

# FCC Test Report (Part 15C)

## WPT

|                         |                       |                                  |               |
|-------------------------|-----------------------|----------------------------------|---------------|
| <b>Test report no.:</b> | EMC_BO_002299 (v1.0)  | <b>Date of report:</b>           | 14-May-2020   |
| <b>Number of pages:</b> | 21                    | <b>Project support engineer:</b> | Oliver Flecke |
| <b>Test period:</b>     | 14-Apr to 08-May-2020 |                                  |               |

|                            |                                                                                                                                     |                 |              |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------|
| <b>Applicant:</b>          | Molex CVS Dabendorf GmbH, Märkische Straße 72, 15806 Zossen, Germany, Mr. Michael Schmidt                                           |                 |              |
| <b>Manufacturer:</b>       | Molex CVS Dabendorf GmbH, Märkische Straße 72, 15806 Zossen, Germany                                                                |                 |              |
| <b>EUT identification:</b> | Wireless Mobile Interface (WMI), WCH-302 (WCH-302a, WCH-302b, WCH-302c, WCH-302d, WCH-302e, WCH-302f, WCH-302g, WCH-302h, WCH-302i) |                 |              |
| <b>FCC ID:</b>             | RK7WCH-302                                                                                                                          | <b>ISED ID:</b> | 4774A-WCH302 |

|                            |                                                                              |                                     |                              |
|----------------------------|------------------------------------------------------------------------------|-------------------------------------|------------------------------|
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|                            | FCC designation no.:                                                         | DE0017                              | ISED recognition no.: DE0015 |
|                            | Laboratory manager:                                                          | Robert Müller                       |                              |

|                     |                                                                             |
|---------------------|-----------------------------------------------------------------------------|
| <b>Test result:</b> | The EUT complies with the requirements made in the referred test documents. |
|---------------------|-----------------------------------------------------------------------------|

|                  |                                         |                          |                          |
|------------------|-----------------------------------------|--------------------------|--------------------------|
| <b>Approver:</b> | Jürgen Mitterer                         | <b>Technical review:</b> | Frank Wittmann           |
| <b>Title:</b>    | Validation and Test Engineering Manager | <b>Title:</b>            | Senior Test Engineer EMC |

|                   |                                                                                     |                   |                                                                                       |
|-------------------|-------------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------|
| <b>Signature:</b> |  | <b>Signature:</b> |  |
|-------------------|-------------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------|

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## Table of contents

|                                                                   |           |
|-------------------------------------------------------------------|-----------|
| <b>VERSION HISTORY .....</b>                                      | <b>3</b>  |
| <b>1. SUMMARY FOR FCC PART 15C TEST REPORT .....</b>              | <b>4</b>  |
| 1.1. EUT AND ACCESSORY INFORMATION .....                          | 4         |
| 1.2. TECHNICAL CHARACTERISTICS .....                              | 5         |
| 1.3. APPLIED STANDARDS .....                                      | 6         |
| 1.4. MEASUREMENT UNCERTAINTIES .....                              | 7         |
| 1.5. DECISION RULE .....                                          | 7         |
| 1.6. SUMMARY OF TEST RESULTS .....                                | 8         |
| <b>2. TEST SETUPS .....</b>                                       | <b>9</b>  |
| 2.1. CONDUCTED RF TEST SETUP (SETUP 1) .....                      | 9         |
| 2.2. CONDUCTED AC POWER LINE EMISSIONS TEST SETUP (SETUP 2) ..... | 9         |
| 2.3. RADIATED EMISSIONS TEST SETUP (SETUP 3) .....                | 9         |
| <b>3. RADIATED EMISSIONS BELOW 30 MHZ .....</b>                   | <b>10</b> |
| 3.1. TEST METHOD AND LIMIT .....                                  | 10        |
| 3.2. TEST RESULTS (FCC) .....                                     | 11        |
| 3.3. TEST RESULTS (ISED) .....                                    | 12        |
| <b>4. RADIATED EMISSIONS ABOVE 30 MHZ .....</b>                   | <b>13</b> |
| 4.1. TEST METHOD AND LIMIT .....                                  | 13        |
| 4.2. TEST RESULTS (FCC) .....                                     | 14        |
| 4.3. TEST RESULTS (ISED) .....                                    | 15        |
| <b>5. OCCUPIED BANDWIDTH .....</b>                                | <b>16</b> |
| 5.1. TEST METHOD AND LIMIT .....                                  | 16        |
| 5.2. TEST RESULTS (FCC) .....                                     | 17        |
| 5.3. TEST RESULTS (ISED) .....                                    | 18        |
| <b>6. TEST EQUIPMENT .....</b>                                    | <b>19</b> |
| 6.1. RADIATED EMISSION .....                                      | 19        |
| 6.2. CONDUCTED RADIO .....                                        | 20        |

## Version History

| Report Number        | Date        | Comment                          |
|----------------------|-------------|----------------------------------|
| EMC_BO_002299 (v1.0) | 14-May-2020 | 1 <sup>st</sup> approved version |
| -                    | -           | -                                |
| -                    | -           | -                                |
| -                    | -           | -                                |

## 1. Summary for FCC Part 15C Test Report

|                                 |                                           |
|---------------------------------|-------------------------------------------|
| Date of receipt                 | 14-Apr-2020                               |
| Testing completed               | 08-May-2020                               |
| The customer's contact person   | Mr. Michael Schmidt                       |
| Test samples / setup pictures   | RK7302-00_EUT_&_Test_Setup_Photos_1.0.pdf |
| HW change / difference document | 2.1_WCH-302_Difference_document_1.0.pdf   |
| Notes                           | none                                      |

### 1.1. EUT and accessory Information

#### OP1: (15 W, EPP)

The EUT is an inductive wireless power transfer device (wireless charger) with transmitter and load modulation operating at 127.55 kHz. The EUT is tested with an artificial load, continuously charging at 15 W (duty cycle of 100 %).

The following test samples provided by the customer were tested.

| ID         | Description | Manufacturer | Model    | S/N          | HW Version | SW Version |
|------------|-------------|--------------|----------|--------------|------------|------------|
| DAB200448E | WMI         | Molex        | WCH-302a | 000002511C02 | V16        | RC36+      |
| DAB200490E | WMI         | Molex        | WCH-302a | 000002511C04 | V16        | RC36+      |

The following accessories have been provided by the customer and belong to the equipment under test (EUT).

| ID         | Description              | Manufacturer | Type | S/N          | HW Version | SW Version |
|------------|--------------------------|--------------|------|--------------|------------|------------|
| DAB191879E | System Cable             | Molex        | -    | -            | -          | -          |
| DAB191878E | System Cable             | Molex        | -    | -            | -          | -          |
| DAB16069E  | RF Cable + Bias-T (100k) | Molex        | -    | -            | -          | -          |
| DAB16071E  | RF Cable + Bias-T (100k) | Molex        | -    | -            | -          | -          |
| DAB200463E | External NFC Antenna     | -            | -    | -            | -          | -          |
| DAB191907E | External NFC Antenna     | -            | -    | -            | -          | -          |
| DAB191883E | Load Receiver (15 W)     | Molex        | -    | -            | -          | -          |
| DAB200593E | Load Qi Receiver (15 W)  | -            | -    | 000012594217 | 102-03     | -          |

## 1.2. Technical characteristics

|                                 |                                                                                 |                  |                  |
|---------------------------------|---------------------------------------------------------------------------------|------------------|------------------|
| Power Supply [V]                | Lead-acid battery (vehicle regulated) – 12 V DC                                 |                  |                  |
| Voltage Range [V]               | $U_{nom} = 12.0$                                                                | $U_{min} = 10.2$ | $U_{max} = 13.8$ |
| Charging cut-off Voltage [V]    | $U_{cut-off} = 8.8$ (wireless power transfer is stopped for $U < U_{cut-off}$ ) |                  |                  |
| Temperatures Range [°C]         | -40 ... +60                                                                     |                  |                  |
| Radio Type                      | WPT transceiver                                                                 |                  |                  |
| Operating Frequency Range [kHz] | 127.55                                                                          |                  |                  |
| Communication Frequency [kHz]   | Same as operating frequency range                                               |                  |                  |
| Operating Channels              | Not channelized                                                                 |                  |                  |
| Antenna Type                    | Integral inductive loop coils < 0.05 m <sup>2</sup> (no customization allowed)  |                  |                  |
| Antenna gain [dBi]              | n.a.                                                                            |                  |                  |
| Product Category                | Category I radio apparatus (type 3)                                             |                  |                  |
| Modulation Type                 | H-field for charging is digital modulated                                       |                  |                  |
| Modulation Technique            | H-field for charging is FSK modulated                                           |                  |                  |

Above technical information was provided by the applicant. For more details, please refer to the User's manual of the EUT.

### 1.3. Applied standards

| Standard / Rule Part | Version        | Year     |
|----------------------|----------------|----------|
| CFR 47, FCC Part 15C | -              | May-2020 |
| ANSI C63.10          | -              | Jun-2013 |
| ISED RSS-Gen         | Issue 5 + AMD1 | Mar-2019 |
| ISED RSS-216         | Issue 2        | Jan-2016 |

Deviations or clarifications to these standards are noted in the related test result under “test method and limit”.

#### 1.4. Measurement uncertainties

| Parameter                     | Measurement Uncertainty  | Maximum Uncertainty    |
|-------------------------------|--------------------------|------------------------|
| Radio Frequency               | $\pm 3.6 \times 10^{-7}$ | $\pm 1 \times 10^{-5}$ |
| Total RF Power, conducted     | $\pm 0.79$ dB            | $\pm 1.5$ dB           |
| RF Power density, conducted   | $\pm 0.79$ dB            | $\pm 3.0$ dB           |
| Spurious emissions, conducted | $\pm 1.67$ dB            | $\pm 3.0$ dB           |
| All emissions, radiated       | $\pm 5.38$ dB            | $\pm 6.0$ dB           |
| Temperature                   | $\pm 1.0$ °C             | $\pm 3$ °C             |
| Humidity                      | $\pm 2.0$ %              | $\pm 5.0$ %            |

These uncertainties represent an expanded uncertainty expressed approximately at the 95% confidence level using a coverage factor of  $k=2$

#### 1.5. Decision rule

In this test report the measurement uncertainty is not included in the test result.

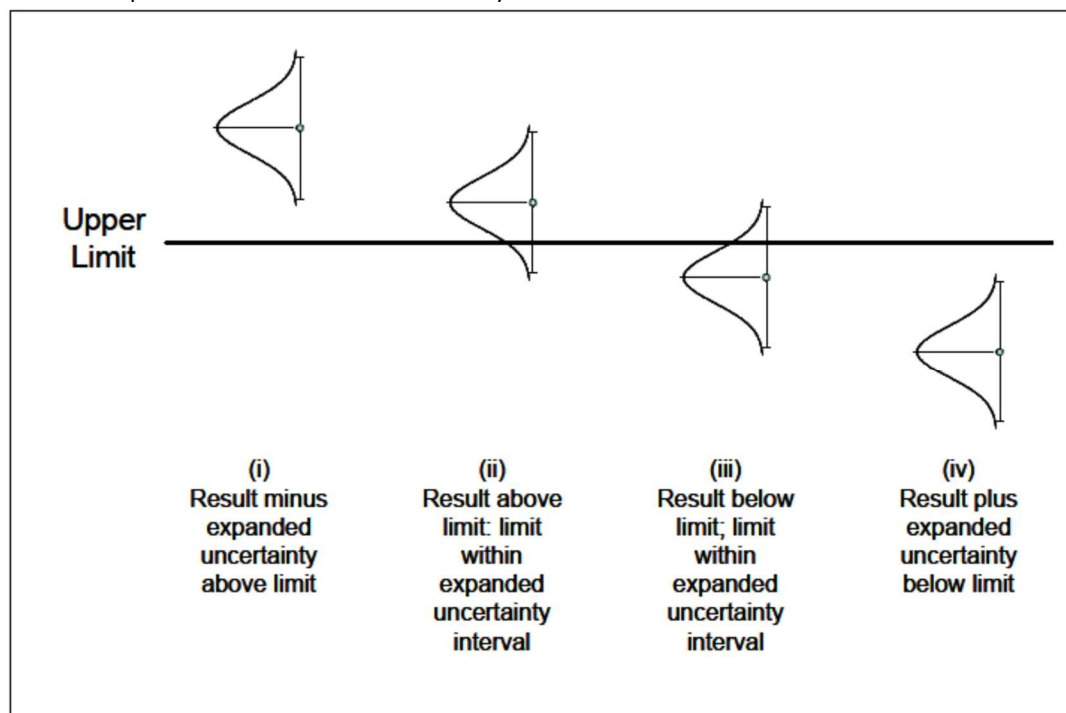


Figure 1: Assessment of Compliance with an Upper Limit (Source: EURACHEM/CITAC Guide: Use of uncertainty information in compliance assessment; First edition 2007)

- (i) measurement value is clearly above the limit, result is failed
- (ii) measurement value is above the limit, result is failed
- (iii) measurement value is below the limit, result is passed
- (iv) measurement value is clearly below the limit, result is passed

## 1.6. Summary of test results

| Section | Section in CFR 47 | Section in RSS-Gen | Section in RSS-216                     | Name of the test                 | Result |
|---------|-------------------|--------------------|----------------------------------------|----------------------------------|--------|
| 3 & 4   | 15.205, 15.209    | 8.9, 8.10          | 6.2.2.2, 6.2.3<br>(Type 3 WPT devices) | Radiated emissions               | PASSED |
| -       | 15.207            | -                  | 6.2.2.1                                | AC powerline conducted emissions | NA     |
| 5       | 15.215 (c)        | 6.7                | -                                      | Occupied bandwidth               | PASSED |

PASSED: The EUT complies with the essential requirements in the standard.

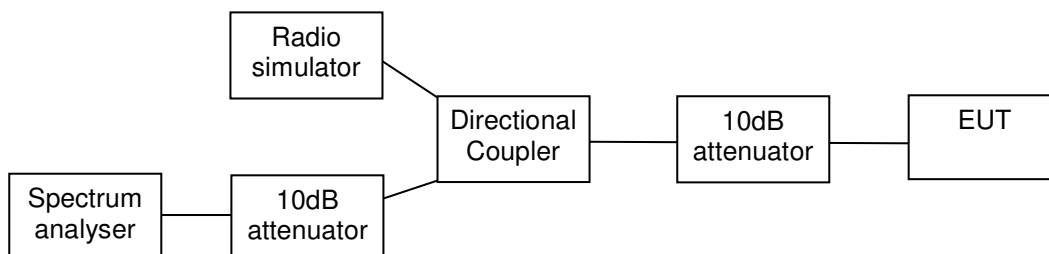
FAILED: The EUT does not comply with the essential requirements in the standard.

NP: The test was not performed.

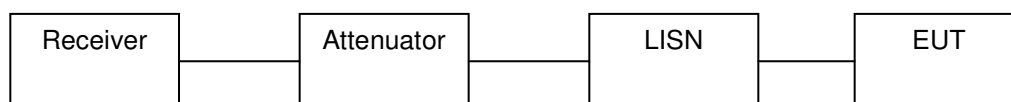
NA: The test was not applicable.

## 2. Test setups

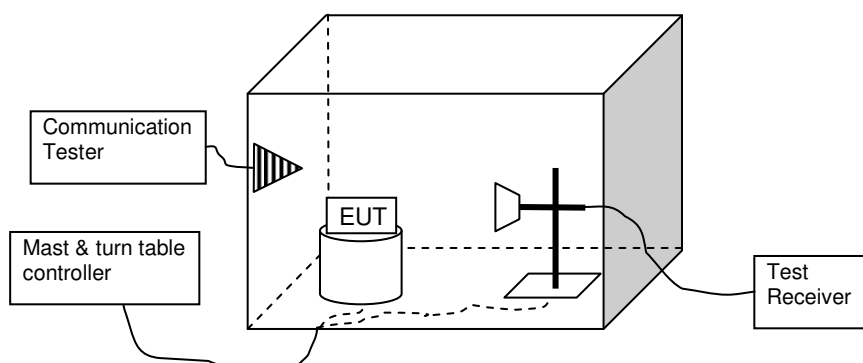
### 2.1. Conducted RF test setup (Setup 1)



### 2.2. Conducted AC power line emissions test setup (Setup 2)



### 2.3. Radiated emissions test setup (Setup 3)



### 3. Radiated emissions below 30 MHz

|                              |                                               |
|------------------------------|-----------------------------------------------|
| EUT with DUT number          | DAB200448E                                    |
| Accessories with DUT numbers | DAB191879E, DAB16069E, DAB200463E, DAB191883E |
| Operation Voltage [V] / [Hz] | 12 V / DC                                     |
| Result                       | PASSED                                        |
| Remarks                      | OP1                                           |
| Temp [°C] / Humidity [%RH]   | 22.9 °C / 41.0 %                              |
| Date of measurement          | 14-Apr to 29-Apr-2020                         |
| Test Engineer                | Frank Wittmann                                |
| Test system SW version       | V1.7.1                                        |

#### 3.1. Test method and limit

The measurement is made according to ANSI C63.10 and RSS-Gen as follows:

- ⇒ The measurement distance is 3 m with a shielded loop antenna. The magnetic field to electric field conversion factor is 51.5 dB ( $\text{dB}\mu\text{A}/\text{m} = \text{dB}\mu\text{V}/\text{m} - 51.5 \text{ dB}$ ).
- ⇒ The Limit has been adjusted with the distance correction factor according to 15.31(f)(2). (+40 dB for 30 m distance and +80 dB for 300 m distance)
- ⇒ The measurement is divided into the Preliminary Measurement and the Final Measurement. The Preliminary Measurement and the Final Measurement are performed with the measuring antenna at fixed height using a 2-axis EUT position system, set on the turntable, which is rotated by 360 degrees.
- ⇒ During the Preliminary Measurement the suspected frequencies are searched by using the PK detector. In the Final Measurement the exact frequency and amplitude of these emissions are re-measured by using the applicable QP and AV detector.
- ⇒ The Final Measurement is performed if the Preliminary Measurement results are closer than 20 dB to the permissible limit.
- ⇒ The measurement results are obtained as described in the following formula:  $E [\text{dB}\mu\text{V}/\text{m}] = U_{\text{RX}} + A_{\text{CF}}$   
Where  $U_{\text{RX}}$  is receiver reading and  $A_{\text{CF}}$  is total correction factor including cable loss, antenna factor and preamplifier gain ( $A_{\text{CF}} = L_{\text{CABLES}} + \text{AF} - G_{\text{PREAMP}}$ ).

FCC limits for radiated emissions measurements (3 m measurement distance)

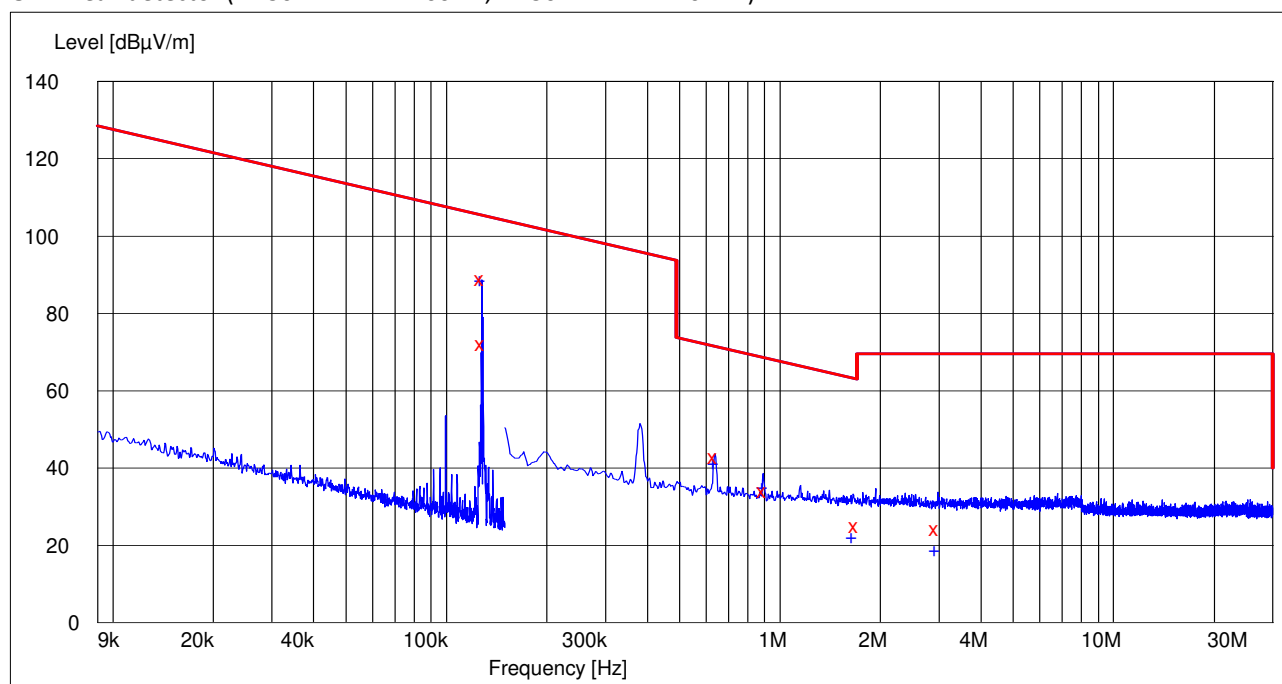
| Frequency range [MHz] | Limit [ $\mu\text{V}/\text{m}$ ] | Limit [ $\text{dB}\mu\text{V}/\text{m}$ ] | Detector |
|-----------------------|----------------------------------|-------------------------------------------|----------|
| 0.009 - 0.09          | $10000 * 2400 / f[\text{kHz}]$   | 128.5 - 93.8                              | AV       |
| 0.09 - 0.11           |                                  |                                           | QP       |
| 0.11 - 0.19           |                                  |                                           | AV       |
| 0.19 - 0.49           |                                  |                                           | AV       |
| 0.490 - 1.705         | $100 * 24000 / f[\text{kHz}]$    | 73.8 - 63.0                               | QP       |
| 1.705 - 30.0          | $100 * 30$                       | 69.5                                      | QP       |

CISPR11 Induction cooking (group 2) limits (3 m measurement distance)

| Frequency range [MHz] | Limit [ $\text{dB}\mu\text{A}/\text{m}$ ] | Limit [ $\text{dB}\mu\text{V}/\text{m}$ ] | Detector |
|-----------------------|-------------------------------------------|-------------------------------------------|----------|
| 0.009 - 0.070         | 69.0                                      | 120.5                                     | QP       |
| 0.070 - 0.1485        | 69 - 39                                   | 120.5 - 90.5                              | QP       |
| 0.1485 - 4.0          | 39 - 3                                    | 90.5 - 54.5                               | QP       |
| 4.0 - 30              | 3                                         | 54.5                                      | QP       |

### 3.2. Test results (FCC)

**OP1: Peak detector** (< 150 kHz: RBW 200 Hz, > 150 kHz: RBW 10 kHz)



**Quasi-Peak detector** (< 150 kHz: RBW 200 Hz, >150 kHz: RBW 9 kHz)

| Frequency [MHz] | Level [dBμV/m] | Transducer [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Azimuth [deg] | Polarisation | Result |
|-----------------|----------------|-----------------|----------------|-------------|-------------|---------------|--------------|--------|
| 0.127555        | 89.00          | 23.20           | 105.50         | 16.50       | 170.0       | 247.00        | VERTICAL     | PASSED |
| 0.128141        | 72.30          | 23.20           | 105.50         | 33.20       | 170.0       | 234.00        | VERTICAL     | PASSED |
| 0.638472        | 42.90          | 23.40           | 71.50          | 28.60       | 170.0       | 10.00         | VERTICAL     | PASSED |
| 0.896483        | 34.20          | 23.30           | 68.60          | 34.40       | 170.0       | 360.00        | VERTICAL     | PASSED |
| 1.686016        | 25.10          | 23.10           | 63.10          | 38.00       | 170.0       | 178.00        | VERTICAL     | PASSED |
| 2.930141        | 24.40          | 23.10           | 69.50          | 45.10       | 170.0       | 109.00        | VERTICAL     | PASSED |

No further emissions found less than 20 dB to the regulatory limit and no emission found in the restricted bands of operation.

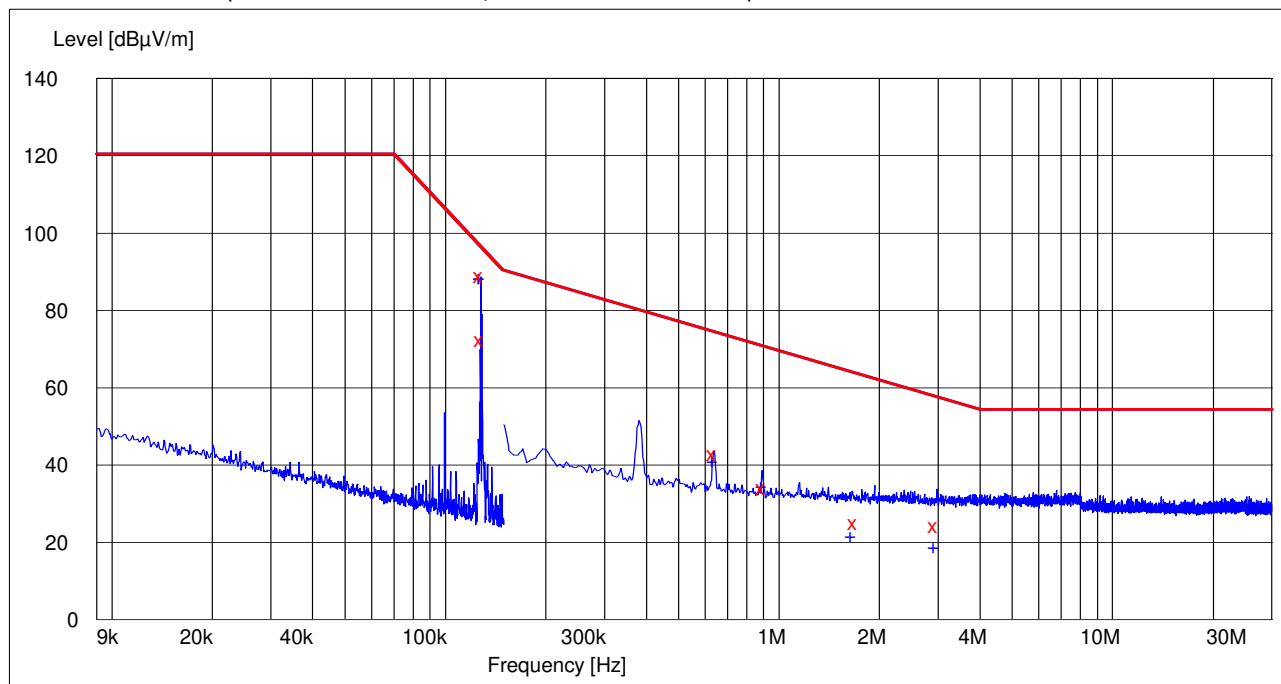
**Average detector** (< 150 kHz: RBW 200Hz, > 150 kHz: RBW 9 kHz)

| Frequency [MHz] | Level [dBμV/m] | Transducer [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Azimuth [deg] | Polarisation | Result |
|-----------------|----------------|-----------------|----------------|-------------|-------------|---------------|--------------|--------|
| 0.127541        | 88.90          | 23.20           | 105.50         | 16.60       | 170.0       | 247.00        | VERTICAL     | PASSED |
| 0.127555        | 88.90          | 23.20           | 105.50         | 16.60       | 170.0       | 239.00        | VERTICAL     | PASSED |
| 0.637972        | 41.70          | 23.40           | 71.50          | 29.80       | 170.0       | 3.00          | VERTICAL     | PASSED |
| 0.892983        | 35.40          | 23.30           | 68.60          | 33.20       | 170.0       | 13.00         | VERTICAL     | PASSED |
| 1.656516        | 22.60          | 23.10           | 63.20          | 40.60       | 170.0       | 185.00        | VERTICAL     | PASSED |
| 2.933141        | 19.30          | 23.10           | 69.50          | 50.20       | 170.0       | 134.00        | VERTICAL     | PASSED |

No further emissions found less than 20 dB to the regulatory limit and no emission found in the restricted bands of operation.

### 3.3. Test results (ISED)

**OP1: Peak detector** (< 150 kHz: RBW 200 Hz, > 150 kHz: RBW 10 kHz)



**Quasi-Peak detector** (< 150 kHz: RBW 200 Hz, >150 kHz: RBW 9 kHz)

| Frequency [MHz] | Level [dBμV/m] | Transducer [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Azimuth [deg] | Polarisation | Result |
|-----------------|----------------|-----------------|----------------|-------------|-------------|---------------|--------------|--------|
| 0.127555        | 89.00          | 23.20           | 96.60          | 7.60        | 170.0       | 247.00        | VERTICAL     | PASSED |
| 0.128141        | 72.50          | 23.20           | 96.40          | 23.90       | 170.0       | 234.00        | VERTICAL     | PASSED |
| 0.638472        | 43.10          | 23.40           | 74.60          | 31.50       | 170.0       | 10.00         | VERTICAL     | PASSED |
| 0.896483        | 34.30          | 23.30           | 70.80          | 36.50       | 170.0       | 360.00        | VERTICAL     | PASSED |
| 1.686016        | 25.10          | 23.10           | 63.90          | 38.80       | 170.0       | 178.00        | VERTICAL     | PASSED |
| 2.930141        | 24.40          | 23.10           | 57.90          | 33.50       | 170.0       | 109.00        | VERTICAL     | PASSED |

No further emissions found less than 20 dB to the regulatory limit and no emission found in the restricted bands of operation.

**Average detector** (< 150 kHz: RBW 200Hz, > 150 kHz: RBW 9 kHz)

| Frequency [MHz] | Level [dBμV/m] | Transducer [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Azimuth [deg] | Polarisation | Result |
|-----------------|----------------|-----------------|----------------|-------------|-------------|---------------|--------------|--------|
| 0.127541        | 88.70          | 23.20           | 96.60          | 7.90        | 170.0       | 247.00        | VERTICAL     | PASSED |
| 0.127555        | 88.80          | 23.20           | 96.60          | 7.80        | 170.0       | 239.00        | VERTICAL     | PASSED |
| 0.637972        | 41.50          | 23.40           | 74.60          | 33.10       | 170.0       | 3.00          | VERTICAL     | PASSED |
| 0.892983        | 34.80          | 23.30           | 70.90          | 36.10       | 170.0       | 13.00         | VERTICAL     | PASSED |
| 1.656516        | 22.10          | 23.10           | 64.10          | 42.00       | 170.0       | 185.00        | VERTICAL     | PASSED |
| 2.933141        | 19.30          | 23.10           | 57.90          | 38.60       | 170.0       | 134.00        | VERTICAL     | PASSED |

No further emissions found less than 20 dB to the regulatory limit and no emission found in the restricted bands of operation.

## 4. Radiated emissions above 30 MHz

|                              |                                               |
|------------------------------|-----------------------------------------------|
| EUT with DUT number          | DAB200448E                                    |
| Accessories with DUT numbers | DAB191879E, DAB16069E, DAB200463E, DAB191883E |
| Operation Voltage [V] / [Hz] | 12 V / DC                                     |
| Result                       | PASSED                                        |
| Remarks                      | OP1                                           |
| Temp [°C] / Humidity [%RH]   | 22.9 °C / 41.0 %                              |
| Date of measurement          | 14-Apr to 29-Apr-2020                         |
| Test Engineer                | Frank Wittmann                                |
| Test system SW version       | V1.7.1                                        |

### 4.1. Test method and limit

The measurement is made according to ANSI C63.10 and RSS-Gen as follows:

- ⇒ The EUT is placed on a nonconductive plate in the centre of the turntable.
- ⇒ The measurement is divided into the Preliminary Measurement and the Final Measurement.  
The Preliminary Measurement and the Final Measurement is performed in 3 m distance without floor absorbers by rotating the turntable of 360 degrees and moving the antenna height between 1-4 m.
- ⇒ During the Preliminary Measurement the suspected frequencies are searched by using the PK detector.  
In the Final Measurement the exact frequency and amplitude of these emissions are re-measured by using the applicable QP detector.
- ⇒ The Final Measurement is performed if the Preliminary Measurement results are closer than 20 dB to the permissible limit.
- ⇒ The measurement results are obtained as described in the following formula:  $E \text{ [dB}\mu\text{V/m]} = U_{RX} + A_{CF}$   
Where  $U_{RX}$  is receiver reading and  $A_{CF}$  is total correction factor including cable loss, antenna factor and preamplifier gain ( $A_{CF} = L_{CABLES} + AF - G_{PREAMP}$ ).

FCC limits for radiated emissions measurements (3 m measurement distance)

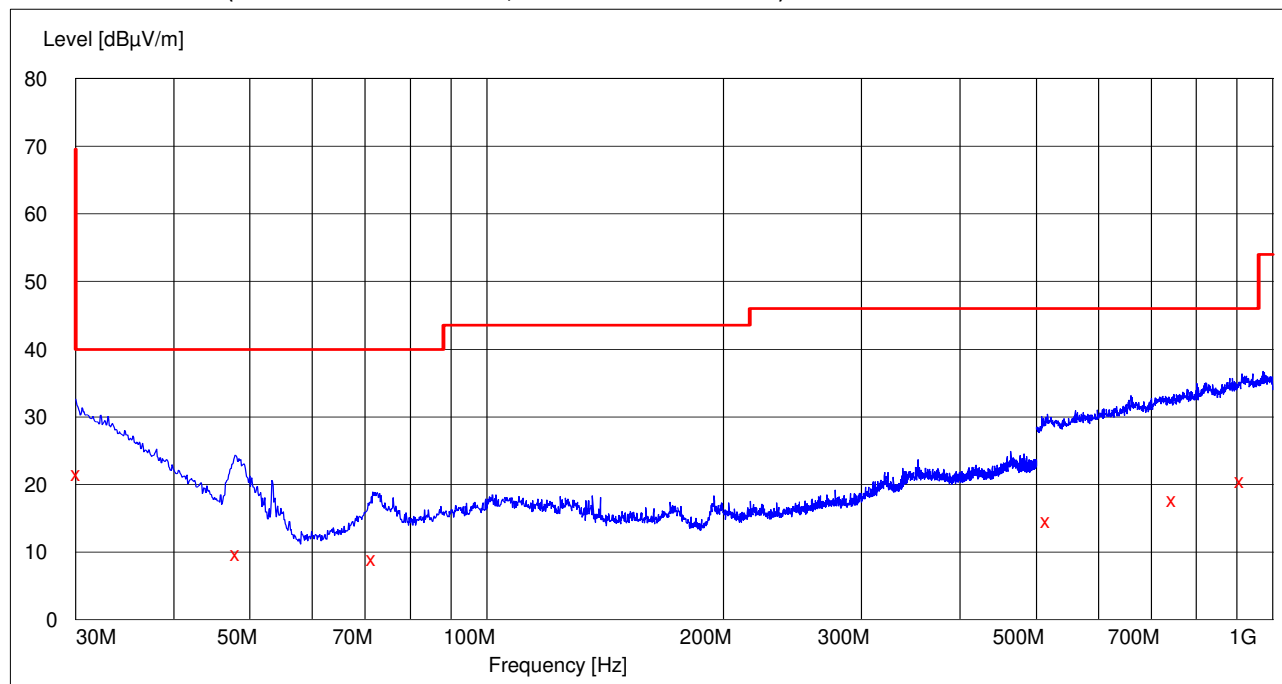
| Frequency range [MHz] | Limit [ $\mu\text{V/m}$ ] | Limit [dB $\mu\text{V/m}$ ] | Detector |
|-----------------------|---------------------------|-----------------------------|----------|
| 30 – 88               | 100                       | 40                          | QP       |
| 88 – 216              | 150                       | 43.5                        | QP       |
| 216 – 960             | 200                       | 46                          | QP       |
| 960 – 1000            | 500                       | 54                          | QP       |

CISPR11 Class B group 2 limits (3 m measurement distance)

| Frequency range [MHz] | Limit [ $\mu\text{V/m}$ ] | Limit [dB $\mu\text{V/m}$ ] | Detector |
|-----------------------|---------------------------|-----------------------------|----------|
| 30 – 80.872           | 100                       | 40                          | QP       |
| 80.872 – 81.848       | 1000                      | 60                          | QP       |
| 81.848 – 134.786      | 100                       | 40                          | QP       |
| 134.786 – 136.414     | 1000                      | 60                          | QP       |
| 136.414 – 230         | 100                       | 40                          | QP       |
| 230 - 1000            | 500                       | 47                          | QP       |

## 4.2. Test results (FCC)

**OP1:** Peak detector (< 500 MHz: RBW 300 kHz, > 500 MHz: RBW 1 MHz)



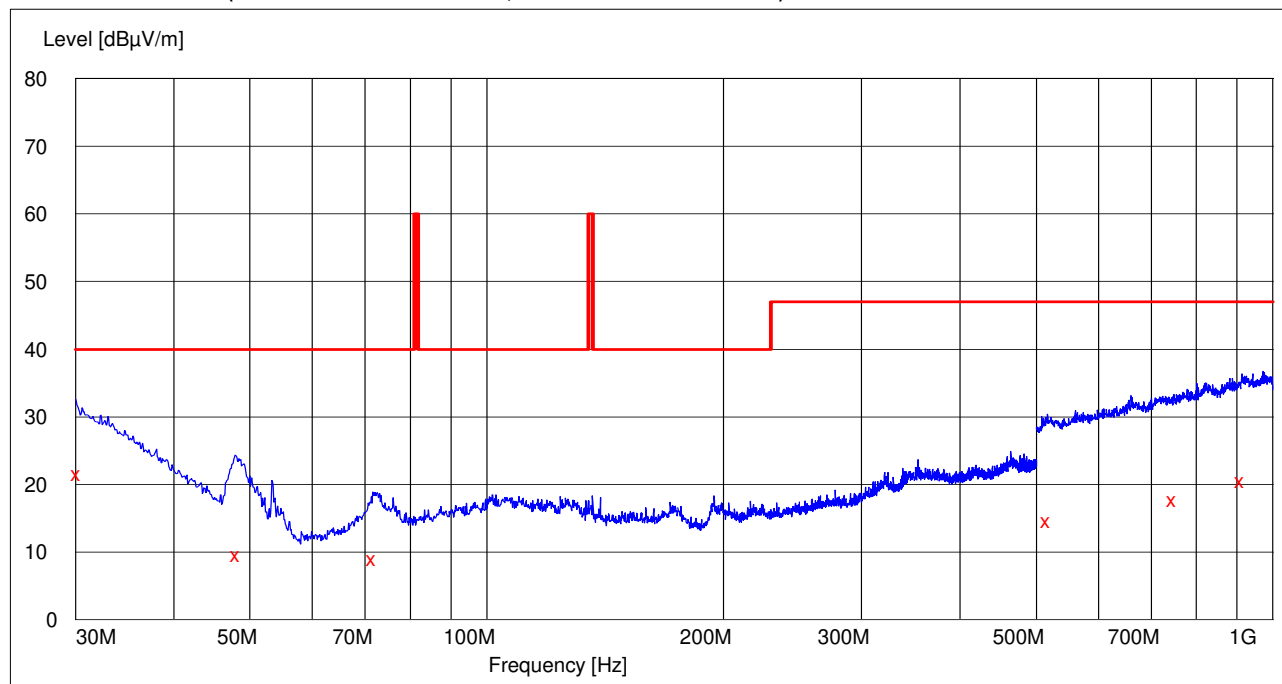
Quasi-Peak detector (RBW 120 kHz)

| Frequency [MHz] | Level [dBμV/m] | Transducer [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Azimuth [deg] | Polarisation | Result |
|-----------------|----------------|-----------------|----------------|-------------|-------------|---------------|--------------|--------|
| 30.200000       | 21.50          | -7.90           | 40.00          | 18.50       | 249.0       | 43.00         | VERTICAL     | PASSED |
| 48.165631       | 9.70           | -26.60          | 40.00          | 30.30       | 125.0       | 143.00        | VERTICAL     | PASSED |
| 71.823046       | 9.00           | -25.40          | 40.00          | 31.00       | 373.0       | 44.00         | HORIZONTAL   | PASSED |
| 517.033066      | 14.70          | -22.30          | 46.00          | 31.30       | 98.0        | 220.00        | VERTICAL     | PASSED |
| 748.046994      | 17.80          | -18.70          | 46.00          | 28.20       | 223.0       | 190.00        | HORIZONTAL   | PASSED |
| 913.225651      | 20.60          | -16.00          | 46.00          | 25.40       | 276.0       | 39.00         | HORIZONTAL   | PASSED |

No further emissions found less than 20 dB to the regulatory limit and no emission found in the restricted bands of operation.

### 4.3. Test results (ISED)

**OP1:** Peak detector (< 500 MHz: RBW 300 kHz, > 500 MHz: RBW 1 MHz)



Quasi-Peak detector (RBW 120 kHz)

| Frequency [MHz] | Level [dBμV/m] | Transducer [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Azimuth [deg] | Polarisation | Result |
|-----------------|----------------|-----------------|----------------|-------------|-------------|---------------|--------------|--------|
| 30.200000       | 21.50          | -7.90           | 40.00          | 18.50       | 249.0       | 43.00         | VERTICAL     | PASSED |
| 48.165631       | 9.60           | -26.60          | 40.00          | 30.40       | 125.0       | 143.00        | VERTICAL     | PASSED |
| 71.823046       | 9.00           | -25.40          | 40.00          | 31.00       | 373.0       | 44.00         | HORIZONTAL   | PASSED |
| 517.033066      | 14.70          | -22.30          | 47.00          | 32.30       | 98.0        | 220.00        | VERTICAL     | PASSED |
| 748.046994      | 17.80          | -18.70          | 47.00          | 29.20       | 223.0       | 190.00        | HORIZONTAL   | PASSED |
| 913.225651      | 20.60          | -16.00          | 47.00          | 26.40       | 276.0       | 39.00         | HORIZONTAL   | PASSED |

No further emissions found less than 20 dB to the regulatory limit and no emission found in the restricted bands of operation.

## 5. Occupied bandwidth

|                              |                                              |
|------------------------------|----------------------------------------------|
| EUT with DUT number          | DAB200490E                                   |
| Accessories with DUT numbers | DAB191878E, NOV16037E, DAB16071E, DAB200593E |
| Operation Voltage [V] / [Hz] | 12 V / DC                                    |
| Result                       | PASSED                                       |
| Remarks                      | OP1                                          |
| Temp [°C] / Humidity [%RH]   | 23 °C / 34.5 %                               |
| Date of measurement          | 06-May to 08-May-2020                        |
| Test Engineer                | Bhushan Pawar                                |
| Test system SW version       | V1.7                                         |

### 5.1. Test method and limit

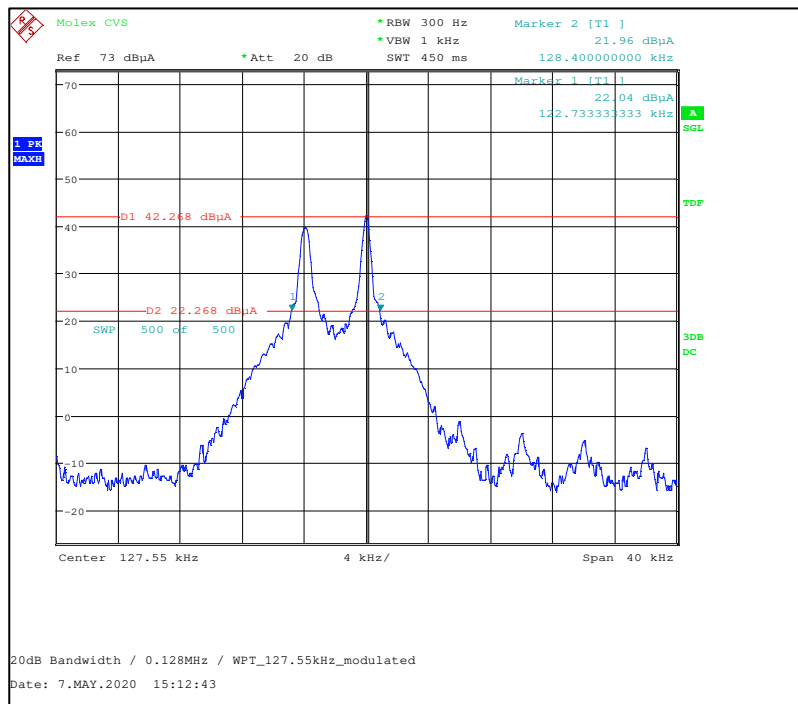
The measurement is made according to FCC 15.215(c) and RSS-Gen.

FCC and ISED limits for occupied bandwidth measurements

| 20 dB Bandwidth Limit<br>[kHz] | 99 % Bandwidth Limit<br>[kHz] |
|--------------------------------|-------------------------------|
| -                              | -                             |

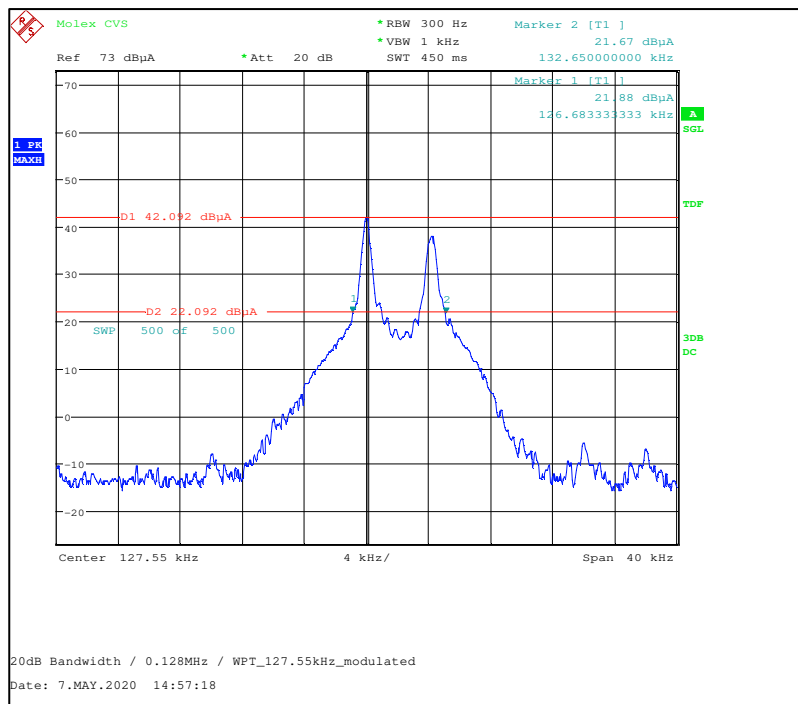
## 5.2. Test results (FCC)

### OP1: Negative polarity, maximum modulation depth



| Frequency [kHz] | 20 dB Bandwidth [kHz] | Result |
|-----------------|-----------------------|--------|
| 127.550         | 5.66                  | PASSED |

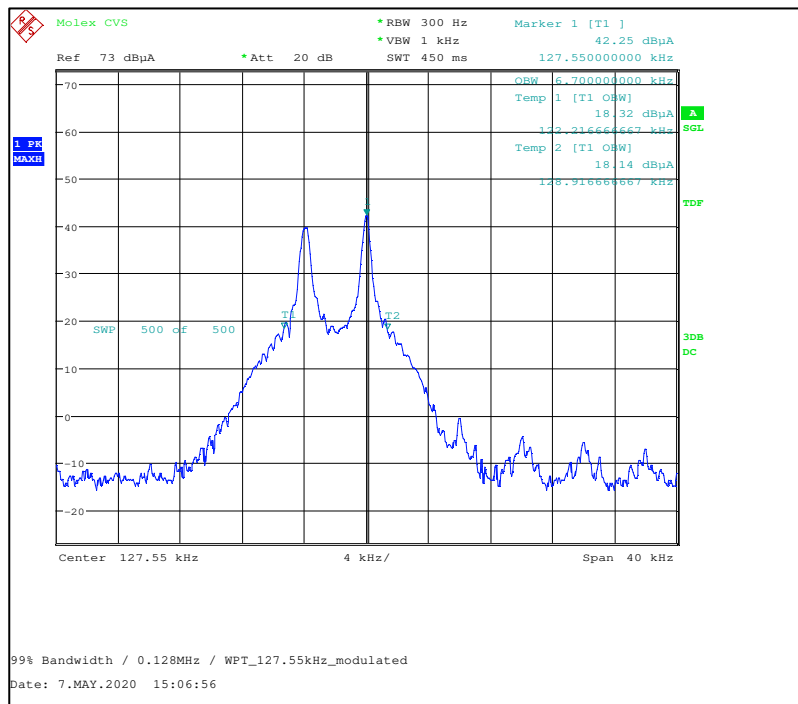
### OP1: Positive polarity, maximum modulation depth



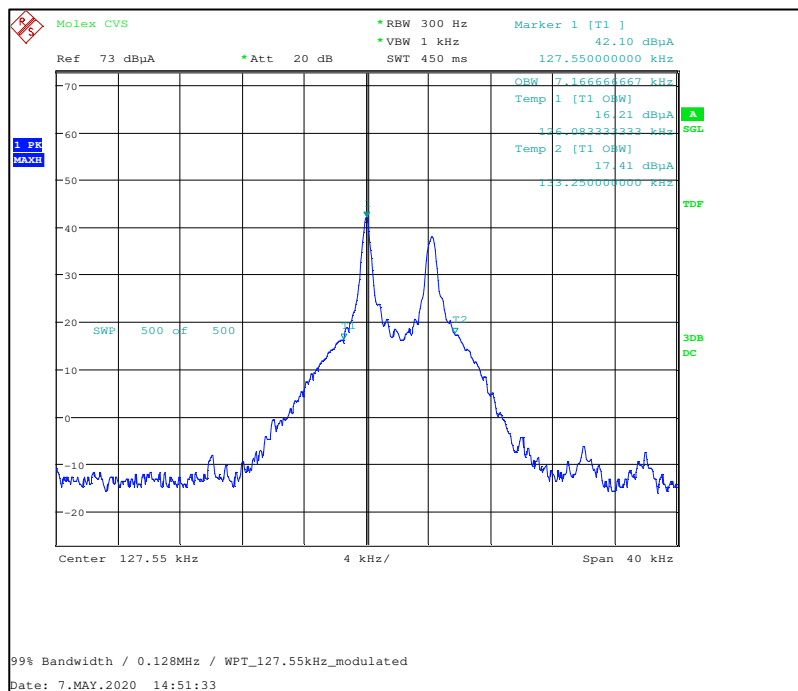
| Frequency [kHz] | 20 dB Bandwidth [kHz] | Result |
|-----------------|-----------------------|--------|
| 127.550         | 5.97                  | PASSED |

### 5.3. Test results (ISED)

#### OP1: Negative polarity, maximum modulation depth



#### OP1: Positive polarity, maximum modulation depth



## 6. Test Equipment

### 6.1. Radiated Emission

| Equipment                         | Manufacturer                     | Type              | Serial No.  | Actual Calibration | Next Calibration |
|-----------------------------------|----------------------------------|-------------------|-------------|--------------------|------------------|
| Antenna                           | Schwarzbeck Mess-Elektronik      | FMZB_1519         | 1519-056    | 14.07.2017         | 14.07.2020       |
| EMI Test Receiver                 | ROHDE & SCHWARZ                  | ESIB26            | 827769/010  | 23.05.2019         | 23.05.2020       |
| Signal Generator                  | ROHDE & SCHWARZ                  | SMP02             | 828269/008  | 09.08.2017         | 09.08.2020       |
| Signal Generator                  | ROHDE & SCHWARZ                  | SML01             | 100652      | 06.04.2018         | 06.04.2021       |
| Power Supply                      | Hewlett Packard - Agilent        | E3632A            | KR75303301  | 17.05.2018         | 17.05.2020       |
| Radio Communication Tester        | ROHDE & SCHWARZ                  | CMU 200           | 101138      | 22.05.2018         | 22.05.2020       |
| Field Analyzer                    | Wandel & Goltermann              | EMR20             | P-0030      | 23.11.2017         | 23.11.2020       |
| Antenna                           | ROHDE & SCHWARZ                  | HL025             | 359012/006  | -                  | -                |
| EMI Test Receiver                 | ROHDE & SCHWARZ                  | ESU26             | 100077      | 20.05.2019         | 20.05.2020       |
| Temp. / Humidity Logger           | Lufft                            | Opus 10           | 13262       | 21.01.2020         | 21.01.2023       |
| Antenna                           | ROHDE & SCHWARZ                  | HL562             | 100191      | 26.10.2018         | 26.10.2021       |
| Antenna                           | ROHDE & SCHWARZ                  | HK-116: 20-300MHz | 825177/0017 | 21.07.2017         | 21.07.2020       |
| Antenna                           | ROHDE & SCHWARZ                  | HK-116: 20-300MHz | 100401      | 21.07.2017         | 21.07.2020       |
| Antenna                           | ROHDE & SCHWARZ                  | HL223             | 832369/006  | 26.04.2019         | 26.04.2022       |
| Antenna                           | Schwarzbeck                      | UBA 9116          | 9116-396    | 28.07.2017         | 28.07.2020       |
| Antenna                           | Emco                             | 3115              | 9810-5588   | 24.04.2018         | 24.04.2021       |
| Antenna                           | Schwarzbeck                      | BBHA-9120-D       | 01617       | 09.04.2019         | 09.04.2022       |
| Antenna                           | ROHDE & SCHWARZ                  | HL223             | 100731      | 07.12.2018         | 07.12.2021       |
| H-Field Probe 100 cm <sup>2</sup> | Narda Safety Test Solutions GmbH | Probe             | M-0823      | 07.12.2017         | 07.12.2020       |
| H-field Probe 3cm <sup>2</sup>    | Narda Safety Test Solutions GmbH | 2300/90.20        | C-0150      | 23.04.2018         | 23.04.2021       |
| Antenna                           | Schwarzbeck Mess-Elektronik      | VAMP 9243         | 9243-486    | 23.05.2018         | 23.05.2021       |
| Exposure Level Tester             | Narda Safety Test Solutions GmbH | ELT-400           | N-0385      | 07.12.2017         | 07.12.2020       |
| Antenna                           | Emco                             | 3160-09           | 1232        | 07.08.2017         | 07.08.2020       |
| Isotropic Electric Field Probe    | Wandel & Goltermann              | Type 8            | M-0082      | 23.11.2017         | 23.11.2020       |
| Signal Generator                  | ROHDE & SCHWARZ                  | SMB100A           | 181275      | 08.07.2019         | 08.07.2020       |
| EMI Test Receiver                 | ROHDE & SCHWARZ                  | ESW44             | 101733      | 19.08.2019         | 19.08.2020       |
| Vector Signal Generator           | ROHDE & SCHWARZ                  | SMBV100A          | 263158      | 16.05.2019         | 16.05.2020       |
| Wideband Radio Comm. Tester       | ROHDE & SCHWARZ                  | CMW500            | 101674      | 22.05.2019         | 22.05.2020       |

## 6.2. Conducted Radio

| Equipment                  | Manufacturer              | Type             | Serial No. | Actual Calibration | Next Calibration |
|----------------------------|---------------------------|------------------|------------|--------------------|------------------|
| Signal Generator           | ROHDE & SCHWARZ           | SMP02            | 828269/008 | 09.08.2017         | 09.08.2020       |
| Signal Generator           | ROHDE & SCHWARZ           | SMB100A          | 181275     | 08.07.2019         | 08.07.2020       |
| Vector Signal Generator    | ROHDE & SCHWARZ           | SMBV100A         | 263158     | 16.05.2019         | 16.05.2020       |
| EMI Test Receiver          | ROHDE & SCHWARZ           | ESU26            | 100077     | 20.05.2019         | 20.05.2020       |
| Vector Signal Generator    | ROHDE & SCHWARZ           | SMJ100A          | 100845     | 16.05.2018         | 16.05.2020       |
| EMI Test Receiver          | ROHDE & SCHWARZ           | ESW44            | 101733     | 19.08.2019         | 19.08.2020       |
| Power Supply               | Hewlett Packard - Agilent | E3632A           | MY40011318 | 23.05.2018         | 23.05.2020       |
| Powermeter                 | ETS                       | EMPower 7002-006 | 7202040    | 18.01.2019         | 18.01.2022       |
| Climatic Chamber           | Vötsch                    | VT4002           | 521/85094  | 23.11.2018         | 23.11.2020       |
| Network Analyzer           | Hewlett Packard - Agilent | 8722ES           | US39175320 | 03.11.2017         | 03.08.2020       |
| BT-/W-Lan-Testsetup        | Hewlett Packard - Agilent | N4010A           | MY46320388 | 17.08.2017         | 17.08.2020       |
| Radio Communication Tester | ROHDE & SCHWARZ           | CMU 200          | 101138     | 22.05.2018         | 22.05.2020       |
| Wideband Radio Comm.Tester | ROHDE & SCHWARZ           | CMW500           | 101674     | 22.05.2019         | 22.05.2020       |

## End of Report