# TEST REPORT

## No.I22N02501-RF UMTS

for

**Honor Device Co., Ltd.**

**Smart Phone**

**Model Name: RBN-NX1**

**FCC ID: 2AYGCRBN-NX1**

with

**Hardware Version: HN2VNEM**

**Software Version: 6.1.0.9(C900E9R1P1)**

**Issued Date: 2023-01-17**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

**Test Laboratory:**
**SAICT, Shenzhen Academy of Information and Communications Technology**

Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China 518000.

Tel:+86(0)755-33322000,   Fax:+86(0)755-33322001

Email: yewu@caict.ac.cn.   www.saict.ac.cn

## REPORT HISTORY

| Report Number | Revision | Description | Issue Date |
|---|---|---|---|
| I22N02501-RF UMTS | Rev.0 | 1st edition | 2023-01-17 |

# CONTENTS

# 1. SUMMARY OF TEST REPORT

## 1.1. Test Items

| | |
|---|---|
| Description | Smart Phone |
| Model Name | RBN-NX1 |
| Brand Name | HONOR |
| Applicant's name | Honor Device Co., Ltd. |
| Manufacturer's Name | Honor Device Co., Ltd. |

## 1.2. Test Standards

| | |
|---|---|
| FCC Part 2/22/24 | 10-1-20 Edition |
| ANSI C63.26 | 2015 |
| KDB971168 D01 | v03r01 |

## 1.3. Test Result

All test items are pass. Please refer to "6 Summary of Test Results" for detail.

## 1.4. Testing Location

Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China 518000

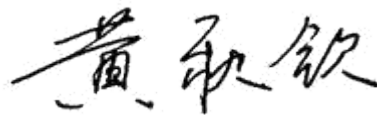## 1.5. Project Data

Testing Start Date: 2022-12-02          Testing End Date: 2022-12-28

## 1.6. Signature

**Wang Ping**
**(Prepared this test report)**

**Huang Qiuqin**
**(Reviewed this test report)**

**Zhang Hao**
**(Approved this test report)**

## 2.  CLIENT INFORMATION

### 2.1.  Applicant Information

Company Name:     Honor Device Co., Ltd.

Address /Post:       Suite 3401, Unit A, Building 6, Shum Yip Sky Park, No. 8089, Hongli West
Road, Xiangmihu Street, Futian District, Shenzhen, P.R.China

Contact Person:     Li Ming

Contact Email       liming136@hihonor.com

Telephone:          0755-61886688

Fax:                /

### 2.2.  Manufacturer Information

Company Name:     Honor Device Co., Ltd.

Address /Post:       Suite 3401, Unit A, Building 6, Shum Yip Sky Park, No. 8089, Hongli West
Road, Xiangmihu Street, Futian District, Shenzhen, P.R.China

Contact Person:     Li Ming

Contact Email       liming136@hihonor.com

Telephone:          0755-61886688

Fax:                /

# 3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)

## 3.1. About EUT

| | |
|---|---|
| Description | Smart Phone |
| Model Name | RBN-NX1 |
| FCC ID | 2AYGCRBN-NX1 |
| Frequency Bands | WCDMA Band 2,5 |
| Antenna | Integrated |
| Extreme vol. Limits | 3.60V to 4.45V (nominal: 3.87V) |
| Condition of EUT as received | No abnormality in appearance |

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of SAICT.

## 3.2. Internal Identification of EUT used during the test

| EUT ID* | SN or IMEI | HW Version | SW Version | Date of receipt |
|---|---|---|---|---|
| UT01aa | 868648060007462 | HN2VNEM | 6.1.0.9(C900E9R1P1) | 2022-11-29 |

*EUT ID: is used to identify the test sample in the lab internally.

## 3.3. Internal Identification of AE used during the test

| AE ID* | Description |
|---|---|
| AE1 | Battery |
| AE2 | RF cable |

*AE ID: is used to identify the test sample in the lab internally.

## 3.4. General Description

RBN-NX1 is subscriber equipment in the GSM/WCDMA/LTE/5G NR system. The GSM frequency bands include GSM850, GSM900, DCS1800 and PCS1900. The UMTS frequency band includes band I, band II, band V and band VIII. The LTE frequency bands include band 1, band3, band 5, band 7, band 8, band 20, band 28A, band 32, band 38, band 40 and band 41. The 5G NR frequency bands include band 1, band3, band 7, band 8, band 20, band 28A, band 38, band 40, band 41, band 77(3.3GHz-3.8GHz) and band 78. But only GSM850 and GSM1900, UMTS frequency band II and band V, LTE frequency band 5, band 7, band 38, band 41, 5G NR frequency band 7,band 38, band 41, band 78(3450MHz-3550MHz) bands test data included in this report. The Mobile Phone implements such functions as RF signal receiving/transmitting, 5G NR/LTE/UMTS and GSM/GPRS/EDGE protocol processing, voice, video MMS service, GPS, AGPS, Wi-Fi etc. Externally it provides one micro SD card interface, earphone port (to provide voice service), and dual SIM/single SIM card interface.RBN-NX1 is single/dual SIM smart phone. It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

## 4. REFERENCE DOCUMENTS

The following documents listed in this section are referred for testing.

| Reference | Title | Version |
|---|---|---|
| FCC Part 22 | PUBLIC MOBILE SERVICES | 10-1-20 Edition |
| FCC Part 2 | FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS | 10-1-20 Edition |
| FCC Part 24 | PERSONAL COMMUNICATIONS SERVICES | 10-1-20 Edition |
| ANSI C63.26 | American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services | 2015 |
| KDB971168 D01 | Power Meas License Digital Systems | v03r01 |

## 5. LABORATORY ENVIRONMENT

**Shielded room** did not exceed following limits along the RF testing:

| Temperature | Min. = 15 ℃, Max. = 35 ℃ |
|---|---|
| Relative humidity | Min. = 20 %, Max. = 75 % |
| Shielding effectiveness | 0.014MHz-1MHz>60 dB; 1MHz-18000MHz>90 dB |
| Electrical insulation | >2 MΩ |
| Ground system resistance | < 4 Ω |

**Fully-anechoic chamber** did not exceed following limits along the EMC testing

| Temperature | Min. = 15 ℃, Max. = 35 ℃ |
|---|---|
| Relative humidity | Min. = 20 %, Max. = 75 % |
| Shielding effectiveness | 0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB |
| Electrical insulation | > 2MΩ |
| Ground system resistance | < 4 Ω |
| Voltage Standing Wave Ratio （VSWR） | ≤ 6 dB, from 1 to 18 GHz, 3 m distance |
| Uniformity of field strength | Between 0 and 6 dB, from 80 to 6000 MHz |

## 6. SUMMARY OF TEST RESULTS

| Abbreviations used in this clause: | | |
|---|---|---|
| Verdict Column | P | Pass |
| | F | Fail |
| | NA | Not applicable |
| | NM | Not measured |

**WCDMA Band II**

| Items | Test Name | Clause in FCC rules | Section in this report | Verdict |
|---|---|---|---|---|
| 1 | Output Power | 2.1046/24.232 | A.1 | P |
| 2 | Frequency Stability | 2.1055/24.235 | A.2 | P |
| 3 | Occupied Bandwidth | 2.1049/24.238 | A.3 | P |
| 4 | Emission Bandwidth | 2.1049/24.238 | A.4 | P |
| 5 | Band Edge Compliance | 2.1051/24.238 | A.5 | P |
| 6 | Conducted Spurious Emission | 2.1051/24.238 | A.6 | P |
| 7 | Peak-to-Average Power Ratio | 24.232/KDB971168 D01 | A.7 | P |

**WCDMA Band V**

| Items | Test Name | Clause in FCC rules | Section in this report | Verdict |
|---|---|---|---|---|
| 1 | Output Power | 2.1046/22.913 | A.1 | P |
| 2 | Frequency Stability | 2.1055/22.355 | A.2 | P |
| 3 | Occupied Bandwidth | 2.1049/22.917 | A.3 | P |
| 4 | Emission Bandwidth | 2.1049/22.917 | A.4 | P |
| 5 | Band Edge Compliance | 2.1051/22.917 | A.5 | P |
| 6 | Conducted Spurious Emission | 2.1051/22.917 | A.6 | P |
| 7 | Peak-to-Average Power Ratio | KDB971168 D01 | A.7 | P |

## 7. <u>STATEMENT</u>

Since the information of samples in this report is provided by the client, the laboratory is not responsible for the authenticity of sample information.

This report takes measured values as criterion of test conclusion. The test conclusion meets the limit requirements.

## 8. TEST EQUIPMENTS UTILIZED

| NO. | Description | TYPE | Manufacture | series number | Cal Due Date | Cal.Interval |
|---|---|---|---|---|---|---|
| 1 | Universal Radio Communication Tester | E7515B | Keysight | MY59322022 | 2023-04-14 | 1 year |
| 2 | Universal Radio Communication Tester | MT8000A | Anritsu | 6261987936 | 2023-03-29 | 1 year |
| 3 | Universal Radio Communication Tester | CMW500 | R&S | 129146 | 2023-04-24 | 1 year |
| 4 | Spectrum Analyzer | FSW26 | R&S | 102197 | 2023-11-24 | 1 year |
| 5 | Temperature Chamber | SH-241 | ESPEC | 92007516 | 2023-10-15 | 1 year |
| 6 | DC Power Supply | U3606A | Agilent Technologies | MY50450012 | 2023-11-13 | 1 year |

# ANNEX A: MEASUREMENT RESULTS

## A.1 OUTPUT POWER

**Reference**

FCC: CFR Part 2.1046, 22.913, 24.232

### A.1.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMW500) to ensure max power transmission and proper modulation.

This result contains max output power and EIRP measurements for the EUT. In all cases, output power is within the specified limits.

### A.1.2 Conducted

### A.1.2.1 Method of Measurements

The EUT was set up for the max output power with pseudo random data modulation.

These measurements were done at 3 frequencies, 1852.4 MHz, 1880.0MHz and 1907.6MHz for WCDMA Band II;826.4MHz, 836.6MHz and 846.6MHz for WCDMA Band V (bottom, middle and top of operational frequency range).

**Limit**

According to FCC Part 2.1046

**WCDMA Band II**

### A.1.2.2 Measurement result

**QPSK**

| | CH | Frequency(MHz) | output power(dBm) |
|---|---|---|---|
| WCDMA (Band II) | 9262 | 1852.4 | 23.18 |
| | 9400 | 1880.0 | 23.27 |
| | 9538 | 1907.6 | 23.07 |

**16QAM**

| | CH | Frequency(MHz) | output power(dBm) |
|---|---|---|---|
| WCDMA (Band II) | 9262 | 1852.4 | 22.37 |
| | 9400 | 1880.0 | 22.43 |
| | 9538 | 1907.6 | 22.21 |

**WCDMA Band V**

**Measurement result**

**QPSK**

| | CH | Frequency(MHz) | output power(dBm) |
|---|---|---|---|
| WCDMA (Band V) | 4132 | 826.4 | 24.25 |
| | 4183 | 836.6 | 24.07 |
| | 4233 | 846.6 | 24.17 |

**16QAM**

| | CH | Frequency(MHz) | output power(dBm) |
|---|---|---|---|
| WCDMA (Band V) | 4132 | 826.4 | 23.42 |
| | 4183 | 836.6 | 23.29 |
| | 4233 | 846.6 | 23.37 |

Note: Expanded measurement uncertainty is $U$ = 0.49dB, $k$ = 1.96

**A.1.3 Radiated**

**A.1.3.1 Description**

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

Rule Part 24.232(c) specifies, "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."

Rule Part 22.913(a) specifies " The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

**A.1.3.2  Method of Measurement**

ANSI C63.26 chapter 5.2.5.5: when working in decibels (i.e., logarithmic scale), the ERP and EIRP represent the sum of the transmit antenna gain (in dBd or dBi, respectively) and the conducted RF output power (expressed in dB relative to watts or milliwatts).

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation (1) as follows:

ERP or EIRP=PMea+ GT

Where

ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as PMea , e.g., dBm or dBW)

PMea    measured transmitter output power , in dBm.

GT  gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

**WCDMA Band II**

**Limits**

| | Burst Peak EIRP (dBm) |
|---|---|
| WCDMA Band II | ≤33dBm (2W) |

**Measurement result**

**QPSK**

| Frequency (MHz) | Conducted output power (dBm) | Radiated output power (dBm) $G_T$ = -0.6dBi |
|---|---|---|
| 1852.4 | 23.18 | 22.58 |
| 1880.0 | 23.27 | 22.67 |
| 1907.6 | 23.07 | 22.47 |

**16QAM**

| Frequency (MHz) | Conducted output power (dBm) | Radiated output power (dBm) $G_T$ = -0.6dBi |
|---|---|---|
| 1852.4 | 22.37 | 21.77 |
| 1880.0 | 22.43 | 21.83 |
| 1907.6 | 22.21 | 21.61 |

**WCDMA Band V**

**Limits**

| | Burst Peak ERP (dBm) |
|---|---|
| WCDMA Band V | ≤38.45dBm |

**Measurement result**

**QPSK**

| Frequency (MHz) | Conducted output power (dBm) | Radiated output power (dBm) $G_T$ = 0.2dBi |
|---|---|---|
| 826.4 | 24.25 | 22.30 |
| 836.6 | 24.07 | 22.12 |
| 846.6 | 24.17 | 22.22 |

**16QAM**

| Frequency (MHz) | Conducted output power (dBm) | Radiated output power (dBm) $G_T$ = 0.2dBi |
|---|---|---|
| 826.4 | 23.42 | 21.47 |
| 836.6 | 23.29 | 21.34 |
| 846.6 | 23.37 | 21.42 |

## A.2 FREQUENCY STABILITY

**Reference**

FCC: CFR Part 2.1055, 22.355, 24.235

**A.2.1 Method of Measurement**

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMW500

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -10℃.
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on mid channel of each band, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10℃ increments from -10℃ to +50℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Remeasure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments remeasuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50℃.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10℃ increments from +50℃ to -10℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.   As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of the lower, higher and nominal voltage. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress.

**A.2.2 Measurement results**

**WCDMA Band II**

**Frequency Error vs Voltage**

| Temperature(℃) | Voltage(V) | FL(MHz) | FH(MHz) | Offset(Hz) | Frequency error(ppm) |
|---|---|---|---|---|---|
| 20 | | | | | |
| 50 | | | | 1.02 | 0.0011 |
| 40 | | | | 0.29 | 0.0003 |
| 30 | 3.87 | 1850.060 | 1909.930 | 0.65 | 0.0007 |
| 10 | | | | 0.56 | 0.0006 |
| 0 | | | | 0.22 | 0.0002 |
| -10 | | | | 0.54 | 0.0006 |

**Frequency Error vs Voltage**

| Voltage(V) | Temperature(℃) | FL(MHz) | FH(MHz) | Offset(Hz) | Frequency error(ppm) |
|---|---|---|---|---|---|
| 3.60 | 20 | 1850.060 | 1909.930 | 1.77 | 0.0019 |
| 4.45 | | | | 2.02 | 0.0021 |

**WCDMA Band V**

**Frequency Error vs Voltage-QPSK**

| Temperature(℃) | Voltage(V) | FL(MHz) | FH(MHz) | Offset(Hz) | Frequency error(ppm) |
|---|---|---|---|---|---|
| 20 | | | | | |
| 50 | | | | -0.19 | 0.0004 |
| 40 | | | | -0.69 | 0.0017 |
| 30 | 3.87 | 824.060 | 848.930 | 0.04 | 0.0001 |
| 10 | | | | -0.56 | 0.0013 |
| 0 | | | | -1.17 | 0.0028 |
| -10 | | | | -0.47 | 0.0011 |

**Frequency Error vs Voltage**

| Voltage(V) | Temperature(℃) | FL(MHz) | FH(MHz) | Offset(Hz) | Frequency error(ppm) |
|---|---|---|---|---|---|
| 3.60 | 20 | 824.060 | 848.930 | -0.26 | 0.0006 |
| 4.45 | | | | -0.04 | 0.0001 |

Expanded measurement uncertainty is 10Hz, k = 2

## A.3 OCCUPIED BANDWIDTH

**Reference**

FCC: CFR Part 2.1049, 22.917, 24.238.

### A.3.1 Occupied Bandwidth Results

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 US Cellular/PCS frequency bands. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).

b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.

c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least 10log (OBW / RBW) below the reference level.

e) Set the detection mode to peak, and the trace mode to max hold.

d) Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

## WCDMA Band 2 (99%)-QPSK

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) |
|---|---|
| 1852.4 | 4.165 |
| 1880 | 4.145 |
| 1907.6 | 4.158 |

### WCDMA Band 2 (99%)

### Channel 9262-Occupied Bandwidth (99% BW)



### Channel 9400-Occupied Bandwidth (99% BW)



Page **18** of **43**
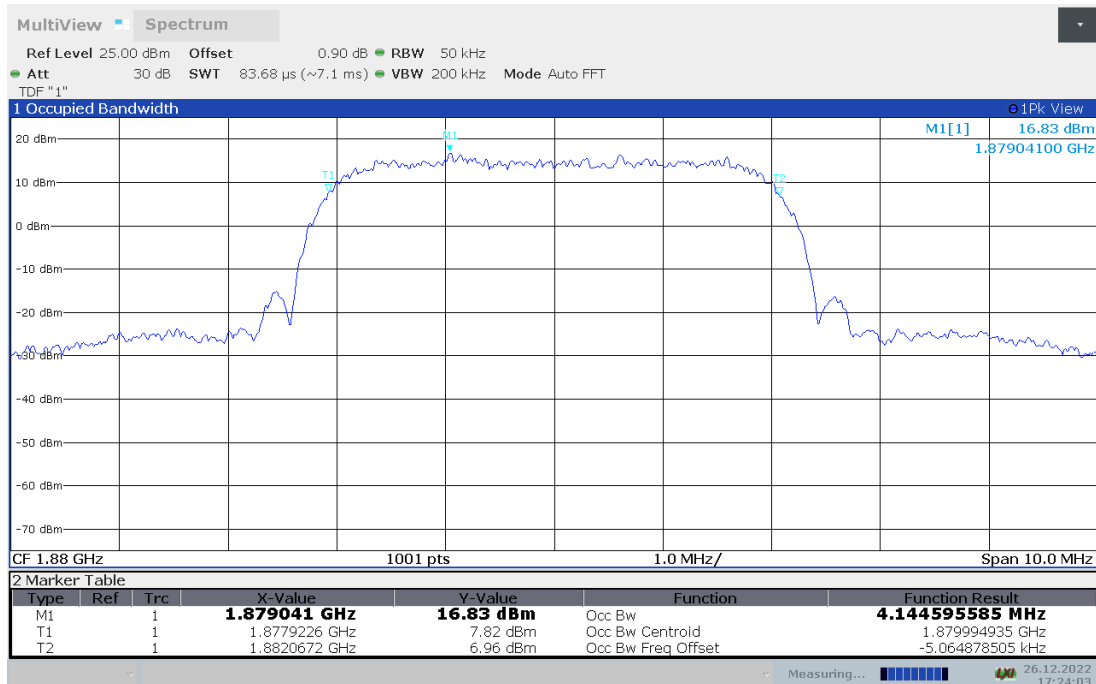
## Channel 9538-Occupied Bandwidth (99% BW)

**WCDMA Band 2 (99%)-16QAM**

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) |
|---|---|
| 1852.4 | 4.155 |
| 1880 | 4.165 |
| 1907.6 | 4.167 |

**WCDMA Band 2 (99%)**

**Channel 9262-Occupied Bandwidth (99% BW)**
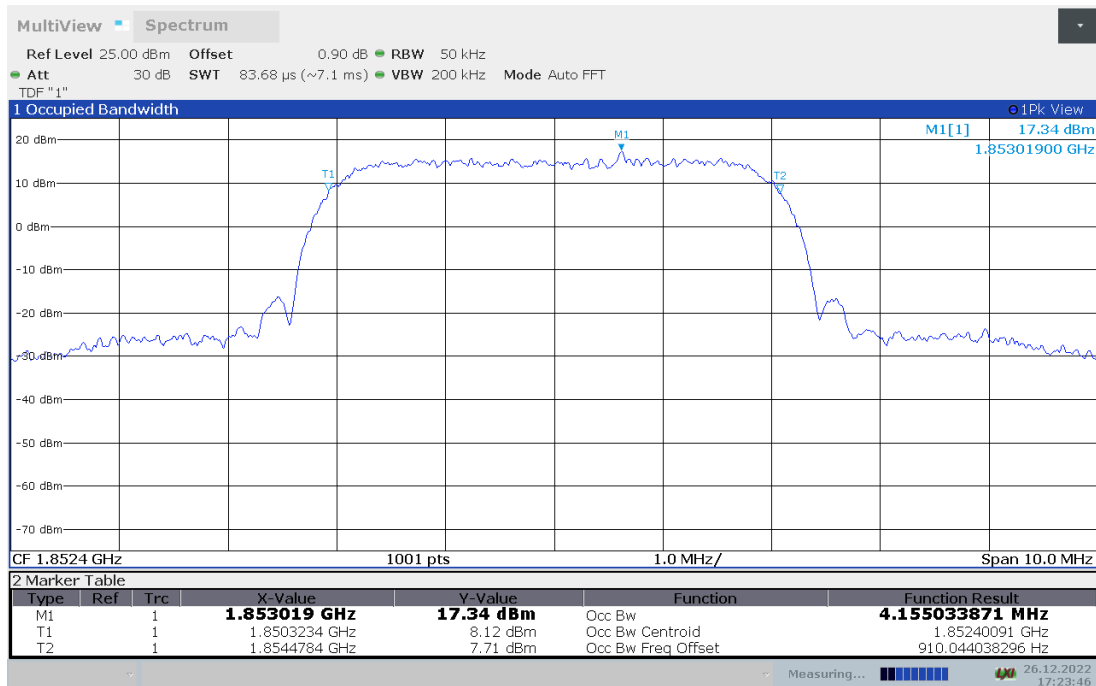


**Channel 9400-Occupied Bandwidth (99% BW)**

## Channel 9538-Occupied Bandwidth (99% BW)



| MultiView ■ | Spectrum | | | | | ▾ |
|---|---|---|---|---|---|---|

Ref Level 25.00 dBm  Offset  0.90 dB ● RBW 50 kHz
● Att  30 dB  SWT  83.68 µs (~7.1 ms) ● VBW 200 kHz  Mode Auto FFT
TDF "1"

1 Occupied Bandwidth  ○1Pk View

M1[1]  15.52 dBm
1.90829900 GHz

CF 1.9076 GHz  1001 pts  1.0 MHz/  Span 10.0 MHz

2 Marker Table

| Type | Ref | Trc | X-Value | Y-Value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | **1.908299 GHz** | **15.52 dBm** | Occ Bw | **4.166785987 MHz** |
| T1 | | 1 | 1.905521 GHz | 6.05 dBm | Occ Bw Centroid | 1.907604357 GHz |
| T2 | | 1 | 1.9096877 GHz | 6.78 dBm | Occ Bw Freq Offset | 4.35653416 kHz |

Measuring... 26.12.2022 17:24:59
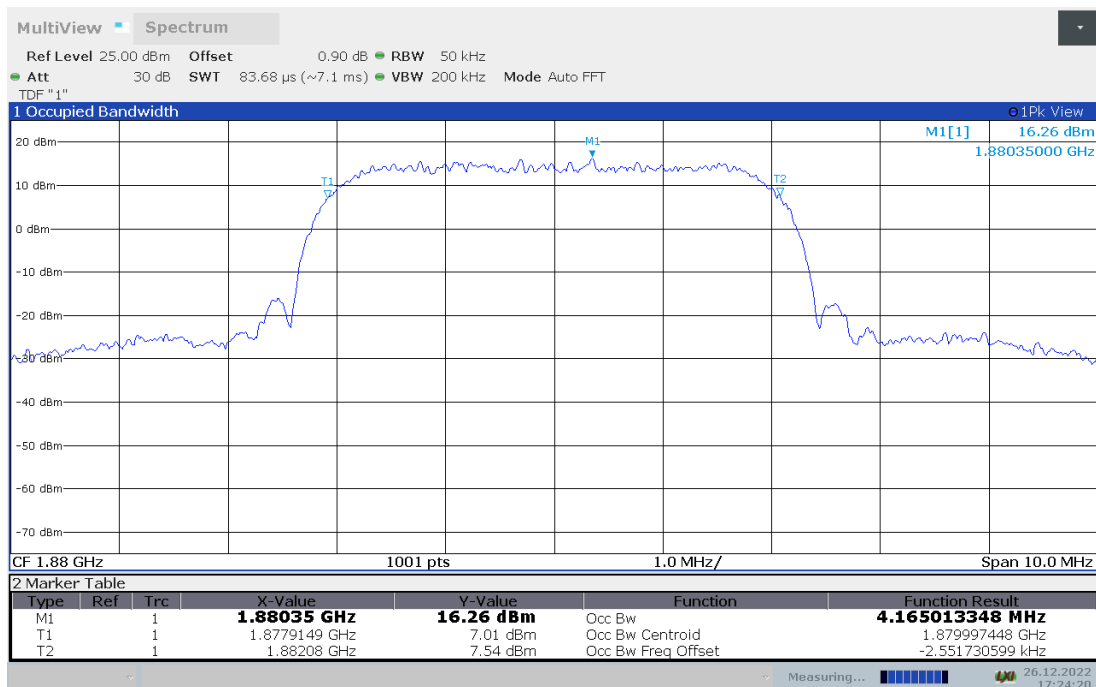
### WCDMA Band 5 (99%)-QPSK

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) |
|---|---|
| 826.4 | 4.122 |
| 836.6 | 4.139 |
| 846.6 | 4.135 |

### WCDMA Band 5 (99%)

### Channel 4132-Occupied Bandwidth (99% BW)
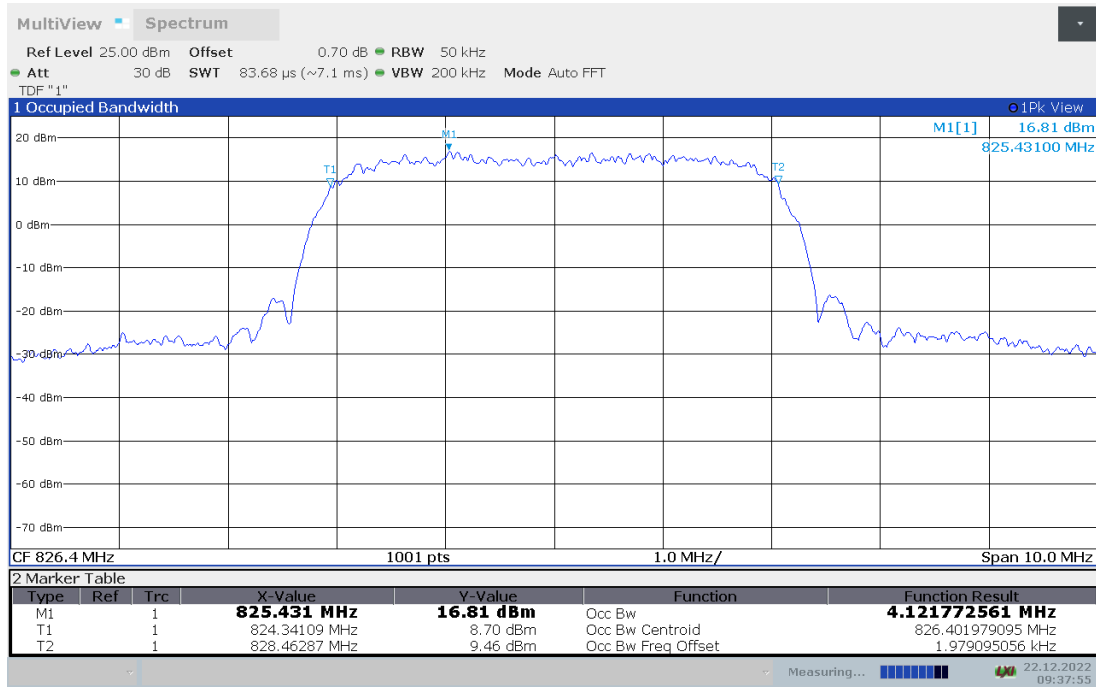


### Channel 4183-Occupied Bandwidth (99% BW)
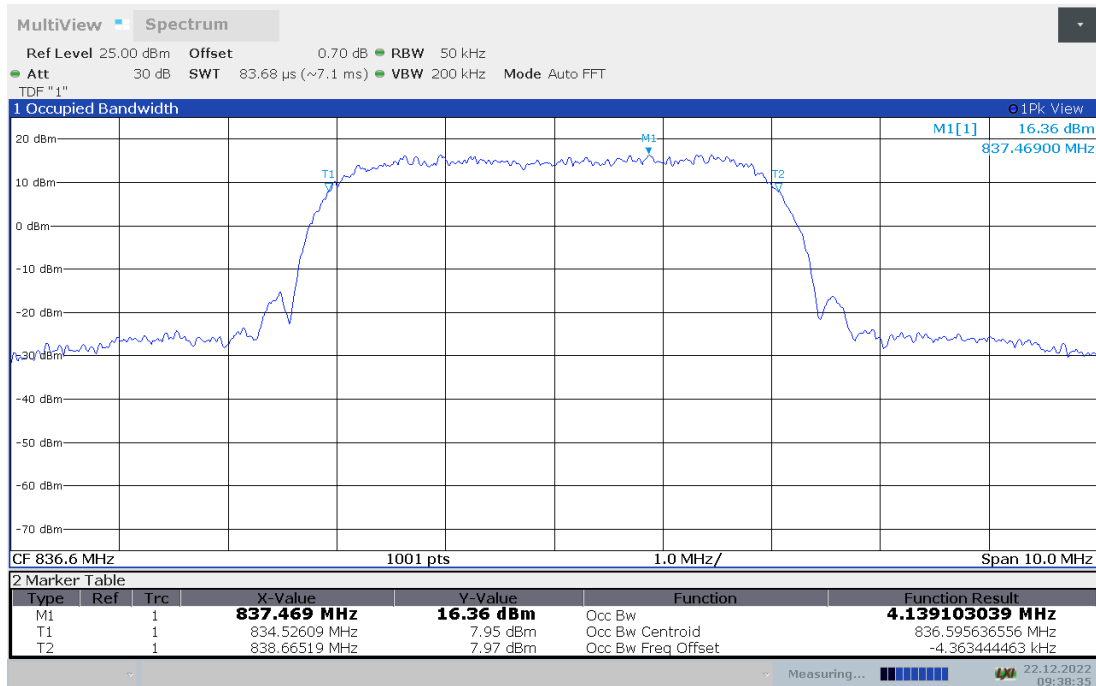
**Channel 4233-Occupied Bandwidth (99% BW)**
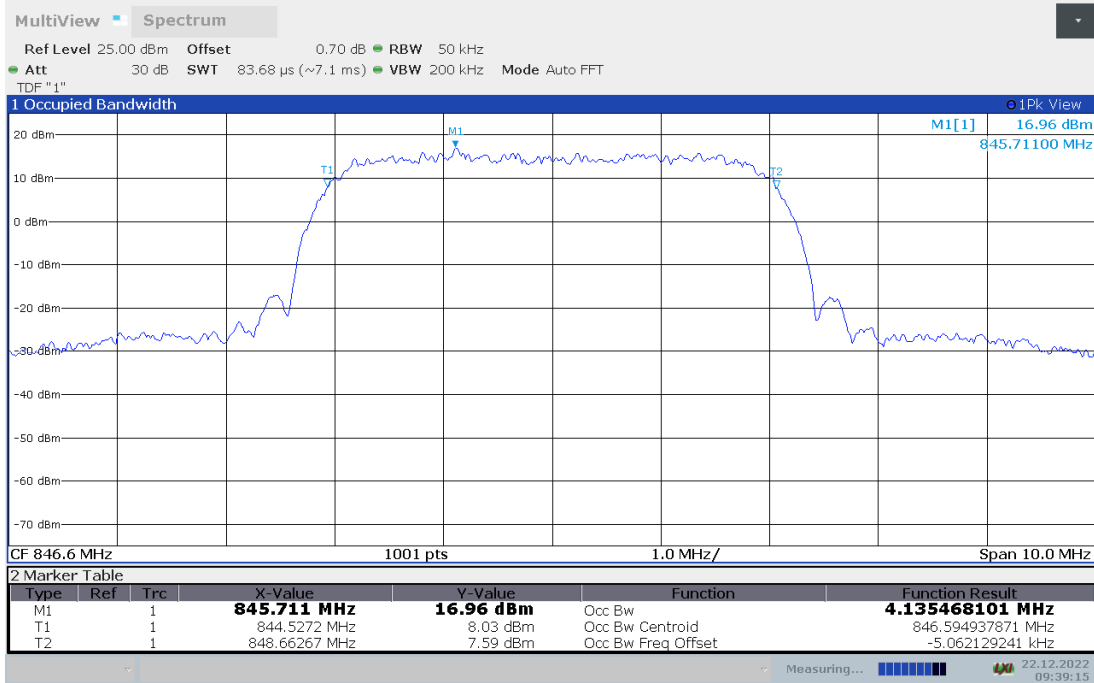
**WCDMA Band 5 (99%)-16QAM**

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) |
|---|---|
| 826.4 | 4.139 |
| 836.6 | 4.140 |
| 846.6 | 4.146 |

**WCDMA Band 5 (99%)**

**Channel 4132-Occupied Bandwidth (99% BW)**
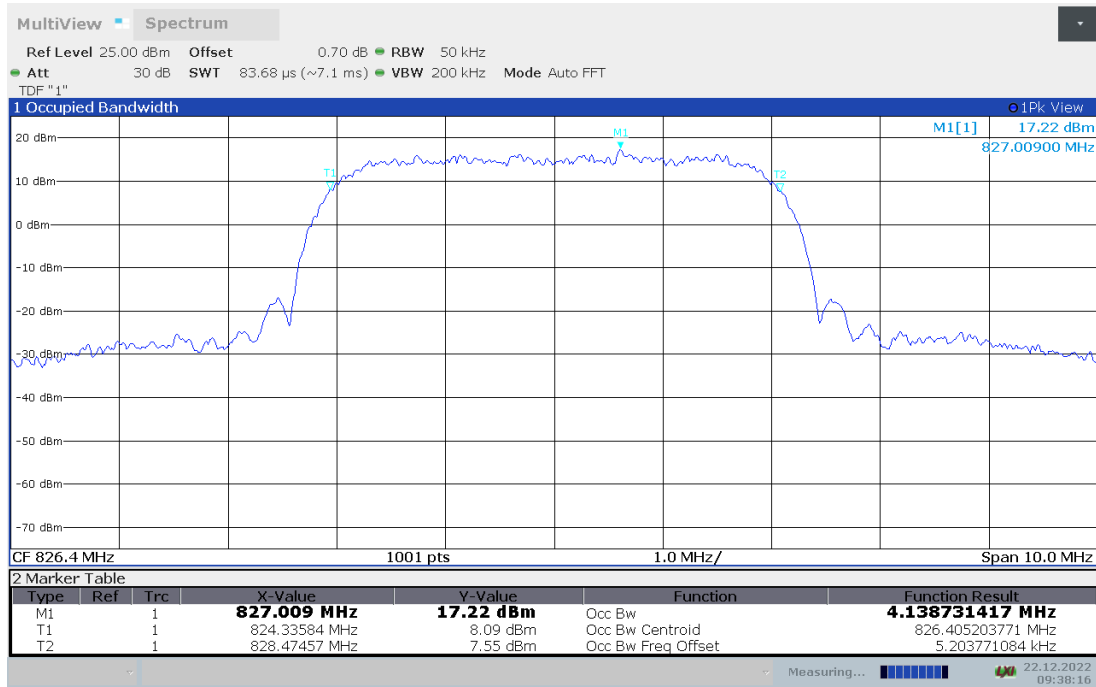


**Channel 4183-Occupied Bandwidth (99% BW)**
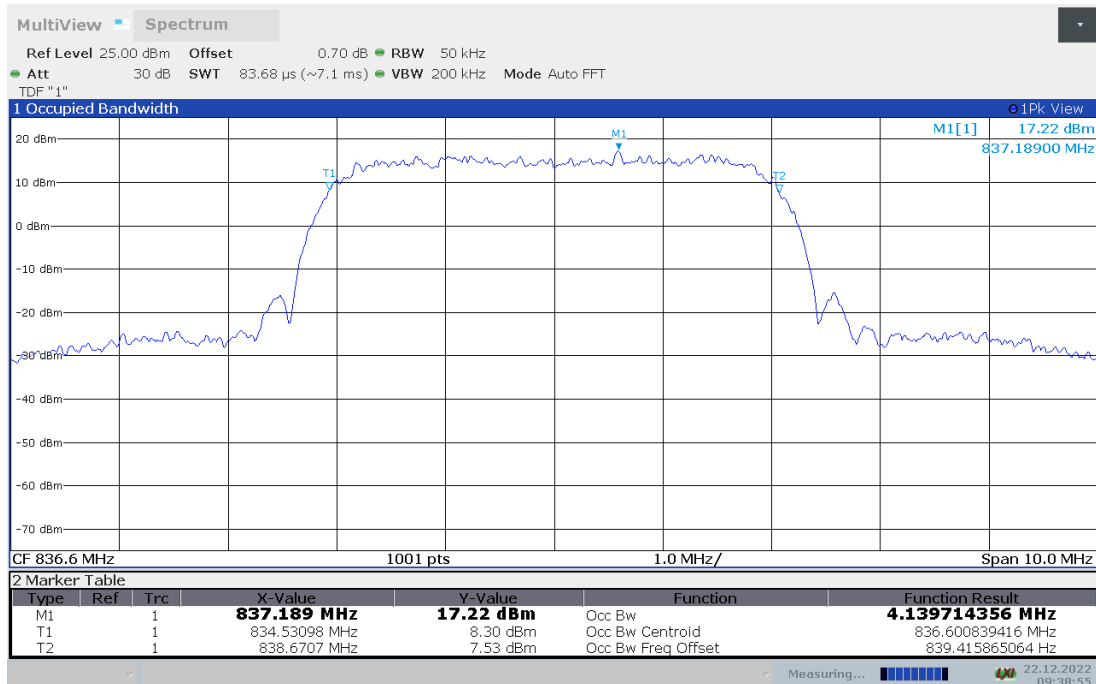
**Channel 4233-Occupied Bandwidth (99% BW)**
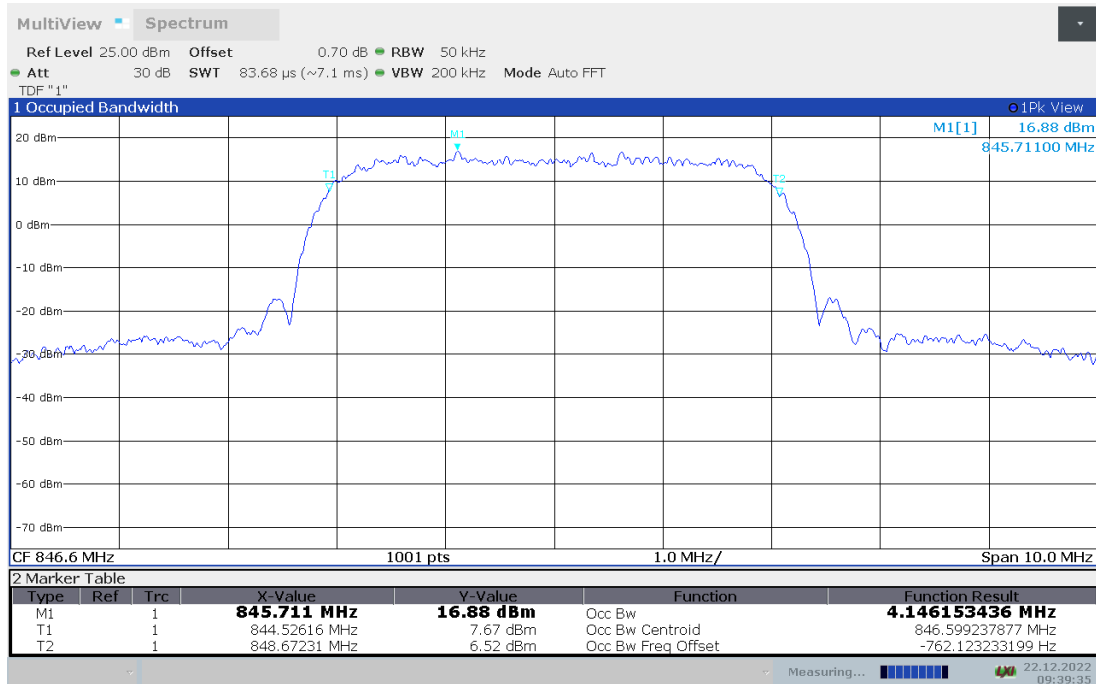


Note: Expanded measurement uncertainty is *U* = 3428Hz, *k* = 2

## A.4 EMISSION BANDWIDTH

**Reference**

FCC: CFR Part 2.1049, 22.917, 24.238.

**A.4.1Emission Bandwidth Results**

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 26dB below the transmitter power.

Similar to conducted emissions; Emission 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. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

**WCDMA Band 2 (-26dBc)-QPSK**

| Frequency (MHz) | Emission Bandwidth (-26dBc)(MHz) |
|---|---|
| 1852.4 | 4.715 |
| 1880 | 4.675 |
| 1907.6 | 4.695 |

**WCDMA Band 2 (-26dBc)**
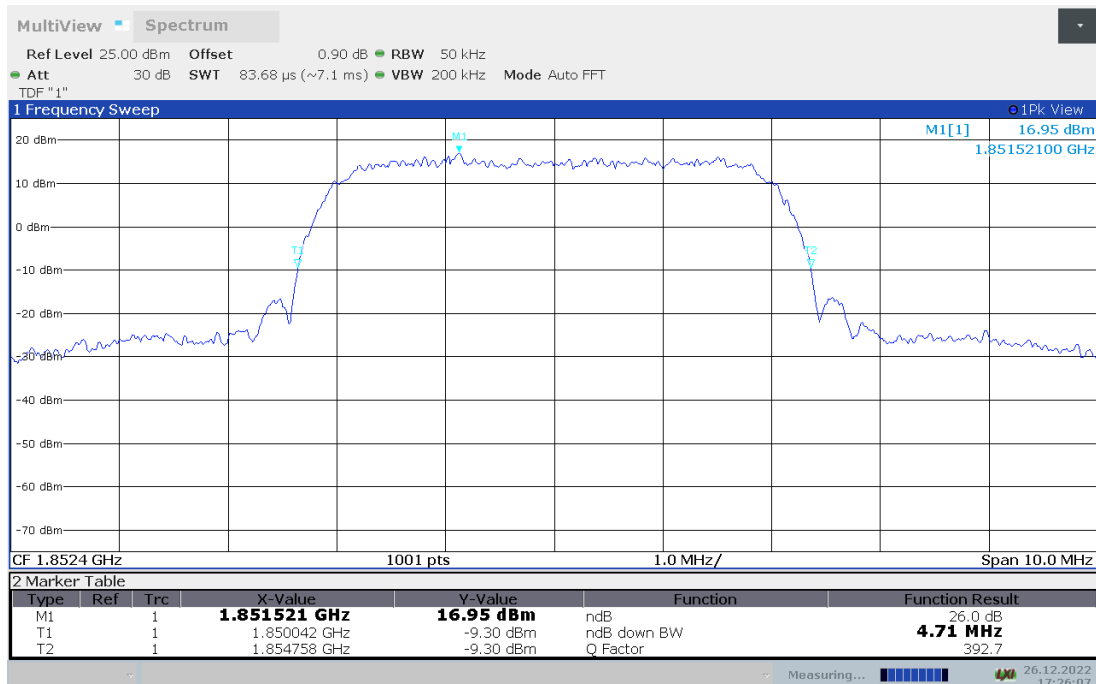
**Channel 9262-Emission Bandwidth (-26dBc BW)**

**Channel 9400-Emission Bandwidth (-26dBc BW)**
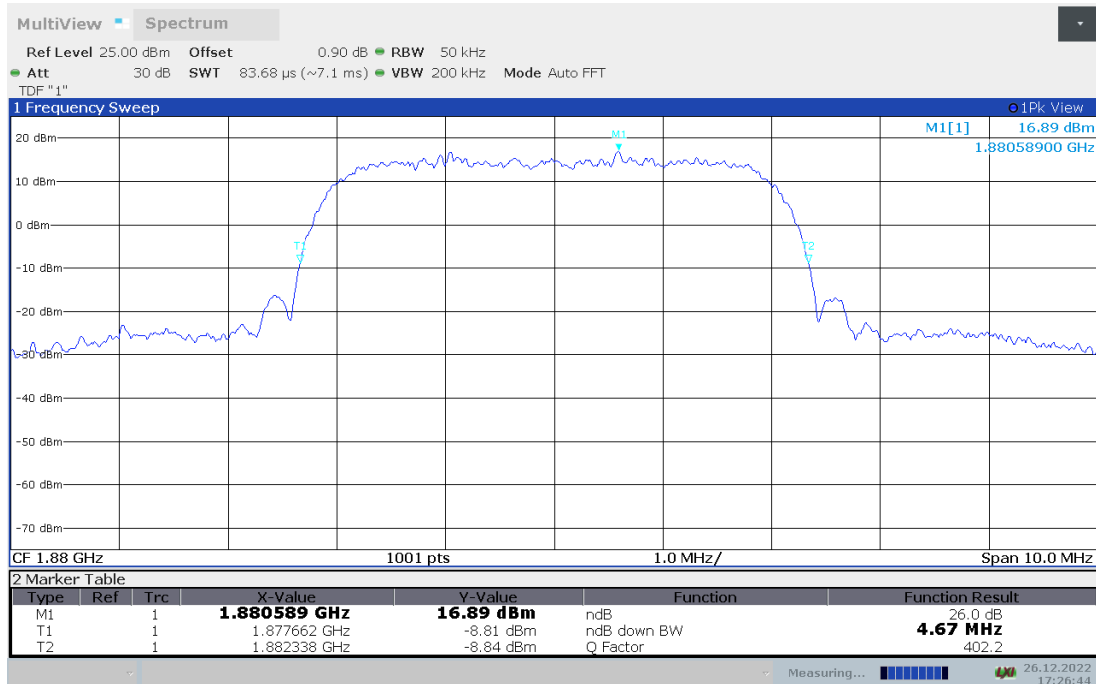


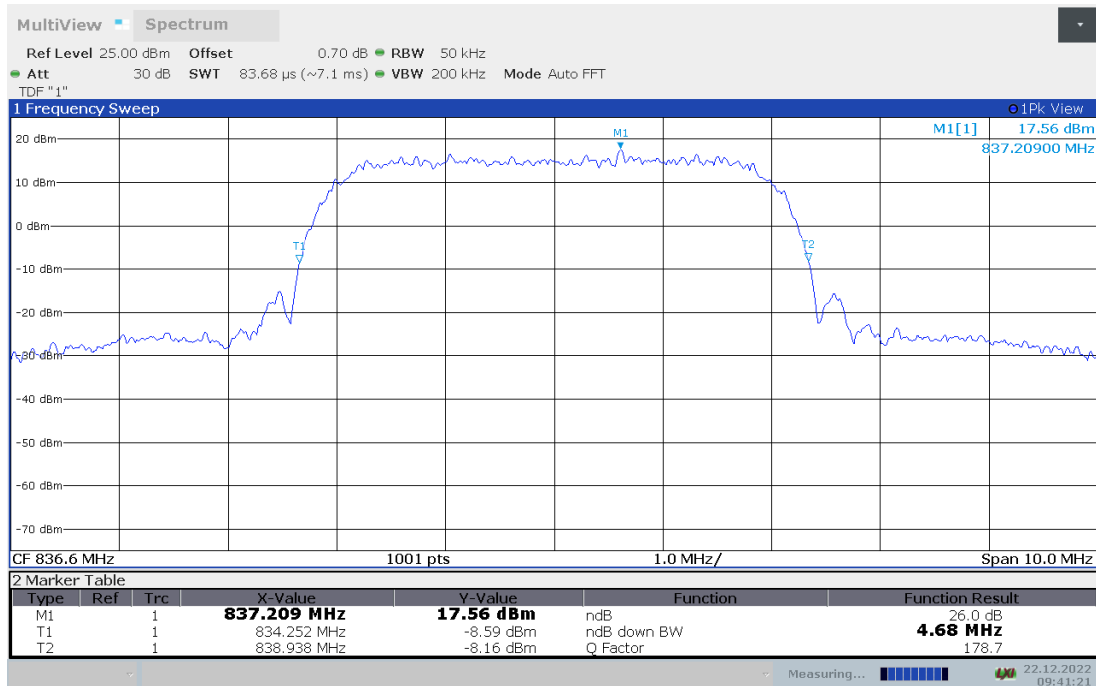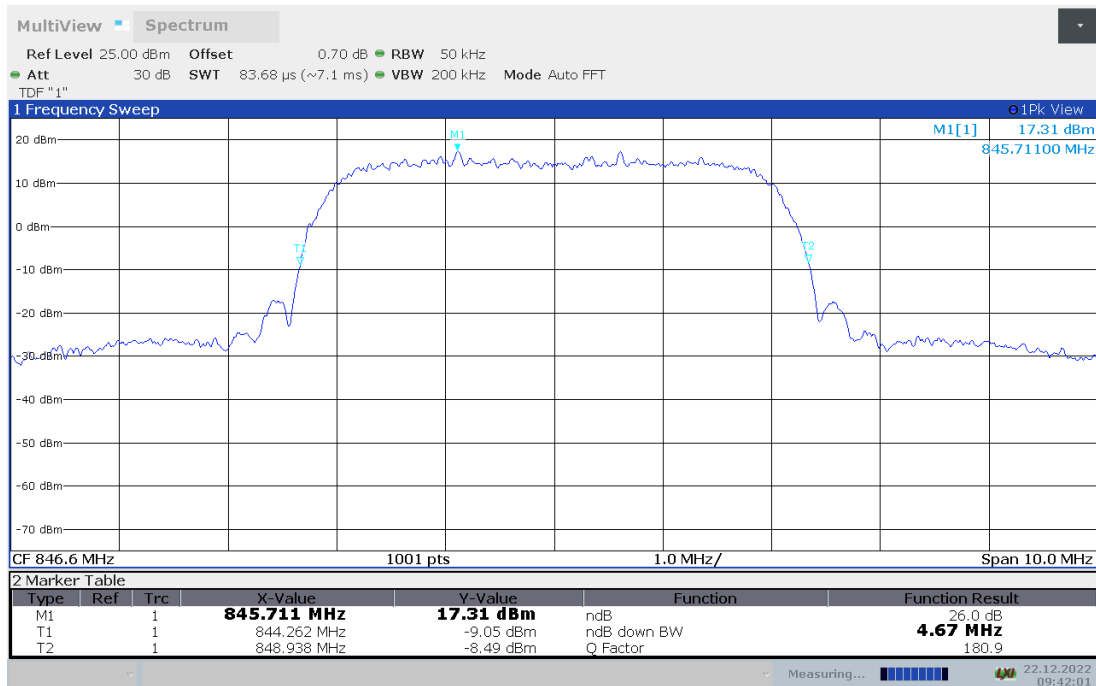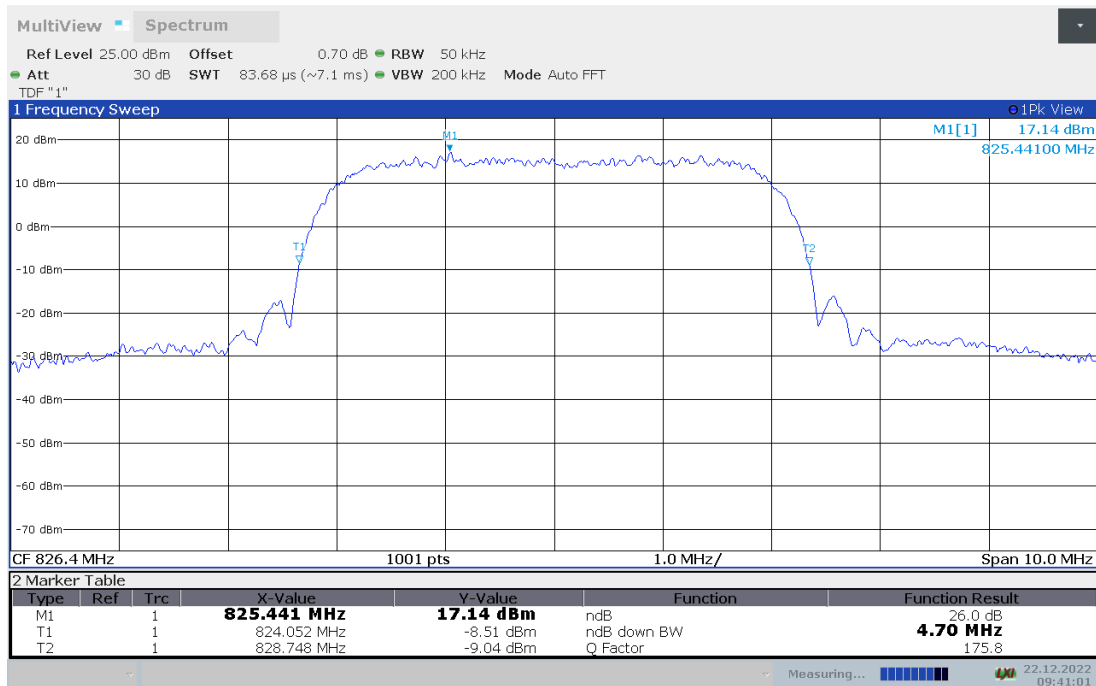**Channel 9538-Emission Bandwidth (-26dBc BW)**
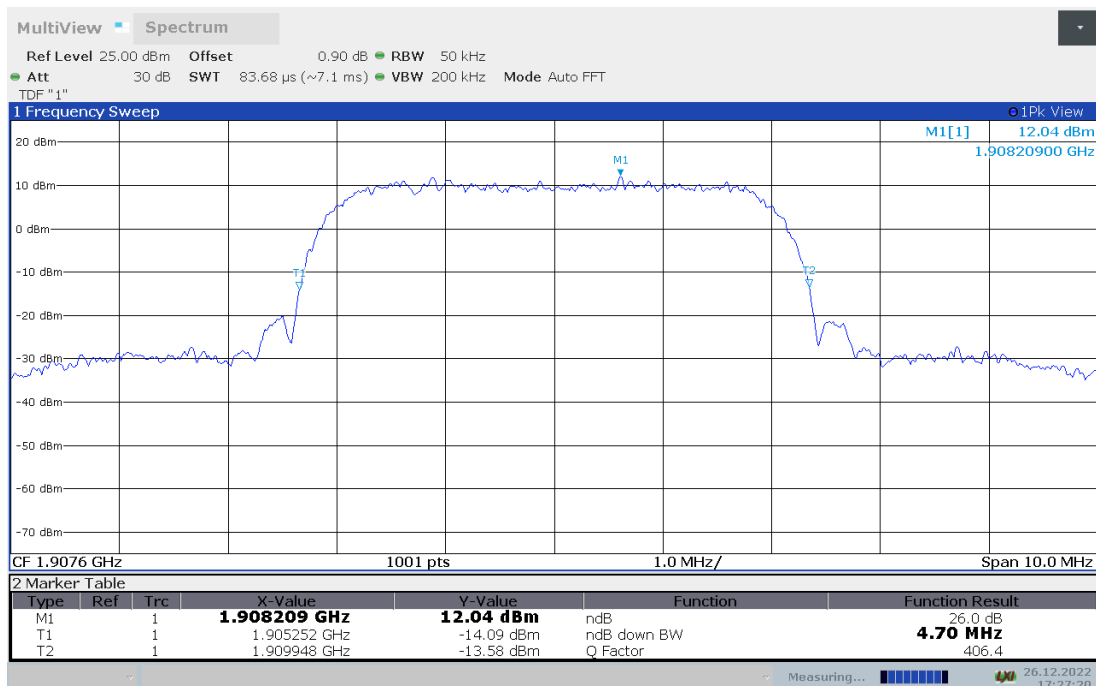
## WCDMA Band 2 (-26dBc)-16QAM

| Frequency (MHz) | Emission Bandwidth (-26dBc)(MHz) |
|---|---|
| 1852.4 | 4.685 |
| 1880 | 4.705 |
| 1907.6 | 4.705 |

## WCDMA Band 2 (-26dBc)
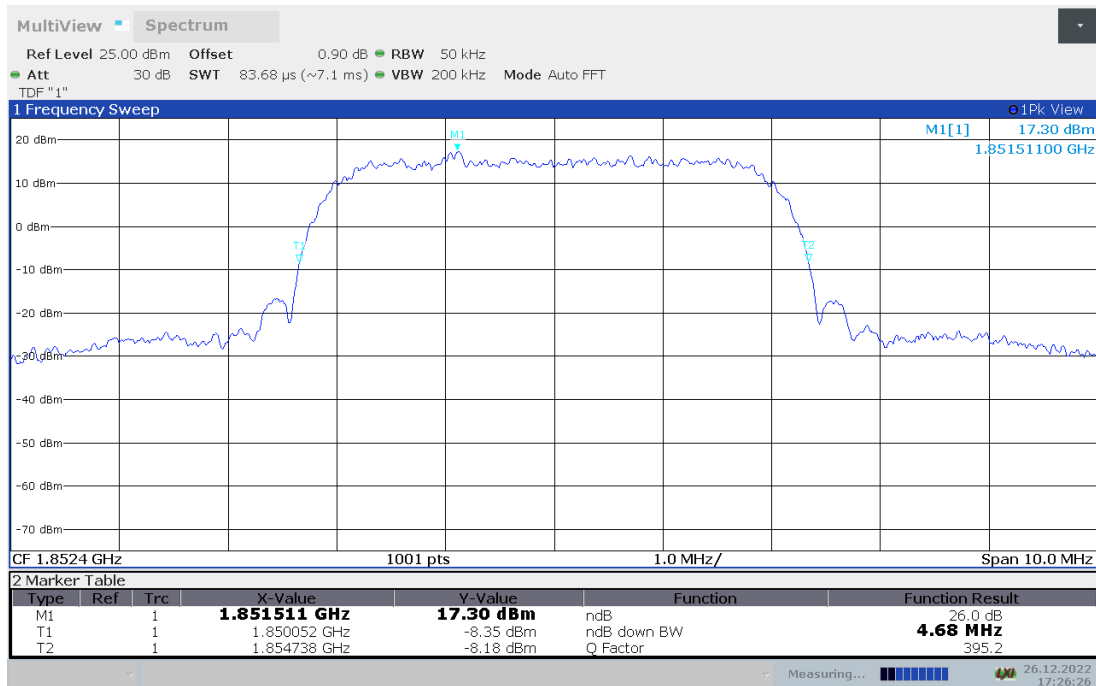
## Channel 9262-Emission Bandwidth (-26dBc BW)



## Channel 9400-Emission Bandwidth (-26dBc BW)
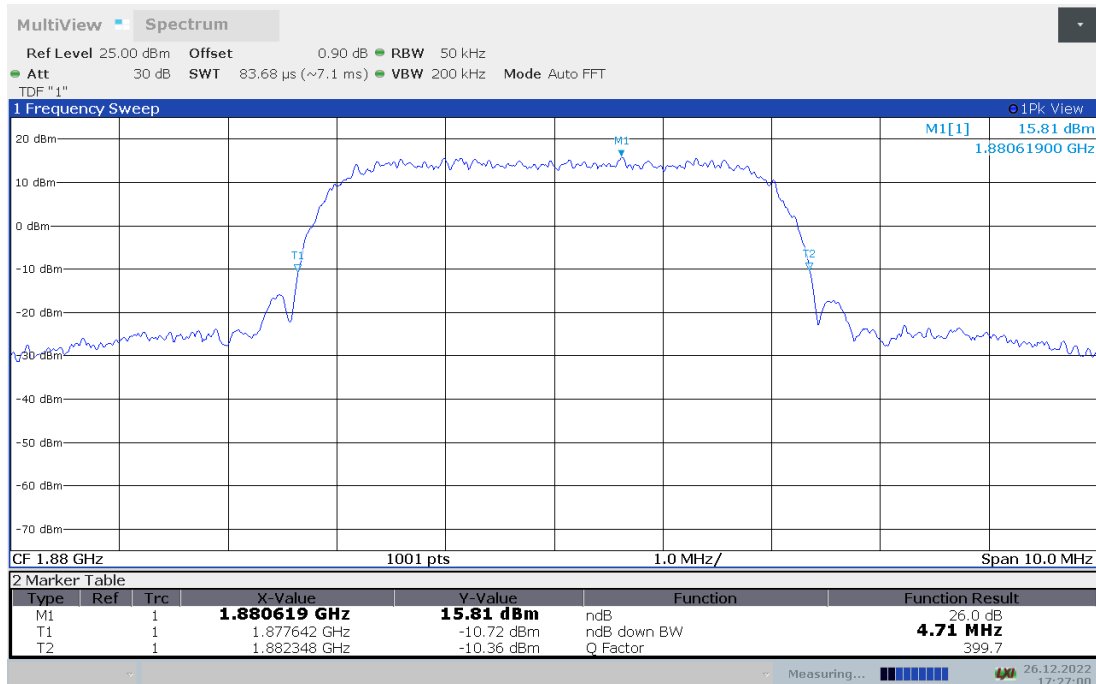
## Channel 9538-Emission Bandwidth (-26dBc BW)
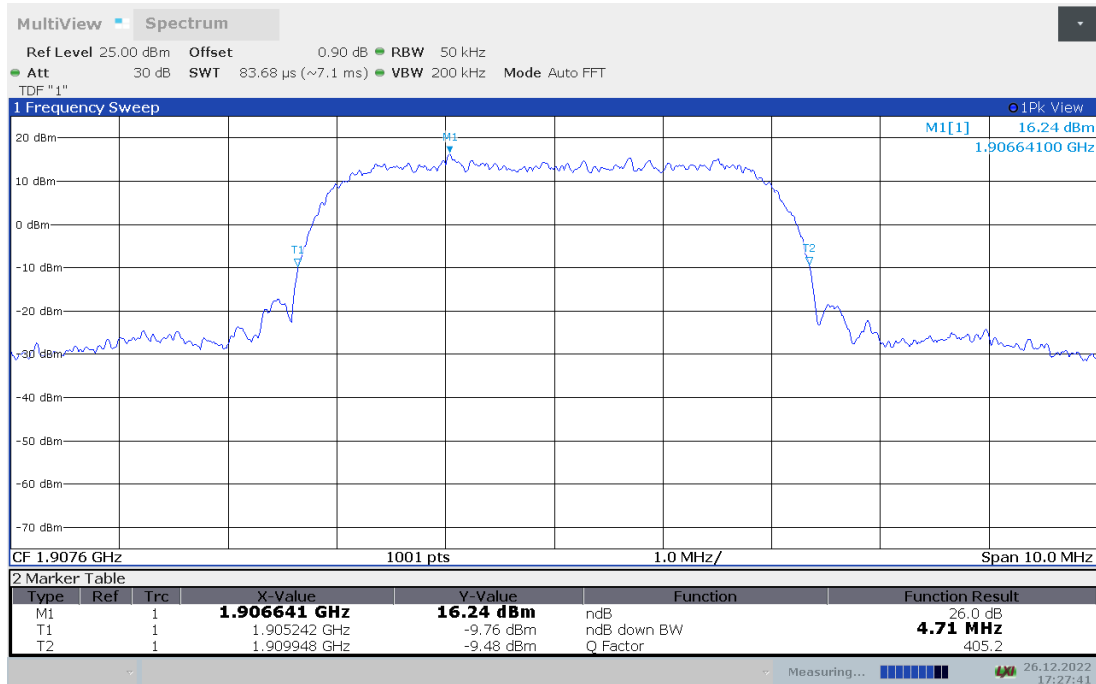
### WCDMA Band 5 (-26dBc)-QPSK

| Frequency (MHz) | Emission Bandwidth (-26dBc)(MHz) |
|---|---|
| 826.4 | 4.685 |
| 836.6 | 4.685 |
| 846.6 | 4.675 |

### WCDMA Band 5 (-26dBc)

### Channel 4132-Emission Bandwidth (-26dBc BW)



### Channel 4183-Emission Bandwidth (-26dBc BW)

**Channel 4233-Emission Bandwidth (-26dBc BW)**



| Type | Ref | Trc | X-Value | Y-Value | Function | Function Result |
|------|-----|-----|---------|---------|----------|-----------------|
| M1 | 1 | | **845.711 MHz** | **17.31 dBm** | ndB | 26.0 dB |
| T1 | 1 | | 844.262 MHz | -9.05 dBm | ndB down BW | **4.67 MHz** |
| T2 | 1 | | 848.938 MHz | -8.49 dBm | Q Factor | 180.9 |

## WCDMA Band 5 (-26dBc)-16QAM

| Frequency (MHz) | Emission Bandwidth (-26dBc)(MHz) |
|---|---|
| 826.4 | 4.695 |
| 836.6 | 4.685 |
| 846.6 | 4.685 |

## WCDMA Band 5 (-26dBc)

## Channel 4132-Emission Bandwidth (-26dBc BW)



## Channel 4183-Emission Bandwidth (-26dBc BW)

**Channel 4233-Emission Bandwidth (-26dBc BW)**
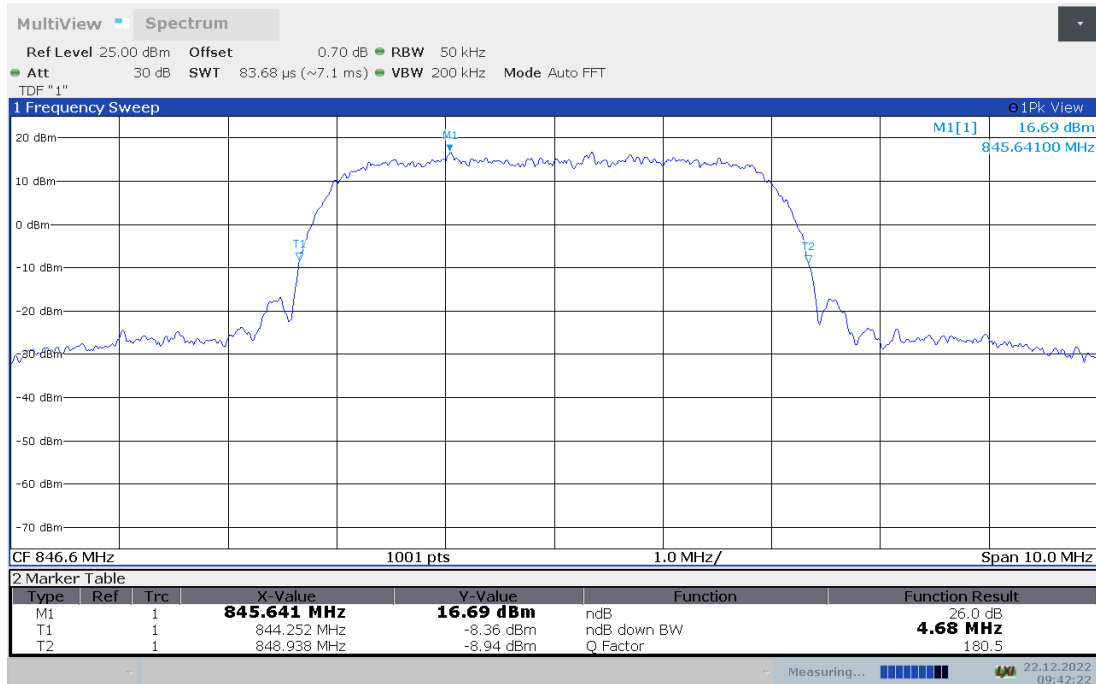


Note: Expanded measurement uncertainty is *U* = 3428Hz, *k* = 2

## A.5 BAND EDGE COMPLIANCE

**Reference**

FCC: CFR Part 2.1051, 22.917, 24.238.

**A.5.1 Measurement limit**

On any frequency outside frequency band of the US Cellular/PCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log (P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm. A relaxation of the reference bandwidth is often provided for measurements within a specified frequency range at the edge of the authorized frequency block/band. This is often implemented by permitting the use of a narrower RBW (typically limited to a minimum RBW of 1% of the OBW) for measuring the out-of-band emissions without a requirement to integrate the result over the full reference bandwidth.

**A.5.2 Measurement result**

**Only worst case result is given below**

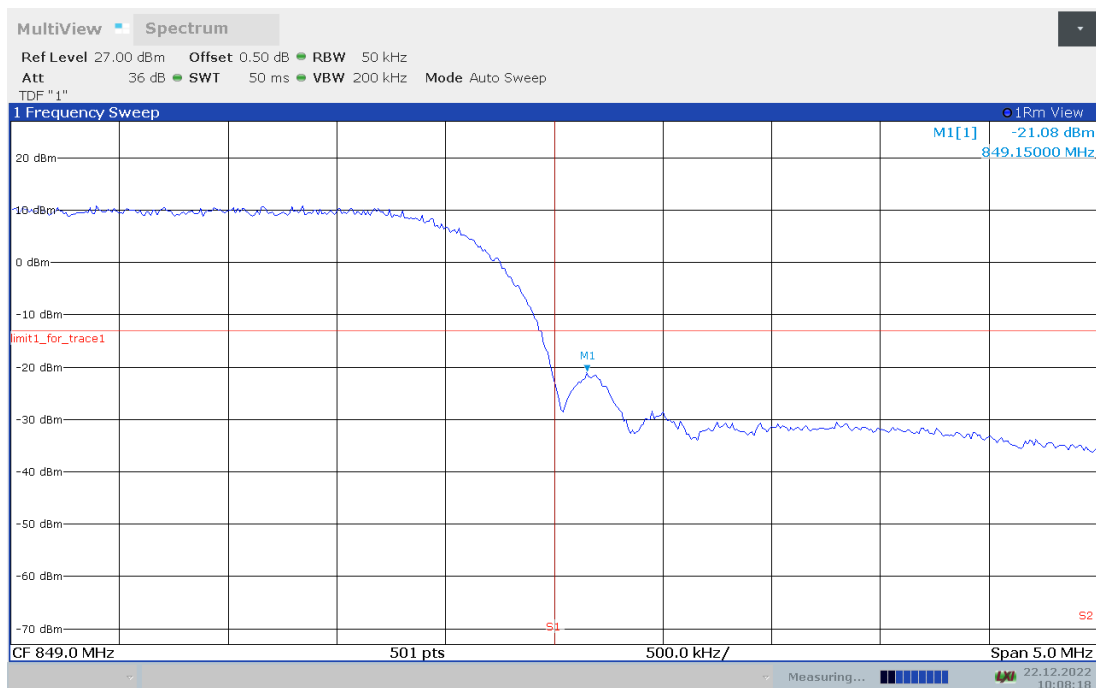**WCDMA BandⅡ**

**LOW BAND EDGE BLOCK-A-Channel 9262**
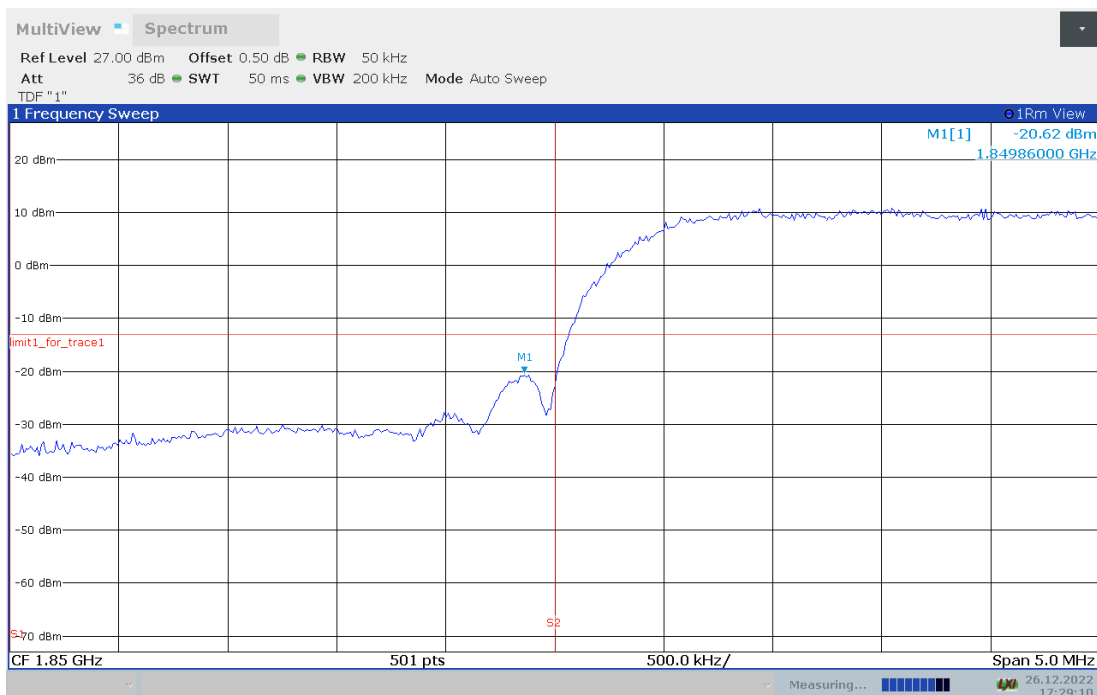
## HIGH BAND EDGE BLOCK-C–Channel 9538
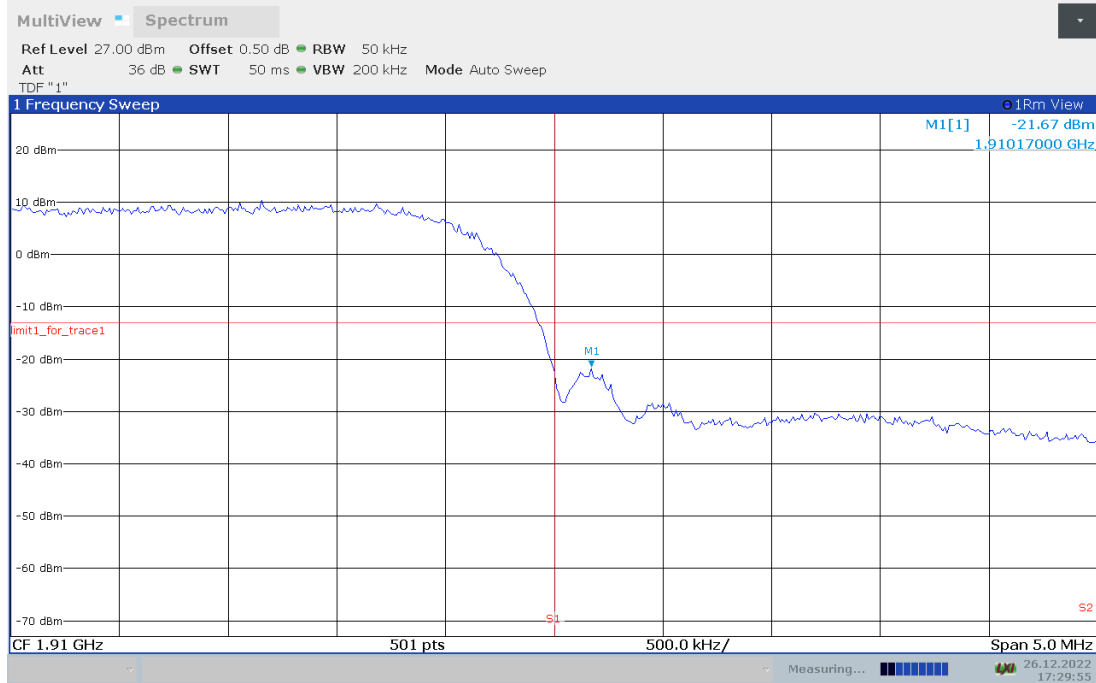
**WCDMA Band Ⅴ**
**LOW BAND EDGE BLOCK-A-Channel 4132**
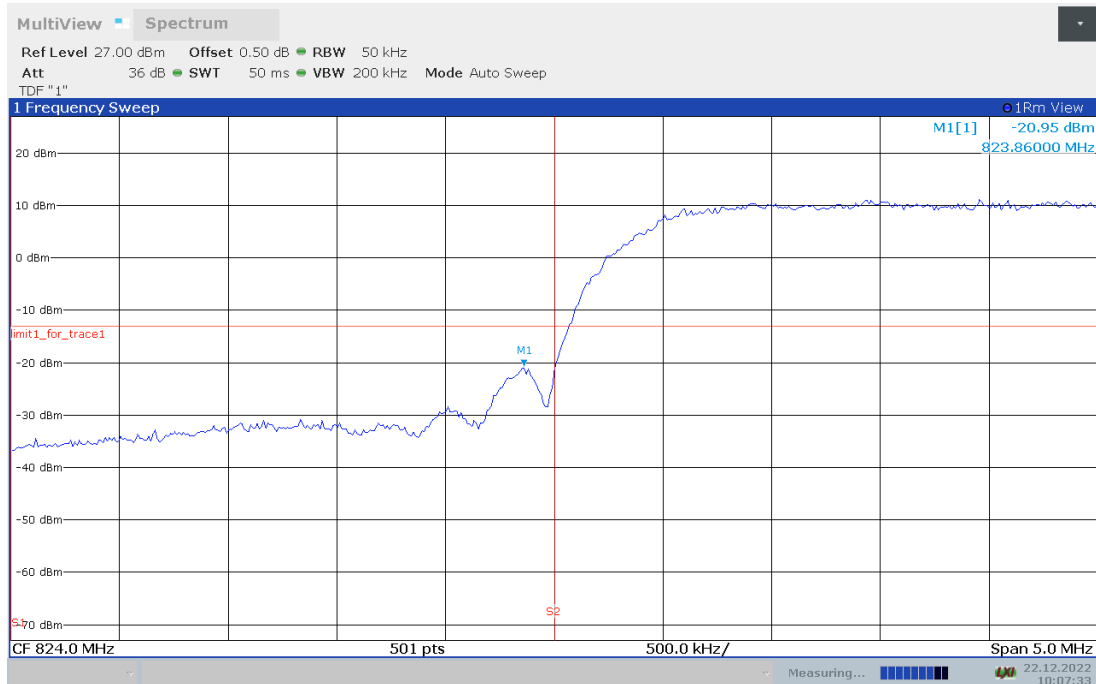


**HIGH BAND EDGE BLOCK-C–Channel 4233**



Note: Expanded measurement uncertainty is $U$ = 0.49 dB(100KHz-2GHz)/1.21 dB (2GHz-26.5GHz), $k$ = 1.96

## A.6 CONDUCTED SPURIOUS EMISSION

**Reference**

FCC: CFR Part 2.1051, 22.917, 24.238.

**A.6.1 Measurement Method**

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

1. Determine frequency range for measurements: From CFR 2.1051 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. For the mobile station equipment tested, this equates to a frequency range of 13 MHz to 9 GHz, data taken from 10 MHz to 25 GHz.

2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

**WCDMA Band Ⅱ Transmitter**

| Channel | Frequency (MHz) |
|---------|-----------------|
| 9262 | 1852.4 |
| 9400 | 1880.0 |
| 9538 | 1907.6 |

**WCDMA Band Ⅴ Transmitter**

| Channel | Frequency (MHz) |
|---------|-----------------|
| 4132 | 826.4 |
| 4183 | 836.6 |
| 4233 | 846.6 |

**A.6.2 Measurement Limit**

Part 24.238, Part 22.917 and Part 27.53(h) specify that the power of any emission outside of the authorized

operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.
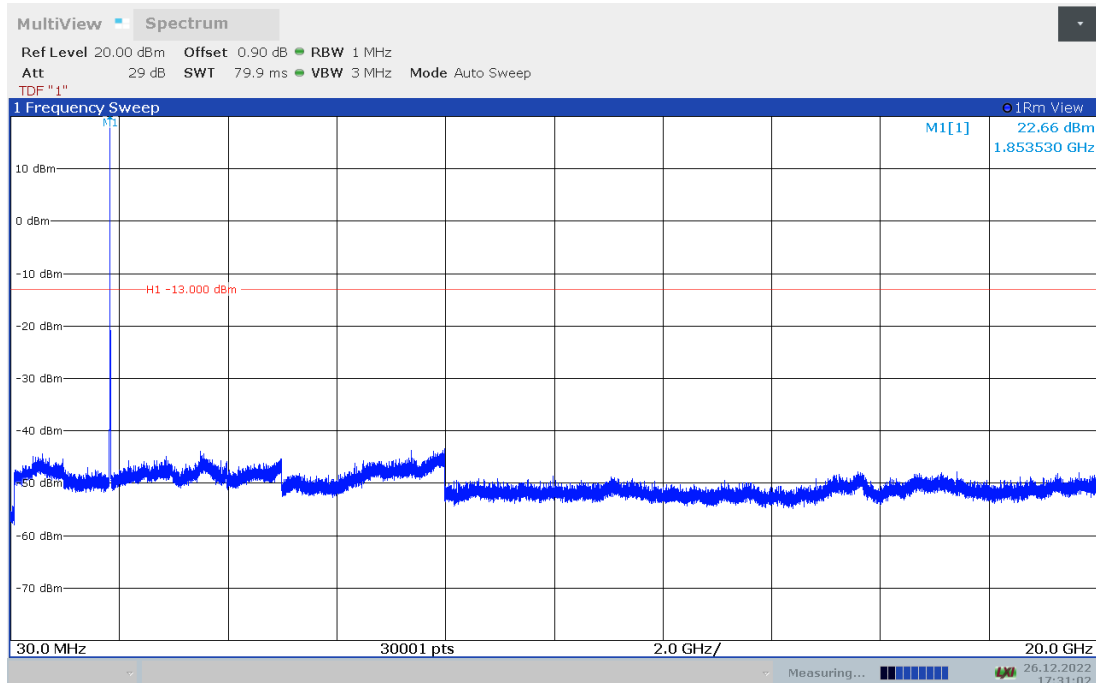
**A.6.3 Measurement result**

**Only worst case result is given below**

**WCDMA Band Ⅱ**

**Channel 9262: 30MHz –19.1GHz**
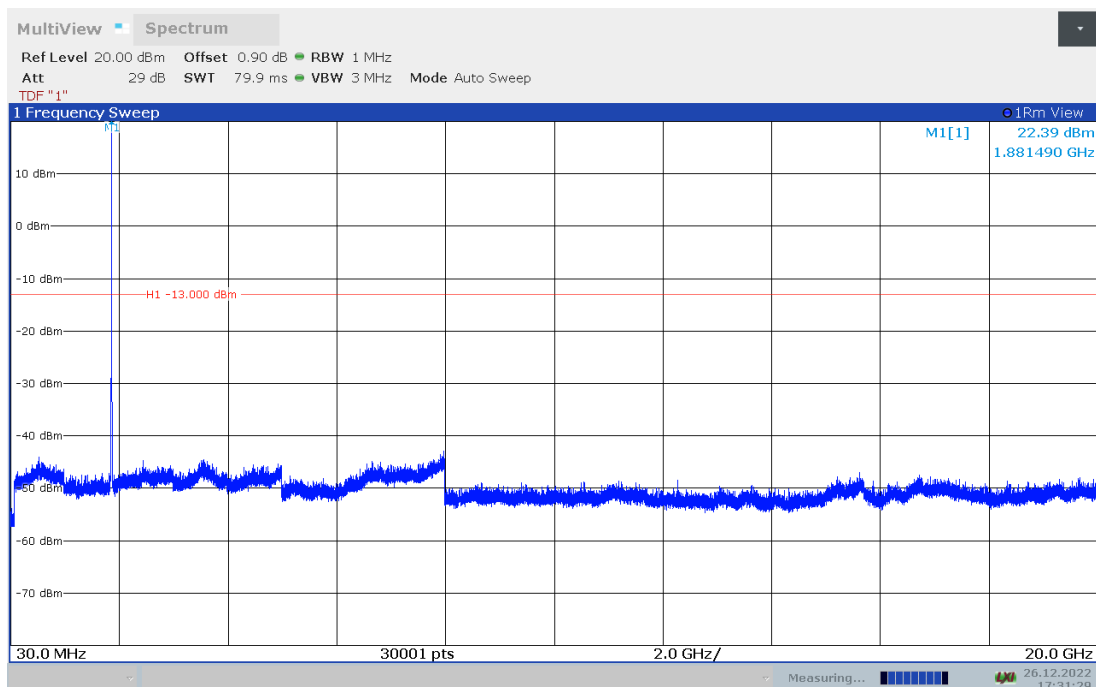
Spurious emission limit –13dBm.

**NOTE: peak above the limit line is the carrier frequency.**



**Channel 9400: 30MHz –19.1GHz**
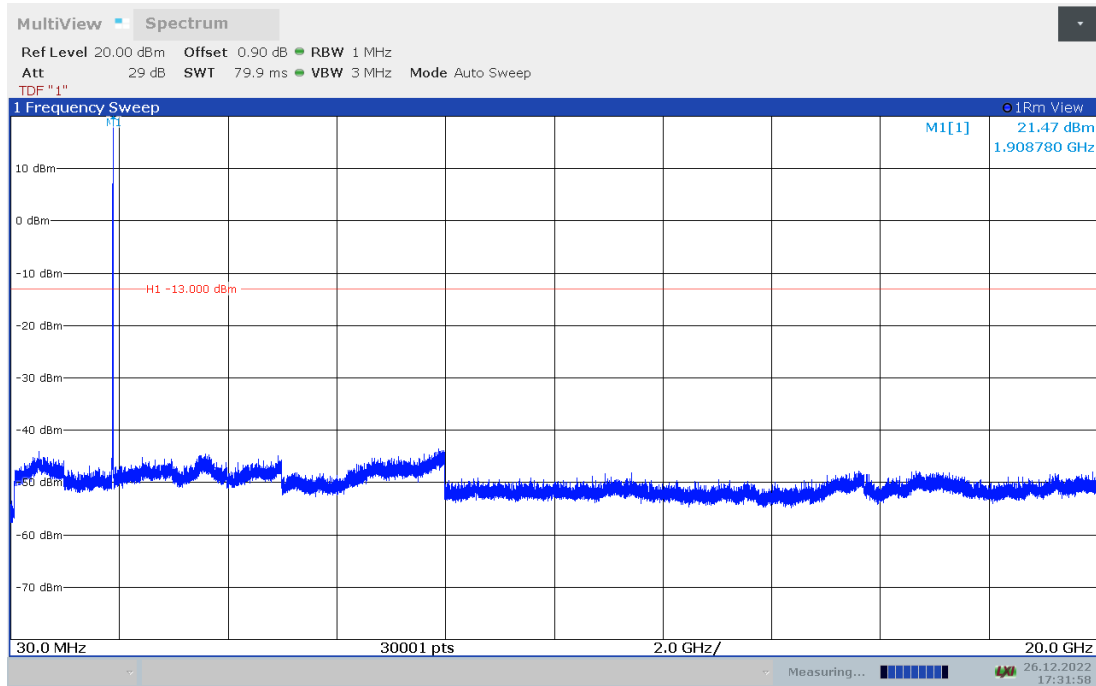
Spurious emission limit –13dBm.

**NOTE: peak above the limit line is the carrier frequency.**

**Channel 9538: 30MHz –19.1GHz**

Spurious emission limit –13dBm.

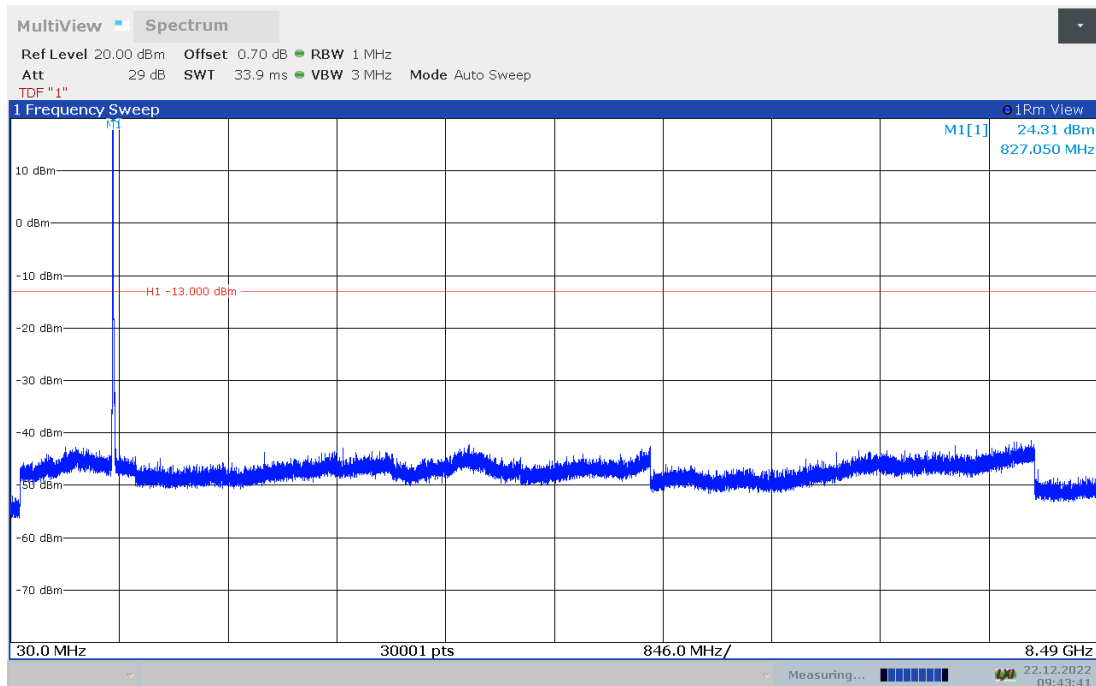**NOTE: peak above the limit line is the carrier frequency.**



**WCDMA Band V**

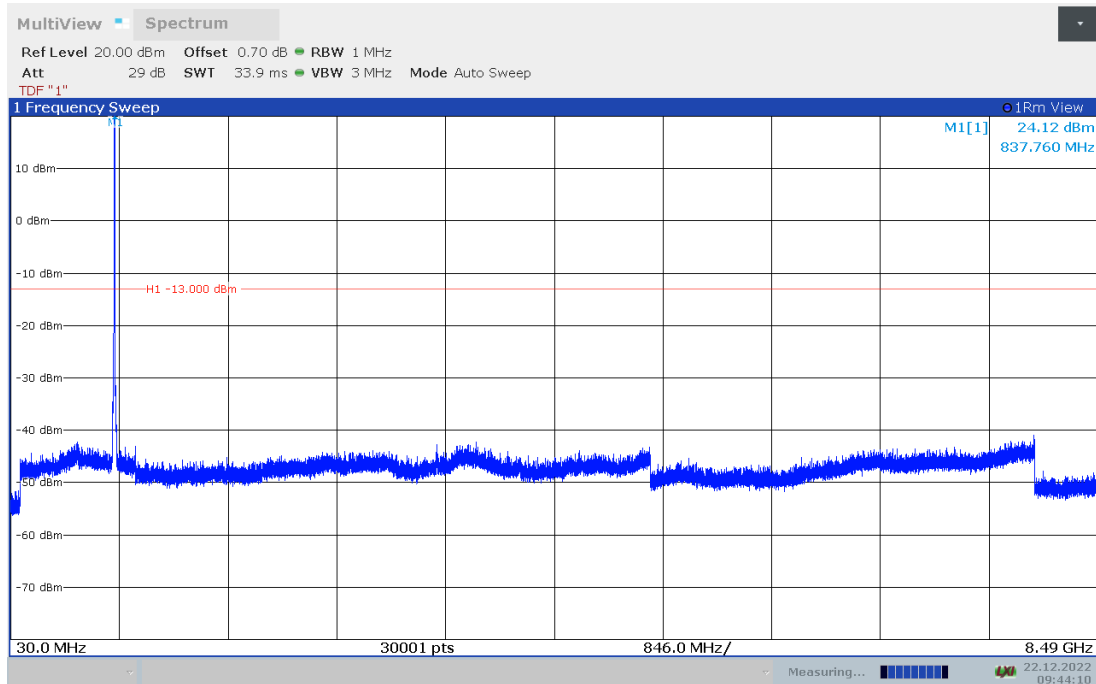**Channel 4132: 30MHz –8.49GHz**

Spurious emission limit –13dBm.

**NOTE: peak above the limit line is the carrier frequency.**

**Channel 4183: 30MHz –8.49GHz**
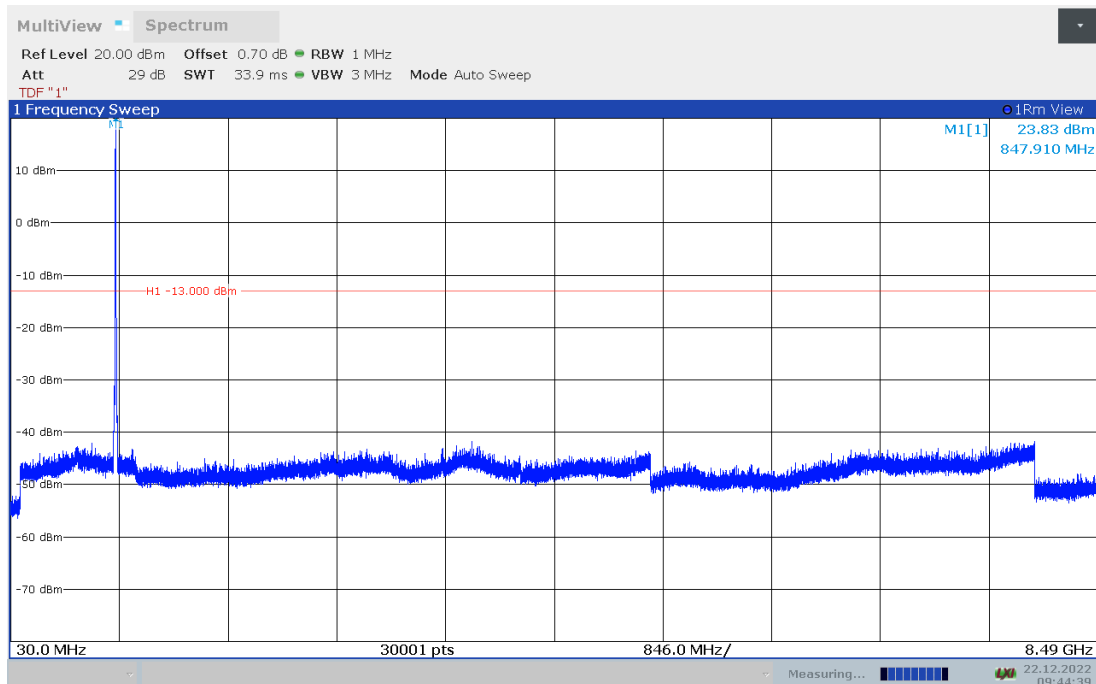
Spurious emission limit –13dBm.

**NOTE: peak above the limit line is the carrier frequency.**



**Channel 4233: 30MHz –8.49GHz**

Spurious emission limit –13dBm.

**NOTE: peak above the limit line is the carrier frequency.**



Note: Expanded measurement uncertainty is $U$ = 0.49 dB(100KHz-2GHz)/1.21 dB (2GHz-26.5GHz), $k$ = 1.96

## A.7 PEAK-TO-AVERAGE POWER RATIO

**Reference**

FCC: CFR Part 24.232, KDB971168 D01.

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

a)Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;

b) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;

c) Set the number of counts to a value that stabilizes the measured CCDF curve;

d) Set the measurement interval to 1 ms

e)Record the maximum PAPR level associated with a probability of 0.1%

**A.7.1 Measurement limit**
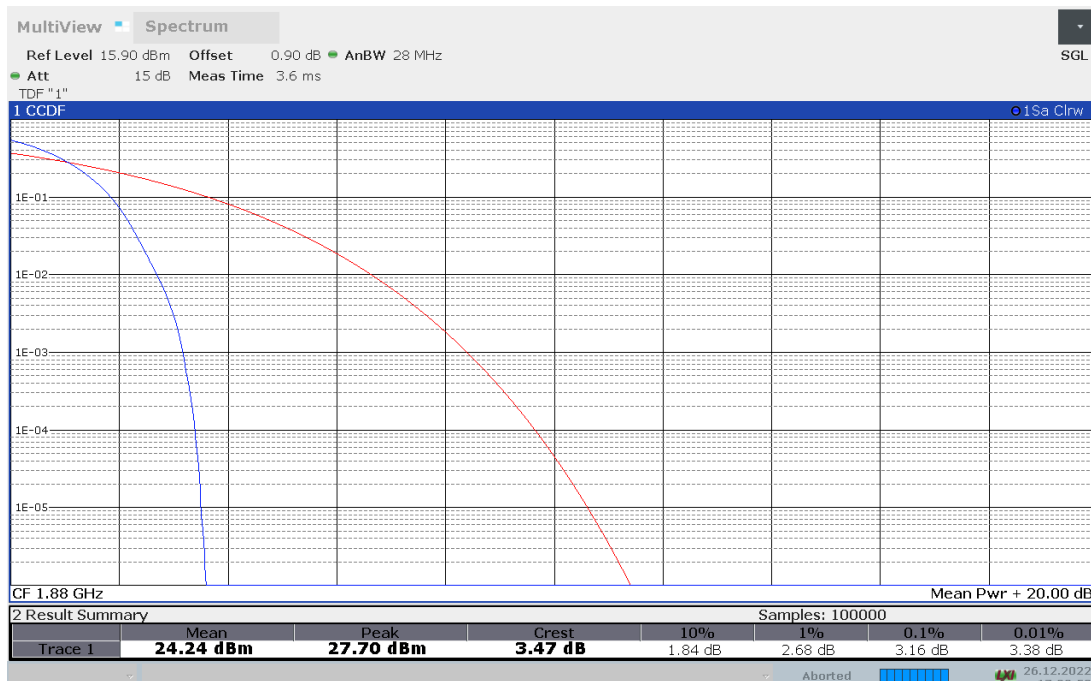
not exceed 13 dB

**A.7.2 Measurement results**

**Only worst case result is given below**

**WCDMA Band II (PAPR)-QPSK**

| Frequency(MHz) | Peak-To-Average Power Ratio(PAPR)(dB) |
|---|---|
| 1880.0 | 3.16 |

**WCDMA Band II**

**Channel 9400- Peak-To-Average Power Ratio(PAPR)-QPSK**

## WCDMA Band II (PAPR)-16QAM

| Frequency(MHz) | Peak-To-Average Power Ratio(PAPR)(dB) |
|---|---|
| 1880.0 | 4.96 |

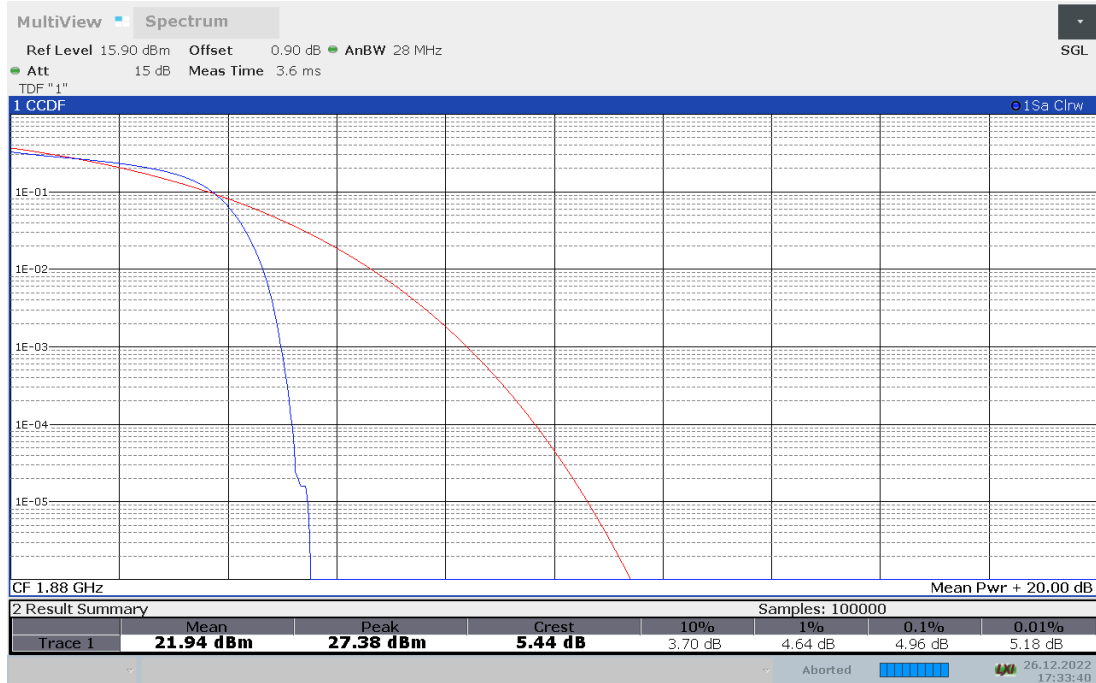## WCDMA Band II

### Channel 9400- Peak-To-Average Power Ratio(PAPR)-16QAM



## WCDMA Band V (PAPR)-QPSK

| Frequency(MHz) | Peak-To-Average Power Ratio(PAPR)(dB) |
|---|---|
| 836.6 | 3.18 |

## WCDMA Band V

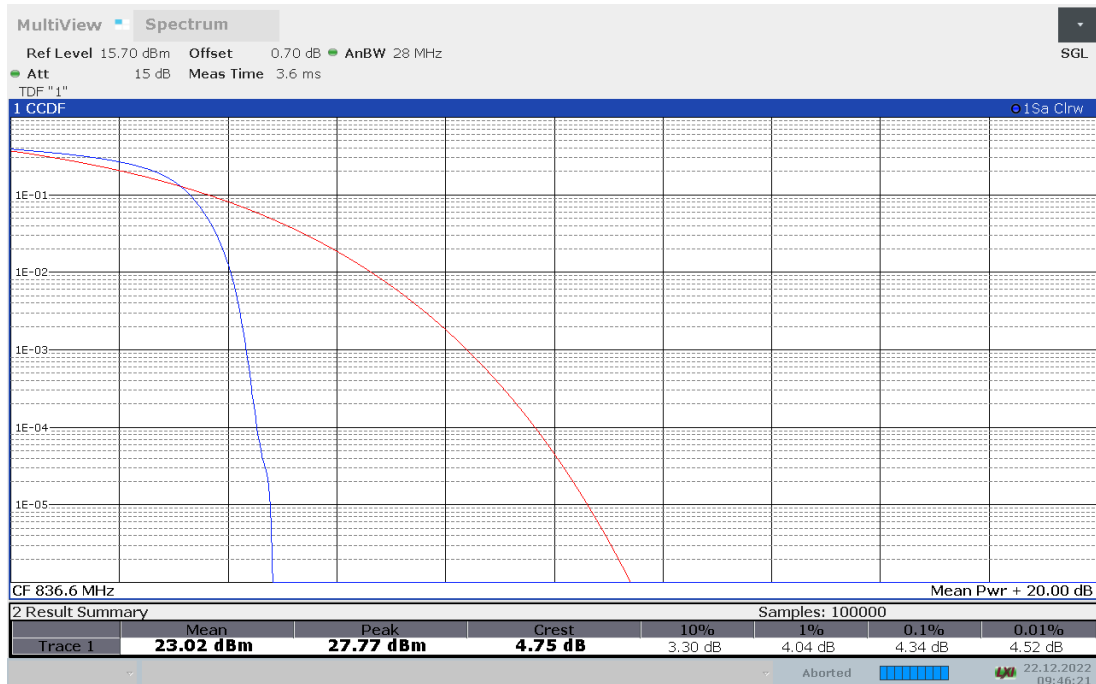### Channel 4183- Peak-To-Average Power Ratio(PAPR)-QPSK
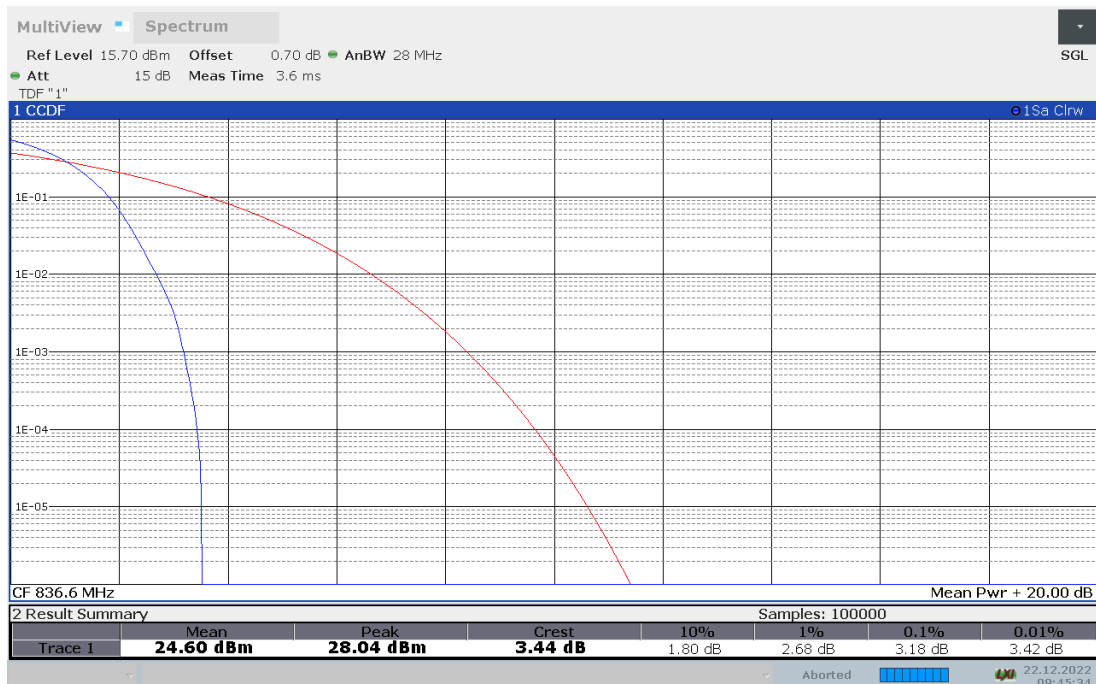
**WCDMA Band V (PAPR)-16QAM**

| Frequency(MHz) | Peak-To-Average Power Ratio(PAPR)(dB) |
|---|---|
| 836.6 | 4.34 |

**WCDMA Band V**

**Channel 4183- Peak-To-Average Power Ratio(PAPR)-16QAM**



Note: Expanded measurement uncertainty is *U* = 0.48 dB, *k* = 2

**\*\*\*END OF REPORT\*\*\***