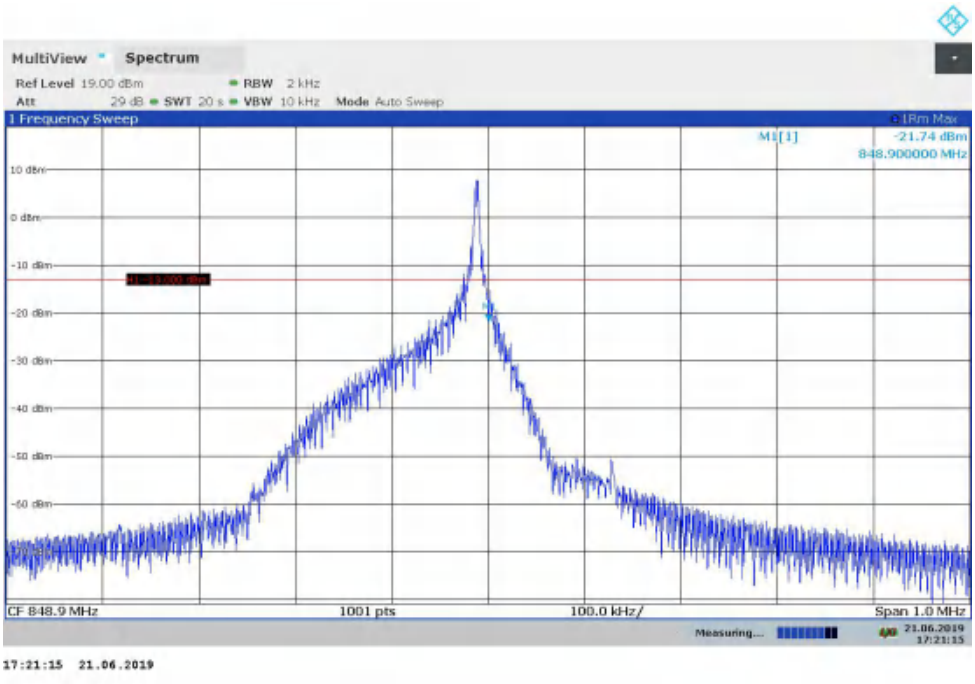
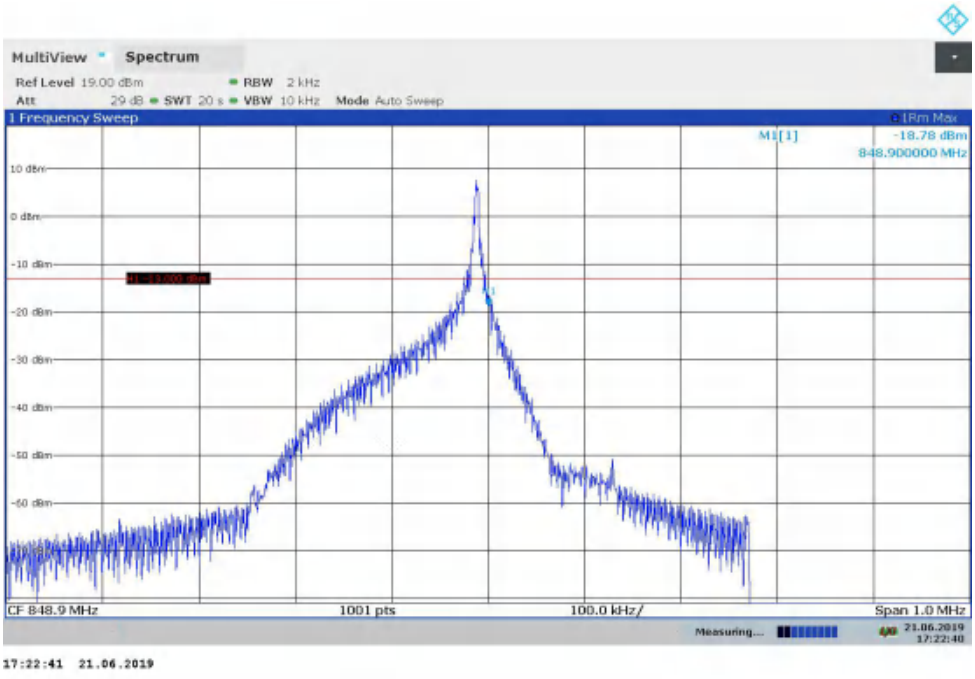
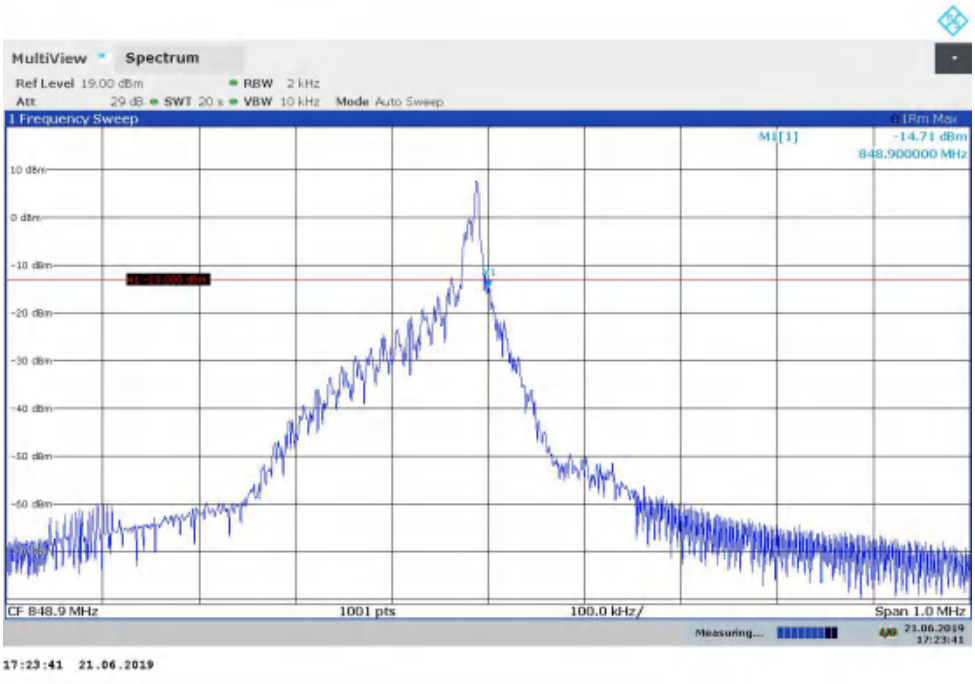


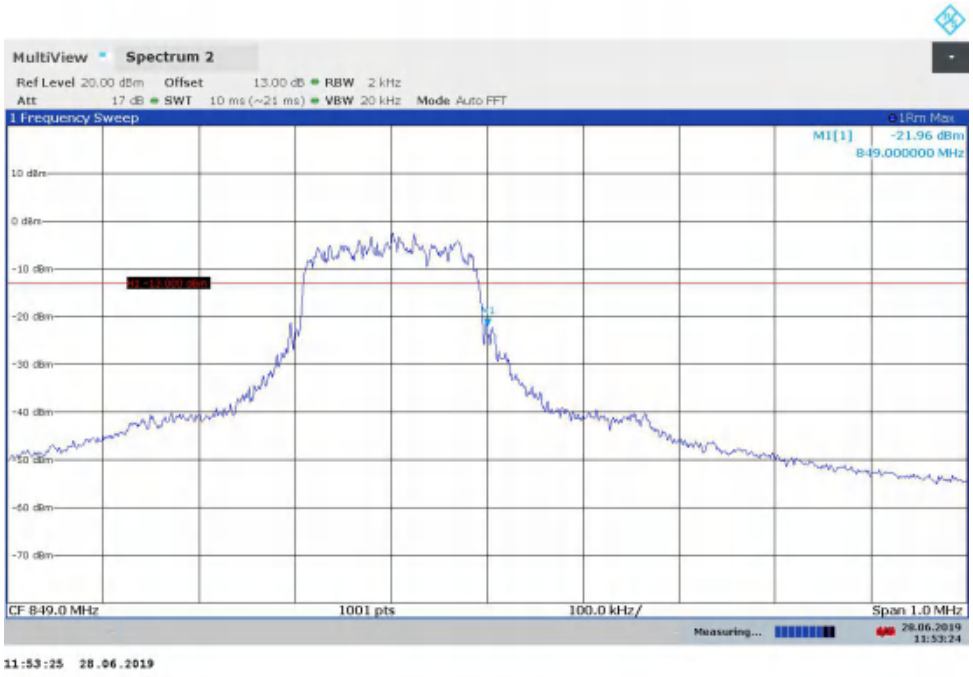

High Channel, Subcarrier (3.75kHz), QPSK, 1@47



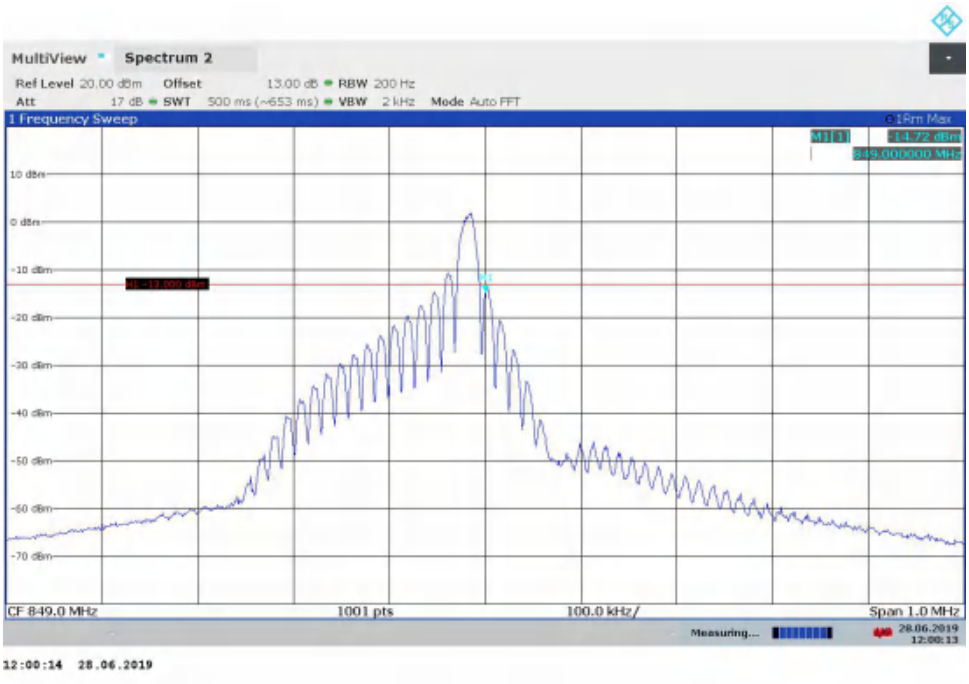

High Channel, Subcarrier (3.75kHz), BPSK, 1@47



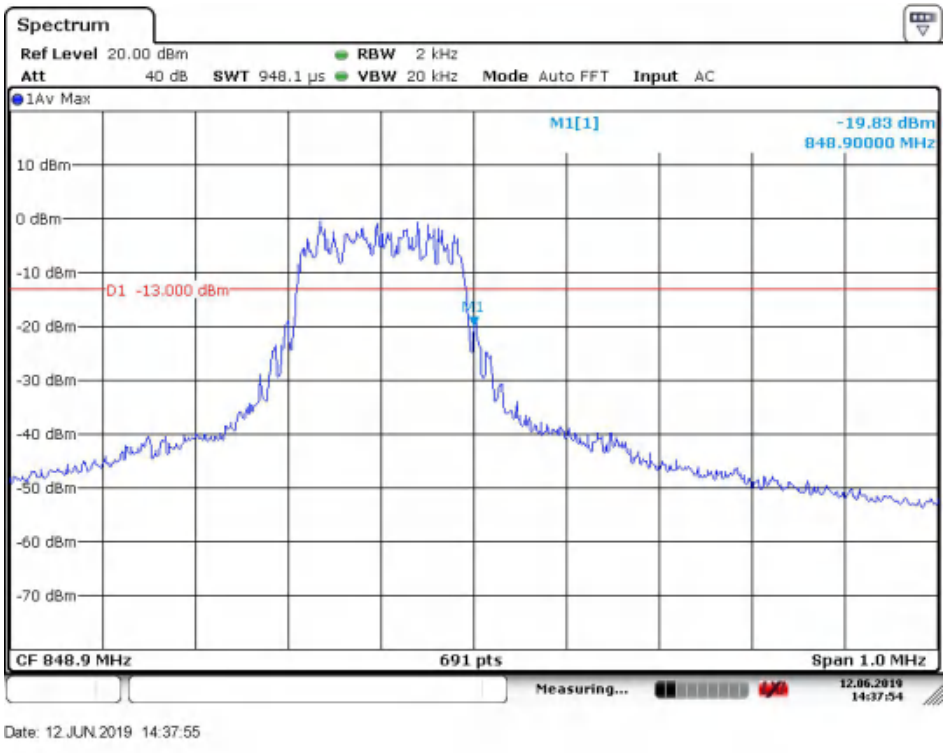

High Channel, Subcarrier (15kHz), QPSK, 1@11




High Channel, Subcarrier (15kHz), QPSK, 12@0

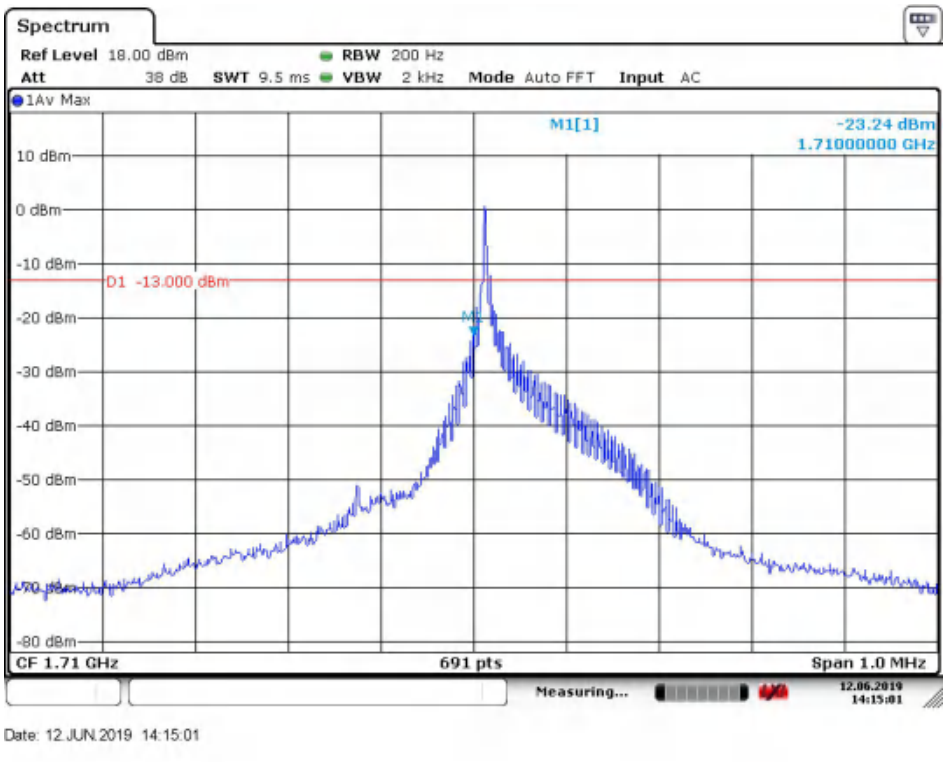



High Channel, Subcarrier (15kHz), BPSK, 1@11

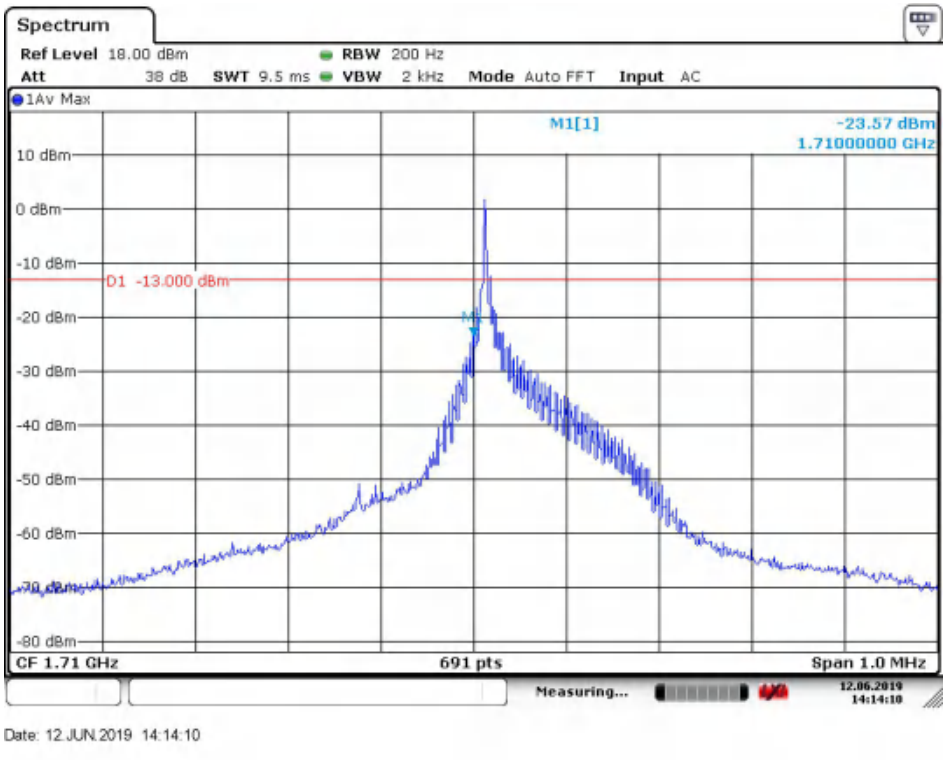



High Channel, Subcarrier (15kHz), BPSK, 12@0

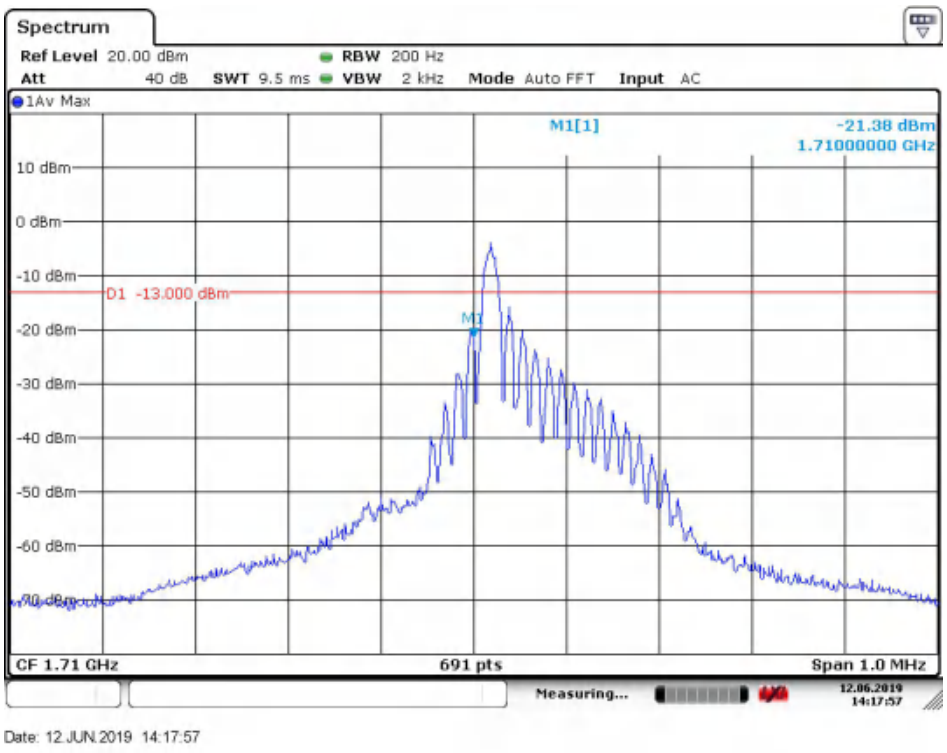
### 5.5.6 NB-IoT Band 66 Edge Results



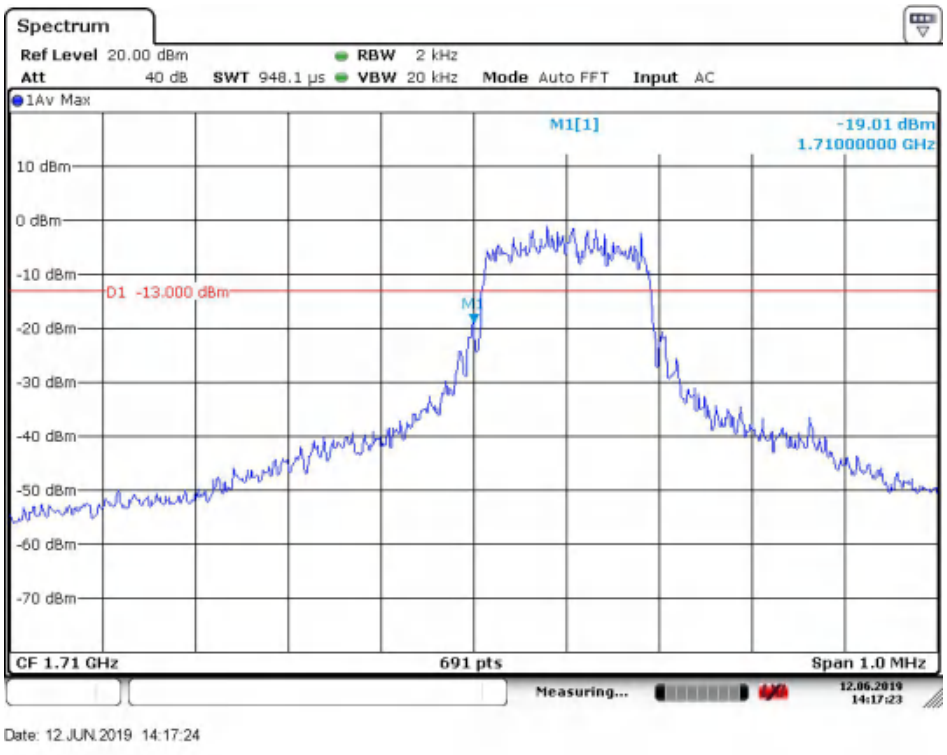

Low Channel, Subcarrier (3.75kHz), QPSK, 1@0



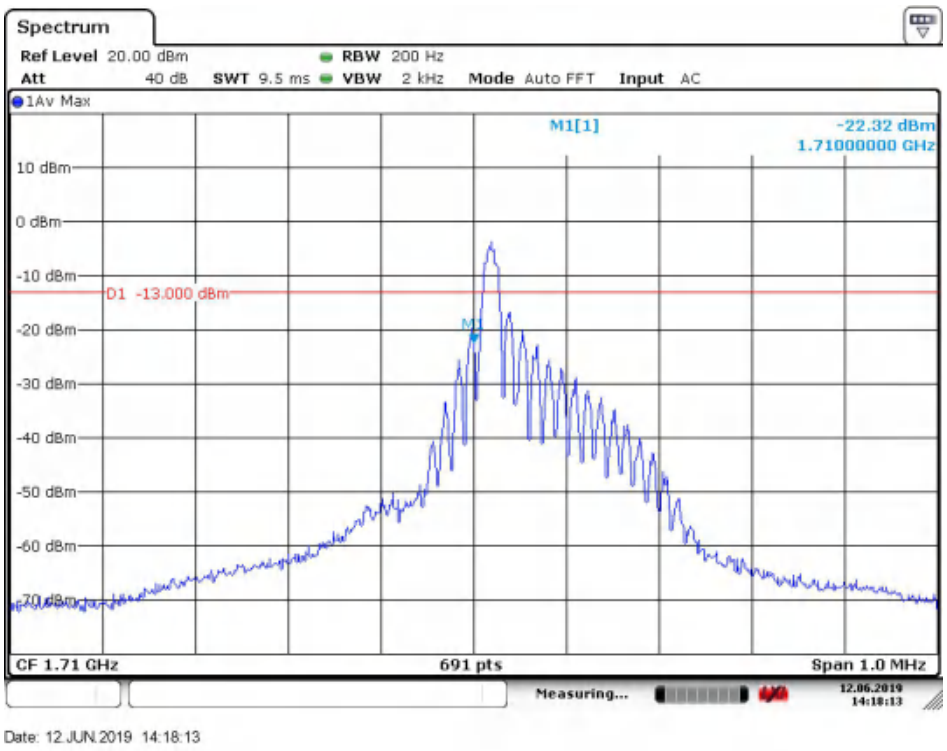

Low Channel, Subcarrier (3.75kHz), BPSK, 1@0



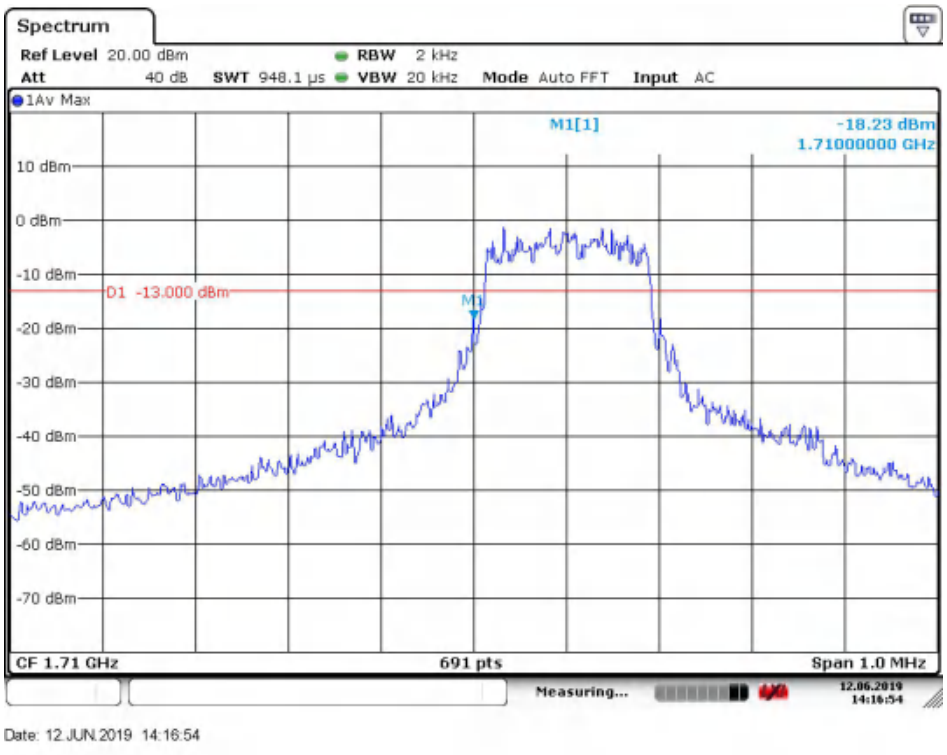

Low Channel, Subcarrier (15kHz), QPSK, 1@0



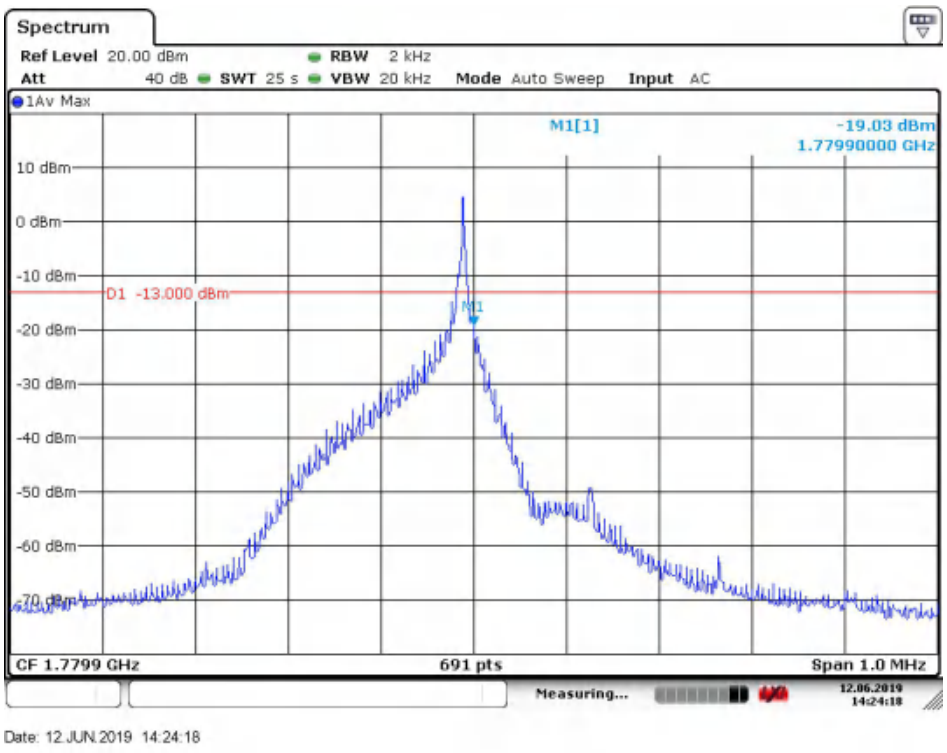

Low Channel, Subcarrier (15kHz), QPSK, 12@0



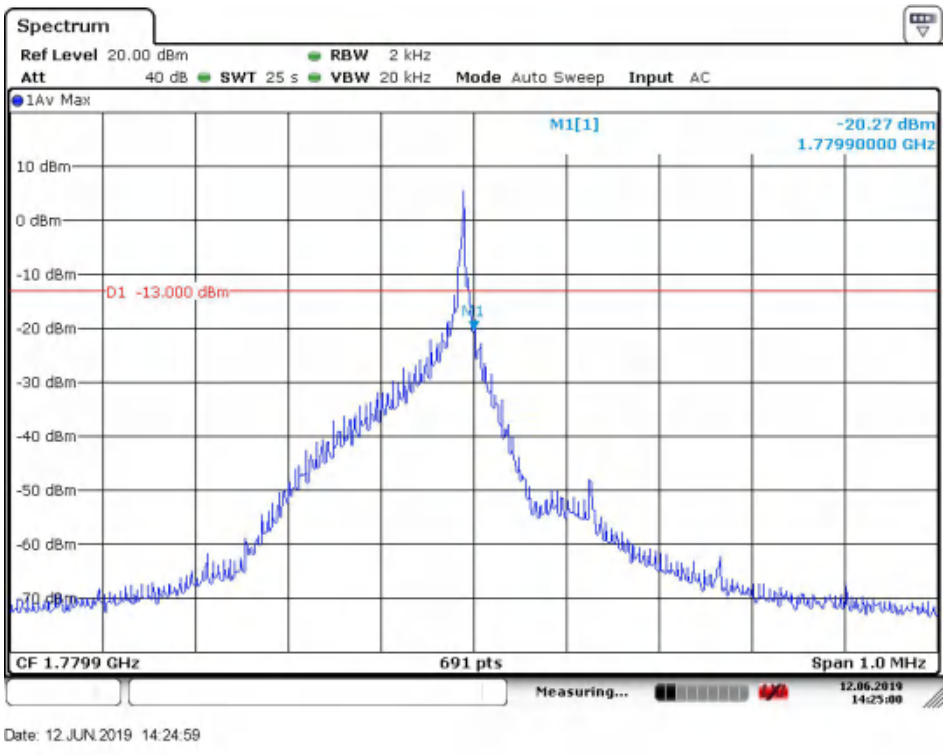

Low Channel, Subcarrier (15kHz), BPSK, 1@0



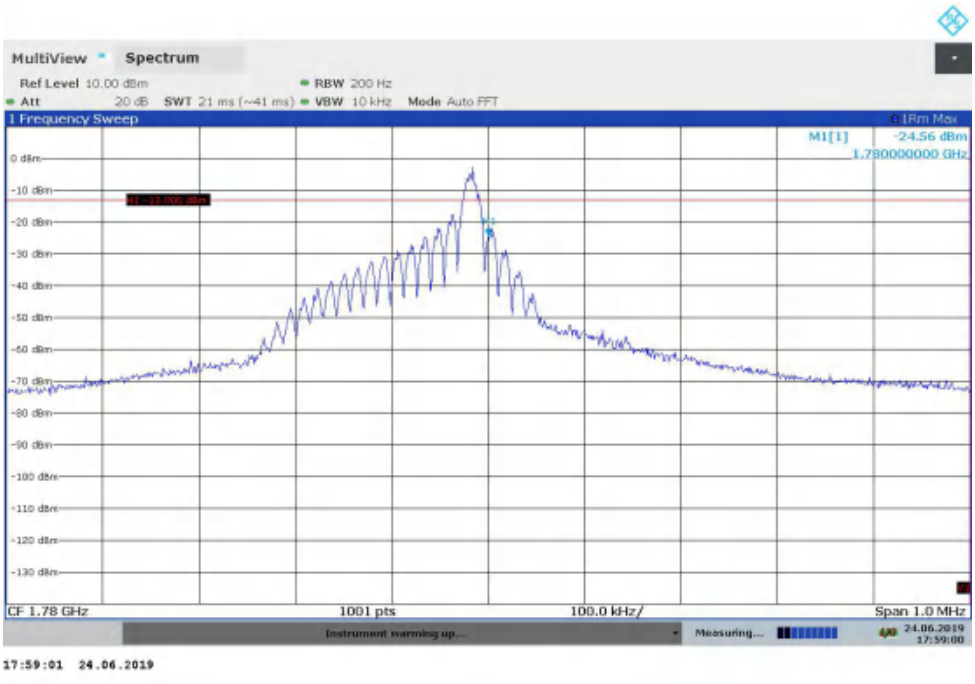

Low Channel, Subcarrier (15kHz), BPSK, 12@0



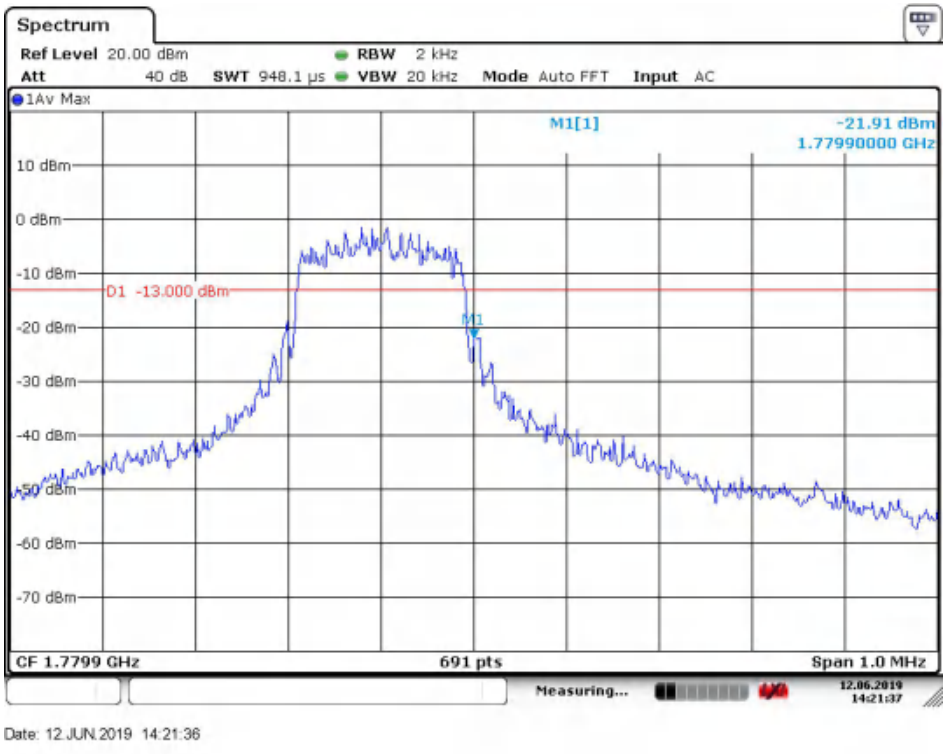

High Channel, Subcarrier (3.75kHz), QPSK, 1@47



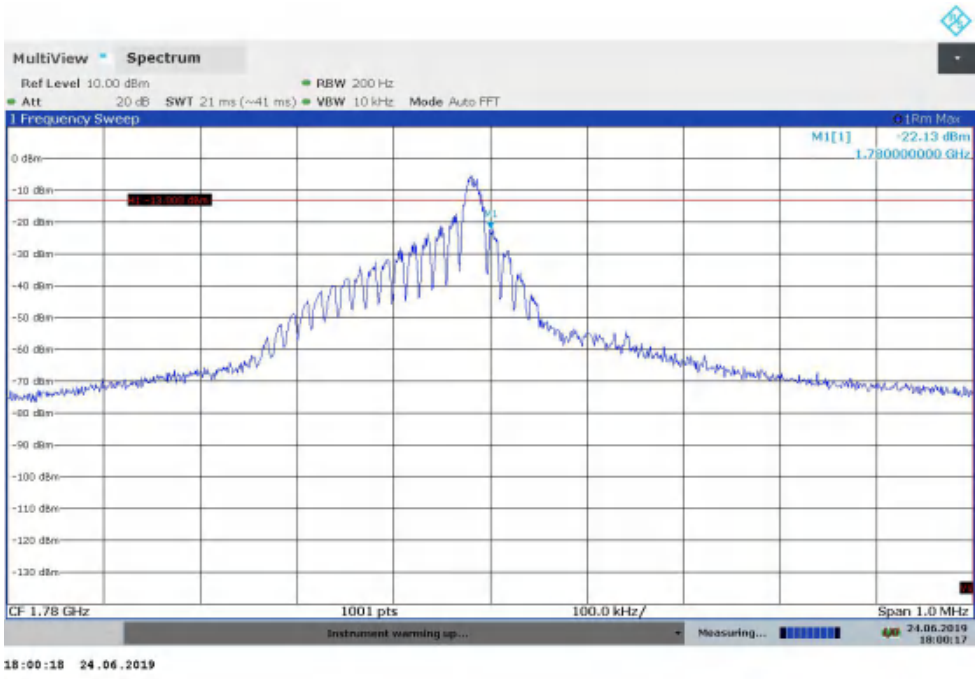

High Channel, Subcarrier (3.75kHz), BPSK, 1@47



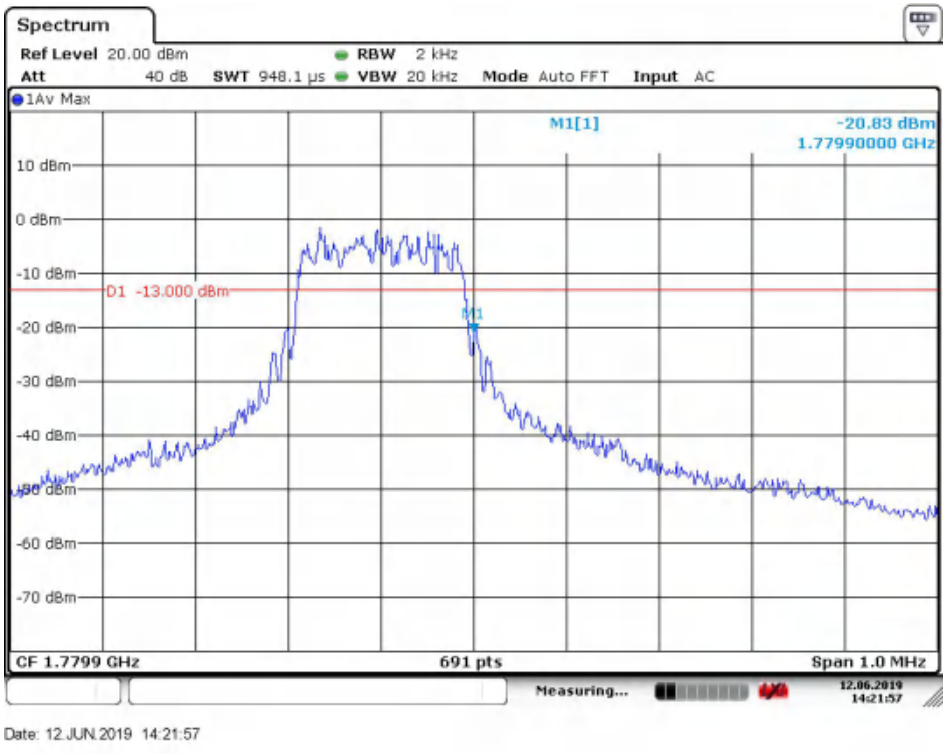

High Channel, Subcarrier (15kHz), QPSK, 1@11




High Channel, Subcarrier (15kHz), QPSK, 12@0

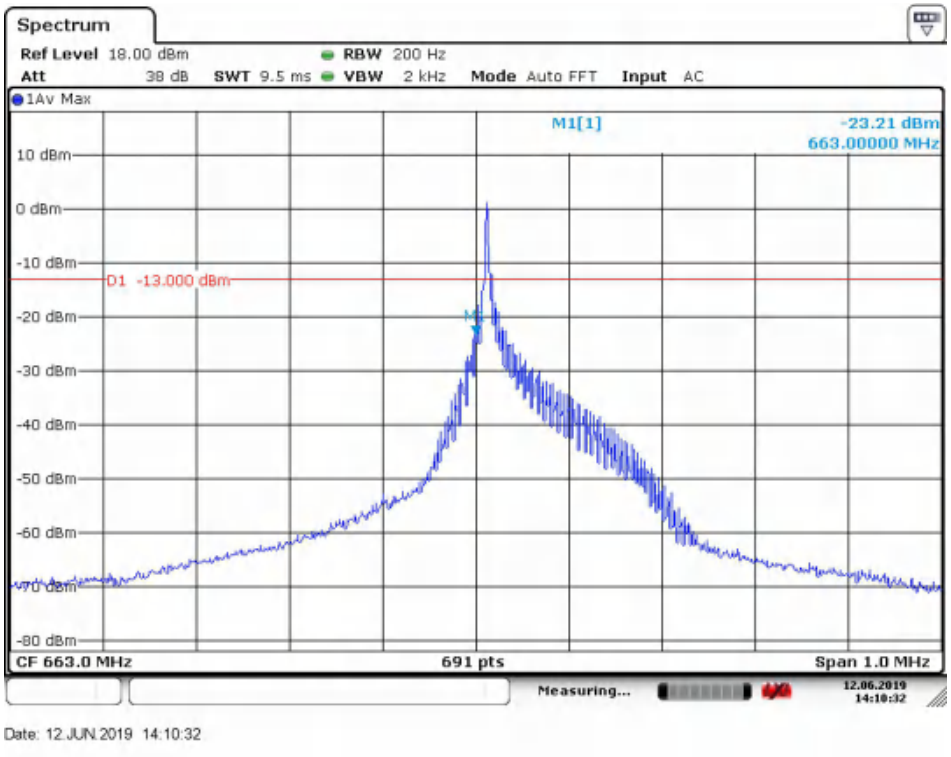



High Channel, Subcarrier (15kHz), BPSK, 1@11

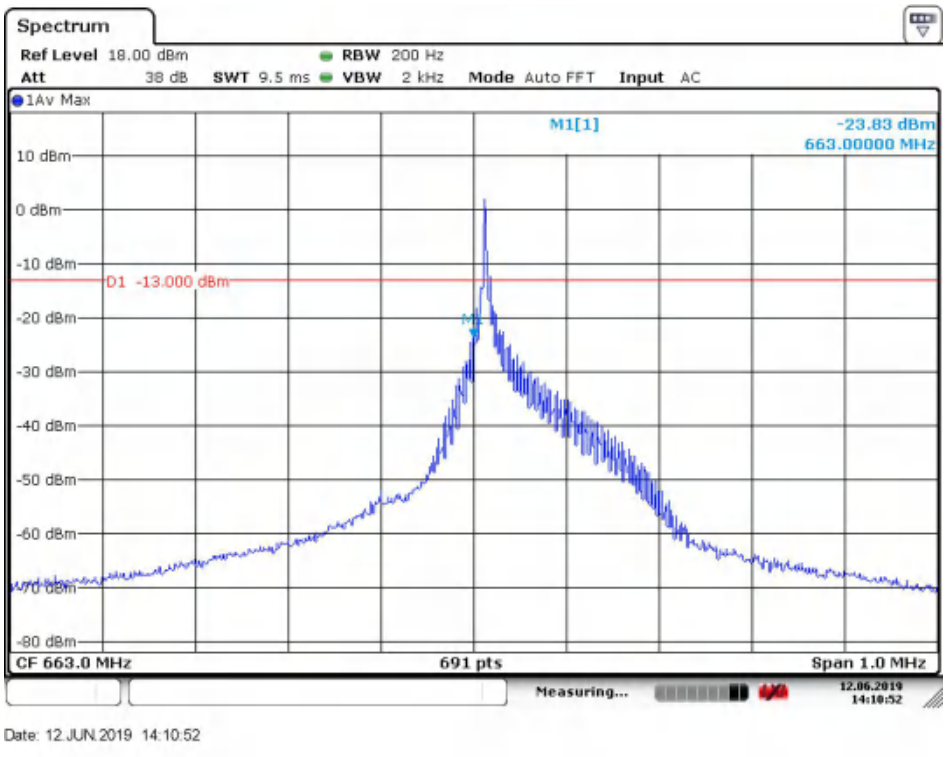



High Channel, Subcarrier (15kHz), BPSK, 12@0

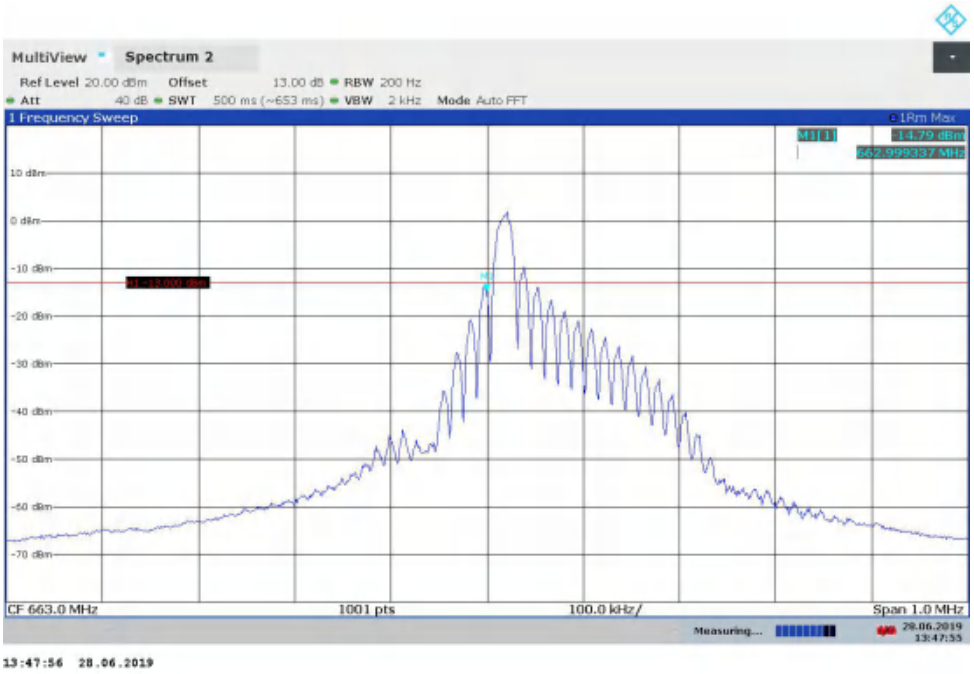
### 5.5.7 NB-IoT Band 71 Edge Results



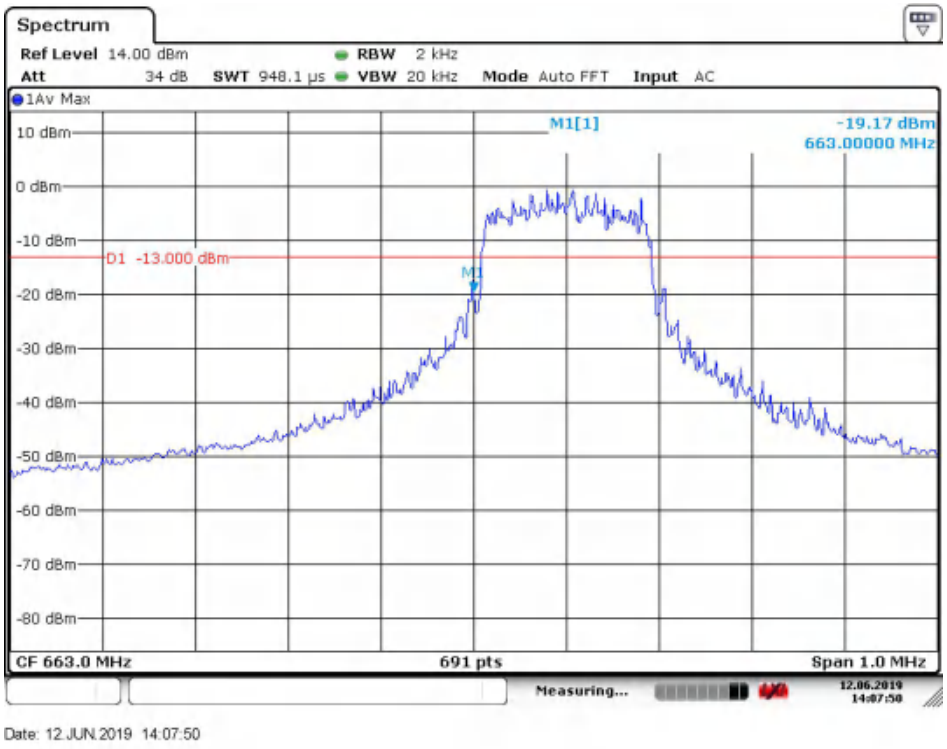

Low Channel, Subcarrier (3.75kHz), QPSK, 1@0



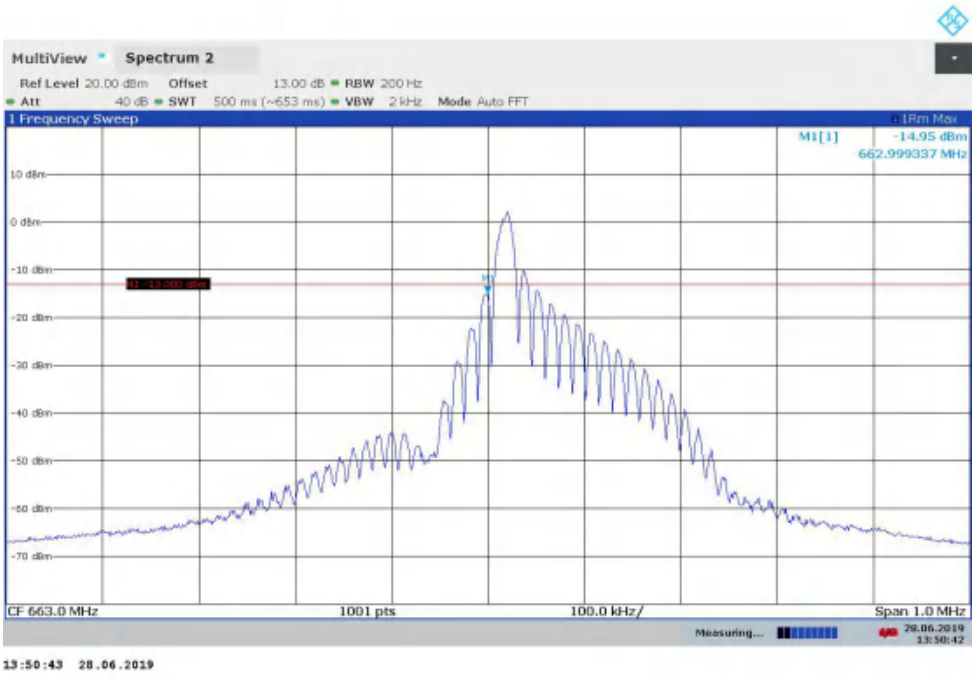
Low Channel, Subcarrier (3.75kHz), BPSK, 1@0



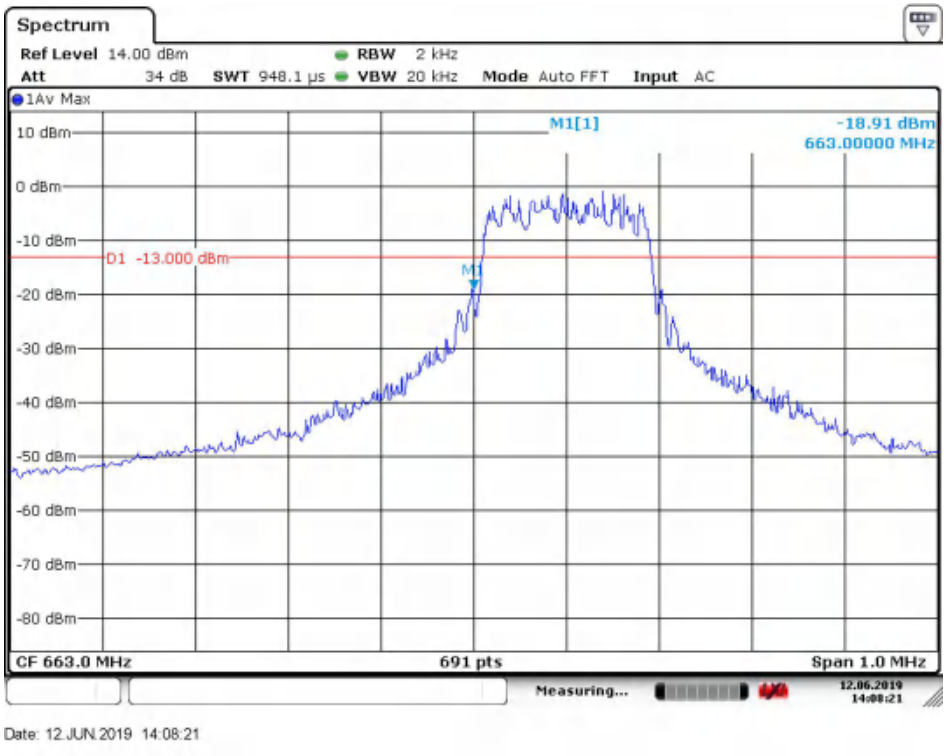

Low Channel, Subcarrier (15kHz), QPSK, 1@0



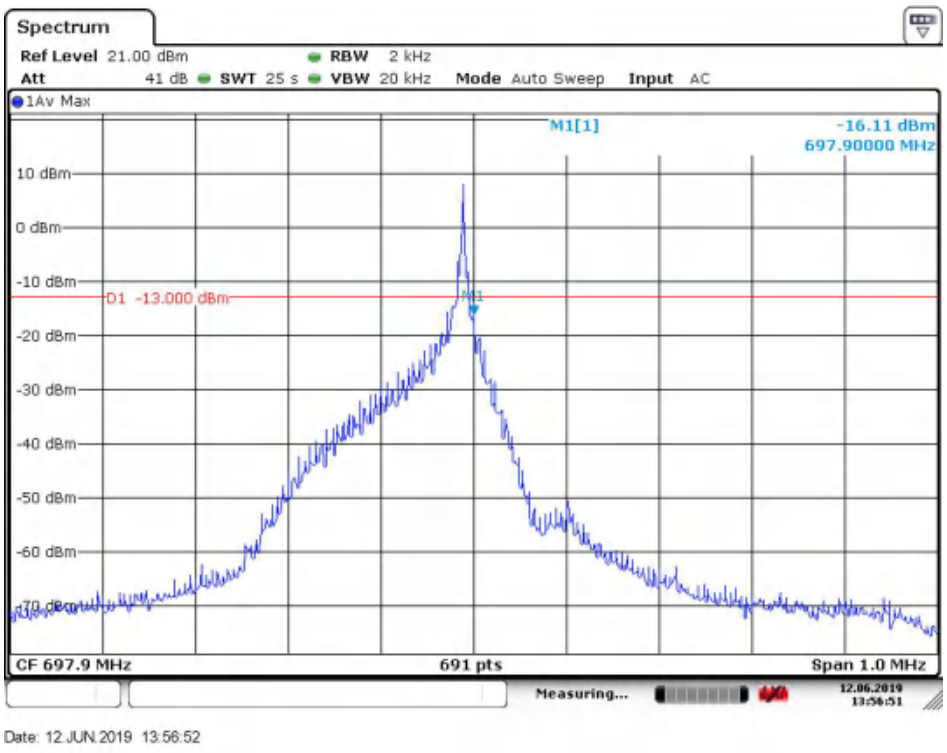

Low Channel, Subcarrier (15kHz), QPSK, 12@0



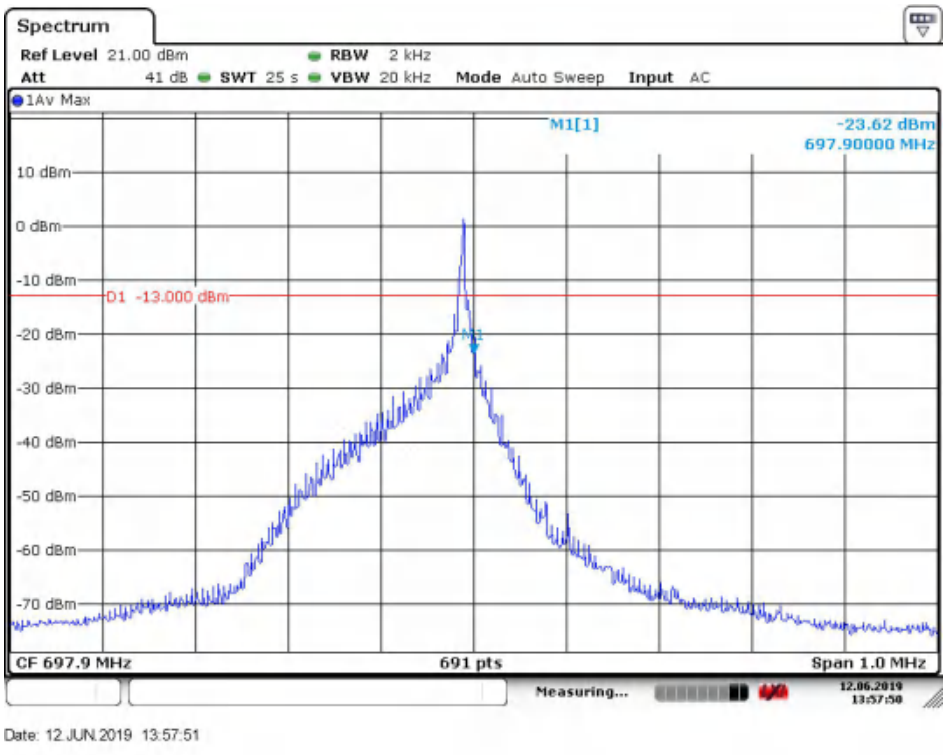

Low Channel, Subcarrier (15kHz), BPSK, 1@0



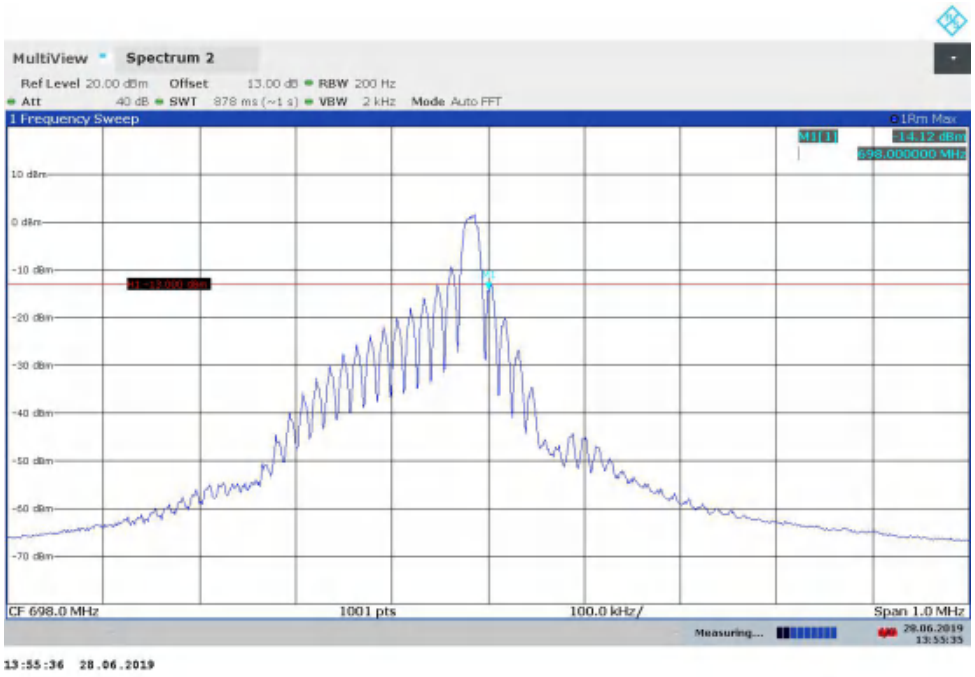

Low Channel, Subcarrier (15kHz), BPSK, 12@0



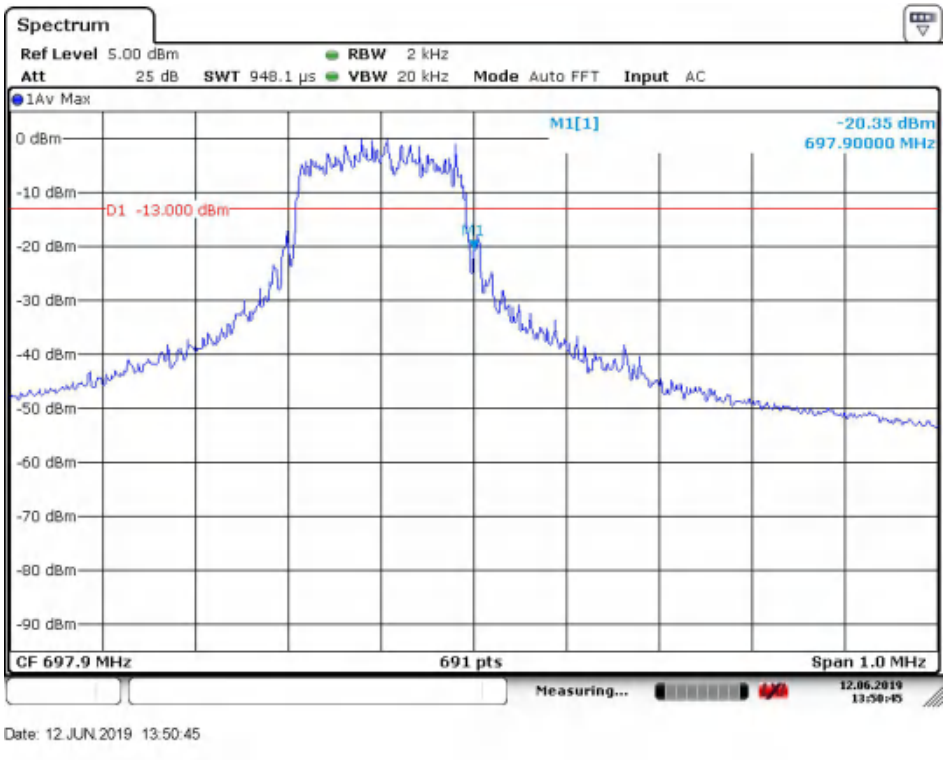

High Channel, Subcarrier (3.75kHz), QPSK, 1@47



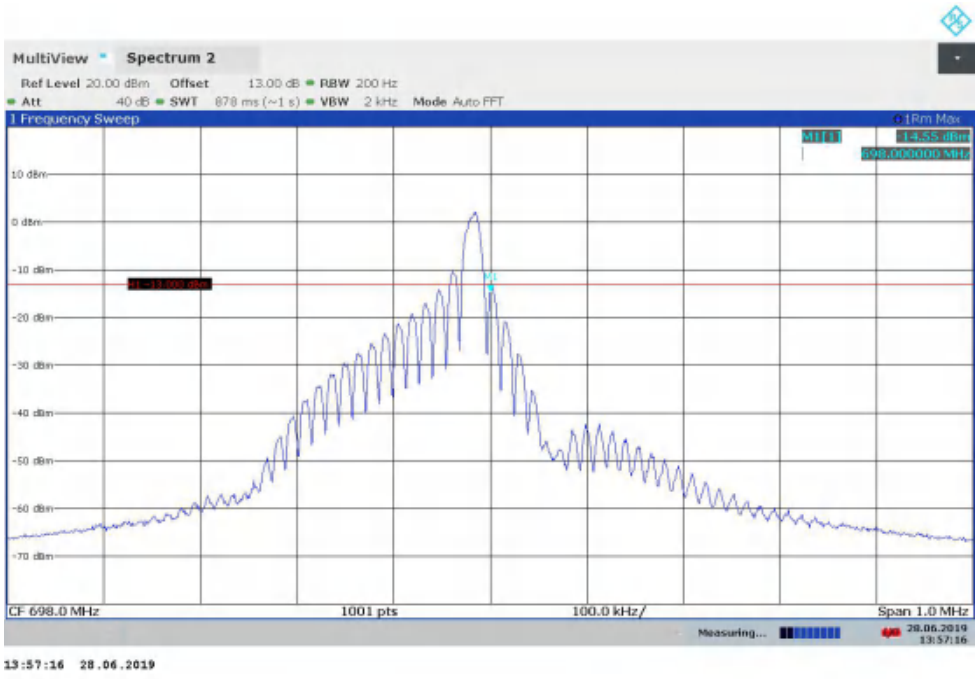

High Channel, Subcarrier (3.75kHz), BPSK, 1@47



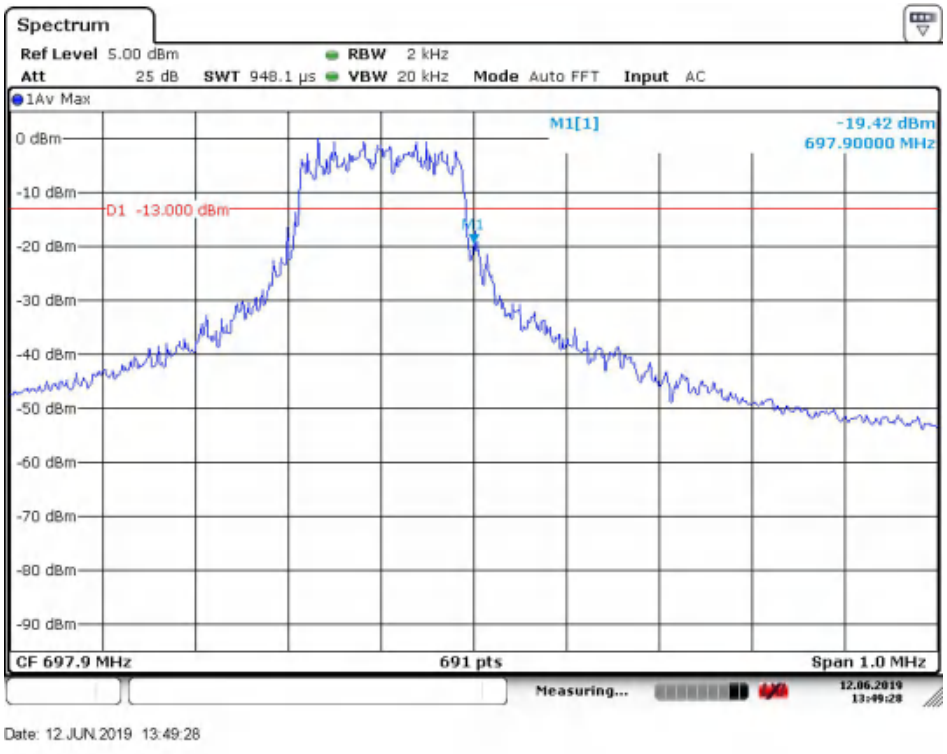

High Channel, Subcarrier (15kHz), QPSK, 1@11




High Channel, Subcarrier (15kHz), QPSK, 12@0




High Channel, Subcarrier (15kHz), BPSK, 1@11




High Channel, Subcarrier (15kHz), BPSK, 12@0

## 5.6 Frequency Stability over Temperature Variation

| | |
|---|---|
| **Specifications:** | FCC Part 2.1055, 22.355, 24.235, 27.54 |
| **DUT Serial Number:** | 868334032569216 |
| **Test conditions:** | Ambient Temperature:15℃-35℃<br>Relative Humidity:30%-60%<br>Air pressure: 86-106kPa |
| **Test Results:** | Pass |

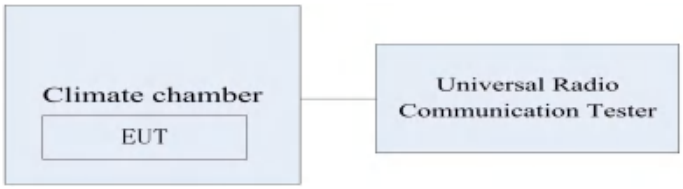
| **Limit** | |
|---|---|
| Frequency deviation [ppm] | ±2.5 |

**Measurement Uncertainty:**

| Item | Uncertainty |
|---|---|
| Expanded Uncertainty | 15 Hz (k=2) |

### Test Setup

The EUT was placed in a temperature chamber, demonstrated as figure T. The Wireless Telecommunications Test Set was used to set the Tx channel and power level, modulate the TX signal with different bit patterns and measure the frequency of Tx.




### Test Method

1、 The EUT was turned off and placed in the temperature chamber.

2、 The temperature of the chamber was set to -30℃ and allowed to stabilize.

3、 The EUT temperature was allowed to stabilize for 45 minutes.

4、 The EUT was turned on and set to transmit with Wireless Telecommunications Test Set.

5、 The maximum transmit frequency deviation during one minute period was measured by Wireless Communications Test Set.

6、 The steps 3-5 were repeated for -30℃,-20℃, -10℃, 0℃, 10℃, 20℃, 30℃, 40℃ and 50℃.

**Note:** Only worst case mode of in-band result is given below, the EUT is working in BPSK modulation, Sub-carrier Spacing 15 kHz, full tones, middle channel mode.

### 5.6.1 NB-IoT Band Frequency Stability over Temperature Variation Results

| Band | Offset | Temperature[℃] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | -30 | -20 | -10 | 0 | 10 | 20 | 30 | 40 | 50 |
| Band 2 | Hz | -24.6 | -22.4 | 12.77 | 13.52 | -9.45 | -17.85 | -9.2 | -15.12 | 13.23 |
| | ppm | -0.013 | -0.012 | 0.007 | 0.007 | -0.005 | -0.009 | -0.005 | -0.008 | 0.007 |
| Band 4 | Hz | -22.98 | -6.05 | 8.23 | 14.34 | 15.04 | -4.74 | -5.87 | 14.23 | -6.15 |
| | ppm | -0.011 | -0.003 | 0.004 | 0.007 | 0.007 | -0.002 | -0.003 | 0.007 | -0.003 |
| Band 12 | Hz | -10.09 | -12.02 | 14.87 | 13.91 | -13.48 | -14.38 | 12.4 | -5.88 | -8.82 |
| | ppm | -0.014 | -0.017 | 0.021 | 0.020 | -0.019 | -0.020 | 0.018 | -0.008 | -0.013 |
| Band 13 | Hz | -12.46 | -7.65 | 13.63 | 15.94 | -12.12 | 7.67 | 11.52 | -8.12 | -14.77 |
| | ppm | -0.016 | -0.010 | 0.017 | 0.020 | -0.016 | 0.010 | 0.015 | -0.010 | -0.019 |
| Band 26 | Hz | -13.75 | 12.86 | 6.45 | -7.66 | 11.87 | -18.83 | 8.71 | 17.54 | -13.49 |
| | ppm | -0.017 | 0.015 | 0.008 | -0.009 | 0.014 | -0.023 | 0.010 | 0.021 | -0.016 |
| Band 66 | Hz | -15.38 | 5.48 | 15.36 | -5.53 | 9.8 | 13.65 | -12.33 | 10.53 | 15.49 |
| | ppm | -0.009 | 0.003 | 0.009 | -0.003 | 0.006 | 0.008 | -0.007 | 0.006 | 0.009 |
| Band 71 | Hz | 15.73 | 12.61 | 6.74 | 8.61 | 17.62 | 15.12 | -12.36 | -11.21 | 13.51 |
| | ppm | 0.023 | 0.019 | 0.010 | 0.013 | 0.026 | 0.022 | -0.018 | -0.017 | 0.020 |

## 5.7 Frequency Stability over Voltage Variation

| | |
|---|---|
| **Specifications:** | FCC Part 2.1055, 22.355, 24.235, 27.54 |
| **DUT Serial Number:** | 868334032569216 |
| **Test conditions:** | Ambient Temperature:15℃-35℃<br>Relative Humidity:30%-60%<br>Air pressure: 86-106kPa |
| **Test Results:** | Pass |

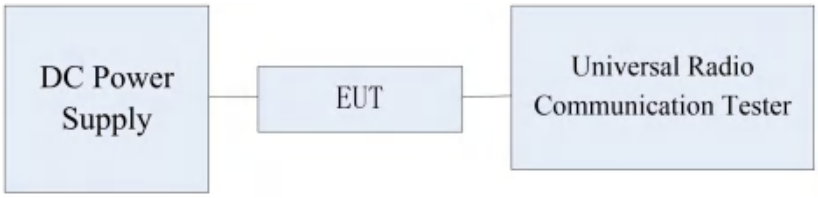
| **Limit** | |
|---|---|
| Frequency deviation [ppm] | ±2.5 |

**Measurement Uncertainty:**

| Item | Uncertainty |
|---|---|
| Expanded Uncertainty | 15 Hz (k=2) |

### Test Setup

The EUT was placed in a shielding chamber and powered by an adjustable power supply, demonstrated as figure V. A Wireless Telecommunications Test Set was used to set the TX channel and power level, modulate the TX signal with different bit patterns and measure the frequency of TX.




### Test Method

The EUT was powered by the adjustable power supply. The frequency stability is measured by the Wireless Telecommunications Test Set.

**Note:** Only worst case mode of in-band result is given below, the EUT is working in BPSK modulation, Sub-carrier Spacing 15 kHz, full tones, middle channel mode.

### 5.7.1 NB-IoT Band Frequency Stability over Voltage Variation Results

**Test data：**

| Band | Offset | Voltage (V) | | |
|---|---|---|---|---|
| | | 3.00 | 3.30 | 3.60 |
| Band 2 | Hz | 13.61 | 16.17 | 10.21 |
| | ppm | 0.007 | 0.009 | 0.005 |
| Band 4 | Hz | 10.04 | 5.04 | 8.04 |
| | ppm | 0.005 | 0.002 | 0.004 |
| Band 12 | Hz | -13.82 | 15.82 | 11.82 |
| | ppm | -0.020 | 0.022 | 0.017 |
| Band 13 | Hz | -14.77 | -14.77 | -14.77 |
| | ppm | -0.019 | -0.019 | -0.019 |
| Band 26 | Hz | 12.34 | -15.49 | -17.49 |
| | ppm | 0.015 | -0.019 | -0.021 |
| Band 66 | Hz | 7.53 | 15.49 | 12.49 |
| | ppm | 0.004 | 0.009 | 0.007 |
| Band 71 | Hz | 6.71 | 8.92 | 10.32 |
| | ppm | 0.010 | 0.013 | 0.015 |

## 5.8 Peak to Average Ratio

| | |
|---|---|
| **Specifications:** | FCC Part 24.232, 27.50 |
| **DUT Serial Number:** | 868334032569216 |
| **Test conditions:** | Ambient Temperature:15℃-35℃<br>Relative Humidity:30%-60%<br>Air pressure: 86-106kPa |
| **Test Results:** | Pass |

**Limit**

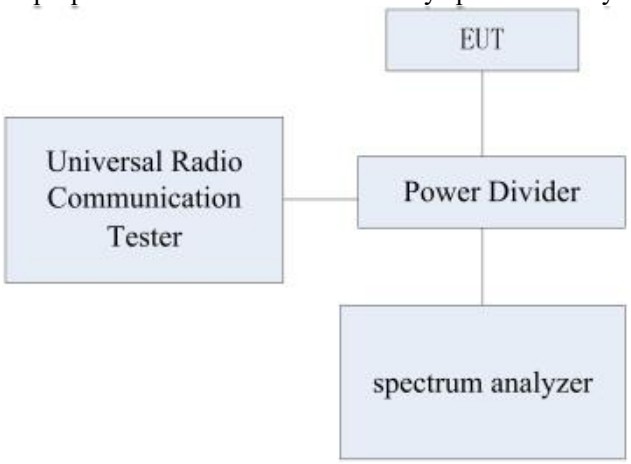
The EUT meets the requirement of having a peak to average ratio of less than 13dB.

**Measurement Uncertainty:**

| Item | Uncertainty |
|---|---|
| Expanded Uncertainty | 0.52 dB (k=2) |

### Test Setup

During the test, the EUT was controlled via the Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by spectrum analyzer.




### Test Method

The transmitter output was connected to a SP8315 through a coaxial RF cable and directional coupler, and configured to operate at maximum power. The peak to average ratio was measured at the required operating frequencies in each Band on the Spectrum Analyzer.

**Note:** Only worst case mode of in-band result is given below.

### 5.8.1 NB-IoT band 2 Peak to Average Ratio Results

| Channel | Sub-carrier Spacing [kHz] | Modulation | $N_{tones}$ | Peak to Average Ratio |
|---|---|---|---|---|
| Low | 15 | BPSK | 1 | 4.37 |
| | | QPSK | 1 | 7.00 |
| Mid | 15 | BPSK | 1 | 8.88 |
| | | QPSK | 1 | 6.54 |
| High | 15 | BPSK | 1 | 7.22 |
| | | QPSK | 1 | 6.81 |

### 5.8.2 NB-IoT band 4 Peak to Average Ratio Results

| Channel | Sub-carrier Spacing [kHz] | Modulation | $N_{tones}$ | Peak to Average Ratio |
|---|---|---|---|---|
| Low | 15 | BPSK | 1 | 7.22 |
| | | QPSK | 1 | 7.03 |
| Mid | 15 | BPSK | 1 | 7.19 |
| | | QPSK | 1 | 6.91 |
| High | 15 | BPSK | 1 | 7.15 |
| | | QPSK | 1 | 6.96 |

### 5.8.3 NB-IoT band 12 Peak to Average Ratio Results

| Channel | Sub-carrier Spacing [kHz] | Modulation | $N_{tones}$ | Peak to Average Ratio |
|---|---|---|---|---|
| Low | 15 | BPSK | 1 | 7.38 |
| | | QPSK | 1 | 6.88 |
| Mid | 15 | BPSK | 1 | 7.34 |
| | | QPSK | 1 | 6.99 |
| High | 15 | BPSK | 1 | 8.11 |

| | | | | |
|---|---|---|---|---|
| | | QPSK | 1 | 7.59 |

### 5.8.4 NB-IoT band 13 Peak to Average Ratio Results

| Channel | Sub-carrier Spacing [kHz] | Modulation | $N_{tones}$ | Peak to Average Ratio |
|---|---|---|---|---|
| Low | 15 | BPSK | 1 | 7.24 |
| | | QPSK | 1 | 6.94 |
| Mid | 15 | BPSK | 1 | 6.99 |
| | | QPSK | 1 | 6.88 |
| High | 15 | BPSK | 1 | 7.16 |
| | | QPSK | 1 | 6.88 |

### 5.8.5 NB-IoT band 26 Peak to Average Ratio Results

| Channel | Sub-carrier Spacing [kHz] | Modulation | $N_{tones}$ | Peak to Average Ratio |
|---|---|---|---|---|
| Low | 15 | BPSK | 1 | 7.59 |
| | | QPSK | 1 | 7.66 |
| Mid | 15 | BPSK | 1 | 7.47 |
| | | QPSK | 1 | 7.68 |
| High | 15 | BPSK | 1 | 7.06 |
| | | QPSK | 1 | 6.67 |

### 5.8.6 NB-IoT band 66 Peak to Average Ratio Results

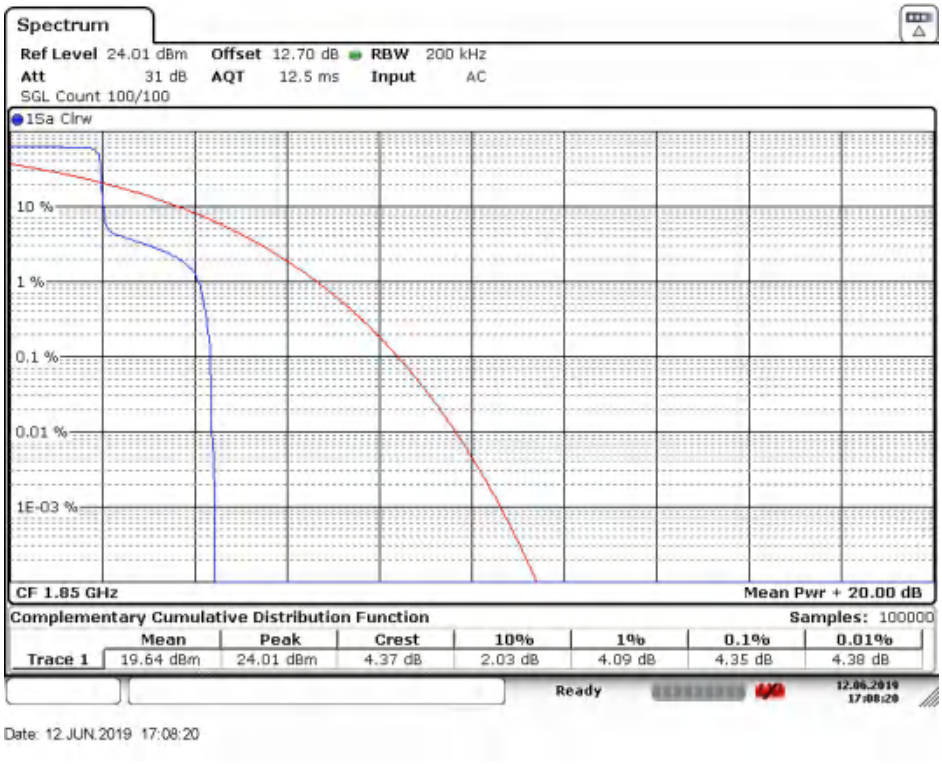
| Channel | Sub-carrier Spacing [kHz] | Modulation | $N_{tones}$ | Peak to Average Ratio |
|---|---|---|---|---|
| Low | 15 | BPSK | 1 | 5.96 |
| | | QPSK | 1 | 6.14 |
| Mid | 15 | BPSK | 1 | 7.11 |

| | | | | |
|---|---|---|---|---|
| | | QPSK | 1 | 6.85 |
| High | 15 | BPSK | 1 | 7.05 |
| | | QPSK | 1 | 6.90 |

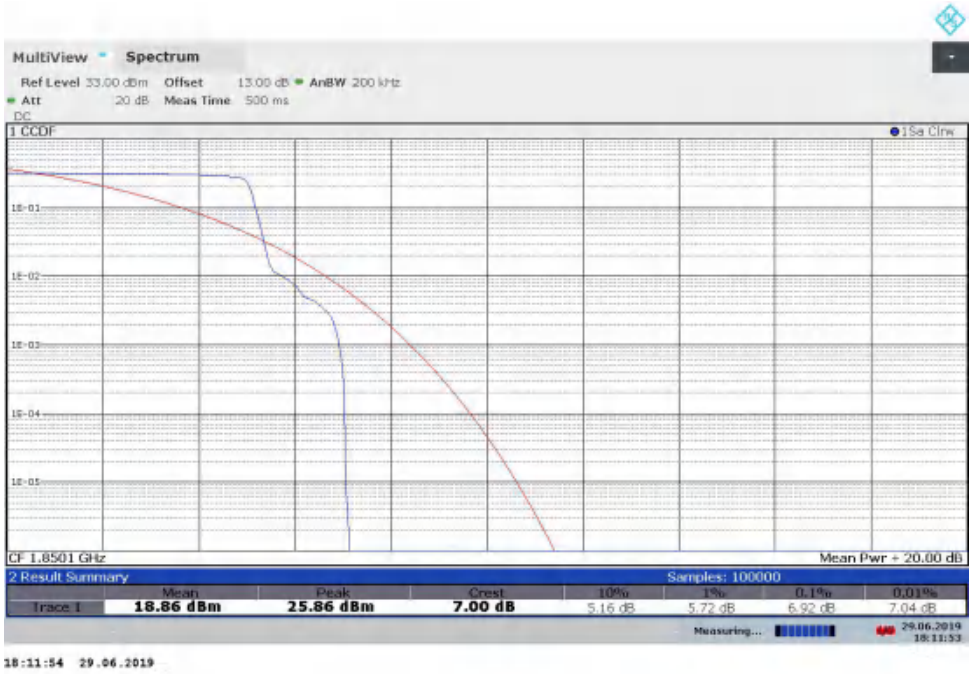
### 5.8.7 NB-IoT band 71Peak to Average Ratio Results

| Channel | Sub-carrier Spacing [kHz] | Modulation | $N_{tones}$ | Peak to Average Ratio |
|---|---|---|---|---|
| Low | 15 | BPSK | 1 | 7.47 |
| | | QPSK | 1 | 7.11 |
| Mid | 15 | BPSK | 1 | 7.38 |
| | | QPSK | 1 | 7.08 |
| High | 15 | BPSK | 1 | 6.06 |
| | | QPSK | 1 | 6.41 |

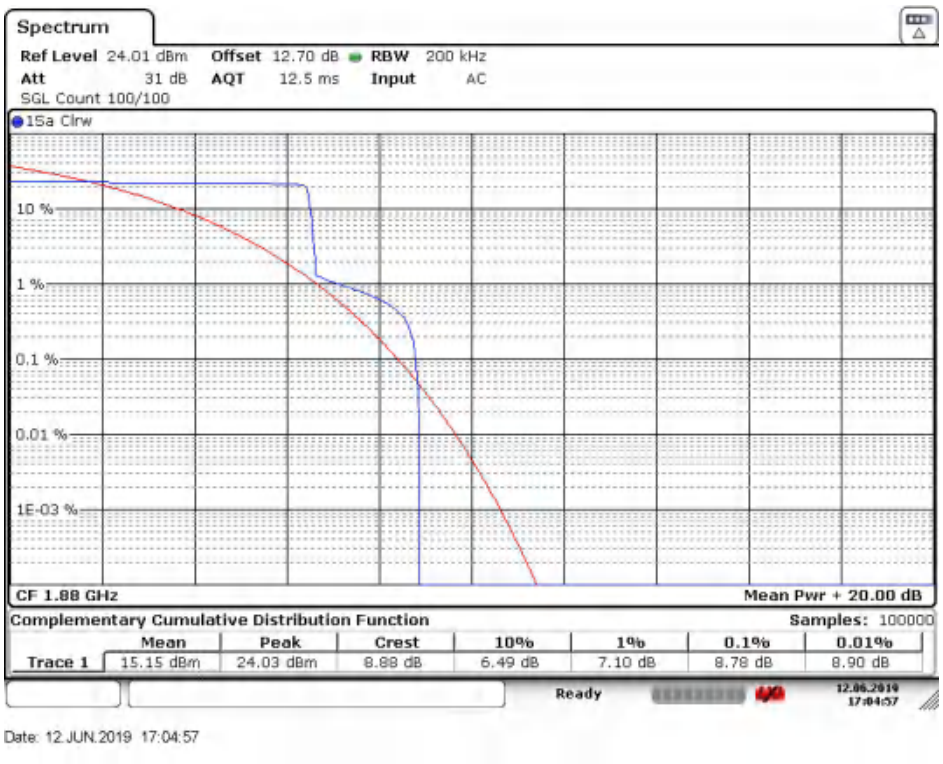
**Graphical for Peak to Average Ratio Results**



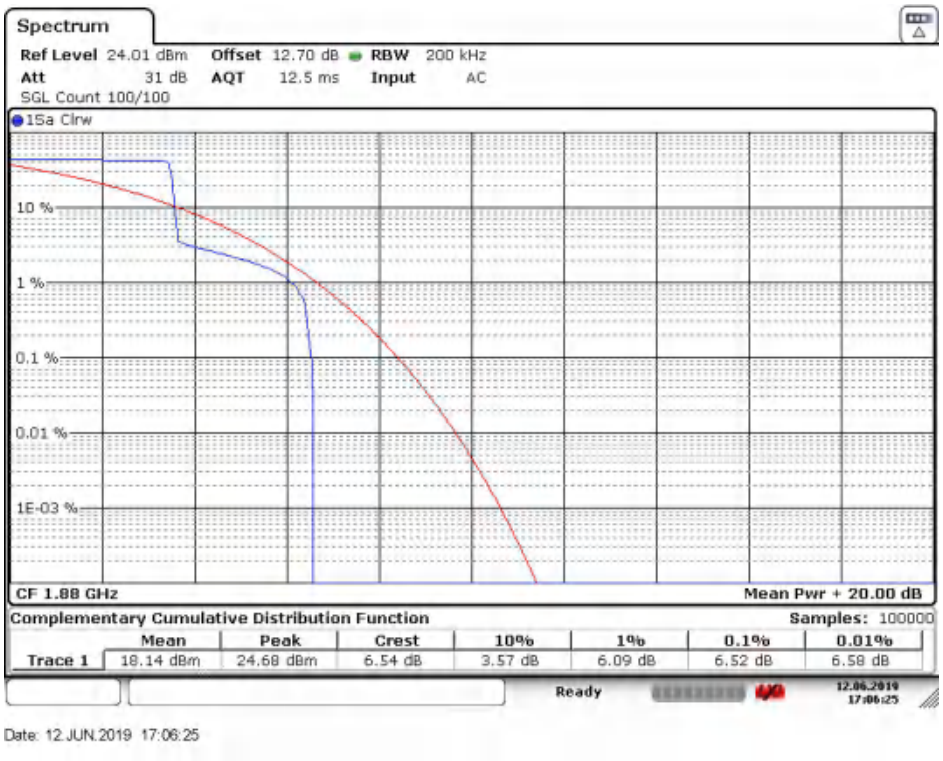

NB-IoT Band 2, Low Channel, BPSK, 1



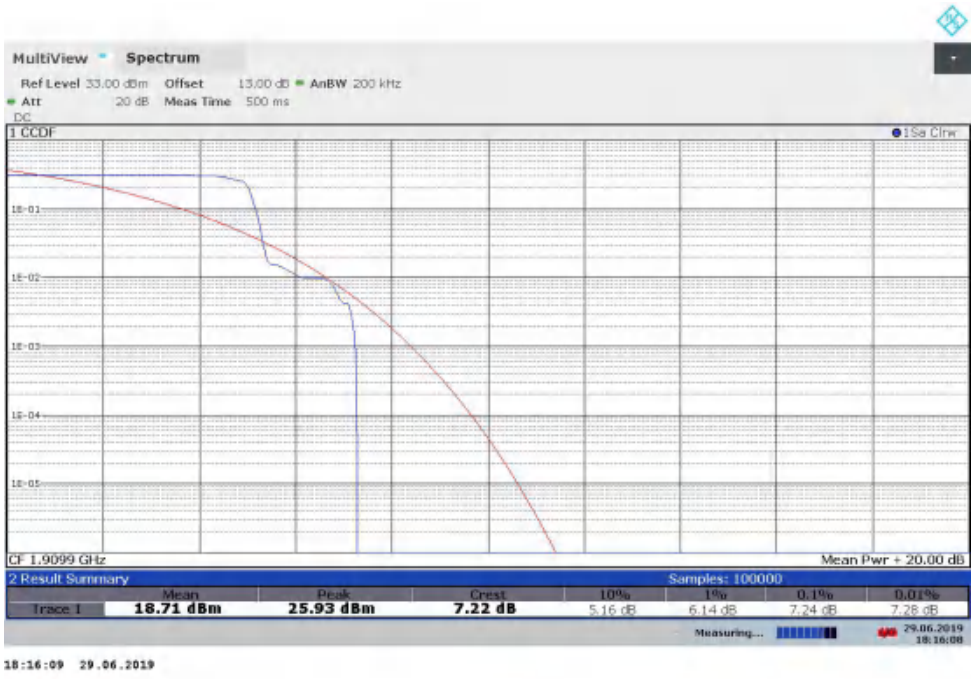

NB-IoT Band 2, Low Channel, QPSK, 1



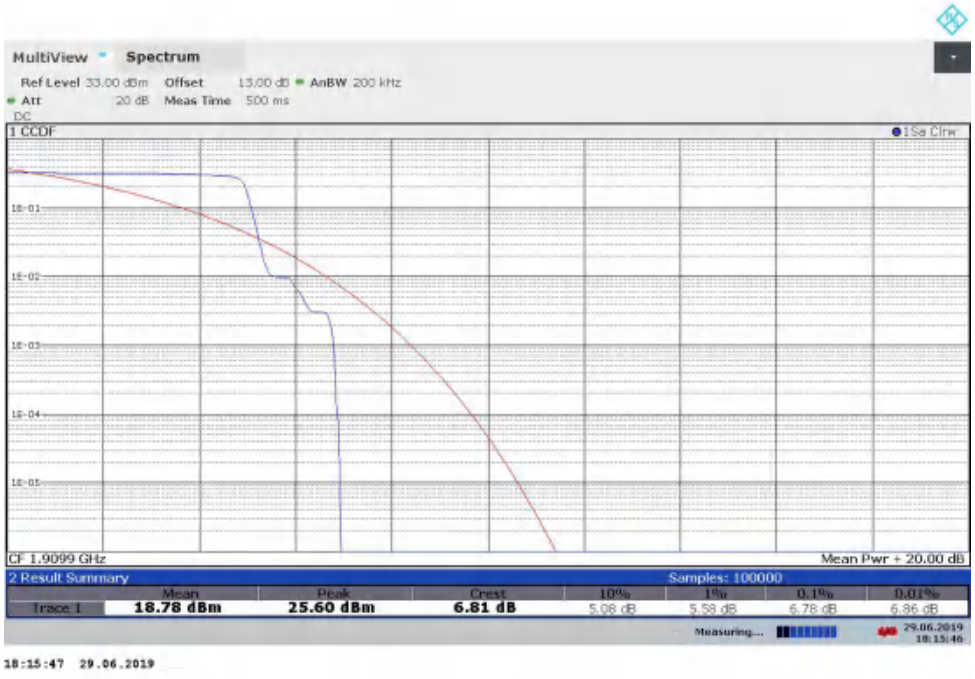

NB-IoT Band 2, Mid Channel, BPSK, 1




NB-IoT Band 2, Mid Channel, QPSK, 1

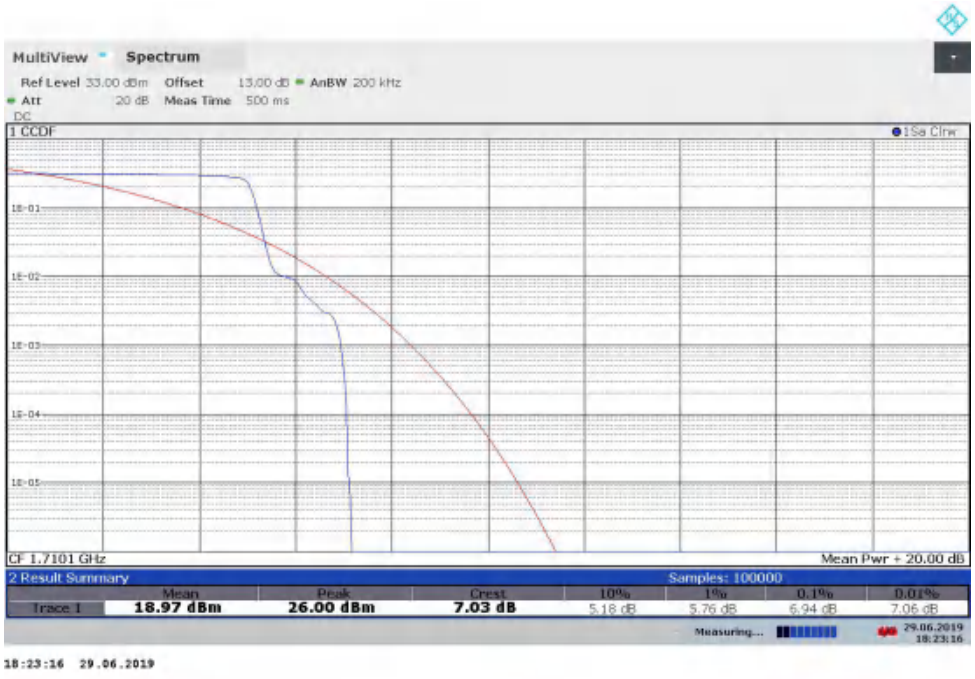



NB-IoT Band 2, High Channel, BPSK, 1

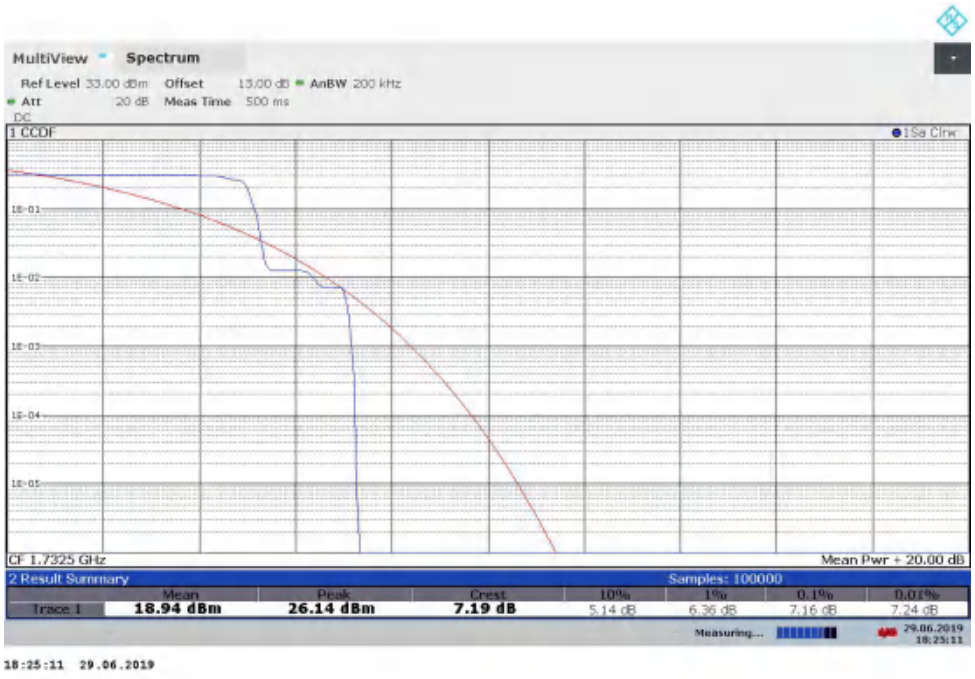



NB-IoT Band 2, High Channel, QPSK, 1

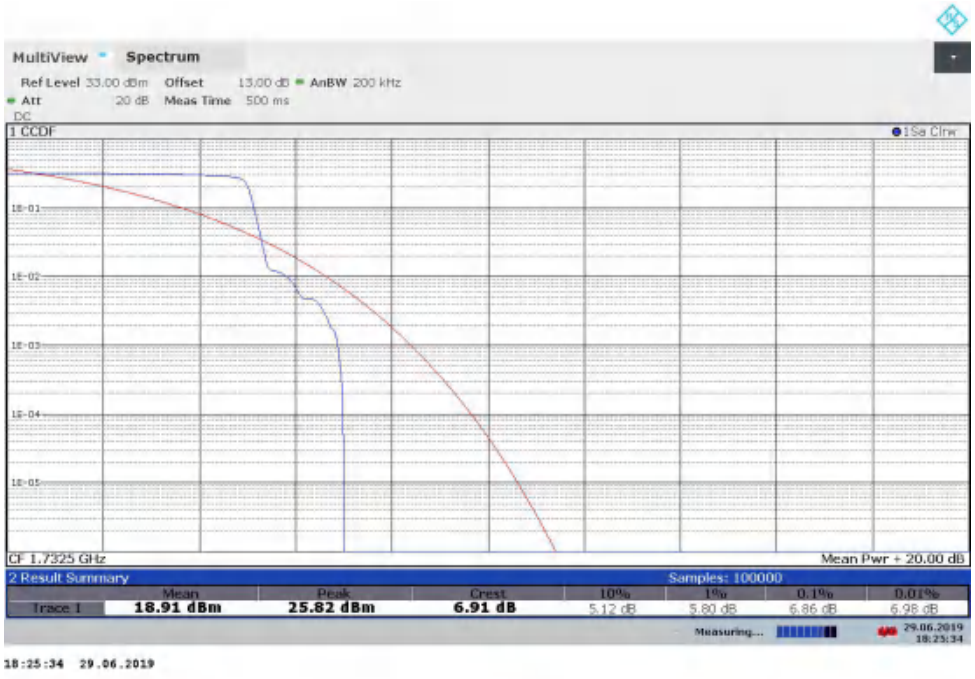

NB-IoT Band 4, Low Channel, BPSK, 1



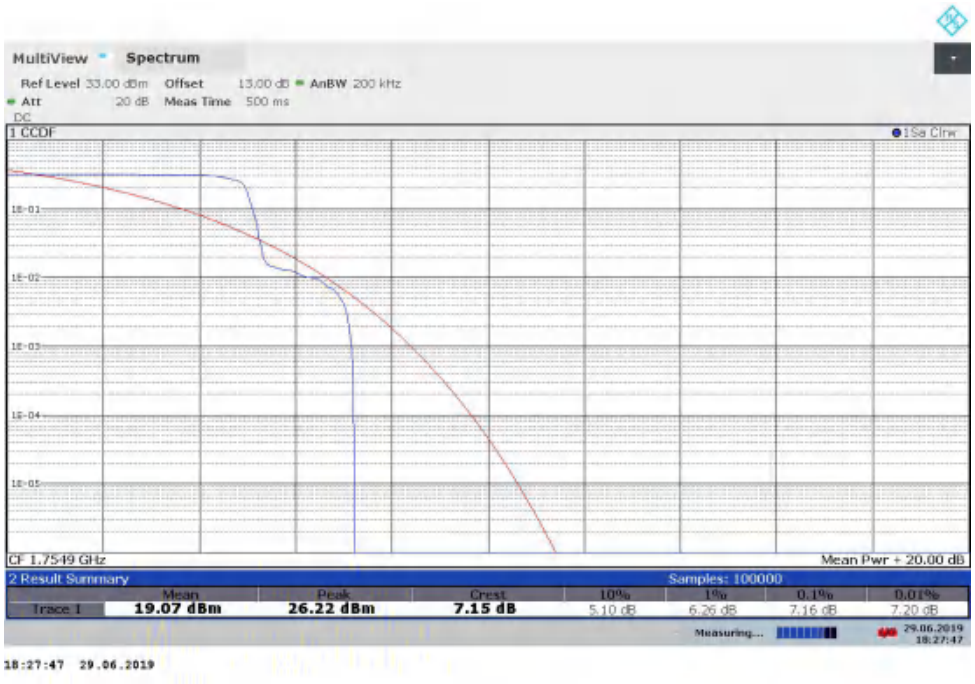

NB-IoT Band 4, Low Channel, QPSK, 1



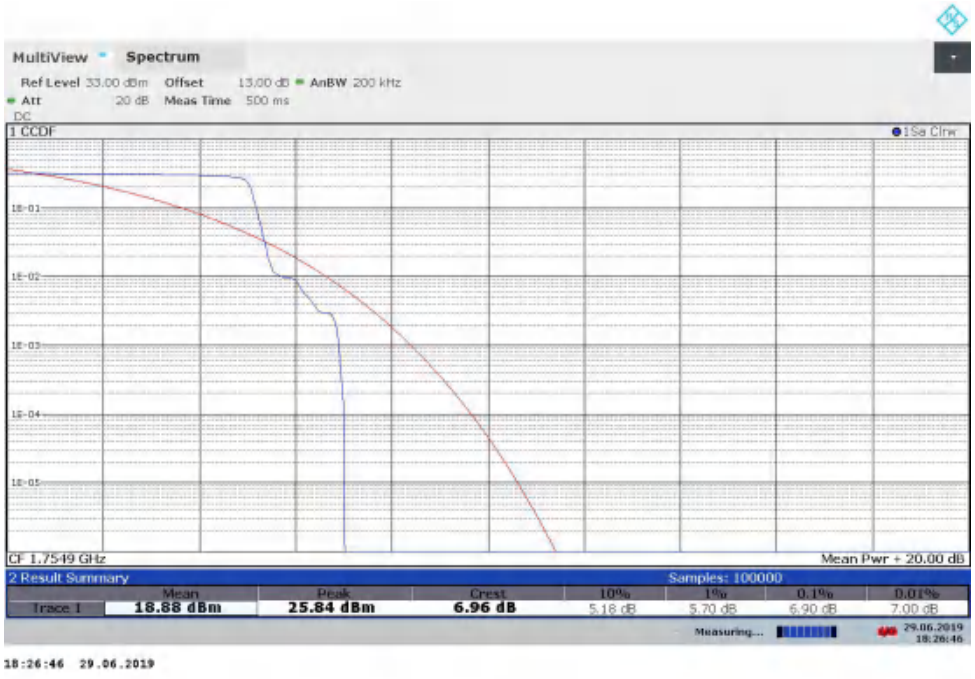

NB-IoT Band 4, Mid Channel, BPSK, 1



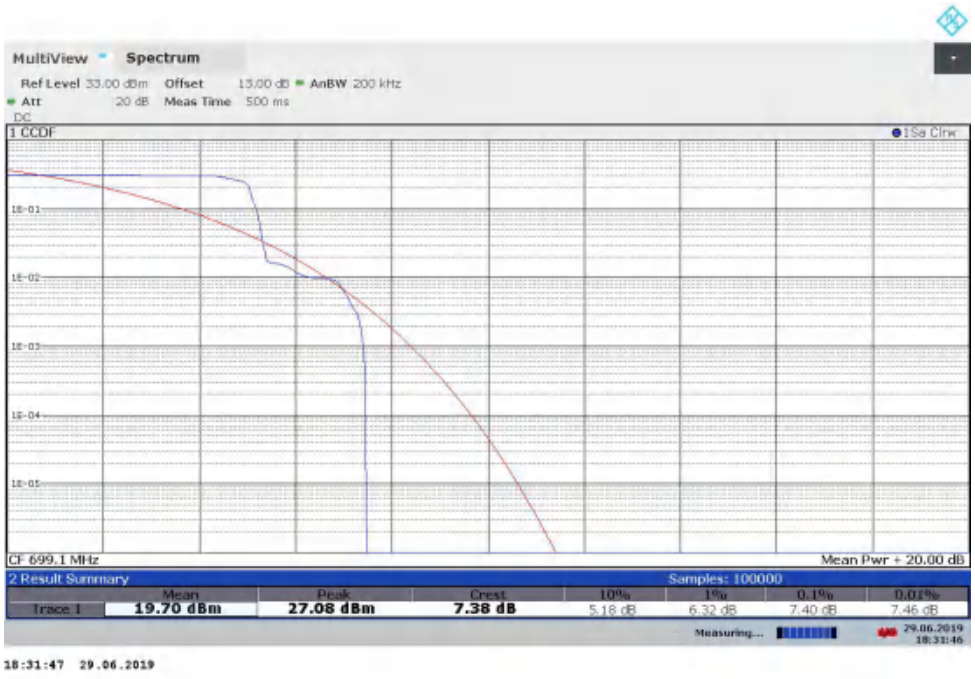

NB-IoT Band 4, Mid Channel, QPSK, 1



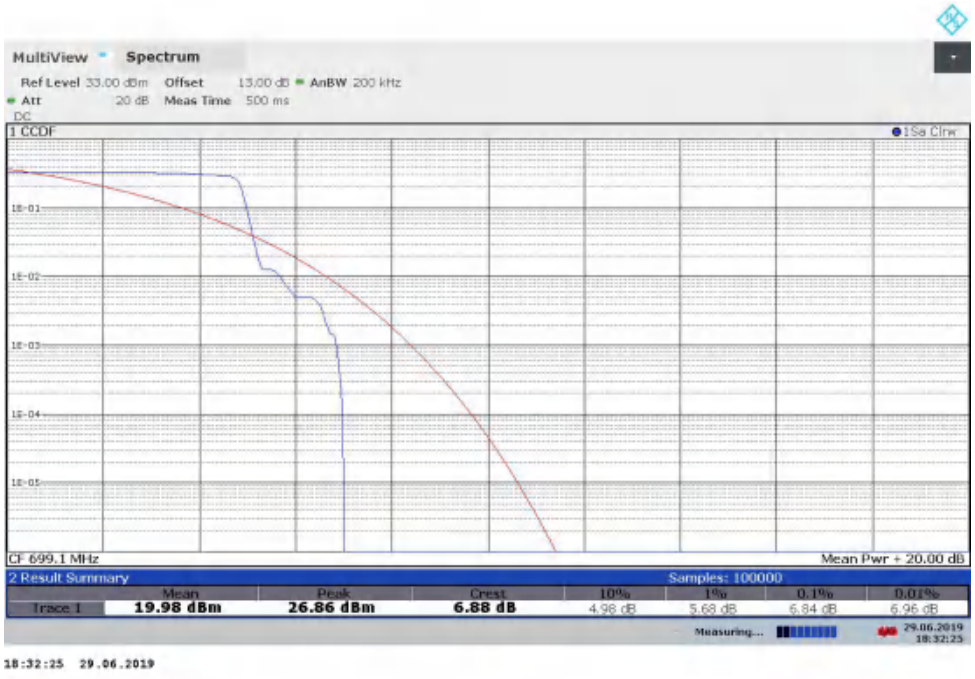

NB-IoT Band 4, High Channel, BPSK, 1



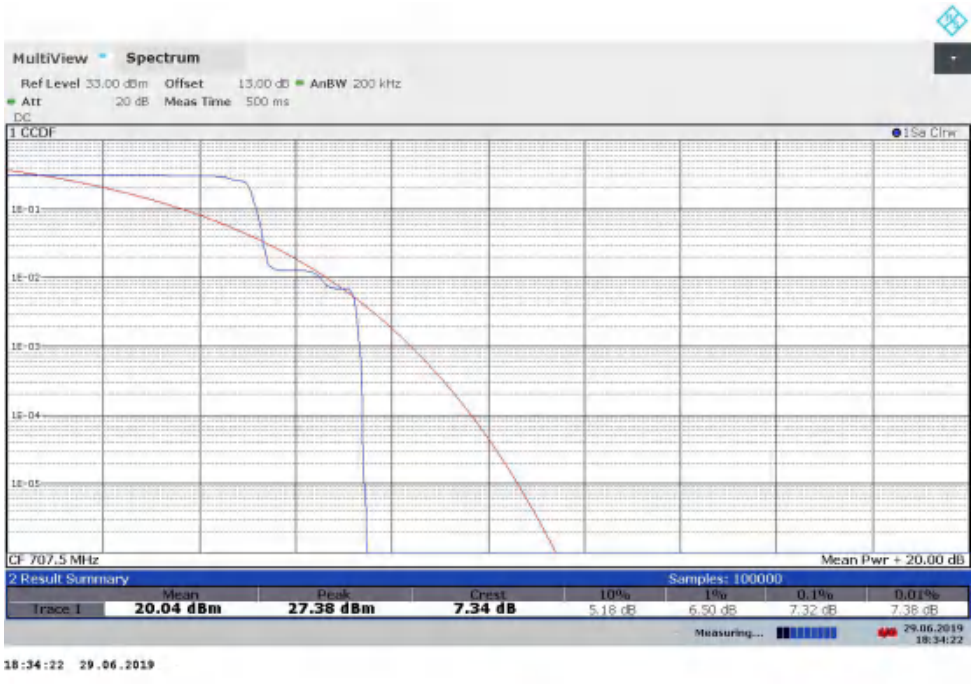

NB-IoT Band 4, High Channel, QPSK, 1



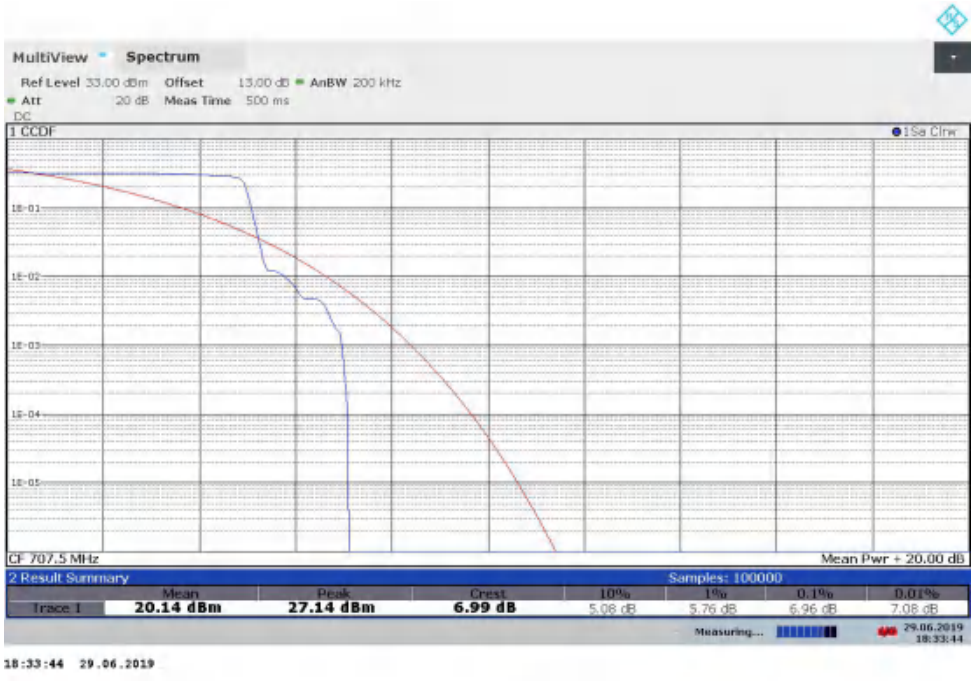

NB-IoT Band 12, Low Channel, BPSK, 1



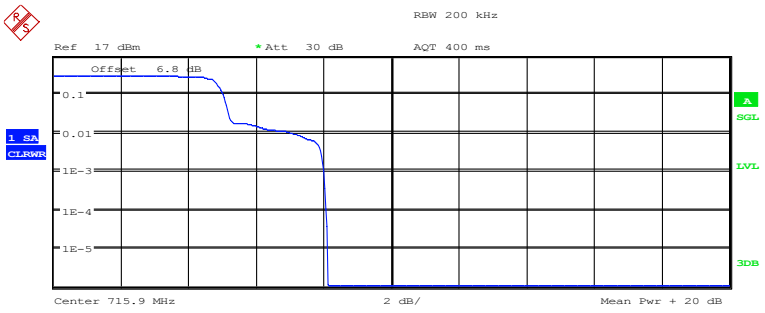

NB-IoT Band 12, Low Channel, QPSK, 1




NB-IoT Band 12, Mid Channel, BPSK, 1




NB-IoT Band 12, Mid Channel, QPSK, 1




Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 204kHz

| | Trace 1 |
|---|---|
| Mean | -10.10 dBm |
| Peak | -1.99 dBm |
| Crest | 8.11 dB |
| 10 % | 5.03 dB |
| 1 % | 7.05 dB |
| .1 % | 8.01 dB |
| .01 % | 8.08 dB |

Date: 2.JAN.2020 04:31:50

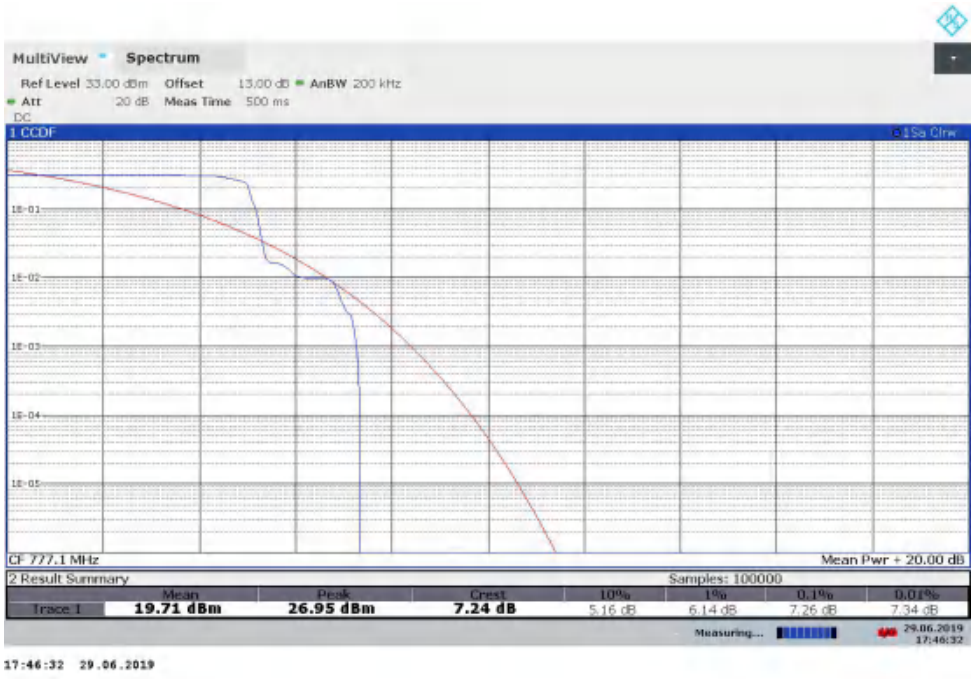
NB-IoT Band 12, High Channel, BPSK, 1


Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 204kHz

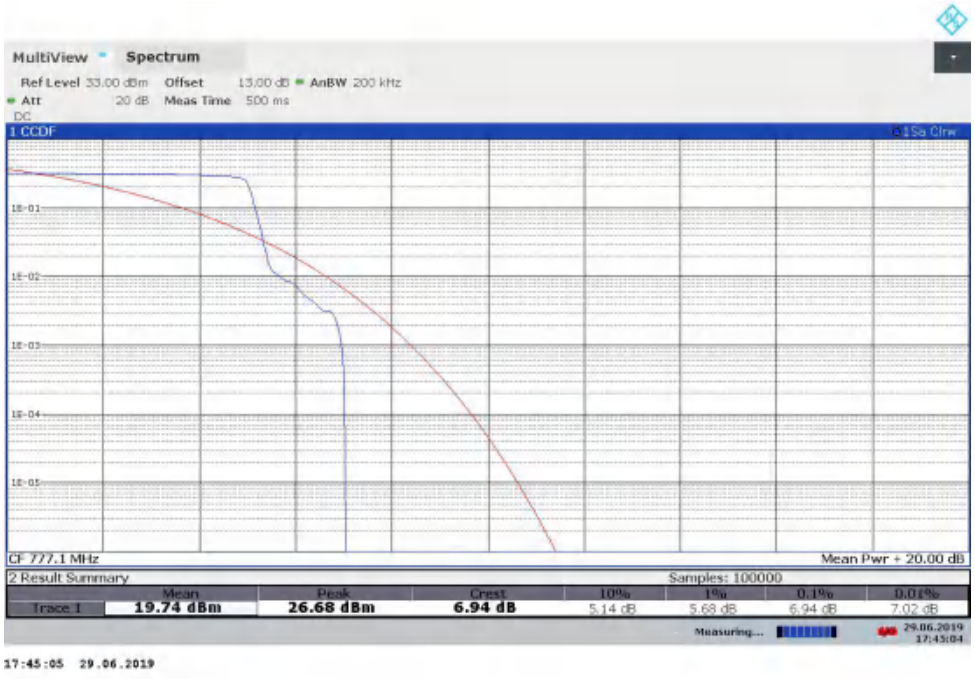
| | Trace 1 |
|---|---|
| Mean | -10.21 dBm |
| Peak | -2.62 dBm |
| Crest | 7.59 dB |
| 10 % | 5.13 dB |
| 1 % | 6.63 dB |
| .1 % | 7.44 dB |
| .01 % | 7.53 dB |

Date: 2.JAN.2020 04:32:16

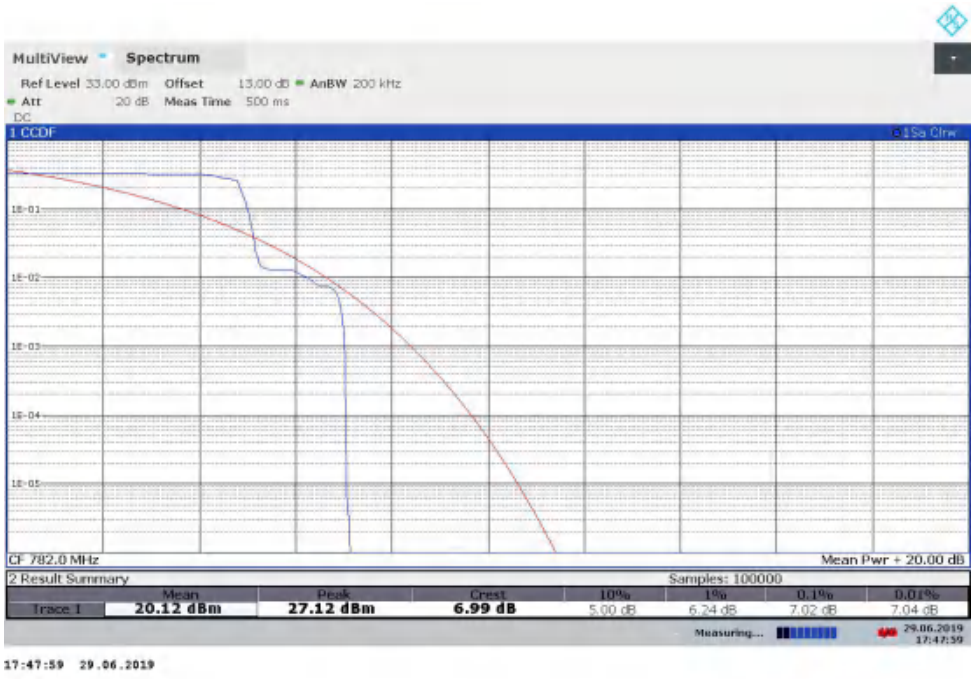
NB-IoT Band 12, High Channel, QPSK, 1



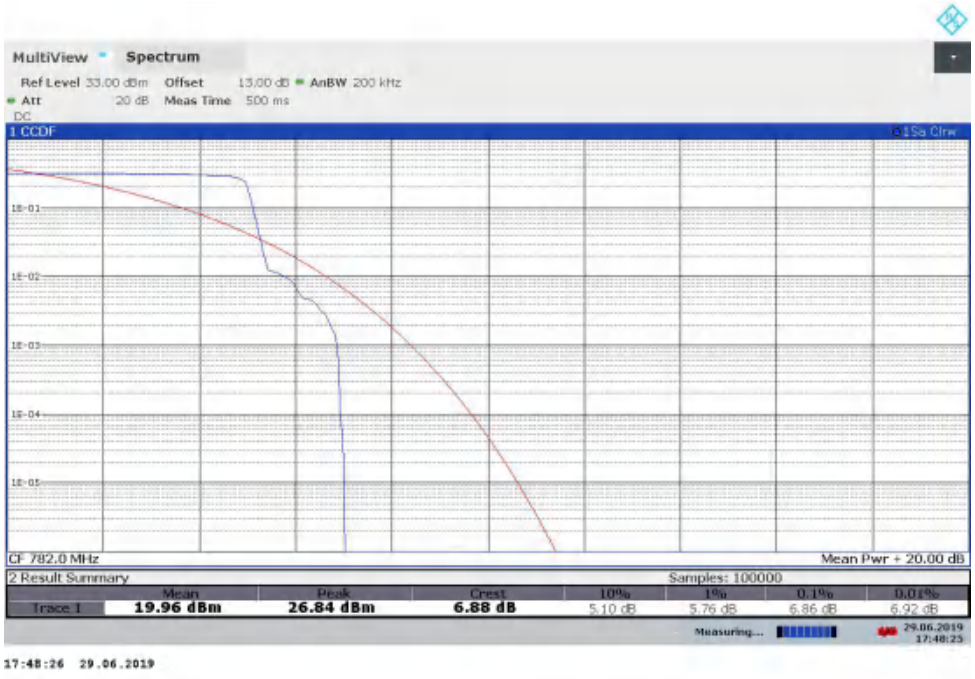

NB-IoT Band 13, Low Channel, BPSK, 1



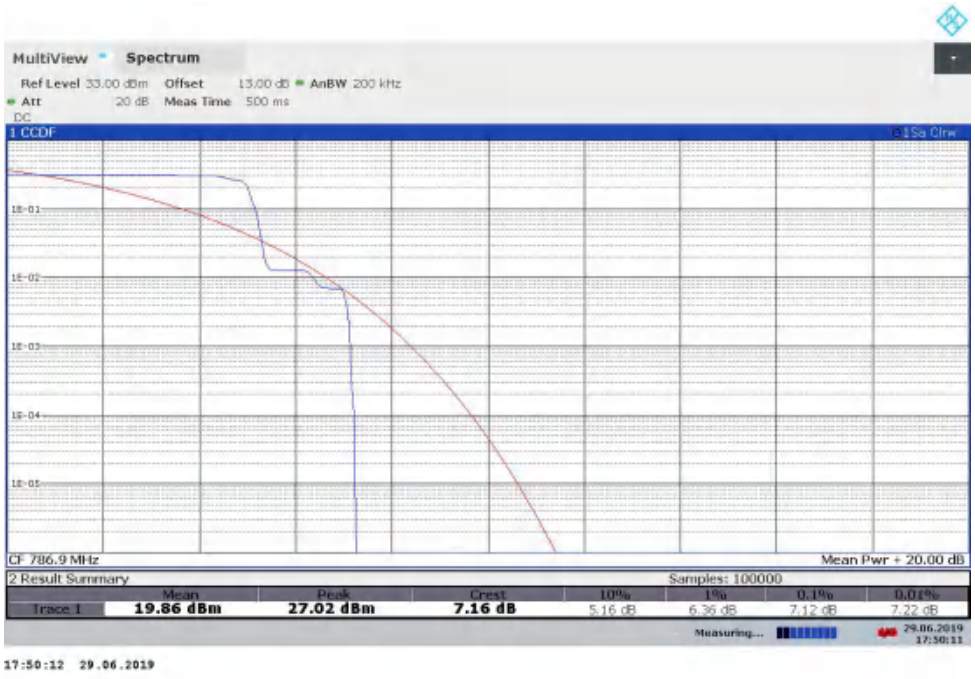

NB-IoT Band 13, Low Channel, QPSK, 1



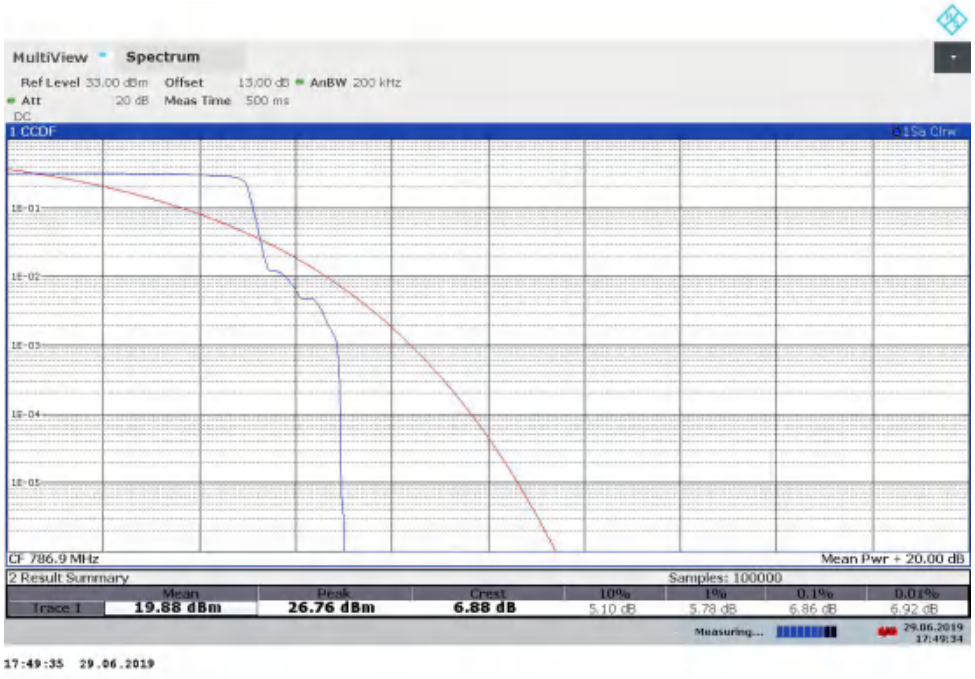

NB-IoT Band 13, Mid Channel, BPSK, 1



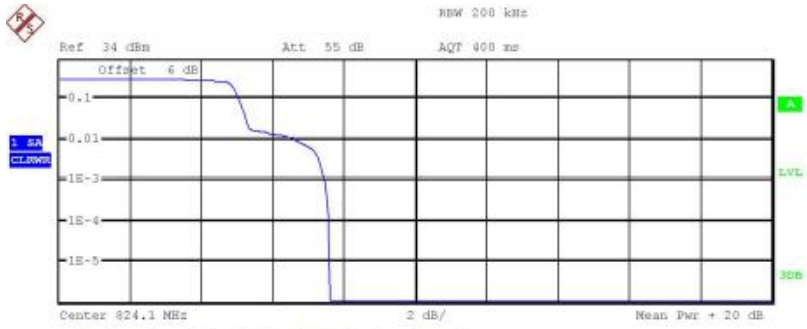

NB-IoT Band 13, Mid Channel, QPSK, 1




NB-IoT Band 13, High Channel, BPSK, 1




NB-IoT Band 13, High Channel, QPSK, 1

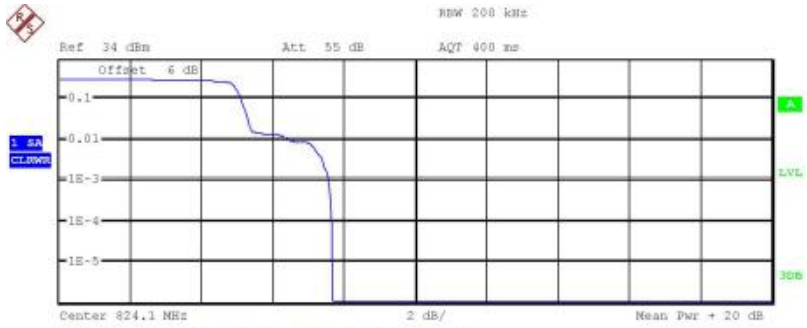



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 204kHz

| | Trace 1 |
|---|---|
| Mean | 18.57 dBm |
| Peak | 26.15 dBm |
| Crest | 7.59 dB |
| 10 % | 5.06 dB |
| 1 % | 6.63 dB |
| .1 % | 7.47 dB |
| .01 % | 7.56 dB |

Date: 19.AUG.2019 16:56:11

NB-IoT Band 26, Low Channel, BPSK, 1

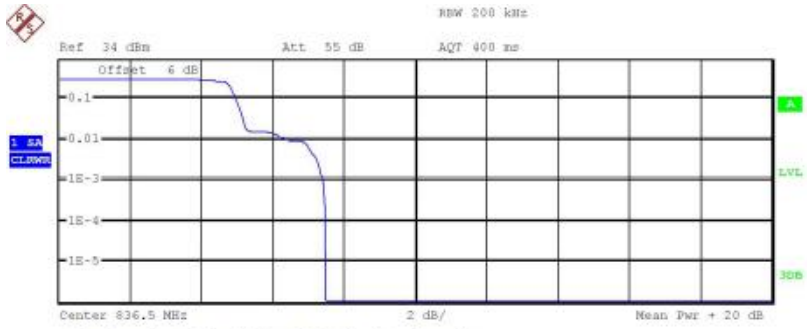



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 204kHz

| | Trace 1 |
|---|---|
| Mean | 18.49 dBm |
| Peak | 26.15 dBm |
| Crest | 7.66 dB |
| 10 % | 5.13 dB |
| 1 % | 6.47 dB |
| .1 % | 7.56 dB |
| .01 % | 7.66 dB |

Date: 19.AUG.2019 16:56:26

NB-IoT Band 26, Low Channel, QPSK, 1

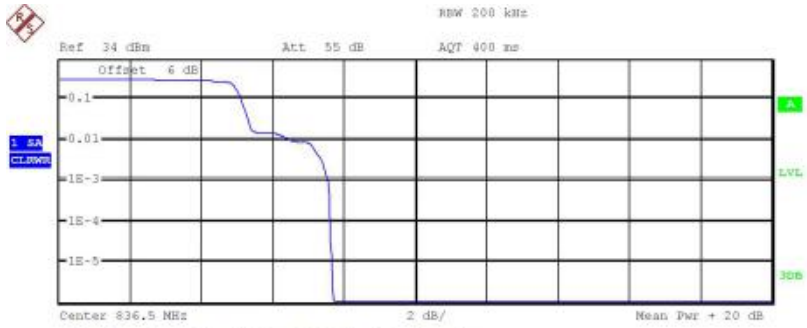



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 204kHz

| | Trace 1 |
|---|---|
| Mean | 18.61 dBm |
| Peak | 26.08 dBm |
| Crest | 7.47 dB |
| 10 % | 4.97 dB |
| 1 % | 6.44 dB |
| .1 % | 7.40 dB |
| .01 % | 7.50 dB |

Date: 19.AUG.2019 16:57:36

NB-IoT Band 26, Mid Channel, BPSK, 1

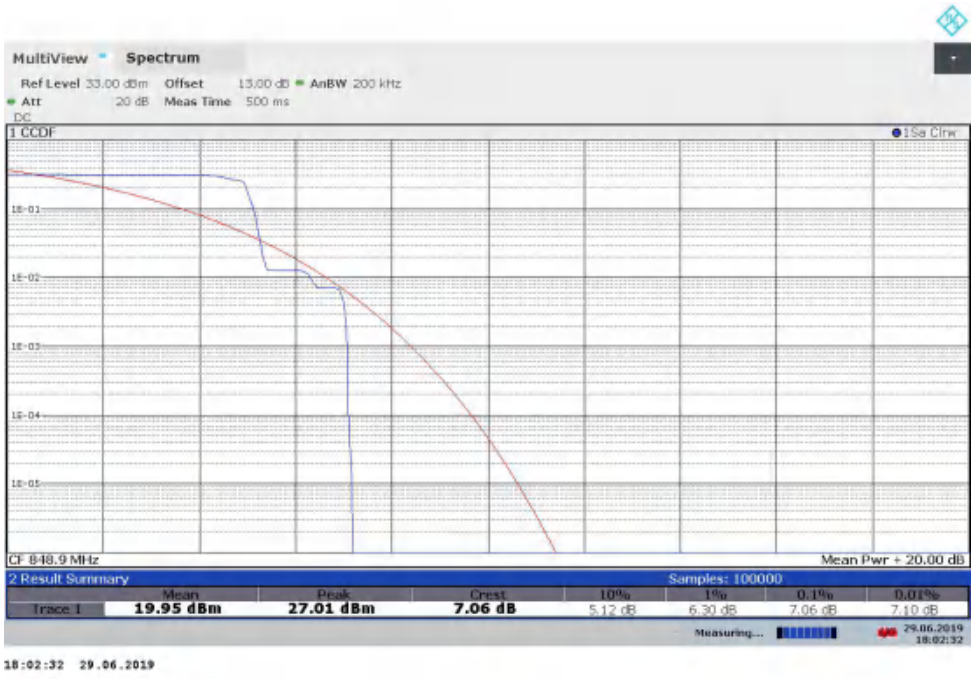



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 204kHz

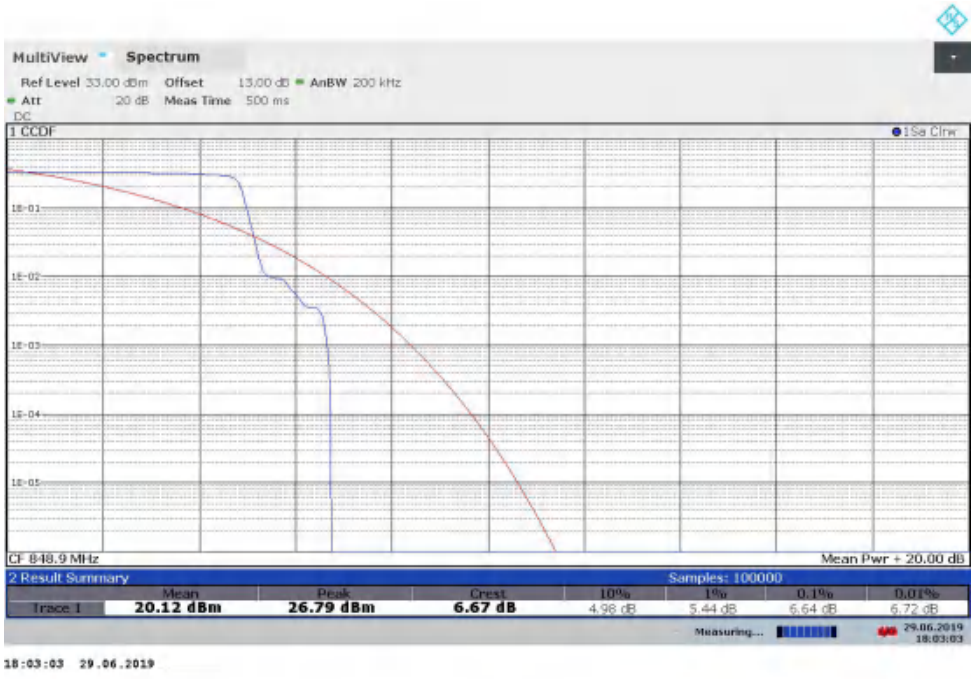
| | Trace 1 |
|---|---|
| Mean | 18.47 dBm |
| Peak | 26.15 dBm |
| Crest | 7.68 dB |
| 10 % | 5.10 dB |
| 1 % | 6.47 dB |
| .1 % | 7.56 dB |
| .01 % | 7.63 dB |

Date: 19.AUG.2019 16:57:24

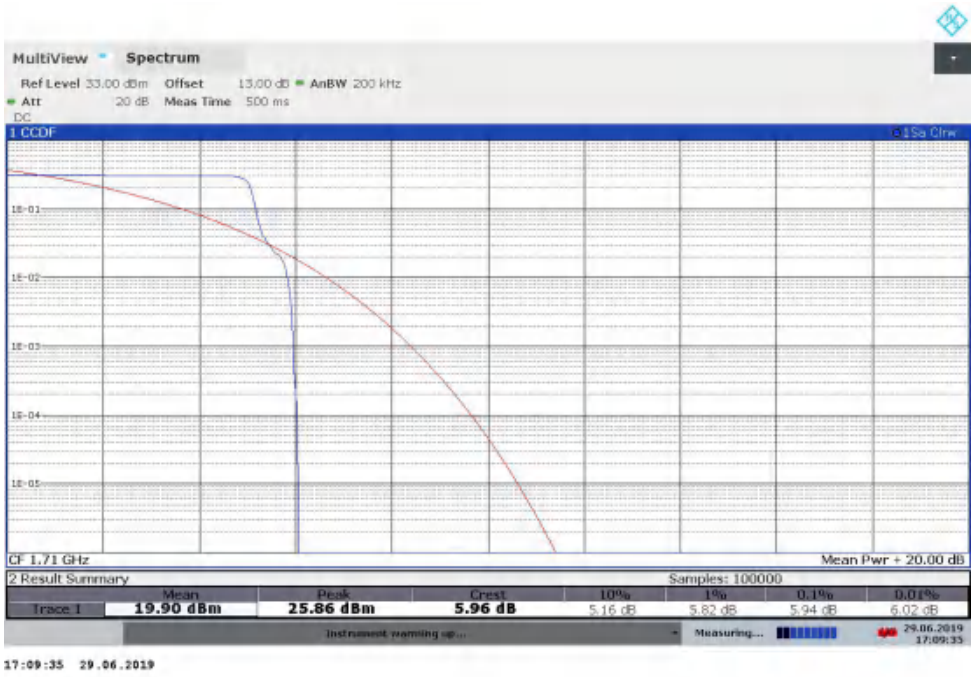
NB-IoT Band 26, Mid Channel, QPSK, 1




NB-IoT Band 26, High Channel, BPSK, 1




NB-IoT Band 26, High Channel, QPSK, 1




NB-IoT Band 66, Low Channel, BPSK, 1

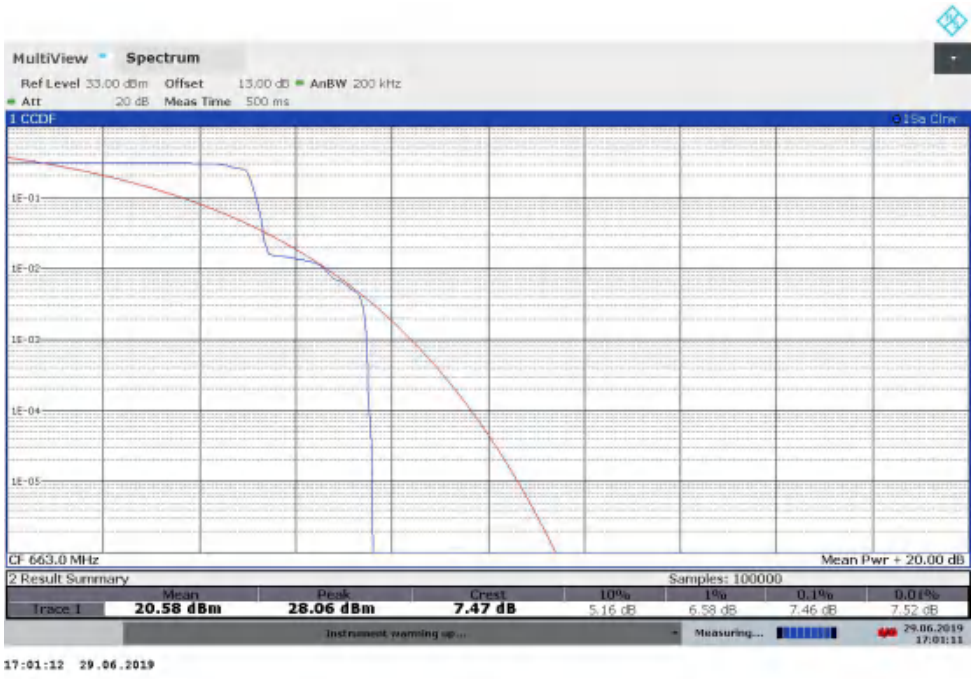

NB-IoT Band 66, Low Channel, QPSK, 1


NB-IoT Band 66, Mid Channel, BPSK, 1

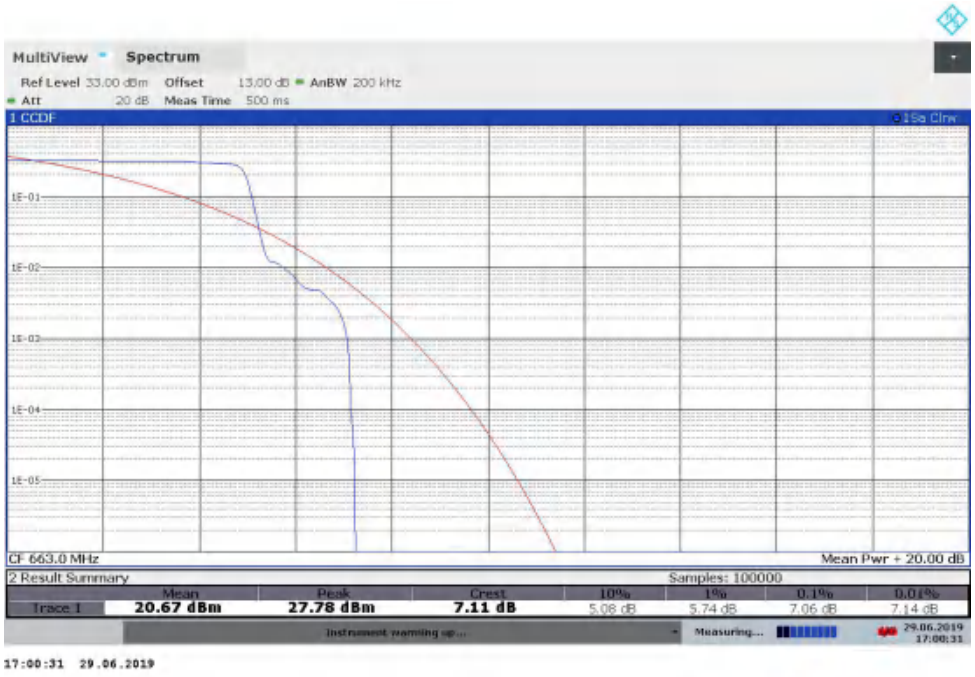

NB-IoT Band 66, Mid Channel, QPSK, 1


NB-IoT Band 66, High Channel, BPSK, 1

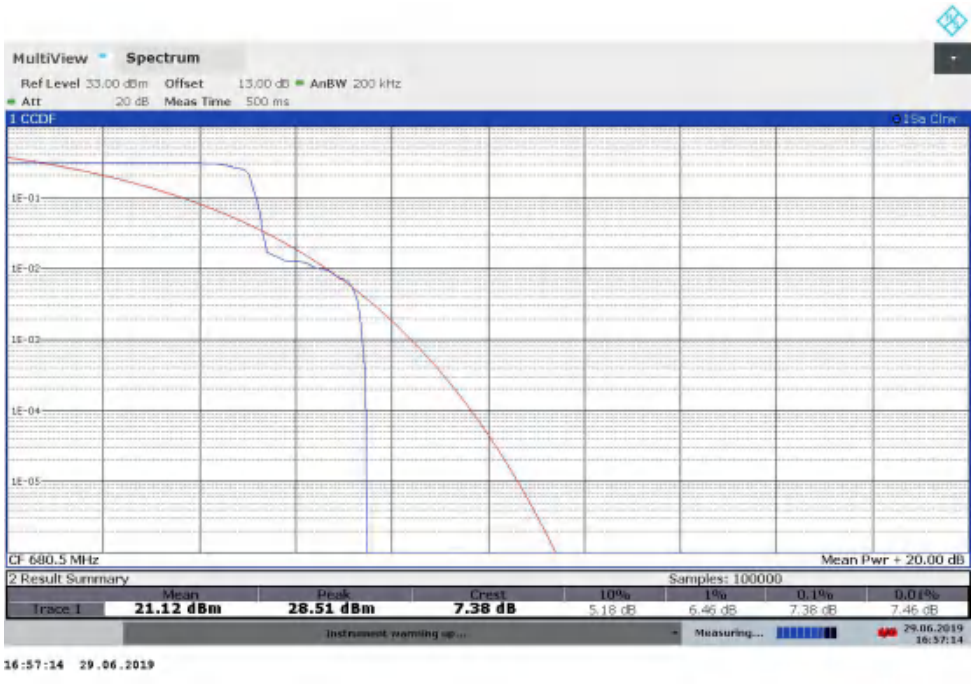

NB-IoT Band 66, High Channel, QPSK, 1



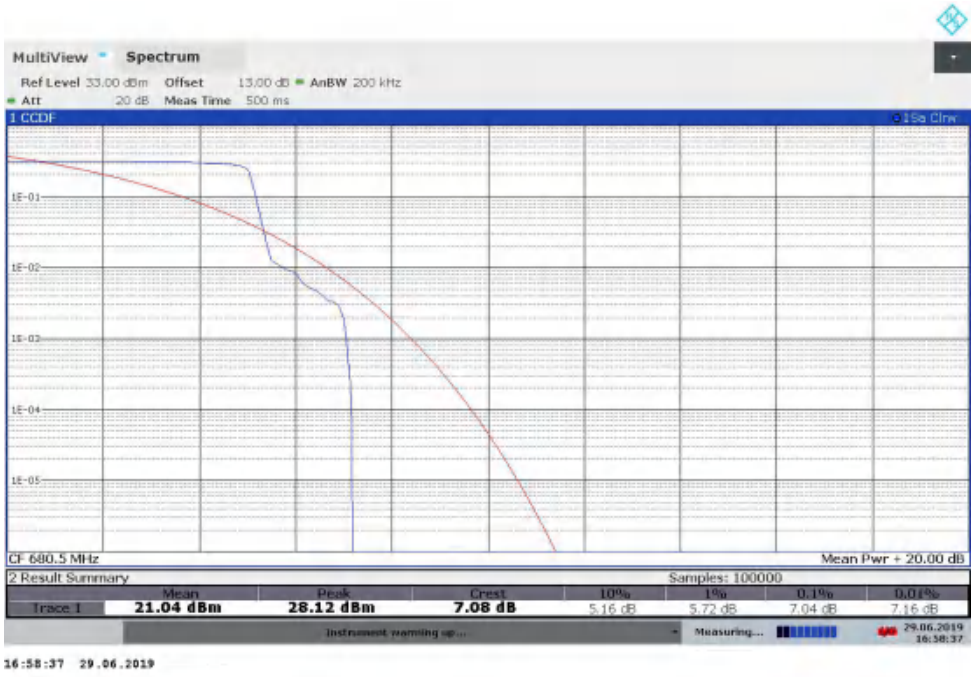

NB-IoT Band 71, Low Channel, BPSK, 1



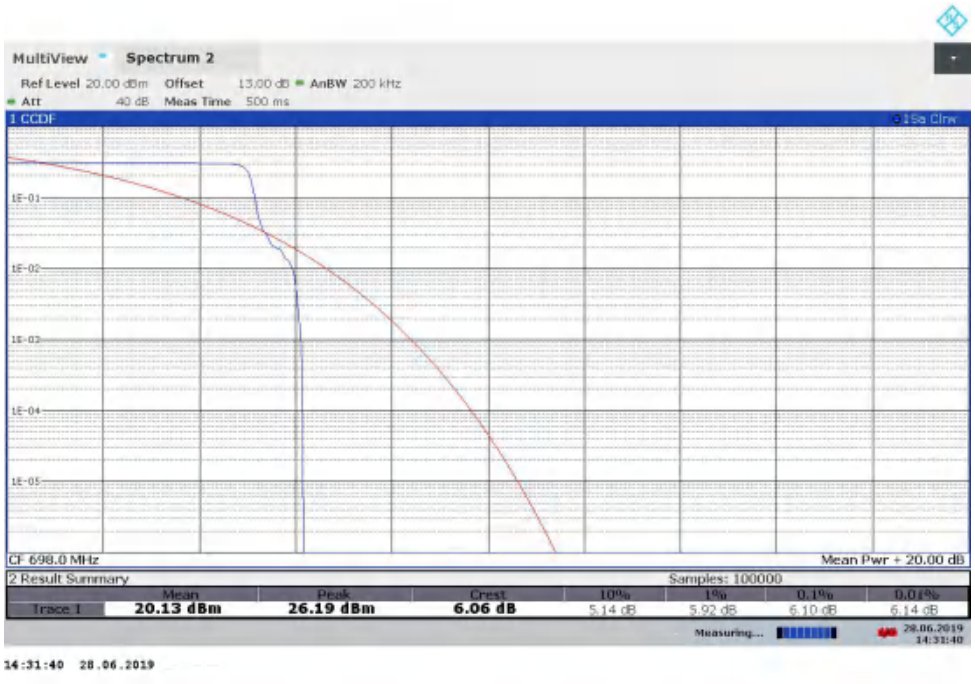

NB-IoT Band 71, Low Channel, QPSK, 1




NB-IoT Band 71, Mid Channel, BPSK, 1




NB-IoT Band 71, Mid Channel, QPSK, 1




NB-IoT Band 71, High Channel, BPSK, 1


NB-IoT Band 71, High Channel, QPSK, 1

## 5.9 ERP and EIRP

| | |
|---|---|
| **Specifications:** | FCC Part 2.1046, 22.913(a),24.232(c), 27.50 |
| **DUT Serial Number:** | 868334032569323 |
| **Test conditions:** | Ambient Temperature:15℃-35℃<br>Relative Humidity:30%-60%<br>Air pressure: 86-106kPa |
| **Test Results:** | Pass |

### Limit Level Construction:

This is the test for the maximum radiated power from the EUT.

**According to Part 24.232(c)**,"Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power"and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

**According to Part 27.50(d),** “Fixed, mobile, and portable (handheld) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP”.

**According to Part 27.50(h)(2)** “Mobile stations are limited to 2.0 watts EIRP.”.

**According to Part 27.50(c)**, specifies “Portable stations (hand-held de-vices) are limited to 3 watts ERP.”.

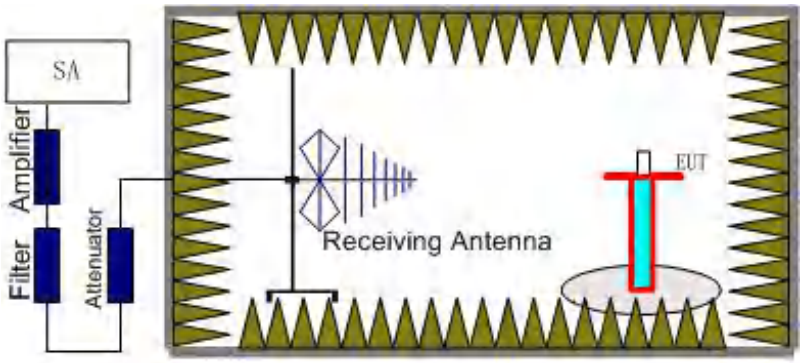
**Measurement Uncertainty:**

| Item | Uncertainty |
|---|---|
| Expanded Uncertainty | 5.15 dB (k=2) |

**Method of Measurement**

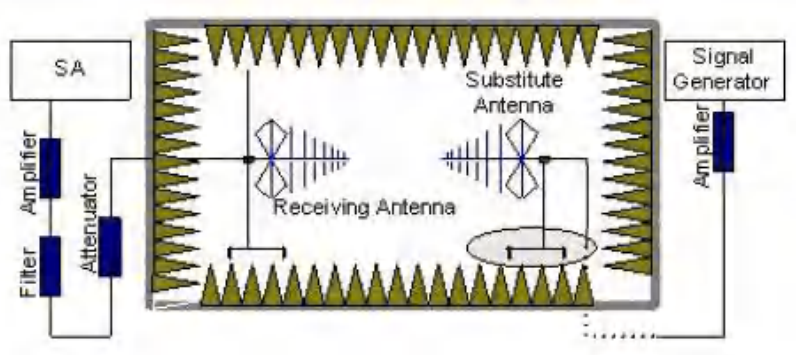
The measurements procedures in TIA-603E-2016 are used.

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from thereceive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUTfor emission measurements. The height of receiving antenna is 1.5m. The test setup refers tofigure below. Detected emissions were maximized at each frequency by rotating the EUTthrough 360° and adjusting the receiving antenna polarization. The radiated emissionmeasurements of all transmit frequencies in three channels (High, Middle, Low) weremeasured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level duringthe test. And the maximum value of the receiver should be recorded as (Pr).

3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.




In the chamber, an substitution antenna for the frequency band of interest is placed at thereference point of the chamber. An RF Signal source for the frequency band of interest isconnected to the substitution antenna with a cable that has been constructed to not interferewith the radiation pattern of the antenna. A power (PMea) is applied to the input of thesubstitution antenna, and adjust the level of the signal generator output until the value of thereceiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. Thetest should be performed by rotating the test item and adjusting the receiving antennapolarization.

4. A amplifier should be connected to the Signal Source output port. And the cable should beconnect between the Amplifier and the Substitution Antenna.

The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should berecorded after test.

The measurement results are obtained as described below:

Power(EIRP)=PMea+ PAg- Pcl+ Ga

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dBi) and known input power.

6. ERP can be calculated from EIRP by subtracting the gain of the dipole,

**ERP=S.G output(dBM)-cable loss (dB) + antenna gain (dBd)**

**EIRP=S.G output(dBM)-cable loss (dB) + antenna gain (dBi)**

**Note:** The EUT working in Sub-carrier Spacing 3.75 kHz, one tone mode is the worst mode, only worst mode test result is given below.

### 5.9.1 NB-IoT Band 2 EIRP

**NB-IoT standalone Test frequencies for operating band 2 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | EIRP (Pd) [dBm] |
|---|---|---|---|---|
| 1850. | 20.03 | 5.0 | 7.7 | 22.73 |
| 1880.0 | 20.18 | 5.0 | 7.2 | 22.38 |
| 1909.9 | 20.28 | 5.1 | 6.8 | 21.98 |

**NB-IoT In-band Test frequencies for operating band 2 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | EIRP (Pd) [dBm] |
|---|---|---|---|---|
| 1850.1 | 19.97 | 5.0 | 7.7 | 22.67 |
| 1880.0 | 20.38 | 5.0 | 7.2 | 22.58 |
| 1909.9 | 20.46 | 5.1 | 6.8 | 22.16 |

**NB-IoT Guard-band Test frequencies for operating band 2 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | EIRP (Pd) [dBm] |
|---|---|---|---|---|
| 1850.1 | 19.84 | 5.0 | 7.7 | 22.54 |
| 1880.0 | 19.02 | 5.0 | 7.2 | 21.22 |
| 1909.9 | 19.45 | 5.1 | 6.8 | 21.15 |

**NB-IoT standalone Test frequencies for operating band 2 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | EIRP (Pd) [dBm] |
|---|---|---|---|---|
| 1850.1 | 19.44 | 5.0 | 7.7 | 22.14 |
| 1880.0 | 20.38 | 5.0 | 7.2 | 22.58 |
| 1909.9 | 20.17 | 5.1 | 6.8 | 21.87 |

**NB-IoT In-band Test frequencies for operating band 2 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | EIRP (Pd) [dBm] |
|---|---|---|---|---|
| 1850.1 | 19.75 | 5.0 | 7.7 | 22.45 |
| 1880.0 | 19.98 | 5.0 | 7.2 | 22.18 |
| 1909.9 | 20.71 | 5.1 | 6.8 | 22.41 |

**NB-IoT Guard-band Test frequencies for operating band 2 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | EIRP (Pd) [dBm] |
|---|---|---|---|---|
| 1850.1 | 20.02 | 5.0 | 7.7 | 22.72 |
| 1880.0 | 19.74 | 5.0 | 7.2 | 21.94 |
| 1909.9 | 20.36 | 5.1 | 6.8 | 22.06 |

### 5.9.2 NB-IoT Band 4 EIRP

**NB-IoT standalone Test frequencies for operating band 4 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | EIRP (Pd) [dBm] |
|---|---|---|---|---|
| 1710.1 | 18.87 | 4.8 | 8.0 | 22.07 |
| 1732.5 | 18.87 | 4.9 | 7.9 | 21.87 |
| 1754.9 | 18.53 | 4.9 | 8.1 | 21.73 |

**NB-IoT In-band Test frequencies for operating band 4 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | EIRP (Pd) [dBm] |
|---|---|---|---|---|
| 1710.1 | 18.16 | 4.8 | 8.0 | 21.36 |
| 1732.5 | 18.47 | 4.9 | 7.9 | 21.47 |
| 1754.9 | 18.60 | 4.9 | 8.1 | 21.80 |

**NB-IoT Guard-band Test frequencies for operating band 4 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | EIRP (Pd) [dBm] |
|---|---|---|---|---|
| 1710.1 | 18.53 | 4.8 | 8.0 | 21.73 |
| 1732.5 | 18.61 | 4.9 | 7.9 | 21.61 |
| 1754.9 | 18.18 | 4.9 | 8.1 | 21.38 |

**NB-IoT standalone Test frequencies for operating band 4 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | EIRP (Pd) [dBm] |
|---|---|---|---|---|
| 1710.1 | 18.26 | 4.8 | 8.0 | 21.46 |
| 1732.5 | 18.49 | 4.9 | 7.9 | 21.49 |
| 1754.9 | 18.62 | 4.9 | 8.1 | 21.82 |

**NB-IoT In-band Test frequencies for operating band 4 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | EIRP (Pd) [dBm] |
|---|---|---|---|---|
| 1710.1 | 18.42 | 4.8 | 8.0 | 21.52 |
| 1732.5 | 18.58 | 4.9 | 7.9 | 21.68 |
| 1754.9 | 18.16 | 4.9 | 8.1 | 21.66 |

**NB-IoT Guard-band Test frequencies for operating band 4 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | EIRP (Pd) [dBm] |
|---|---|---|---|---|
| 1710.1 | 18.57 | 4.8 | 8.0 | 21.77 |
| 1732.5 | 18.27 | 4.9 | 7.9 | 21.27 |
| 1754.9 | 18.33 | 4.9 | 8.1 | 21.53 |

### 5.9.3 NB-IoT Band 12 ERP

**NB-IoT standalone Test frequencies for operating band 12 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 699.1 | 16.51 | 3.1 | 8.9 | 22.31 |
| 707.5 | 16.18 | 3.1 | 9.1 | 22.18 |
| 715.9 | 15.89 | 3.1 | 9.1 | -13.89 |

**NB-IoT In-band Test frequencies for operating band 12 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 699.1 | 16.36 | 3.1 | 8.9 | 22.16 |
| 707.5 | 16.20 | 3.1 | 9.1 | 22.20 |
| 715.9 | 15.59 | 3.1 | 9.1 | -13.81 |

**NB-IoT Guard-band Test frequencies for operating band 12 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 699.1 | 16.07 | 3.1 | 8.9 | 21.87 |
| 707.5 | 15.42 | 3.1 | 9.1 | 21.42 |
| 715.9 | 15.44 | 3.1 | 9.1 | -13.63 |

**NB-IoT standalone Test frequencies for operating band 12 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 699.1 | 15.41 | 3.1 | 8.9 | 21.21 |
| 707.5 | 15.50 | 3.1 | 9.1 | 21.50 |
| 715.9 | 15.03 | 3.1 | 9.1 | -14.72 |

**NB-IoT In-band Test frequencies for operating band 12 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 699.1 | 15.56 | 3.1 | 8.9 | 21.36 |
| 707.5 | 15.47 | 3.1 | 9.1 | 21.47 |
| 715.9 | 15.25 | 3.1 | 9.1 | -14.33 |

**NB-IoT Guard-band Test frequencies for operating band 12 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 699.1 | 15.75 | 3.1 | 8.9 | 21.55 |
| 707.5 | 15.38 | 3.1 | 9.1 | 21.38 |
| 715.9 | 14.85 | 3.1 | 9.1 | -14.39 |

### 5.9.4 NB-IoT Band 13 ERP

**NB-IoT standalone Test frequencies for operating band 13 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 777.1 | 17.08 | 3.3 | 8.1 | 21.88 |
| 782.0 | 17.38 | 3.3 | 8.1 | 22.18 |
| 786.9 | 16.62 | 3.3 | 8.0 | 21.32 |

**NB-IoT In-band Test frequencies for operating band 13 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 777.1 | 17.26 | 3.3 | 8.1 | 22.06 |
| 782.0 | 17.18 | 3.3 | 8.1 | 21.98 |
| 786.9 | 17.47 | 3.3 | 8.0 | 22.17 |

**NB-IoT Guard-band Test frequencies for operating band 13 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 777.1 | 17.34 | 3.3 | 8.1 | 22.14 |
| 782.0 | 17.56 | 3.3 | 8.1 | 22.36 |
| 786.9 | 17.47 | 3.3 | 8.0 | 22.17 |

**NB-IoT standalone Test frequencies for operating band 13 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 777.1 | 17.31 | 3.3 | 8.1 | 22.11 |
| 782.0 | 17.05 | 3.3 | 8.1 | 21.85 |
| 786.9 | 17.24 | 3.3 | 8.0 | 21.94 |

**NB-IoT In-band Test frequencies for operating band 13 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 777.1 | 17.08 | 3.3 | 8.1 | 21.88 |
| 782.0 | 16.99 | 3.3 | 8.1 | 21.79 |
| 786.9 | 17.35 | 3.3 | 8.0 | 22.05 |

**NB-IoT Guard-band Test frequencies for operating band 13 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 777.1 | 17.85 | 3.3 | 8.1 | 22.65 |
| 782.0 | 17.39 | 3.3 | 8.1 | 22.19 |
| 786.9 | 17.09 | 3.3 | 8.0 | 21.79 |

### 5.9.5 NB-IoT Band 26 ERP

**NB-IoT standalone Test frequencies for operating band 26 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 824.1 | 17.07 | 3.3 | 7.8 | 21.57 |
| 836.5 | 17.39 | 3.4 | 7.3 | 21.29 |
| 848.9 | 18.26 | 3.4 | 7.2 | 22.06 |

**NB-IoT In-band Test frequencies for operating band 26 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 824.1 | 16.89 | 3.3 | 7.8 | 21.39 |
| 836.5 | 17.92 | 3.4 | 7.3 | 21.82 |
| 848.9 | 17.62 | 3.4 | 7.2 | 21.42 |

**NB-IoT Guard-band Test frequencies for operating band 26 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 824.1 | 17.57 | 3.3 | 7.8 | 22.07 |
| 836.5 | 17.65 | 3.4 | 7.3 | 21.55 |
| 848.9 | 17.93 | 3.4 | 7.2 | 21.73 |

**NB-IoT standalone Test frequencies for operating band 26 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 824.1 | 17.28 | 3.3 | 7.8 | 21.78 |
| 836.5 | 17.72 | 3.4 | 7.3 | 21.62 |
| 848.9 | 17.89 | 3.4 | 7.2 | 21.69 |

**NB-IoT In-band Test frequencies for operating band 26 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 824.1 | 16.99 | 3.3 | 7.8 | 21.49 |
| 836.5 | 17.90 | 3.4 | 7.3 | 21.80 |
| 848.9 | 17.57 | 3.4 | 7.2 | 21.37 |

**NB-IoT Guard-band Test frequencies for operating band 26 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 824.1 | 17.29 | 3.3 | 7.8 | 21.79 |
| 836.5 | 18.11 | 3.4 | 7.3 | 22.01 |
| 848.9 | 17.82 | 3.4 | 7.2 | 21.62 |

### 5.9.6 NB-IoT Band 66 EIRP

**NB-IoT standalone Test frequencies for operating band 66 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | EIRP (Pd) [dBm] |
|---|---|---|---|---|
| 1710.1 | 18.31 | 4.8 | 8.0 | 21.51 |
| 1745.0 | 18.58 | 4.9 | 8.1 | 21.78 |
| 1779.9 | 17.62 | 4.9 | 8.8 | 21.52 |

**NB-IoT In-band Test frequencies for operating band 66 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | EIRP (Pd) [dBm] |
|---|---|---|---|---|
| 1710.1 | 18.19 | 4.8 | 8.0 | 21.39 |
| 1745.0 | 18.41 | 4.9 | 8.1 | 21.61 |
| 1779.9 | 17.97 | 4.9 | 8.8 | 21.87 |

**NB-IoT Guard-band Test frequencies for operating band 66 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | EIRP (Pd) [dBm] |
|---|---|---|---|---|
| 1710.1 | 18.28 | 4.8 | 8.0 | 21.48 |
| 1745.0 | 18.49 | 4.9 | 8.1 | 21.69 |
| 1779.9 | 17.43 | 4.9 | 8.8 | 21.33 |

**NB-IoT standalone Test frequencies for operating band 66 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | EIRP (Pd) [dBm] |
|---|---|---|---|---|
| 1710.1 | 18.38 | 4.8 | 8.0 | 21.58 |
| 1745.0 | 18.69 | 4.9 | 8.1 | 21.89 |
| 1779.9 | 17.91 | 4.9 | 8.8 | 21.81 |

**NB-IoT In-band Test frequencies for operating band 66 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | EIRP (Pd) [dBm] |
|---|---|---|---|---|
| 1710.1 | 18.53 | 4.8 | 8.0 | 21.73 |
| 1745.0 | 18.32 | 4.9 | 8.1 | 21.52 |
| 1779.9 | 18.20 | 4.9 | 8.8 | 22.10 |

**NB-IoT Guard-band Test frequencies for operating band 66 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | EIRP (Pd) [dBm] |
|---|---|---|---|---|
| 1710.1 | 18.36 | 4.8 | 8.0 | 21.56 |
| 1745.0 | 18.68 | 4.9 | 8.1 | 21.88 |
| 1779.9 | 17.49 | 4.9 | 8.8 | 21.39 |

### 5.9.7 NB-IoT Band 71 ERP

**NB-IoT standalone Test frequencies for operating band 71 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 663.1 | 16.69 | 3.0 | 7.9 | 21.59 |
| 680.5 | 16.49 | 3.1 | 8.5 | 21.89 |
| 697.9 | 15.51 | 3.1 | 8.9 | 21.31 |

**NB-IoT In-band Test frequencies for operating band 71 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 663.1 | 17.03 | 3.0 | 7.9 | 21.93 |
| 680.5 | 16.59 | 3.1 | 8.5 | 21.99 |
| 697.9 | 16.37 | 3.1 | 8.9 | 22.17 |

**NB-IoT Guard-band Test frequencies for operating band 71 QPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 663.1 | 17.01 | 3.0 | 7.9 | 21.91 |
| 680.5 | 16.81 | 3.1 | 8.5 | 22.21 |
| 697.9 | 15.94 | 3.1 | 8.9 | 21.74 |

**NB-IoT standalone Test frequencies for operating band 71 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 663.1 | 16.71 | 3.0 | 7.9 | 21.61 |
| 680.5 | 16.45 | 3.1 | 8.5 | 21.85 |
| 697.9 | 16.26 | 3.1 | 8.9 | 22.06 |

**NB-IoT In-band Test frequencies for operating band 71 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 663.1 | 16.97 | 3.0 | 7.9 | 21.87 |
| 680.5 | 16.55 | 3.1 | 8.5 | 21.95 |
| 697.9 | 15.89 | 3.1 | 8.9 | 21.69 |

**NB-IoT Guard-band Test frequencies for operating band 71 BPSK**

| Frequency [MHz] | S.G output [dBm] | Cable loss [dB] | Antenna Gain [dB] | ERP (Pd) [dBm] |
|---|---|---|---|---|
| 663.1 | 17.25 | 3.0 | 7.9 | 22.15 |
| 680.5 | 16.68 | 3.1 | 8.5 | 22.08 |
| 697.9 | 15.94 | 3.1 | 8.9 | 21.74 |

# Annex A EUT Photos

See the document" SIM7020G -External Photos".
See the document" SIM7020G -Internal Photos".

## Annex B Deviations From Prescribed Test Methods

No deviation from Prescribed Test Methods.

***End Of Report***