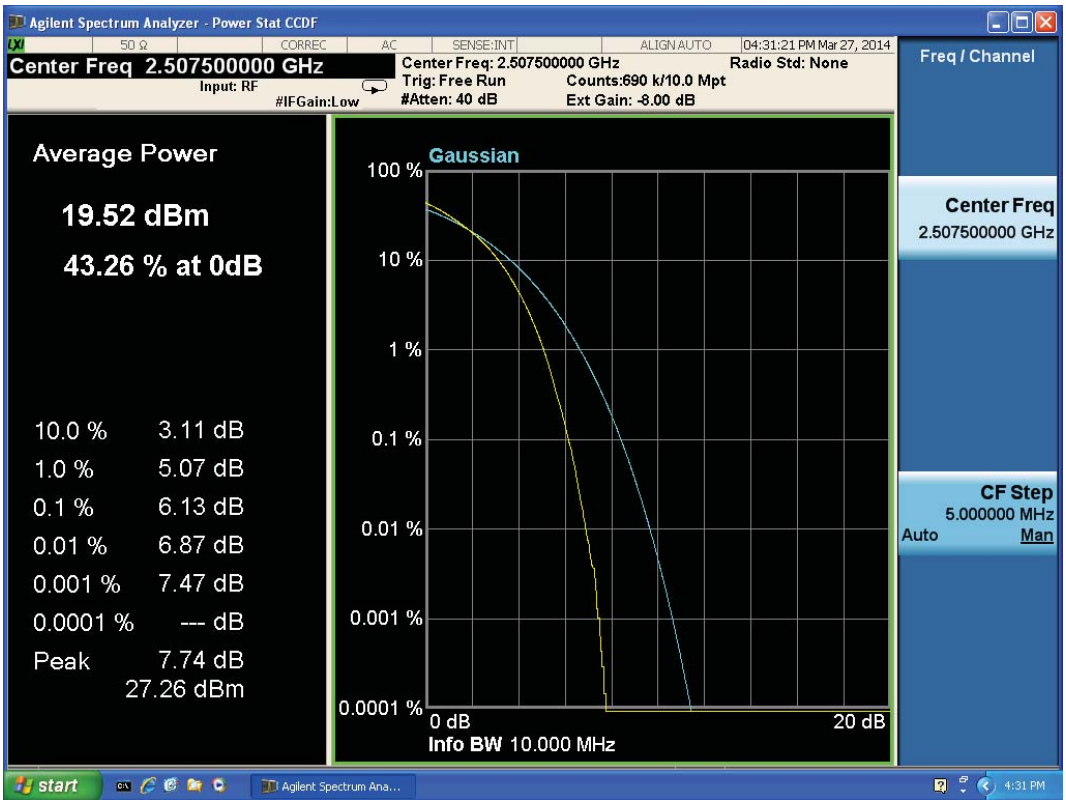
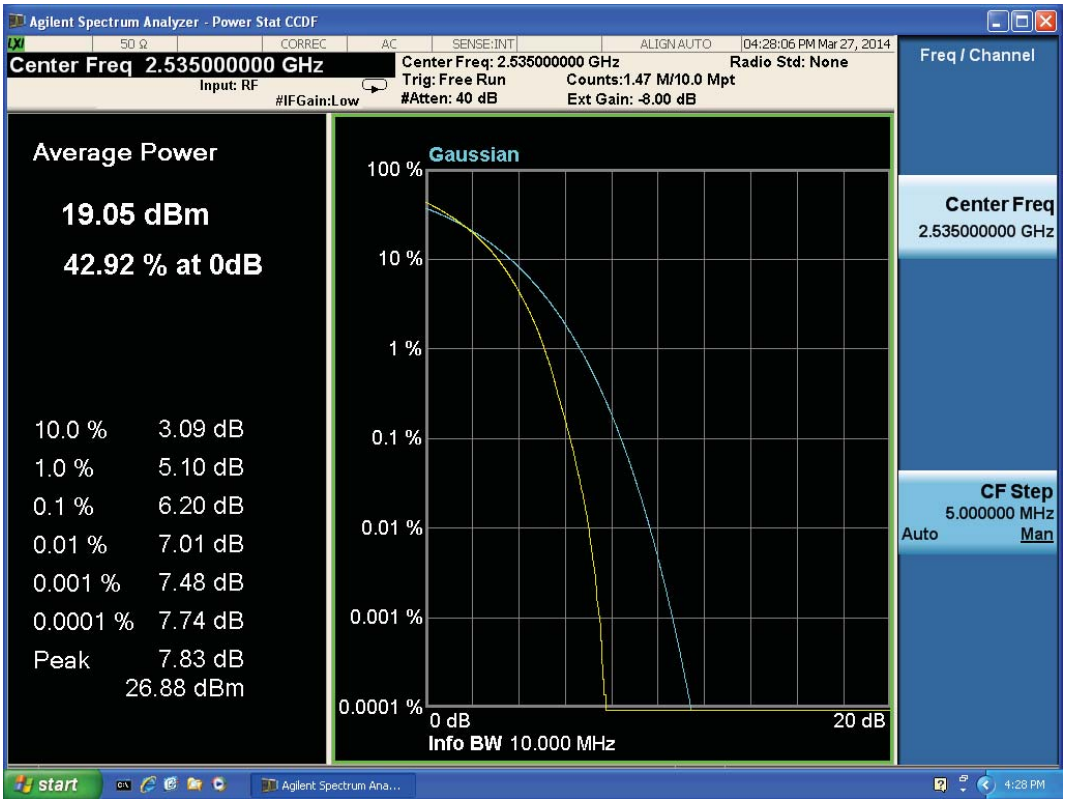
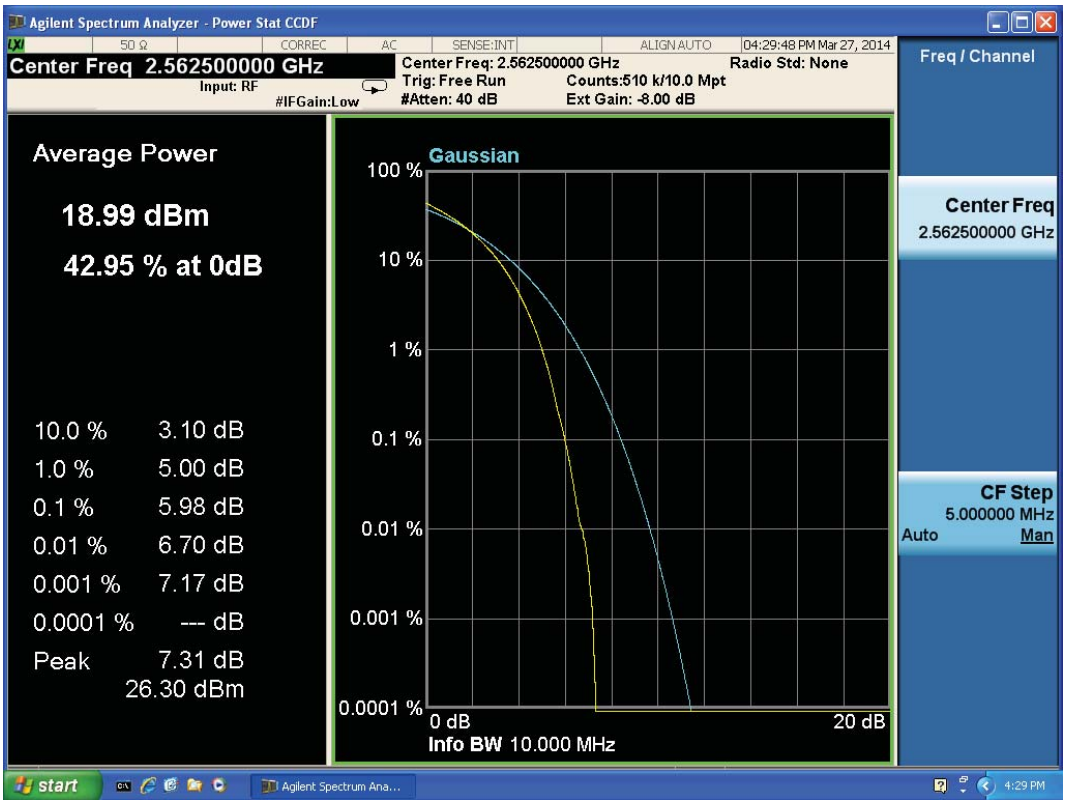


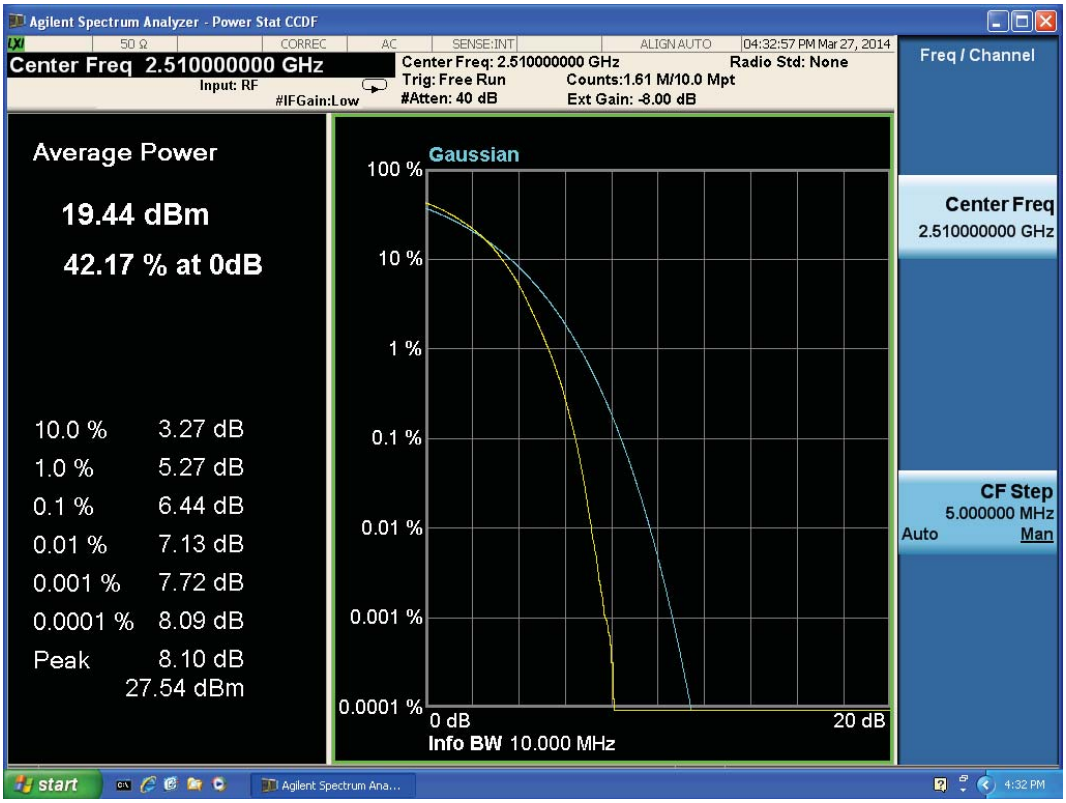
LTE Band 7 16QAM Bandwidth = 15MHz CH20825



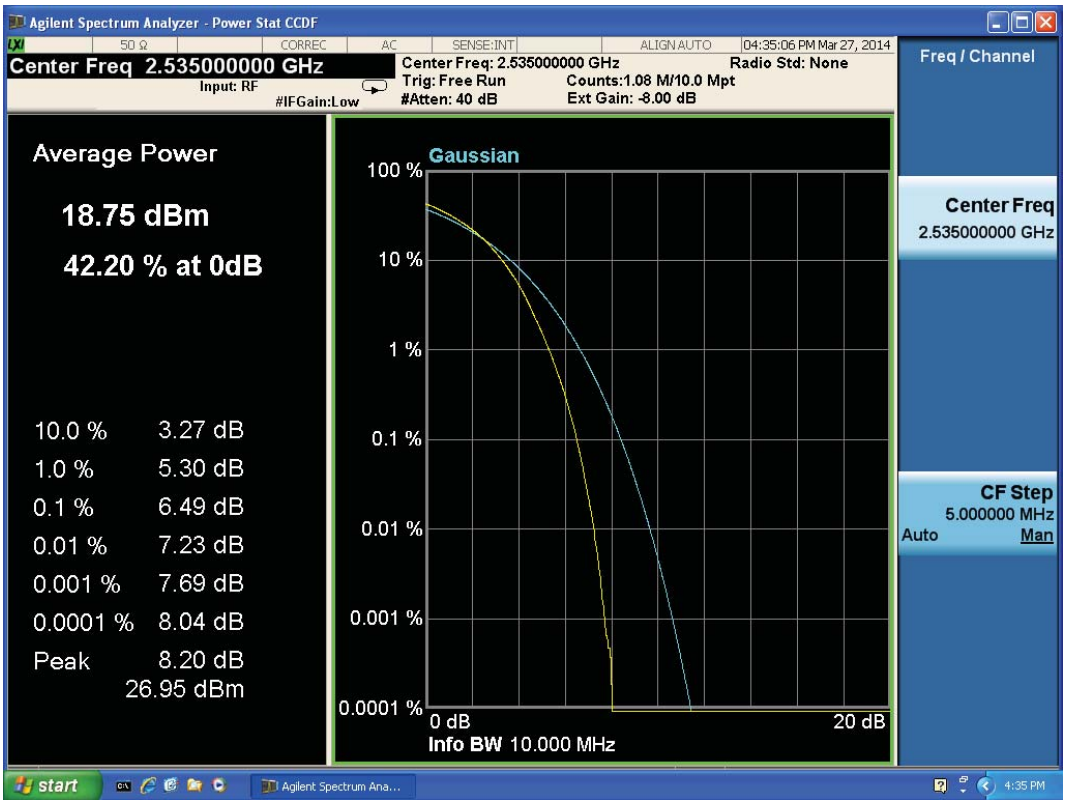
LTE Band 7 16QAM Bandwidth = 15MHz CH21100



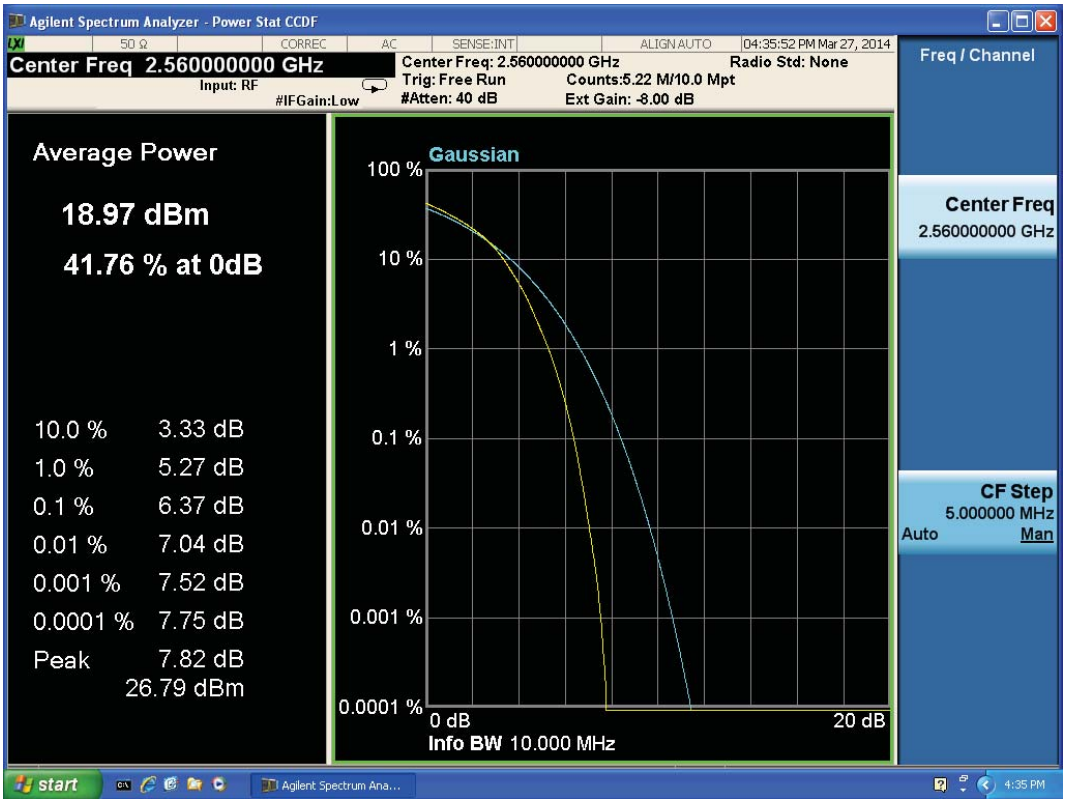
LTE Band 7 16QAM Bandwidth = 15MHz CH21375



LTE Band 7 16QAM Bandwidth = 20MHz CH20850

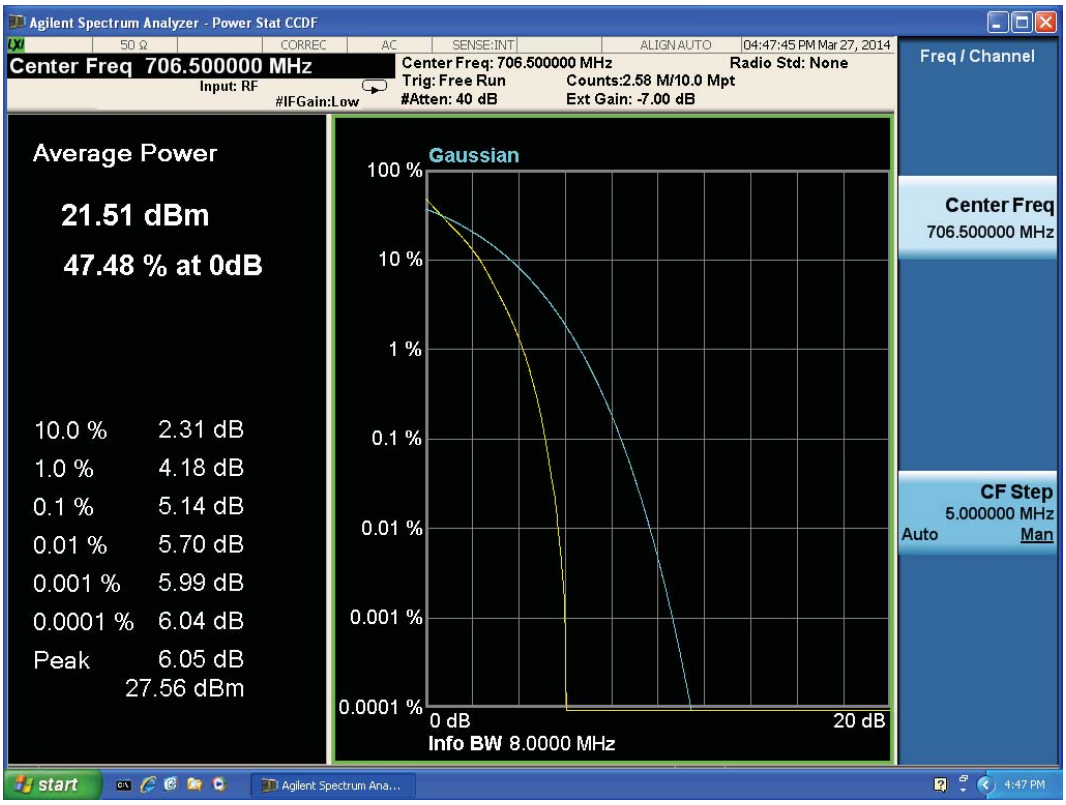


LTE Band 7 16QAM Bandwidth = 20MHz CH21100

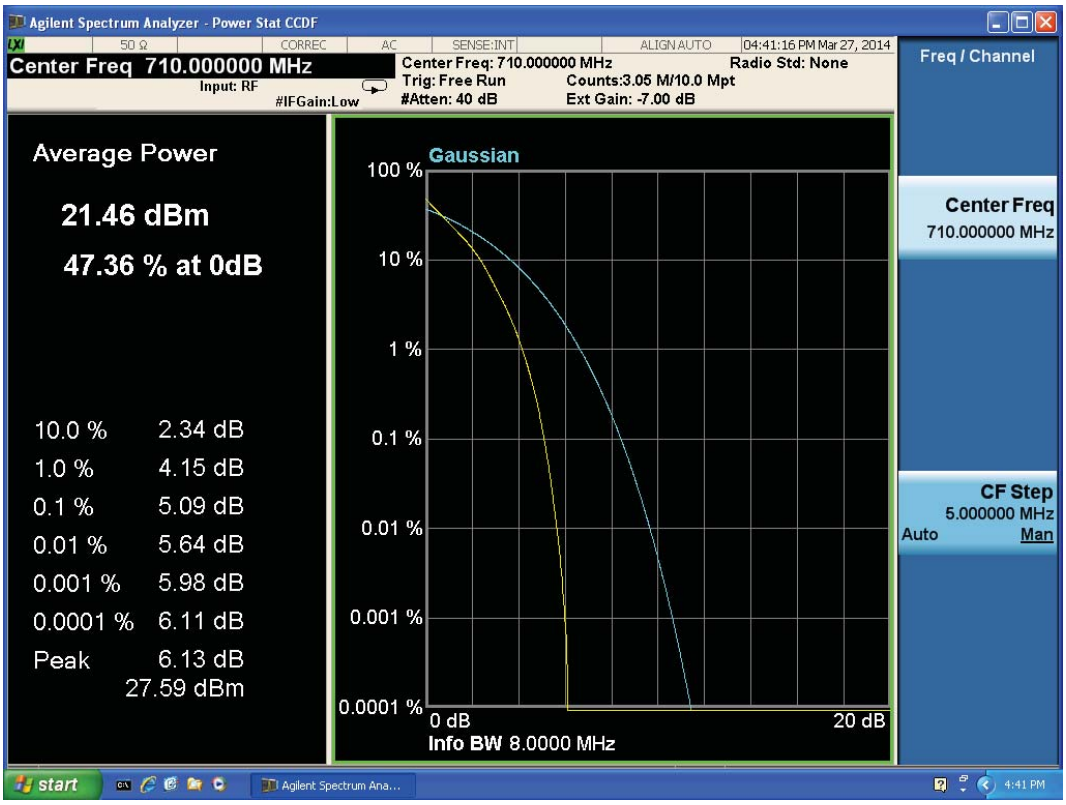


LTE Band 7 16QAM Bandwidth = 20MHz CH21350

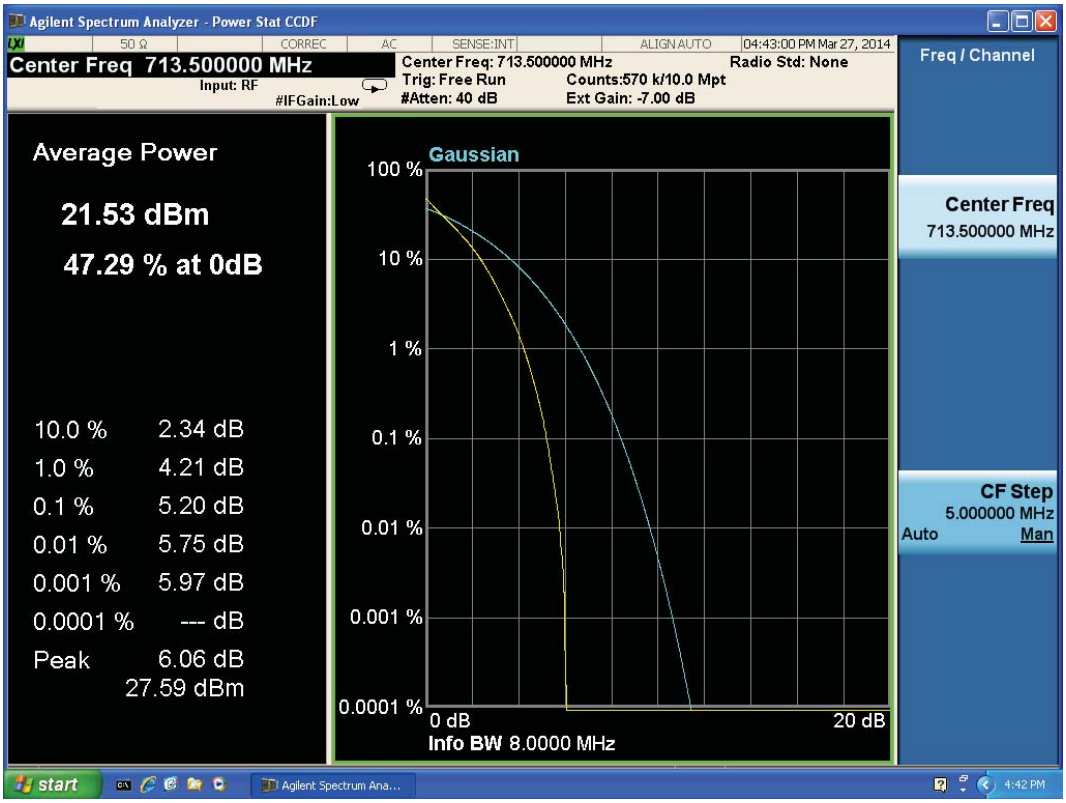
LTE Band 17					
RB	Modulation	Bandwidth ((MHz))	Channel	Frequency (MHz)	Test Result(dB)
100%	QPSK	5	23755	706.5	5.14
			23790	710	5.09
			23825	713.5	5.20
		10	23780	709	5.11
			23790	710	5.29
			23800	711	5.38
	16QAM	5	23755	706.5	5.61
			23790	710	5.55
			23825	713.5	5.68
		10	23780	709	5.50
			23790	710	5.84
			23800	711	5.81



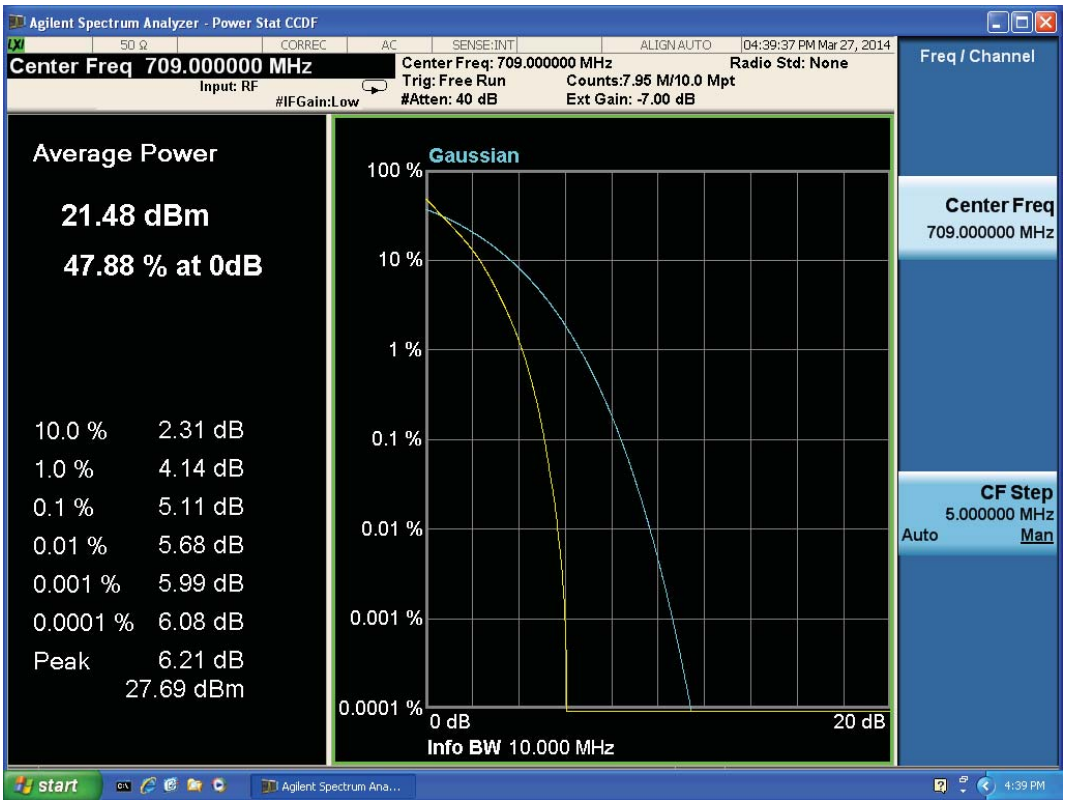
LTE Band 17 QPSK Bandwidth = 5MHz CH23755



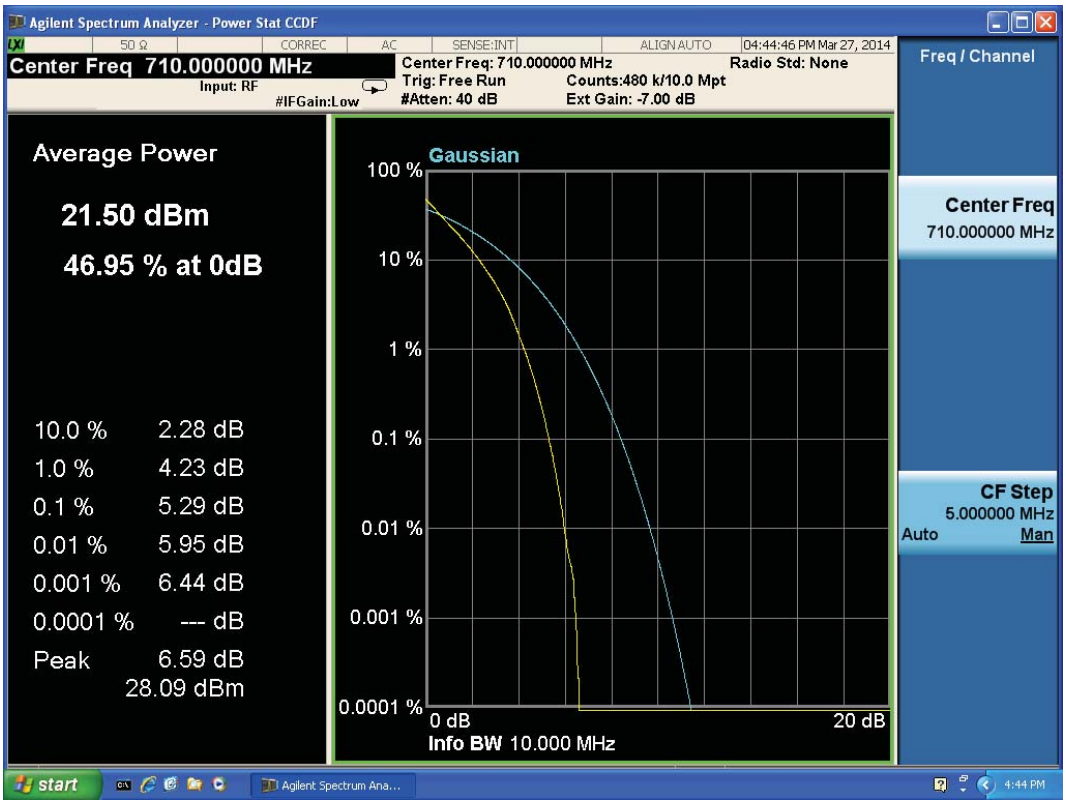
LTE Band 17 QPSK Bandwidth = 5MHz CH23790



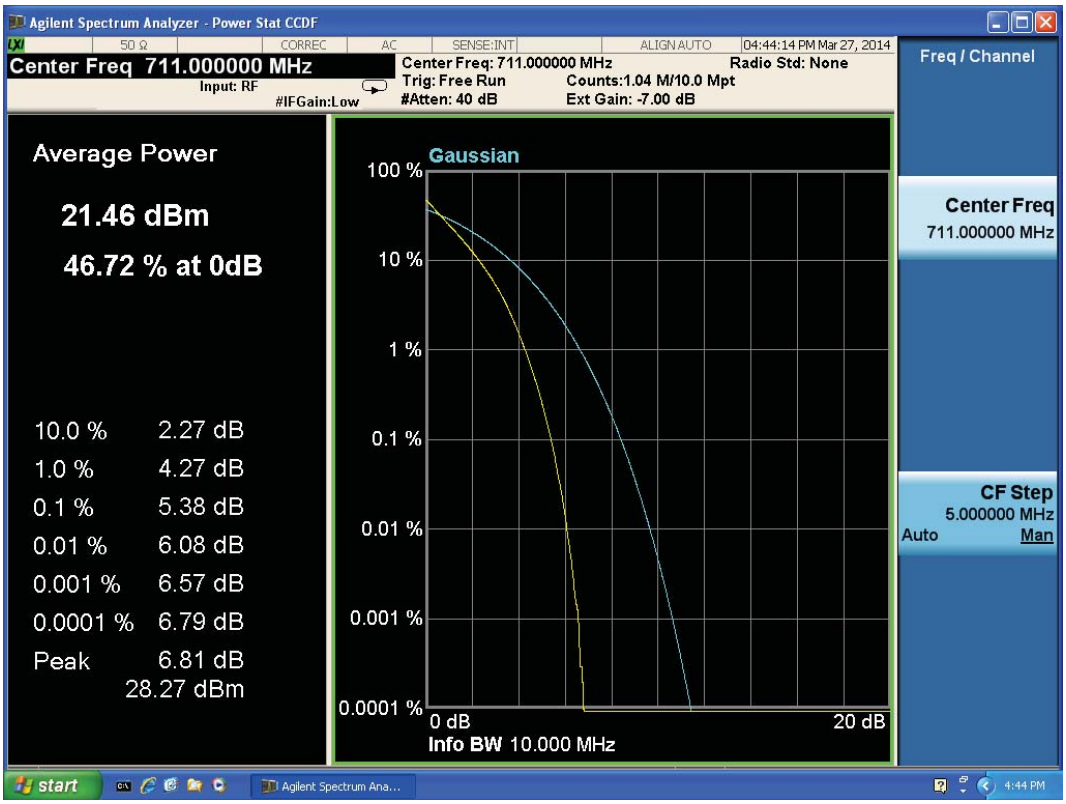
LTE Band 17 QPSK Bandwidth = 5MHz CH23825



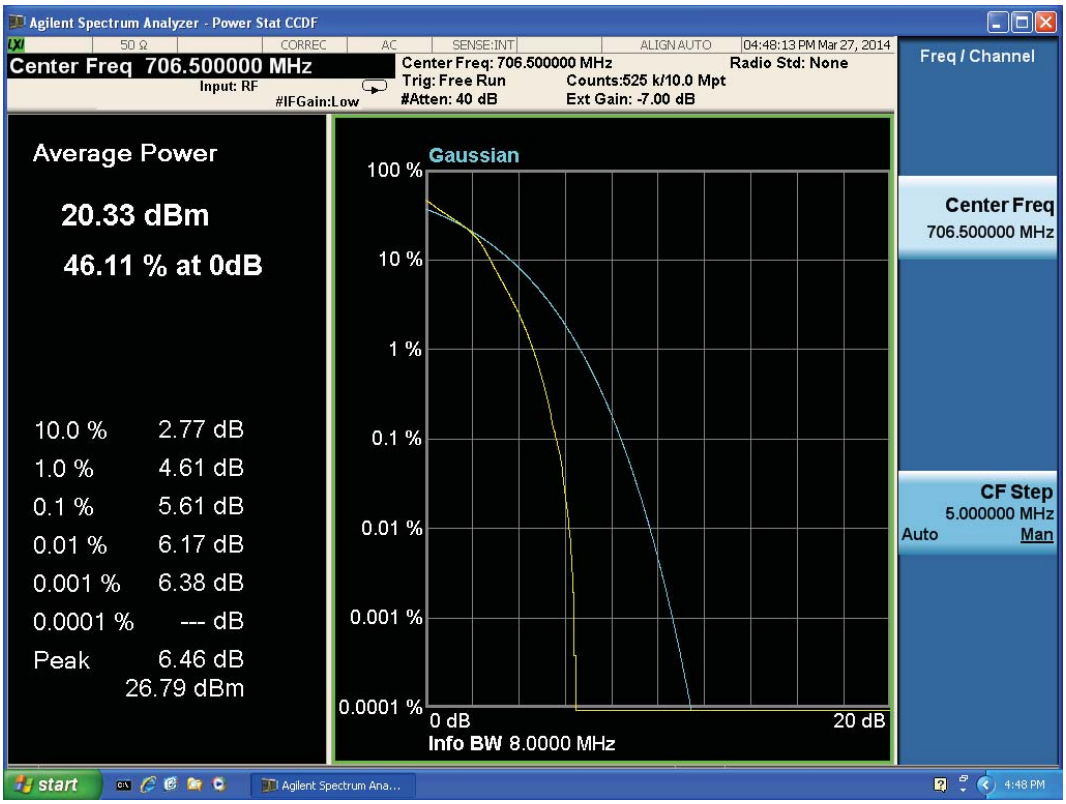
LTE Band 17 QPSK Bandwidth = 10MHz CH23780



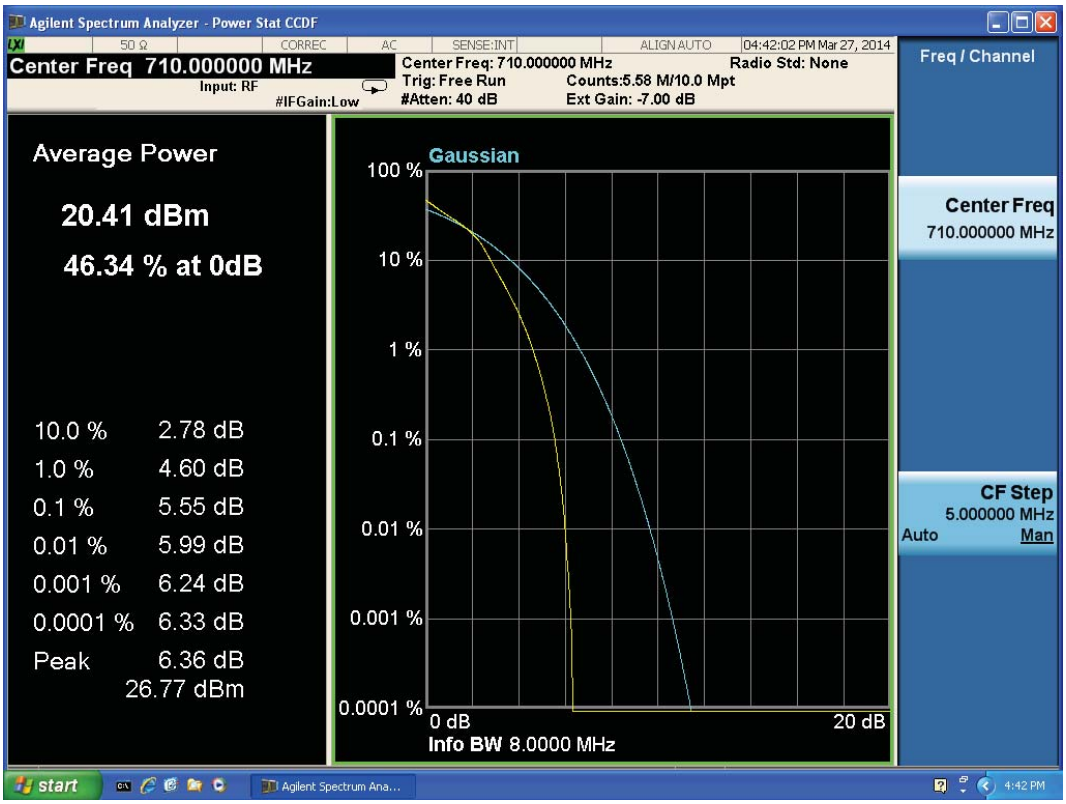
LTE Band 17 QPSK Bandwidth = 10MHz CH23790



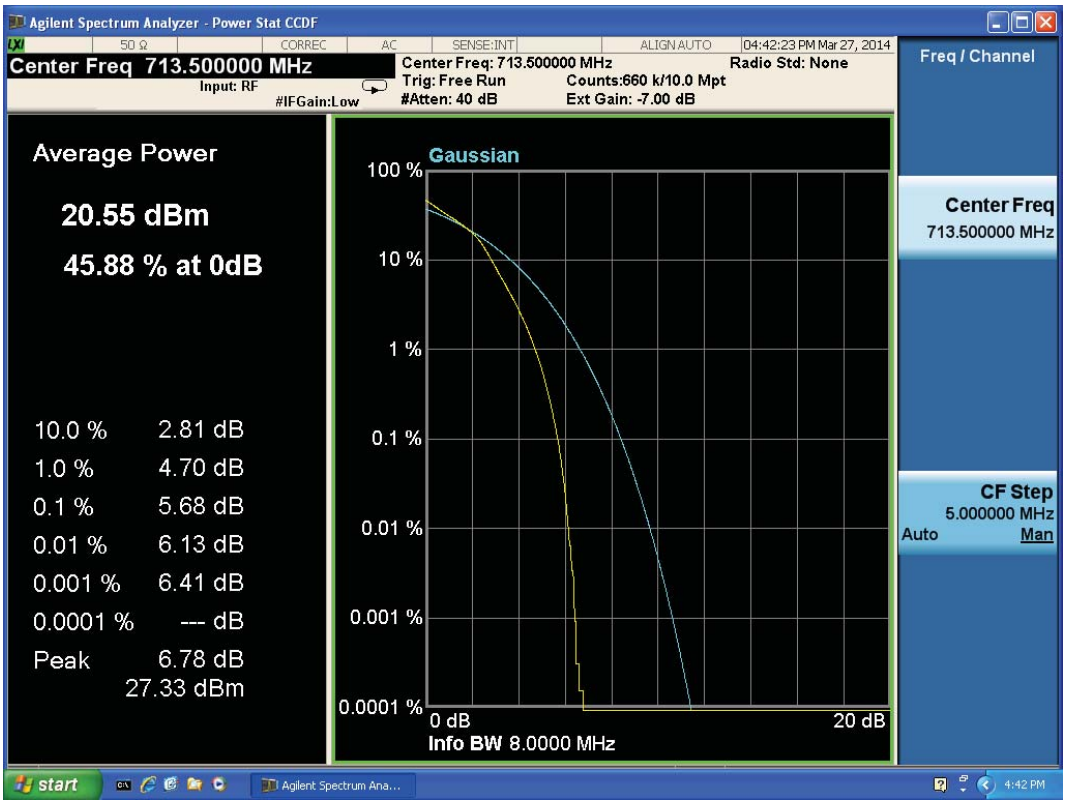
LTE Band 17 QPSK Bandwidth = 10MHz CH20350



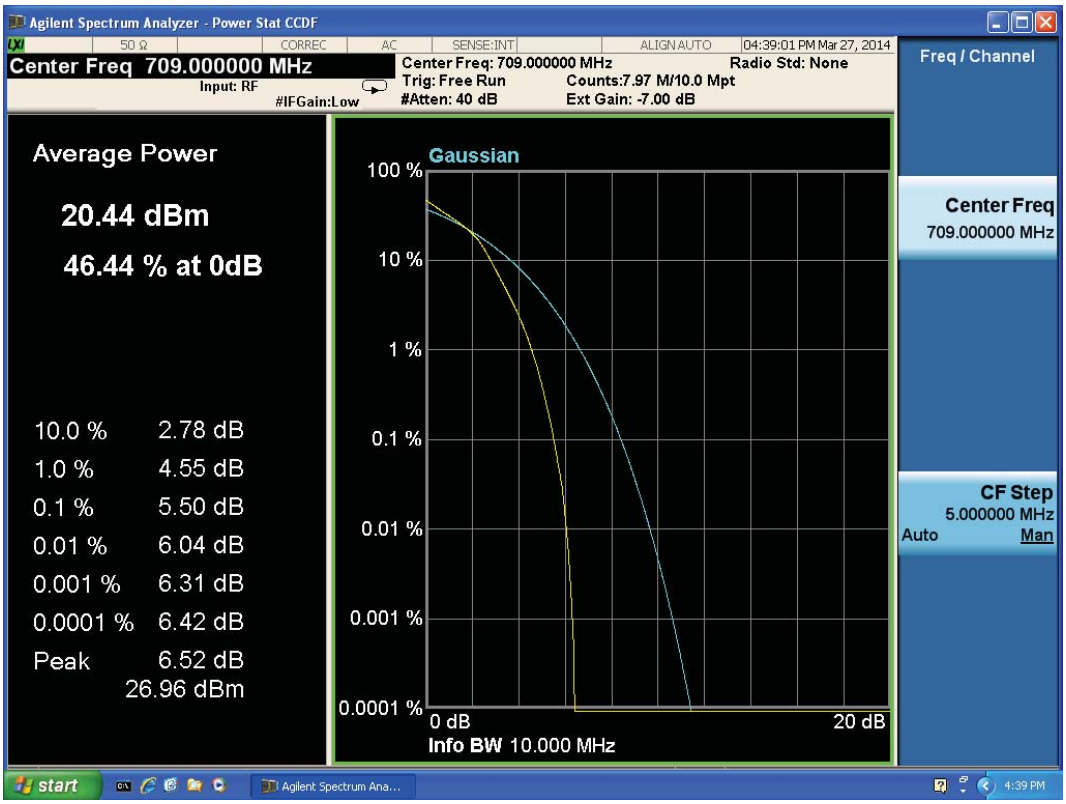
LTE Band 17 16QAM Bandwidth = 5MHz CH23755



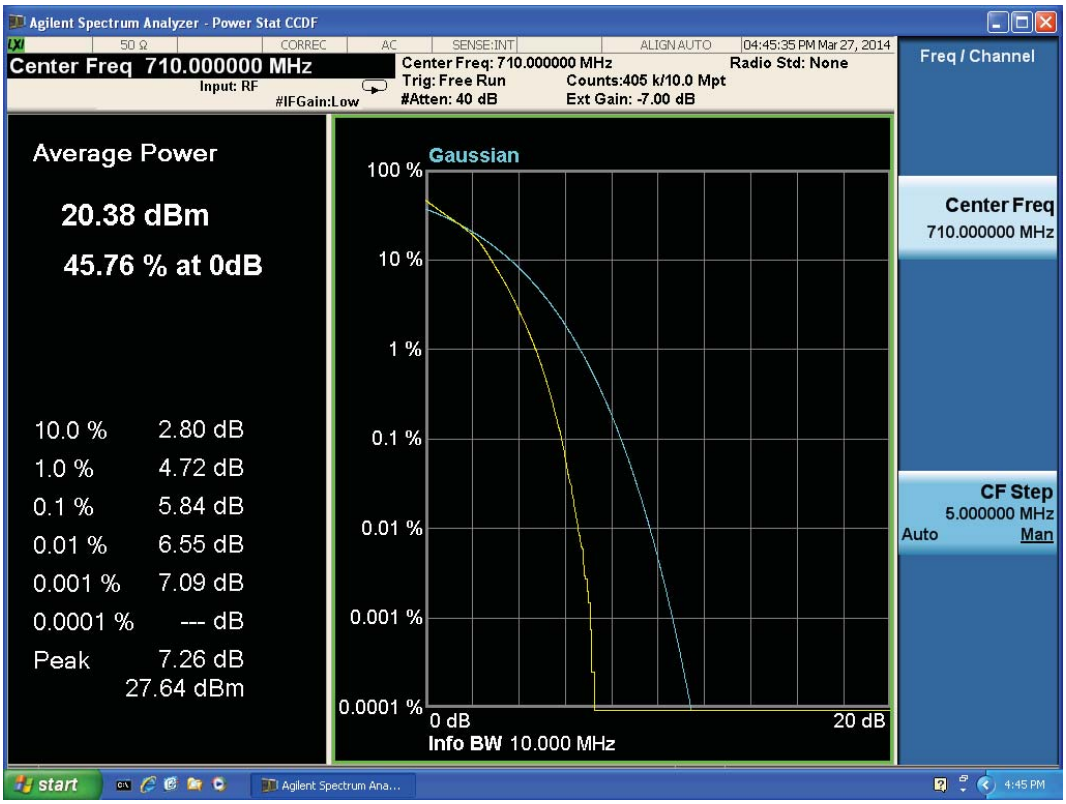
LTE Band 17 16QAM Bandwidth = 5MHz CH23790



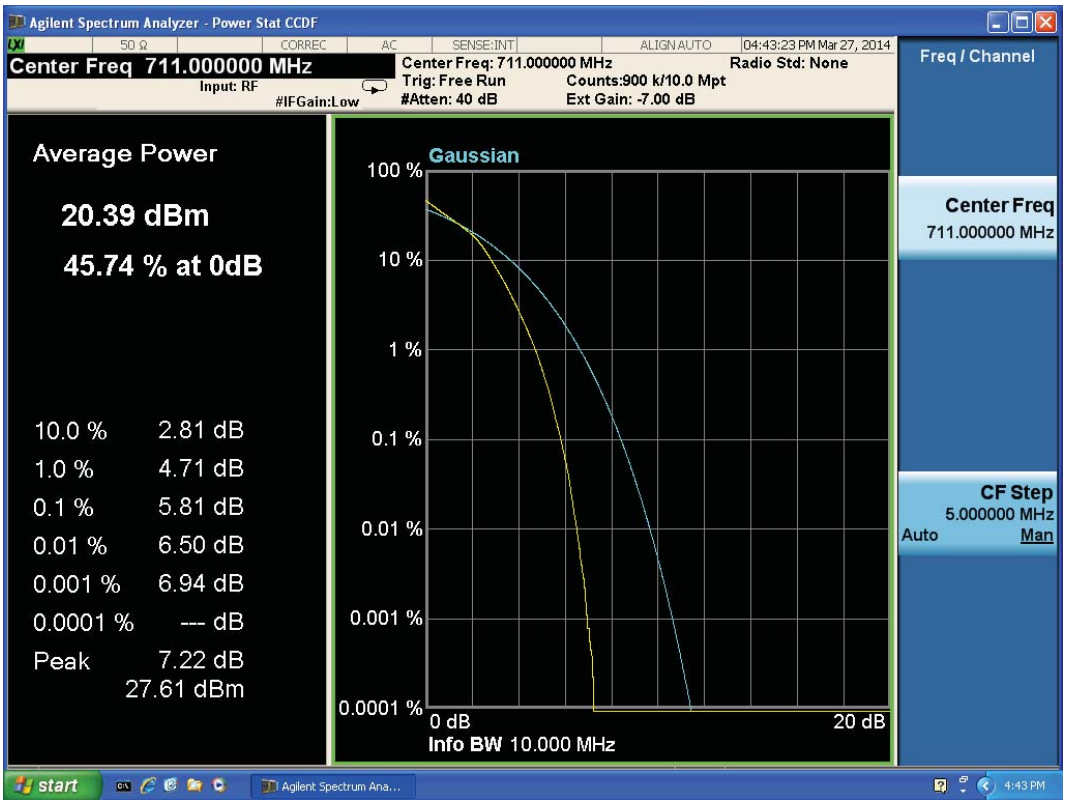
LTE Band 17 16QAM Bandwidth = 5MHz CH23825



LTE Band 17 16QAM Bandwidth = 10MHz CH23780



LTE Band 17 16QAM Bandwidth = 10MHz CH23790



LTE Band 17 16QAM Bandwidth = 10MHz CH20350

2.7. Frequency Stability

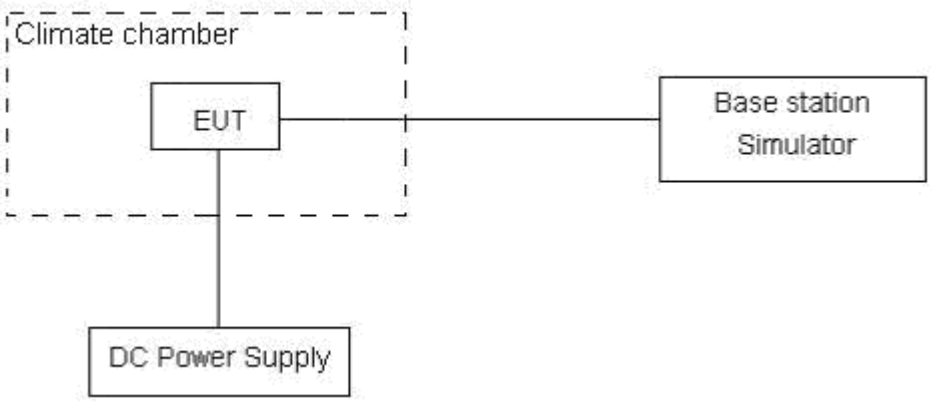
Ambient condition

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 0°C to +40°C in 10°C step size,
   (1) With all power removed, the temperature was decreased to 0°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 0°C to +40°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 3.5 V and 4.2 V, with a nominal voltage of 3.7V.

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*= 0.01ppm.

Test Result

LTE Band 4

Channel Bandwidth(MHz), 100%RB	Temperature (° C)	Test Results (ppm) / 3.7 V Power supply Channel 20175	
		QPSK	16QAM
1.4	40	-0.00479	0.00254
	30	-0.00185	0.001732
	20	0.000115	-0.00035
	10	-0.00196	0.001847
	0	-0.00439	0.00456
3	40	0.00733	-0.00283
	30	0.005137	-0.00202
	20	0.003636	-0.0041
	10	0.003348	-0.00485
	0	0.00254	-0.0045
5	40	0.003175	-0.00144
	30	0.002482	-0.00398
	20	0.001212	-0.00087
	10	0.002251	-0.0041
	0	0.004618	0.004271
10	40	0.000231	0.002193
	30	0.00075	0.002597
	20	0.00254	0.00381
	10	0.002597	0.004618
	0	0.00456	0.006061
15	40	0.001385	0.002713
	30	0.002482	0.003694
	20	-0.00087	0.006234
	10	-0.00323	0.002771
	0	-0.00133	0.003059
20	40	-0.00514	0.001385
	30	-0.00375	0.002482
	20	-0.00652	0.002136
	10	-0.00462	0.003348
	0	-0.0026	0.003232

Channel Bandwidth(MHz), 100%RB	Voltage (V)	Test Results(ppm) / 20° C Channel 20175	
		QPSK	16QAM
1.4	4.2	-0.00162	0.006811
	3.7	0.000115	-0.00035
	3.5	0.006522	-0.003
3	4.2	0.005599	-0.00664
	3.7	0.003636	-0.0041
	3.5	0.004964	-0.00225
5	4.2	0.001616	0.001905
	3.7	0.001212	-0.00087
	3.5	0.001501	0.001212
10	4.2	0.005137	0.007792
	3.7	0.00254	0.00381
	3.5	0.003867	0.004387
15	4.2	-0.00543	0.001212
	3.7	-0.00087	0.006234
	3.5	-0.0045	0.005195
20	4.2	-0.00127	0.000866
	3.7	-0.00652	0.002136
	3.5	-0.00231	0.001962

LTE Band 7

Channel Bandwidth(MHz), 100%RB	Temperature (° C)	Test Results (ppm) / 3.7 V Power supply Channel 21100	
		QPSK	16QAM
5	40	0.00351085	0.003432
	30	0.00114398	0.006312
	20	0.00134122	0.003748
	10	7.8895E-05	0.004181
	0	0.00280079	0.002209
10	40	0.00071006	0.00568
	30	0.00153846	0.004063
	20	0.00145957	0.003787
	10	-0.0001578	0.002446
	0	0.00059172	0.003393
15	40	0.00445759	-0.00414
	30	0.00418146	-0.00276
	20	0.00284024	-0.00185
	10	0.00378698	-0.00256
	0	0.00378698	0.004024
20	40	0.00209073	0.002051
	30	0.00098619	0.001854
	20	0.00126233	0.000394
	10	0.00177515	0.001105
	0	-0.0004339	0.004852

Channel Bandwidth(MHz), 100%RB	Voltage (V)	Test Results(ppm) / 20° C Channel 21100	
		QPSK	16QAM
5	4.2	0.000197	0.002367
	3.7	0.00134122	0.003748
	3.5	0.000947	0.003945
10	4.2	0.004339	-0.00355
	3.7	0.00145957	0.003787
	3.5	0.006075	-0.00544
15	4.2	0.003077	0.004576
	3.7	0.00284024	-0.00185
	3.5	0.003116	0.003077
20	4.2	-0.00213	0.003471
	3.7	0.00126233	0.000394
	3.5	0.003037	0.001262

LTE Band 7

Channel Bandwidth(MHz), 100%RB	Temperature (° C)	Test Results (ppm) / 3.7 V Power supply Channel 23790	
		QPSK	16QAM
5	40	0.013521	0.014366
	30	0.010986	0.016338
	20	0.011127	0.010986
	10	0.007465	0.007324
	0	0.003521	0.00662
10	40	0.015775	0.010563
	30	0.019155	0.006197
	20	0.010845	0.004507
	10	0.004507	0.001408
	0	0.006338	0.003944

Channel Bandwidth(MHz), 100%RB	Voltage (V)	Test Results(ppm) / 20° C Channel 21100	
		QPSK	16QAM
5	4.2	0.006197	0.004648
	3.7	0.011127	0.010986
	3.5	0.021549	0.012113
10	4.2	-0.00155	0.017324
	3.7	0.010845	0.004507
	3.5	-0.00761	0.012394

2.8. Spurious Emissions at Antenna Terminals

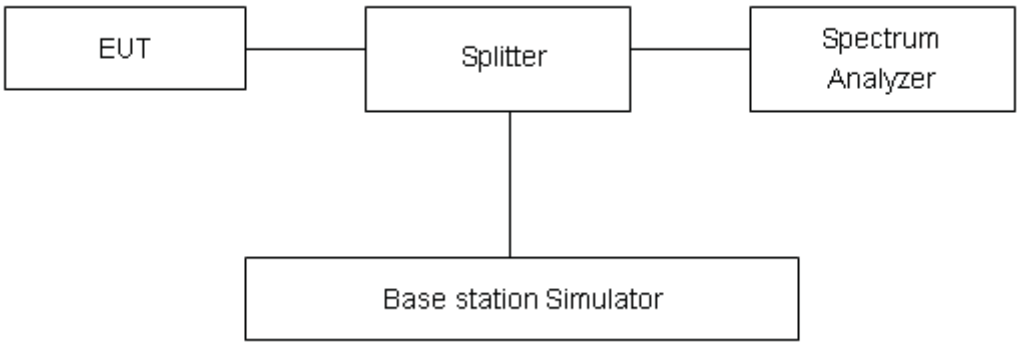
Ambient condition

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

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to the 10th harmonic of the carrier. The peak detector is used. RBW and VBW are set to 100 kHz for the carrier frequency, or RBW and VBW are set to 1MHz(other frequency), Sweep is set to ATUO.
Of those disturbances below (limit – 20 dB), the mark is not required for the EUT.
We tested all modes for LTE Band 4/7/17. The worst emission was recorded in the report.

Test setup



Limits

Rule Part 27.53(h) specifies that “the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log10(P) dB.”

Limit	-13 dBm

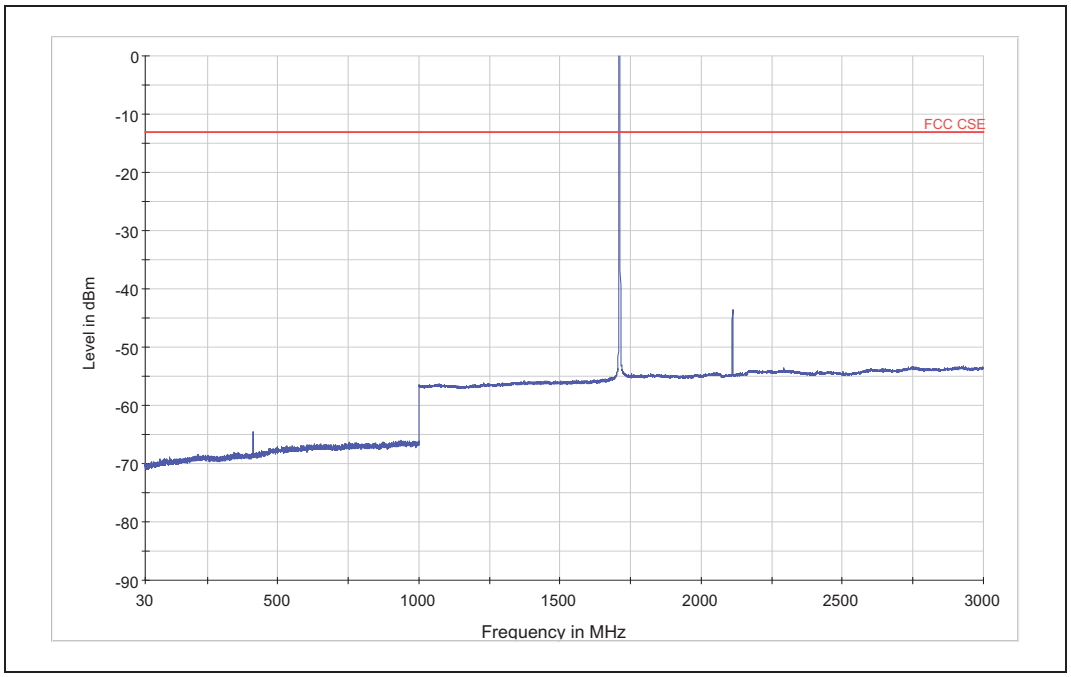
Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75％ confidence level for the normal distribution is with the coverage factor *k* = 1.96.

Frequency	Uncertainty
100kHz-2GHz	0.684 dB
Above 2GHz	1.407 dB

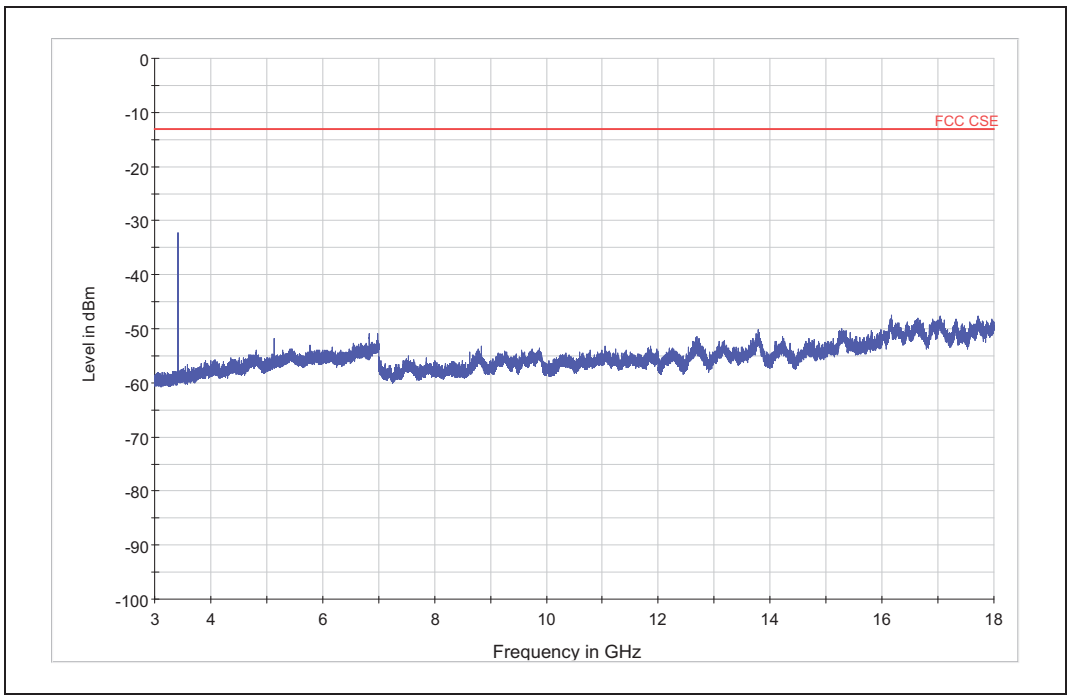
Test Result: PASS

LTE Band 4 QPSK Bandwidth = 1.4MHz CH19957,RB 1



Note: The signal beyond the limit is carrier.

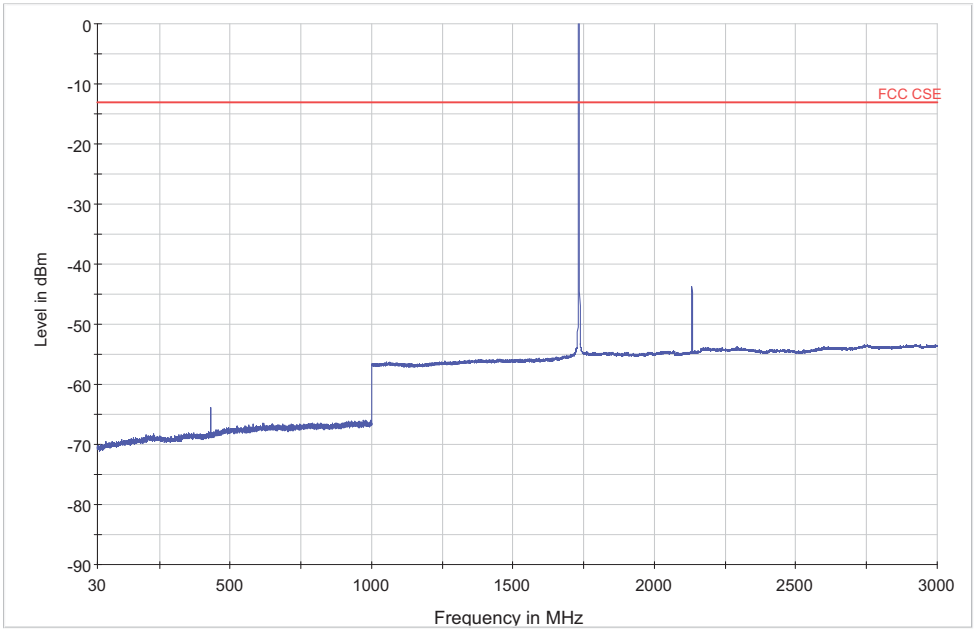
LTE Band 4 19957 Channel 30MHz~3GHz



LTE Band 4 19957 Channel 3GHz~18GHz

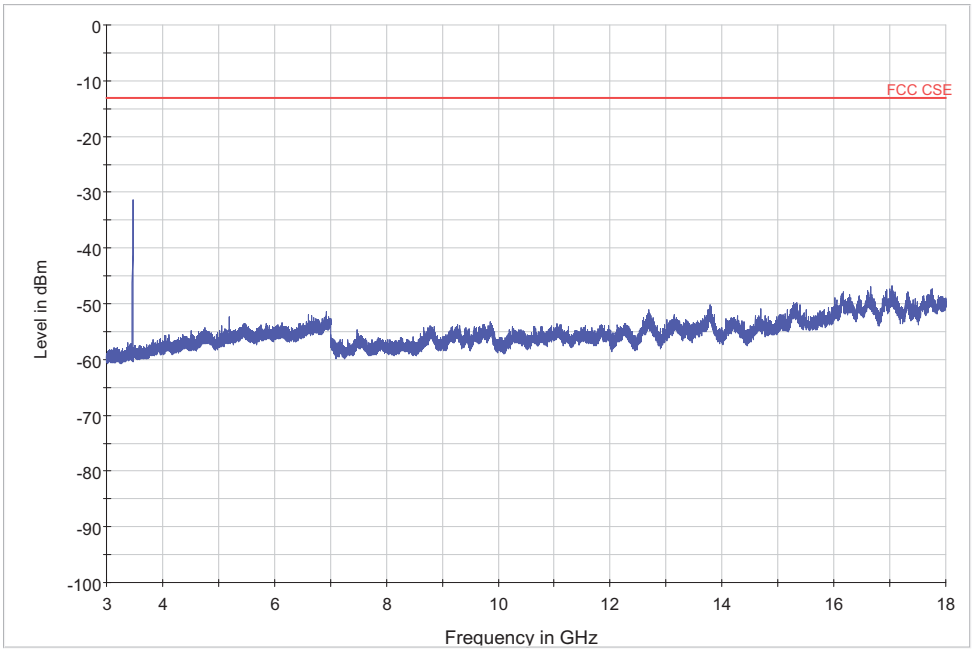
Harmonic	TX ch. 19957 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3420.4	-32.18	-13	19.18

LTE Band 4 QPSK Bandwidth = 1.4MHz CH20175,RB 1



Note: The signal beyond the limit is carrier.

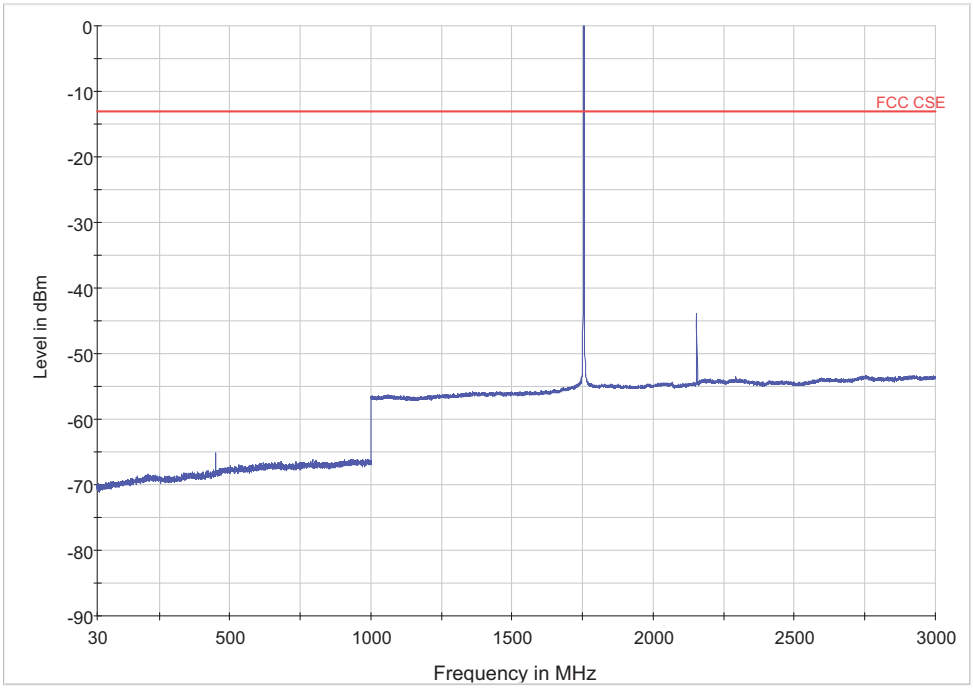
LTE Band 4 20175 Channel 30MHz~3GHz



LTE Band 4 20175 Channel 3GHz ~18GHz

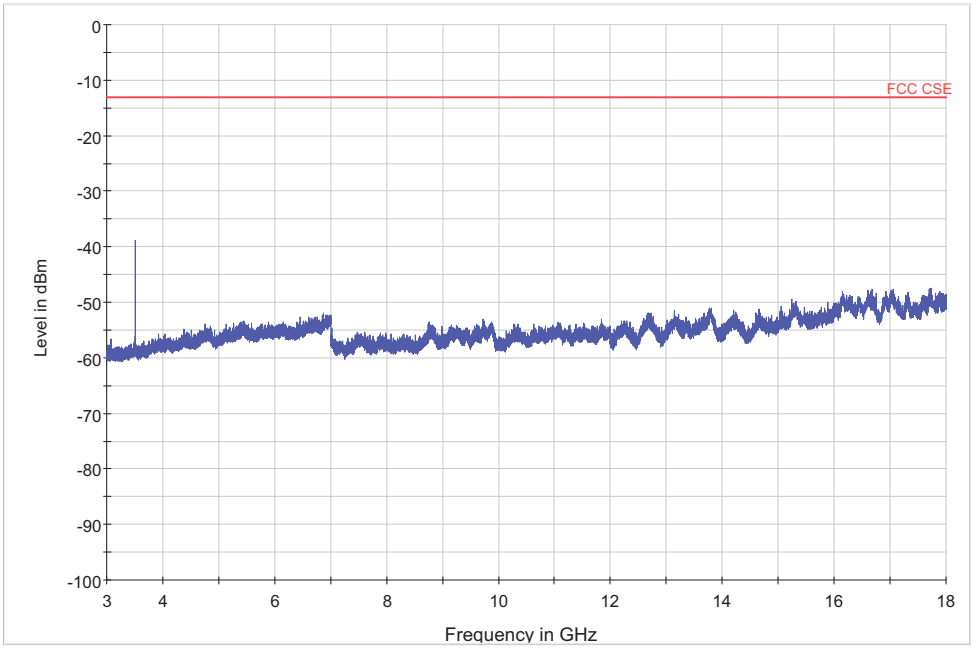
Harmonic	TX ch. 20175 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3463.9	-31.38	-13	18.38

LTE Band 4 QPSK Bandwidth = 1.4MHz CH20393,RB 1



Note: The signal beyond the limit is carrier.

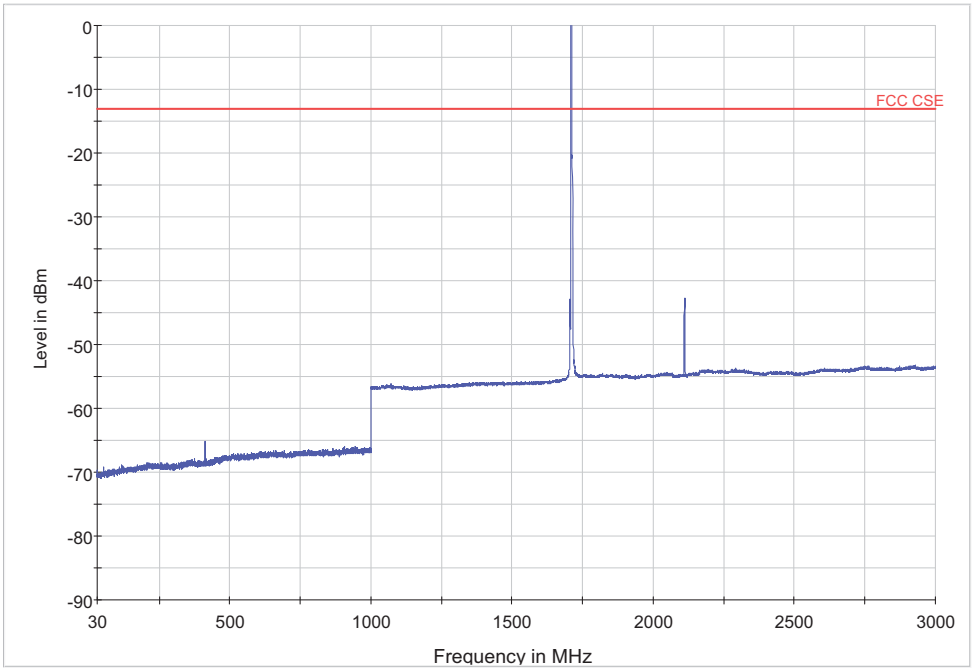
LTE Band 4 20393 Channel 30MHz~3GHz



LTE Band 4 20393 Channel 3GHz ~18GHz

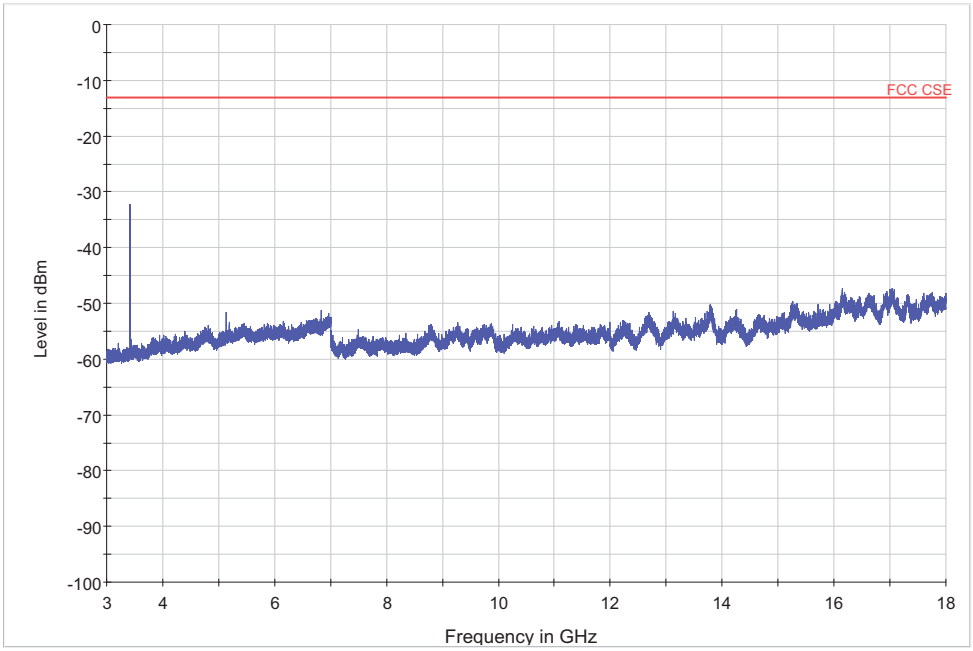
Harmonic	TX ch. 20393 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3507.8	-38.95	-13	25.95

LTE Band 4 QPSK Bandwidth = 3MHz CH19965,RB 1



Note: The signal beyond the limit is carrier.

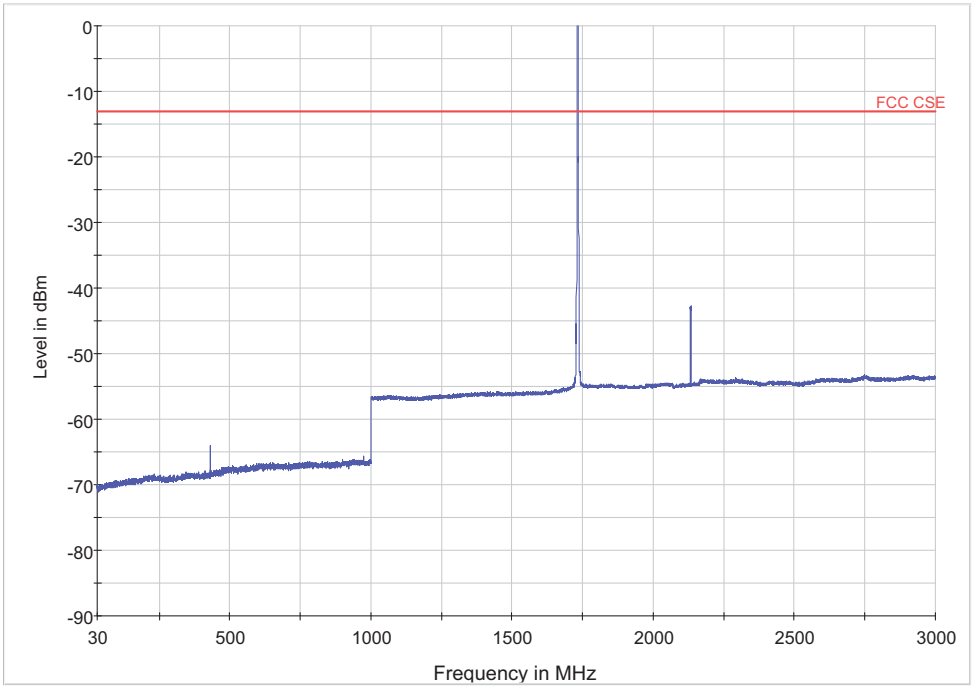
LTE Band 4 19965 Channel 30MHz~3GHz



LTE Band 4 19965 Channel 3GHz~18GHz

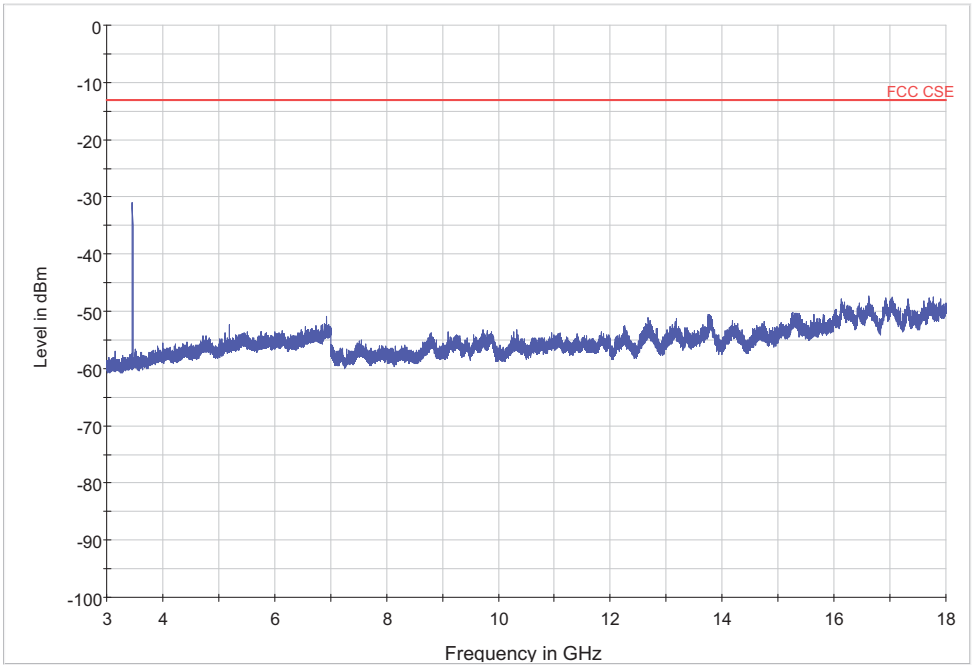
Harmonic	TX ch. 19965 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3420.4	-32.24	-13	19.24

LTE Band 4 QPSK Bandwidth = 3MHz CH20175,RB 1



Note: The signal beyond the limit is carrier.

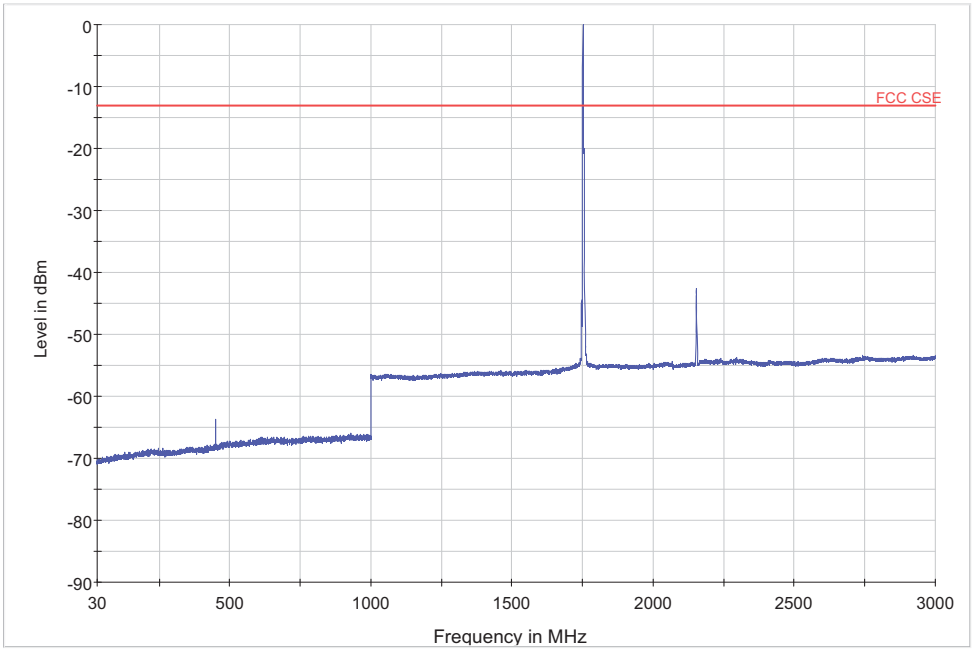
LTE Band 4 20175 Channel 30MHz~3GHz



LTE Band 4 20175 Channel 3GHz~18GHz

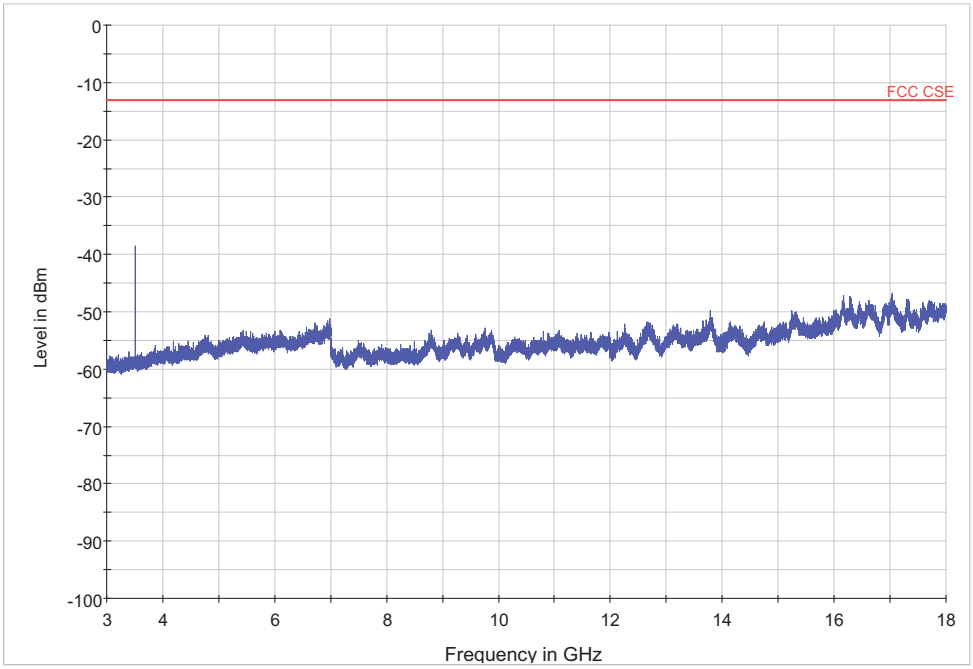
Harmonic	TX ch. 20175 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3462.4	-31.06	-13	18.06

LTE Band 4 QPSK Bandwidth = 3MHz CH20385,RB 1



Note: The signal beyond the limit is carrier.

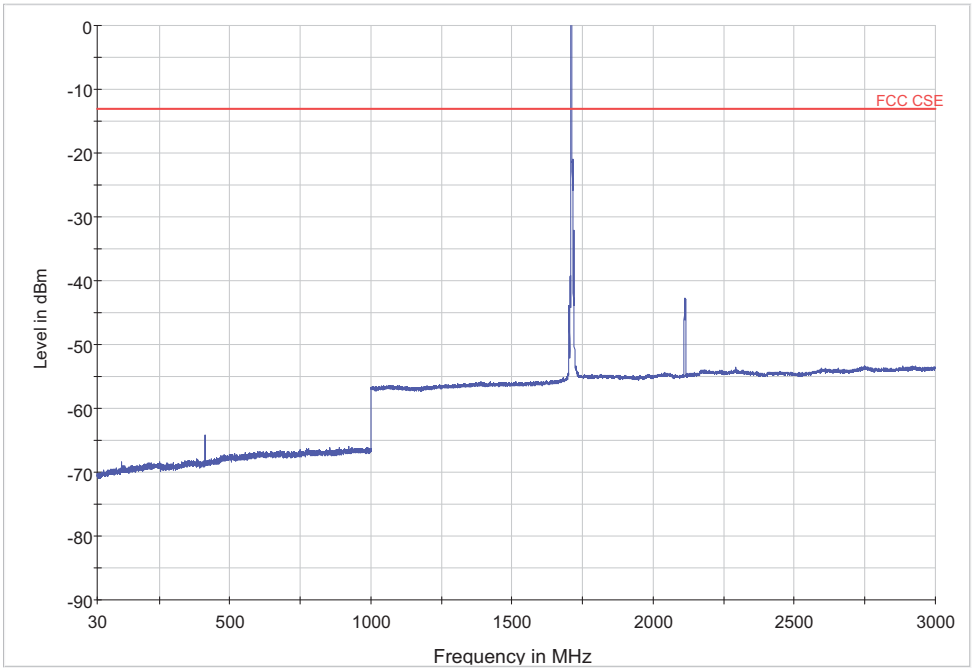
LTE Band 4 20385 Channel 30MHz~3GHz



LTE Band 4 20385 Channel 3GHz~18GHz

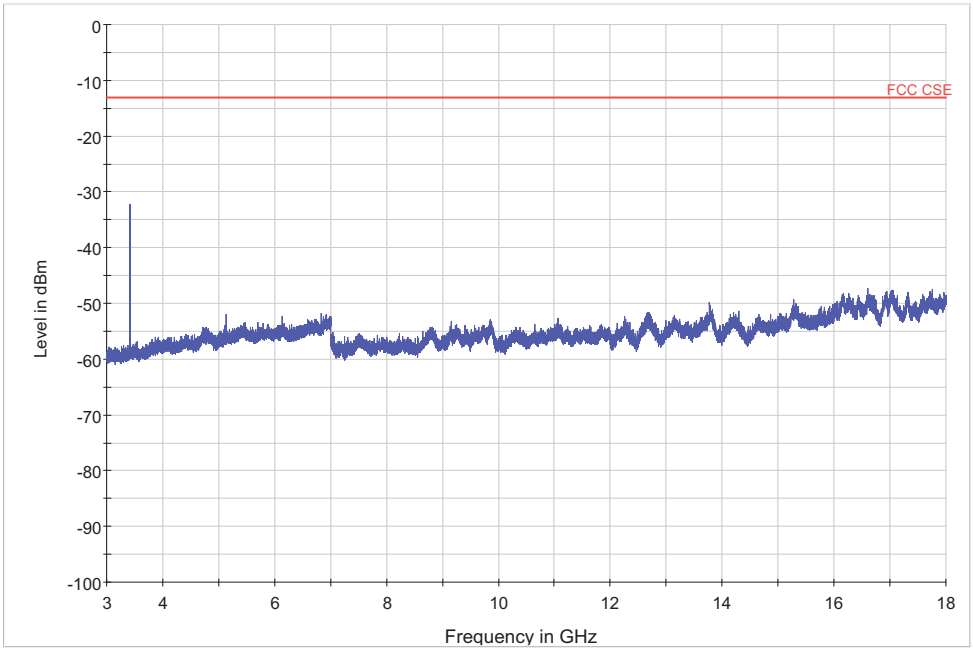
Harmonic	TX ch. 20385 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3504.4	-38.46	-13	25.46

LTE Band 4 QPSK Bandwidth = 5MHz CH19975,RB 1



Note: The signal beyond the limit is carrier.

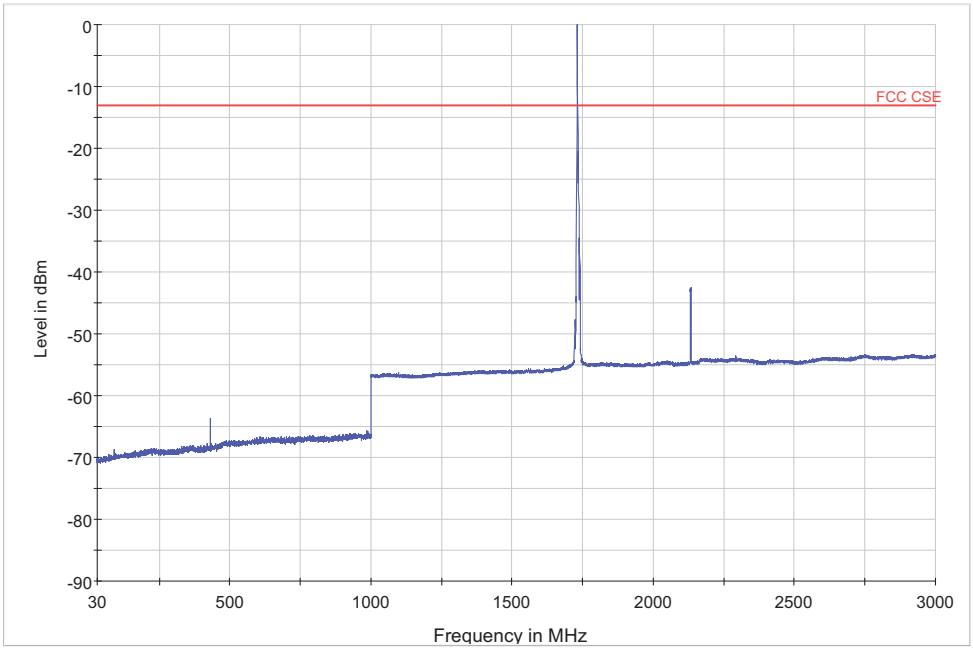
LTE Band 4 19975 Channel 30MHz~3GHz



LTE Band 4 19975 Channel 3GHz~18GHz

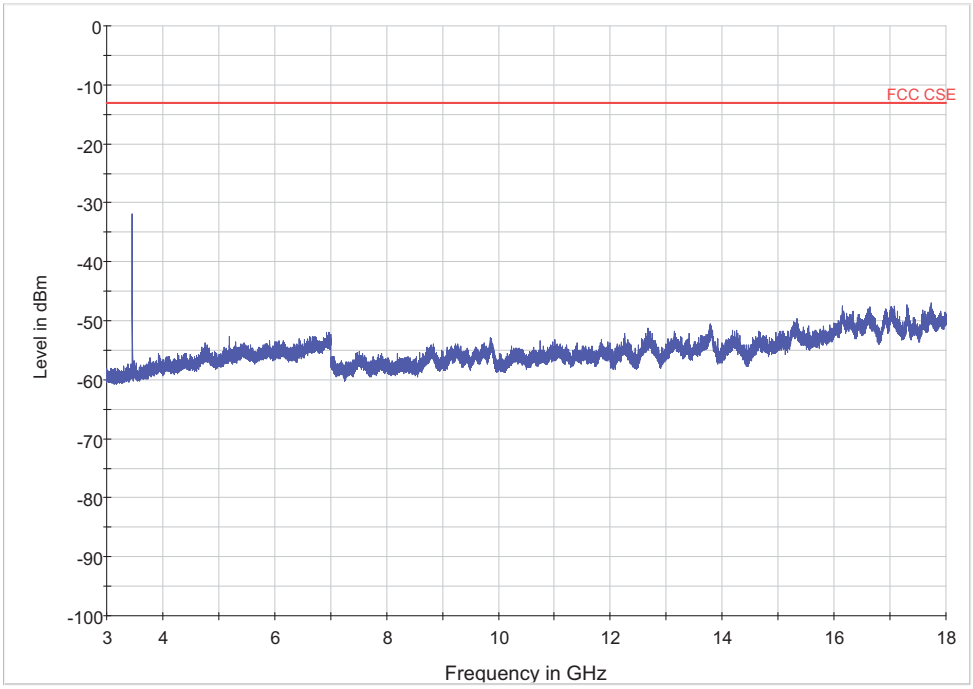
Harmonic	TX ch. 19975 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3420.8	-32.28	-13	19.28

LTE Band 4 QPSK Bandwidth = 5MHz CH20175,RB 1



Note: The signal beyond the limit is carrier.

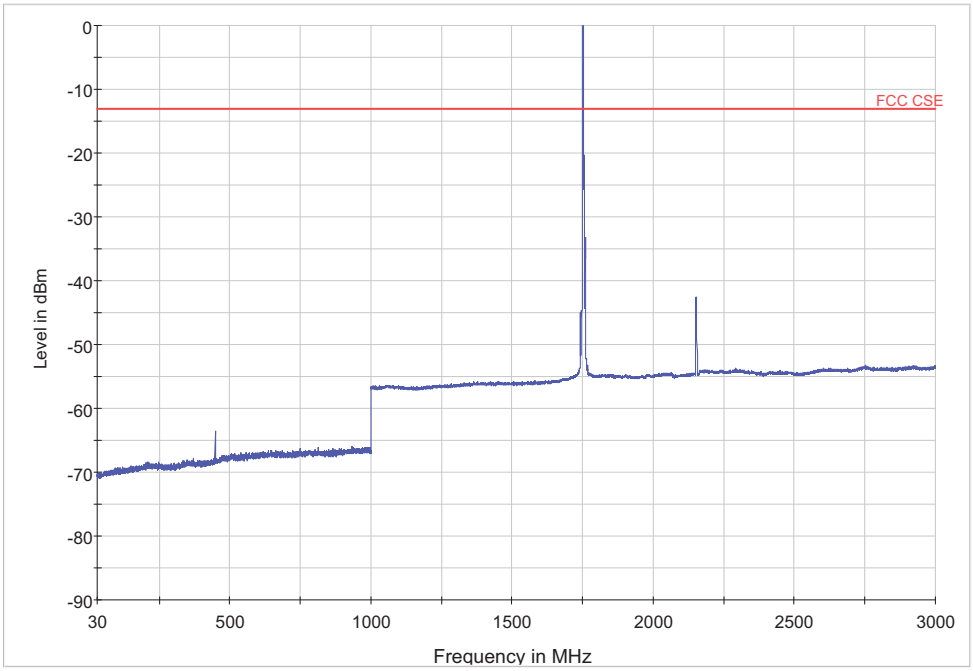
LTE Band 4 20175 Channel 30MHz~3GHz



LTE Band 4 20175 Channel 3GHz~18GHz

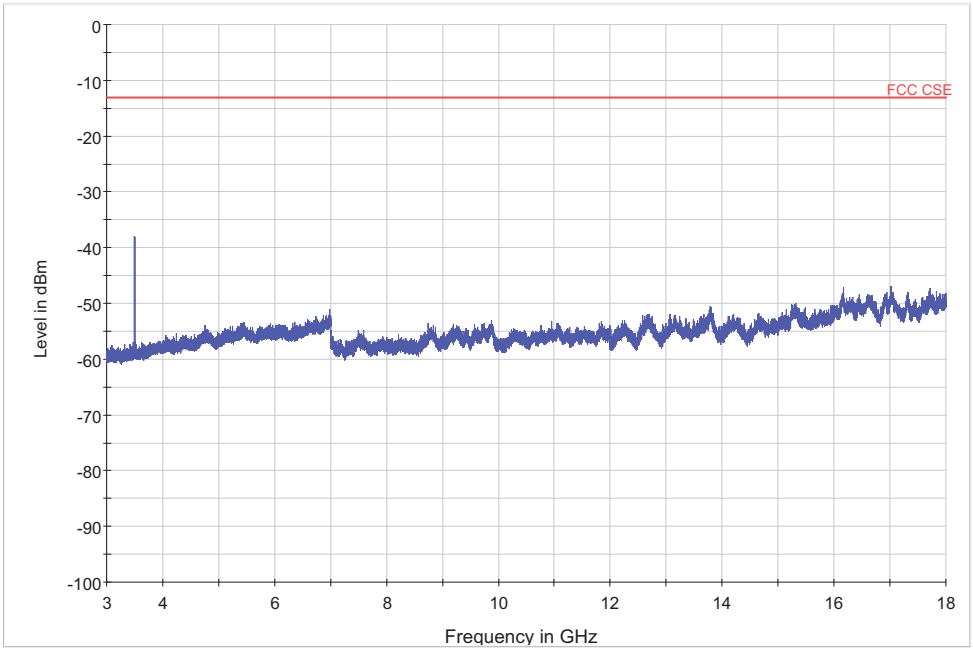
Harmonic	TX ch. 20175 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3460.5	-31.86	-13	18.86

LTE Band 4 QPSK Bandwidth = 5MHz CH20375,RB 1



Note: The signal beyond the limit is carrier.

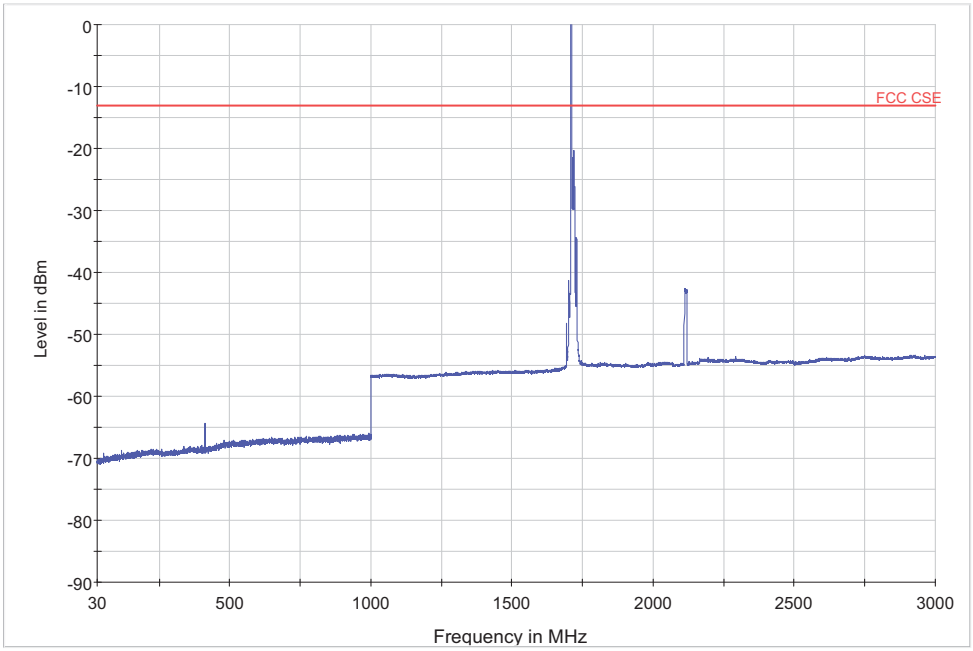
LTE Band 4 20375 Channel 30MHz~3GHz



LTE Band 4 20375 Channel 3GHz~18GHz

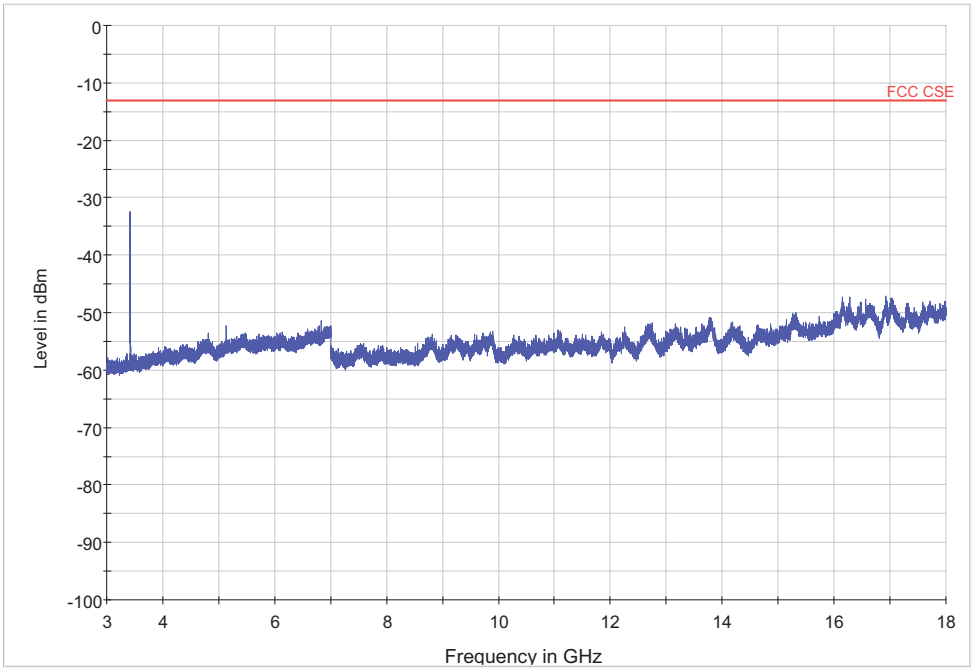
Harmonic	TX ch. 20375 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3500.6	-38.07	-13	25.07

LTE Band 4 QPSK Bandwidth = 10MHz CH20000,RB 1



Note: The signal beyond the limit is carrier.

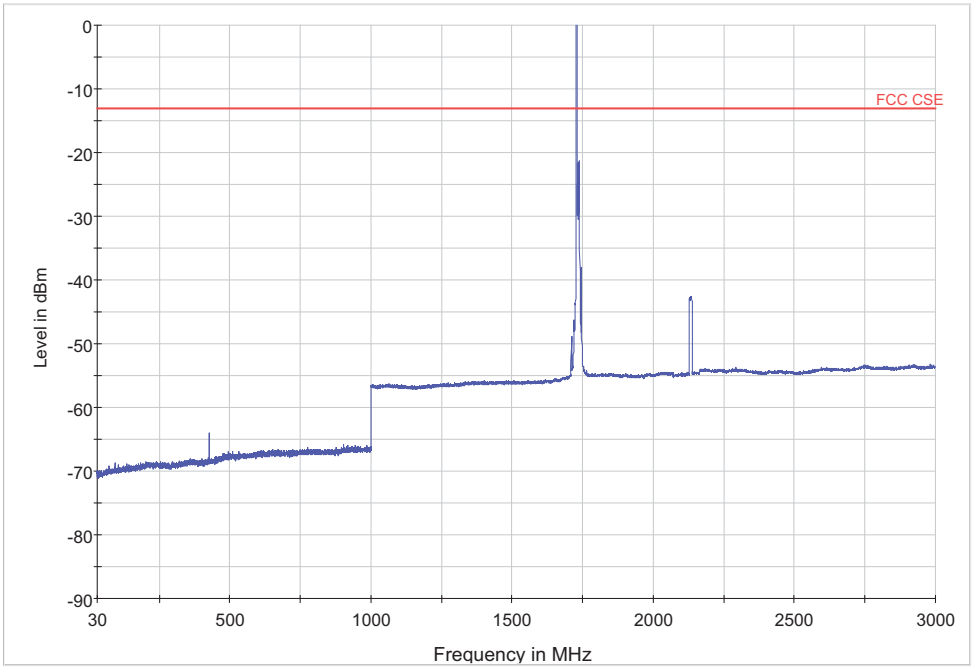
LTE Band 4 20000 Channel 30MHz~3GHz



LTE Band 4 20000 Channel 3GHz~18GHz

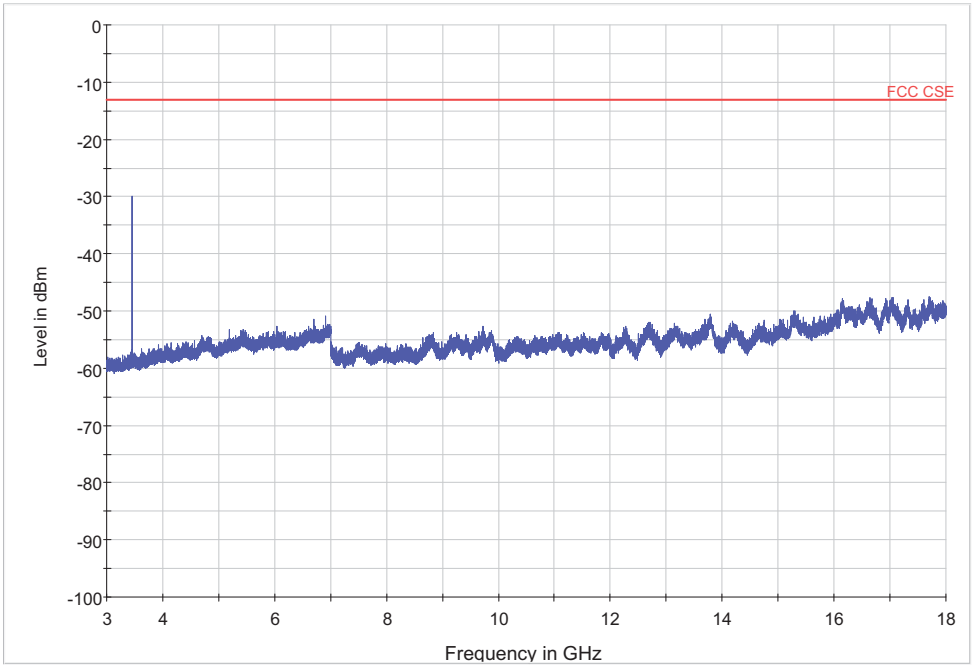
Harmonic	TX ch. 20000 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3421.1	-32.42	-13	19.42

LTE Band 4 QPSK Bandwidth = 10MHz CH20175,RB 1



Note: The signal beyond the limit is carrier.

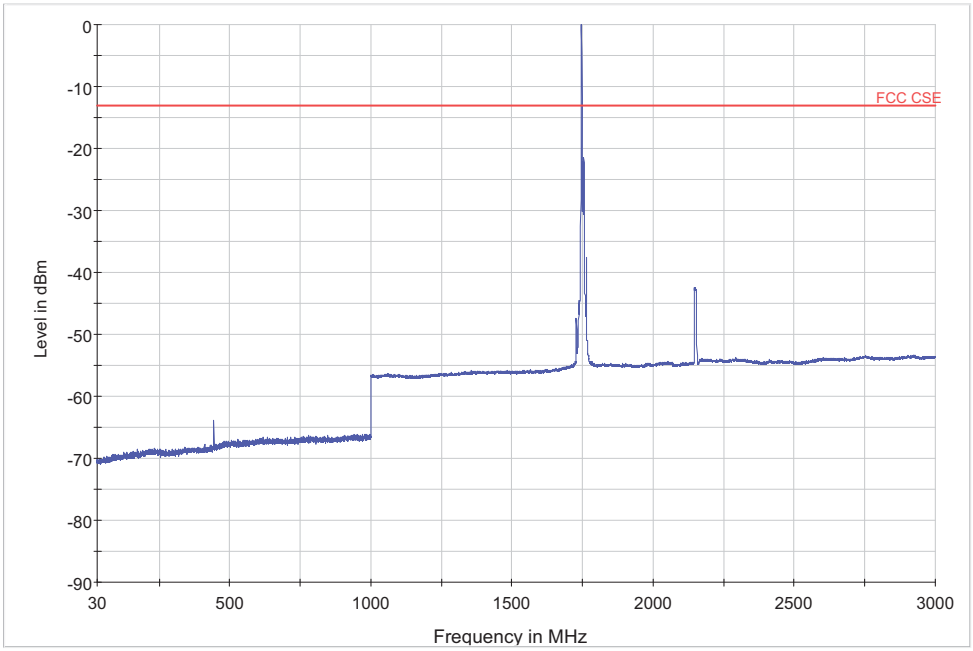
LTE Band 4 20175 Channel 30MHz~3GHz



LTE Band 4 20175 Channel 3GHz~18GHz

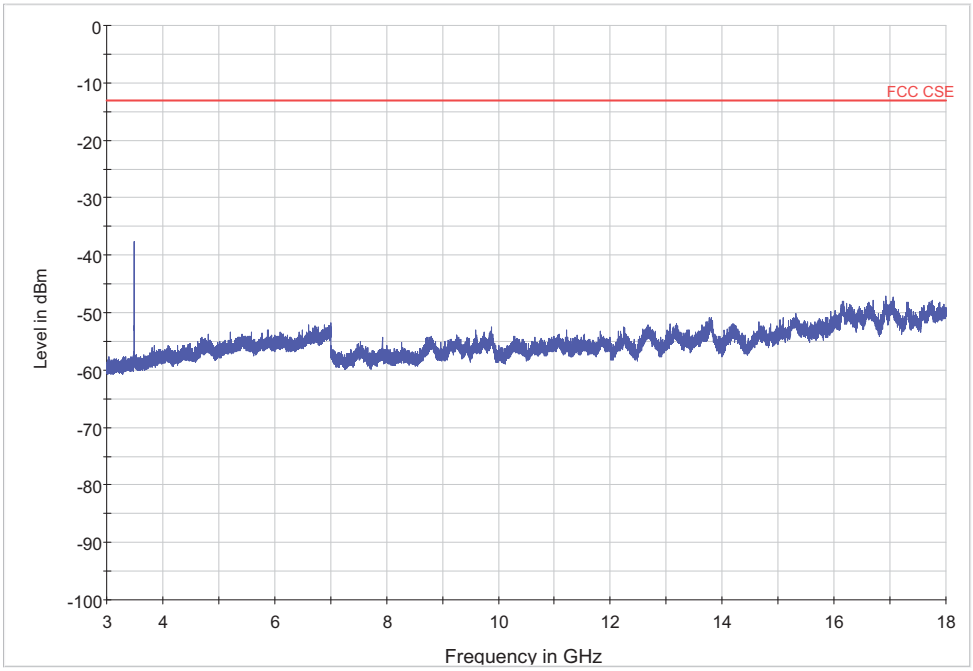
Harmonic	TX ch. 20175 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3456.4	-31.68	-13	18.68

LTE Band 4 QPSK Bandwidth = 10MHz CH20350,RB 1



Note: The signal beyond the limit is carrier.

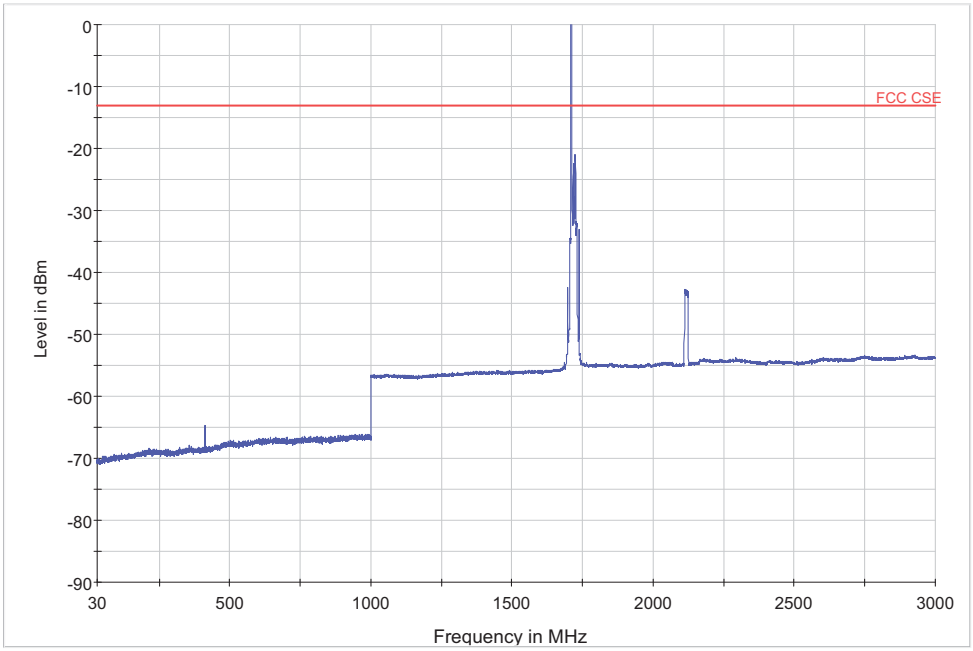
LTE Band 4 20350 Channel 30MHz~3GHz



LTE Band 4 20350 Channel 3GHz ~18GHz

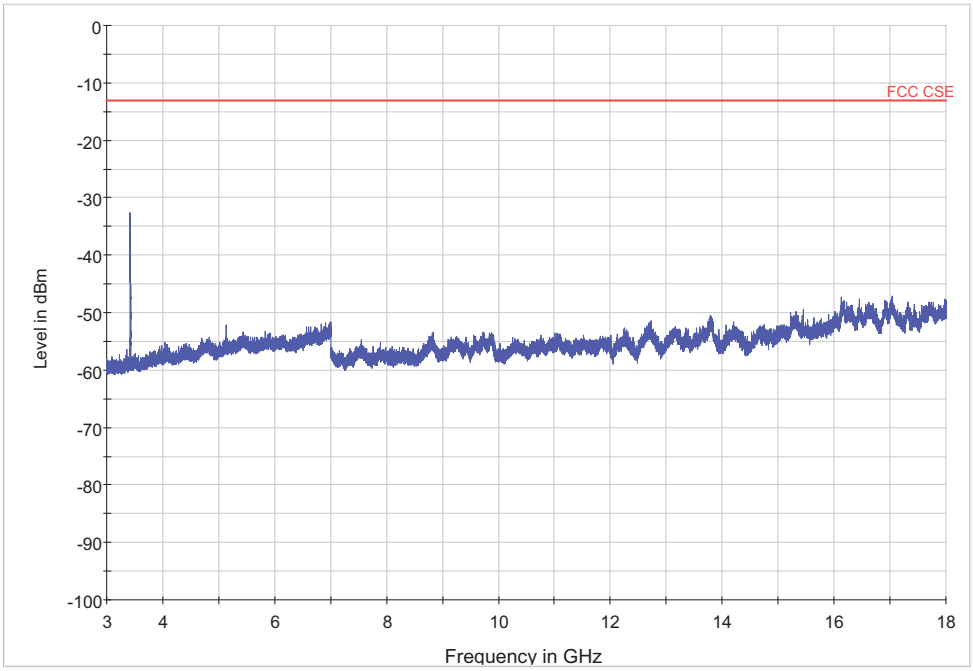
Harmonic	TX ch. 20350 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3491.3	-37.79	-13	24.79

LTE Band 4 QPSK Bandwidth = 15MHz CH20025,RB 1



Note: The signal beyond the limit is carrier.

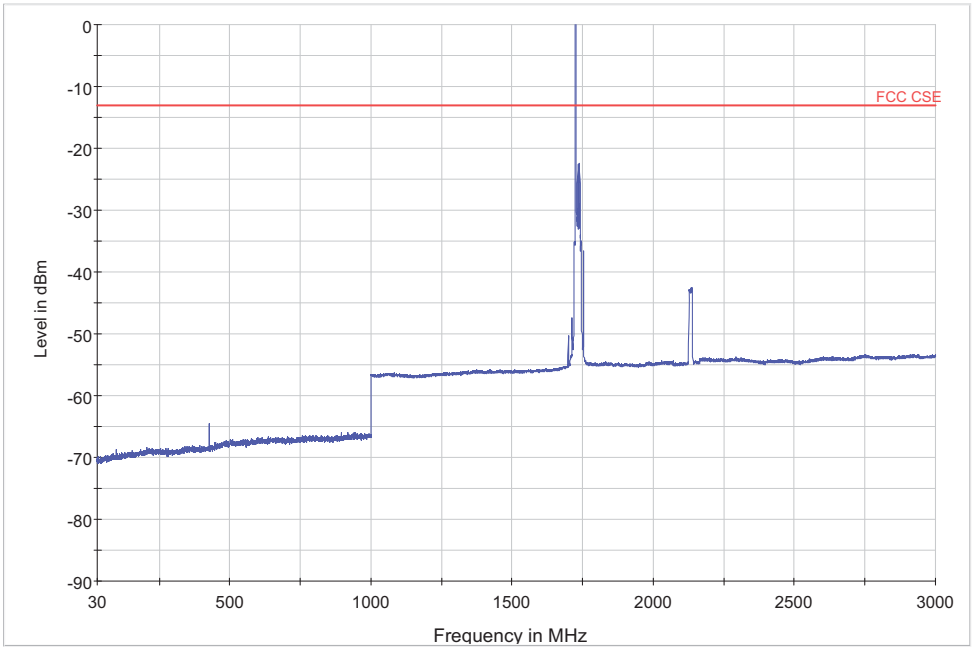
LTE Band 4 20025 Channel 30MHz~3GHz



LTE Band 4 20025 Channel 3GHz~18GHz

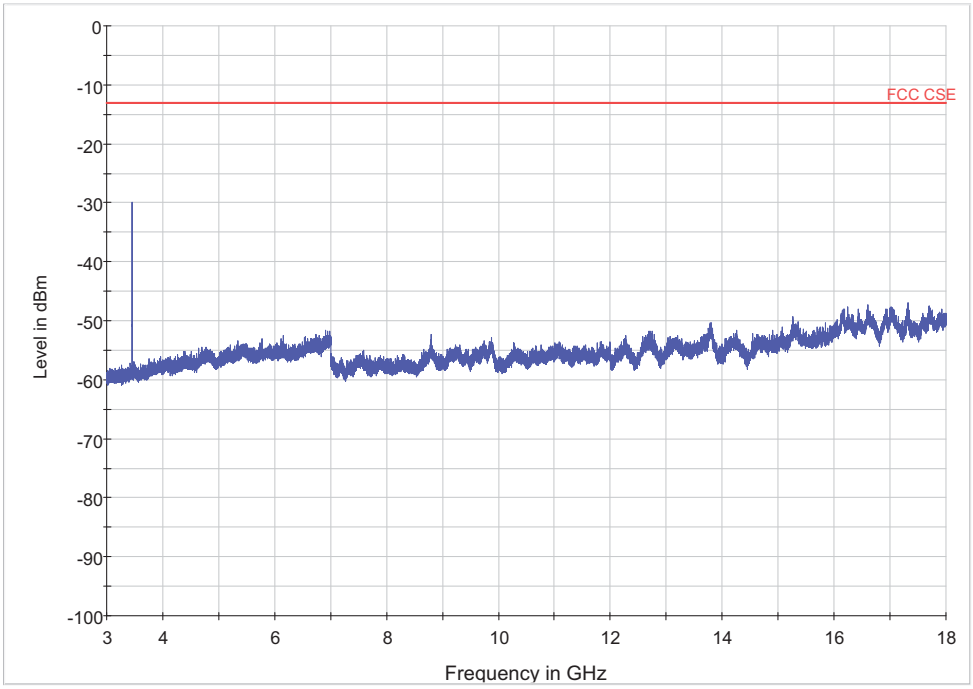
Harmonic	TX ch. 20025 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3421.5	-32.56	-13	19.56

LTE Band 4 QPSK Bandwidth = 15MHz CH20175,RB 1



Note: The signal beyond the limit is carrier.

LTE Band 4 20175 Channel 30MHz~3GHz



LTE Band 4 20175 Channel 3GHz~18GHz

Harmonic	TX ch. 20175 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3451.9	-29.87	-13	16.87