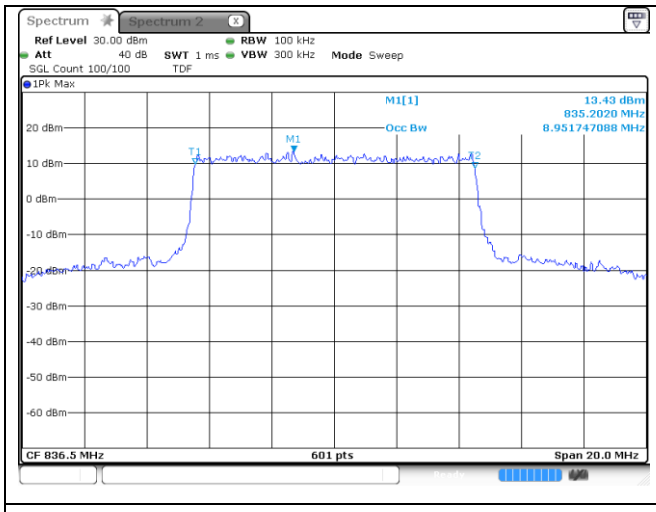
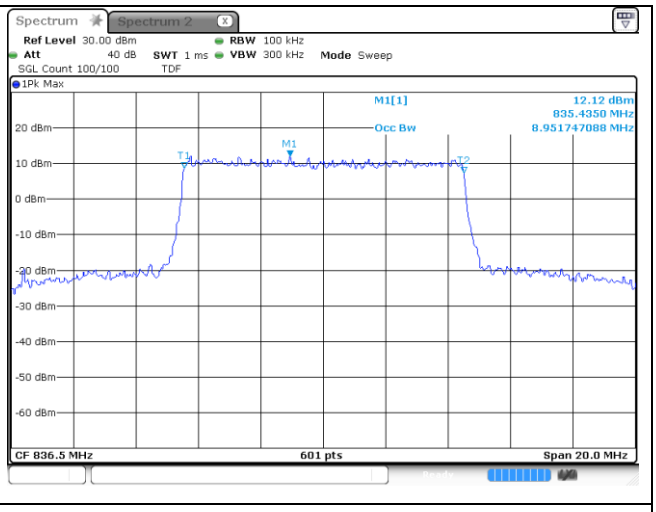
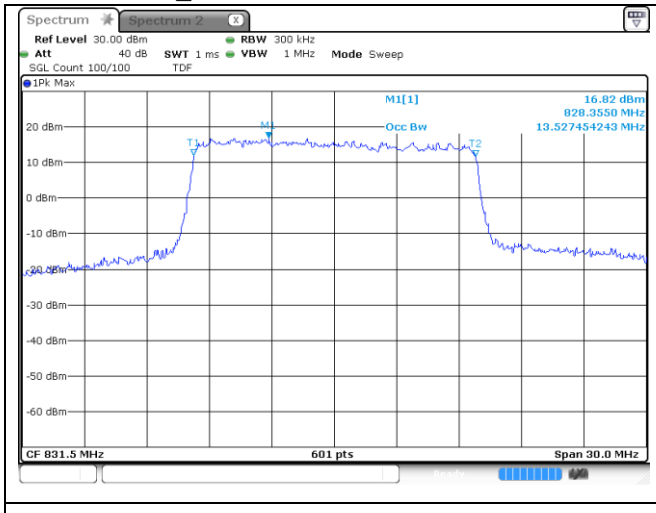


10 ㎒ QPSK Middle Channel – Full RB

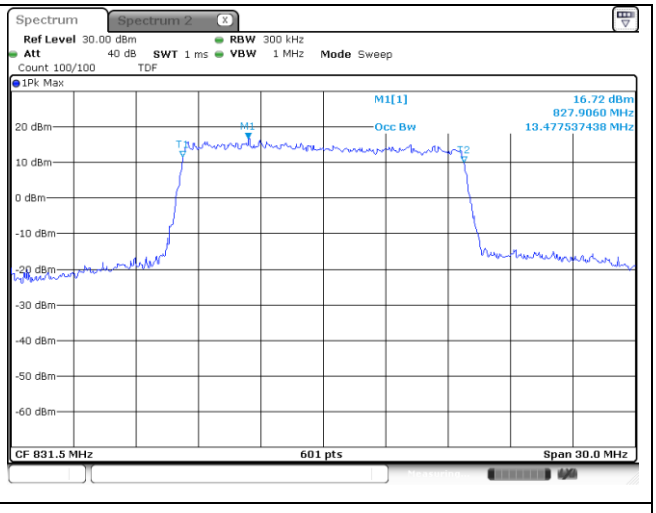


10 ㎒ 16QAM Middle Channel – Full RB

LTE band 26_Part 22



15 ㎒ QPSK Low Channel – Full RB



15 ㎒ 16QAM Low Channel – Full RB

5. Peak-Average Ratio

5.1. Limit

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

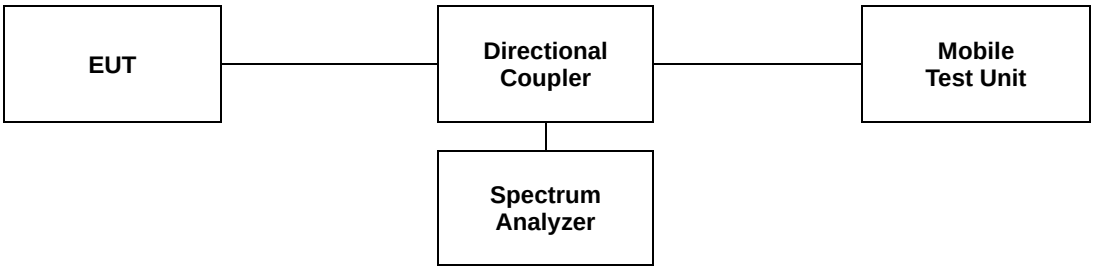
- §24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance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

5.2. Test Procedure

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

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

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



5.3 Test Results

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

Band	Mode	Frequency (㎒)	PAR (㏈)
GSM 850	EDGE	824.2	3.07
		836.6	3.07
		848.8	3.10
GSM 1 900	EDGE	1 850.2	3.10
		1 880.0	3.19
		1 909.8	3.19

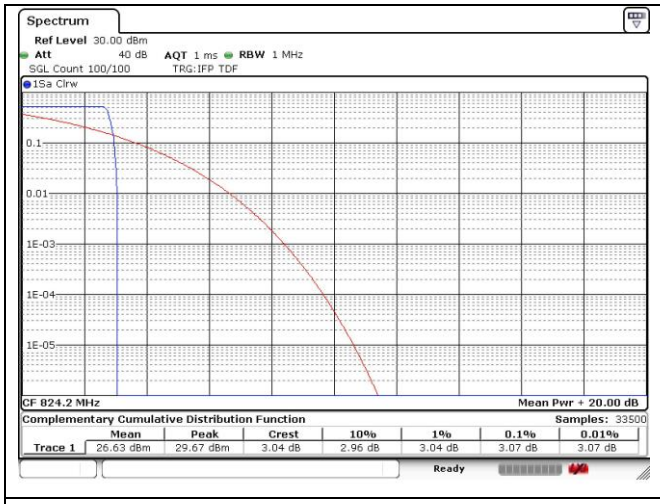
Band	Mode	Frequency (㎒)	PAR (㏈)
WCDMA Ⅴ	HSDPA	826.4	3.16
		836.6	2.87
		846.6	3.16

Band	Bandwidth (㎒)	Mode	Frequency (㎒)	PAR (㏈)
7	5	16QAM	2 502.5	5.39
			2 535	5.77
			2 567.5	5.88
	10		2 505	5.51
			2 535	5.74
			2 565	6.00
	15		2 507.5	5.68
			2 535	5.71
			2 562.5	5.80
	20		2 510	5.62
			2 535	5.68
			2 560	5.71
26 Part 90	1.4	16QAM	814.7	5.62
			819	5.25
			823.3	5.62
	3		815.5	5.42
			819	5.33
			822.5	5.54
	5		816.5	5.28
			819	5.30
			821.5	5.51
	10		819	5.42
	15		821.5	5.39

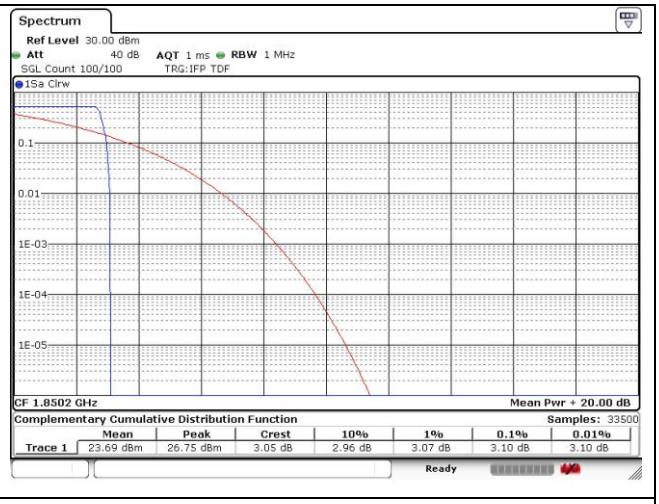
Band	Bandwidth (㎒)	Mode	Frequency (㎒)	PAR (dB)
26/5 Part 22	1.4	16QAM	824.7	5.48
			836.5	4.84
			848.3	5.04
	3		825.5	5.48
			836.5	4.87
			847.5	5.16
	5		826.5	5.54
			836.5	4.84
			846.5	5.30
	10		829	5.25
			836.5	5.01
			844	5.45
26 Part 22	15		831.5	5.13
			841.5	5.59

- Test plots

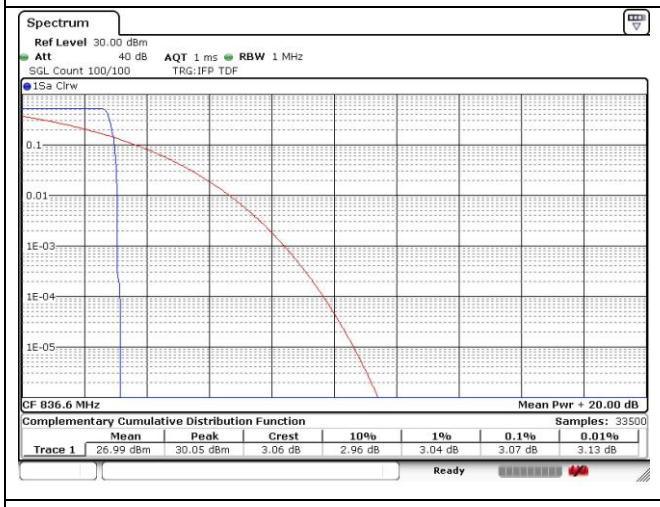
GSM



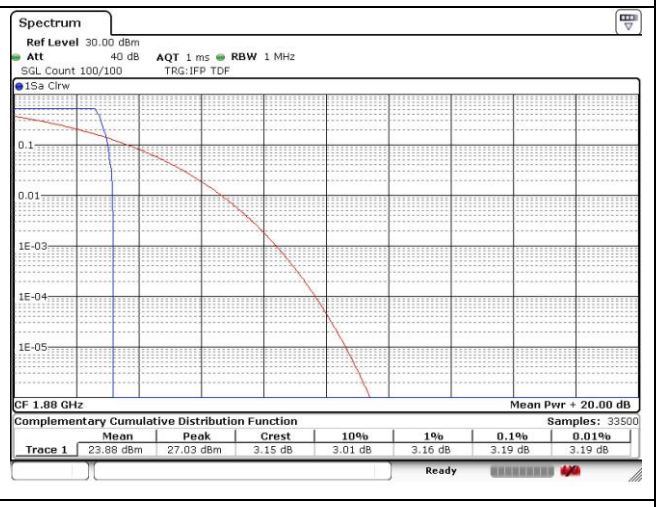
GSM 850 EDGE Low Channel



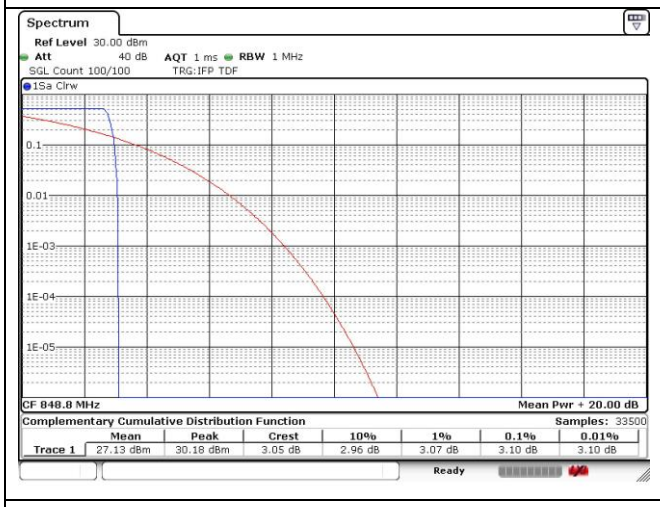
GSM 1 900 EDGE Low Channel



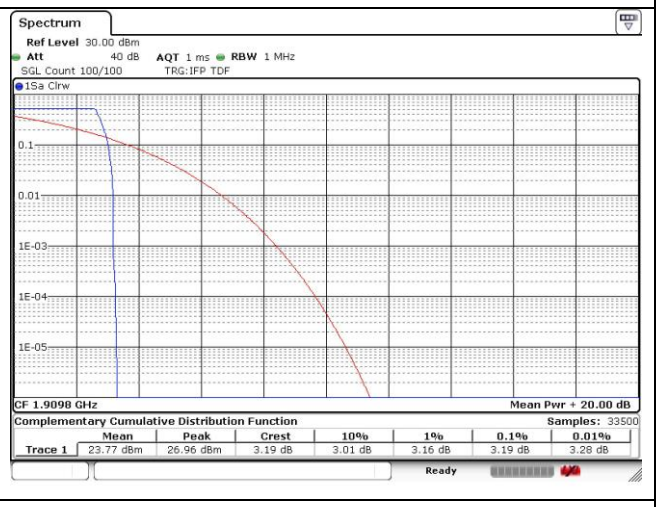
GSM 850 EDGE Middle Channel



GSM 1 900 EDGE Middle Channel

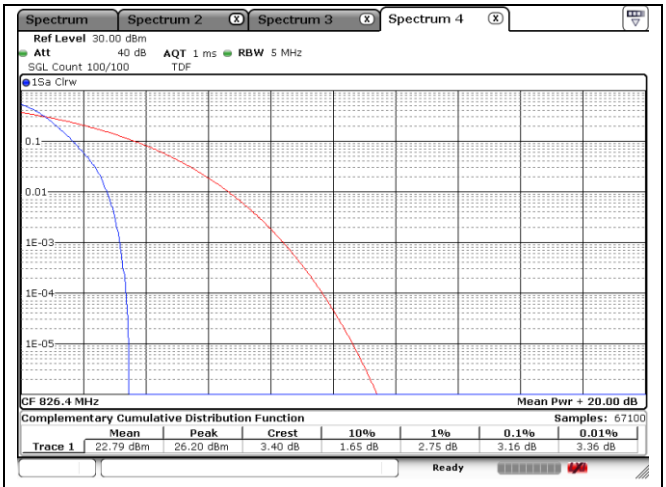


GSM 850 EDGE High Channel

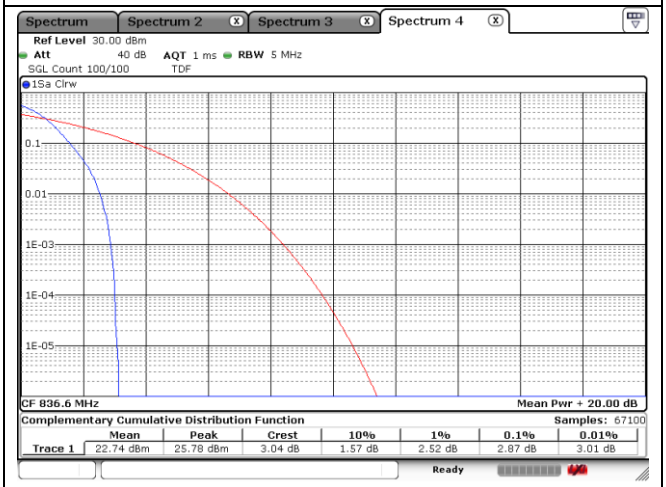


GSM 1 900 EDGE High Channel

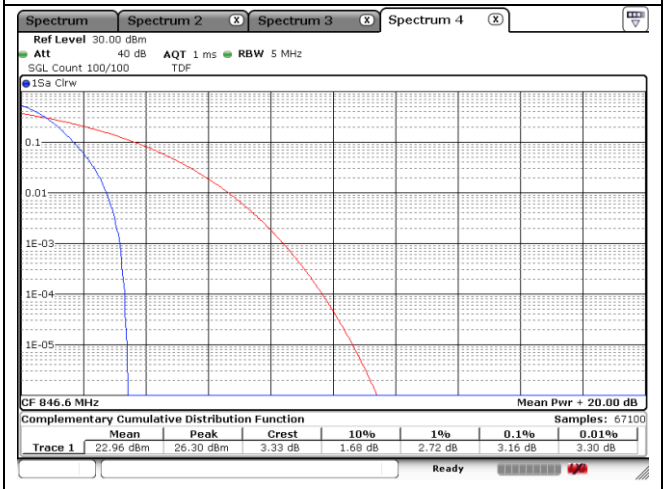
WCDMA Ⅴ



WCDMA Ⅴ HSDPA Low Channel

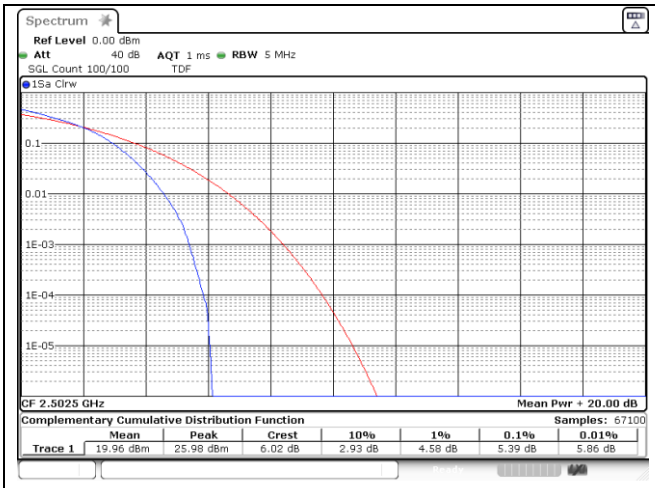


WCDMA Ⅴ HSDPA Middle Channel

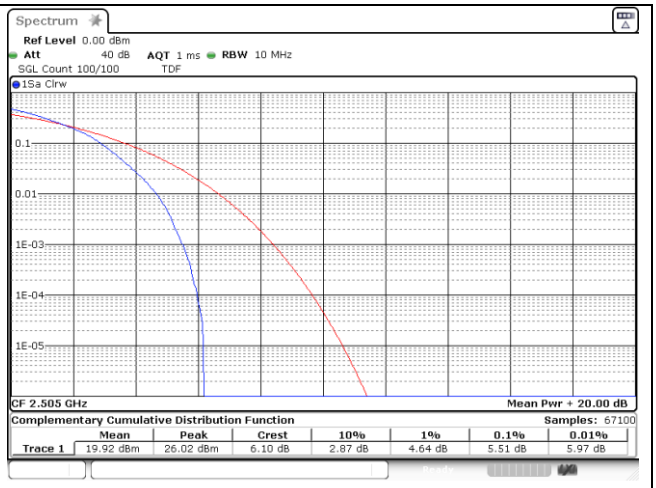


WCDMA Ⅴ HSDPA High Channel

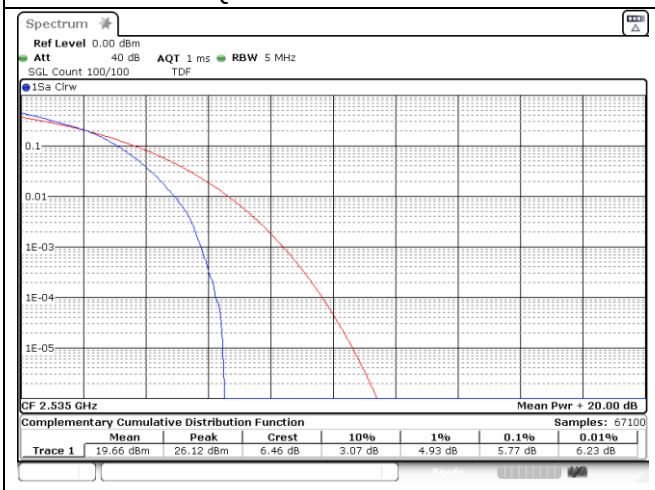
LTE Band 7



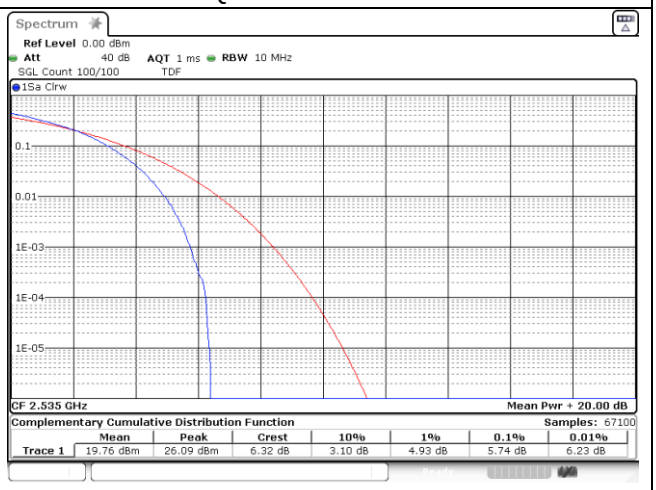
5 ㎒ 16QAM Low Channel – Full RB



10 ㎒ 16QAM Low Channel – Full RB



5 ㎒ 16QAM Middle Channel – Full RB



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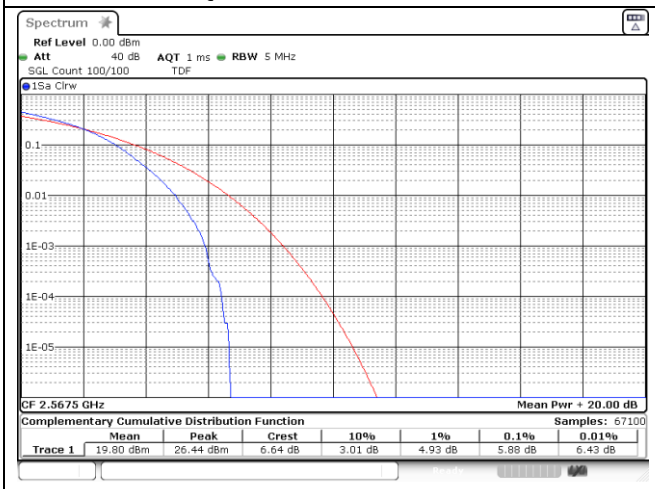
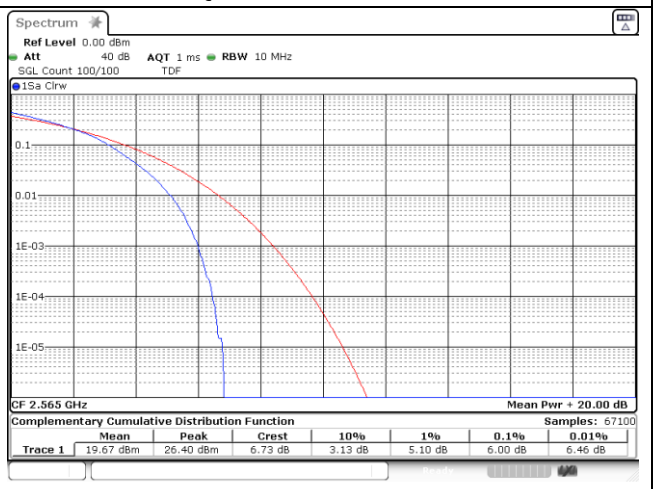
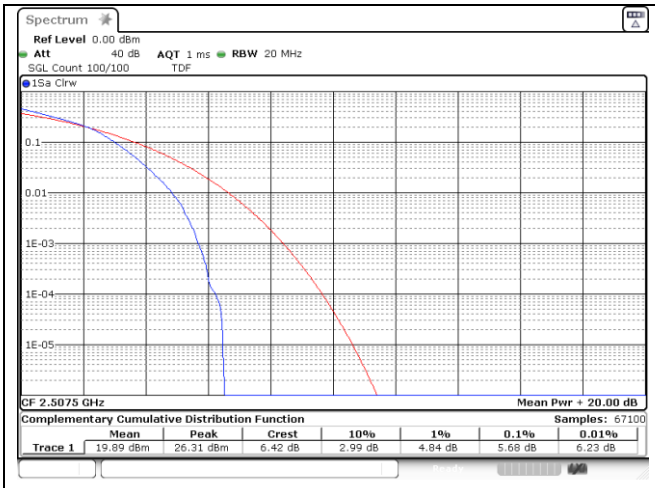


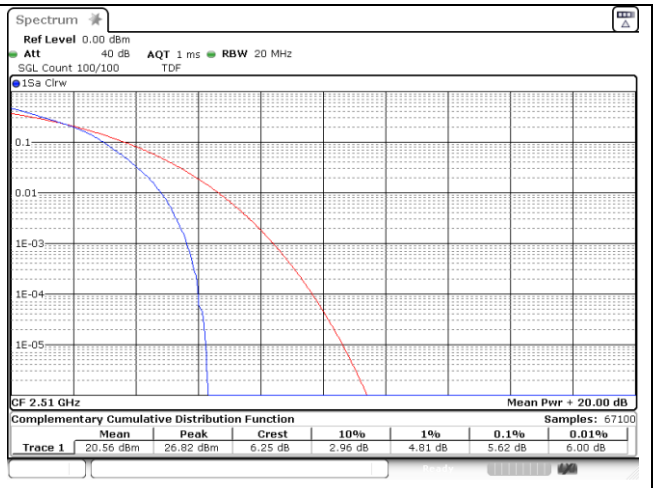
5 ㎒ 16QAM High Channel – Full RB



10 ㎒ 16QAM High Channel – Full RB



15 ㎒ 16QAM Low Channel – Full RB



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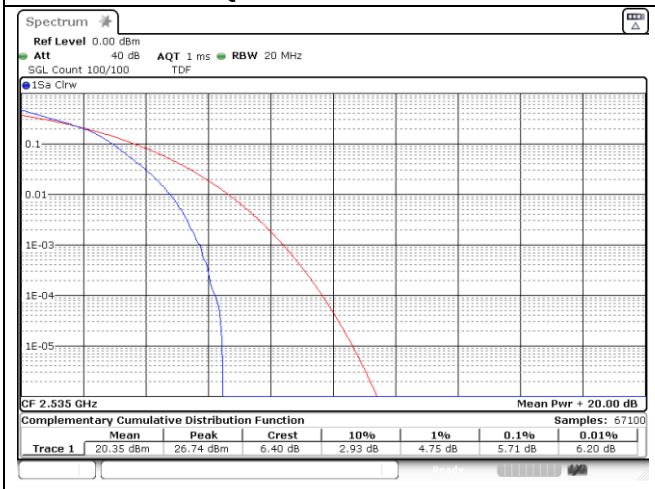

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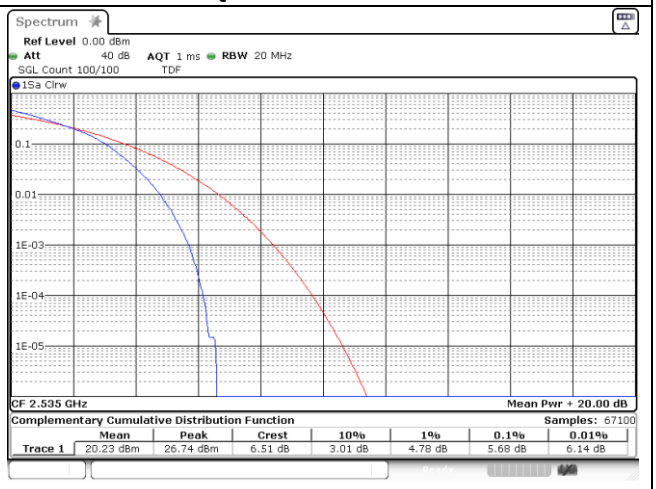

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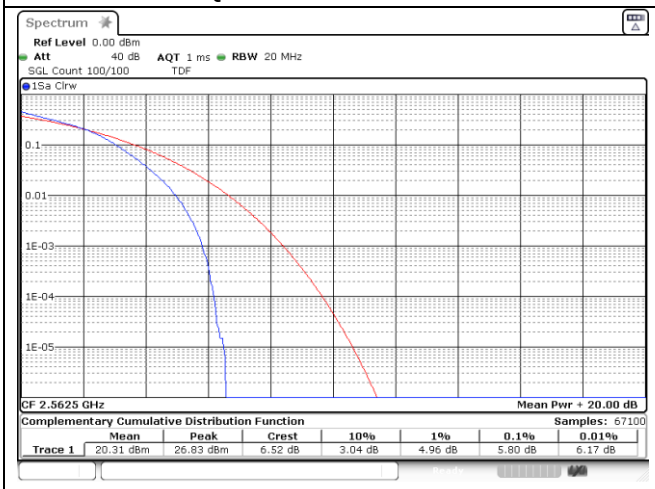

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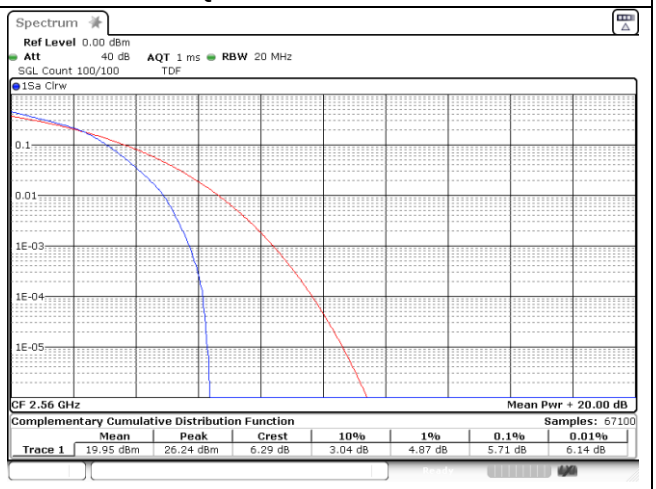
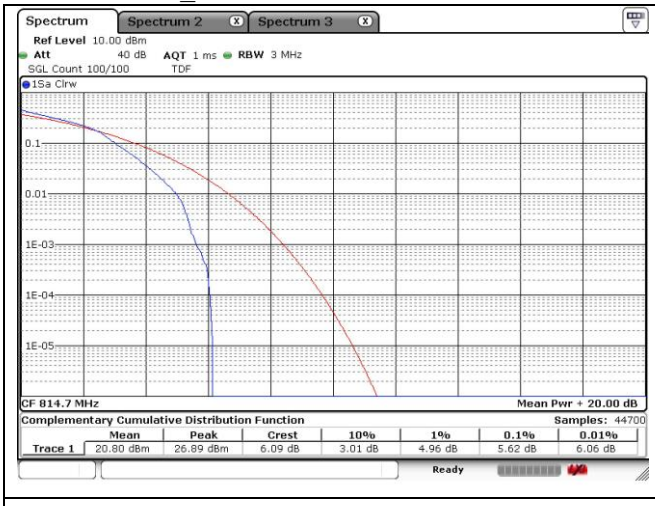
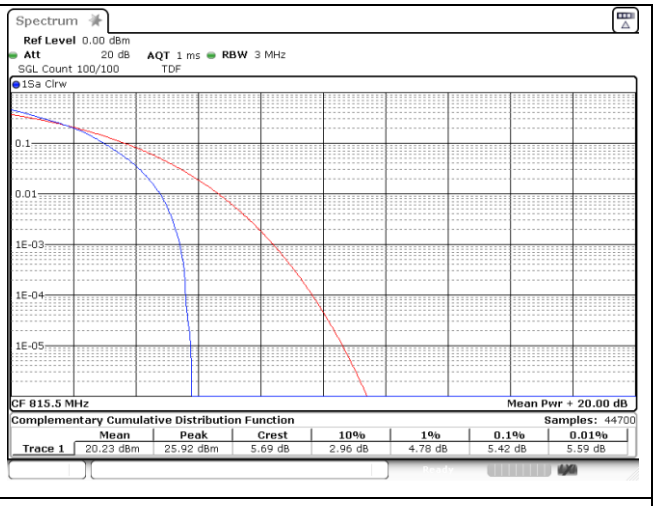


20 ㎒ 16QAM High Channel – Full RB

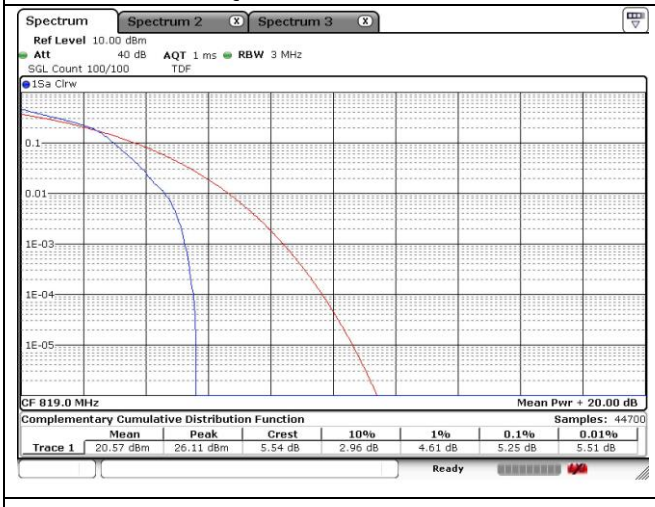
LTE Band 26_Part 90



1.4 ㎒ 16QAM Low Channel – Full RB



3 ㎒ 16QAM Low Channel – Full RB



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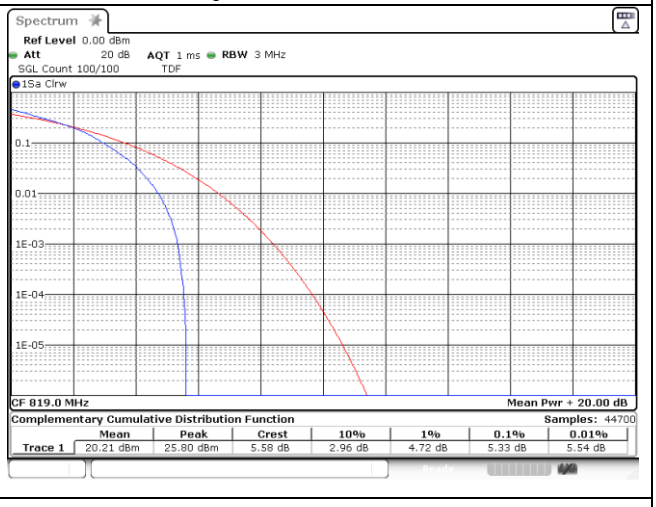
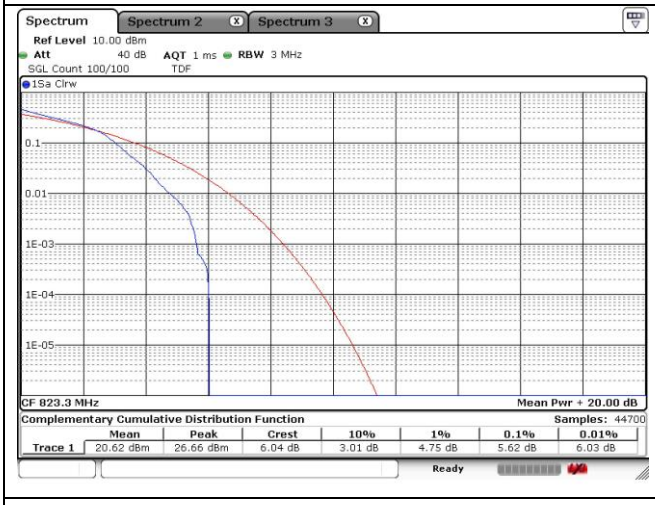


3 ㎒ 16QAM Middle Channel – Full RB



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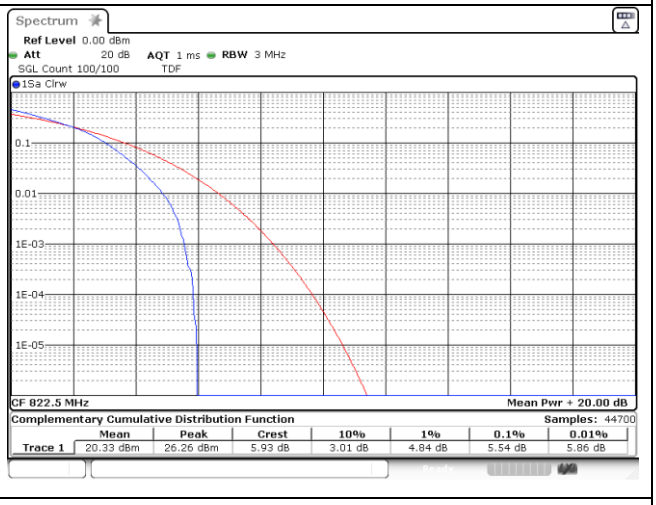

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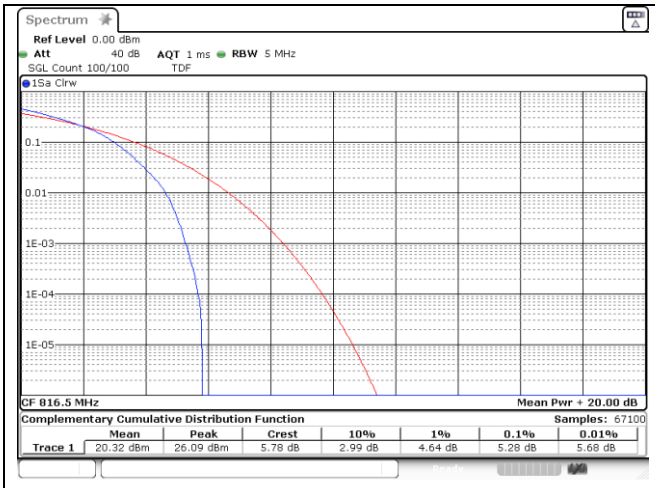
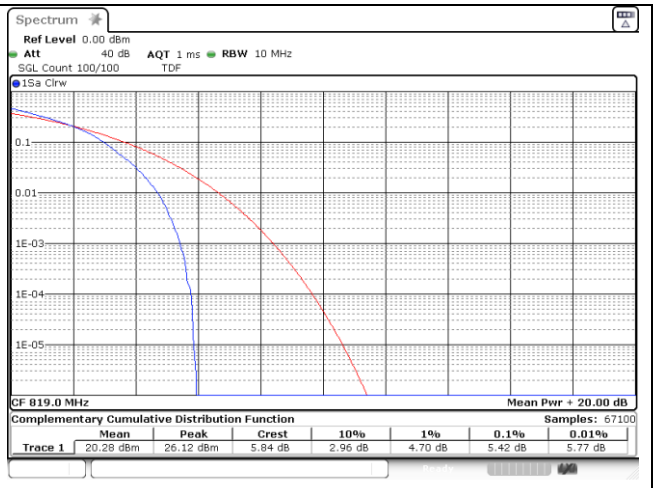
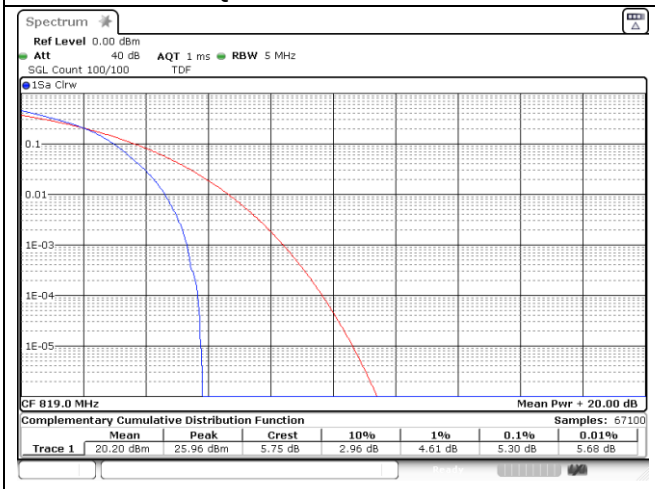


5 ㎒ 16QAM Low Channel – Full RB



10 ㎒ 16QAM Middle Channel – Full RB



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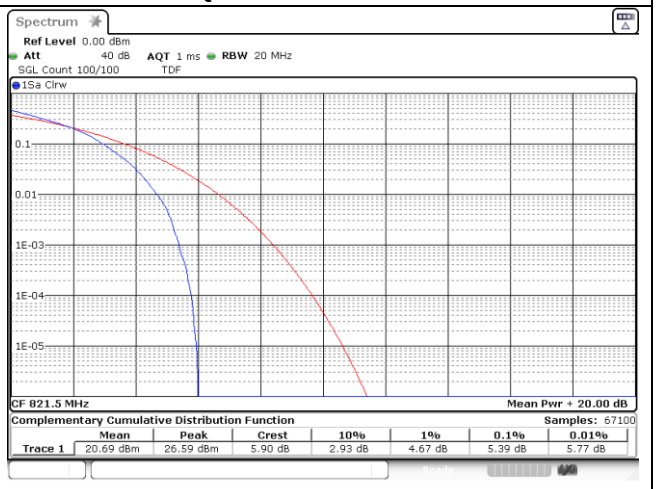

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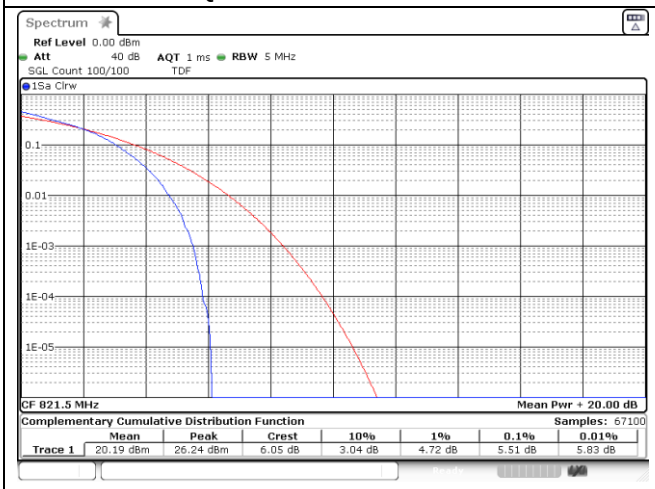
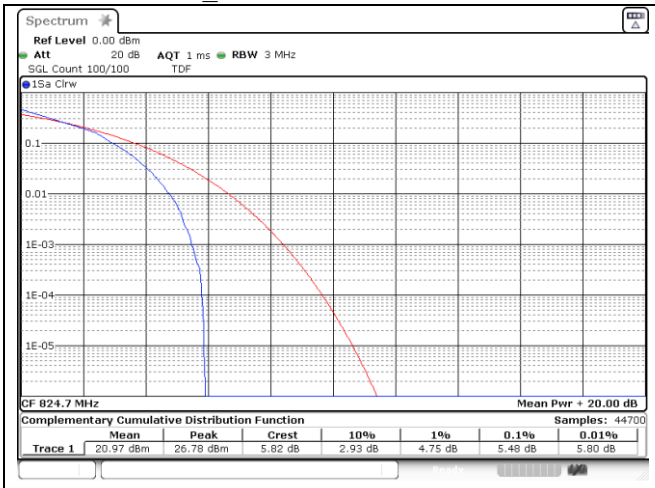
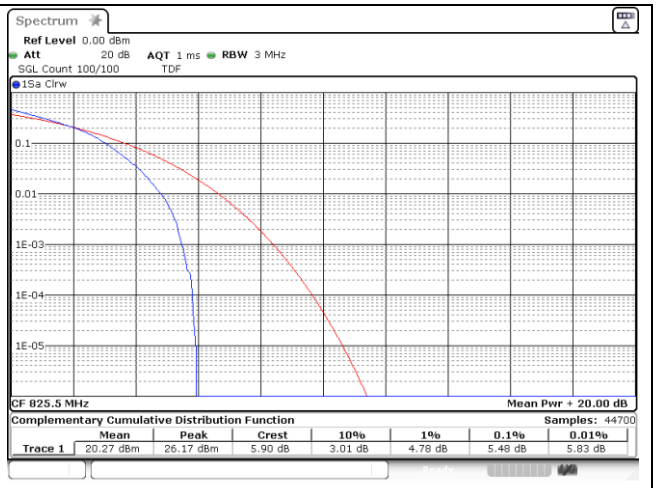


5 ㎒ 16QAM High Channel – Full RB

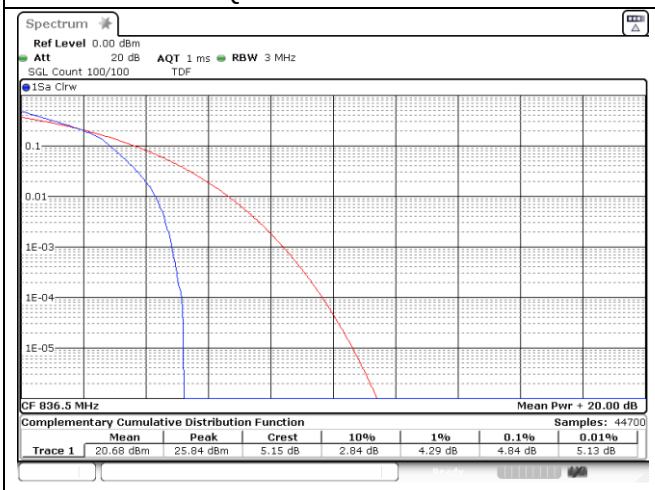
LTE Band 26/5_Part 22



1.4 ㎒ 16QAM Low Channel – Full RB



3 ㎒ 16QAM Low Channel – Full RB



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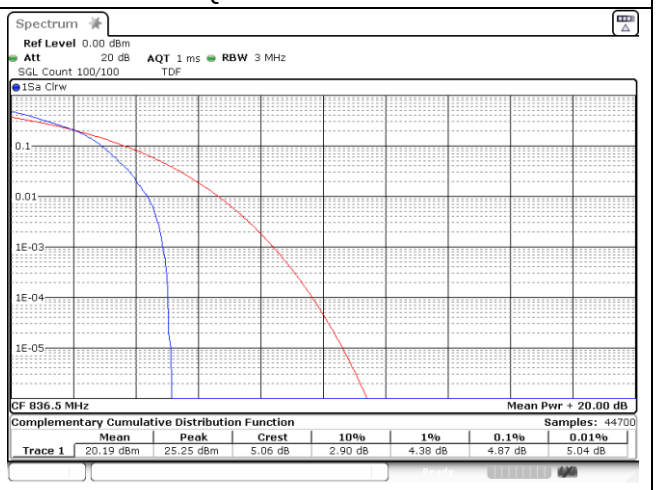
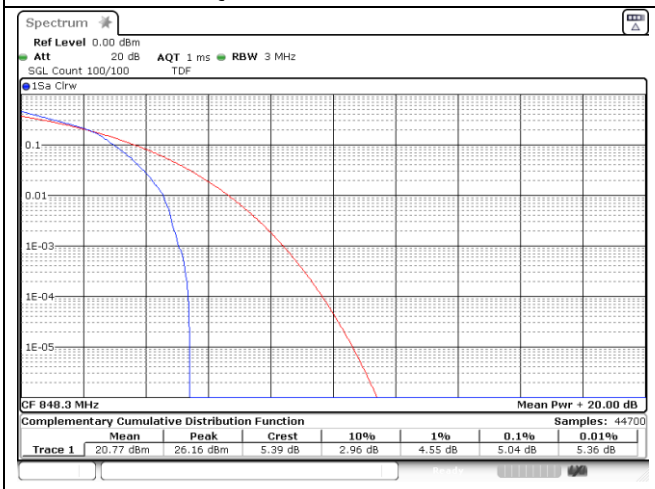


3 ㎒ 16QAM Middle Channel – Full RB



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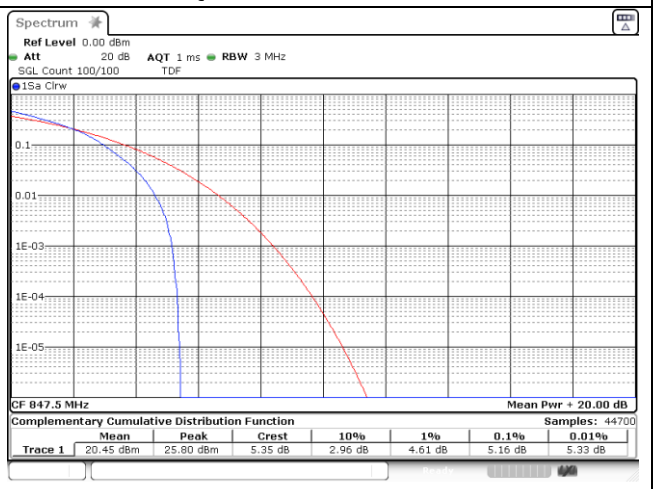
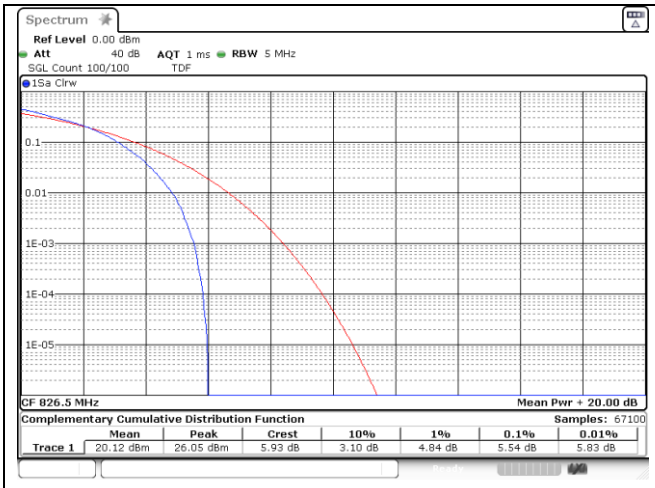
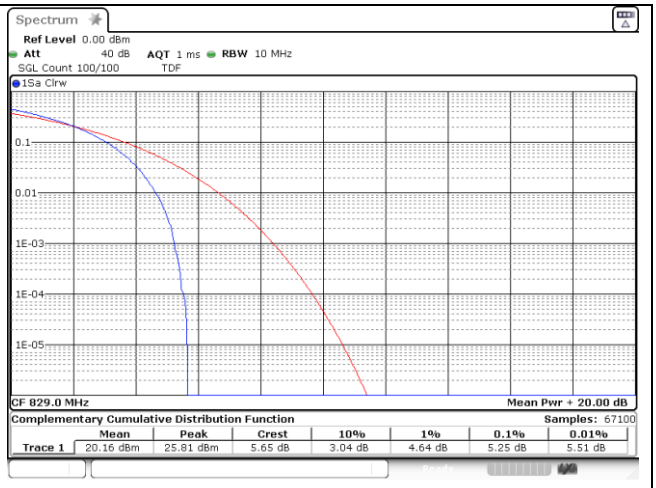


3 ㎒ 16QAM High Channel – Full RB



5 ㎒ 16QAM Low Channel – Full RB



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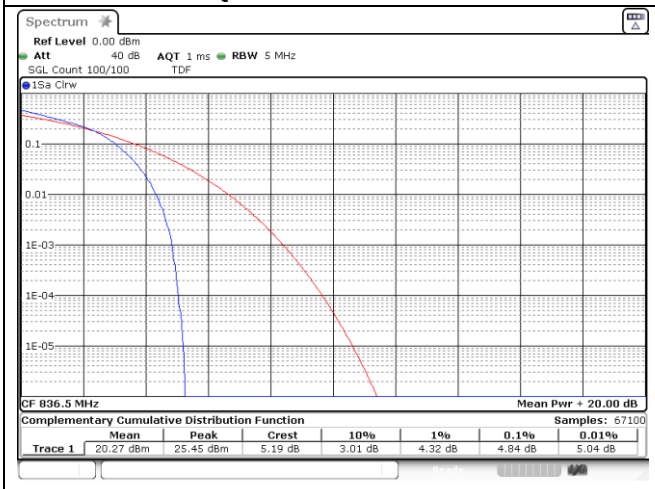
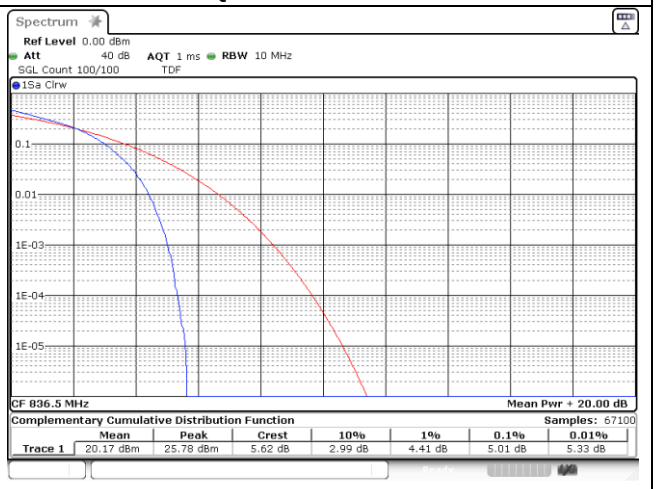
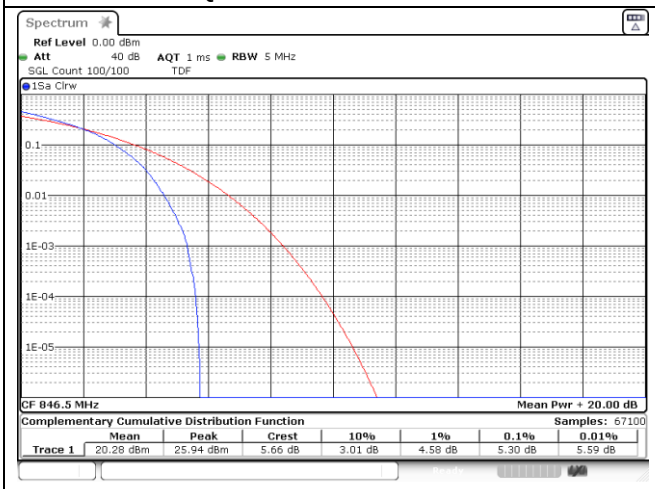


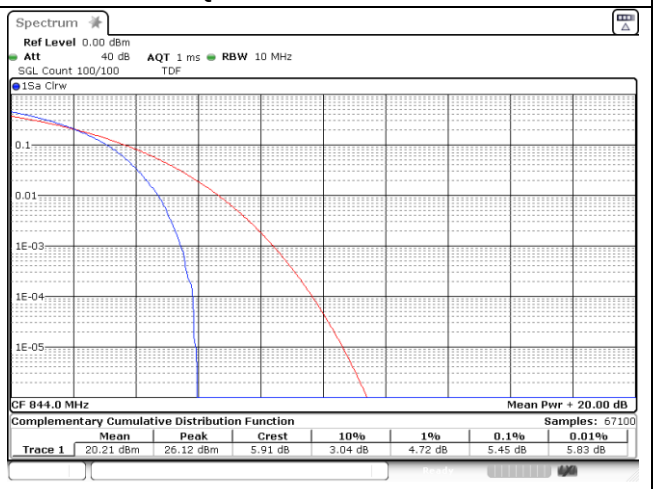
5 ㎒ 16QAM Middle Channel – Full RB



10 ㎒ 16QAM Middle Channel – Full RB

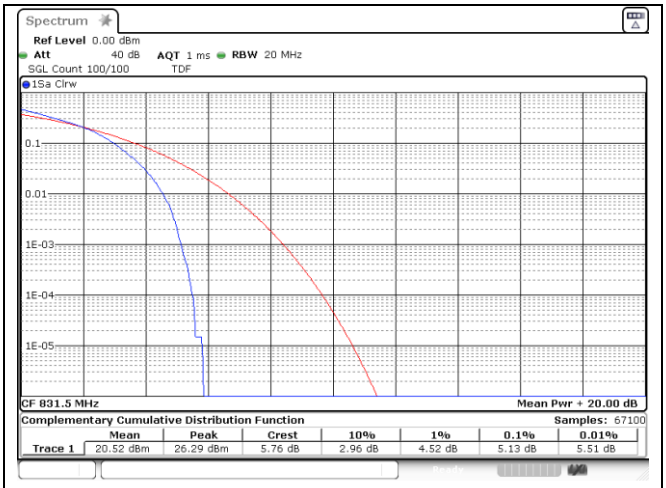


5 ㎒ 16QAM High Channel – Full RB

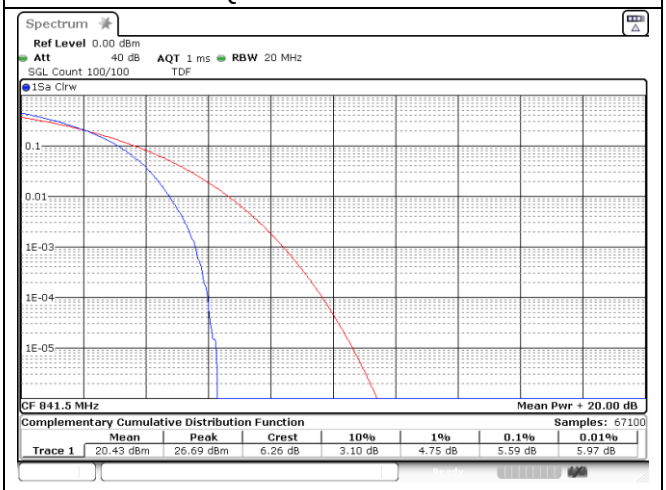


10 ㎒ 16QAM High Channel – Full RB

LTE Band 26_Part 22



15 ㎒ 16QAM Low Channel – Full RB



15 ㎒ 16QAM High Channel – Full RB

6. Spurious Emissions at Antenna Terminal

6.1. Limit

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

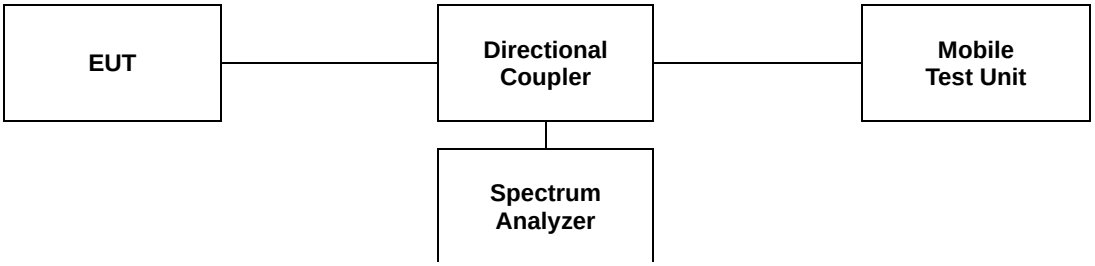
- §27.53(m)(4), for mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) ㏈ on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) ㏈ on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (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 (P) ㏈ on all frequencies between 2 490.5 ㎒ and 2 496 ㎒ and 55 + 10 log (P) ㏈ at or below 2 490.5 ㎒. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

- §90.691(a), out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:
(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 ㎑, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50 + 10 Log10(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 + 10Log10(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 ㎑.

6.2. Test Procedure

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

1. Start frequency was set to 9 ㎑ and stop frequency was set to at least 10* the fundamental frequency.
2. Detector = RMS.
3. Trace mode = Max hold.
4. Sweep time = Auto couple.
5. The trace was allowed to stabilize.
6. Please see notes below for RBW and VBW settings.
7. For plots showing conducted spurious emissions from 9 ㎑ to 26 ㎓, all path loss of wide frequency range was investigated and compensated to spectrum analyzer as TDF function.



Note;

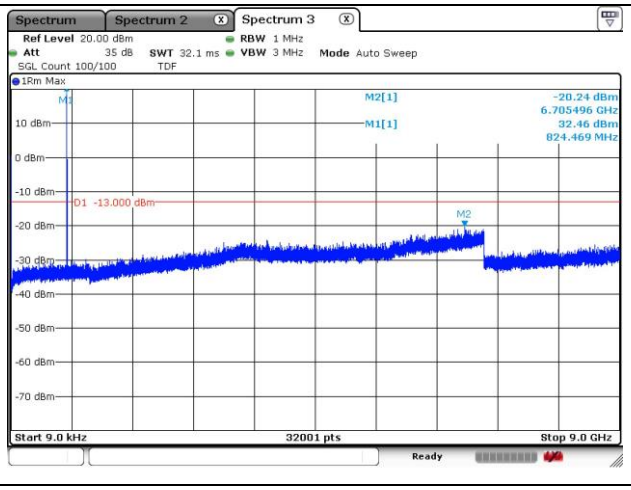
Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 ㎑ or greater for frequencies less than 1 ㎓ and frequencies greater than 1 ㎓. However, in the 1 ㎒ bands immediately outside and adjacent to the frequency block a resolution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

6.3. Test Results

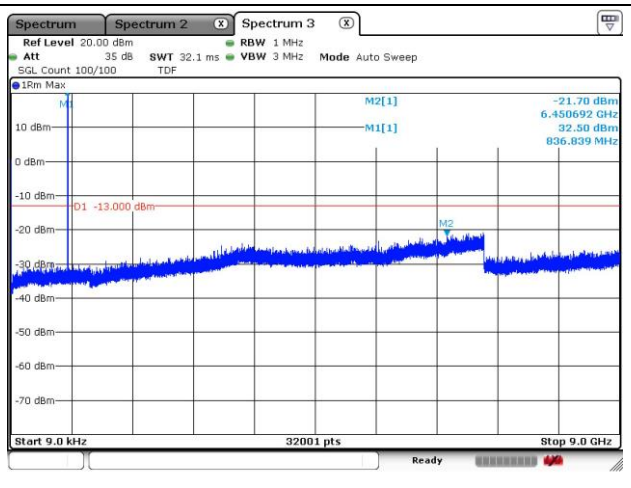
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

- Test plots

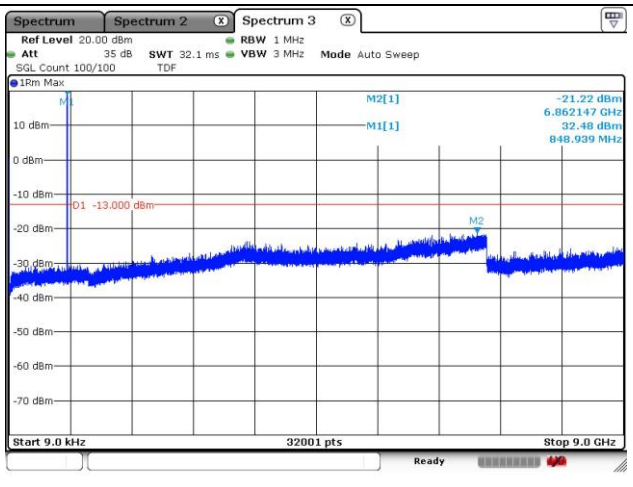
GSM 850



GSM 850 GPRS Low Channel

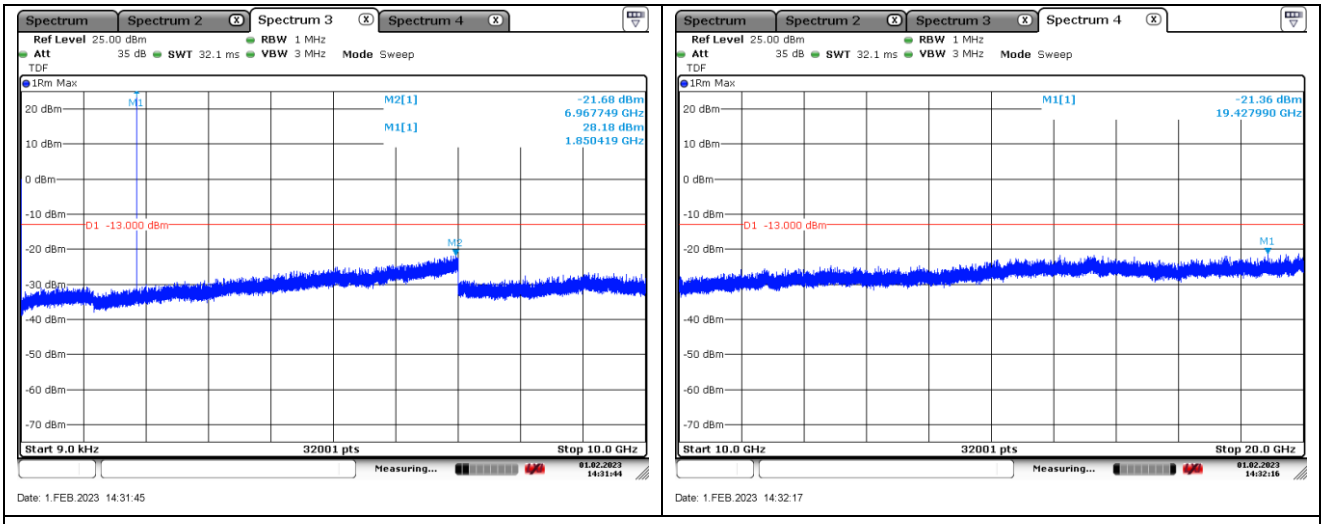


GSM 850 GPRS Middle Channel

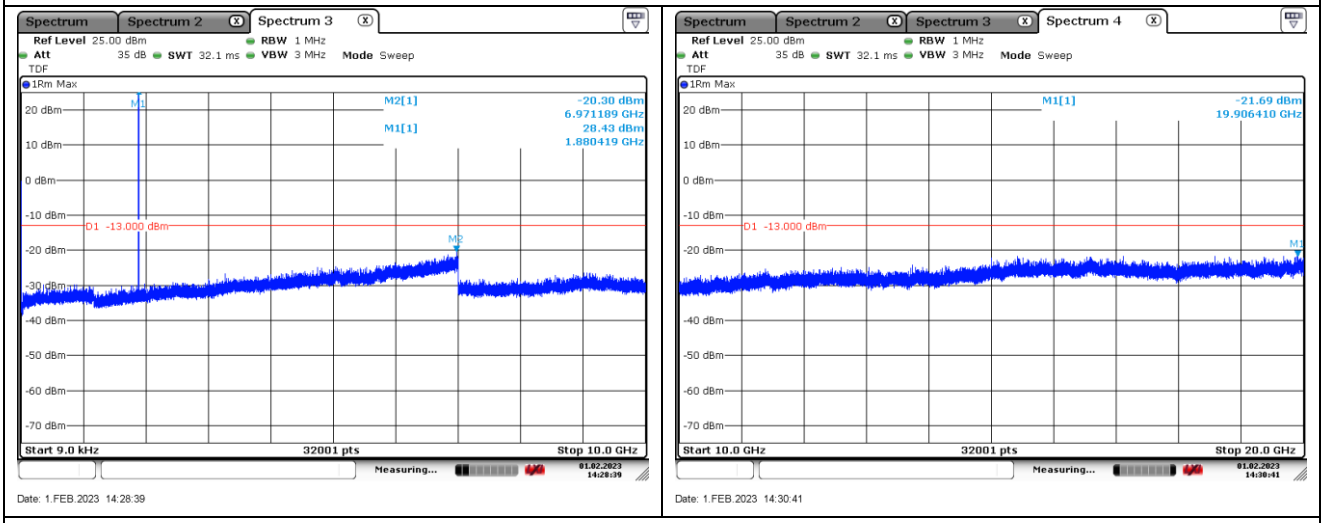


GSM 850 GPRS High Channel

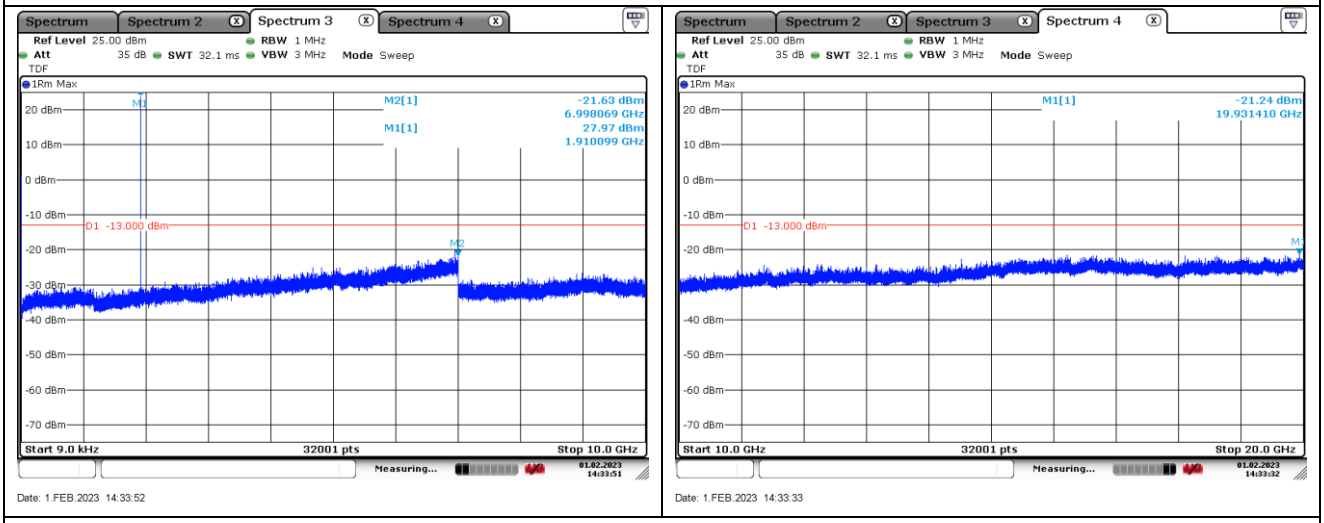
GSM 1 900



GSM 1 900 GPRS Low Channel

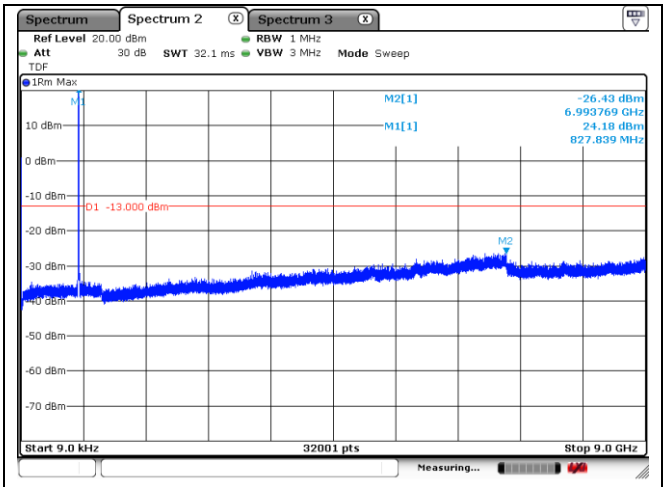


GSM 1 900 GPRS Middle Channel

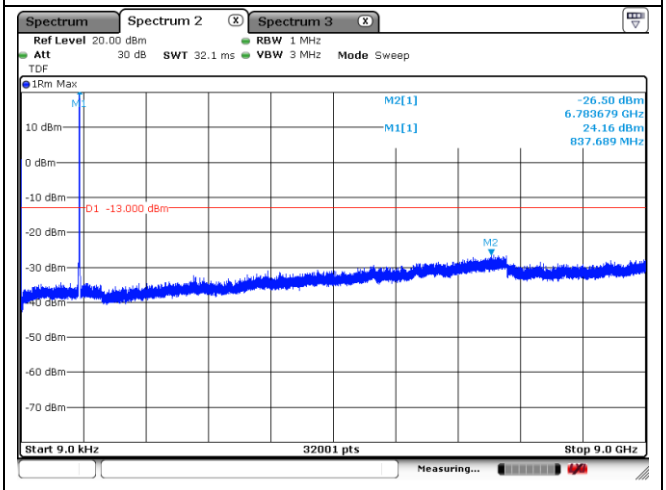


GSM 1 900 GPRS High Channel

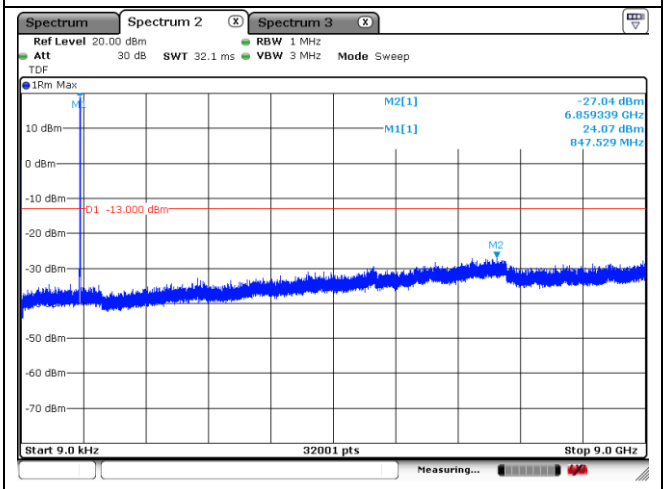
WCDMA Ⅴ



WCDMA Ⅴ RMC Low channel

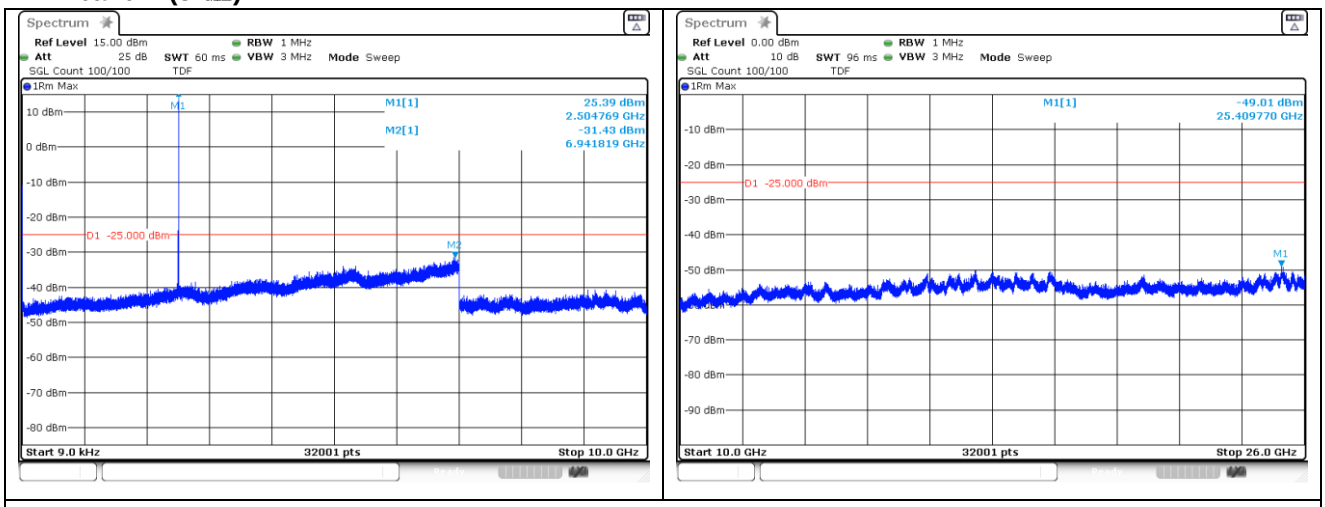


WCDMA Ⅴ RMC Middle channel

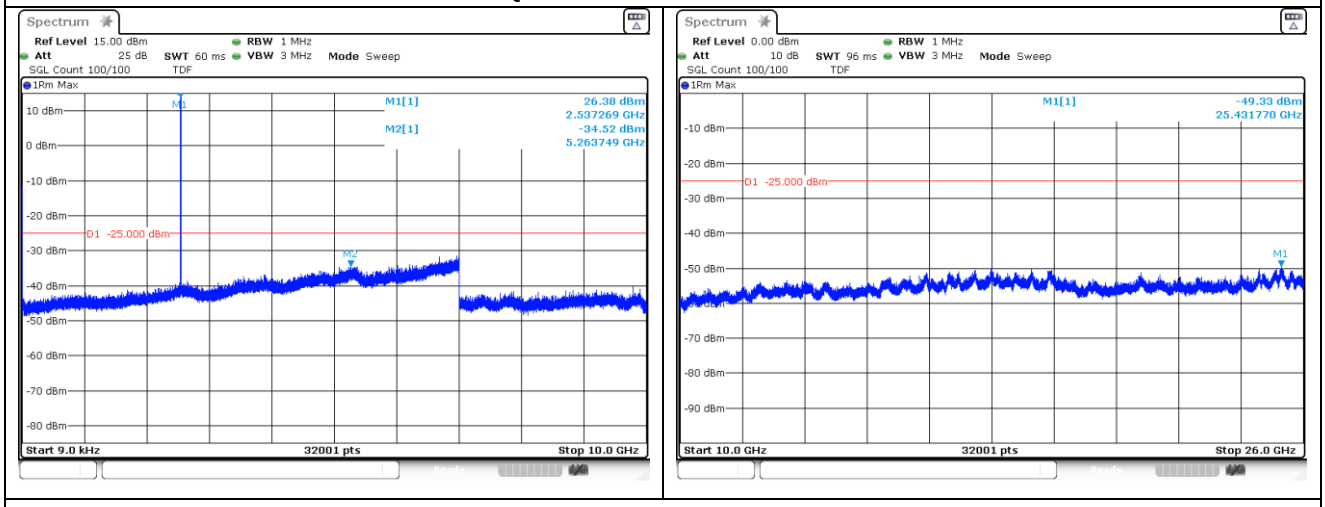


WCDMA Ⅴ RMC High channel

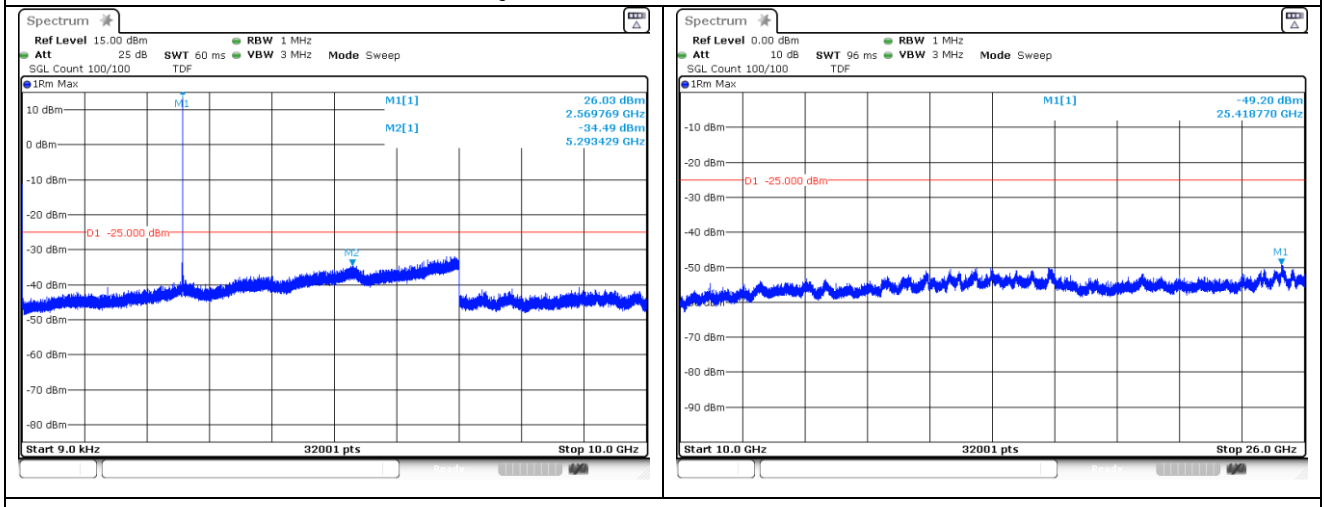
LTE band 7 (5 ㎒)



QPSK Low Channel - 1 RB

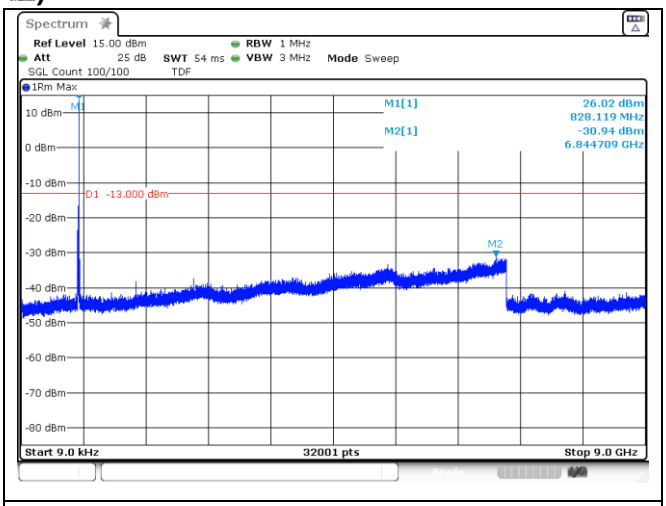


QPSK Middle Channel - 1 RB



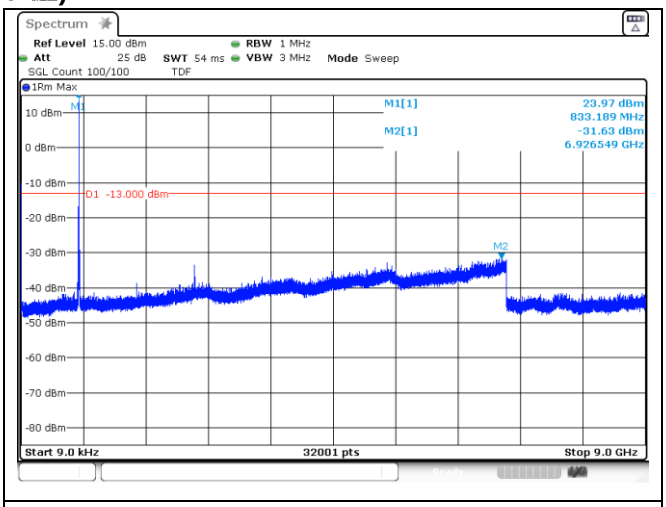
QPSK High Channel - 1 RB

LTE band 26_Part 90 (15 ㎒)

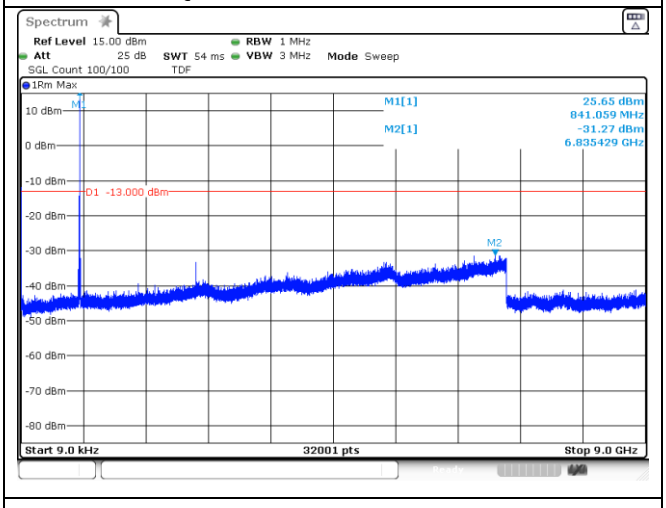


QPSK Low Channel - 1 RB

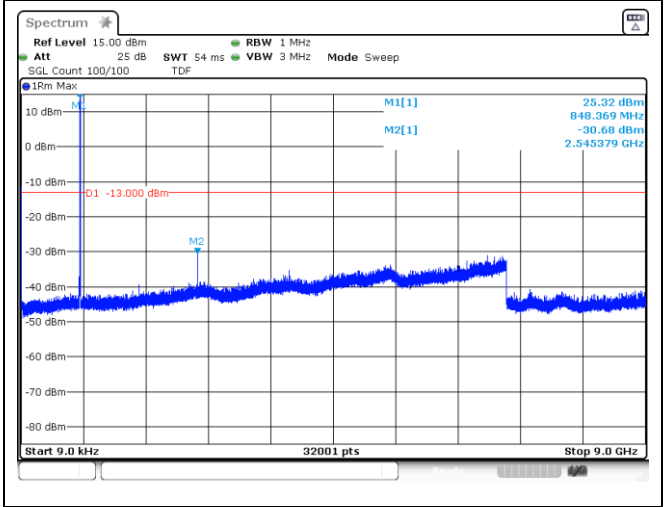
LTE band 26/5_Part 22 (10 ㎒)



QPSK Low Channel - 1 RB



QPSK Middle Channel - 1 RB



QPSK High Channel - 1 RB

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) ㏈.

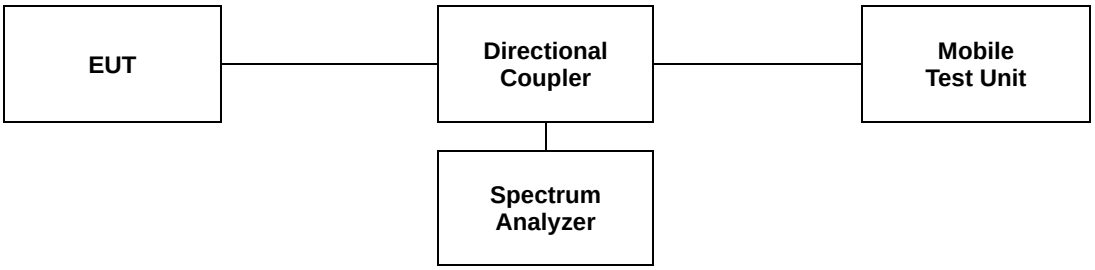
- §27.53(m)(4), for mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) ㏈ on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) ㏈ on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (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 (P) ㏈ on all frequencies between 2 490.5 ㎒ and 2 496 ㎒ and 55 + 10 log (P) ㏈ at or below 2 490.5 ㎒. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

- §90.691(a), out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:
(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 ㎑, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50 + 10 Log10(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 + 10Log10(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 ㎑.

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.



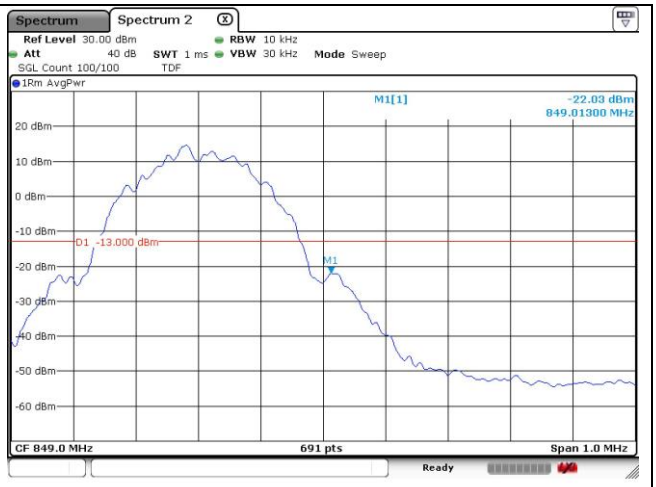
7.3. Test Results

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

- Test plots

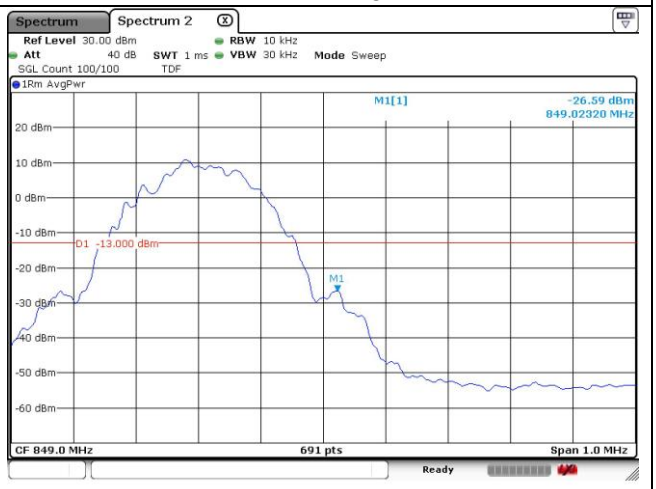
GSM 850

GSM 850 GPRS Low Channel



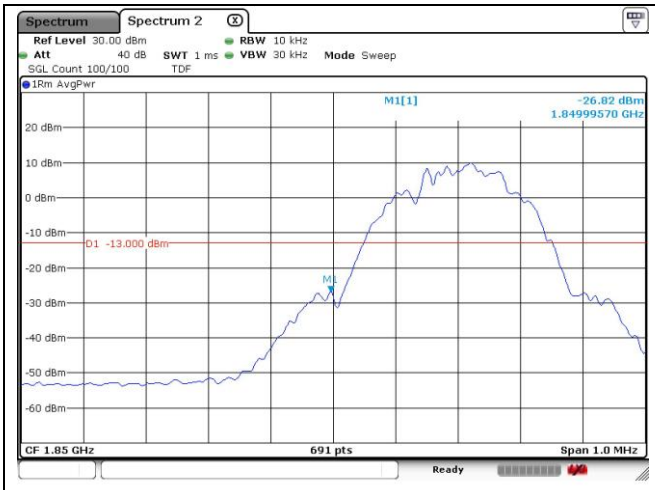
GSM 850 GPRS High Channel

GSM 850 EDGE Low Channel

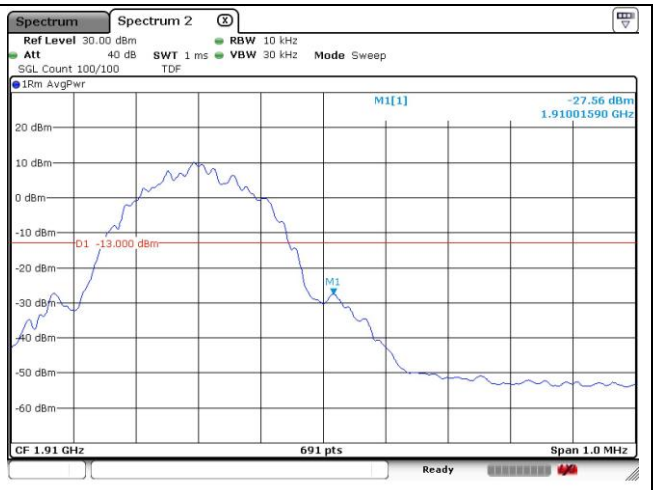


GSM 850 EDGE High Channel

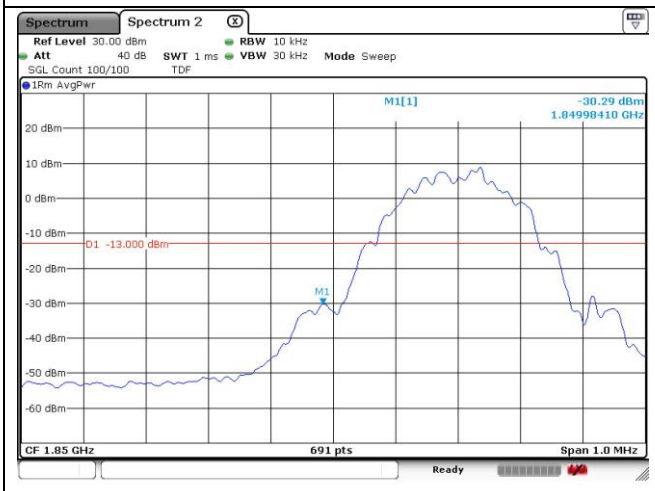
GSM 1 900



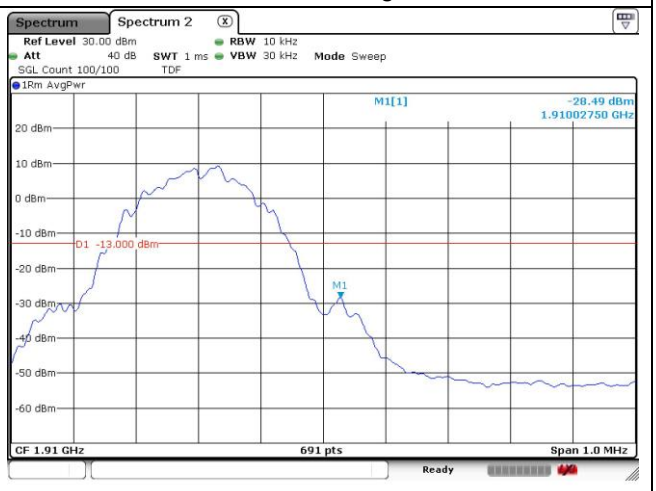
GSM 1 900 GPRS Low Channel



GSM 1 900 GPRS High Channel

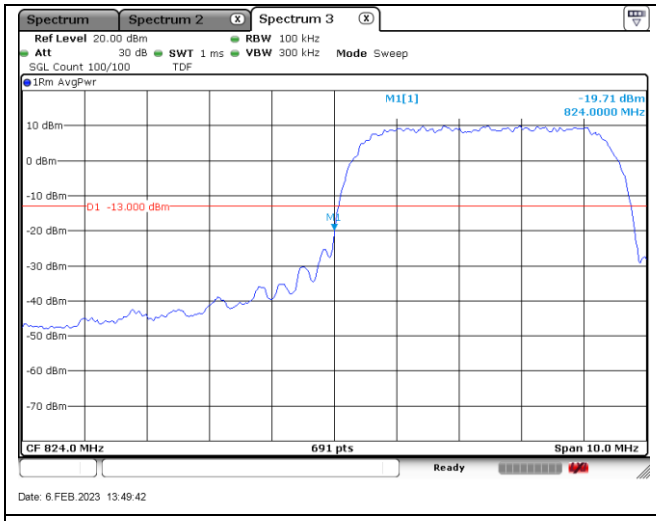


GSM 1 900 EDGE Low Channel

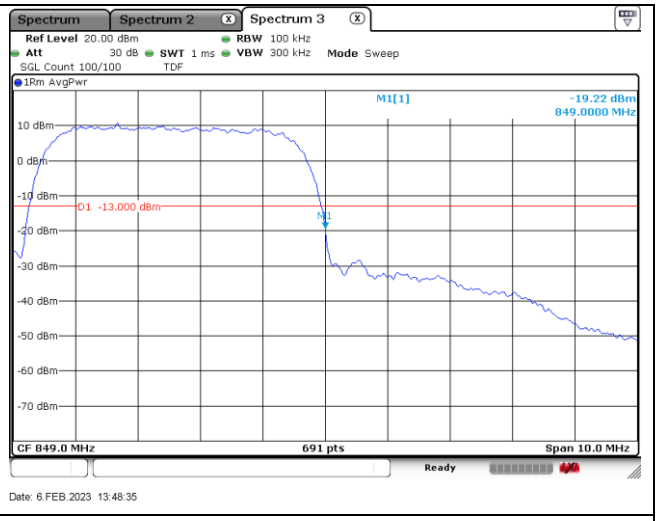


GSM 1 900 EDGE High Channel

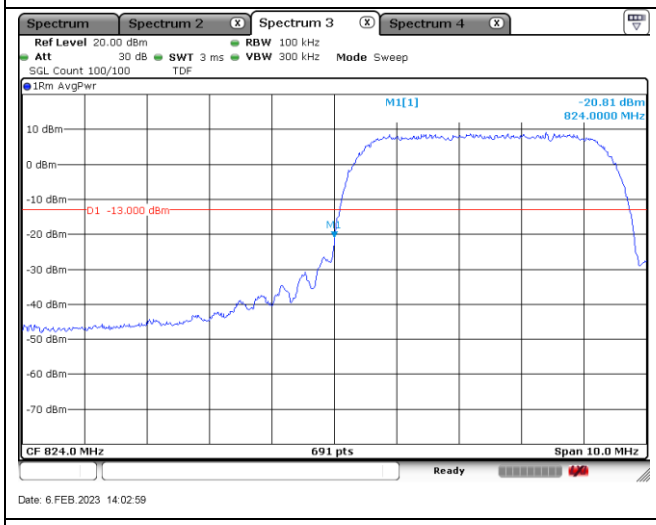
WCDMA Ⅴ



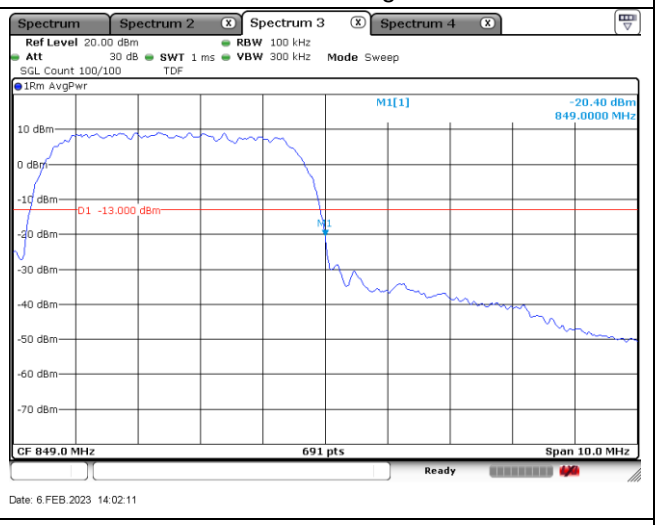
WCDMA Ⅴ RMC Low Channel



WCDMA Ⅴ RMC High Channel

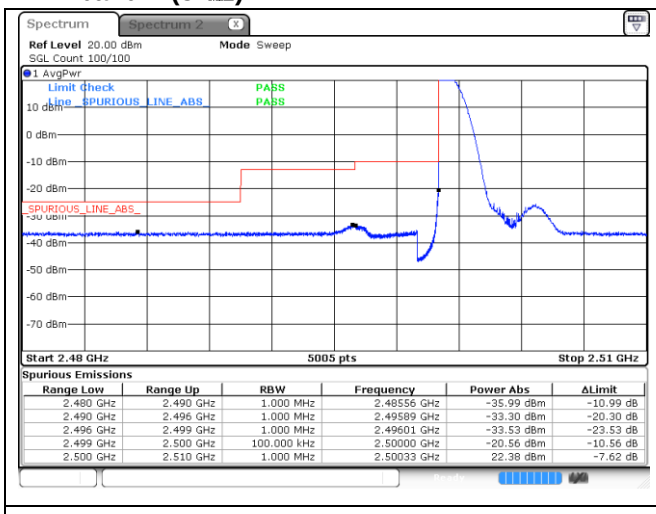


WCDMA Ⅴ HSDPA Low Channel

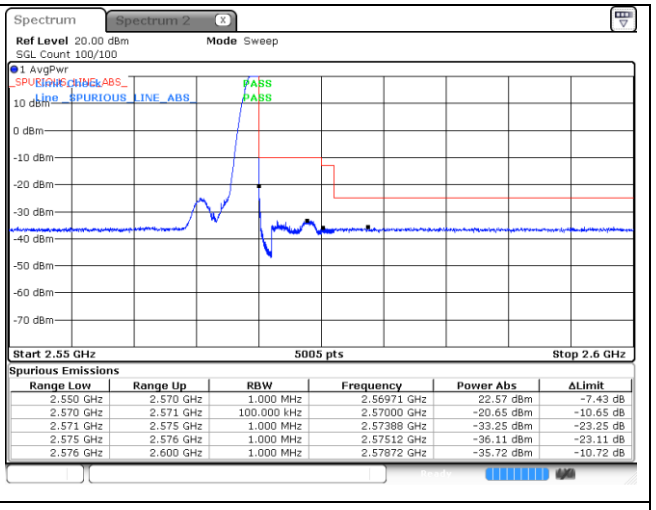


WCDMA Ⅴ HSDPA High Channel

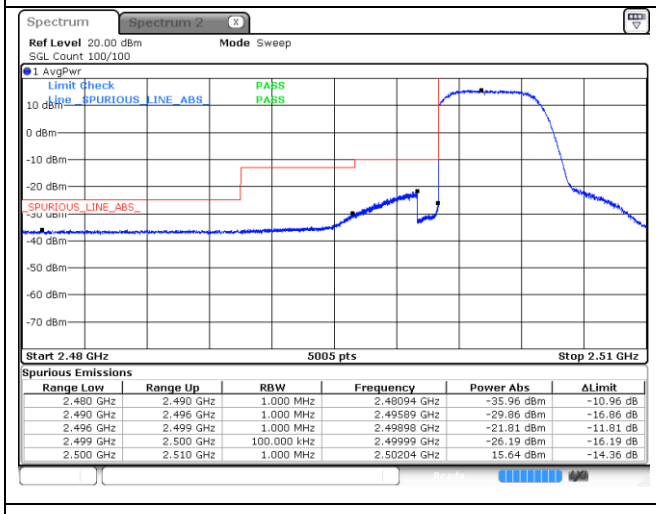
LTE band 7 (5 ㎒)



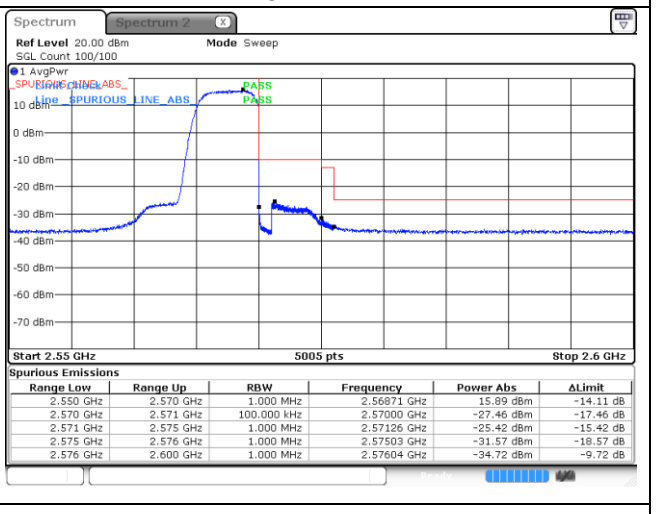
QPSK Low Channel - 1 RB



QPSK High Channel - 1 RB

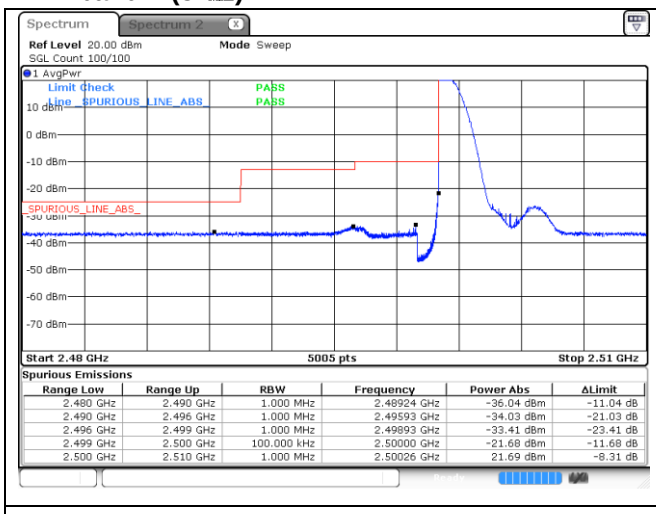


QPSK Low Channel - Full RB

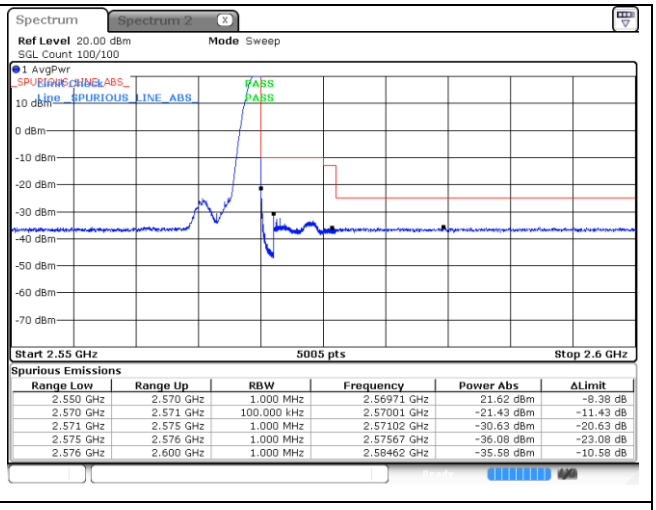


QPSK High Channel - Full RB

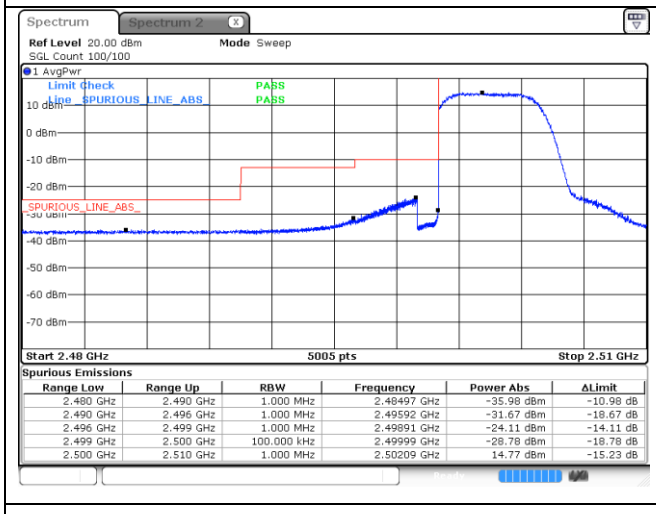
LTE band 7 (5 ㎒)



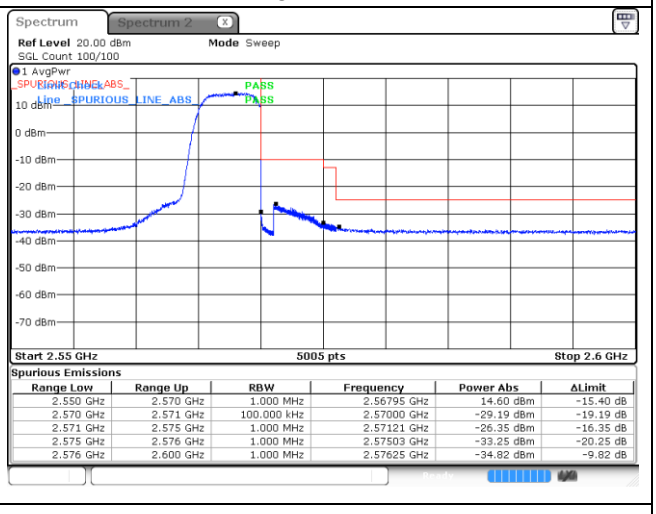
16QAM Low Channel - 1 RB



16QAM High Channel - 1 RB



16QAM Low Channel - Full RB



16QAM High Channel - Full RB