4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stabiliity Measurement

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

4.3.2 Test Procedure

a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5 ℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

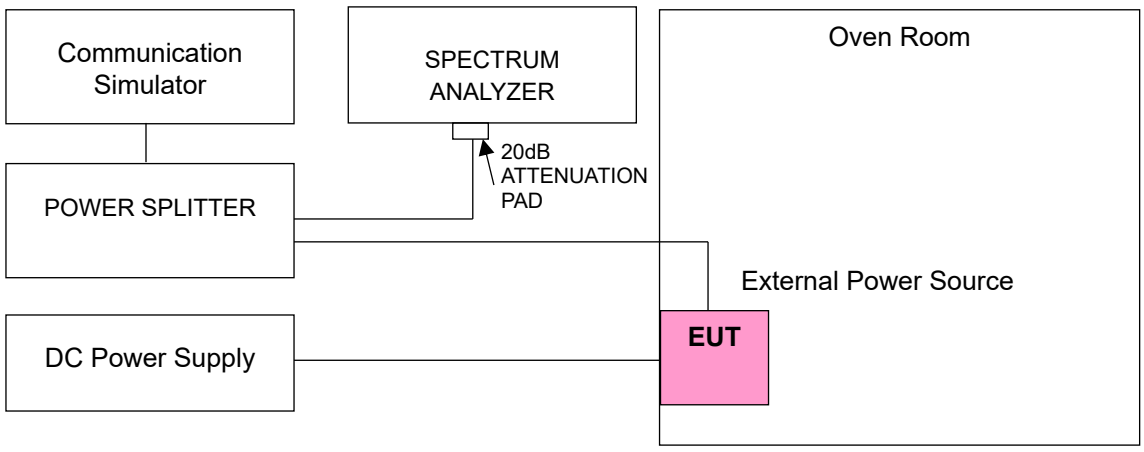
Note: The frequency error was recorded frequency error from the communication simulator.

4.3.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Radio Communication Analyzer Anritsu	MT8821C	6261806803	Jan. 22, 2021	Jan. 21, 2022
Temperature & Humidity Chamber TERCHY	HRM-120RF	931022	Dec. 24, 2020	Dec. 23, 2021
Digital Multimeter Fluke	87-III	70360742	Jun. 23, 2020	Jun. 22, 2021
DC Power Supply Topward	6306A	727263	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.3.4 Conducted Setup



4.3.5 Test Results

Frequency Error vs. Voltage

Voltage (Vdc)	WCDMA Band 2			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.43	1852.400003	0.002	1907.600003	0.001
3.85	1852.400003	0.002	1907.600003	0.002
3.28	1852.400003	0.002	1907.600002	0.001

Note: The applicant defined the normal working voltage is from 3.28Vdc to 4.43Vdc.

Frequency Error vs. Temperature

Temp. (℃)	WCDMA Band 2			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1852.400002	0.001	1907.600004	0.002
-20	1852.400004	0.002	1907.600002	0.001
-10	1852.400004	0.002	1907.600003	0.002
0	1852.400001	0.001	1907.600002	0.001
10	1852.399997	-0.002	1907.599997	-0.002
20	1852.399998	-0.001	1907.599997	-0.001
30	1852.399997	-0.001	1907.599997	-0.001
40	1852.399999	-0.001	1907.599999	-0.001
50	1852.399997	-0.002	1907.599997	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 2			
	Channel Bandwidth 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.43	1850.700003	0.001	1909.300000	0.002
3.85	1850.700002	0.001	1909.300002	0.001
3.28	1850.700003	0.002	1909.300002	0.001

Note: The applicant defined the normal working voltage is from 3.28Vdc to 4.43Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 2			
	Channel Bandwidth 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1850.700003	0.001	1909.300004	0.002
-20	1850.700003	0.001	1909.300002	0.001
-10	1850.700002	0.001	1909.300003	0.002
0	1850.700003	0.002	1909.300003	0.002
10	1850.699999	-0.001	1909.299997	-0.002
20	1850.699997	-0.001	1909.299998	-0.001
30	1850.699996	-0.002	1909.299999	-0.001
40	1850.699999	-0.001	1909.299997	-0.002
50	1850.699997	-0.002	1909.299998	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 2			
	Channel Bandwidth 3MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.43	1851.500004	0.002	1908.500003	0.002
3.85	1851.500003	0.002	1908.500002	0.001
3.28	1851.500002	0.001	1908.500002	0.001

Note: The applicant defined the normal working voltage is from 3.28Vdc to 4.43Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 2			
	Channel Bandwidth 3MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1851.500002	0.001	1908.500003	0.002
-20	1851.500004	0.002	1908.500002	0.001
-10	1851.500002	0.001	1908.500001	0.001
0	1851.500003	0.001	1908.500003	0.002
10	1851.499998	-0.001	1908.499997	-0.002
20	1851.499996	-0.002	1908.499998	-0.001
30	1851.499999	-0.001	1908.499999	-0.001
40	1851.499998	-0.001	1908.499997	-0.002
50	1851.499996	-0.002	1908.499997	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 2			
	Channel Bandwidth 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.43	1852.500004	0.002	1907.500004	0.002
3.85	1852.500003	0.001	1907.500003	0.001
3.28	1852.500001	0.001	1907.500002	0.001

Note: The applicant defined the normal working voltage is from 3.28Vdc to 4.43Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 2			
	Channel Bandwidth 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1852.500004	0.002	1907.500004	0.002
-20	1852.500002	0.001	1907.500004	0.002
-10	1852.500001	0.001	1907.500003	0.002
0	1852.500001	0.001	1907.500003	0.002
10	1852.499998	-0.001	1907.499997	-0.002
20	1852.499996	-0.002	1907.499997	-0.001
30	1852.499997	-0.002	1907.499997	-0.001
40	1852.499997	-0.001	1907.499996	-0.002
50	1852.499997	-0.002	1907.499997	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 2			
	Channel Bandwidth 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.43	1855.000002	0.001	1905.000004	0.002
3.85	1855.000003	0.001	1905.000003	0.002
3.28	1855.000002	0.001	1905.000004	0.002

Note: The applicant defined the normal working voltage is from 3.28Vdc to 4.43Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 2			
	Channel Bandwidth 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1855.000001	0.001	1905.000002	0.001
-20	1855.000001	0.001	1905.000002	0.001
-10	1855.000003	0.002	1905.000002	0.001
0	1855.000003	0.001	1905.000003	0.001
10	1854.999997	-0.002	1904.999997	-0.002
20	1854.999998	-0.001	1904.999997	-0.002
30	1854.999997	-0.001	1904.999997	-0.002
40	1854.999997	-0.002	1904.999998	-0.001
50	1854.999997	-0.002	1904.999997	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 2			
	Channel Bandwidth 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.43	1857.500004	0.002	1902.500004	0.002
3.85	1857.500004	0.002	1902.500003	0.002
3.28	1857.500001	0.001	1902.500003	0.002

Note: The applicant defined the normal working voltage is from 3.28Vdc to 4.43Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 2			
	Channel Bandwidth 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1857.500002	0.001	1902.500004	0.002
-20	1857.500001	0.001	1902.500002	0.001
-10	1857.500004	0.002	1902.500003	0.002
0	1857.500003	0.002	1902.500002	0.001
10	1857.499996	-0.002	1902.499997	-0.002
20	1857.499998	-0.001	1902.499998	-0.001
30	1857.499999	-0.001	1902.499998	-0.001
40	1857.499997	-0.002	1902.499998	-0.001
50	1857.499998	-0.001	1902.499997	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 2			
	Channel Bandwidth 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.43	1860.000003	0.002	1900.000002	0.001
3.85	1860.000002	0.001	1900.000001	0.001
3.28	1860.000003	0.002	1900.000003	0.001

Note: The applicant defined the normal working voltage is from 3.28Vdc to 4.43Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 2			
	Channel Bandwidth 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1860.000004	0.002	1900.000001	0.001
-20	1860.000003	0.002	1900.000004	0.002
-10	1860.000003	0.001	1900.000003	0.001
0	1860.000001	0.001	1900.000001	0.001
10	1859.999997	-0.002	1899.999997	-0.001
20	1859.999996	-0.002	1899.999999	-0.001
30	1859.999997	-0.002	1899.999998	-0.001
40	1859.999996	-0.002	1899.999996	-0.002
50	1859.999996	-0.002	1899.999996	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 25			
	Channel Bandwidth 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.43	1850.700002	0.001	1914.300002	0.001
3.85	1850.700002	0.001	1914.300002	0.001
3.28	1850.700004	0.002	1914.300003	0.002

Note: The applicant defined the normal working voltage is from 3.28Vdc to 4.43Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 25			
	Channel Bandwidth 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1850.700001	0.001	1914.300001	0.001
-20	1850.700003	0.002	1914.300001	0.001
-10	1850.700002	0.001	1914.300001	0.001
0	1850.700004	0.002	1914.300001	0.001
10	1850.699996	-0.002	1914.299997	-0.002
20	1850.699996	-0.002	1914.299998	-0.001
30	1850.699997	-0.002	1914.299997	-0.001
40	1850.699999	-0.001	1914.299999	-0.001
50	1850.699997	-0.002	1914.299997	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 25			
	Channel Bandwidth 3MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.43	1851.500003	0.002	1913.500001	0.001
3.85	1851.500004	0.002	1913.500002	0.001
3.28	1851.500002	0.001	1913.500004	0.002

Note: The applicant defined the normal working voltage is from 3.28Vdc to 4.43Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 25			
	Channel Bandwidth 3MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1851.500003	0.002	1913.500001	0.001
-20	1851.500003	0.002	1913.500002	0.001
-10	1851.500001	0.001	1913.500001	0.001
0	1851.500003	0.002	1913.500004	0.002
10	1851.499997	-0.002	1913.499999	-0.001
20	1851.499999	-0.001	1913.499999	-0.001
30	1851.499998	-0.001	1913.499998	-0.001
40	1851.499996	-0.002	1913.499997	-0.001
50	1851.499997	-0.001	1913.499999	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 25			
	Channel Bandwidth 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.43	1852.500003	0.001	1912.500004	0.002
3.85	1852.500004	0.002	1912.500002	0.001
3.28	1852.500001	0.001	1912.500002	0.001

Note: The applicant defined the normal working voltage is from 3.28Vdc to 4.43Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 25			
	Channel Bandwidth 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1852.500001	0.001	1912.500003	0.002
-20	1852.500002	0.001	1912.500004	0.002
-10	1852.500001	0.001	1912.500002	0.001
0	1852.500002	0.001	1912.500002	0.001
10	1852.499998	-0.001	1912.499996	-0.002
20	1852.499998	-0.001	1912.499998	-0.001
30	1852.499997	-0.002	1912.499997	-0.002
40	1852.499999	-0.001	1912.499996	-0.002
50	1852.499999	-0.001	1912.499998	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 25			
	Channel Bandwidth 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.43	1855.000002	0.001	1910.000001	0.001
3.85	1855.000003	0.001	1910.000002	0.001
3.28	1855.000002	0.001	1910.000002	0.001

Note: The applicant defined the normal working voltage is from 3.28Vdc to 4.43Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 25			
	Channel Bandwidth 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1855.000002	0.001	1910.000002	0.001
-20	1855.000003	0.002	1910.000003	0.002
-10	1855.000001	0.001	1910.000002	0.001
0	1855.000001	0.001	1910.000003	0.002
10	1854.999997	-0.002	1909.999997	-0.002
20	1854.999998	-0.001	1909.999997	-0.002
30	1854.999998	-0.001	1909.999999	-0.001
40	1854.999996	-0.002	1909.999997	-0.002
50	1854.999996	-0.002	1909.999998	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 25			
	Channel Bandwidth 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.43	1857.500004	0.002	1907.500002	0.001
3.85	1857.500003	0.002	1907.500001	0.001
3.28	1857.500003	0.002	1907.500003	0.002

Note: The applicant defined the normal working voltage is from 3.28Vdc to 4.43Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 25			
	Channel Bandwidth 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1857.500002	0.001	1907.500003	0.002
-20	1857.500002	0.001	1907.500002	0.001
-10	1857.500003	0.001	1907.500003	0.002
0	1857.500001	0.001	1907.500003	0.001
10	1857.499997	-0.001	1907.499997	-0.002
20	1857.499999	-0.001	1907.499997	-0.002
30	1857.499998	-0.001	1907.499997	-0.002
40	1857.499998	-0.001	1907.499998	-0.001
50	1857.499997	-0.002	1907.499999	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 25			
	Channel Bandwidth 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.43	1860.000003	0.002	1905.000002	0.001
3.85	1860.000002	0.001	1905.000002	0.001
3.28	1860.000001	0.001	1905.000003	0.002

Note: The applicant defined the normal working voltage is from 3.28Vdc to 4.43Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 25			
	Channel Bandwidth 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1860.000001	0.001	1905.000004	0.002
-20	1860.000002	0.001	1905.000004	0.002
-10	1860.000001	0.001	1905.000002	0.001
0	1860.000001	0.001	1905.000002	0.001
10	1859.999997	-0.002	1904.999998	-0.001
20	1859.999998	-0.001	1904.999999	-0.001
30	1859.999997	-0.002	1904.999997	-0.002
40	1859.999998	-0.001	1904.999998	-0.001
50	1859.999998	-0.001	1904.999999	-0.001

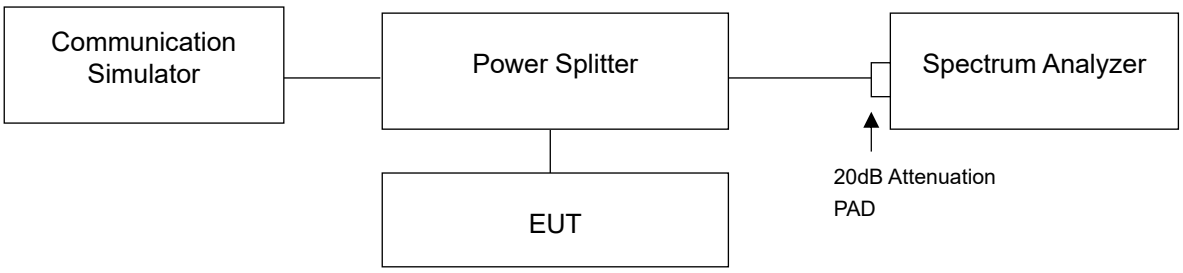
4.4 Occupied Bandwidth Measurement

4.4.1 Test Procedure

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Measurement method, please refer to section 5.4.4 of ANSI C63.26. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

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

4.4.2 Test Setup



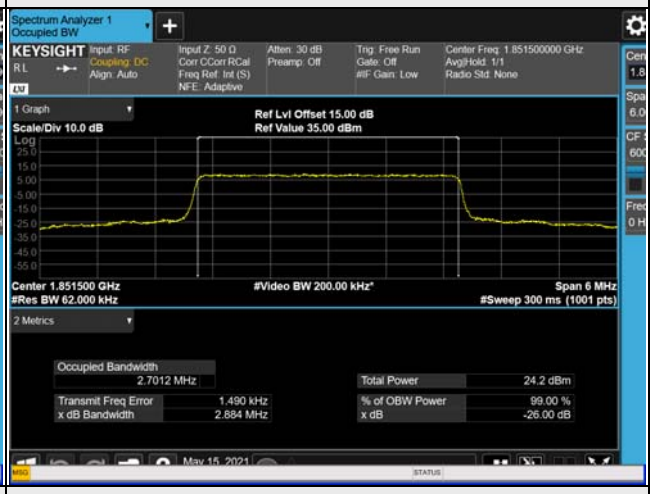
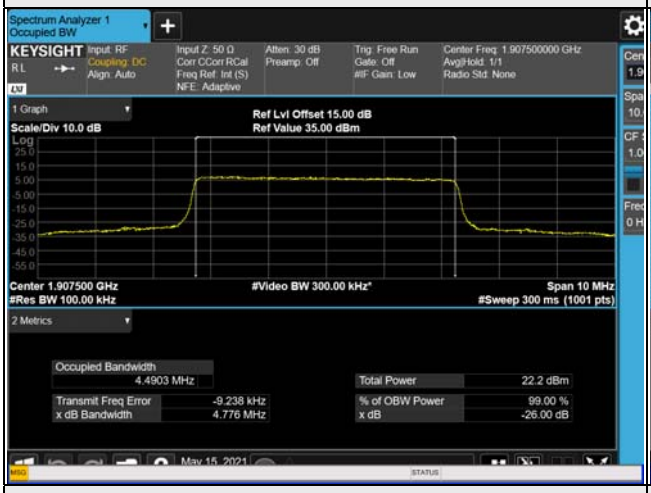
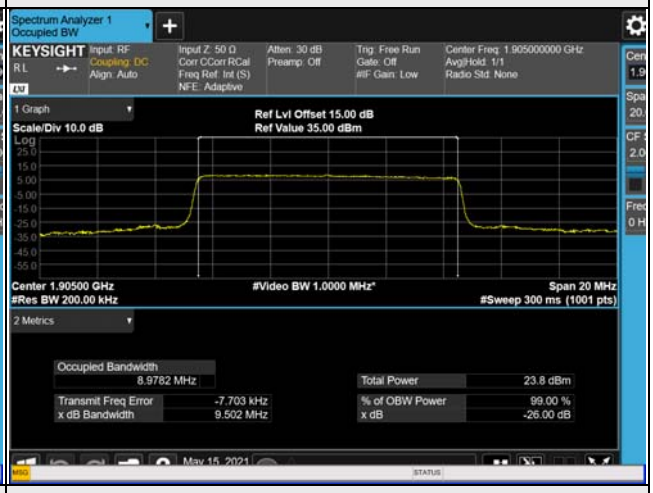
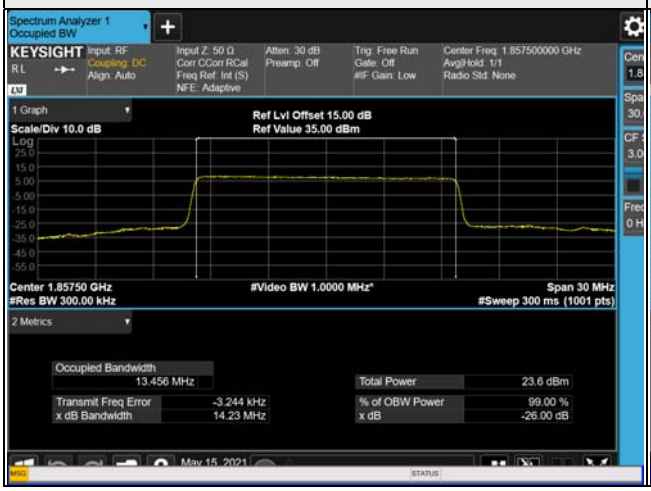
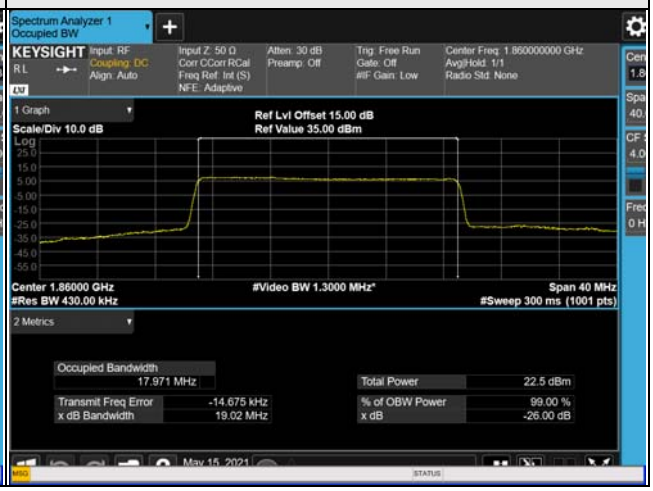
4.4.3 Test Result

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		WCDMA	HSDPA	HSUPA
9262	1852.4	4.19	4.17	4.17
9400	1880.0	4.23	4.18	4.18
9538	1907.6	4.17	4.16	4.16

Spectrum Plot of Worst Value	
WCDMA	HSDPA
HSUPA	

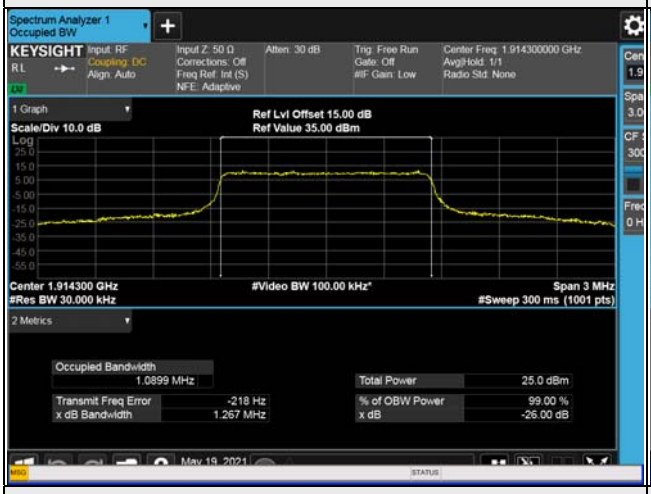
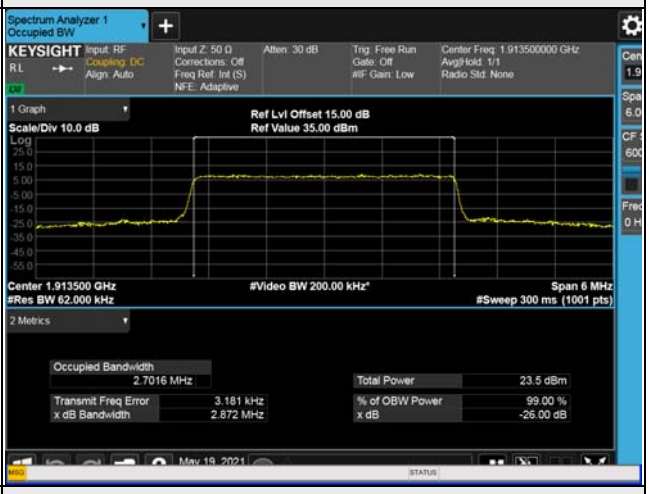
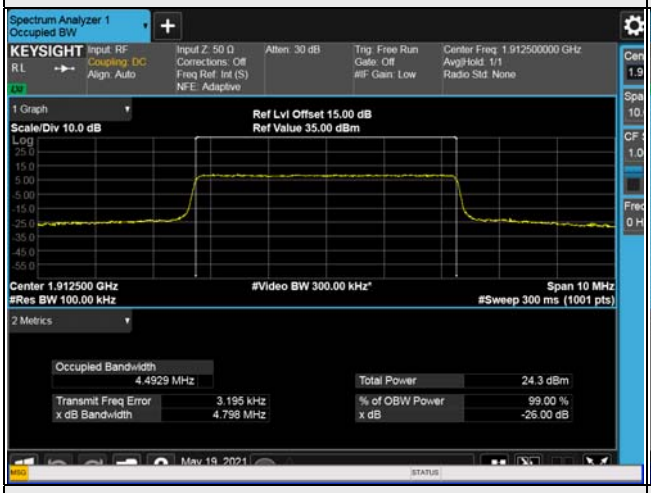
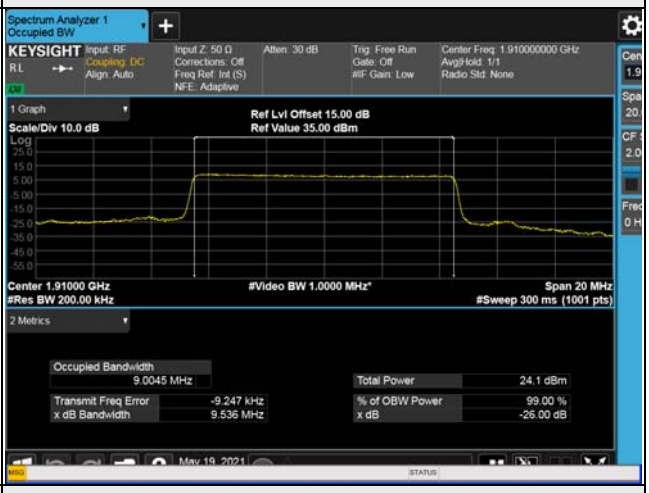
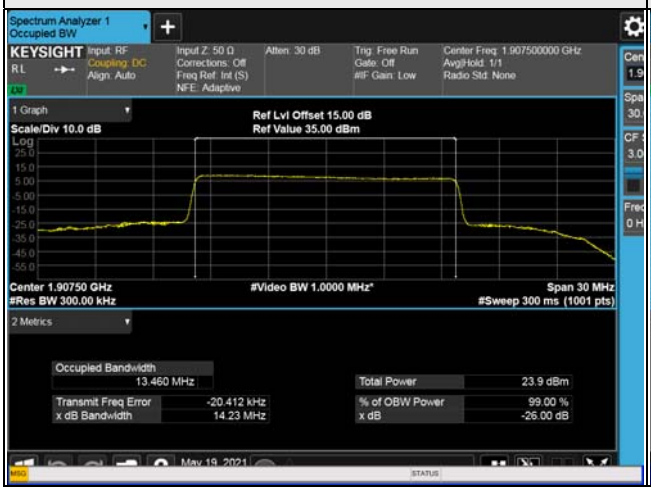
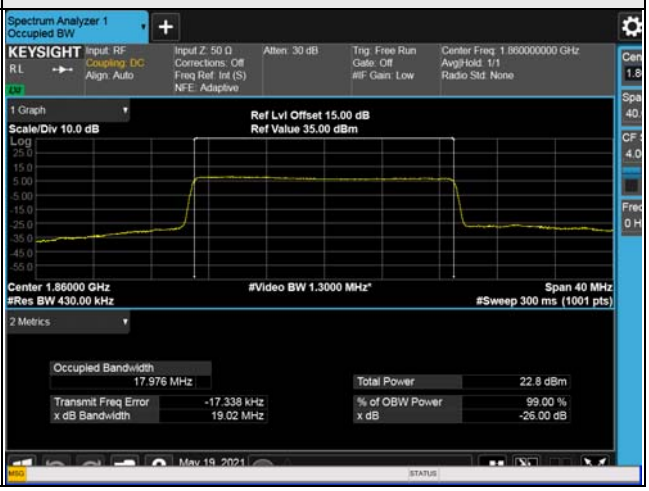
LTE Band 2, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18607	1850.7	1.09	1.09	1.09	1.08
18900	1880.0	1.09	1.09	1.09	1.09
19193	1909.3	1.09	1.09	1.09	1.09
LTE Band 2, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18615	1851.5	2.70	2.70	2.70	2.70
18900	1880.0	2.70	2.70	2.70	2.70
19185	1908.5	2.70	2.70	2.70	2.69
LTE Band 2, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18625	1852.5	4.49	4.49	4.48	4.48
18900	1880.0	4.49	4.49	4.49	4.49
19175	1907.5	4.49	4.49	4.49	4.48
LTE Band 2, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18650	1855.0	8.97	8.96	8.97	8.95
18900	1880.0	8.97	8.96	8.96	8.96
19150	1905.0	8.98	8.96	8.95	8.95
LTE Band 2, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18675	1857.5	13.46	13.45	13.45	13.44
18900	1880.0	13.44	13.43	13.43	13.42
19125	1902.5	13.41	13.41	13.41	13.41

LTE Band 2, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18700	1860.0	17.96	17.97	17.96	17.95
18900	1880.0	17.88	17.89	17.89	17.87
19100	1900.0	17.88	17.89	17.89	17.90

Spectrum Plot of Worst Value	
1.4MHz / 64QAM	3MHz / QPSK
	
5MHz / 64QAM	10MHz / QPSK
	
15MHz / QPSK	20MHz / 16QAM
	

LTE Band 25, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
26047	1850.7	1.09	1.09	1.09	1.09
26365	1882.5	1.09	1.09	1.09	1.09
26683	1914.3	1.09	1.09	1.09	1.09
LTE Band 25, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
26055	1851.5	2.70	2.70	2.70	2.69
26365	1882.5	2.70	2.70	2.70	2.69
26675	1913.5	2.70	2.70	2.70	2.70
LTE Band 25, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
26065	1852.5	4.49	4.49	4.49	4.48
26365	1882.5	4.49	4.49	4.48	4.49
26665	1912.5	4.49	4.49	4.49	4.49
LTE Band 25, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
26090	1855.0	8.98	8.96	8.96	8.95
26365	1882.5	8.99	8.97	8.96	8.96
26640	1910.0	9.00	8.99	8.99	8.98
LTE Band 25, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
26115	1857.5	13.46	13.45	13.45	13.44
26365	1882.5	13.45	13.43	13.43	13.43
26615	1907.5	13.46	13.45	13.45	13.44

LTE Band 25, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
26140	1860.0	17.97	17.98	17.97	17.96
26365	1882.5	17.90	17.91	17.91	17.89
26590	1905.0	17.89	17.90	17.90	17.88

Spectrum Plot of Worst Value	
1.4MHz / QPSK	3MHz / 16QAM
	
5MHz / QPSK	10MHz / QPSK
	
15MHz / QPSK	20MHz / 16QAM
	

26dB Bandwidth

Channel	Frequency (MHz)	26dB Bandwidth (MHz)		
		WCDMA	HSDPA	HSUPA
9262	1852.4	4.81	4.73	4.71
9400	1880.0	4.88	4.94	4.92
9538	1907.6	4.73	4.70	4.70

Spectrum Plot of Worst Value

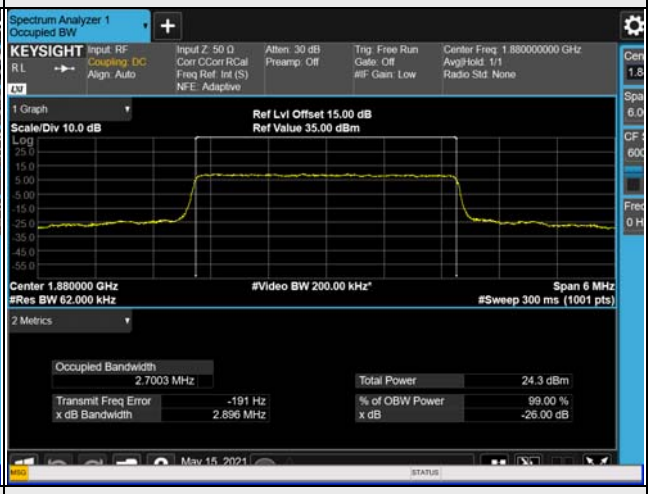
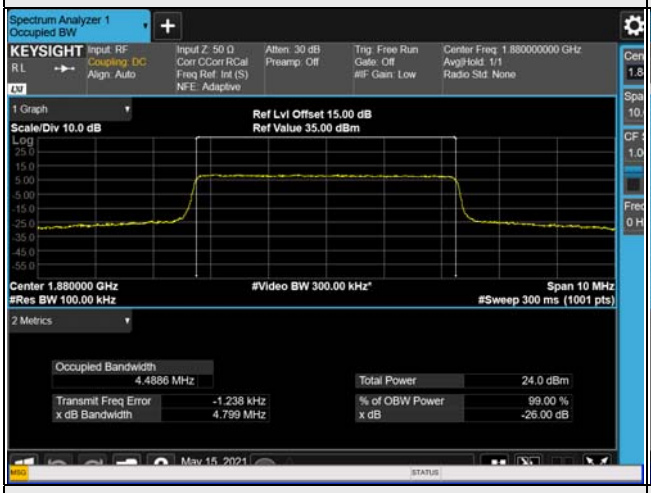
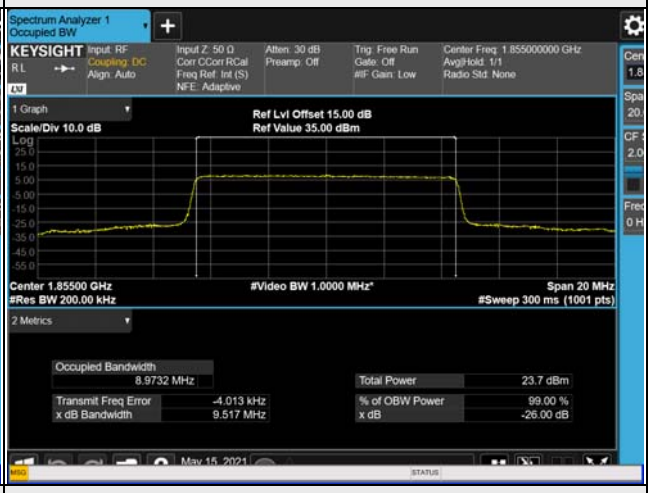
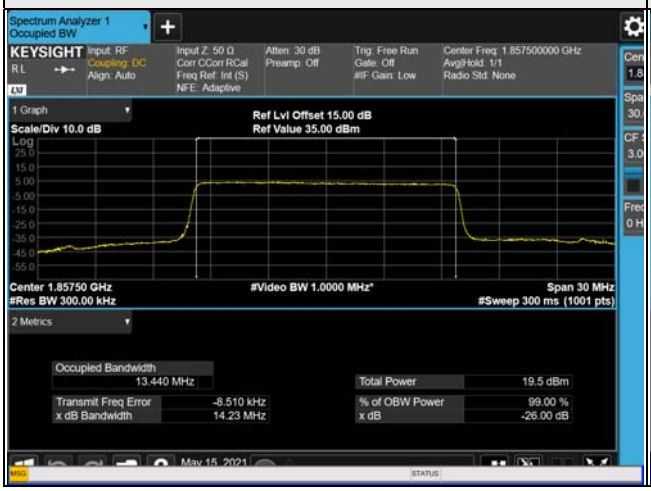
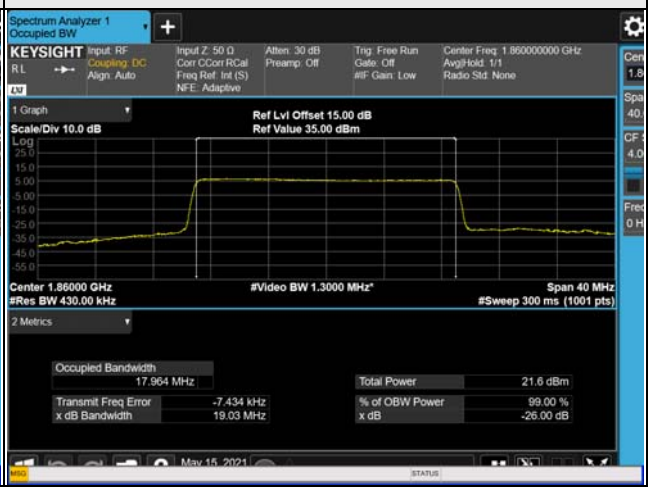
WCDMA

HSDPA

HSUPA

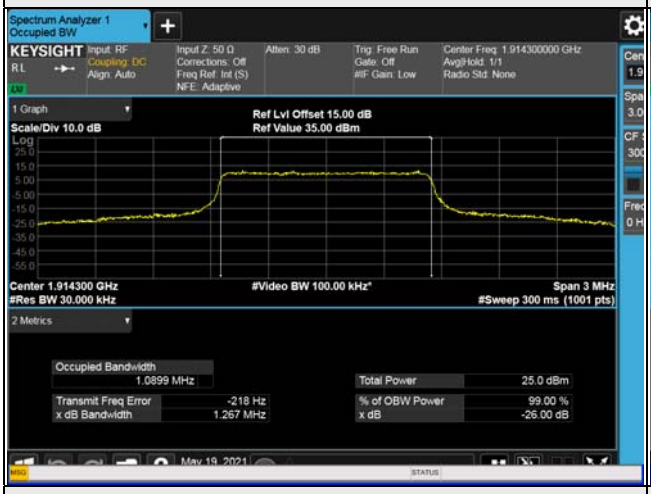
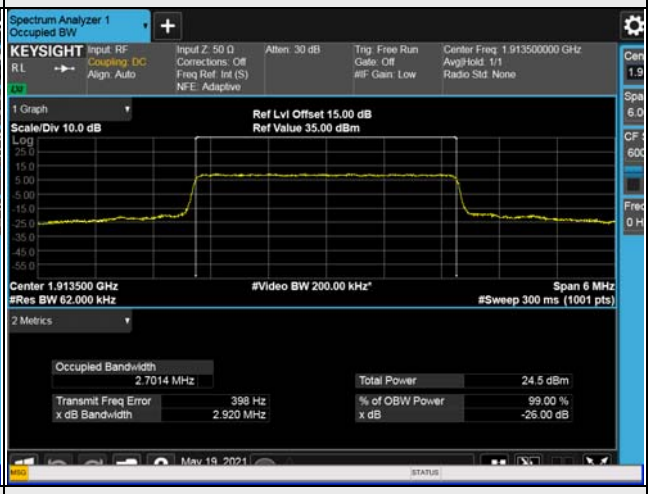
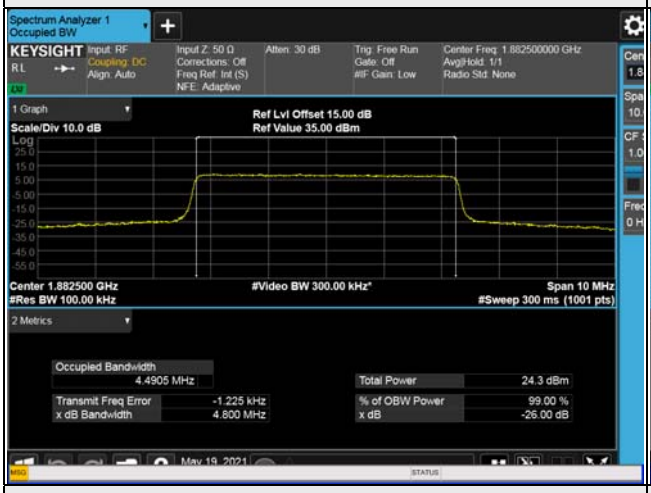
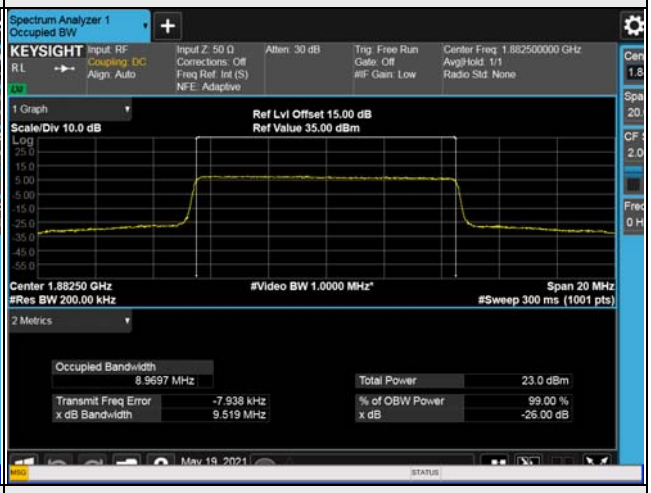
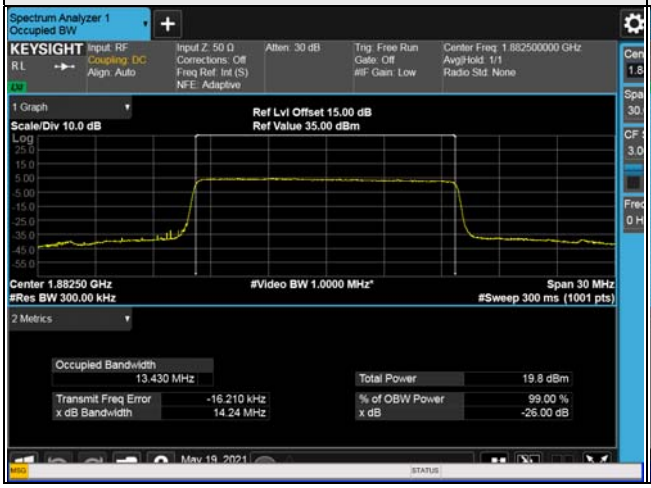
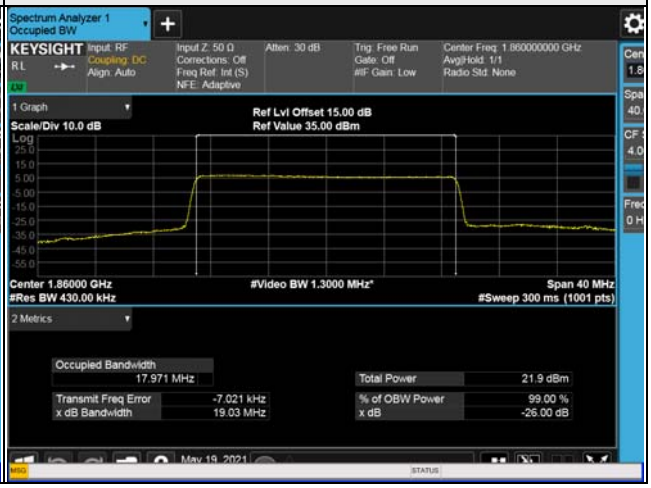
LTE Band 2, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18607	1850.7	1.25	1.25	1.25	1.25
18900	1880.0	1.25	1.25	1.26	1.23
19193	1909.3	1.24	1.24	1.26	1.24
LTE Band 2, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18615	1851.5	2.88	2.88	2.87	2.88
18900	1880.0	2.90	2.87	2.87	2.87
19185	1908.5	2.89	2.87	2.88	2.87
LTE Band 2, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18625	1852.5	4.79	4.78	4.79	4.77
18900	1880.0	4.80	4.78	4.79	4.77
19175	1907.5	4.78	4.79	4.78	4.77
LTE Band 2, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18650	1855.0	9.52	9.50	9.50	9.48
18900	1880.0	9.51	9.51	9.50	9.50
19150	1905.0	9.50	9.50	9.49	9.49
LTE Band 2, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18675	1857.5	14.23	14.23	14.23	14.23
18900	1880.0	14.23	14.21	14.22	14.22
19125	1902.5	14.22	14.21	14.22	14.21

LTE Band 2, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18700	1860.0	19.02	19.02	19.03	19.00
18900	1880.0	18.99	18.99	18.99	18.99
19100	1900.0	19.00	19.00	19.00	19.00

Spectrum Plot of Worst Value	
1.4MHz / 64QAM	3MHz / QPSK
	
5MHz / QPSK	10MHz / QPSK
	
15MHz / 256QAM	20MHz / 64QAM
	

LTE Band 25, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
26047	1850.7	1.25	1.25	1.25	1.23
26365	1882.5	1.25	1.25	1.25	1.24
26683	1914.3	1.27	1.26	1.26	1.24
LTE Band 25, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
26055	1851.5	2.90	2.87	2.87	2.87
26365	1882.5	2.89	2.87	2.87	2.88
26675	1913.5	2.92	2.87	2.88	2.88
LTE Band 25, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
26065	1852.5	4.79	4.79	4.78	4.79
26365	1882.5	4.80	4.80	4.78	4.78
26665	1912.5	4.80	4.79	4.80	4.79
LTE Band 25, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
26090	1855.0	9.51	9.50	9.51	9.48
26365	1882.5	9.51	9.52	9.50	9.49
26640	1910.0	9.54	9.51	9.50	9.50
LTE Band 25, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
26115	1857.5	14.23	14.21	14.23	14.21
26365	1882.5	14.22	14.20	14.23	14.24
26615	1907.5	14.23	14.22	14.23	14.23

LTE Band 25, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
26140	1860.0	19.02	19.02	19.03	19.02
26365	1882.5	18.99	18.99	19.00	19.00
26590	1905.0	18.97	18.98	18.98	18.98

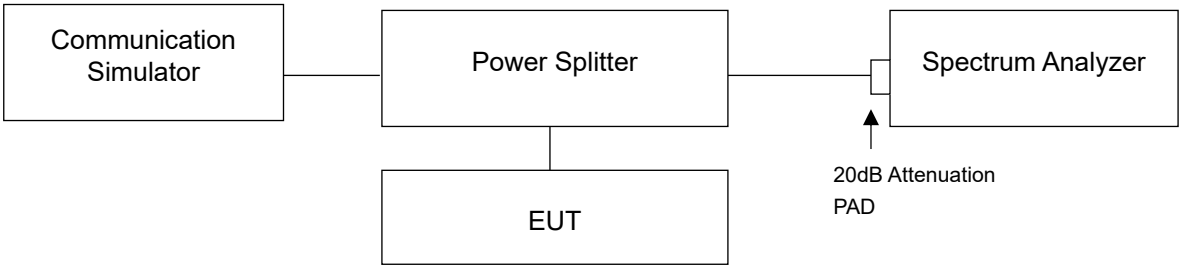
Spectrum Plot of Worst Value	
1.4MHz / QPSK	3MHz / QPSK
	
5MHz / QPSK	10MHz / 16QAM
	
15MHz / 256QAM	20MHz / 64QAM
	

4.5 Band Edge Measurement

4.5.1 Limits of Band Edge Measurement

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) dB. In the 1 MHz 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.

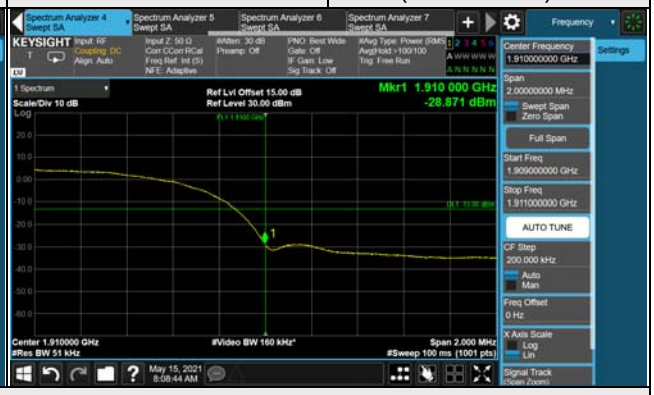
4.5.2 Test Setup

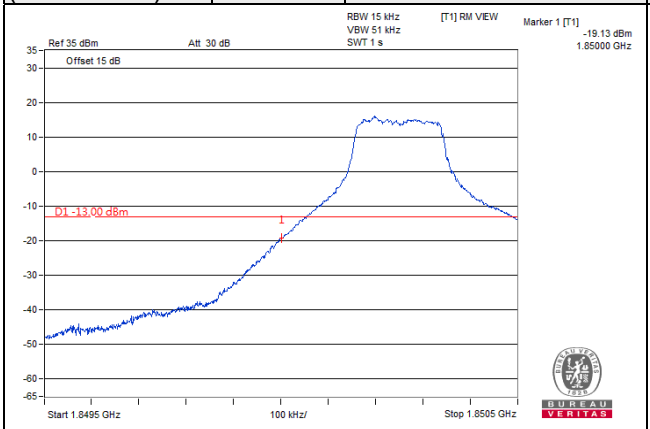
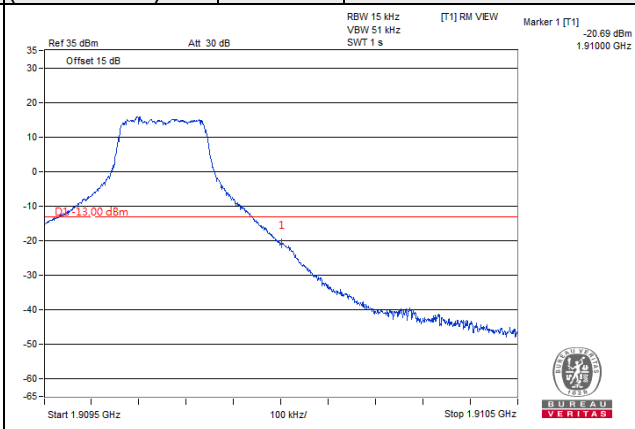
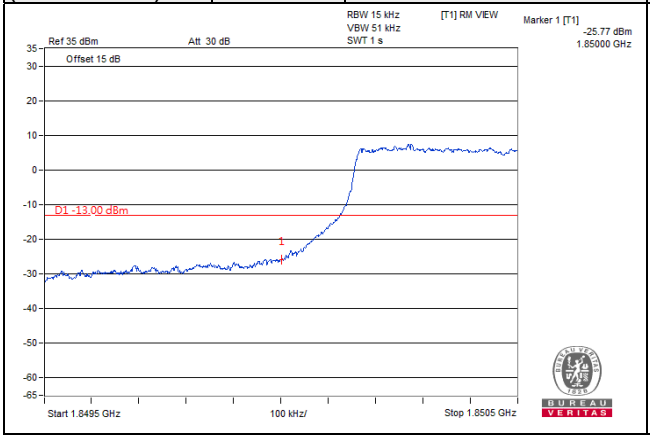
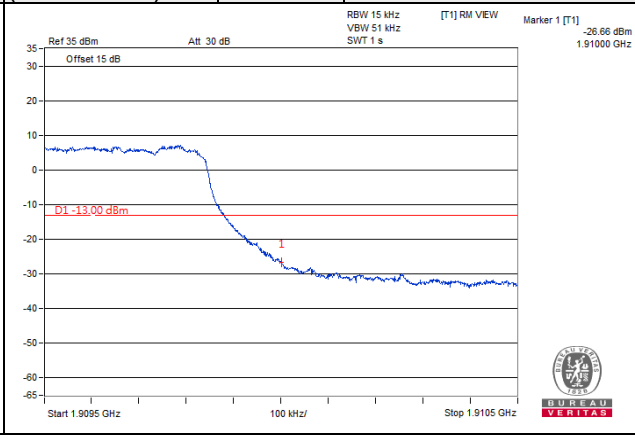


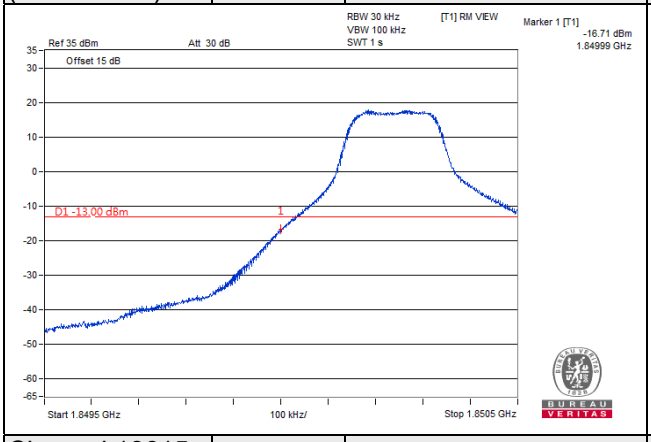
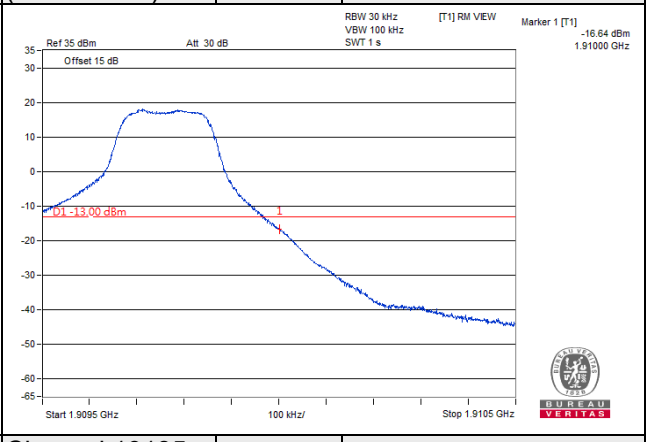
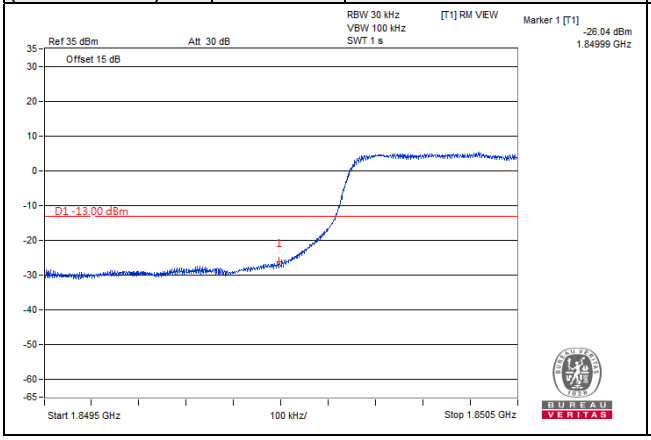
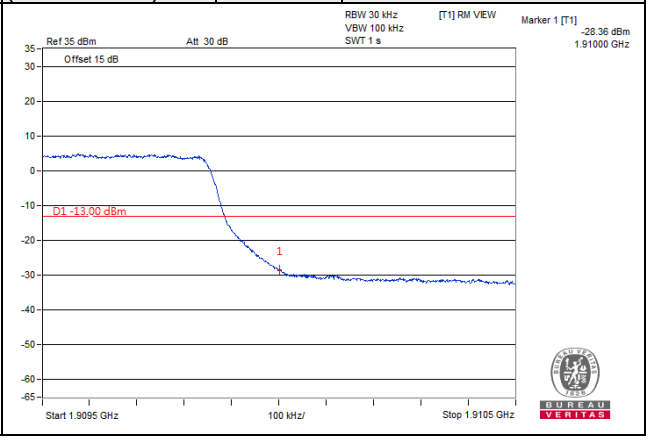
4.5.3 Test Procedures

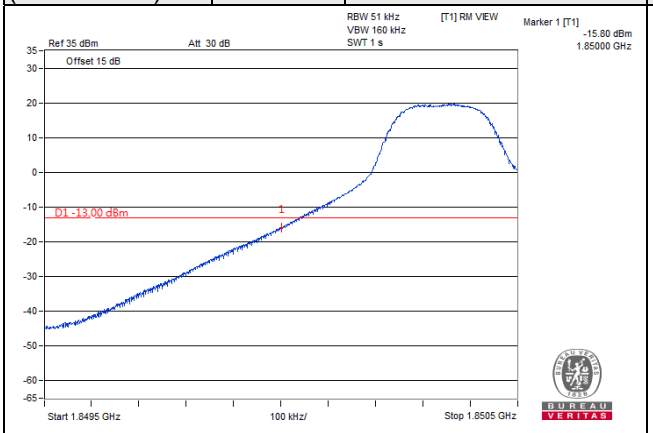
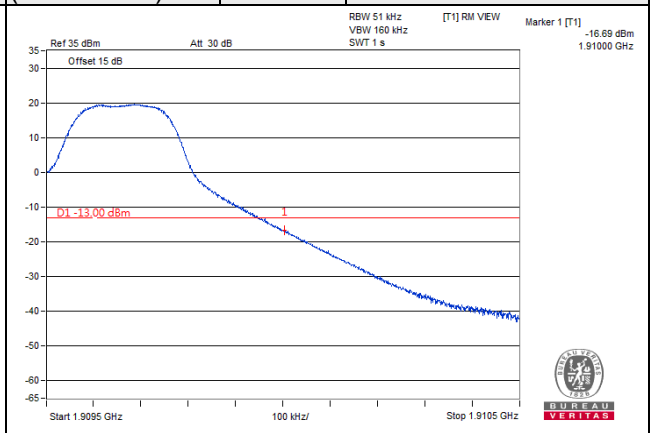
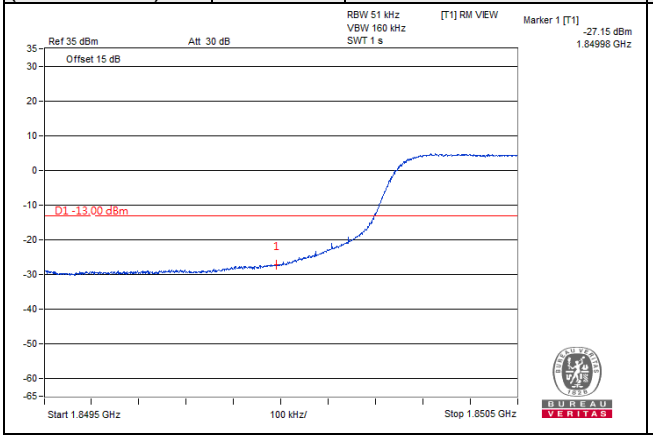
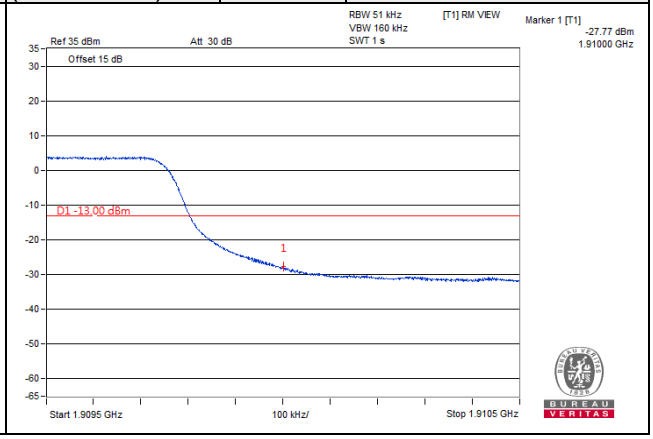
a. All measurements were done at low and high operational frequency range.
b. The center frequency of spectrum is the band edge frequency and span is 2MHz. RB of the spectrum is 51kHz and VB of the spectrum is 160kHz (WCDMA / HSDPA / HSUPA).
c. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 15kHz and VB of the spectrum is 51kHz (LTE Channel Bandwidth 1.4MHz).
d. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 30kHz and VB of the spectrum is 100kHz (LTE Channel Bandwidth 3MHz).
e. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 51kHz and VB of the spectrum is 160kHz (LTE Channel Bandwidth 5MHz).
f. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE Channel Bandwidth 10MHz).
g. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 150kHz and VB of the spectrum is 470kHz (LTE Channel Bandwidth 15MHz).
h. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 200kHz and VB of the spectrum is 1MHz (LTE Channel Bandwidth 20MHz).
i. Record the max trace plot into the test report.

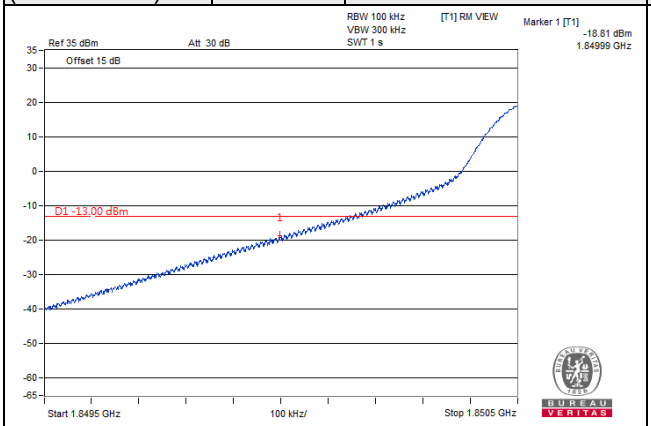
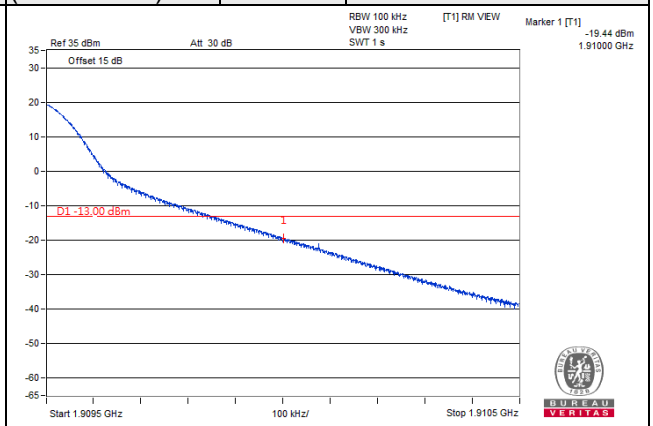
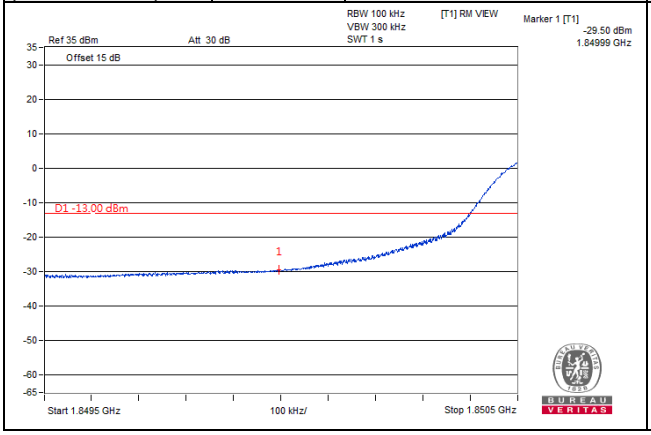
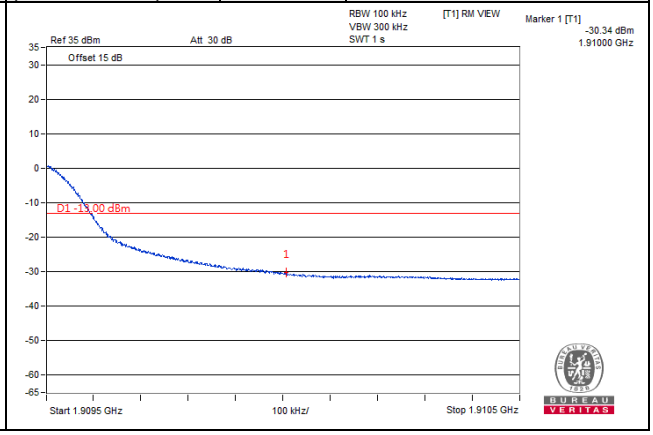
4.5.4 Test Results

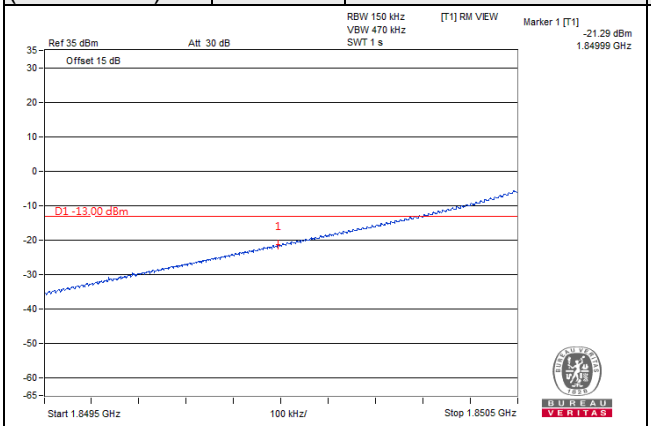
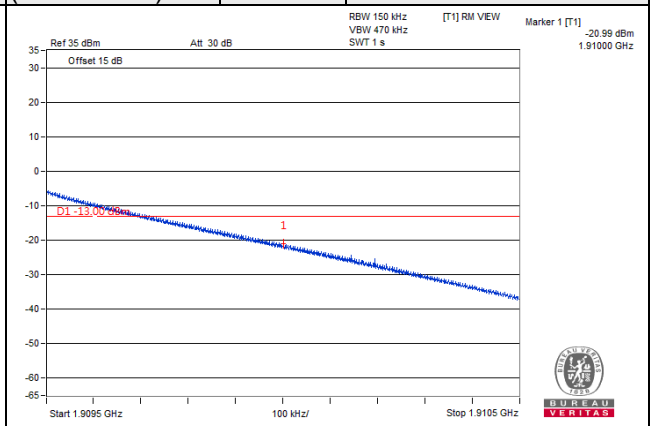
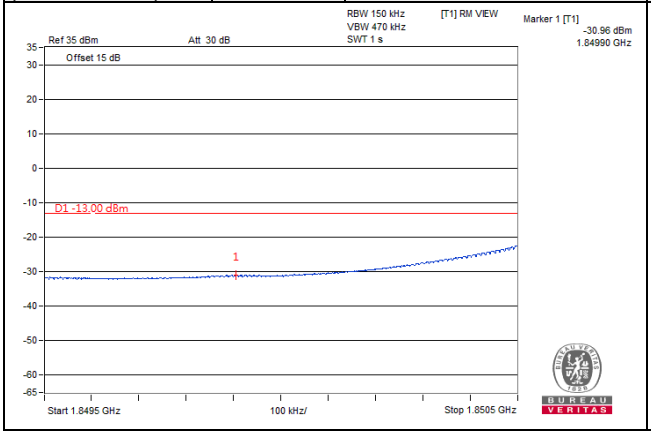
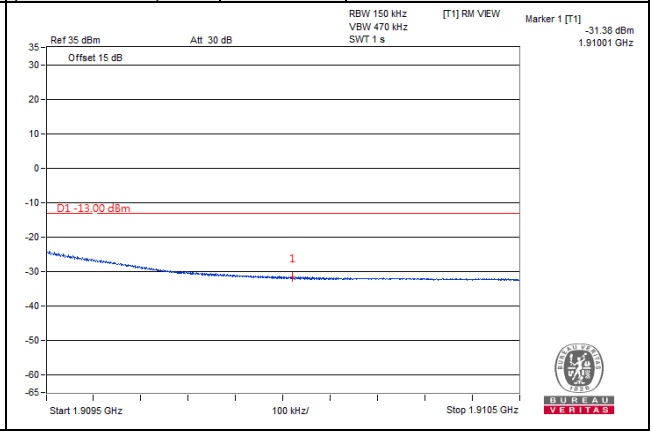
WCDMA			
Channel	9262 (1852.4MHz)	Channel	9538 (1907.6MHz)
HSDPA			
Channel	9262 (1852.4MHz)	Channel	9538 (1907.6MHz)
			
HSUPA			
Channel	9262 (1852.4MHz)	Channel	9538 (1907.6MHz)

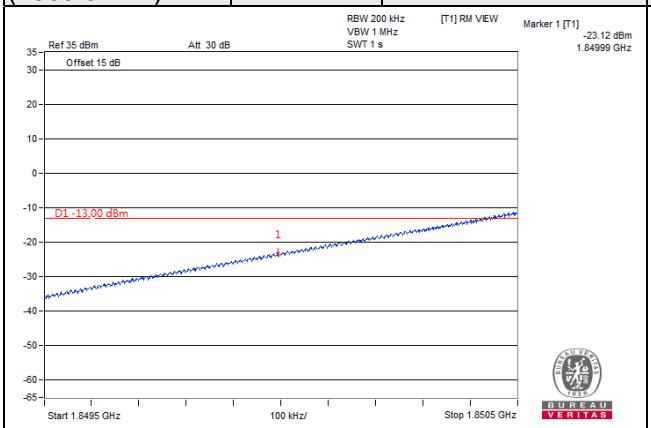
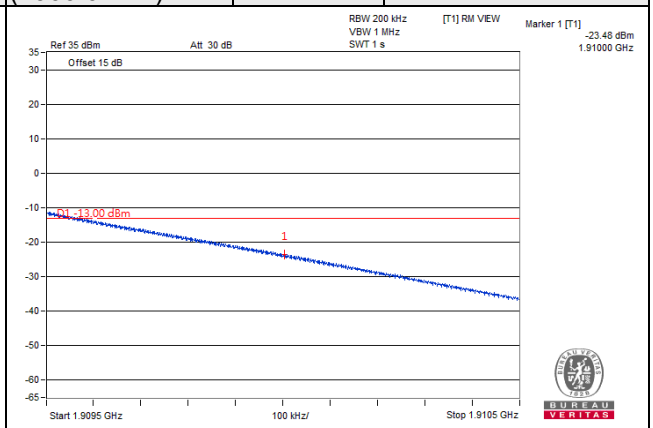
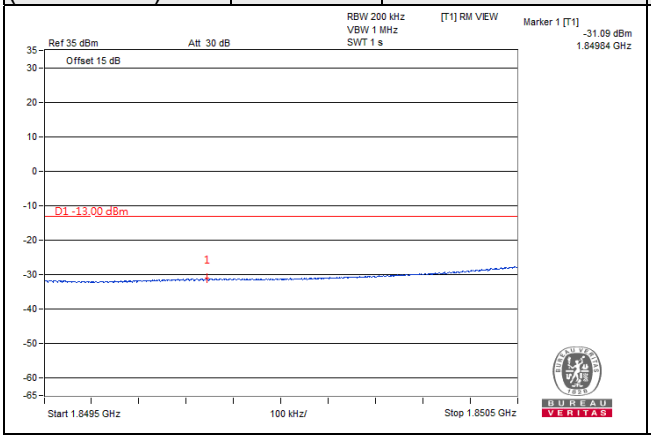
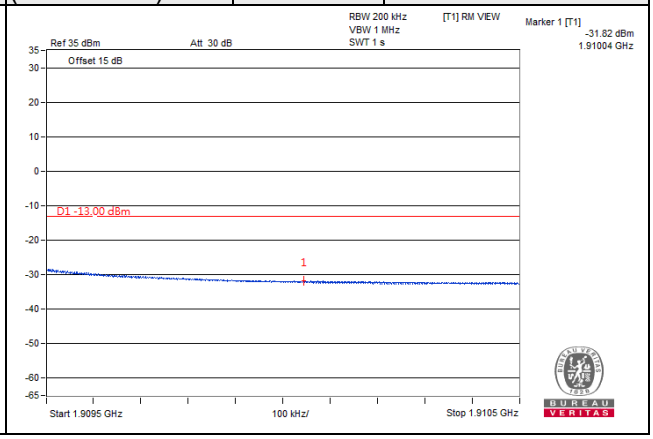
LTE Band 2, Channel Bandwidth 1.4MHz					
Channel 18607 (1850.7MHz)	QPSK	1 RB / 0 RB Offset	Channel 19193 (1909.3MHz)	QPSK	1 RB / 5 RB Offset
					
Channel 18607 (1850.7MHz)	QPSK	6 RB / 0 RB Offset	Channel 19193 (1909.3MHz)	QPSK	6 RB / 0 RB Offset
					

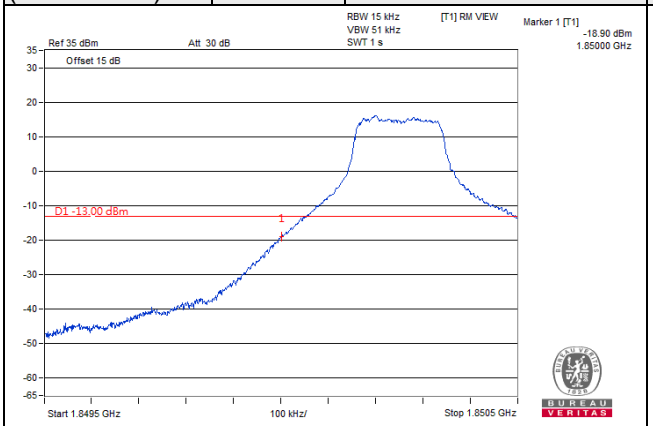
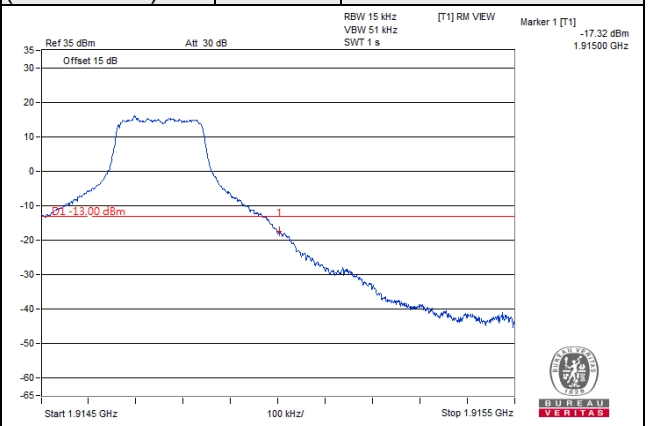
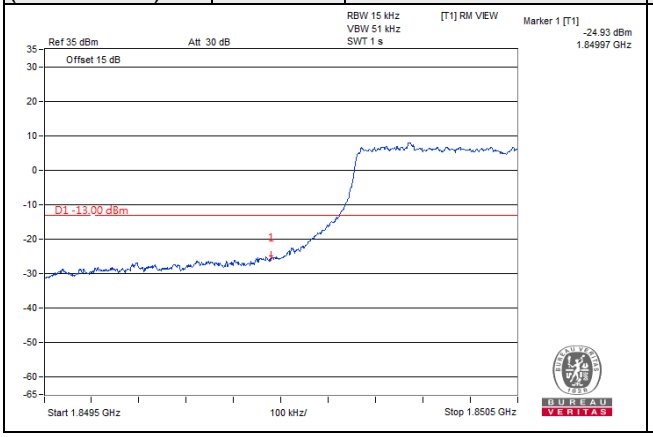
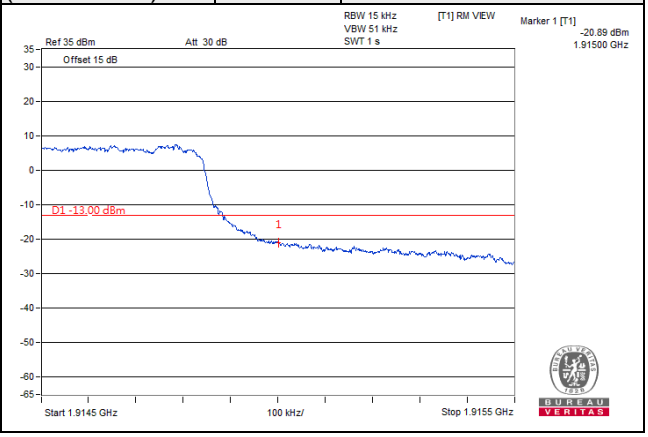
LTE Band 2, Channel Bandwidth 3MHz					
Channel 18615 (1851.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 19185 (1908.5MHz)	QPSK	1 RB / 14 RB Offset
					
Channel 18615 (1851.5MHz)	QPSK	15 RB / 0 RB Offset	Channel 19185 (1908.5MHz)	QPSK	15 RB / 0 RB Offset
					

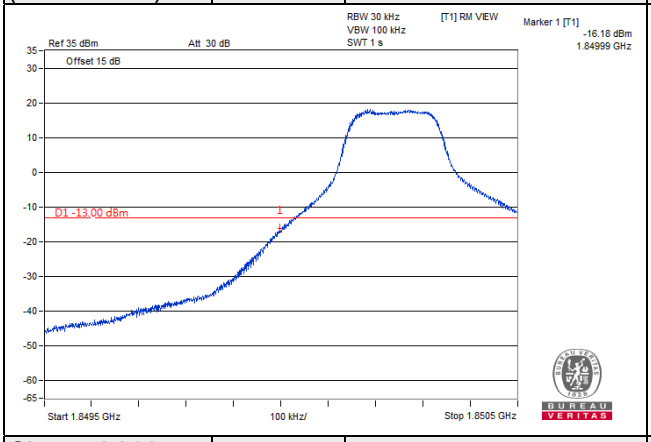
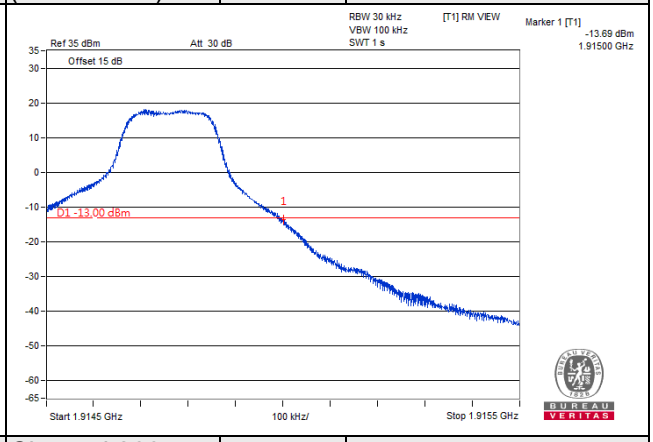
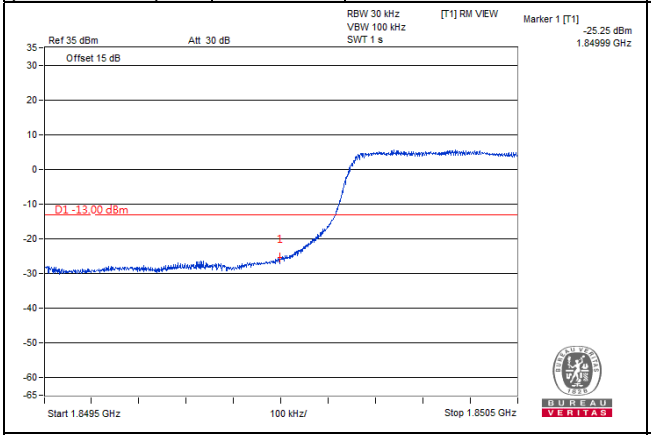
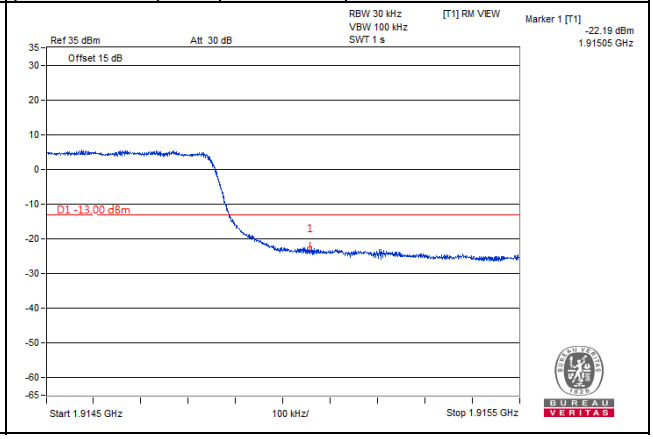
LTE Band 2, Channel Bandwidth 5MHz					
Channel 18625 (1852.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 19175 (1907.5MHz)	QPSK	1 RB / 24 RB Offset
					
Channel 18625 (1852.5MHz)	QPSK	25 RB / 0 RB Offset	Channel 19175 (1907.5MHz)	QPSK	25 RB / 0 RB Offset
					

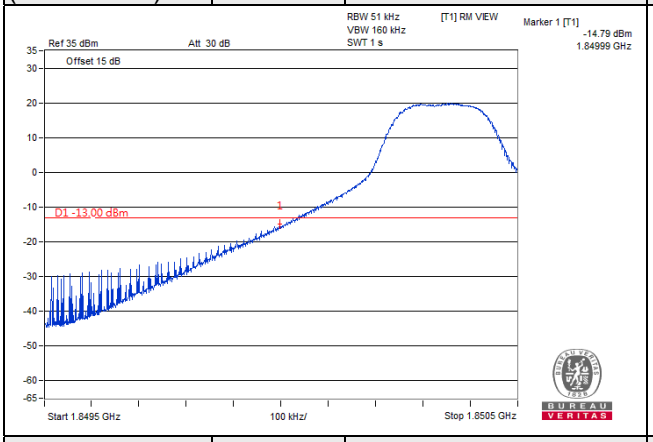
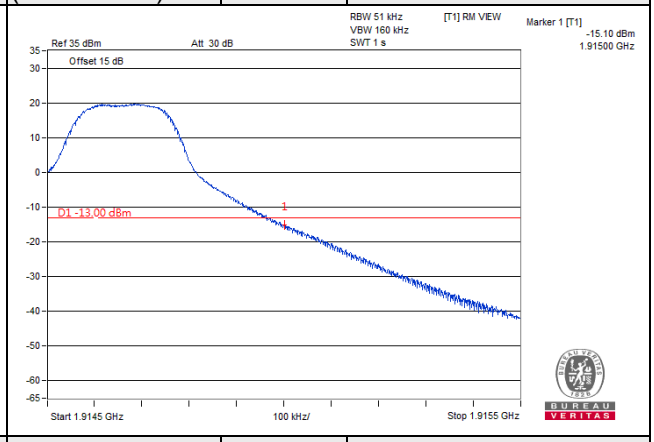
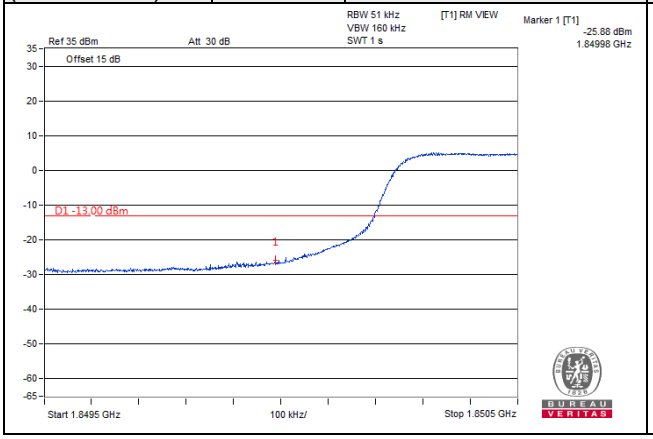
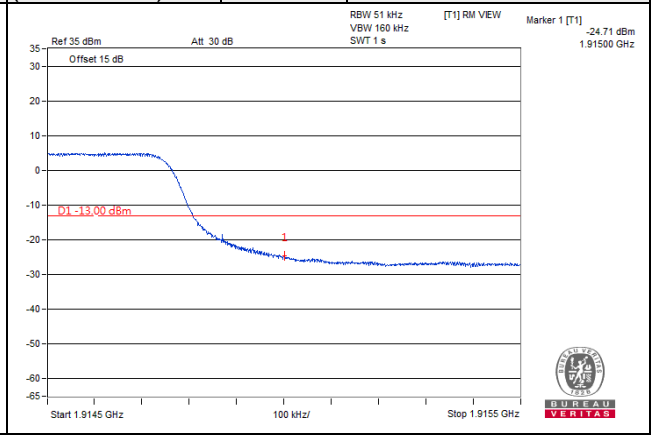
LTE Band 2, Channel Bandwidth 10MHz					
Channel 18650 (1855.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 19150 (1905.0MHz)	QPSK	1 RB / 49 RB Offset
					
Channel 18650 (1855.0MHz)	QPSK	50 RB / 0 RB Offset	Channel 19150 (1905.0MHz)	QPSK	50 RB / 0 RB Offset
					

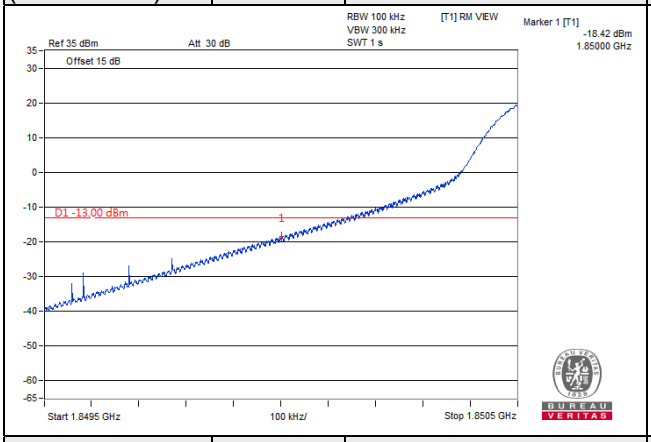
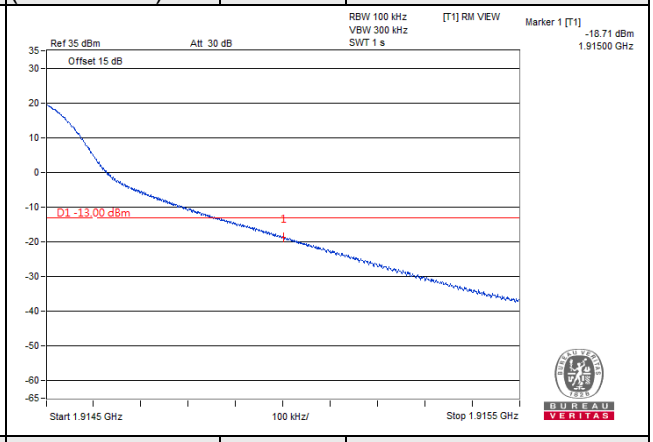
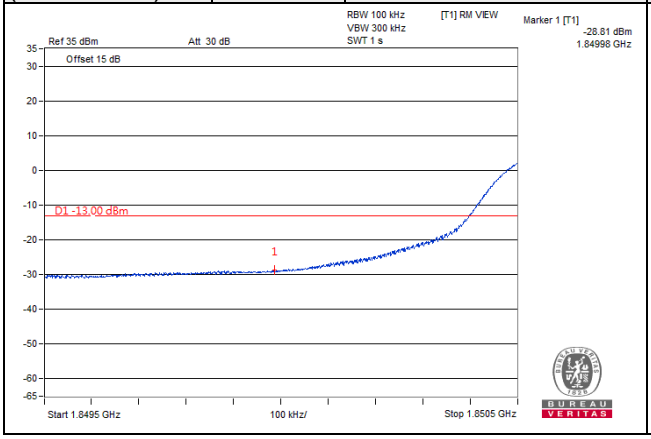
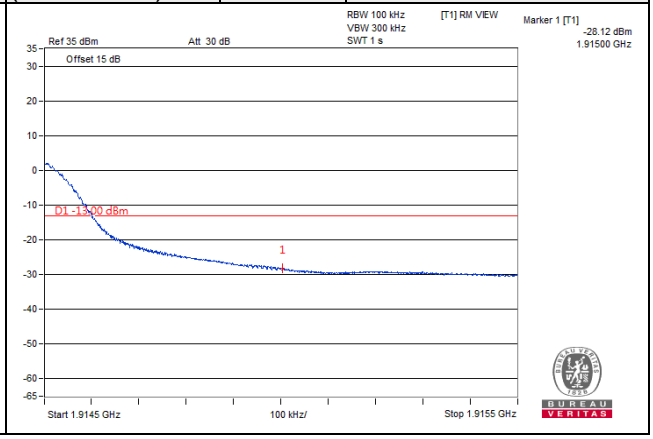
LTE Band 2, Channel Bandwidth 15MHz					
Channel 18675 (1857.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 19125 (1902.5MHz)	QPSK	1 RB / 74 RB Offset
					
Channel 18675 (1857.5MHz)	QPSK	75 RB / 0 RB Offset	Channel 19125 (1902.5MHz)	QPSK	75 RB / 0 RB Offset
					

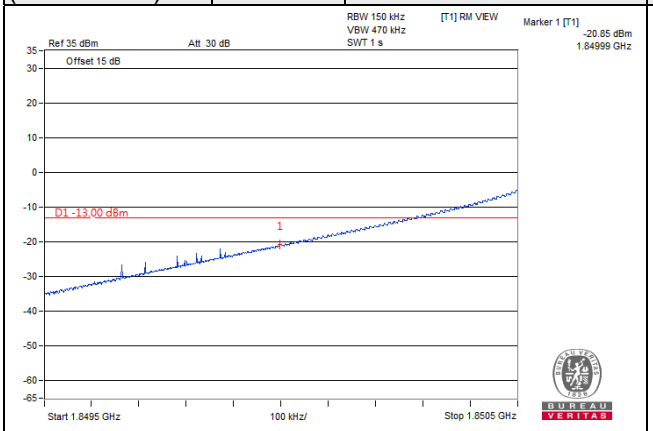
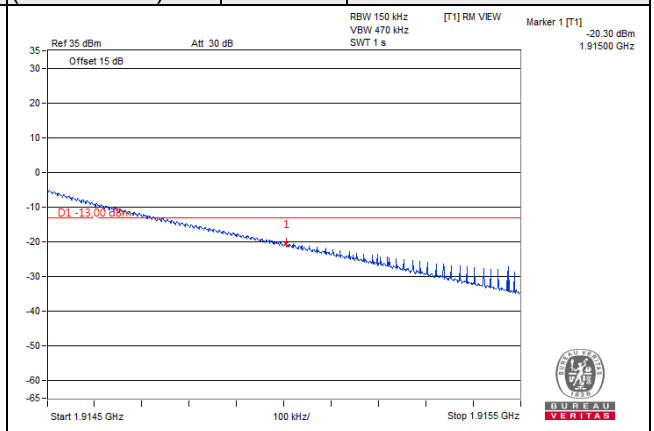
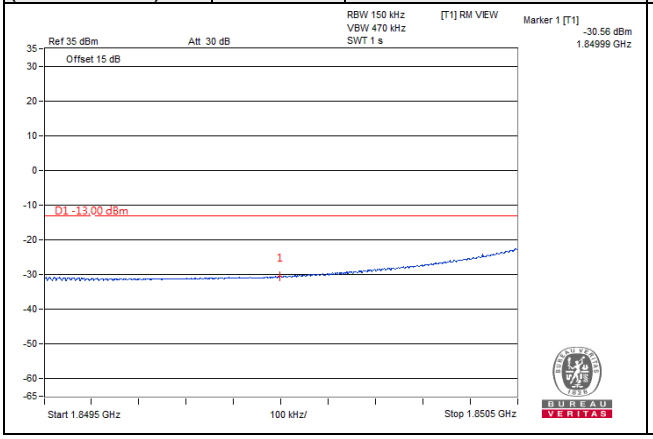
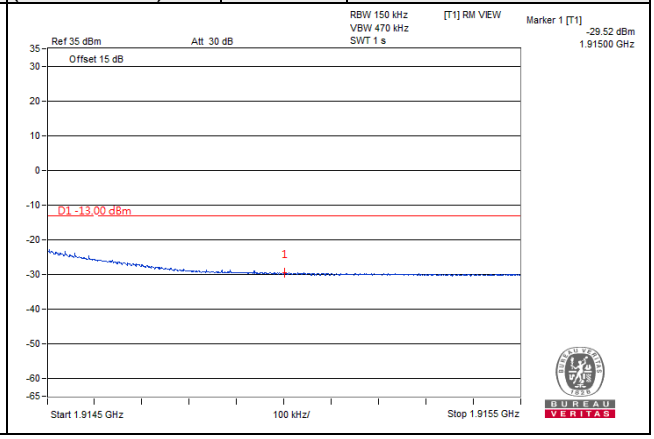
LTE Band 2, Channel Bandwidth 20MHz					
Channel 18700 (1860.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 19100 (1900.0MHz)	QPSK	1 RB / 99 RB Offset
					
Channel 18700 (1860.0MHz)	QPSK	100 RB / 0 RB Offset	Channel 19100 (1900.0MHz)	QPSK	100 RB / 0 RB Offset
					

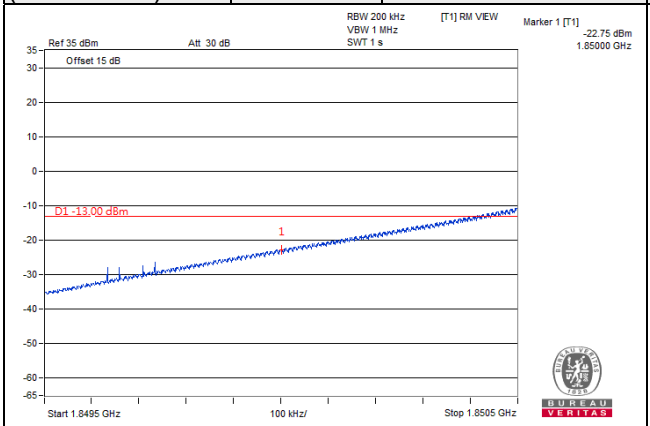
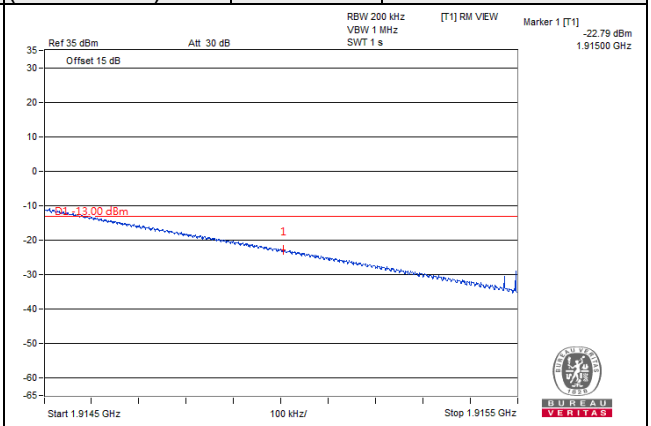
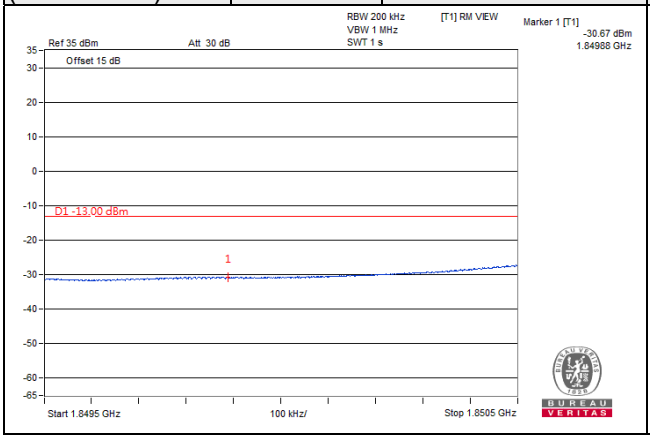
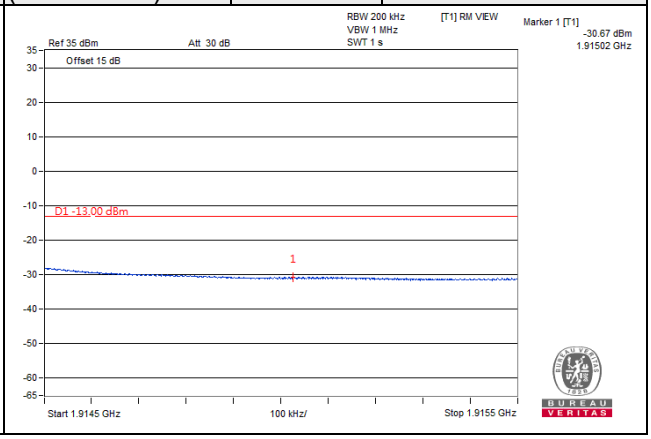
LTE Band 25, Channel Bandwidth 1.4MHz					
Channel 26047 (1850.7MHz)	QPSK	1 RB / 0 RB Offset	Channel 26683 (1914.3MHz)	QPSK	1 RB / 5 RB Offset
					
Channel 26047 (1850.7MHz)	QPSK	6 RB / 0 RB Offset	Channel 26683 (1914.3MHz)	QPSK	6 RB / 0 RB Offset
					

LTE Band 25, Channel Bandwidth 3MHz					
Channel 26055 (1851.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 26675 (1913.5MHz)	QPSK	1 RB / 14 RB Offset
					
Channel 26055 (1851.5MHz)	QPSK	15 RB / 0 RB Offset	Channel 26675 (1913.5MHz)	QPSK	15 RB / 0 RB Offset
					

LTE Band 25, Channel Bandwidth 5MHz					
Channel 26065 (1852.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 26665 (1912.5MHz)	QPSK	1 RB / 24 RB Offset
					
Channel 26065 (1852.5MHz)	QPSK	25 RB / 0 RB Offset	Channel 26665 (1912.5MHz)	QPSK	25 RB / 0 RB Offset
					

LTE Band 25, Channel Bandwidth 10MHz					
Channel 26090 (1855.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 26640 (1910.0MHz)	QPSK	1 RB / 49 RB Offset
					
Channel 26090 (1855.0MHz)	QPSK	50 RB / 0 RB Offset	Channel 26640 (1910.0MHz)	QPSK	50 RB / 0 RB Offset
					

LTE Band 25, Channel Bandwidth 15MHz					
Channel 26115 (1857.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 26615 (1907.5MHz)	QPSK	1 RB / 74 RB Offset
					
Channel 26115 (1857.5MHz)	QPSK	75 RB / 0 RB Offset	Channel 26615 (1907.5MHz)	QPSK	75 RB / 0 RB Offset
					

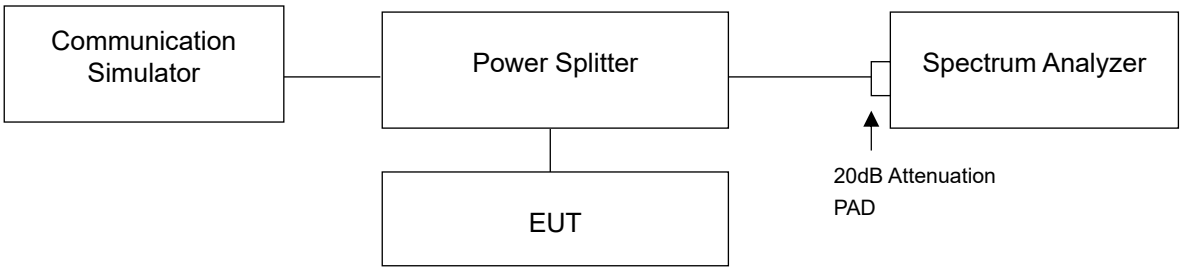
LTE Band 25, Channel Bandwidth 20MHz					
Channel 26140 (1860.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 26590 (1905.0MHz)	QPSK	1 RB / 99 RB Offset
					
Channel 26140 (1860.0MHz)	QPSK	100 RB / 0 RB Offset	Channel 26590 (1905.0MHz)	QPSK	100 RB / 0 RB Offset
					

4.6 Peak to Average Ratio

4.6.1 Limits of Peak to Average Ratio Measurement

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

4.6.2 Test Setup

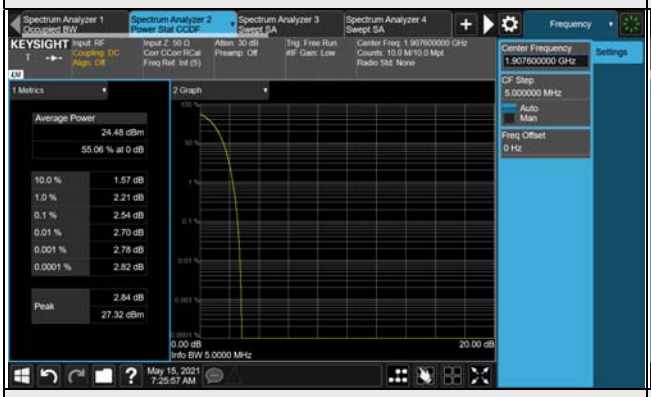
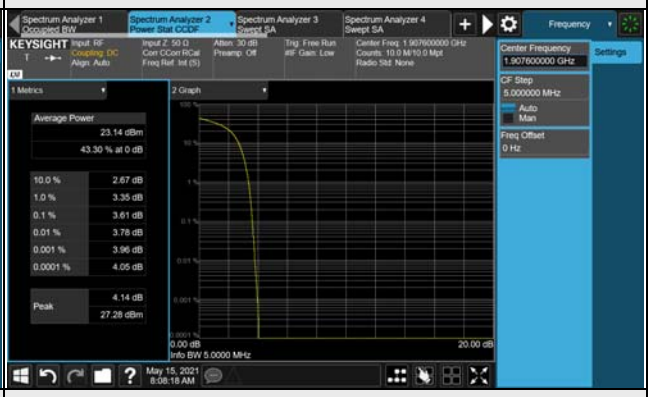
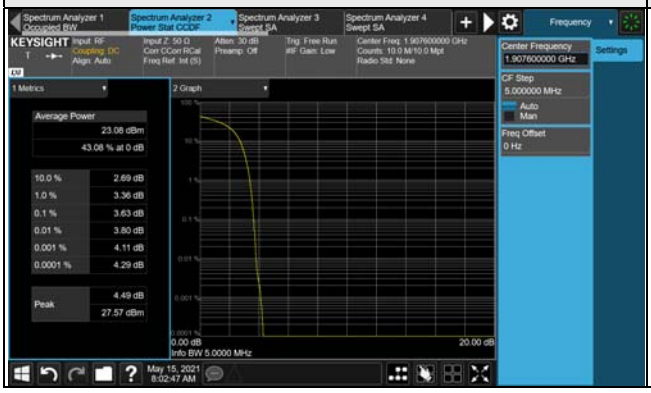


4.6.3 Test Procedures

a. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
b. Set the number of counts to a value that stabilizes the measured CCDF curve;
c. Record the maximum PAPR level associated with a probability of 0.1%.

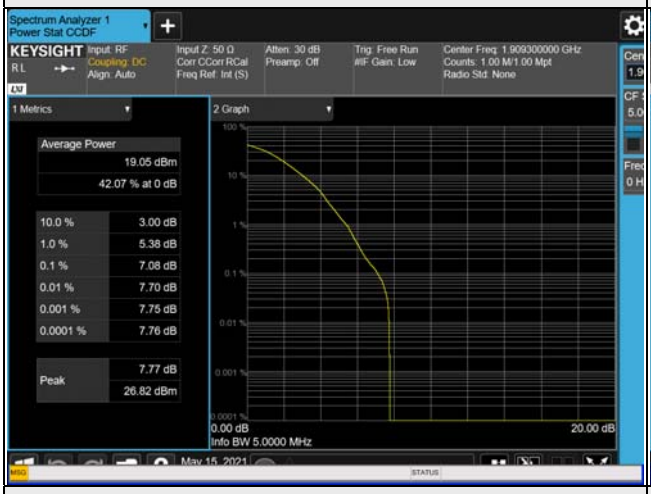
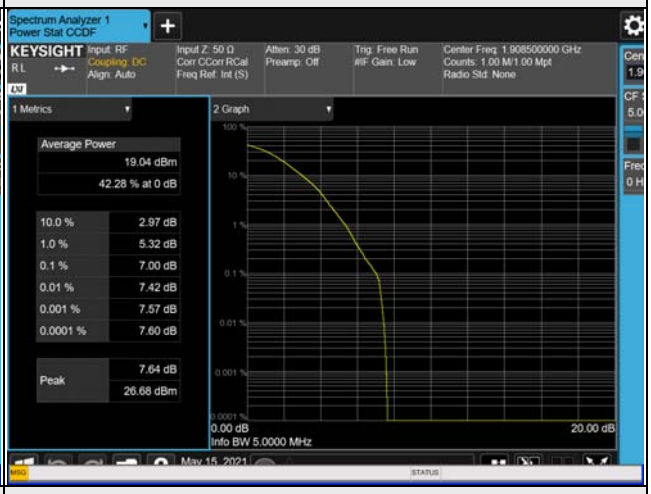
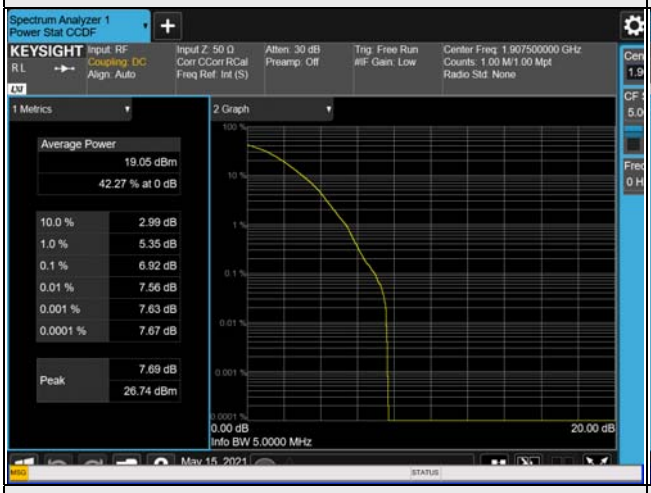
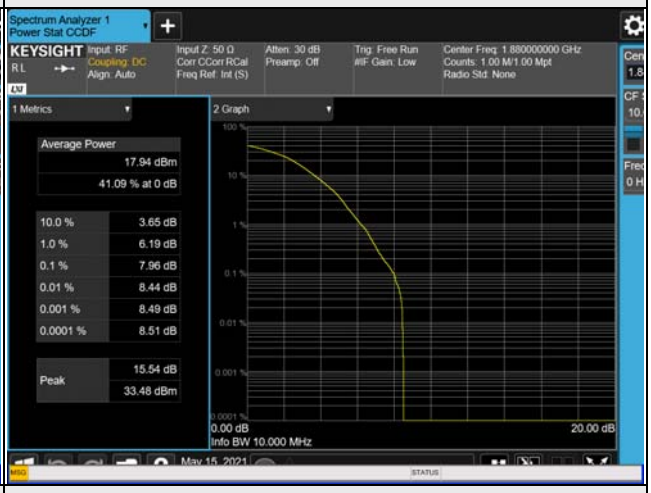
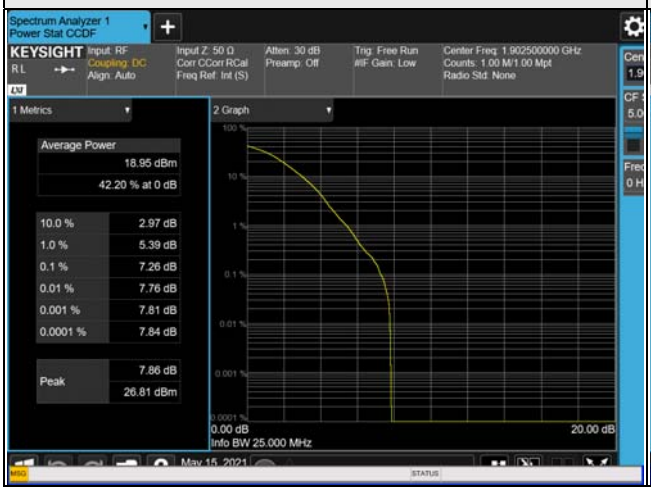
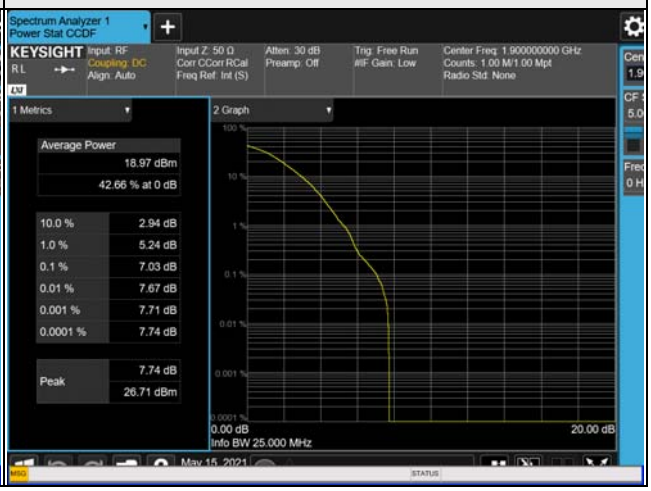
4.6.4 Test Results

Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		WCDMA	HSDPA	HSUPA
9262	1852.4	2.01	3.23	3.18
9400	1880.0	1.82	3.13	3.11
9538	1907.6	2.54	3.61	3.63

Spectrum Plot of Worst Value	
WCDMA	HSDPA
	
HSUPA	
	

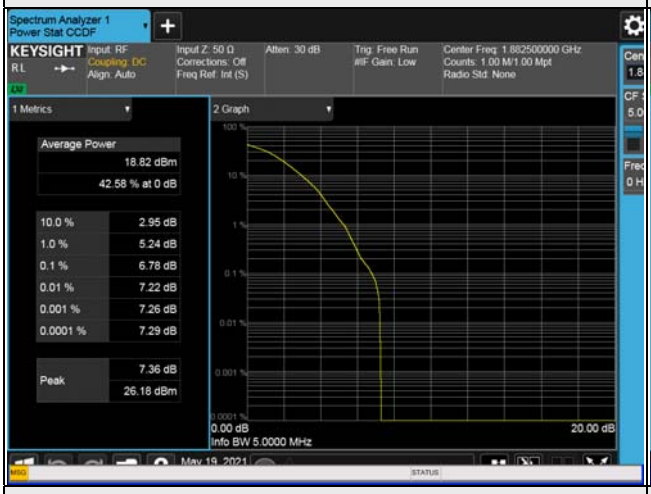
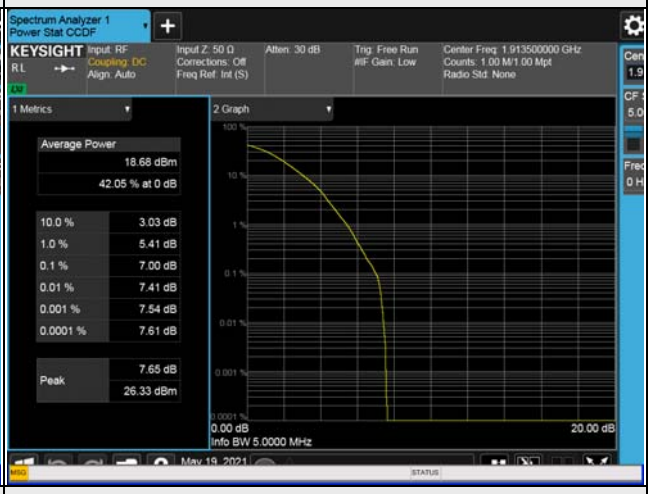
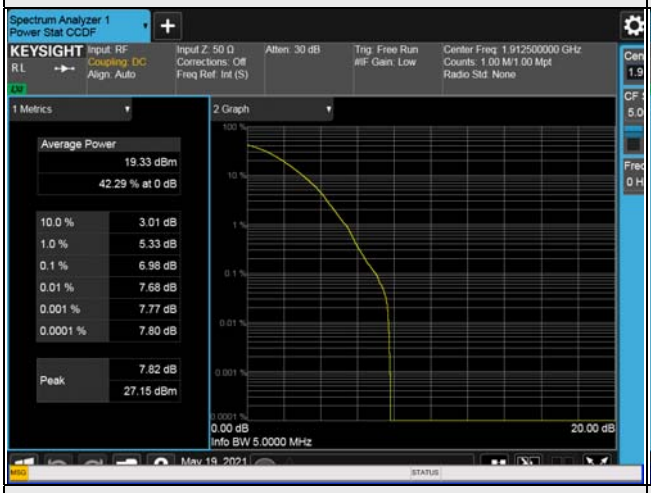
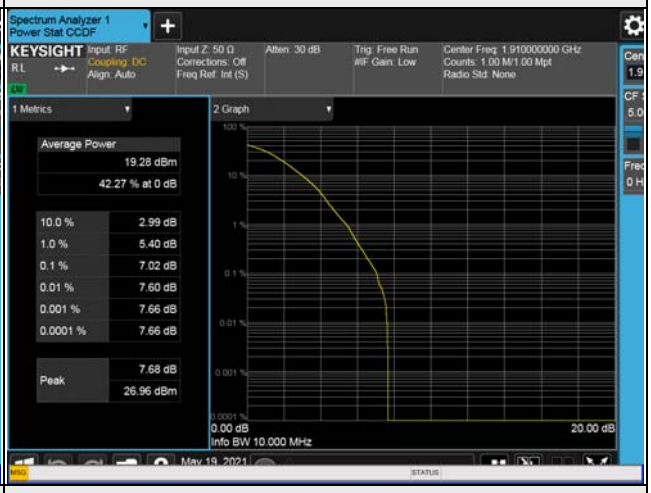
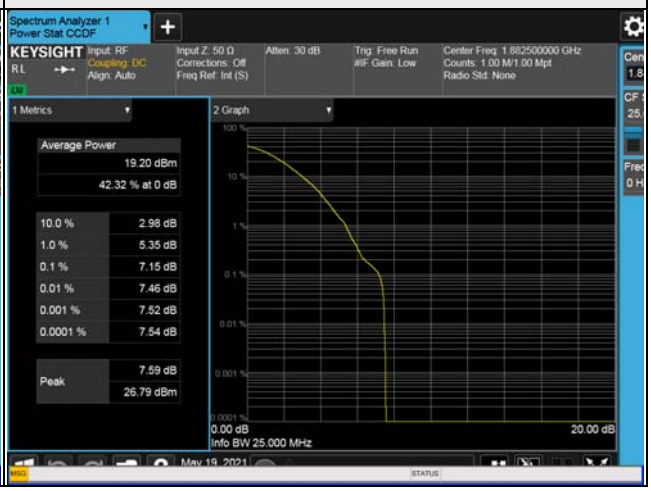
LTE Band 2, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
18607	1850.7	3.73	4.56	5.37	6.74
18900	1880.0	3.72	4.52	5.35	6.74
19193	1909.3	4.81	5.65	6.32	7.08
LTE Band 2, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
18615	1851.5	3.72	4.54	5.39	6.69
18900	1880.0	3.69	4.52	5.34	6.65
19185	1908.5	4.81	5.65	6.19	7.00
LTE Band 2, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
18625	1852.5	3.69	4.53	5.34	6.76
18900	1880.0	3.69	4.55	5.33	6.74
19175	1907.5	4.54	5.40	6.00	6.92
LTE Band 2, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
18650	1855.0	3.70	4.57	5.21	6.77
18900	1880.0	3.89	4.72	5.58	7.96
19150	1905.0	4.48	5.38	6.08	7.08
LTE Band 2, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
18675	1857.5	3.77	4.58	5.35	6.75
18900	1880.0	4.25	5.10	5.88	6.84
19125	1902.5	5.00	5.91	6.48	7.26

LTE Band 2, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
18700	1860.0	3.76	4.59	5.43	6.88
18900	1880.0	4.61	5.56	6.17	6.94
19100	1900.0	5.02	5.91	6.21	7.03

Spectrum Plot of Worst Value	
1.4MHz / 256QAM	3MHz / 256QAM
	
5MHz / 256QAM	10MHz / 256QAM
	
15MHz / 256QAM	20MHz / 256QAM
	

LTE Band 25, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
26047	1850.7	3.65	4.47	5.33	6.56
26365	1882.5	3.83	4.62	5.40	6.78
26683	1914.3	2.87	3.73	5.02	6.74
LTE Band 25, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
26055	1851.5	3.63	4.46	5.32	6.69
26365	1882.5	3.73	4.51	5.31	6.68
26675	1913.5	3.42	4.37	5.56	7.00
LTE Band 25, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
26065	1852.5	3.60	4.45	5.30	6.78
26365	1882.5	3.62	4.44	5.22	6.68
26665	1912.5	4.16	5.11	6.18	6.98
LTE Band 25, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
26090	1855.0	3.63	4.46	5.24	6.85
26365	1882.5	3.59	4.42	5.21	6.84
26640	1910.0	4.55	5.37	6.07	7.02
LTE Band 25, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
26115	1857.5	3.70	4.50	5.32	6.57
26365	1882.5	3.84	4.64	5.44	7.54
26615	1907.5	4.44	5.26	6.07	7.12

LTE Band 25, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
26140	1860.0	3.70	4.49	5.30	6.59
26365	1882.5	4.20	5.01	5.78	7.15
26590	1905.0	5.00	5.86	6.38	7.02

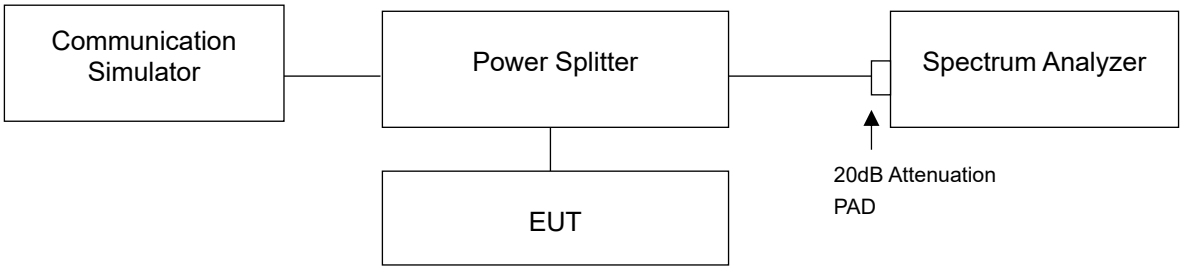
Spectrum Plot of Worst Value	
1.4MHz / 256QAM	3MHz / 256QAM
	
5MHz / 256QAM	10MHz / 256QAM
	
15MHz / 256QAM	20MHz / 256QAM
	

4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

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) dB. The emission limit equal to –13dBm.

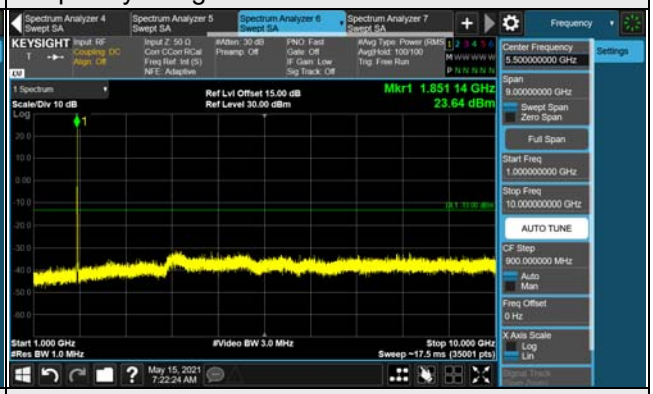
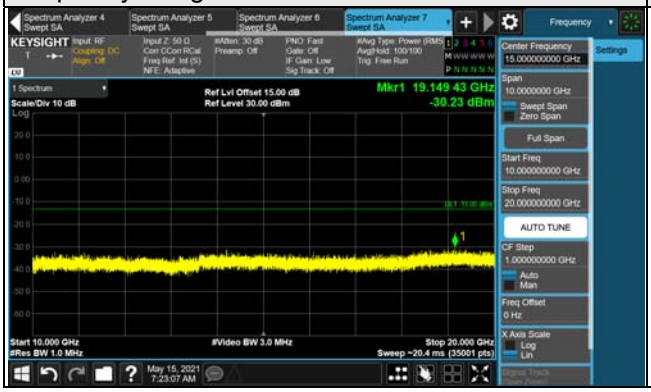
4.7.2 Test Setup



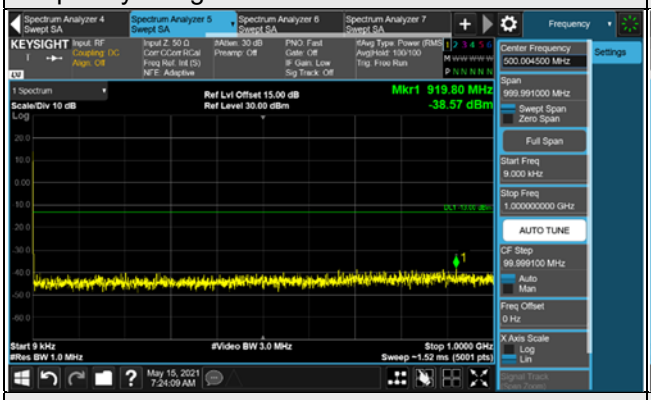
4.7.3 Test Procedure

a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
b. Measuring frequency range is from 9kHz to 20GHz / 26.5GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.

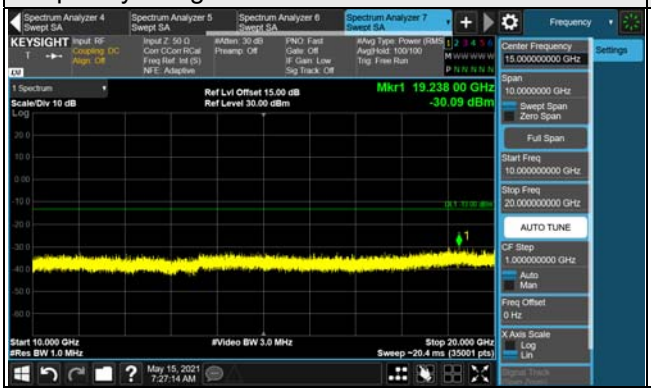
4.7.4 Test Results

WCDMA	
Channel 9262 (1852.4MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
	
Frequency Range : 10GHz ~ 20GHz	
	

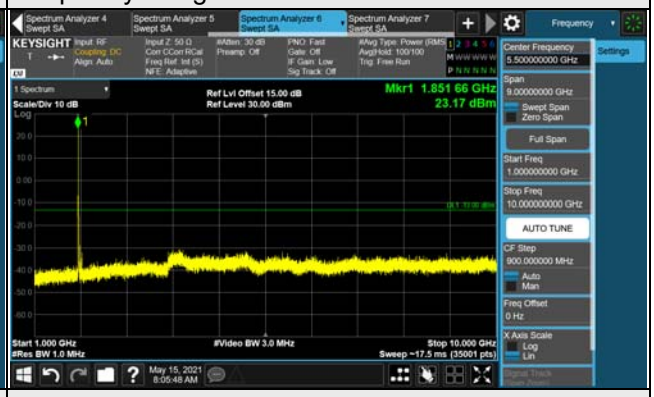
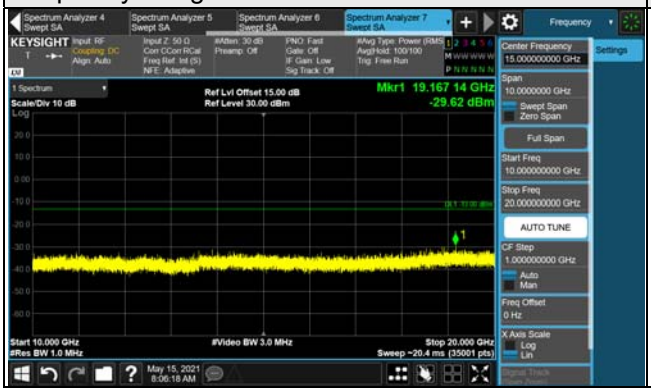
*The 9kHz signal over the limit is from Spectrum.

WCDMA	
Channel 9400 (1880.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
	
Frequency Range : 10GHz ~ 20GHz	

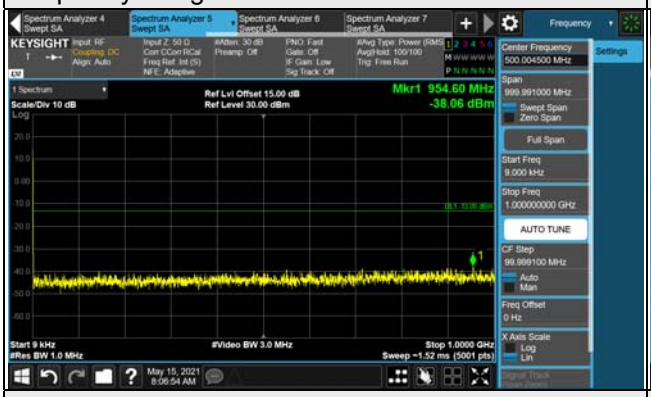
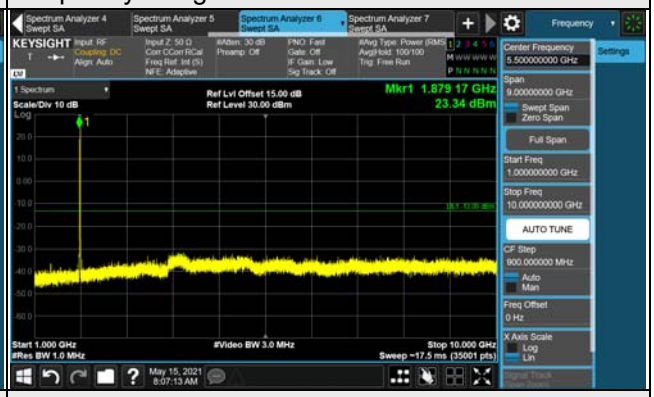
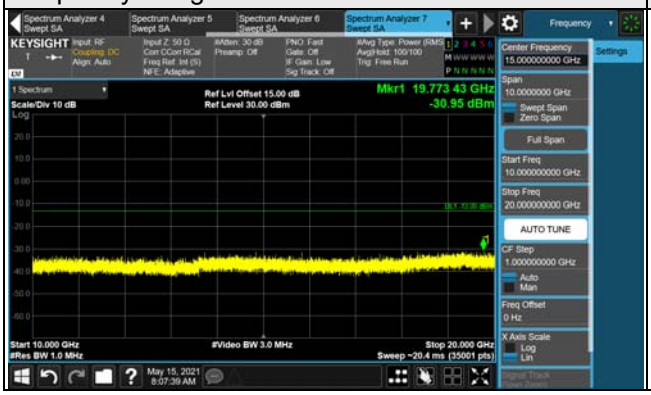
*The 9kHz signal over the limit is from Spectrum.

WCDMA	
Channel 9538 (1907.6MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
Frequency Range : 10GHz ~ 20GHz	
	

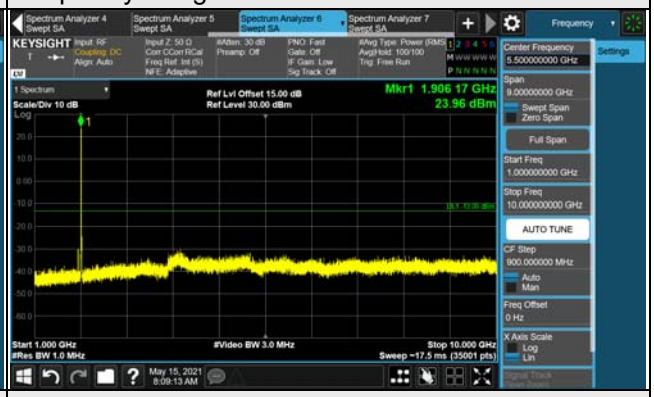
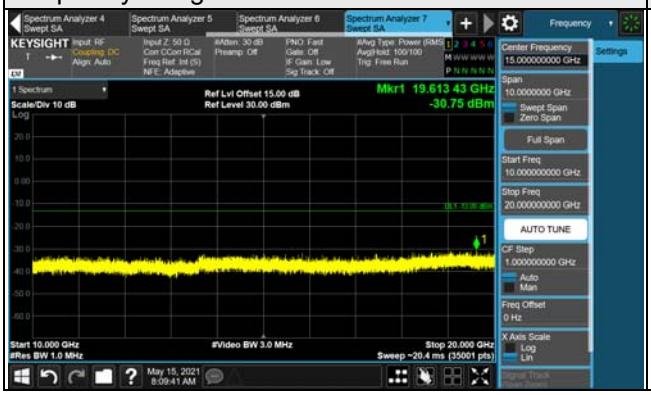
*The 9kHz signal over the limit is from Spectrum.

HSDPA	
Channel 9262 (1852.4MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
	
Frequency Range : 10GHz ~ 20GHz	
	

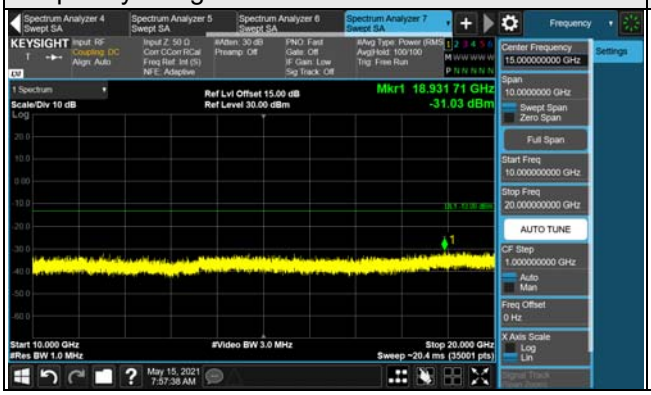
*The 9kHz signal over the limit is from Spectrum.

HSDPA	
Channel 9400 (1880.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
	
Frequency Range : 10GHz ~ 20GHz	
	

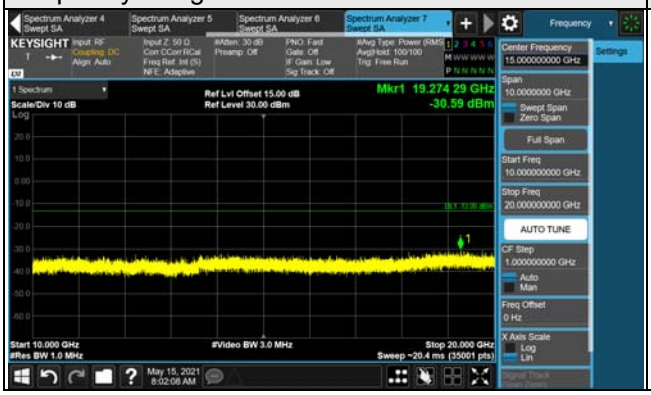
*The 9kHz signal over the limit is from Spectrum.

HSDPA	
Channel 9538 (1907.6MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
	
Frequency Range : 10GHz ~ 20GHz	
	

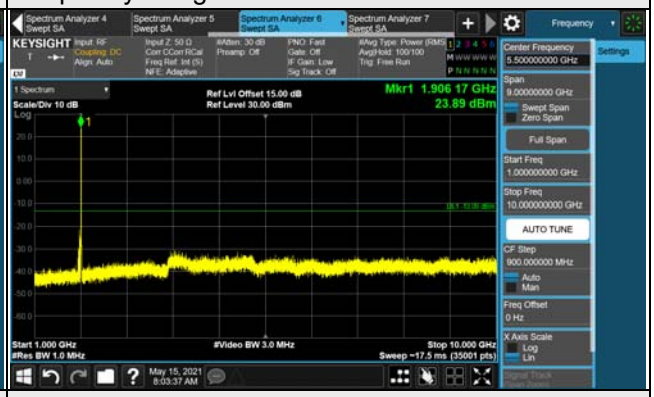
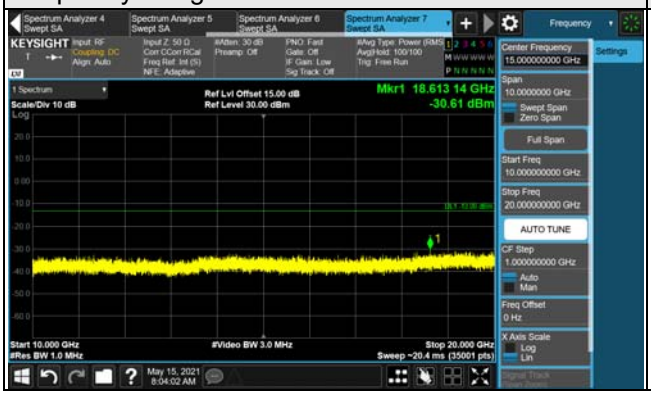
*The 9kHz signal over the limit is from Spectrum.

HSUPA	
Channel 9262 (1852.4MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
Frequency Range : 10GHz ~ 20GHz	
	

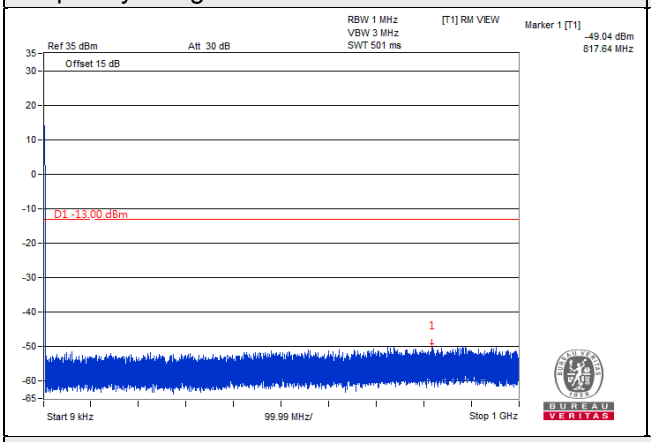
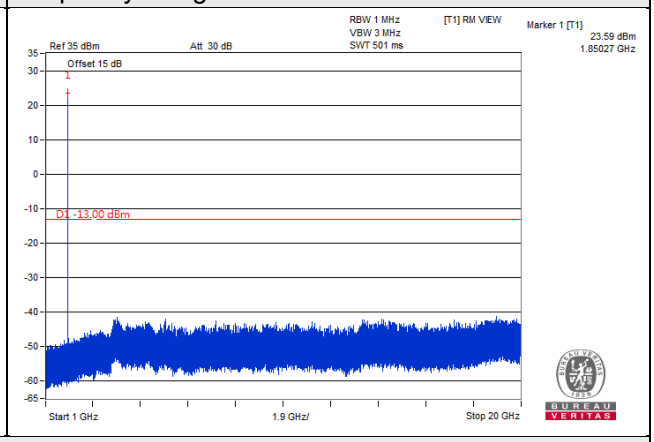
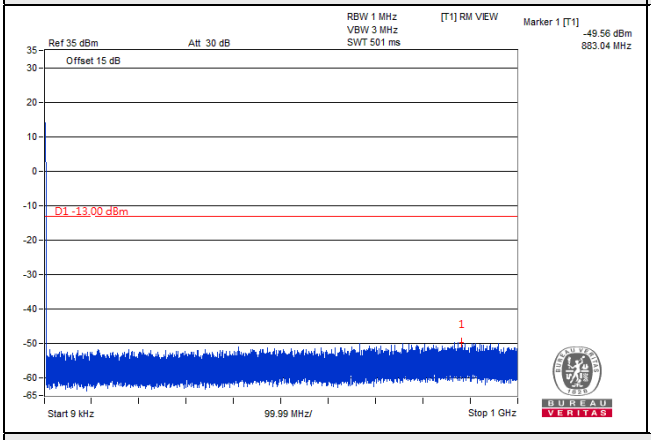
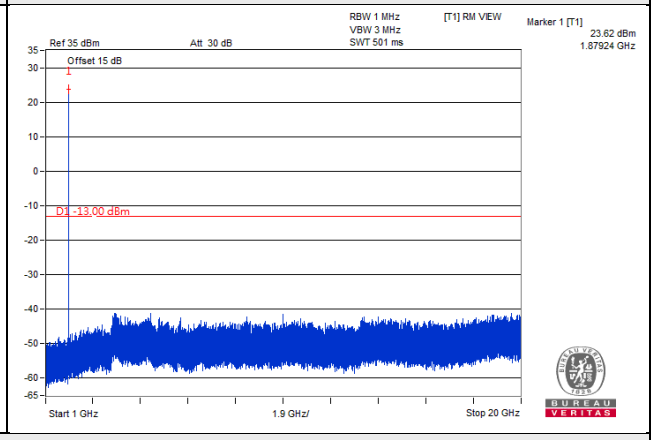
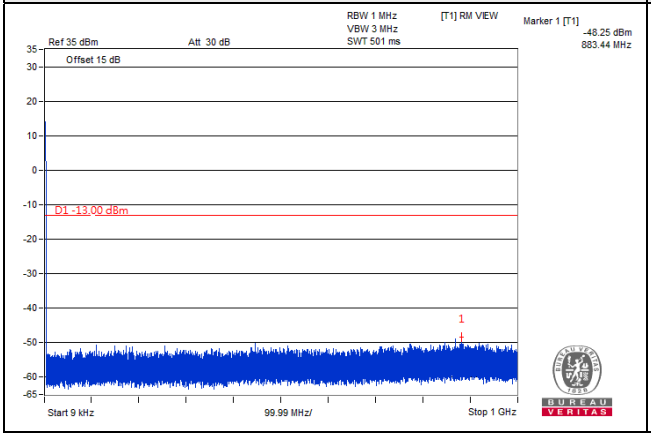
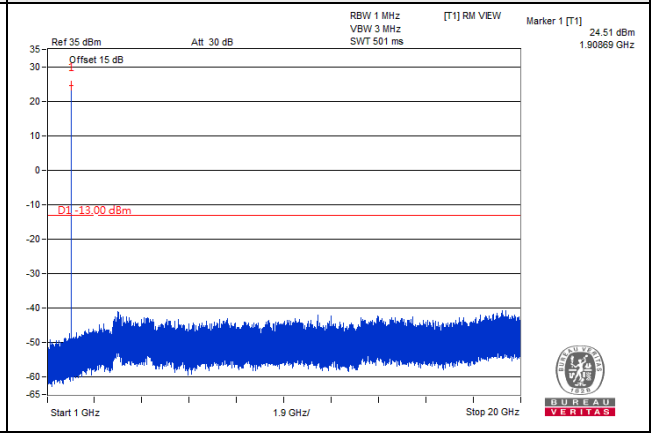
*The 9kHz signal over the limit is from Spectrum.

HSUPA	
Channel 9400 (1880.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
Frequency Range : 10GHz ~ 20GHz	
	

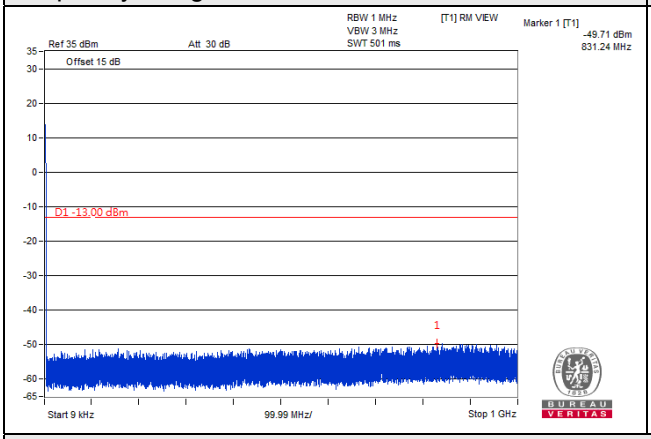
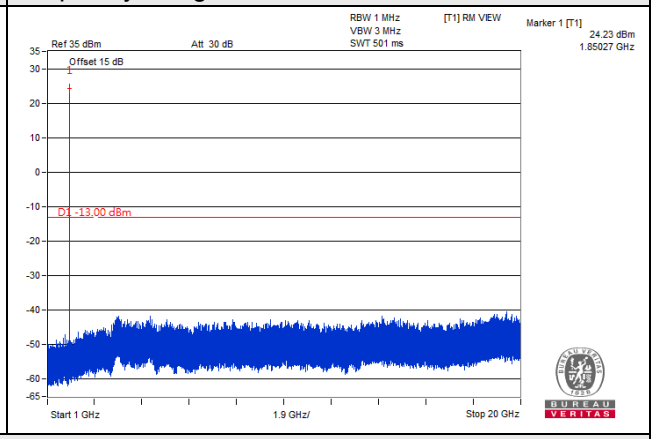
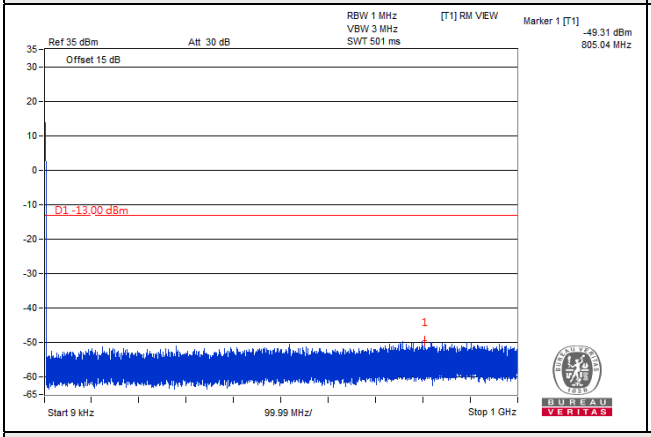
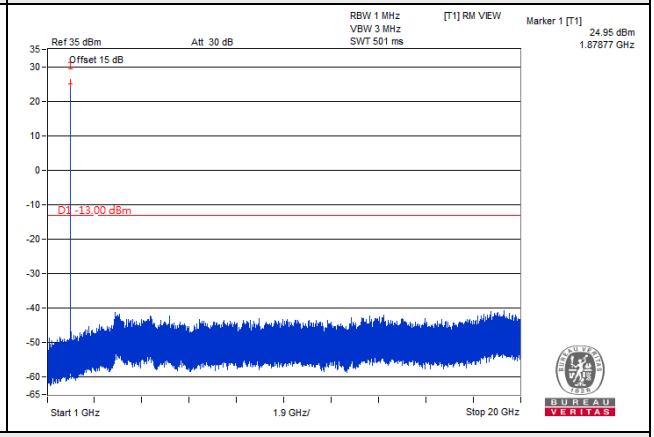
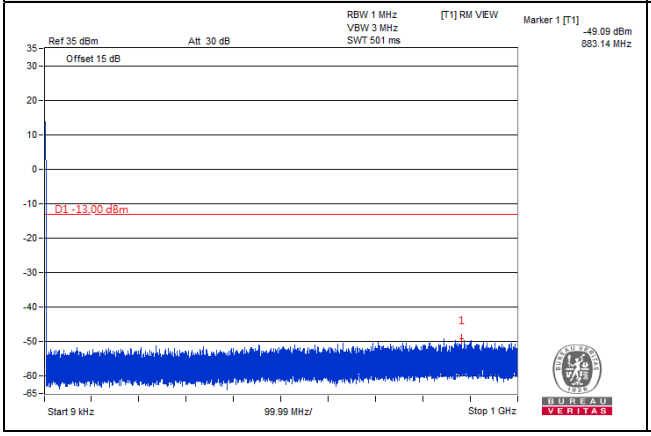
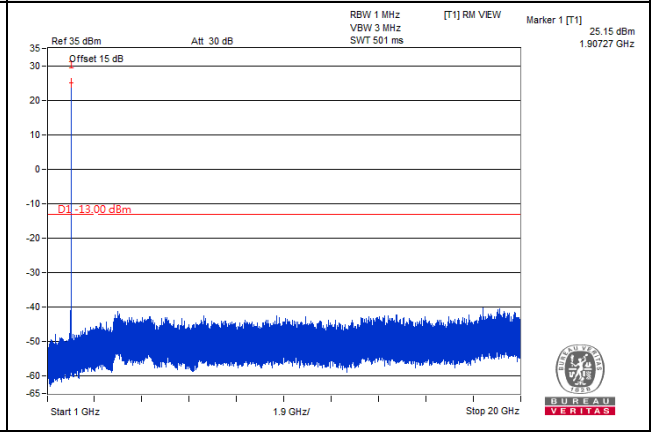
*The 9kHz signal over the limit is from Spectrum.

HSUPA	
Channel 9538 (1907.6MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
	
Frequency Range : 10GHz ~ 20GHz	
	

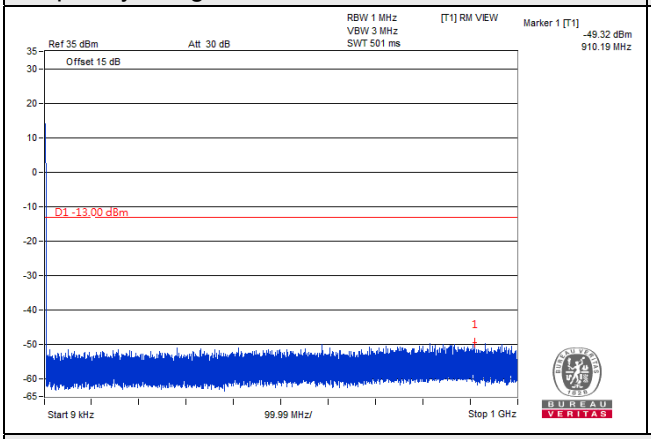
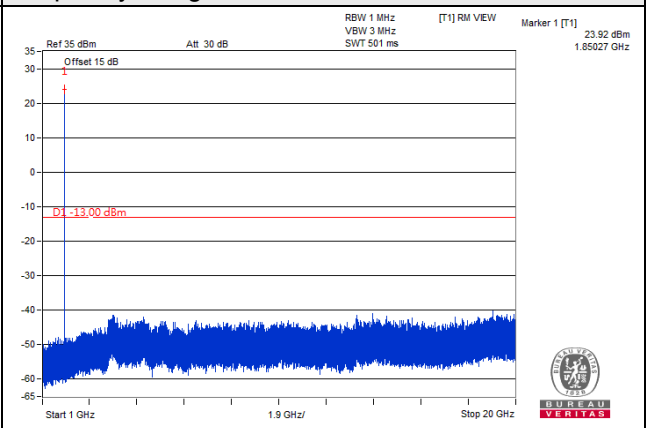
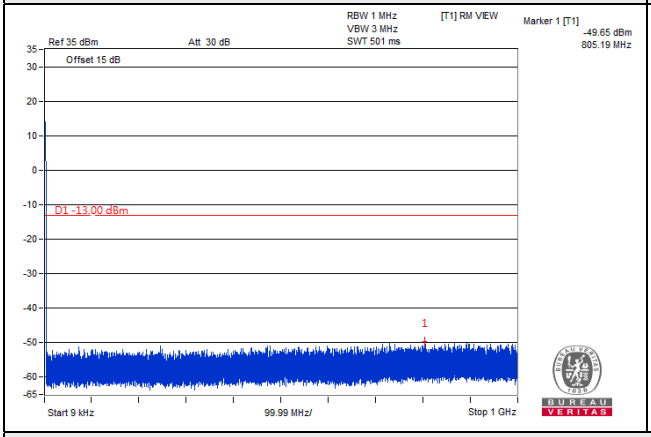
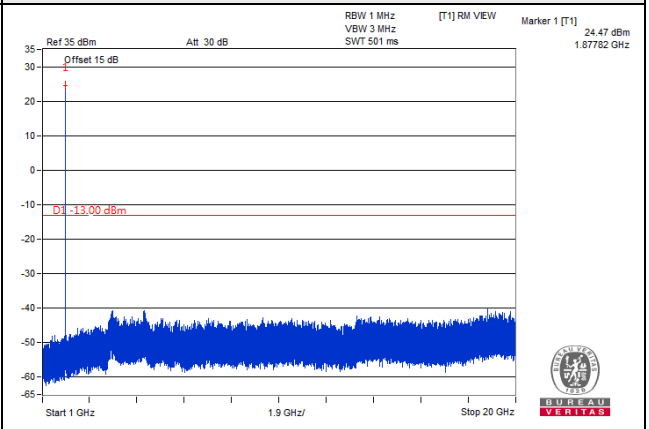
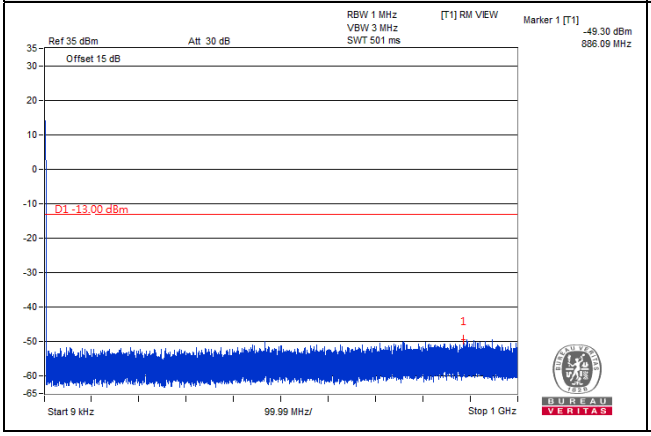
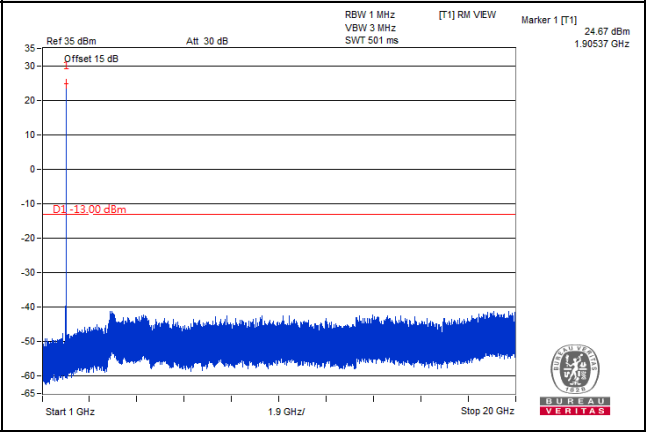
*The 9kHz signal over the limit is from Spectrum.

LTE Band 2, Channel Bandwidth 1.4MHz	
Channel 18607 (1850.7MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 18900 (1880.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 19193 (1909.3MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	

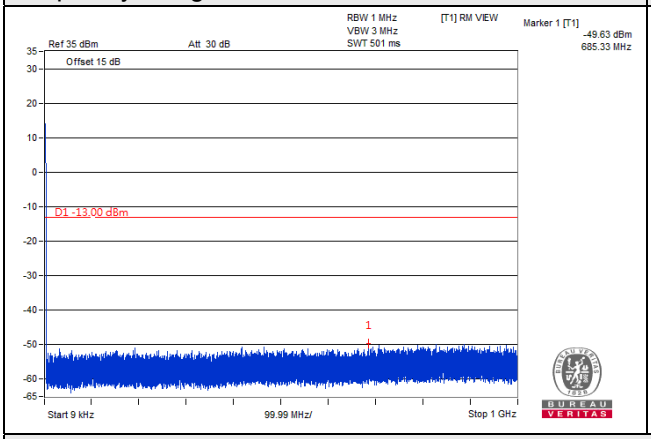
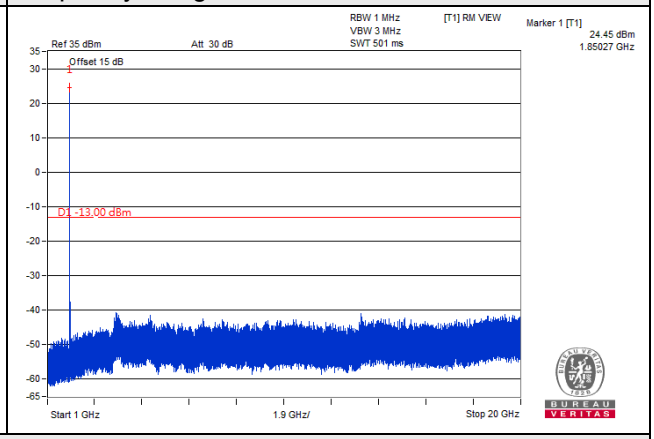
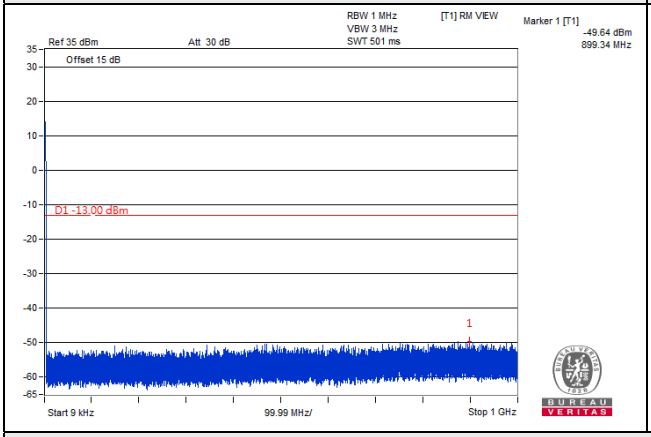
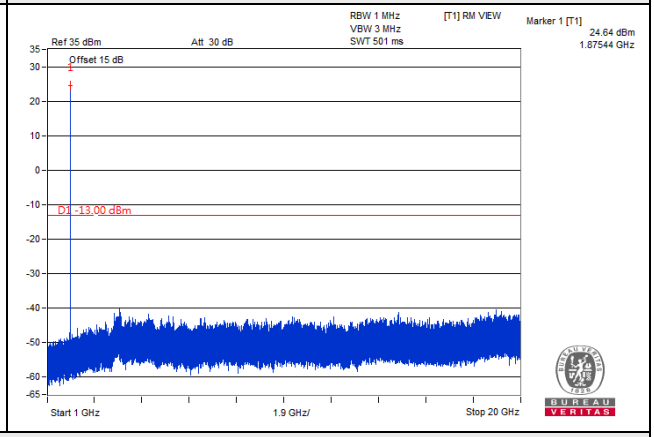
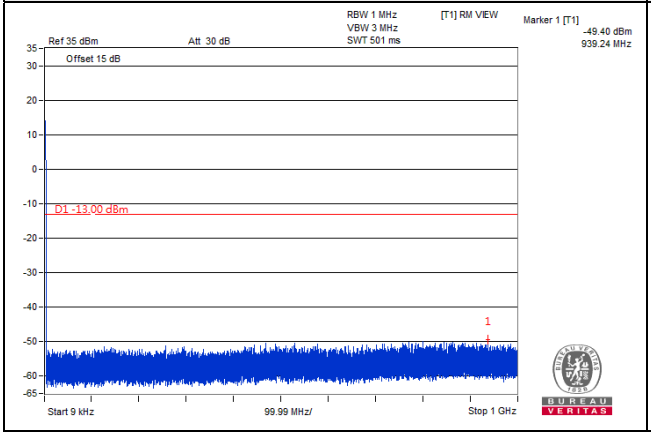
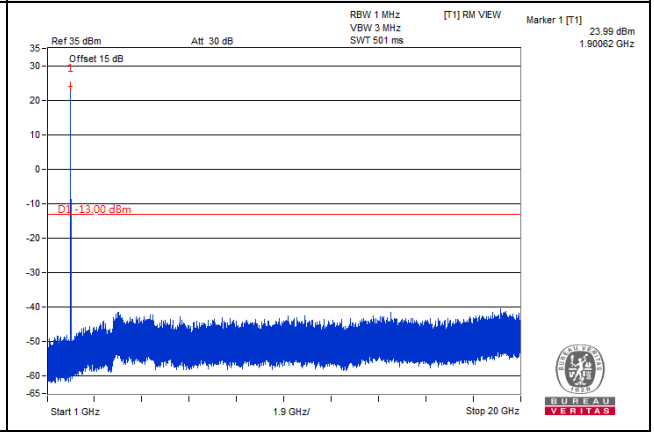
*The 9kHz signal over the limit is from Spectrum.

LTE Band 2, Channel Bandwidth 3MHz	
Channel 18615 (1851.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 18900 (1880.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 19185 (1908.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	

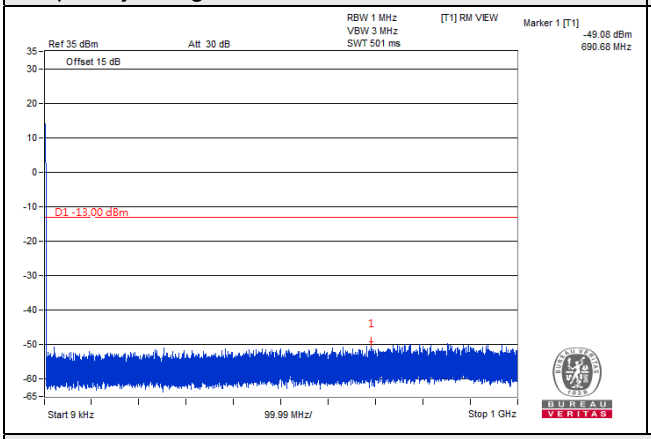
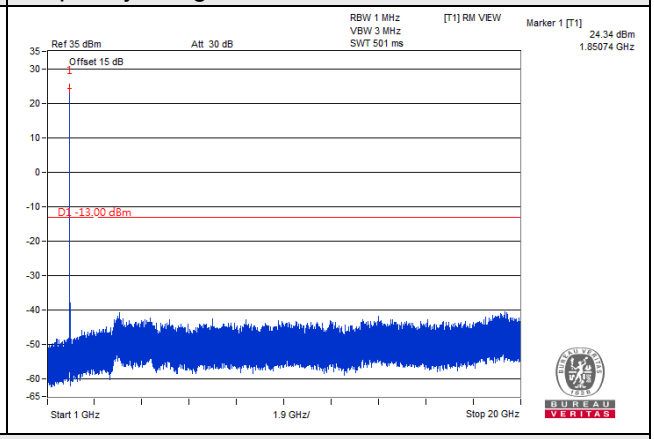
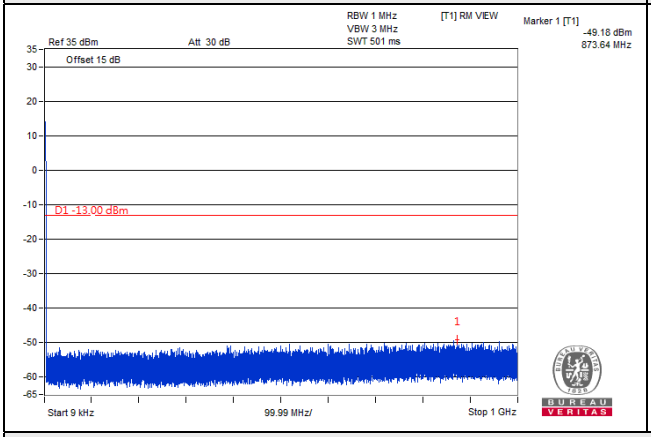
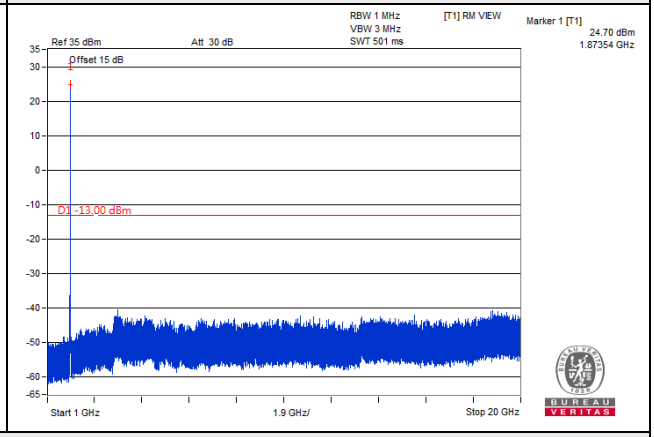
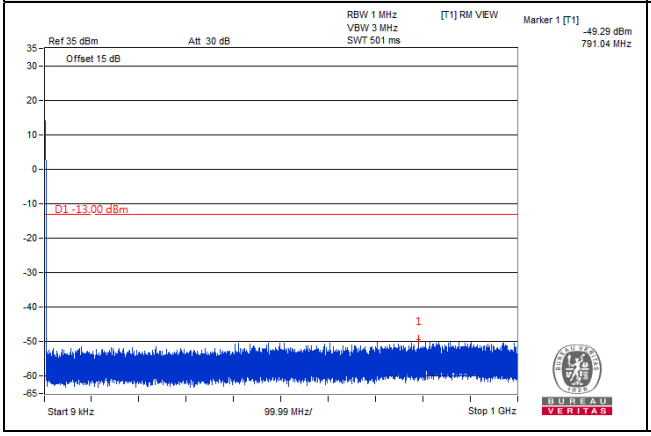
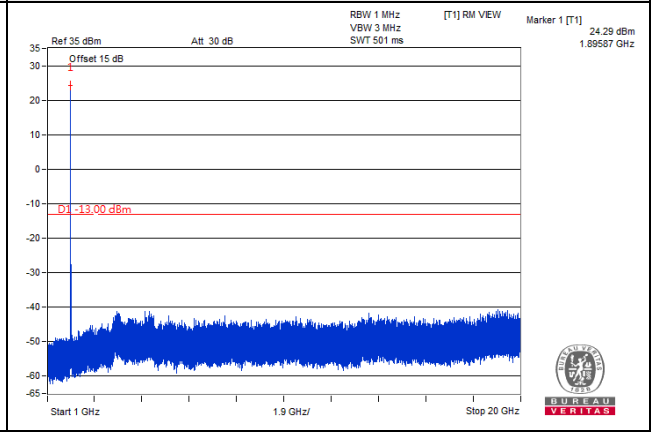
*The 9kHz signal over the limit is from Spectrum.

LTE Band 2, Channel Bandwidth 5MHz	
Channel 18625 (1852.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 18900 (1880.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 19175 (1907.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	

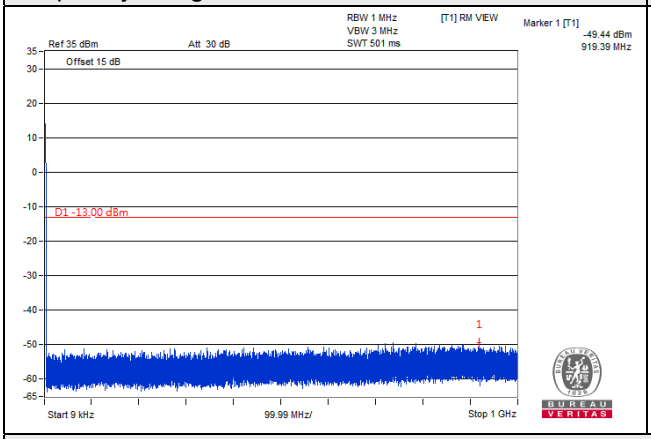
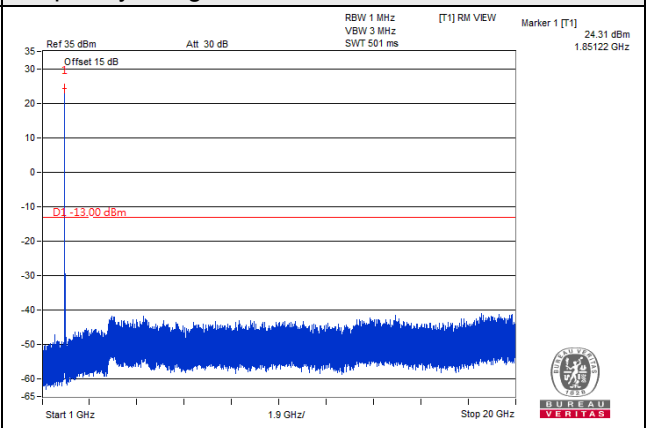
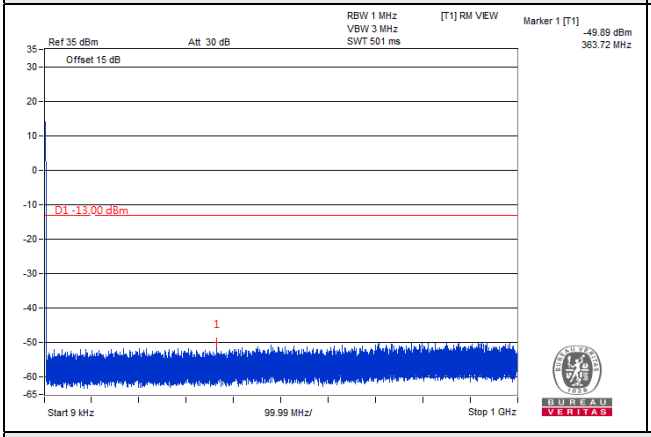
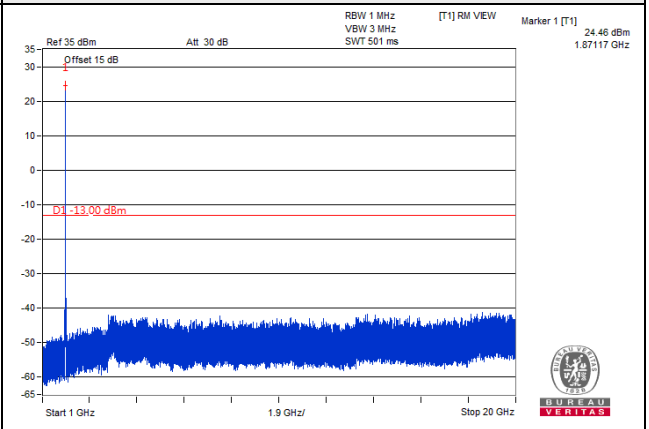
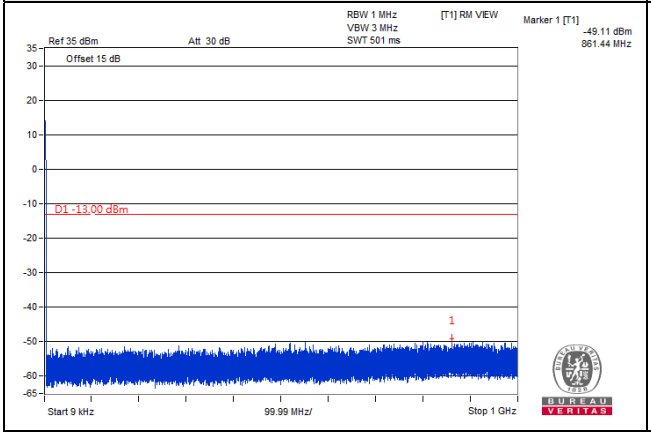
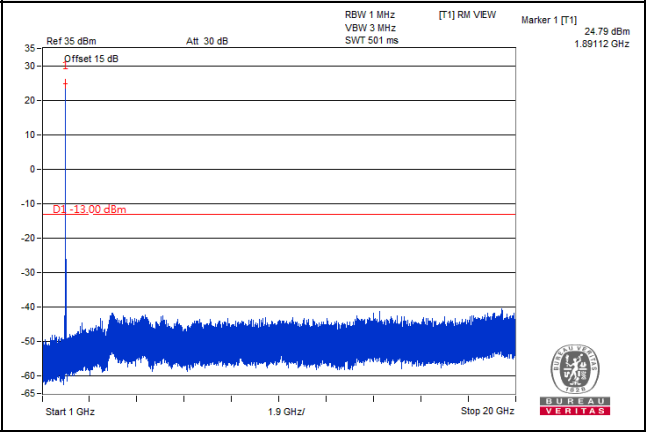
*The 9kHz signal over the limit is from Spectrum.

LTE Band 2, Channel Bandwidth 10MHz	
Channel 18650 (1855.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 18900 (1880.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 19150 (1905.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	

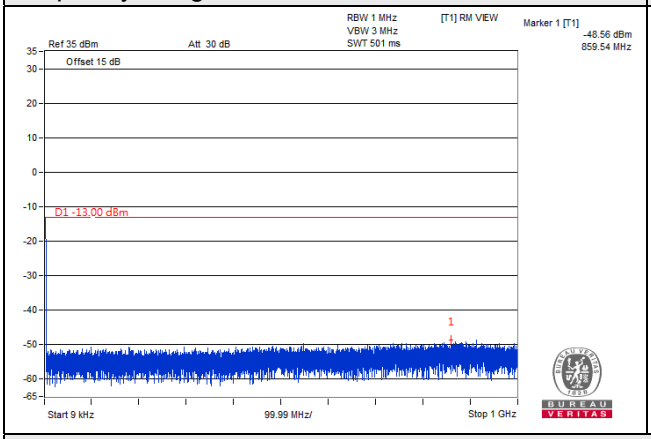
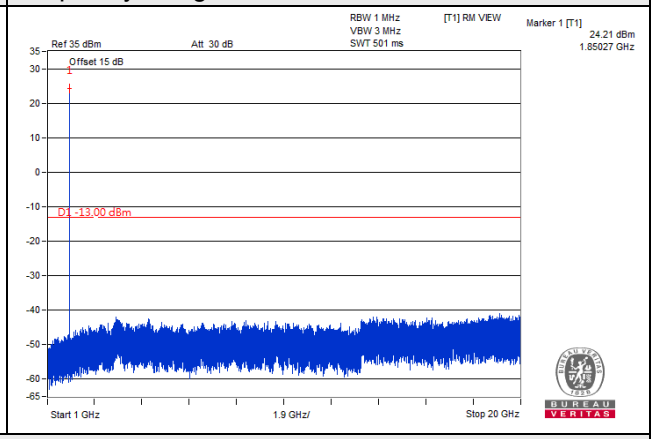
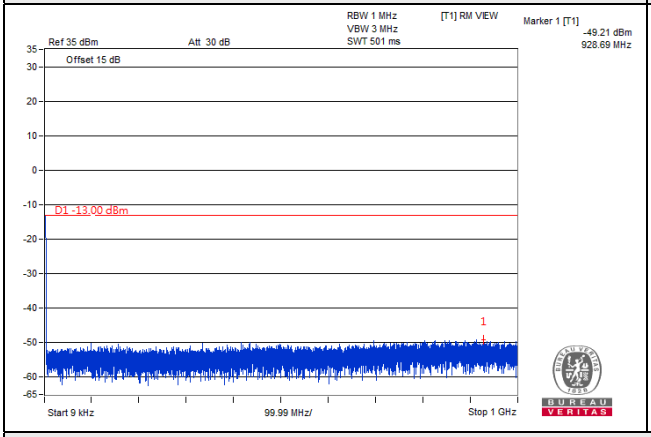
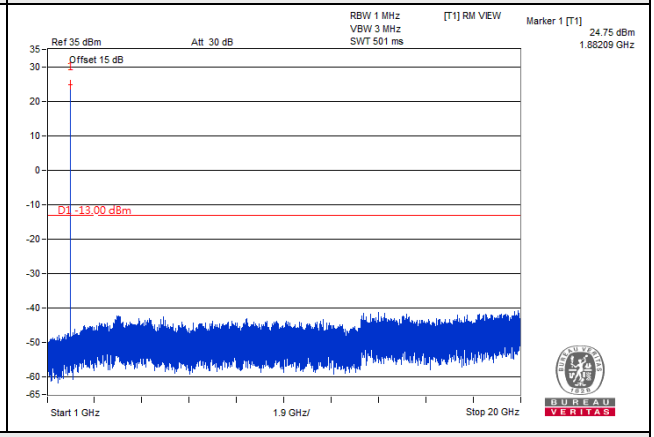
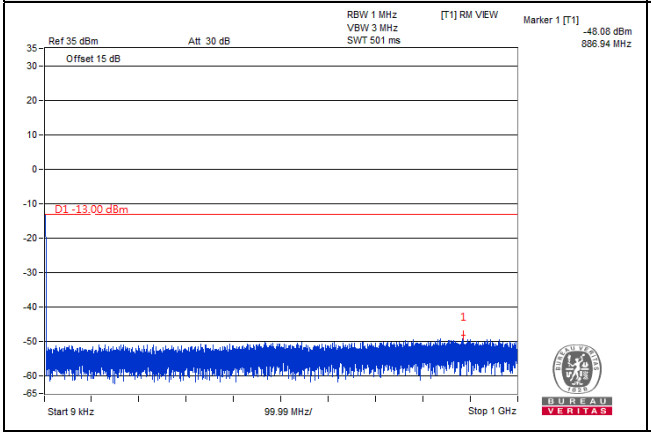
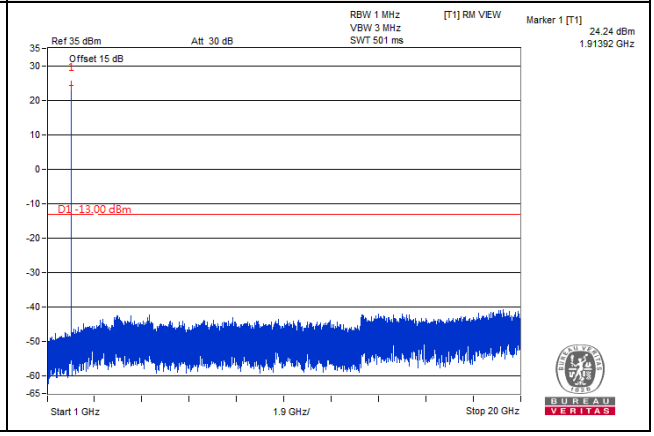
*The 9kHz signal over the limit is from Spectrum.

LTE Band 2, Channel Bandwidth 15MHz	
Channel 18675 (1857.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 18900 (1880.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 19125 (1902.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	

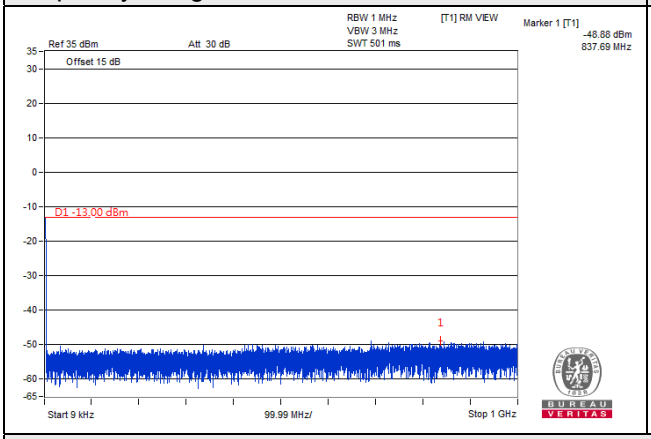
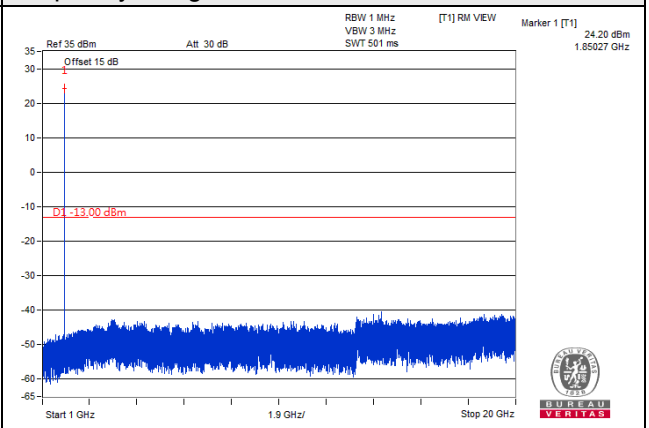
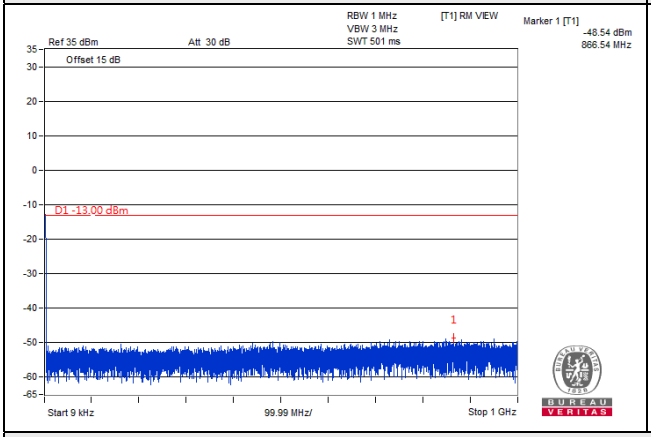
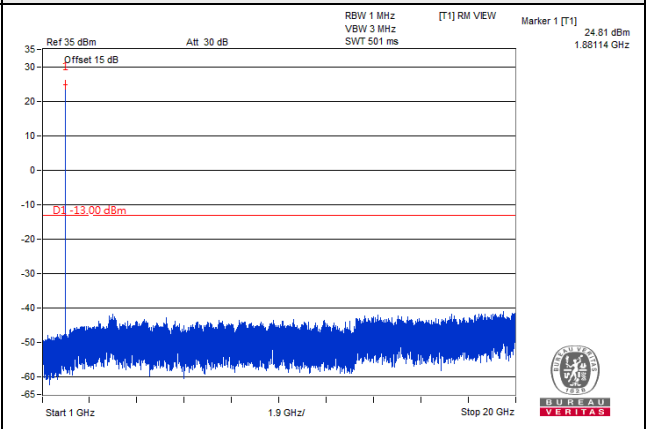
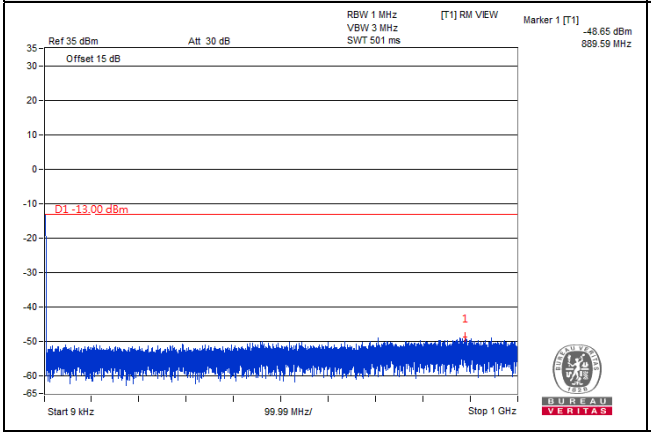
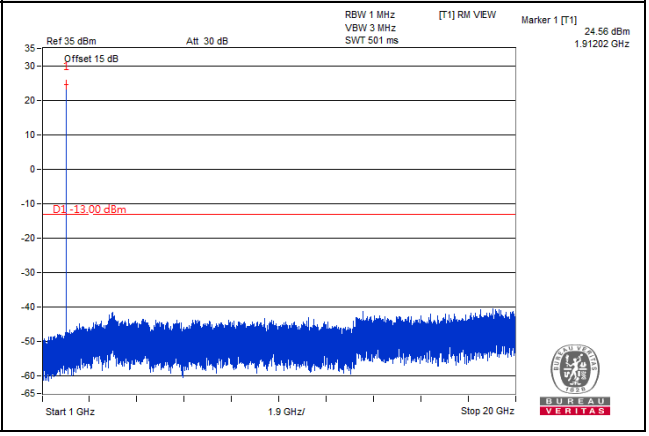
*The 9kHz signal over the limit is from Spectrum.

LTE Band 2, Channel Bandwidth 20MHz	
Channel 18700 (1860.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 18900 (1880.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 19100 (1900.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	

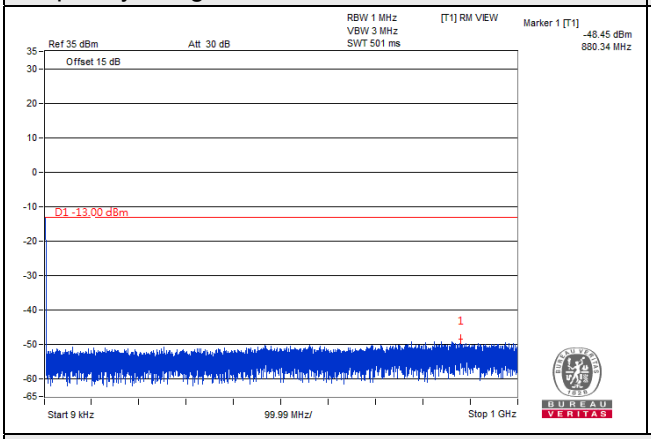
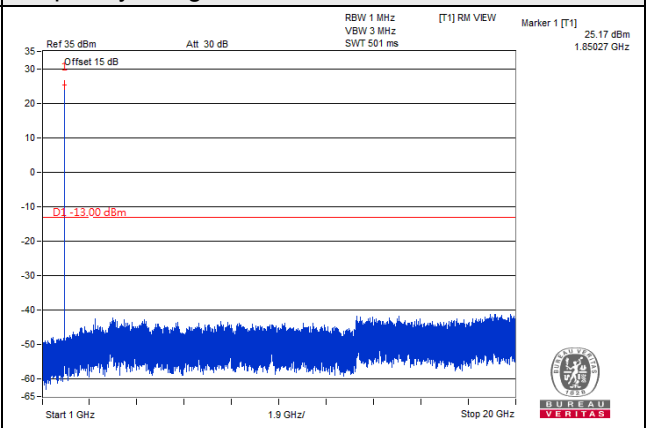
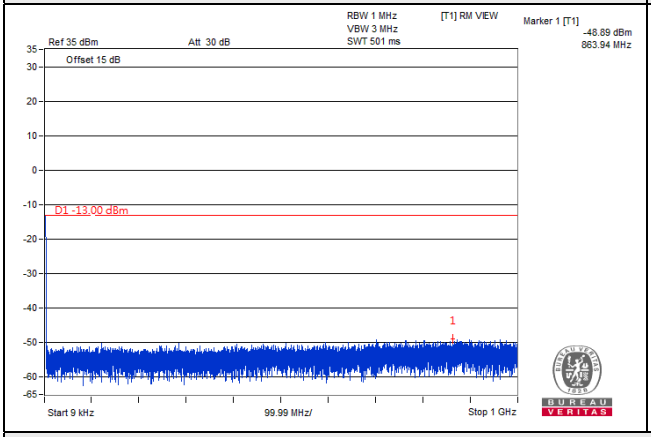
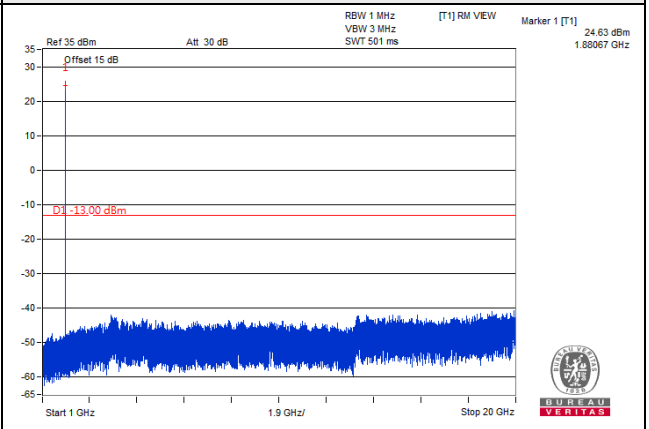
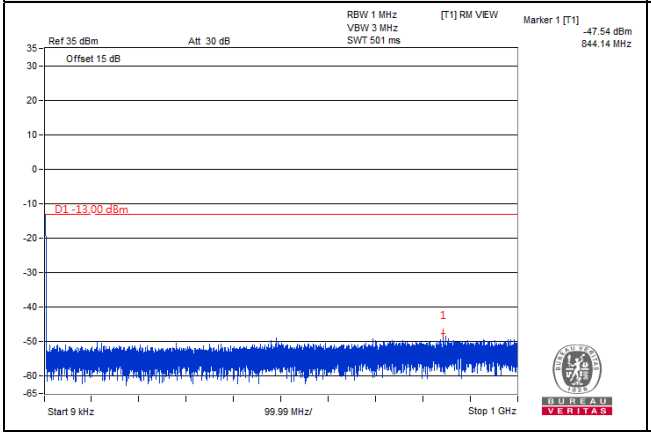
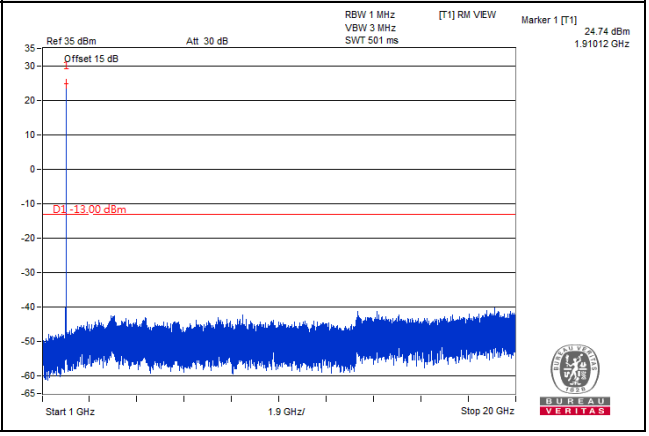
*The 9kHz signal over the limit is from Spectrum.

LTE Band 25, Channel Bandwidth 1.4MHz	
Channel 26047 (1850.7MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 26365 (1882.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 26683 (1914.3MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	

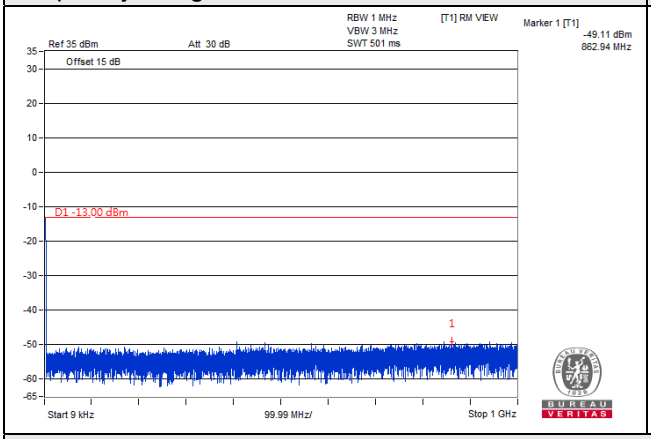
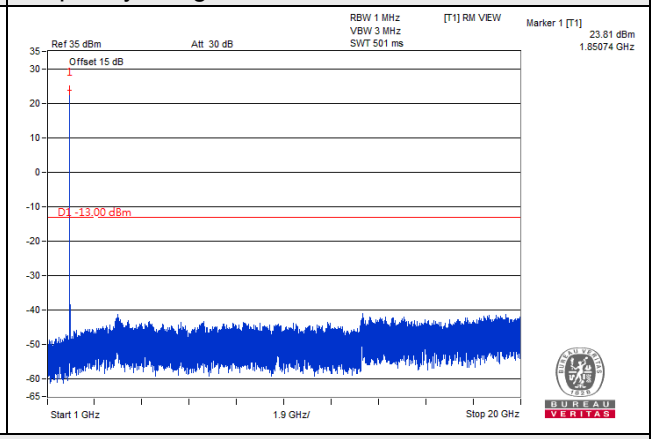
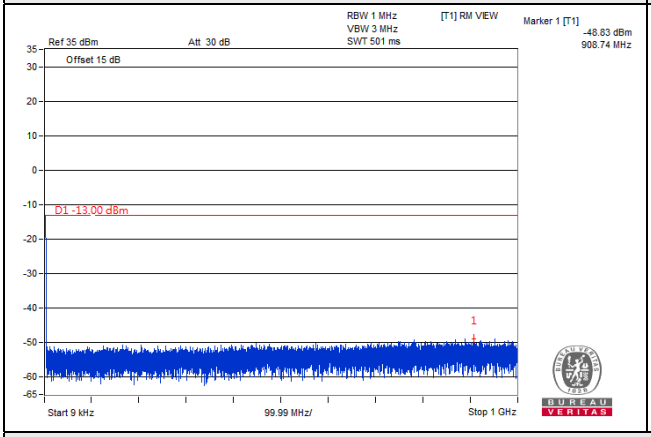
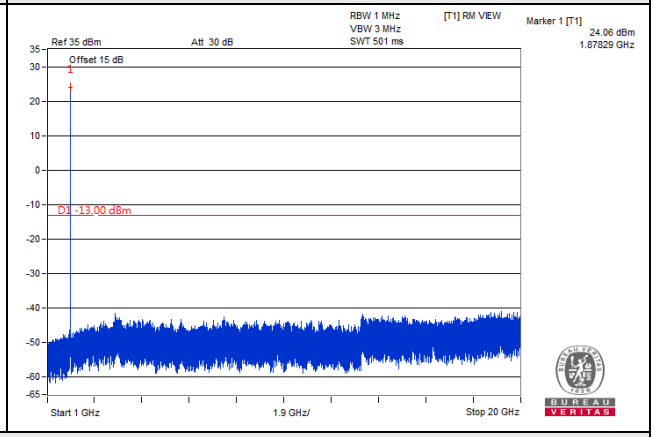
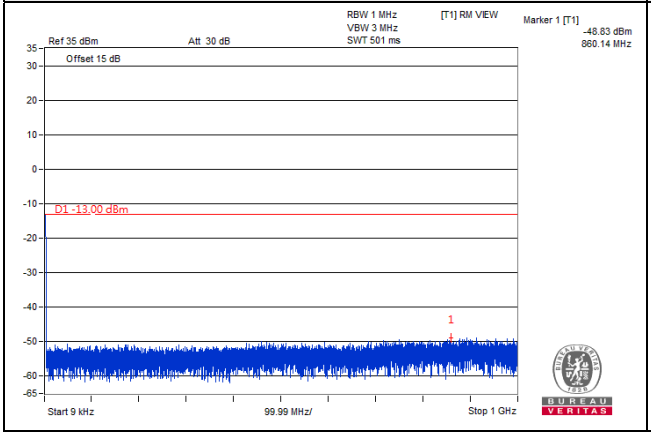
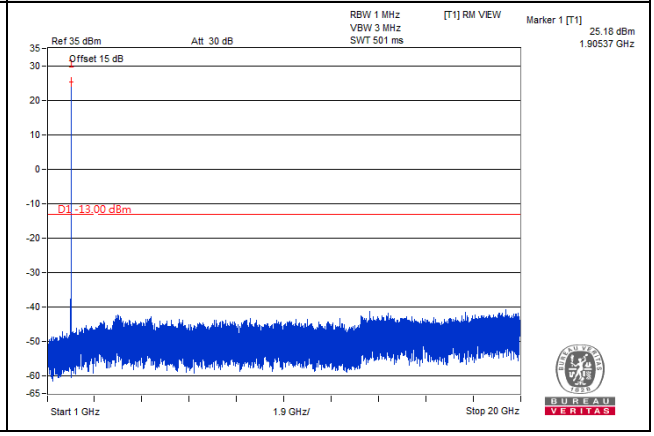
*The 9kHz signal over the limit is from Spectrum.

LTE Band 25, Channel Bandwidth 3MHz	
Channel 26055 (1851.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 26365 (1882.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 26675 (1913.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	

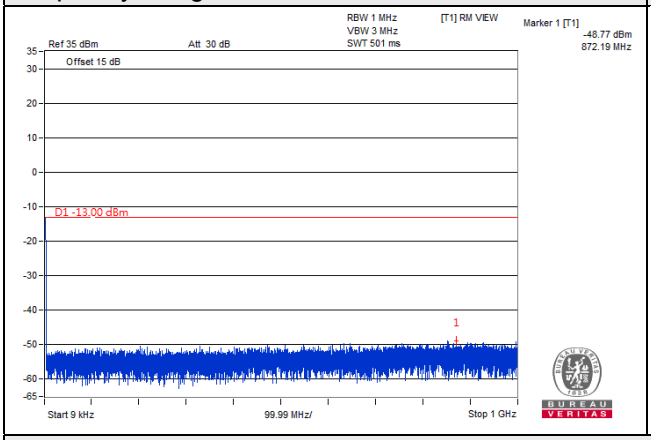
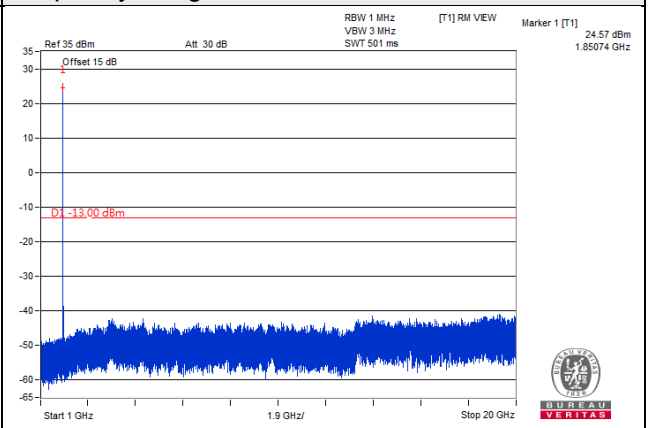
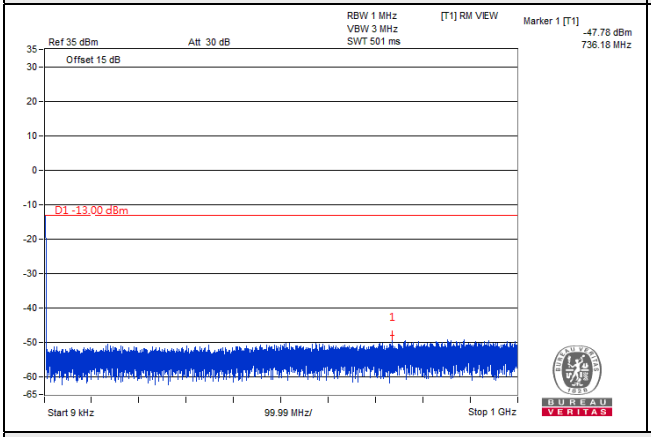
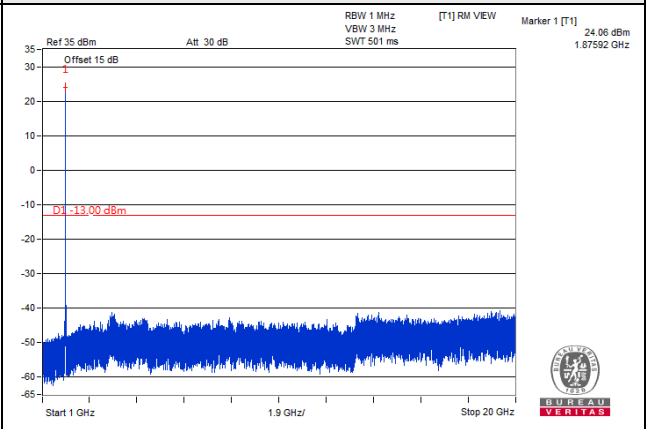
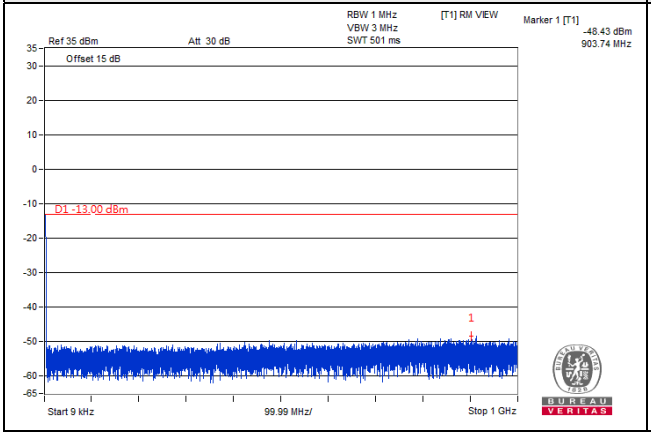
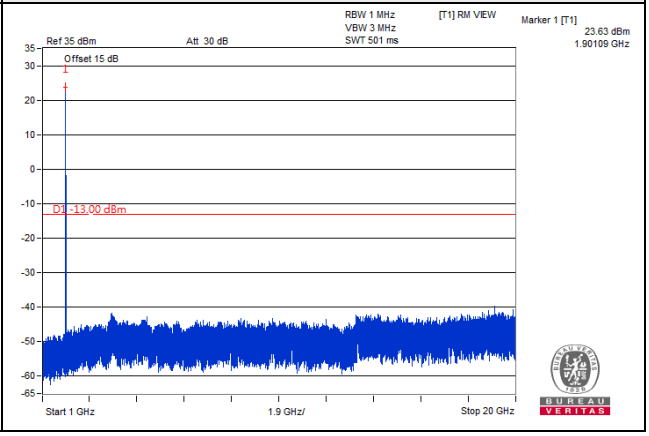
*The 9kHz signal over the limit is from Spectrum.

LTE Band 25, Channel Bandwidth 5MHz	
Channel 26065 (1852.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 26365 (1882.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 26665 (1912.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	

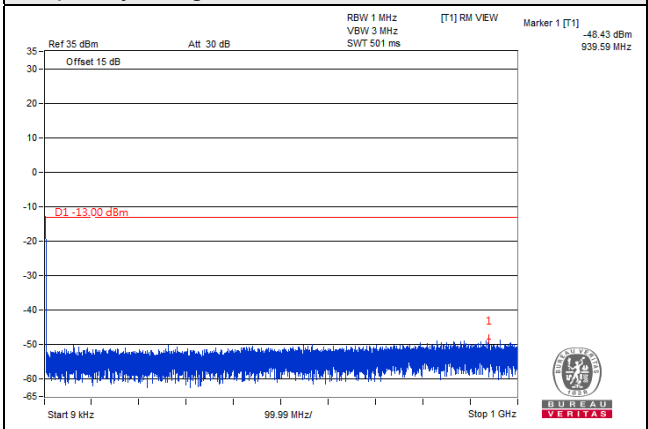
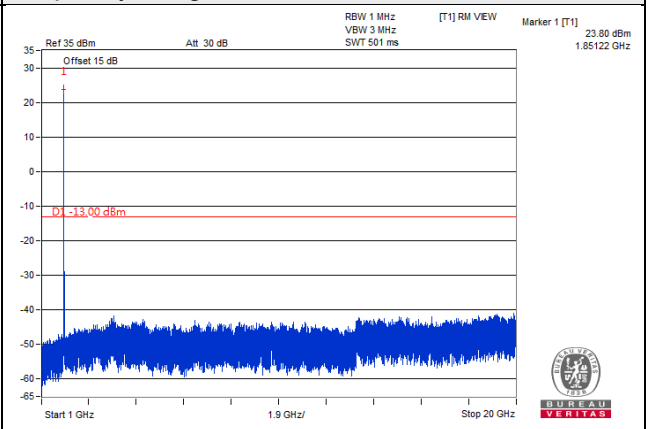
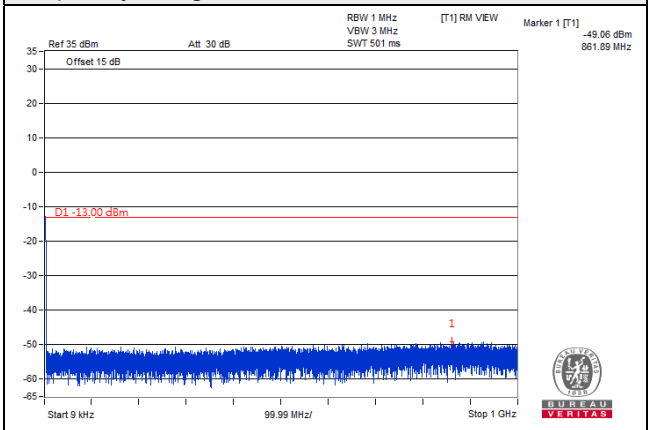
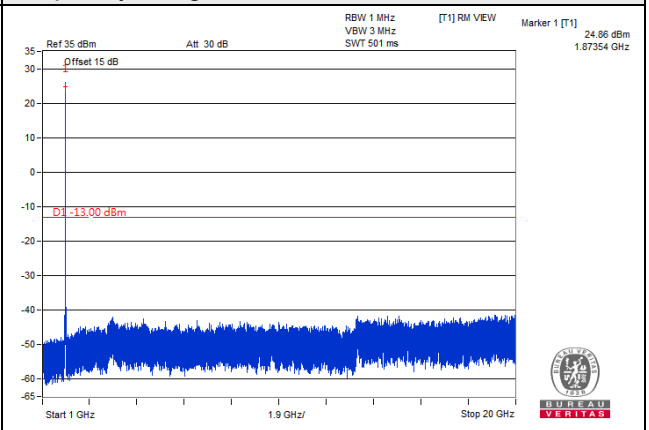
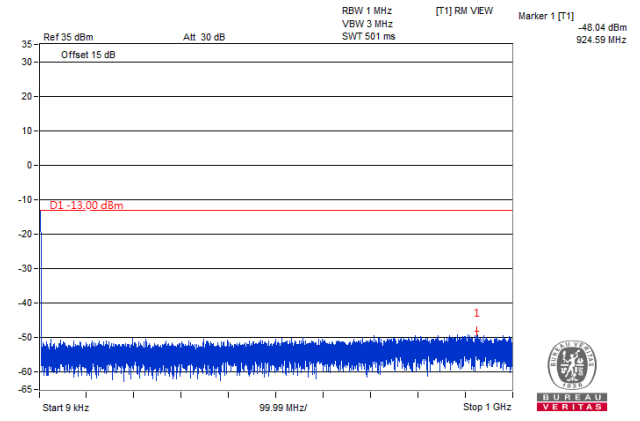
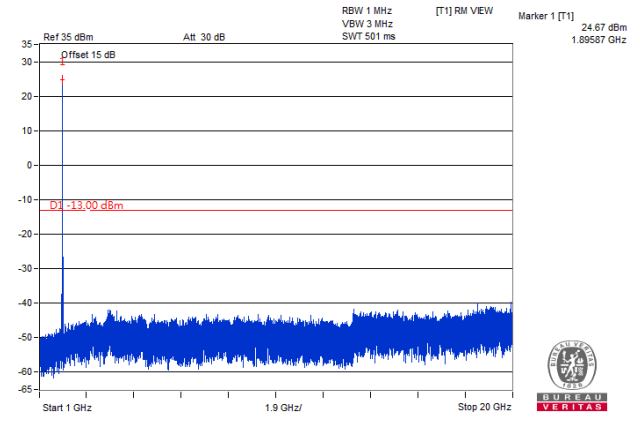
*The 9kHz signal over the limit is from Spectrum.

LTE Band 25, Channel Bandwidth 10MHz	
Channel 26090 (1855.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 26365 (1882.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 26640 (1910.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	

*The 9kHz signal over the limit is from Spectrum.

LTE Band 25, Channel Bandwidth 15MHz	
Channel 26115 (1857.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 26365 (1882.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 26615 (1907.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	

*The 9kHz signal over the limit is from Spectrum.

LTE Band 25, Channel Bandwidth 20MHz	
Channel 26140 (1860.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 26365 (1882.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 26590 (1905.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	

*The 9kHz signal over the limit is from Spectrum.

4.8 Radiated Emission Measurement

4.8.1 Limits of Radiated Emission Measurement

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) dB. The emission limit equal to –13dBm.

4.8.2 Test Procedure

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.

d. Following C63.26 section 5.5 and 5.2.7
   - EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.
   - ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

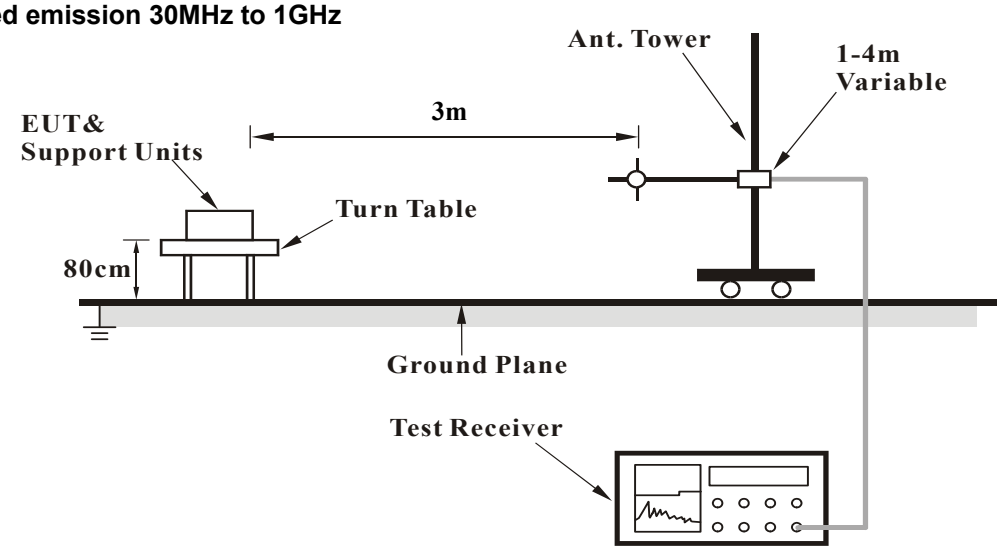
Note:
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:
   The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.8.3 Deviation from Test Standard

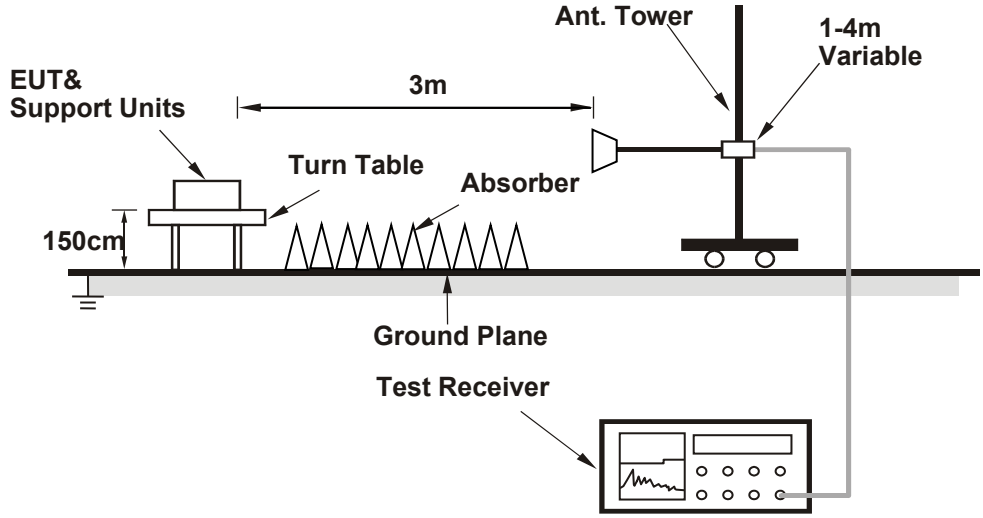
No deviation.

4.8.4 Test Setup

For radiated emission 30MHz to 1GHz



For radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.8.5 Test Results

Below 1GHz

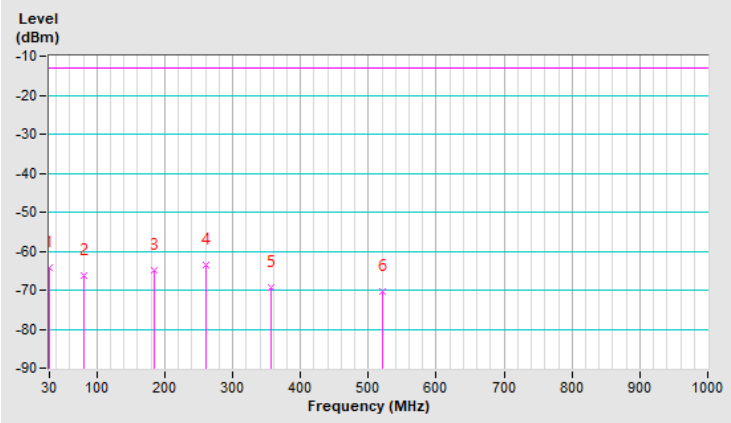
WCDMA Band 2

Mode	TX channel 9400 (1880.0MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Edsion Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.00	-64.30	-13.00	-51.30	2.00 H	106	41.90	-106.20
2	80.61	-66.20	-13.00	-53.20	1.00 H	278	42.60	-108.80
3	184.64	-65.00	-13.00	-52.00	1.00 H	225	40.60	-105.60
4	260.55	-63.40	-13.00	-50.40	1.50 H	33	39.90	-103.30
5	356.14	-69.40	-13.00	-56.40	1.00 H	160	31.40	-100.80
6	520.62	-70.40	-13.00	-57.40	1.50 H	201	26.80	-97.20

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

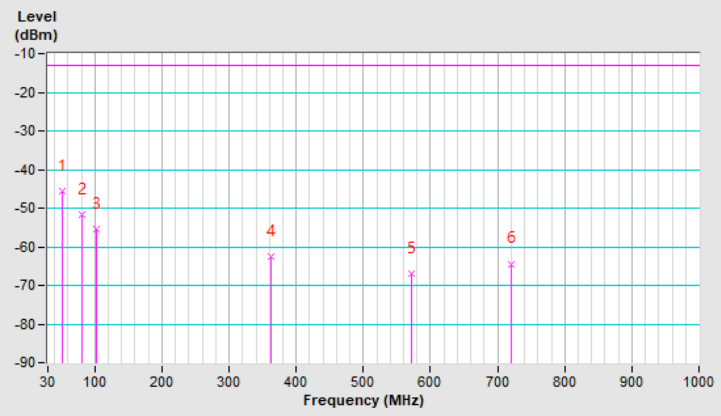


Mode	TX channel 9400 (1880.0MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Edsion Lee		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	51.09	-45.60	-13.00	-32.60	2.00 V	354	58.80	-104.40
2	80.61	-51.60	-13.00	-38.60	1.00 V	76	57.20	-108.80
3	103.10	-55.50	-13.00	-42.50	2.00 V	45	52.50	-108.00
4	363.17	-62.70	-13.00	-49.70	1.50 V	107	37.90	-100.60
5	572.64	-67.10	-13.00	-54.10	1.00 V	119	28.90	-96.00
6	720.25	-64.40	-13.00	-51.40	1.00 V	262	28.70	-93.10

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.



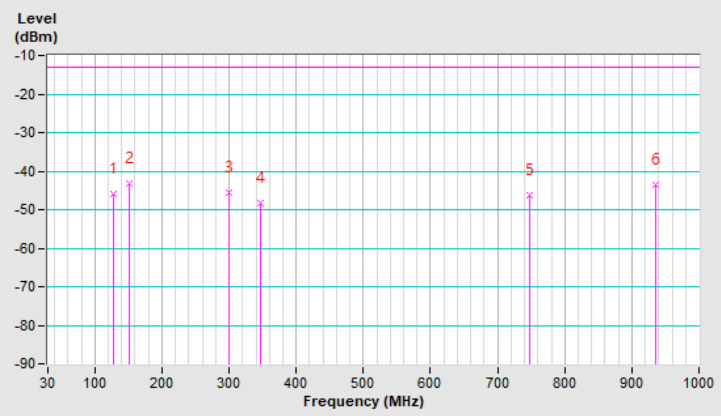
LTE Band 2, Channel Bandwidth 5MHz

Mode	TX channel 18625 (1852.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Noah Chang		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	127.00	-46.09	-13.00	-33.09	1.50 H	252	59.73	-105.82
2	**150.28**	**-43.09**	**-13.00**	**-30.09**	**2.00 H**	**214**	**60.96**	**-104.05**
3	299.66	-45.49	-13.00	-32.49	1.00 H	302	57.46	-102.95
4	346.22	-48.30	-13.00	-35.30	1.00 H	302	53.86	-102.16
5	747.80	-46.25	-13.00	-33.25	1.00 H	100	46.37	-92.62
6	935.98	-43.70	-13.00	-30.70	1.00 H	274	44.65	-88.35

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

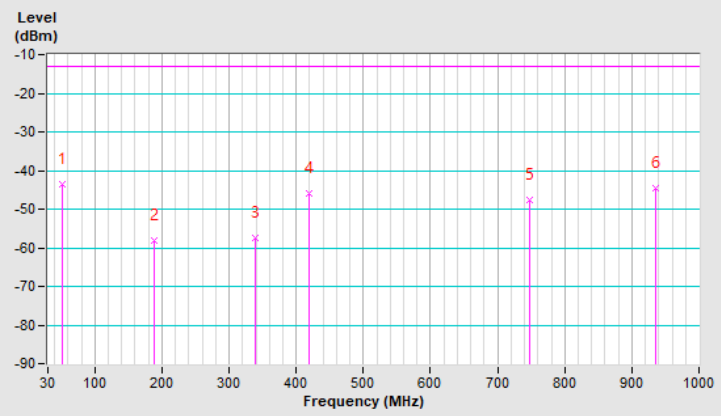


Mode	TX channel 18625 (1852.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Noah Chang		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	51.34	-43.66	-13.00	-30.66	1.50 V	125	60.46	-104.12
2	189.08	-58.08	-13.00	-45.08	1.00 V	320	48.53	-106.61
3	338.46	-57.33	-13.00	-44.33	1.00 V	159	44.84	-102.17
4	419.94	-46.10	-13.00	-33.10	1.00 V	298	54.59	-100.69
5	747.80	-47.64	-13.00	-34.64	2.00 V	353	44.98	-92.62
6	935.98	-44.52	-13.00	-31.52	1.00 V	201	43.83	-88.35

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.



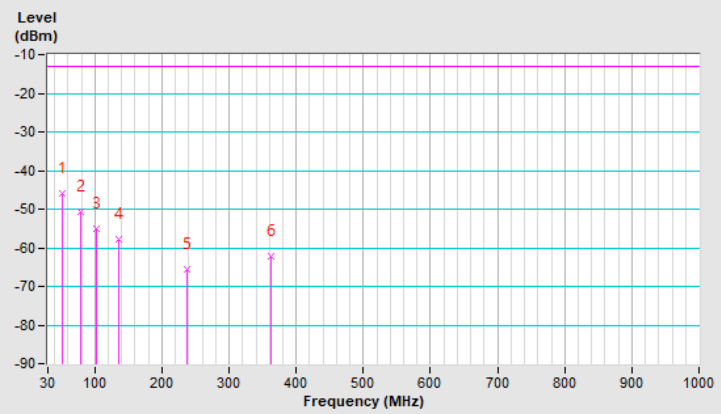
LTE Band 25, Channel Bandwidth 1.4MHz

Mode	TX channel 26683 (1914.3MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Edsion Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	51.09	-45.80	-13.00	-32.80	1.50 H	270	58.60	-104.40
2	79.20	-50.80	-13.00	-37.80	1.00 H	117	57.60	-108.40
3	103.10	-55.10	-13.00	-42.10	1.00 H	61	52.90	-108.00
4	135.43	-57.90	-13.00	-44.90	1.00 H	186	46.80	-104.70
5	238.06	-65.70	-13.00	-52.70	2.00 H	77	39.00	-104.70
6	363.17	-62.10	-13.00	-49.10	1.00 H	233	38.50	-100.60

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

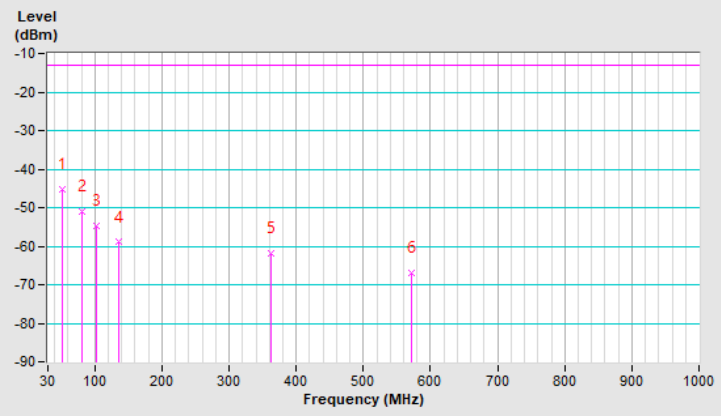


Mode	TX channel 26683 (1914.3MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Edsion Lee		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	51.09	-45.30	-13.00	-32.30	1.50 V	318	59.10	-104.40
2	80.61	-51.00	-13.00	-38.00	1.00 V	116	57.80	-108.80
3	103.10	-54.90	-13.00	-41.90	1.50 V	57	53.10	-108.00
4	135.43	-59.00	-13.00	-46.00	1.00 V	188	45.70	-104.70
5	363.17	-61.70	-13.00	-48.70	1.00 V	113	38.90	-100.60
6	572.64	-66.80	-13.00	-53.80	2.00 V	125	29.20	-96.00

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.



Above 1GHz
WCDMA Band 2

Mode	TX channel 9262 (1852.4MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Edsion Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3704.80	-49.30	-13.00	-36.30	1.50 H	294	43.90	-93.20
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3704.80	-49.10	-13.00	-36.10	3.16 V	87	44.10	-93.20

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 9400 (1880.0MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Edsion Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-48.20	-13.00	-35.20	1.44 H	302	44.70	-92.90
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-47.90	-13.00	-34.90	3.12 V	99	45.00	-92.90

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 9538 (1907.6MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Edsion Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3815.20	-49.00	-13.00	-36.00	1.56 H	299	43.60	-92.60
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3815.20	-48.80	-13.00	-35.80	3.26 V	102	43.80	-92.60

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

LTE Band 2, Channel Bandwidth 1.4MHz

Mode	TX channel 18607 (1850.7MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Hans Wu		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3701.40	-44.70	-13.00	-31.70	1.40 H	52	44.80	-89.50
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3701.40	-48.90	-13.00	-35.90	1.02 V	64	40.60	-89.50

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 18900 (1880.0MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Hans Wu		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-50.90	-13.00	-37.90	1.50 H	67	38.50	-89.40
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-52.90	-13.00	-39.90	1.00 V	332	36.50	-89.40

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 19193 (1909.3MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Hans Wu		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3818.60	-52.20	-13.00	-39.20	1.63 H	75	36.80	-89.00
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3818.60	-51.00	-13.00	-38.00	1.76 V	248	38.00	-89.00

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

LTE Band 2, Channel Bandwidth 5MHz

Mode	TX channel 18625 (1852.5MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Hans Wu		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3705.00	-44.60	-13.00	-31.60	1.00 H	43	44.90	-89.50
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3705.00	-44.20	-13.00	-31.20	1.00 V	318	45.30	-89.50

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 18900 (1880.0MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Hans Wu		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-50.30	-13.00	-37.30	1.25 H	54	39.10	-89.40
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-49.40	-13.00	-36.40	1.46 V	319	40.00	-89.40

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 19175 (1907.5MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Hans Wu		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3815.00	-51.20	-13.00	-38.20	1.06 H	17	37.80	-89.00
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3815.00	-50.50	-13.00	-37.50	1.76 V	256	38.50	-89.00

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

LTE Band 2, Channel Bandwidth 20MHz

Mode	TX channel 18700 (1860.0MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Hans Wu		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3720.00	-52.70	-13.00	-39.70	1.08 H	27	36.80	-89.50
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3720.00	-53.30	-13.00	-40.30	1.53 V	186	36.20	-89.50

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 18900 (1880.0MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Hans Wu		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-52.60	-13.00	-39.60	1.00 H	56	36.80	-89.40
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-52.30	-13.00	-39.30	1.52 V	173	37.10	-89.40

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 19100 (1900.0MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Hans Wu		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3800.00	-52.50	-13.00	-39.50	1.00 H	21	36.70	-89.20
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3800.00	-51.40	-13.00	-38.40	1.50 V	194	37.80	-89.20

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

LTE Band 25, Channel Bandwidth 1.4MHz

Mode	TX channel 26047 (1850.7MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Edsion Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3701.40	-49.30	-13.00	-36.30	2.88 H	30	43.90	-93.20
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3701.40	-48.70	-13.00	-35.70	1.88 V	326	44.50	-93.20

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 26365 (1882.5MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Edsion Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3765.00	-49.10	-13.00	-36.10	2.78 H	26	43.80	-92.90
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3765.00	-48.50	-13.00	-35.50	1.87 V	325	44.40	-92.90

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 26683 (1914.3MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Edsion Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3828.60	-49.40	-13.00	-36.40	2.69 H	33	43.10	-92.50
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3828.60	-48.20	-13.00	-35.20	1.83 V	333	44.30	-92.50

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

LTE Band 25, Channel Bandwidth 5MHz

Mode	TX channel 26065 (1852.5MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Edsion Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3705.00	-53.10	-13.00	-40.10	1.35 H	219	42.86	-95.96
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3705.00	-53.29	-13.00	-40.29	1.07 V	242	42.67	-95.96

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 26365 (1882.5MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Edsion Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3765.00	-53.59	-13.00	-40.59	1.31 H	216	42.18	-95.77
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3765.00	-53.43	-13.00	-40.43	1.09 V	241	42.34	-95.77

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 26665 (1912.5MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Edsion Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3825.00	-53.14	-13.00	-40.14	1.36 H	220	42.38	-95.52
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3825.00	-52.51	-13.00	-39.51	1.06 V	243	43.01	-95.52

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

LTE Band 25, Channel Bandwidth 20MHz

Mode	TX channel 26140 (1860.0MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Edsion Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3720.00	-52.98	-13.00	-39.98	1.32 H	217	42.94	-95.92
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3720.00	-53.13	-13.00	-40.13	1.03 V	242	42.79	-95.92

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 26365 (1882.5MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Edsion Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3765.00	-53.60	-13.00	-40.60	1.29 H	214	42.17	-95.77
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3765.00	-52.63	-13.00	-39.63	1.08 V	245	43.14	-95.77

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 26590 (1905.0MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Edsion Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3810.00	-53.11	-13.00	-40.11	1.36 H	219	42.44	-95.55
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3810.00	-52.30	-13.00	-39.30	1.05 V	241	43.25	-95.55

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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