

A.4 Occupied Bandwidth

Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the mid frequencies frequency. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

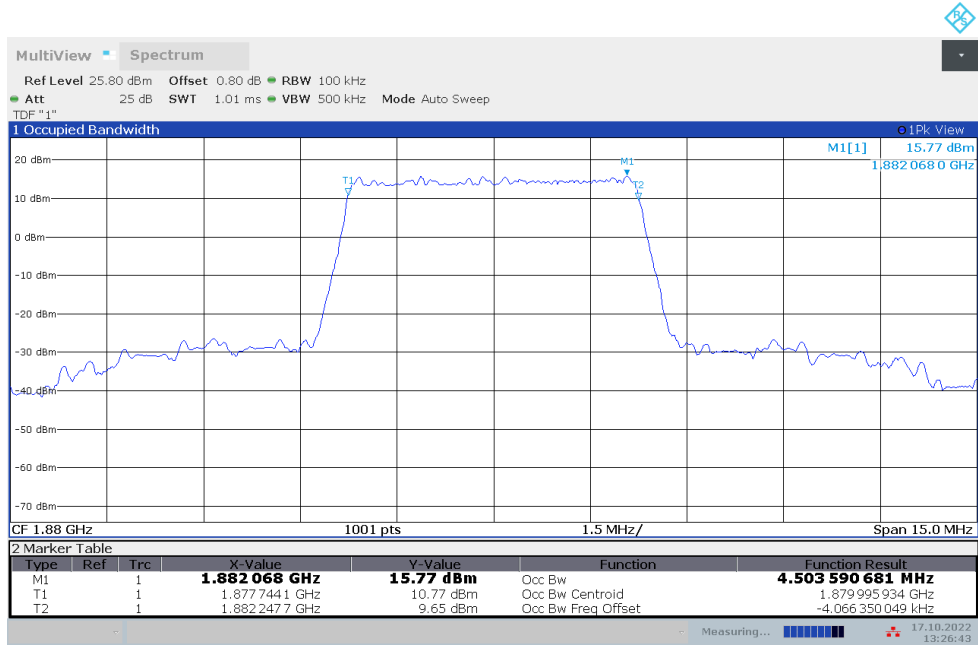
The measurement method is from ANSI C63.26:

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts.
- b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times$ RBW.
- c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation.
- d) Set the detection mode to peak, and the trace mode to max-hold.

n2
n2,5MHz(99%)

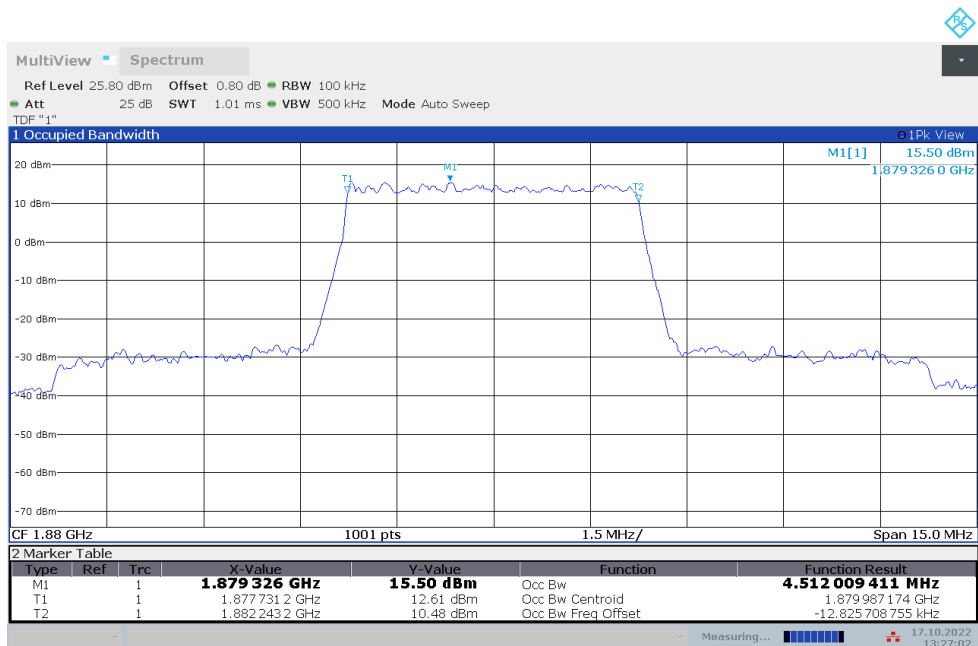
| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 1880 | 4.504 | 4.512 | 4.506 |

n2,5MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)



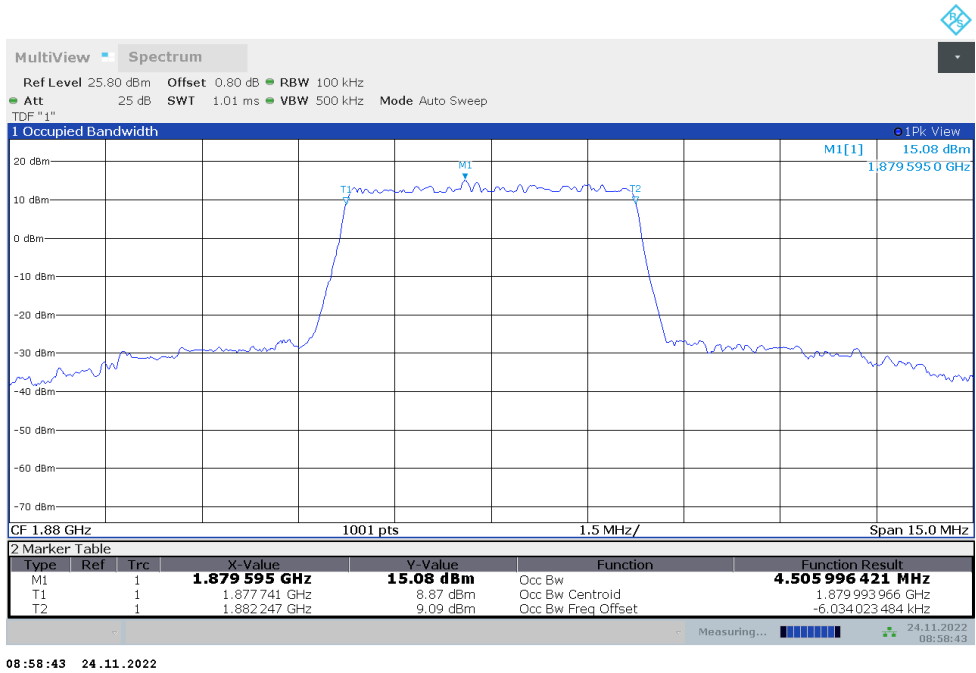
13:26:43 17.10.2022

n2,5MHz Bandwidth,DFT-s-QPSK (99% BW)



13:27:02 17.10.2022

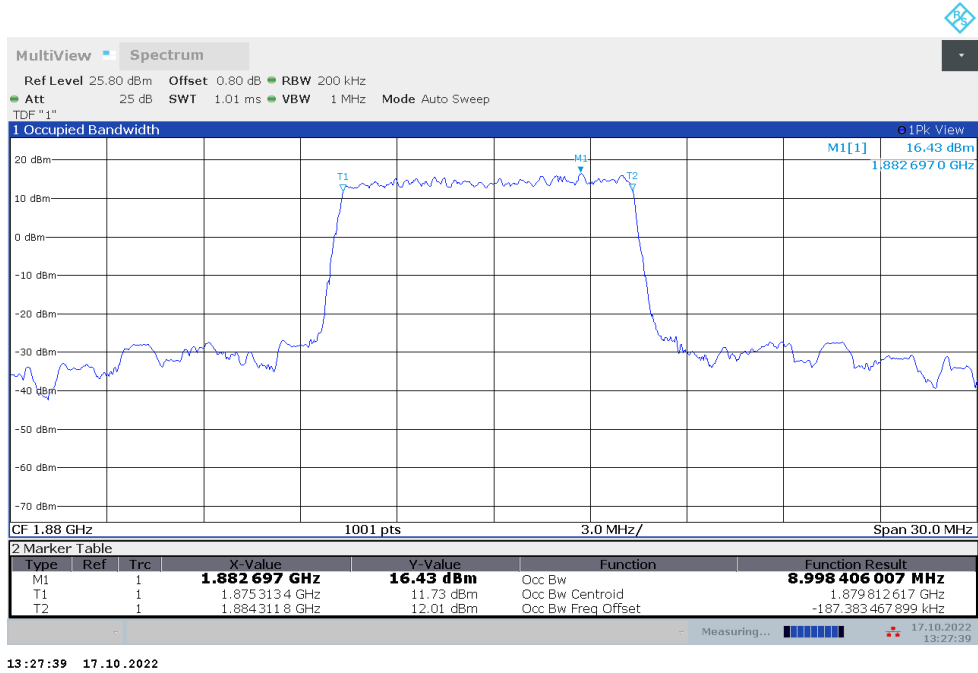
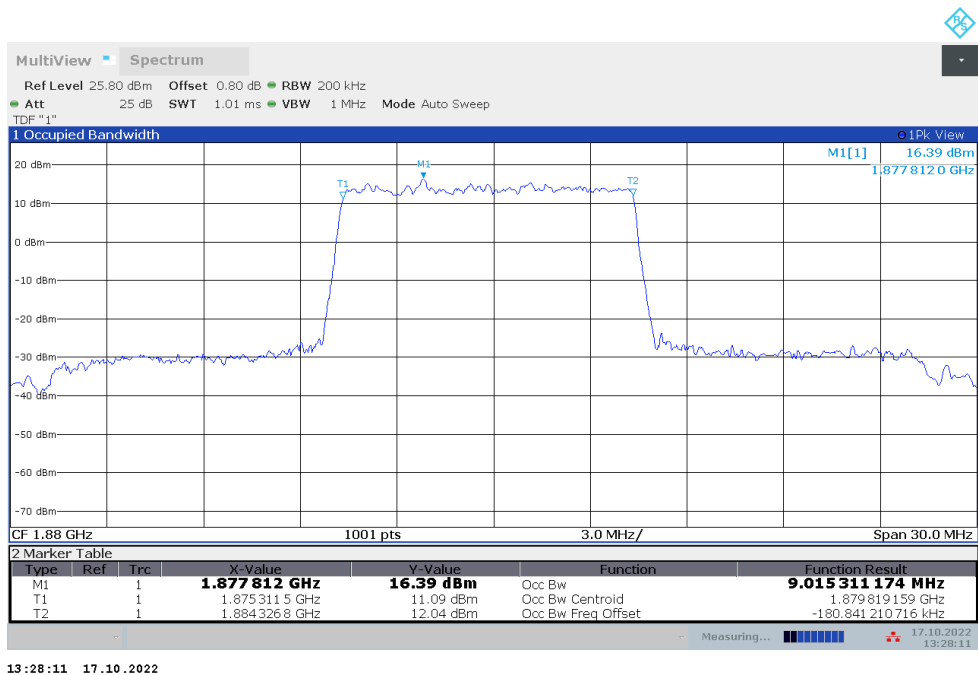
n2,5MHz Bandwidth,DFT-s-16QAM (99% BW)



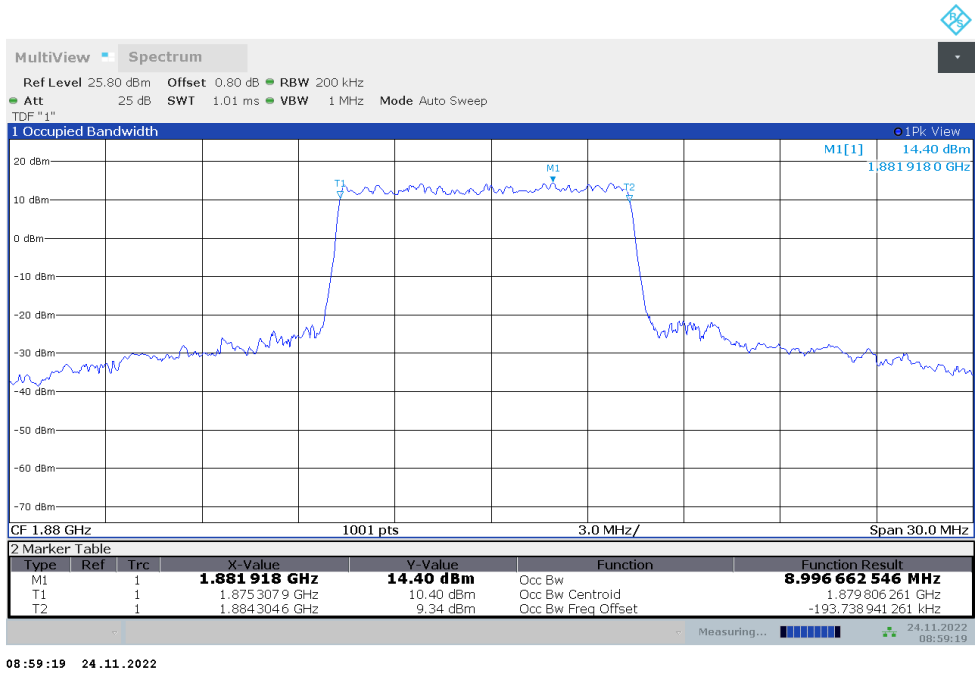
08:58:43 24.11.2022

n2,10MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 1880 | 8.998 | 9.015 | 8.997 |

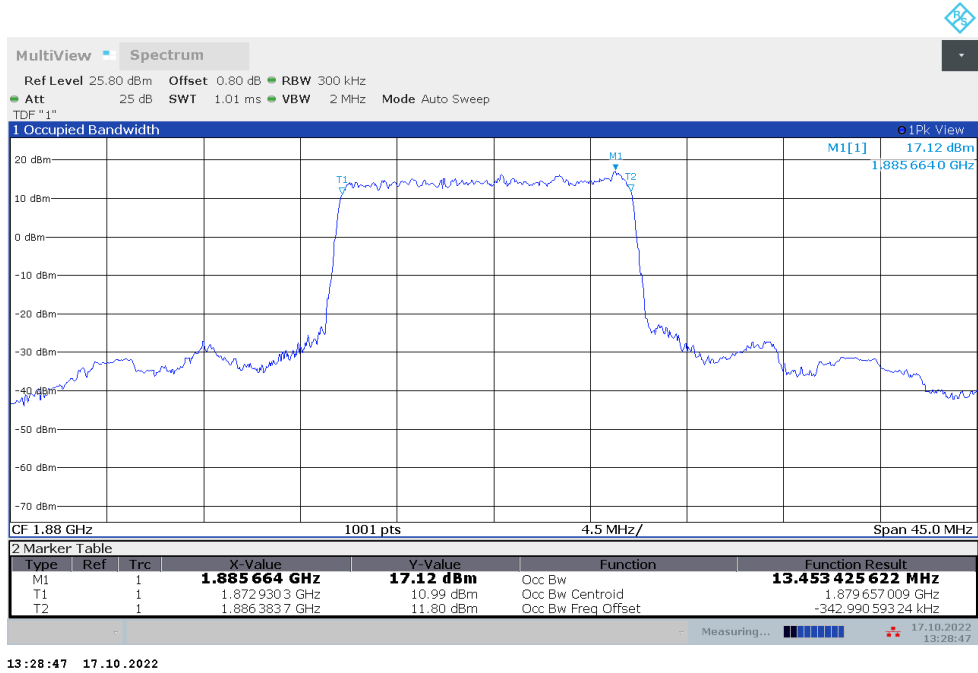
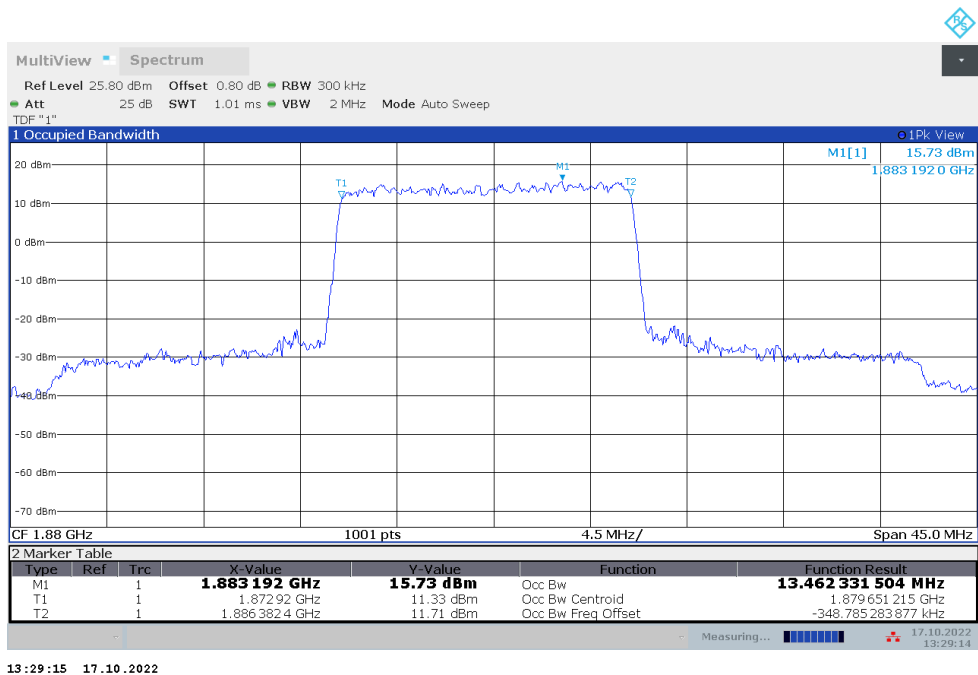
n2,10MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n2,10MHz Bandwidth,DFT-s-QPSK (99% BW)


n2,10MHz Bandwidth,DFT-s-16QAM (99% BW)

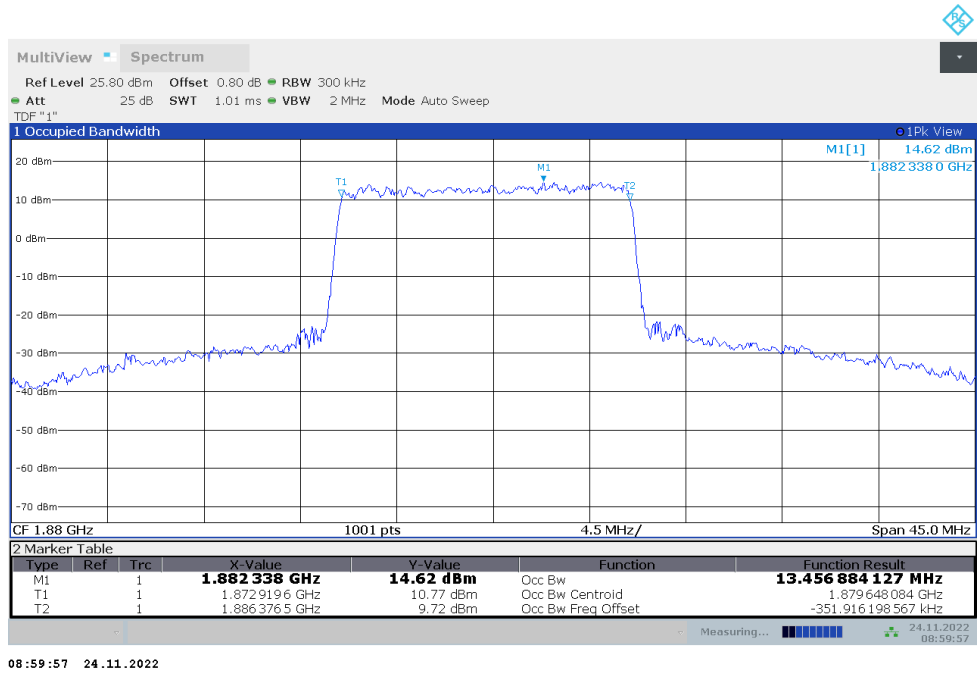


n2,15MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 1880 | 13.453 | 13.462 | 13.457 |

n2,15MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n2,15MHz Bandwidth,DFT-s-QPSK (99% BW)


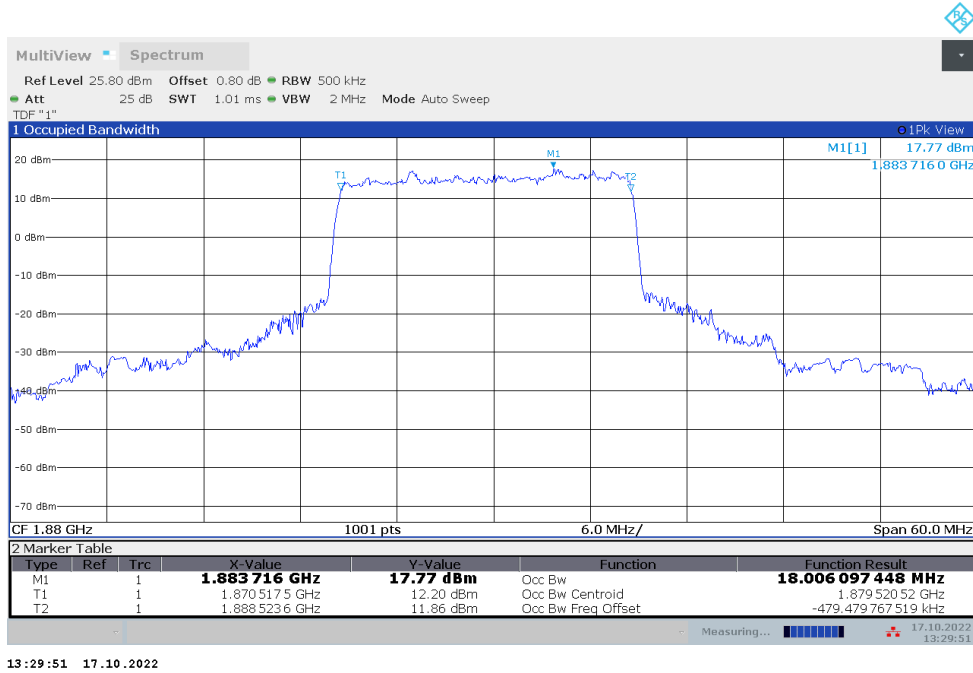
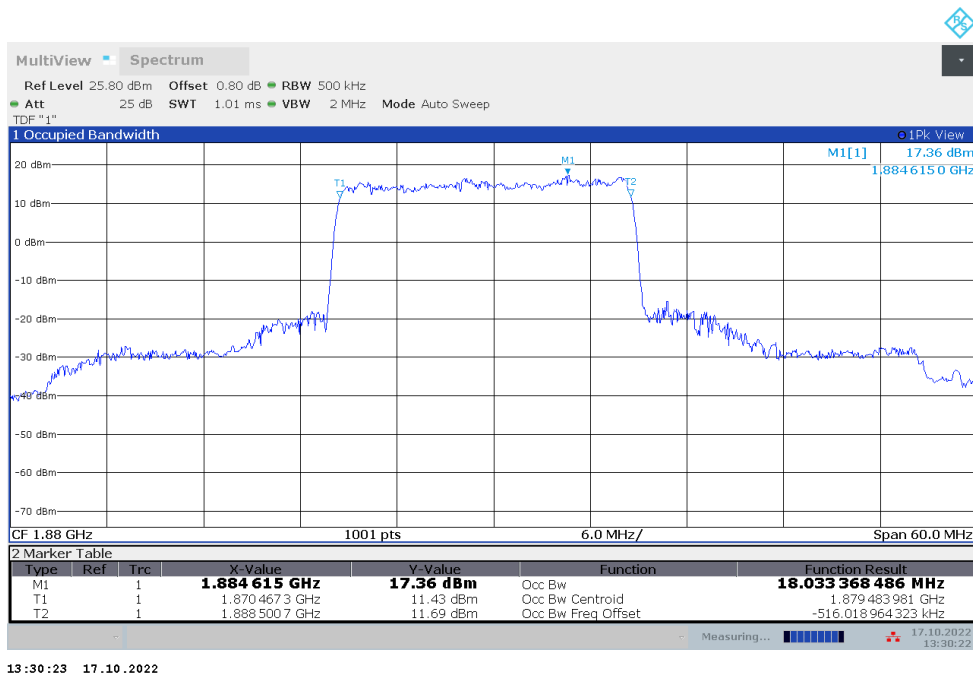
n2,15MHz Bandwidth,DFT-s-16QAM (99% BW)



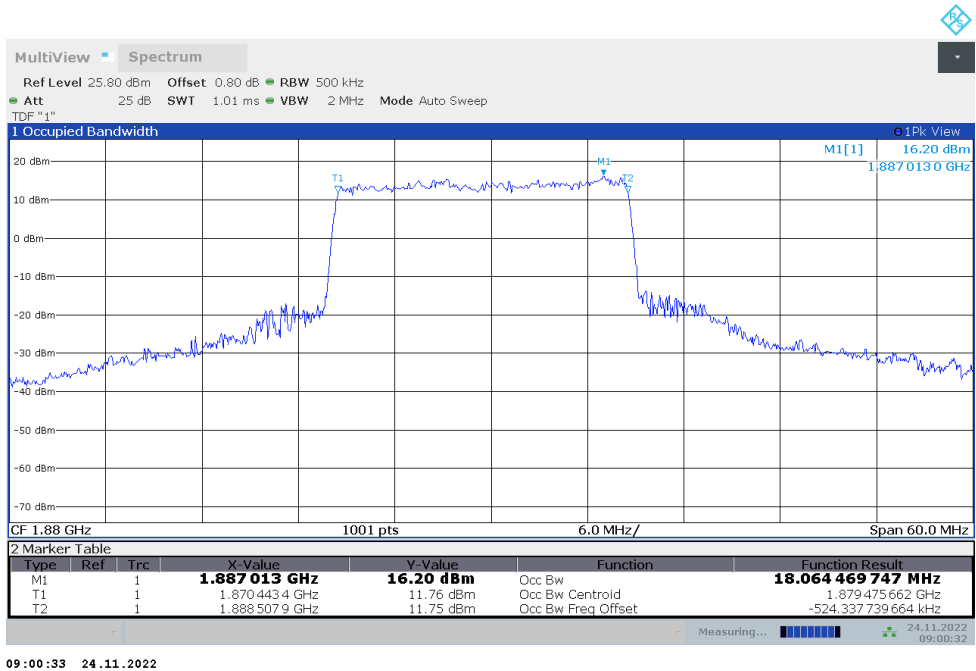
08:59:57 24.11.2022

n2,20MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 1880 | 18.006 | 18.033 | 18.064 |

n2,20MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n2,20MHz Bandwidth,DFT-s-QPSK (99% BW)


n2,20MHz Bandwidth,DFT-s-16QAM (99% BW)



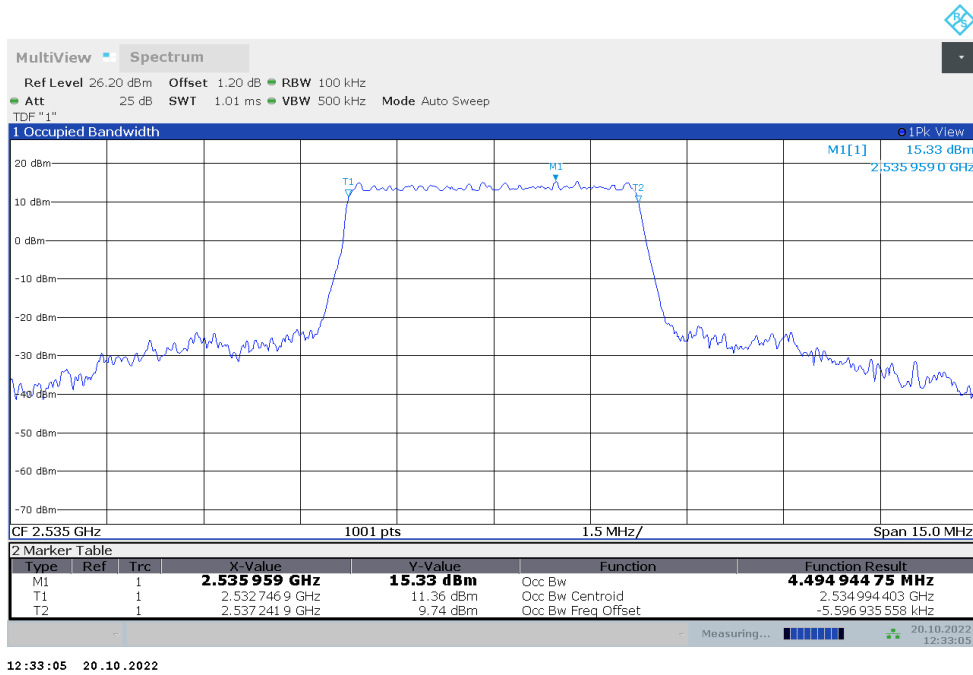
09:00:33 24.11.2022

n7

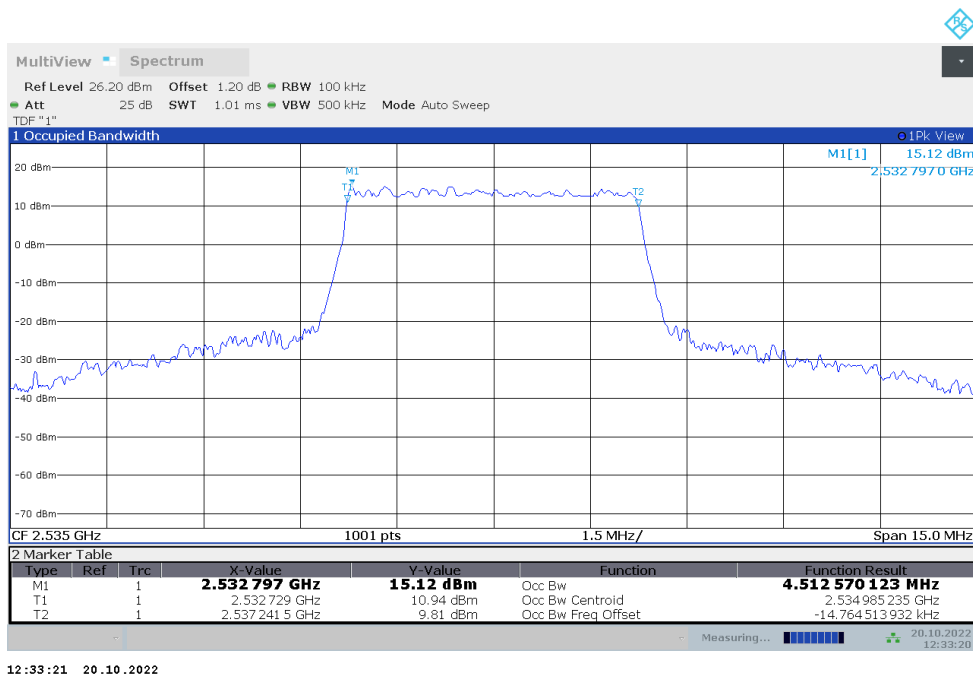
n7,5MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 2535 | 4.495 | 4.513 | 4.502 |

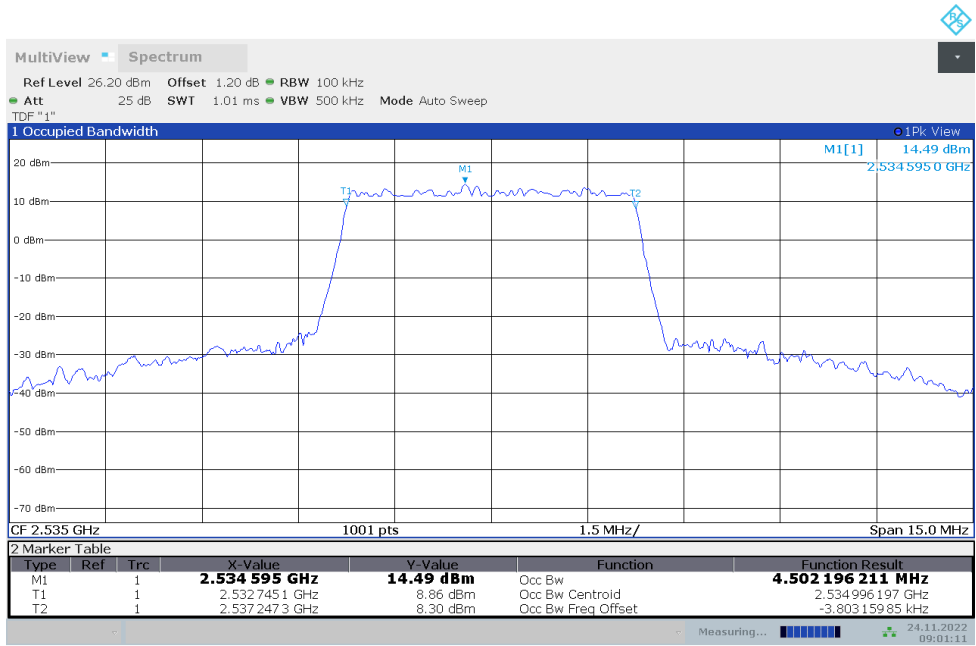
n7,5MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)



n7,5MHz Bandwidth,DFT-s-QPSK (99% BW)



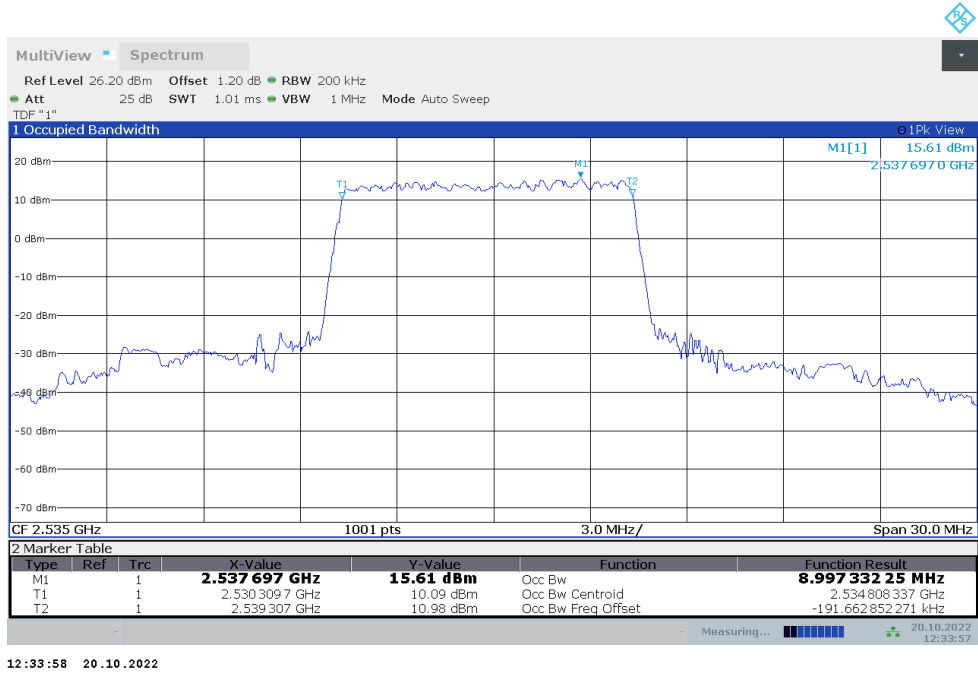
n7,5MHz Bandwidth,DFT-s-16QAM (99% BW)



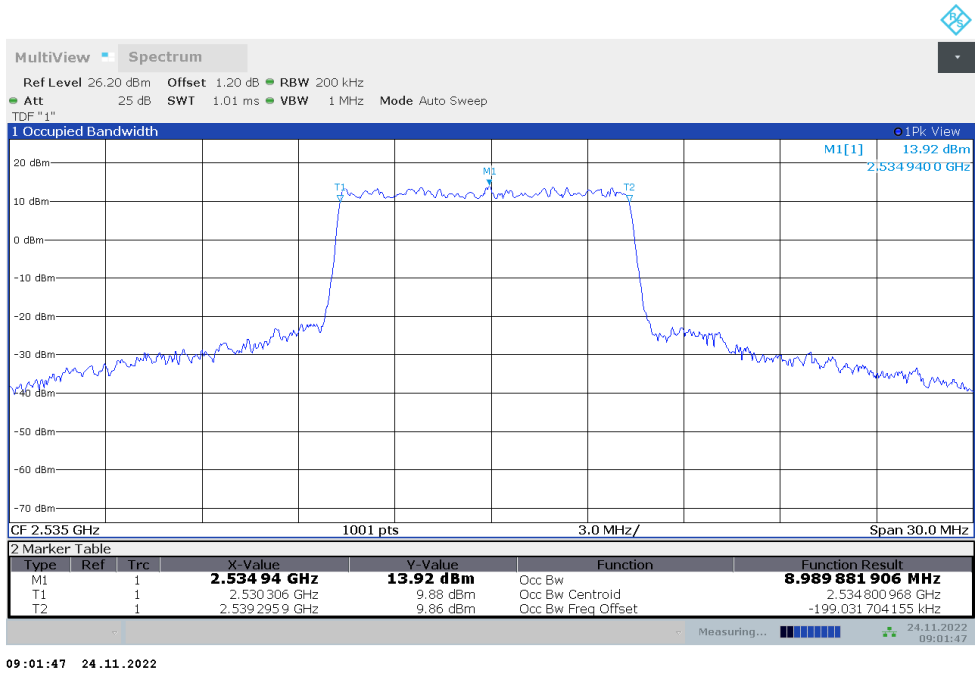
09:01:11 24.11.2022

n7,10MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 2535 | 8.997 | 9.014 | 8.990 |

n7,10MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n7,10MHz Bandwidth,DFT-s-QPSK (99% BW)

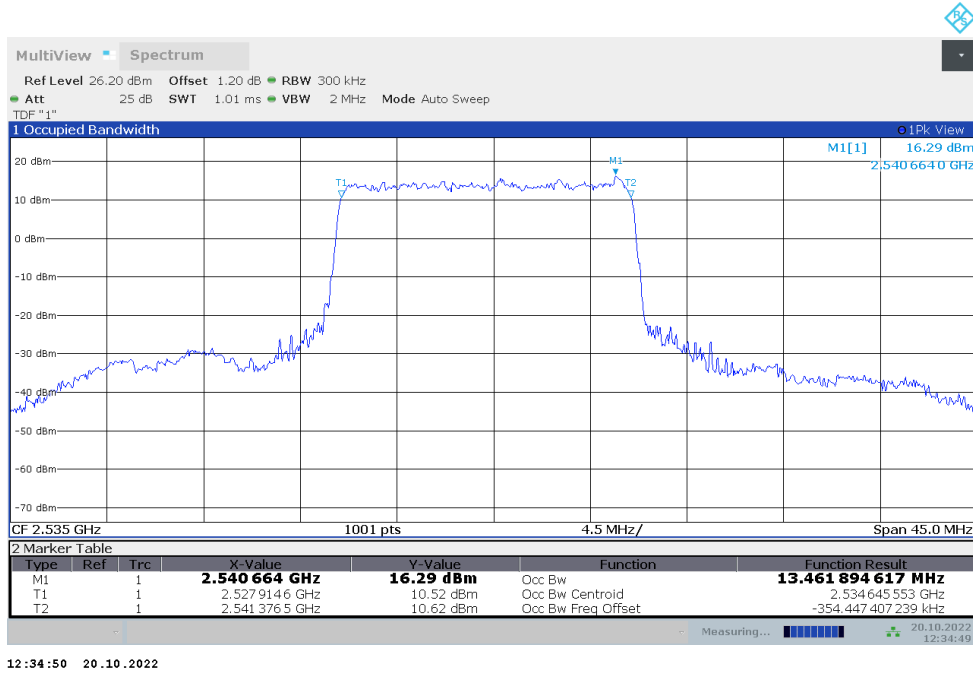
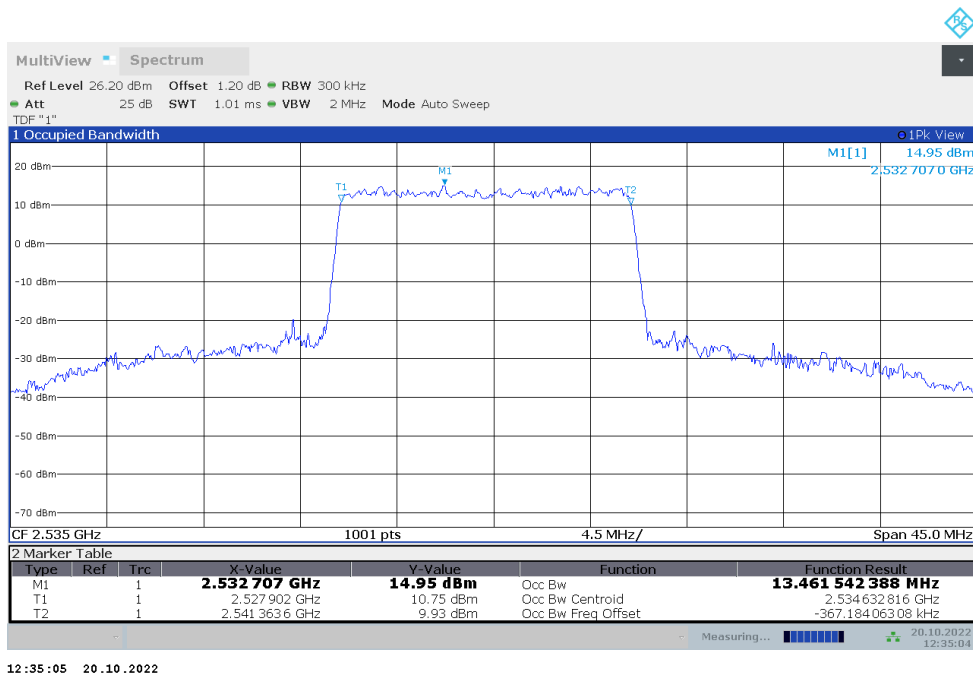

n7,10MHz Bandwidth,DFT-s-16QAM (99% BW)



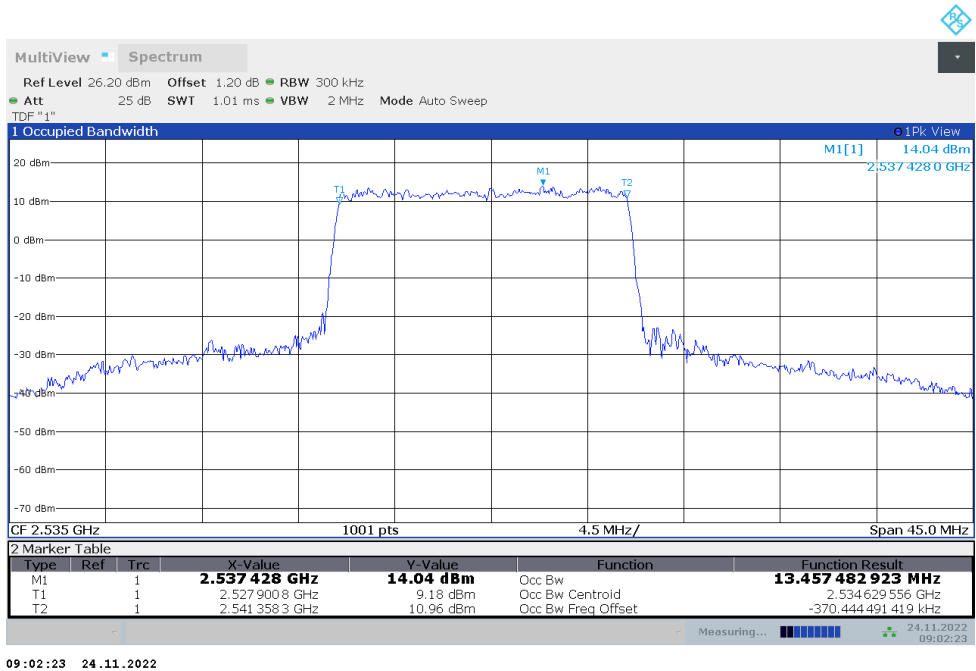
09:01:47 24.11.2022

n7,15MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 2535 | 13.462 | 13.462 | 13.457 |

n7,15MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n7,15MHz Bandwidth,DFT-s-QPSK (99% BW)


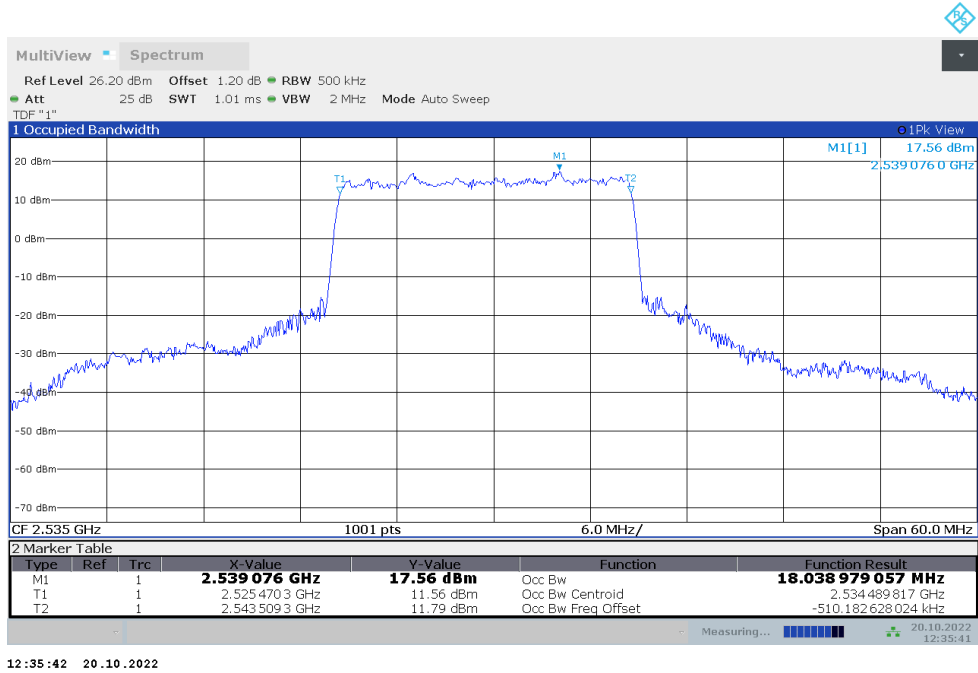
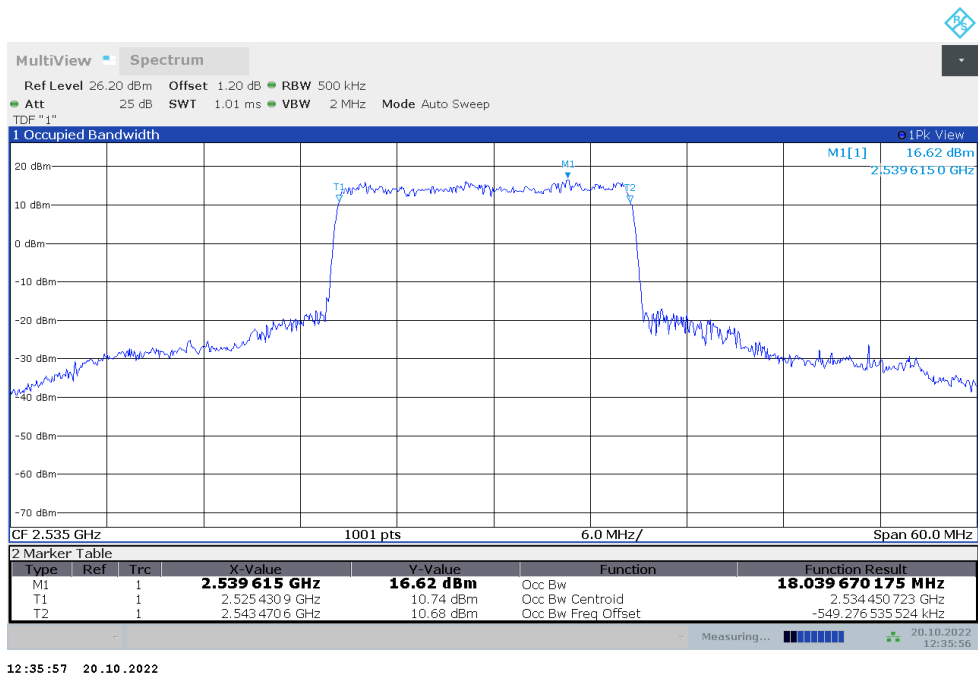
n7,15MHz Bandwidth,DFT-s-16QAM (99% BW)



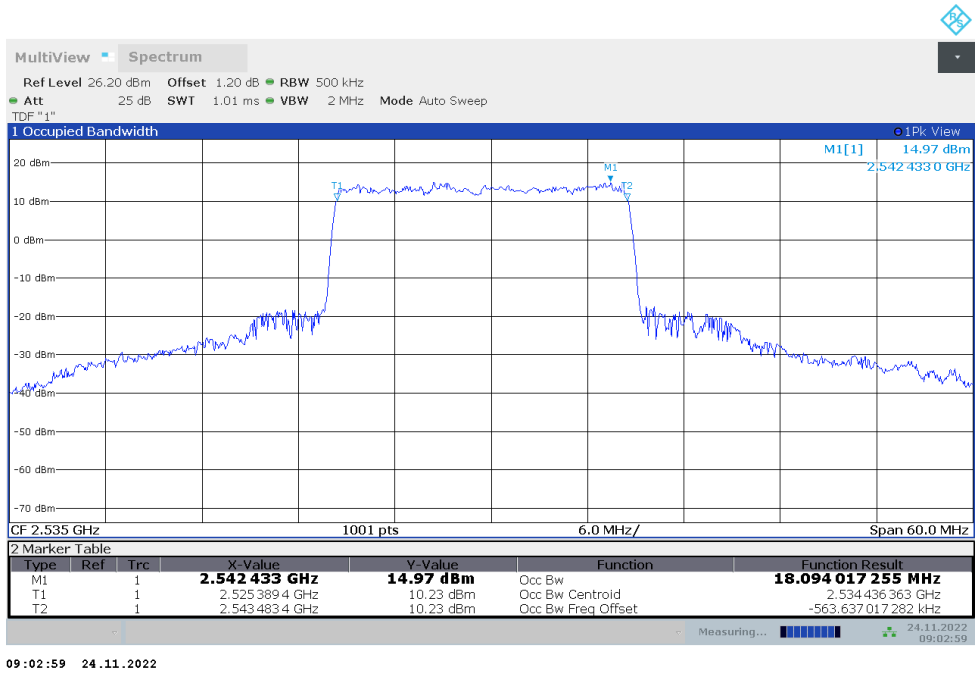
09:02:23 24.11.2022

n7,20MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 2535 | 18.039 | 18.040 | 18.094 |

n7,20MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n7,20MHz Bandwidth,DFT-s-QPSK (99% BW)


n7,20MHz Bandwidth,DFT-s-16QAM (99% BW)



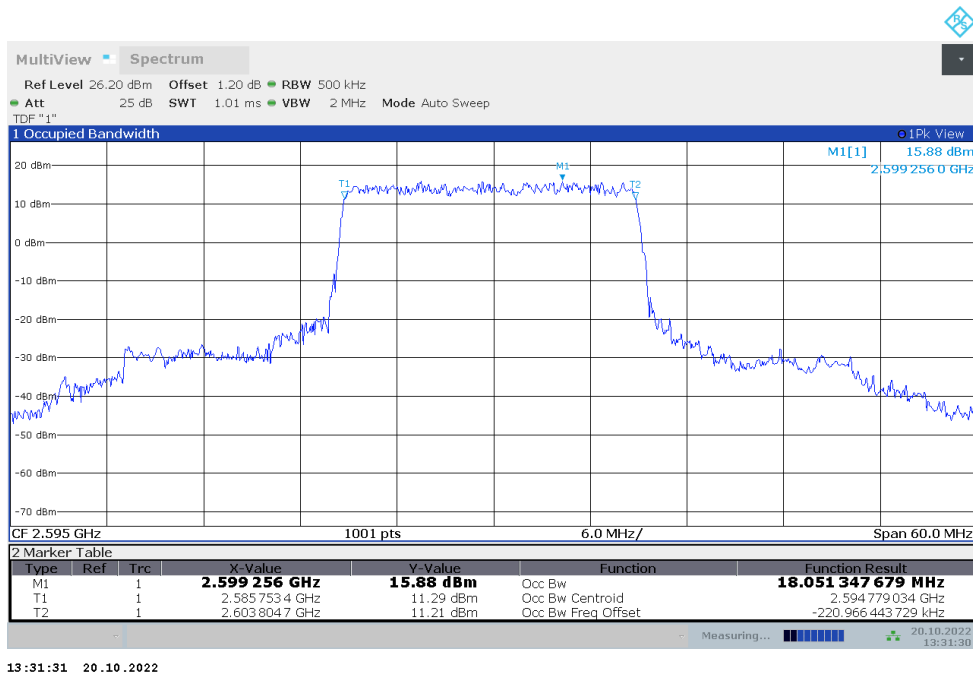
09:02:59 24.11.2022

n38

n38,20MHz(99%)

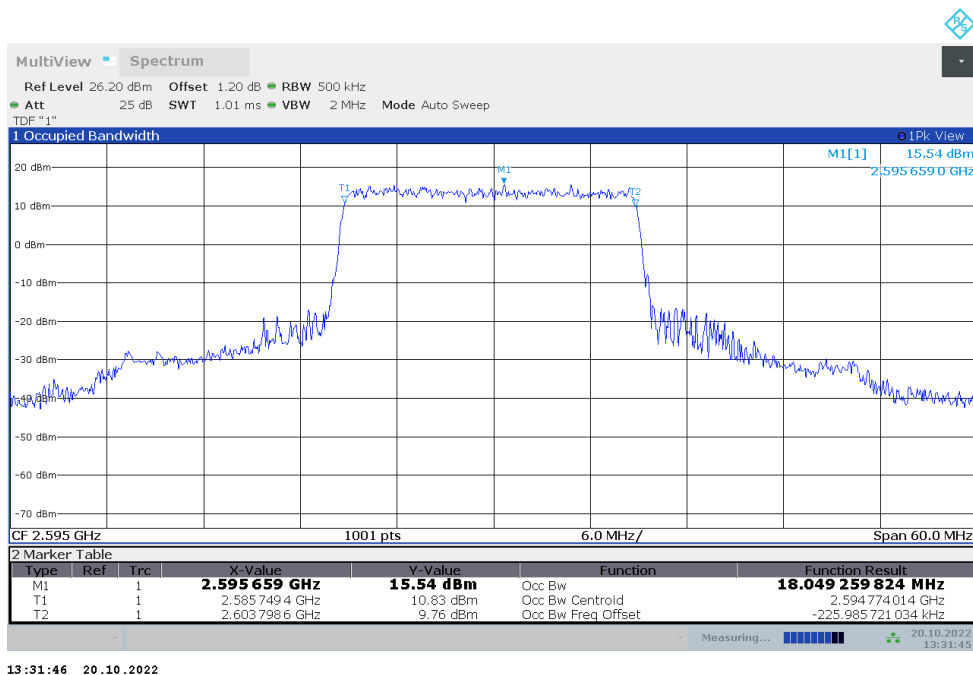
| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 2595 | 18.051 | 18.049 | 18.071 |

n38,20MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)



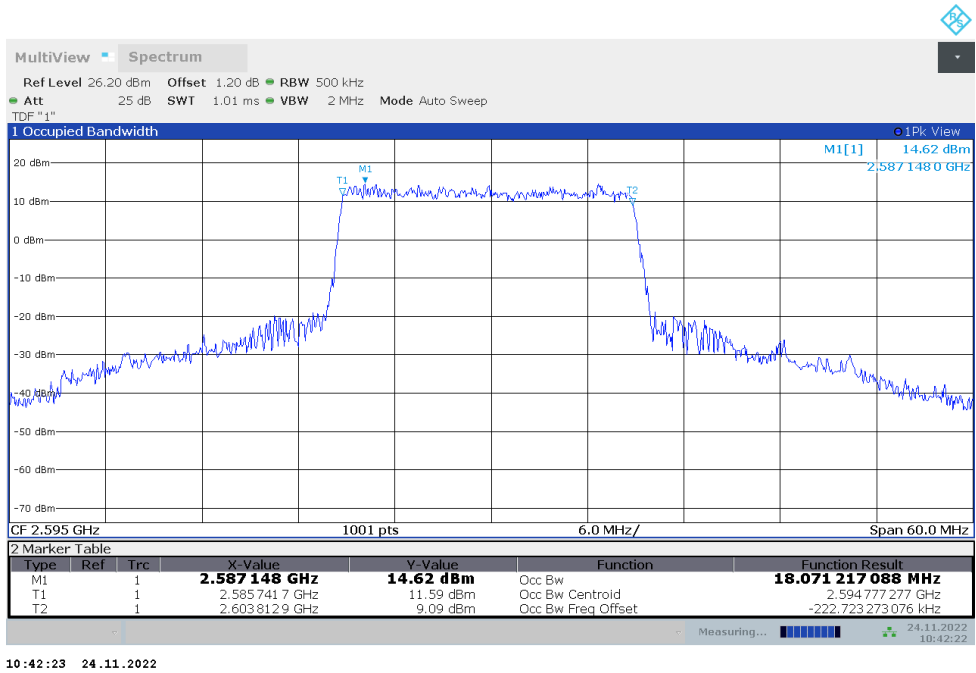
13:31:31 20.10.2022

n38,20MHz Bandwidth,DFT-s-QPSK (99% BW)



13:31:46 20.10.2022

n38,20MHz Bandwidth,DFT-s-16QAM (99% BW)



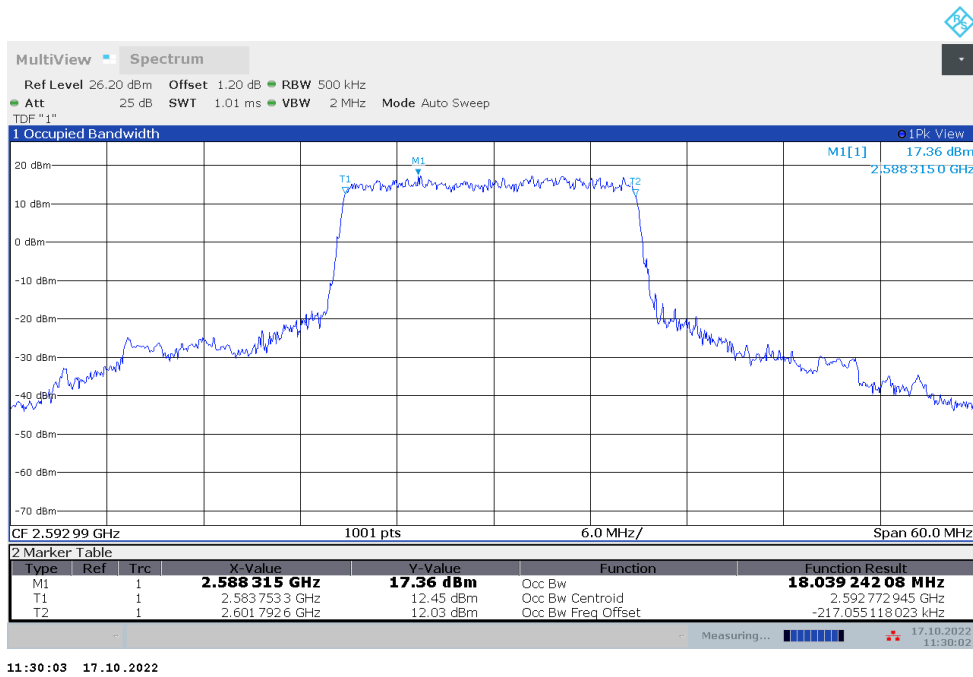
10:42:23 24.11.2022

n41

n41,20MHz(99%)

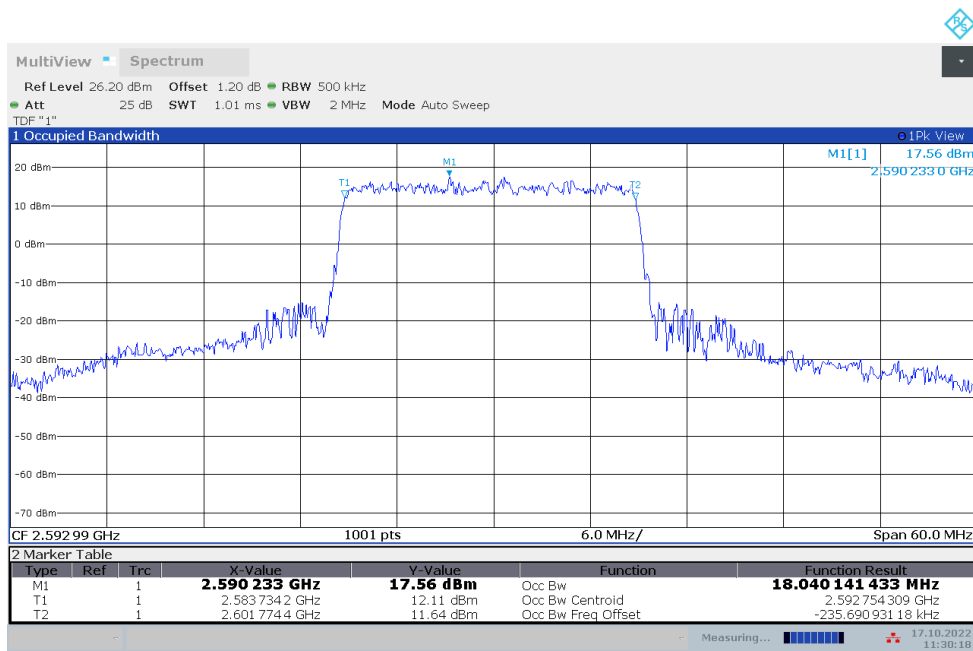
| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 2592.99 | 18.039 | 18.040 | 18.092 |

n41,20MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)



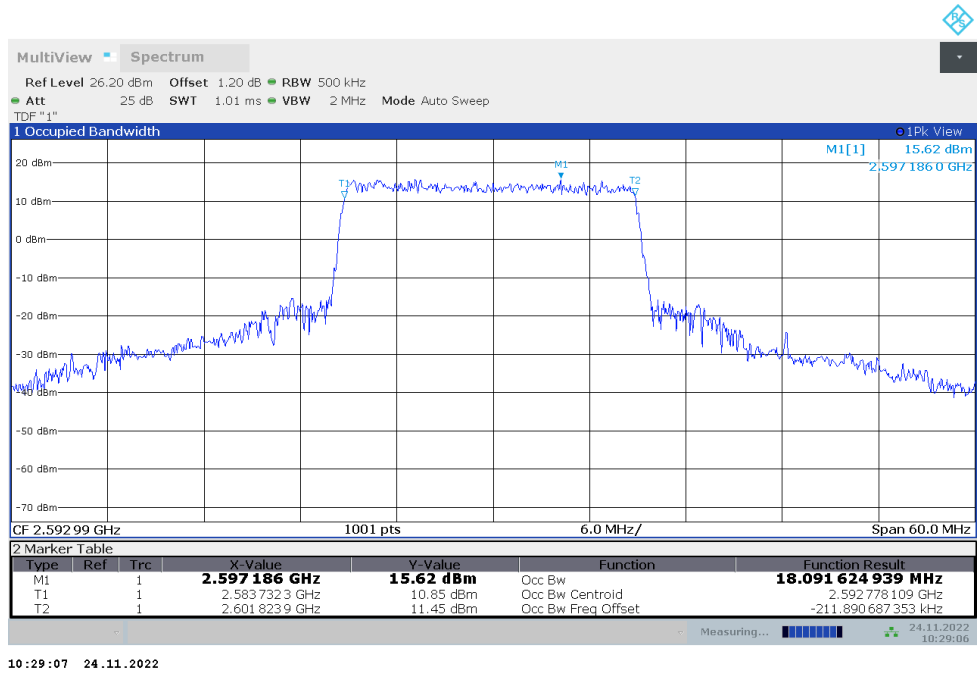
11:30:03 17.10.2022

n41,20MHz Bandwidth,DFT-s-QPSK (99% BW)



11:30:18 17.10.2022

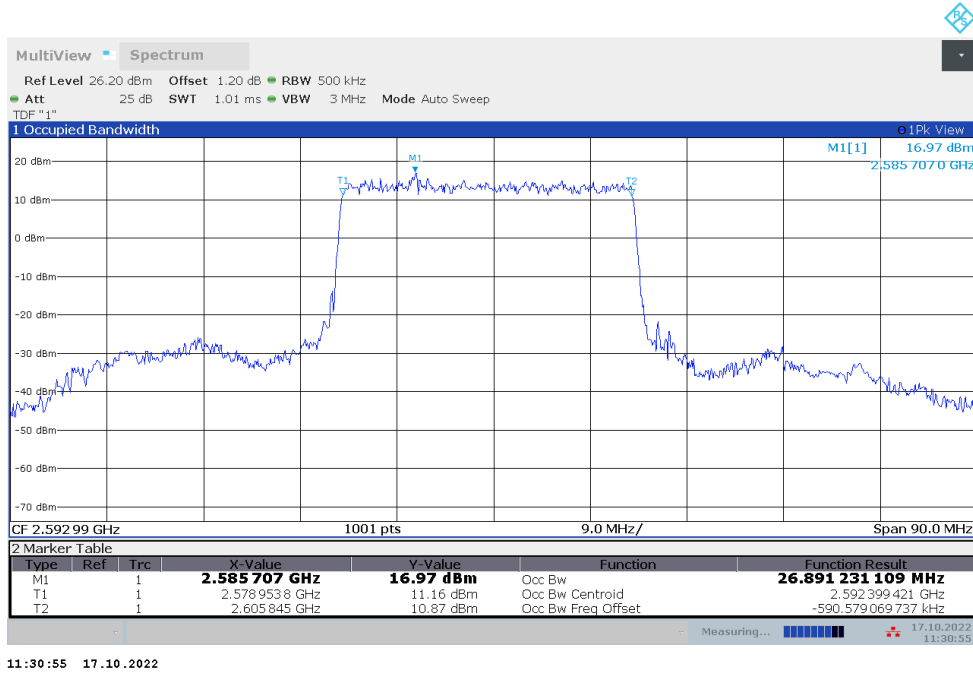
n41,20MHz Bandwidth,DFT-s-16QAM (99% BW)



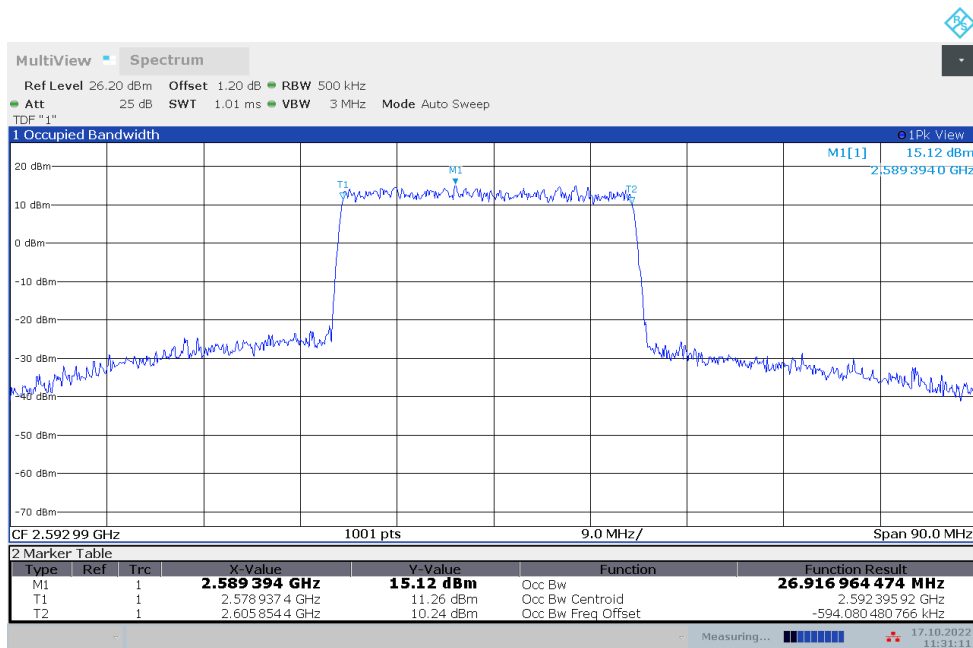
10:29:07 24.11.2022

n41,30MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 2592.99 | 26.891 | 26.917 | 27.026 |

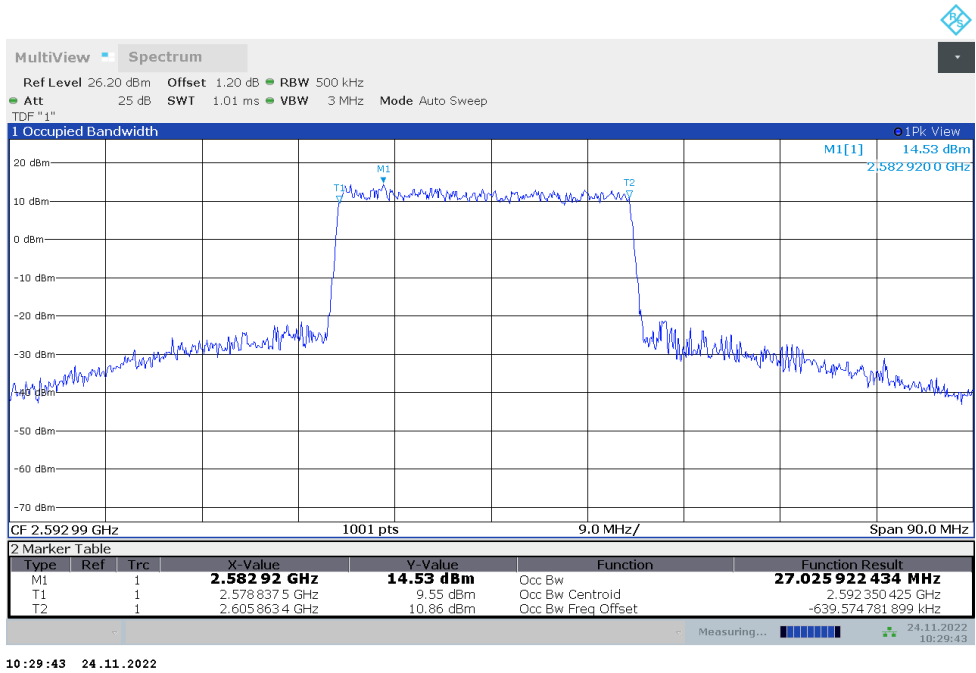
n41,30MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)


11:30:55 17.10.2022

n41,30MHz Bandwidth,DFT-s-QPSK (99% BW)


11:31:11 17.10.2022

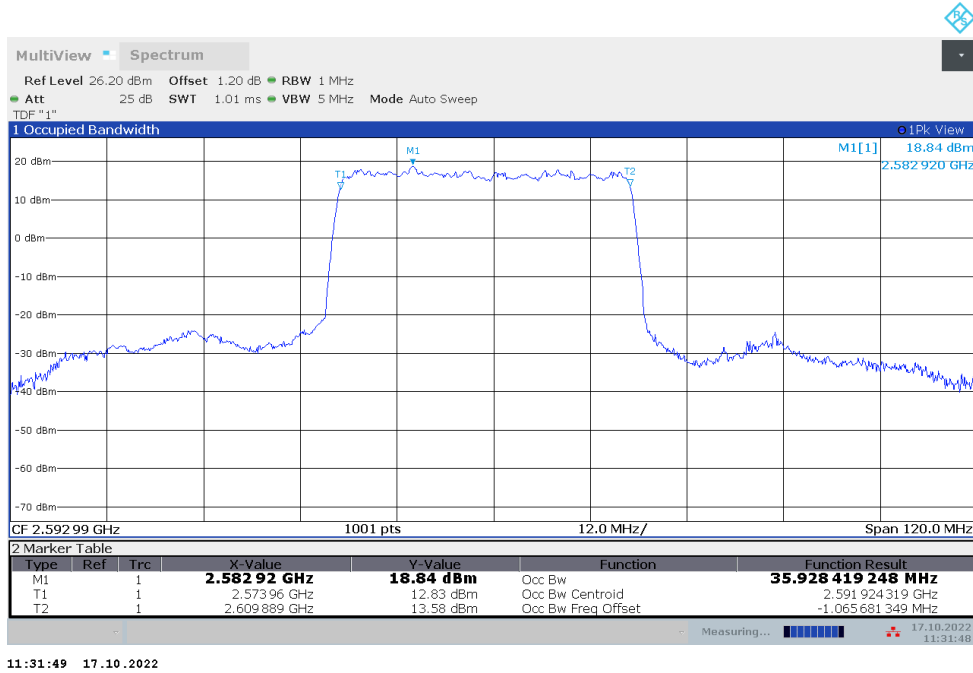
n41,30MHz Bandwidth,DFT-s-16QAM (99% BW)



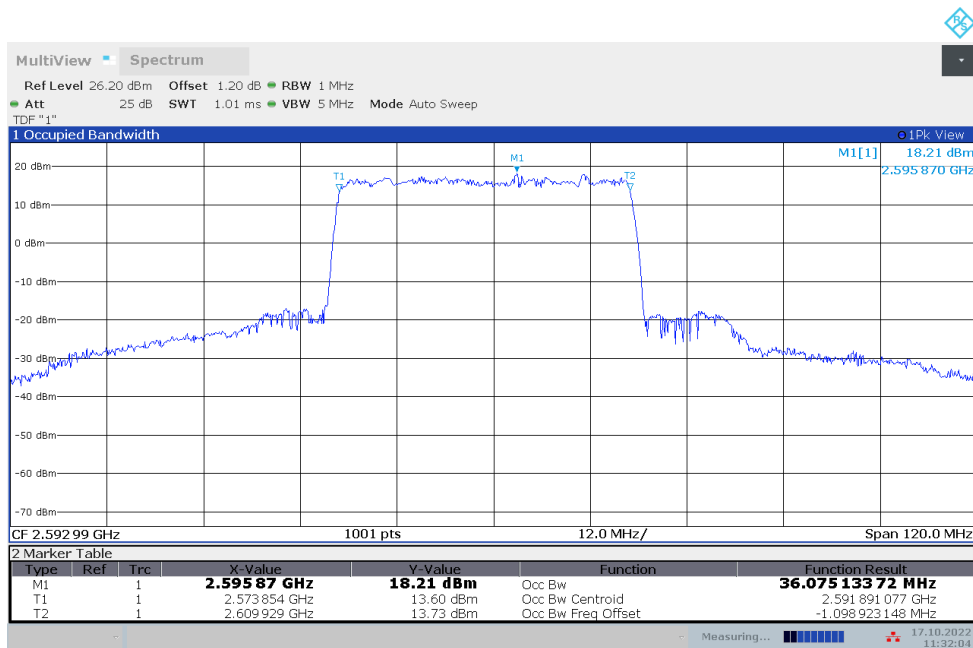
10:29:43 24.11.2022

n41,40MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 2592.99 | 35.928 | 36.075 | 36.043 |

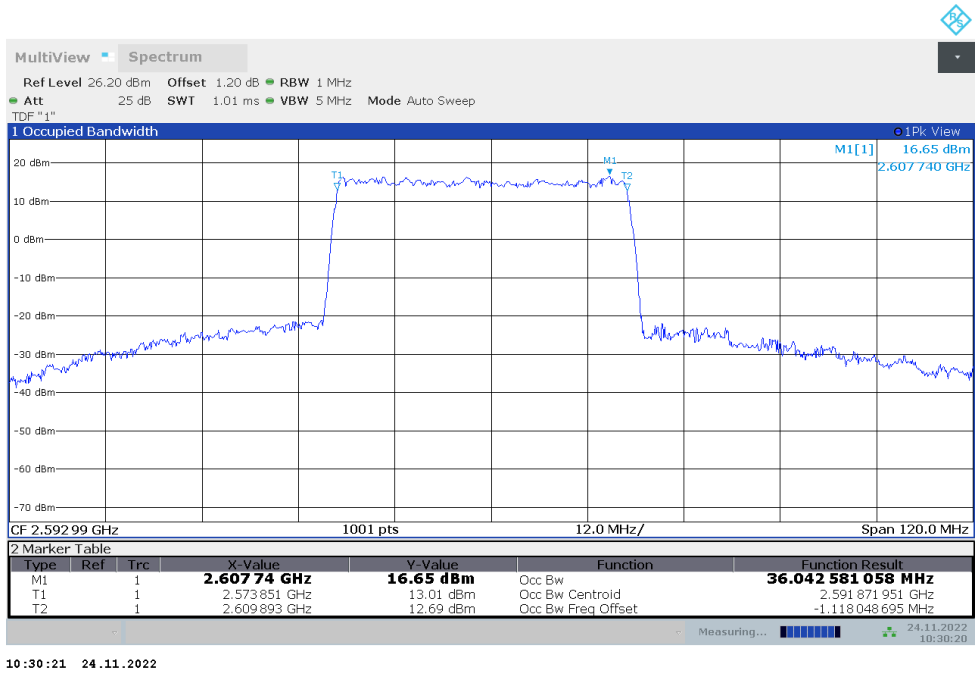
n41,40MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)


11:31:49 17.10.2022

n41,40MHz Bandwidth,DFT-s-QPSK (99% BW)


11:32:04 17.10.2022

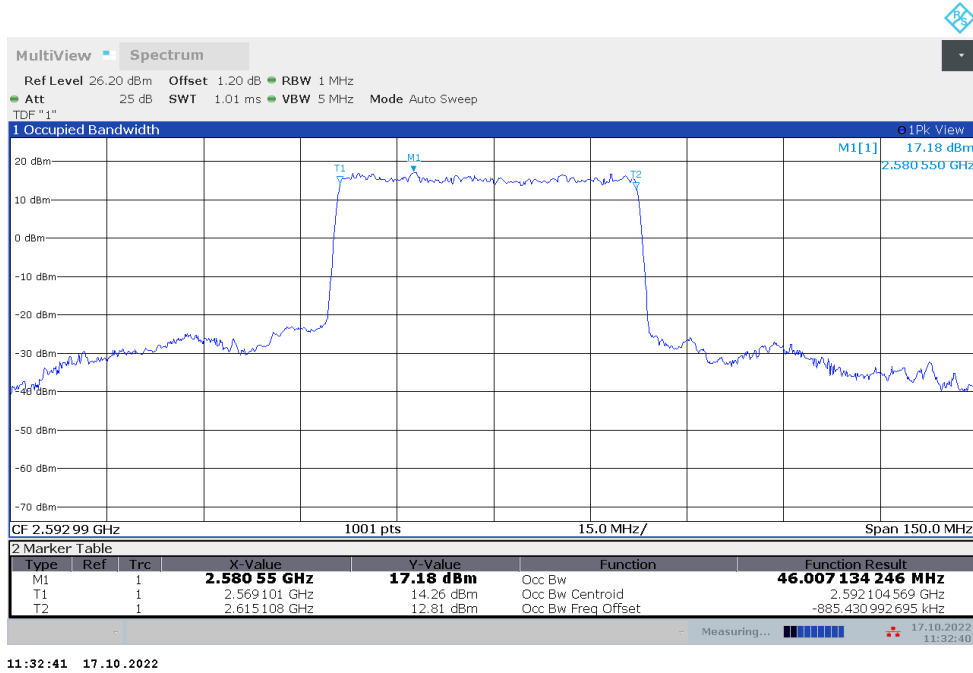
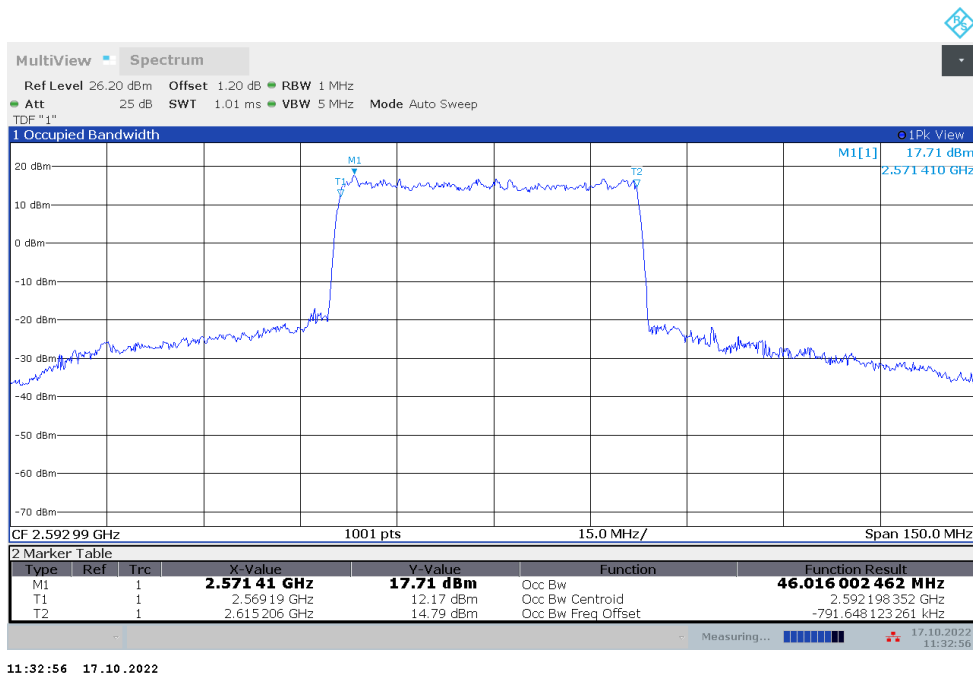
n41,40MHz Bandwidth,DFT-s-16QAM (99% BW)



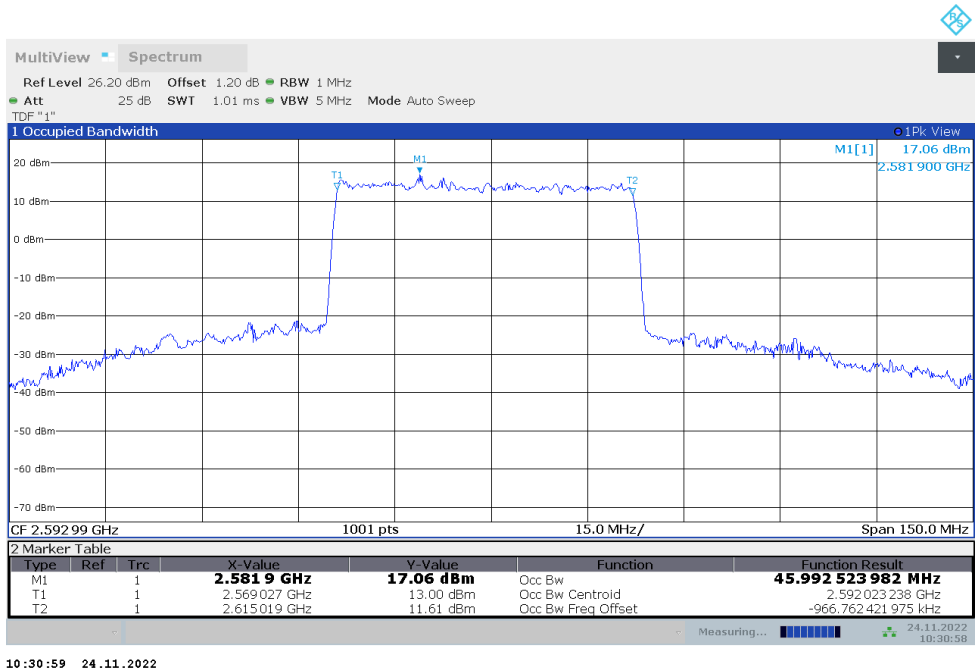
10:30:21 24.11.2022

n41,50MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 2592.99 | 46.007 | 46.016 | 45.993 |

n41,50MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n41,50MHz Bandwidth,DFT-s-QPSK (99% BW)


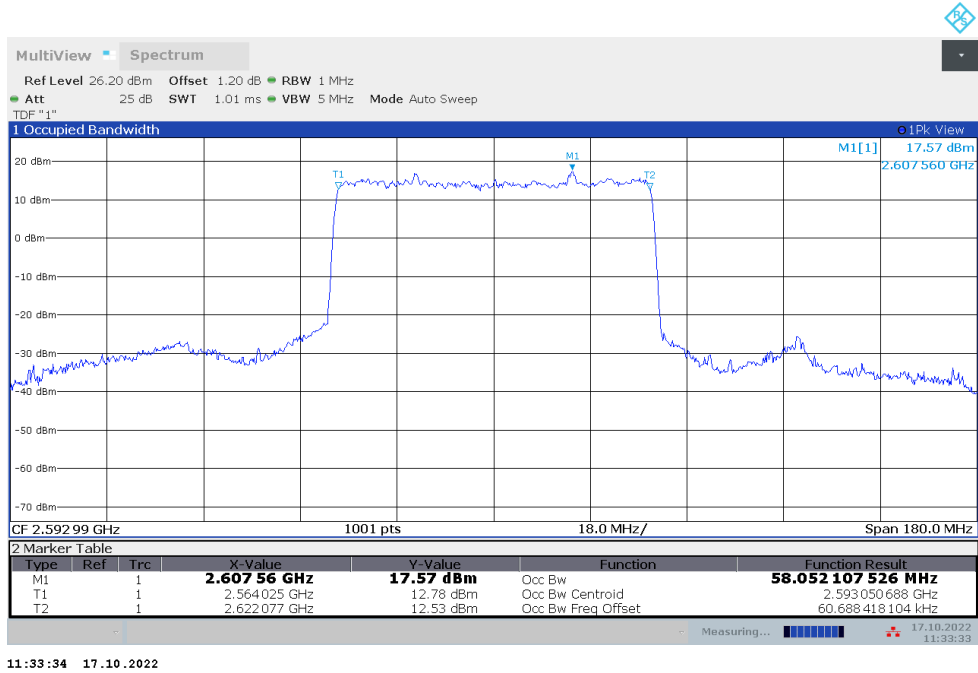
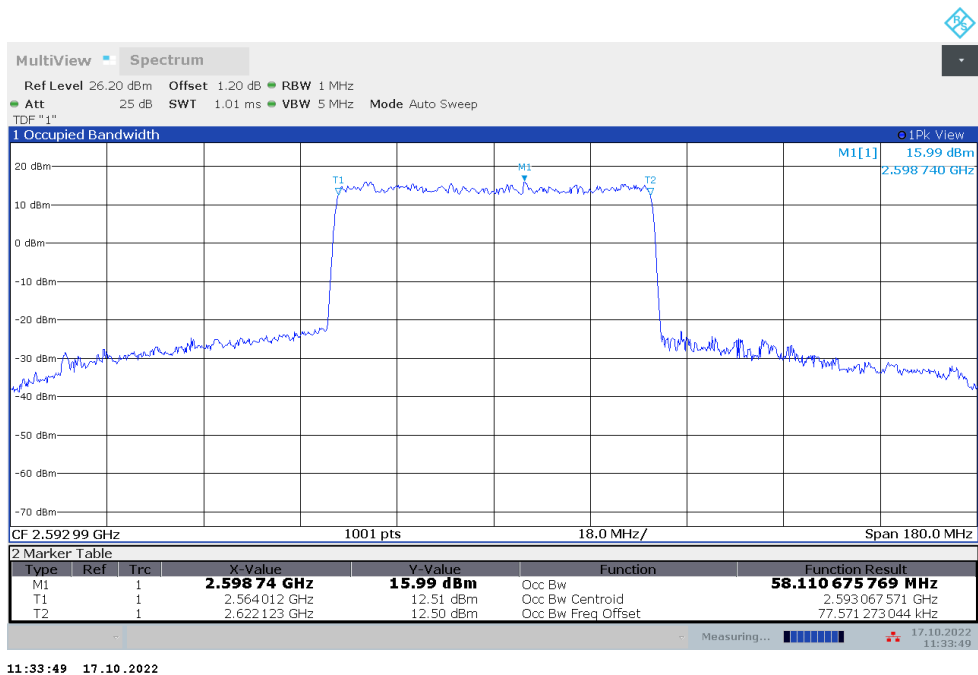
n41,50MHz Bandwidth,DFT-s-16QAM (99% BW)



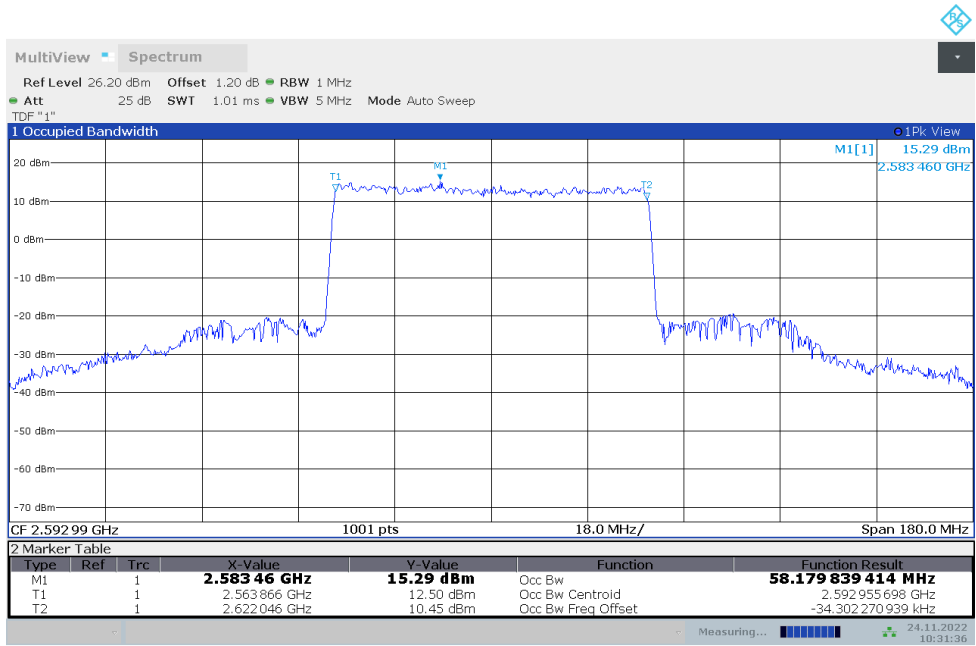
10:30:59 24.11.2022

n41,60MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 2592.99 | 58.052 | 58.111 | 58.180 |

n41,60MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n41,60MHz Bandwidth,DFT-s-QPSK (99% BW)


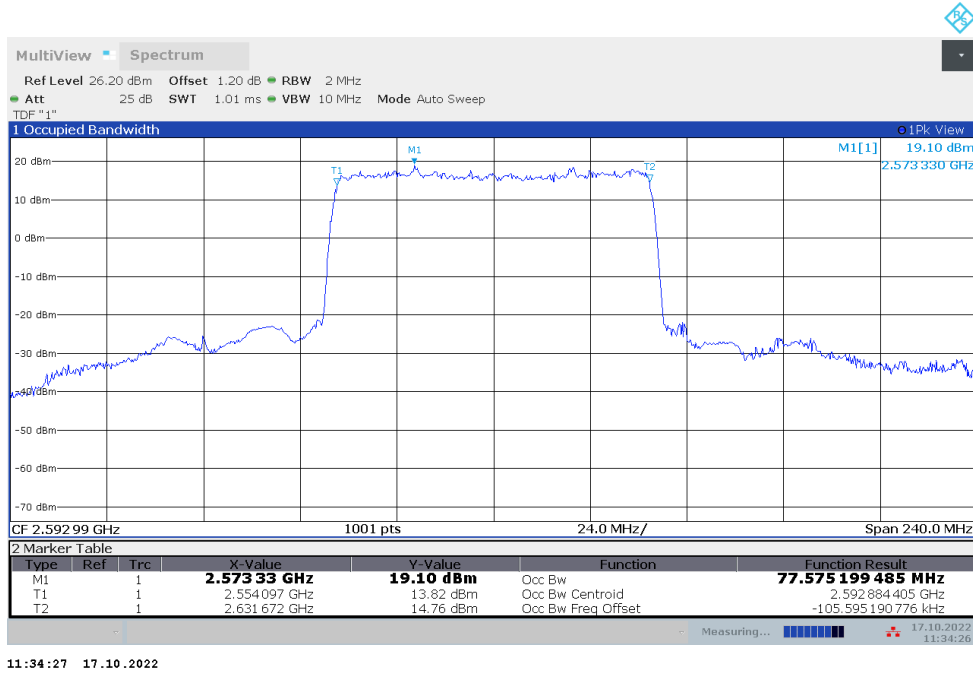
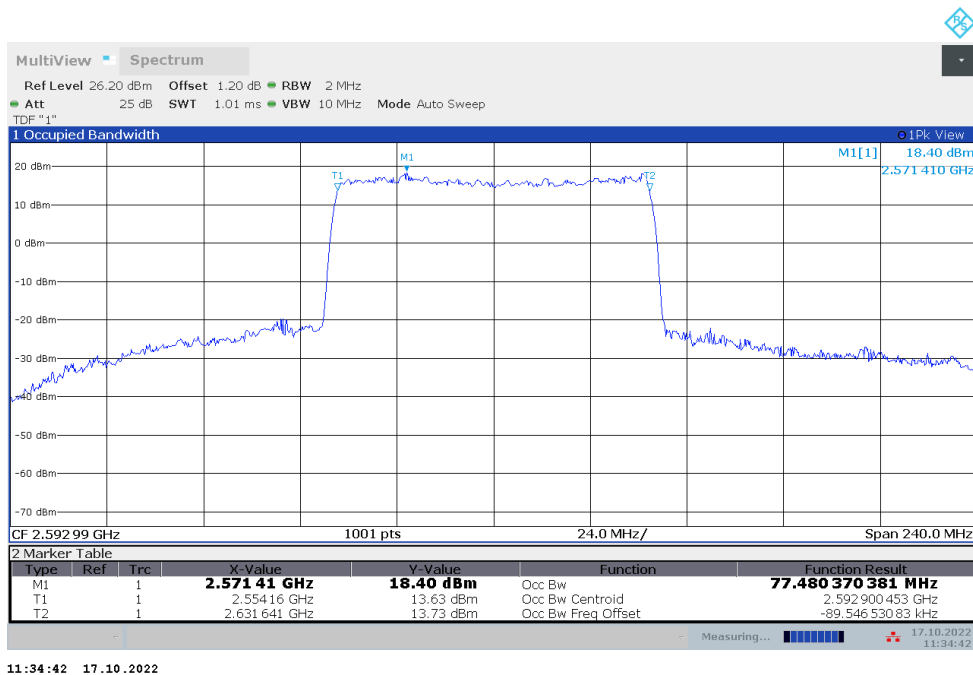
n41,60MHz Bandwidth,DFT-s-16QAM (99% BW)



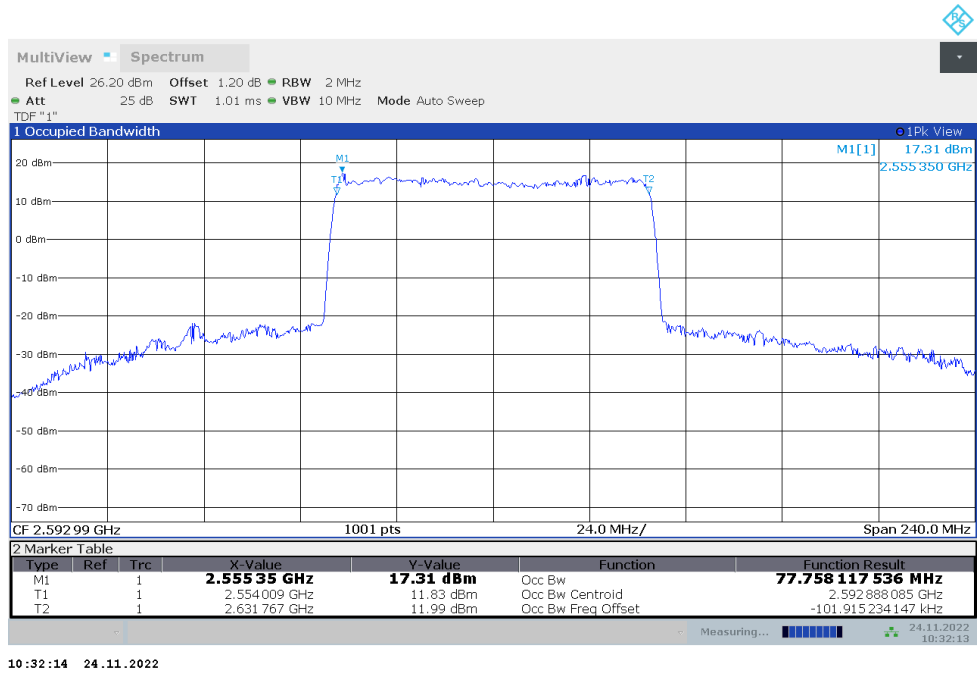
10:31:36 24.11.2022

n41,80MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 2592.99 | 77.575 | 77.480 | 77.758 |

n41,80MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n41,80MHz Bandwidth,DFT-s-QPSK (99% BW)


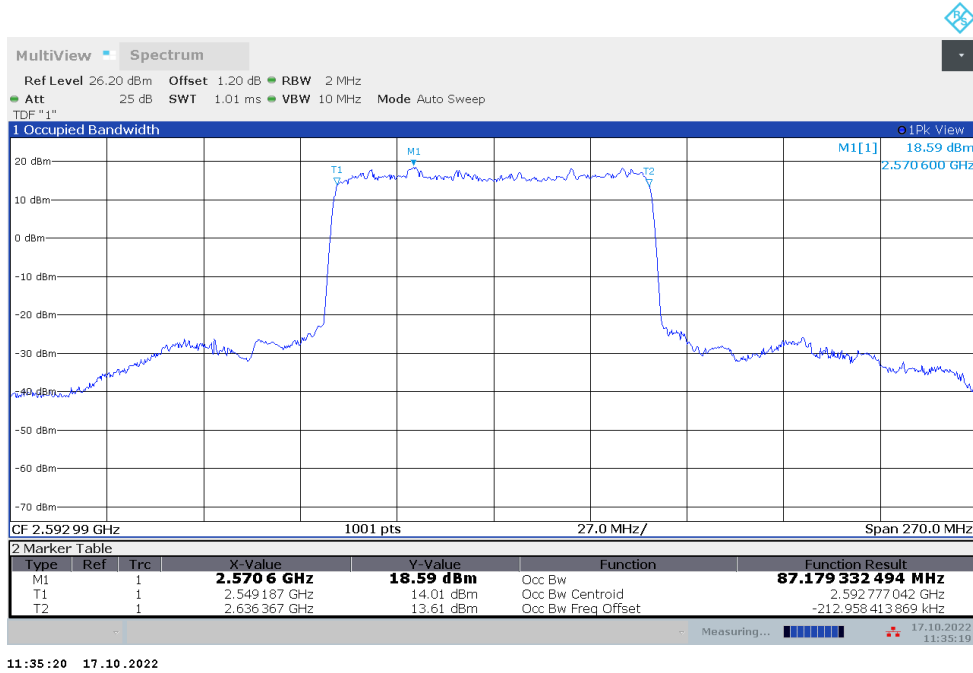
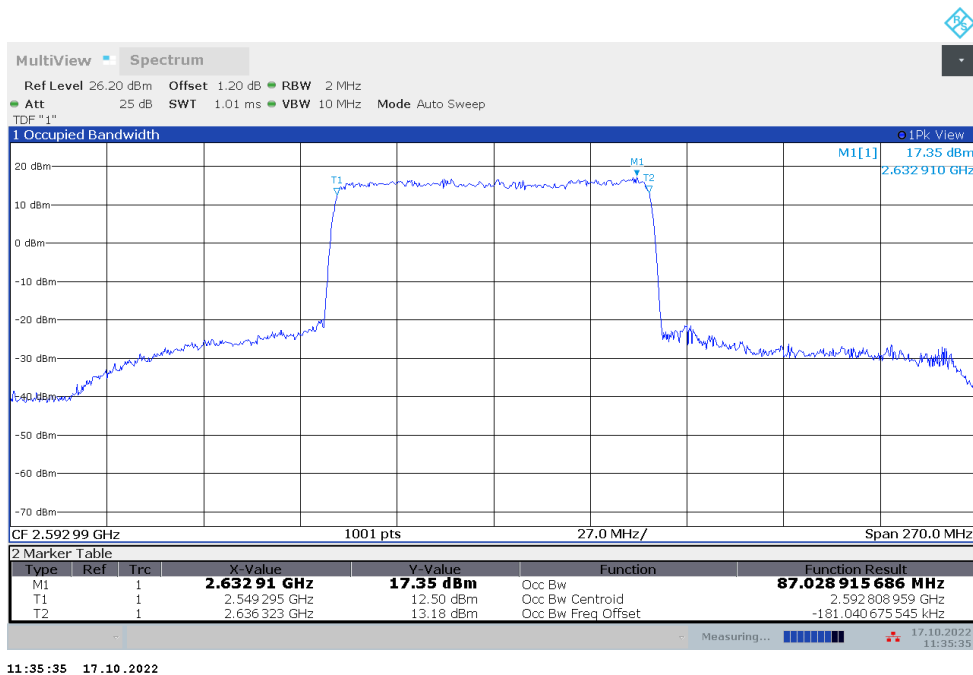
n41,80MHz Bandwidth,DFT-s-16QAM (99% BW)



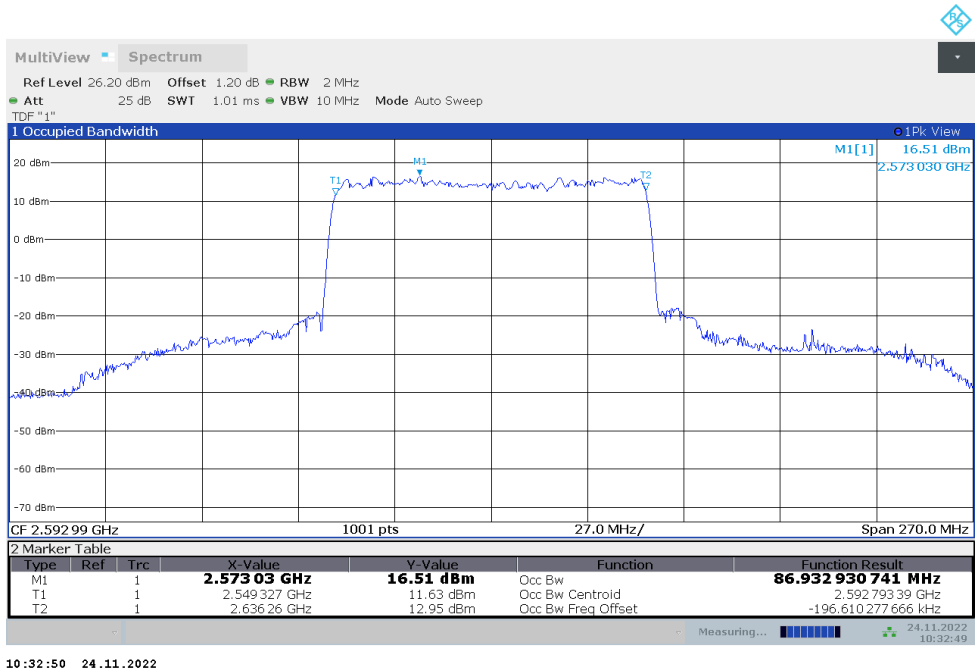
10:32:14 24.11.2022

n41,90MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 2592.99 | 87.179 | 87.029 | 86.933 |

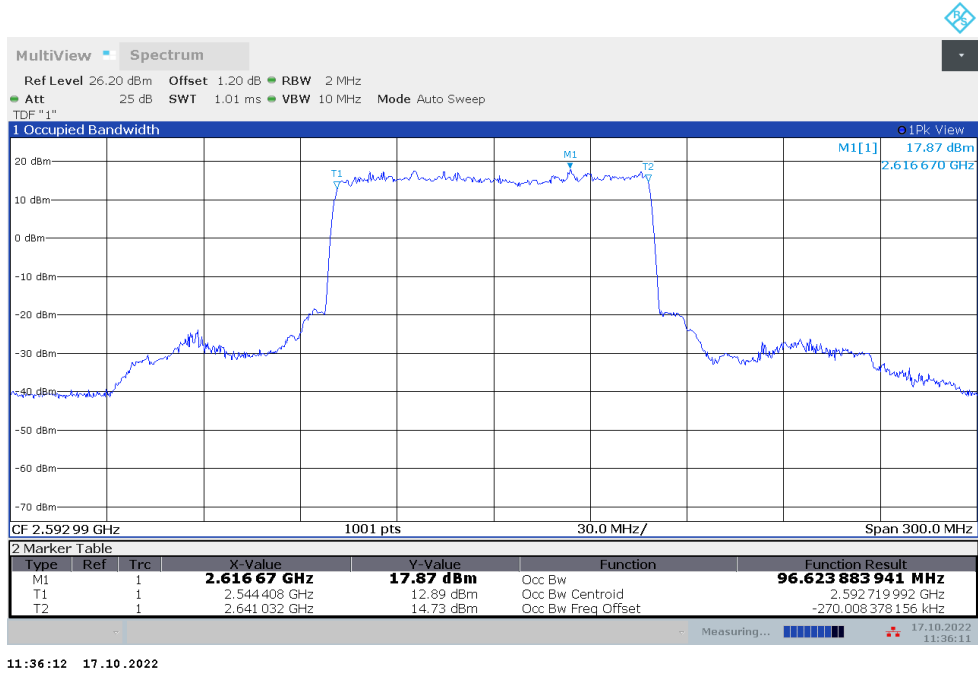
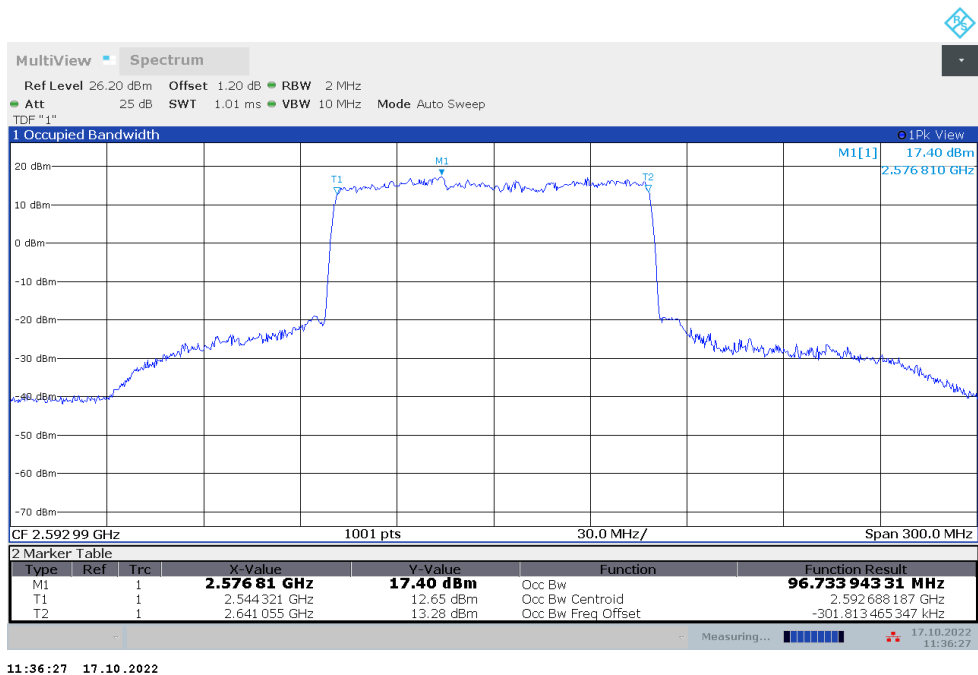
n41,90MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n41,90MHz Bandwidth,DFT-s-QPSK (99% BW)


n41,90MHz Bandwidth,DFT-s-16QAM (99% BW)

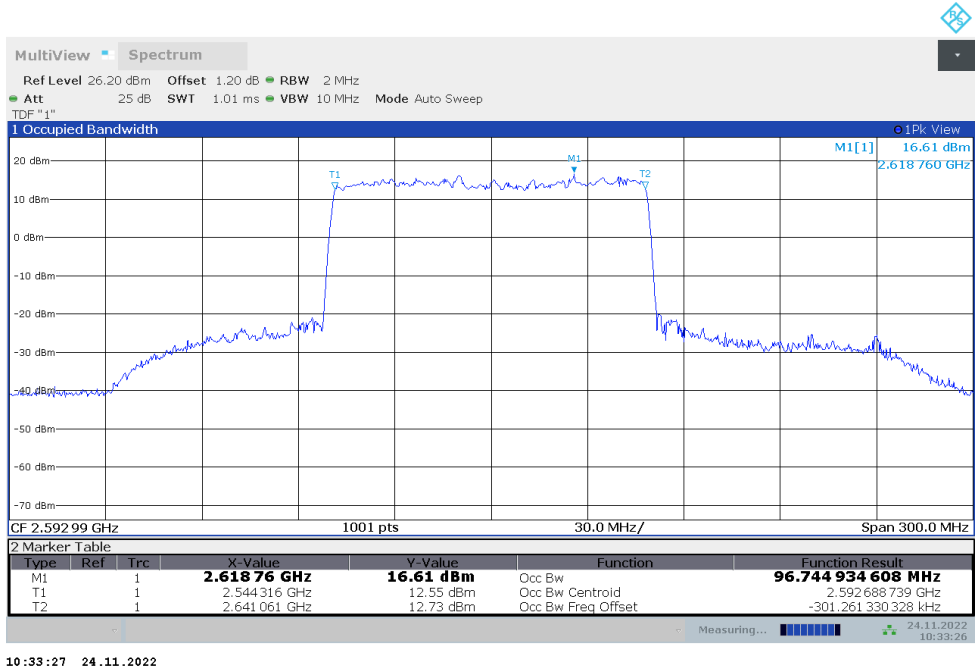


n41,100MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 2592.99 | 96.624 | 96.734 | 96.745 |

n41,100MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n41,100MHz Bandwidth,DFT-s-QPSK (99% BW)


n41,100MHz Bandwidth,DFT-s-16QAM (99% BW)

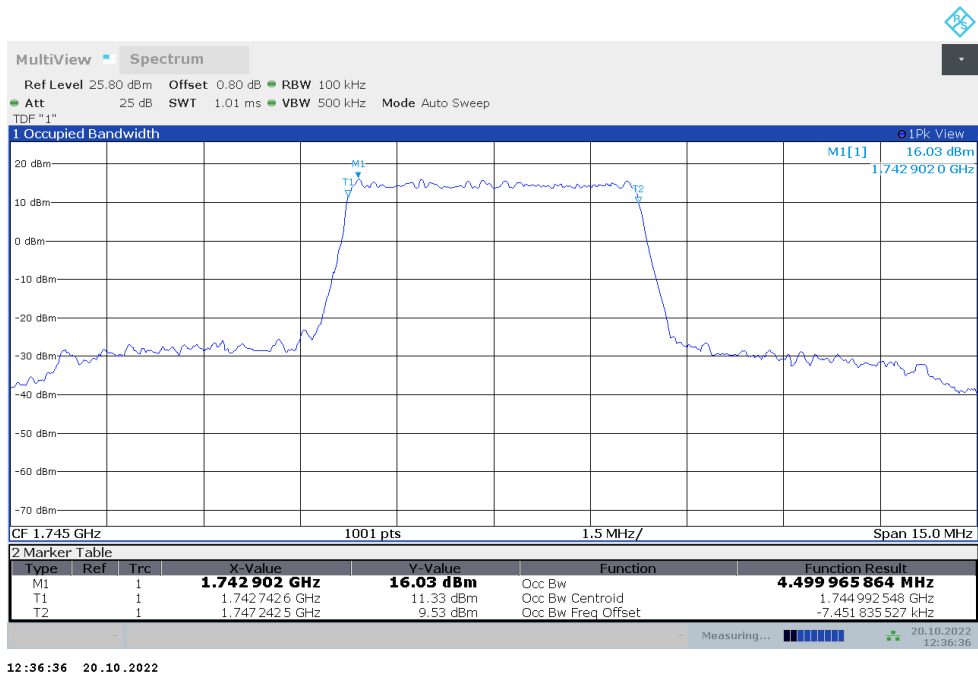


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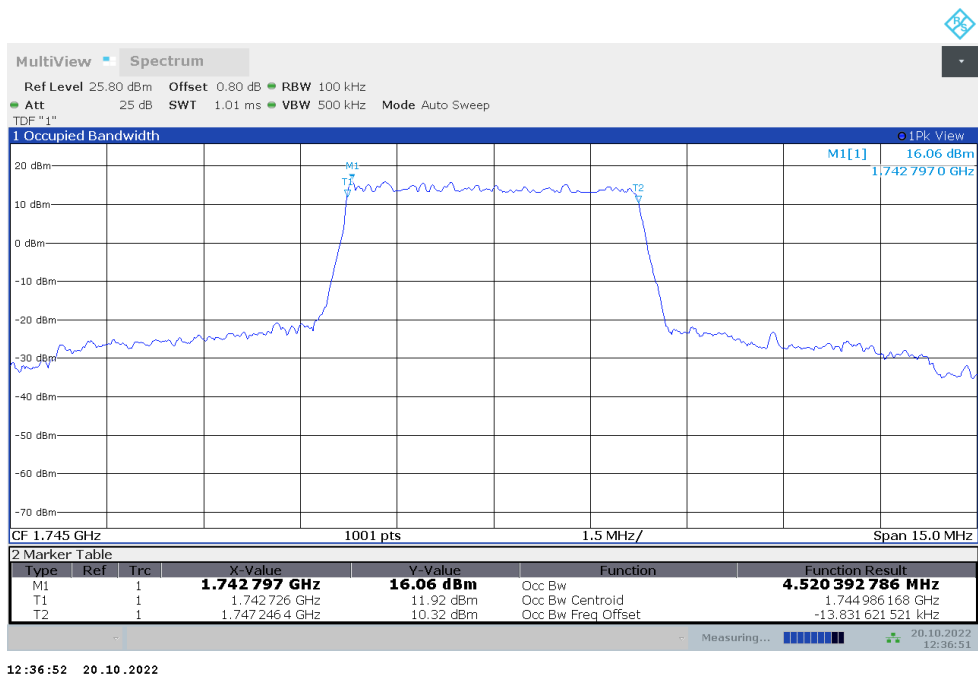
n66
n66,5MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 1745 | 4.500 | 4.520 | 4.501 |

n66,5MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)



n66,5MHz Bandwidth,DFT-s-QPSK (99% BW)



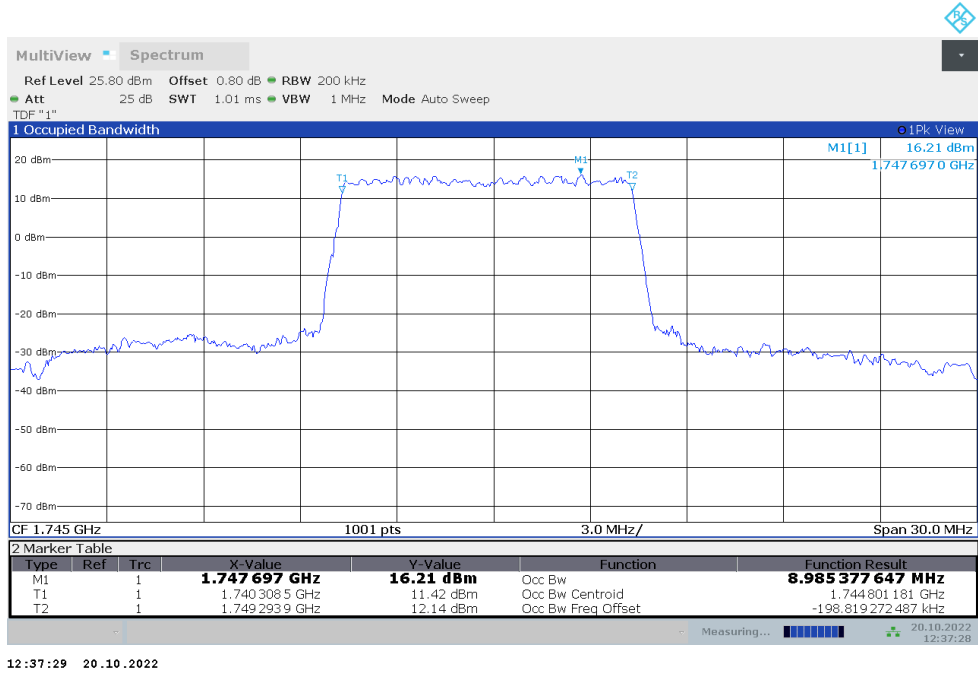
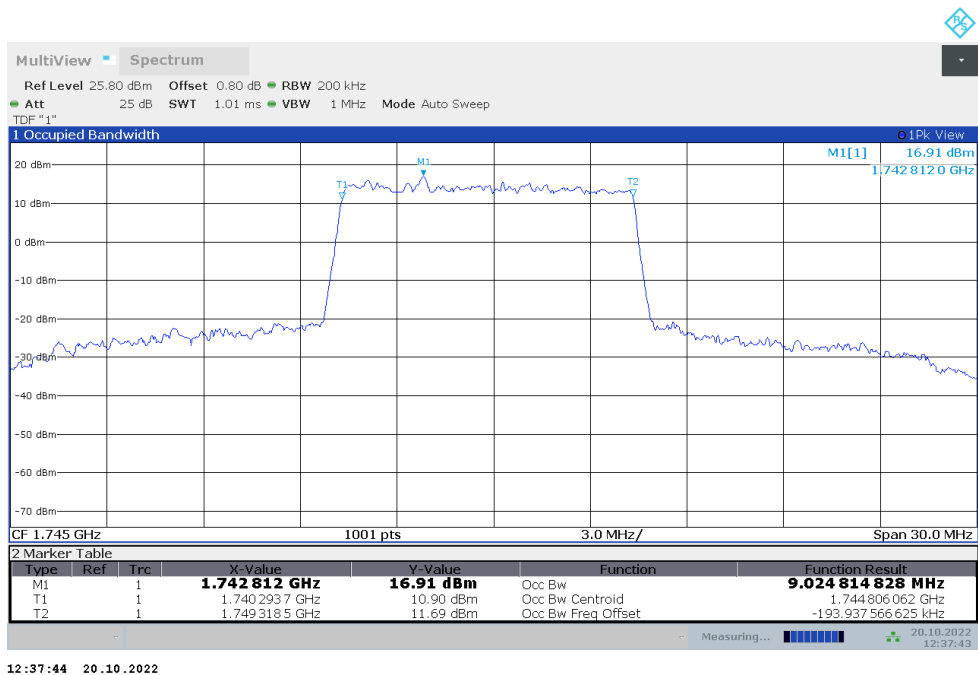
n66,5MHz Bandwidth,DFT-s-16QAM (99% BW)



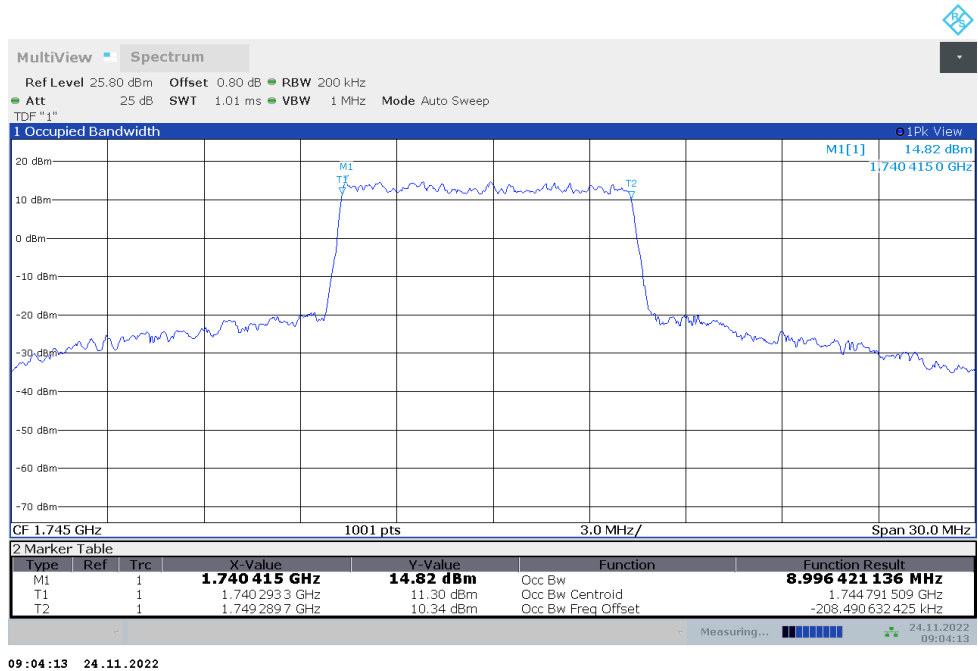
09:03:37 24.11.2022

n66,10MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 1745 | 8.985 | 9.025 | 8.996 |

n66,10MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n66,10MHz Bandwidth,DFT-s-QPSK (99% BW)


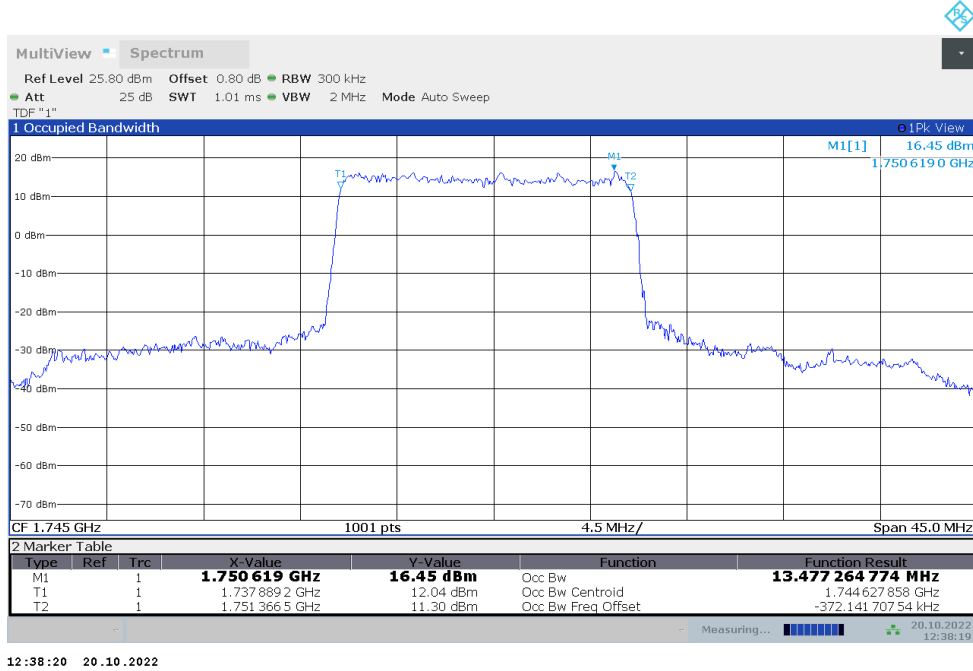
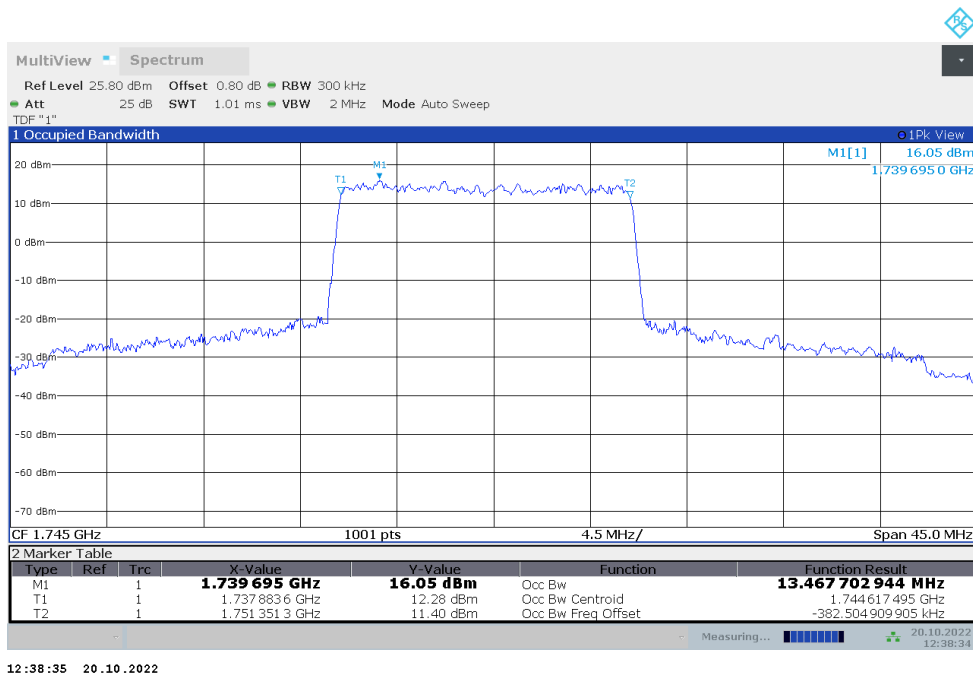
n66,10MHz Bandwidth,DFT-s-16QAM (99% BW)



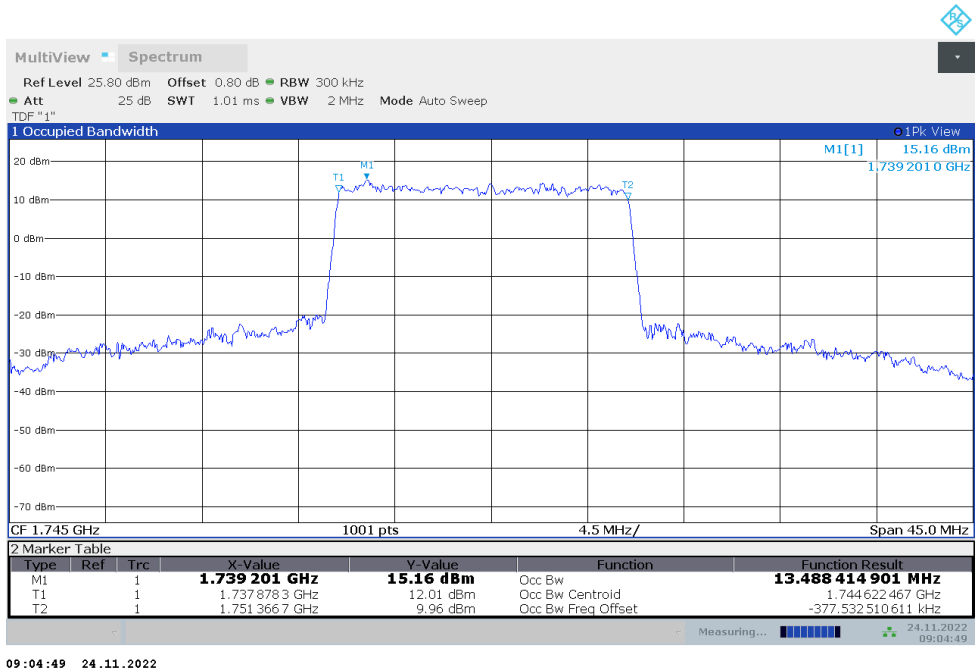
09:04:13 24.11.2022

n66,15MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 1745 | 13.477 | 13.468 | 13.488 |

n66,15MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n66,15MHz Bandwidth,DFT-s-QPSK (99% BW)


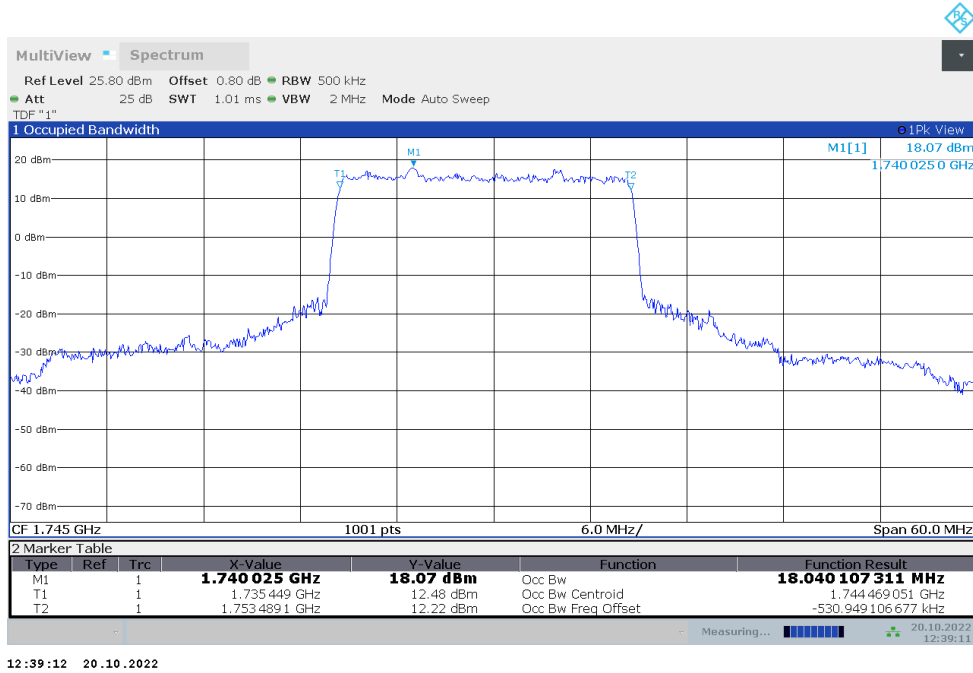
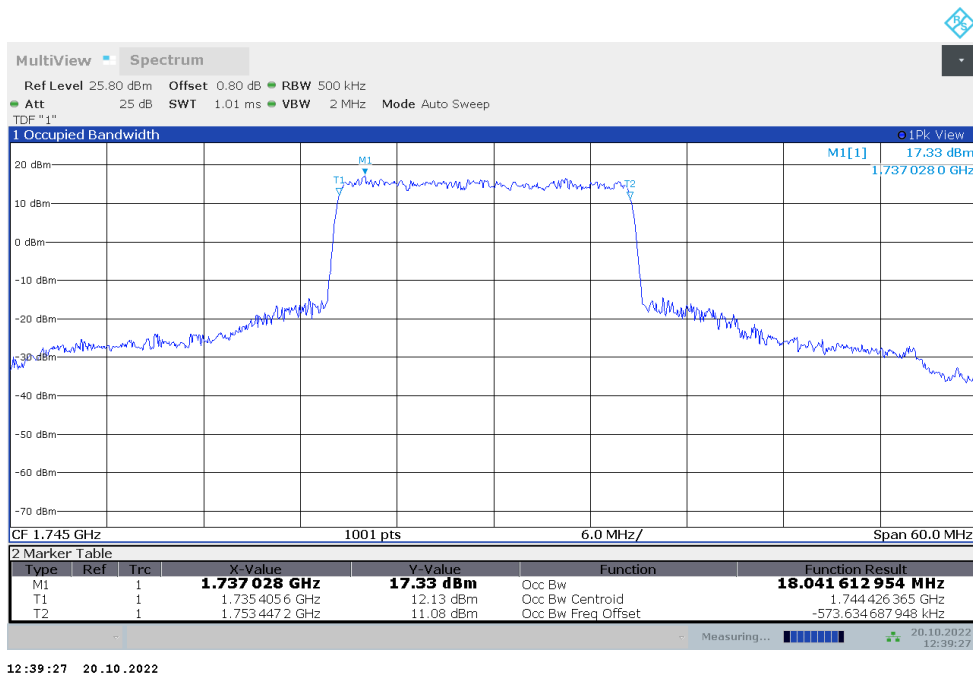
n66,15MHz Bandwidth,DFT-s-16QAM (99% BW)



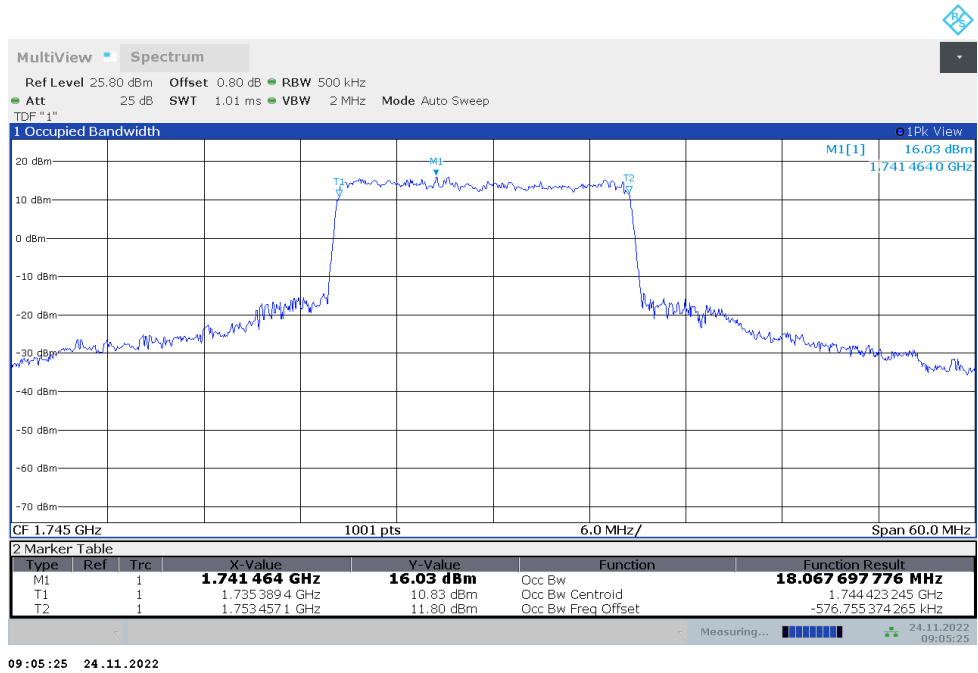
09:04:49 24.11.2022

n66,20MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 1745 | 18.040 | 18.042 | 18.068 |

n66,20MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n66,20MHz Bandwidth,DFT-s-QPSK (99% BW)


n66,20MHz Bandwidth,DFT-s-16QAM (99% BW)



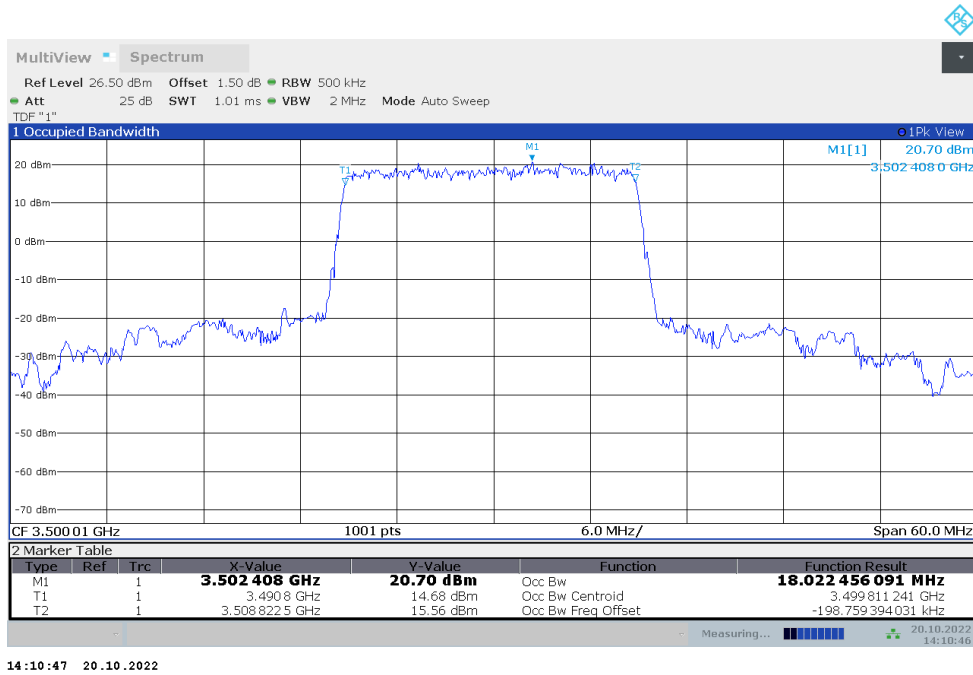
09:05:25 24.11.2022

n78L

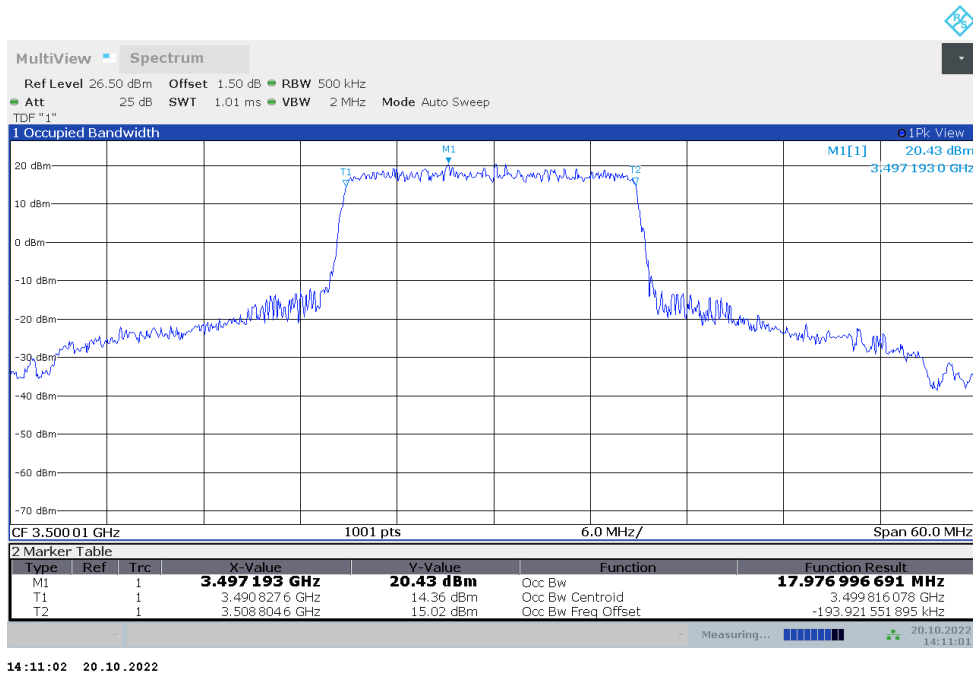
n78L,20MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 3500.01 | 18.022 | 17.977 | 18.044 |

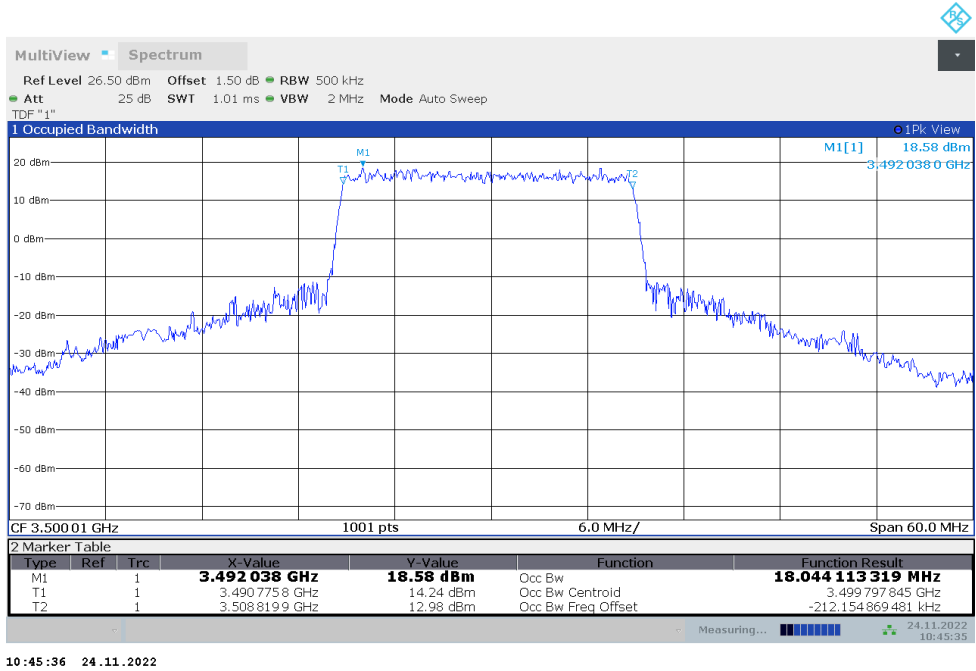
n78L,20MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)



n78L,20MHz Bandwidth,DFT-s-QPSK (99% BW)

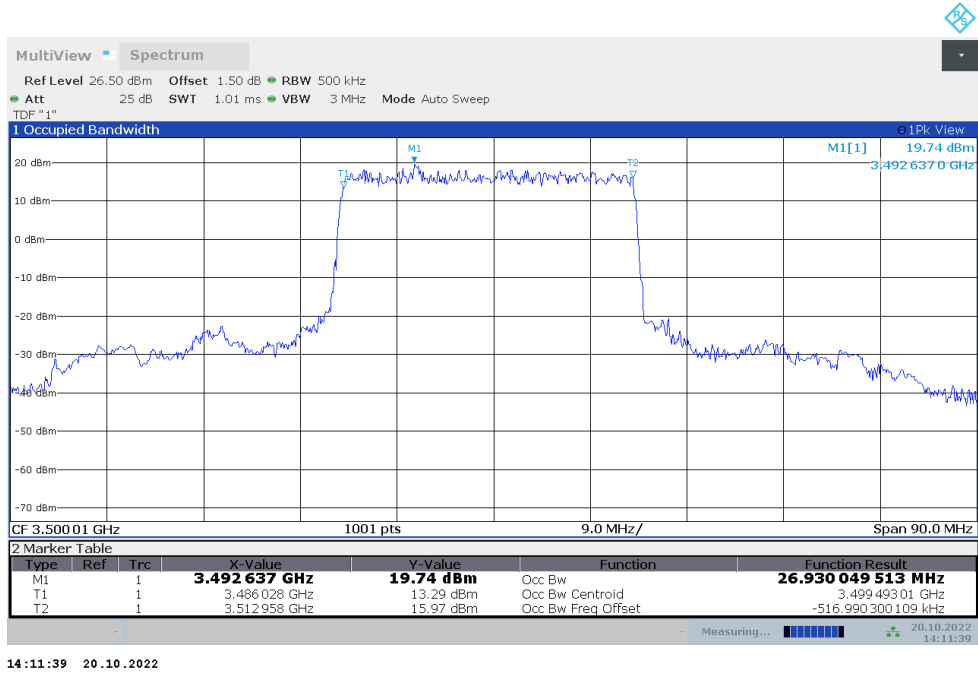
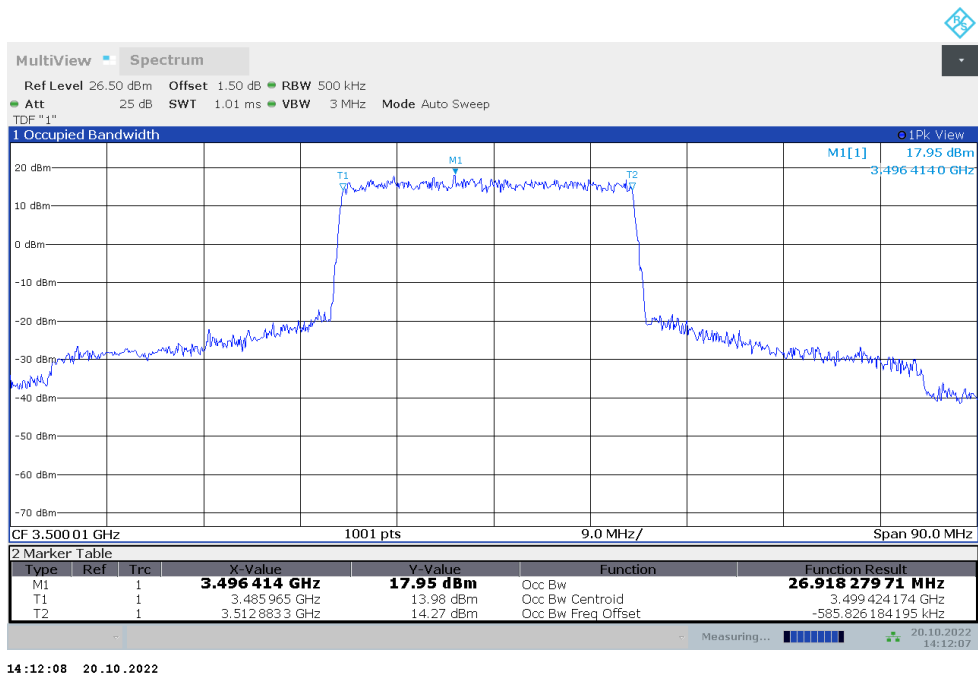


n78L,20MHz Bandwidth,DFT-s-16QAM (99% BW)

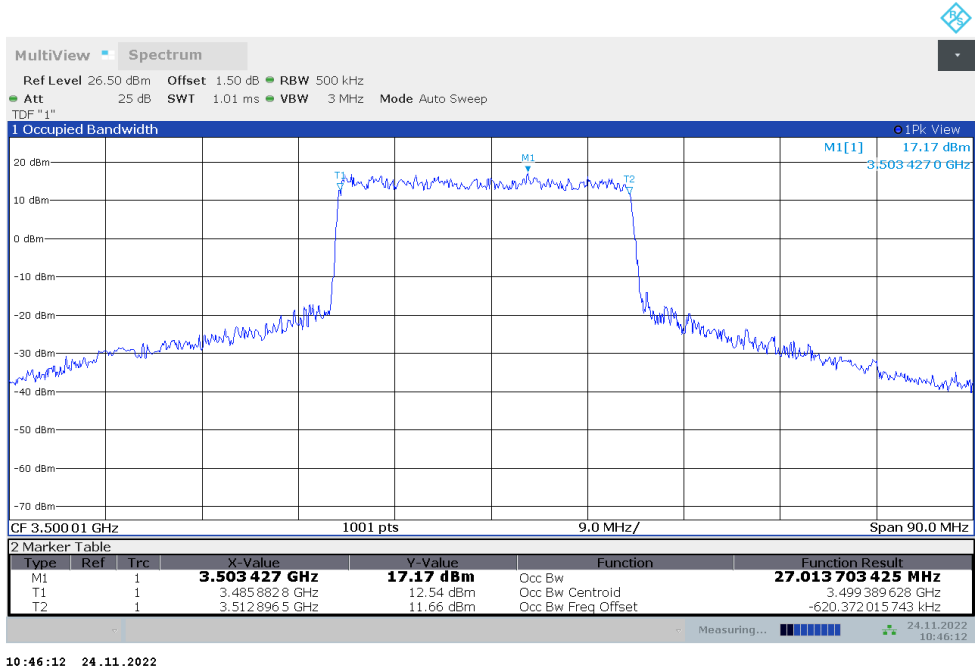


n78L,30MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 3500.01 | 26.930 | 26.918 | 27.014 |

n78L,30MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n78L,30MHz Bandwidth,DFT-s-QPSK (99% BW)


n78L,30MHz Bandwidth,DFT-s-16QAM (99% BW)

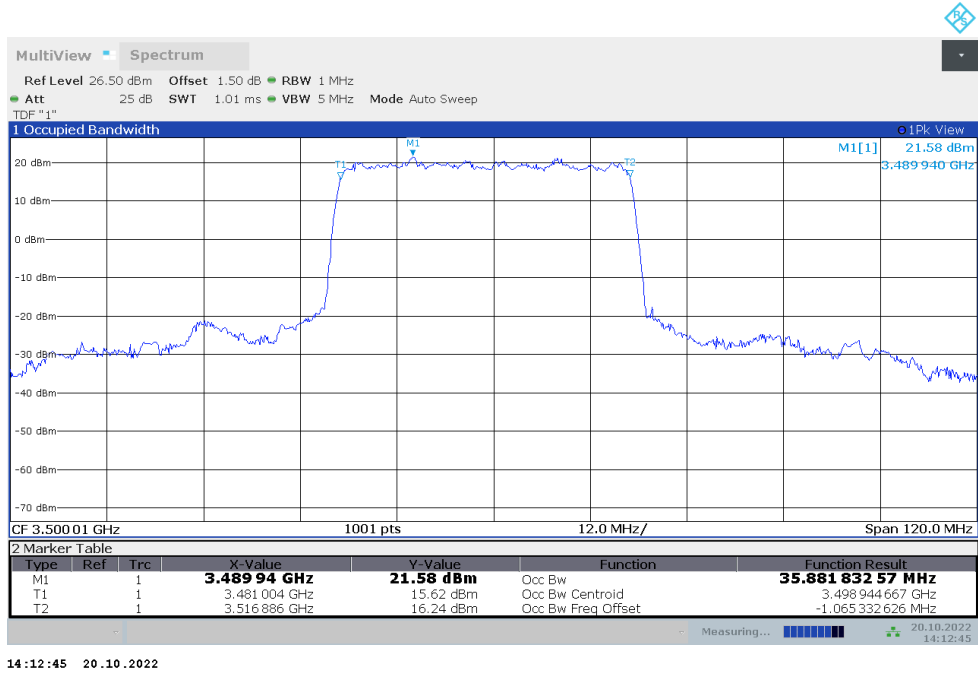


10:46:12 24.11.2022

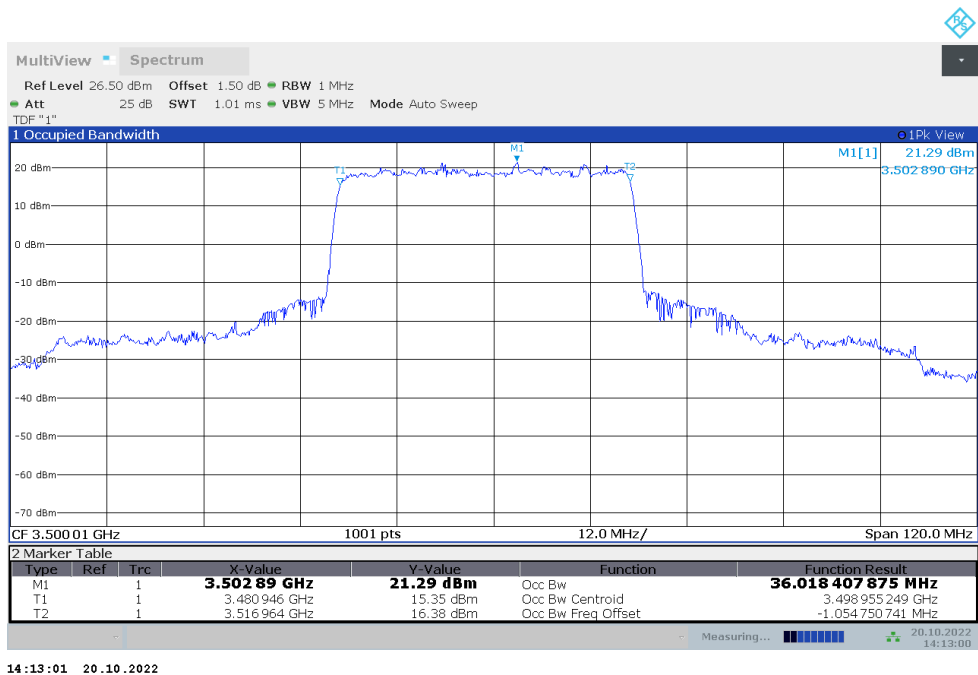
n78L,40MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 3500.01 | 35.882 | 36.018 | 36.057 |

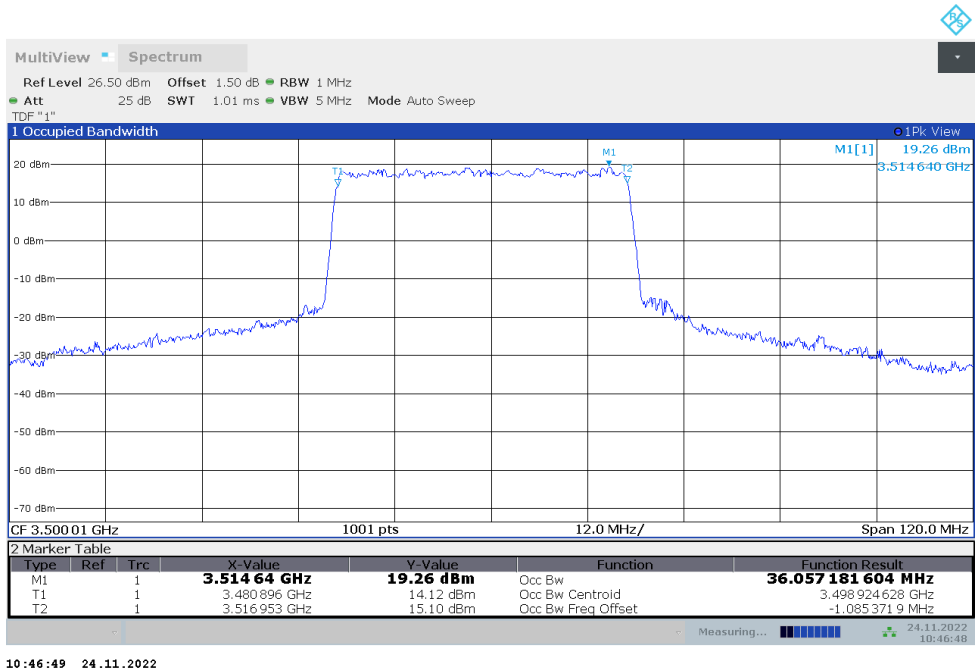
n78L,40MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)



n78L,40MHz Bandwidth,DFT-s-QPSK (99% BW)



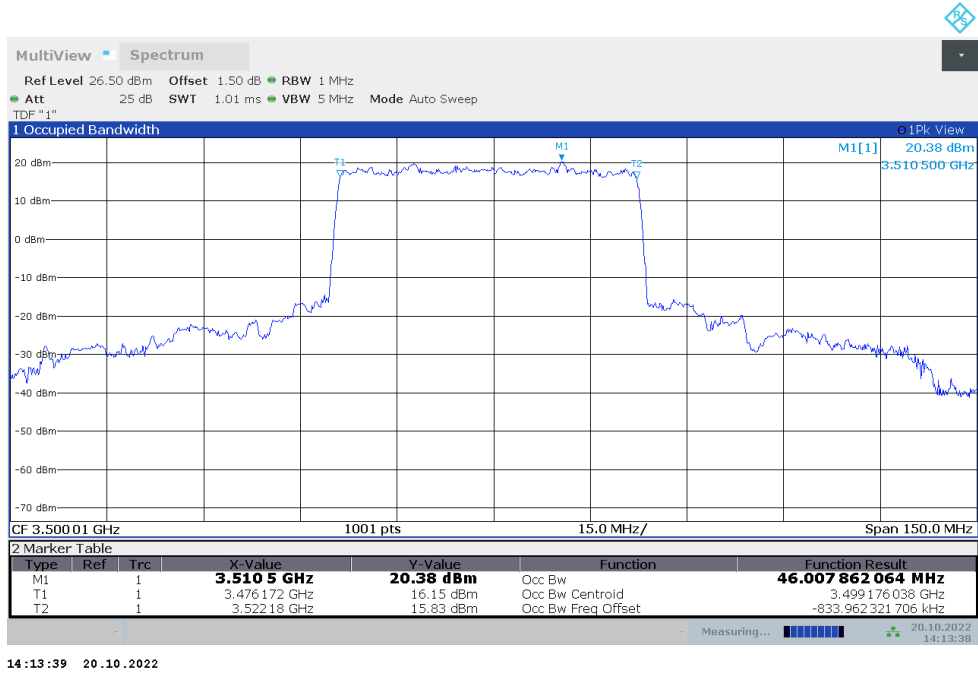
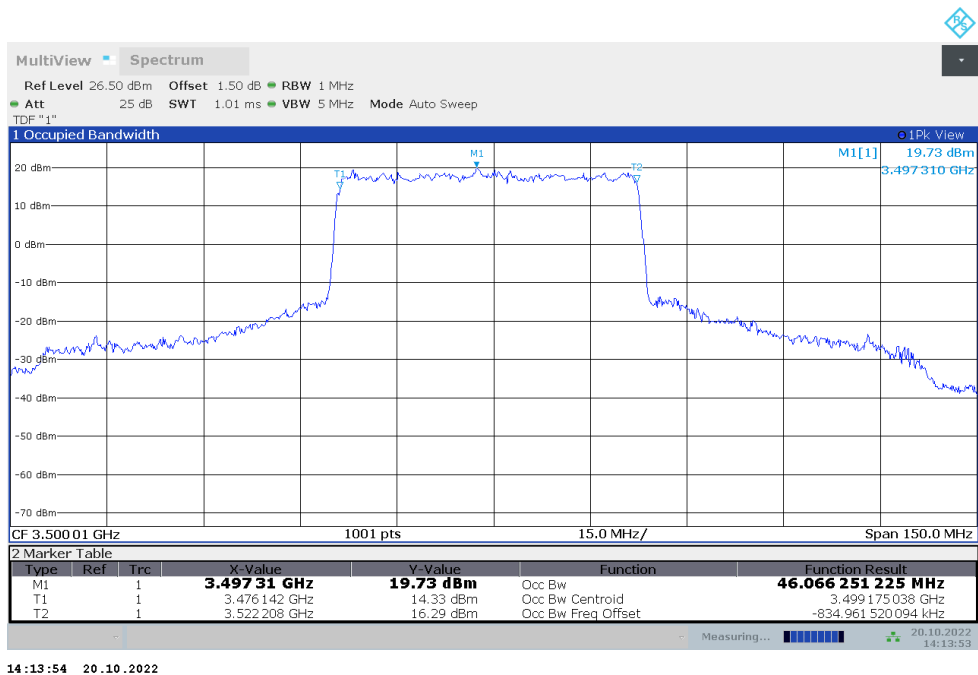
n78L,40MHz Bandwidth,DFT-s-16QAM (99% BW)



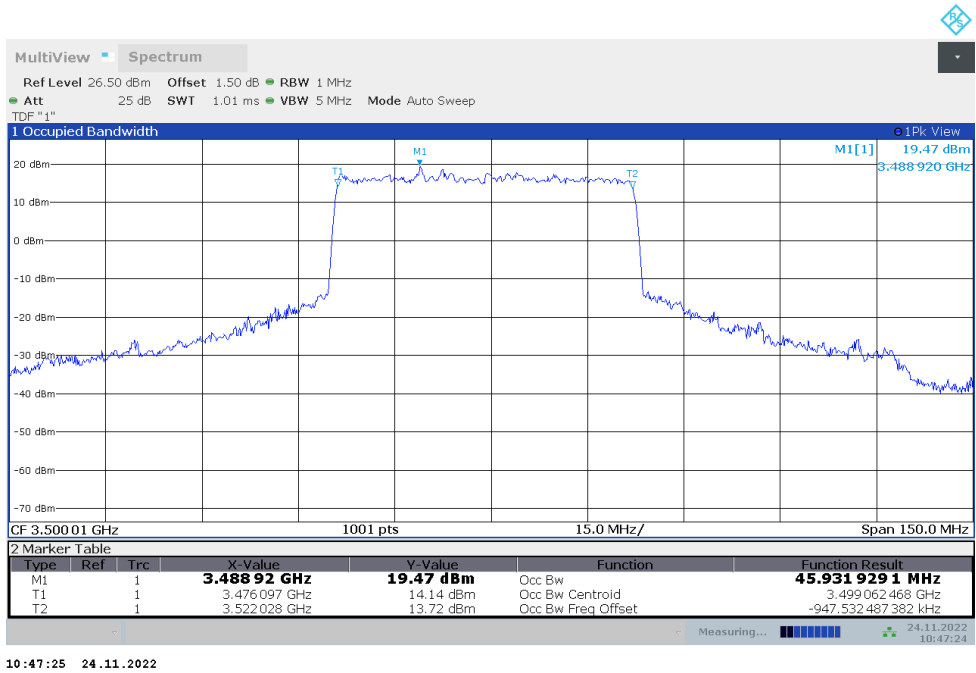
10:46:49 24.11.2022

n78L,50MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 3500.01 | 46.008 | 46.066 | 45.932 |

n78L,50MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n78L,50MHz Bandwidth,DFT-s-QPSK (99% BW)


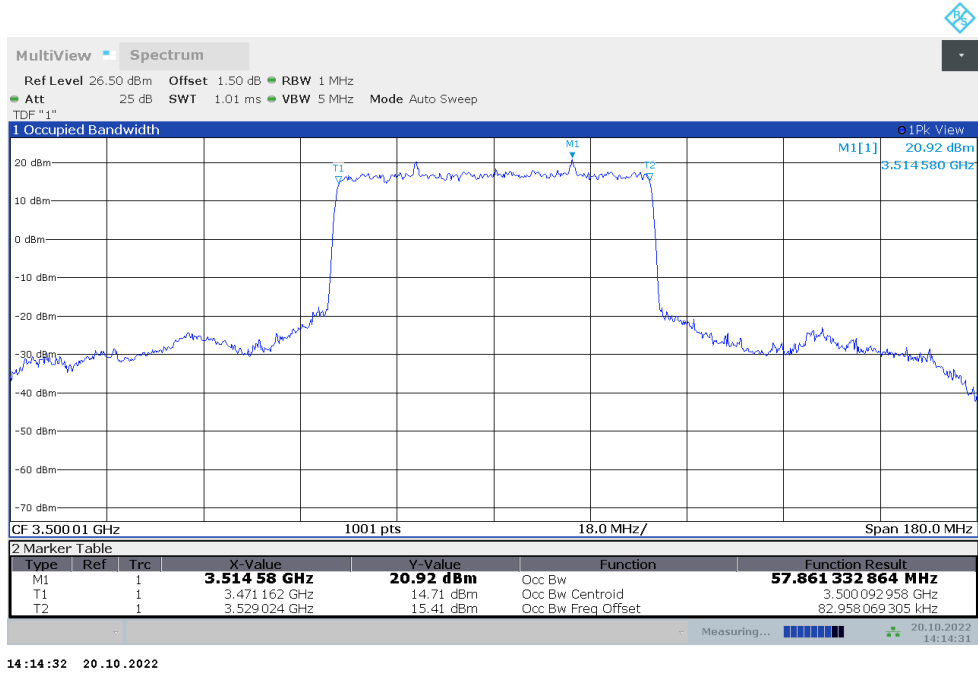
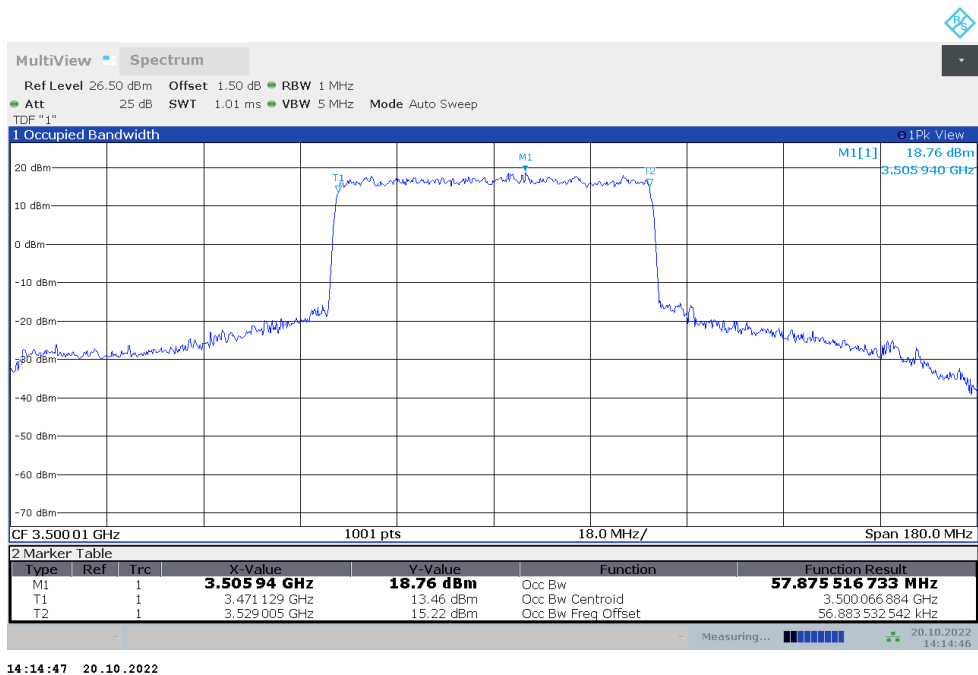
n78L,50MHz Bandwidth,DFT-s-16QAM (99% BW)



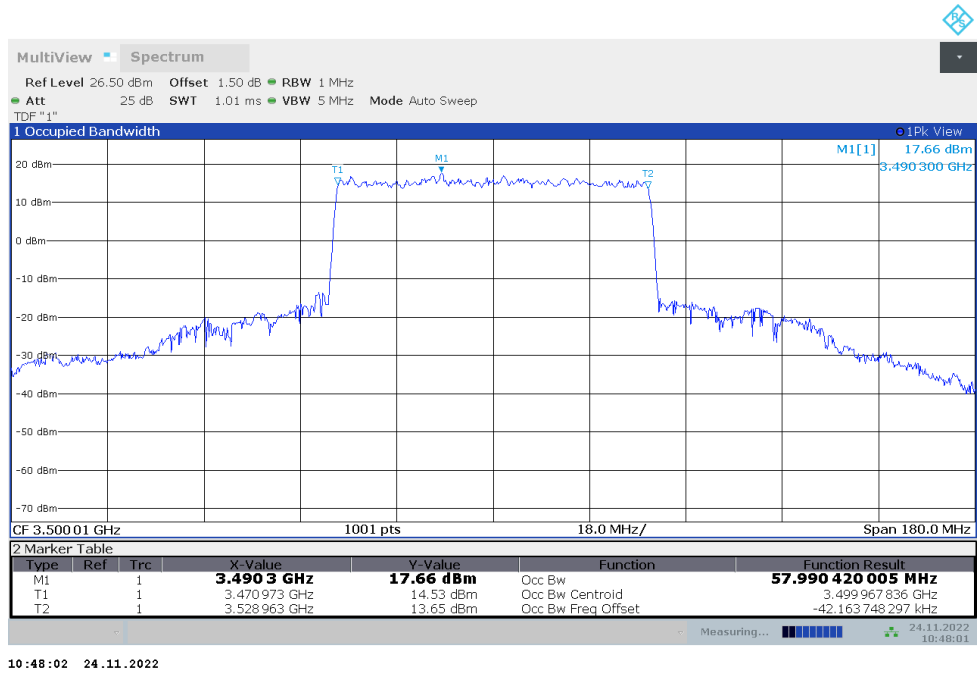
10:47:25 24.11.2022

n78L,60MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 3500.01 | 57.861 | 57.876 | 57.990 |

n78L,60MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n78L,60MHz Bandwidth,DFT-s-QPSK (99% BW)


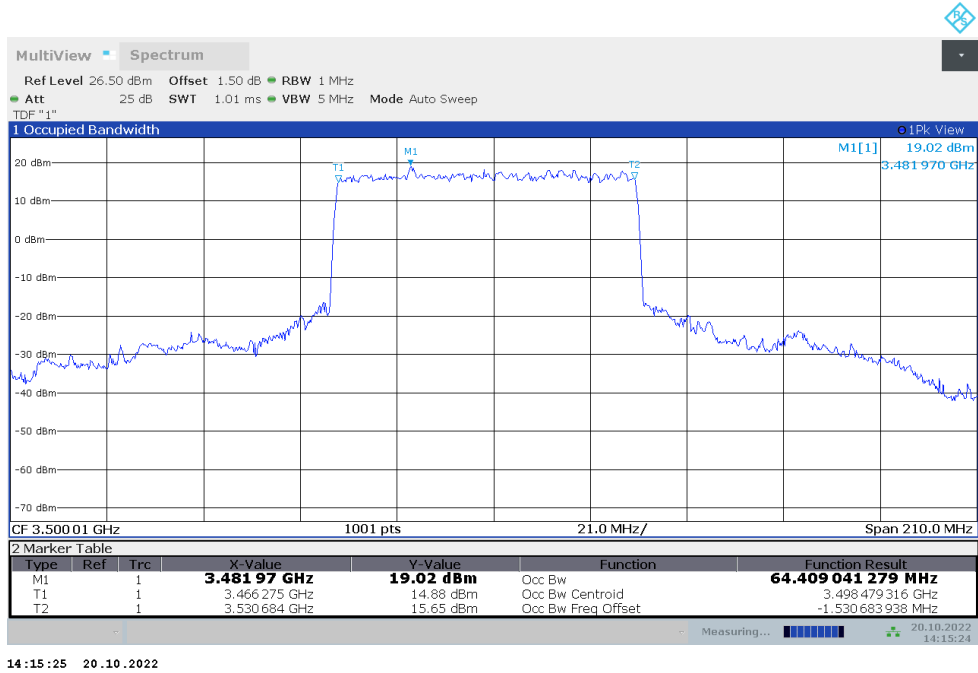
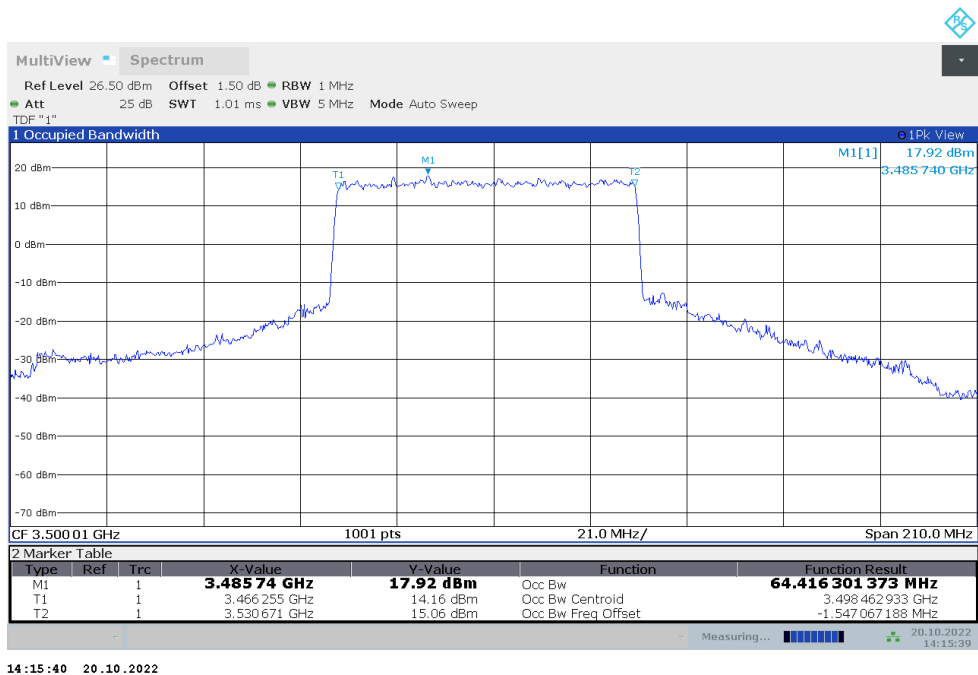
n78L,60MHz Bandwidth,DFT-s-16QAM (99% BW)



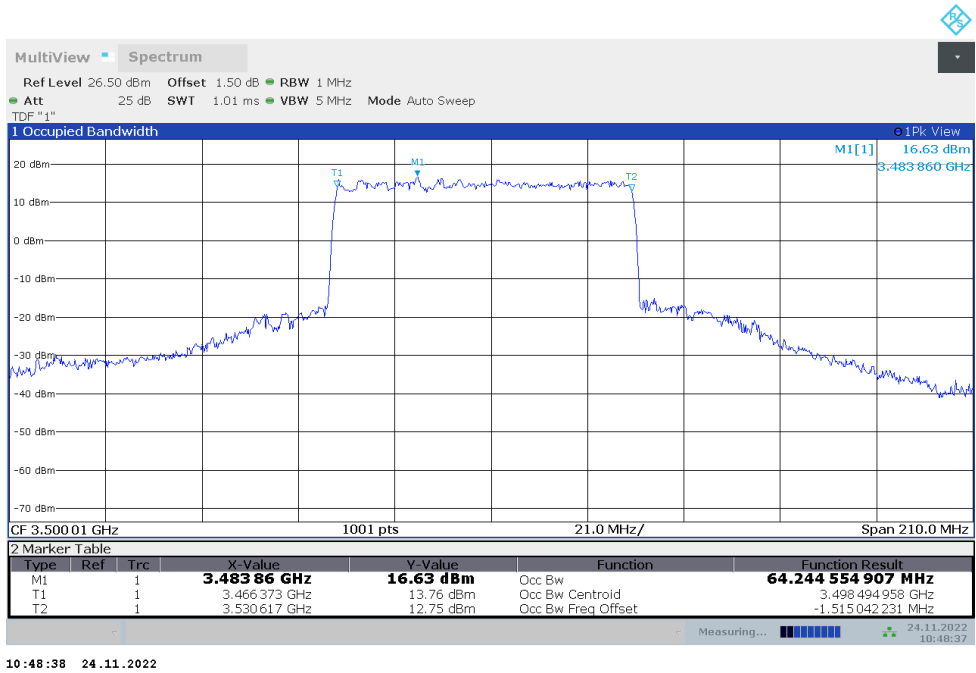
10:48:02 24.11.2022

n78L,70MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 3500.01 | 64.409 | 64.416 | 64.245 |

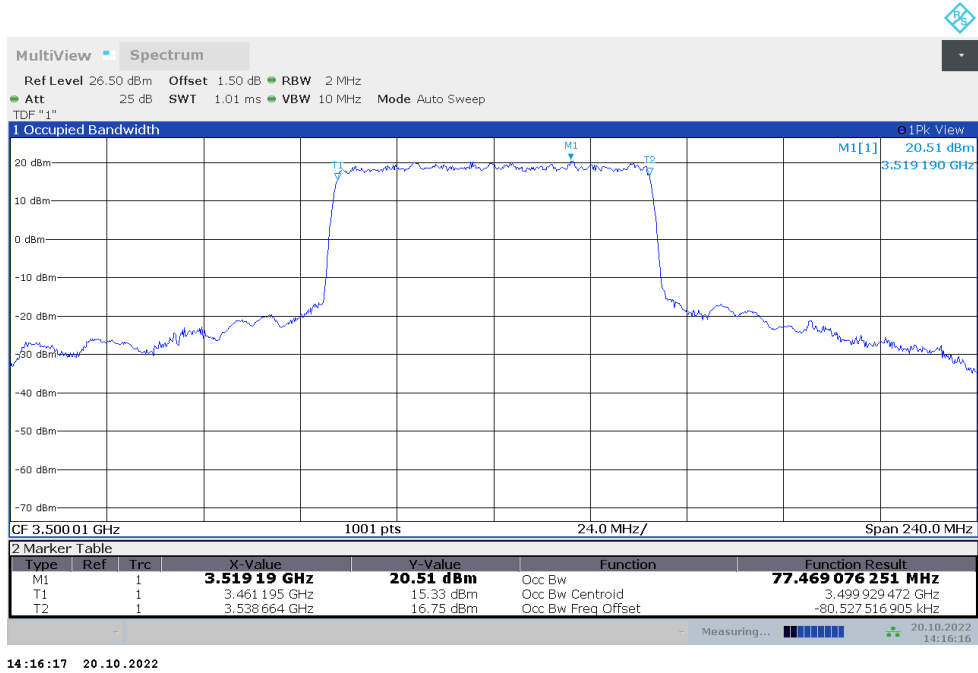
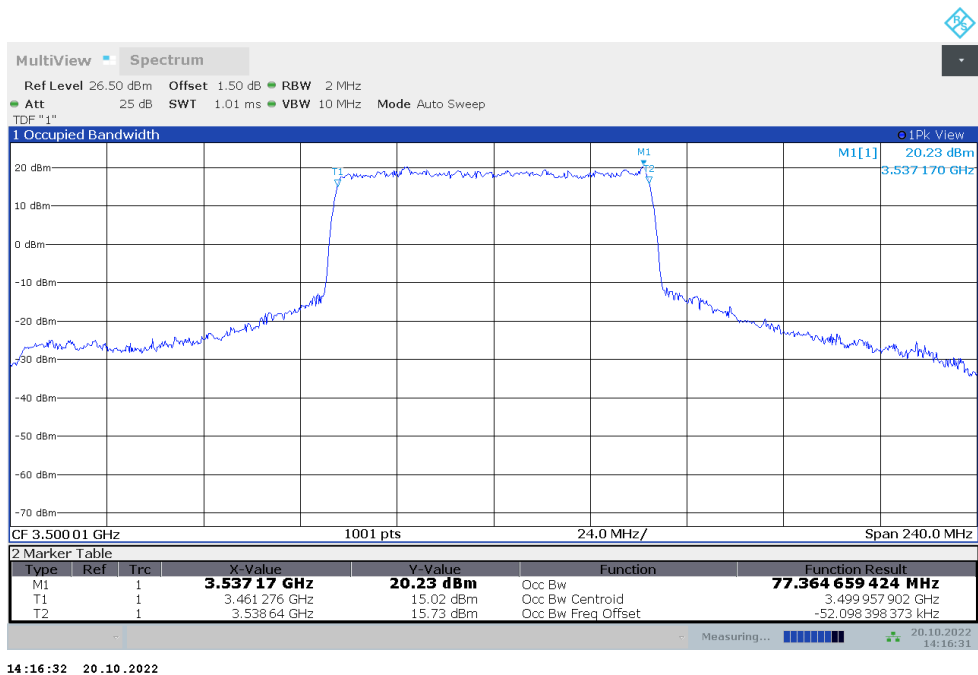
n78L,70MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n78L,70MHz Bandwidth,DFT-s-QPSK (99% BW)


n78L,70MHz Bandwidth,DFT-s-16QAM (99% BW)

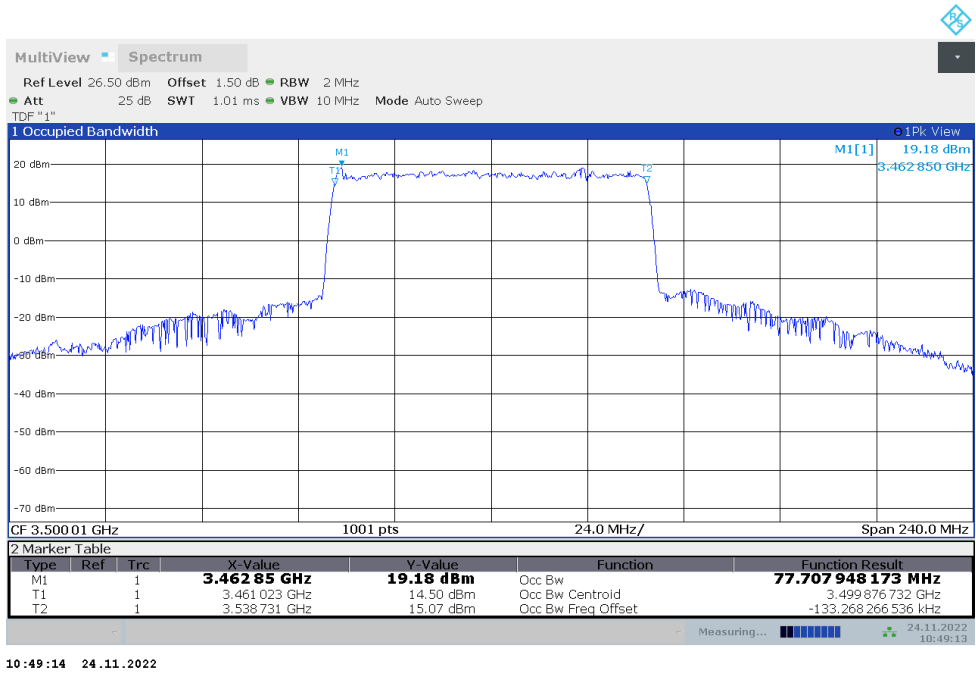


n78L,80MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 3500.01 | 77.469 | 77.365 | 77.708 |

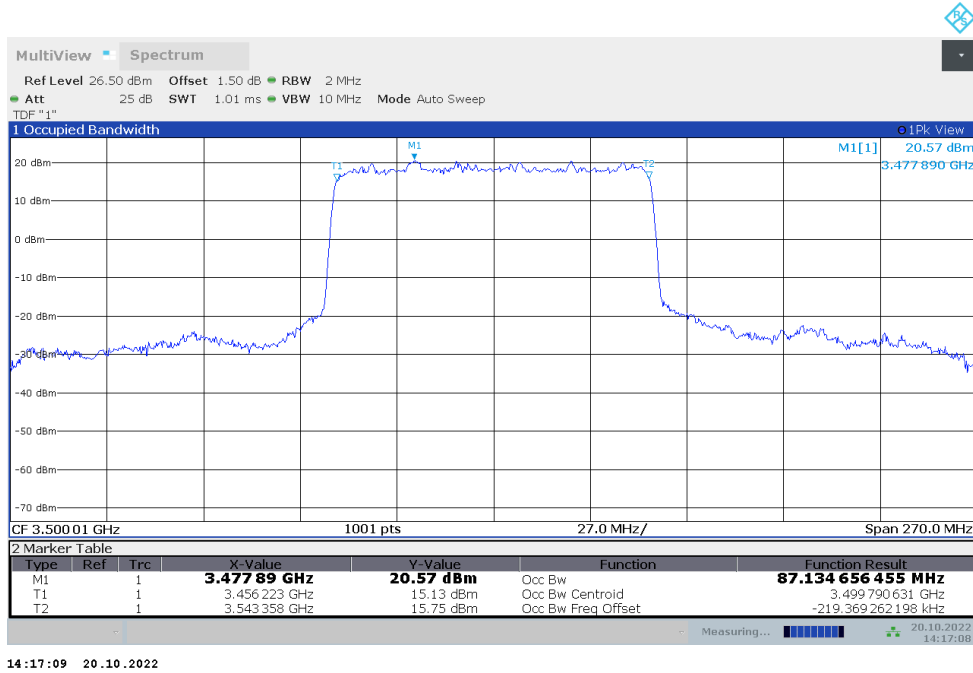
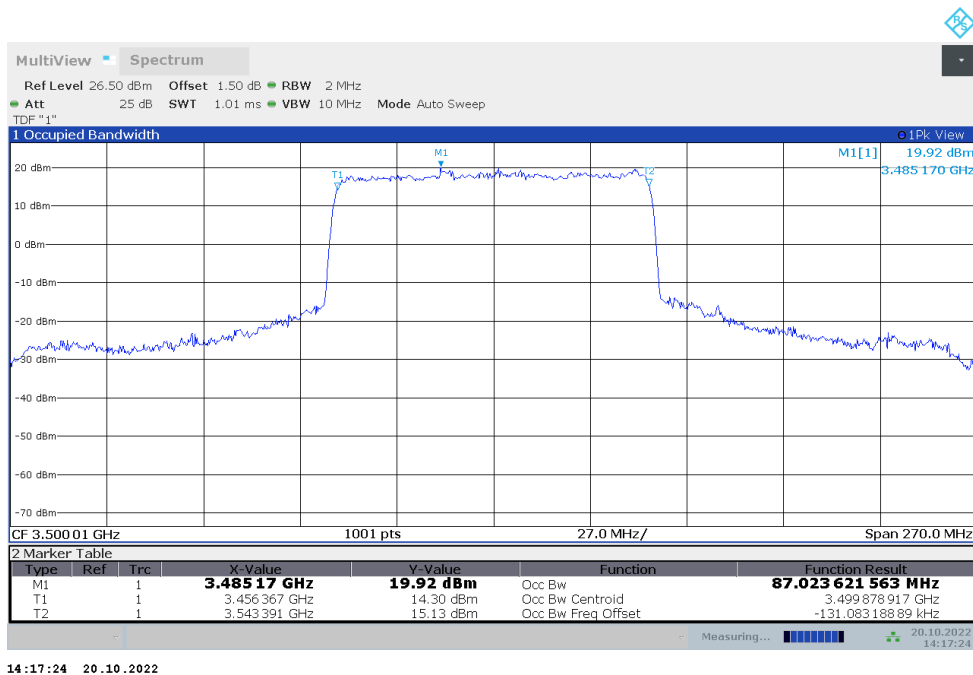
n78L,80MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n78L,80MHz Bandwidth,DFT-s-QPSK (99% BW)


n78L,80MHz Bandwidth,DFT-s-16QAM (99% BW)

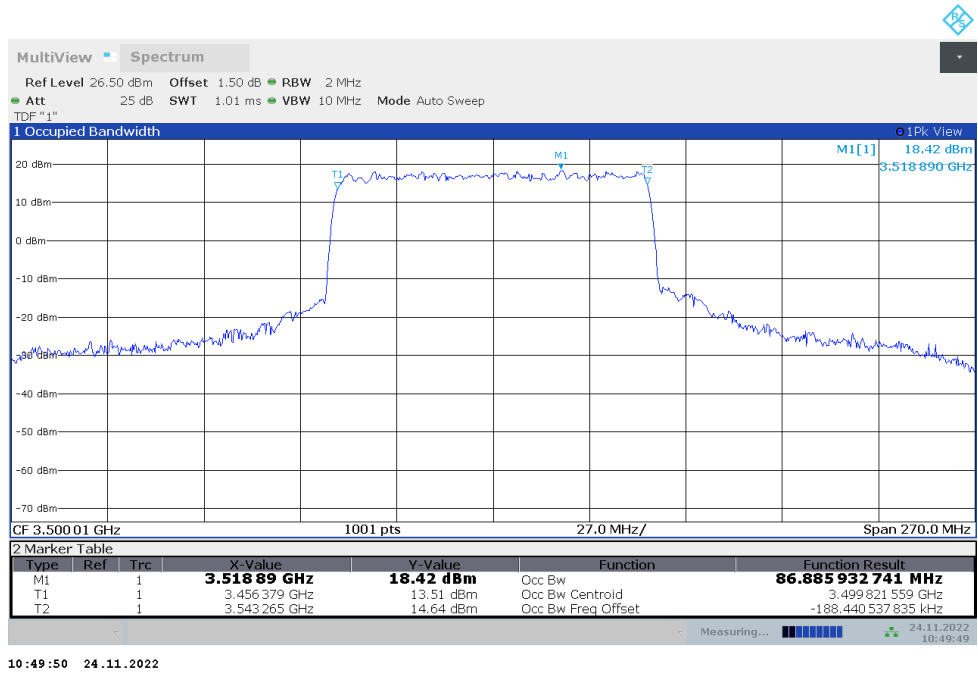


n78L,90MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%) (MHz) | | |
|-----------------|--------------------------------|------------|-------------|
| | DFT-s-pi/2 BPSK | DFT-s-QPSK | DFT-s-16QAM |
| 3500.01 | 87.135 | 87.024 | 86.886 |

n78L,90MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

n78L,90MHz Bandwidth,DFT-s-QPSK (99% BW)


n78L,90MHz Bandwidth,DFT-s-16QAM (99% BW)



Note: The maximum value of expanded measurement uncertainty for this test item is $U = 0.626$ kHz, $k = 2$.

A.5 Emission Bandwidth

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. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

The measurement method is from ANSI C63.26:

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
- b) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times$ RBW.
- c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation.
- d) The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target “-X dB” requirement, i.e., if the requirement calls for measuring the -26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
- e) Set spectrum analyzer detection mode to peak, and the trace mode to max hold.