# FCC RF Test Report

| | | |
|---|---|---|
| **APPLICANT** | : | **Guangdong OPPO Mobile Telecommunications Corp., Ltd.** |
| **EQUIPMENT** | : | **Mobile Phone** |
| **BRAND NAME** | : | **OPPO** |
| **MODEL NAME** | : | **CPH2065** |
| **FCC ID** | : | **R9C-CPH2065** |
| **STANDARD** | : | **47 CFR Part 2, 22, 27** |
| **CLASSIFICATION** | : | **PCS Licensed Transmitter Held to Ear (PCE)** |

**The product was received on Jun. 01, 2020 and completely tested on Jul. 11, 2020. We, Sporton International (ShenZhen) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.**

**The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (ShenZhen) Inc., the test report shall not be reproduced except in full.**

**Reviewed by: Derreck Chen / Supervisor**

**Approved by: Eric Shih / Manager**

ACCREDITED Cert #5145.01

***Sporton International (ShenZhen) Inc.***

***1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055***

***People's Republic of China***

# TABLE OF CONTENTS

# REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION | ISSUED DATE |
|---|---|---|---|
| FG060110C | Rev. 01 | Initial issue of report | Jul. 30, 2020 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

# SUMMARY OF TEST RESULT

| Report Section | FCC Rule | Description | Limit | Result | Remark |
|---|---|---|---|---|---|
| 3.4 | §2.1046 | Conducted Output Power | Reporting Only | PASS | - |
| | §22.913(a)(5) | Effective Radiated Power (5G NR n5) | ERP < 7 Watt | | |
| | §27.50(h)(2) | Equivalent Isotropic Radiated Power (5G NR n7) | EIRP < 2Watt | | |
| 3.5 | N/A | Peak-to-Average Ratio | <13 dB | PASS | - |
| 3.6 | §2.1049 | Occupied Bandwidth | Reporting Only | PASS | - |
| 3.7 | §2.1051 §22.917(a) | Conducted Band Edge Measurement (5G NR n5) | < 43+10log10(P[Watts]) | PASS | - |
| | §27.53(m)(4) | Conducted Band Edge Measurement (5G NR n7) | §27.53(m)(4) | | |
| 3.8 | §2.1051 §22.917(a) | Conducted Spurious Emission (5G NR n5) | < 43+10log10(P[Watts]) | PASS | - |
| | §2.1051 §27.53(m)(4) | Conducted Spurious Emission (5G NR n7) | < 55+10log$_{10}$(P[Watts]) | | |
| 3.9 | §2.1055 §22.355 | Frequency Stability Temperature & Voltage | < 2.5 ppm for Part 22 | PASS | - |
| | §2.1055 §27.54 | | Within Authorized Band | | |
| 4.4 | §2.1053 §22.917(a) | Radiated Spurious Emission (5G NR n5) | < 43+10log$_{10}$(P[Watts]) | PASS | Under limit 21.60 dB at 10104.360 MHz |
| | §2.1053 §27.53(m)(4) | Radiated Spurious Emission (5G NR n7) | < 55+10log$_{10}$(P[Watts]) | | |

# 1 General Description

## 1.1 Applicant

**Guangdong OPPO Mobile Telecommunications Corp., Ltd.**
NO.18 HaiBin Road,Wusha village,Chang An Town,DongGuan City,GuangDong,China

## 1.2 Manufacturer

**Guangdong OPPO Mobile Telecommunications Corp., Ltd.**
NO.18 HaiBin Road,Wusha village,Chang An Town,DongGuan City,GuangDong,China

## 1.3 Product Feature of Equipment Under Test

| Product Feature | |
|---|---|
| **Equipment** | Mobile Phone |
| **Brand Name** | OPPO |
| **Model Name** | CPH2065 |
| **FCC ID** | R9C-CPH2065 |
| **EUT supports Radios application** | GSM/WCDMA/LTE/5G NR<br>WLAN 2.4GHz 802.11b/g/n HT20/HT40<br>WLAN 5GHz 802.11a/n HT20/HT40<br>WLAN 5GHz 802.11ac VHT20/VHT40/VHT80<br>Bluetooth BR / EDR / LE<br>GNSS / NFC |
| **IMEI Code** | Conducted : 863597040018518/863597040018500<br>Radiation : 863597040018435/863597040018427 |
| **HW Version** | 11 |
| **SW Version** | ColorOS 7.1 |
| **EUT Stage** | Identical Prototype |

**Remark:**

1. Only 5G NR bands are tested in this report, all the other RF bands are tested in the other reports separately.
2. 5G NR n5 support NSA; 5G NR n7 support SA.
3. 5G NR supports CP-OFDM and DFT-s-OFDM modulation, for DFT-s-OFDM power is higher than CP-OFDM, so chose DFT-s-OFDM modulation to perform all test.
4. The maximum ERP/EIRP is calculated from max antenna gain and max conducted power, only the maximum ERP/EIRP of bottom antenna is shown on the report.

## 1.4 Product Specification of Equipment Under Test

| Standards-related Product Specification | |
|---|---|
| **Tx Frequency** | 5G NR n5: 826.5 MHz ~ 846.5 MHz<br>5G NR n7: 2502.5 MHz ~ 2567.5 MHz |
| **Rx Frequency** | 5G NR n5: 871.5 MHz ~ 891.5 MHz<br>5G NR n7: 2622.5MHz ~ 2687.5 MHz |
| **Bandwidth** | n5, n7: 5MHz / 10MHz / 15MHz / 20MHz |
| **Maximum Output Power to Antenna** | Top Antenna:<br>EN-DC_7A_n5A : 23.01 dBm<br>5G NR_n7 : 23.26 dBm<br>Bottom Antenna:<br>EN-DC_7A_n5A : 23.29 dBm<br>5G NR_n7 : 23.52 dBm |
| **Antenna Gain** | Top Antenna:<br>n5 : -4.20 dBi<br>n7 : 1.70 dBi<br>Bottom Antenna:<br>n5 : -3.90 dBi<br>n7 : 1.50 dBi |
| **Type of Modulation** | CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM<br>DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM |

## 1.5 Modification of EUT

No modifications are made to the EUT during all test items.

## 1.6 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

| 5G NR n5 (EN DC_7A-n5A) | | PI/2 BPSK | | QPSK | |
|---|---|---|---|---|---|
| **BW (MHz)** | **Frequency Range (MHz)** | **Emission Designator (99%OBW)** | **Maximum EIRP(W)** | **Emission Designator (99%OBW)** | **Maximum EIRP(W)** |
| **5** | 826.5 ~ 846.5 | 4M51G7D | 0.0530 | 4M50G7D | 0.0518 |
| **10** | 829.0 ~ 844.0 | 9M17G7D | 0.0476 | 8M99G7D | 0.0482 |
| **20** | 834.0 ~ 839.0 | 17M9G7D | 0.0490 | 18M0G7D | 0.0494 |
| **Frequency Tolerance (ppm)** | | 0.0023 | | | |

| 5G NR n7 | | PI/2 BPSK | | QPSK | |
|---|---|---|---|---|---|
| BW (MHz) | Frequency Range (MHz) | Emission Designator (99%OBW) | Maximum EIRP(W) | Emission Designator (99%OBW) | Maximum EIRP(W) |
| 5 | 2502.5 ~ 2567.5 | 4M48G7D | 0.3162 | 4M50G7D | 0.3034 |
| 10 | 2505.0 ~ 2565.0 | 9M05G7D | 0.3069 | 9M07G7D | 0.3155 |
| 20 | 2510.0 ~ 2560.0 | 17M9G7D | 0.3177 | 17M9G7D | 0.3041 |
| Frequency Tolerance (ppm) | | 0.0025 | | | |

## 1.7 Testing Location

Sporton International (Shenzhen) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

| Test Firm | Sporton International (Shenzhen) Inc. | | |
|---|---|---|---|
| Test Site Location | 1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China<br>TEL: +86-755-86379589<br>FAX: +86-755-86379595 | | |
| Test Site No. | Sporton Site No. | FCC Designation No. | FCC Test Firm Registration No. |
| | TH01-SZ | CN1256 | 421272 |

| Test Firm | Sporton International (Shenzhen) Inc. | | |
|---|---|---|---|
| Test Site Location | No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan Shenzhen, 518055 People's Republic of China<br>TEL: +86-755-33202398 | | |
| Test Site No. | Sporton Site No. | FCC Designation No. | FCC Test Firm Registration No. |
| | 03CH02-SZ | CN1256 | 421272 |

## 1.8 Test Software

| Item | Site | Manufacture | Name | Version |
|---|---|---|---|---|
| 1. | 03CH02-SZ | AUDIX | E3 | 6.2009-8-24a |

## 1.9 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 2, 22, 24, 27
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

**Remark:**

All test items were verified and recorded according to the standards and without any deviation during the test.

# 2 Test Configuration of Equipment Under Test

## 2.1 Test Mode

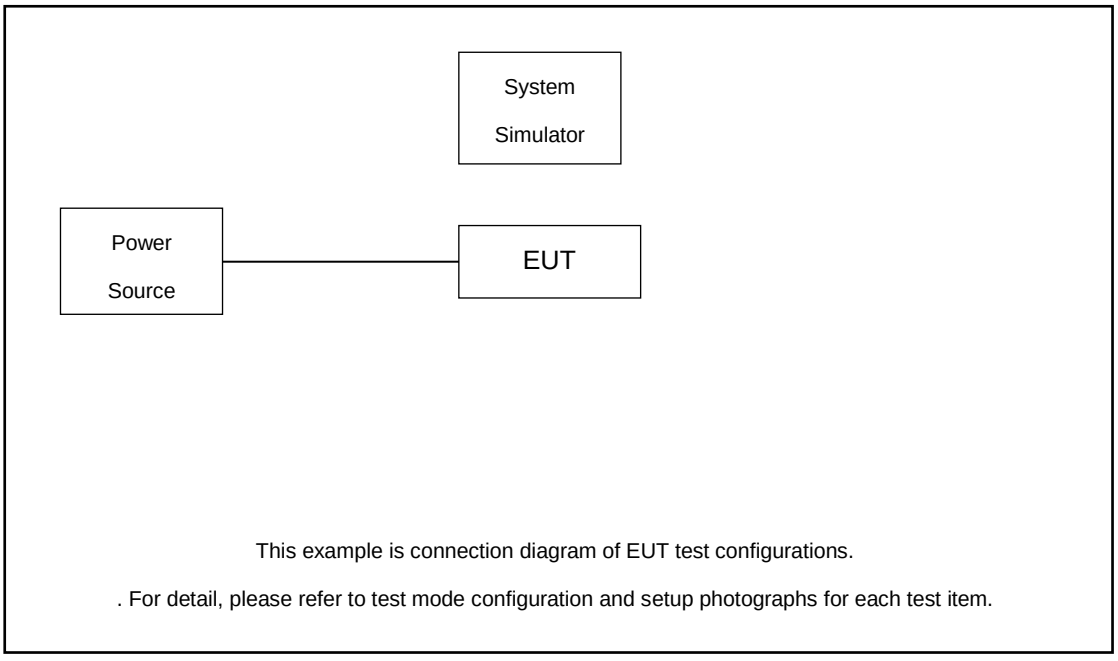
Antenna port conducted and radiated test items are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.

The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.

| | X Plane | Y Plane | Z Plane |
|---|---|---|---|
| **Orthogonal Planes of EUT** |  |  |  |

## 2.2 Connection Diagram of Test System




This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

## 2.3 Support Unit used in test configuration and system

| Item | Equipment | Trade Name | Model No. | FCC ID | Data Cable | Power Cord |
|---|---|---|---|---|---|---|
| 1. | DC Power Supply | GW | GPS-3030D | N/A | N/A | Unshielded, 1.8 m |
| 2. | LTE Base Station | Anritsu | MT8821C | N/A | N/A | Unshielded, 1.8 m |
| 3. | NR Base Station | Anritsu | MT8000A | N/A | N/A | Unshielded, 1.8 m |
| 4. | Fixture | INTEL | NGFF Card Carrier | N/A | N/A | N/A |

## 2.4 Measurement Results Explanation Example

**For all conducted test items:**

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

*Offset = RF cable loss.*

Following shows an offset computation example with cable loss 3.7 dB

Example :

*Offset(dB) = RF cable loss(dB).*

= 3.7 (dB)

## 2.5 Frequency List of Low/Middle/High Channels

| 5G NR n5 Channel and Frequency List | | |
|---|---|---|
| **NR Bandwidth (MHz)** | **Channel** | **NR Frequncy (MHz)** |
| 20 | Low | 834 |
| | Mid. | 836.5 |
| | High | 839 |
| 10 | Low | 829 |
| | Mid. | 836.5 |
| | High | 844 |
| 5 | Low | 826.5 |
| | Mid. | 836.5 |
| | High | 846.5 |

| 5G NR n7 Channel and Frequency List | | |
|---|---|---|
| **NR Bandwidth (MHz)** | **Channel** | **NR Frequncy (MHz)** |
| 20 | Low | 2510 |
| | Mid. | 2535 |
| | High | 2560 |
| 10 | Low | 2505 |
| | Mid. | 2535 |
| | High | 2565 |
| 5 | Low | 2502.5 |
| | Mid. | 2535 |
| | High | 2567.5 |

# 3 Conducted Test Items

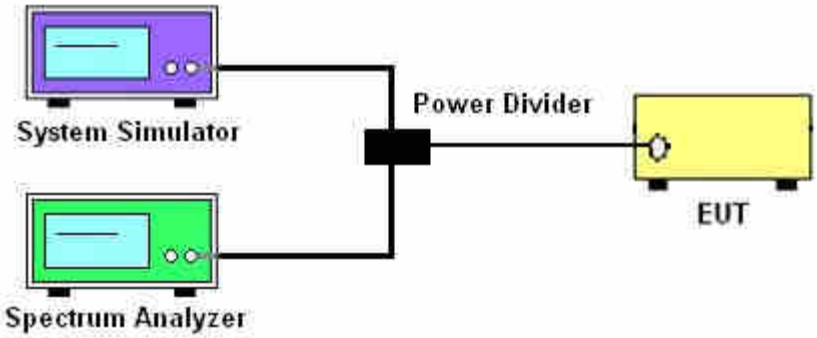
## 3.1 Measuring Instruments

See list of measuring instruments of this test report.

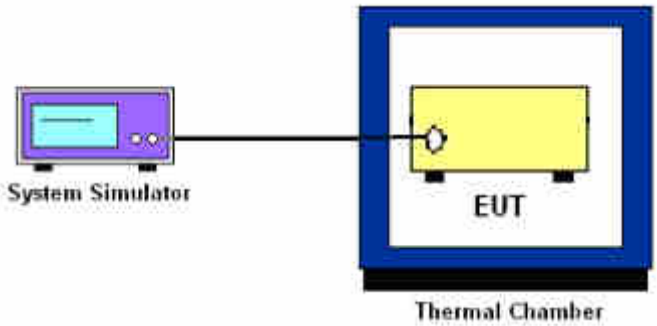
## 3.2 Test Setup

### 3.2.1 Conducted Output Power


### 3.2.2 Peak-to-Average Ratio, Occupied Bandwidth ,Conducted Band-Edge and Conducted Spurious Emission




### 3.2.3 Frequency Stability




## 3.3 Test Result of Conducted Test

Please refer to Appendix A.

## 3.4 Conducted Output Power and ERP/EIRP

### 3.4.1 Description of the Conducted Output Power Measurement and ERP/EIRP Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The ERP of mobile transmitters must not exceed 7 Watts for 5G NR n5.

The EIRP of mobile transmitters must not exceed 2 Watts for 5G NR n7.

According to KDB 412172 D01 Power Approach,

EIRP = $P_T + G_T – L_C$, ERP = EIRP -2.15, where

$P_T$ = transmitter output power in dBm

$G_T$ = gain of the transmitting antenna in dBi

$L_C$ = signal attenuation in the connecting cable between the transmitter and antenna in dB

### 3.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system simulator.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure and record the power level from the system simulator.

## 3.5 Peak-to-Average Ratio

### 3.5.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. 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.

### 3.5.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2.3.4 (CCDF).
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.

# 3.6 Occupied Bandwidth

## 3.6.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

## 3.6.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.4
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
4. The nominal resolution bandwidth (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.
5. Set the detection mode to peak, and the trace mode to max hold.
6. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)
7. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
8. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “–X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

# 3.7 Conducted Band Edge

## 3.7.1 Description of Conducted Band Edge Measurement

22.917(a)

For operations in the 824 – 849 MHz band, the FCC limit is 43 + $10\log_{10}$(P[Watts]) dB below the transmitter power P(Watts) in a 100kHz bandwidth. However, in the 1MHz bands immediately outside and 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.

27.53(m)(4)

For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

## 3.7.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured.
4. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
5. Beyond the 1 MHz band from the band edge, RBW=1MHz was used.
6. Set spectrum analyzer with RMS detector.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. Checked that all the results comply with the emission limit line.
   Example:
   The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
   = P(W)- [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB) = -13dBm.
9. For 5G NR n7, the other 40 dB, and 55 dB have additionally applied same calculation above.

# 3.8 Conducted Spurious Emission

## 3.8.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

For 5G NR n7:

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its $10^{th}$ harmonic.

## 3.8.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
7. Set spectrum analyzer with RMS detector.
8. Taking the record of maximum spurious emission.
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
10. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.
11. For 5G NR n7
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [55+ 10log(P)] (dB)
    = [30+ 10log(P)] (dBm) - [55+ 10log(P)] (dB)
    = -25dBm.

# 3.9 Frequency Stability

## 3.9.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.

## 3.9.2 Test Procedures for Temperature Variation

1. The testing follows ANSI C63.26 section 5.6.4
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

## 3.9.3 Test Procedures for Voltage Variation

1. The testing follows ANSI C63.26 section 5.6.5
2. The EUT was placed in a temperature chamber at 20±5°C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.
4. For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.
5. The variation in frequency was measured for the worst case.

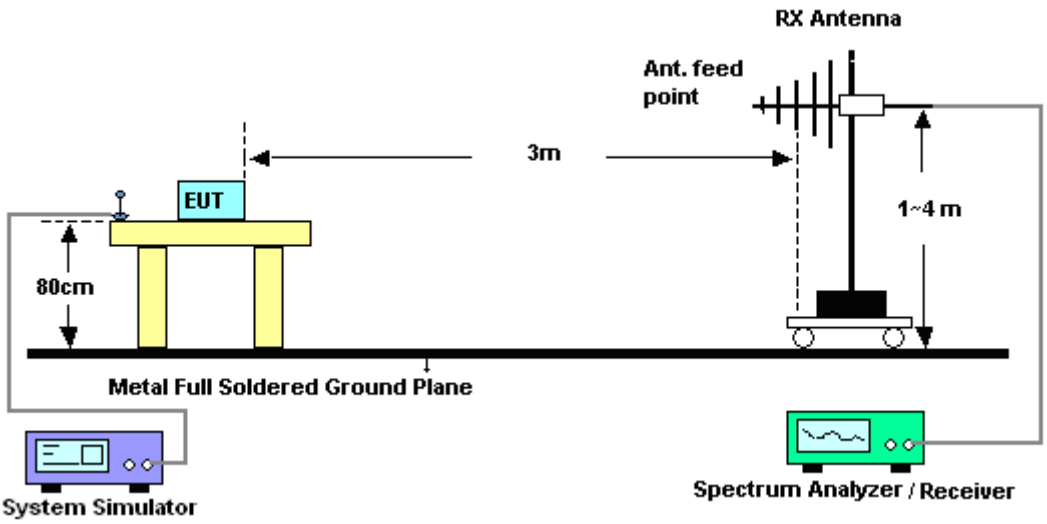
# 4 Radiated Test Items

## 4.1 Measuring Instruments

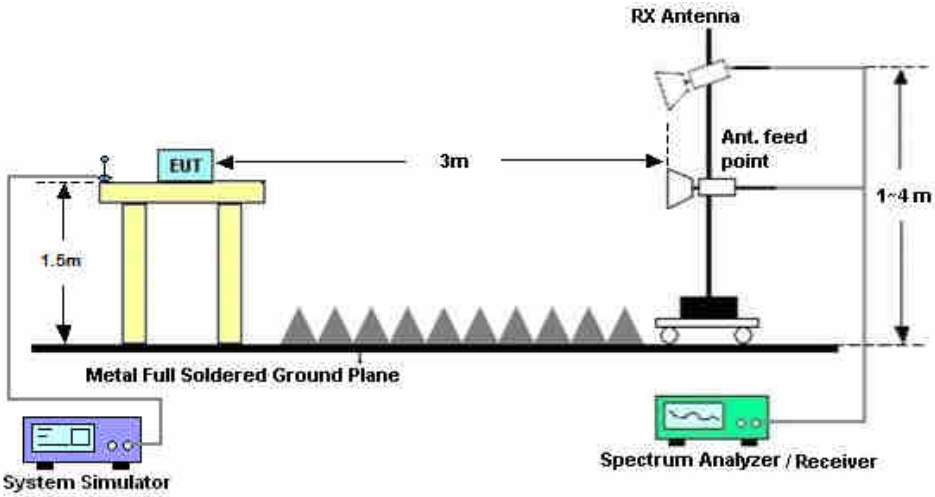
See list of measuring instruments of this test report.

## 4.2 Test Setup

### 4.2.1 For radiated test from 30MHz to 1GHz




### 4.2.2 For radiated test above 1GHz




## 4.3 Test Result of Radiated Test

Please refer to Appendix B.

# 4.4 Radiated Spurious Emission

## 4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

For 5G NR n7

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

## 4.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
10. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11. ERP (dBm) = EIRP - 2.15
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
    The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.
13. For 5G NR n7:
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)

# 5 List of Measuring Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|---|---|---|---|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSV40 | 101078 | 10Hz~40GHz | Apr. 16, 2010 | Jun. 09, 2020~ Jul. 11, 2020 | Apr. 15, 2021 | Conducted (TH01-SZ) |
| DC Power Supply | GWINSTEK | AnritsuGPS-3030D | EM882636 | Max 30V | Apr. 16, 2010 | Jun. 09, 2020~ Jul. 11, 2020 | Apr. 15, 2021 | Conducted (TH01-SZ) |
| Thermal Chamber | Ten Billion Hongzhangroup | LP-150U | H2014081803 | -40~+150°C | Dec. 26, 2019 | Jun. 09, 2020~ Jul. 11, 2020 | Dec. 25, 2020 | Conducted (TH01-SZ) |
| EXA Spectrum Analyzer | KEYSIGHT | N9010A | MY55150213 | 10Hz~44GHz | Apr. 17, 2020 | Jun. 29, 2020 | Apr. 16, 2021 | Radiation (03CH02-SZ) |
| Bilog Antenna | TeseQ | CBL6112D | 35407 | 30MHz-2GHz | Jul. 19, 2019 | Jun. 29, 2020 | Jul. 18, 2020 | Radiation (03CH02-SZ) |
| Double Ridge Horn Antenna | ETS-Lindgren | 3117 | 00119436 | 1GHz~18GHz | Aug. 27, 2019 | Jun. 29, 2020 | Aug. 26, 2020 | Radiation (03CH02-SZ) |
| HF Amplifier | MITEQ | TTA1840-35-HG | 1871923 | 18GHz~40GHz | Jul. 22. 2019 | Jun. 29, 2020 | Jul. 21. 2020 | Radiation (03CH02-SZ) |
| SHF-EHF Horn | com-power | AH-840 | 101071 | 18Ghz-40GHz | Apr. 17, 2020 | Jun. 29, 2020 | Apr. 16, 2021 | Radiation (03CH02-SZ) |
| LF Amplifier | Burgeon | BPA-530 | 102211 | 0.01~3000Mhz | Oct. 18,2019 | Jun. 29, 2020 | Oct. 17,2020 | Radiation (03CH02-SZ) |
| HF Amplifier | KEYSIGHT | 83017A | MY53270105 | 0.5GHz~26.5Ghz | Oct. 18,2019 | Jun. 29, 2020 | Oct. 17,2020 | Radiation (03CH02-SZ) |
| AC Power Source | Chroma | 61601 | 616010002470 | N/A | NCR | Jun. 29, 2020 | NCR | Radiation (03CH02-SZ) |
| Turn Table | Chaintek | T-200 | N/A | 0~360 degree | NCR | Jun. 29, 2020 | NCR | Radiation (03CH02-SZ) |
| Antenna Mast | Chaintek | MBS-400 | N/A | 1 m~4 m | NCR | Jun. 29, 2020 | NCR | Radiation (03CH02-SZ) |

NCR: No Calibration Required

# 6 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

**Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)**

| | |
|---|---|
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **2.47dB** |

**Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)**

| | |
|---|---|
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **3.31dB** |

**Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)**

| | |
|---|---|
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **3.72dB** |

# Appendix A. Test Results of Conducted Test

## Conducted Output Power(Average power and EIRP)

### Bottom antenna

| EN-DC_7A_n5A | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Combination 20MHz+20MHz(LTE) | | | | | | | | | | | |
| NR Channel | NR Freq. | LTE Channel | LTE Freq. | Modulation | NR | | LTE | | NR | LTE | Total | EIRP (W) |
| | | | | | RB Size | RB offset | RB Size | RB offset | Measured Power (dBm) | Measured Power (dBm) | Measured Power (dBm) | |
| 166800 | 834 | 20850 | 2510 | PI/2 BPSK DFT-s-OFDM | 1 | 1 | 1 | 0 | 22.63 | -0.54 | 22.65 | 0.0457 |
| | | | | | 1 | 104 | 1 | 99 | 22.64 | -0.53 | 22.66 | 0.0458 |
| | | | | | 50 | 25 | 100 | 0 | 22.93 | -0.39 | 22.95 | 0.049 |
| | | | | QPSK DFT-s-OFDM | 1 | 1 | 1 | 0 | 22.69 | -0.45 | 22.71 | 0.0464 |
| | | | | | 1 | 104 | 1 | 99 | 22.67 | -0.47 | 22.69 | 0.0461 |
| | | | | | 50 | 25 | 100 | 0 | 22.97 | -0.43 | 22.99 | 0.0494 |
| 167300 | 836.5 | 21100 | 2535 | PI/2 BPSK DFT-s-OFDM | 1 | 1 | 1 | 0 | 22.69 | -0.2 | 22.71 | 0.0464 |
| | | | | | 1 | 104 | 1 | 99 | 22.61 | -0.13 | 22.63 | 0.0455 |
| | | | | | 50 | 25 | 100 | 0 | 22.89 | -0.23 | 22.91 | 0.0485 |
| | | | | QPSK DFT-s-OFDM | 1 | 1 | 1 | 0 | 22.65 | -0.13 | 22.67 | 0.0459 |
| | | | | | 1 | 104 | 1 | 99 | 22.58 | -0.23 | 22.60 | 0.0452 |
| | | | | | 50 | 25 | 100 | 0 | 22.84 | -0.26 | 22.86 | 0.048 |
| 167800 | 839 | 21350 | 2560 | PI/2 BPSK DFT-s-OFDM | 1 | 1 | 1 | 0 | 22.76 | -0.22 | 22.78 | 0.0471 |
| | | | | | 1 | 104 | 1 | 99 | 22.62 | -0.17 | 22.64 | 0.0456 |
| | | | | | 50 | 25 | 100 | 0 | 22.91 | -0.25 | 22.93 | 0.0488 |
| | | | | QPSK DFT-s-OFDM | 1 | 1 | 1 | 0 | 22.78 | -0.26 | 22.80 | 0.0473 |
| | | | | | 1 | 104 | 1 | 99 | 22.66 | -0.26 | 22.68 | 0.046 |
| | | | | | 50 | 25 | 100 | 0 | 22.89 | -0.25 | 22.91 | 0.0485 |

| EN-DC_7A_n5A | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Combination 10MHz+20MHz(LTE) | | | | | | | | | | | | |
| NR Channel | NR Freq. | LTE Channel | LTE Freq. | Modulation | NR | | LTE | | NR | LTE | Total | EIRP (W) |
| | | | | | RB Size | RB offset | RB Size | RB offset | Measured Power (dBm) | Measured Power (dBm) | Measured Power (dBm) | |
| 165800 | 829 | 20850 | 2510 | PI/2 BPSK DFT-s-OFDM | 1 | 1 | 1 | 0 | 22.62 | -0.44 | 22.64 | 0.0456 |
| | | | | | 1 | 50 | 1 | 99 | 22.71 | -0.46 | 22.73 | 0.0466 |
| | | | | | 25 | 12 | 100 | 0 | 22.81 | -0.47 | 22.83 | 0.0476 |
| | | | | QPSK DFT-s-OFDM | 1 | 1 | 1 | 0 | 22.67 | -0.45 | 22.69 | 0.0461 |
| | | | | | 1 | 50 | 1 | 99 | 22.67 | -0.46 | 22.69 | 0.0461 |
| | | | | | 25 | 12 | 100 | 0 | 22.82 | -0.48 | 22.84 | 0.0478 |
| 167300 | 836.5 | 21100 | 2535 | PI/2 BPSK DFT-s-OFDM | 1 | 1 | 1 | 0 | 22.79 | -0.23 | 22.81 | 0.0474 |
| | | | | | 1 | 50 | 1 | 99 | 22.58 | -0.28 | 22.60 | 0.0452 |
| | | | | | 25 | 12 | 100 | 0 | 22.74 | -0.23 | 22.76 | 0.0469 |
| | | | | QPSK DFT-s-OFDM | 1 | 1 | 1 | 0 | 22.84 | -0.2 | 22.86 | 0.048 |
| | | | | | 1 | 50 | 1 | 99 | 22.57 | -0.25 | 22.59 | 0.0451 |
| | | | | | 25 | 12 | 100 | 0 | 22.8 | -0.25 | 22.82 | 0.0475 |
| 168800 | 844 | 21350 | 2560 | PI/2 BPSK DFT-s-OFDM | 1 | 1 | 1 | 0 | 22.77 | -0.35 | 22.79 | 0.0472 |
| | | | | | 1 | 50 | 1 | 99 | 22.74 | -0.28 | 22.76 | 0.0469 |
| | | | | | 25 | 12 | 100 | 0 | 22.78 | -0.36 | 22.80 | 0.0473 |
| | | | | QPSK DFT-s-OFDM | 1 | 1 | 1 | 0 | 22.79 | -0.28 | 22.81 | 0.0474 |
| | | | | | 1 | 50 | 1 | 99 | 22.75 | -0.3 | 22.77 | 0.047 |
| | | | | | 25 | 12 | 100 | 0 | 22.86 | -0.17 | 22.88 | 0.0482 |

| EN-DC_7A_n5A | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Combination 5MHz+20MHz(LTE) | | | | | | | | | | | | |
| NR Channel | NR Freq. | LTE Channel | LTE Freq. | Modulation | NR | | LTE | | NR | LTE | Total | EIRP (W) |
| | | | | | RB Size | RB offset | RB Size | RB offset | Measured Power (dBm) | Measured Power (dBm) | Measured Power (dBm) | |
| 165300 | 826.5 | 20850 | 2510 | PI/2 BPSK DFT-s-OFDM | 1 | 1 | 1 | 0 | 23.02 | -0.51 | 23.04 | 0.0500 |
| | | | | | 1 | 23 | 1 | 99 | 22.92 | -0.5 | 22.94 | 0.0489 |
| | | | | | 12 | 6 | 100 | 0 | 23.01 | -0.48 | 23.03 | 0.0499 |
| | | | | QPSK DFT-s-OFDM | 1 | 1 | 1 | 0 | 23.03 | -0.51 | 23.05 | 0.0501 |
| | | | | | 1 | 23 | 1 | 99 | 22.86 | -0.59 | 22.88 | 0.0482 |
| | | | | | 12 | 6 | 100 | 0 | 23.07 | -0.42 | 23.09 | 0.0506 |
| 167300 | 836.5 | 21100 | 2535 | PI/2 BPSK DFT-s-OFDM | 1 | 1 | 1 | 0 | 23.27 | -0.21 | 23.29 | 0.053 |
| | | | | | 1 | 23 | 1 | 99 | 23.13 | -0.23 | 23.15 | 0.0513 |
| | | | | | 12 | 6 | 100 | 0 | 23.12 | -0.24 | 23.14 | 0.0512 |
| | | | | QPSK DFT-s-OFDM | 1 | 1 | 1 | 0 | 23.17 | -0.36 | 23.19 | 0.0518 |
| | | | | | 1 | 23 | 1 | 99 | 22.96 | -0.23 | 22.98 | 0.0493 |
| | | | | | 12 | 6 | 100 | 0 | 23.13 | -0.29 | 23.15 | 0.0513 |
| 169300 | 846.5 | 21350 | 2560 | PI/2 BPSK DFT-s-OFDM | 1 | 1 | 1 | 0 | 23.02 | -0.24 | 23.04 | 0.05 |
| | | | | | 1 | 23 | 1 | 99 | 22.94 | -0.23 | 22.96 | 0.0491 |
| | | | | | 12 | 6 | 100 | 0 | 23.12 | -0.26 | 23.14 | 0.0512 |
| | | | | QPSK DFT-s-OFDM | 1 | 1 | 1 | 0 | 23.04 | -0.39 | 23.06 | 0.0502 |
| | | | | | 1 | 23 | 1 | 99 | 22.91 | -0.19 | 22.93 | 0.0488 |
| | | | | | 12 | 6 | 100 | 0 | 23.14 | -0.27 | 23.16 | 0.0514 |

| 5G NR_n7 | | | | | | |
|---|---|---|---|---|---|---|
| 20MHz | | | | | | |
| NR Channel | NR Freq. | Modulation | NR | | NR | EIRP (W) |
| | | | RB Size | RB offset | Measured Power (dBm) | |
| 502000 | 2510 | PI/2 BPSK DFT-s-OFDM | 1 | 1 | 23.1 | 0.2884 |
| | | | 1 | 104 | 23.46 | 0.3133 |
| | | | 50 | 25 | 23.52 | 0.3177 |
| | | QPSK DFT-s-OFDM | 1 | 1 | 22.98 | 0.2805 |
| | | | 1 | 104 | 23.19 | 0.2944 |
| | | | 50 | 25 | 23.11 | 0.2891 |
| 507000 | 2535 | PI/2 BPSK DFT-s-OFDM | 1 | 1 | 22.92 | 0.2767 |
| | | | 1 | 104 | 23.4 | 0.309 |
| | | | 50 | 25 | 23.34 | 0.3048 |
| | | QPSK DFT-s-OFDM | 1 | 1 | 22.93 | 0.2773 |
| | | | 1 | 104 | 23.18 | 0.2938 |
| | | | 50 | 25 | 23.33 | 0.3041 |
| 512000 | 2560 | PI/2 BPSK DFT-s-OFDM | 1 | 1 | 22.97 | 0.2799 |
| | | | 1 | 104 | 22.57 | 0.2553 |
| | | | 50 | 25 | 23.2 | 0.2951 |
| | | QPSK DFT-s-OFDM | 1 | 1 | 22.84 | 0.2716 |
| | | | 1 | 104 | 22.49 | 0.2506 |
| | | | 50 | 25 | 23.18 | 0.2938 |

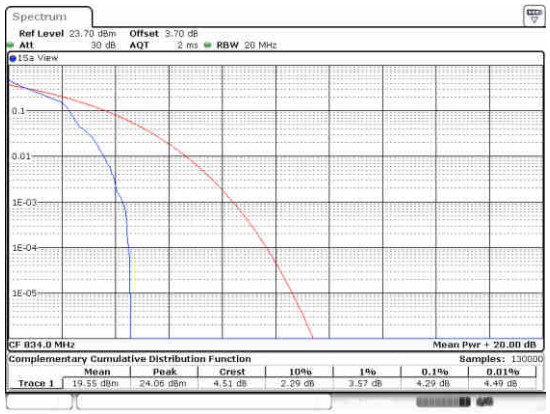
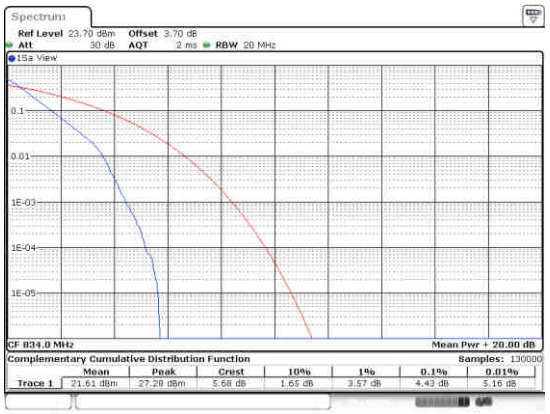
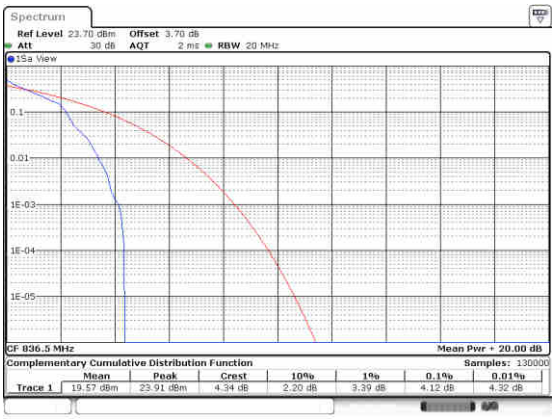
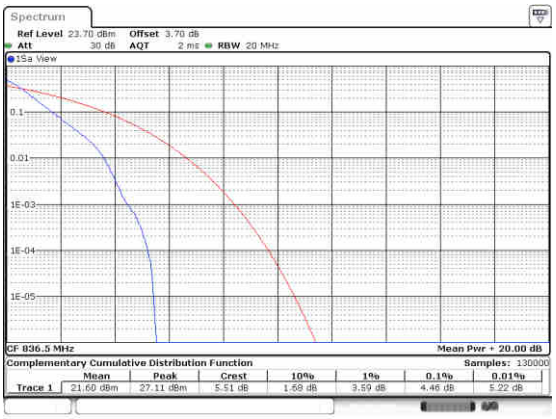
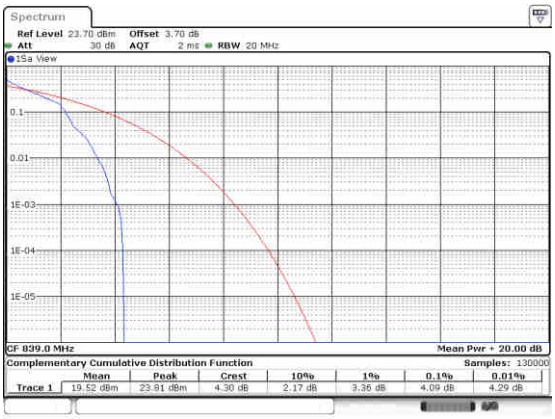
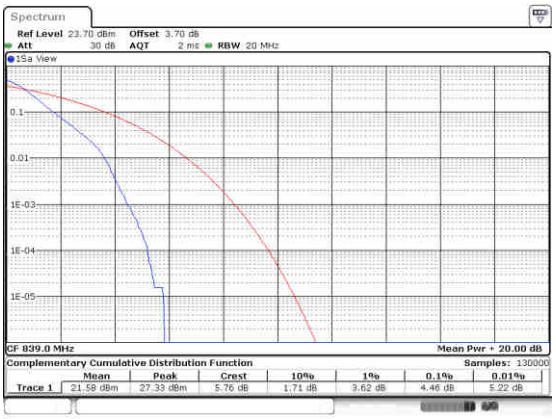
| 5G NR_n7 | | | | | | |
|---|---|---|---|---|---|---|
| 10MHz | | | | | | |
| NR Channel | NR Freq. | Modulation | NR | | NR | EIRP (W) |
| | | | RB Size | RB offset | Measured Power (dBm) | |
| 501000 | 2505 | PI/2 BPSK DFT-s-OFDM | 1 | 1 | 23 | 0.2818 |
| | | | 1 | 50 | 23.01 | 0.2825 |
| | | | 25 | 12 | 23.37 | 0.3069 |
| | | QPSK DFT-s-OFDM | 1 | 1 | 23.35 | 0.3055 |
| | | | 1 | 50 | 23.28 | 0.3006 |
| | | | 25 | 12 | 23.49 | 0.3155 |
| 507000 | 2535 | PI/2 BPSK DFT-s-OFDM | 1 | 1 | 23.13 | 0.2904 |
| | | | 1 | 50 | 23.25 | 0.2985 |
| | | | 25 | 12 | 23.26 | 0.2992 |
| | | QPSK DFT-s-OFDM | 1 | 1 | 23.19 | 0.2944 |
| | | | 1 | 50 | 23.16 | 0.2924 |
| | | | 25 | 12 | 23.38 | 0.3076 |
| 513000 | 2565 | PI/2 BPSK DFT-s-OFDM | 1 | 1 | 23.26 | 0.2992 |
| | | | 1 | 50 | 22.75 | 0.2661 |
| | | | 25 | 12 | 23.06 | 0.2858 |
| | | QPSK DFT-s-OFDM | 1 | 1 | 23.13 | 0.2904 |
| | | | 1 | 50 | 22.56 | 0.2547 |
| | | | 25 | 12 | 23 | 0.2818 |

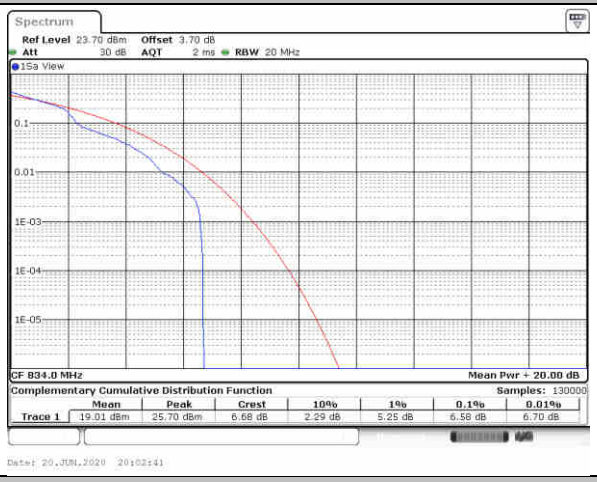
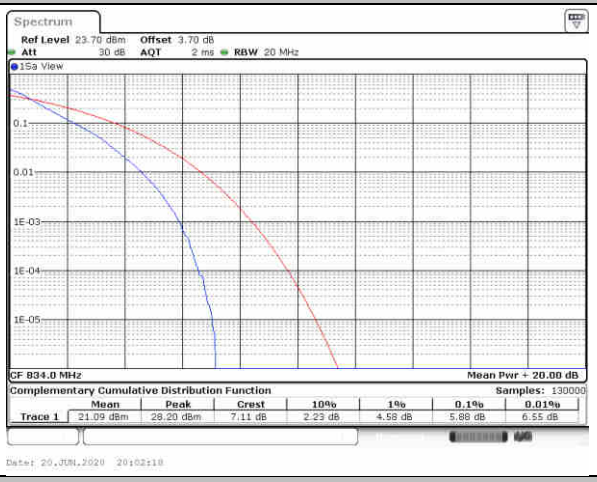
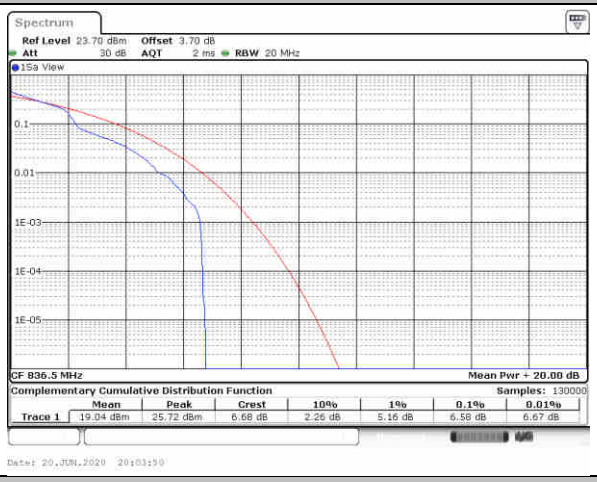
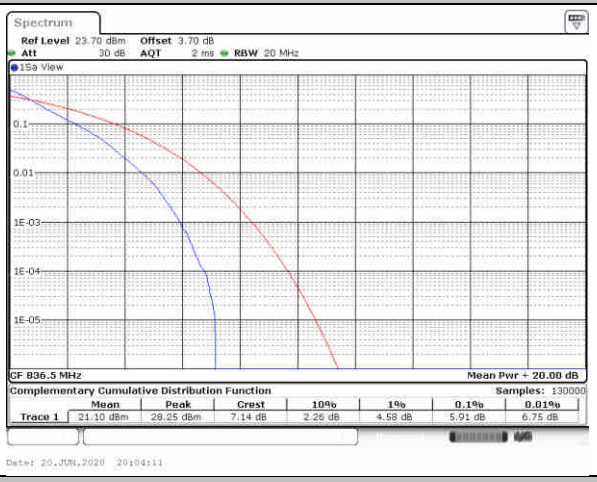
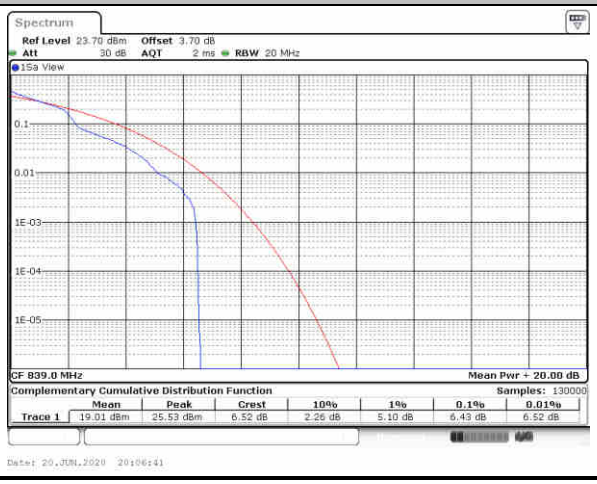
| 5G NR_n7 | | | | | | |
|---|---|---|---|---|---|---|
| 5MHz | | | | | | |
| NR Channel | NR Freq. | Modulation | NR | | NR | EIRP (W) |
| | | | RB Size | RB offset | Measured Power (dBm) | |
| 500500 | 2502.5 | PI/2 BPSK DFT-s-OFDM | 1 | 1 | 22.76 | 0.2667 |
| | | | 1 | 23 | 22.77 | 0.2673 |
| | | | 12 | 6 | 22.85 | 0.2723 |
| | | QPSK DFT-s-OFDM | 1 | 1 | 22.62 | 0.2582 |
| | | | 1 | 23 | 22.57 | 0.2553 |
| | | | 12 | 6 | 22.82 | 0.2704 |
| 507000 | 2535 | PI/2 BPSK DFT-s-OFDM | 1 | 1 | 23.5 | 0.3162 |
| | | | 1 | 23 | 23.4 | 0.309 |
| | | | 12 | 6 | 23.46 | 0.3133 |
| | | QPSK DFT-s-OFDM | 1 | 1 | 23.32 | 0.3034 |
| | | | 1 | 23 | 23.08 | 0.2871 |
| | | | 12 | 6 | 23.29 | 0.3013 |
| 513500 | 2567.5 | PI/2 BPSK DFT-s-OFDM | 1 | 1 | 23.01 | 0.2825 |
| | | | 1 | 23 | 22.48 | 0.25 |
| | | | 12 | 6 | 22.79 | 0.2685 |
| | | QPSK DFT-s-OFDM | 1 | 1 | 22.99 | 0.2812 |
| | | | 1 | 23 | 22.8 | 0.2692 |
| | | | 12 | 6 | 22.96 | 0.2793 |

# 5G NR n5

## Peak-to-Average Ratio

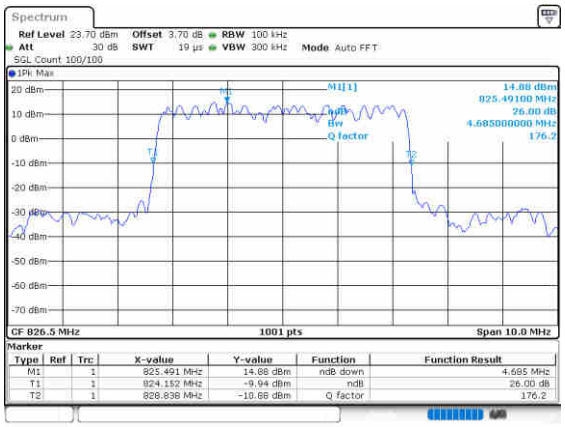
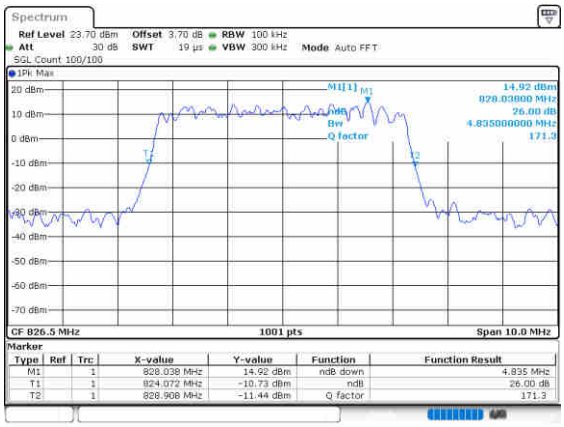
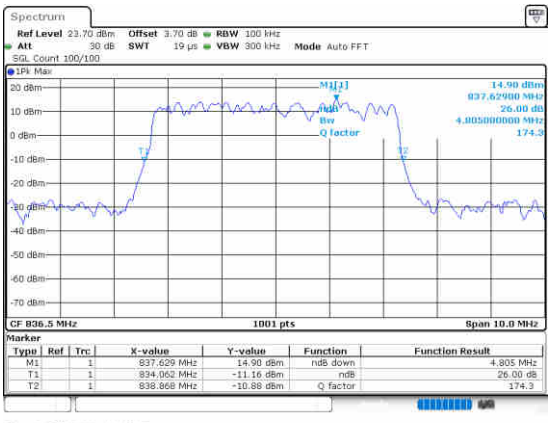
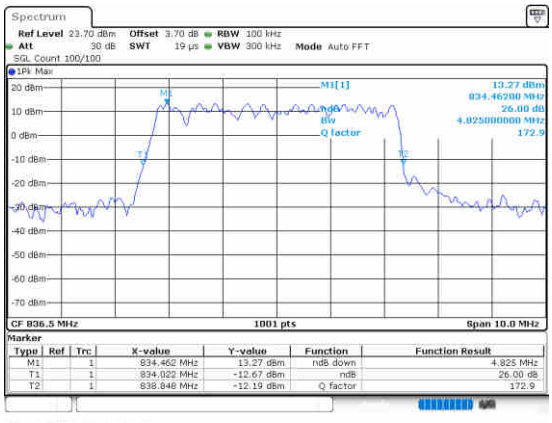
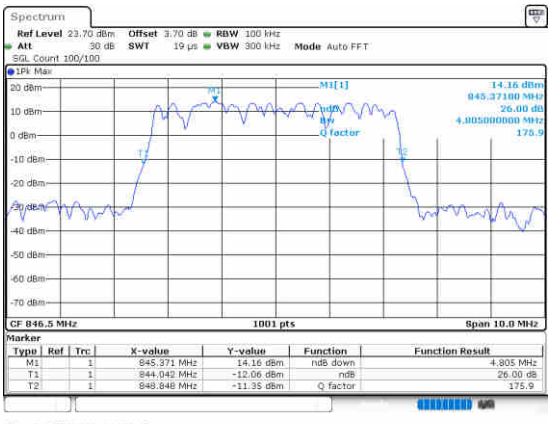
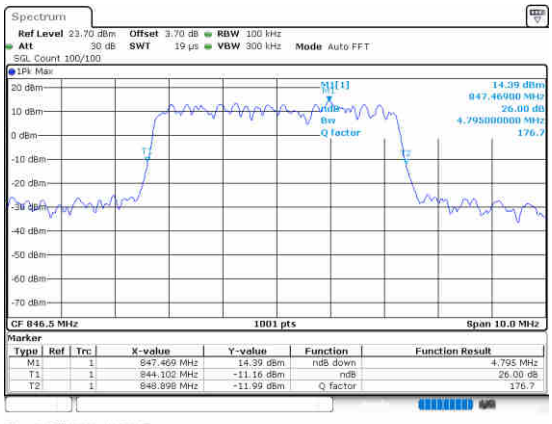
| Mode | NR N5+7A / 20MHz | | | | |
|---|---|---|---|---|---|
| Mod. | BPSK | | QPSK | | Limit: 13dB |
| RB Size | 1RB | Full RB | 1RB | Full RB | Result |
| Lowest CH | 4.29 | 4.43 | 6.58 | 5.88 | PASS |
| Middle CH | 4.12 | 4.46 | 6.58 | 5.91 | |
| Highest CH | 4.09 | 4.46 | 6.43 | 5.86 | |

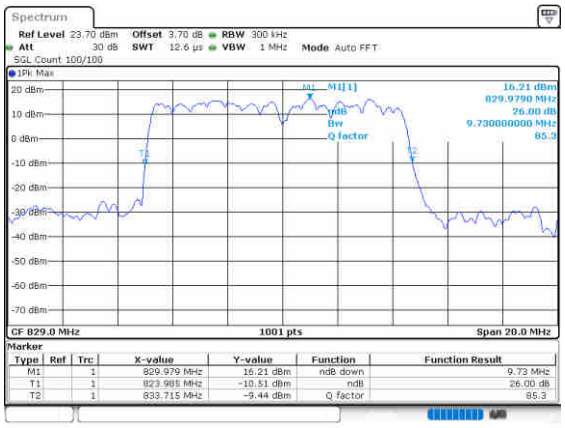
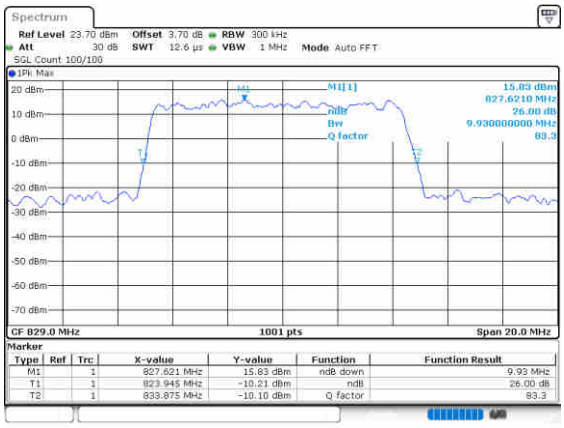
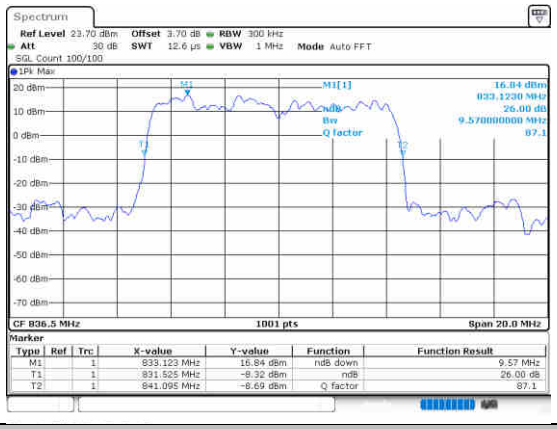
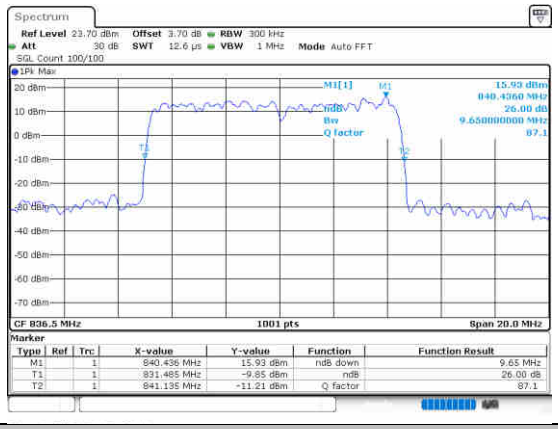
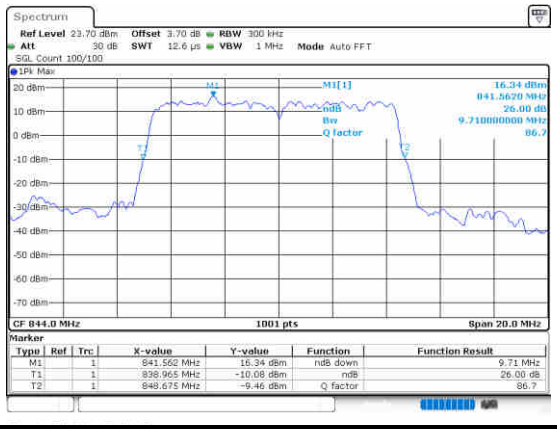
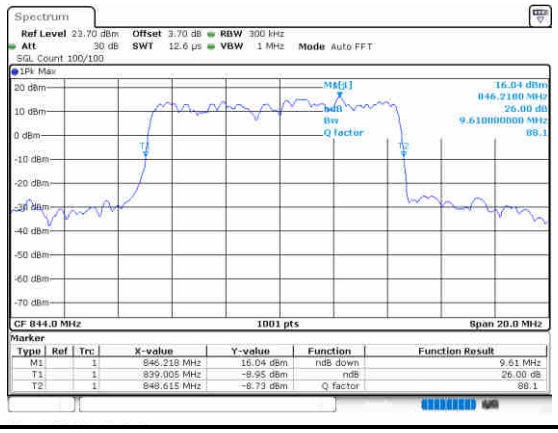
| NR N5+7A / 20MHz / BPSK | |
|---|---|
| **Lowest Channel / 1RB** | **Lowest Channel / Full RB** |
|  |  |
| **Middle Channel / 1RB** | **Middle Channel / Full RB** |
|  |  |
| **Highest Channel / 1RB** | **Highest Channel / Full RB** |
|  |  |

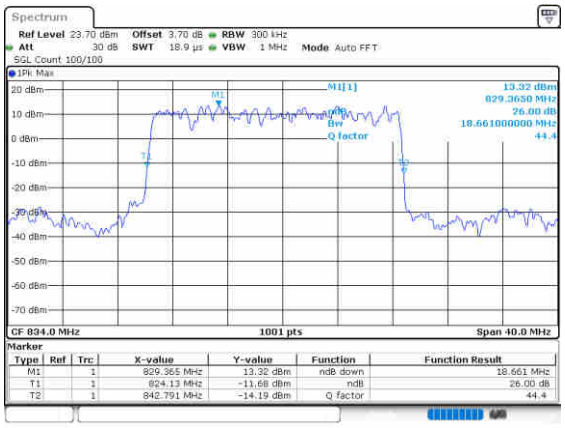
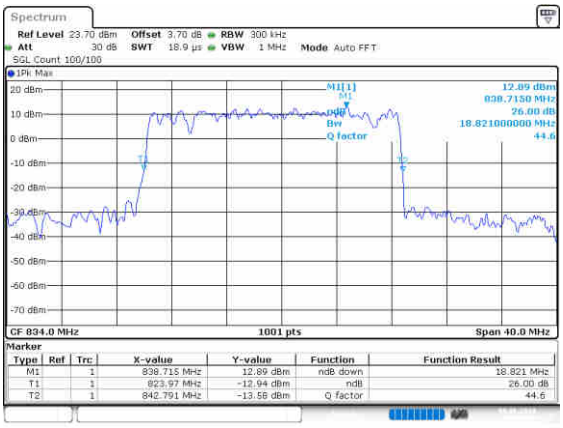
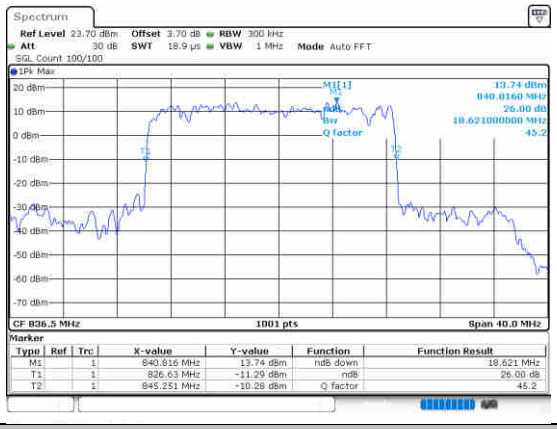
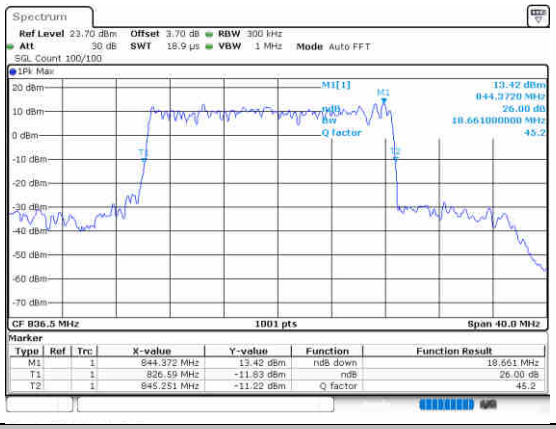
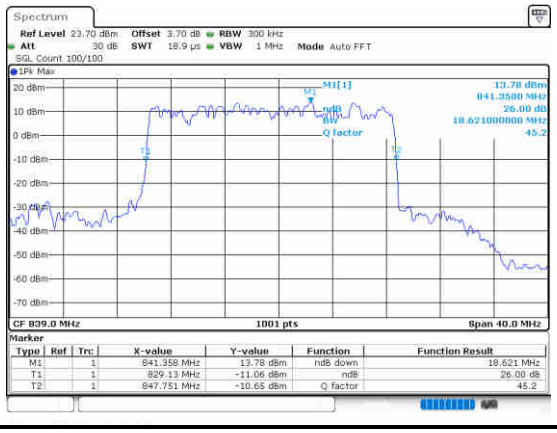
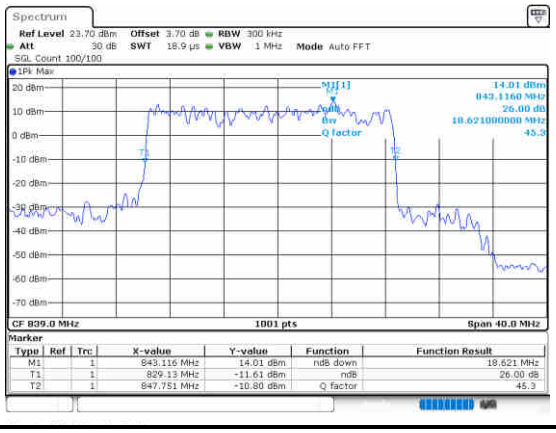
| NR N5+7A / 20MHz / QPSK | |
|---|---|
| **Lowest Channel / 1RB** | **Lowest Channel / Full RB** |
|  |  |
| **Middle Channel / 1RB** | **Middle Channel / Full RB** |
|  |  |
| **Highest Channel / 1RB** | **Highest Channel / Full RB** |
|  |  |

# 26dB Bandwidth

| Mode | NR N5+7A : 26dB BW(MHz) | | | | | |
|---|---|---|---|---|---|---|
| BW | 5 MHz | | 10 MHz | | 20 MHz | |
| Mod. | BPSK | QPSK | BPSK | QPSK | BPSK | QPSK |
| Lowest CH | 4.685 | 4.835 | 9.73 | 9.93 | 18.661 | 18.821 |
| Middle CH | 4.805 | 4.825 | 9.57 | 9.65 | 18.621 | 18.661 |
| Highest CH | 4.805 | 4.795 | 9.71 | 9.61 | 18.621 | 18.621 |

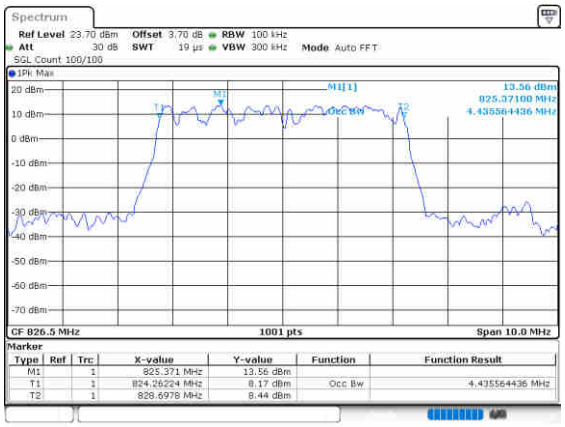
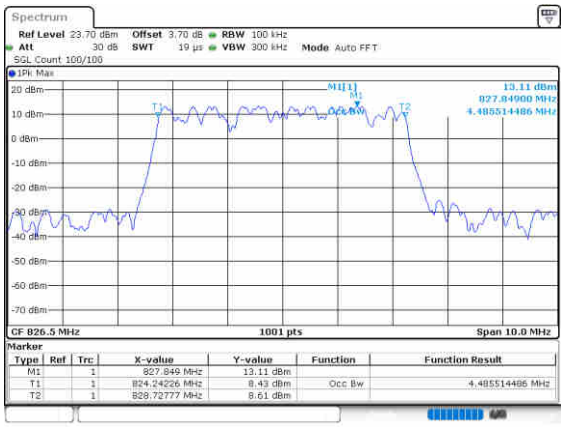
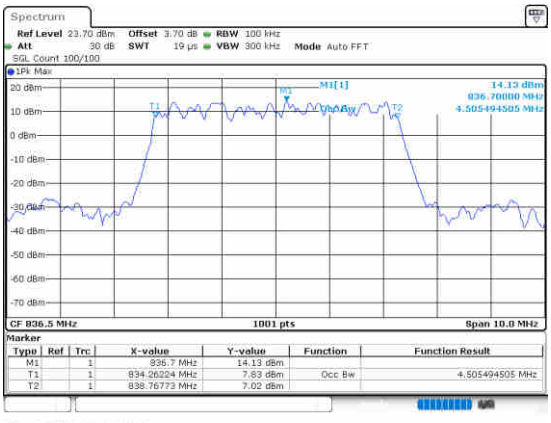
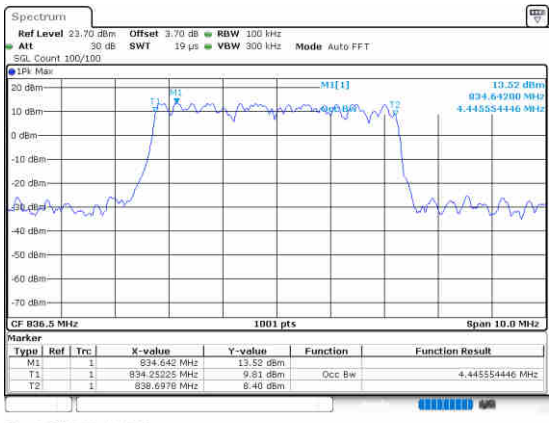
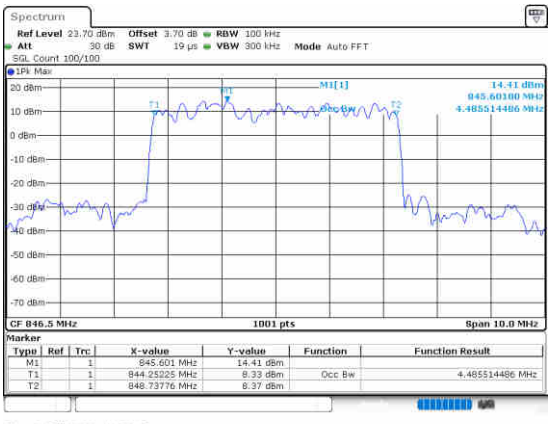
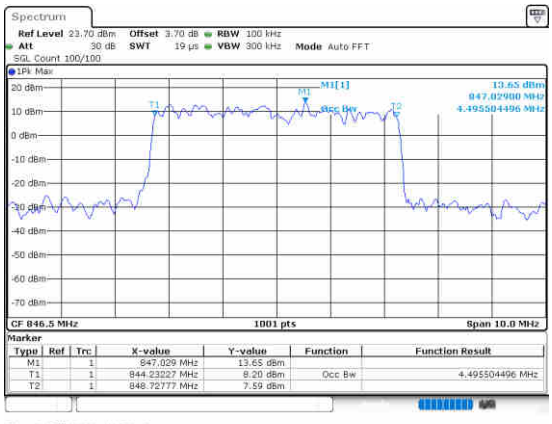
| NR N5+7A | |
|---|---|
| **Lowest Channel / 5MHz / BPSK** | **Lowest Channel / 5MHz / QPSK** |
|  |  |
| **Middle Channel / 5MHz / BPSK** | **Middle Channel / 5MHz / QPSK** |
|  |  |
| **Highest Channel / 5MHz / BPSK** | **Highest Channel / 5MHz / QPSK** |
|  |  |

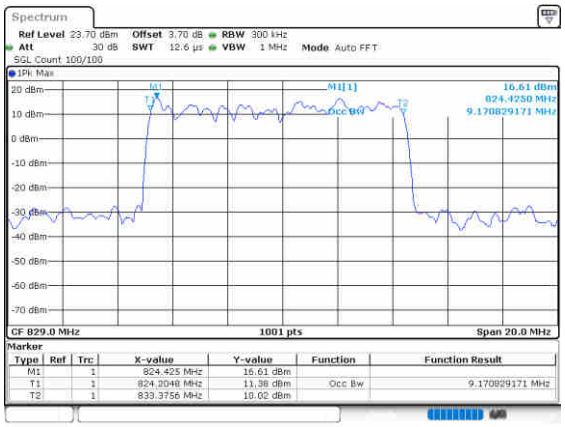
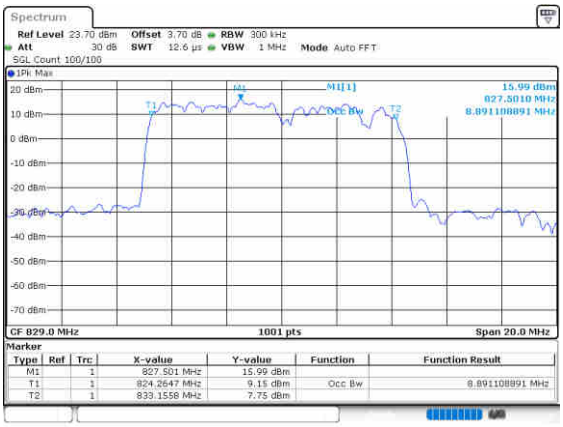
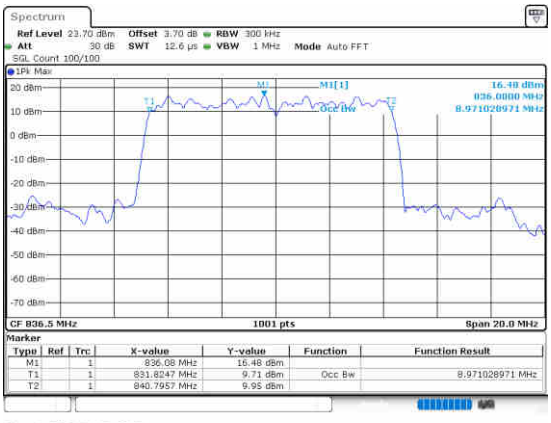
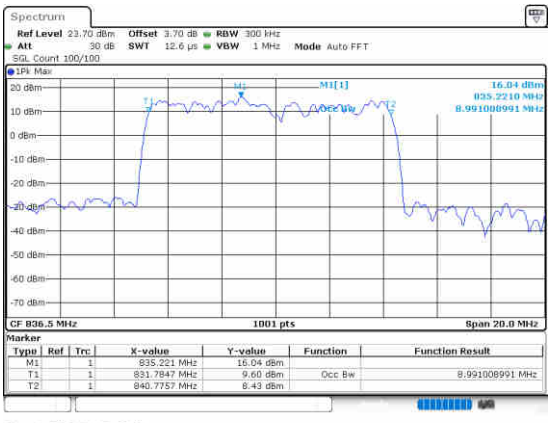
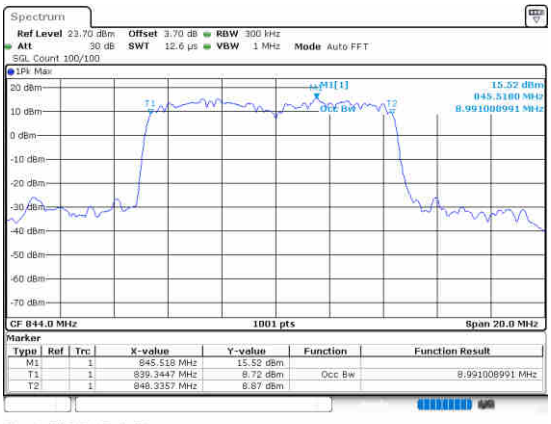
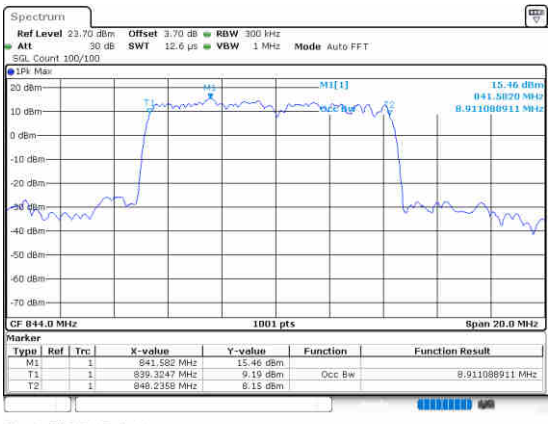
| NR N5+7A | |
|---|---|
| **Lowest Channel / 10MHz / BPSK** | **Lowest Channel / 10MHz / QPSK** |
|  |  |
| **Middle Channel / 10MHz / BPSK** | **Middle Channel / 10MHz / QPSK** |
|  |  |
| **Highest Channel / 10MHz / BPSK** | **Highest Channel / 10MHz / QPSK** |
|  |  |

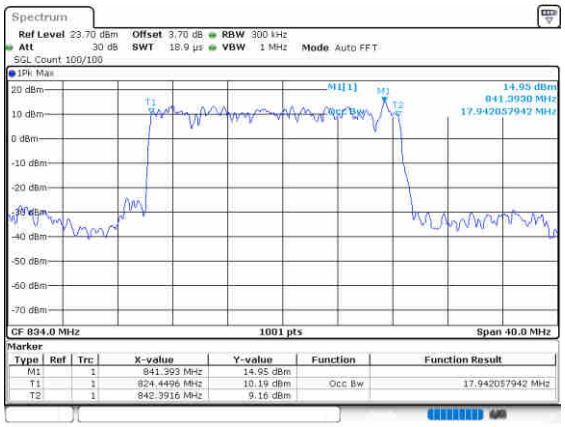
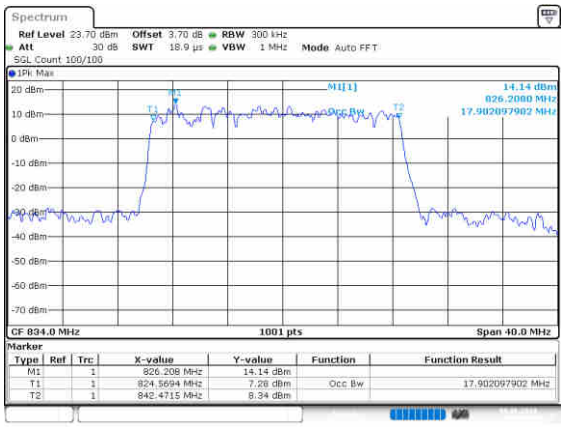
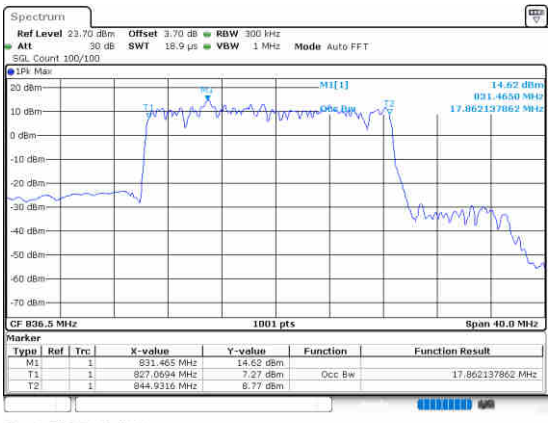
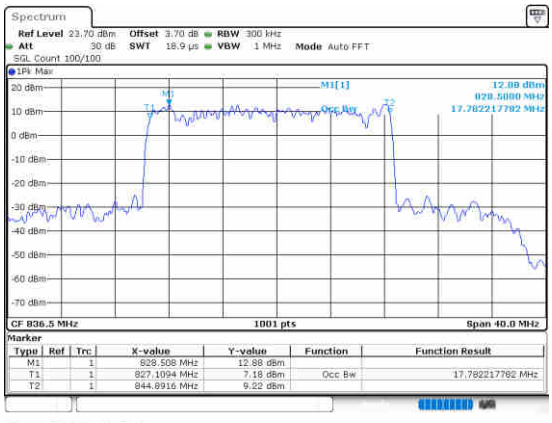
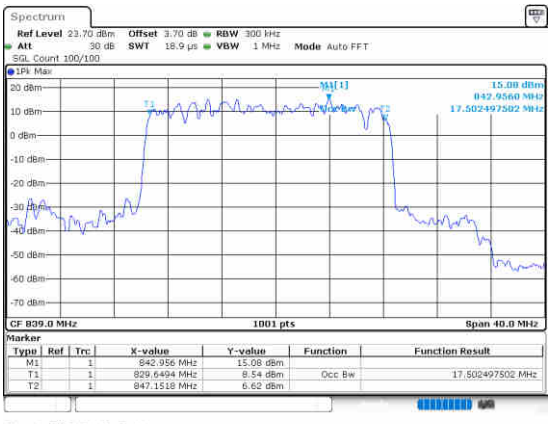
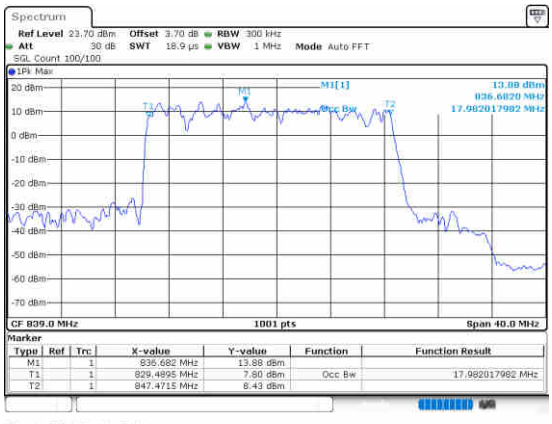
| NR N5+7A | |
|---|---|
| **Lowest Channel / 20MHz / BPSK** | **Lowest Channel / 20MHz / QPSK** |
|  |  |
| **Middle Channel / 20MHz / BPSK** | **Middle Channel / 20MHz / QPSK** |
|  |  |
| **Highest Channel / 20MHz / BPSK** | **Highest Channel / 20MHz / QPSK** |
|  |  |

# Occupied Bandwidth

| Mode | NR N5+7A : OB BW(MHz) | | | | | |
|---|---|---|---|---|---|---|
| BW | 5 MHz | | 10 MHz | | 20 MHz | |
| Mod. | BPSK | QPSK | BPSK | QPSK | BPSK | QPSK |
| Lowest CH | 4.44 | 4.49 | 9.17 | 8.89 | 17.94 | 17.90 |
| Middle CH | 4.51 | 4.45 | 8.97 | 8.99 | 17.86 | 17.78 |
| Highest CH | 4.49 | 4.5 | 8.99 | 8.91 | 17.50 | 17.98 |

| NR N5+7A | |
|---|---|
| **Lowest Channel / 5MHz / BPSK** | **Lowest Channel / 5MHz / QPSK** |
|  |  |
| **Middle Channel / 5MHz / BPSK** | **Middle Channel / 5MHz / QPSK** |
|  |  |
| **Highest Channel / 5MHz / BPSK** | **Highest Channel / 5MHz / QPSK** |
|  |  |

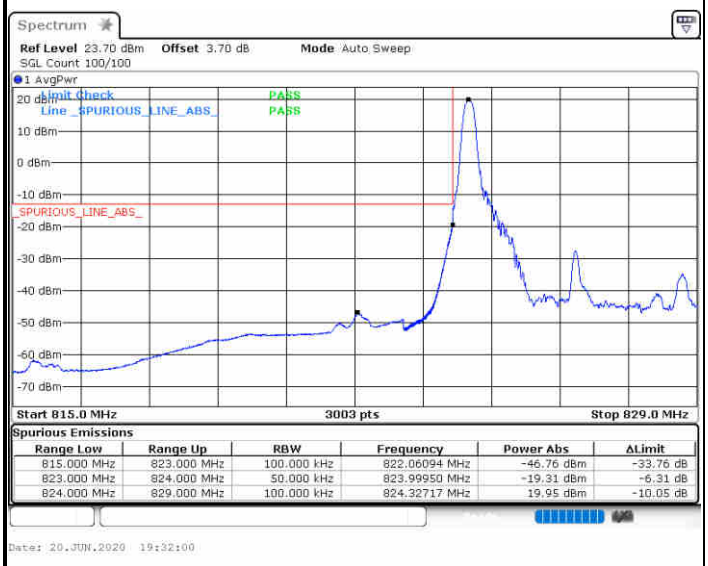
| NR N5+7A | |
|---|---|
| **Lowest Channel / 10MHz / BPSK** | **Lowest Channel / 10MHz / QPSK** |
|  |  |
| **Middle Channel / 10MHz / BPSK** | **Middle Channel / 10MHz / QPSK** |
|  |  |
| **Highest Channel / 10MHz / BPSK** | **Highest Channel / 10MHz / QPSK** |
|  |  |

| NR N5+7A | |
|---|---|
| **Lowest Channel / 20MHz / BPSK** | **Lowest Channel / 20MHz / QPSK** |
|  |  |
| **Middle Channel / 20MHz / BPSK** | **Middle Channel / 20MHz / QPSK** |
|  |  |
| **Highest Channel / 20MHz / BPSK** | **Highest Channel / 20MHz / QPSK** |
|  |  |

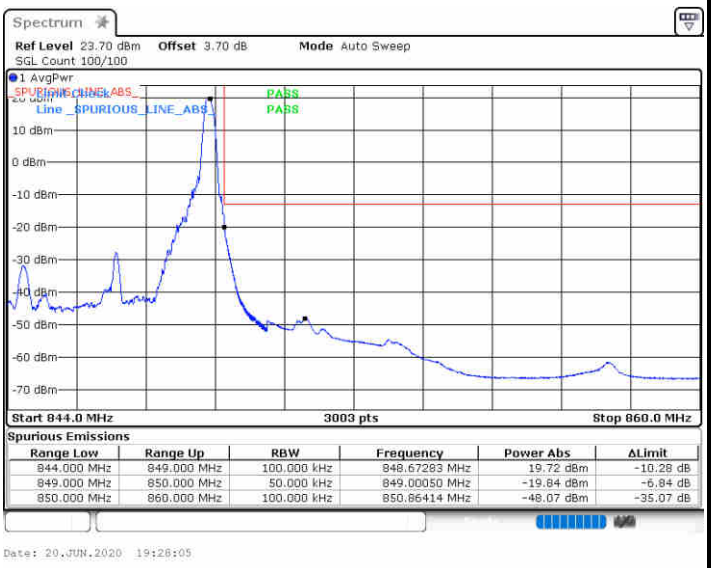
# Conducted Band Edge

## NR N5+7A / 5MHz / BPSK

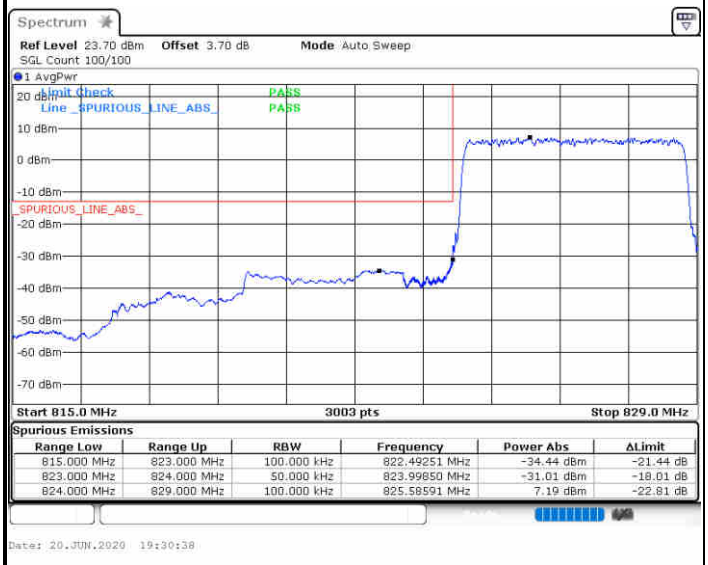
### Lowest Band Edge / 1 RB



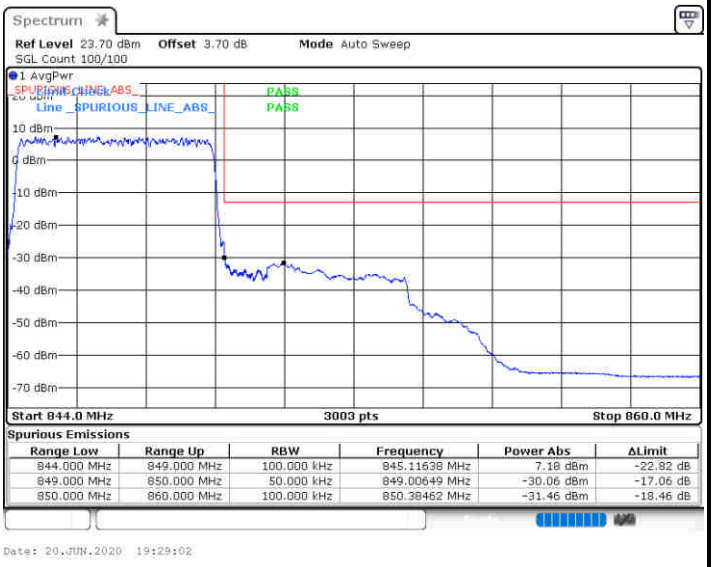

### Highest Band Edge / 1 RB

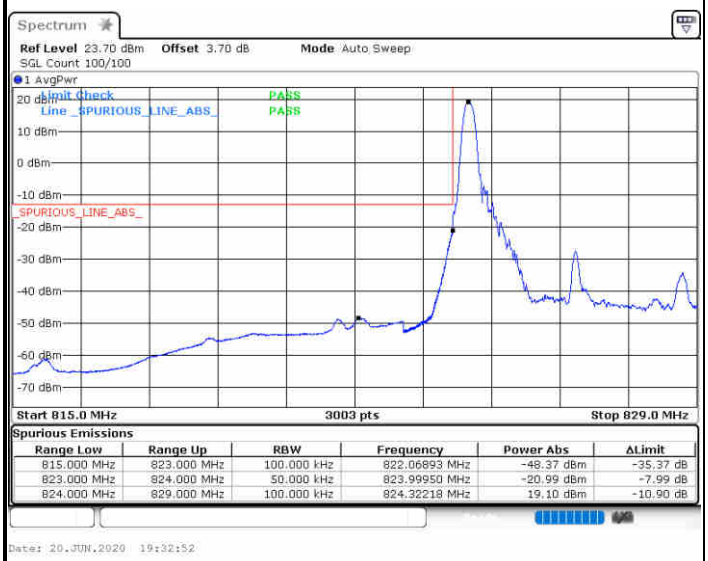
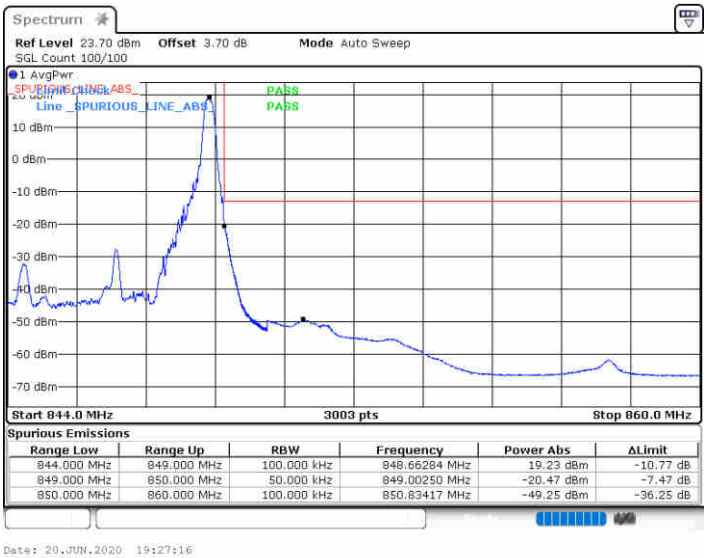
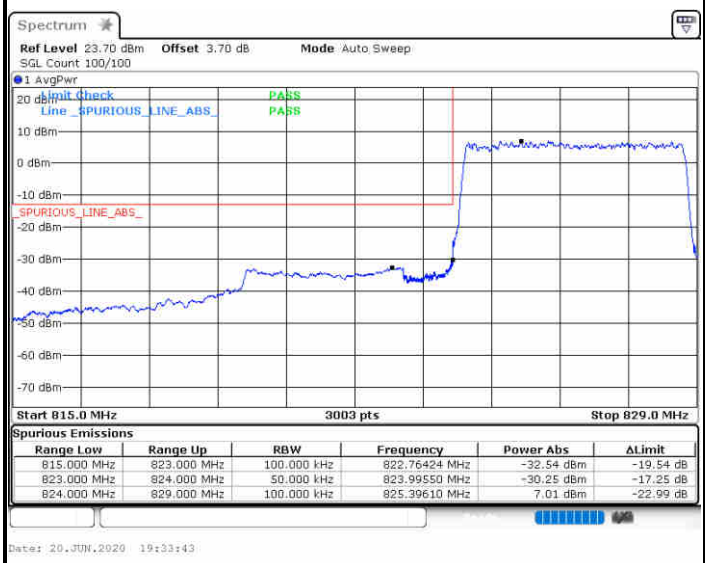
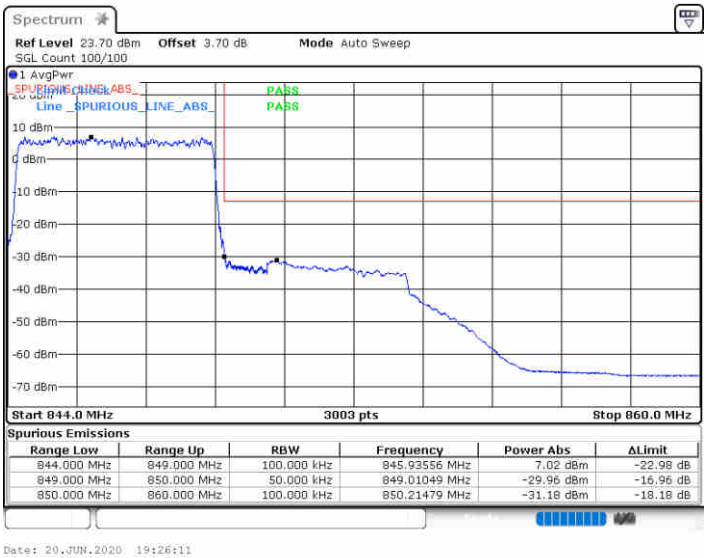


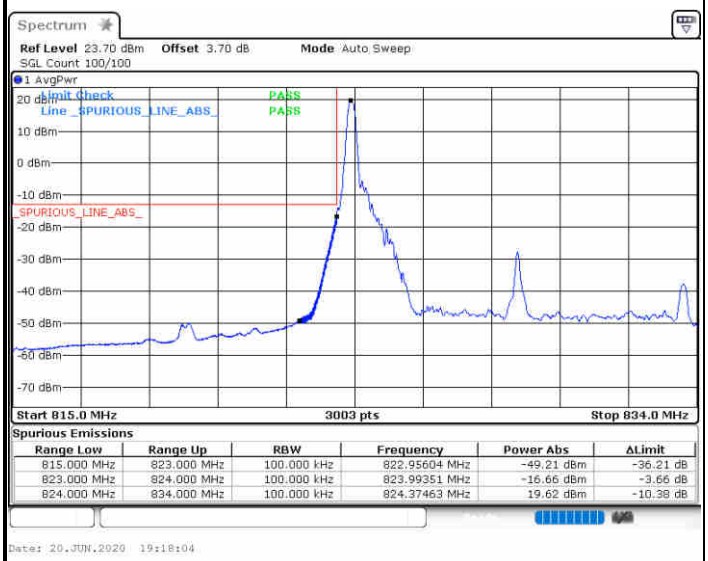
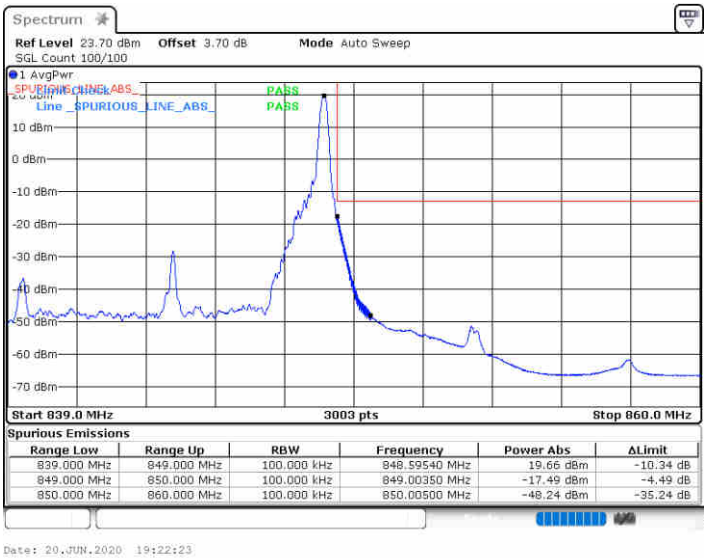
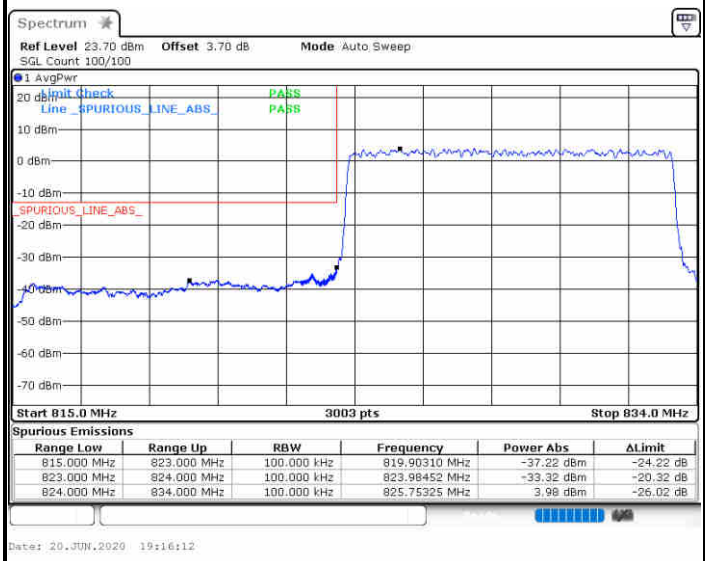
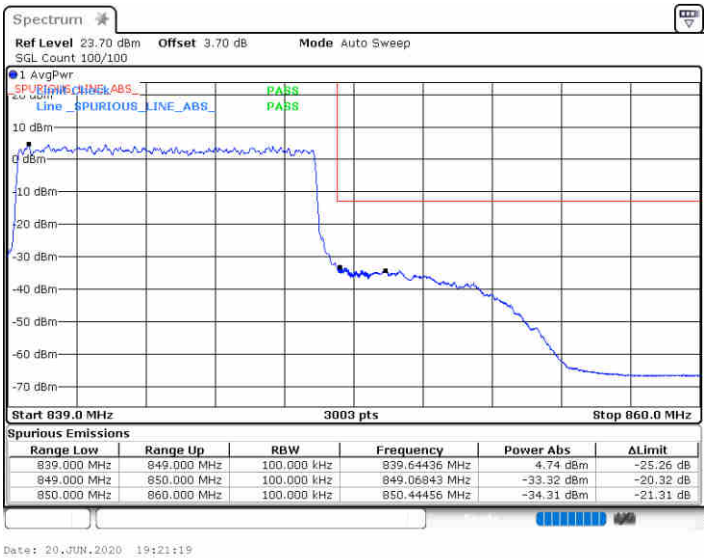

### Lowest Band Edge / Full RB

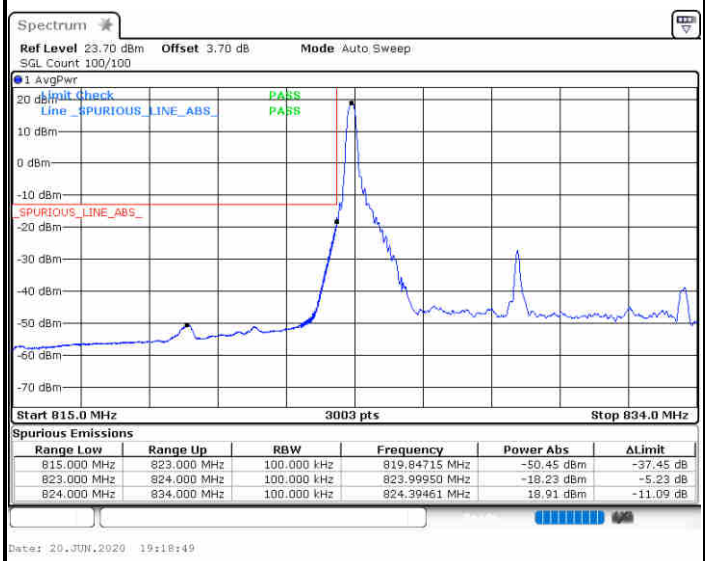
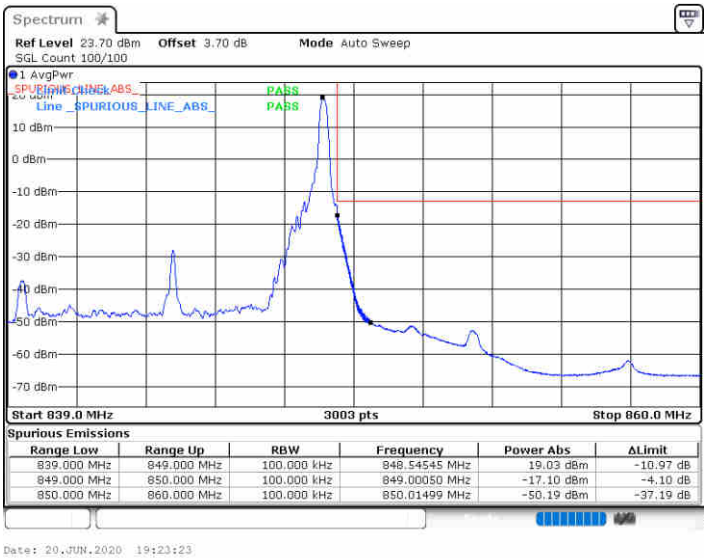
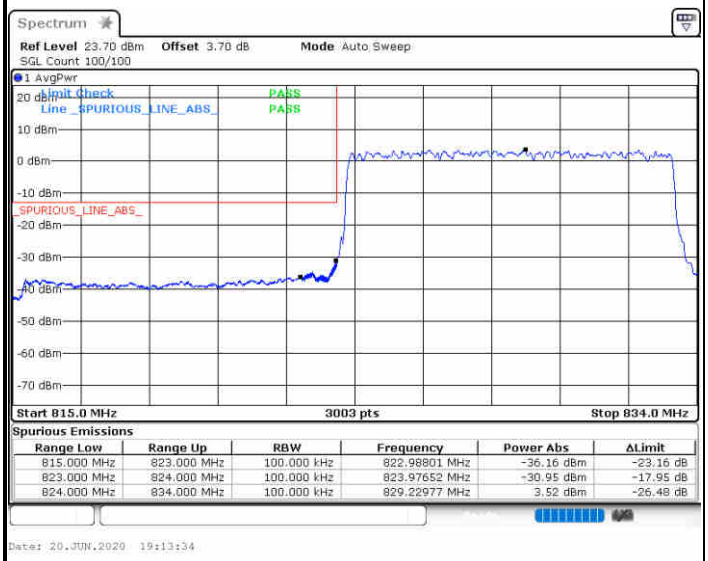
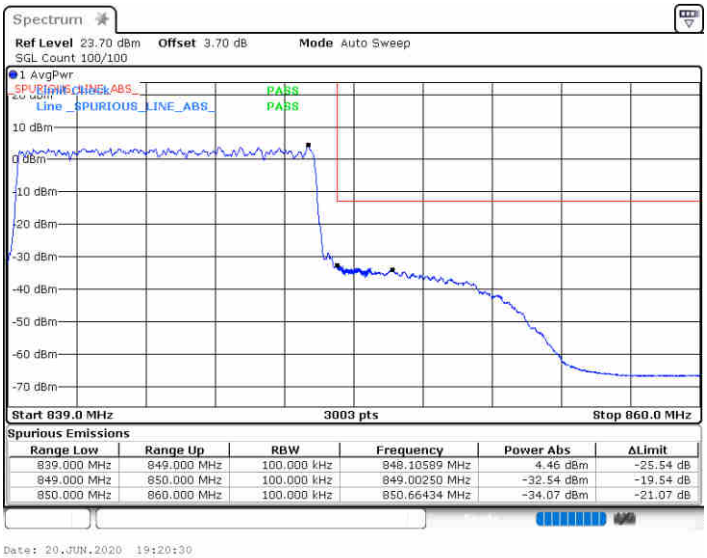


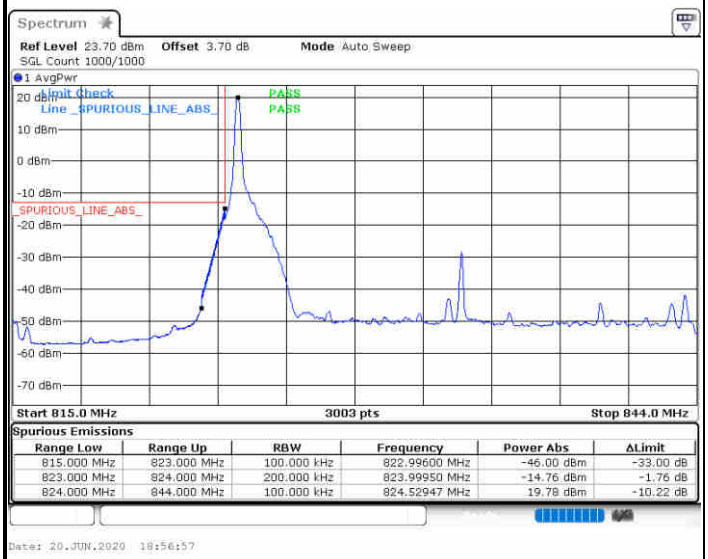
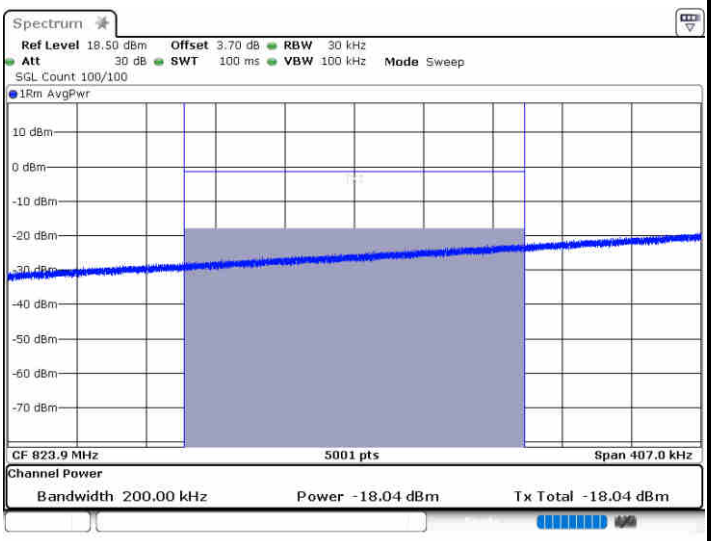
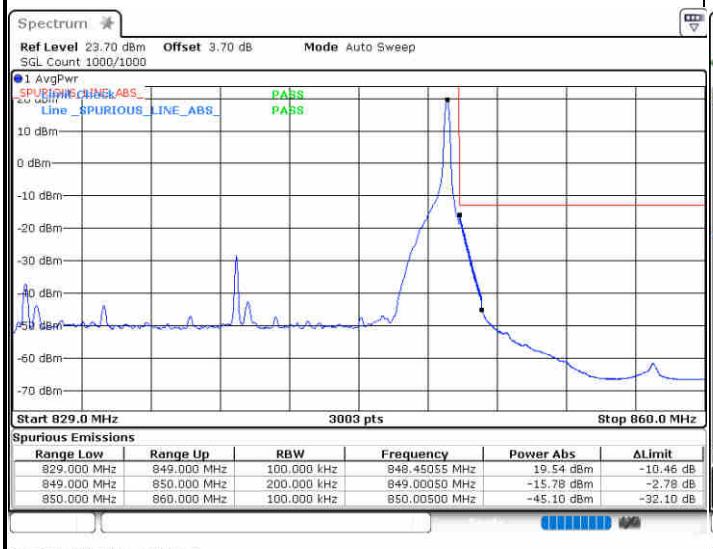
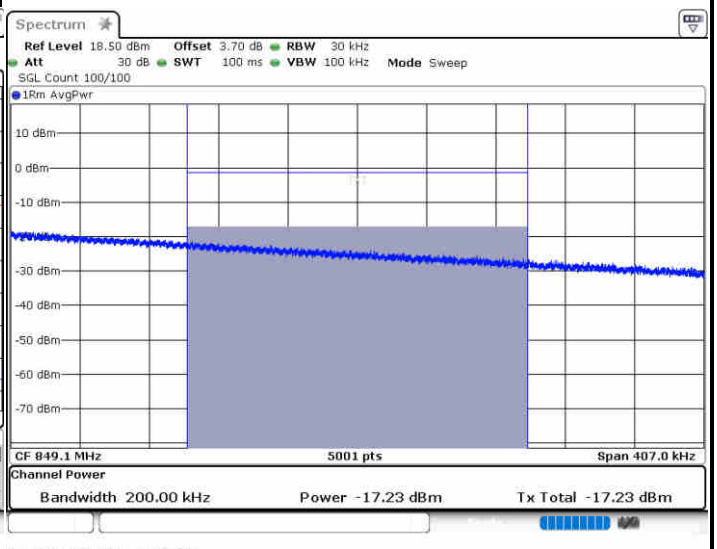

### Highest Band Edge / Full RB

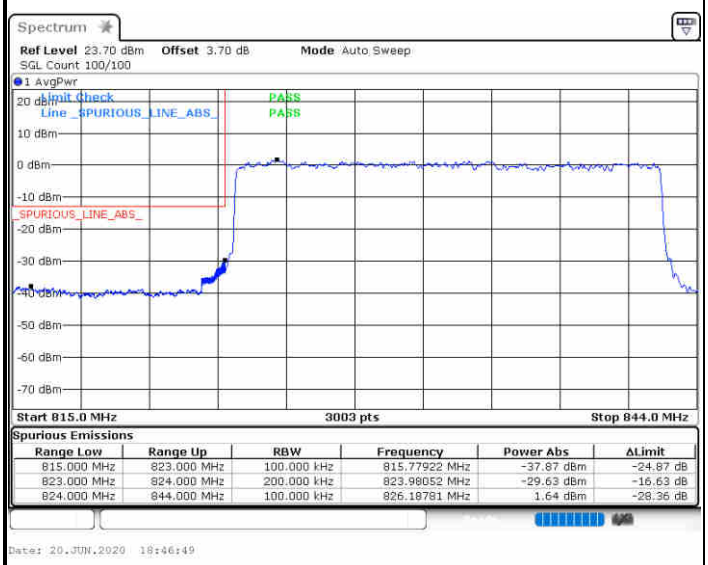
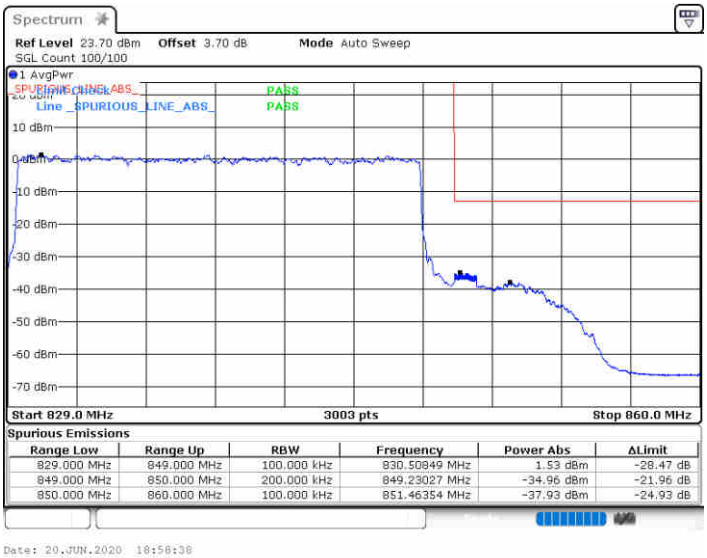


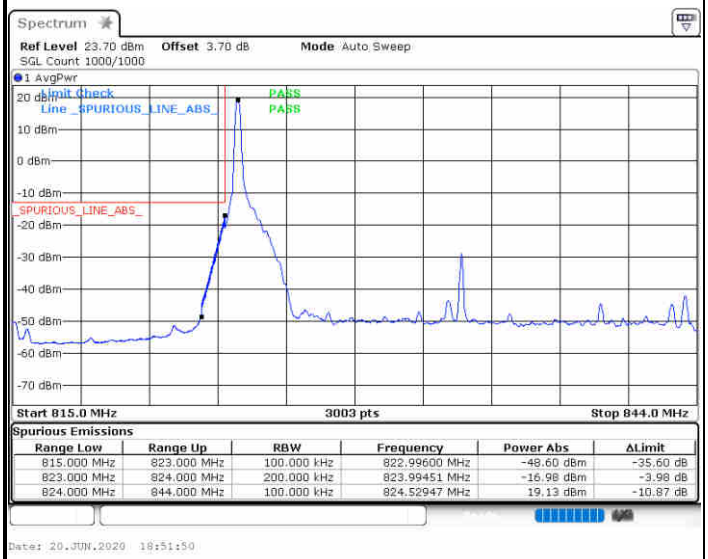
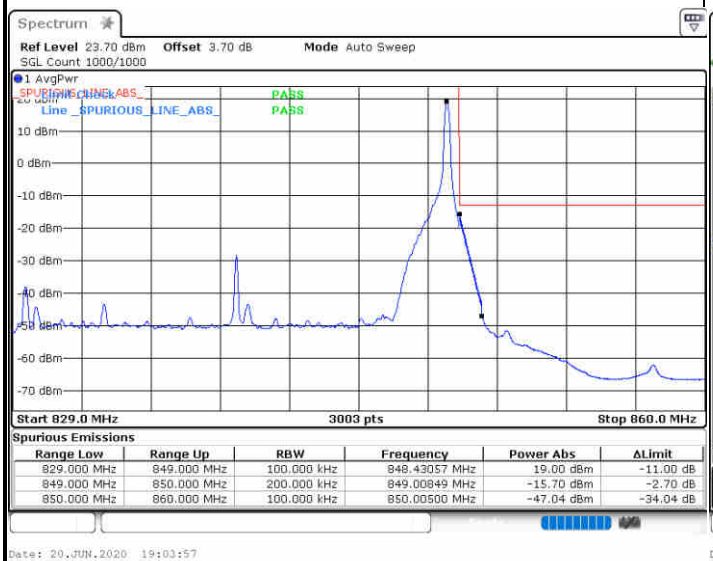
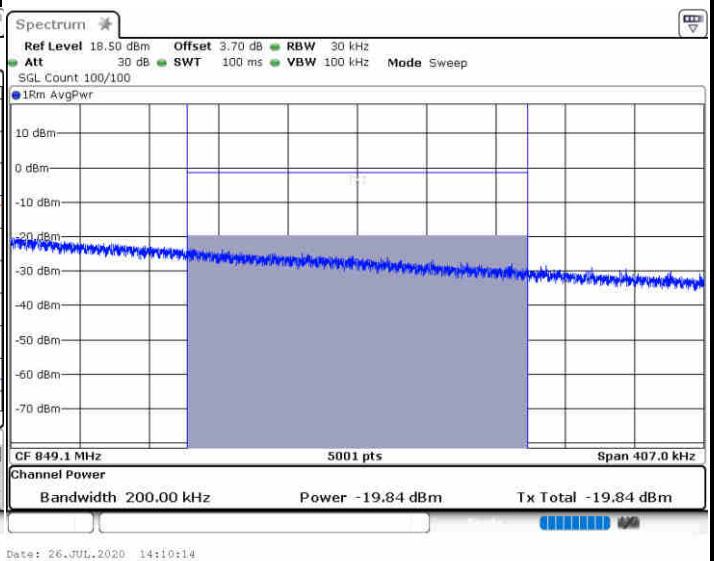
| NR N5+7A / 5MHz / QPSK | |
|---|---|
| **Lowest Band Edge / 1 RB** | **Highest Band Edge / 1 RB** |
|  |  |
| **Lowest Band Edge / Full RB** | **Highest Band Edge / Full RB** |
|  |  |

| NR N5+7A / 10MHz / BPSK | |
|---|---|
| **Lowest Band Edge / 1 RB** | **Highest Band Edge / 1 RB** |
|  |  |
| **Lowest Band Edge / Full RB** | **Highest Band Edge / Full RB** |
|  |  |

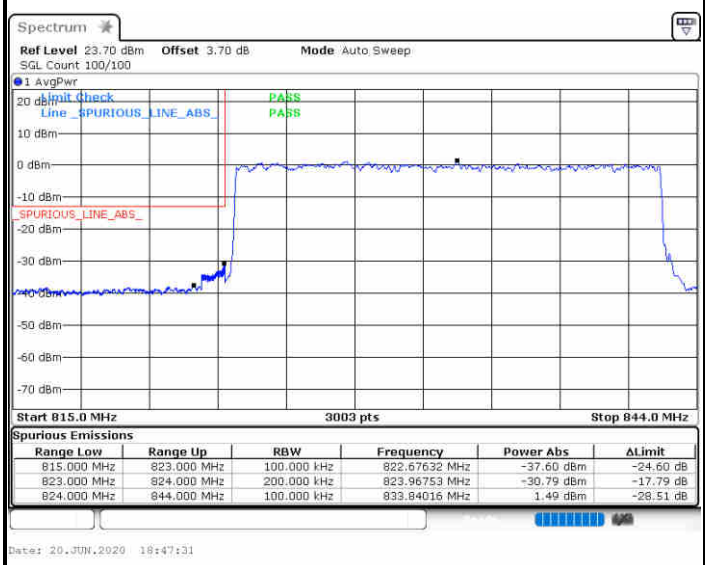
| NR N5+7A / 10MHz / QPSK | |
|---|---|
| **Lowest Band Edge / 1 RB** | **Highest Band Edge / 1 RB** |
|  |  |
| **Lowest Band Edge / Full RB** | **Highest Band Edge / Full RB** |
|  |  |

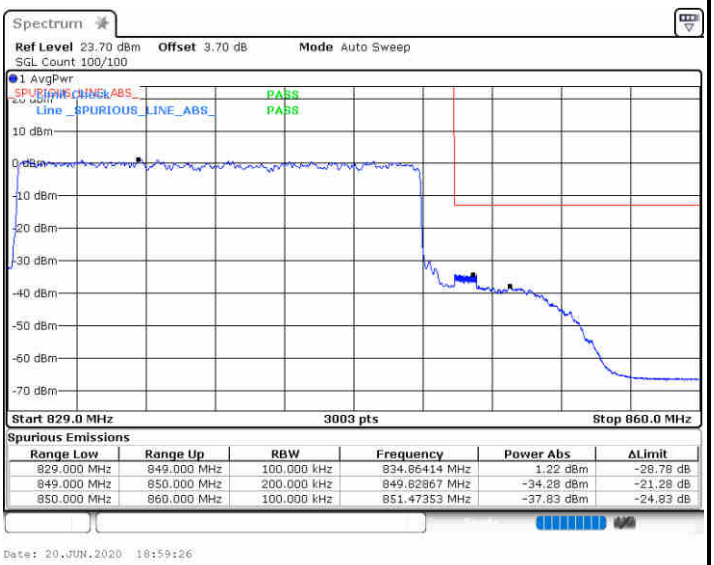
| NR N5+7A / 20MHz / BPSK | |
|---|---|
| **Lowest Band Edge / 1 RB** | **Channel Power < -13dBm Pass** |
|  |  |
| **Lowest Band Edge / 1 RB** | **Channel Power < -13dBm Pass** |
|  |  |

| NR N5+7A / 20MHz / BPSK | |
|---|---|
| **Lowest Band Edge / Full RB** | **Highest Band Edge / Full RB** |
|  |  |

| NR N5+7A / 20MHz / QPSK | |
|---|---|
| **Lowest Band Edge / 1 RB** | **Channel Power < -13dBm Pass** |
|  | - |
| **Highest Band Edge / 1 RB** | **Channel Power < -13dBm Pass** |
|  |  |

| NR N5+7A / 20MHz / QPSK | |
|---|---|
| **Lowest Band Edge / Full RB** | **Highest Band Edge / Full RB** |

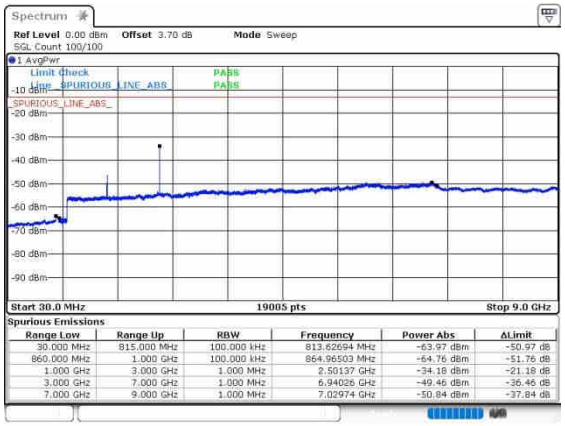


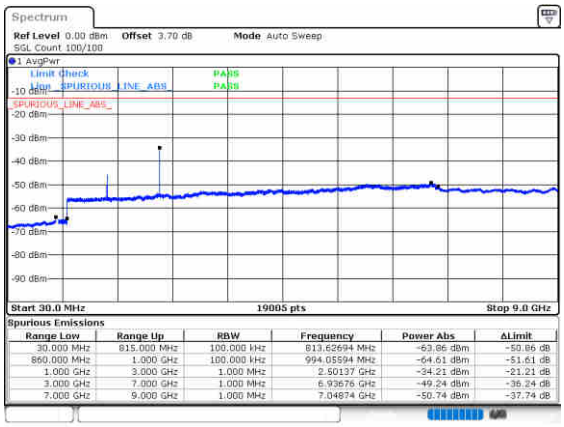
# Conducted Spurious Emission

## NR N5+7A / 5MHz

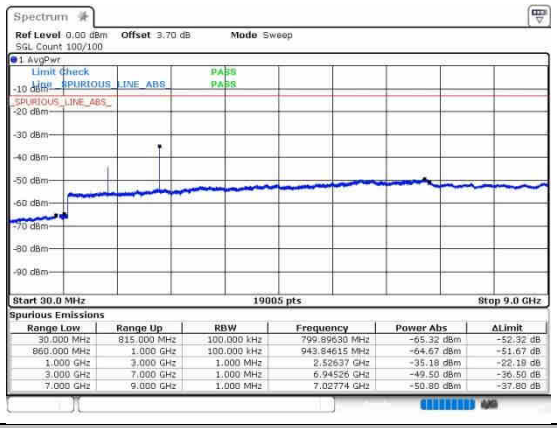
### Lowest Channel / BPSK



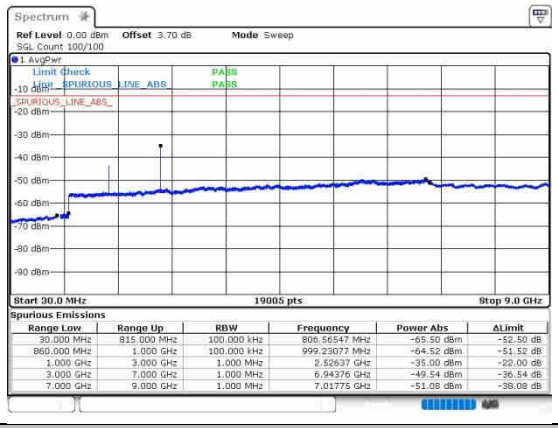

### Lowest Channel / QPSK



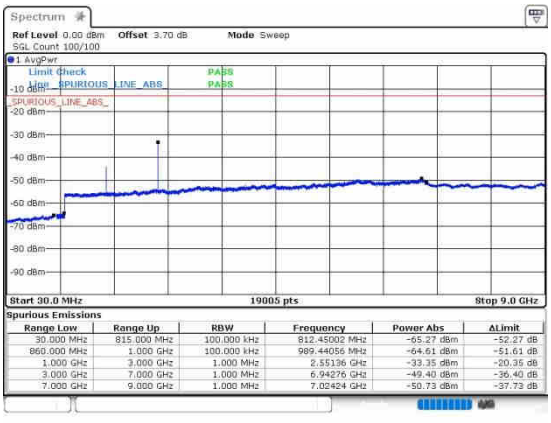

### Middle Channel / BPSK



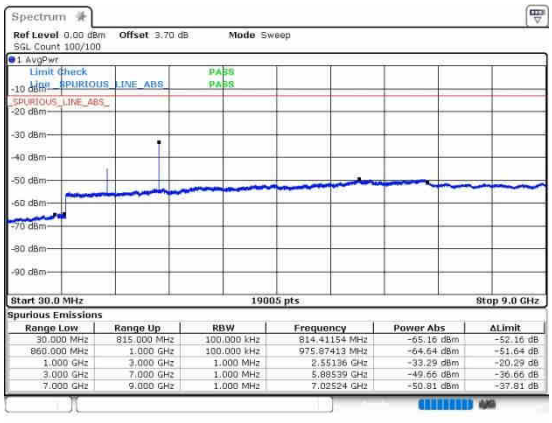

### Middle Channel / QPSK




### Highest Channel / BPSK

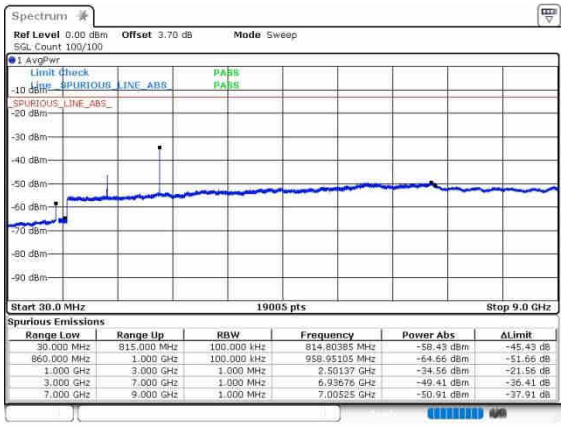



### Highest Channel / QPSK

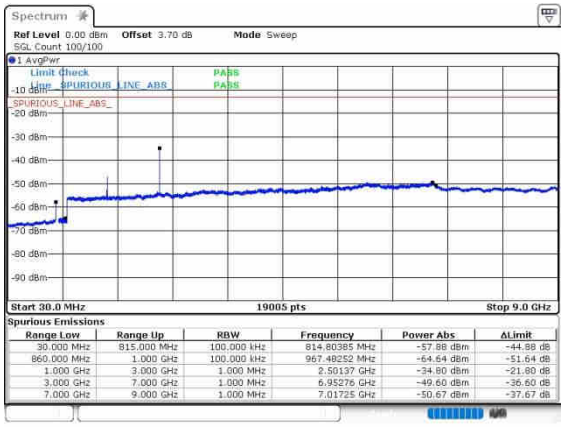


## NR N5+7A / 10MHz

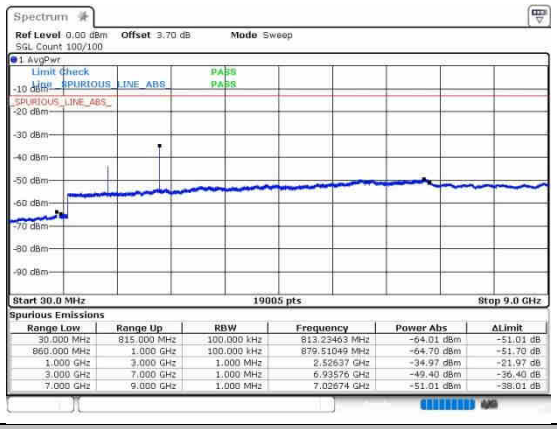
### Lowest Channel / BPSK



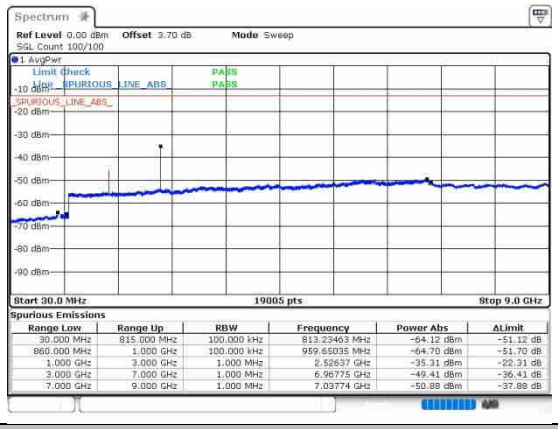

### Lowest Channel / QPSK



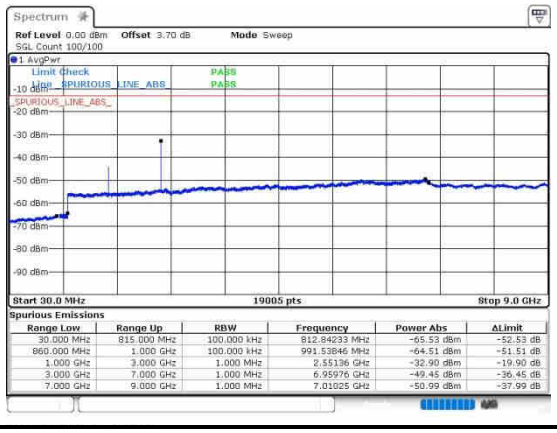

### Middle Channel / BPSK



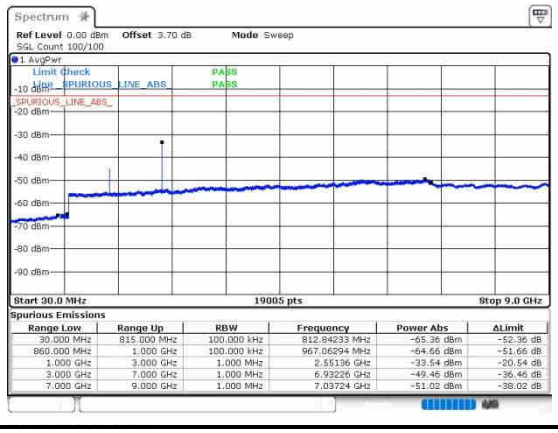

### Middle Channel / QPSK

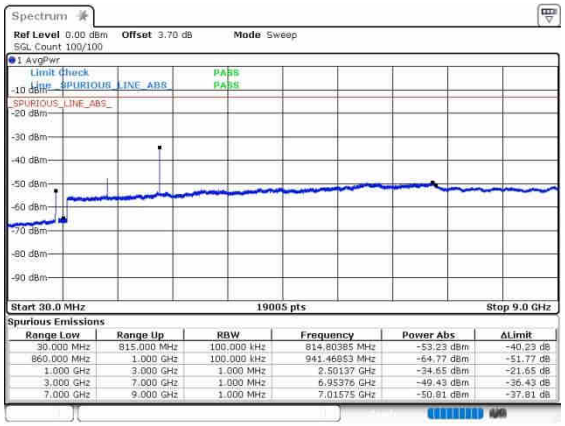
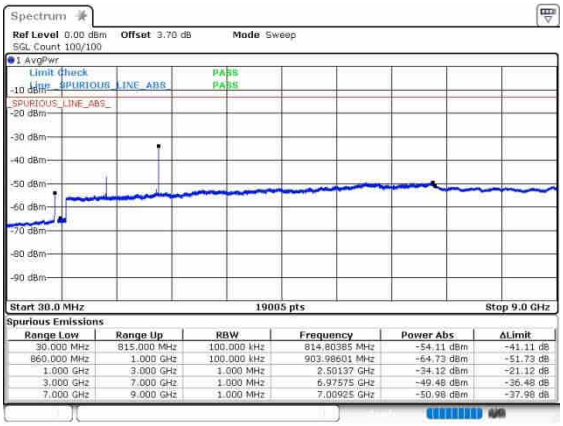
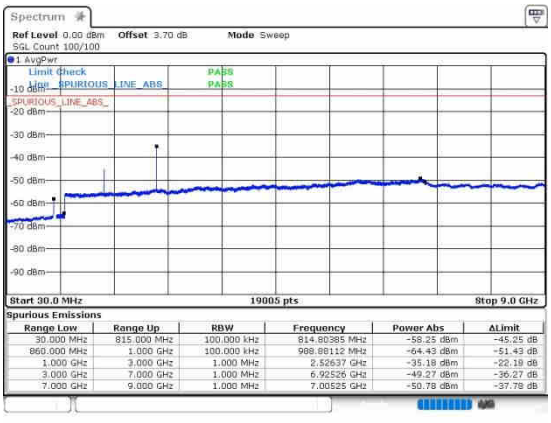
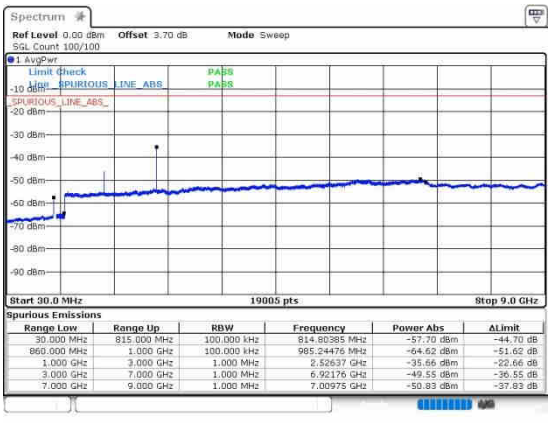
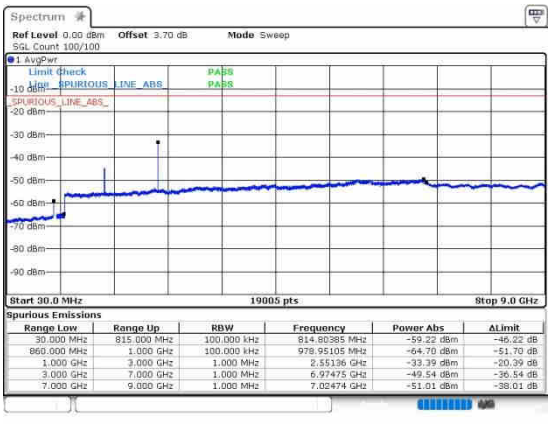
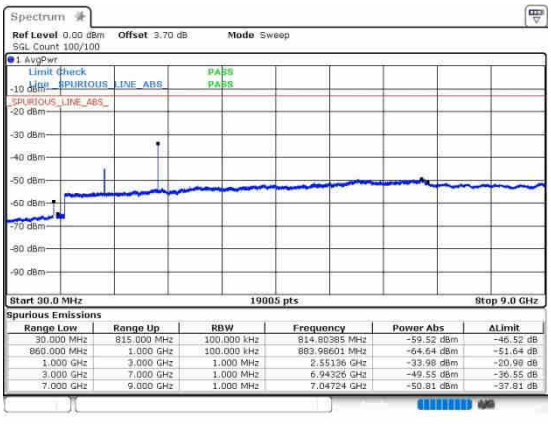



### Highest Channel / BPSK




### Highest Channel / QPSK



| NR N5+7A / 20MHz | |
|---|---|
| **Lowest Channel / BPSK** | **Lowest Channel / QPSK** |
|  |  |
| **Middle Channel / BPSK** | **Middle Channel / QPSK** |
|  |  |
| **Highest Channel / BPSK** | **Highest Channel / QPSK** |
|  |  |

# Frequency Stability

| Test Conditions | | N5+7A (BPSK) / Middle Channel | Limit |
|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | NR 20MHz | Note 2. |
| | | Deviation (ppm) | Result |
| 50 | Normal Voltage | 0.0012 | PASS |
| 40 | Normal Voltage | 0.0011 | |
| 30 | Normal Voltage | 0.0012 | |
| 20(Ref.) | Normal Voltage | 0.0012 | |
| 10 | Normal Voltage | 0.0011 | |
| 0 | Normal Voltage | 0.0016 | |
| -10 | Normal Voltage | 0.0012 | |
| -20 | Normal Voltage | 0.0018 | |
| -30 | Normal Voltage | 0.0013 | |
| 20 | Maximum Voltage | 0.0023 | |
| 20 | Normal Voltage | 0.0015 | |
| 20 | Battery End Point | 0.0012 | |

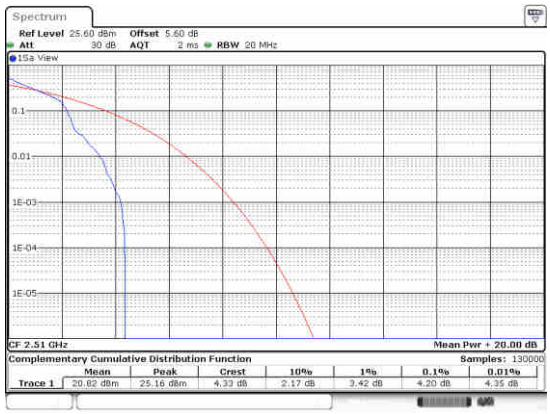
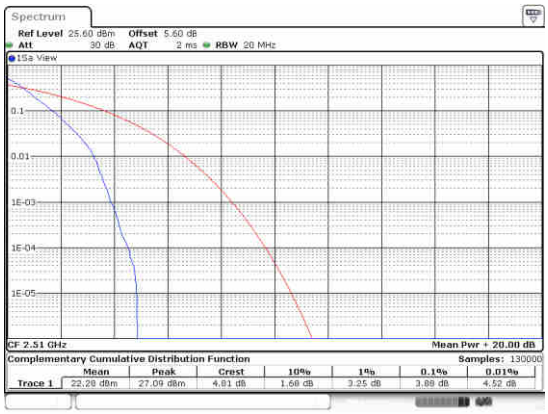
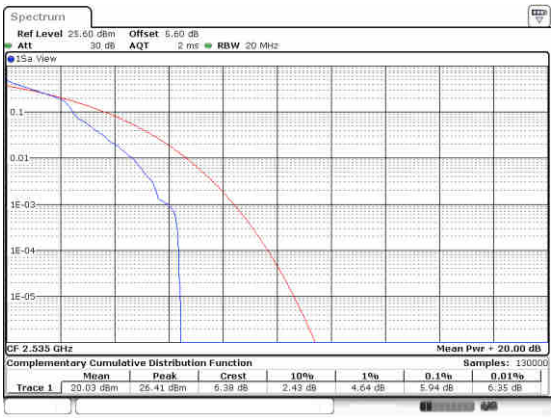
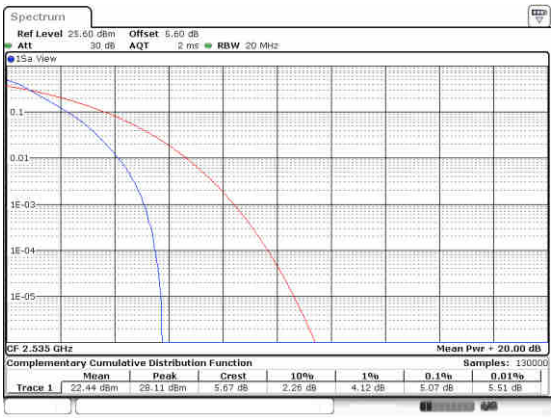
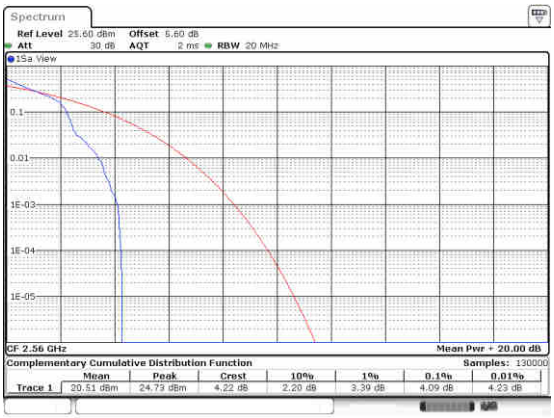
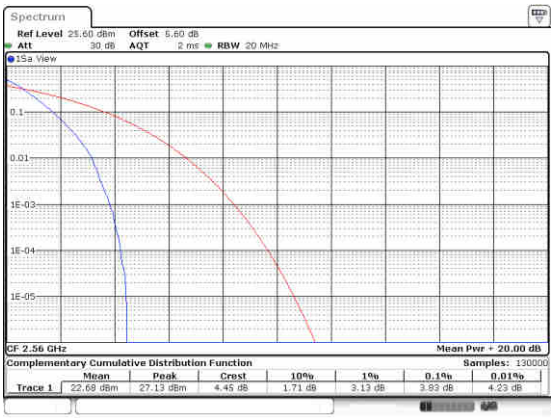
**Note:**

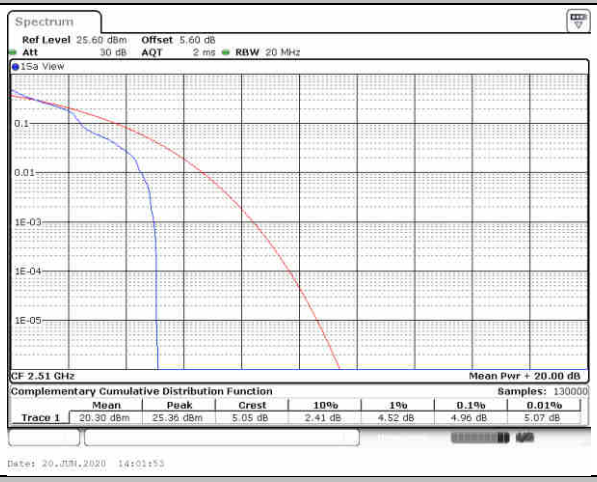
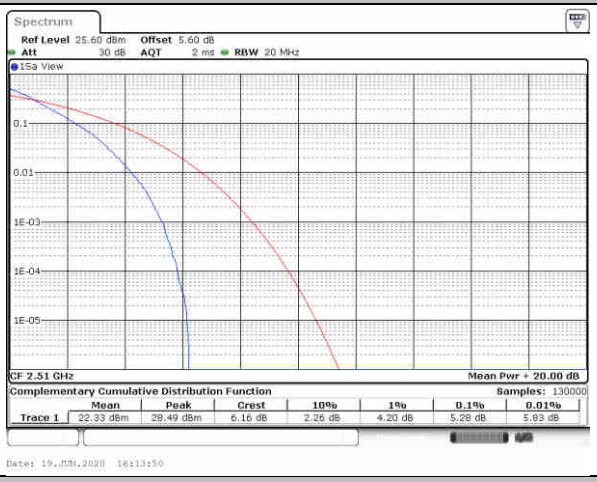
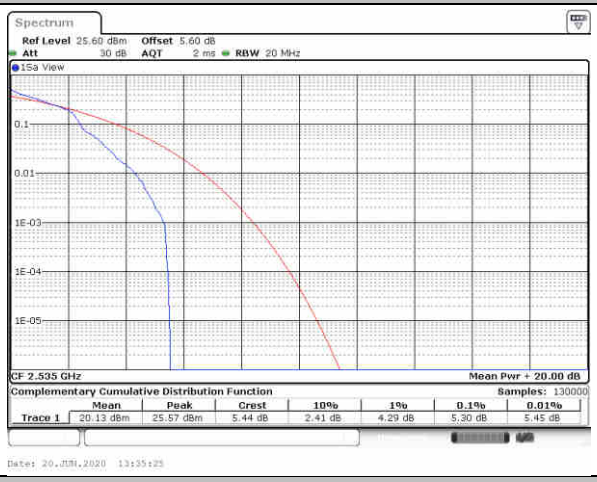
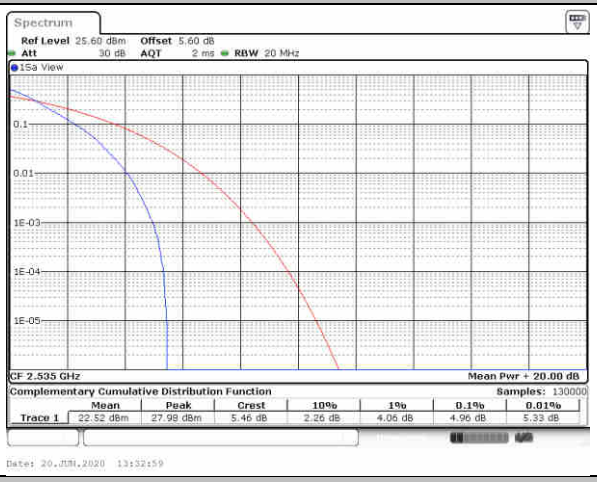
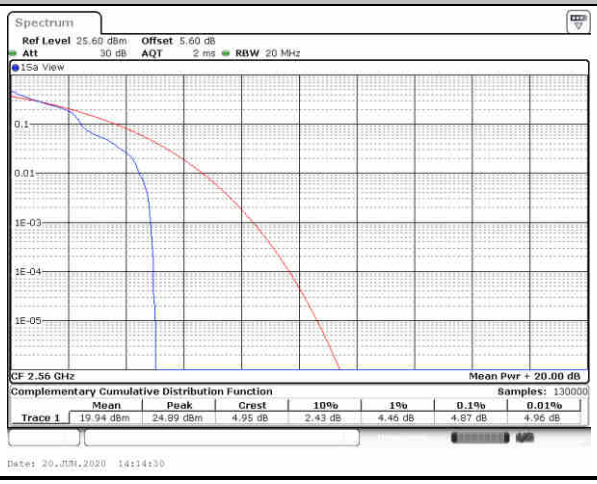
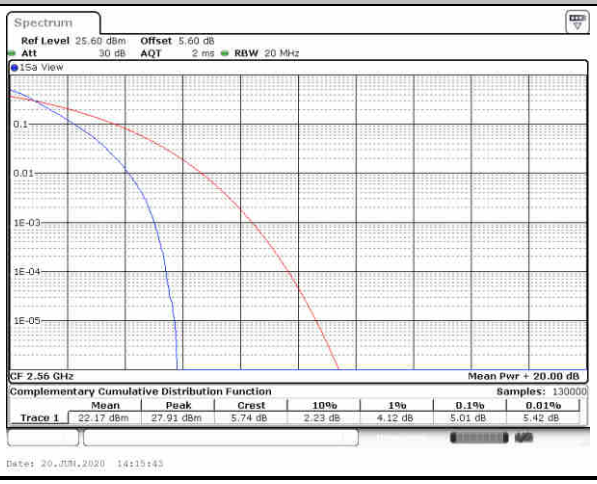
1. Normal Voltage =3.85 V.；Battery End Point (BEP) =3.6 V.；Maximum Voltage =4.4 V.
2. Note: The frequency fundamental emissions stay within the authorized frequency block.

# 5G NR n7

## Peak-to-Average Ratio

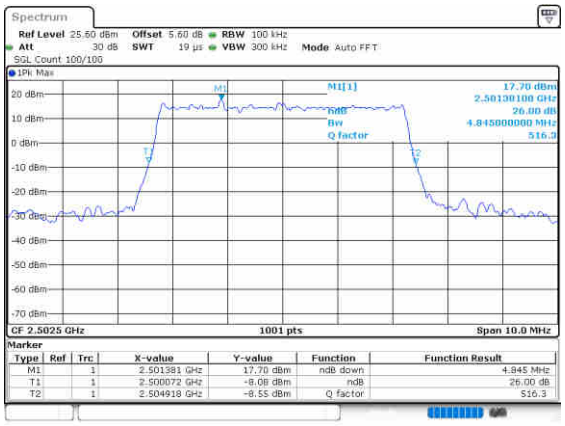
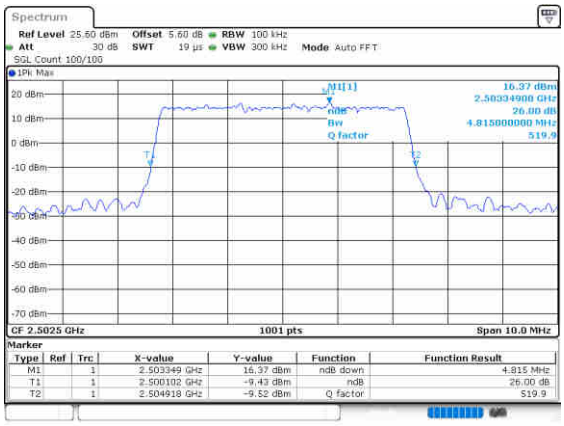
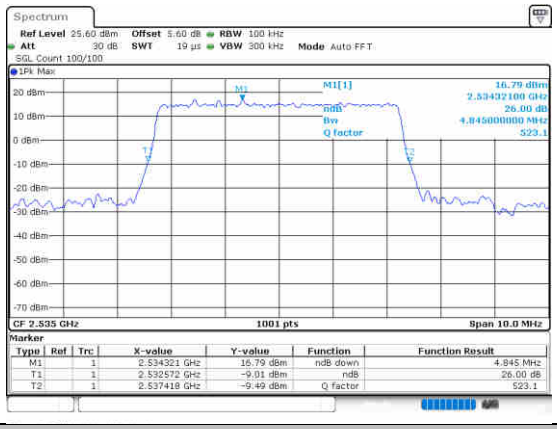
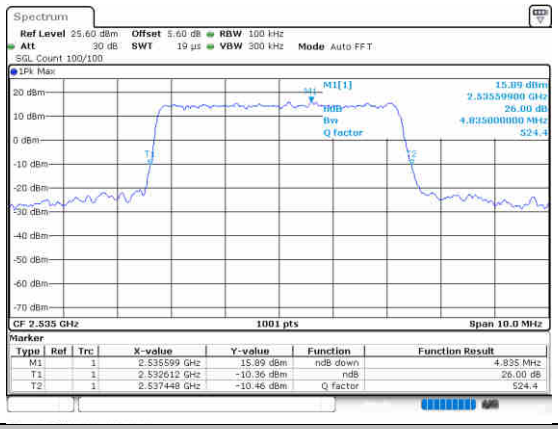
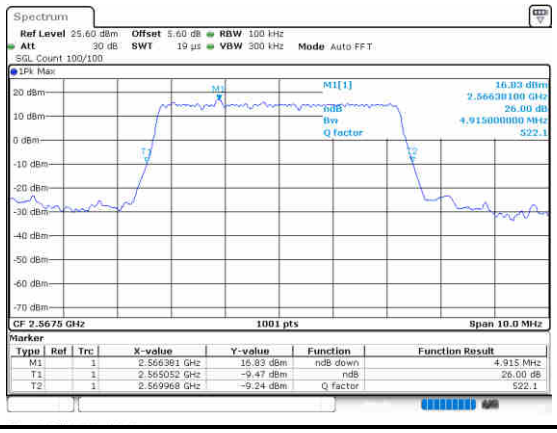
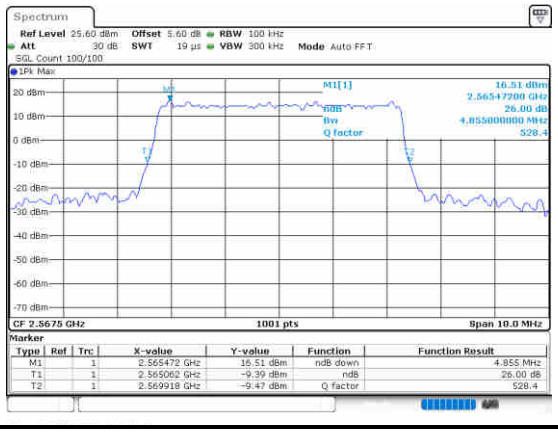
| Mode | NR N7 / 20MHz | | | | |
|---|---|---|---|---|---|
| Mod. | BPSK | | QPSK | | Limit: 13dB |
| RB Size | 1RB | Full RB | 1RB | Full RB | Result |
| Lowest CH | 4.20 | 3.88 | 4.96 | 5.28 | PASS |
| Middle CH | 5.94 | 5.07 | 5.30 | 4.96 | |
| Highest CH | 4.09 | 3.83 | 4.87 | 5.01 | |

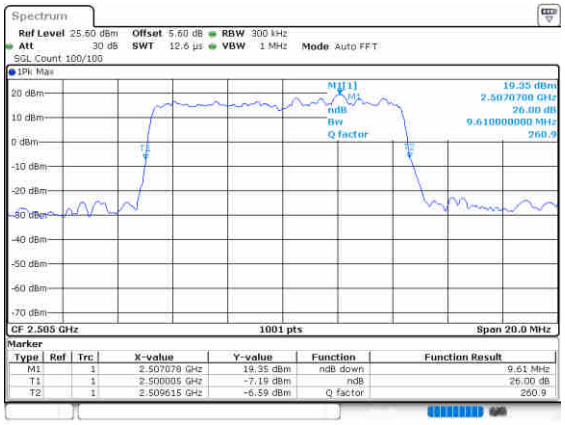
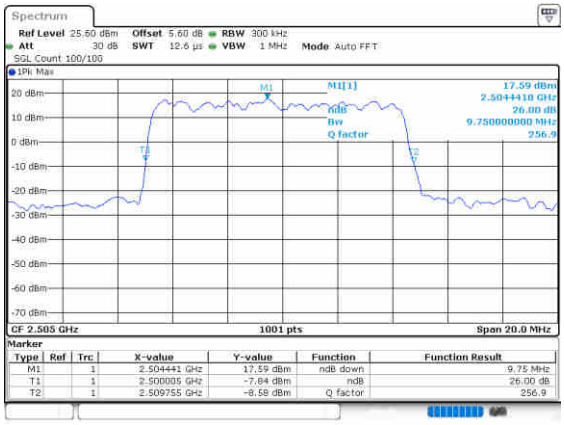
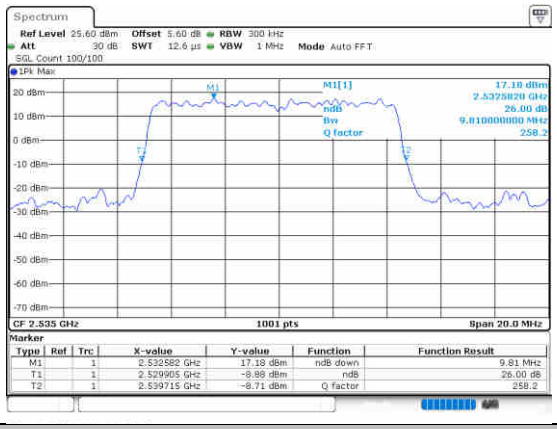
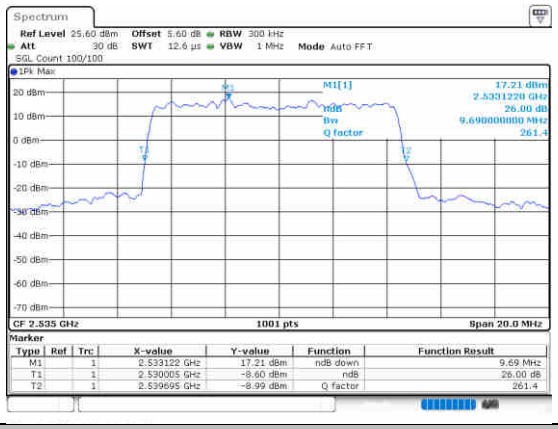
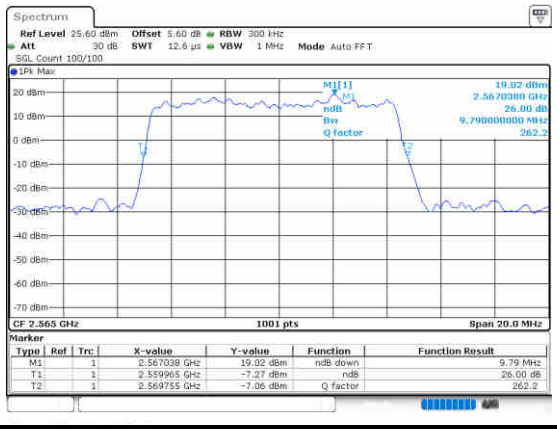
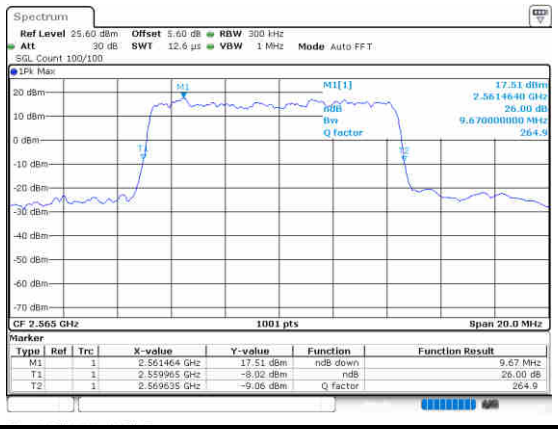
| NR N7 / 20MHz / BPSK | |
|---|---|
| **Lowest Channel / 1RB** | **Lowest Channel / Full RB** |
|  |  |
| **Middle Channel / 1RB** | **Middle Channel / Full RB** |
|  |  |
| **Highest Channel / 1RB** | **Highest Channel / Full RB** |
|  |  |

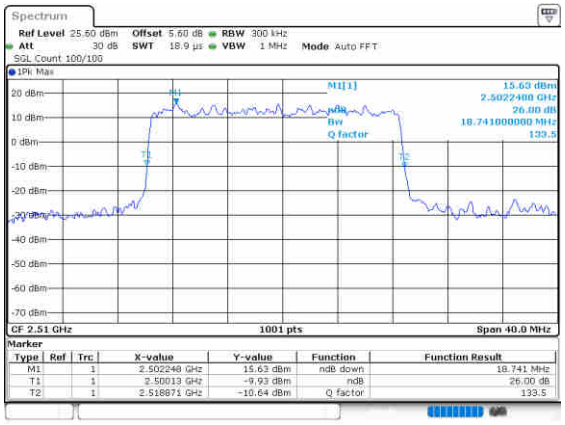
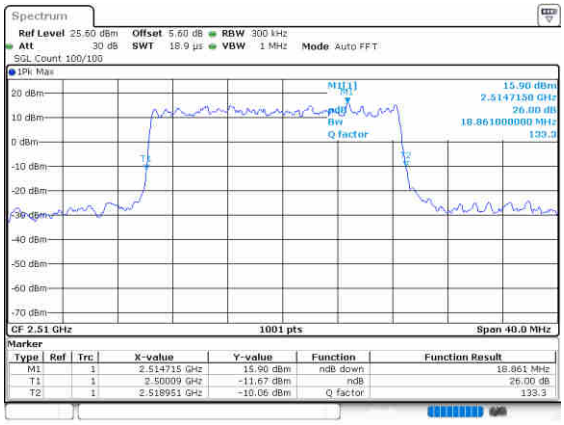
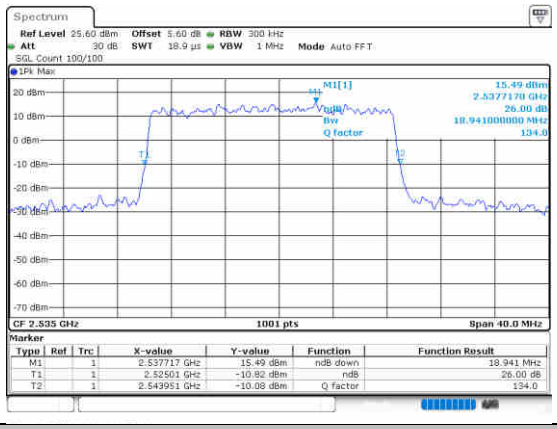
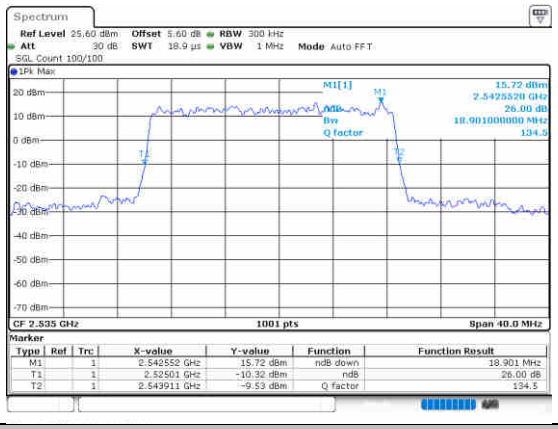
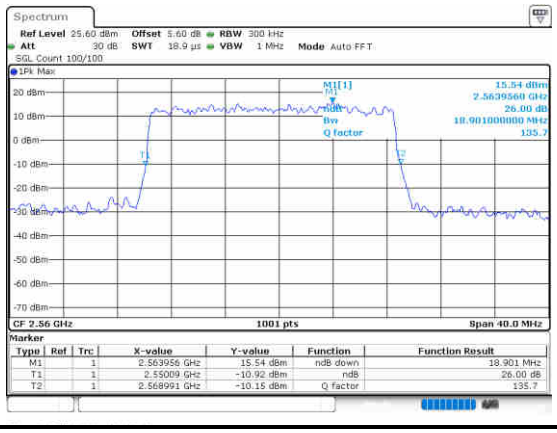
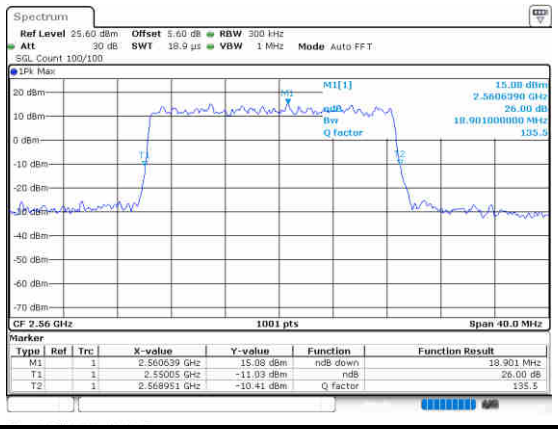
| NR N7 / 20MHz / QPSK | |
|---|---|
| **Lowest Channel / 1RB** | **Lowest Channel / Full RB** |
|  |  |
| **Middle Channel / 1RB** | **Middle Channel / Full RB** |
|  |  |
| **Highest Channel / 1RB** | **Highest Channel / Full RB** |
|  |  |

# 26dB Bandwidth

| Mode | NR N7 : 26dB BW(MHz) | | | | | |
|---|---|---|---|---|---|---|
| BW | 5 MHz | | 10 MHz | | 20 MHz | |
| Mod. | BPSK | QPSK | BPSK | QPSK | BPSK | QPSK |
| Lowest CH | 4.845 | 4.815 | 9.61 | 9.75 | 18.741 | 18.861 |
| Middle CH | 4.845 | 4.835 | 9.81 | 9.69 | 18.941 | 18.901 |
| Highest CH | 4.915 | 4.855 | 9.79 | 9.67 | 18.901 | 18.901 |

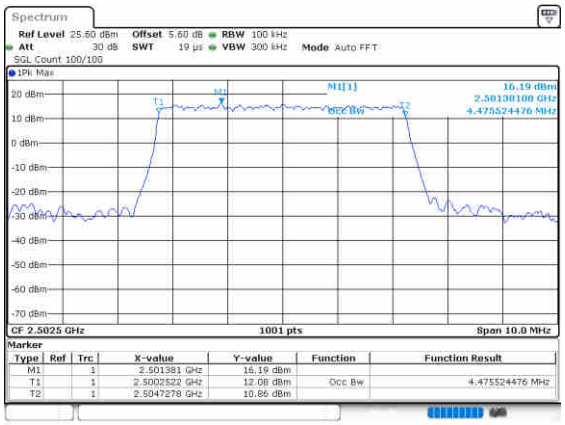
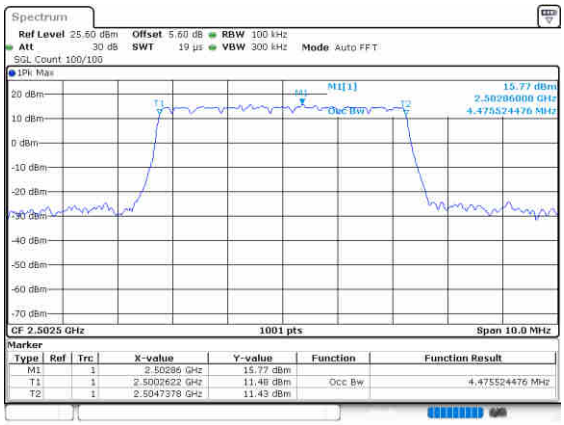
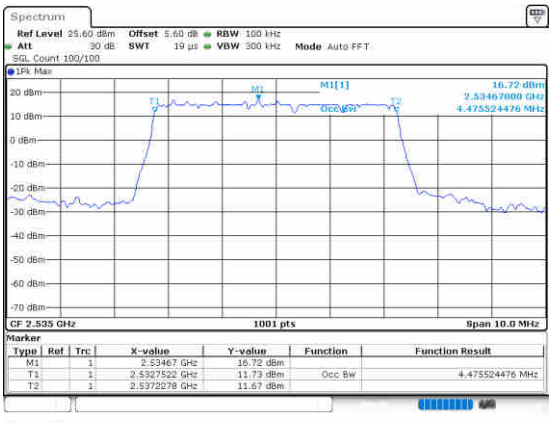
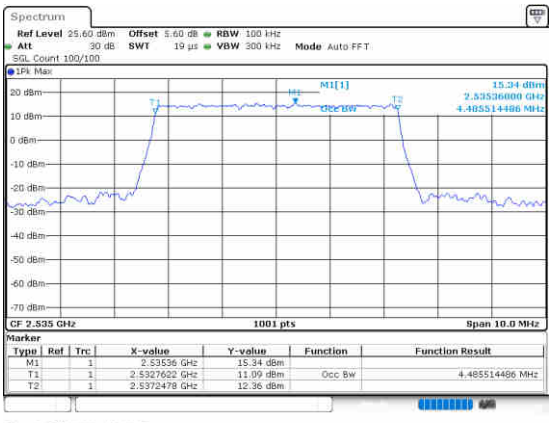
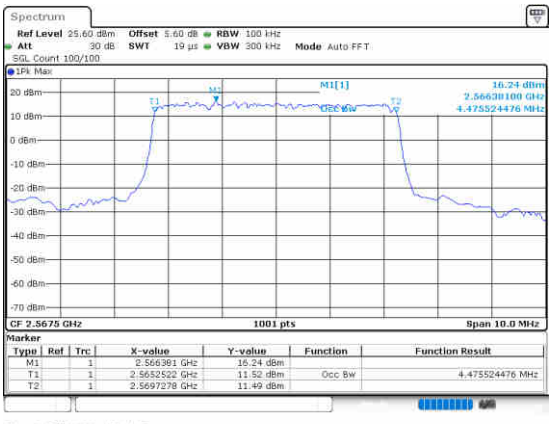
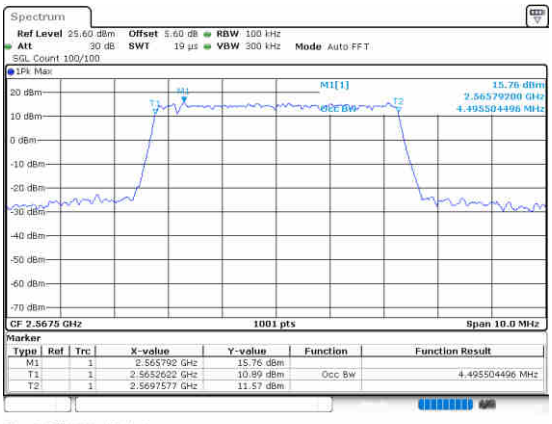
| NR N7 | |
|---|---|
| **Lowest Channel / 5MHz / BPSK** | **Lowest Channel / 5MHz / QPSK** |
|  |  |
| **Middle Channel / 5MHz / BPSK** | **Middle Channel / 5MHz / QPSK** |
|  |  |
| **Highest Channel / 5MHz / BPSK** | **Highest Channel / 5MHz / QPSK** |
|  |  |

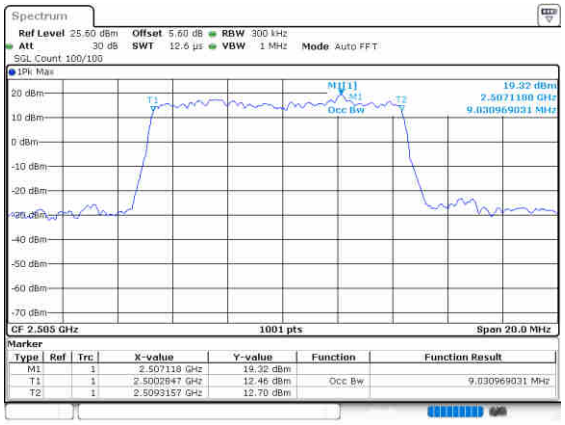
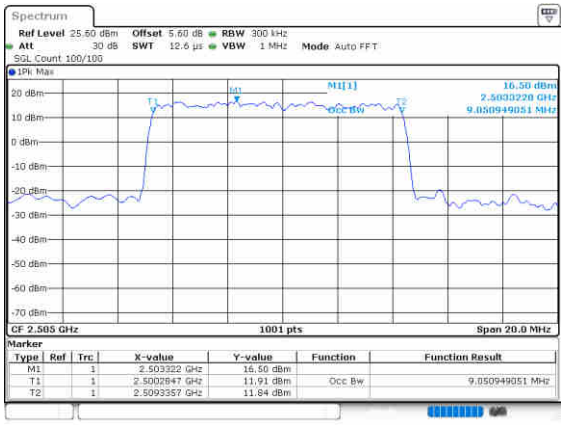
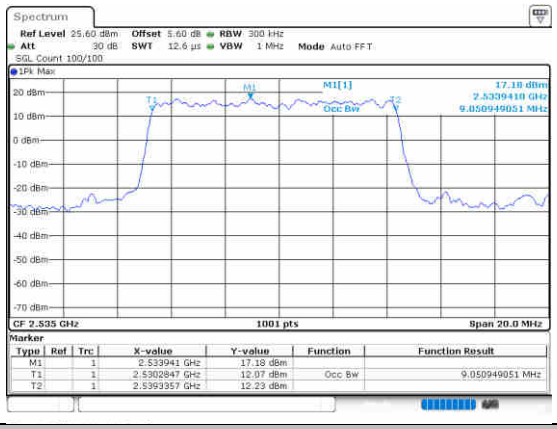
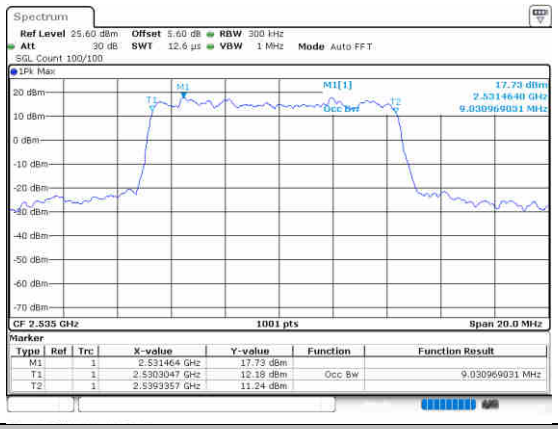
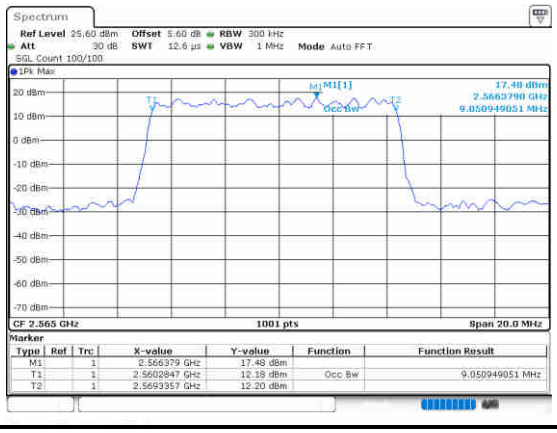
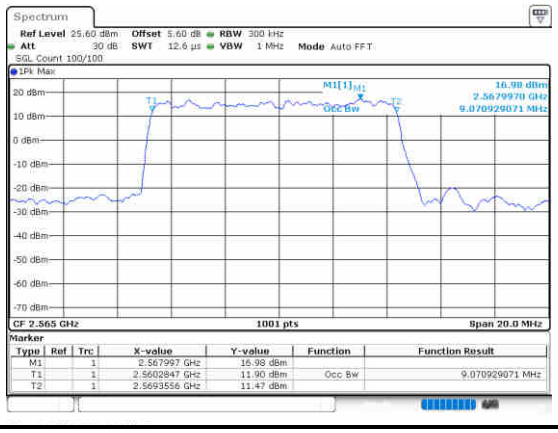
| NR N7 | |
|---|---|
| **Lowest Channel / 10MHz / BPSK** | **Lowest Channel / 10MHz / QPSK** |
|  |  |
| **Middle Channel / 10MHz / BPSK** | **Middle Channel / 10MHz / QPSK** |
|  |  |
| **Highest Channel / 10MHz / BPSK** | **Highest Channel / 10MHz / QPSK** |
|  |  |

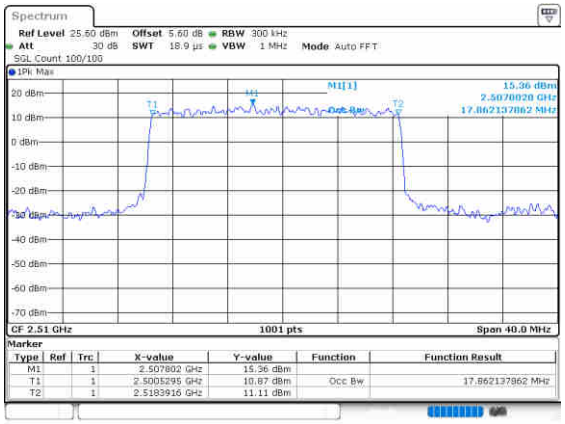
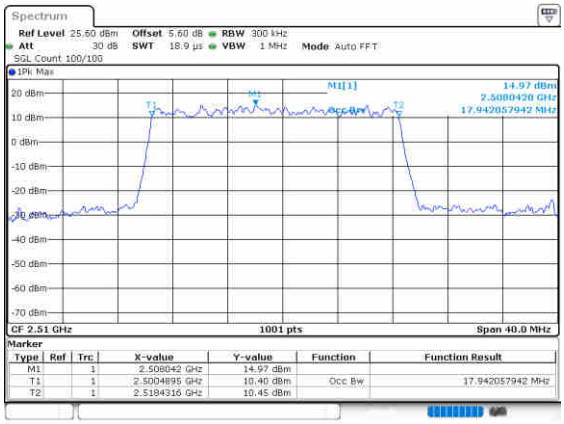
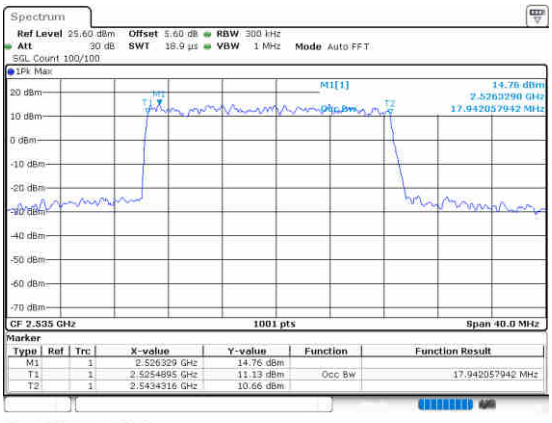
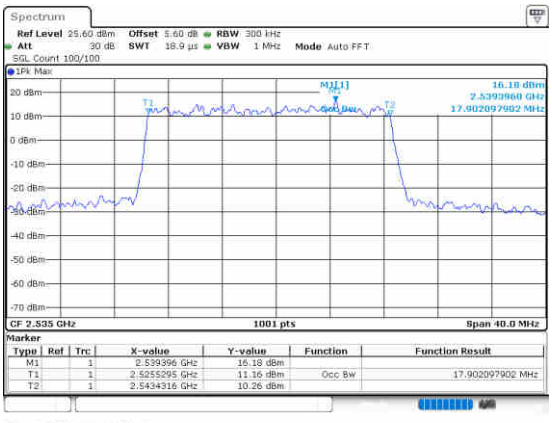
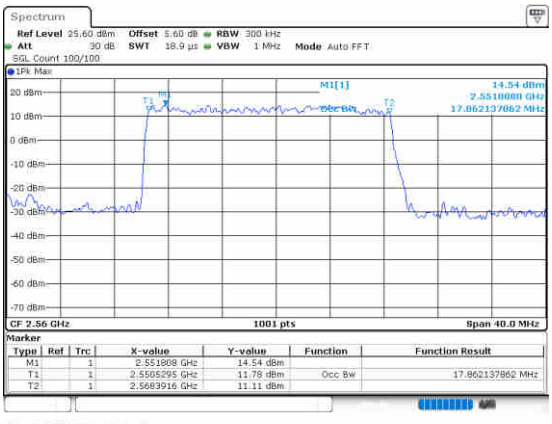
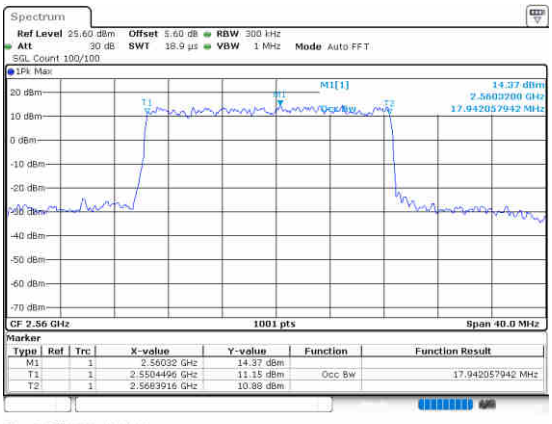
| NR N7 | |
|---|---|
| **Lowest Channel / 20MHz / BPSK** | **Lowest Channel / 20MHz / QPSK** |
|  |  |
| **Middle Channel / 20MHz / BPSK** | **Middle Channel / 20MHz / QPSK** |
|  |  |
| **Highest Channel / 20MHz / BPSK** | **Highest Channel / 20MHz / QPSK** |
|  |  |

# Occupied Bandwidth

| Mode | NR N7 : OB BW(MHz) | | | | | |
|---|---|---|---|---|---|---|
| BW | 5 MHz | | 10 MHz | | 20 MHz | |
| Mod. | BPSK | QPSK | BPSK | QPSK | BPSK | QPSK |
| Lowest CH | 4.48 | 4.48 | 9.03 | 9.05 | 17.86 | 17.94 |
| Middle CH | 4.48 | 4.49 | 9.05 | 9.03 | 17.94 | 17.90 |
| Highest CH | 4.48 | 4.50 | 9.05 | 9.07 | 17.86 | 17.94 |

| NR N7 | |
|---|---|
| **Lowest Channel / 5MHz / BPSK** | **Lowest Channel / 5MHz / QPSK** |
|  |  |
| **Middle Channel / 5MHz / BPSK** | **Middle Channel / 5MHz / QPSK** |
|  |  |
| **Highest Channel / 5MHz / BPSK** | **Highest Channel / 5MHz / QPSK** |
|  |  |

| NR N7 | |
|---|---|
| **Lowest Channel / 10MHz / BPSK** | **Lowest Channel / 10MHz / QPSK** |
|  |  |
| **Middle Channel / 10MHz / BPSK** | **Middle Channel / 10MHz / QPSK** |
|  |  |
| **Highest Channel / 10MHz / BPSK** | **Highest Channel / 10MHz / QPSK** |
|  |  |

| NR N7 | |
|---|---|
| **Lowest Channel / 20MHz / BPSK** | **Lowest Channel / 20MHz / QPSK** |
|  |  |
| **Middle Channel / 20MHz / BPSK** | **Middle Channel / 20MHz / QPSK** |
|  |  |
| **Highest Channel / 20MHz / BPSK** | **Highest Channel / 20MHz / QPSK** |
|  |  |