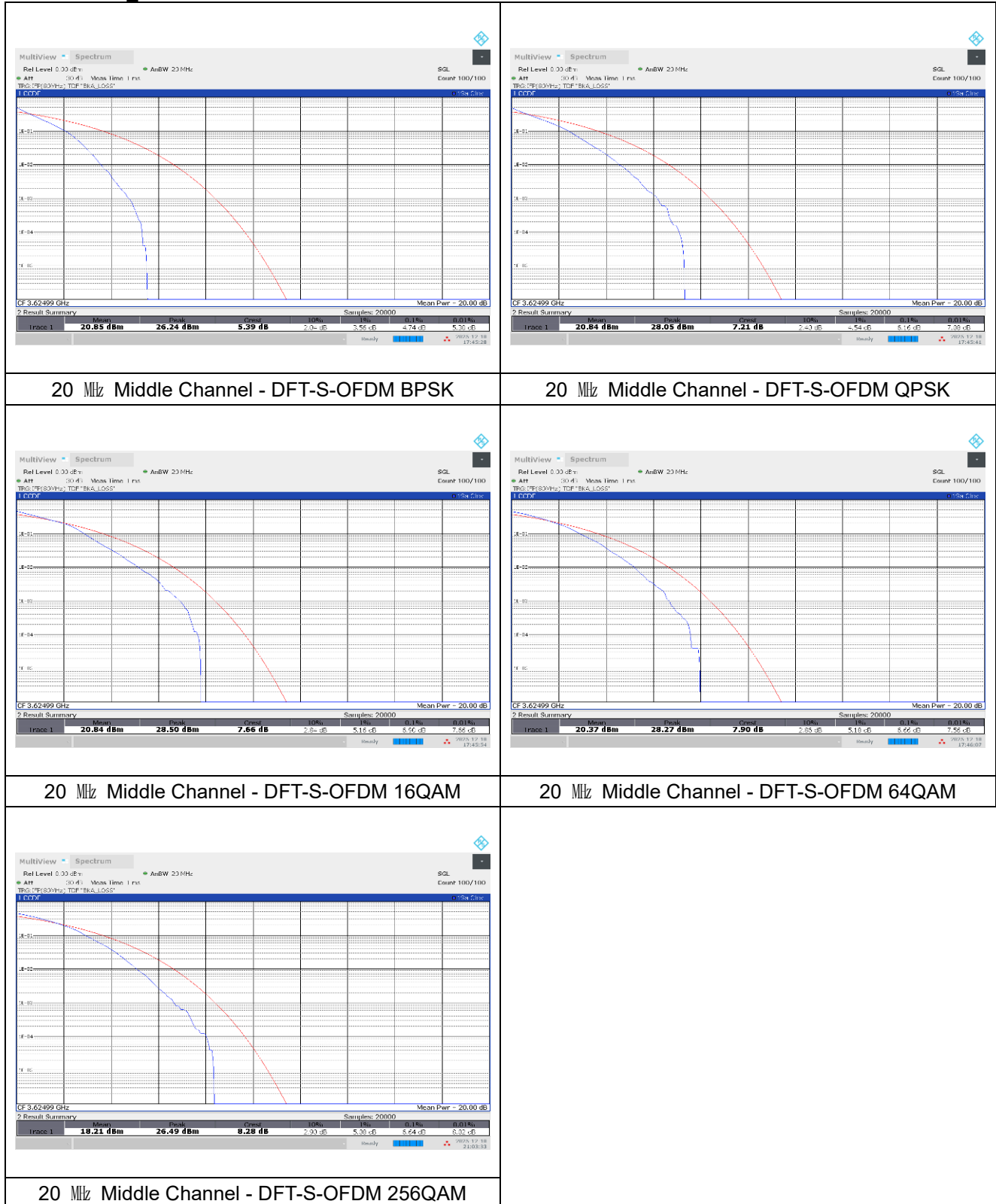
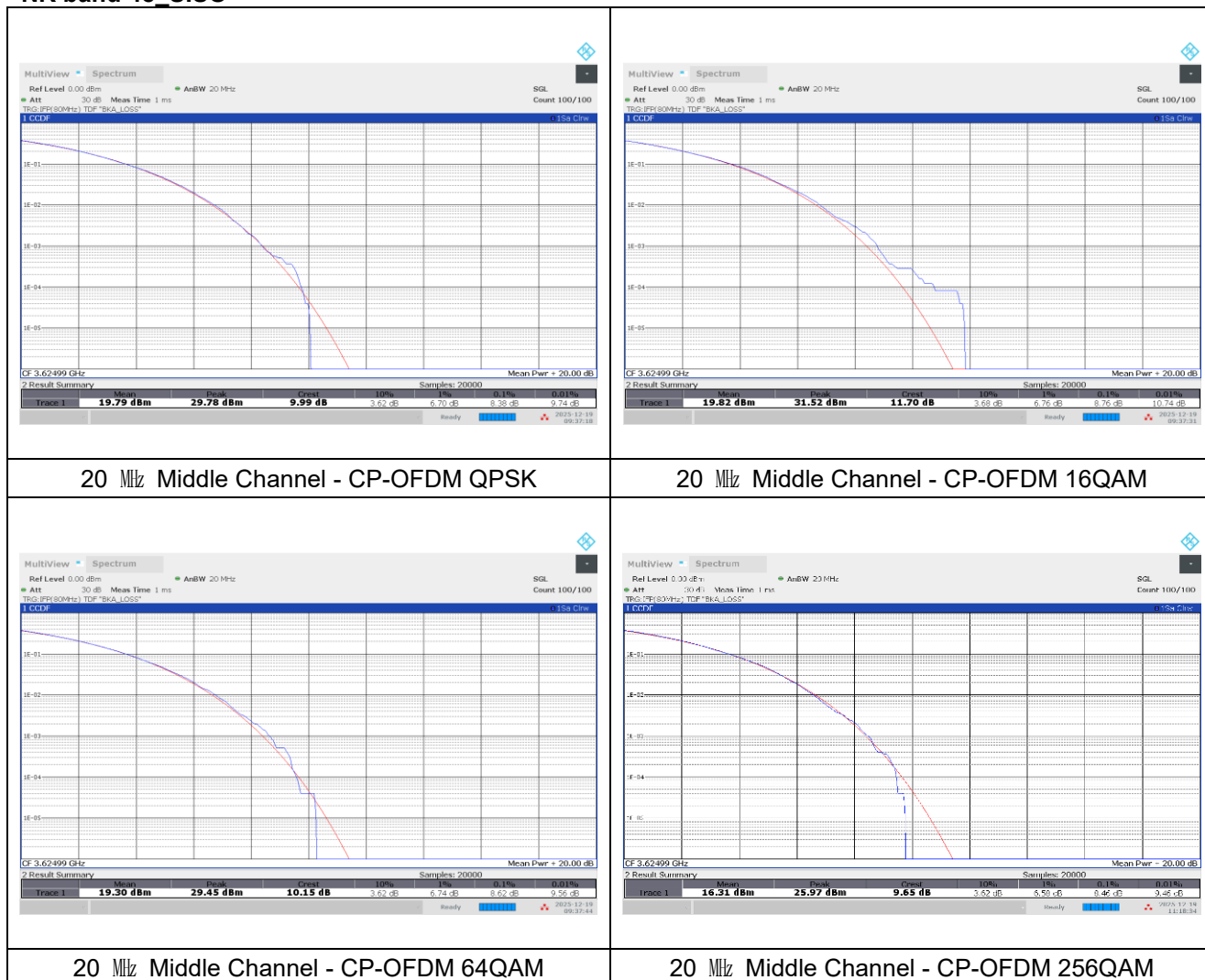


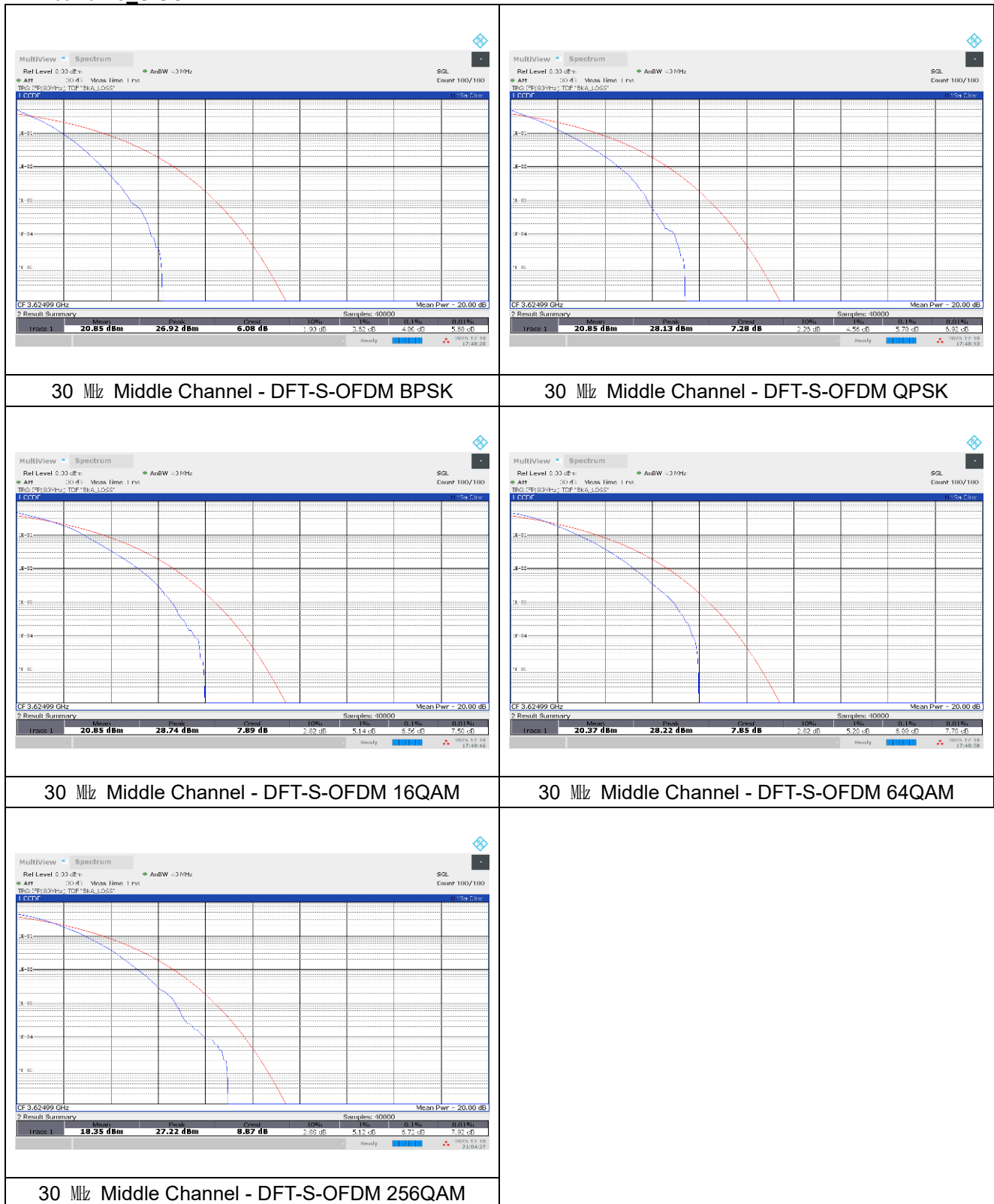
NR band 48_SISO



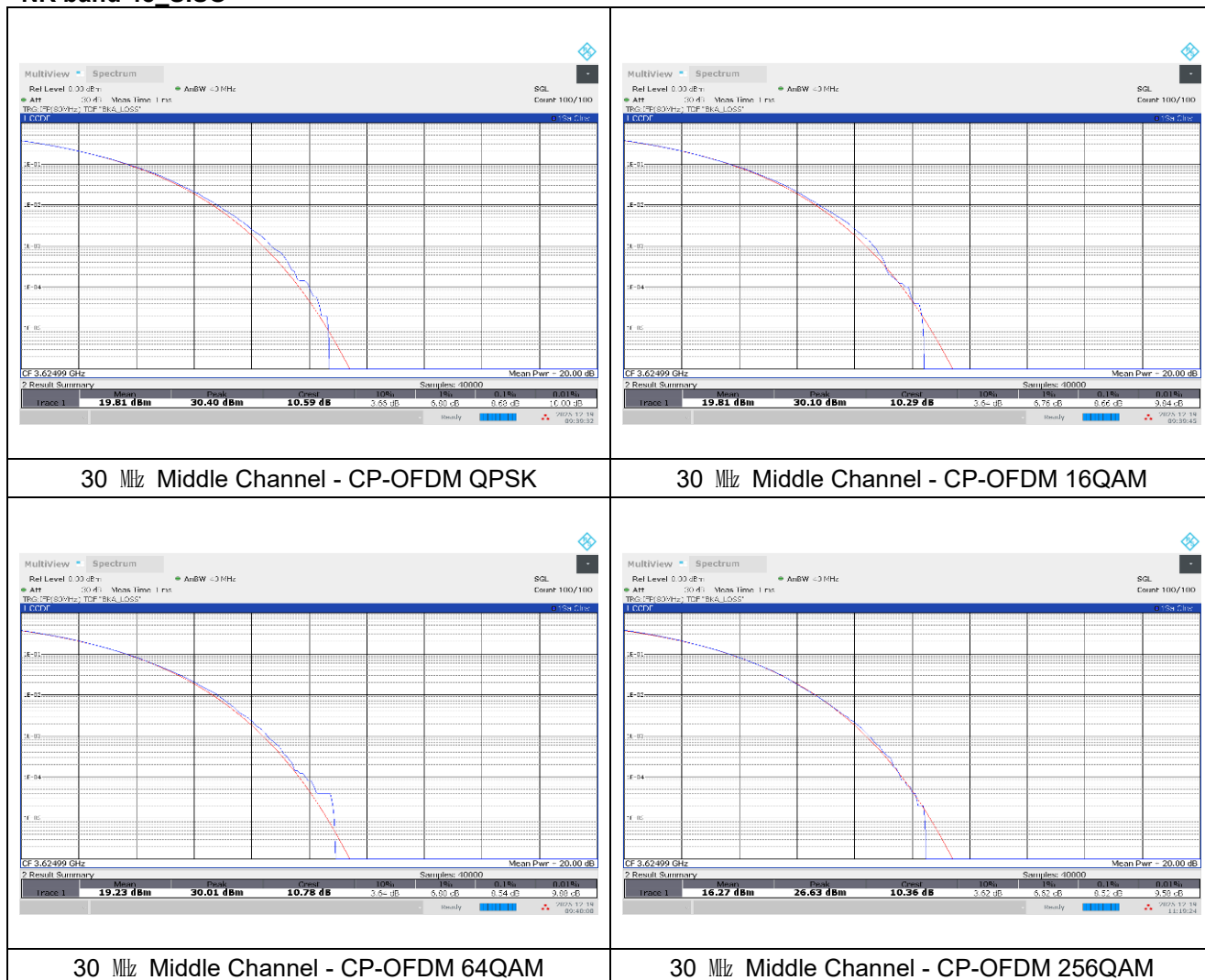
NR band 48_SISO



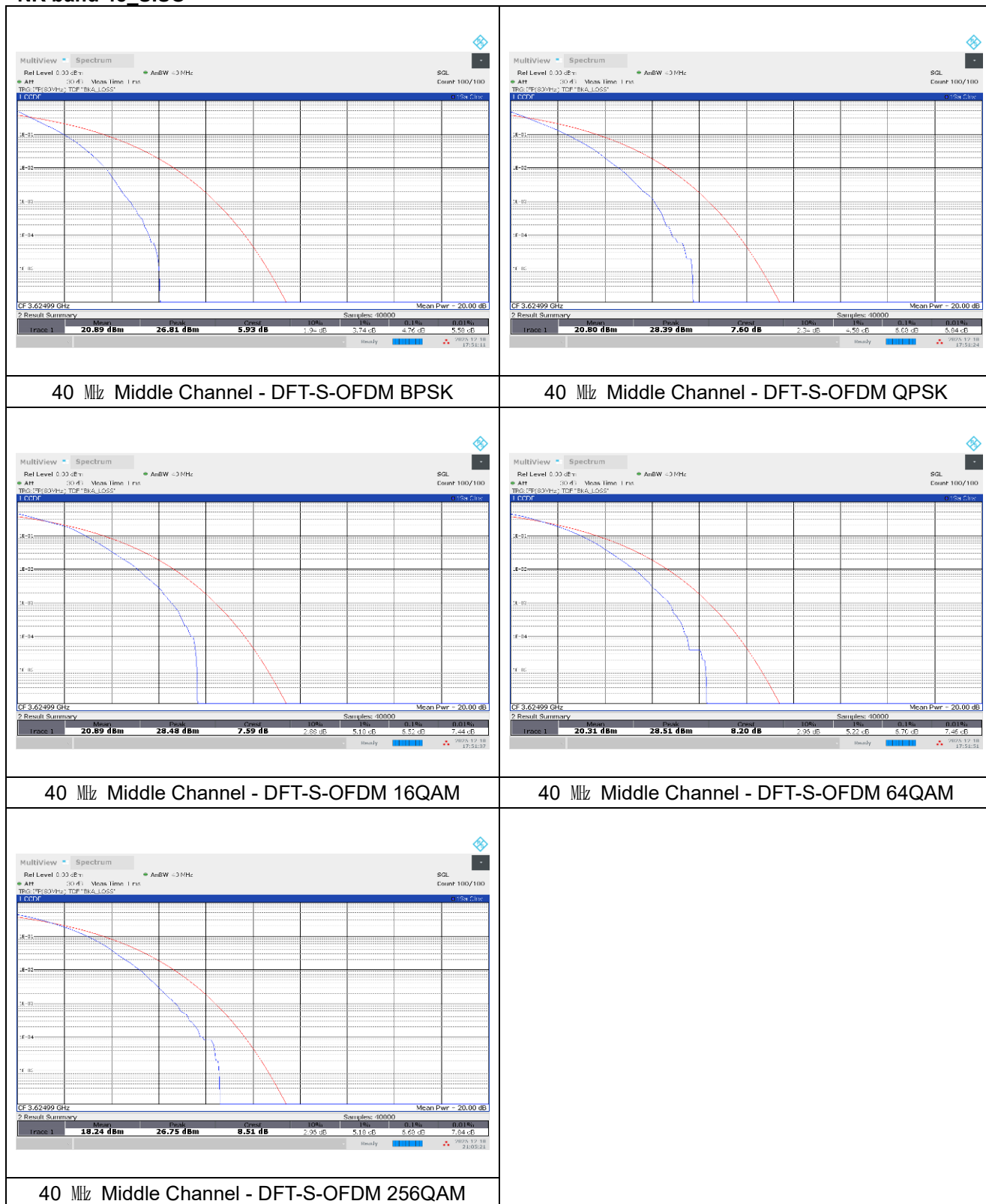
NR band 48_SISO



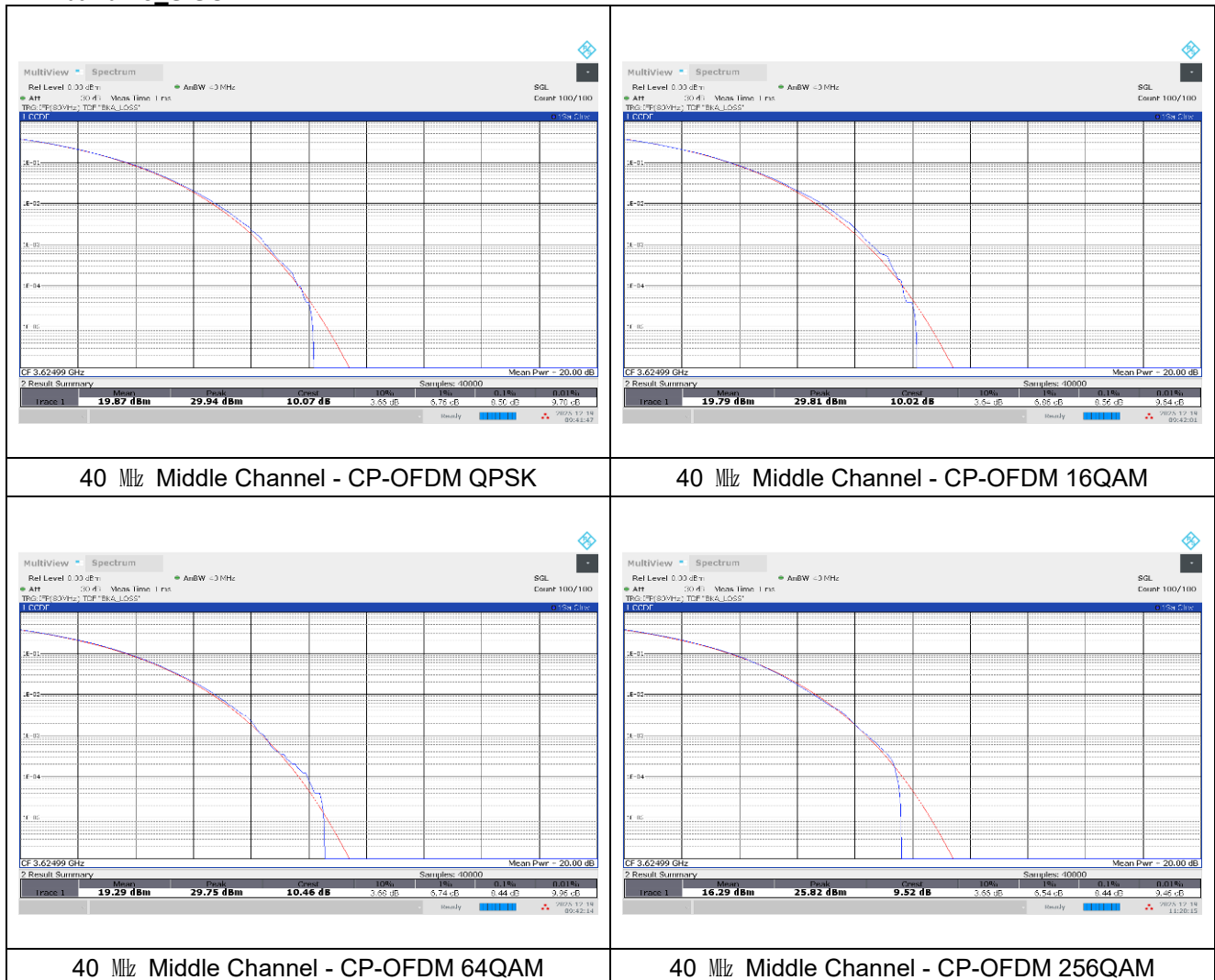
NR band 48_SISO



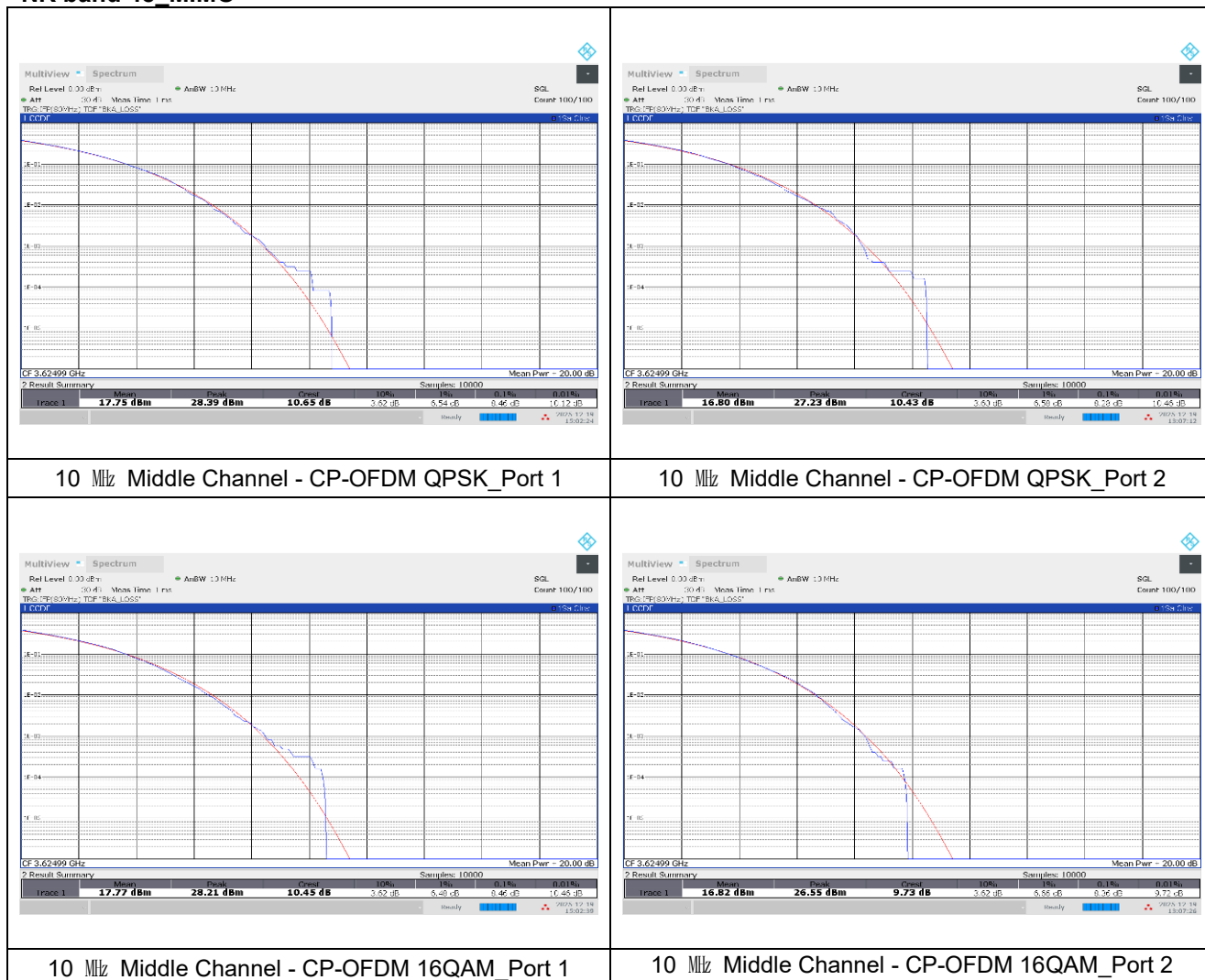
NR band 48_SISO



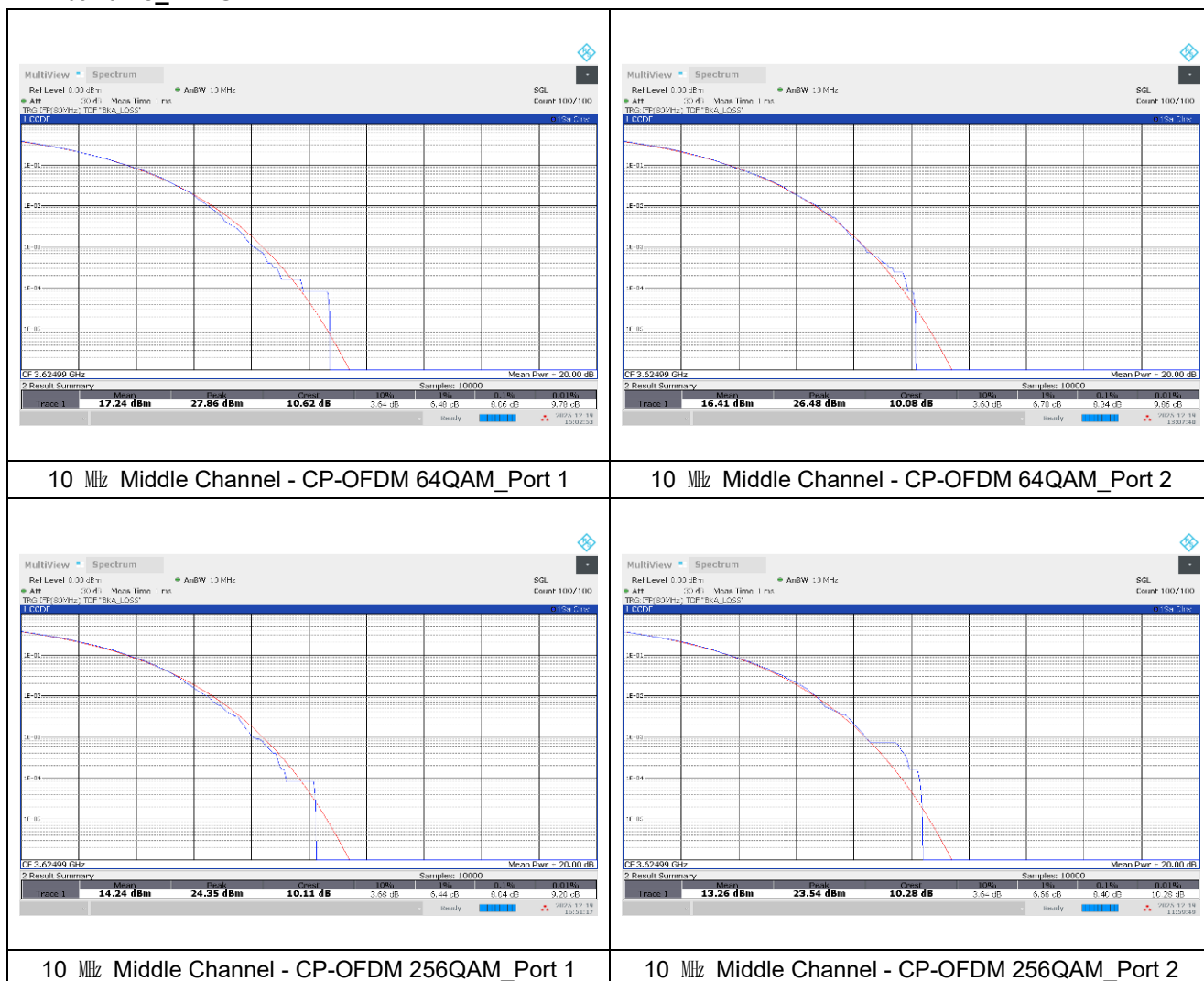
NR band 48_SISO



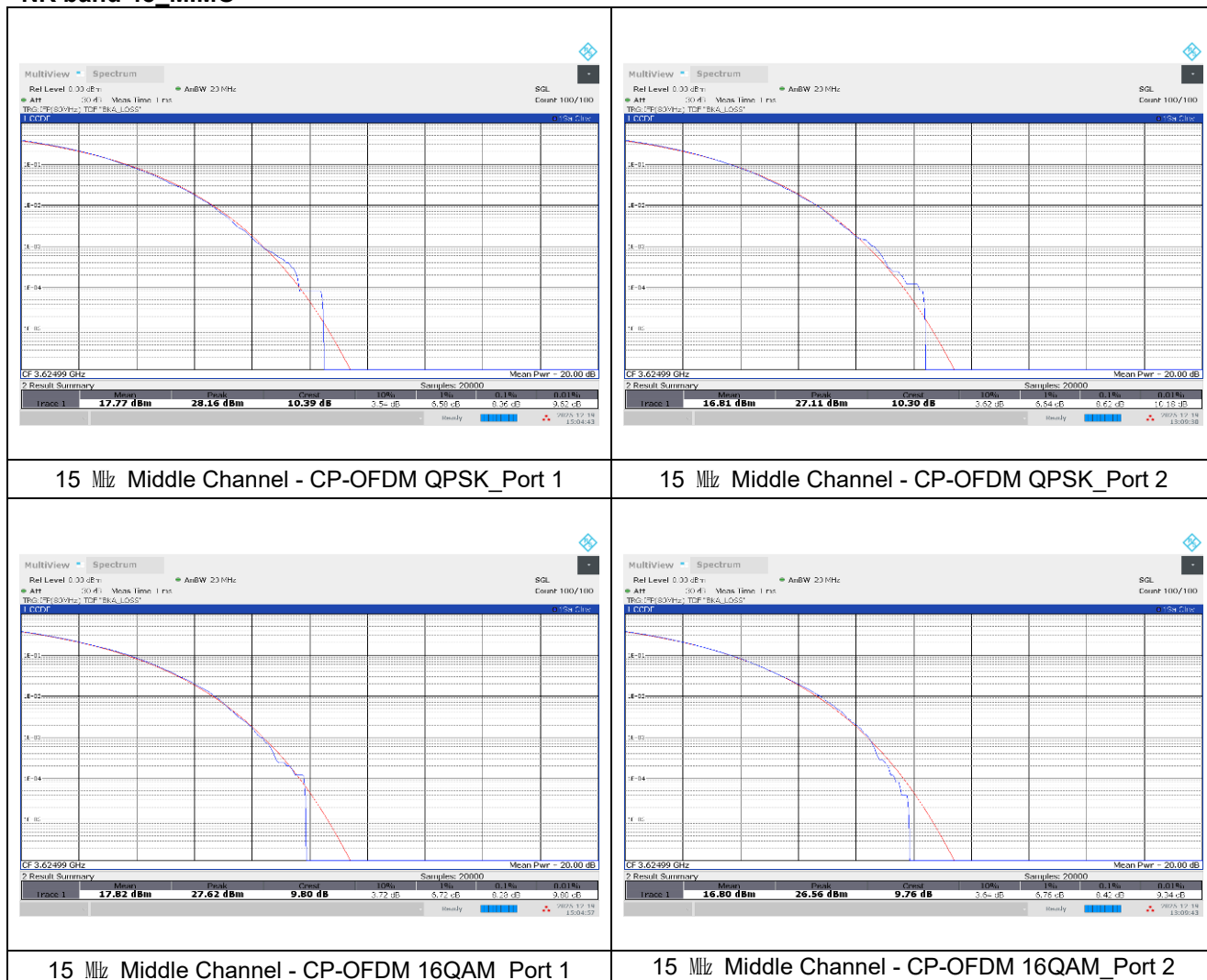
NR band 48_MIMO



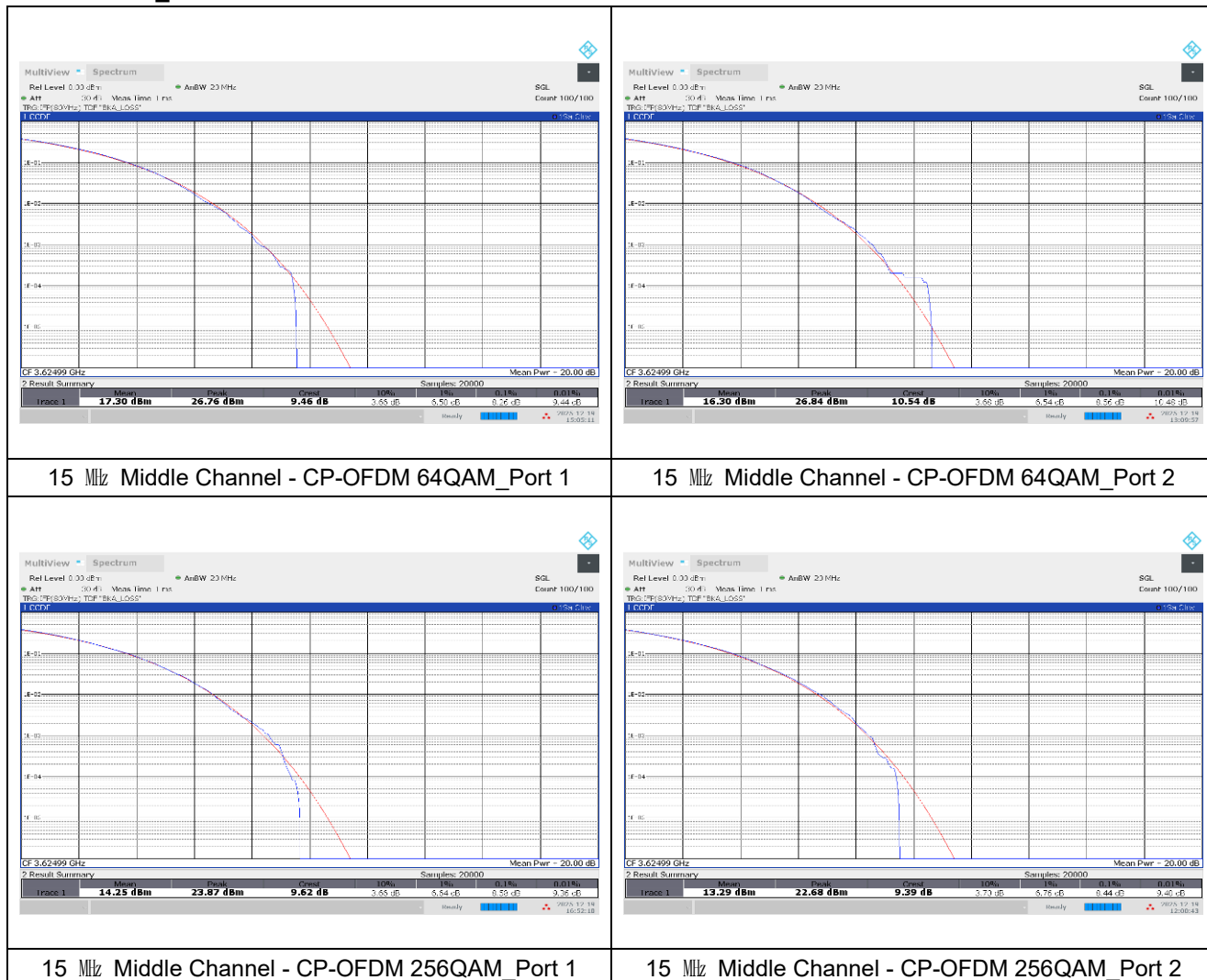
NR band 48_MIMO



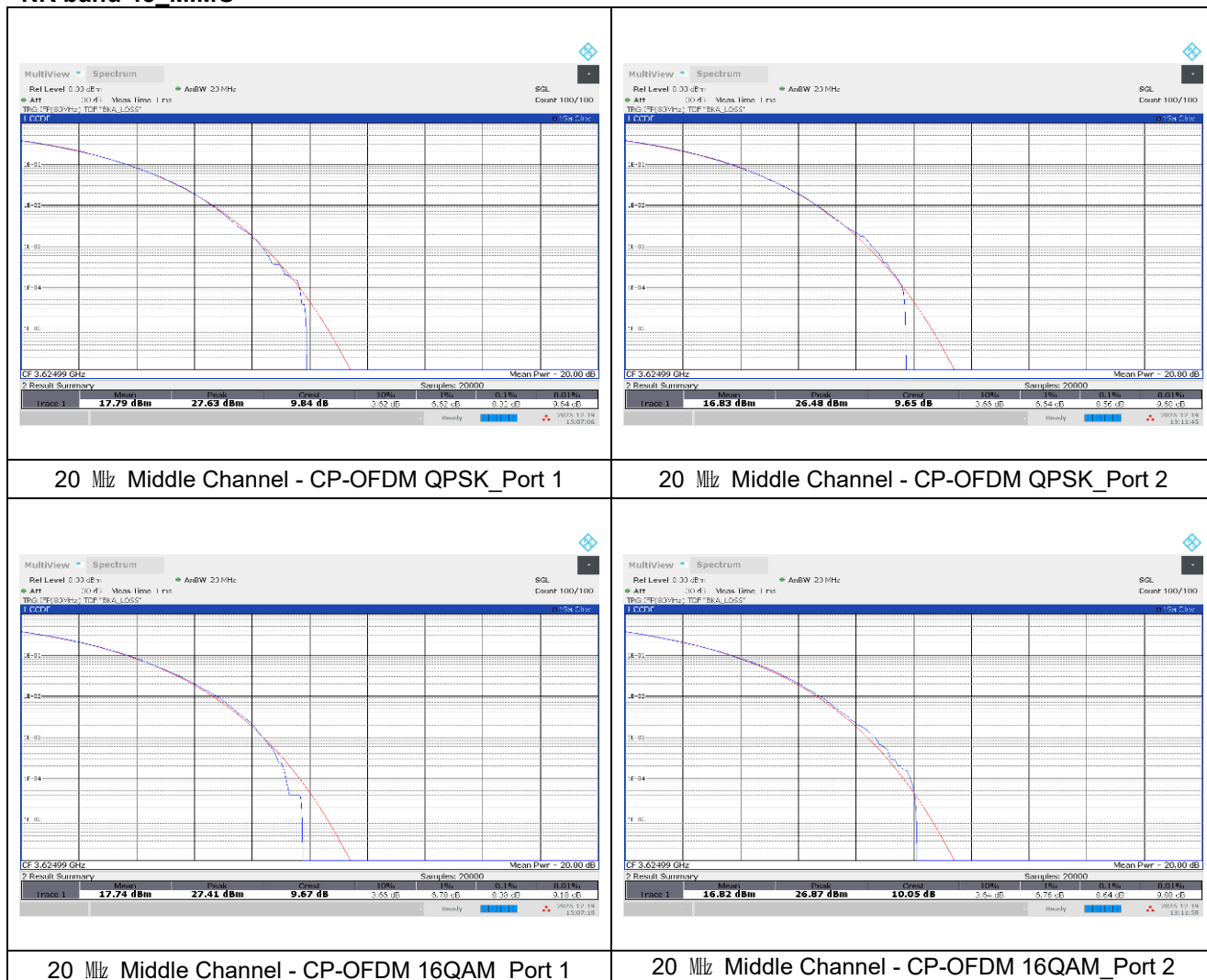
NR band 48_MIMO

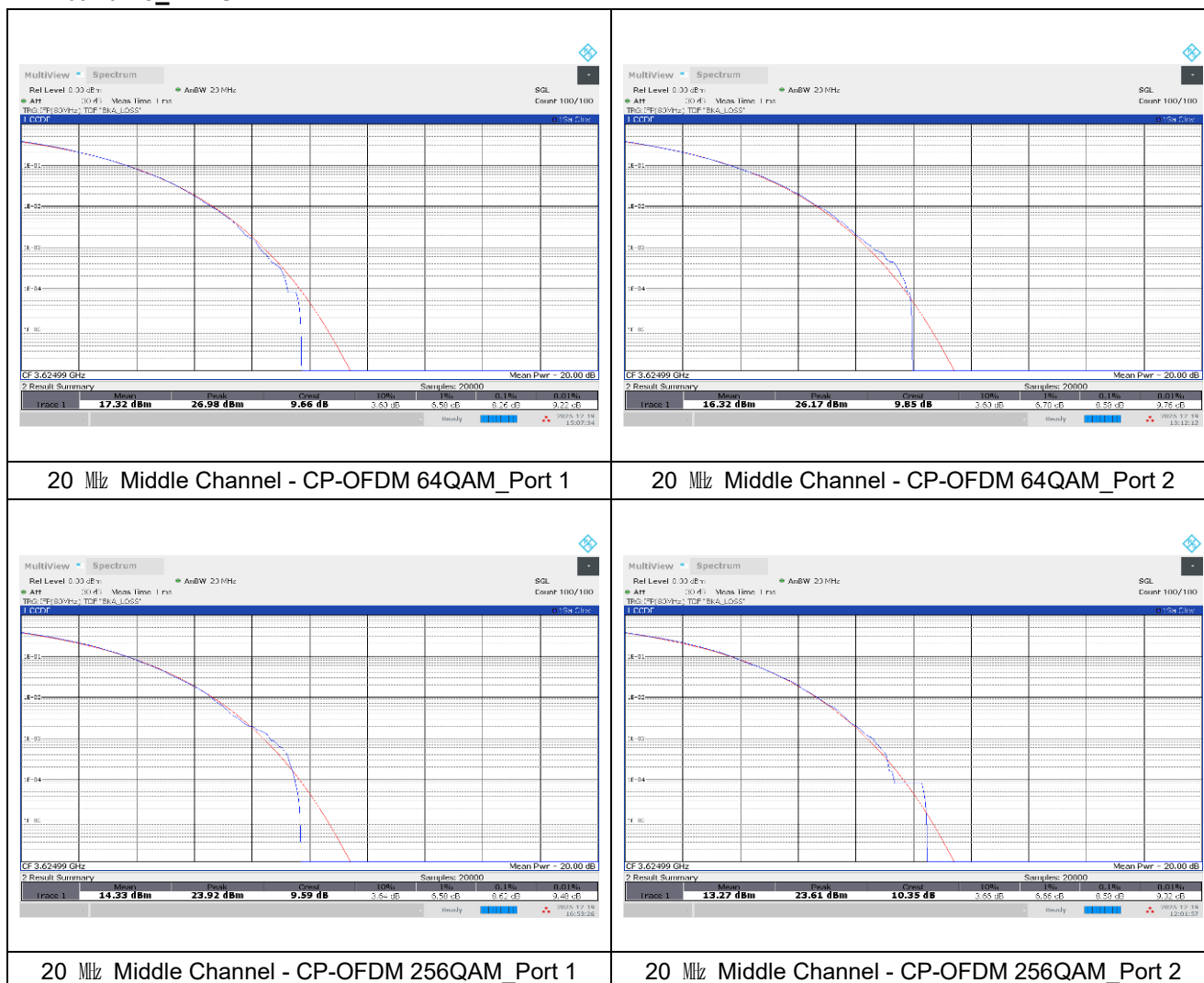


NR band 48_MIMO

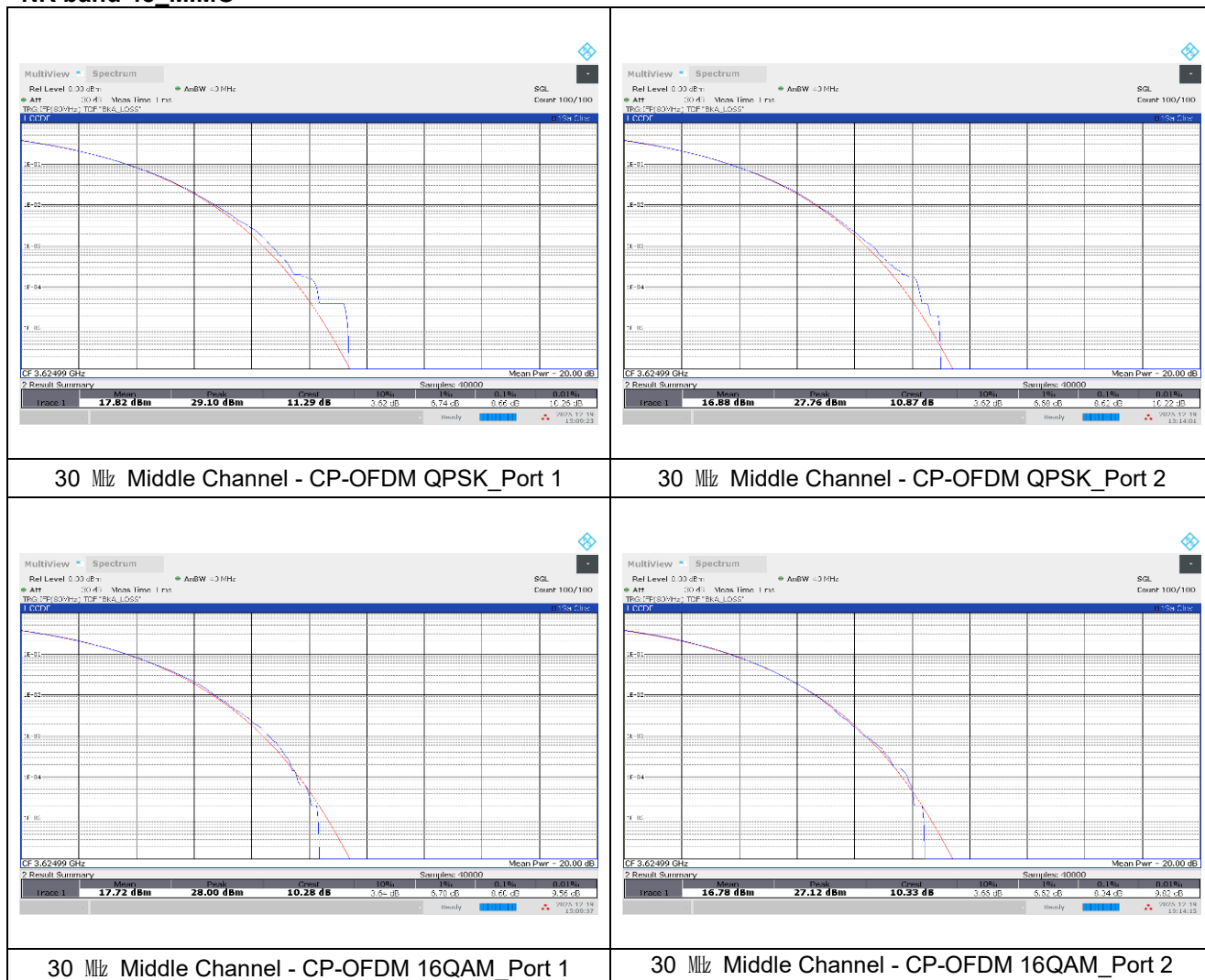


NR band 48_MIMO

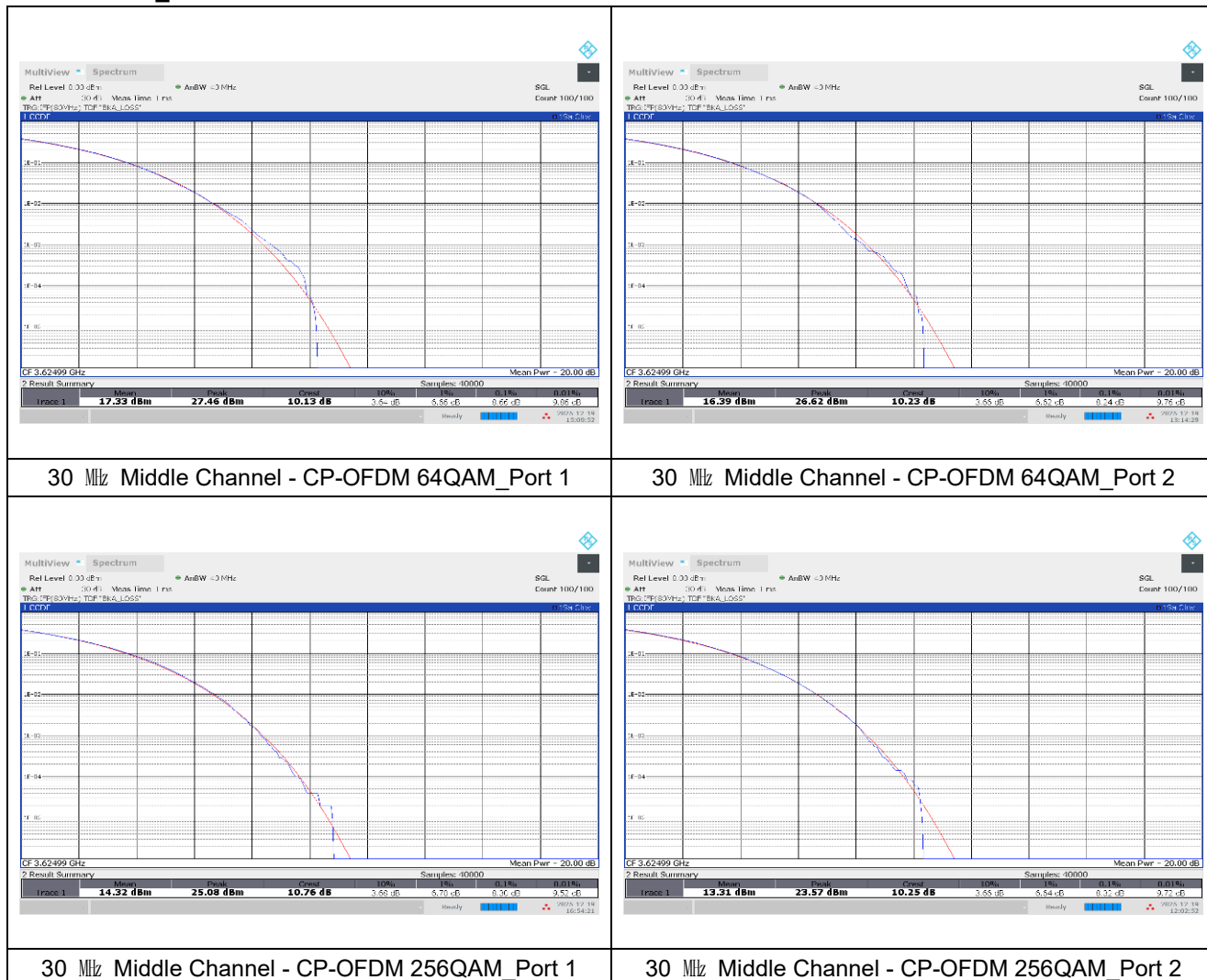


NR band 48_MIMO

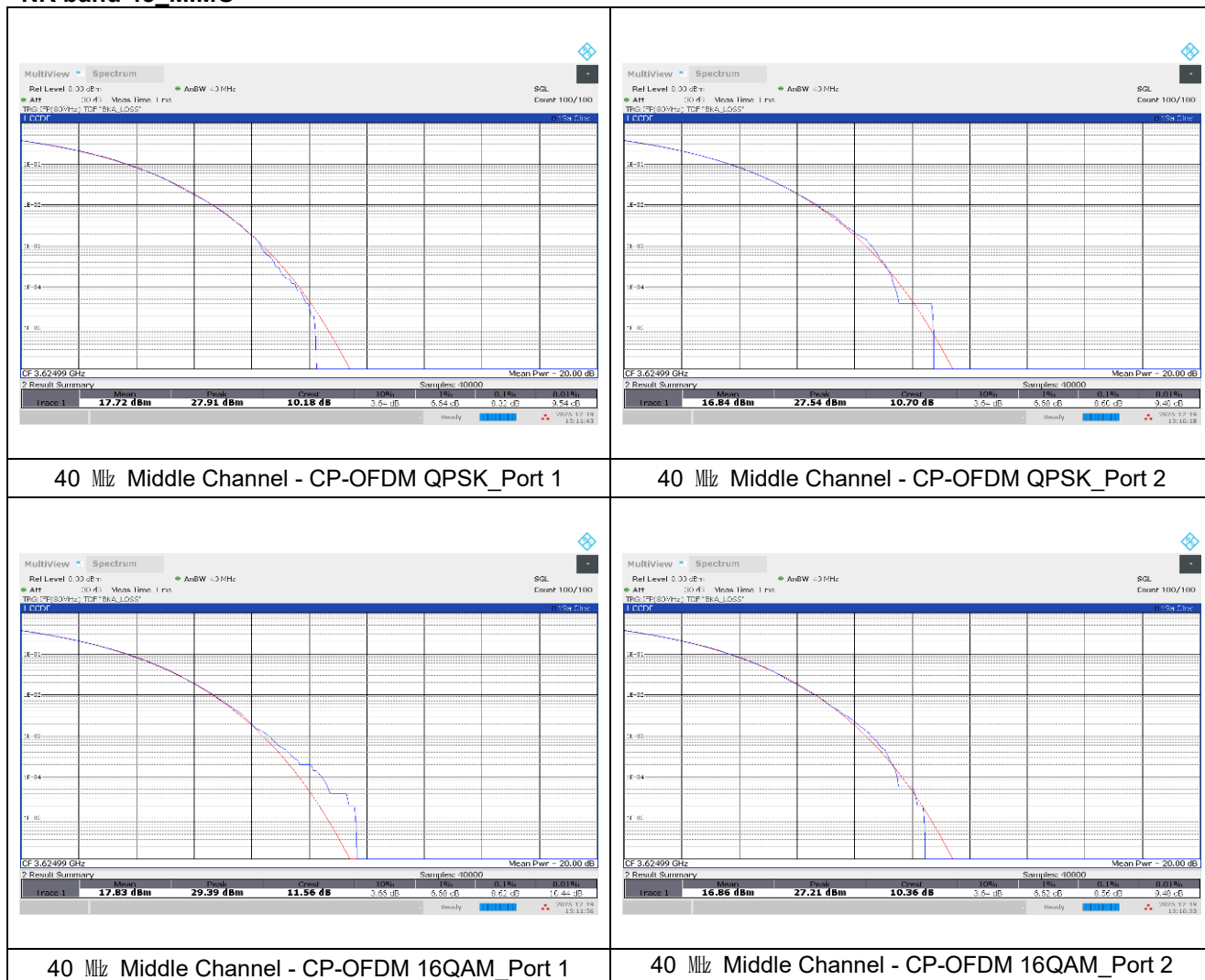
NR band 48_MIMO



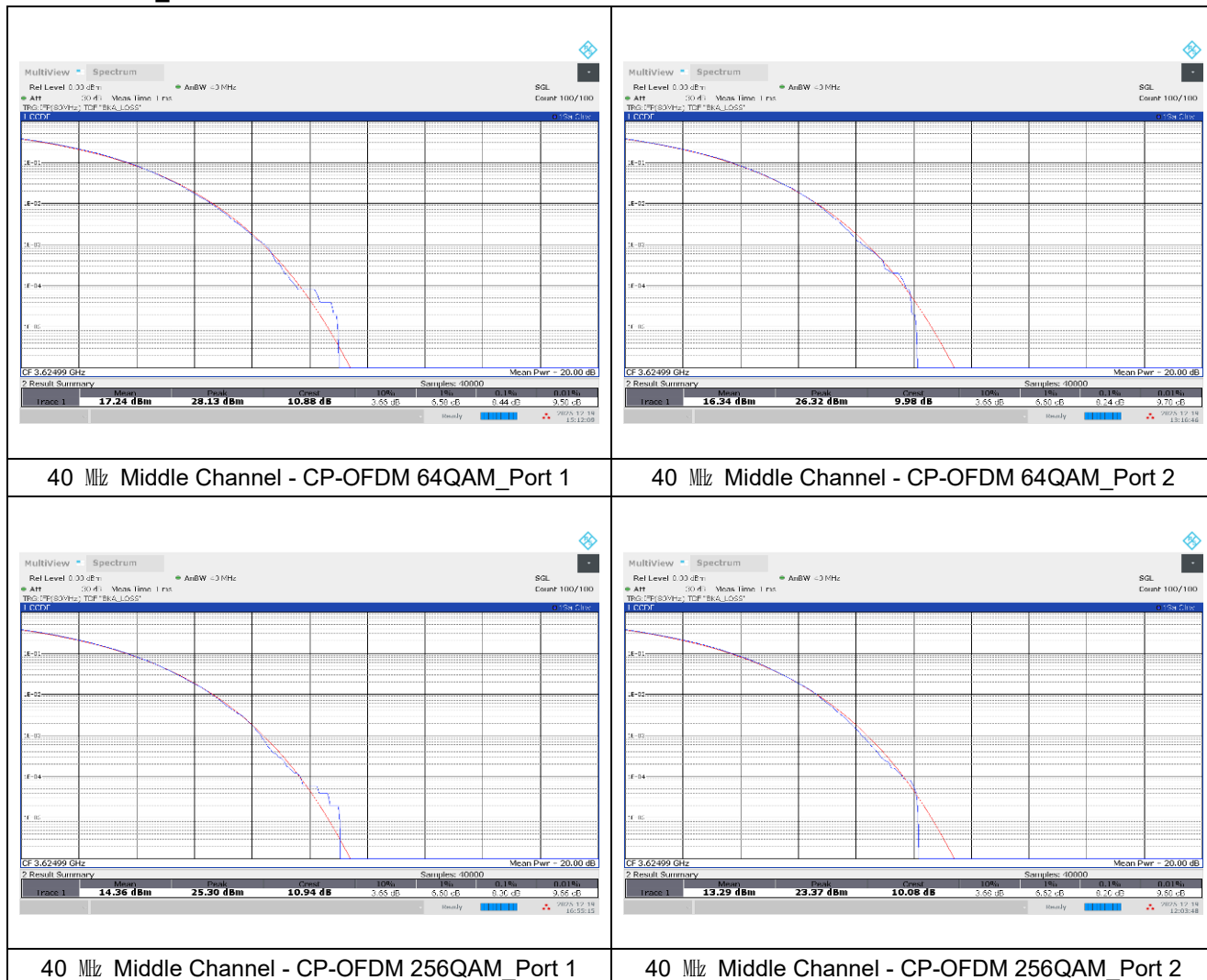
NR band 48_MIMO



NR band 48_MIMO



NR band 48_MIMO



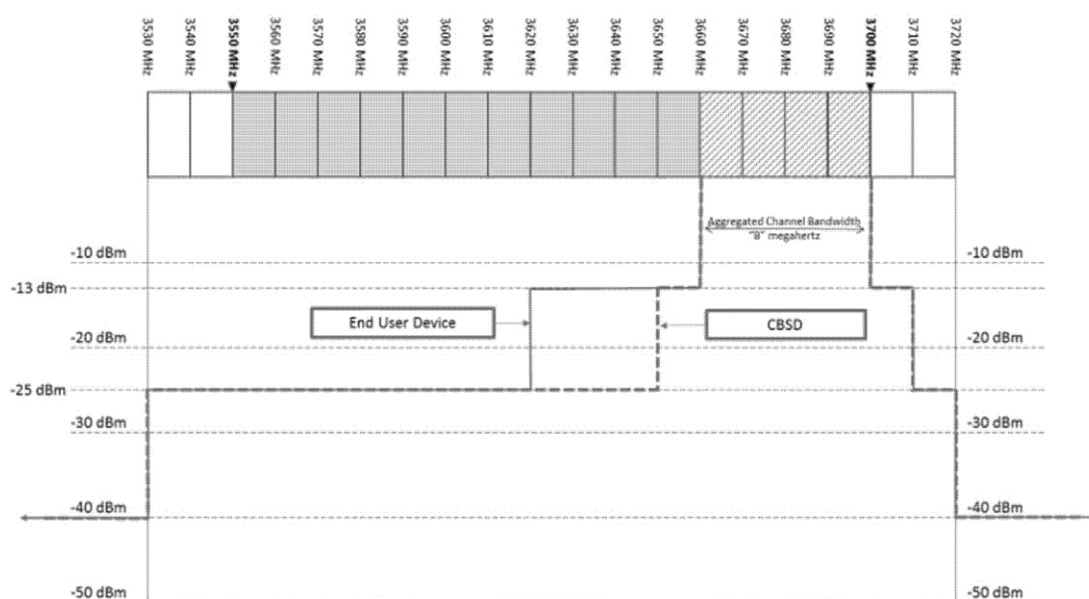
6. Spurious Emissions at Antenna Terminal

6.1. Limit

- §96.41(e), 3.5GHz Emissions and Interference Limits

(1) General protection levels.

Figure 1 to paragraph (e) – Protection levels



(i) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any CBSD emission outside the fundamental emission bandwidth as specified in paragraph (e)(3) of this section (whether the emission is inside or outside of the authorized band) shall not exceed -13 dB m/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any CBSD emission shall not exceed -25 dB m/MHz . The upper and lower SAS assigned channel edges are the upper and lower limits of any channel assigned to a CBSD by an SAS, or in the case of multiple contiguous channels, the upper and lower limits of the combined contiguous channels.

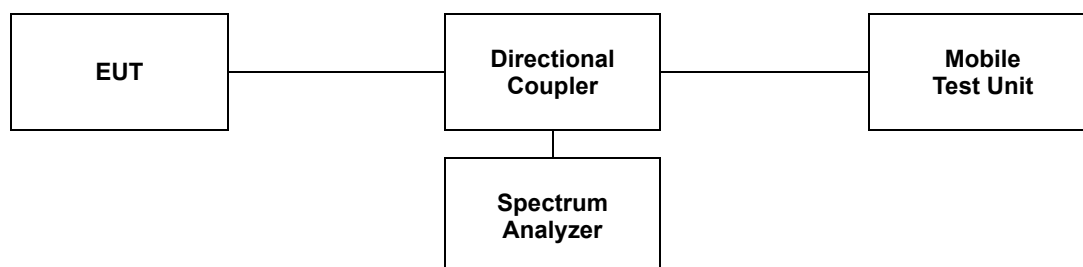
(ii) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by a CBSD to End User Devices, the conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dB m/MHz within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed -25 dB m/MHz . Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

(2) **Additional protection levels.** Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3 540 MHz or above 3 710 MHz shall not exceed -25 dB m/MHz , and the conducted power of emissions below 3 530 MHz or above 3 720 MHz shall not exceed -40 dB m/MHz .

6.2. Test Procedure

The test follows section 5.7 of ANSI C63.26-2015.

1. Start frequency was set to 9 kHz and stop frequency was set to at least 10* the fundamental frequency.
2. Detector = RMS.
3. Trace mode = Max hold.
4. Sweep time = Auto couple.
5. The trace was allowed to stabilize.
6. Please see notes below for RBW and VBW settings.
7. For plots showing conducted spurious emissions from 9 kHz to 10* the fundamental, all path loss of wide frequency range was investigated and compensated to spectrum analyzer as TDF function.



Note;

1. 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 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. The emission bandwidth is defined as the width of the signal between two point, 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. The limits were adjusted by a factor of $10 \cdot \log(2)$ dB to account for the device operation as a 2 port MIMO transmitter, as per KDB 622911. MIMO factor calculation as below:
MIMO Factor = $10 \cdot \log(2)$ = 3.01 dB

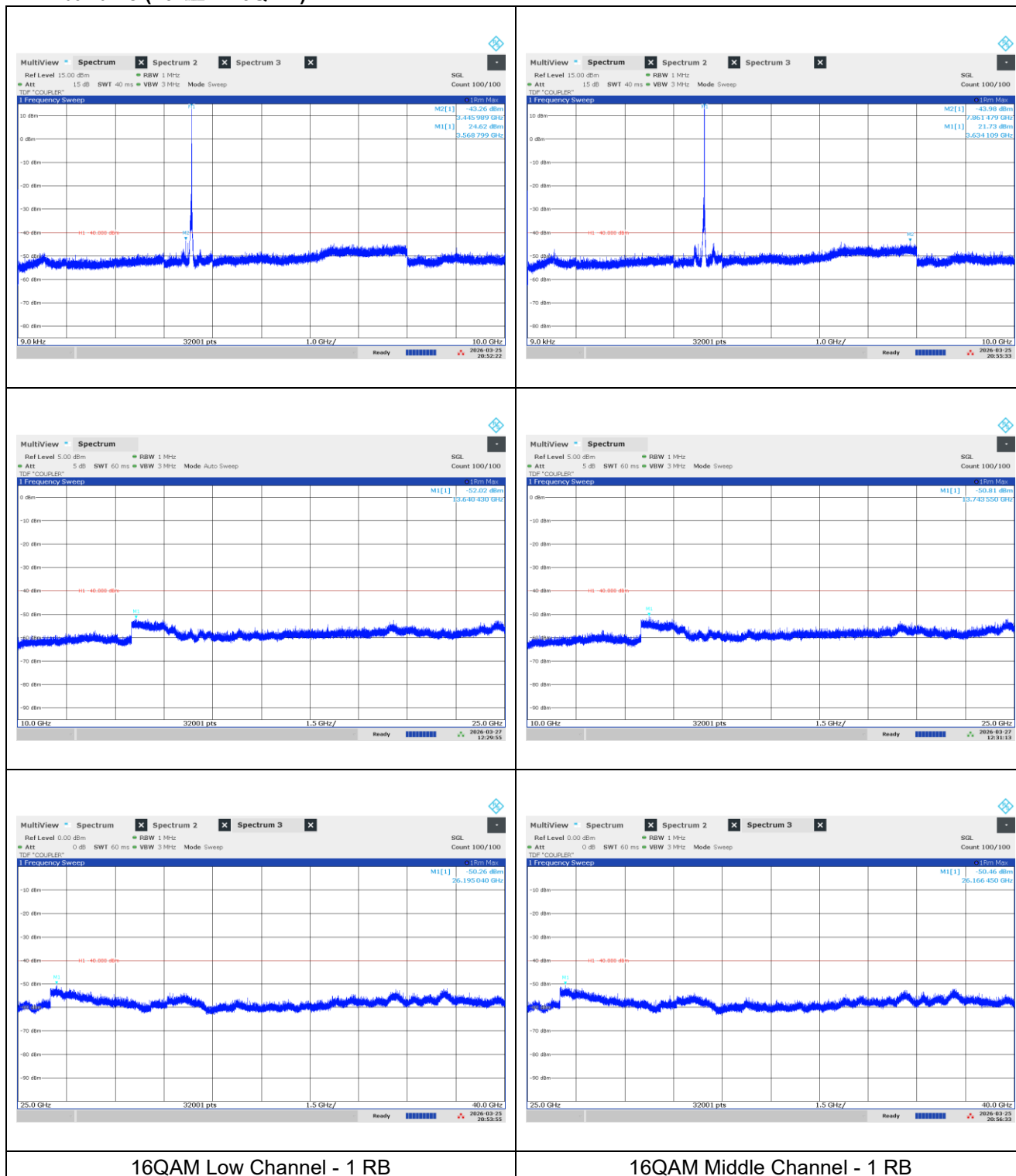
Frequency	Basic Limit (dB m)	MIMO Factor (dB)	Adjusted Limit (dB m)
3 550 – 3 700 MHz	-40	3.01	-43.01

6.3. Test Results

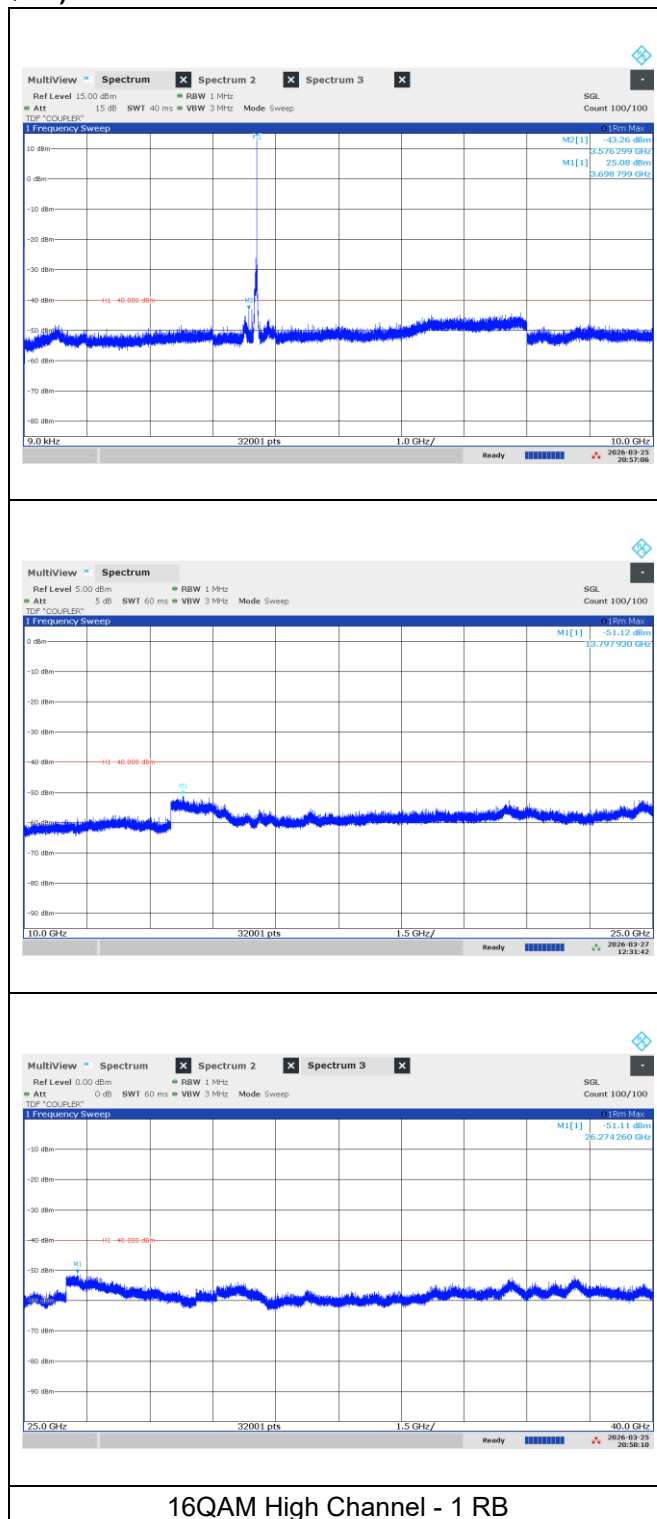
Ambient temperature : $(23 \pm 1) ^\circ\text{C}$
 Relative humidity : 47 %

- Test plots

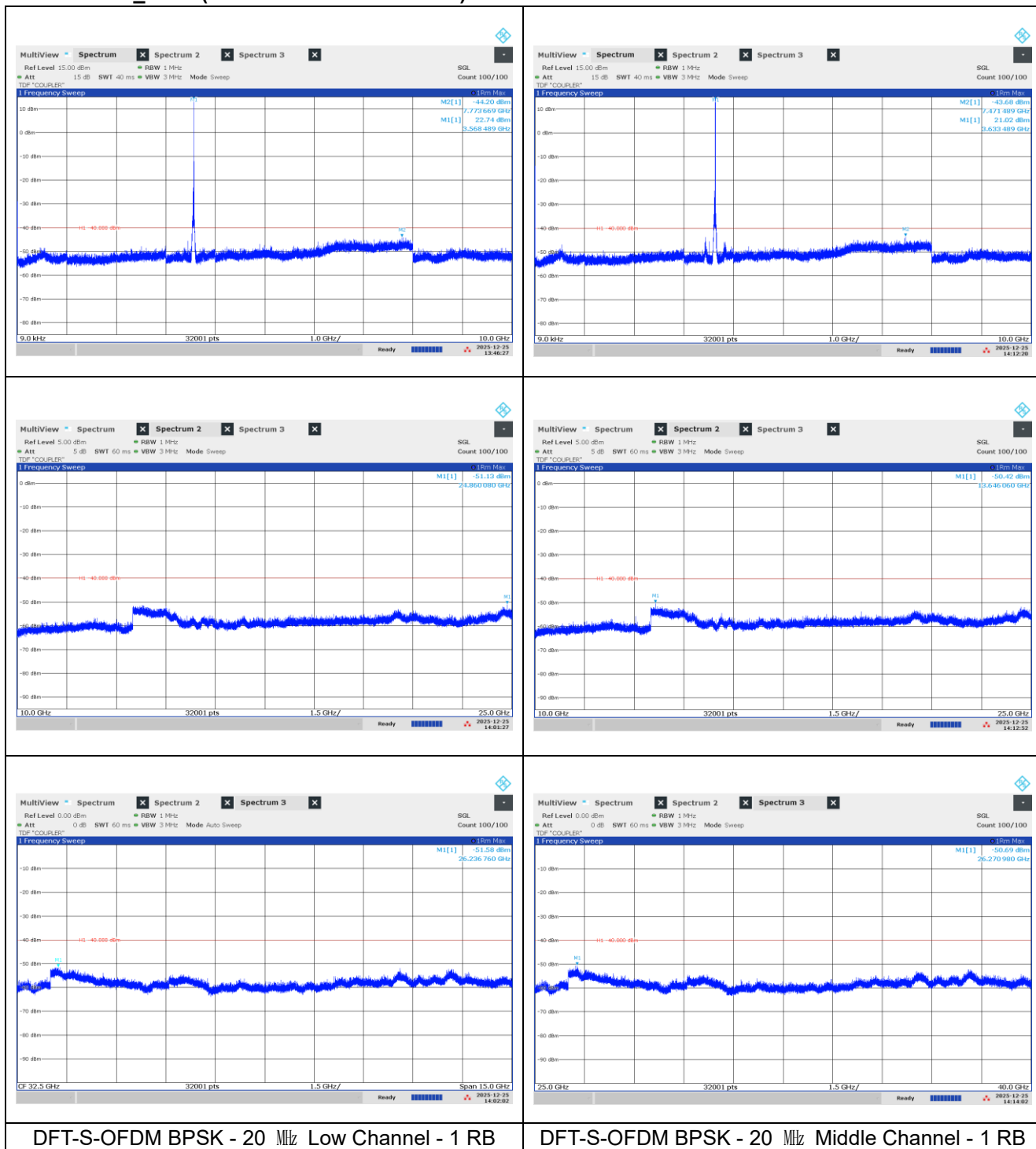
LTE band 48 (20 MHz - 16QAM)



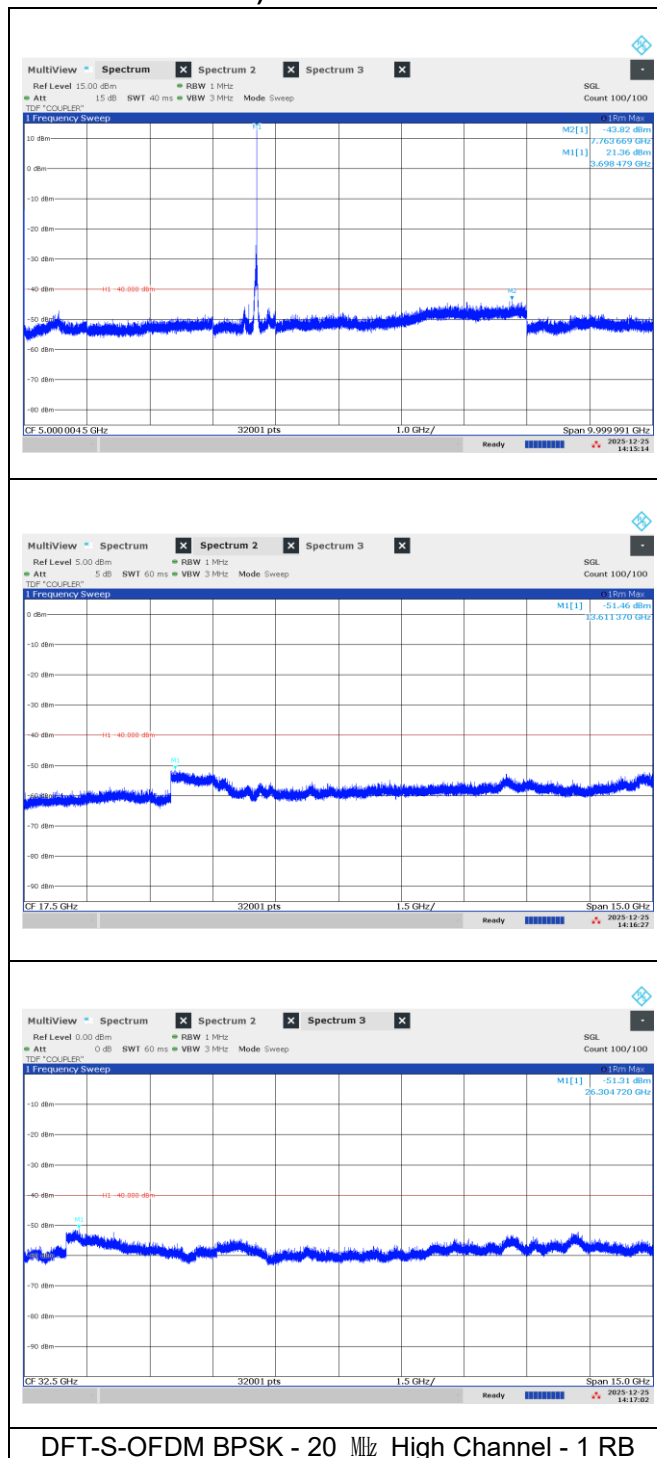
LTE band 48 (20 MHz - 16QAM)



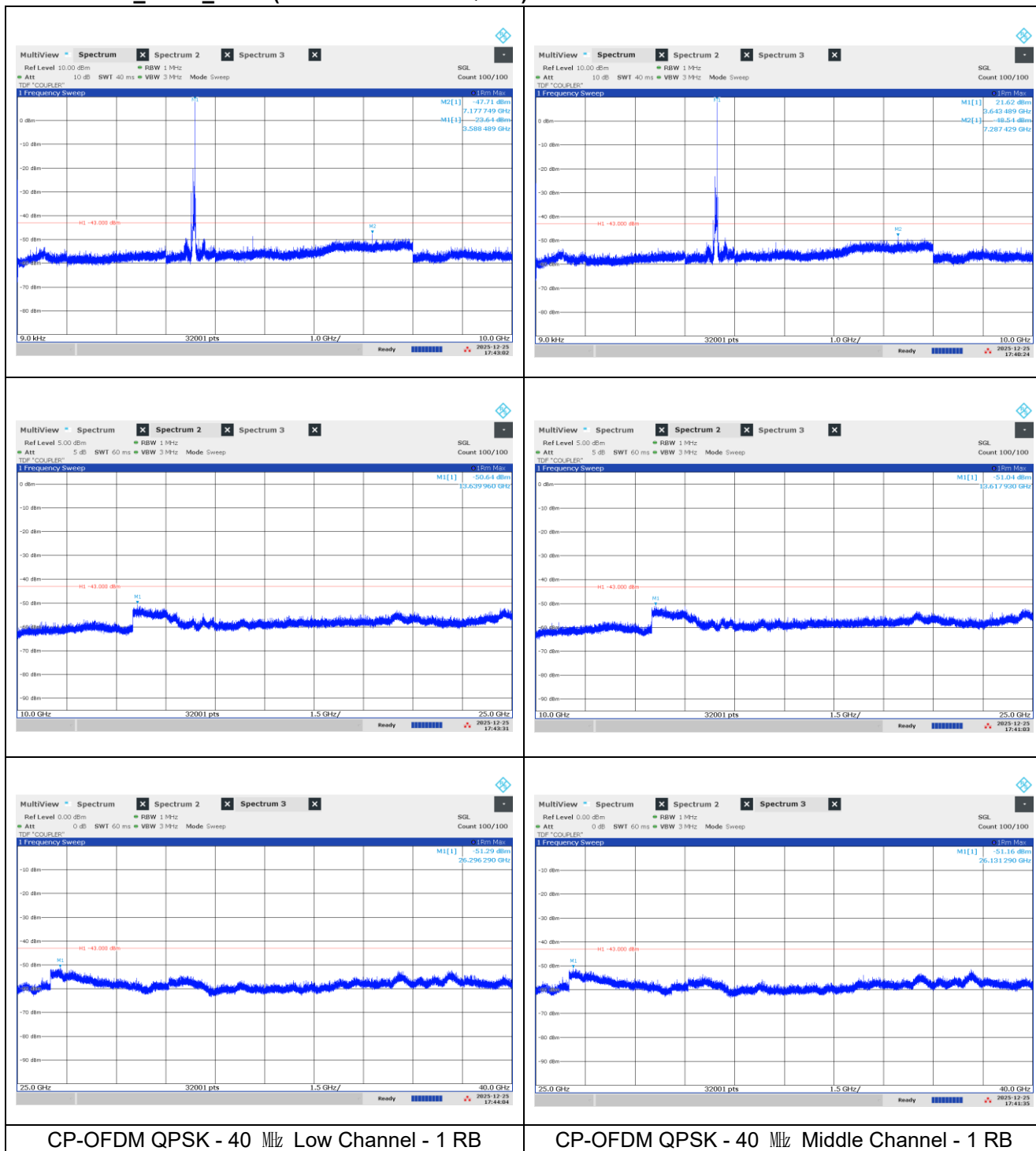
NR band 48_SISO (20 MHz - DFT-OFDM BPSK)



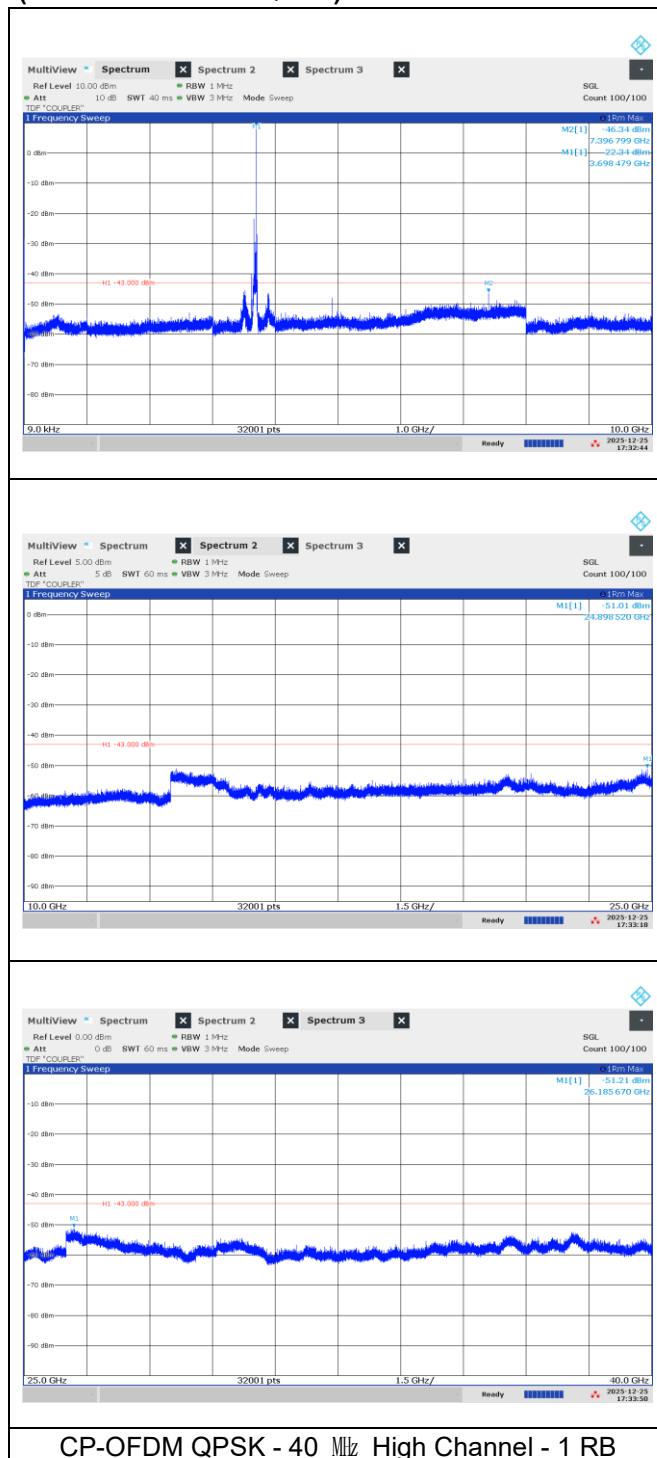
NR band 48_SISO (20 MHz - DFT-OFDM BPSK)



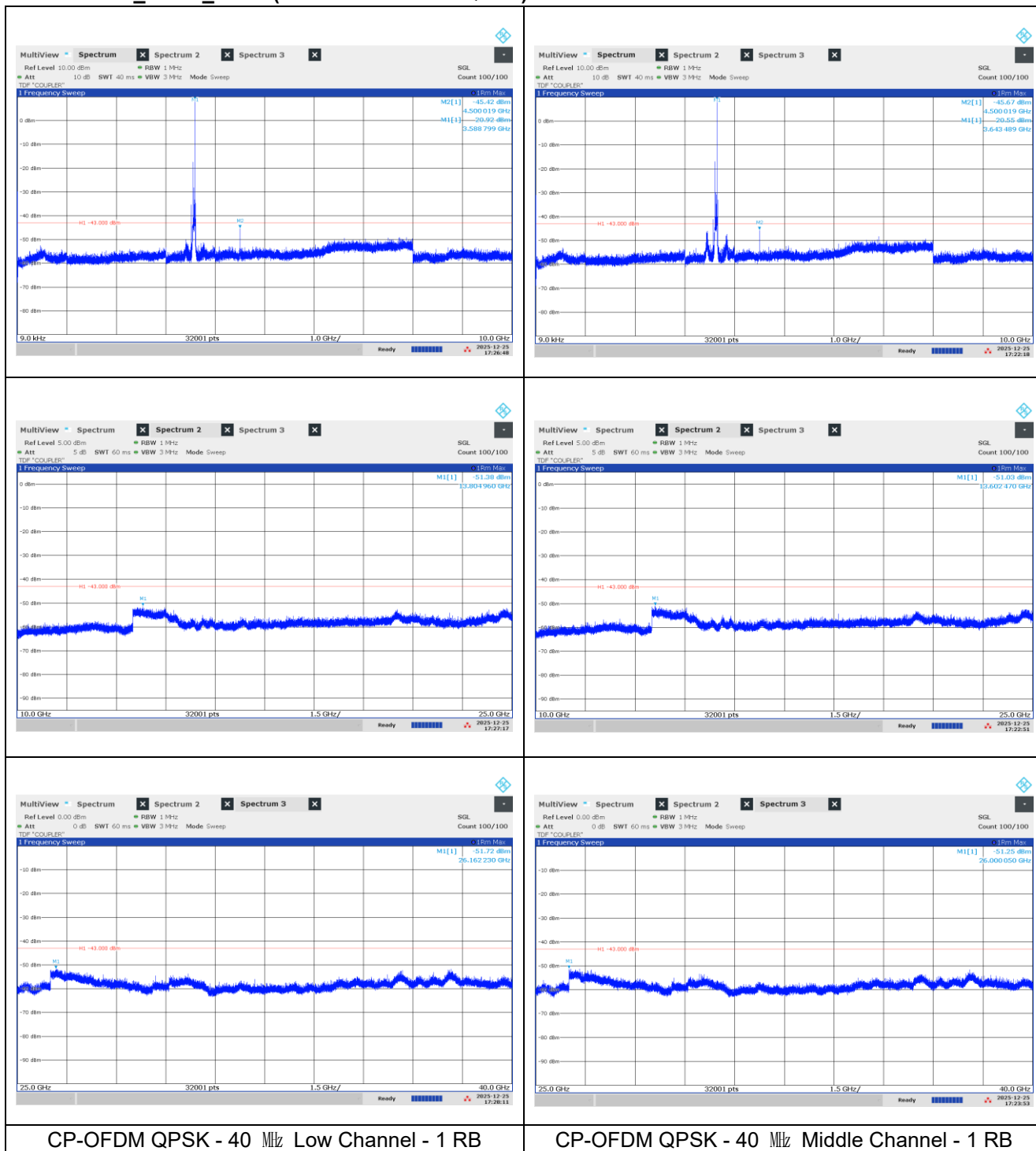
NR band 48_MIMO_Ant.1 (40 MHz - CP-OFDM QPSK)



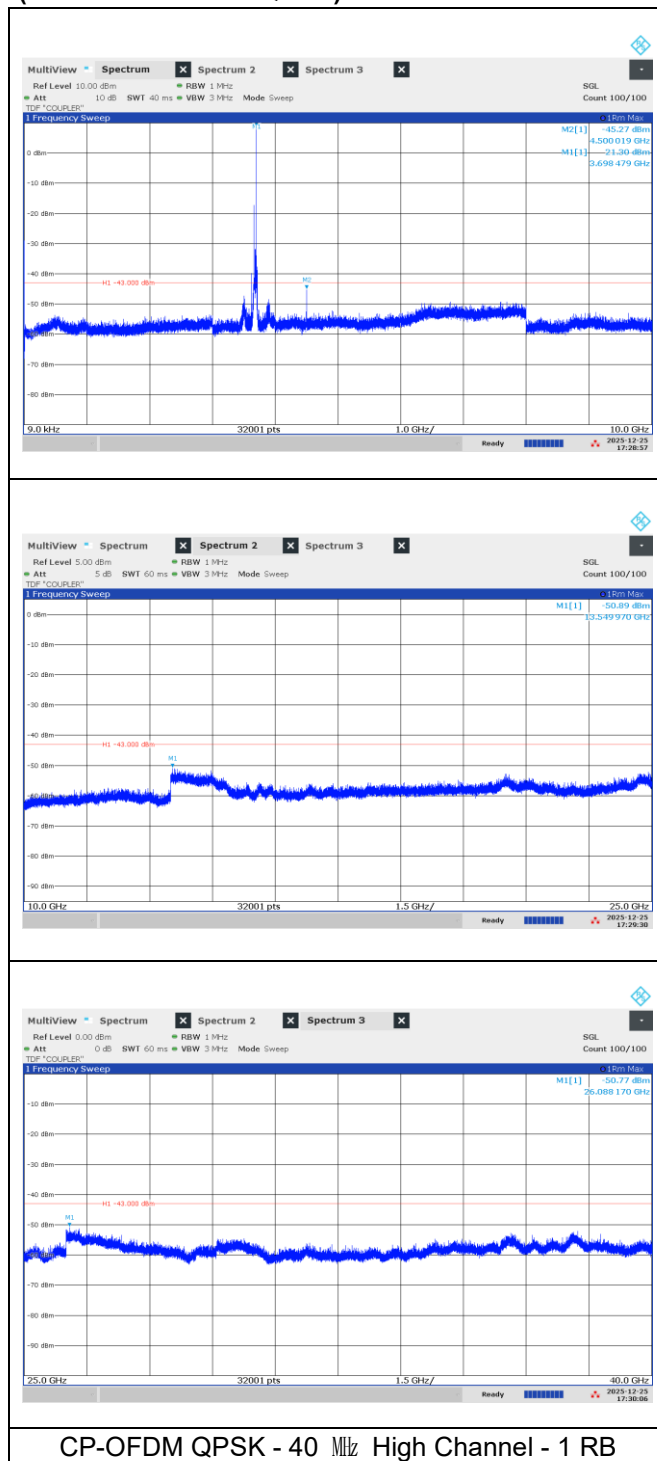
NR band 48_MIMO_Ant.1 (40 MHz - CP-OFDM QPSK)



NR band 48_MIMO_Ant.2 (40 MHz - CP-OFDM QPSK)



NR band 48_MIMO_Ant.2 (40 MHz - CP-OFDM QPSK)



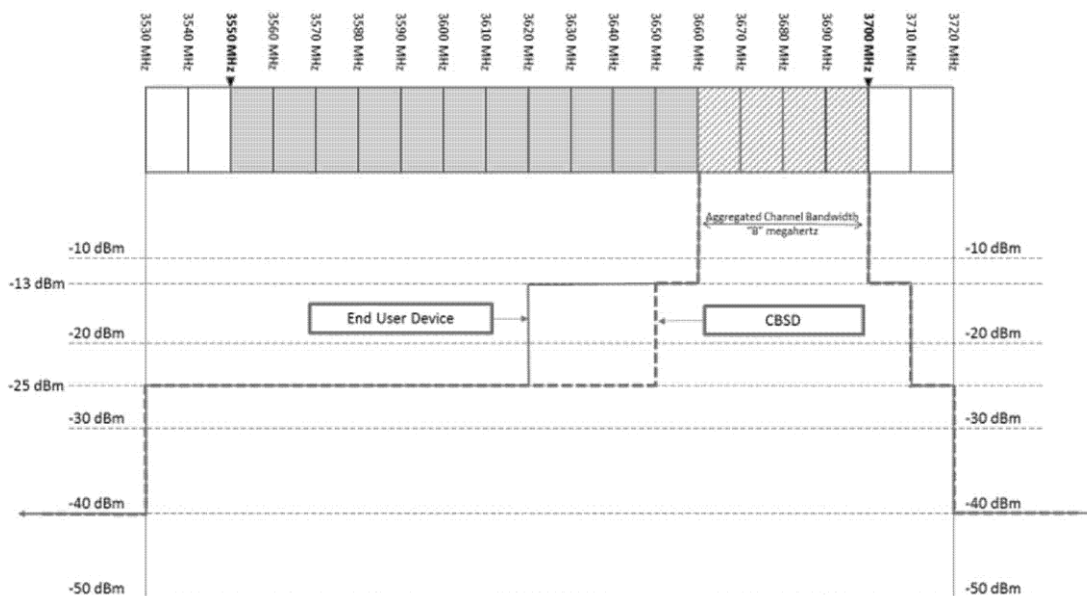
7. Band Edge and Adjacent Channel Leakage Ratio

7.1. Limit

- §96.41(e), 3.5GHz Emissions and Interference Limits

(1) General protection levels.

Figure 1 to paragraph (e) – Protection levels



(i) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any CBSD emission outside the fundamental emission bandwidth as specified in paragraph (e)(3) of this section (whether the emission is inside or outside of the authorized band) shall not exceed -13 dB m/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any CBSD emission shall not exceed -25 dB m/MHz. The upper and lower SAS assigned channel edges are the upper and lower limits of any channel assigned to a CBSD by an SAS, or in the case of multiple contiguous channels, the upper and lower limits of the combined contiguous channels.

(ii) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by a CBSD to End User Devices, the conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dB m/MHz within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed -25 dB m/MHz. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

(2) Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3 540 MHz or above 3 710 MHz shall not exceed -25 dB m/MHz, and the conducted power of emissions below 3 530 MHz or above 3 720 MHz shall not exceed -40 dB m/MHz.

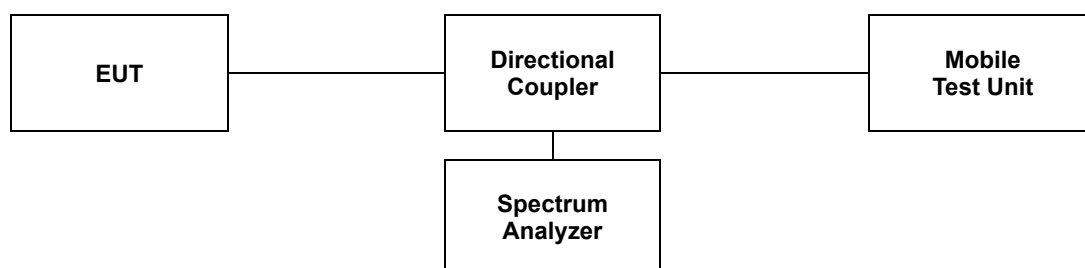
(3) Measurement procedure.

(i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's authorized frequency channel, a resolution bandwidth of no less than one percent of the fundamental emission bandwidth may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full reference bandwidth (i.e., 1 MHz or 1 percent of emission bandwidth, as specified). The fundamental emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

7.2. Test Procedure

The test follows section 5.7 of ANSI C63.26-2015.

- a. Span was set large enough so as to capture all out of band emissions near the band edge.
- b. RBW ≥ 1 % of OBW
- c. VBW $\geq 3 \times$ RBW.
- d. Detector = RMS.
- e. Trace mode = Average.
- f. Sweep time = Auto.
- g. The trace was allowed to stabilize.
- h. All path loss of frequency range was investigated and compensated to spectrum analyzer as TDF function.



Note;

1. In case of MIMO mode, the limits were adjusted by a factor of $10 \cdot \log(2)$ dB to account for the device operation as a 2 port MIMO transmitter, as per KDB 622911. MIMO factor calculation as below:
MIMO Factor = $10 \cdot \log(2) = 3.01$ dB

Frequency Range	Basic Limit (dB m)	MIMO Factor (dB)	Adjusted Limit (dB m)
0 MHz to B MHz above and below the channel edges	-13	3.01	-16.01
B MHz above and below the channel edges	-25	3.01	-28.01
below 3 540 MHz or above 3 710 MHz	-25	3.01	-28.01
below 3 530 MHz or above 3 720 MHz	-40	3.01	-43.01

7.3. Test Results

Ambient temperature : (23 ± 1) °C
Relative humidity : 47 %

- Test plots

Band edge

LTE band 48 (5 MHz)

