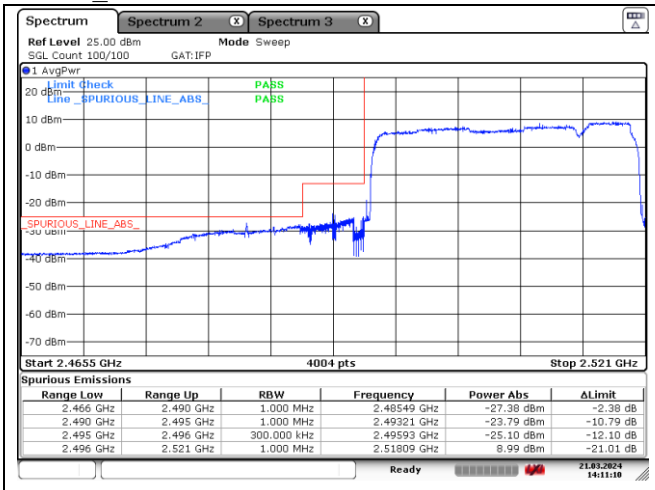
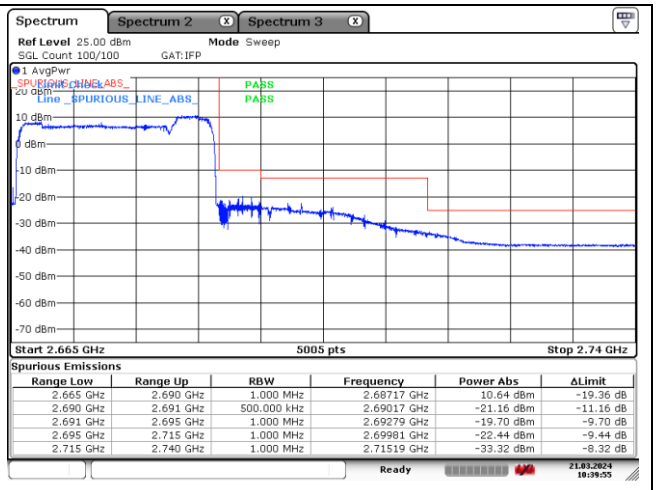
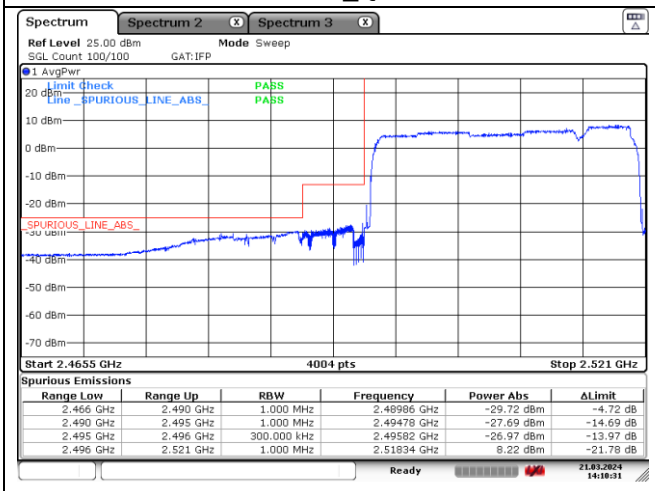
ULCA_41C



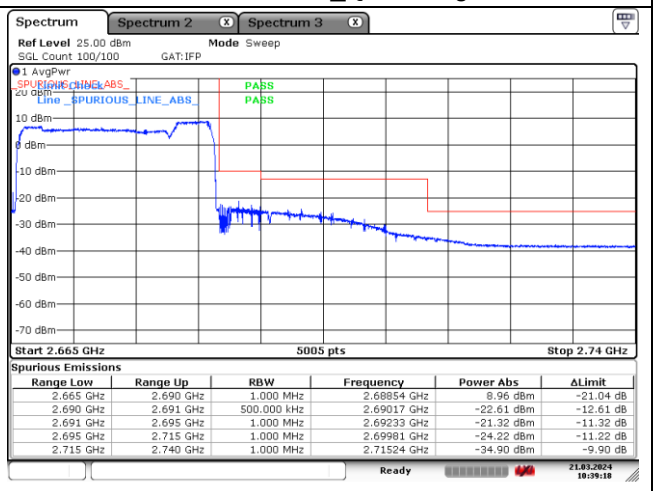
PCC 20 ㎒ + SCC 5 ㎒_QPSK-Low Channel



PCC 20 ㎒ + SCC 5 ㎒_QPSK-High Channel

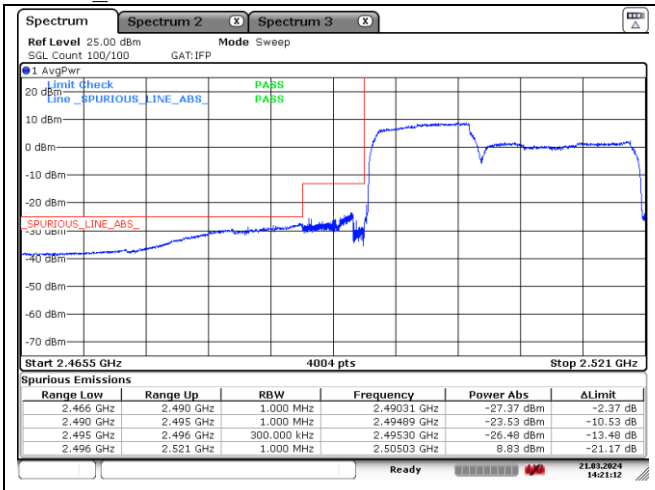


PCC 20 ㎒ + SCC 5 ㎒_16QAM-Low Channel

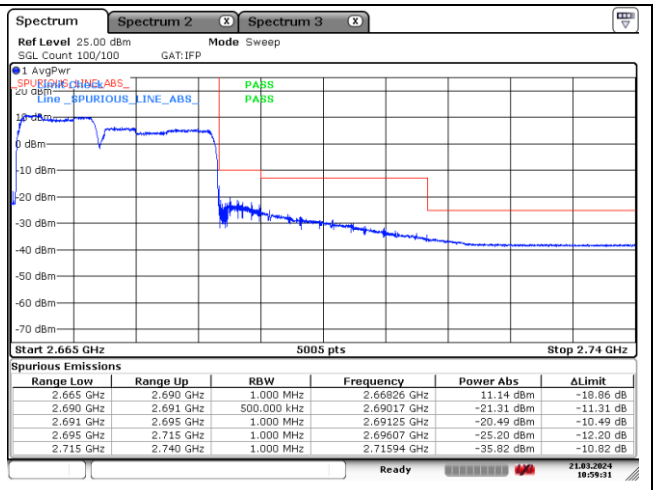


PCC 20 ㎒ + SCC 5 ㎒_16QAM-High Channel

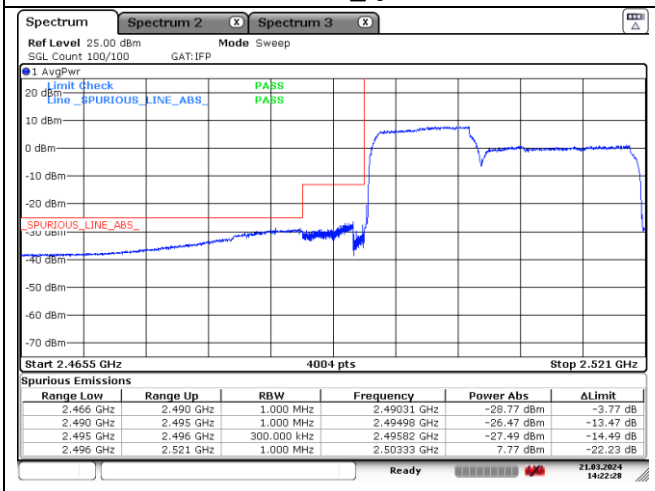
ULCA_41C



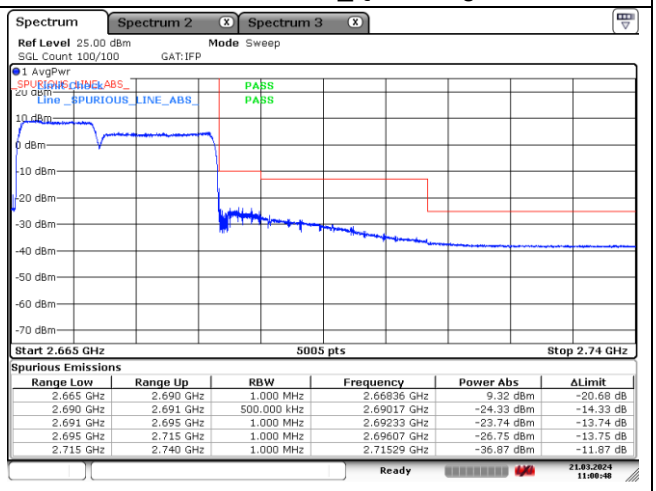
PCC 10 ㎒ + SCC 15 ㎒_QPSK-Low Channel



PCC 10 ㎒ + SCC 15 ㎒_QPSK-High Channel

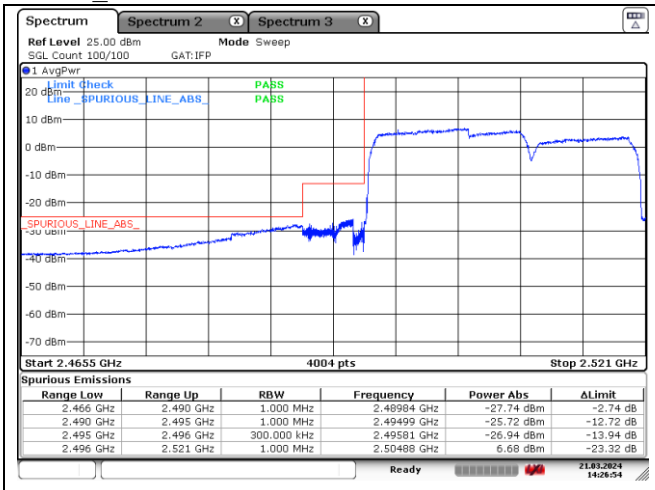


PCC 10 ㎒ + SCC 15 ㎒_16QAM-Low Channel

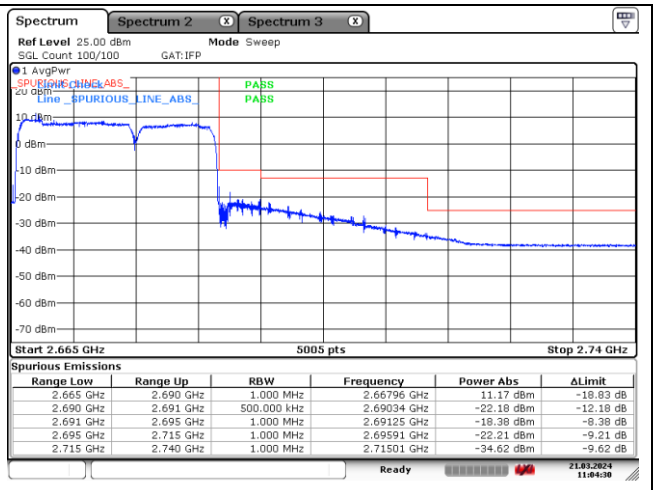


PCC 10 ㎒ + SCC 15 ㎒_16QAM-High Channel

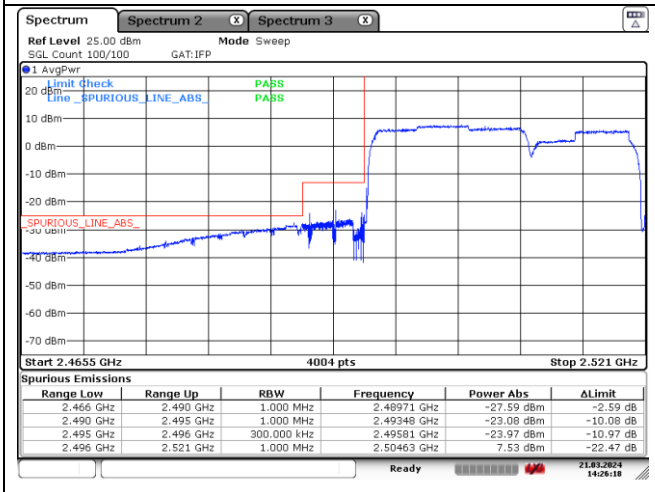
ULCA_41C



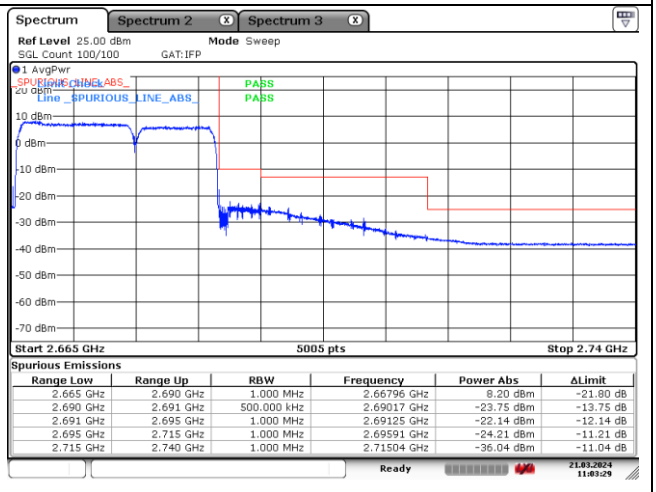
PCC 15 ㎒ + SCC 10 ㎒_QPSK-Low Channel



PCC 15 ㎒ + SCC 10 ㎒_QPSK-High Channel

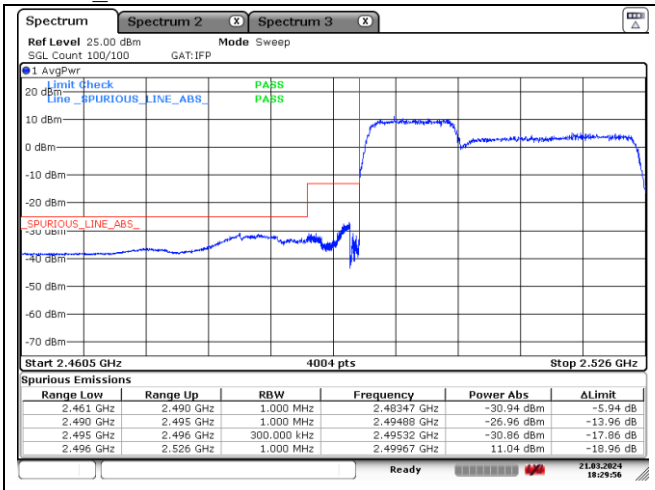


PCC 15 ㎒ + SCC 10 ㎒_16QAM-Low Channel

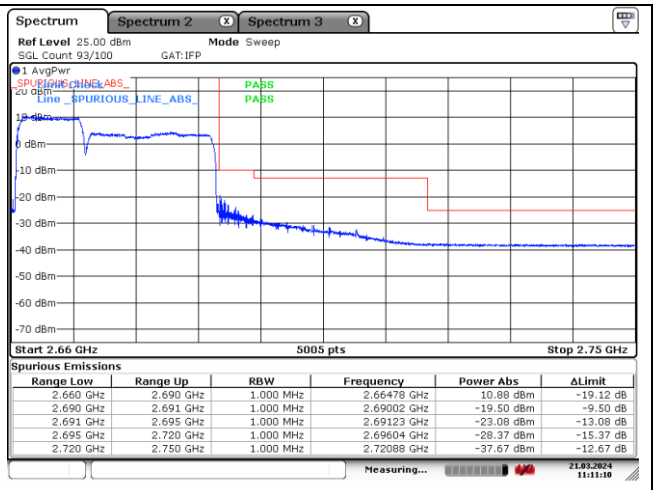


PCC 15 ㎒ + SCC 10 ㎒_16QAM-High Channel

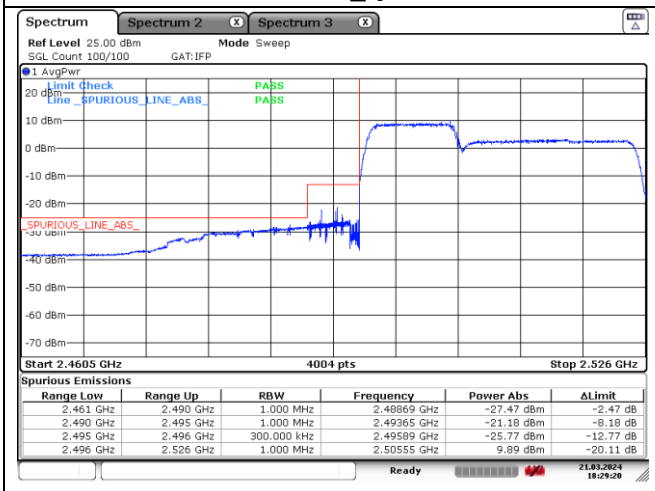
ULCA_41C



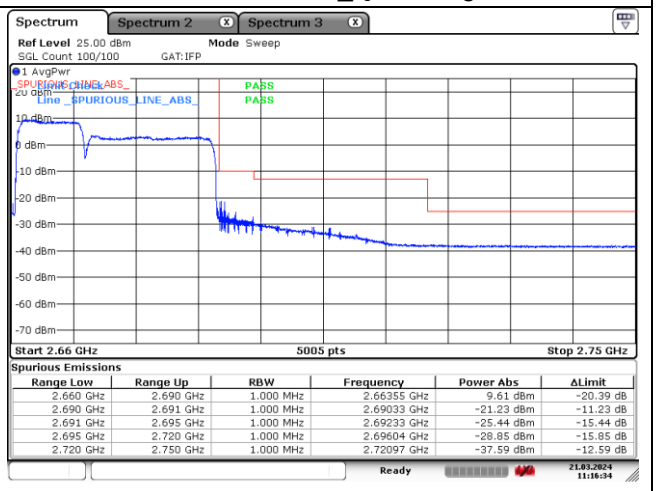
PCC 10 ㎒ + SCC 20 ㎒_QPSK-Low Channel



PCC 10 ㎒ + SCC 20 ㎒_QPSK-High Channel

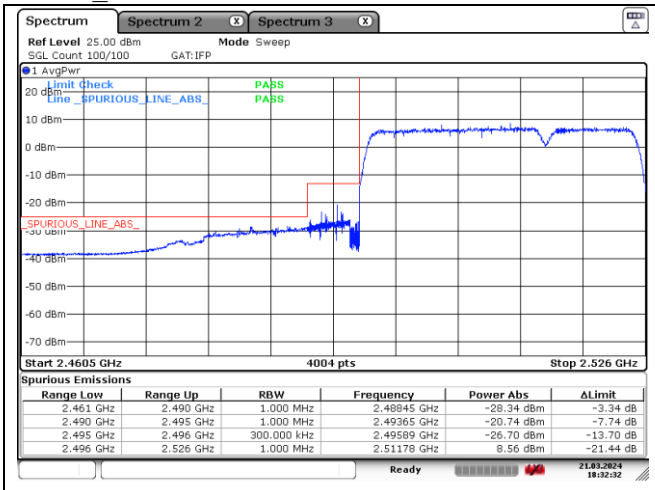


PCC 10 ㎒ + SCC 20 ㎒_16QAM-Low Channel

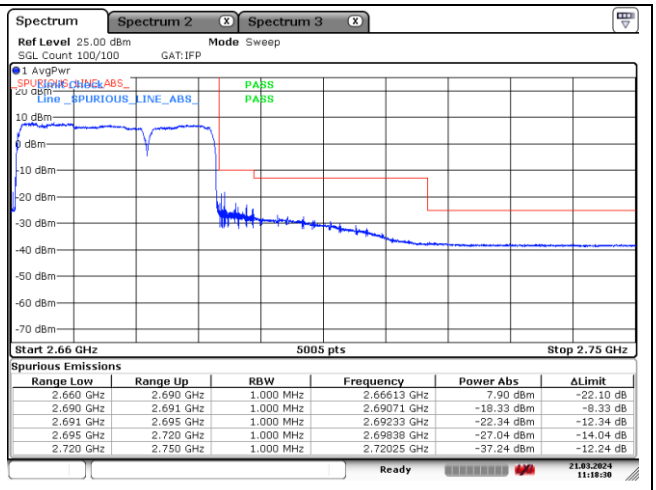


PCC 10 ㎒ + SCC 20 ㎒_16QAM-High Channel

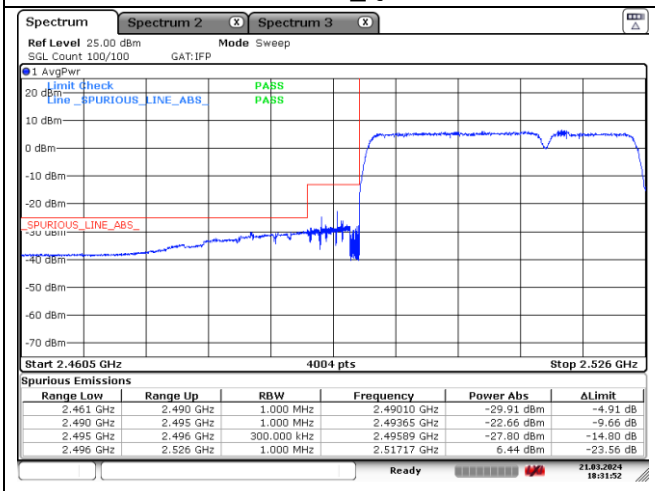
ULCA_41C



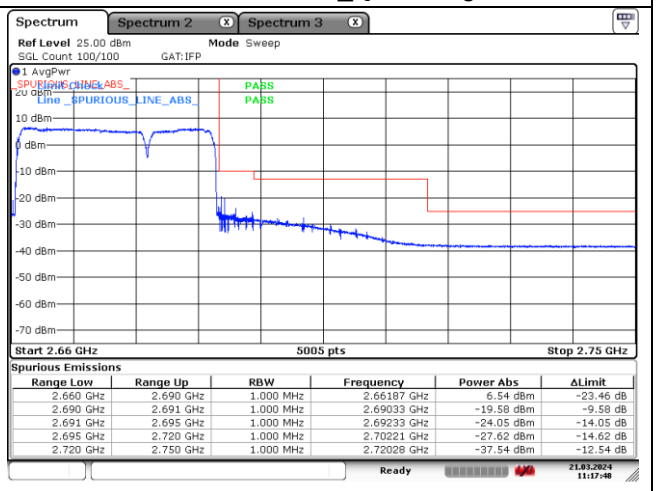
PCC 20 ㎒ + SCC 10 ㎒_QPSK-Low Channel



PCC 20 ㎒ + SCC 10 ㎒_QPSK-High Channel

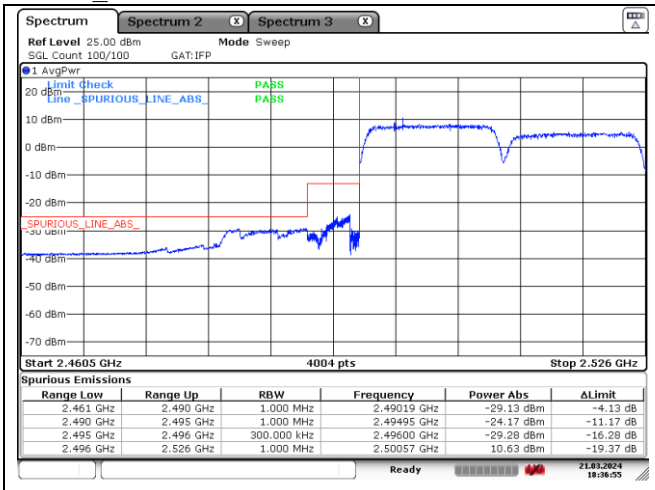


PCC 20 ㎒ + SCC 10 ㎒_16QAM-Low Channel

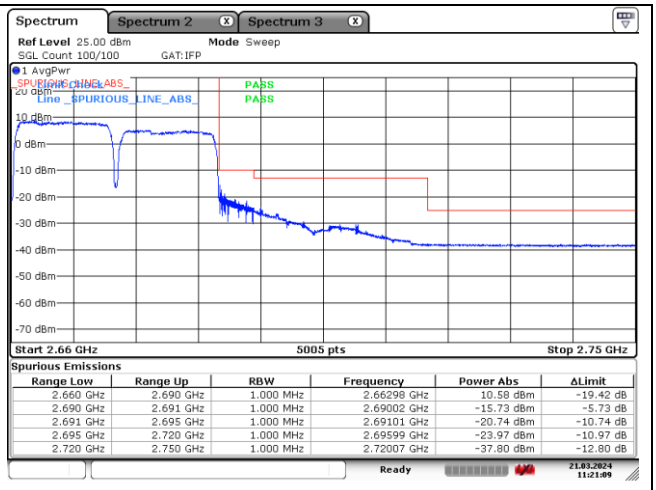


PCC 20 ㎒ + SCC 10 ㎒_16QAM-High Channel

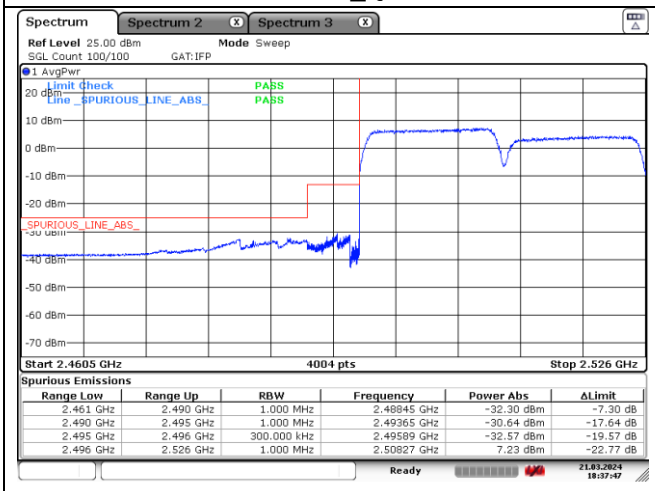
ULCA_41C



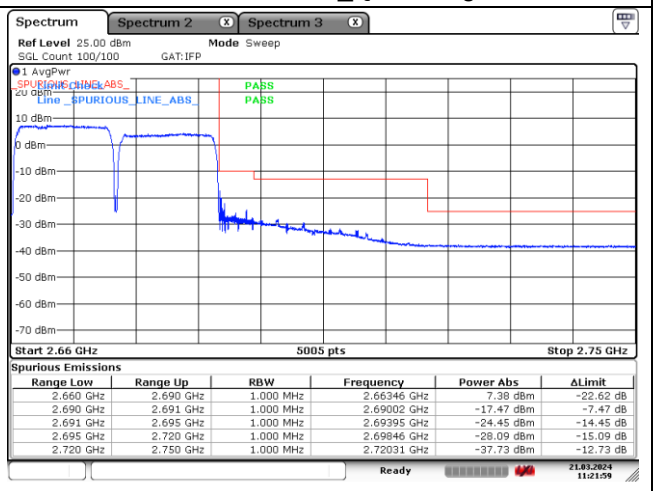
PCC 15 ㎒ + SCC 15 ㎒_QPSK-Low Channel



PCC 15 ㎒ + SCC 15 ㎒_QPSK-High Channel

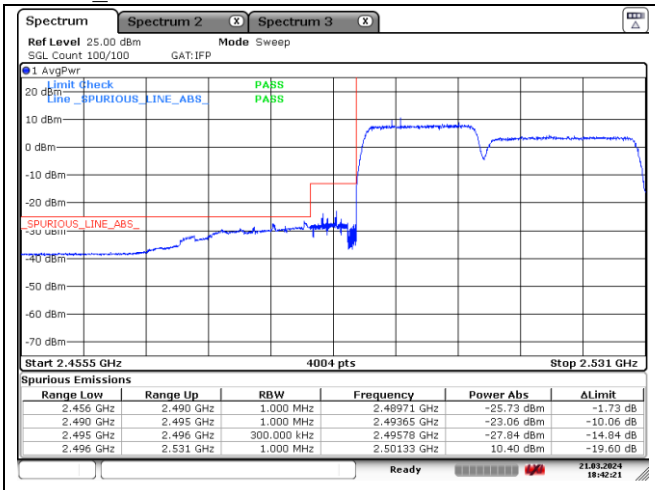


PCC 15 ㎒ + SCC 15 ㎒_16QAM-Low Channel

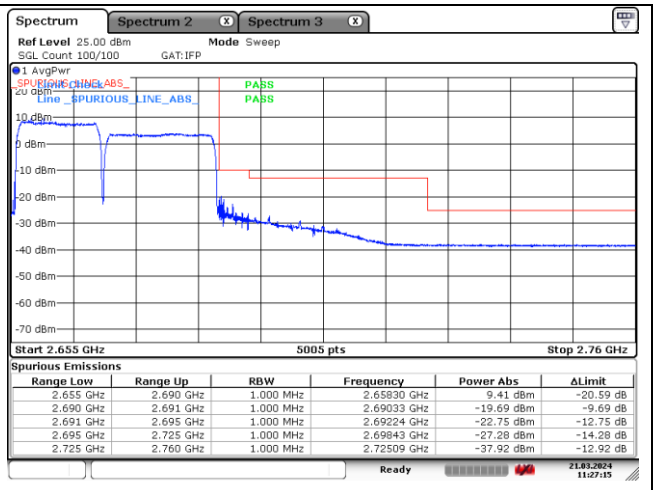


PCC 15 ㎒ + SCC 15 ㎒_16QAM-High Channel

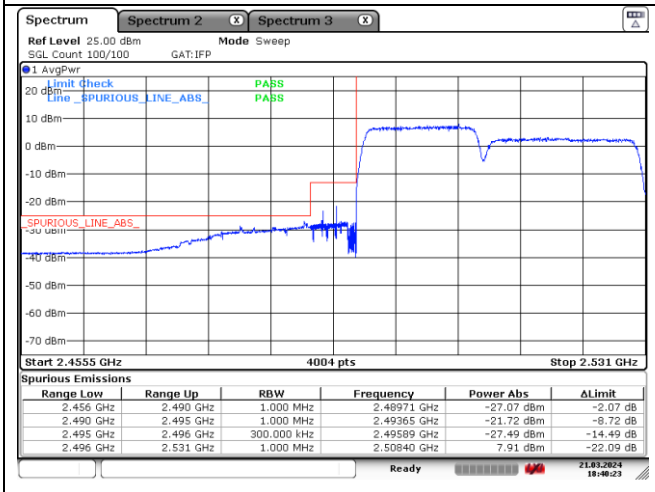
ULCA_41C



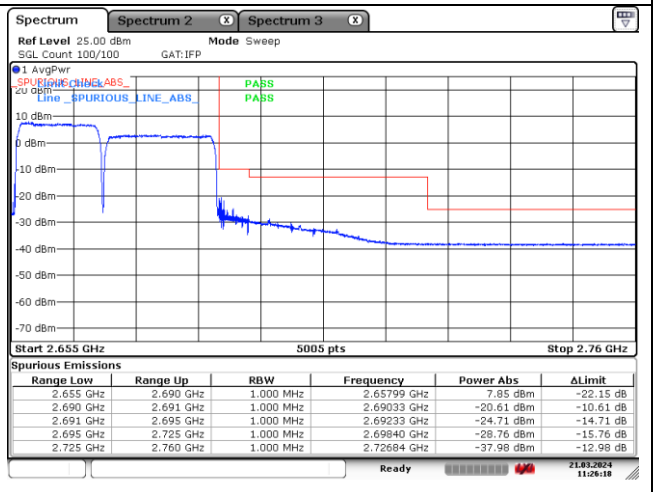
PCC 15 ㎒ + SCC 20 ㎒_QPSK-Low Channel



PCC 15 ㎒ + SCC 20 ㎒_QPSK-High Channel

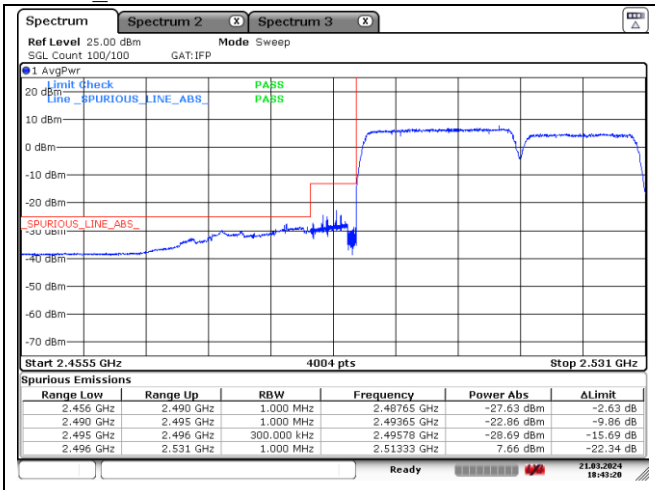


PCC 15 ㎒ + SCC 20 ㎒_16QAM-Low Channel

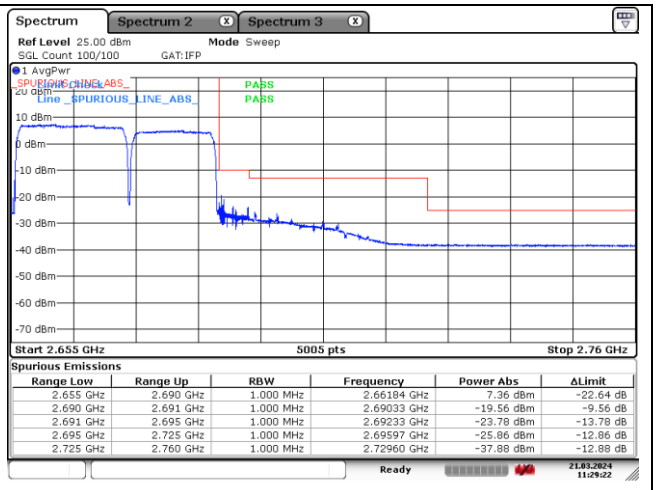


PCC 15 ㎒ + SCC 20 ㎒_16QAM-High Channel

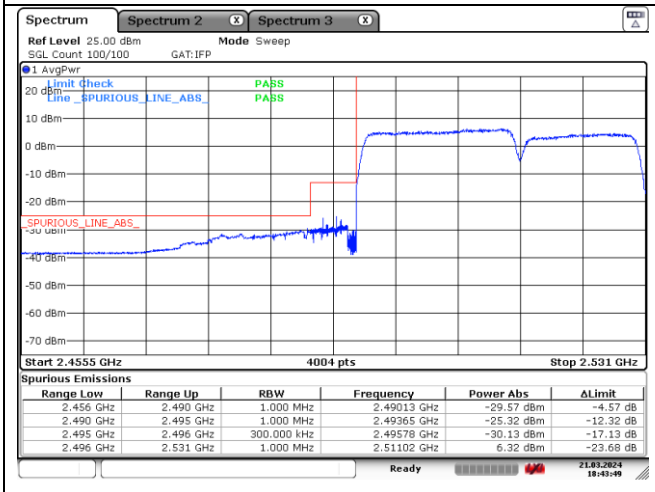
ULCA_41C



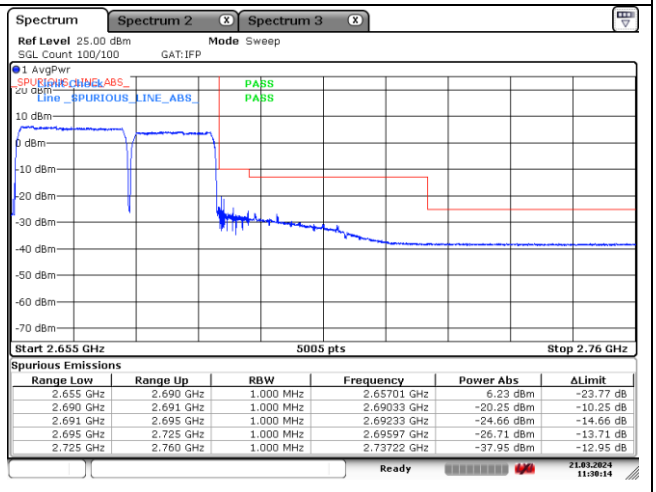
PCC 20 ㎒ + SCC 15 ㎒_QPSK-Low Channel



PCC 20 ㎒ + SCC 15 ㎒_QPSK-High Channel

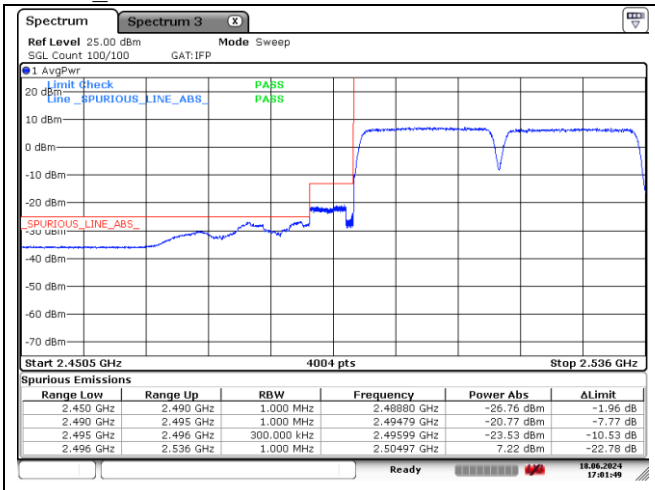


PCC 20 ㎒ + SCC 15 ㎒_16QAM-Low Channel

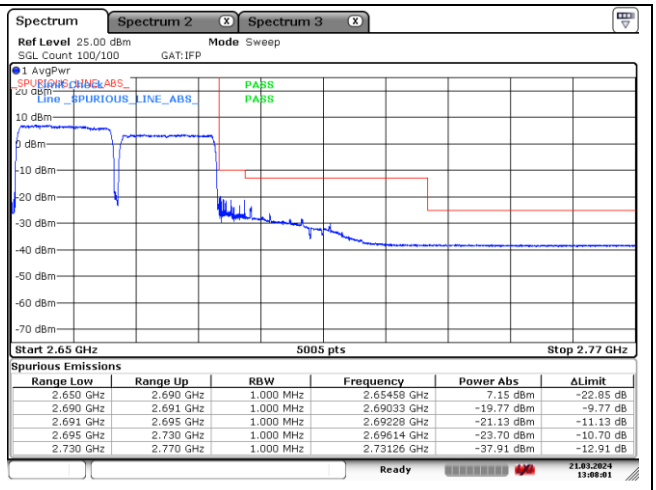


PCC 20 ㎒ + SCC 15 ㎒_16QAM-High Channel

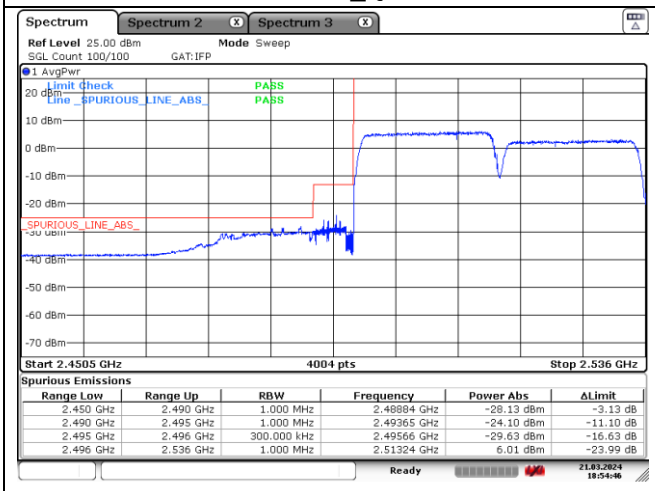
ULCA_41C



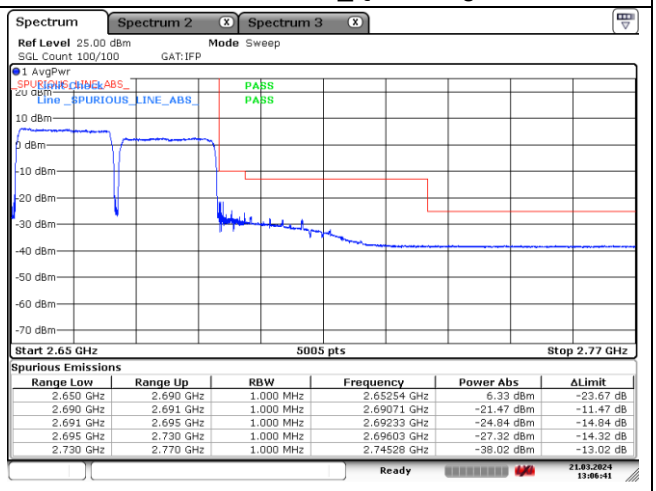
PCC 20 ㎒ + SCC 20 ㎒_QPSK-Low Channel



PCC 20 ㎒ + SCC 20 ㎒_QPSK-High Channel

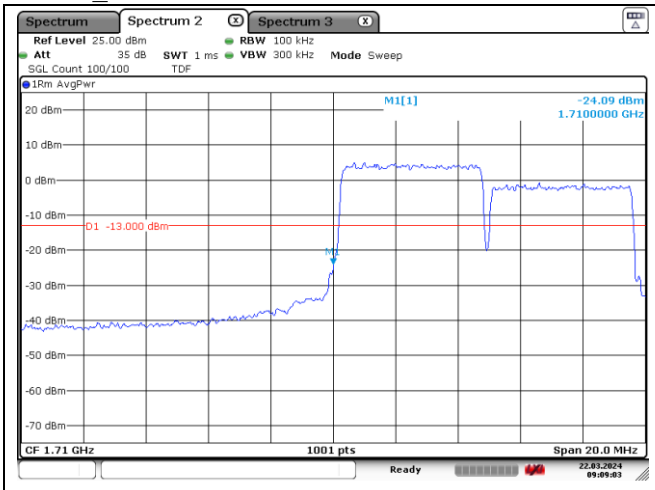


PCC 20 ㎒ + SCC 20 ㎒_16QAM-Low Channel

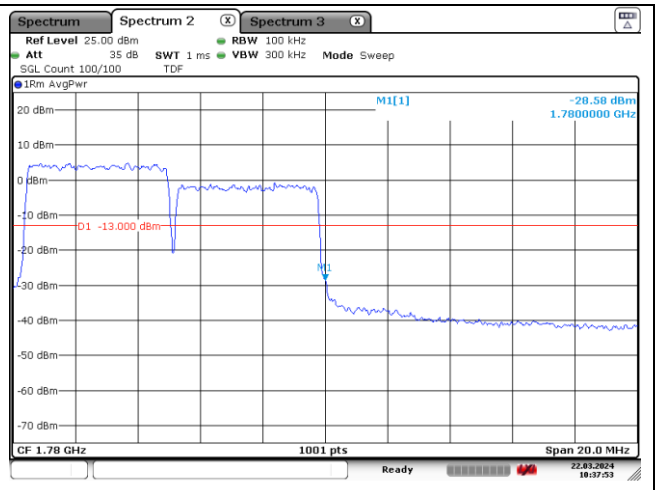


PCC 20 ㎒ + SCC 20 ㎒_16QAM-High Channel

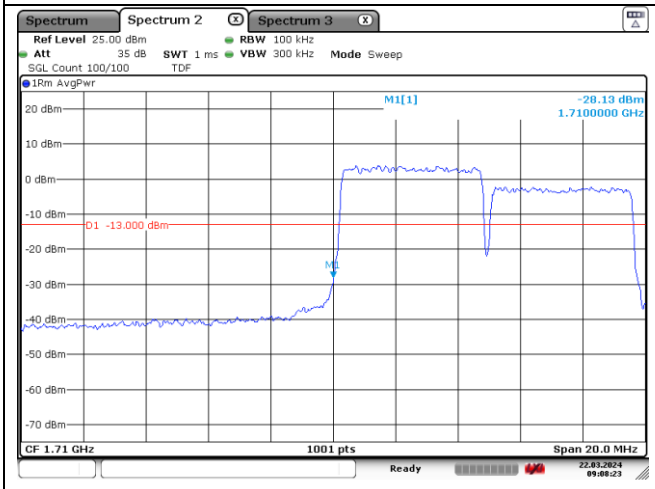
ULCA_66B



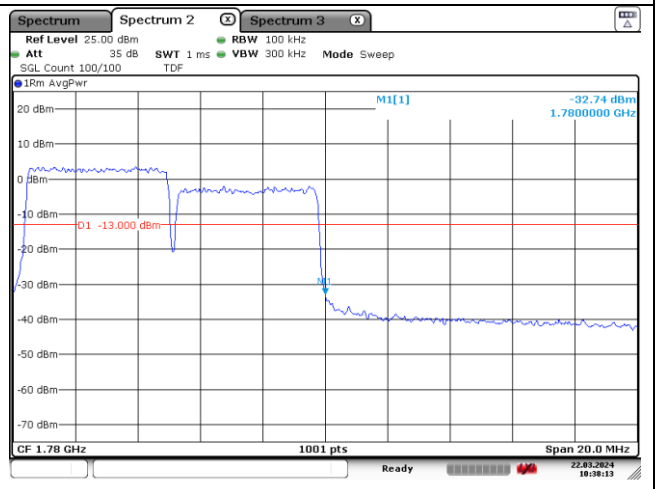
PCC 5 ㎒ + SCC 5 ㎒_QPSK-Low Channel



PCC 5 ㎒ + SCC 5 ㎒_QPSK-High Channel

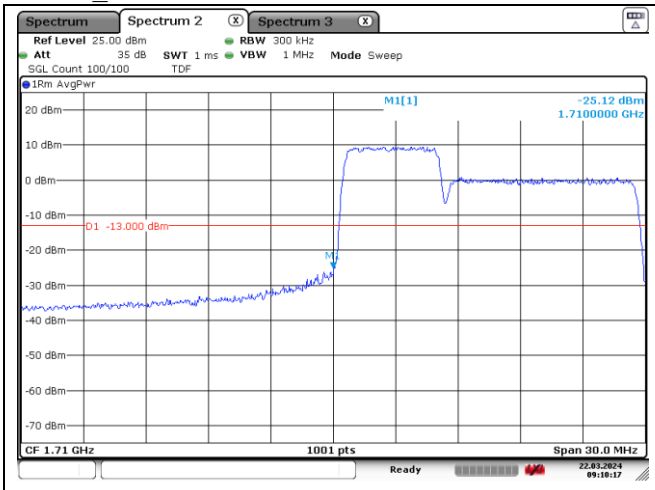


PCC 5 ㎒ + SCC 5 ㎒_16QAM-Low Channel

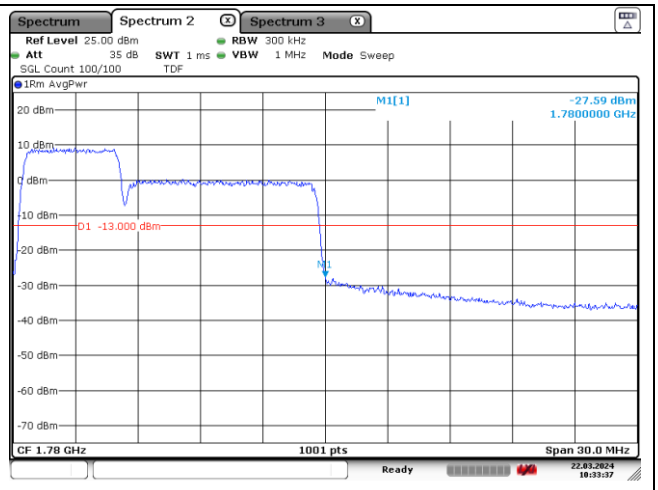


PCC 5 ㎒ + SCC 5 ㎒_16QAM-High Channel

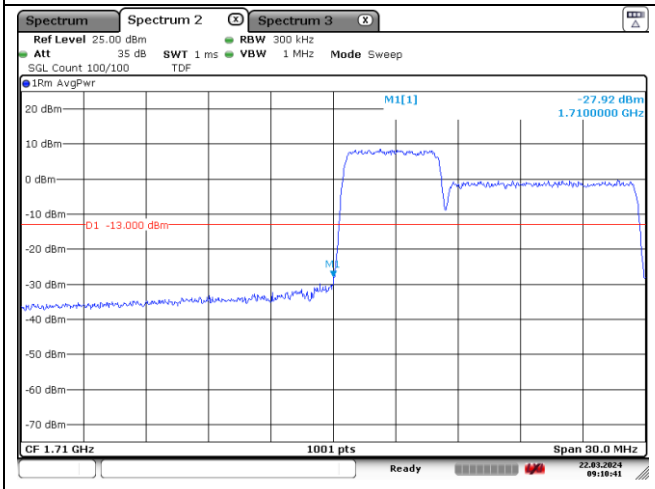
ULCA_66B



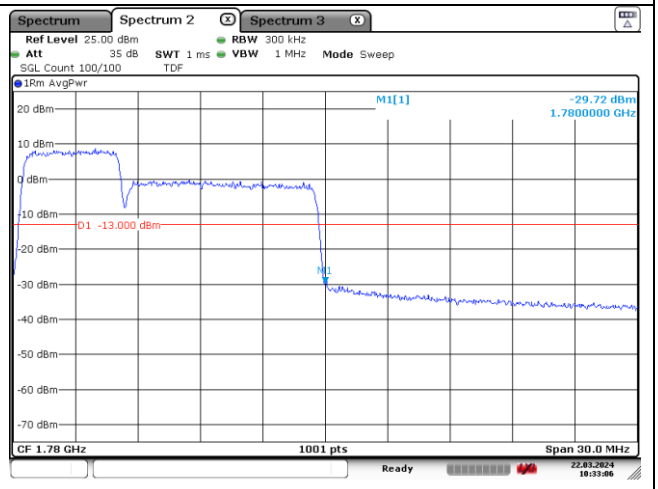
PCC 5 ㎒ + SCC 10 ㎒_QPSK-Low Channel



PCC 5 ㎒ + SCC 10 ㎒_QPSK-High Channel

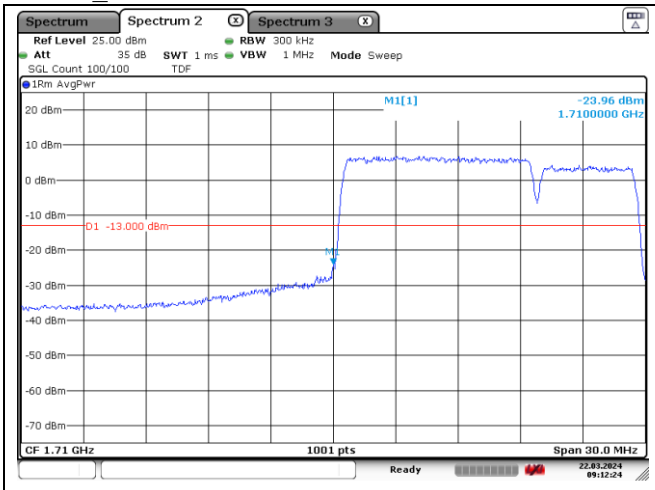


PCC 5 ㎒ + SCC 10 ㎒_16QAM-Low Channel

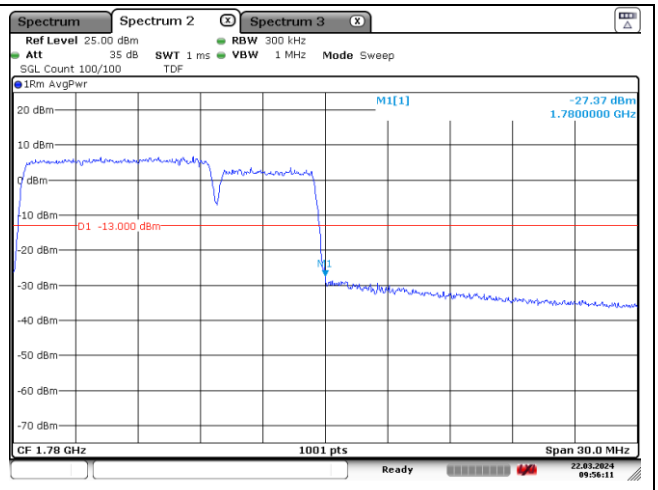


PCC 5 ㎒ + SCC 10 ㎒_16QAM-High Channel

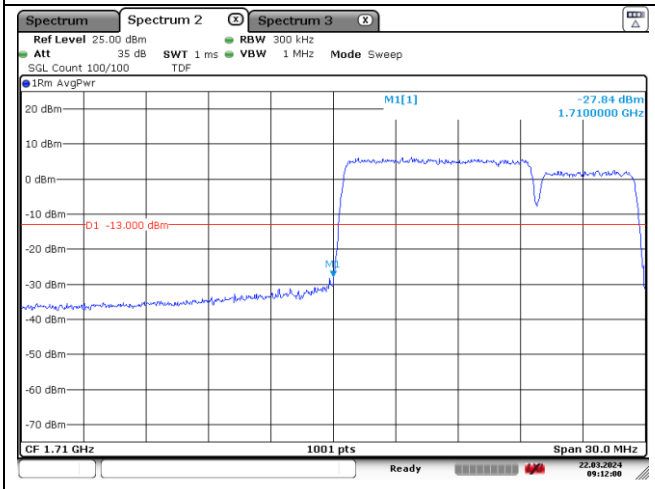
ULCA_66B



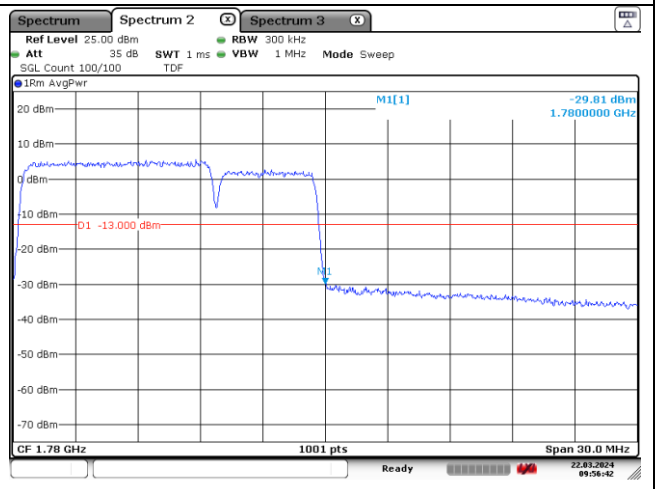
PCC 10 ㎒ + SCC 5 ㎒_QPSK-Low Channel



PCC 10 ㎒ + SCC 5 ㎒_QPSK-High Channel

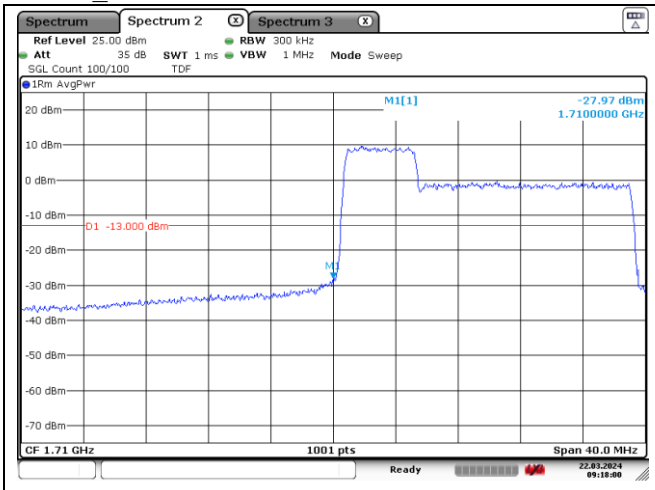


PCC 10 ㎒ + SCC 5 ㎒_16QAM-Low Channel

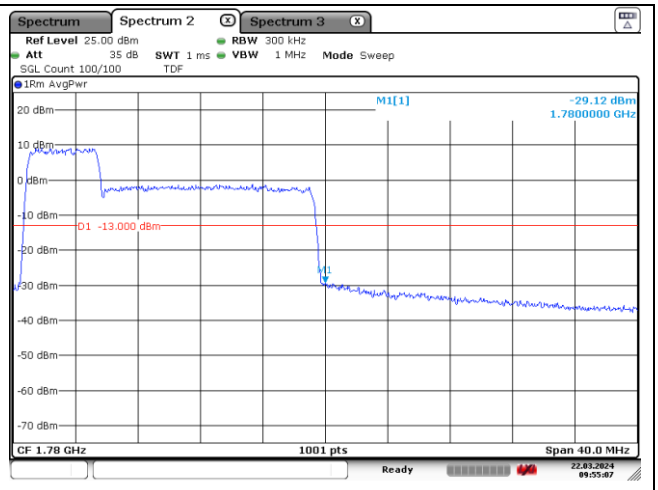


PCC 10 ㎒ + SCC 5 ㎒_16QAM-High Channel

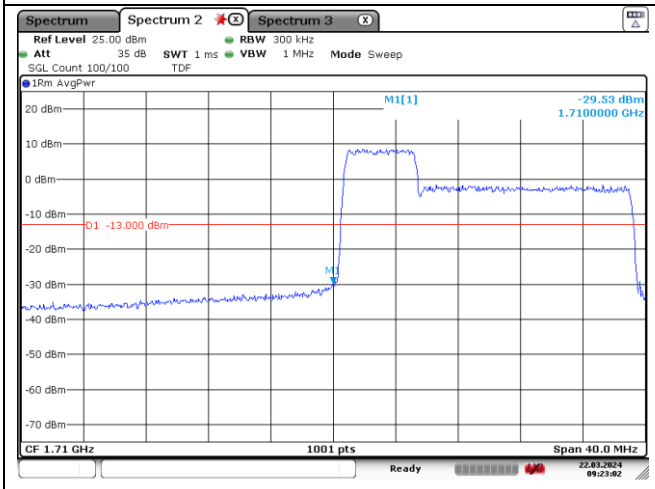
ULCA_66B



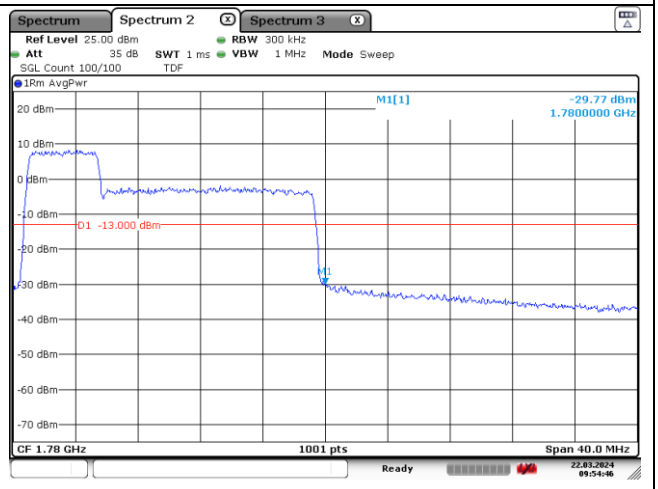
PCC 5 ㎒ + SCC 15 ㎒_QPSK-Low Channel



PCC 5 ㎒ + SCC 15 ㎒_QPSK-High Channel

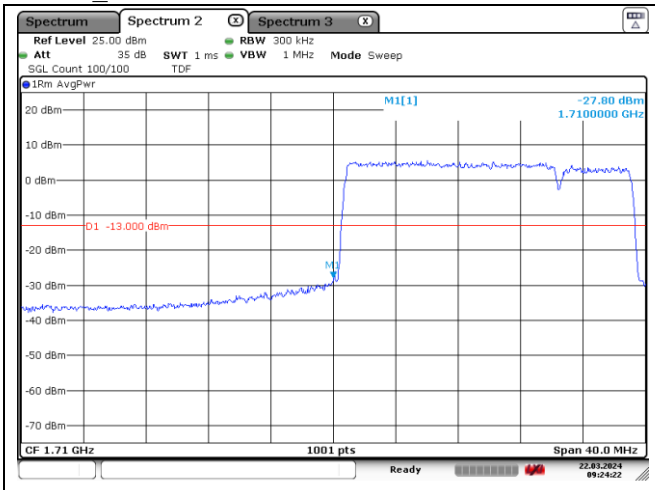


PCC 5 ㎒ + SCC 15 ㎒_16QAM-Low Channel

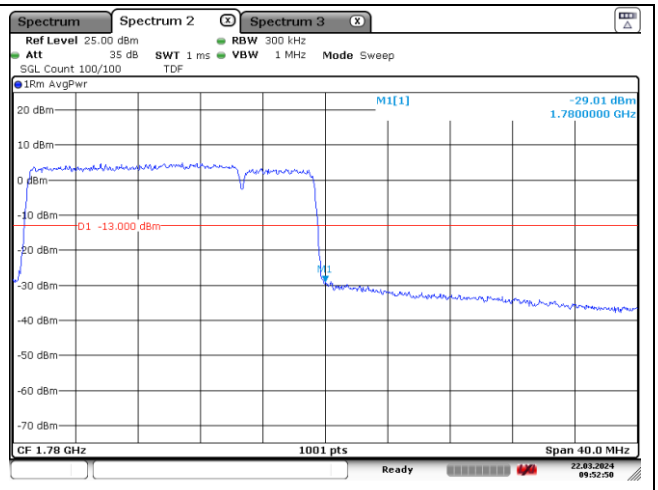


PCC 5 ㎒ + SCC 15 ㎒_16QAM-High Channel

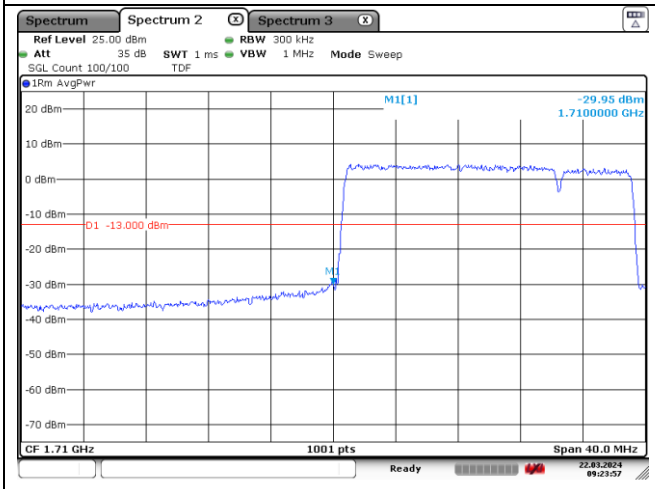
ULCA_66B



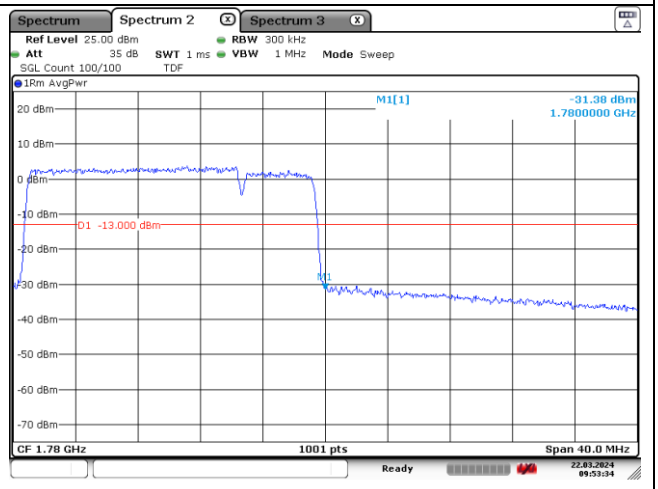
PCC 15 ㎒ + SCC 5 ㎒_QPSK-Low Channel



PCC 15 ㎒ + SCC 5 ㎒_QPSK-High Channel

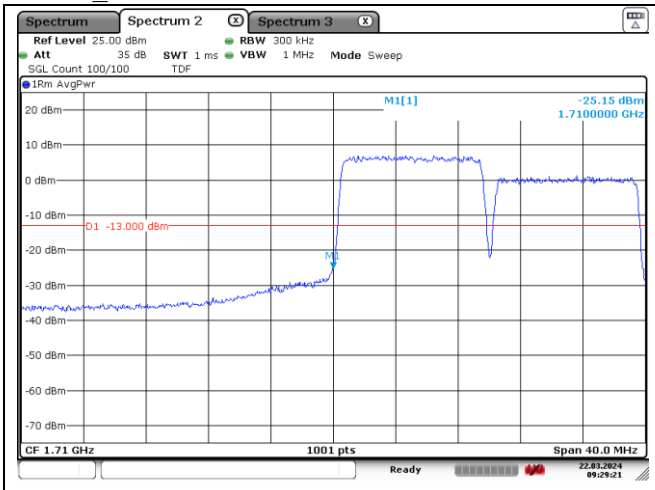


PCC 15 ㎒ + SCC 5 ㎒_16QAM-Low Channel

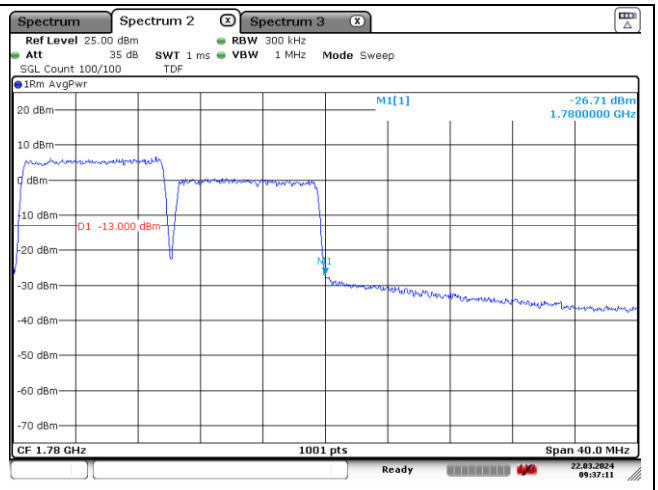


PCC 15 ㎒ + SCC 5 ㎒_16QAM-High Channel

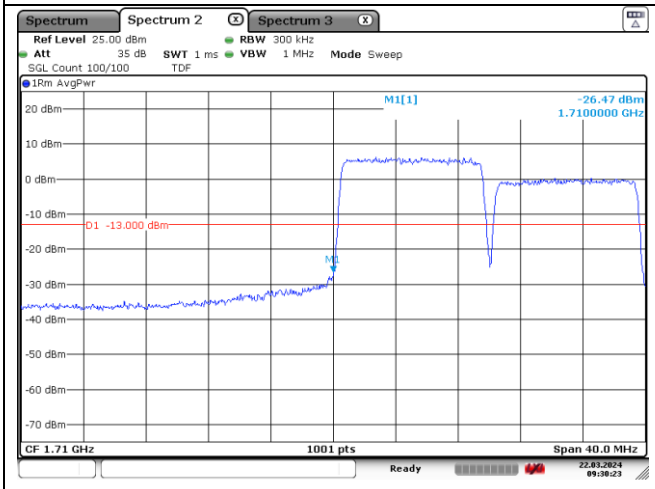
ULCA_66B



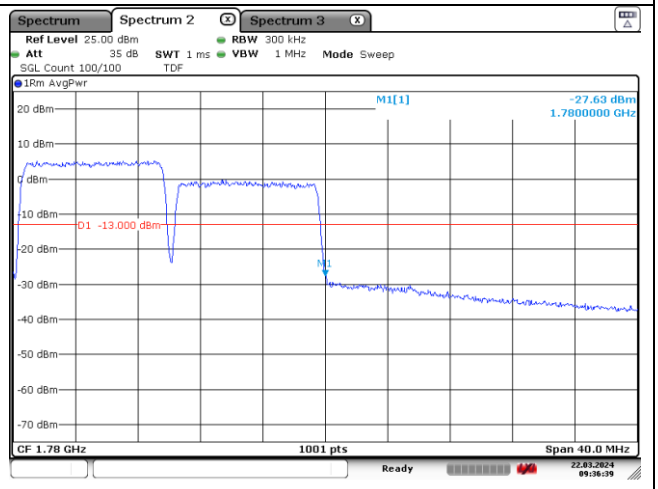
PCC 10 ㎒ + SCC 10 ㎒_QPSK-Low Channel



PCC 10 ㎒ + SCC 10 ㎒_QPSK-High Channel

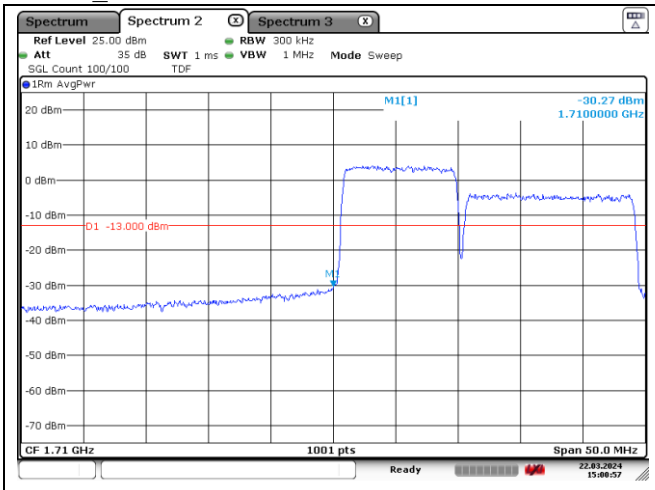


PCC 10 ㎒ + SCC 10 ㎒_16QAM-Low Channel

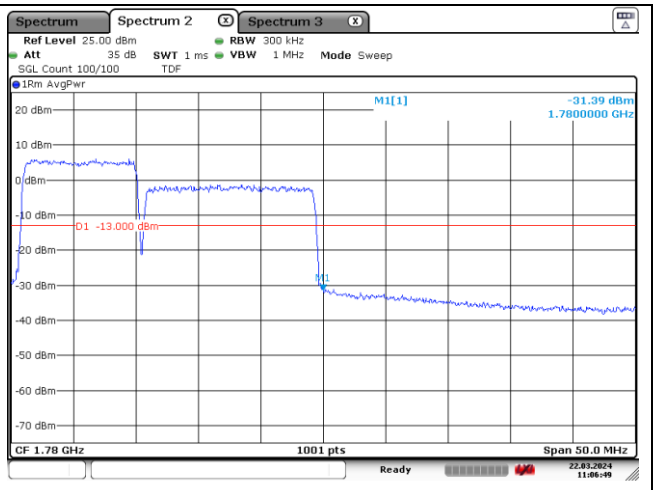


PCC 10 ㎒ + SCC 10 ㎒_16QAM-High Channel

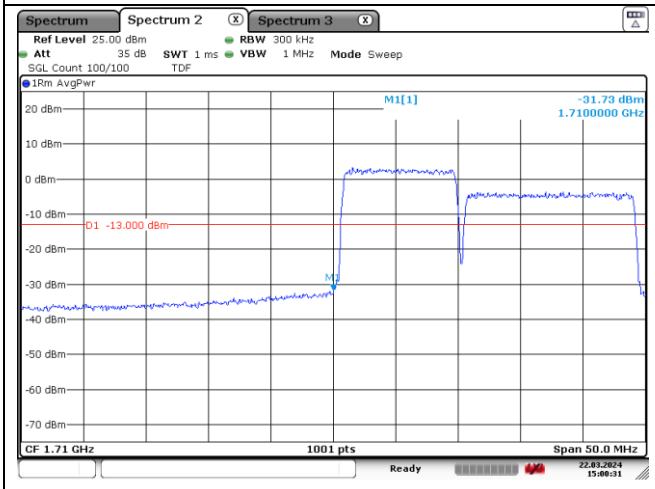
ULCA_66C



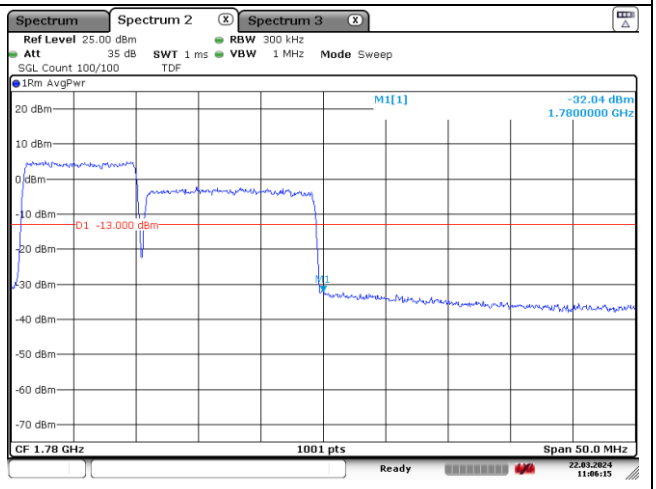
PCC 10 ㎒ + SCC 15 ㎒_QPSK-Low Channel



PCC 10 ㎒ + SCC 15 ㎒_QPSK-High Channel

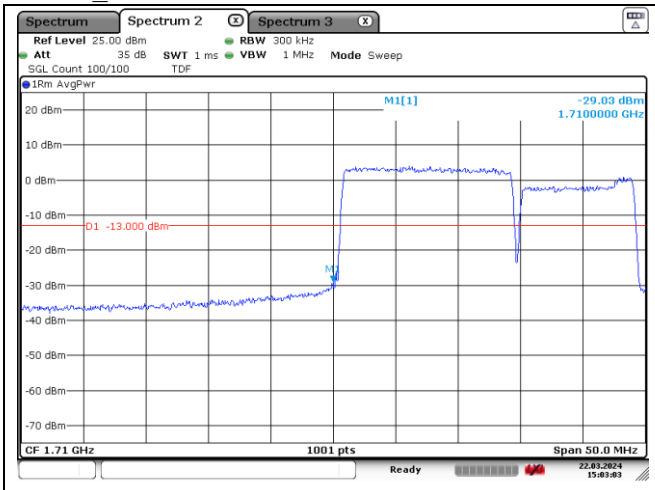


PCC 10 ㎒ + SCC 15 ㎒_16QAM-Low Channel

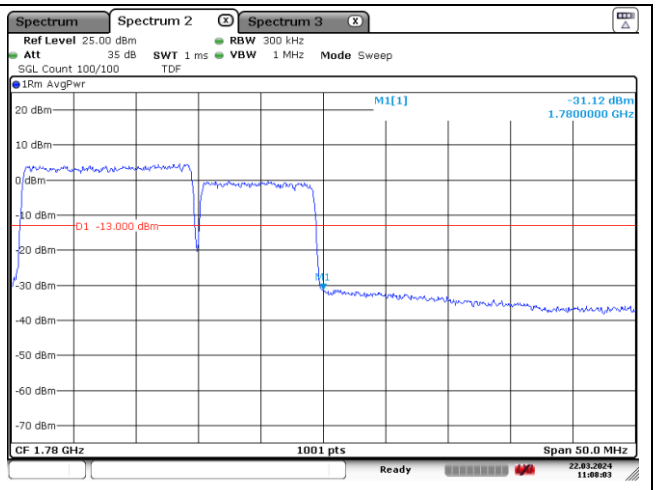


PCC 10 ㎒ + SCC 15 ㎒_16QAM-High Channel

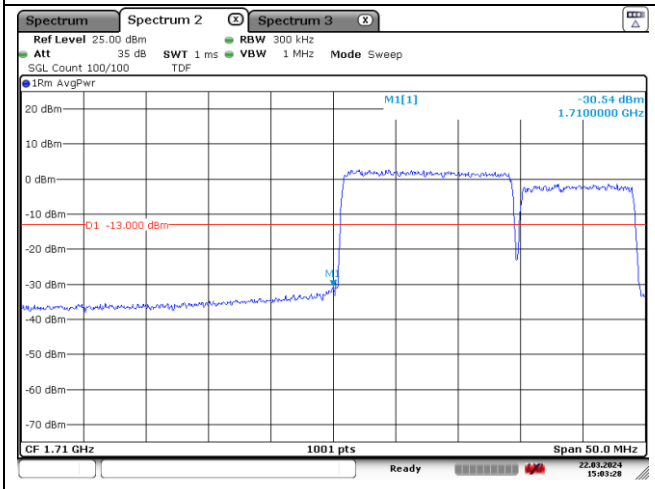
ULCA_66C



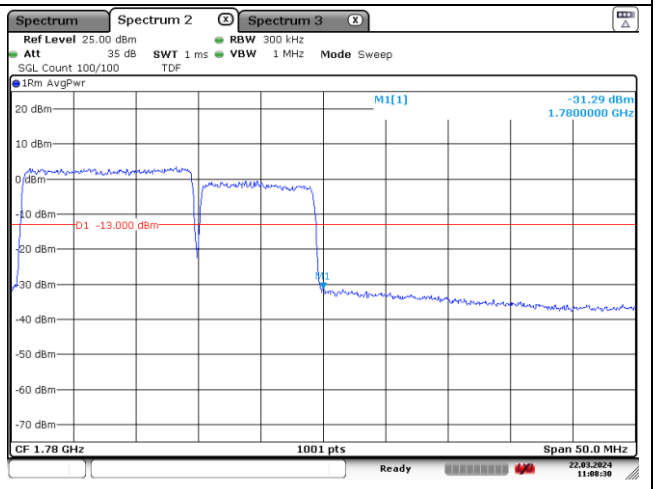
PCC 15 ㎒ + SCC 10 ㎒_QPSK-Low Channel



PCC 15 ㎒ + SCC 10 ㎒_QPSK-High Channel

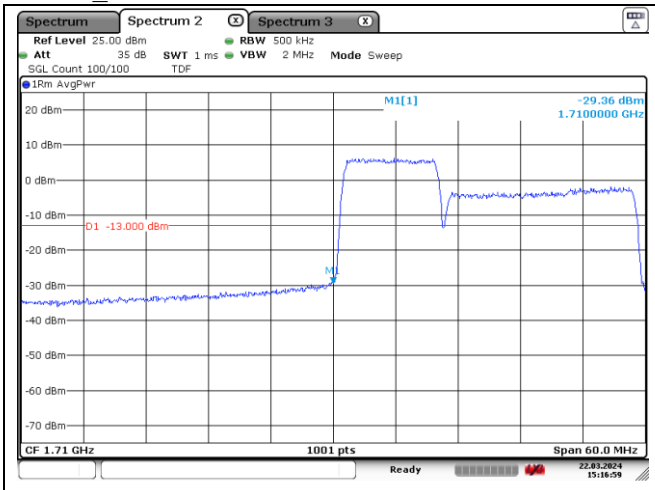


PCC 15 ㎒ + SCC 10 ㎒_16QAM-Low Channel

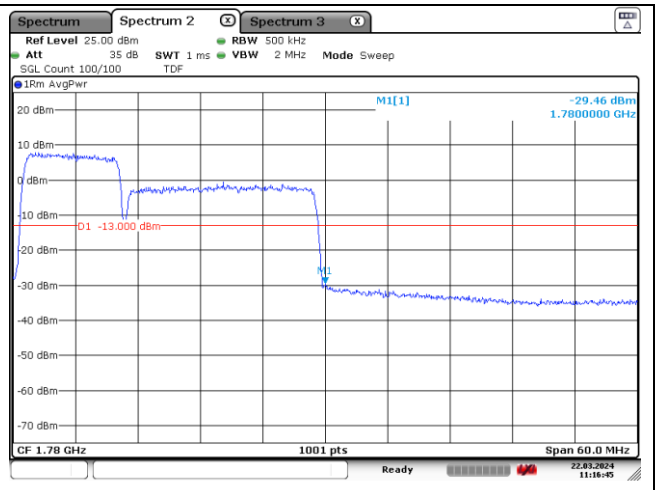


PCC 15 ㎒ + SCC 10 ㎒_16QAM-High Channel

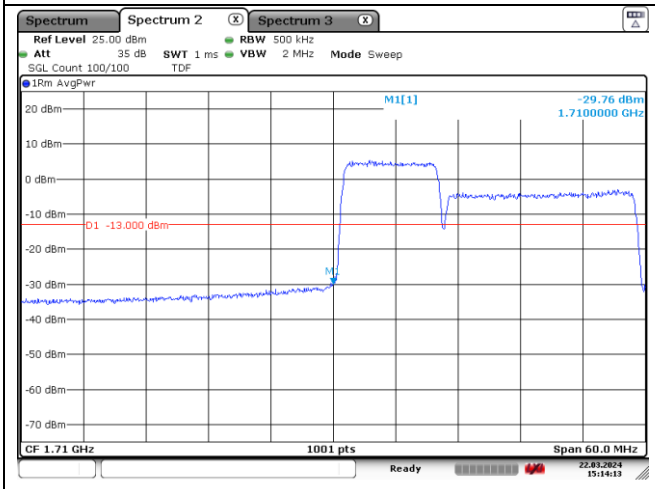
ULCA_66C



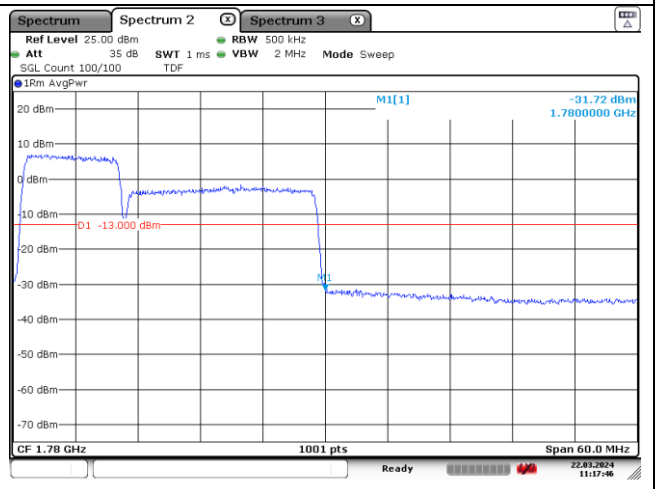
PCC 10 ㎒ + SCC 20 ㎒_QPSK-Low Channel



PCC 10 ㎒ + SCC 20 ㎒_QPSK-High Channel

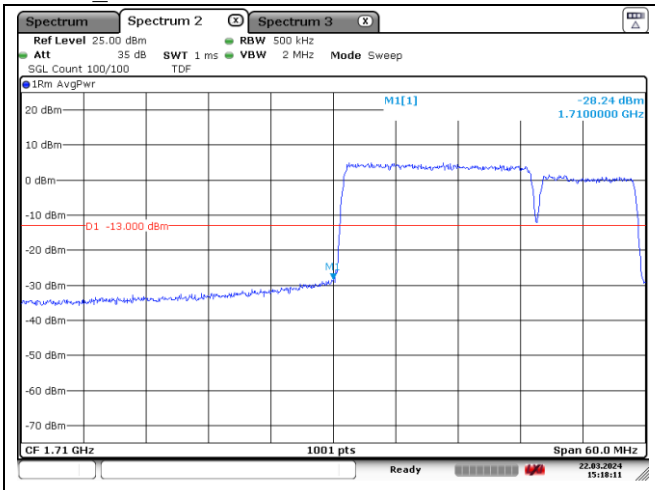


PCC 10 ㎒ + SCC 20 ㎒_16QAM-Low Channel

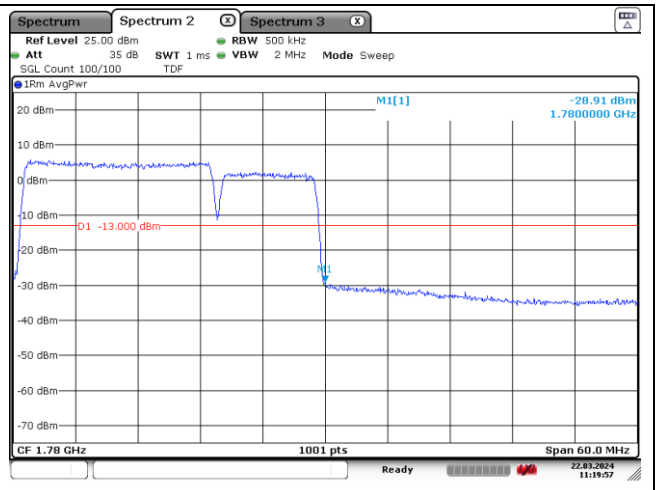


PCC 10 ㎒ + SCC 20 ㎒_16QAM-High Channel

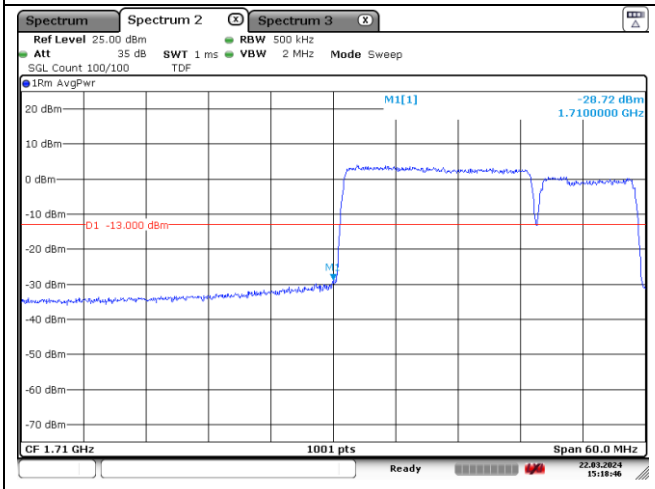
ULCA_66C



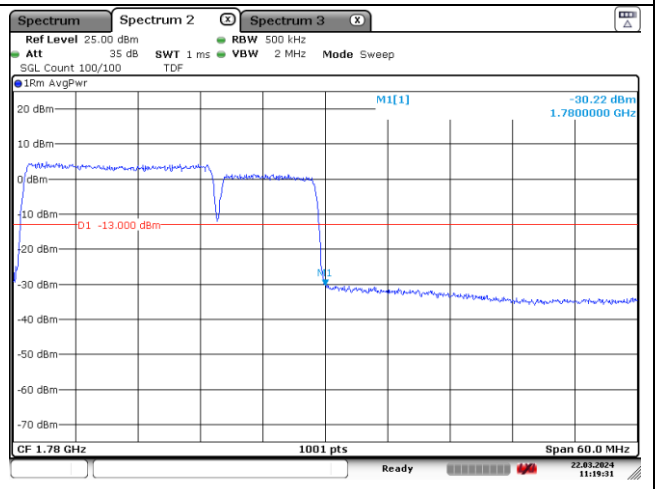
PCC 20 ㎒ + SCC 10 ㎒_QPSK-Low Channel



PCC 20 ㎒ + SCC 10 ㎒_QPSK-High Channel

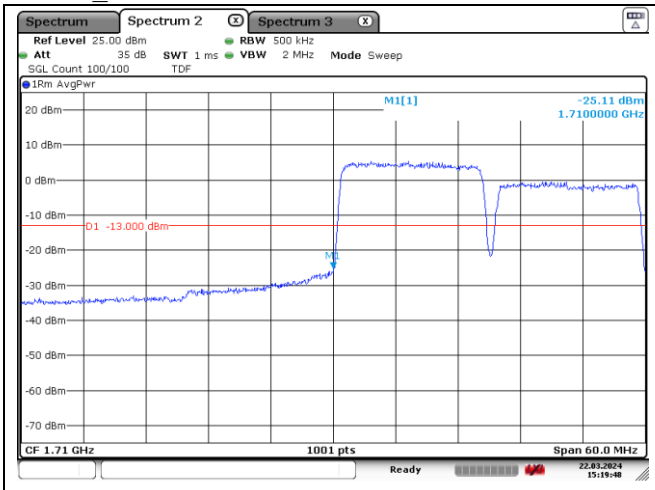


PCC 20 ㎒ + SCC 10 ㎒_16QAM-Low Channel

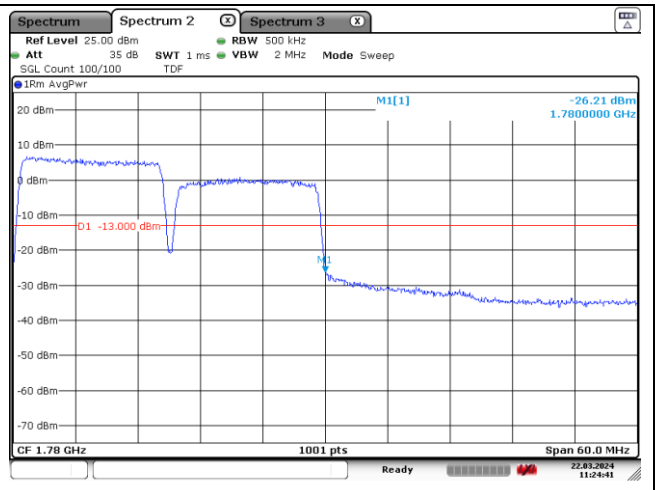


PCC 20 ㎒ + SCC 10 ㎒_16QAM-High Channel

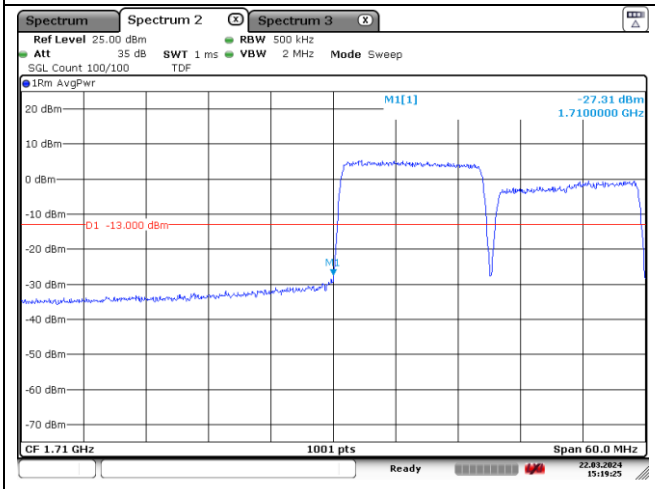
ULCA_66C



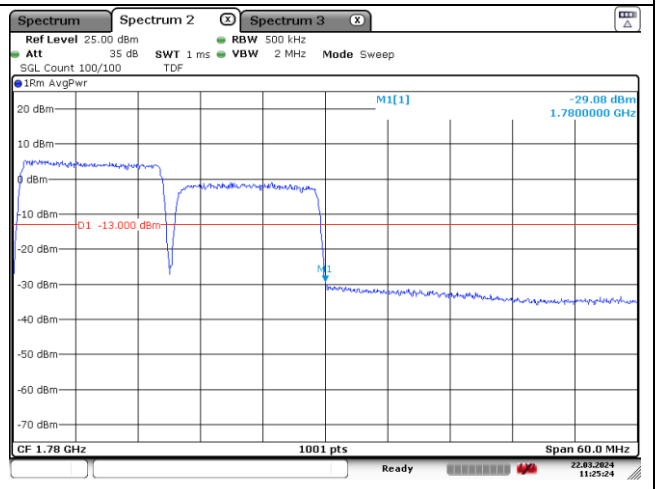
PCC 15 ㎒ + SCC 15 ㎒_QPSK-Low Channel



PCC 15 ㎒ + SCC 15 ㎒_QPSK-High Channel

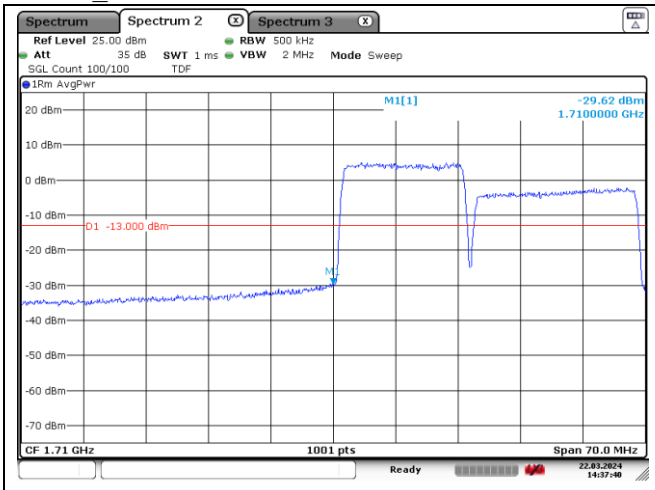


PCC 15 ㎒ + SCC 15 ㎒_16QAM-Low Channel

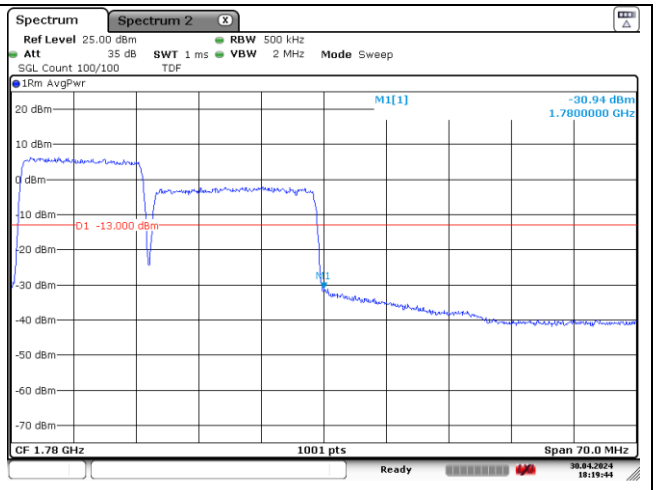


PCC 15 ㎒ + SCC 15 ㎒_16QAM-High Channel

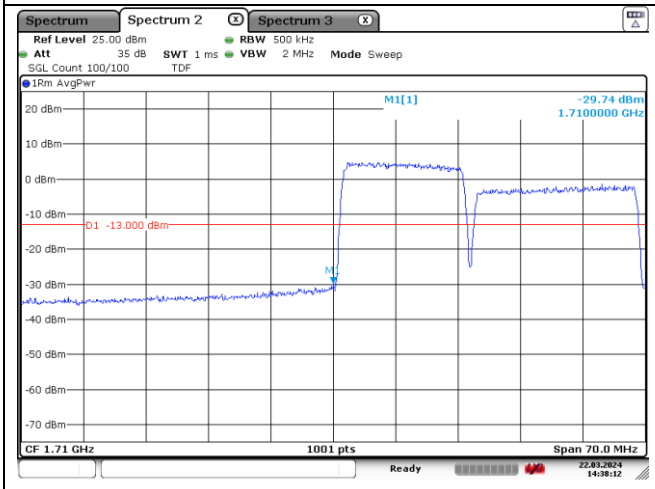
ULCA_66C



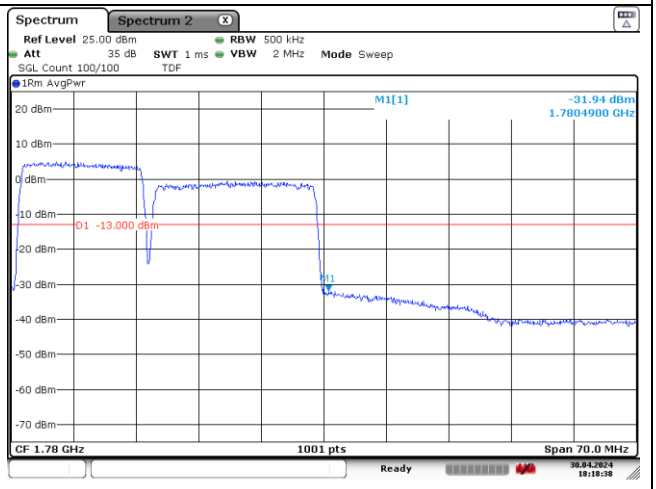
PCC 15 ㎒ + SCC 20 ㎒_QPSK-Low Channel



PCC 15 ㎒ + SCC 20 ㎒_QPSK-High Channel

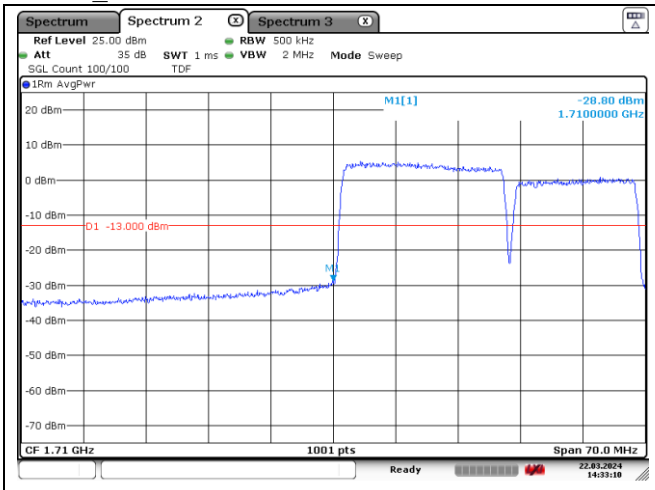


PCC 15 ㎒ + SCC 20 ㎒_16QAM-Low Channel

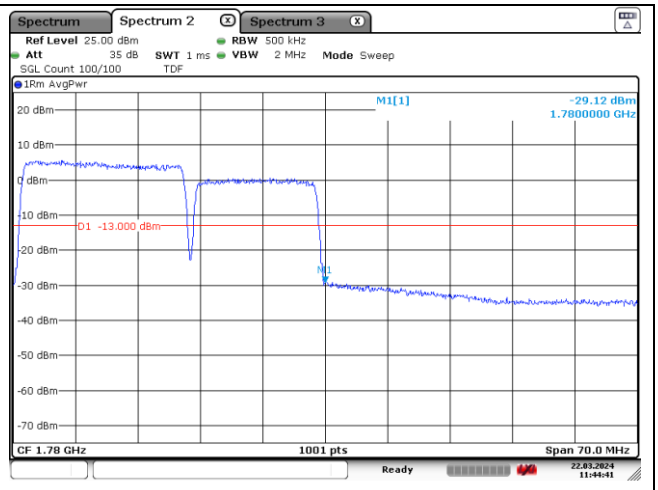


PCC 15 ㎒ + SCC 20 ㎒_16QAM-High Channel

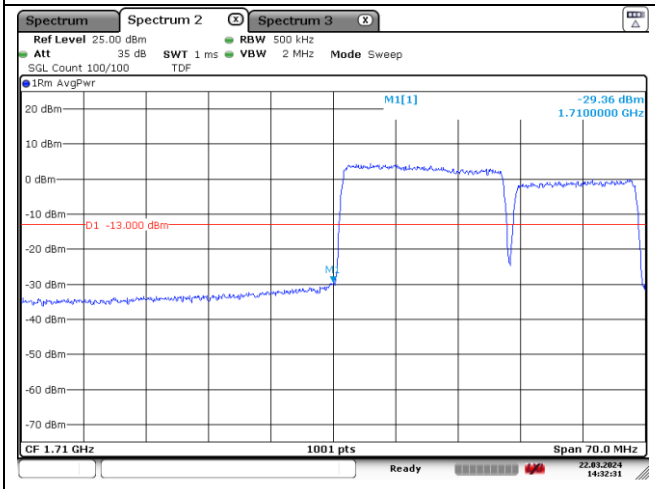
ULCA_66C



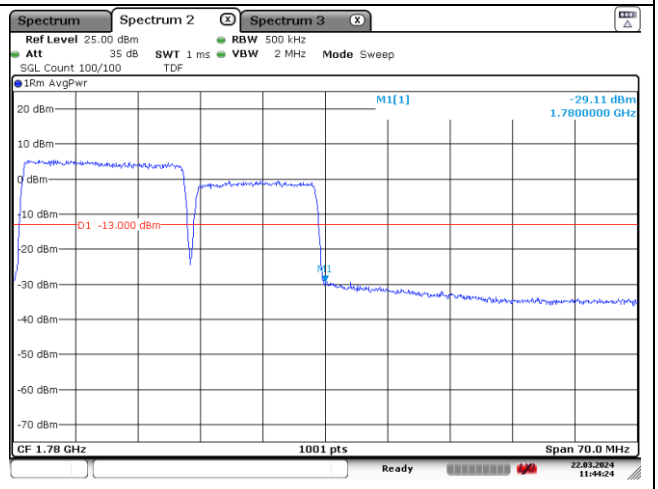
PCC 20 ㎒ + SCC 15 ㎒_QPSK-Low Channel



PCC 20 ㎒ + SCC 15 ㎒_QPSK-High Channel

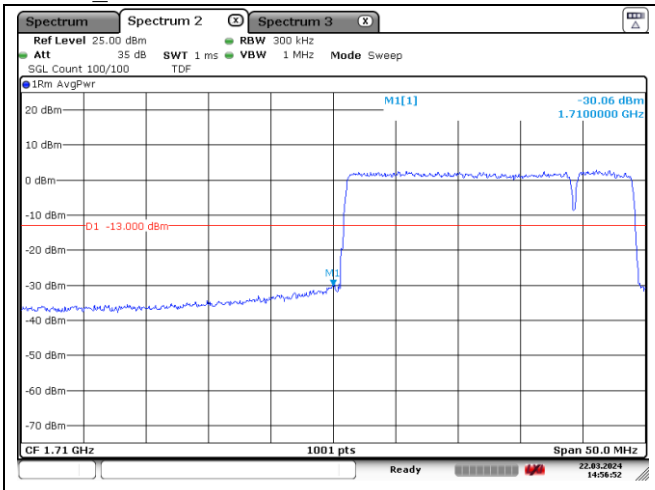


PCC 20 ㎒ + SCC 15 ㎒_16QAM-Low Channel

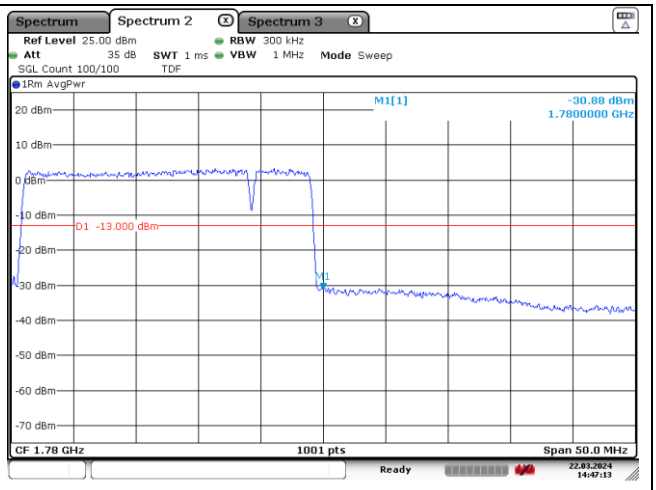


PCC 20 ㎒ + SCC 15 ㎒_16QAM-High Channel

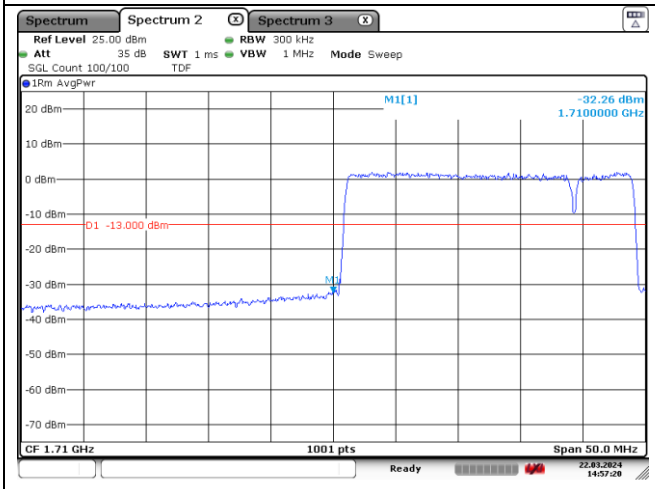
ULCA_66C



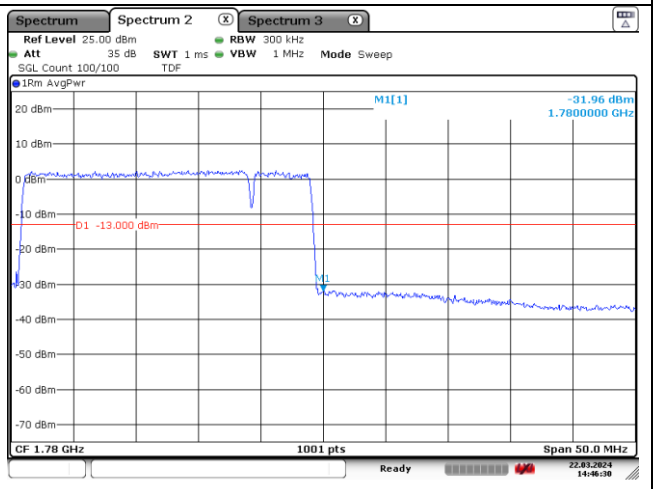
PCC 20 ㎒ + SCC 5 ㎒_QPSK-Low Channel



PCC 20 ㎒ + SCC 5 ㎒_QPSK-High Channel

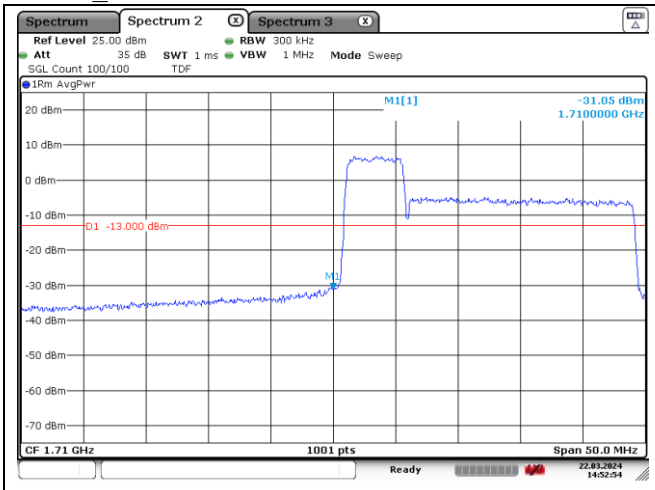


PCC 20 ㎒ + SCC 5 ㎒_16QAM-Low Channel

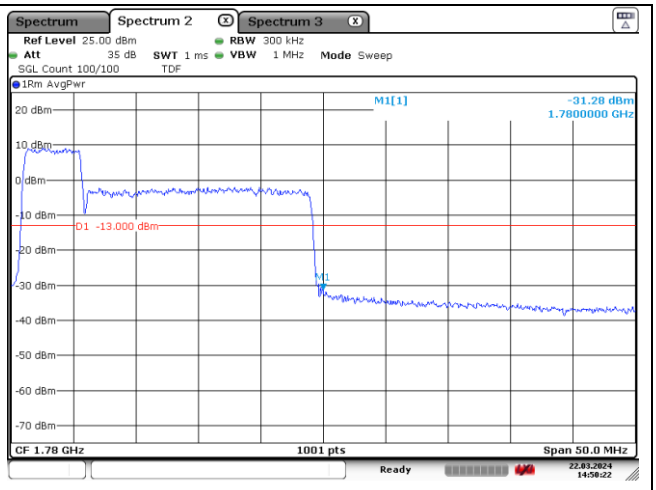


PCC 20 ㎒ + SCC 5 ㎒_16QAM-High Channel

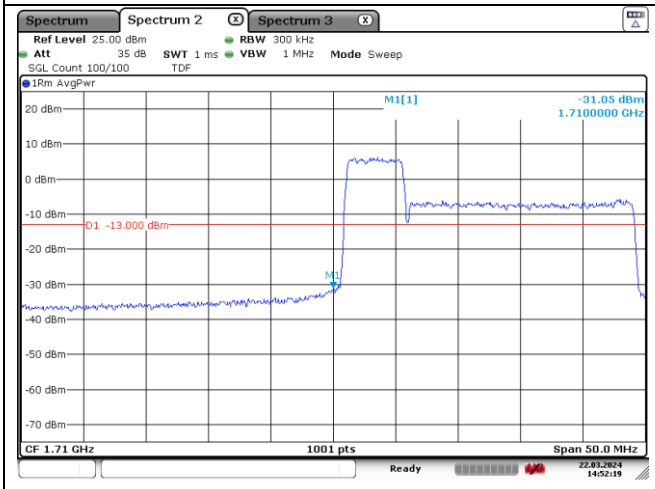
ULCA_66C



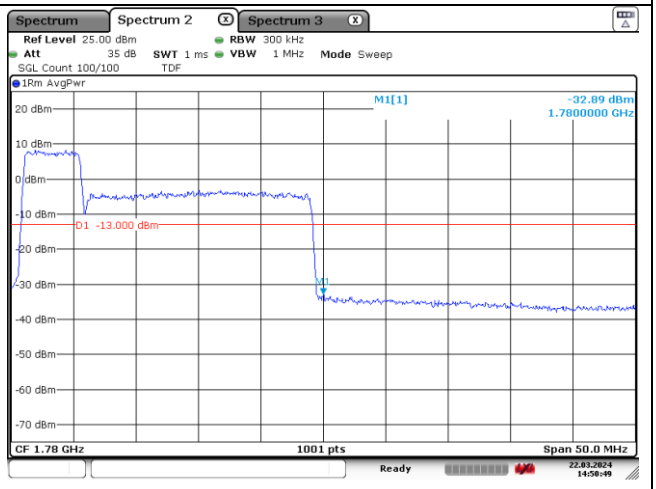
PCC 5 ㎒ + SCC 20 ㎒_QPSK-Low Channel



PCC 5 ㎒ + SCC 20 ㎒_QPSK-High Channel

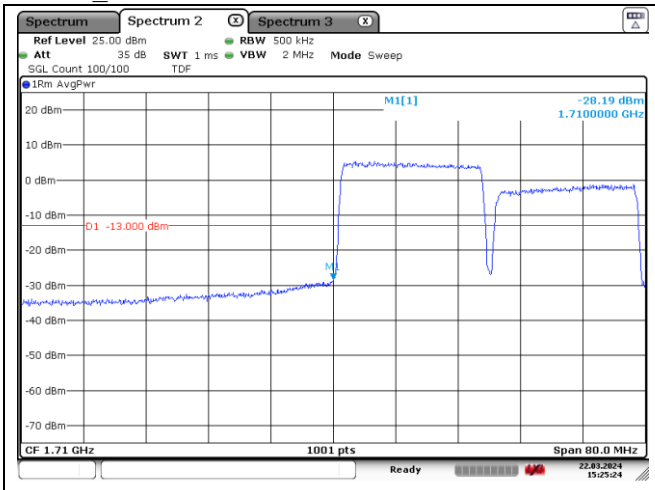


PCC 5 ㎒ + SCC 20 ㎒_16QAM-Low Channel

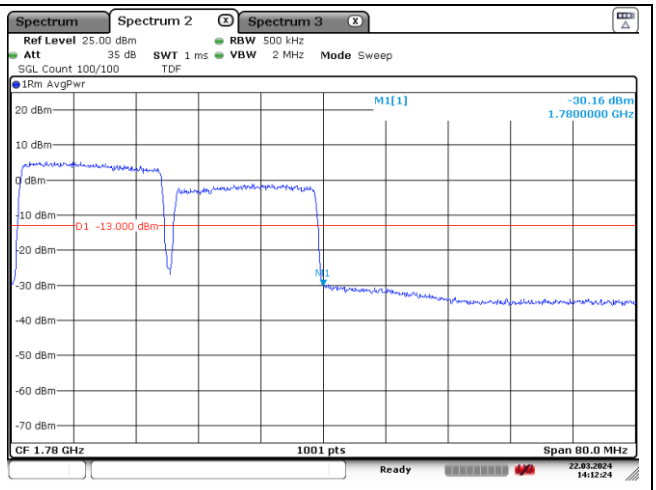


PCC 5 ㎒ + SCC 20 ㎒_16QAM-High Channel

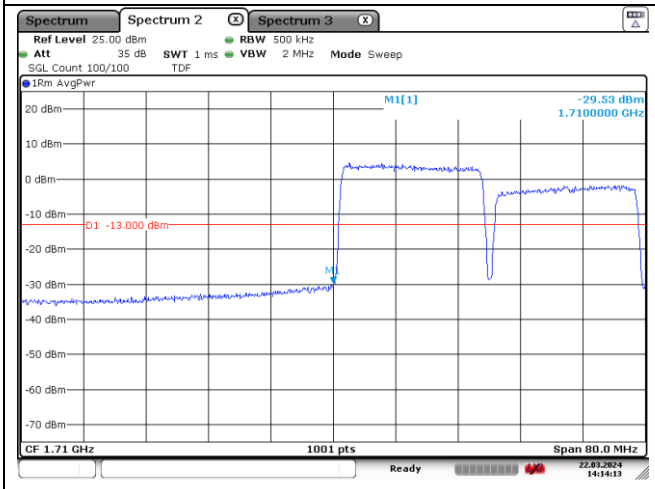
ULCA_66C



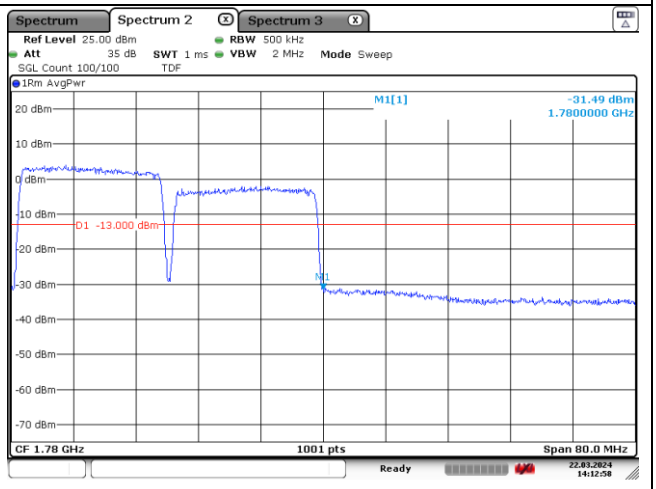
PCC 20 ㎒ + SCC 20 ㎒_QPSK-Low Channel



PCC 20 ㎒ + SCC 20 ㎒_QPSK-High Channel



PCC 20 ㎒ + SCC 20 ㎒_16QAM-Low Channel



PCC 20 ㎒ + SCC 20 ㎒_16QAM-High Channel

8. Frequency Stability

8.1. Limit

- § 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.

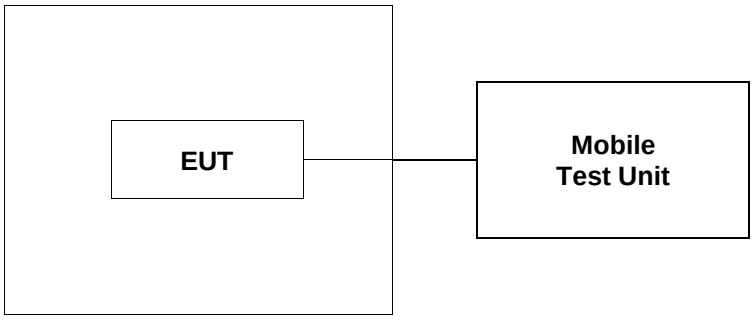
- §24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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

- §90.213, transmitters used in the services governed by this part must have a minimum frequency stability as specified in the following table.
For Mobile devices operating in the 809 to 824 ㎒ band at a power level 2 Watts or less, the limit specified in Table is +/- 2.5 ppm.

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.

ULCA 5B at middle channel

Reference Frequency: PCC 834.1 ㎒ / SCC 838 ㎒					
Frequency Stability versus Temperature					
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**			
		Frequency Error (㎐)		**ppm**	
		PCC	**SCC**	**PCC**	**SCC**
50	4.00	135.32	96.36	0.013 14	0.014 01
40		131.41	87.44	0.008 45	0.003 37
30		127.66	88.56	0.003 96	0.004 70
20(Ref.)		124.36	84.62	-	-
10		125.23	89.47	0.001 04	0.005 79
0		129.36	84.36	0.005 99	-0.000 31
-10		133.22	87.47	0.010 62	0.003 40
-20		137.25	85.52	0.015 45	0.001 07
-30		139.36	90.87	0.017 98	0.007 46
Frequency Stability versus Power Supply					
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**			
		Frequency Error (㎐)		**Ppm**	
		PCC	**SCC**	**PCC**	**SCC**
20	3.40 (85%)	125.21	84.55	0.001 02	-0.000 08
	4.60 (115%)	113.58	96.63	-0.012 92	0.014 33

ULCA 7C at middle channel

Reference Frequency: PCC 2 525.6 ㎒ / SCC 2 540 ㎒					
Frequency Stability versus Temperature					
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**			
		Frequency Error (㎐)		**ppm**	
		PCC	**SCC**	**PCC**	**SCC**
50	4.00	115.32	108.36	-0.005 16	0.008 56
40		133.41	84.44	0.002 00	-0.000 86
30		138.66	69.56	0.004 08	-0.006 72
20(Ref.)		128.36	86.62	-	-
10		118.23	70.47	-0.004 01	-0.006 36
0		148.36	90.36	0.007 92	0.001 47
-10		117.22	70.47	-0.004 41	-0.006 36
-20		128.25	99.52	-0.000 04	0.005 08
-30		139.36	91.87	0.004 36	0.002 07
Frequency Stability versus Power Supply					
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**			
		Frequency Error (㎐)		**ppm**	
		PCC	**SCC**	**PCC**	**SCC**
20	3.40 (85%)	127.21	85.55	-0.000 46	-0.000 42
	4.60 (115%)	131.58	106.63	0.001 27	0.007 88

ULCA 12B at middle channel

Reference Frequency: PCC 705.1 ㎒ / SCC 709.9 ㎒					
Frequency Stability versus Temperature					
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**			
		Frequency Error (㎐)		**ppm**	
		PCC	**SCC**	**PCC**	**SCC**
50	4.00	125.32	109.36	0.015 54	0.041 89
40		139.41	81.44	0.035 53	0.002 56
30		154.66	75.56	0.057 16	-0.005 72
20(Ref.)		114.36	79.62	-	-
10		113.23	77.47	-0.001 60	-0.005 72
0		137.36	85.36	0.032 62	0.008 09
-10		129.22	77.47	0.021 08	-0.003 03
-20		145.25	102.52	0.043 81	0.032 26
-30		148.36	88.87	0.048 22	0.013 03
Frequency Stability versus Power Supply					
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**			
		Frequency Error (㎐)		**ppm**	
		PCC	**SCC**	**PCC**	**SCC**
20	3.40 (85%)	113.21	66.55	-0.001 63	-0.018 41
	4.60 (115%)	117.58	107.63	0.004 57	0.039 46

ULCA 41C at middle channel

Reference Frequency: PCC 2 583.8 ㎒ / SCC 2 595.5 ㎒					
Frequency Stability versus Temperature					
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**			
		Frequency Error (㎐)		**ppm**	
		PCC	**SCC**	**PCC**	**SCC**
50	4.00	135.32	100.36	0.006 56	-0.000 87
40		147.41	68.44	0.011 24	-0.013 17
30		133.66	76.56	0.018 34	-0.010 04
20(Ref.)		118.36	102.62	-	-
10		111.23	84.47	-0.008 55	-0.006 99
0		129.36	83.36	0.013 19	-0.007 42
-10		113.22	90.47	-0.006 16	-0.004 68
-20		118.25	98.52	-0.000 13	-0.001 58
-30		135.36	89.87	0.020 38	-0.004 91
Frequency Stability versus Power Supply					
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**			
		Frequency Error (㎐)		**ppm**	
		PCC	**SCC**	**PCC**	**SCC**
20	3.40 (85%)	135.21	96.55	0.006 52	-0.002 34
	4.60 (115%)	133.58	87.63	0.005 89	-0.005 78

ULCA 66B at middle channel

Reference Frequency: PCC 1 752.6 ㎒ / SCC 1 757.4 ㎒					
Frequency Stability versus Temperature					
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**			
		Frequency Error (㎐)		**ppm**	
		PCC	**SCC**	**PCC**	**SCC**
50	4.00	145.32	91.36	0.004 54	0.006 68
40		134.41	72.44	-0.001 68	-0.004 09
30		125.66	69.56	-0.006 68	-0.005 72
20(Ref.)		137.36	79.62	-	-
10		132.23	96.47	-0.002 93	0.009 59
0		147.36	100.36	0.005 71	0.011 80
-10		113.22	99.47	-0.013 77	0.011 30
-20		152.25	92.52	0.008 50	0.007 34
-30		141.36	97.87	0.002 28	0.010 38
Frequency Stability versus Power Supply					
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**			
		Frequency Error (㎐)		**ppm**	
		PCC	**SCC**	**PCC**	**SCC**
20	3.40 (85%)	121.21	67.55	-0.009 21	-0.006 87
	4.60 (115%)	125.58	103.63	-0.006 72	0.013 66

ULCA 66C at middle channel

Reference Frequency: PCC 1 747.9 ㎒ / SCC 1 759.9 ㎒					
Frequency Stability versus Temperature					
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**			
		Frequency Error (㎐)		**ppm**	
		PCC	**SCC**	**PCC**	**SCC**
50	4.00	132.32	96.36	-0.001 17	0.002 69
40		113.41	86.44	-0.011 99	-0.002 94
30		126.66	87.56	-0.004 41	-0.002 31
20(Ref.)		134.36	91.62	-	-
10		118.23	88.47	-0.009 23	-0.001 79
0		131.36	100.36	-0.001 72	0.004 97
-10		135.22	81.47	0.000 49	-0.005 77
-20		135.25	97.52	0.000 51	0.003 35
-30		139.36	77.87	0.002 86	-0.007 81
Frequency Stability versus Power Supply					
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**			
		Frequency Error (㎐)		**ppm**	
		PCC	**SCC**	**PCC**	**SCC**
20	3.40 (85%)	114.21	73.55	-0.011 53	-0.010 27
	4.60 (115%)	130.58	95.63	-0.002 16	0.002 28

- End of the Test Report -