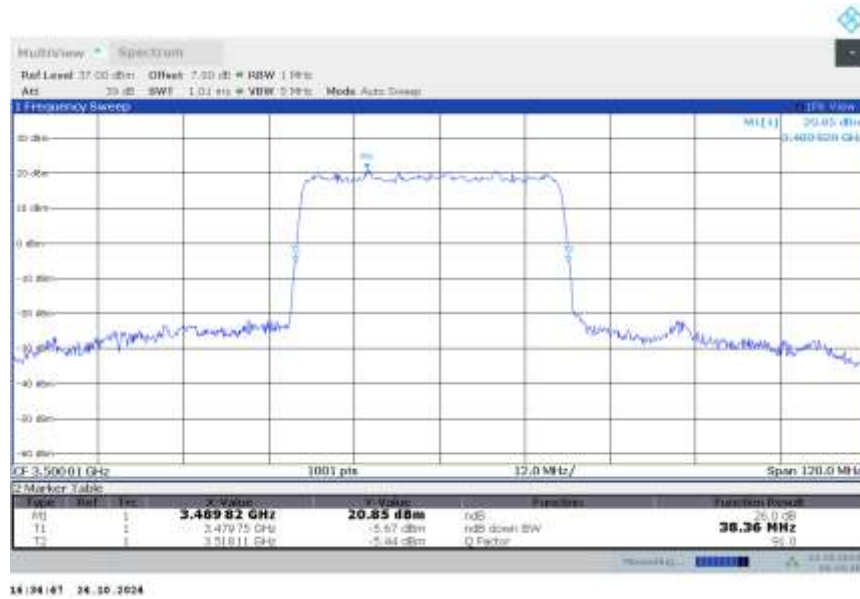


n77L

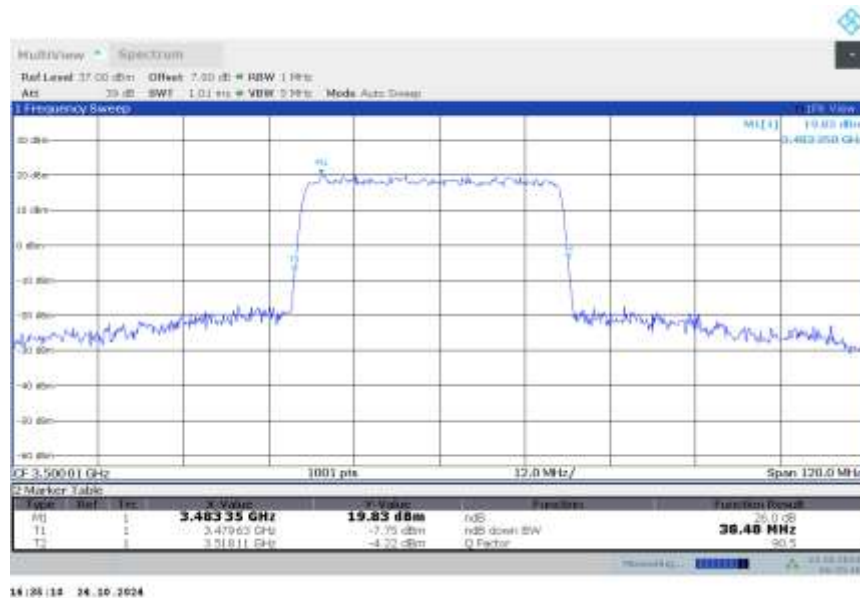
n77L,40MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3500.01	38.360	38.480

n77L,40MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77L,40MHz Bandwidth,DFT-s-QPSK (-26dBc BW)

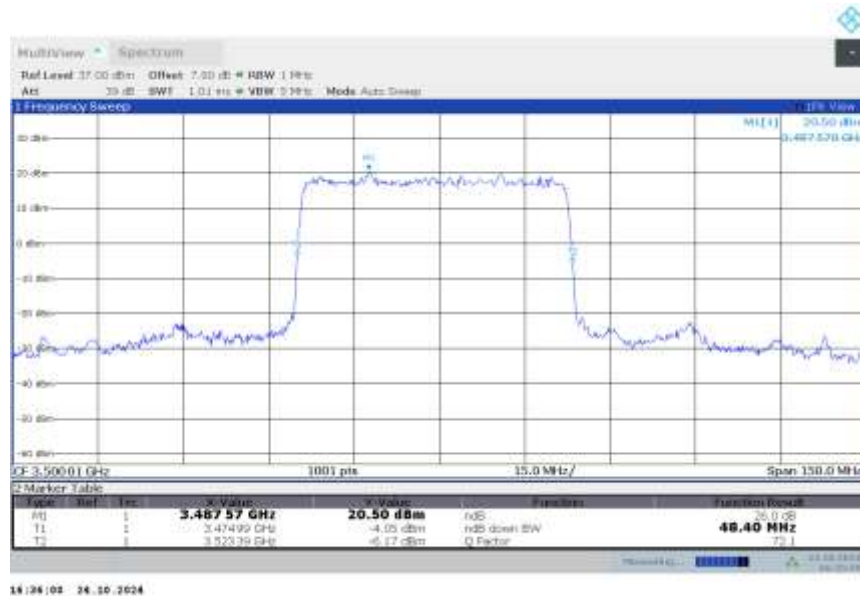


n77L

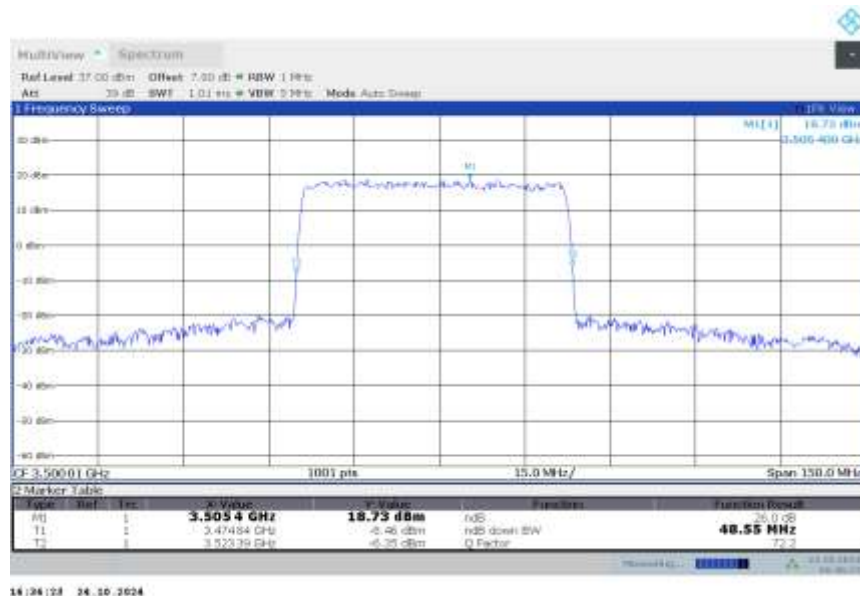
n77L,50MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3500.01	48.400	48.550

n77L,50MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77L,50MHz Bandwidth,DFT-s-QPSK (-26dBc BW)

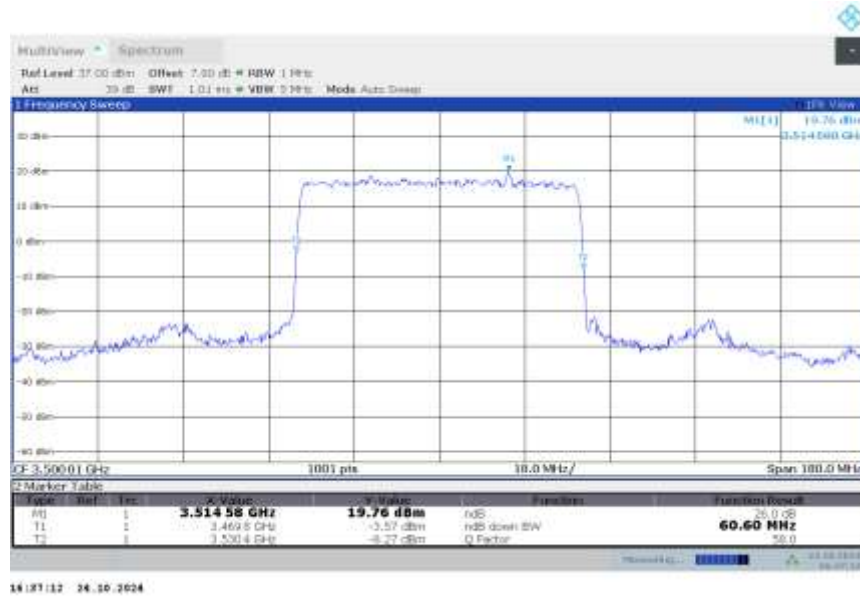


n77L

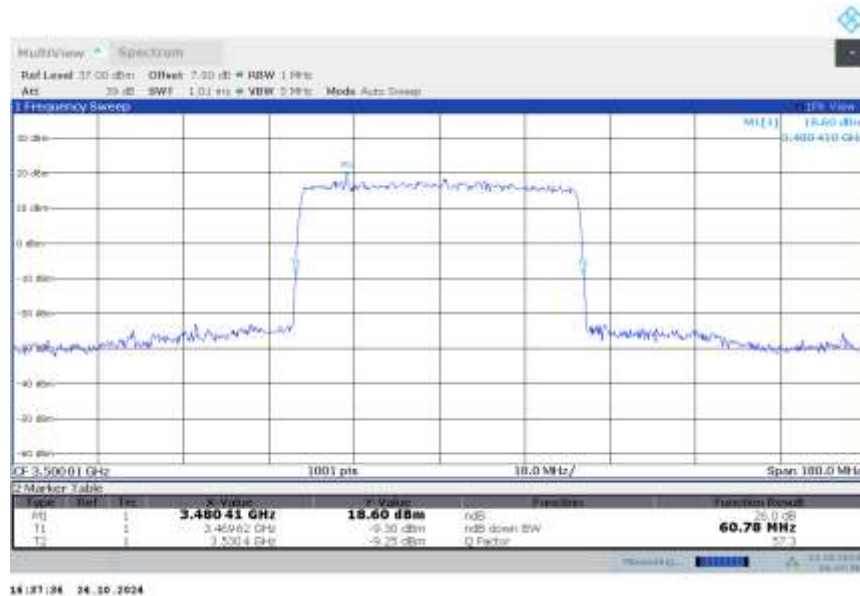
n77L,60MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3500.01	60.600	60.780

n77L,60MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77L,60MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



n77L

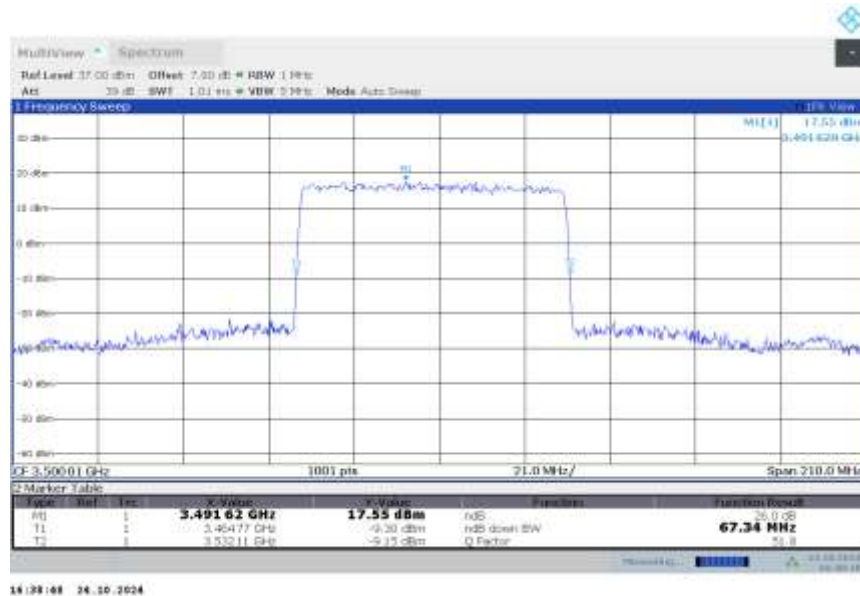
n77L,70MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3500.01	67.130	67.340

n77L,70MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77L,70MHz Bandwidth,DFT-s-QPSK (-26dBc BW)

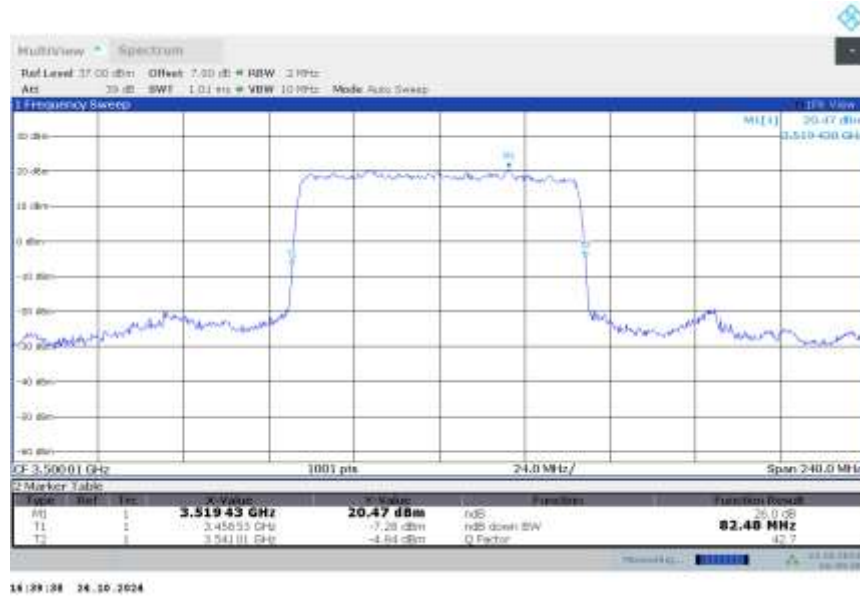


n77L

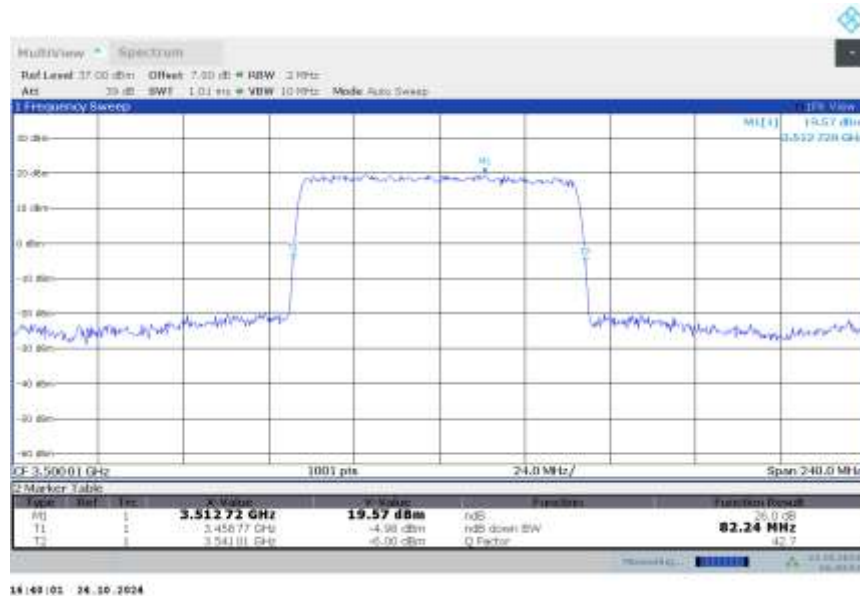
n77L,80MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3500.01	82.480	82.240

n77L,80MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77L,80MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



n77L

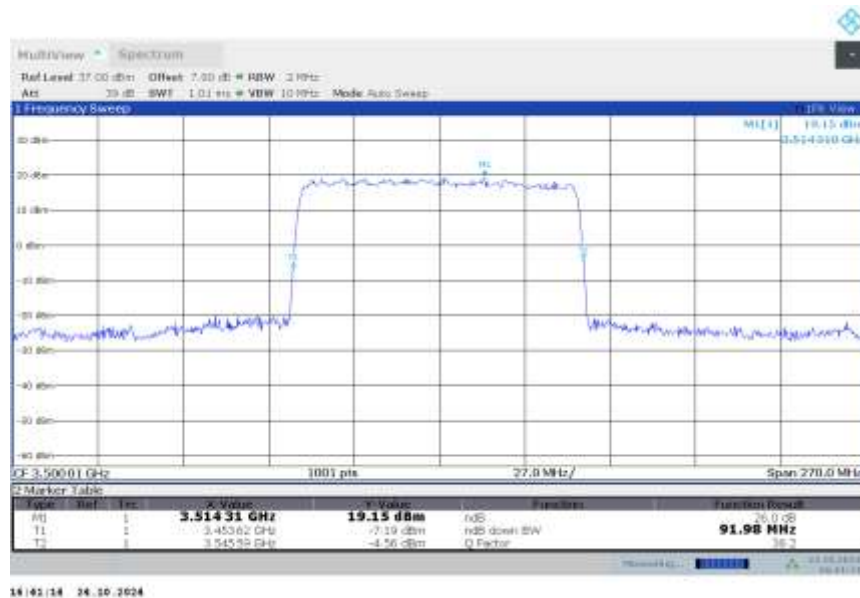
n77L,90MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3500.01	92.250	91.980

n77L,90MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77L,90MHz Bandwidth,DFT-s-QPSK (-26dBc BW)





n77L

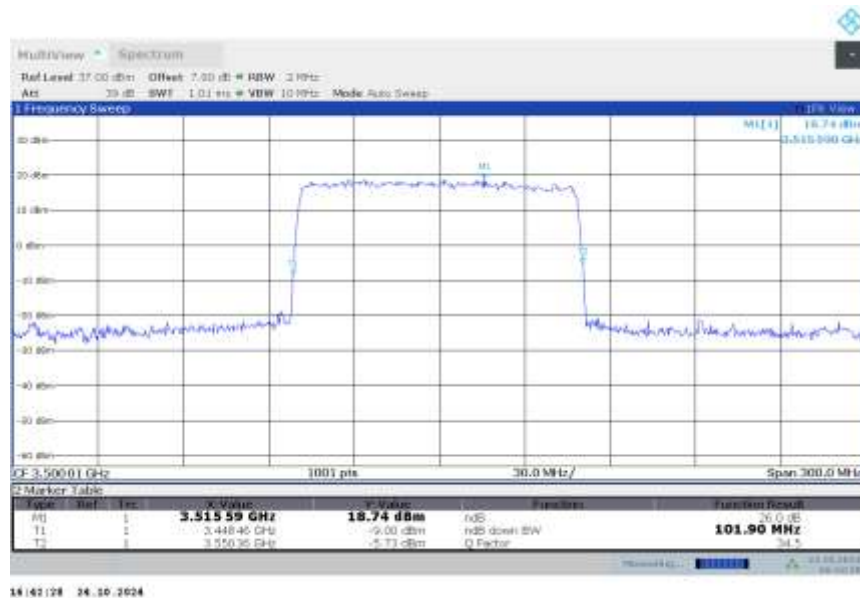
n77L,100MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3500.01	101.600	101.900

n77L,100MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77L,100MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



n77H

n77H,10MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3840	9.471	9.381

n77H,10MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77H,10MHz Bandwidth,DFT-s-QPSK (-26dBc BW)





n77H

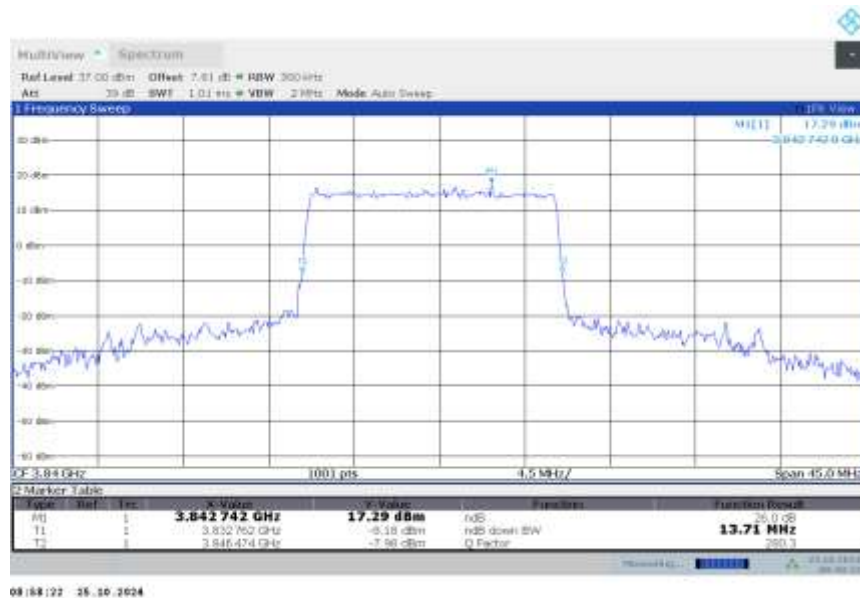
n77H,15MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3840	13.846	13.711

n77H,15MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77H,15MHz Bandwidth,DFT-s-QPSK (-26dBc BW)

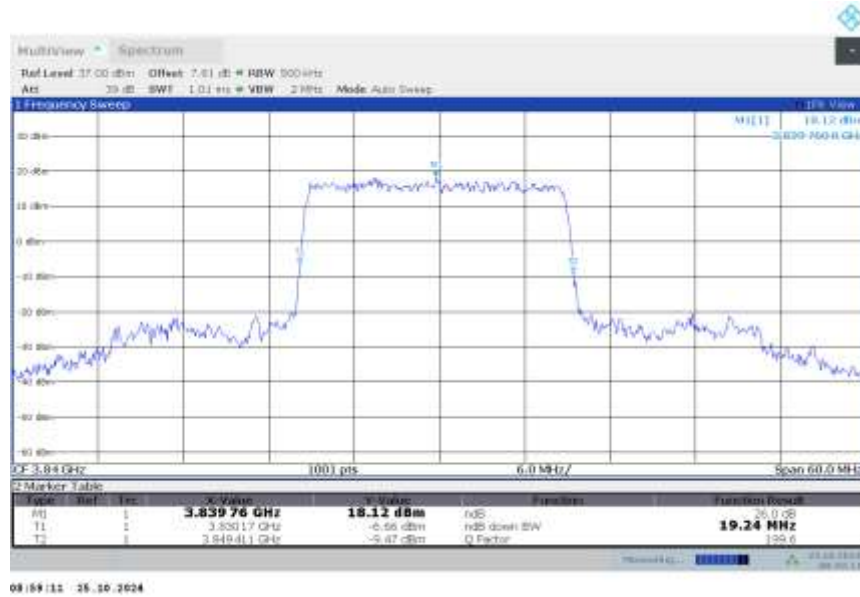


n77H

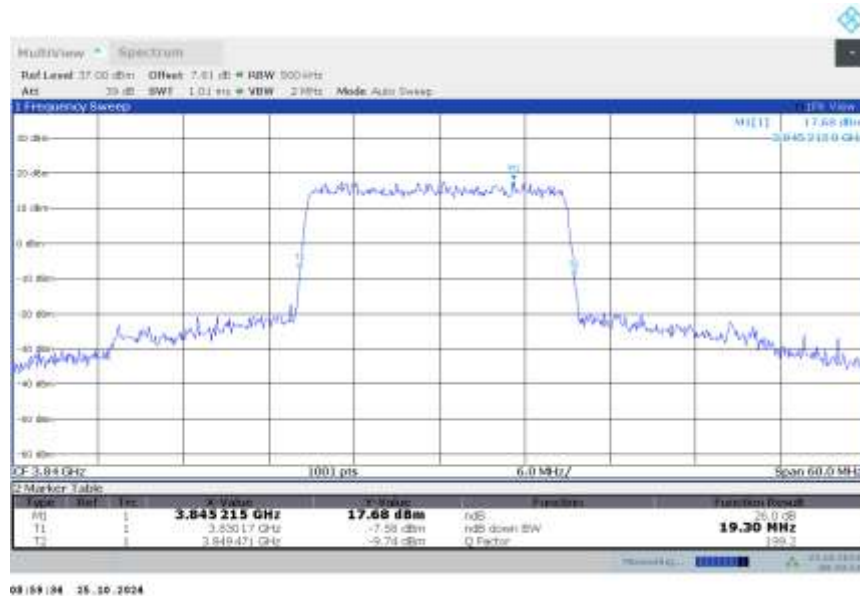
n77H,20MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3840	19.241	19.301

n77H,20MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77H,20MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



n77H

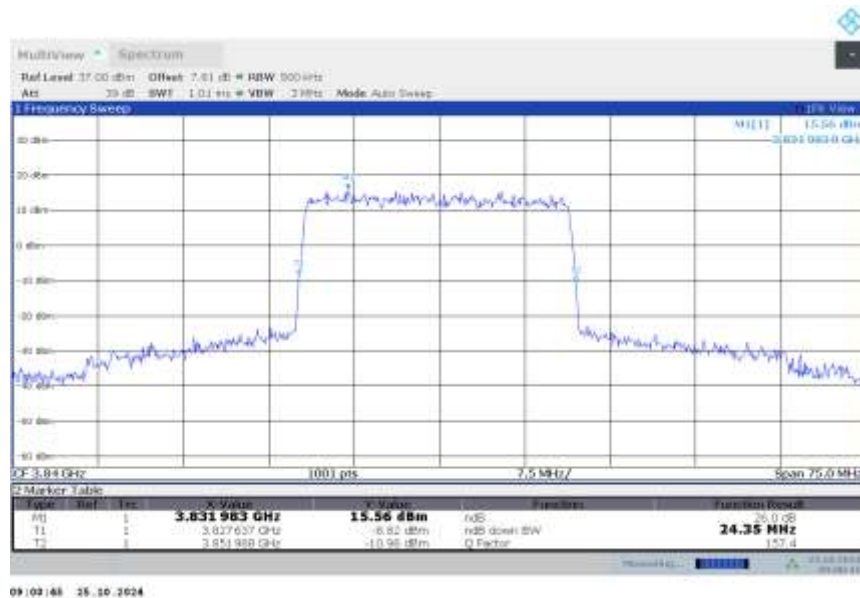
n77H,25MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3840	24.201	24.351

n77H,25MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77H,25MHz Bandwidth,DFT-s-QPSK (-26dBc BW)

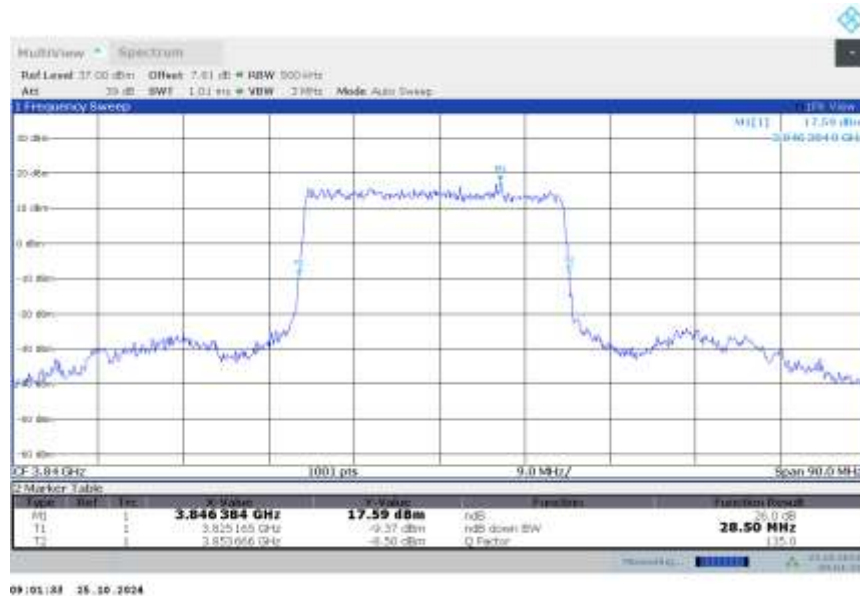


n77H

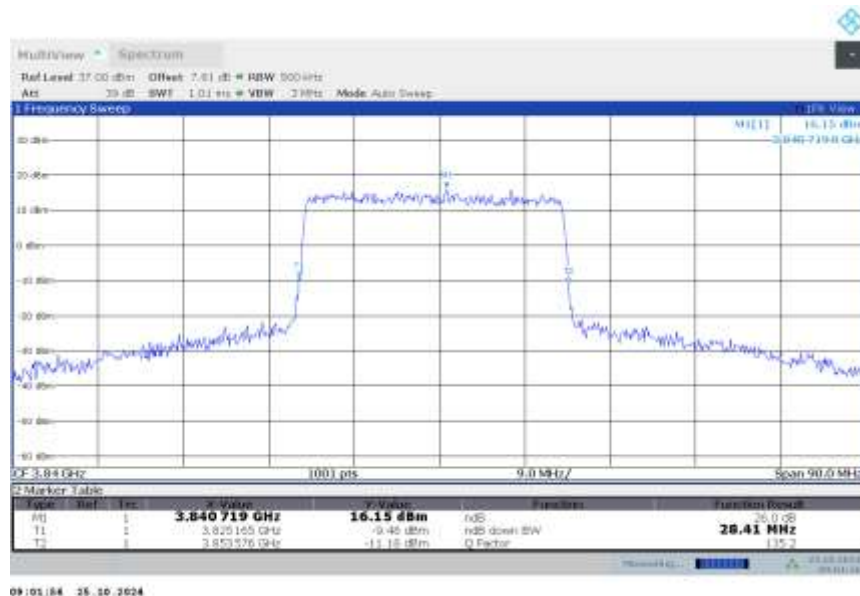
n77H,30MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3840	28.501	28.412

n77H,30MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77H,30MHz Bandwidth,DFT-s-QPSK (-26dBc BW)

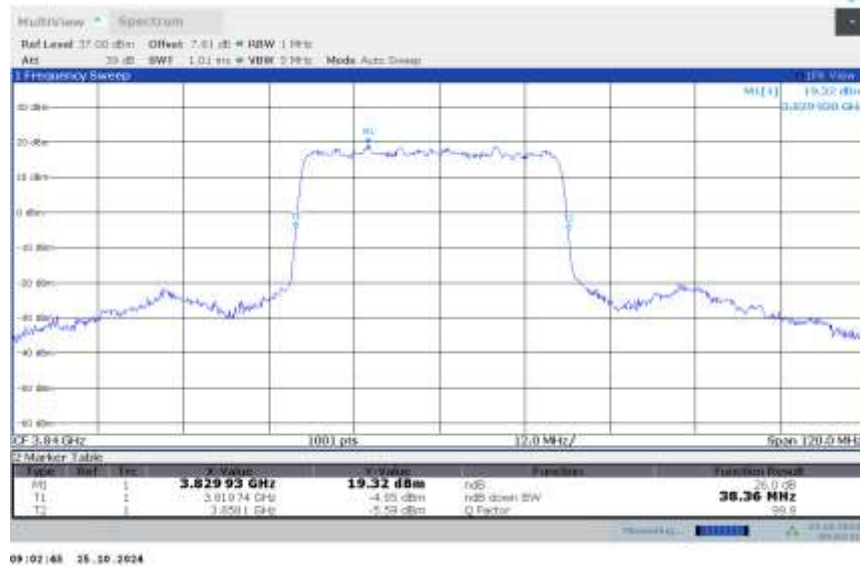


n77H

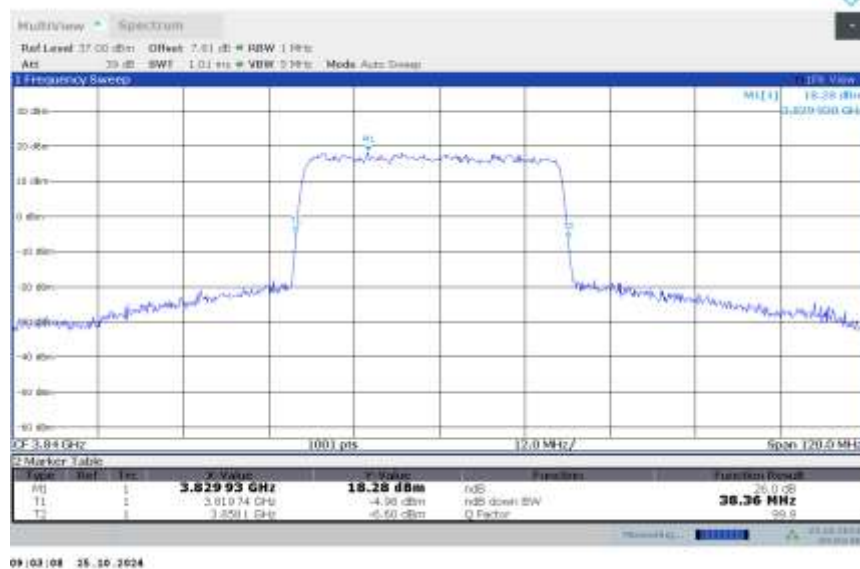
n77H,40MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3840	38.360	38.360

n77H,40MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77H,40MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



n77H

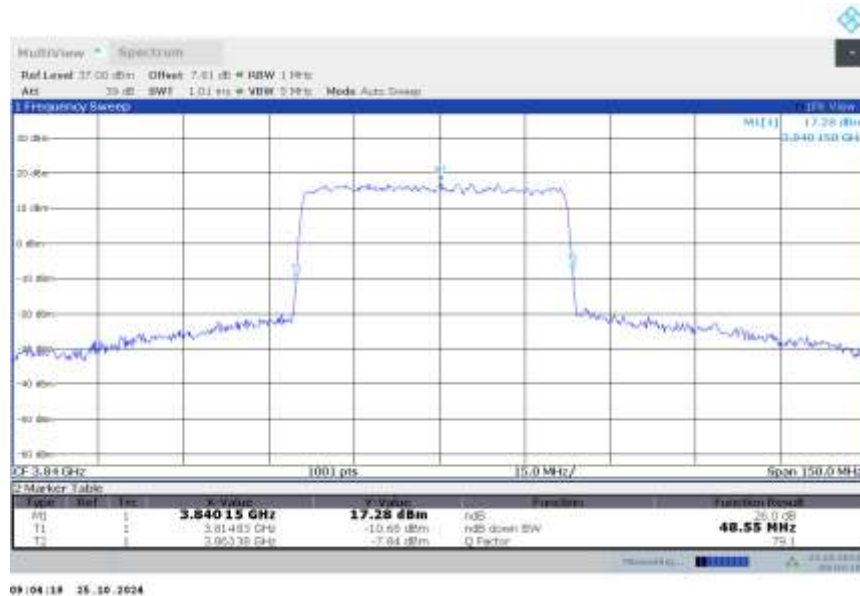
n77H,50MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3840	48.400	48.550

n77H,50MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77H,50MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



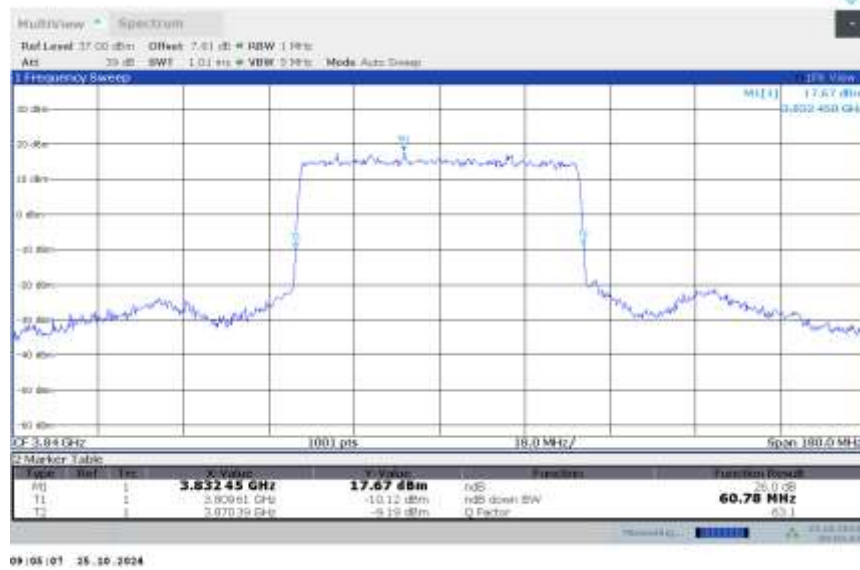


n77H

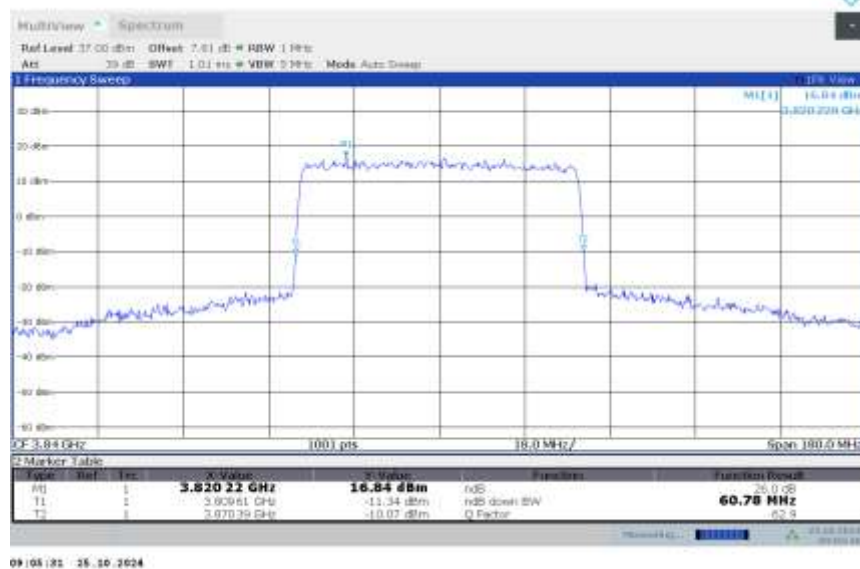
n77H,60MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3840	60.780	60.780

n77H,60MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77H,60MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



n77H

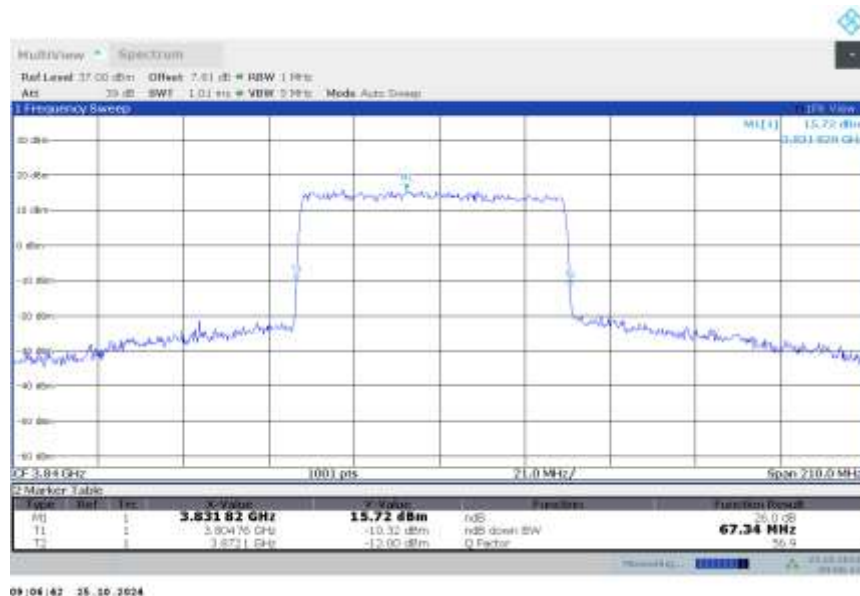
n77H,70MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3840	67.130	67.340

n77H,70MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77H,70MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



n77H

n77H,80MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3840	82.480	82.480

n77H,80MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77H,80MHz Bandwidth,DFT-s-QPSK (-26dBc BW)

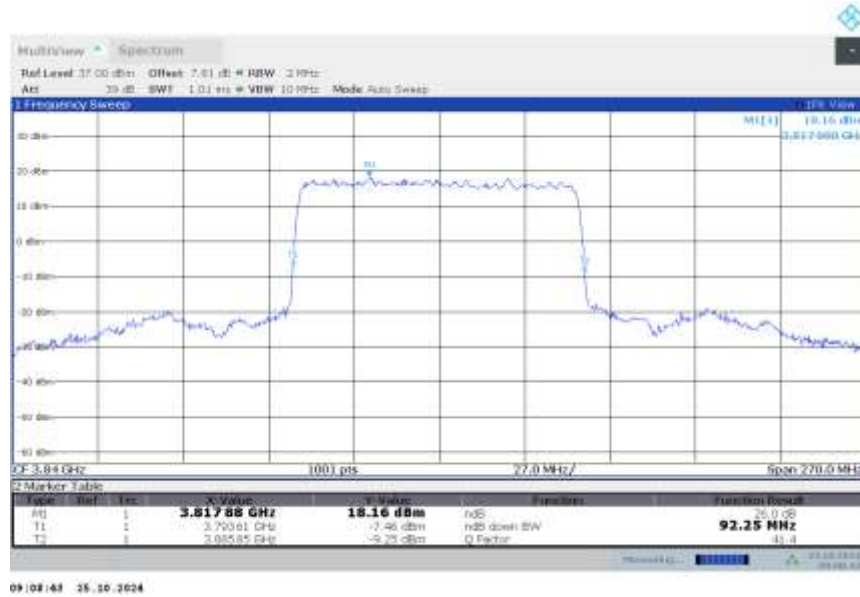


n77H

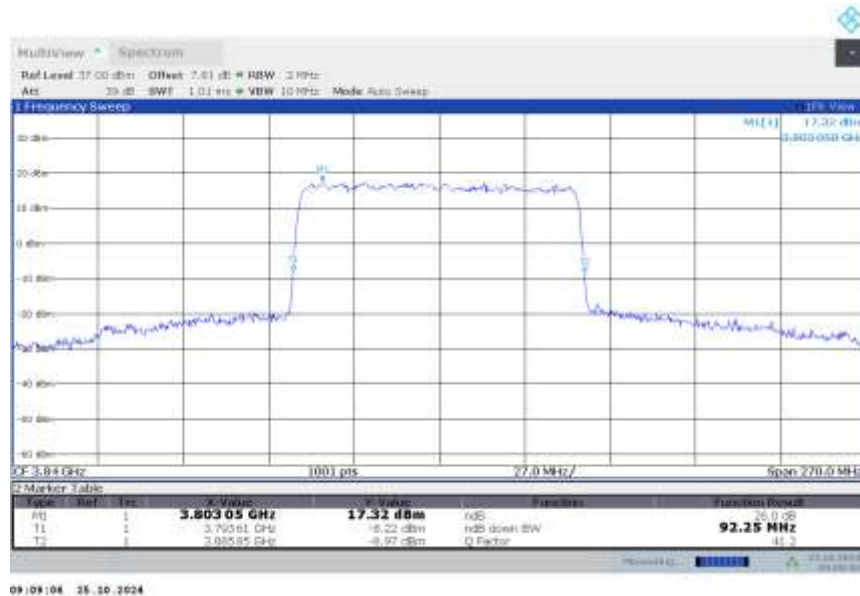
n77H,90MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3840	92.250	92.250

n77H,90MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77H,90MHz Bandwidth,DFT-s-QPSK (-26dBc BW)

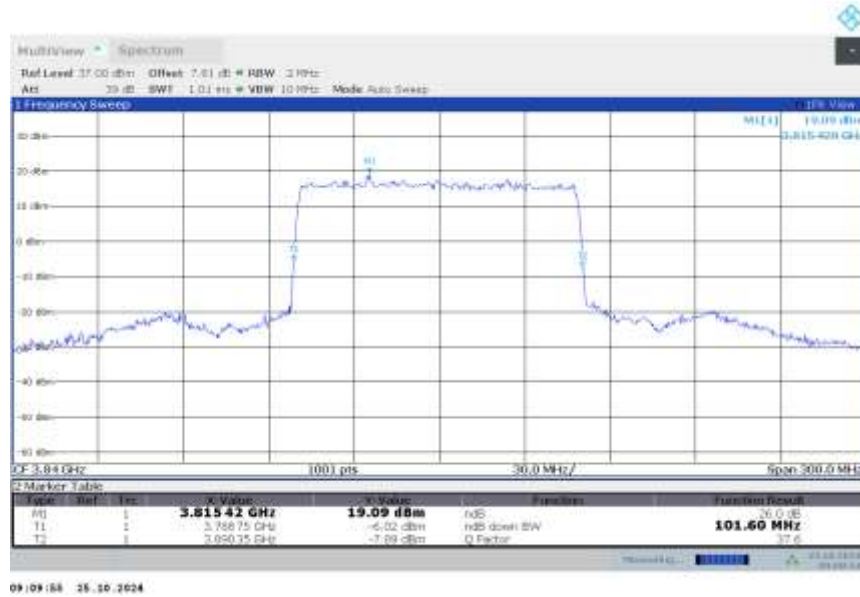


n77H

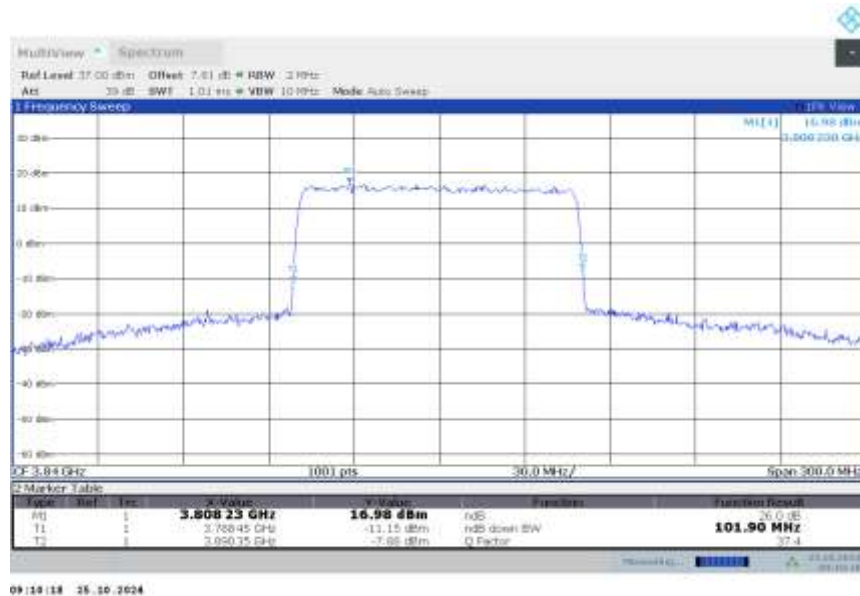
n77H,100MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3840	101.600	101.900

n77H,100MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n77H,100MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



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

## **A.6 Band Edge Compliance**

### **A.6.1 Measurement limit**

Part 22.917, Part 24.238 and Part 27.53(h) specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

Part 27.53(m) specifies for mobile digital stations, the attenuation 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 as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log(P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log(P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Part 27.53(g) states 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. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Part 27.53(a) states for mobile and portable stations operating in the 2305–2315 MHz and 2350–2360 MHz bands: By a factor of not less than:  $43 + 10 \log(P)$  dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than  $55 + 10 \log(P)$  dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than  $61 + 10 \log(P)$  dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than  $67 + 10 \log(P)$  dB on all frequencies between 2328 and 2337MHz; By a factor of not less than  $43 + 10 \log(P)$  dB on all frequencies between 2300 and 2305 MHz,  $55 + 10 \log(P)$  dB on all frequencies between 2296 and 2300MHz,  $61 + 10 \log(P)$  dB on all frequencies between 2292 and 2296 MHz,  $67 + 10 \log(P)$  dB on all frequencies between 2288 and 2292 MHz, and  $70 + 10 \log(P)$  dB below 2288 MHz; By a factor of not less than  $43 + 10 \log(P)$  dB on all frequencies between 2360 and 2365 MHz, and not less than  $70 + 10 \log(P)$  dB above 2365 MHz.

Part 96.41(e) states 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  $-13$  dBm/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  $-25$  dBm/MHz. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

Part 27.53(h) for operations in the 1695–1710 MHz, 1710–1755 MHz, 1755–1780 MHz, 1915–1920 MHz, 1995–2000 MHz, 2000–2020 MHz, 2110–2155 MHz, 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  $43 + 10 \log_{10}(P)$  dB. 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 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 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.

Part 27.53(n) states for mobile operations in the 3450–3550 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.

Part 27.53(l) states for mobile operations in the 3700–3980 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.

The spectrum analyzer readings are corrected by  $[10 \log (1/\text{duty cycle})]$  for the non-continuous transmitting scenario.

## A.6.2 Measurement result

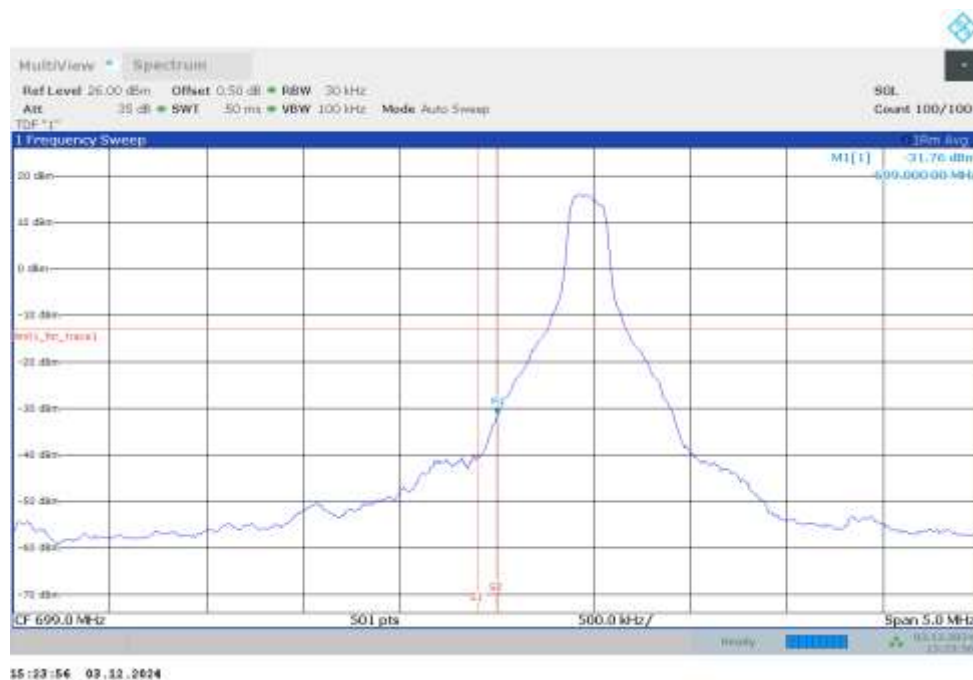
### Measurement Results from UT09a:

NR n12

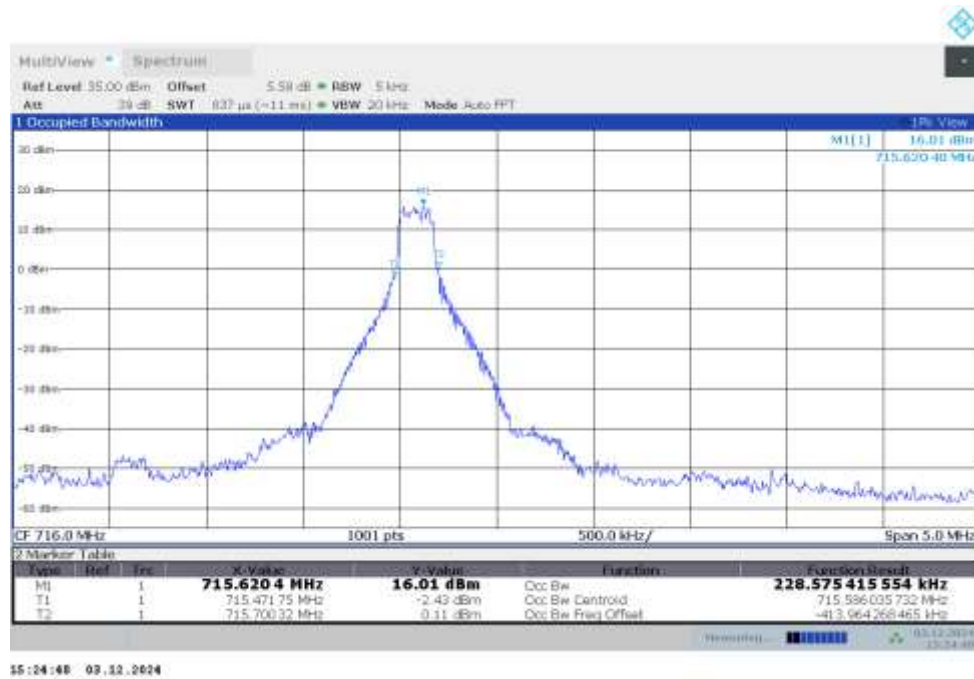
OBW: 1RB-LOW\_offset



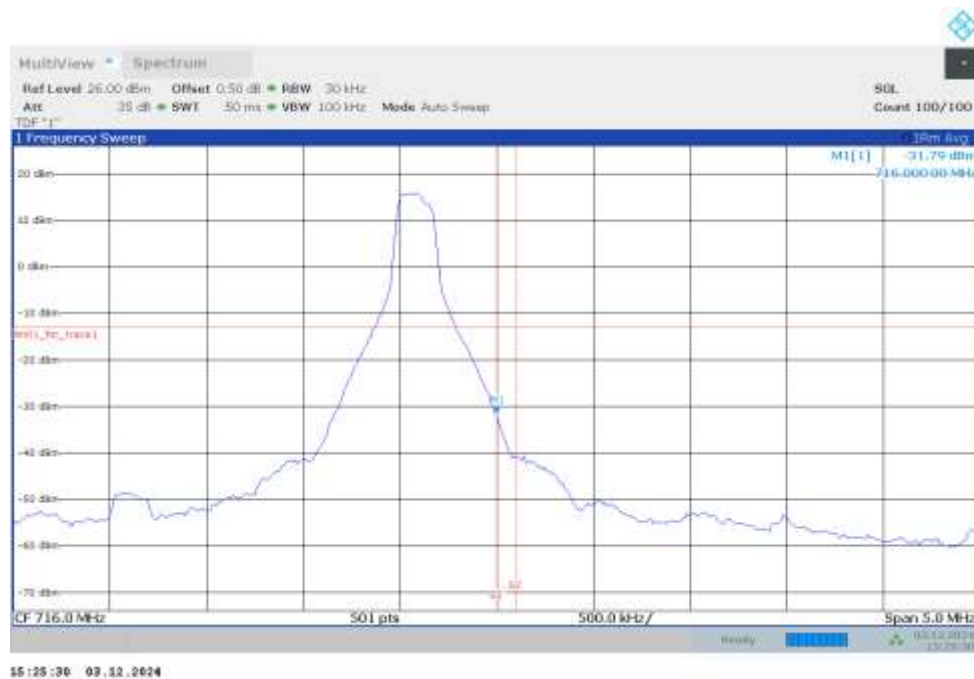
### LOW BAND EDGE BLOCK-1RB-LOW\_offset



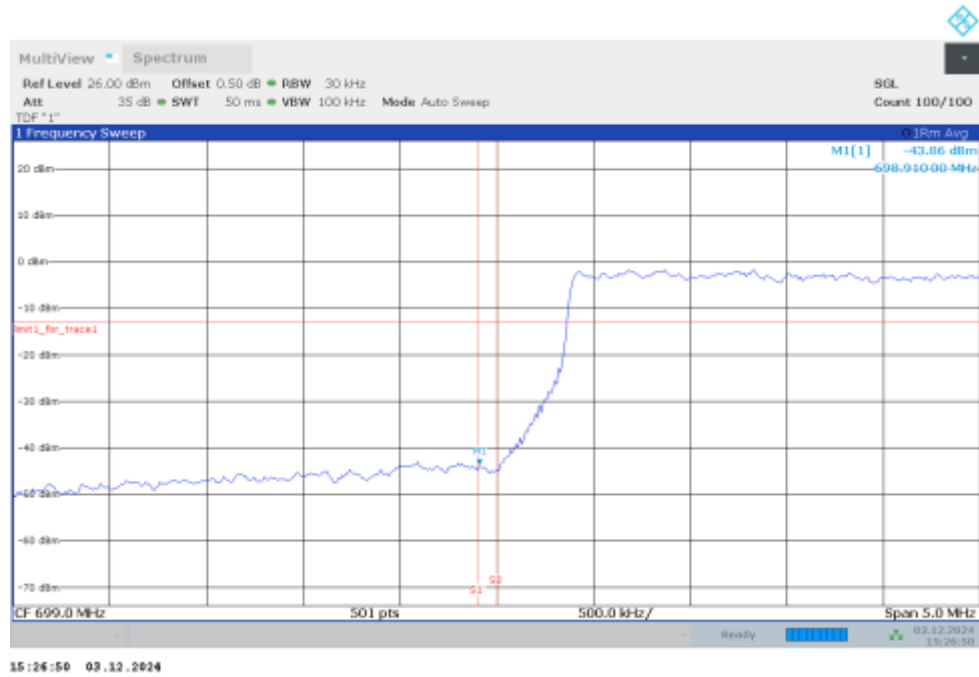
## OBW: 1RB-HIGH\_offset



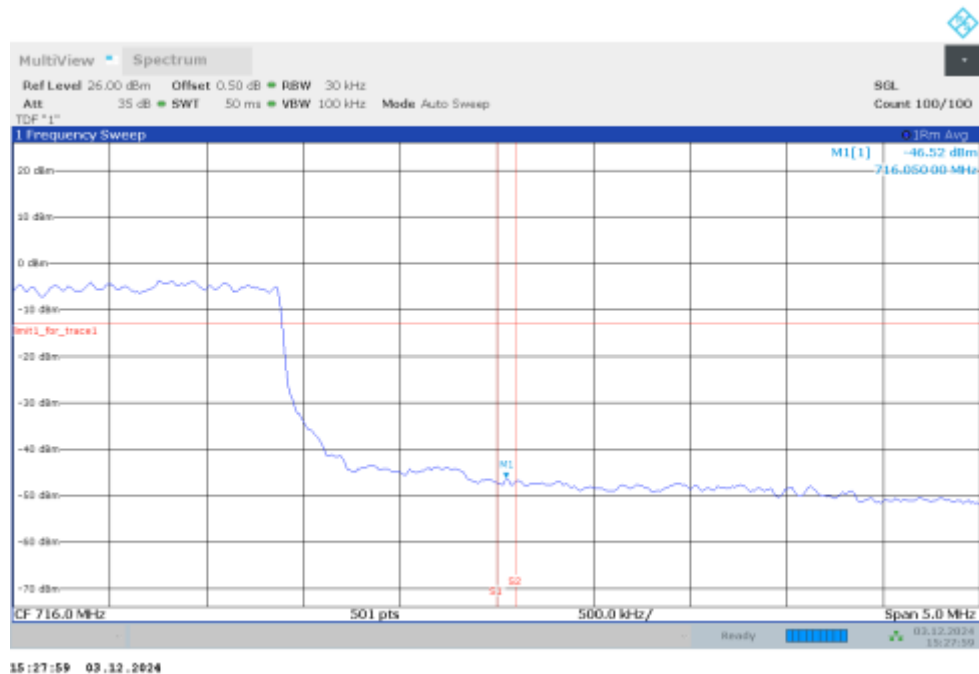
## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



## LOW BAND EDGE BLOCK-15MHz-100%RB

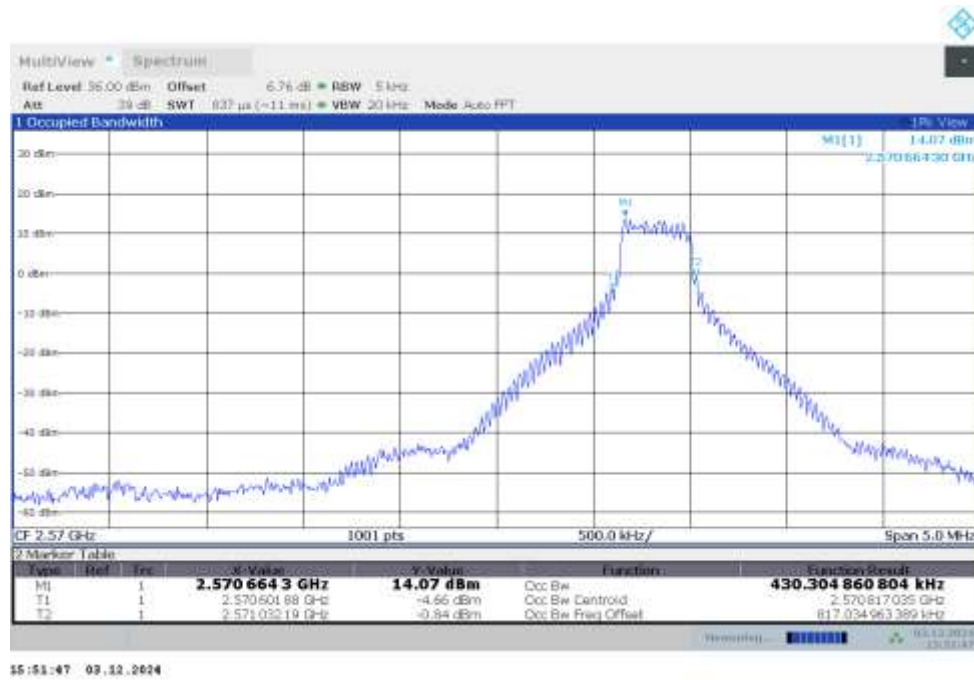


## HIGH BAND EDGE BLOCK-15MHz-100%RB

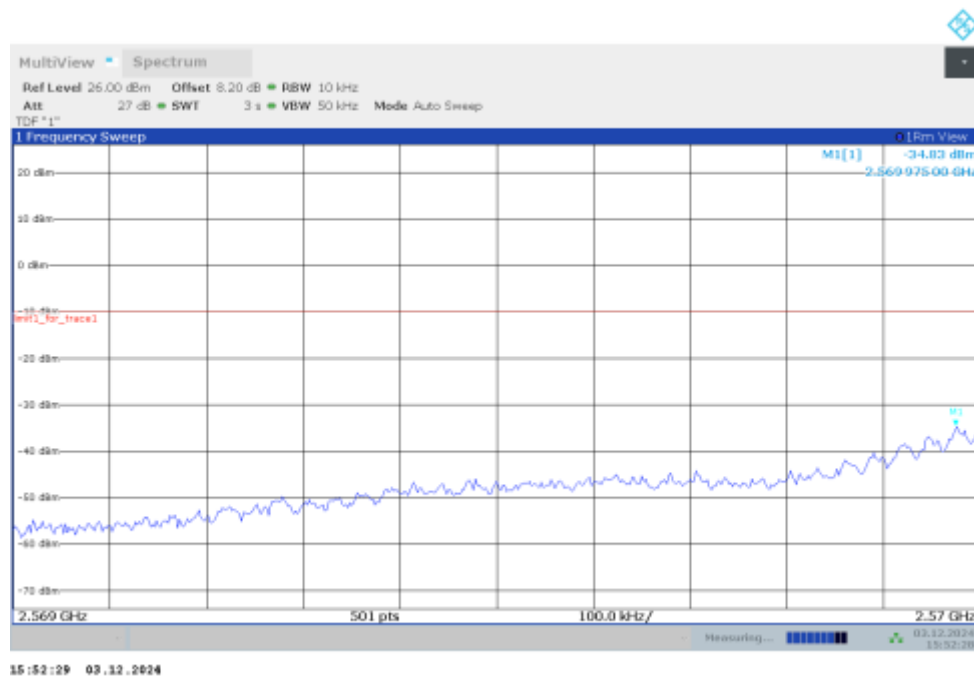


NR n38

OBW: 1RB-LOW\_offset



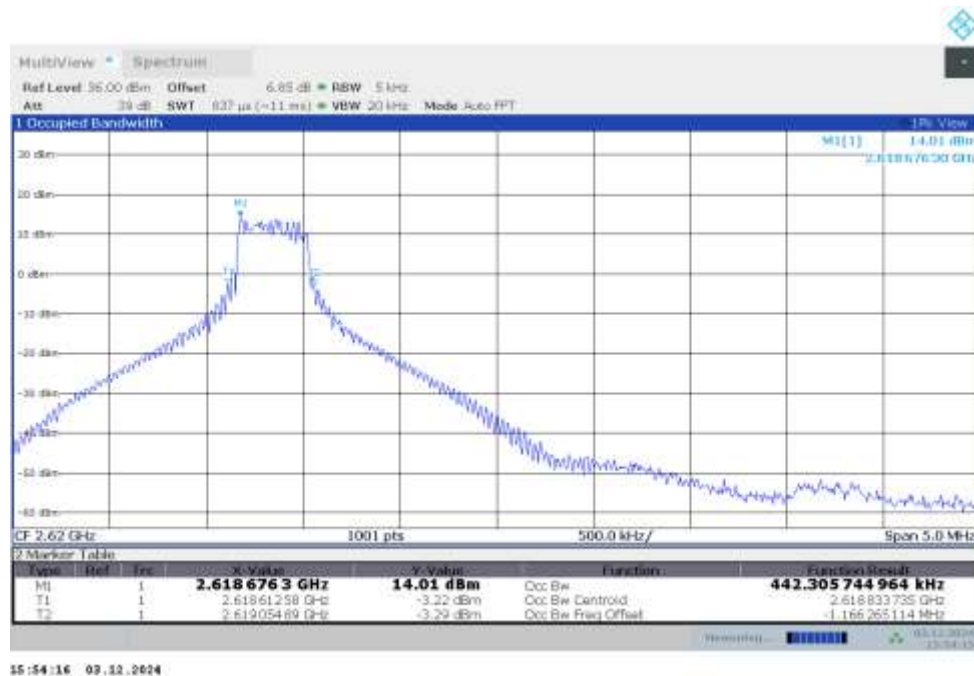
LOW BAND EDGE BLOCK-1RB-LOW\_offset



## LOW BAND EDGE BLOCK-1RB-LOW\_offset

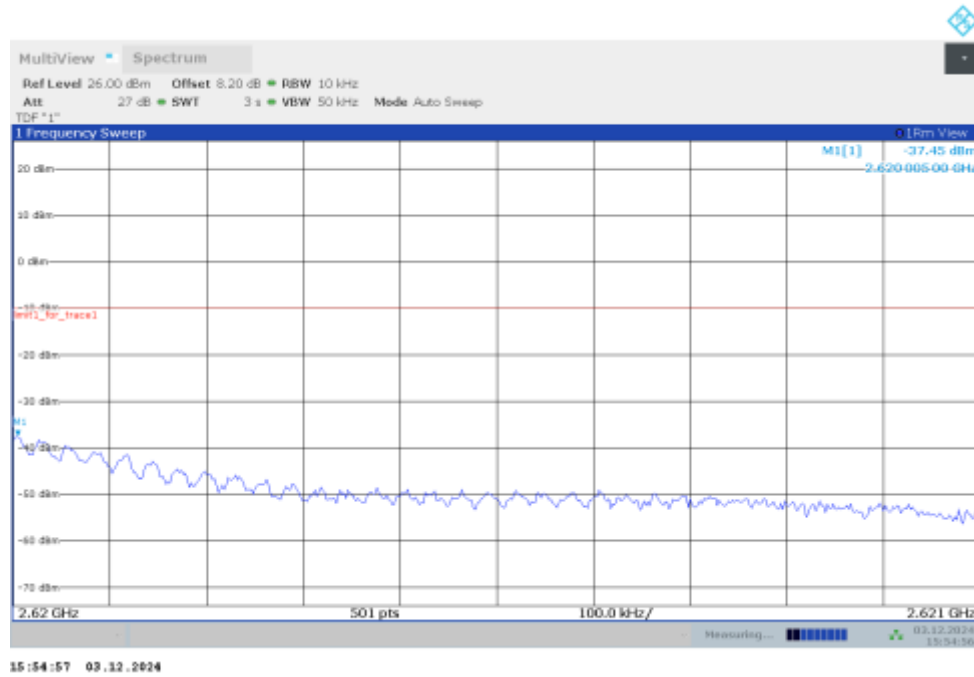


## OBW: 1RB-HIGH\_offset

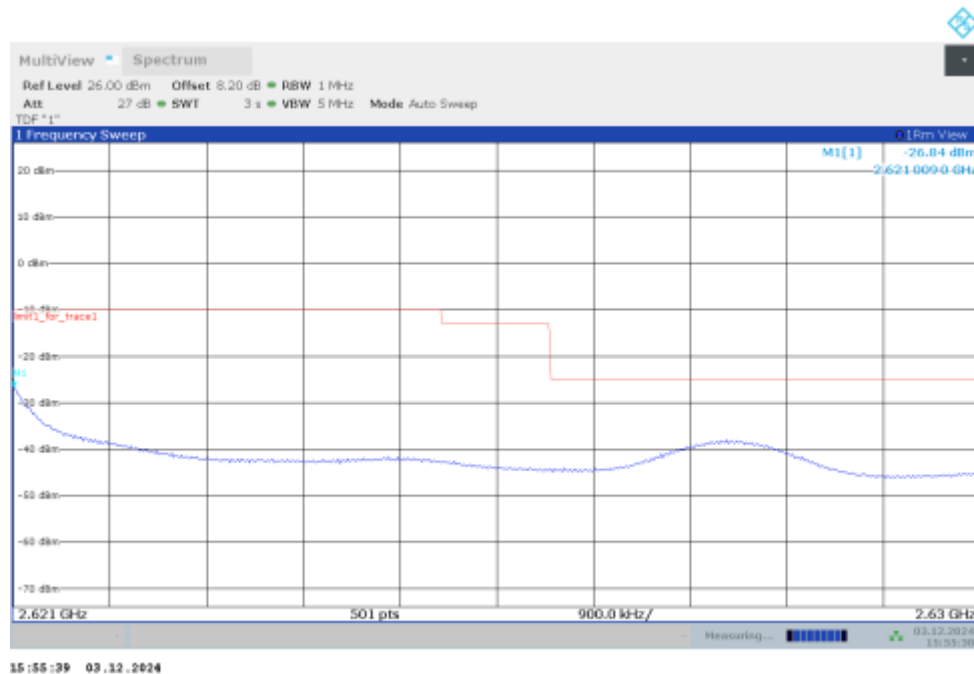




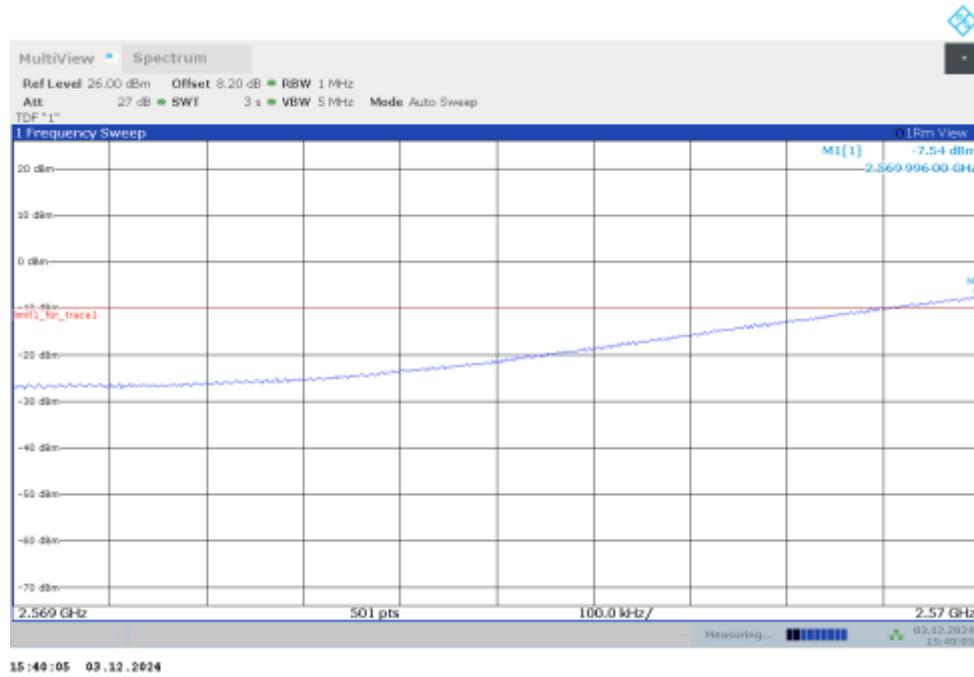
## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



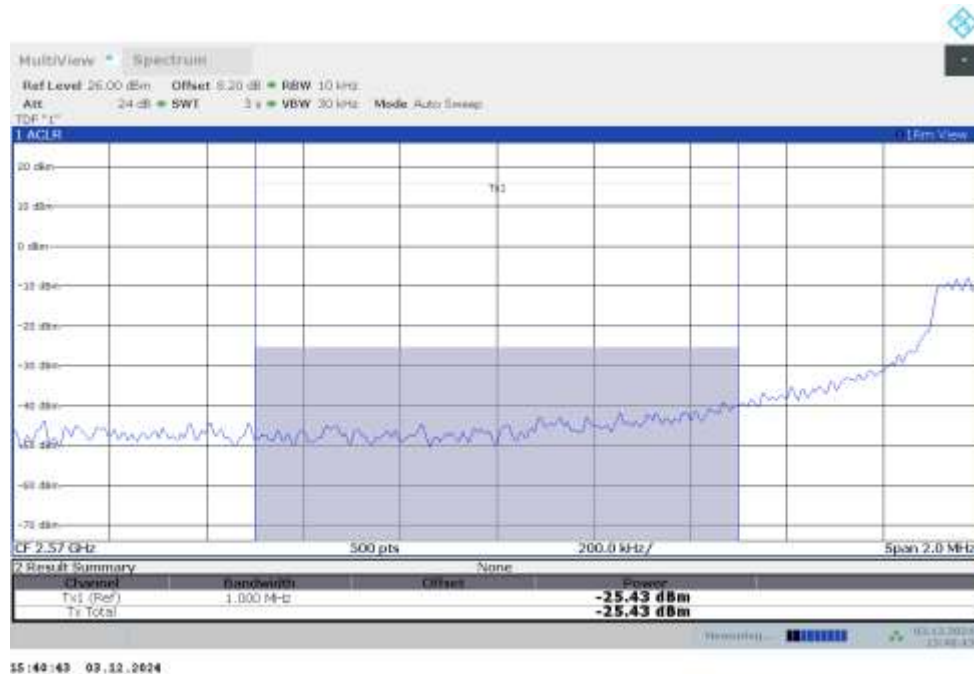
## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



## LOW BAND EDGE BLOCK-40MHz-100%RB



## Channel power



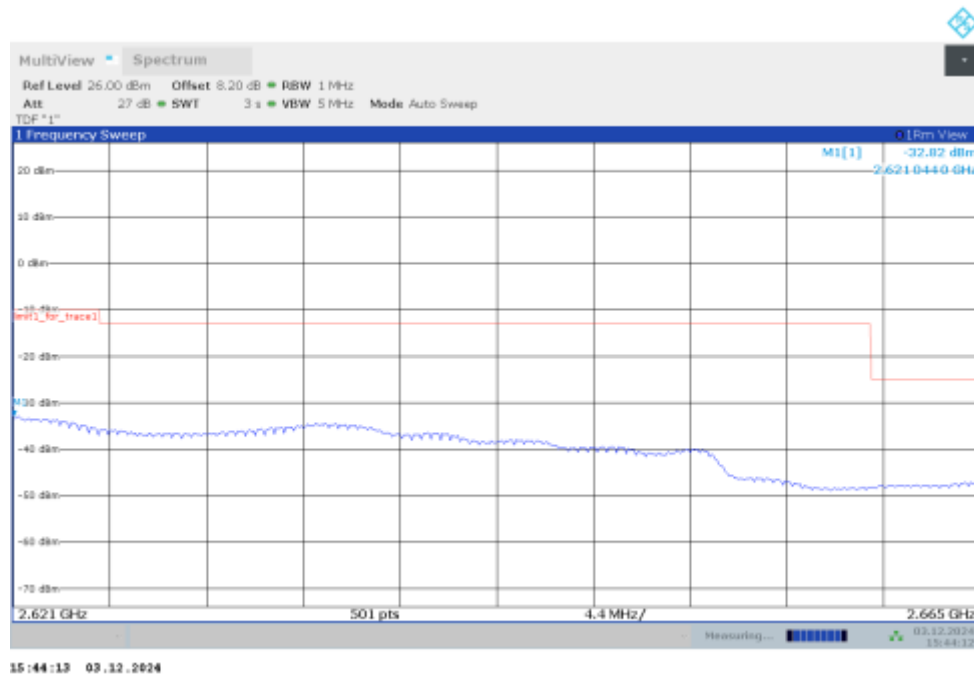
## LOW BAND EDGE BLOCK-40MHz-100%RB



## HIGH BAND EDGE BLOCK-40MHz-100%RB



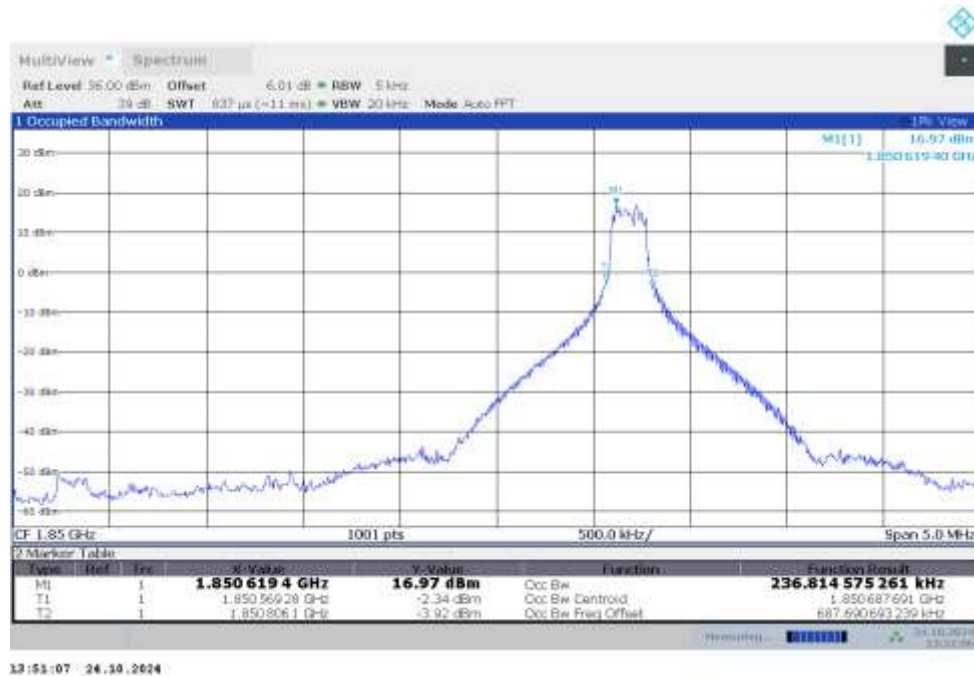
## HIGH BAND EDGE BLOCK-40MHz-100%RB



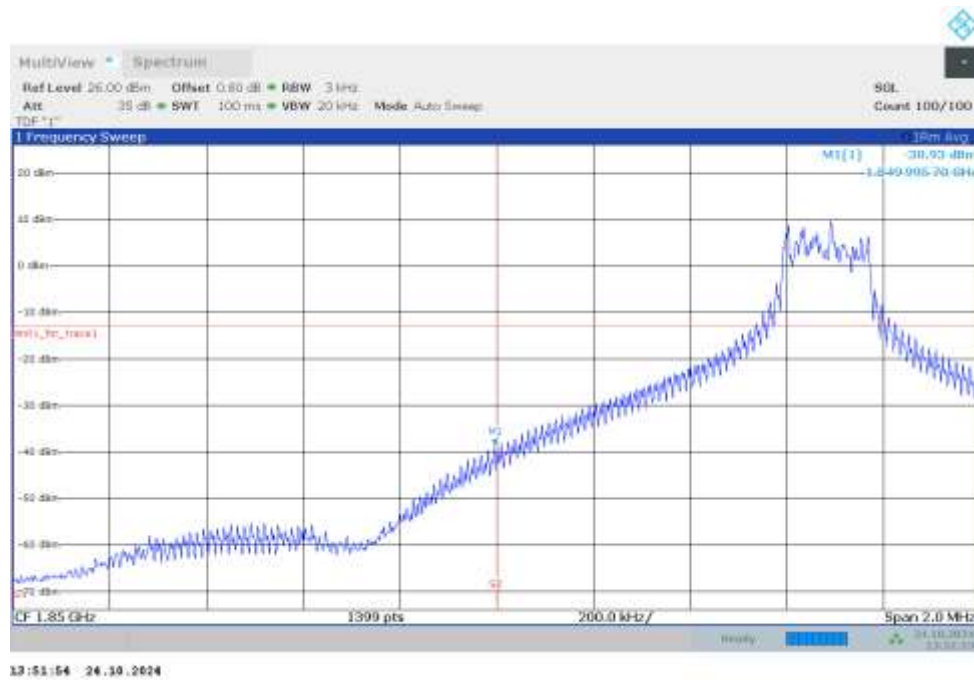
## Reference Measurement Results from basic model:

NR n2

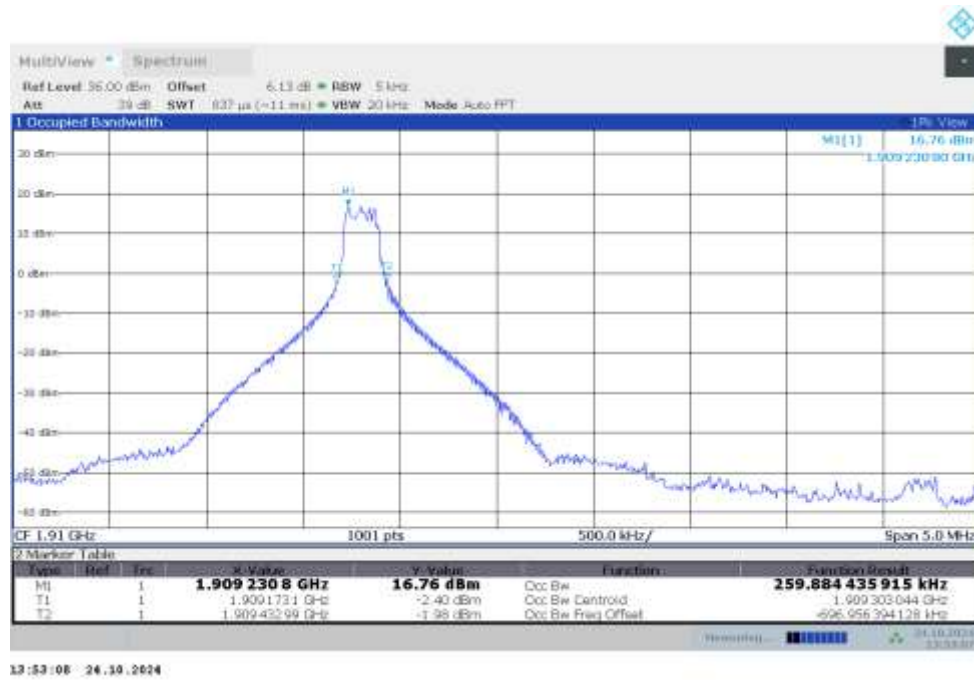
OBW: 1RB-LOW\_offset



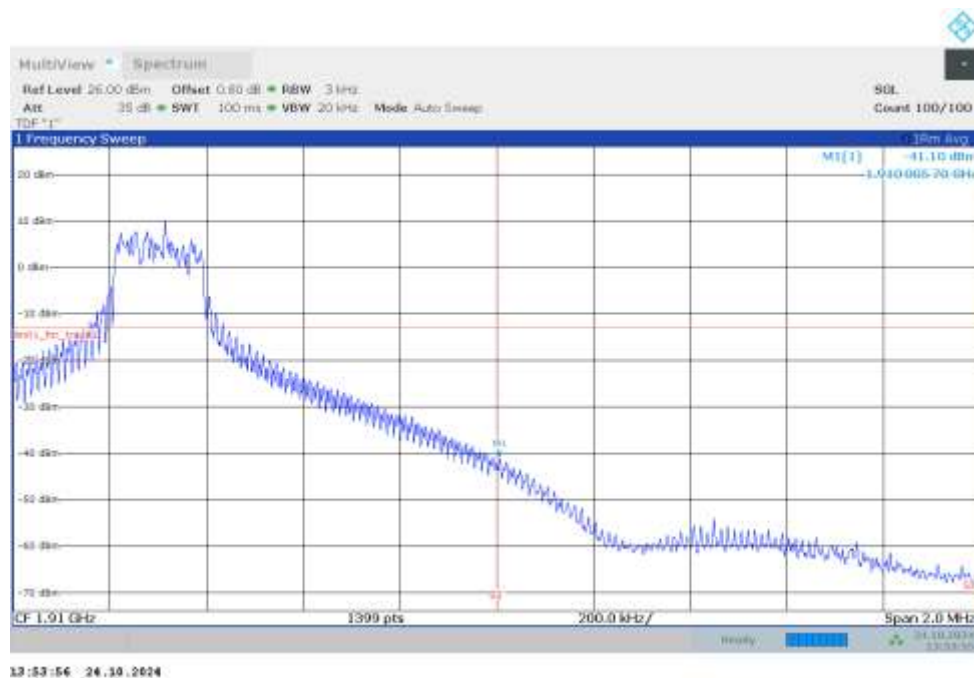
## LOW BAND EDGE BLOCK-1RB-LOW\_offset



## OBW: 1RB-HIGH\_offset

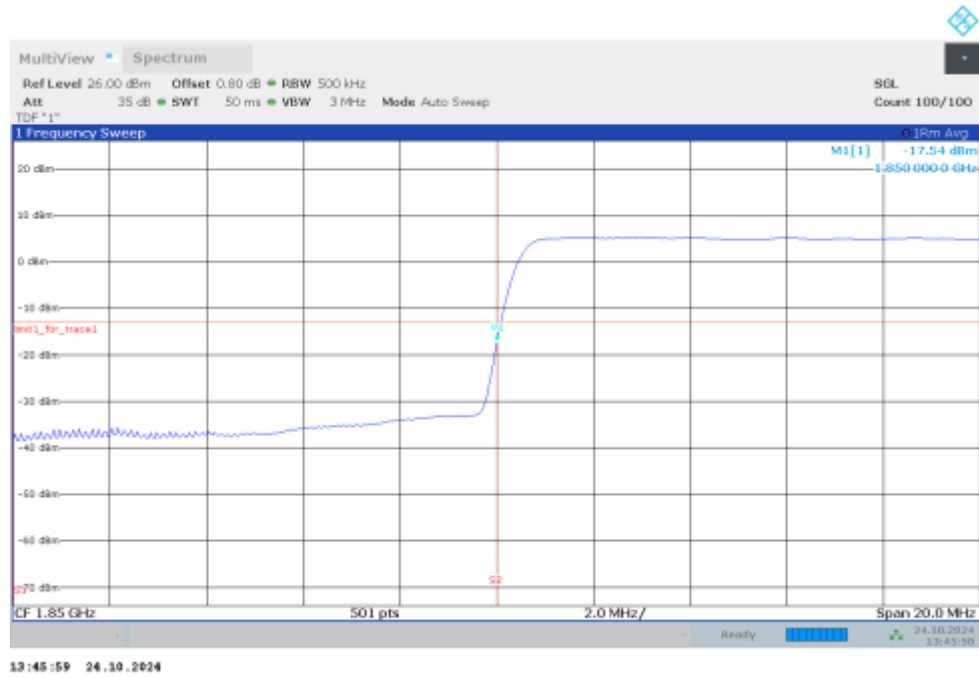


## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset

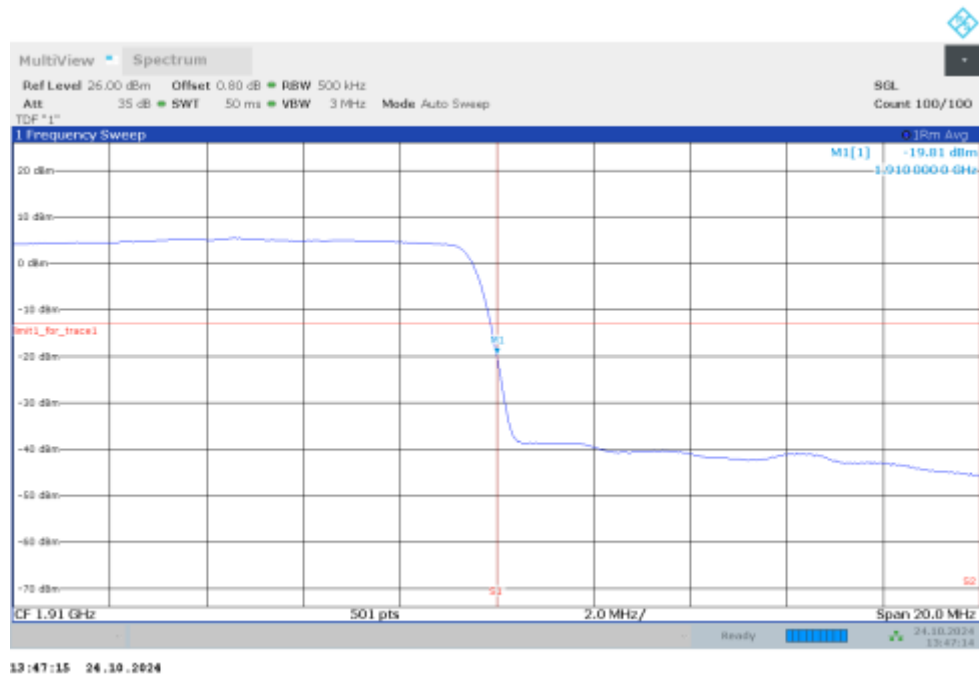




## LOW BAND EDGE BLOCK-40MHz-100%RB



## HIGH BAND EDGE BLOCK-40MHz-100%RB

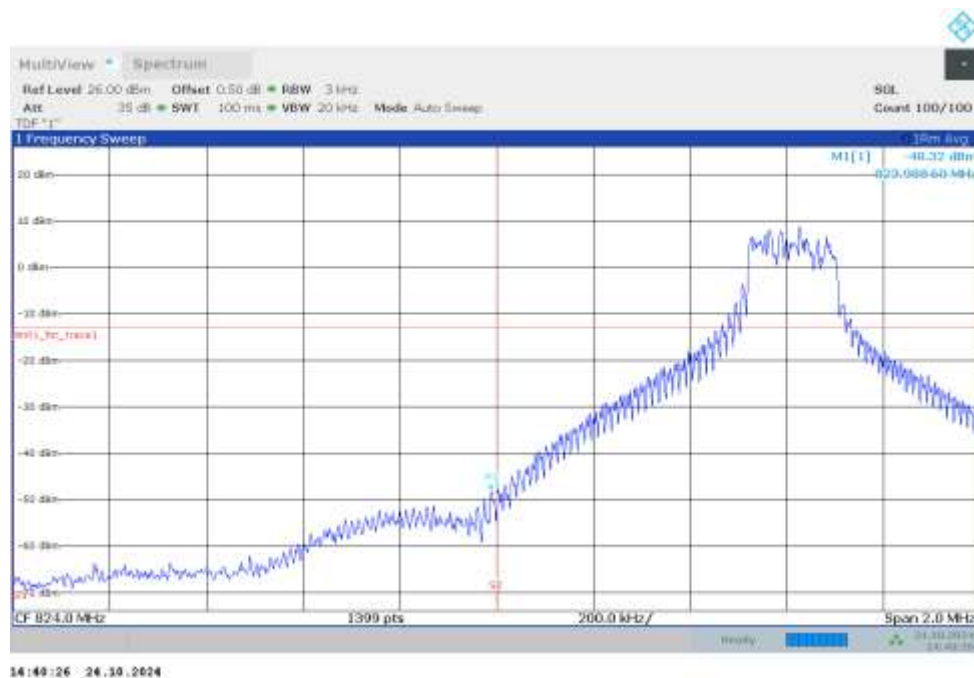


**NR n5**

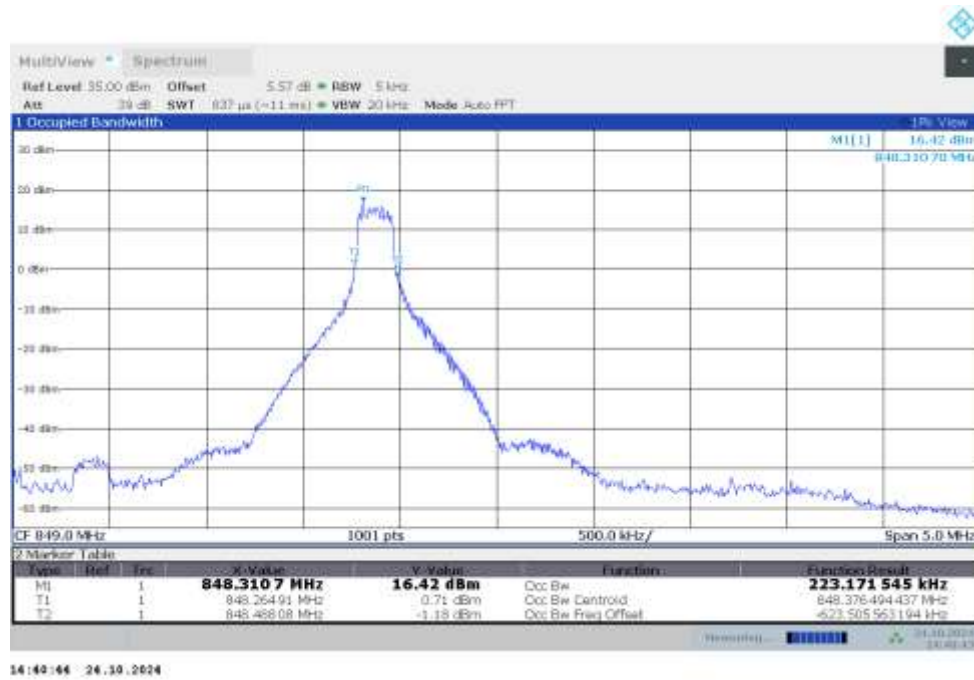
**OBW: 1RB-LOW\_offset**



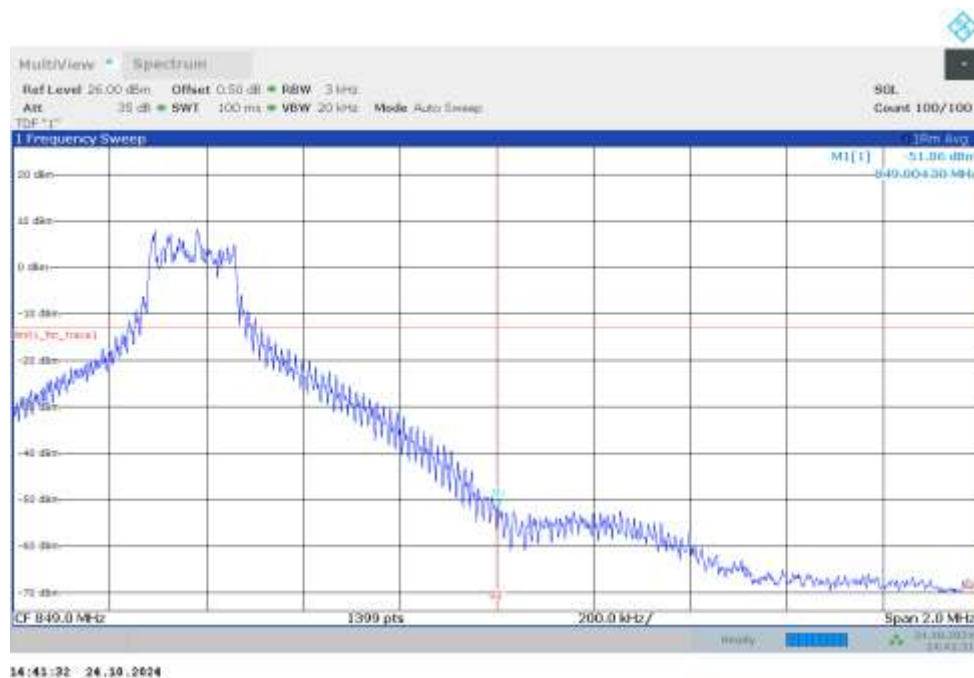
**LOW BAND EDGE BLOCK-1RB-LOW\_offset**



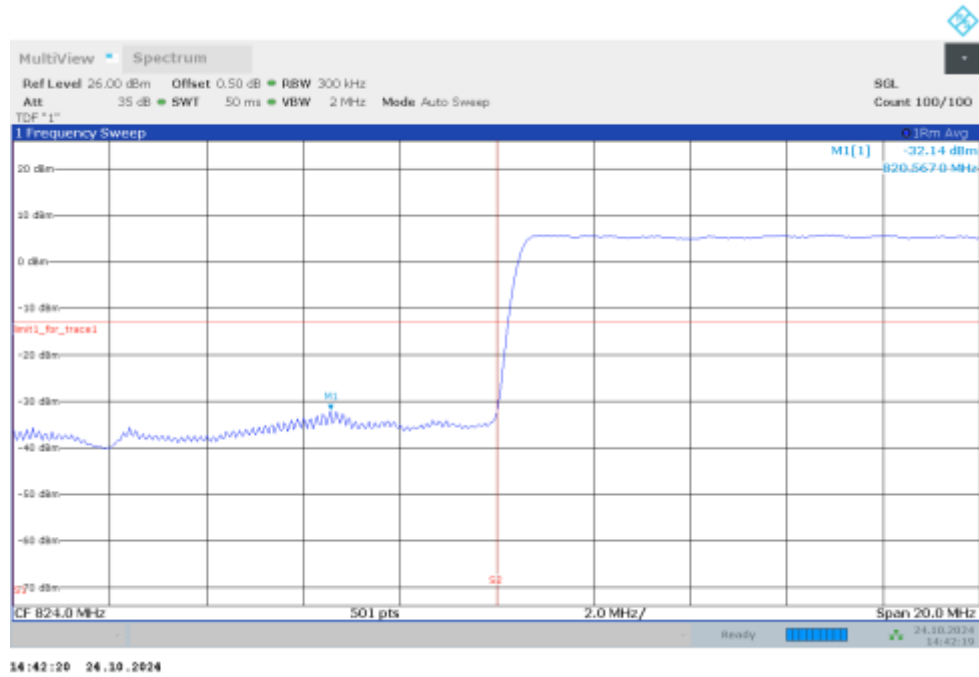
## OBW: 1RB-HIGH\_offset



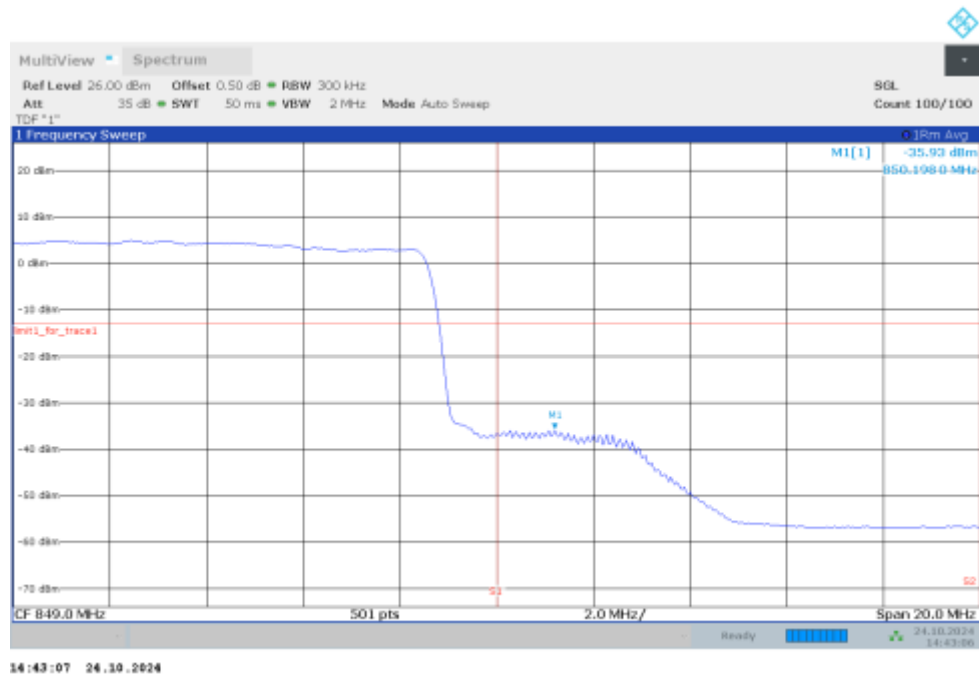
## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



## LOW BAND EDGE BLOCK-25MHz-100%RB

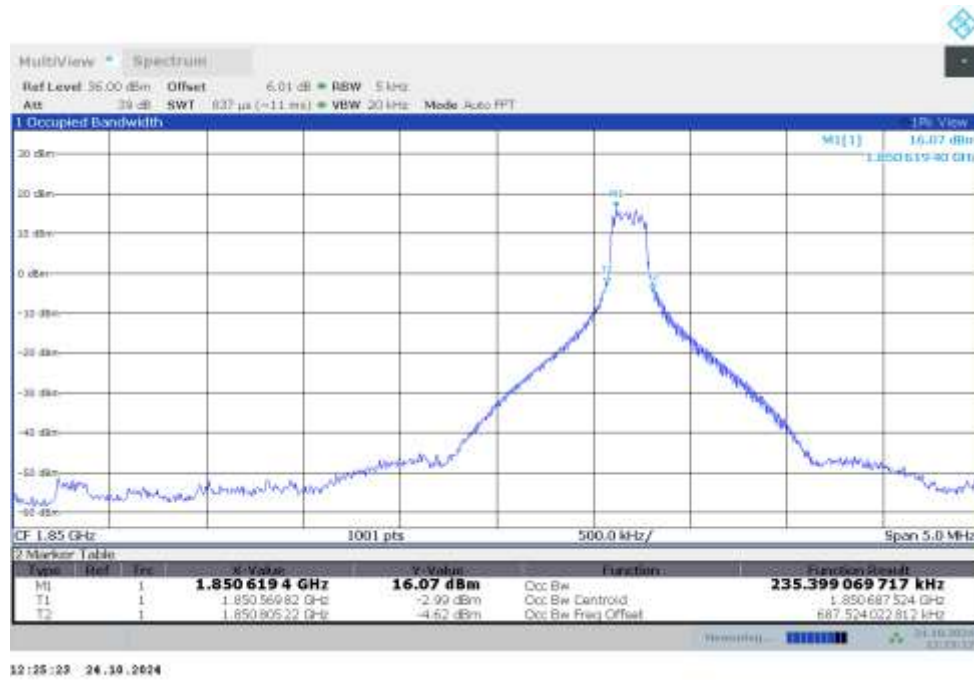


## HIGH BAND EDGE BLOCK-25MHz-100%RB

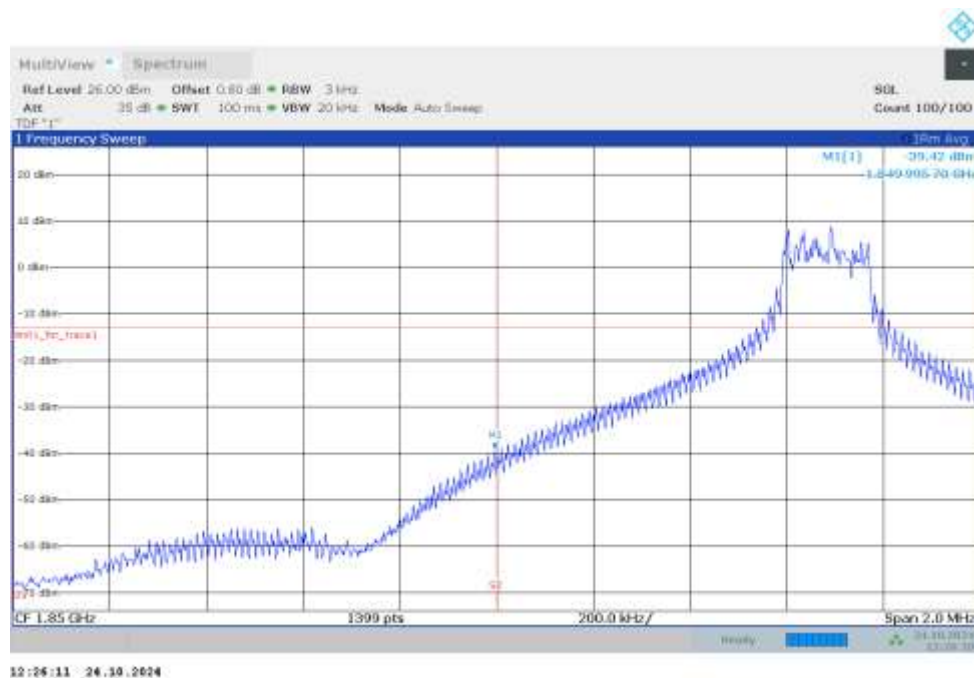


NR n25

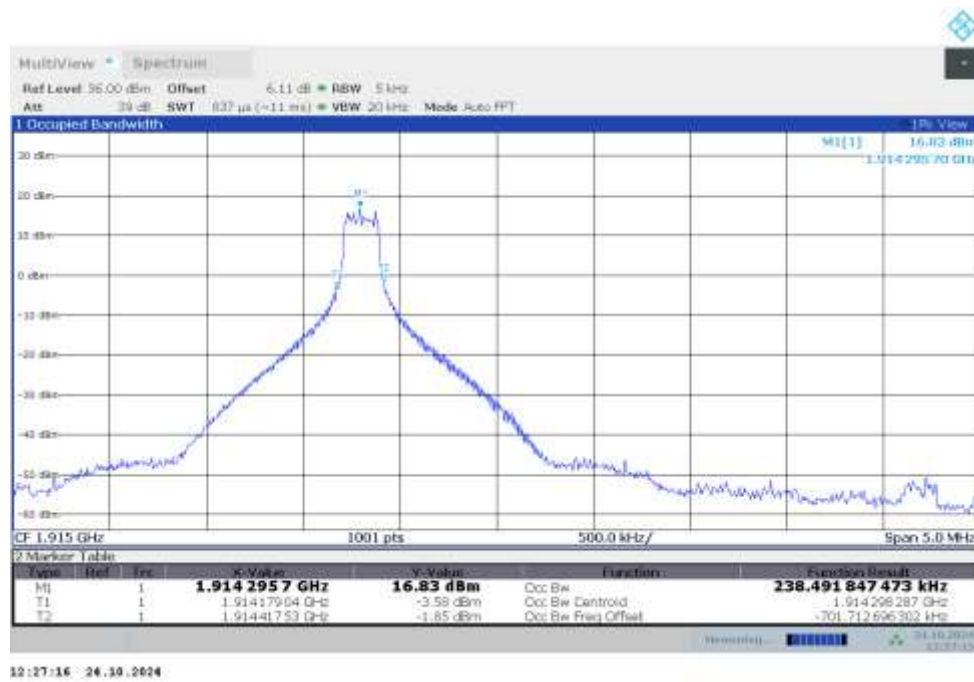
OBW: 1RB-LOW\_offset



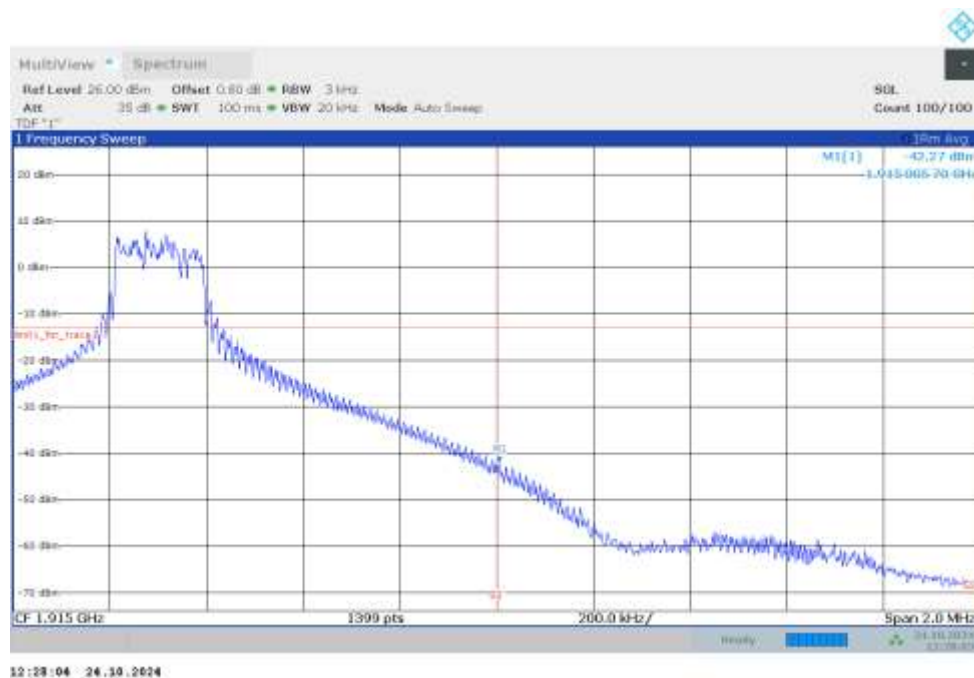
LOW BAND EDGE BLOCK-1RB-LOW\_offset



## OBW: 1RB-HIGH\_offset

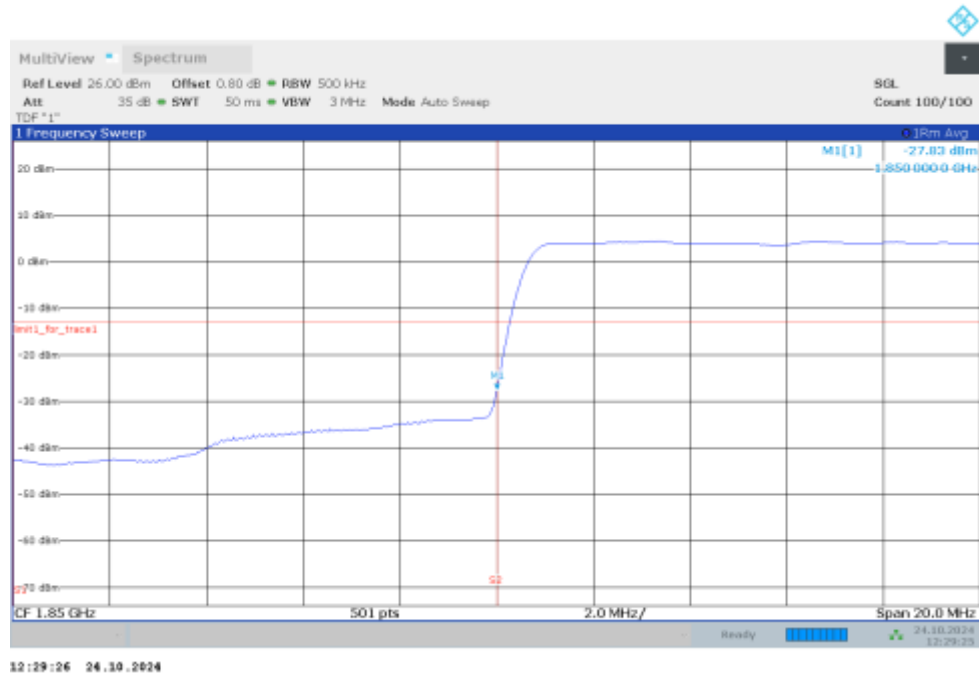


## HIGH BAND EDGE BLOCK--1RB-HIGH\_offset

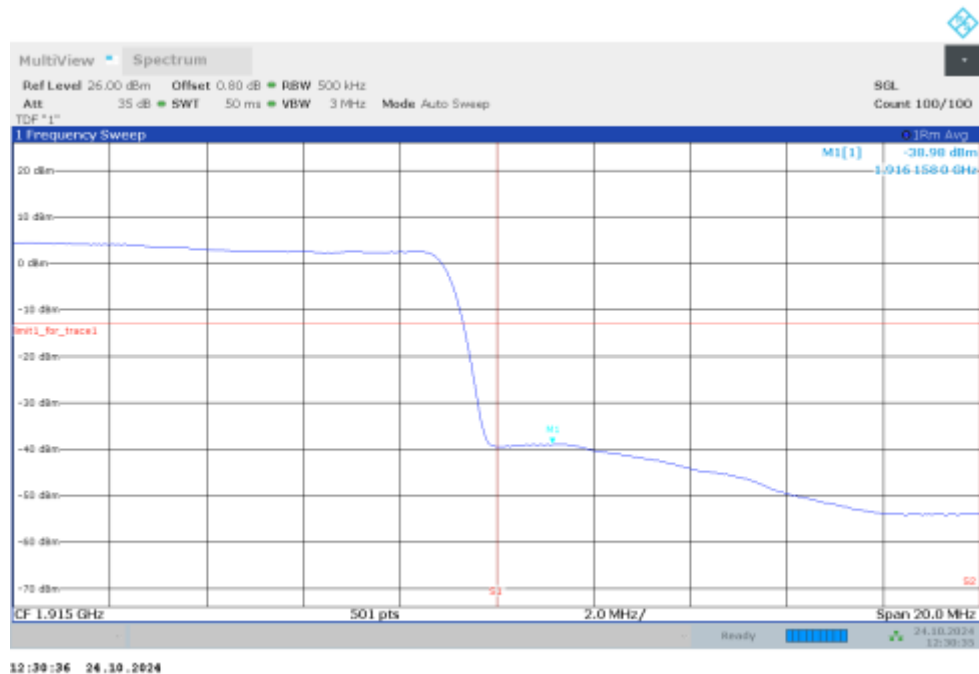




## LOW BAND EDGE BLOCK-45MHz-100%RB



## HIGH BAND EDGE BLOCK-45MHz-100%RB

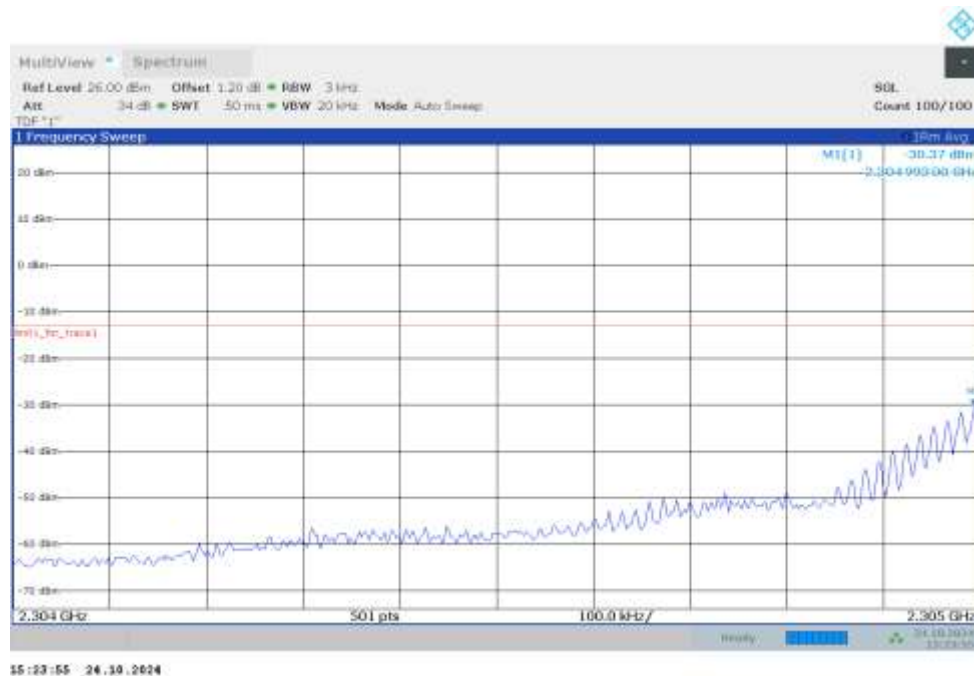


NR n30

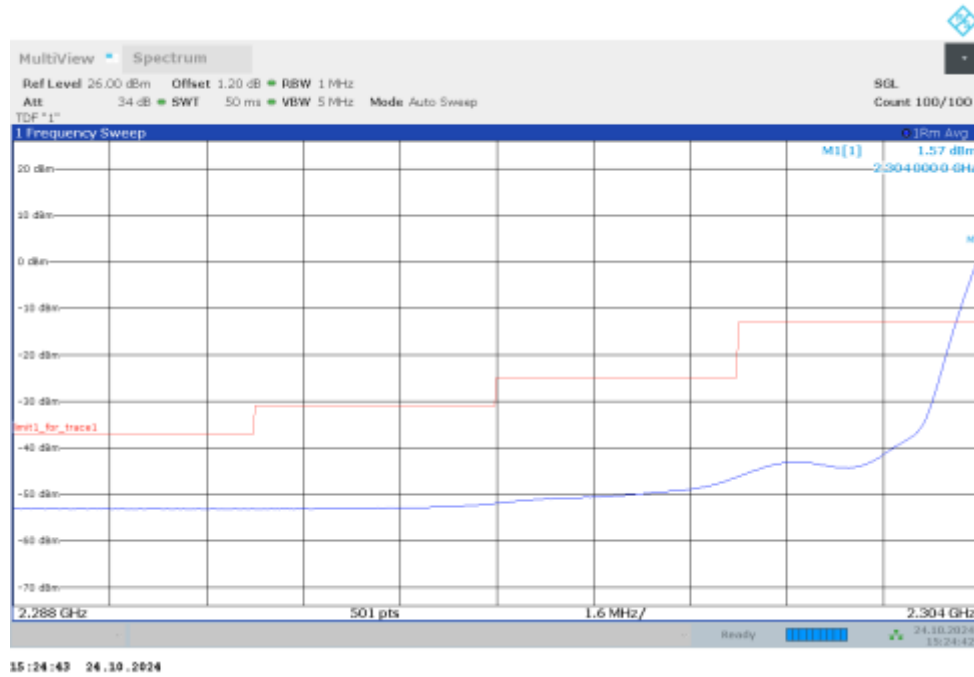
OBW: 1RB-LOW\_offset



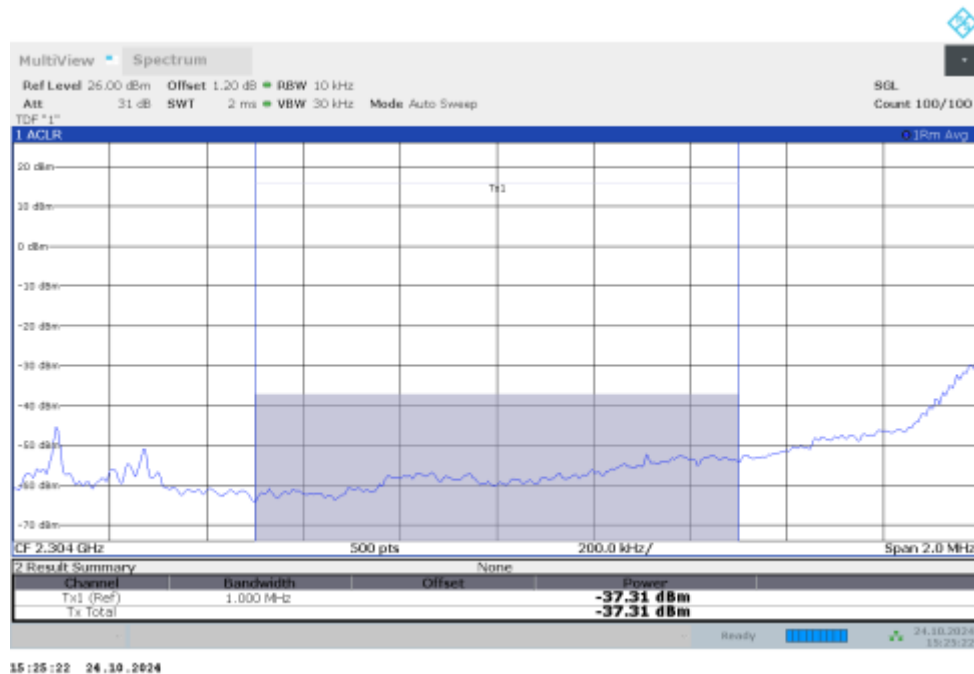
LOW BAND EDGE BLOCK-1RB-LOW\_offset



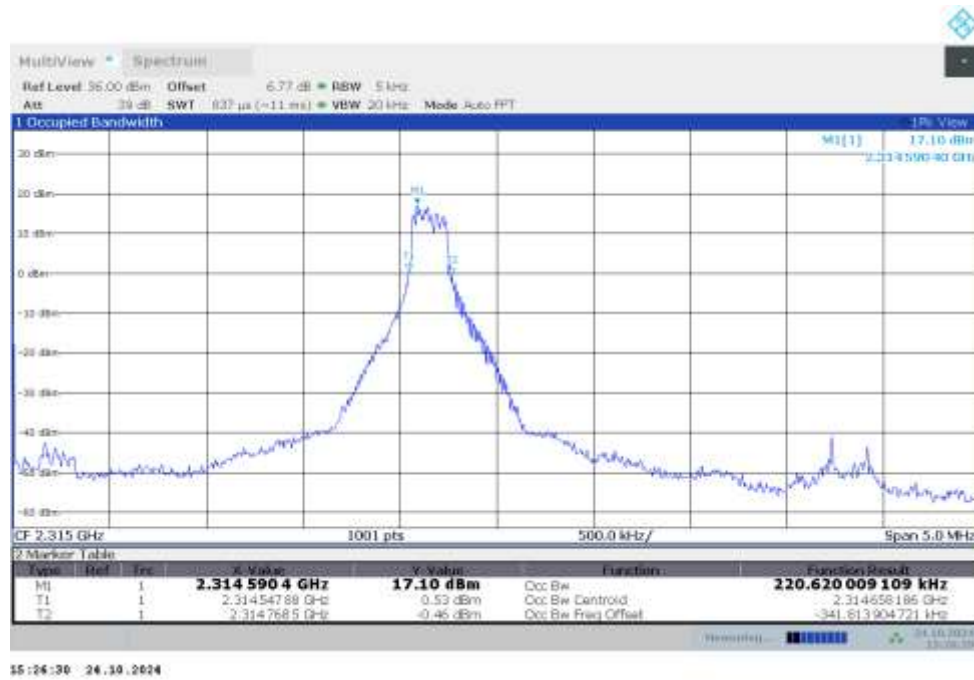
## LOW BAND EDGE BLOCK-1RB-LOW\_offset



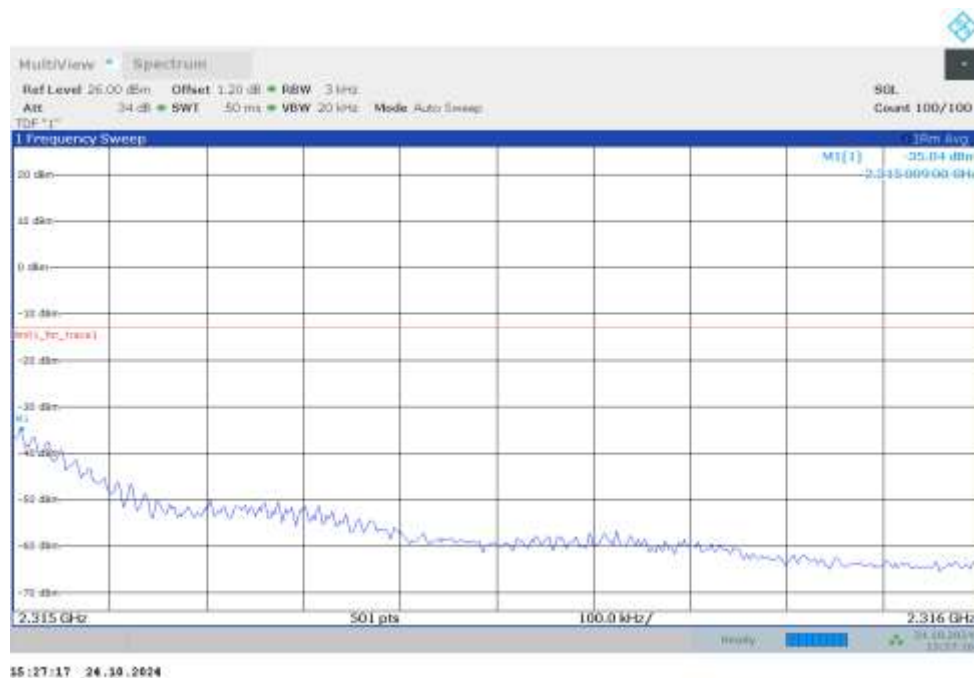
## Channel power



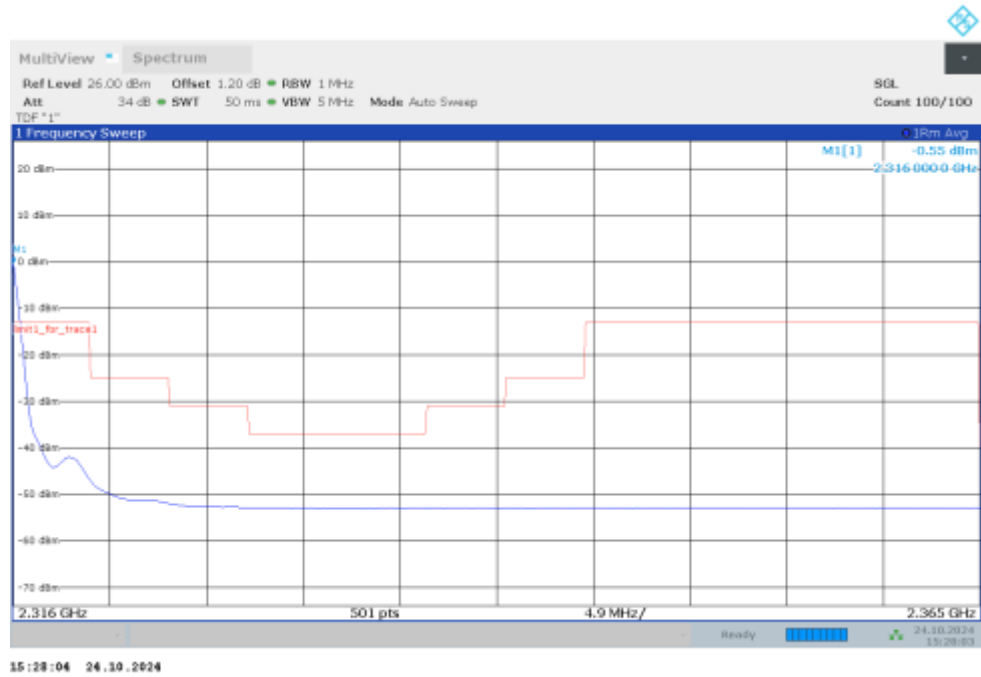
## OBW: 1RB-HIGH\_offset



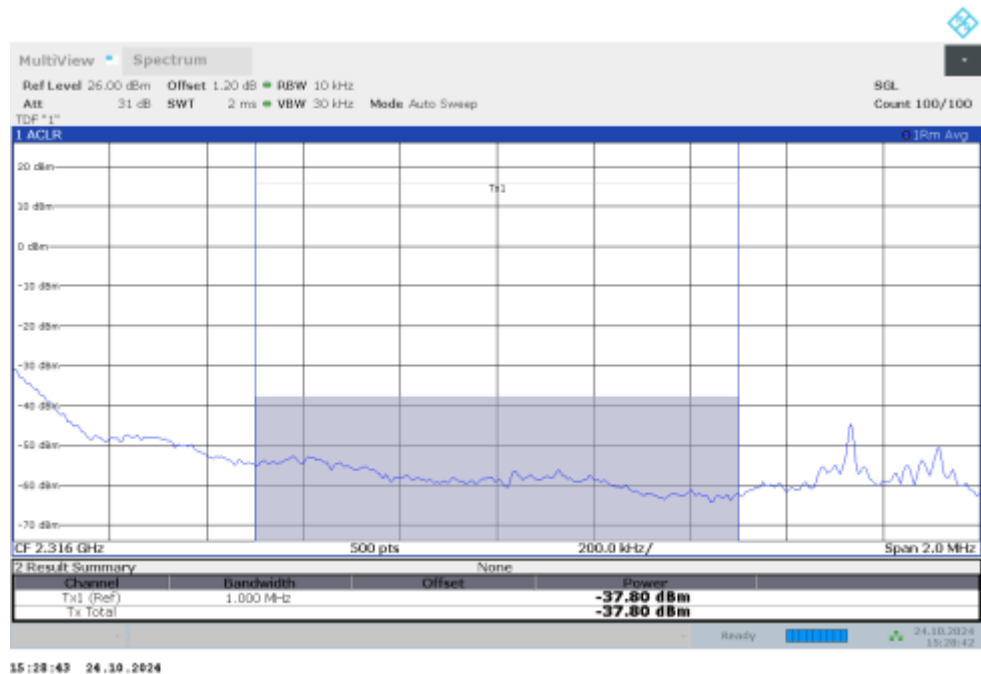
## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



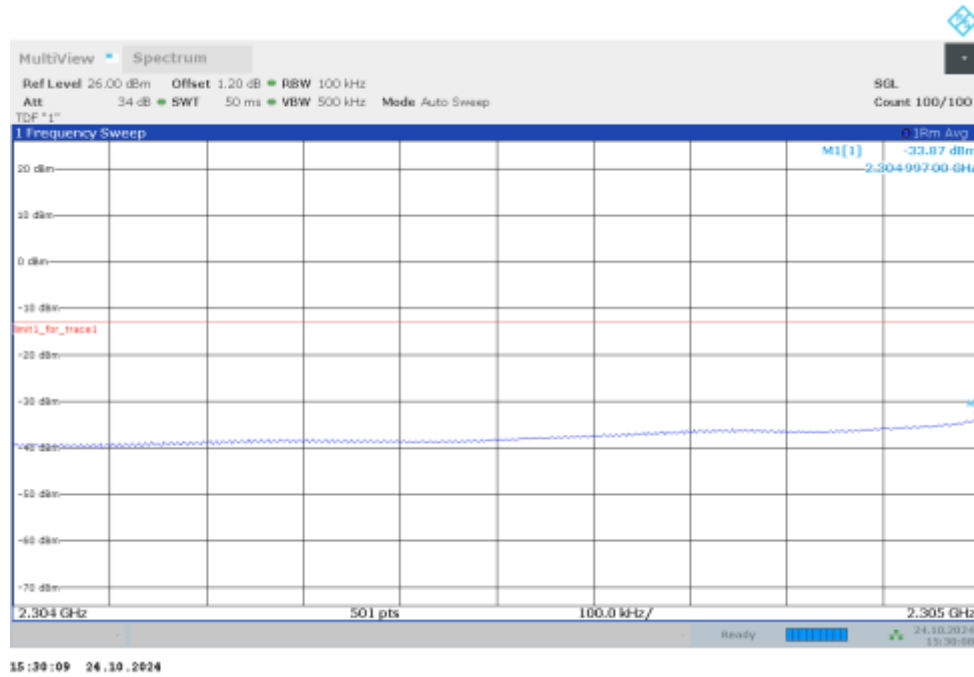
## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



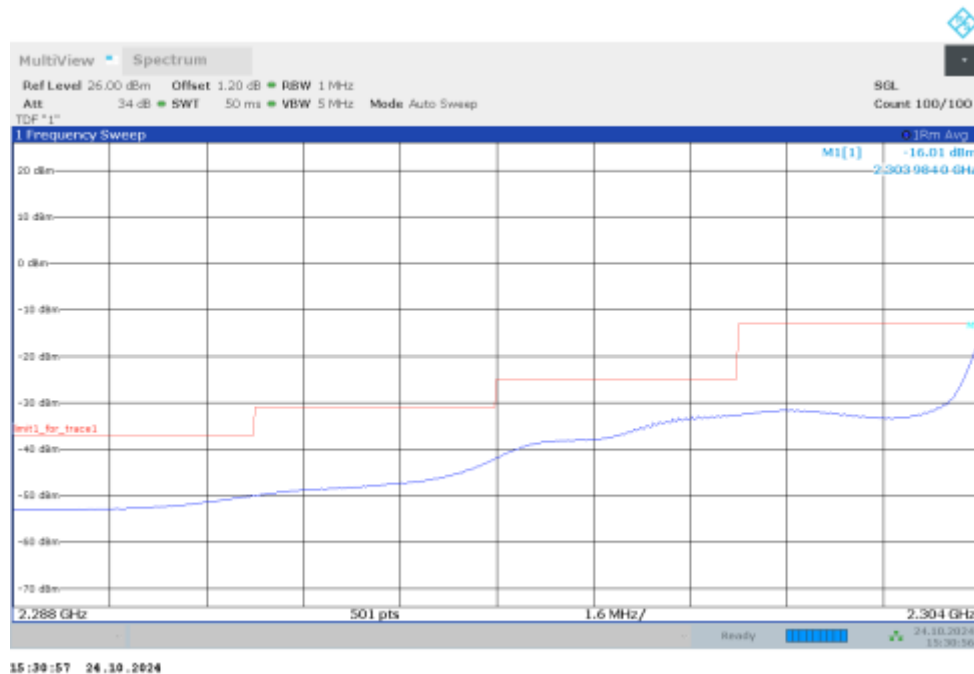
## Channel power



## LOW BAND EDGE BLOCK-10MHz-100%RB

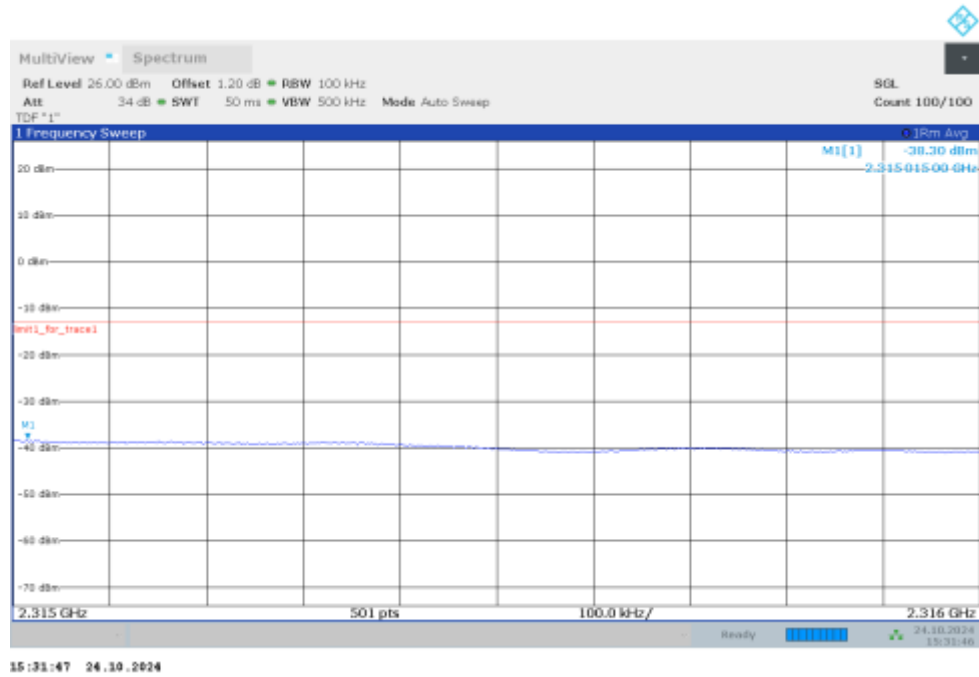


## LOW BAND EDGE BLOCK-10MHz-100%RB

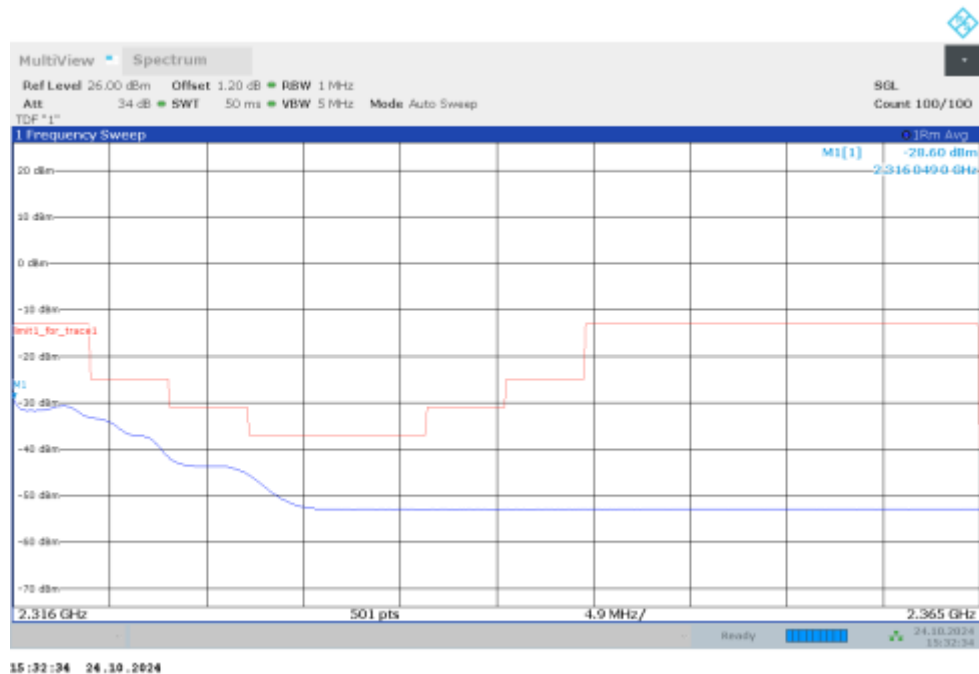




## HIGH BAND EDGE BLOCK-10MHz-100%RB

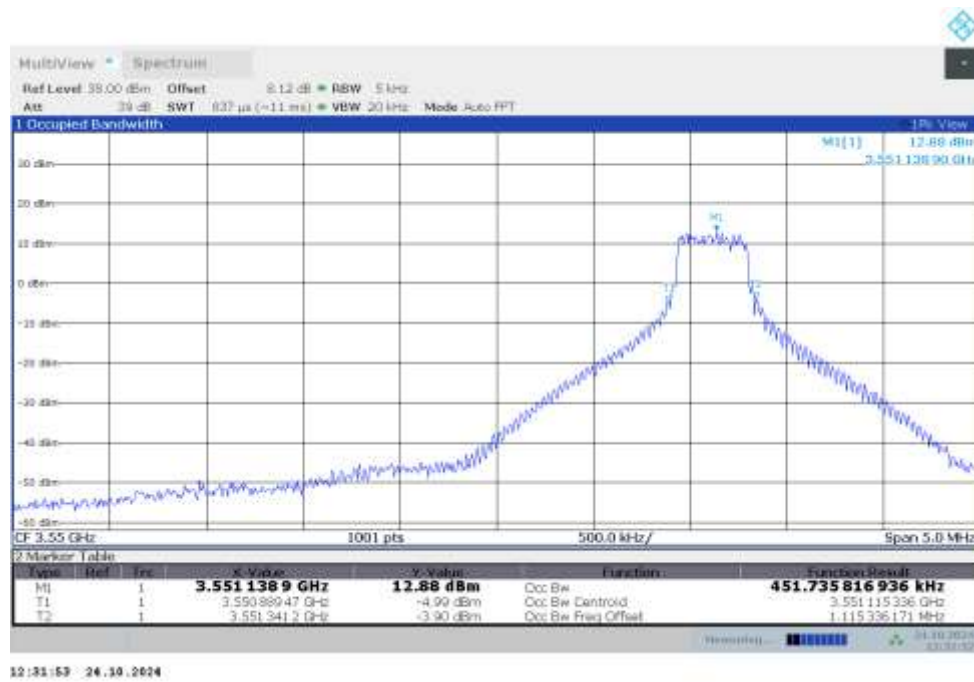


## HIGH BAND EDGE BLOCK-10MHz-100%RB

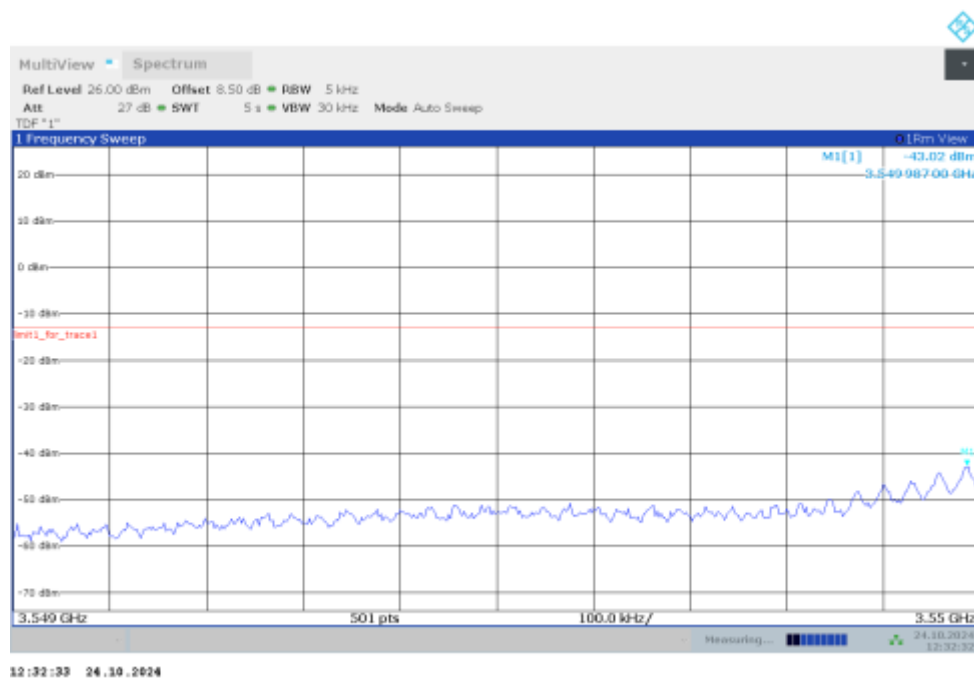


NR n48

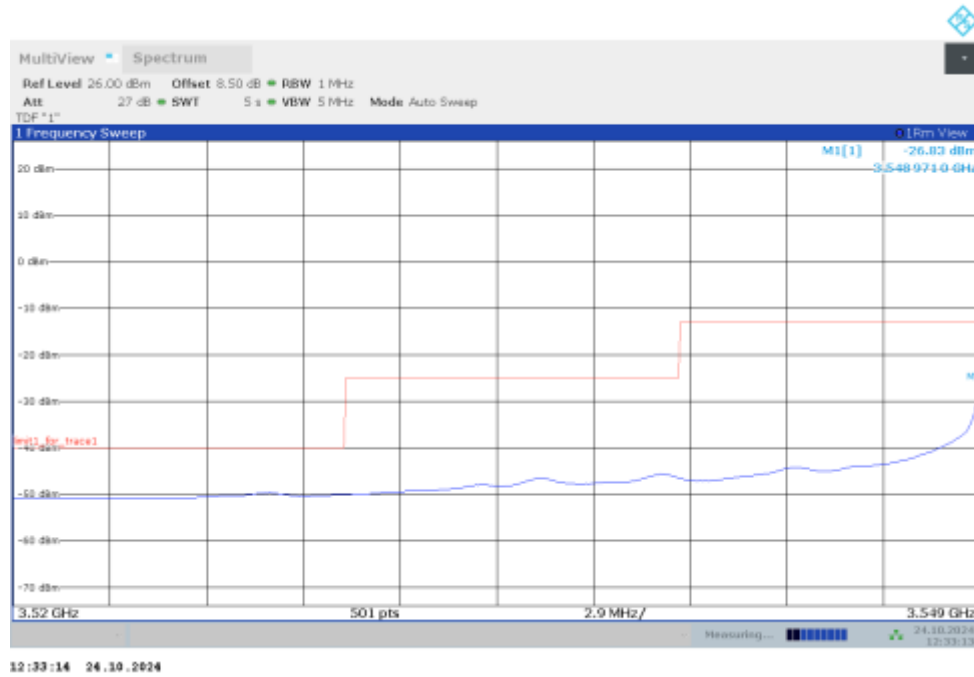
OBW: 1RB-LOW\_offset



LOW BAND EDGE BLOCK-1RB-LOW\_offset



## LOW BAND EDGE BLOCK-1RB-LOW\_offset



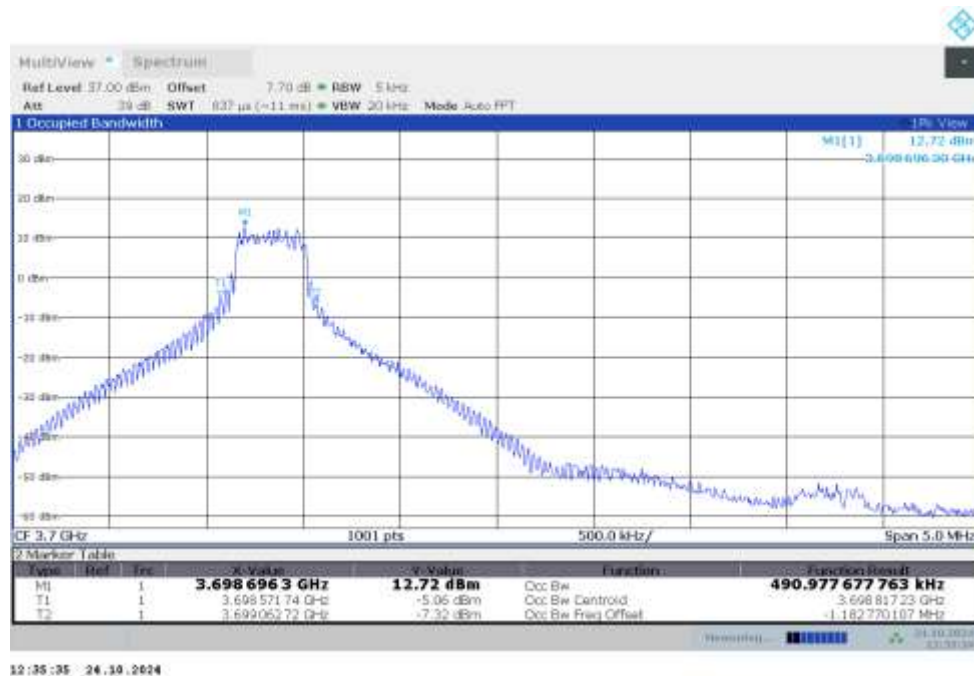
## LOW BAND EDGE BLOCK-1RB-LOW\_offset



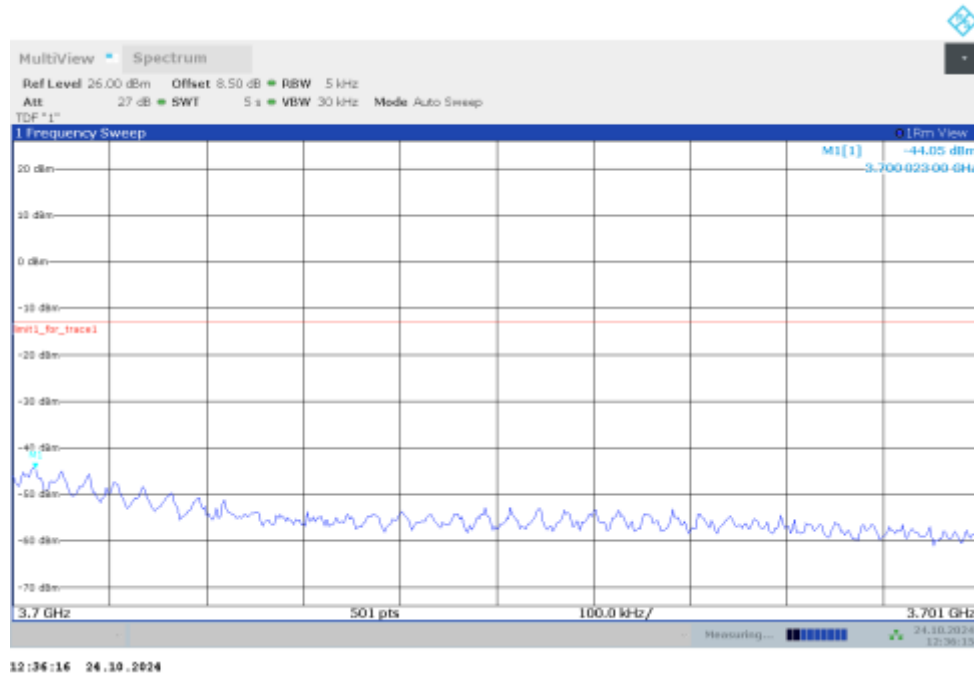
## LOW BAND EDGE BLOCK-1RB-LOW\_offset



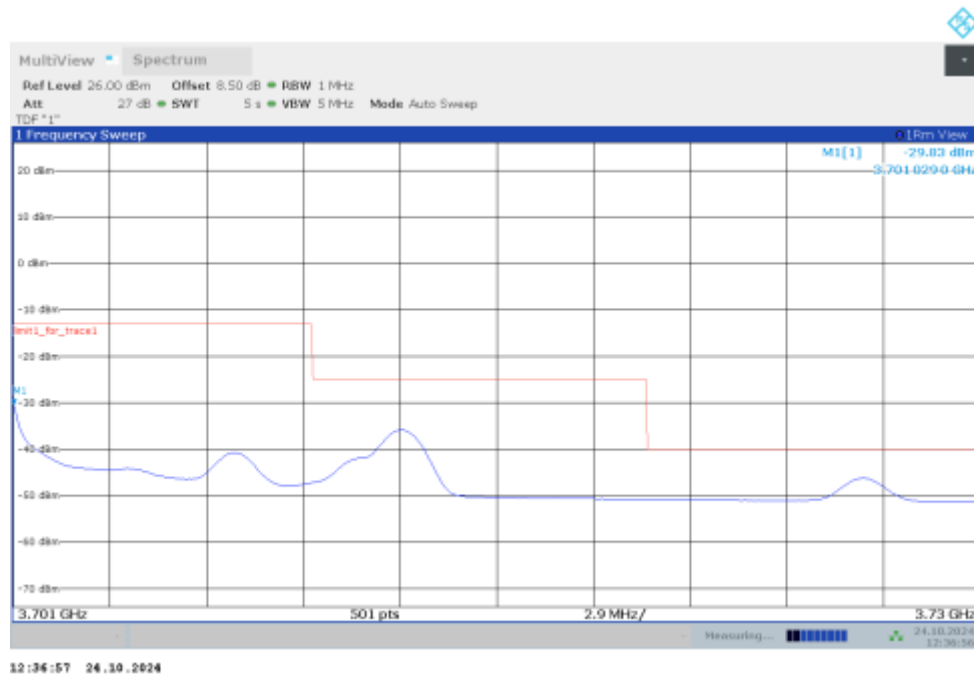
## OBW: 1RB-HIGH\_offset



## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset

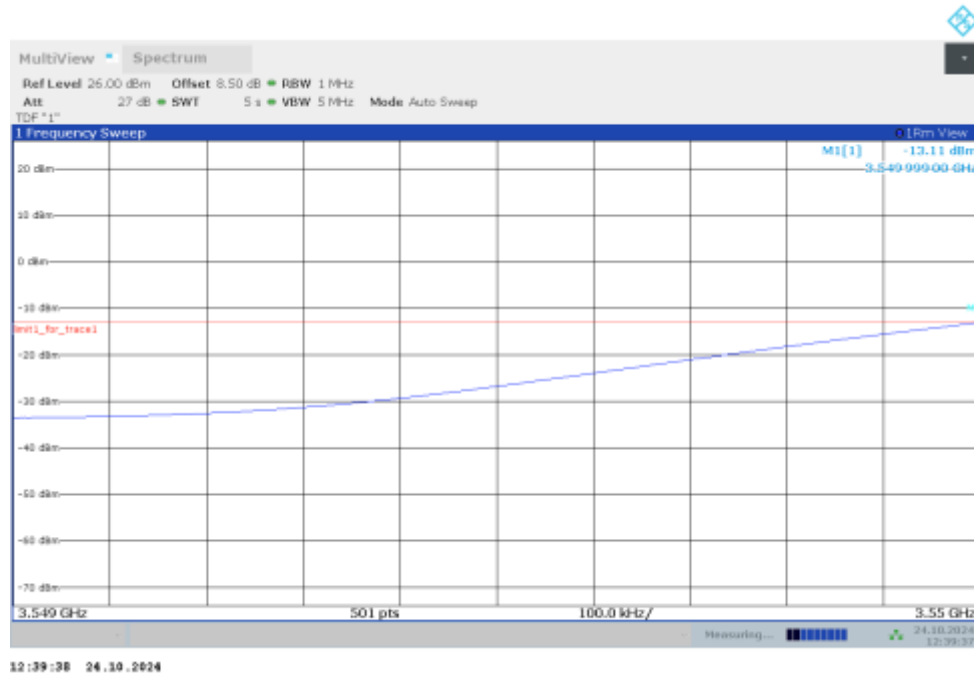


## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset

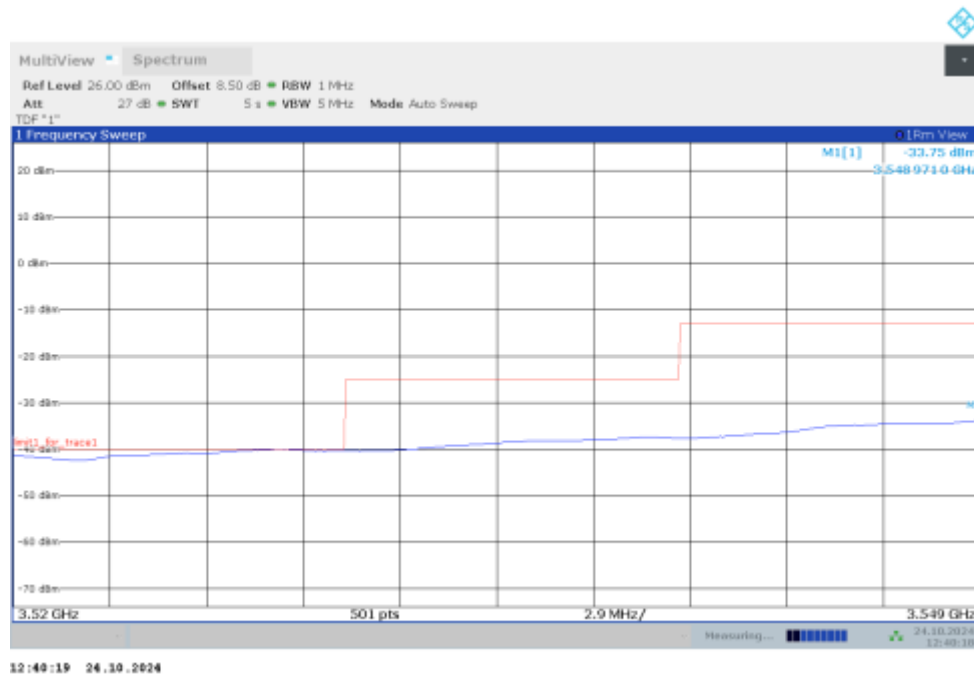




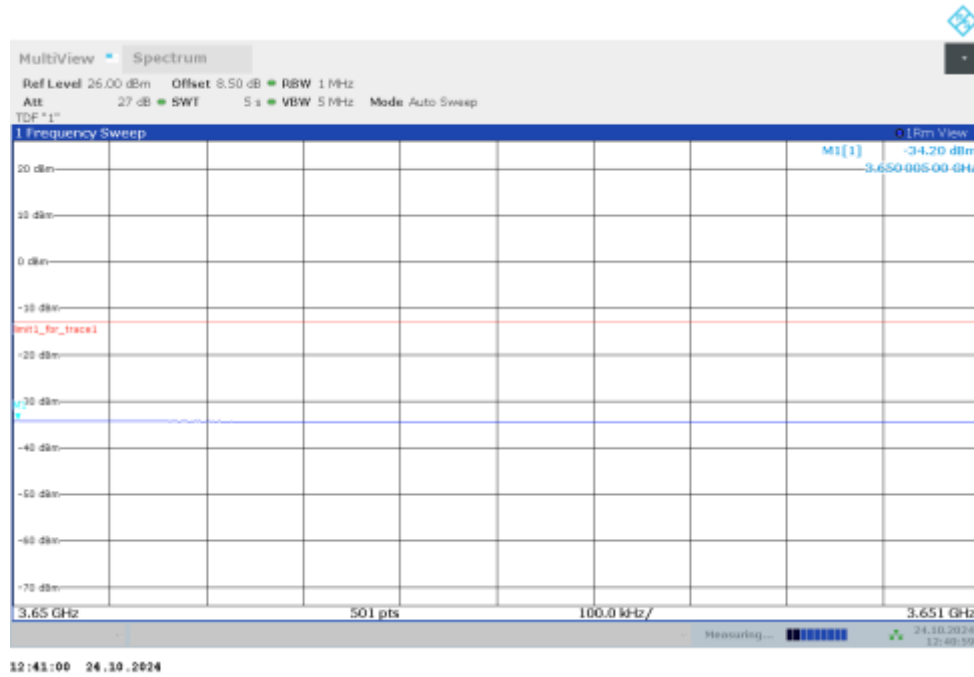
## LOW BAND EDGE BLOCK-100MHz-100%RB



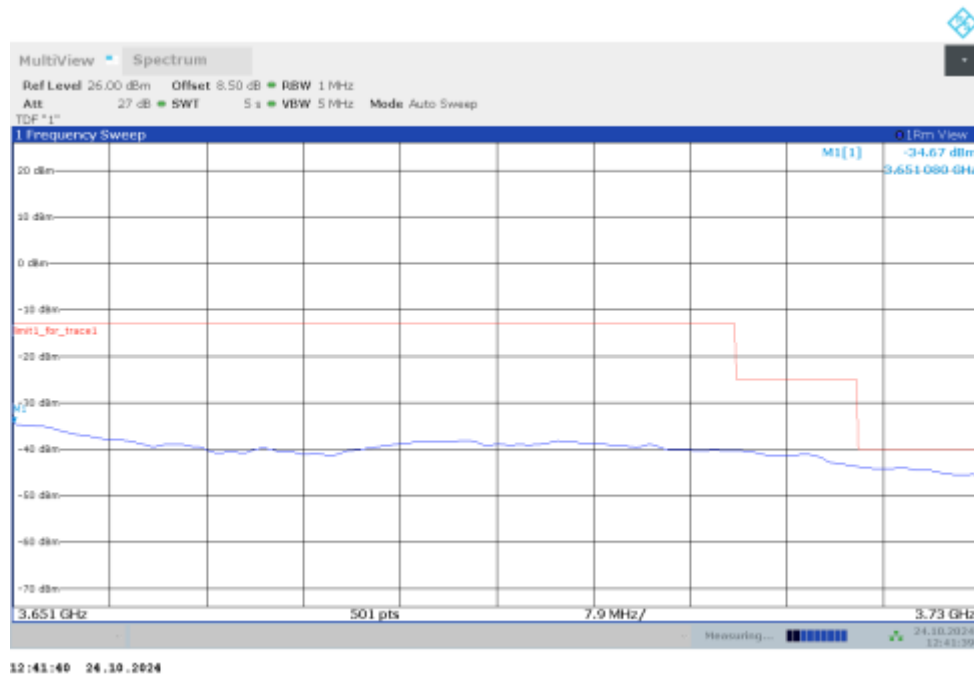
## LOW BAND EDGE BLOCK-100MHz-100%RB



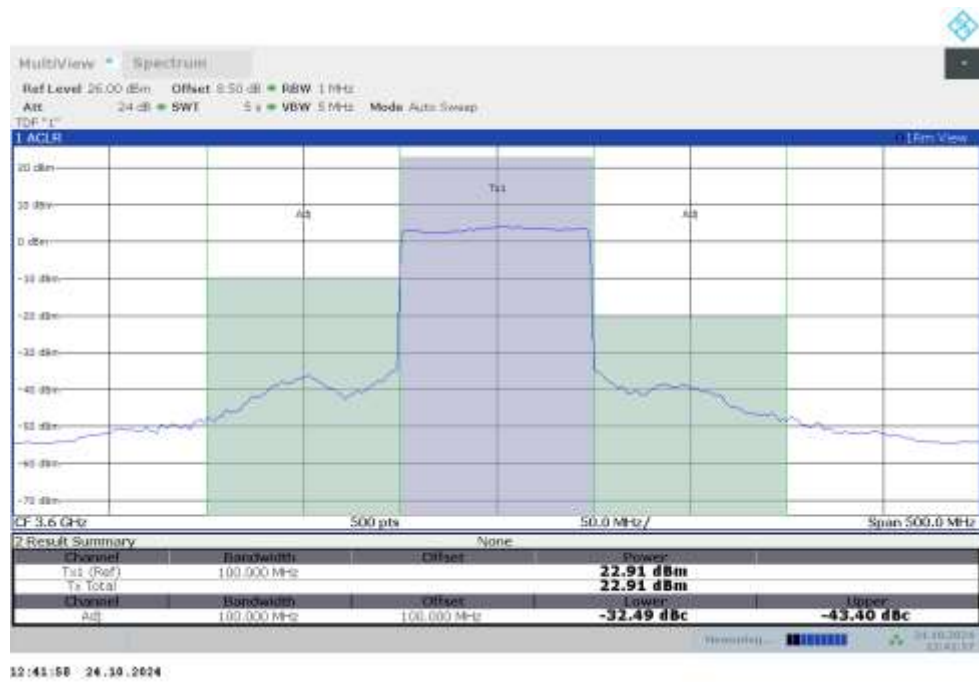
## LOW BAND EDGE BLOCK-100MHz-100%RB



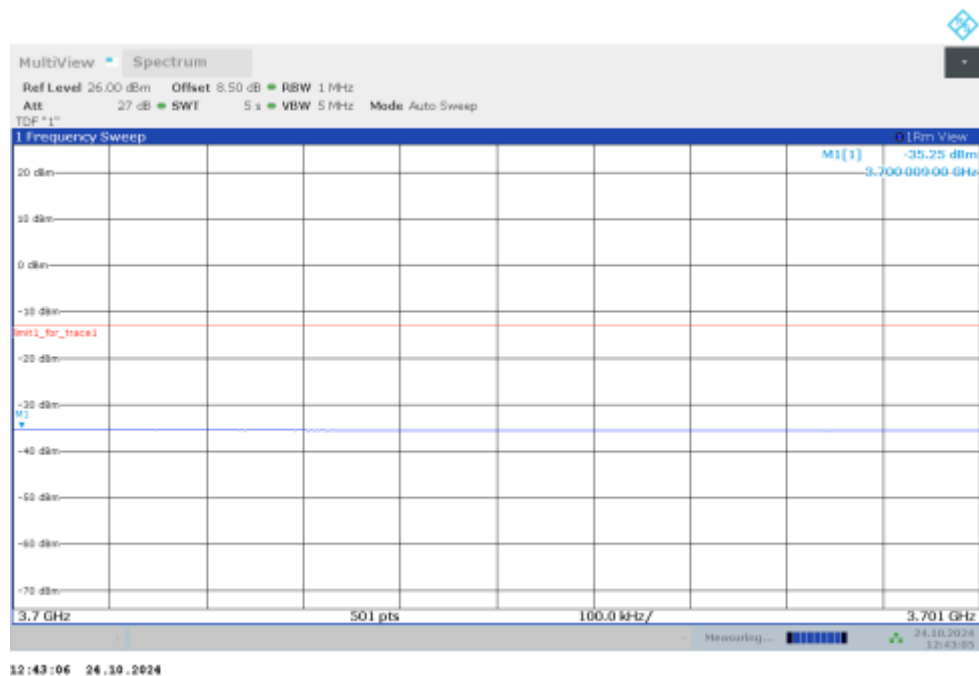
## LOW BAND EDGE BLOCK-100MHz-100%RB



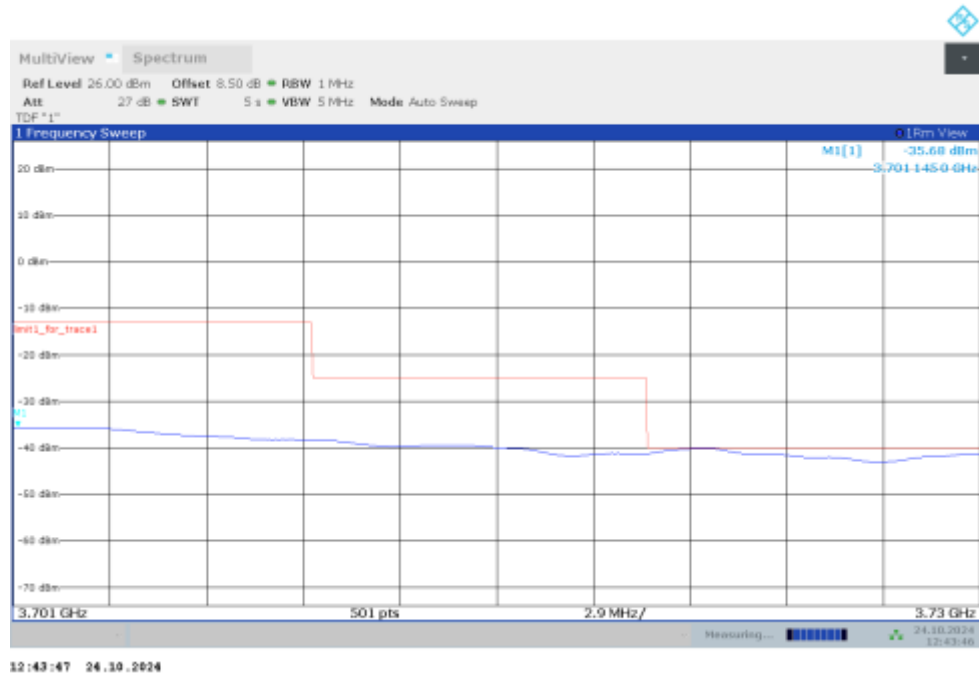
## ACLR



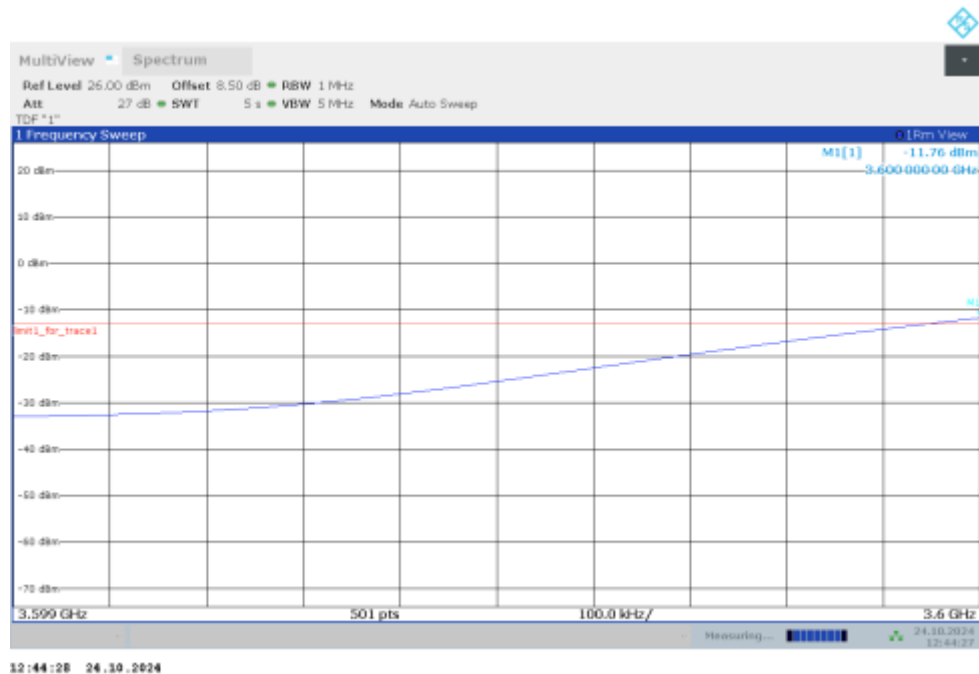
## HIGH BAND EDGE BLOCK-100MHz-100%RB



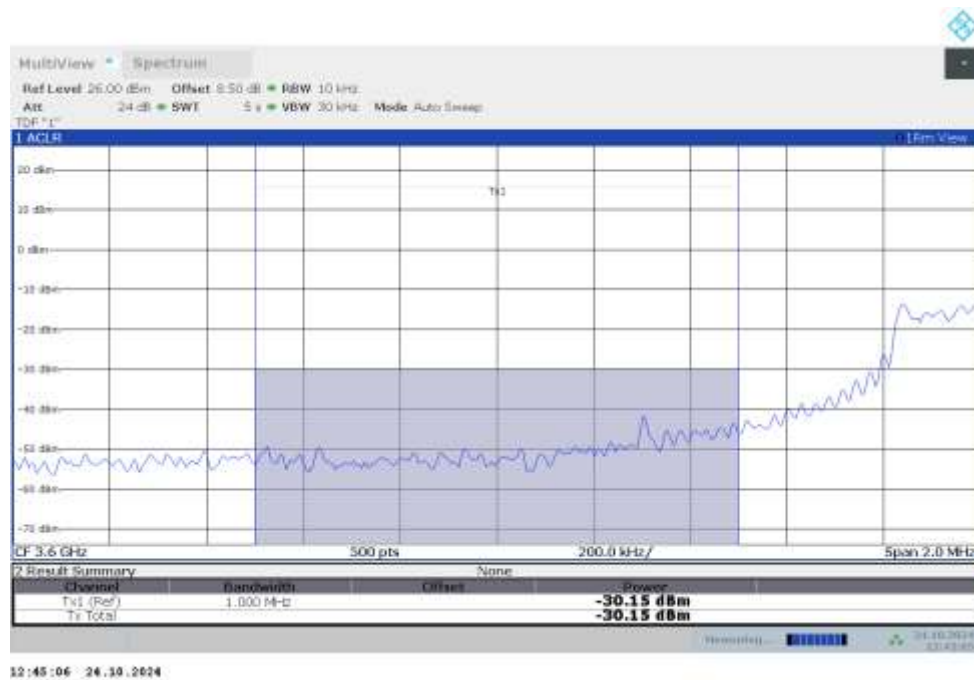
## HIGH BAND EDGE BLOCK-100MHz-100%RB



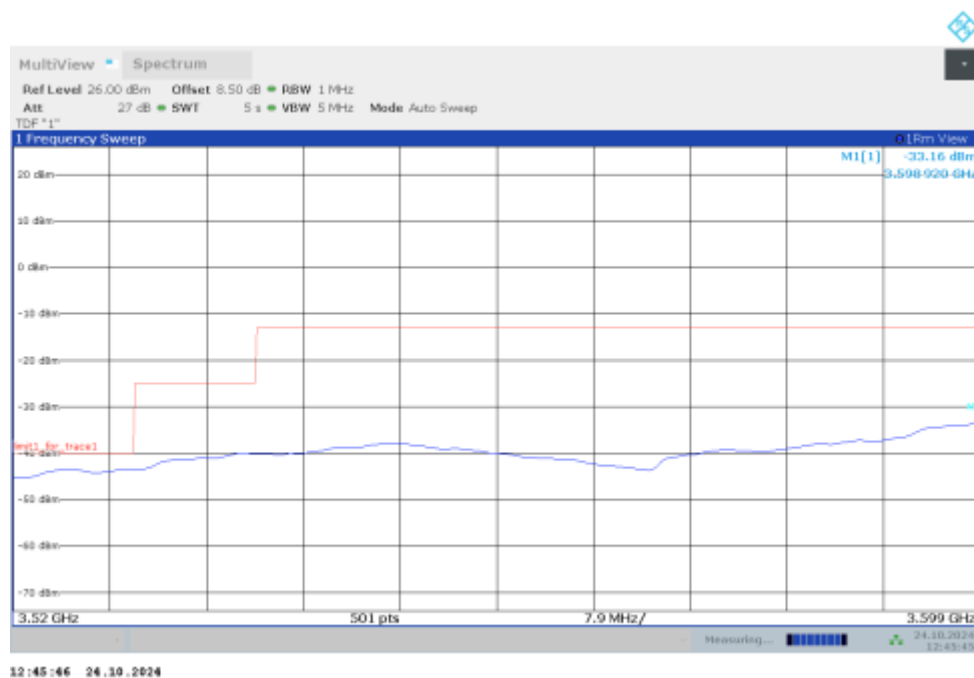
## HIGH BAND EDGE BLOCK-100MHz-100%RB



## Channel power



## HIGH BAND EDGE BLOCK-100MHz-100%RB

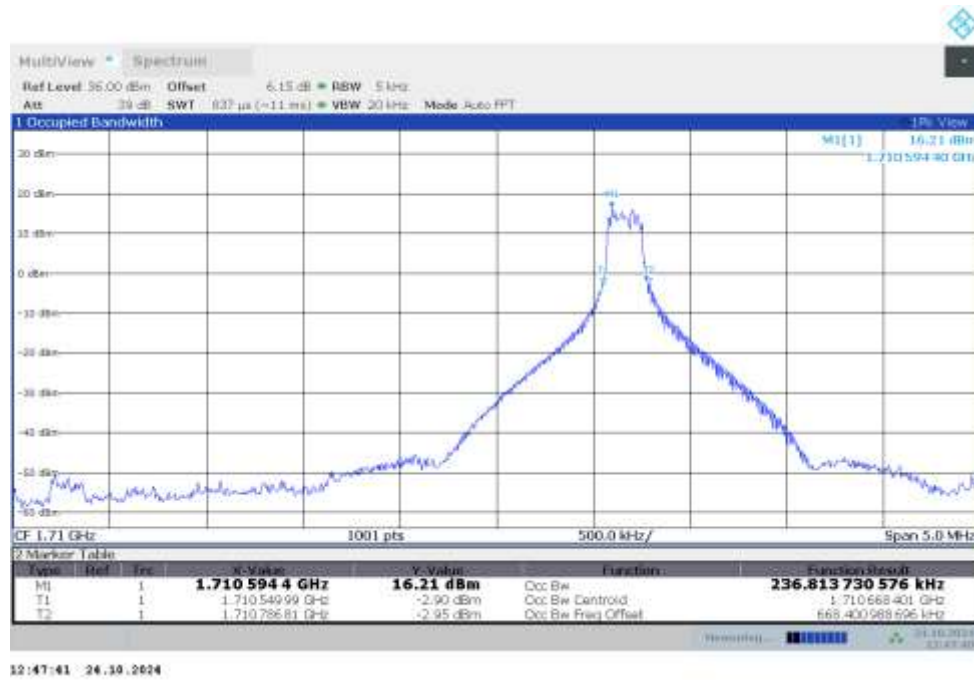


## ACLR

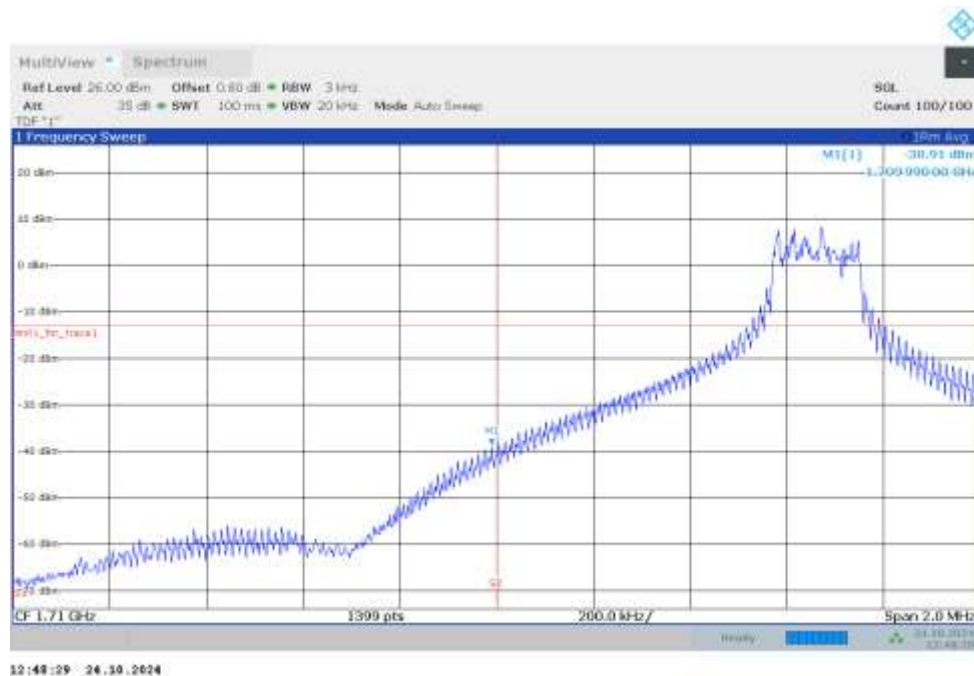


NR n66

OBW: 1RB-LOW\_offset

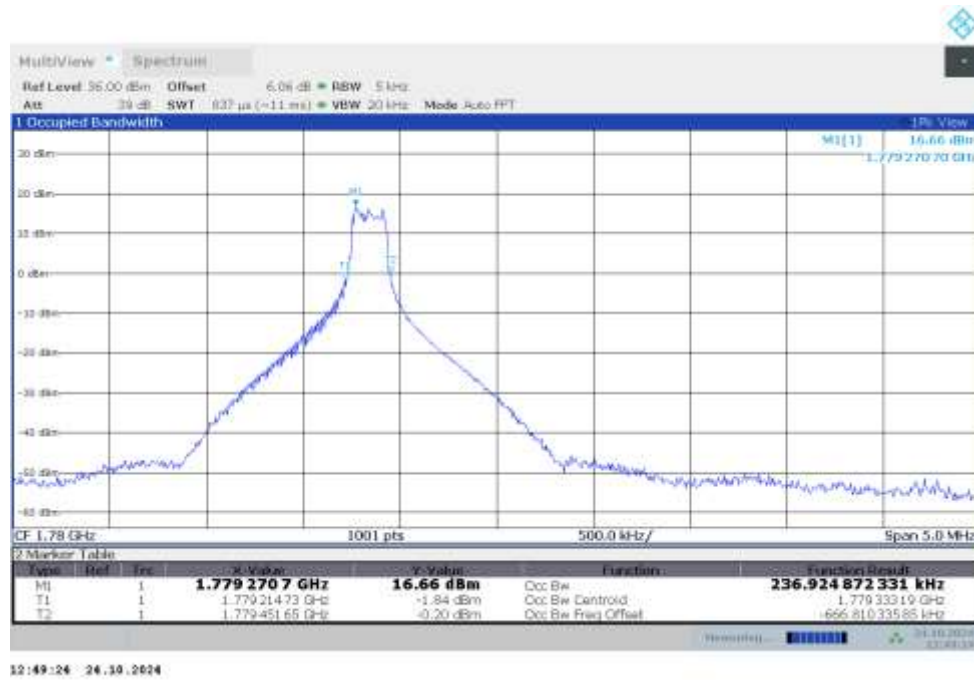


LOW BAND EDGE BLOCK-1RB-LOW\_offset

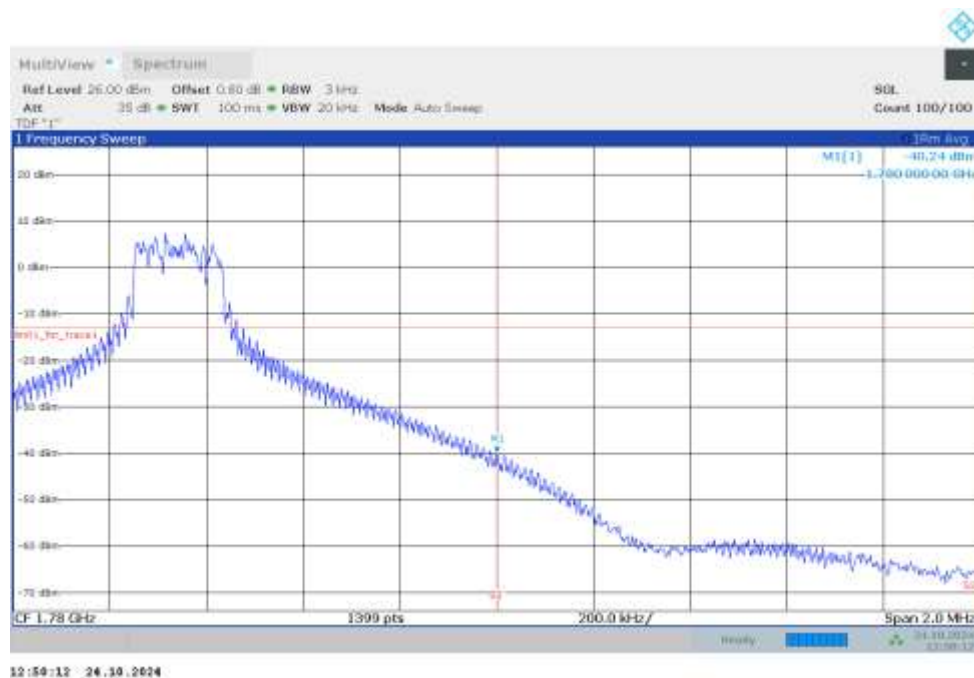




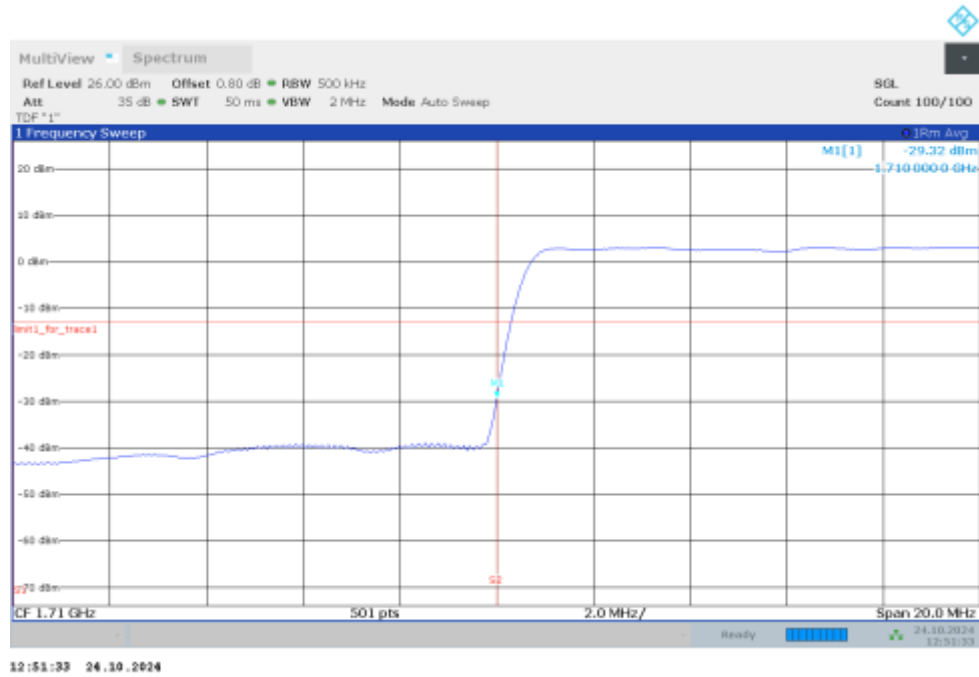
## OBW: 1RB-HIGH\_offset



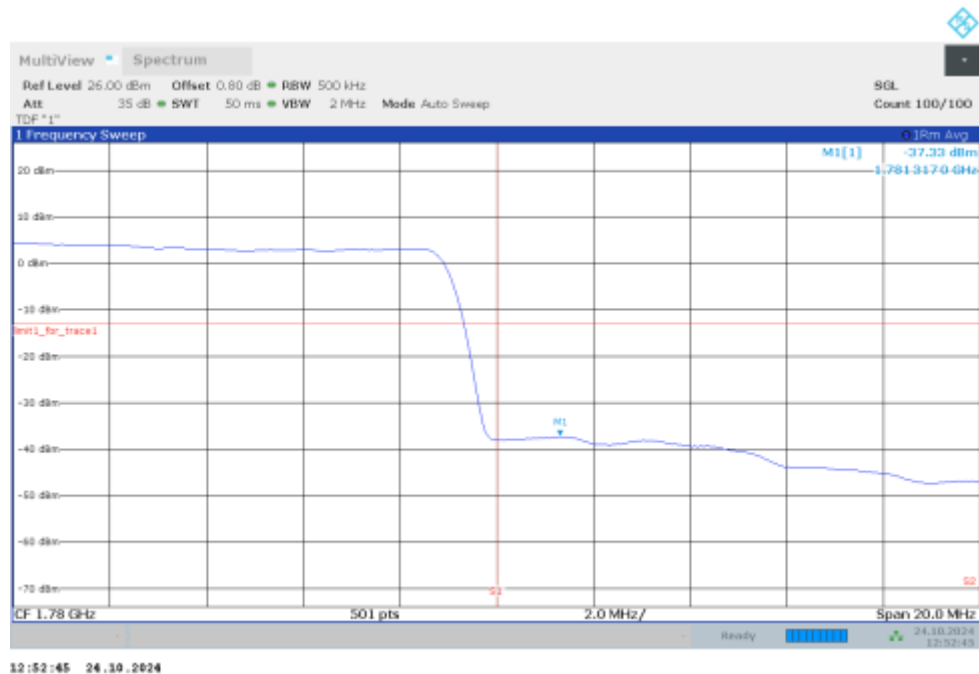
## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



## LOW BAND EDGE BLOCK-45MHz-100%RB



## HIGH BAND EDGE BLOCK-45MHz-100%RB

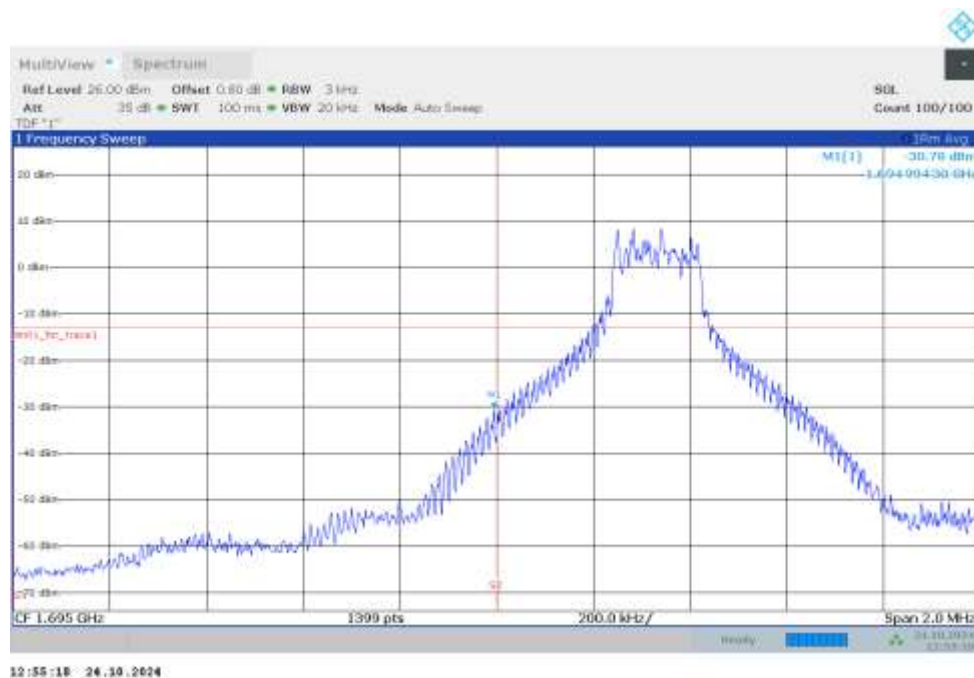


NR n70

OBW: 1RB-LOW\_offset



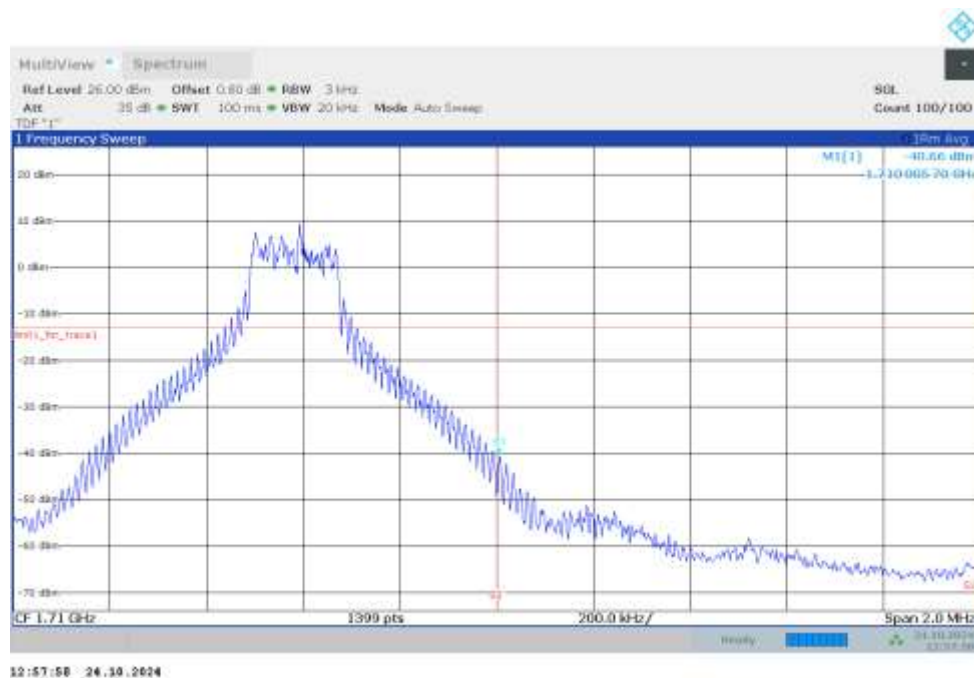
LOW BAND EDGE BLOCK-1RB-LOW\_offset



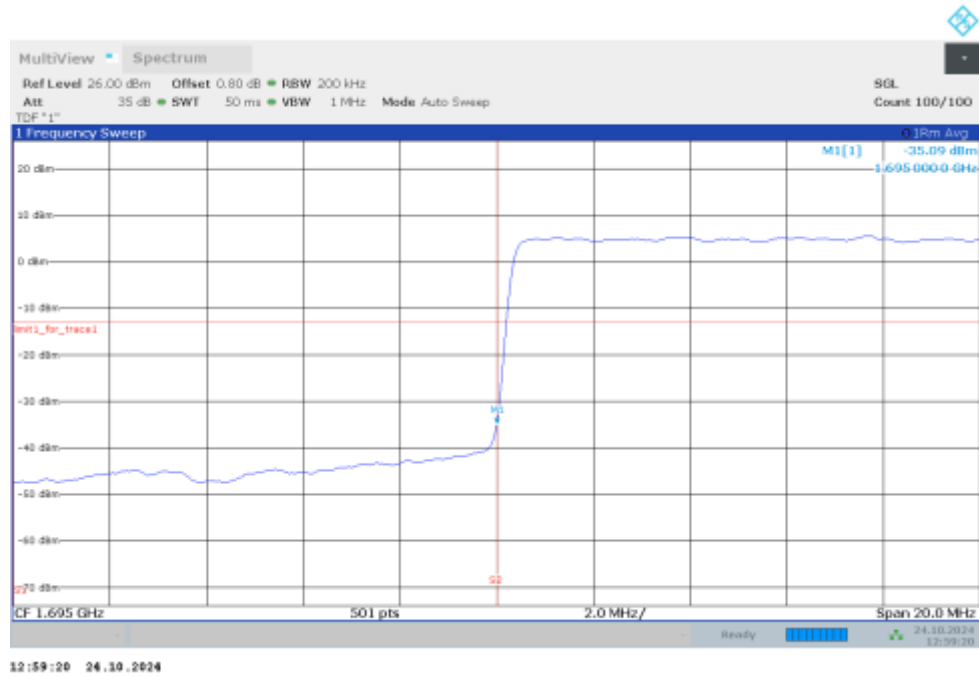
# OBW: 1RB-HIGH\_offset



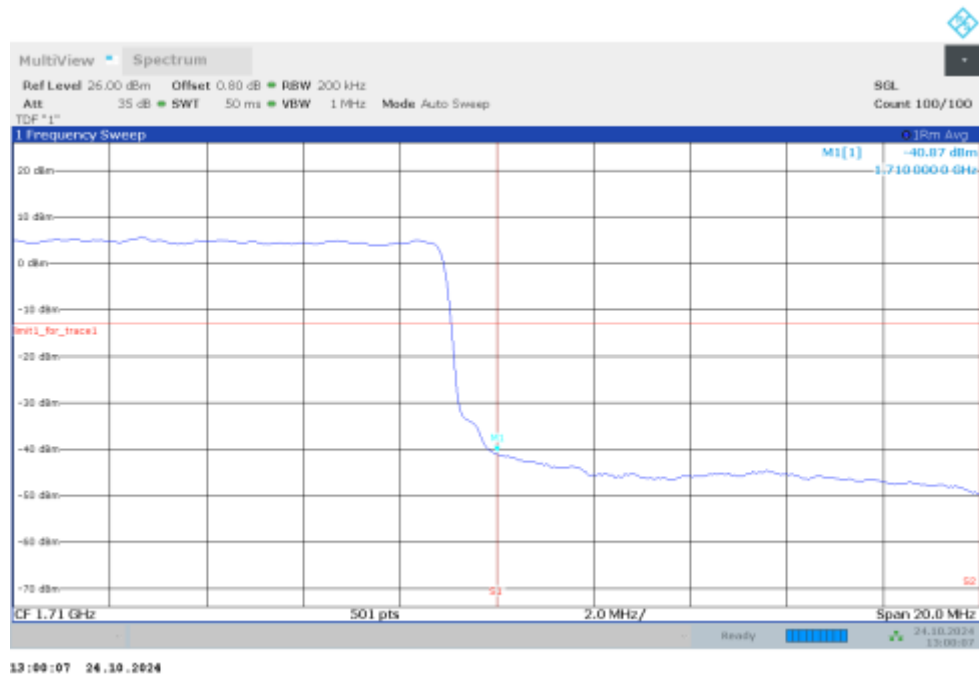
# HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



## LOW BAND EDGE BLOCK-15MHz-100%RB



## HIGH BAND EDGE BLOCK-15MHz-100%RB

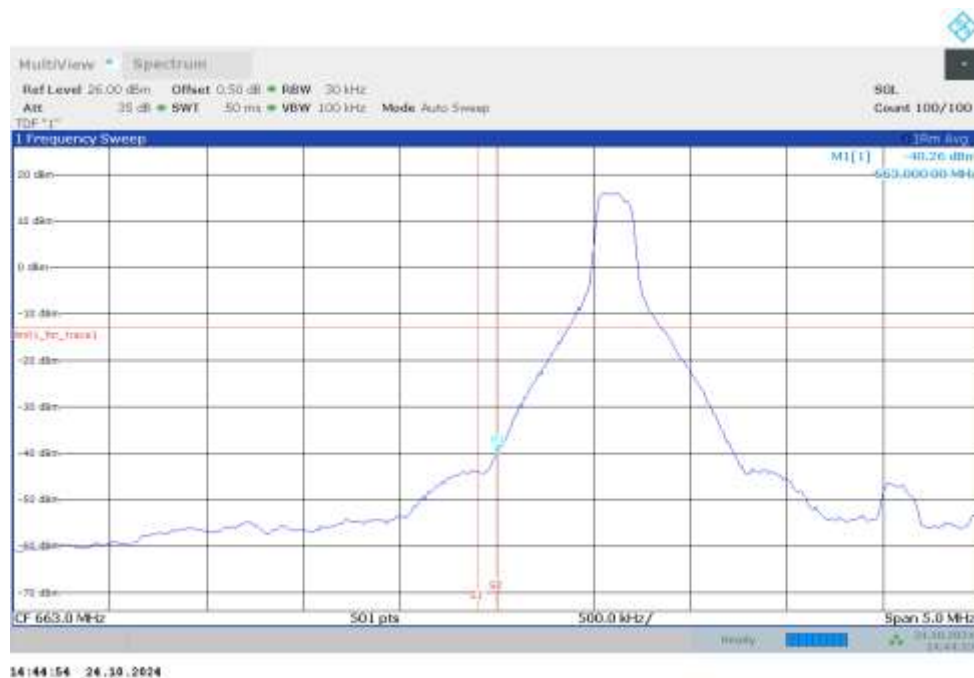


NR n71

OBW: 1RB-LOW\_offset



LOW BAND EDGE BLOCK-1RB-LOW\_offset



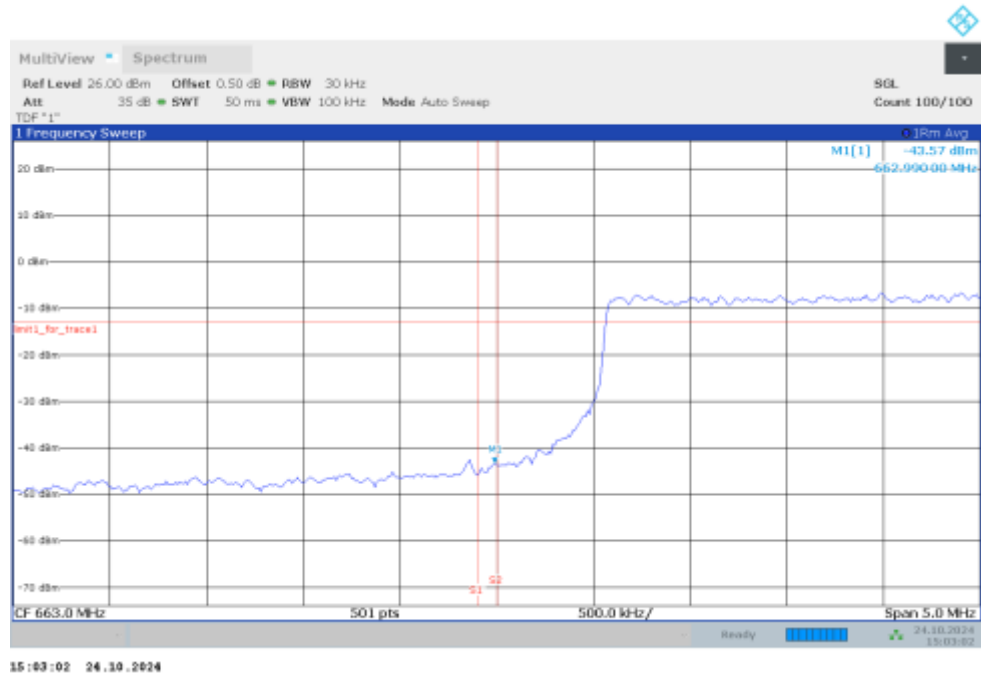
## OBW: 1RB-HIGH\_offset



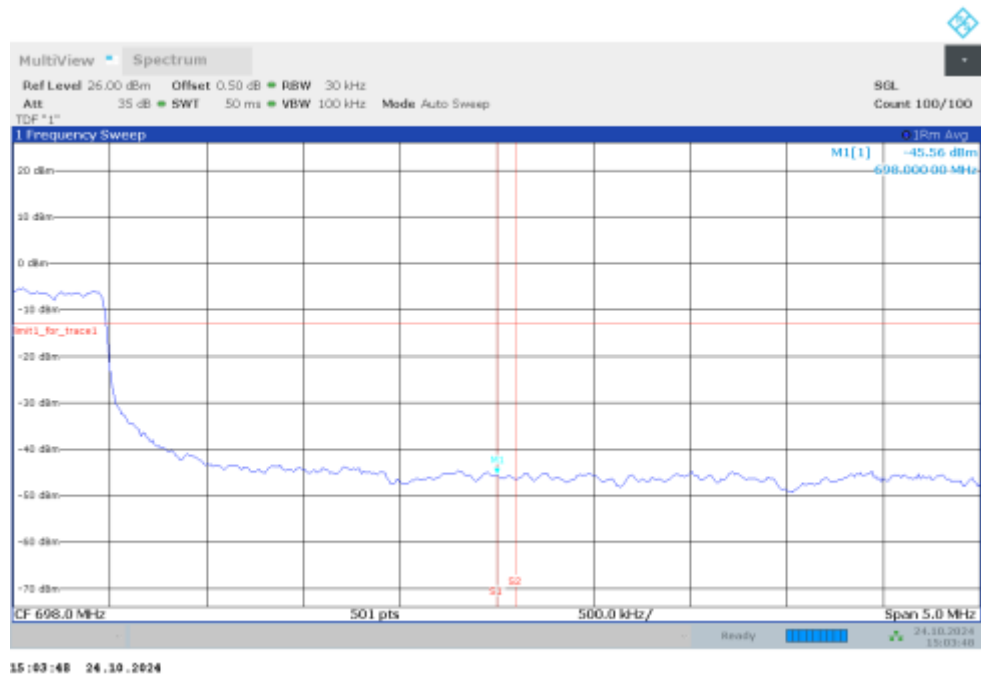
## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



## LOW BAND EDGE BLOCK-35MHz-100%RB



## HIGH BAND EDGE BLOCK-35MHz-100%RB



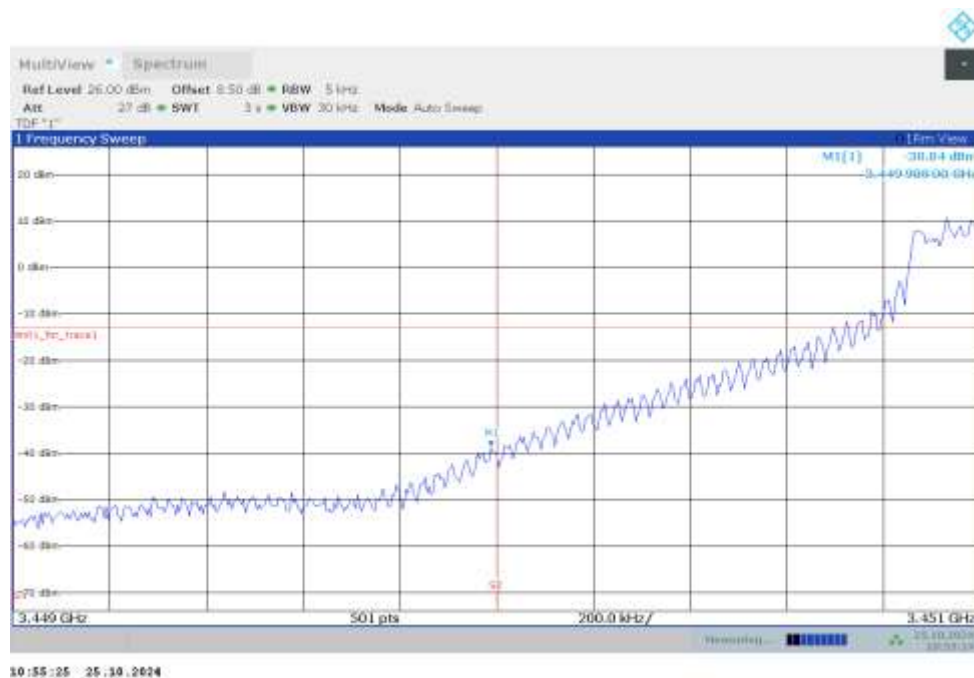


NR n78L

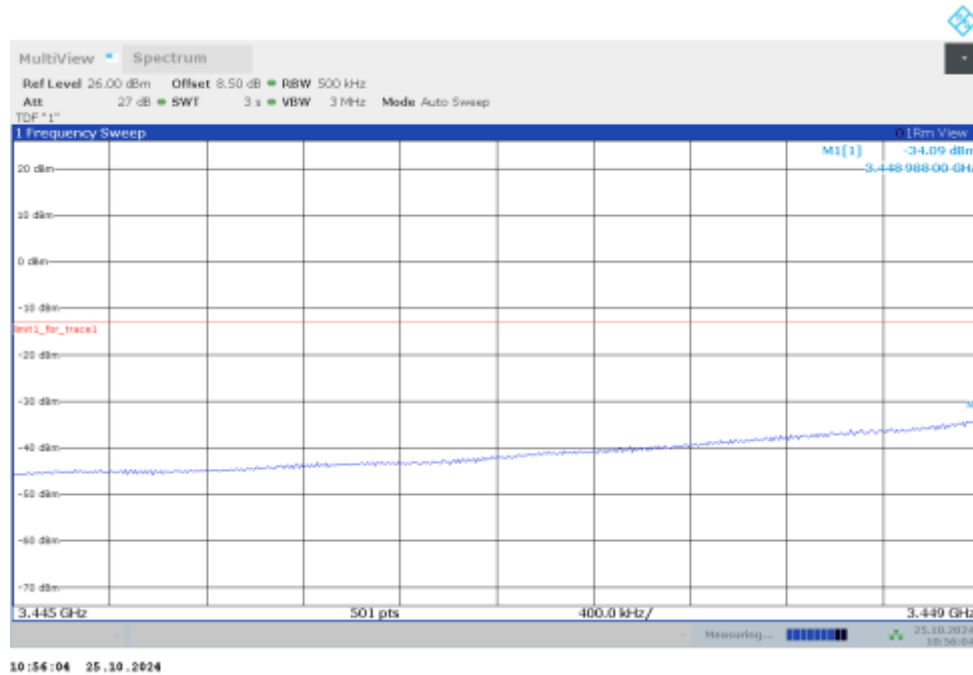
OBW: 1RB-LOW\_offset



LOW BAND EDGE BLOCK-1RB-LOW\_offset



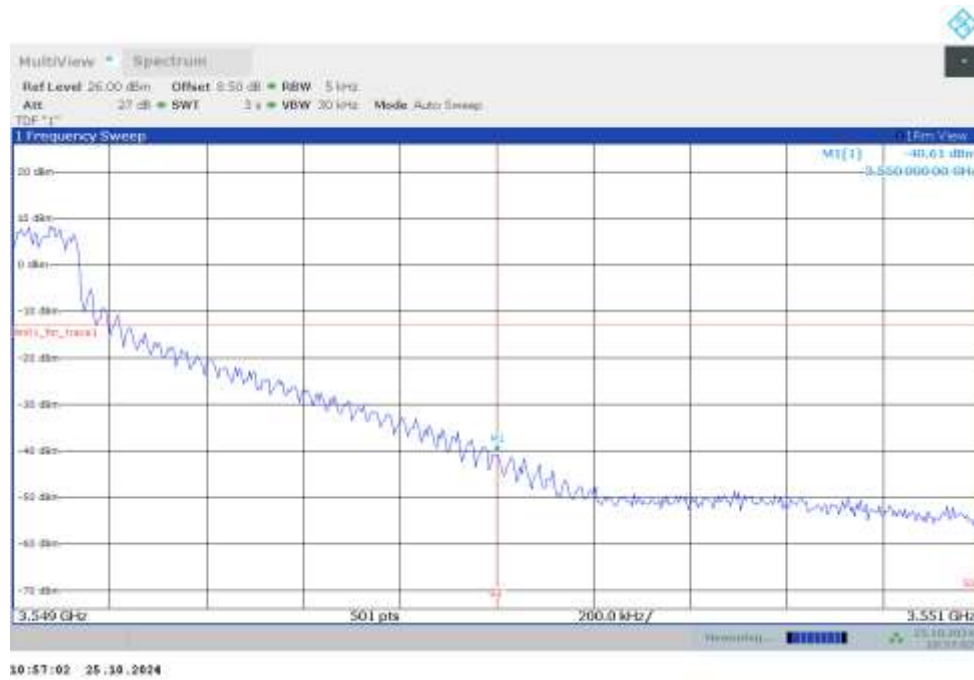
## LOW BAND EDGE BLOCK-1RB-LOW\_offset



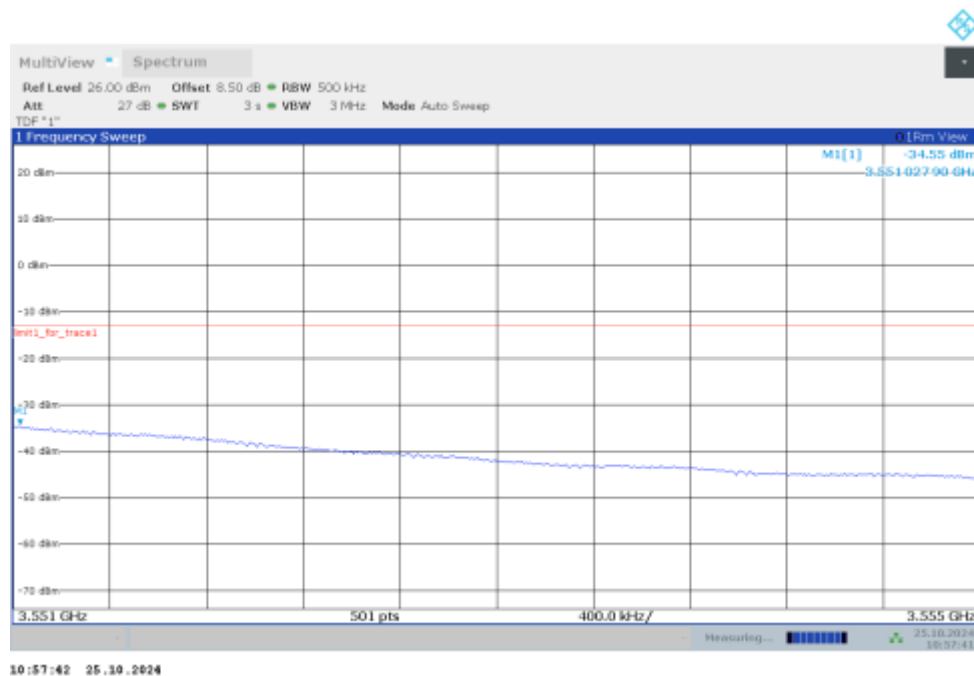
## OBW: 1RB-HIGH\_offset



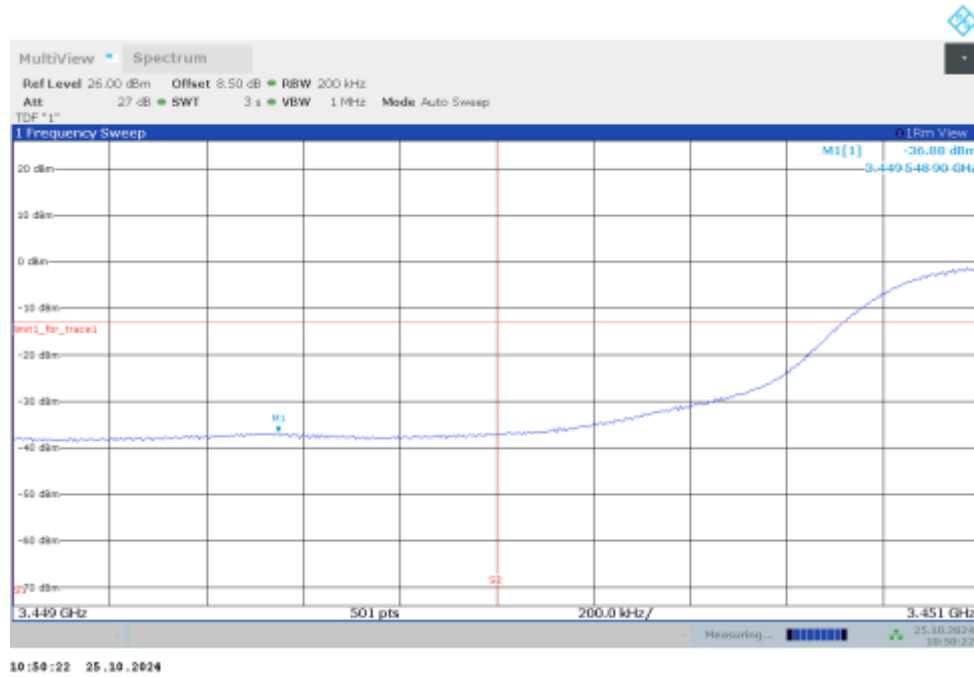
## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



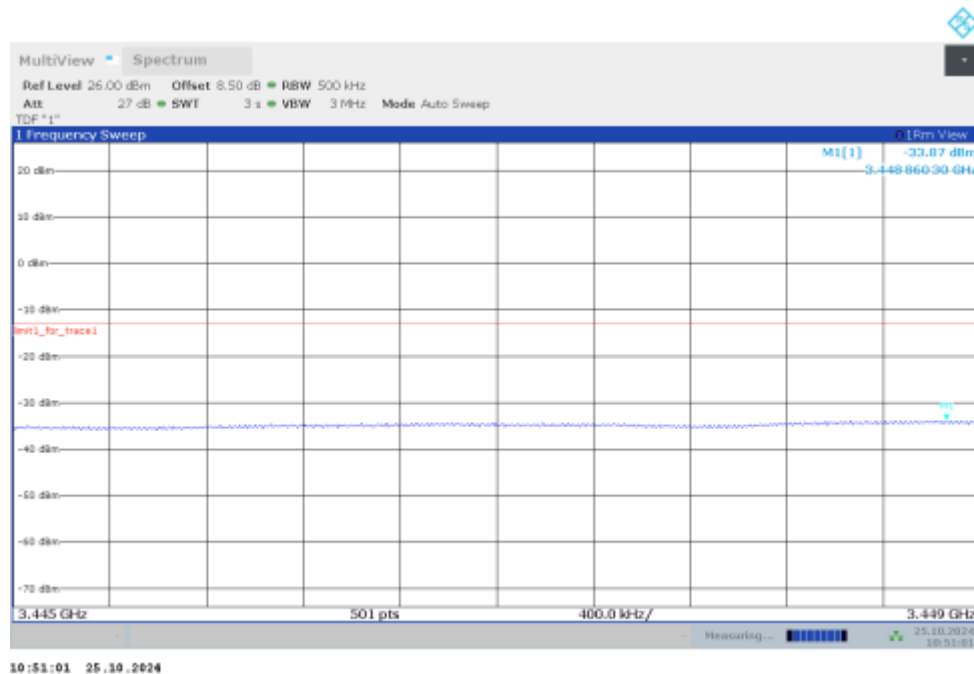
## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



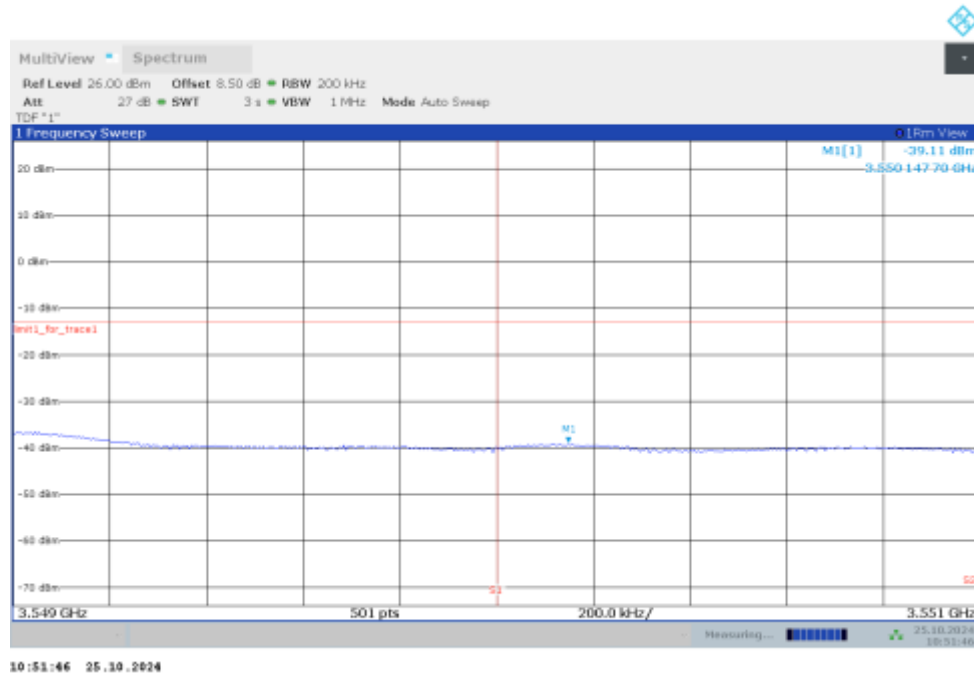
## LOW BAND EDGE BLOCK-100MHz-100%RB



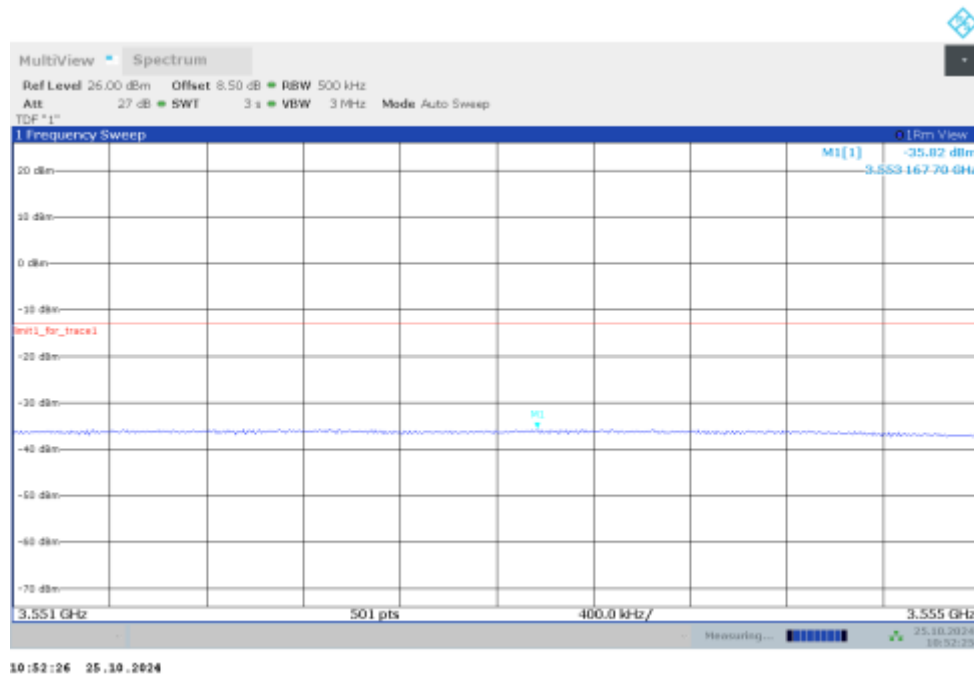
## LOW BAND EDGE BLOCK-100MHz-100%RB



## HIGH BAND EDGE BLOCK-100MHz-100%RB



## HIGH BAND EDGE BLOCK-100MHz-100%RB

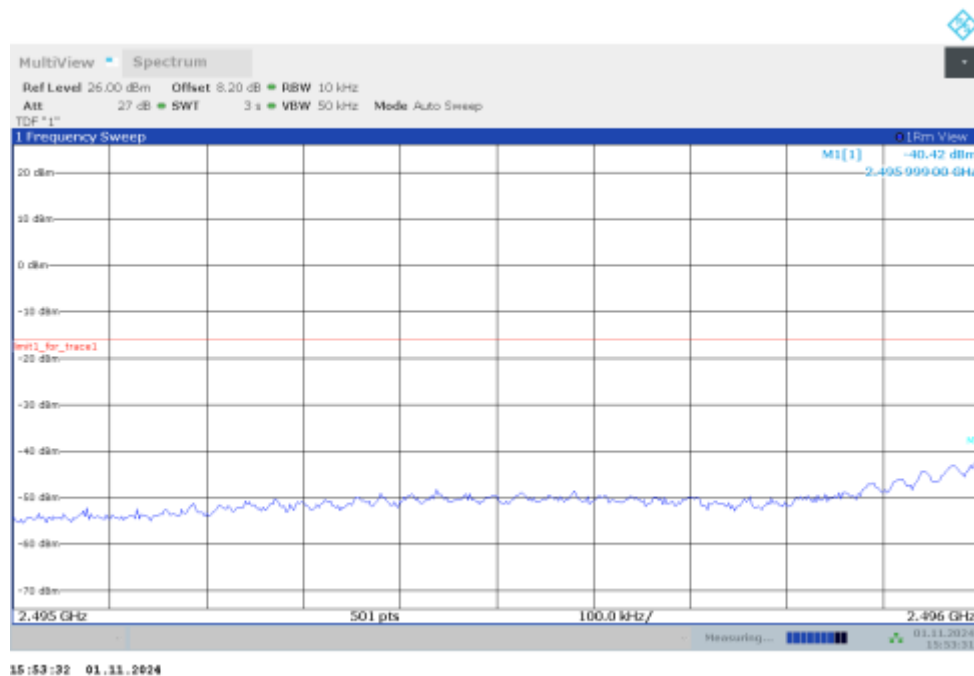


NR n41

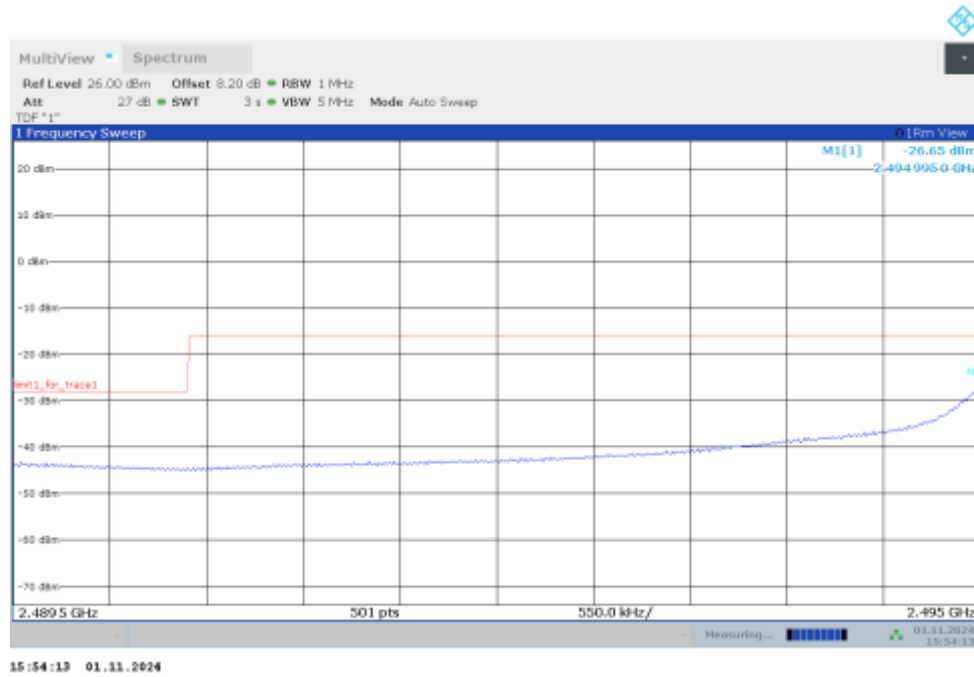
OBW: 1RB-LOW\_offset



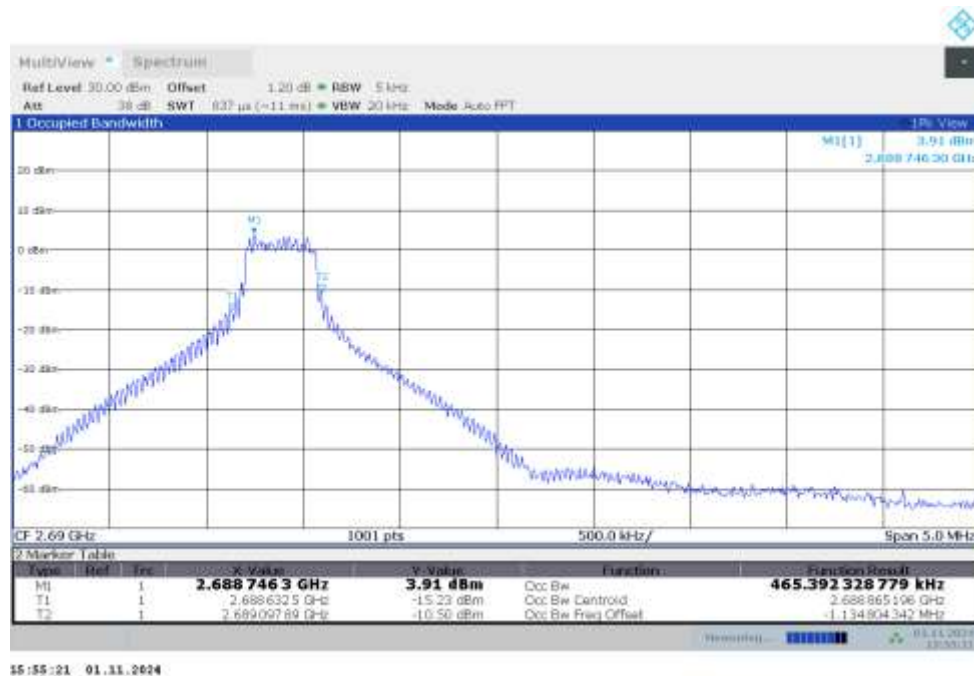
LOW BAND EDGE BLOCK-1RB-LOW\_offset



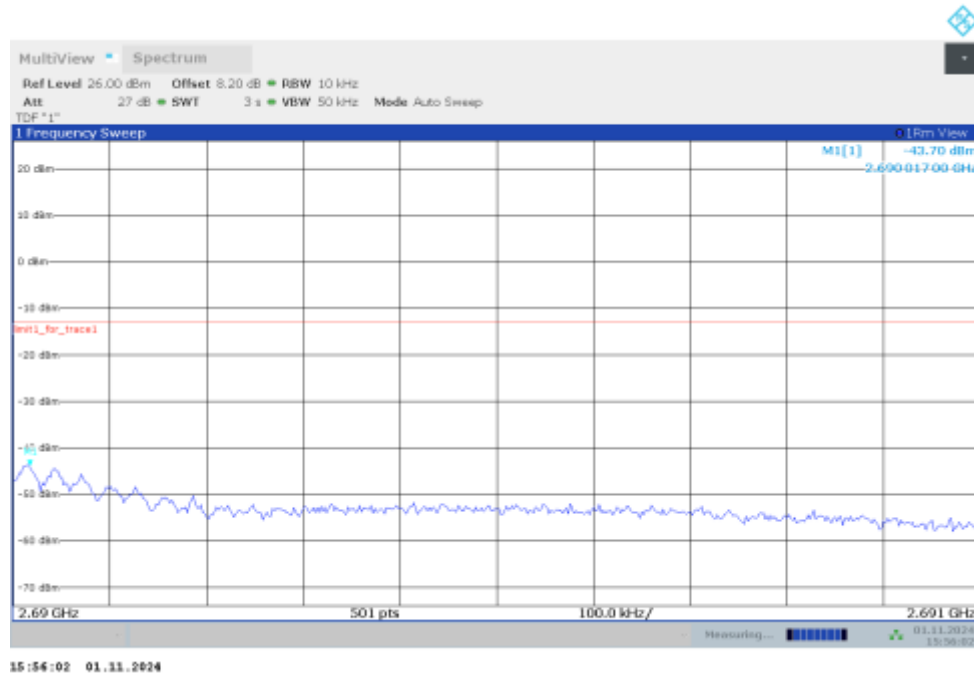
## LOW BAND EDGE BLOCK-1RB-LOW\_offset



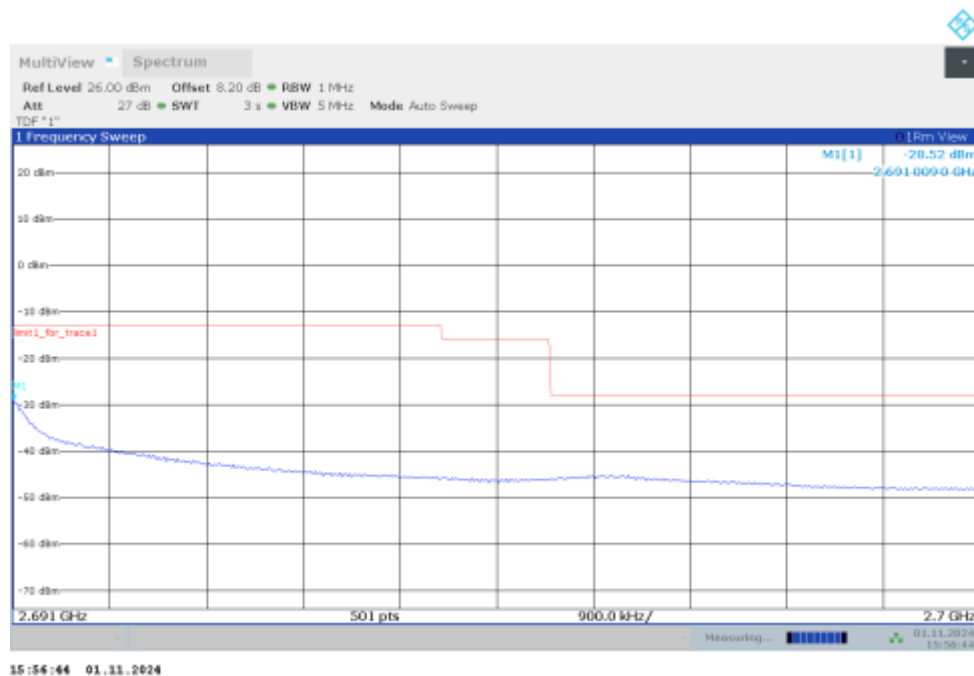
## OBW: 1RB-HIGH\_offset



## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset

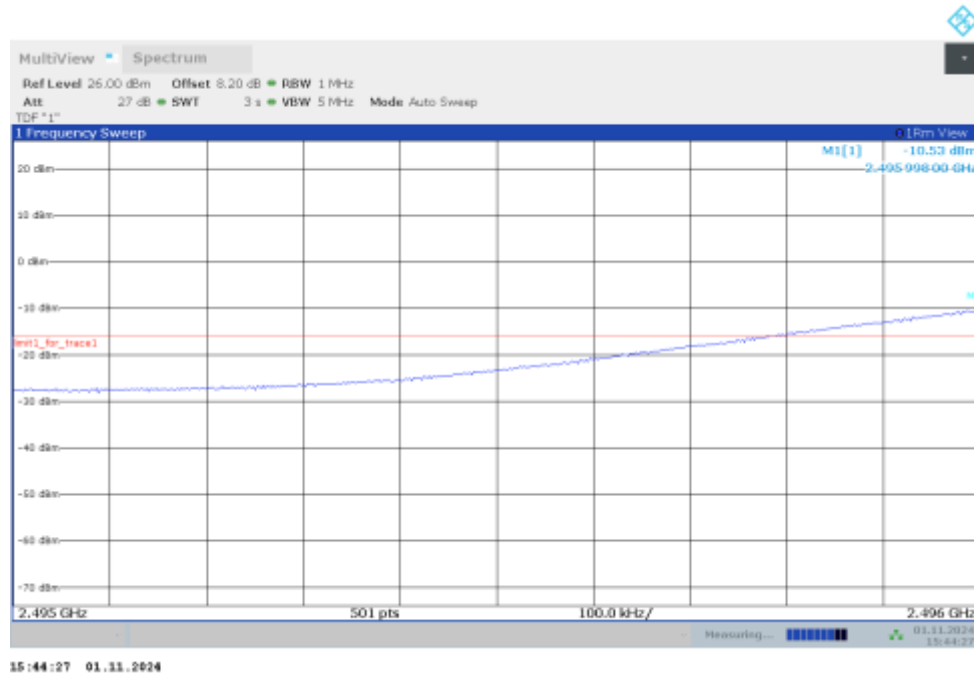


## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset

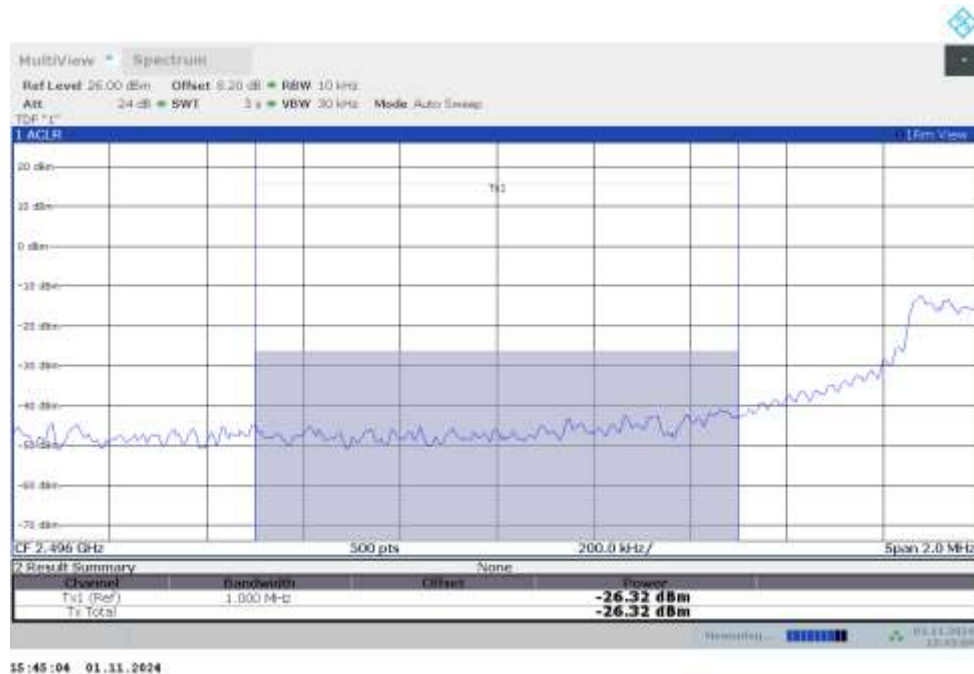




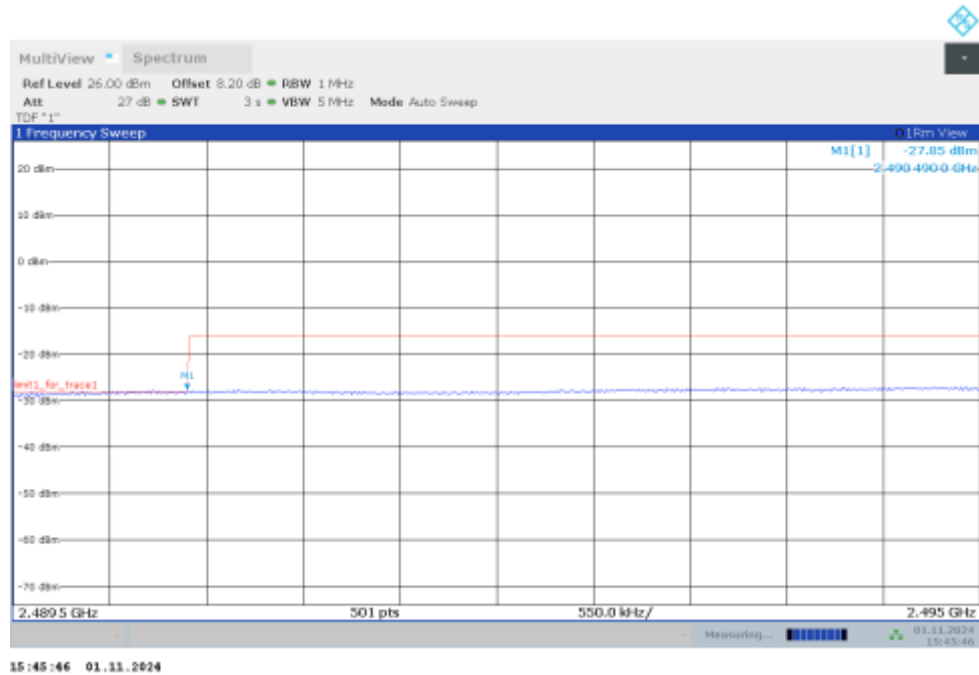
## LOW BAND EDGE BLOCK-100MHz-100%RB



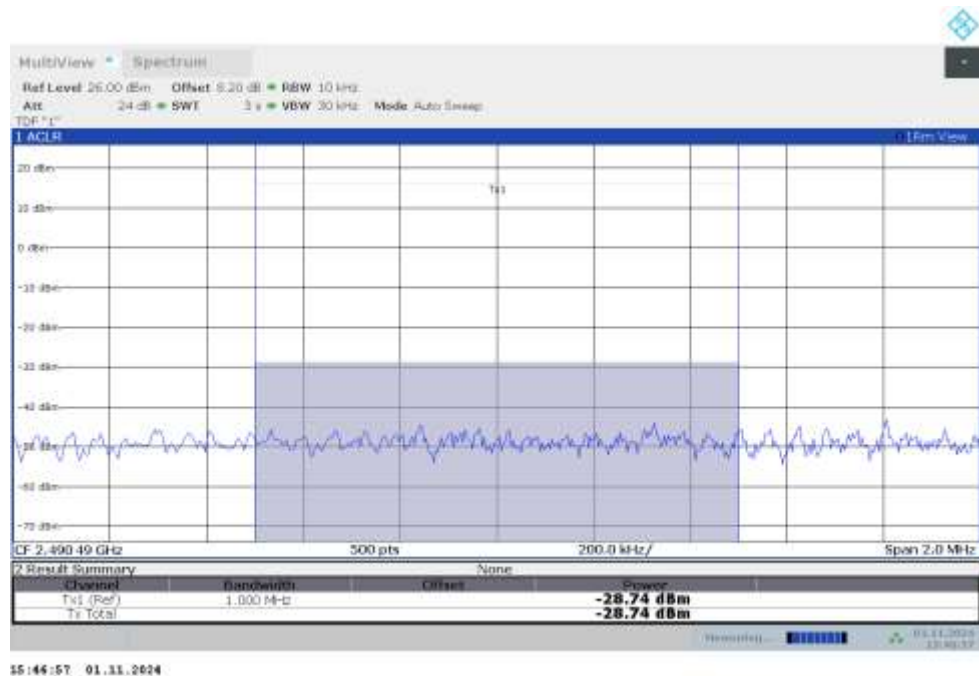
## Channel power



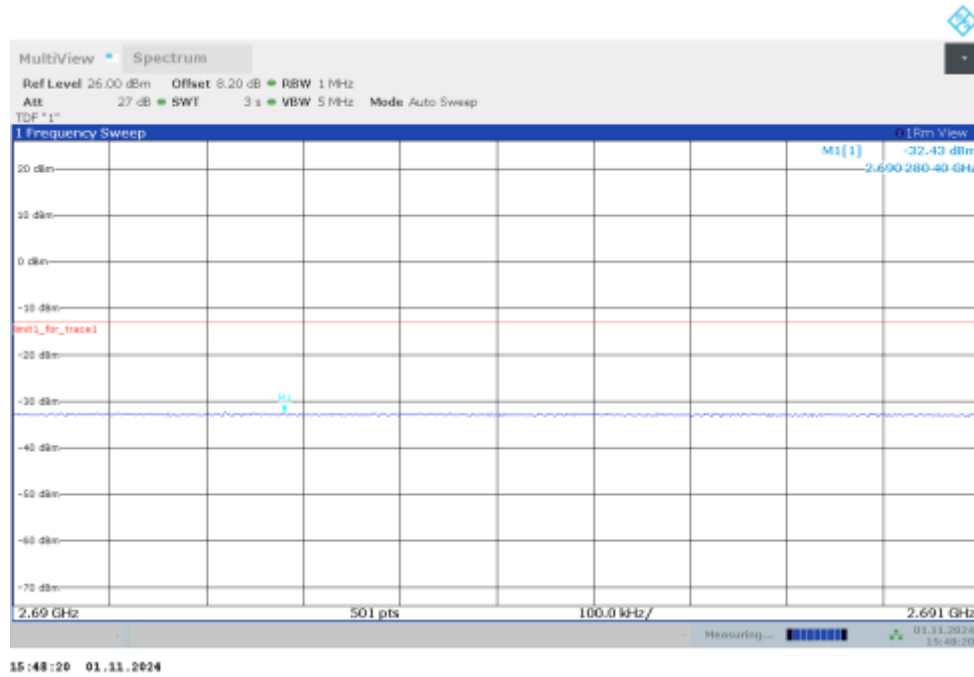
## LOW BAND EDGE BLOCK-100MHz-100%RB



## Channel power



## HIGH BAND EDGE BLOCK-100MHz-100%RB

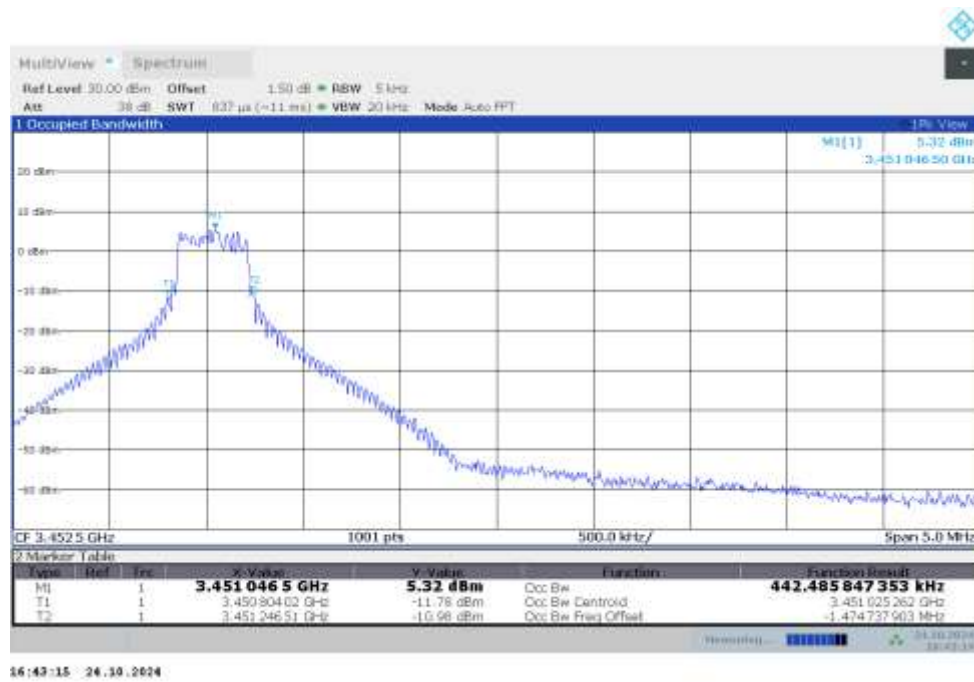


## HIGH BAND EDGE BLOCK-100MHz-100%RB

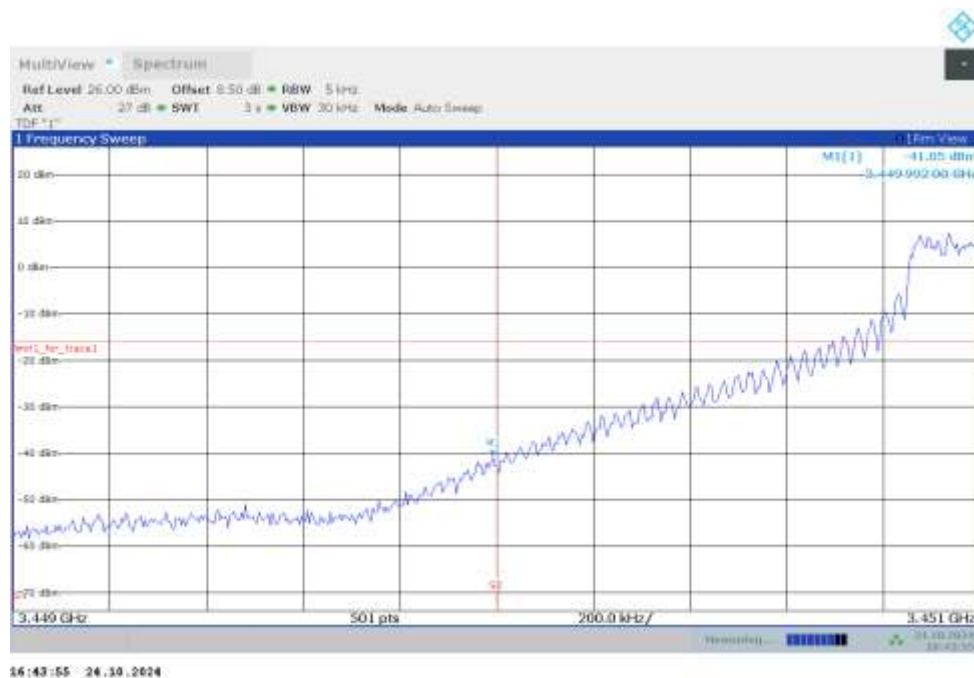


NR n77L

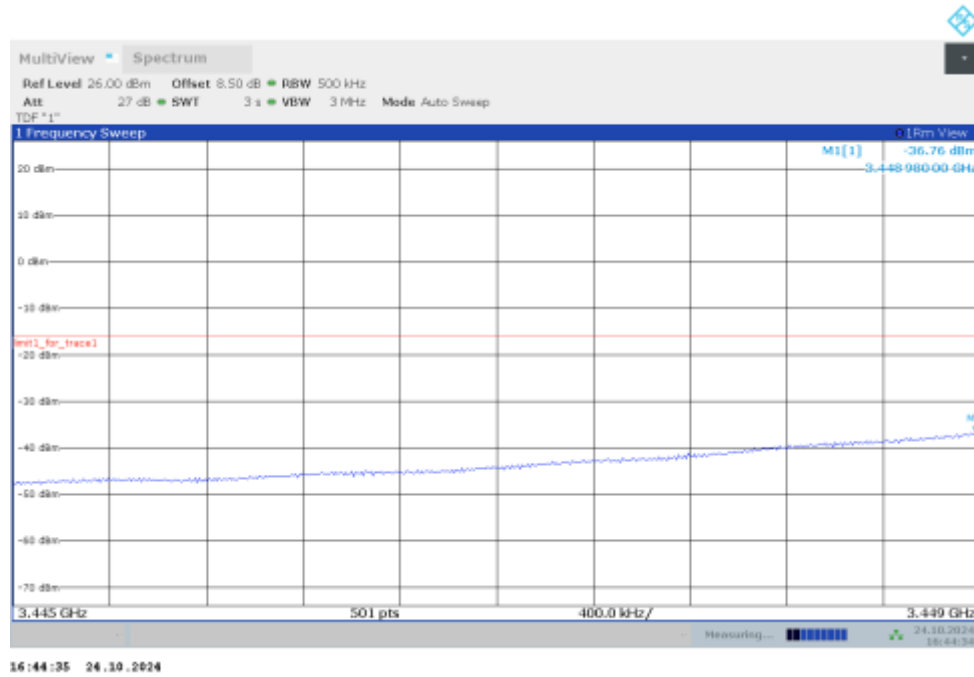
OBW: 1RB-LOW\_offset



LOW BAND EDGE BLOCK-1RB-LOW\_offset



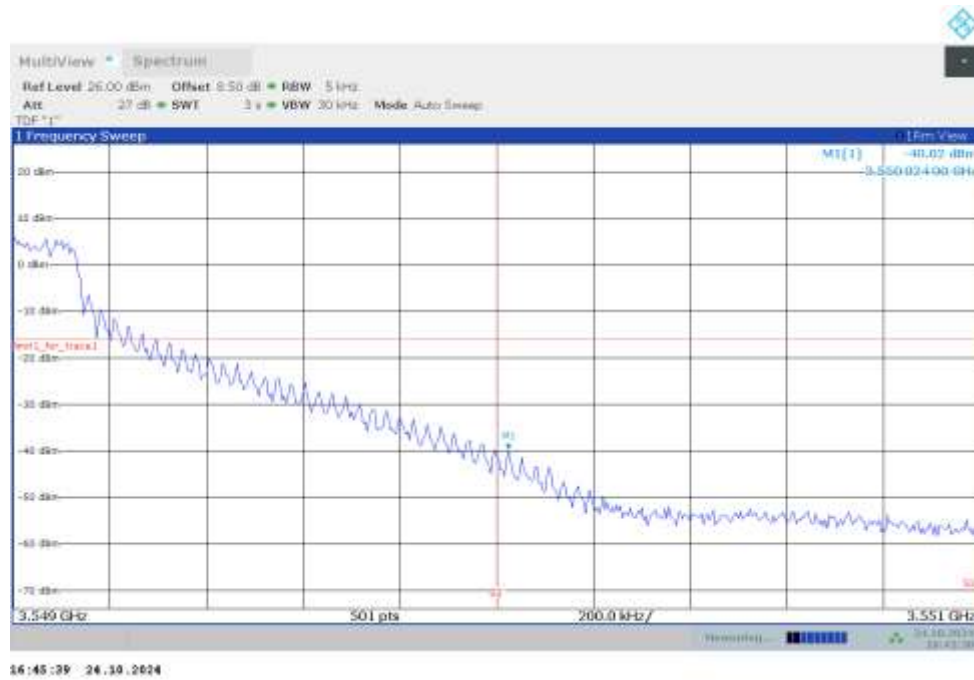
## LOW BAND EDGE BLOCK-1RB-LOW\_offset



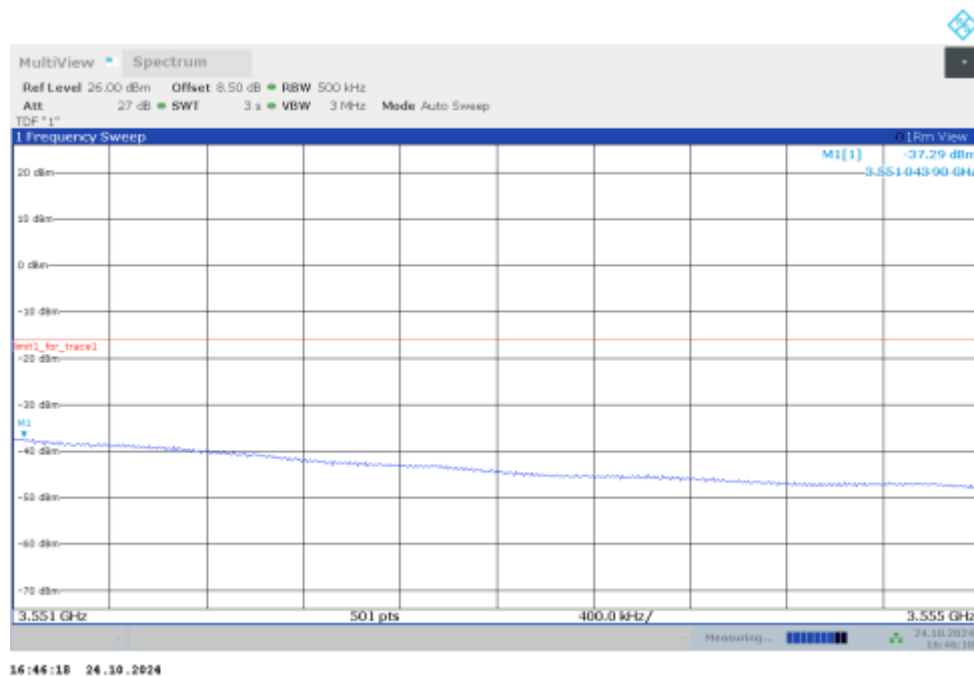
## OBW: 1RB-HIGH\_offset



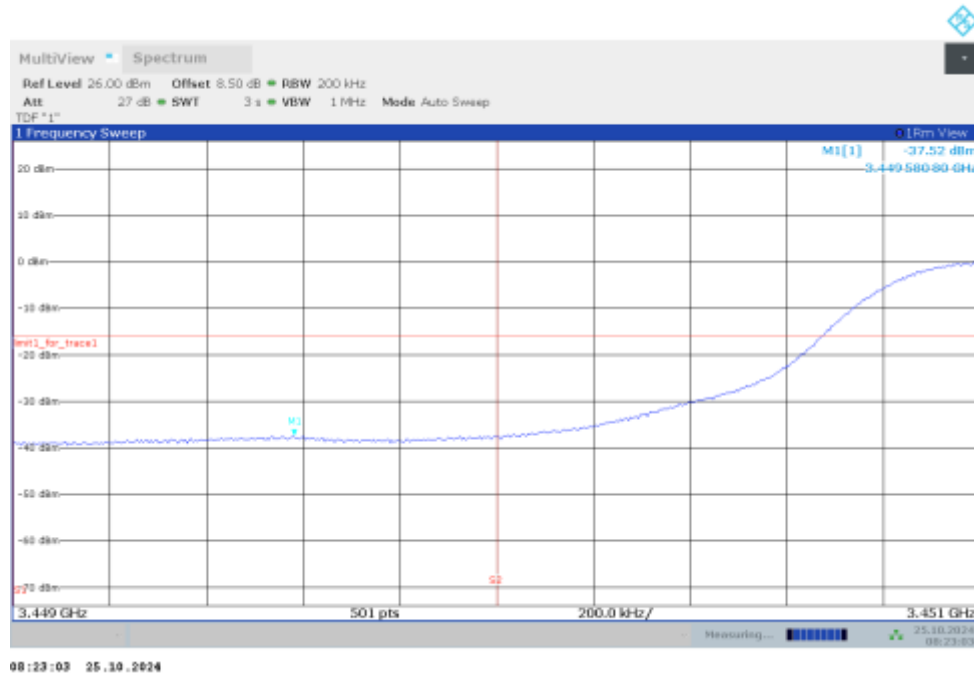
## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



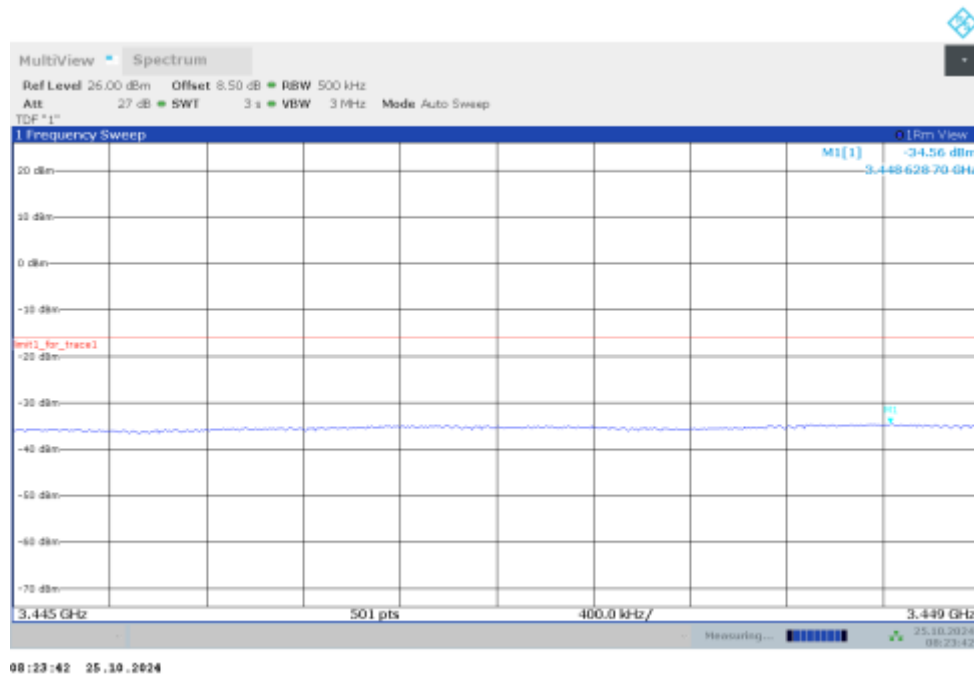
## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



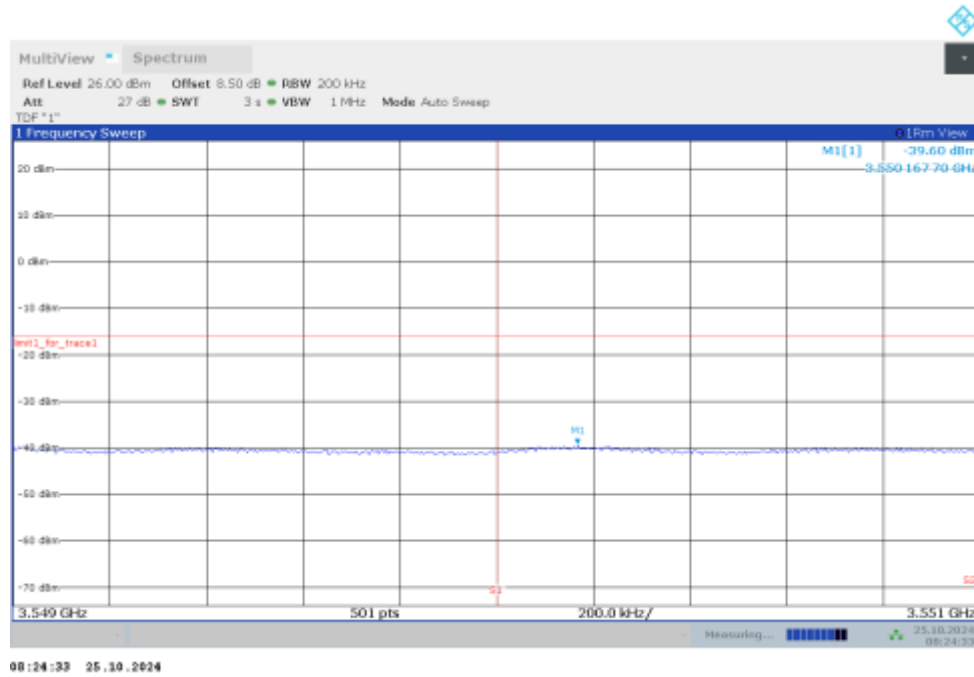
## LOW BAND EDGE BLOCK-100MHz-100%RB



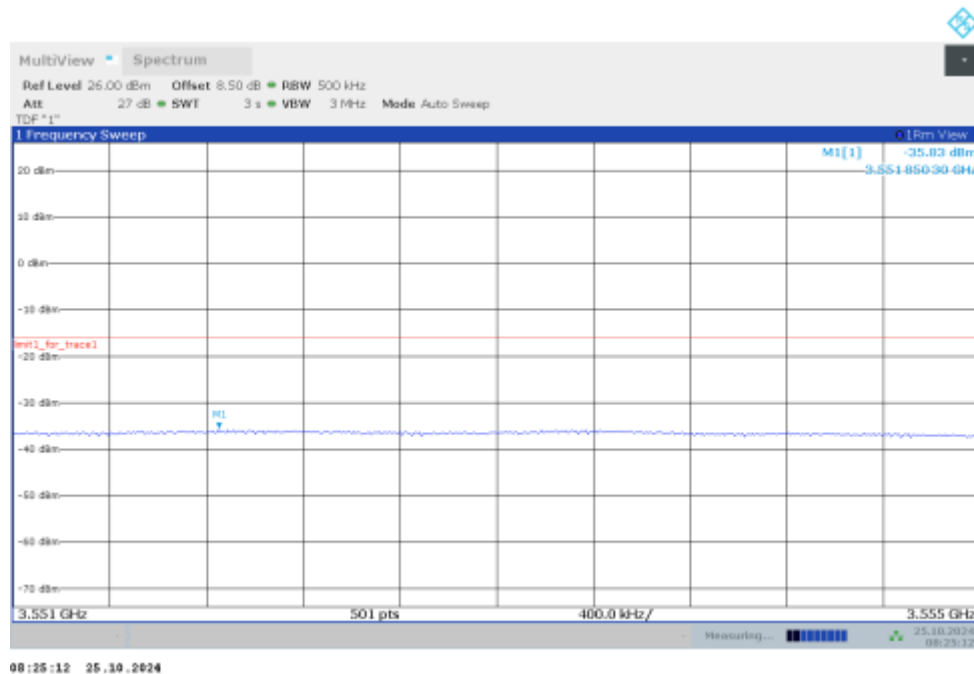
## LOW BAND EDGE BLOCK-100MHz-100%RB



## HIGH BAND EDGE BLOCK-100MHz-100%RB



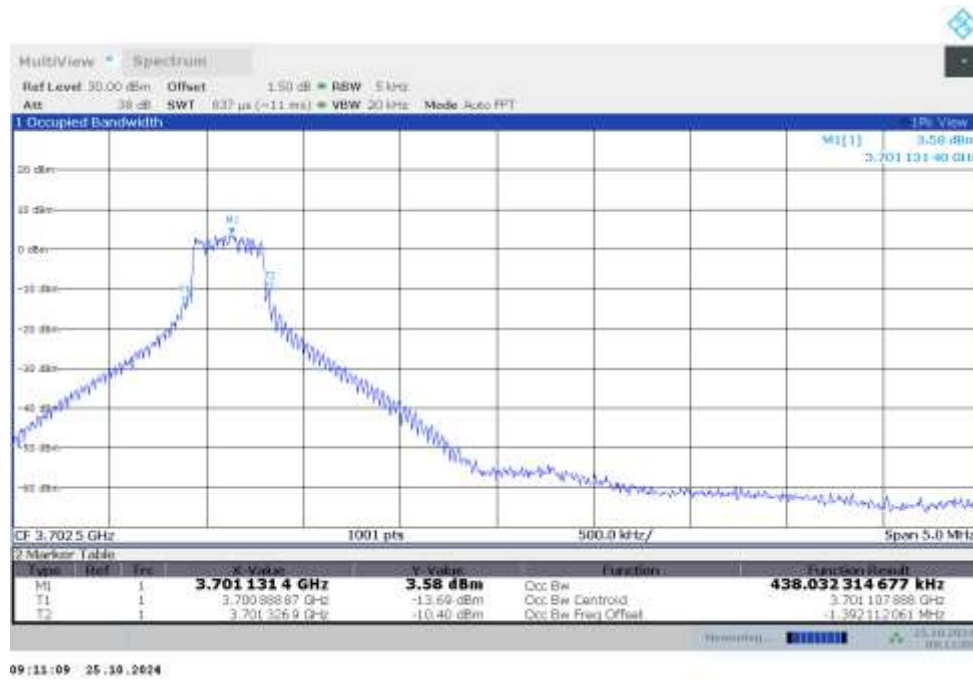
## HIGH BAND EDGE BLOCK-100MHz-100%RB



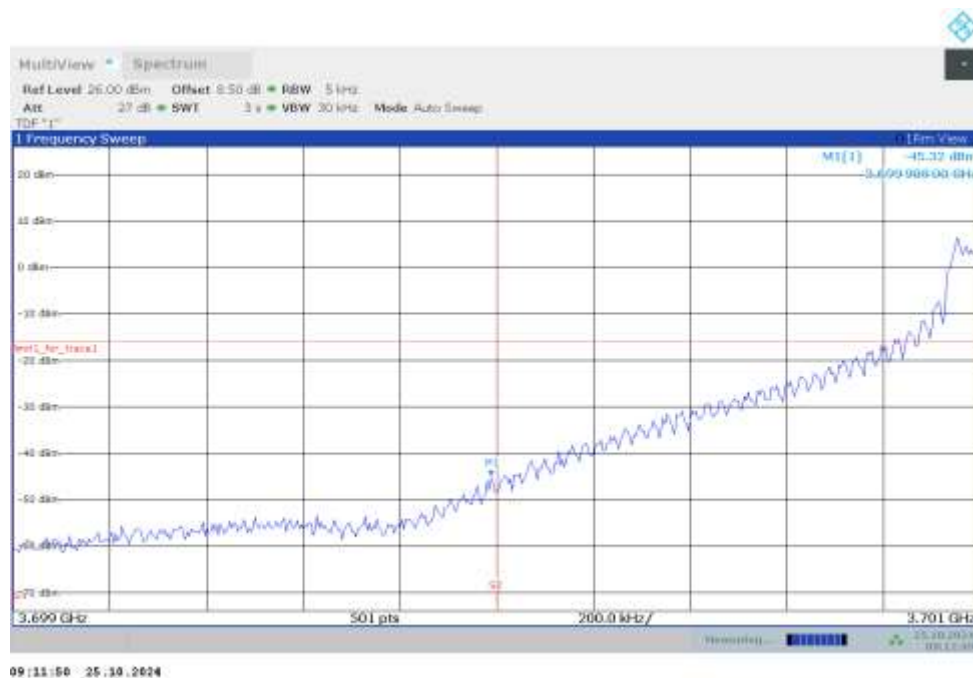


NR n77H

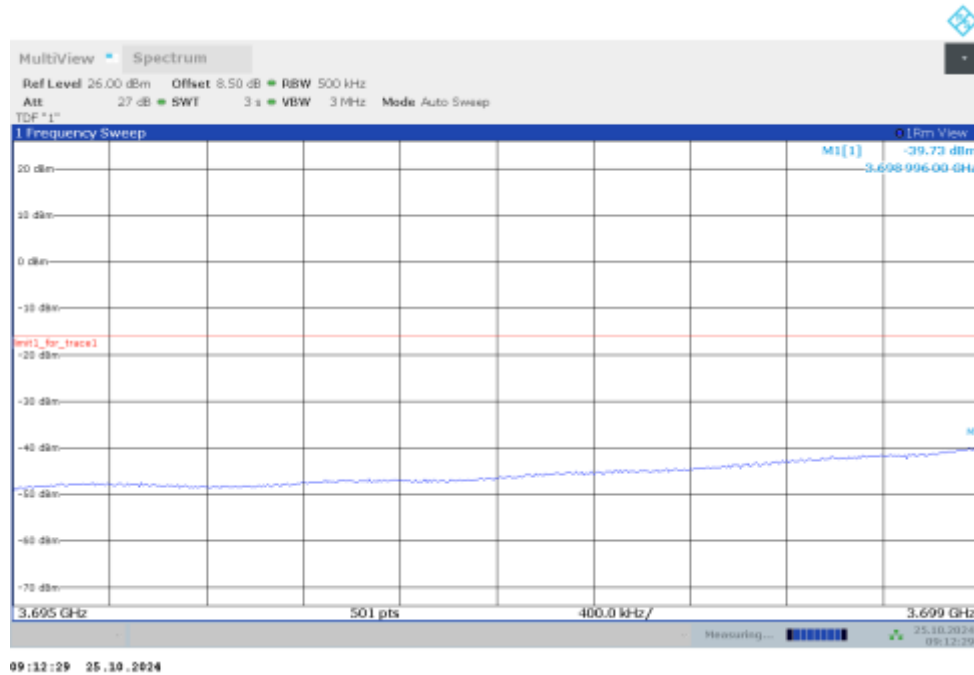
OBW: 1RB-LOW\_offset



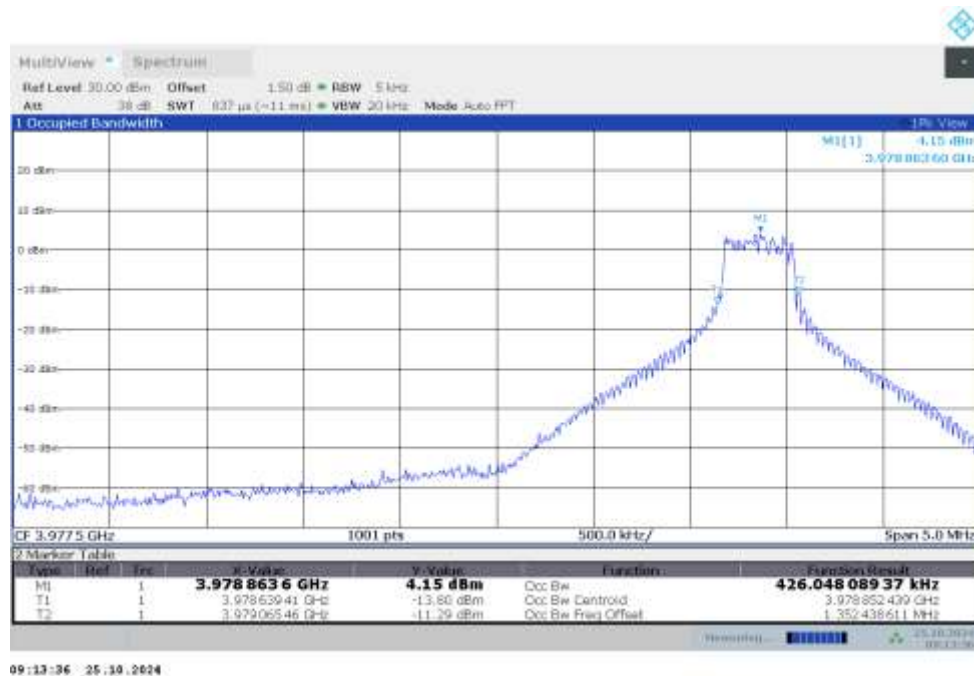
LOW BAND EDGE BLOCK-1RB-LOW\_offset



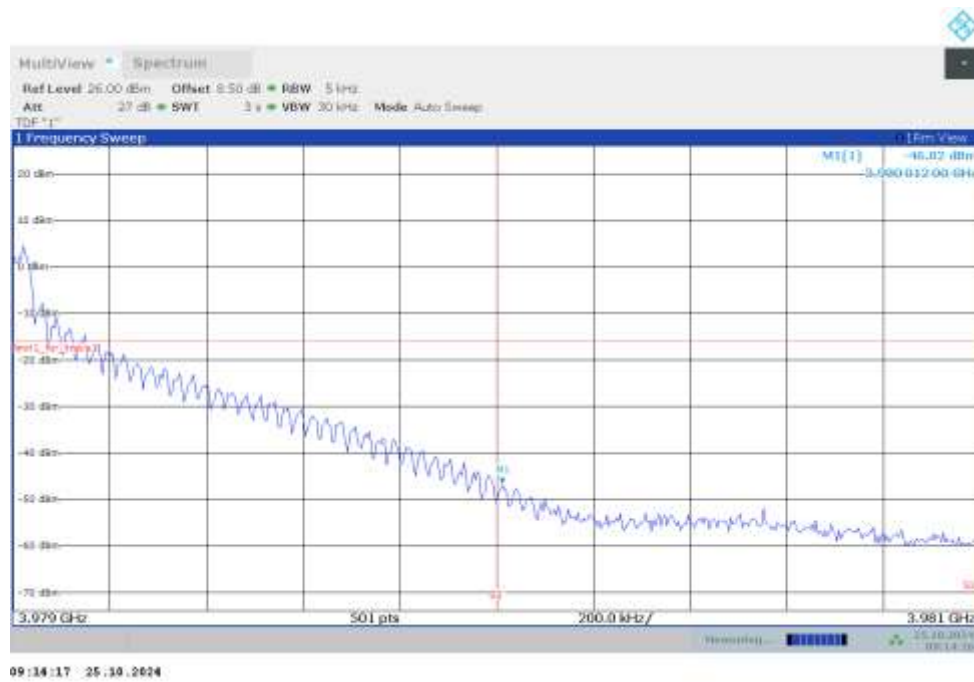
## LOW BAND EDGE BLOCK-1RB-LOW\_offset



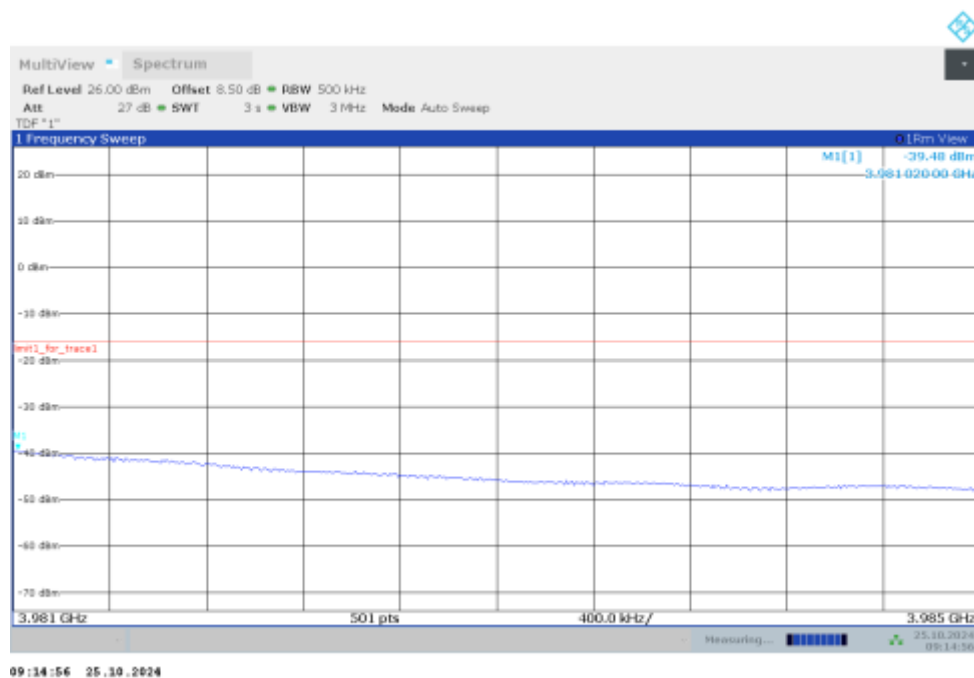
## OBW: 1RB-HIGH\_offset



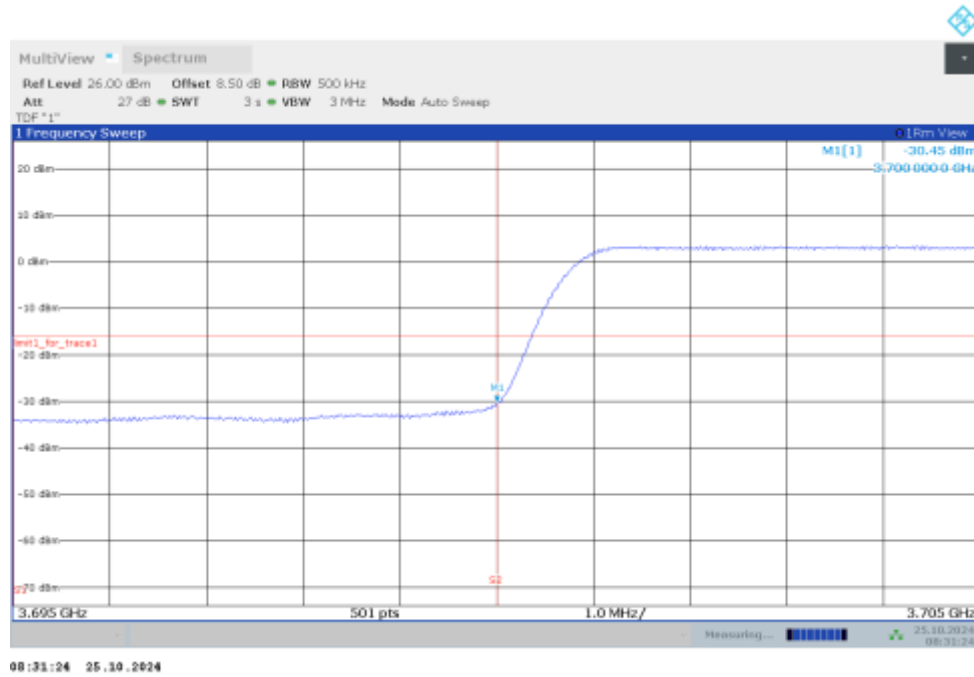
## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



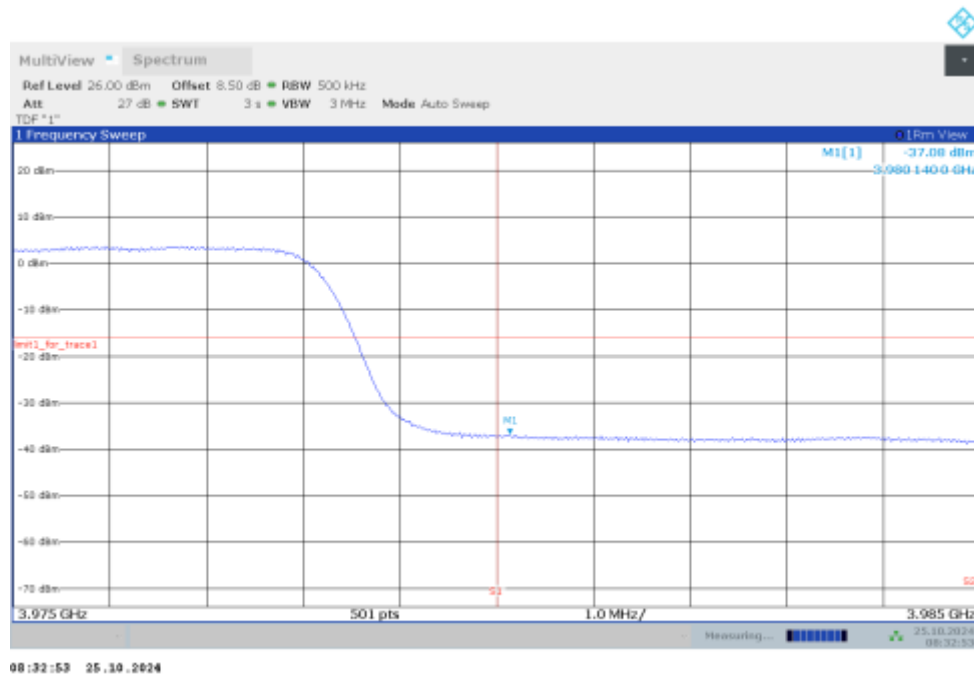
## HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



## LOW BAND EDGE BLOCK-100MHz-100%RB



## HIGH BAND EDGE BLOCK-100MHz-100%RB



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

## **A.7 Conducted Spurious Emission**

### **A.7.1 Measurement Method**

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz or the lowest radio frequency signal generated in the equipment, whichever is lower, without going below 9 kHz, up to at least the frequency given below:
  - (a) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
  - (b) If the equipment operates at or above 10 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.
3. The number of sweep points of spectrum analyzer is greater than  $2 \times \text{span/RBW}$ .

### **A. 7.2 Measurement Limit**

Part 22.917, Part 24.238 and Part 27.53(h) specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

Part 27.53(m) specifies for mobile digital stations, the attenuation 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 as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log(P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log(P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Part 27.53(g) states 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. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Part 27.53(a) states for mobile and portable stations operating in the 2305–2315 MHz and 2350–2360 MHz bands: By a factor of not less than:  $43 + 10 \log(P)$  dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than  $55 + 10 \log(P)$  dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than  $61 + 10 \log(P)$

dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than  $67 + 10 \log (P)$  dB on all frequencies between 2328 and 2337MHz; By a factor of not less than  $43 + 10 \log (P)$  dB on all frequencies between 2300 and 2305 MHz,  $55 + 10 \log (P)$  dB on all frequencies between 2296 and 2300MHz,  $61 + 10 \log (P)$  dB on all frequencies between 2292 and 2296 MHz,  $67 + 10 \log (P)$  dB on all frequencies between 2288 and 2292 MHz, and  $70 + 10 \log (P)$  dB below 2288 MHz; By a factor of not less than  $43 + 10 \log (P)$  dB on all frequencies between 2360 and 2365 MHz, and not less than  $70 + 10 \log (P)$  dB above 2365 MHz.

Part 96.41(e) states 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  $-13$  dBm/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  $-25$  dBm/MHz. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

Part 27.53(h) for operations in the 1695–1710 MHz, 1710–1755 MHz, 1755–1780 MHz, 1915–1920 MHz, 1995–2000 MHz, 2000–2020 MHz, 2110–2155 MHz, 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  $43 + 10 \log_{10} (P)$  dB. 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 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 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.

Part 27.53(n) states for mobile operations in the 3450-3550 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.

Part 27.53(l) states for mobile operations in the 3700-3980 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

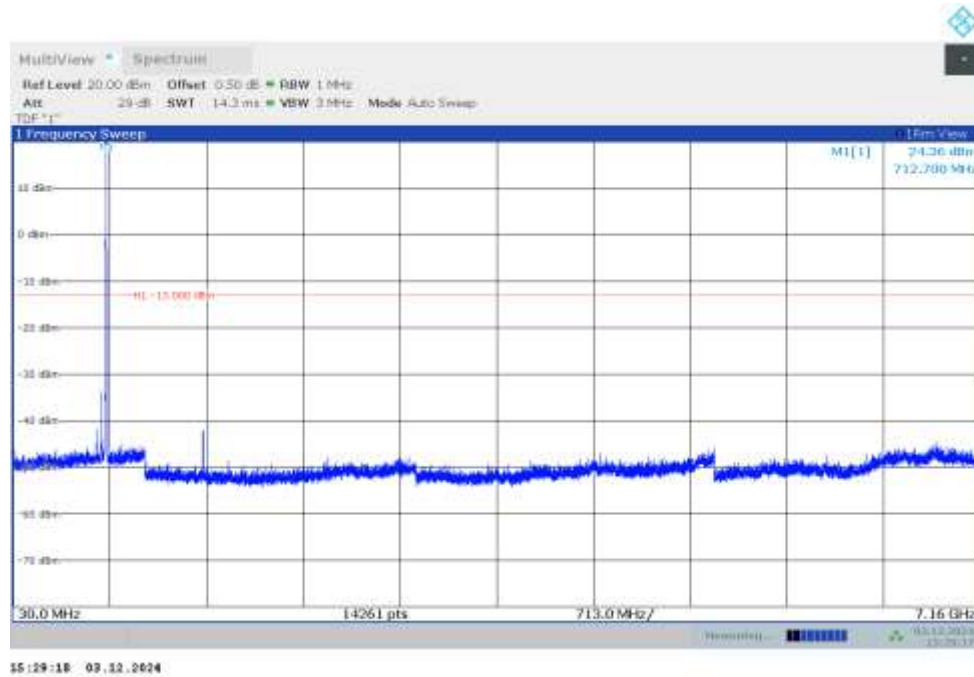
immediately outside and adjacent to the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency 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.

### A. 7.3 Measurement result

#### Measurement Results from UT09a:

n12

NOTE: peak above the limit line is the carrier frequency.

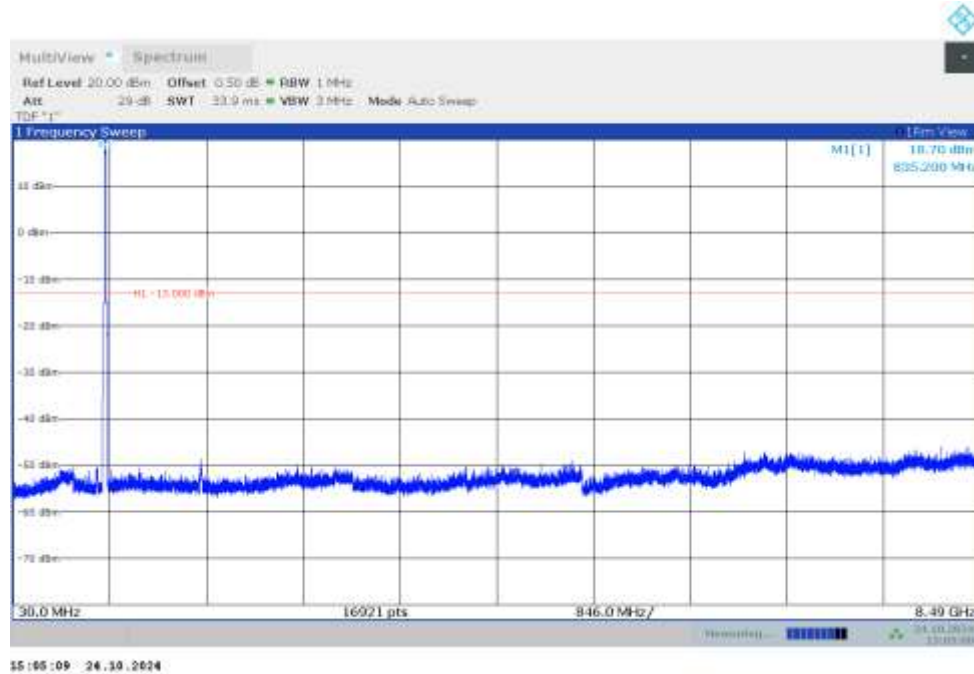




# Reference Measurement Results from basic model:

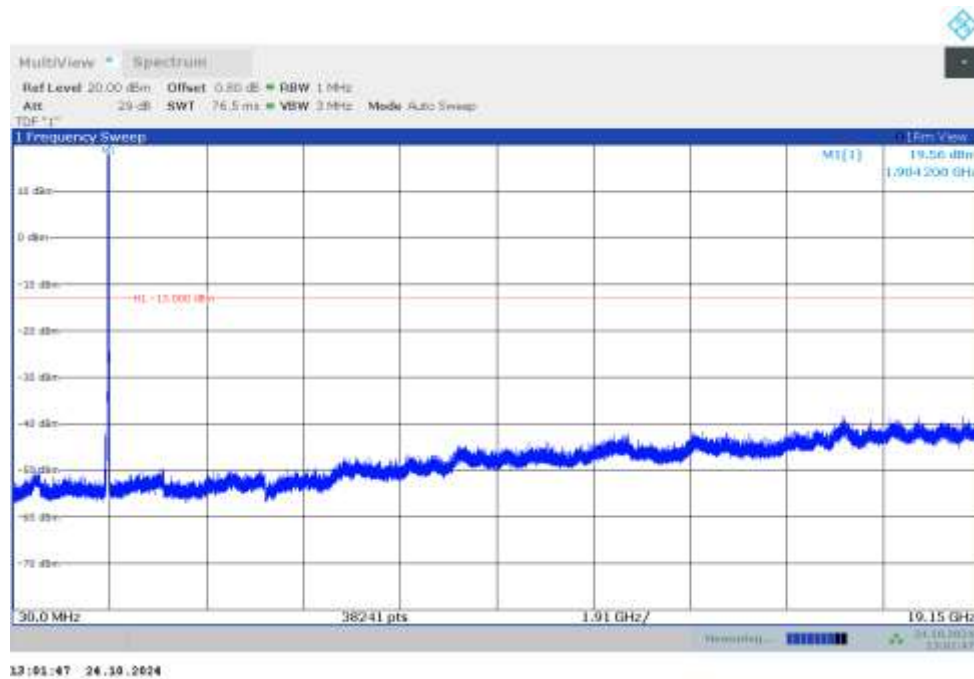
n5

NOTE: peak above the limit line is the carrier frequency.



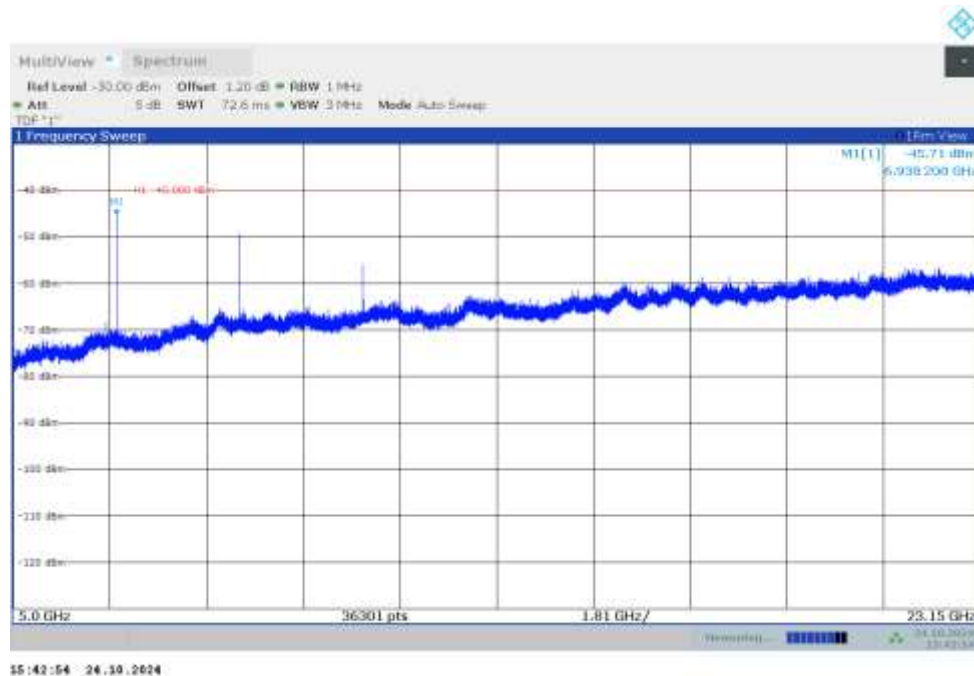
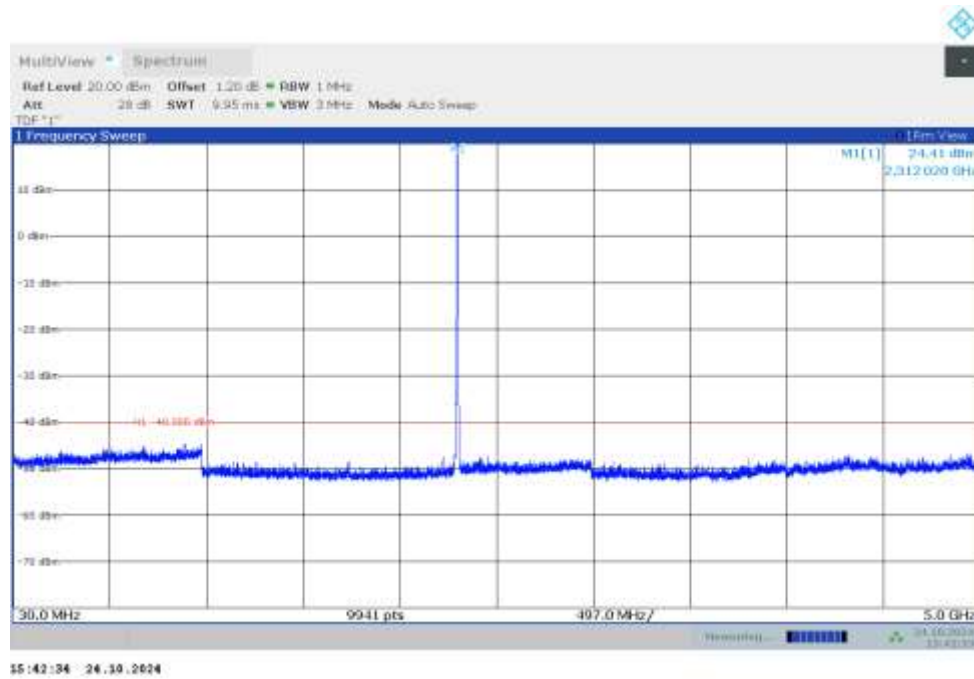
n25

NOTE: peak above the limit line is the carrier frequency.



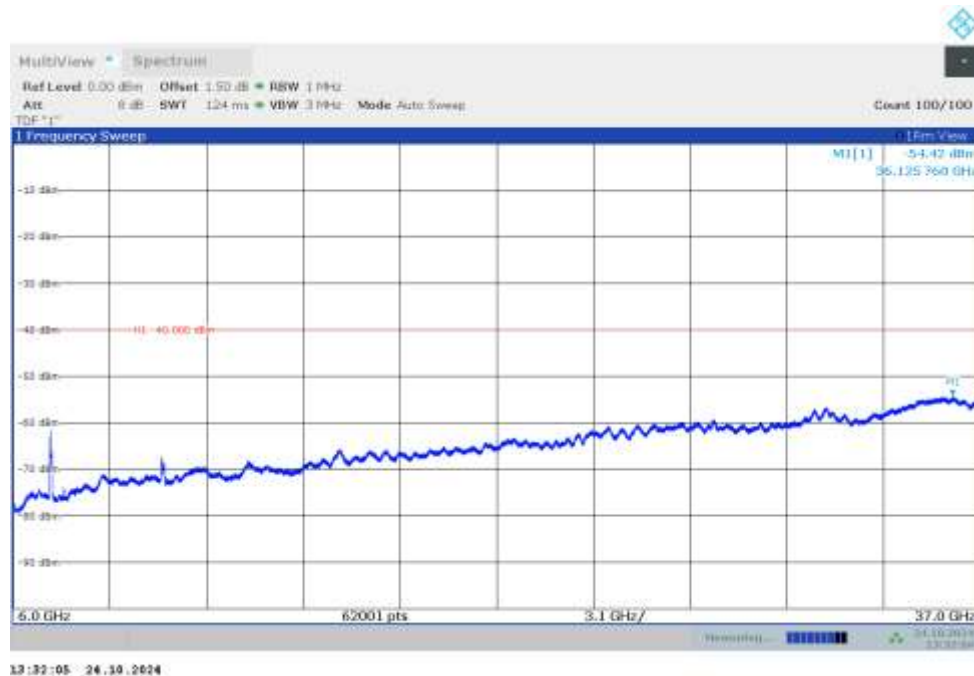
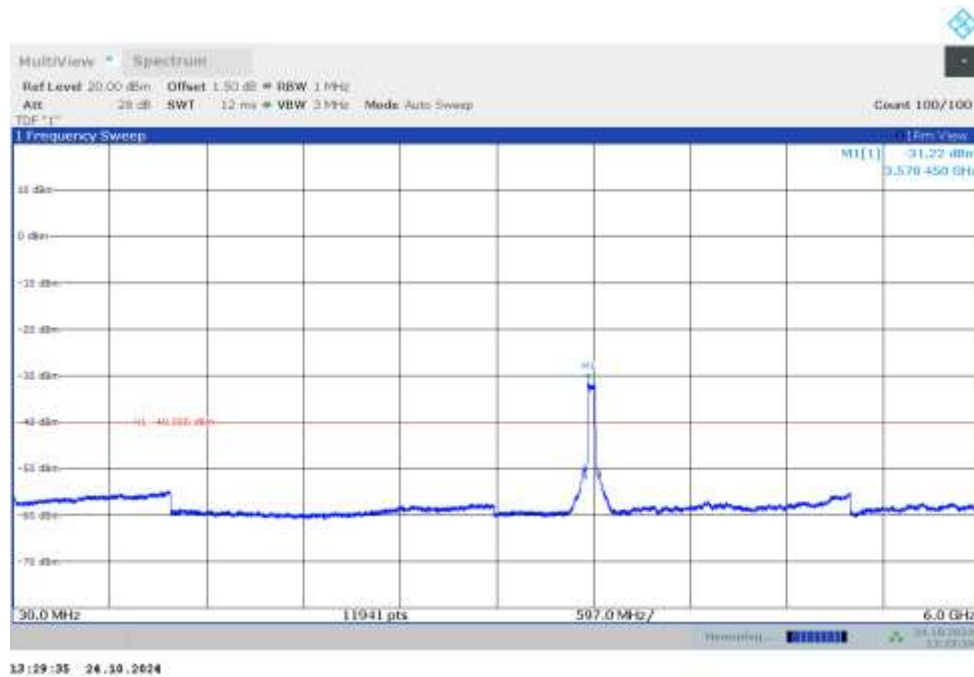
n30

NOTE: peak above the limit line is the carrier frequency.



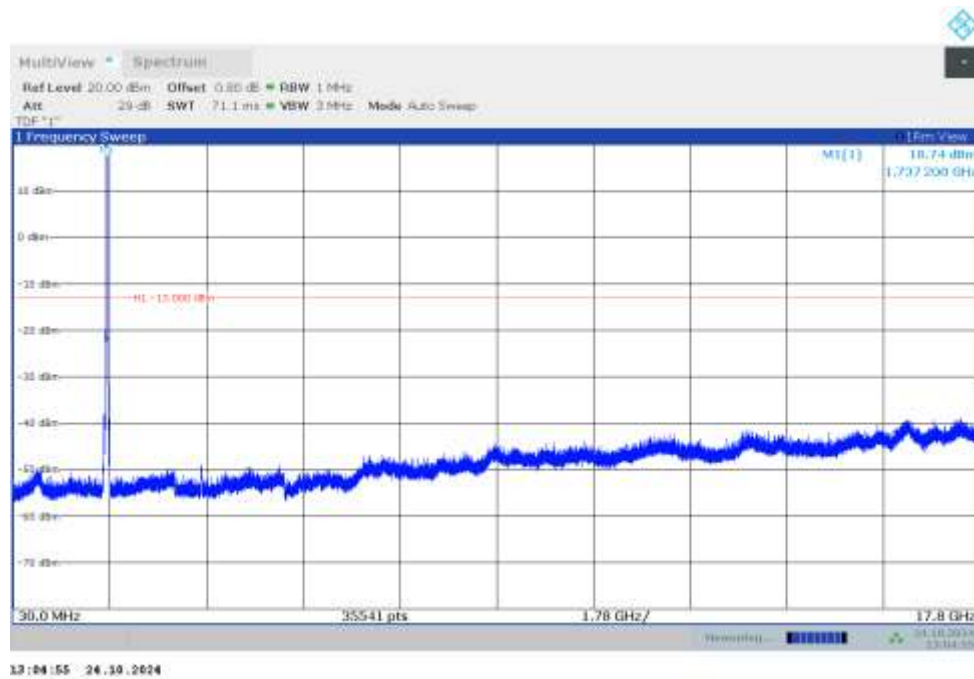
n48

NOTE: peak above the limit line is the carrier frequency.



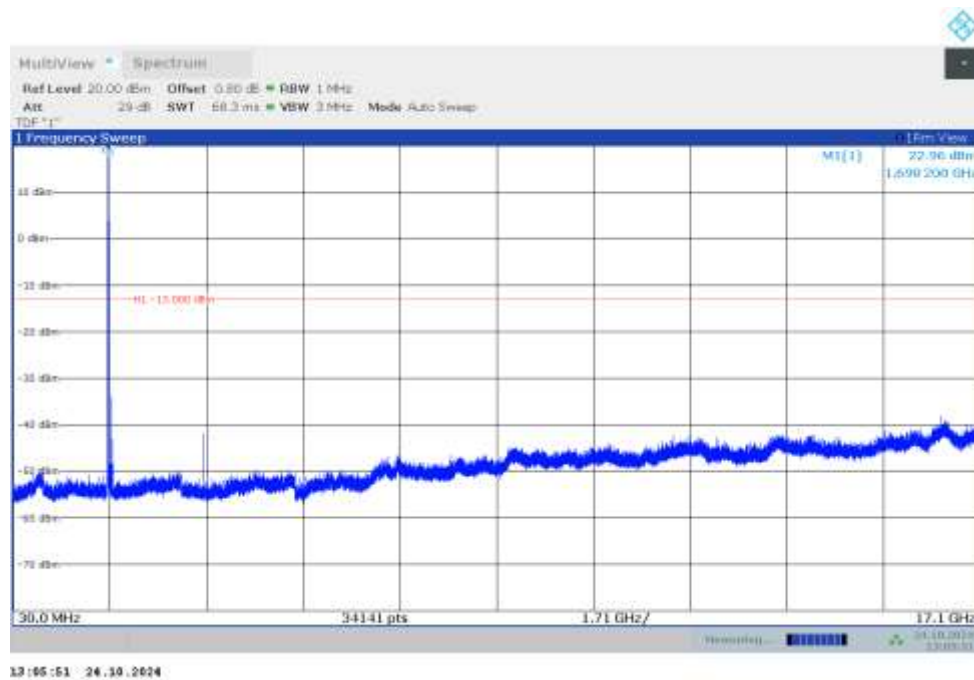
n66

NOTE: peak above the limit line is the carrier frequency.



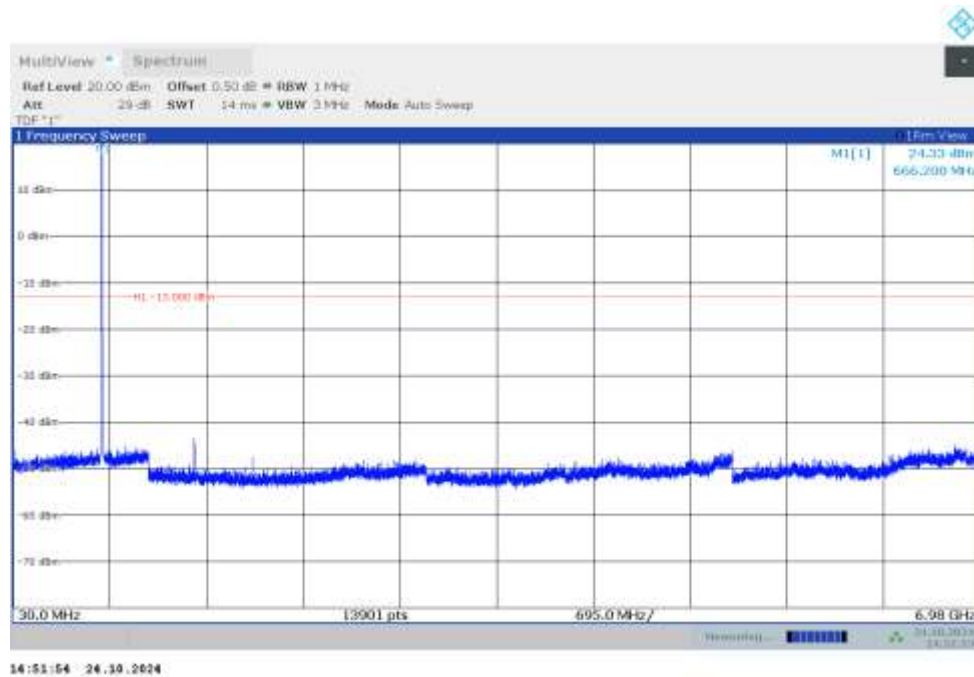
n70

NOTE: peak above the limit line is the carrier frequency.



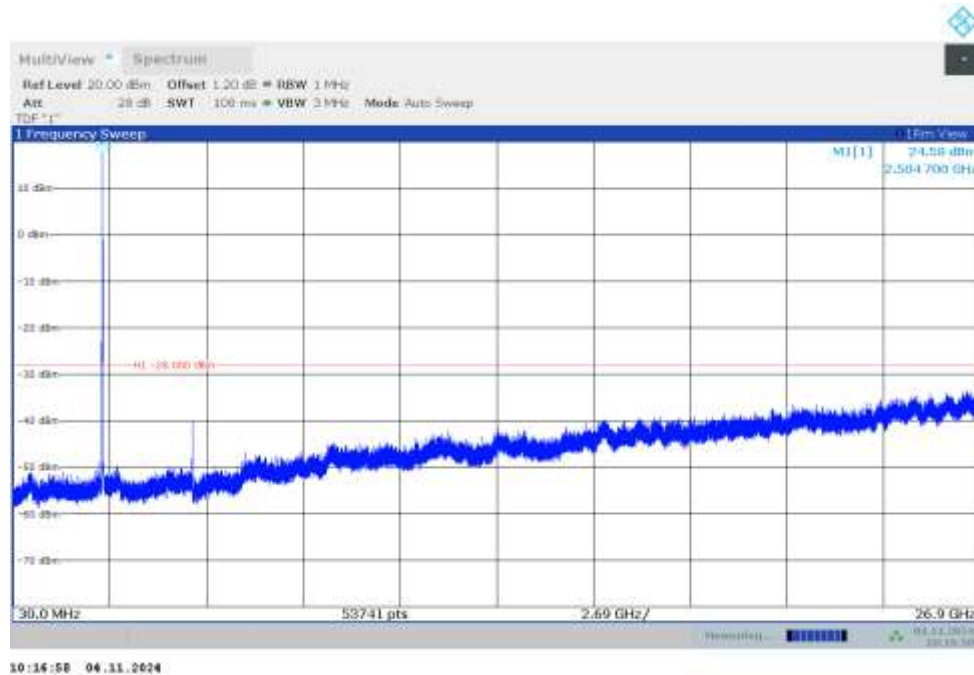
n71

NOTE: peak above the limit line is the carrier frequency.



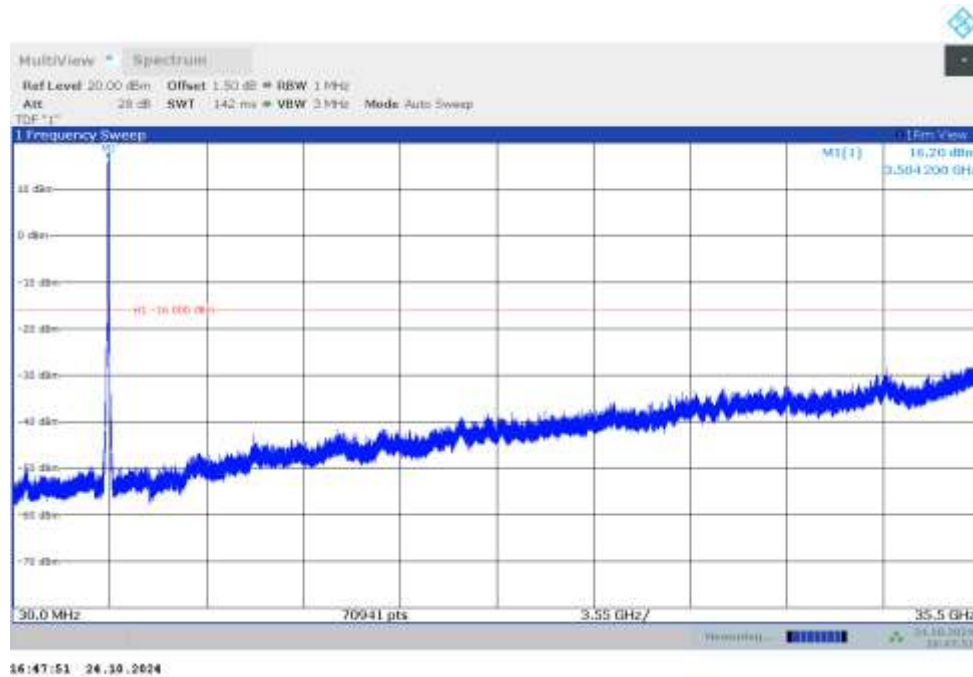
n41

NOTE: peak above the limit line is the carrier frequency.



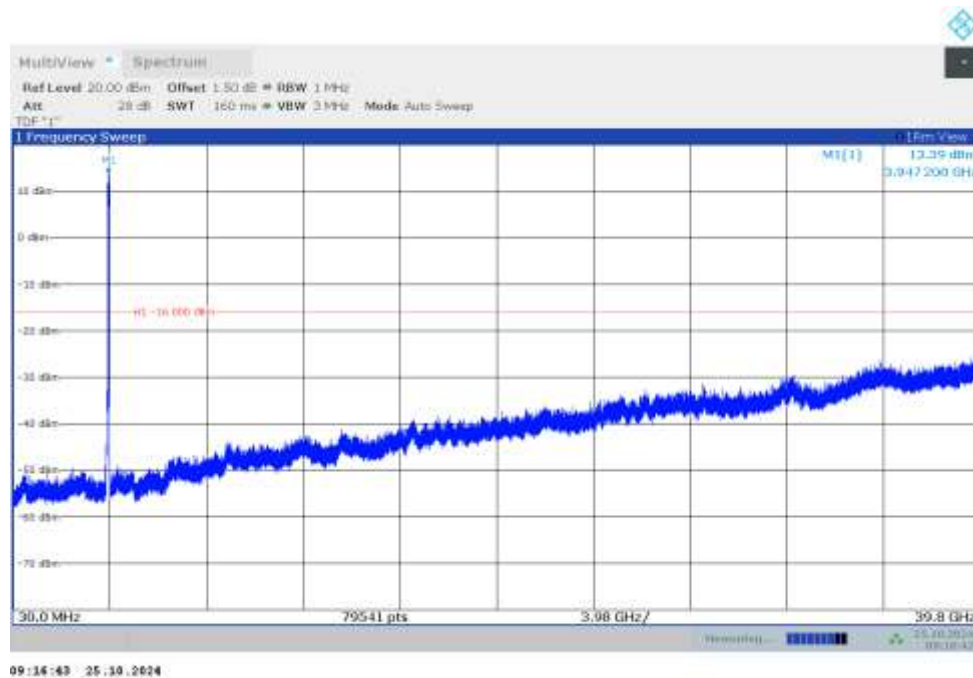
n77L

NOTE: peak above the limit line is the carrier frequency.



n77H

NOTE: peak above the limit line is the carrier frequency.



Note: The maximum value of expanded measurement uncertainty for this test item is  $U = 0.372 \text{ dB}$ ,  $k = 2$ .

## A.8 Peak-to-Average Power Ratio

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB

- Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
- Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
- Set the number of counts to a value that stabilizes the measured CCDF curve;
- Record the maximum PAPR level associated with a probability of 0.1%.

### Measurement results

#### Measurement Results from UT09a:

##### n12,15MHz

Frequency (MHz)	PAPR (dB)								
	DFT-s-pi/2 BPSK	DFT-s-QPSK	DFT-s-16QAM	DFT-s-64QAM	DFT-s-256QAM	CP-QPSK	CP-16QAM	CP-64QAM	CP-256QAM
707.5	4.36	5.28	6.14	6.36	6.40	8.02	7.86	7.98	8.54

#### Reference Measurement Results from basic model:

##### n25,45MHz

Frequency (MHz)	PAPR (dB)								
	DFT-s-pi/2 BPSK	DFT-s-QPSK	DFT-s-16QAM	DFT-s-64QAM	DFT-s-256QAM	CP-QPSK	CP-16QAM	CP-64QAM	CP-256QAM
1882.5	4.77	5.58	6.36	6.51	6.59	8.42	8.41	8.49	8.49

##### n30,10MHz

Frequency (MHz)	PAPR (dB)								
	DFT-s-pi/2 BPSK	DFT-s-QPSK	DFT-s-16QAM	DFT-s-64QAM	DFT-s-256QAM	CP-QPSK	CP-16QAM	CP-64QAM	CP-256QAM
2310	4.46	5.46	6.10	6.50	6.80	7.76	7.82	7.98	8.64

##### n48,100MHz

Frequency (MHz)	PAPR (dB)								
	DFT-s-pi/2 BPSK	DFT-s-QPSK	DFT-s-16QAM	DFT-s-64QAM	DFT-s-256QAM	CP-QPSK	CP-16QAM	CP-64QAM	CP-256QAM
3624.99	5.36	6.61	7.48	7.07	7.20	9.32	8.88	9.05	8.78

##### n66,45MHz

Frequency (MHz)	PAPR (dB)								
	DFT-s-pi/2 BPSK	DFT-s-QPSK	DFT-s-16QAM	DFT-s-64QAM	DFT-s-256QAM	CP-QPSK	CP-16QAM	CP-64QAM	CP-256QAM
1745	4.59	5.28	5.99	6.25	6.56	7.83	7.79	7.97	8.35

##### n70,15MHz

Frequency (MHz)	PAPR (dB)								
	DFT-s-pi/2 BPSK	DFT-s-QPSK	DFT-s-16QAM	DFT-s-64QAM	DFT-s-256QAM	CP-QPSK	CP-16QAM	CP-64QAM	CP-256QAM
1702.5	4.32	5.45	6.25	6.44	6.53	8.21	8.04	8.19	8.46



**n71,35MHz**

Frequency (MHz)	PAPR (dB)								
	DFT-s-pi/2 BPSK	DFT-s-QPSK	DFT-s-16QAM	DFT-s-64QAM	DFT-s-256QAM	CP-QPSK	CP-16QAM	CP-64QAM	CP-256QAM
680.5	4.90	5.39	6.12	6.43	6.81	7.70	7.80	7.92	8.77

**n41,100MHz**

Frequency (MHz)	PAPR (dB)								
	DFT-s-pi/2 BPSK	DFT-s-QPSK	DFT-s-16QAM	DFT-s-64QAM	DFT-s-256QAM	CP-QPSK	CP-16QAM	CP-64QAM	CP-256QAM
2592.99	5.75	6.06	6.16	6.48	7.23	8.22	7.98	8.66	8.76

**n77L,100MHz**

Frequency (MHz)	PAPR (dB)								
	DFT-s-pi/2 BPSK	DFT-s-QPSK	DFT-s-16QAM	DFT-s-64QAM	DFT-s-256QAM	CP-QPSK	CP-16QAM	CP-64QAM	CP-256QAM
3500.01	5.88	6.32	6.56	7.66	7.55	8.60	9.32	8.53	8.99

**n77H,100MHz**

Frequency (MHz)	PAPR (dB)								
	DFT-s-pi/2 BPSK	DFT-s-QPSK	DFT-s-16QAM	DFT-s-64QAM	DFT-s-256QAM	CP-QPSK	CP-16QAM	CP-64QAM	CP-256QAM
3840	5.70	6.83	6.97	7.36	7.07	9.21	9.08	8.87	8.98

Note: The maximum value of expanded measurement uncertainty for this test item is  $U = 0.356 \text{ dB}$ ,  $k = 2$ .



## Annex B: Accreditation Certificate



\*\*\*END OF REPORT\*\*\*