



# RF - TEST REPORT

- Jp ORRE 49.20 -

**Type / Model Name** : SONNET 3 EAS (market name), Me1720 (product code), OPUS 4++ (internal development name)

**Product Description** : Audio processor for cochlear implant including a 2.4 GHz transceiver with integral antenna

**Applicant** : MED-EL Elektromedizinische Geraete GmbH  
**Address** : Fuerstenweg 77a  
 6020 INNSBRUCK, AUSTRIA

**Manufacturer** : MED-EL Elektromedizinische Geraete GmbH  
**Address** : Fuerstenweg 77a  
 6020 INNSBRUCK, AUSTRIA

|                                                                                  |                 |
|----------------------------------------------------------------------------------|-----------------|
| <b>Test Result</b> according to the standards listed in clause 1 test standards: | <b>POSITIVE</b> |
|----------------------------------------------------------------------------------|-----------------|

|                                            |                                 |
|--------------------------------------------|---------------------------------|
| <b>Test Report No. :</b> 80282831-00 Rev_1 | 03. March 2026<br>Date of issue |
|--------------------------------------------|---------------------------------|



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ATTACHMENT A as separate supplement

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

# 1 TEST STANDARDS

The tests were performed according to following standards:

Radio Law

Chapter III, Radio Equipment, Article 28

Quality of Radio Waves

Chapter III, Radio Equipment, Article 29

Requirements for receiving equipment

Radio Law Enforcement Regulations Abstract

Latest revision

Ordinance concerning Technical Regulations Conformity Certification etc. of Specified Radio Equipment, Chapter 1, Article 2, Item 19

Ordinance Regulating Radio Equipment

Chapter IV, Section 4.17 Radio Equipment of Radio Stations of a Low-Power Data Communication System based on the provisions of Article 49-20, Items 1

Public notice no. 88

Table No.1

Measuring Method for Intensity of Spurious Emission or Extraneous Emission

Table No.43

Test Method for Radio Equipment specified in No.19, Clause 1, Item 2 of Regulations for Certification

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

## 2 EQUIPMENT UNDER TEST

### 2.1 Information provided by the Client

Please note, we do not take any responsibility for information provided by the client or his representative which may have an influence on the validity of the test results.

### 2.2 Sampling

The customer is responsible for the choice of sample. Sample configuration, start-up and operation is carried out by the customer or according to his/her instructions.

### 2.3 General remarks

None.

### 2.4 Photo documentation of the EUT – Detailed photos see attachment A

### 2.5 Equipment type

Bluetooth Low Energy (BLE) device

### 2.6 Short description of the equipment under test (EUT)

The EUT is an audio processor for a MED-EL cochlear implant including a 2.4 GHz transceiver with integral antenna.

Market names: SONNET 3 / SONNET 3 EAS

Product codes: Me1710, Me1711, Me1712, Me1713 / Me1720, Me1721, Me1722, Me1723\*.

The EUT is a medical device similar to a hearing aid. It is worn behind the ear, converts acoustic signals and drives an implanted MED-EL cochlear implant which – based on the information from the audio processor – directly stimulates the acoustic nerve in the inner ear to evoke auditory sensations.

The 2.4 GHz transceiver can receive commands or data from external devices (e.g., remote control, remote programmer, streaming device, etc.). Additionally, it can transmit responses to external devices (external devices are not part of this testing).

Number of tested samples: 1  
Serial number: 002596  
Firmware number: hci\_2dBm  
Type: Me1720  
Hardware variant: Me172

| Items            | Description            |
|------------------|------------------------|
| BT type          | 5.2 Low Energy         |
| BT chipset type  | onsemi RSL10           |
| Modulation       | GFSK                   |
| Frequency range  | 2400 MHz to 2483.5 MHz |
| Channel numbers  | 40                     |
| Data rate (Mbps) | 1, 2                   |
| Power setting    | Default (2 dBm)        |
| Antenna type     | PCB                    |

\*According to the customer the only difference between the devices with the product code Me172x (x = 0, 1, 2, or 3) and the devices with the product code Me171x is that the devices with the product code Me171x do not contain acoustic hearing aid functionality, i.e., do not contain an acoustic only output ("loudspeaker"). The devices with the product code Me172x are referred to as EAS (electric acoustic stimulation) devices.

The sub variants Me1710, Me1711, Me1712, and Me1713 do not differ in hardware and / or firmware, they just differ in product code. The same is true for the sub variants Me1720, Me1721, Me1722, and Me1723, i.e. they do not differ in hardware and / or firmware, they just differ in product code. These different sub variants are only introduced for marketing and sales purposes.

## 2.7 Operation frequency and channel plan

The operating frequency is 2400 MHz to 2483.5 MHz.

Channel plan:

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 37      | 2402            | 18      | 2442            |
| 0       | 2404            | 19      | 2444            |
| 1       | 2406            | 20      | 2446            |
| 2       | 2408            | 21      | 2448            |
| 3       | 2410            | 22      | 2450            |
| 4       | 2412            | 23      | 2452            |
| 5       | 2414            | 24      | 2454            |
| 6       | 2416            | 25      | 2456            |
| 7       | 2418            | 26      | 2458            |
| 8       | 2420            | 27      | 2460            |
| 9       | 2422            | 28      | 2462            |
| 10      | 2424            | 29      | 2464            |
| 38      | 2426            | 30      | 2466            |
| 11      | 2428            | 31      | 2468            |
| 12      | 2430            | 32      | 2470            |
| 13      | 2432            | 33      | 2472            |
| 14      | 2434            | 34      | 2474            |
| 15      | 2436            | 35      | 2476            |
| 16      | 2438            | 36      | 2478            |
| 17      | 2440            | 39      | 2480            |

Note: the marked frequencies are determined for final testing.

## 2.8 Transmit operating modes

The EUT use GFSK modulation and may provide the following data rates:

- 1000 kbps (kbps – kilobits per second)
- 2000 kbps

## 2.9 Antenna

The following antennas shall be used with the EUT:

| Number | Characteristic | Model number | Frequency range (GHz) | Gain (dBi) |
|--------|----------------|--------------|-----------------------|------------|
| 1      | Omni           | PCB antenna  | 2.4                   | -8         |

## 2.10 Power supply system utilised

Power supply voltage,  $V_{nom}$  : 2.2 V/DC (2x zinc-air batteries type 675)

Note: The EUT has an input voltage control and a supply voltage stabilisation on the BLE-module. This stabilisation is in sum better than 1 %. This is the reason why the EUT is measured with  $V_{nom}$ , only.

## 2.11 Peripheral devices and interface cables

The following peripheral devices and interface cables are connected during the measurements:

- Battery pack Model : SONNET battery pack
- - Model : -

## 2.12 Determination of worst-case conditions for final measurement

For the final test the following channels and test modes are selected:

| IEEE Standard | Available channel | Tested channels | Power setting | Modulation | Data rate |
|---------------|-------------------|-----------------|---------------|------------|-----------|
| 802.15.1      | 00 to 39          | 37, 17, 39      | Pdef          | GFSK       | 1000 kbps |
| 802.15.1      | 00 to 39          | 0, 17, 36       | Pdef          | GFSK       | 2000 kbps |

- TX continuous mode, 802.15.1
- RX continuous mode

### 2.12.1 Test jig

The conducted measurements are performed under the support of a test jig.

### 2.12.2 Test software

A special test software "DTM\_Windows\_Tool\_HCI" is used to set test channels and data rate. The output power cannot be changed, it is always at the default setting of nom. 2 dBm.

### 3 TEST RESULT SUMMARY

| ORRE<br>Article Reference                                                                                   | Report chapter | Test items                                  | Test Results                |
|-------------------------------------------------------------------------------------------------------------|----------------|---------------------------------------------|-----------------------------|
| <b>Chapter I General Provisions, Section 2 Quality of Emissions</b>                                         |                |                                             |                             |
| 5                                                                                                           | 5.1            | Frequency tolerance                         | passed                      |
| 6                                                                                                           | 5.2            | Occupied bandwidth                          | passed                      |
| 7                                                                                                           | 5.3            | Spurious emissions                          | passed                      |
| <b>Chapter I General Provisions, Section 5 Interference Prevention Function</b>                             |                |                                             |                             |
| 9.4 (11)                                                                                                    | 5.4            | Interference prevention function            | passed                      |
| <b>Chapter II Transmitting Equipment, Section 1 General</b>                                                 |                |                                             |                             |
| 14                                                                                                          | 5.6            | Antenna power tolerance                     | passed                      |
| <b>Chapter II Transmitting Equipment, Section 3 Transmitting Antenna</b>                                    |                |                                             |                             |
| 20                                                                                                          | -              | Type, configuration of transmitting antenna | not applicable              |
| <b>Chapter III – Receiving Equipment</b>                                                                    |                |                                             |                             |
| 24 (2)                                                                                                      | 5.9            | Limit on secondary radiated emissions       | passed                      |
| <b>Chapter IV – Section 4.17 Radio Equipment of Radio Stations of a Low-Power Data Communication System</b> |                |                                             |                             |
| 49.20                                                                                                       | 5.7            | High frequency section                      | passed                      |
| 49.20                                                                                                       | -              | Spread spectrum method                      | not applicable              |
| 49.20 1, (4)                                                                                                | 5.5            | Antenna power                               | passed                      |
| 49.20 2, (1)                                                                                                | 5.8            | Transmitting antenna, EIRP                  | passed                      |
| 49.20                                                                                                       | -              | Angular width of principal radiation        | not applicable <sup>1</sup> |
| 49.20                                                                                                       | -              | Number of carriers                          | not applicable <sup>2</sup> |
| 49.20                                                                                                       | -              | Frequency retention time (FH employed)      | not applicable <sup>3</sup> |
| 49.20                                                                                                       | -              | Carrier sense function                      | not applicable <sup>4</sup> |
|                                                                                                             | -              | Transmitting antenna assembly gain          | not applicable <sup>5</sup> |

#### Notes:

<sup>1</sup> Not applicable, because the EIRP is less than 12.14 dBm/MHz.

<sup>2</sup> Not applicable because the EUT does not use OFDM modulation.

<sup>3</sup> Not applicable, because the EUT is not an FHSS device.

<sup>4</sup> Not applicable because the occupied bandwidth is less than 26 MHz.

<sup>5</sup> Not applicable because the duty cycle is less than 1.

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

### 3.1 Final assessment

The equipment under test fulfils the requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 04 February 2026

Testing concluded on : 26 February 2026

Checked by:

 Klaus  
Gegenfurtner  
2026.03.03  
13:54:12 +01'00'

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Klaus Gegenfurtner  
Teamleader Radio

Tested by:

 Christopher  
Thaller  
2026.03.03  
13:38:20 +01'00'

---

Christopher Thaller  
Radio Team

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

## 4 TEST ENVIRONMENT

### 4.1 Address of the test laboratory

**CSA Group Bayern GmbH  
Straubinger Straße 100  
94447 PLATTLING  
GERMANY**

### 4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 5 - 35 ° C

Humidity: 45 - 85 %

Atmospheric pressure: 86 - 106 kPa

### 4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. It is noted that the expanded measurement uncertainty corresponds to the measurement results from the standard measurement uncertainty multiplied by the coverage factor  $k = 2$ . The true value is located in the corresponding interval with a probability of 95 %. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4-2 / 2011 + A1 / 2014 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, CSA Group Bayern GmbH, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

| Measurement uncertainty table             |                        |
|-------------------------------------------|------------------------|
| Measurement output power, conducted       | $\pm 1.5$ dB           |
| Measurement output power, radiated        | $\pm 3.0$ dB           |
| Measurement PSD, conducted                | $\pm 1.5$ dB           |
| Measurement PSD, radiated                 | $\pm 3.0$ dB           |
| Measurement spurious emissions, conducted | $\pm 3.0$ dB           |
| Measurement spurious emissions, radiated  | $\pm 6.0$ dB           |
| Measurement frequency                     | $\pm 1 \times 10^{-8}$ |

### 4.4 Conformity Decision Rule

The conformity decision rule is based on the ILAC G8 published at the time of reporting.

## 4.5 Measurement protocol

### 4.5.1 General information

#### 4.5.1.1 Test methodology

Conducted and radiated disturbance testing is performed according to the procedures of the Table No 43 as shown under section 1 of this test report.

#### 4.5.1.2 Justification

The equipment under test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into its characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum disturbances from the unit.

## 5 TEST CONDITIONS AND RESULTS

### 5.1 Frequency tolerance

For test instruments and accessories used see section 6 Part **MB**.

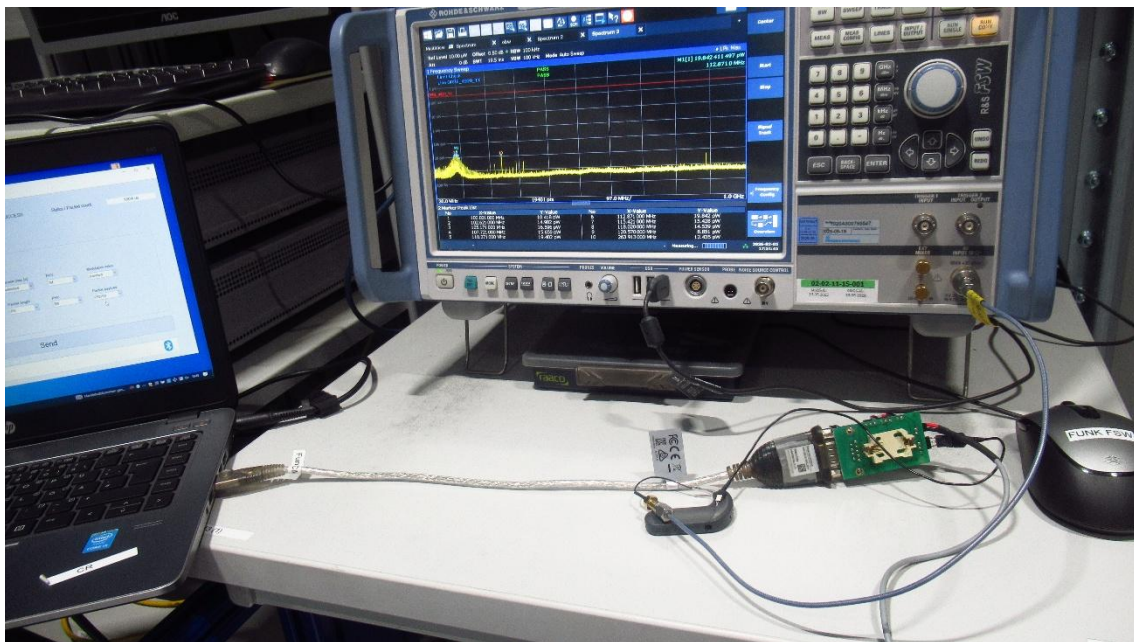
#### 5.1.1 Description of the test location

Test location:                Shielded Room SR6

#### 5.1.2 Environmental conditions

|             |         |
|-------------|---------|
| Temperature | 21.5 °C |
| Humidity    | 47 %    |

#### 5.1.3 Photo documentation of the test set-up



#### 5.1.4 Applicable standard

According to Ordinance Regulating Radio Equipment, Chapter I, Section 2, Article 5:  
The permissible deviation of the frequency of radio waves used for transmitting equipment shall be as specified in Attached Table 1 .

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

### 5.1.5 Description of Measurement

The EUT is operated in unmodulated mode. The transmitter output is connected to the spectrum analyser through an attenuator. The centre frequency of the spectrum analyser is set to the fundamental frequency.

Spectrum analyser settings:

1M

RBW: 30 kHz,

VBW: 100 kHz,

SPAN: 3 MHz

2M

RBW: 50 kHz,

VBW: 200 kHz,

SPAN: 5 MHz

### 5.1.6 Test result

NOTE: Due to the modulation the OBW is measured and the centre frequency calculated from the upper and lower marker set on the 0.5% band power.

| Test conditions                             |           | Frequency (MHz) |          |          |
|---------------------------------------------|-----------|-----------------|----------|----------|
| 1 M                                         |           | 2402            | 2440     | 2480     |
| $T_{nom}$                                   | $V_{nom}$ | 2401.999        | 2439.999 | 2479.999 |
| Determination of the limit in kHz, 50 ppm = |           | 120.100         | 122.000  | 124.000  |
| Maximum frequency drift in kHz, $f_e - f =$ |           | -0.957          | -1.160   | -1.045   |
| Maximum frequency drift in ppm              |           | -0.4            | -0.5     | -0.4     |

| Test conditions                             |           | Frequency (MHz) |          |          |
|---------------------------------------------|-----------|-----------------|----------|----------|
| 2 M                                         |           | 2404            | 2440     | 2478     |
| $T_{nom}$                                   | $V_{nom}$ | 2404.005        | 2440.005 | 2478.005 |
| Determination of the limit in kHz, 50 ppm = |           | 120.200         | 122.000  | 123.900  |
| Maximum frequency drift in kHz, $f_e - f =$ |           | 4.776           | 5.246    | 5.089    |
| Maximum frequency drift in ppm              |           | 2.0             | 2.2      | 2.1      |

Limit according to Ordinance Regulating Radio Equipment, Chapter I, Section 2, Article 5:

Table 1

| Frequency tolerance limit (ppm) |
|---------------------------------|
| $\pm 50$                        |

The requirements are **FULFILLED**.

**Remarks:** Due to the input voltage stabilisation of the RF-Module with an input voltage fluctuation of the circuit of less than 1 %, the measurement was done at the rated input voltage only.

## 5.2 Occupied bandwidth

For test instruments and accessories used see section 6 Part **MB**.

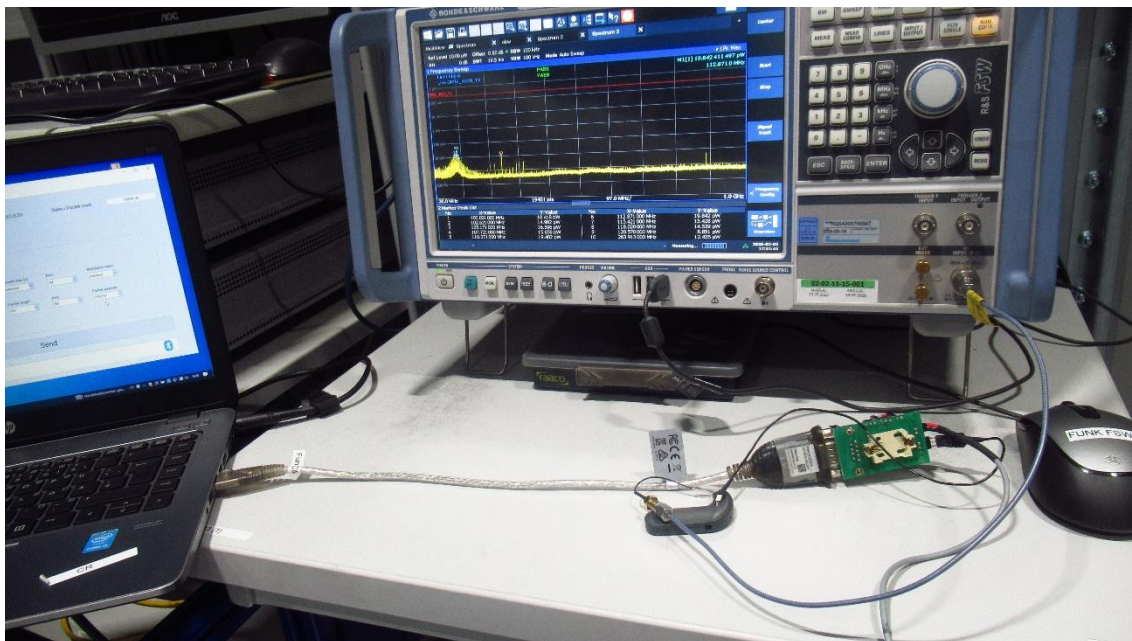
### 5.2.1 Description of the test location

Test location: Shielded Room SR6

### 5.2.2 Environmental conditions

Temperature 21.5 °C  
Humidity 47 %

### 5.2.3 Photo documentation of the test set-up



### 5.2.4 Applicable standard

According to Ordinance Regulating Radio Equipment, Chapter I, Section 2, Article 6:  
The value of the occupied frequency bandwidth permitted for radio waves emitted shall be as specified in Appendix 2.

### 5.2.5 Description of Measurement

The transmitter output is connected to the spectrum analyser through an attenuator. The centre frequency of the spectrum analyser was set to the fundamental frequency. To get the value of the occupied bandwidth the function “% Power Bandwidth” of the analyser is used. The channel power is the same as described in item 5.5.

Analyser settings:

1M:  
RBW: 30 kHz    VBW: 100 kHz    SPAN: 3 MHz    Detector: PK    Trace: max hold

2M:  
RBW: 50 kHz    VBW: 300 kHz    SPAN: 5 MHz    Detector: PK    Trace: max hold

## 5.2.6 Test result

| Channel | Centre frequency | 99% OBW, 1 M |           | OBW (MHz) | Limit (MHz) |
|---------|------------------|--------------|-----------|-----------|-------------|
|         |                  | f1 (MHz)     | f2 (MHz)  |           |             |
| CH37    | 2401.9990        | 2401.4674    | 2402.5306 | 1.0632    | ≤ 26        |
| CH17    | 2439.9988        | 2439.4673    | 2440.5304 | 1.0631    | ≤ 26        |
| CH39    | 2479.9990        | 2479.4673    | 2480.5306 | 1.0633    | ≤ 26        |

| Channel | Centre frequency (MHz) | 99% OBW, 2 M |           | OBW (MHz) | Limit (MHz) |
|---------|------------------------|--------------|-----------|-----------|-------------|
|         |                        | f1 (MHz)     | f2 (MHz)  |           |             |
| CH0     | 2404.0048              | 2402.9363    | 2405.0733 | 2.1370    | ≤ 26        |
| CH17    | 2440.0052              | 2438.9366    | 2441.0739 | 2.1372    | ≤ 26        |
| CH36    | 2478.0051              | 2476.9365    | 2479.0737 | 2.1372    | ≤ 26        |

Limit according to Ordinance Regulating Radio Equipment, Table 2, Item XXX.:

Notwithstanding the values prescribed in I to IV, the tolerance value for occupied bandwidth of the radio equipment of radio stations of low-power data-based communication systems shall be as follows:

- 1) Radio equipment that uses 2400 MHz to 2483.5 MHz and uses frequency hopping method, and a combination of the frequency hopping method and direct spread method 83.5 MHz
- 2) Radio equipment that uses OFDM method and other than those specified in (1) above 38 MHz
- 3) Radio equipment that uses methods other than those specified in (1) and (2) above 26 MHz

The requirements are **FULFILLED**.

**Remarks:** For detailed results, please see the test protocol below.

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

## 5.2.7 Test protocols OBW99

1 Mbps

CH37



CH17



CH39



## 2 Mbps

### CH0



### CH17



### CH36



### 5.3 Spurious emissions conducted

For test instruments and accessories used see section 6 Part **SEC 1-3**.

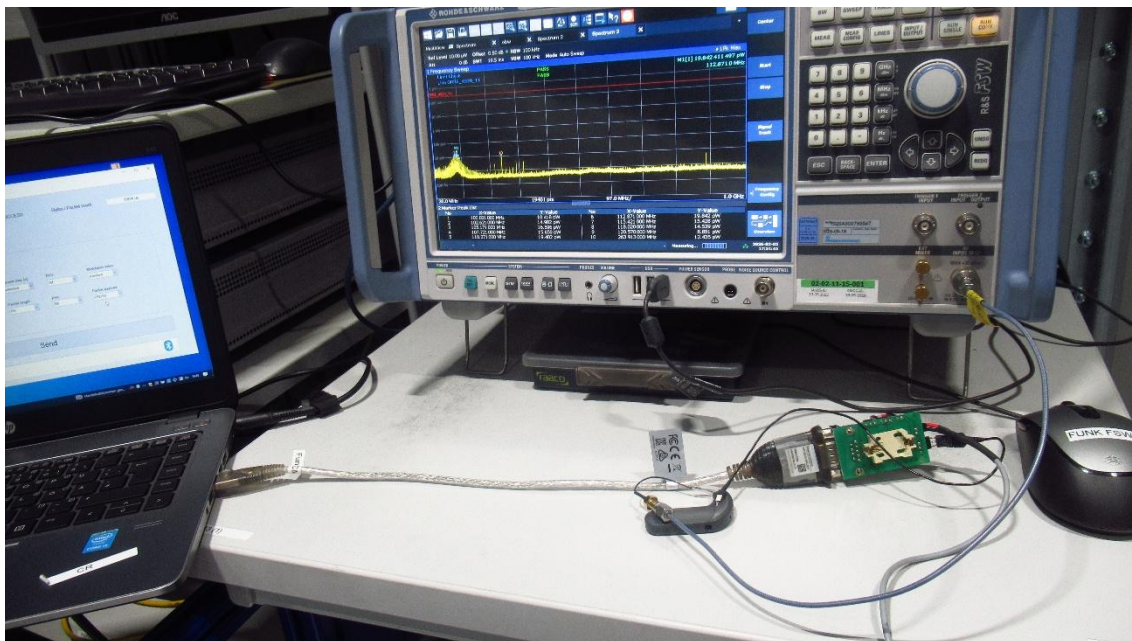
#### 5.3.1 Description of the test location

Test location:                Shielded Room SR6

#### 5.3.2 Environmental conditions

|             |         |
|-------------|---------|
| Temperature | 21.5 °C |
| Humidity    | 47 %    |

#### 5.3.3 Photo documentation of the test set-up



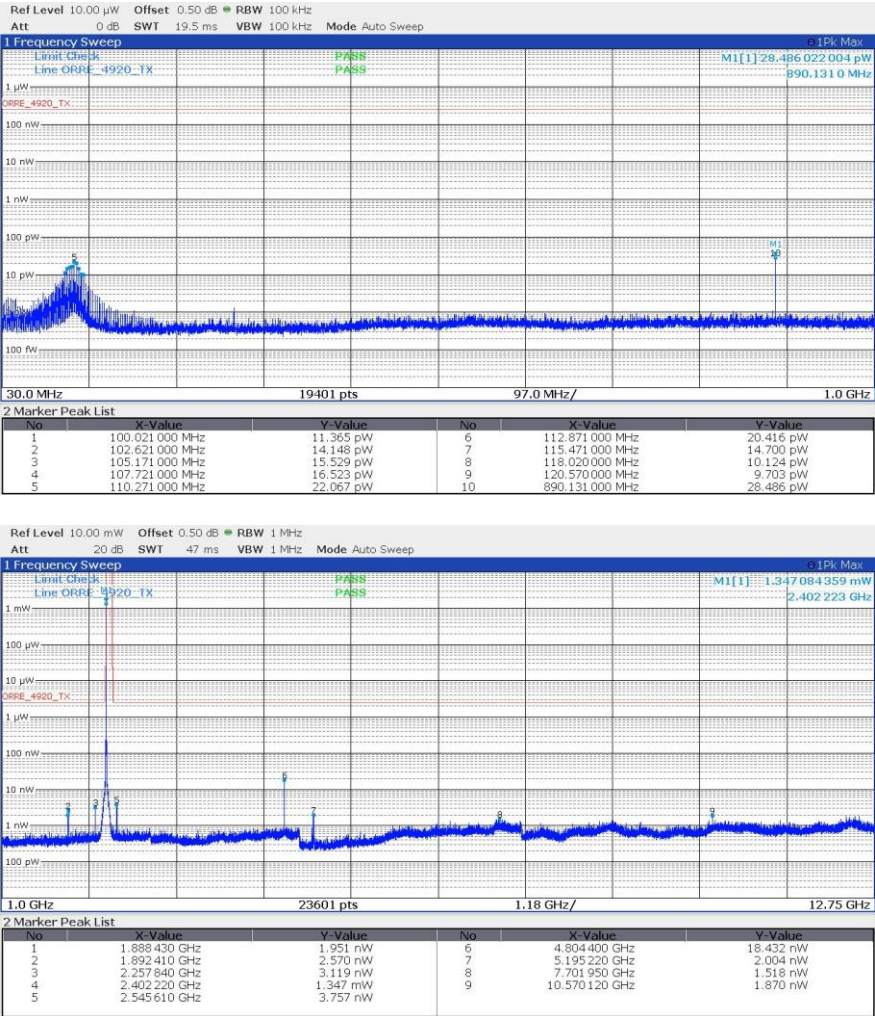
#### 5.3.4 Applicable standard

According to Ordinance Regulating Radio Equipment, Chapter I, Section 2, Article 7:  
The permissible value for the intensity of spurious or unwanted emissions shall be as stipulated in Table 3.

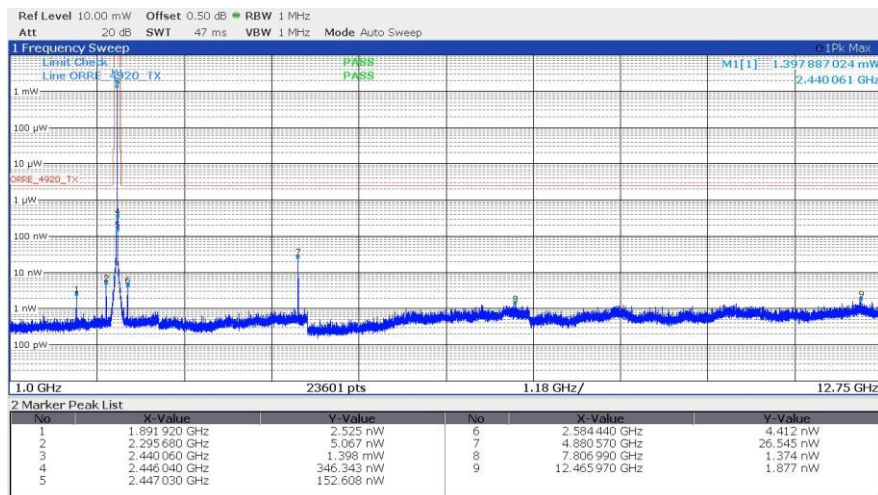
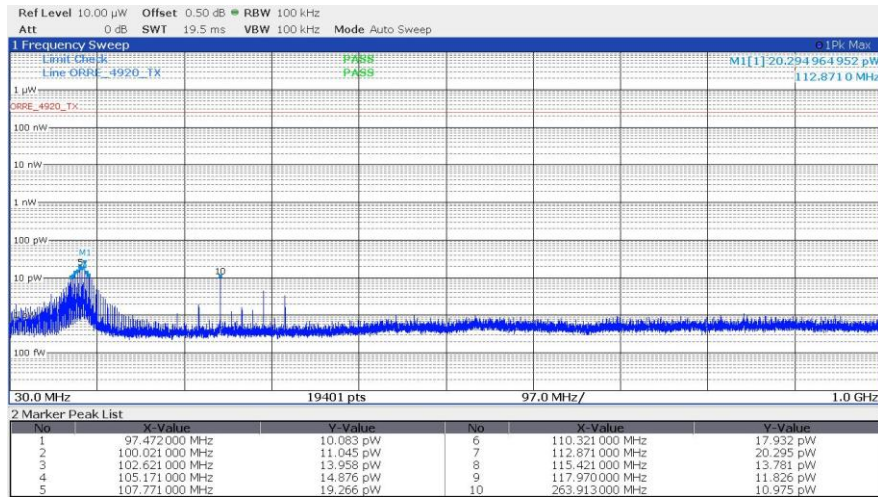
5.3.5 Test result

1 Mbps

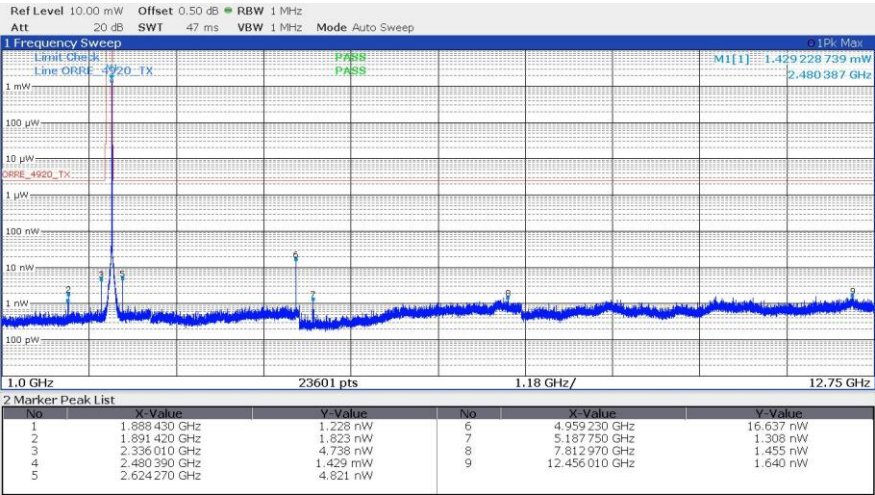
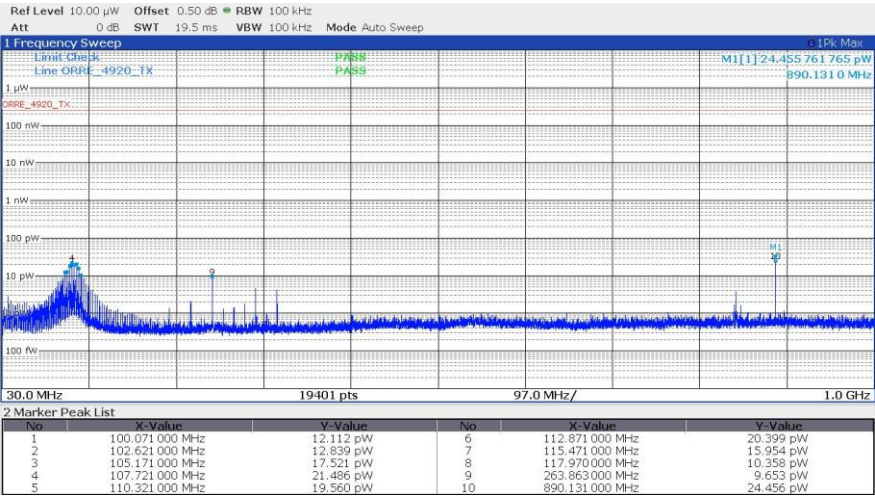
CH37



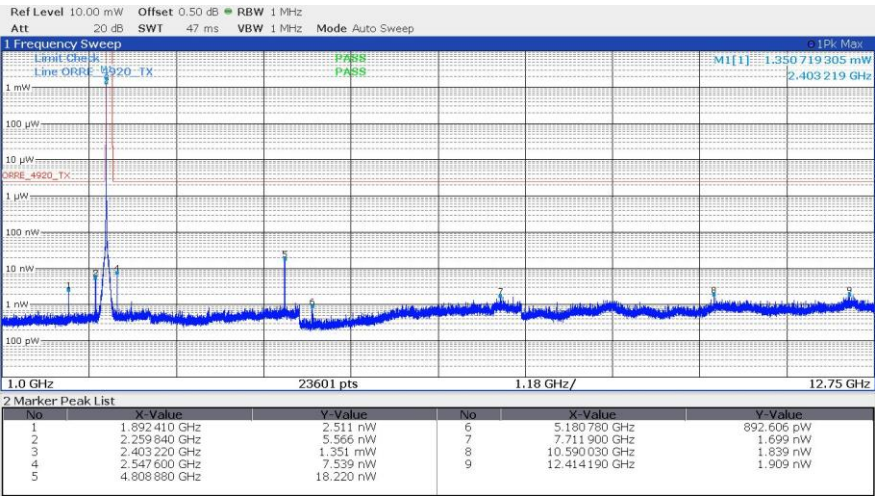
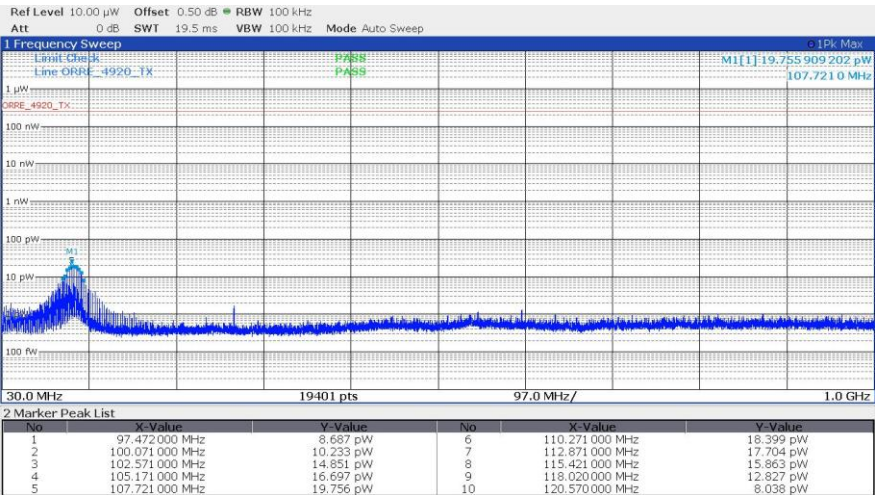
CH17



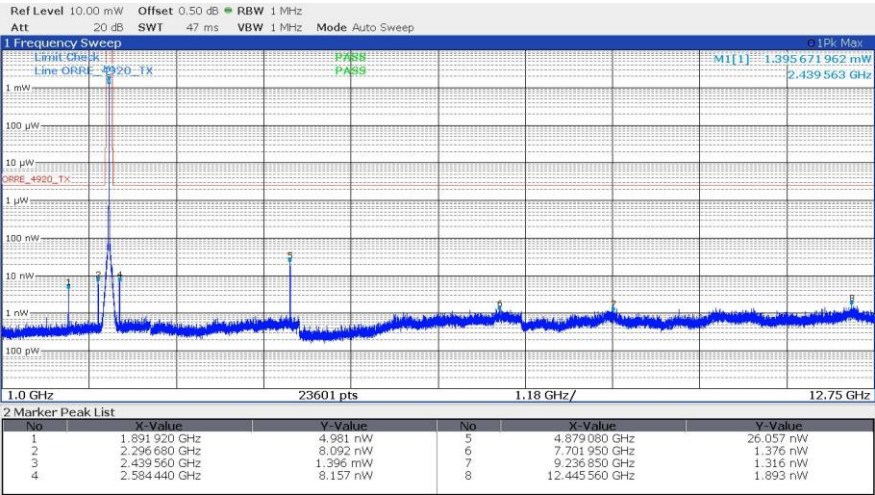
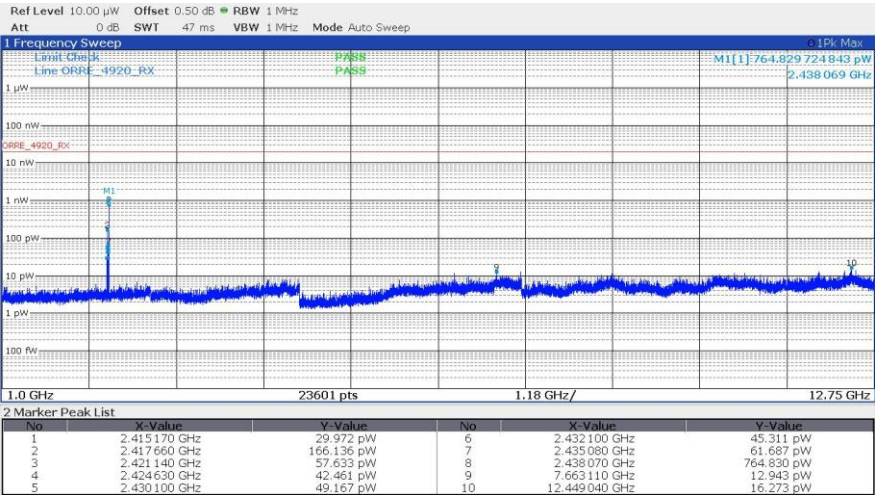
CH39



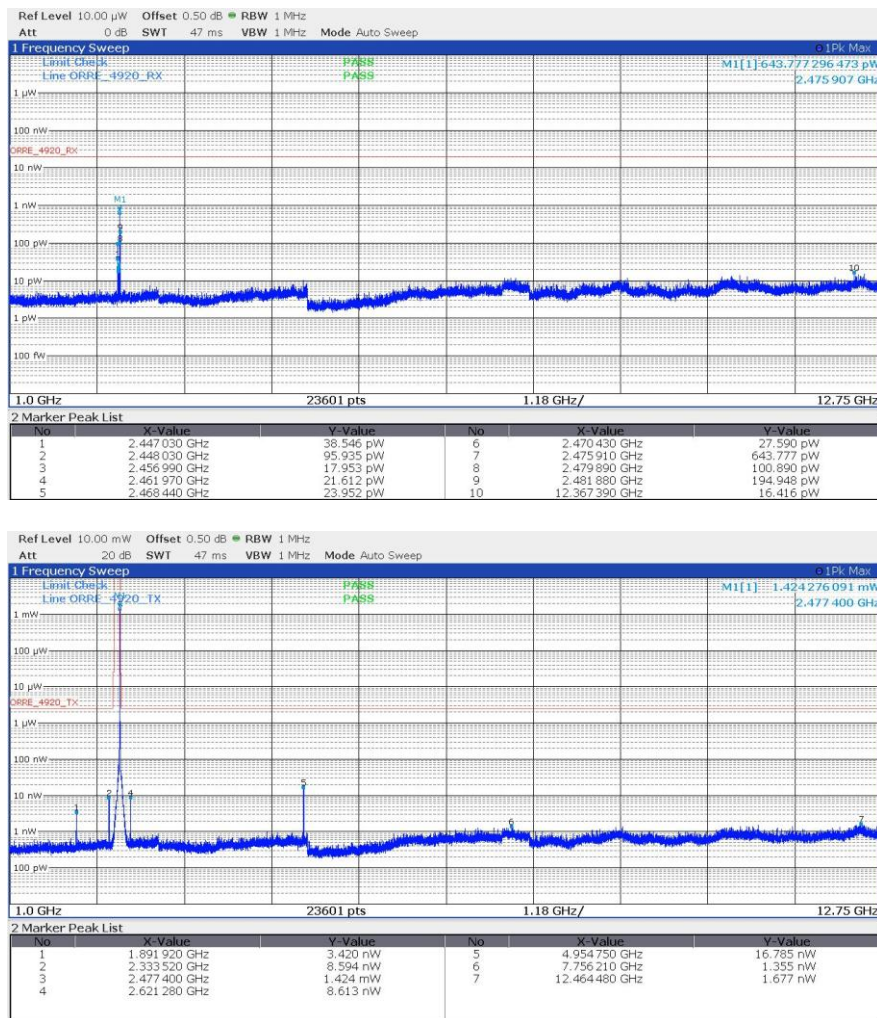
2 Mbps  
CH0



CH17



CH36



Limit according to Ordinance Regulating Radio Equipment, Chapter I, Section 2, Article 7:  
Table 3, Item 25

| Frequency range          | Limit        |
|--------------------------|--------------|
| 30 to 1000 MHz           | 0.25 $\mu$ W |
| 1000 to 2387 MHz         | 2.5 $\mu$ W  |
| 2387 MHz to 2400 MHz     | 25.0 $\mu$ W |
| 2483.5 MHz to 2496.5 MHz | 25.0 $\mu$ W |
| Higher than 2496.5 MHz   | 2.5 $\mu$ W  |

The requirements are **FULFILLED**.

Remarks:

-

## 5.4 Interference prevention function (identification code)

Requirement according to Ordinance Regulating Radio Equipment, Chapter I, Section 5, Article 9.4, 9c):  
The radio stations shall be equipped with the interference prevention function stated in Article 6-2, Item 3 of the Enforcement Regulations:  
Radio equipment of radio stations used in the same premises that automatically transmits or receives identification code.

The transmitted and received identification of the EUT is according to 802.15.1 using the 48-bit MAC address for identification.

**The identification process works “good”.**

Remarks:

-

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

## 5.5 Antenna power

For test instruments and accessories used see section 6 Part **CPC3**.

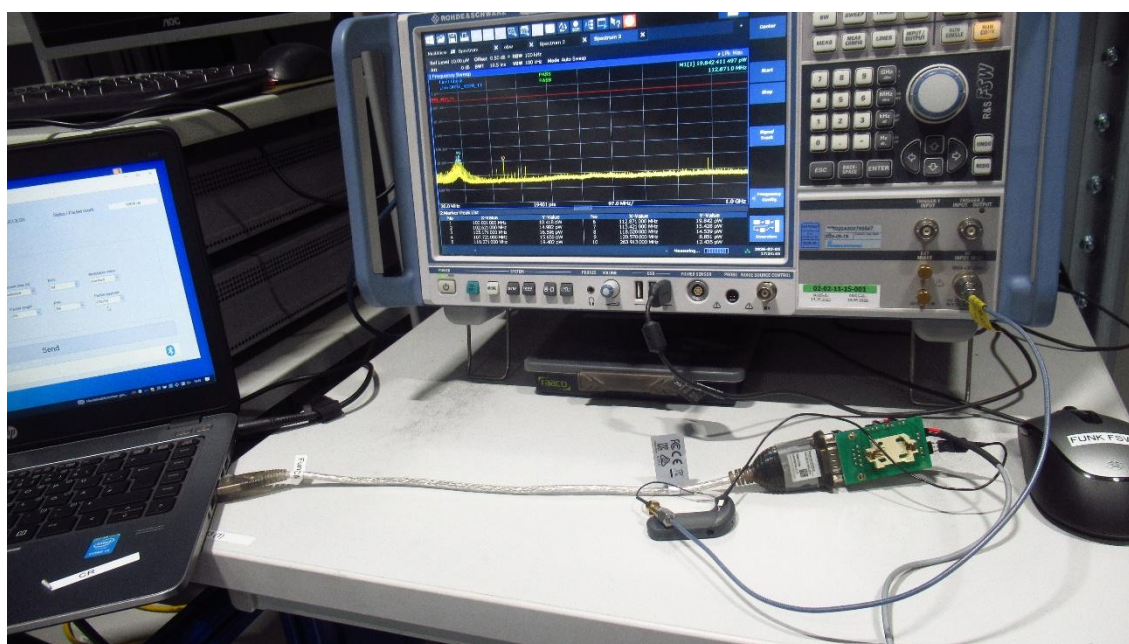
### 5.5.1 Description of the test location

Test location:                Shielded Room SR6

### 5.5.2 Environmental conditions

|             |         |
|-------------|---------|
| Temperature | 21.5 °C |
| Humidity    | 47 %    |

### 5.5.3 Photo documentation of the test set-up



### 5.5.4 Applicable standard

According to Ordinance Regulating Radio Equipment, Chapter IV, Section 4.17, Article 49.20, Item 1, (4):  
The aerial power of transmitting devices other than (1), (2), and (3) shall be 10 milliwatts or less.

### 5.5.5 Description of Measurement

A spectrum analyser is used for measurement with the settings below. With the marker function "max peak" the maximum amplitude is determined.

Analyser settings:

RBW: 1 MHz, VBW: 3 MHz, Detector: PK, Trace mode: Max hold, Span: 2 times OBW;

At found frequency the power measurement is done with following settings:

Analyser settings:

RBW: 1 MHz, VBW: 1 MHz, Detector: RMS, Trace mode: Clwr, Span: Zero;

### 5.5.6 Test result

| Test conditions: 1000 kbps |           | Measured antenna power (mW) |       |       |
|----------------------------|-----------|-----------------------------|-------|-------|
|                            |           | CH37                        | CH17  | CH39  |
| $T_{nom}$                  | $V_{nom}$ | 1.002                       | 1.062 | 1.059 |

Note: The measurement cable is taken into account with +0.5 dB

| Test conditions: 2000 kbps |           | Measured antenna power (mW) |       |       |
|----------------------------|-----------|-----------------------------|-------|-------|
|                            |           | CH0                         | CH17  | CH36  |
| $T_{nom}$                  | $V_{nom}$ | 0.611                       | 0.644 | 0.637 |

Note: The measurement cable is taken into account with +0.5 dB

Limit according to Ordinance Regulating Radio Equipment, Chapter IV, Section 4.17, Article 49.20, Item 1, (4):  
The aerial power of transmitting devices other than (1), (2), and (3) shall be 10 milliwatts or less.

|              | Limit                |
|--------------|----------------------|
| Aerial power | $\leq 10 \text{ mW}$ |

The requirements are **FULFILLED**.

**Remarks:** Due to the input voltage stabilisation of the RF-Module with an input voltage fluctuation of the circuit of less than 1 %, the measurement was done at the rated input voltage only.

## 5.6 Antenna power tolerance

### 5.6.1 Applicable standard

According to Ordinance Regulating Radio Equipment, Chapter II, Section 1, Article 14, Item 7(5):  
The tolerance for antenna power of the transmitter shall be as stipulated in the table below.

### 5.6.2 Calculation of the tolerance

|                                |                   |       |      |
|--------------------------------|-------------------|-------|------|
| Rated mean antenna power level | $P_R =$           | 1.60  | (mW) |
| Measured output power maximum  | $P_{max} =$       | 1.06  | (mW) |
| Maximum deviation +            | $P_{Max} - P_R =$ | -0.54 | (mW) |
| Maximum power tolerance +      |                   | 0.0   | %    |

Limit according to Ordinance Regulating Radio Equipment, Chapter II, Section 1, Article 14, Item 7(3):

The measured antenna power has to be up to +20 % of declared power

The requirements are **FULFILLED**.

**Remarks:** Due to the input voltage stabilisation of the RF-Module with an input voltage fluctuation of the circuit of less than 1 %, the measurement was done at the rated input voltage only.

## 5.7 High-frequency section

### 5.7.1 Applicable standard

According to Ordinance Regulating Radio Equipment, Chapter IV, Section 4.17, Article 49.20:  
The high frequency section and modulation section, excluding the antenna system, cannot be easily opened.

The RF and modulation section is built with SMD devices and have no devices, which are adjustable. A handle of the devices can only be done by special tools. This avoids manipulation.

The requirements are **FULFILLED**.

Remarks:

-

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

## 5.8 Transmitting antenna, EIRP

For test instruments and accessories used see section 6 Part **CPC 3**.

### 5.8.1 Description of the test location

Test location:                Shielded Room SR6

### 5.8.2 Environmental conditions

|             |         |
|-------------|---------|
| Temperature | 21.5 °C |
| Humidity    | 47 %    |

### 5.8.3 Applicable standard

According to Ordinance Regulating Radio Equipment, Chapter IV, Section 4.17, Article 49.20, Item 2, (1):  
The absolute gain of a transmitting antenna shall be 12.14 dB or less.

### 5.8.1 Calculation of the EIRP

Regarding the data sheet of the used antenna, the absolute gain is calculated using the following formula.  
$$P = A + G$$

Where:

P: Antenna power (EIRP)  
D: Antenna power (max measured power conducted)  
G: Antenna gain (dBi)

The measured output power of item 5.5 is calculated from linear to logarithmic values by applying the following formula:

$$A = 10\log(A(\text{lin}))$$

For example:

125k

$P_{ch37} = 10\log(2.82) = 4.5 \text{ dBm}$ ;

$P_{ch17} = 10\log(2.24) = 3.5 \text{ dBm}$ ;

$P_{ch39} = 10\log(1.93) = 2.9 \text{ dBm}$ ;

## 1 M

| Channel | Antenna     | Gain (dBi) | A (dBm) | P (dBm) | EIRP Limit (dBm) | Margin (dB) |
|---------|-------------|------------|---------|---------|------------------|-------------|
| CH37    | PCB antenna | -8.0       | 0.0     | -8.0    | 12.14            | -20.1       |
| CH17    | PCB antenna | -8.0       | 0.3     | -7.7    | 12.14            | -19.9       |
| CH39    | PCB antenna | -8.0       | 0.3     | -7.8    | 12.14            | -19.9       |

**2 M**

| Channel | Antenna     | effektive Gain<br>(dBi) | A (dBm) | P (dBm) | EIRP Limit<br>(dBm) | Margin<br>(dB) |
|---------|-------------|-------------------------|---------|---------|---------------------|----------------|
| CH0     | PCB antenna | -8.0                    | -2.1    | -10.1   | 12.14               | -22.3          |
| CH17    | PCB antenna | -8.0                    | -1.9    | -9.9    | 12.14               | -22.1          |
| CH36    | PCB antenna | -8.0                    | -2.0    | -10.0   | 12.14               | -22.1          |

Limit according to Certification Regulation, Chapter IV, Section 4.17, Article 49.20, Item 2:

Determination of the limit:

| Applicable Antenna | Max EIRP<br>(mW) | Rad. angle ant.<br>(°) | Calc. A | Resulting EIRP Limit<br>(dBm) |
|--------------------|------------------|------------------------|---------|-------------------------------|
| PCB antenna        | 16.37            | 360                    | 1.0     | 12.14                         |

The requirements are **FULFILLED**.

Remarks:

-

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

## 5.9 Limit on secondary radiated emissions

For test instruments and accessories used see section 6 Part **SEC1-3**.

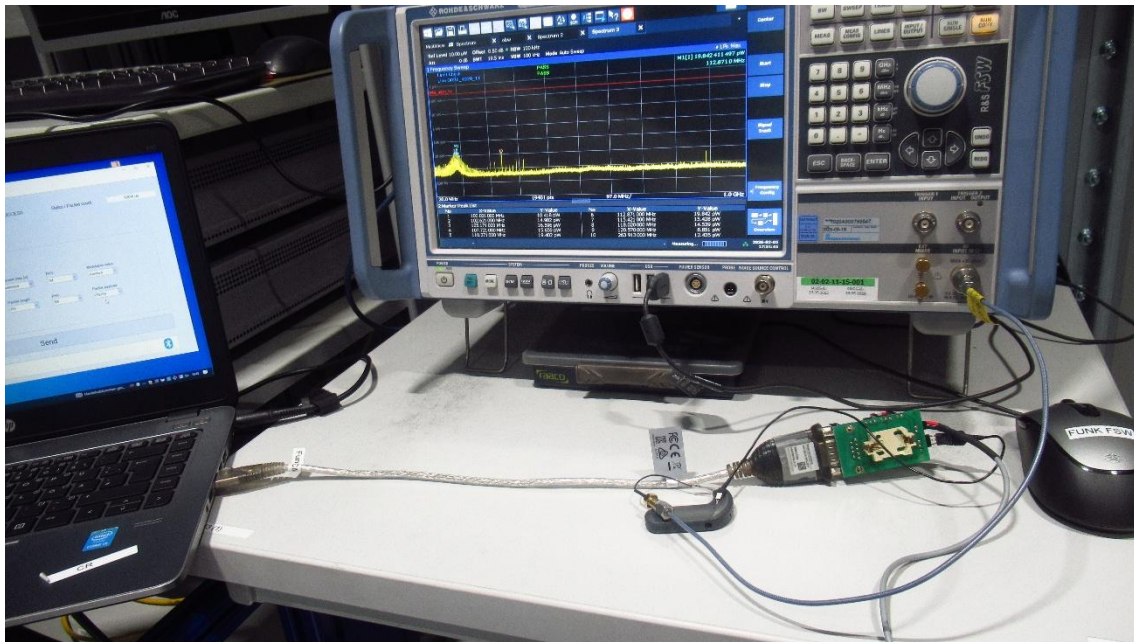
### 5.9.1 Description of the test location

Test location: Shielded Room SR6

### 5.9.2 Environmental conditions

Temperature 21.5 °C  
Humidity 47 %

### 5.9.3 Photo documentation of the test set-up



### 5.9.4 Applicable standard

According to Ordinance Regulating Radio Equipment, Chapter III, Article 24, Item 2:  
The limit on secondary emissions radiated from the receiving equipment shall be as stipulated in the Table below.

### 5.9.5 Description of Measurement

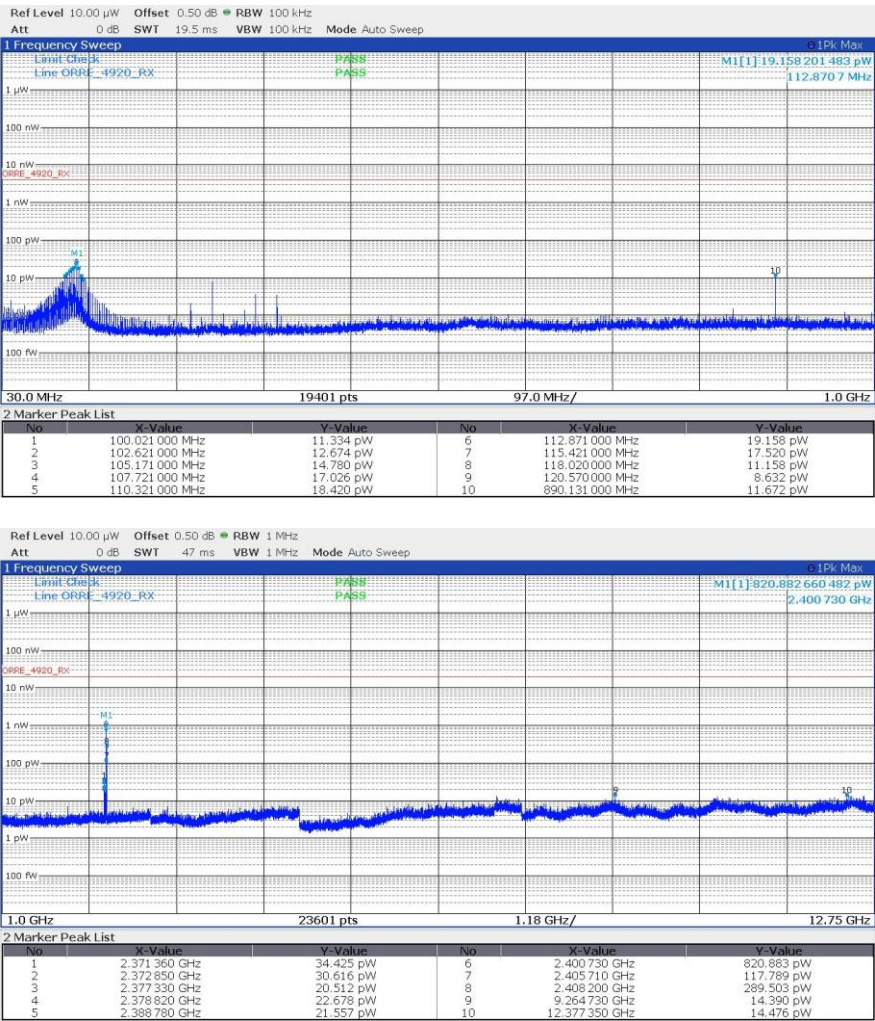
A Spectrum analyser is connected to the output of the transmitter while the EUT was in continuous receive mode at the assigned frequency.

Analyser Settings:

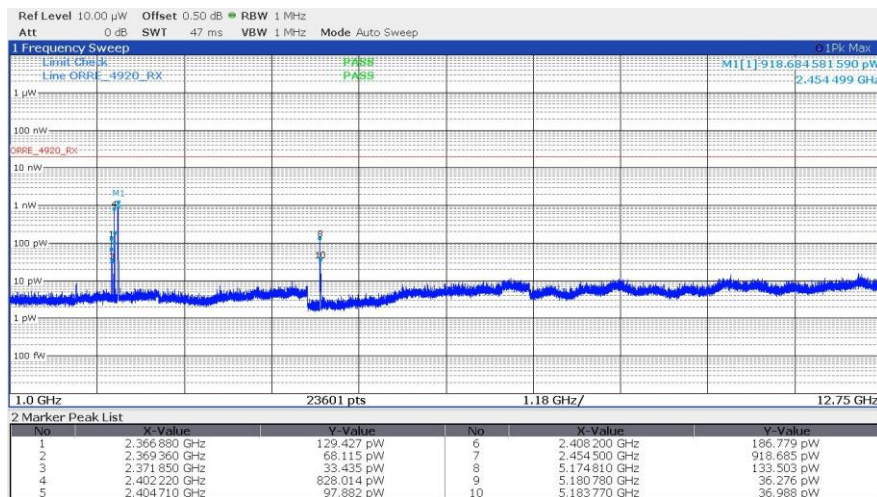
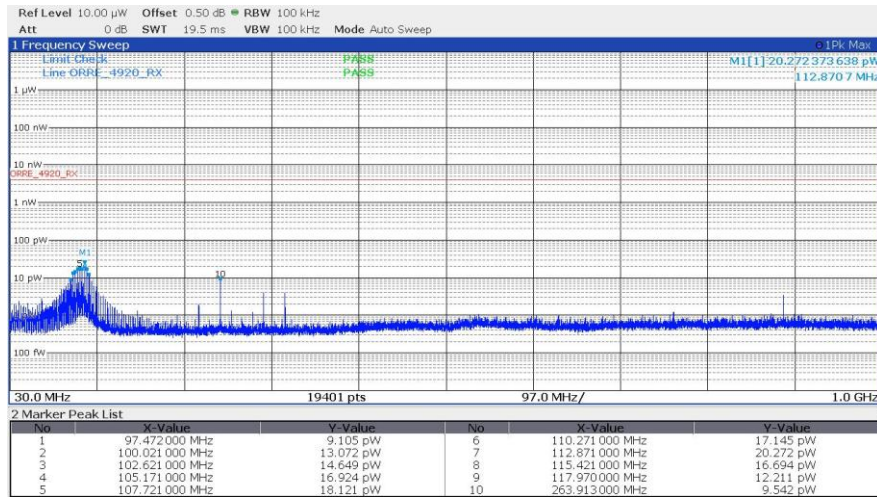
|                     |                      |                    |
|---------------------|----------------------|--------------------|
| $f < 1 \text{ GHz}$ | RBW = VBW = 100 kHz, | Detector: Max peak |
| $f > 1 \text{ GHz}$ | RBW = VBW = 1 MHz,   | Detector: Max peak |

5.9.6 Test result

1M



2M



Limit according to Ordinance Regulating Radio Equipment, Chapter III, Article 24, Item 2:

| Frequency         | Limit |
|-------------------|-------|
| Lower than 1 GHz  | 4 nW  |
| Higher than 1 GHz | 20 nW |

The requirements are **FULFILLED**.

Remarks:

-

## 6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

### 6.1 Full name of calibration companies

- Rohde & Schwarz GmbH & Co. KG

### 6.2 Calibration information

The calibrations are conducted in foreign countries, which is equivalent to calibration conducted by the NICT or a designated calibration agency under Article 102-18-1 of the Radio Act.

### 6.3 Test systems

| Test ID | Model Type | Kind of equipment | Equipment No.   | Next Calib. | Last Calib. | Calibrated by company |
|---------|------------|-------------------|-----------------|-------------|-------------|-----------------------|
| CPC 3   | FSW43      | Spectrum analyzer | 02-02/11-15-001 | 19/05/2026  | 19/05/2025  | Rohde&Schwarz         |
| MB      | FSW43      | Spectrum analyzer | 02-02/11-15-001 | 19/05/2026  | 19/05/2025  | Rohde&Schwarz         |
| SEC 1-3 | FSW43      | Spectrum analyzer | 02-02/11-15-001 | 19/05/2026  | 19/05/2025  | Rohde&Schwarz         |