

## TEST REPORT

Test report no.: 1-8780/19-01-02-A

### Testing laboratory

**CTC advanced GmbH**

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**Accredited Testing Laboratory:**

The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)

The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate starting with the registration number: D-PL-12076-01.

### Applicant

**Sennheiser electronic GmbH & Co. KG**

Am Labor 1

30900 Wedemark / GERMANY

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### Manufacturer

**Sennheiser electronic GmbH & Co. KG**

Am Labor 1

30900 Wedemark / GERMANY

### Test standard/s

FCC - Title 47 CFR  
Part 74

FCC - Title 47 of the Code of Federal Regulations; Chapter I; Part 74 - Experimental radio, auxiliary, special broadcast and other program distributional services

RSS - 210 Issue 9

Spectrum Management and Telecommunications Radio Standards Specification - Licence-Exempt Radio Apparatus: Category I Equipment

RSS - Gen Issue 5

Spectrum Management and Telecommunications Radio Standards Specification - General Requirements for Compliance of Radio Apparatus

For further applied test standards please refer to section 3 of this test report.

### Test Item

**Kind of test item:** Wireless Microphone

**Model name:** SKM 9000 / SKM 6000

**FCC ID:** DMOSKM9000

**IC:** 2099A-SKM9000

Frequency: 470.200 MHz – 607.800 MHz

Technology tested: Digital Audio Transmission

Antenna: Integrated antenna

Power supply: 2.65 V to 3.45 V DC by 2x AA batteries

Temperature range: -30°C to +50°C



This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

### Test report authorized:



Marco Bertolino  
Lab Manager  
Radio Communications & EMC

### Test performed:



Tobias Wittenmeier  
Testing Manager  
Radio Communications & EMC

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## 2 General information

### 2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CTC advanced GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

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This test report replaces the test report with the number 1-8780/19-01-02 and dated 2019-12-10

### 2.2 Application details

|                                    |            |
|------------------------------------|------------|
| Date of receipt of order:          | 2019-10-17 |
| Date of receipt of test item:      | 2019-11-29 |
| Start of test:                     | 2019-12-02 |
| End of test:                       | 2019-12-03 |
| Person(s) present during the test: | -/-        |

### 2.3 Test laboratories sub-contracted

None

### 3 Test standard/s, references and accreditations

| Test standard              | Date        | Description                                                                                                                                                        |
|----------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FCC - Title 47 CFR Part 74 |             | FCC - Title 47 of the Code of Federal Regulations; Chapter I; Part 74 - Experimental radio, auxiliary, special broadcast and other program distributional services |
| RSS - 210 Issue 9          | August 2016 | Spectrum Management and Telecommunications Radio Standards Specification - Licence-Exempt Radio Apparatus: Category I Equipment                                    |
| RSS - Gen Issue 5          | April 2018  | Spectrum Management and Telecommunications Radio Standards Specification<br>- General Requirements for Compliance of Radio Apparatus                               |

| Guidance                 | Version | Description                                                                                                                                                                |
|--------------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANSI C63.4-2014          | -/-     | American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz        |
| ANSI C63.10-2013         | -/-     | American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices<br>Wireless Microphones; Audio PMSE up to 3 GHz; Part 1: Class A Receivers; |
| ETSI EN 300 422-1 V1.4.2 | 2011-08 | Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU                                                                             |

| Accreditation    | Description                                                                                                                                               |                                                                                                                                                                                                                                      |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D-PL-12076-01-04 | Telecommunication and EMC Canada<br><a href="https://www.dakks.de/as/ast/d/D-PL-12076-01-04.pdf">https://www.dakks.de/as/ast/d/D-PL-12076-01-04.pdf</a>   |  <br>Deutsche<br>Akkreditierungsstelle<br>D-PL-12076-01-04 |
| D-PL-12076-01-05 | Telecommunication FCC requirements<br><a href="https://www.dakks.de/as/ast/d/D-PL-12076-01-05.pdf">https://www.dakks.de/as/ast/d/D-PL-12076-01-05.pdf</a> |  <br>Deutsche<br>Akkreditierungsstelle<br>D-PL-12076-01-05 |

## 4 Test environment

|                           |   |                                     |                                                                                                                                                              |
|---------------------------|---|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature               | : | $T_{nom}$<br>$T_{max}$<br>$T_{min}$ | +22 °C during room temperature tests<br>No tests under extreme temperature conditions performed.<br>No tests under extreme temperature conditions performed. |
| Relative humidity content | : |                                     | 55 %                                                                                                                                                         |
| Barometric pressure       | : |                                     | 1021 hpa                                                                                                                                                     |
| Power supply              | : | $V_{nom}$<br>$V_{max}$<br>$V_{min}$ | 3.0 V DC by 2x AA batteries<br>No tests under extreme temperature conditions performed.<br>No tests under extreme temperature conditions performed.          |

## 5 Test item

### 5.1 General description

|                            |   |                                                                                                                                          |
|----------------------------|---|------------------------------------------------------------------------------------------------------------------------------------------|
| Kind of test item          | : | Wireless Microphone                                                                                                                      |
| Model name                 | : | SKM 9000 / SKM 6000                                                                                                                      |
| HMN                        | : | -/-                                                                                                                                      |
| PMN                        | : | SKM 9000 / SKM 6000                                                                                                                      |
| HVIN                       | : | SKM 9000 / SKM 6000                                                                                                                      |
| FVIN                       | : | 1.1.48                                                                                                                                   |
| S/N serial number          | : | No information available                                                                                                                 |
| Hardware status            | : | 572022                                                                                                                                   |
| Software status            | : | N/A                                                                                                                                      |
| Firmware status            | : | 1.1.48                                                                                                                                   |
| Frequency band             | : | 470.200 MHz – 607.800 MHz<br>Frequency range:<br>A1 - A4: 470.2 MHz, 514.0 MHz, 558.0 MHz<br>A5 - A8 US: 550.0 MHz, 579.0 MHz, 607.8 MHz |
| Type of radio transmission | : | Modulated carrier                                                                                                                        |
| Use of frequency spectrum  | : |                                                                                                                                          |
| Type of modulation         | : | Pi/4 DQPSK                                                                                                                               |
| Number of channels         | : | A1-A4: 420<br>A5-A8: 290                                                                                                                 |
| Antenna                    | : | Integrated antenna                                                                                                                       |
| Power supply               | : | 2.65 V to 3.45 V DC by 2x AA batteries                                                                                                   |
| Temperature range          | : | -30°C to +50°C                                                                                                                           |

### 5.2 Additional information

The content of the following annexes is defined in the QA. It may be that not all of the listed annexes are necessary for this report, thus some values in between may be missing.

Test setup and EUT photos are included in test report:

- 1-8780\_19-01-01\_AnnexA
- 1-8780\_19-01-01\_AnnexB
- 1-8780\_19-01-01\_AnnexC

## 6 Description of the test setup

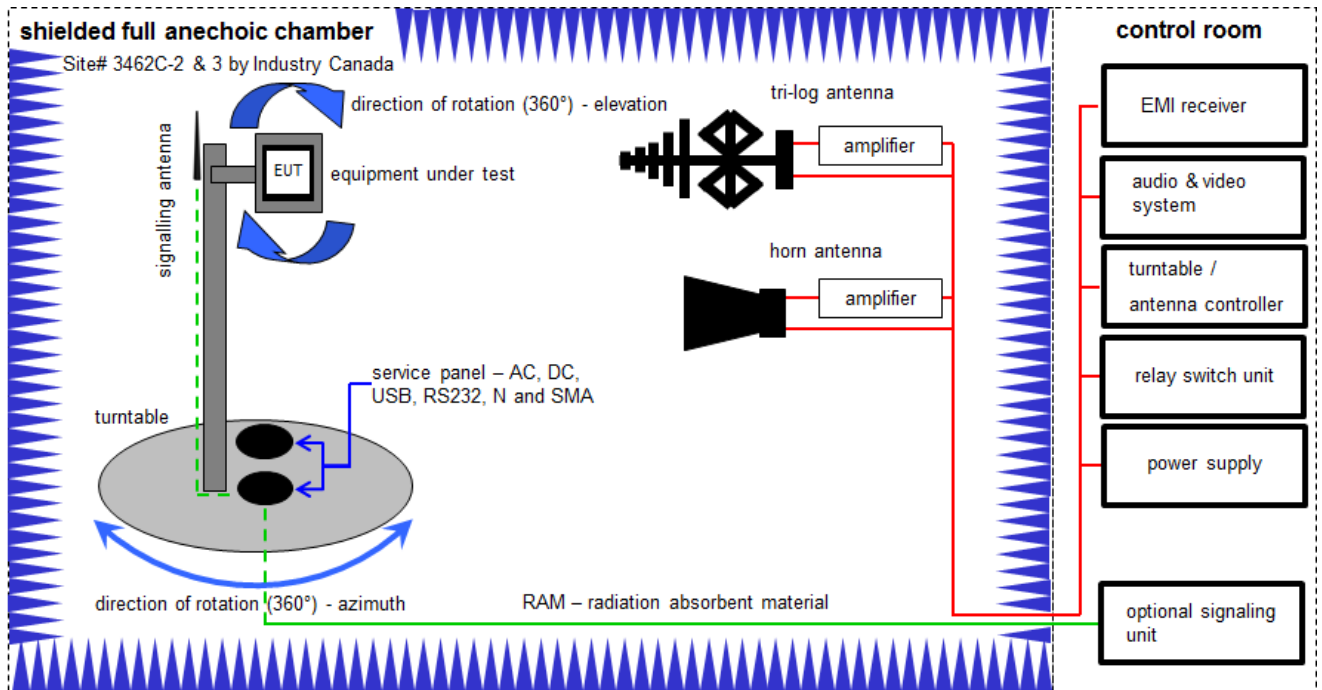
Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, RF generating and signaling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

### **Agenda:** Kind of Calibration

|      |                                            |     |                                                      |
|------|--------------------------------------------|-----|------------------------------------------------------|
| k    | calibration / calibrated                   | EK  | limited calibration                                  |
| ne   | not required (k, ev, izw, zw not required) | zw  | cyclical maintenance (external cyclical maintenance) |
| ev   | periodic self verification                 | izw | internal cyclical maintenance                        |
| Ve   | long-term stability recognized             | g   | blocked for accredited testing                       |
| vlk! | Attention: extended calibration interval   |     |                                                      |
| NK!  | Attention: not calibrated                  | *)  | next calibration ordered / currently in progress     |

## 6.1 Shielded fully anechoic chamber



Measurement distance: tri-log antenna and horn antenna 3 meter

$$OP = AV + D - G + CA$$

(OP-radiated output power; AV-analyzer value; D-free field attenuation of measurement distance; G-antenna gain+amplifier gain; CA-loss signal path)

### Example calculation:

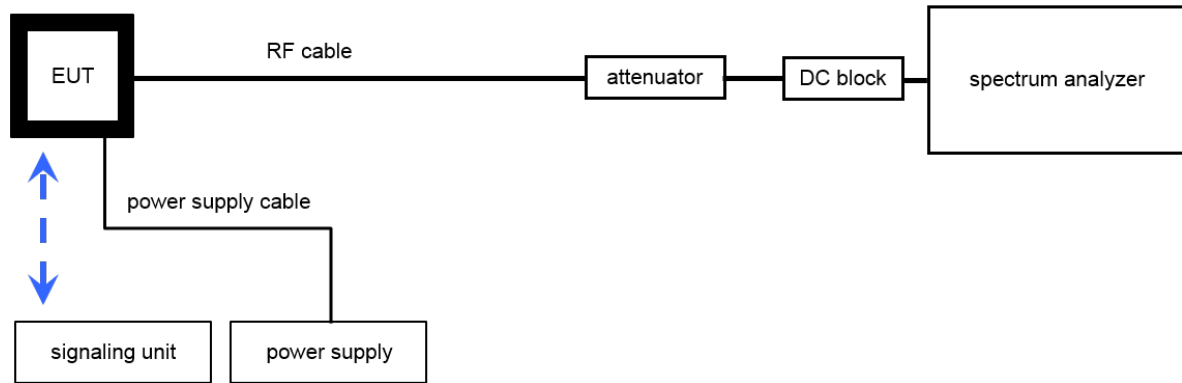
$$OP \text{ [dBm]} = -65.0 \text{ [dBm]} + 50 \text{ [dB]} - 20 \text{ [dBi]} + 5 \text{ [dB]} = -30 \text{ [dBm]} \text{ (1 } \mu\text{W)}$$

### Equipment table:

| No. | Lab / Item | Equipment                                      | Type              | Manufacturer                  | Serial No. | INV. No.  | Kind of Calibration | Last Calibration | Next Calibration |
|-----|------------|------------------------------------------------|-------------------|-------------------------------|------------|-----------|---------------------|------------------|------------------|
| 1   | A,B        | Anechoic chamber                               | FAC 3/5m          | MWB / TDK                     | 87400/02   | 300000996 | ev                  | -/-              | -/-              |
| 2   | B          | Double-Ridged Waveguide Horn Antenna 1-18.0GHz | 3115              | EMCO                          | 9107-3697  | 300001605 | vKI!                | 27.02.2019       | 26.02.2021       |
| 3   | A,B        | Switch / Control Unit                          | 3488A             | HP                            | *          | 300000199 | ne                  | -/-              | -/-              |
| 4   | A,B        | EMI Test Receiver 20Hz- 26,5GHz                | ESU26             | R&S                           | 100037     | 300003555 | k                   | 14.09.2018       | 13.12.2019       |
| 5   | B          | Highpass Filter                                | WHK1.1/15G-10SS   | Wainwright                    | 3          | 300003255 | ev                  | -/-              | -/-              |
| 6   | A          | TRILOG Broadband Test-Antenna 30 MHz - 3 GHz   | VULB9163          | Schwarzbeck Mess - Elektronik | 295        | 300003787 | vKI!                | 19.02.2019       | 18.02.2021       |
| 7   | B          | Broadband Amplifier 0.5-18 GHz                 | CBLU5184540       | CERNEX                        | 22049      | 300004481 | ev                  | -/-              | -/-              |
| 8   | A,B        | 4U RF Switch Platform                          | L4491A            | Agilent Technologies          | MY50000037 | 300004509 | ne                  | -/-              | -/-              |
| 9   | A,B        | NEXIO EMV-Software                             | BAT EMC V3.19.1.9 | EMCO                          |            | 300004682 | ne                  | -/-              | -/-              |
| 10  | A,B        | PC                                             | ExOne             | F+W                           |            | 300004703 | ne                  | -/-              | -/-              |

## 6.2 Conducted measurements

### Conducted measurements normal conditions



OP = AV + CA  
 (OP-output power; AV-analyzer value; CA-loss signal path)

#### Example calculation:

OP [dBm] = 6.0 [dBm] + 11.7 [dB] = 17.7 [dBm] (58.88 mW)

#### Equipment table:

| No. | Lab / Item | Equipment                                   | Type   | Manufacturer         | Serial No. | INV. No.  | Kind of Calibration | Last Calibration | Next Calibration |
|-----|------------|---------------------------------------------|--------|----------------------|------------|-----------|---------------------|------------------|------------------|
| 1   | A          | Power Supply                                | 2X30V  | Zentro               | 870008     | 300000830 | NK!                 | -/-              | -/-              |
| 2   | A          | Arbitrary Function Generator                | 33220A | Agilent Technologies | MY44051717 | 300004164 | vKI!                | 11.12.2017       | 10.12.2019       |
| 3   | A          | Signal- and Spectrum Analyzer 2 Hz - 26 GHz | FSW26  | R&S                  | 101455     | 300004528 | k                   | 19.12.2018       | 18.12.2019       |
| 4   | A          | RF Cable BNC                                | RG58   | Huber & Suhner       |            | 400001209 | ev                  | -/-              | -/-              |

## 7 Measurement uncertainty

| Measurement uncertainty                                  |                                                    |
|----------------------------------------------------------|----------------------------------------------------|
| Test case                                                | Uncertainty                                        |
| Transmitter output power                                 | $\pm 3$ dB                                         |
| Occupied bandwidth                                       | $\pm 3$ kHz to 10 kHz<br>(depends on the used RBW) |
| Transmitter frequency stability                          | $\pm 1$ Hz to 1 kHz<br>(depends on the used RBW)   |
| Transmitter unwanted emissions (radiated or conducted)   | Radiated: $\pm 3$ dB<br>Conducted: $\pm 0.5$ dB    |
| Modulation characteristics                               | -/-                                                |
| Necessary bandwidth (BN) for analogue systems            | $\pm 1$ kHz<br>(depends on the used RBW)           |
| Frequency modulation                                     | $\pm 3$ kHz<br>(depends on the used RBW)           |
| Spurious emissions conducted below 30 MHz (AC conducted) | $\pm 2.6$ dB                                       |

## 8 Summary of measurement results

|                                     |                                                                                                                          |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | No deviations from the technical specifications were ascertained                                                         |
| <input type="checkbox"/>            | There were deviations from the technical specifications ascertained                                                      |
| <input checked="" type="checkbox"/> | This test report is only a partial test report.<br>The content and verdict of the performed test cases are listed below. |

| TC Identifier | Description                                          | Verdict    | Date       | Remark |
|---------------|------------------------------------------------------|------------|------------|--------|
| RF-Testing    | FCC Part 74<br>RSS - 210, Issue 9<br>RSS-Gen Issue 5 | See table! | 2019-12-12 | -/-    |

| Test specification clause                                                                                    | Test case                                              | Temperature conditions | Voltage conditions | C                                   | NC                       | NA                                  | NP                                  | Remark                  |
|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|------------------------|--------------------|-------------------------------------|--------------------------|-------------------------------------|-------------------------------------|-------------------------|
| FCC Part 74.861 (e)(1)(ii)<br>FCC Part 2.1046)<br>RSS-210 – G.3.1<br>RSS-Gen – Issue 5                       | Transmitter output power                               | Nominal                | Nominal            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | -/-                     |
| FCC Part 74.861 (e)(5)<br>FCC Part 2.1049<br>RSS-210 – G.3.2<br>RSS-Gen – Issue 5                            | Occupied bandwidth                                     | Nominal                | Nominal            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | -/-                     |
| FCC Part 74.861 (e)(4)<br>FCC Part 2.1055<br>RSS-210 – G.3.3<br>RSS-Gen – Issue 5                            | Transmitter frequency stability                        | Nominal                | Nominal            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | -/-                     |
|                                                                                                              |                                                        | Extreme                | Extreme            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |                         |
| FCC Part 74.861 (e)(6)<br>FCC Part 74.861 (e)(7)<br>RSS-210 – G.3.4<br>ETSI EN 300 422-1 v1.4.2<br>(2011-08) | Transmitter unwanted emissions (radiated or conducted) | Nominal                | Nominal            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | -/-                     |
| FCC Part 2.1047                                                                                              | Modulation characteristics                             | Nominal                | Nominal            | -/-                                 |                          |                                     |                                     | -/-                     |
| FCC Part 74.861 (e)(7)<br>ETSI EN 300 422-1 v1.4.2<br>(2011-08)                                              | Necessary bandwidth (BN) for analogue systems          | Nominal                | Nominal            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | -/-                     |
| FCC Part 74.861 (e)(3)<br>RSS-210 – G.3.5.2                                                                  | Frequency modulation                                   | Nominal                | Nominal            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | -/-                     |
| FCC Part 74.861 (e)(7)<br>RSS-210 – G.3.4                                                                    | Receiver spurious emissions                            | Nominal                | Nominal            | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | No receiver integrated! |
| FCC Part 15.107(a)<br>FCC Part 15.207                                                                        | Conducted emissions < 30 MHz                           | Nominal                | Nominal            | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | -/-                     |

**Note:** C = Compliant; NC = Not compliant; NA = Not applicable; NP = Not performed

## 9 Additional comments

Reference documents: None

Special test descriptions: None

Configuration descriptions: The EUT has been tested in LD Mode (Link Density Mode)

Test mode:

☒ No test mode available.  
Test signal is applied to the transmitter.

☐ Special software is used.  
EUT is transmitting pseudo random data by itself

Antennas and transmit operating modes:

☒ **Operating mode 1 (single antenna)**

- *Equipment with 1 antenna,*
- *Equipment with 2 diversity antennas operating in switched diversity mode by which at any moment in time only 1 antenna is used,*
- *Smart antenna system with 2 or more transmit/receive chains, but operating in a mode where only 1 transmit/receive chain is used)*

☐ **Operating mode 2 (multiple antennas, no beamforming)**

- *Equipment operating in this mode contains a smart antenna system using two or more transmit/receive chains simultaneously but without beamforming.*

☐ **Operating mode 3 (multiple antennas, with beamforming)**

- *Equipment operating in this mode contains a smart antenna system using two or more transmit/receive chains simultaneously with beamforming.  
In addition to the antenna assembly gain (G), the beamforming gain (Y) may have to be taken into account when performing the measurements.*

## 10 Measurement results

### 10.1 Transmitter output power

#### Measurement:

| Measurement parameter    |                                                                                                                                                                                                                                                                       |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Detector:                | Peak (worst case) / Average (RMS)                                                                                                                                                                                                                                     |
| Sweep time:              | Auto / 20s                                                                                                                                                                                                                                                            |
| Resolution bandwidth:    | > emission bandwidth                                                                                                                                                                                                                                                  |
| Video bandwidth:         | > resolution bandwidth                                                                                                                                                                                                                                                |
| Span:                    | > 2 times emissions bandwidth                                                                                                                                                                                                                                         |
| Trace mode:              | Max. hold                                                                                                                                                                                                                                                             |
| EUT configuration:       | Peak:<br>Transmitter without NF tone<br>RMS:<br>Modulate the transmitter with a 2.5 kHz tone at a level 16 dB higher than that required to produce a frequency deviation of $\pm 75$ kHz, or to produce 50% of the manufacturer's rated deviation, whichever is less. |
| Test setup:              | See sub clause 6.1A & 6.2A                                                                                                                                                                                                                                            |
| Measurement uncertainty: | See sub clause 7                                                                                                                                                                                                                                                      |

#### Limits:

| FCC & IC                                               |
|--------------------------------------------------------|
| 470 MHz to 608 MHz 250 mW (average) / 24 dBm (average) |

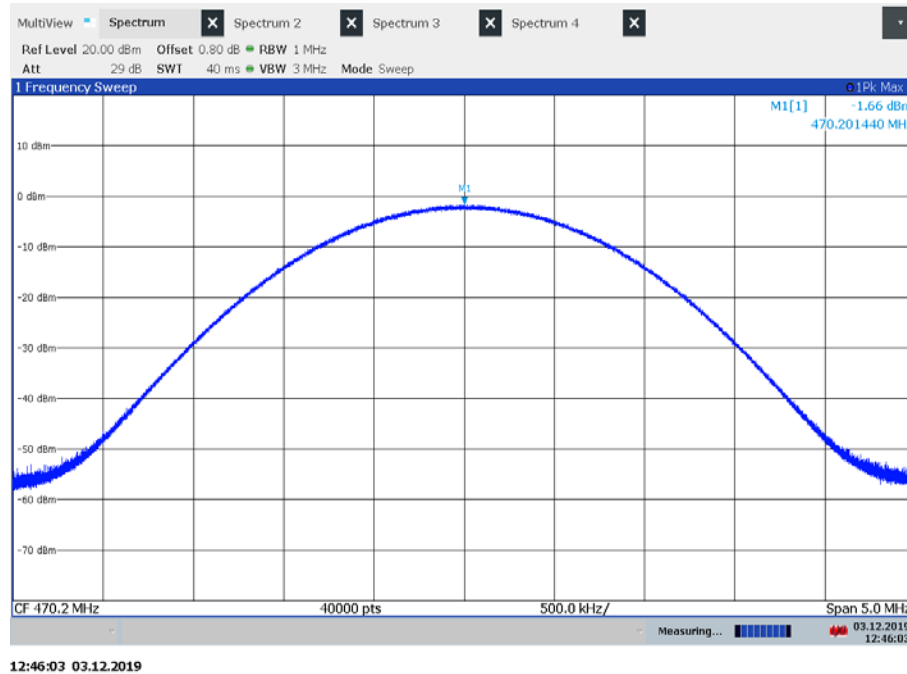
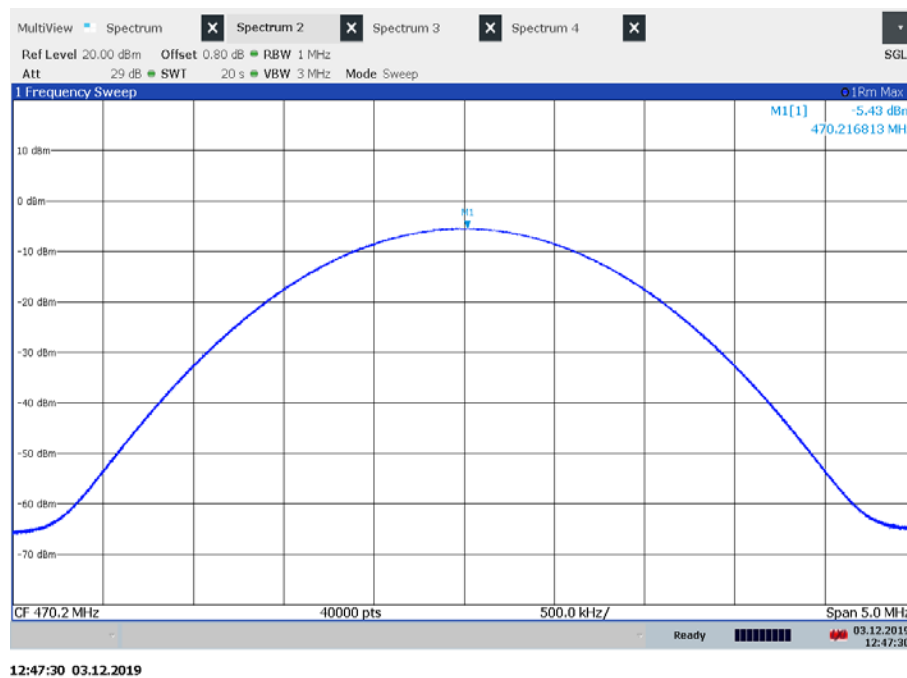
#### Result:

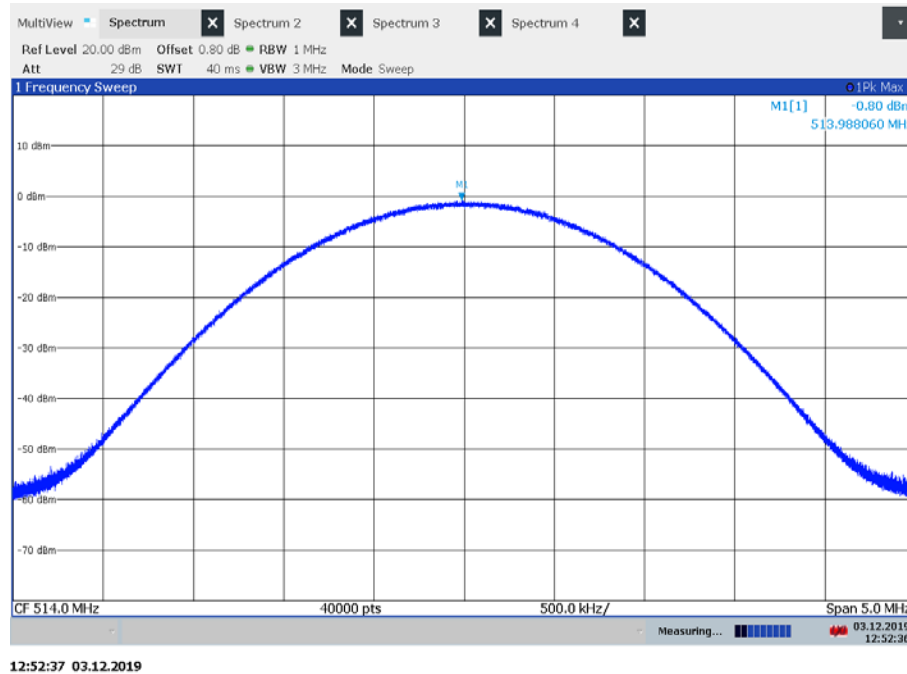
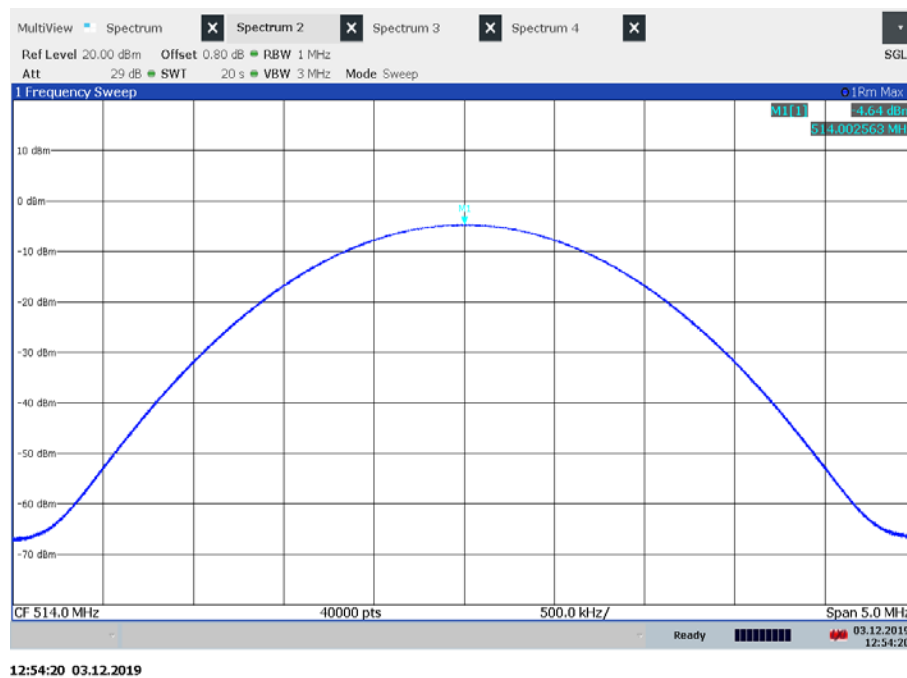
A1-A4

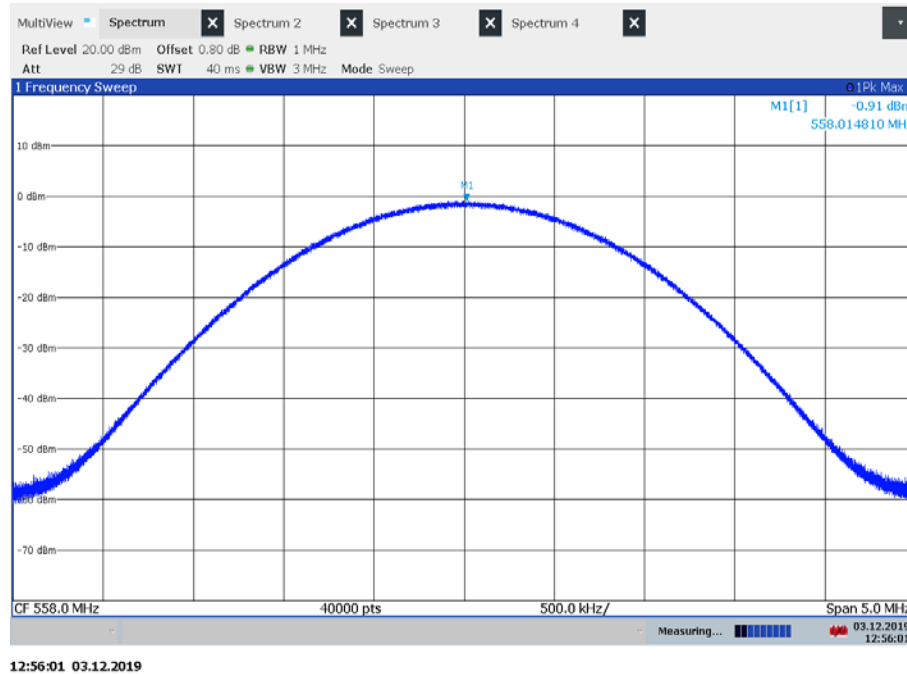
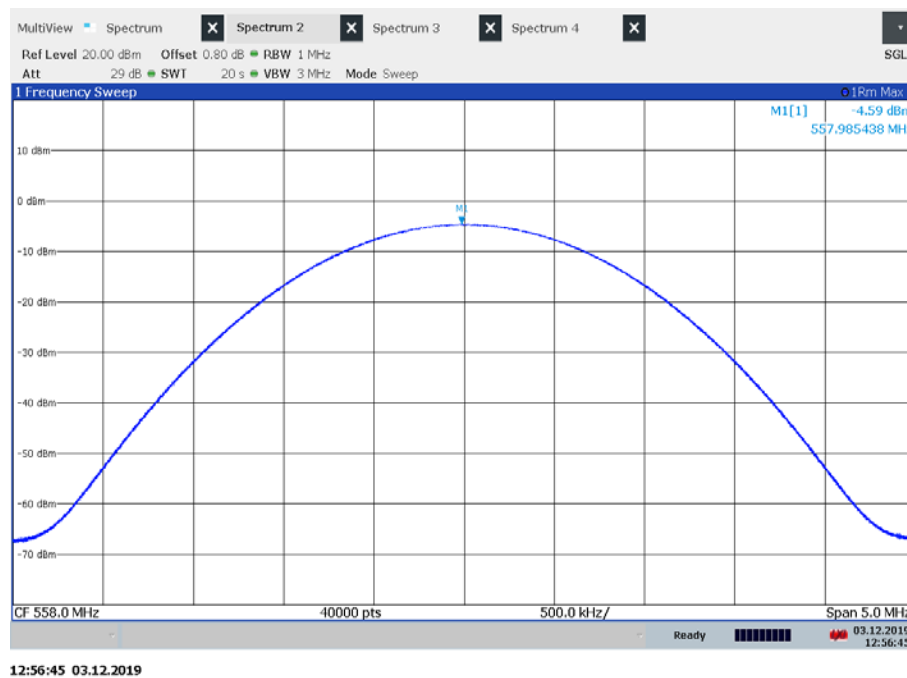
| Frequency (MHz) | transmitter output power (dBm) |         |        |         |          |         |
|-----------------|--------------------------------|---------|--------|---------|----------|---------|
|                 | Conducted                      |         | e.r.p. |         | e.i.r.p. |         |
|                 | Peak                           | Average | Peak   | Average | Peak     | Average |
| 470.2           | -1.7                           | -5.4    | 0.8    | -2.9    | 3.0      | -0.8    |
| 514.0           | -0.8                           | -4.6    | 4.5    | 0.7     | 6.7      | 2.9     |
| 558.0           | -0.9                           | -4.6    | 6.2    | 2.5     | 8.4      | 4.7     |

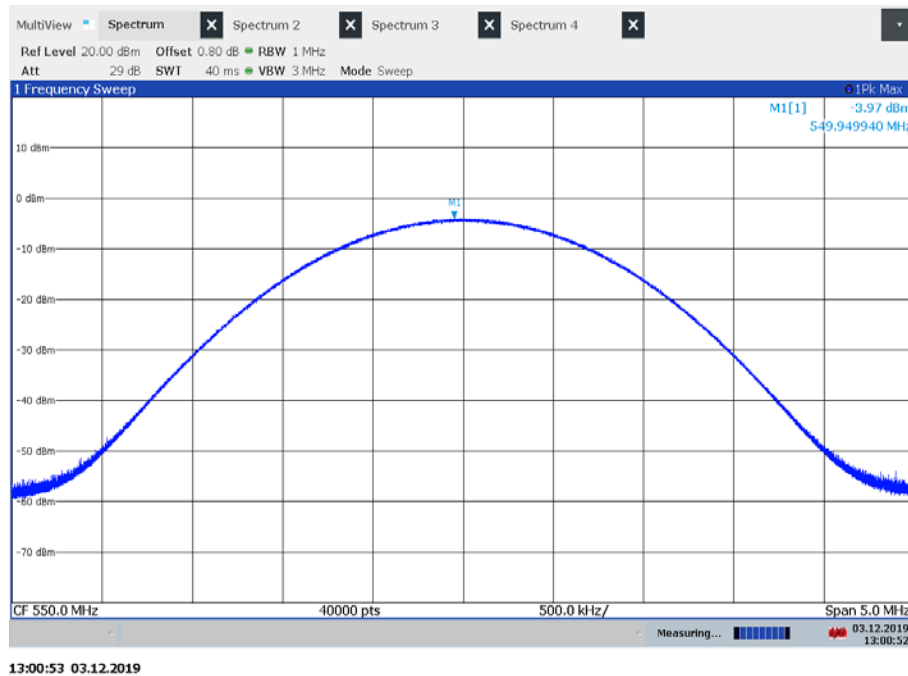
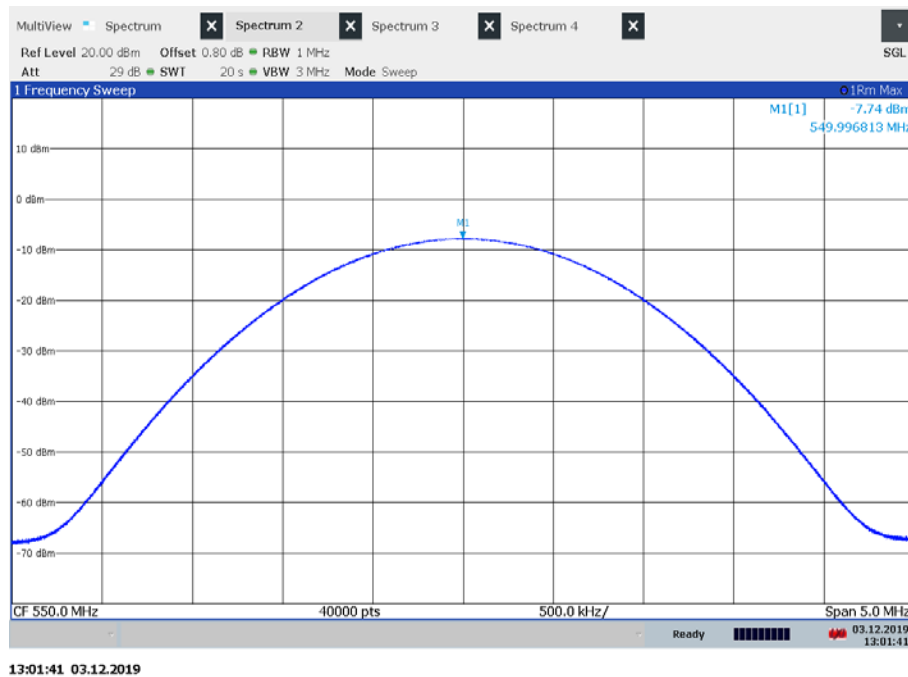
A5-A8

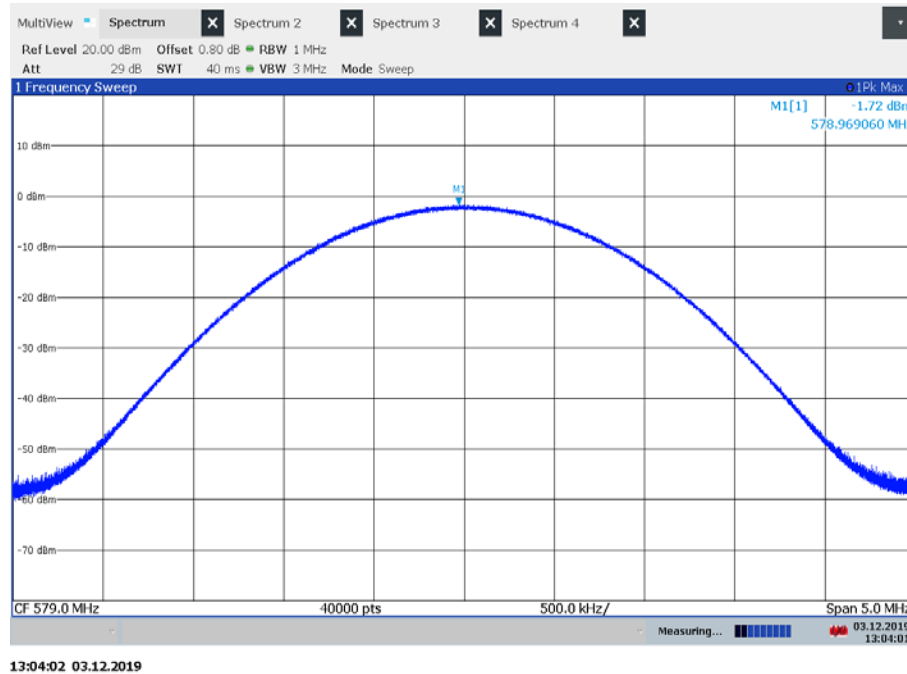
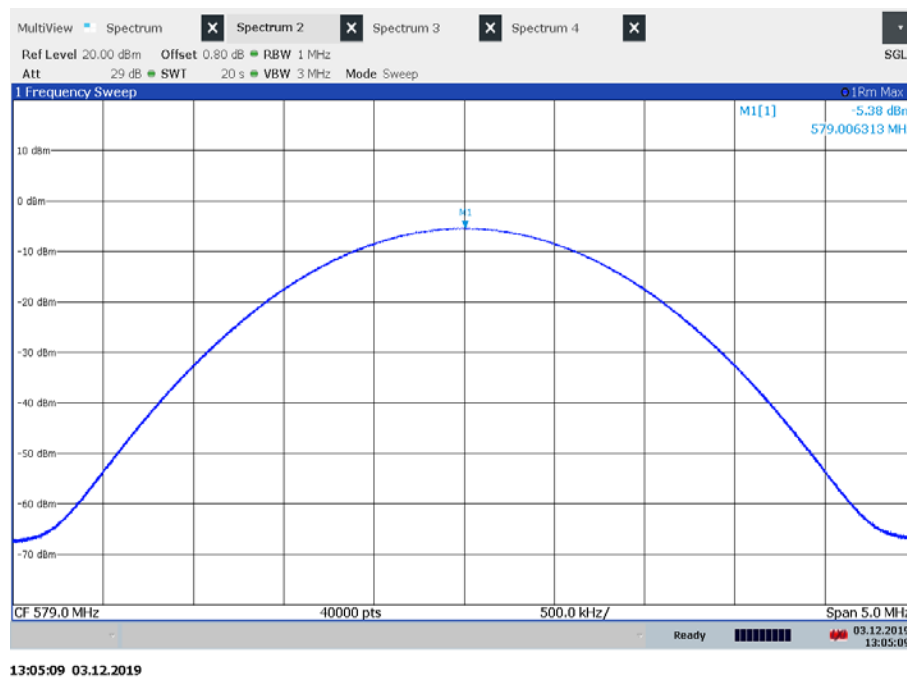
| Frequency (MHz) | transmitter output power (dBm) |         |        |         |          |         |
|-----------------|--------------------------------|---------|--------|---------|----------|---------|
|                 | Conducted                      |         | e.r.p. |         | e.i.r.p. |         |
|                 | Peak                           | Average | Peak   | Average | Peak     | Average |
| 550.0           | -4.0                           | -7.7    | -0.6   | -4.3    | 2.0      | -2.2    |
| 579.0           | -1.7                           | -5.4    | 2.8    | -0.9    | 5.0      | 1.3     |
| 607.8           | -1.9                           | -5.6    | 3.6    | -0.1    | 5.8      | 2.1     |

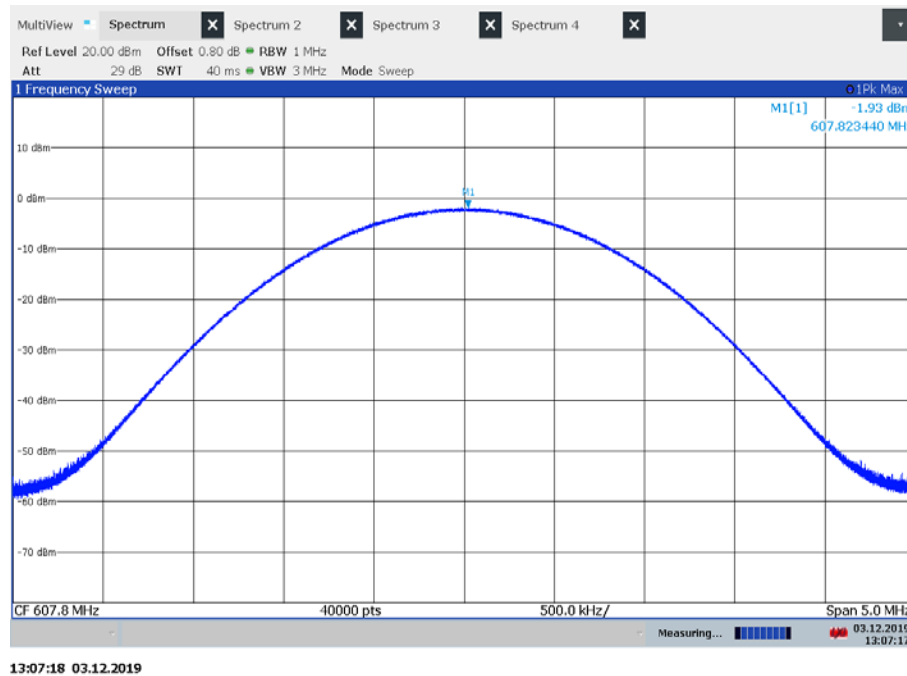
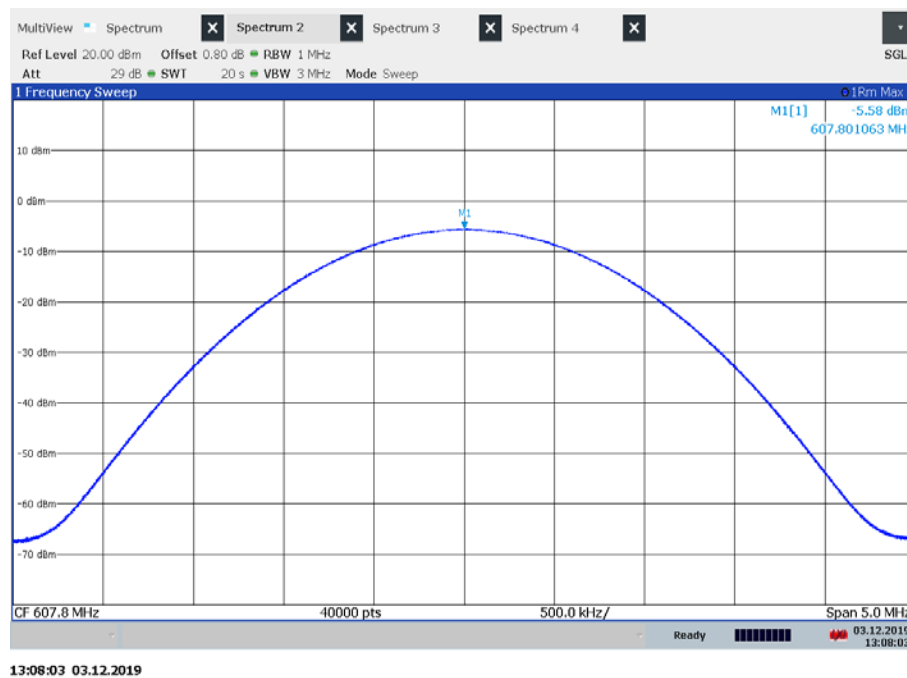
**Plots:** A1-A4**Plot 1:** lowest channel, conducted peak power**Plot 2:** lowest channel, conducted average power

**Plot 3:** middle channel, conducted peak power**Plot 4:** middle channel, conducted average power

**Plot 5:** highest channel, conducted peak power**Plot 6:** highest channel, conducted average power

**Plots:** A5-A8**Plot 1:** lowest channel, conducted peak power**Plot 2:** lowest channel, conducted average power

**Plot 3:** middle channel, conducted peak power**Plot 4:** middle channel, conducted average power

**Plot 5:** highest channel, conducted peak power**Plot 6:** highest channel, conducted average power

## 10.2 Occupied bandwidth

### Measurement:

| Measurement parameter    |                                                |
|--------------------------|------------------------------------------------|
| Detector:                | Peak                                           |
| Sweep time:              | Auto                                           |
| Resolution bandwidth:    | 1 % to 5 % of the occupied bandwidth           |
| Video bandwidth:         | 3 x resolution bandwidth                       |
| Span:                    | 2 x emission bandwidth                         |
| Trace mode:              | Max. hold                                      |
| Analyzer function:       | 99% power occupied bandwidth function          |
| EUT:                     | Modulated signal with max. frequency deviation |
| Test setup:              | See sub clause 6.2A                            |
| Measurement uncertainty: | See sub clause 7                               |

### Limits:

| FCC & IC                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 470 MHz to 608 MHz 200 kHz                                                                                                                                                                                                                                                                                                  |
| Occupied bandwidth 99%. Other than single sideband or independent sideband transmitters – when modulated by a 2500 Hz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation. The input level shall be established at the frequency of maximum response of the audio modulating circuit. |

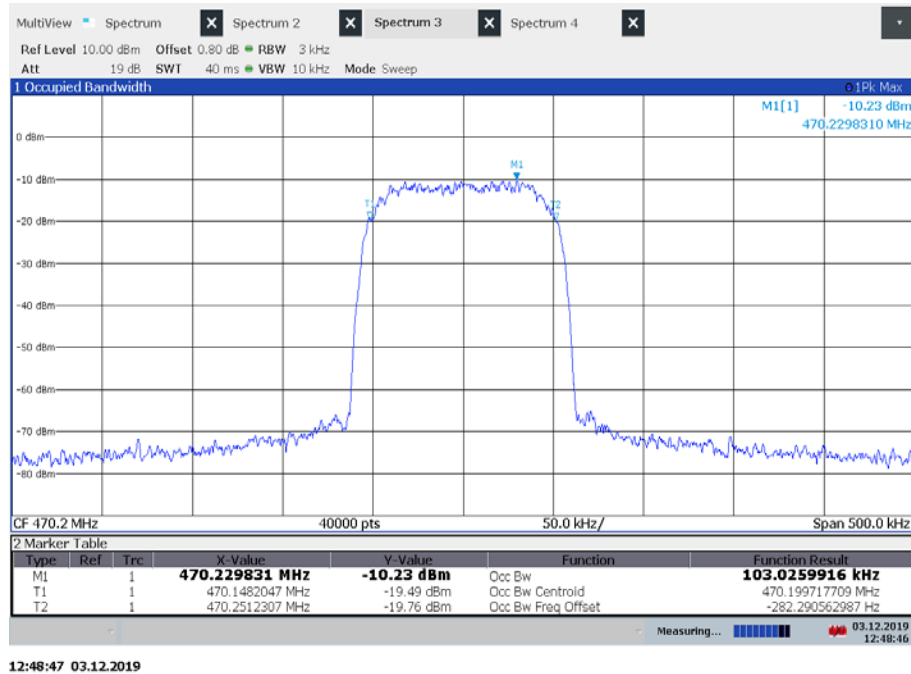
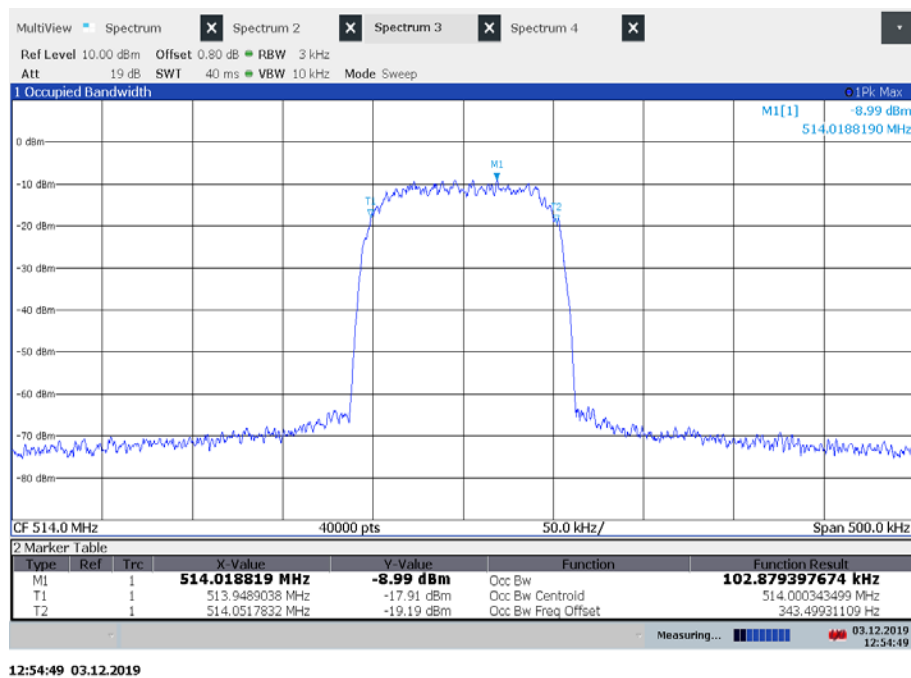
### Result:

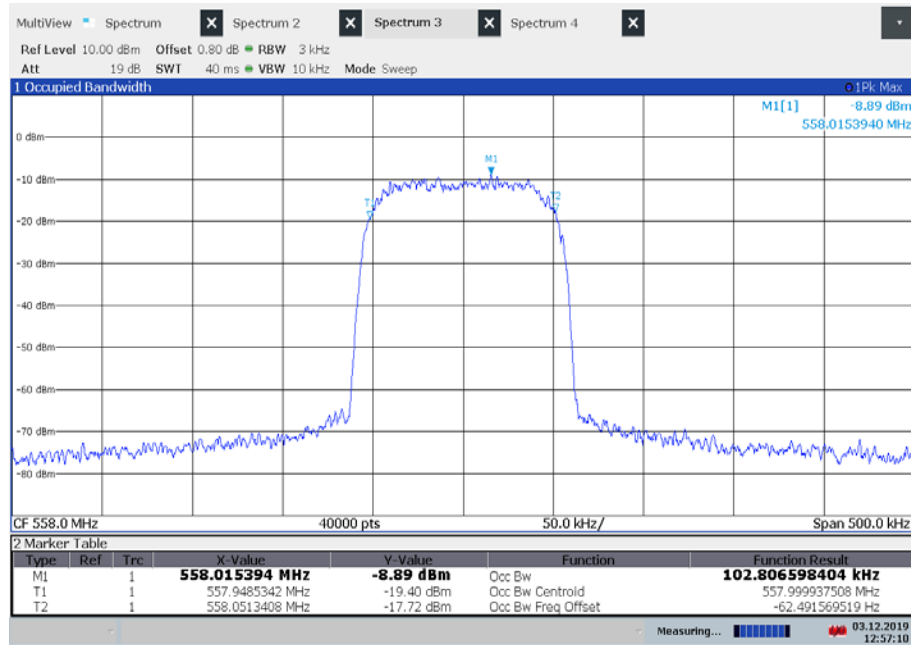
A1-A4

| Occupied bandwidth |        |                  |                   |
|--------------------|--------|------------------|-------------------|
| Channels           | OBW    | Lowest frequency | Highest frequency |
| 470.2 MHz          | 103.03 | 470.148          | 558.015           |
| 514.0 MHz          | 102.87 |                  |                   |
| 558.0 MHz          | 101.75 |                  |                   |

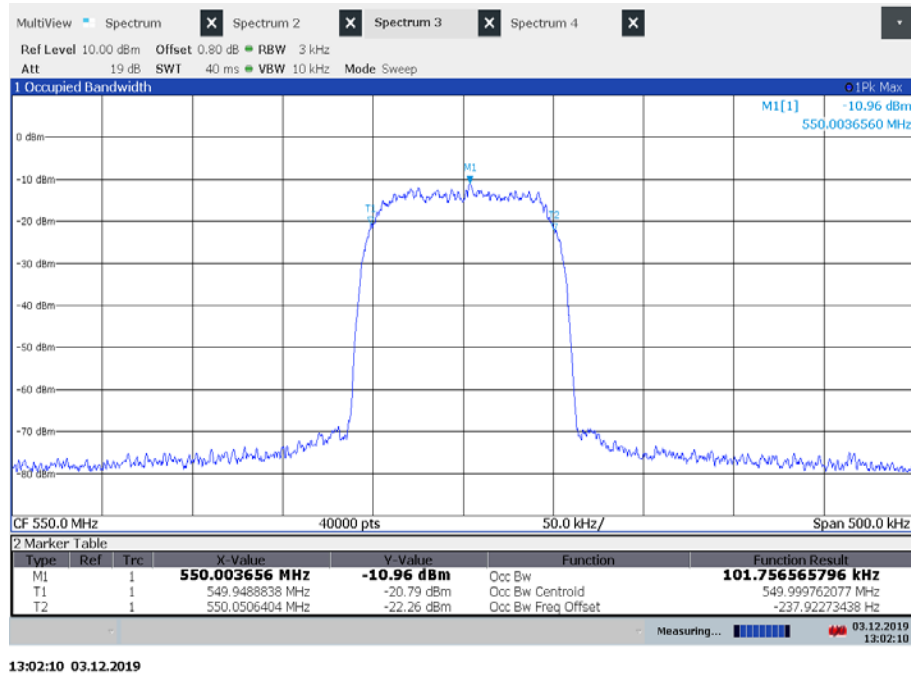
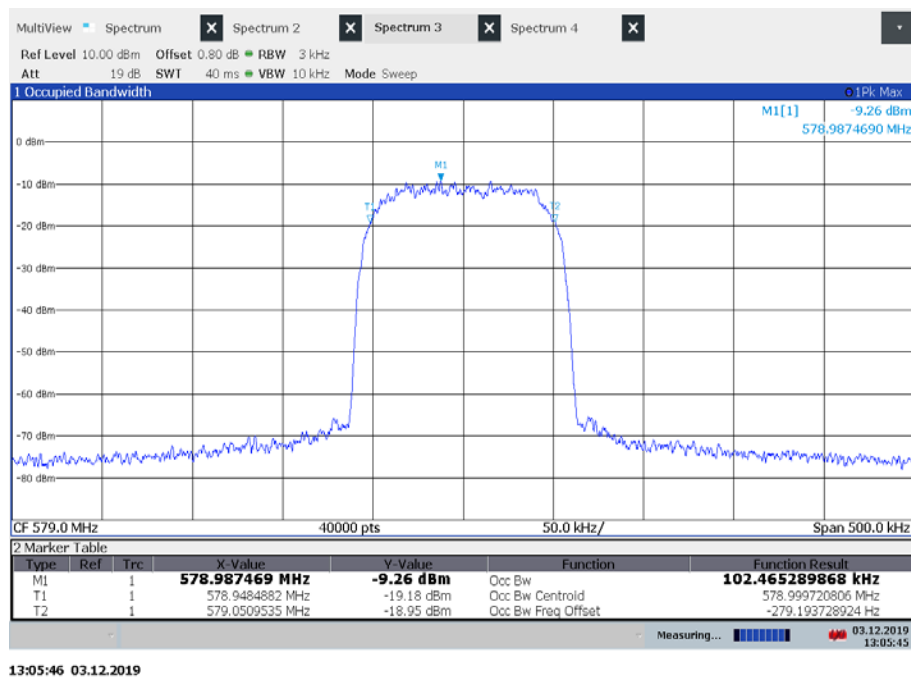
A5-A8

| Occupied bandwidth |        |                  |                   |
|--------------------|--------|------------------|-------------------|
| Channels           | OBW    | Lowest frequency | Highest frequency |
| 550.0 MHz          | 102.81 | 549.949          | 607.851           |
| 579.0 MHz          | 102.47 |                  |                   |
| 607.8 MHz          | 102.68 |                  |                   |

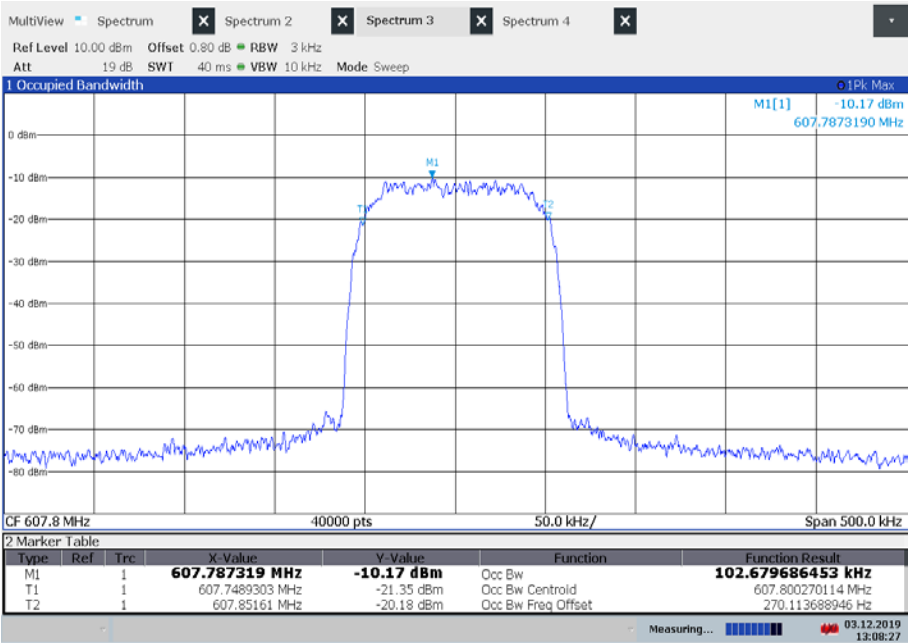
**Plots:** A1-A4**Plot 1:** lowest channel**Plot 2:** middle channel

**Plot 3: highest channel**

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**Plots:** A5-A8**Plot 1:** lowest channel**Plot 2:** middle channel

Plot 3: highest channel



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### 10.3 Transmitter unwanted emissions (radiated)

#### Measurement:

| Measurement parameter    |                                 |
|--------------------------|---------------------------------|
| Detector:                | Peak (prescan) / RMS            |
| Sweep time:              | Auto                            |
| Resolution bandwidth:    | See table below!                |
| Video bandwidth:         | See table below!                |
| Span:                    | 100 MHz steps!                  |
| Trace-Mode:              | Max. hold                       |
| EUT:                     | MC with max frequency deviation |
| Used equipment:          | See sub clause 6.1A,B & 6.2A    |
| Measurement uncertainty: | See chapter 7                   |

| Frequency being measured | Measuring receiver bandwidth |
|--------------------------|------------------------------|
| 25 MHz to 30 MHz         | 9 kHz to 10 kHz              |
| 30 MHz to 1 000 MHz      | 100 kHz                      |
| > 1 000 MHz              | 1 MHz                        |

#### Limits:

| FCC & IC (according to ETSI EN 300 422-1 v1.4.2 (2011-08)) |                                                                                     |                                 |                               |
|------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------|-------------------------------|
| State                                                      | Max. spurious level                                                                 |                                 |                               |
|                                                            | 47 MHz to 74 MHz<br>87.5 MHz to 118 MHz<br>174 MHz to 230 MHz<br>470 MHz to 862 MHz | Other frequencies<br>≤ 1000 MHz | All frequencies<br>> 1000 MHz |
| Operating                                                  | 4.0 nW                                                                              | 250 nW                          | 1.00 µW                       |
| Standby                                                    | 2.0 nW                                                                              | 2.0 nW                          | 20.0 nW                       |

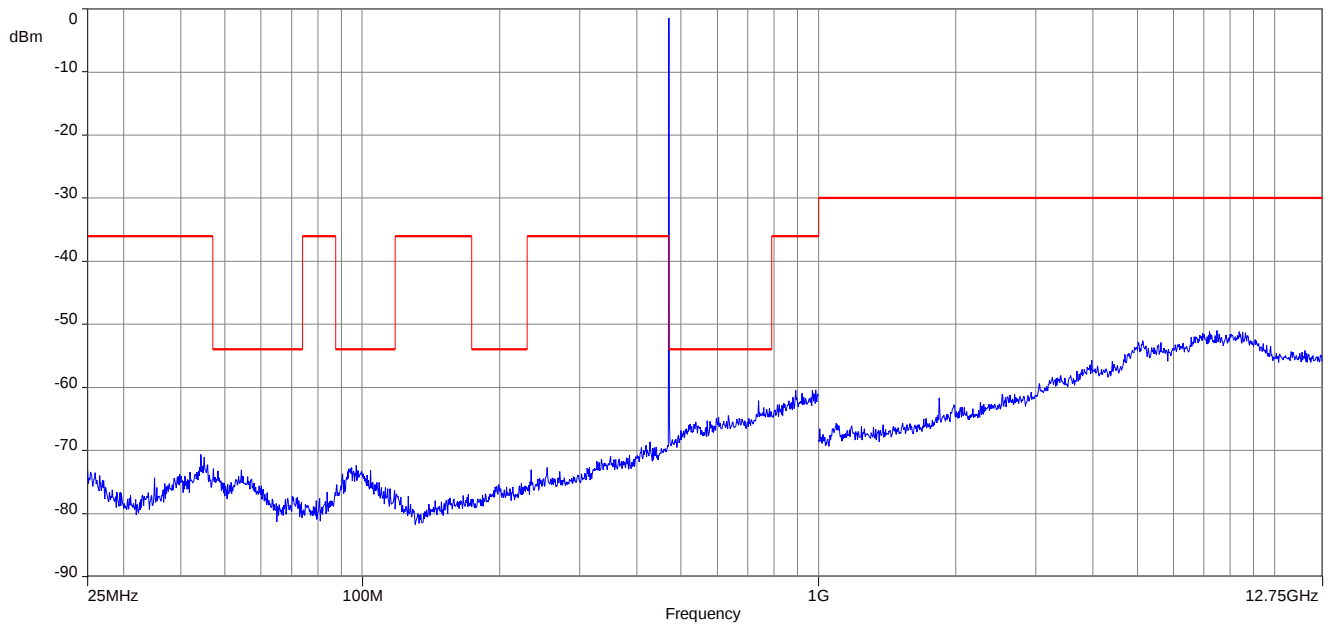
| FCC & IC                                                                                                                                            |                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:           |                                                          |
| On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least | 25 dB                                                    |
| On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth          | 35 dB                                                    |
| On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least                                | 43 + 10log <sub>10</sub> (mean output power in watts) dB |

**Results:**

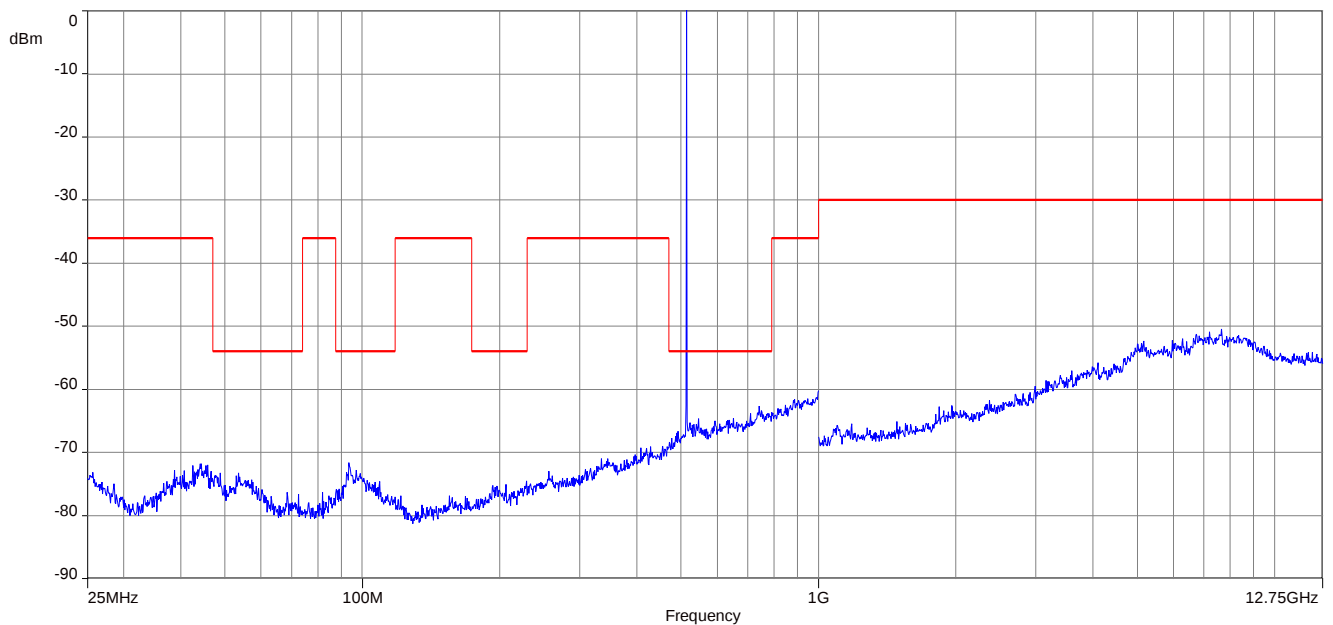
| carrier frequency (MHz)                                     | unwanted emission<br>frequency (MHz) | Limit | level (dB) / (dBm)<br>or remark |
|-------------------------------------------------------------|--------------------------------------|-------|---------------------------------|
| All detected emissions are more than 20 dB below the limit. |                                      |       |                                 |

**Plots:** radiated

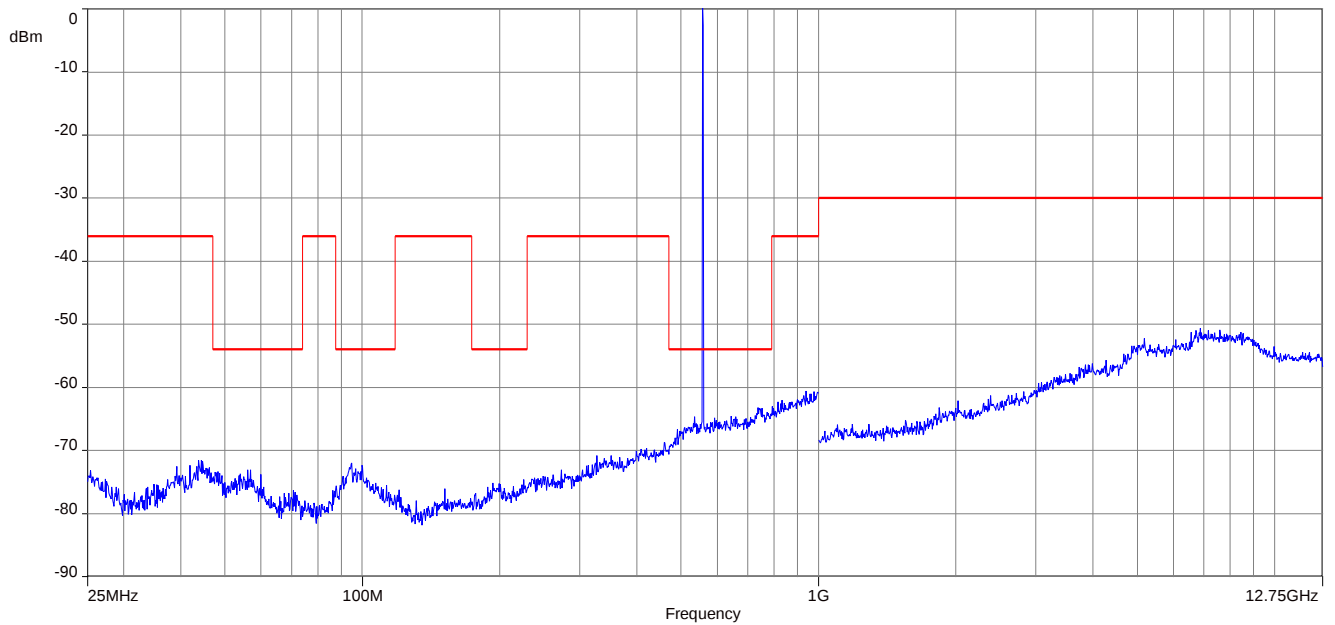
**Plot 1:** 470.2 MHz, spurious emissions, 25 MHz – 12.75 GHz



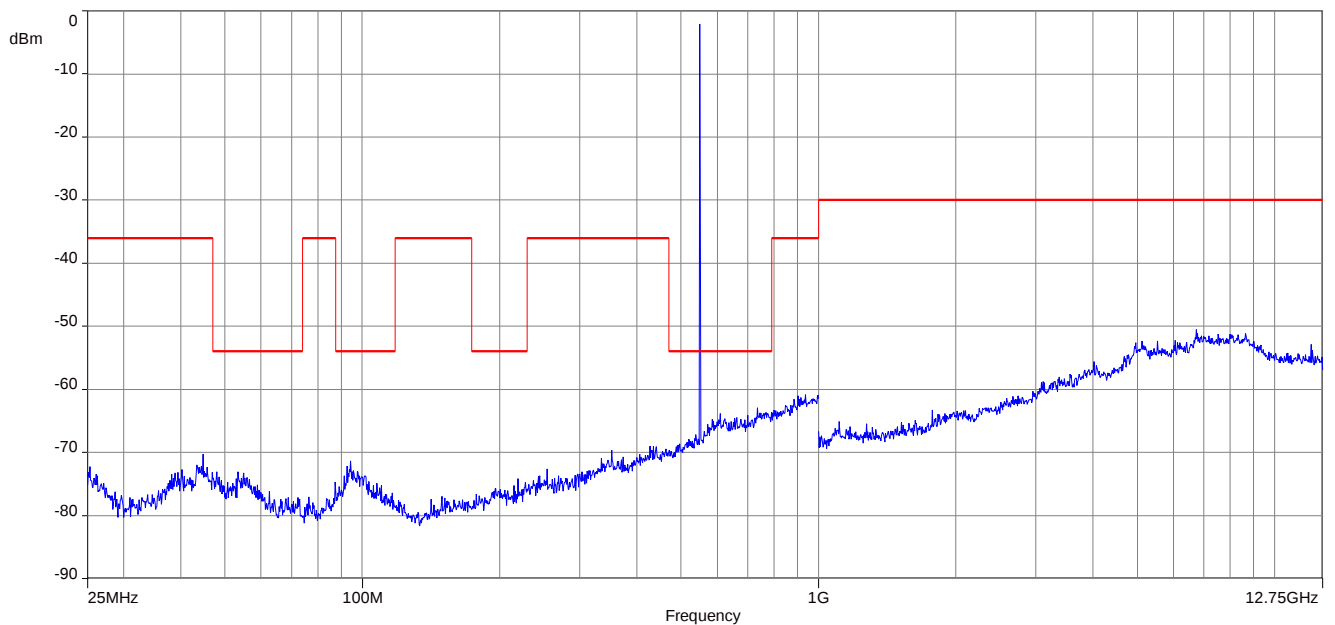
**Plot 2:** 514.0 MHz, spurious emissions, 25 MHz – 12.75 GHz



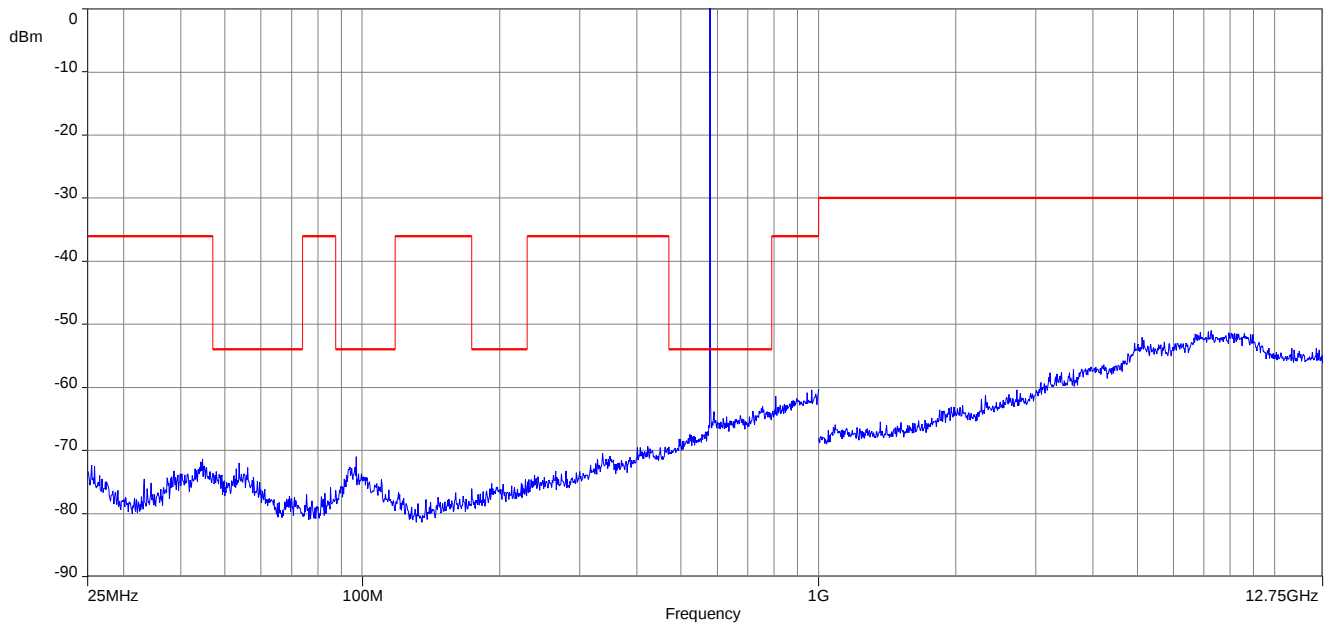
**Plot 3:** 558.0 MHz, spurious emissions, 25 MHz – 12.75 GHz



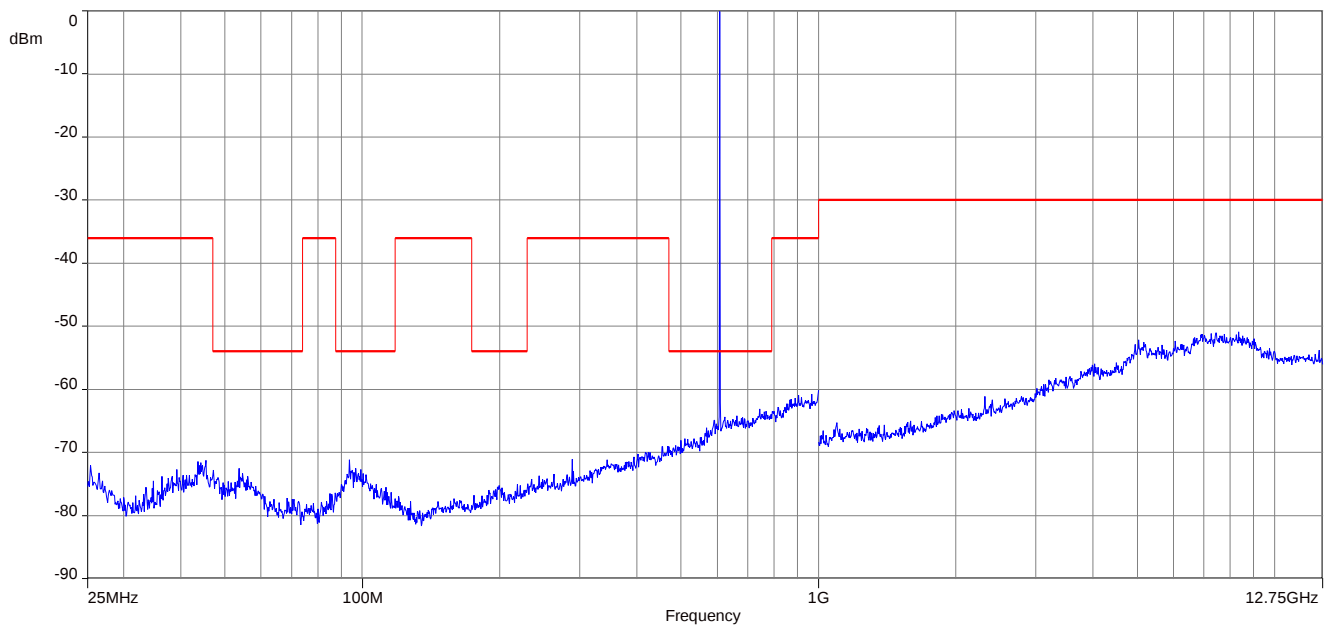
**Plot 4:** 550.0 MHz, spurious emissions, 25 MHz – 12.75 GHz



**Plot 5:** 579.0 MHz, spurious emissions, 25 MHz – 12.75 GHz

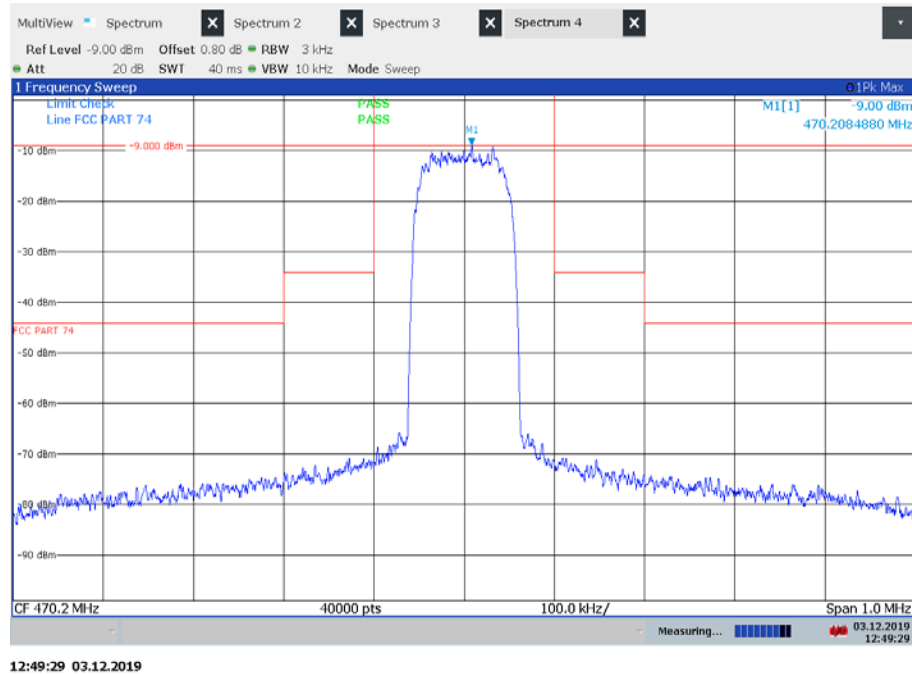


**Plot 6:** 607.8 MHz, spurious emissions, 25 MHz – 12.75 GHz

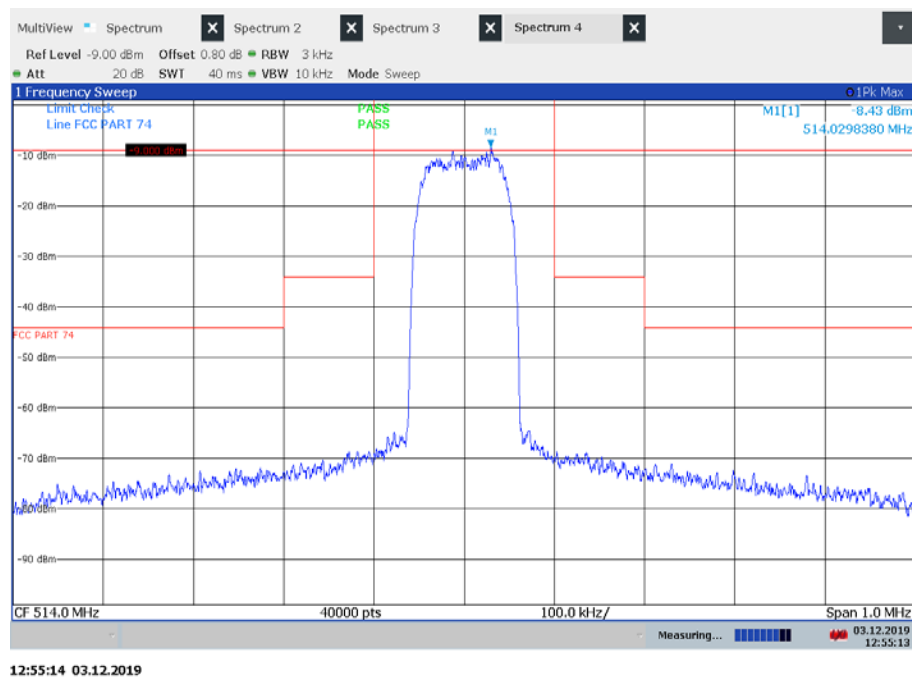


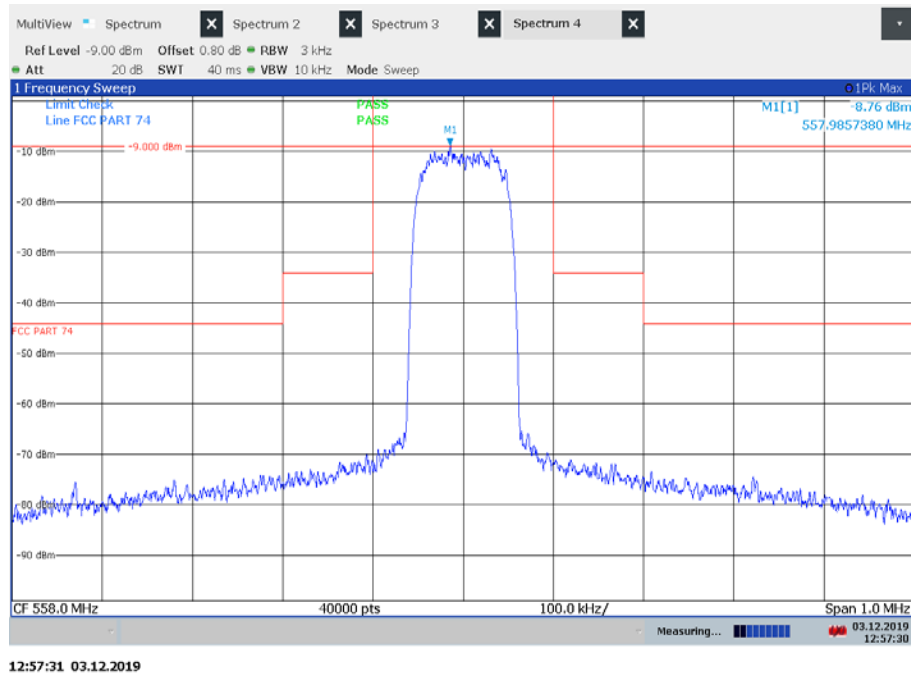
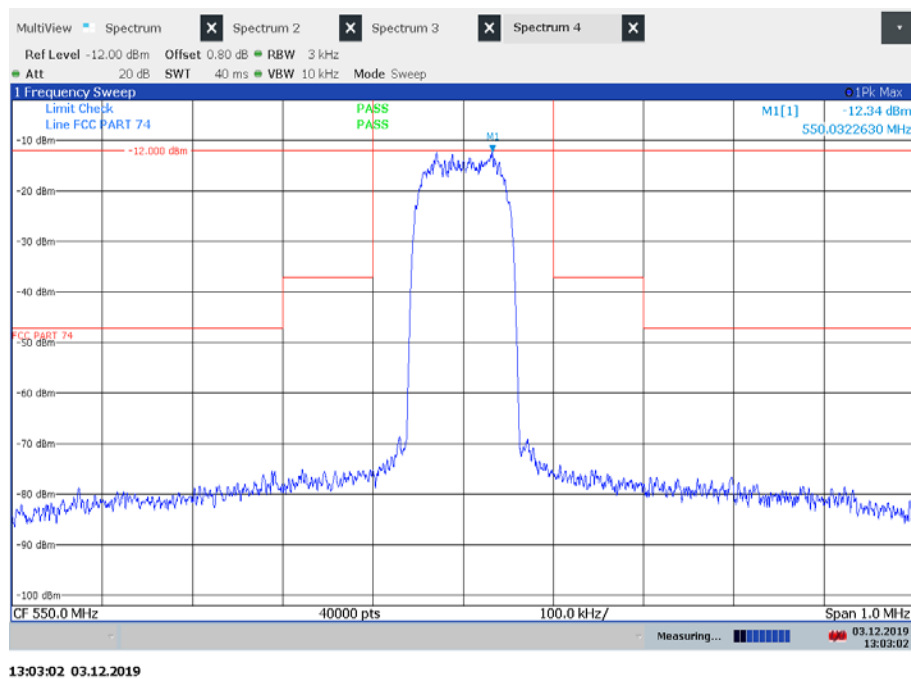
**Plots:** conducted,

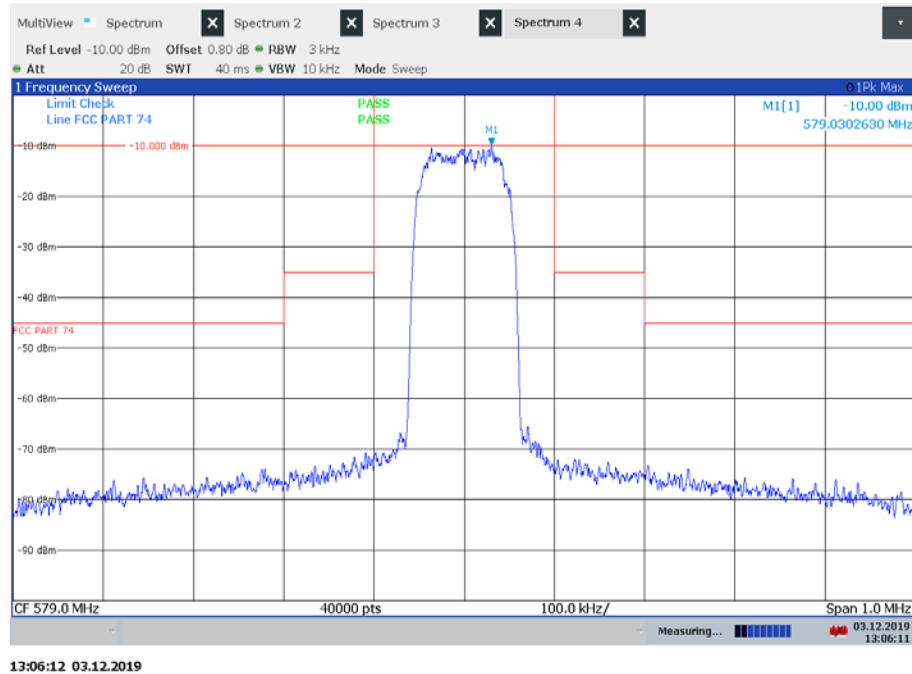
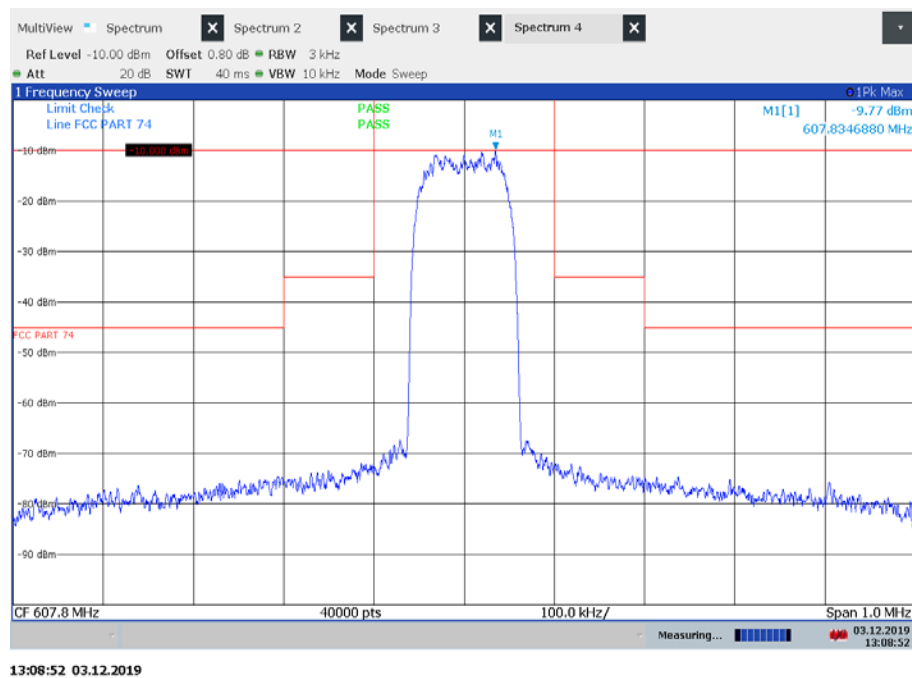
**Plot 1:** 470.2 MHz, spectrum mask



**Plot 2:** 514.0 MHz, spectrum mask



**Plot 3: 558.0 MHz, spectrum mask****Plot 4: 550.0 MHz, spectrum mask**

**Plot 5:** 579.0 MHz, spectrum mask**Plot 6:** 607.8 MHz, spectrum mask

## 11 Observations

No observations except those reported with the single test cases have been made.

## Annex A Glossary

|                        |                                                    |
|------------------------|----------------------------------------------------|
| <b>EUT</b>             | Equipment under test                               |
| <b>DUT</b>             | Device under test                                  |
| <b>UUT</b>             | Unit under test                                    |
| <b>GUE</b>             | GNSS User Equipment                                |
| <b>ETSI</b>            | European Telecommunications Standards Institute    |
| <b>EN</b>              | European Standard                                  |
| <b>FCC</b>             | Federal Communications Commission                  |
| <b>FCC ID</b>          | Company Identifier at FCC                          |
| <b>IC</b>              | Industry Canada                                    |
| <b>PMN</b>             | Product marketing name                             |
| <b>HMN</b>             | Host marketing name                                |
| <b>HVIN</b>            | Hardware version identification number             |
| <b>FVIN</b>            | Firmware version identification number             |
| <b>EMC</b>             | Electromagnetic Compatibility                      |
| <b>HW</b>              | Hardware                                           |
| <b>SW</b>              | Software                                           |
| <b>Inv. No.</b>        | Inventory number                                   |
| <b>S/N or SN</b>       | Serial number                                      |
| <b>C</b>               | Compliant                                          |
| <b>NC</b>              | Not compliant                                      |
| <b>NA</b>              | Not applicable                                     |
| <b>NP</b>              | Not performed                                      |
| <b>PP</b>              | Positive peak                                      |
| <b>QP</b>              | Quasi peak                                         |
| <b>AVG</b>             | Average                                            |
| <b>OC</b>              | Operating channel                                  |
| <b>OCW</b>             | Operating channel bandwidth                        |
| <b>OBW</b>             | Occupied bandwidth                                 |
| <b>OOB</b>             | Out of band                                        |
| <b>DFS</b>             | Dynamic frequency selection                        |
| <b>CAC</b>             | Channel availability check                         |
| <b>OP</b>              | Occupancy period                                   |
| <b>NOP</b>             | Non occupancy period                               |
| <b>DC</b>              | Duty cycle                                         |
| <b>PER</b>             | Packet error rate                                  |
| <b>CW</b>              | Clean wave                                         |
| <b>MC</b>              | Modulated carrier                                  |
| <b>WLAN</b>            | Wireless local area network                        |
| <b>RLAN</b>            | Radio local area network                           |
| <b>DSSS</b>            | Dynamic sequence spread spectrum                   |
| <b>OFDM</b>            | Orthogonal frequency division multiplexing         |
| <b>FHSS</b>            | Frequency hopping spread spectrum                  |
| <b>GNSS</b>            | Global Navigation Satellite System                 |
| <b>C/N<sub>0</sub></b> | Carrier to noise-density ratio, expressed in dB-Hz |

## Annex B Document history

| Version | Applied changes               | Date of release |
|---------|-------------------------------|-----------------|
| -/-     | Initial release               | 2019-12-10      |
| -A      | Editorial Changes (Section 9) | 2019-12-12      |

## Annex C Accreditation Certificate – D-PL-12076-01-04

| first page                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | last page                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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<https://www.dakks.de/as/ast/d/D-PL-12076-01-04.pdf>

## Annex D Accreditation Certificate – D-PL-12076-01-05

| first page                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | last page                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
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##### END OF TEST REPORT #####