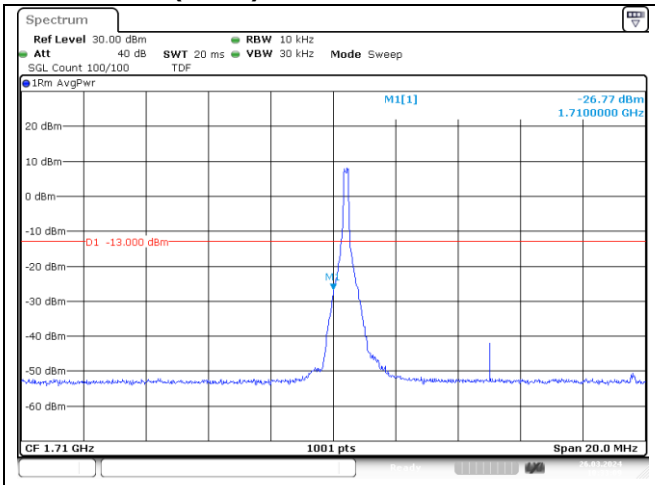
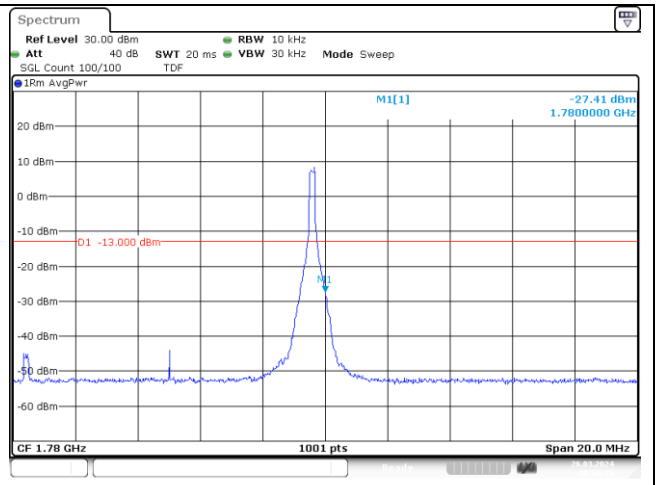
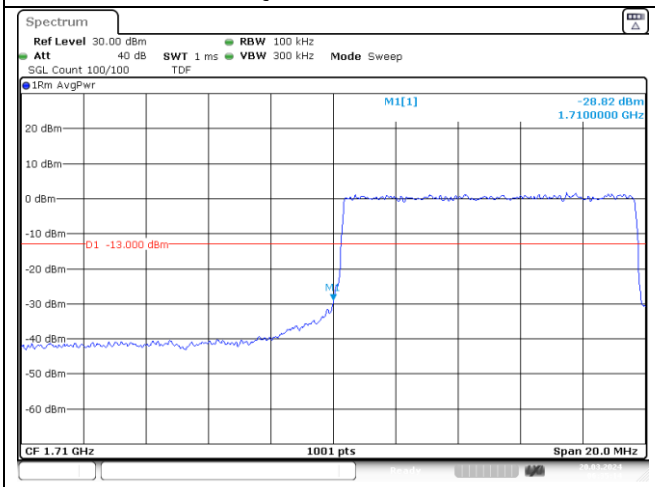
NR band 66 (10 ㎒)



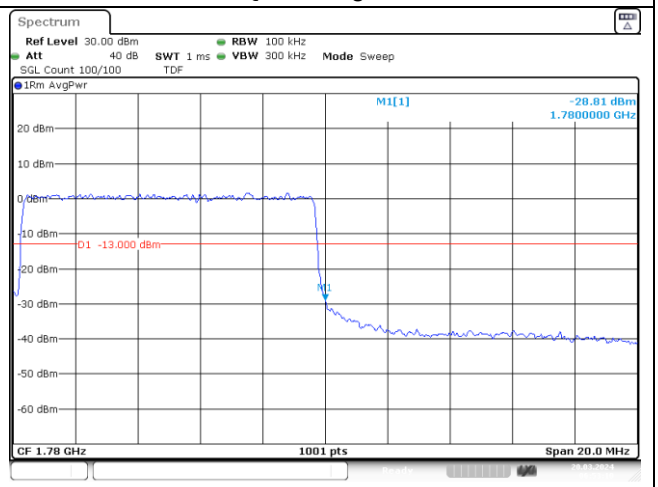
CP-OFDM 16QAM - Low Channel - 1 RB



CP-OFDM 16QAM - High Channel - 1 RB

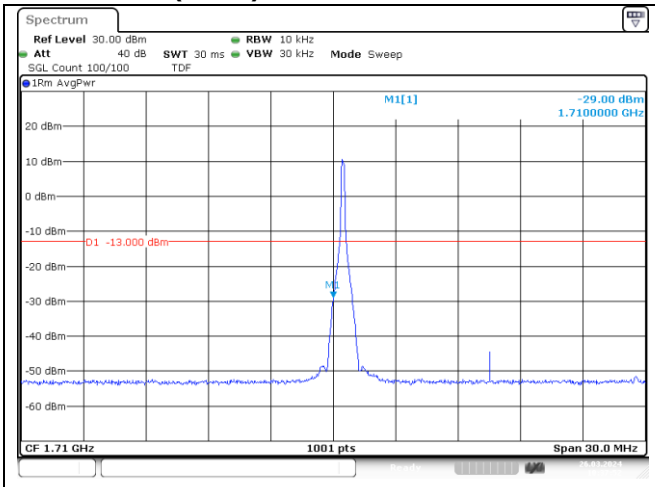


CP-OFDM 16QAM - Low Channel - Full RB

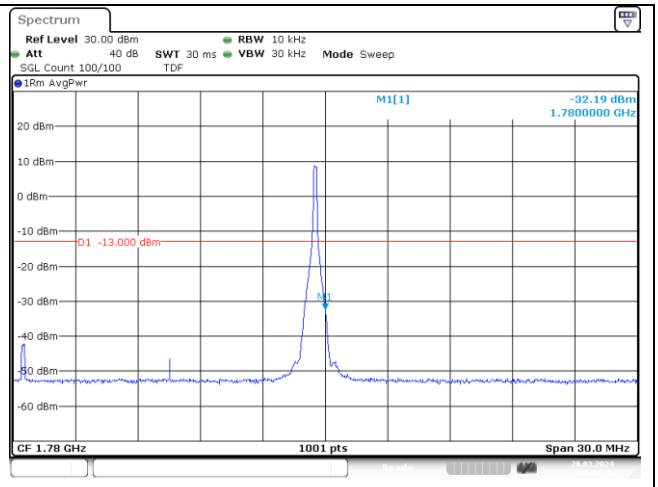


CP-OFDM 16QAM - High Channel - Full RB

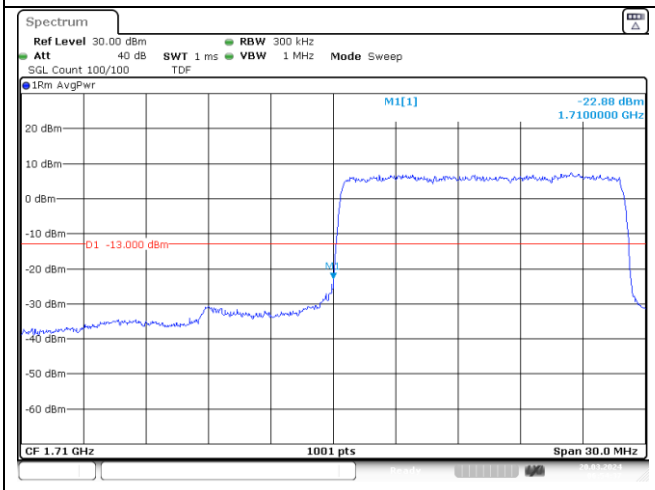
NR band 66 (15 ㎒)



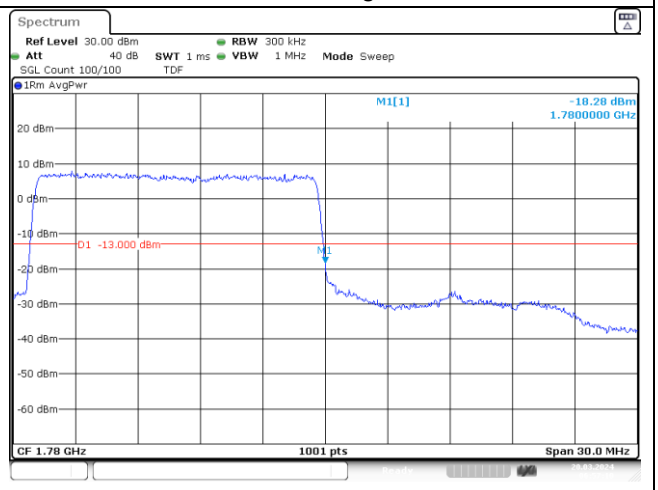
DFT-S-OFDM BPSK - Low Channel - 1 RB



DFT-S-OFDM BPSK - High Channel - 1 RB

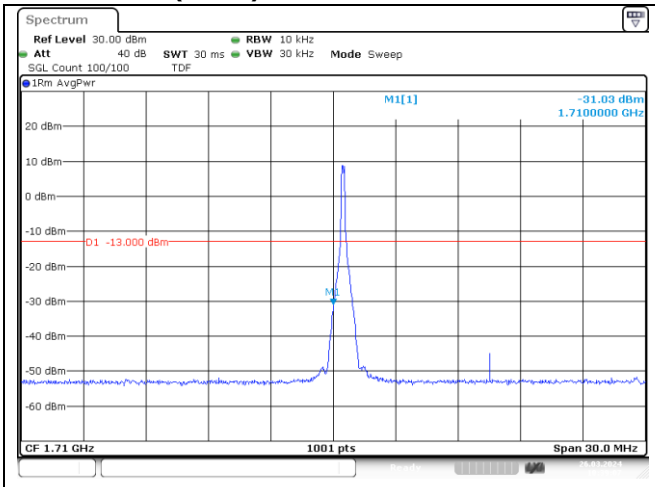


DFT-S-OFDM BPSK - Low Channel - Full RB

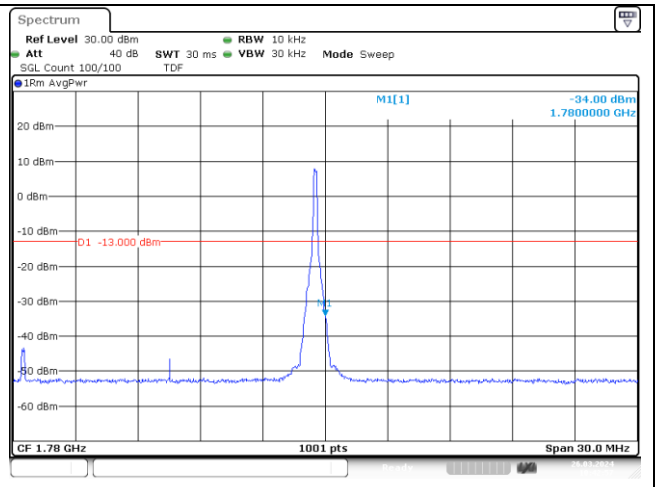


DFT-S-OFDM BPSK - High Channel - Full RB

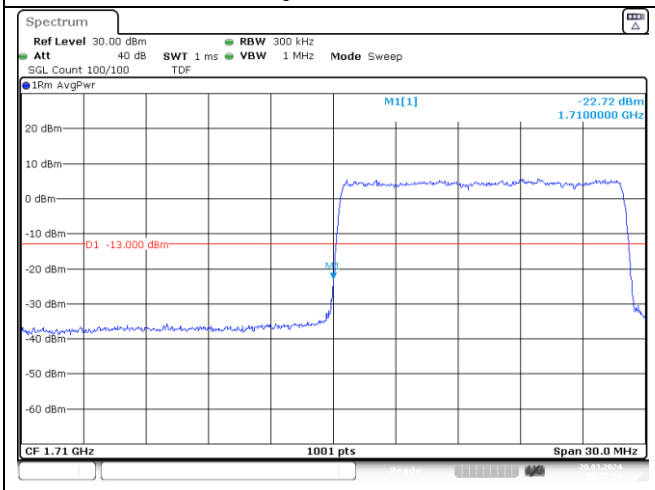
NR band 66 (15 ㎒)



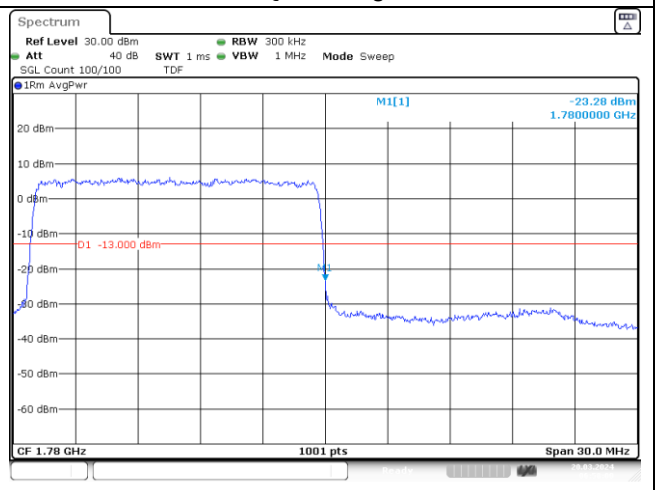
DFT-S-OFDM 16QAM - Low Channel - 1 RB



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

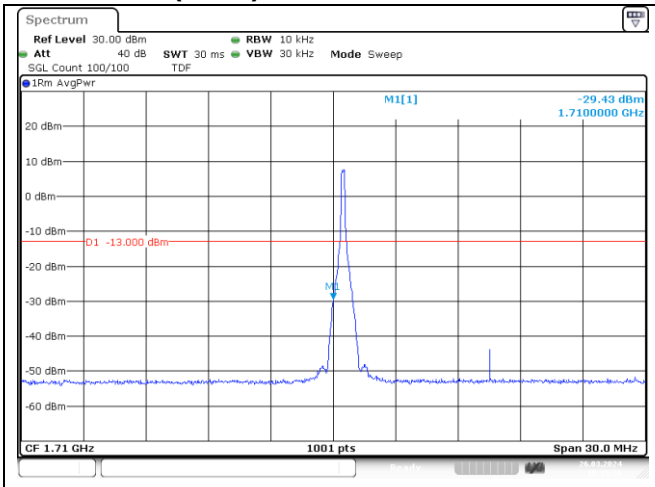


DFT-S-OFDM 16QAM - Low Channel - Full RB

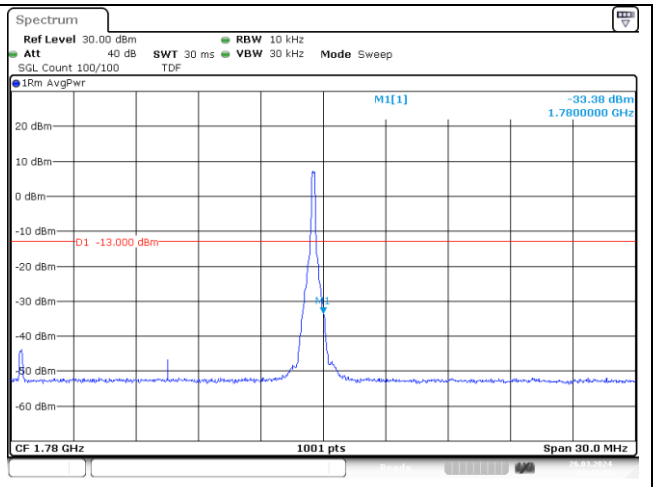


DFT-S-OFDM 16QAM - High Channel - Full RB

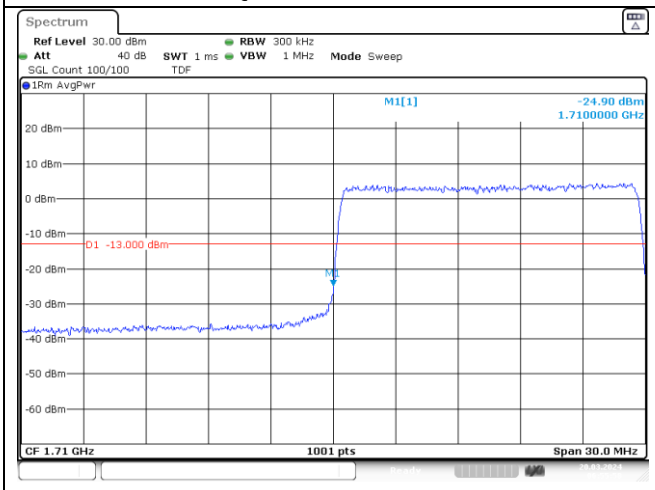
NR band 66 (15 ㎒)



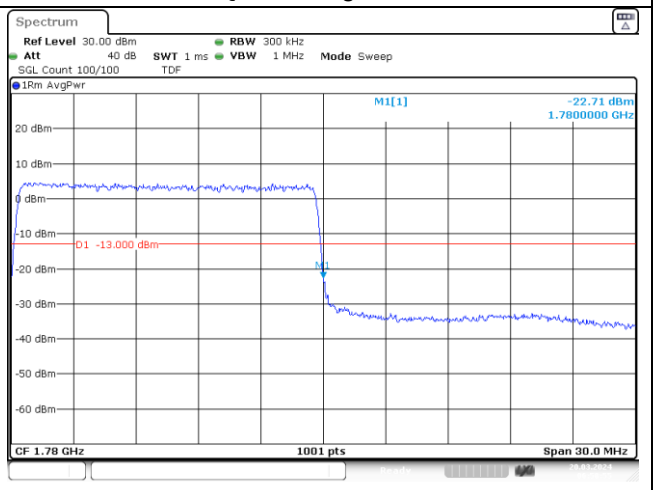
CP-OFDM QPSK - Low Channel - 1 RB



CP-OFDM QPSK - High Channel - 1 RB

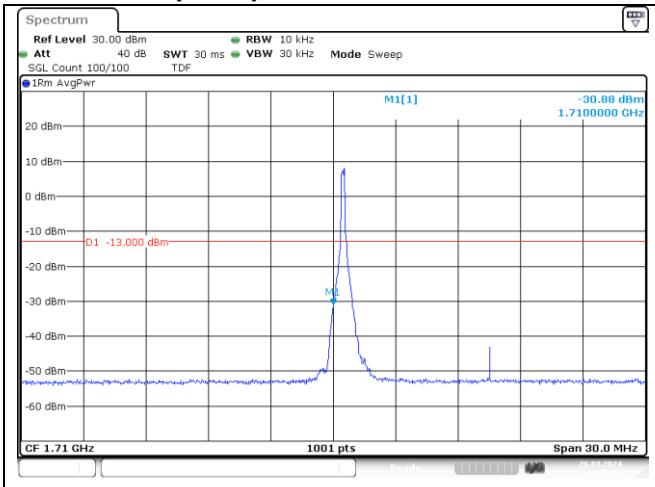


CP-OFDM QPSK - Low Channel - Full RB

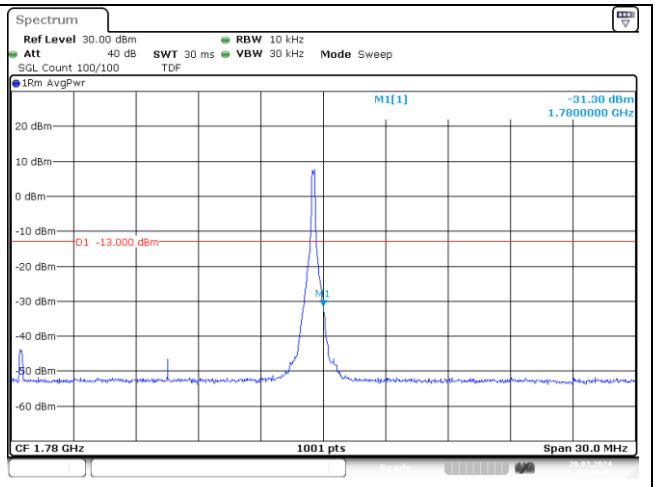


CP-OFDM QPSK - High Channel - Full RB

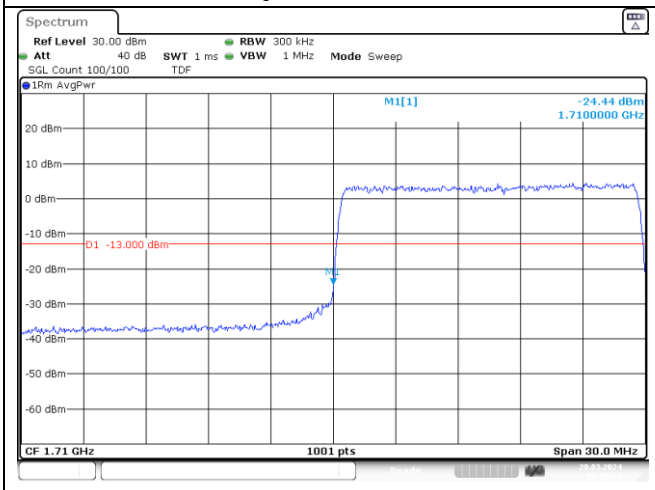
NR band 66 (15 ㎒)



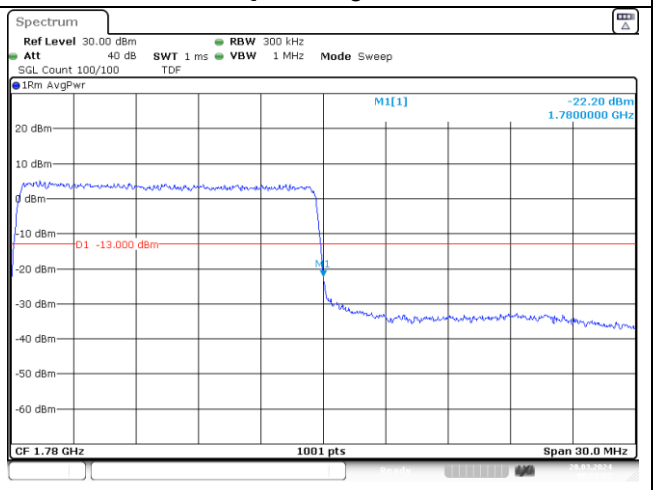
CP-OFDM 16QAM - Low Channel - 1 RB



CP-OFDM 16QAM - High Channel - 1 RB

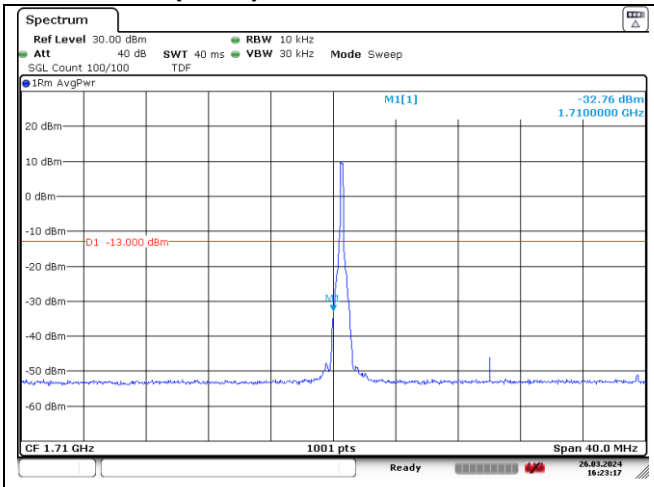


CP-OFDM 16QAM - Low Channel - Full RB

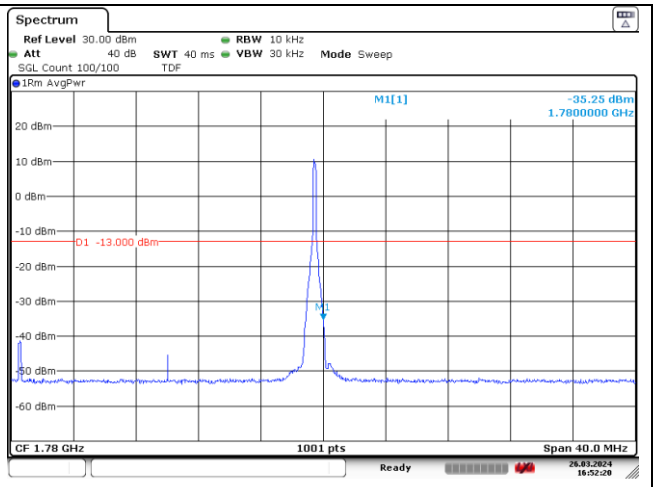


CP-OFDM 16QAM - High Channel - Full RB

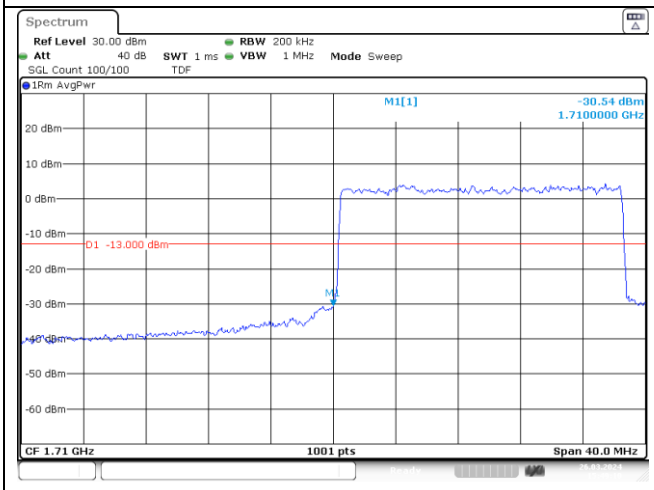
NR band 66 (20 ㎒)



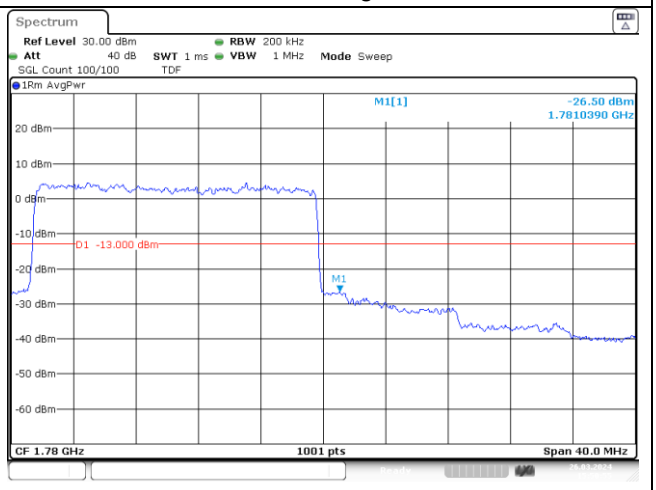
DFT-S-OFDM BPSK - Low Channel - 1 RB



DFT-S-OFDM BPSK - High Channel - 1 RB

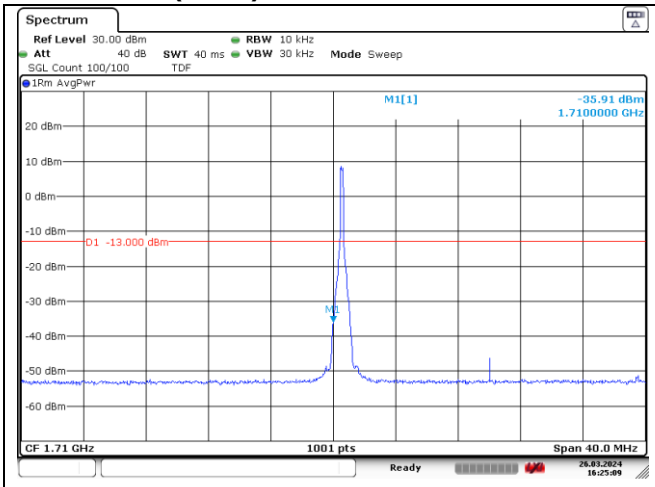


DFT-S-OFDM BPSK - Low Channel - Full RB

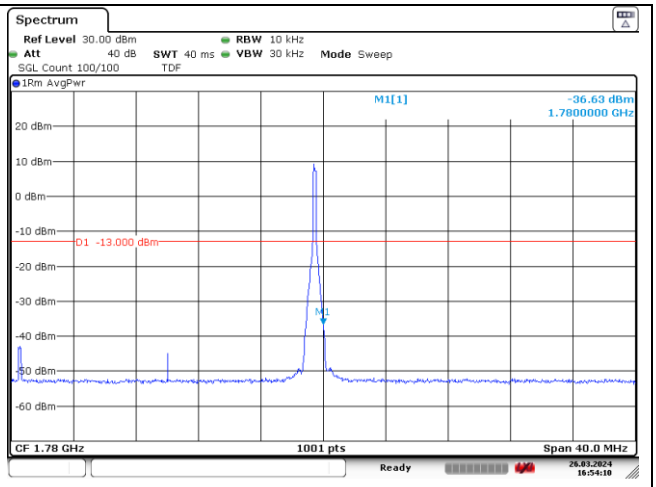


DFT-S-OFDM BPSK - High Channel - Full RB

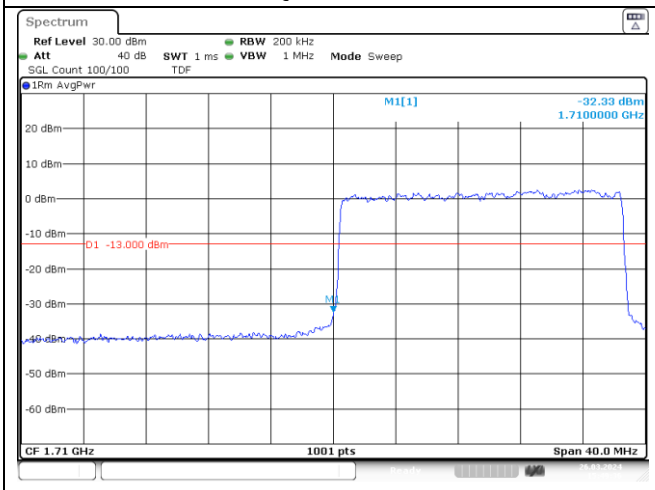
NR band 66 (20 ㎒)



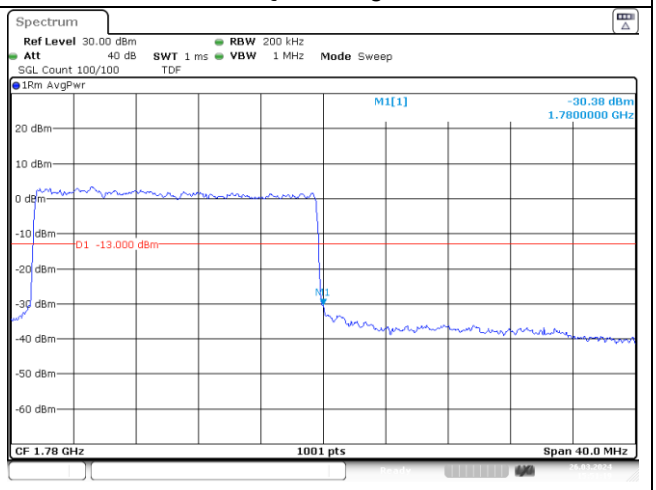
DFT-S-OFDM 16QAM - Low Channel - 1 RB



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

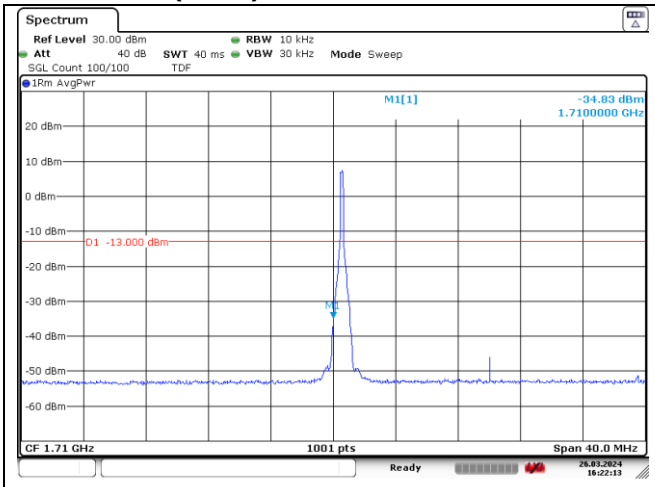


DFT-S-OFDM 16QAM - Low Channel - Full RB

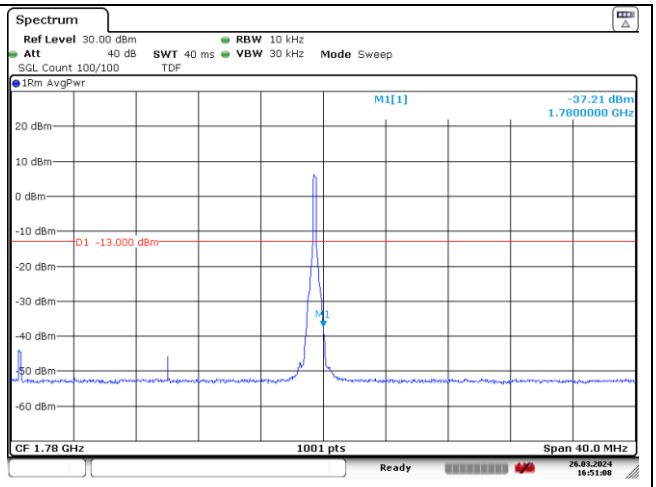


DFT-S-OFDM 16QAM - High Channel - Full RB

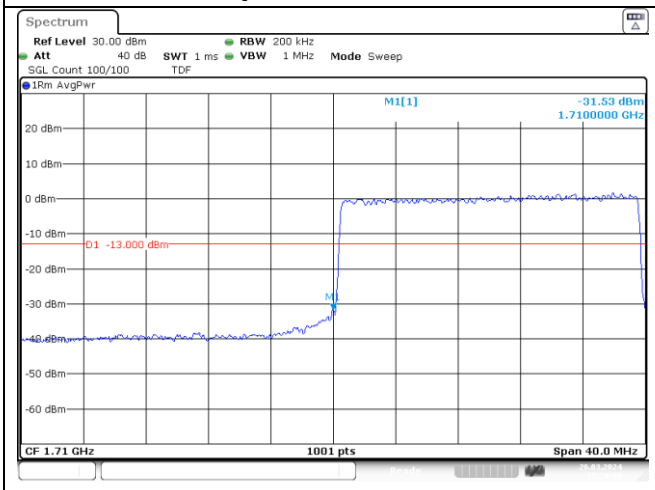
NR band 66 (20 ㎒)



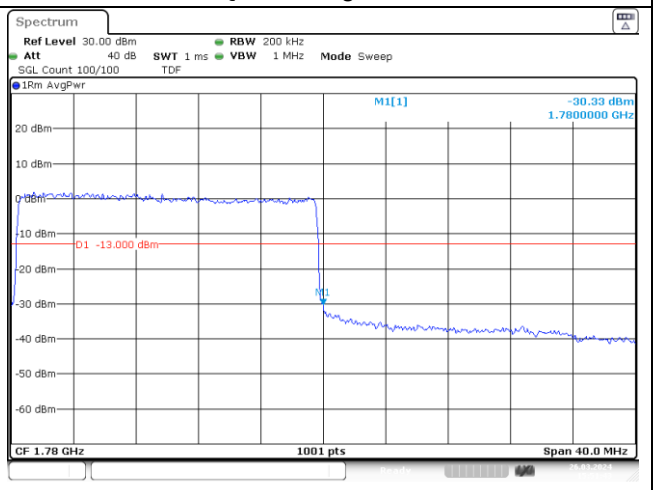
CP-OFDM QPSK - Low Channel - 1 RB



CP-OFDM QPSK - High Channel - 1 RB

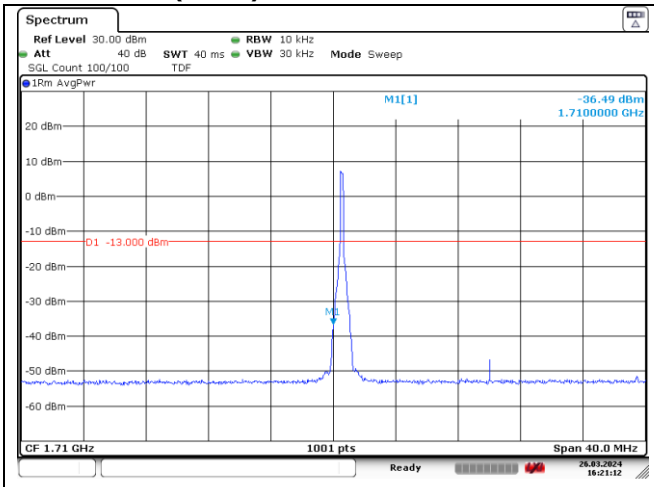


CP-OFDM QPSK - Low Channel - Full RB

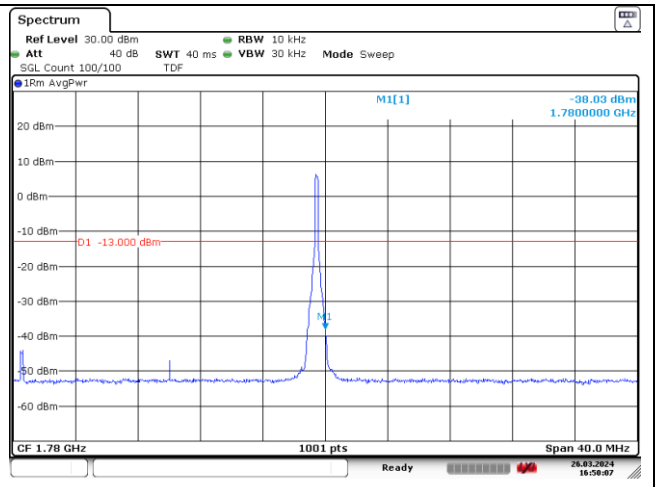


CP-OFDM QPSK - High Channel - Full RB

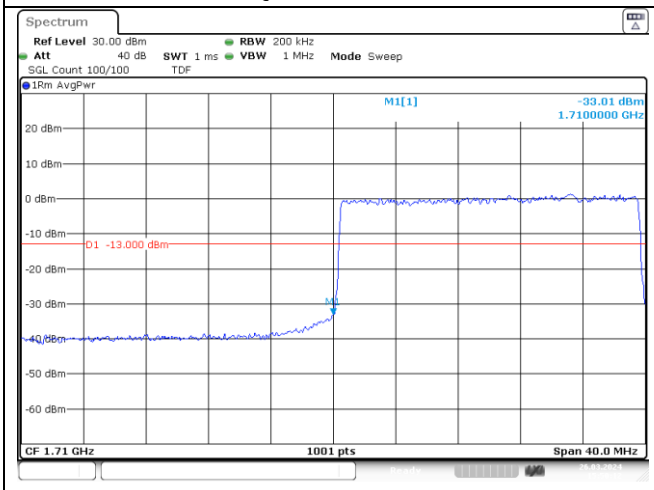
NR band 66 (20 ㎒)



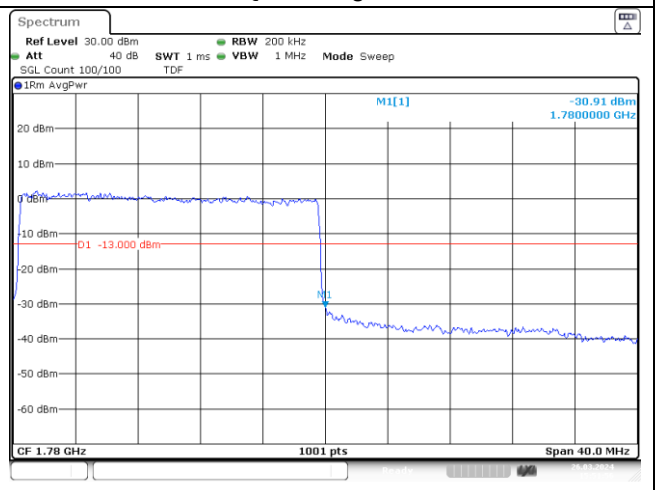
CP-OFDM 16QAM - Low Channel - 1 RB



CP-OFDM 16QAM - High Channel - 1 RB

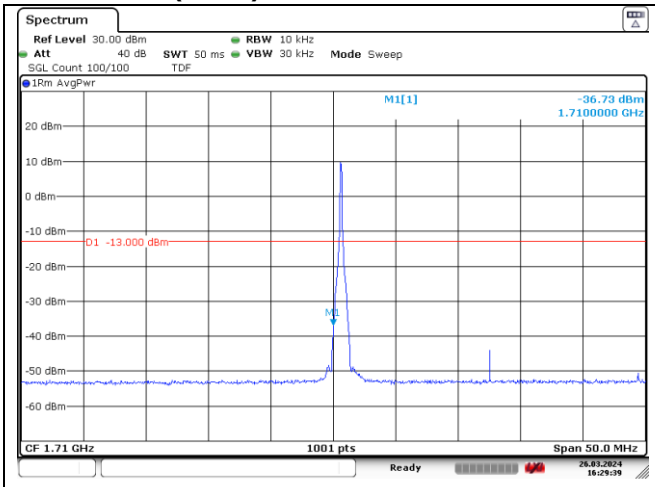


CP-OFDM 16QAM - Low Channel - Full RB

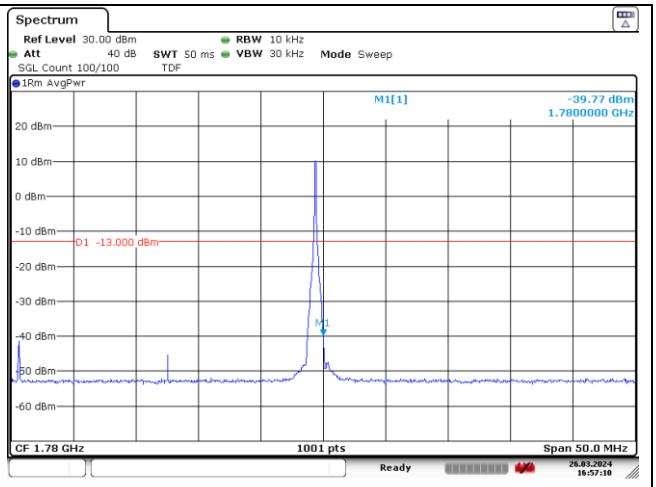


CP-OFDM 16QAM - High Channel - Full RB

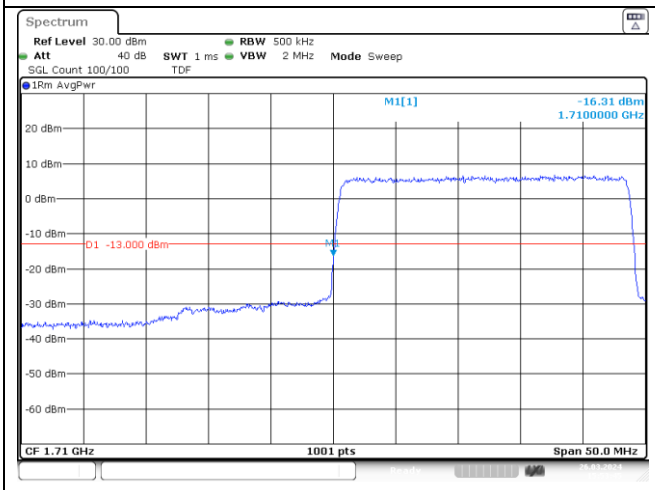
NR band 66 (25 ㎒)



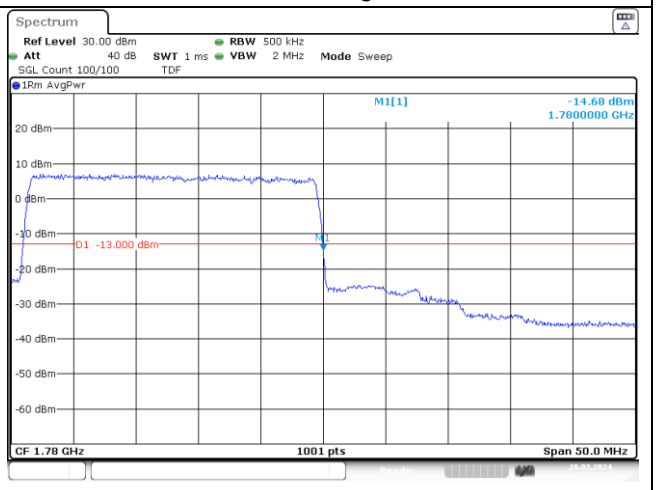
DFT-S-OFDM BPSK - Low Channel - 1 RB



DFT-S-OFDM BPSK - High Channel - 1 RB

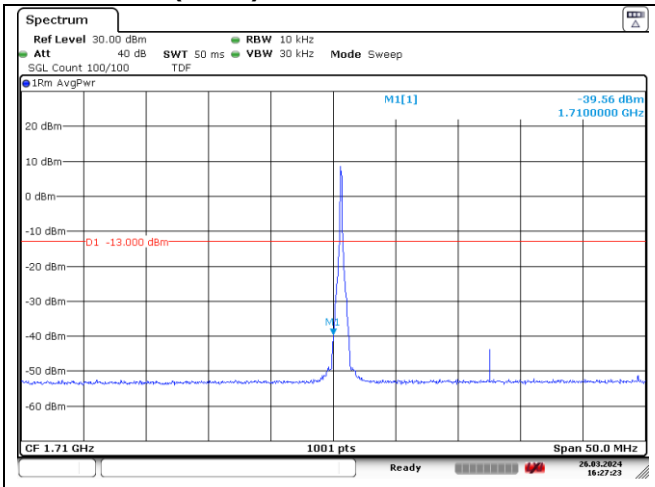


DFT-S-OFDM BPSK - Low Channel - Full RB

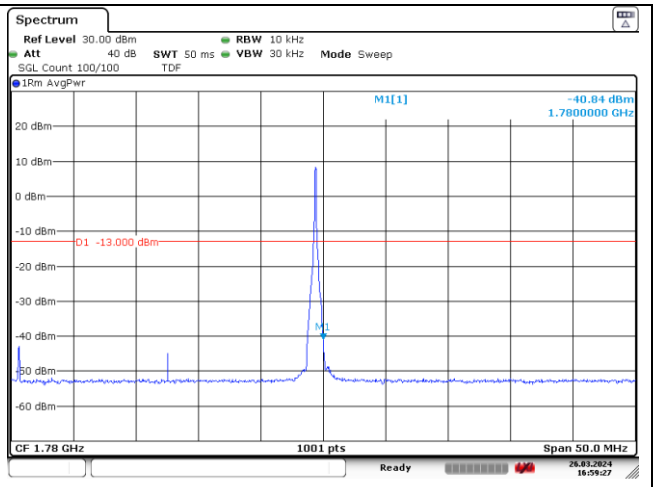


DFT-S-OFDM BPSK - High Channel - Full RB

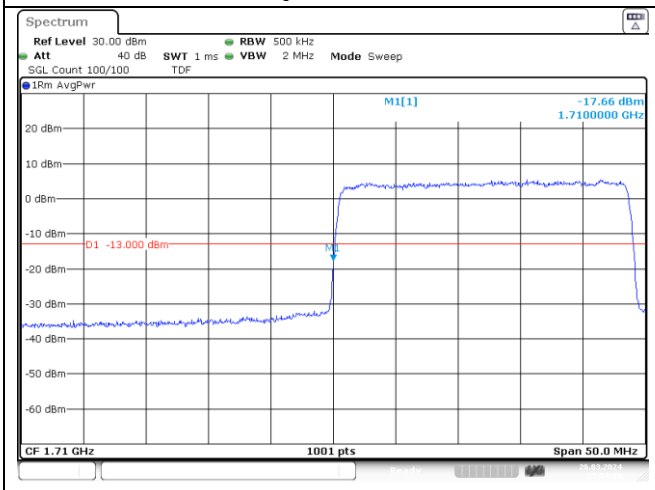
NR band 66 (25 ㎒)



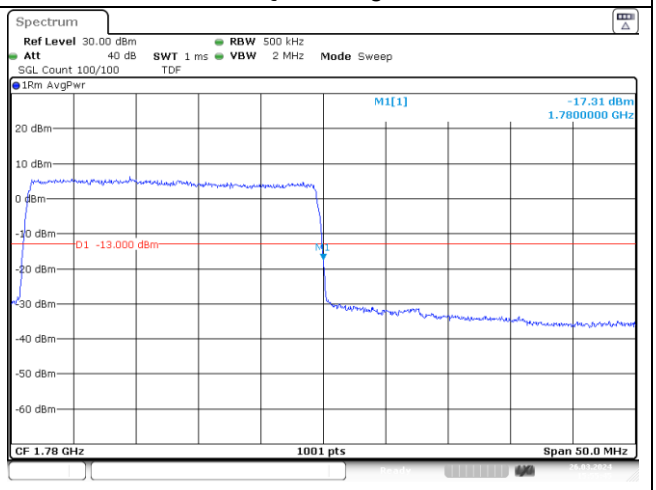
DFT-S-OFDM 16QAM - Low Channel - 1 RB



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

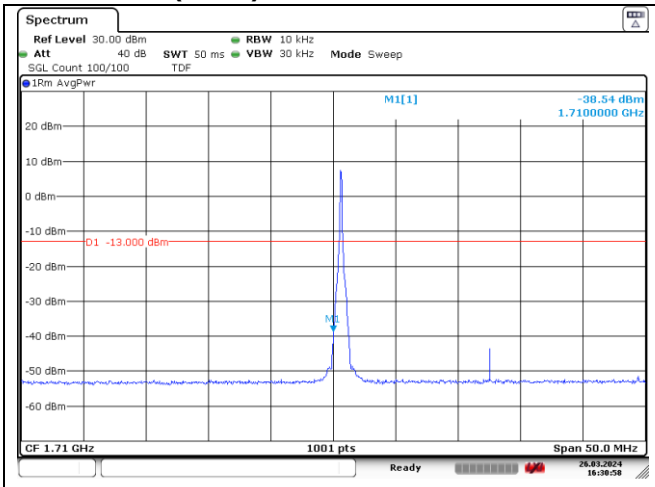


DFT-S-OFDM 16QAM - Low Channel - Full RB

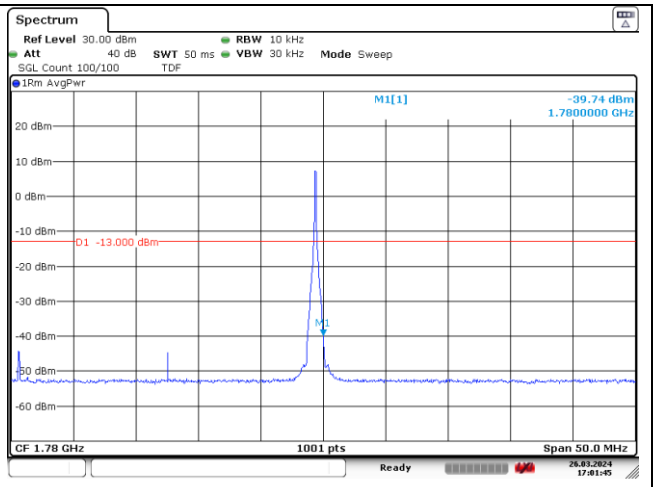


DFT-S-OFDM 16QAM - High Channel - Full RB

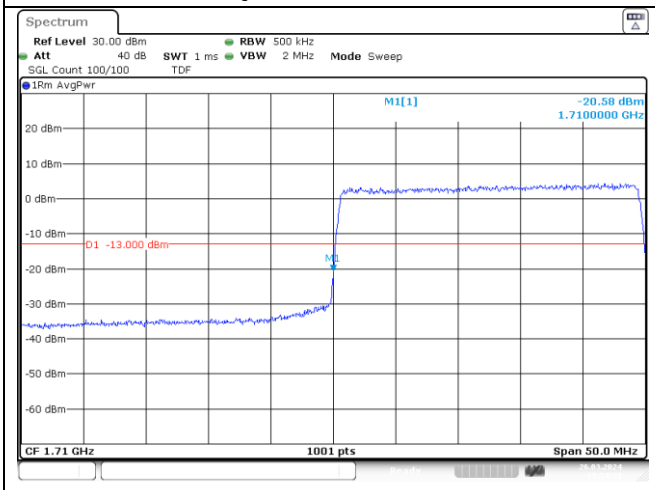
NR band 66 (25 ㎒)



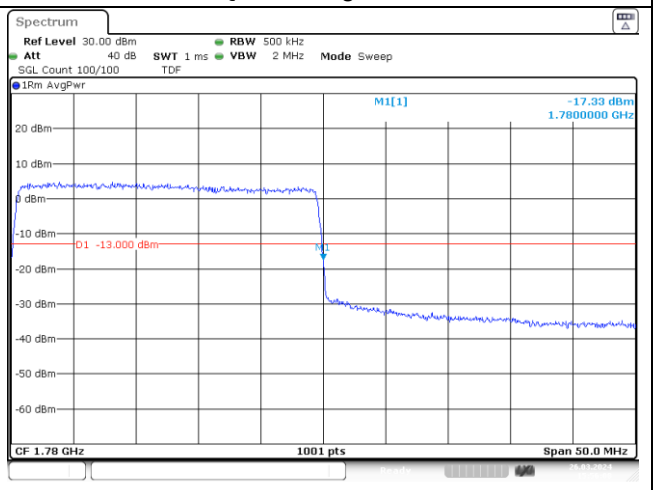
CP-OFDM QPSK - Low Channel - 1 RB



CP-OFDM QPSK - High Channel - 1 RB

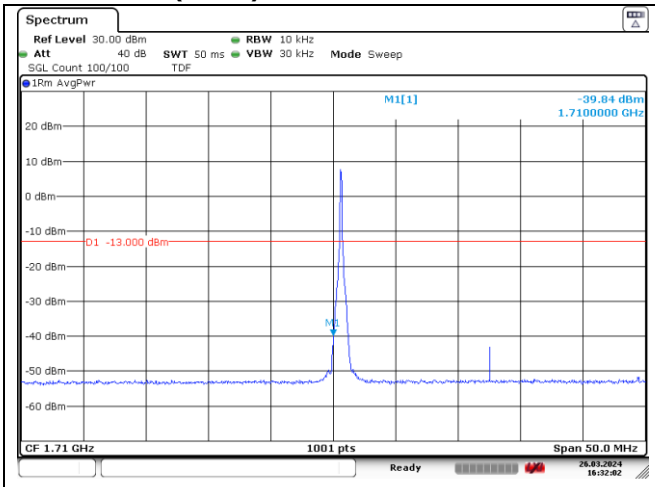


CP-OFDM QPSK - Low Channel - Full RB

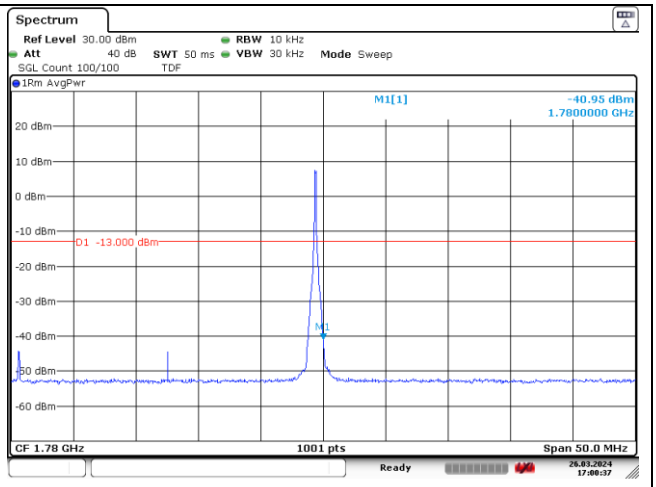


CP-OFDM QPSK - High Channel - Full RB

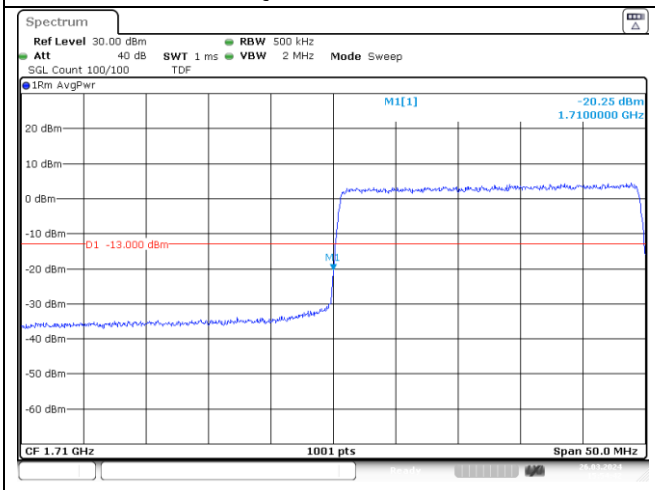
NR band 66 (25 ㎒)



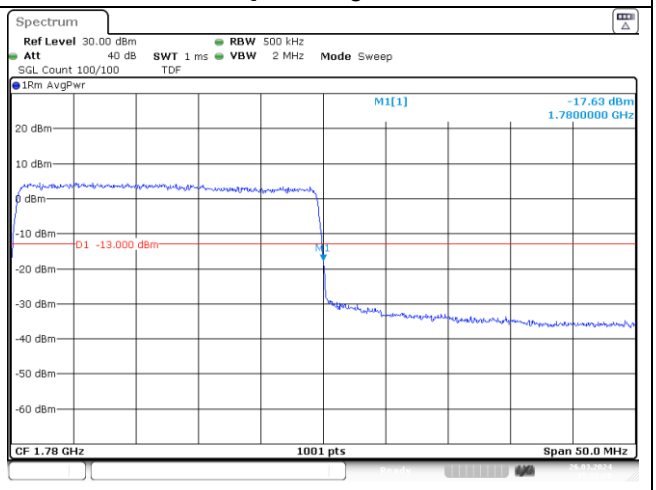
CP-OFDM 16QAM - Low Channel - 1 RB



CP-OFDM 16QAM - High Channel - 1 RB

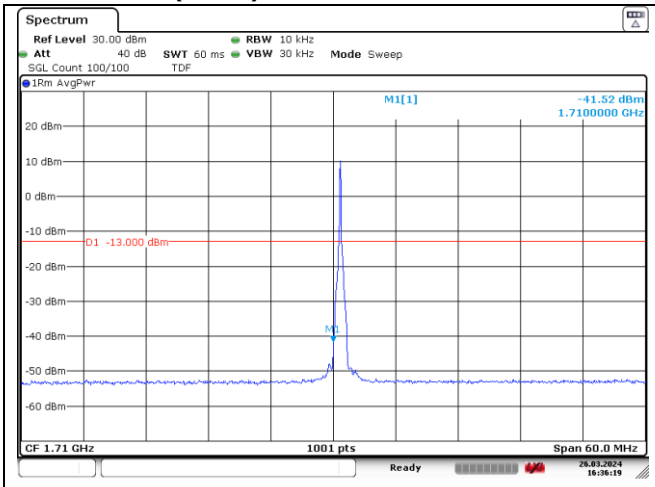


CP-OFDM 16QAM - Low Channel - Full RB

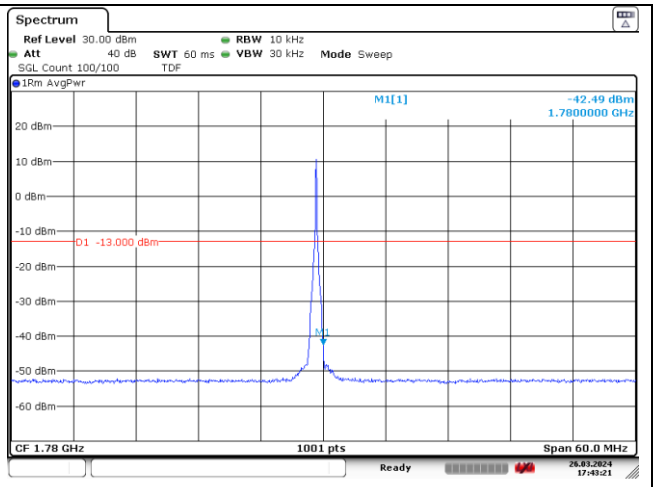


CP-OFDM 16QAM - High Channel - Full RB

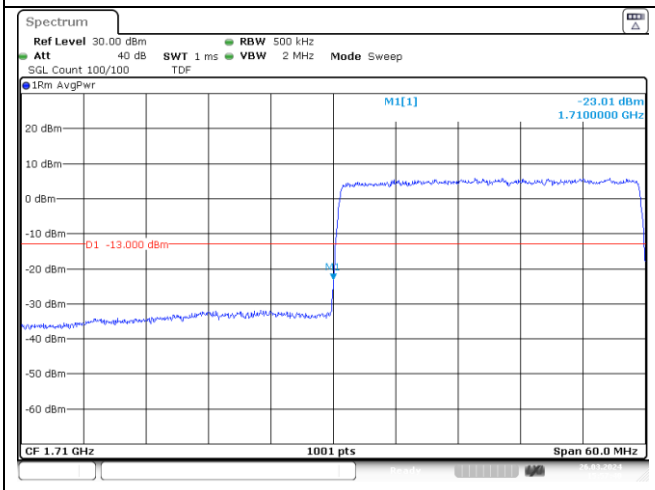
NR band 66 (30 ㎒)



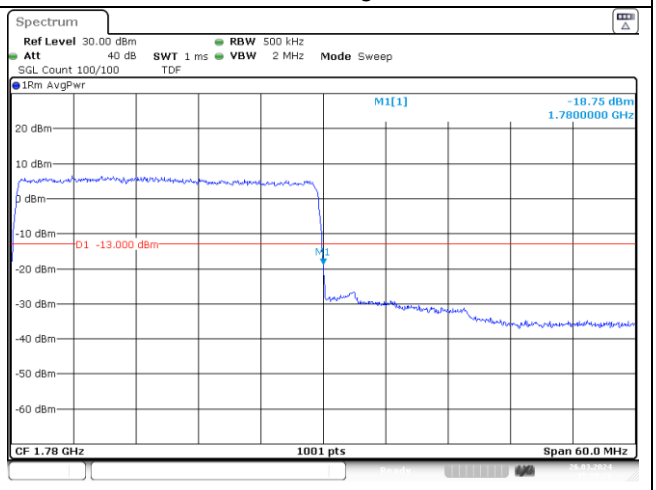
DFT-S-OFDM BPSK - Low Channel - 1 RB



DFT-S-OFDM BPSK - High Channel - 1 RB

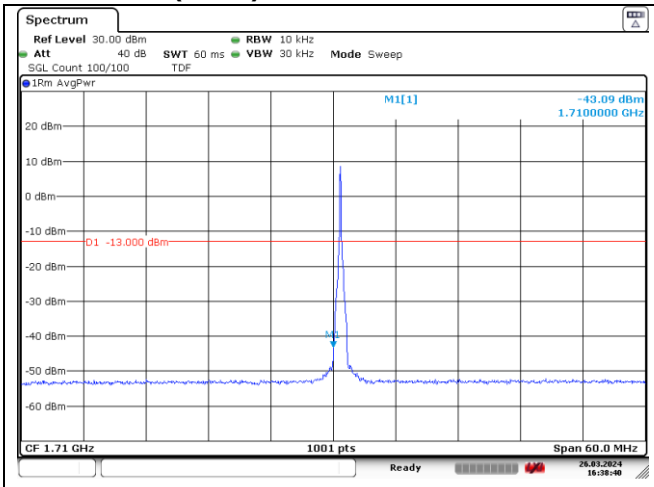


DFT-S-OFDM BPSK - Low Channel - Full RB

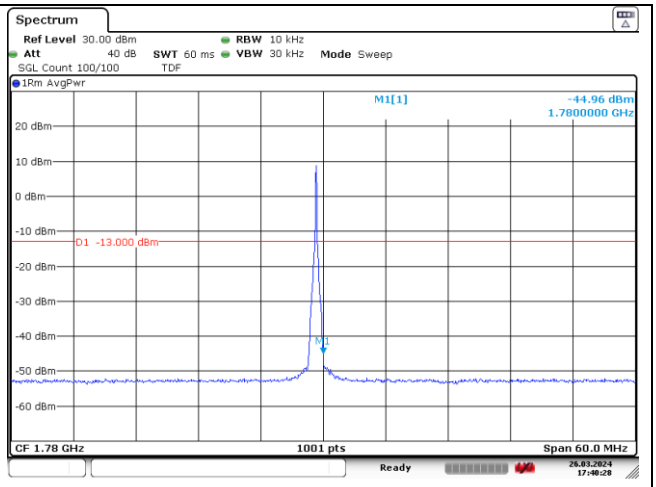


DFT-S-OFDM BPSK - High Channel - Full RB

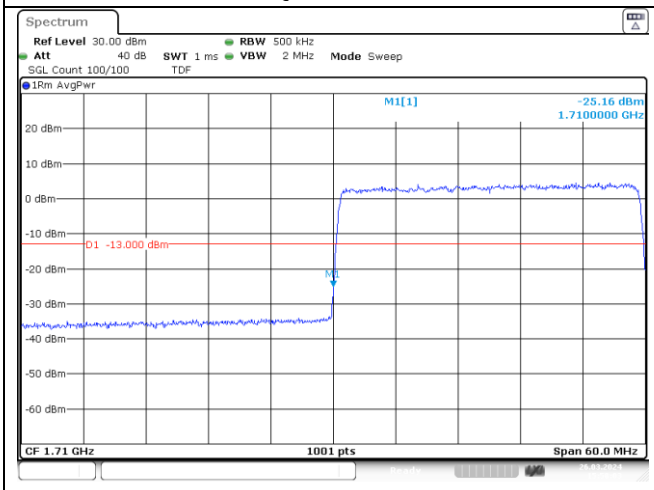
NR band 66 (30 ㎒)



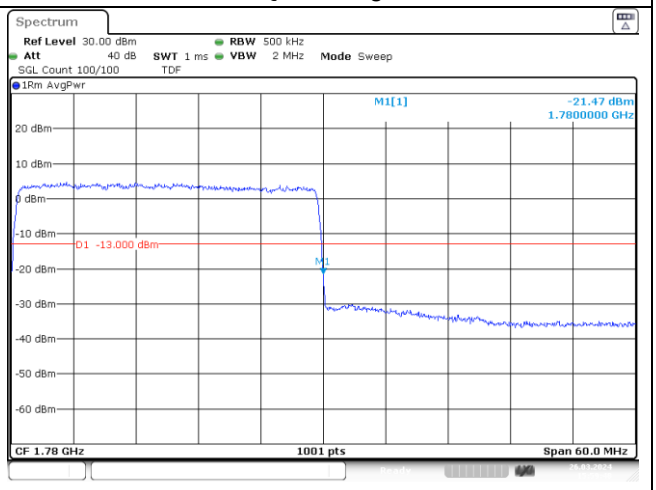
DFT-S-OFDM 16QAM - Low Channel - 1 RB



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

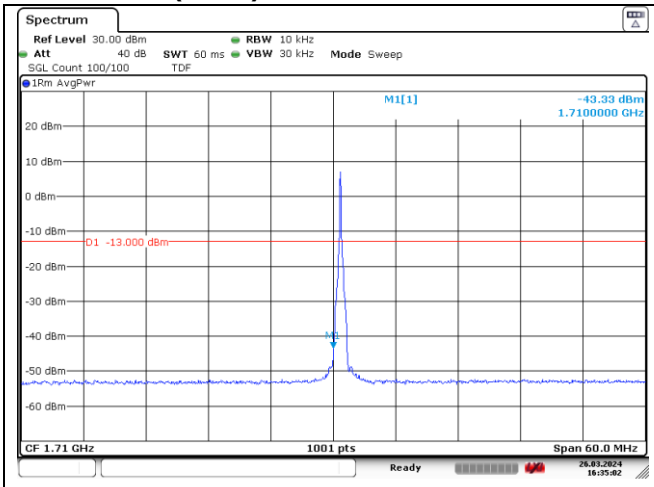


DFT-S-OFDM 16QAM - Low Channel - Full RB

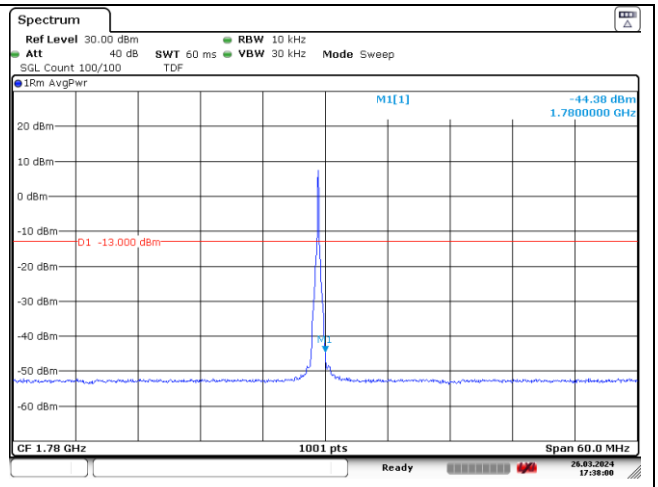


DFT-S-OFDM 16QAM - High Channel - Full RB

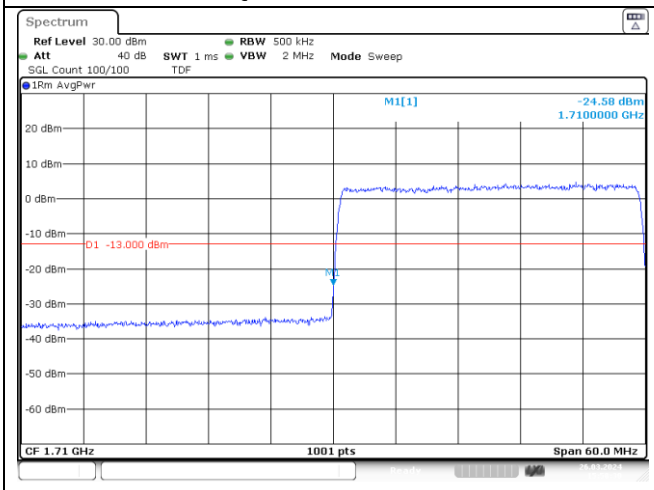
NR band 66 (30 ㎒)



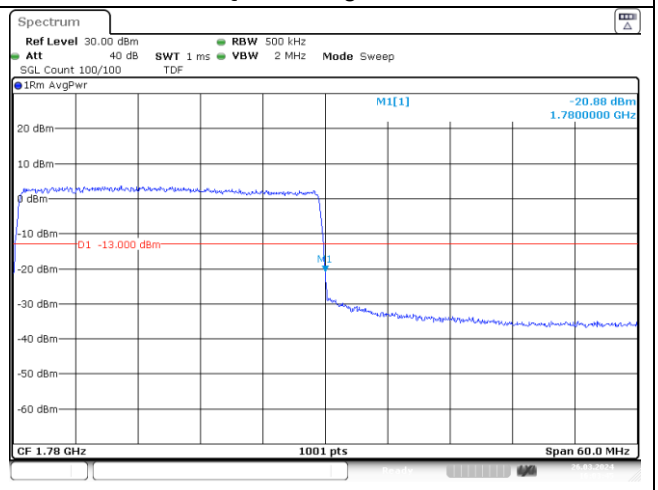
CP-OFDM QPSK - Low Channel - 1 RB



CP-OFDM QPSK - High Channel - 1 RB

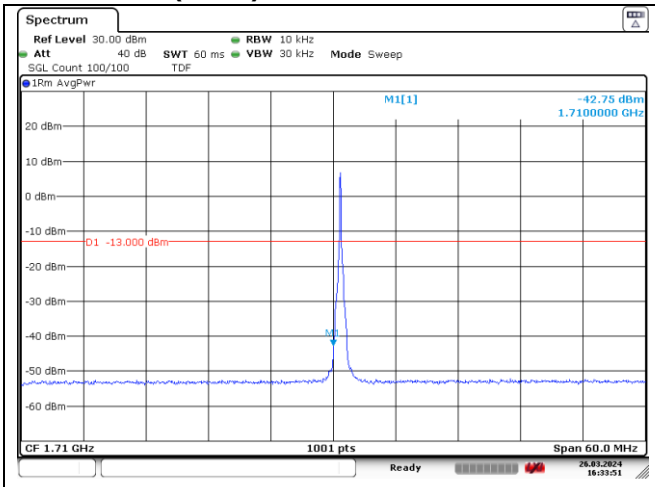


CP-OFDM QPSK - Low Channel - Full RB

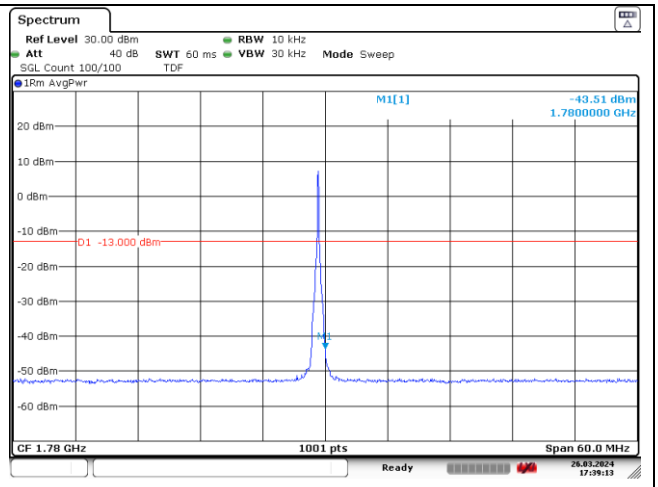


CP-OFDM QPSK - High Channel - Full RB

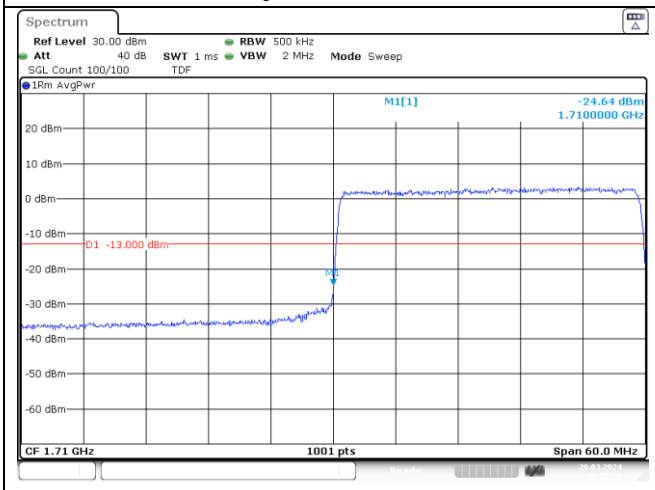
NR band 66 (30 ㎒)



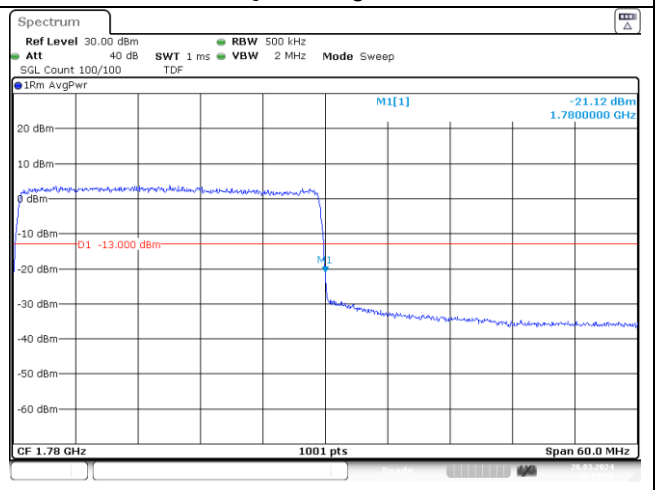
CP-OFDM 16QAM - Low Channel - 1 RB



CP-OFDM 16QAM - High Channel - 1 RB

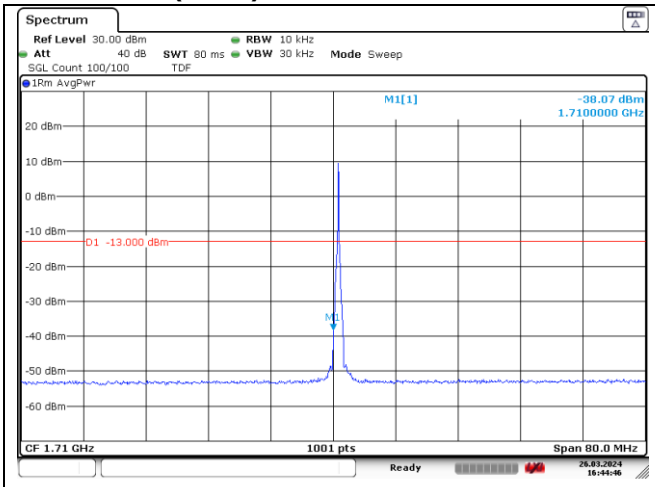


CP-OFDM 16QAM - Low Channel - Full RB

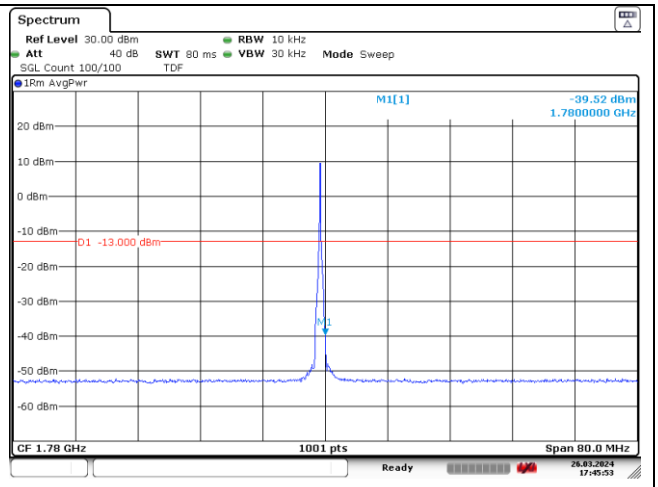


CP-OFDM 16QAM - High Channel - Full RB

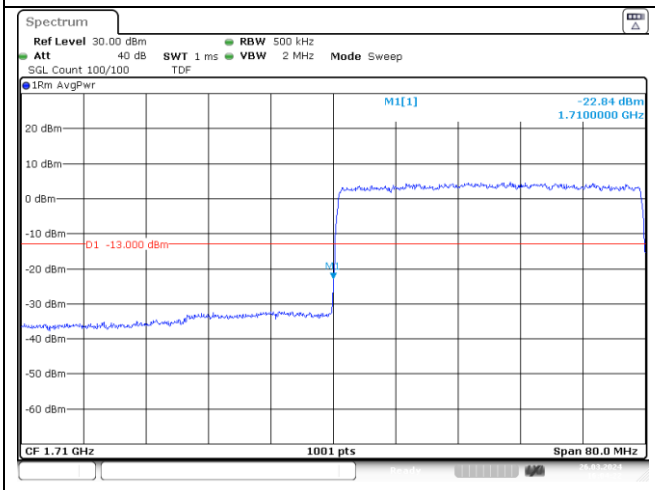
NR band 66 (40 ㎒)



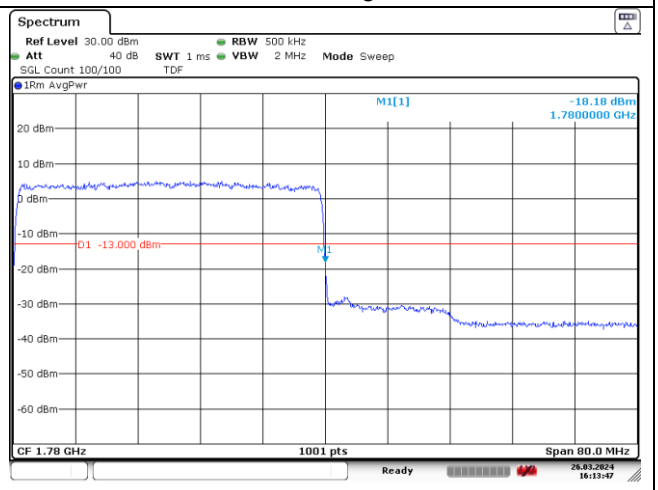
DFT-S-OFDM BPSK - Low Channel - 1 RB



DFT-S-OFDM BPSK - High Channel - 1 RB

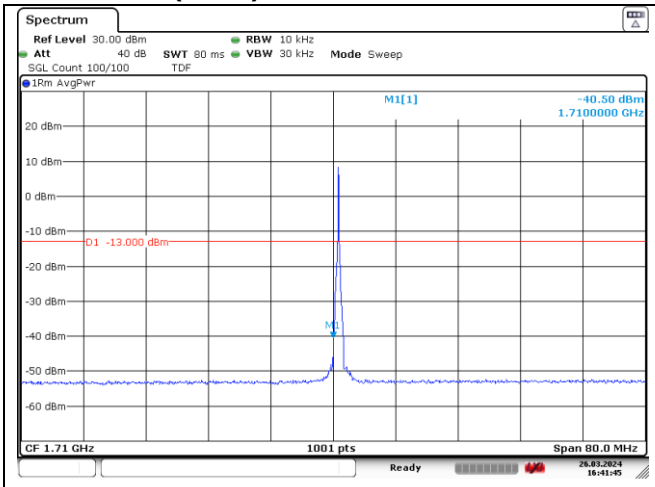


DFT-S-OFDM BPSK - Low Channel - Full RB

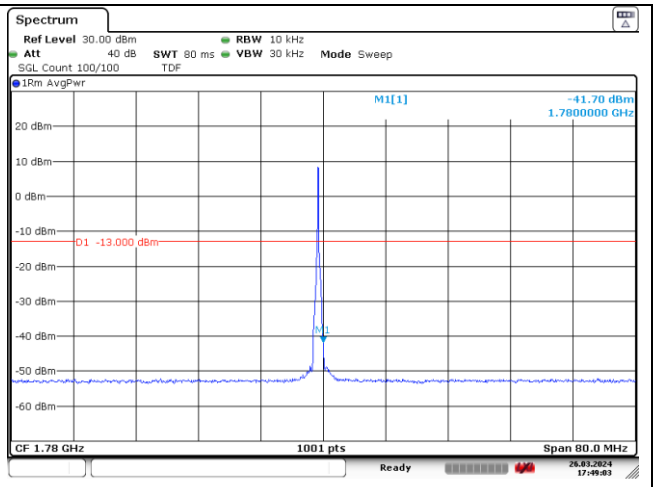


DFT-S-OFDM BPSK - High Channel - Full RB

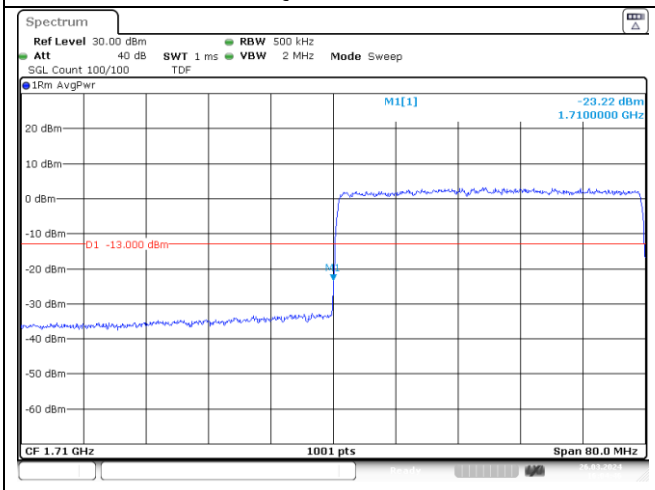
NR band 66 (40 ㎒)



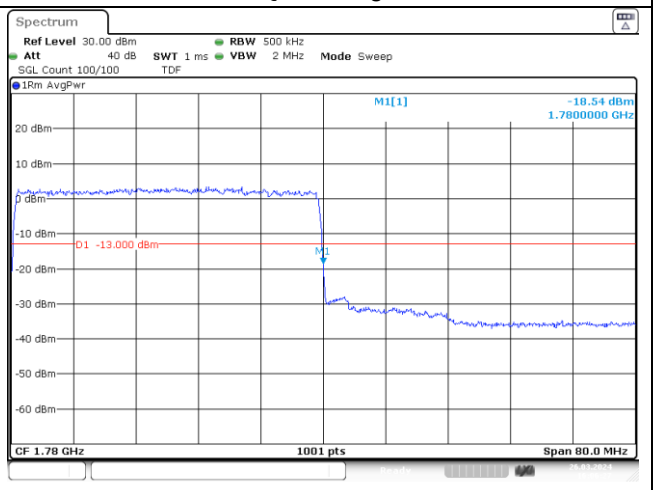
DFT-S-OFDM 16QAM - Low Channel - 1 RB



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

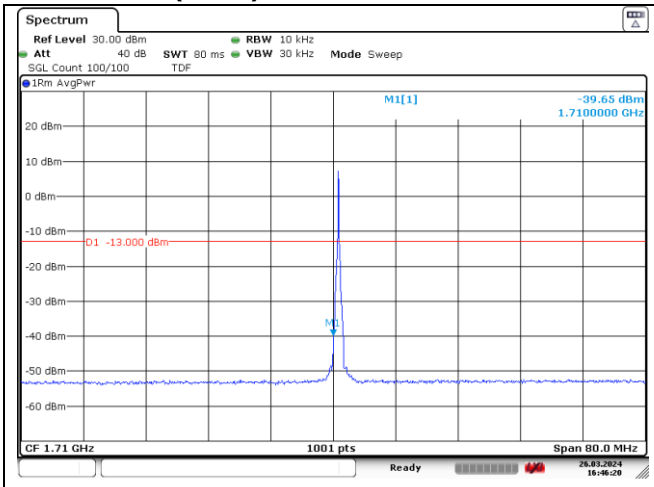


DFT-S-OFDM 16QAM - Low Channel - Full RB

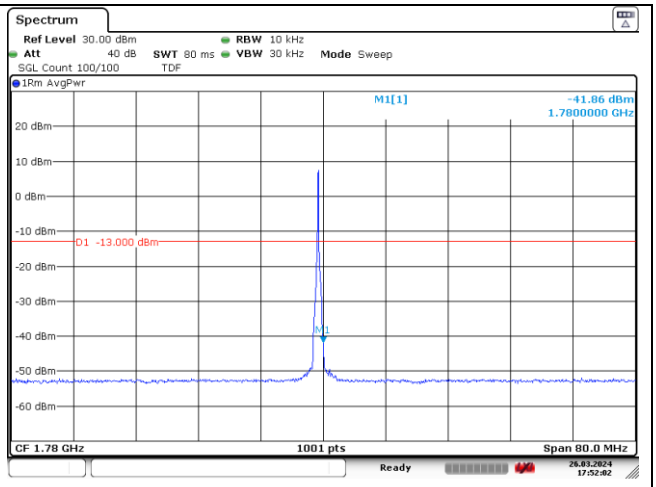


DFT-S-OFDM 16QAM - High Channel - Full RB

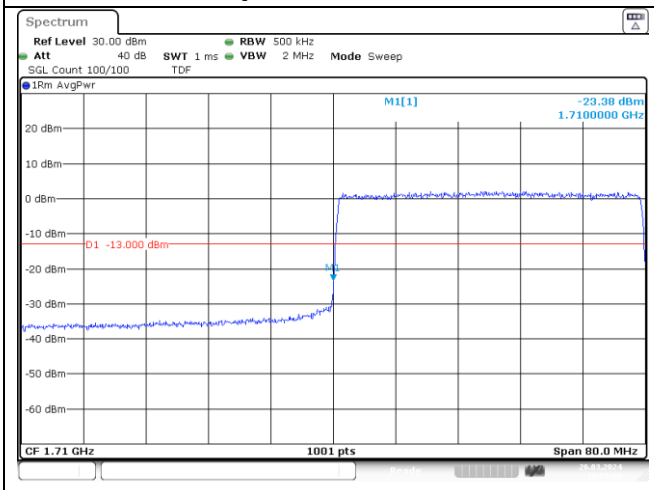
NR band 66 (40 ㎒)



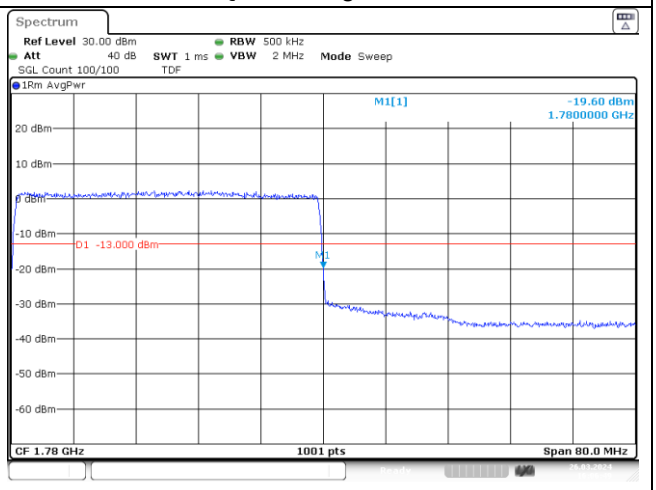
CP-OFDM QPSK - Low Channel - 1 RB



CP-OFDM QPSK - High Channel - 1 RB

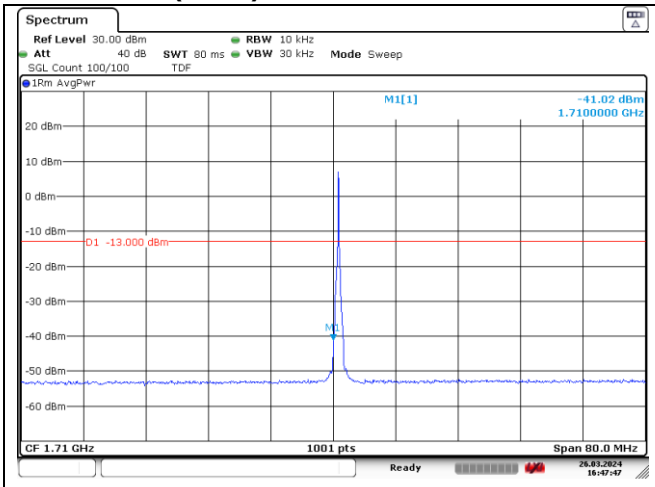


CP-OFDM QPSK - Low Channel - Full RB

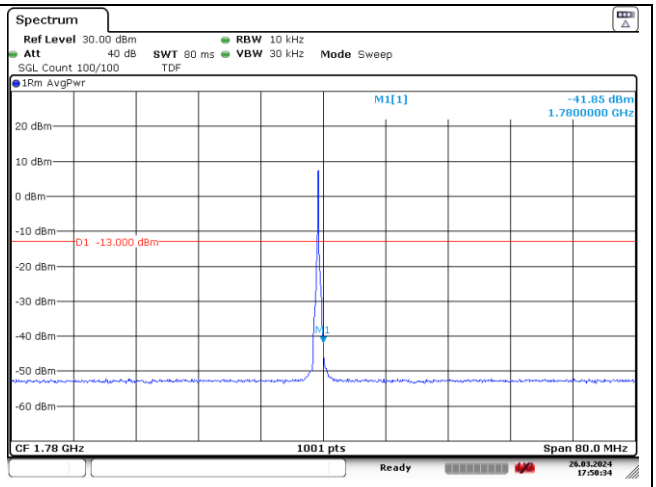


CP-OFDM QPSK - High Channel - Full RB

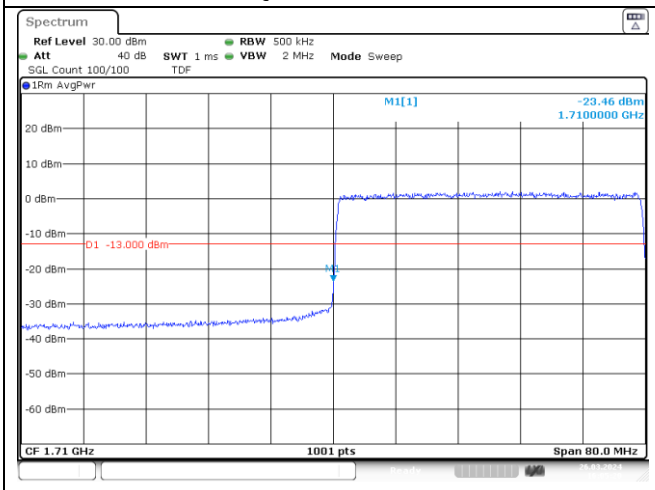
NR band 66 (40 ㎒)



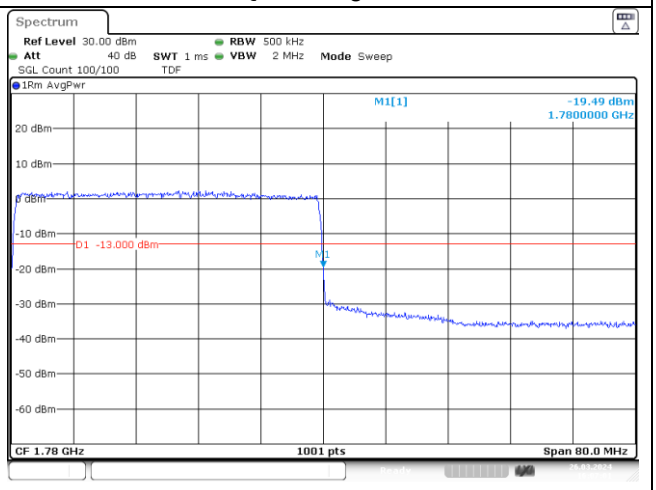
CP-OFDM 16QAM - Low Channel - 1 RB



CP-OFDM 16QAM - High Channel - 1 RB

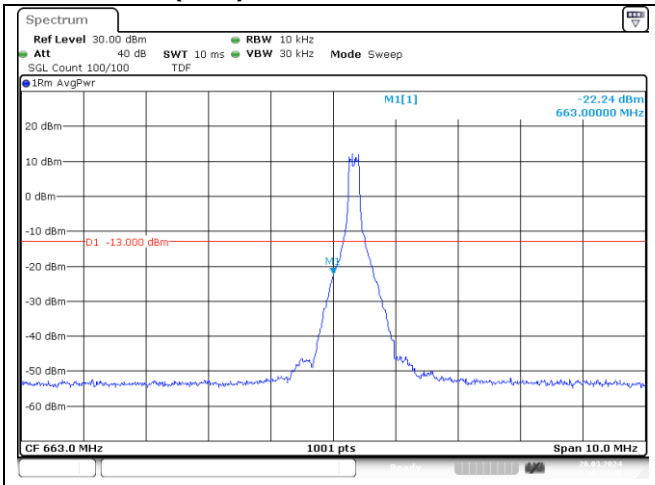


CP-OFDM 16QAM - Low Channel - Full RB

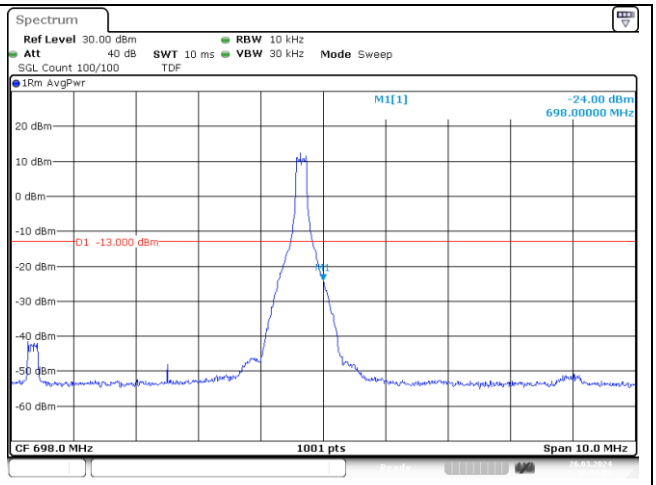


CP-OFDM 16QAM - High Channel - Full RB

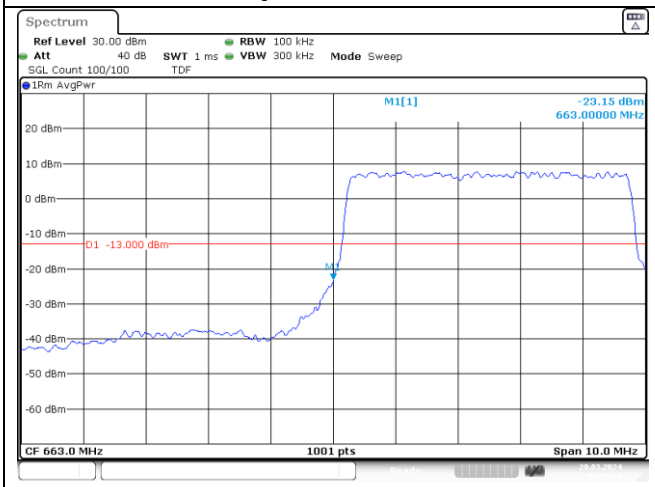
NR band 71 (5 ㎒)



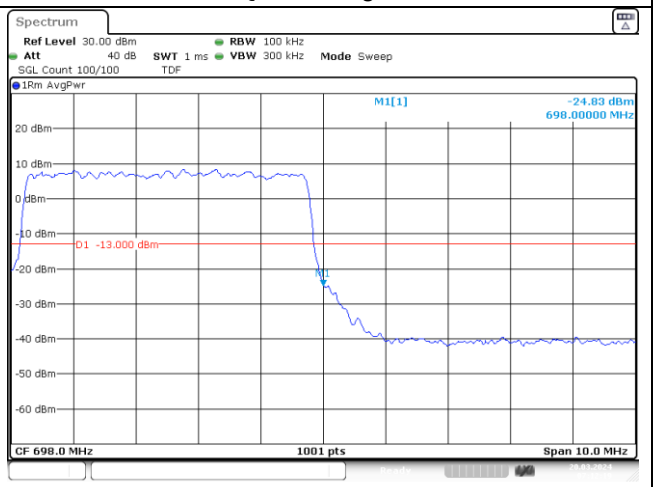
DFT-S-OFDM QPSK - Low Channel - 1 RB



DFT-S-OFDM QPSK - High Channel - 1 RB

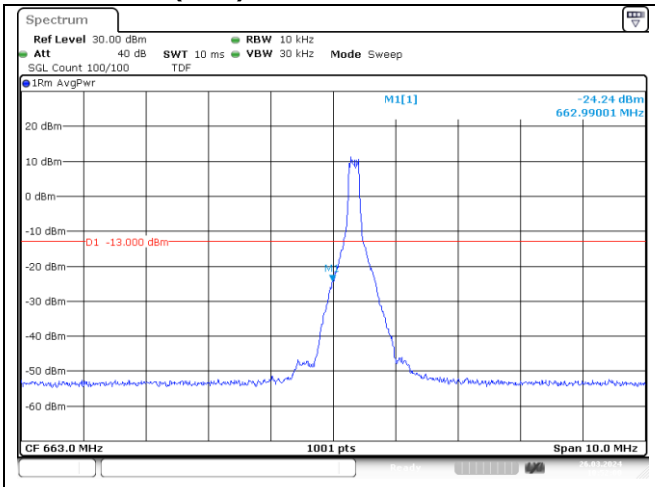


DFT-S-OFDM QPSK - Low Channel - Full RB

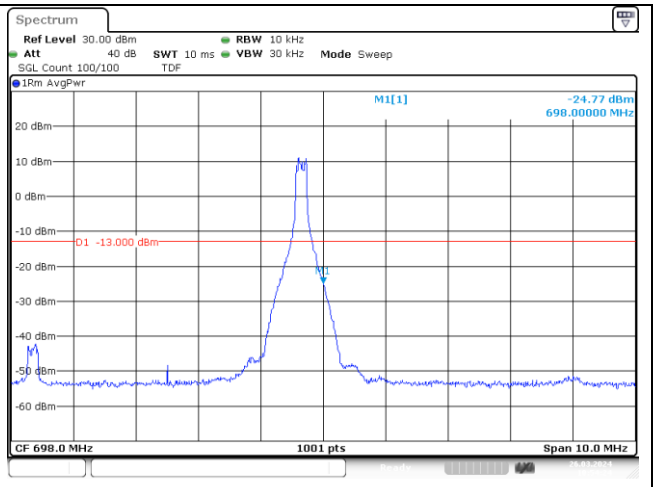


DFT-S-OFDM QPSK - High Channel - Full RB

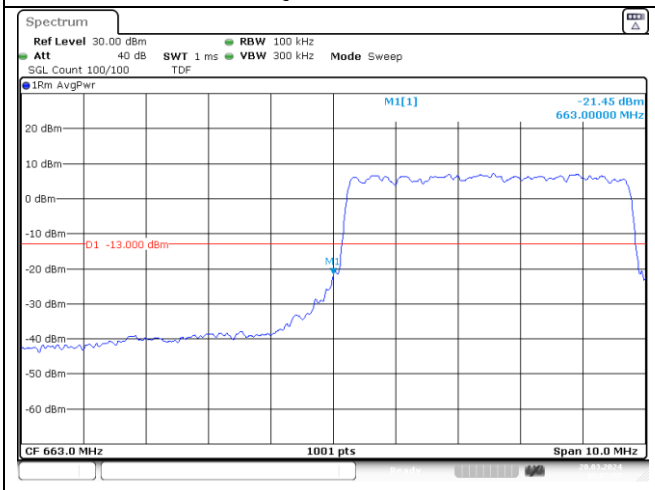
NR band 71 (5 ㎒)



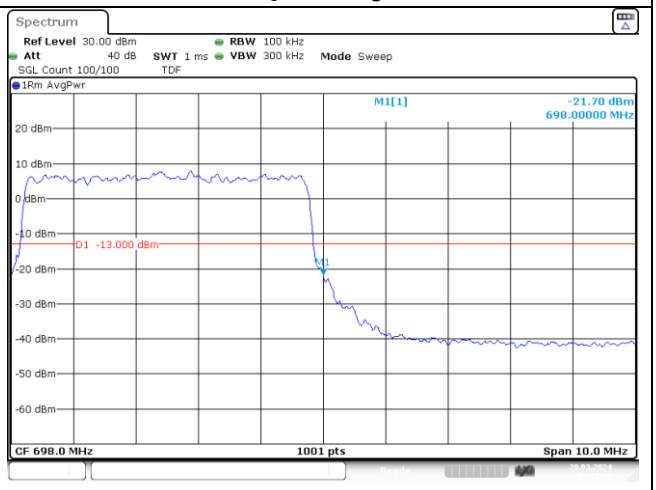
DFT-S-OFDM 16QAM - Low Channel - 1 RB



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

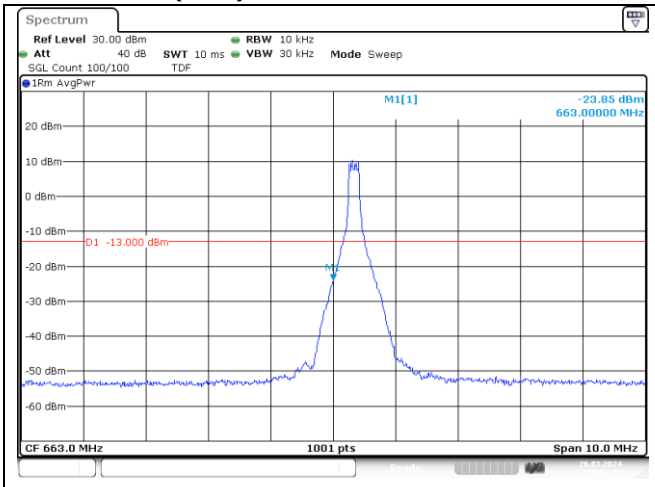


DFT-S-OFDM 16QAM - Low Channel - Full RB

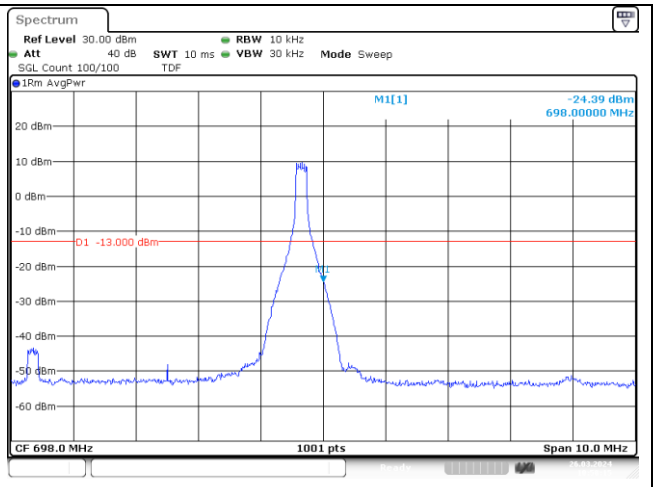


DFT-S-OFDM 16QAM - High Channel - Full RB

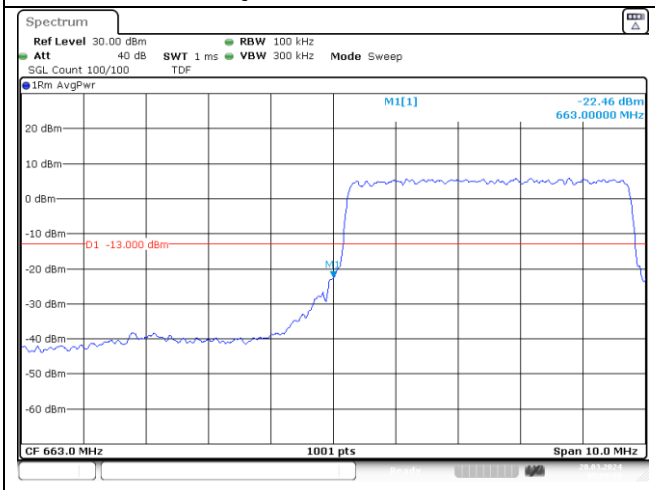
NR band 71 (5 ㎒)



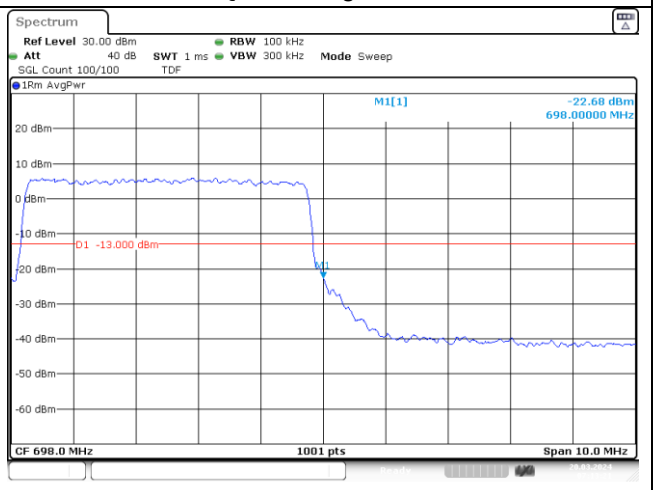
CP-OFDM QPSK - Low Channel - 1 RB



CP-OFDM QPSK - High Channel - 1 RB

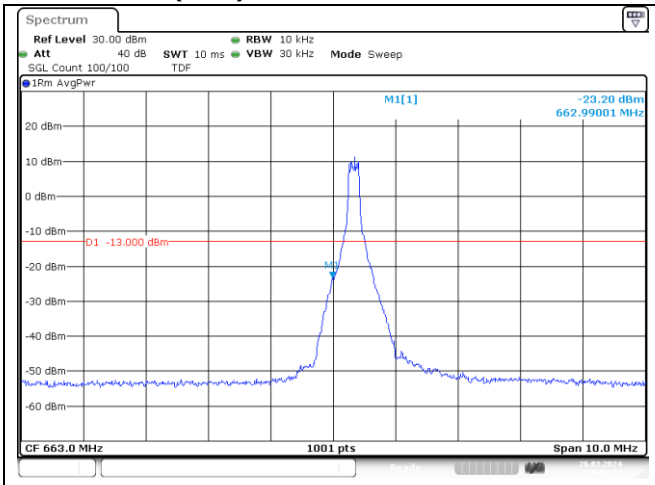


CP-OFDM QPSK - Low Channel - Full RB

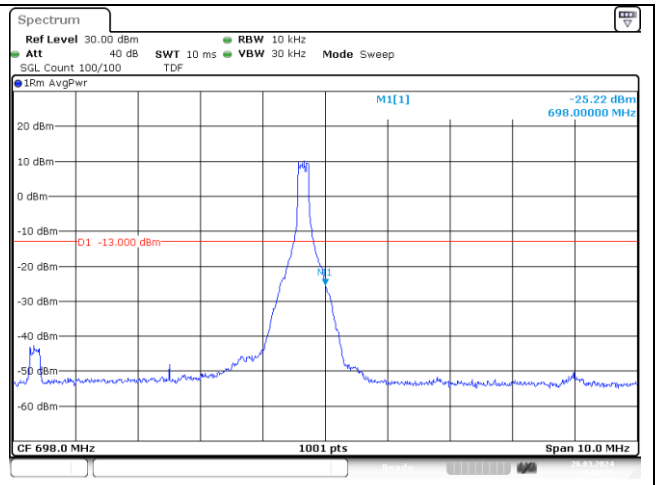


CP-OFDM QPSK - High Channel - Full RB

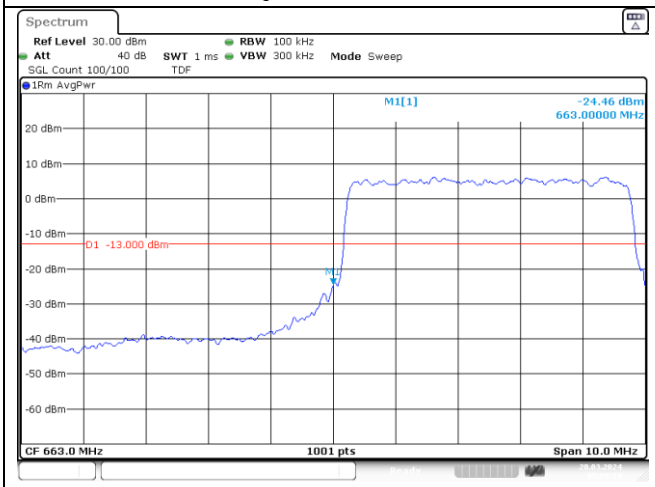
NR band 71 (5 ㎒)



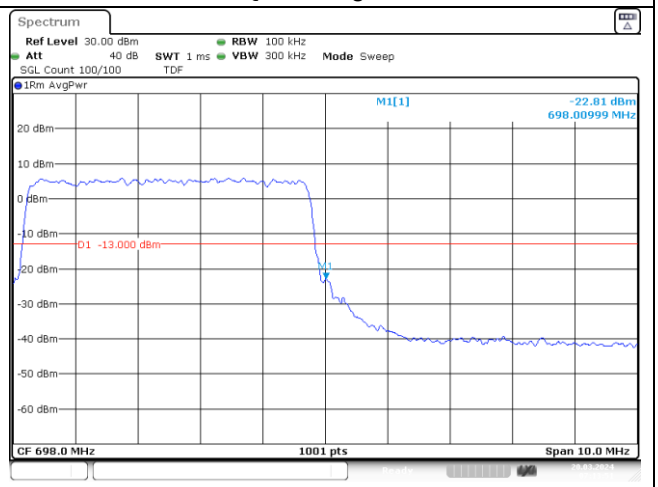
CP-OFDM 16QAM - Low Channel - 1 RB



CP-OFDM 16QAM - High Channel - 1 RB

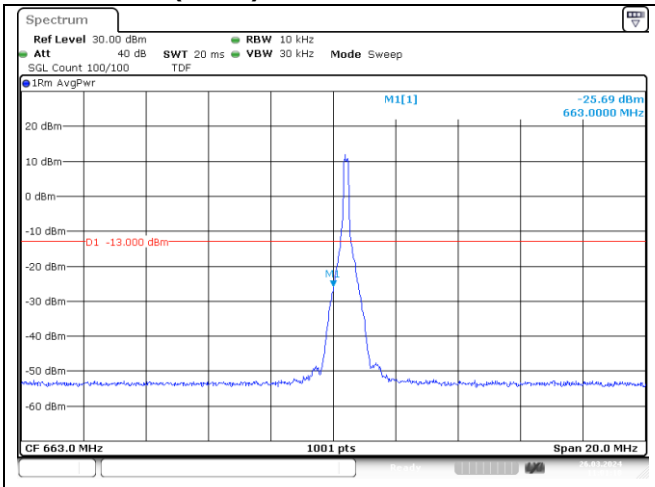


CP-OFDM 16QAM - Low Channel - Full RB

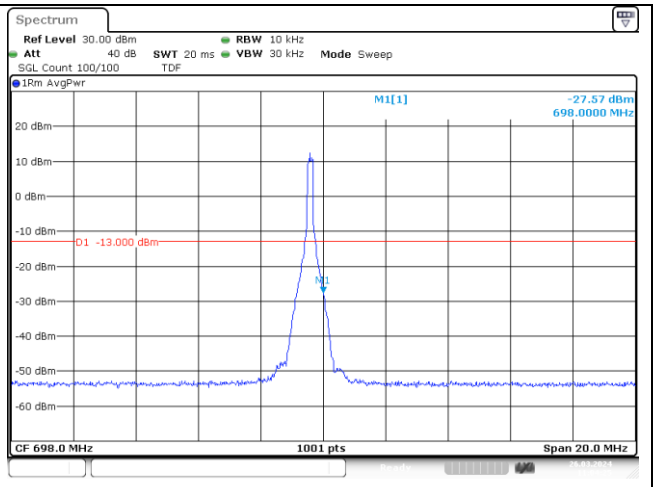


CP-OFDM 16QAM - High Channel - Full RB

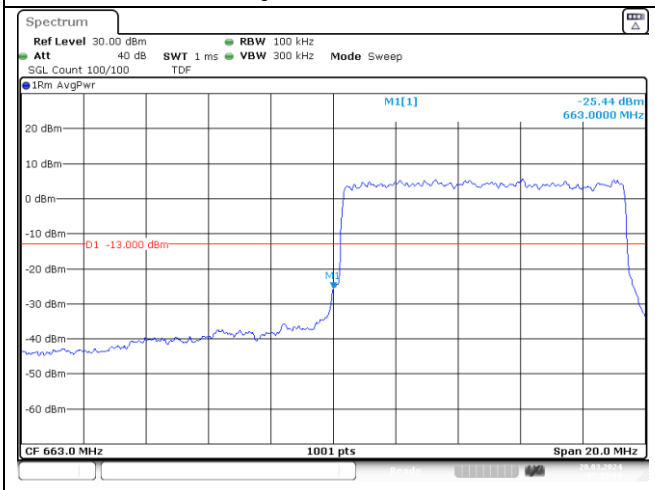
NR band 71 (10 ㎒)



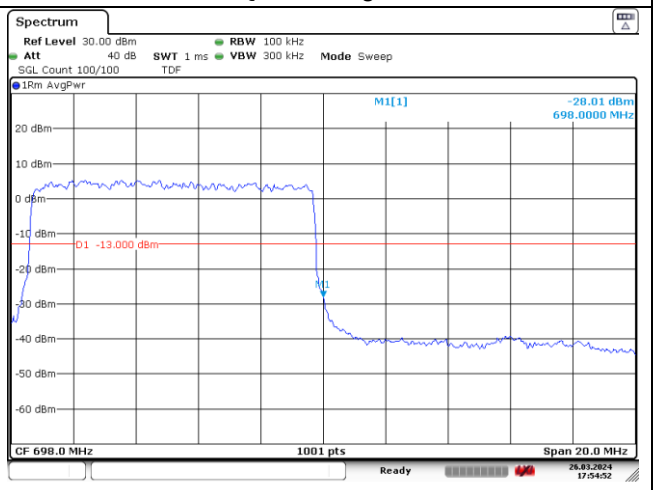
DFT-S-OFDM QPSK - Low Channel - 1 RB



DFT-S-OFDM QPSK - High Channel - 1 RB

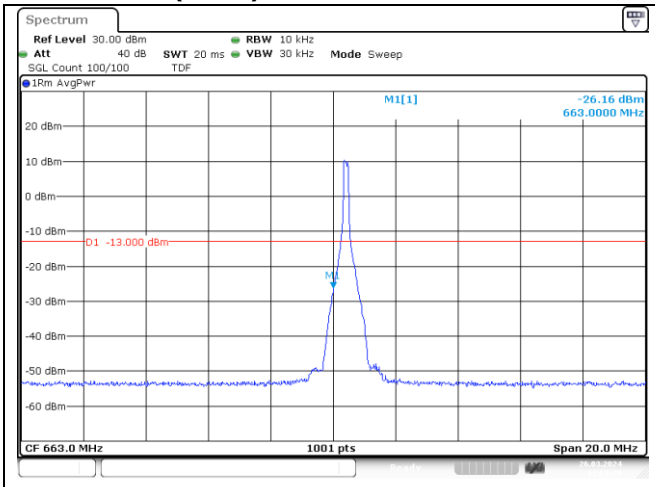


DFT-S-OFDM QPSK - Low Channel - Full RB

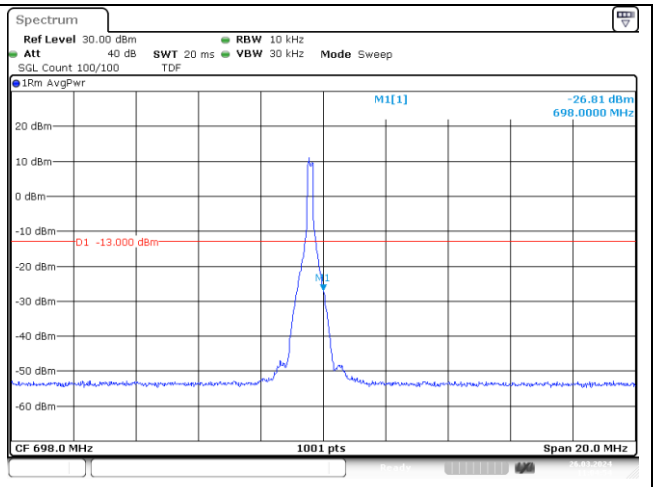


DFT-S-OFDM QPSK - High Channel - Full RB

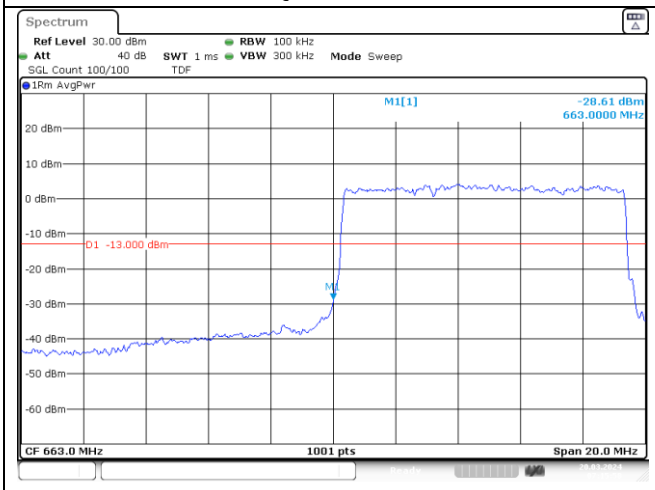
NR band 71 (10 ㎒)



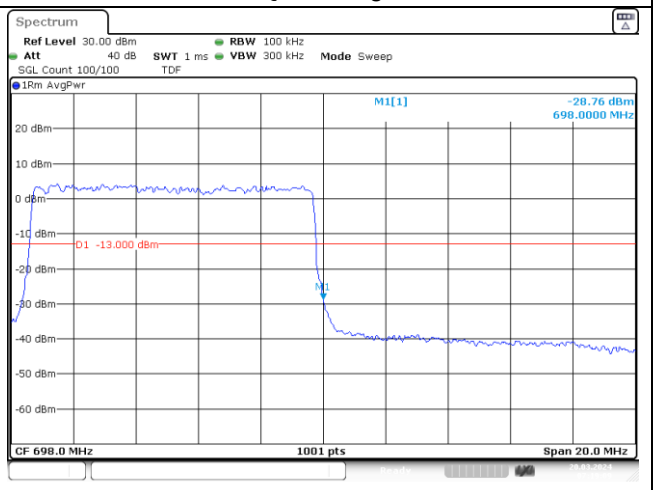
DFT-S-OFDM 16QAM - Low Channel - 1 RB



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

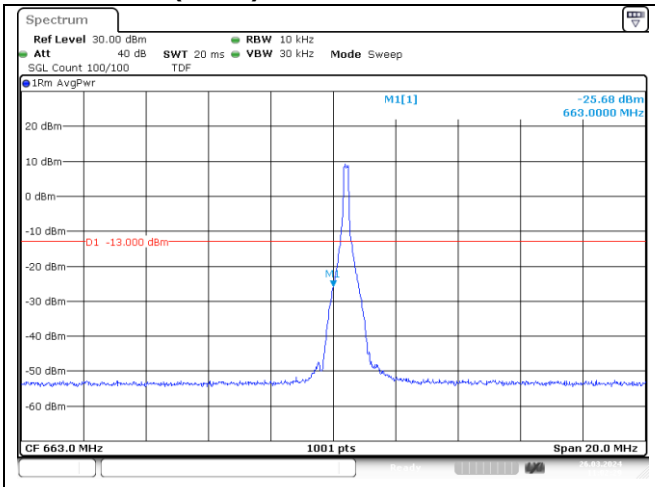


DFT-S-OFDM 16QAM - Low Channel - Full RB

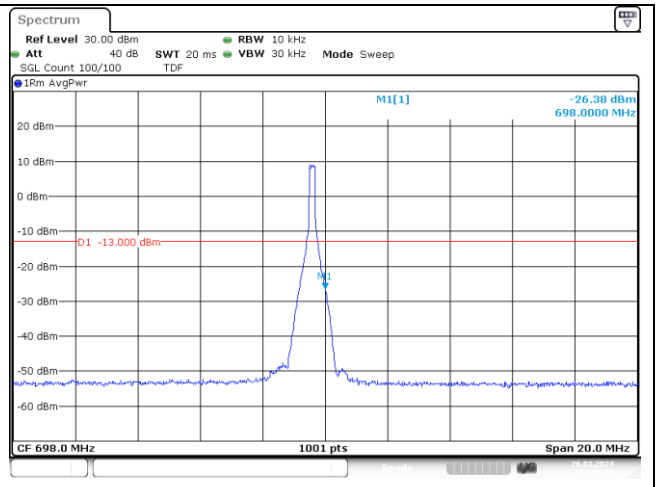


DFT-S-OFDM 16QAM - High Channel - Full RB

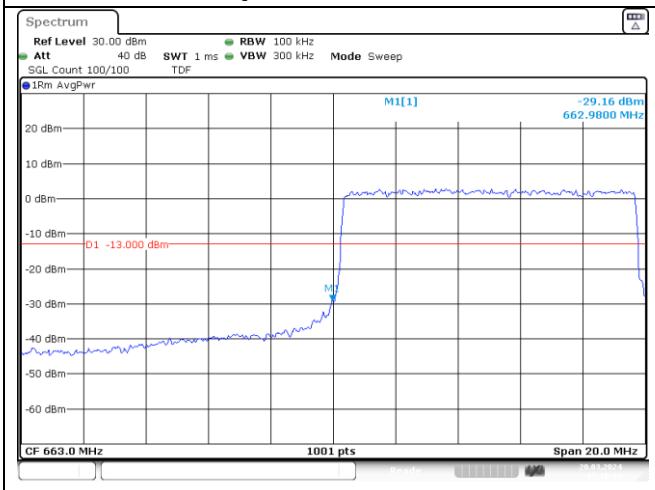
NR band 71 (10 ㎒)



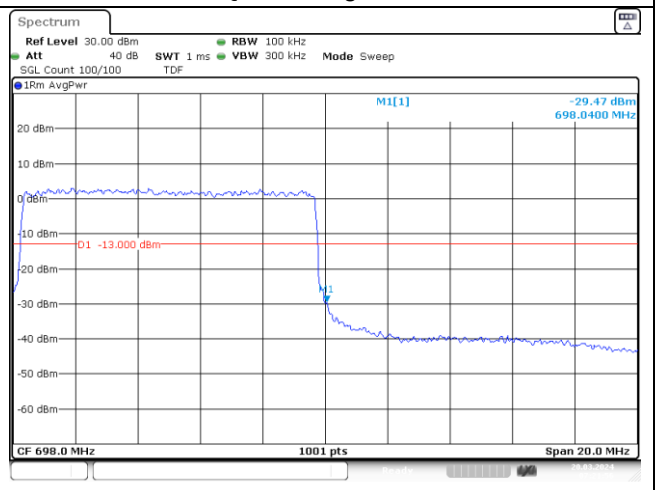
CP-OFDM QPSK - Low Channel - 1 RB



CP-OFDM QPSK - High Channel - 1 RB

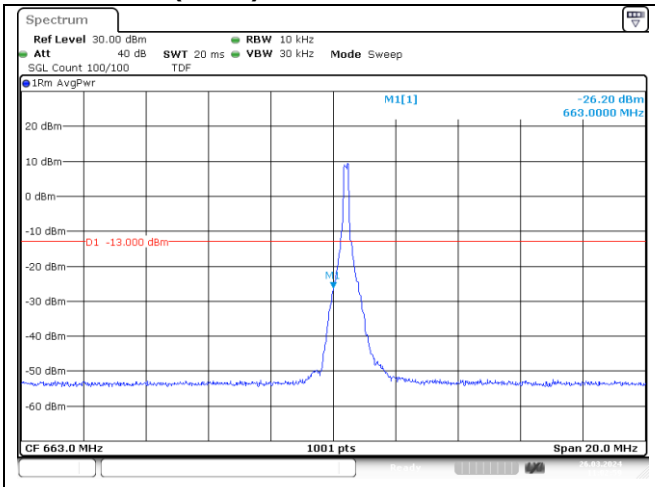


CP-OFDM QPSK - Low Channel - Full RB

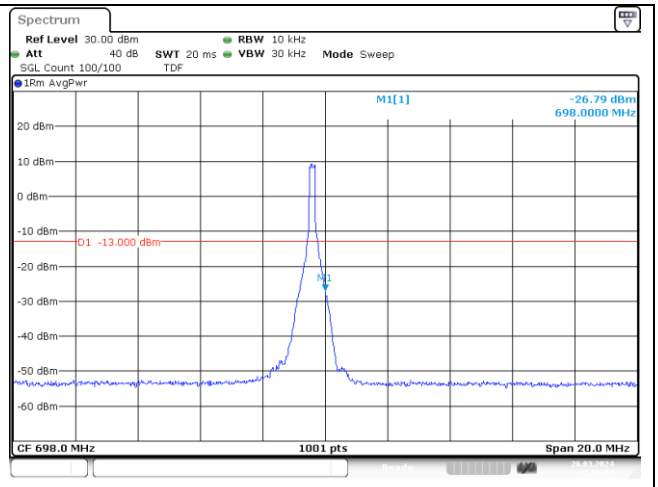


CP-OFDM QPSK - High Channel - Full RB

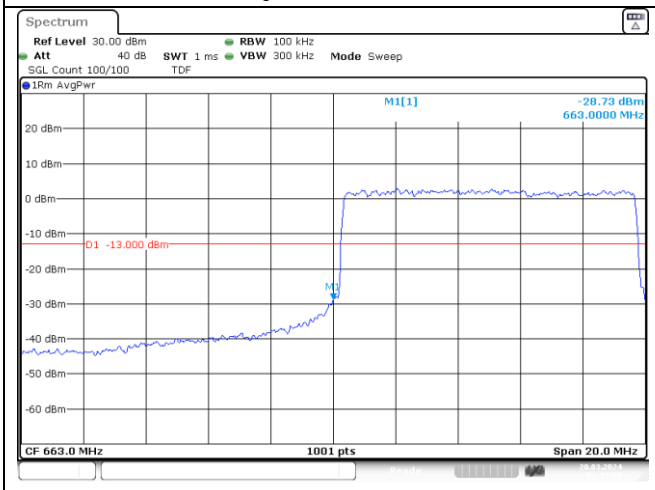
NR band 71 (10 ㎒)



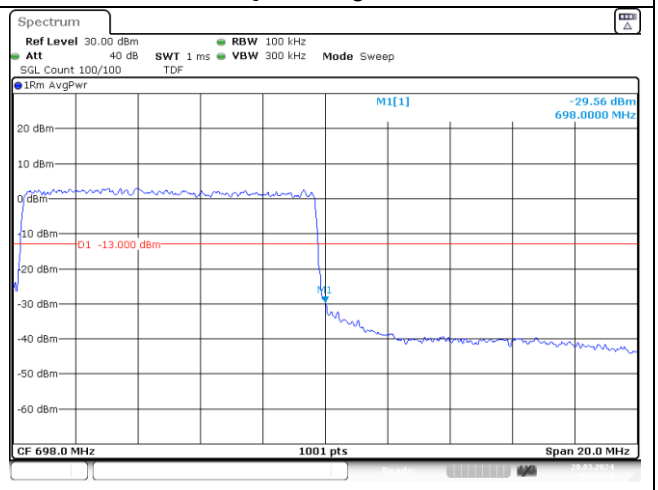
CP-OFDM 16QAM - Low Channel - 1 RB



CP-OFDM 16QAM - High Channel - 1 RB

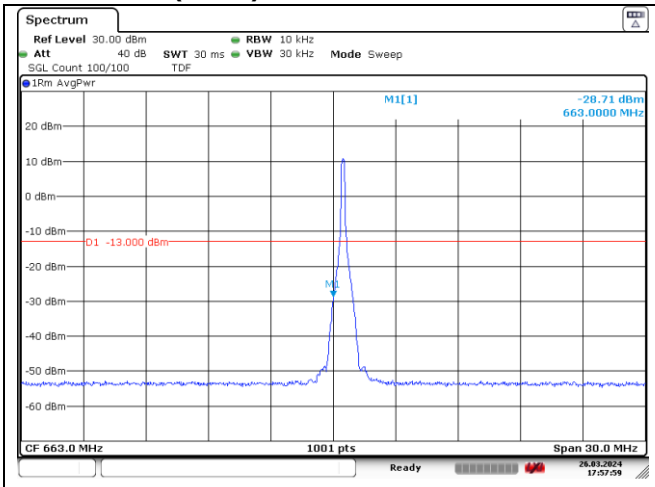


CP-OFDM 16QAM - Low Channel - Full RB

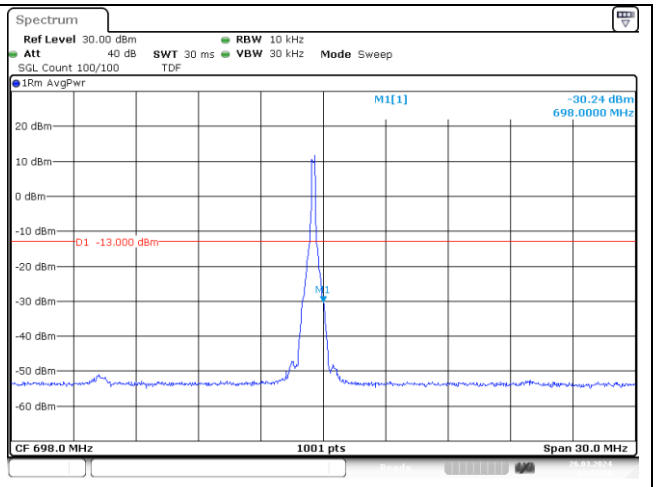


CP-OFDM 16QAM - High Channel - Full RB

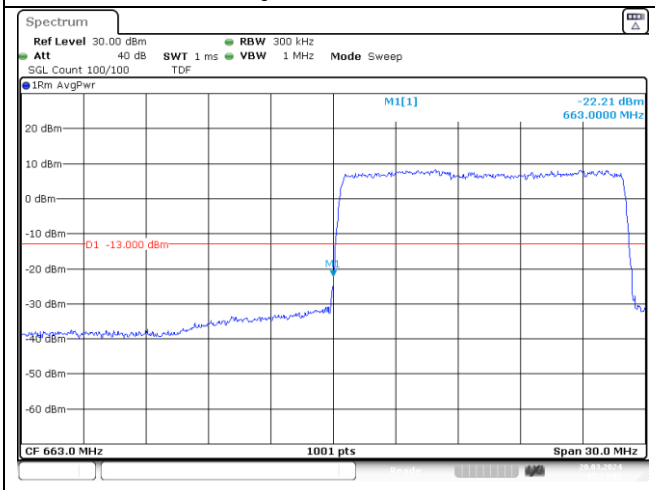
NR band 71 (15 ㎒)



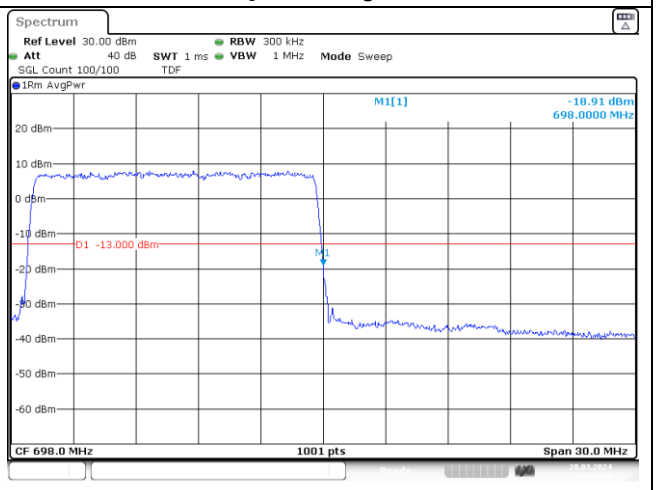
DFT-S-OFDM QPSK - Low Channel - 1 RB



DFT-S-OFDM QPSK - High Channel - 1 RB

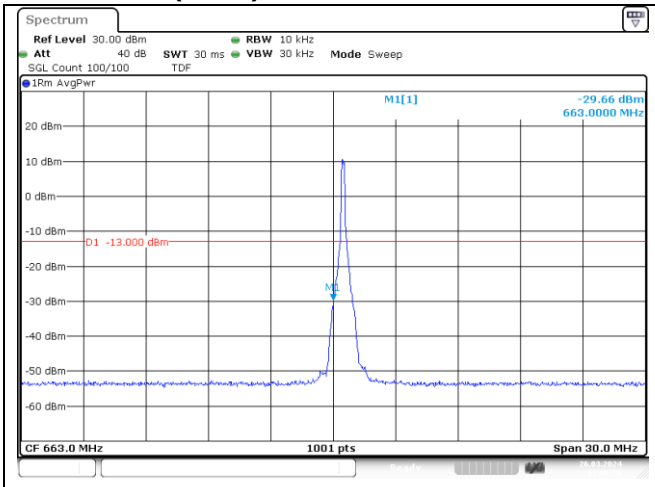


DFT-S-OFDM QPSK - Low Channel - Full RB

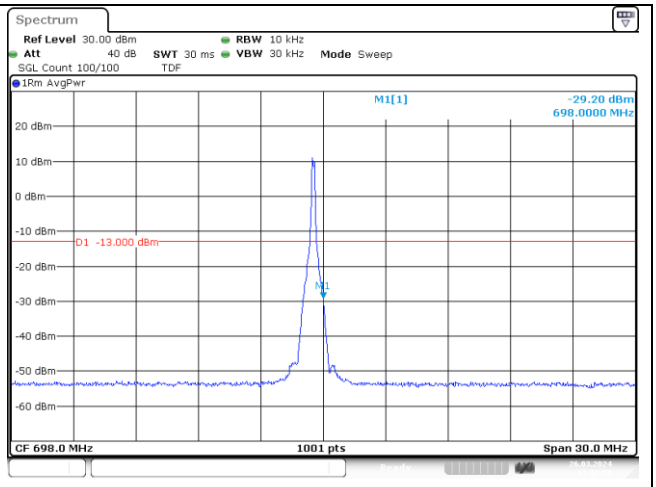


DFT-S-OFDM QPSK - High Channel - Full RB

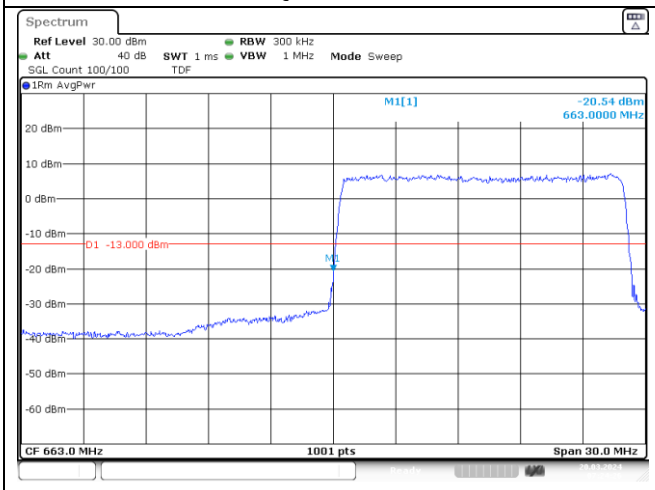
NR band 71 (15 ㎒)



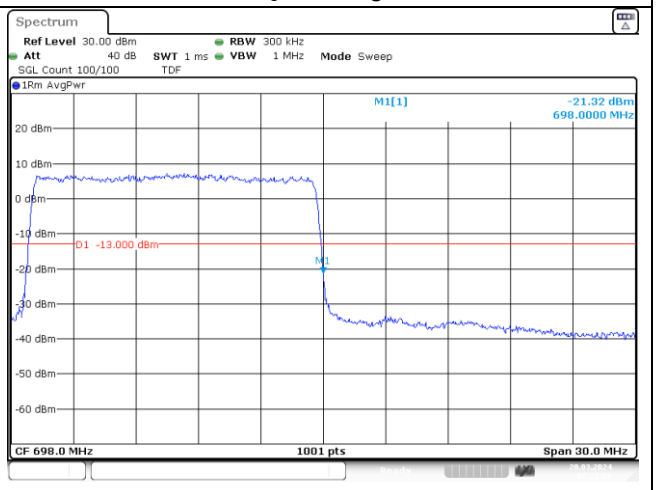
DFT-S-OFDM 16QAM - Low Channel - 1 RB



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

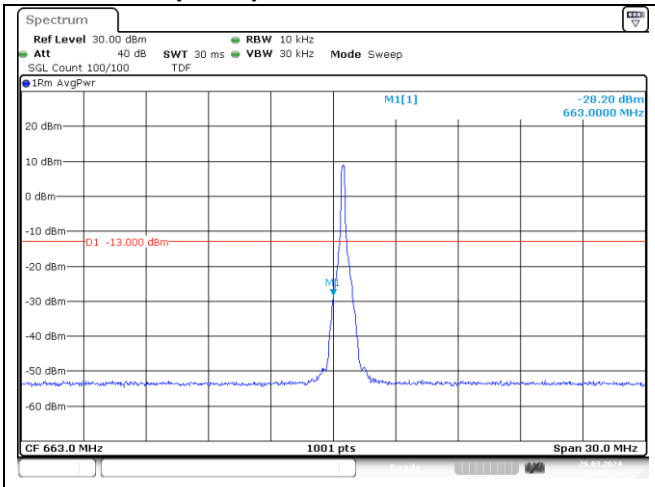


DFT-S-OFDM 16QAM - Low Channel - Full RB

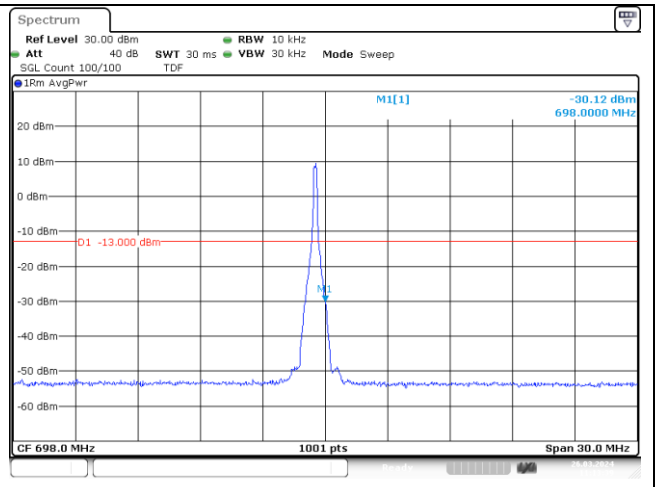


DFT-S-OFDM 16QAM - High Channel - Full RB

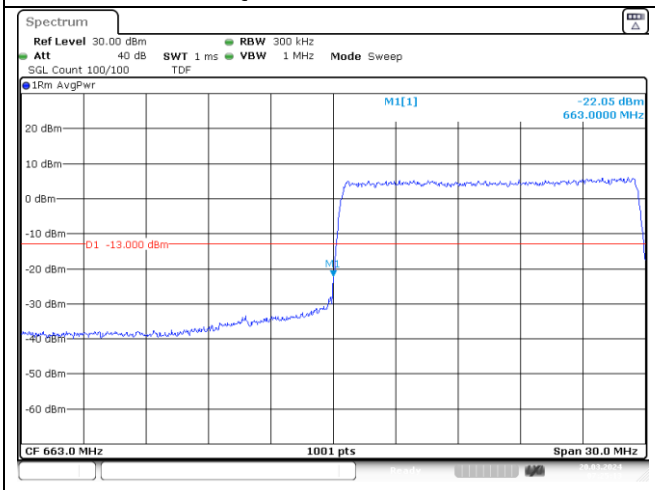
NR band 71 (15 ㎒)



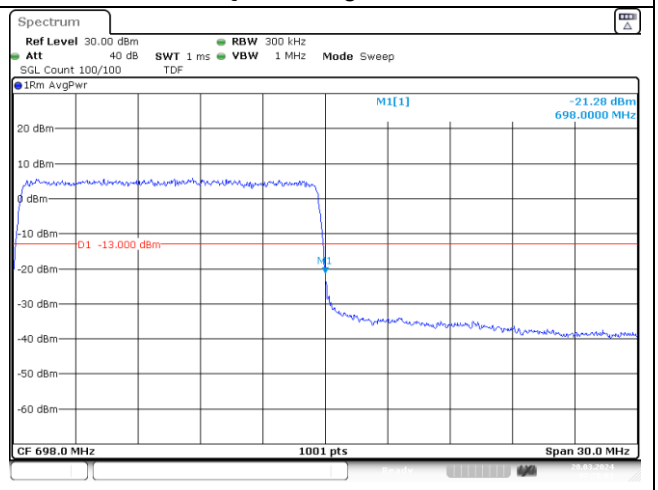
CP-OFDM QPSK - Low Channel - 1 RB



CP-OFDM QPSK - High Channel - 1 RB

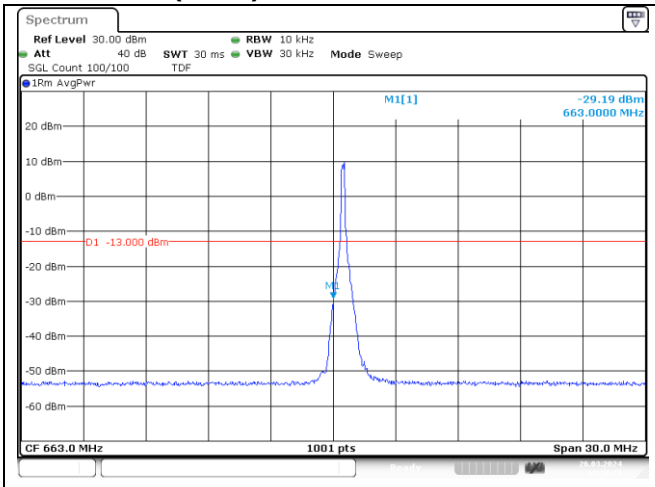


CP-OFDM QPSK - Low Channel - Full RB

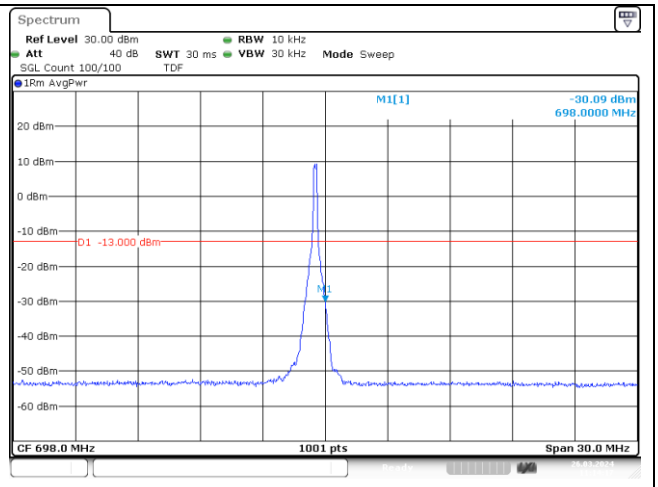


CP-OFDM QPSK - High Channel - Full RB

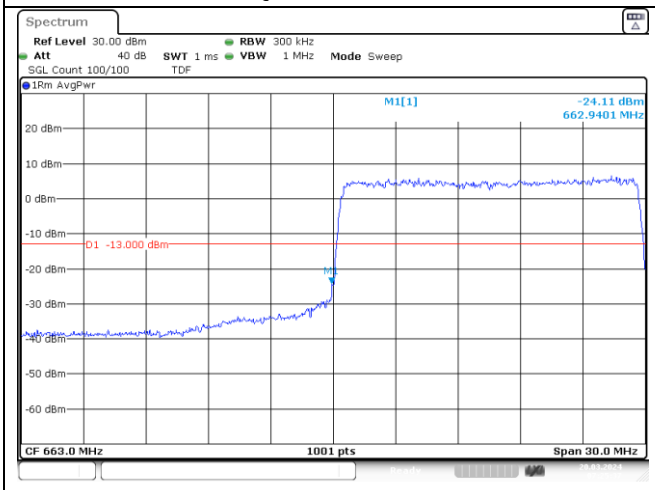
NR band 71 (15 ㎒)



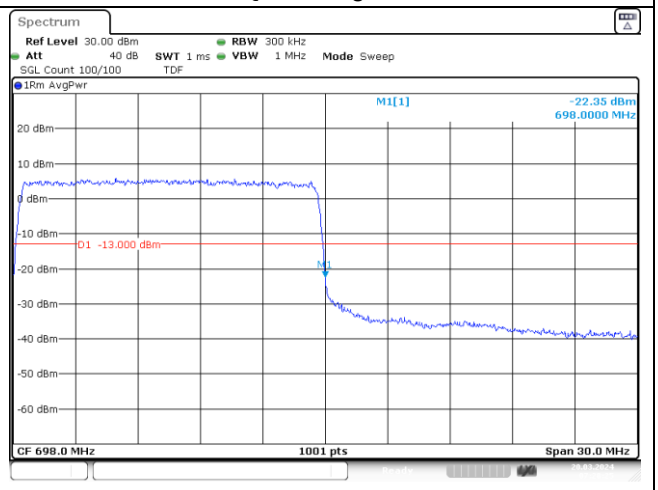
CP-OFDM 16QAM - Low Channel - 1 RB



CP-OFDM 16QAM - High Channel - 1 RB

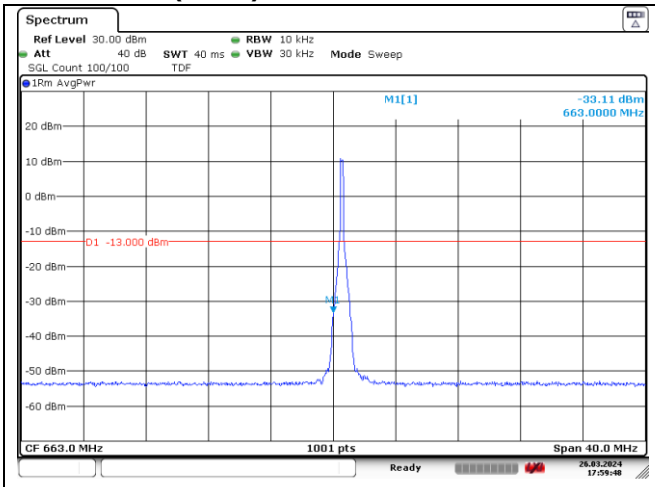


CP-OFDM 16QAM - Low Channel - Full RB

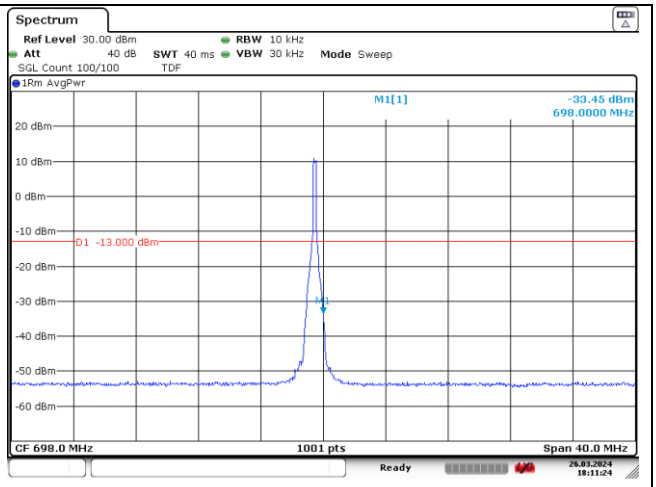


CP-OFDM 16QAM - High Channel - Full RB

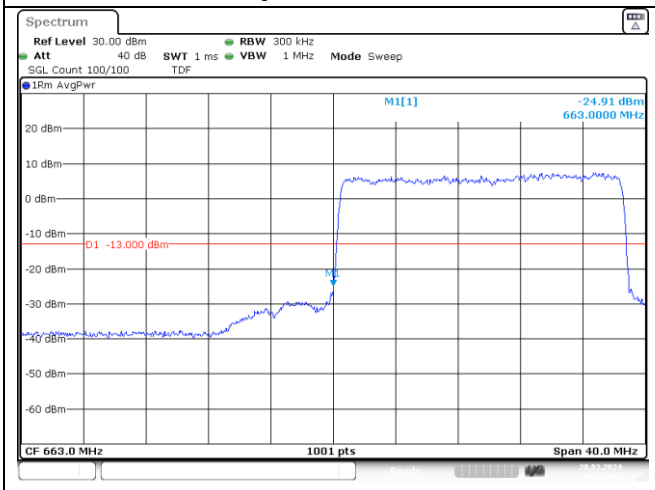
NR band 71 (20 ㎒)



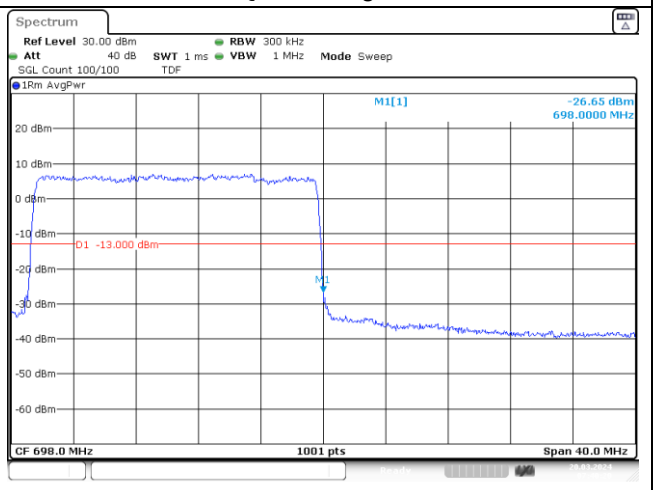
DFT-S-OFDM QPSK - Low Channel - 1 RB



DFT-S-OFDM QPSK - High Channel - 1 RB

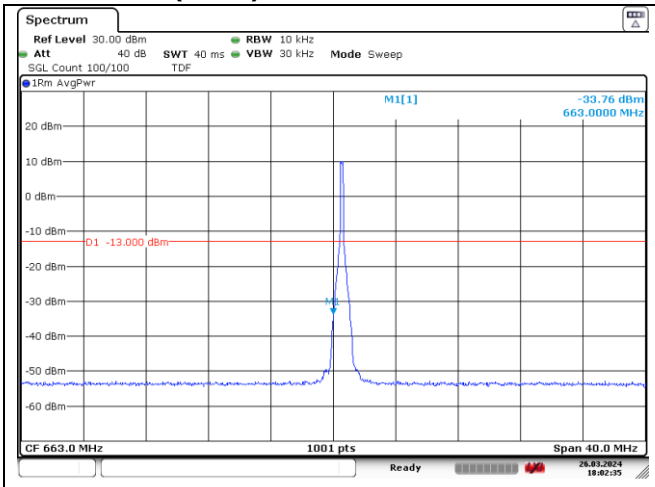


DFT-S-OFDM QPSK - Low Channel - Full RB

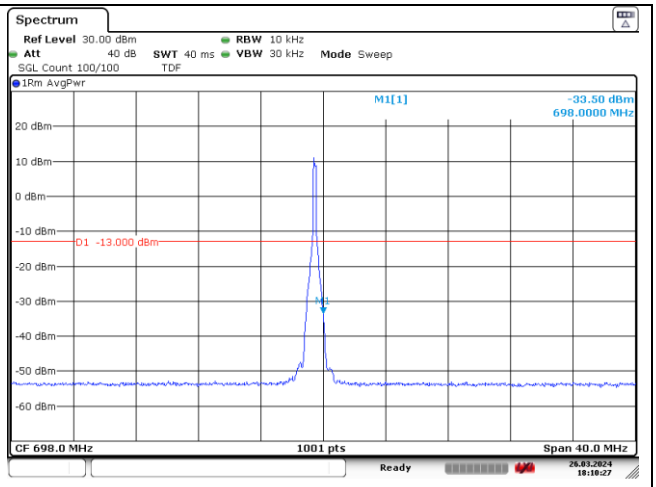


DFT-S-OFDM QPSK - High Channel - Full RB

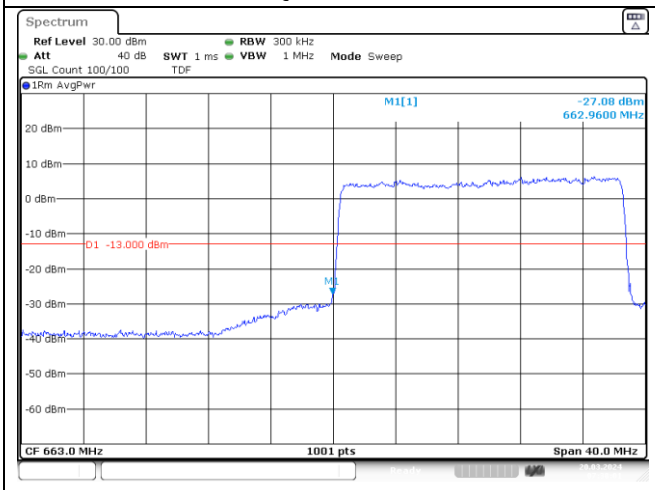
NR band 71 (20 ㎒)



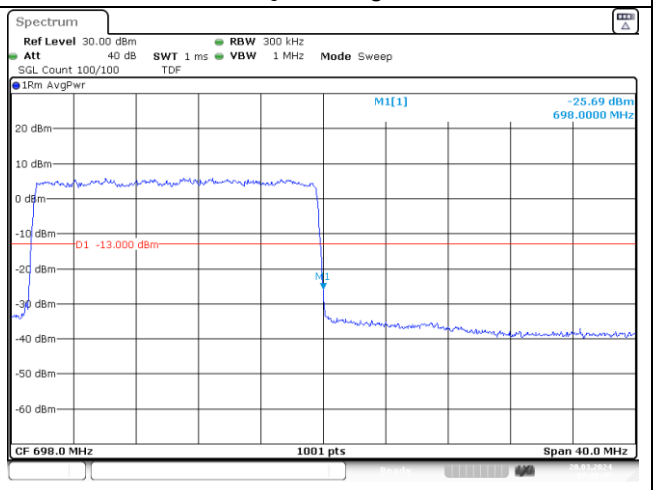
DFT-S-OFDM 16QAM - Low Channel - 1 RB



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

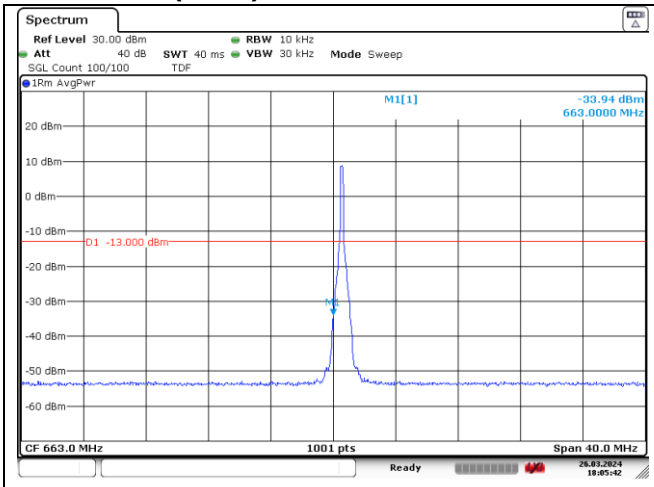


DFT-S-OFDM 16QAM - Low Channel - Full RB

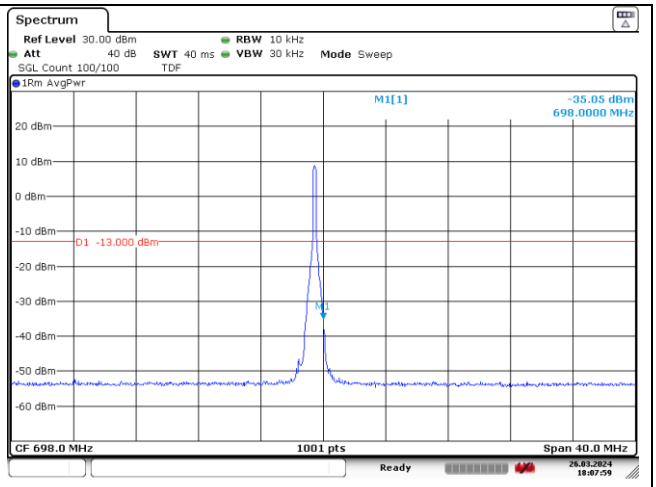


DFT-S-OFDM 16QAM - High Channel - Full RB

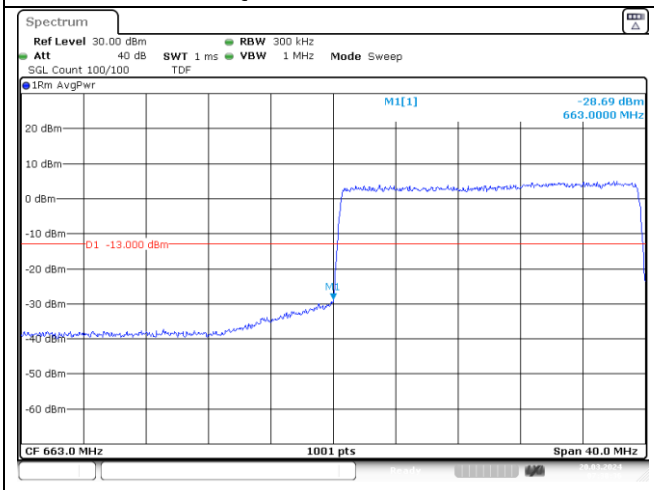
NR band 71 (20 ㎒)



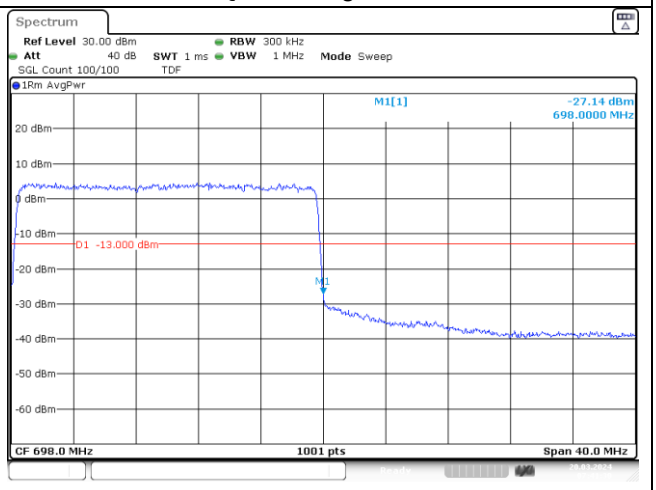
CP-OFDM QPSK - Low Channel - 1 RB



CP-OFDM QPSK - High Channel - 1 RB

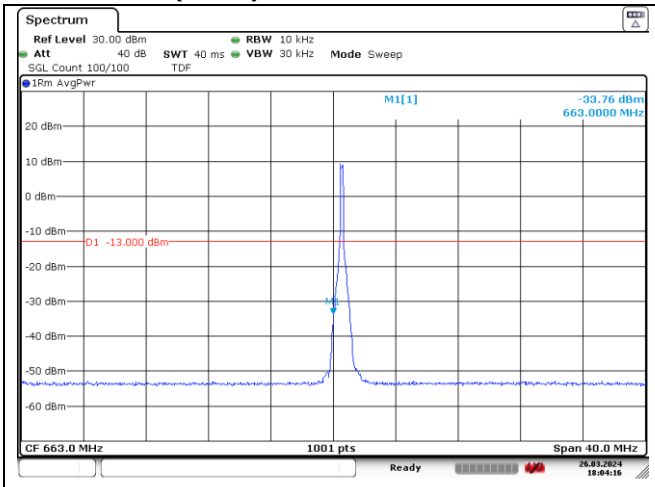


CP-OFDM QPSK - Low Channel - Full RB

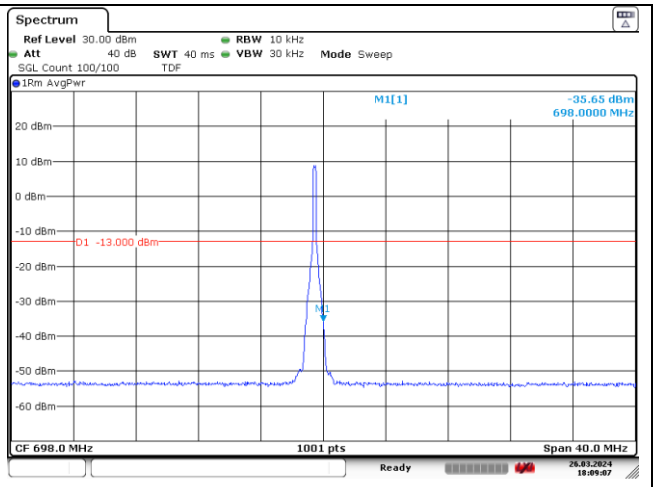


CP-OFDM QPSK - High Channel - Full RB

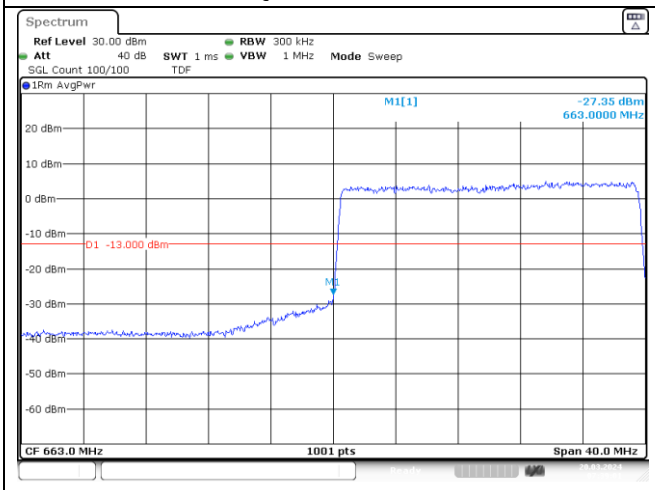
NR band 71 (20 ㎒)



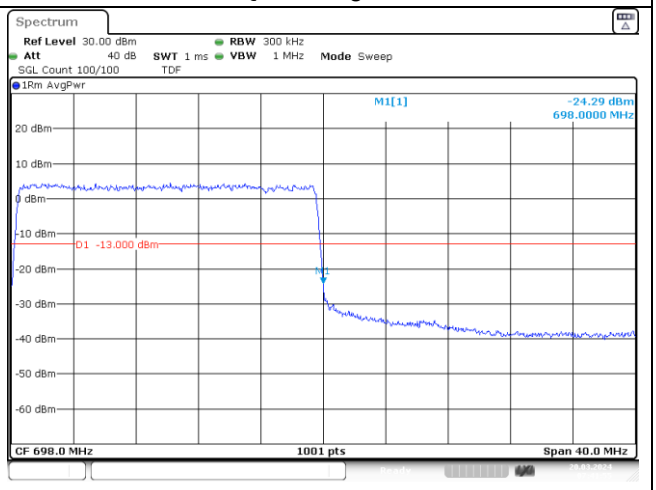
CP-OFDM 16QAM - Low Channel - 1 RB



CP-OFDM 16QAM - High Channel - 1 RB



CP-OFDM 16QAM - Low Channel - Full RB



CP-OFDM 16QAM - High Channel - Full RB

8. Frequency Stability

8.1. Limit

FCC
- § 2.1055 (a), § 2.1055 (d) & following:

- §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table of this section.
For Mobile devices operating in the 824 to 849 ㎒ band at a power level less than or equal to 3 Watts, the limit specified in Table C-1 is +/- 2.5 ppm.

- §24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

- §27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

IC
- RSS-Gen Issue 5
6.11, for licensed devices, the following measurement conditions apply:
a. at the temperatures of -30°C (-22°F), +20°C (+68°F) and +50°C (+122°F), and at the manufacturer's rated supply voltage

- RSS-130 Issue 2
4.5, the transmitter frequency stability limit shall be determined as follows:

For equipment that is capable of transmitting numerous channels simultaneously for different applications (e.g. LTE and narrowband – internet of things (IoT)), the occupied bandwidth shall be the bandwidth representing the sum of the occupied bandwidths of these channels.

The frequency stability shall be sufficient to ensure that the occupied bandwidth remains within each frequency block range when tested at the temperature and supply voltage variations specified in RSS-Gen.

- RSS-132 Issue 4
5.3, the frequency stability shall be sufficient to ensure that the occupied bandwidth stays within each of the sub-bands when tested at the temperature and supply voltage variations specified in RSS-Gen.

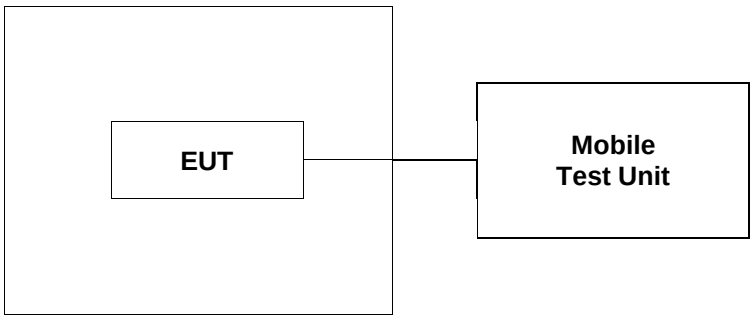
- RSS-133 Issue 6
6.3, the carrier frequency shall not depart from the reference frequency, in excess of ±2.5 ppm for mobile stations and ±1.0 ppm for base stations.

- RSS-139 Issue 4
5.4, the frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block or frequency block group when tested to the temperature and supply voltage variations specified in RSS-Gen.

- RSS-199 Issue 4
5.4, the frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block or frequency block group when tested to the temperature and supply voltage variations specified in RSS-Gen.

8.2. Test Procedure

1. Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a Mobile Test Unit via feed-through attenuators.
2. The EUT was placed inside the temperature chamber.
3. After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from Mobile Test Unit.



Temperature Chamber

8.3. Test Results

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

NR band 25/2 at middle channel

Reference Frequency: 1 882.5 ㎒			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	4.10	8.20	0.008 50
40		-1.50	0.003 35
30		9.00	0.008 92
20(Ref.)		-7.80	-
10		3.90	0.006 22
0		-3.60	0.002 23
-10		2.50	0.005 47
-20		1.60	0.004 99
-30		-6.20	0.000 85
Frequency Stability versus Power Supply			
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
20	3.49 (85%)	-4.30	0.001 86
	4.72 (115%)	6.80	0.007 76

NR band 5 at middle channel

Reference Frequency: 836.5 ㎒			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	4.10	12.20	0.030 36
40		0.40	0.016 26
30		-14.70	-0.001 79
20(Ref.)		-13.20	-
10		0.40	0.016 26
0		8.50	0.025 94
-10		1.40	0.017 45
-20		5.60	0.022 47
-30		-8.30	0.005 86
Frequency Stability versus Power Supply			
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
20	3.49 (85%)	-4.70	0.010 16
	4.72 (115%)	0.40	0.016 26

NR band 7 at middle channel

Reference Frequency: 2 535 ㎒			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	4.10	-2.90	0.000 75
40		-8.70	-0.001 54
30		1.40	0.002 45
20(Ref.)		-4.80	-
10		11.20	0.006 31
0		-0.30	0.001 78
-10		-4.90	-0.000 04
-20		5.10	0.003 91
-30		-5.90	-0.000 43
Frequency Stability versus Power Supply			
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
20	3.49 (85%)	1.30	0.002 41
	4.72 (115%)	6.80	0.004 58

NR band 12 at middle channel

Reference Frequency: 707.5 ㎒			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	4.10	2.90	0.009 47
40		-0.90	0.004 10
30		-5.90	-0.002 97
20(Ref.)		-3.80	-
10		11.80	0.022 05
0		-7.00	-0.004 52
-10		-2.80	0.001 41
-20		1.30	0.007 21
-30		8.10	0.016 82
Frequency Stability versus Power Supply			
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
20	3.49 (85%)	-6.30	-0.003 53
	4.72 (115%)	2.40	0.008 76

NR band 66 at middle channel

Reference Frequency: 1 745.0 ㎒			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	4.10	-6.00	-0.005 67
40		-8.40	-0.007 05
30		10.50	0.003 78
20(Ref.)		3.90	-
10		1.60	-0.001 32
0		8.60	0.002 69
-10		1.10	-0.001 60
-20		11.90	0.004 58
-30		2.20	-0.000 97
Frequency Stability versus Power Supply			
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
20	3.49 (85%)	11.50	0.004 36
	4.72 (115%)	7.40	0.002 01

NR band 71 at middle channel

Reference Frequency: 680.5 ㎒			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	4.10	-10.30	-0.013 96
40		-6.40	-0.008 23
30		-4.30	-0.005 14
20(Ref.)		-0.80	-
10		2.00	0.004 11
0		0.60	0.002 06
-10		-3.30	-0.003 67
-20		8.00	0.012 93
-30		-2.40	-0.002 35
Frequency Stability versus Power Supply			
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
20	3.49 (85%)	2.70	0.005 14
	4.72 (115%)	8.90	0.014 25

- End of the Test Report -