

## TEST REPORT

BNetzA-CAB-02/21-102

Test report no.: 1-3977/22-02-11

### Testing laboratory

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**Accredited Testing Laboratory:**

The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2018-03) 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

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### Manufacturer

**SAGEMCOM BROADBAND SAS**

250, route de l' Empereur

92848 Rueil-Malmaison Cedex / FRANCE

### Test standard/s

FCC - Title 47 CFR Part 27

FCC - Title 47 of the Code of Federal Regulations; Chapter I; Part 27 -  
Miscellaneous wireless communications services

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

### Test Item

**Kind of test item:**

**Gateway**

**Model name:**

**F5688W**

**FCC ID:**

**VW3FAST5688W**

**Frequency:**

**Band 77 – 3450-3550 MHz & 3700-3980 MHz**

**Technology tested:**

**5G NR**

**Antenna:**

**4 integrated antenna**

**Power supply:**

**120 V AC by power supply unit**

**Temperature range:**

**0°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.

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

### 2.2 Application details

|                                    |            |
|------------------------------------|------------|
| Date of receipt of order:          | 2022-03-11 |
| Date of receipt of test item:      | 2022-02-16 |
| Start of test:*                    | 2022-02-21 |
| End of test:*                      | 2022-07-20 |
| Person(s) present during the test: | -/-        |

\*Date of each measurement, if not shown in the plot, can be requested. Dates are stored in the measurement software.

### 2.3 Test laboratories sub-contracted

None

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

| Test standard              | Date | Description                                                                                                            |
|----------------------------|------|------------------------------------------------------------------------------------------------------------------------|
| FCC - Title 47 CFR Part 27 |      | FCC - Title 47 of the Code of Federal Regulations; Chapter I; Part 27 - Miscellaneous wireless communications services |

| 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 C63.26-2015                           | -/-     | American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services                                                                   |
| KDB 662911 D01                             | v02r01  | Emissions Testing of Transmitters with Multiple Outputs in the Same Band                                                                                            |
| Power Meas License Systems: KDB 971168 D01 | v03r01  | Measurement Guidance for Certification of Licensed Digital Transmitters                                                                                             |

| Accreditation | Description |
|---------------|-------------|
|---------------|-------------|

D-PL-12076-01-05

 Telecommunication FCC requirements  
<https://www.dakks.de/as/ast/d/D-PL-12076-01-05e.pdf>

 Deutsche  
 Akkreditierungsstelle  
 D-PL-12076-01-05

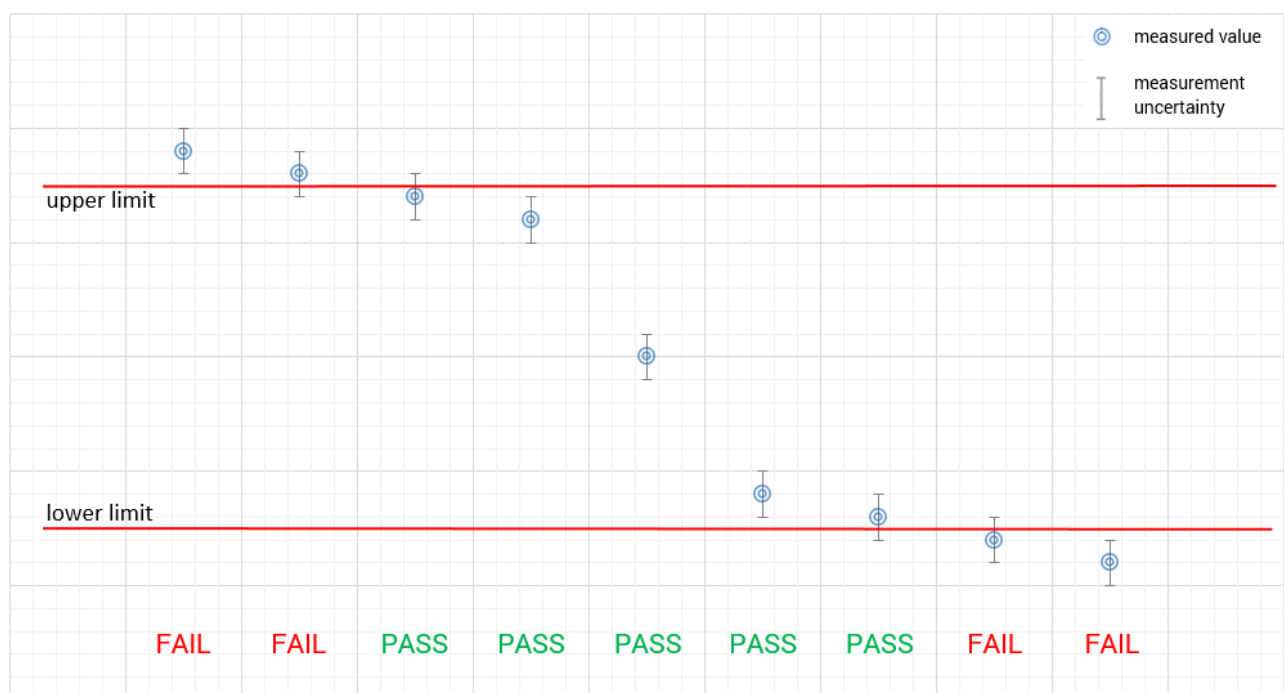
FCC designation number: DE0002

#### 4 Reporting statements of conformity – decision rule

Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed in chapter 3.

The measurement uncertainty is mentioned in this test report, see chapter 9, but is not taken into account - neither to the limits nor to the measurement results. Measurement results with a smaller margin to the corresponding limits than the measurement uncertainty have a potential risk of more than 5% that the decision might be wrong."

measured value, measurement uncertainty, verdict



## 5 Test environment

|                             |                                                          |                                                                                                                     |
|-----------------------------|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Temperature :               | T <sub>nom</sub><br>T <sub>max</sub><br>T <sub>min</sub> | +22 °C during room temperature tests<br>+50 °C during high temperature tests<br>-30 °C during low temperature tests |
| Relative humidity content : |                                                          | 55 %                                                                                                                |
| Barometric pressure :       |                                                          | 1021 hpa                                                                                                            |
| Power supply :              | V <sub>nom</sub><br>V <sub>max</sub><br>V <sub>min</sub> | 120 V AC by power supply unit.<br>136 V AC by external power supply.<br>104 V AC by external power supply.          |

## 6 Test item

### 6.1 General description

|                              |                                                                                                                     |
|------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Kind of test item :          | Gateway                                                                                                             |
| Model name :                 | F5688W                                                                                                              |
| S/N serial number :          | Radiated units: DM2205259000020 (IMEI: 359509840011321)<br>Conducted units: DM2205259000045 (IMEI: 359509840012014) |
| Hardware status :            | V1.0                                                                                                                |
| Software status :            | SG520TMDAR01A04M4G_BETA_20220524A_01.001.01.001                                                                     |
| Firmware status :            | SG520TMDAR01A04M4G_BETA_20220524A_01.001.01.001                                                                     |
| Frequency band :             | Band 77 – 3450-3550 MHz & 3700-3980 MHz                                                                             |
| Type of radio transmission : | Modulated carrier                                                                                                   |
| Use of frequency spectrum :  |                                                                                                                     |
| Type of modulation :         | BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM                                                                                 |
| Antenna :                    | 4 integrated antenna                                                                                                |
| Power supply :               | 120 V AC by power supply unit                                                                                       |
| Temperature range :          | 0°C to +50°C                                                                                                        |

### 6.2 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: 1-3977/22-02-01\_AnnexA  
 1-3977/22-02-01\_AnnexB  
 1-3977/22-02-01\_AnnexC

## 7 Sequence of testing

### 7.1 Sequence of testing radiated spurious 9 kHz to 30 MHz

#### Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, it is placed on a table with 0.8 m height.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

#### Premeasurement\*

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna height is 1 m.
- At each turntable position the analyzer sweeps with positive-peak detector to find the maximum of all emissions.

#### Final measurement

- Identified emissions during the pre-measurement are maximized by the software by rotating the turntable from 0° to 360°.
- Loop antenna is rotated about its vertical axis for maximum response at each azimuth about the EUT. (For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT)
- The final measurement is done in the position (turntable and elevation) causing the highest emissions with quasi-peak (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. A plot with the graph of the premeasurement and the limit is stored.

\*)Note: The sequence will be repeated three times with different EUT orientations.

## 7.2 Sequence of testing radiated spurious 30 MHz to 1 GHz

### Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 10 m or 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

### Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 m to 3 m.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

### Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximize the peaks by changing turntable position  $\pm 45^\circ$  and antenna height between 1 and 4 m.
- The final measurement is done with quasi-peak detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.

### 7.3 Sequence of testing radiated spurious 1 GHz to 18 GHz

#### Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a 2-axis positioner with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

#### Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height is 1.5 m.
- At each turntable position and antenna polarization the analyzer sweeps with positive peak detector to find the maximum of all emissions.

#### Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximizes the peaks by rotating the turntable from 0° to 360°. This measurement is repeated for different EUT-table positions (0° to 150° in 30°-steps) and for both antenna polarizations.
- The final measurement is done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and RMS detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.

## 7.4 Sequence of testing radiated spurious above 18 GHz

### Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet.
- The measurement distance is as appropriate (e.g. 0.5 m).
- The EUT is set into operation.

### Premeasurement

- The test antenna is handheld and moved carefully over the EUT to cover the EUT's whole sphere and different polarizations of the antenna.

### Final measurement

- The final measurement is performed at the position and antenna orientation causing the highest emissions with Peak and RMS detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement and the limit is stored.

## 8 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).

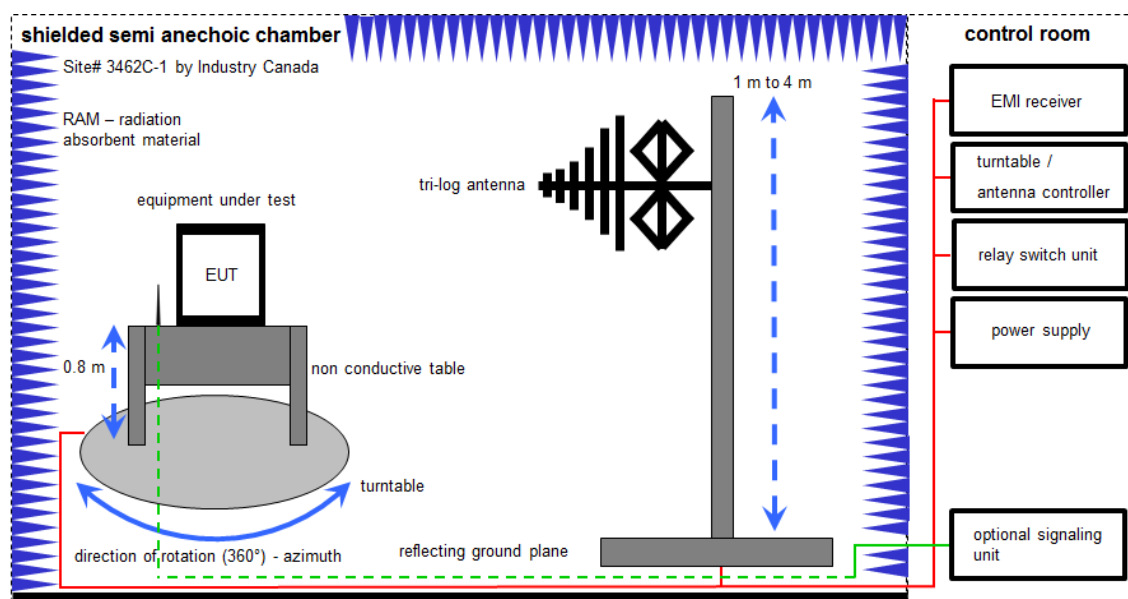
Each block diagram listed can contain several test setup configurations. All devices belonging to a test setup are identified with the same letter syntax. For example: Column Setup and all devices with an A.

### **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                       |
| vlkl! | Attention: extended calibration interval   |     |                                                      |
| NK!   | Attention: not calibrated                  | *)  | next calibration ordered / currently in progress     |

## 8.1 Shielded semi anechoic chamber

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 30 MHz to 1 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are conform to specifications ANSI C63. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analyzers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.



Measurement distance: tri-log antenna 10 meter; EMC32 software version: 10.59.00

$$FS = UR + CL + AF$$

(FS-field strength; UR-voltage at the receiver; CL-loss of the cable; AF-antenna factor)

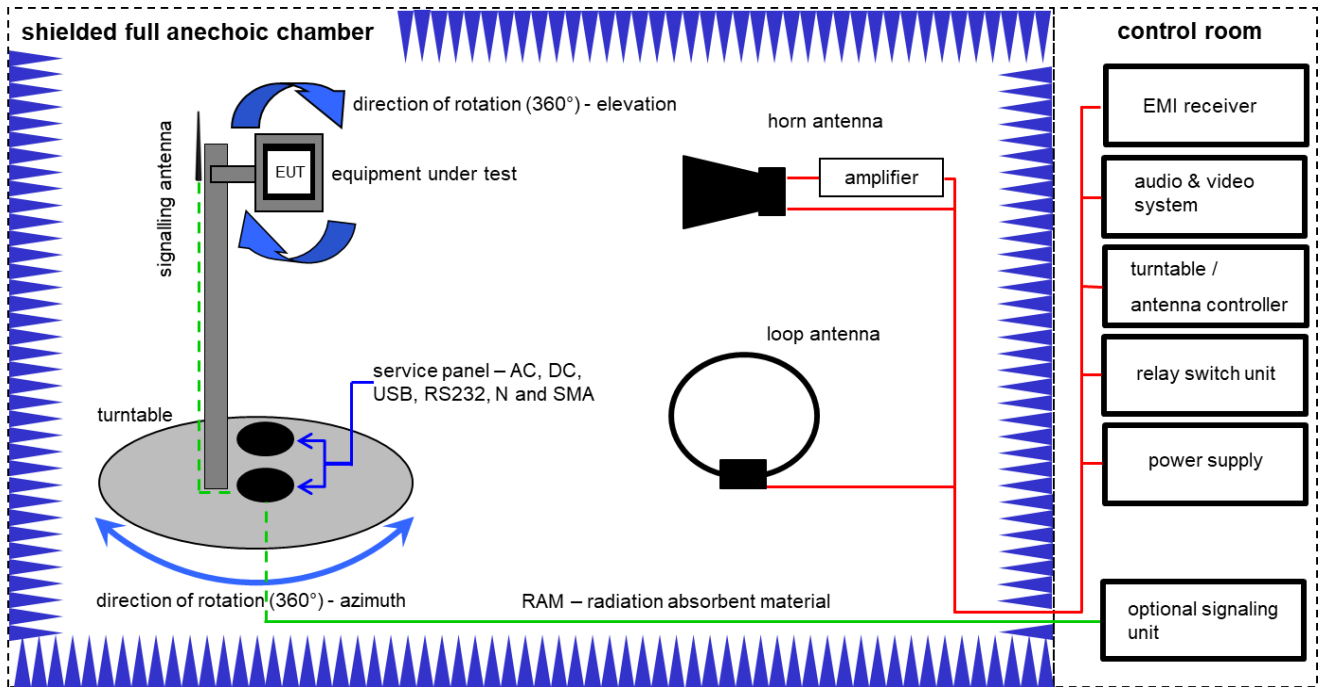
Example calculation:

$$FS \text{ [dB}\mu\text{V/m]} = 12.35 \text{ [dB}\mu\text{V/m]} + 1.90 \text{ [dB]} + 16.80 \text{ [dB/m]} = 31.05 \text{ [dB}\mu\text{V/m]} \text{ (35.69 } \mu\text{V/m)}$$

### Equipment table:

| No. | Lab / Item | Equipment                                    | Type             | Manufacturer                | Serial No.       | INV. No.  | Kind of Calibration | Last Calibration | Next Calibration |
|-----|------------|----------------------------------------------|------------------|-----------------------------|------------------|-----------|---------------------|------------------|------------------|
| 1   | A          | Switch-Unit                                  | 3488A            | HP                          | 2719A14505       | 300000368 | ev                  | -/-              | -/-              |
| 2   | A          | Meßkabine 1                                  | HF-Absorberhalle | MWB AG 300023               | Batch no. 699714 | 300000551 | ne                  | -/-              | -/-              |
| 3   | A          | Antenna Tower                                | Model 2175       | ETS-Lindgren                | 64762            | 300003745 | izw                 | -/-              | -/-              |
| 4   | A          | Positioning Controller                       | Model 2090       | ETS-Lindgren                | 64672            | 300003746 | izw                 | -/-              | -/-              |
| 5   | A          | Turntable Interface-Box                      | Model 105637     | ETS-Lindgren                | 44583            | 300003747 | izw                 | -/-              | -/-              |
| 6   | A          | TRILOG Broadband Test-Antenna 30 MHz - 3 GHz | VULB9163         | Schwarzbeck Mess-Elektronik | 295              | 300003787 | vKII                | 21.04.2021       | 20.04.2023       |
| 7   | A          | EMI Test Receiver                            | ESR3             | Rohde & Schwarz             | 102587           | 300005771 | k                   | 10.12.2020       | 09.06.2022       |
| 8   | A          | Wideband Radio Communication Tester          | CMW500           | Rohde & Schwarz             | 170616           | 300006251 | k                   | 16.09.2021       | 30.09.2023       |

## 8.2 Shielded fully anechoic chamber



Measurement distance: horn antenna 3 meter; loop 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)

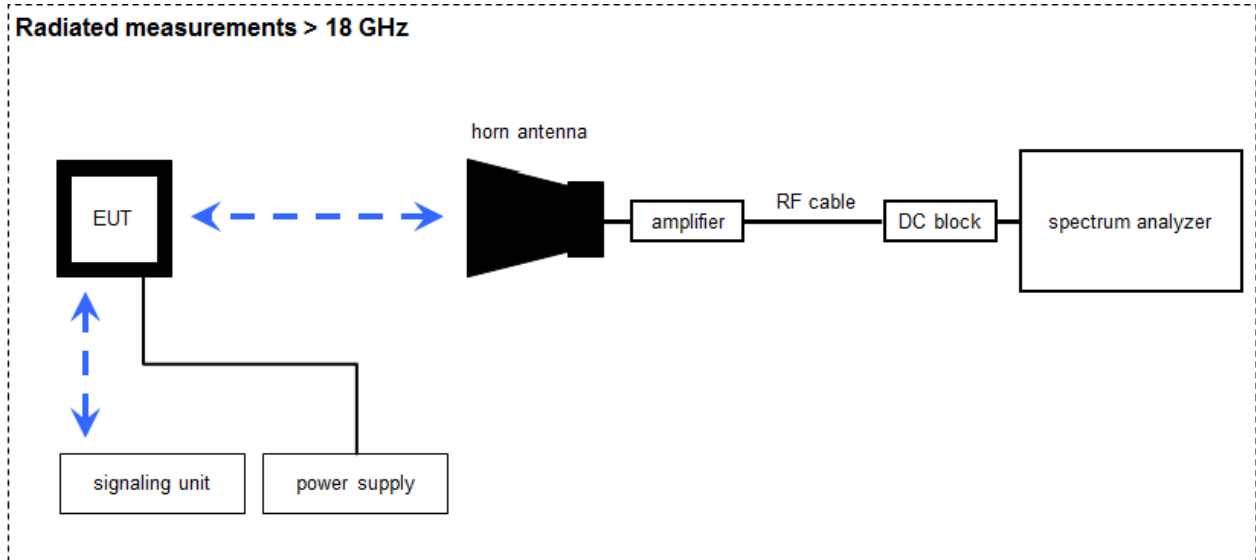
### Example calculation:

$$OP \text{ [dBm]} = -39.0 \text{ [dBm]} + 57.0 \text{ [dB]} - 12.0 \text{ [dBi]} + (-36.0) \text{ [dB]} = -30 \text{ [dBm]} (1 \text{ } \mu\text{W})$$

### Equipment table:

| No. | Setup | Equipment                                      | Type                    | Manufacturer         | Serial No. | INV. No.  | Kind of Calibration | Last Calibration | Next Calibration |
|-----|-------|------------------------------------------------|-------------------------|----------------------|------------|-----------|---------------------|------------------|------------------|
| 1   | B     | Active Loop Antenna 9 kHz to 30 MHz            | 6502                    | EMCO                 | 2210       | 300001015 | vIKI!               | 01.07.2021       | 31.07.2023       |
| 2   | A, B  | Anechoic chamber                               | FAC 3/5m                | MWB / TDK            | 87400/02   | 300000996 | ev                  | -/-              | -/-              |
| 3   | A     | Double-Ridged Waveguide Horn Antenna 1-18.0GHz | 3115                    | EMCO                 | 8812-3089  | 300000307 | vIKI!               | 11.02.2022       | 29.02.2024       |
| 4   | A, B  | EMI Test Receiver 20Hz- 26,5GHz                | ESU26                   | R&S                  | 100037     | 300003555 | k                   | 09.12.2021       | 31.12.2022       |
| 5   | A, B  | Highpass Filter                                | WHK1.1/15G-10SS         | Wainwright           | 3          | 300003255 | ev                  | -/-              | -/-              |
| 6   | A, B  | Highpass Filter                                | WHKX7.0/18G-8SS         | Wainwright           | 19         | 300003790 | ne                  | -/-              | -/-              |
| 7   | A     | 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 V3.21.0.27      | EMCO                 |            | 300004682 | ne                  | -/-              | -/-              |
| 10  | A     | RF-Amplifier                                   | AMF-6F06001800-30-10P-R | NARDA-MITEQ Inc      | 2011572    | 300005241 | ev                  | -/-              | -/-              |
| 11  | A, B  | Wideband Radio Communication Tester            | CMW500                  | Rohde & Schwarz      | 170616     | 300006251 | k                   | 16.09.2021       | 30.09.2023       |

### 8.3 Radiated measurements > 18 GHz



Measurement distance: horn antenna 50 cm

FS = UR + CA + AF

(FS-field strength; UR-voltage at the receiver; CA-loss signal path & distance correction; AF-antenna factor)

Example calculation:

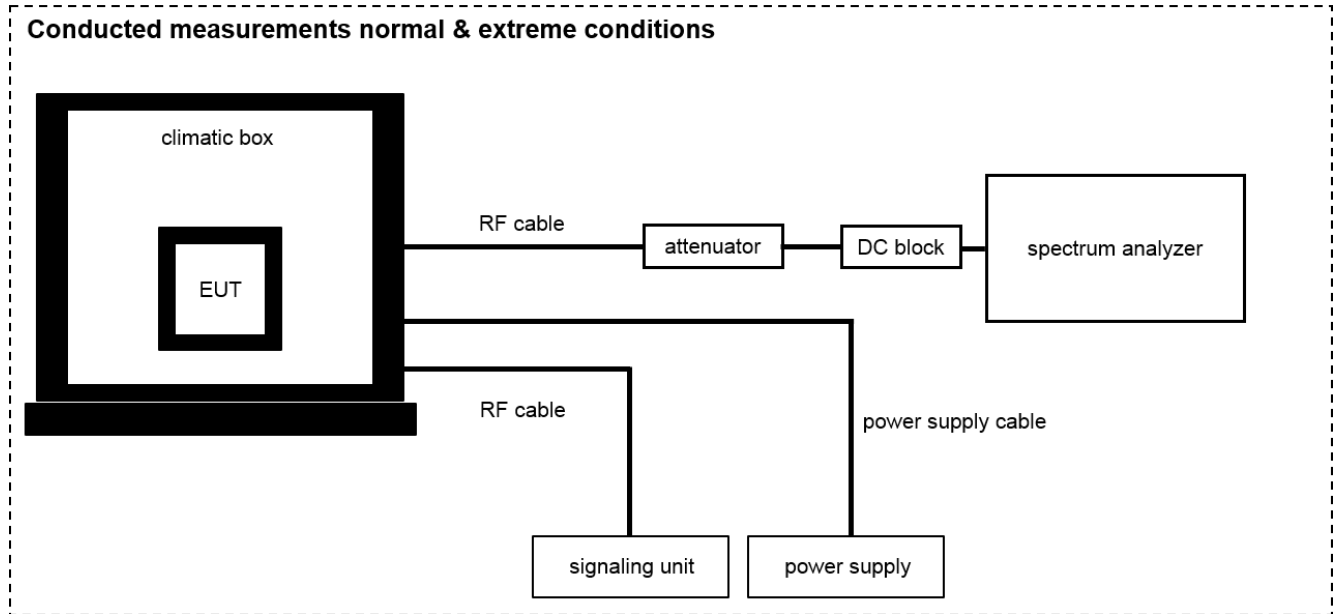
FS [dBμV/m] = 40.0 [dBμV/m] + (-60.1) [dB] + 36.74 [dB/m] = 16.64 [dBμV/m] (6.79 μV/m)

#### Equipment table:

| No. | Lab / Item | Equipment                                | Type               | Manufacturer    | Serial No.       | INV. No.  | Kind of Calibration | Last Calibration | Next Calibration |
|-----|------------|------------------------------------------|--------------------|-----------------|------------------|-----------|---------------------|------------------|------------------|
| 1   | A          | Microwave System Amplifier, 0.5-26.5 GHz | 83017A             | HP              | 00419            | 300002268 | ev                  | -/-              | -/-              |
| 2   | A          | Std. Gain Horn Antenna 18.0-26.5 GHz     | 638                | Narda           | 01096            | 300000486 | vIKI!               | 17.01.2022       | 31.01.2024       |
| 3   | A          | Std. Gain Horn Antenna 26.5-40.0 GHz     | V637               | Narda           | 82-16            | 300000510 | vIKI!               | 17.01.2022       | 31.01.2024       |
| 4   | A          | Broadband Low Noise Amplifier 18-50 GHz  | CBL18503070-XX     | CERNEX          | 19338            | 300004273 | ev                  | -/-              | -/-              |
| 5   | A          | RF-Cable                                 | ST18/SMAM/SMAM /48 | Huber & Suhner  | Batch no. 600918 | 400001182 | ev                  | -/-              | -/-              |
| 6   | A          | Signal Analyzer 40 GHz                   | FSV40              | R&S             | 101042           | 300004517 | k                   | 25.01.2022       | 31.01.2023       |
| 7   | A          | Wideband Radio Communication Tester      | CMW500             | Rohde & Schwarz | 170616           | 300006251 | k                   | 16.09.2021       | 30.09.2023       |

## 8.4 Conducted measurements normal and extreme conditions

### Conducted measurements normal & extreme 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. | Setup | Equipment                | Type                             | Manufacturer              | Serial No.       | INV. No.  | Kind of Calibration | Last Calibration | Next Calibration |
|-----|-------|--------------------------|----------------------------------|---------------------------|------------------|-----------|---------------------|------------------|------------------|
| 1   | A     | Signal analyzer          | FSV40                            | Rohde&Schwarz             | 101042           | 300004517 | k                   | 25.01.2022       | 31.01.2023       |
| 2   | A     | Teststand                | Teststand Custom Sequence Editor | National Instruments GmbH |                  | 300004590 | ne                  | -/-              | -/-              |
| 3   | A     | RF-Cable                 | ST18/SMAM/SMAM /72               | Huber & Suhner            | Batch no. 699714 | 400001184 | ev                  | -/-              | -/-              |
| 4   | A     | DC-Blocker 0.1-40 GHz    | 8141A                            | Inmet                     |                  | 400001185 | ev                  | -/-              | -/-              |
| 5   | A     | RF-Cable                 | ST18/SMAM/SMAM /36               | Huber & Suhner            | Batch no. 601494 | 400001309 | ev                  | -/-              | -/-              |
| 6   | A     | Temperature Test Chamber | T-40/50                          | CTS GmbH                  | 064023           | 300003540 | ev                  | 08.05.2022       | 07.05.2024       |

## 9 Measurement uncertainty

| Measurement uncertainty                        |                  |           |
|------------------------------------------------|------------------|-----------|
| Test case                                      | Uncertainty      |           |
| Antenna gain                                   | ± 3 dB           |           |
| 99 % bandwidth                                 | ± RBW            |           |
| -26 dB bandwidth                               | ± RBW            |           |
| Frequency stability                            | 10 <sup>-6</sup> |           |
| Maximum output power conducted                 | ± 1.56 dB        |           |
| Block edge compliance                          | ± 1.56 dB        |           |
| Spurious emissions conducted                   | > 3.6 GHz        | ± 1.56 dB |
|                                                | > 7 GHz          | ± 1.56 dB |
|                                                | > 18 GHz         | ± 2.31 dB |
|                                                | ≥ 40 GHz         | ± 2.97 dB |
| Spurious emissions radiated below 30 MHz       | ± 3 dB           |           |
| Spurious emissions radiated 30 MHz to 1 GHz    | ± 3 dB           |           |
| Spurious emissions radiated 1 GHz to 12.75 GHz | ± 3.7 dB         |           |
| Spurious emissions radiated above 12.75 GHz    | ± 4.5 dB         |           |

## 10 Additional information and comments

Reference documents: Customer Questionnaire\_F5688W\_Sagemcom\_v3.docx  
F5866WTMO\_ANTENNA MAPPING\_v2.xlsx  
1-3977\_22-02-11\_Annex\_MR\_A1.pdf  
1-3977\_22-02-11\_Annex\_MR\_A2.pdf

Special test descriptions: Although the device has 4 integrated antennas, for 5G NR band 77 only 2 antennas are used for TX mode (LTE\_M and 5GNR\_P).  
Supported bandwidths for 5G NR band 77: 10 MHz, 20 MHz, 30 MHz, 40 MHz, 50 MHz, 60 MHz, 70 MHz, 80 MHz, 90 MHz and 100 MHz..  
CP-OFDM and DFT-s-OFDM were investigated and DFT-s-OFDM was found to be the worst case.  
For 5G NR tests the MT8000A from Anritsu with the serial number SN6262186399 was used.

Configuration descriptions: None

EUT selection: ☐ Only one device available  
☐ Devices selected by the customer  
☒ Devices selected by the laboratory (Randomly)

## 11 RF measurements

### 11.1 Description of test setup

For the spurious measurements we use the substitution method according TIA/EIA 603.

## 12 Summary of measurement results

|                                     |                                                                                                                          |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | No deviations from the technical specifications were ascertained                                                         |
| <input type="checkbox"/>            | There were deviations from the technical specifications ascertained                                                      |
| <input 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: CFR Part 2 & Part 27 | See table! | 2022-07-28 | -/-    |

### 12.1 Part 27: 5G NR band 77

| Test Case                    | temperature conditions | power source voltages | C                                   | NC                       | NA                       | NP                       | Remark |
|------------------------------|------------------------|-----------------------|-------------------------------------|--------------------------|--------------------------|--------------------------|--------|
| RF Output Power              | Nominal                | Nominal               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | -/-    |
| Frequency Stability          | Extreme                | Extreme               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | -/-    |
| Spurious Emissions Radiated  | Nominal                | Nominal               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | -/-    |
| Spurious Emissions Conducted | Nominal                | Nominal               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | -/-    |
| Block Edge Compliance        | Nominal                | Nominal               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | -/-    |
| Occupied Bandwidth           | Nominal                | Nominal               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | -/-    |

#### Notes:

|          |           |           |               |           |                |           |               |
|----------|-----------|-----------|---------------|-----------|----------------|-----------|---------------|
| <b>C</b> | Compliant | <b>NC</b> | Not compliant | <b>NA</b> | Not applicable | <b>NP</b> | Not performed |
|----------|-----------|-----------|---------------|-----------|----------------|-----------|---------------|

## **13 RF measurements**

### **13.1 Description of test setup**

For the spurious measurements we use the substitution method according TIA/EIA 603.

### **13.2 Results 5G NR band 77**

The EUT was set to transmit the maximum power.

### 13.2.1 RF output power / Peak to AVG ratio – 5G NR n77 – 3450 MHz to 3550 MHz

#### Description:

This paragraph contains average power, peak output power and EIRP measurements for the mobile station. In all cases, the peak output power is within the required mask (this mask is specified in the JTC standards, TIA PN3389 Vol. 1 Chap 7, and is no FCC requirement).

#### Measurement:

The mobile was set up for the maximum output power with pseudo random data modulation.

To determine the Peak-To-Average Power Ratio (PAPR) the measurement was performed with the Power Complementary Cumulative Distribution Function (CCDF).

| Measurement parameters   |                                       |
|--------------------------|---------------------------------------|
| Detector:                | Sample                                |
| AQT:                     | See plot                              |
| Used equipment:          | See chapter 8.2 setup A & 8.4 setup A |
| Measurement uncertainty: | See chapter 9                         |
| Measurement procedure:   | FCC: § 2.1046                         |

#### Limits:

| FCC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| §27.50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p>Mobile devices are limited to 1Watt (30 dBm) EIRP. Mobile devices operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.</p> <p>Equipment employed must be authorized in accordance with the provisions of § 27.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (j)(5) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB</p> |
| <p>Power: 30 dBm EIRP<br/>PAPR: 13 dB</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

### 13.2.1.1 Results – conducted power

| Output Power (conducted) |                                        |                              |                                             |                                               |                                               |                                                |                                                 |
|--------------------------|----------------------------------------|------------------------------|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| ANT1 + ANT2 sum          |                                        |                              |                                             |                                               |                                               |                                                | ANT1                                            |
| Bandwidth<br>(MHz)       | Channel No.<br>/<br>Frequency<br>(MHz) | RB Allocation – RB<br>Offset | Average<br>Output<br>Power<br>(dBm)<br>QPSK | Average<br>Output<br>Power<br>(dBm)<br>16-QAM | Average<br>Output<br>Power<br>(dBm)<br>64-QAM | Average<br>Output<br>Power<br>(dBm)<br>256-QAM | Average<br>Output<br>Power<br>(dBm)<br>PI/2BPSK |
| 10                       | 630333 /<br>3455.0                     | 1 RB low                     | 23.9                                        | 23.8                                          | 23.7                                          | 22.6                                           | 22.0                                            |
|                          |                                        | 1 RB low+1                   | 25.8                                        | 25.4                                          | 23.6                                          | 22.5                                           | 25.4                                            |
|                          |                                        | 1 RB high-1                  | 25.8                                        | 25.5                                          | 23.6                                          | 22.5                                           | 25.4                                            |
|                          |                                        | 1 RB high                    | 23.8                                        | 23.7                                          | 23.6                                          | 22.4                                           | 22.0                                            |
|                          |                                        | 50% RB mid                   | 25.7                                        | 25.3                                          | 23.7                                          | 22.5                                           | 25.5                                            |
|                          |                                        | 100% RB                      | 24.3                                        | 24.2                                          | 23.8                                          | 22.5                                           | 25.0                                            |
|                          | 633332 /<br>3550.0                     | 1 RB low                     | 24.1                                        | 24.1                                          | 23.9                                          | 22.7                                           | 22.0                                            |
|                          |                                        | 1 RB low+1                   | 26.0                                        | 25.5                                          | 23.8                                          | 22.7                                           | 25.4                                            |
|                          |                                        | 1 RB high-1                  | 25.9                                        | 25.3                                          | 23.7                                          | 22.6                                           | 25.3                                            |
|                          |                                        | 1 RB high                    | 23.9                                        | 23.9                                          | 23.7                                          | 22.4                                           | 21.9                                            |
|                          |                                        | 50% RB mid                   | 25.9                                        | 25.4                                          | 23.9                                          | 22.5                                           | 25.4                                            |
|                          |                                        | 100% RB                      | 24.3                                        | 24.3                                          | 23.9                                          | 22.6                                           | 24.9                                            |
|                          | 636333 /<br>3545.0                     | 1 RB low                     | 24.1                                        | 24.2                                          | 23.9                                          | 22.7                                           | 21.9                                            |
|                          |                                        | 1 RB low+1                   | 26.0                                        | 25.7                                          | 23.9                                          | 22.8                                           | 25.4                                            |
|                          |                                        | 1 RB high-1                  | 25.9                                        | 25.5                                          | 23.7                                          | 22.7                                           | 25.7                                            |
|                          |                                        | 1 RB high                    | 23.9                                        | 23.9                                          | 23.7                                          | 22.5                                           | 22.1                                            |
|                          |                                        | 50% RB mid                   | 25.9                                        | 25.5                                          | 23.9                                          | 22.6                                           | 25.6                                            |
|                          |                                        | 100% RB                      | 24.4                                        | 24.5                                          | 24.0                                          | 22.6                                           | 25.2                                            |
| 20                       | 630666 /<br>3460.0                     | 1 RB low                     | 24.1                                        | 24.2                                          | 23.9                                          | 22.8                                           | 25.3                                            |
|                          |                                        | 1 RB low+1                   | 26.1                                        | 25.7                                          | 23.8                                          | 22.9                                           | 25.7                                            |
|                          |                                        | 1 RB high-1                  | 26.0                                        | 25.6                                          | 23.7                                          | 22.6                                           | 25.6                                            |
|                          |                                        | 1 RB high                    | 23.9                                        | 23.8                                          | 23.7                                          | 22.7                                           | 25.7                                            |
|                          |                                        | 50% RB mid                   | 25.9                                        | 25.5                                          | 23.8                                          | 22.7                                           | 25.7                                            |
|                          |                                        | 100% RB                      | 24.5                                        | 24.5                                          | 24.0                                          | 22.7                                           | 25.1                                            |
|                          | 633332 /<br>3550.0                     | 1 RB low                     | 23.9                                        | 24.0                                          | 23.7                                          | 22.5                                           | 22.2                                            |
|                          |                                        | 1 RB low+1                   | 25.9                                        | 25.3                                          | 23.7                                          | 22.6                                           | 25.7                                            |

| Output Power (conducted) |                                        |                              |                                             |                                               |                                               |                                                |                                                 |
|--------------------------|----------------------------------------|------------------------------|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| ANT1 + ANT2 sum          |                                        |                              |                                             |                                               |                                               |                                                | ANT1                                            |
| Bandwidth<br>(MHz)       | Channel No.<br>/<br>Frequency<br>(MHz) | RB Allocation – RB<br>Offset | Average<br>Output<br>Power<br>(dBm)<br>QPSK | Average<br>Output<br>Power<br>(dBm)<br>16-QAM | Average<br>Output<br>Power<br>(dBm)<br>64-QAM | Average<br>Output<br>Power<br>(dBm)<br>256-QAM | Average<br>Output<br>Power<br>(dBm)<br>PI/2BPSK |
|                          |                                        | 1 RB high-1                  | 25.6                                        | 24.9                                          | 23.2                                          | 22.3                                           | 25.5                                            |
|                          |                                        | 1 RB high                    | 23.5                                        | 23.4                                          | 23.3                                          | 22.2                                           | 25.5                                            |
|                          |                                        | 50% RB mid                   | 25.7                                        | 25.2                                          | 23.6                                          | 22.4                                           | 25.6                                            |
|                          |                                        | 100% RB                      | 24.1                                        | 24.1                                          | 23.7                                          | 22.4                                           | 25.1                                            |
|                          | 635998 /<br>3540.0                     | 1 RB low                     | 23.9                                        | 23.7                                          | 23.6                                          | 22.5                                           | 21.6                                            |
|                          |                                        | 1 RB low+1                   | 25.8                                        | 25.2                                          | 23.5                                          | 22.4                                           | 25.2                                            |
|                          |                                        | 1 RB high-1                  | 25.5                                        | 25.0                                          | 23.3                                          | 22.3                                           | 25.8                                            |
|                          |                                        | 1 RB high                    | 23.5                                        | 23.5                                          | 23.3                                          | 22.3                                           | 25.8                                            |
|                          |                                        | 50% RB mid                   | 25.7                                        | 25.2                                          | 23.7                                          | 22.4                                           | 25.4                                            |
|                          |                                        | 100% RB                      | 24.2                                        | 24.2                                          | 23.7                                          | 22.4                                           | 24.9                                            |
| 30                       | 631000 /<br>3465.0                     | 1 RB low                     | 23.6                                        | 23.7                                          | 23.5                                          | 22.4                                           | 22.3                                            |
|                          |                                        | 1 RB low+1                   | 25.8                                        | 25.1                                          | 23.4                                          | 22.3                                           | 25.8                                            |
|                          |                                        | 1 RB high-1                  | 25.5                                        | 24.9                                          | 23.2                                          | 22.3                                           | 25.6                                            |
|                          |                                        | 1 RB high                    | 23.4                                        | 23.5                                          | 23.2                                          | 22.1                                           | 25.6                                            |
|                          |                                        | 50% RB mid                   | 25.6                                        | 25.2                                          | 23.6                                          | 22.3                                           | 25.2                                            |
|                          |                                        | 100% RB                      | 24.1                                        | 24.1                                          | 23.6                                          | 22.3                                           | 25.2                                            |
|                          | 633332 /<br>3550.0                     | 1 RB low                     | 24.1                                        | 23.6                                          | 23.4                                          | 22.2                                           | 22.0                                            |
|                          |                                        | 1 RB low+1                   | 25.6                                        | 25.3                                          | 23.3                                          | 22.3                                           | 25.7                                            |
|                          |                                        | 1 RB high-1                  | 25.5                                        | 25.1                                          | 23.2                                          | 22.3                                           | 25.5                                            |
|                          |                                        | 1 RB high                    | 23.4                                        | 23.4                                          | 23.2                                          | 22.3                                           | 25.6                                            |
|                          |                                        | 50% RB mid                   | 25.6                                        | 25.1                                          | 23.6                                          | 22.3                                           | 25.6                                            |
|                          |                                        | 100% RB                      | 24.1                                        | 24.1                                          | 23.5                                          | 22.3                                           | 25.0                                            |
|                          | 635666 /<br>3535.0                     | 1 RB low                     | 23.6                                        | 23.7                                          | 23.5                                          | 22.3                                           | 22.0                                            |
|                          |                                        | 1 RB low+1                   | 25.7                                        | 25.2                                          | 23.5                                          | 22.4                                           | 25.4                                            |
|                          |                                        | 1 RB high-1                  | 25.7                                        | 25.2                                          | 23.3                                          | 22.4                                           | 25.9                                            |
|                          |                                        | 1 RB high                    | 23.6                                        | 23.5                                          | 23.4                                          | 22.4                                           | 25.9                                            |
|                          |                                        | 50% RB mid                   | 25.6                                        | 25.1                                          | 23.7                                          | 22.3                                           | 25.4                                            |
|                          |                                        | 100% RB                      | 24.1                                        | 24.1                                          | 23.6                                          | 22.3                                           | 25.1                                            |

| Output Power (conducted) |                                        |                              |                                             |                                               |                                               |                                                |                                                 |
|--------------------------|----------------------------------------|------------------------------|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| ANT1 + ANT2 sum          |                                        |                              |                                             |                                               |                                               |                                                | ANT1                                            |
| Bandwidth<br>(MHz)       | Channel No.<br>/<br>Frequency<br>(MHz) | RB Allocation – RB<br>Offset | Average<br>Output<br>Power<br>(dBm)<br>QPSK | Average<br>Output<br>Power<br>(dBm)<br>16-QAM | Average<br>Output<br>Power<br>(dBm)<br>64-QAM | Average<br>Output<br>Power<br>(dBm)<br>256-QAM | Average<br>Output<br>Power<br>(dBm)<br>PI/2BPSK |
| 40                       | 631332 /<br>3470.0                     | 1 RB low                     | 23.9                                        | 23.8                                          | 23.7                                          | 22.6                                           | 22.4                                            |
|                          |                                        | 1 RB low+1                   | 25.8                                        | 25.4                                          | 23.6                                          | 22.5                                           | 25.6                                            |
|                          |                                        | 1 RB high-1                  | 25.8                                        | 25.5                                          | 23.6                                          | 22.5                                           | 25.7                                            |
|                          |                                        | 1 RB high                    | 23.8                                        | 23.7                                          | 23.6                                          | 22.4                                           | 25.7                                            |
|                          |                                        | 50% RB mid                   | 25.7                                        | 25.3                                          | 23.7                                          | 22.5                                           | 25.7                                            |
|                          |                                        | 100% RB                      | 24.3                                        | 24.2                                          | 23.8                                          | 22.5                                           | 25.3                                            |
|                          | 633332 /<br>3550.0                     | 1 RB low                     | 24.1                                        | 24.1                                          | 23.9                                          | 22.7                                           | 22.3                                            |
|                          |                                        | 1 RB low+1                   | 26.0                                        | 25.5                                          | 23.8                                          | 22.7                                           | 25.7                                            |
|                          |                                        | 1 RB high-1                  | 25.9                                        | 25.3                                          | 23.7                                          | 22.6                                           | 25.6                                            |
|                          |                                        | 1 RB high                    | 23.9                                        | 23.9                                          | 23.7                                          | 22.4                                           | 25.6                                            |
|                          |                                        | 50% RB mid                   | 25.9                                        | 25.4                                          | 23.9                                          | 22.5                                           | 25.6                                            |
|                          |                                        | 100% RB                      | 24.3                                        | 24.3                                          | 23.9                                          | 22.6                                           | 25.1                                            |
|                          | 635332 /<br>3530.0                     | 1 RB low                     | 24.1                                        | 24.2                                          | 23.9                                          | 22.7                                           | 22.3                                            |
|                          |                                        | 1 RB low+1                   | 26.0                                        | 25.7                                          | 23.9                                          | 22.8                                           | 25.7                                            |
|                          |                                        | 1 RB high-1                  | 25.9                                        | 25.5                                          | 23.7                                          | 22.7                                           | 25.9                                            |
|                          |                                        | 1 RB high                    | 23.9                                        | 23.9                                          | 23.7                                          | 22.5                                           | 25.8                                            |
|                          |                                        | 50% RB mid                   | 25.9                                        | 25.5                                          | 23.9                                          | 22.6                                           | 25.3                                            |
|                          |                                        | 100% RB                      | 24.4                                        | 24.5                                          | 24.0                                          | 22.6                                           | 25.0                                            |
| 50                       | 631666 /<br>3475.0                     | 1 RB low                     | 24.1                                        | 24.2                                          | 23.9                                          | 22.8                                           | 22.1                                            |
|                          |                                        | 1 RB low+1                   | 26.1                                        | 25.7                                          | 23.8                                          | 22.9                                           | 25.5                                            |
|                          |                                        | 1 RB high-1                  | 26.0                                        | 25.6                                          | 23.7                                          | 22.6                                           | 25.3                                            |
|                          |                                        | 1 RB high                    | 23.9                                        | 23.8                                          | 23.7                                          | 22.7                                           | 25.3                                            |
|                          |                                        | 50% RB mid                   | 25.9                                        | 25.5                                          | 23.8                                          | 22.7                                           | 25.4                                            |
|                          |                                        | 100% RB                      | 24.5                                        | 24.5                                          | 24.0                                          | 22.7                                           | 24.9                                            |
|                          | 633332 /<br>3550.0                     | 1 RB low                     | 23.9                                        | 24.0                                          | 23.7                                          | 22.5                                           | 21.8                                            |
|                          |                                        | 1 RB low+1                   | 25.9                                        | 25.3                                          | 23.7                                          | 22.6                                           | 25.4                                            |
|                          |                                        | 1 RB high-1                  | 25.6                                        | 24.9                                          | 23.2                                          | 22.3                                           | 25.0                                            |
|                          |                                        | 1 RB high                    | 23.5                                        | 23.4                                          | 23.3                                          | 22.2                                           | 25.1                                            |

| Output Power (conducted) |                               |                           |                                 |                                   |                                   |                                    |                                     |
|--------------------------|-------------------------------|---------------------------|---------------------------------|-----------------------------------|-----------------------------------|------------------------------------|-------------------------------------|
| ANT1 + ANT2 sum          |                               |                           |                                 |                                   |                                   |                                    | ANT1                                |
| Bandwidth (MHz)          | Channel No. / Frequency (MHz) | RB Allocation – RB Offset | Average Output Power (dBm) QPSK | Average Output Power (dBm) 16-QAM | Average Output Power (dBm) 64-QAM | Average Output Power (dBm) 256-QAM | Average Output Power (dBm) PI/2BPSK |
|                          |                               | 50% RB mid                | 25.7                            | 25.2                              | 23.6                              | 22.4                               | 25.4                                |
|                          |                               | 100% RB                   | 24.1                            | 24.1                              | 23.7                              | 22.4                               | 24.8                                |
|                          | 634998 / 3525.0               | 1 RB low                  | 23.9                            | 23.7                              | 23.6                              | 22.5                               | 22.0                                |
|                          |                               | 1 RB low+1                | 25.8                            | 25.2                              | 23.5                              | 22.4                               | 25.6                                |
|                          |                               | 1 RB high-1               | 25.5                            | 25.0                              | 23.3                              | 22.3                               | 25.4                                |
|                          |                               | 1 RB high                 | 23.5                            | 23.5                              | 23.3                              | 22.3                               | 25.4                                |
|                          |                               | 50% RB mid                | 25.7                            | 25.2                              | 23.7                              | 22.4                               | 25.1                                |
|                          |                               | 100% RB                   | 24.2                            | 24.2                              | 23.7                              | 22.4                               | 24.8                                |
| 60                       | 632000 / 3480.0               | 1 RB low                  | 23.6                            | 23.7                              | 23.5                              | 22.4                               | 22.0                                |
|                          |                               | 1 RB low+1                | 25.8                            | 25.1                              | 23.4                              | 22.3                               | 25.6                                |
|                          |                               | 1 RB high-1               | 25.5                            | 24.9                              | 23.2                              | 22.3                               | 25.5                                |
|                          |                               | 1 RB high                 | 23.4                            | 23.5                              | 23.2                              | 22.1                               | 22.1                                |
|                          |                               | 50% RB mid                | 25.6                            | 25.2                              | 23.6                              | 22.3                               | 25.5                                |
|                          |                               | 100% RB                   | 24.1                            | 24.1                              | 23.6                              | 22.3                               | 25.1                                |
|                          | 633332 / 3550.0               | 1 RB low                  | 24.1                            | 23.6                              | 23.4                              | 22.2                               | 21.8                                |
|                          |                               | 1 RB low+1                | 25.6                            | 25.3                              | 23.3                              | 22.3                               | 25.5                                |
|                          |                               | 1 RB high-1               | 25.5                            | 25.1                              | 23.2                              | 22.3                               | 24.8                                |
|                          |                               | 1 RB high                 | 23.4                            | 23.4                              | 23.2                              | 22.3                               | 21.4                                |
|                          |                               | 50% RB mid                | 25.6                            | 25.1                              | 23.6                              | 22.3                               | 25.5                                |
|                          |                               | 100% RB                   | 24.1                            | 24.1                              | 23.5                              | 22.3                               | 24.9                                |
|                          | 634666 / 3520.0               | 1 RB low                  | 23.6                            | 23.7                              | 23.5                              | 22.3                               | 22.0                                |
|                          |                               | 1 RB low+1                | 25.7                            | 25.2                              | 23.5                              | 22.4                               | 25.6                                |
|                          |                               | 1 RB high-1               | 25.7                            | 25.2                              | 23.3                              | 22.4                               | 25.5                                |
|                          |                               | 1 RB high                 | 23.6                            | 23.5                              | 23.4                              | 22.4                               | 22.0                                |
|                          |                               | 50% RB mid                | 25.6                            | 25.1                              | 23.7                              | 22.3                               | 25.4                                |
|                          |                               | 100% RB                   | 24.1                            | 24.1                              | 23.6                              | 22.3                               | 24.8                                |
| 70                       | 632333 / 3485.0               | 1 RB low                  | 23.9                            | 23.8                              | 23.7                              | 22.6                               | 21.9                                |
|                          |                               | 1 RB low+1                | 25.8                            | 25.4                              | 23.6                              | 22.5                               | 25.4                                |

| Output Power (conducted) |                                        |                              |                                             |                                               |                                               |                                                |                                                 |
|--------------------------|----------------------------------------|------------------------------|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| ANT1 + ANT2 sum          |                                        |                              |                                             |                                               |                                               |                                                | ANT1                                            |
| Bandwidth<br>(MHz)       | Channel No.<br>/<br>Frequency<br>(MHz) | RB Allocation – RB<br>Offset | Average<br>Output<br>Power<br>(dBm)<br>QPSK | Average<br>Output<br>Power<br>(dBm)<br>16-QAM | Average<br>Output<br>Power<br>(dBm)<br>64-QAM | Average<br>Output<br>Power<br>(dBm)<br>256-QAM | Average<br>Output<br>Power<br>(dBm)<br>PI/2BPSK |
|                          |                                        | 1 RB high-1                  | 25.8                                        | 25.5                                          | 23.6                                          | 22.5                                           | 25.2                                            |
|                          |                                        | 1 RB high                    | 23.8                                        | 23.7                                          | 23.6                                          | 22.4                                           | 25.0                                            |
|                          |                                        | 50% RB mid                   | 25.7                                        | 25.3                                          | 23.7                                          | 22.5                                           | 25.2                                            |
|                          |                                        | 100% RB                      | 24.3                                        | 24.2                                          | 23.8                                          | 22.5                                           | 24.8                                            |
|                          | 633332 /<br>3550.0                     | 1 RB low                     | 24.1                                        | 24.1                                          | 23.9                                          | 22.7                                           | 21.8                                            |
|                          |                                        | 1 RB low+1                   | 26.0                                        | 25.5                                          | 23.8                                          | 22.7                                           | 25.4                                            |
|                          |                                        | 1 RB high-1                  | 25.9                                        | 25.3                                          | 23.7                                          | 22.6                                           | 24.8                                            |
|                          |                                        | 1 RB high                    | 23.9                                        | 23.9                                          | 23.7                                          | 22.4                                           | 24.8                                            |
|                          |                                        | 50% RB mid                   | 25.9                                        | 25.4                                          | 23.9                                          | 22.5                                           | 25.2                                            |
|                          |                                        | 100% RB                      | 24.3                                        | 24.3                                          | 23.9                                          | 22.6                                           | 24.7                                            |
|                          | 634333 /<br>3515.0                     | 1 RB low                     | 24.1                                        | 24.2                                          | 23.9                                          | 22.7                                           | 21.9                                            |
|                          |                                        | 1 RB low+1                   | 26.0                                        | 25.7                                          | 23.9                                          | 22.8                                           | 25.3                                            |
|                          |                                        | 1 RB high-1                  | 25.9                                        | 25.5                                          | 23.7                                          | 22.7                                           | 25.5                                            |
|                          |                                        | 1 RB high                    | 23.9                                        | 23.9                                          | 23.7                                          | 22.5                                           | 25.5                                            |
|                          |                                        | 50% RB mid                   | 25.9                                        | 25.5                                          | 23.9                                          | 22.6                                           | 25.4                                            |
|                          |                                        | 100% RB                      | 24.4                                        | 24.5                                          | 24.0                                          | 22.6                                           | 24.8                                            |
| 80                       | 632666 /<br>3490.0                     | 1 RB low                     | 24.1                                        | 24.2                                          | 23.9                                          | 22.8                                           | 22.0                                            |
|                          |                                        | 1 RB low+1                   | 26.1                                        | 25.7                                          | 23.8                                          | 22.9                                           | 25.3                                            |
|                          |                                        | 1 RB high-1                  | 26.0                                        | 25.6                                          | 23.7                                          | 22.6                                           | 24.9                                            |
|                          |                                        | 1 RB high                    | 23.9                                        | 23.8                                          | 23.7                                          | 22.7                                           | 24.8                                            |
|                          |                                        | 50% RB mid                   | 25.9                                        | 25.5                                          | 23.8                                          | 22.7                                           | 25.5                                            |
|                          |                                        | 100% RB                      | 24.5                                        | 24.5                                          | 24.0                                          | 22.7                                           | 24.9                                            |
|                          | 633332 /<br>3550.0                     | 1 RB low                     | 23.9                                        | 24.0                                          | 23.7                                          | 22.5                                           | 21.8                                            |
|                          |                                        | 1 RB low+1                   | 25.9                                        | 25.3                                          | 23.7                                          | 22.6                                           | 25.3                                            |
|                          |                                        | 1 RB high-1                  | 25.6                                        | 24.9                                          | 23.2                                          | 22.3                                           | 24.8                                            |
|                          |                                        | 1 RB high                    | 23.5                                        | 23.4                                          | 23.3                                          | 22.2                                           | 24.9                                            |
|                          |                                        | 50% RB mid                   | 25.7                                        | 25.2                                          | 23.6                                          | 22.4                                           | 25.4                                            |
|                          |                                        | 100% RB                      | 24.1                                        | 24.1                                          | 23.7                                          | 22.4                                           | 24.8                                            |

| Output Power (conducted) |                               |                           |                                 |                                   |                                   |                                    |                                     |
|--------------------------|-------------------------------|---------------------------|---------------------------------|-----------------------------------|-----------------------------------|------------------------------------|-------------------------------------|
| ANT1 + ANT2 sum          |                               |                           |                                 |                                   |                                   |                                    | ANT1                                |
| Bandwidth (MHz)          | Channel No. / Frequency (MHz) | RB Allocation – RB Offset | Average Output Power (dBm) QPSK | Average Output Power (dBm) 16-QAM | Average Output Power (dBm) 64-QAM | Average Output Power (dBm) 256-QAM | Average Output Power (dBm) PI/2BPSK |
|                          | 633998 / 3510.0               | 1 RB low                  | 23.9                            | 23.7                              | 23.6                              | 22.5                               | 21.9                                |
|                          |                               | 1 RB low+1                | 25.8                            | 25.2                              | 23.5                              | 22.4                               | 25.4                                |
|                          |                               | 1 RB high-1               | 25.5                            | 25.0                              | 23.3                              | 22.3                               | 25.5                                |
|                          |                               | 1 RB high                 | 23.5                            | 23.5                              | 23.3                              | 22.3                               | 25.6                                |
|                          |                               | 50% RB mid                | 25.7                            | 25.2                              | 23.7                              | 22.4                               | 25.3                                |
|                          |                               | 100% RB                   | 24.2                            | 24.2                              | 23.7                              | 22.4                               | 24.8                                |
| 90                       | 633000 / 3495.0               | 1 RB low                  | 23.6                            | 23.7                              | 23.5                              | 22.4                               | 22                                  |
|                          |                               | 1 RB low+1                | 25.8                            | 25.1                              | 23.4                              | 22.3                               | 25.4                                |
|                          |                               | 1 RB high-1               | 25.5                            | 24.9                              | 23.2                              | 22.3                               | 25                                  |
|                          |                               | 1 RB high                 | 23.4                            | 23.5                              | 23.2                              | 22.1                               | 25.1                                |
|                          |                               | 50% RB mid                | 25.6                            | 25.2                              | 23.6                              | 22.3                               | 25.4                                |
|                          |                               | 100% RB                   | 24.1                            | 24.1                              | 23.6                              | 22.3                               | 24.8                                |
|                          | 633332 / 3550.0               | 1 RB low                  | 24.1                            | 23.6                              | 23.4                              | 22.2                               | 22                                  |
|                          |                               | 1 RB low+1                | 25.6                            | 25.3                              | 23.3                              | 22.3                               | 25.3                                |
|                          |                               | 1 RB high-1               | 25.5                            | 25.1                              | 23.2                              | 22.3                               | 25.3                                |
|                          |                               | 1 RB high                 | 23.4                            | 23.4                              | 23.2                              | 22.3                               | 25.2                                |
|                          |                               | 50% RB mid                | 25.6                            | 25.1                              | 23.6                              | 22.3                               | 25.3                                |
|                          |                               | 100% RB                   | 24.1                            | 24.1                              | 23.5                              | 22.3                               | 24.7                                |
|                          | 633666 / 3505.0               | 1 RB low                  | 23.6                            | 23.7                              | 23.5                              | 22.3                               | 21.9                                |
|                          |                               | 1 RB low+1                | 25.7                            | 25.2                              | 23.5                              | 22.4                               | 25.2                                |
|                          |                               | 1 RB high-1               | 25.7                            | 25.2                              | 23.3                              | 22.4                               | 25.6                                |
|                          |                               | 1 RB high                 | 23.6                            | 23.5                              | 23.4                              | 22.4                               | 25.7                                |
|                          |                               | 50% RB mid                | 25.6                            | 25.1                              | 23.7                              | 22.3                               | 25.4                                |
|                          |                               | 100% RB                   | 24.1                            | 24.1                              | 23.6                              | 22.3                               | 24.9                                |
| 100                      | -/-                           | -/-                       | -/-                             | -/-                               | -/-                               | -/-                                | -/-                                 |
|                          |                               | -/-                       | -/-                             | -/-                               | -/-                               | -/-                                | -/-                                 |
|                          |                               | -/-                       | -/-                             | -/-                               | -/-                               | -/-                                | -/-                                 |
|                          |                               | -/-                       | -/-                             | -/-                               | -/-                               | -/-                                | -/-                                 |

| Output Power (conducted) |                                        |                              |                                             |                                               |                                               |                                                |                                                 |
|--------------------------|----------------------------------------|------------------------------|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| ANT1 + ANT2 sum          |                                        |                              |                                             |                                               |                                               |                                                | ANT1                                            |
| Bandwidth<br>(MHz)       | Channel No.<br>/<br>Frequency<br>(MHz) | RB Allocation – RB<br>Offset | Average<br>Output<br>Power<br>(dBm)<br>QPSK | Average<br>Output<br>Power<br>(dBm)<br>16-QAM | Average<br>Output<br>Power<br>(dBm)<br>64-QAM | Average<br>Output<br>Power<br>(dBm)<br>256-QAM | Average<br>Output<br>Power<br>(dBm)<br>PI/2BPSK |
|                          |                                        | -/-                          | -/-                                         | -/-                                           | -/-                                           | -/-                                            | -/-                                             |
|                          |                                        | -/-                          | -/-                                         | -/-                                           | -/-                                           | -/-                                            | -/-                                             |
|                          | 633332 /<br>3550.0                     | 1 RB low                     | 23.7                                        | 23.8                                          | 23.4                                          | 22.3                                           | 21.8                                            |
|                          |                                        | 1 RB low+1                   | 25.7                                        | 25.3                                          | 23.4                                          | 22.3                                           | 25.3                                            |
|                          |                                        | 1 RB high-1                  | 25.8                                        | 25.5                                          | 23.5                                          | 22.4                                           | 25.4                                            |
|                          |                                        | 1 RB high                    | 23.6                                        | 23.6                                          | 23.4                                          | 22.4                                           | 25.4                                            |
|                          |                                        | 50% RB mid                   | 25.6                                        | 25.1                                          | 23.6                                          | 22.3                                           | 25.3                                            |
|                          |                                        | 100% RB                      | 24.1                                        | 24.1                                          | 23.6                                          | 22.3                                           | 24.8                                            |
|                          | -/-                                    | -/-                          | -/-                                         | -/-                                           | -/-                                           | -/-                                            | -/-                                             |
|                          |                                        | -/-                          | -/-                                         | -/-                                           | -/-                                           | -/-                                            | -/-                                             |
|                          |                                        | -/-                          | -/-                                         | -/-                                           | -/-                                           | -/-                                            | -/-                                             |
|                          |                                        | -/-                          | -/-                                         | -/-                                           | -/-                                           | -/-                                            | -/-                                             |
|                          |                                        | -/-                          | -/-                                         | -/-                                           | -/-                                           | -/-                                            | -/-                                             |
|                          |                                        | -/-                          | -/-                                         | -/-                                           | -/-                                           | -/-                                            | -/-                                             |
|                          |                                        | -/-                          | -/-                                         | -/-                                           | -/-                                           | -/-                                            | -/-                                             |

### 13.2.1.2 Results – EIRP

| Radiated output power (EIRP) |                                  |                                             |                                               |                                               |                                                |                                                 |
|------------------------------|----------------------------------|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| ANT1+ANT2                    |                                  |                                             |                                               |                                               |                                                | ANT1                                            |
| Bandwidth<br>(MHz)           | Channel No. /<br>Frequency (MHz) | Average<br>Output<br>Power<br>(dBm)<br>QPSK | Average<br>Output<br>Power<br>(dBm)<br>16-QAM | Average<br>Output<br>Power<br>(dBm)<br>64-QAM | Average<br>Output<br>Power<br>(dBm)<br>256-QAM | Average<br>Output<br>Power<br>(dBm)<br>PI/2BPSK |
| 10                           | 630333 / 3455.0                  | 27.6                                        | 27.3                                          | 25.6                                          | 24.4                                           | 26.4                                            |
|                              | 633332 / 3550.0                  | 27.7                                        | 27.2                                          | 25.6                                          | 24.4                                           | 25.8                                            |
|                              | 636333 / 3545.0                  | 27.3                                        | 27.0                                          | 25.3                                          | 24.1                                           | 25.0                                            |
| 20                           | 630666 / 3460.0                  | 27.9                                        | 27.5                                          | 25.8                                          | 24.7                                           | 26.6                                            |
|                              | 633332 / 3550.0                  | 27.6                                        | 27.0                                          | 25.4                                          | 24.3                                           | 26.1                                            |
|                              | 635998 / 3540.0                  | 27.1                                        | 26.5                                          | 25.0                                          | 23.8                                           | 25.1                                            |
| 30                           | 631000 / 3465.0                  | 27.6                                        | 27.0                                          | 25.4                                          | 24.2                                           | 26.7                                            |
|                              | 633332 / 3550.0                  | 27.3                                        | 27.0                                          | 25.3                                          | 24.0                                           | 26.1                                            |
|                              | 635666 / 3535.0                  | 27.0                                        | 26.5                                          | 25.0                                          | 23.7                                           | 25.2                                            |
| 40                           | 631332 / 3470.0                  | 27.6                                        | 27.3                                          | 25.6                                          | 24.4                                           | 26.6                                            |
|                              | 633332 / 3550.0                  | 27.7                                        | 27.2                                          | 25.6                                          | 24.4                                           | 26.1                                            |
|                              | 635332 / 3530.0                  | 27.3                                        | 27.0                                          | 25.3                                          | 24.1                                           | 25.2                                            |
| 50                           | 631666 / 3475.0                  | 27.9                                        | 27.5                                          | 25.8                                          | 24.7                                           | 26.4                                            |
|                              | 633332 / 3550.0                  | 27.6                                        | 27.0                                          | 25.4                                          | 24.3                                           | 25.8                                            |
|                              | 634998 / 3525.0                  | 27.1                                        | 26.5                                          | 25.0                                          | 23.8                                           | 24.9                                            |
| 60                           | 632000 / 3480.0                  | 27.6                                        | 27.0                                          | 25.4                                          | 24.2                                           | 26.5                                            |
|                              | 633332 / 3550.0                  | 27.3                                        | 27.0                                          | 25.3                                          | 24.0                                           | 25.9                                            |
|                              | 634666 / 3520.0                  | 27.0                                        | 26.5                                          | 25.0                                          | 23.7                                           | 24.9                                            |
| 70                           | 632333 / 3485.0                  | 27.6                                        | 27.3                                          | 25.6                                          | 24.4                                           | 26.3                                            |
|                              | 633332 / 3550.0                  | 27.7                                        | 27.2                                          | 25.6                                          | 24.4                                           | 25.8                                            |
|                              | 634333 / 3515.0                  | 27.3                                        | 27.0                                          | 25.3                                          | 24.1                                           | 24.8                                            |
| 80                           | 632666 / 3490.0                  | 27.9                                        | 27.5                                          | 25.8                                          | 24.7                                           | 26.4                                            |
|                              | 633332 / 3550.0                  | 27.6                                        | 27.0                                          | 25.4                                          | 24.3                                           | 25.8                                            |
|                              | 633998 / 3510.0                  | 27.1                                        | 26.5                                          | 25.0                                          | 23.8                                           | 24.9                                            |
| 90                           | 633000 / 3495.0                  | 27.6                                        | 27.0                                          | 25.4                                          | 24.2                                           | 26.3                                            |
|                              | 633332 / 3550.0                  | 27.3                                        | 27.0                                          | 25.3                                          | 24.0                                           | 25.7                                            |

| Radiated output power (EIRP) |                                  |                                             |                                               |                                               |                                                |                                                 |
|------------------------------|----------------------------------|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| ANT1+ANT2                    |                                  |                                             |                                               |                                               |                                                | ANT1                                            |
| Bandwidth<br>(MHz)           | Channel No. /<br>Frequency (MHz) | Average<br>Output<br>Power<br>(dBm)<br>QPSK | Average<br>Output<br>Power<br>(dBm)<br>16-QAM | Average<br>Output<br>Power<br>(dBm)<br>64-QAM | Average<br>Output<br>Power<br>(dBm)<br>256-QAM | Average<br>Output<br>Power<br>(dBm)<br>PI/2BPSK |
|                              | 633666 / 3505.0                  | 27.0                                        | 26.5                                          | 25.0                                          | 23.7                                           | 25.0                                            |
| 100                          | -/-                              | -/-                                         | -/-                                           | -/-                                           | -/-                                            | -/-                                             |
|                              | 633332 / 3550.0                  | 27.5                                        | 27.2                                          | 25.3                                          | 24.1                                           | 25.8                                            |
|                              | -/-                              | -/-                                         | -/-                                           | -/-                                           | -/-                                            | -/-                                             |

### 13.2.1.3 Results – Peak to AVG ratio

| Peak to average ratio (conducted) |                               |                           |                                 |                                   |                                   |                                    |                                     |
|-----------------------------------|-------------------------------|---------------------------|---------------------------------|-----------------------------------|-----------------------------------|------------------------------------|-------------------------------------|
| ANT1                              |                               |                           |                                 |                                   |                                   |                                    | ANT1                                |
| Bandwidth (MHz)                   | Channel No. / Frequency (MHz) | RB Allocation – RB Offset | Peak to Average ratio (dB) QPSK | Peak to Average ratio (dB) 16-QAM | Peak to Average ratio (dB) 64-QAM | Peak to Average ratio (dB) 256-QAM | Peak to Average ratio (dB) PI/2BPSK |
| 10                                | 630333 / 3455.0               | 100% RB                   | 5.22                            | 5.63                              | 5.05                              | 7.24                               | 5.60                                |
|                                   | 633332 / 3550.0               | 100% RB                   | 5.97                            | 5.56                              | 5.23                              | 7.42                               | 5.15                                |
|                                   | 636333 / 3545.0               | 100% RB                   | 5.98                            | 5.80                              | 6.26                              | 6.52                               | 6.57                                |
| 20                                | 630666 / 3460.0               | 100% RB                   | 5.08                            | 5.59                              | 7.39                              | 4.36                               | 4.30                                |
|                                   | 633332 / 3550.0               | 100% RB                   | 5.49                            | 7.97                              | 7.11                              | 4.84                               | 5.81                                |
|                                   | 635998 / 3540.0               | 100% RB                   | 7.16                            | 5.34                              | 4.43                              | 4.85                               | 5.72                                |
| 30                                | 631000 / 3465.0               | 100% RB                   | 6.39                            | 7.43                              | 6.10                              | 7.84                               | 6.79                                |
|                                   | 633332 / 3550.0               | 100% RB                   | 7.28                            | 7.26                              | 7.18                              | 5.75                               | 6.15                                |
|                                   | 635666 / 3535.0               | 100% RB                   | 5.31                            | 7.93                              | 5.96                              | 5.26                               | 6.50                                |
| 40                                | 631332 / 3470.0               | 100% RB                   | 4.35                            | 4.39                              | 6.99                              | 6.44                               | 4.51                                |
|                                   | 633332 / 3550.0               | 100% RB                   | 6.14                            | 6.12                              | 7.09                              | 5.94                               | 5.23                                |
|                                   | 635332 / 3530.0               | 100% RB                   | 7.35                            | 4.09                              | 7.14                              | 4.66                               | 4.52                                |
| 50                                | 631666 / 3475.0               | 100% RB                   | 4.19                            | 6.30                              | 6.31                              | 4.77                               | 5.57                                |
|                                   | 633332 / 3550.0               | 100% RB                   | 4.87                            | 5.25                              | 4.03                              | 7.23                               | 6.84                                |
|                                   | 634998 / 3525.0               | 100% RB                   | 4.26                            | 6.33                              | 4.80                              | 6.03                               | 4.63                                |
| 60                                | 632000 / 3480.0               | 100% RB                   | 5.08                            | 4.81                              | 6.50                              | 5.28                               | 6.69                                |
|                                   | 633332 / 3550.0               | 100% RB                   | 6.64                            | 4.70                              | 5.53                              | 6.56                               | 6.90                                |
|                                   | 634666 / 3520.0               | 100% RB                   | 7.74                            | 7.70                              | 4.03                              | 5.86                               | 4.76                                |
| 70                                | 632333 / 3485.0               | 100% RB                   | 4.18                            | 5.36                              | 4.01                              | 6.40                               | 4.75                                |
|                                   | 633332 / 3550.0               | 100% RB                   | 5.91                            | 4.19                              | 6.90                              | 4.60                               | 6.18                                |
|                                   | 634333 / 3515.0               | 100% RB                   | 7.41                            | 6.67                              | 7.09                              | 4.81                               | 5.32                                |
| 80                                | 632666 / 3490.0               | 100% RB                   | 7.75                            | 4.86                              | 4.66                              | 4.54                               | 6.16                                |
|                                   | 633332 / 3550.0               | 100% RB                   | 5.26                            | 4.27                              | 6.40                              | 4.14                               | 5.86                                |
|                                   | 633998 / 3510.0               | 100% RB                   | 4.41                            | 4.02                              | 5.52                              | 4.48                               | 5.86                                |
| 90                                | 633000 / 3495.0               | 100% RB                   | 4.92                            | 5.77                              | 7.23                              | 7.40                               | 5.32                                |
|                                   | 633332 / 3550.0               | 100% RB                   | 5.48                            | 4.88                              | 5.42                              | 4.26                               | 4.46                                |

| Peak to average ratio (conducted) |                                  |                                 |                                          |                                            |                                            |                                             |                                              |
|-----------------------------------|----------------------------------|---------------------------------|------------------------------------------|--------------------------------------------|--------------------------------------------|---------------------------------------------|----------------------------------------------|
| ANT1                              |                                  |                                 |                                          |                                            |                                            |                                             | ANT1                                         |
| Bandwidth<br>(MHz)                | Channel No. /<br>Frequency (MHz) | RB<br>Allocation –<br>RB Offset | Peak to<br>Average<br>ratio (dB)<br>QPSK | Peak to<br>Average<br>ratio (dB)<br>16-QAM | Peak to<br>Average<br>ratio (dB)<br>64-QAM | Peak to<br>Average<br>ratio (dB)<br>256-QAM | Peak to<br>Average<br>ratio (dB)<br>PI/2BPSK |
|                                   | 633666 / 3505.0                  | 100% RB                         | 4.36                                     | 7.93                                       | 4.34                                       | 5.82                                        | 6.39                                         |
| 100                               | -/-                              | -/-                             | -/-                                      | -/-                                        | -/-                                        | -/-                                         | -/-                                          |
|                                   | 633332 / 3550.0                  | 100% RB                         | 4.35                                     | 4.65                                       | 5.39                                       | 7.29                                        | 6.48                                         |
|                                   | -/-                              | -/-                             | -/-                                      | -/-                                        | -/-                                        | -/-                                         | -/-                                          |

### 13.2.2 RF output power / Peak to AVG ratio – 5G NR n77 – 3700 MHz to 3980 MHz

#### Description:

This paragraph contains average power, peak output power and EIRP measurements for the mobile station. In all cases, the peak output power is within the required mask (this mask is specified in the JTC standards, TIA PN3389 Vol. 1 Chap 7, and is no FCC requirement).

#### Measurement:

The mobile was set up for the maximum output power with pseudo random data modulation.

To determine the Peak-To-Average Power Ratio (PAPR) the measurement was performed with the Power Complementary Cumulative Distribution Function (CCDF).

| Measurement parameters   |                                       |
|--------------------------|---------------------------------------|
| Detector:                | Sample                                |
| AQT:                     | See plot                              |
| Used equipment:          | See chapter 8.2 setup A & 8.4 setup A |
| Measurement uncertainty: | See chapter 9                         |
| Measurement procedure:   | FCC: § 2.1046                         |

#### Limits:

| FCC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| §27.50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p>Mobile and portable stations are limited to 1 Watt EIRP. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications. Equipment employed must be authorized in accordance with the provisions of § 27.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (k)(5) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.</p> |
| Power: 30 dBm EIRP<br>PAPR: 13 dB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

### 13.2.2.1 Results – conducted power

| Output Power (conducted) |                                        |                              |                                             |                                               |                                               |                                                |                                                 |
|--------------------------|----------------------------------------|------------------------------|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| ANT1 + ANT2 sum          |                                        |                              |                                             |                                               |                                               |                                                | ANT1                                            |
| Bandwidth<br>(MHz)       | Channel No.<br>/<br>Frequency<br>(MHz) | RB Allocation – RB<br>Offset | Average<br>Output<br>Power<br>(dBm)<br>QPSK | Average<br>Output<br>Power<br>(dBm)<br>16-QAM | Average<br>Output<br>Power<br>(dBm)<br>64-QAM | Average<br>Output<br>Power<br>(dBm)<br>256-QAM | Average<br>Output<br>Power<br>(dBm)<br>PI/2BPSK |
| 10                       | 647000 /<br>3705.0                     | 1 RB low                     | 22.5                                        | 22.5                                          | 22.3                                          | 21.4                                           | 23.2                                            |
|                          |                                        | 1 RB low+1                   | 24.5                                        | 24.1                                          | 22.3                                          | 21.4                                           | 26.1                                            |
|                          |                                        | 1 RB high-1                  | 24.8                                        | 24.4                                          | 22.6                                          | 21.8                                           | 26.2                                            |
|                          |                                        | 1 RB high                    | 22.8                                        | 22.7                                          | 22.6                                          | 21.8                                           | 23.4                                            |
|                          |                                        | 50% RB mid                   | 24.5                                        | 24.0                                          | 22.5                                          | 21.5                                           | 26.2                                            |
|                          |                                        | 100% RB                      | 23.0                                        | 23.0                                          | 22.5                                          | 21.5                                           | 25.9                                            |
|                          | 656000 /<br>3840.0                     | 1 RB low                     | 22.4                                        | 22.5                                          | 22.3                                          | 21.3                                           | 22.7                                            |
|                          |                                        | 1 RB low+1                   | 24.4                                        | 24.0                                          | 22.3                                          | 21.4                                           | 26.2                                            |
|                          |                                        | 1 RB high-1                  | 24.6                                        | 24.1                                          | 22.5                                          | 21.4                                           | 26.2                                            |
|                          |                                        | 1 RB high                    | 22.5                                        | 22.6                                          | 22.5                                          | 21.4                                           | 22.8                                            |
|                          |                                        | 50% RB mid                   | 24.4                                        | 24.1                                          | 22.6                                          | 21.5                                           | 26.1                                            |
|                          |                                        | 100% RB                      | 23.0                                        | 22.9                                          | 22.5                                          | 21.5                                           | 25.8                                            |
|                          | 665000 /<br>3975.0                     | 1 RB low                     | 23.1                                        | 23.1                                          | 22.9                                          | 21.9                                           | 22.8                                            |
|                          |                                        | 1 RB low+1                   | 25.2                                        | 24.6                                          | 22.8                                          | 22.0                                           | 26.0                                            |
|                          |                                        | 1 RB high-1                  | 25.2                                        | 24.9                                          | 22.9                                          | 22.1                                           | 26.1                                            |
|                          |                                        | 1 RB high                    | 23.0                                        | 23.0                                          | 22.8                                          | 22.1                                           | 22.7                                            |
|                          |                                        | 50% RB mid                   | 24.9                                        | 24.5                                          | 23.1                                          | 22.0                                           | 26.1                                            |
|                          |                                        | 100% RB                      | 23.6                                        | 23.5                                          | 23.1                                          | 22.0                                           | 25.8                                            |
| 20                       | 647333 /<br>3710.0                     | 1 RB low                     | 22.7                                        | 22.8                                          | 22.5                                          | 21.6                                           | 23.4                                            |
|                          |                                        | 1 RB low+1                   | 24.8                                        | 24.2                                          | 22.4                                          | 21.7                                           | 26.2                                            |
|                          |                                        | 1 RB high-1                  | 25.5                                        | 25.0                                          | 23.2                                          | 22.4                                           | 26.3                                            |
|                          |                                        | 1 RB high                    | 23.4                                        | 23.4                                          | 23.2                                          | 22.5                                           | 26.3                                            |
|                          |                                        | 50% RB mid                   | 24.9                                        | 24.4                                          | 22.9                                          | 21.9                                           | 26.2                                            |
|                          |                                        | 100% RB                      | 23.5                                        | 23.5                                          | 23.0                                          | 22.0                                           | 26.1                                            |
|                          | 656000 /<br>3840.0                     | 1 RB low                     | 22.5                                        | 22.6                                          | 22.4                                          | 21.5                                           | 22.6                                            |
|                          |                                        | 1 RB low+1                   | 24.6                                        | 24.0                                          | 22.3                                          | 21.6                                           | 26.1                                            |

| Output Power (conducted) |                                        |                              |                                             |                                               |                                               |                                                |                                                 |
|--------------------------|----------------------------------------|------------------------------|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| ANT1 + ANT2 sum          |                                        |                              |                                             |                                               |                                               |                                                | ANT1                                            |
| Bandwidth<br>(MHz)       | Channel No.<br>/<br>Frequency<br>(MHz) | RB Allocation – RB<br>Offset | Average<br>Output<br>Power<br>(dBm)<br>QPSK | Average<br>Output<br>Power<br>(dBm)<br>16-QAM | Average<br>Output<br>Power<br>(dBm)<br>64-QAM | Average<br>Output<br>Power<br>(dBm)<br>256-QAM | Average<br>Output<br>Power<br>(dBm)<br>PI/2BPSK |
|                          |                                        | 1 RB high-1                  | 24.7                                        | 24.3                                          | 22.6                                          | 21.6                                           | 26.1                                            |
|                          |                                        | 1 RB high                    | 22.7                                        | 22.8                                          | 22.6                                          | 21.7                                           | 26.2                                            |
|                          |                                        | 50% RB mid                   | 24.5                                        | 24.0                                          | 22.6                                          | 21.5                                           | 26.2                                            |
|                          |                                        | 100% RB                      | 23.1                                        | 23.1                                          | 22.6                                          | 21.6                                           | 26.0                                            |
|                          | 664666 /<br>3970.0                     | 1 RB low                     | 23.4                                        | 23.4                                          | 23.2                                          | 22.4                                           | 23.1                                            |
|                          |                                        | 1 RB low+1                   | 25.3                                        | 25.0                                          | 23.2                                          | 22.3                                           | 26.2                                            |
|                          |                                        | 1 RB high-1                  | 25.3                                        | 25.0                                          | 23.2                                          | 22.4                                           | 26.3                                            |
|                          |                                        | 1 RB high                    | 23.3                                        | 23.4                                          | 23.2                                          | 22.3                                           | 26.2                                            |
|                          |                                        | 50% RB mid                   | 25.2                                        | 24.7                                          | 23.2                                          | 22.3                                           | 26.3                                            |
|                          |                                        | 100% RB                      | 23.7                                        | 23.8                                          | 23.3                                          | 22.3                                           | 26.1                                            |
| 30                       | 648000 /<br>3720.0                     | 1 RB low                     | 22.7                                        | 22.8                                          | 22.5                                          | 21.6                                           | 23.4                                            |
|                          |                                        | 1 RB low+1                   | 24.7                                        | 24.2                                          | 22.4                                          | 21.5                                           | 26.3                                            |
|                          |                                        | 1 RB high-1                  | 25.7                                        | 25.1                                          | 23.4                                          | 22.6                                           | 26.4                                            |
|                          |                                        | 1 RB high                    | 23.6                                        | 23.5                                          | 23.3                                          | 22.6                                           | 26.4                                            |
|                          |                                        | 50% RB mid                   | 25.1                                        | 24.6                                          | 23.2                                          | 22.2                                           | 26.1                                            |
|                          |                                        | 100% RB                      | 23.7                                        | 23.7                                          | 23.2                                          | 22.1                                           | 26.2                                            |
|                          | 656000 /<br>3840.0                     | 1 RB low                     | 22.6                                        | 22.6                                          | 22.5                                          | 21.6                                           | 23.2                                            |
|                          |                                        | 1 RB low+1                   | 24.7                                        | 24.2                                          | 22.3                                          | 21.6                                           | 26.2                                            |
|                          |                                        | 1 RB high-1                  | 24.7                                        | 24.3                                          | 22.6                                          | 21.8                                           | 26.3                                            |
|                          |                                        | 1 RB high                    | 22.8                                        | 22.8                                          | 22.5                                          | 21.7                                           | 26.3                                            |
|                          |                                        | 50% RB mid                   | 24.7                                        | 24.2                                          | 22.7                                          | 21.7                                           | 26.1                                            |
|                          |                                        | 100% RB                      | 23.2                                        | 23.2                                          | 22.7                                          | 21.7                                           | 26.0                                            |
|                          | 664000 /<br>3960.0                     | 1 RB low                     | 22.6                                        | 22.7                                          | 22.5                                          | 21.5                                           | 23.4                                            |
|                          |                                        | 1 RB low+1                   | 24.7                                        | 24.2                                          | 22.5                                          | 21.6                                           | 26.2                                            |
|                          |                                        | 1 RB high-1                  | 24.4                                        | 24.0                                          | 22.3                                          | 21.5                                           | 26.3                                            |
|                          |                                        | 1 RB high                    | 22.3                                        | 22.4                                          | 22.3                                          | 21.4                                           | 26.3                                            |
|                          |                                        | 50% RB mid                   | 24.4                                        | 23.9                                          | 22.4                                          | 21.4                                           | 26.4                                            |
|                          |                                        | 100% RB                      | 22.9                                        | 23.0                                          | 22.4                                          | 21.5                                           | 26.1                                            |

| Output Power (conducted) |                                        |                              |                                             |                                               |                                               |                                                |                                                 |
|--------------------------|----------------------------------------|------------------------------|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| ANT1 + ANT2 sum          |                                        |                              |                                             |                                               |                                               |                                                | ANT1                                            |
| Bandwidth<br>(MHz)       | Channel No.<br>/<br>Frequency<br>(MHz) | RB Allocation – RB<br>Offset | Average<br>Output<br>Power<br>(dBm)<br>QPSK | Average<br>Output<br>Power<br>(dBm)<br>16-QAM | Average<br>Output<br>Power<br>(dBm)<br>64-QAM | Average<br>Output<br>Power<br>(dBm)<br>256-QAM | Average<br>Output<br>Power<br>(dBm)<br>PI/2BPSK |
| 40                       | 648000 /<br>3720.0                     | 1 RB low                     | 22.9                                        | 23.0                                          | 22.7                                          | 21.9                                           | 23.6                                            |
|                          |                                        | 1 RB low+1                   | 24.9                                        | 24.3                                          | 22.7                                          | 21.9                                           | 26.0                                            |
|                          |                                        | 1 RB high-1                  | 25.7                                        | 25.0                                          | 23.3                                          | 22.5                                           | 26.3                                            |
|                          |                                        | 1 RB high                    | 23.5                                        | 23.5                                          | 23.3                                          | 22.5                                           | 26.3                                            |
|                          |                                        | 50% RB mid                   | 25.4                                        | 24.9                                          | 23.4                                          | 22.4                                           | 26.4                                            |
|                          |                                        | 100% RB                      | 23.7                                        | 23.8                                          | 23.3                                          | 22.3                                           | 26.2                                            |
|                          | 656000 /<br>3840.0                     | 1 RB low                     | 23.1                                        | 22.8                                          | 22.5                                          | 21.7                                           | 22.8                                            |
|                          |                                        | 1 RB low+1                   | 24.7                                        | 24.1                                          | 22.4                                          | 21.8                                           | 26.2                                            |
|                          |                                        | 1 RB high-1                  | 24.7                                        | 24.2                                          | 22.4                                          | 21.8                                           | 26.2                                            |
|                          |                                        | 1 RB high                    | 22.7                                        | 22.7                                          | 22.4                                          | 21.7                                           | 26.2                                            |
|                          |                                        | 50% RB mid                   | 24.7                                        | 24.2                                          | 22.7                                          | 21.7                                           | 26.4                                            |
|                          |                                        | 100% RB                      | 23.2                                        | 23.2                                          | 22.7                                          | 21.7                                           | 25.9                                            |
|                          | 664000 /<br>3960.0                     | 1 RB low                     | 22.4                                        | 22.5                                          | 22.3                                          | 21.4                                           | 23.3                                            |
|                          |                                        | 1 RB low+1                   | 24.5                                        | 24.1                                          | 22.3                                          | 21.3                                           | 26.2                                            |
|                          |                                        | 1 RB high-1                  | 24.6                                        | 24.1                                          | 22.3                                          | 21.4                                           | 26.2                                            |
|                          |                                        | 1 RB high                    | 22.4                                        | 22.5                                          | 22.3                                          | 21.4                                           | 26.1                                            |
|                          |                                        | 50% RB mid                   | 24.4                                        | 23.9                                          | 22.4                                          | 21.4                                           | 26.3                                            |
|                          |                                        | 100% RB                      | 22.9                                        | 22.9                                          | 22.4                                          | 21.4                                           | 26.2                                            |
| 50                       | 648333 /<br>3725.0                     | 1 RB low                     | 22.5                                        | 22.5                                          | 22.3                                          | 21.4                                           | 23.3                                            |
|                          |                                        | 1 RB low+1                   | 24.5                                        | 23.9                                          | 22.2                                          | 21.4                                           | 26.3                                            |
|                          |                                        | 1 RB high-1                  | 24.7                                        | 24.0                                          | 22.3                                          | 21.7                                           | 26.4                                            |
|                          |                                        | 1 RB high                    | 22.7                                        | 22.6                                          | 22.4                                          | 21.6                                           | 26.4                                            |
|                          |                                        | 50% RB mid                   | 25.2                                        | 24.7                                          | 23.2                                          | 22.2                                           | 26.3                                            |
|                          |                                        | 100% RB                      | 23.5                                        | 23.5                                          | 23.0                                          | 22.0                                           | 26.2                                            |
|                          | 656000 /<br>3840.0                     | 1 RB low                     | 22.5                                        | 22.5                                          | 22.4                                          | 21.7                                           | 22.6                                            |
|                          |                                        | 1 RB low+1                   | 24.6                                        | 24.2                                          | 22.3                                          | 21.5                                           | 26.0                                            |
|                          |                                        | 1 RB high-1                  | 24.5                                        | 24.1                                          | 22.2                                          | 21.5                                           | 25.8                                            |
|                          |                                        | 1 RB high                    | 22.4                                        | 22.5                                          | 22.2                                          | 21.4                                           | 25.8                                            |

| Output Power (conducted) |                                        |                              |                                             |                                               |                                               |                                                |                                                 |
|--------------------------|----------------------------------------|------------------------------|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| ANT1 + ANT2 sum          |                                        |                              |                                             |                                               |                                               |                                                | ANT1                                            |
| Bandwidth<br>(MHz)       | Channel No.<br>/<br>Frequency<br>(MHz) | RB Allocation – RB<br>Offset | Average<br>Output<br>Power<br>(dBm)<br>QPSK | Average<br>Output<br>Power<br>(dBm)<br>16-QAM | Average<br>Output<br>Power<br>(dBm)<br>64-QAM | Average<br>Output<br>Power<br>(dBm)<br>256-QAM | Average<br>Output<br>Power<br>(dBm)<br>PI/2BPSK |
|                          |                                        | 50% RB mid                   | 24.5                                        | 24.0                                          | 22.5                                          | 21.5                                           | 26.3                                            |
|                          |                                        | 100% RB                      | 23.0                                        | 23.0                                          | 22.5                                          | 21.4                                           | 25.6                                            |
|                          | 663666 /<br>3955.0                     | 1 RB low                     | 21.9                                        | 22.1                                          | 22.0                                          | 21.2                                           | 22.5                                            |
|                          |                                        | 1 RB low+1                   | 24.0                                        | 23.5                                          | 22.0                                          | 20.9                                           | 26.0                                            |
|                          |                                        | 1 RB high-1                  | 24.3                                        | 23.8                                          | 22.2                                          | 21.2                                           | 26.4                                            |
|                          |                                        | 1 RB high                    | 22.1                                        | 22.3                                          | 22.2                                          | 21.0                                           | 26.3                                            |
|                          |                                        | 50% RB mid                   | 24.3                                        | 23.8                                          | 22.3                                          | 21.3                                           | 26.4                                            |
|                          |                                        | 100% RB                      | 22.7                                        | 22.8                                          | 22.3                                          | 21.3                                           | 26.0                                            |
| 60                       | 648666 /<br>3730.0                     | 1 RB low                     | 22.4                                        | 22.6                                          | 22.4                                          | 21.4                                           | 23.1                                            |
|                          |                                        | 1 RB low+1                   | 24.6                                        | 24.0                                          | 22.2                                          | 21.4                                           | 26.2                                            |
|                          |                                        | 1 RB high-1                  | 24.4                                        | 23.8                                          | 22.2                                          | 21.3                                           | 26.3                                            |
|                          |                                        | 1 RB high                    | 22.3                                        | 22.4                                          | 22.2                                          | 21.3                                           | 23.3                                            |
|                          |                                        | 50% RB mid                   | 25.2                                        | 24.7                                          | 23.2                                          | 22.2                                           | 26.4                                            |
|                          |                                        | 100% RB                      | 23.5                                        | 23.5                                          | 22.9                                          | 22.0                                           | 26.4                                            |
|                          | 656000 /<br>3840.0                     | 1 RB low                     | 22.5                                        | 22.6                                          | 22.4                                          | 21.5                                           | 22.7                                            |
|                          |                                        | 1 RB low+1                   | 24.7                                        | 24.2                                          | 22.3                                          | 21.6                                           | 26.2                                            |
|                          |                                        | 1 RB high-1                  | 24.3                                        | 24.0                                          | 22.1                                          | 21.5                                           | 25.5                                            |
|                          |                                        | 1 RB high                    | 22.3                                        | 22.3                                          | 22.1                                          | 21.3                                           | 22.0                                            |
|                          |                                        | 50% RB mid                   | 24.4                                        | 24.0                                          | 22.5                                          | 21.5                                           | 26.3                                            |
|                          |                                        | 100% RB                      | 23.0                                        | 22.9                                          | 22.5                                          | 21.4                                           | 25.7                                            |
|                          | 663333 /<br>3950.0                     | 1 RB low                     | 21.6                                        | 21.4                                          | 21.7                                          | 20.7                                           | 22.2                                            |
|                          |                                        | 1 RB low+1                   | 23.6                                        | 22.9                                          | 21.7                                          | 20.6                                           | 25.6                                            |
|                          |                                        | 1 RB high-1                  | 23.8                                        | 23.5                                          | 22.1                                          | 21.0                                           | 26.2                                            |
|                          |                                        | 1 RB high                    | 22.0                                        | 21.9                                          | 21.8                                          | 20.9                                           | 22.7                                            |
|                          |                                        | 50% RB mid                   | 24.0                                        | 23.6                                          | 22.0                                          | 21.0                                           | 26.4                                            |
|                          |                                        | 100% RB                      | 22.4                                        | 22.5                                          | 21.9                                          | 20.9                                           | 25.8                                            |
| 70                       | 649000 /<br>3735.0                     | 1 RB low                     | 22.4                                        | 22.6                                          | 22.2                                          | 21.3                                           | 23.1                                            |
|                          |                                        | 1 RB low+1                   | 24.5                                        | 24.0                                          | 22.2                                          | 21.4                                           | 26.3                                            |

| Output Power (conducted) |                                        |                              |                                             |                                               |                                               |                                                |                                                 |
|--------------------------|----------------------------------------|------------------------------|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| ANT1 + ANT2 sum          |                                        |                              |                                             |                                               |                                               |                                                | ANT1                                            |
| Bandwidth<br>(MHz)       | Channel No.<br>/<br>Frequency<br>(MHz) | RB Allocation – RB<br>Offset | Average<br>Output<br>Power<br>(dBm)<br>QPSK | Average<br>Output<br>Power<br>(dBm)<br>16-QAM | Average<br>Output<br>Power<br>(dBm)<br>64-QAM | Average<br>Output<br>Power<br>(dBm)<br>256-QAM | Average<br>Output<br>Power<br>(dBm)<br>PI/2BPSK |
|                          |                                        | 1 RB high-1                  | 24.1                                        | 23.6                                          | 21.8                                          | 21.0                                           | 26.4                                            |
|                          |                                        | 1 RB high                    | 22.1                                        | 22.0                                          | 21.8                                          | 21.0                                           | 26.4                                            |
|                          |                                        | 50% RB mid                   | 25.0                                        | 24.5                                          | 23.0                                          | 22.0                                           | 26.4                                            |
|                          |                                        | 100% RB                      | 23.2                                        | 23.2                                          | 22.7                                          | 21.7                                           | 26.4                                            |
|                          | 656000 /<br>3840.0                     | 1 RB low                     | 22.6                                        | 22.6                                          | 22.6                                          | 21.5                                           | 22.7                                            |
|                          |                                        | 1 RB low+1                   | 24.7                                        | 24.2                                          | 22.3                                          | 21.5                                           | 26.2                                            |
|                          |                                        | 1 RB high-1                  | 24.2                                        | 23.8                                          | 21.9                                          | 21.2                                           | 25.4                                            |
|                          |                                        | 1 RB high                    | 22.2                                        | 22.2                                          | 21.9                                          | 21.2                                           | 25.4                                            |
|                          |                                        | 50% RB mid                   | 24.3                                        | 23.8                                          | 22.3                                          | 21.3                                           | 26.1                                            |
|                          |                                        | 100% RB                      | 22.8                                        | 22.8                                          | 22.3                                          | 21.4                                           | 25.5                                            |
|                          | 663000 /<br>3945.0                     | 1 RB low                     | 21.4                                        | 21.5                                          | 21.6                                          | 20.5                                           | 22.0                                            |
|                          |                                        | 1 RB low+1                   | 23.5                                        | 23.0                                          | 21.5                                          | 20.7                                           | 25.4                                            |
|                          |                                        | 1 RB high-1                  | 23.9                                        | 23.3                                          | 21.9                                          | 20.8                                           | 25.9                                            |
|                          |                                        | 1 RB high                    | 21.8                                        | 22.0                                          | 22.0                                          | 20.7                                           | 25.9                                            |
|                          |                                        | 50% RB mid                   | 23.9                                        | 23.4                                          | 21.9                                          | 20.8                                           | 26.1                                            |
|                          |                                        | 100% RB                      | 22.3                                        | 22.2                                          | 21.8                                          | 20.7                                           | 25.3                                            |
| 80                       | 649333 /<br>3740.0                     | 1 RB low                     | 23.2                                        | 22.3                                          | 22.2                                          | 21.3                                           | 23.1                                            |
|                          |                                        | 1 RB low+1                   | 24.4                                        | 24.0                                          | 22.4                                          | 21.5                                           | 26.3                                            |
|                          |                                        | 1 RB high-1                  | 24.3                                        | 23.8                                          | 22.4                                          | 21.4                                           | 26.3                                            |
|                          |                                        | 1 RB high                    | 22.3                                        | 22.4                                          | 22.5                                          | 21.4                                           | 26.3                                            |
|                          |                                        | 50% RB mid                   | 24.9                                        | 24.4                                          | 22.9                                          | 21.9                                           | 26.4                                            |
|                          |                                        | 100% RB                      | 23.2                                        | 23.2                                          | 22.7                                          | 21.7                                           | 26.4                                            |
|                          | 656000 /<br>3840.0                     | 1 RB low                     | 22.6                                        | 22.7                                          | 22.5                                          | 21.6                                           | 22.7                                            |
|                          |                                        | 1 RB low+1                   | 24.6                                        | 24.2                                          | 22.4                                          | 21.6                                           | 26.2                                            |
|                          |                                        | 1 RB high-1                  | 24.3                                        | 23.8                                          | 22.0                                          | 21.2                                           | 25.4                                            |
|                          |                                        | 1 RB high                    | 22.3                                        | 22.2                                          | 22.0                                          | 21.2                                           | 25.4                                            |
|                          |                                        | 50% RB mid                   | 24.4                                        | 23.8                                          | 22.3                                          | 21.3                                           | 26.0                                            |
|                          |                                        | 100% RB                      | 22.8                                        | 22.8                                          | 22.3                                          | 21.3                                           | 25.4                                            |

| Output Power (conducted) |                                        |                              |                                             |                                               |                                               |                                                |                                                 |
|--------------------------|----------------------------------------|------------------------------|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| ANT1 + ANT2 sum          |                                        |                              |                                             |                                               |                                               |                                                | ANT1                                            |
| Bandwidth<br>(MHz)       | Channel No.<br>/<br>Frequency<br>(MHz) | RB Allocation – RB<br>Offset | Average<br>Output<br>Power<br>(dBm)<br>QPSK | Average<br>Output<br>Power<br>(dBm)<br>16-QAM | Average<br>Output<br>Power<br>(dBm)<br>64-QAM | Average<br>Output<br>Power<br>(dBm)<br>256-QAM | Average<br>Output<br>Power<br>(dBm)<br>PI/2BPSK |
|                          | 662666 /<br>3940.0                     | 1 RB low                     | 21.4                                        | 21.6                                          | 21.6                                          | 20.5                                           | 22.0                                            |
|                          |                                        | 1 RB low+1                   | 23.4                                        | 22.9                                          | 21.5                                          | 20.4                                           | 25.6                                            |
|                          |                                        | 1 RB high-1                  | 23.8                                        | 23.5                                          | 21.8                                          | 20.8                                           | 26.1                                            |
|                          |                                        | 1 RB high                    | 21.9                                        | 22.1                                          | 22.3                                          | 20.9                                           | 26.1                                            |
|                          |                                        | 50% RB mid                   | 23.8                                        | 23.4                                          | 21.8                                          | 20.8                                           | 26.1                                            |
|                          |                                        | 100% RB                      | 22.3                                        | 22.3                                          | 21.8                                          | 20.8                                           | 25.4                                            |
| 90                       | 649666 /<br>3745.0                     | 1 RB low                     | 22.3                                        | 22.4                                          | 22.4                                          | 21.4                                           | 23.1                                            |
|                          |                                        | 1 RB low+1                   | 24.3                                        | 23.7                                          | 22.4                                          | 21.1                                           | 26.4                                            |
|                          |                                        | 1 RB high-1                  | 24.7                                        | 24.2                                          | 22.7                                          | 21.7                                           | 26.4                                            |
|                          |                                        | 1 RB high                    | 22.6                                        | 22.7                                          | 22.6                                          | 21.6                                           | 26.3                                            |
|                          |                                        | 50% RB mid                   | 24.7                                        | 24.1                                          | 22.7                                          | 21.7                                           | 26.4                                            |
|                          |                                        | 100% RB                      | 23.1                                        | 23.1                                          | 22.6                                          | 21.6                                           | 26.4                                            |
|                          | 656000 /<br>3840.0                     | 1 RB low                     | 22.8                                        | 22.7                                          | 22.4                                          | 21.5                                           | 22.9                                            |
|                          |                                        | 1 RB low+1                   | 24.8                                        | 24.3                                          | 22.4                                          | 21.5                                           | 26.3                                            |
|                          |                                        | 1 RB high-1                  | 24.4                                        | 24.0                                          | 22.1                                          | 21.2                                           | 25.6                                            |
|                          |                                        | 1 RB high                    | 22.3                                        | 22.3                                          | 22.0                                          | 21.3                                           | 25.6                                            |
|                          |                                        | 50% RB mid                   | 24.3                                        | 23.8                                          | 22.3                                          | 21.3                                           | 25.9                                            |
|                          |                                        | 100% RB                      | 22.8                                        | 22.8                                          | 22.3                                          | 21.3                                           | 25.5                                            |
|                          | 662333 /<br>3935.0                     | 1 RB low                     | 21.5                                        | 21.7                                          | 21.7                                          | 20.6                                           | 22.2                                            |
|                          |                                        | 1 RB low+1                   | 23.5                                        | 23.1                                          | 21.9                                          | 20.5                                           | 25.7                                            |
|                          |                                        | 1 RB high-1                  | 24.0                                        | 23.4                                          | 22.0                                          | 21.0                                           | 26.1                                            |
|                          |                                        | 1 RB high                    | 21.9                                        | 22.0                                          | 21.9                                          | 21.1                                           | 26.1                                            |
|                          |                                        | 50% RB mid                   | 23.8                                        | 23.3                                          | 21.9                                          | 20.9                                           | 25.6                                            |
|                          |                                        | 100% RB                      | 22.3                                        | 22.3                                          | 21.8                                          | 20.8                                           | 25.4                                            |
| 100                      | 650000 /<br>3750.0                     | 1 RB low                     | 22.3                                        | 22.4                                          | 22.1                                          | 21.2                                           | 25.6                                            |
|                          |                                        | 1 RB low+1                   | 24.5                                        | 23.9                                          | 22.1                                          | 21.3                                           | 22.3                                            |
|                          |                                        | 1 RB high-1                  | 24.8                                        | 24.5                                          | 22.6                                          | 21.8                                           | 25.7                                            |
|                          |                                        | 1 RB high                    | 22.7                                        | 22.8                                          | 22.6                                          | 21.7                                           | 25.5                                            |

| Output Power (conducted) |                                        |                              |                                             |                                               |                                               |                                                |                                                 |
|--------------------------|----------------------------------------|------------------------------|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| ANT1 + ANT2 sum          |                                        |                              |                                             |                                               |                                               |                                                | ANT1                                            |
| Bandwidth<br>(MHz)       | Channel No.<br>/<br>Frequency<br>(MHz) | RB Allocation – RB<br>Offset | Average<br>Output<br>Power<br>(dBm)<br>QPSK | Average<br>Output<br>Power<br>(dBm)<br>16-QAM | Average<br>Output<br>Power<br>(dBm)<br>64-QAM | Average<br>Output<br>Power<br>(dBm)<br>256-QAM | Average<br>Output<br>Power<br>(dBm)<br>PI/2BPSK |
|                          |                                        | 50% RB mid                   | 24.6                                        | 24.2                                          | 22.7                                          | 21.7                                           | 25.5                                            |
|                          |                                        | 100% RB                      | 23.2                                        | 23.2                                          | 22.7                                          | 21.7                                           | 26.2                                            |
|                          | 656000 /<br>3840.0                     | 1 RB low                     | 22.6                                        | 22.7                                          | 22.4                                          | 21.6                                           | 25.5                                            |
|                          |                                        | 1 RB low+1                   | 24.6                                        | 24.1                                          | 22.4                                          | 21.3                                           | 22.8                                            |
|                          |                                        | 1 RB high-1                  | 24.4                                        | 23.8                                          | 22.1                                          | 21.2                                           | 26.3                                            |
|                          |                                        | 1 RB high                    | 22.3                                        | 22.3                                          | 22.1                                          | 21.2                                           | 25.7                                            |
|                          |                                        | 50% RB mid                   | 24.2                                        | 23.8                                          | 22.3                                          | 21.3                                           | 25.6                                            |
|                          |                                        | 100% RB                      | 22.8                                        | 22.8                                          | 22.3                                          | 21.3                                           | 26.1                                            |
|                          | 662000 /<br>3930.0                     | 1 RB low                     | 21.7                                        | 21.6                                          | 21.6                                          | 20.6                                           | 21.2                                            |
|                          |                                        | 1 RB low+1                   | 23.5                                        | 23.1                                          | 21.7                                          | 20.8                                           | 24.5                                            |
|                          |                                        | 1 RB high-1                  | 24.1                                        | 23.7                                          | 22.1                                          | 21.0                                           | 25.5                                            |
|                          |                                        | 1 RB high                    | 21.9                                        | 21.9                                          | 21.8                                          | 20.7                                           | 25.5                                            |
|                          |                                        | 50% RB mid                   | 23.7                                        | 23.2                                          | 21.8                                          | 20.7                                           | 25.0                                            |
|                          |                                        | 100% RB                      | 22.2                                        | 22.2                                          | 21.8                                          | 20.8                                           | 24.6                                            |

### 13.2.2.2 Results – EIRP

| Radiated output power (EIRP) |                                  |                                             |                                               |                                               |                                                |                                                 |
|------------------------------|----------------------------------|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| ANT1+ANT2                    |                                  |                                             |                                               |                                               |                                                | ANT1                                            |
| Bandwidth<br>(MHz)           | Channel No. /<br>Frequency (MHz) | Average<br>Output<br>Power<br>(dBm)<br>QPSK | Average<br>Output<br>Power<br>(dBm)<br>16-QAM | Average<br>Output<br>Power<br>(dBm)<br>64-QAM | Average<br>Output<br>Power<br>(dBm)<br>256-QAM | Average<br>Output<br>Power<br>(dBm)<br>PI/2BPSK |
| 10                           | 647000 / 3705.0                  | 28.0                                        | 27.6                                          | 25.8                                          | 25.0                                           | 25.5                                            |
|                              | 656000 / 3840.0                  | 27.4                                        | 26.9                                          | 25.4                                          | 24.3                                           | 25.2                                            |
|                              | 665000 / 3975.0                  | 28.0                                        | 27.7                                          | 25.9                                          | 24.9                                           | 25.6                                            |
| 20                           | 647333 / 3710.0                  | 28.7                                        | 28.2                                          | 26.4                                          | 25.7                                           | 25.6                                            |
|                              | 656000 / 3840.0                  | 27.5                                        | 27.1                                          | 25.4                                          | 24.5                                           | 25.2                                            |
|                              | 664666 / 3970.0                  | 28.1                                        | 27.8                                          | 26.1                                          | 25.2                                           | 25.8                                            |
| 30                           | 648000 / 3720.0                  | 28.9                                        | 28.3                                          | 26.6                                          | 25.8                                           | 25.7                                            |
|                              | 656000 / 3840.0                  | 27.5                                        | 27.1                                          | 25.5                                          | 24.6                                           | 25.3                                            |
|                              | 664000 / 3960.0                  | 27.5                                        | 27.0                                          | 25.3                                          | 24.4                                           | 25.9                                            |
| 40                           | 648000 / 3720.0                  | 28.9                                        | 28.2                                          | 26.6                                          | 25.7                                           | 25.7                                            |
|                              | 656000 / 3840.0                  | 27.5                                        | 27.0                                          | 25.5                                          | 24.6                                           | 25.4                                            |
|                              | 664000 / 3960.0                  | 27.4                                        | 26.9                                          | 25.2                                          | 24.2                                           | 25.8                                            |
| 50                           | 648333 / 3725.0                  | 28.4                                        | 27.9                                          | 26.4                                          | 25.4                                           | 25.7                                            |
|                              | 656000 / 3840.0                  | 27.4                                        | 27.0                                          | 25.3                                          | 24.5                                           | 25.3                                            |
|                              | 663666 / 3955.0                  | 27.1                                        | 26.6                                          | 25.1                                          | 24.1                                           | 25.9                                            |
| 60                           | 648666 / 3730.0                  | 28.4                                        | 27.9                                          | 26.4                                          | 25.4                                           | 25.7                                            |
|                              | 656000 / 3840.0                  | 27.5                                        | 27.0                                          | 25.3                                          | 24.4                                           | 25.3                                            |
|                              | 663333 / 3950.0                  | 26.8                                        | 26.4                                          | 24.9                                          | 23.8                                           | 25.9                                            |
| 70                           | 649000 / 3735.0                  | 28.2                                        | 27.7                                          | 26.2                                          | 25.2                                           | 25.7                                            |
|                              | 656000 / 3840.0                  | 27.5                                        | 27.0                                          | 25.4                                          | 24.3                                           | 25.2                                            |
|                              | 663000 / 3945.0                  | 26.7                                        | 26.2                                          | 24.8                                          | 23.6                                           | 25.6                                            |
| 80                           | 649333 / 3740.0                  | 28.1                                        | 27.6                                          | 26.1                                          | 25.1                                           | 25.7                                            |
|                              | 656000 / 3840.0                  | 27.4                                        | 27.0                                          | 25.3                                          | 24.4                                           | 25.2                                            |
|                              | 662666 / 3940.0                  | 26.6                                        | 26.3                                          | 25.1                                          | 23.7                                           | 25.6                                            |
| 90                           | 649666 / 3745.0                  | 27.9                                        | 27.4                                          | 25.9                                          | 24.9                                           | 25.7                                            |
|                              | 656000 / 3840.0                  | 27.6                                        | 27.1                                          | 25.2                                          | 24.3                                           | 25.3                                            |

| Radiated output power (EIRP) |                                  |                                             |                                               |                                               |                                                |                                                 |
|------------------------------|----------------------------------|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| ANT1+ANT2                    |                                  |                                             |                                               |                                               |                                                | ANT1                                            |
| Bandwidth<br>(MHz)           | Channel No. /<br>Frequency (MHz) | Average<br>Output<br>Power<br>(dBm)<br>QPSK | Average<br>Output<br>Power<br>(dBm)<br>16-QAM | Average<br>Output<br>Power<br>(dBm)<br>64-QAM | Average<br>Output<br>Power<br>(dBm)<br>256-QAM | Average<br>Output<br>Power<br>(dBm)<br>PI/2BPSK |
|                              | 662333 / 3935.0                  | 26.8                                        | 26.2                                          | 24.8                                          | 23.9                                           | 25.6                                            |
| 100                          | 650000 / 3750.0                  | 28.0                                        | 27.7                                          | 25.9                                          | 25.0                                           | 25.5                                            |
|                              | 656000 / 3840.0                  | 27.4                                        | 26.9                                          | 25.2                                          | 24.4                                           | 25.3                                            |
|                              | 662000 / 3930.0                  | 26.9                                        | 26.5                                          | 24.9                                          | 23.8                                           | 25.0                                            |

### 13.2.2.3 Results – Peak to AVG ratio

| Peak to average ratio (conducted) |                               |                           |                                 |                                   |                                   |                                    |                                     |
|-----------------------------------|-------------------------------|---------------------------|---------------------------------|-----------------------------------|-----------------------------------|------------------------------------|-------------------------------------|
| ANT1                              |                               |                           |                                 |                                   |                                   |                                    | ANT1                                |
| Bandwidth (MHz)                   | Channel No. / Frequency (MHz) | RB Allocation – RB Offset | Peak to Average ratio (dB) QPSK | Peak to Average ratio (dB) 16-QAM | Peak to Average ratio (dB) 64-QAM | Peak to Average ratio (dB) 256-QAM | Peak to Average ratio (dB) PI/2BPSK |
| 10                                | 647000 / 3705.0               | 100% RB                   | 5.70                            | 5.22                              | 7.71                              | 5.36                               | 6.36                                |
|                                   | 656000 / 3840.0               | 100% RB                   | 6.17                            | 6.59                              | 7.32                              | 6.67                               | 5.21                                |
|                                   | 665000 / 3975.0               | 100% RB                   | 5.91                            | 5.40                              | 7.62                              | 6.49                               | 5.59                                |
| 20                                | 647333 / 3710.0               | 100% RB                   | 5.97                            | 4.75                              | 7.48                              | 5.00                               | 6.20                                |
|                                   | 656000 / 3840.0               | 100% RB                   | 6.51                            | 7.39                              | 6.93                              | 4.78                               | 4.01                                |
|                                   | 664666 / 3970.0               | 100% RB                   | 6.93                            | 6.72                              | 5.97                              | 5.16                               | 4.62                                |
| 30                                | 648000 / 3720.0               | 100% RB                   | 4.32                            | 6.57                              | 5.05                              | 7.41                               | 4.77                                |
|                                   | 656000 / 3840.0               | 100% RB                   | 4.99                            | 6.68                              | 6.18                              | 4.14                               | 6.78                                |
|                                   | 664000 / 3960.0               | 100% RB                   | 4.79                            | 5.39                              | 7.41                              | 7.95                               | 6.89                                |
| 40                                | 648000 / 3720.0               | 100% RB                   | 5.12                            | 7.12                              | 4.93                              | 4.11                               | 4.39                                |
|                                   | 656000 / 3840.0               | 100% RB                   | 4.64                            | 7.03                              | 5.86                              | 5.00                               | 5.32                                |
|                                   | 664000 / 3960.0               | 100% RB                   | 7.45                            | 5.16                              | 4.03                              | 5.55                               | 4.47                                |
| 50                                | 648333 / 3725.0               | 100% RB                   | 4.25                            | 7.02                              | 6.90                              | 5.89                               | 4.07                                |
|                                   | 656000 / 3840.0               | 100% RB                   | 7.12                            | 5.41                              | 4.67                              | 7.38                               | 5.32                                |
|                                   | 663666 / 3955.0               | 100% RB                   | 4.46                            | 4.29                              | 5.50                              | 4.50                               | 6.55                                |
| 60                                | 648666 / 3730.0               | 100% RB                   | 7.85                            | 4.15                              | 7.84                              | 4.68                               | 4.52                                |
|                                   | 656000 / 3840.0               | 100% RB                   | 6.47                            | 4.07                              | 4.89                              | 5.81                               | 4.98                                |
|                                   | 663333 / 3950.0               | 100% RB                   | 7.63                            | 7.63                              | 7.48                              | 6.51                               | 5.96                                |
| 70                                | 649000 / 3735.0               | 100% RB                   | 5.91                            | 6.52                              | 7.95                              | 5.11                               | 4.67                                |
|                                   | 656000 / 3840.0               | 100% RB                   | 7.48                            | 7.21                              | 5.92                              | 7.31                               | 4.34                                |
|                                   | 663000 / 3945.0               | 100% RB                   | 7.54                            | 5.22                              | 5.01                              | 5.08                               | 5.19                                |
| 80                                | 649333 / 3740.0               | 100% RB                   | 4.93                            | 5.44                              | 4.83                              | 5.29                               | 6.61                                |
|                                   | 656000 / 3840.0               | 100% RB                   | 7.63                            | 6.78                              | 6.72                              | 7.21                               | 4.58                                |
|                                   | 662666 / 3940.0               | 100% RB                   | 6.06                            | 4.14                              | 7.92                              | 6.73                               | 6.32                                |
| 90                                | 649666 / 3745.0               | 100% RB                   | 5.81                            | 7.19                              | 7.59                              | 7.98                               | 6.68                                |
|                                   | 656000 / 3840.0               | 100% RB                   | 5.43                            | 6.25                              | 7.16                              | 6.21                               | 5.88                                |

| Peak to average ratio (conducted) |                                     |                              |                                          |                                            |                                            |                                             |                                              |
|-----------------------------------|-------------------------------------|------------------------------|------------------------------------------|--------------------------------------------|--------------------------------------------|---------------------------------------------|----------------------------------------------|
| ANT1                              |                                     |                              |                                          |                                            |                                            |                                             | ANT1                                         |
| Bandwidth<br>(MHz)                | Channel No. /<br>Frequency<br>(MHz) | RB Allocation –<br>RB Offset | Peak to<br>Average<br>ratio (dB)<br>QPSK | Peak to<br>Average<br>ratio (dB)<br>16-QAM | Peak to<br>Average<br>ratio (dB)<br>64-QAM | Peak to<br>Average<br>ratio (dB)<br>256-QAM | Peak to<br>Average<br>ratio (dB)<br>PI/2BPSK |
|                                   | 662333 / 3935.0                     | 100% RB                      | 7.93                                     | 4.43                                       | 5.45                                       | 5.23                                        | 4.53                                         |
| 100                               | 650000 / 3750.0                     | 100% RB                      | 6.45                                     | 4.08                                       | 5.21                                       | 5.36                                        | 6.96                                         |
|                                   | 656000 / 3840.0                     | 100% RB                      | 5.81                                     | 4.04                                       | 7.51                                       | 7.65                                        | 5.69                                         |
|                                   | 662000 / 3930.0                     | 100% RB                      | 7.84                                     | 4.64                                       | 6.96                                       | 6.94                                        | 4.59                                         |

### 13.2.3 Frequency stability – 5G NR n77 – 3450 MHz to 3550 MHz

#### Description:

1. Measure the carrier frequency at room temperature.
2. Subject the mobile station to overnight soak at -30 °C.
3. With the mobile station, powered with  $V_{nom}$ , connected to the CMW500 and in a simulated call on channel 18900 (center channel), measure the carrier frequency. These measurements should be made within two minutes of powering up the mobile station, to prevent significant self warming.
4. Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with  $V_{nom}$ . Vary supply voltage from  $V_{min}$  to  $V_{max}$ , in 0.1 Volt steps re-measuring carrier frequency at each voltage. Pause at  $V_{nom}$  for 1.5 hours unpowered, to allow any self heating to stabilize, before continuing.
6. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

#### Measurement:

| Measurement parameters   |                         |
|--------------------------|-------------------------|
| Detector:                | Measured with CMW500    |
| Sweep time:              |                         |
| Video bandwidth:         |                         |
| Resolution bandwidth:    |                         |
| Span:                    |                         |
| Trace-Mode:              |                         |
| Used equipment:          | See chapter 8.4 setup A |
| Measurement uncertainty: | See chapter 9           |
| Measurement procedure:   | FCC: § 2.1055           |

#### Limits:

| FCC                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------|
| §27.54                                                                                                                              |
| The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation. |

**Results:****AFC FREQ ERROR versus VOLTAGE**

| Voltage (V) | Frequency<br>Low channel (MHz)<br>(3455 MHz) | Frequency<br>High channel (MHz)<br>(3545 MHz) | Frequency Error<br>(Hz) | Frequency Error<br>(ppm) |
|-------------|----------------------------------------------|-----------------------------------------------|-------------------------|--------------------------|
| $V_{low}$   | 3455.010                                     |                                               | 13                      | 0.004                    |
|             |                                              | 3544.980                                      | 7                       | 0.002                    |
| $V_{nom}$   | 3455.010                                     |                                               | 22                      | 0.006                    |
|             |                                              | 3544.980                                      | 13                      | 0.004                    |
| $V_{high}$  | 3455.010                                     |                                               | 18                      | 0.005                    |
|             |                                              | 3544.980                                      | 11                      | 0.003                    |

**AFC FREQ ERROR versus TEMPERATURE**

| Temperature (°C) | Frequency<br>Low channel (MHz)<br>(3455 MHz) | Frequency<br>High channel (MHz)<br>(3545 MHz) | Frequency Error<br>(Hz) | Frequency Error<br>(ppm) |
|------------------|----------------------------------------------|-----------------------------------------------|-------------------------|--------------------------|
| 50               | 3455.010                                     |                                               | 15                      | 0.004                    |
|                  |                                              | 3544.980                                      | 15                      | 0.004                    |
| 40               | 3455.010                                     |                                               | 12                      | 0.003                    |
|                  |                                              | 3544.980                                      | 15                      | 0.004                    |
| 30               | 3455.010                                     |                                               | 17                      | 0.005                    |
|                  |                                              | 3544.980                                      | 14                      | 0.004                    |
| 20               | 3455.010                                     |                                               | 22                      | 0.006                    |
|                  |                                              | 3544.980                                      | 13                      | 0.004                    |
| 10               | 3455.010                                     |                                               | 11                      | 0.003                    |
|                  |                                              | 3544.980                                      | 9                       | 0.003                    |
| 0                | 3455.010                                     |                                               | 13                      | 0.004                    |
|                  |                                              | 3544.980                                      | 18                      | 0.005                    |
| -10              | 3455.010                                     |                                               | 18                      | 0.005                    |
|                  |                                              | 3544.980                                      | 15                      | 0.004                    |
| -20              | 3455.010                                     |                                               | 19                      | 0.005                    |
|                  |                                              | 3544.980                                      | 13                      | 0.004                    |
| -30              | 3455.010                                     |                                               | 13                      | 0.004                    |
|                  |                                              | 3544.980                                      | 11                      | 0.003                    |

### 13.2.4 Frequency stability – 5G NR n77 – 3700 MHz to 3980 MHz

#### Description:

1. Measure the carrier frequency at room temperature.
2. Subject the mobile station to overnight soak at -30 °C.
3. With the mobile station, powered with  $V_{nom}$ , connected to the CMW500 and in a simulated call on channel 18900 (center channel), measure the carrier frequency. These measurements should be made within two minutes of powering up the mobile station, to prevent significant self warming.
4. Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with  $V_{nom}$ . Vary supply voltage from  $V_{min}$  to  $V_{max}$ , in 0.1 Volt steps re-measuring carrier frequency at each voltage. Pause at  $V_{nom}$  for 1.5 hours unpowered, to allow any self heating to stabilize, before continuing.
6. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

#### Measurement:

| Measurement parameters   |                         |
|--------------------------|-------------------------|
| Detector:                | Measured with CMW500    |
| Sweep time:              |                         |
| Video bandwidth:         |                         |
| Resolution bandwidth:    |                         |
| Span:                    |                         |
| Trace-Mode:              |                         |
| Used equipment:          | See chapter 8.4 setup A |
| Measurement uncertainty: | See chapter 9           |
| Measurement procedure:   | FCC: § 2.1055           |

#### Limits:

| FCC                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------|
| §27.54                                                                                                                              |
| The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation. |

**Results:****AFC FREQ ERROR versus VOLTAGE**

| Voltage (V) | Frequency<br>Low channel (MHz)<br>(3705 MHz) | Frequency<br>High channel (MHz)<br>(3975 MHz) | Frequency Error<br>(Hz) | Frequency Error<br>(ppm) |
|-------------|----------------------------------------------|-----------------------------------------------|-------------------------|--------------------------|
| $V_{low}$   | 3705.000                                     |                                               | 11                      | 0.003                    |
|             |                                              | 3975.000                                      | 7                       | 0.002                    |
| $V_{nom}$   | 3705.000                                     |                                               | 16                      | 0.004                    |
|             |                                              | 3975.000                                      | 11                      | 0.003                    |
| $V_{high}$  | 3705.000                                     |                                               | 10                      | 0.003                    |
|             |                                              | 3975.000                                      | 13                      | 0.003                    |

**AFC FREQ ERROR versus TEMPERATURE**

| Temperature (°C) | Frequency<br>Low channel (MHz)<br>(3705 MHz) | Frequency<br>High channel (MHz)<br>(3975 MHz) | Frequency Error<br>(Hz) | Frequency Error<br>(ppm) |
|------------------|----------------------------------------------|-----------------------------------------------|-------------------------|--------------------------|
| 50               | 3705.000                                     |                                               | 11                      | 0.003                    |
|                  |                                              | 3975.000                                      | 13                      | 0.003                    |
| 40               | 3705.000                                     |                                               | 17                      | 0.005                    |
|                  |                                              | 3975.000                                      | 13                      | 0.003                    |
| 30               | 3705.000                                     |                                               | 18                      | 0.005                    |
|                  |                                              | 3975.000                                      | 8                       | 0.002                    |
| 20               | 3705.000                                     |                                               | 17                      | 0.005                    |
|                  |                                              | 3975.000                                      | 17                      | 0.004                    |
| 10               | 3705.000                                     |                                               | 12                      | 0.003                    |
|                  |                                              | 3975.000                                      | 12                      | 0.003                    |
| 0                | 3705.000                                     |                                               | 10                      | 0.003                    |
|                  |                                              | 3975.000                                      | 7                       | 0.002                    |
| -10              | 3705.000                                     |                                               | 10                      | 0.003                    |
|                  |                                              | 3975.000                                      | 9                       | 0.002                    |
| -20              | 3705.000                                     |                                               | 19                      | 0.005                    |
|                  |                                              | 3975.000                                      | 7                       | 0.002                    |
| -30              | 3705.000                                     |                                               | 12                      | 0.003                    |
|                  |                                              | 3975.000                                      | 17                      | 0.004                    |

### 13.2.5 Spurious emissions radiated – 5G NR n77 – 3450 MHz to 3550 MHz

#### Description:

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4:2014 requirements and is recognized by the FCC to be in compliance for a 3 and a 10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set as outlined in Part 27.53. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, middle and highest channels of the 5G NR band 77.

#### Measurement:

| Measurement parameters   |                                                           |
|--------------------------|-----------------------------------------------------------|
| Detector:                | Peak                                                      |
| Sweep time:              | 2 sec.                                                    |
| Resolution bandwidth:    | 1 MHz                                                     |
| Video bandwidth:         | 3 MHz                                                     |
| Span:                    | 100 MHz Steps                                             |
| Trace mode:              | Max Hold                                                  |
| Used equipment:          | See chapter 8.1 setup A & 8.2 setup A and B & setup 8.3 A |
| Measurement uncertainty: | See chapter 9                                             |
| Measurement procedure    | FCC: § 2.1053                                             |

#### Limits:

| FCC                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| § 27.53                                                                                                                                                            |
| For mobile operations in the 3450 MHz to 3550 MHz band, the radiated power of any emission outside the licensee's authorized bandwidth shall not exceed -13dBm/MHz |

**Results:** antenna 1+2

| BPSK modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-----------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 20 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| QPSK modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-----------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 20 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

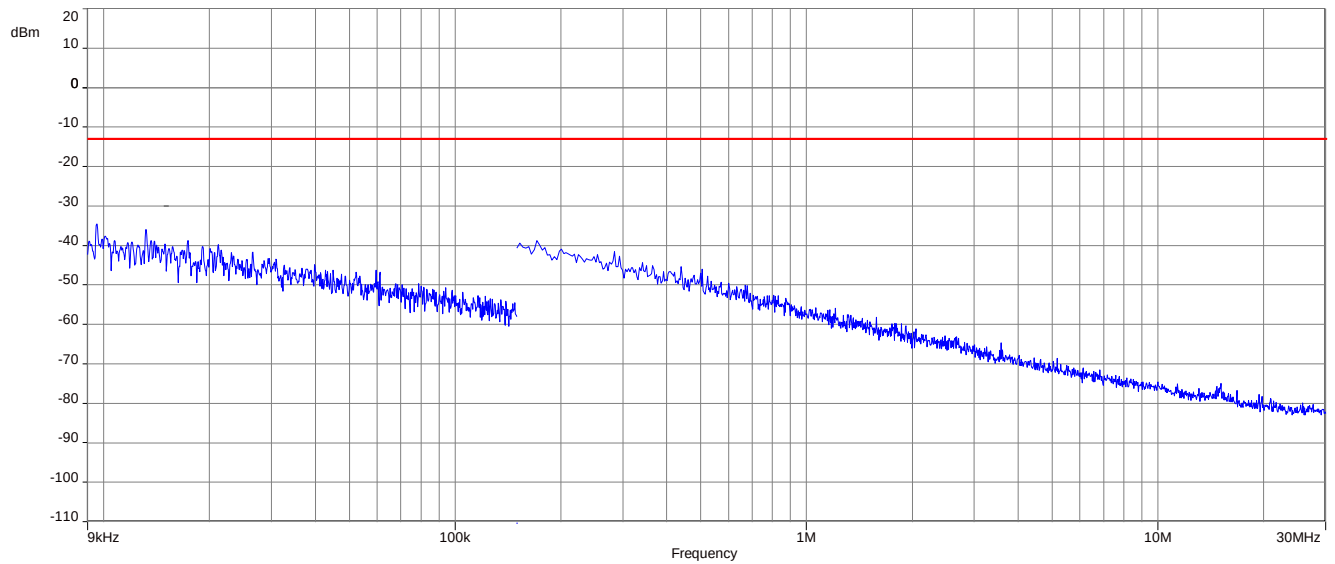
| 16-QAM modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz)   | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 20 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| 64-QAM modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz)   | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 20 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

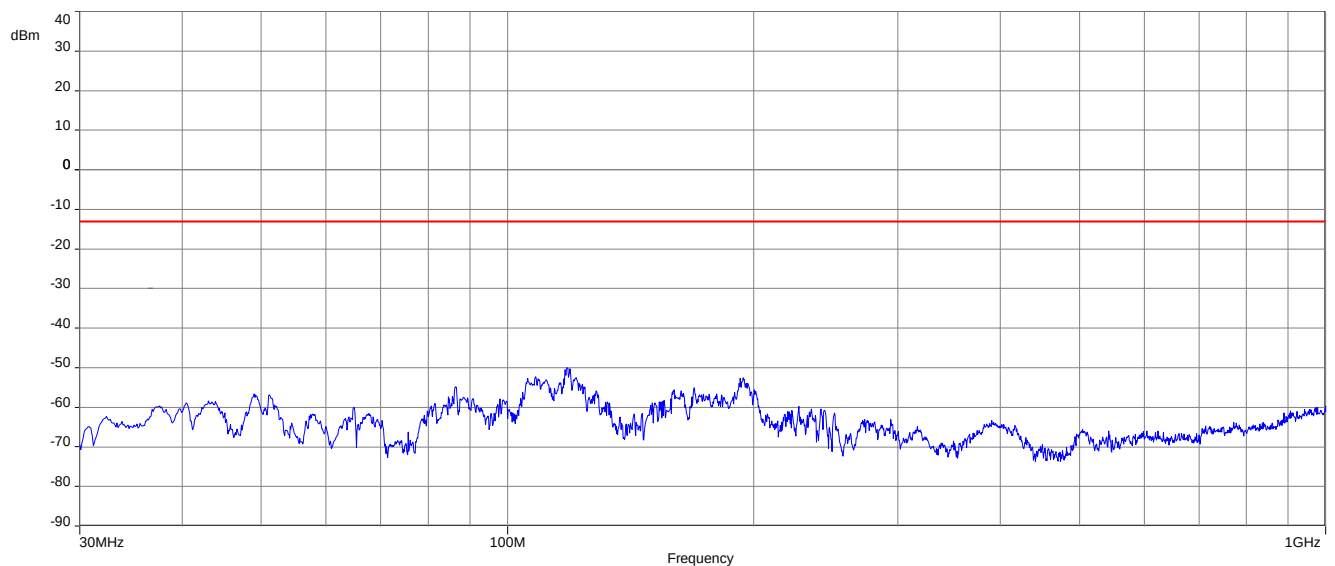
| 256-QAM modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|--------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz)    | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 20 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

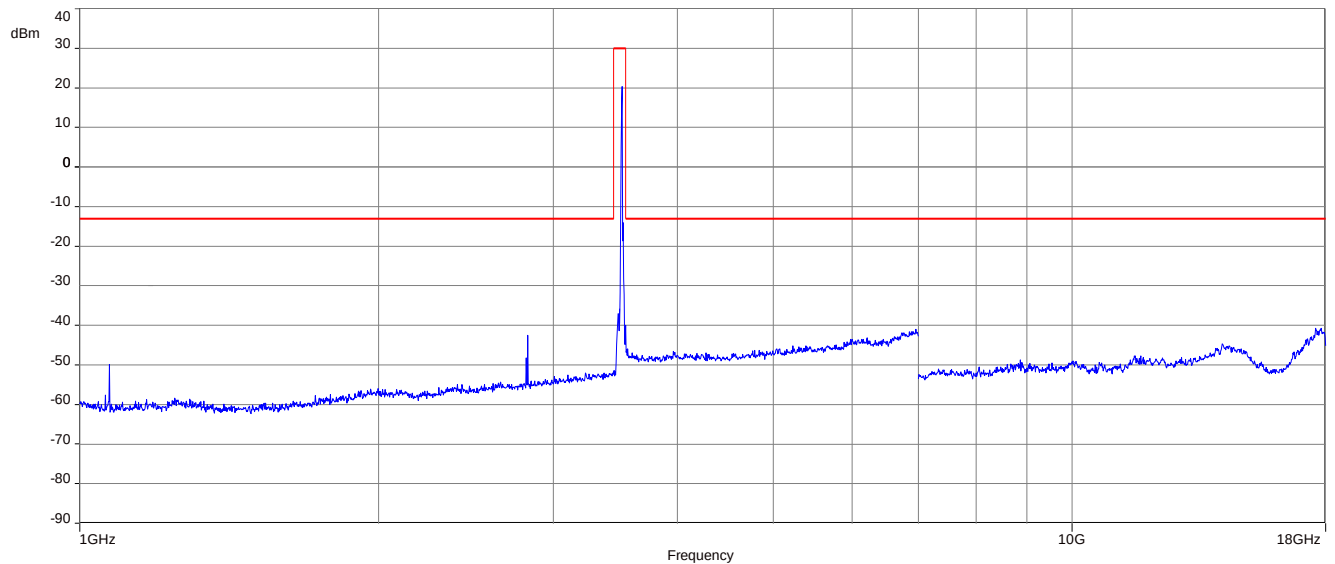
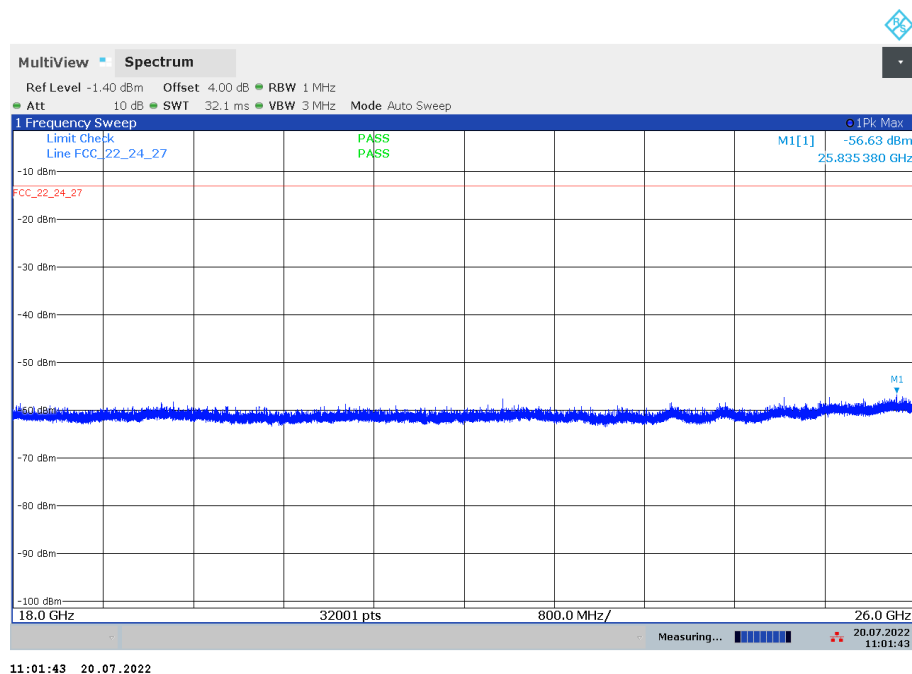
**Plots:** antenna 1, BPSK modulation

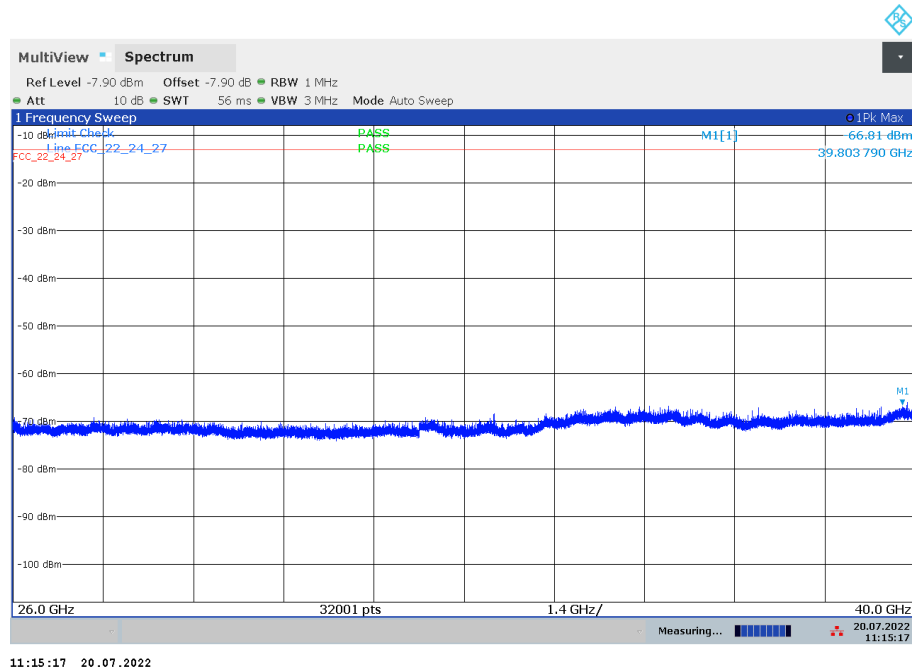
**Plot 1:** BPSK - mid channel (9 kHz - 30 MHz)



**Plot 2:** BPSK - mid channel (30 MHz – 1 GHz)

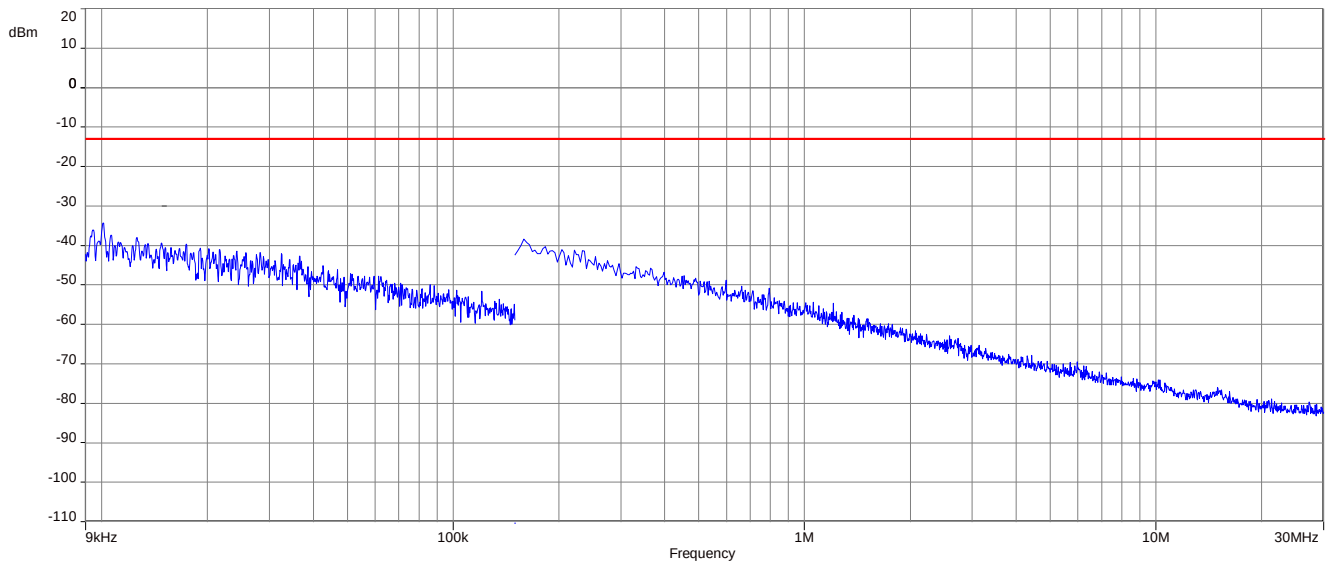


**Plot 3:** BPSK - mid channel (1 GHz – 18 GHz)**Plot 4:** BPSK - mid channel (18 GHz – 26 GHz)

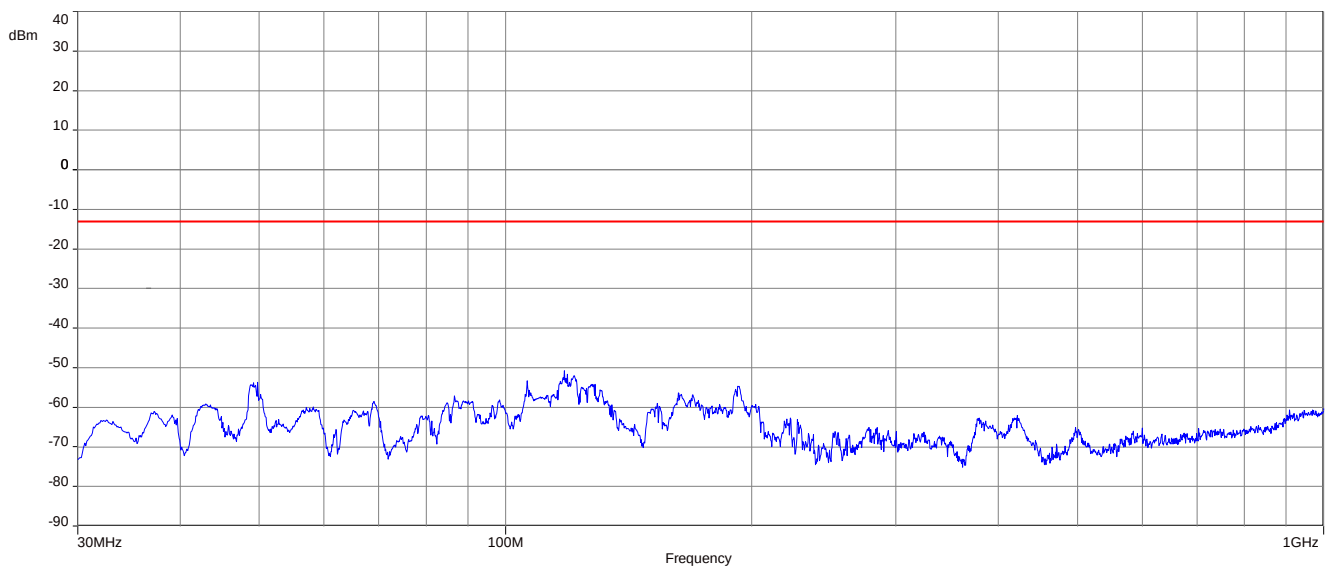
**Plot 5:** BPSK - mid channel (26 GHz – 40 GHz)

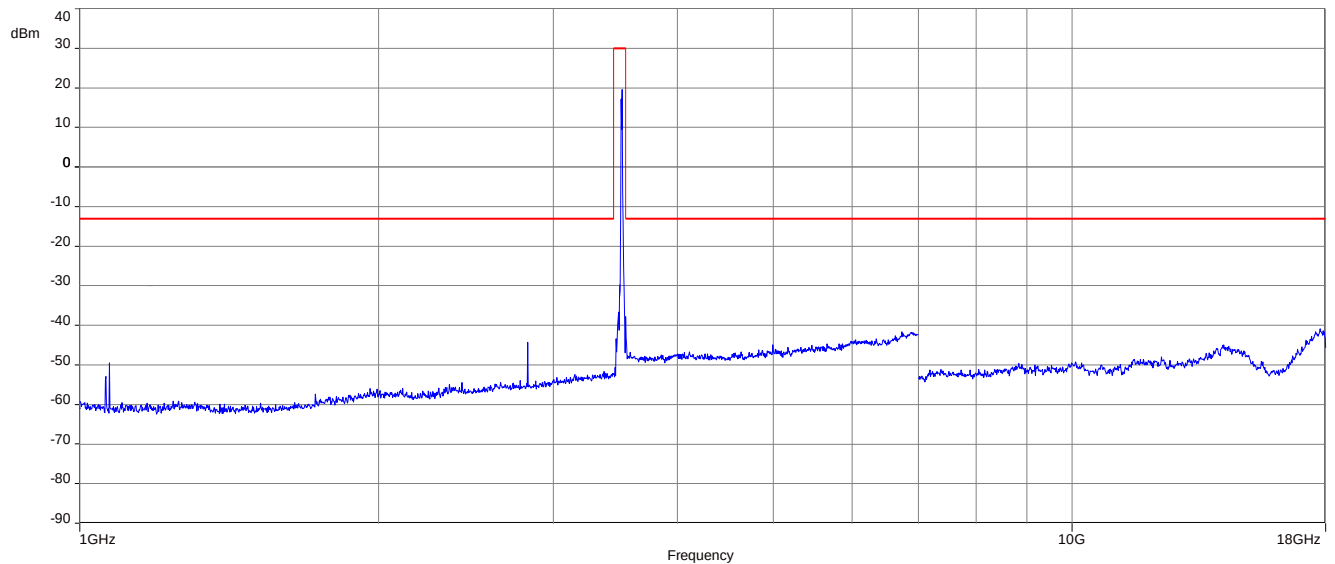
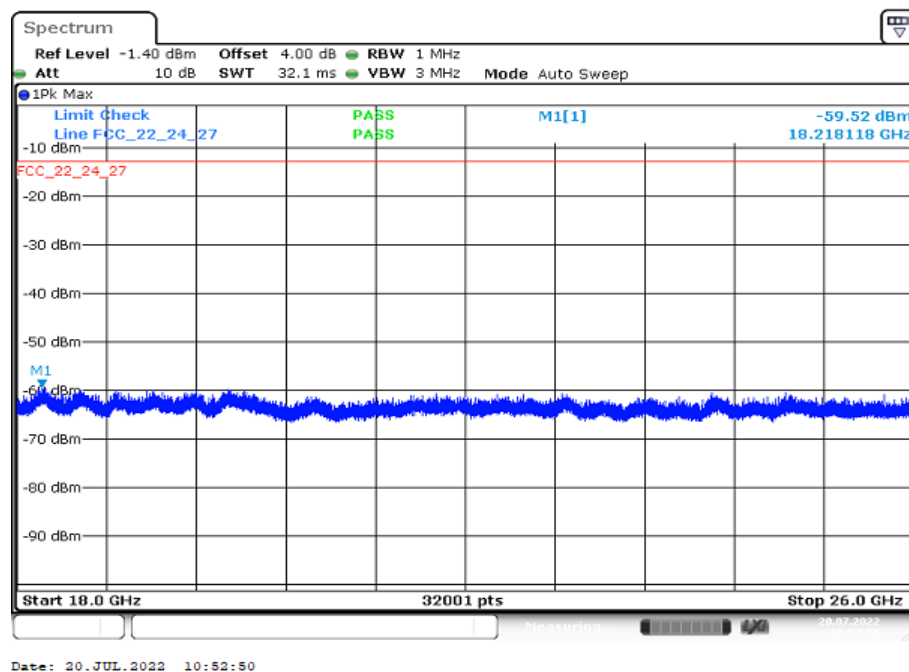
**Plots:** antenna 1+2, QPSK modulation

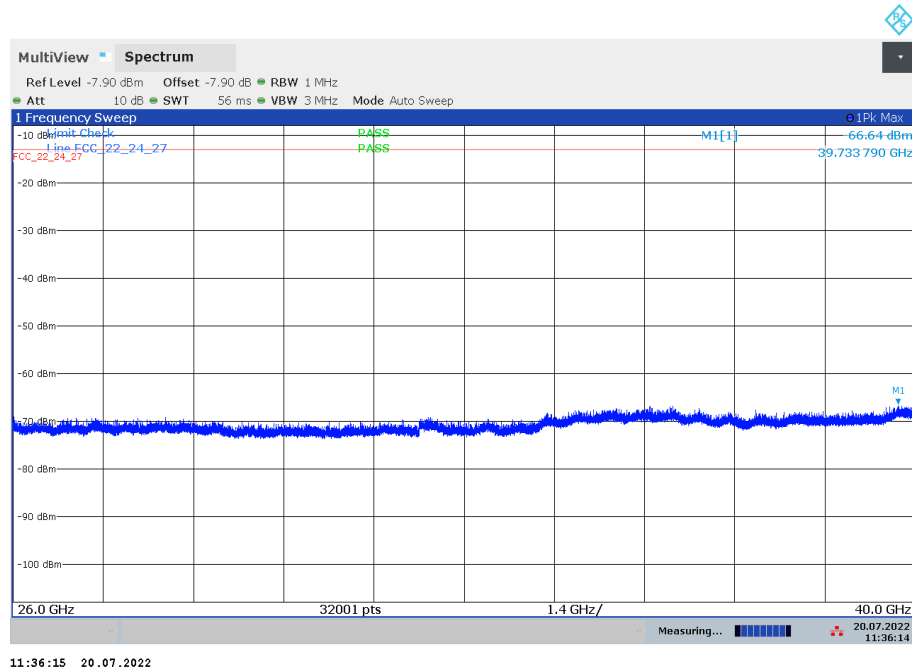
**Plot 6:** QPSK - mid channel (9 kHz - 30 MHz)



**Plot 7:** QPSK - mid channel (30 MHz – 1 GHz)

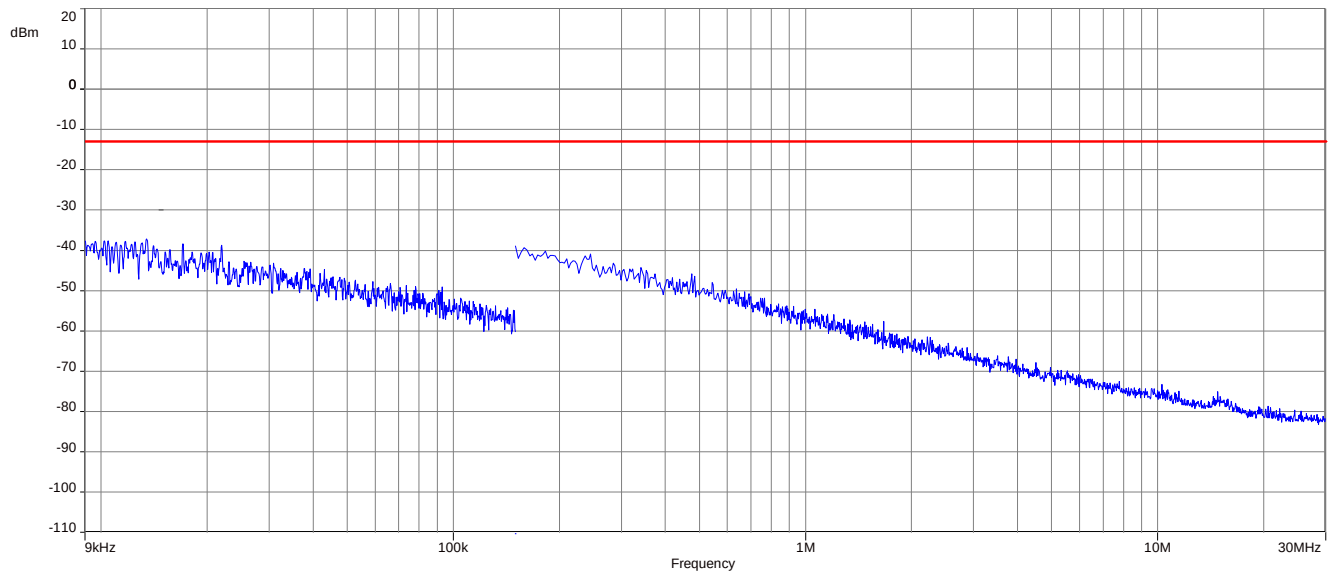


**Plot 8:** QPSK - mid channel (1 GHz – 18 GHz)**Plot 9:** QPSK - mid channel (18 GHz – 26 GHz)

**Plot 10:** QPSK - mid channel (26 GHz – 40 GHz)

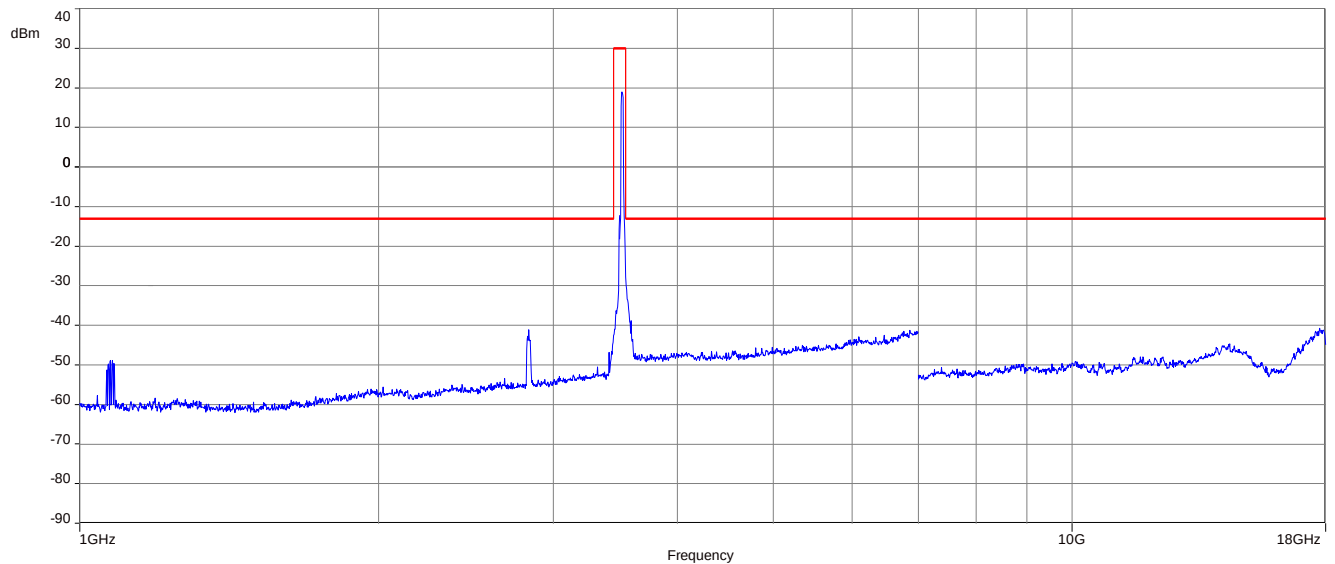
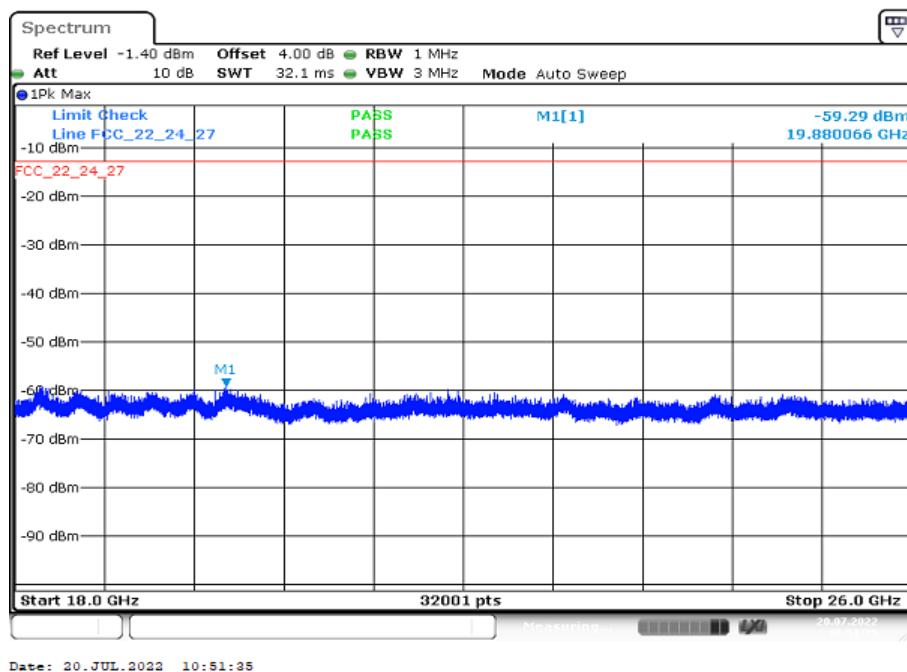
**Plots:** antenna 1+2, 16-QAM modulation

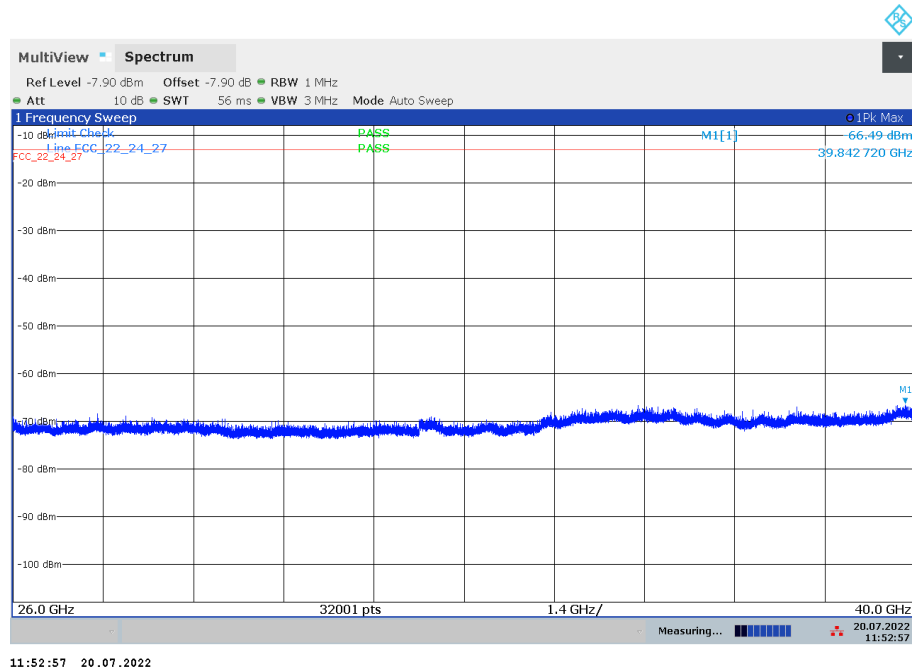
**Plot 11:** 16-QAM - mid channel (9 kHz - 30 MHz)



**Plot 12:** 16-QAM - mid channel (30 MHz – 1 GHz)

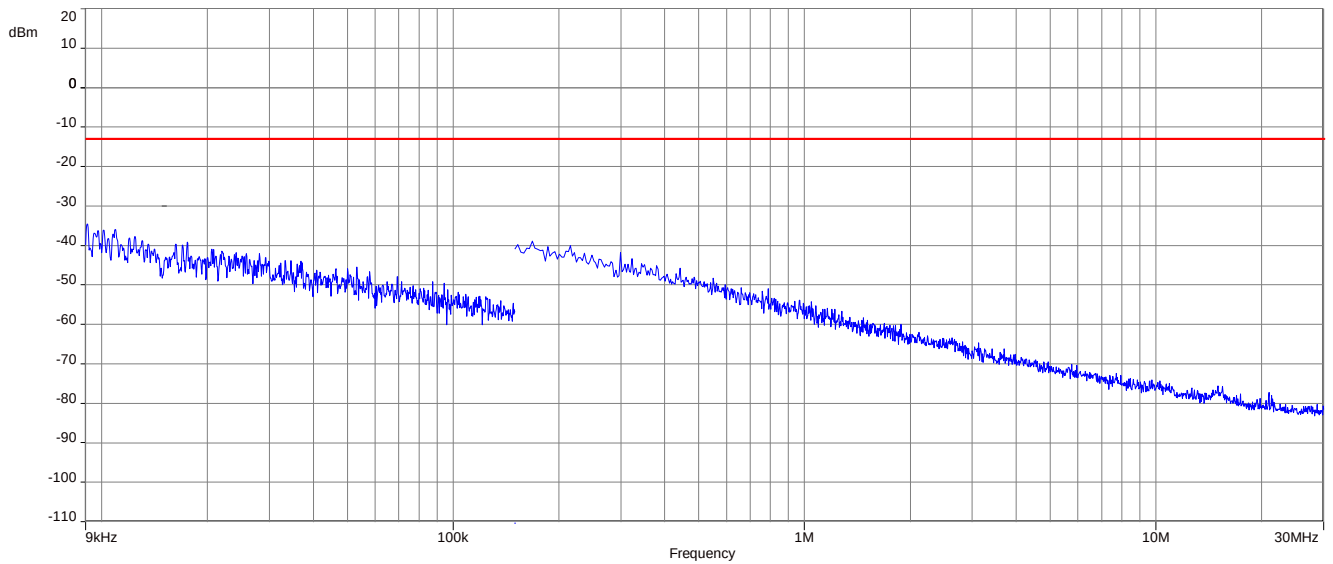


**Plot 13:** 16-QAM - mid channel (1 GHz – 18 GHz)**Plot 14:** 16-QAM - mid channel (18 GHz – 26 GHz)

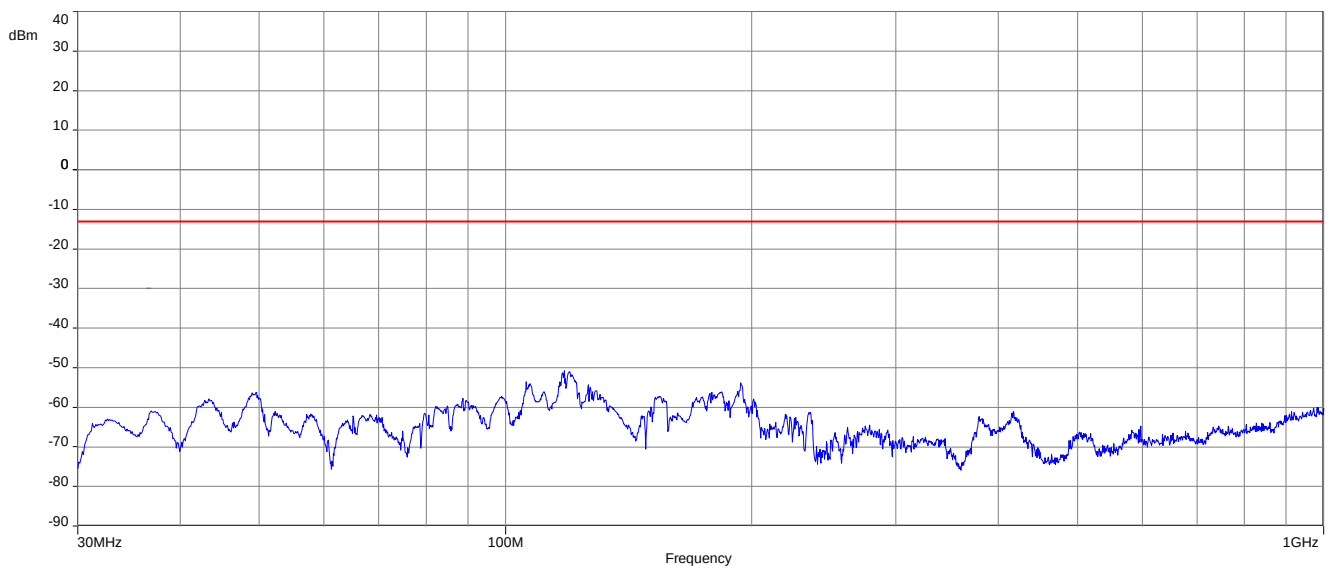
**Plot 15:** 16-QAM - mid channel (26 GHz – 40 GHz)

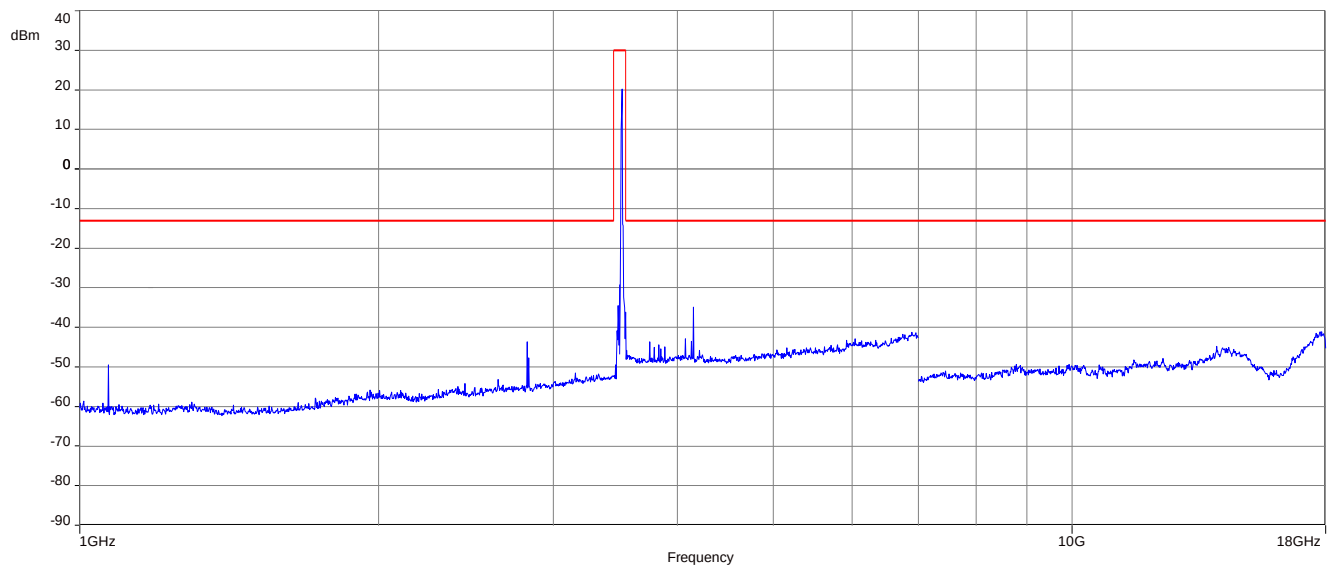
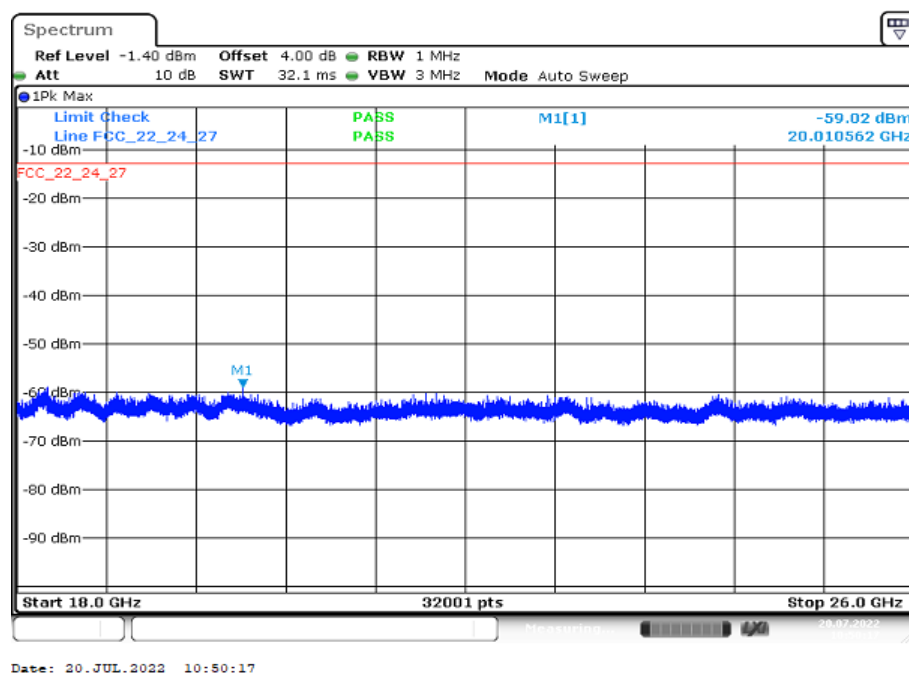
**Plots:** antenna 1+2, 64-QAM modulation

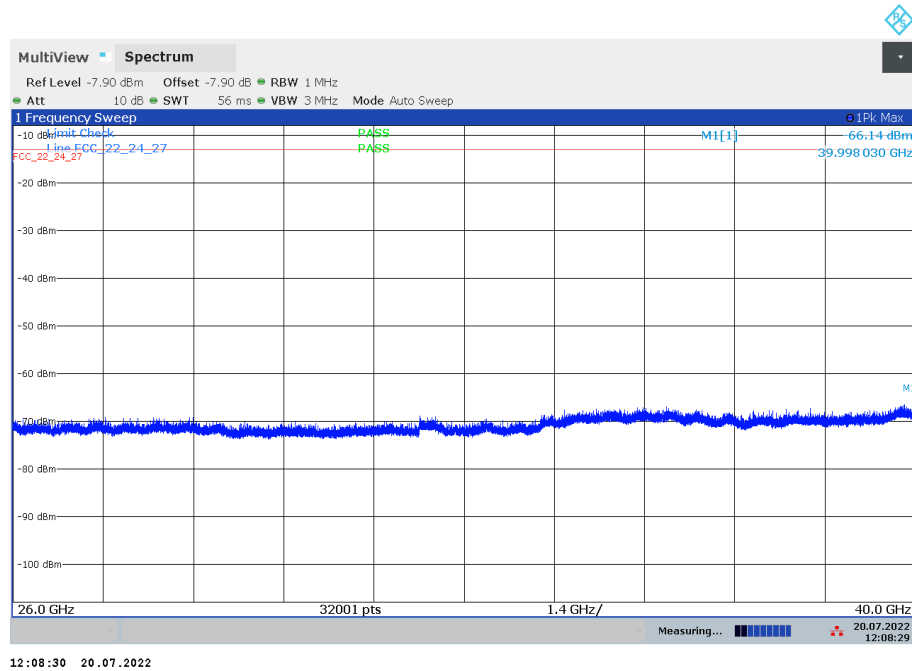
**Plot 16:** 64-QAM - mid channel (9 kHz - 30 MHz)



**Plot 17:** 64-QAM - mid channel (30 MHz – 1 GHz)

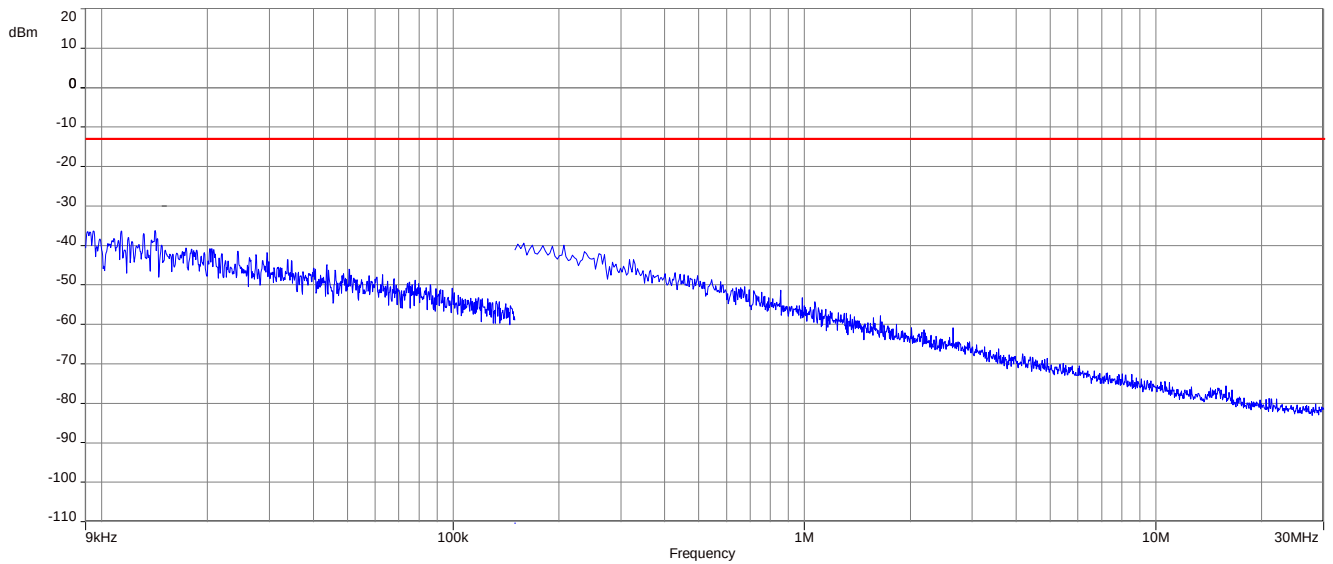


**Plot 18:** 64-QAM - mid channel (1 GHz – 18 GHz)**Plot 19:** 64-QAM - mid channel (18 GHz – 26 GHz)

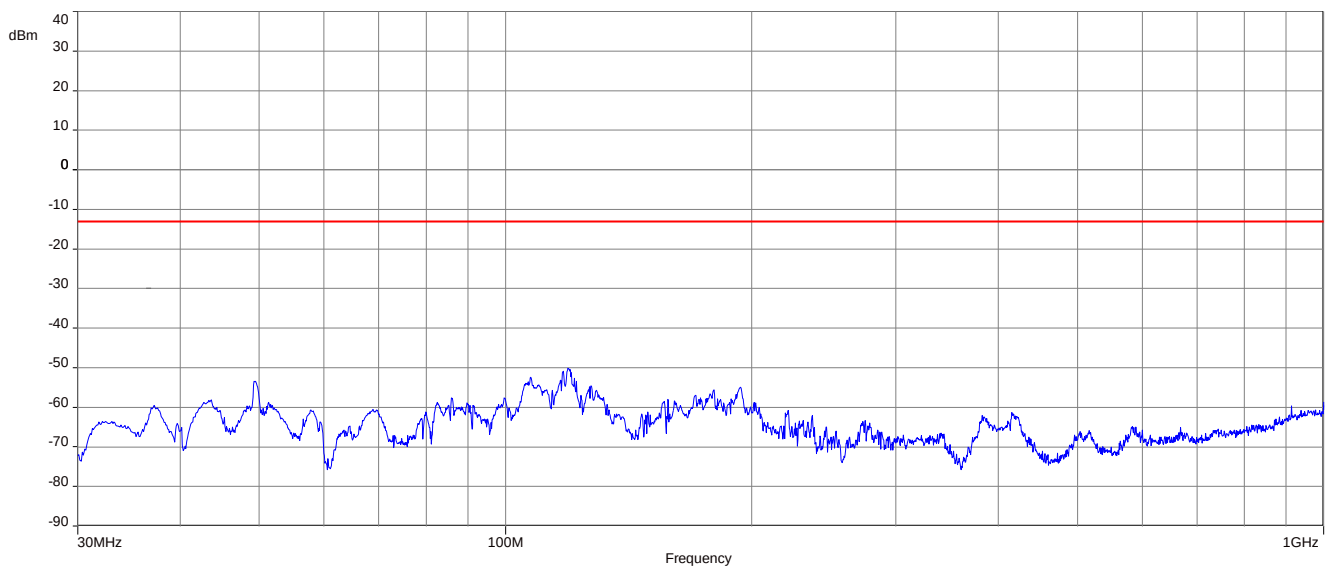
**Plot 20:** 64-QAM - mid channel (26 GHz – 40 GHz)

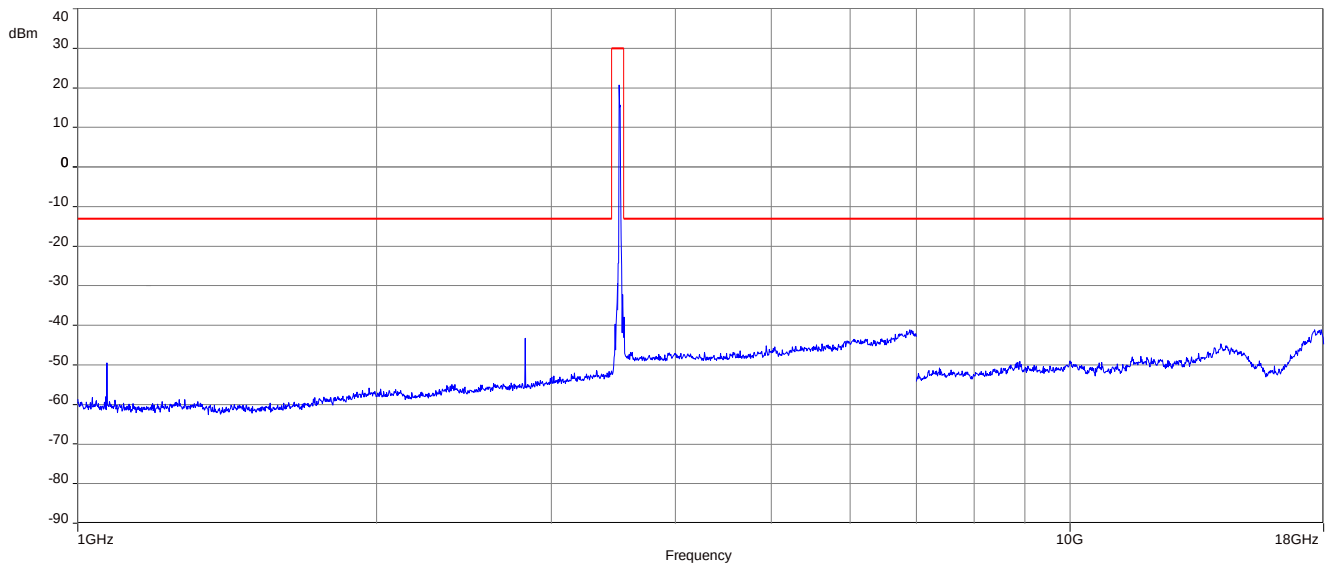
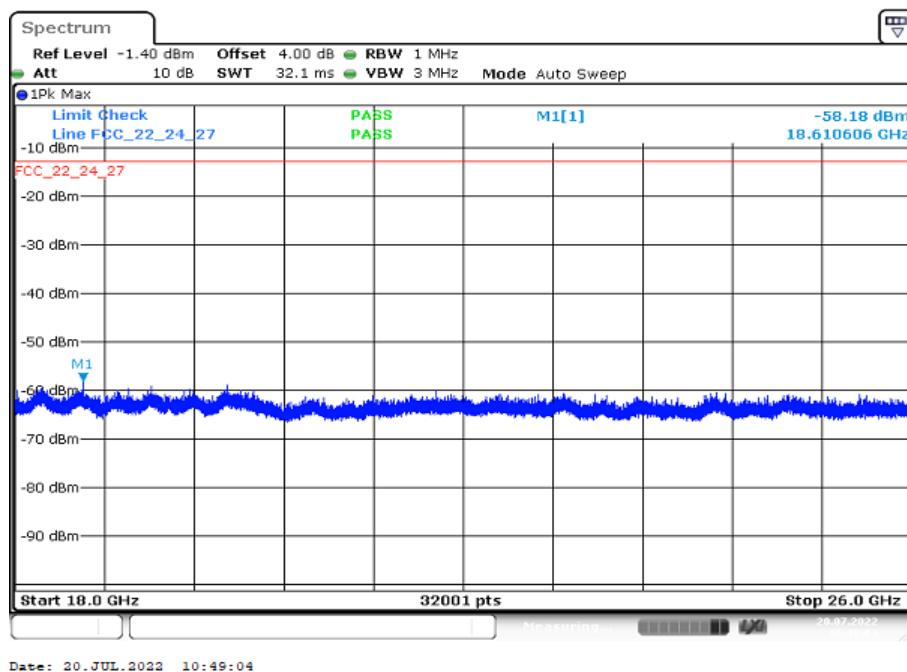
**Plots:** antenna 1+2, 256-QAM modulation

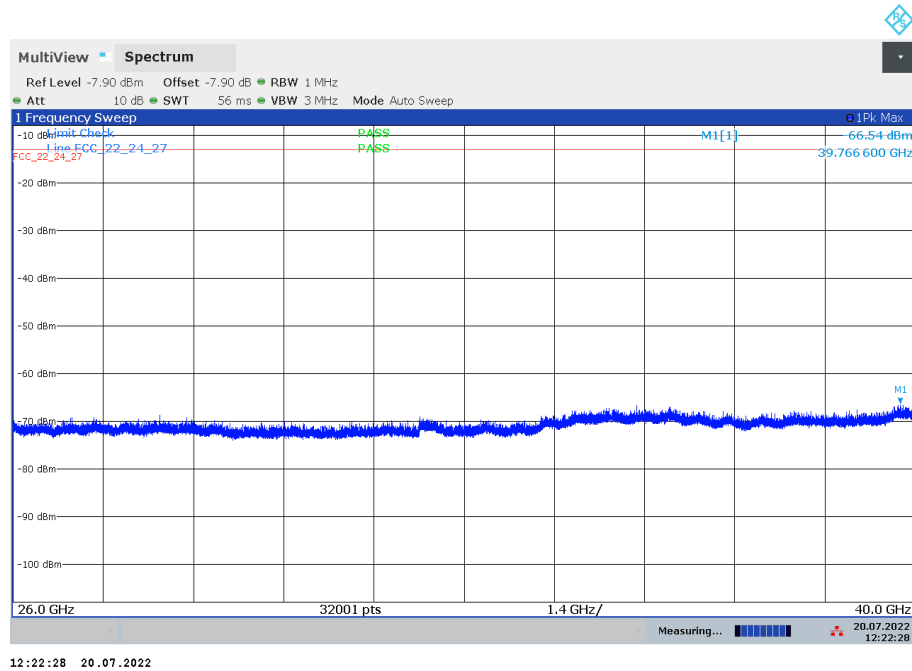
**Plot 21:** 256-QAM - mid channel (9 kHz - 30 MHz)



**Plot 22:** 256-QAM - mid channel (30 MHz – 1 GHz)



**Plot 23:** 256-QAM - mid channel (1 GHz – 18 GHz)**Plot 24:** 256-QAM - mid channel (18 GHz – 26 GHz)

**Plot 25:** 256-QAM - mid channel (26 GHz – 40 GHz)

### 13.2.6 Spurious emissions radiated – 5G NR n77 – 3700 MHz to 3980 MHz

#### Description:

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4:2014 requirements and is recognized by the FCC to be in compliance for a 3 and a 10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set as outlined in Part 27.53. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, middle and highest channels of the 5G NR band 77.

#### Measurement:

| Measurement parameters   |                                                           |
|--------------------------|-----------------------------------------------------------|
| Detector:                | Peak                                                      |
| Sweep time:              | 2 sec.                                                    |
| Resolution bandwidth:    | 1 MHz                                                     |
| Video bandwidth:         | 3 MHz                                                     |
| Span:                    | 100 MHz Steps                                             |
| Trace mode:              | Max Hold                                                  |
| Used equipment:          | See chapter 8.1 setup A & 8.2 setup A and B & setup 8.3 A |
| Measurement uncertainty: | See chapter 9                                             |
| Measurement procedure    | FCC: § 2.1053                                             |

#### Limits:

| FCC                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| § 27.53                                                                                                                                                            |
| For mobile operations in the 3700 MHz to 3980 MHz band, the radiated power of any emission outside the licensee's authorized bandwidth shall not exceed -13dBm/MHz |

**Results:** antenna 1

| BPSK modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-----------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 20 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| QPSK modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-----------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 20 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

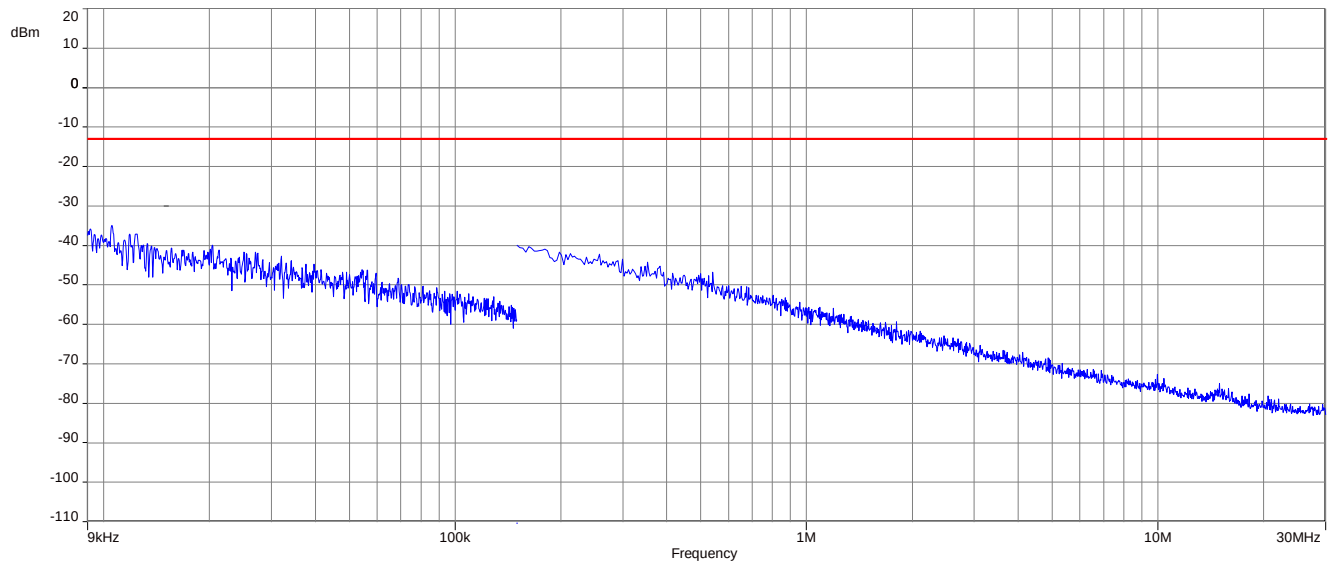
| 16-QAM modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz)   | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 20 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| 64-QAM modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz)   | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 20 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

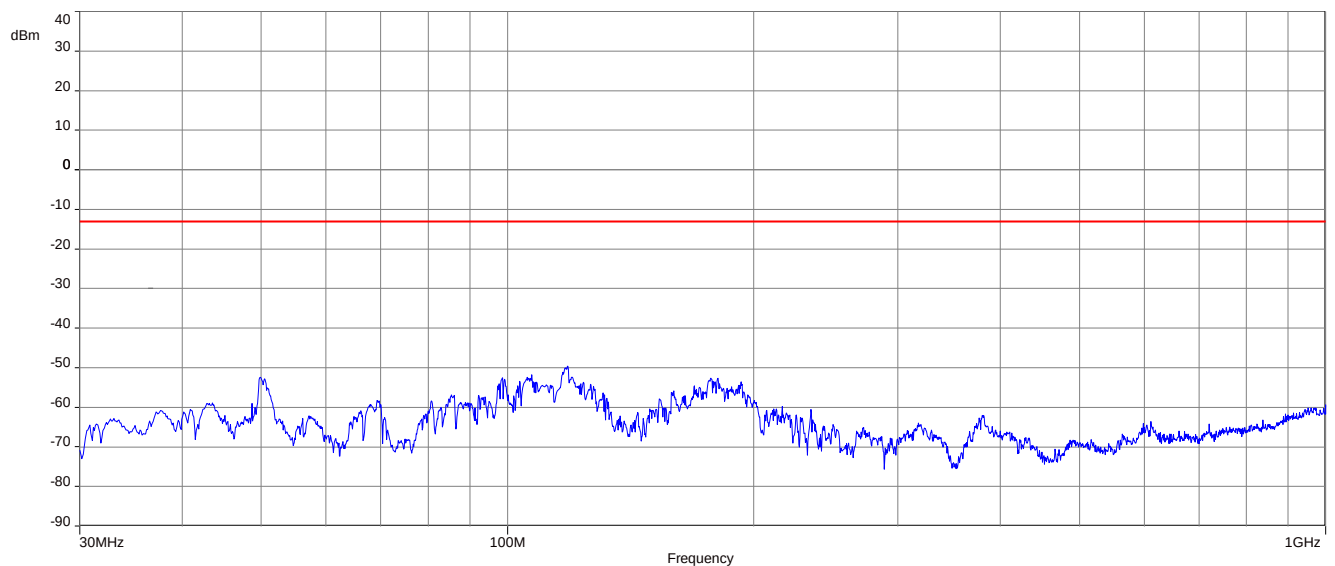
| 256-QAM modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|--------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz)    | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 20 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

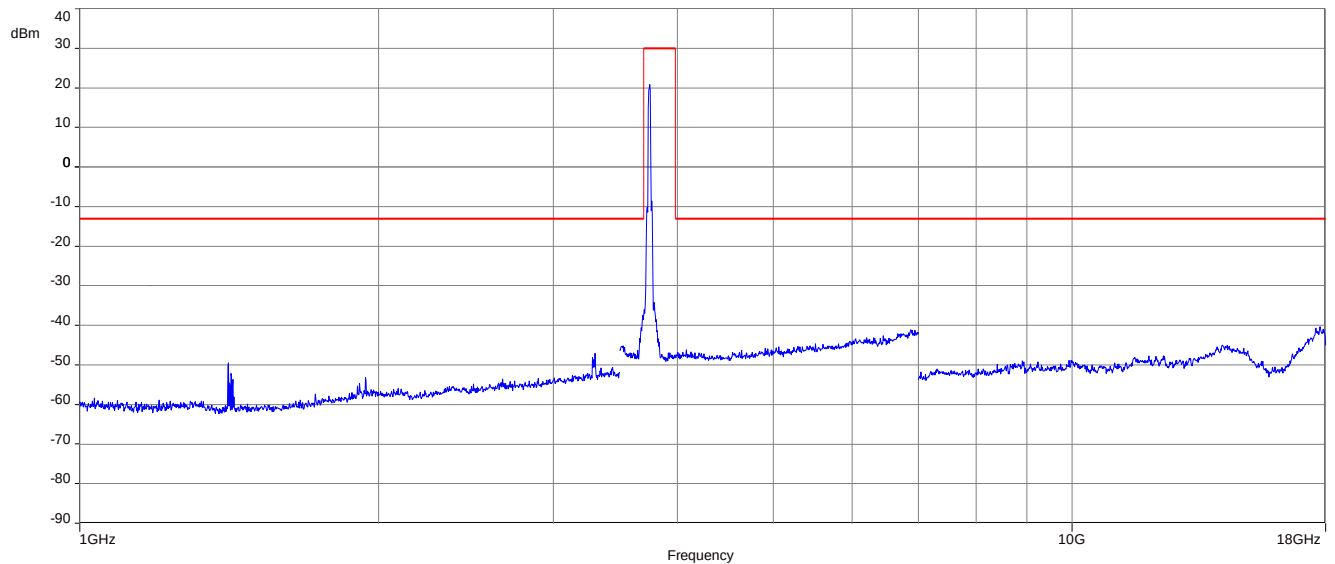
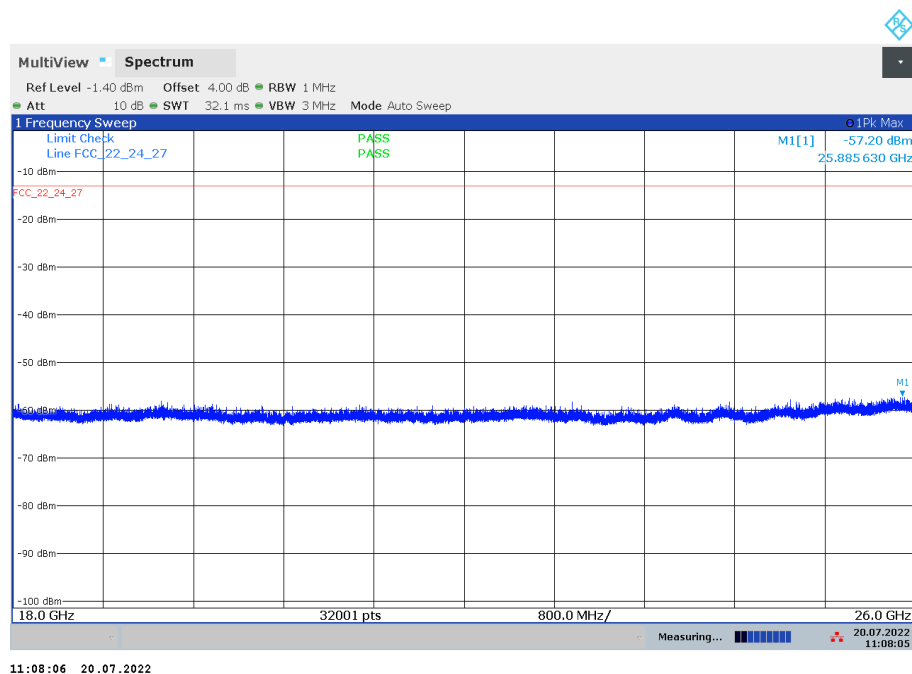
**Plots:** antenna 1, BPSK modulation

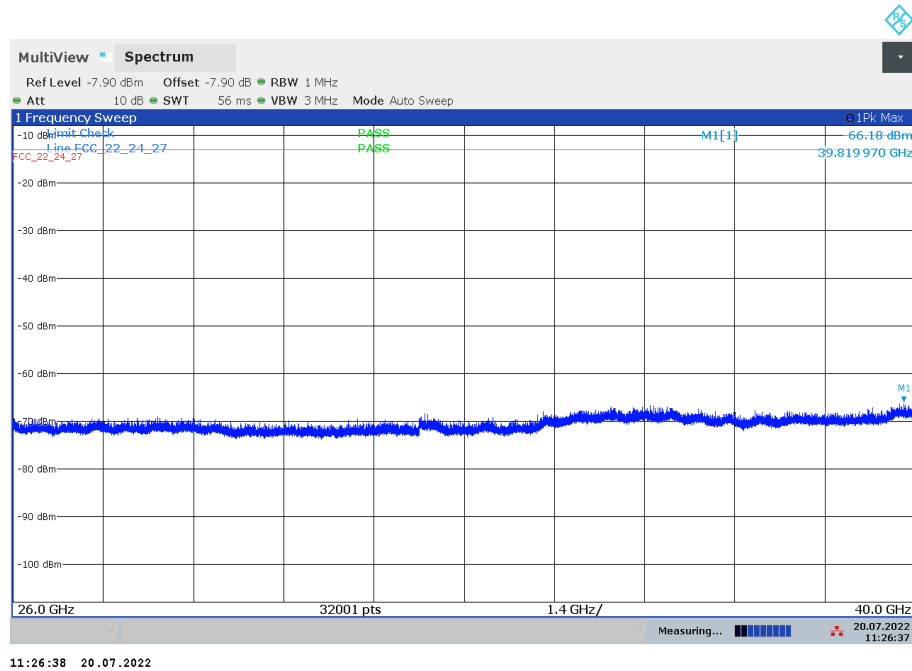
**Plot 1:** BPSK - lowest channel (9 kHz - 30 MHz)



**Plot 2:** BPSK - lowest channel (30 MHz – 1 GHz)

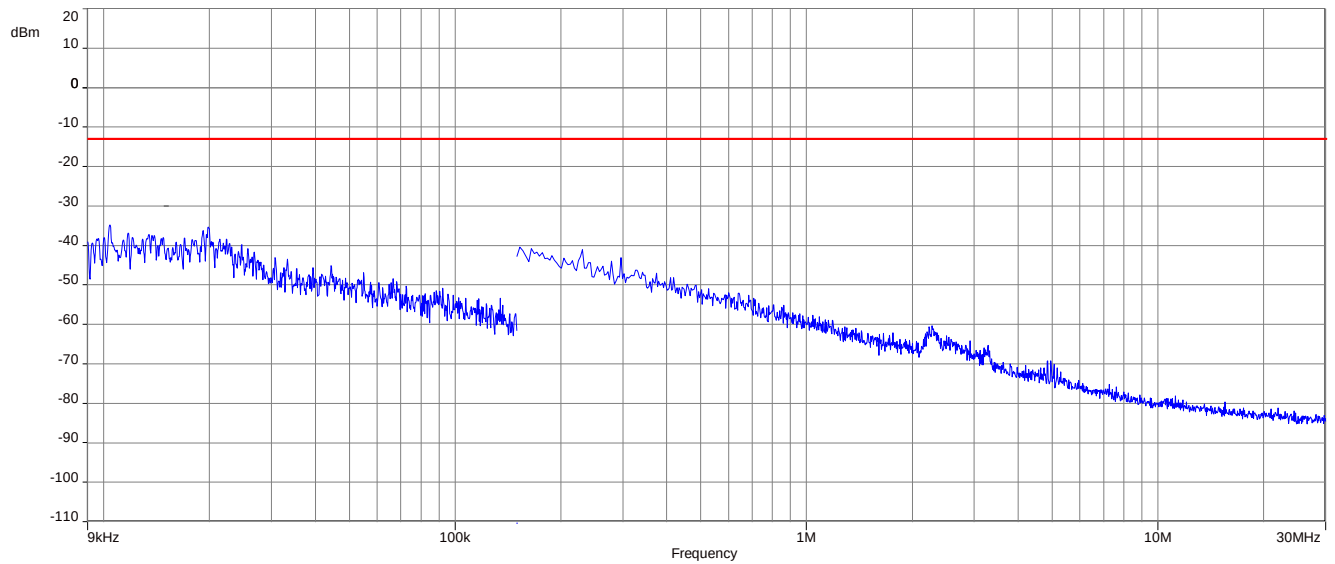


**Plot 3:** BPSK - lowest channel (1 GHz – 18 GHz)**Plot 4:** BPSK - lowest channel (18 GHz – 26 GHz)

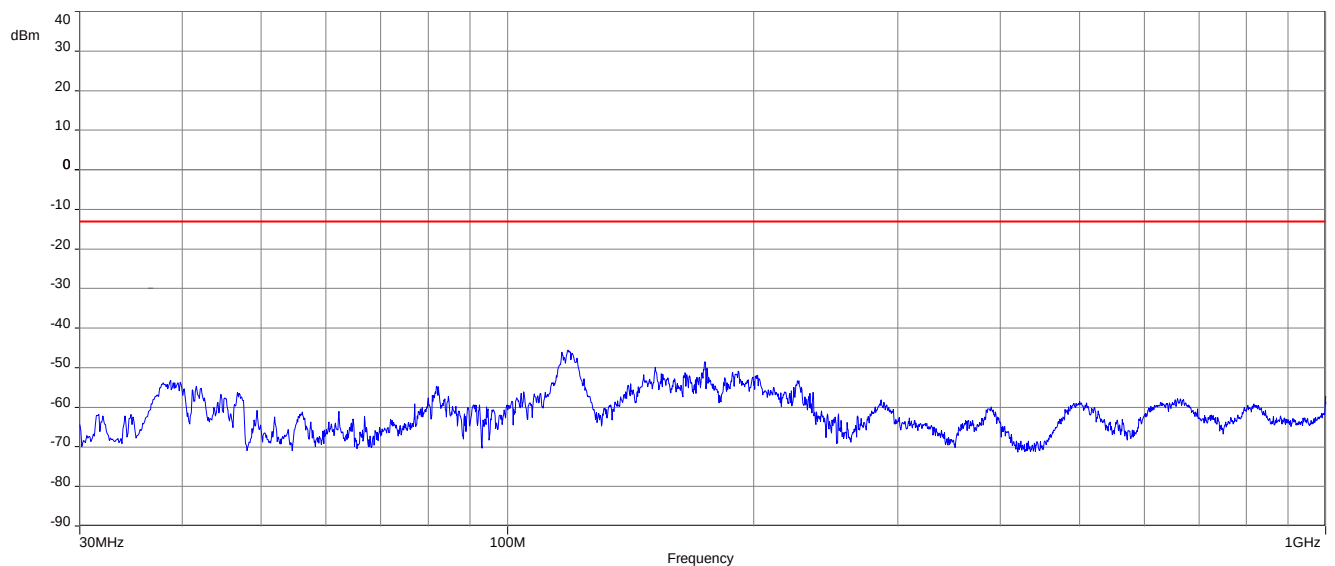
**Plot 5:** BPSK - lowest channel (26 GHz – 40 GHz)

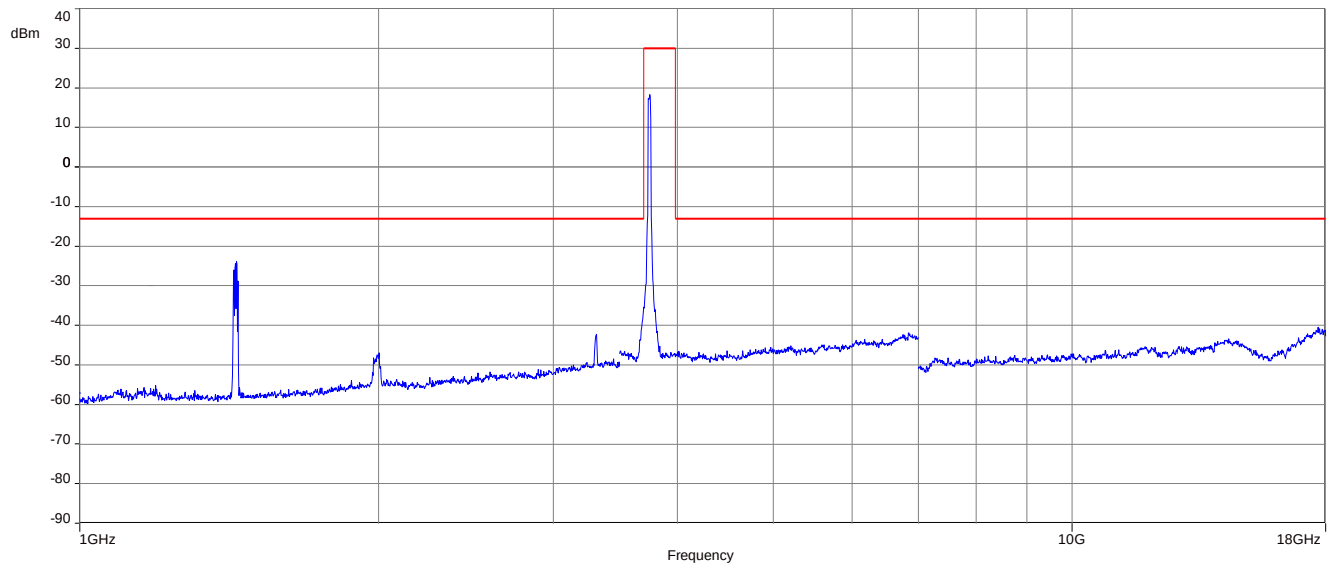
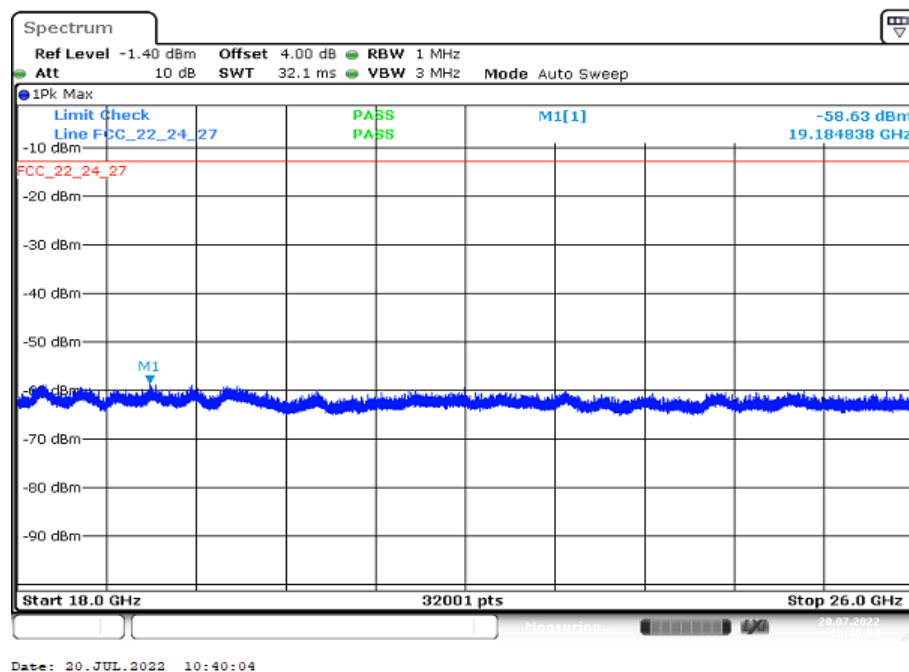
**Plots:** antenna 1+2, QPSK modulation

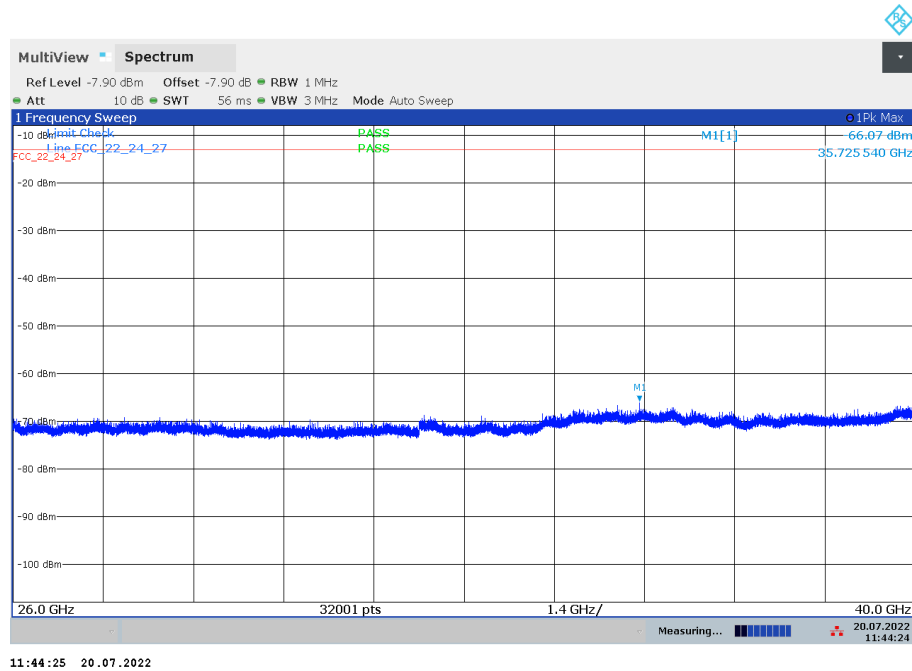
**Plot 1:** QPSK - lowest channel (9 kHz - 30 MHz)



**Plot 2:** QPSK - lowest channel (30 MHz – 1 GHz)

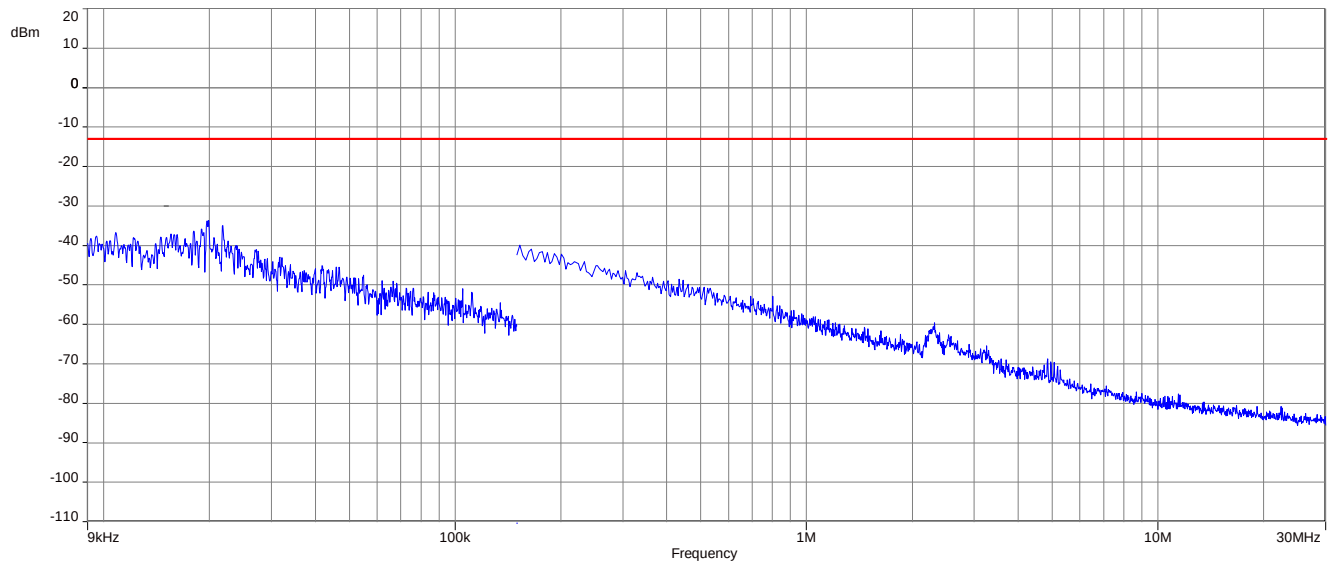


**Plot 3:** QPSK - lowest channel (1 GHz – 18 GHz)**Plot 4:** QPSK - lowest channel (18 GHz – 26 GHz)

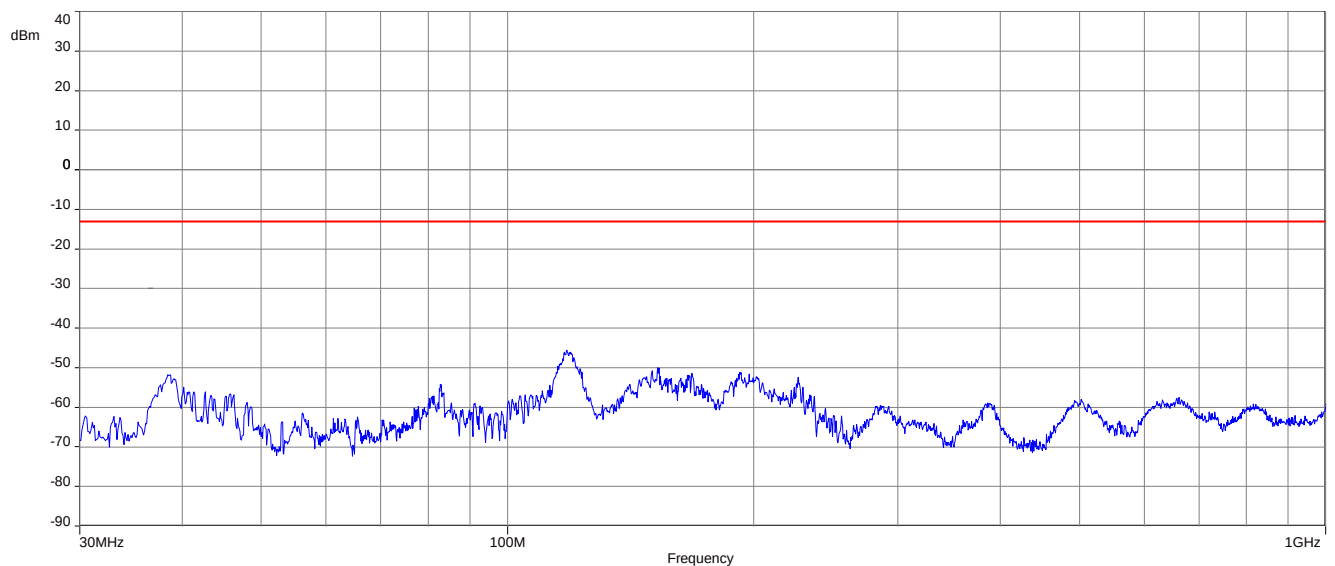
**Plot 5:** QPSK - lowest channel (26 GHz – 40 GHz)

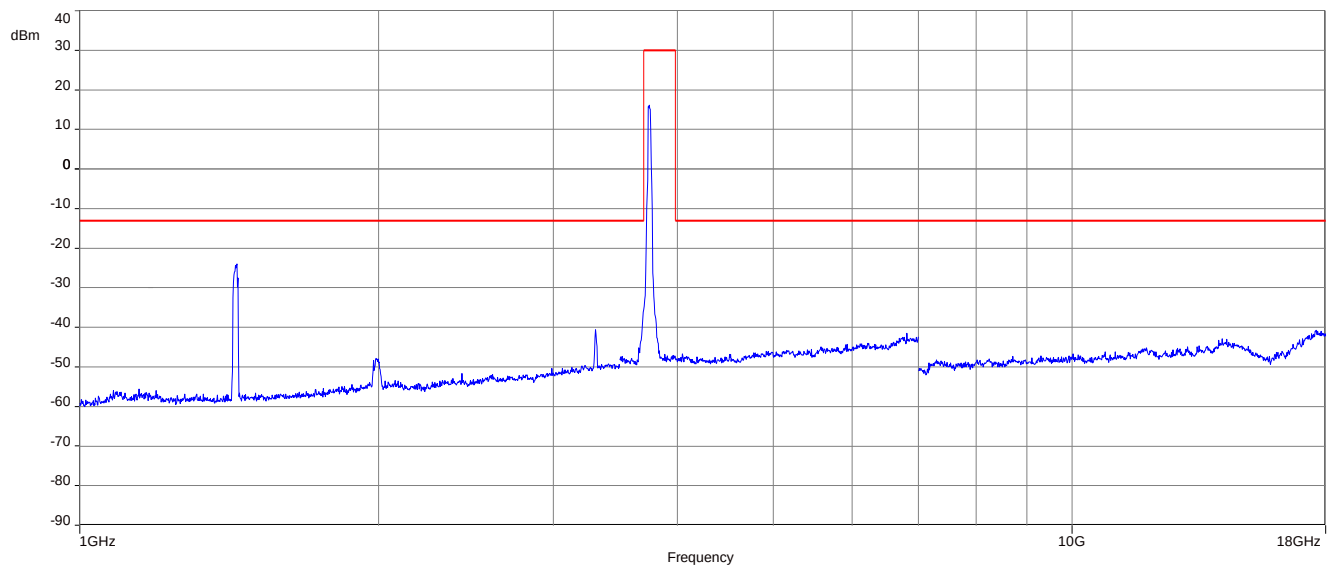
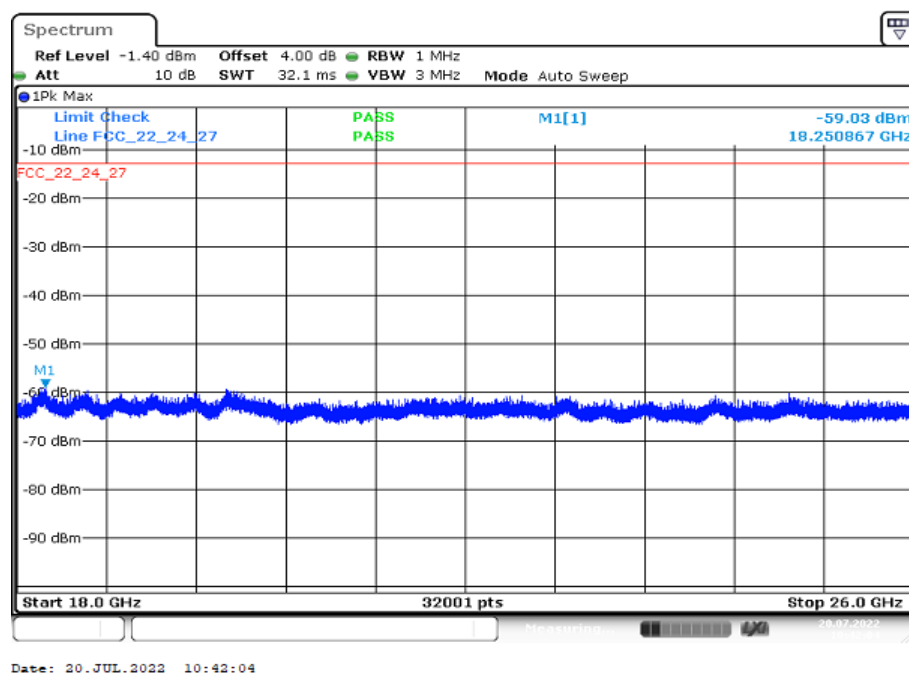
**Plots:** antenna 1+2, 16-QAM modulation

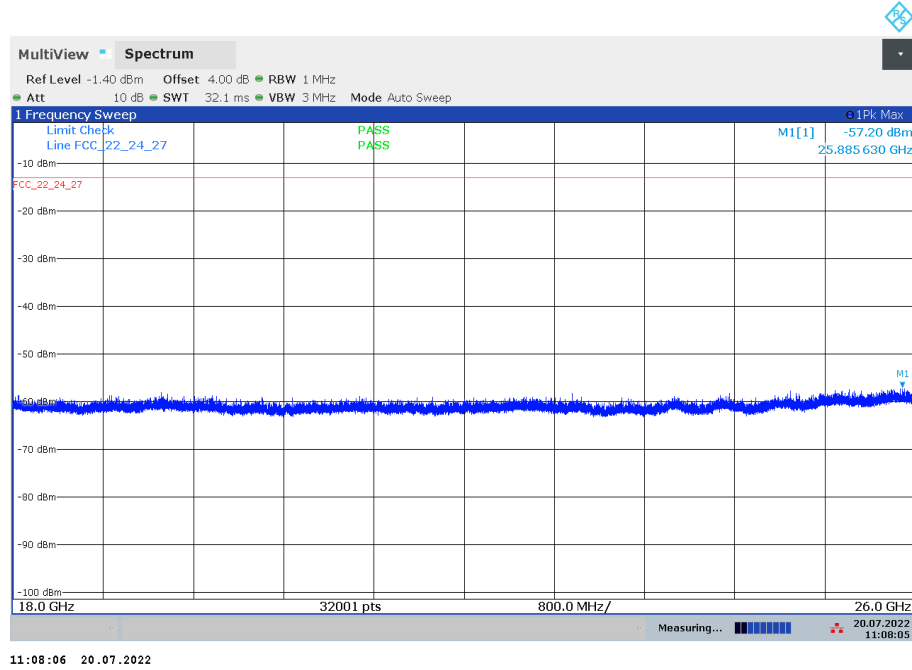
**Plot 1:** 16-QAM - lowest channel (9 kHz - 30 MHz)



**Plot 2:** 16-QAM - lowest channel (30 MHz – 1 GHz)

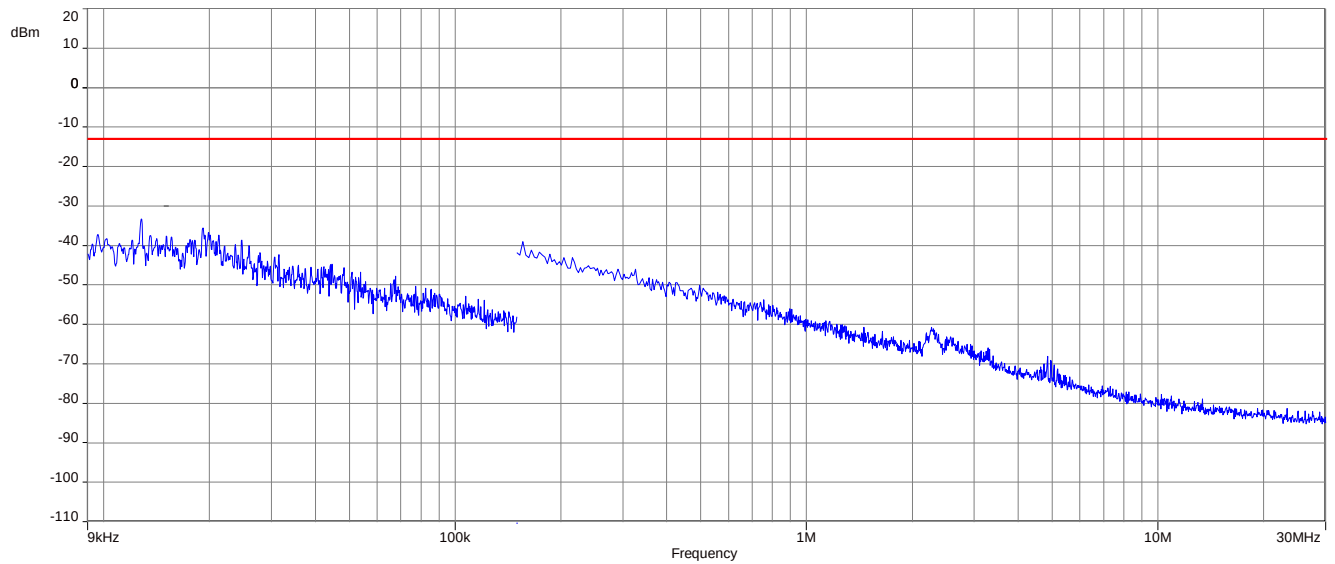


**Plot 3:** 16-QAM - lowest channel (1 GHz – 18 GHz)**Plot 4:** 16-QAM - lowest channel (18 GHz – 26 GHz)

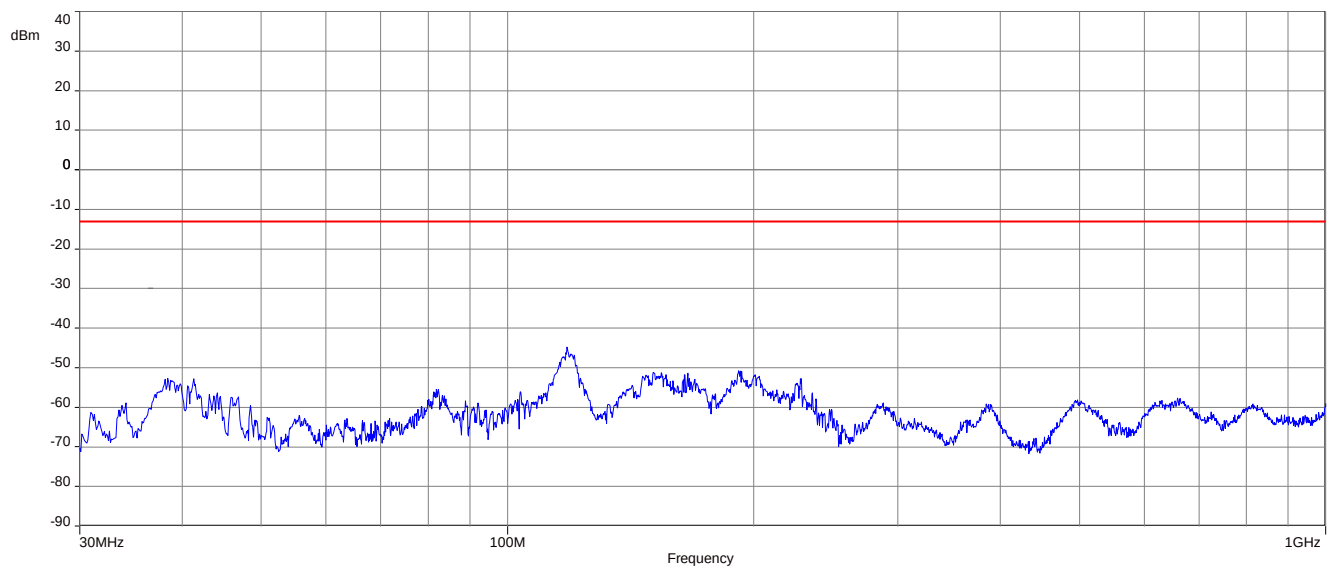
**Plot 5:** 16-QAM - lowest channel (26 GHz – 40 GHz)

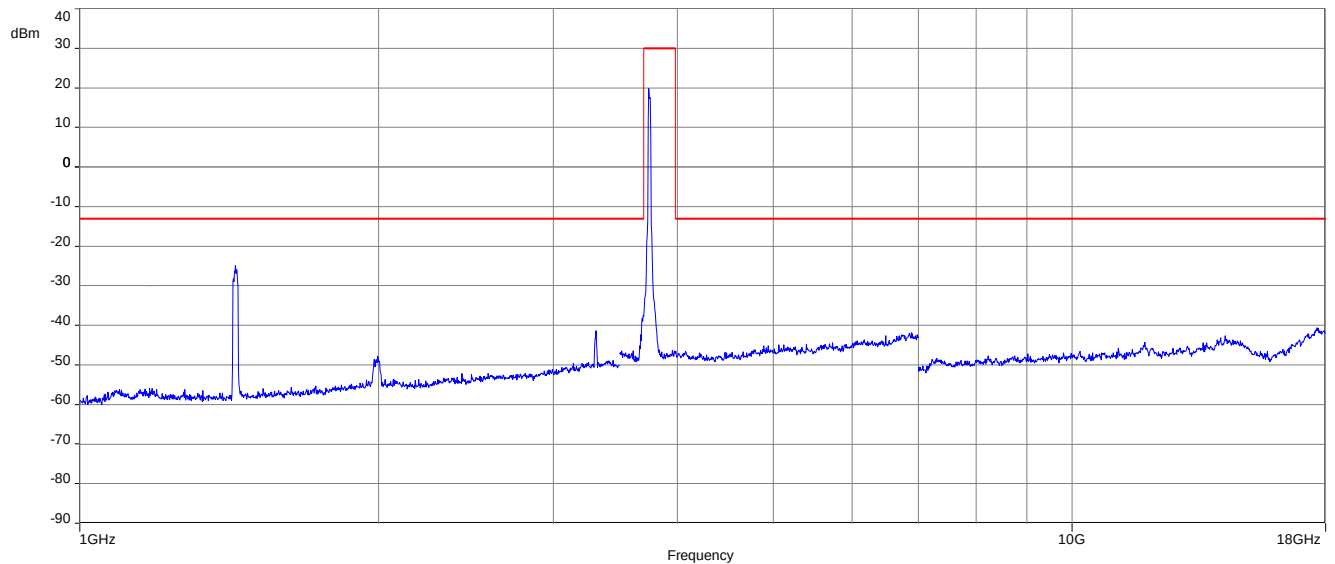
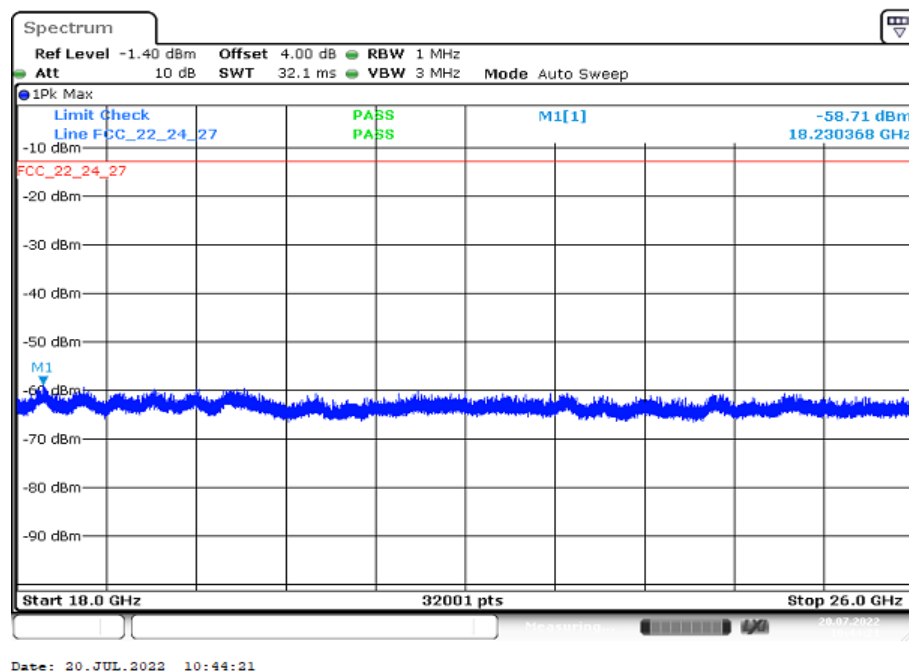
**Plots:** antenna 1+2, 64-QAM modulation

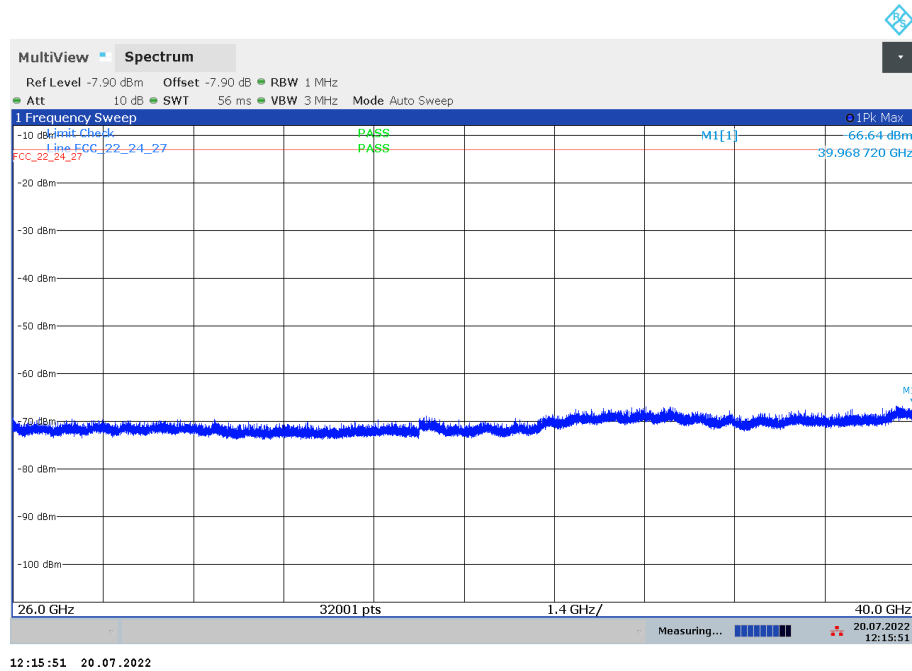
**Plot 1:** 64-QAM - lowest channel (9 kHz - 30 MHz)



**Plot 2:** 64-QAM - lowest channel (30 MHz – 1 GHz)

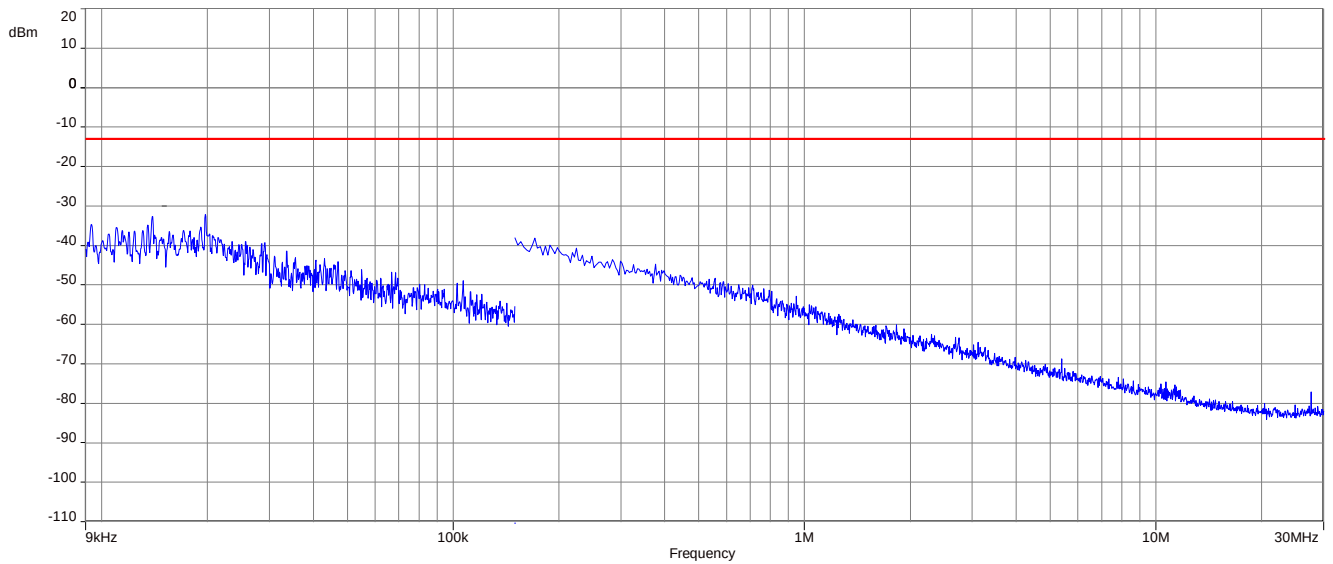


**Plot 3:** 64-QAM - lowest channel (1 GHz – 18 GHz)**Plot 4:** 64-QAM - lowest channel (18 GHz – 26 GHz)

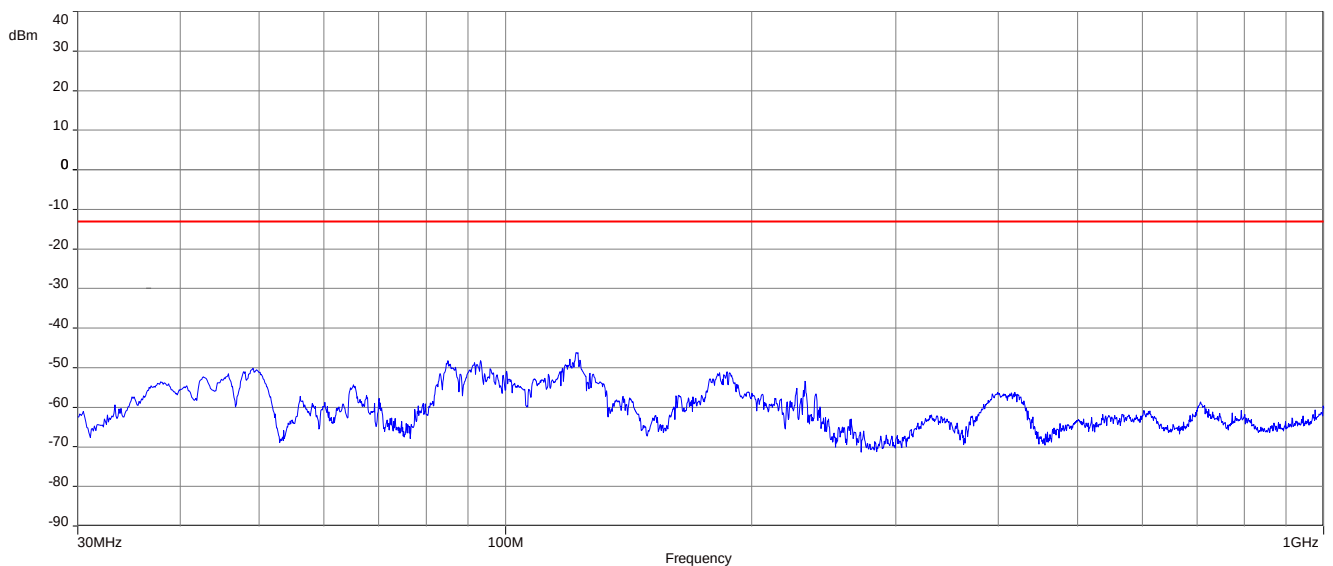
**Plot 5:** 64-QAM - lowest channel (26 GHz – 40 GHz)

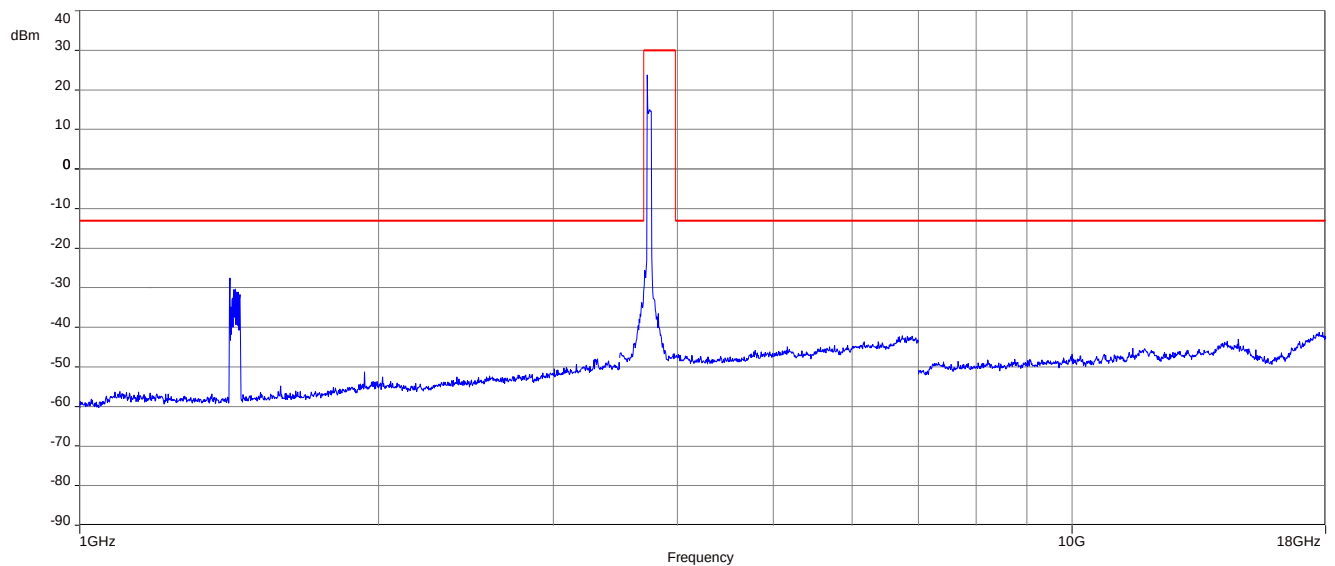
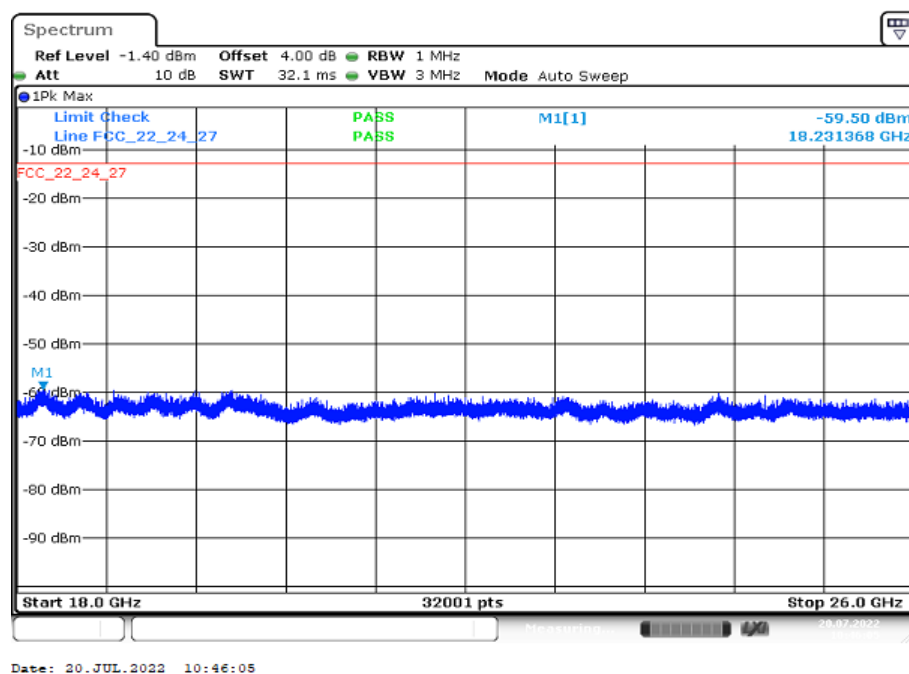
**Plots:** antenna 1+2, 256-QAM modulation

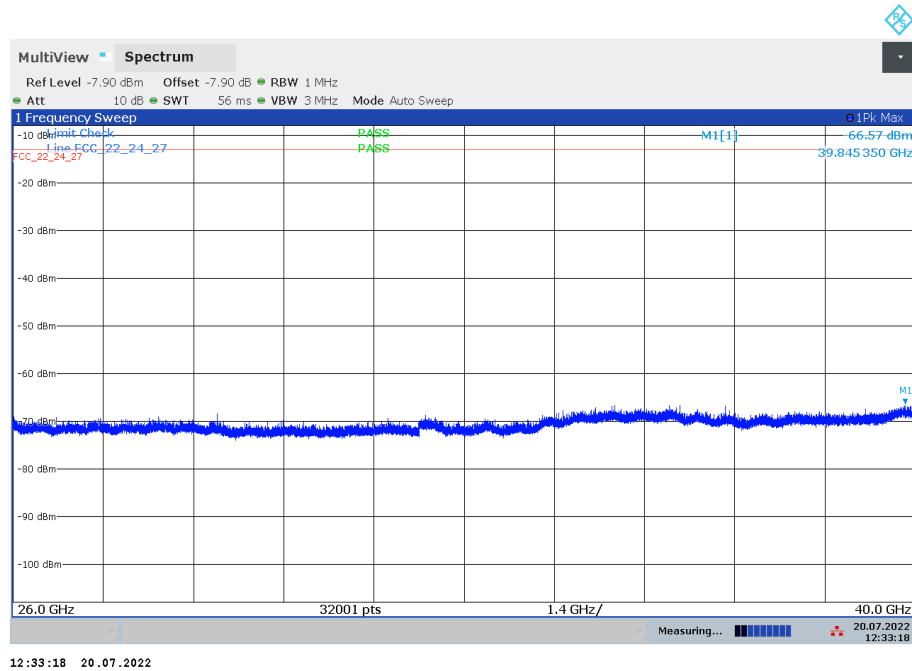
**Plot 1:** 256-QAM - lowest channel (9 kHz - 30 MHz)



**Plot 2:** 256-QAM - lowest channel (30 MHz – 1 GHz)



**Plot 3:** 256-QAM - lowest channel (1 GHz – 18 GHz)**Plot 4:** 256-QAM - lowest channel (18 GHz – 26 GHz)

**Plot 5:** 256-QAM - lowest channel (26 GHz – 40 GHz)

### 13.2.7 Spurious emissions conducted – 5G NR n77 – 3450 MHz to 3550 MHz

#### Description:

The following steps outline the procedure used to measure the conducted emissions from the mobile station.

1. The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable.
2. Determine frequency range for measurements: From § 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency.
3. Determine mobile station transmits frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

#### Measurement:

| Measurement parameters   |                         |
|--------------------------|-------------------------|
| Detector:                | Peak                    |
| Sweep time:              | Auto                    |
| Resolution bandwidth:    | 1 MHz                   |
| Video bandwidth:         | 3 MHz                   |
| Span:                    | 30 MHz – 40 GHz         |
| Trace-Mode:              | Max Hold                |
| Used equipment:          | See chapter 8.4 setup A |
| Measurement uncertainty: | see chapter 9           |
| Measurement procedure    | FCC: § 2.1051           |

#### Limits:

| FCC                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| § Part 27.53                                                                                                                                                                                                                                                                                                                                                |
| <ul style="list-style-type: none"> <li>• (n) 3.45 GHz Service. The following emission limits apply to stations transmitting in the 3450 MHz to 3550 MHz band.</li> <li>• (2) for mobile operations in the 3450 MHz to 3550 MHz band, the conducted power of any emission outside the licensee`s authorized bandwidth shall not exceed -13dBm/MHz</li> </ul> |

**Results:** antenna 1

| BPSK modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-----------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz         | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| QPSK modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-----------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz         | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| 16-QAM modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz)   | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz           | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| 64-QAM modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz)   | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz           | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| 256-QAM modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|--------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz)    | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

**Results:** antenna 2

| BPSK modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-----------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz         | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| QPSK modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-----------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz         | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| 16-QAM modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz)   | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz           | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| 64-QAM modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz)   | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz           | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| 256-QAM modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|--------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz)    | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

### 13.2.8 Spurious emissions conducted – 5G NR n77 – 3700 MHz to 3980 MHz

#### Description:

The following steps outline the procedure used to measure the conducted emissions from the mobile station.

1. The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable.
2. Determine frequency range for measurements: From § 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency.
3. Determine mobile station transmits frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

#### Measurement:

| Measurement parameters   |                         |
|--------------------------|-------------------------|
| Detector:                | Peak                    |
| Sweep time:              | Auto                    |
| Resolution bandwidth:    | 1 MHz                   |
| Video bandwidth:         | 3 MHz                   |
| Span:                    | 30 MHz – 40 GHz         |
| Trace-Mode:              | Max Hold                |
| Used equipment:          | See chapter 8.4 setup A |
| Measurement uncertainty: | see chapter 9           |
| Measurement procedure    | FCC: § 2.1051           |

#### Limits:

| FCC                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| § Part 27.53                                                                                                                                                                                                                                                                                                                                               |
| <ul style="list-style-type: none"> <li>• (1) 3.7 GHz Service. The following emission limits apply to stations transmitting in the 3700 MHz to 3980 MHz band.</li> <li>• (2) for mobile operations in the 3700 MHz to 3980 MHz band, the conducted power of any emission outside the licensee`s authorized bandwidth shall not exceed -13dBm/MHz</li> </ul> |

**Results:** antenna 1

| BPSK modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-----------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz         | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| QPSK modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-----------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz         | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| 16-QAM modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz)   | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz           | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| 64-QAM modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz)   | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz           | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| 256-QAM modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|--------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz)    | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

**Results:** antenna 2

| BPSK modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-----------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz         | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| QPSK modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-----------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz          | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz         | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                 | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| 16-QAM modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz)   | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz           | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| 64-QAM modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|-------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz)   | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz           | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                   | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

| 256-QAM modulation | Lowest channel           |             | Middle channel           |             | Highest channel          |             |
|--------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Bandwidth (MHz)    | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) | Spurious emissions (MHz) | Level (dBm) |
| 10 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 20 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 30 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 40 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 50 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 60 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 70 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 80 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 90 MHz             | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
| 100 MHz            | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |
|                    | -/-                      | -/-         | -/-                      | -/-         | -/-                      | -/-         |

### 13.2.9 Block edge compliance – 5G NR n77 – 3450 MHz to 3550 MHz

#### Description:

The spectrum at the band edges must comply with the spurious emissions limits.

#### Measurement:

| Measurement parameters   |                         |
|--------------------------|-------------------------|
| Detector:                | RMS                     |
| Sweep time:              | 30 sec.                 |
| Video bandwidth:         | See plots               |
| Resolution bandwidth:    | See plots               |
| Span:                    | 1 MHz steps             |
| Trace-Mode:              | Max Hold                |
| Used equipment:          | See chapter 8.4 setup A |
| Measurement uncertainty: | See chapter 9           |
| Measurement procedure    | FCC: § 2.1051           |

#### Limits:

| FCC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| § 27.53                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p>The following emission limits apply to stations transmitting in the 3450 MHz to 3550 MHz frequency band: For mobile operations in the 3450 MHz to 3550 MHz frequency band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. compliance with this paragraph (n)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside an adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter, may be employed, but limited to a maximum of 200 kHz. In the band between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.</p> |

**Results: PASS** (See log files)

### 13.2.10 Block edge compliance – 5G NR n77 – 3700 MHz to 3980 MHz

#### Description:

The spectrum at the band edges must comply with the spurious emissions limits.

#### Measurement:

| Measurement parameters   |                         |
|--------------------------|-------------------------|
| Detector:                | RMS                     |
| Sweep time:              | 30 sec.                 |
| Video bandwidth:         | See plots               |
| Resolution bandwidth:    | See plots               |
| Span:                    | 1 MHz steps             |
| Trace-Mode:              | Max Hold                |
| Used equipment:          | See chapter 8.4 setup A |
| Measurement uncertainty: | See chapter 9           |
| Measurement procedure    | FCC: § 2.1051           |

#### Limits:

| FCC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| § 27.53                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p>The following emission limits apply to stations transmitting in the 3700 MHz to 3980 MHz frequency band: For mobile operations in the 3700 MHz to 3980 MHz frequency band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. compliance with this paragraph (n)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside an adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter, may be employed, but limited to a maximum of 350 kHz. In the band between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.</p> |

**Results: PASS** (See log files)

### 13.2.11 Occupied bandwidth – 5G NR n77 – 3450 MHz to 3550 MHz

#### Description:

Measurement of the occupied bandwidth of the transmitted signal. The transmitter output was connected to a calibrated coaxial cable and a coupler to a spectrum analyzer.

#### Measurement:

Similar to conducted emissions, occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the 5G NR band 77 frequency band. The table below lists the measured 99% power and -26dBc occupied bandwidths.

| Measurement parameters   |                         |
|--------------------------|-------------------------|
| Detector:                | Peak                    |
| Sweep time:              | 180s                    |
| Resolution bandwidth:    | 30 kHz                  |
| Video bandwidth:         | 100 kHz                 |
| Span:                    | 2 x nominal bandwidth   |
| Trace-Mode:              | Max Hold                |
| Used equipment:          | See chapter 8.4 setup A |
| Measurement uncertainty: | See chapter 9           |
| Measurement procedure    | FCC: § 2.1049           |

#### Limits:

| FCC            |
|----------------|
| § 2.1049       |
| Reporting only |

**Results:** antenna 1

| Occupied Bandwidth |         |               |                  |
|--------------------|---------|---------------|------------------|
| BPSK modulation    | Channel | 99% OBW (MHz) | -26 dBc BW (MHz) |
| Bandwidth          |         |               |                  |
| 10                 | low     | 8.666         | 9.900            |
|                    | mid     | 8.666         | 10.200           |
|                    | high    | 8.716         | 10.325           |
| 20                 | low     | 18.032        | 19.900           |
|                    | mid     | 18.032        | 19.750           |
|                    | high    | 18.032        | 20.200           |
| 30                 | low     | 26.898        | 28.725           |
|                    | mid     | 26.973        | 28.875           |
|                    | high    | 26.898        | 28.875           |
| 40                 | low     | 36.064        | 38.500           |
|                    | mid     | 35.964        | 38.800           |
|                    | high    | 35.964        | 38.600           |
| 50                 | low     | 45.954        | 48.625           |
|                    | mid     | 45.954        | 48.625           |
|                    | high    | 45.954        | 48.500           |
| 60                 | low     | 57.992        | 61.050           |
|                    | mid     | 57.842        | 61.050           |
|                    | high    | 57.842        | 61.200           |
| 70                 | low     | 64.336        | 67.375           |
|                    | mid     | 64.336        | 67.200           |
|                    | high    | 64.510        | 67.375           |
| 80                 | low     | 77.522        | 82.000           |
|                    | mid     | 77.323        | 81.800           |
|                    | high    | 77.323        | 82.000           |
| 90                 | low     | 86.988        | 91.575           |
|                    | mid     | 86.988        | 91.575           |
|                    | high    | 86.763        | 91.800           |
| 100                | low     | -/-           | -/-              |
|                    | mid     | 96.653        | 101.750          |
|                    | high    | -/-           | -/-              |

| Occupied Bandwidth |         |               |                  |
|--------------------|---------|---------------|------------------|
| QPSK modulation    | Channel | 99% OBW (MHz) | -26 dBc BW (MHz) |
| Bandwidth          |         |               |                  |
| 10                 | low     | 8.691         | 10.325           |
|                    | mid     | 8.666         | 10.175           |
|                    | high    | 8.666         | 10.225           |
| 20                 | low     | 18.332        | 20.200           |
|                    | mid     | 18.332        | 20.150           |
|                    | high    | 18.382        | 20.300           |
| 30                 | low     | 27.947        | 29.850           |
|                    | mid     | 27.872        | 29.925           |
|                    | high    | 27.947        | 30.000           |
| 40                 | low     | 38.162        | 40.800           |
|                    | mid     | 37.962        | 40.900           |
|                    | high    | 38.062        | 40.500           |
| 50                 | low     | 47.702        | 50.500           |
|                    | mid     | 47.577        | 50.250           |
|                    | high    | 47.702        | 50.375           |
| 60                 | low     | 58.142        | 61.050           |
|                    | mid     | 57.842        | 60.900           |
|                    | high    | 57.992        | 60.750           |
| 70                 | low     | 67.483        | 70.700           |
|                    | mid     | 67.483        | 70.700           |
|                    | high    | 67.483        | 70.875           |
| 80                 | low     | 77.722        | 82.600           |
|                    | mid     | 77.922        | 82.600           |
|                    | high    | 77.722        | 82.800           |
| 90                 | low     | 87.662        | 92.925           |
|                    | mid     | 87.887        | 92.700           |
|                    | high    | 87.887        | 92.700           |
| 100                | low     | -/-           | -/-              |
|                    | mid     | 97.652        | 102.750          |
|                    | high    | -/-           | -/-              |

| Occupied Bandwidth |         |               |                  |
|--------------------|---------|---------------|------------------|
| 16-QAM modulation  | Channel | 99% OBW (MHz) | -26 dBc BW (MHz) |
| Bandwidth          |         |               |                  |
| 10                 | low     | 8.666         | 10.000           |
|                    | mid     | 8.641         | 10.225           |
|                    | high    | 8.641         | 10.125           |
| 20                 | low     | 18.432        | 20.350           |
|                    | mid     | 18.432        | 20.300           |
|                    | high    | 18.482        | 20.350           |
| 30                 | low     | 27.947        | 29.925           |
|                    | mid     | 27.947        | 30.075           |
|                    | high    | 28.022        | 29.925           |
| 40                 | low     | 38.062        | 40.800           |
|                    | mid     | 37.962        | 40.800           |
|                    | high    | 38.062        | 40.700           |
| 50                 | low     | 47.702        | 50.250           |
|                    | mid     | 47.702        | 50.875           |
|                    | high    | 47.702        | 50.250           |
| 60                 | low     | 57.842        | 61.200           |
|                    | mid     | 57.992        | 60.750           |
|                    | high    | 57.992        | 61.050           |
| 70                 | low     | 67.657        | 70.700           |
|                    | mid     | 67.483        | 70.525           |
|                    | high    | 67.483        | 70.525           |
| 80                 | low     | 77.722        | 82.400           |
|                    | mid     | 77.922        | 82.600           |
|                    | high    | 77.922        | 82.600           |
| 90                 | low     | 87.662        | 92.700           |
|                    | mid     | 87.662        | 92.700           |
|                    | high    | 87.662        | 92.475           |
| 100                | low     | -/-           | -/-              |
|                    | mid     | 97.652        | 102.750          |
|                    | high    | -/-           | -/-              |

| Occupied Bandwidth |         |               |                  |
|--------------------|---------|---------------|------------------|
| 64-QAM modulation  | Channel | 99% OBW (MHz) | -26 dBc BW (MHz) |
| Bandwidth          |         |               |                  |
| 10                 | low     | 8.641         | 10.025           |
|                    | mid     | 8.791         | 14.975           |
|                    | high    | 8.641         | 10.000           |
| 20                 | low     | 18.432        | 9.900            |
|                    | mid     | 18.332        | 20.350           |
|                    | high    | 18.382        | 20.250           |
| 30                 | low     | 27.872        | 20.350           |
|                    | mid     | 27.797        | 29.775           |
|                    | high    | 27.797        | 29.700           |
| 40                 | low     | 38.062        | 29.700           |
|                    | mid     | 37.962        | 40.800           |
|                    | high    | 38.062        | 40.900           |
| 50                 | low     | 47.702        | 40.800           |
|                    | mid     | 47.702        | 50.625           |
|                    | high    | 47.702        | 50.500           |
| 60                 | low     | 58.142        | 50.500           |
|                    | mid     | 57.842        | 60.900           |
|                    | high    | 57.992        | 61.050           |
| 70                 | low     | 67.832        | 61.050           |
|                    | mid     | 67.483        | 70.875           |
|                    | high    | 67.483        | 70.350           |
| 80                 | low     | 77.722        | 70.875           |
|                    | mid     | 77.722        | 82.400           |
|                    | high    | 77.922        | 82.800           |
| 90                 | low     | 87.887        | 82.600           |
|                    | mid     | 87.662        | 92.700           |
|                    | high    | 87.887        | 92.700           |
| 100                | low     | -/-           | -/-              |
|                    | mid     | 97.902        | 102.750          |
|                    | high    | -/-           | -/-              |

| Occupied Bandwidth |         |               |                  |
|--------------------|---------|---------------|------------------|
| 256-QAM modulation | Channel | 99% OBW (MHz) | -26 dBc BW (MHz) |
| Bandwidth          |         |               |                  |
| 10                 | low     | 8.691         | 9.925            |
|                    | mid     | 8.666         | 10.200           |
|                    | high    | 8.691         | 10.000           |
| 20                 | low     | 18.282        | 9.800            |
|                    | mid     | 18.332        | 20.200           |
|                    | high    | 18.282        | 20.150           |
| 30                 | low     | 27.947        | 20.400           |
|                    | mid     | 27.947        | 30.075           |
|                    | high    | 27.947        | 30.150           |
| 40                 | low     | 38.262        | 30.000           |
|                    | mid     | 38.262        | 41.100           |
|                    | high    | 38.162        | 40.700           |
| 50                 | low     | 47.702        | 40.600           |
|                    | mid     | 47.577        | 50.500           |
|                    | high    | 47.577        | 50.750           |
| 60                 | low     | 57.842        | 50.625           |
|                    | mid     | 57.842        | 60.750           |
|                    | high    | 57.992        | 60.750           |
| 70                 | low     | 67.308        | 60.450           |
|                    | mid     | 67.308        | 70.525           |
|                    | high    | 67.308        | 70.350           |
| 80                 | low     | 77.922        | 70.525           |
|                    | mid     | 77.922        | 82.400           |
|                    | high    | 77.922        | 82.600           |
| 90                 | low     | 88.112        | 82.400           |
|                    | mid     | 87.887        | 92.475           |
|                    | high    | 87.887        | 92.700           |
| 100                | low     | -/-           | -/-              |
|                    | mid     | 97.902        | 102.500          |
|                    | high    | -/-           | -/-              |

**Results:** antenna 2

| Occupied Bandwidth |         |               |                  |
|--------------------|---------|---------------|------------------|
| QPSK modulation    | Channel | 99% OBW (MHz) | -26 dBc BW (MHz) |
| Bandwidth          |         |               |                  |
| 10                 | low     | 8.691         | 10.150           |
|                    | mid     | 8.666         | 11.875           |
|                    | high    | 8.666         | 10.100           |
| 20                 | low     | 18.382        | 20.500           |
|                    | mid     | 18.432        | 26.700           |
|                    | high    | 18.382        | 20.400           |
| 30                 | low     | 27.947        | 30.075           |
|                    | mid     | 27.947        | 33.750           |
|                    | high    | 27.872        | 30.150           |
| 40                 | low     | 37.962        | 40.800           |
|                    | mid     | 38.162        | 59.500           |
|                    | high    | 38.062        | 40.700           |
| 50                 | low     | 47.577        | 50.625           |
|                    | mid     | 47.577        | 51.625           |
|                    | high    | 47.702        | 50.500           |
| 60                 | low     | 57.842        | 60.900           |
|                    | mid     | 57.842        | 63.450           |
|                    | high    | 57.842        | 60.600           |
| 70                 | low     | 67.657        | 70.525           |
|                    | mid     | 67.657        | 74.550           |
|                    | high    | 67.483        | 70.700           |
| 80                 | low     | 77.722        | 82.800           |
|                    | mid     | 78.122        | 111.200          |
|                    | high    | 77.922        | 82.800           |
| 90                 | low     | 87.662        | 92.700           |
|                    | mid     | 88.112        | 107.775          |
|                    | high    | 87.662        | 92.700           |
| 100                | low     | -/-           | -/-              |
|                    | mid     | 97.902        | 110.250          |
|                    | high    | -/-           | -/-              |

| Occupied Bandwidth |         |               |                  |
|--------------------|---------|---------------|------------------|
| 16-QAM modulation  | Channel | 99% OBW (MHz) | -26 dBc BW (MHz) |
| Bandwidth          |         |               |                  |
| 10                 | low     | 8.666         | 9.850            |
|                    | mid     | 8.666         | 9.875            |
|                    | high    | 8.691         | 10.325           |
| 20                 | low     | 18.382        | 20.350           |
|                    | mid     | 18.382        | 20.800           |
|                    | high    | 18.432        | 20.400           |
| 30                 | low     | 27.947        | 30.075           |
|                    | mid     | 27.947        | 34.575           |
|                    | high    | 27.872        | 30.075           |
| 40                 | low     | 38.062        | 40.900           |
|                    | mid     | 38.062        | 42.600           |
|                    | high    | 38.062        | 40.700           |
| 50                 | low     | 47.577        | 50.375           |
|                    | mid     | 47.577        | 51.125           |
|                    | high    | 47.577        | 50.375           |
| 60                 | low     | 57.842        | 60.750           |
|                    | mid     | 57.842        | 63.600           |
|                    | high    | 57.842        | 60.750           |
| 70                 | low     | 67.483        | 70.700           |
|                    | mid     | 67.483        | 79.450           |
|                    | high    | 67.483        | 70.525           |
| 80                 | low     | 77.922        | 82.400           |
|                    | mid     | 77.922        | 87.000           |
|                    | high    | 77.922        | 82.400           |
| 90                 | low     | 87.438        | 92.700           |
|                    | mid     | 87.887        | 96.975           |
|                    | high    | 87.438        | 92.700           |
| 100                | low     | -/-           | -/-              |
|                    | mid     | 97.902        | 110.000          |
|                    | high    | -/-           | -/-              |

| Occupied Bandwidth |         |               |                  |
|--------------------|---------|---------------|------------------|
| 64-QAM modulation  | Channel | 99% OBW (MHz) | -26 dBc BW (MHz) |
| Bandwidth          |         |               |                  |
| 10                 | low     | 8.641         | 9.775            |
|                    | mid     | 8.891         | 14.500           |
|                    | high    | 8.641         | 10.050           |
| 20                 | low     | 18.282        | 20.050           |
|                    | mid     | 18.332        | 20.600           |
|                    | high    | 18.382        | 20.250           |
| 30                 | low     | 28.022        | 29.925           |
|                    | mid     | 27.947        | 31.350           |
|                    | high    | 27.947        | 30.075           |
| 40                 | low     | 37.962        | 40.700           |
|                    | mid     | 38.062        | 46.600           |
|                    | high    | 37.962        | 40.600           |
| 50                 | low     | 47.577        | 50.500           |
|                    | mid     | 47.827        | 59.500           |
|                    | high    | 47.702        | 50.625           |
| 60                 | low     | 57.992        | 61.050           |
|                    | mid     | 57.992        | 68.400           |
|                    | high    | 57.992        | 60.900           |
| 70                 | low     | 67.483        | 70.525           |
|                    | mid     | 67.657        | 72.450           |
|                    | high    | 67.483        | 70.525           |
| 80                 | low     | 77.922        | 82.800           |
|                    | mid     | 78.122        | 91.400           |
|                    | high    | 77.722        | 82.600           |
| 90                 | low     | 87.662        | 92.700           |
|                    | mid     | 87.887        | 108.675          |
|                    | high    | 87.662        | 92.700           |
| 100                | low     | -/-           | -/-              |
|                    | mid     | 98.152        | 108.500          |
|                    | high    | -/-           | -/-              |

| Occupied Bandwidth |         |               |                  |
|--------------------|---------|---------------|------------------|
| 256-QAM modulation | Channel | 99% OBW (MHz) | -26 dBc BW (MHz) |
| Bandwidth          |         |               |                  |
| 10                 | low     | 8.591         | 9.900            |
|                    | mid     | 8.691         | 10.375           |
|                    | high    | 8.641         | 10.000           |
| 20                 | low     | 18.332        | 20.150           |
|                    | mid     | 18.332        | 21.250           |
|                    | high    | 18.332        | 20.250           |
| 30                 | low     | 27.872        | 29.775           |
|                    | mid     | 27.872        | 31.050           |
|                    | high    | 27.872        | 29.925           |
| 40                 | low     | 37.962        | 40.600           |
|                    | mid     | 38.162        | 56.700           |
|                    | high    | 38.062        | 40.800           |
| 50                 | low     | 47.577        | 50.625           |
|                    | mid     | 47.702        | 51.000           |
|                    | high    | 47.702        | 50.625           |
| 60                 | low     | 57.842        | 61.050           |
|                    | mid     | 57.842        | 63.300           |
|                    | high    | 57.842        | 60.750           |
| 70                 | low     | 67.483        | 70.525           |
|                    | mid     | 67.483        | 74.025           |
|                    | high    | 67.483        | 70.700           |
| 80                 | low     | 77.722        | 82.600           |
|                    | mid     | 78.122        | 94.400           |
|                    | high    | 77.722        | 82.600           |
| 90                 | low     | 87.887        | 92.700           |
|                    | mid     | 88.112        | 101.250          |
|                    | high    | 87.662        | 92.700           |
| 100                | low     | -/-           | -/-              |
|                    | mid     | 97.902        | 111.250          |
|                    | high    | -/-           | -/-              |

### 13.2.12 Occupied bandwidth – 5G NR n77 – 3700 MHz to 3980 MHz

#### Description:

Measurement of the occupied bandwidth of the transmitted signal. The transmitter output was connected to a calibrated coaxial cable and a coupler to a spectrum analyzer.

#### Measurement:

Similar to conducted emissions, occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the 5G NR band 77 frequency band. The table below lists the measured 99% power and -26dBc occupied bandwidths.

| Measurement parameters   |                         |
|--------------------------|-------------------------|
| Detector:                | Peak                    |
| Sweep time:              | 180s                    |
| Resolution bandwidth:    | 30 kHz                  |
| Video bandwidth:         | 100 kHz                 |
| Span:                    | 2 x nominal bandwidth   |
| Trace-Mode:              | Max Hold                |
| Used equipment:          | See chapter 8.4 setup A |
| Measurement uncertainty: | See chapter 9           |
| Measurement procedure    | FCC: § 2.1049           |

#### Limits:

| FCC            |
|----------------|
| § 2.1049       |
| Reporting only |

**Results:** antenna 1

| Occupied Bandwidth |         |               |                  |
|--------------------|---------|---------------|------------------|
| BPSK modulation    | Channel | 99% OBW (MHz) | -26 dBc BW (MHz) |
| Bandwidth          |         |               |                  |
| 10                 | low     | 8.666         | 9.975            |
|                    | mid     | 8.666         | 10.025           |
|                    | high    | 8.641         | 10.250           |
| 20                 | low     | 18.032        | 19.850           |
|                    | mid     | 18.032        | 19.750           |
|                    | high    | 18.032        | 19.850           |
| 30                 | low     | 26.898        | 29.025           |
|                    | mid     | 26.898        | 29.025           |
|                    | high    | 26.973        | 28.950           |
| 40                 | low     | 35.964        | 38.700           |
|                    | mid     | 35.964        | 38.600           |
|                    | high    | 35.964        | 38.800           |
| 50                 | low     | 45.829        | 48.500           |
|                    | mid     | 45.954        | 48.625           |
|                    | high    | 45.954        | 48.625           |
| 60                 | low     | 57.842        | 60.900           |
|                    | mid     | 57.992        | 61.200           |
|                    | high    | 57.842        | 60.900           |
| 70                 | low     | 64.510        | 67.375           |
|                    | mid     | 64.336        | 67.200           |
|                    | high    | 64.510        | 67.550           |
| 80                 | low     | 77.323        | 81.800           |
|                    | mid     | 77.522        | 82.000           |
|                    | high    | 77.522        | 82.000           |
| 90                 | low     | 86.988        | 91.800           |
|                    | mid     | 86.988        | 91.800           |
|                    | high    | 87.213        | 91.800           |
| 100                | low     | 96.903        | 101.750          |
|                    | mid     | 96.903        | 101.750          |
|                    | high    | 96.653        | 102.000          |

| Occupied Bandwidth |         |               |                  |
|--------------------|---------|---------------|------------------|
| QPSK modulation    | Channel | 99% OBW (MHz) | -26 dBc BW (MHz) |
| Bandwidth          |         |               |                  |
| 10                 | low     | 8.641         | 10.225           |
|                    | mid     | 8.641         | 10.175           |
|                    | high    | 8.666         | 10.000           |
| 20                 | low     | 18.332        | 20.100           |
|                    | mid     | 18.282        | 20.150           |
|                    | high    | 18.332        | 20.150           |
| 30                 | low     | 27.872        | 30.000           |
|                    | mid     | 27.947        | 29.850           |
|                    | high    | 27.947        | 29.850           |
| 40                 | low     | 38.062        | 40.800           |
|                    | mid     | 38.062        | 40.900           |
|                    | high    | 37.962        | 40.800           |
| 50                 | low     | 47.577        | 50.375           |
|                    | mid     | 47.702        | 50.375           |
|                    | high    | 47.702        | 50.500           |
| 60                 | low     | 57.992        | 60.900           |
|                    | mid     | 57.842        | 61.050           |
|                    | high    | 57.842        | 60.600           |
| 70                 | low     | 67.483        | 70.525           |
|                    | mid     | 67.483        | 70.525           |
|                    | high    | 67.483        | 70.700           |
| 80                 | low     | 77.922        | 82.800           |
|                    | mid     | 77.922        | 82.800           |
|                    | high    | 77.722        | 82.800           |
| 90                 | low     | 87.662        | 92.925           |
|                    | mid     | 87.887        | 92.700           |
|                    | high    | 87.887        | 92.700           |
| 100                | low     | 97.652        | 103.000          |
|                    | mid     | 97.652        | 102.750          |
|                    | high    | 97.652        | 103.000          |

| Occupied Bandwidth |         |               |                  |
|--------------------|---------|---------------|------------------|
| 16-QAM modulation  | Channel | 99% OBW (MHz) | -26 dBc BW (MHz) |
| Bandwidth          |         |               |                  |
| 10                 | low     | 8.641         | 10.050           |
|                    | mid     | 8.641         | 10.125           |
|                    | high    | 8.641         | 10.050           |
| 20                 | low     | 18.482        | 20.450           |
|                    | mid     | 18.432        | 20.200           |
|                    | high    | 18.482        | 20.300           |
| 30                 | low     | 27.947        | 30.000           |
|                    | mid     | 27.947        | 30.075           |
|                    | high    | 28.022        | 30.000           |
| 40                 | low     | 38.062        | 40.800           |
|                    | mid     | 38.162        | 40.600           |
|                    | high    | 38.062        | 40.800           |
| 50                 | low     | 47.577        | 50.250           |
|                    | mid     | 47.702        | 50.500           |
|                    | high    | 47.702        | 50.500           |
| 60                 | low     | 57.992        | 60.900           |
|                    | mid     | 57.842        | 60.900           |
|                    | high    | 57.842        | 61.050           |
| 70                 | low     | 67.483        | 70.700           |
|                    | mid     | 67.483        | 70.700           |
|                    | high    | 67.483        | 70.700           |
| 80                 | low     | 77.922        | 82.600           |
|                    | mid     | 78.122        | 82.600           |
|                    | high    | 77.722        | 82.600           |
| 90                 | low     | 87.662        | 92.475           |
|                    | mid     | 87.887        | 92.700           |
|                    | high    | 87.887        | 92.700           |
| 100                | low     | 97.652        | 102.750          |
|                    | mid     | 97.652        | 103.000          |
|                    | high    | 97.652        | 102.500          |

| Occupied Bandwidth |         |               |                  |
|--------------------|---------|---------------|------------------|
| 64-QAM modulation  | Channel | 99% OBW (MHz) | -26 dBc BW (MHz) |
| Bandwidth          |         |               |                  |
| 10                 | low     | 8.641         | 10.100           |
|                    | mid     | 8.641         | 9.975            |
|                    | high    | 8.641         | 9.975            |
| 20                 | low     | 18.382        | 20.450           |
|                    | mid     | 18.382        | 20.300           |
|                    | high    | 18.382        | 20.150           |
| 30                 | low     | 27.797        | 29.775           |
|                    | mid     | 27.872        | 29.775           |
|                    | high    | 27.872        | 29.550           |
| 40                 | low     | 38.162        | 40.900           |
|                    | mid     | 38.062        | 40.700           |
|                    | high    | 38.062        | 40.800           |
| 50                 | low     | 47.577        | 50.500           |
|                    | mid     | 47.702        | 50.625           |
|                    | high    | 47.702        | 50.375           |
| 60                 | low     | 57.992        | 61.050           |
|                    | mid     | 57.842        | 61.050           |
|                    | high    | 58.142        | 61.200           |
| 70                 | low     | 67.483        | 70.525           |
|                    | mid     | 67.657        | 70.350           |
|                    | high    | 67.657        | 70.700           |
| 80                 | low     | 77.922        | 82.600           |
|                    | mid     | 77.922        | 82.600           |
|                    | high    | 77.722        | 82.800           |
| 90                 | low     | 87.887        | 92.700           |
|                    | mid     | 87.887        | 92.700           |
|                    | high    | 87.887        | 92.925           |
| 100                | low     | 97.902        | 102.750          |
|                    | mid     | 97.652        | 102.750          |
|                    | high    | 97.652        | 102.750          |

| Occupied Bandwidth |         |               |                  |
|--------------------|---------|---------------|------------------|
| 256-QAM modulation | Channel | 99% OBW (MHz) | -26 dBc BW (MHz) |
| Bandwidth          |         |               |                  |
| 10                 | low     | 8.666         | 9.825            |
|                    | mid     | 8.666         | 9.950            |
|                    | high    | 8.666         | 9.825            |
| 20                 | low     | 18.282        | 20.400           |
|                    | mid     | 18.282        | 20.300           |
|                    | high    | 18.332        | 20.250           |
| 30                 | low     | 27.947        | 30.000           |
|                    | mid     | 27.872        | 30.000           |
|                    | high    | 27.947        | 29.850           |
| 40                 | low     | 38.162        | 41.000           |
|                    | mid     | 38.162        | 40.900           |
|                    | high    | 38.062        | 40.800           |
| 50                 | low     | 47.577        | 50.750           |
|                    | mid     | 47.702        | 50.250           |
|                    | high    | 47.577        | 50.500           |
| 60                 | low     | 57.842        | 60.600           |
|                    | mid     | 57.842        | 60.900           |
|                    | high    | 57.842        | 60.600           |
| 70                 | low     | 67.483        | 70.175           |
|                    | mid     | 67.308        | 70.350           |
|                    | high    | 67.308        | 70.525           |
| 80                 | low     | 77.922        | 82.600           |
|                    | mid     | 78.122        | 82.600           |
|                    | high    | 77.722        | 82.600           |
| 90                 | low     | 87.887        | 92.925           |
|                    | mid     | 88.112        | 93.150           |
|                    | high    | 88.112        | 92.925           |
| 100                | low     | 97.652        | 102.750          |
|                    | mid     | 97.652        | 102.750          |
|                    | high    | 97.902        | 102.750          |

**Results:** antenna 2

| Occupied Bandwidth |         |               |                  |
|--------------------|---------|---------------|------------------|
| QPSK modulation    | Channel | 99% OBW (MHz) | -26 dBc BW (MHz) |
| Bandwidth          |         |               |                  |
| 10                 | low     | 8.691         | 10.375           |
|                    | mid     | 8.741         | 10.375           |
|                    | high    | 8.716         | 10.450           |
| 20                 | low     | 18.382        | 21.000           |
|                    | mid     | 18.382        | 21.000           |
|                    | high    | 18.382        | 20.600           |
| 30                 | low     | 28.097        | 30.150           |
|                    | mid     | 27.947        | 30.075           |
|                    | high    | 27.947        | 29.850           |
| 40                 | low     | 38.062        | 41.000           |
|                    | mid     | 37.962        | 40.700           |
|                    | high    | 38.062        | 40.800           |
| 50                 | low     | 47.577        | 50.500           |
|                    | mid     | 47.577        | 50.500           |
|                    | high    | 47.702        | 50.750           |
| 60                 | low     | 57.992        | 60.750           |
|                    | mid     | 57.842        | 60.900           |
|                    | high    | 57.992        | 60.900           |
| 70                 | low     | 67.483        | 70.700           |
|                    | mid     | 67.657        | 70.700           |
|                    | high    | 67.657        | 70.875           |
| 80                 | low     | 77.922        | 82.800           |
|                    | mid     | 77.922        | 82.600           |
|                    | high    | 77.922        | 82.400           |
| 90                 | low     | 87.887        | 92.700           |
|                    | mid     | 87.887        | 92.700           |
|                    | high    | 87.662        | 92.925           |
| 100                | low     | 97.652        | 103.000          |
|                    | mid     | 97.652        | 103.000          |
|                    | high    | 97.652        | 102.500          |

| Occupied Bandwidth |         |               |                  |
|--------------------|---------|---------------|------------------|
| 16QAM modulation   | Channel | 99% OBW (kHz) | -26 dBc BW (kHz) |
| Bandwidth          |         |               |                  |
| 10                 | low     | 8.666         | 10.175           |
|                    | mid     | 8.641         | 10.225           |
|                    | high    | 8.666         | 10.100           |
| 20                 | low     | 18.432        | 20.300           |
|                    | mid     | 18.382        | 20.450           |
|                    | high    | 18.332        | 20.400           |
| 30                 | low     | 27.947        | 30.000           |
|                    | mid     | 27.872        | 30.000           |
|                    | high    | 27.947        | 29.850           |
| 40                 | low     | 38.062        | 40.900           |
|                    | mid     | 38.062        | 40.700           |
|                    | high    | 38.062        | 40.500           |
| 50                 | low     | 47.577        | 50.500           |
|                    | mid     | 47.453        | 50.375           |
|                    | high    | 47.577        | 50.250           |
| 60                 | low     | 57.842        | 60.750           |
|                    | mid     | 57.842        | 60.900           |
|                    | high    | 57.842        | 60.750           |
| 70                 | low     | 67.483        | 70.700           |
|                    | mid     | 67.657        | 70.525           |
|                    | high    | 67.483        | 70.875           |
| 80                 | low     | 77.722        | 82.800           |
|                    | mid     | 78.122        | 82.400           |
|                    | high    | 77.722        | 82.600           |
| 90                 | low     | 87.887        | 92.700           |
|                    | mid     | 87.887        | 92.700           |
|                    | high    | 87.887        | 92.700           |
| 100                | low     | 97.902        | 102.750          |
|                    | mid     | 97.902        | 103.000          |
|                    | high    | 97.652        | 102.750          |

| Occupied Bandwidth |         |               |                  |
|--------------------|---------|---------------|------------------|
| 64-QAM modulation  | Channel | 99% OBW (kHz) | -26 dBc BW (kHz) |
| Bandwidth          |         |               |                  |
| 10                 | low     | 8.666         | 9.825            |
|                    | mid     | 8.641         | 10.150           |
|                    | high    | 8.641         | 9.875            |
| 20                 | low     | 18.332        | 20.150           |
|                    | mid     | 18.332        | 20.350           |
|                    | high    | 18.332        | 20.150           |
| 30                 | low     | 27.947        | 30.075           |
|                    | mid     | 27.947        | 30.000           |
|                    | high    | 28.022        | 29.925           |
| 40                 | low     | 38.062        | 40.800           |
|                    | mid     | 37.962        | 40.600           |
|                    | high    | 38.062        | 41.000           |
| 50                 | low     | 47.702        | 50.500           |
|                    | mid     | 47.702        | 50.375           |
|                    | high    | 47.577        | 50.375           |
| 60                 | low     | 57.992        | 61.050           |
|                    | mid     | 57.992        | 60.900           |
|                    | high    | 58.142        | 61.050           |
| 70                 | low     | 67.483        | 70.700           |
|                    | mid     | 67.483        | 70.700           |
|                    | high    | 67.657        | 70.525           |
| 80                 | low     | 77.722        | 82.600           |
|                    | mid     | 77.922        | 82.800           |
|                    | high    | 77.922        | 82.800           |
| 90                 | low     | 87.887        | 92.700           |
|                    | mid     | 87.887        | 92.700           |
|                    | high    | 87.887        | 92.700           |
| 100                | low     | 98.152        | 102.750          |
|                    | mid     | 97.652        | 103.000          |
|                    | high    | 97.652        | 102.750          |

| Occupied Bandwidth |         |               |                  |
|--------------------|---------|---------------|------------------|
| 256-QAM modulation | Channel | 99% OBW (kHz) | -26 dBc BW (kHz) |
| Bandwidth          |         |               |                  |
| 10                 | low     | 8.616         | 10.000           |
|                    | mid     | 8.666         | 10.125           |
|                    | high    | 8.691         | 10.025           |
| 20                 | low     | 18.332        | 20.300           |
|                    | mid     | 18.282        | 20.350           |
|                    | high    | 18.332        | 20.200           |
| 30                 | low     | 27.947        | 30.000           |
|                    | mid     | 27.872        | 29.925           |
|                    | high    | 27.797        | 30.075           |
| 40                 | low     | 38.062        | 40.700           |
|                    | mid     | 37.962        | 40.800           |
|                    | high    | 37.962        | 40.700           |
| 50                 | low     | 47.577        | 50.500           |
|                    | mid     | 47.577        | 50.750           |
|                    | high    | 47.702        | 50.625           |
| 60                 | low     | 57.992        | 61.050           |
|                    | mid     | 57.842        | 61.050           |
|                    | high    | 57.842        | 60.900           |
| 70                 | low     | 67.483        | 70.525           |
|                    | mid     | 67.483        | 70.700           |
|                    | high    | 67.483        | 70.525           |
| 80                 | low     | 77.722        | 82.400           |
|                    | mid     | 77.722        | 82.600           |
|                    | high    | 77.722        | 82.600           |
| 90                 | low     | 88.112        | 92.700           |
|                    | mid     | 87.887        | 92.700           |
|                    | high    | 87.887        | 92.700           |
| 100                | low     | 97.652        | 102.750          |
|                    | mid     | 97.652        | 102.500          |
|                    | high    | 97.652        | 103.000          |

## 14 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 |

## 15 Document history

| Version | Applied changes | Date of release |
|---------|-----------------|-----------------|
| -/-     | Initial release | 2022-07-28      |

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

first page

last page



Deutsche Akkreditierungsstelle GmbH

Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV  
 Signatory to the Multilateral Agreements of EA, ILAC and IAF for Mutual Recognition

### Accreditation



The Deutsche Akkreditierungsstelle GmbH attests that the testing laboratory

**CTC advanced GmbH**  
 Untertürkheimer Straße 6-10, 66117 Saarbrücken

is competent under the terms of DIN EN ISO/IEC 17025:2018 to carry out tests in the following fields:

Telecommunication (FCC Requirements)

The accreditation certificate shall only apply in connection with the notice of accreditation of 09.06.2020 with the accreditation number D-PL-12076-01. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 05 pages.

Registration number of the certificate: D-PL-12076-01-05

Frankfurt am Main, 09.06.2020

by  Egnor  
 Head of Division

The certificate together with its annex reflects the status at the time of the date of issue. The current status of the scope of accreditation can be found in the database of accredited bodies of Deutsche Akkreditierungsstelle GmbH.  
<https://www.dakks.de/en/content/accredited-bodies-dakks>  
 See notes attached.

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The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkreditierungsstelle GmbH (DAKKS). Exempted is the unchanged form of separate disseminations of the cover sheet by the conformity assessment body mentioned overleaf.

No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAKKS.

The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) of 31 July 2009 (Federal Law Gazette I p. 2625) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products (Official Journal of the European Union L 218 of 9 July 2008, p. 30). DAKKS is a signatory to the Multilateral Agreements for Mutual Recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC). The signatories to these agreements recognise each other's accreditations.

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<https://www.dakks.de/files/data/as/pdf/D-PL-12076-01-05e.pdf>

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##### END OF TEST REPORT #####