Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 5			
	Channel Bandwidth 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	824.700002	0.002	848.300004	0.005
3.4	824.700002	0.002	848.300003	0.004
4.6	824.700004	0.005	848.300003	0.004

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 5			
	Channel Bandwidth 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	824.700002	0.002	848.300003	0.004
-30	824.700004	0.005	848.300002	0.002
-20	824.700001	0.001	848.300003	0.004
-10	824.700001	0.001	848.300001	0.001
0	824.700003	0.004	848.300003	0.004
10	824.700001	0.001	848.300001	0.001
20	824.699998	-0.002	848.299997	-0.004
30	824.699998	-0.002	848.299998	-0.002
40	824.699997	-0.004	848.299996	-0.005
50	824.699999	-0.001	848.299997	-0.004
60	824.699998	-0.002	848.299999	-0.001
70	824.699997	-0.004	848.299999	-0.001
80	824.699998	-0.002	848.299997	-0.004
85	824.699999	-0.001	848.299997	-0.004

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 5			
	Channel Bandwidth 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	825.500002	0.002	847.500004	0.005
3.4	825.500002	0.002	847.500002	0.002
4.6	825.500002	0.002	847.500003	0.004

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 5			
	Channel Bandwidth 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	825.500004	0.005	847.500002	0.002
-30	825.500003	0.004	847.500004	0.005
-20	825.500003	0.004	847.500002	0.002
-10	825.500001	0.001	847.500002	0.002
0	825.500004	0.005	847.500002	0.002
10	825.500001	0.001	847.500002	0.002
20	825.499998	-0.002	847.499997	-0.004
30	825.499999	-0.001	847.499999	-0.001
40	825.499997	-0.004	847.499996	-0.005
50	825.499999	-0.001	847.499998	-0.002
60	825.499997	-0.004	847.499998	-0.002
70	825.499996	-0.005	847.499997	-0.004
80	825.499999	-0.001	847.499998	-0.002
85	825.499997	-0.004	847.499998	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 5			
	Channel Bandwidth 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	826.500003	0.004	846.500002	0.002
3.4	826.500003	0.004	846.500002	0.002
4.6	826.500004	0.005	846.500002	0.002

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 5			
	Channel Bandwidth 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	826.500004	0.005	846.500002	0.002
-30	826.500001	0.001	846.500001	0.001
-20	826.500004	0.005	846.500004	0.005
-10	826.500002	0.002	846.500001	0.001
0	826.500004	0.005	846.500003	0.004
10	826.500001	0.001	846.500003	0.004
20	826.499998	-0.002	846.499998	-0.002
30	826.499997	-0.004	846.499996	-0.005
40	826.499996	-0.005	846.499996	-0.005
50	826.499999	-0.001	846.499996	-0.005
60	826.499997	-0.004	846.499997	-0.004
70	826.499996	-0.005	846.499996	-0.005
80	826.499997	-0.004	846.499999	-0.001
85	826.499999	-0.001	846.499997	-0.004

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 5			
	Channel Bandwidth 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	829.000003	0.004	844.000003	0.004
3.4	829.000004	0.005	844.000003	0.004
4.6	829.000003	0.004	844.000002	0.002

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 5			
	Channel Bandwidth 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	829.000002	0.002	844.000003	0.004
-30	829.000001	0.001	844.000002	0.002
-20	829.000004	0.005	844.000002	0.002
-10	829.000004	0.005	844.000001	0.001
0	829.000001	0.001	844.000001	0.001
10	829.000003	0.004	844.000002	0.002
20	828.999996	-0.005	843.999999	-0.001
30	828.999999	-0.001	843.999998	-0.002
40	828.999999	-0.001	843.999996	-0.005
50	828.999998	-0.002	843.999997	-0.004
60	828.999999	-0.001	843.999997	-0.004
70	828.999999	-0.001	843.999999	-0.001
80	828.999998	-0.002	843.999996	-0.005
85	828.999996	-0.005	843.999997	-0.004

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 26			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	824.700003	0.004	848.300002	0.002
3.4	824.700001	0.001	848.300002	0.002
4.6	824.700002	0.002	848.300001	0.001

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 26			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	824.700002	0.002	848.300003	0.004
-30	824.700003	0.004	848.300002	0.002
-20	824.700001	0.001	848.300001	0.001
-10	824.700003	0.004	848.300001	0.001
0	824.700001	0.001	848.300003	0.004
10	824.700001	0.001	848.300003	0.004
20	824.699999	-0.001	848.299997	-0.004
30	824.699997	-0.004	848.299996	-0.005
40	824.699998	-0.002	848.299998	-0.002
50	824.699997	-0.004	848.299997	-0.004
60	824.699999	-0.001	848.299997	-0.004
70	824.699997	-0.004	848.299998	-0.002
80	824.699999	-0.001	848.299996	-0.005
85	824.699999	-0.001	848.299999	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 26			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	825.500003	0.004	847.500001	0.001
3.4	825.500004	0.005	847.500001	0.001
4.6	825.500001	0.001	847.500004	0.005

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 26			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	825.500004	0.005	847.500004	0.005
-30	825.500003	0.004	847.500001	0.001
-20	825.500004	0.005	847.500001	0.001
-10	825.500002	0.002	847.500001	0.001
0	825.500004	0.005	847.500003	0.004
10	825.500004	0.005	847.500001	0.001
20	825.499996	-0.005	847.499999	-0.001
30	825.499999	-0.001	847.499998	-0.002
40	825.499999	-0.001	847.499998	-0.002
50	825.499997	-0.004	847.499997	-0.004
60	825.499997	-0.004	847.499999	-0.001
70	825.499999	-0.001	847.499997	-0.004
80	825.499997	-0.004	847.499997	-0.004
85	825.499996	-0.005	847.499999	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 26			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	826.500003	0.004	846.500001	0.001
3.4	826.500003	0.004	846.500002	0.002
4.6	826.500001	0.001	846.500003	0.004

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 26			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	826.500003	0.004	846.500001	0.001
-30	826.500001	0.001	846.500004	0.005
-20	826.500001	0.001	846.500003	0.004
-10	826.500001	0.001	846.500001	0.001
0	826.500003	0.004	846.500001	0.001
10	826.500004	0.005	846.500004	0.005
20	826.499998	-0.002	846.499996	-0.005
30	826.499996	-0.005	846.499998	-0.002
40	826.499999	-0.001	846.499998	-0.002
50	826.499997	-0.004	846.499998	-0.002
60	826.499998	-0.002	846.499999	-0.001
70	826.499997	-0.004	846.499996	-0.005
80	826.499997	-0.004	846.499999	-0.001
85	826.499998	-0.002	846.499996	-0.005

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 26			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	829.000001	0.001	844.000001	0.001
3.4	829.000001	0.001	844.000002	0.002
4.6	829.000001	0.001	844.000002	0.002

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 26			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	829.000002	0.002	844.000002	0.002
-30	829.000003	0.004	844.000004	0.005
-20	829.000003	0.004	844.000001	0.001
-10	829.000002	0.002	844.000001	0.001
0	829.000004	0.005	844.000003	0.004
10	829.000001	0.001	844.000004	0.005
20	828.999998	-0.002	843.999998	-0.002
30	828.999997	-0.004	843.999998	-0.002
40	828.999997	-0.004	843.999997	-0.004
50	828.999999	-0.001	843.999997	-0.004
60	828.999996	-0.005	843.999997	-0.004
70	828.999999	-0.001	843.999998	-0.002
80	828.999997	-0.004	843.999999	-0.001
85	828.999999	-0.001	843.999998	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 26			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	831.500003	0.004	841.500004	0.005
3.4	831.500002	0.002	841.500004	0.005
4.6	831.500002	0.002	841.500002	0.002

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 26			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	831.500001	0.001	841.500003	0.004
-30	831.500004	0.005	841.500002	0.002
-20	831.500004	0.005	841.500003	0.004
-10	831.500004	0.005	841.500003	0.004
0	831.500001	0.001	841.500004	0.005
10	831.500003	0.004	841.500001	0.001
20	831.499997	-0.004	841.499998	-0.002
30	831.499998	-0.002	841.499996	-0.005
40	831.499997	-0.004	841.499999	-0.001
50	831.499996	-0.005	841.499998	-0.002
60	831.499996	-0.005	841.499999	-0.001
70	831.499996	-0.005	841.499998	-0.002
80	831.499998	-0.002	841.499997	-0.004
85	831.499999	-0.001	841.499996	-0.005

4.4 Occupied Bandwidth Measurement

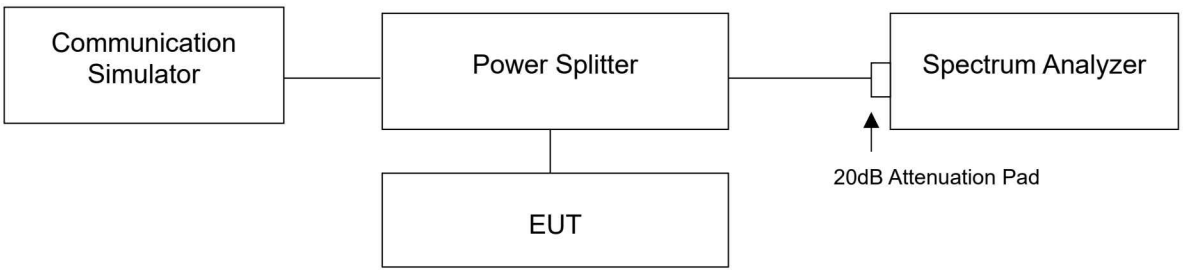
4.4.1 Test Procedure

For the 26dBc bandwidth measurement method, please refer to section 5.4.3 of ANSI C63.26.

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
b) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.
c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
d) The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target "−X dB" requirement, i.e., if the requirement calls for measuring the −26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
e) Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
f) Determine the following reference values: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
g) Determine the "−X dB amplitude" as equal to (Reference Value − X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function.
h) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the "−X dB amplitude" determined in step f). If a marker is below this "−X dB amplitude" value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers.
i) The OBW shall be reported by providing plot(s) of the measuring instrument display, to include markers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

For the occupied bandwidth measurement method, please refer to section 5.4.4 of ANSI C63.26.

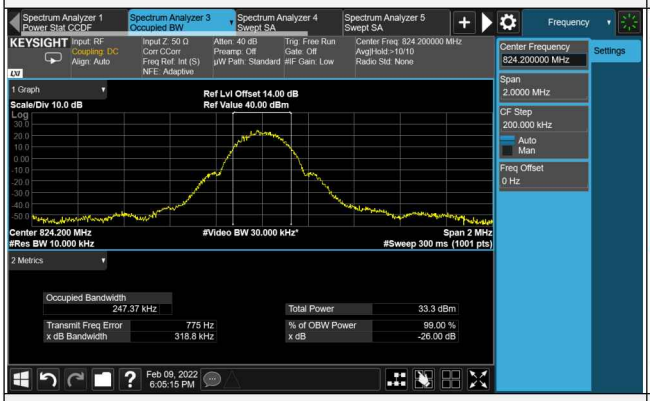
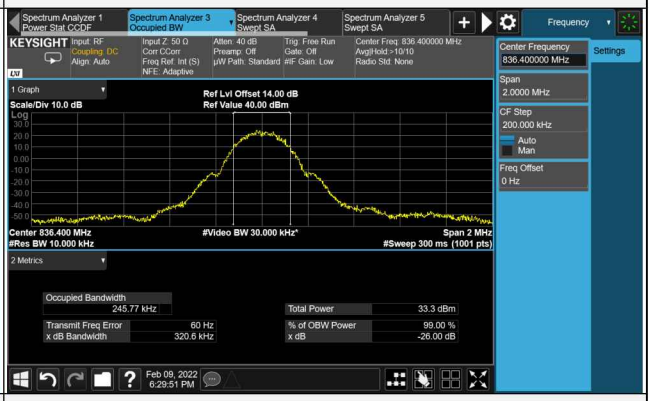
4.4.2 Test Setup



4.4.3 Test Result

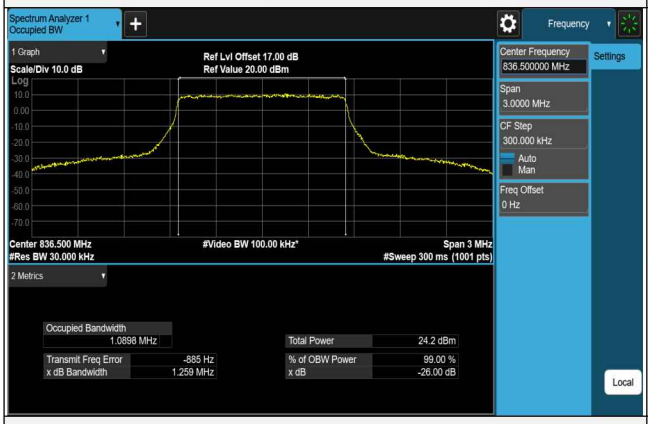
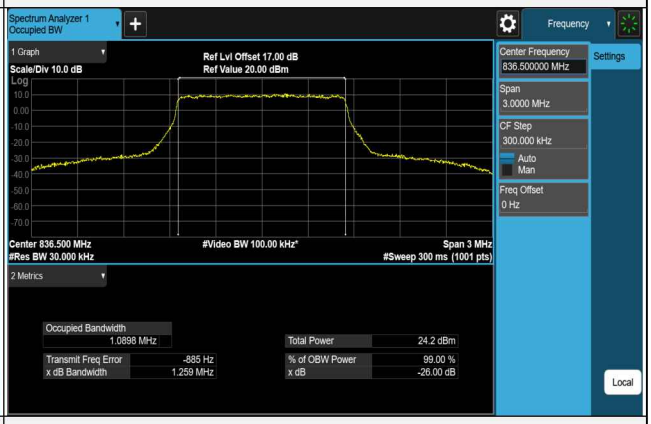
GPRS, EDGE

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (kHz)	26dB Bandwidth (kHz)
GPRS	128	824.2	247.37	318.80
GPRS	189	836.4	246.25	317.50
GPRS	251	848.8	245.04	314.30
EDGE	128	824.2	244.70	318.80
EDGE	189	836.4	245.77	320.60
EDGE	251	848.8	245.37	318.00

<table>
<tr><th colspan="2">Spectrum Plot of Worst Value</th></tr>
<tr><th>Occupied bandwidth</th><th>26dB Bandwidth</th></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>GPRS CH 128 (824.2MHz)</td><td>EDGE CH 189 (836.4MHz)</td></tr>
</table>

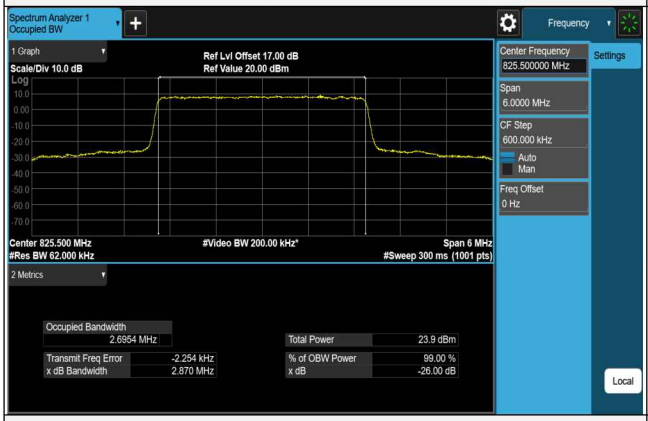
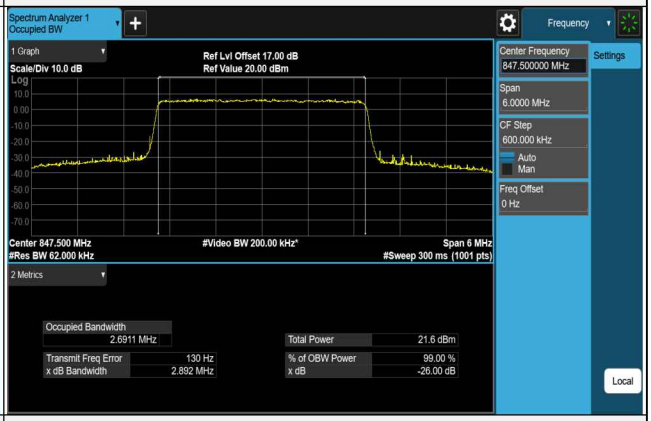
LTE Band 5 (Channel Bandwidth 1.4MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	20407	824.7	1.0865	1.256
QPSK	20525	836.5	1.0898	1.259
QPSK	20643	848.3	1.0880	1.253
16QAM	20407	824.7	1.0872	1.253
16QAM	20525	836.5	1.0861	1.250
16QAM	20643	848.3	1.0871	1.247
64QAM	20407	824.7	1.0883	1.251
64QAM	20525	836.5	1.0882	1.246
64QAM	20643	848.3	1.0873	1.251

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
QPSK CH 20525 (836.5MHz)	QPSK CH 20525 (836.5MHz)

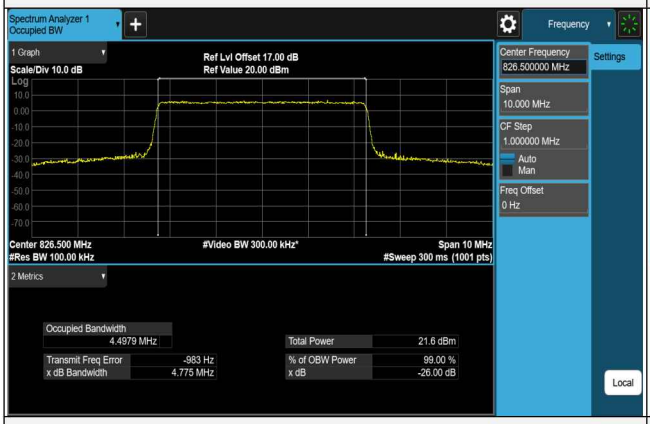
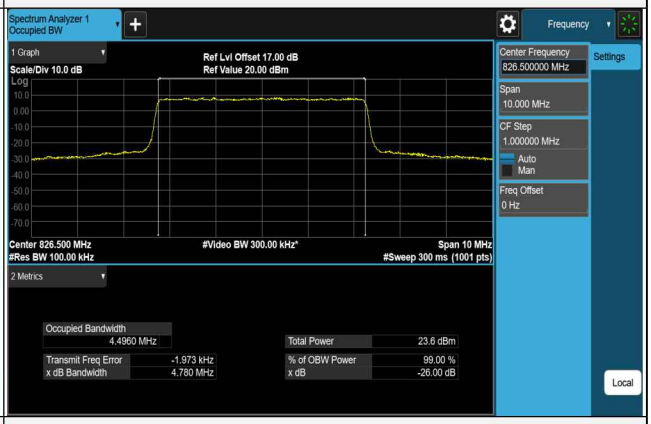
LTE Band 5 (Channel Bandwidth 3MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	20415	825.5	2.6954	2.870
QPSK	20525	836.5	2.6917	2.868
QPSK	20635	847.5	2.6941	2.866
16QAM	20415	825.5	2.6938	2.875
16QAM	20525	836.5	2.6916	2.872
16QAM	20635	847.5	2.6920	2.873
64QAM	20415	825.5	2.6916	2.862
64QAM	20525	836.5	2.6902	2.861
64QAM	20635	847.5	2.6911	2.892

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
QPSK CH 20415 (825.5MHz)	64QAM CH 20635 (847.5MHz)

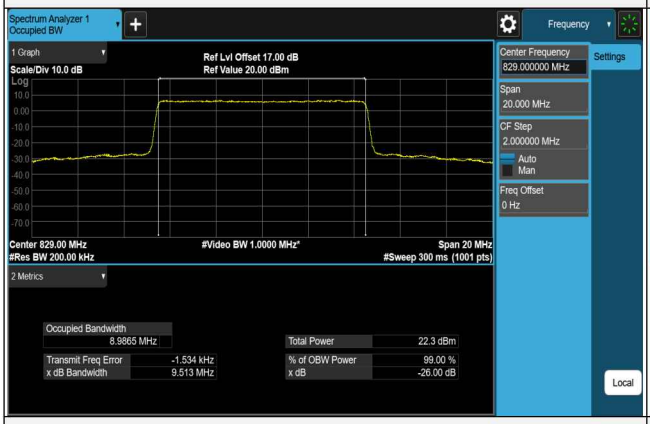
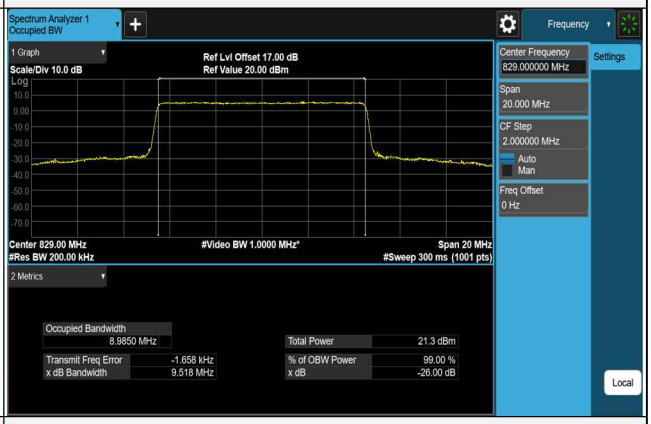
LTE Band 5 (Channel Bandwidth 5MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	20425	826.5	4.4960	4.780
QPSK	20525	836.5	4.4941	4.779
QPSK	20625	846.5	4.4864	4.764
16QAM	20425	826.5	4.4924	4.773
16QAM	20525	836.5	4.4898	4.767
16QAM	20625	846.5	4.4883	4.765
64QAM	20425	826.5	4.4979	4.775
64QAM	20525	836.5	4.4915	4.770
64QAM	20625	846.5	4.4892	4.776

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
64QAM CH 20425 (826.5MHz)	QPSK CH 20425 (826.5MHz)

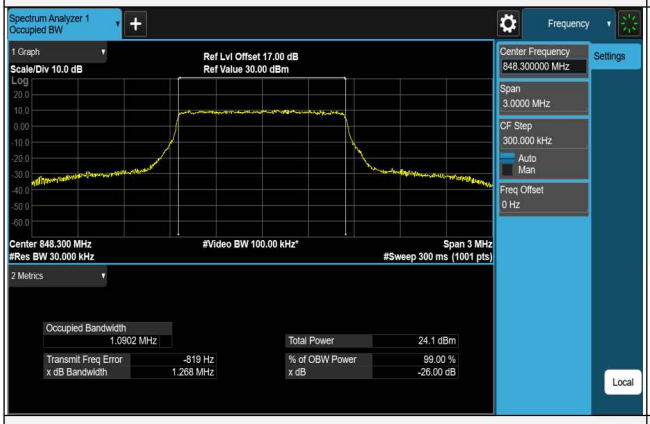
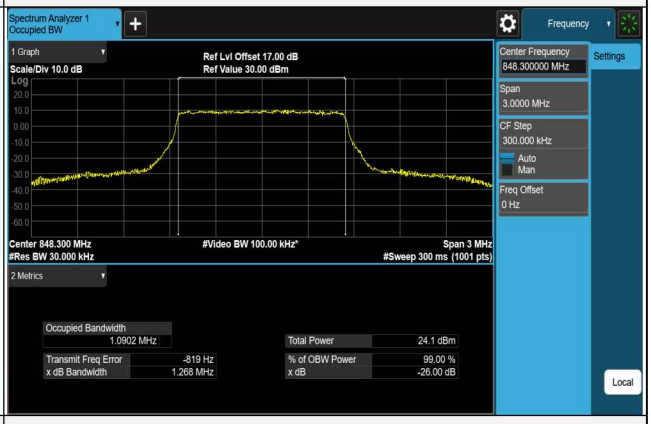
LTE Band 5 (Channel Bandwidth 10MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	20450	829	8.9857	9.516
QPSK	20525	836.5	8.9736	9.510
QPSK	20600	844	8.9792	9.510
16QAM	20450	829	8.9865	9.513
16QAM	20525	836.5	8.9747	9.503
16QAM	20600	844	8.9797	9.498
64QAM	20450	829	8.9850	9.518
64QAM	20525	836.5	8.9724	9.505
64QAM	20600	844	8.9785	9.515

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
16QAM CH 20450 (829MHz)	64QAM CH 20450 (829MHz)

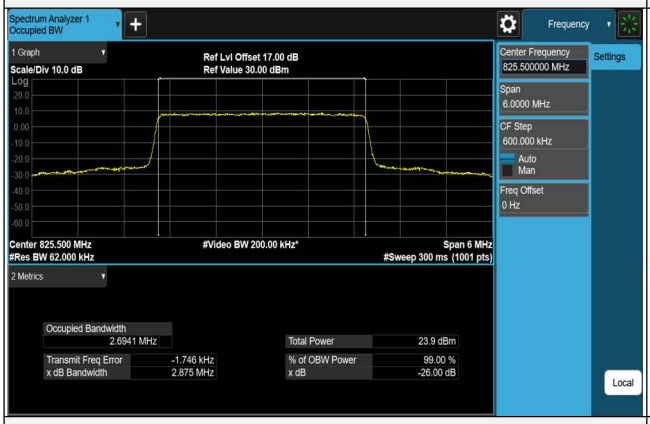
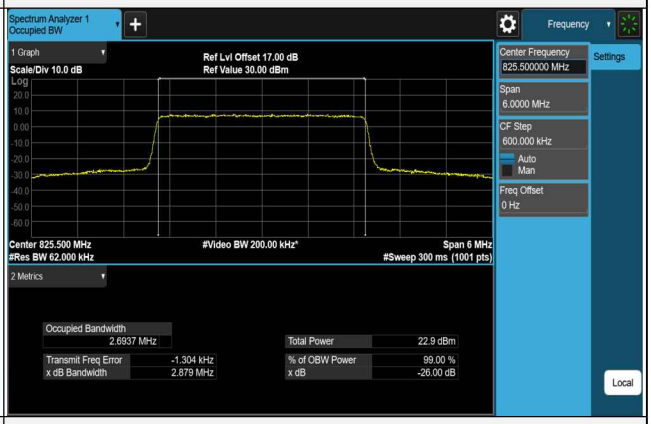
LTE Band 26 (Channel Bandwidth 1.4MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	26797	824.7	1.0876	1.251
QPSK	26915	836.5	1.0894	1.262
QPSK	27033	848.3	1.0902	1.268
16QAM	26797	824.7	1.0865	1.243
16QAM	26915	836.5	1.0872	1.248
16QAM	27033	848.3	1.0861	1.250
64QAM	26797	824.7	1.0861	1.245
64QAM	26915	836.5	1.0880	1.246
64QAM	27033	848.3	1.0857	1.249

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
QPSK CH 27033 (848.3MHz)	QPSK CH 27033 (848.3MHz)

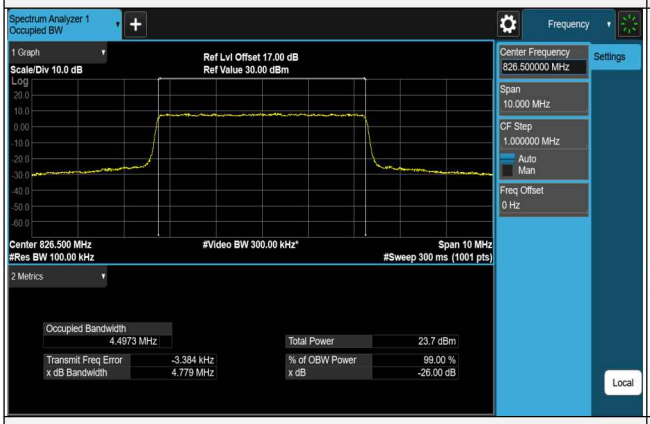
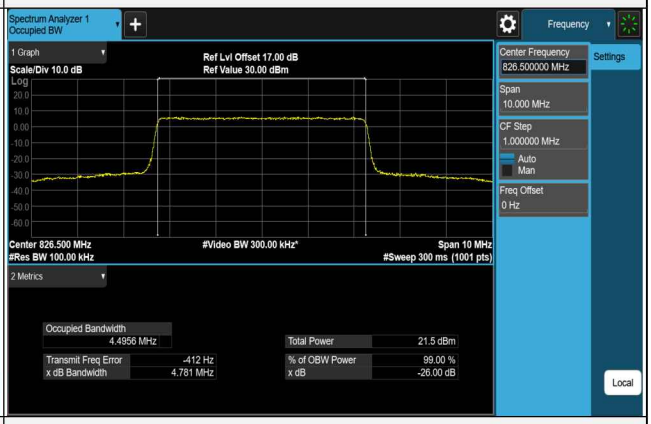
LTE Band 26 (Channel Bandwidth 3MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	26805	825.5	2.6941	2.875
QPSK	26915	836.5	2.6934	2.870
QPSK	27025	847.5	2.6894	2.868
16QAM	26805	825.5	2.6937	2.879
16QAM	26915	836.5	2.6920	2.868
16QAM	27025	847.5	2.6894	2.871
64QAM	26805	825.5	2.6932	2.865
64QAM	26915	836.5	2.6923	2.861
64QAM	27025	847.5	2.6907	2.860

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
QPSK CH 26805 (825.5MHz)	16QAM CH 26805 (825.5MHz)

LTE Band 26 (Channel Bandwidth 5MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	26815	826.5	4.4973	4.779
QPSK	26915	836.5	4.4948	4.769
QPSK	27015	846.5	4.4921	4.778
16QAM	26815	826.5	4.4933	4.768
16QAM	26915	836.5	4.4923	4.770
16QAM	27015	846.5	4.4859	4.767
64QAM	26815	826.5	4.4956	4.781
64QAM	26915	836.5	4.4929	4.778
64QAM	27015	846.5	4.4926	4.771

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
QPSK CH 26815 (826.5MHz)	64QAM CH 26815 (826.5MHz)