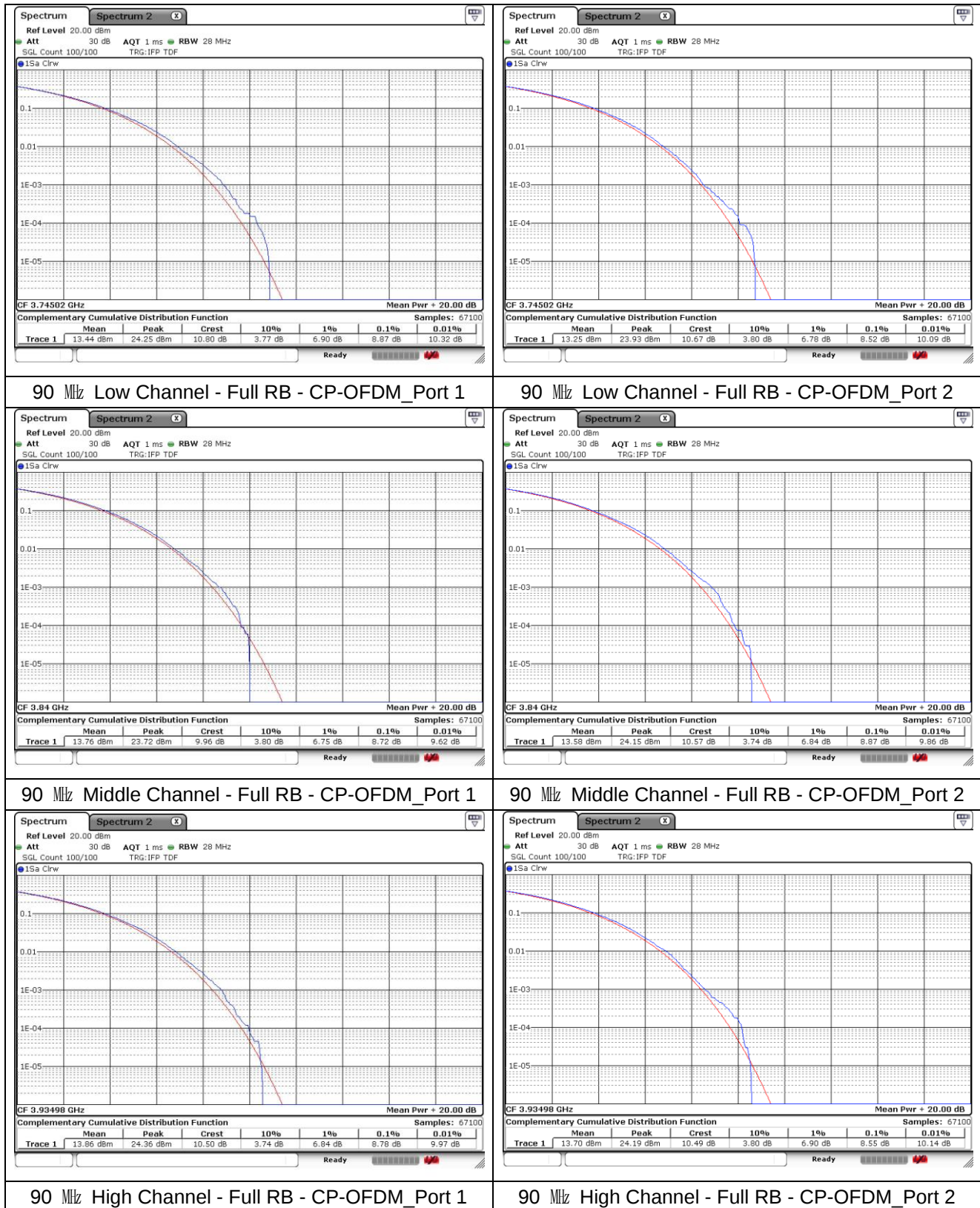
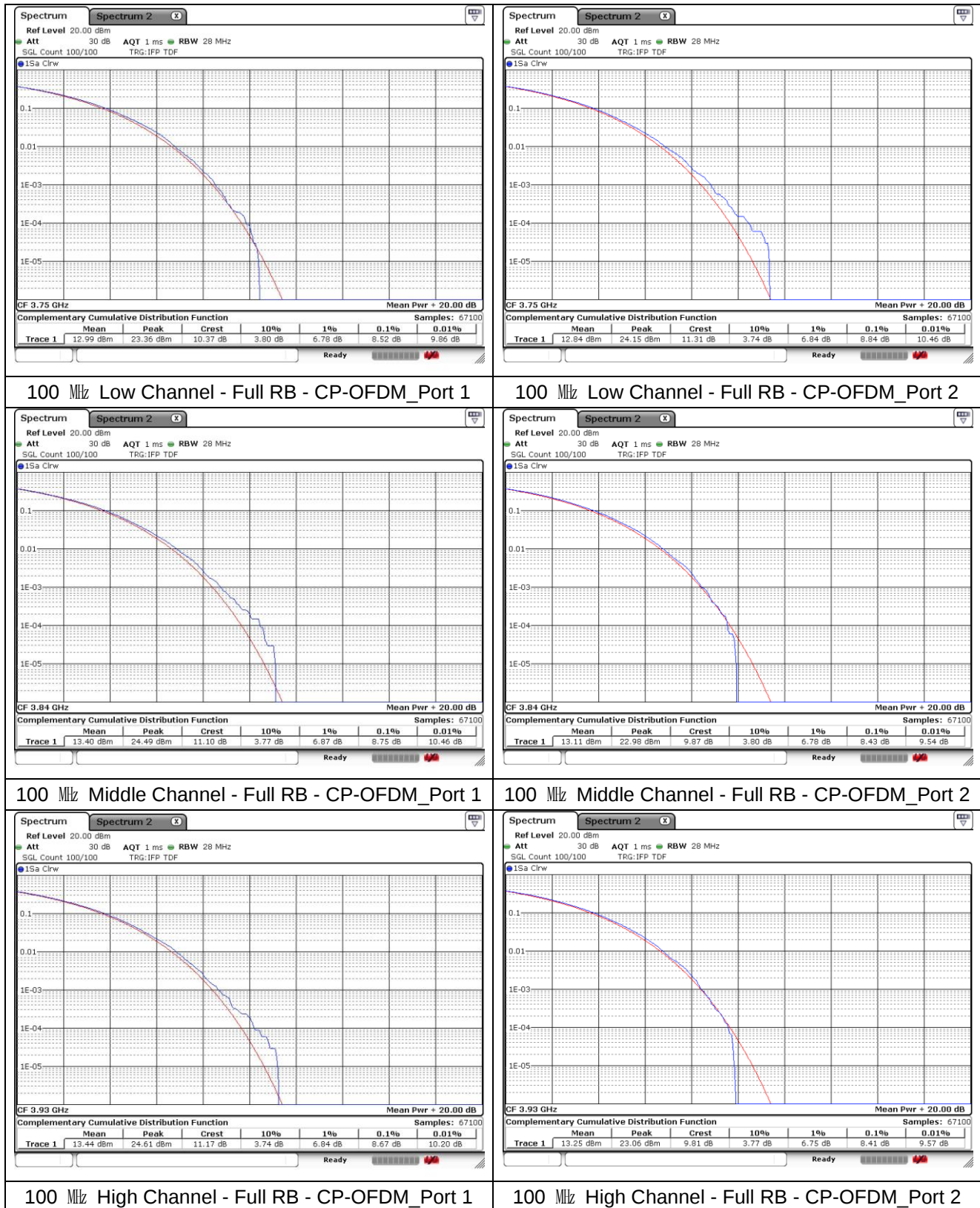






6. Spurious Emissions at Antenna Terminal

6.1. Limit

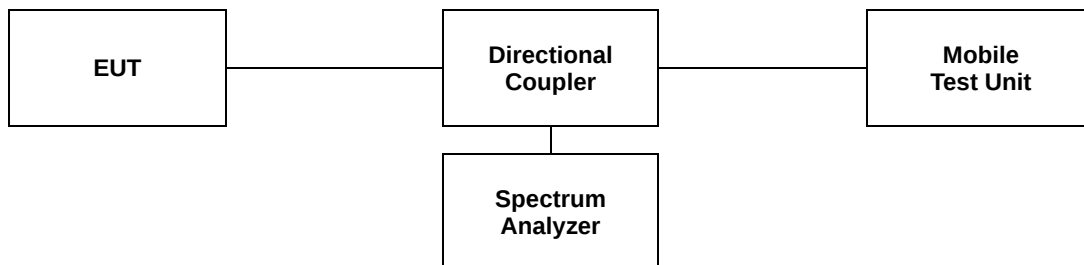
- §27.53(l)(2), for mobile operations in the 3 700-3 980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. Compliance with this paragraph (l)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

- §27.53(n)(2), for mobile operations in the 3 450-3 550 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. Compliance with this paragraph (n)(2) 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 frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed, but limited to a maximum of 200 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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 40 GHz, 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)
Low Band (3 450 – 3 550 MHz)	-13	3.01	-16.01
High Band (3 700 – 3 980 MHz)	-13	3.01	-16.01

6.3. Test Results

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

- Test plots

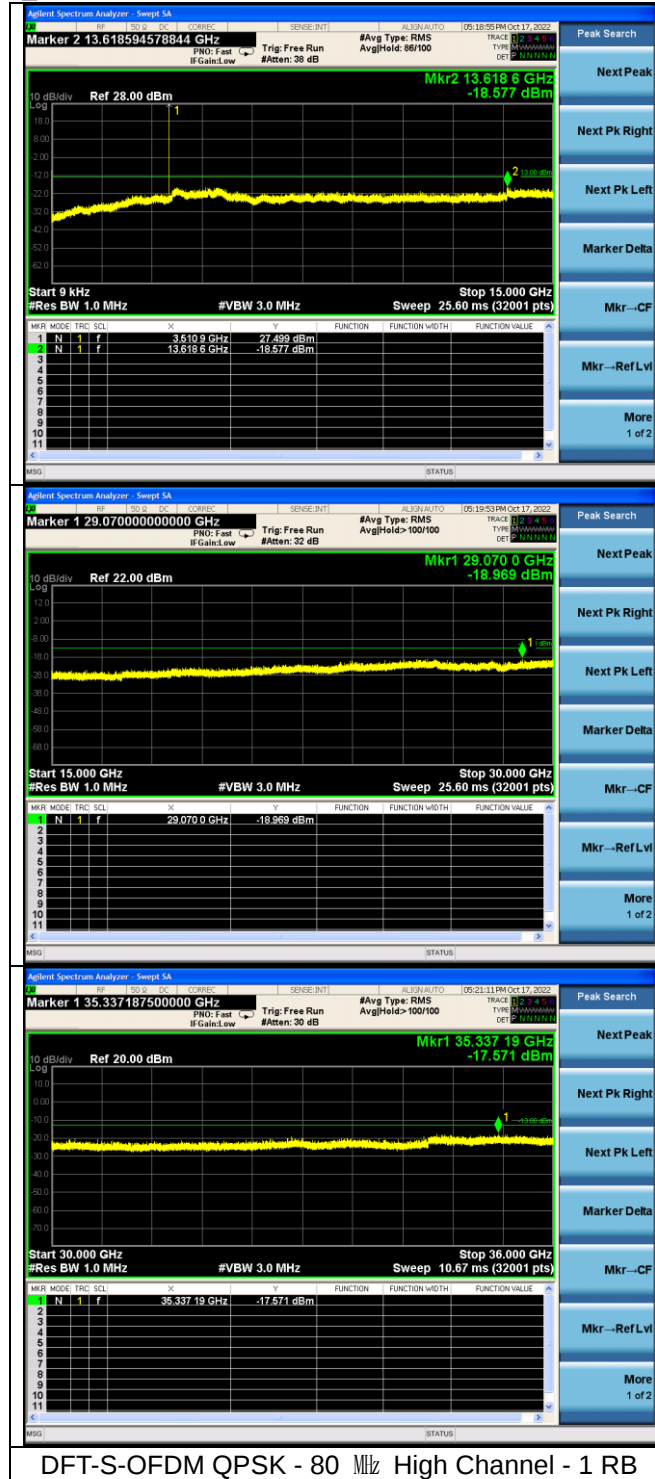
NR band 77/78 Low Band SISO



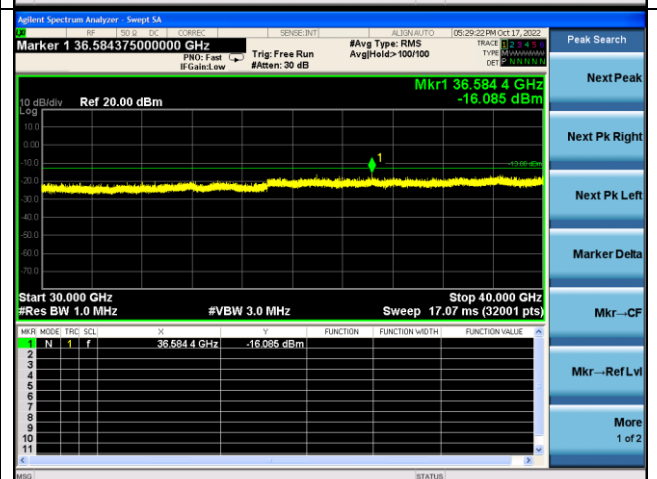
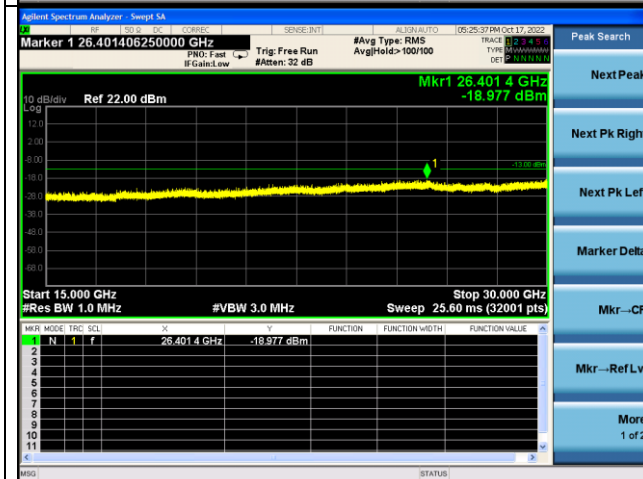
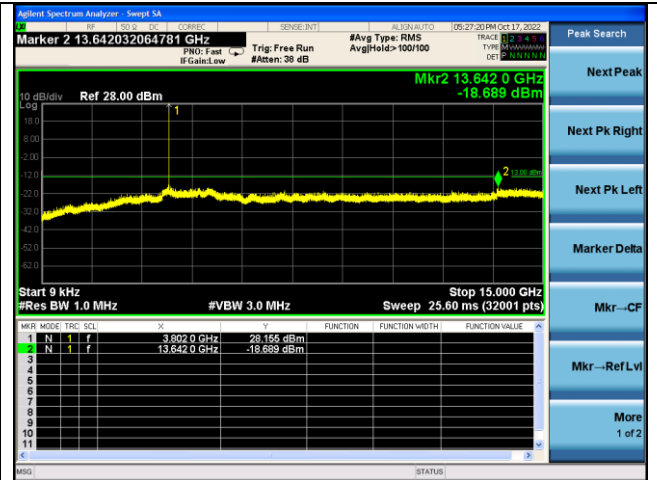
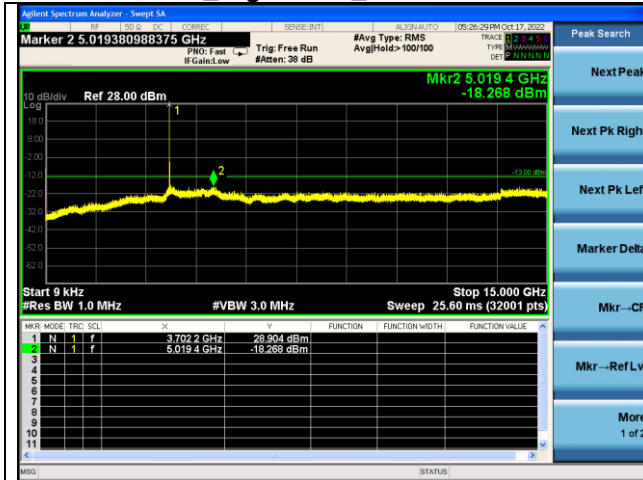
DFT-S-OFDM QPSK - 80 MHz Low Channel - 1 RB

DFT-S-OFDM QPSK - 80 MHz Middle Channel - 1 RB

NR band 77/78_Low Band_SISO



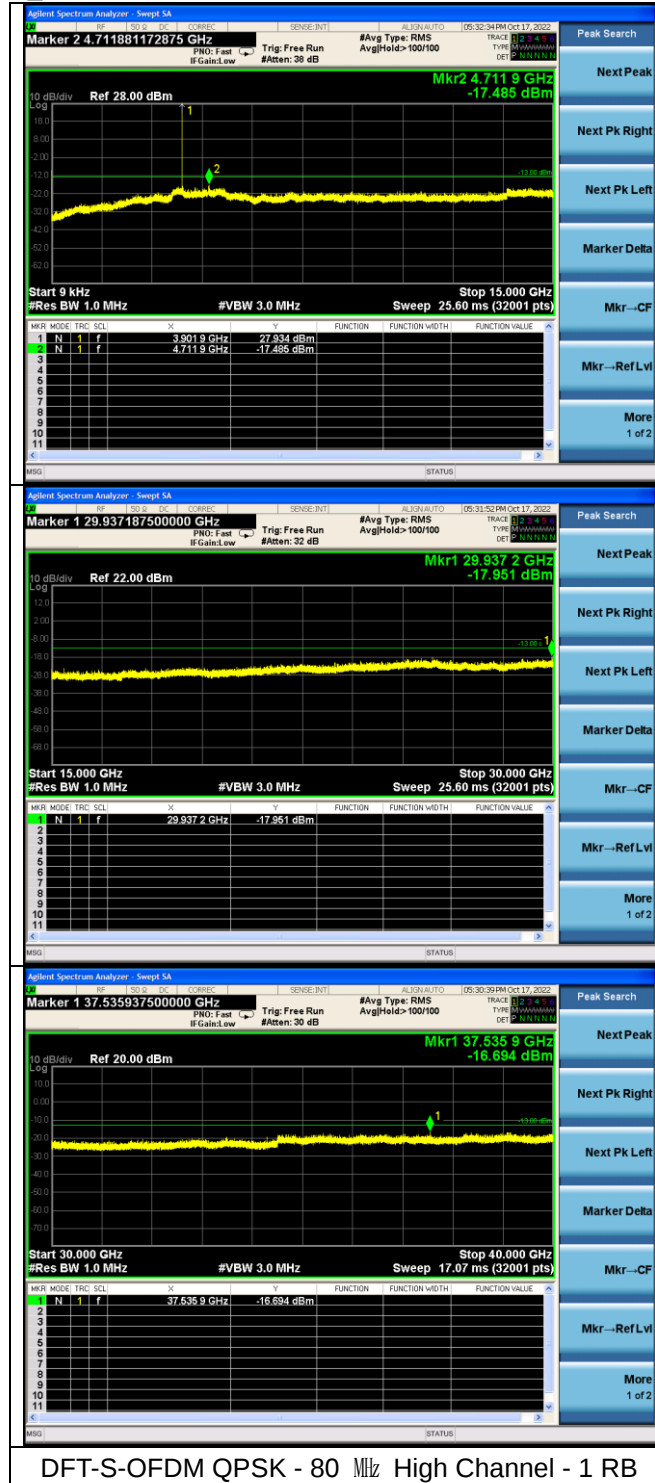
NR band 77/78_High Band_SISO



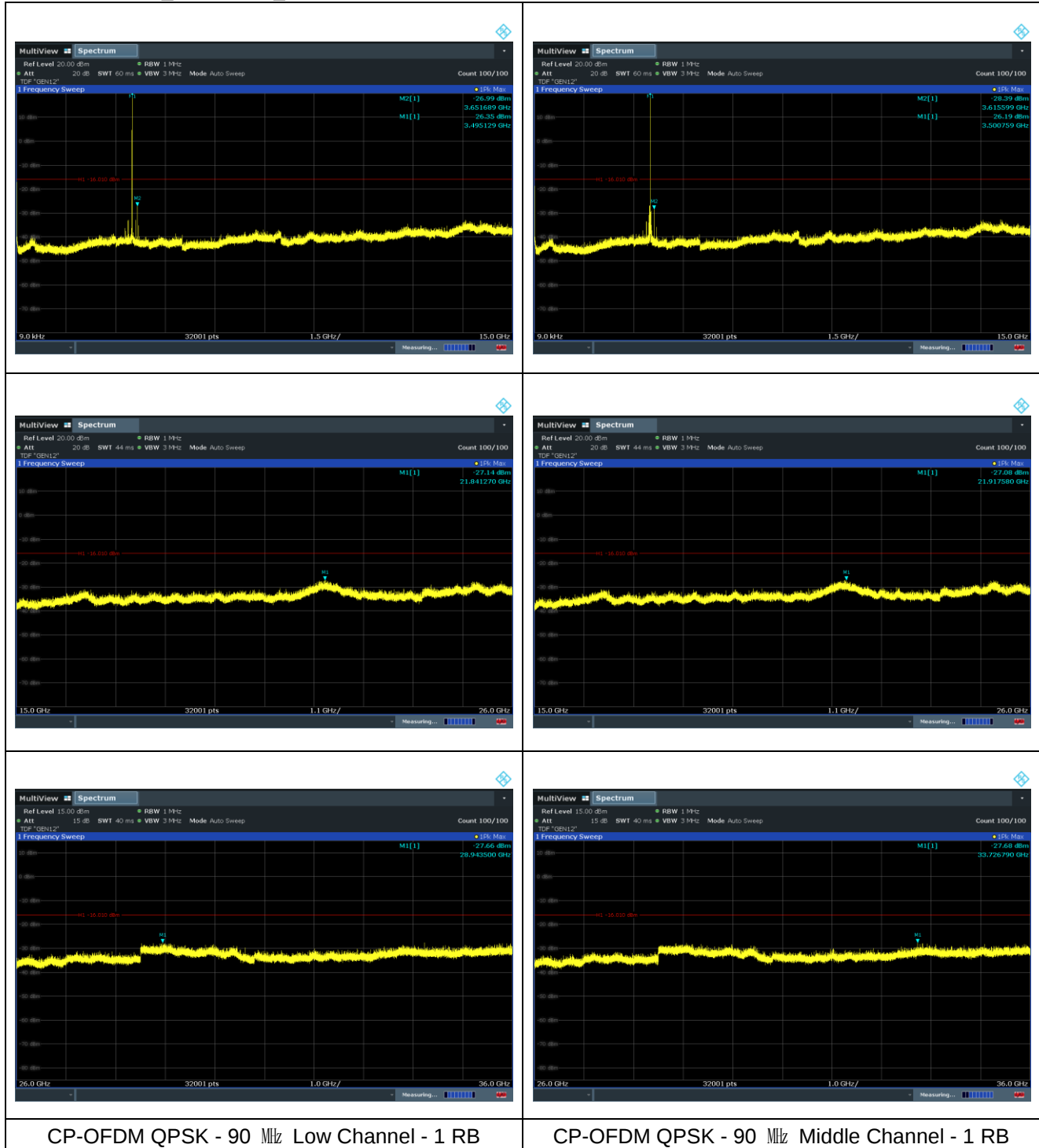
DFT-S-OFDM QPSK - 80 MHz Low Channel - 1 RB

DFT-S-OFDM QPSK - 80 MHz Middle Channel - 1 RB

NR band 77/78_High Band_SISO



NR band 77/78 Low Band MIMO-Port 1



CP-OFDM QPSK - 90 MHz Low Channel - 1 RB

CP-OFDM QPSK - 90 MHz Middle Channel - 1 RB

NR band 77/78_Low Band_MIMO-Port 1



NR band 77/78 Low Band MIMO-Port 2



CP-OFDM QPSK - 90 MHz Low Channel - 1 RB

CP-OFDM QPSK - 90 MHz Middle Channel - 1 RB

NR band 77/78_Low Band_MIMO-Port 2



NR band 77/78_High Band_MIMO-Port 1



CP-OFDM QPSK - 60 MHz Low Channel - 1 RB

CP-OFDM QPSK - 60 MHz Middle Channel - 1 RB

NR band 77/78_High Band_MIMO-Port 1



NR band 77/78_High Band_MIMO-Port 2



CP-OFDM QPSK - 60 MHz Low Channel - 1 RB

CP-OFDM QPSK - 60 MHz Middle Channel - 1 RB

NR band 77/78_High Band_MIMO-Port 2



7. Band Edge and Emission Mask

7.1. Limit

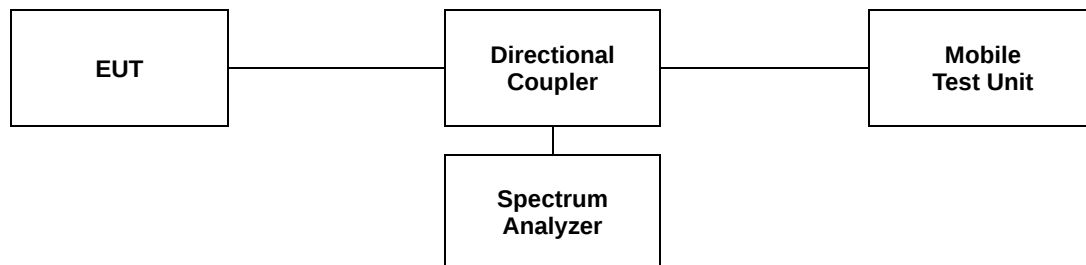
- §27.53(l)(2), for mobile operations in the 3 700-3 980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. Compliance with this paragraph (l)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

- §27.53(n)(2), for mobile operations in the 3 450-3 550 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. Compliance with this paragraph (n)(2) 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 frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed, but limited to a maximum of 200 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

7.2. Test Procedure

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

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



Note;

- 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:

$$\text{MIMO Factor} = 10 \cdot \log(2) = 3.01 \text{ dB}$$

Frequency Range	Basic Limit (dB m)	MIMO Factor (dB)	Adjusted Limit (dB m)
1 MHz above and below the channel edges	-13	3.01	-16.01
1 MHz to 5 MHz above and below the channel edges	-13	3.01	-16.01
5 MHz above and below the channel edges	-13	3.01	-16.01

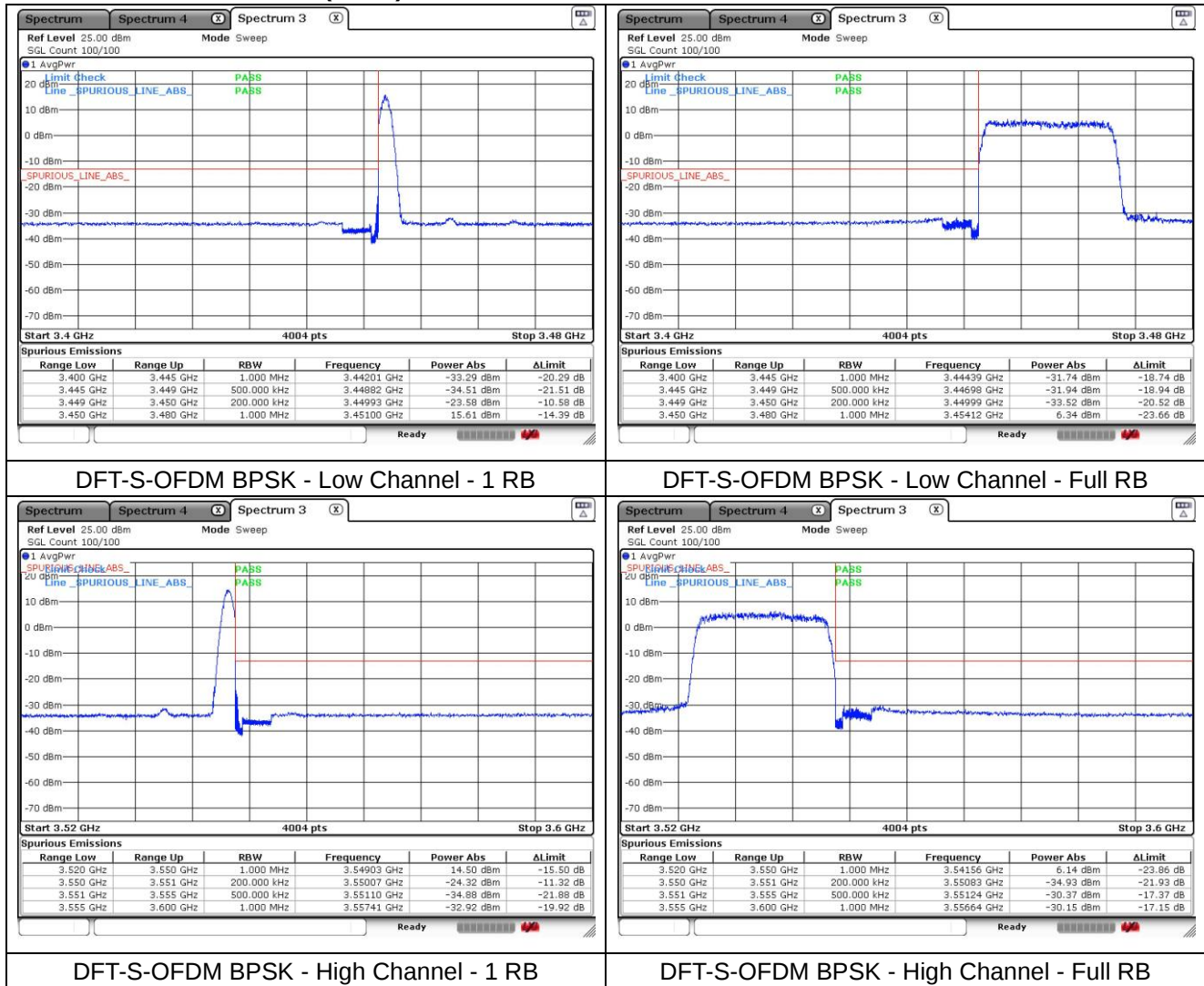
7.3. Test Results

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

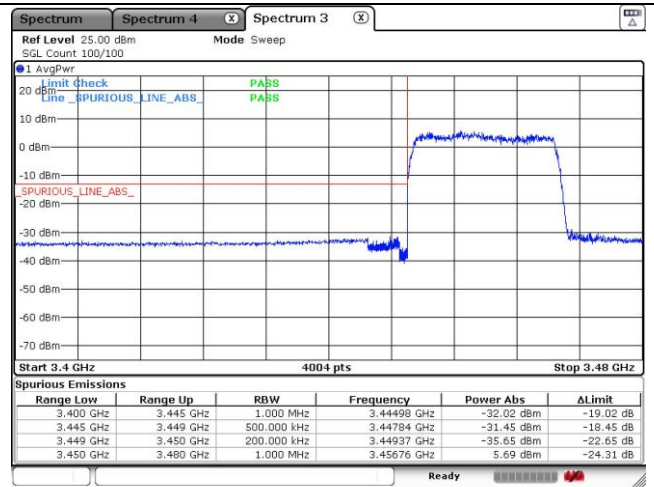
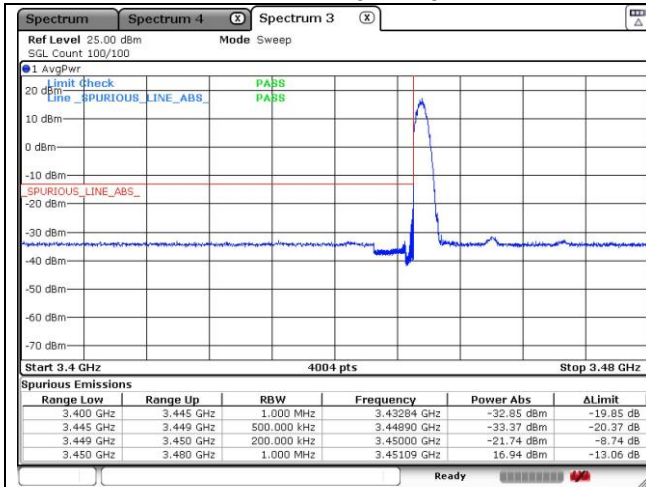
- Test plots

SISO

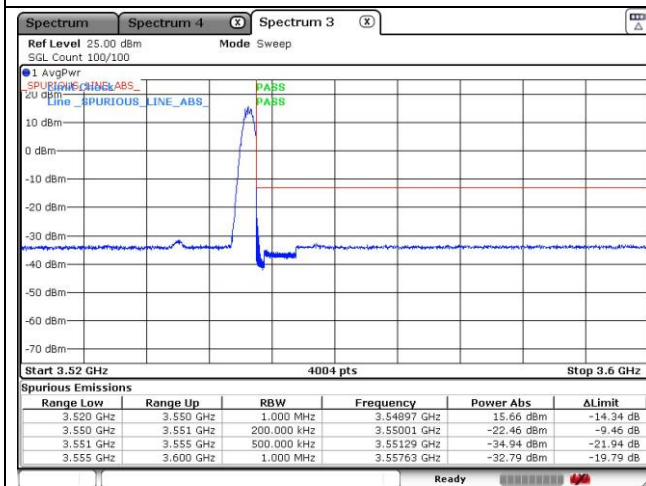
NR band 77/78_Low Band (20 MHz)



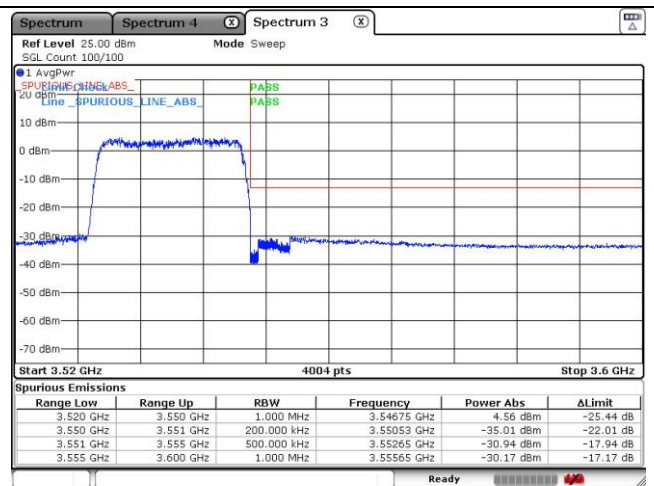
NR band 77/78 Low Band (20 MHz)



DFT-S-OFDM 16QAM - Low Channel - 1 RB



DFT-S-OFDM 16QAM - Low Channel - Full RB



DFT-S-OFDM 16QAM - High Channel - 1 RB

DFT-S-OFDM 16QAM - High Channel - Full RB