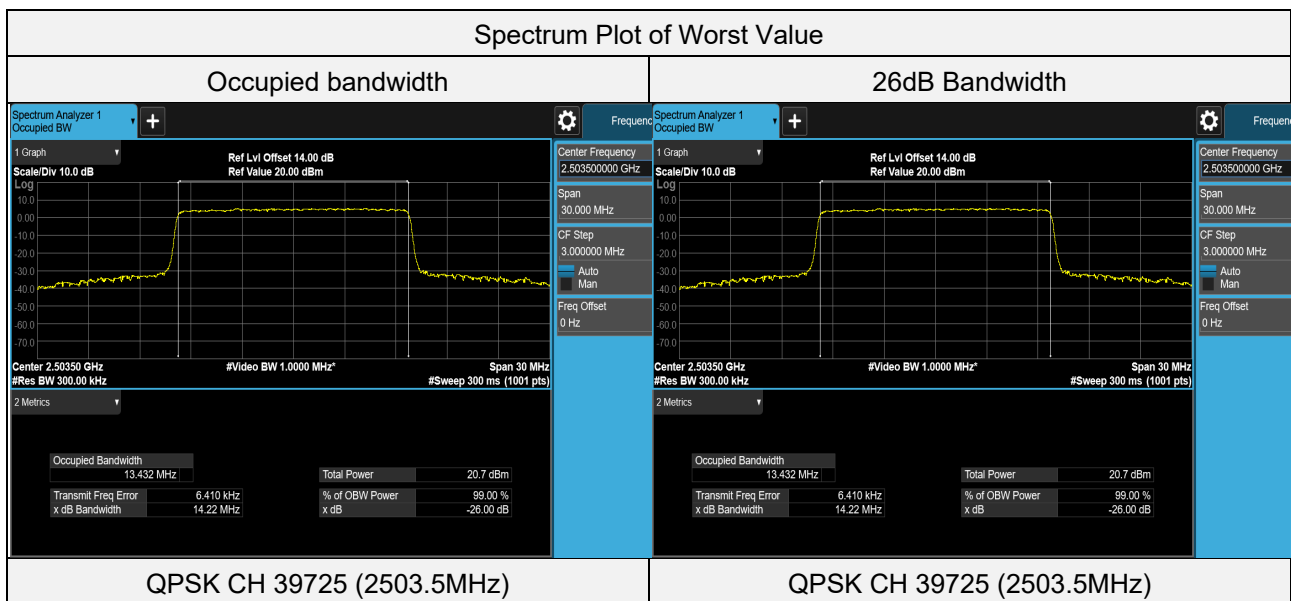


LTE Band 41 (Channel Bandwidth 15MHz)

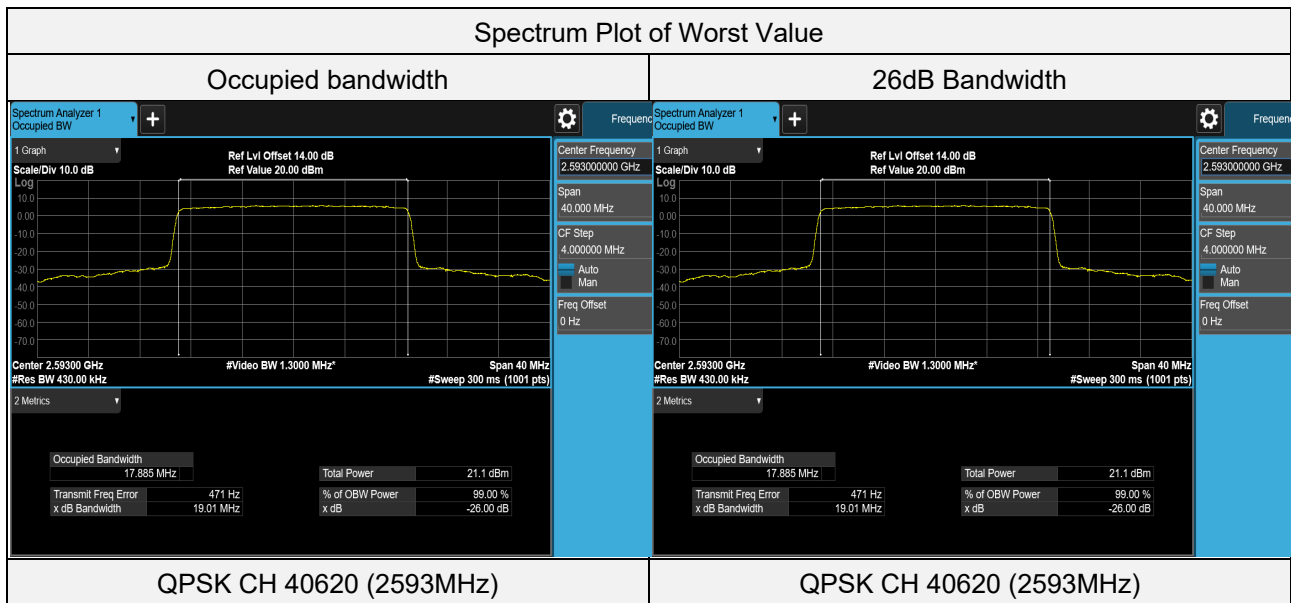
Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	39725	2503.5	13.4322	14.221
QPSK	40620	2593	13.4320	14.218
QPSK	41515	2682.5	13.4256	14.221
16QAM	39725	2503.5	4.6664	5.353
16QAM	40620	2593	4.6733	5.363
16QAM	41515	2682.5	4.6673	5.341



LTE Band 41 (Channel Bandwidth 20MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	39750	2506	17.8756	18.977
QPSK	40620	2593	17.8848	19.006
QPSK	41490	2680	17.8687	18.995
16QAM	39750	2506	4.8030	5.549
16QAM	40620	2593	4.8135	5.566
16QAM	41490	2680	4.7867	5.571

Spectrum Plot of Worst Value



## 4.5 Channel Edge / Out-of-Band Emissions Measurement

### 4.5.1 Limits of Band Edge / Out-of-Band Emissions Measurement

For WCDMA Band 4, LTE Band 4:

According to FCC 27.53(h) for operations in the 1695-1710MHz, 1710-1755MHz, 1755-1780 MHz, 1915-1920MHz, 1995-2000 MHz, 2000-2020MHz, 2110-2155MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log (P)$  dB.

For LTE Band 7, LTE Band 38, LTE Band 41:

According to FCC 27.53(m)(4) specified that power of any emission outside of the channel edge must be attenuated below the transmitting power (P) by a 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. In addition, the attenuation factor shall not be less that  $43 + 10 \log (P)$  dB on all frequencies between 2490.5MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5MHz. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed.

For LTE Band 12:

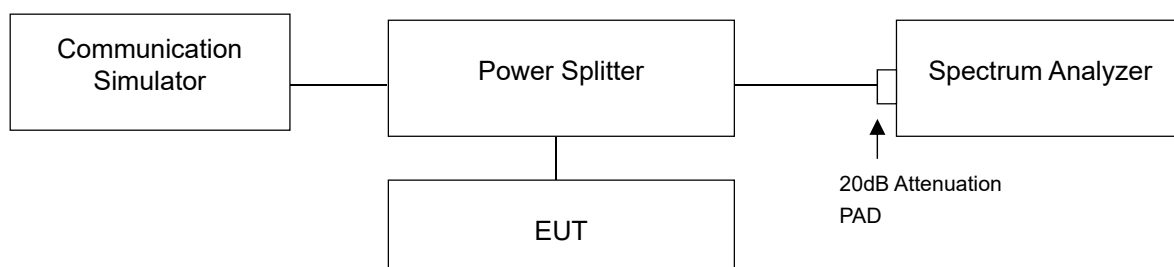
According to FCC 27.53(g) for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.

For LTE Band 13:

According to FCC 27.53(c)(2) for on any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB.

According to 27.53(c)(4) On all frequencies between 763-775MHz and 793-805MHz, by a factor not less than  $65 + 10 \log (P)$  dB in a 6.25 kHz band segment, for mobile and portable stations

### 4.5.2 Test Setup



#### 4.5.3 Test Procedures

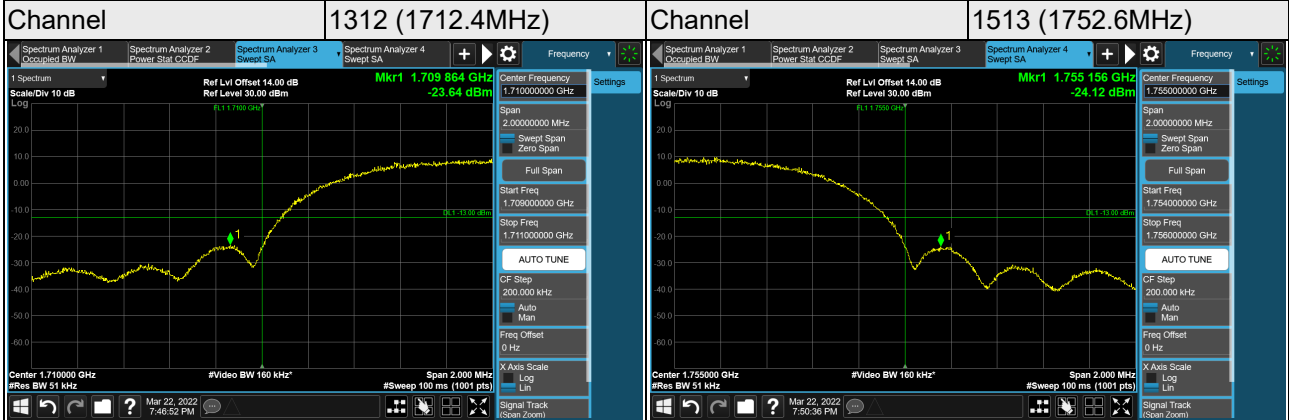
- a. The EUT was set up for the rated peak power. The power was measured with Spectrum Analyzer. Band edge measurements were done at 2 channels: low and high operational frequency range.
- b. The center frequency of spectrum is the band edge frequency and span is 2MHz. RB of the spectrum is 51kHz and VB of the spectrum is 160kHz (WCDMA / HSDPA / HSUPA).
- c. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 15kHz and VB of the spectrum is 51kHz (LTE Channel Bandwidth 1.4MHz).
- d. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 30kHz and VB of the spectrum is 100kHz (LTE Channel Bandwidth 3MHz).
- e. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 51kHz and VB of the spectrum is 160kHz (LTE Channel Bandwidth 5MHz).
- f. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE Channel Bandwidth 10MHz).
- g. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 150kHz and VB of the spectrum is 470kHz (LTE Channel Bandwidth 15MHz).
- h. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 200kHz and VB of the spectrum is 1MHz (LTE Channel Bandwidth 20MHz).
- i. Except LTE Band 12 measurement procedure refer 27.53(g).
- j. LTE Band 7, Band 38, Band 41 measurement, for 5 MHz and 10 MHz channel BW mode, extend the 1% range from 1M to 2M above and below the channel edge and then reduce the limit further by  $10 \log(1000/100) = 10\text{dB}$  (i.e. total  $-10 + -10 = -20\text{dB}$ ) to compensate for the integration from 100k to 1M.
- k. LTE Band 13 measurements in the 763 - 775 MHz and 793 - 805 MHz band, the FCC limit is  $65 + 10 \log(P[\text{watt}])$  in a 6.25 kHz bandwidth. Since it was not possible to set the resolution bandwidth to 6.25 kHz with the available equipment, a bandwidth of 6.8 kHz was used instead to show compliance, and the correction factor is compensated at the spectrum.
- l. Record the max trace plot into the test report.



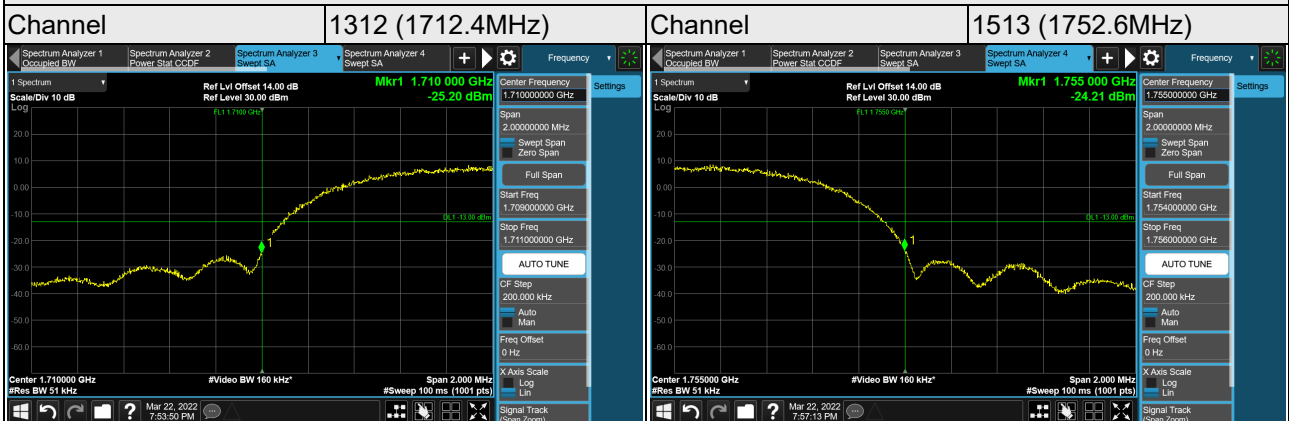
### 4.5.4 Test Results

#### Band Edge

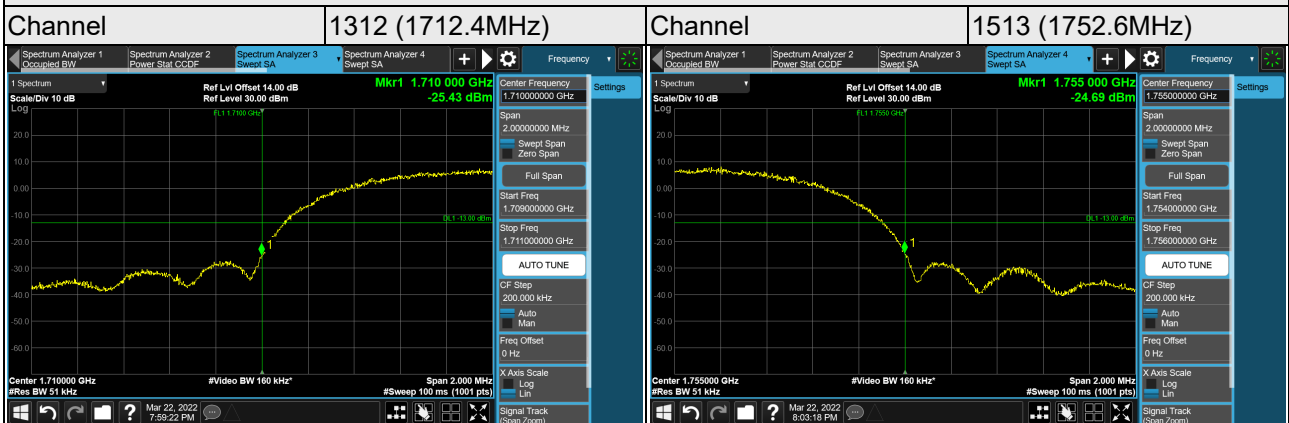
##### WCDMA Band 4



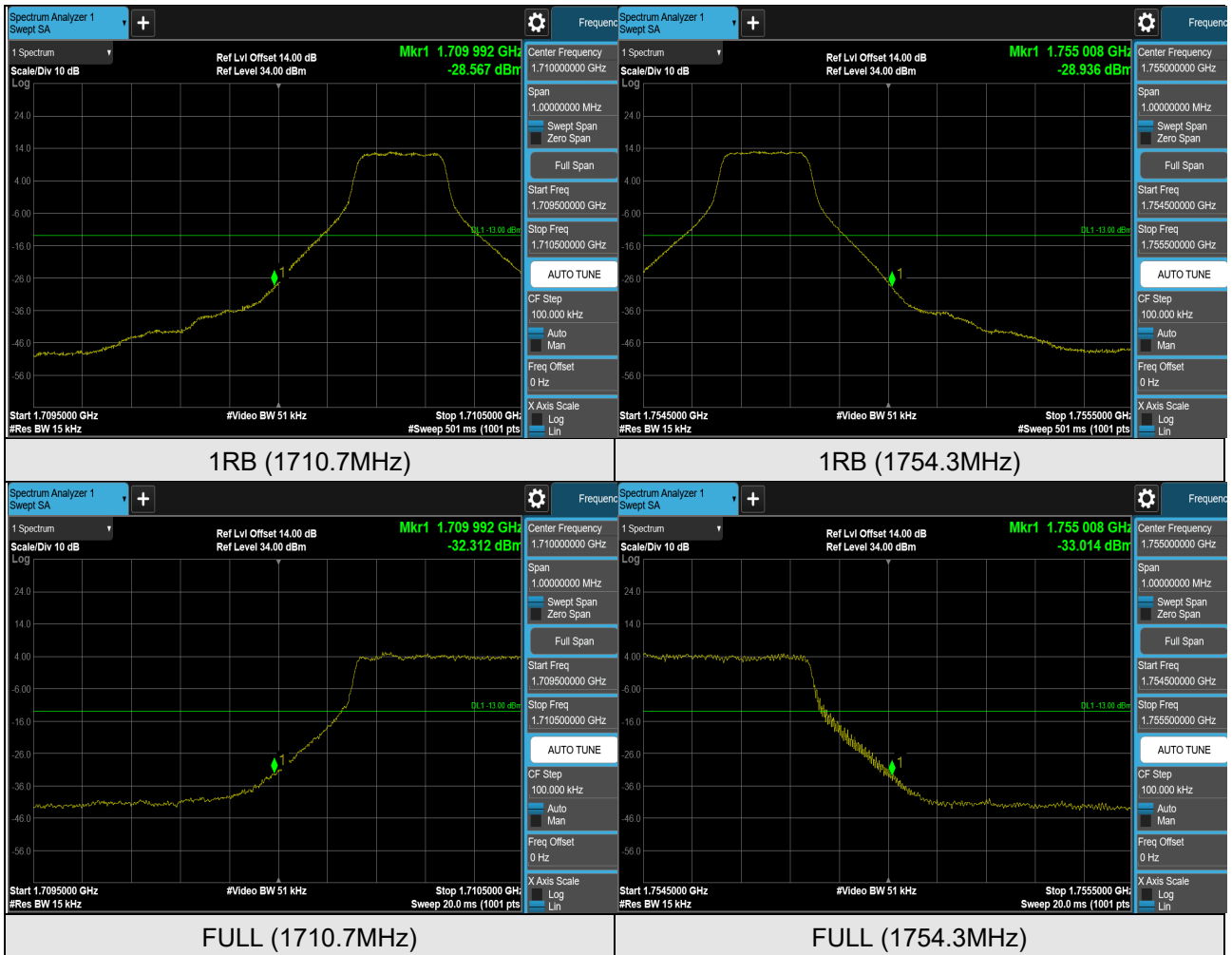
##### HSDPA



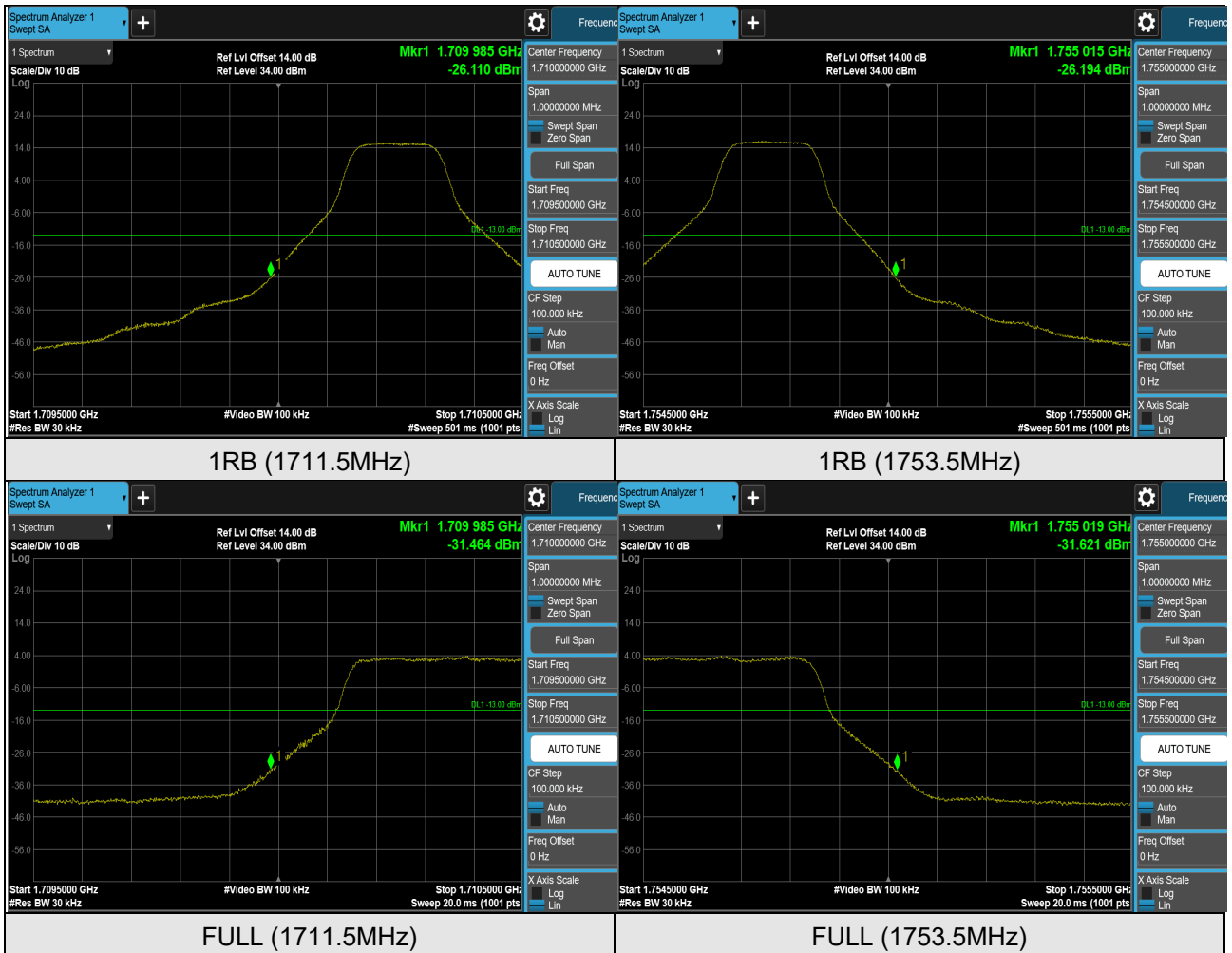
##### HSUPA



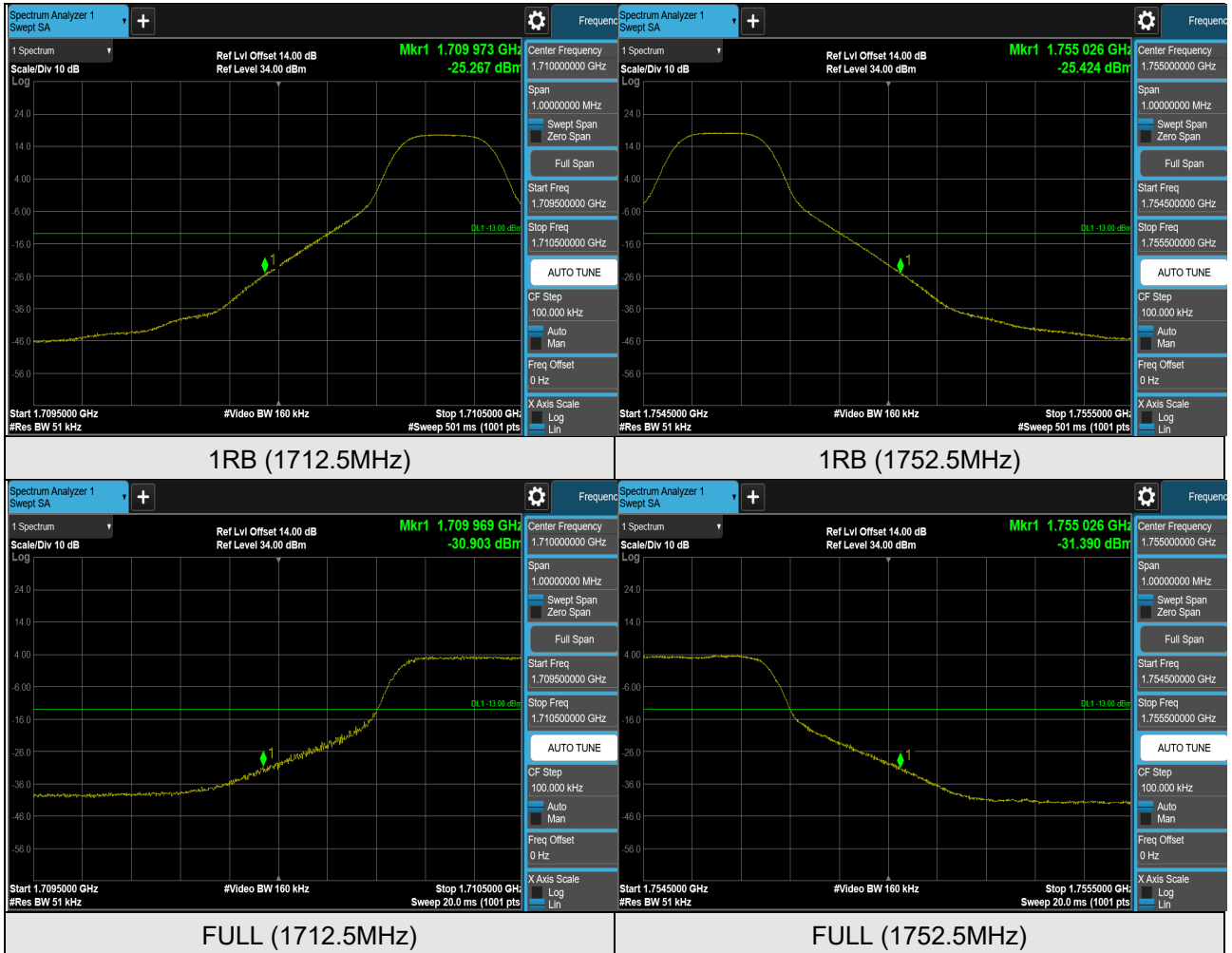
### LTE Band 4 (Channel Bandwidth 1.4MHz)



### LTE Band 4 (Channel Bandwidth 3MHz)

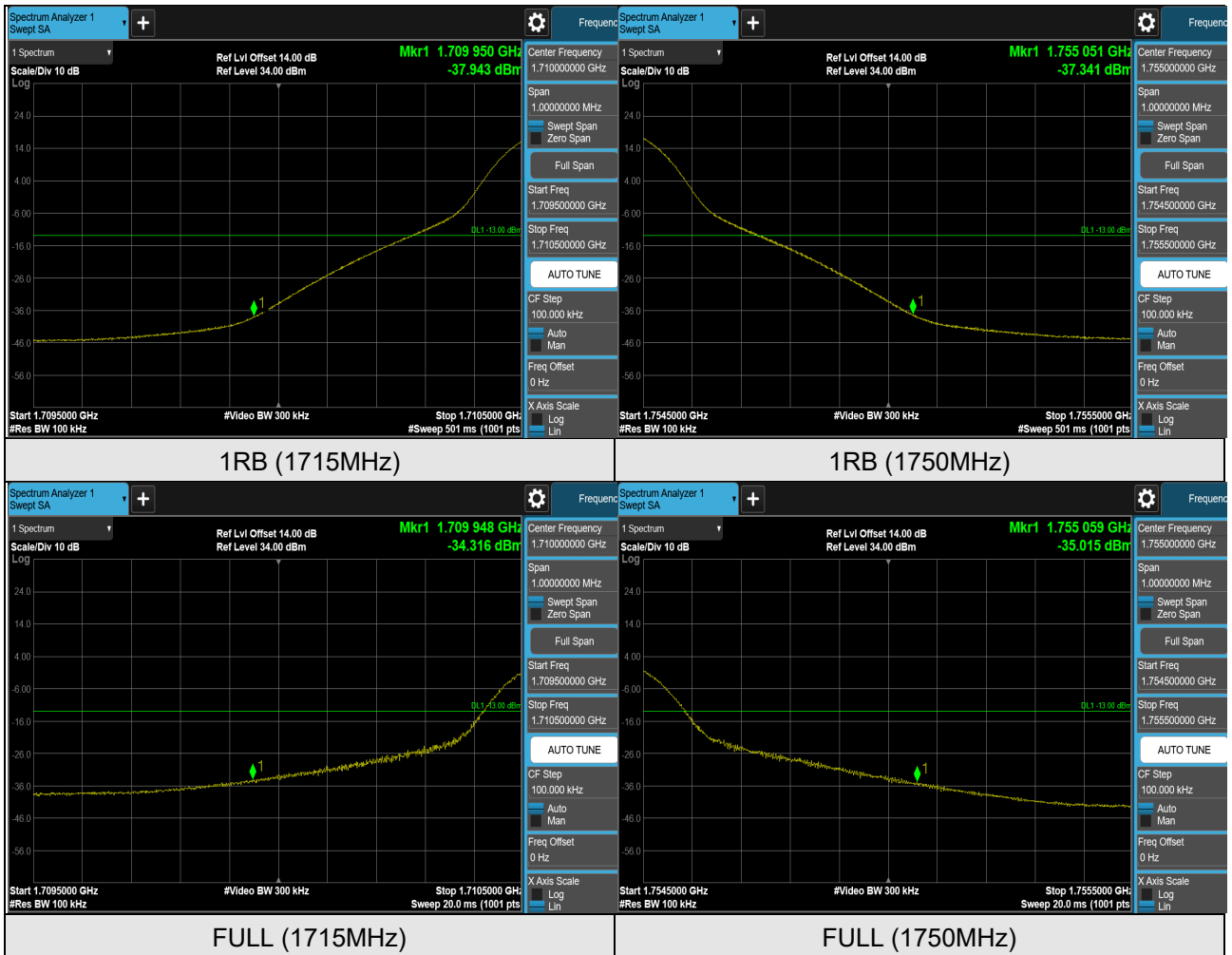


### LTE Band 4 (Channel Bandwidth 5MHz)

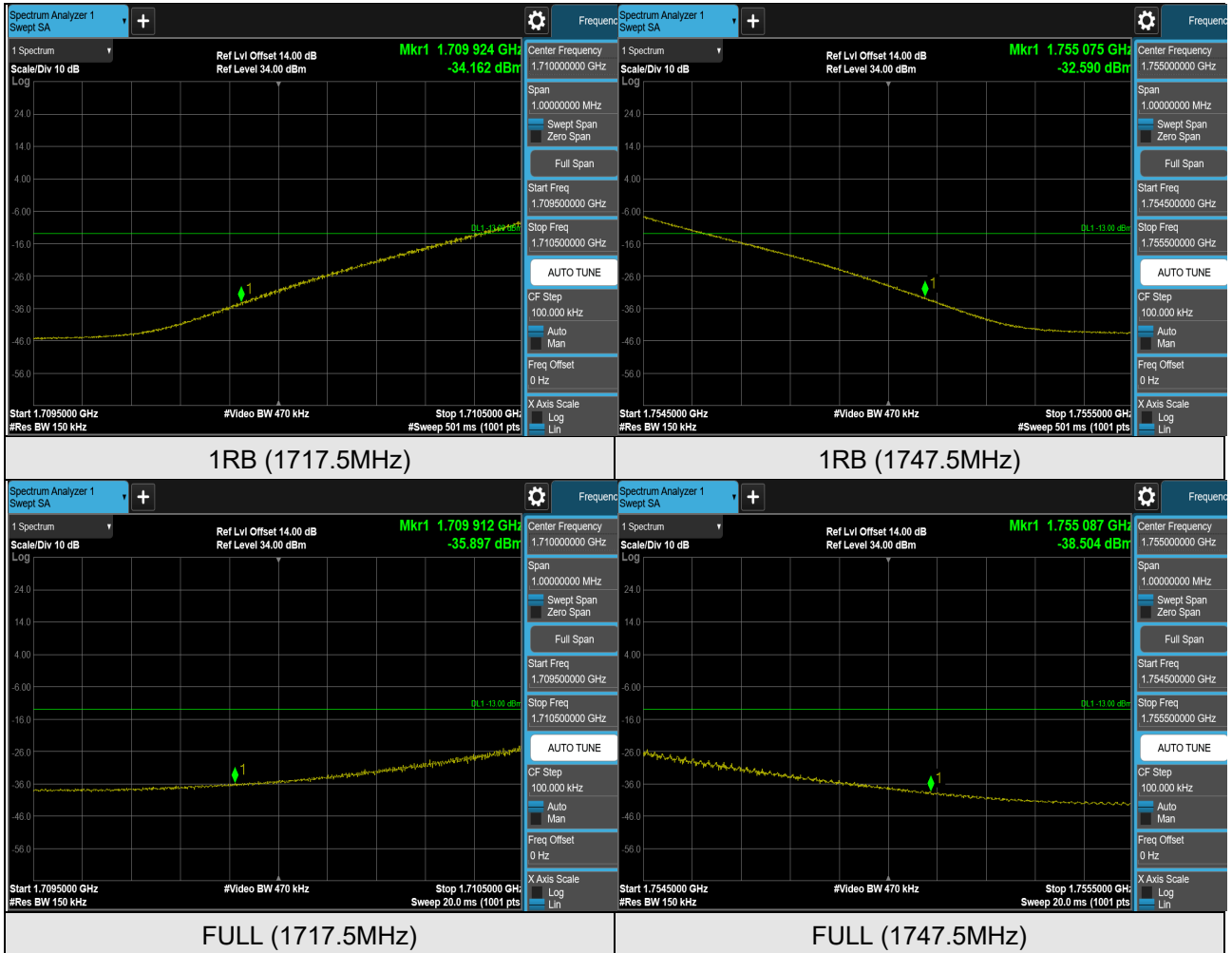




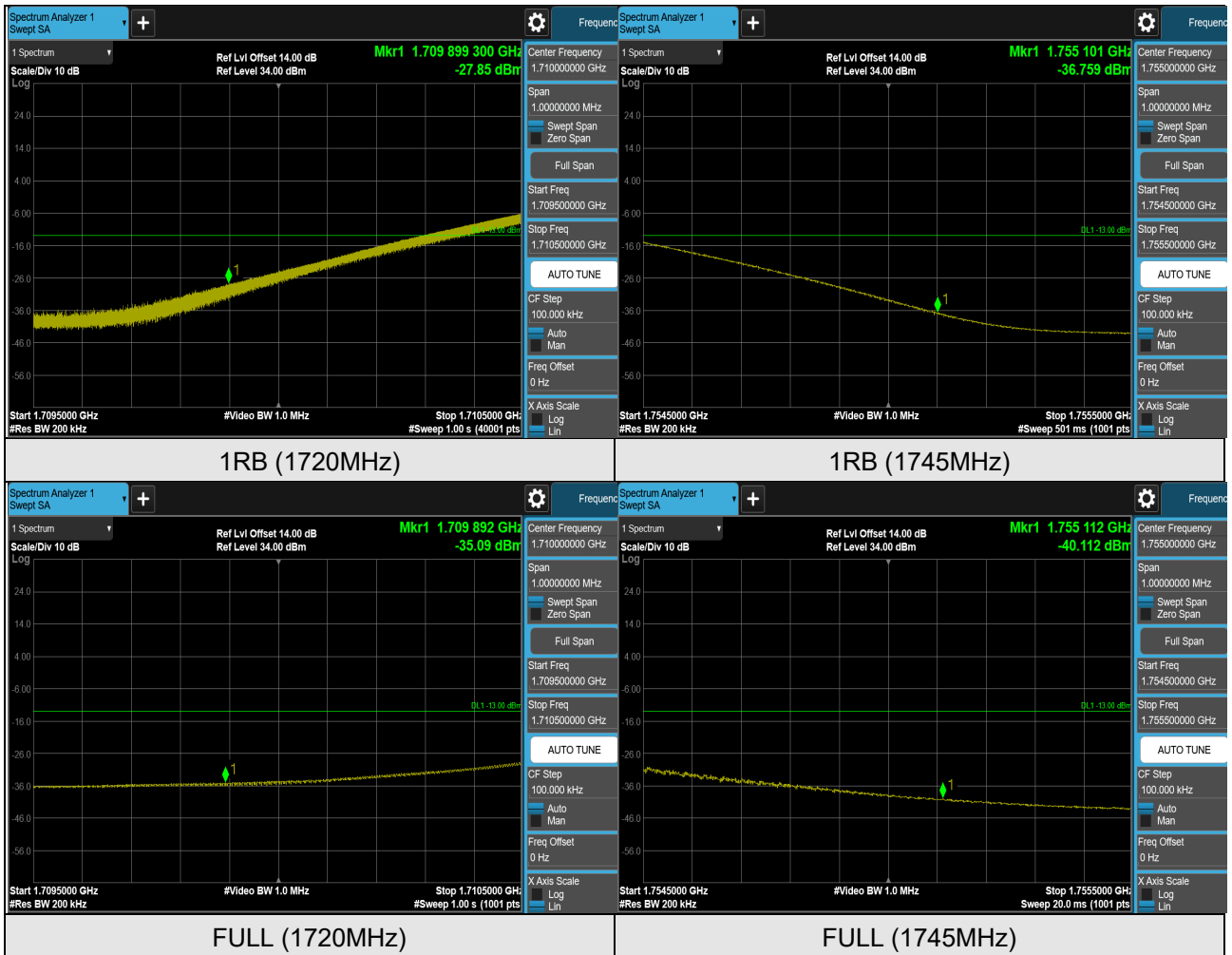
### LTE Band 4 (Channel Bandwidth 10MHz)



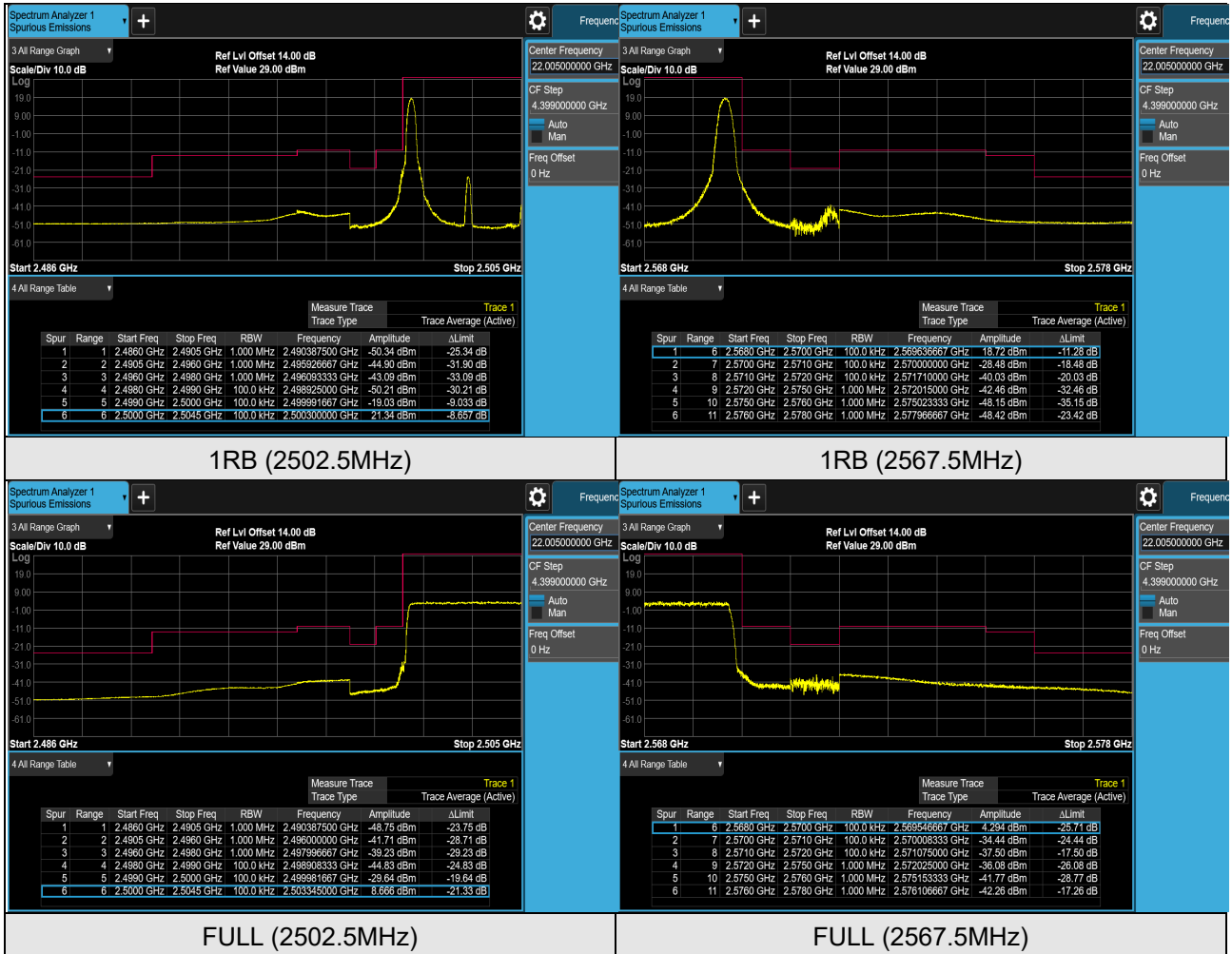
### LTE Band 4 (Channel Bandwidth 15MHz)



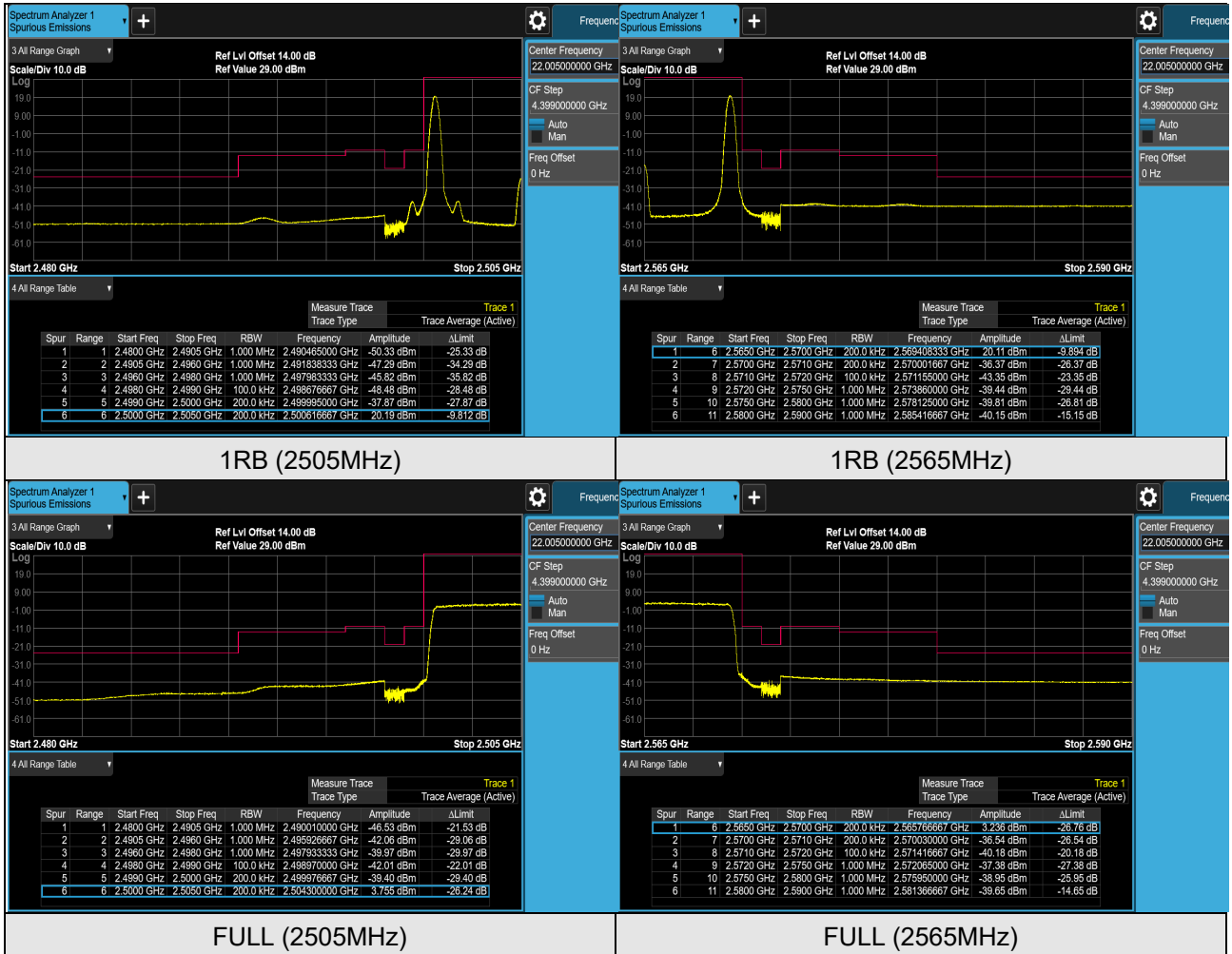
### LTE Band 4 (Channel Bandwidth 20MHz)



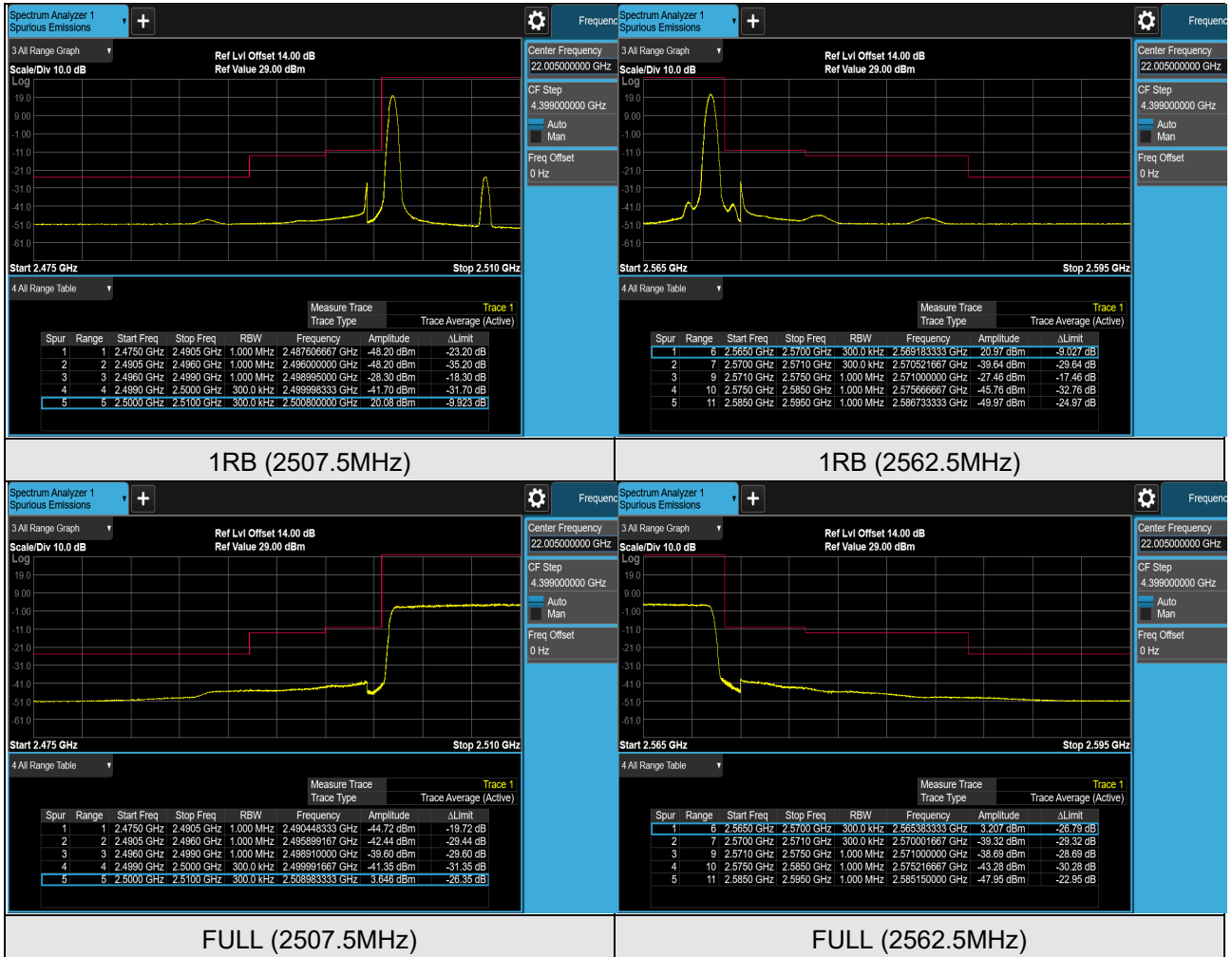
### LTE Band 7 (Channel Bandwidth 5MHz)



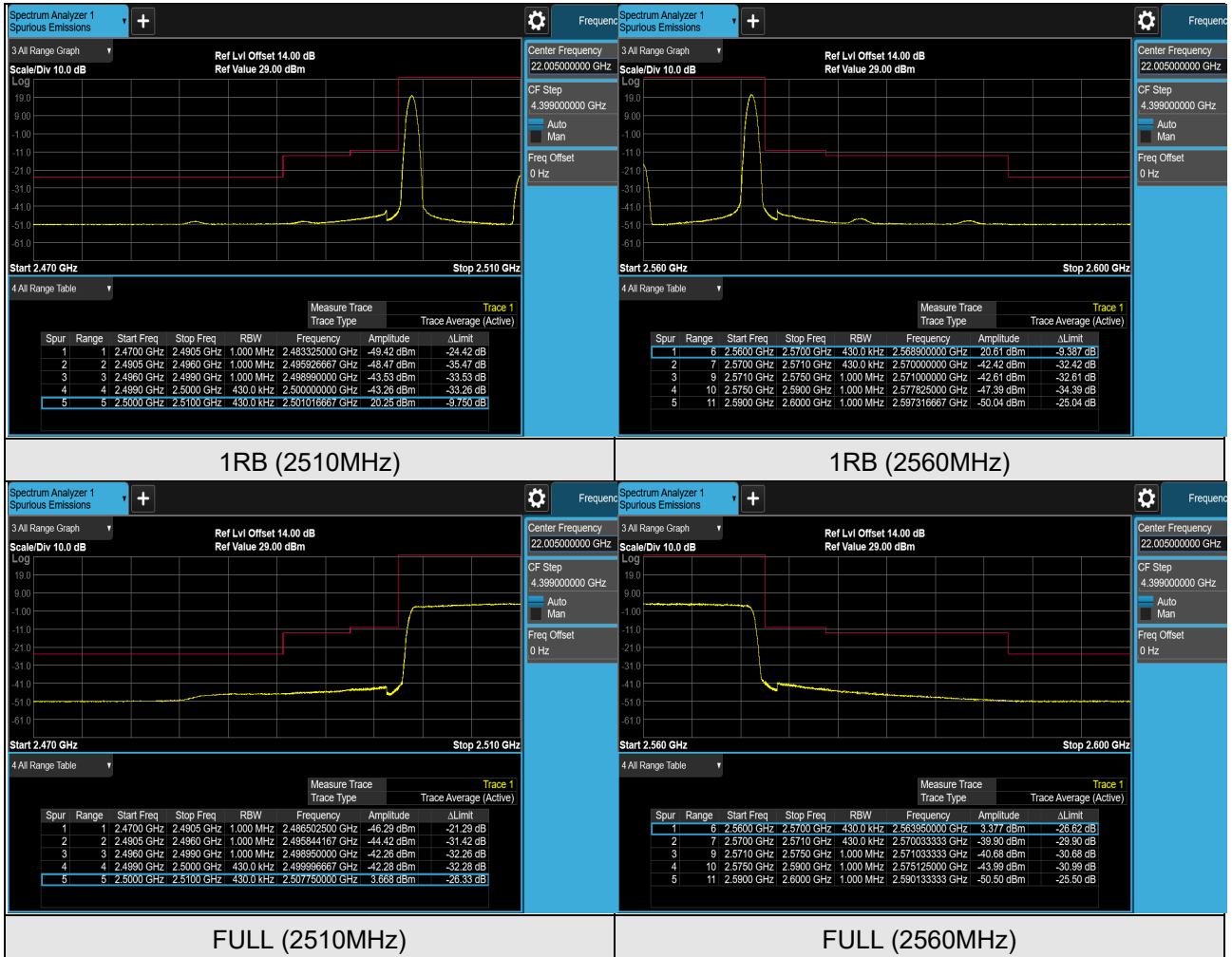
### LTE Band 7 (Channel Bandwidth 10MHz)



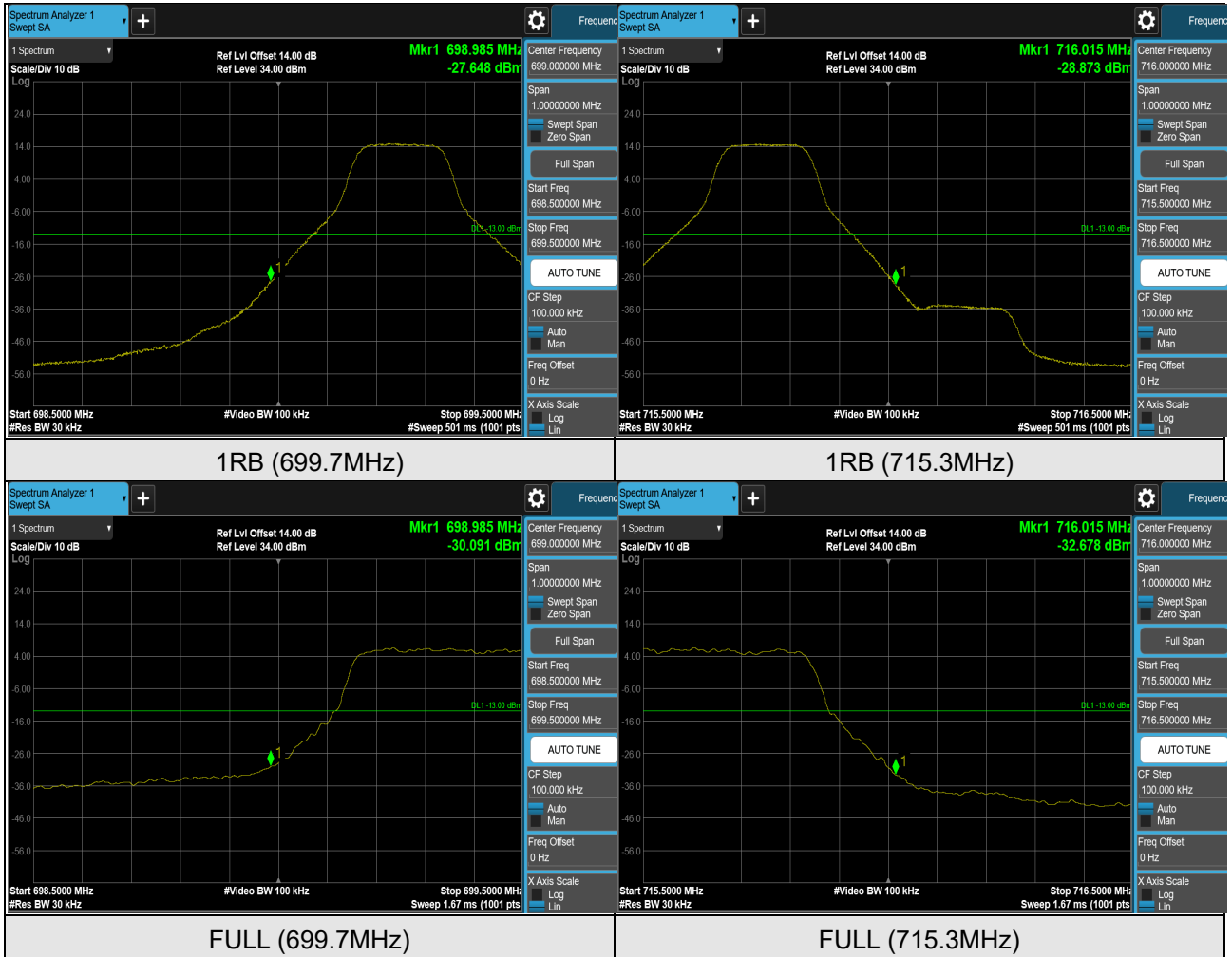
### LTE Band 7 (Channel Bandwidth 15MHz)



### LTE Band 7 (Channel Bandwidth 20MHz)

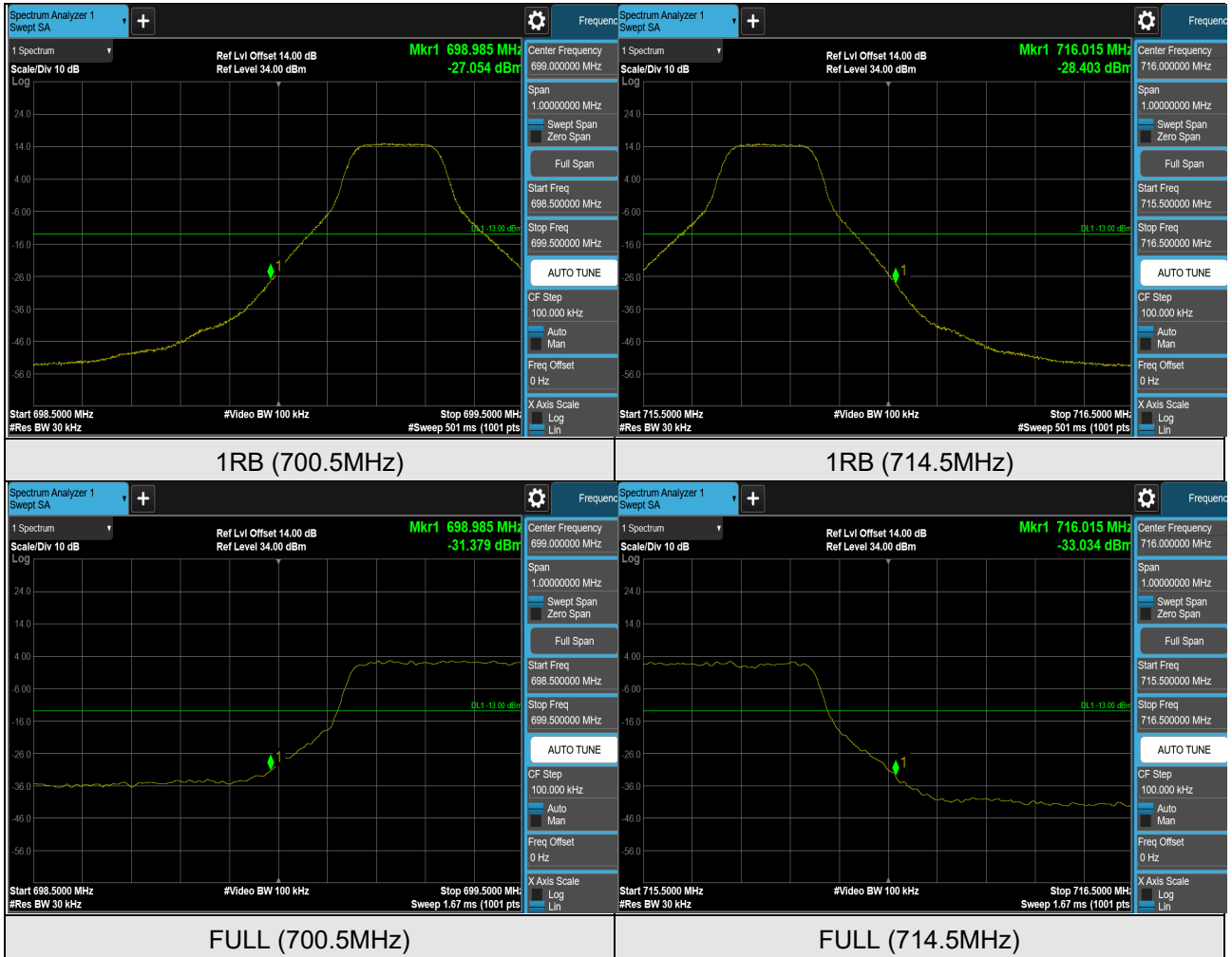


## LTE Band 12 (Channel Bandwidth 1.4MHz)

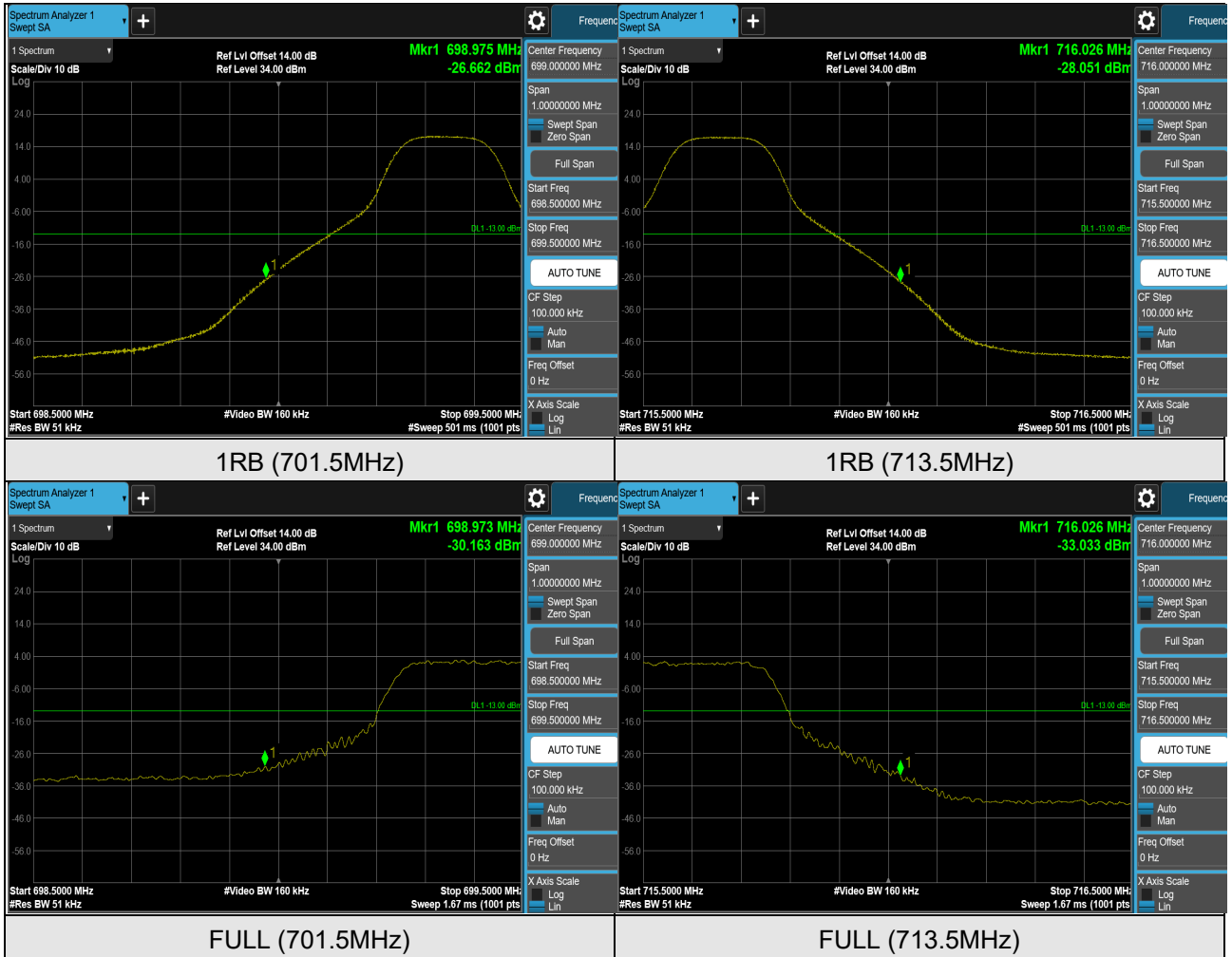




## LTE Band 12 (Channel Bandwidth 3MHz)



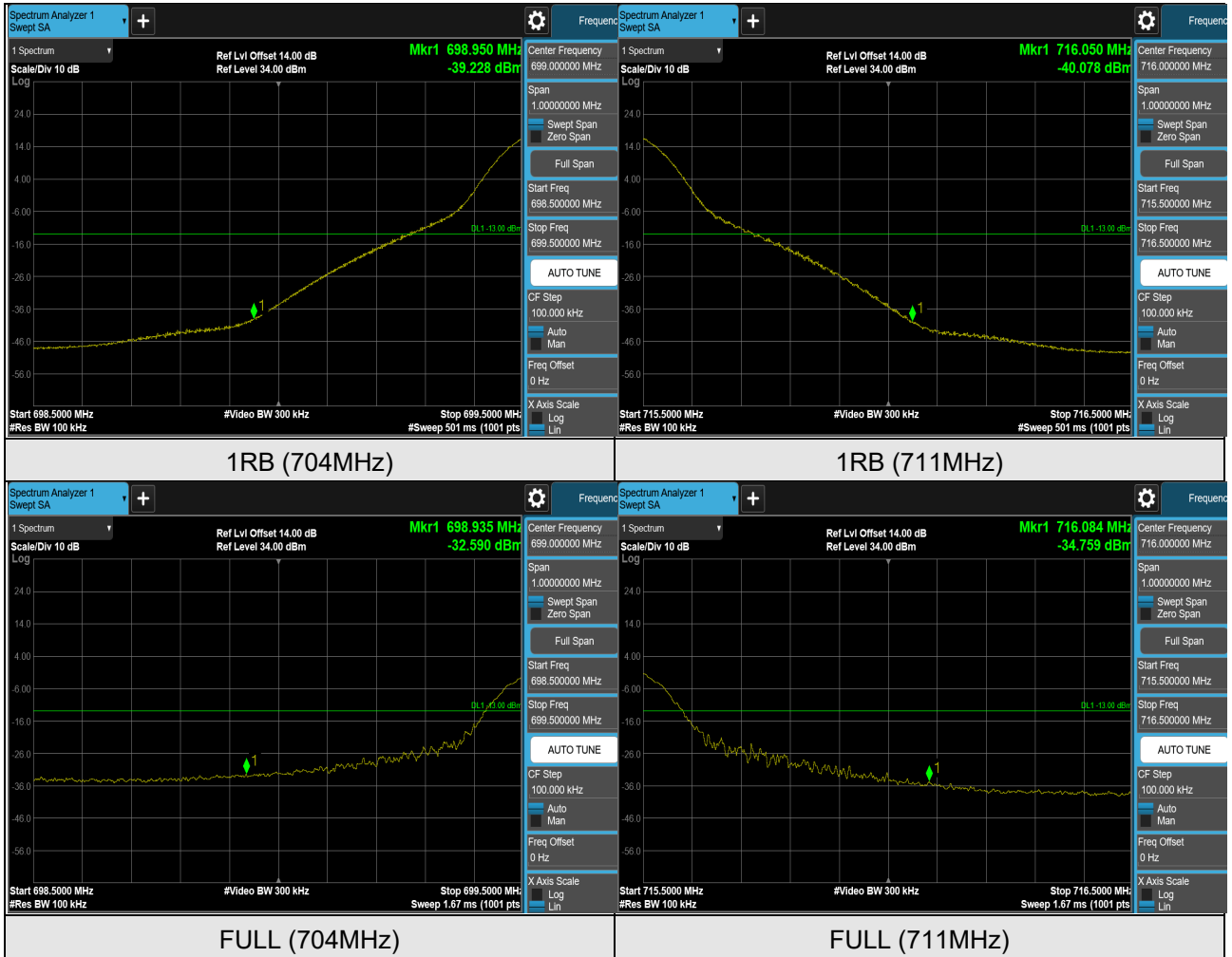
### LTE Band 12 (Channel Bandwidth 5MHz)





BUREAU  
VERITAS

## LTE Band 12 (Channel Bandwidth 10MHz)





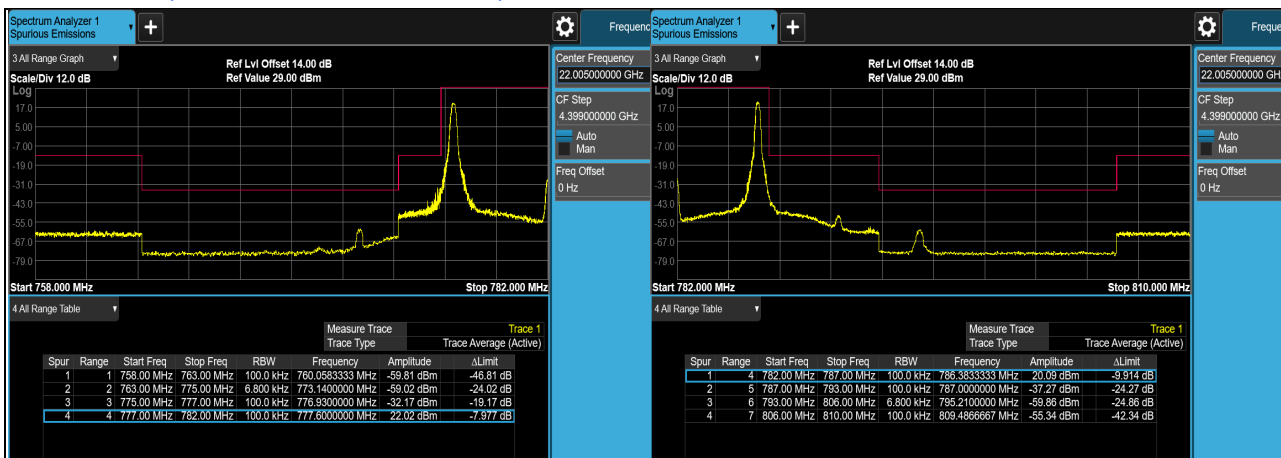
### LTE Band 13 (Channel Bandwidth 5MHz)



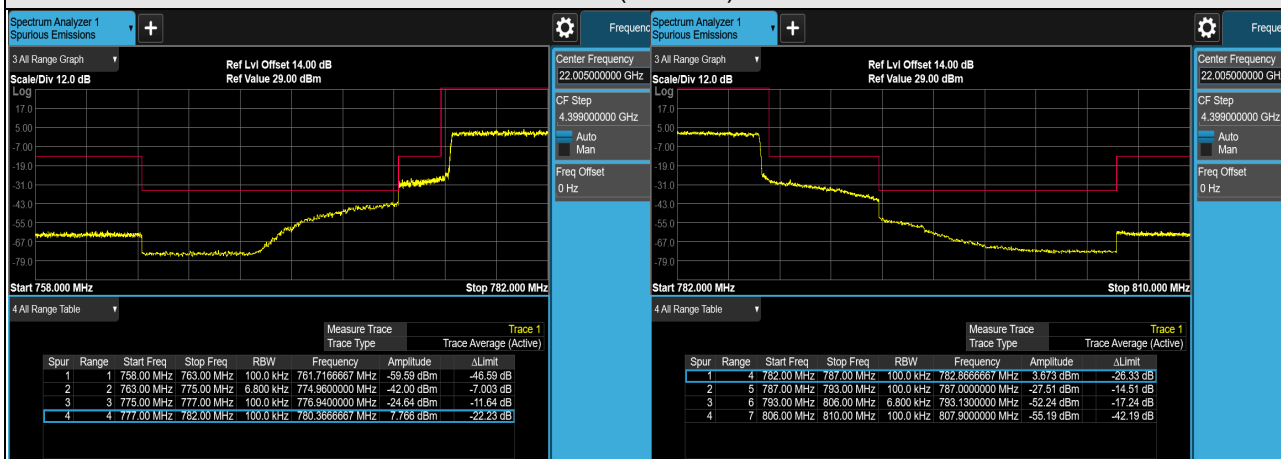


BUREAU VERITAS

### LTE Band 13 (Channel Bandwidth 10MHz)



### 1RB (782MHz)



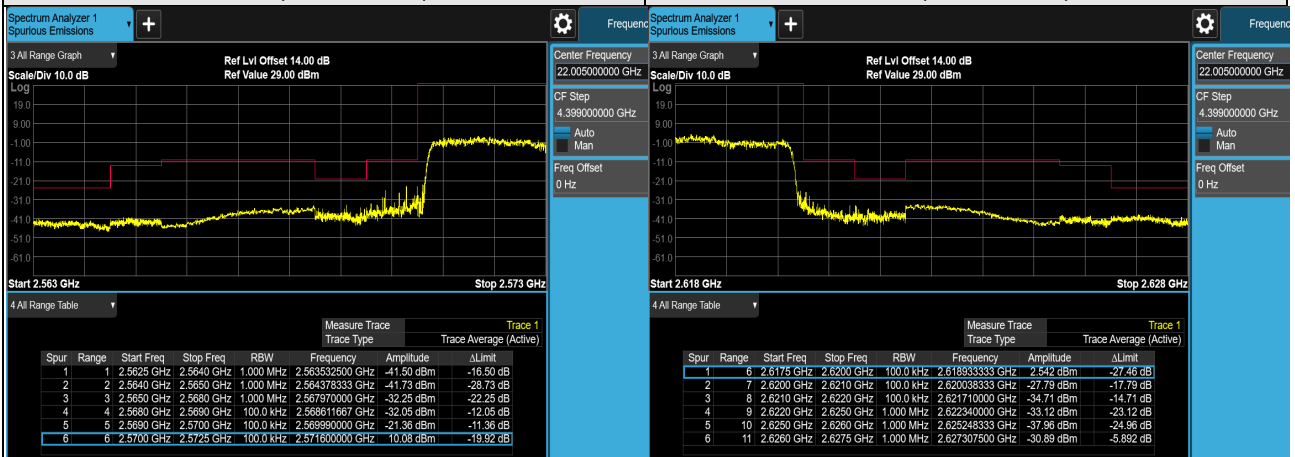
### FULL (782MHz)

### LTE Band 38 (Channel Bandwidth 5MHz)



1RB (2572.5MHz)

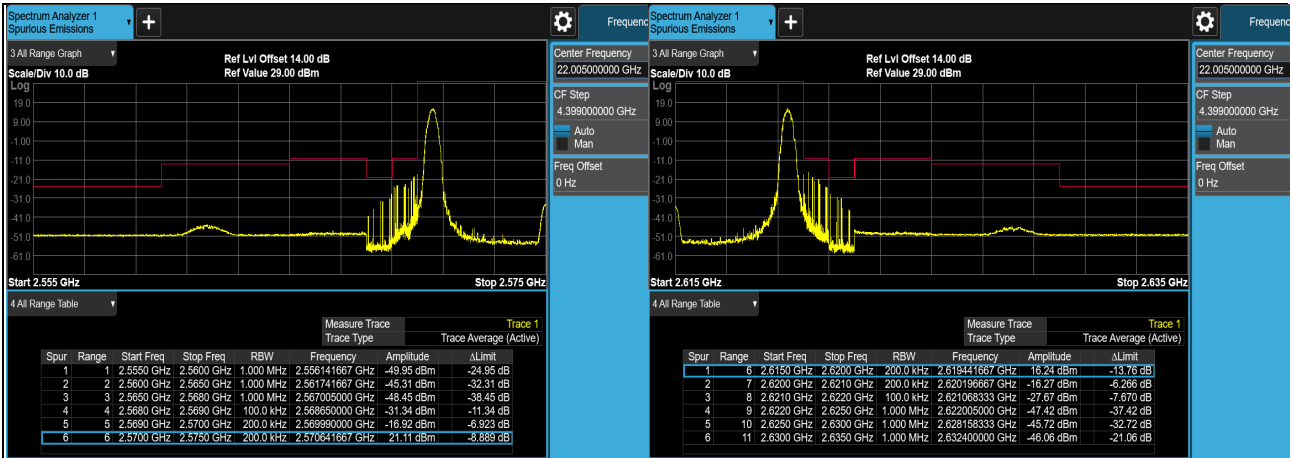
1RB (2617.5MHz)



FULL (2572.5MHz)

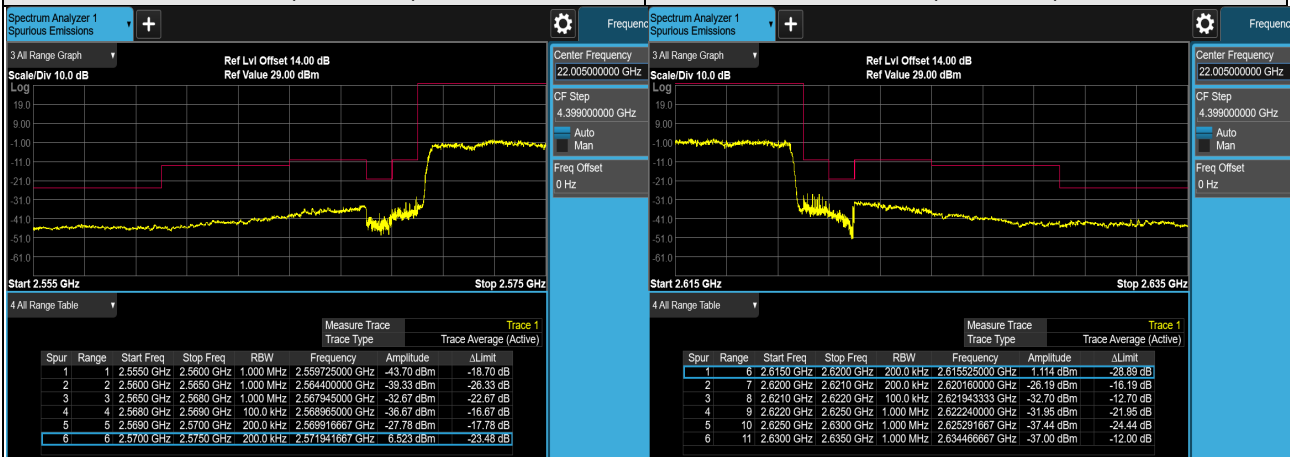
FULL (2617.5MHz)

### LTE Band 38 (Channel Bandwidth 10MHz)



1RB (2575MHz)

1RB (2615MHz)



FULL (2575MHz)

FULL (2615MHz)