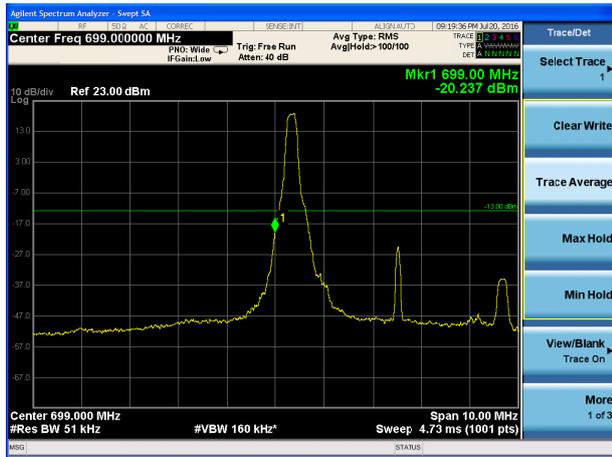




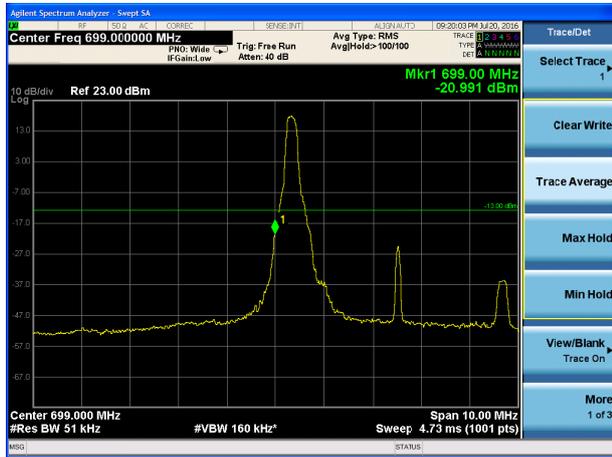
LTE Band 12 QPSK Bandwidth = 5MHz
CH23035, RB 1



LTE Band 12 QPSK Bandwidth = 5MHz
CH23035, RB 25



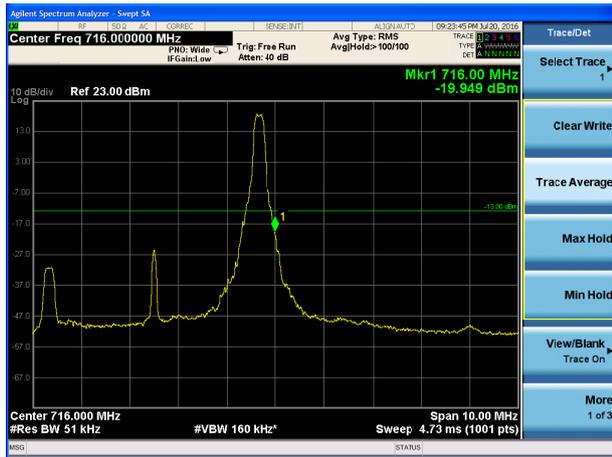
LTE Band 12 16QAM Bandwidth = 5MHz
CH23035, RB 1



LTE Band 12 16QAM Bandwidth = 5MHz
CH23035, RB 25



LTE Band 12 QPSK Bandwidth = 5MHz
CH23155, RB 1

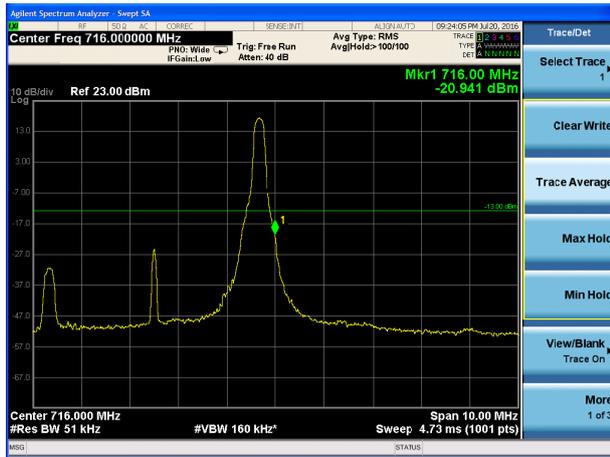


LTE Band 12 QPSK Bandwidth = 5MHz
CH23155, RB 25





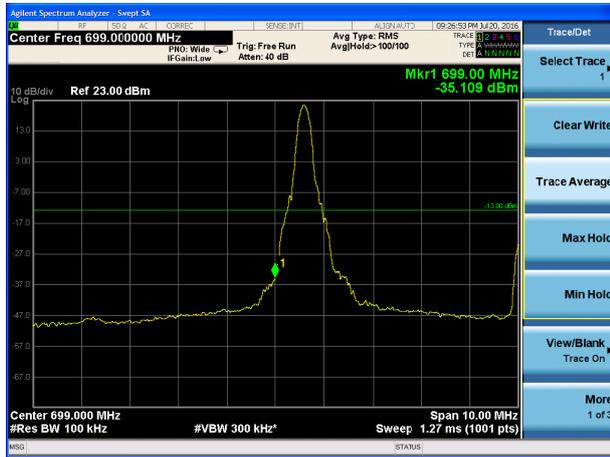
LTE Band 12 16QAM Bandwidth = 5MHz
CH23155, RB 1



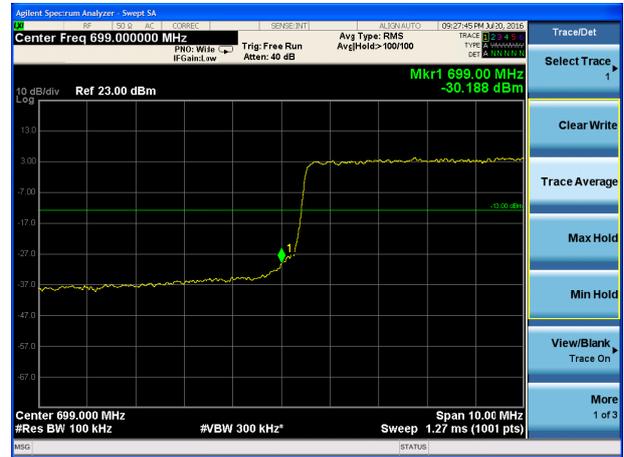
LTE Band 12 16QAM Bandwidth = 5MHz
CH23155, RB 25



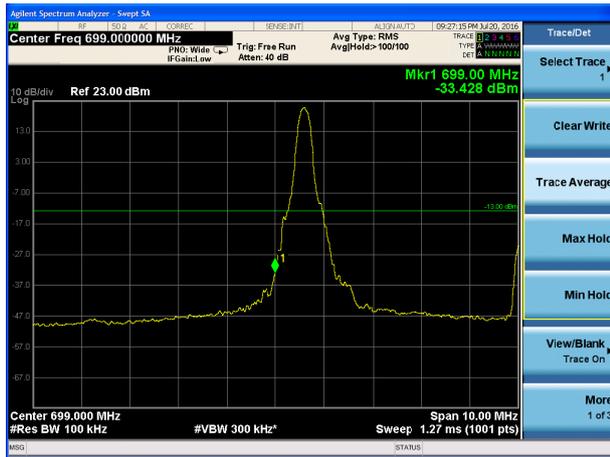
LTE Band 12 QPSK Bandwidth = 10MHz
CH23060, RB 1



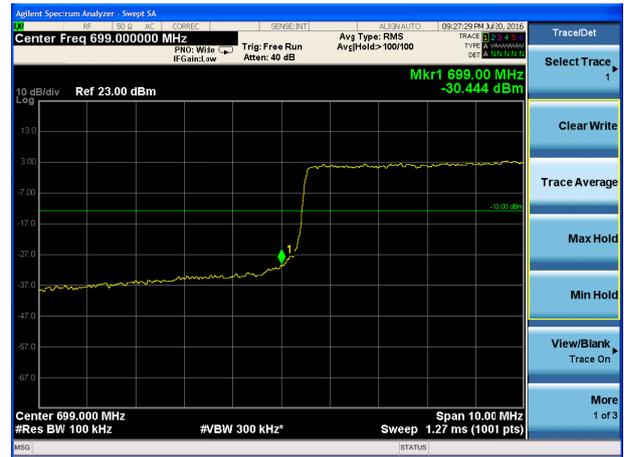
LTE Band 12 QPSK Bandwidth = 10MHz
CH23060, RB 50



LTE Band 12 16QAM Bandwidth = 10MHz
CH23060, RB 1

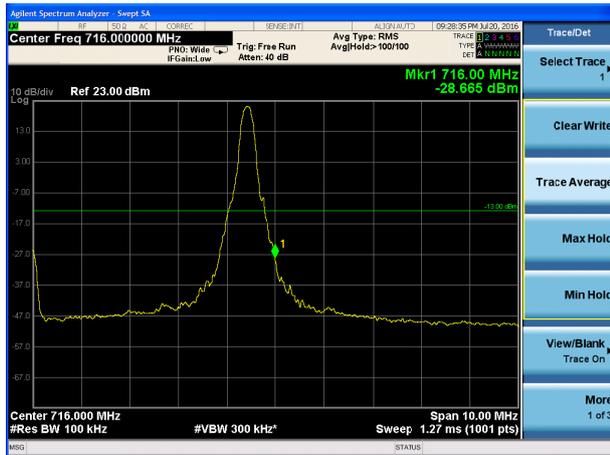


LTE Band 12 16QAM Bandwidth = 10MHz
CH23060, RB 50





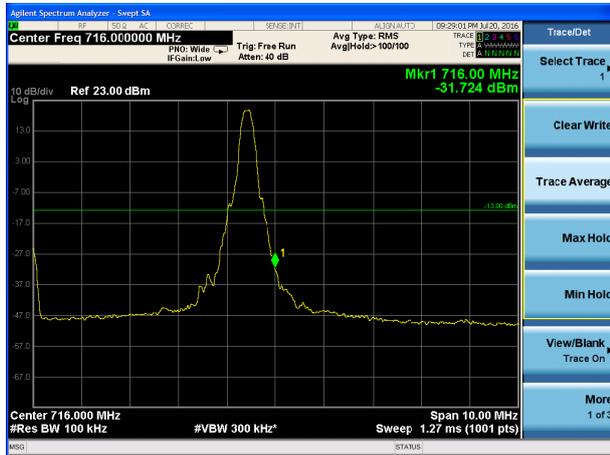
LTE Band 12 QPSK Bandwidth = 10MHz
CH23130, RB 1



LTE Band 12 QPSK Bandwidth = 10MHz
CH23130, RB 50



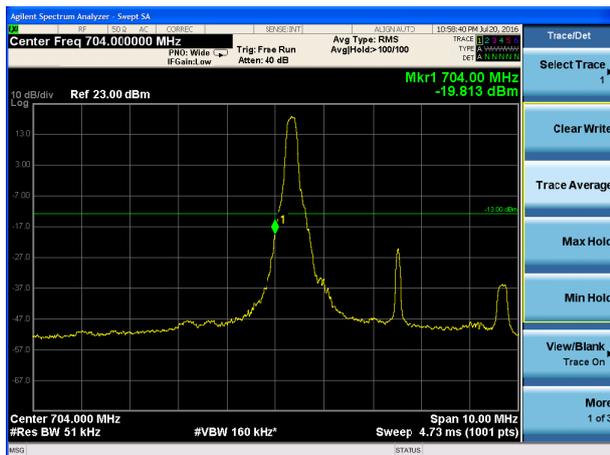
LTE Band 12 16QAM Bandwidth = 10MHz
CH23130, RB 1



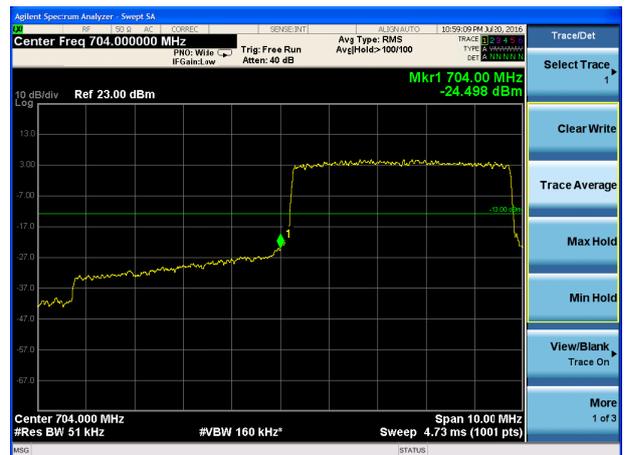
LTE Band 12 16QAM Bandwidth = 10MHz
CH23130, RB 50



LTE Band 17 QPSK Bandwidth = 5MHz
CH23755, RB 1

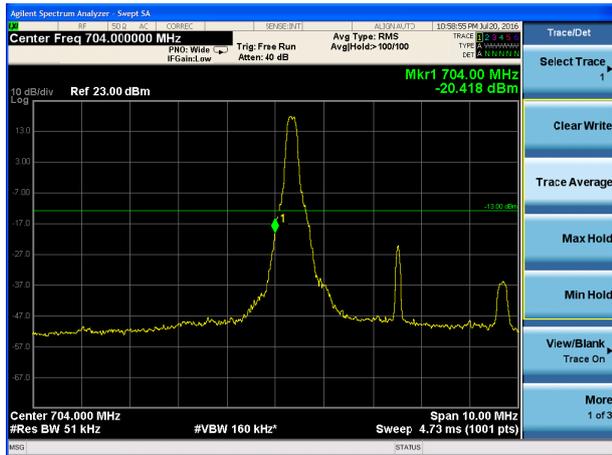


LTE Band 17 QPSK Bandwidth = 5MHz
CH23755, RB 25





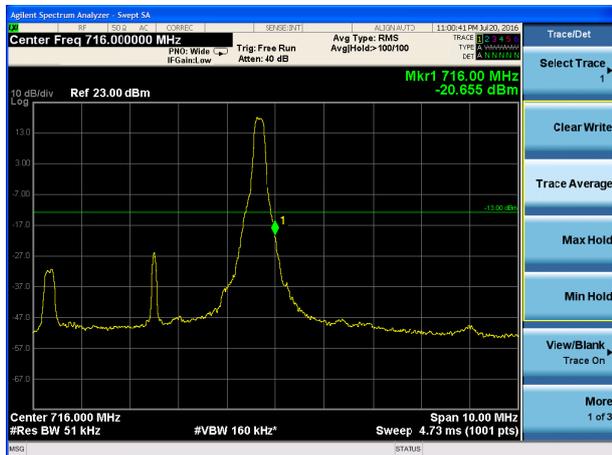
LTE Band 17 16QAM Bandwidth = 5MHz
CH23755, RB 1



LTE Band 17 16QAM Bandwidth = 5MHz
CH23755, RB 25



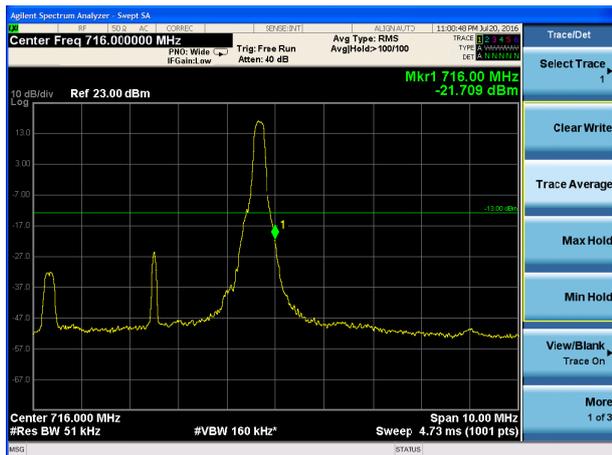
LTE Band 17 QPSK Bandwidth = 5MHz
CH23825, RB 1



LTE Band 17 QPSK Bandwidth = 5MHz
CH23825, RB 25



LTE Band 17 16QAM Bandwidth = 5MHz
CH23825, RB 1

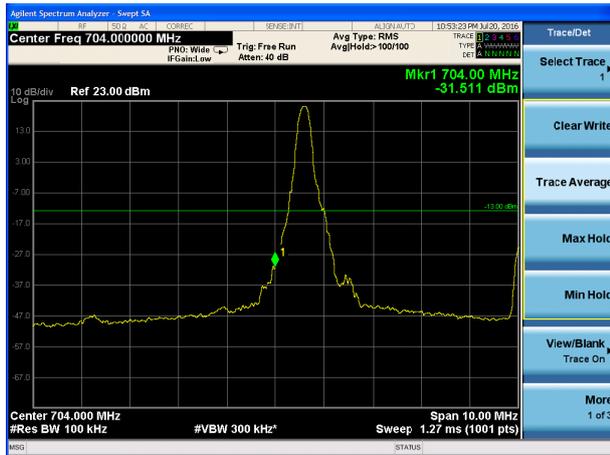


LTE Band 17 16QAM Bandwidth = 5MHz
CH23825, RB 25

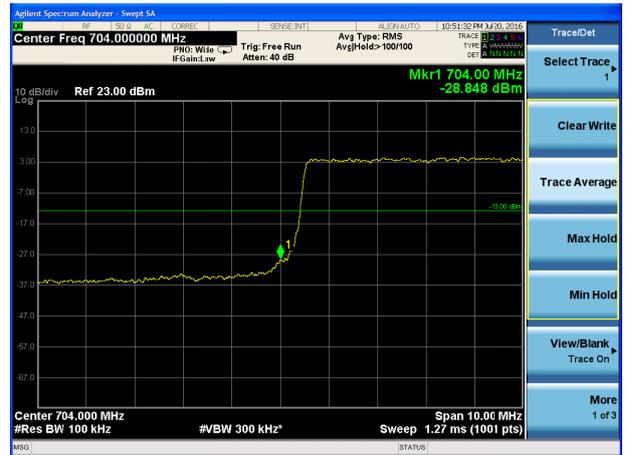




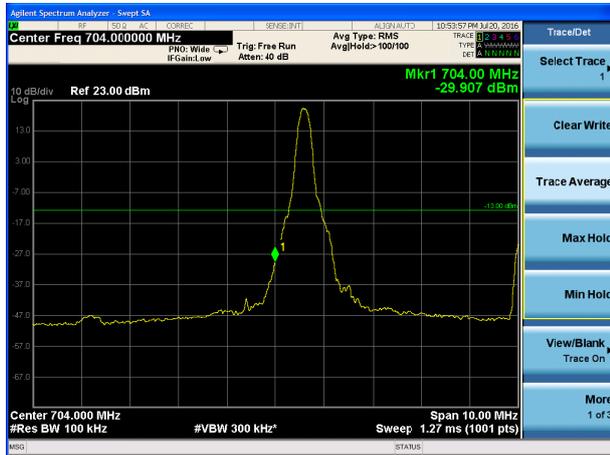
LTE Band 17 QPSK Bandwidth = 10MHz
CH23780, RB 1



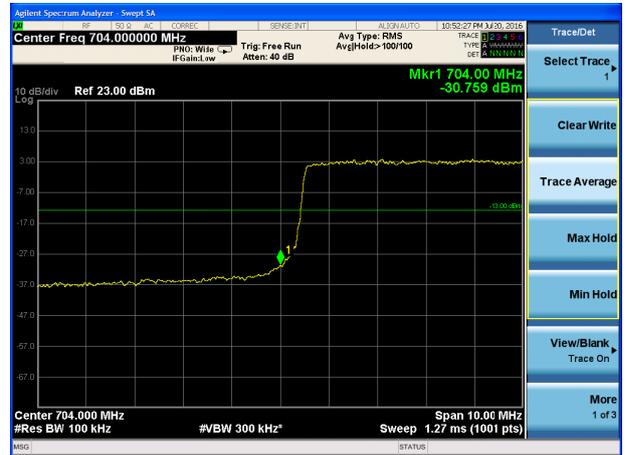
LTE Band 17 QPSK Bandwidth = 10MHz
CH23780, RB 50



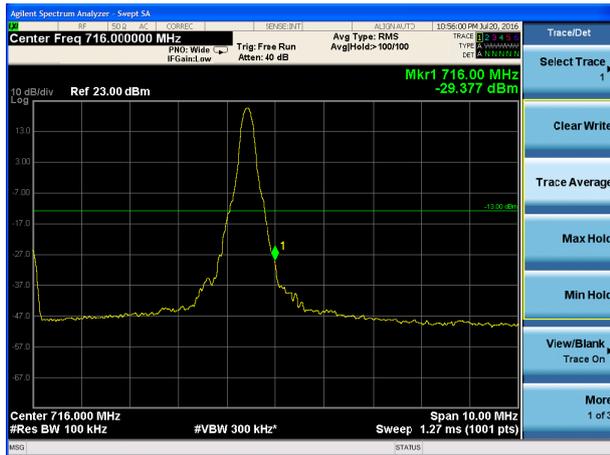
LTE Band 17 16QAM Bandwidth = 10MHz
CH23780, RB 1



LTE Band 17 16QAM Bandwidth = 10MHz
CH23780, RB 50



LTE Band 17 QPSK Bandwidth = 10MHz
CH23800, RB 1



LTE Band 17 QPSK Bandwidth = 10MHz
CH23800, RB 50





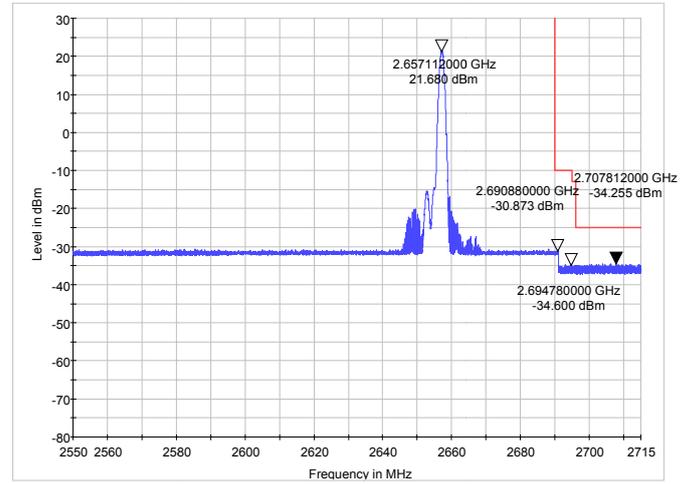
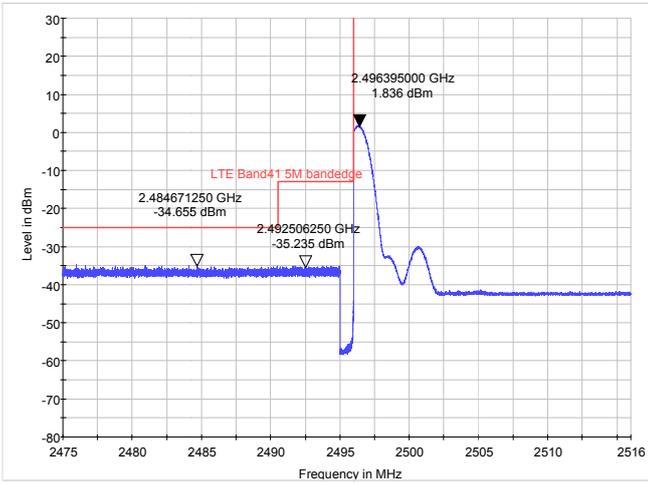
LTE Band 17 16QAM Bandwidth = 10MHz
CH23800, RB 1

LTE Band 17 16QAM Bandwidth = 10MHz
CH23800, RB 50



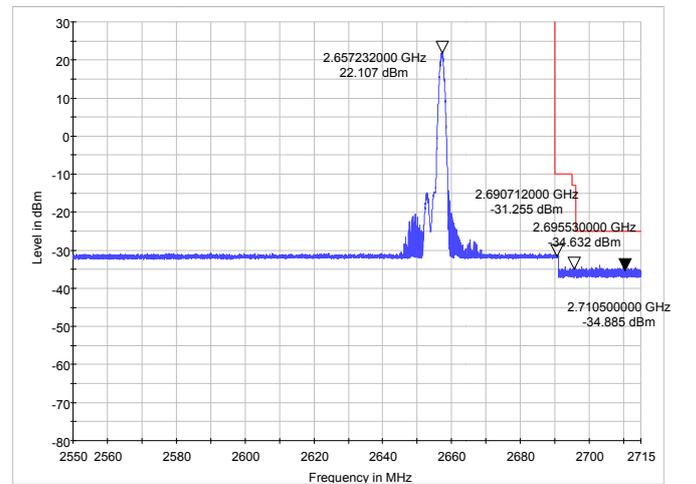
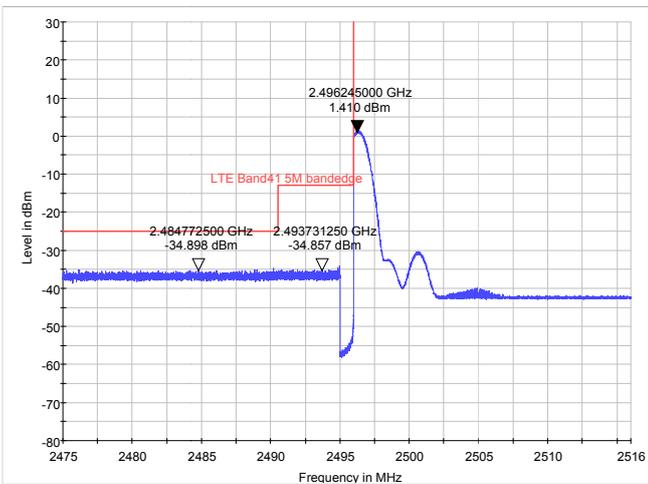
LTE Band 41 QPSK Bandwidth = 5MHz CH39675, RB 1

LTE Band 41 QPSK Bandwidth = 5MHz CH41565, RB 1

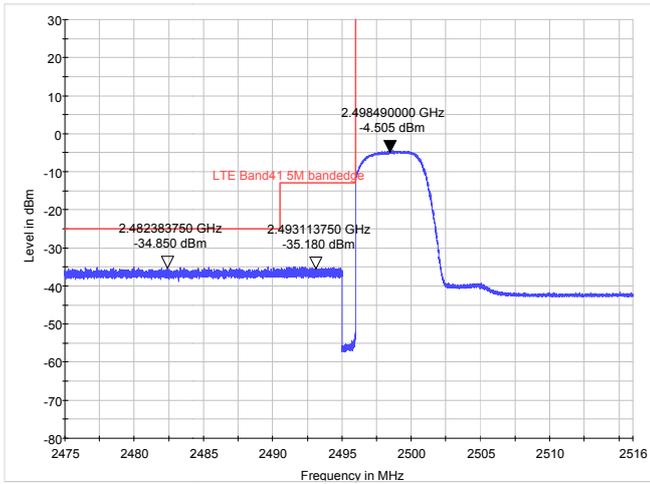


LTE Band 41 16QAM Bandwidth = 5MHz CH39675, RB 1

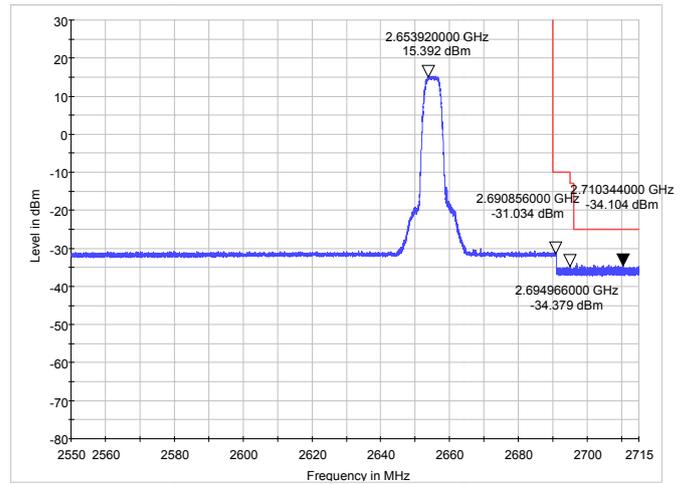
LTE Band 41 16QAM Bandwidth = 5MHz CH41565, RB 1



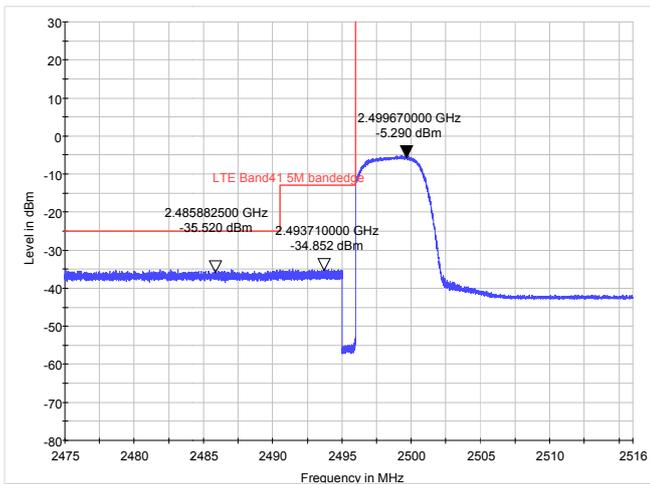
LTE Band 41 QPSK Bandwidth = 5MHz CH39675, RB 25



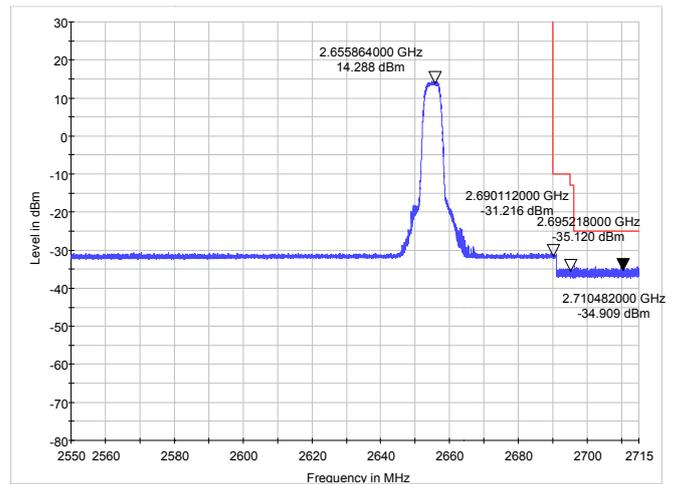
LTE Band 41 QPSK Bandwidth = 5MHz CH41565, RB 25



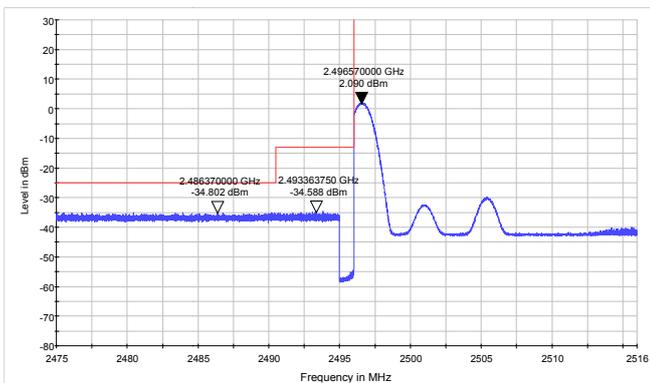
LTE Band 41 16QAM Bandwidth = 5MHz CH39675, RB 25



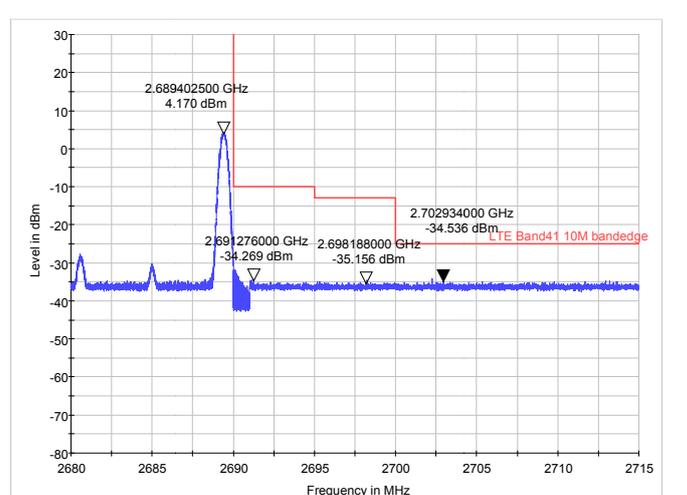
LTE Band 41 16QAM Bandwidth = 5MHz CH41565, RB 25



LTE Band 41 QPSK Bandwidth = 10MHz CH39700, RB 1



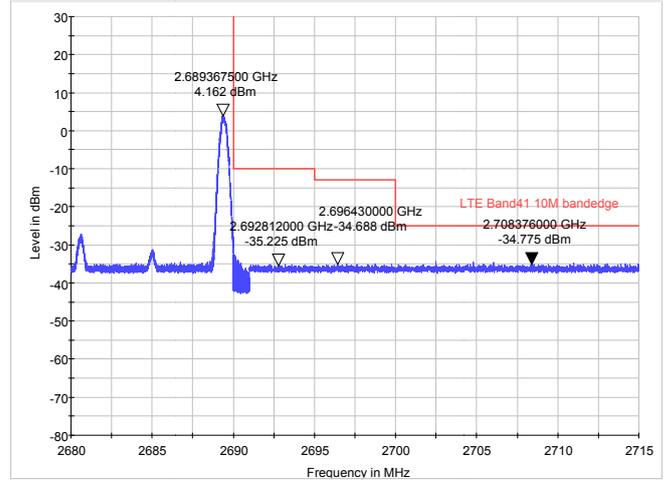
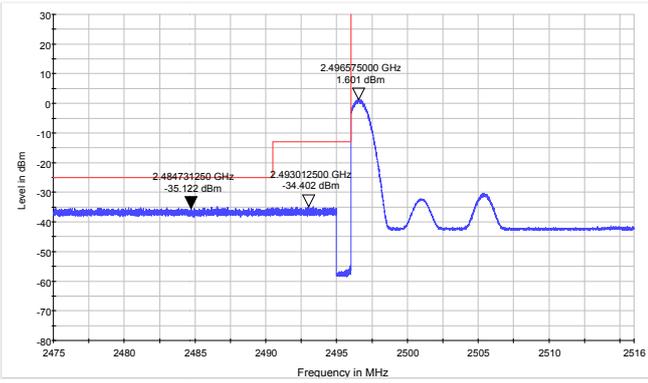
LTE Band 41 QPSK Bandwidth = 10MHz CH41540, RB 1





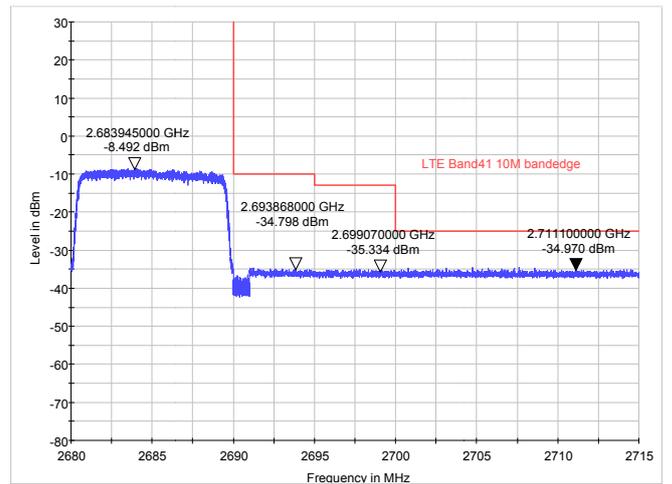
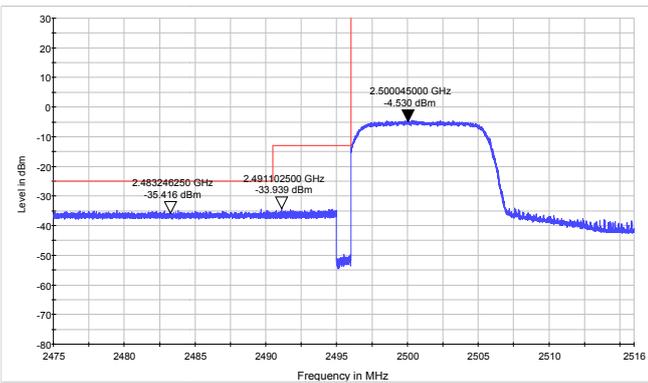
LTE Band 41 16QAM Bandwidth=10MHz CH39700, RB 1

LTE Band 41 16QAM Bandwidth = 10MHz CH41540, RB 1



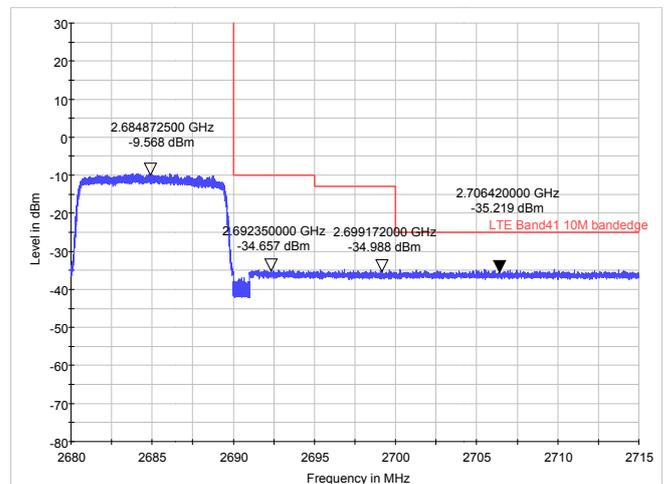
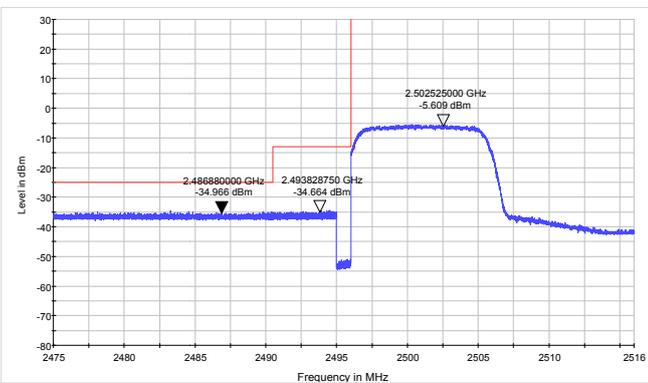
LTE Band 41 QPSK Bandwidth = 10MHz CH39700, RB 50

LTE Band 41 QPSK Bandwidth = 10MHz CH41540, RB 50



LTE Band 41 16QAM Bandwidth = 10MHz CH39700, RB 50

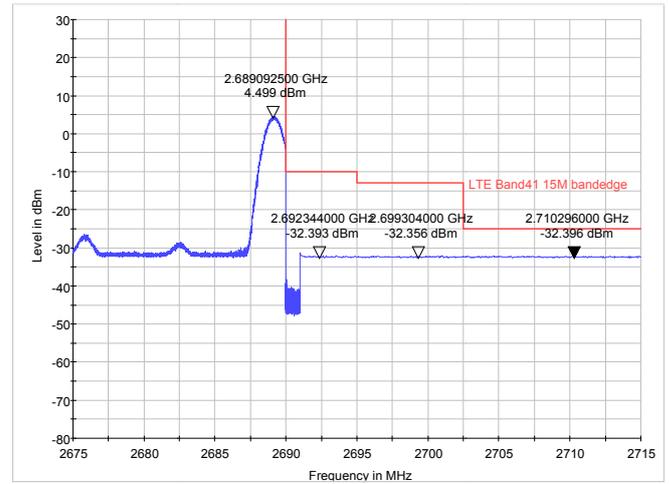
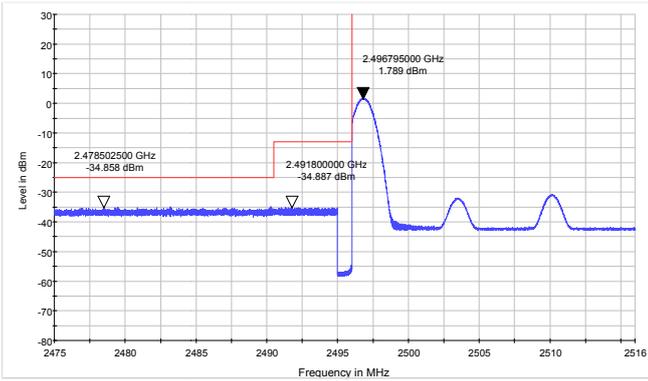
LTE Band 41 16QAM Bandwidth = 10MHz CH41540, RB 50





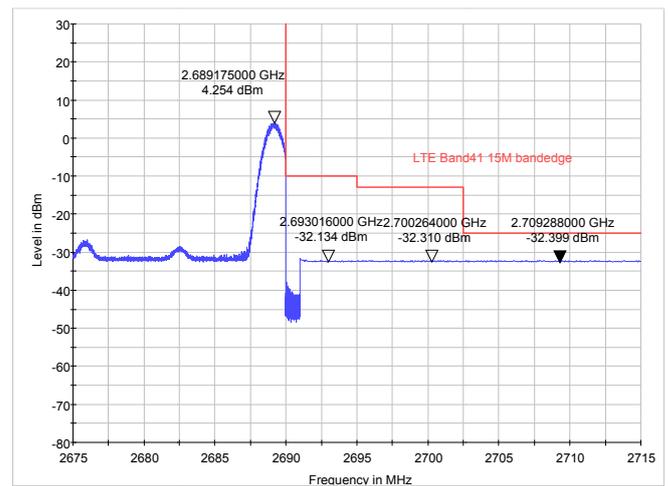
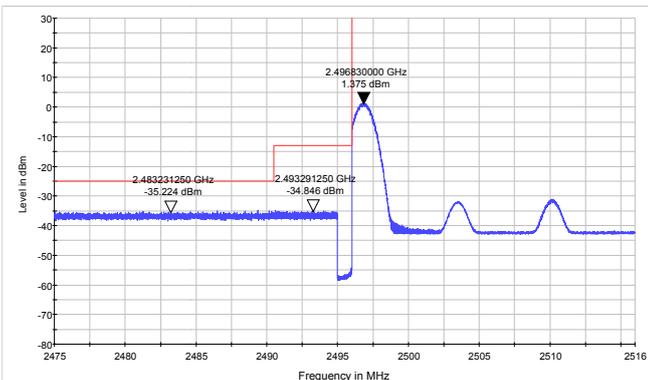
LTE Band 41 QPSK Bandwidth = 15MHz CH39725, RB 1

LTE Band 41 QPSK Bandwidth = 15MHz CH41515, RB 1



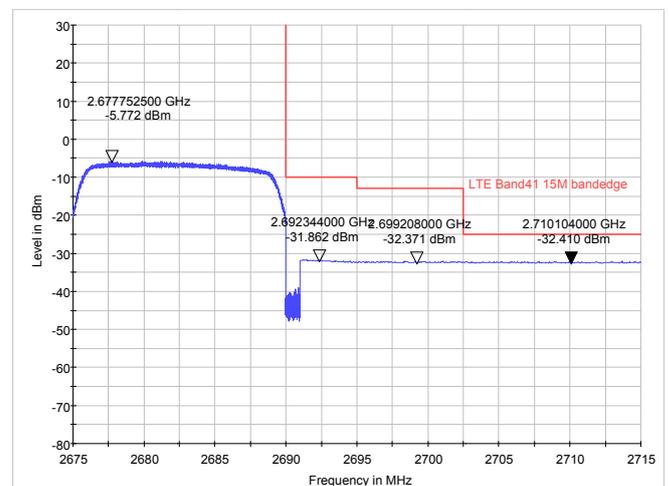
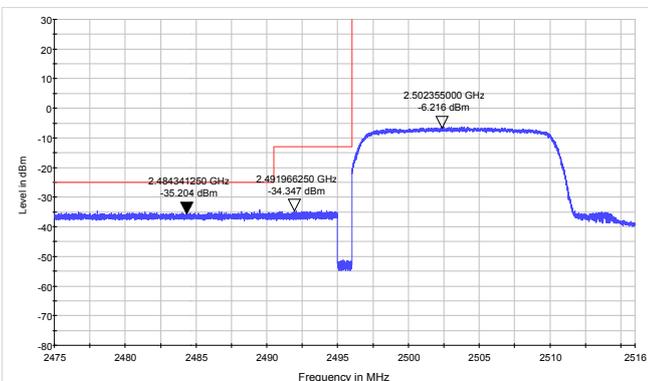
LTE Band 41 16QAM Bandwidth = 15MHz CH39725, RB 1

LTE Band 41 16QAM Bandwidth = 15MHz CH41515, RB 1



LTE Band 41 QPSK Bandwidth = 15MHz CH39725, RB 75

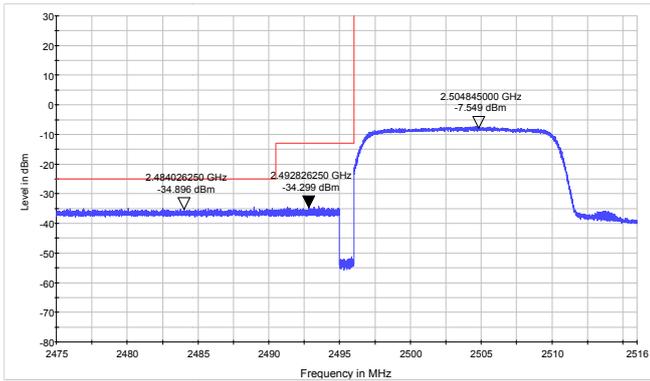
LTE Band 41 QPSK Bandwidth = 15MHz CH41515, RB 75





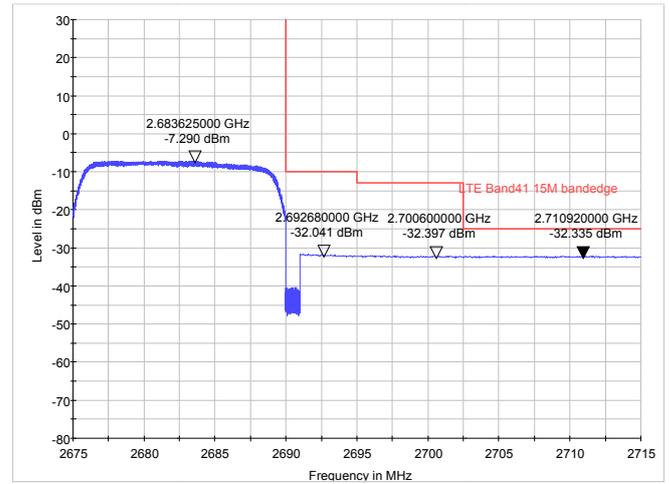
LTE Band 41 16QAM Bandwidth = 15MHz CH39725, RB

75

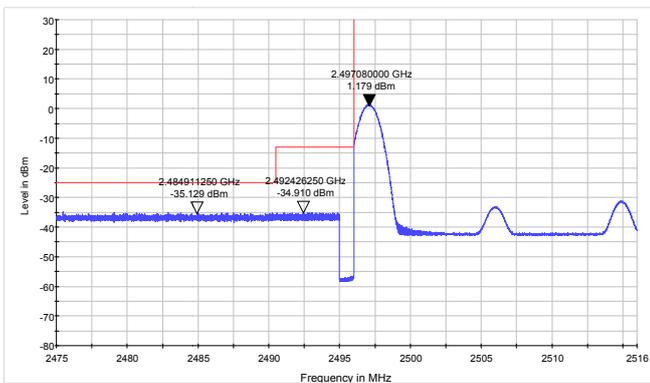


LTE Band 41 16QAM Bandwidth = 15MHz CH41515, RB

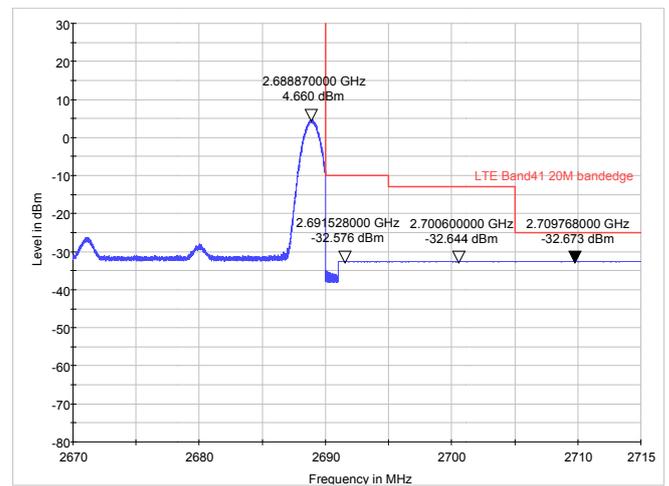
75



LTE Band 41 QPSK Bandwidth = 20MHz CH39750, RB 1

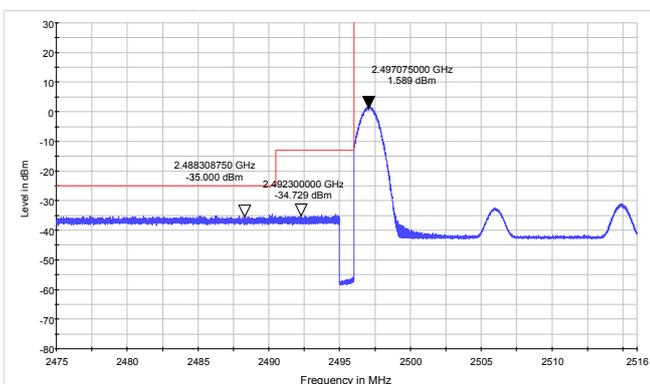


LTE Band 41 QPSK Bandwidth = 20MHz CH41490, RB 1



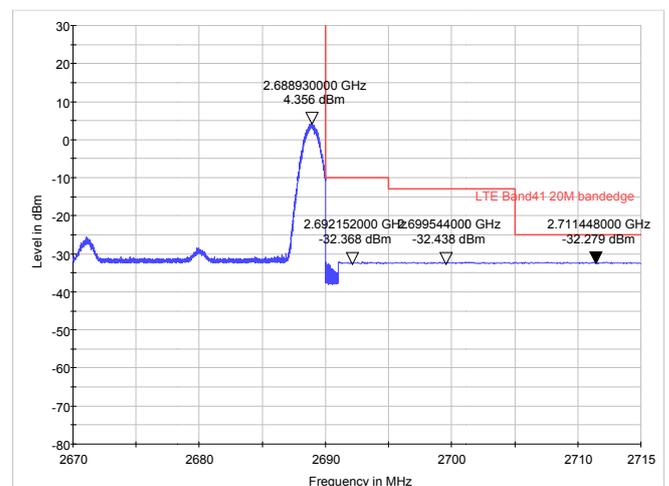
LTE Band 41 16QAM Bandwidth = 20MHz CH39750, RB

1



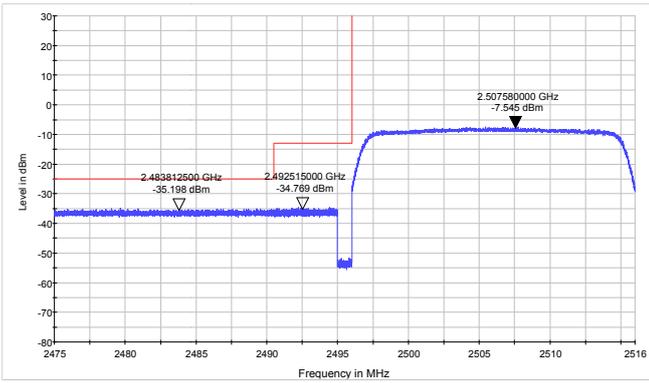
LTE Band 41 16QAM Bandwidth = 20MHz CH41490, RB

1

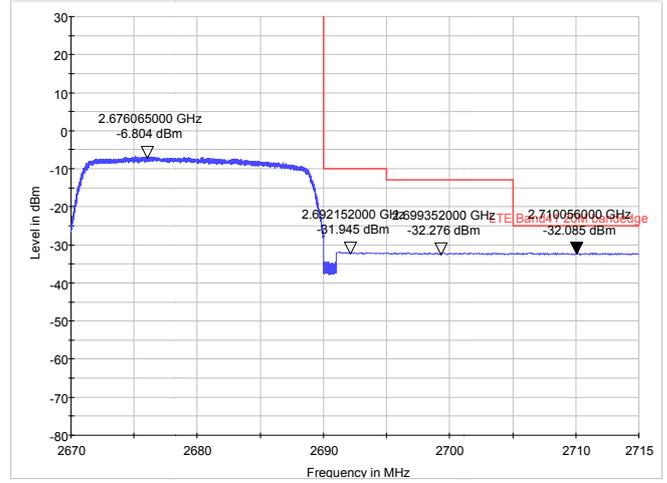




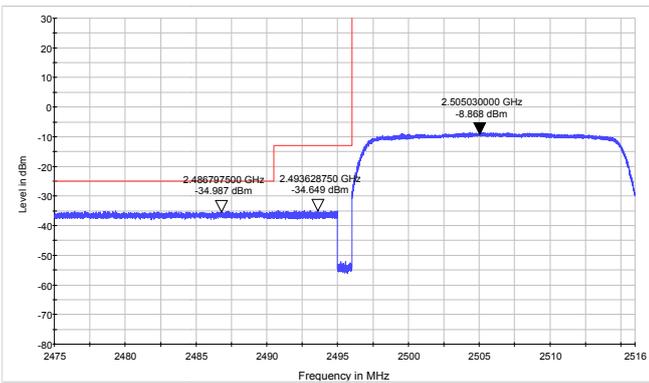
LTE Band 41 QPSK Bandwidth = 20MHz CH39750, RB 100



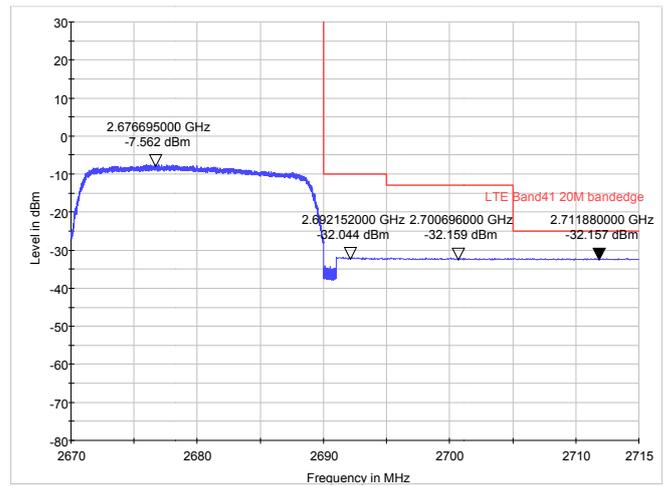
LTE Band 41 QPSK Bandwidth = 20MHz CH41490, RB 100



LTE Band 41 16QAM Bandwidth = 20MHz CH39750, RB 100



LTE Band 41 16QAM Bandwidth = 20MHz CH41490, RB 100



4.5 Peak-to-Average Power Ratio (PAPR)

Ambient condition

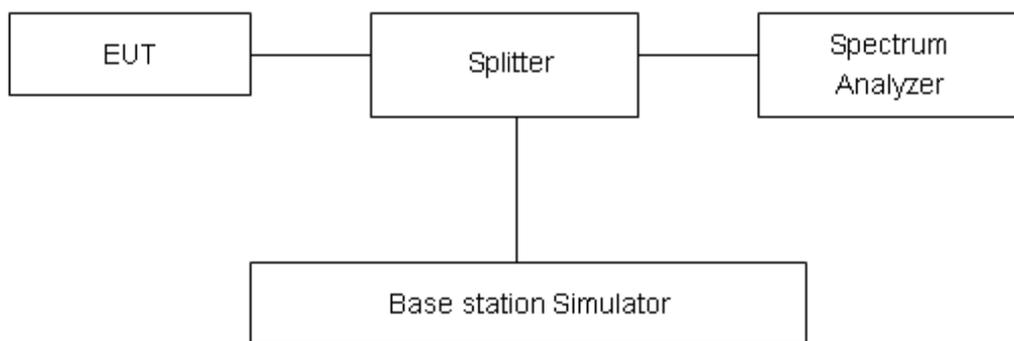
Temperature	Relative humidity
21°C ~25°C	40%~60%

Methods of Measurement

Measure the total peak power and record as PPk. And measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

$$PAPR (dB) = PPk (dBm) - PAvg (dBm).$$

Test Setup



Limits

Equipment employed must be authorized in accordance with the provisions of 24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. 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.in Part27.50(d).

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for thenormal distribution is with the coverage factor k = 2, U= 0.4 dB.

Test Results

WCDMA Band IV	Channel	Frequency (MHz)	Peak(dBm)	Avg(dBm)	PAPR(dB)	Conclusion
RMC	1312	1712.4	26.08	22.19	3.89	PASS
	1413	1732.6	26.10	22.30	3.80	PASS
	1513	1752.6	26.08	22.36	3.72	PASS

LTE Band 4							
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Conclusion
QPSK	1.4	19957	1710.7	25.81	21.54	4.27	PASS
		20175	1732.5	25.84	21.61	4.23	PASS
		20393	1754.3	26.28	21.94	4.34	PASS
	3	19965	1711.5	26.04	21.57	4.47	PASS
		20175	1732.5	26.09	21.65	4.44	PASS
		20385	1753.5	26.48	21.97	4.51	PASS
	5	19975	1712.5	25.98	21.55	4.43	PASS
		20175	1732.5	26.04	21.64	4.40	PASS
		20375	1752.5	26.40	21.95	4.45	PASS
	10	20000	1715	26.10	21.63	4.47	PASS
		20175	1732.5	26.17	21.66	4.51	PASS
		20350	1750	26.47	21.99	4.48	PASS
	15	20025	1717.5	25.94	21.61	4.33	PASS
		20175	1732.5	25.94	21.62	4.32	PASS
		20325	1747.5	26.23	21.94	4.29	PASS
	20	20050	1720	26.62	21.58	5.04	PASS
		20175	1732.5	26.68	21.57	5.11	PASS
		20300	1745	26.98	21.90	5.08	PASS
16QAM	1.4	19957	1710.7	25.56	20.58	4.98	PASS
		20175	1732.5	25.64	20.69	4.95	PASS
		20393	1754.3	25.98	21.09	4.89	PASS
	3	19965	1711.5	25.91	20.61	5.30	PASS
		20175	1732.5	26.05	20.73	5.32	PASS
		20385	1753.5	26.51	21.12	5.39	PASS
	5	19975	1712.5	25.47	20.59	4.88	PASS
		20175	1732.5	25.61	20.69	4.92	PASS
		20375	1752.5	25.94	21.07	4.87	PASS
	10	20000	1715	25.27	20.62	4.65	PASS
		20175	1732.5	25.40	20.74	4.66	PASS
		20350	1750	25.70	21.11	4.59	PASS



15	20025	1717.5	25.75	20.59	5.16	PASS
	20175	1732.5	25.91	20.69	5.22	PASS
	20325	1747.5	26.34	21.07	5.27	PASS
20	20050	1720	25.76	20.57	5.19	PASS
	20175	1732.5	25.81	20.65	5.16	PASS
	20300	1745	26.29	21.04	5.25	PASS

LTE Band 7							
Modulation	Bandwidth ((MHz))	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Conclusion
QPSK	5	20775	2502.5	26.15	21.32	4.83	PASS
		21100	2535	26.10	21.33	4.77	PASS
		21425	2567.5	25.97	21.08	4.89	PASS
	10	20800	2505	26.26	21.40	4.86	PASS
		21100	2535	26.16	21.35	4.81	PASS
		21400	2565	26.04	21.12	4.92	PASS
	15	20825	2507.5	26.25	21.38	4.87	PASS
		21100	2535	26.16	21.31	4.85	PASS
		21375	2562.5	25.86	21.07	4.79	PASS
20	20850	2510	26.22	21.35	4.87	PASS	
	21100	2535	26.19	21.26	4.93	PASS	
	21350	2560	25.85	21.03	4.82	PASS	
16QAM	5	20775	2502.5	26.44	20.77	5.67	PASS
		21100	2535	26.02	20.46	5.56	PASS
		21425	2567.5	26.10	20.47	5.63	PASS
	10	20800	2505	26.49	20.80	5.69	PASS
		21100	2535	26.16	20.51	5.65	PASS
		21400	2565	26.12	20.51	5.61	PASS
	15	20825	2507.5	26.37	20.77	5.60	PASS
		21100	2535	26.12	20.46	5.66	PASS
		21375	2562.5	26.19	20.47	5.72	PASS
20	20850	2510	26.43	20.75	5.68	PASS	
	21100	2535	26.07	20.42	5.65	PASS	
	21350	2560	26.17	20.44	5.73	PASS	

LTE Band 12							
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Conclusion
QPSK	1.4	23017	699.7	26.00	21.89	4.11	PASS
		23095	707.5	25.99	21.86	4.13	PASS
		23173	715.3	26.13	21.91	4.22	PASS
	3	23025	700.5	26.35	21.92	4.43	PASS
		23095	707.5	26.32	21.90	4.42	PASS
		23165	714.5	26.32	21.94	4.38	PASS
	5	23035	701.5	26.72	21.96	4.76	PASS
		23095	707.5	26.66	21.87	4.79	PASS
		23155	713.5	26.65	21.91	4.74	PASS
	10	23060	704	26.56	21.93	4.63	PASS
		23095	707.5	26.48	21.82	4.66	PASS
		23130	711	26.55	21.87	4.68	PASS
16QAM	1.4	23017	699.7	26.01	20.99	5.02	PASS
		23095	707.5	26.01	20.89	5.12	PASS
		23173	715.3	25.99	20.88	5.11	PASS
	3	23025	700.5	26.19	21.02	5.17	PASS
		23095	707.5	26.12	20.93	5.19	PASS
		23165	714.5	26.11	20.91	5.20	PASS
	5	23035	701.5	26.29	21.00	5.29	PASS
		23095	707.5	26.15	20.89	5.26	PASS
		23155	713.5	26.10	20.86	5.24	PASS
	10	23060	704	26.99	20.98	6.01	PASS
		23095	707.5	26.93	20.85	6.08	PASS
		23130	711	26.94	20.83	6.11	PASS

LTE Band 17							
Modulation	Bandwidth ((MHz))	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Conclusion
QPSK	5	23755	706.5	26.60	21.90	4.70	PASS
		23790	710	26.75	22.08	4.67	PASS
		23825	713.5	26.81	22.08	4.73	PASS
	10	23780	709	26.61	21.93	4.68	PASS
		23790	710	26.65	22.01	4.64	PASS
		23800	711	26.65	22.03	4.62	PASS
16QAM	5	23755	706.5	26.35	20.88	5.47	PASS



		23790	710	26.47	20.95	5.52	PASS
		23825	713.5	26.44	21.01	5.43	PASS
	10	23780	709	26.37	20.86	5.51	PASS
		23790	710	26.47	20.91	5.56	PASS
		23800	711	26.52	20.98	5.54	PASS

LTE Band 41							
Modulation	Bandwidth ((MHz))	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Conclusion
QPSK	5	39675	2498.5	29.10	21.19	7.91	PASS
		40620	2593	28.98	21.17	7.81	PASS
		41565	2687.5	29.11	21.15	7.96	PASS
	10	39700	2501	30.15	21.27	8.88	PASS
		40620	2593	30.03	21.19	8.84	PASS
		41540	2685	29.94	21.19	8.75	PASS
	15	39725	2503.5	30.41	21.25	9.16	PASS
		40620	2593	30.32	21.15	9.17	PASS
		41515	2682.5	30.36	21.14	9.22	PASS
	20	39750	2506	29.22	21.22	8.00	PASS
		40620	2593	29.23	21.10	8.13	PASS
		41490	2680	29.19	21.10	8.09	PASS
16QAM	5	39675	2498.5	28.99	20.16	8.83	PASS
		40620	2593	29.03	20.24	8.79	PASS
		41565	2687.5	28.87	20.12	8.75	PASS
	10	39700	2501	28.83	20.19	8.64	PASS
		40620	2593	28.92	20.29	8.63	PASS
		41540	2685	28.73	20.16	8.57	PASS
	15	39725	2503.5	29.69	20.16	9.53	PASS
		40620	2593	29.78	20.24	9.54	PASS
		41515	2682.5	29.54	20.12	9.42	PASS
	20	39750	2506	29.04	20.14	8.90	PASS
		40620	2593	29.06	20.20	8.86	PASS
		41490	2680	28.90	20.09	8.81	PASS

4.6 Frequency Stability

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

1. Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from -10°C to +55°C in 10°C step size.

(1)With all power removed, the temperature was decreased to -10°C and permitted to stabilize for three hours.

(2)Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.

(3) Repeat the above measurements at 10°C increments from -10°C to +55°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

2. Frequency Stability (Voltage Variation)

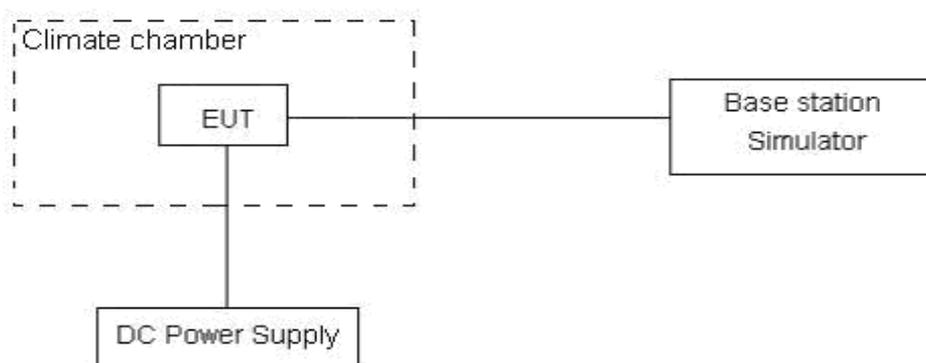
The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery-operating end point which shall be specified by the manufacturer.

This transceiver is specified to operate with an input voltage of between 3.4 V and 4.4 V, with a nominal voltage of 3.85V.

Test setup



Limits

No specific frequency stability requirements in part 27.54

Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 3, U=0.01\text{ppm}$.

Test Result

WCDMA Band IV

Test status	WCDMA Band IV Channel 1413 RMC	
	Test Results (ppm)	Conclusion
55°C/3.85 V	0.00008	PASS
50°C/3.85 V	-0.00010	PASS
40°C/3.85 V	0.00006	PASS
30°C/3.85 V	0.00017	PASS
20°C/3.85 V	0.00020	PASS
10°C/3.85 V	0.00004	PASS
0°C/3.85 V	0.00036	PASS
-10°C/3.85 V	-0.00020	PASS
20°C/4.4 V	0.00016	PASS
20°C/3.4 V	0.00027	PASS

Bandwidth	Test status	LTE Band 4 Channel 20175 Test Results (ppm)		
		QPSK	16QAM	Conclusion
1.4MHz	55°C/3.85 V	-0.00055	0.00006	PASS
	50°C/3.85 V	-0.00004	0.00044	PASS
	40°C/3.85 V	-0.00059	0.00008	PASS
	30°C/3.85 V	0.00076	-0.00021	PASS
	20°C/3.85 V	-0.00046	0.00052	PASS
	10°C/3.85 V	-0.00048	0.00046	PASS
	0°C/3.85 V	0.00048	0.00003	PASS
	-10°C/3.85 V	0.00013	0.00071	PASS
	20°C/4.4 V	0.00002	0.00054	PASS
	20°C/3.4 V	0.00028	-0.00085	PASS
3MHz	55°C/3.85 V	-0.00148	-0.00186	PASS
	50°C/3.85 V	-0.00237	-0.00195	PASS
	40°C/3.85 V	-0.00205	-0.00238	PASS
	30°C/3.85 V	-0.00148	-0.00358	PASS
	20°C/3.85 V	-0.00238	-0.00336	PASS
	10°C/3.85 V	-0.00123	-0.00279	PASS
	0°C/3.85 V	-0.00192	-0.00256	PASS
	-10°C/3.85 V	-0.00215	-0.00283	PASS
	20°C/4.4 V	-0.00225	-0.00223	PASS
	20°C/3.4 V	-0.00169	-0.00383	PASS
5MHz	55°C/3.85 V	-0.00257	-0.00223	PASS



	50°C/3.85 V	-0.00293	-0.00201	PASS
	40°C/3.85 V	-0.00306	-0.00259	PASS
	30°C/3.85 V	-0.00286	-0.00278	PASS
	20°C/3.85 V	-0.00320	-0.00253	PASS
	10°C/3.85 V	-0.00293	-0.00296	PASS
	0°C/3.85 V	-0.00271	-0.00253	PASS
	-10°C/3.85 V	-0.00248	-0.00199	PASS
	20°C/4.4 V	-0.00266	-0.00205	PASS
	20°C/3.4 V	-0.00228	-0.00171	PASS
10MHz	55°C/3.85 V	-0.00091	-0.00018	PASS
	50°C/3.85 V	-0.00067	0.00021	PASS
	40°C/3.85 V	-0.00079	0.00302	PASS
	30°C/3.85 V	-0.00050	0.00122	PASS
	20°C/3.85 V	-0.00037	0.00192	PASS
	10°C/3.85 V	-0.00042	0.00038	PASS
	0°C/3.85 V	-0.00023	-0.00004	PASS
	-10°C/3.85 V	-0.00088	-0.00223	PASS
	20°C/4.4 V	0.00002	0.00146	PASS
20°C/3.4 V	-0.00083	0.00296	PASS	
15MHz	55°C/3.85 V	0.00001	-0.00021	PASS
	50°C/3.85 V	-0.00005	0.00031	PASS
	40°C/3.85 V	-0.00035	0.00019	PASS
	30°C/3.85 V	-0.00004	0.00031	PASS
	20°C/3.85 V	0.00052	0.00048	PASS
	10°C/3.85 V	0.00005	-0.00031	PASS
	0°C/3.85 V	0.00043	0.00029	PASS
	-10°C/3.85 V	0.00002	0.00032	PASS
	20°C/4.4 V	-0.00010	-0.00002	PASS
20°C/3.4 V	0.00008	-0.00051	PASS	
20MHz	55°C/3.85 V	0.00048	0.00054	PASS
	50°C/3.85 V	0.00077	0.00086	PASS
	40°C/3.85 V	-0.00006	0.00046	PASS
	30°C/3.85 V	0.00063	0.00073	PASS
	20°C/3.85 V	0.00055	0.00006	PASS
	10°C/3.85 V	0.00066	0.00052	PASS
	0°C/3.85 V	-0.00021	0.00047	PASS
	-10°C/3.85 V	0.00048	0.00057	PASS
	20°C/4.4 V	0.00118	0.00027	PASS
20°C/3.4 V	0.00008	0.00064	PASS	