7. Band Edge

7.1. 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 + 10log(P) ㏈.

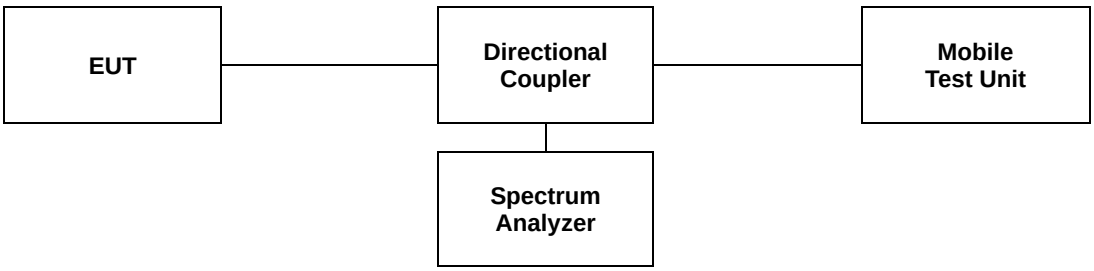
- §24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) ㏈.

- §27.53(h)(1), for operations in the 1 695-1 710 ㎒, 1 710-1 755 ㎒, 1 755-1 780 ㎒, 1 915-1 920 ㎒, 1 995-2 000 ㎒, 2 000-2 020 ㎒, 2 110-2 155 ㎒, 2 155-2 180 ㎒, 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 log10 (P) ㏈.

7.2. Test Procedure

The test follows section 6.1 of FCC KDB Publication 971168 D01 v03.

1. Span was set large enough so as to capture all out of band emissions near the band edge.
2. RBW ≥ 1 % of OBW.
3. VBW ≥ 3 x RBW.
4. Detector = RMS.
5. Trace mode = Average.
6. Sweep time = Auto.
7. The trace was allowed to stabilize.
8. All path loss of frequency range was investigated and compensated to spectrum analyzer as correction factor.



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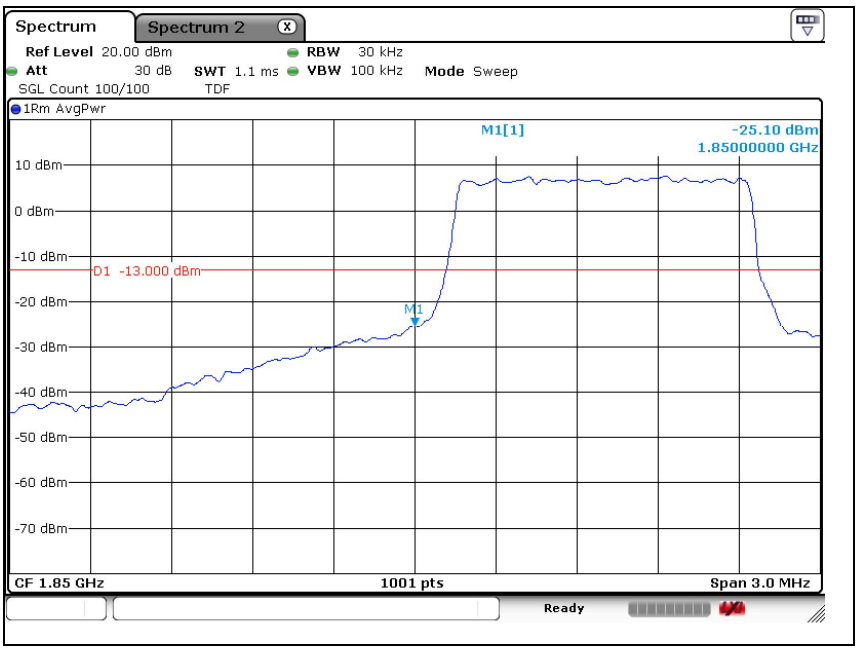
7.3. Test Results

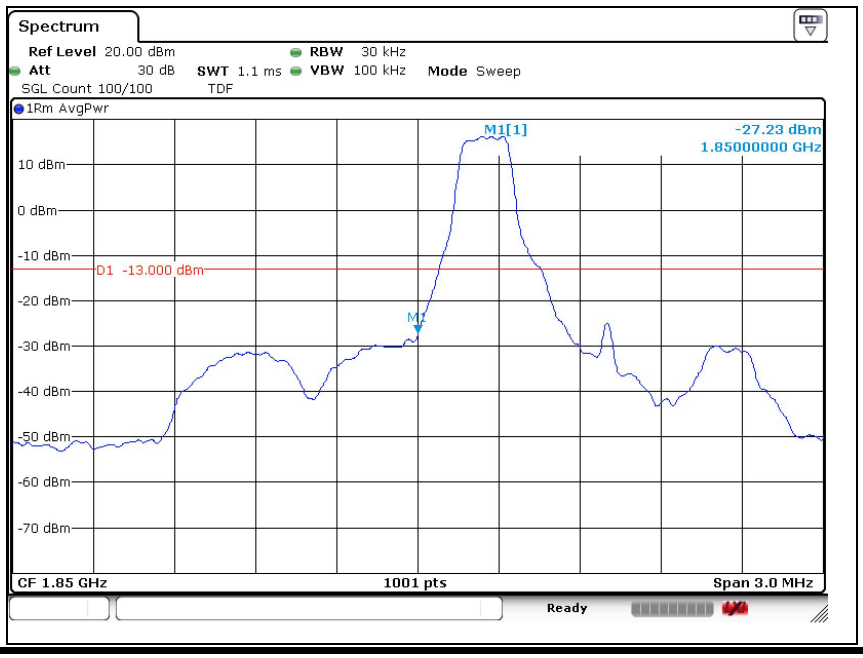
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Please refer to the following plots.

LTE band 2 (1.4 ㎒ - QPSK_RB 6)
Low Channel



LTE band 2 (1.4 ㎒ - QPSK_RB 1)
Low Channel



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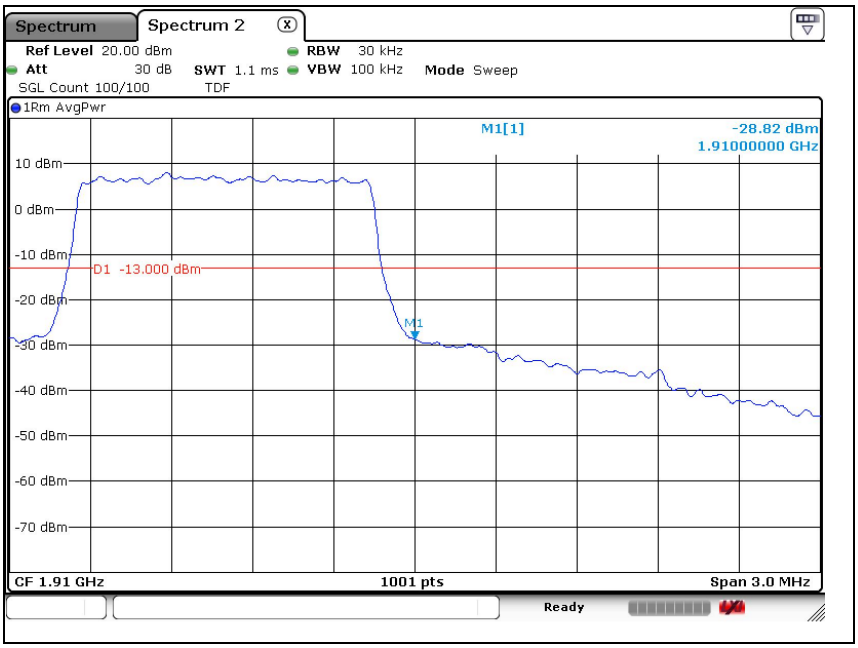
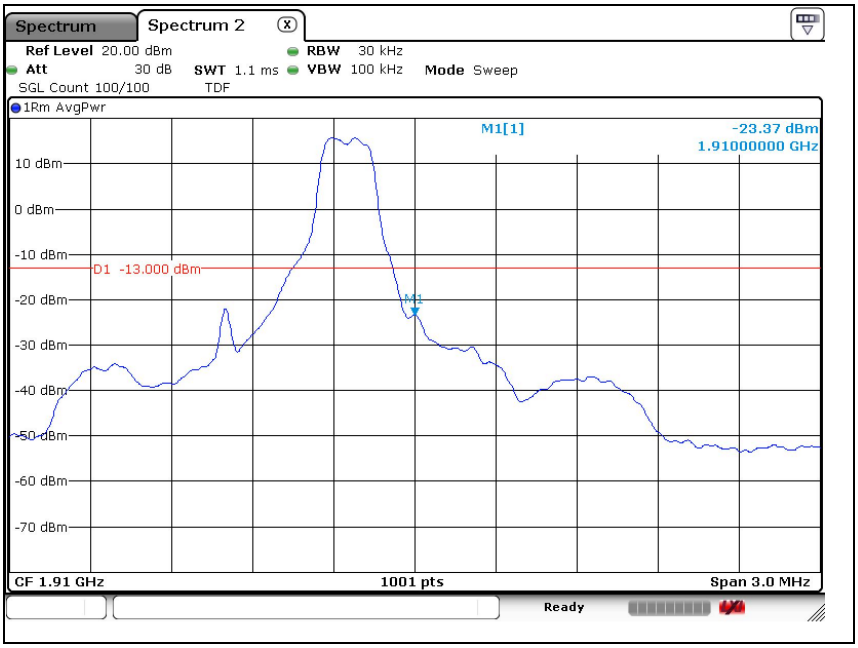
LTE band 2 (1.4 ㎒ - QPSK_RB 6)
High Channel



LTE band 2 (1.4 ㎒ - QPSK_RB 1)
High Channel



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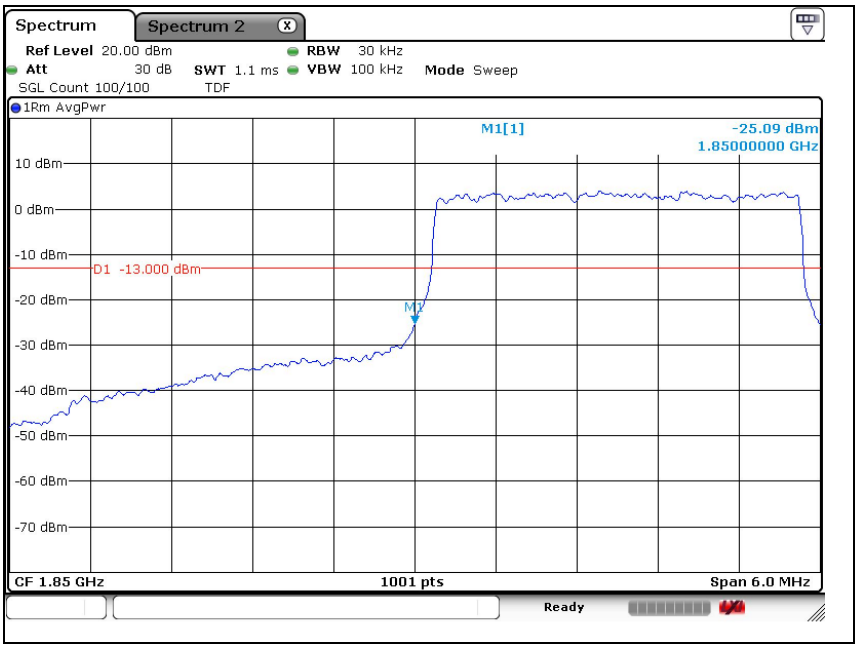
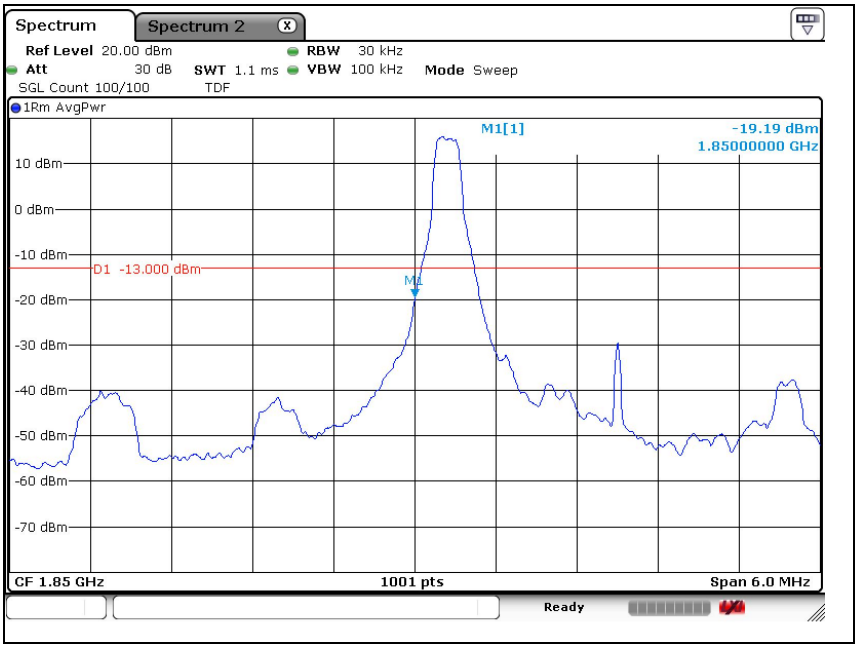
LTE band 2 (3 ㎒ - QPSK_RB 15)
Low Channel



LTE band 2 (3 ㎒ - QPSK_RB 1)
Low Channel



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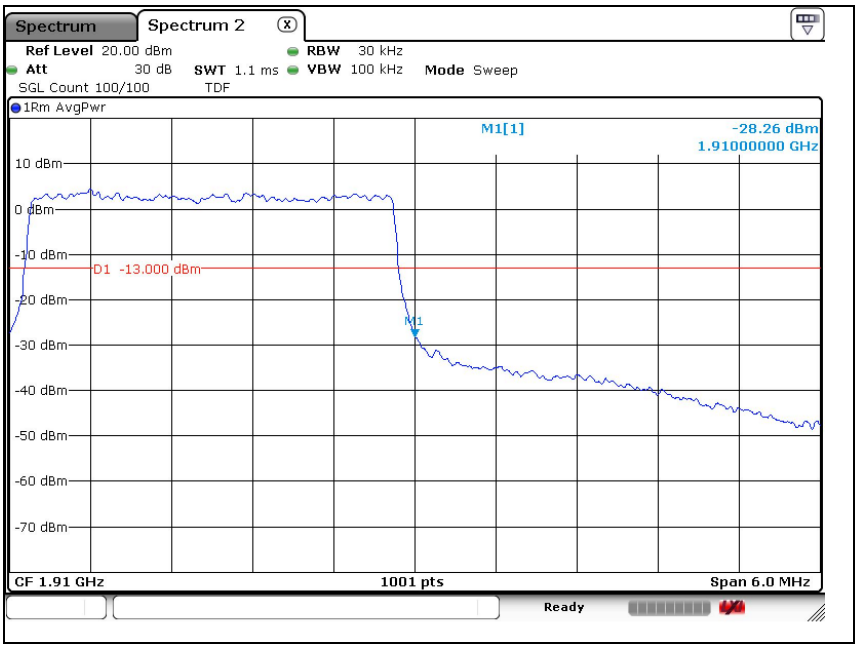
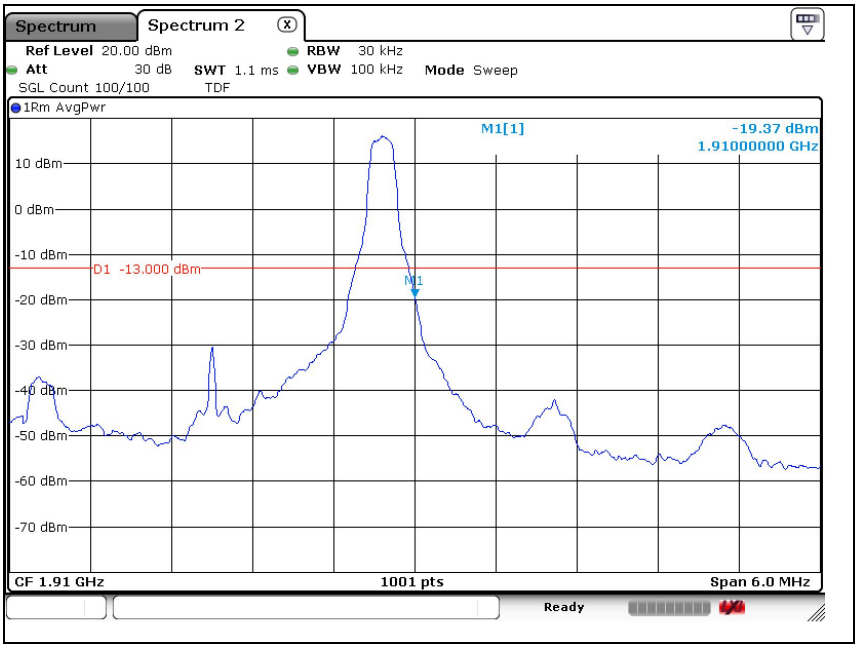
LTE band 2 (3 ㎒ - QPSK_RB 15)
High Channel



LTE band 2 (3 ㎒ - QPSK_RB 1)
High Channel



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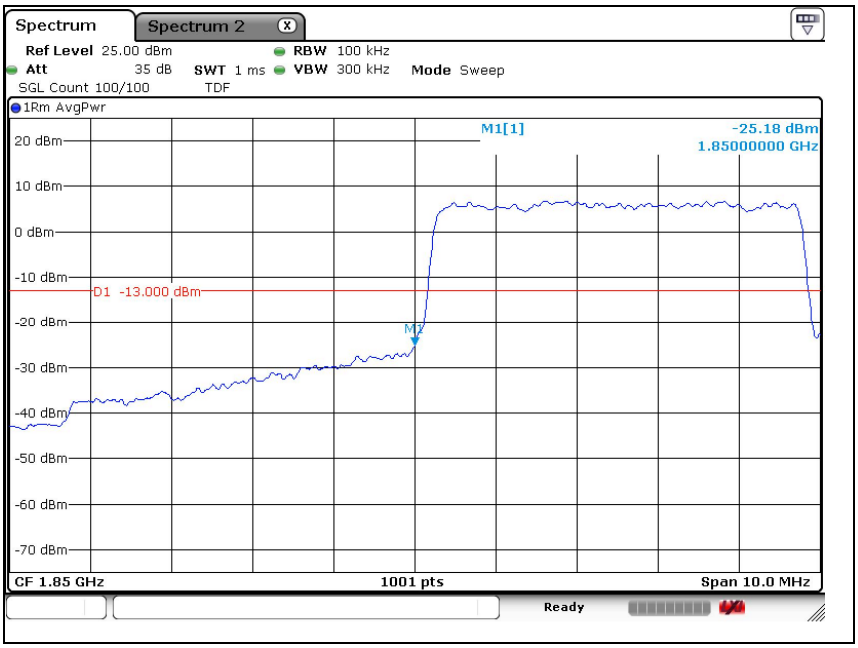
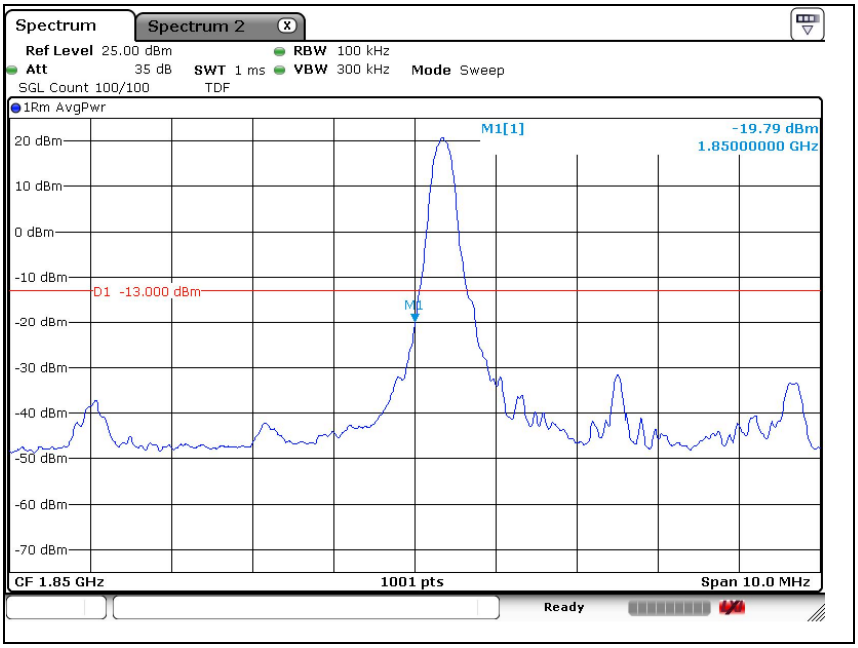
LTE band 2 (5 ㎒ - QPSK_RB 25)
Low Channel



LTE band 2 (5 ㎒ - QPSK_RB 1)
Low Channel



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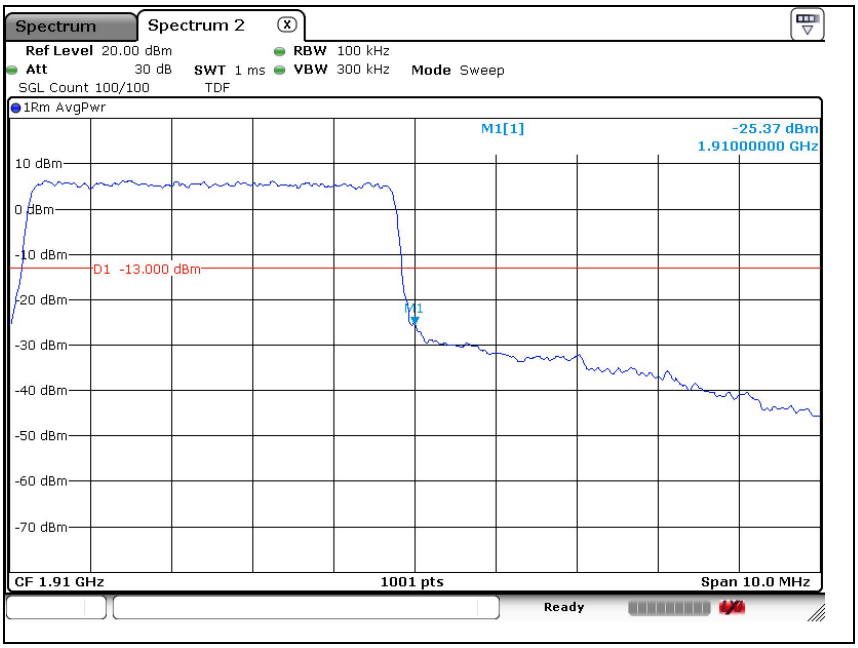
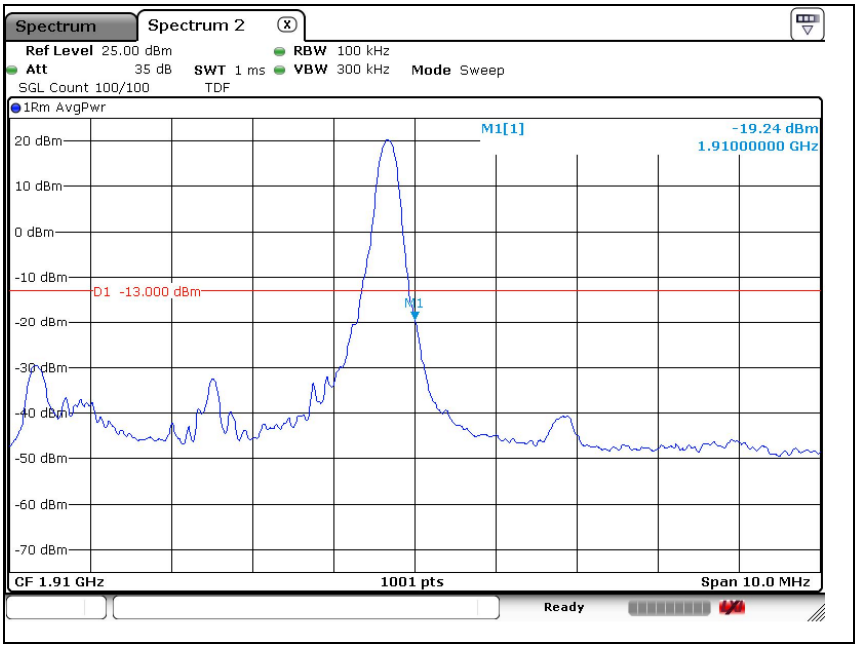
LTE band 2 (5 ㎒ - QPSK_RB 25)
High Channel



LTE band 2 (5 ㎒ - QPSK_RB 1)
High Channel



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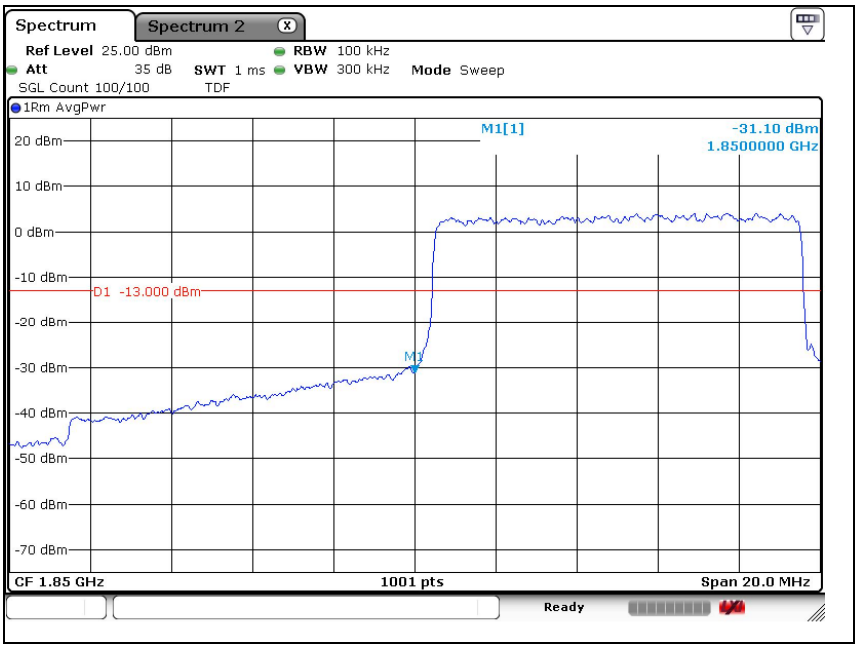
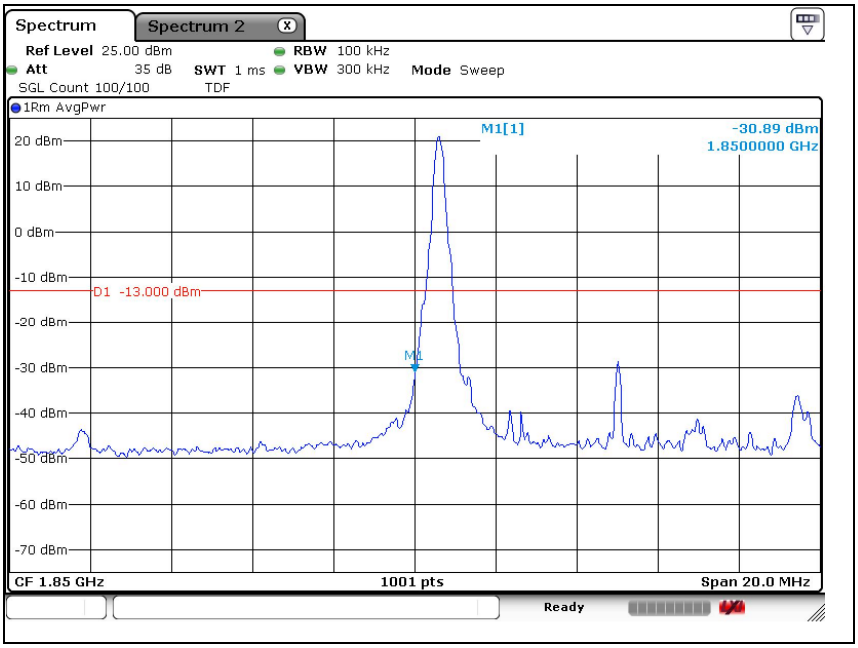
LTE band 2 (10 ㎒ - QPSK_RB 50)

Low Channel



LTE band 2 (10 ㎒ - QPSK_RB 1)

Low Channel



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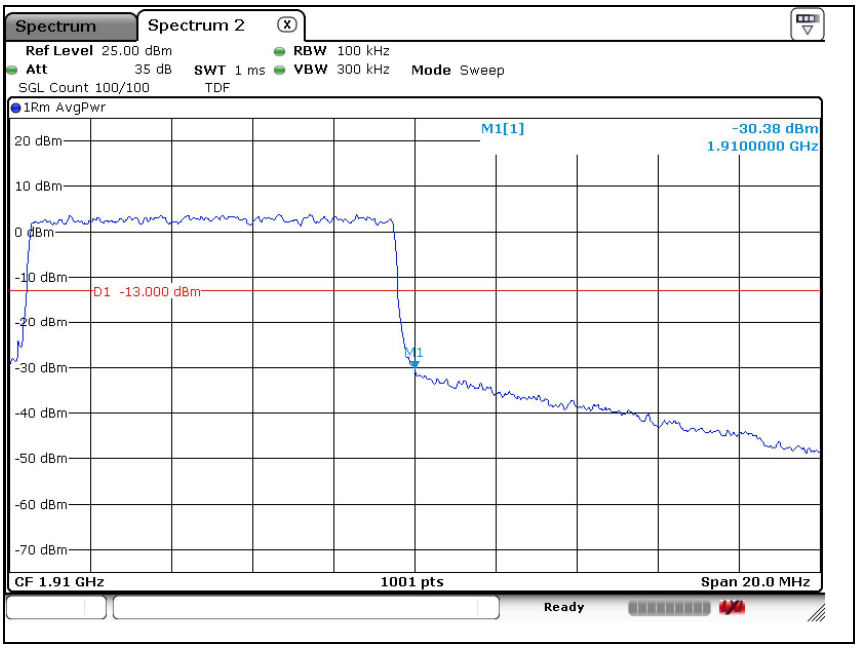
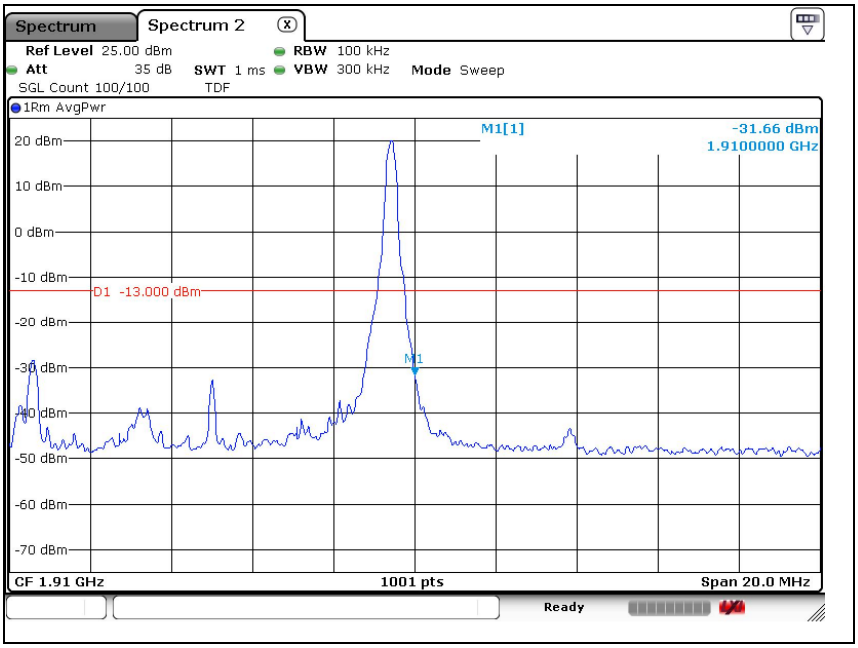
LTE band 2 (10 ㎒ - QPSK_RB 50)
High Channel



LTE band 2 (10 ㎒ - QPSK_RB 1)
High Channel



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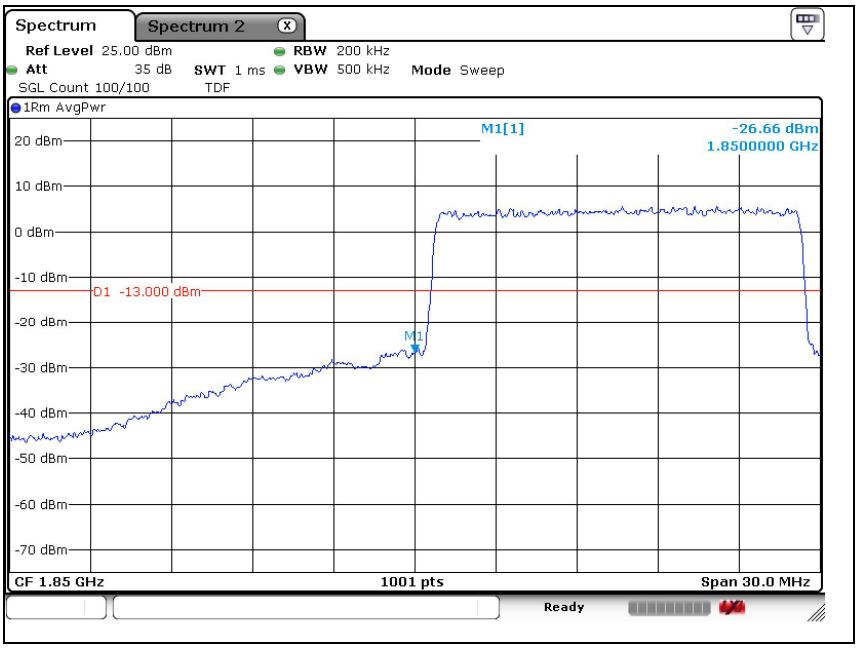
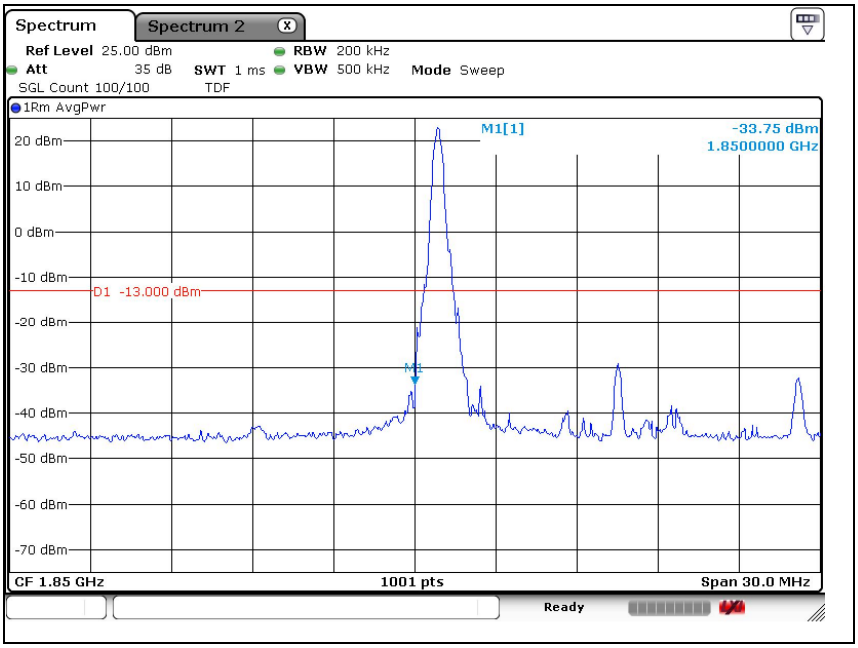
LTE band 2 (15 ㎒ - QPSK_RB 75)

Low Channel



LTE band 2 (15 ㎒ - QPSK_RB 1)

Low Channel



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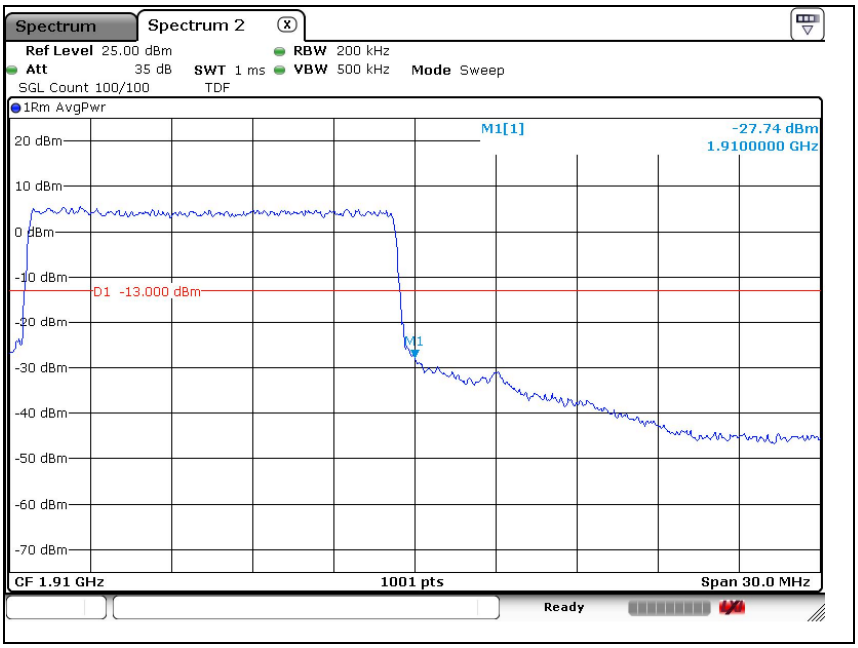
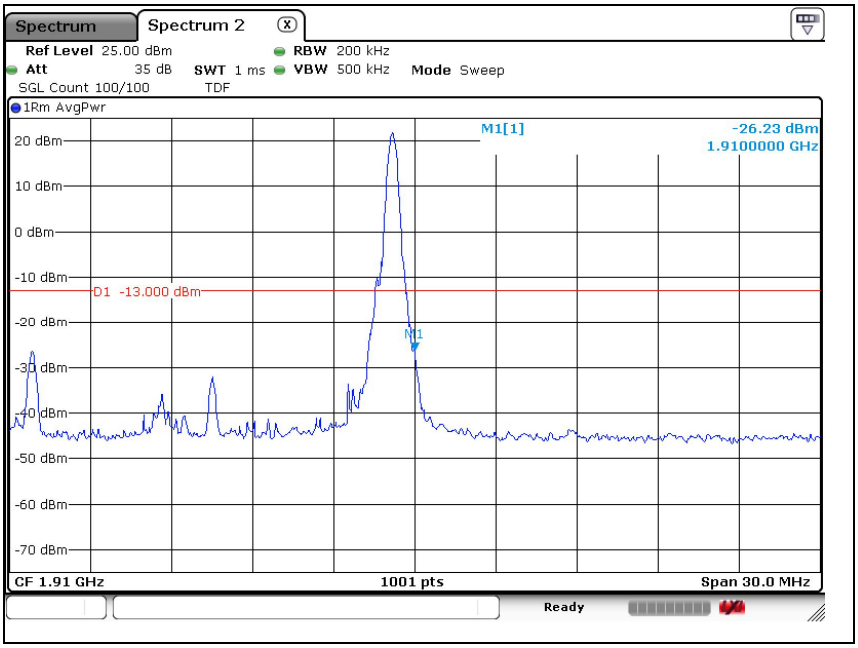
LTE band 2 (15 ㎒ - QPSK_RB 75)
High Channel



LTE band 2 (15 ㎒ - QPSK_RB 1)
High Channel



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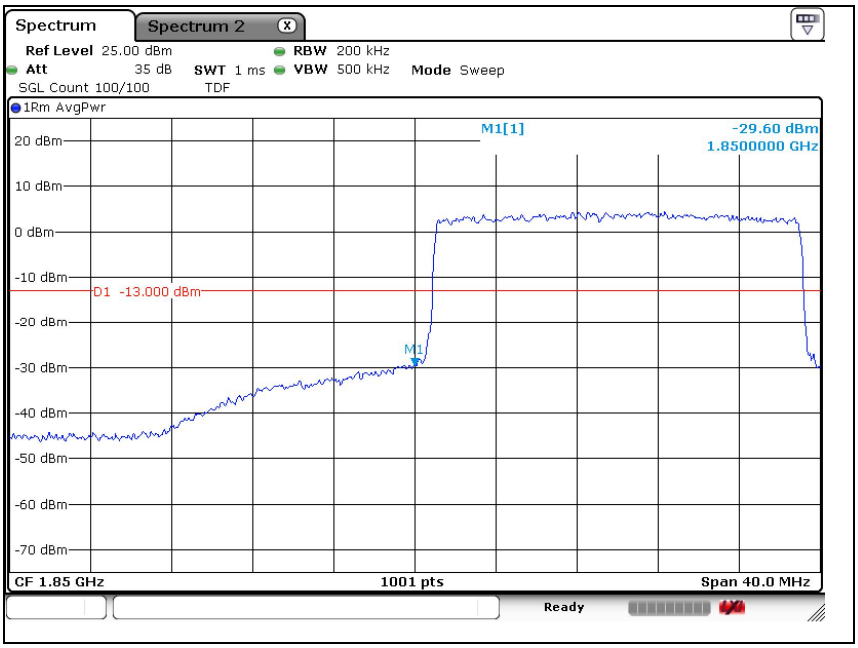
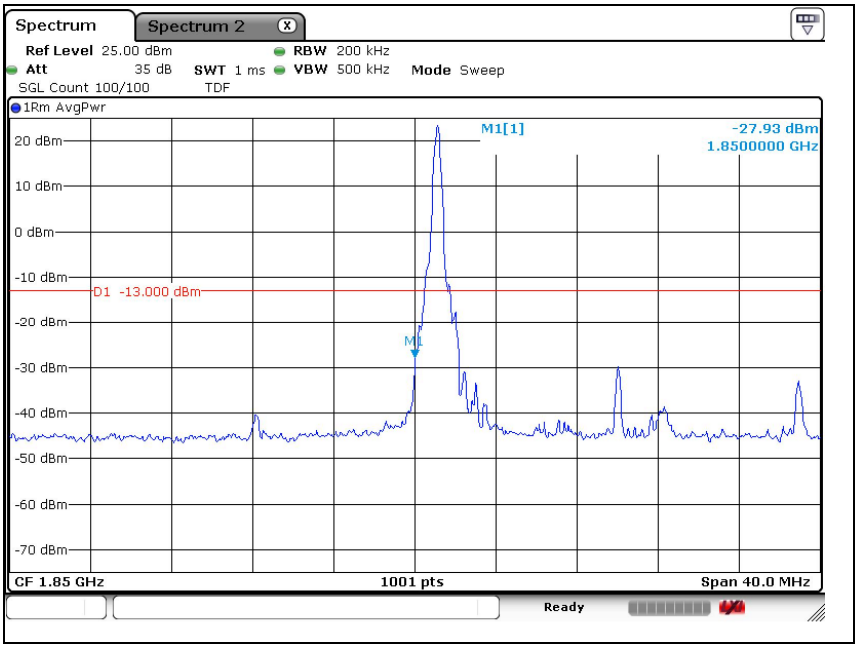
LTE band 2 (20 ㎒ - QPSK_RB 100)

Low Channel



LTE band 2 (20 ㎒ - QPSK_RB 1)

Low Channel



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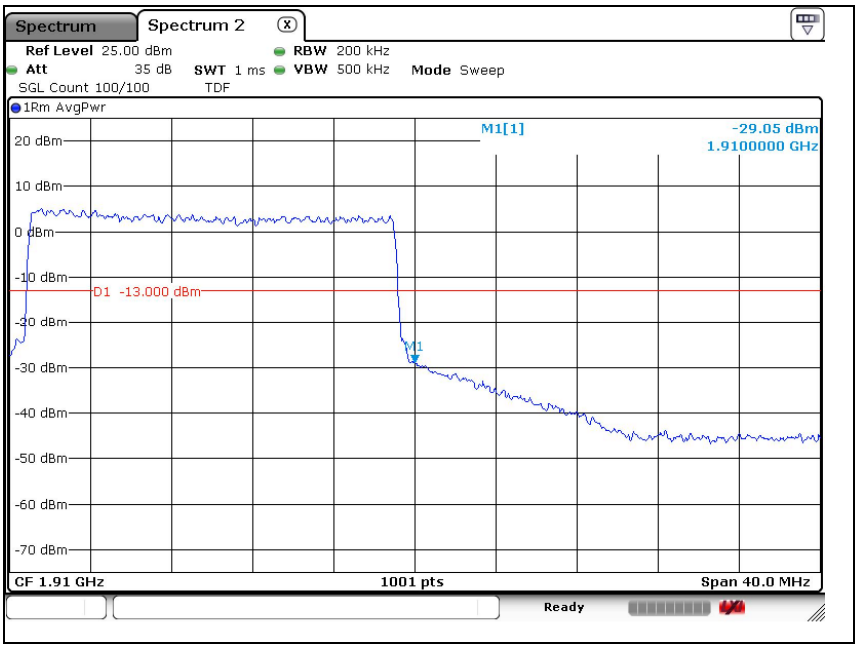
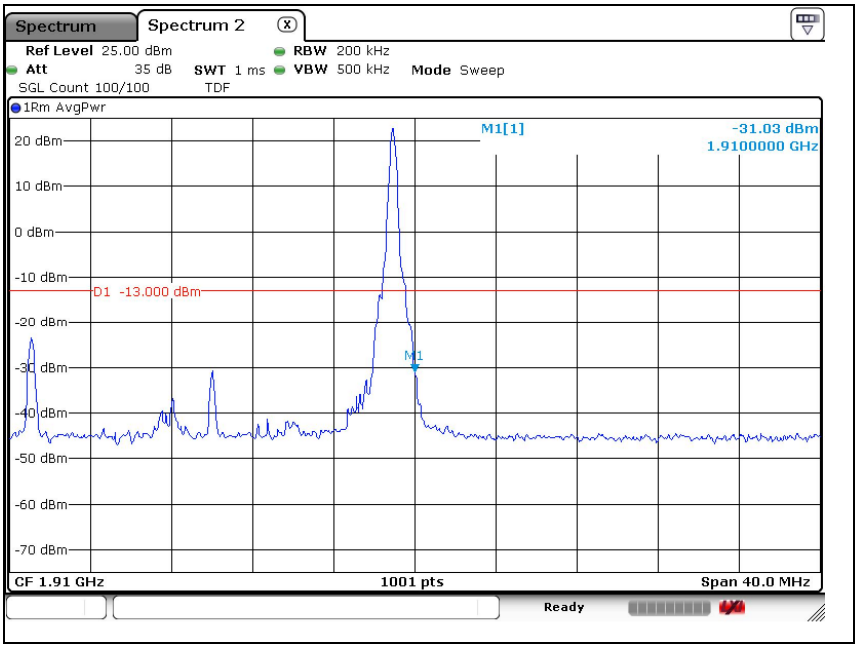
LTE band 2 (20 ㎒ - QPSK_RB 100)
High Channel



LTE band 2 (20 ㎒ - QPSK_RB 1)
High Channel



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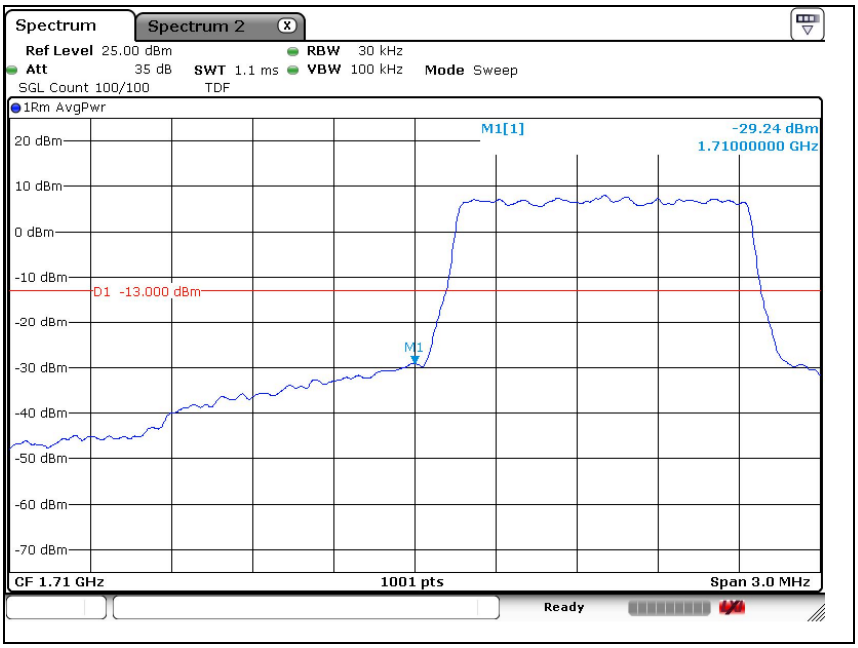
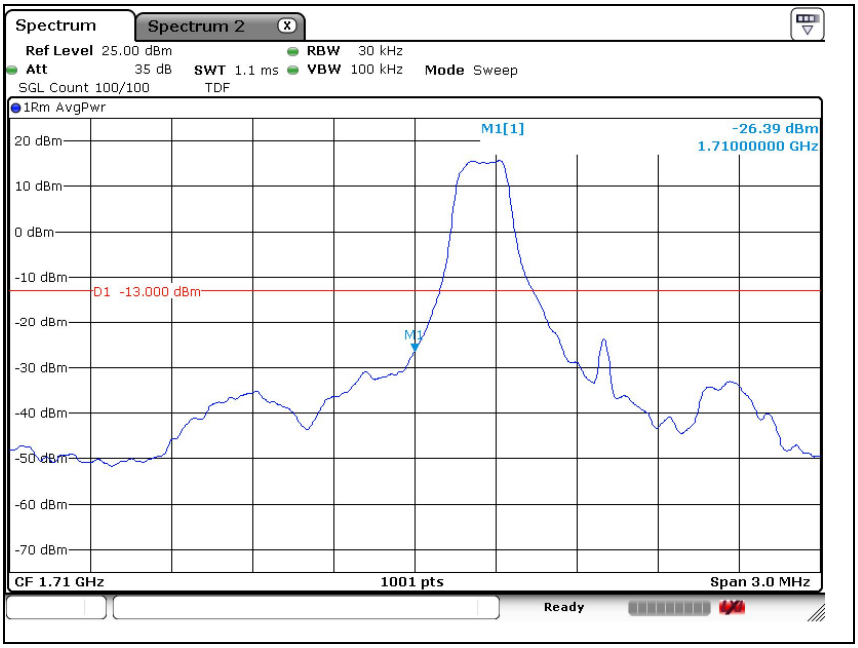
LTE band 4 (1.4 ㎒ - QPSK_RB 6)

Low Channel



LTE band 4 (1.4 ㎒ - QPSK_RB 1)

Low Channel



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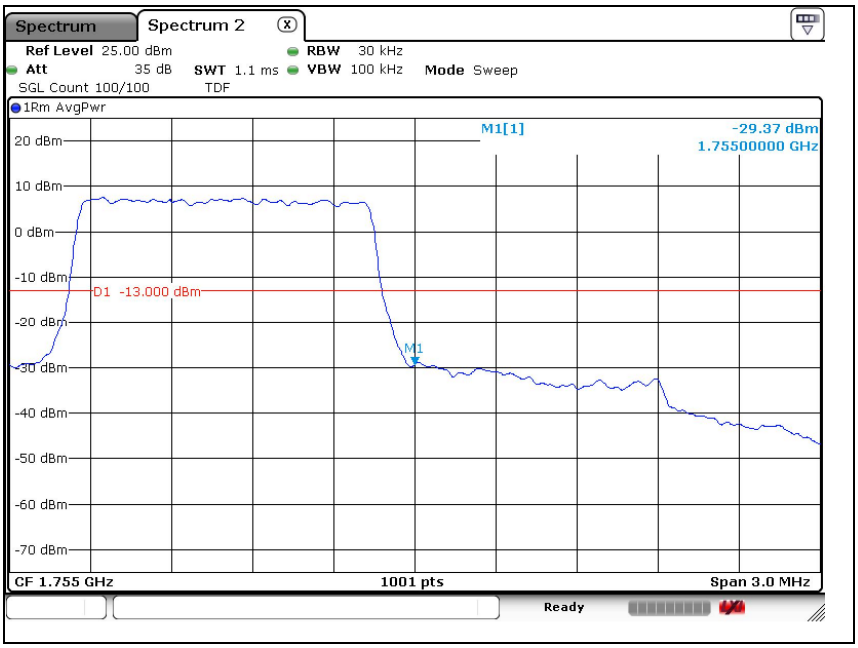
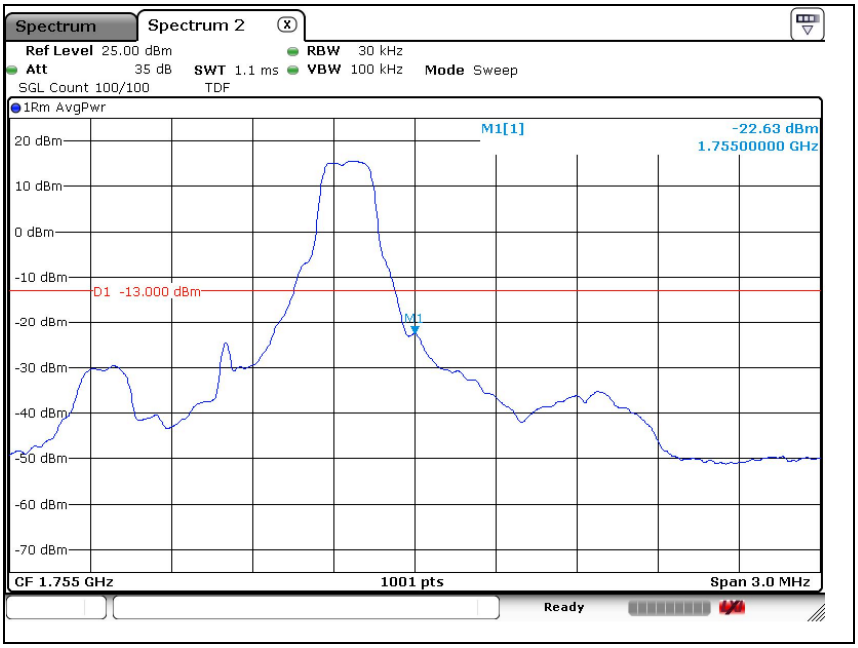
LTE band 4 (1.4 ㎒ - QPSK_RB 6)
High Channel



LTE band 4 (1.4 ㎒ - QPSK_RB 1)
High Channel



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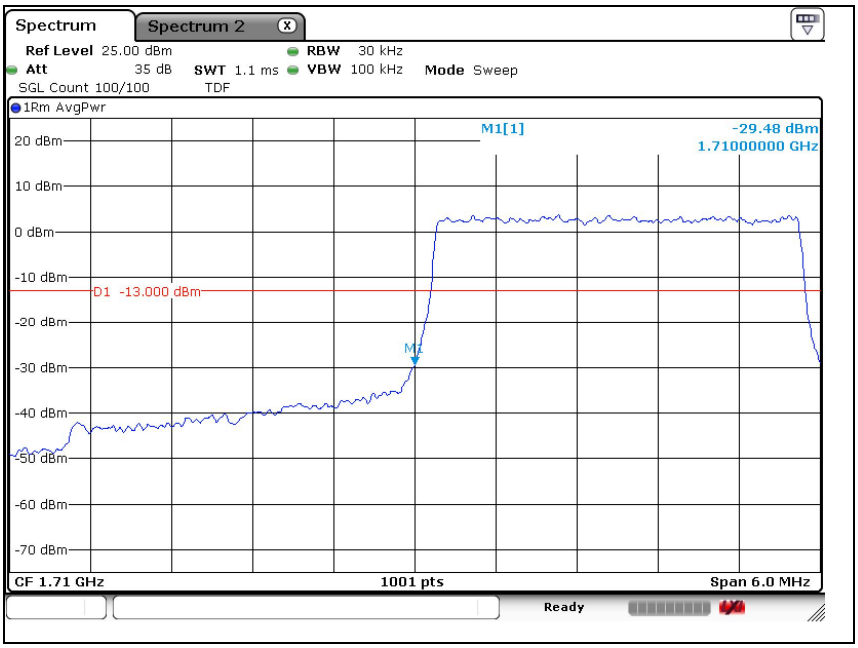
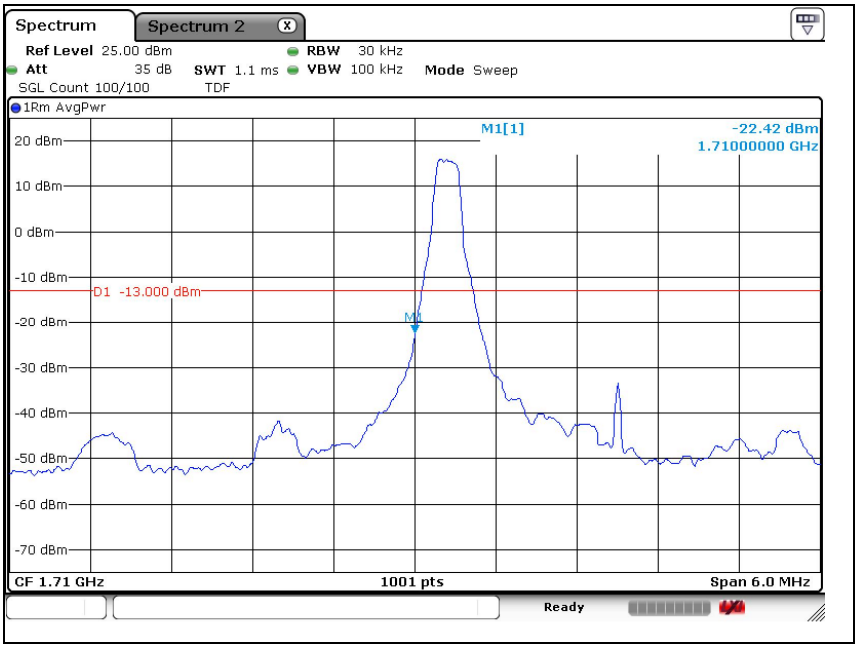
LTE band 4 (3 ㎒ - QPSK_RB 15)
Low Channel



LTE band 4 (3 ㎒ - QPSK_RB 1)
Low Channel



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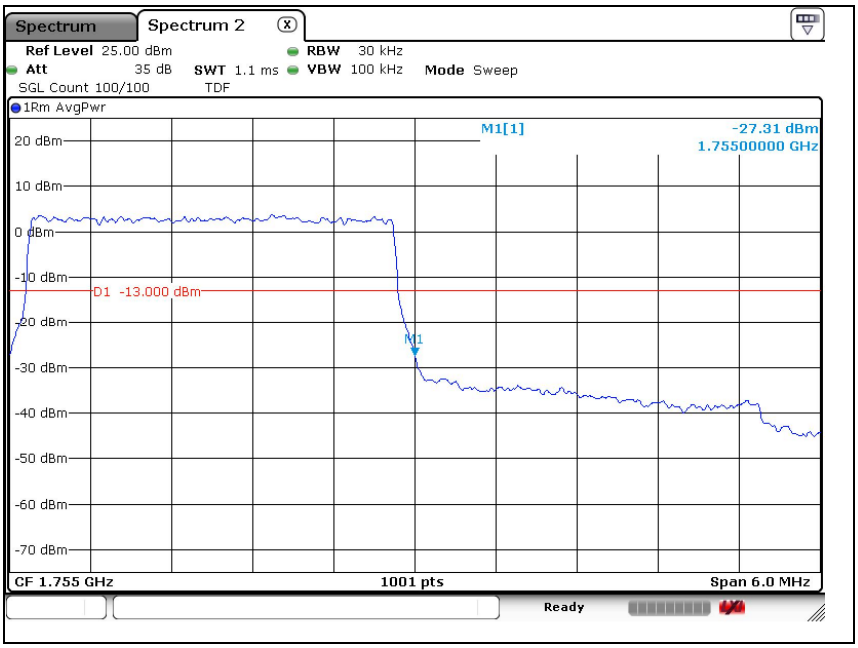
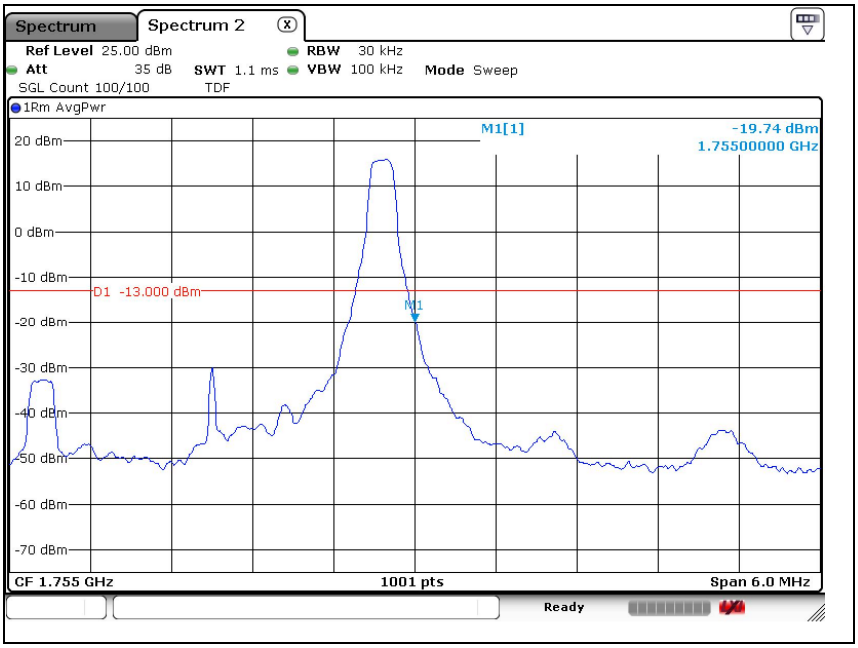
LTE band 4 (3 ㎒ - QPSK_RB 15)
High Channel



LTE band 4 (3 ㎒ - QPSK_RB 1)
High Channel



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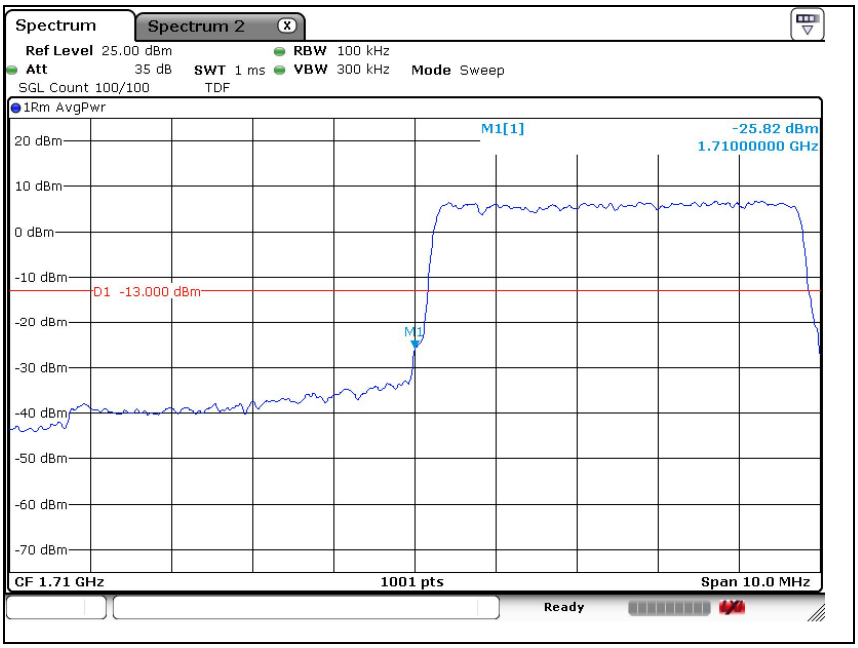
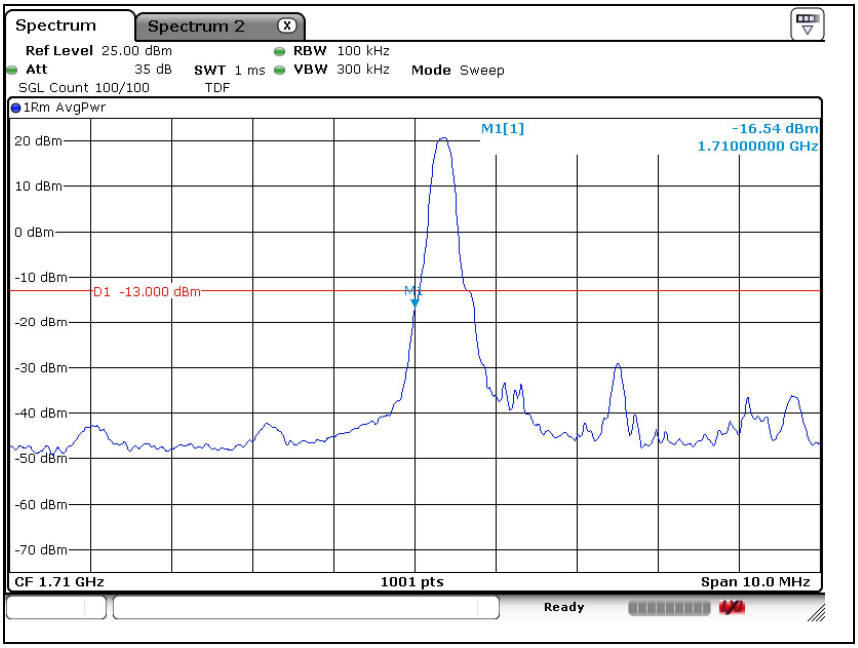
LTE band 4 (5 ㎒ - QPSK_RB 25)

Low Channel



LTE band 4 (5 ㎒ - QPSK_RB 1)

Low Channel



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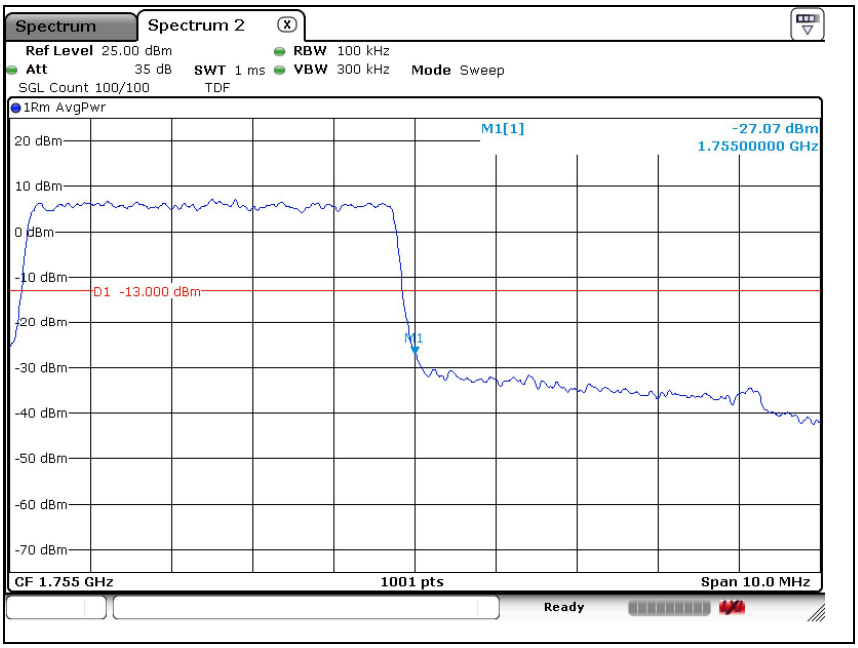
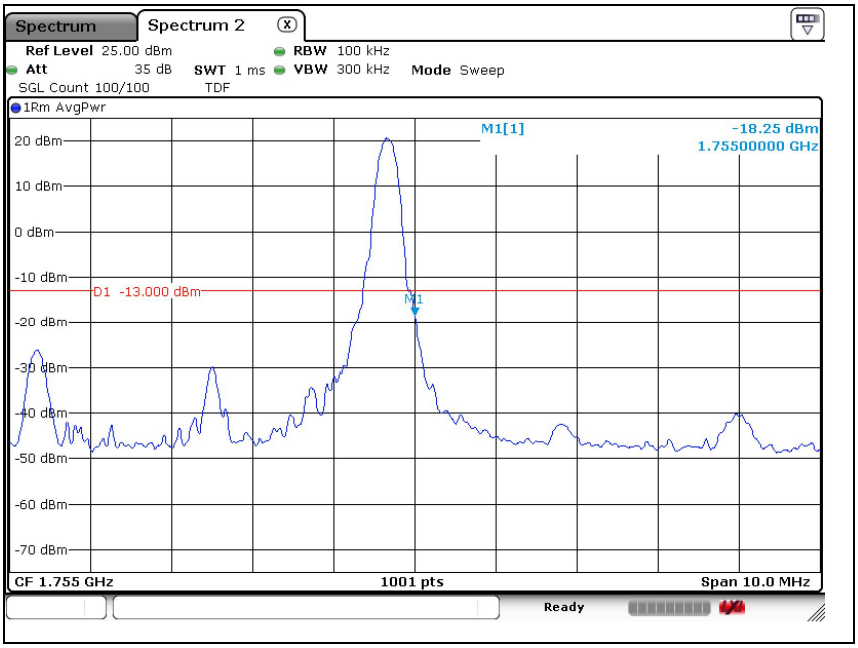
LTE band 4 (5 ㎒ - QPSK_RB 25)
High Channel



LTE band 4 (5 ㎒ - QPSK_RB 1)
High Channel



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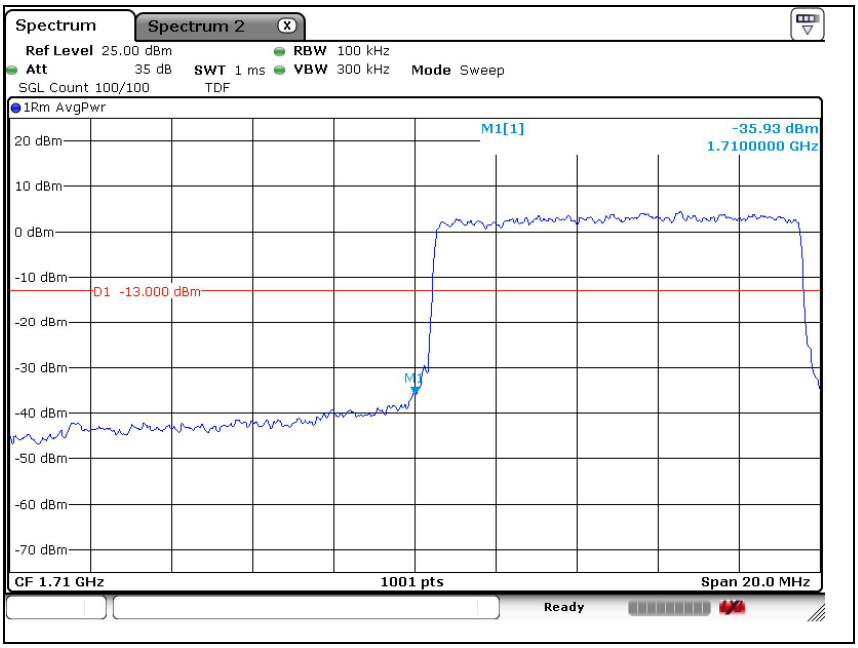
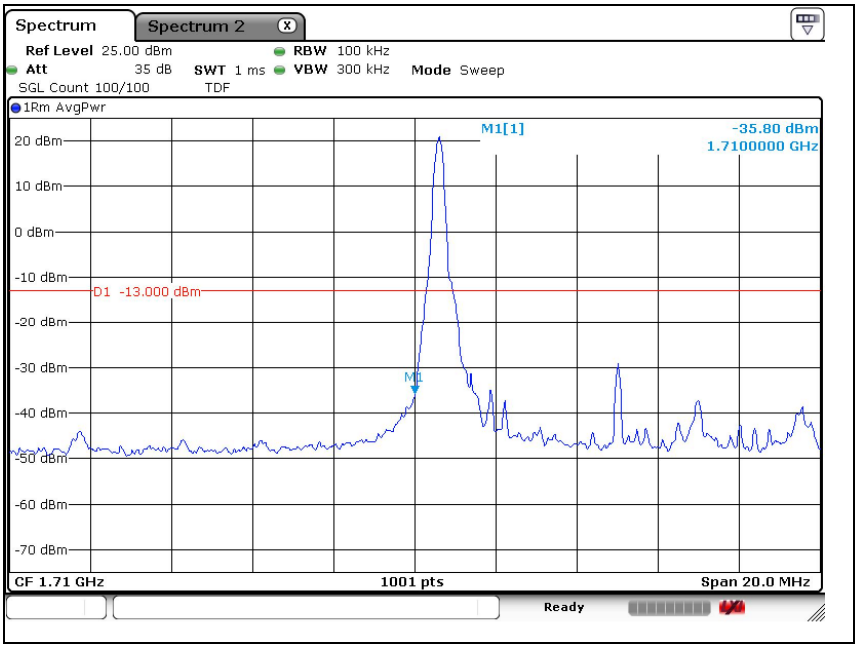
LTE band 4 (10 ㎒ - QPSK_RB 50)

Low Channel



LTE band 4 (10 ㎒ - QPSK_RB 1)

Low Channel



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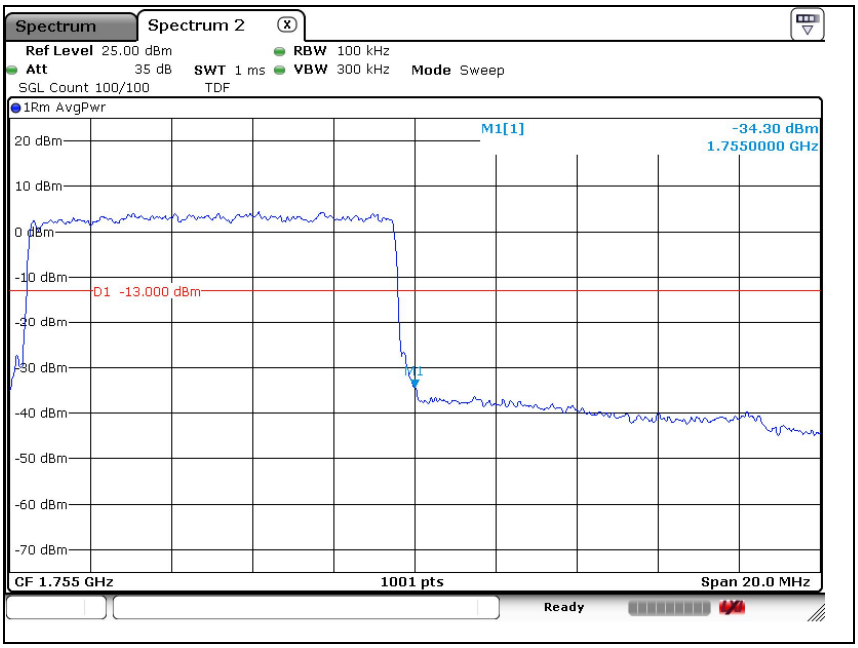
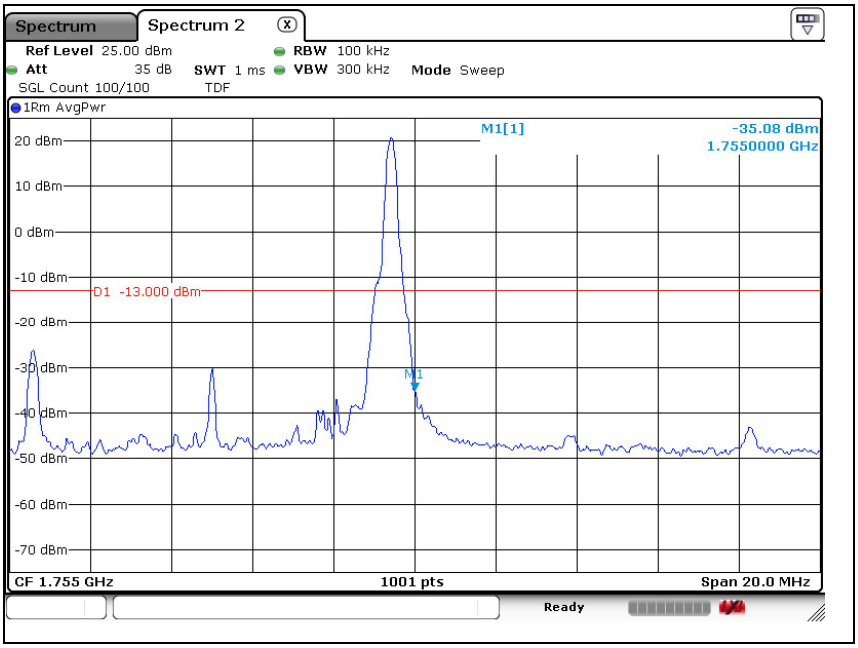
LTE band 4 (10 ㎒ - QPSK_RB 50)
High Channel



LTE band 4 (10 ㎒ - QPSK_RB 1)
High Channel



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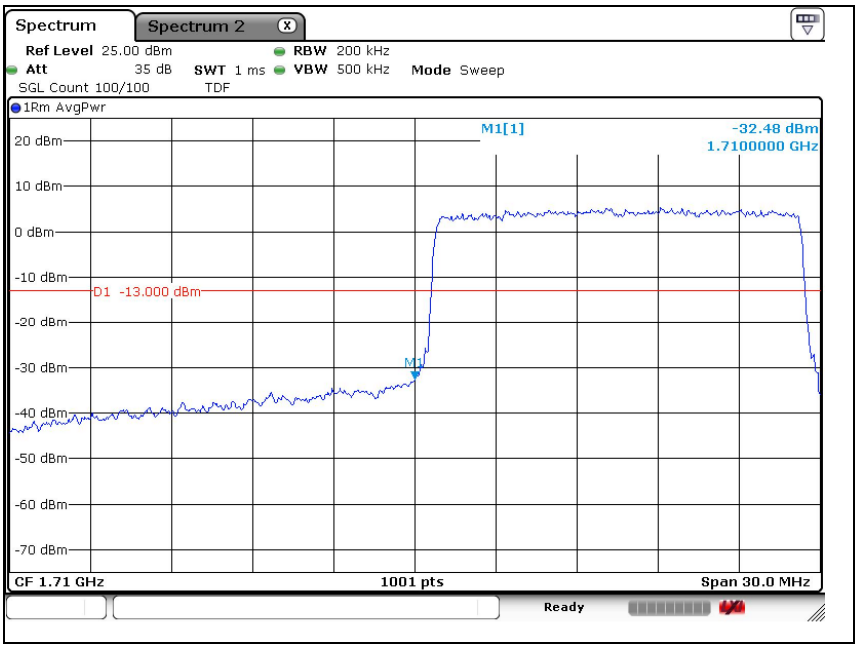
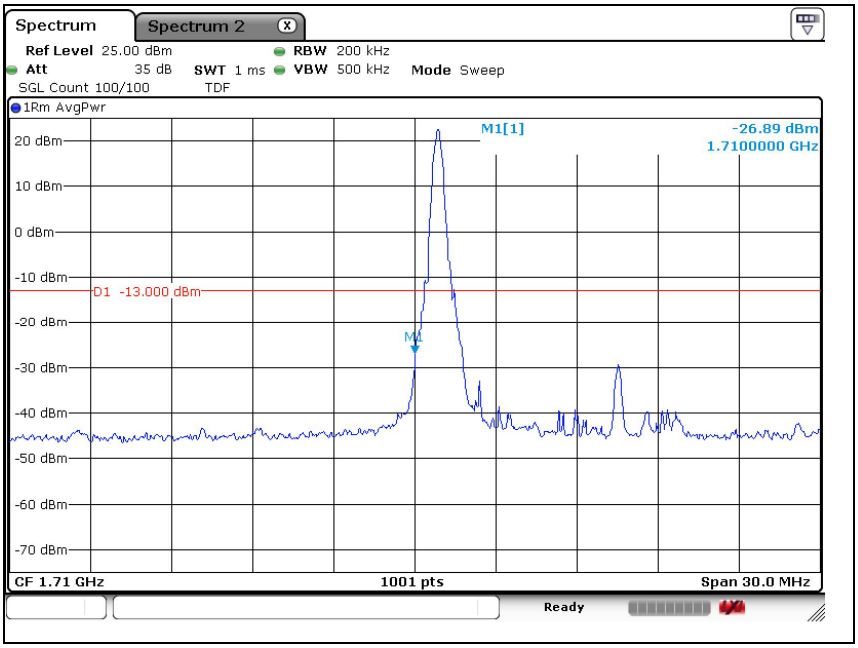
LTE band 4 (15 ㎒ - QPSK_RB 75)

Low Channel



LTE band 4 (15 ㎒ - QPSK_RB 1)

Low Channel



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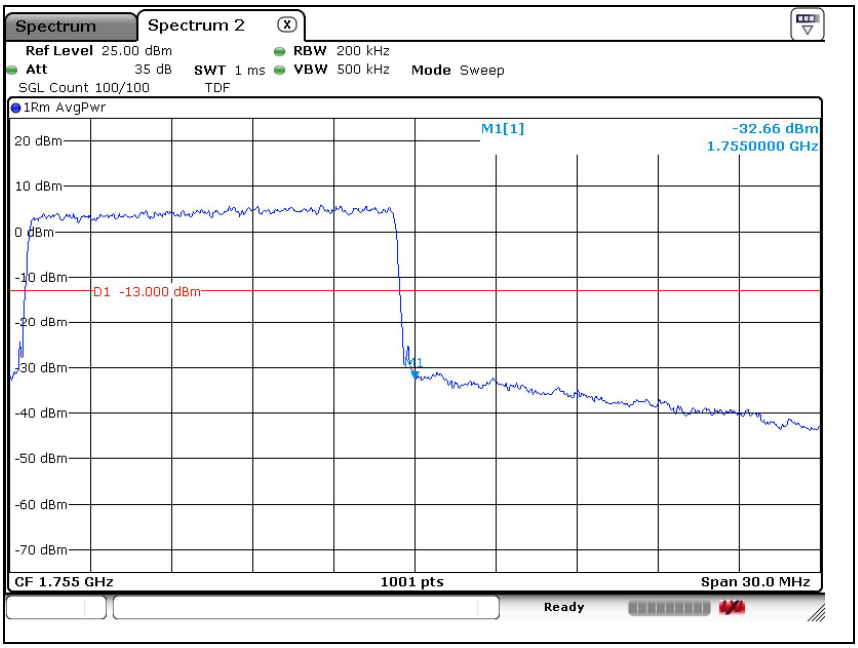
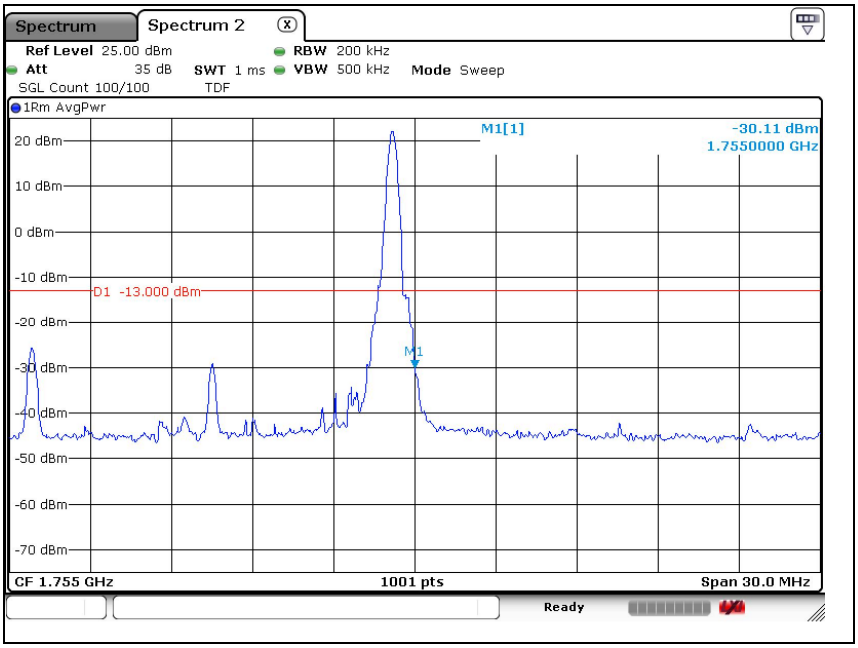
LTE band 4 (15 ㎒ - QPSK_RB 75)
High Channel



LTE band 4 (15 ㎒ - QPSK_RB 1)
High Channel



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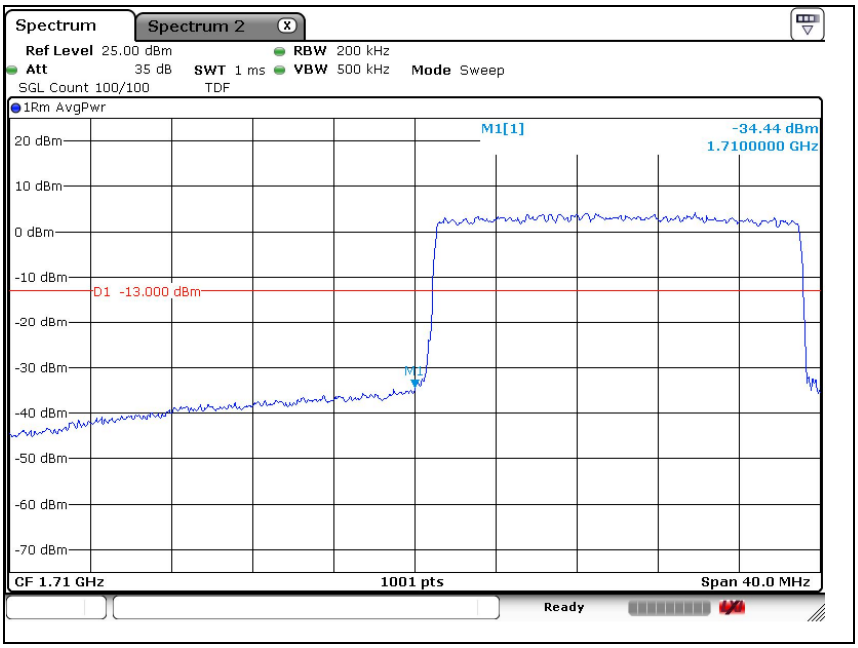
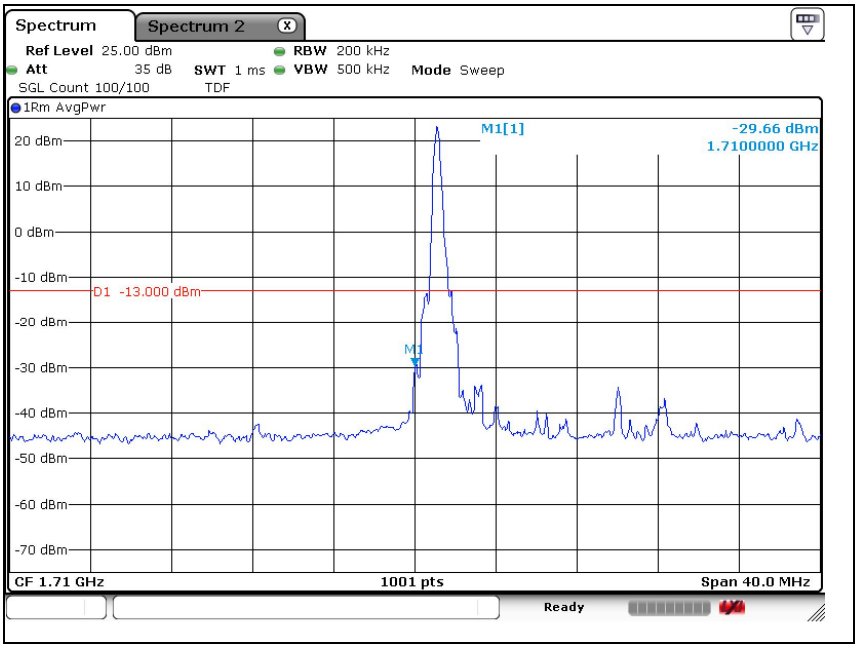
LTE band 4 (20 ㎒ - QPSK_RB 100)

Low Channel



LTE band 4 (20 ㎒ - QPSK_RB 1)

Low Channel



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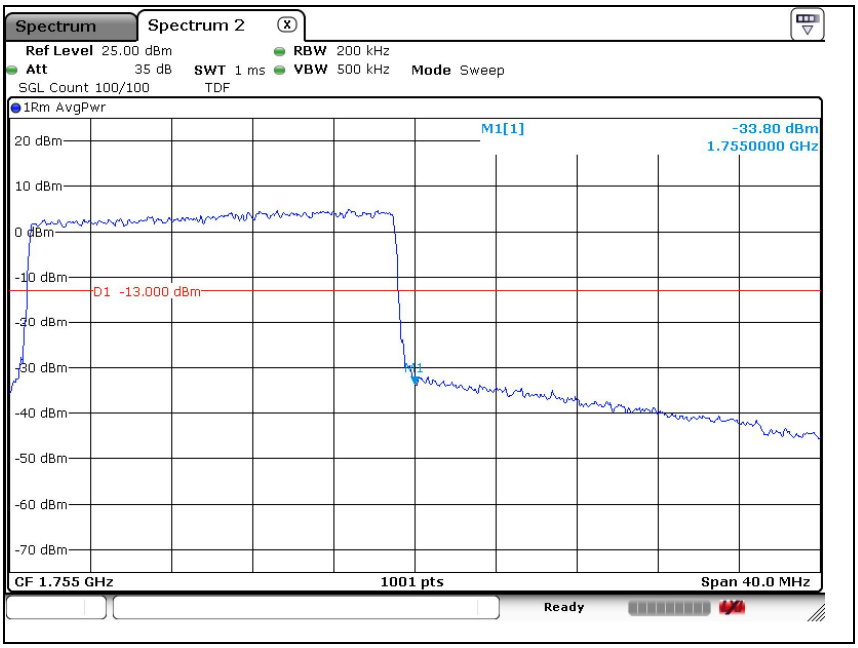
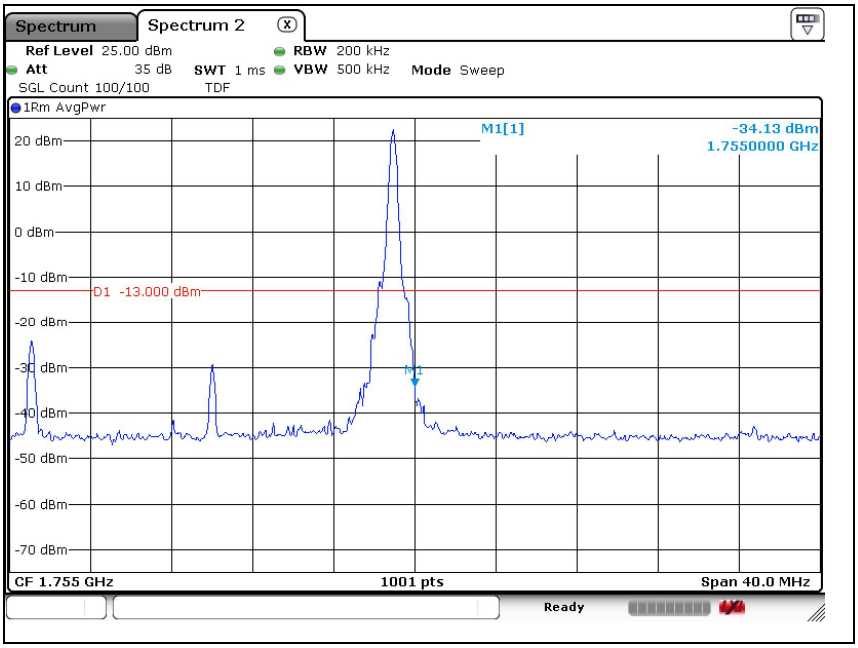
LTE band 4 (20 ㎒ - QPSK_RB 100)
High Channel



LTE band 4 (20 ㎒ - QPSK_RB 1)
High Channel



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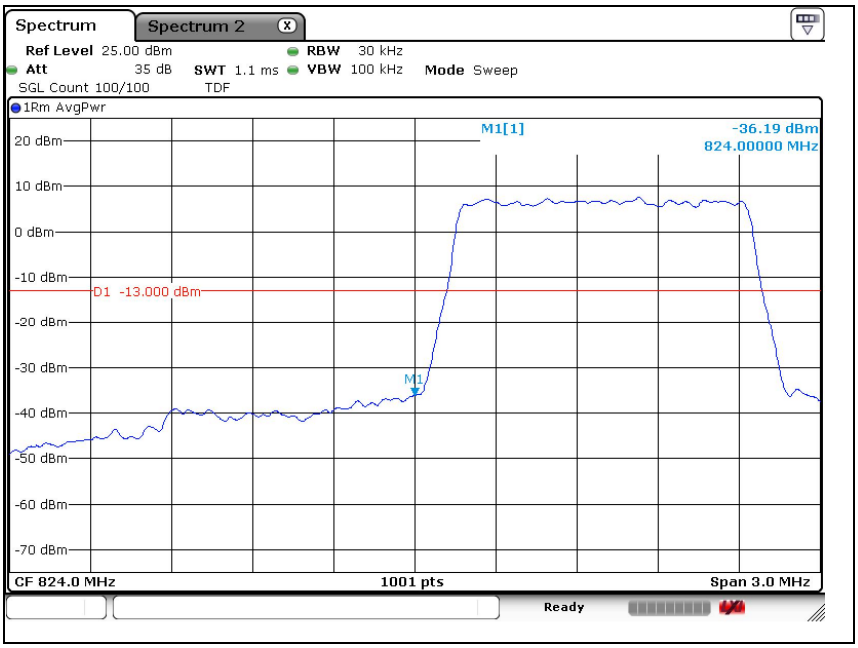
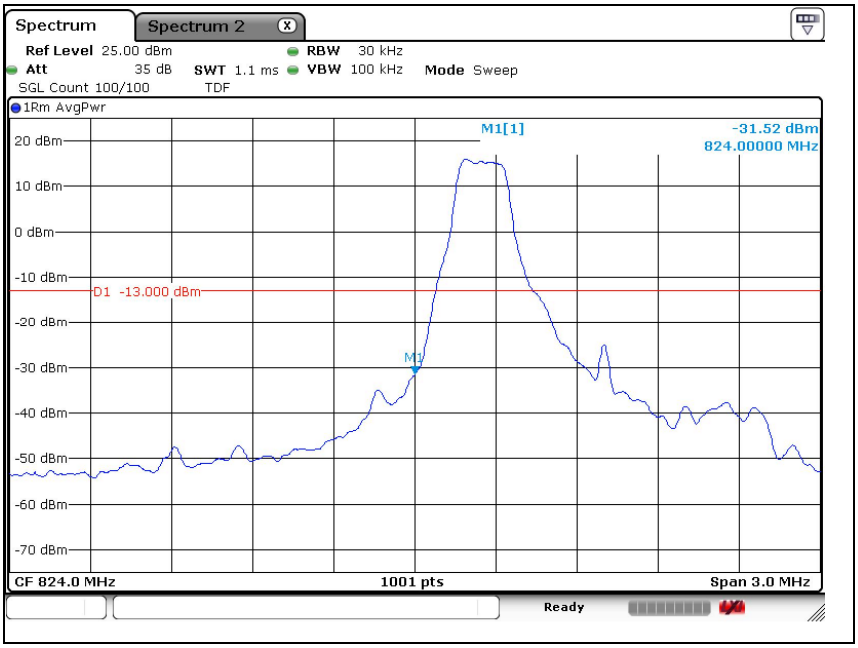
LTE band 5 (1.4 ㎒ - QPSK_RB 6)
Low Channel



LTE band 5 (1.4 ㎒ - QPSK_RB 1)
Low Channel



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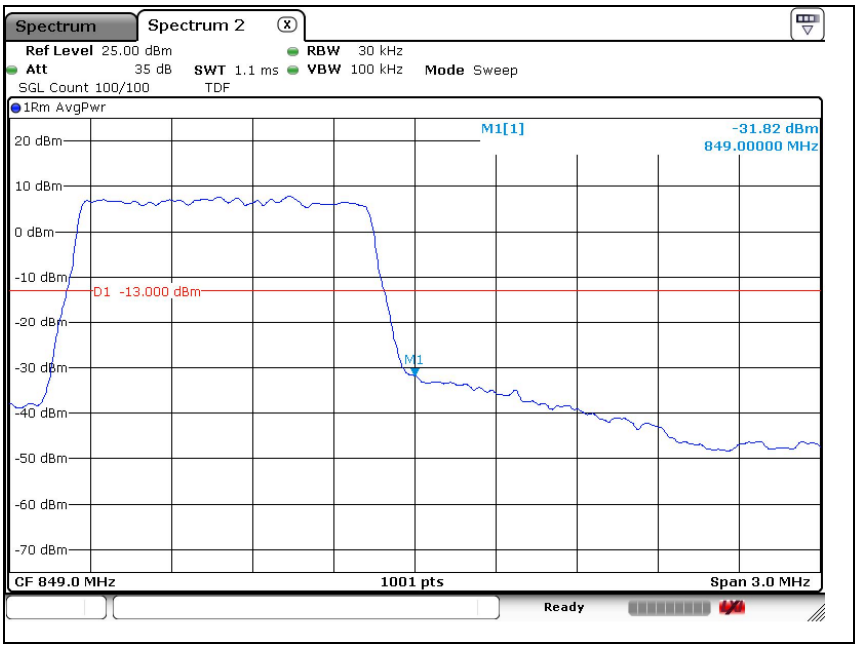
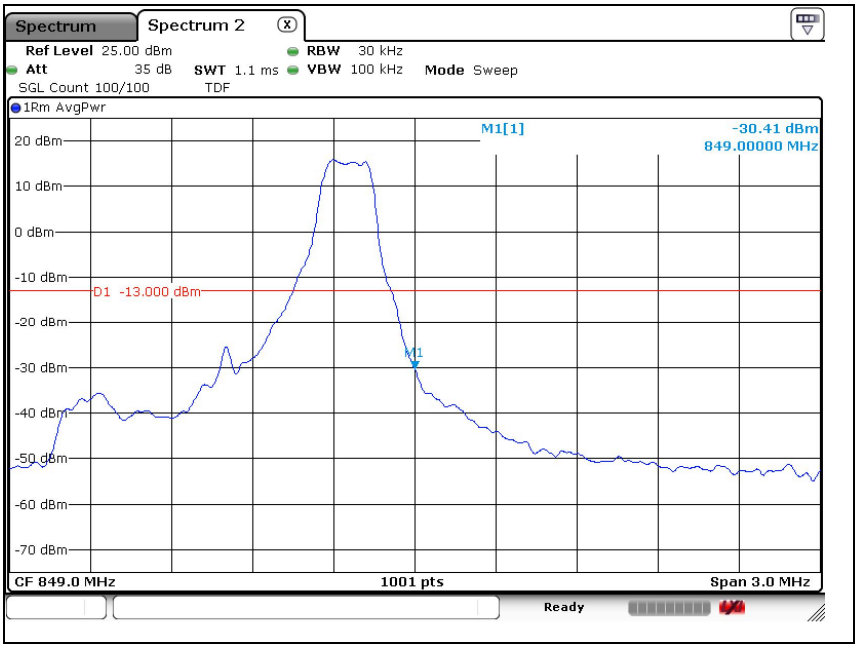
LTE band 5 (1.4 ㎒ - QPSK_RB 6)
High Channel



LTE band 5 (1.4 ㎒ - QPSK_RB 1)
High Channel



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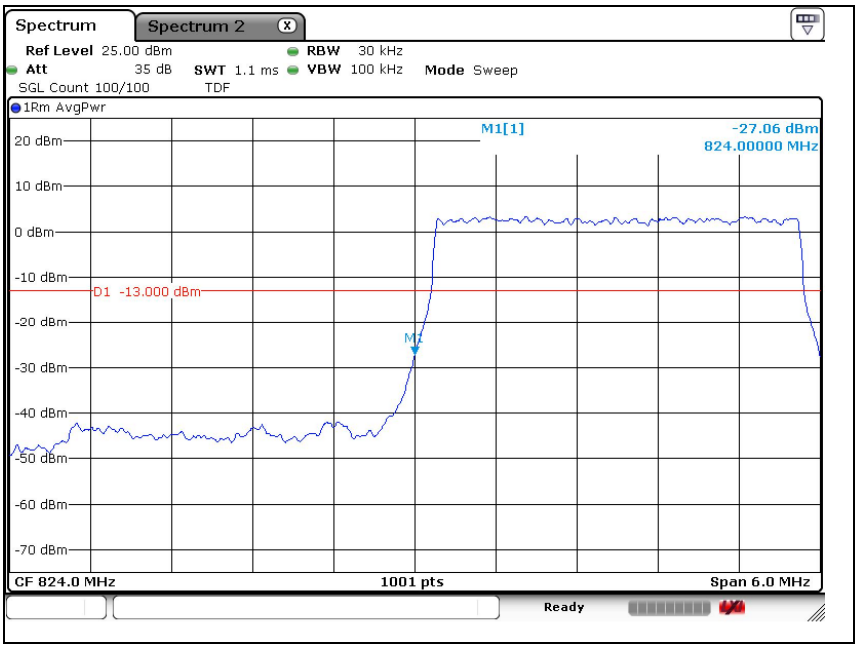
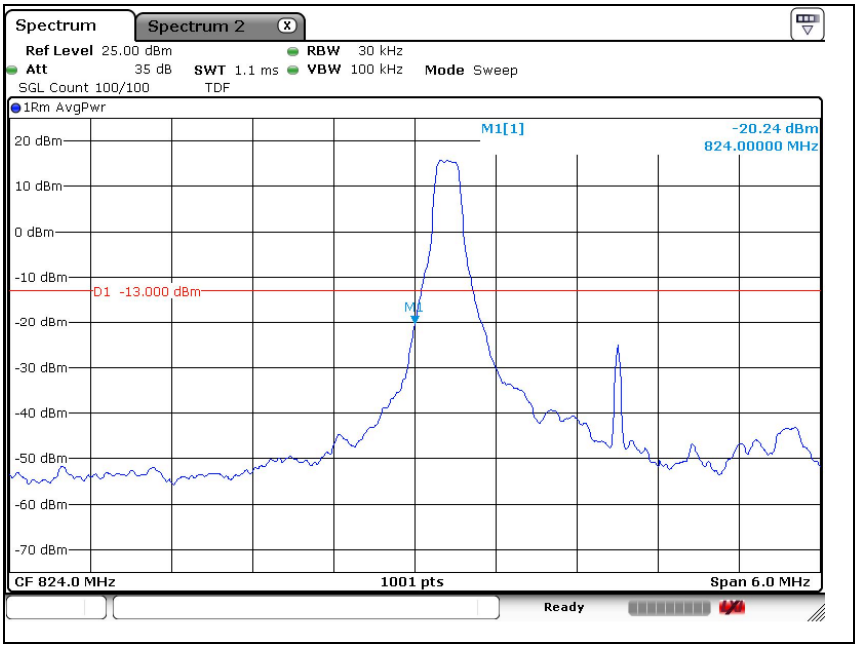
LTE band 5 (3 ㎒ - QPSK_RB 15)
Low Channel



LTE band 5 (3 ㎒ - QPSK_RB 1)
Low Channel



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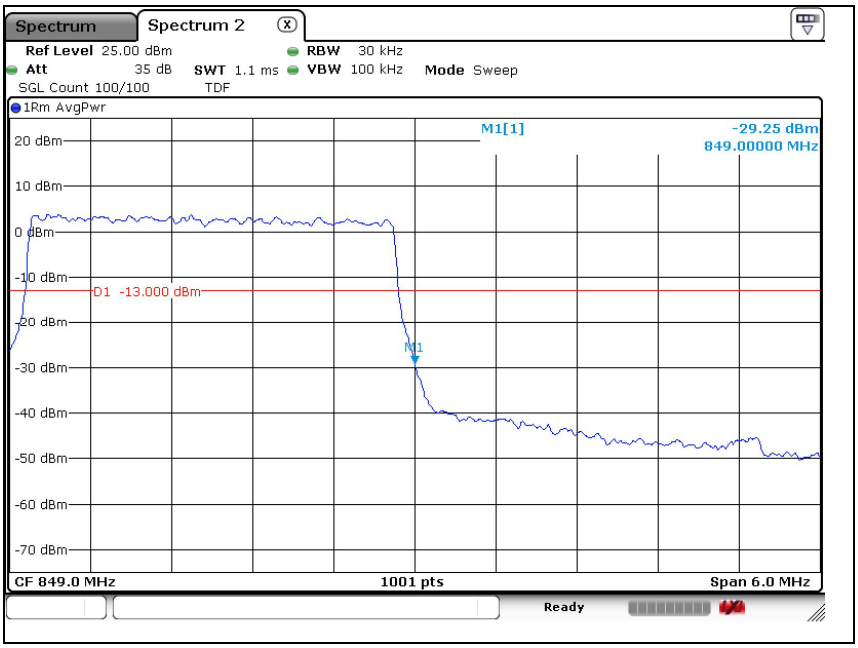
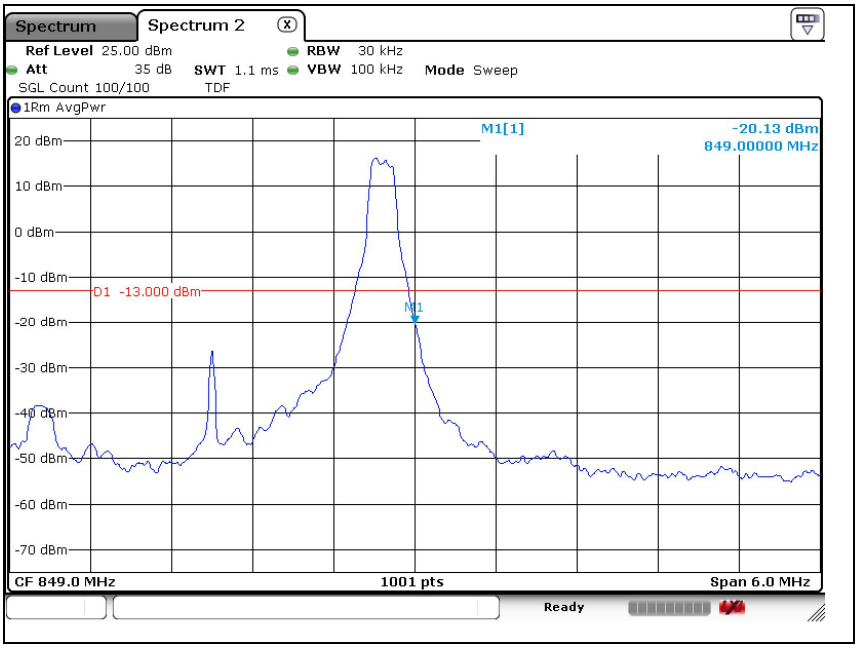
LTE band 5 (3 ㎒ - QPSK_RB 15)
High Channel



LTE band 5 (3 ㎒ - QPSK_RB 1)
High Channel



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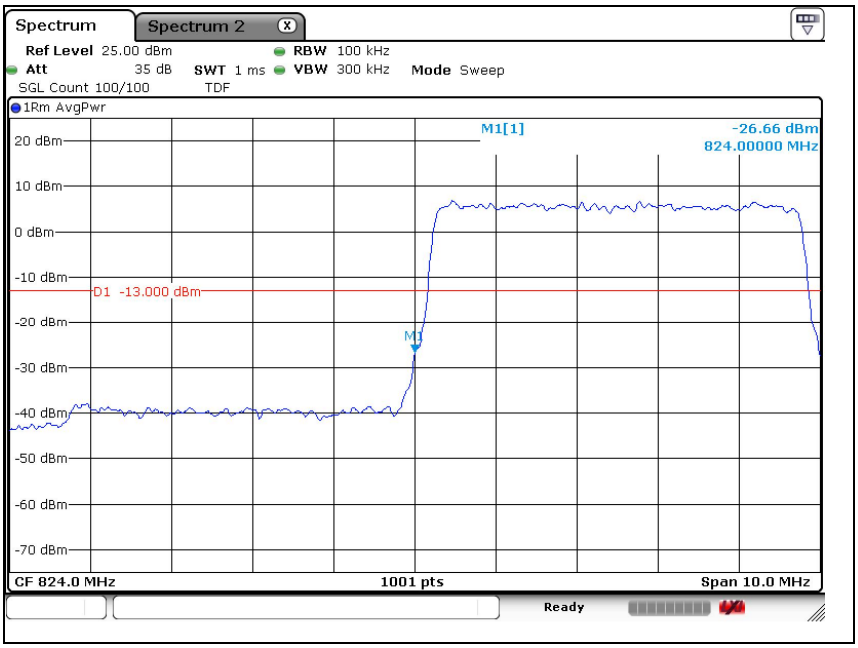
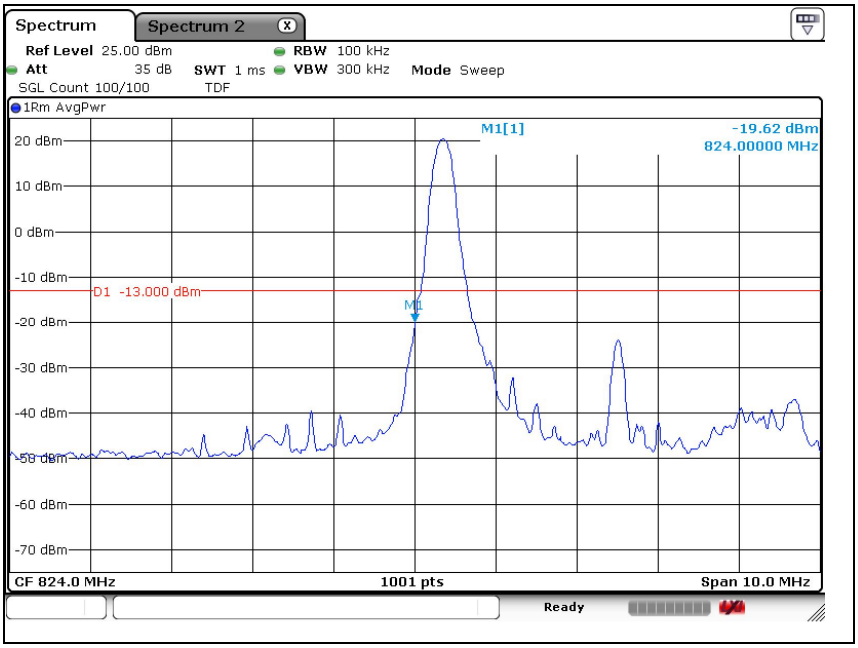
LTE band 5 (5 ㎒ - QPSK_RB 25)
Low Channel



LTE band 5 (5 ㎒ - QPSK_RB 1)
Low Channel



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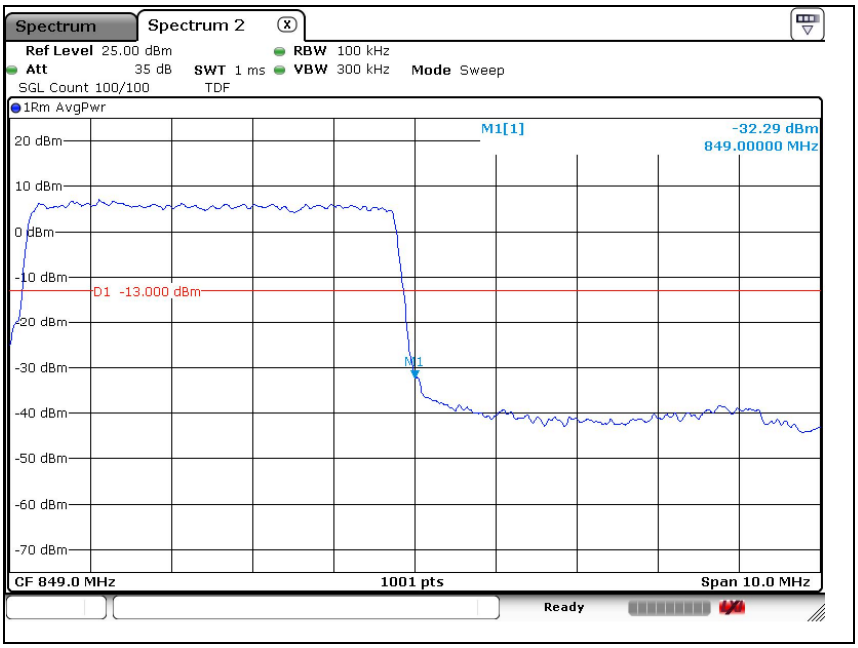
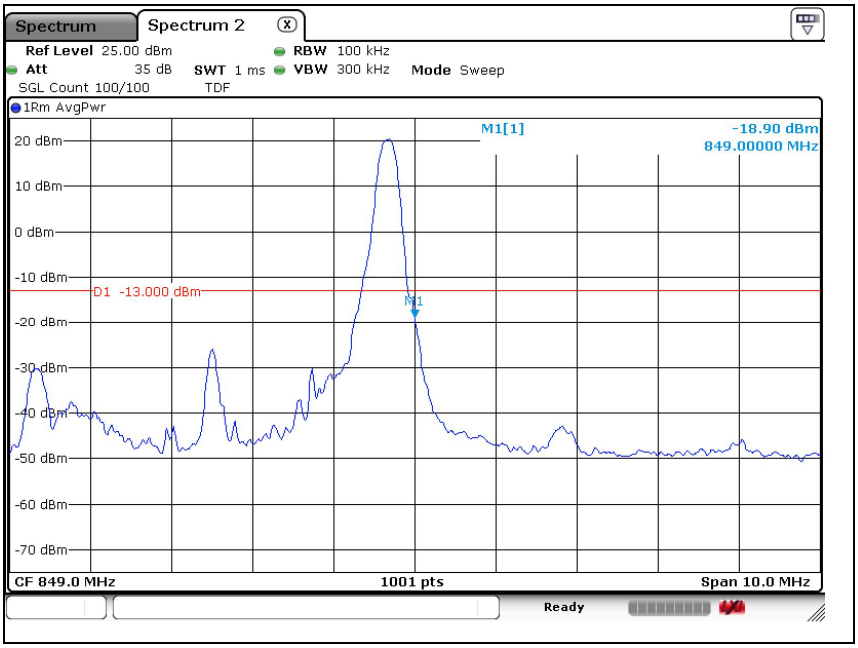
LTE band 5 (5 ㎒ - QPSK_RB 25)
High Channel



LTE band 5 (5 ㎒ - QPSK_RB 1)
High Channel



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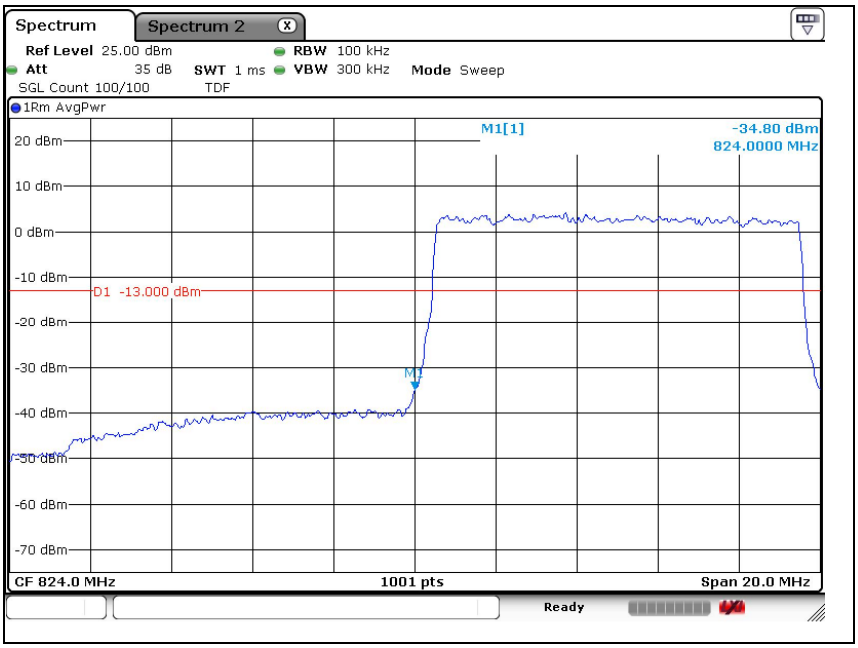
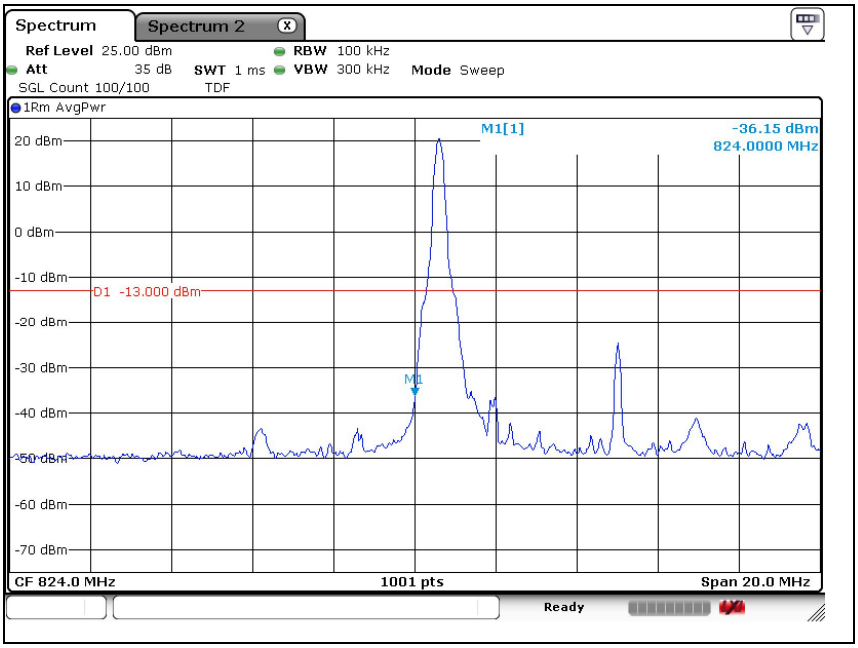
LTE band 5 (10 ㎒ - QPSK_RB 50)
Low Channel



LTE band 5 (10 ㎒ - QPSK_RB 1)
Low Channel



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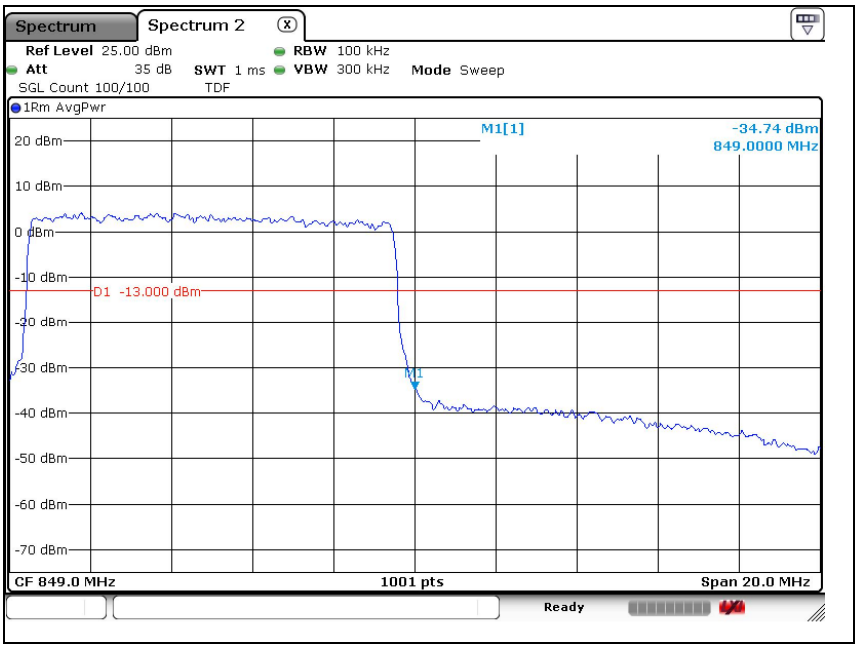
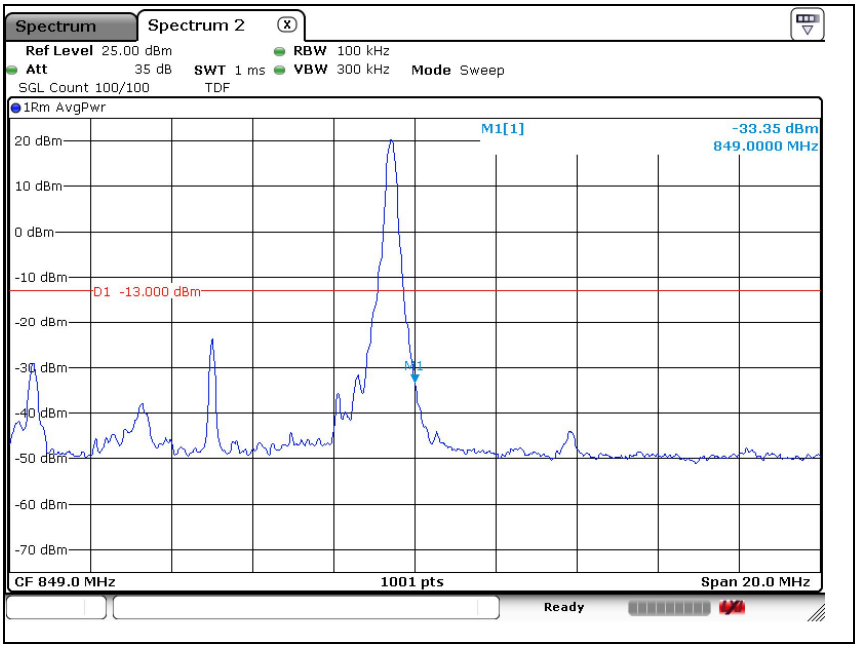
LTE band 5 (10 ㎒ - QPSK_RB 50)
High Channel



LTE band 5 (10 ㎒ - QPSK_RB 1)
High Channel



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8. Frequency Stability

8.1. Limit

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

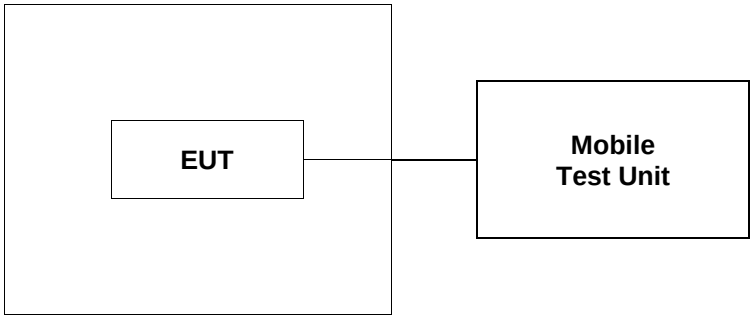
- §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table of this section.
For Mobile devices operating in the 824 to 849 ㎒ band at a power level less than or equal to 3 Watts, the limit specified in Table C-1 is +/- 2.5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

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

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8.3. Test Results

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

LTE band 2 at middle channel

Reference Frequency: 1 880.0 ㎒			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (V_{dc})**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	12	-5	-0.002 7
40		-3	-0.001 6
30		1	0.000 5
23		3	0.001 6
10		5	0.002 7
0		7	0.003 7
-10		2	0.001 1
-20		3	0.001 6
-30		-5	-0.002 7
Frequency Stability versus Power Supply			
Environment Temperature (℃)	**Power Supplied (V_{dc})**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
23	13.8	5	0.002 7
	10.2	7	0.003 7

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LTE band 4 at middle channel

Reference Frequency: 1 732.5 ㎒			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (V_{dc})**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	12	4	0.002 3
40		5	0.002 9
30		7	0.004 0
23		6	0.003 5
10		-2	-0.001 2
0		-4	-0.002 3
-10		1	0.000 6
-20		-5	-0.002 9
-30		-10	-0.005 8
Frequency Stability versus Power Supply			
Environment Temperature (℃)	**Power Supplied (V_{dc})**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
23	13.8	-4	-0.002 3
	10.2	6	0.003 5

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LTE band 5 at middle channel

Reference Frequency: 836.5 ㎒			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (V_{dc})**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	12	-5	-0.006 0
40		7	0.008 4
30		-3	-0.003 6
23		1	0.001 2
10		10	0.012 0
0		5	0.006 0
-10		-3	-0.003 6
-20		-5	-0.006 0
-30		1	0.001 2
Frequency Stability versus Power Supply			
Environment Temperature (℃)	**Power Supplied (V_{dc})**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
23	13.8	3	0.003 6
	10.2	7	0.008 4

- End of the Test Report -

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