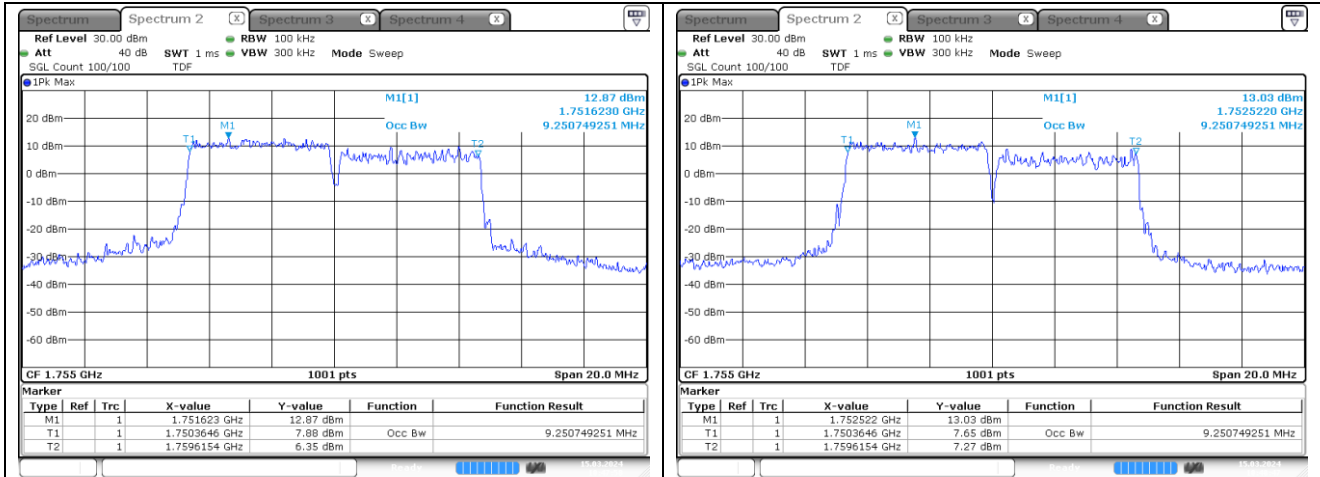
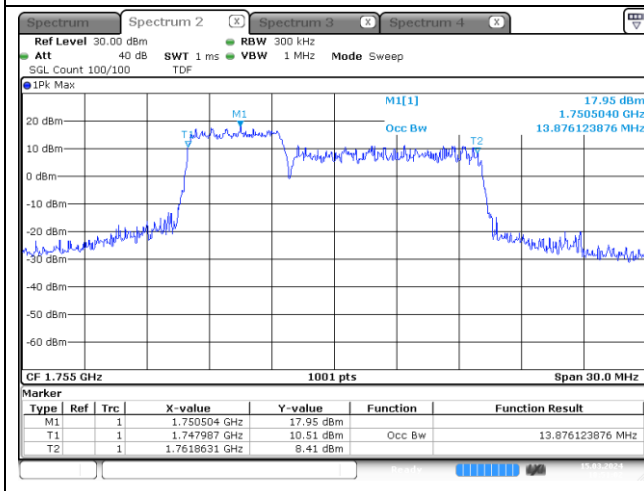


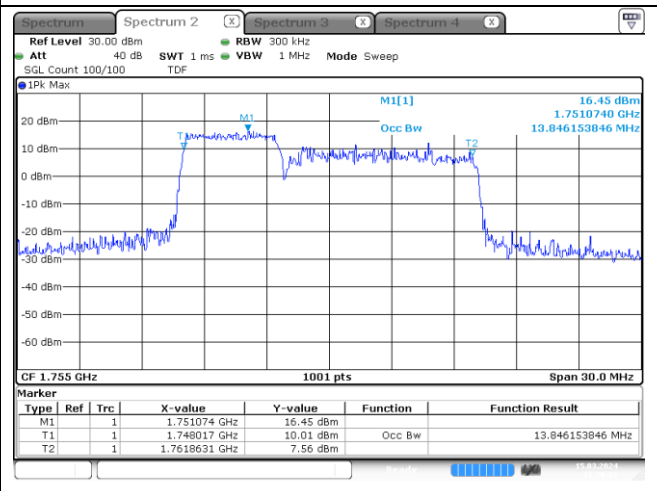
**ULCA 66B**



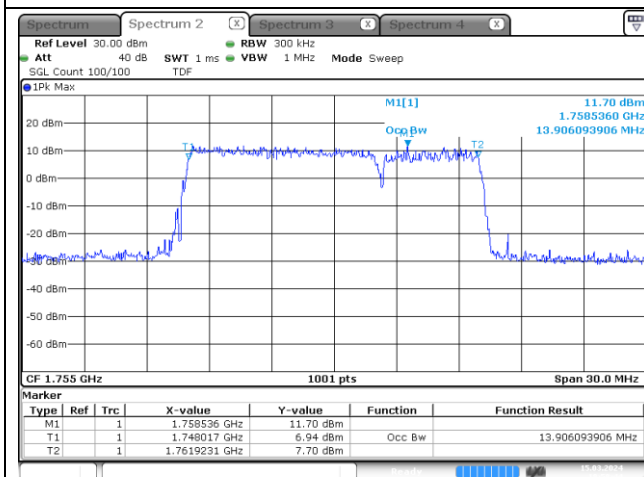
**5 MHz + 5 MHz QPSK Middle Channel - Full RB**



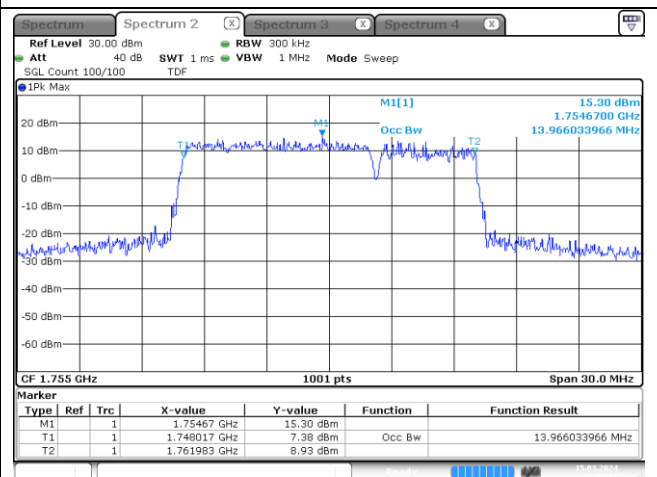
**5 MHz + 5 MHz 16QAM Middle Channel - Full RB**



**5 MHz + 10 MHz QPSK Middle Channel - Full RB**



**5 MHz + 10 MHz 16QAM Middle Channel - Full RB**



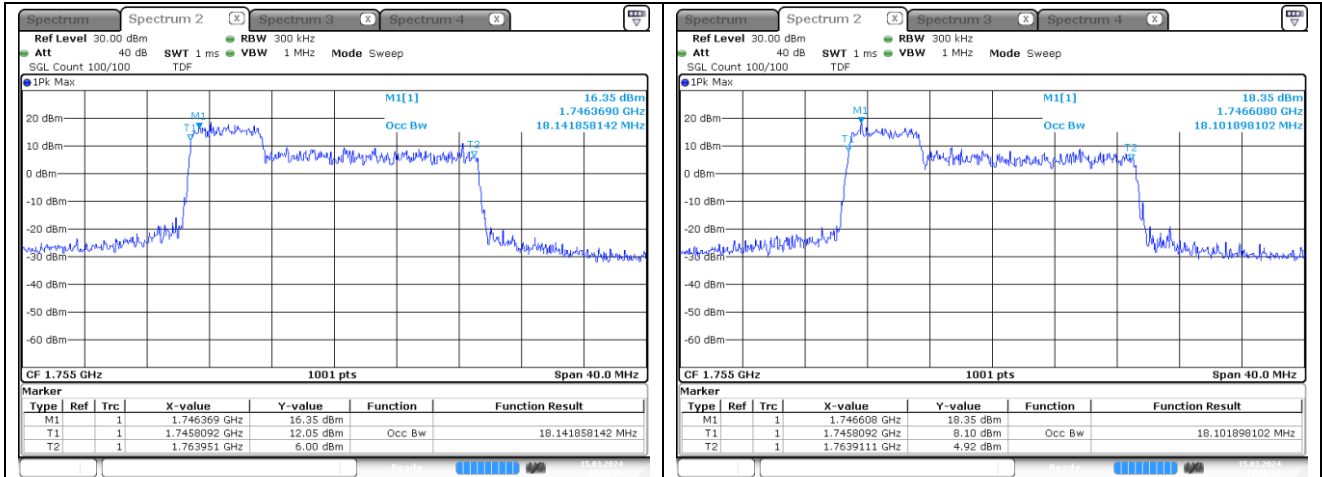
**10 MHz + 5 MHz QPSK Middle Channel - Full RB**



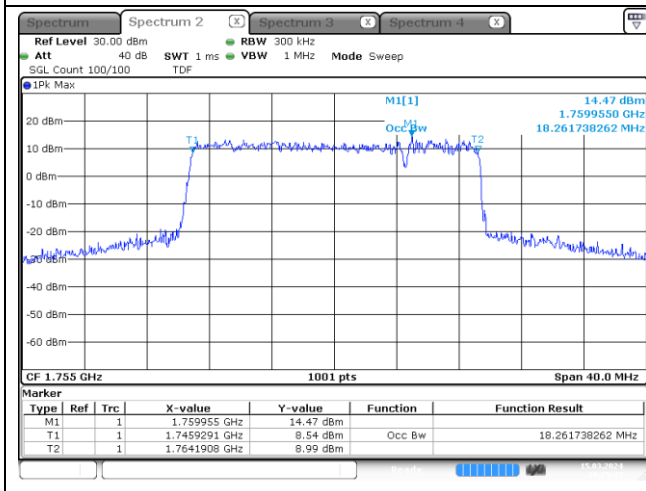
**10 MHz + 5 MHz 16QAM Middle Channel - Full RB**



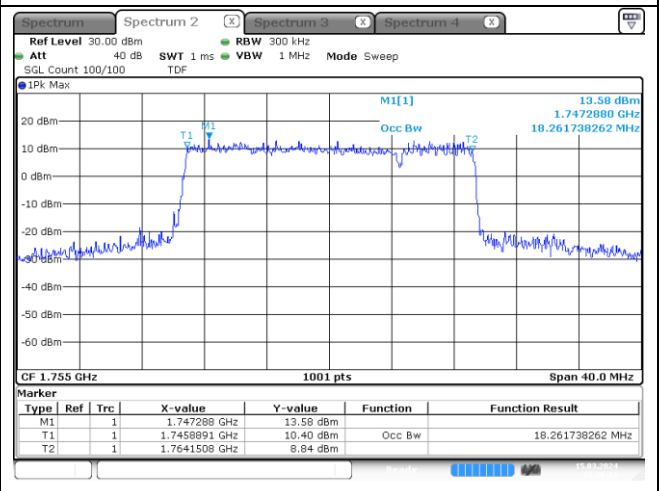
**ULCA 66B**



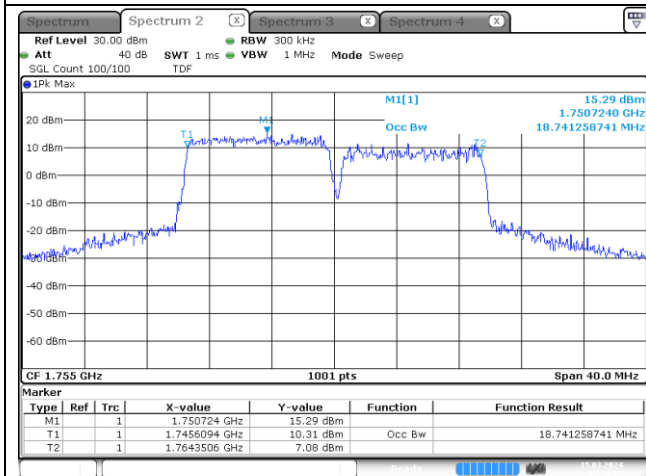
**5 MHz + 15 MHz QPSK Middle Channel - Full RB**



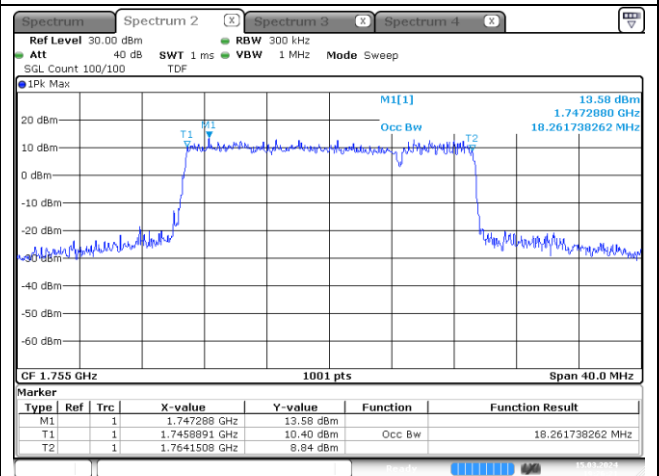
**5 MHz + 15 MHz 16QAM Middle Channel - Full RB**



**15 MHz + 5 MHz QPSK Middle Channel - Full RB**



**15 MHz + 5 MHz 16QAM Middle Channel - Full RB**



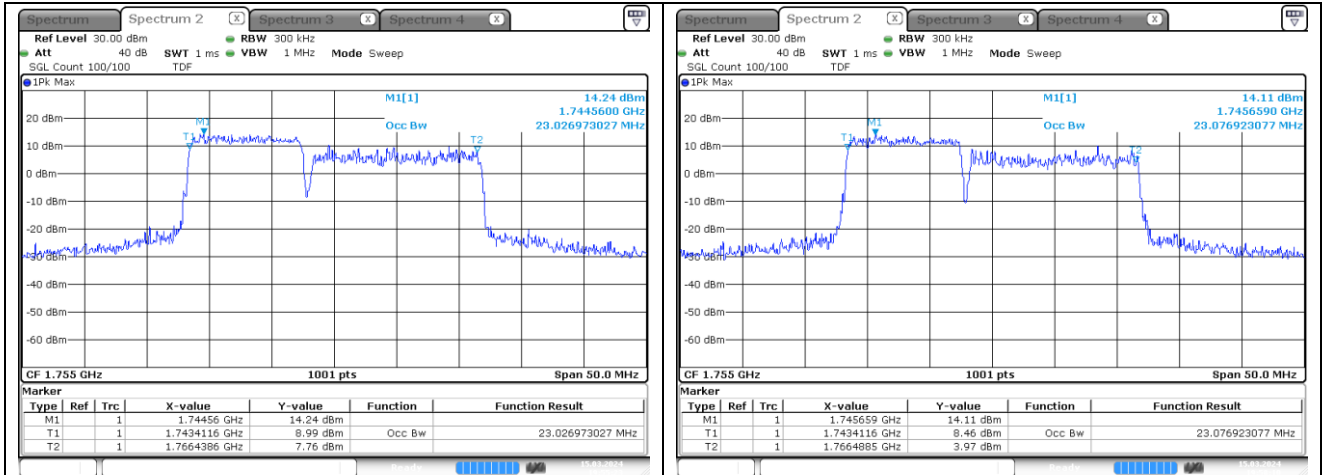
**10 MHz + 10 MHz QPSK Middle Channel - Full RB**



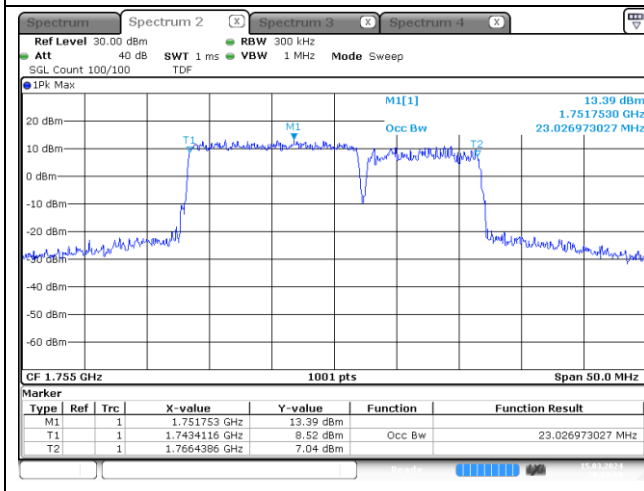
**10 MHz + 10 MHz 16QAM Middle Channel - Full RB**



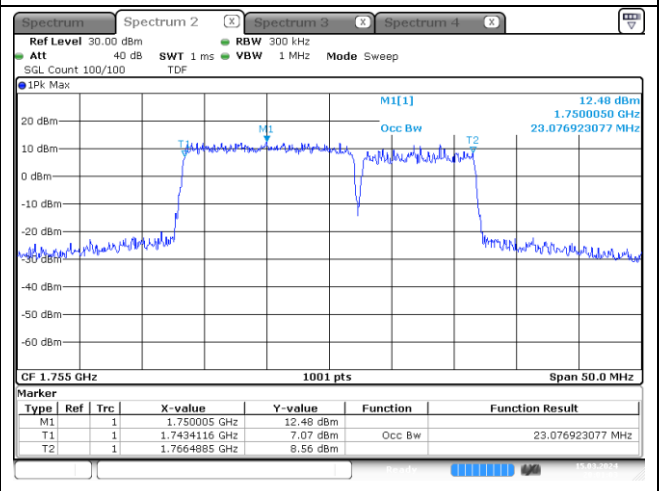
**ULCA 66C**



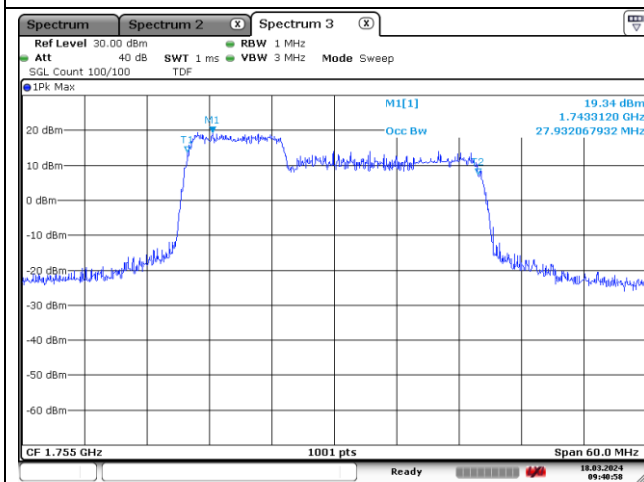
**10 MHz + 15 MHz QPSK Middle Channel - Full RB**



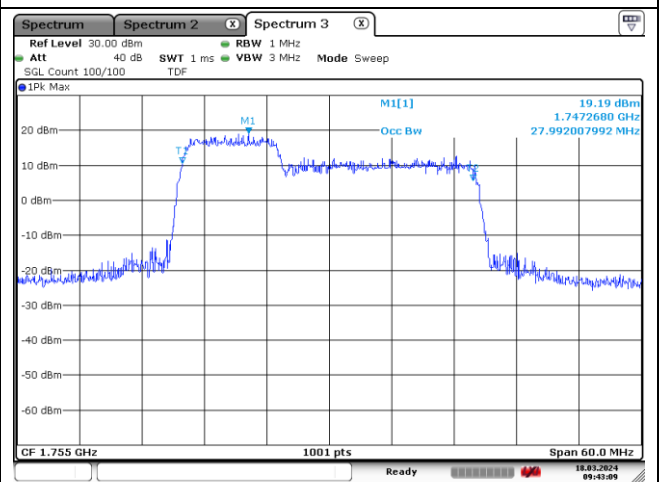
**10 MHz + 15 MHz 16QAM Middle Channel - Full RB**



**15 MHz + 10 MHz QPSK Middle Channel - Full RB**



**15 MHz + 10 MHz 16QAM Middle Channel - Full RB**



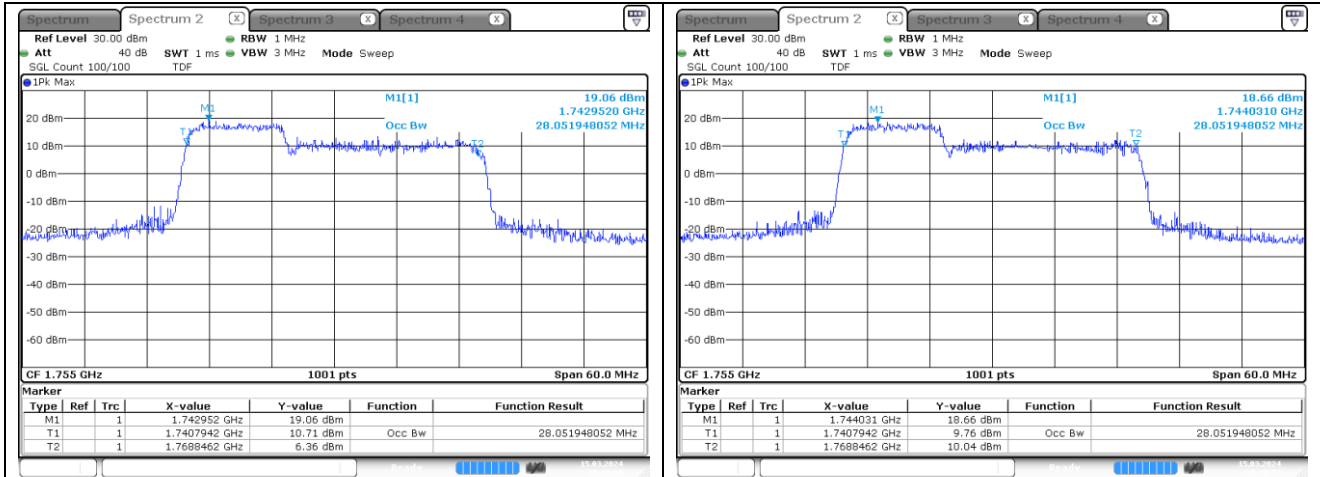
**10 MHz + 20 MHz QPSK Middle Channel - Full RB**



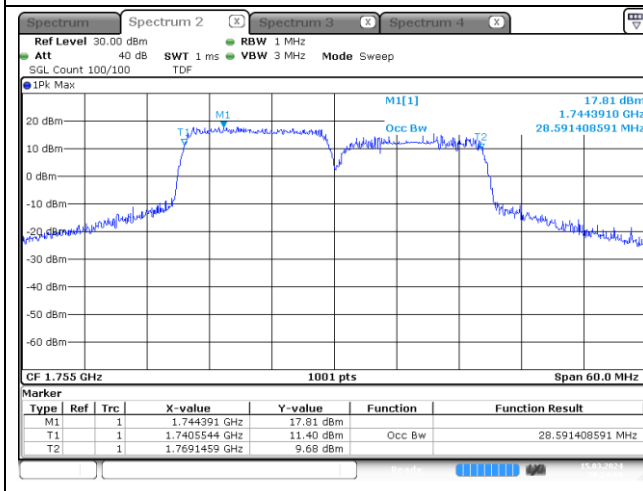
**10 MHz + 20 MHz 16QAM Middle Channel - Full RB**



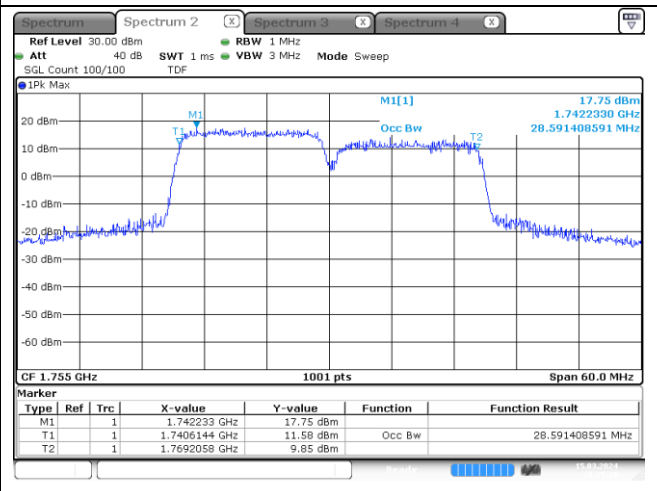
**ULCA 66C**



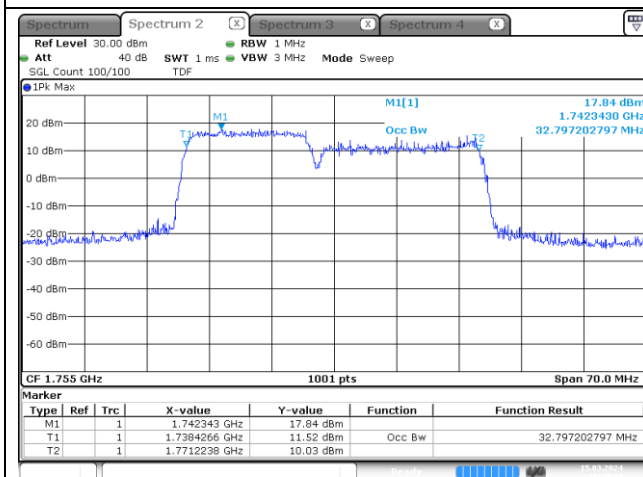
**20 MHz + 10 MHz QPSK Middle Channel - Full RB**



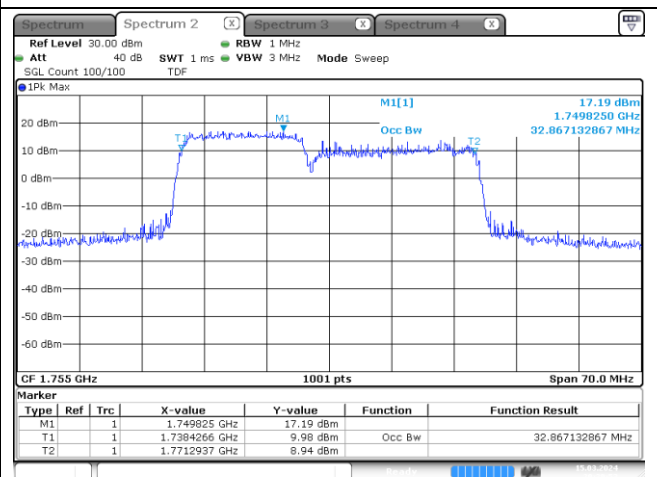
**20 MHz + 10 MHz 16QAM Middle Channel - Full RB**



**15 MHz + 15 MHz QPSK Middle Channel - Full RB**



**15 MHz + 15 MHz 16QAM Middle Channel - Full RB**



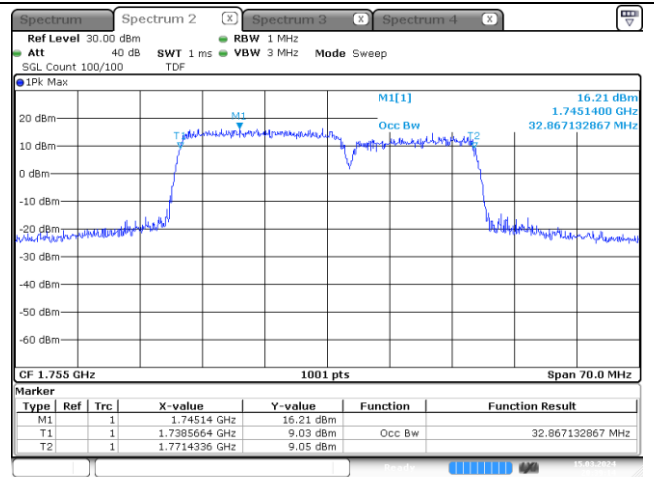
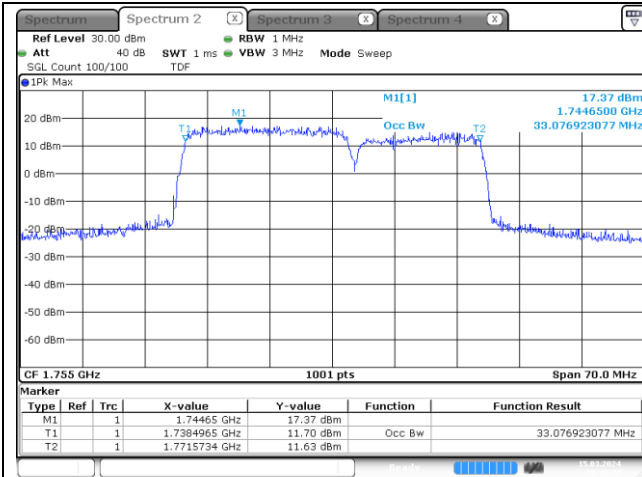
**15 MHz + 20 MHz QPSK Middle Channel - Full RB**



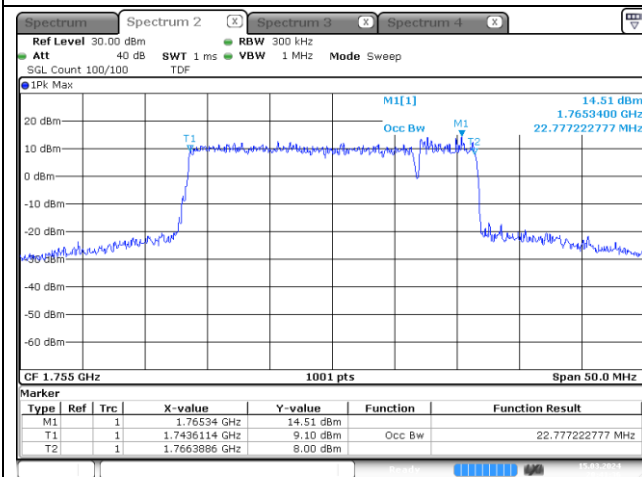
**15 MHz + 20 MHz 16QAM Middle Channel - Full RB**



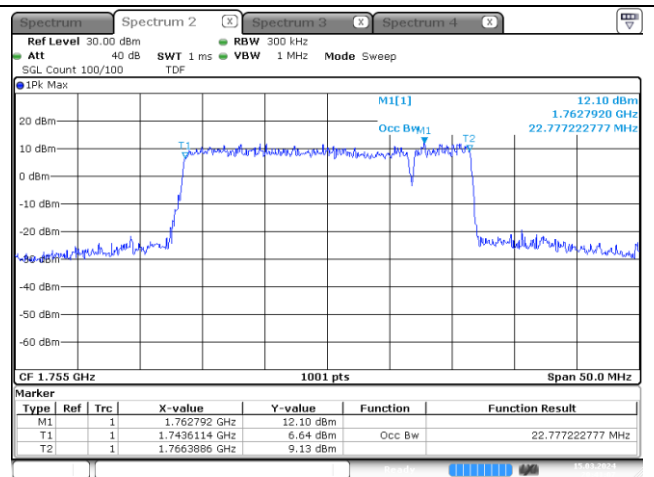
**ULCA 66C**



**20 MHz + 15 MHz QPSK Middle Channel - Full RB**



**20 MHz + 15 MHz 16QAM Middle Channel - Full RB**



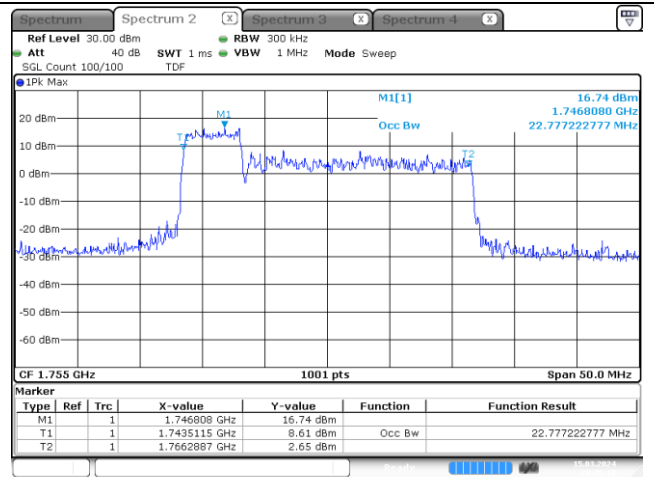
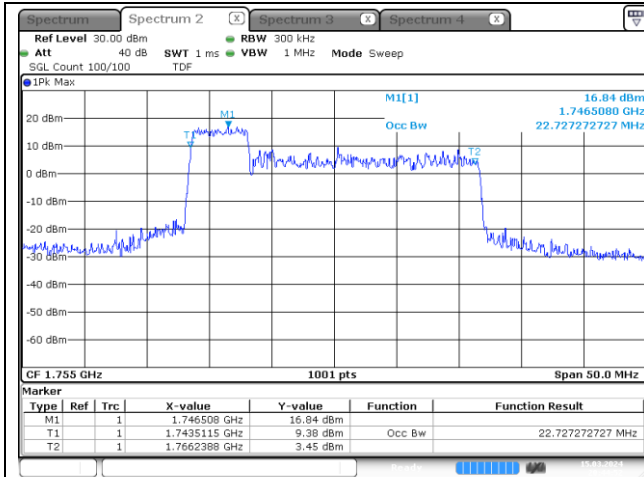
**20 MHz + 5 MHz QPSK Middle Channel - Full RB**



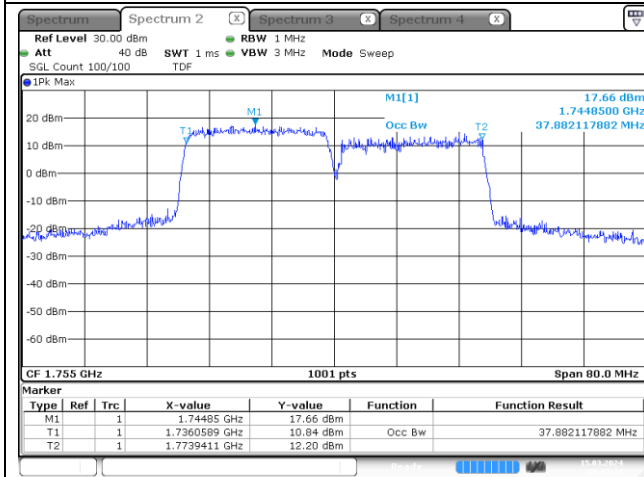
**20 MHz + 5 MHz 16QAM Middle Channel - Full RB**



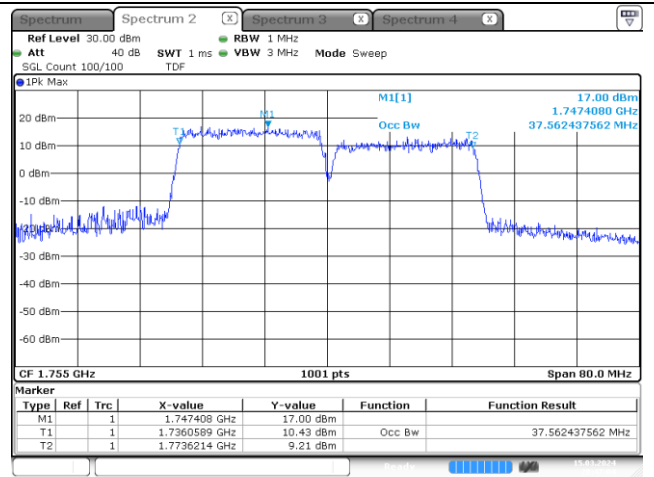
**ULCA 66C**



**5 MHz + 20 MHz QPSK Middle Channel - Full RB**



**5 MHz + 20 MHz 16QAM Middle Channel - Full RB**



**20 MHz + 20 MHz QPSK Middle Channel - Full RB**



**20 MHz + 20 MHz 16QAM Middle Channel - Full RB**



## 5. Peak-Average Ratio

### 5.1. Limit

- §22.913(d) measurement of the ERP of Cellular base transmitters and repeaters must be made using an average power measurement technique. The peak-to-average ratio (PAR) of the transmission must not exceed 13 dB.

- §24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

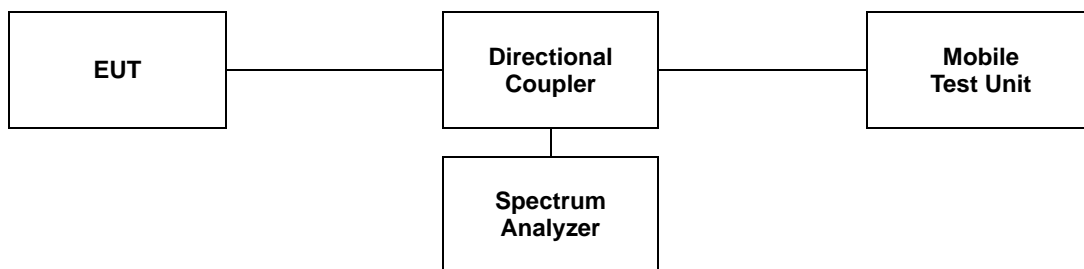
- §27.50(d)(5), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

## 5.2. Test Procedure

The test follows section 5.2.3.4 of ANSI C63.26-2015.

See instrumentation-specific application literature for further guidance regarding use of the CCDF capability. The following guidelines are offered for performing a CCDF measurement.

- a. Set resolution/measurement bandwidth  $\geq$  OBW or specified reference bandwidth.
- b. Set the number of counts to a value that stabilizes the measured CCDF curve.
- c. Set the measurement interval as follows:
  - 1) For continuous transmissions, set to greater of  $[10 \times (\text{number of points in sweep}) \times (\text{transmission symbol period})]$  or 1 ms.
  - 2) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize. Set the measurement interval to a time that is less than or equal to the burst duration.
  - 3) If there are several carriers in a single antenna port, the peak power shall be determined for each individual carrier (by disabling the other carriers while measuring the required carrier) and the total peak power calculated from the sum of the individual carrier peak powers.
- d. Record the maximum PAPR level associated with a probability of 0.1 %.
- e. The peak power level is calculated from the sum of the PAPR value from step d) to the measured average power.





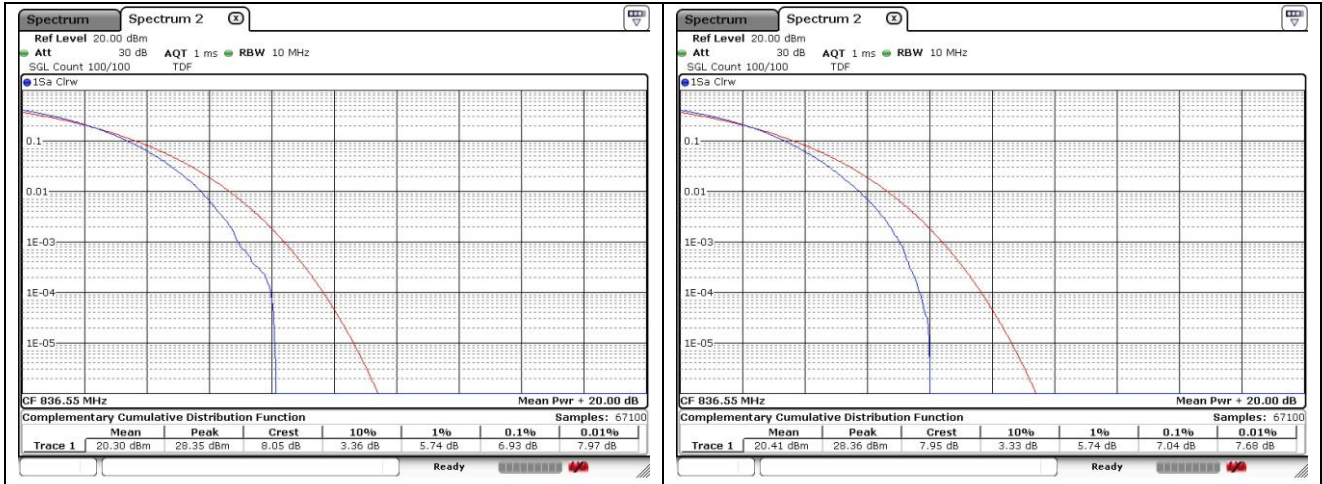
### 5.3 Test Results

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

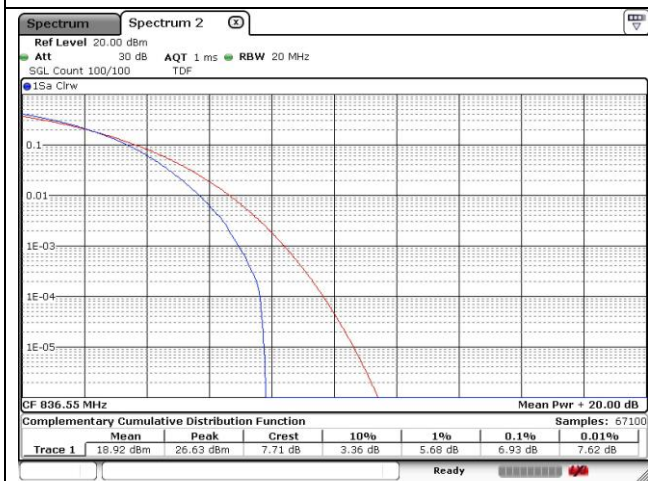
Band	PCC			SCC			PAR (dB)
	BW (MHz)	Frequency (MHz)	Channel	BW (MHz)	Frequency (MHz)	Channel	256QAM
5B	3	834.1	20501	5	838.0	20540	6.93
	5	835.0	20510	3	838.9	20549	7.04
	5	831.8	20478	10	839.0	20550	6.93
	10	834.0	20500	5	841.2	20572	7.04
	10	831.6	20476	10	841.5	20575	7.30
7C	10	2 525.6	21006	20	2 540.0	21150	7.07
	20	2 530.1	21051	10	2 544.5	21195	7.01
	15	2 530.1	21051	15	2 542.1	21171	6.93
	15	2 527.5	21025	10	2 542.5	21175	7.19
	15	2 525.3	21003	20	2 542.4	21174	7.10
	20	2 527.6	21026	15	2 544.7	21197	7.01
	20	2 525.1	21001	20	2 544.9	21199	7.28
38C	15	2 587.5	37925	15	2 602.5	38075	7.13
	20	2 585.1	37901	20	2 604.9	38099	7.39
41C	5	2 583.8	40528	20	2 595.5	40645	7.19
	20	2 590.5	40595	5	2 602.2	40712	7.13
	10	2 585.9	40549	15	2 597.9	40669	7.19
	15	2 588.1	40571	10	2 600.1	40691	6.67
	10	2 583.6	40526	20	2 598.0	40670	6.84
	20	2 588.1	40571	10	2 602.5	40715	6.84
	15	2 585.5	40545	15	2 600.5	40695	6.84
	15	2 583.3	40523	20	2 600.4	40694	6.93
	20	2 585.6	40546	15	2 602.7	40717	6.81
	20	2 583.1	40521	20	2 602.9	40719	7.10
66B	5	1 752.6	132398	5	1 757.4	132446	7.19
	5	1 750.3	132375	10	1 757.5	132447	7.25
	10	1 752.5	132397	5	1 759.7	132469	7.10
	5	1 748.1	132353	15	1 757.4	132446	7.04
	15	1 752.6	132398	5	1 761.9	132491	7.07
	10	1 750.1	132373	10	1 760.0	132472	7.19
66C	10	1 747.9	132351	15	1 759.9	132471	7.13
	15	1 750.1	132373	10	1 762.1	132493	7.19
	10	1 745.6	132328	20	1 760.0	132472	7.13
	20	1 750.1	132373	10	1 764.5	132517	6.90
	15	1 747.5	132347	15	1 762.5	132497	7.19
	15	1 745.3	132325	20	1 762.4	132496	6.96
	20	1 747.6	132348	15	1 764.7	132519	7.33
	20	1 752.5	132397	5	1 764.2	132514	6.99
	5	1 745.8	132330	20	1 757.5	132447	7.19
	20	1 745.1	132323	20	1 764.9	132521	7.10

**- Test plots**

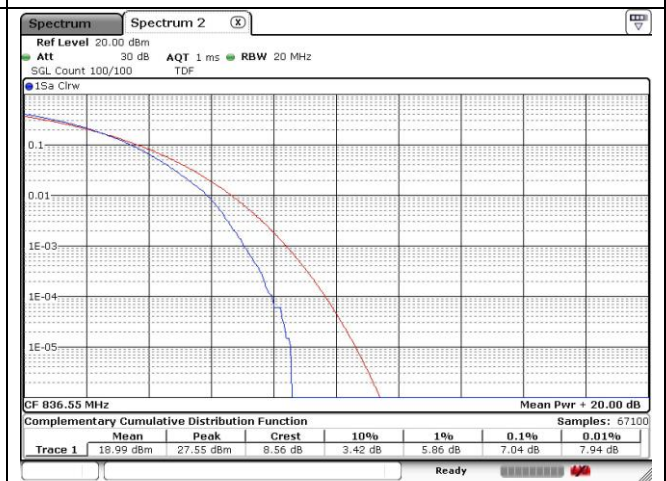
**ULCA 5B**



**3 MHz + 5 MHz 256QAM Middle Channel - Full RB**

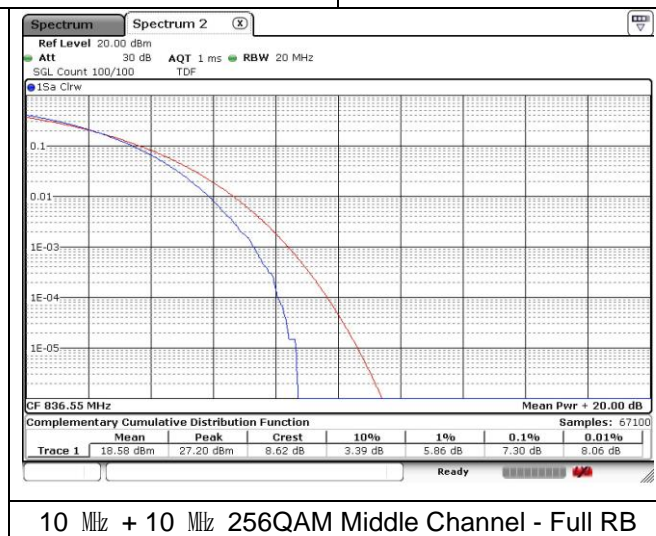


**5 MHz + 3 MHz 256QAM Middle Channel - Full RB**

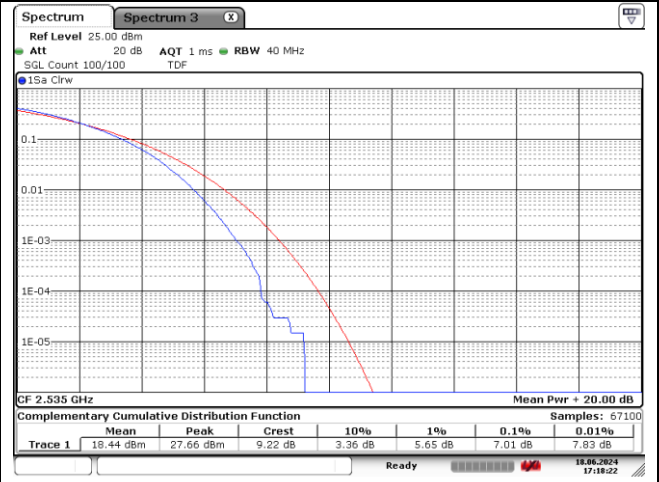
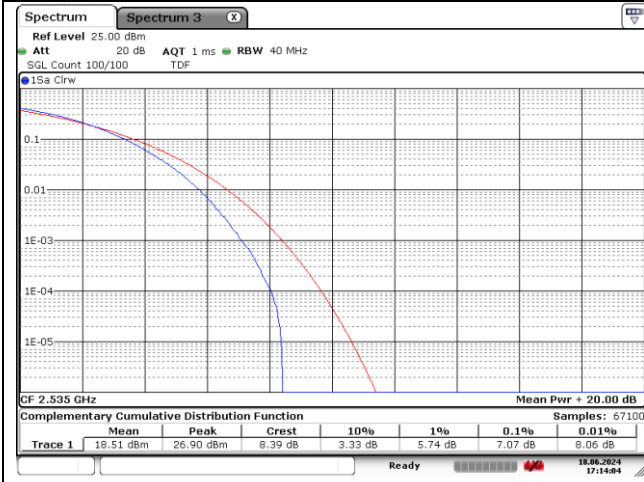


**5 MHz + 10 MHz 256QAM Middle Channel - Full RB**

**10 MHz + 5 MHz 256QAM Middle Channel - Full RB**

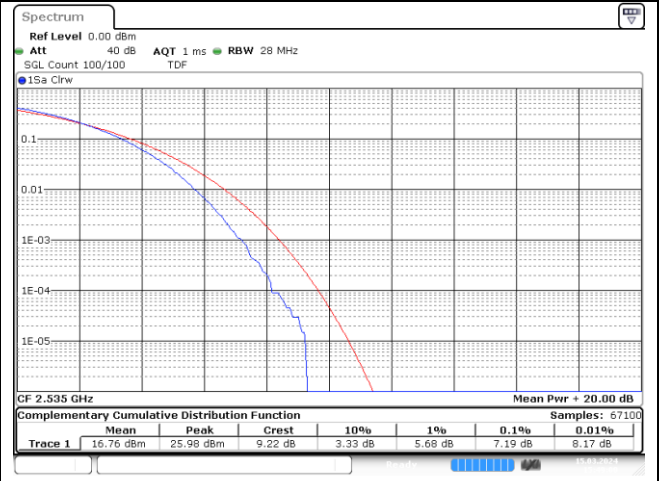
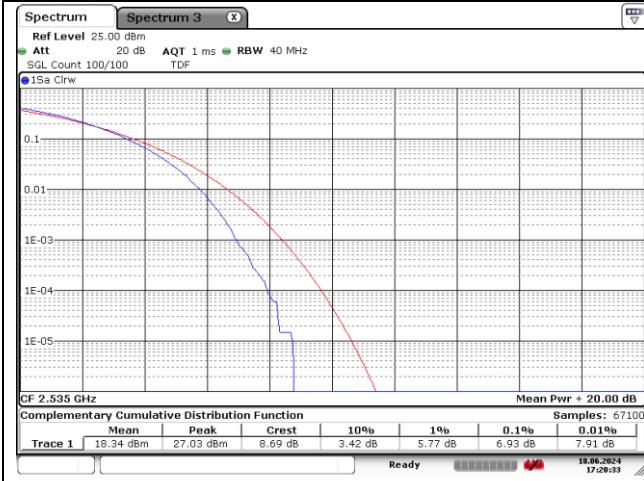


**ULCA 7C**



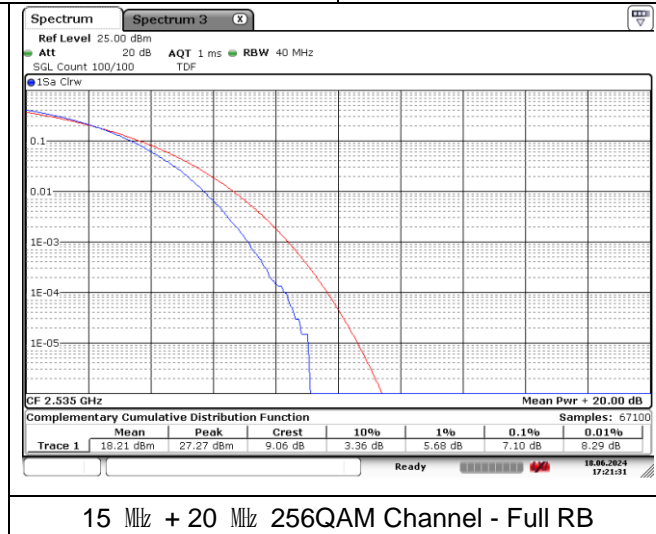
10 MHz + 20 MHz 256QAM Middle Channel - Full RB

20 MHz + 10 MHz 256QAM Channel - Full RB

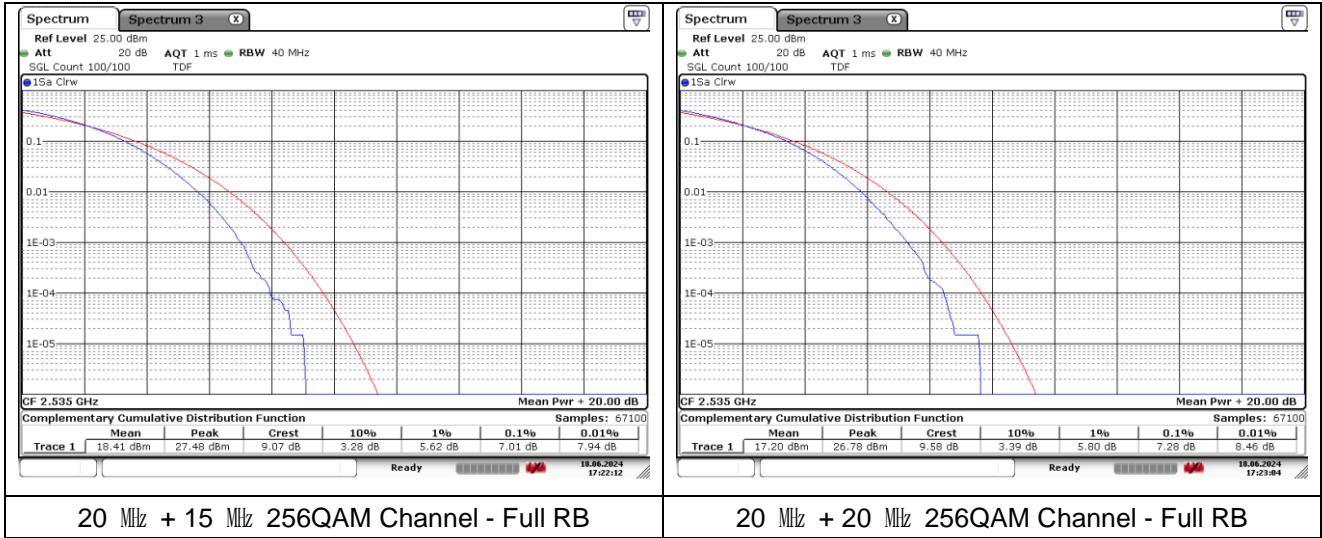


15 MHz + 15 MHz 256QAM Middle Channel - Full RB

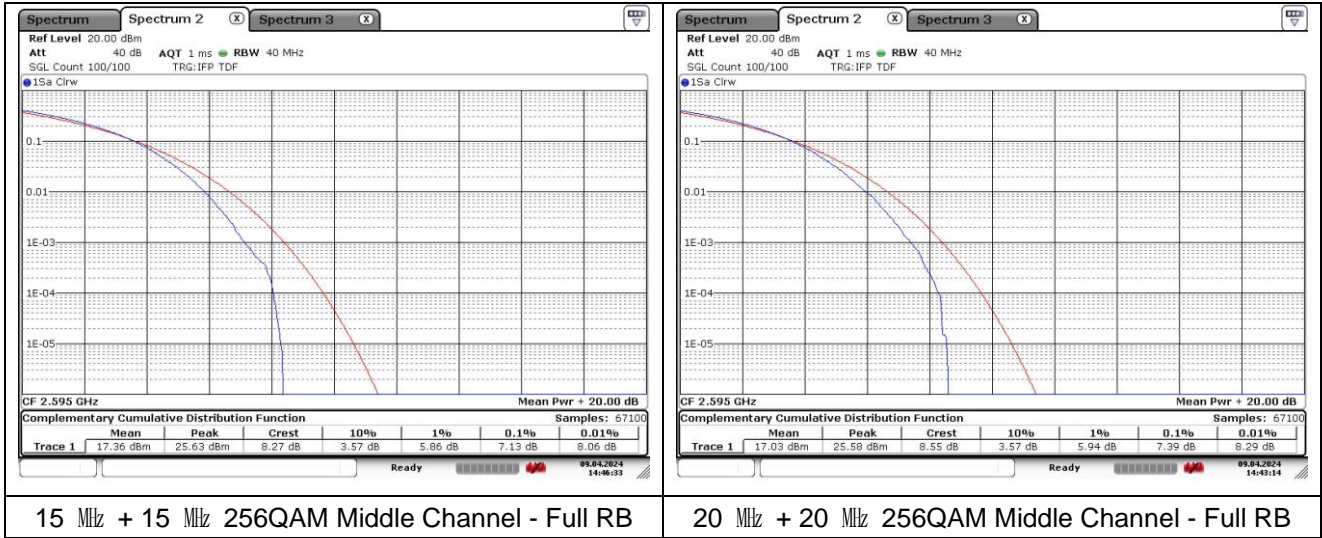
15 MHz + 10 MHz 256QAM Channel - Full RB



15 MHz + 20 MHz 256QAM Channel - Full RB



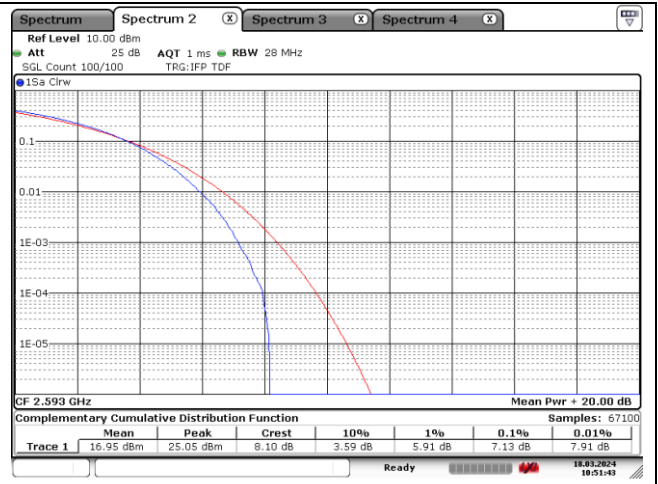
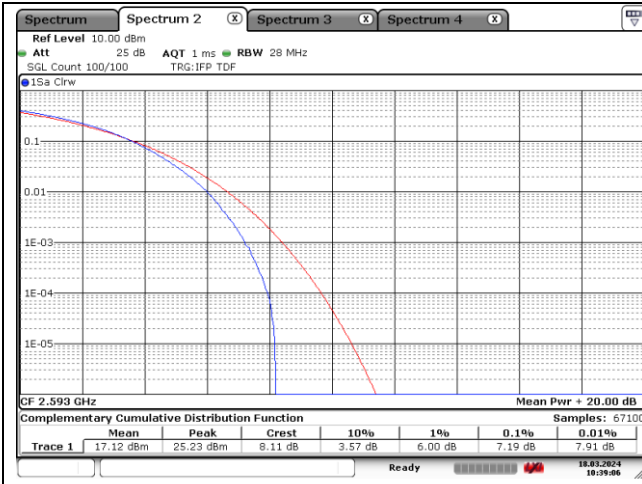
**ULCA 38C**



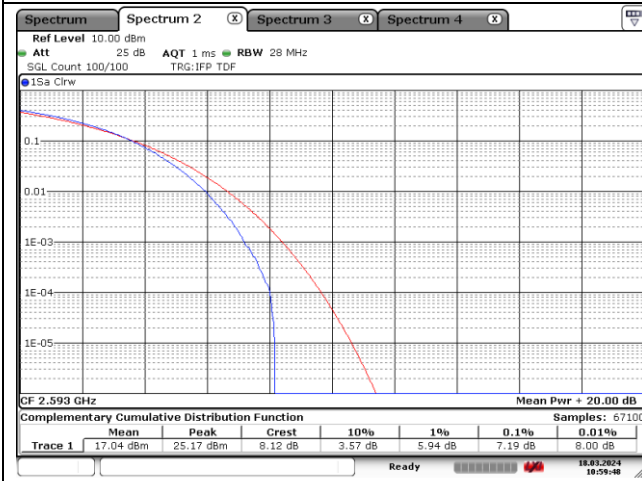
15 MHz + 15 MHz 256QAM Middle Channel - Full RB

20 MHz + 20 MHz 256QAM Middle Channel - Full RB

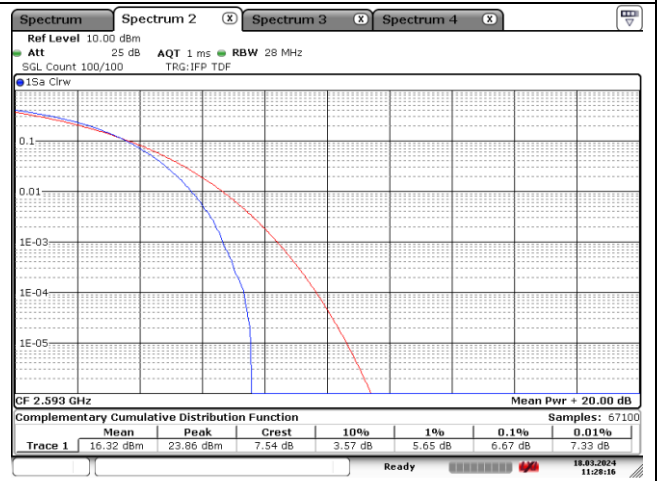
**ULCA 41C**



**5 MHz + 20 MHz 256QAM Middle Channel - Full RB**

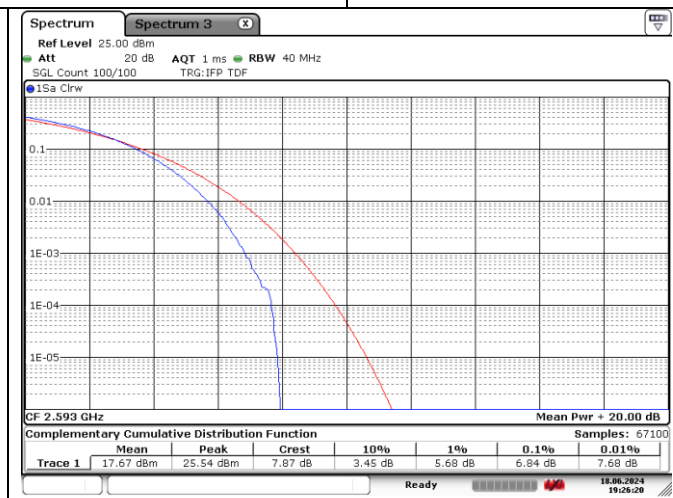


**20 MHz + 5 MHz 256QAM Middle Channel - Full RB**



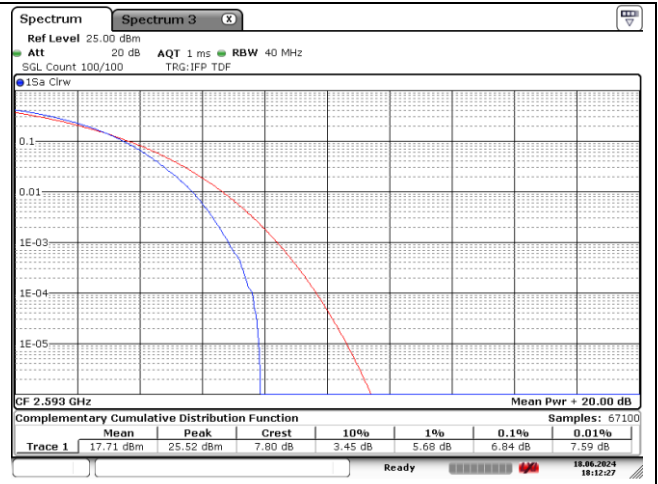
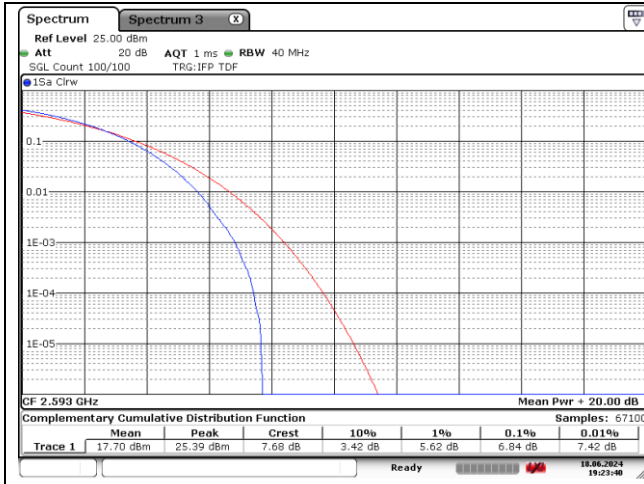
**10 MHz + 15 MHz 256QAM Middle Channel - Full RB**

**15 MHz + 10 MHz 256QAM Middle Channel - Full RB**

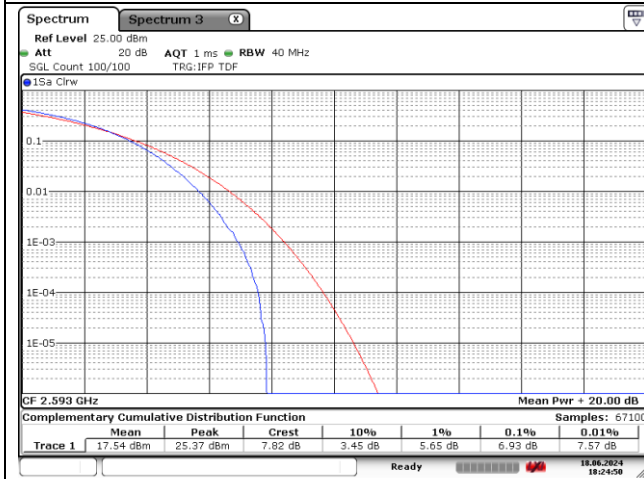


**10 MHz + 20 MHz 256QAM Middle Channel - Full RB**

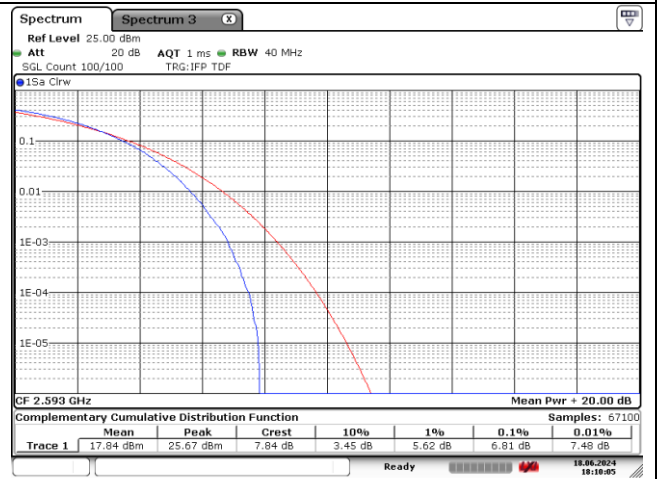
**ULCA 41C**



**20 MHz + 10 MHz 256QAM Middle Channel - Full RB**

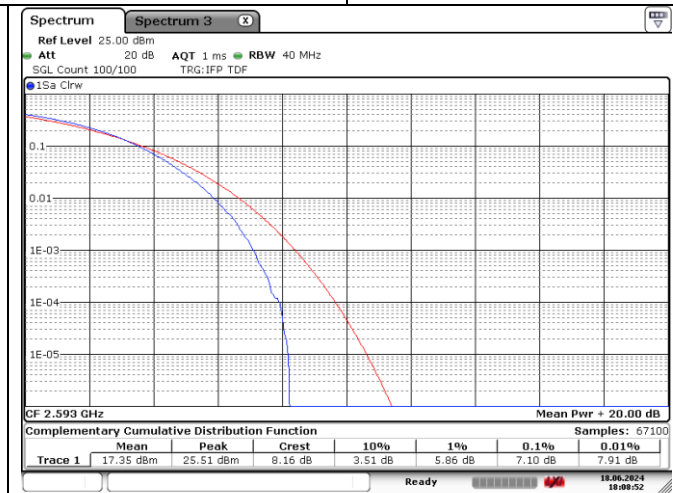


**15 MHz + 15 MHz 256QAM Middle Channel - Full RB**



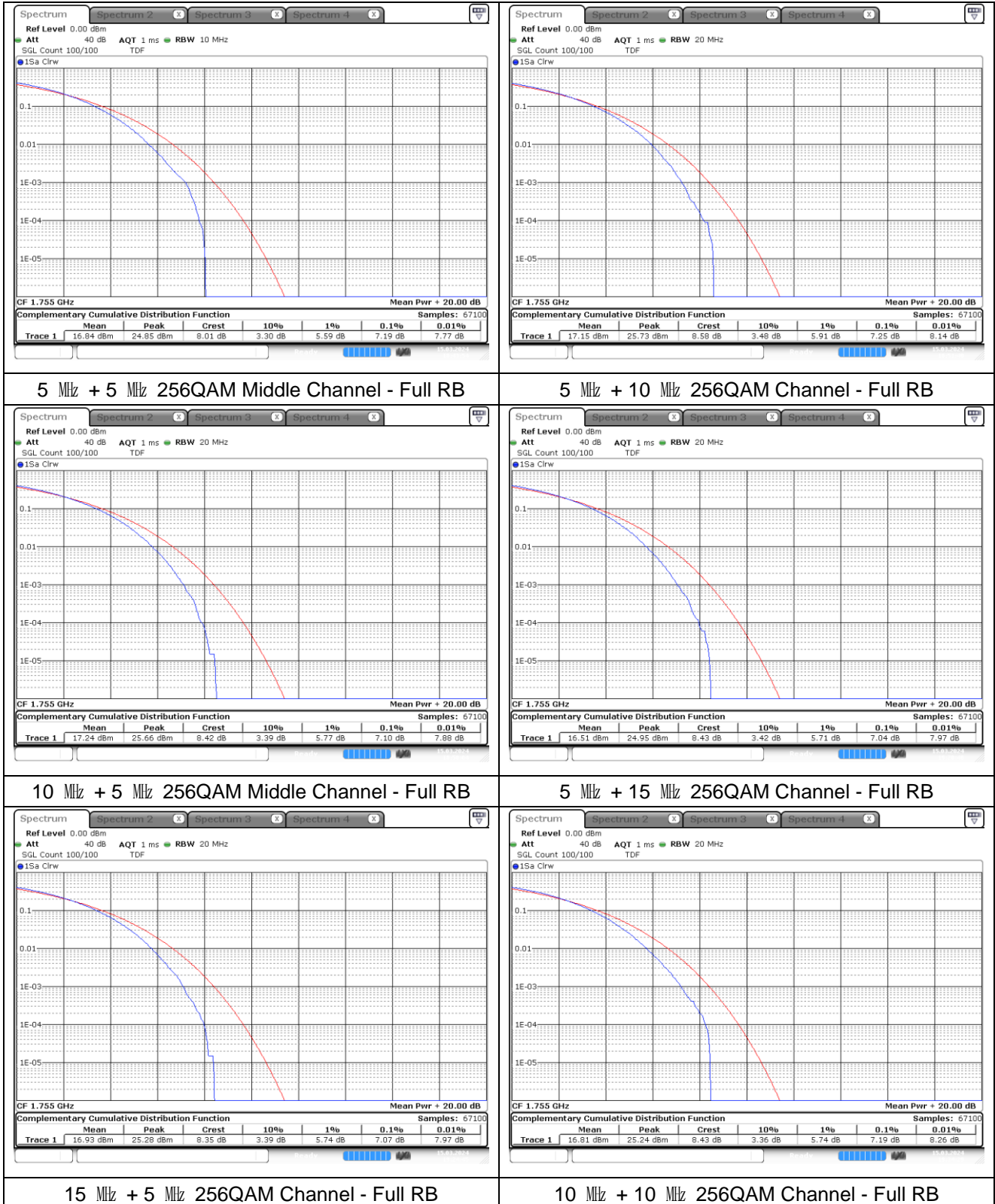
**15 MHz + 20 MHz 256QAM Middle Channel - Full RB**

**20 MHz + 15 MHz 256QAM Middle Channel - Full RB**



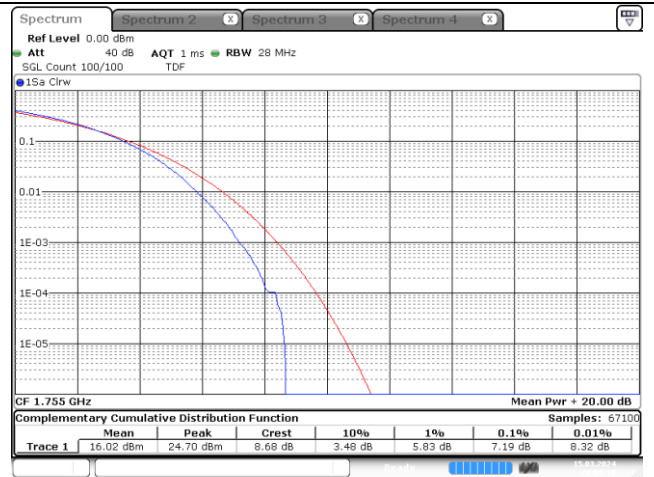
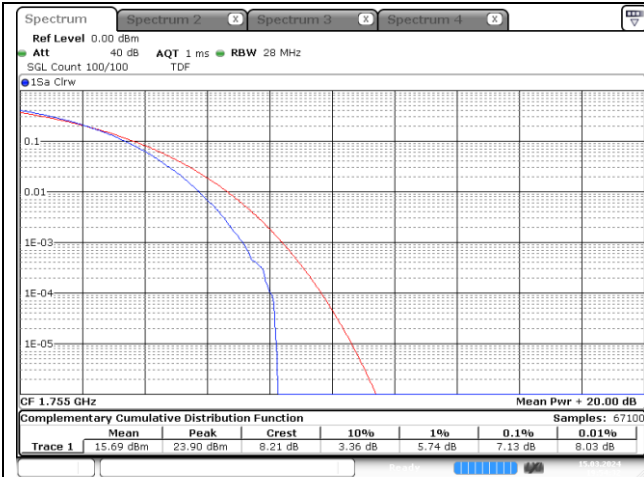
**20 MHz + 20 MHz 256QAM Middle Channel - Full RB**

**ULCA 66B**

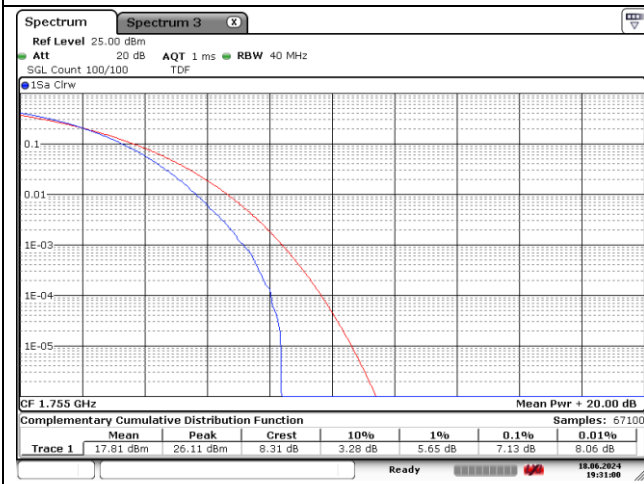




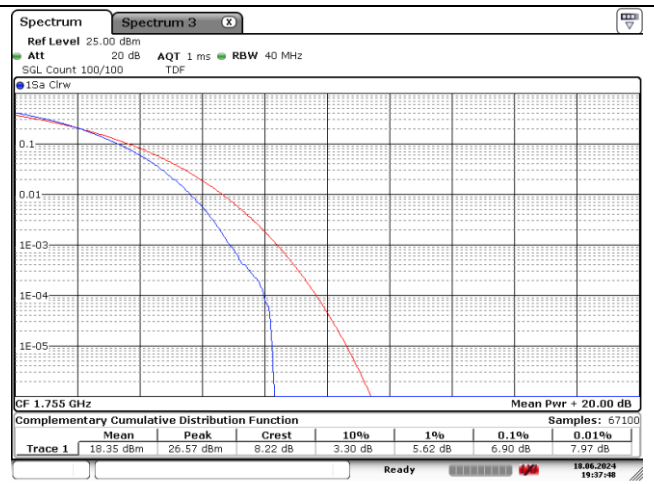
**ULCA 66C**



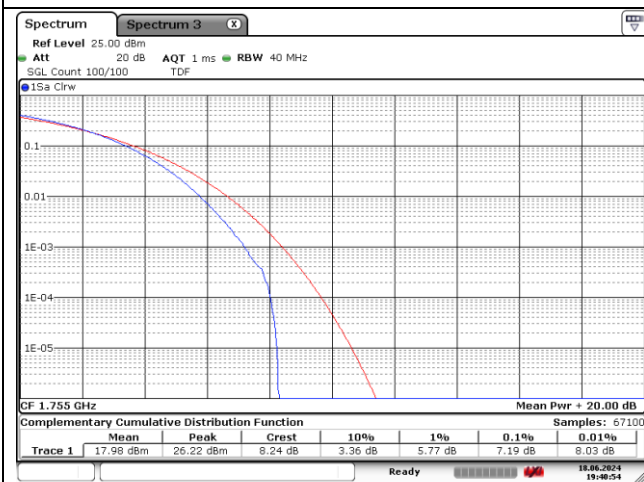
**10 MHz + 15 MHz 256QAM Middle Channel - Full RB**



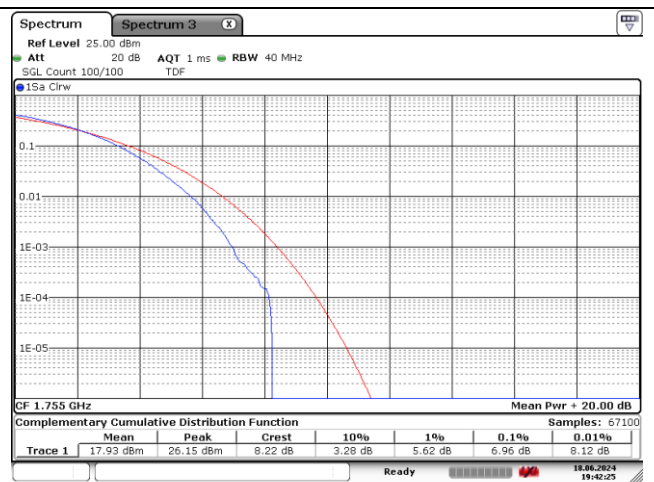
**15 MHz + 10 MHz 256QAM Middle Channel - Full RB**



**10 MHz + 20 MHz 256QAM Middle Channel - Full RB**



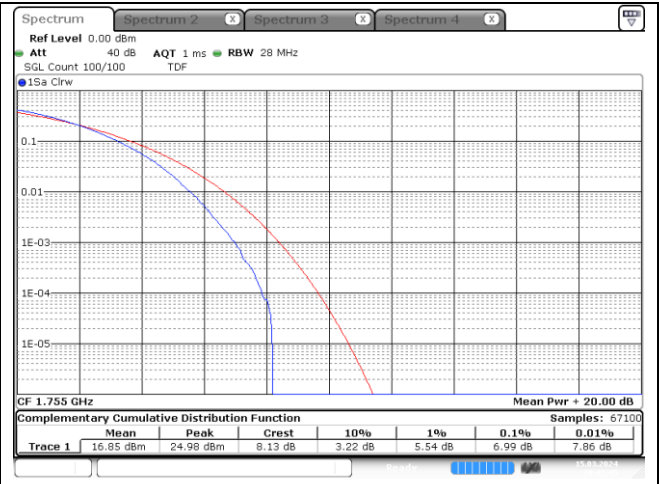
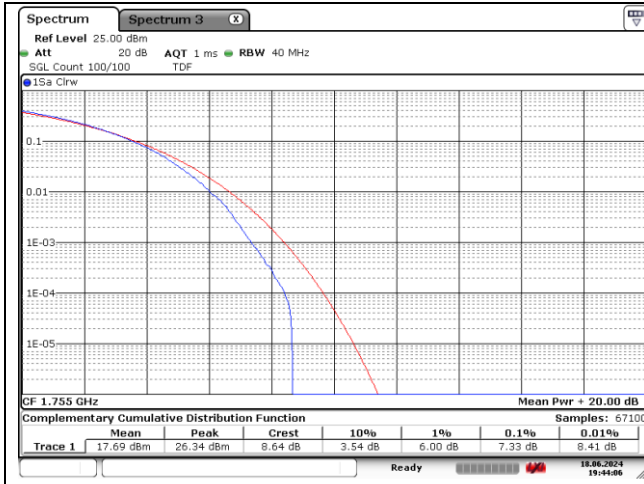
**20 MHz + 10 MHz 256QAM Middle Channel - Full RB**



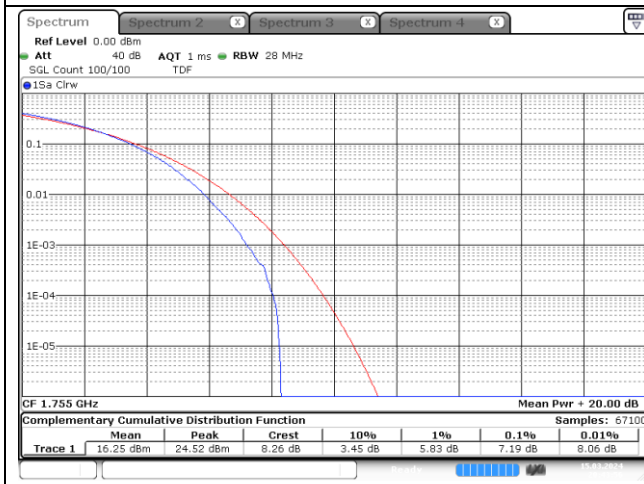
**15 MHz + 15 MHz 256QAM Middle Channel - Full RB**

**15 MHz + 20 MHz 256QAM Middle Channel - Full RB**

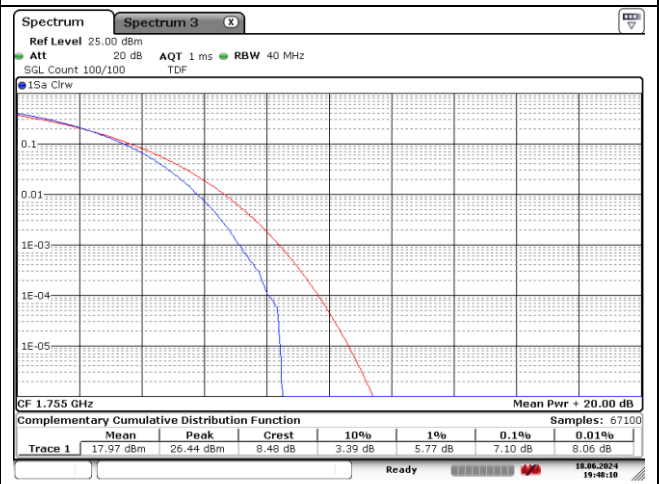
**ULCA 66C**



**20 MHz + 15 MHz 256QAM Middle Channel - Full RB**



**20 MHz + 5 MHz 256QAM Middle Channel - Full RB**



**5 MHz + 20 MHz 256QAM Middle Channel - Full RB**

**20 MHz + 20 MHz 256QAM Middle Channel - Full RB**

## 6. Spurious Emissions at Antenna Terminal

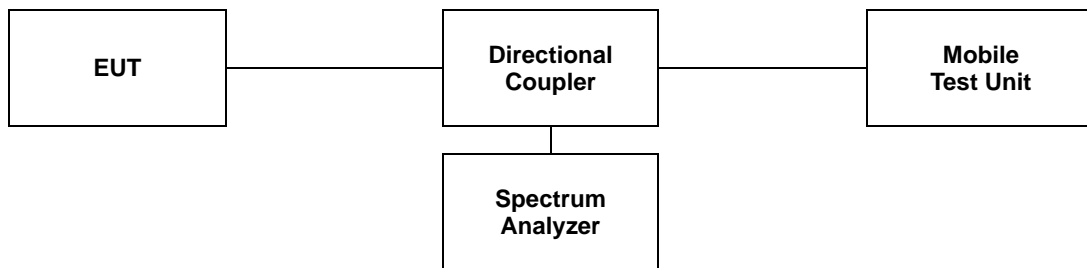
### 6.1. Limit

- §22.917(a), 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.
- §24.238(a), 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.
- §27.53(h)(1), for operations in the 1 695-1 710 MHz, 1 710-1 755 MHz, 1 755-1 780 MHz, 1 915-1 920 MHz, 1 995-2 000 MHz, 2 000-2 020 MHz, 2 110-2 155 MHz, 2 155-2 180 MHz, and 2 180-2 200 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.
- §27.53(m)(4), for mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log_{10}(P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log_{10}(P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log_{10}(P)$  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 that  $43 + 10 \log_{10}(P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log_{10}(P)$  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.
- §90.691(a), out-of-band emission requirement shall apply only to the "outer" channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:
  - (1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $116 \text{ Log}_{10}(f / 6.1)$  decibels or  $50 + 10 \text{ Log}_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.
  - (2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \text{ Log}_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

## 6.2. Test Procedure

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

1. Start frequency was set to 9 kHz and stop frequency was set to at least 10\* the fundamental frequency.
2. Detector = RMS.
3. Trace mode = Max hold.
4. Sweep time = Auto couple.
5. The trace was allowed to stabilize.
6. Please see notes below for RBW and VBW settings.
7. For plots showing conducted spurious emissions from 9 kHz to 27 GHz, all path loss of wide frequency range was investigated and compensated to spectrum analyzer as TDF function.



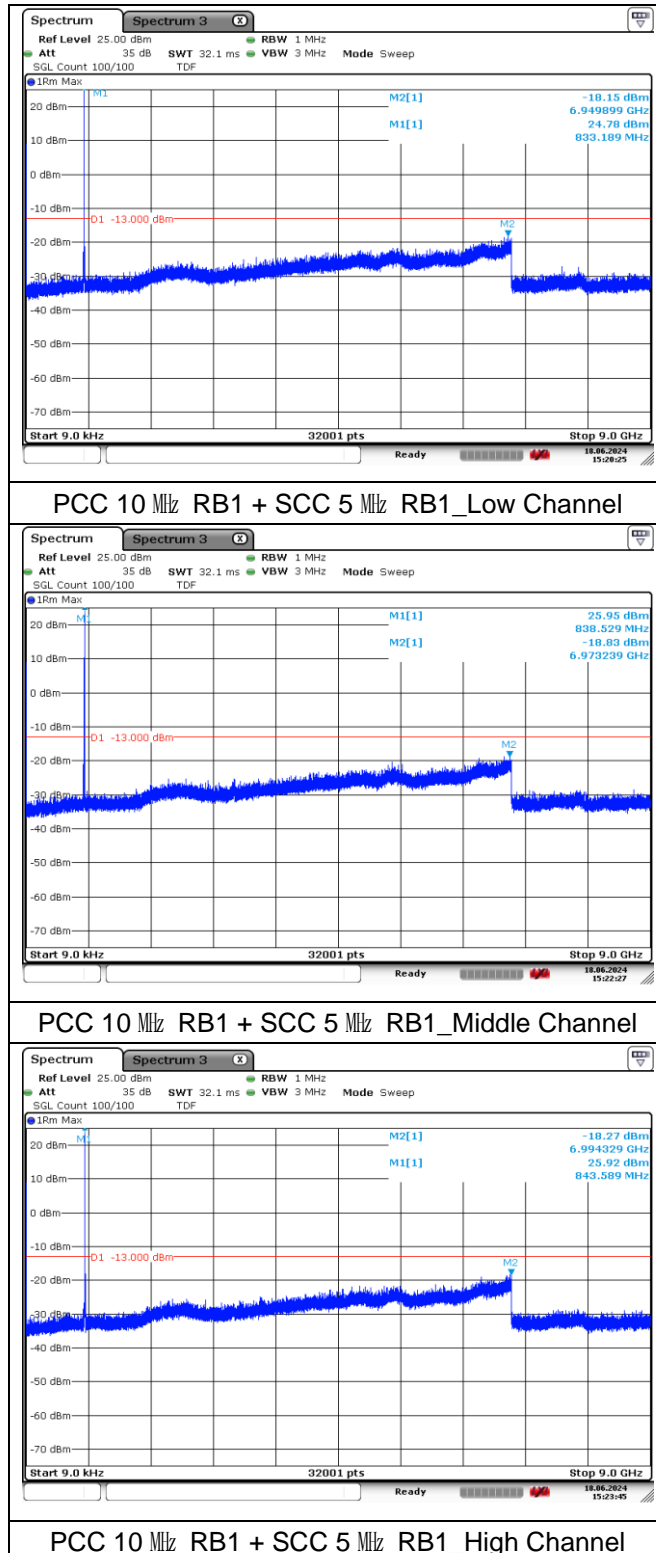
### Note;

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and frequencies greater than 1 GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two point, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

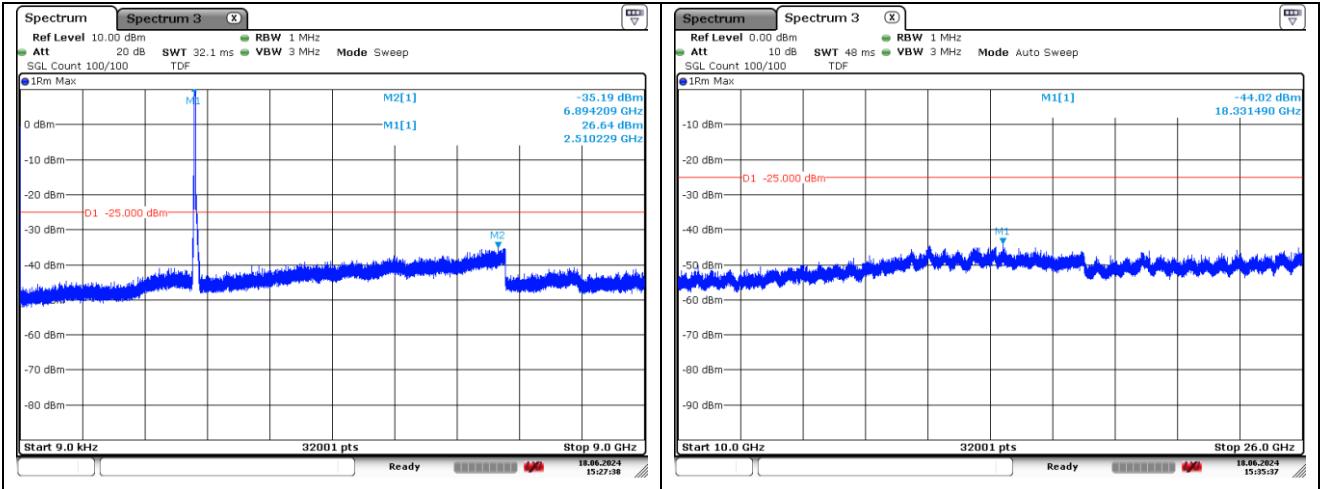
### 6.3. Test Results

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

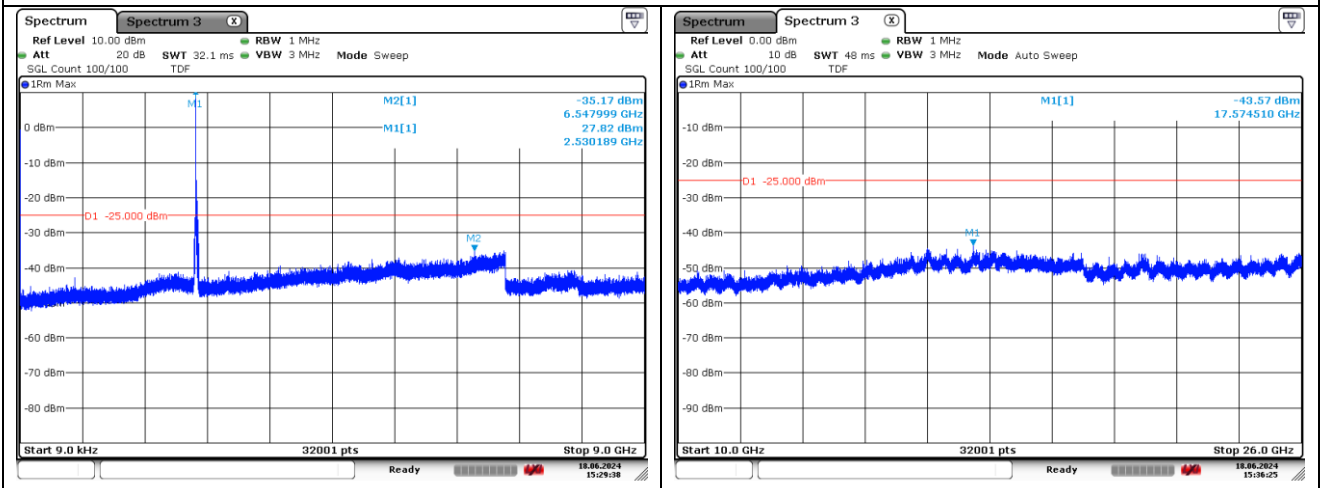
**- Test plots**  
**ULCA 5B**



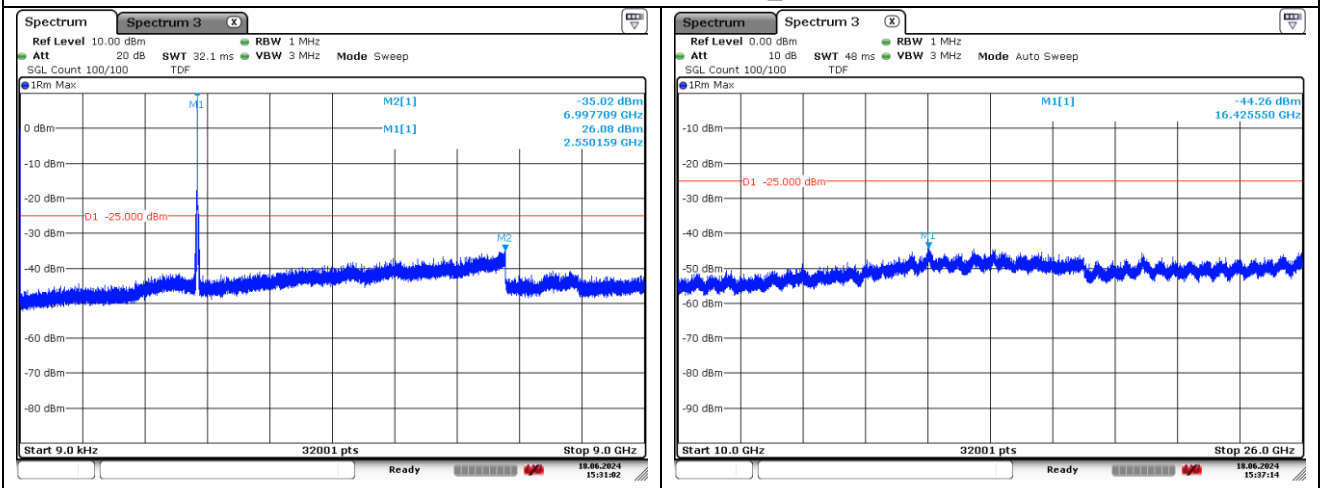
**ULCA 7C**



**PCC 20 MHz RB1 + SCC 10 MHz RB1\_Low Channel**

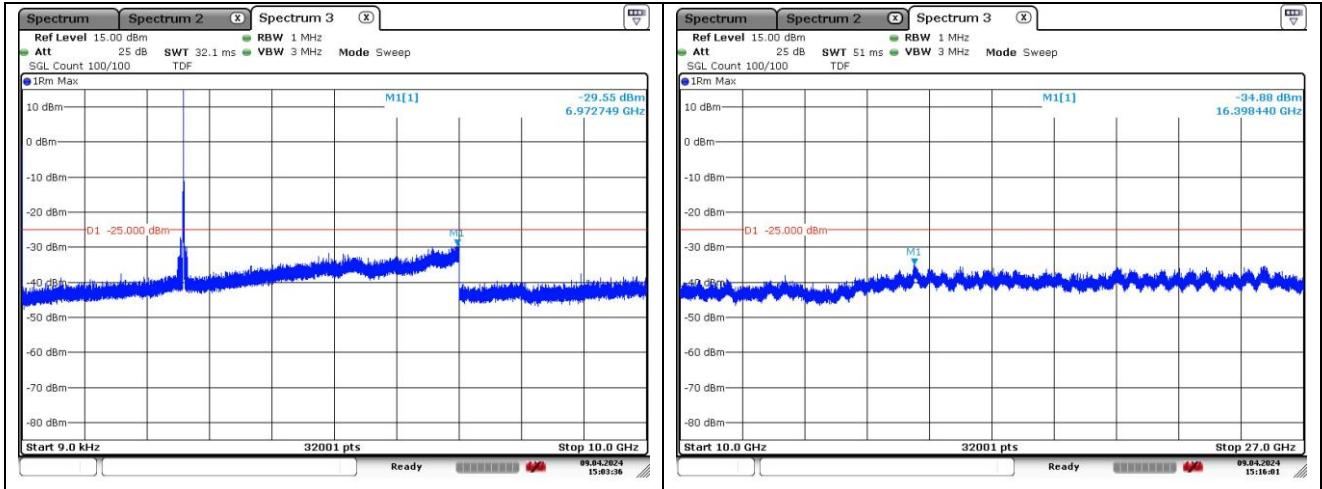


**PCC 20 MHz RB1 + SCC 10 MHz RB1\_Middle Channel**

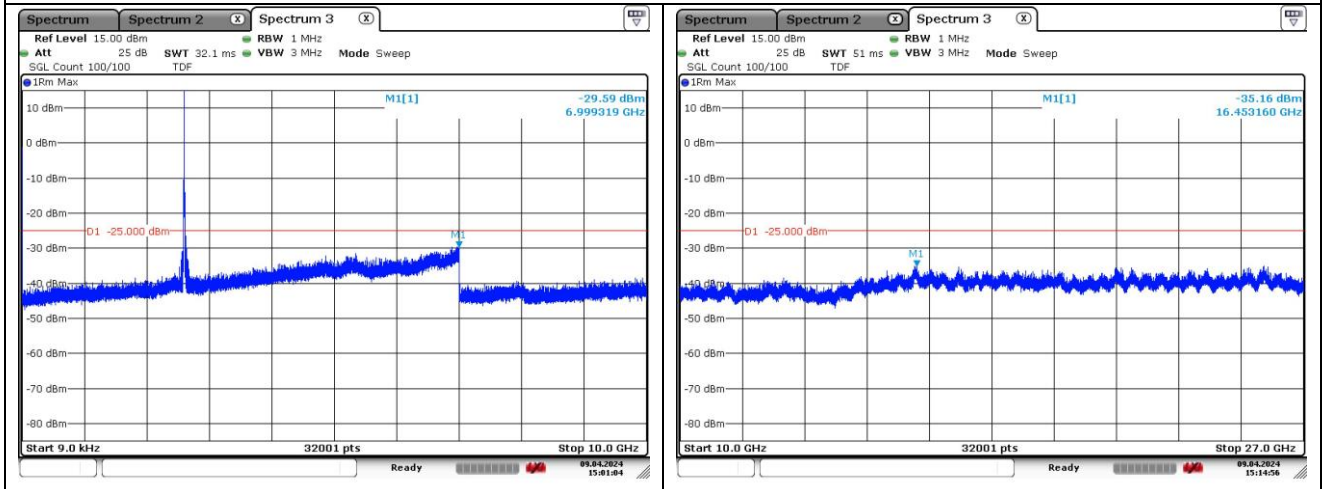


**PCC 20 MHz RB1 + SCC 10 MHz RB1\_High Channel**

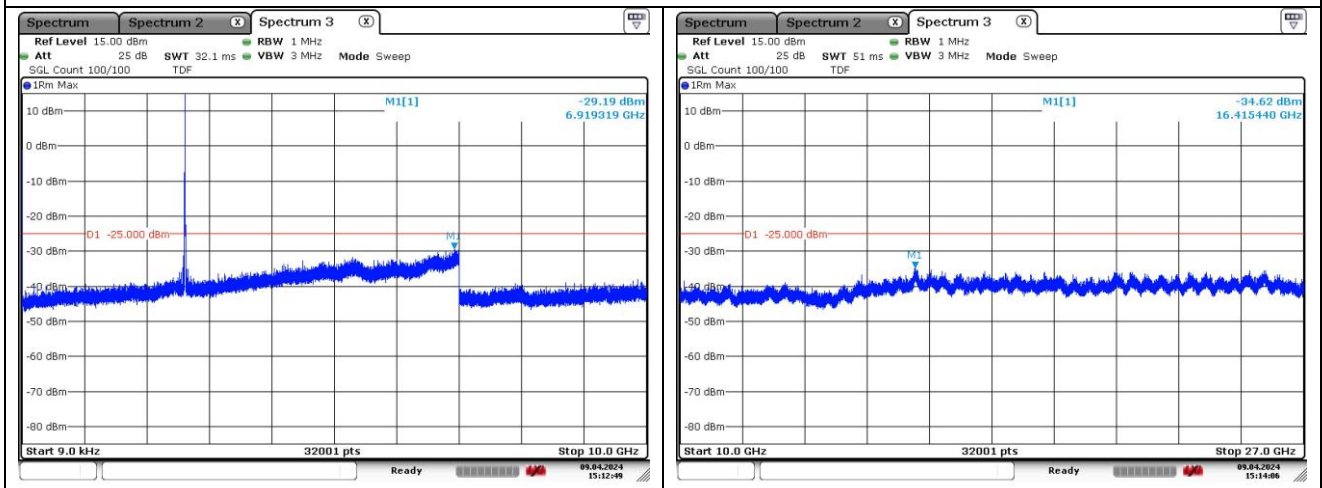
**ULCA 38C**



**PCC 15 MHz RB1 + SCC 15 MHz RB1\_Low Channel**



**PCC 15 MHz RB1 + SCC 15 MHz RB1\_Middle Channel**



**PCC 15 MHz RB1 + SCC 15 MHz RB1\_High Channel**