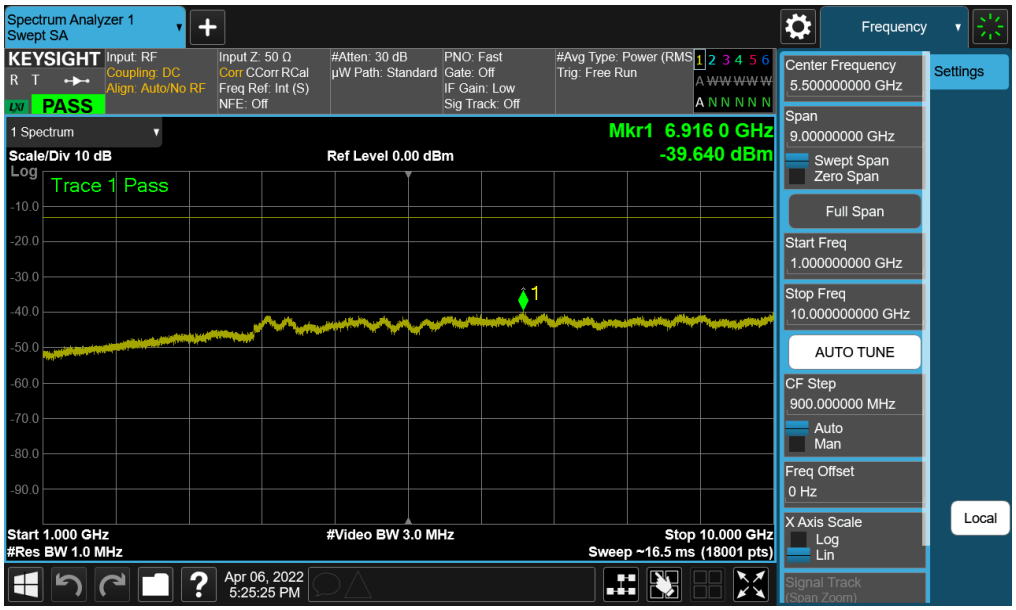
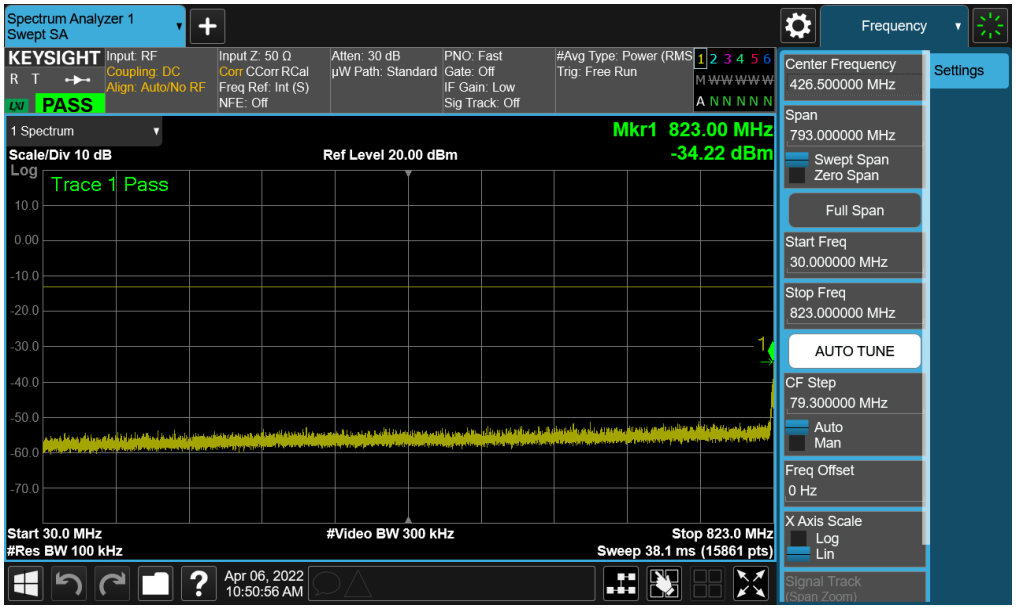
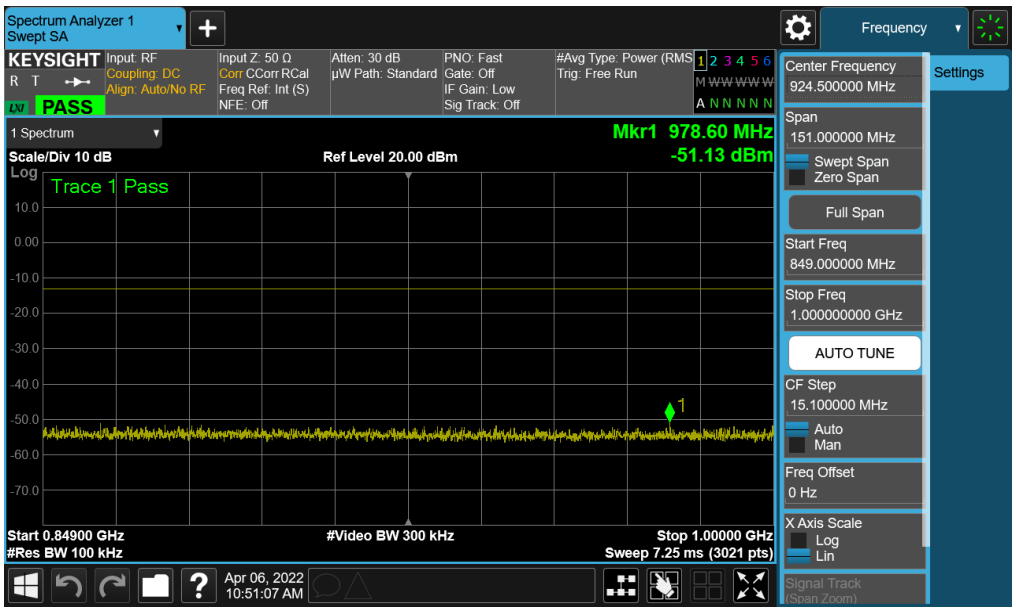



**Plot 7-43. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB - High Channel)**

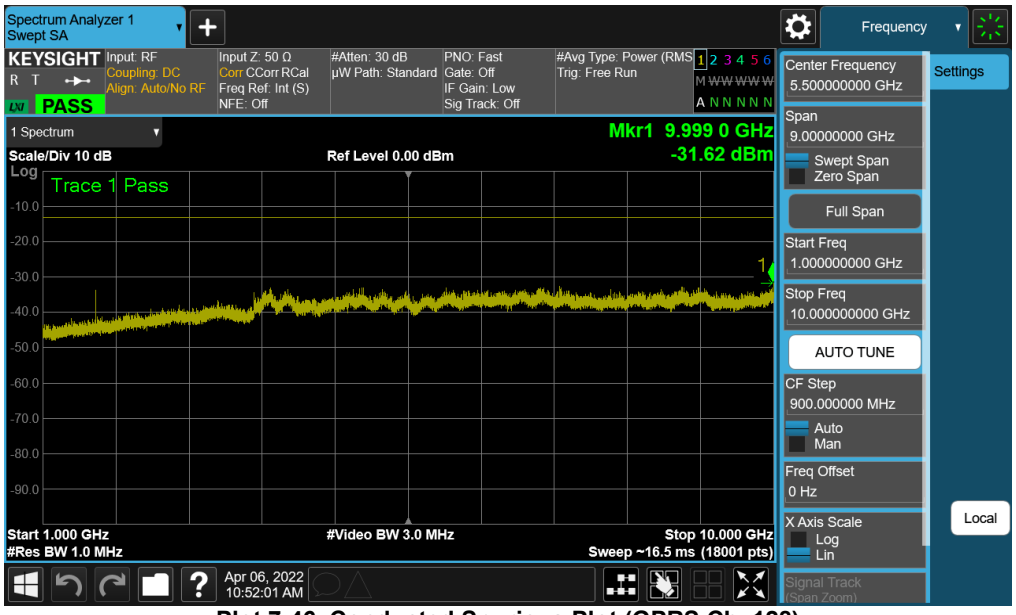
## GSM/GPRS Cell



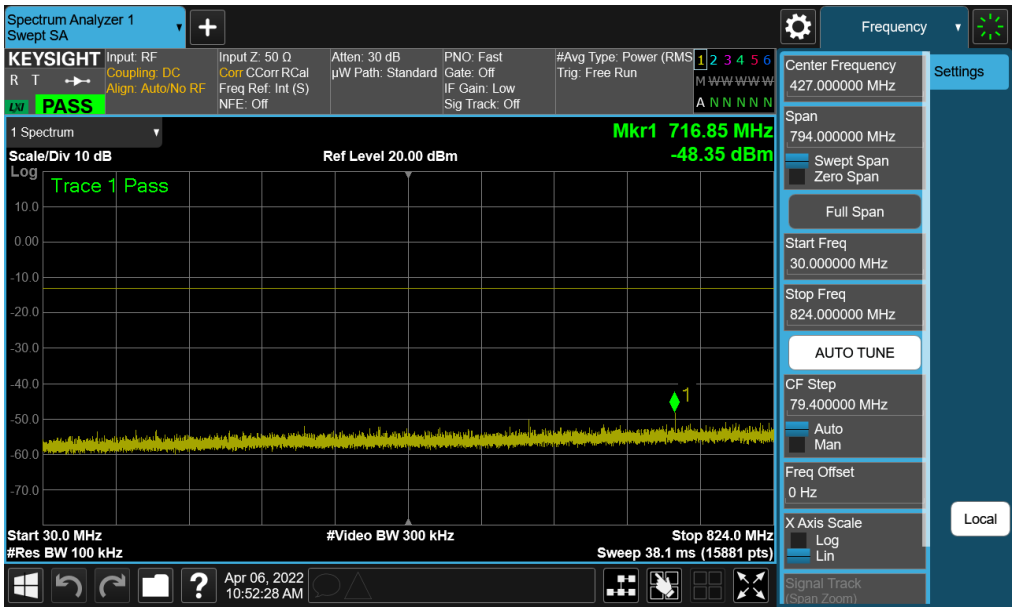

**Plot 7-44. Conducted Spurious Plot (GPRS Ch. 128)**



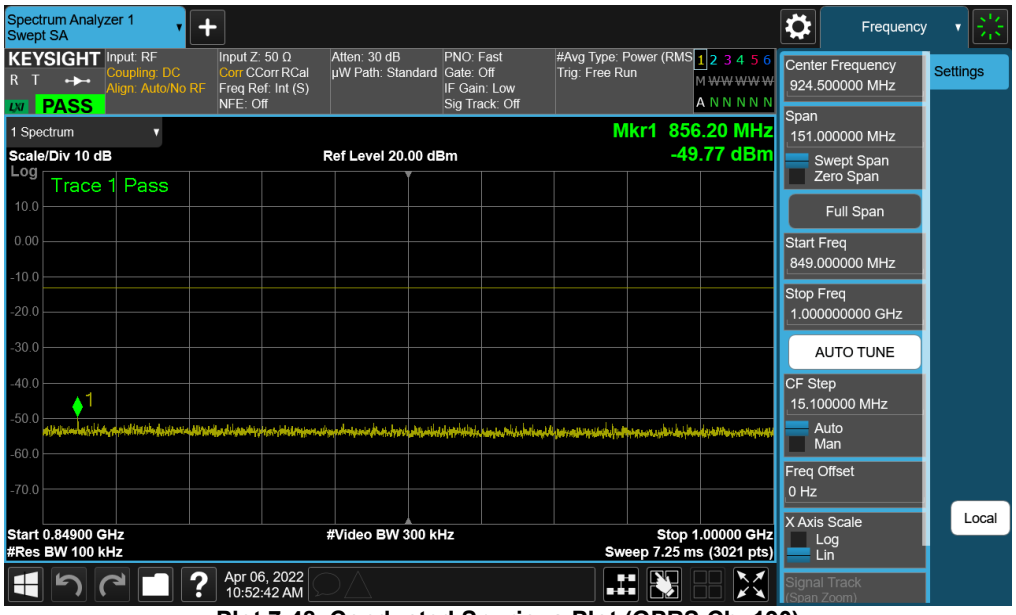

**Plot 7-45. Conducted Spurious Plot (GPRS Ch. 128)**




**Plot 7-46. Conducted Spurious Plot (GPRS Ch. 128)**

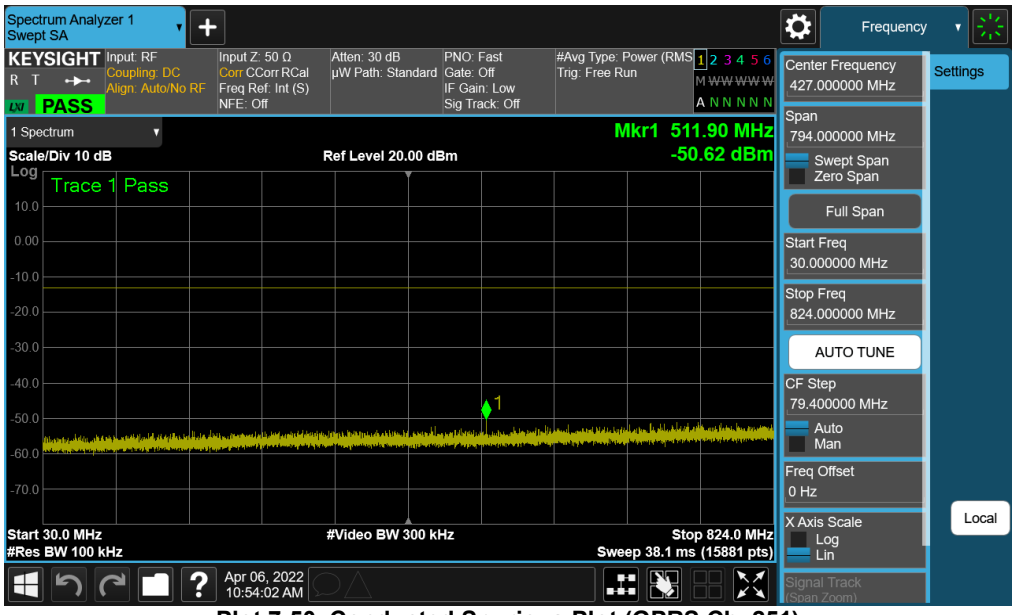



**Plot 7-47. Conducted Spurious Plot (GPRS Ch. 190)**

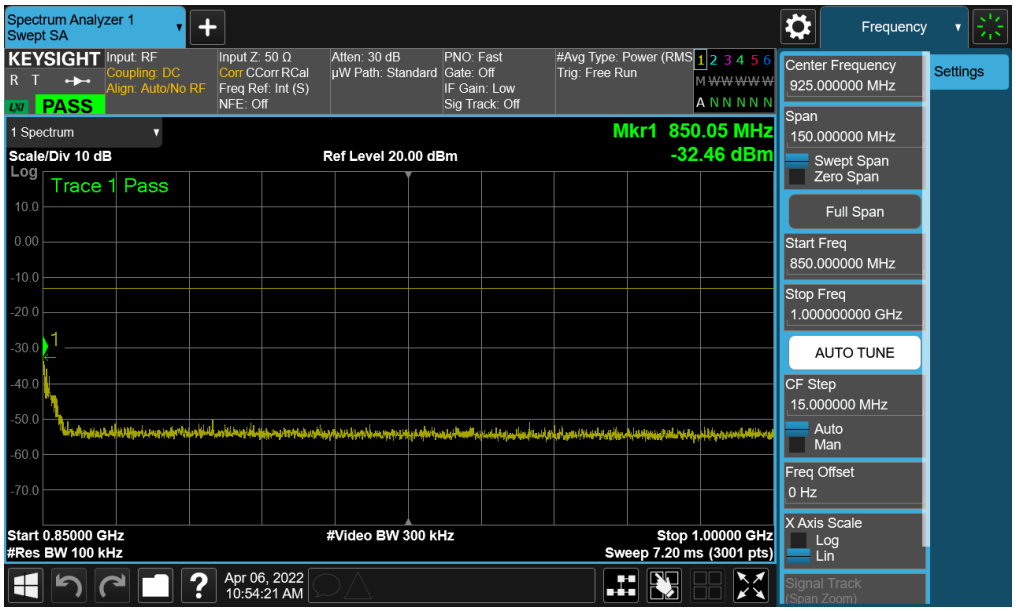



**Plot 7-48. Conducted Spurious Plot (GPRS Ch. 190)**

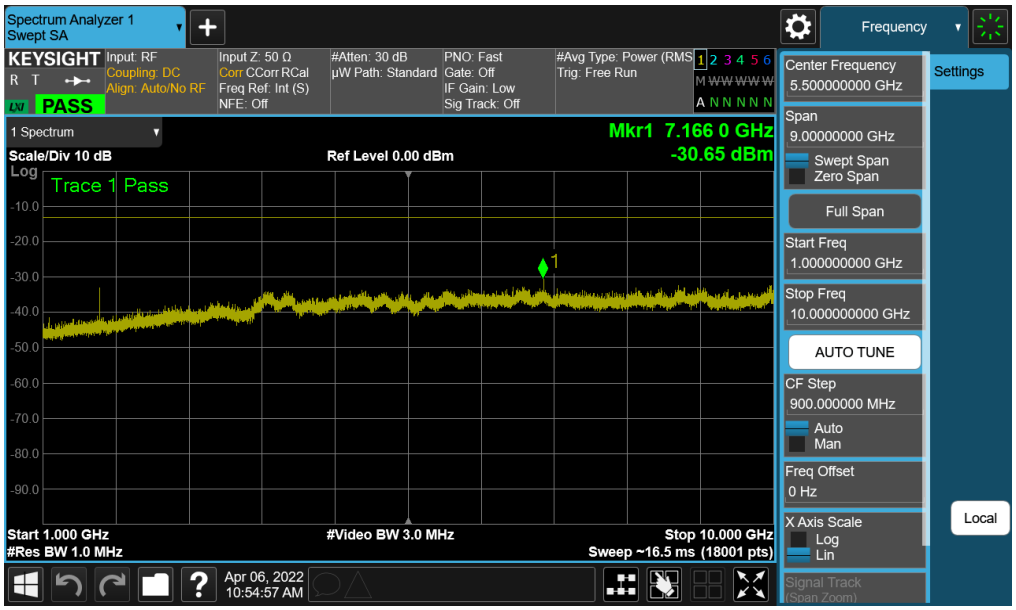

**Plot 7-49. Conducted Spurious Plot (GPRS Ch. 190)**




**Plot 7-50. Conducted Spurious Plot (GPRS Ch. 251)**

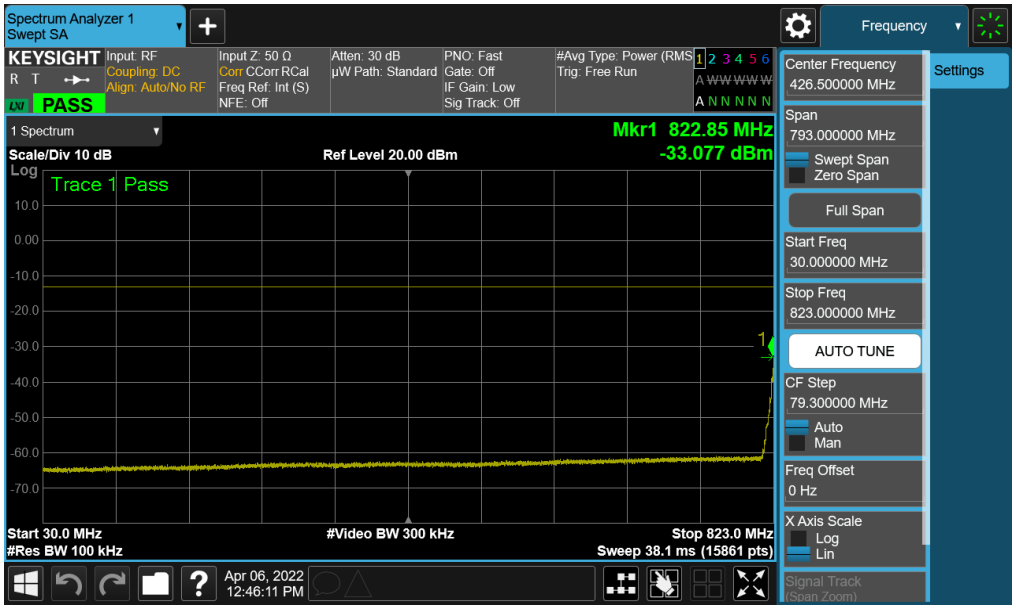



**Plot 7-51. Conducted Spurious Plot (GPRS Ch. 251)**

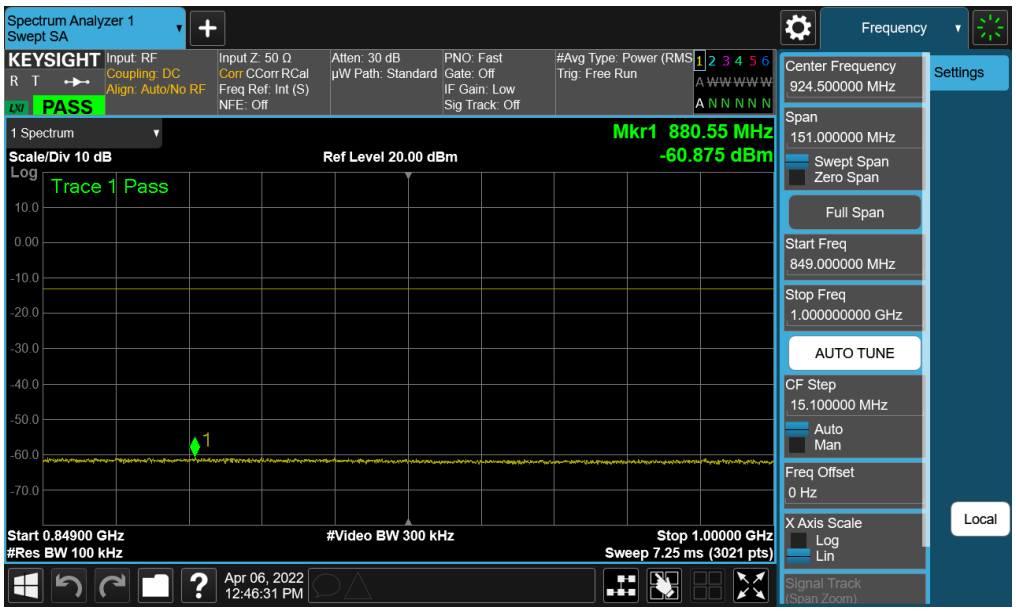



**Plot 7-52. Conducted Spurious Plot (GPRS Ch. 251)**

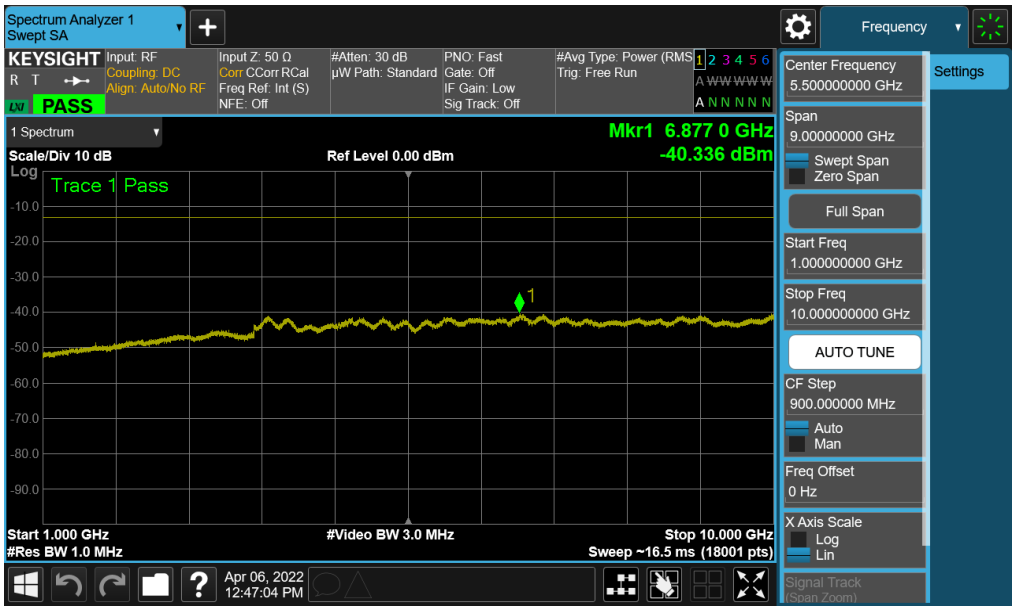
## WCDMA Cell



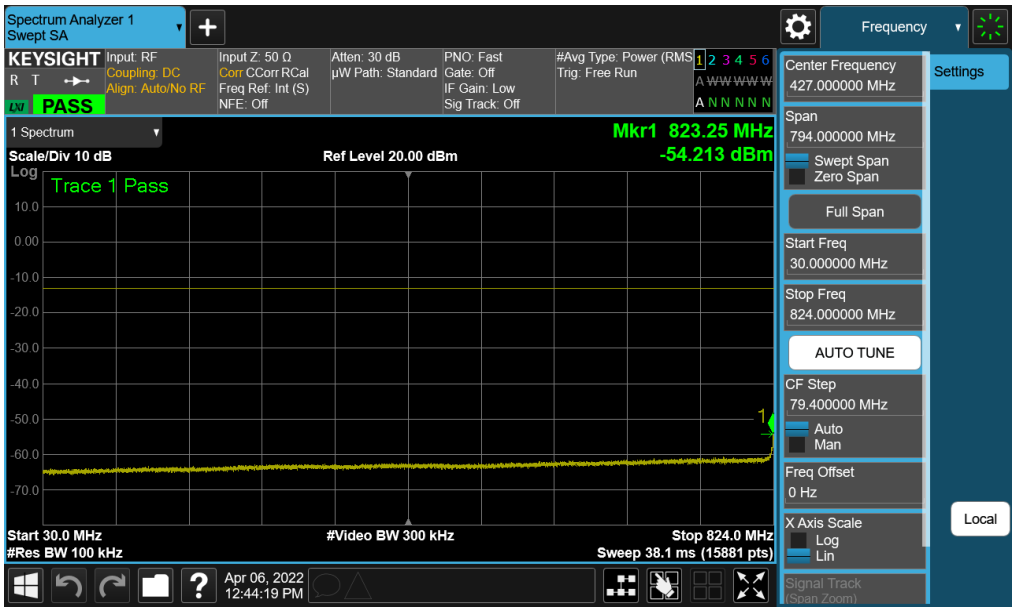

**Plot 7-53. Conducted Spurious Plot (WCDMA Ch. 4132)**



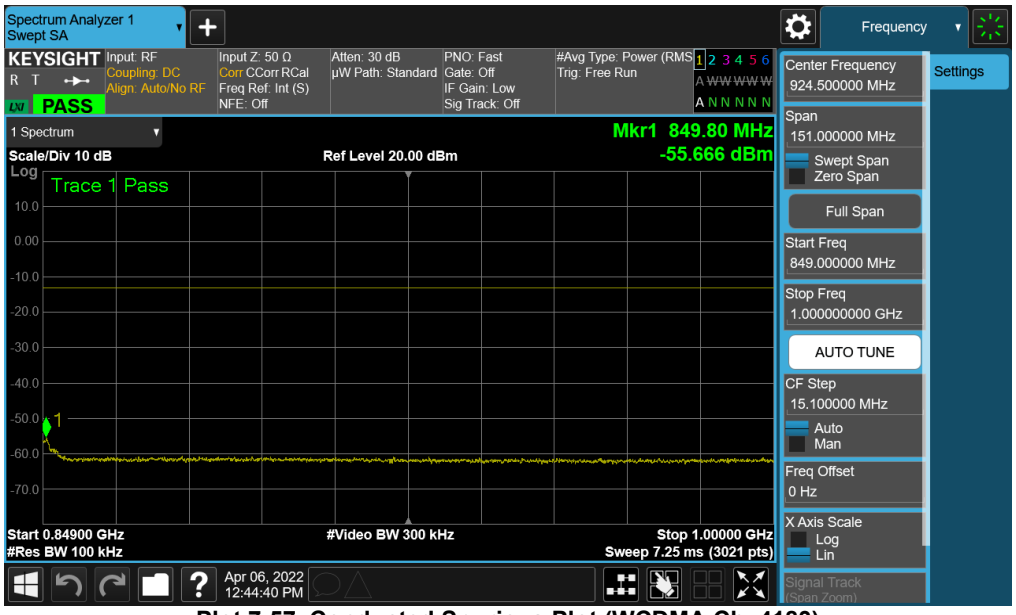

**Plot 7-54. Conducted Spurious Plot (WCDMA Ch. 4132)**



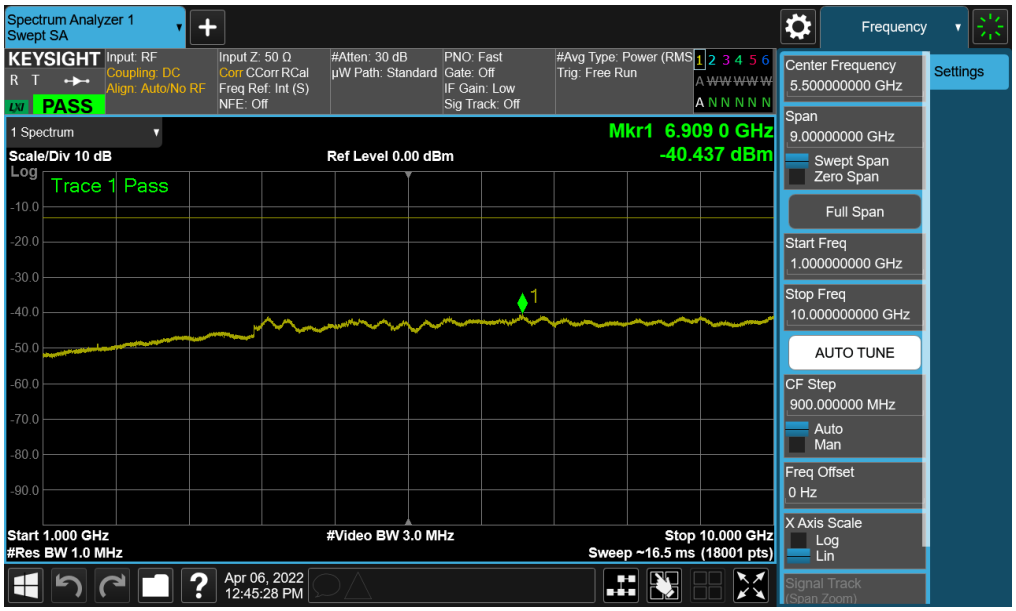

**Plot 7-55. Conducted Spurious Plot (WCDMA Ch. 4132)**



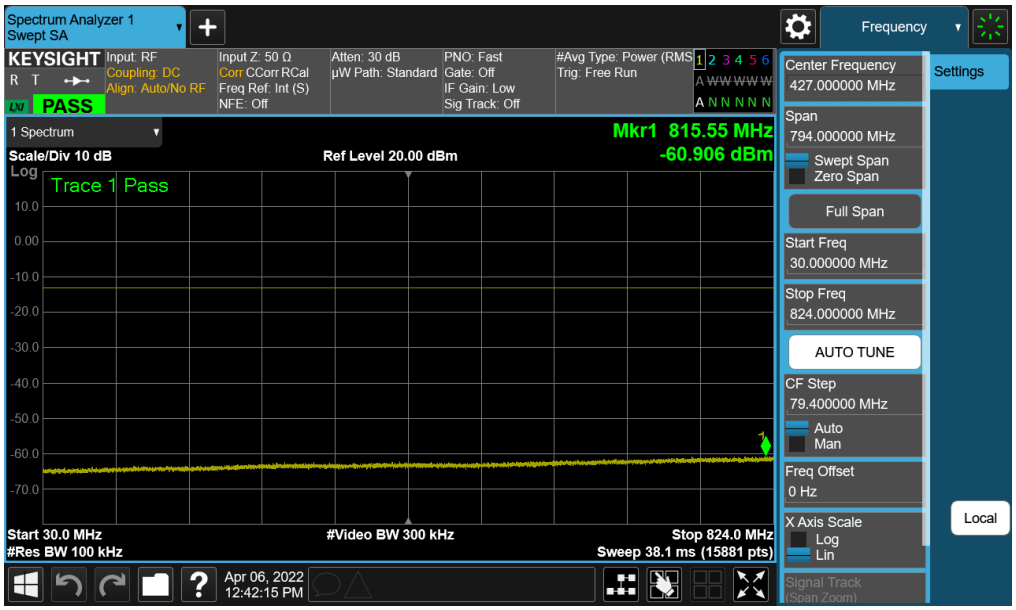

**Plot 7-56. Conducted Spurious Plot (WCDMA Ch. 4183)**



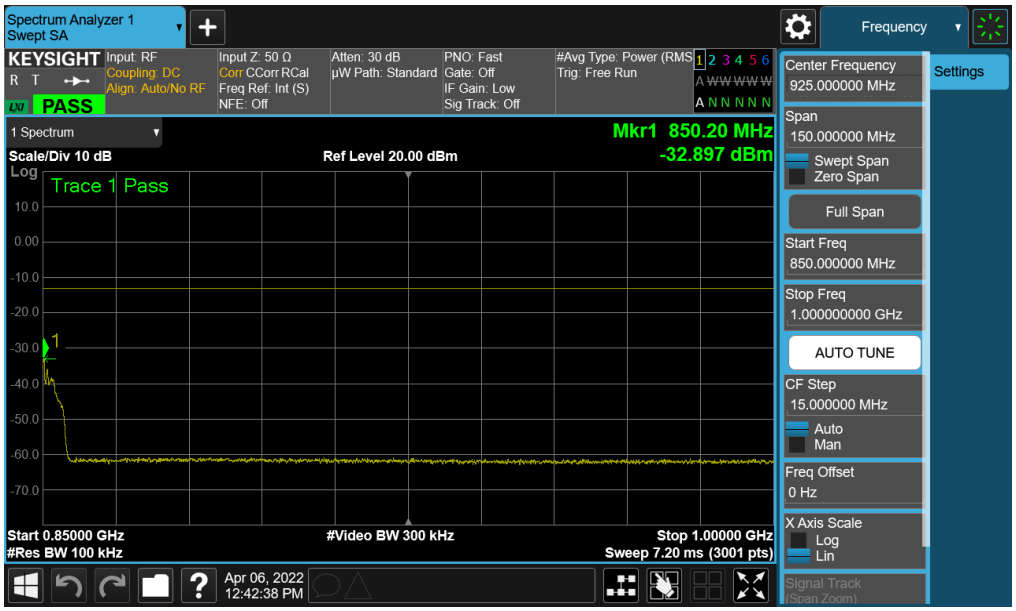

**Plot 7-57. Conducted Spurious Plot (WCDMA Ch. 4183)**



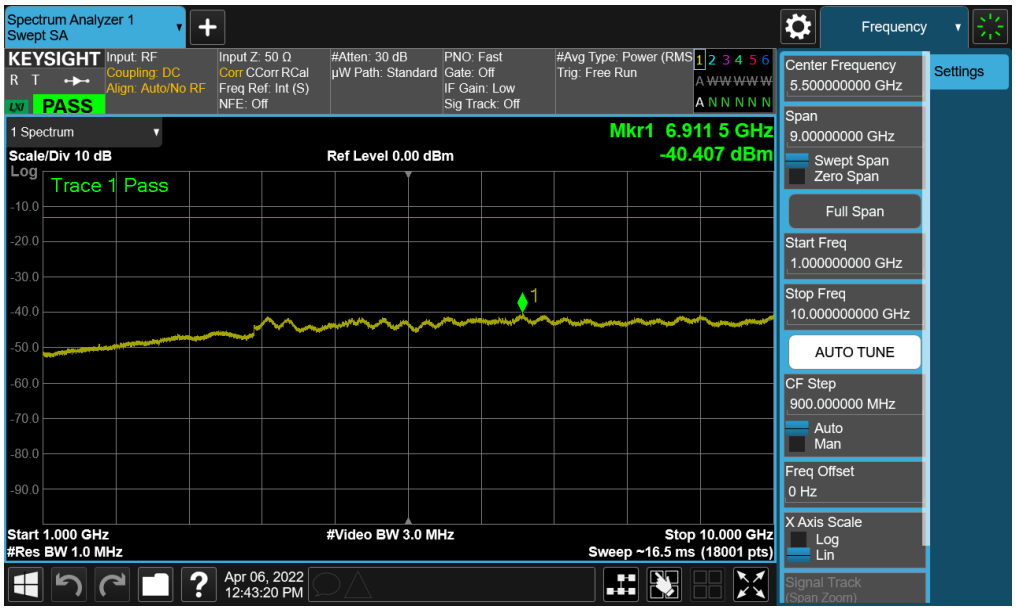

**Plot 7-58. Conducted Spurious Plot (WCDMA Ch. 4183)**




**Plot 7-59. Conducted Spurious Plot (WCDMA Ch. 4233)**




**Plot 7-60. Conducted Spurious Plot (WCDMA Ch. 4233)**




**Plot 7-61. Conducted Spurious Plot (WCDMA Ch. 4233)**

## 7.4 Band Edge Emissions at Antenna Terminal

**Test Overview**

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

***The minimum permissible attenuation level of any spurious emission is 43 + 10 log$_{10}$(P$_{[Watts]}$), where P is the transmitter power in Watts.***

**Test Procedure Used**

ANSI C63.26-2015 – Section 5.7.3

**Test Settings**

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW ≥ 1% of the emission bandwidth
4. VBW ≥ 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW
7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
8. Sweep time = auto couple
9. The trace was allowed to stabilize

**Test Setup**

The EUT and measurement equipment were set up as shown in the diagram below.

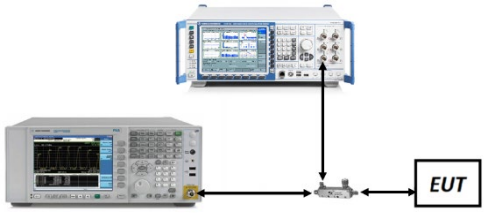


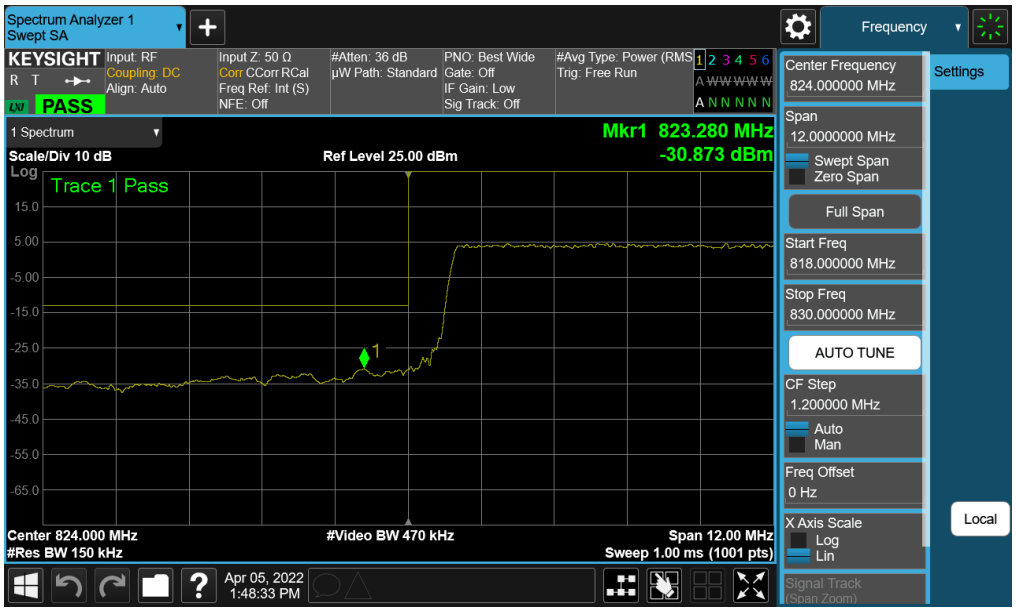

**Figure 7-3. Test Instrument & Measurement Setup**

## Test Notes

1. Per 22.917(b) and RSS-132(5.5), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. 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 emission are attenuated at least 26 dB below the transmitter power.

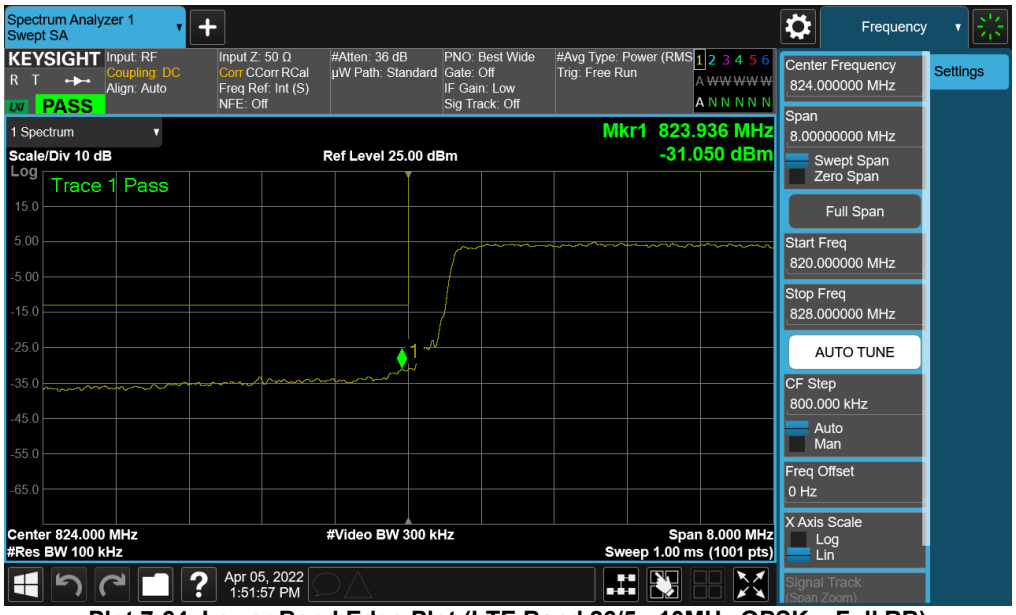
2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

## LTE Band 26/5

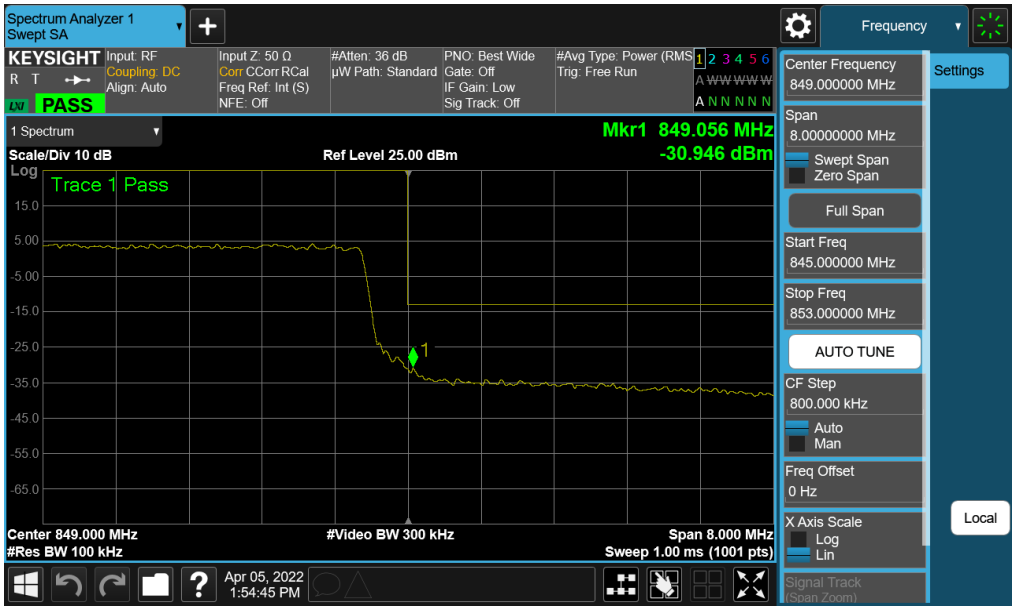



**Plot 7-62. Lower Band Edge Plot (LTE Band 26 - 15MHz QPSK – Full RB)**

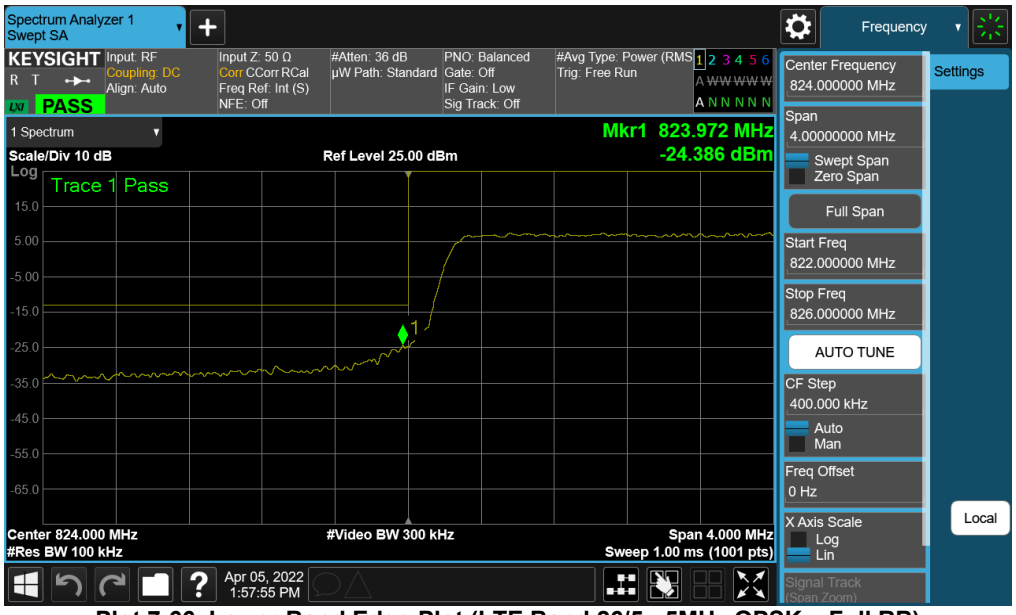

**Plot 7-63. Upper Band Edge Plot (LTE Band 26 - 15MHz QPSK – Full RB)**




**Plot 7-64. Lower Band Edge Plot (LTE Band 26/5 - 10MHz QPSK – Full RB)**

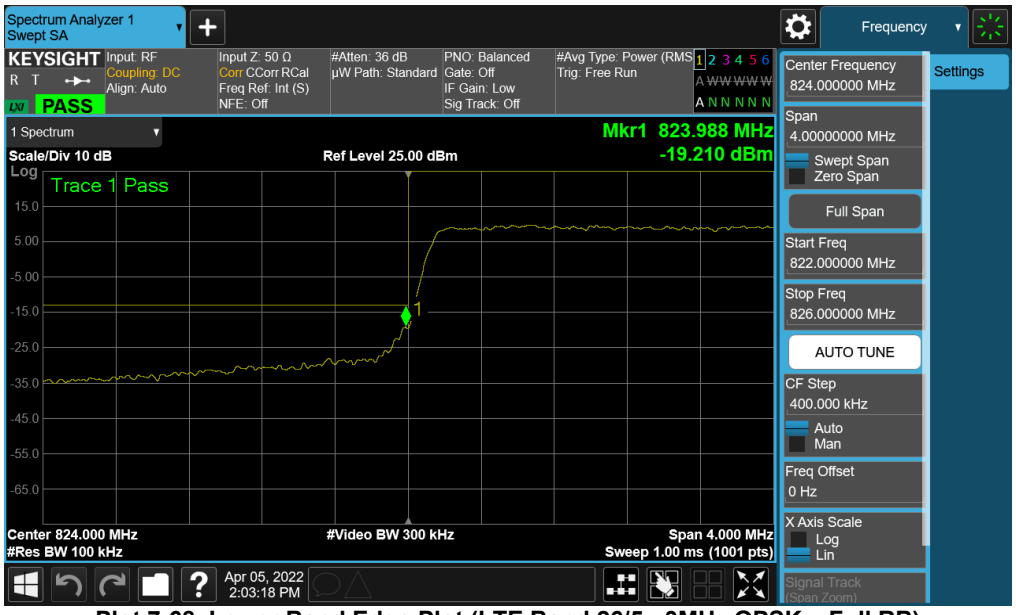



**Plot 7-65. Upper Band Edge Plot (LTE Band 26/5 - 10MHz QPSK – Full RB)**

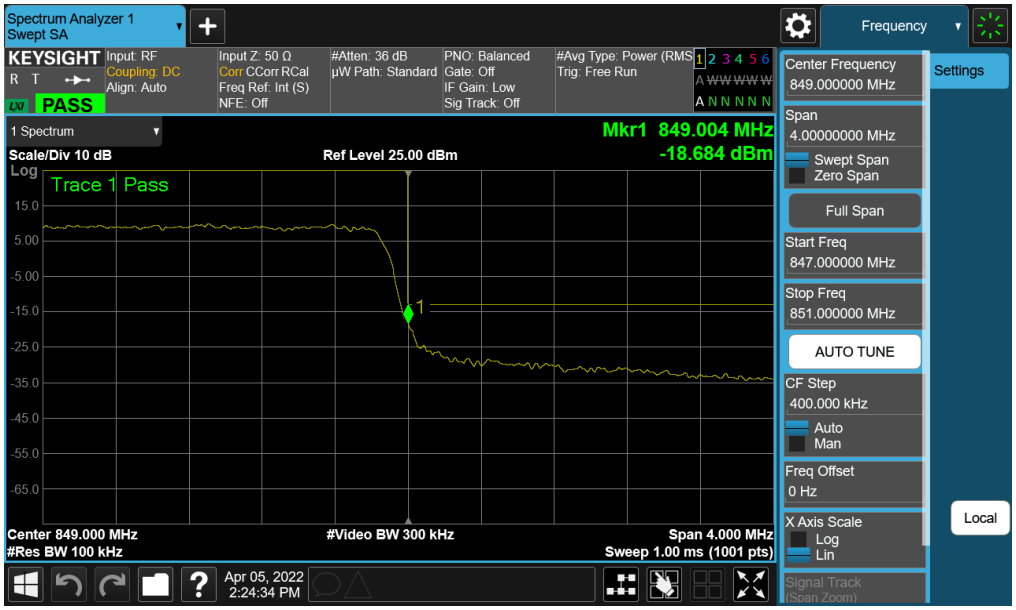



**Plot 7-66. Lower Band Edge Plot (LTE Band 26/5 - 5MHz QPSK – Full RB)**

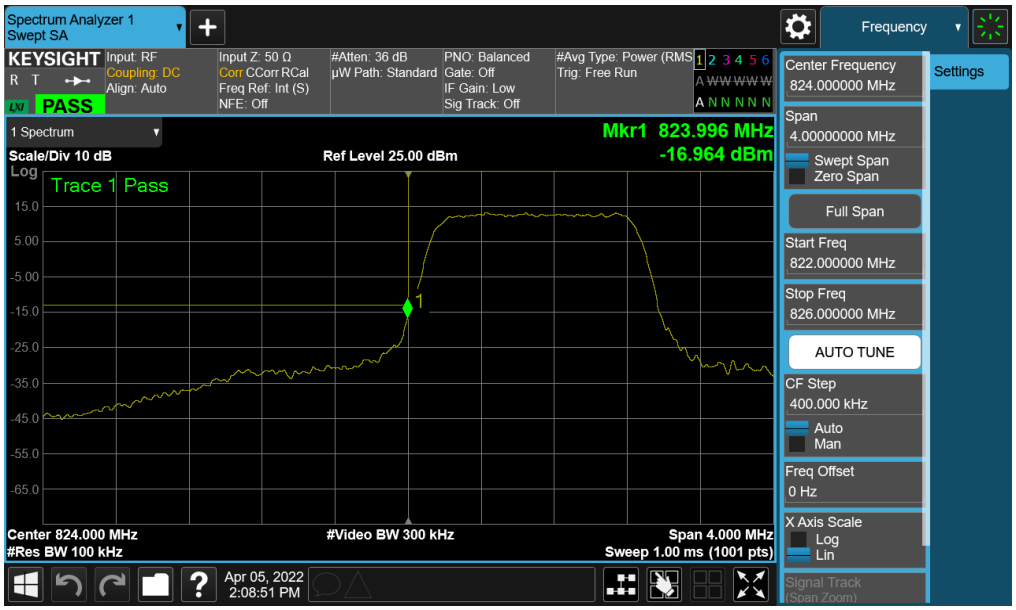

**Plot 7-67. Upper Band Edge Plot (LTE Band 26/5 - 5MHz QPSK – Full RB)**




**Plot 7-68. Lower Band Edge Plot (LTE Band 26/5 - 3MHz QPSK – Full RB)**



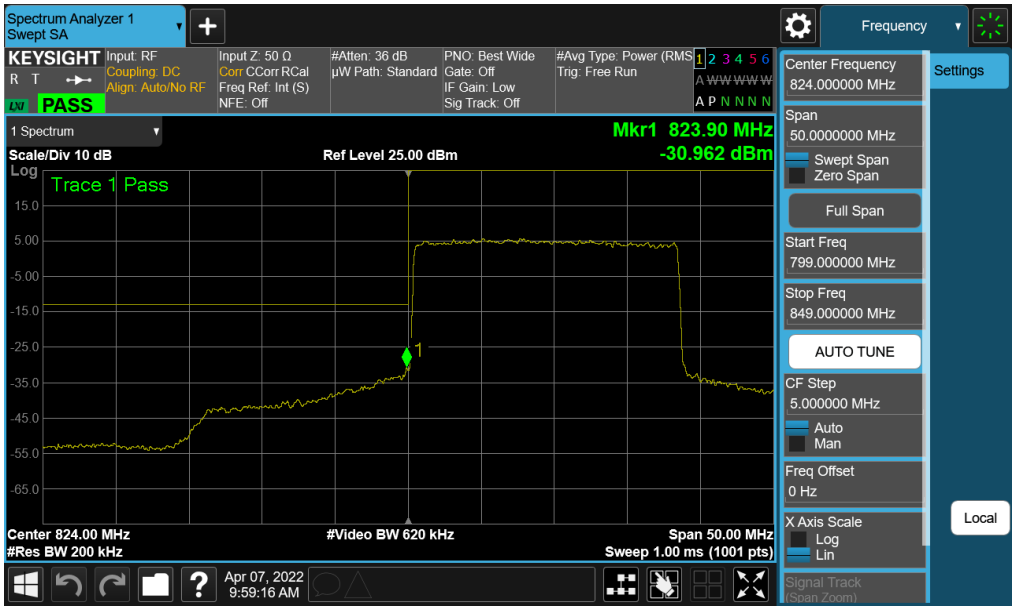

**Plot 7-69. Upper Band Edge Plot (LTE Band 26/5 - 3MHz QPSK – Full RB)**




**Plot 7-70. Lower Band Edge Plot (LTE Band 26/5 – 1.4MHz QPSK – Full RB)**

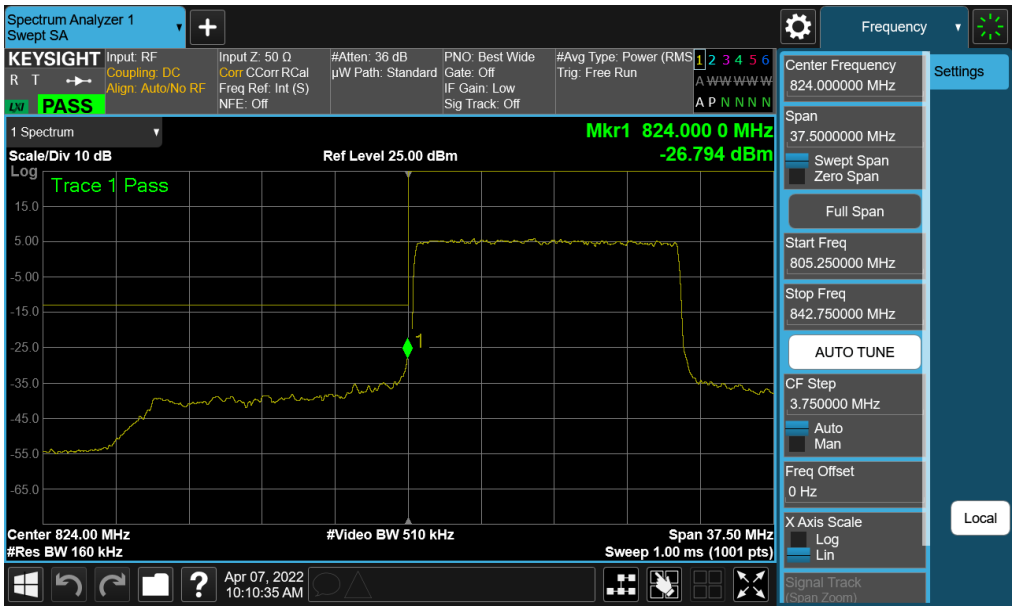

**Plot 7-71. Upper Band Edge Plot (LTE Band 26/5 – 1.4MHz QPSK – Full RB)**

## NR Band n5



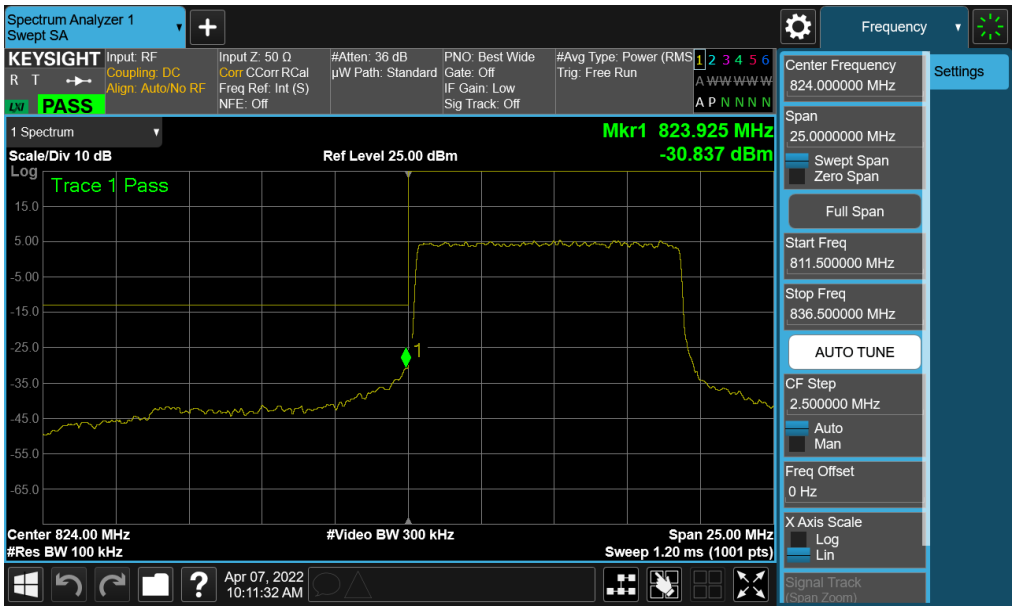

**Plot 7-72. Lower Band Edge Plot (NR Band n5 – 20.0MHz - Full RB)**


**Plot 7-73. Upper Band Edge Plot (NR Band n5 – 20.0MHz - Full RB)**



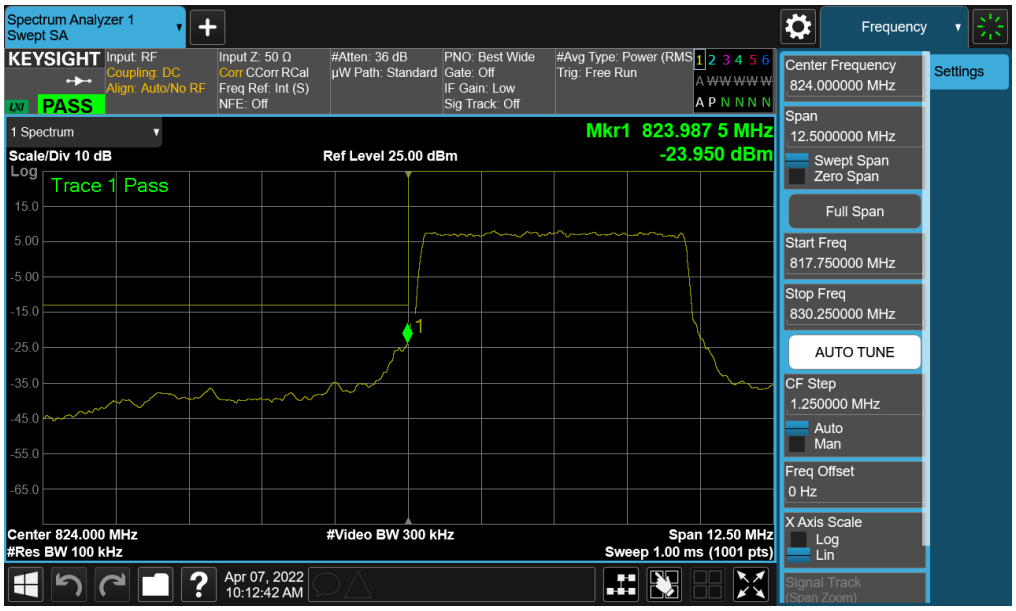

**Plot 7-74. Lower Band Edge Plot (NR Band n5 – 15.0MHz - Full RB)**


**Plot 7-75. Upper Band Edge Plot (NR Band n5 – 15.0MHz - Full RB)**

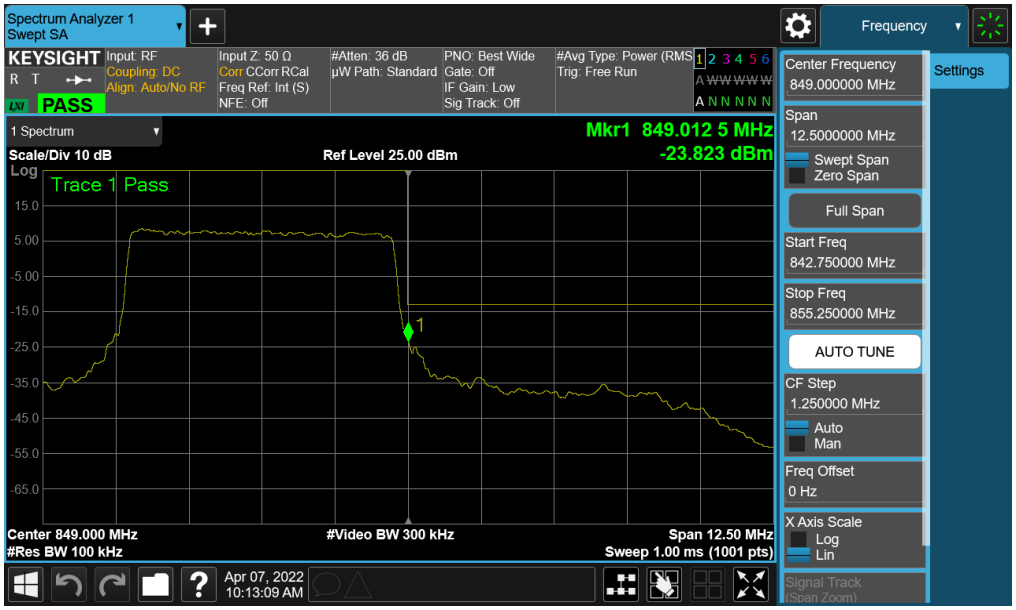



**Plot 7-76. Lower Band Edge Plot (NR Band n5 – 10.0MHz - Full RB)**


**Plot 7-77. Upper Band Edge Plot (NR Band n5 – 10.0MHz - Full RB)**

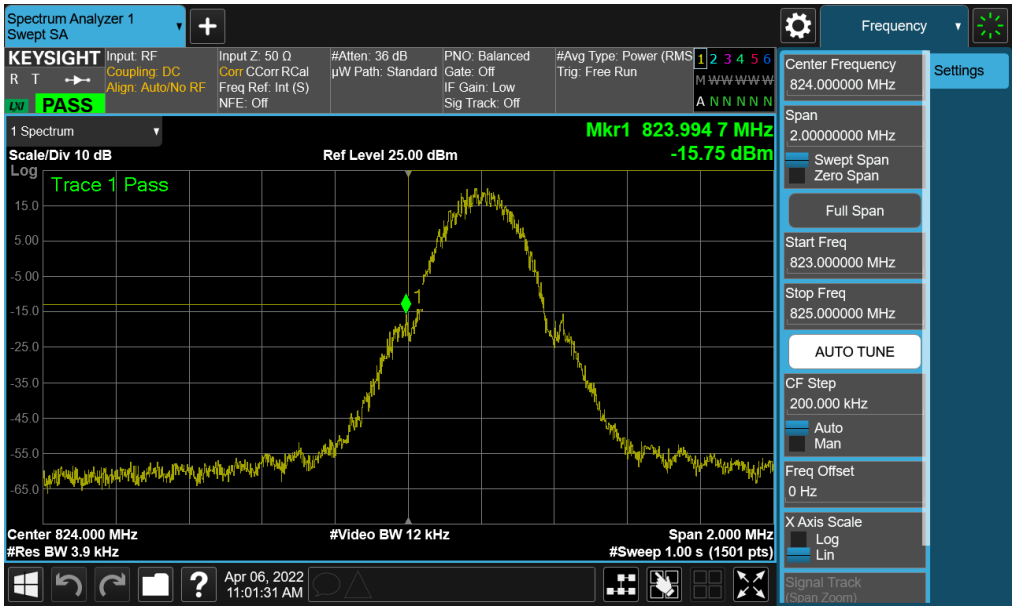



**Plot 7-78. Lower Band Edge Plot (NR Band n5 – 5.0MHz - Full RB)**

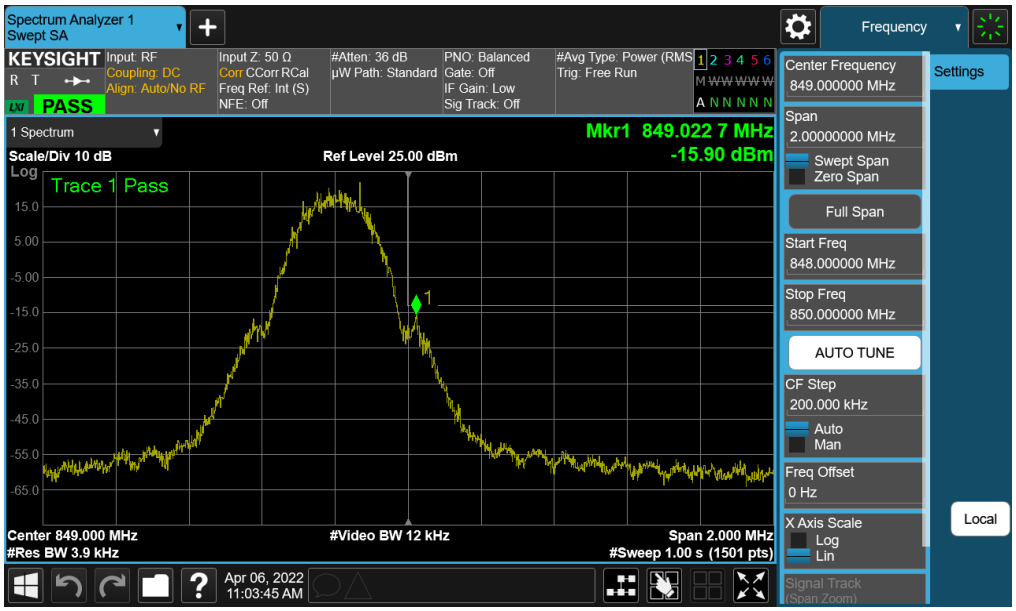



**Plot 7-79. Upper Band Edge Plot (NR Band n5 – 5.0MHz - Full RB)**

## GSM/GPRS Cell

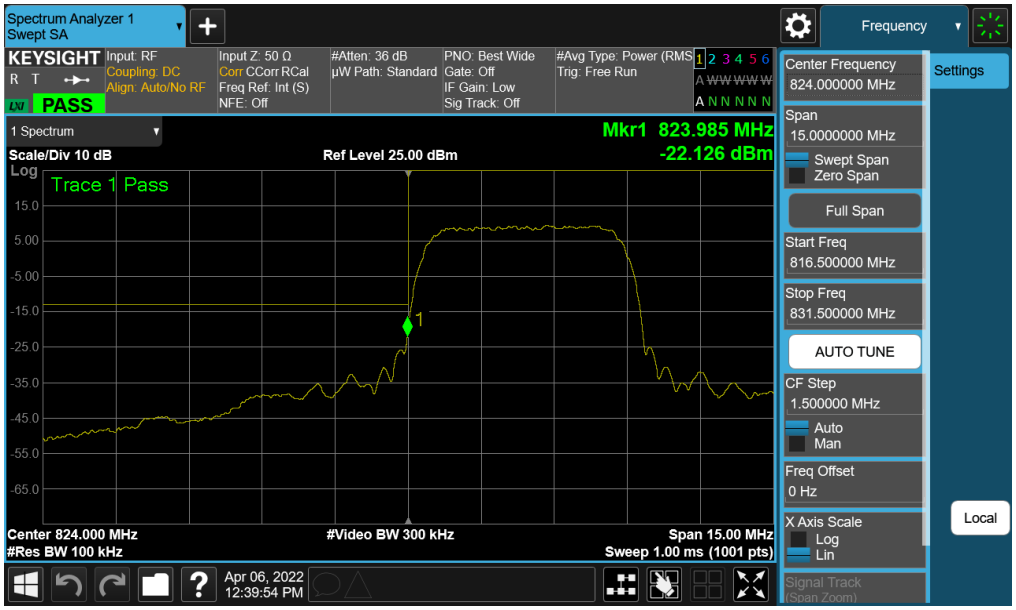



**Plot 7-80. Lower Band Edge Plot (GPRS Cell – Ch. 128)**




**Plot 7-81. Upper Band Edge Plot (GPRS Cell – Ch. 251)**

## WCDMA Cell




**Plot 7-82. Lower Band Edge Plot (WCDMA Cell – Ch. 4132)**


**Plot 7-83. Upper Band Edge Plot (WCDMA Cell – Ch. 4233)**

## 7.5 Uplink Carrier Aggregation and EN-DC

**Test Overview**

The EUT is set up to transmit two contiguous LTE channels. The power level of both carriers and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

**Test Procedure Used**

KDB 971168 D01 v03r01 – Section 6.0

**Test Settings**

1. Start frequency was set to 30MHz and stop frequency was set to at least 10 * the fundamental frequency (separated into at least two plots per channel)
2. Detector = RMS
3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
4. Sweep time = auto couple.
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings

**Test Setup**

The EUT and measurement equipment were set up as shown in the diagram below.

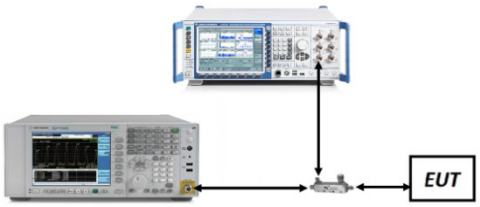



**Figure 7-4. Test Instrument & Measurement Setup**

## Test Notes

1. Conducted power and spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device. The worst case (highest) powers were found while operating with QPSK modulation with both carriers set to transmit using 1RB.

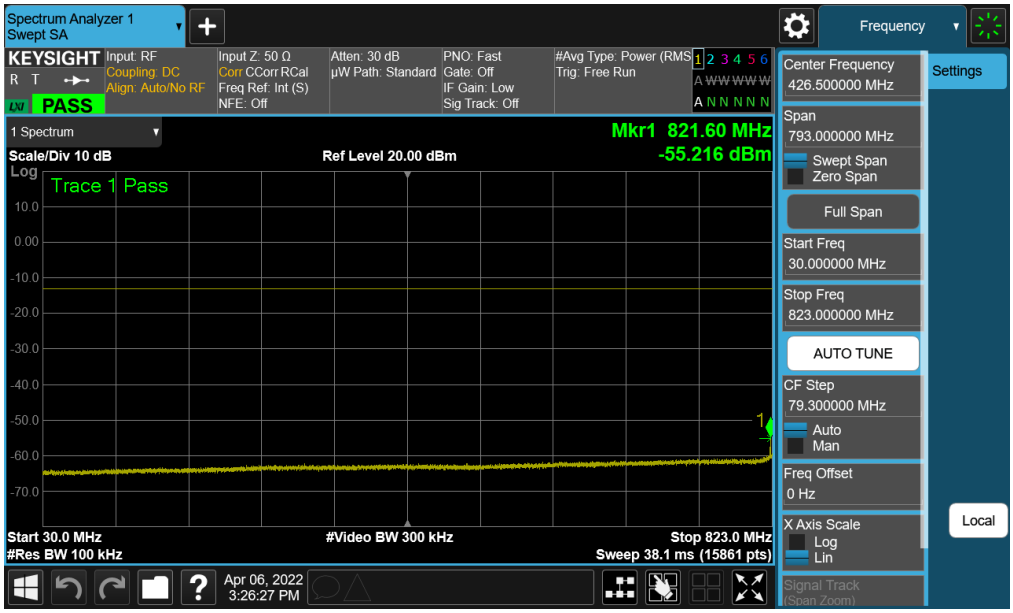
2. Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

3. Conducted power measurements are also evaluated for simultaneous transmission of two NR FR1 carriers operating in different bands (interband NR FR1 ULCA). The powers were investigated while both bands are operating at their widest supported channel bandwidth.

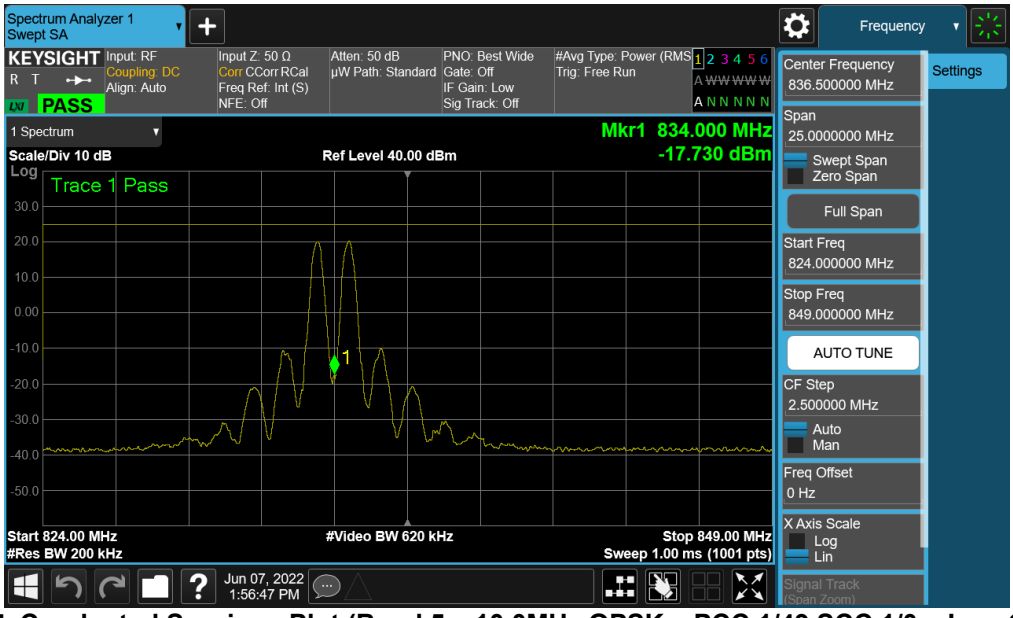
## Uplink CA configuration 5B

| Power State | Band | Bandwidth (PCC + SCC) | PCC | | | | | SCC | | | | | ULCA Tx. Power [dBm] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Modulation | UL Channel | UL Frequency | UL # RB | UL RB Offset | Modulation | UL Channel | UL Frequency | UL # RB | UL RB Offset | |
| Max | LTE B5 | 10MHz + 10MHz | QPSK | 20450 | 829.0 | 1 | 49 | QPSK | 20549 | 838.9 | 1 | 0 | 24.41 |
| | | | | 20475 | 831.5 | 1 | 49 | | 20574 | 841.4 | 1 | 0 | 24.54 |
| | | | | 20600 | 844.0 | 1 | 0 | | 20501 | 834.1 | 1 | 49 | 24.37 |
| | | | QPSK | 20475 | 831.5 | 50 | 0 | QPSK | 20574 | 841.4 | 50 | 0 | 22.54 |
| | | | 16-QAM | 20475 | 831.5 | 50 | 0 | 16-QAM | 20574 | 841.4 | 50 | 0 | 21.54 |
| | | | 64-QAM | 20475 | 831.5 | 50 | 0 | 64-QAM | 20574 | 841.4 | 50 | 0 | 21.47 |
| | | | 256-QAM | 20475 | 831.5 | 50 | 0 | 256-QAM | 20574 | 841.4 | 50 | 0 | 19.53 |

**Table 7-2. Conducted Powers (5B)**




**Plot 7-84. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Low Channel)**




**Plot 7-85. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Low Channel)**