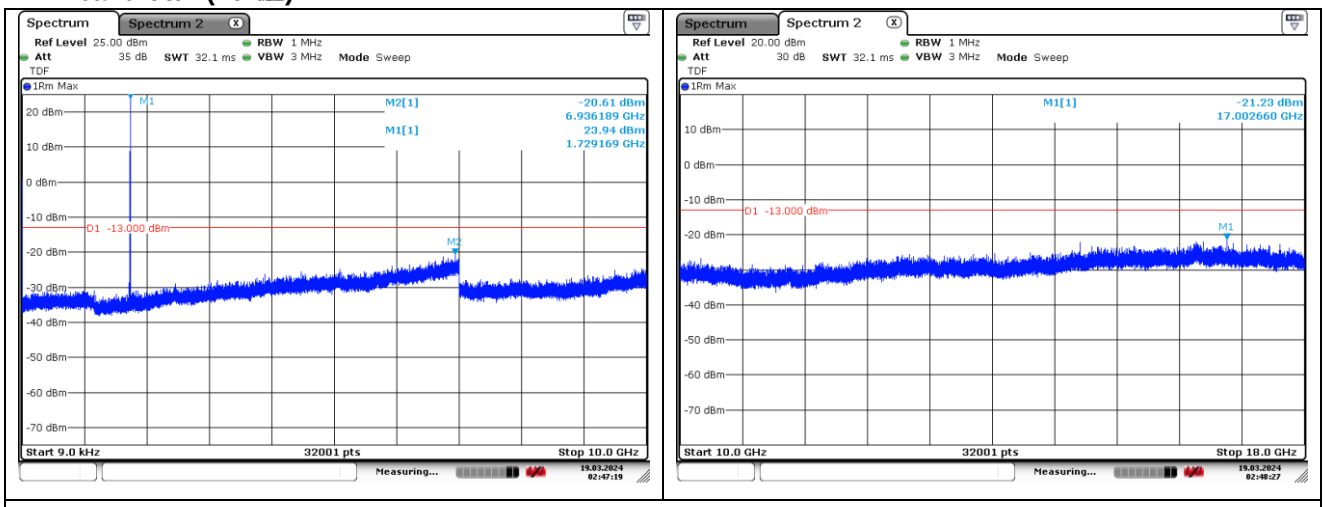
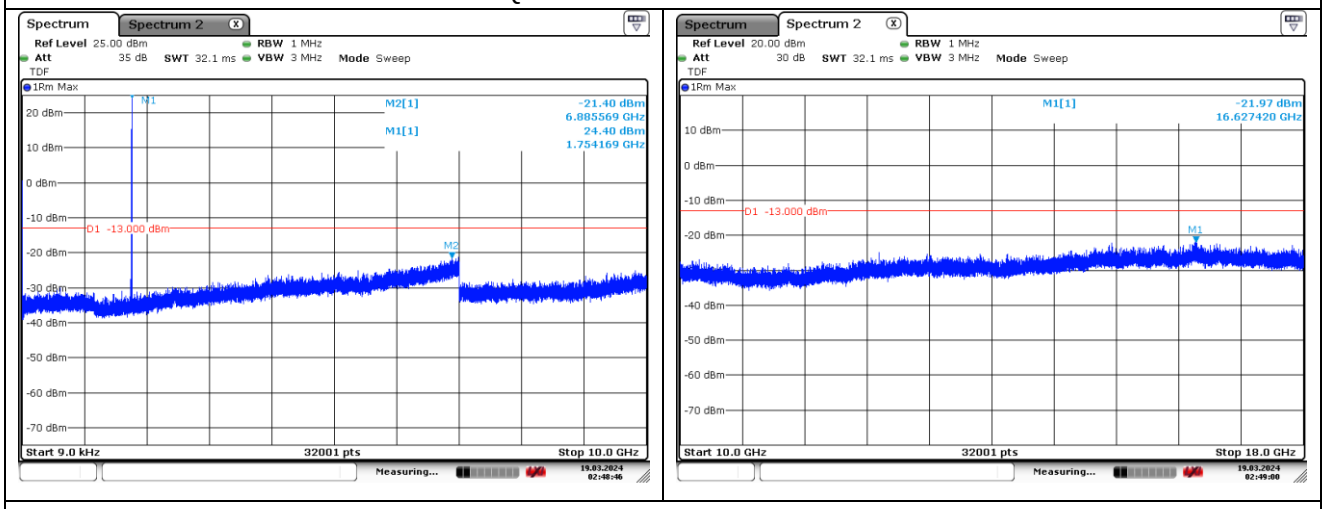
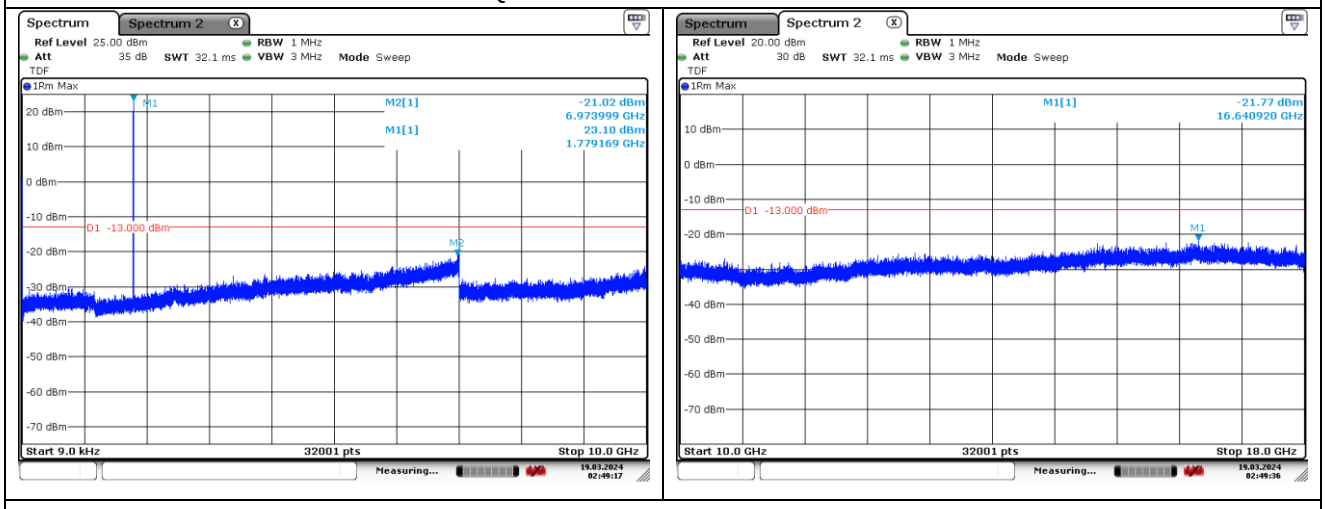
LTE band 66/4 (20 MHz)



QPSK Low Channel - 1 RB

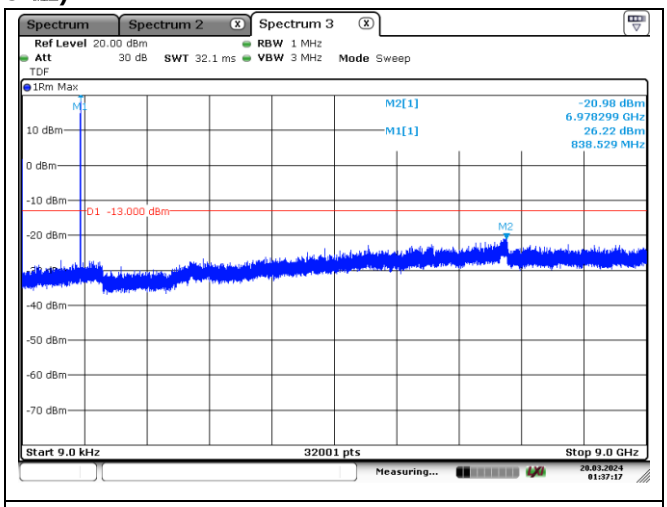


QPSK Middle Channel - 1 RB

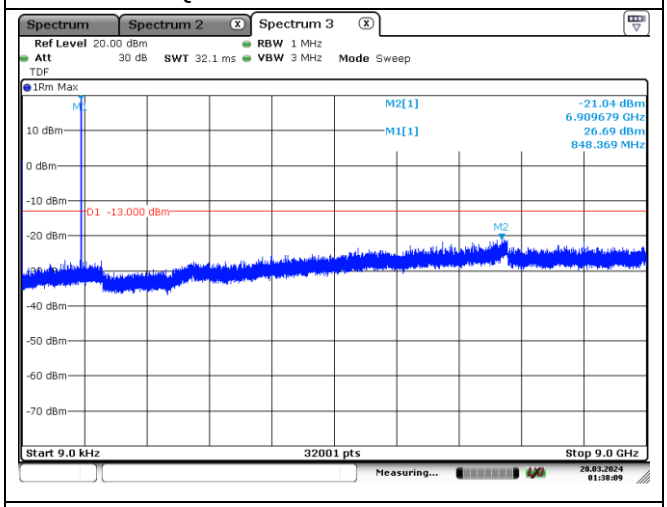


QPSK High Channel - 1 RB

LTE band 26/5_Part 22 (15 ㎒)

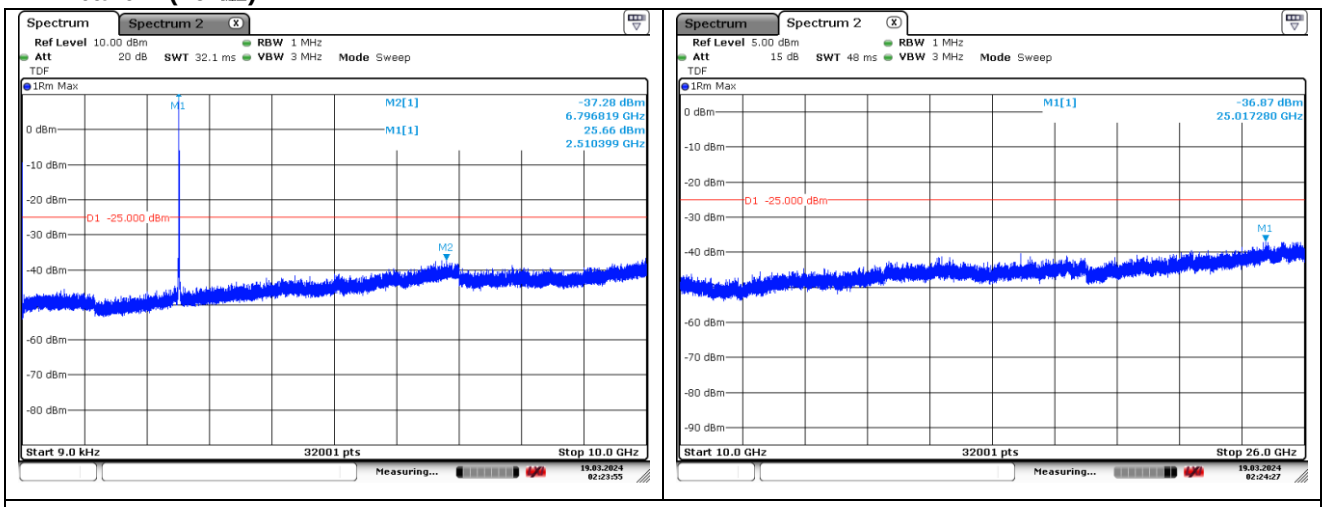


QPSK Low Channel - 1 RB

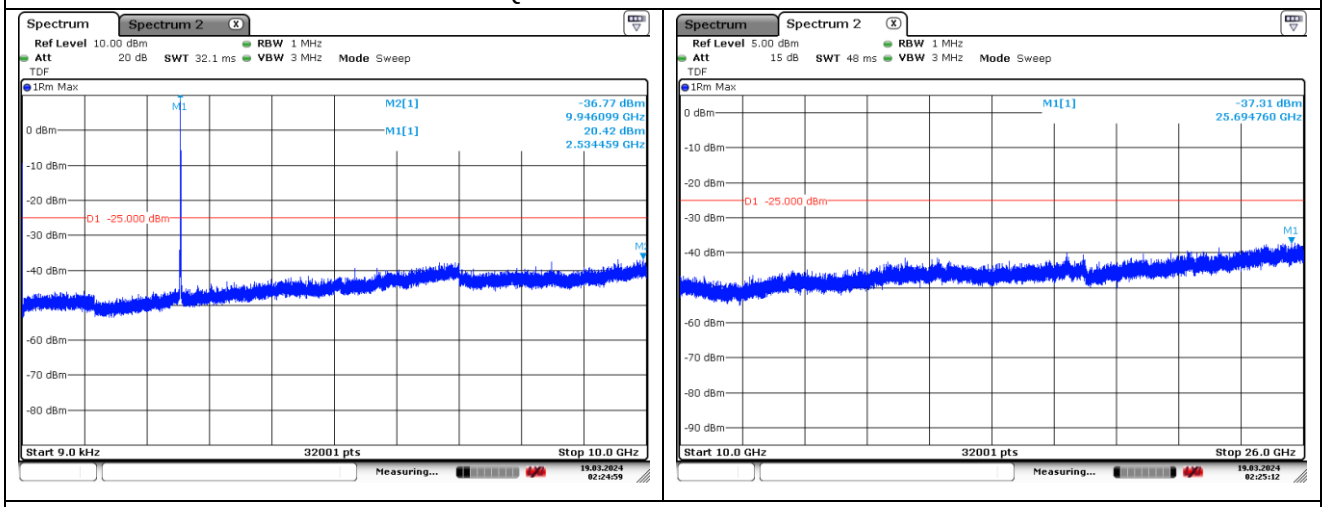


QPSK High Channel - 1 RB

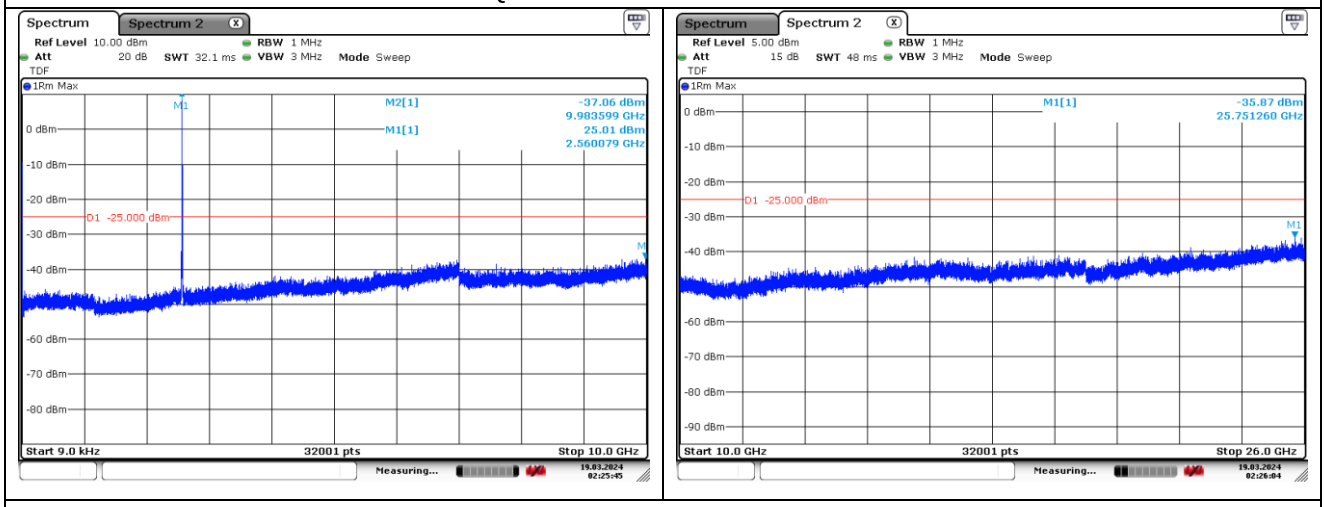
LTE band 7 (20 ㎒)



QPSK Low Channel - 1 RB

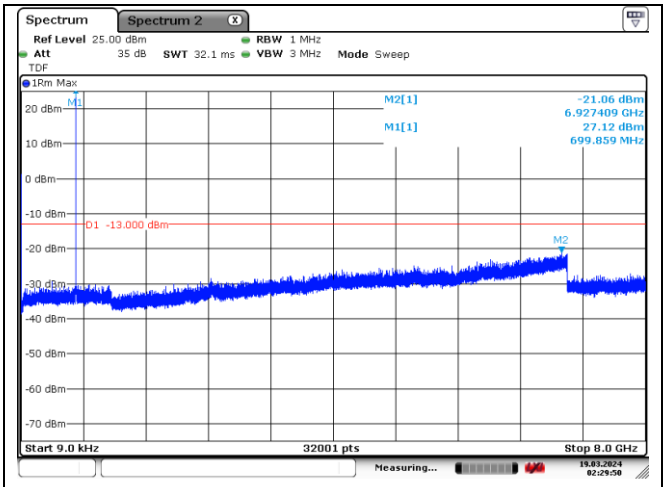


QPSK Middle Channel - 1 RB

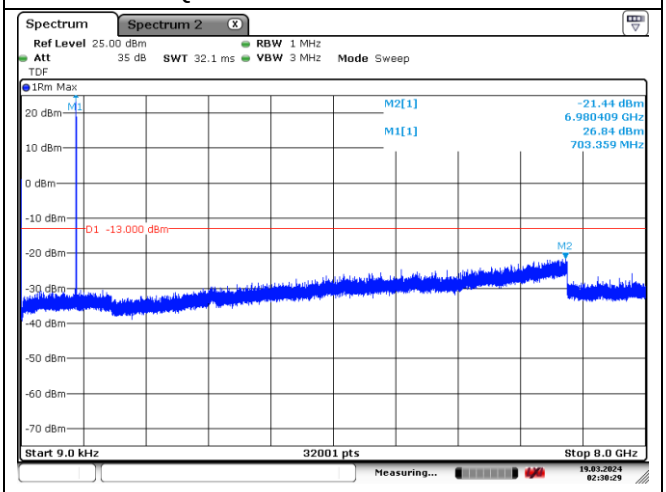


QPSK High Channel - 1 RB

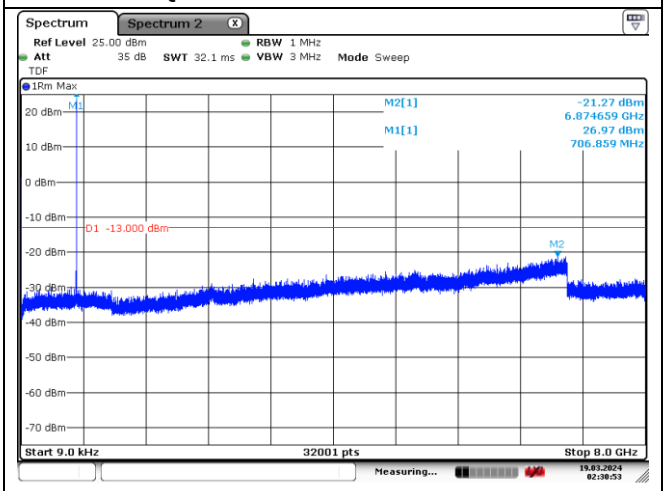
LTE band 12/17 (10 ㎒)



QPSK Low Channel - 1 RB

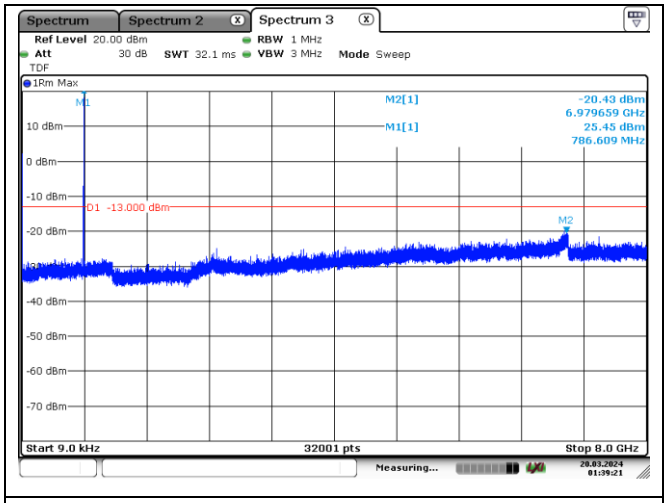


QPSK Middle Channel - 1 RB



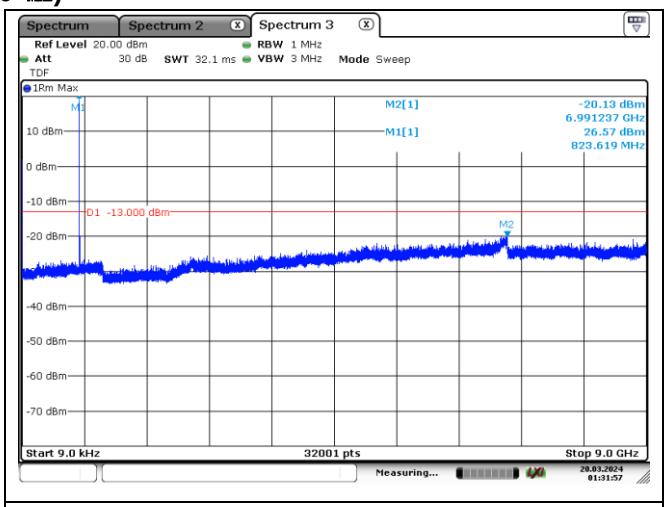
QPSK High Channel - 1 RB

LTE band 13 (10 ㎒)



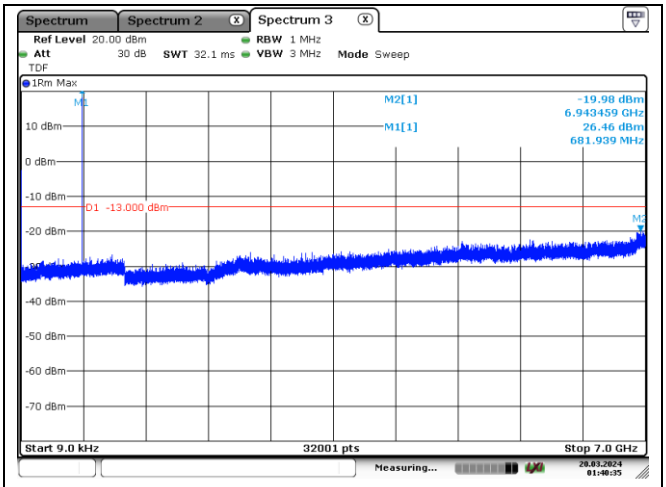
QPSK Middle Channel - 1 RB

LTE band 26_Part 90 (10 ㎒)

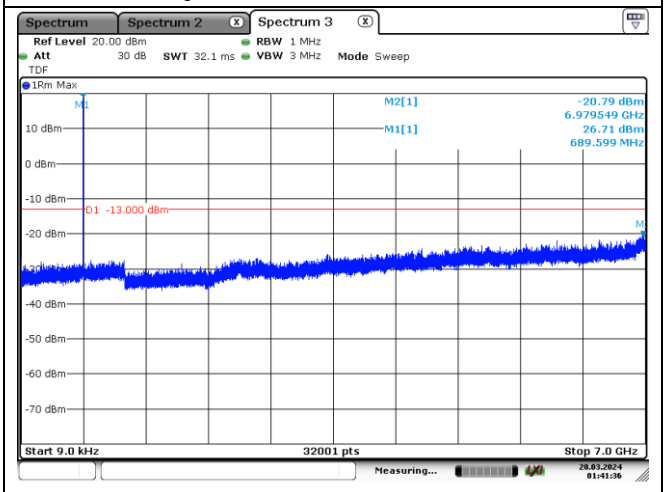


QPSK Middle Channel - 1 RB

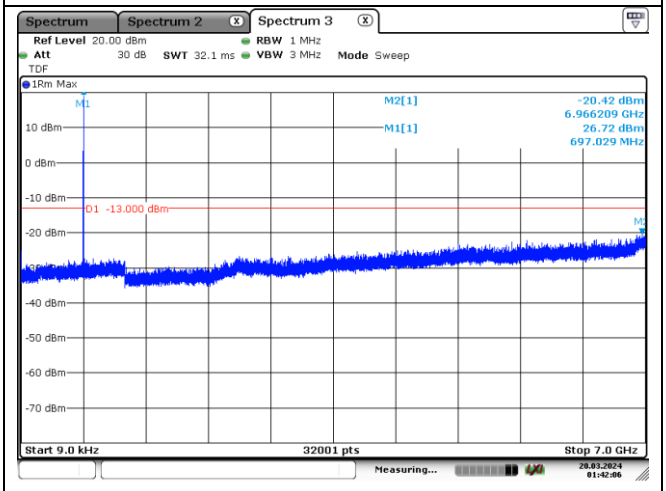
LTE band 71 (10 ㎒)



QPSK Low Channel - 1 RB



QPSK Middle Channel - 1 RB



QPSK High Channel - 1 RB

7. Band Edge and Emission Mask

7.1. Limit

FCC

- §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(c)(2), on any frequency outside the 776-788 ㎒ band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) ㎧.

- §27.53(c)(4), on all frequencies between 763-775 ㎒ and 793-805 ㎒, by a factor not less than 65 + 10 log (P) ㎧ in a 6.25 ㎑ band segment, for mobile and portable stations;

- §27.53(g), the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) ㎧.

- §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 $\log_{10}$ (P) ㎧.

- §27.53(m)(4), for mobile digital stations, the attenuation factor shall be not less than 40 + 10 $\log_{10}$ (P) ㎧ on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 $\log_{10}$ (P) ㎧ on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 $\log_{10}$ (P) ㎧ on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 $\log_{10}$ (P) ㎧ on all frequencies between 2 490.5 ㎒ and 2 496 ㎒ and 55 + 10 $\log_{10}$ (P) ㎧ at or below 2 490.5 ㎒. Mobile Satellite Service licensees operating on frequencies below 2 495 ㎒ may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

- §90.691(a), out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 ㎑, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log_{10} (f / 6.1) decibels or 50 + 10 Log_{10} (P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 ㎑.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 ㎑, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 Log_{10} (P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 ㎑.

IC

- RSS-130 Issue 2

4.7.1, the unwanted emissions in any 100 ㎑ bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (㏈ W), by at least 43 + 10 $\log_{10}$ p (watts), ㏈. However, in the 100 ㎑ band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 ㎑ may be employed.

4.7.2, In addition to the limit outlined in section 4.7.1 above, equipment operating in the frequency bands 746-756 ㎒ and 777-787 ㎒ shall also comply with the following restrictions:

a) The power of any unwanted emissions in any 6.25 ㎑ bandwidth for all frequencies between 763-775 ㎒ and 793-806 ㎒ shall be attenuated below the transmitter power, P (㏈ W), by at least:

(i) 76 + 10 log10 p (watts), ㏈, for base and fixed equipment, and

(ii) 65 + 10 log10 p (watts), ㏈, for mobile and portable equipment.

b) The e.i.r.p. in the band 1 559-1 610 ㎒ shall not exceed -70 ㏈ W/㎒ for wideband signal and -80 ㏈ W for discrete emission with bandwidth less than 700 ㎐.

- RSS-132 Issue 4

5.5, Equipment shall meet the unwanted emission limits specified below.
(i) In the first 1.0 ㎒ band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1 % of the occupied bandwidth shall be attenuated below the transmitter output power P (㏈ W) by at least 43 + 10 log(p) ㏈.

(ii) After the first 1.0 ㎒ immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 ㎑ bandwidth shall be attenuated below the transmitter output power P (㏈ W) by at least 43 + 10 log(p) ㏈. If the measurement is performed using 1 % of the occupied bandwidth, power integration over 100 ㎑ is required.

- RSS-133 Issue 6

6.5, Equipment shall comply with the limits in (i) and (ii) below.

(i) In the 1.0 ㎒ bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1 % of the emission bandwidth shall be attenuated (in ㏈) below the transmitter output power P (㏈ W) by at least 43 + 10 $\log_{10}$ p(watts).

(ii) After the first 1.0 ㎒, the emission power in any 1 ㎒ bandwidth shall be attenuated (in ㏈) below the transmitter output power P (㏈ W) by at least 43 + 10 $\log_{10}$ p(watts). If the measurement is performed using 1 % of the emission bandwidth, power integration over 1.0 ㎒ is required.

- RSS-139 Issue 4

5.6, Unwanted emissions shall be measured in terms of average values.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors) of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in table 6.

Table 6: Unwanted emission limits

Offset from the edge of the frequency block or frequency block group	Unwanted emission lmit
≤1 ㎒	-13 ㏈m/(1% of OB)*
>1 ㎒	-13 ㏈m

* OB is the occupied bandwidth

- RSS-199 Issue 4
5.6, unwanted emissions shall be measured in terms of average values when the transmitter is operating at the manufacturer's rated power and modulated as specified in RSS-Gen.

Equipment shall meet the unwanted emission limits, specified below, outside each frequency block group. For each channel bandwidth supported by the equipment under test, the unwanted emissions shall be measured and reported for two channel frequencies: one located as close as possible to the low end and one located as close as possible to the high end of the equipment's operating frequency range.

For the unwanted emission limits, in the 1 ㎒ band immediately outside and adjacent to the frequency block group, the power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth for fixed stations, base stations, and fixed subscriber equipment, and 2 % for subscriber equipment other than fixed subscriber equipment. Beyond this 1 ㎒ band, a resolution bandwidth of 1 ㎒ shall be used. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 ㎒, or 1 % or 2 % of the occupied bandwidth, as applicable.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors), where applicable, of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in the tables below.

Table 4: Unwanted emission limits for fixed station, base station and fixed subscriber equipment

Offset from the edge of the frequency block or frequency block group (㎒)	Unwanted emission limit
≤1	-13 ㏈m/(1% of OB*)
>1	-13 ㏈m/㎒

* OB is the occupied bandwidth

Table 5: Unwanted emission limits for subscriber equipment other than fixed subscriber equipment

Offset from the edge of the frequency block or frequency block group (㎒)	Unwanted emission limit
0-1	-10 ㏈m/(2% of OB*)
1-5	-10 ㏈m/㎒
5-X**	-13 ㏈m/㎒
≥X	-25 ㏈m/㎒

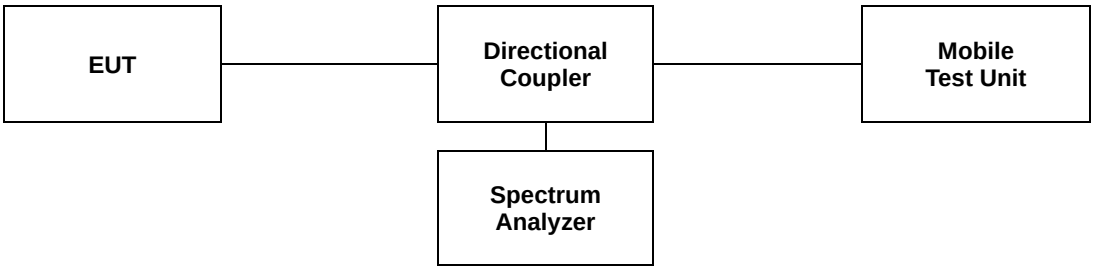
* OB is the occupied bandwidth
** X is 6 ㎒ or the equipment occupied bandwidth, whichever is greater

In addition to complying with the limits in table 5, subscriber equipment other than fixed subscriber equipment shall not exceed -13 ㏈m/㎒ on all frequencies between 2 490.5 ㎒ and 2 496 ㎒,and -25 ㏈m/㎒ at or below 2 490.5 ㎒.

7.2. Test Procedure

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

a. Span was set large enough so as to capture all out of band emissions near the band edge.
b. RBW ≥ 1 % of OBW
c. VBW ≥ 3 x RBW.
d. Detector = RMS.
e. Trace mode = Average.
f. Sweep time = Auto.
g. The trace was allowed to stabilize.
h. All path loss of frequency range was investigated and compensated to spectrum analyzer as TDF function.



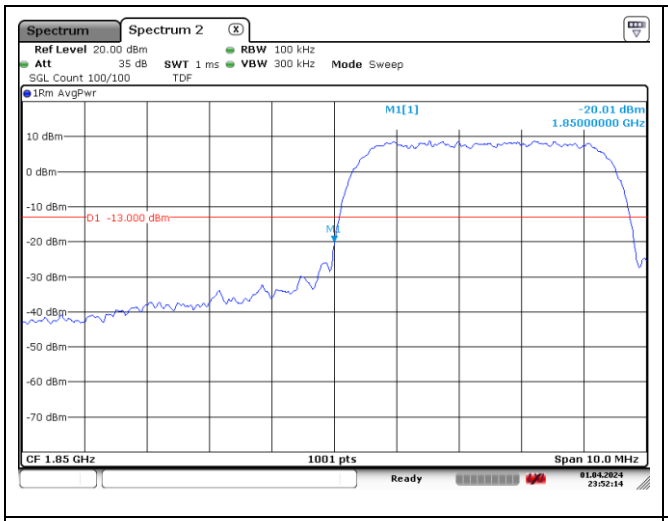
7.3. Test Results

Ambient temperature : (23 ± 1) ℃

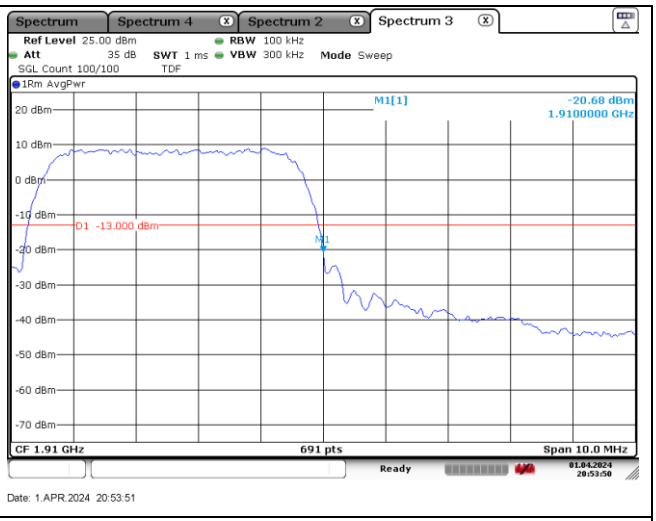
Relative humidity : 47 % R.H.

- Test plots

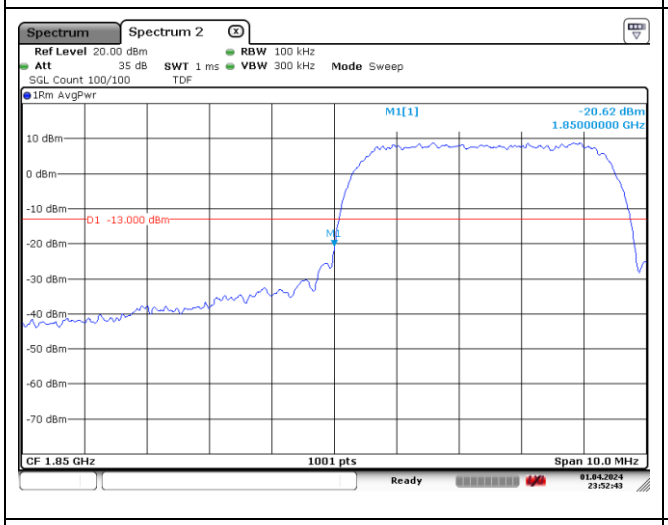
WCDMA Ⅱ



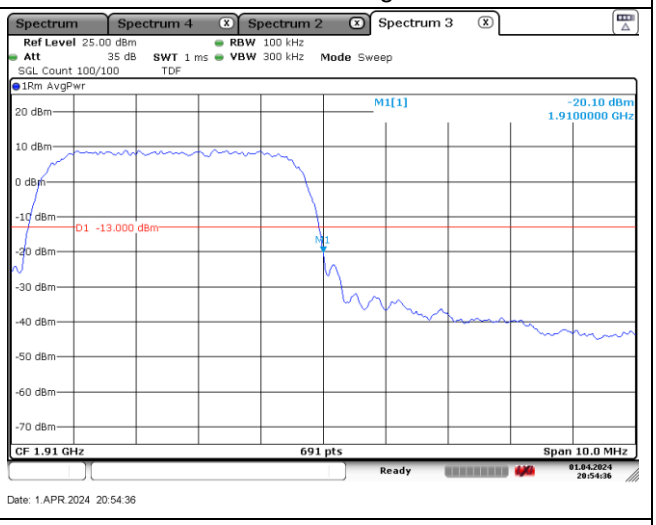
WCDMA Ⅱ RMC Low Channel



WCDMA Ⅱ RMC High Channel

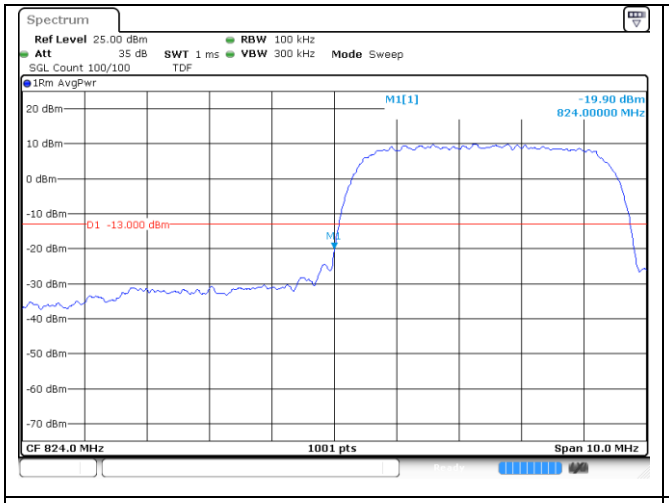


WCDMA Ⅱ HSDPA Low Channel



WCDMA Ⅱ HSDPA High Channel

WCDMA Ⅴ



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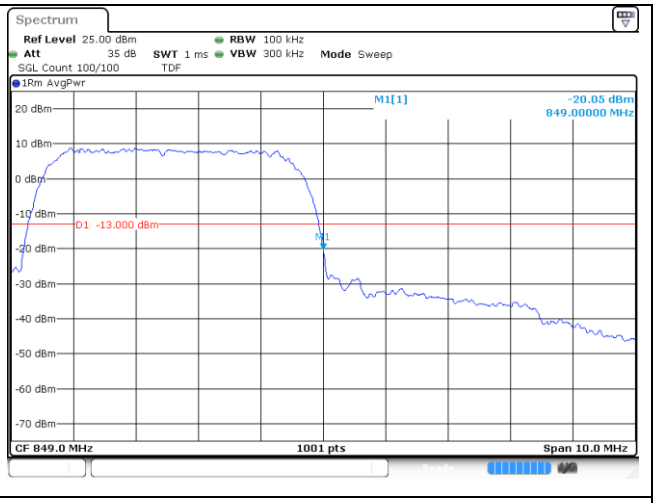

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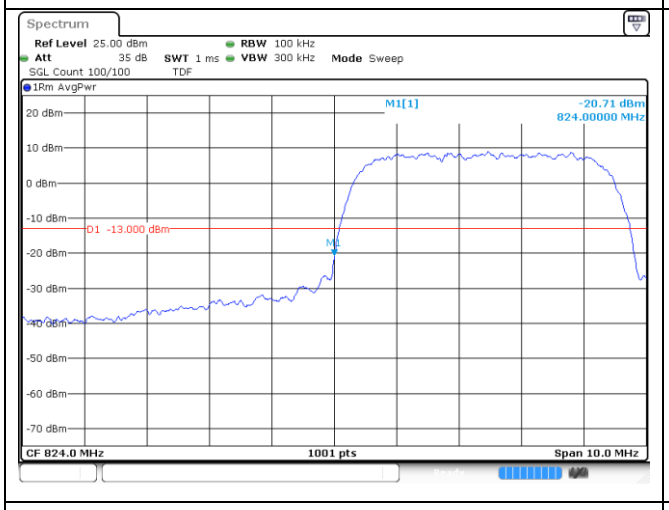
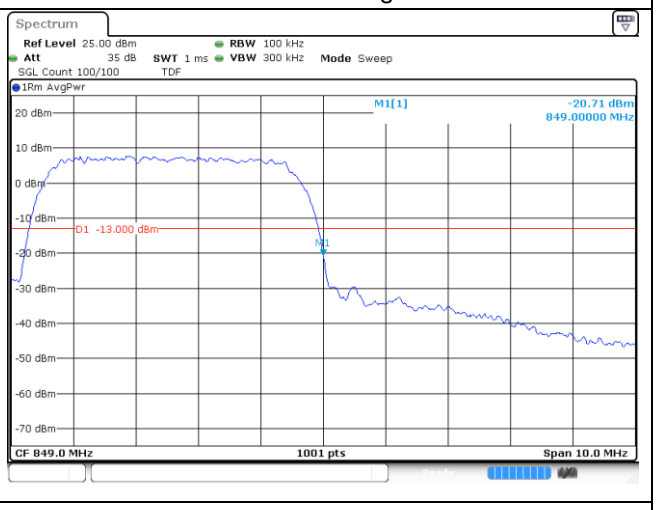
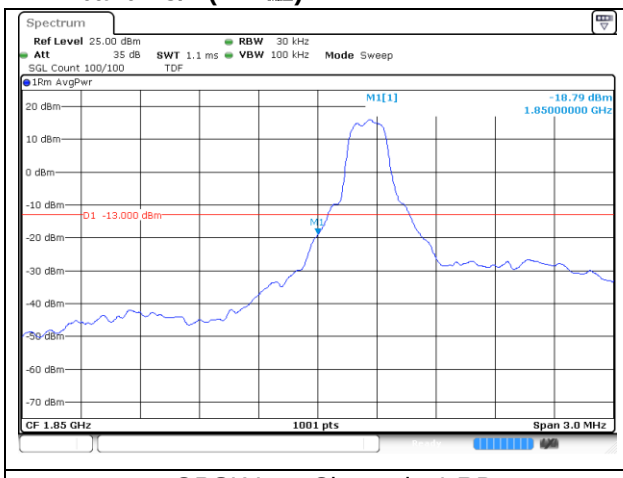


WCDMA Ⅴ HSDPA Low Channel

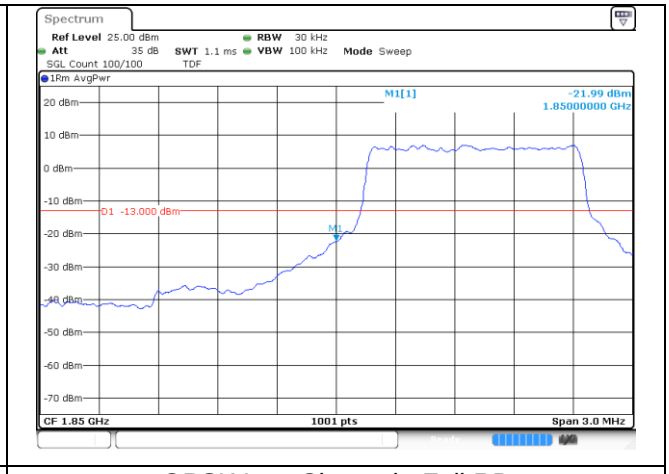


WCDMA Ⅴ HSDPA High Channel

LTE band 25/2 (1.4 ㎒)

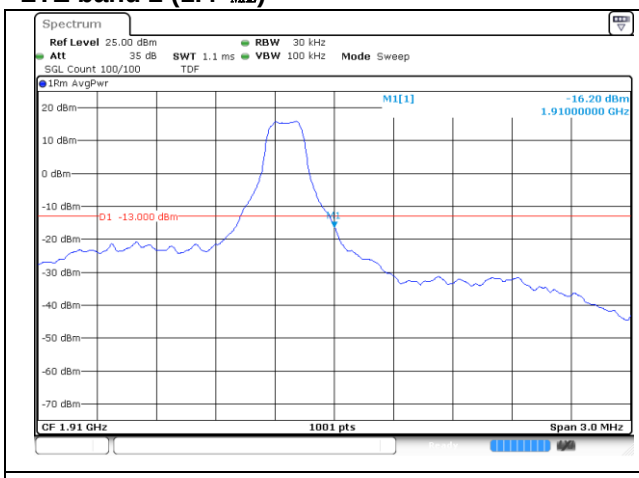


QPSK Low Channel - 1 RB

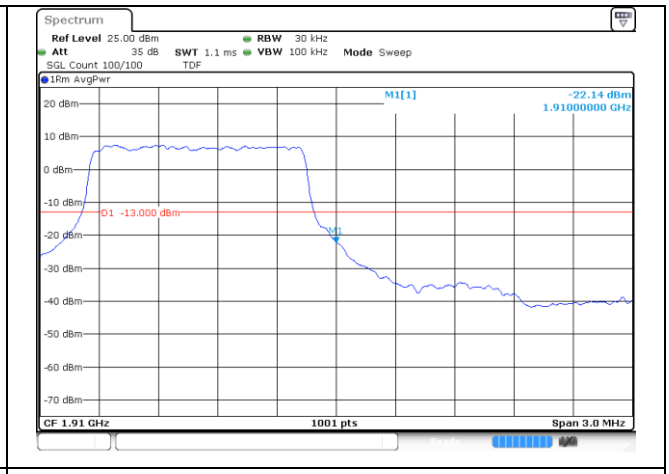


QPSK Low Channel - Full RB

LTE band 2 (1.4 ㎒)

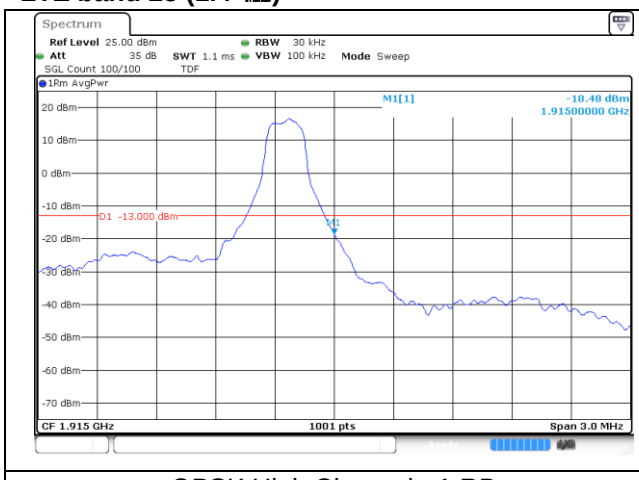


QPSK High Channel - 1 RB

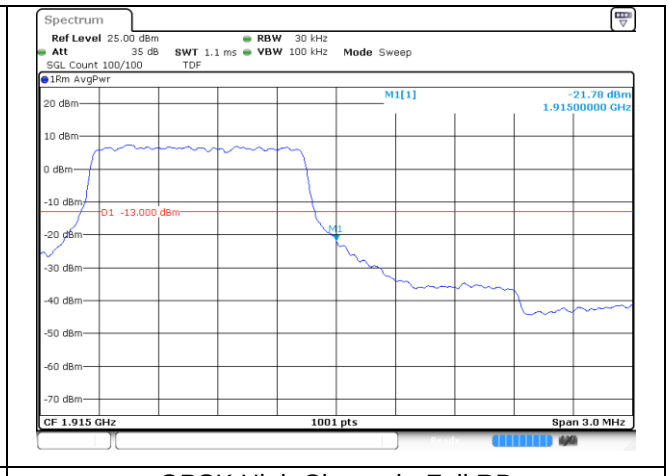


QPSK High Channel - Full RB

LTE band 25 (1.4 ㎒)

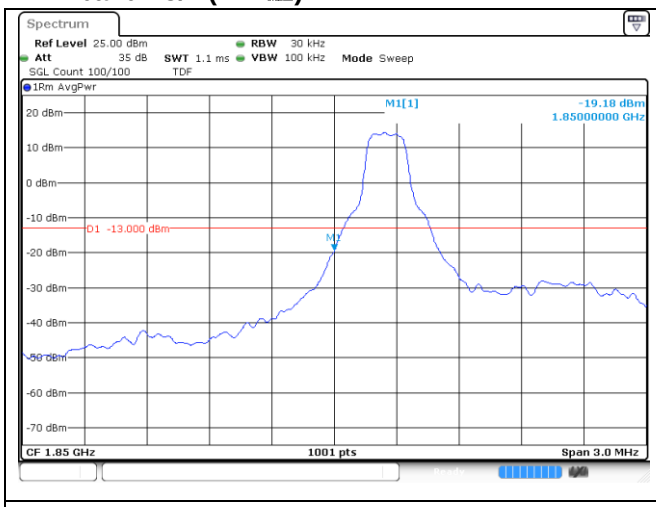


QPSK High Channel - 1 RB

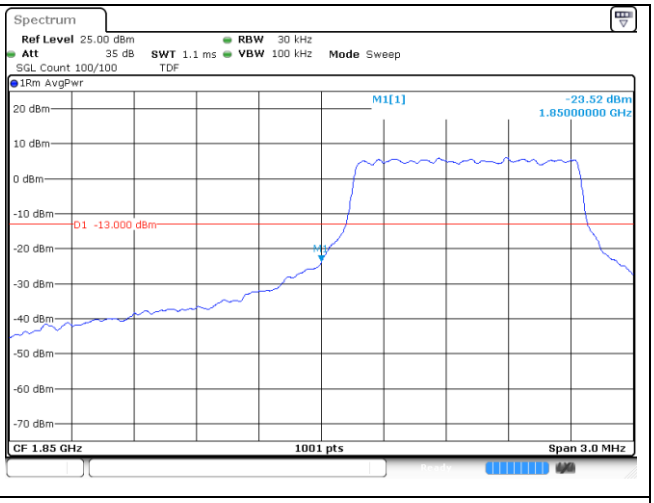


QPSK High Channel - Full RB

LTE band 25/2 (1.4 ㎒)

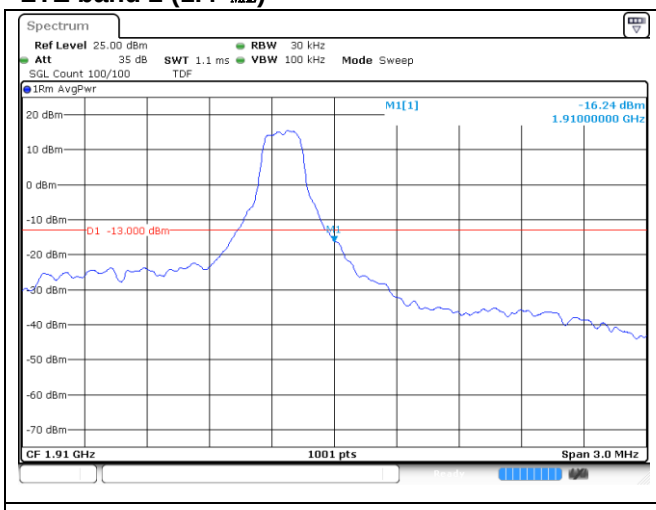


16QAM Low Channel - 1 RB

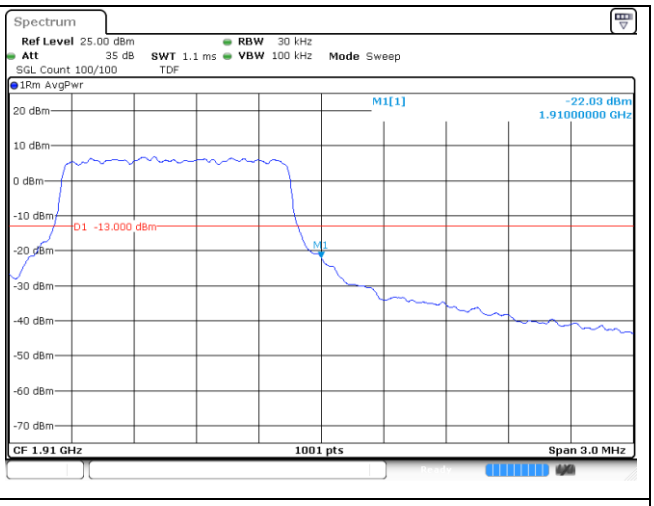


16QAM Low Channel - Full RB

LTE band 2 (1.4 ㎒)

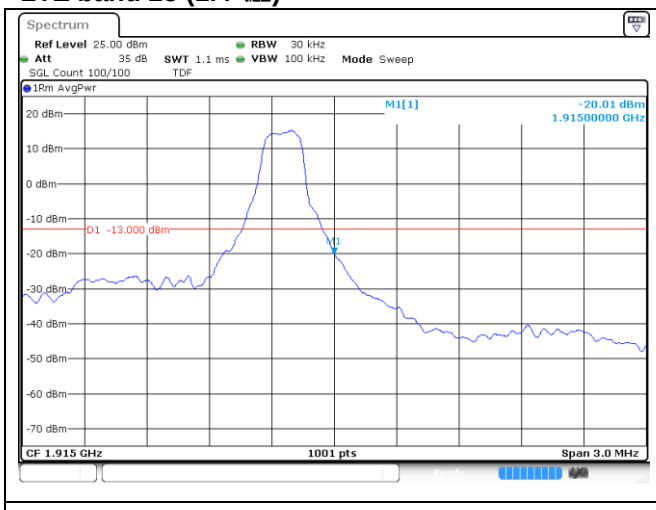


16QAM High Channel - 1 RB

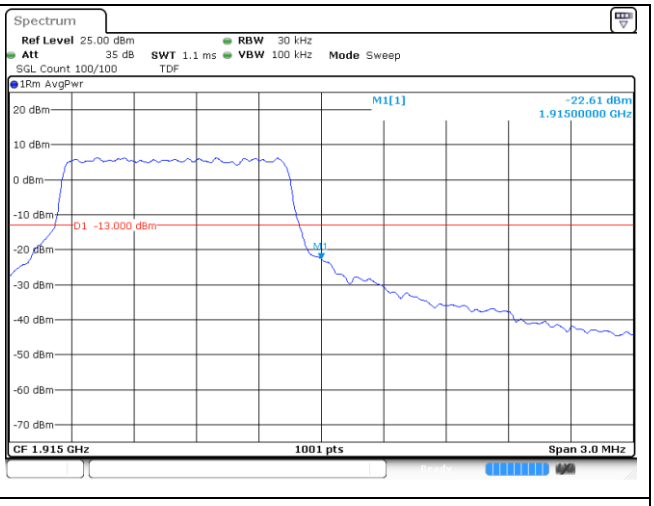


16QAM High Channel - Full RB

LTE band 25 (1.4 ㎒)

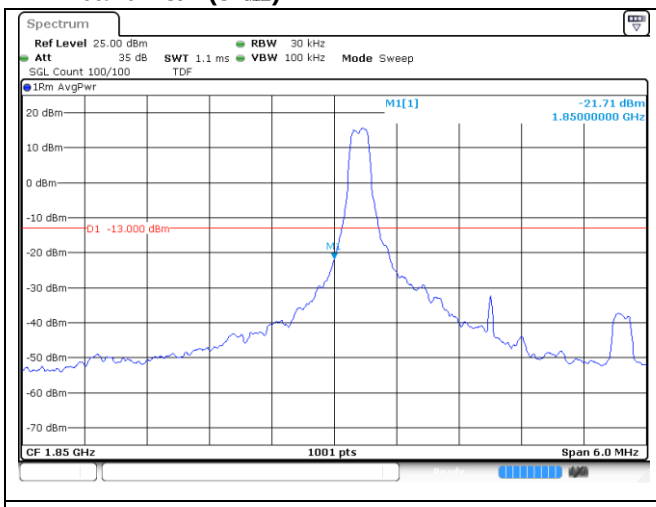


16QAM High Channel - 1 RB

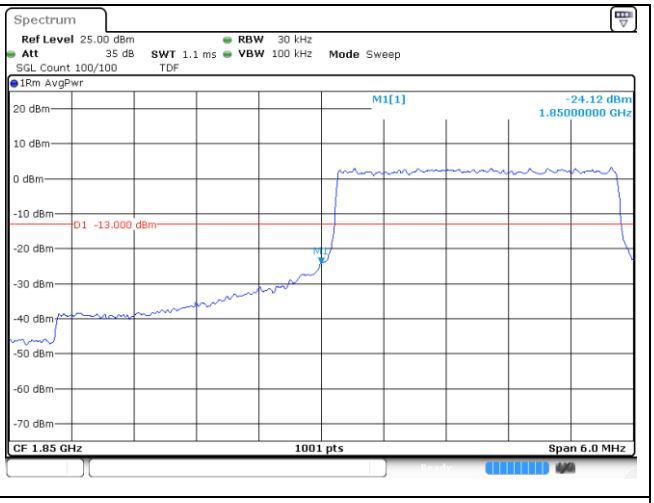


16QAM High Channel - Full RB

LTE band 25/2 (3 ㎒)

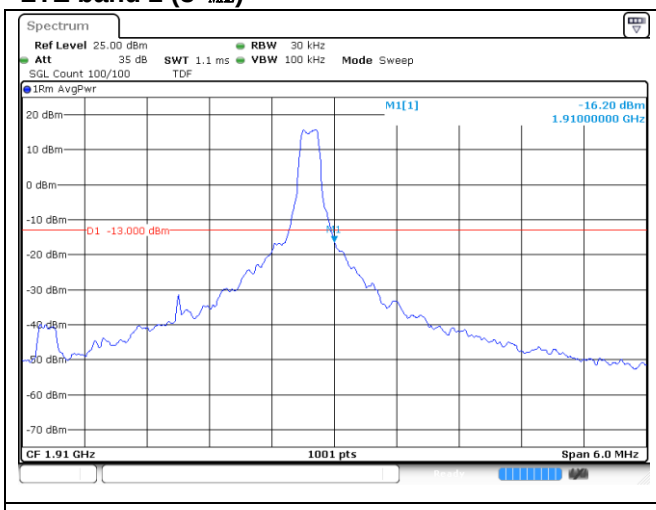


QPSK Low Channel - 1 RB



QPSK Low Channel - Full RB

LTE band 2 (3 ㎒)



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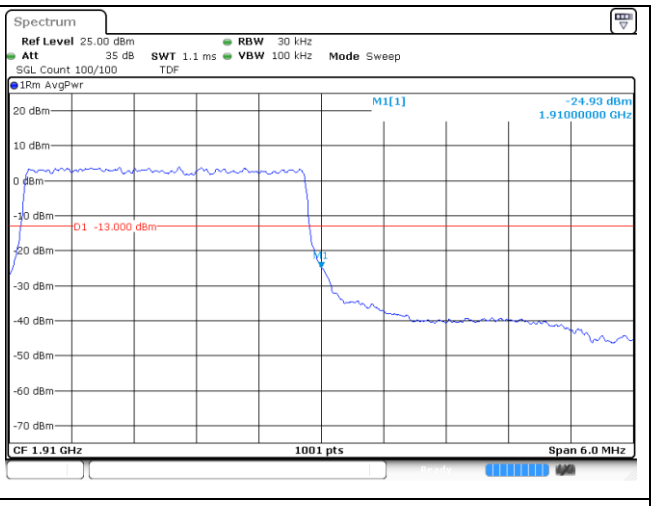
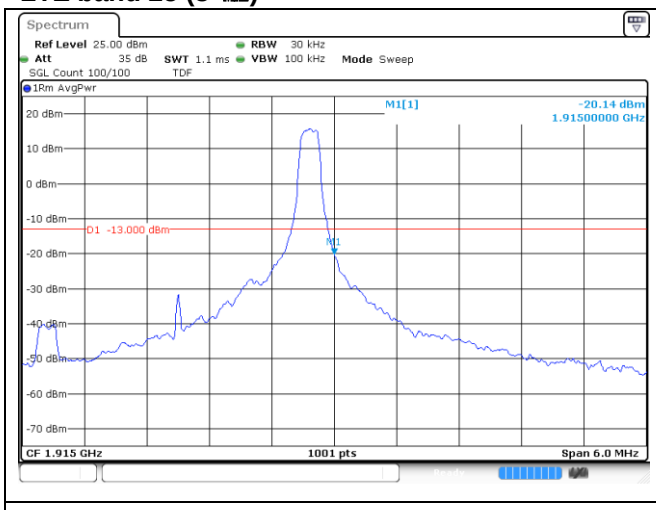
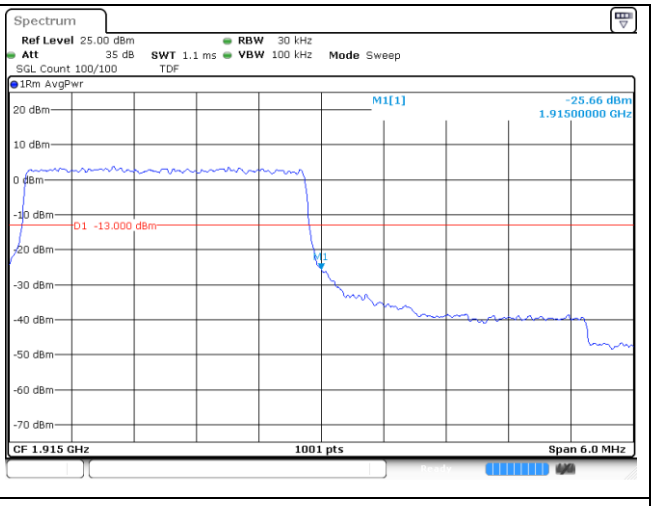


QPSK High Channel - Full RB

LTE band 25 (3 ㎒)

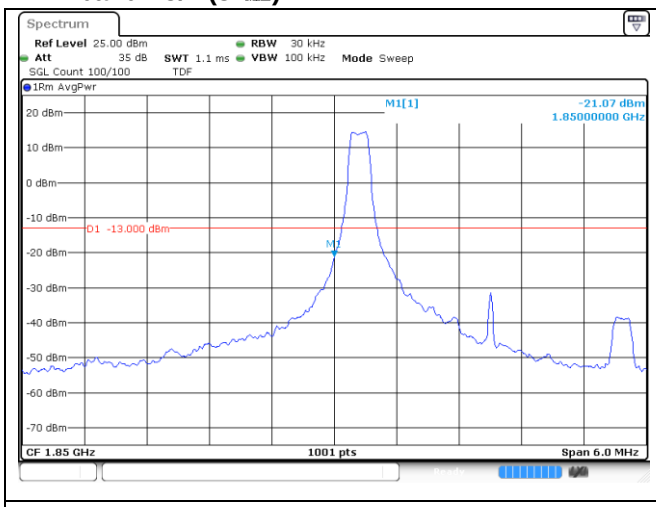


QPSK High Channel - 1 RB

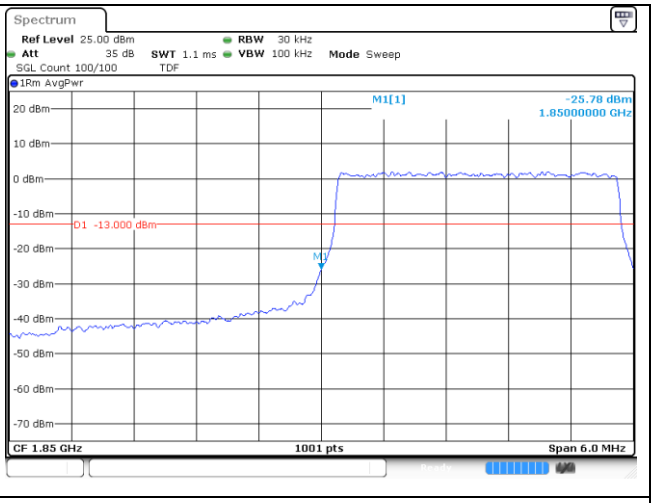


QPSK High Channel - Full RB

LTE band 25/2 (3 ㎒)

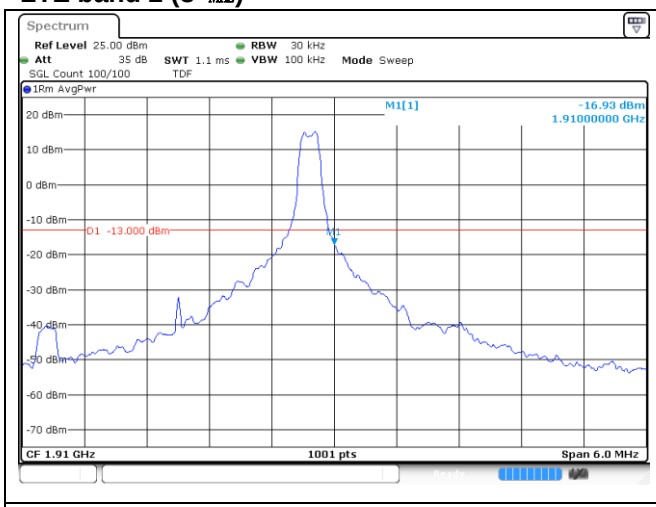


16QAM Low Channel - 1 RB

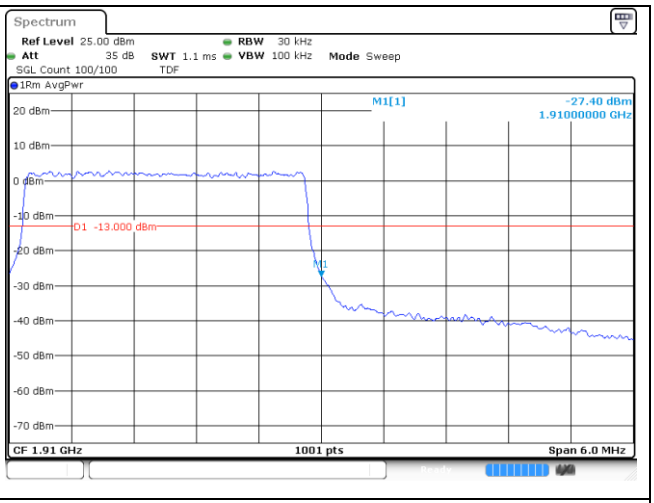


16QAM Low Channel - Full RB

LTE band 2 (3 ㎒)

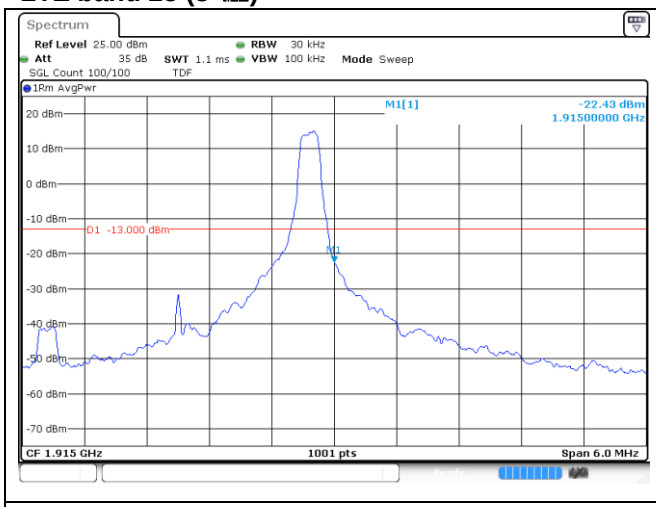


16QAM High Channel - 1 RB

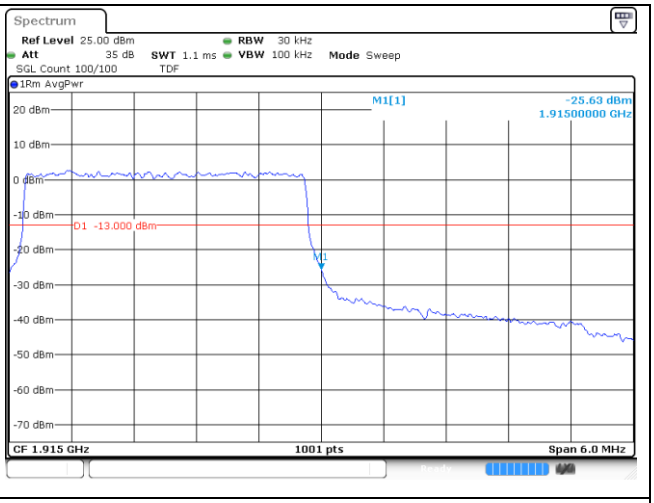


16QAM High Channel - Full RB

LTE band 25 (3 ㎒)

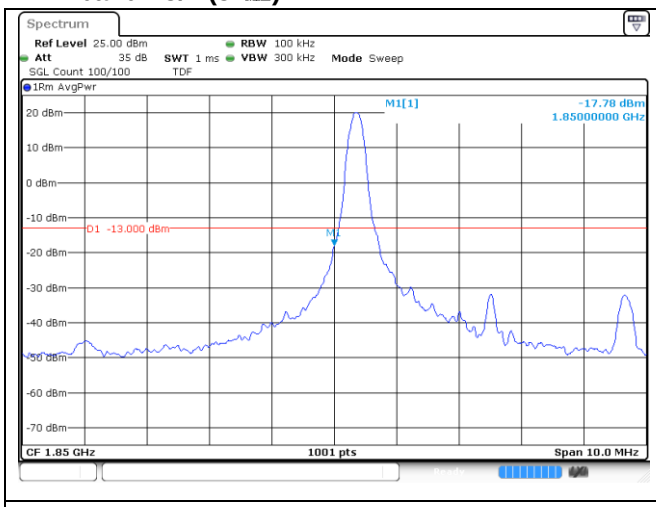


16QAM High Channel - 1 RB

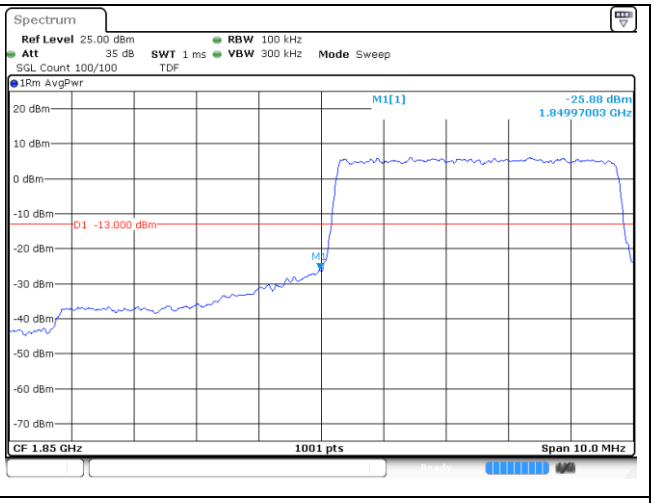


16QAM High Channel - Full RB

LTE band 25/2 (5 ㎒)

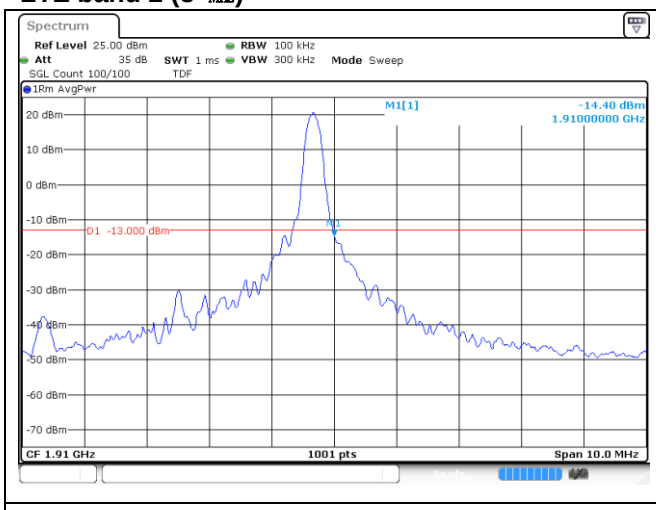


QPSK Low Channel - 1 RB

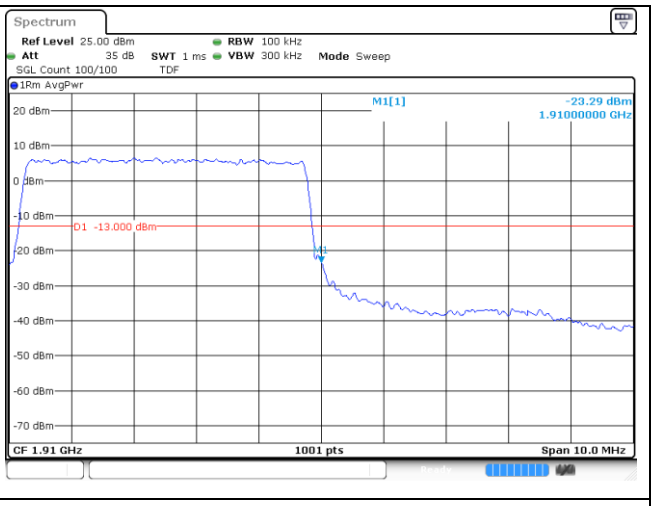


QPSK Low Channel - Full RB

LTE band 2 (5 ㎒)

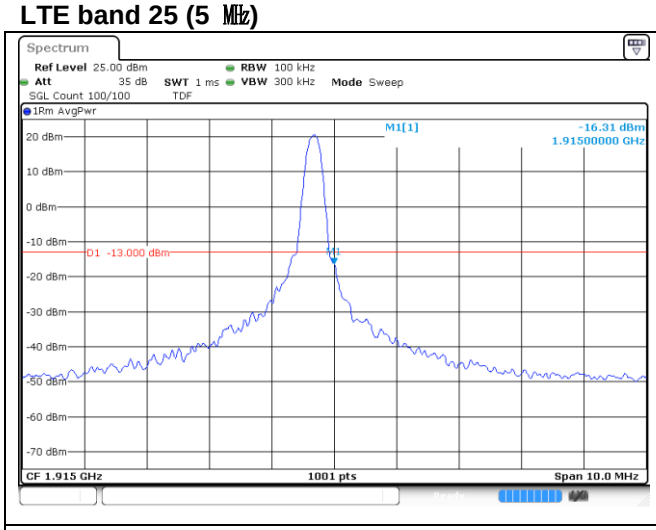


QPSK High Channel - 1 RB

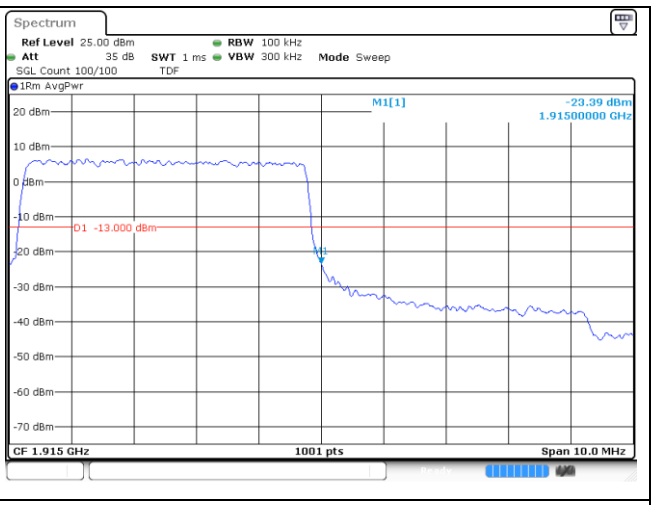


QPSK High Channel - Full RB

LTE band 25 (5 ㎒)

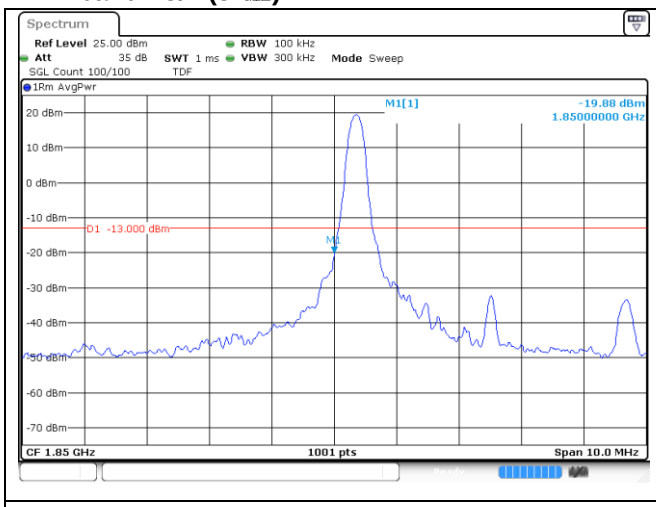


QPSK High Channel - 1 RB

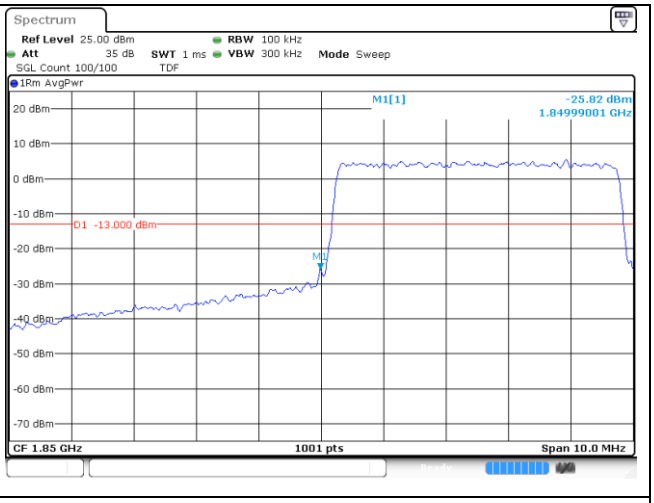


QPSK High Channel - Full RB

LTE band 25/2 (5 ㎒)

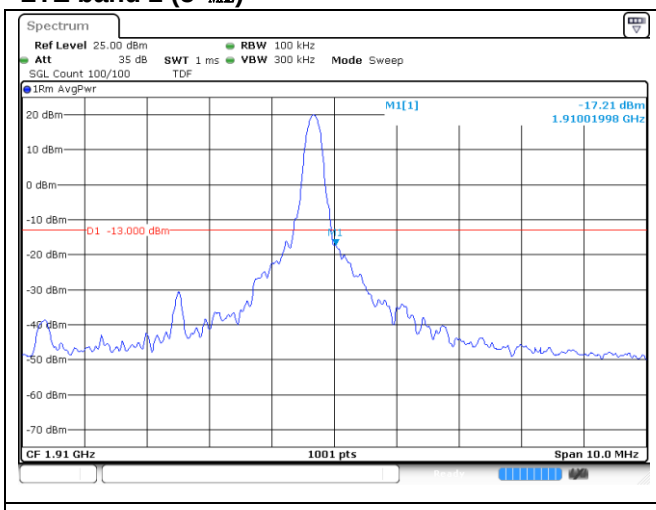


16QAM Low Channel - 1 RB

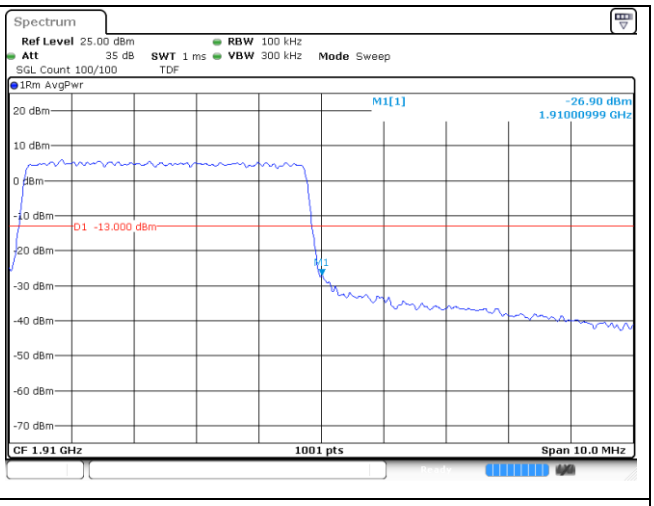


16QAM Low Channel - Full RB

LTE band 2 (5 ㎒)

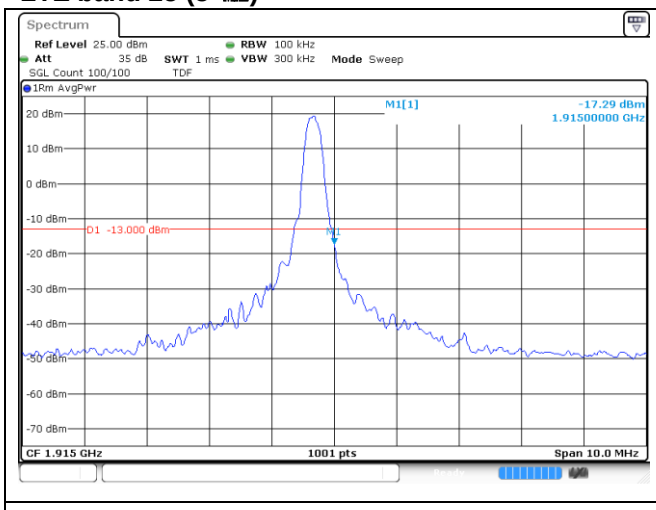


16QAM High Channel - 1 RB



16QAM High Channel - Full RB

LTE band 25 (5 ㎒)



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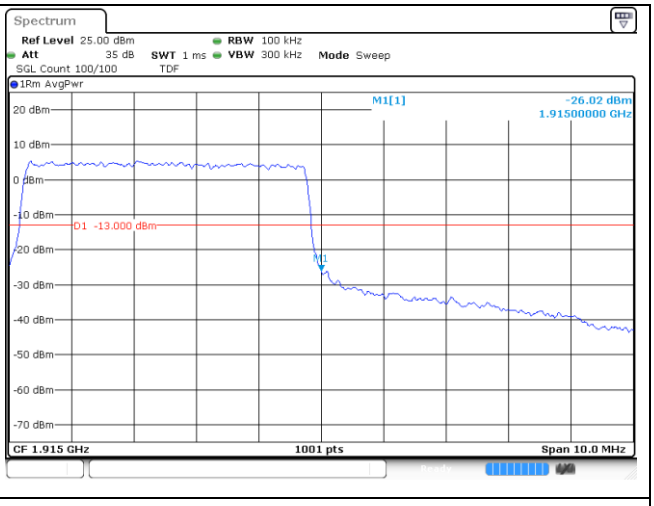
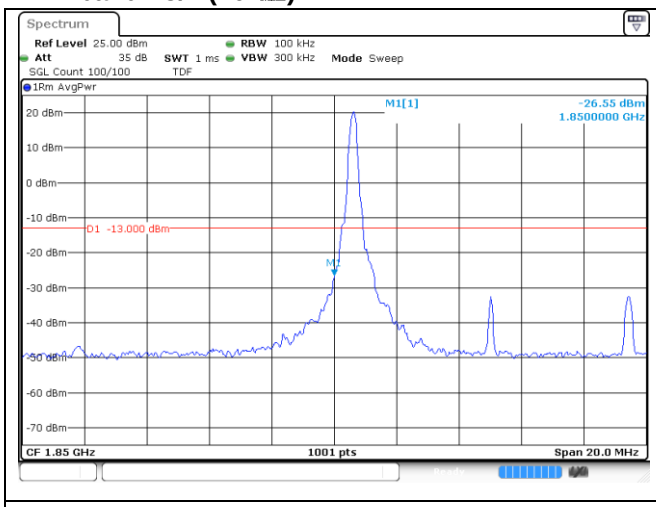
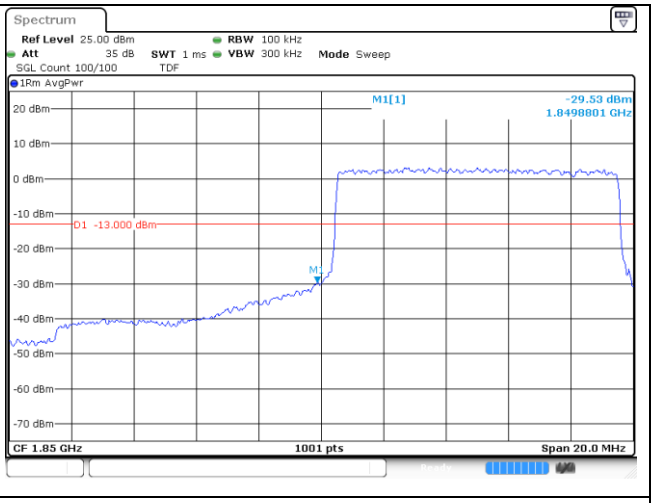


16QAM High Channel - Full RB

LTE band 25/2 (10 ㎒)

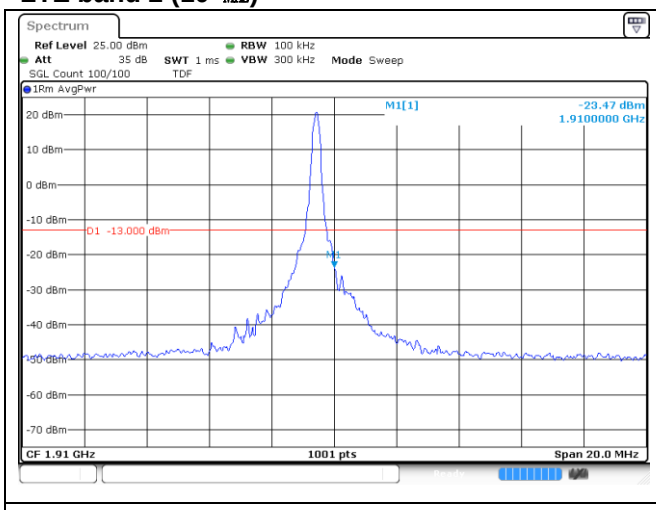


QPSK Low Channel - 1 RB

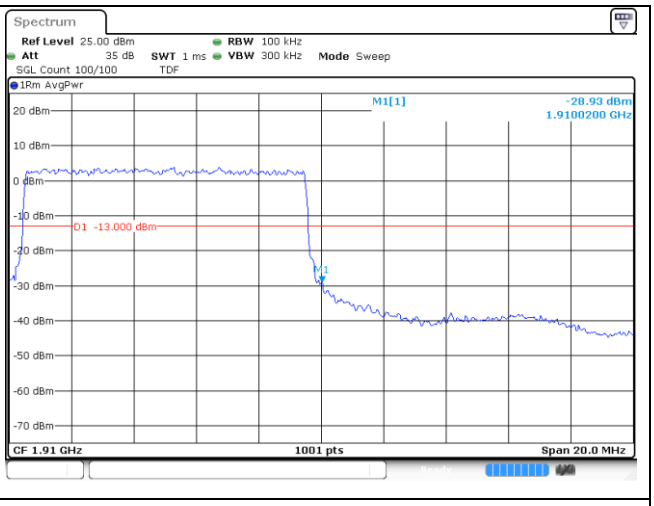


QPSK Low Channel - Full RB

LTE band 2 (10 ㎒)

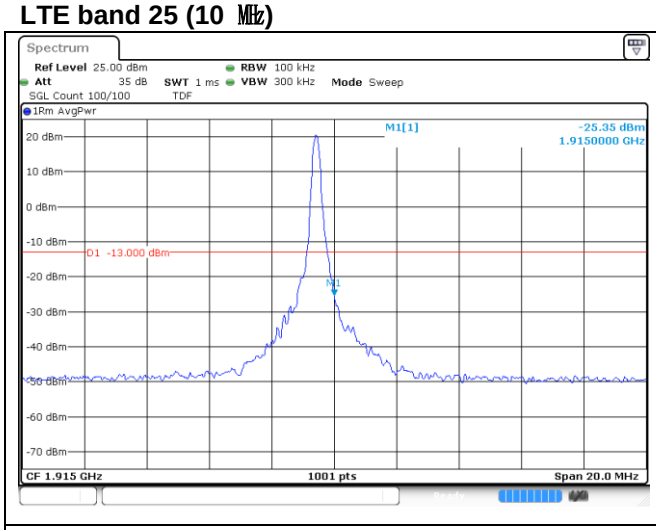


QPSK High Channel - 1 RB

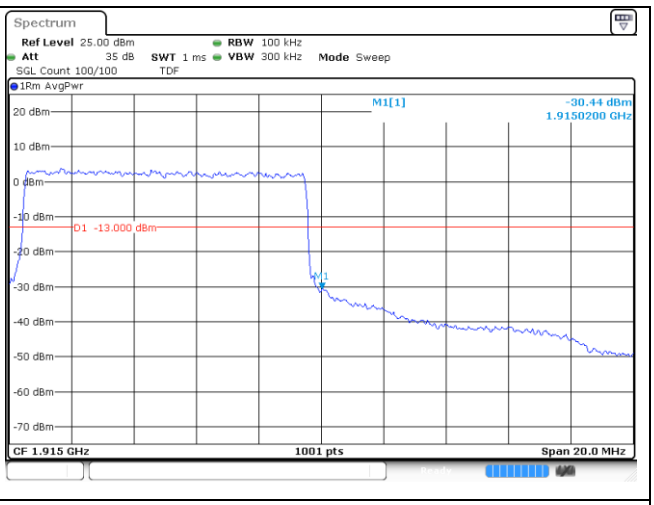


QPSK High Channel - Full RB

LTE band 25 (10 ㎒)

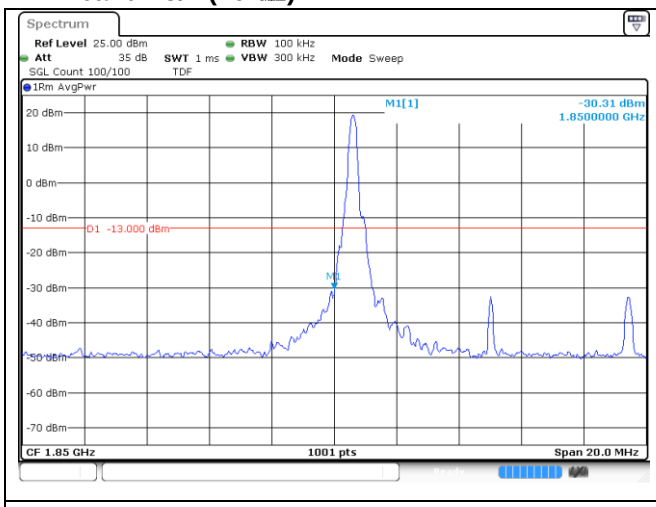


QPSK High Channel - 1 RB

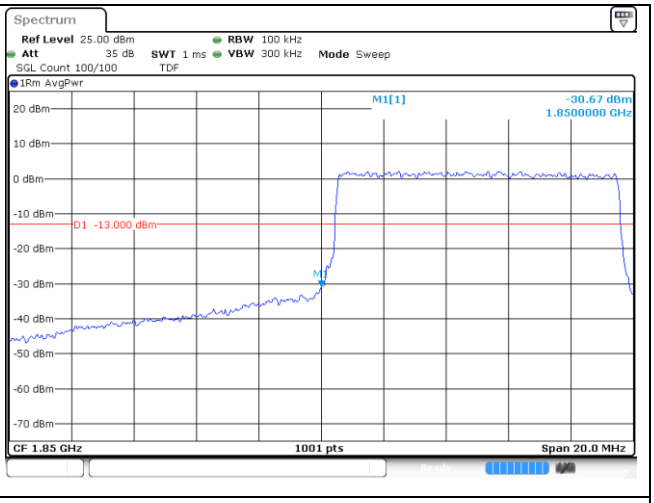


QPSK High Channel - Full RB

LTE band 25/2 (10 ㎒)

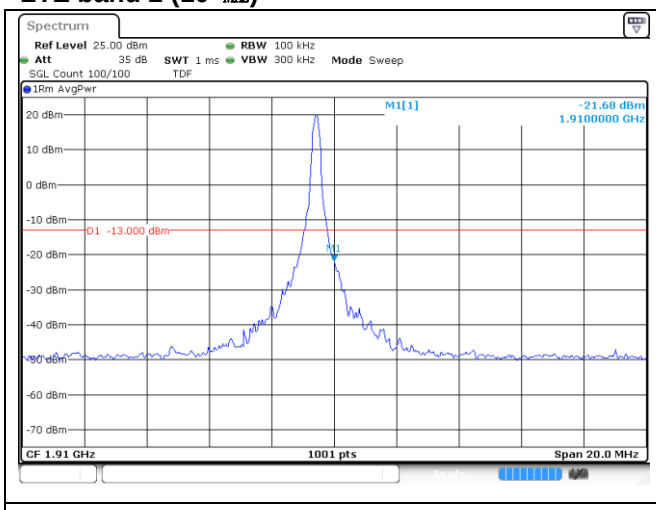


16QAM Low Channel - 1 RB

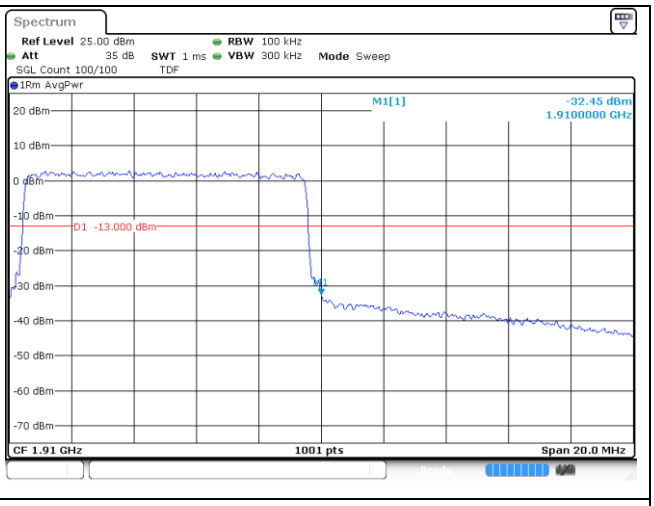


16QAM Low Channel - Full RB

LTE band 2 (10 ㎒)

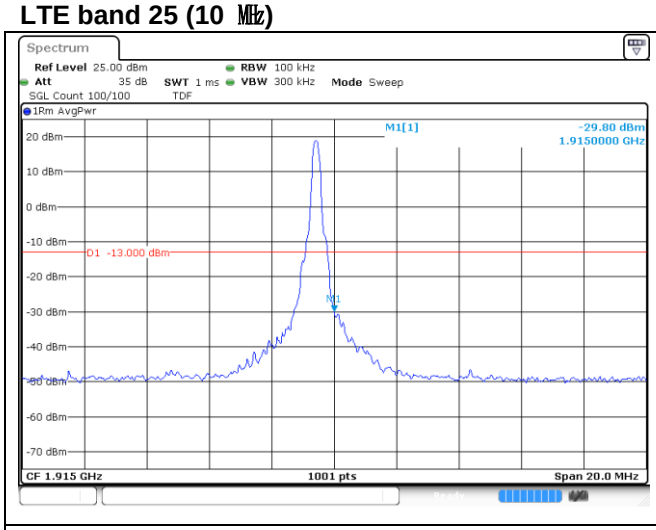


16QAM High Channel - 1 RB



16QAM High Channel - Full RB

LTE band 25 (10 ㎒)



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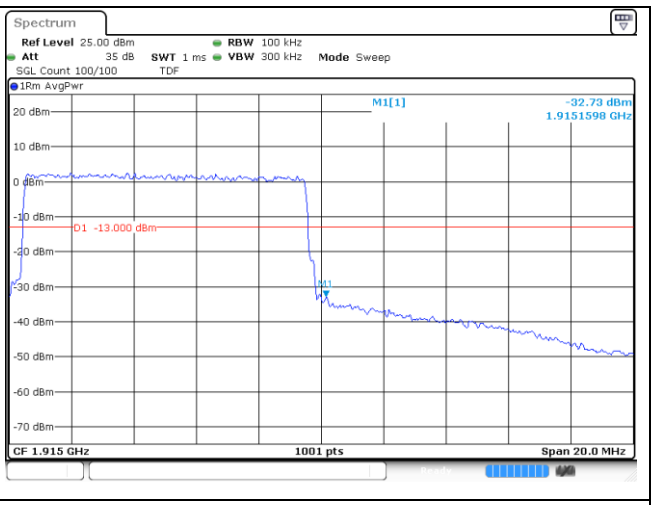
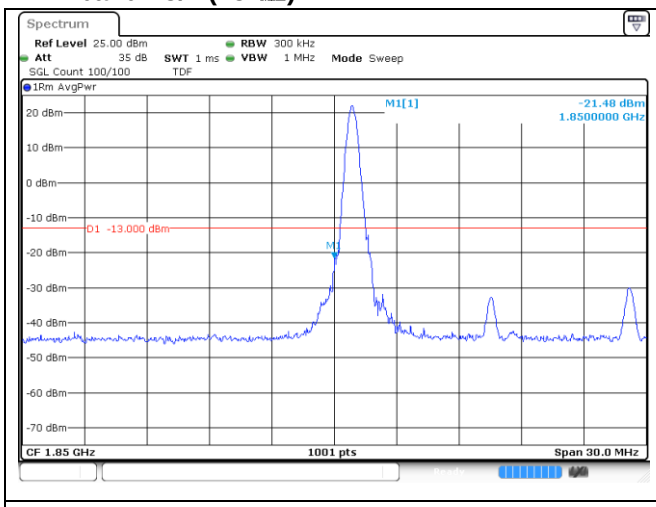
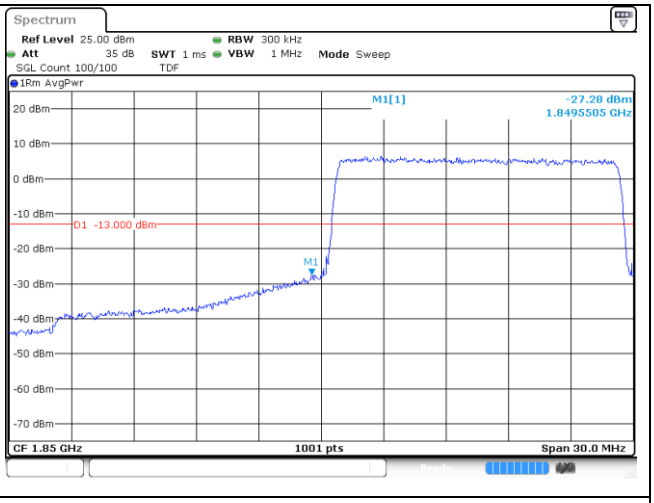


16QAM High Channel - Full RB

LTE band 25/2 (15 ㎒)

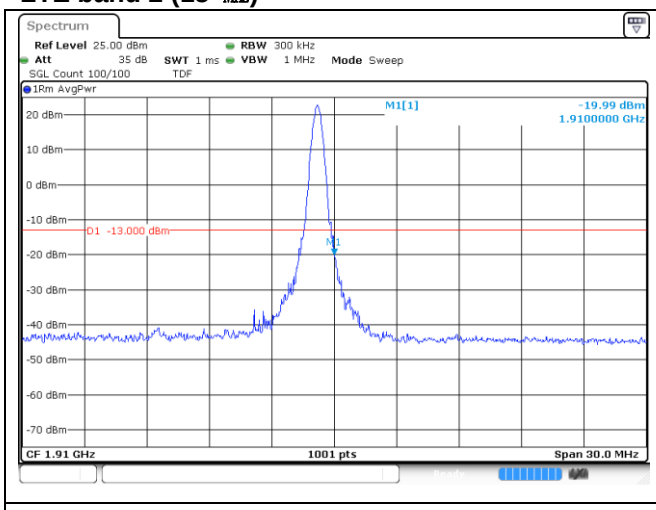


QPSK Low Channel - 1 RB

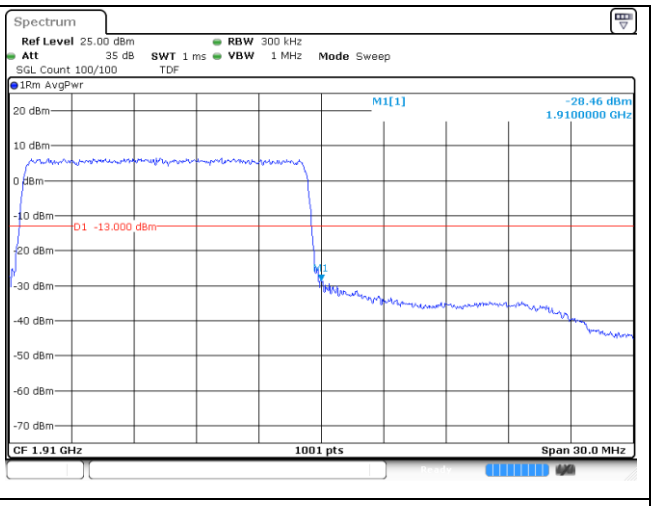


QPSK Low Channel - Full RB

LTE band 2 (15 ㎒)

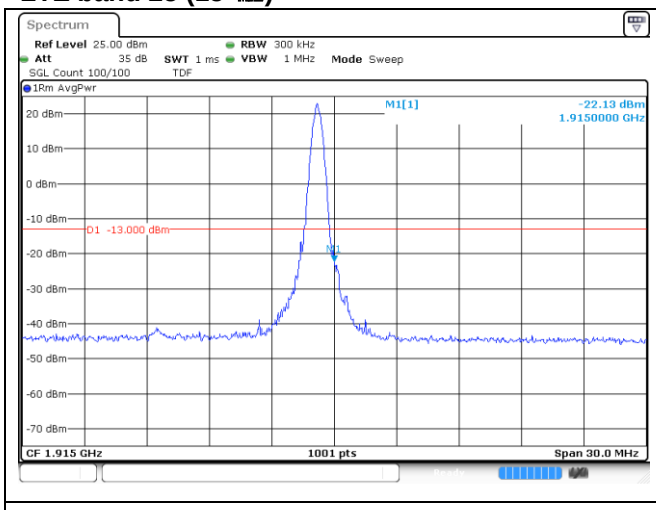


QPSK High Channel - 1 RB

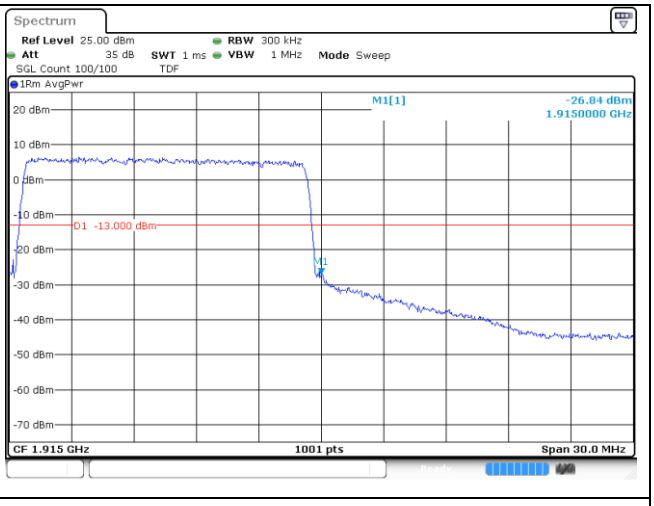


QPSK High Channel - Full RB

LTE band 25 (15 ㎒)

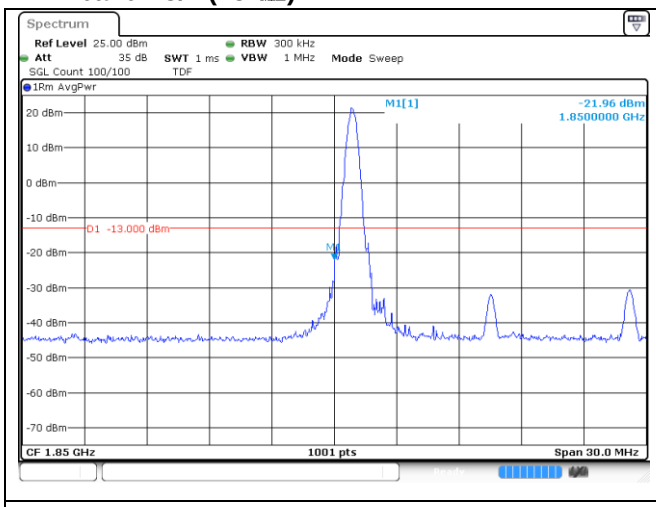


QPSK High Channel - 1 RB

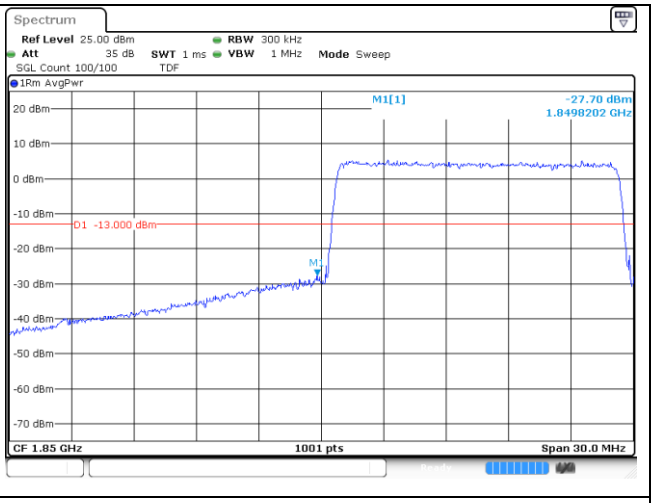


QPSK High Channel - Full RB

LTE band 25/2 (15 ㎒)

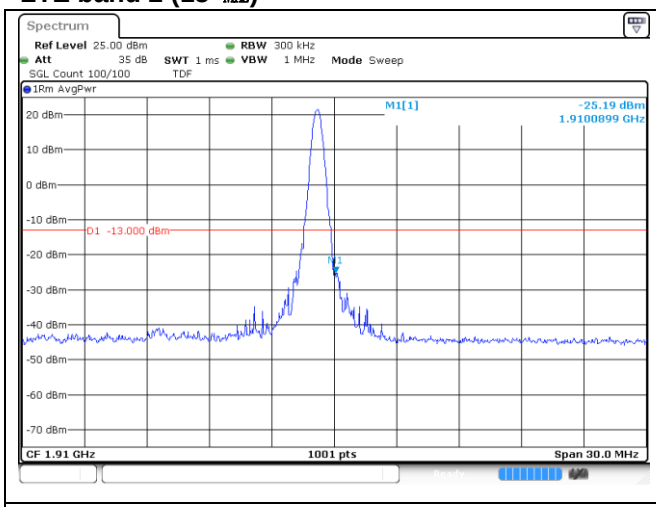


16QAM Low Channel - 1 RB

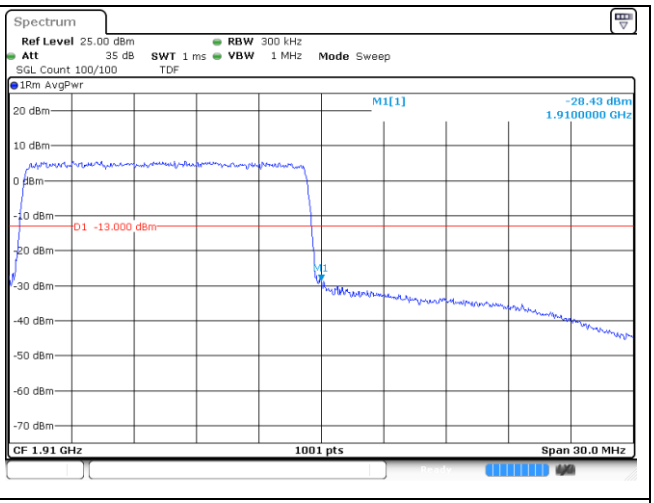


16QAM Low Channel - Full RB

LTE band 2 (15 ㎒)

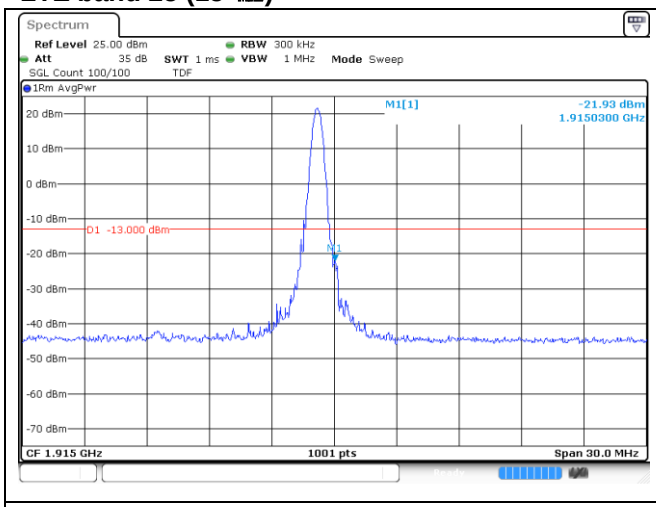


16QAM High Channel - 1 RB

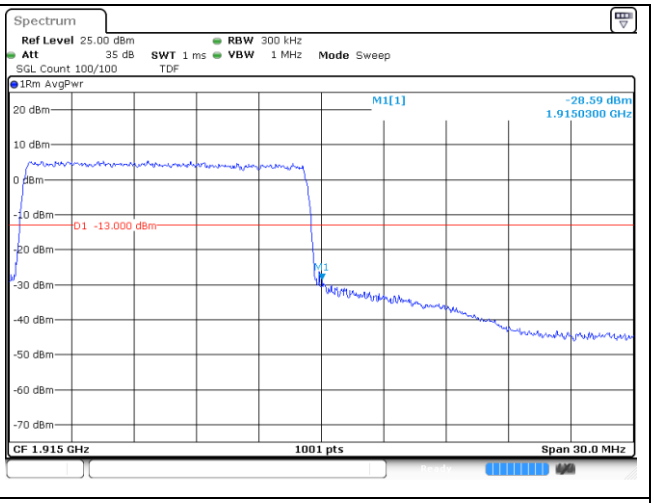


16QAM High Channel - Full RB

LTE band 25 (15 ㎒)

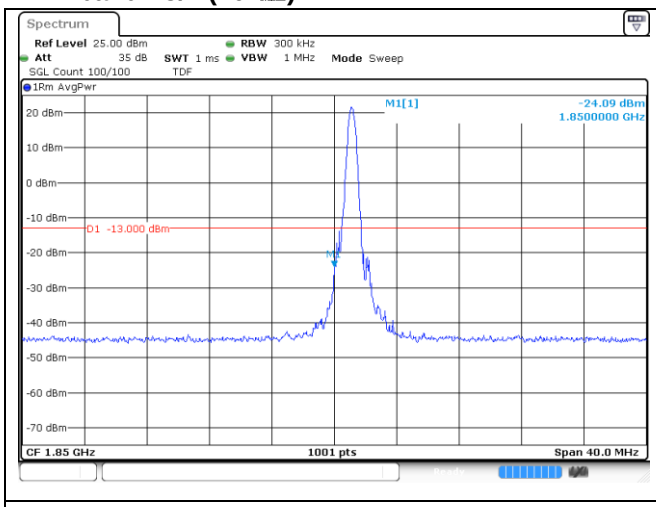


16QAM High Channel - 1 RB

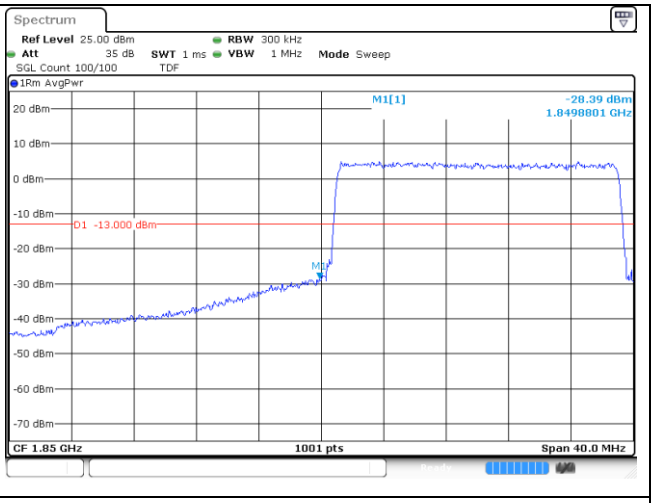


16QAM High Channel - Full RB

LTE band 25/2 (20 ㎒)

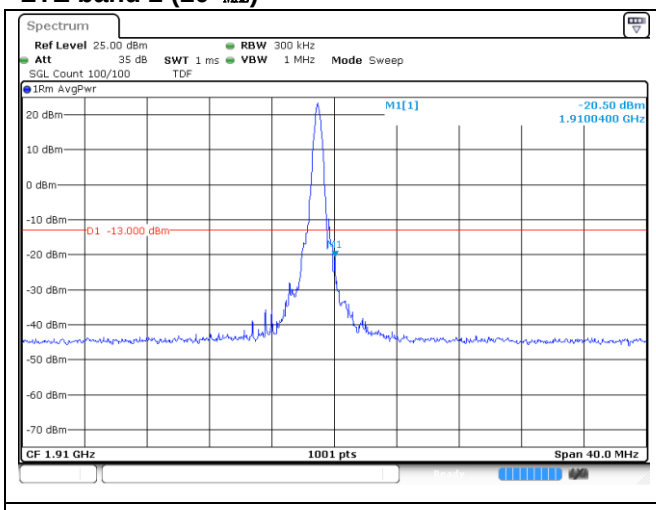


QPSK Low Channel - 1 RB

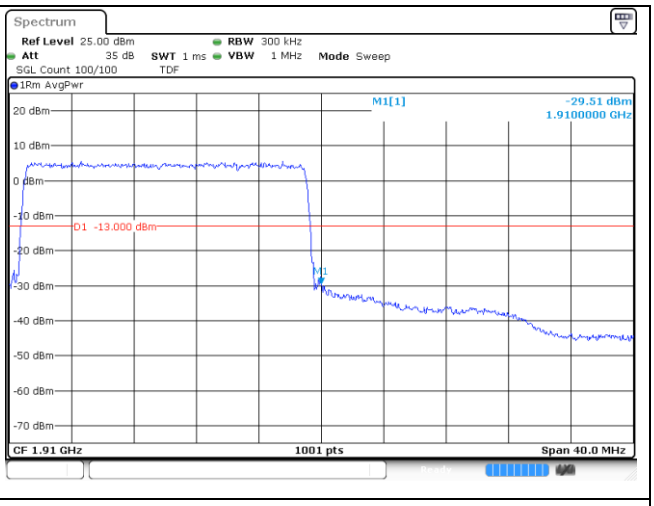


QPSK Low Channel - Full RB

LTE band 2 (20 ㎒)

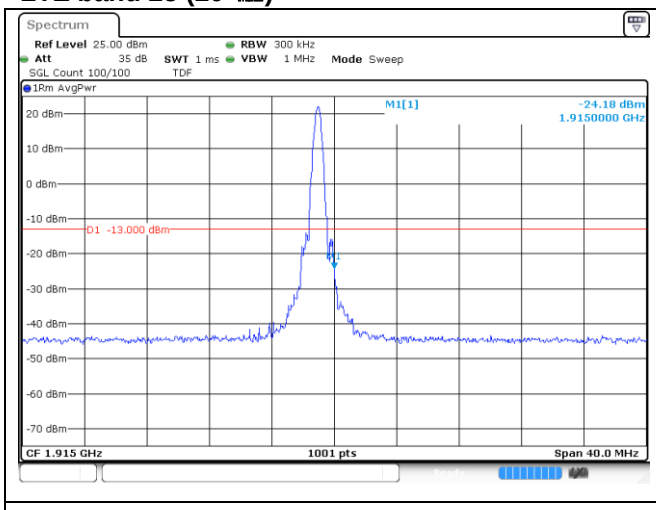


QPSK High Channel - 1 RB

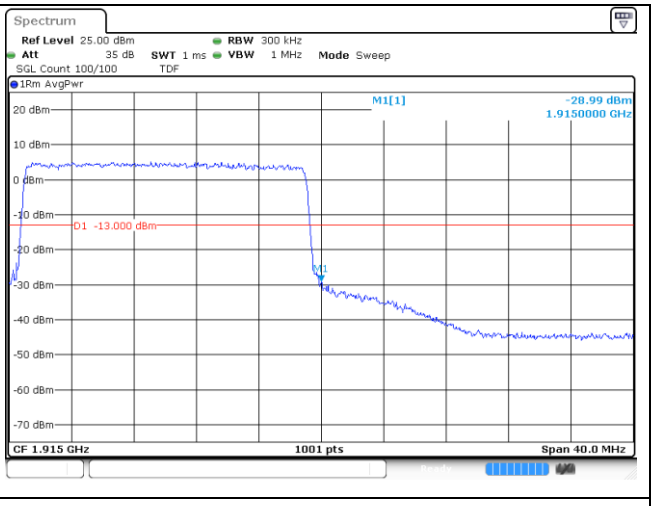


QPSK High Channel - Full RB

LTE band 25 (20 ㎒)

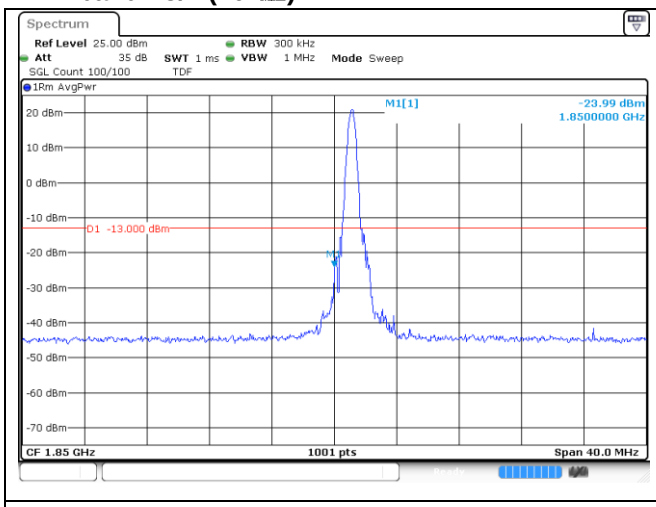


QPSK High Channel - 1 RB

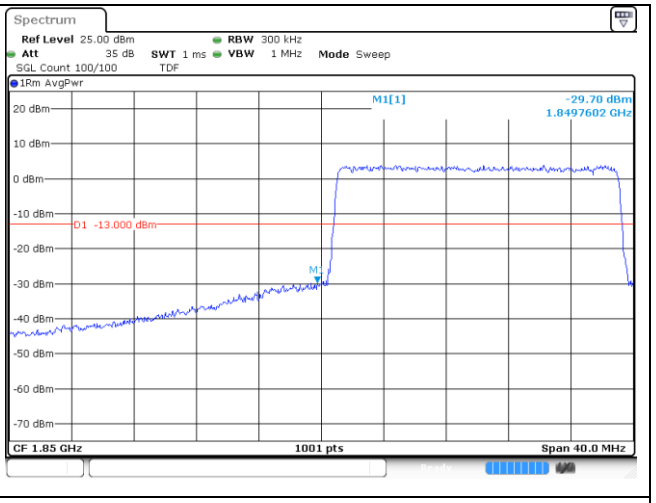


QPSK High Channel - Full RB

LTE band 25/2 (20 ㎒)

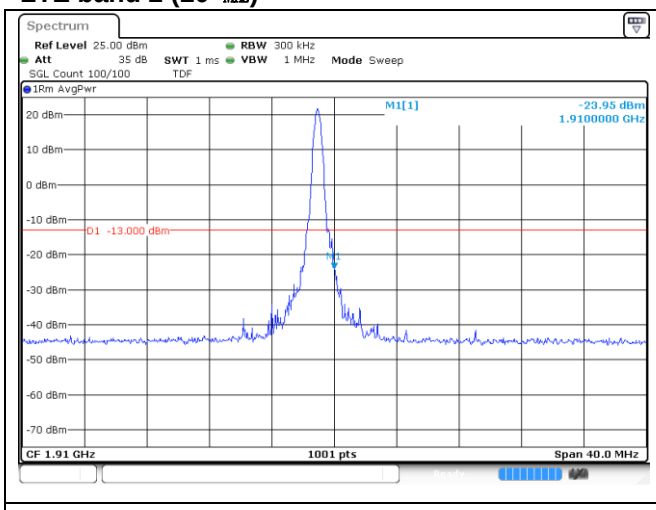


16QAM Low Channel - 1 RB

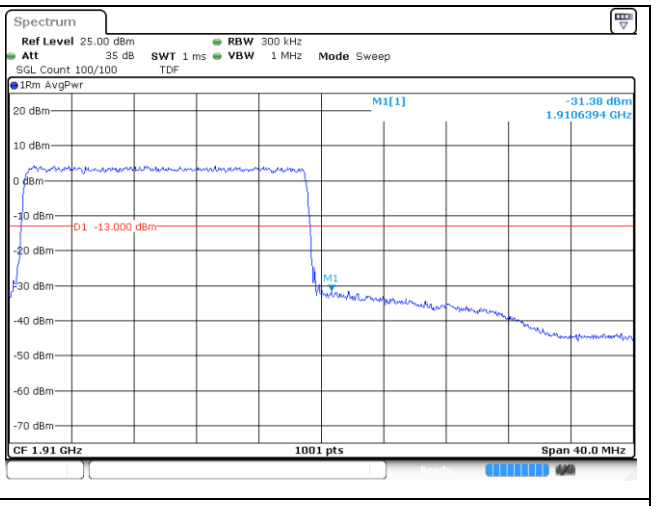


16QAM Low Channel - Full RB

LTE band 2 (20 ㎒)

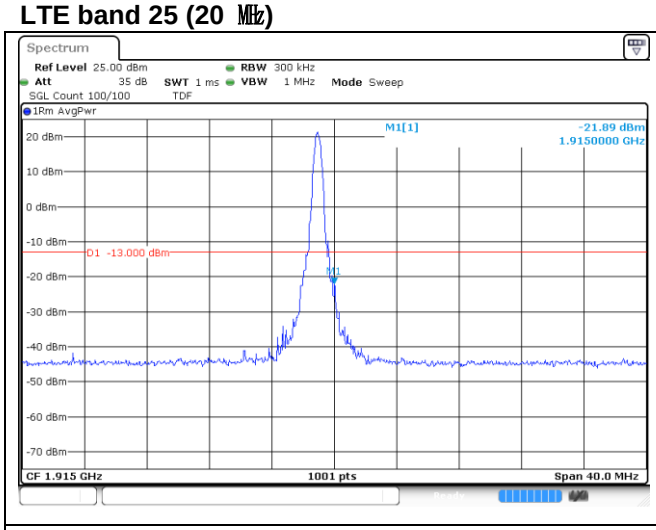


16QAM High Channel - 1 RB

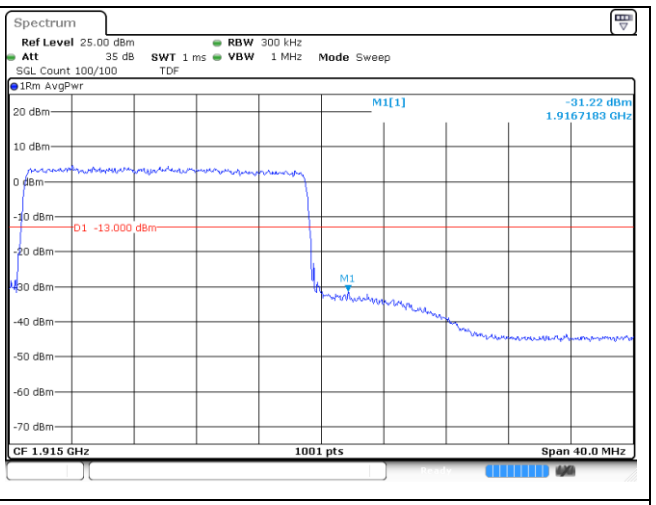


16QAM High Channel - Full RB

LTE band 25 (20 ㎒)

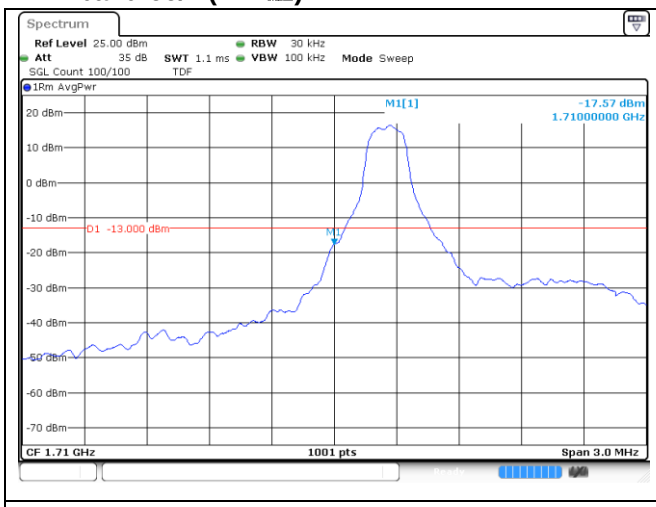


16QAM High Channel - 1 RB

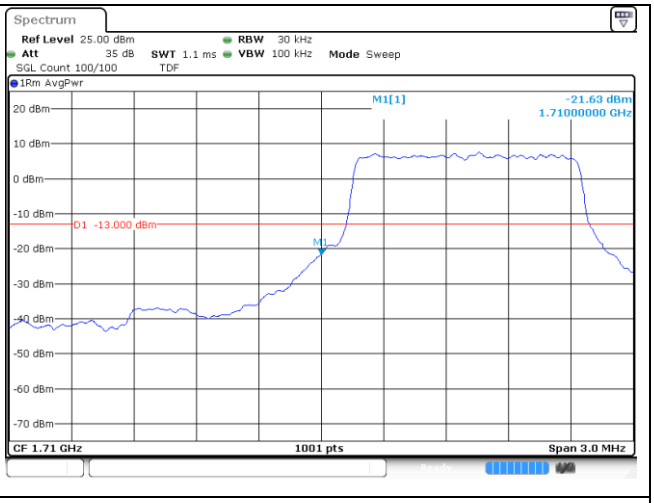


16QAM High Channel - Full RB

LTE band 66/4 (1.4 ㎒)

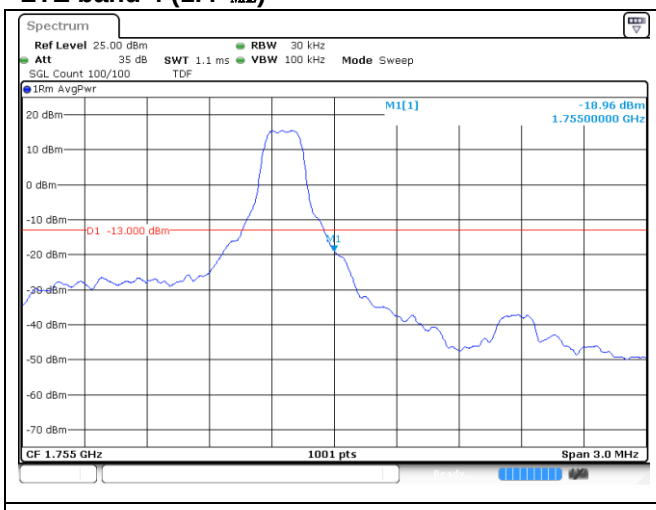


QPSK Low Channel - 1 RB

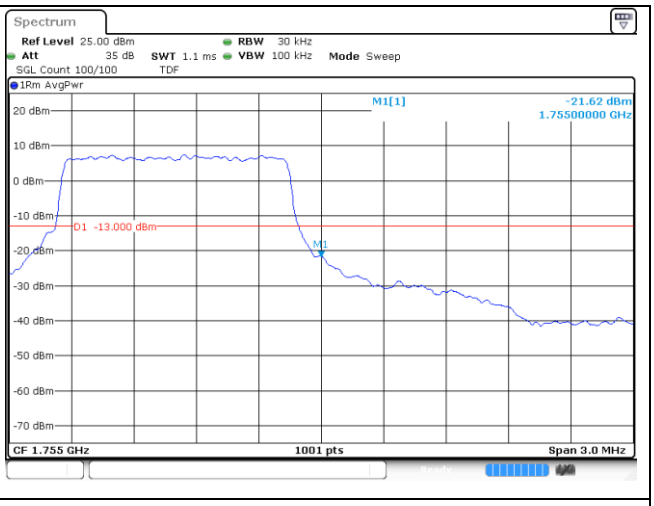


QPSK Low Channel - Full RB

LTE band 4 (1.4 ㎒)

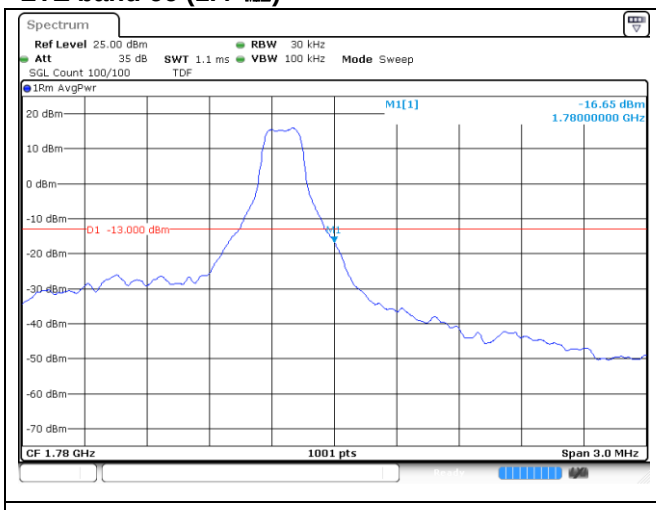


QPSK High Channel - 1 RB

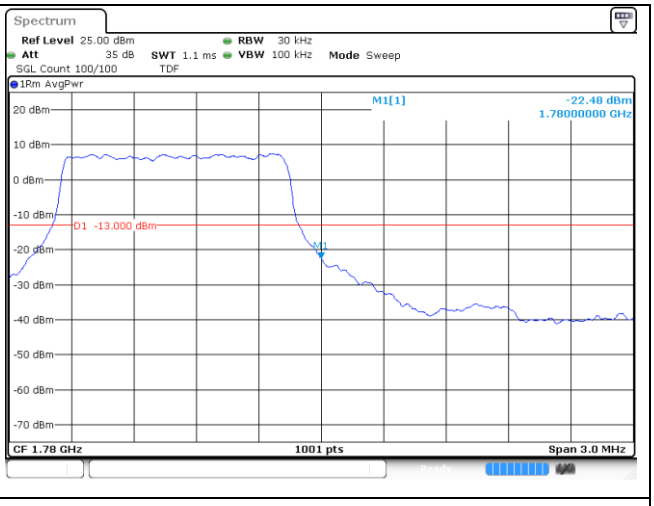


QPSK High Channel - Full RB

LTE band 66 (1.4 ㎒)

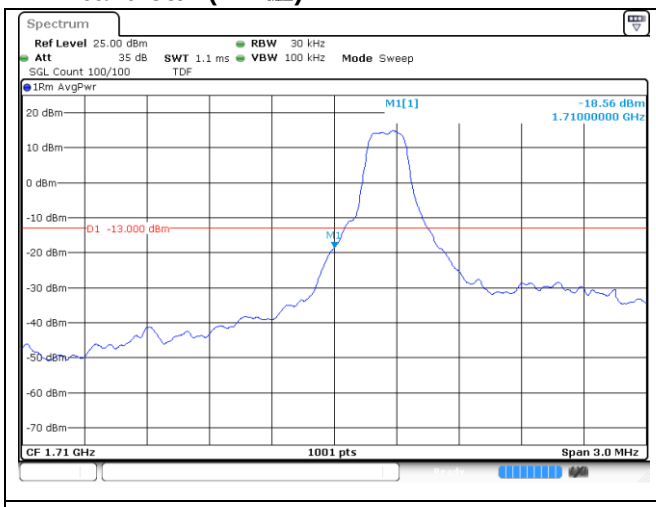


QPSK High Channel - 1 RB

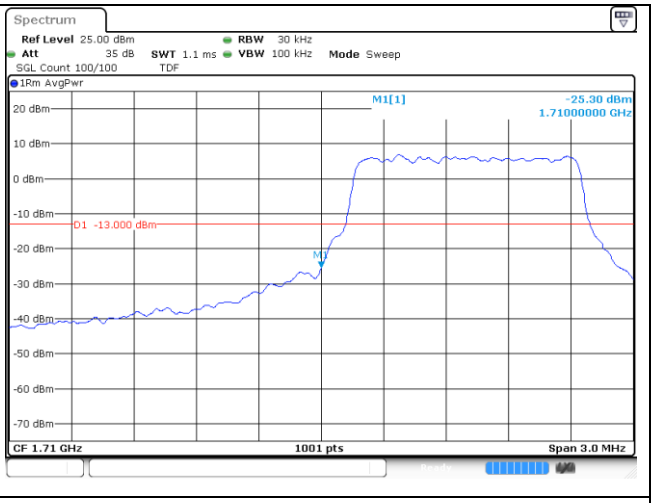


QPSK High Channel - Full RB

LTE band 66/4 (1.4 ㎒)

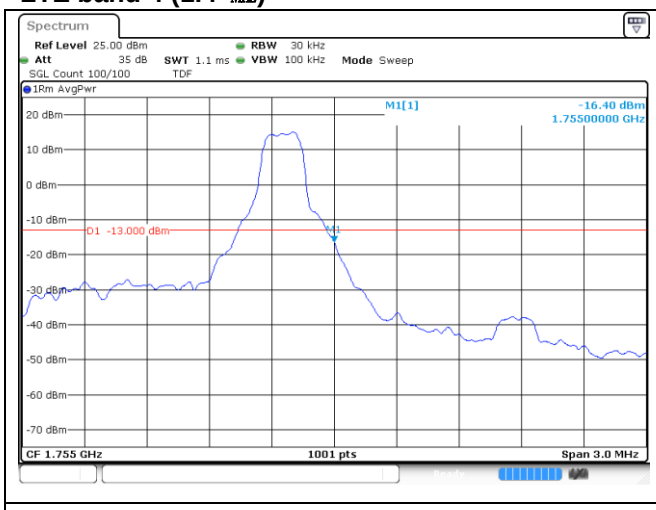


16QAM Low Channel - 1 RB

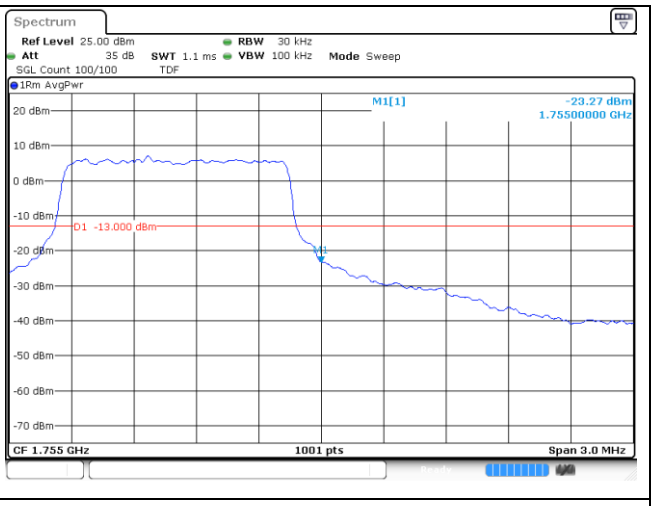


16QAM Low Channel - Full RB

LTE band 4 (1.4 ㎒)

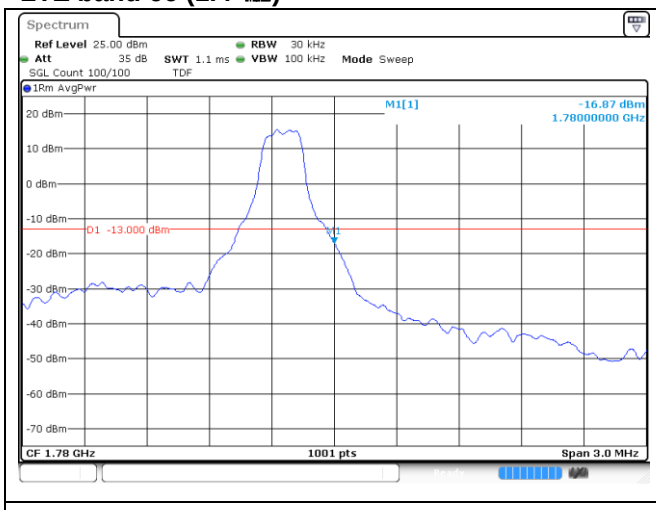


16QAM High Channel - 1 RB

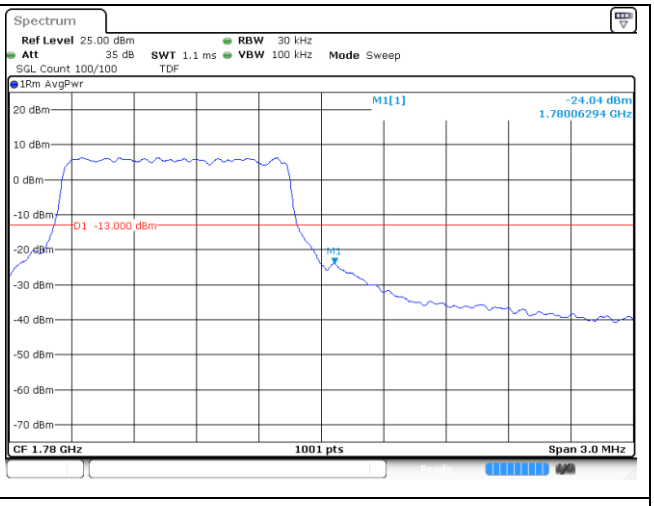


16QAM High Channel - Full RB

LTE band 66 (1.4 ㎒)

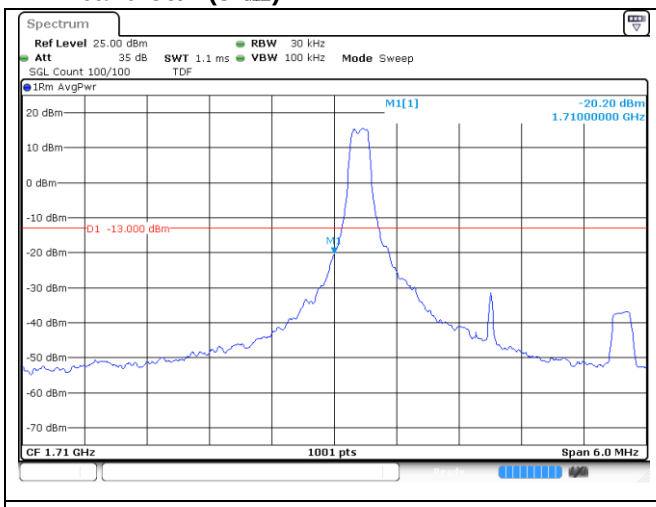


16QAM High Channel - 1 RB

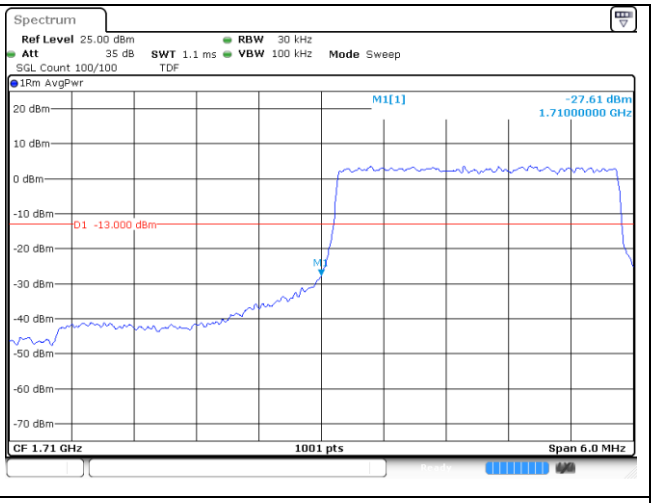


16QAM High Channel - Full RB

LTE band 66/4 (3 ㎒)

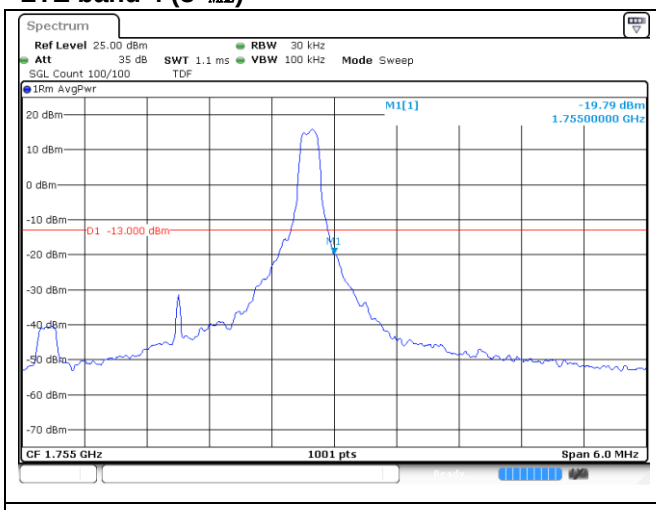


QPSK Low Channel - 1 RB

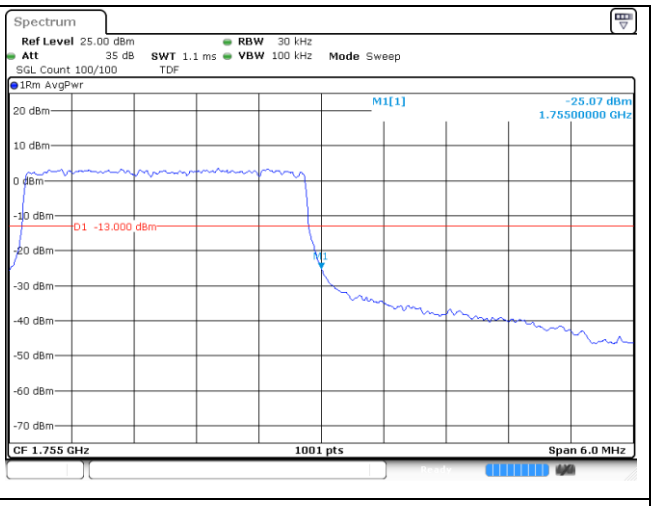


QPSK Low Channel - Full RB

LTE band 4 (3 ㎒)

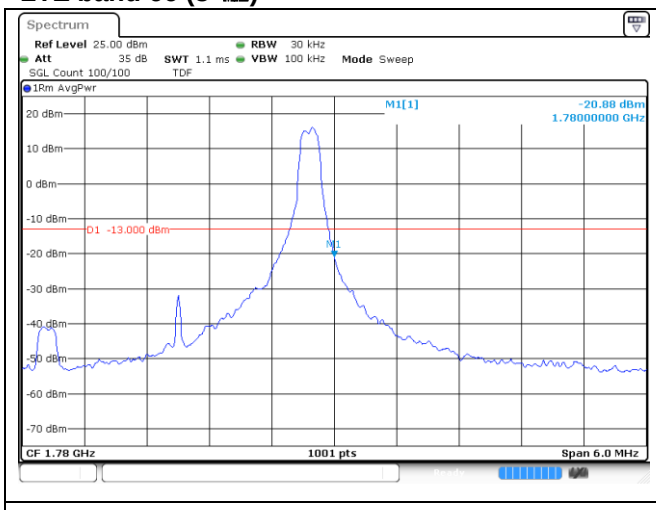


QPSK High Channel - 1 RB

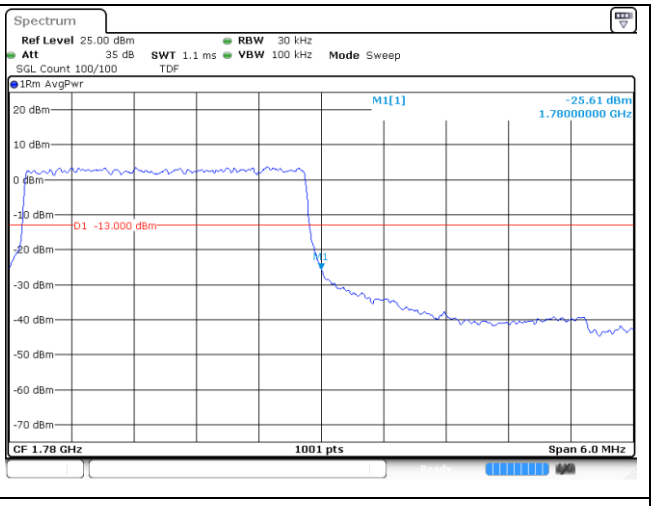


QPSK High Channel - Full RB

LTE band 66 (3 ㎒)

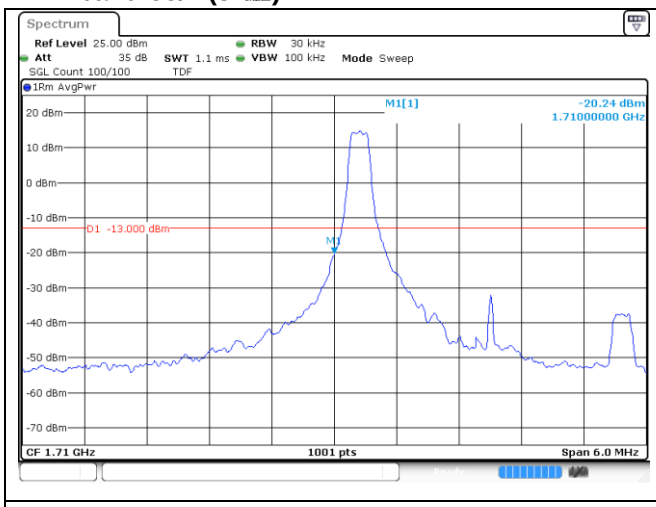


QPSK High Channel - 1 RB

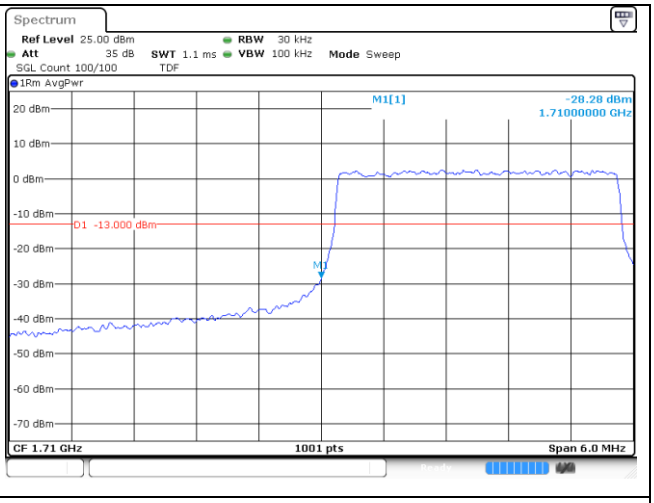


QPSK High Channel - Full RB

LTE band 66/4 (3 ㎒)

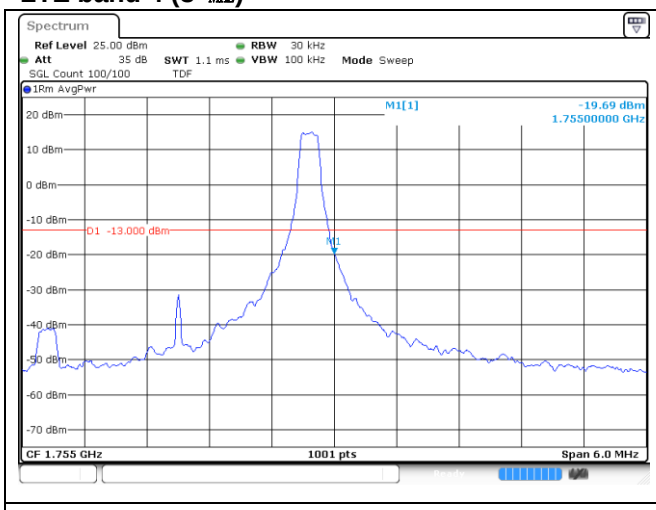


16QAM Low Channel - 1 RB

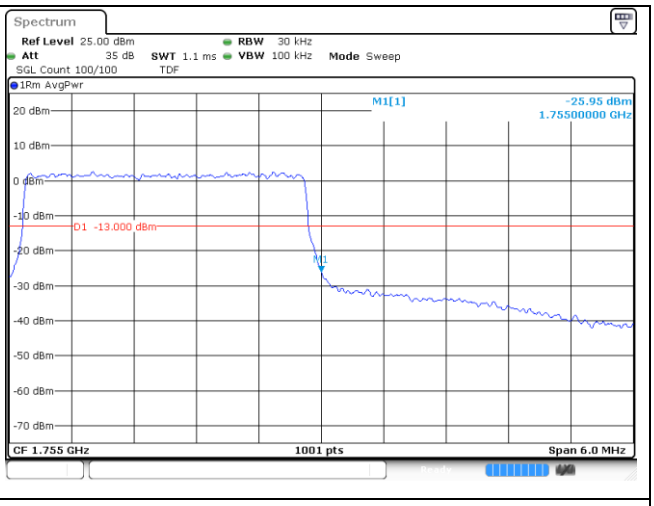


16QAM Low Channel - Full RB

LTE band 4 (3 ㎒)

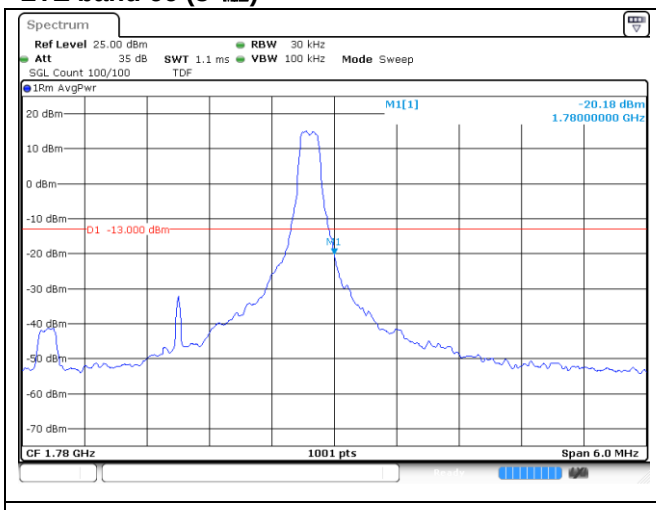


16QAM High Channel - 1 RB

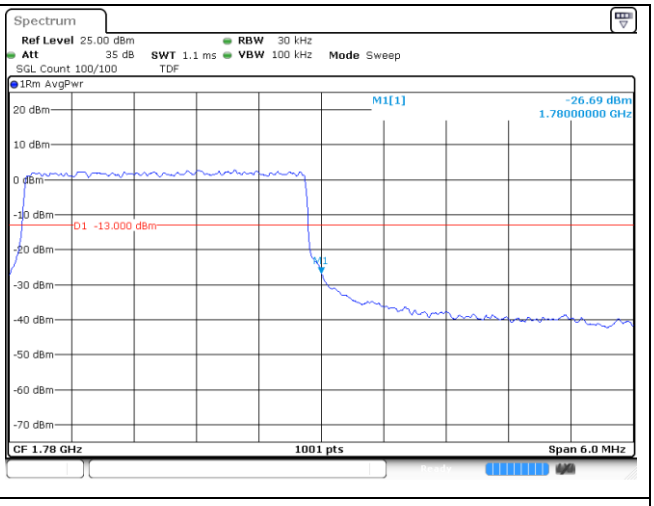


16QAM High Channel - Full RB

LTE band 66 (3 ㎒)

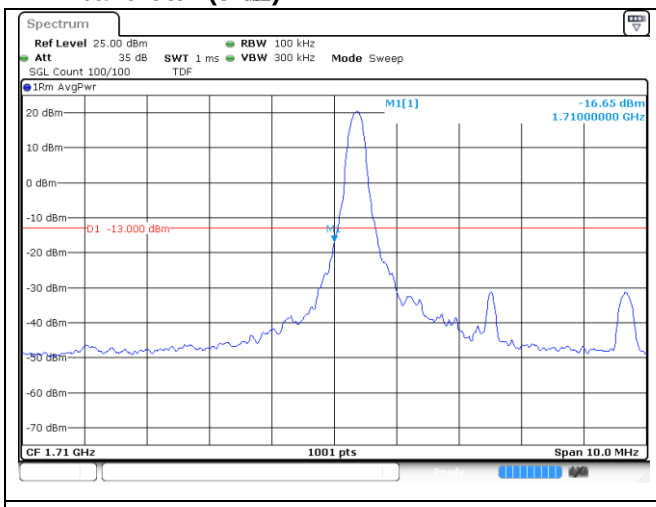


16QAM High Channel - 1 RB

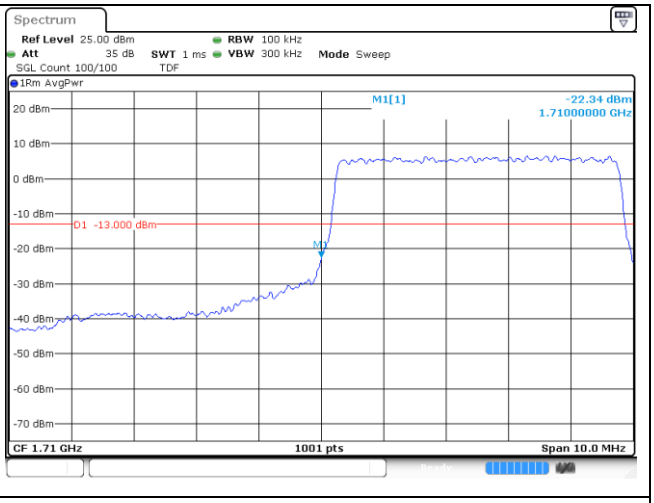


16QAM High Channel - Full RB

LTE band 66/4 (5 ㎒)

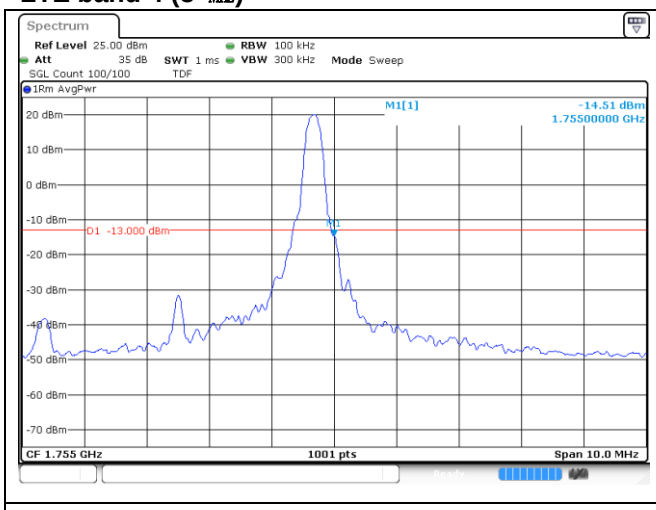


QPSK Low Channel - 1 RB

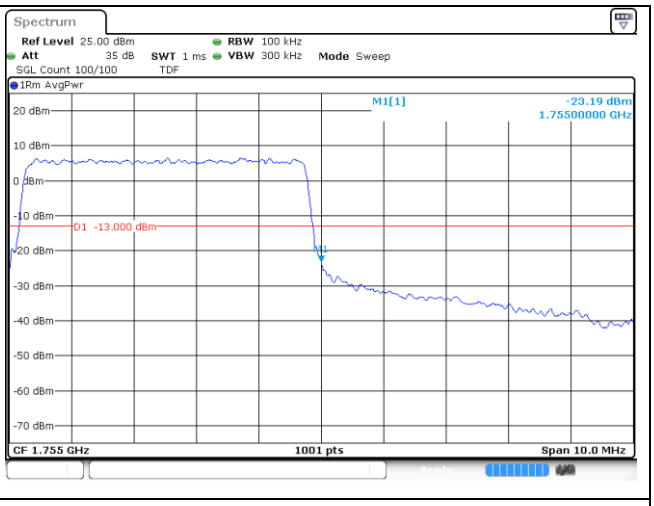


QPSK Low Channel - Full RB

LTE band 4 (5 ㎒)

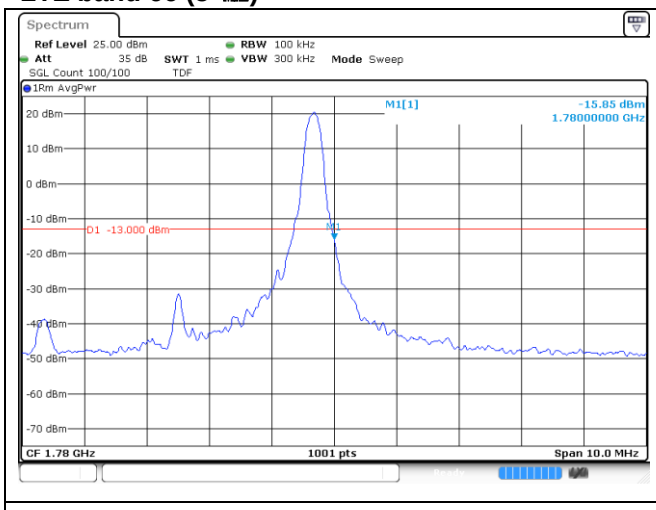


QPSK High Channel - 1 RB

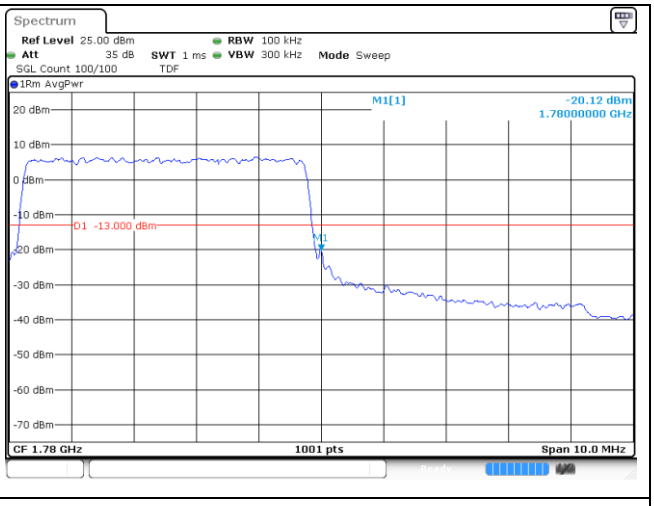


QPSK High Channel - Full RB

LTE band 66 (5 ㎒)

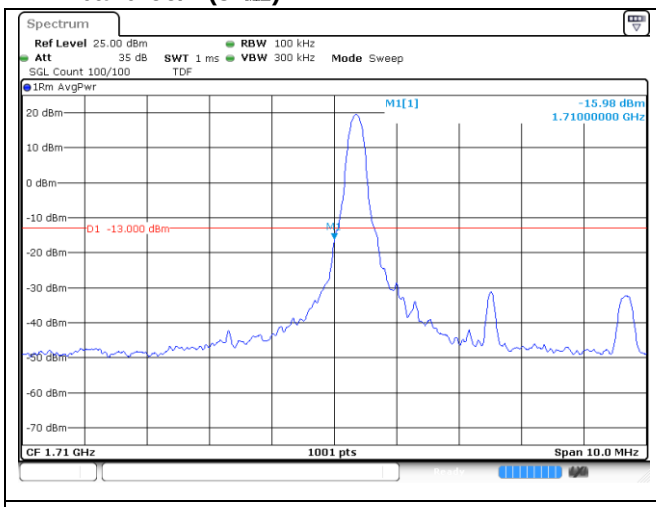


QPSK High Channel - 1 RB

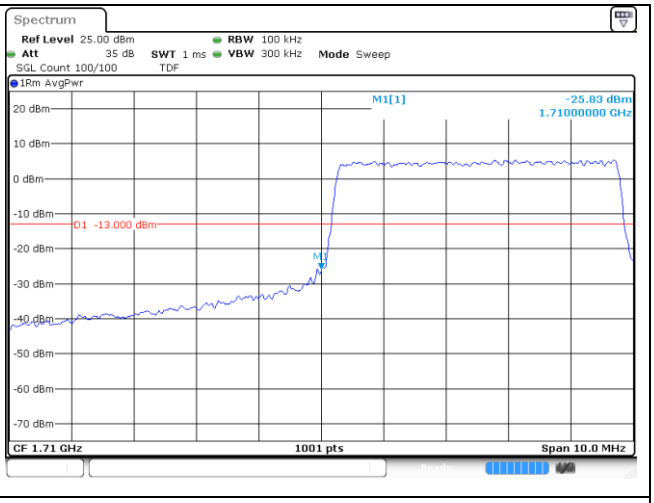


QPSK High Channel - Full RB

LTE band 66/4 (5 ㎒)

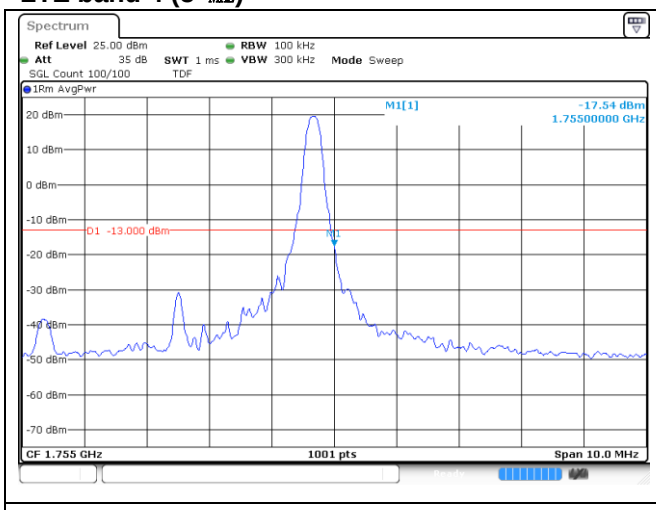


16QAM Low Channel - 1 RB

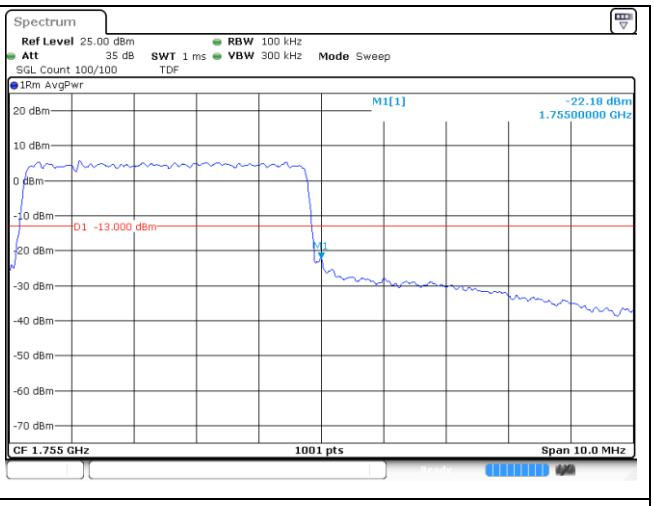


16QAM Low Channel - Full RB

LTE band 4 (5 ㎒)

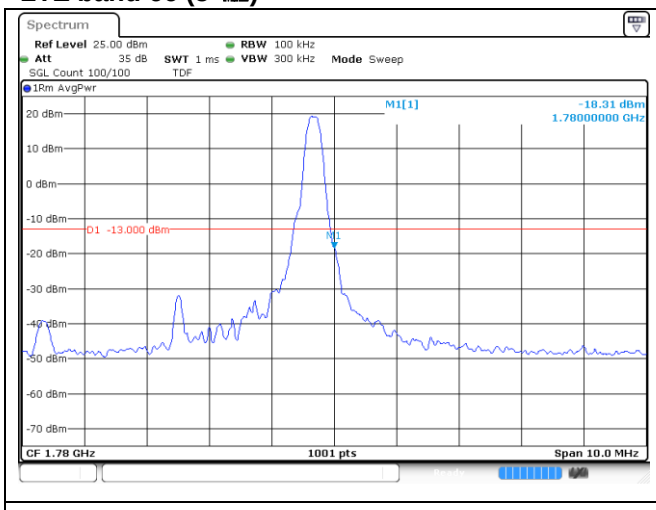


16QAM High Channel - 1 RB

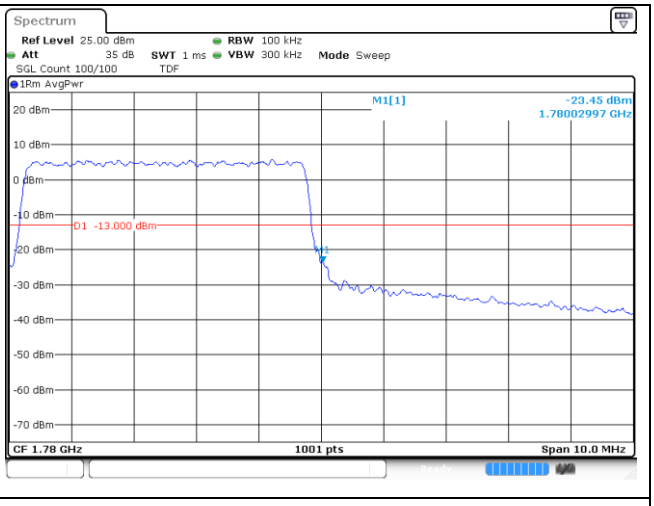


16QAM High Channel - Full RB

LTE band 66 (5 ㎒)



16QAM High Channel - 1 RB



16QAM High Channel - Full RB