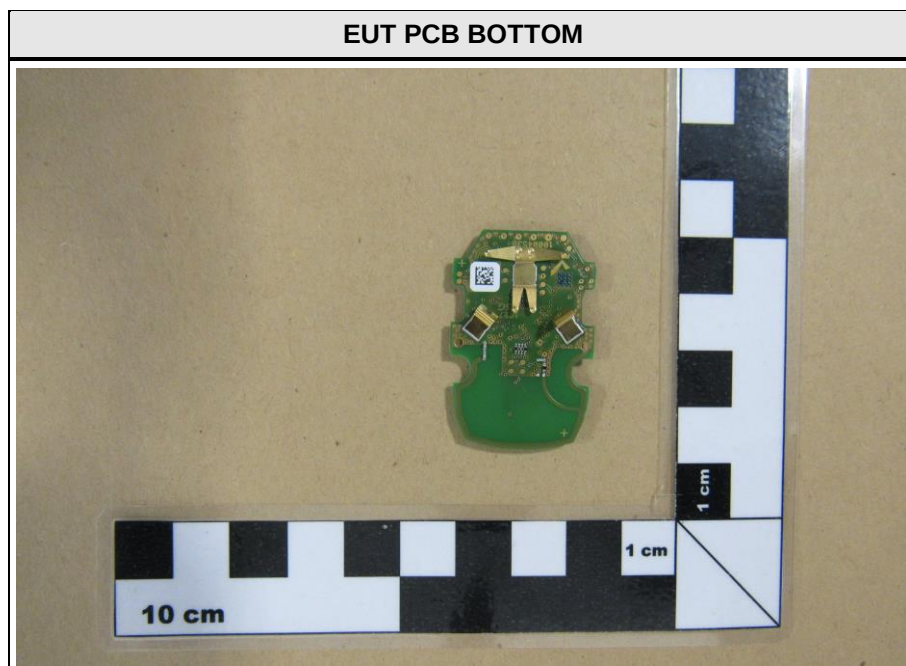
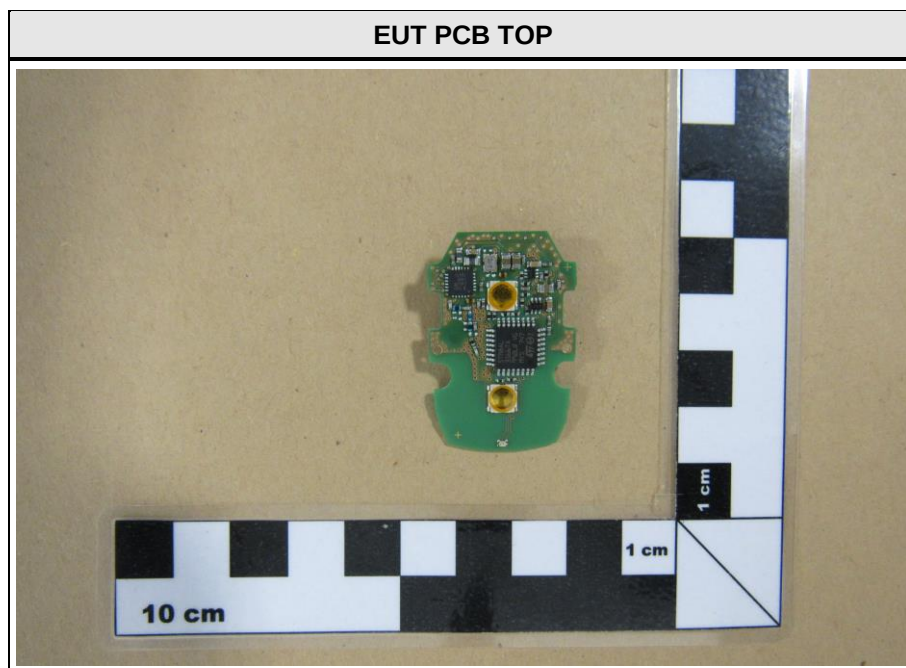
## 1 Equipment (Test Item) Under Test

|                                  |                                                                  |                                  |
|----------------------------------|------------------------------------------------------------------|----------------------------------|
| Description                      | VW RemoteStart                                                   |                                  |
| Model                            | Remote Start Key Fob - VWRSTT                                    |                                  |
| Additional Model(s)              | None                                                             |                                  |
| Brand Name(s)                    | None                                                             |                                  |
| Serial Number(s)                 | unspecified                                                      |                                  |
| Hardware Version(s)              | HW 005                                                           |                                  |
| Software Version(s)              | SW 0702                                                          |                                  |
| FCC-ID                           | QNFVWRSTT                                                        |                                  |
| IC                               | 6869A-VWRSTT                                                     |                                  |
| Class                            | Class B                                                          |                                  |
| Equipment type                   | Table top                                                        |                                  |
| Highest internal frequency [MHz] | 919.5                                                            |                                  |
| Supply Voltage                   | V <sub>NOM</sub>                                                 | 3 VDC (Non-rechargeable battery) |
| AC/DC-Adaptor                    | None                                                             |                                  |
| Manufacturer                     | digades GmbH<br>Äußere Weberstraße 20<br>02763 Zittau<br>GERMANY |                                  |

## 1.1 Equipment Ports

| Name         | Type                             | Attributes | Comment |
|--------------|----------------------------------|------------|---------|
| None         |                                  |            |         |
| Description: |                                  |            |         |
| AC           | AC mains power input/output port |            |         |
| DC           | DC power input/output port       |            |         |
| IO           | Input/Output port                |            |         |
| TP           | Telecommunication port           |            |         |
| NE           | Non-electrical port              |            |         |

## 1.2 Equipment Photos - Internal



### 1.3 Equipment Photos - External



#### 1.4 Support Equipment

| Product Type | Device              | Manufacturer | Model | Comment |
|--------------|---------------------|--------------|-------|---------|
| -            | -                   | -            | -     | -       |
| Description: |                     |              |       |         |
| AE           | Auxillary Equipment |              |       |         |
| SIM          | Simulator           |              |       |         |
| CBL          | Connecting Cable    |              |       |         |
| Comment:     |                     |              |       |         |

## 1.5 Operational Modes

| Mode #   | Description                                      |
|----------|--------------------------------------------------|
| 1        | EUT powered up.<br>Active transmit on 919.5 MHz. |
| Comment: |                                                  |

## 1.6 EUT Configuration

| Configuration # | Description                                                                                                                    |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------|
| 1               | EUT powered via 3V DC (non-rechargeable battery) battery dummy adaptor.<br>EUT transmit stand alone on 919.5 MHz continuously. |
| Comment:        |                                                                                                                                |

## 1.7 Sample emission level calculation

The following is a description of terms and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading:

This is the reading obtained on the spectrum analyzer in dBμV. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

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

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

Net:

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

Limit:

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

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

Margin:

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

Example only:

|              |                       |   |             |               |           |
|--------------|-----------------------|---|-------------|---------------|-----------|
| 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 15B, ISED ICES-003 Issue 6 |                                   |                  |        |         |
|--------------------------------------------|-----------------------------------|------------------|--------|---------|
| Reference                                  | Requirement                       | Reference Method | Result | Remarks |
| Emission                                   |                                   |                  |        |         |
| FCC 15.109<br>ICES-003, 8, 6.1             | Radiated emissions                | ANSI C63.4:2014  | PASS   |         |
| FCC 15.107<br>ICES-003, 8, 6.2             | AC power line conducted emissions | ANSI C63.4:2014  | N/R    |         |
| Comment:                                   |                                   |                  |        |         |

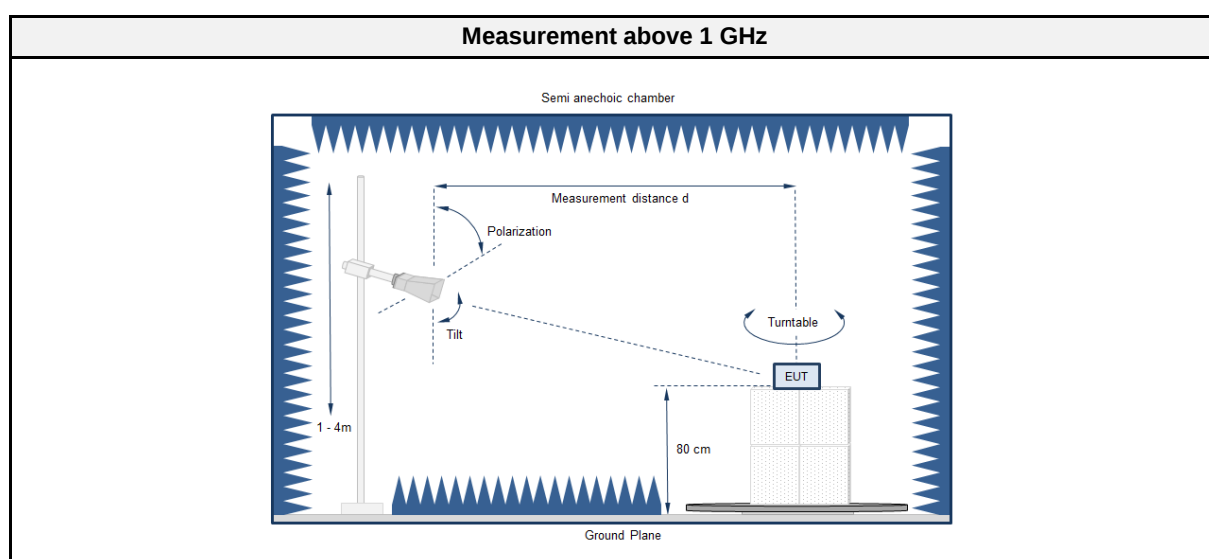
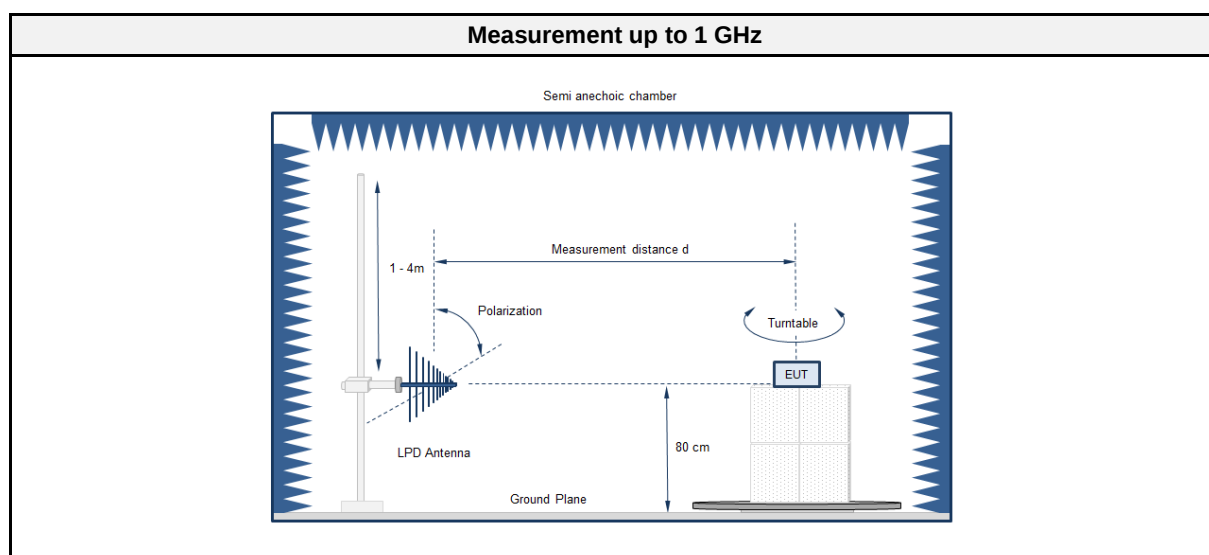
| Possible Test Case Verdicts |                                              |
|-----------------------------|----------------------------------------------|
| PASS                        | Test object does meet the requirements       |
| FAIL                        | Test object does not meet the requirements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

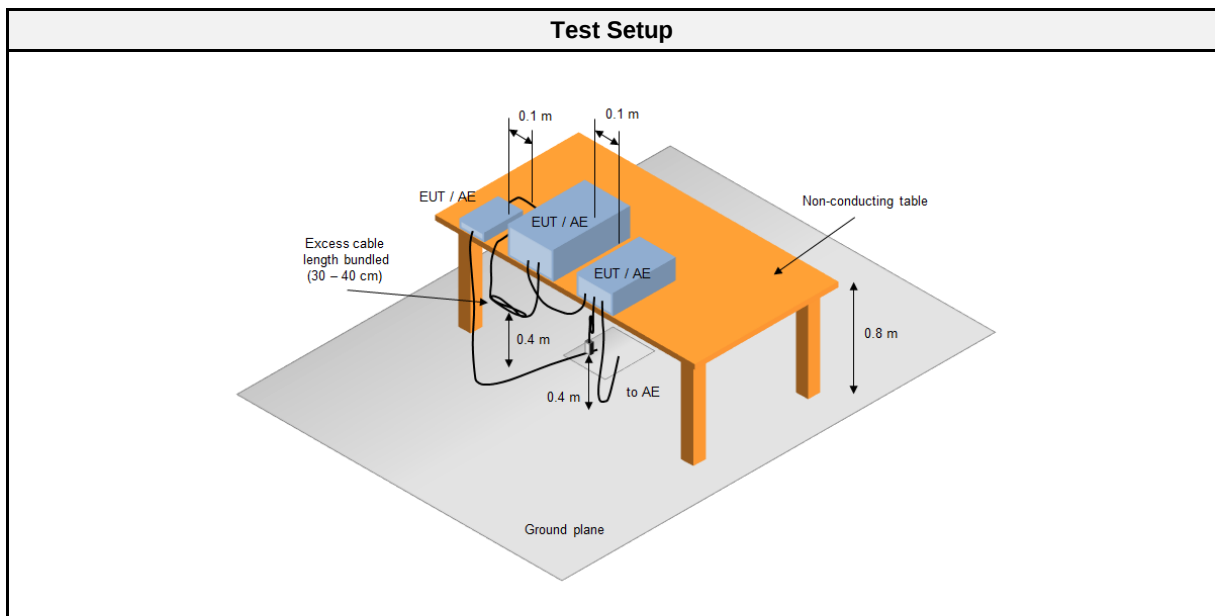
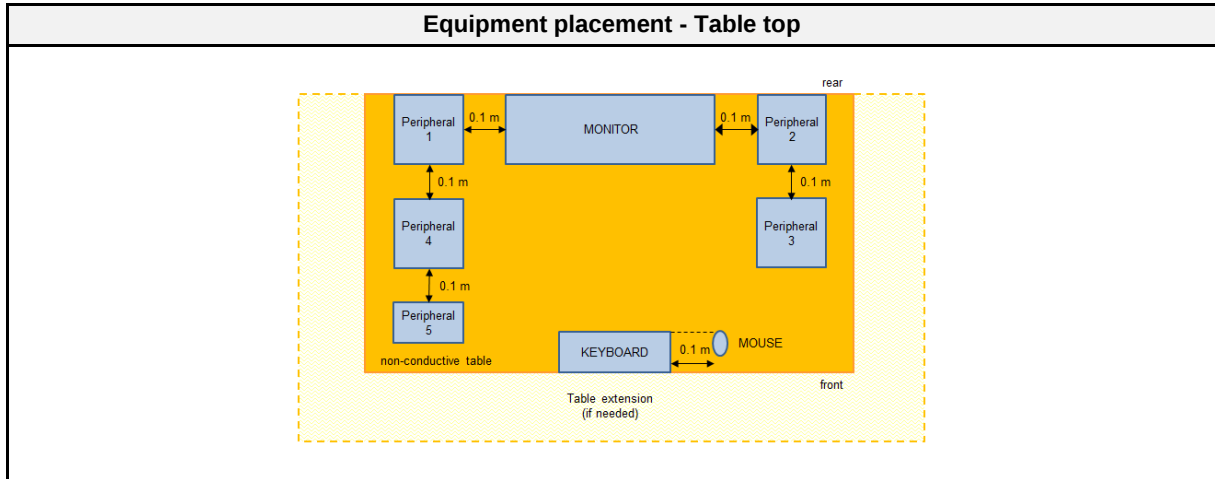
## 2.1 Test Conditions and Results - Radiated emissions acc. to ANSI C63.4

### 2.1.1 Information

| Test Information                 |                              |
|----------------------------------|------------------------------|
| Reference                        | FCC 15.109, ICES-003, 8, 6.1 |
| Reference method                 | ANSI C63.4:2014 Section 8    |
| Equipment class                  | Class B                      |
| Equipment type                   | Table top                    |
| Highest internal frequency [MHz] | 919.5                        |
| Measurement range                | 30 MHz to 5 GHz              |
| Temperature [°C]                 | 24 C°                        |
| Humidity [%]                     | 57 %                         |
| Operator                         | Matthias Handrik             |
| Date                             | 2018-08-24                   |

### 2.1.2 Setup





### 2.1.3 Equipment

| Test Equipment   |                   |                      |            |                 |                 |
|------------------|-------------------|----------------------|------------|-----------------|-----------------|
| Manufacturer     | Description       | Model                | Identifier | Cal. Date       | Cal. Due        |
| Anechoic chamber | Frankonia         | AC1                  | EF00200    | functional test | functional test |
| Keysight         | EMI Test Receiver | N9038A-526/WXP       | EF01070    | 2017-08         | 2018-08         |
| R&S              | Biconical Antenna | HK116                | EF00203    | 2018-06         | 2020-06         |
| R&S              | LPD Antenna       | HL 223               | EF00187    | 2016-05         | 2019-05         |
| Schwarzbeck      | Horn Antenna      | BBHA 9120D (1-18GHz) | EF00018    | 2016-09         | 2019-09         |

## 2.1.4 Procedure

| Exploratory measurement |                                                                                                                                                                                |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.                      | The EUT was placed on a non-conductive table at a height of 0.8m.                                                                                                              |
| 2.                      | The EUT and support equipment, if needed, were set up to simulate typical usage.                                                                                               |
| 3.                      | Cables, of type and length specified by the manufacturer, were connected to at least one port of each type and were terminated by a device or simulating load of actual usage. |
| 4.                      | The antenna was placed at a distance of 3 or 10 m.                                                                                                                             |
| 5.                      | The received signal was monitored at the measurement receiver.                                                                                                                 |
| 6.                      | This procedure has to be performed in both antenna polarizations, horizontal and vertical.                                                                                     |
| 7.                      | The arrangement of the equipment with the maximum emission level is shown on the setup picture at item 1.3                                                                     |

| Final measurement |                                                                                                                                                                                                                                                                                         |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.                | The EUT was placed on a 0.8 m non-conductive table at a 3 m distance from the receive antenna. The antenna output was connected to the measurement receiver.                                                                                                                            |
| 2.                | A biconical antenna was used for the frequency range 30 – 200 MHz, a logarithmic periodical antenna was used for the frequency range from 200 – 1000 MHz. Above one 1 GHz a Double Ridged Broadband Horn antenna was used. The antenna was placed on an adjustable height antenna mast. |
| 3.                | The EUT and cable arrangement were based on the exploratory measurement results.                                                                                                                                                                                                        |
| 4.                | Emissions were maximized at each frequency by rotating the EUT and adjusting the receive antenna height and polarization. The maximum values were recorded.                                                                                                                             |
| 5.                | The test data of the worst-case conditions were recorded and shown on the next pages.                                                                                                                                                                                                   |

## 2.1.5 Limits

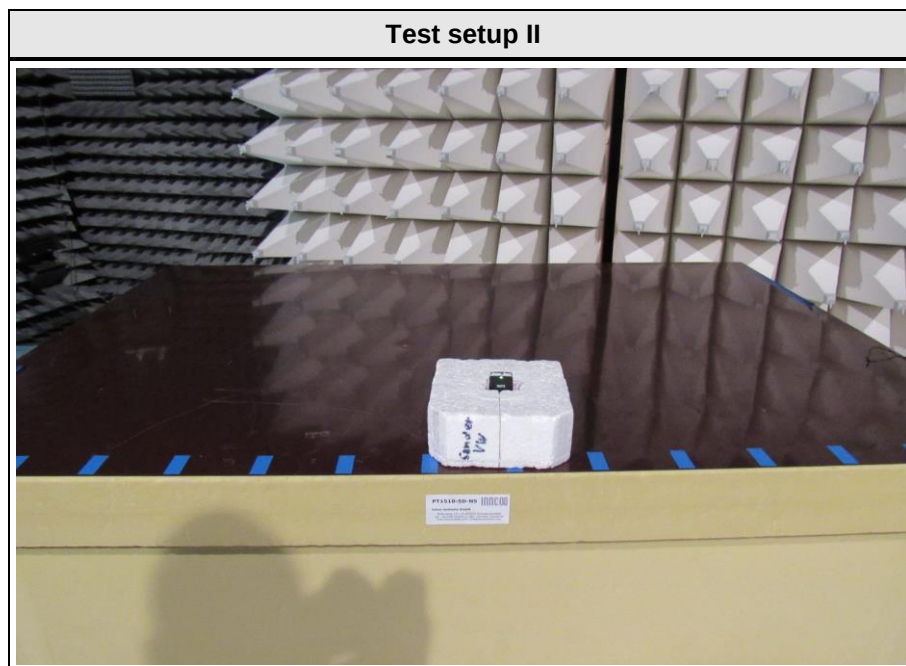
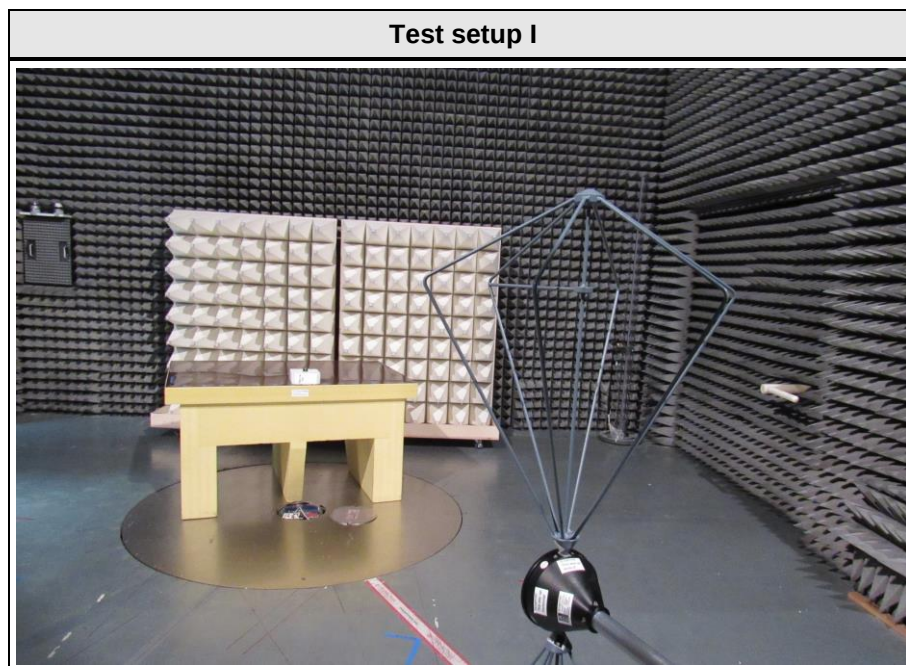
| Class B @ 3 m   |            |                      |
|-----------------|------------|----------------------|
| Frequency [MHz] | Detector   | Limit [dB $\mu$ V/m] |
| 30 - 88         | Quasi-peak | 40                   |
| 88 - 216        | Quasi-peak | 43.5                 |
| 216 - 960       | Quasi-peak | 46                   |
| 960 - 1000      | Quasi-peak | 54                   |
| > 1000          | Peak       | 74                   |
|                 | Average    | 54                   |

| Class A @ 10 m  |            |                      |
|-----------------|------------|----------------------|
| Frequency [MHz] | Detector   | Limit [dB $\mu$ V/m] |
| 30 - 88         | Quasi-peak | 39                   |
| 88 - 216        | Quasi-peak | 43.5                 |
| 216 - 960       | Quasi-peak | 46.5                 |
| 960 - 1000      | Quasi-peak | 49.5                 |
| > 1000          | Peak       | 69.5                 |
|                 | Average    | 49.5                 |

## 2.1.6 Results

| Test Results     |                   |         |        |
|------------------|-------------------|---------|--------|
| Operational mode | EUT Configuration | Verdict | Remark |
| 1                | 1                 | PASS    |        |

### 2.1.7 Setup Photos



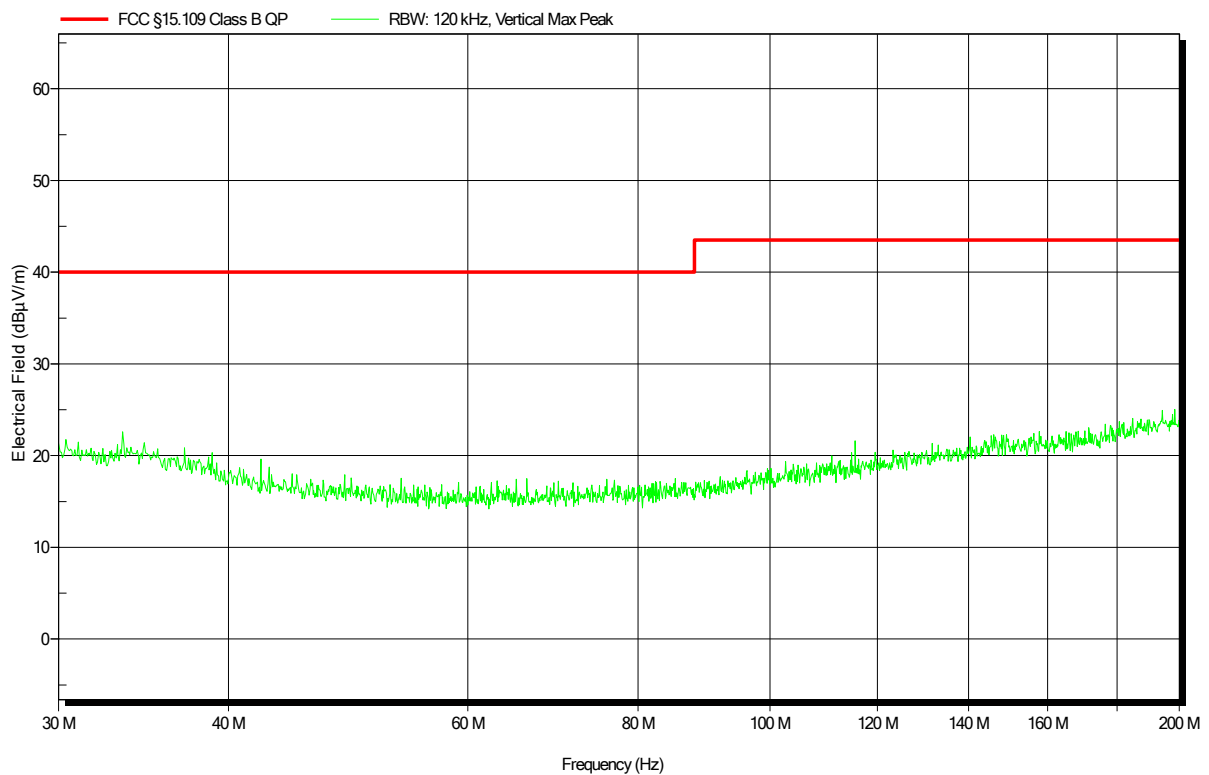
## 2.1.8 Records

### Radiated emissions under normal conditions according to FCC Part 15b

Project number: G0M-1807-7557

|                       |                                                    |
|-----------------------|----------------------------------------------------|
| Applicant:            | digades GmbH                                       |
| EUT Name:             | Remote Start VW "Sender"                           |
| Model:                | Sender RemoteStart Sender VW-VWRSTT                |
| Test Site:            | Eurofins Product Service GmbH                      |
| Operator:             | Mr. Handrik                                        |
| Test Conditions:      | Tnom: 24°C, Unom: 3V DC (non rechargeable battery) |
| Antenna:              | Rohde & Schwarz HK 116, Vertical                   |
| Measurement distance: | 3m                                                 |
| Mode:                 | mode# 1                                            |
| Test Date:            | 2018-08-24                                         |
| Note:                 |                                                    |

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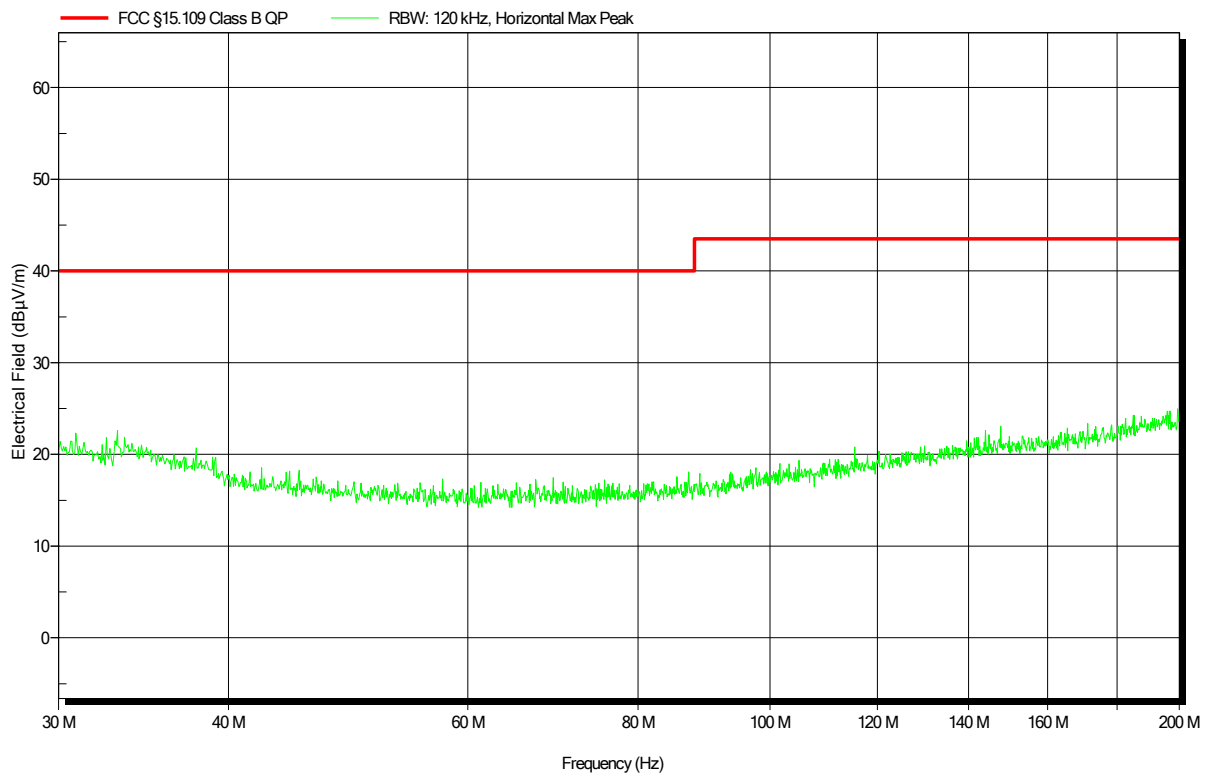


## Radiated emissions under normal conditions according to FCC Part 15b

Project number: G0M-1807-7557

Applicant: digades GmbH  
EUT Name: Remote Start VW "Sender"  
Model: Sender RemoteStart Sender VW-VWRSTT  
Test Site: Eurofins Product Service GmbH  
Operator: Mr. Handrik  
Test Conditions: Tnom: 24°C, Unom: 3V DC (non rechargeable battery)  
Antenna: Rohde & Schwarz HK 116, Horizontal  
Measurement distance: 3m  
Mode: mode# 1  
Test Date: 2018-08-24  
Note:

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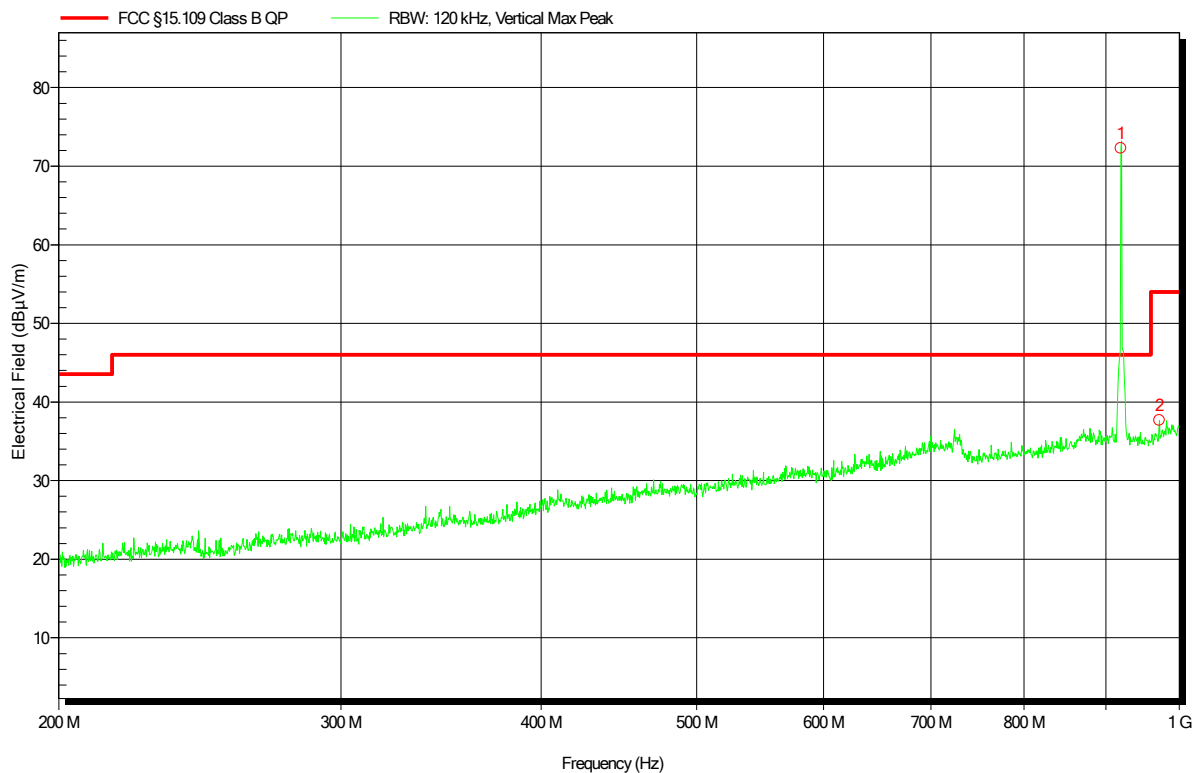


## Radiated emissions under normal conditions according to FCC Part 15b

Project number: G0M-1807-7557

Applicant: digades GmbH  
EUT Name: Remote Start VW "Sender"  
Model: Sender RemoteStart Sender VW-VWRSTT  
Test Site: Eurofins Product Service GmbH  
Operator: Mr. Handrik  
Test Conditions: Tnom: 24°C, Unom: 3V DC (non rechargeable battery)  
Antenna: Rohde & Schwarz HL 223, Vertical  
Measurement distance: 3m  
Mode: mode# 1  
Test Date: 2018-08-24  
Note:

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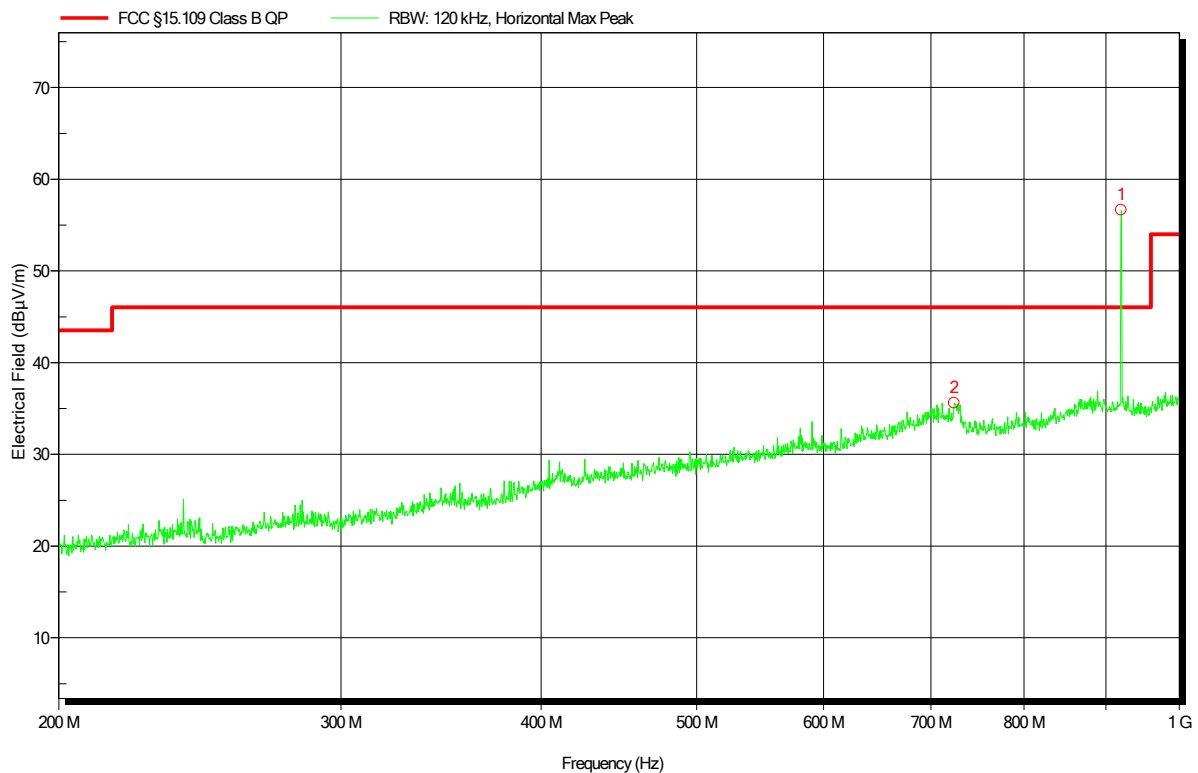
| Peak Number | Frequency  | Angle   | Height |
|-------------|------------|---------|--------|
| 1           | 919.28 MHz | carrier |        |

## Radiated emissions under normal conditions according to FCC Part 15b

Project number: G0M-1807-7557

Applicant: digades GmbH  
EUT Name: Remote Start VW "Sender"  
Model: Sender RemoteStart Sender VW-VWRSTT  
Test Site: Eurofins Product Service GmbH  
Operator: Mr. Handrik  
Test Conditions: Tnom: 24°C, Unom: 3V DC (non rechargeable battery)  
Antenna: Rohde & Schwarz HL 223, Horizontal  
Measurement distance: 3m  
Mode: mode# 1  
Test Date: 2018-08-24  
Note:

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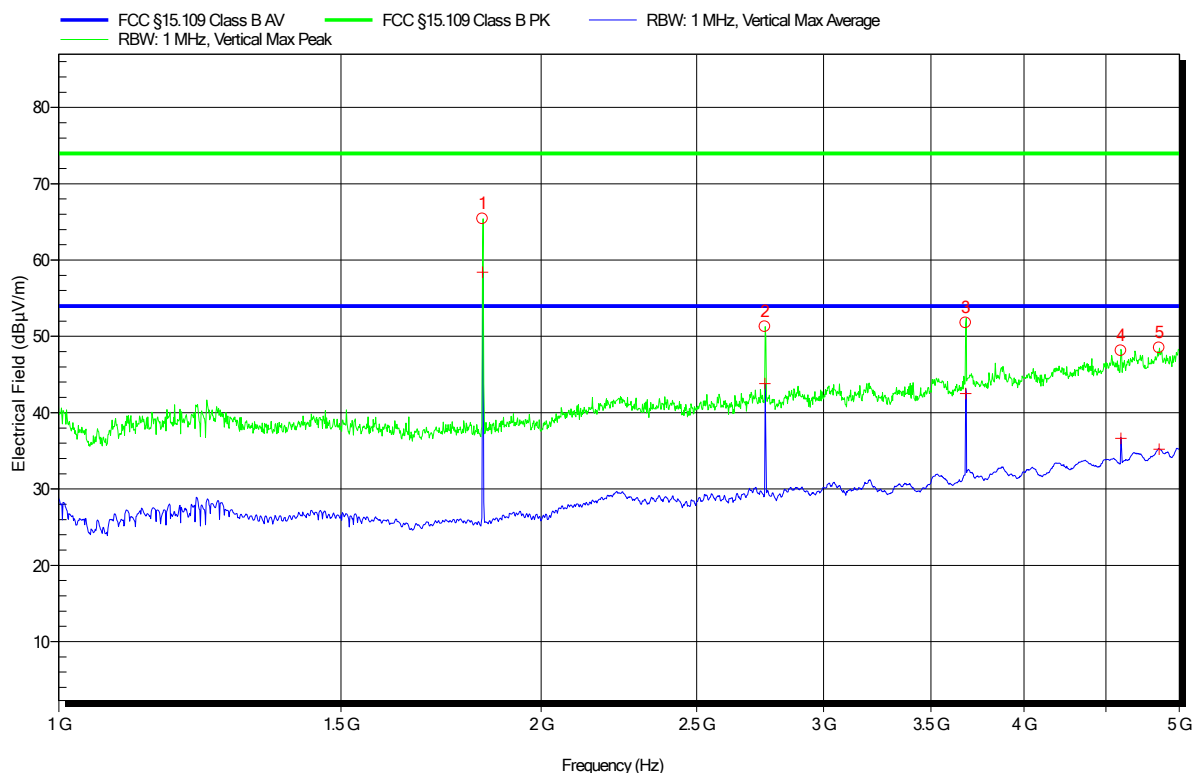
| Peak Number | Frequency  | Angle   | Height |
|-------------|------------|---------|--------|
| 1           | 919.76 MHz | carrier |        |

## Radiated emissions under normal conditions according to FCC Part 15b

Project number: G0M-1807-7557

Applicant: digades GmbH  
 EUT Name: Remote Start VW "Sender"  
 Model: Sender RemoteStart Sender VW-VWRSTT  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Handrik  
 Test Conditions: Tnom: 24°C, Unom: 3V DC (non rechargeable battery)  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 3m  
 Mode: mode# 1  
 Test Date: 2018-08-24  
 Note:

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| Peak Number | Frequency | Peak                     | Angle     | Height |
|-------------|-----------|--------------------------|-----------|--------|
| 1           | 1.839 GHz | 2 <sup>nd</sup> harmonic |           |        |
| 2           | 2.758 GHz | 3 <sup>rd</sup> harmonic |           |        |
| 3           | 3.679 GHz | 4 <sup>th</sup> harmonic |           |        |
| 4           | 4.598 GHz | 48.13 dBμV/m             | 32 Degree | 1 m    |
| 5           | 4.857 GHz | 48.49 dBμV/m             | 32 Degree | 1 m    |

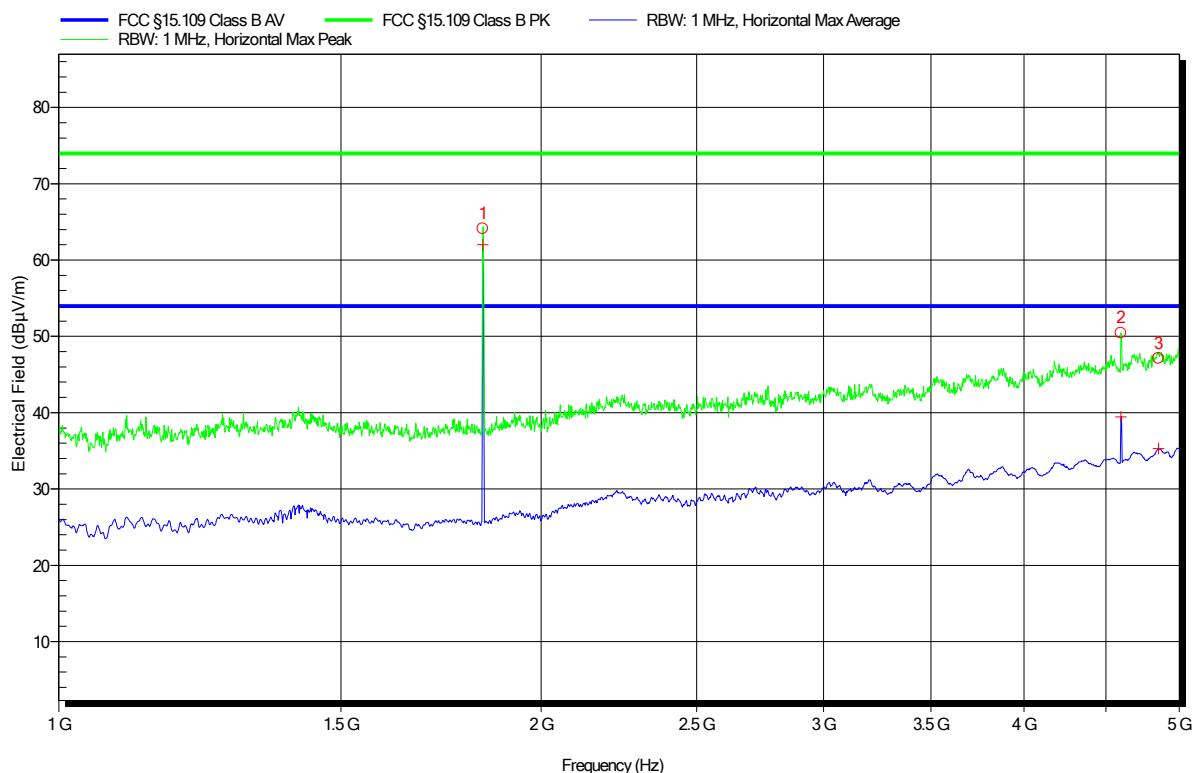
| Peak Number | Frequency | Average                  | Average Limit | Average Difference | Average Status | Angle     | Height |
|-------------|-----------|--------------------------|---------------|--------------------|----------------|-----------|--------|
| 1           | 1.839 GHz | 2 <sup>nd</sup> harmonic |               |                    |                |           |        |
| 2           | 2.758 GHz | 3 <sup>rd</sup> harmonic |               |                    |                |           |        |
| 3           | 3.679 GHz | 4 <sup>th</sup> harmonic |               |                    |                |           |        |
| 4           | 4.598 GHz | 36.63 dBμV/m             | 53.98 dBμV/m  | -17.35 dB          | Pass           | 32 Degree | 1 m    |
| 5           | 4.857 GHz | 35.19 dBμV/m             | 53.98 dBμV/m  | -18.79 dB          | Pass           | 32 Degree | 1 m    |

## Radiated emissions under normal conditions according to FCC Part 15b

Project number: G0M-1807-7557

Applicant: digades GmbH  
 EUT Name: Remote Start VW "Sender"  
 Model: Sender RemoteStart Sender VW-VWRSTT  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Handrik  
 Test Conditions: Tnom: 24°C, Unom: 3V DC (non rechargeable battery)  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 3m  
 Mode: mode# 1  
 Test Date: 2018-08-24  
 Note:

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| Peak Number | Frequency | Peak                     | Angle     | Height |
|-------------|-----------|--------------------------|-----------|--------|
| 1           | 1.839 GHz | 2 <sup>nd</sup> harmonic |           |        |
| 2           | 4.598 GHz | 5 <sup>th</sup> harmonic |           |        |
| 3           | 4.852 GHz | 47.14 dBμV/m             | 32 Degree | 1.50 m |

| Peak Number | Frequency | Average                  | Average Limit | Average Difference | Average Status | Angle     | Height |
|-------------|-----------|--------------------------|---------------|--------------------|----------------|-----------|--------|
| 1           | 1.839 GHz | 2 <sup>nd</sup> harmonic |               |                    |                |           |        |
| 2           | 4.598 GHz | 5 <sup>th</sup> harmonic |               |                    |                |           |        |
| 3           | 4.852 GHz | 35.31 dBμV/m             | 53.98 dBμV/m  | -18.67 dB          | Pass           | 32 Degree | 1.50 m |